



12 Frederick Street, St Leonards - North Shore Health Hub  
Environmental Impact Statement  
Transport Impact Assessment

**Client //** Dexus Projects  
**Office //** NSW  
**Reference //** 16S9001000  
**Date //** 08/02/18

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Issue: A 08/02/18

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GTA Consultants Office: NSW

### Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
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# 1. Introduction

## 1.1 Background

Dexus Projects is proposing to develop the North Shore Health Hub at 12 Frederick Street in St Leonards. Included in this development is the construction of two towers, known as Tower A and Tower B, as well as a two-storey podium.

A State Significant Development Application (SSDA) was lodged with the Department of Planning & Environment (DPE) for Tower A and podium (SSD 7543) in early 2017. In mid-2017, a staged SSDA was lodged for the concept proposal for Tower B (SSD 8499) which would include ancillary medical and health uses such as medical specialist suites and associated allied health. These uses would support the proposed private hospital in Tower A. Tower B is situated on the northern and eastern sides of the two-storey podium of the proposed private hospital (Tower A and podium, SSD 7543).

Subsequent to the lodgement of SSD 7543 and 8499, refinements have been made to Tower B. It is understood that a Stage 2 Development Application (DA) is now to be lodged for Tower B which includes a proposal for detailed design, construction and use of Tower B for hospital and ancillary health uses.

GTA Consultants (GTA) was commissioned in November 2017 by Dexus Projects to undertake a transport impact assessment for the refined proposed Tower B proposal, in support of the Stage 2 DA.

## 1.2 Secretary's Environmental Assessment Requirements

The Department of Planning and Environment (DPE) has issued the Secretary's Environmental Assessment Requirements (SEARs) on 1 December 2017, which includes a requirement for a transport and accessibility assessment, which details the traffic and transport impacts of the proposal, specifically including those discussed in Table 1.1.

**Table 1.1: Secretary's Environmental Assessment Requirements**

Requirements	Report Section
Accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development.	Refer to Section 2.
An assessment of the operation of existing and future transport networks including the bus network and their ability to accommodate the forecast number of trips to and from the development.	Existing transport network operation is addressed in Section 2. Future transport network operation is addressed in Section 5.
Details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips.	Refer to Section 5.
The adequacy of public transport, pedestrian and bicycle networks and infrastructure to meet the likely future demand of the proposed development.	Refer to Section 5.4.
The impact of the proposed development on existing and future public transport infrastructure within the vicinity of the site in consultation with Roads and Maritime Services and Transport for NSW and identify measures to integrate the development with the transport network.	Refer to Section 5.4 and 5.5.

Requirements	Report Section
Details of any upgrading or road improvement works required to accommodate the proposed development.	Refer to Section 5.3.
Details of travel demand management measures to encourage sustainable travel choices and details of programs for implementation.	Refer to Section 6. It is expected that the development consent would include a condition for a green travel plan to be prepared prior to the occupation of the development, to promote sustainable travel to and from the site. A framework for this green travel plan is provided in Section 6.
The impact of trips generated by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvement works, if required (note: traffic modelling is to be undertaken with scope to be agreed by TfNSW and RMS in advance).	Refer to Section 5.3. Comments on the traffic modelling scope were received in response to the concept proposal for Tower B (SSD 8499).
The proposed active transport access arrangements and connections to public transport services.	Refer to Section 2.6, Section 4.2 and Section 5.4.
The proposed access arrangements, including car and bus pick-up/ drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones.	Refer to Section 3.2 and Section 5. It is noted that no on-site bus pick-up/ drop-off facilities are proposed or required.
Measures to maintain road and personal safety in line with CPTED principles.	Road safety associated with the site access points is discussed in Section 3.2. Personal/ pedestrian safety is discussed in Section 3.4.
The proposed car and bicycle parking provision, including end-of-trip facilities, which must be taken into consideration of the availability of public transport and the requirements of Council's relevant parking codes and Australian Standards.	Refer to Section 4.
Proposed bicycle parking facilities in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance.	Refer to Section 4.2.
Details of the proposed number of car parking spaces and compliance with appropriate parking codes and justify the level of car parking provided on-site.	Refer to Section 4.1.
Details of emergency vehicle access arrangements.	Ambulances would use the porte cochere/ pick-up/ drop-off facilities if required, while fire appliances would access the boosters on Westbourne Street and/or operate from the perimeter of the site. No Emergency Department facilities are proposed as part of the development.
An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures.	Road safety associated with the site access points is discussed in Section 3.2. Personal/ pedestrian safety is discussed in Section 3.4.
Service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times);	Refer to Section 3.2 and Section 3.3. Specific service requirements (including type, frequency and timing) would be tenant-specific and therefore not yet known.

Requirements	Report Section
<p>In relation to construction traffic:</p> <ul style="list-style-type: none"> <li>o assessment of cumulative impacts associated with other construction activities;</li> <li>o an assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity;</li> <li>o details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process;</li> <li>o details of anticipated peak hour and daily construction vehicle movements to and from the site;</li> <li>o details of access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle;</li> <li>o details of temporary cycling and pedestrian access during construction;</li> <li>o details of proposed construction vehicle access arrangements at all stages of construction; and</li> <li>o traffic and transport impacts during construction, including cumulative impacts associated with other construction activities, and how these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport, including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact (which must include vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures for all demolition/construction activities).</li> </ul>	<p>A preliminary Construction Traffic Management Plan was prepared as part of the Tower A proposal (SSD 7543). It is anticipated that construction vehicle movements would be in the order of 50 per cent higher for the concurrent construction of Tower A and Tower B.</p> <p>The Construction Traffic Management Plan would be updated and refined once a contractor has been appointed and further construction staging and timing specifics are known. This would include consultation with Transport for NSW, Roads and Maritime Services and Council as appropriate.</p>

### 1.3 References

In preparing this report, reference has been made to the following:

- o an inspection of the site and its surrounds
- o Willoughby City Council Development Control Plan (DCP)
- o Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/NZS 2890.1:2004
- o Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2002
- o Australian Standard/ New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009
- o traffic and car parking surveys undertaken as referenced in the context of this report
- o plans for the proposed development prepared by Billard Leece Partnership
- o other documents and data as referenced in this report.

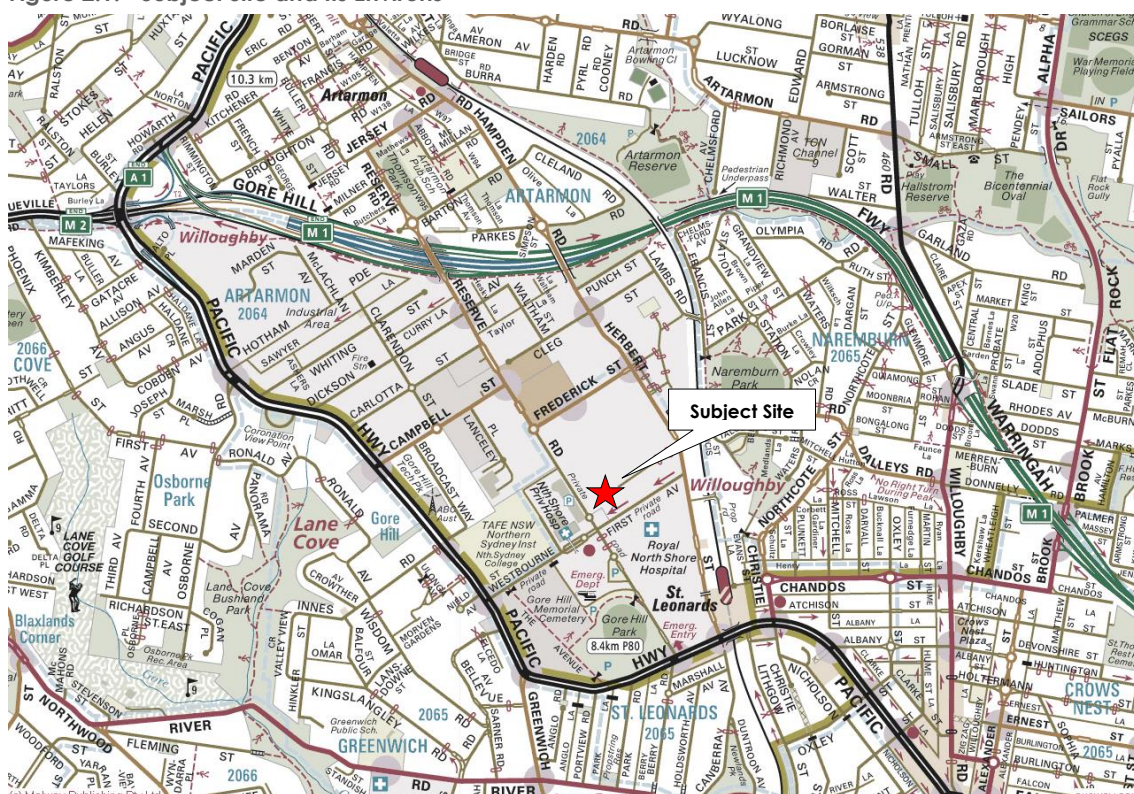
## 2. Existing Conditions

### 2.1 Site Description

The subject site is located at 12 Frederick Street, St Leonards, east of the North Shore Private Hospital, and is generally bounded by Frederick Street, Reserve Road and Westbourne Street along the northern, western and southern boundary respectively.

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

Figure 2.1: Subject Site and Its Environs



(Reproduced with permission from Sydway Publishing Pty Ltd)

The subject site is currently occupied by a commercial/industrial building with a combined floor area of approximately 15,000m<sup>2</sup>.

Land uses in the vicinity of the subject site are predominately health infrastructure facilities, notably the Royal North Shore Hospital and North Shore Private Hospital to the south and west of the site respectively. Other land uses in the vicinity generally consist of general and light industrial uses.

### 2.2 Road Network

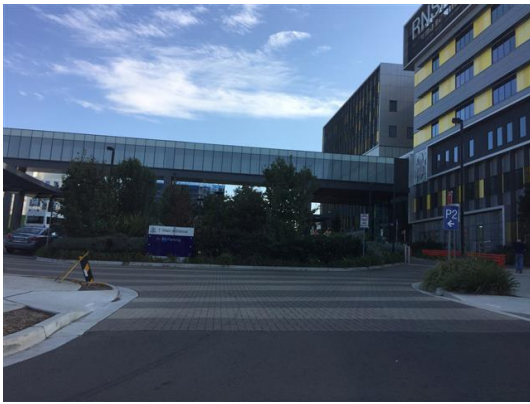
The subject site is surrounded by a network of roads and has a frontage along Reserve Road, Westbourne Street and Frederick Street to the western, southern and northern boundary, respectively. Below is a description of these roads.

## Reserve Road

Reserve Road functions as a two-way collector road between Frederick Street and Jersey Road and is generally aligned in a north-south direction. It is a private road between Frederick Street and Pacific Highway with a posted speed limit of 20 km/h, providing the linkage from Pacific Highway to the Royal North Shore Hospital

No through traffic is permitted to travel via Reserve Road past the roundabout near Westbourne Street. A "restricted staff" parking area relating to the North Shore Hospital is provided past this point. It is noted that southbound vehicles are also not permitted to continue past the restricted staff parking area from the northern end of Reserve Road, as shown in Figure 2.3.

**Figure 2.2: Reserve Road / Westbourne Street roundabout (looking north)**



**Figure 2.3: Reserve Road (looking south)**



## Westbourne Street

Westbourne Street functions as a two-way private road and is generally aligned in an east-west direction. 90 degree parking is made available on the north side of the road, accommodating for up to approximately 75 spaces. This road provides linkage between Herbert Street and Reserve Road with a pedestrian crossing provided on both ends of Westbourne Street.

**Figure 2.4: Westbourne Street (looking west)**



## Frederick Street

Frederick Street functions as a two-way collector road and aligns in an east-west direction to the northern boundary of the site. Kerbside parking is permitted on both sides of the road and is generally well-utilised based on site observations. Vehicle access to the subject site is provided directly off Frederick Street via the existing driveway, as shown in Figure 2.6.

Figure 2.5: 12 Frederick Street (subject site)



Figure 2.6: Frederick Street (looking towards the internal access road)



## 2.2.1 Surrounding Intersections

The following intersections currently exist in the vicinity of the site:

- Campbell Street / Pacific Highway (signalised)
- Herbert Street / Cleg Street (signalised)
- Herbert Street / Frederick Street (signalised)
- Herbert Street / Pacific Highway (signalised)
- Herbert Street / Westbourne Street (unsignalised)
- Reserve Road / Campbell Street (signalised)
- Reserve Road / Frederick Street (unsignalised).

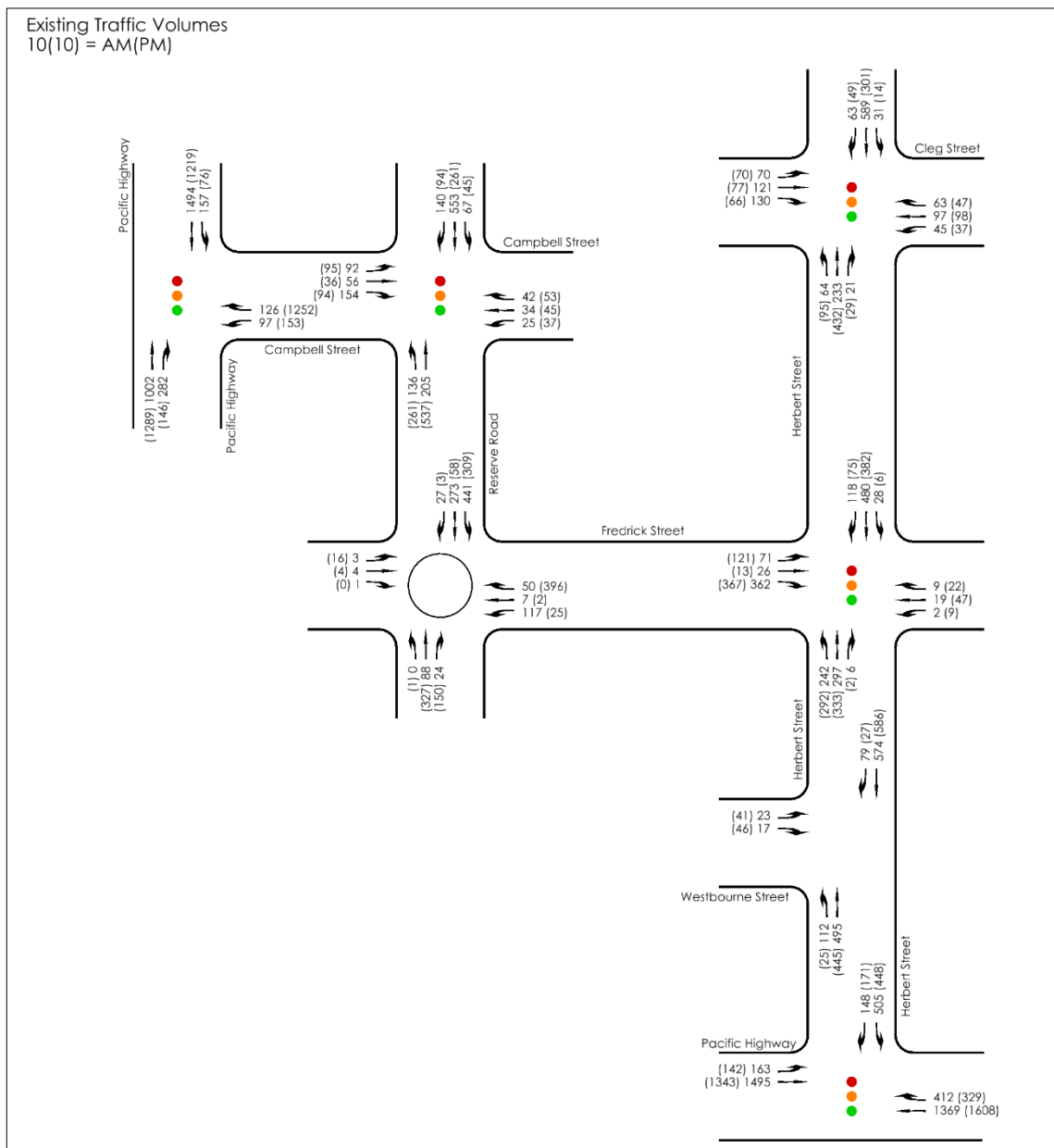
## 2.3 Traffic Volumes

GTA Consultants commissioned traffic movement counts on abovementioned seven (7) intersections on a normal weekday during the following peak periods:

- 7:00am and 9:00am (morning peak)
- 4:00pm and 6:00pm (evening peak).

The AM and PM peak hour traffic volumes are summarised in Figure 2.7.

**Figure 2.7: Existing AM/ PM Peak Hour Traffic Volumes**



## 2.4 Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION<sup>1</sup>, a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the Roads and Maritime Services, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.1 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

<sup>1</sup> Program used under license from Akcelik & Associates Pty Ltd.

**Table 2.1: SIDRA INTERSECTION Level of Service Criteria**

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
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	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

In terms of the intersection analysis results reported, the following typical approach is adopted for the purposes of documenting intersection performance:

- Signalised Intersections – The overall intersection performance is recorded
- Unsignalised intersections – The worst leg of the intersection is recorded.

### 2.4.1 Pre-Development Analysis

An intersection analysis of the nominated study intersections has been conducted for the existing conditions. Table 2.2 presents a summary of the existing operation of the intersection, with full results presented in Appendix A of this report. It is noted that these results may vary slightly from previous analysis by GTA Consultants as the latest software version has been adopted.

**Table 2.2: Existing Operating Conditions**

Intersection	Priority Type	Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Campbell St/ Pacific Hwy	Signalised	AM	0.87	20	165	B
		PM	0.55	16	103	B
Herbert St/ Cleg St	Signalised	AM	0.83	14	74	A
		PM	0.47	11	33	A
Herbert St/ Frederick St	Signalised	AM	0.90	28	136	B
		PM	0.87	24	109	B
Herbert St/ Pacific Hwy	Signalised	AM	0.76	28	198	B
		PM	0.74	27	181	B
Herbert St/ Westbourne St	Give way	AM	0.69	4	79	A
		PM	0.62	3	53	A
Reserve Rd/ Campbell St	Signalised	AM	0.83	23	147	B
		PM	0.9	30	114	C
Reserve Rd/ Frederick St	Roundabout	AM	0.51	7	31	A
		PM	0.53	8	34	A

Based on the above assessment, the nominated study intersections currently operate satisfactorily at a Level of Service of C or better.



Notwithstanding this, the Hillsbus also operates four routes via St Leonards, providing linkage to Rouse Hill, Riley T-way, Dural and West Pennant Hills.

Overall, high frequency public transport services are provided in the vicinity of the subject site. Additionally, Council operates a free shuttle bus within the Artarmon area, providing linkage through St Leonards Station to the Artarmon industrial area. This service encourages the use of public transport for staff and visitors to the area, notably for hospital staff.

## 2.7 Pedestrian and Cycling Infrastructure

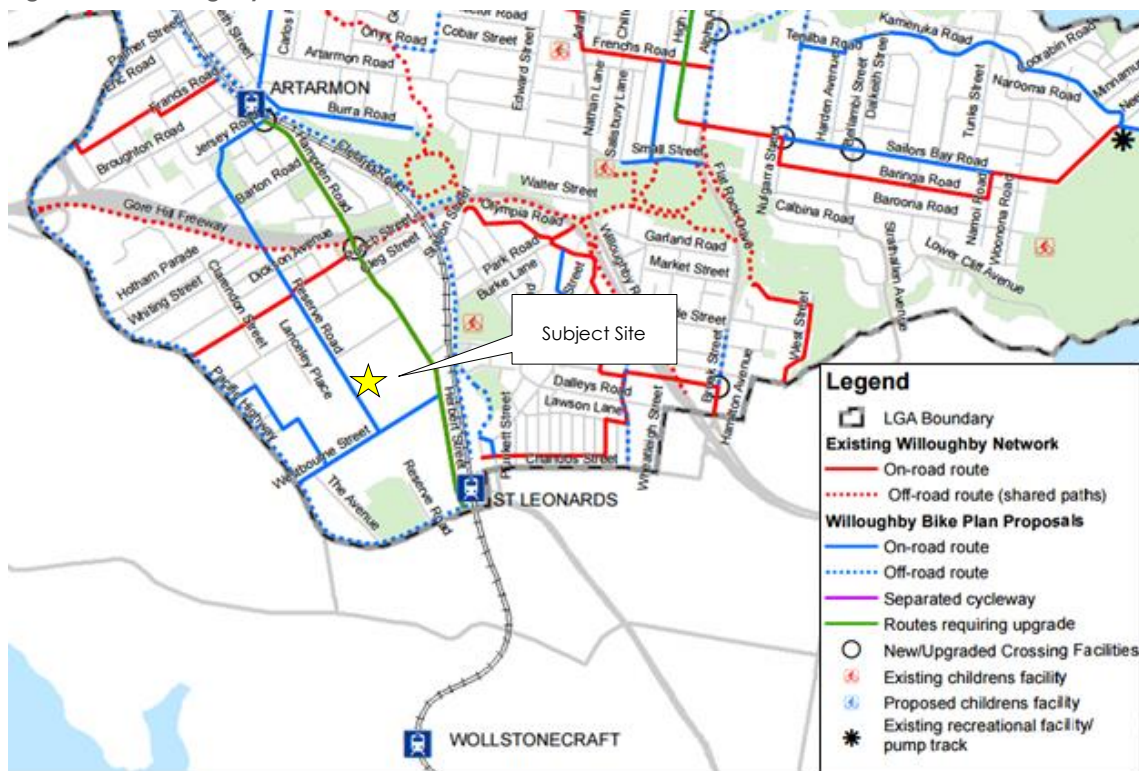
In the immediate vicinity of the site, pedestrian paths are located as follows:

- Frederick Street (both sides) – 1.5-3.5m wide path, providing access to the retail and commercial uses in the vicinity of the site
- Westbourne Street (both sides) – 1.5-3.0m wide path, providing linkage to the Royal North Shore and North Shore Private Hospitals and to the TAFE NSW St Leonards Campus
- Reserve Road (both sides) – 1.5-2.0m wide path, predominately providing access to the Royal North Shore Hospital and other local points of interest including bus stops.

In addition, it is noted that there are several pedestrian crossings currently installed along Westbourne Street, near the intersection with Reserve Road, providing pedestrians with right of way at these locations.

Further, there are currently limited cycle routes made available in the vicinity of the site. However, as part of Willoughby City Council's Bike Plan, several new cycle routes are proposed to be implemented in the near future. An extract of Council's proposed bike network is shown in Figure 2.9.

Figure 2.9: Willoughby Bike Plan



Source: Willoughby City Council –Proposed Bike Network 2012 (extract)

## 3. Development Proposal

### 3.1 Proposal Description

The project involves the construction of a new tower, known as Tower B, situated on the northern and eastern sides of the 2-storey podium of the proposed Tower A (SSD 7543) on the site. Together the towers comprise of the proposed North Shore Health Hub, which is intended to provide a range of complementary medical services associated with the existing St Leonards Health and education precinct. Proposed Tower B will:

- be six storeys in height with a maximum RL (inclusive of lift overrun)
- have a gross floor area (GFA) of 7,000m<sup>2</sup> (equivalent to FSR of 1.1:1)
- comprise health and medical purposes associated with the proposed health hub and ancillary to Royal North Shore Hospital and North Shore Private Hospital, including medical specialist suites and associated allied health uses.

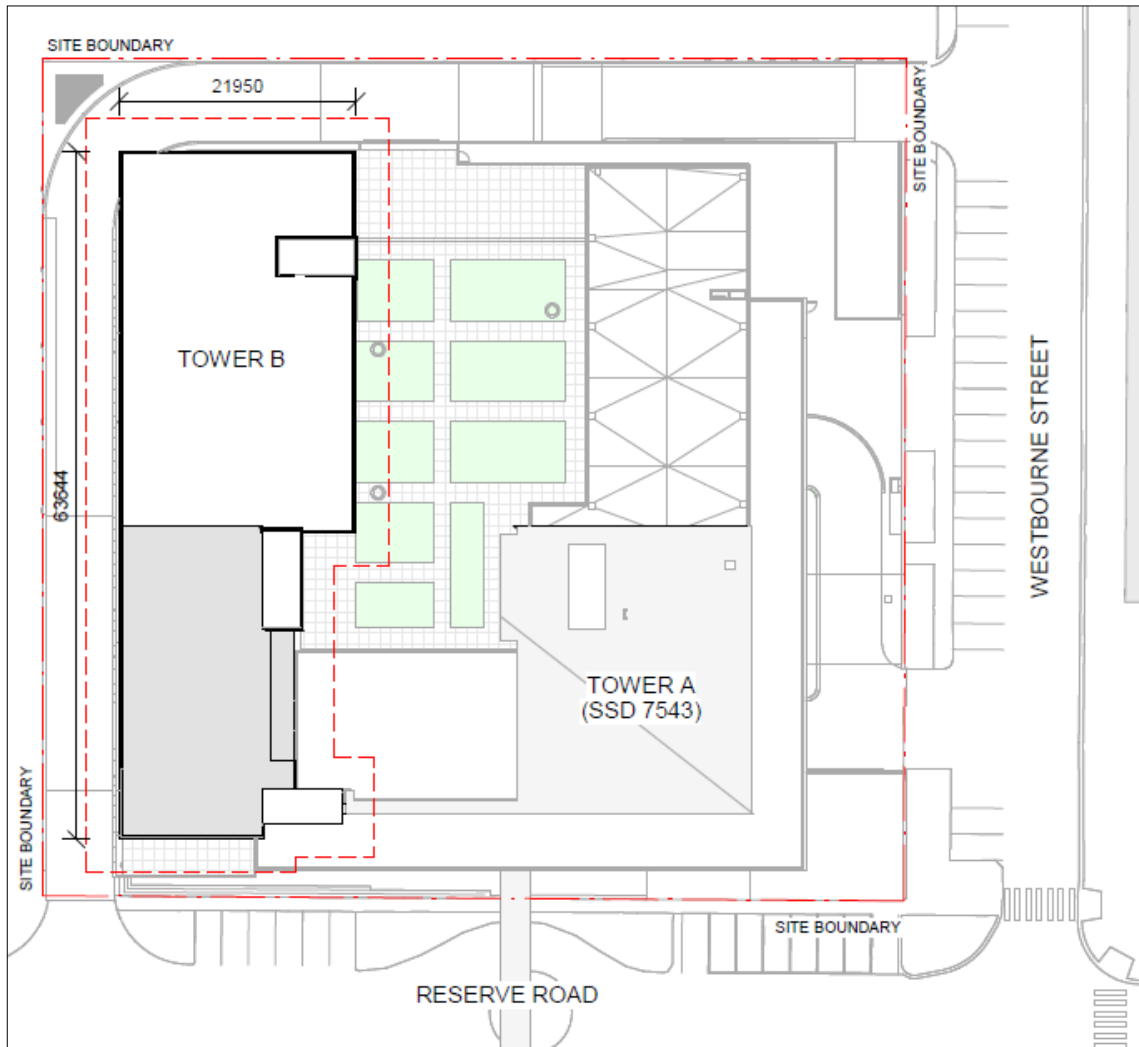
Roads and Maritime Services and the Willoughby Development Control Plan 2016 sets out definitions for different uses within a development as part of assessing transport and parking requirements. Based on the current architectural plans and area schedules for both Towers A and B, the following indicative classification and quantity of uses have been assumed for this transport impact assessment:

- 82 medical consulting suites, 46 hospital beds and 610m<sup>2</sup> of retail space within Tower A and podium
- 76 medical consulting suites within Tower B.

The proposed site layout is shown in Figure 3.1.

Vehicle access and parking for Tower B would be provided as part of the Tower A proposal (SSD 7543), with additional basement parking provided to service Tower B.

Figure 3.1: Proposed Site Layout



Source: Billard Leece Partnership

### 3.2 Vehicle Access and Circulation

Currently, vehicle access to the site is provided from the internal private access road via the existing driveway from Frederick Street. As part of the proposed Tower A and podium, three new vehicular crossovers would be provided; two on Westbourne Street and one on Reserve Road. All crossovers have appropriate parking set-backs in order to accommodate vehicle swept paths and maintain appropriate sight lines and associated road safety outcomes.

A new 7.6m wide two-way vehicular crossover is proposed from Westbourne Street, near the south-east corner of the site, providing vehicular access to the basement car parking and loading area. The driveway located on Reserve Road in the north-west of the site is also proposed to act as an entry and exit point for the loading dock and basement car parking.

Swept path assessment shows that the Westbourne Street driveway access and ramp would appropriately facilitate service vehicle access and egress, however the use of the Reserve Road driveway access for service vehicle entry (one-way loop) would reduce the likelihood of conflict between service vehicles entering and exiting the loading dock area. This could be addressed through a loading dock management plan.

In addition, a porte cochere/ pick-up and drop-off area is proposed adjacent to the main entry near the southern boundary along Westbourne Street. Vehicle access to the pick-up/ drop-off area is proposed via a new 9.0m wide vehicular crossover from Westbourne Street at the south-west corner of the site. Tower A, Tower B and the podium are expected to all utilise this pick-up and drop-off area and associated driveway crossover.

Swept path assessment shows that the access arrangements for cars and service vehicles are generally acceptable, subject to some minor modifications as part of the detailed design process and refinement of structure. Vehicle queuing at the car park access control point (boom gates) from Westbourne Street could temporarily obstruct access to the loading dock, however there is unlikely to be any significant service vehicle activity during AM and PM peak periods. This could also be suitably addressed in a loading dock management plan. Relevant swept paths are shown in Appendix B.

### 3.3 Loading Areas

There is a single loading bay proposed within basement level B1, able to accommodate up to 12.5m long Heavy Rigid Vehicles (HRVs). For forward-in and forward-out access can be accommodated with the provision of a turntable to assist manoeuvring of vehicles larger than an 8.8m Medium Rigid Vehicle (MRV). Relevant swept paths are shown in Appendix B, noting that the loading area forms part of the Tower A proposal. All loading and service vehicle facilities would be constructed in accordance with the relevant Australian Standard (AS2890.2:2002).

In addition to the above, one to two smaller service/ courier vehicles (e.g. vans or utes) could be accommodated within the loading dock area. Parking spaces within the car park could also be dedicated for specific smaller service vehicle activity, depending on tenant requirements (e.g. pathology courier vehicles).

Roads and Maritime provides guidance on provision of loading bays for services vehicles within *Guide to Traffic Generating Developments* (Roads and Maritime, 2002). For a commercial premises with less than 20,000m<sup>2</sup> GFA, the minimum requirements are one space per 4,000m<sup>2</sup> GFA. Based on the proposed development (8,721m<sup>2</sup>), a minimum of three loading bays should be provided. Given that a single loading bay has been provided, a dock management plan with an appropriate booking/ scheduling system would be required.

Additionally, it is anticipated that waste collection activities would be undertaken on-site within the dedicated loading area. It is proposed that given the separation of waste uses (i.e. clean and soiled linen, sharps and gas bottles) within the loading dock area and ability to schedule waste collection, it would be feasible to accommodate loading and service vehicle access for Tower A, Tower B and podium in the same loading area. As such, with appropriate dock management to address the timing of vehicle deliveries and interaction with car park operation, the loading area will be able to adequately service the development.

### 3.4 Pedestrian and Bicycle Access

As discussed in Section 2.7, footpaths are available along Reserve Road and Westbourne Street which would provide appropriate pedestrian access to the development. Further connections with generally good passive surveillance are also available through Royal North Shore Hospital, with a covered walkway adjacent to the acute services building and footpath to the Herbert Street pedestrian overbridge (which connects to St Leonards Railway Station).

The existing footpaths in the vicinity of the site are well used and are generally well lit, servicing the 24-hour operation of the hospital precinct. This achieves appropriate Crime Prevention through Environmental Design (CPTED) outcomes for the proposed development. The proposed main entrance and forecourt area is open and would be well lit, with CCTV monitoring, thereby also achieving appropriate CPTED outcomes.

As seen in Figure 2.9, the Willoughby Bike Plan shows proposed upgrades along Westbourne Street and Reserve Road, especially towards the north of the site. Herbert Street currently has bicycle shoulder lanes in both directions.

## 4. Car Parking

### 4.1 Car Parking Requirements

The car parking requirements for different development types are set out in the Willoughby City Council DCP 2016. Car parking requirements for the proposal are summarised in Table 4.1.

While the WDCP land use of Health Consulting Rooms is closest to the proposed medical consulting suites, the definition of this is “premises comprising one or more rooms within a dwelling house”. As such, the Medical Centre land use has been used to calculate parking requirements, noting that there are very similar requirements for the two WDCP land uses.

**Table 4.1: Willoughby DCP 2016 Parking Requirements**

DCP Land Use	Type	Size	WDCP Parking Rate	WDCP Parking Requirement
<b>Tower A and Podium</b>				
Medical Centre	Staff Parking	<ul style="list-style-type: none"> <li>○ 82 medical professionals</li> <li>○ 28 support staff</li> </ul>	<ul style="list-style-type: none"> <li>○ 1 space per health care professional</li> <li>○ 1 space per 2 other employees</li> </ul>	96 spaces
	Patient Parking	<ul style="list-style-type: none"> <li>○ 82 medical professionals</li> </ul>	<ul style="list-style-type: none"> <li>○ 1 space per health care professional</li> </ul>	82 spaces
Private Hospital	Staff Parking	<ul style="list-style-type: none"> <li>○ 5 medical officers</li> <li>○ 32 support staff</li> <li>○ 46 beds</li> </ul>	<ul style="list-style-type: none"> <li>○ 1 space per medical officer</li> <li>○ 1 space per 2 other employees</li> </ul>	24 spaces
	Patient Parking	<ul style="list-style-type: none"> <li>○ 46 beds</li> </ul>	<ul style="list-style-type: none"> <li>○ 1 space per 3 visitors</li> </ul>	12 spaces
Retail	-	<ul style="list-style-type: none"> <li>○ 610 sq.m GFA</li> </ul>	<ul style="list-style-type: none"> <li>○ 1 space per 25 sq.m GFA</li> </ul>	24 spaces
Sub-total				238 spaces
<b>Tower B</b>				
Medical Centre	Staff Parking	<ul style="list-style-type: none"> <li>○ 76 medical professionals</li> <li>○ 25 support staff</li> </ul>	<ul style="list-style-type: none"> <li>○ 1 space per health care professional</li> <li>○ 1 space per 2 other employees</li> </ul>	89 spaces
	Patient Parking	<ul style="list-style-type: none"> <li>○ 76 medical professionals</li> </ul>	<ul style="list-style-type: none"> <li>○ 1 space per health care professional</li> </ul>	76 spaces
Sub-total				165 spaces
<b>Total</b>				<b>403 spaces</b>

It is noted that 2011 Census Journey to Work data for persons employed in the relevant Travel Zone indicates that approximately 58 per cent of employees travel by private vehicle. It is understood that leasing discussion for the proposed development indicates that the likely take-up of parking for medical professionals is going to be significantly less than one space per health care professional. Adopting the Journey to Work private car mode split of 58 per cent for the

medical suites component of the development would reduce the parking requirement by 63 spaces.

Given the ancillary nature of the retail uses proposed, other than a minor potential tenant allocation (which can be accommodated within the overall parking supply), this floorspace would not generate additional parking demand. As such, the retail should be excluded from the parking calculations, resulting in a total on-site parking requirement (including the above reduction of 63 spaces) of **316 spaces**. Based on this reduction, the parking requirements for Tower A and Tower B would be **181 spaces** and **135 spaces** respectively.

As a comparison with the neighbouring North Sydney DCP 2013, a St Leonards medical centre land use would have parking requirement of one space per 400m<sup>2</sup> and a hospital land use would have a parking requirement of one space per six beds and one space per four staff. Based on an approximate floor area of 11,100m<sup>2</sup> for the medical suites (in addition to the above data, excluding retail), the proposed development would have a total parking requirement of 45 spaces. It is not proposed to adopt this number, however there is a clear justification for reducing parking supply on the basis of the available public transport, existing travel patterns and the relevant parking controls that apply to part of the St Leonards area.

In addition, the proposed development would incur a loss of 24 on-street parking spaces on Reserve Road and Westbourne Street due to driveway access placement. It is proposed that this loss in on-street parking is provided within the development thus resulting in a requirement of **340 parking spaces**. The nature of the current on-street parking along Reserve Road and Westbourne Street is paid parking. Therefore, this replacement in parking provision would be effectively like-for-like in nature, assuming that car park pricing is consistent with the existing Royal North Shore Hospital multi-storey car parks and/or the existing on-street parking. As such, the publicly accessible component of the proposed on-site car parking would effectively form part of the broader parking supply for the health precinct.

The architectural plans for Tower A (SSD 7543) currently indicate a supply of approximately 360 car parking spaces across basement levels B1 to B5, which meets the above requirement of 340 spaces for both Towers A and B, noting that parking and access would be provided as part of the Tower A proposal (as previously discussed). All car parking would be constructed in accordance with the relevant Australian Standards (AS2890.1:2004 and AS2890.6:2009).

## 4.2 Bicycle Parking

Bicycle parking for hospitals is not specified in the Willoughby DCP 2006. As such, reference to the Planning Guidelines for Walking and Cycling (NSW Government, 2004) and Cycling Aspects of Austroads Guides (Austroads, 2017) have been made which sets out recommendations for bicycle parking on relevant land uses. This has been assessed and summarised in Table 4.2.

**Table 4.2: Bicycle Parking Requirements**

Use	Size	Bicycle Parking Rate	Bicycle Parking Requirement
Medical Centre <sup>[1]</sup>	<ul style="list-style-type: none"> <li>○ 158 medical professionals</li> <li>○ 53 support staff</li> </ul>	<ul style="list-style-type: none"> <li>○ 1 space per 20 medical professionals for employees</li> <li>○ 1 space per 20 staff (including medical professionals) for visitors</li> </ul>	<ul style="list-style-type: none"> <li>○ 8 bicycle lockers</li> <li>○ 11 bicycle rails/ racks</li> </ul>
Hospital <sup>[2]</sup>	<ul style="list-style-type: none"> <li>○ 46 beds</li> <li>○ 37 staff</li> </ul>	<ul style="list-style-type: none"> <li>○ 1 space per 15 beds for employees</li> <li>○ 1 space per 30 beds for visitors</li> </ul>	<ul style="list-style-type: none"> <li>○ 4 bicycle lockers</li> <li>○ 2 bicycle rails/ racks</li> </ul>
<b>Total</b>			<b>12 bicycle lockers 13 bicycle rails/ racks</b>

[1] rates based on Planning Guidelines for Walking and Cycling (NSW Government, 2004)

[2] rates based on Cycling Aspects of Austroads Guides, Appendix I (Austroads, 2017)

Based on the above requirements and in-line with AS2890.3-2015, a total of 12 bicycle lockers or similar secure storage facility would be required for employee use, with a further 13 bicycles accommodated by rails or racks in a publicly accessible location for visitor use. DCP 2006 requires that shower and change facilities be provided where there are three or more bicycle lockers provided.

The architectural plans for Tower A (SSD 7543) currently indicate a proposed supply of 22 bicycle racks within basement level B1. Whilst not a secure enclosure, the basement entry and bicycle parking location between elevator lobbies (with likely CCTV monitoring and closed roller shutters out of hours) would provide adequate security, noting that basement car parks are considered a secure enclosure within the Planning Guidelines for Walking and Cycling (NSW Government, 2004).

End of trip facilities are also proposed for the development and located in the immediate vicinity of the basement level bicycle parking. Other shower and change facilities are also likely to be provided within tenancies.

On the above basis, the proposed bicycle parking would be adequate for the identified staff and visitor requirements, noting that additional at-grade visitor bicycle parking in the vicinity of the main entrance would be investigated during detailed design.

### 4.3 Motorcycle Parking

Motorcycle parking requirements for different developments are set out in Willoughby DCP 2016 at a rate of one motorcycle parking space per 25 car parking spaces. Based on this requirement and the approximately 360 space car parking supply, the development would require 15 motorcycle parking spaces. The architectural plans for Tower A (SSD 7543) show a total of 20 motorcycle spaces across basement levels B2 to B4. As such, the proposed supply of motorcycle parking spaces is adequate for the proposed development.

## 5. Transport Impact Assessment

### 5.1 Traffic Generation

The cumulative traffic generation for both the Tower A and Tower B proposals has been assessed based on the following indicative classification and quantity of uses, as discussed in Section 3.1:

- Tower A - 46 hospital beds with 37 staff members
- Tower A - 82 medical consulting rooms
- Tower B - 76 medical consulting rooms.

On the above basis, the traffic generation of the development has been summarised in Table 5.1, with trip rates estimated from surveys of comparable facilities as follows:

- Medical centre rates based on six survey sites within the Sydney region with similar public transport characteristics to St Leonards.
- Hospital rates based on surveys of several urban hospitals, including Royal North Shore, Westmead, Concord Repatriation, Wollongong, Randwick, Nepean, Liverpool and Royal Prince Alfred.

**Table 5.1: Traffic Generation Estimates**

Use	Size	Trip Rate	Morning Peak	Evening Peak
Medical Centre	158 medical consulting rooms	<ul style="list-style-type: none"> <li>○ 1.4 trips per room in the AM peak</li> <li>○ 1.7 trips per room in the PM peak</li> </ul>	219 vehicle trips	271 vehicle trips
Private Hospital	46 hospital beds 37 day staff members	<ul style="list-style-type: none"> <li>○ In the AM peak, 0.34 trips per staff member plus 0.32 trips per bed</li> <li>○ In the PM peak, 0.39 trips per staff member plus 0.33 trips per bed</li> </ul>	27 vehicle trips	30 vehicle trips
<b>Total</b>			<b>246 vehicle trips</b>	<b>301 vehicle trips</b>

Based on the trip generation estimates, the cumulative traffic generation of Tower A, Tower B and the two-storey podium would be 246 and 301 vehicle movements in the AM and PM peaks respectively. This equates to approximately four and five vehicles per minute.

As with the parking requirements, it is assumed that the retail component of the development would not generate any additional trips as these facilities would be ancillary to the hospital and medical consulting suites and therefore not attracting specific retail-only trips.

### 5.2 Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

- i configuration of the arterial road network in the immediate vicinity of the site
- ii existing operation of intersections providing access between the local and arterial road network
- iii distribution of households in the vicinity of the site
- iv configuration of access points to the site.

Having consideration for the above, for the purposes of estimating vehicle movements, the following directional distributions have been assumed:

- Pacific Highway/ Herbert Street (south) 40%
- Herbert Street (north) 40%
- Campbell Street/ Reserve Road/ Frederick Street/ Herbert Street (inbound) or Campbell Street/ Reserve Road (outbound) 20%.

The existing boom gate on reserve road at the northern end of the Royal North Shore Hospital multi-storey car park would be maintained by the proposed development. This permits northbound through traffic movements only on Reserve Road, accessing Frederick Street.

The following inbound/ outbound splits have been adopted for the medical centre and hospital uses, based on the trip generation data analysed (see Section 5.1):

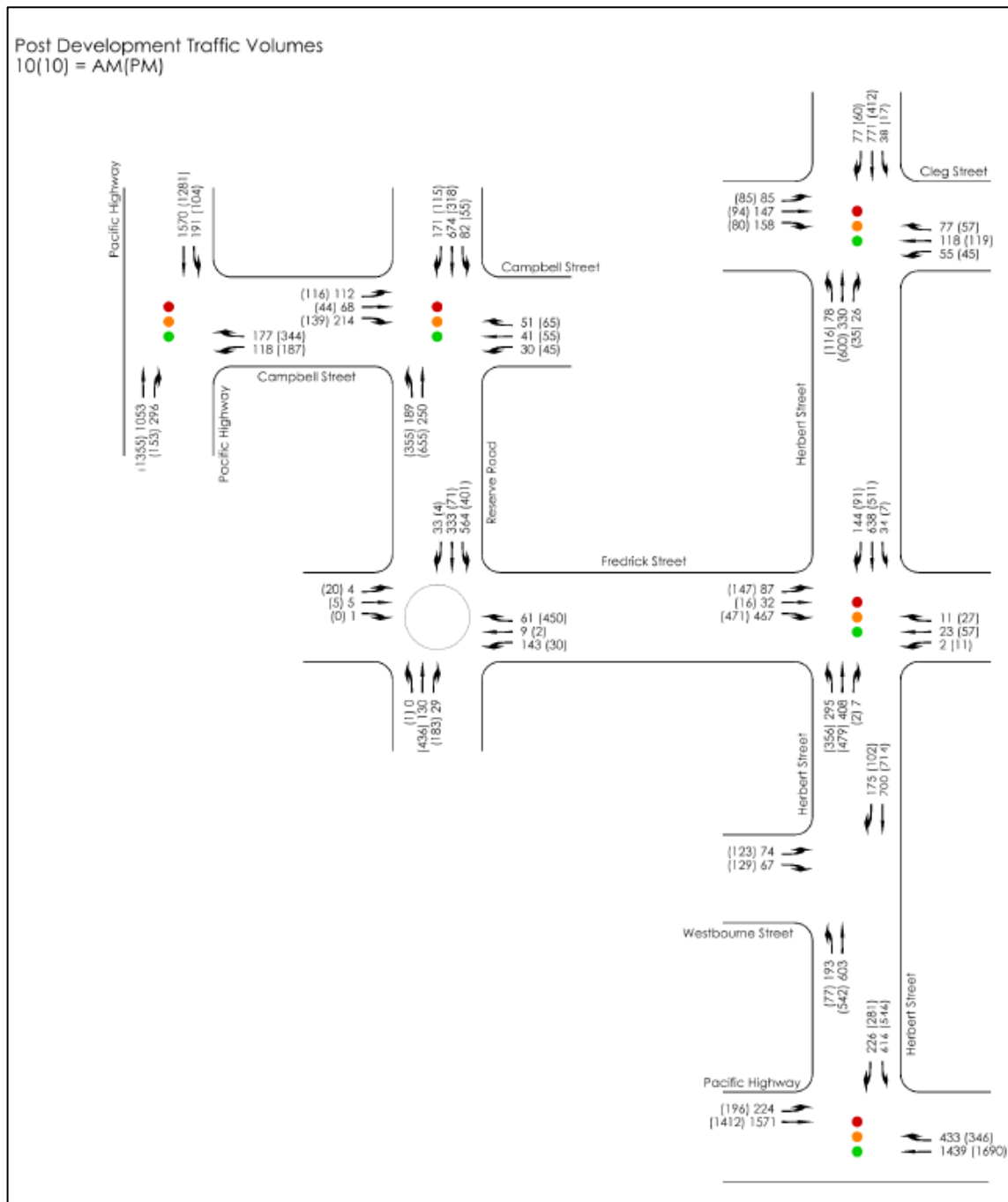
- Medical centre – 49%:51% in the AM peak and 42%:58% in the PM peak
- Private Hospital – 90%:10% in the AM peak and 15%:85% in the PM peak.

Notwithstanding the above, it is noted that a small portion of vehicles may potentially travel via Westbourne Street from Pacific Highway (i.e. impacting upon the Westbourne Street/ Reserve Road intersection). However, this route is not expected to generate high usage due to the “Left Turn Only” restrictions at the Westbourne Street/ Reserve Road intersection for eastbound vehicles, as well as the general Westbourne Street layout and signage. Thus, any traffic associated with the development travelling via the Westbourne Street/ Reserve Road intersection would be low, with negligible impacts and could not be expected to result in any operational or safety issues at this intersection, given the low to moderate existing traffic volumes.

It is also noted that the Pacific Highway/ Reserve Road intersection has not been assessed as the road link between Westbourne Street and the Royal North Shore Hospital main entrance is a once-way low speed connection that is not likely to be used by staff and visitors or the proposed development.

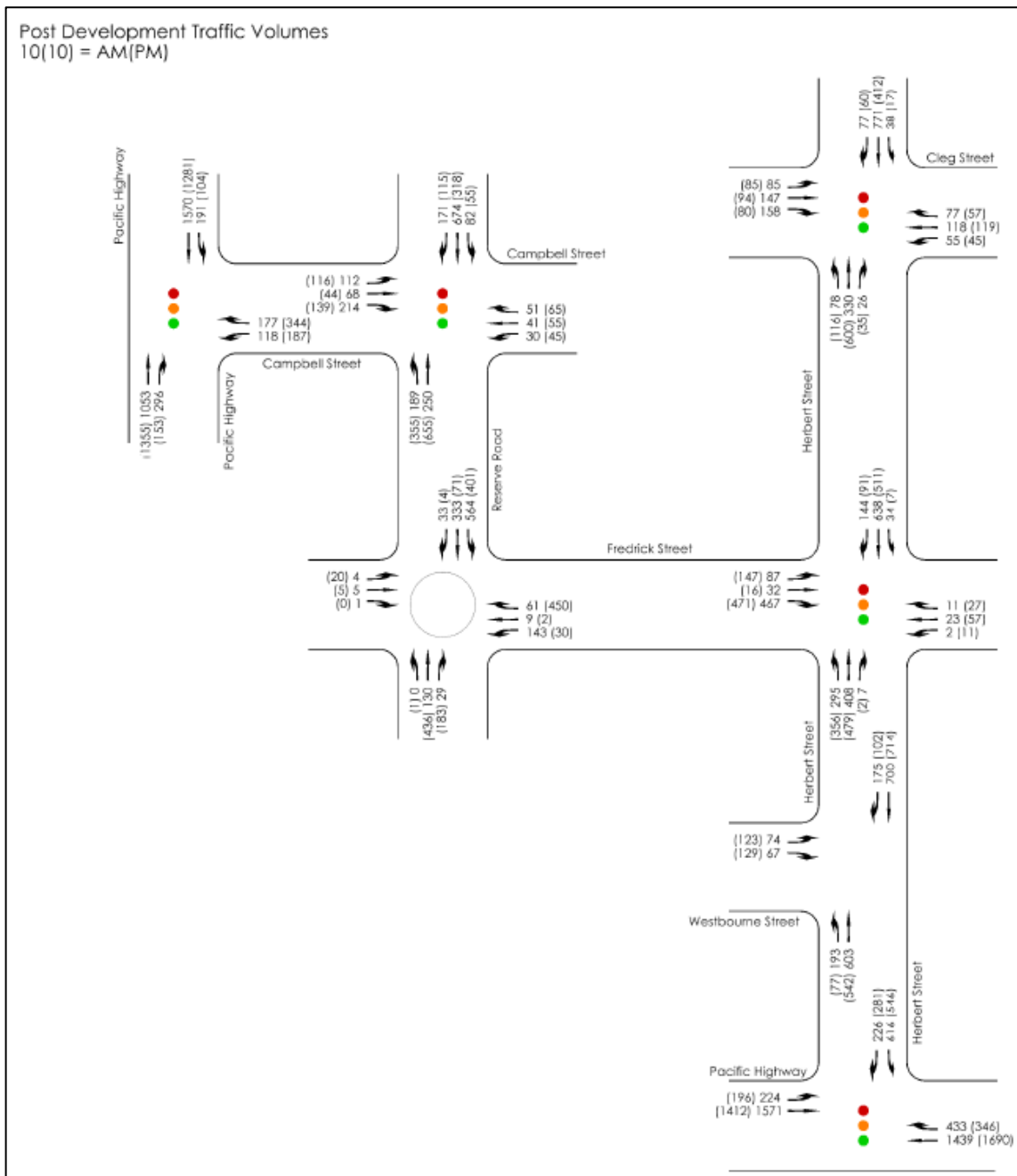
The surrounding local road network following the full development of the site is shown in Figure 5.1.

Figure 5.1: 2016 Post Development AM/ PM Peak Hour Traffic Volumes



In addition to the traffic generation for the development, Council has requested that +10-year traffic forecast (i.e. 2026) be assessed as part of the traffic impact assessment. GTA has adopted rates of 0.5% per annum for traffic volumes along Pacific Highway (as shown by analysis of Roads and Maritime Services historical AADT data) and 2% per annum for traffic volumes on minor roads (industry accepted typical growth rate). Council was consulted with respect to the proposed traffic growth rates, however no specific feedback could be obtained (with Council requesting that DPE agree the relevant rates to be used).

Figure 5.2: 2026 Post Development AM/ PM Peak Hour Traffic Volumes



## 5.3 Traffic Impact

### 5.3.1 2016 Post-Development Analysis

The anticipated additional traffic associated with the proposed development has been examined using SIDRA INTERSECTION to assess the intersection performance at the seven nominated study intersections. The results of the analysis have been summarised Table 5.2, with full results in Appendix A.

**Table 5.2: 2016 Post-Development Intersection Operating Conditions**

Intersection	Control Type	Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Campbell St/ Pacific Hwy	Signalised	AM	0.88	21	168	B
		PM	0.49	22	152	B
Herbert St/ Cleg St	Signalised	AM	0.68	14	98	A
		PM	0.51	10	41	A
Herbert St/ Frederick St	Signalised	AM	1.03	41	202	C
		PM	0.80	21	13	B
Herbert St/ Pacific Hwy	Signalised	AM	0.64	29	180	C
		PM	0.69	30	198	C
Herbert St/ Westbourne St	Priority controlled	AM	0.70	33	14	C
		PM	0.99	70	68	E
Reserve Rd/ Campbell St	Signalised	AM	0.84	25	113	B
		PM	0.73	22	82	B
Reserve Rd/ Frederick St	Roundabout	AM	0.53	6	31	A
		PM	0.56	8	37	A

Based on the results as presented in Table 5.2, the majority of intersections within the study area would continue to operate at acceptable levels of service post-development. However, the Herbert Street/ Westbourne Street intersection would be at capacity, with potential extended delays and queuing in the PM peak period for traffic on the Westbourne Street approach in particular.

### 5.3.2 2026 Future Traffic Conditions Analysis

The estimated future 10-year background traffic growth has also been examined using SIDRA INTERSECTION to assess the intersection performance (both with and without the additional development traffic) at the seven nominated study intersections. Results for the 2026 base scenario and 2026 post-development scenario are summarised in Table 5.3 and Table 5.4 respectively, with full results in Appendix A.

**Table 5.3: 2026 Base Year Intersection Operating Conditions**

Intersection	Control Type	Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Campbell St/ Pacific Hwy	Signalised	AM	0.94	23	203	B
		PM	0.75	17	110	B
Herbert St/ Cleg St	Signalised	AM	1.14	35	185	C
		PM	0.59	11	46	A
Herbert St/ Frederick St	Signalised	AM	1.19	85	414	F
		PM	1.05	41	240	C
Herbert St/ Pacific Hwy	Signalised	AM	0.92	32	320	C
		PM	0.9	29	232	C
Herbert St/ Westbourne St	Priority controlled	AM	0.86	29	179	C
		PM	0.51	23	9	B
Reserve Rd/ Campbell St	Signalised	AM	1.04	47	337	D
		PM	0.87	29	130	C
Reserve Rd/ Frederick St	Roundabout	AM	0.63	6	45	A
		PM	0.68	10	67	A

**Table 5.4: 2026 Post-Development Intersection Operating Conditions**

Intersection	Control Type	Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Campbell St/ Pacific Hwy	Signalised	AM	0.95	24	207	B
		PM	0.53	25	173	B
Herbert St/ Cleg St	Signalised	AM	0.96	30	243	C
		PM	0.62	11	61	A
Herbert St/ Frederick St	Signalised	AM	1.03	59	276	E
		PM	0.98	35	180	C
Herbert St/ Pacific Hwy	Signalised	AM	0.76	35	235	C
		PM	0.73	33	234	C
Herbert St/ Westbourne St	Priority Controlled	AM	1.25	296	158	F
		PM	1.63	600	479	F
Reserve Rd/ Campbell St	Signalised	AM	1.01	43	302	D
		PM	0.92	34	162	C
Reserve Rd/ Frederick St	Roundabout	AM	0.64	6	49	A
		PM	0.73	11	80	A

As seen in Table 5.3, certain intersections would be at or above operational capacity in 2026 without the proposed development, given the degree of saturation (DoS) nearing or exceeding 1.0 (and associated delays/ queues). Comparison of the results in Table 5.3 and Table 5.4 show overall intersection performance for most intersections would be generally similar between the base 2026 scenario and the 2026 post-development scenario. The analysis includes minor

changes made to post-development signalised intersections to optimise signal phasing and timing (which have not been applied to the base 2026 scenario).

However, it is noted that traffic volumes at the Herbert Street/ Westbourne Street intersection would exceed the capacity of the existing layout (priority controlled (give-way) intersection) in the post-development scenario. Design of an appropriate intersection treatment is required to mitigate the development traffic impact and future traffic growth at this intersection.

It is understood that strategic planning investigations are currently underway for the St Leonards and Crows Nest Strategic Centre by DPE. The future Crows Nest Metro Station is also under planning and construction, and would provide another high quality public transport interchange within the local area. As such, traffic conditions within the St Leonards and Crows Nest area are expected to change, which would affect the road network in the immediate vicinity of the hospital precinct. Further assessment of road network performance and potential improvements will be required to address the likely infrastructure and development impacts of the Strategic Centre and Crows Nest Metro Station.

## 5.4 Herbert Street/ Westbourne Street Mitigation Options

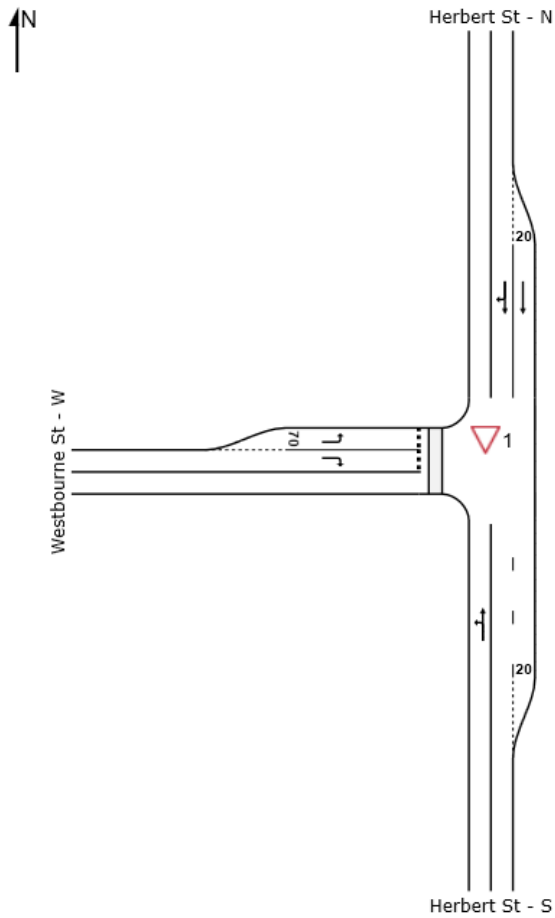
### 5.4.1 Implement Additional Approach Lanes

A potential future layout which maintains a priority-controlled intersection at Herbert Street/ Westbourne Street is detailed in Figure 5.3, with additional capacity created by the provision of separate left and right turn lanes on Westbourne Street, as well as a basic right turn treatment on Herbert Street that allows through traffic to pass.

With this layout, the intersection performs slightly better. However, the Level of Service would still be unsatisfactory. This is due to insufficient available gaps in the Herbert Street traffic stream for the volume of traffic turning right from Westbourne Street. The SIDRA analysis for the intersection shown in Figure 5.3 is detailed in Table 5.5.

While assessing the potential traffic distribution, a large amount of the right turn traffic from Westbourne Street may be using Herbert Street to access Pacific Highway. It should be considered that, if there were potential long delays on Westbourne Street, this traffic would use an alternate means to access Pacific Highway, such as using Reserve Road instead of Herbert Street, potentially improving the operation of the Herbert Street/ Westbourne Street intersection.

Figure 5.3: Potential Herbert Street/ Westbourne Street with Additional Approach Lanes

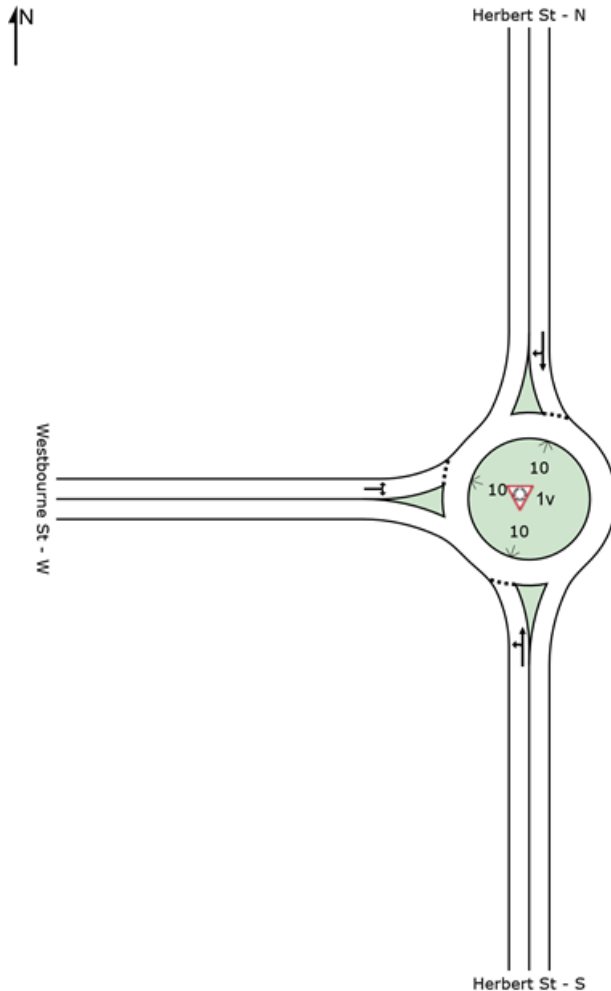


GTA tested other potential layouts for Herbert Street/ Westbourne Street. However, sufficient capacity would not be available for the forecast right turn volumes from Westbourne Street. There could also be significant impacts to existing on-street parking in the vicinity of the intersection under these scenarios.

## 5.4.2 Upgrade Intersection to a Roundabout

An alternate potential future layout for Herbert Street/ Westbourne Street is a roundabout as shown in Figure 5.4. The intersection would operate satisfactorily from a traffic perspective, with the current Level of Service largely maintained, albeit with an increase in traffic through the area. The relevant SIDRA analysis results are summarised in Table 5.5.

**Figure 5.4: Potential Herbert Street/ Westbourne Street with Roundabout Control**



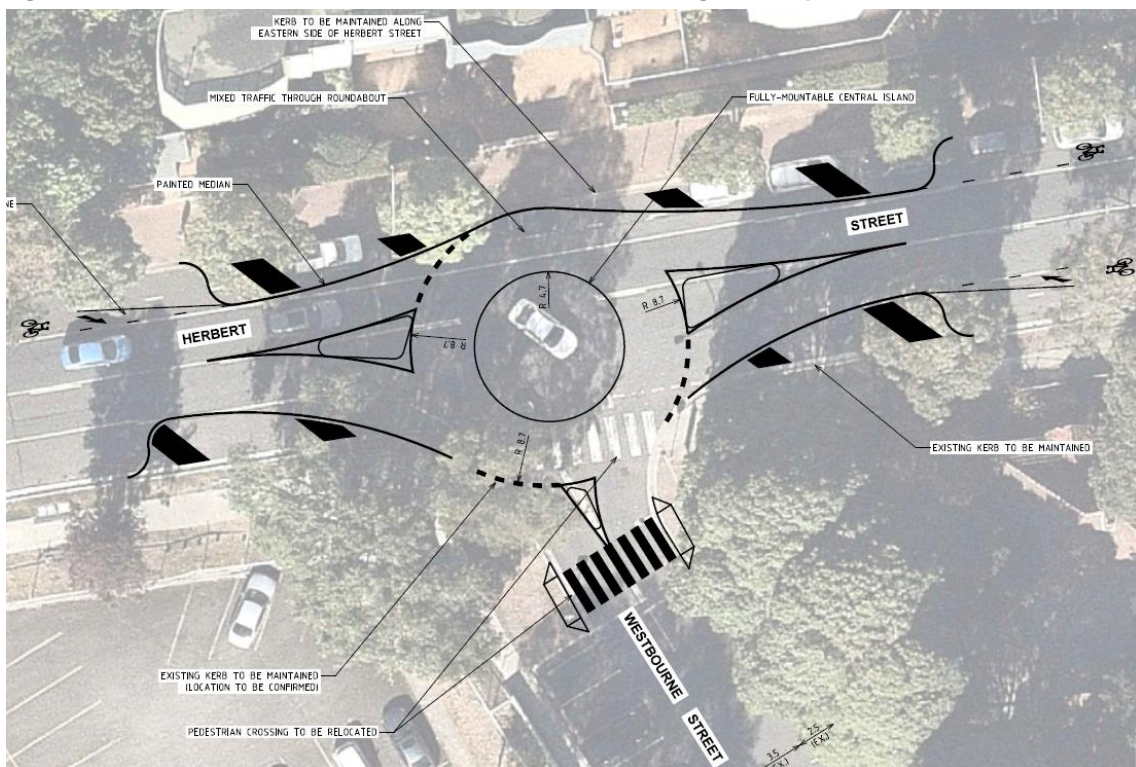
**Table 5.5: Herbert Street/ Westbourne Street Options Testing**

Intersection Scenario	Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Existing Operation Conditions	AM	0.69	4	79	A
	PM	0.62	3	53	A
2026 Post-Development (No upgrade)	AM	1.25	297	>270	F
	PM	1.63	>300	>270	F
Implement Additional Approach Lanes	AM	1.16	255	65	F
	PM	1.52	>300	230	F
Upgrade Intersection to a Roundabout	AM	0.65	9	54	A
	PM	0.62	10	51	A

To further investigate the feasibility of the potential roundabout, a design concept has been prepared as shown in Figure 5.5. Key points to note are:

- The design largely maintains the existing kerb lines, noting there is limited opportunity to modify kerbs without impacting property boundaries and/or existing footpath widths.
- The largest vehicle that can complete a U-turn manoeuvre is a 6.4m Small Rigid Vehicle.
- A mountable central island would be provided such that all existing heavy vehicle movement required can be accommodated.
- The Herbert Street bicycle shoulder lanes would end prior to the roundabout, with mixed traffic conditions through the roundabout itself. The alternate option of maintaining bicycle lanes through the roundabout (either at road or footpath level) would require widening, with associated impacts on property boundaries, footpath widths and/or existing in-ground services
- The existing pedestrian (zebra) crossing of Westbourne Street would be relocated immediately west of the roundabout to maintain this facility.

**Figure 5.5: Herbert Street/ Westbourne Street Roundabout Design Concept**



On the basis of the above concept design, the impact to the safety and efficiency of key road user groups (in order of priority) have been assessed to confirm the feasibility of the proposed roundabout.

### Pedestrians

Pedestrian movements would not be significantly impacted by the proposed roundabout as the pedestrian crossing on Westbourne Street will be maintained, with a minor additional travel distance as a result of the realignment. Additionally, pedestrian desire lines across Herbert Street are serviced by pedestrian crossing facilities south of Westbourne Street, including the pedestrian overbridge to St Leonards Station. As there are no key trip attractors immediately on the eastern

side of intersection, existing and future pedestrian movement across Herbert Street at this location would be low.

### Cyclists

Cyclists are currently serviced by the bicycle shoulder lanes on Herbert Street. The northbound bicycle lane currently ends approximately 20 metres prior to the Herbert Street/ Westbourne Street intersection before restarting 30 metres after the intersection. The southbound bicycle lane continues through the intersection. The introduction of the roundabout will not affect cycling amenity for northbound riders as the mixed traffic treatment will begin and end at approximately the same locations as existing, with a reduction in the travel speed of through traffic at the merge and diverge locations. Bicycle riders are also aided by the gentle northbound downhill slope. Southbound riders would need to merge with traffic to negotiate the roundabout, which would reduce cyclist amenity. However, given that the intersection currently presents good sight lines and the southbound (uphill) gradient is reasonable (between three and five per cent), the short stretch of mixed traffic treatment would not present a significant additional risk in road safety.

### Public Transport

Rail replacement buses (routes 21T1 and 22T2) currently utilise Herbert Street. Given that there are other mountable roundabouts along this route on Hampden Road, buses would not be significantly impacted by the proposed roundabout. Swept path analysis, as provided in Appendix C, demonstrates that a 12.5 metre rigid truck/ bus is able to navigate the roundabout. Buses would be required to mount the central island of the roundabout in the northbound direction, however this would have a minimal impact on passenger comfort and consistent with the above nearby roundabouts.

### General Traffic and Heavy Vehicles

The roundabout would facilitate significantly better general safety and traffic flow compared to the existing priority-controlled intersection. The roundabout would reduce the approach speeds of Herbert Street traffic, reduce the risk of rear-end collisions with right-turning vehicles on Herbert Street, as well as reducing the potential for intersection collisions as a result of Westbourne Street vehicles selecting inappropriate gaps in Herbert Street traffic as background volumes increase. A limited number of 2P paid on-street car parking spaces would be lost as a result of the roundabout approach geometry to facilitate the deflection of the roundabout, however, this is minor in the context of the surrounding precinct parking supply and the affected spaces are not servicing an immediately adjacent land use.

Vehicles larger than a 12.5m large rigid design vehicle would not regularly use this section of Herbert Street given the alternative route to the Artarmon industrial area via the Gore Hill Freeway Reserve Road ramps. The proposed roundabout has been designed to accommodate vehicles up to a 12.5m large rigid vehicle as discussed above and shown in Appendix C. As such, no adverse impact on heavy vehicle movements in the area is expected.

## 5.5 Transport Impact

The proposed development is expected to generate a moderate level of public transport, pedestrian and cycle trips, typically from staff and employee trips to the development. Based on the anticipated use of the site (i.e. a private hospital), it can be expected that a majority of visitor trips made to the site would be via car travel.

Notwithstanding the above, the Bureau of Transport Statistics indicates that based on 2011 Journey to Work (JTW) data the mode shares for employed residents living in Chatswood and St Leonards are as follows:

- Vehicle driver / passenger – 45%
- Train – 33%
- Bus – 7%
- Walk – 13%
- Other – 2%.

Based on a daily average of 248 staff for Tower A and Tower B, the expected public transport and pedestrian trips is summarised in Table 5.4.

**Table 5.6: Estimated Public Transport and Pedestrian Trips**

Mode of Travel	No. of Staff Trips
Train	82 trips
Bus	17 trips
Pedestrian	32 trips
<b>Total</b>	<b>131 trips</b>

Table 5.4 indicates that the proposed development would generate approximately 99 public transport trips (i.e. 82 train trips and 17 bus trips) and 32 pedestrian trips. It is noted that these are two-way trips and therefore, it can be expected that there would approximately 29 public transport and pedestrian trips in both morning and evening peak times.

Thus, it is expected that existing infrastructure would have adequate capacity to accommodate this moderate demand in public transport and pedestrian trips associated with the proposed development.

## 5.6 Agency Consultation

As required by the Secretary's Environmental Assessment Requirements, the Tower A and two-storey podium development (SSD 7543) was previously discussed with Roads and Maritime Services in early 2015 during the development of the site layout and initial assessment of transport impacts.

Both Transport for NSW and Roads and Maritime Services were contacted with respect to the Tower B proposal (SSD 8499), with a summary of the traffic and parking implications provided.

As part of the assessment process for Tower A and two-storey podium development (SSD 7543), submissions from Transport for NSW and Roads and Maritime Services have subsequently been received (dated 15 June 2017 and 22 May 2017 respectively). The comments received were addressed in a response to submissions letter prepared by GTA and dated 30 November 2017.

One outstanding issue is the use of Herbert Street and Frederick Street by rail replacement buses as part of the Temporary Transport Plan (TTP) during the construction of the Sydney Metro between Epping and Chatswood. A preliminary Construction Traffic Management Plan was

prepared as part of the Tower A SSDA (SSD 7543) and would be updated once a contractor has been appointed and further construction staging and timing specifics are known. This would include consultation with Transport for NSW regarding the Sydney Metro rail replacement bus services and appropriate construction traffic provisions to suit the period of overlap between the two projects (and any other known cumulative impacts at the time).

It is anticipated that Transport for NSW and Roads and Maritime Services would also be consulted further during design development and in relation to the anticipated conditions of consent (including preparation of the Green Travel Plan).

Feedback on the proposed roundabout at the Herbert Street/ Westbourne Street intersection was sought from Willoughby City Council, with modelling and analysis provided as part of the SSD 7543 and SSD 8499 Response to Submissions documentation, as well as the design concept provided directly to Council's Traffic and Transport Team Leader. At the time of this report, no specific feedback was available.

## 6. Green Travel Plan

### 6.1 Introduction

The Secretary's Environmental Assessment Requirements state that the proposed private hospital development at 12 Frederick Street, St Leonards, is to implement the design of ecologically sustainable development by including measures that promote travel choices that support sustainable travel, such as the following:

- *Location-specific sustainable travel plan*
- *Provision of end-of-trip facilities*
- *Green travel plans and wayfinding strategies.*

Thus, it is expected that any approval of the proposed development would include a consent condition requiring a green travel plan to be prepared to promote sustainable travel. As such, a green travel plan applicable to tenants and staff working on the site would be prepared prior to the occupation of the development. The section below provides a framework for the implementation of such a travel plan.

### 6.2 Travel Plan Framework

Transport is a necessary part of life, but it has economic, public health and environmental consequences. The transport sector is one of the fastest growing emissions sectors in Australia, and therefore is one of the key opportunities for reducing greenhouse gases. As well as delivering better environmental outcomes, providing a range of travel choices with a focus on walking, cycling and public transport will have major public health benefits and will ensure a strong and prosperous community.

The physical infrastructure being provided as part of the development is only part of the solution. A green travel plan will ensure that the transport infrastructure, services and policies both within and external to the site are tailored to the users and co-ordinated to achieve the most sustainable outcome possible.

### 6.3 What is a Green Travel Plan?

A green travel plan is a package of measures aimed at promoting sustainable travel and reducing reliance on the private car. It is not designed to be 'anti-car', but will encourage and support people's aspirations for carrying out their daily business in a more sustainable way. Travel plans can provide both:

- measures which restrict car use (disincentives or 'sticks')
- measures which encourage or support sustainable travel, reduce the need to travel or make travelling more efficient (incentives or 'carrots').

The travel plan would promote the use of transport, other than the private car, provide choice for staff to travel to and from the site, which is more sustainable and environmentally friendly.

Indeed, there are a range of "non-car" transport options that are available at the site which have been described in this report.

## 6.4 Key Objectives

The aim of the green travel plan is to bring about better transport arrangements for working at the site. The key objectives of the travel plan are:

- to encourage walking
- to encourage cycling
- to encourage the use of public transport
- to reduce the use of the car, in particular single car occupancy
- where it is necessary to use the car, encourage more efficient use.

It is the intention therefore that the travel plan will deliver the following benefits:

- enable higher mode share targets to be achieved
- contribute to greenhouse gas emission reductions and carbon footprint minimisation
- contribute to healthy living for all
- contribute to social equity and reduction in social exclusion
- improve knowledge and contribute to learning.

## 6.5 Site Specific Measures

The location of the site, in terms of its close proximity to a wide range of sustainable transport, is a key attribute in the justification of the development. The GTP will then put in place measures to raise awareness and further influence the travel patterns of those people working or visiting the development with a view to encouraging modal shift away from cars.

The following measures are proposed to encourage staff and visitors to reduce travel by private cars and adopt alternative and more sustainable travel modes:

- Compliance with the stringent parking controls applicable to the site
- Provision of a Travel Access Guide (TAG) which would be given to all staff and visitors. This document has been based upon facilities currently available at the site
- Public transport information boards to make staff and visitors more aware of the alternative transport options available (the format of such information boards would be based upon the travel access guide)
- Promotion of the availability of car sharing pods for trips that require the use of private vehicles
- Provision of bicycle facilities including secure bicycle parking for staff, bicycle racks for visitors and shower and change room facilities
- Connect staff working at the site to carpool together by creating a Carpooling club
- Replacement of existing GoGet car share pods within the site.

## 6.6 Travel Access Guide

A Travel Access Guide (TAG) provides information to staff and visitors on how to travel to the site using sustainable transport modes such as walking and public transport. The information is presented visually in the format of a map showing the site location and nearby transport nodes highlighting available pedestrian and cycle routes. The information is usually presented as a brochure to be included in a welcome pack, available from reception or printed on the back of hospital stationery.

## 6.7 Information and Communication

Several opportunities exist to provide staff and visitors with information about nearby transport options. Connecting staff and visitors with information would help to facilitate journey planning and increase their awareness of convenient and inexpensive transport options which support change in travel behaviour. These include:

- Transport NSW provides Bus, train and ferry routes, timetables and journey planning are provided by Transport for New South Wales through their Transport Info website: <http://www.transportnsw.info>
- City of Sydney provides a number of services and a range of information to encourage people of all levels of experience to travel by bicycle: <http://sydneycycleways.net/>.

Connecting staff and visitors via social media may provide a platform to informally pilot new programs or create travel-buddy networks and communication.

## 6.8 Monitoring of the GTP

There is no standard methodology for this but it is suggested that the GTP be monitored to ensure that it is achieving the desired benefits and modify it if required. It will not be possible at this stage to state what additional modifications might be made as this will be dependent upon the particular circumstances prevailing at that time.

The GTP should be monitored on a regular basis, e.g. yearly, by carrying out travel surveys. Travel surveys will allow the most effective initiatives of the GTP to be identified, and conversely less effective initiatives can be modified or replaced to ensure the best outcomes are achieved. It will clearly be important to understand people's reasons for travelling the way they do, any barriers to changing their behaviour, and their propensity to change.

To ensure the successful implementation of the GTP, a Travel Plan Coordinator (TPC) should be appointed to ensure the successful implementation of the GTP.

## 6.9 Summary

Future building owners/managers should be required to develop and utilise a travel plan to increase the use of sustainable transport by the staff working in the development. Although it is difficult to predict what measures might be achievable until the building is occupied, the above measures provide a framework for the development and implementation of a future travel plan for the site.

It is considered that it is appropriate that any development consent is conditioned to ensure that a travel plan is implemented prior to occupation of the development.

## 7. Construction Traffic Management

A preliminary construction traffic management plan (CTMP) was prepared as part of the Tower A and two storey podium (SSD 7543) proposal. The report examined the impacts on traffic (i.e. vehicles and pedestrians) on the local road network and provided mitigation measures to address any traffic and/or transport implications associated with the development.

The overall principles of traffic management during the construction activity are to:

- provide an appropriate and convenient environment for pedestrians
- minimise the impact on pedestrian movements
- maintain appropriate capacity for pedestrians at all times on footpaths around the site
- maintain appropriate public transport access
- restrict construction vehicle movements to designated routes to/ from the site
- manage and control construction vehicle activity in the vicinity of the site
- minimise impacts to general traffic in the vicinity of the site.

The key construction activities and anticipated staging of the works, as previously prepared for the proposed private hospital, is summarised in Table 7.1.

**Table 7.1: Construction Activities and Staging**

Phase	Anticipated Duration
Site Establishment and Demolition	2 months
Excavation and Piling	6 months
Ground Slabs and Concrete Structure	9 months
Roof, Ceiling and Facade	5 months
Internal Fitout and Finishes	7 months

It is envisaged that the Tower B proposal would be constructed in a similar manner and most likely concurrently with the Tower A and podium construction, noting that this may increase the construction timeframe and/or construction traffic volumes slightly.

On the basis of the above, the document *Private Hospital East Tower, 12 Frederick Street St Leonards, CTMP – Main Works* (GTA Consultants, 2/3/17) appropriately addresses construction traffic management for the Tower B proposal.

The Construction Traffic Management Plan would be updated and refined once a contractor has been appointed and further construction staging and timing specifics are known. This would include consultation with Transport for NSW, Roads and Maritime Services and Council as appropriate.

## 8. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

- i The proposed North Shore Medical Hub is well located within an existing hospital and medical precinct and in close proximity to frequent public transport services that access a range of origins/ destinations.
- ii The Tower B proposal comprises a 7,000m<sup>2</sup> gross floor area building of six storeys in height for health and medical purposes, which has been assessed from a traffic and transport perspective based on an indicative 76 medical consulting rooms and 46 hospital beds. Parking and loading facilities are provided as part of the Tower A proposal (SSD 7543).
- iii The proposed development generates a parking requirement of 189 parking spaces for Tower A and 135 parking spaces for Tower B for a combined required total of 316 spaces. These rates are considered conservative given the available public transport access in St Leonards and complementary nature of supporting/ co-located medical facilities.
- iv 24 replacement parking spaces need to be accommodated within the basement car parking, to offset removal of on-street paid parking as a result of the driveway accesses for the development.
- v The above parking requirements would be accommodated within five basement levels as part of the overall development and Tower A construction.
- vi Swept path assessment shows that the proposed vehicle access points, including the porte-cochere/ pick-up and drop-off area, are generally acceptable, subject to some minor modifications as part of the detailed design process and refinement of structure.
- vii All car parking would be designed in accordance with the Australian/New Zealand Standard for Off Street Car Parking (AS/NZS 2890.1:2004 and AS/NZS2890.6:2009).
- viii With appropriate loading dock management to address the timing of vehicle deliveries and interaction with car park operation, the loading area would be sufficient to service both Tower A (including the two-storey podium) and Tower B.
- ix The cumulative traffic impact of Tower A, Tower B and the two-storey podium would be 246 and 301 vehicle movements in the morning and evening peak hours respectively.
- x There is adequate capacity in the surrounding road network to cater for the traffic generated by the proposed development, with the exception of the Herbert Street/ Westbourne Street intersection. Background traffic growth is likely to place pressure on some key intersections in the vicinity of the site, however the anticipated development traffic has only a minor additional impact.
- xi Upgrading the Herbert Street/ Westbourne Street intersection to a roundabout could appropriately mitigate the development traffic impact and provides a balanced design outcomes, considering safety and efficiency for all road users.
- xii A green travel plan should be prepared for the development prior to commencement of work.
- xiii Construction traffic management would be consistent with the Construction Traffic Management Plan prepared for Tower A and the two storey podium (SSD7543), noting the construction timeframe and/or construction traffic volumes may increase slightly and relevant agency comments would be incorporated prior to construction.

# Appendix A

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## SIDRA INTERSECTION Analysis Results

Appendix A

# MOVEMENT SUMMARY

## Site: 1 [Herbert St/Cleg St (Ex-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	67	6.3	0.067	11.9	LOS A	0.9	6.5	0.47	0.67	48.9
2	T1	245	0.9	0.272	4.3	LOS A	2.4	16.7	0.32	0.31	55.7
3	R2	22	9.5	0.272	10.0	LOS A	2.4	16.7	0.32	0.31	53.8
Approach		335	2.5	0.272	6.2	LOS A	2.4	16.7	0.35	0.38	54.0
East: Cleg St - E											
4	L2	47	4.4	0.106	12.4	LOS A	0.7	5.3	0.66	0.66	49.5
5	T1	102	2.1	0.530	21.4	LOS B	4.2	29.8	0.89	0.75	43.0
6	R2	66	3.2	0.530	29.7	LOS C	4.2	29.8	0.93	0.77	40.9
Approach		216	2.9	0.530	22.0	LOS B	4.2	29.8	0.85	0.74	43.6
North: Herbert St - N											
7	L2	33	0.0	0.111	11.0	LOS A	1.6	11.1	0.45	0.45	52.6
8	T1	620	0.7	0.556	7.5	LOS A	10.5	73.9	0.62	0.58	52.9
9	R2	66	0.0	0.556	13.4	LOS A	10.5	73.9	0.65	0.60	51.4
Approach		719	0.6	0.556	8.2	LOS A	10.5	73.9	0.61	0.57	52.7
West: Cleg St - W											
10	L2	74	1.4	0.167	16.3	LOS B	1.8	12.9	0.73	0.69	47.2
11	T1	127	2.5	0.825	26.5	LOS B	7.8	56.1	0.93	0.93	40.2
12	R2	137	4.6	0.825	37.2	LOS C	7.8	56.1	1.00	1.00	37.4
Approach		338	3.1	0.825	28.6	LOS C	7.8	56.1	0.91	0.90	40.3
All Vehicles		1607	1.8	0.825	13.9	LOS A	10.5	73.9	0.65	0.62	48.5

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

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: 1 [Herbert St/Cleg St (Ex-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	100	4.2	0.098	12.0	LOS A	1.3	9.7	0.48	0.68	48.9
2	T1	455	1.2	0.444	4.3	LOS A	4.6	32.8	0.35	0.33	55.8
3	R2	31	0.0	0.444	9.8	LOS A	4.6	32.8	0.35	0.33	54.4
Approach		585	1.6	0.444	5.9	LOS A	4.6	32.8	0.37	0.39	54.4
East: Cleg St - E											
4	L2	39	2.7	0.082	14.3	LOS A	0.8	5.7	0.67	0.65	48.3
5	T1	103	4.1	0.409	21.0	LOS B	3.7	26.3	0.87	0.73	43.4
6	R2	49	0.0	0.409	28.4	LOS B	3.7	26.3	0.90	0.75	41.8
Approach		192	2.7	0.409	21.5	LOS B	3.7	26.3	0.84	0.72	43.9
North: Herbert St - N											
7	L2	15	0.0	0.066	10.9	LOS A	0.9	6.4	0.44	0.41	52.9
8	T1	317	1.0	0.330	6.3	LOS A	4.5	32.0	0.51	0.49	53.6
9	R2	52	0.0	0.330	12.0	LOS A	4.5	32.0	0.53	0.51	52.2
Approach		383	0.8	0.330	7.2	LOS A	4.5	32.0	0.51	0.49	53.4
West: Cleg St - W											
10	L2	74	1.4	0.095	7.2	LOS A	0.4	2.7	0.34	0.64	52.4
11	T1	81	2.6	0.467	22.8	LOS B	4.0	29.1	0.90	0.76	42.3
12	R2	69	6.1	0.467	28.9	LOS C	4.0	29.1	0.92	0.77	41.1
Approach		224	3.3	0.467	19.6	LOS B	4.0	29.1	0.72	0.72	44.8
All Vehicles		1384	1.8	0.467	10.6	LOS A	4.6	32.8	0.53	0.52	50.7

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

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: 1 [Herbert St/Frederick St (Ex-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	255	8.3	0.203	9.2	LOS A	2.9	21.6	0.36	0.67	50.6
2	T1	313	1.7	0.420	16.5	LOS B	7.9	56.3	0.77	0.66	47.2
3	R2	6	0.0	0.420	22.0	LOS B	7.9	56.3	0.77	0.66	46.2
Approach		574	4.6	0.420	13.3	LOS A	7.9	56.3	0.58	0.67	48.6
East: Carpark Access - E											
4	L2	2	0.0	0.016	39.6	LOS C	0.1	0.5	0.95	0.61	35.8
5	T1	20	5.3	0.157	32.8	LOS C	1.0	7.0	0.95	0.69	38.3
6	R2	9	0.0	0.157	38.3	LOS C	1.0	7.0	0.95	0.69	37.6
Approach		32	3.3	0.157	34.9	LOS C	1.0	7.0	0.95	0.69	37.9
North: Herbert St - N											
7	L2	29	3.6	0.269	20.2	LOS B	4.8	34.0	0.70	0.61	46.8
8	T1	505	1.3	0.898	29.8	LOS C	19.1	135.5	0.87	0.93	39.8
9	R2	124	3.4	0.898	44.0	LOS D	19.1	135.5	0.97	1.12	35.6
Approach		659	1.8	0.898	32.1	LOS C	19.1	135.5	0.88	0.95	39.2
West: Frederick St - W											
10	L2	75	7.0	0.253	30.1	LOS C	2.9	21.5	0.86	0.74	40.0
11	T1	27	0.0	0.253	24.5	LOS B	2.9	21.5	0.86	0.74	40.9
12	R2	381	2.8	0.862	41.8	LOS C	15.1	107.9	1.00	0.99	35.0
Approach		483	3.3	0.862	39.0	LOS C	15.1	107.9	0.97	0.94	36.0
All Vehicles		1747	3.1	0.898	27.9	LOS B	19.1	135.5	0.81	0.85	40.7

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
P2	East Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
All Pedestrians		211	23.7	LOS C			0.82	0.82	

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: 1 [Herbert St/Frederick St (Ex-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	307	6.5	0.242	9.3	LOS A	3.6	26.6	0.37	0.68	50.6
2	T1	351	0.9	0.444	16.0	LOS B	8.7	61.5	0.76	0.66	47.5
3	R2	2	0.0	0.444	21.5	LOS B	8.7	61.5	0.76	0.66	46.5
Approach		660	3.5	0.444	12.9	LOS A	8.7	61.5	0.58	0.67	48.9
East: Carpark Access - E											
4	L2	9	11.1	0.077	40.7	LOS C	0.3	2.5	0.96	0.67	35.2
5	T1	49	4.3	0.385	33.9	LOS C	2.5	17.8	0.97	0.75	37.8
6	R2	23	0.0	0.385	39.5	LOS C	2.5	17.8	0.97	0.75	37.2
Approach		82	3.8	0.385	36.3	LOS C	2.5	17.8	0.97	0.74	37.3
North: Herbert St - N											
7	L2	6	33.3	0.189	20.0	LOS B	3.3	23.2	0.67	0.56	46.5
8	T1	402	0.5	0.631	18.3	LOS B	9.8	70.0	0.81	0.70	45.7
9	R2	79	6.7	0.631	26.3	LOS B	9.8	70.0	0.88	0.78	43.1
Approach		487	1.9	0.631	19.6	LOS B	9.8	70.0	0.82	0.71	45.2
West: Frederick St - W											
10	L2	127	0.8	0.352	30.7	LOS C	4.2	29.6	0.88	0.77	39.4
11	T1	14	7.7	0.352	25.2	LOS B	4.2	29.6	0.88	0.77	40.1
12	R2	386	1.6	0.867	42.2	LOS C	15.4	109.2	1.00	0.99	34.8
Approach		527	1.6	0.867	39.0	LOS C	15.4	109.2	0.97	0.94	36.0
All Vehicles		1757	2.5	0.867	23.7	LOS B	15.4	109.2	0.78	0.76	42.7

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
P2	East Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
All Pedestrians		211	23.7	LOS C			0.82	0.82	

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: 1 [Herbert St/Westbourne St (Ex-AM)]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	118	0.0	0.368	5.8	LOS A	1.1	7.9	0.08	0.11	57.0
2	T1	521	9.1	0.368	0.1	LOS A	1.1	7.9	0.08	0.11	58.6
Approach		639	7.4	0.368	1.1	NA	1.1	7.9	0.08	0.11	58.3
North: Herbert St - N											
8	T1	604	2.1	0.685	4.0	LOS A	11.1	78.6	0.49	0.47	55.0
9	R2	83	0.0	0.685	16.1	LOS B	11.1	78.6	0.49	0.47	53.1
Approach		687	1.8	0.685	5.4	NA	11.1	78.6	0.49	0.47	54.8
West: Westbourne St - W											
10	L2	24	0.0	0.166	8.1	LOS A	0.3	2.2	0.67	0.84	48.6
12	R2	18	0.0	0.166	18.5	LOS B	0.3	2.2	0.67	0.84	48.2
Approach		42	0.0	0.166	12.5	LOS A	0.3	2.2	0.67	0.84	48.5
All Vehicles		1368	4.4	0.685	3.7	NA	11.1	78.6	0.30	0.31	56.2

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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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPH\Modelling\Tower 2\170623sid\_16S9001000\_Existing - Copy.sip7

# MOVEMENT SUMMARY

## ▽ Site: 1 [Herbert St/Westbourne St (Ex-PM)]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	26	4.0	0.266	5.9	LOS A	0.2	1.7	0.02	0.03	57.8
2	T1	468	3.8	0.266	0.0	LOS A	0.2	1.7	0.02	0.03	59.6
Approach		495	3.8	0.266	0.3	NA	0.2	1.7	0.02	0.03	59.5
North: Herbert St - N											
8	T1	617	0.7	0.617	2.5	LOS A	7.5	53.1	0.48	0.35	57.3
9	R2	28	0.0	0.617	11.5	LOS A	7.5	53.1	0.48	0.35	55.2
Approach		645	0.7	0.617	2.9	NA	7.5	53.1	0.48	0.35	57.2
West: Westbourne St - W											
10	L2	43	0.0	0.328	8.9	LOS A	0.7	5.0	0.66	0.89	48.2
12	R2	48	0.0	0.328	16.9	LOS B	0.7	5.0	0.66	0.89	47.8
Approach		92	0.0	0.328	13.2	LOS A	0.7	5.0	0.66	0.89	48.0
All Vehicles		1232	1.9	0.617	2.6	NA	7.5	53.1	0.31	0.26	57.3

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: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPH\Modelling\Tower 2\170623sid\_16S9001000\_Existing - Copy.sip7

# MOVEMENT SUMMARY

## Site: 1 [Herbert St/Pacific Hwy (Ex-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1441	4.0	0.498	19.7	LOS B	20.0	145.0	0.67	0.59	45.4
6	R2	434	2.2	0.624	57.0	LOS E	13.4	95.5	0.96	0.82	30.7
Approach		1875	3.6	0.624	28.3	LOS B	20.0	145.0	0.74	0.65	40.8
North: Herbert St - N											
7	L2	532	2.4	0.760	41.9	LOS C	27.8	198.3	0.89	0.85	34.9
9	R2	156	2.7	0.654	65.5	LOS E	9.7	69.6	1.00	0.82	28.7
Approach		687	2.5	0.760	47.2	LOS D	27.8	198.3	0.92	0.84	33.3
West: Pacific Highway - W											
10	L2	172	9.2	0.160	12.9	LOS A	3.5	26.8	0.45	0.69	48.2
11	T1	1574	5.6	0.548	20.4	LOS B	22.7	166.5	0.69	0.62	45.0
Approach		1745	5.9	0.548	19.7	LOS B	22.7	166.5	0.67	0.63	45.3
All Vehicles		4307	4.3	0.760	27.8	LOS B	27.8	198.3	0.74	0.67	41.0

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		105	39.3	LOS D			0.75	0.75	

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: 1 [Herbert St/Pacific Hwy (Ex-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1693	3.9	0.582	20.9	LOS B	25.0	181.0	0.71	0.64	44.7
6	R2	346	0.6	0.493	55.5	LOS D	10.4	72.9	0.93	0.81	31.1
Approach		2039	3.3	0.582	26.8	LOS B	25.0	181.0	0.75	0.67	41.6
North: Herbert St - N											
7	L2	472	0.9	0.577	40.5	LOS C	23.7	167.0	0.86	0.84	35.4
9	R2	180	0.0	0.741	67.7	LOS E	11.6	81.1	1.00	0.86	28.3
Approach		652	0.6	0.741	48.0	LOS D	23.7	167.0	0.90	0.84	33.1
West: Pacific Highway - W											
10	L2	149	9.9	0.140	12.8	LOS A	3.0	23.1	0.44	0.68	48.2
11	T1	1414	2.5	0.479	19.4	LOS B	19.2	137.0	0.66	0.59	45.5
Approach		1563	3.2	0.479	18.8	LOS B	19.2	137.0	0.64	0.60	45.7
All Vehicles		4254	2.9	0.741	27.1	LOS B	25.0	181.0	0.73	0.67	41.3

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		105	39.3	LOS D			0.75	0.75	

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: 1 [Reserved Rd/Frederick St (Ex-AM)]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
2	T1	93	3.4	0.119	6.6	LOS A	0.7	5.2	0.50	0.59	52.8
3	R2	25	0.0	0.119	9.8	LOS A	0.7	5.2	0.50	0.59	52.5
Approach		118	2.7	0.119	7.2	LOS A	0.7	5.2	0.50	0.59	52.7
East: Frederick St - E											
4	L2	123	0.9	0.395	6.9	LOS A	2.6	19.3	0.48	0.67	50.8
5	T1	7	0.0	0.395	7.2	LOS A	2.6	19.3	0.48	0.67	51.8
6	R2	263	9.6	0.395	10.8	LOS A	2.6	19.3	0.48	0.67	51.0
Approach		394	6.7	0.395	9.5	LOS A	2.6	19.3	0.48	0.67	51.0
North: Reserved Rd - N											
7	L2	464	2.7	0.512	4.7	LOS A	4.3	30.6	0.17	0.49	53.6
8	T1	287	0.0	0.512	5.0	LOS A	4.3	30.6	0.17	0.49	54.8
9	R2	28	18.5	0.512	8.5	LOS A	4.3	30.6	0.17	0.49	53.5
Approach		780	2.3	0.512	5.0	LOS A	4.3	30.6	0.17	0.49	54.0
West: Enterprise Centre - W											
10	L2	3	33.3	0.010	7.3	LOS A	0.1	0.4	0.51	0.55	50.8
11	T1	4	0.0	0.010	6.7	LOS A	0.1	0.4	0.51	0.55	53.1
12	R2	1	0.0	0.010	10.0	LOS A	0.1	0.4	0.51	0.55	52.7
Approach		8	12.5	0.010	7.3	LOS A	0.1	0.4	0.51	0.55	52.2
All Vehicles		1300	3.7	0.512	6.6	LOS A	4.3	30.6	0.29	0.56	52.9

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: 1 [Reserved Rd/Frederick St (Ex-PM)]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	1	0.0	0.534	8.5	LOS A	4.8	33.9	0.78	0.73	50.5
2	T1	344	0.6	0.534	8.8	LOS A	4.8	33.9	0.78	0.73	51.4
3	R2	158	1.3	0.534	12.1	LOS A	4.8	33.9	0.78	0.73	51.1
Approach		503	0.8	0.534	9.8	LOS A	4.8	33.9	0.78	0.73	51.3
East: Frederick St - E											
4	L2	26	4.0	0.334	4.9	LOS A	2.2	16.1	0.21	0.61	51.2
5	T1	2	0.0	0.334	5.1	LOS A	2.2	16.1	0.21	0.61	52.3
6	R2	417	7.6	0.334	8.6	LOS A	2.2	16.1	0.21	0.61	51.7
Approach		445	7.3	0.334	8.3	LOS A	2.2	16.1	0.21	0.61	51.7
North: Reserved Rd - N											
7	L2	325	3.2	0.342	5.6	LOS A	2.1	15.1	0.37	0.57	53.1
8	T1	61	1.7	0.342	5.8	LOS A	2.1	15.1	0.37	0.57	54.2
9	R2	3	33.3	0.342	9.9	LOS A	2.1	15.1	0.37	0.57	52.4
Approach		389	3.2	0.342	5.7	LOS A	2.1	15.1	0.37	0.57	53.2
West: Enterprise Centre - W											
10	L2	17	6.3	0.041	12.7	LOS A	0.3	2.2	0.87	0.70	48.2
11	T1	4	0.0	0.041	12.6	LOS A	0.3	2.2	0.87	0.70	49.3
12	R2	1	0.0	0.041	15.9	LOS B	0.3	2.2	0.87	0.70	49.0
Approach		22	4.8	0.041	12.8	LOS A	0.3	2.2	0.87	0.70	48.5
All Vehicles		1360	3.7	0.534	8.2	LOS A	4.8	33.9	0.48	0.65	51.9

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: 1 [Reserve Rd/Campbell St (Ex-AM)]

16S9001000 - 12 Frederick St, St Leonards  
 Signals - Fixed Time Isolated Cycle Time = 65 seconds (Minimum Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	143	14.0	0.240	13.7	LOS A	2.8	21.8	0.68	0.70	48.4
2	T1	216	5.9	0.240	14.6	LOS B	3.9	29.0	0.74	0.63	47.9
Approach		359	9.1	0.240	14.3	LOS A	3.9	29.0	0.71	0.66	48.1
East: Bunning Access - E											
4	L2	26	0.0	0.142	36.7	LOS C	0.8	5.7	0.95	0.71	36.8
5	T1	36	0.0	0.422	32.5	LOS C	2.6	18.2	0.99	0.76	37.9
6	R2	44	0.0	0.422	38.0	LOS C	2.6	18.2	0.99	0.76	37.1
Approach		106	0.0	0.422	35.9	LOS C	2.6	18.2	0.98	0.74	37.3
North: Reserved Rd - N											
7	L2	71	1.5	0.223	16.9	LOS B	3.9	28.1	0.64	0.61	48.1
8	T1	582	2.4	0.834	21.0	LOS B	20.3	147.3	0.92	0.92	43.9
9	R2	147	10.0	0.834	29.5	LOS C	20.3	147.3	1.00	1.01	41.4
Approach		800	3.7	0.834	22.2	LOS B	20.3	147.3	0.91	0.91	43.7
West: Campbell St - W											
10	L2	97	30.4	0.238	27.9	LOS B	2.6	22.6	0.84	0.76	39.8
11	T1	59	0.0	0.604	27.9	LOS B	6.9	49.6	0.98	0.82	39.4
12	R2	162	5.2	0.604	33.5	LOS C	6.9	49.6	0.98	0.82	38.5
Approach		318	11.9	0.604	30.8	LOS C	6.9	49.6	0.94	0.80	39.1
All Vehicles		1583	6.3	0.834	23.0	LOS B	20.3	147.3	0.87	0.82	43.1

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	10.6	LOS B	0.1	0.1	0.65	0.65	
P3	North Full Crossing	53	22.5	LOS C	0.1	0.1	0.91	0.91	
P4	West Full Crossing	53	17.0	LOS B	0.1	0.1	0.80	0.80	
All Pedestrians		158	16.7	LOS B			0.79	0.79	

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: 1 [Reserve Rd/Campbell St (Ex-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	275	5.7	0.899	37.4	LOS C	15.7	114.3	1.00	1.14	37.3
2	T1	568	2.8	0.899	34.1	LOS C	15.7	114.3	0.98	1.12	38.0
Approach		843	3.7	0.899	35.2	LOS C	15.7	114.3	0.98	1.12	37.8
East: Bunning Access - E											
4	L2	39	0.0	0.210	34.2	LOS C	1.1	7.9	0.95	0.72	37.8
5	T1	47	0.0	0.543	30.1	LOS C	3.1	21.9	0.99	0.78	38.9
6	R2	56	0.0	0.543	35.6	LOS C	3.1	21.9	0.99	0.78	38.1
Approach		142	0.0	0.543	33.4	LOS C	3.1	21.9	0.98	0.77	38.2
North: Reserved Rd - N											
7	L2	47	0.0	0.163	15.5	LOS B	2.4	17.4	0.61	0.57	49.1
8	T1	275	3.8	0.612	16.9	LOS B	7.2	52.2	0.82	0.73	45.8
9	R2	99	5.3	0.612	26.2	LOS B	7.2	52.2	0.93	0.81	42.6
Approach		421	3.8	0.612	18.9	LOS B	7.2	52.2	0.82	0.73	45.3
West: Campbell St - W											
10	L2	100	12.6	0.176	21.2	LOS B	2.1	16.4	0.74	0.74	43.3
11	T1	38	0.0	0.554	28.1	LOS B	4.0	28.7	0.98	0.79	39.3
12	R2	99	3.2	0.554	33.7	LOS C	4.0	28.7	0.98	0.79	38.5
Approach		237	6.7	0.554	27.5	LOS B	4.0	28.7	0.88	0.77	40.5
All Vehicles		1643	3.8	0.899	29.8	LOS C	15.7	114.3	0.93	0.94	39.9

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	12.7	LOS B	0.1	0.1	0.65	0.65	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
All Pedestrians		158	20.5	LOS C			0.82	0.82	

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: 101 [Campbell St/Pacific Hwy (Ex-AM)]**

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1055	4.8	0.355	4.4	LOS A	9.7	70.9	0.32	0.29	56.0
3	R2	297	4.3	0.873	77.7	LOS F	22.8	165.4	1.00	1.19	25.3
Approach		1352	4.7	0.873	20.5	LOS B	22.8	165.4	0.47	0.49	44.2
East: Campbell St - E											
4	L2	102	5.2	0.190	40.7	LOS C	4.8	34.9	0.78	0.74	33.3
6	R2	133	6.3	0.285	60.7	LOS E	3.9	28.6	0.94	0.76	28.2
Approach		235	5.8	0.285	52.0	LOS D	4.8	34.9	0.87	0.75	30.2
North: Pacific Hwy - N											
7	L2	165	5.1	0.507	19.4	LOS B	19.2	141.9	0.58	0.59	43.9
8	T1	1573	7.4	0.507	14.5	LOS B	20.2	150.2	0.60	0.56	48.2
Approach		1738	7.1	0.507	15.0	LOS B	20.2	150.2	0.60	0.56	47.8
All Vehicles		3324	6.0	0.873	19.8	LOS B	22.8	165.4	0.56	0.55	44.5

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

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: 101 [Campbell St/Pacific Hwy (Ex-PM)]**

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1357	3.9	0.455	4.9	LOS A	14.0	101.6	0.36	0.33	55.5
3	R2	154	6.2	0.383	19.9	LOS B	5.9	43.5	0.66	0.77	42.1
Approach		1511	4.1	0.455	6.4	LOS A	14.0	101.6	0.39	0.38	53.8
East: Campbell St - E											
4	L2	161	0.7	0.290	41.9	LOS C	7.8	54.8	0.81	0.77	33.0
6	R2	265	2.0	0.554	63.1	LOS E	8.1	57.6	0.99	0.80	27.7
Approach		426	1.5	0.554	55.1	LOS D	8.1	57.6	0.92	0.79	29.5
North: Pacific Hwy - N											
7	L2	80	2.6	0.388	18.2	LOS B	13.8	99.2	0.53	0.52	44.9
8	T1	1283	3.4	0.388	13.1	LOS A	14.3	102.9	0.54	0.49	49.2
Approach		1363	3.4	0.388	13.4	LOS A	14.3	102.9	0.54	0.50	48.9
All Vehicles		3300	3.5	0.554	15.6	LOS B	14.3	102.9	0.52	0.48	46.9

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

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: 1 [Herbert St/Cleg St (2026 Base-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	82	5.1	0.081	11.9	LOS A	1.1	7.9	0.48	0.68	48.9
2	T1	299	0.7	0.352	5.8	LOS A	3.6	25.7	0.40	0.38	54.4
3	R2	27	7.7	0.352	11.4	LOS A	3.6	25.7	0.40	0.38	52.8
Approach		408	2.1	0.352	7.4	LOS A	3.6	25.7	0.42	0.44	53.1
East: Cleg St - E											
4	L2	58	3.6	0.161	12.4	LOS A	0.9	6.2	0.68	0.68	49.5
5	T1	124	1.7	0.806	27.1	LOS B	6.0	42.5	0.93	0.91	40.3
6	R2	81	2.6	0.806	36.3	LOS C	6.0	42.5	0.97	0.95	38.1
Approach		263	2.4	0.806	26.7	LOS B	6.0	42.5	0.89	0.87	41.3
North: Herbert St - N											
7	L2	40	0.0	0.138	11.1	LOS A	2.0	13.9	0.46	0.46	52.5
8	T1	756	0.6	0.688	8.4	LOS A	14.5	102.0	0.69	0.65	52.2
9	R2	81	0.0	0.688	14.4	LOS A	14.5	102.0	0.73	0.68	50.7
Approach		877	0.5	0.688	9.1	LOS A	14.5	102.0	0.69	0.64	52.1
West: Cleg St - W											
10	L2	89	1.2	0.230	15.4	LOS B	2.0	14.2	0.72	0.70	47.7
11	T1	155	2.0	1.136	133.2	LOS F	25.7	184.9	0.94	1.65	18.3
12	R2	166	3.8	1.136	171.6	LOS F	25.7	184.9	1.00	1.91	15.5
Approach		411	2.6	1.136	123.1	LOS F	25.7	184.9	0.92	1.55	19.5
All Vehicles		1959	1.5	1.136	35.0	LOS C	25.7	184.9	0.71	0.82	37.7

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

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: 1 [Herbert St/Cleg St (2026 Base-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	122	3.4	0.119	12.1	LOS A	1.7	11.9	0.49	0.69	48.8
2	T1	555	0.9	0.548	4.7	LOS A	6.5	45.7	0.40	0.38	55.4
3	R2	37	0.0	0.548	10.2	LOS A	6.5	45.7	0.40	0.38	54.0
Approach		714	1.3	0.548	6.2	LOS A	6.5	45.7	0.41	0.43	54.1
East: Cleg St - E											
4	L2	47	2.2	0.114	12.4	LOS A	0.8	5.5	0.64	0.66	49.5
5	T1	125	3.4	0.570	21.8	LOS B	4.7	33.5	0.90	0.76	43.0
6	R2	60	0.0	0.570	29.1	LOS C	4.7	33.5	0.93	0.78	41.4
Approach		233	2.3	0.570	21.8	LOS B	4.7	33.5	0.85	0.75	43.8
North: Herbert St - N											
7	L2	18	0.0	0.084	10.9	LOS A	1.2	8.3	0.44	0.42	52.9
8	T1	386	0.8	0.421	7.1	LOS A	6.1	42.8	0.56	0.53	53.0
9	R2	63	0.0	0.421	13.1	LOS A	6.1	42.8	0.59	0.56	51.4
Approach		467	0.7	0.421	8.1	LOS A	6.1	42.8	0.56	0.53	52.8
West: Cleg St - W											
10	L2	89	1.2	0.120	7.5	LOS A	0.6	4.0	0.36	0.66	52.1
11	T1	99	2.1	0.591	25.1	LOS B	5.2	37.5	0.96	0.81	41.3
12	R2	84	5.0	0.591	30.7	LOS C	5.2	37.5	0.96	0.81	40.4
Approach		273	2.7	0.591	21.0	LOS B	5.2	37.5	0.76	0.76	44.0
All Vehicles		1686	1.5	0.591	11.3	LOS A	6.5	45.7	0.57	0.55	50.2

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

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: 1 [Herbert St/Frederick St (2026 Base-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	311	6.8	0.245	9.3	LOS A	3.6	27.0	0.37	0.68	50.6
2	T1	381	1.4	0.519	17.3	LOS B	10.2	72.0	0.81	0.70	46.7
3	R2	7	0.0	0.519	22.9	LOS B	10.2	72.0	0.81	0.70	45.7
Approach		699	3.8	0.519	13.8	LOS A	10.2	72.0	0.61	0.69	48.3
East: Carpark Access - E											
4	L2	2	0.0	0.016	39.6	LOS C	0.1	0.5	0.95	0.61	35.8
5	T1	24	4.3	0.190	33.0	LOS C	1.2	8.5	0.95	0.70	38.2
6	R2	12	0.0	0.190	38.5	LOS C	1.2	8.5	0.95	0.70	37.5
Approach		38	2.8	0.190	35.0	LOS C	1.2	8.5	0.95	0.70	37.8
North: Herbert St - N											
7	L2	36	2.9	0.357	20.9	LOS B	6.7	47.1	0.73	0.64	46.4
8	T1	616	1.0	1.188	135.5	LOS F	58.4	414.5	0.89	1.64	18.3
9	R2	152	2.8	1.188	220.8	LOS F	58.4	414.5	1.00	2.30	12.9
Approach		803	1.4	1.188	146.5	LOS F	58.4	414.5	0.91	1.72	17.4
West: Frederick St - W											
10	L2	92	5.7	0.309	30.5	LOS C	3.7	26.5	0.87	0.75	39.8
11	T1	34	0.0	0.309	24.9	LOS B	3.7	26.5	0.87	0.75	40.7
12	R2	464	2.3	1.046	105.9	LOS F	32.5	231.9	1.00	1.40	21.5
Approach		589	2.7	1.046	89.5	LOS F	32.5	231.9	0.97	1.26	23.9
All Vehicles		2129	2.6	1.188	85.2	LOS F	58.4	414.5	0.83	1.24	24.6

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
P2	East Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
All Pedestrians		211	23.7	LOS C			0.82	0.82	

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: 1 [Herbert St/Frederick St (2026 Base-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	414	4.8	0.323	9.6	LOS A	5.2	38.0	0.40	0.70	50.5
2	T1	427	0.7	0.541	16.8	LOS B	11.2	78.8	0.81	0.70	47.0
3	R2	2	0.0	0.541	22.4	LOS B	11.2	78.8	0.81	0.70	46.0
Approach		843	2.7	0.541	13.3	LOS A	11.2	78.8	0.61	0.70	48.6
East: Carpark Access - E											
4	L2	12	9.1	0.093	40.8	LOS C	0.4	3.0	0.96	0.67	35.2
5	T1	60	3.5	0.468	34.3	LOS C	3.1	21.8	0.98	0.76	37.7
6	R2	28	0.0	0.468	39.8	LOS C	3.1	21.8	0.98	0.76	37.0
Approach		100	3.2	0.468	36.6	LOS C	3.1	21.8	0.98	0.75	37.2
North: Herbert St - N											
7	L2	7	28.6	0.260	20.4	LOS B	4.7	33.0	0.69	0.58	46.4
8	T1	491	0.4	0.865	26.7	LOS B	15.6	110.7	0.87	0.87	41.3
9	R2	96	5.5	0.865	40.6	LOS C	15.6	110.7	0.98	1.06	36.8
Approach		594	1.6	0.865	28.8	LOS C	15.6	110.7	0.88	0.90	40.6
West: Frederick St - W											
10	L2	155	0.7	0.427	31.3	LOS C	5.2	36.7	0.90	0.79	39.1
11	T1	17	6.3	0.427	25.7	LOS B	5.2	36.7	0.90	0.79	39.9
12	R2	471	1.3	1.053	110.8	LOS F	33.8	239.7	1.00	1.42	20.9
Approach		642	1.3	1.053	89.4	LOS F	33.8	239.7	0.97	1.25	23.9
All Vehicles		2179	2.0	1.053	41.0	LOS C	33.8	239.7	0.81	0.92	35.4

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92	
P2	East Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	18.6	LOS B	0.1	0.1	0.73	0.73	
All Pedestrians		211	23.7	LOS C			0.82	0.82	

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: 1 [Herbert St/Westbourne St (2026 Base-AM)]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	144	0.0	0.446	5.9	LOS A	1.3	9.8	0.08	0.11	57.1
2	T1	635	7.5	0.446	0.1	LOS A	1.3	9.8	0.08	0.11	58.6
Approach		779	6.1	0.446	1.2	NA	1.3	9.8	0.08	0.11	58.3
North: Herbert St - N											
8	T1	737	1.7	0.858	9.6	LOS A	25.2	178.6	0.57	0.73	50.2
9	R2	101	0.0	0.858	28.5	LOS C	25.2	178.6	0.57	0.73	48.6
Approach		838	1.5	0.858	11.9	NA	25.2	178.6	0.57	0.73	50.0
West: Westbourne St - W											
10	L2	29	0.0	0.272	10.2	LOS A	0.5	3.8	0.76	0.92	45.8
12	R2	22	0.0	0.272	26.2	LOS B	0.5	3.8	0.76	0.92	45.5
Approach		52	0.0	0.272	17.1	LOS B	0.5	3.8	0.76	0.92	45.7
All Vehicles		1668	3.6	0.858	7.0	NA	25.2	178.6	0.35	0.45	53.4

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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Organisation: GTA CONSULTANTS | Processed: Tuesday, 21 November 2017 9:54:13 AM

Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPH\Modelling\Response to Submissions

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# MOVEMENT SUMMARY

## Site: 1 [Herbert St/Westbourne St (2026 Base-PM)]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Herbert St - S											
1	L2	32	3.3	0.323	5.9	LOS A	0.3	1.9	0.02	0.03	57.8
2	T1	571	3.1	0.323	0.0	LOS A	0.3	1.9	0.02	0.03	59.6
Approach		602	3.1	0.323	0.3	NA	0.3	1.9	0.02	0.03	59.5
North: Herbert St - N											
8	T1	752	0.6	0.756	4.8	LOS A	15.0	105.6	0.55	0.48	55.2
9	R2	35	0.0	0.756	17.2	LOS B	15.0	105.6	0.55	0.48	53.2
Approach		786	0.5	0.756	5.3	NA	15.0	105.6	0.55	0.48	55.1
West: Westbourne St - W											
10	L2	53	0.0	0.509	12.8	LOS A	1.3	8.8	0.75	0.99	44.8
12	R2	59	0.0	0.509	24.5	LOS B	1.3	8.8	0.75	0.99	44.4
Approach		112	0.0	0.509	19.0	LOS B	1.3	8.8	0.75	0.99	44.6
All Vehicles		1500	1.5	0.756	4.3	NA	15.0	105.6	0.35	0.34	55.8

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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Organisation: GTA CONSULTANTS | Processed: Tuesday, 21 November 2017 9:54:24 AM

Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPH\Modelling\Response to Submissions

\171128sid\_16S9001000\_2026 BASE CASE.sip7

# MOVEMENT SUMMARY

## Site: 1 [Herbert St/Pacific Hwy (2026 Base-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1515	3.8	0.532	20.1	LOS B	22.0	159.1	0.68	0.61	45.2
6	R2	456	2.1	0.655	57.4	LOS E	14.2	101.1	0.97	0.83	30.6
Approach		1971	3.4	0.655	28.7	LOS C	22.0	159.1	0.75	0.66	40.7
North: Herbert St - N											
7	L2	648	1.9	0.924	62.8	LOS E	44.9	319.9	0.96	0.97	29.1
9	R2	189	2.2	0.793	70.0	LOS E	12.5	89.5	1.00	0.89	27.8
Approach		838	2.0	0.924	64.4	LOS E	44.9	319.9	0.97	0.95	28.8
West: Pacific Highway - W											
10	L2	180	8.8	0.167	12.9	LOS A	3.7	28.1	0.45	0.69	48.1
11	T1	1654	5.3	0.577	20.8	LOS B	24.5	179.2	0.71	0.63	44.7
Approach		1834	5.6	0.577	20.0	LOS B	24.5	179.2	0.68	0.64	45.1
All Vehicles		4642	4.0	0.924	31.7	LOS C	44.9	319.9	0.76	0.70	39.3

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		105	39.3	LOS D			0.75	0.75	

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: 1 [Herbert St/Pacific Hwy (2026 Base-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1779	3.7	0.617	21.4	LOS B	27.3	196.9	0.73	0.66	44.4
6	R2	364	0.6	0.518	55.7	LOS D	11.0	77.1	0.94	0.81	31.0
Approach		2143	3.1	0.617	27.2	LOS B	27.3	196.9	0.76	0.68	41.4
North: Herbert St - N											
7	L2	575	0.7	0.838	47.4	LOS D	33.0	232.4	0.92	0.89	33.2
9	R2	219	0.0	0.902	79.7	LOS F	15.9	111.4	1.00	0.99	25.9
Approach		794	0.5	0.902	56.3	LOS D	33.0	232.4	0.94	0.92	30.8
West: Pacific Highway - W											
10	L2	157	9.4	0.146	12.8	LOS A	3.2	24.3	0.45	0.68	48.2
11	T1	1486	2.4	0.505	19.8	LOS B	20.6	147.2	0.67	0.60	45.3
Approach		1643	3.1	0.505	19.1	LOS B	20.6	147.2	0.65	0.61	45.6
All Vehicles		4580	2.7	0.902	29.4	LOS C	33.0	232.4	0.75	0.70	40.3

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	19.4	LOS B	0.1	0.1	0.55	0.55	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		105	39.3	LOS D			0.75	0.75	

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: 1 [Reserve Rd/Frederick St (2026 Base-AM)]**

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
2	T1	113	2.8	0.125	5.6	LOS A	0.7	5.2	0.34	0.53	53.4
3	R2	31	0.0	0.125	8.9	LOS A	0.7	5.2	0.34	0.53	53.1
Approach		143	2.2	0.125	6.3	LOS A	0.7	5.2	0.34	0.53	53.4
East: Frederick St - E											
4	L2	151	0.7	0.271	7.2	LOS A	1.6	12.2	0.48	0.66	51.4
5	T1	9	0.0	0.271	7.4	LOS A	1.6	12.2	0.48	0.66	52.5
6	R2	88	28.6	0.271	11.6	LOS A	1.6	12.2	0.48	0.66	50.9
Approach		248	10.6	0.271	8.8	LOS A	1.6	12.2	0.48	0.66	51.3
North: Reserved Rd - N											
7	L2	566	2.2	0.626	4.9	LOS A	6.4	45.4	0.21	0.49	53.5
8	T1	351	0.0	0.626	5.1	LOS A	6.4	45.4	0.21	0.49	54.6
9	R2	35	15.2	0.626	8.6	LOS A	6.4	45.4	0.21	0.49	53.5
Approach		952	1.9	0.626	5.1	LOS A	6.4	45.4	0.21	0.49	53.9
West: Enterprise Centre - W											
10	L2	4	25.0	0.010	6.2	LOS A	0.1	0.4	0.39	0.52	51.7
11	T1	5	0.0	0.010	5.9	LOS A	0.1	0.4	0.39	0.52	53.7
12	R2	1	0.0	0.010	9.2	LOS A	0.1	0.4	0.39	0.52	53.3
Approach		11	10.0	0.010	6.3	LOS A	0.1	0.4	0.39	0.52	52.8
All Vehicles		1354	3.6	0.626	5.9	LOS A	6.4	45.4	0.28	0.53	53.3

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPHModelling\Response to Submissions

\171128sid\_16S9001000\_2026 BASE CASE.sip7

# MOVEMENT SUMMARY

 Site: 1 [Reserve Rd/Frederick St (2026 Base-PM)]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	1	0.0	0.683	13.1	LOS A	9.5	66.9	0.93	0.91	47.5
2	T1	420	0.5	0.683	13.4	LOS A	9.5	66.9	0.93	0.91	48.3
3	R2	193	1.1	0.683	16.7	LOS B	9.5	66.9	0.93	0.91	48.0
Approach		614	0.7	0.683	14.4	LOS A	9.5	66.9	0.93	0.91	48.2
East: Frederick St - E											
4	L2	32	3.3	0.387	5.1	LOS A	2.7	20.0	0.26	0.61	51.2
5	T1	2	0.0	0.387	5.3	LOS A	2.7	20.0	0.26	0.61	52.2
6	R2	474	6.7	0.387	8.7	LOS A	2.7	20.0	0.26	0.61	51.6
Approach		507	6.4	0.387	8.4	LOS A	2.7	20.0	0.26	0.61	51.6
North: Reserved Rd - N											
7	L2	397	2.7	0.435	6.0	LOS A	3.0	21.5	0.45	0.60	52.9
8	T1	75	1.4	0.435	6.2	LOS A	3.0	21.5	0.45	0.60	54.0
9	R2	4	25.0	0.435	10.1	LOS A	3.0	21.5	0.45	0.60	52.5
Approach		476	2.7	0.435	6.0	LOS A	3.0	21.5	0.45	0.60	53.0
West: Enterprise Centre - W											
10	L2	21	5.0	0.065	17.2	LOS B	0.6	4.1	1.00	0.76	45.6
11	T1	5	0.0	0.065	17.1	LOS B	0.6	4.1	1.00	0.76	46.5
12	R2	1	0.0	0.065	20.4	LOS B	0.6	4.1	1.00	0.76	46.2
Approach		27	3.8	0.065	17.3	LOS B	0.6	4.1	1.00	0.76	45.8
All Vehicles		1624	3.1	0.683	10.2	LOS A	9.5	66.9	0.58	0.73	50.5

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPHModelling\Response to Submissions

\171128sid\_16S9001000\_2026 BASE CASE.sip7

# MOVEMENT SUMMARY

## Site: 1 [Reserve Rd/Campbell St (2026 Base-AM)]

16S9001000 - 12 Frederick St, St Leonards  
 Signals - Fixed Time Isolated Cycle Time = 65 seconds (Minimum Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	175	11.4	0.290	13.9	LOS A	3.5	26.9	0.70	0.71	48.3
2	T1	263	4.8	0.290	15.0	LOS B	4.9	35.8	0.75	0.65	47.7
Approach		438	7.5	0.290	14.5	LOS B	4.9	35.8	0.73	0.68	47.9
East: Bunning Access - E											
4	L2	32	0.0	0.170	36.9	LOS C	1.0	6.9	0.96	0.72	36.7
5	T1	43	0.0	0.510	32.9	LOS C	3.2	22.3	1.00	0.77	37.7
6	R2	54	0.0	0.510	38.4	LOS C	3.2	22.3	1.00	0.77	36.9
Approach		128	0.0	0.510	36.2	LOS C	3.2	22.3	0.99	0.76	37.1
North: Reserved Rd - N											
7	L2	86	1.2	0.276	17.3	LOS B	5.1	35.9	0.66	0.62	47.9
8	T1	709	1.9	1.035	68.7	LOS E	46.7	336.6	0.92	1.37	27.1
9	R2	180	8.2	1.035	92.2	LOS F	46.7	336.6	1.00	1.61	23.4
Approach		976	3.0	1.035	68.5	LOS E	46.7	336.6	0.91	1.35	27.3
West: Campbell St - W											
10	L2	118	25.0	0.280	28.1	LOS B	3.2	26.9	0.86	0.77	39.8
11	T1	72	0.0	0.809	32.8	LOS C	9.4	67.6	1.00	0.97	37.4
12	R2	198	4.3	0.809	38.4	LOS C	9.4	67.6	1.00	0.97	36.7
Approach		387	9.8	0.809	34.2	LOS C	9.4	67.6	0.96	0.91	37.7
All Vehicles		1929	5.2	1.035	47.2	LOS D	46.7	336.6	0.88	1.07	32.9

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	10.6	LOS B	0.1	0.1	0.65	0.65	
P3	North Full Crossing	53	22.5	LOS C	0.1	0.1	0.91	0.91	
P4	West Full Crossing	53	17.0	LOS B	0.1	0.1	0.80	0.80	
All Pedestrians		158	16.7	LOS B			0.79	0.79	

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: 1 [Reserve Rd/Campbell St (2026 Base-PM)]

16S9001000 - 12 Frederick St, St Leonards  
 Signals - Fixed Time Isolated Cycle Time = 65 seconds (Minimum Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	335	4.7	0.867	30.8	LOS C	18.1	130.4	0.96	1.02	40.0
2	T1	689	2.3	0.867	28.3	LOS B	18.1	130.4	0.92	1.00	40.5
Approach		1024	3.1	0.867	29.1	LOS C	18.1	130.4	0.94	1.01	40.3
East: Bunning Access - E											
4	L2	47	0.0	0.255	37.3	LOS C	1.5	10.5	0.97	0.73	36.6
5	T1	58	0.0	0.665	34.3	LOS C	4.3	30.2	1.00	0.84	37.2
6	R2	68	0.0	0.665	39.8	LOS C	4.3	30.2	1.00	0.84	36.5
Approach		174	0.0	0.665	37.3	LOS C	4.3	30.2	0.99	0.81	36.7
North: Reserved Rd - N											
7	L2	58	0.0	0.218	16.9	LOS B	3.9	27.6	0.64	0.59	48.4
8	T1	335	3.1	0.816	21.9	LOS B	10.7	77.2	0.84	0.82	43.2
9	R2	121	4.3	0.816	35.5	LOS C	10.7	77.2	1.00	1.00	38.5
Approach		514	3.1	0.816	24.5	LOS B	10.7	77.2	0.86	0.84	42.5
West: Campbell St - W											
10	L2	122	10.3	0.265	27.7	LOS B	3.2	24.7	0.85	0.77	40.3
11	T1	46	0.0	0.451	26.8	LOS B	5.0	35.4	0.94	0.79	39.9
12	R2	121	2.6	0.451	32.3	LOS C	5.0	35.4	0.94	0.79	39.1
Approach		289	5.5	0.451	29.5	LOS C	5.0	35.4	0.90	0.78	39.7
All Vehicles		2001	3.2	0.867	28.7	LOS C	18.1	130.4	0.92	0.91	40.4

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	10.6	LOS B	0.1	0.1	0.65	0.65	
P3	North Full Crossing	53	22.5	LOS C	0.1	0.1	0.91	0.91	
P4	West Full Crossing	53	17.0	LOS B	0.1	0.1	0.80	0.80	
All Pedestrians		158	16.7	LOS B			0.79	0.79	

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: 101 [Campbell St/Pacific Hwy (2026 Base-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1108	4.6	0.373	4.5	LOS A	10.4	75.8	0.33	0.30	55.9
3	R2	312	4.1	0.942	105.7	LOS F	28.0	202.5	1.00	1.29	21.2
Approach		1420	4.4	0.942	26.7	LOS B	28.0	202.5	0.48	0.52	41.1
East: Campbell St - E											
4	L2	124	4.2	0.230	41.2	LOS C	5.9	42.7	0.79	0.75	33.2
6	R2	162	5.2	0.346	61.2	LOS E	4.8	35.0	0.95	0.77	28.1
Approach		286	4.8	0.346	52.5	LOS D	5.9	42.7	0.88	0.76	30.1
North: Pacific Hwy - N											
7	L2	174	4.8	0.532	19.7	LOS B	20.6	152.0	0.59	0.61	43.8
8	T1	1653	7.0	0.532	14.8	LOS B	21.7	161.0	0.61	0.57	48.0
Approach		1826	6.8	0.532	15.3	LOS B	21.7	161.0	0.61	0.58	47.6
All Vehicles		3533	5.7	0.942	22.9	LOS B	28.0	202.5	0.58	0.57	42.8

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

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: 101 [Campbell St/Pacific Hwy (2026 Base-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1426	3.7	0.477	5.1	LOS A	15.2	109.7	0.37	0.34	55.4
3	R2	161	5.9	0.415	22.0	LOS B	7.0	51.2	0.74	0.80	41.1
Approach		1587	3.9	0.477	6.8	LOS A	15.2	109.7	0.41	0.39	53.5
East: Campbell St - E											
4	L2	197	0.5	0.417	42.8	LOS D	9.7	68.5	0.83	0.78	32.8
6	R2	323	1.6	0.748	66.6	LOS E	11.6	82.5	1.00	0.87	27.0
Approach		520	1.2	0.748	57.6	LOS E	11.6	82.5	0.93	0.83	28.9
North: Pacific Hwy - N											
7	L2	84	2.5	0.407	18.4	LOS B	14.7	105.8	0.54	0.53	44.8
8	T1	1348	3.3	0.407	13.3	LOS A	15.2	109.7	0.55	0.50	49.1
Approach		1433	3.2	0.407	13.6	LOS A	15.2	109.7	0.55	0.51	48.8
All Vehicles		3540	3.2	0.748	17.0	LOS B	15.2	109.7	0.54	0.50	46.0

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

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: 1 [Herbert St/Cleg St (2016PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	67	6.3	0.076	14.0	LOS A	1.0	7.5	0.54	0.69	47.5
2	T1	294	0.7	0.367	8.5	LOS A	4.5	31.6	0.51	0.46	52.4
3	R2	22	9.5	0.367	14.2	LOS A	4.5	31.6	0.51	0.46	50.7
Approach		383	2.2	0.367	9.8	LOS A	4.5	31.6	0.51	0.50	51.4
East: Cleg St - E											
4	L2	47	4.4	0.085	10.3	LOS A	0.6	4.1	0.53	0.66	50.3
5	T1	102	2.1	0.424	19.6	LOS B	4.1	29.5	0.85	0.74	44.1
6	R2	66	3.2	0.424	25.9	LOS B	4.1	29.5	0.87	0.74	42.8
Approach		216	2.9	0.424	19.5	LOS B	4.1	29.5	0.79	0.72	44.9
North: Herbert St - N											
7	L2	33	0.0	0.136	13.1	LOS A	2.0	14.2	0.53	0.50	51.1
8	T1	676	0.6	0.681	10.6	LOS A	13.9	97.5	0.75	0.68	50.6
9	R2	66	0.0	0.681	16.7	LOS B	13.9	97.5	0.79	0.72	49.1
Approach		775	0.5	0.681	11.3	LOS A	13.9	97.5	0.74	0.68	50.5
West: Cleg St - W											
10	L2	74	1.4	0.135	10.5	LOS A	0.9	6.5	0.56	0.66	50.5
11	T1	127	2.5	0.668	21.7	LOS B	7.1	51.2	0.90	0.83	42.6
12	R2	137	4.6	0.668	29.3	LOS C	7.1	51.2	0.95	0.85	40.8
Approach		338	3.1	0.668	22.3	LOS B	7.1	51.2	0.85	0.80	43.3
All Vehicles		1712	1.7	0.681	14.2	LOS A	13.9	97.5	0.72	0.67	48.3

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	23.5	LOS C	0.1	0.1	0.89	0.89	
P2	East Full Crossing	53	12.1	LOS B	0.1	0.1	0.63	0.63	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	10.2	LOS B	0.1	0.1	0.58	0.58	
All Pedestrians		211	17.5	LOS B			0.75	0.75	

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: 1 [Herbert St/Cleg St (2016PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	100	4.2	0.102	11.4	LOS A	1.3	9.6	0.46	0.67	49.4
2	T1	532	1.0	0.510	4.5	LOS A	5.8	40.7	0.38	0.36	55.6
3	R2	31	0.0	0.510	10.0	LOS A	5.8	40.7	0.38	0.36	54.2
Approach		662	1.4	0.510	5.8	LOS A	5.8	40.7	0.39	0.40	54.5
East: Cleg St - E											
4	L2	39	2.7	0.083	12.1	LOS A	0.6	4.4	0.61	0.65	49.6
5	T1	103	4.1	0.417	21.3	LOS B	3.8	27.1	0.88	0.74	43.3
6	R2	49	0.0	0.417	28.4	LOS B	3.8	27.1	0.91	0.75	41.8
Approach		192	2.7	0.417	21.3	LOS B	3.8	27.1	0.83	0.72	44.0
North: Herbert St - N											
7	L2	15	0.0	0.075	10.9	LOS A	1.0	7.3	0.44	0.41	53.0
8	T1	364	0.9	0.373	6.9	LOS A	5.4	38.3	0.54	0.51	53.2
9	R2	52	0.0	0.373	12.8	LOS A	5.4	38.3	0.57	0.53	51.7
Approach		431	0.7	0.373	7.7	LOS A	5.4	38.3	0.54	0.51	53.0
West: Cleg St - W											
10	L2	74	1.4	0.097	7.2	LOS A	0.4	2.9	0.34	0.65	52.3
11	T1	81	2.6	0.472	23.3	LOS B	4.1	29.5	0.92	0.77	42.1
12	R2	69	6.1	0.472	28.9	LOS C	4.1	29.5	0.92	0.77	41.1
Approach		224	3.3	0.472	19.8	LOS B	4.1	29.5	0.73	0.73	44.6
All Vehicles		1508	1.7	0.510	10.4	LOS A	5.8	40.7	0.54	0.52	50.9

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

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: 1 [Herbert St/Frederick St (2016PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 78 seconds (Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Herbert St - S											
1	L2	255	8.3	0.333	14.0	LOS A	3.9	29.3	0.70	0.76	47.5
2	T1	361	1.5	0.828	36.5	LOS C	15.2	107.7	1.00	0.99	37.5
3	R2	6	0.0	0.828	42.1	LOS C	15.2	107.7	1.00	0.99	36.8
Approach		622	4.2	0.828	27.4	LOS B	15.2	107.7	0.88	0.90	41.0
East: Carpark Access - E											
4	L2	2	0.0	0.022	45.7	LOS D	0.1	0.6	0.97	0.61	33.8
5	T1	20	5.3	0.204	38.8	LOS C	1.1	8.1	0.97	0.70	36.0
6	R2	9	0.0	0.204	44.3	LOS D	1.1	8.1	0.97	0.70	35.4
Approach		32	3.3	0.204	40.9	LOS C	1.1	8.1	0.97	0.70	35.7
North: Herbert St - N											
7	L2	29	3.6	0.226	17.3	LOS B	4.6	32.7	0.60	0.53	48.5
8	T1	561	1.1	0.752	20.8	LOS B	15.9	112.8	0.82	0.82	44.1
9	R2	124	3.4	0.752	30.9	LOS C	15.9	112.8	0.93	0.97	40.9
Approach		715	1.6	0.752	22.4	LOS B	15.9	112.8	0.83	0.84	43.7
West: Frederick St - W											
10	L2	75	7.0	0.198	28.1	LOS B	2.9	21.5	0.79	0.72	40.9
11	T1	27	0.0	0.198	22.4	LOS B	2.9	21.5	0.79	0.72	41.9
12	R2	408	2.6	1.028	98.4	LOS F	28.3	202.4	1.00	1.30	22.6
Approach		511	3.1	1.028	84.0	LOS F	28.3	202.4	0.96	1.18	24.8
All Vehicles		1879	2.9	1.028	41.1	LOS C	28.3	202.4	0.88	0.95	35.5

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian ped	Distance m	per ped		
P1	South Full Crossing	53	33.3	LOS D	0.1	0.1	0.93	0.93	
P2	East Full Crossing	53	33.3	LOS D	0.1	0.1	0.93	0.93	
P3	North Full Crossing	53	32.4	LOS D	0.1	0.1	0.91	0.91	
P4	West Full Crossing	53	30.6	LOS D	0.1	0.1	0.89	0.89	
All Pedestrians		211	32.4	LOS D			0.91	0.91	

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: 1 [Herbert St/Frederick St (2016PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	307	6.5	0.236	8.4	LOS A	2.9	21.4	0.34	0.67	51.3
2	T1	427	0.7	0.584	16.1	LOS B	10.2	71.8	0.85	0.73	47.4
3	R2	2	0.0	0.584	21.7	LOS B	10.2	71.8	0.85	0.73	46.4
Approach		737	3.1	0.584	12.9	LOS A	10.2	71.8	0.64	0.71	49.0
East: Carpark Access - E											
4	L2	9	11.1	0.110	38.3	LOS C	0.3	2.3	0.98	0.66	36.1
5	T1	49	4.3	0.578	32.9	LOS C	2.3	16.6	1.00	0.79	38.2
6	R2	23	0.0	0.578	38.4	LOS C	2.3	16.6	1.00	0.79	37.6
Approach		82	3.8	0.578	35.1	LOS C	2.3	16.6	1.00	0.77	37.8
North: Herbert St - N											
7	L2	6	33.3	0.230	19.6	LOS B	3.4	24.1	0.71	0.59	46.7
8	T1	449	0.5	0.767	20.6	LOS B	11.1	78.6	0.88	0.81	44.4
9	R2	79	6.7	0.767	30.1	LOS C	11.1	78.6	0.97	0.93	41.2
Approach		535	1.8	0.767	22.0	LOS B	11.1	78.6	0.89	0.82	44.0
West: Frederick St - W											
10	L2	127	0.8	0.302	25.0	LOS B	3.4	24.1	0.84	0.76	41.9
11	T1	14	7.7	0.302	19.5	LOS B	3.4	24.1	0.84	0.76	42.8
12	R2	412	1.5	0.791	31.3	LOS C	12.7	90.0	0.98	0.93	38.9
Approach		553	1.5	0.791	29.5	LOS C	12.7	90.0	0.95	0.89	39.6
All Vehicles		1906	2.3	0.791	21.2	LOS B	12.7	90.0	0.81	0.80	44.0

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	18.4	LOS B	0.1	0.1	0.79	0.79	
P3	North Full Crossing	53	23.5	LOS C	0.1	0.1	0.89	0.89	
P4	West Full Crossing	53	18.4	LOS B	0.1	0.1	0.79	0.79	
All Pedestrians		211	21.2	LOS C			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: 1 [Herbert St/Westbourne St (2016PD-AM)]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Herbert St - S											
1	L2	174	0.0	0.409	4.9	LOS A	1.6	11.8	0.11	0.13	43.8
2	T1	521	9.1	0.409	0.1	LOS A	1.6	11.8	0.11	0.13	48.9
Approach		695	6.8	0.409	1.3	NA	1.6	11.8	0.11	0.13	47.5
North: Herbert St - N											
8	T1	604	2.1	0.543	4.0	LOS A	4.8	33.9	0.57	0.21	46.3
9	R2	166	0.0	0.543	12.5	LOS A	4.8	33.9	0.57	0.21	41.3
Approach		771	1.6	0.543	5.9	NA	4.8	33.9	0.57	0.21	45.1
West: Westbourne St - W											
10	L2	73	0.0	0.695	16.6	LOS B	2.0	14.1	0.78	1.16	34.1
12	R2	66	0.0	0.695	32.5	LOS C	2.0	14.1	0.78	1.16	33.8
Approach		139	0.0	0.695	24.2	LOS B	2.0	14.1	0.78	1.16	33.9
All Vehicles		1604	3.7	0.695	5.5	NA	4.8	33.9	0.39	0.26	44.8

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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Project: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPH\Modelling\Tower B TIA\180124sid\_16S9001000\_2016 POST-DEV.sip7

# MOVEMENT SUMMARY

## Site: 1 [Herbert St/Westbourne St (2016PD-PM)]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	76	1.4	0.303	4.8	LOS A	0.7	4.7	0.06	0.07	44.2
2	T1	468	3.8	0.303	0.1	LOS A	0.7	4.7	0.06	0.07	49.4
Approach		544	3.5	0.303	0.7	NA	0.7	4.7	0.06	0.07	48.6
North: Herbert St - N											
8	T1	617	0.7	0.427	1.4	LOS A	2.1	14.6	0.28	0.10	48.3
9	R2	101	0.0	0.427	9.2	LOS A	2.1	14.6	0.28	0.10	42.9
Approach		718	0.6	0.427	2.5	NA	2.1	14.6	0.28	0.10	47.5
West: Westbourne St - W											
10	L2	120	0.0	0.991	57.3	LOS E	9.6	67.5	0.78	2.58	24.9
12	R2	125	0.0	0.991	69.7	LOS E	9.6	67.5	0.78	2.58	24.8
Approach		245	0.0	0.991	63.6	LOS E	9.6	67.5	0.78	2.58	24.8
All Vehicles		1507	1.5	0.991	11.8	NA	9.6	67.5	0.28	0.50	41.6

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: 1 [Herbert St/Pacific Hwy (2016PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1441	4.0	0.564	23.6	LOS B	21.1	153.0	0.76	0.67	43.3
6	R2	434	2.2	0.624	53.2	LOS D	12.4	88.5	0.96	0.82	30.4
Approach		1875	3.6	0.624	30.5	LOS C	21.1	153.0	0.80	0.71	39.4
North: Herbert St - N											
7	L2	532	2.4	0.571	32.4	LOS C	23.3	166.6	0.82	0.82	36.1
9	R2	204	2.1	0.638	55.0	LOS D	11.3	80.7	0.98	0.82	29.7
Approach		736	2.3	0.638	38.7	LOS C	23.3	166.6	0.86	0.82	34.0
West: Pacific Highway - W											
10	L2	227	6.9	0.198	12.6	LOS A	4.7	34.8	0.43	0.69	45.5
11	T1	1574	5.6	0.633	24.6	LOS B	24.6	180.3	0.79	0.70	42.8
Approach		1801	5.7	0.633	23.1	LOS B	24.6	180.3	0.74	0.70	43.1
All Vehicles		4412	4.2	0.638	28.8	LOS C	24.6	180.3	0.79	0.72	39.7

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	22.9	LOS C	0.1	0.1	0.62	0.62	
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		105	38.6	LOS D			0.79	0.79	

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: 1 [Herbert St/Pacific Hwy (2016PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1693	3.9	0.685	26.8	LOS B	27.3	197.7	0.83	0.74	41.7
6	R2	346	0.6	0.514	52.8	LOS D	9.7	68.3	0.94	0.81	31.8
Approach		2039	3.3	0.685	31.2	LOS C	27.3	197.7	0.85	0.76	39.6
North: Herbert St - N											
7	L2	472	0.9	0.482	30.7	LOS C	19.3	136.1	0.76	0.81	39.1
9	R2	257	0.0	0.691	54.8	LOS D	14.3	100.1	0.98	0.85	31.4
Approach		728	0.6	0.691	39.2	LOS C	19.3	136.1	0.84	0.82	36.0
West: Pacific Highway - W											
10	L2	199	7.4	0.171	12.1	LOS A	3.9	29.0	0.41	0.68	48.7
11	T1	1414	2.5	0.572	24.9	LOS B	21.4	152.9	0.77	0.68	42.6
Approach		1613	3.1	0.572	23.3	LOS B	21.4	152.9	0.73	0.68	43.3
All Vehicles		4380	2.8	0.691	29.6	LOS C	27.3	197.7	0.80	0.74	40.2

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	24.1	LOS C	0.1	0.1	0.63	0.63	
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		105	39.2	LOS D			0.79	0.79	

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: 1 [Reserve Rd/Frederick St (2016PD-AM)]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
2	T1	117	2.7	0.118	5.3	LOS A	0.7	4.9	0.28	0.51	53.7
3	R2	25	0.0	0.118	8.6	LOS A	0.7	4.9	0.28	0.51	53.4
Approach		142	2.2	0.118	5.9	LOS A	0.7	4.9	0.28	0.51	53.7
East: Frederick St - E											
4	L2	123	0.9	0.193	6.5	LOS A	1.0	8.2	0.41	0.61	52.2
5	T1	7	0.0	0.193	6.7	LOS A	1.0	8.2	0.41	0.61	53.2
6	R2	53	48.0	0.193	11.3	LOS A	1.0	8.2	0.41	0.61	50.9
Approach		183	14.4	0.193	7.9	LOS A	1.0	8.2	0.41	0.61	51.8
North: Reserved Rd - N											
7	L2	492	2.6	0.528	4.7	LOS A	4.3	30.6	0.16	0.50	53.6
8	T1	287	0.0	0.528	5.0	LOS A	4.3	30.6	0.16	0.50	54.8
9	R2	28	18.5	0.528	8.5	LOS A	4.3	30.6	0.16	0.50	53.6
Approach		807	2.2	0.528	5.0	LOS A	4.3	30.6	0.16	0.50	54.0
West: Enterprise Centre - W											
10	L2	3	33.3	0.008	6.1	LOS A	0.0	0.3	0.36	0.51	51.4
11	T1	4	0.0	0.008	5.7	LOS A	0.0	0.3	0.36	0.51	53.7
12	R2	1	0.0	0.008	9.0	LOS A	0.0	0.3	0.36	0.51	53.3
Approach		8	12.5	0.008	6.3	LOS A	0.0	0.3	0.36	0.51	52.8
All Vehicles		1141	4.2	0.528	5.6	LOS A	4.3	30.6	0.22	0.52	53.6

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPHModelling\Tower B TIA\180124sid\_16S9001000\_2016 POST-DEV.sip7

# MOVEMENT SUMMARY

 **Site: 1 [Reserve Rd/Frederick St (2016PD-PM)]**

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	1	0.0	0.561	8.5	LOS A	5.3	37.2	0.78	0.73	50.6
2	T1	383	0.5	0.561	8.8	LOS A	5.3	37.2	0.78	0.73	51.5
3	R2	158	1.3	0.561	12.1	LOS A	5.3	37.2	0.78	0.73	51.1
Approach		542	0.8	0.561	9.7	LOS A	5.3	37.2	0.78	0.73	51.4
East: Frederick St - E											
4	L2	26	4.0	0.315	4.9	LOS A	2.0	14.9	0.21	0.61	51.3
5	T1	2	0.0	0.315	5.1	LOS A	2.0	14.9	0.21	0.61	52.4
6	R2	388	8.1	0.315	8.6	LOS A	2.0	14.9	0.21	0.61	51.7
Approach		417	7.8	0.315	8.3	LOS A	2.0	14.9	0.21	0.61	51.7
North: Reserved Rd - N											
7	L2	351	3.0	0.363	5.6	LOS A	2.3	16.4	0.37	0.57	53.1
8	T1	61	1.7	0.363	5.8	LOS A	2.3	16.4	0.37	0.57	54.2
9	R2	3	33.3	0.363	9.9	LOS A	2.3	16.4	0.37	0.57	52.4
Approach		415	3.0	0.363	5.7	LOS A	2.3	16.4	0.37	0.57	53.2
West: Enterprise Centre - W											
10	L2	17	6.3	0.042	12.8	LOS A	0.3	2.3	0.87	0.71	48.1
11	T1	4	0.0	0.042	12.7	LOS A	0.3	2.3	0.87	0.71	49.2
12	R2	1	0.0	0.042	16.1	LOS B	0.3	2.3	0.87	0.71	48.9
Approach		22	4.8	0.042	12.9	LOS A	0.3	2.3	0.87	0.71	48.4
All Vehicles		1396	3.6	0.561	8.2	LOS A	5.3	37.2	0.49	0.65	51.9

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPHModelling\Tower B TIA\180124sid\_16S9001000\_2016 POST-DEV.sip7

# MOVEMENT SUMMARY

## Site: 1 [Reserve Rd/Campbell St (2016PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	167	11.9	0.729	21.6	LOS B	4.3	32.7	0.99	0.88	43.9
2	T1	216	5.9	0.729	27.3	LOS B	5.1	37.3	1.00	0.89	40.9
Approach		383	8.5	0.729	24.8	LOS B	5.1	37.3	0.99	0.88	42.2
East: Bunning Access - E											
4	L2	26	0.0	0.283	38.8	LOS C	0.8	5.8	0.99	0.70	36.1
5	T1	36	0.0	0.843	38.0	LOS C	2.8	19.6	1.00	0.93	35.9
6	R2	44	0.0	0.843	43.5	LOS D	2.8	19.6	1.00	0.93	35.2
Approach		106	0.0	0.843	40.4	LOS C	2.8	19.6	1.00	0.88	35.6
North: Reserved Rd - N											
7	L2	71	1.5	0.219	15.8	LOS B	3.4	24.0	0.63	0.60	48.8
8	T1	582	2.4	0.822	20.5	LOS B	15.5	112.8	0.88	0.97	44.1
9	R2	147	10.0	0.822	28.9	LOS C	15.5	112.8	0.95	1.07	41.7
Approach		800	3.7	0.822	21.6	LOS B	15.5	112.8	0.87	0.96	44.0
West: Campbell St - W											
10	L2	97	30.4	0.119	13.4	LOS A	1.4	12.5	0.52	0.69	47.2
11	T1	59	0.0	0.807	30.5	LOS C	8.0	57.6	1.00	0.97	38.3
12	R2	189	4.4	0.807	36.1	LOS C	8.0	57.6	1.00	0.97	37.5
Approach		345	11.0	0.807	28.8	LOS C	8.0	57.6	0.86	0.89	39.9
All Vehicles		1635	6.1	0.843	25.1	LOS B	15.5	112.8	0.91	0.92	42.0

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	12.7	LOS B	0.1	0.1	0.65	0.65	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
All Pedestrians		158	20.5	LOS C			0.82	0.82	

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: 1 [Reserve Rd/Campbell St (2016PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 67 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	314	5.0	0.708	18.5	LOS B	9.6	69.9	0.86	0.83	46.0
2	T1	565	2.8	0.708	18.3	LOS B	11.5	82.3	0.87	0.80	45.6
Approach		879	3.6	0.708	18.4	LOS B	11.5	82.3	0.86	0.81	45.7
East: Bunning Access - E											
4	L2	39	0.0	0.281	39.8	LOS C	1.3	9.2	0.98	0.72	35.7
5	T1	47	0.0	0.728	37.3	LOS C	3.7	26.1	1.00	0.86	36.1
6	R2	56	0.0	0.728	42.8	LOS D	3.7	26.1	1.00	0.86	35.4
Approach		142	0.0	0.728	40.2	LOS C	3.7	26.1	0.99	0.82	35.7
North: Reserved Rd - N											
7	L2	47	0.0	0.165	15.6	LOS B	2.8	19.7	0.58	0.55	49.1
8	T1	275	3.8	0.618	16.7	LOS B	7.7	55.7	0.79	0.69	45.9
9	R2	99	5.3	0.618	26.5	LOS B	7.7	55.7	0.92	0.78	42.5
Approach		421	3.8	0.618	18.9	LOS B	7.7	55.7	0.80	0.70	45.4
West: Campbell St - W											
10	L2	100	12.6	0.197	24.9	LOS B	2.5	19.3	0.78	0.75	41.5
11	T1	38	0.0	0.533	29.0	LOS C	5.1	36.3	0.96	0.79	38.8
12	R2	124	2.5	0.533	34.6	LOS C	5.1	36.3	0.96	0.79	38.1
Approach		262	6.0	0.533	30.1	LOS C	5.1	36.3	0.89	0.77	39.4
All Vehicles		1704	3.7	0.728	22.1	LOS B	11.5	82.3	0.86	0.78	43.6

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	12.6	LOS B	0.1	0.1	0.61	0.61	
P3	North Full Crossing	53	27.8	LOS C	0.1	0.1	0.91	0.91	
P4	West Full Crossing	53	21.0	LOS C	0.1	0.1	0.79	0.79	
All Pedestrians		158	20.5	LOS C			0.77	0.77	

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: 101 [Campbell St/Pacific Hwy (2016PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1055	4.8	0.355	4.4	LOS A	9.7	70.9	0.32	0.29	56.0
3	R2	297	4.3	0.881	80.8	LOS F	23.2	168.3	1.00	1.20	24.8
Approach		1352	4.7	0.881	21.2	LOS B	23.2	168.3	0.47	0.49	43.8
East: Campbell St - E											
4	L2	102	5.2	0.190	40.7	LOS C	4.8	34.9	0.78	0.74	33.3
6	R2	157	5.4	0.335	61.1	LOS E	4.6	33.9	0.95	0.77	28.1
Approach		259	5.3	0.335	53.1	LOS D	4.8	34.9	0.88	0.76	30.0
North: Pacific Hwy - N											
7	L2	193	4.4	0.515	19.5	LOS B	19.6	144.8	0.58	0.61	43.8
8	T1	1573	7.4	0.515	14.6	LOS B	20.6	153.6	0.60	0.57	48.1
Approach		1765	7.0	0.515	15.2	LOS B	20.6	153.6	0.60	0.57	47.6
All Vehicles		3376	6.0	0.881	20.5	LOS B	23.2	168.3	0.57	0.55	44.1

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

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: 101 [Campbell St/Pacific Hwy (2016PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1357	3.9	0.486	8.7	LOS A	20.0	144.9	0.45	0.41	52.5
3	R2	154	6.2	0.344	31.5	LOS C	8.5	62.9	0.80	0.82	37.1
Approach		1511	4.1	0.486	11.0	LOS A	20.0	144.9	0.49	0.45	50.4
East: Campbell St - E											
4	L2	161	0.7	0.218	35.8	LOS C	7.6	53.5	0.70	0.74	34.9
6	R2	304	1.7	0.471	63.2	LOS E	10.6	75.3	0.94	0.80	27.7
Approach		465	1.4	0.471	53.7	LOS D	10.6	75.3	0.85	0.78	29.8
North: Pacific Hwy - N											
7	L2	105	2.0	0.468	29.4	LOS C	20.7	148.7	0.68	0.65	39.4
8	T1	1283	3.4	0.468	24.0	LOS B	21.1	152.1	0.68	0.62	42.9
Approach		1388	3.3	0.468	24.4	LOS B	21.1	152.1	0.68	0.62	42.6
All Vehicles		3364	3.4	0.486	22.4	LOS B	21.1	152.1	0.62	0.57	43.0

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	64.5	LOS F	0.2	0.2	0.93	0.93	
P2	East Full Crossing	53	22.5	LOS C	0.1	0.1	0.55	0.55	
All Pedestrians		105	43.5	LOS E			0.74	0.74	

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: 1v [Herbert St/Westbourne St (2016PD-PM) - Roundabout]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	76	1.4	0.423	4.3	LOS A	3.7	26.6	0.43	0.46	41.8
2	T1	468	3.8	0.423	4.4	LOS A	3.7	26.6	0.43	0.46	46.9
Approach		544	3.5	0.423	4.4	LOS A	3.7	26.6	0.43	0.46	46.1
North: Herbert St - N											
8	T1	617	0.7	0.565	4.8	LOS A	6.0	42.1	0.57	0.52	46.2
9	R2	101	0.0	0.565	8.2	LOS A	6.0	42.1	0.57	0.52	42.1
Approach		718	0.6	0.565	5.2	LOS A	6.0	42.1	0.57	0.52	45.6
West: Westbourne St - W											
10	L2	120	0.0	0.492	6.7	LOS A	2.1	14.7	0.71	0.80	40.1
12	R2	125	0.0	0.492	9.8	LOS A	2.1	14.7	0.71	0.80	40.6
Approach		245	0.0	0.492	8.2	LOS A	2.1	14.7	0.71	0.80	40.3
All Vehicles		1507	1.5	0.565	5.4	LOS A	6.0	42.1	0.54	0.54	44.8

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: P:\16S9000-9099\16S9001000 12 Frederick Street, St Leonards- NSPHModelling\Tower B TIA\180124sid\_16S9001000\_2016 POST-DEV.sip7

# MOVEMENT SUMMARY

 Site: 1v [Herbert St/Westbourne St (2016PD-AM) - Roundabout]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	174	0.0	0.594	5.2	LOS A	5.9	43.9	0.64	0.56	41.4
2	T1	521	9.1	0.594	5.4	LOS A	5.9	43.9	0.64	0.56	46.3
Approach		695	6.8	0.594	5.4	LOS A	5.9	43.9	0.64	0.56	44.9
North: Herbert St - N											
8	T1	604	2.1	0.546	4.2	LOS A	6.1	43.5	0.42	0.46	46.6
9	R2	166	0.0	0.546	7.6	LOS A	6.1	43.5	0.42	0.46	42.4
Approach		771	1.6	0.546	4.9	LOS A	6.1	43.5	0.42	0.46	45.6
West: Westbourne St - W											
10	L2	73	0.0	0.308	6.2	LOS A	1.2	8.5	0.73	0.76	40.3
12	R2	66	0.0	0.308	9.3	LOS A	1.2	8.5	0.73	0.76	40.8
Approach		139	0.0	0.308	7.7	LOS A	1.2	8.5	0.73	0.76	40.6
All Vehicles		1604	3.7	0.594	5.3	LOS A	6.1	43.9	0.54	0.53	44.8

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: 1 [Herbert St/Westbourne St (2016PD-AM) - 70m Westbourne LT bay 20m Herbert St]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	174	0.0	0.409	4.9	LOS A	1.5	10.8	0.09	0.13	43.8
2	T1	521	9.1	0.409	0.1	LOS A	1.5	10.8	0.09	0.13	48.9
Approach		695	6.8	0.409	1.3	NA	1.5	10.8	0.09	0.13	47.5
North: Herbert St - N											
8	T1	604	2.1	0.441	2.8	LOS A	3.4	24.2	0.41	0.18	47.3
9	R2	166	0.0	0.441	11.1	LOS A	3.4	24.2	0.57	0.25	41.5
Approach		771	1.6	0.441	4.6	NA	3.4	24.2	0.44	0.20	45.9
West: Westbourne St - W											
10	L2	73	0.0	0.133	6.0	LOS A	0.3	2.2	0.53	0.68	41.0
12	R2	66	0.0	0.646	42.9	LOS D	1.6	11.3	0.91	1.12	28.8
Approach		139	0.0	0.646	23.6	LOS B	1.6	11.3	0.71	0.89	34.1
All Vehicles		1604	3.7	0.646	4.8	NA	3.4	24.2	0.32	0.23	45.2

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: 1 [Herbert St/Westbourne St (2016PD-PM) - 70m Westbourne LT bay 20m Herbert St]

16S9001000 - 12 Frederick St, St Leonards  
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	76	0.0	0.302	4.8	LOS A	0.6	4.3	0.05	0.07	44.2
2	T1	468	3.8	0.302	0.1	LOS A	0.6	4.3	0.05	0.07	49.4
Approach		544	3.3	0.302	0.7	NA	0.6	4.3	0.05	0.07	48.6
North: Herbert St - N											
8	T1	617	0.7	0.351	1.1	LOS A	1.6	11.3	0.23	0.09	48.6
9	R2	101	0.0	0.351	8.5	LOS A	1.6	11.3	0.30	0.12	43.1
Approach		718	0.6	0.351	2.1	NA	1.6	11.3	0.24	0.10	47.8
West: Westbourne St - W											
10	L2	120	0.0	0.203	5.6	LOS A	0.5	3.5	0.51	0.67	41.2
12	R2	125	0.0	0.919	68.2	LOS E	4.5	31.4	0.91	1.67	24.0
Approach		245	0.0	0.919	37.6	LOS C	4.5	31.4	0.71	1.18	30.2
All Vehicles		1507	1.5	0.919	7.4	NA	4.5	31.4	0.25	0.27	43.9

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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# MOVEMENT SUMMARY

## Site: 1 [Herbert St/Cleg St (2026PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	82	5.1	0.105	13.9	LOS A	1.4	10.1	0.53	0.66	48.1
2	T1	347	0.6	0.527	14.3	LOS A	7.4	52.1	0.72	0.63	48.3
3	R2	27	7.7	0.527	20.1	LOS B	7.4	52.1	0.72	0.63	46.9
Approach		457	1.8	0.527	14.5	LOS B	7.4	52.1	0.68	0.64	48.2
East: Cleg St - E											
4	L2	58	3.6	0.111	15.1	LOS B	1.1	8.1	0.68	0.68	47.4
5	T1	124	1.7	0.555	20.0	LOS B	5.0	35.9	0.87	0.75	43.9
6	R2	81	2.6	0.555	26.4	LOS B	5.0	35.9	0.89	0.76	42.6
Approach		263	2.4	0.555	20.9	LOS B	5.0	35.9	0.83	0.74	44.2
North: Herbert St - N											
7	L2	40	0.0	0.192	13.9	LOS A	3.0	20.8	0.57	0.53	50.6
8	T1	812	0.5	0.958	39.7	LOS C	34.6	243.0	0.92	1.20	36.1
9	R2	81	0.0	0.958	52.2	LOS D	34.6	243.0	1.00	1.35	33.3
Approach		933	0.5	0.958	39.6	LOS C	34.6	243.0	0.91	1.18	36.3
West: Cleg St - W											
10	L2	89	1.2	0.181	12.1	LOS A	1.3	9.5	0.67	0.69	49.7
11	T1	155	2.0	0.894	31.7	LOS C	10.9	78.5	0.92	1.04	38.1
12	R2	166	3.8	0.894	42.3	LOS C	10.9	78.5	0.97	1.12	35.6
Approach		411	2.6	0.894	31.8	LOS C	10.9	78.5	0.89	0.99	39.0
All Vehicles		2063	1.4	0.958	30.1	LOS C	34.6	243.0	0.85	0.97	39.9

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	22.6	LOS C	0.1	0.1	0.87	0.87	
P2	East Full Crossing	53	12.7	LOS B	0.1	0.1	0.65	0.65	
P3	North Full Crossing	53	23.5	LOS C	0.1	0.1	0.89	0.89	
P4	West Full Crossing	53	10.8	LOS B	0.1	0.1	0.60	0.60	
All Pedestrians		211	17.4	LOS B			0.75	0.75	

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: 1 [Herbert St/Cleg St (2026PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Coordinated Cycle Time = 60 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	122	3.4	0.123	11.5	LOS A	1.6	11.8	0.46	0.67	49.4
2	T1	632	0.8	0.617	5.6	LOS A	8.6	60.7	0.47	0.44	54.7
3	R2	37	0.0	0.617	11.2	LOS A	8.6	60.7	0.47	0.44	53.3
Approach		791	1.2	0.617	6.8	LOS A	8.6	60.7	0.47	0.48	53.7
East: Cleg St - E											
4	L2	47	2.2	0.114	12.0	LOS A	0.7	5.0	0.64	0.66	49.7
5	T1	125	3.4	0.569	21.8	LOS B	4.7	33.5	0.90	0.76	43.0
6	R2	60	0.0	0.569	29.1	LOS C	4.7	33.5	0.93	0.78	41.4
Approach		233	2.3	0.569	21.7	LOS B	4.7	33.5	0.85	0.75	43.8
North: Herbert St - N											
7	L2	18	0.0	0.093	11.0	LOS A	1.3	9.2	0.45	0.41	53.0
8	T1	434	0.7	0.465	7.8	LOS A	7.1	50.2	0.59	0.55	52.6
9	R2	63	0.0	0.465	13.9	LOS A	7.1	50.2	0.63	0.59	50.9
Approach		515	0.6	0.465	8.6	LOS A	7.1	50.2	0.59	0.55	52.4
West: Cleg St - W											
10	L2	89	1.2	0.126	8.0	LOS A	0.7	4.7	0.40	0.67	51.7
11	T1	99	2.1	0.592	25.1	LOS B	5.2	37.5	0.96	0.81	41.3
12	R2	84	5.0	0.592	30.7	LOS C	5.2	37.5	0.96	0.81	40.3
Approach		273	2.7	0.592	21.2	LOS B	5.2	37.5	0.77	0.76	43.9
All Vehicles		1811	1.4	0.617	11.4	LOS A	8.6	60.7	0.60	0.58	50.2

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P2	East Full Crossing	53	9.7	LOS A	0.1	0.1	0.57	0.57	
P3	North Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
P4	West Full Crossing	53	8.0	LOS A	0.0	0.0	0.52	0.52	
All Pedestrians		211	16.6	LOS B			0.72	0.72	

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: 1 [Herbert St/Frederick St (2026PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 88 seconds (Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h	
South: Herbert St - S												
1	L2	311	6.8	0.351	13.2	LOS A	4.9	36.2	0.64	0.75	48.0	
2	T1	429	1.2	0.936	56.0	LOS D	24.5	173.5	1.00	1.18	31.3	
3	R2	7	0.0	0.936	61.5	LOS E	24.5	173.5	1.00	1.18	30.8	
Approach		747	3.5	0.936	38.3	LOS C	24.5	173.5	0.85	1.00	36.6	
East: Carpark Access - E												
4	L2	2	0.0	0.033	53.3	LOS D	0.1	0.7	0.99	0.60	31.5	
5	T1	24	4.3	0.334	46.5	LOS D	1.6	11.5	0.99	0.72	33.5	
6	R2	12	0.0	0.334	52.1	LOS D	1.6	11.5	0.99	0.72	32.9	
Approach		38	2.8	0.334	48.6	LOS D	1.6	11.5	0.99	0.71	33.2	
North: Herbert St - N												
7	L2	36	2.9	0.309	20.1	LOS B	7.4	52.7	0.64	0.58	46.9	
8	T1	672	0.9	1.029	53.1	LOS D	38.9	275.6	0.86	1.03	28.2	
9	R2	152	2.8	1.029	82.1	LOS F	38.9	275.6	1.00	1.30	22.3	
Approach		859	1.3	1.029	56.8	LOS E	38.9	275.6	0.88	1.06	27.4	
West: Frederick St - W												
10	L2	92	5.7	0.215	28.6	LOS C	3.9	28.3	0.76	0.72	40.7	
11	T1	34	0.0	0.215	23.0	LOS B	3.9	28.3	0.76	0.72	41.6	
12	R2	492	2.1	1.028	103.4	LOS F	37.3	266.2	1.00	1.26	21.9	
Approach		617	2.6	1.028	87.9	LOS F	37.3	266.2	0.95	1.15	24.2	
All Vehicles		2261	2.4	1.029	59.0	LOS E	38.9	275.6	0.89	1.06	28.8	

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian ped	Distance m	per ped		
P1	South Full Crossing	53	38.3	LOS D	0.1	0.1	0.93	0.93	
P2	East Full Crossing	53	38.3	LOS D	0.1	0.1	0.93	0.93	
P3	North Full Crossing	53	32.0	LOS D	0.1	0.1	0.85	0.85	
P4	West Full Crossing	53	32.0	LOS D	0.1	0.1	0.85	0.85	
All Pedestrians		211	35.2	LOS D			0.89	0.89	

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: 1 [Herbert St/Frederick St (2026PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 74 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	375	5.3	0.272	8.2	LOS A	3.9	28.5	0.31	0.67	51.4
2	T1	504	0.6	0.612	17.6	LOS B	14.2	100.1	0.83	0.73	46.6
3	R2	2	0.0	0.612	23.1	LOS B	14.2	100.1	0.83	0.73	45.6
Approach		881	2.6	0.612	13.6	LOS A	14.2	100.1	0.61	0.70	48.5
East: Carpark Access - E											
4	L2	12	9.1	0.164	46.8	LOS D	0.5	3.4	0.99	0.67	33.3
5	T1	60	3.5	0.692	40.9	LOS C	3.5	25.0	1.00	0.84	35.3
6	R2	28	0.0	0.692	46.4	LOS D	3.5	25.0	1.00	0.84	34.7
Approach		100	3.2	0.692	43.1	LOS D	3.5	25.0	1.00	0.82	34.9
North: Herbert St - N											
7	L2	7	28.6	0.293	20.6	LOS B	5.7	40.6	0.69	0.59	46.3
8	T1	538	0.4	0.977	44.1	LOS D	23.1	164.2	0.86	1.01	34.6
9	R2	96	5.5	0.977	72.8	LOS F	23.1	164.2	1.00	1.35	27.8
Approach		641	1.5	0.977	48.1	LOS D	23.1	164.2	0.88	1.06	33.5
West: Frederick St - W											
10	L2	155	0.7	0.357	29.6	LOS C	5.1	36.2	0.85	0.78	39.9
11	T1	17	6.3	0.357	24.0	LOS B	5.1	36.2	0.85	0.78	40.6
12	R2	496	1.3	0.949	58.3	LOS E	25.4	179.8	1.00	1.11	30.2
Approach		667	1.3	0.949	50.8	LOS D	25.4	179.8	0.96	1.03	32.2
All Vehicles		2289	1.9	0.977	35.4	LOS C	25.4	179.8	0.80	0.90	37.6

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	31.3	LOS D	0.1	0.1	0.92	0.92	
P2	East Full Crossing	53	18.3	LOS B	0.1	0.1	0.70	0.70	
P3	North Full Crossing	53	26.9	LOS C	0.1	0.1	0.85	0.85	
P4	West Full Crossing	53	18.3	LOS B	0.1	0.1	0.70	0.70	
All Pedestrians		211	23.7	LOS C			0.80	0.80	

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: 1 [Herbert St/Westbourne St (2026PD-AM)]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Herbert St - S											
1	L2	200	0.0	0.487	4.9	LOS A	2.1	15.2	0.11	0.13	43.8
2	T1	635	7.5	0.487	0.1	LOS A	2.1	15.2	0.11	0.13	48.9
Approach		835	5.7	0.487	1.3	NA	2.1	15.2	0.11	0.13	47.6
North: Herbert St - N											
8	T1	737	1.7	0.708	7.6	LOS A	10.7	75.7	1.00	0.25	44.1
9	R2	184	0.0	0.708	18.4	LOS B	10.7	75.7	1.00	0.25	39.6
Approach		921	1.4	0.708	9.7	NA	10.7	75.7	1.00	0.25	43.1
West: Westbourne St - W											
10	L2	78	0.0	1.254	269.0	LOS F	22.6	157.9	1.00	4.73	9.9
12	R2	71	0.0	1.254	296.2	LOS F	22.6	157.9	1.00	4.73	9.9
Approach		148	0.0	1.254	281.9	LOS F	22.6	157.9	1.00	4.73	9.9
All Vehicles		1904	3.2	1.254	27.2	NA	22.6	157.9	0.61	0.55	35.3

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: 1 [Herbert St/Westbourne St (2026PD-PM)]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	81	1.3	0.359	4.9	LOS A	0.8	5.4	0.05	0.07	44.2
2	T1	571	3.1	0.359	0.1	LOS A	0.8	5.4	0.05	0.07	49.5
Approach		652	2.9	0.359	0.7	NA	0.8	5.4	0.05	0.07	48.7
North: Herbert St - N											
8	T1	752	0.6	0.523	2.1	LOS A	3.1	22.1	0.35	0.10	47.8
9	R2	107	0.0	0.523	11.6	LOS A	3.1	22.1	0.35	0.10	42.5
Approach		859	0.5	0.523	3.3	NA	3.1	22.1	0.35	0.10	47.1
West: Westbourne St - W											
10	L2	129	0.0	1.630	585.2	LOS F	68.4	479.0	1.00	9.30	5.4
12	R2	136	0.0	1.630	599.7	LOS F	68.4	479.0	1.00	9.30	5.3
Approach		265	0.0	1.630	592.6	LOS F	68.4	479.0	1.00	9.30	5.3
All Vehicles		1776	1.3	1.630	90.4	NA	68.4	479.0	0.34	1.46	21.8

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: 1 [Herbert St/Pacific Hwy (2026PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1515	3.8	0.657	28.9	LOS C	24.6	177.9	0.84	0.75	40.7
6	R2	456	2.1	0.605	51.4	LOS D	12.8	91.3	0.95	0.82	30.8
Approach		1971	3.4	0.657	34.1	LOS C	24.6	177.9	0.87	0.77	37.9
North: Herbert St - N											
7	L2	648	1.9	0.759	29.4	LOS C	27.8	198.2	0.80	0.82	37.2
9	R2	238	1.8	0.623	51.7	LOS D	12.8	91.3	0.96	0.83	30.5
Approach		886	1.9	0.759	35.4	LOS C	27.8	198.2	0.85	0.82	35.1
West: Pacific Highway - W											
10	L2	236	6.7	0.210	13.4	LOS A	5.1	37.9	0.45	0.69	45.0
11	T1	1654	5.3	0.748	30.4	LOS C	29.4	214.9	0.88	0.79	40.0
Approach		1889	5.5	0.748	28.3	LOS B	29.4	214.9	0.83	0.78	40.6
All Vehicles		4746	3.9	0.759	32.0	LOS C	29.4	214.9	0.85	0.78	38.3

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	26.7	LOS C	0.1	0.1	0.67	0.67	
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		105	40.5	LOS E			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: 1 [Herbert St/Pacific Hwy (2026PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 121 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Pacific Highway - E											
5	T1	1779	3.7	0.739	28.9	LOS C	30.4	219.3	0.87	0.78	40.7
6	R2	364	0.6	0.545	53.7	LOS D	10.4	73.0	0.95	0.81	31.5
Approach		2143	3.1	0.739	33.1	LOS C	30.4	219.3	0.88	0.79	38.8
North: Herbert St - N											
7	L2	575	0.7	0.574	31.3	LOS C	24.6	173.3	0.79	0.83	38.9
9	R2	296	0.0	0.741	55.5	LOS D	16.9	118.4	0.99	0.87	31.2
Approach		871	0.5	0.741	39.5	LOS C	24.6	173.3	0.86	0.84	35.9
West: Pacific Highway - W											
10	L2	206	7.1	0.177	12.1	LOS A	4.0	30.0	0.41	0.68	48.7
11	T1	1486	2.4	0.621	26.8	LOS B	23.8	170.0	0.81	0.71	41.7
Approach		1693	3.0	0.621	25.0	LOS B	23.8	170.0	0.76	0.71	42.4
All Vehicles		4706	2.6	0.741	31.4	LOS C	30.4	219.3	0.83	0.77	39.4

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Pedestrian	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P3	North Full Crossing	53	25.2	LOS C	0.1	0.1	0.65	0.65	
P4	West Full Crossing	53	54.8	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		105	40.0	LOS D			0.80	0.80	

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: 1 [Reserve Rd/Frederick St (2026PD-AM)]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
2	T1	137	2.3	0.142	5.4	LOS A	0.8	6.0	0.31	0.52	53.6
3	R2	31	0.0	0.142	8.7	LOS A	0.8	6.0	0.31	0.52	53.3
Approach		167	1.9	0.142	6.0	LOS A	0.8	6.0	0.31	0.52	53.5
East: Frederick St - E											
4	L2	151	0.7	0.246	7.1	LOS A	1.4	11.0	0.47	0.65	51.7
5	T1	9	0.0	0.246	7.3	LOS A	1.4	11.0	0.47	0.65	52.7
6	R2	64	39.3	0.246	11.9	LOS A	1.4	11.0	0.47	0.65	50.7
Approach		224	11.7	0.246	8.5	LOS A	1.4	11.0	0.47	0.65	51.4
North: Reserved Rd - N											
7	L2	594	2.1	0.643	4.9	LOS A	6.8	48.2	0.22	0.49	53.4
8	T1	351	0.0	0.643	5.1	LOS A	6.8	48.2	0.22	0.49	54.6
9	R2	35	15.2	0.643	8.6	LOS A	6.8	48.2	0.22	0.49	53.5
Approach		979	1.8	0.643	5.1	LOS A	6.8	48.2	0.22	0.49	53.9
West: Enterprise Centre - W											
10	L2	4	25.0	0.010	6.2	LOS A	0.1	0.4	0.40	0.52	51.7
11	T1	5	0.0	0.010	5.9	LOS A	0.1	0.4	0.40	0.52	53.7
12	R2	1	0.0	0.010	9.2	LOS A	0.1	0.4	0.40	0.52	53.3
Approach		11	10.0	0.010	6.3	LOS A	0.1	0.4	0.40	0.52	52.8
All Vehicles		1381	3.5	0.643	5.8	LOS A	6.8	48.2	0.27	0.52	53.4

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: 1 [Reserve Rd/Frederick St (2026PD-PM)]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	1	0.0	0.725	14.6	LOS B	11.3	79.8	0.97	0.96	46.7
2	T1	459	0.5	0.725	14.9	LOS B	11.3	79.8	0.97	0.96	47.5
3	R2	193	1.1	0.725	18.2	LOS B	11.3	79.8	0.97	0.96	47.2
Approach		653	0.6	0.725	15.8	LOS B	11.3	79.8	0.97	0.96	47.4
East: Frederick St - E											
4	L2	32	3.3	0.387	5.1	LOS A	2.7	20.0	0.26	0.61	51.1
5	T1	2	0.0	0.387	5.3	LOS A	2.7	20.0	0.26	0.61	52.2
6	R2	474	6.7	0.387	8.7	LOS A	2.7	20.0	0.26	0.61	51.6
Approach		507	6.4	0.387	8.4	LOS A	2.7	20.0	0.26	0.61	51.6
North: Reserved Rd - N											
7	L2	422	2.5	0.457	6.0	LOS A	3.3	23.4	0.46	0.60	52.8
8	T1	75	1.4	0.457	6.2	LOS A	3.3	23.4	0.46	0.60	53.9
9	R2	4	25.0	0.457	10.2	LOS A	3.3	23.4	0.46	0.60	52.5
Approach		501	2.5	0.457	6.1	LOS A	3.3	23.4	0.46	0.60	53.0
West: Enterprise Centre - W											
10	L2	21	5.0	0.071	18.6	LOS B	0.6	4.6	1.00	0.76	44.8
11	T1	5	0.0	0.071	18.5	LOS B	0.6	4.6	1.00	0.76	45.7
12	R2	1	0.0	0.071	21.8	LOS B	0.6	4.6	1.00	0.76	45.4
Approach		27	3.8	0.071	18.7	LOS B	0.6	4.6	1.00	0.76	45.0
All Vehicles		1688	3.0	0.725	10.8	LOS A	11.3	79.8	0.60	0.75	50.1

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: 1 [Reserve Rd/Campbell St (2026PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 89 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	199	10.1	0.791	32.6	LOS C	7.4	56.0	1.00	0.93	38.8
2	T1	263	4.8	0.791	41.0	LOS C	9.4	68.3	1.00	0.93	35.5
Approach		462	7.1	0.791	37.4	LOS C	9.4	68.3	1.00	0.93	36.9
East: Bunning Access - E											
4	L2	32	0.0	0.303	52.6	LOS D	1.4	10.0	0.99	0.72	31.7
5	T1	43	0.0	0.908	57.7	LOS E	5.1	35.4	1.00	1.00	30.0
6	R2	54	0.0	0.908	63.2	LOS E	5.1	35.4	1.00	1.00	29.6
Approach		128	0.0	0.908	58.7	LOS E	5.1	35.4	1.00	0.93	30.2
North: Reserved Rd - N											
7	L2	86	1.2	0.243	18.2	LOS B	5.6	39.9	0.59	0.58	47.3
8	T1	709	1.9	0.910	35.9	LOS C	32.1	231.1	0.91	1.10	37.2
9	R2	180	8.2	0.910	47.8	LOS D	32.1	231.1	1.00	1.23	34.3
Approach		976	3.0	0.910	36.5	LOS C	32.1	231.1	0.90	1.08	37.3
West: Campbell St - W											
10	L2	118	25.0	0.123	13.7	LOS A	2.2	18.3	0.45	0.68	47.2
11	T1	72	0.0	0.899	49.8	LOS D	15.1	108.2	0.98	1.05	31.8
12	R2	225	3.7	0.899	55.4	LOS D	15.1	108.2	0.98	1.05	31.3
Approach		415	9.1	0.899	42.6	LOS D	15.1	108.2	0.83	0.95	34.7
All Vehicles		1981	5.0	0.910	39.4	LOS C	32.1	231.1	0.91	1.01	36.1

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	14.1	LOS B	0.1	0.1	0.56	0.56	
P3	North Full Crossing	53	35.1	LOS D	0.1	0.1	0.89	0.89	
P4	West Full Crossing	53	38.8	LOS D	0.1	0.1	0.93	0.93	
All Pedestrians		158	29.3	LOS C			0.80	0.80	

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: 1 [Reserve Rd/Campbell St (2026PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 69 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reserved Rd - S											
1	L2	374	4.2	0.865	30.5	LOS C	19.5	140.4	0.89	0.99	40.1
2	T1	689	2.3	0.865	27.3	LOS B	19.5	140.4	0.84	0.93	40.9
Approach		1063	3.0	0.865	28.4	LOS B	19.5	140.4	0.86	0.96	40.6
East: Bunning Access - E											
4	L2	47	0.0	0.352	41.3	LOS C	1.7	11.6	0.99	0.73	35.2
5	T1	58	0.0	0.918	47.1	LOS D	5.3	37.3	1.00	1.06	32.9
6	R2	68	0.0	0.918	52.6	LOS D	5.3	37.3	1.00	1.06	32.3
Approach		174	0.0	0.918	47.6	LOS D	5.3	37.3	1.00	0.97	33.3
North: Reserved Rd - N											
7	L2	58	0.0	0.197	13.9	LOS A	3.5	24.7	0.53	0.52	50.4
8	T1	335	3.1	0.738	17.6	LOS B	10.2	73.5	0.78	0.73	45.5
9	R2	121	4.3	0.738	30.5	LOS C	10.2	73.5	0.97	0.89	40.6
Approach		514	3.1	0.738	20.2	LOS B	10.2	73.5	0.80	0.75	44.7
West: Campbell St - W											
10	L2	122	10.3	0.287	29.0	LOS C	3.4	26.1	0.85	0.77	39.7
11	T1	46	0.0	0.928	48.2	LOS D	8.4	59.5	1.00	1.12	32.3
12	R2	146	2.2	0.928	53.8	LOS D	8.4	59.5	1.00	1.12	31.7
Approach		315	5.0	0.928	43.4	LOS D	8.4	59.5	0.94	0.99	34.5
All Vehicles		2065	3.1	0.928	30.3	LOS C	19.5	140.4	0.87	0.91	39.7

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P2	East Full Crossing	53	10.5	LOS B	0.1	0.1	0.55	0.55	
P3	North Full Crossing	53	28.8	LOS C	0.1	0.1	0.92	0.92	
P4	West Full Crossing	53	18.2	LOS B	0.1	0.1	0.73	0.73	
All Pedestrians		158	19.2	LOS B			0.73	0.73	

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: 101 [Campbell St/Pacific Hwy (2026PD-AM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 130 seconds (User-Given Phase Times)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1108	4.6	0.373	4.5	LOS A	10.4	75.8	0.33	0.30	55.9
3	R2	312	4.1	0.950	110.2	LOS F	28.6	206.8	1.00	1.30	20.7
Approach		1420	4.4	0.950	27.7	LOS B	28.6	206.8	0.48	0.52	40.7
East: Campbell St - E											
4	L2	124	4.2	0.230	41.2	LOS C	5.9	42.7	0.79	0.75	33.2
6	R2	186	4.5	0.396	61.7	LOS E	5.5	40.3	0.96	0.78	28.0
Approach		311	4.4	0.396	53.5	LOS D	5.9	42.7	0.89	0.77	29.9
North: Pacific Hwy - N											
7	L2	201	4.2	0.539	19.8	LOS B	21.0	155.0	0.60	0.62	43.6
8	T1	1653	7.0	0.539	14.9	LOS B	22.2	164.6	0.62	0.58	47.9
Approach		1854	6.7	0.539	15.5	LOS B	22.2	164.6	0.61	0.58	47.4
All Vehicles		3584	5.6	0.950	23.6	LOS B	28.6	206.8	0.58	0.57	42.5

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P2	East Full Crossing	53	13.9	LOS B	0.1	0.1	0.46	0.46	
All Pedestrians		105	36.6	LOS D			0.71	0.71	

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: 101 [Campbell St/Pacific Hwy (2026PD-PM)]

16S9001000 - 12 Frederick St, St Leonards

Signals - Fixed Time Isolated Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S											
2	T1	1426	3.7	0.530	10.8	LOS A	23.8	172.2	0.51	0.47	51.0
3	R2	161	5.9	0.367	39.4	LOS C	10.0	73.2	0.89	0.86	34.4
Approach		1587	3.9	0.530	13.7	LOS A	23.8	172.2	0.55	0.51	48.6
East: Campbell St - E											
4	L2	197	0.5	0.262	33.0	LOS C	9.0	63.0	0.67	0.74	35.9
6	R2	362	1.5	0.515	60.2	LOS E	13.1	92.9	0.93	0.80	28.4
Approach		559	1.1	0.515	50.6	LOS D	13.1	92.9	0.84	0.78	30.6
North: Pacific Hwy - N											
7	L2	109	1.9	0.525	33.3	LOS C	23.6	169.7	0.73	0.69	37.8
8	T1	1348	3.3	0.525	27.9	LOS B	24.1	173.7	0.74	0.67	41.0
Approach		1458	3.2	0.525	28.3	LOS B	24.1	173.7	0.74	0.67	40.7
All Vehicles		3604	3.2	0.530	25.4	LOS B	24.1	173.7	0.67	0.62	41.6

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.

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	60.9	LOS F	0.2	0.2	0.90	0.90	
P2	East Full Crossing	53	25.3	LOS C	0.1	0.1	0.58	0.58	
All Pedestrians		105	43.1	LOS E			0.74	0.74	

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: 1v [Herbert St/Westbourne St (2026PD-PM) - Roundabout]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	81	1.3	0.507	4.5	LOS A	5.0	36.2	0.50	0.47	41.7
2	T1	571	3.1	0.507	4.5	LOS A	5.0	36.2	0.50	0.47	46.7
Approach		652	2.9	0.507	4.5	LOS A	5.0	36.2	0.50	0.47	46.0
North: Herbert St - N											
8	T1	752	0.6	0.681	5.1	LOS A	8.7	60.9	0.71	0.55	45.9
9	R2	107	0.0	0.681	8.6	LOS A	8.7	60.9	0.71	0.55	41.8
Approach		859	0.5	0.681	5.6	LOS A	8.7	60.9	0.71	0.55	45.3
West: Westbourne St - W											
10	L2	129	0.0	0.596	10.4	LOS A	3.1	21.8	0.80	0.98	38.5
12	R2	136	0.0	0.596	13.5	LOS A	3.1	21.8	0.80	0.98	39.0
Approach		265	0.0	0.596	12.0	LOS A	3.1	21.8	0.80	0.98	38.7
All Vehicles		1776	1.3	0.681	6.1	LOS A	8.7	60.9	0.64	0.59	44.4

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.

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

Roundabout Capacity Model: SIDRA Standard.

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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\180119sid\_16S9001000\_2026 POST-DEV.sip7

# MOVEMENT SUMMARY

 Site: 1v [Herbert St/Westbourne St (2026PD-AM) - Roundabout]

16S9001000 - 12 Frederick St, St Leonards  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	200	0.0	0.723	6.2	LOS A	9.2	67.9	0.80	0.64	41.0
2	T1	635	7.5	0.723	6.5	LOS A	9.2	67.9	0.80	0.64	45.8
Approach		835	5.7	0.723	6.4	LOS A	9.2	67.9	0.80	0.64	44.5
North: Herbert St - N											
8	T1	737	1.7	0.653	4.3	LOS A	8.9	63.3	0.52	0.46	46.3
9	R2	184	0.0	0.653	7.8	LOS A	8.9	63.3	0.52	0.46	42.2
Approach		921	1.4	0.653	5.0	LOS A	8.9	63.3	0.52	0.46	45.4
West: Westbourne St - W											
10	L2	78	0.0	0.389	7.4	LOS A	1.6	11.4	0.83	0.85	39.8
12	R2	71	0.0	0.389	10.5	LOS A	1.6	11.4	0.83	0.85	40.3
Approach		148	0.0	0.389	8.9	LOS A	1.6	11.4	0.83	0.85	40.1
All Vehicles		1904	3.2	0.723	5.9	LOS A	9.2	67.9	0.67	0.57	44.6

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.

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

Roundabout Capacity Model: SIDRA Standard.

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: 1 [Herbert St/Westbourne St (2026PD-AM) - 70m Westbourne LT bay 20m Herbert St]

16S9001000 - 12 Frederick St, St Leonards  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	200	0.0	0.487	4.9	LOS A	1.9	14.1	0.10	0.13	43.8
2	T1	635	7.5	0.487	0.1	LOS A	1.9	14.1	0.10	0.13	48.9
Approach		835	5.7	0.487	1.3	NA	1.9	14.1	0.10	0.13	47.6
North: Herbert St - N											
8	T1	737	1.7	0.568	4.6	LOS A	5.7	40.1	0.51	0.19	46.1
9	R2	184	0.0	0.568	15.0	LOS B	5.7	40.1	0.73	0.28	40.1
Approach		921	1.4	0.568	6.7	NA	5.7	40.1	0.55	0.21	44.8
West: Westbourne St - W											
10	L2	78	0.0	0.166	6.8	LOS A	0.4	2.7	0.58	0.76	40.6
12	R2	71	0.0	1.158	255.2	LOS F	9.3	65.3	1.00	2.37	10.6
Approach		148	0.0	1.158	124.8	LOS F	9.3	65.3	0.78	1.52	17.3
All Vehicles		1904	3.2	1.158	13.5	NA	9.3	65.3	0.37	0.28	40.8

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: 1 [Herbert St/Westbourne St (2026PD-PM) - 70m Westbourne LT bay 20m Herbert St]

16S9001000 - 12 Frederick St, St Leonards  
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Herbert St - S											
1	L2	81	0.0	0.359	4.9	LOS A	0.7	4.9	0.05	0.07	44.3
2	T1	571	3.1	0.359	0.1	LOS A	0.7	4.9	0.05	0.07	49.5
Approach		652	2.7	0.359	0.7	NA	0.7	4.9	0.05	0.07	48.8
North: Herbert St - N											
8	T1	747	0.6	0.427	1.6	LOS A	2.4	16.6	0.27	0.09	48.3
9	R2	107	0.0	0.427	10.3	LOS A	2.4	16.6	0.36	0.12	42.7
Approach		855	0.5	0.427	2.7	NA	2.4	16.6	0.28	0.10	47.5
West: Westbourne St - W											
10	L2	129	0.0	0.248	6.4	LOS A	0.6	4.2	0.56	0.75	40.8
12	R2	136	0.0	1.520	516.6	LOS F	32.8	229.9	1.00	4.84	6.0
Approach		265	0.0	1.520	267.6	LOS F	32.8	229.9	0.78	2.84	10.2
All Vehicles		1772	1.2	1.520	41.6	NA	32.8	229.9	0.27	0.50	31.0

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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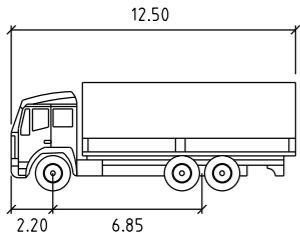
# Appendix B

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## Swept Path Assessment

**SWEPT PATH KEY**

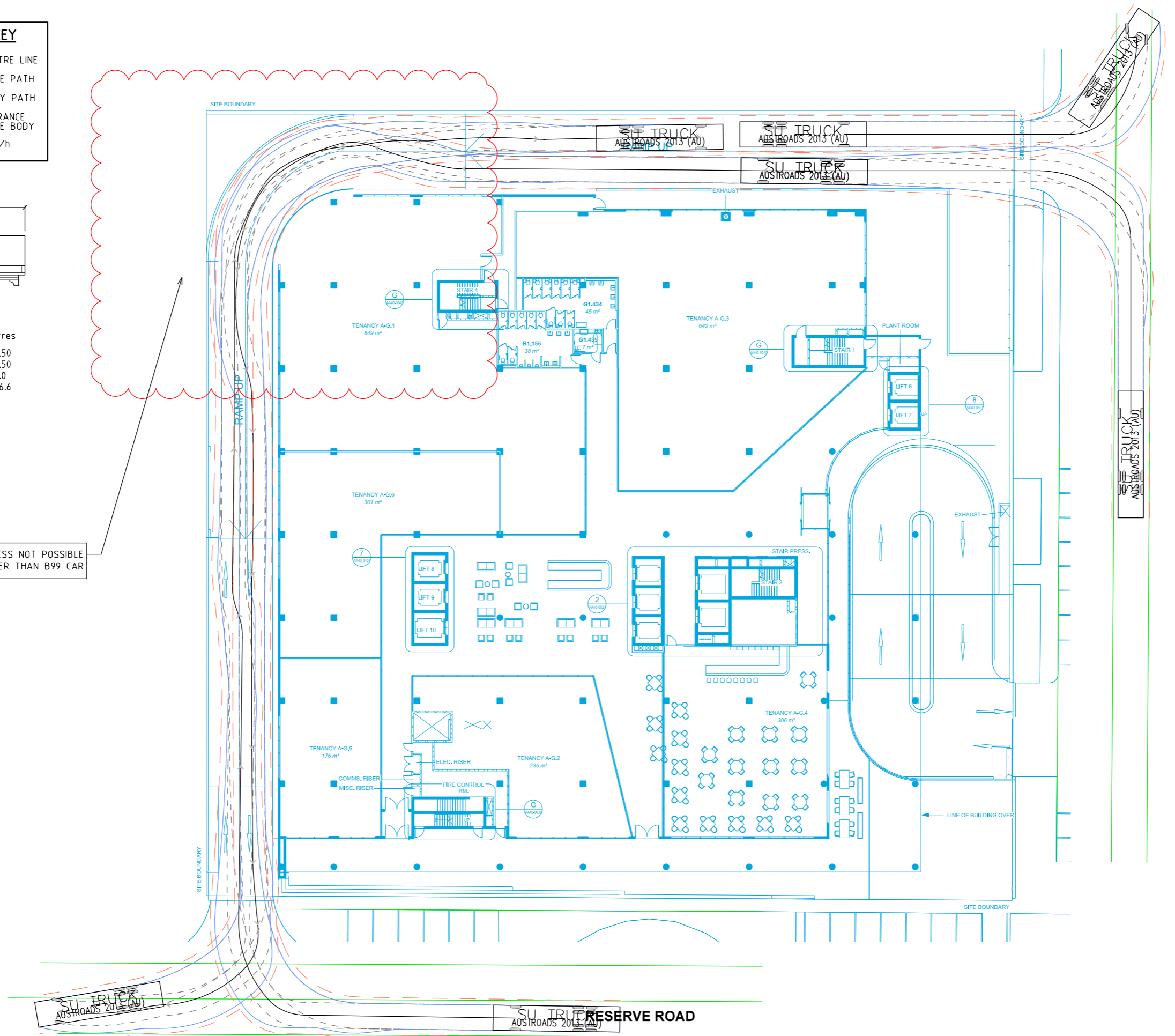
- VEHICLE CENTRE LINE
  - - VEHICLE TYRE PATH
  - VEHICLE BODY PATH
  - - 600mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



**SU TRUCK** metres

Width : 2.50  
 Track : 2.50  
 Lock to Lock Time : 6.0  
 Steering Angle : 36.6

INDEPENDENT ACCESS NOT POSSIBLE FOR VEHICLES LARGER THAN B99 CAR



PLOTTED BY : wendy.zheng ON 19/01/2018 AT 10:52:35 AM



Melbourne 03 9851 9600  
 Sydney 02 9448 1800  
 Brisbane 07 3113 5000  
 Canberra 02 6243 9400  
 Adelaide 08 8334 3600  
 Gold Coast 07 5510 4814  
 Townsville 07 4722 2765  
 Perth 08 6169 1000

**PRELIMINARY PLAN**  
 FOR DISCUSSION PURPOSES  
 ONLY SUBJECT TO CHANGE  
 WITHOUT NOTIFICATION

DESIGNED  
W. ZHENG

DESIGN CHECK  
H. OBERMAIER

APPROVED BY  
B. MAYNARD

DATE ISSUED  
19 JANUARY 2018

SCALE  
A3

CAD FILE NO.  
16S9001000-11-P3.dgn

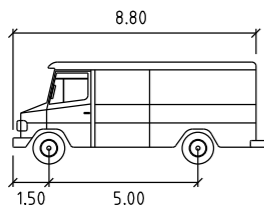
12 FREDERICK STREET, ST LEONARDS

**GROUND FLOOR  
 SWEPT PATH ASSESSMENT**

DRAWING NO. 16S9001000-11-01 SHEET 01 OF 08 ISSUE P3

**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
  - - VEHICLE TYRE PATH
  - VEHICLE BODY PATH
  - - 600mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



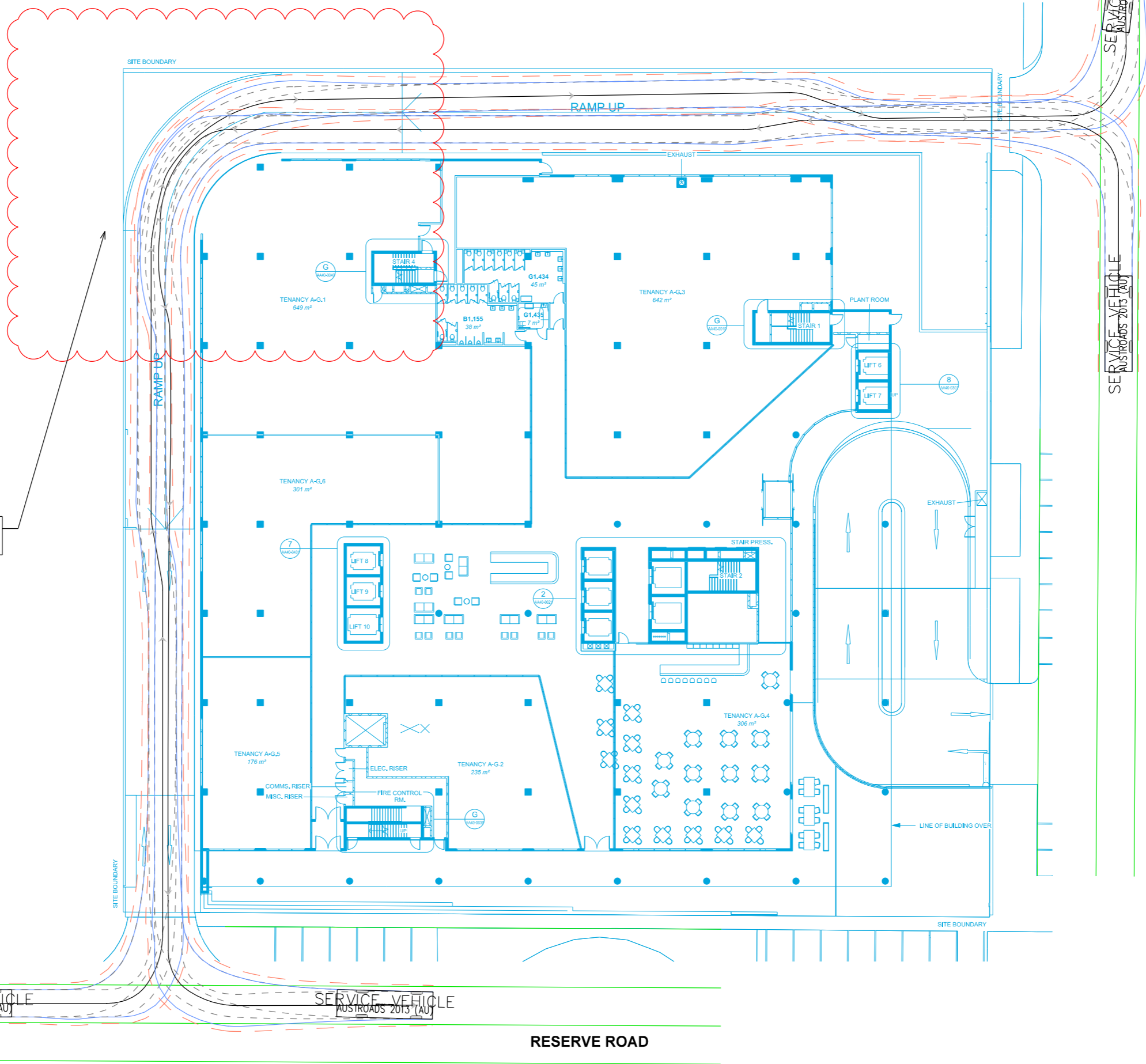
**SERVICE VEHICLE** metres

Width : 2.50  
 Track : 2.50  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.7

INDEPENDENT ACCESS NOT POSSIBLE FOR VEHICLES LARGER THAN B99 CAR

SERVICE VEHICLE AUSTRROADS 2013 (AU)

SERVICE VEHICLE AUSTRROADS 2013 (AU)



WESTBOURNE STREET

RESERVE ROAD

PLOTTED BY : wendy.zheng ON 19/01/2018 AT 10:55:22 AM



Melbourne 03 9851 9500  
 Sydney 02 9448 1800  
 Brisbane 07 3113 5000  
 Canberra 02 6243 9400  
 Adelaide 08 8334 3600  
 Gold Coast 07 5510 4814  
 Townsville 07 4722 2765  
 Perth 08 6169 1000

**PRELIMINARY PLAN**  
 FOR DISCUSSION PURPOSES  
 ONLY SUBJECT TO CHANGE  
 WITHOUT NOTIFICATION

DESIGNED  
W. ZHENG

DESIGN CHECK  
H. OBERMAIER

APPROVED BY  
B. MAYNARD

DATE ISSUED  
19 JANUARY 2018

SCALE  
A3

CAD FILE NO.  
16S9001000-11-P3.dgn

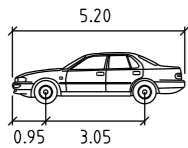
12 FREDERICK STREET, ST LEONARDS

**GROUND FLOOR  
 SWEPT PATH ASSESSMENT**

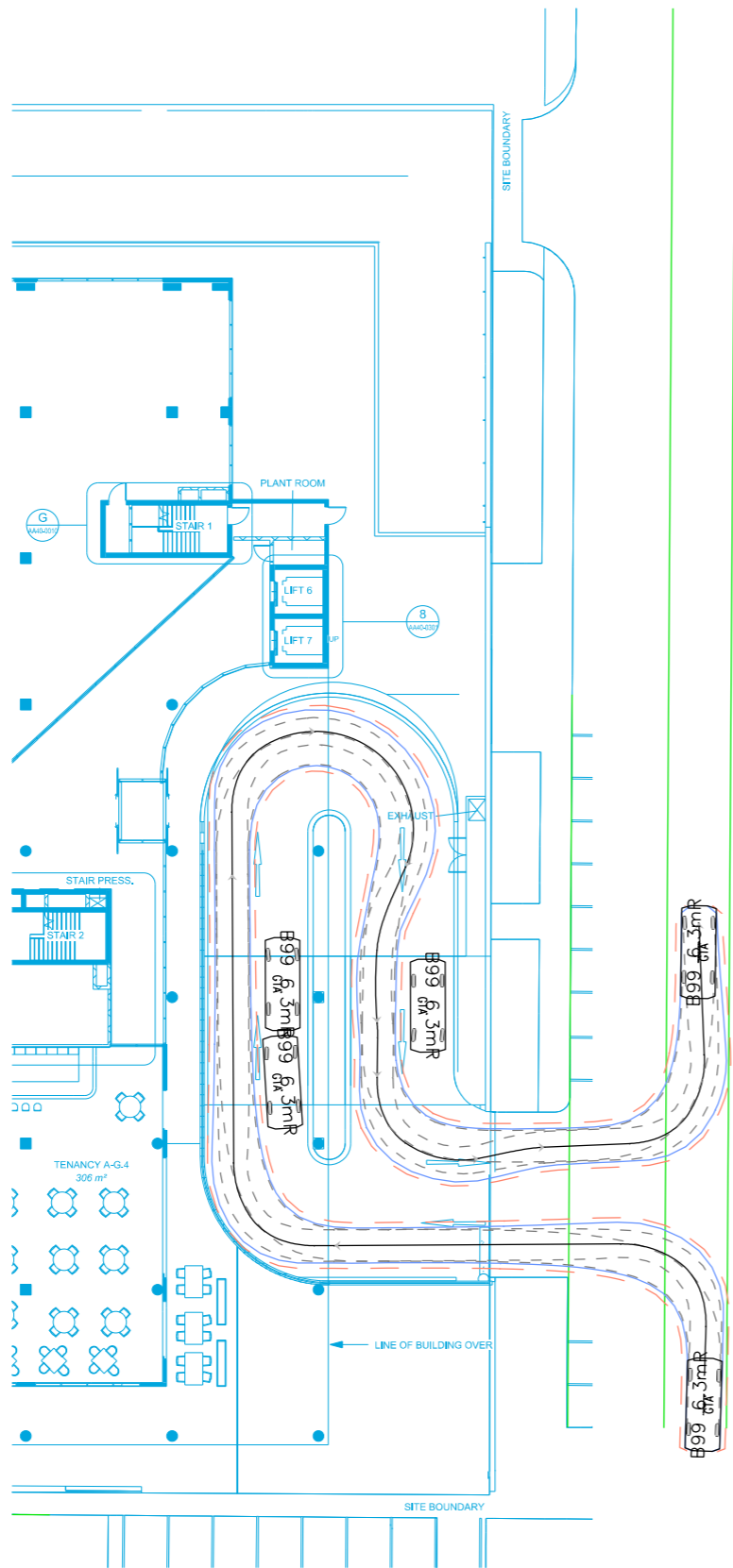
DRAWING NO. 16S9001000-11-02 SHEET 02 OF 08 ISSUE P3

**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
  - - VEHICLE TYRE PATH
  - VEHICLE BODY PATH
  - - 300mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h

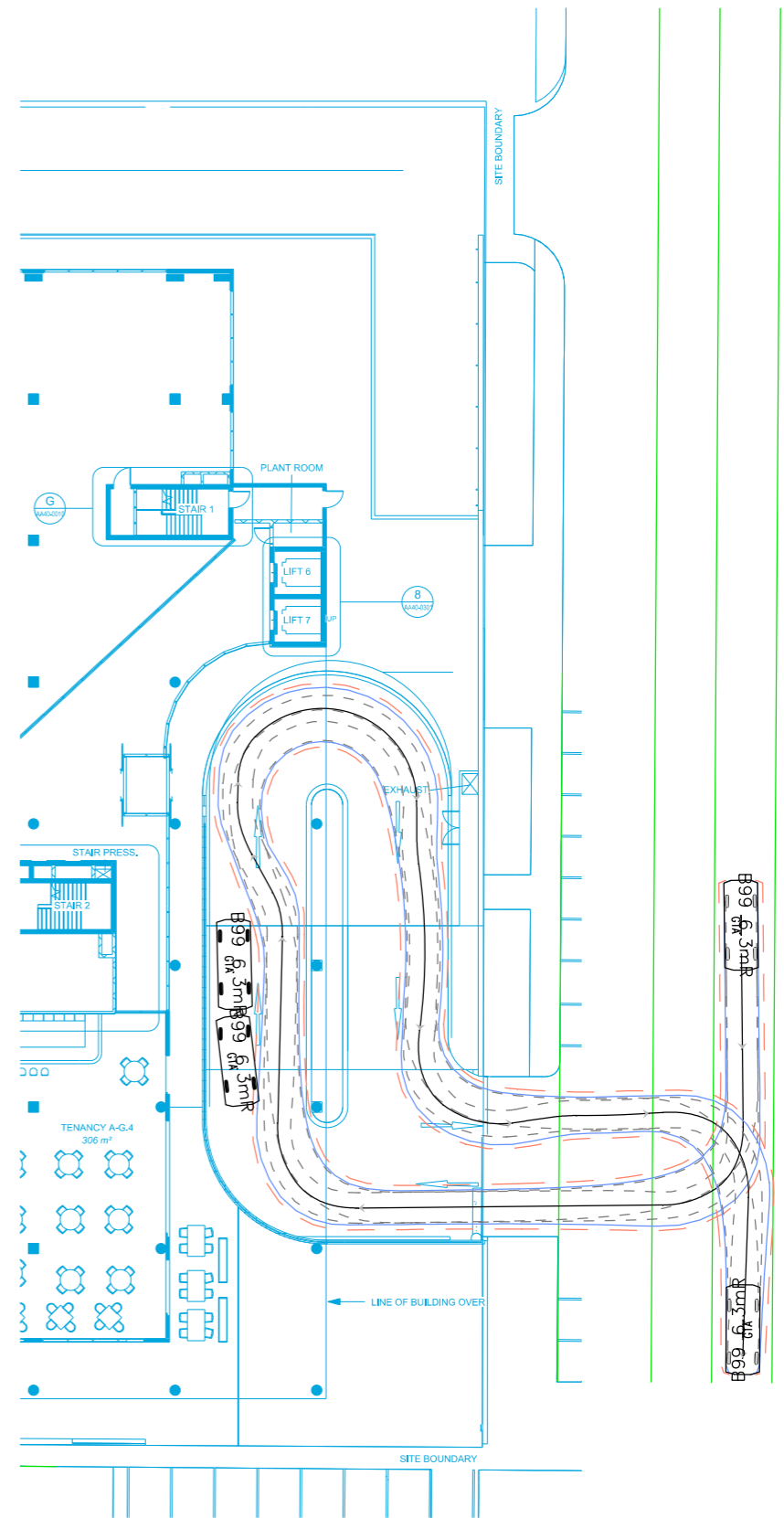


B99 6.3mR metres  
 Width : 1.94  
 Track : 1.77  
 Lock to Lock Time : 6.0  
 Steering Angle : 34.0



WESTBOURNE STREET

RESERVE ROAD



WESTBOURNE STREET

RESERVE ROAD

PLOTTED BY : wendy.zheng ON 19/01/2018 AT 10:55:33 AM



Melbourne 03 9851 9500  
 Sydney 02 8448 1800  
 Brisbane 07 3113 5000  
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 Gold Coast 07 5510 4814  
 Townsville 07 4722 2765  
 Perth 08 6169 1000

**PRELIMINARY PLAN**

FOR DISCUSSION PURPOSES  
 ONLY SUBJECT TO CHANGE  
 WITHOUT NOTIFICATION

DESIGNED  
 W. ZHENG

DESIGN CHECK  
 H. OBERMAIER

APPROVED BY  
 B. MAYNARD

DATE ISSUED  
 19 JANUARY 2018

SCALE  
 A3 1:400

CAD FILE NO.  
 16S9001000-11-P3.dgn

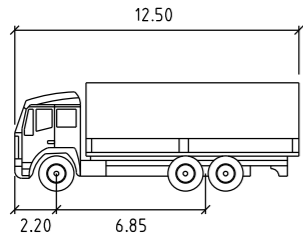
12 FREDERICK STREET, ST LEONARDS

GROUND FLOOR  
 SWEEP PATH ASSESSMENT

DRAWING NO. 16S9001000-11-03 SHEET 03 OF 08 ISSUE P3

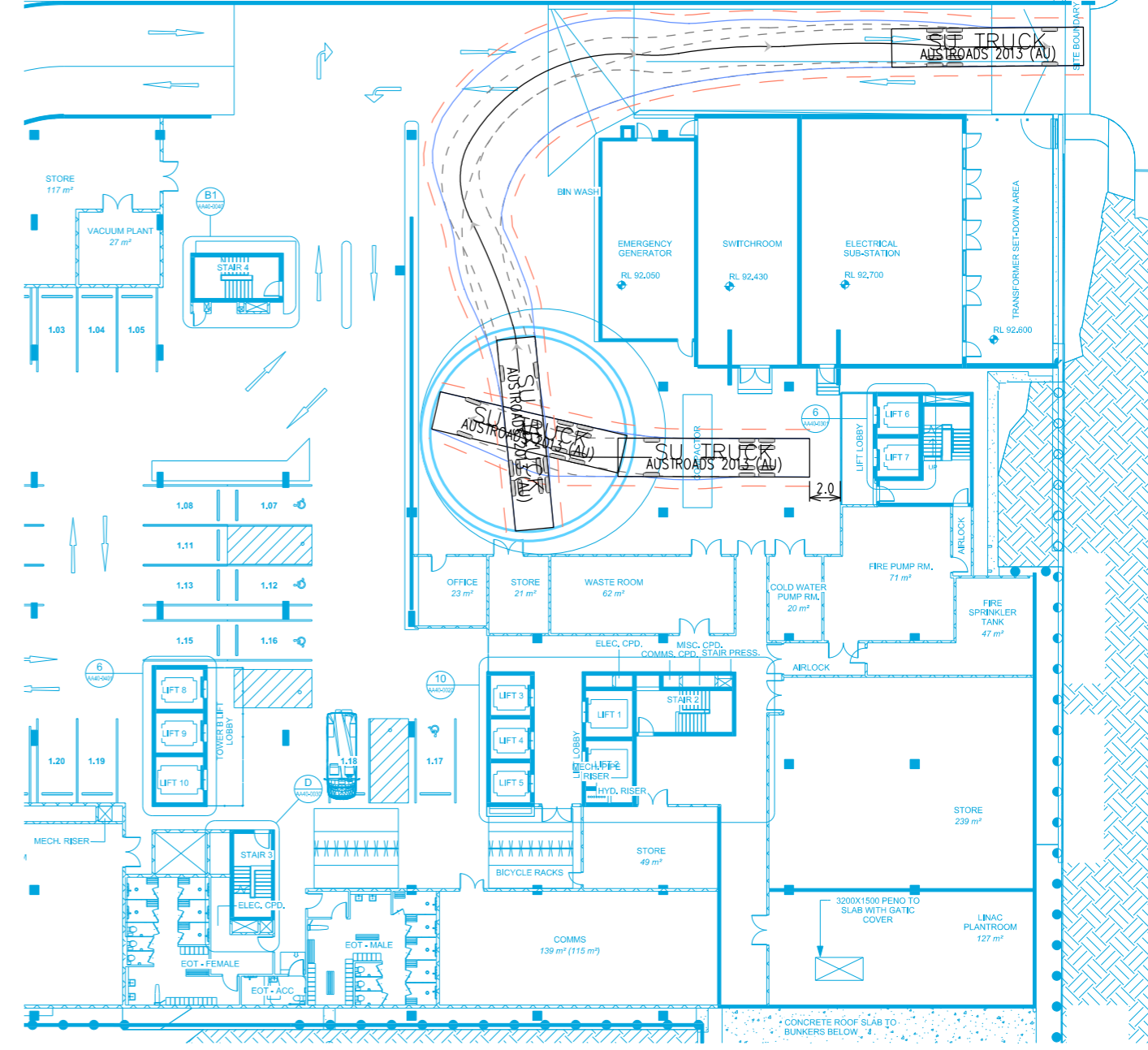
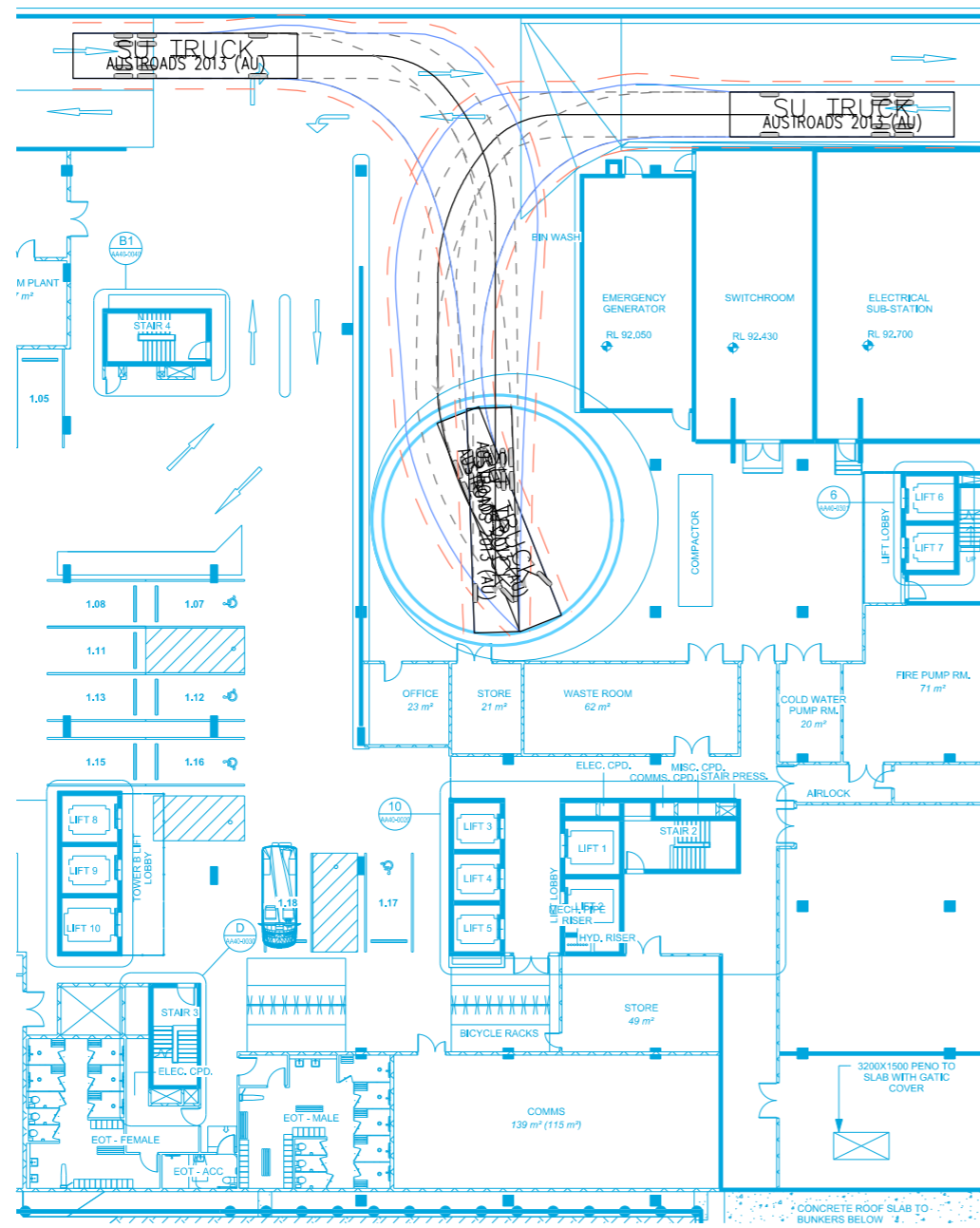
**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
  - - VEHICLE TYRE PATH
  - VEHICLE BODY PATH
  - - 600mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



**SU TRUCK** metres

Width : 2.50  
 Track : 2.50  
 Lock to Lock Time : 6.0  
 Steering Angle : 36.6



PLOTTED BY : wendy.zheng ON 19/01/2018 AT 10:55:46 AM



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 Townsville 07 4722 2765  
 Perth 08 6169 1000

**PRELIMINARY PLAN**  
 FOR DISCUSSION PURPOSES  
 ONLY SUBJECT TO CHANGE  
 WITHOUT NOTIFICATION

DESIGNED  
 W. ZHENG

DESIGN CHECK  
 H. OBERMAIER

APPROVED BY  
 B. MAYNARD

DATE ISSUED  
 19 JANUARY 2018

SCALE  
 A3 0 X X 1:400

CAD FILE NO.  
 16S9001000-11-P3.dgn

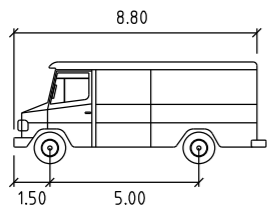
12 FREDERICK STREET, ST LEONARDS

**BASEMENT LEVEL 01 - LOADING DOCK WITH TURNTABLE  
 SWEPT PATH ASSESSMENT**

DRAWING NO. 16S9001000-11-04 SHEET 04 OF 08 ISSUE P3

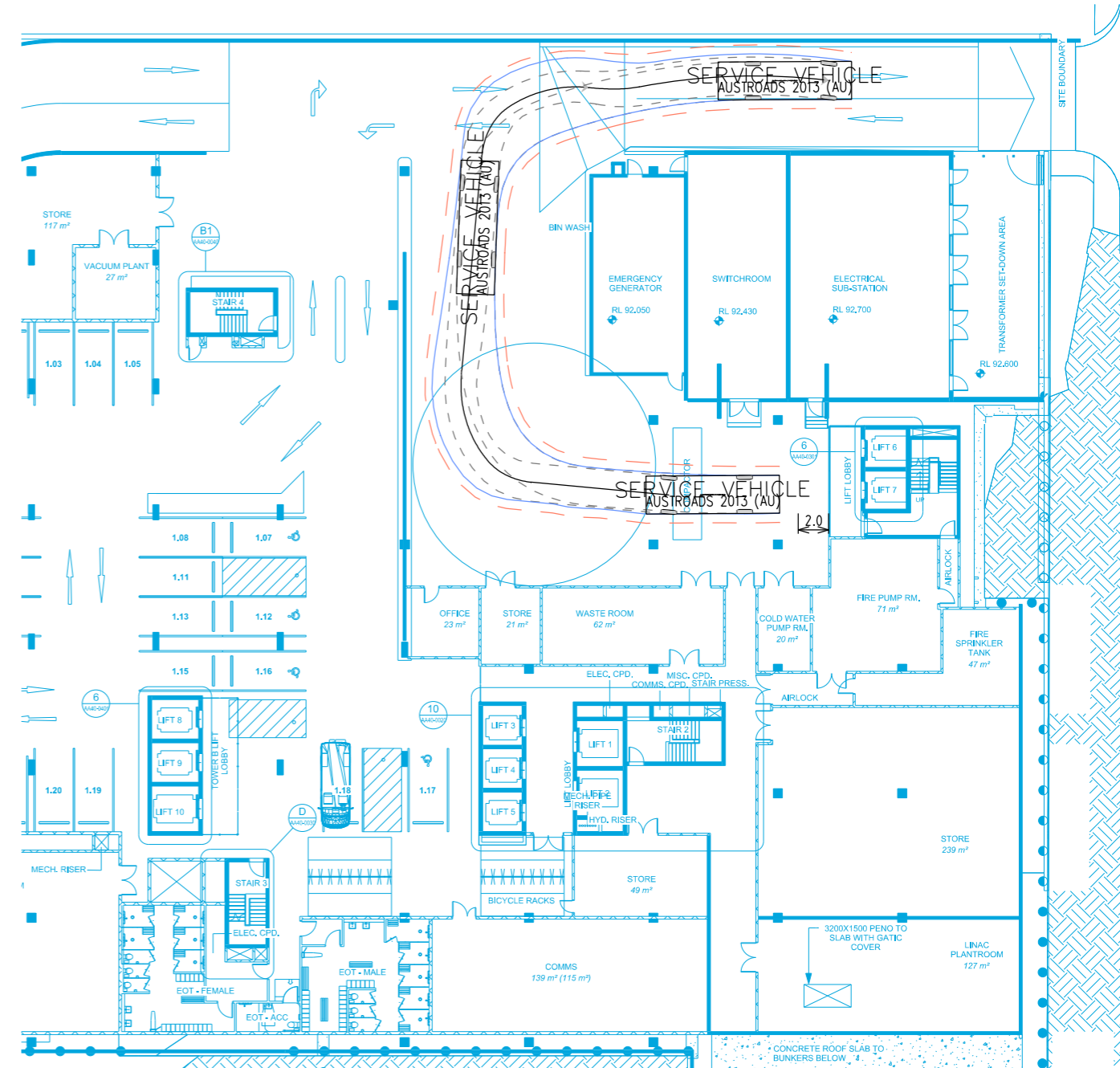
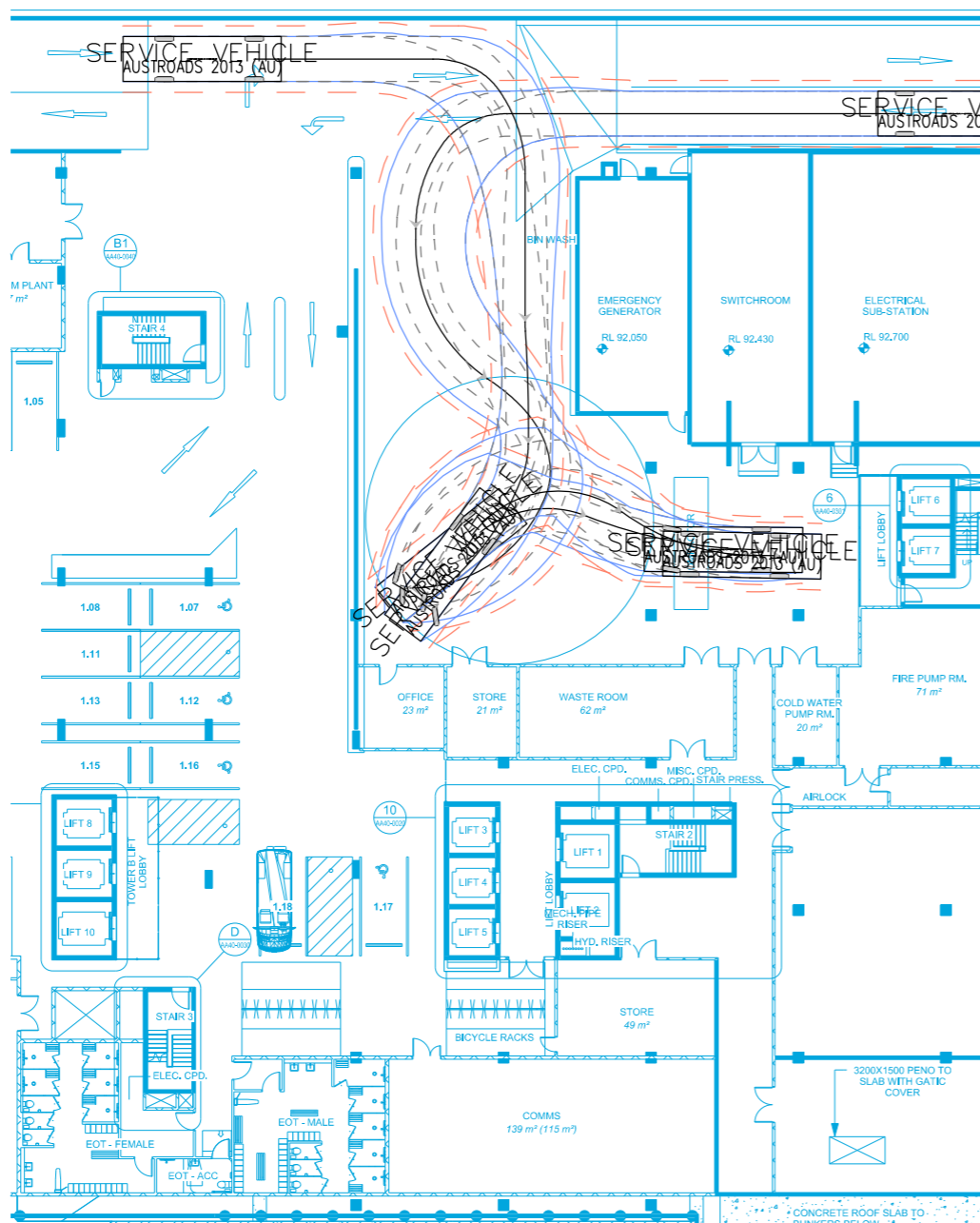
**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
  - - VEHICLE TYRE PATH
  - VEHICLE BODY PATH
  - - 600mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



**SERVICE VEHICLE metres**

- Width : 2.50
- Track : 2.50
- Lock to Lock Time : 6.0
- Steering Angle : 38.7



PLOTTED BY : wendy.zheng ON 19/01/2018 AT 10:55:57 AM



Melbourne 03 9851 9600  
 Sydney 02 8448 1800  
 Brisbane 07 3113 5000  
 Canberra 02 6243 9400  
 Adelaide 08 8334 3600  
 Gold Coast 07 5510 4814  
 Townsville 07 4722 2765  
 Perth 08 6169 1000

**PRELIMINARY PLAN**

FOR DISCUSSION PURPOSES  
 ONLY SUBJECT TO CHANGE  
 WITHOUT NOTIFICATION

DESIGNED  
 W. ZHENG

DESIGN CHECK  
 H. OBERMAIER

APPROVED BY  
 B. MAYNARD

DATE ISSUED  
 19 JANUARY 2018

SCALE  
 A3



CAD FILE NO.  
 16S9001000-11-P3.dgn

12 FREDERICK STREET, ST LEONARDS

**BASEMENT LEVEL 01 - LOADING DOCK  
 SWEPT PATH ASSESSMENT**

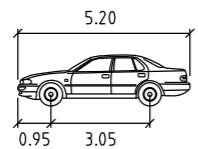
DRAWING NO. 16S9001000-11-05 SHEET 05 OF 08

ISSUE P3

**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 600mm CLEARANCE FROM VEHICLE BODY

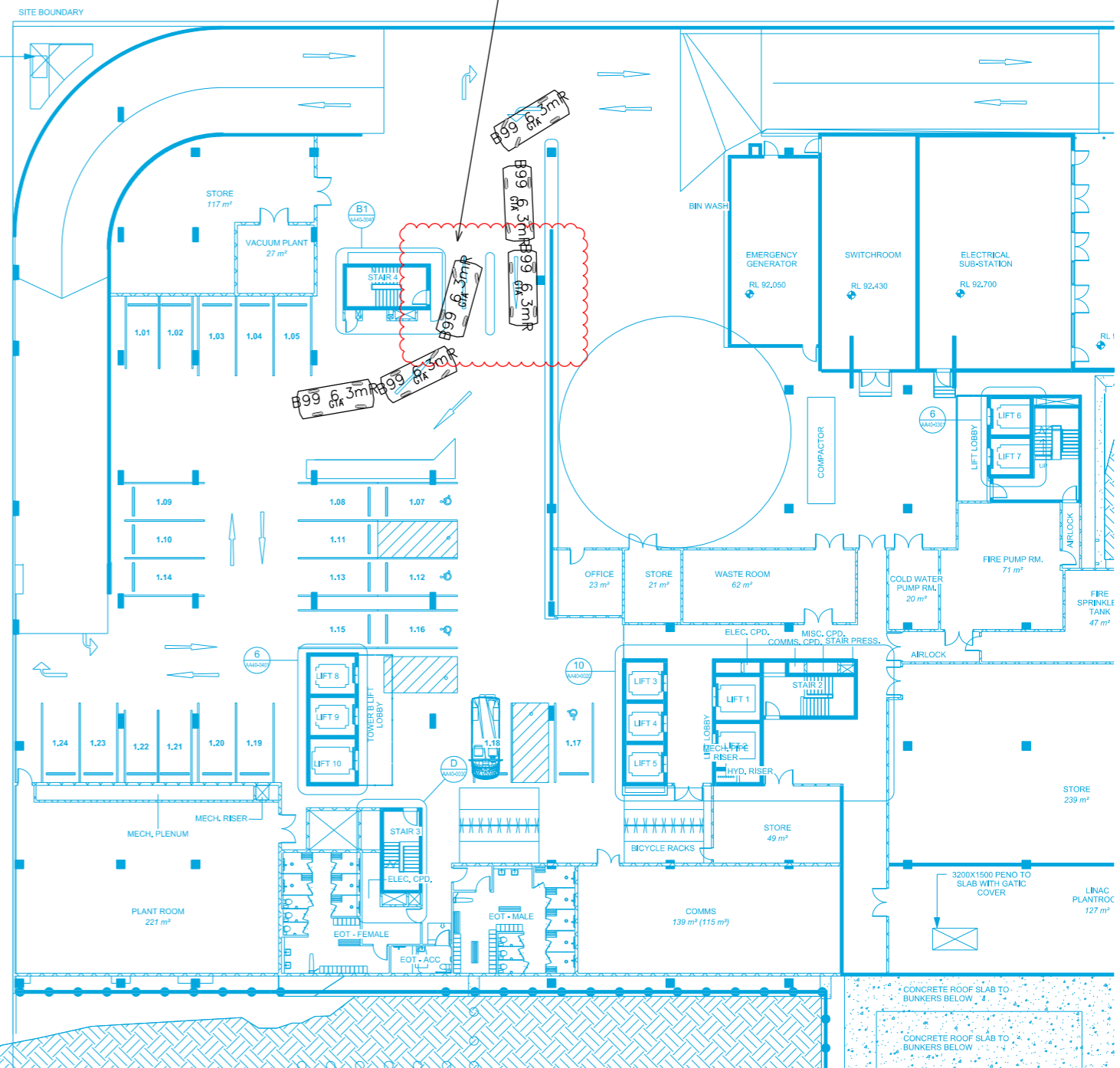
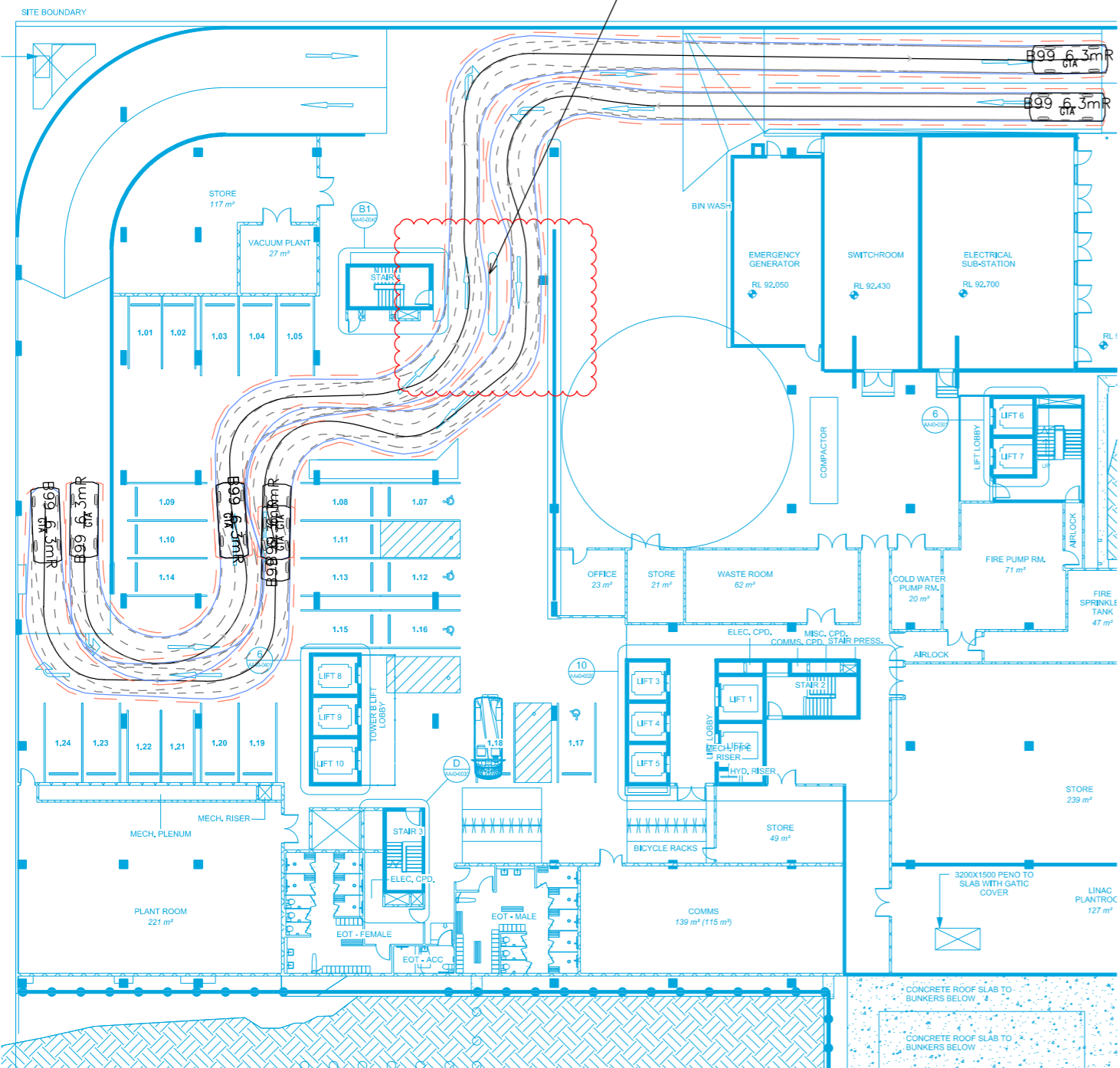
ASSUMED SPEED 5km/h



B99 6.3mR metres  
 Width : 1.94  
 Track : 1.77  
 Lock to Lock Time : 6.0  
 Steering Angle : 34.0

VEHICLE CONFLICTS WITH WALL AND MEDIAN

DRIVERS WOULD HAVE DIFFICULTIES REACHING THE INTERCOM AND THERE IS INSUFFICIENT QUEUING PROVIDED



DN 19/01/2018 AT 10:56:07 AM  
 PLOTTED BY : wendy.zheng



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 Sydney 02 8448 1800  
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 Canberra 02 6243 9400  
 Adelaide 08 8334 3600  
 Cokk Coast 07 5510 4814  
 Townsville 07 4722 2765  
 Perth 08 6169 1000

**PRELIMINARY PLAN**  
 FOR DISCUSSION PURPOSES  
 ONLY SUBJECT TO CHANGE  
 WITHOUT NOTIFICATION

DESIGNED  
 W. ZHENG

DESIGN CHECK  
 H. OBERMAIER

APPROVED BY  
 B. MAYNARD

DATE ISSUED  
 19 JANUARY 2018

SCALE  
 A3 0 X X 1:400

CAD FILE NO.  
 16S9001000-11-P3.dgn

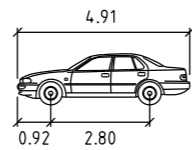
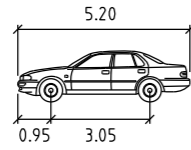
12 FREDERICK STREET, ST LEONARDS

**BASEMENT LEVEL 01 - LOADING DOCK  
 SWEPT PATH ASSESSMENT**

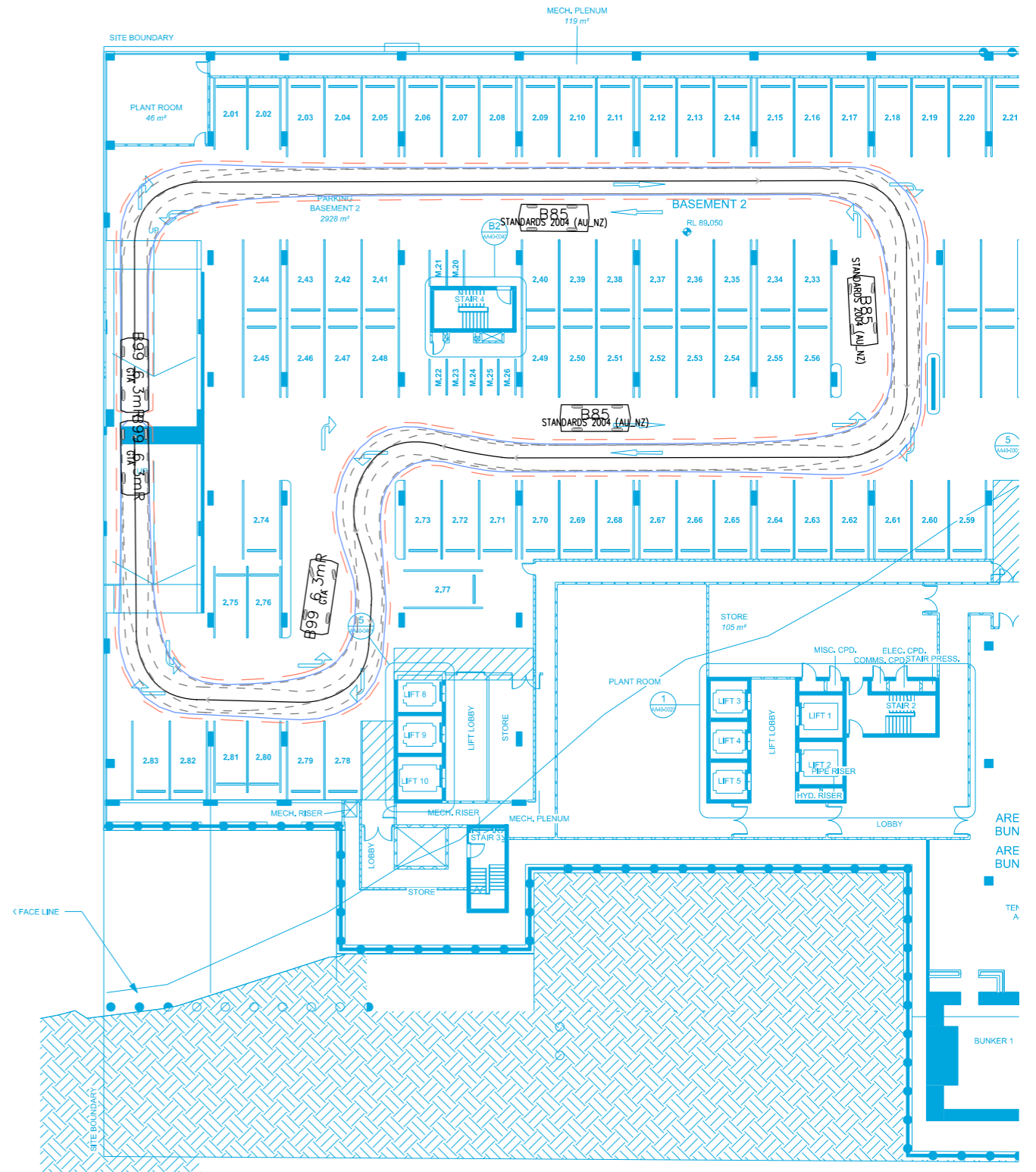
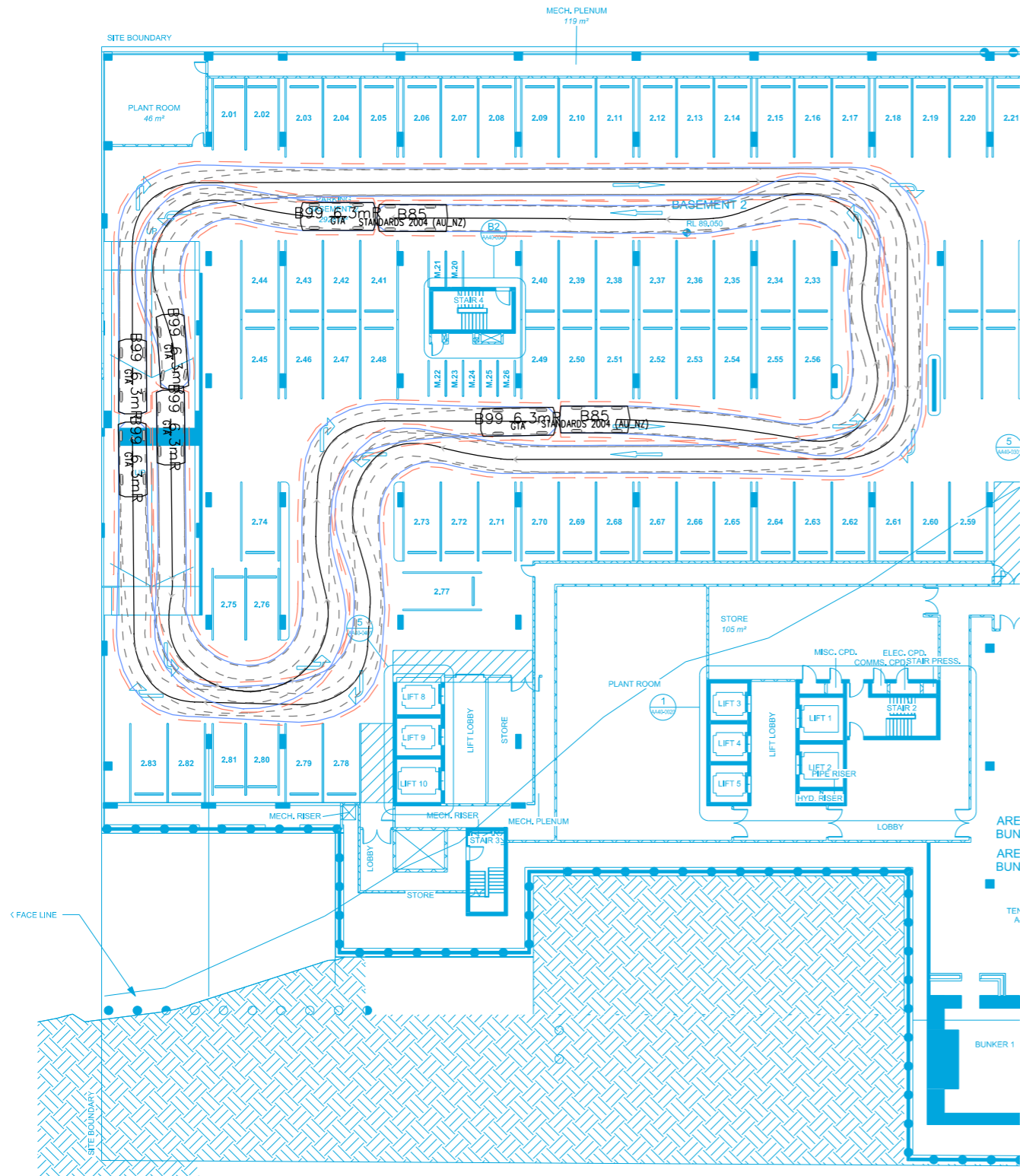
DRAWING NO. 16S9001000-11-06 SHEET 06 OF 08 ISSUE P3

**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
- - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - 600mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



Vehicle	Width (metres)	Track (metres)	Lock to Lock Time	Steering Angle
B99 6.3mR	: 1.94	: 1.77	: 6.0	: 34.0
B85	: 1.87	: 1.77	: 6.0	: 34.0



ON 19/01/2018 AT 10:56:38 AM  
PLOTTED BY : wendy.zheng



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 Canberra 02 6243 9400  
 Adelaide 08 8334 3600  
 Gold Coast 07 5510 4814  
 Townsville 07 4722 2745  
 Perth 08 6169 1000

**PRELIMINARY PLAN**  
 FOR DISCUSSION PURPOSES  
 ONLY SUBJECT TO CHANGE  
 WITHOUT NOTIFICATION

DESIGNED  
W. ZHENG

DESIGN CHECK  
H. OBERMAIER

APPROVED BY  
B. MAYNARD

DATE ISSUED  
19 JANUARY 2018

SCALE  
A3

CAD FILE NO.  
16S9001000-11-P3.dgn

12 FREDERICK STREET, ST LEONARDS  
 TYPICAL LEVEL - BASEMENT LEVEL 02, 03, 04  
 SWEEP PATH ASSESSMENT  
 DRAWING NO. 16S9001000-11-07 SHEET 07 OF 08 ISSUE P3



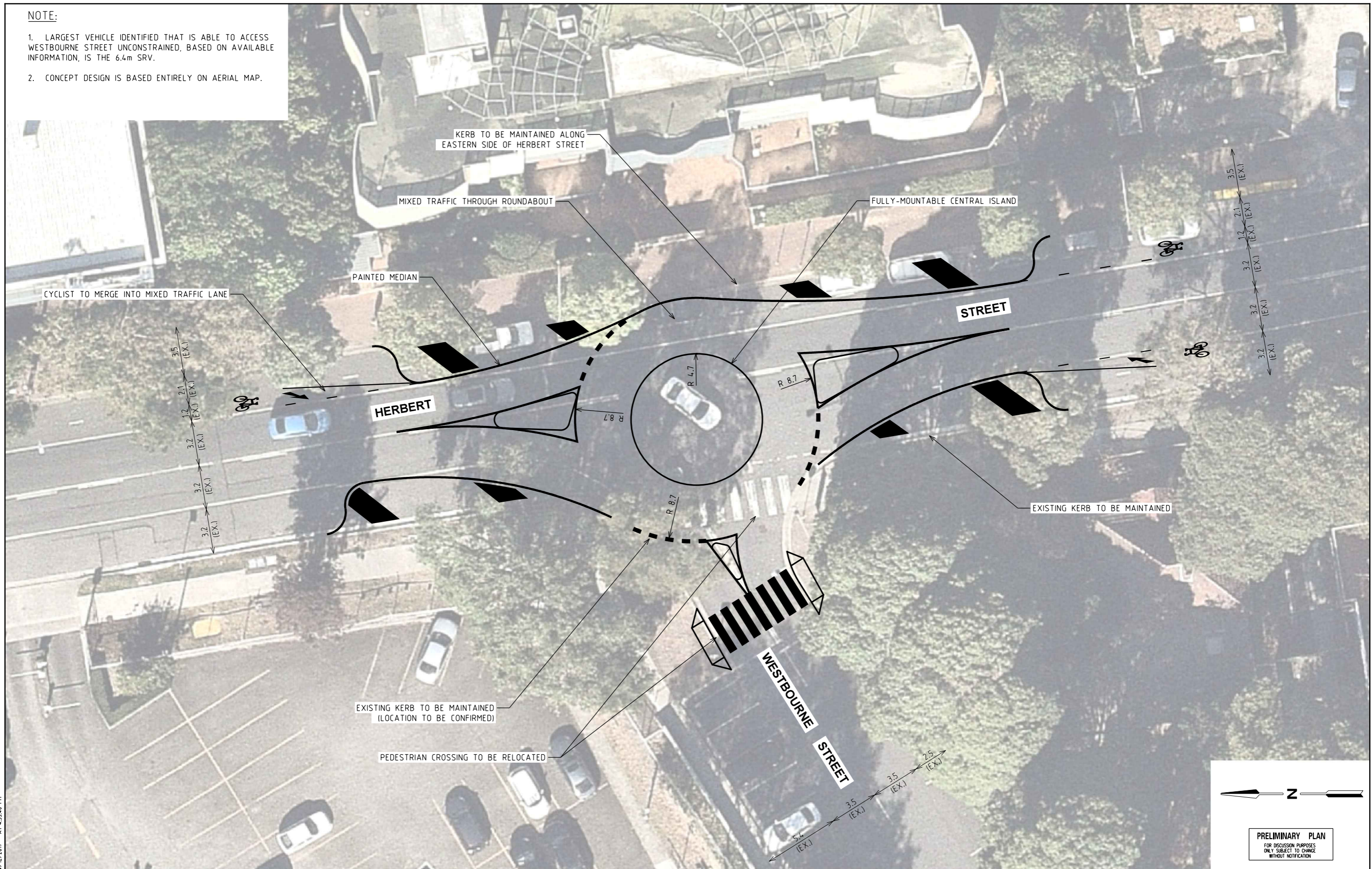
# Appendix C

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## Concept Roundabout and Swept Paths

**NOTE:**

1. LARGEST VEHICLE IDENTIFIED THAT IS ABLE TO ACCESS WESTBOURNE STREET UNCONSTRAINED, BASED ON AVAILABLE INFORMATION, IS THE 6.4m SRV.
2. CONCEPT DESIGN IS BASED ENTIRELY ON AERIAL MAP.



**Z**

**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
WITHOUT NOTIFICATION

PLOTTED BY : Clifford Aguirre ON 14/12/2017 AT 4:55:40 PM

AMENDMENTS			
NO.	DATE	DESCRIPTION	BY
P1	14.12.17	INITIAL ISSUE	CBA MWT BDM

- GENERAL NOTES**
1. ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.
  2. BASE INFORMATION OBTAINED FROM NEARMAP AERIAL PHOTOGRAPHY DATABASE DATED 19 OCTOBER 2017. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.
  3. LOCAL ROAD - HERBERT STREET - SPEED ZONE 50KM/H  
- WESTBOURNE STREET - SPEED ZONE 50KM/H
  4. DESIGN VEHICLE - 6.4m SRV      CHECKING VEHICLE - 12.5m BUS (HERBERT STREET)

DESIGNED C. AGUIRRE	DESIGN CHECK M. TARRANT
DRAWN C. AGUIRRE	DRAFTING CHECK -
APPROVED BY B. MAYNARD	DATE APPROVED FOR INITIAL ISSUE 14 DECEMBER 2017
SCALE A3	CAD FILE NO. 16S9001000-12-P1.dgn

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Sydney	02 8448 1800
Brisbane	07 3113 5000
Canberra	02 6243 9400
Adelaide	08 8334 3600
Gold Coast	07 5510 4814
Townsville	07 4722 2765
Perth	08 6169 1000

CLIENT **DEXUS PROPERTY GROUP**

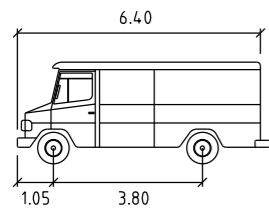
**12 FREDERICK STREET, ST LEONARDS  
PRIVATE HOSPITAL**

**ROUNDBOUT CONCEPT DESIGN**

DRAWING NO. 16S9001000-12-01	SHEET 01 OF 03	ISSUE P1
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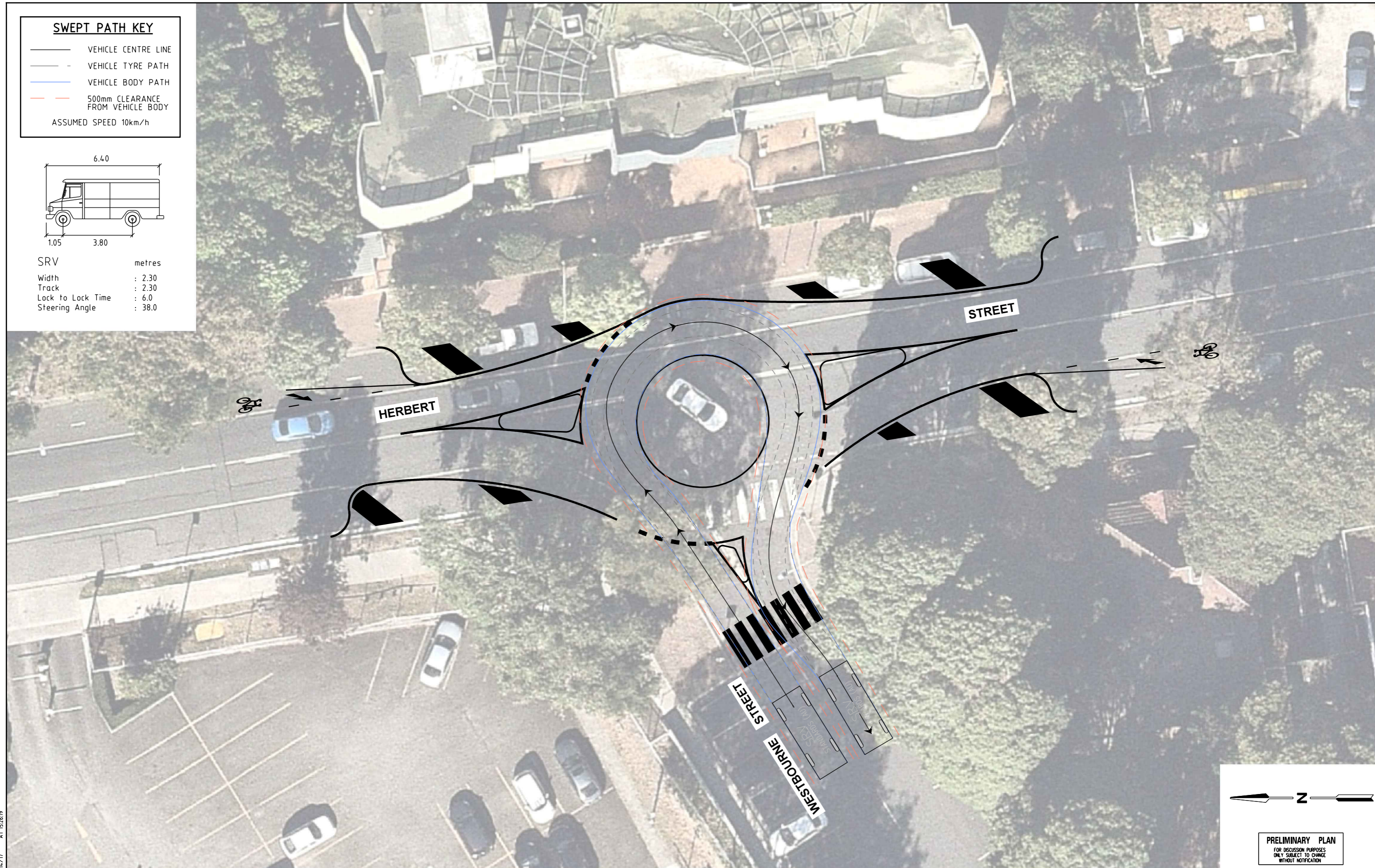
**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
  - - VEHICLE TYRE PATH
  - VEHICLE BODY PATH
  - - 500mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 10km/h



SRV metres

Width : 2.30  
 Track : 2.30  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.0



**N**

**PRELIMINARY PLAN**  
 FOR DISCUSSION PURPOSES  
 ONLY SUBJECT TO CHANGE  
 WITHOUT NOTIFICATION

AMENDMENTS				
NO.	DATE	DESCRIPTION	BY	APP.
P1	08.12.17	INITIAL ISSUE	CBA	MWT

- GENERAL NOTES**
1. ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.
  2. BASE INFORMATION OBTAINED FROM NEARMAP AERIAL PHOTOGRAPHY DATABASE DATED 19 OCTOBER 2017. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.
  3. LOCAL ROAD - HERBERT STREET- SPEED ZONE 50KM/H  
 - WESTBOURNE STREET- SPEED ZONE 50KM/H
  4. DESIGN VEHICLE - 6.4m SRV      CHECKING VEHICLE - 12.5m BUS (HERBERT STREET)

DESIGNED C. AGUIRRE	DESIGN CHECK -
DRAWN C. AGUIRRE	DRAFTING CHECK -
APPROVED BY -	DATE APPROVED FOR INITIAL ISSUE 08 NOVEMBER 2017
SCALE A3	CAD FILE NO. 16S9001000-12-P1.dgn

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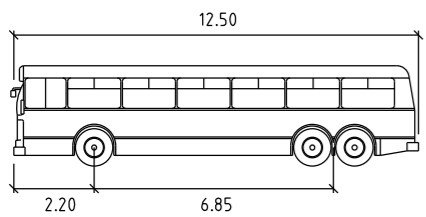
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 Canberra 02 6243 9400  
 Adelaide 08 8334 3600  
 Gold Coast 07 5510 4814  
 Townsville 07 4722 2765  
 Perth 08 6169 1000

CLIENT <b>DEXUS PROPERTY GROUP</b>		
<b>12 FREDERICK STREET, ST LEONARDS PRIVATE HOSPITAL</b>		
<b>SWEPT PATH ASSESSMENT</b>		
DRAWING NO. <b>16S9001000-12-02</b>	SHEET <b>02 OF 03</b>	ISSUE <b>P1</b>

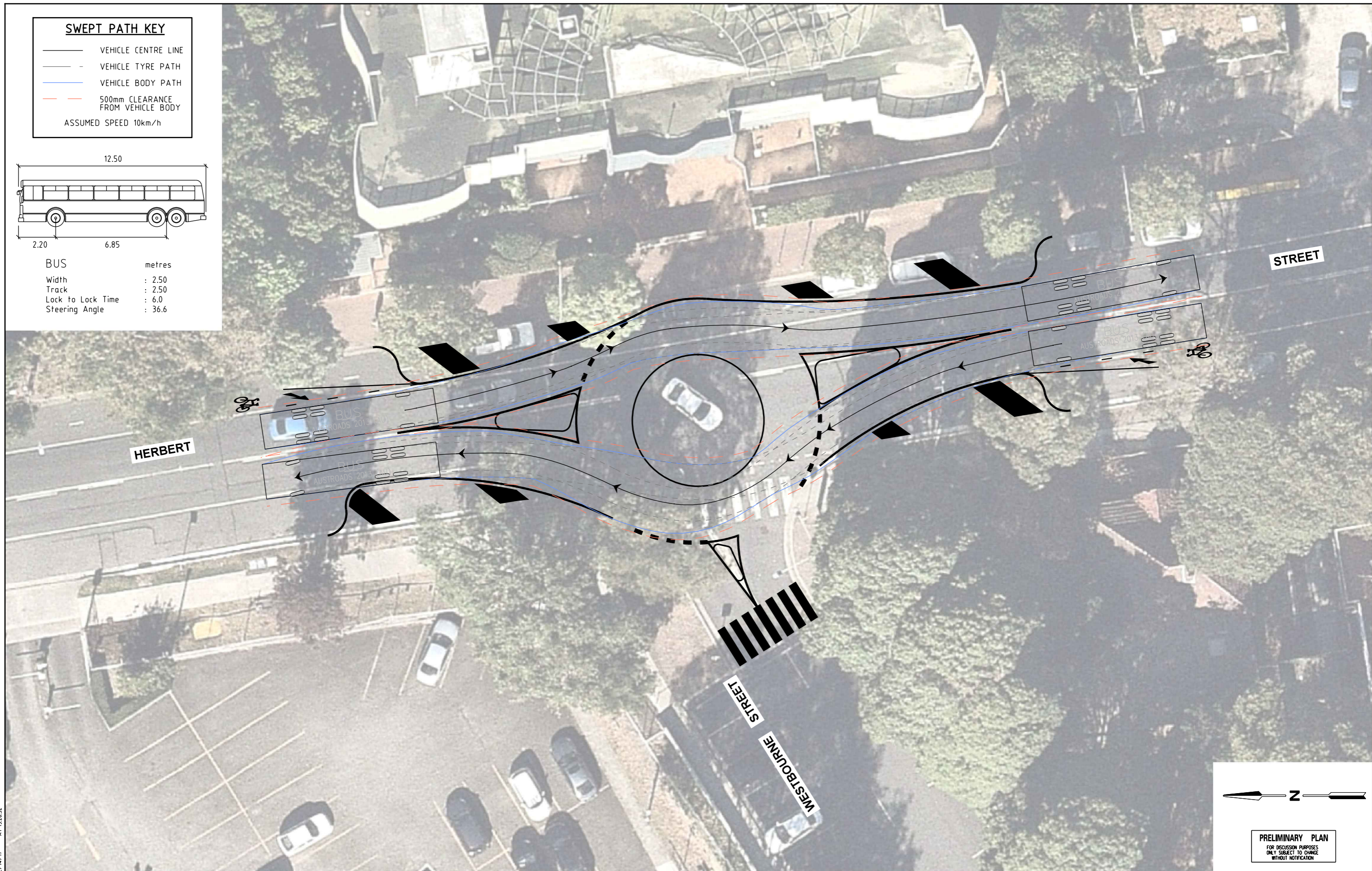
PLOTTED BY : Clifford Aguirre ON 12/11/17 AT 15:26:19

**SWEPT PATH KEY**

- VEHICLE CENTRE LINE
  - - VEHICLE TYRE PATH
  - VEHICLE BODY PATH
  - - 500mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 10km/h



BUS	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6



**PRELIMINARY PLAN**  
FOR DISCUSSION PURPOSES  
ONLY SUBJECT TO CHANGE  
WITHOUT NOTIFICATION

PLOTTED BY : Clifford Aguirre ON 12/11/17 AT 15:26:32

AMENDMENTS					
ISSUE	DATE	DESCRIPTION	BY	CHK.	APP.
P1	08.12.17	INITIAL ISSUE	CBA	MWT	BDM

- GENERAL NOTES**
- ALL DIMENSIONS AND RADII ARE IN METRES AND ARE TO THE FACE OF KERB AND CHANNEL.
  - BASE INFORMATION OBTAINED FROM NEARMAP AERIAL PHOTOGRAPHY DATABASE DATED 19 OCTOBER 2017. GTA CONSULTANTS DOES NOT TAKE ANY RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING CONDITIONS BASE (AERIAL PHOTOGRAPHY) ON WHICH THE SETOUT DETAIL IS BASED. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE EXISTING CONDITIONS INCLUDING UNDERGROUND SERVICES SHOULD BE VERIFIED ON SITE.
  - LOCAL ROAD- HERBERT STREET- SPEED ZONE 50KM/H  
- WESTBOURNE STREET- SPEED ZONE 50KM/H
  - DESIGN VEHICLE - 6.4m SRV      CHECKING VEHICLE - 12.5m BUS (HERBERT STREET)

DESIGNED C. AGUIRRE	DESIGN CHECK -
DRAWN C. AGUIRRE	DRAFTING CHECK -
APPROVED BY -	DATE APPROVED FOR INITIAL ISSUE 08 NOVEMBER 2017
SCALE A3	1:250 CAD FILE NO. 16S9001000-12-P1.dgn

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Gold Coast 07 5510 4814  
Townsville 07 4722 2765  
Perth 08 6169 1000

CLIENT	DEXUS PROPERTY GROUP		
12 FREDERICK STREET, ST LEONARDS PRIVATE HOSPITAL			
<b>SWEPT PATH ASSESSMENT</b>			
DRAWING NO.	SHEET	ISSUE	
16S9001000-12-03	03 OF 03	P1	

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PO Box 24055  
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P +613 9851 9600  
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A Ground Floor, 283 Elizabeth Street  
BRISBANE QLD 4000  
GPO Box 115  
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P +612 6243 4826  
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A Level 9, Corporate Centre 2  
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A Level 1, 25 Sturt Street  
PO Box 1064  
TOWNSVILLE QLD 4810  
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E townsville@gta.com.au

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A Level 27, 44 St Georges Terrace  
PERTH WA 6000  
P +618 6361 4634  
E perth@gta.com.au