

**RAMSAY HEALTH CARE
PROPOSED
MENTAL HEALTH FACILITY
FREDERICK STREET, ARTARMON**
*Assessment of Traffic and
Parking Implications*

May 2016
(Rev B)

Reference 14267

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TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	PLANNING PROPOSAL	4
2.1	Site, Context And Existing Use.....	4
2.2	Planning Proposal	4
2.3	Proposed Development.....	5
3.	ROAD NETWORK AND TRAFFIC CONDITIONS	6
3.1	Road Network.....	6
3.2	Traffic Controls	6
3.3	Traffic Conditions	7
3.4	Transport Services	8
3.5	Walking And Cycling Facilities.....	9
4.	PARKING	10
5.	TRAFFIC	12
6.	ACCESS, INTERNAL CIRCULATION AND SERVICING.....	14
7.	RESPONSE TO SEARS	16
8.	CONCLUSION.....	18

APPENDIX A	DEVELOPMENT PLANS
APPENDIX B	INTERSECTION PLANS
APPENDIX C	TRAFFIC SURVEY RESULTS
APPENDIX D	SIDRA RESULTS
APPENDIX E	TURNING PATH ASSESSMENT

LIST OF ILLUSTRATIONS

FIGURE 1	LOCATION
FIGURE 2	SITE
FIGURE 3	ROAD NETWORK
FIGURE 4	TRAFFIC CONTROLS
FIGURE 5	PEAK TRAFFIC FLOWS

1. INTRODUCTION

This report has been prepared to accompany a Development Application (SSD7588) to the Department of Planning and Environment for a proposed multi function Mental Health Facility in Frederick Street at Artarmon (Figure 1).

The provision of mental health services is an increasingly important sphere of medical care and a significant effort is being made by government and private providers to reduce the current shortage of available facilities. The St. Leonards/Artarmon area has developed as a significant hospital and medical precinct and this is advantaged by the available transport services, walking and cycling facilities and access to the arterial road system.

A Planning Proposal has been approved by Council to rezone the site to permit development of a mental health facility.

The proposed development scheme involves:

- * an 8 level building over 2 levels of car parking
- * 112 beds
- * 25 suites

On 5th May 2016 the Secretarys Environmental Assessment Requirements (SEARS) were forwarded and these included the following:

5. Transport and Accessibility

Include a transport and accessibility assessment which details, but is not limited to, the following:

- *the existing and proposed pedestrian and bicycle routes and facilities within the vicinity of and surrounding the site and to public transport facilities as well as measures to maintain road and personal safety in line with CPTED principles;*
- *an estimate of the total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips;*

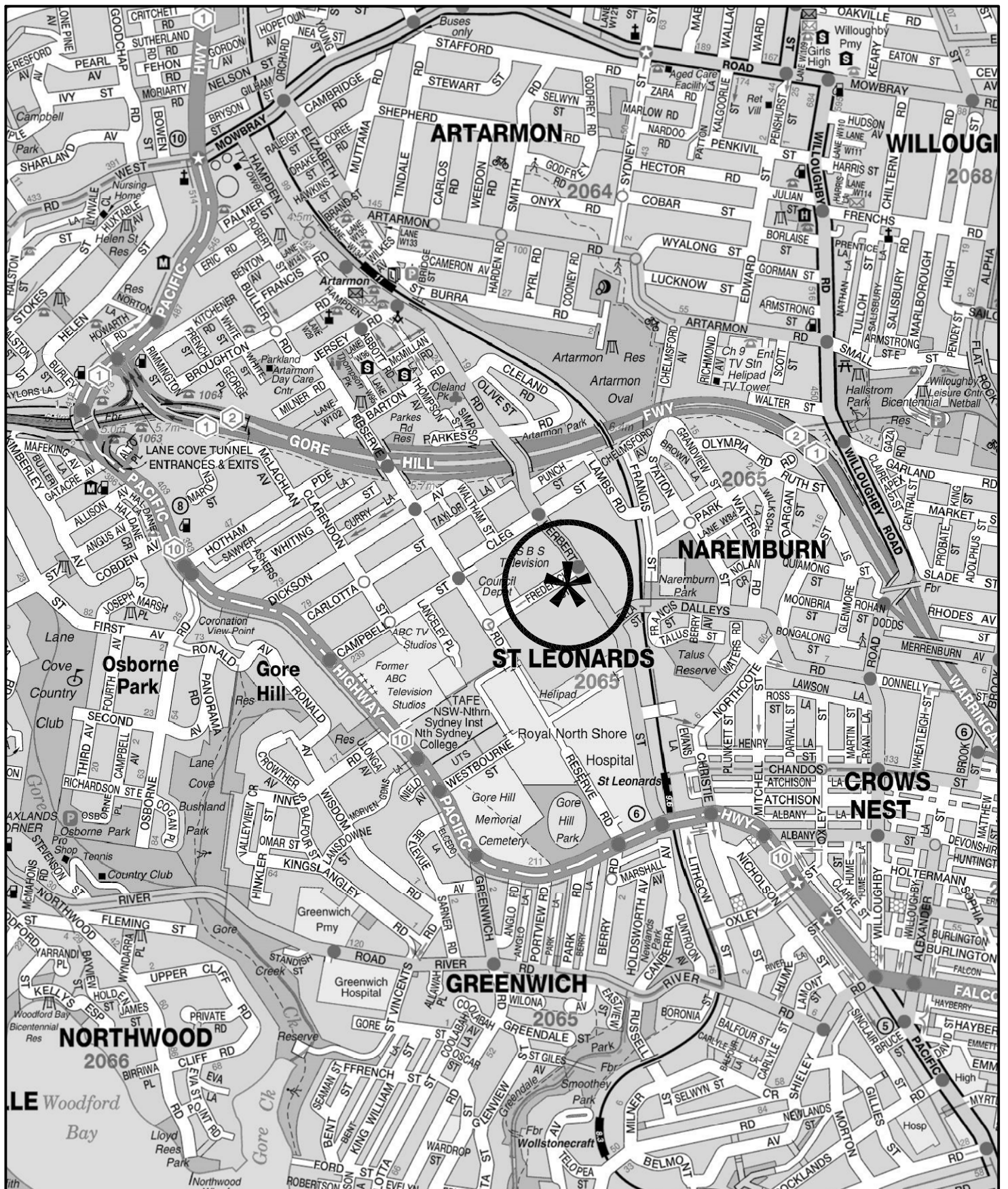
- *the adequacy of public transport to meet the likely future demand of the proposed development;*
- *impact of the proposed development on existing and future public transport and walking and cycling infrastructure within and surrounding the site;*
- *measures to promote travel choices that support sustainable travel, such as a location-specific sustainable travel plan, provision of end-of-trip facilities, green travel plans and wayfinding strategies;*
- *the daily and peak (AM, PM) vehicle movements impact 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);*
- *the proposed walking and cycling access arrangements and connections to public transport services;*
- *the proposed access arrangements, including car pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and cycle networks;*
- *proposed car and bicycle parking provision, including consideration of the availability of public transport and the requirements of the relevant parking codes and Australian Standards;*
- *provision of end of trip facilities (i.e. showers, lockers, change rooms etc.) for the use of employees who choose to walk or cycle to/from work as well as undertake activities during work hours;*
- *service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times); and*
- *traffic and transport impacts during construction and how these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport and the cumulative impact of nearby construction projects, including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact.*

→ *Relevant Policies and Guidelines:*

- *Guide to Traffic Generating Developments (Roads and Maritime Services)*
- *EIS Guidelines – Road and Related Facilities (DoPI)*
- *Cycling Aspects of Austroads Guides*
- *NSW Planning Guidelines for Walking and Cycling*
- *Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development*

The purpose of this report is to:

- * describe the site, its context and the proposed development scheme
- * describe the road network serving the site, the prevailing traffic conditions and the public transport services available
- * assess the proposed parking provision
- * assess the potential traffic implications
- * assess the suitability of the proposed vehicle access, internal circulation and servicing arrangements



LEGEND



LOCATION

FIG 1

2. PLANNING PROPOSAL

2.1 SITE, CONTEXT AND EXISTING USE

The site (Figure 2) is Lot 2 in a proposed subdivision of Lot C in DP401303 being a rectangular shaped area of some 6,260m² which has a frontage of some 108m to the southern side of Frederick Street located just to the west of Herbert Street.

The site is located within the St Leonards/Artarmon Industrial Area and is adjoined by industrial buildings to the east, west and south. The SBS Television Studios are located on the northern side of Frederick Street (corner of Herbert Street) along with a large bulky goods complex (corner of Reserve Road).

The North Shore Hospitals (Public and Private) are located just to the south along with other ancillary medical facilities. There is a mix of industrial, commercial and residential apartment buildings along Herbert Street and the large former ABC Television Studios site just to the west is being redeveloped for contemporary mixed commercial uses. St Leonards Railway Station is located some 650m to the south and there are high frequency bus services operating along the Pacific Highway.

The total Lot C site was formerly occupied by a car dealership and the subject part is occupied by a large brick/metal building of some 5,000m² with an open carpark on the eastern side.

2.2 PLANNING PROPOSAL

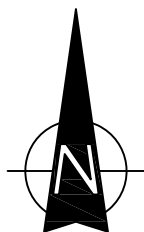
The approved Planning Proposal involved a rezoning of the site to enable demolition of the existing building and excavation of the site to provide a new 8 level building over lower level carparking. The envisaged development in the Planning Proposal comprised:

Hospital	Consultant Suites	Parking
170 Beds	30 Suites	150 spaces with access
111 Staff	30 Practitioners	on Frederick Street
	7 Staff	



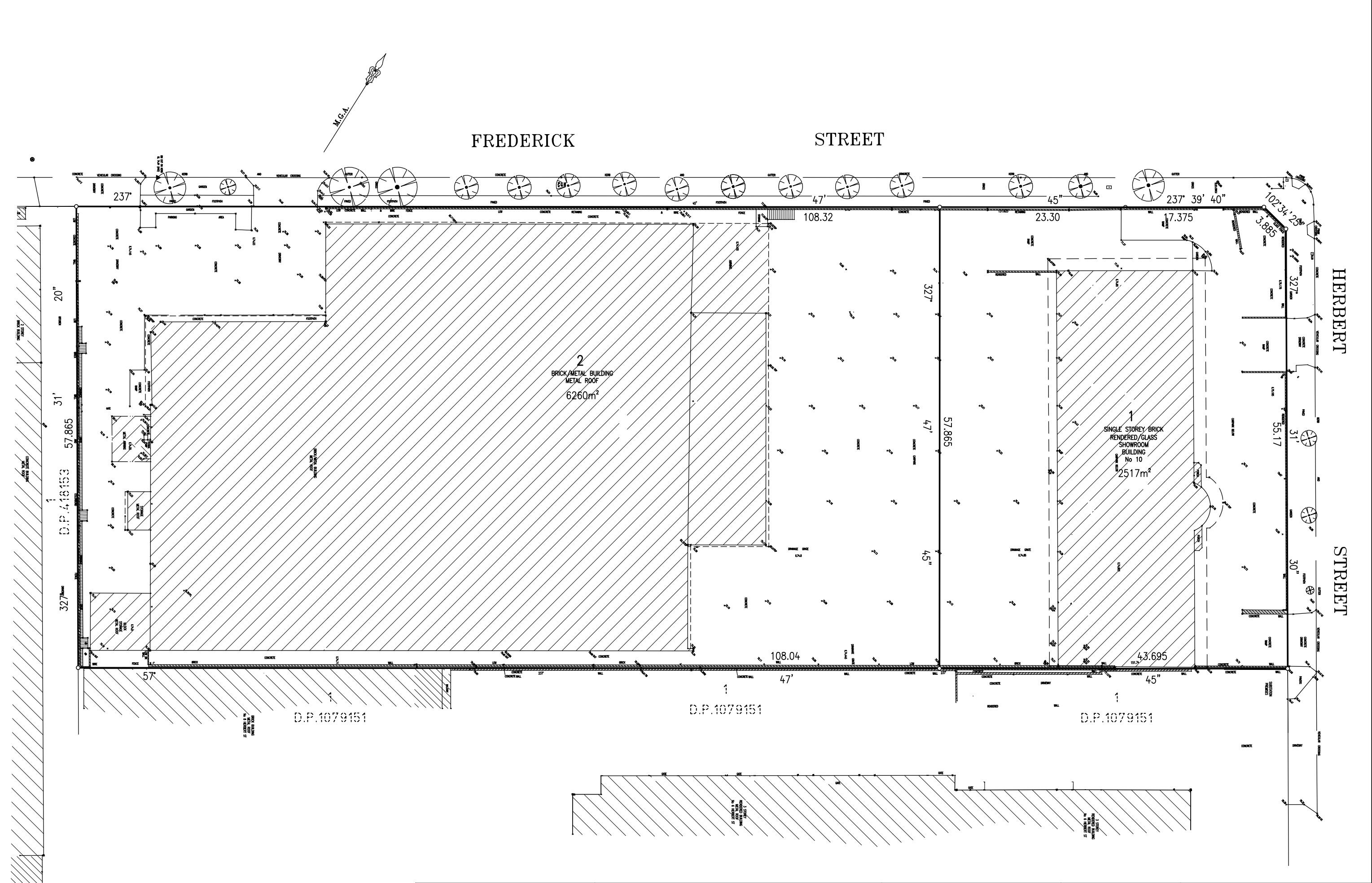
SITE

LEGEND



SITE

FIG 2



Surveyor: TASY MORAITIS Date of Survey: Surveyor's Ref: 131113 DP	PLAN OF PROPOSED SUBDIVISION OF LOT C IN D.P.401303 BEING 10 HERBERT STREET ST LEONARDS	LGA: WILLOUGHBY Locality: ST LEONARDS Subdivision No: 00000000 Lengths are in metres. Reduction Ratio 1: 300	REGISTERED	DRAFT PLAN PRINTED 1 OCT 2014 (ISSUE 3)
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2.3 PROPOSED DEVELOPMENT

It is proposed to demolish the existing building and excavate the site to provide for two levels of car parking and a level building platform. A new 6 level building will be constructed over the entire site providing for:

- 112 beds in-patients
- 85 staff (maximum daytime)
- 25 suites
- 30 practitioners and 8 staff

The proposed scheme reflects a “scaling down” to some extent of what was envisaged with the Planning Proposal as a result of design development and other operational and practice assessments.

A total of 139 parking spaces plus loading dock will be provided in the lower levels with vehicle accesses including a port cochere on the Frederick Street frontage towards the northern and southern site boundaries.

Details of the proposed development scheme are provided on the plans prepared by Silver Thomas Hanley Architects which accompany the Development Application and are reproduced in Appendix A.

3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The road network serving the site (Figure 3) comprise:

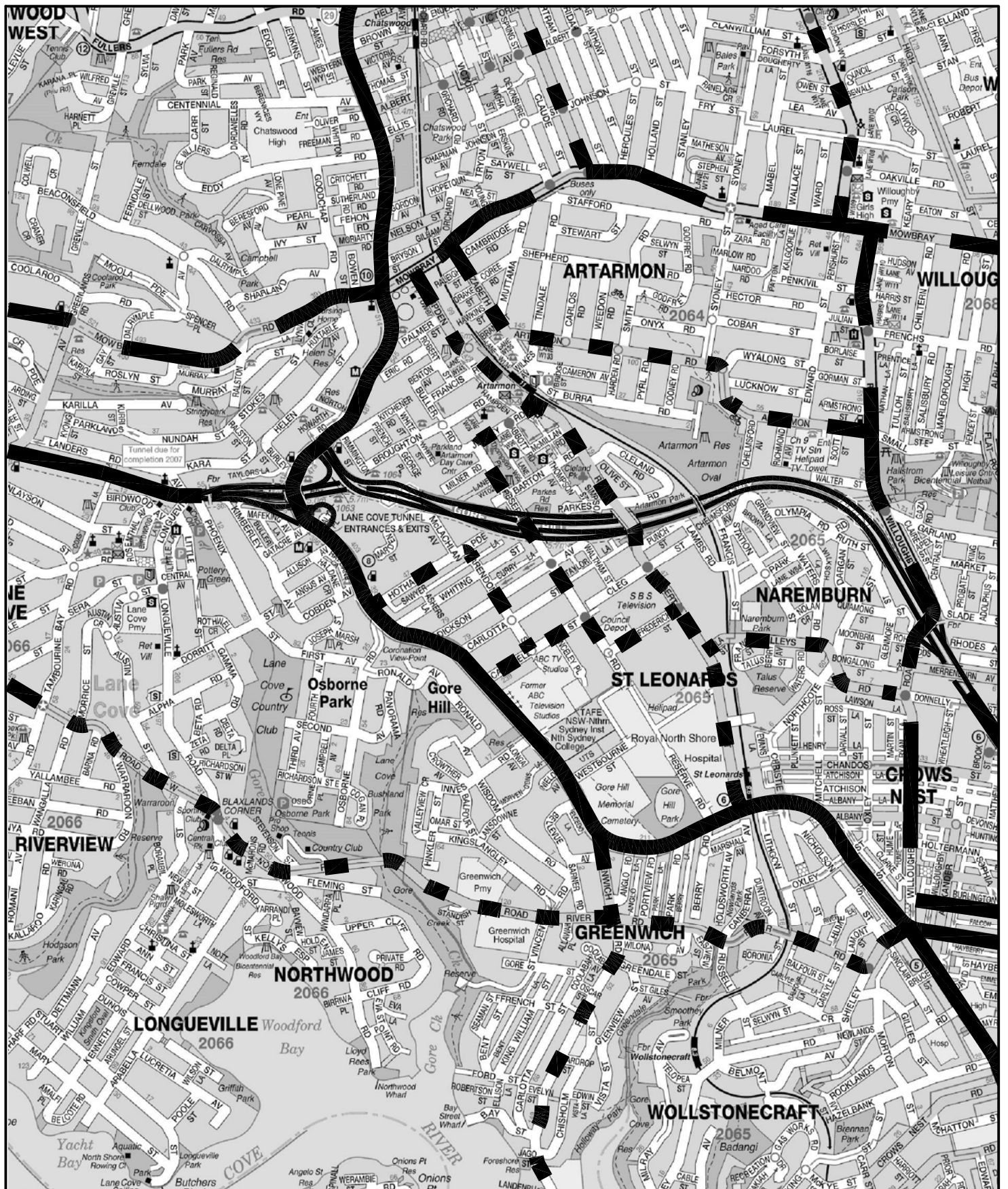
- * *Gore Hill Freeway* – a major arterial route connecting between the harbour crossing and the Pacific Highway, Lane Cove Tunnel and M2 Motorway routes
- * *Pacific Highway* – a State Road and arterial route providing the major north/south connection between Sydney and Hornsby
- * *Herbert Street /Hampden Road* – a major ‘collector’ road which provides connection between Pacific Highway at St Leonards and Mowbray Road at Chatswood
- * *Frederick Street, Reserve Road and Cambell Street* – collector road routes linking through St Leonards and Artarmon (Reserve Road is closed in the section through the hospital site)

Frederick Street is relatively straight and level with a 12.8 wide carriageway.

3.2 TRAFFIC CONTROLS

The traffic controls on the road system serving the area (Figure 4) comprise:

- * the traffic signals at the Herbert Street and Frederick Street intersection. Details of this intersection are provided in Appendix B
- * the roundabout at the Frederick Street and Reserve Road intersection. Details of this intersection are provided in Appendix B
- * the traffic signals along the Pacific Highway at the Herbert Street, Westbourne Street and Reserve Road intersection
- * the 60 kmph speed restriction on the Highway and 50 kmph speed restriction on the local and collector roads



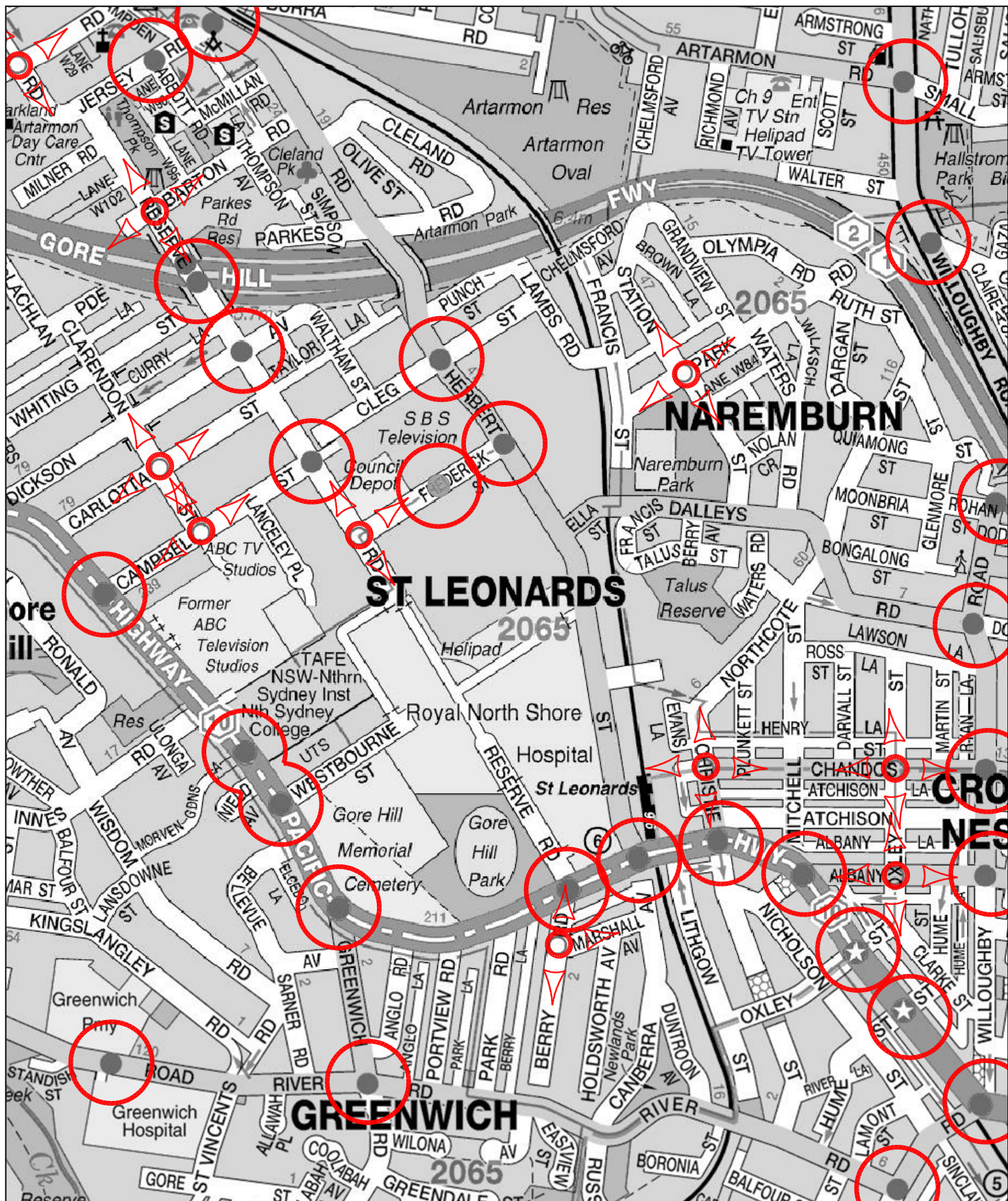
LEGEND

- ARTERIAL
- SUB-ARTERIAL
- COLLECTOR



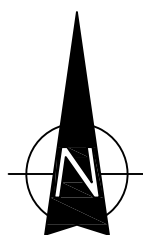
ROAD NETWORK

FIG 3



LEGEND

-  TRAFFIC SIGNAL CONTROL
-  ROUNDABOUT
-  RESTRICTED TURNING MOVEMENT



TRAFFIC CONTROLS

FIG 4

- * the CLEARWAY and the BUS ZONE restrictions along the Pacific Highway
- * the traffic signals on Frederick Street at the bulky goods site access and at other intersections along Reserve Road and Herbert Street/Hampden Road

3.3 TRAFFIC CONDITIONS

An indication of the prevailing traffic conditions in the area is provided by data published by RMS and surveys undertaken as part of this study. This RMS data is expressed in terms of Annual Average Daily Traffic (AADT) and the latest recorded volumes are as follows:

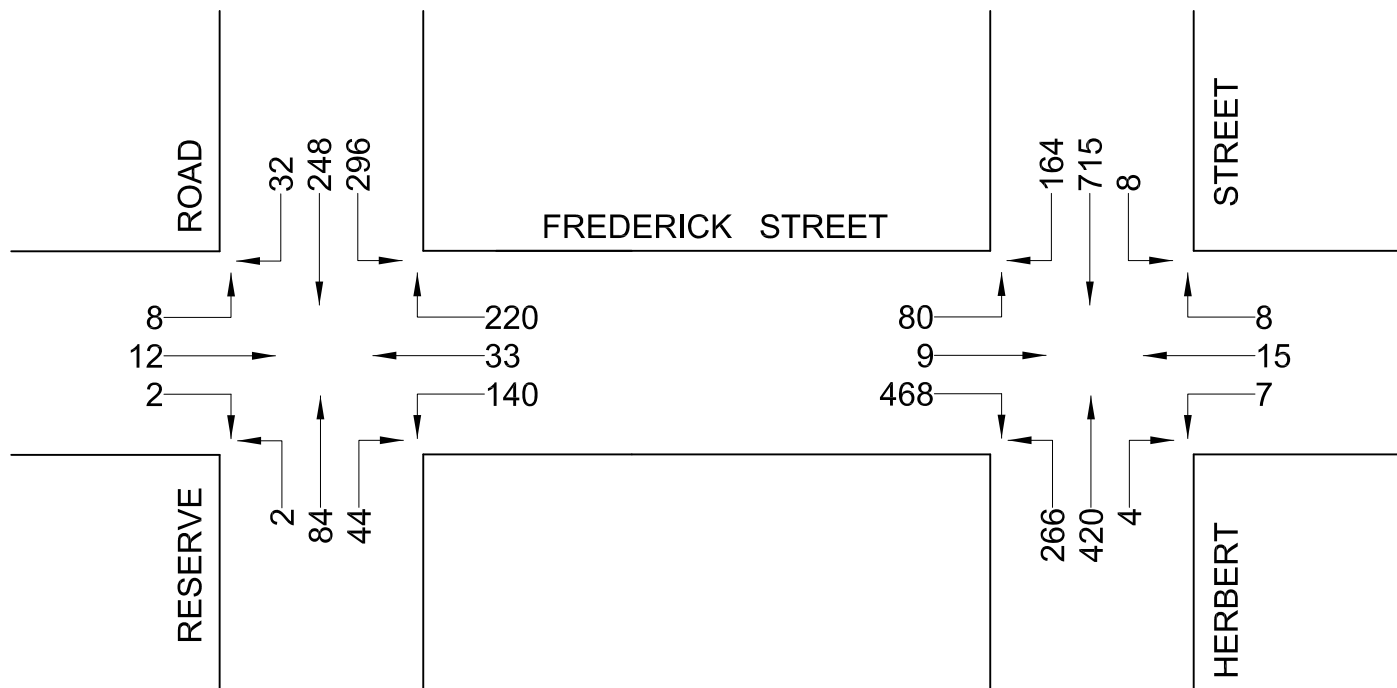
	AADT
Pacific Highway	41,885
Herbert Street	18,494

Traffic surveys have been undertaken at the Herbert Street/Frederick Street and Frederick Street/Reserve Road intersections during the morning and afternoon peak periods. The results of those surveys are provided in Appendix C and summarised on Figure 5. The operational performance of these intersections has been assessed using SIDRA and the results indicating satisfactory performances are provided in Appendix D and summarised in the following while the criteria for interpreting the results are reproduced overleaf:

	AM		PM	
	LOS	AVD	LOS	AVD
Herbert and Frederick	B	25.0	B	28.0
Frederick and Reserve	A	9.4	A	12.1

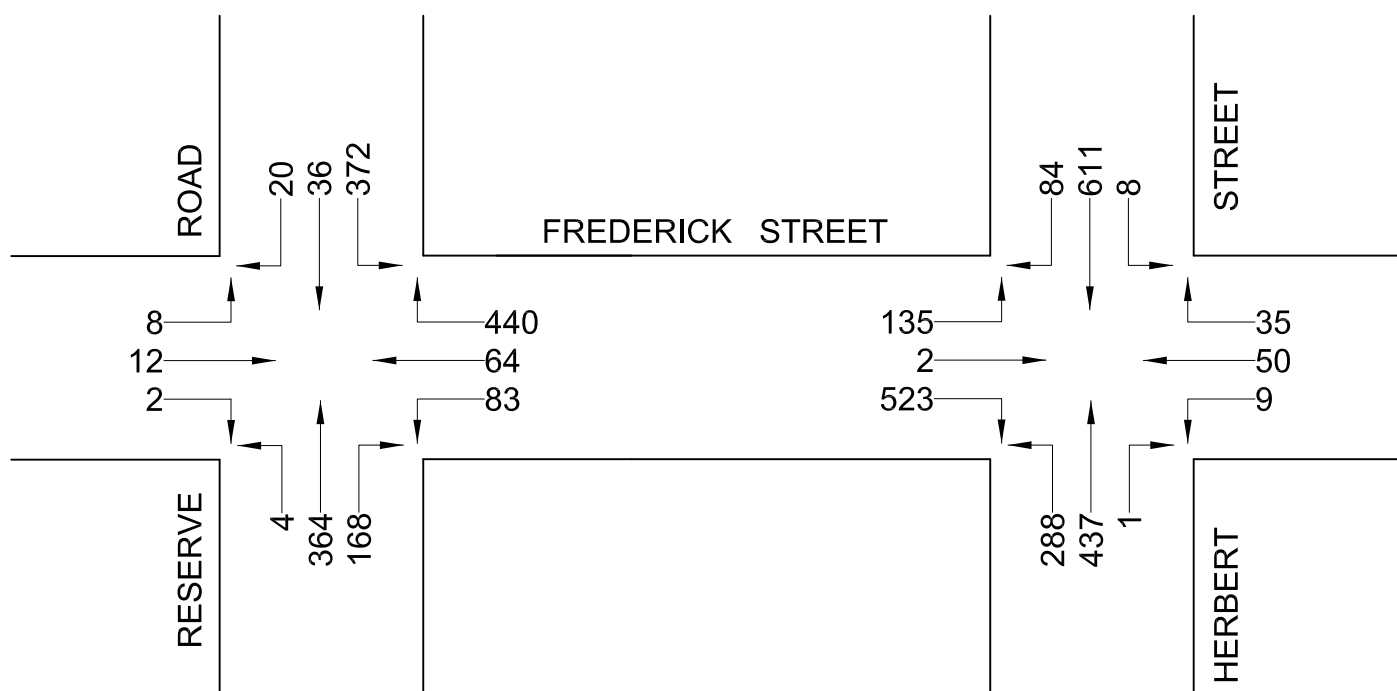
The results of the SIDRA assessments indicate that these intersections operate satisfactorily and traffic conditions in the area are also generally quite satisfactory with vehicle and pedestrian movements facilitated by the numerous traffic signal and roundabout controls.

ACCESS



AM PEAK

ACCESS



PM PEAK

LEGEND



PEAK
TRAFFIC MOVEMENTS

FIG 5

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and Accident Study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below, which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

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

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**¹ both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

¹ the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs

3.4 TRANSPORT SERVICES

The site is ideally located in relation to public transport services which include the St Leonards Railway Station and the numerous bus services which provide access to the surrounding areas of Lane Cove, Chatswood, Macquarie Centre, North Sydney and Sydney CBD etc (and connection to railway stations).

TRAIN

St Leonards railway station on the Main Northern Line is located some 650m to the south of the site and can be accessed to/from the site by:

- walking along the paved and well lit footway along Frederick Street and Herbert Street with crossings provided at traffic signal controlled intersections
- using the M20 or Artarmon Loop bus services
- cycling or travelling by taxi

Artarmon Railway Station is some 800m to the north and can be accessed to/from the site by walking, taxi or the Artarmon Loop bus service.

Bus

The Sydney Buses M20 Route operates along the Pacific Highway and then loops around via Campbell Street and Reserve Road with a bus stop some 250m from the site.

The Artarmon Loop service operates along Frederick Street with a bus stop adjacent to the site frontage.

Sydney Buses Routes 140, 143, 144 and 200 operate along the Pacific Highway with Route 144 circuiting into the Royal North Shore Hospital site with a stop within easy walking distance to the site.

Details of these services are provided overleaf.

3.5 WALKING AND CYCLING FACILITIES

Pedestrians will be able to conveniently walk to/from the site traversing the paved and well lit footways along Frederick Street, Herbert Street and Campbell Street as well as the Reserve Road route through the hospital grounds. Whilst there are some graded sections along the routes Herbert Street in particular is relatively level in the section between Frederick Street and St Leonards.

Bicycle parking will be provided for staff and they will have showers and lockers provided. It is not appropriate for mentally ill patients to cycle and there will be relatively few visitors.

Cyclists will have good access to/from the site using the on-road marked route along Herbert Street which connects to other on and off road routes as well as suggested unmarked routes. Details of these routes are provided overleaf.

artarmon LOOP

The Artarmon Loop is a free shuttle service travelling on a loop from St Leonards Station through the Artarmon industrial area.

Jump on the bus at any of the Artarmon Loop bus stops located on the map.

The Artarmon Loop runs every 10 minutes during peak times (Route A) and every 30 minutes during off peak periods from 6am to 7pm, Monday to Friday. The service incorporates Artarmon Station, Artarmon shops and the Royal North Shore Hospital (Route B) between 10am and 2.30pm, stopping at these locations every 30 minutes.

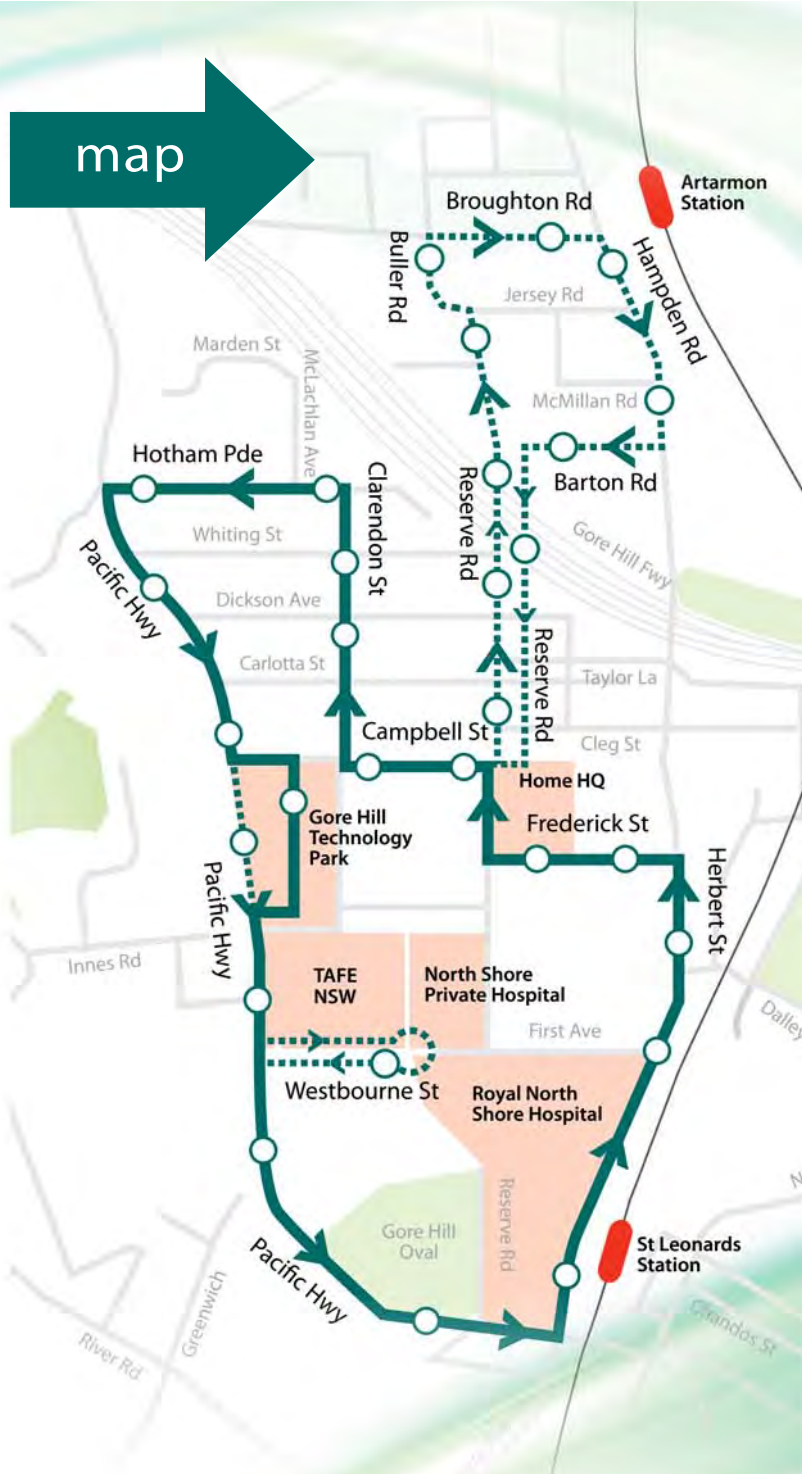
Bicycles can be carried on bike racks at the rear of the bus.

Buses depart from St Leonards Station at the following times:

ROUTE A ONLY:									
AM	6.00	6.15	6.30	6.45	6.55	7.00	7.10	7.20	
	7.30	7.37	7.45	7.54	8.02	8.11	8.19	8.28	
	8.36	8.45	8.53	9.02	9.10	9.20	9.30	9.45	
INCORPORATES ARTARMON STATION AND SHOPS (ROUTE B):									
	10.00	10.30	11.00	11.30					
PM	12.30	1.00	1.30	2.00	2.30				
ROUTE A ONLY:									
	3.00	3.18	3.36	3.54	4.15	4.30	4.39	4.46	4.55
	5.02	5.11	5.18	5.27	5.34	5.43	5.50	6.00	6.20
	6.40								

*The service does not run on public holidays.

Route B: Follows Route A and diverts to Artarmon Station + shops and the Royal North Shore Hospital (RNSH) via Westbourne St. It arrives at Artarmon Station 15 minutes after and at the RNSH approximately 25 minutes after departing St Leonards Station.



KEY

Artarmon Loop bus stops

Route A (Peak period)

Route B (Artarmon shops + RNSH)

metrobus m20 high frequency service connecting Gore Hill, Crows Nest, North Sydney, the City, Victoria Park, Mascot and Botany

Weekdays

Metrobuses depart every 10 minutes during morning and afternoon peak periods, every 15 minutes during the day and every 20 minutes at night and on weekends.

The first Metrobus m20 leaves from Botany Shops at 6:33am, the last service departs at 8:11pm.

The first Metrobus m20 leaves from Gore Hill at 6:28am, the last service departs at 8:13pm.

Saturday

The first Metrobus m20 leaves from Botany Shops at 7:31am and the last service departs at 7:30pm.

The first Metrobus m20 leaves from Gore Hill at 7:38am and the last service departs at 7:37pm.

Sunday

The first Metrobus m20 leaves from Botany Shops at 7:30am and the last service departs at 7:30pm.

The first Metrobus m20 leaves from Gore Hill at 7:38am and the last service departs at 7:35pm.

PrePay service

Metrobus m20 is a PrePay-only service. PrePay simply means purchasing a ticket before boarding the bus.

There are more than 100 PrePay ticket outlets located along the Metrobus m20 route.

Tickets can be purchased from ticket outlets displaying the MyZone/PrePay sign.

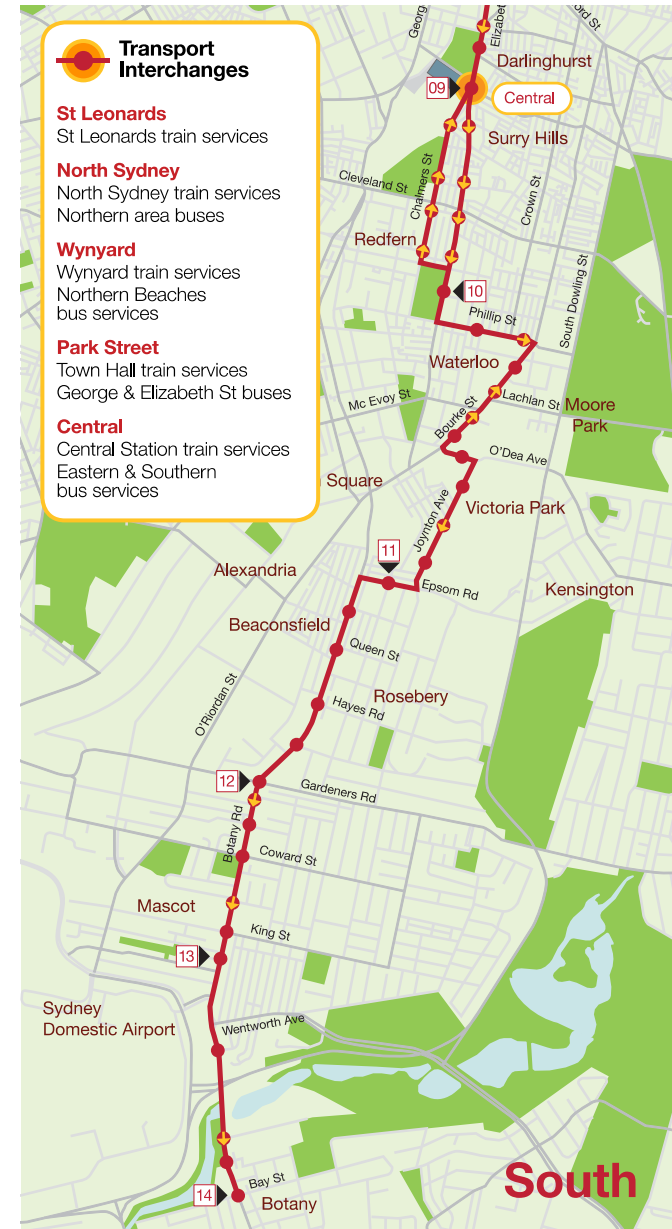


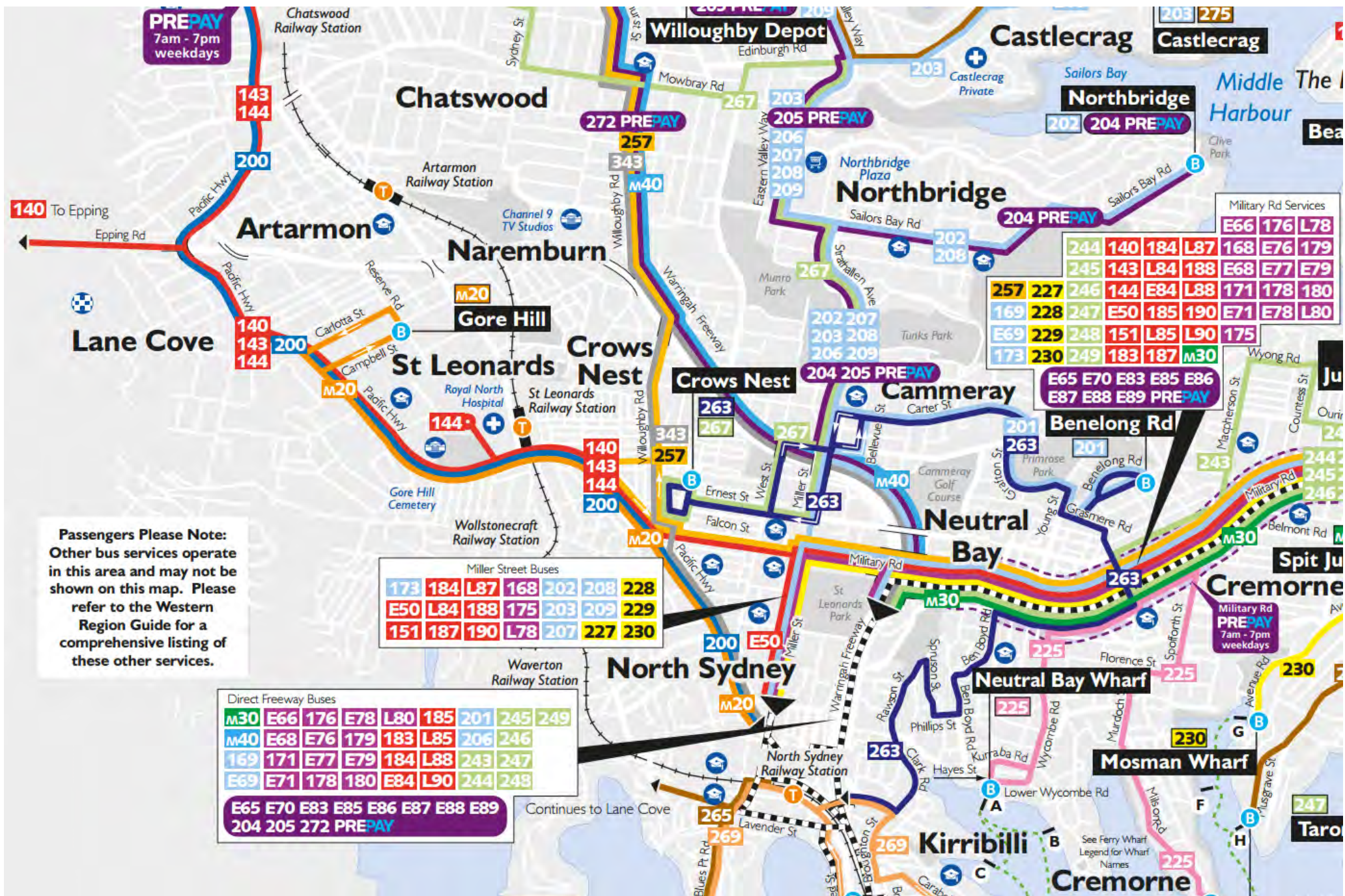
Section Information for Ticket Purchase

Metrobus m20 route section points are shown on the map. Count the sections within which you start your journey and all the sections you travel through (including part sections).

Sections MyBus TravelTen

1-2	MyBus 1
3-5	MyBus 2
6+	MyBus 3







Legend

- Off-Road Bike Route / Shared Path
- On-Road Marked Bike Route
- Suggested Unmarked Bike Route
- Steep Hill
- Chatswood Railway, with Station
- Traffic Light or Pedestrian Crossing
- Bike Shop
- Bike Locker
- Police Station
- Willoughby Council name and boundary

CYCLE MAP

4. PARKING

Willoughby Council's DCP in relation to a "hospital" use specifies the following:

Practitioners	-	1 space each
Staff	-	1 space per 2
Beds	-	1 space per 3
Patients	-	1 per suite

Application of this to the proposed development would indicate the following:

Practitioners	30	30 spaces
Staff (85 + 8)	93	47 spaces
Beds	112	38 spaces
Patients	25	25 spaces
Total:		140 spaces

The Ramsay Health Care experience with the mental health facilities which they operate is that the parking demand is lower than a normal hospital because:

- Mental health patients have less visitors
- Ramsay prohibits in-patients from self driving to/from these facilities

As with most hospitals there will be staff shifts with overlapping changeover times and during the early afternoon change-over (when there are visitors and patient cars present) there will be a congregation of parked cars. It is proposed to provide a total of 139 parking spaces which represents a suitably "constrained provision" on the basis that only 50% of staff will have a parking space and there will only be parking for 1 patient per consulting suite at a time.

The proposed provision includes an appropriate quantum of accessible spaces (4) while at the same time there is provision made for 2 motorbikes and 9 bicycle spaces. Change rooms, showers and lockers will be available for staff which will serve as "end of trip" facilities.

It is apparent however that because of the convenient transport services the proposed parking provision will be adequate and appropriate provided that suitable support and encouragement measures are put in place (i.e. Location Specific Sustainable Travel Plan and Transport Access Guide).

5. TRAFFIC

The traffic generation of the former car dealership on the site can be assessed by application of the RMS Development Guideline traffic generation criteria of 0.7 vtph per 100m² site area. Application of this to the proposed site area of 6,260m² would indicate a peak period traffic generation of 44 vtph.

The RMS Development Guidelines in relation to a “private hospital” use provide the following equations for traffic generation:

$$\text{AM Peak} \quad -10.21 + 0.47 \text{ Beds} + 0.06 \text{ Day staff}$$

$$\text{PM Peak} \quad -2.84 + 0.25 \text{ Beds} + 0.40 \text{ Day Staff}$$

Application of this criteria to the bed/staff numbers proposed would indicate the following generation for a normal private hospital.

$$\begin{aligned} \text{AM} \quad & - 10.21 + 0.47 \times 112 \text{ beds} + 0.06 \times 85 \text{ staff} \\ & = 47.54 \text{ (48 vtph)} \end{aligned}$$

$$\begin{aligned} \text{PM} \quad & - 2.84 + 0.25 \times 112 \text{ beds} + 0.40 \times 85 \text{ staff} \\ & = 59.16 \text{ (60 vtph)} \end{aligned}$$

Mental health facilities exhibit a lower traffic generation characteristic than normal medical/surgical hospital facilities because there is a significantly lower ‘visitor’ factor. The low level of visitor activity and constrained parking provision will be significant factors while other factors are:

- Length of stay in a Mental Health facility is 21 days as compared to 3 days in a medical/surgery facility
- Practitioners tend to see 1 patient per hour in a Mental Health Consultancy Suites compared to 2/3 in a medical/surgery facility
- It is Ramsay’s policy that In-patients at Metal Health facilities are not allowed to drive and park their vehicles at the hospital during their stay

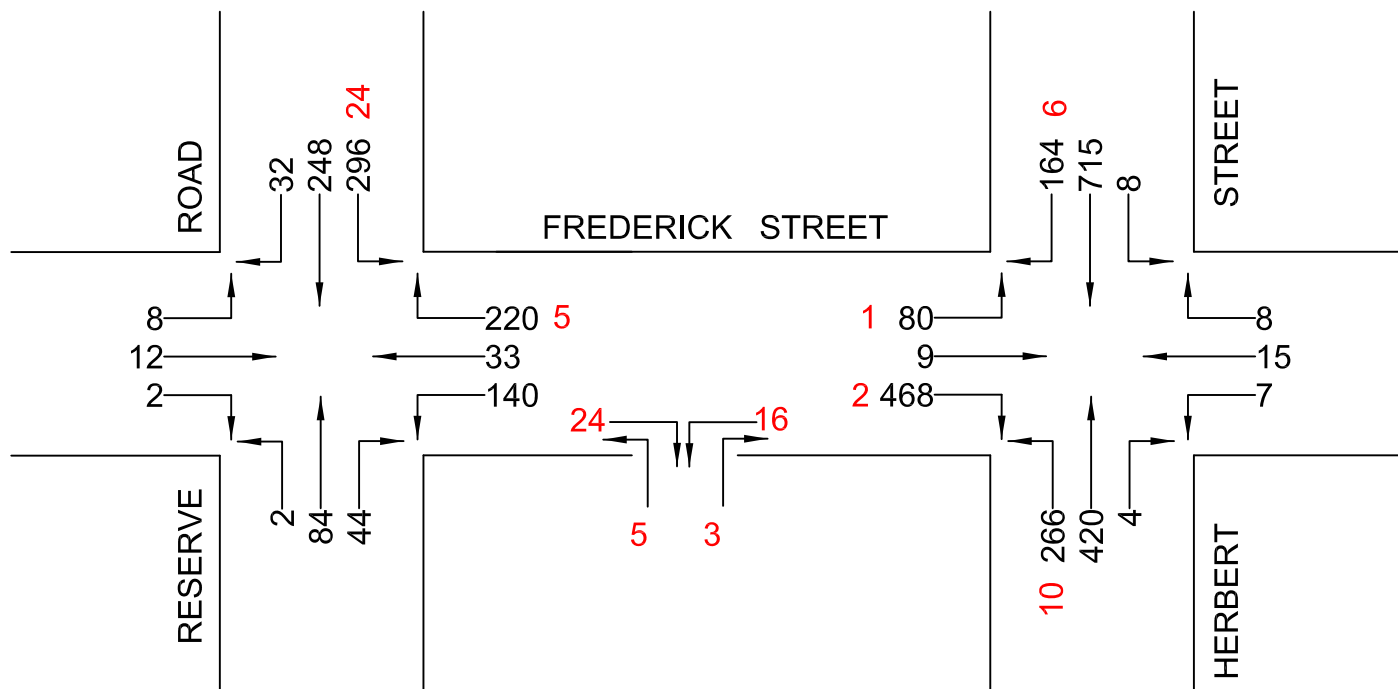
Ramsay Health Care experience is that these factors reduce car activity by some 30% however if a modest 20% reduction is applied the projected traffic movements are 39 vtpd in the AM and 48 vtpd in the PM. However for the sake of a sensitivity provision if no discount is applied then the projected generation is as follows:

AM		PM	
IN	OUT	IN	OUT
40	8	15	45

The projected distribution of these movements is 60% to Reserve Road (and its connection to Gore Hill Freeway) and 40% to Herbert Street. The resultant distribution of the generated traffic is shown on Figure 6 and the effects on the access intersections have been modelled with SIDRA. The results which indicate a satisfactory outcome are provided in Appendix D and summarised in the following:

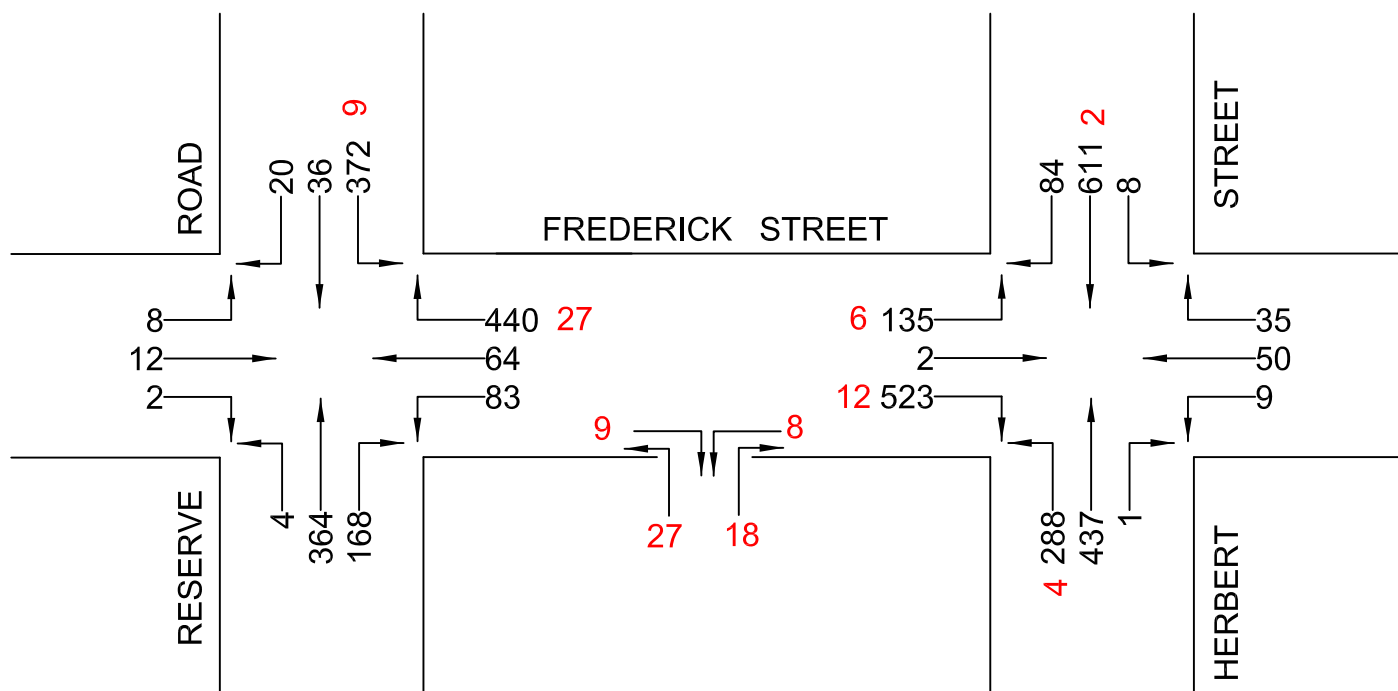
	AM		PM	
	LOS	AVD	LOS	AVD
Herbert and Frederick	B	25.9	C	29.1
Frederick and Reserve	A	9.4	A	12.4

ACCESS



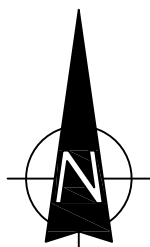
AM PEAK

ACCESS



PM PEAK

LEGEND



**PEAK
TRAFFIC MOVEMENTS
POST DEVELOPMENT**

FIG 6

6. ACCESS, INTERNAL CIRCULATION AND SERVICING

ACCESS

The proposed vehicle access for the development comprises:

- * a combined ingress/egress driveway near the eastern boundary for visitor parking and set down/pick up movements
- * a combined ingress/egress driveway near the western boundary for staff parking and service vehicles

These accesses will be located where there are good sight distances available and will comply with the requirements of AS2890.1 & 2.

INTERNAL CIRCULATION

The layout of the carpark areas will comply with the design criteria of AS 2890.1 & 6 including bays, aisles and manoeuvring areas and details of the turning path assessment for the car park areas are provided in Appendix E.

SERVICING

The loading dock area on western side of the building will provide for trucks up to 11.5m long trucks (the largest which will require to access) as well as ambulances and other small service vehicles. Details of the turning path assessment for the longest vehicle is provided in Appendix E indicating satisfactory provision for turning and manoeuvring with ingress and egress in a forward direction.

In relation to type and frequency of delivery vehicle movements Ramsay operates a very similar size facility at Greenwich and the recorded movement of service vehicles at that site are provided overleaf.

Sita

Waste

Monday – Saturday

RJ Goon

Fruit & Vegetables

Monday – Saturday

Tip Top

Bread

Monday – Saturday

Andrews Meat

Red Meat

Monday – Friday

Trent Keys

Poultry

3 times a week

Bidvest

Frozen & Dry Goods

4 times a week

Spotless

Linen

3 times a week

Bunzl

Disposable & Paper Goods

Twice a week

Lion

Juice & Low Fat Yoghurt

3 times a week

Parmalat

Milk & Full Cream Yoghurt

3 times a week

Douwe Egberts

Coffee

Once a week

These movements are programmed to avoid concurrent arrivals and it is apparent that the projected similar movements at the proposed Artarmon facility will not present any traffic problems.

7. RESPONSE TO SEARS

Dot Points:

1. Comprehensive details in relation to walking, cycling and public transport are provided in Sections 3.4 and 3.5.
2. The projected peak hour vehicle trips are provided in Section 5, however there is no means available to convert that into total daily trips similarly there is no means to project the number of daily public transport, pedestrian or bicycle trips. There are no capacity limits to the pedestrian and bicycle movements which will be generated and these movements will be facilitated by the safe crossing provision with the traffic signals at the Frederick Street and Herbert Street intersection.
3. Observations and enquiries indicate that the relevant rail and bus services will have quite adequate capacity to accommodate additional passenger movements consequential to the proposed development which will be virtually imperceptible in relation to the capacity of these services.
4. As above
5. The need for these measures is acknowledged and that these will be a Consent Condition requirement.
6. This assessment is provided in Section 5. The only known significant “other development” consideration as that of the former ABC Television site where partial development has already occurred and the remainder of the site is subject to an impending application for change. However the traffic assessments undertaken (by TTPA for Lindsay Bennelong) have indicated that very little of the generated traffic will utilise Frederick Street or Herbert Street.

It has been assessed that the proposed Ramsay development will not require to provide any funding for upgrading or road improvement works.

7. These are provided in Sections 3.4 and 3.5.
8. These are described and assessed in Section 6 and it is proposed to provide a segregated dedicated set-down and pick-up facility within the frontage part of the site.
9. This is assessed in Section 4 and 6.
10. These are provided.
11. These are provided in Section 6.
12. It is accepted that a Construction Traffic Management Plan will be a Consent Condition requirement. A comprehensive CTMP will be prepared and submitted for the Construction Certificate and this will be prepared at a time when a building contractor will be engaged and will be able to provide the necessary input for the CTMP. There is no apparent reason why the construction process for this project will present any problems or difficulties.

8. CONCLUSION

The proposed Ramsay Healthcare Mental Health Facility at Artarmon will provide a much needed augmentation to the mental health services on the lower North Shore area.

Assessment of the proposed development has concluded that:

- * there will not be any adverse traffic implications
- * the parking provision will be adequate and appropriate
- * the vehicle access, internal circulation and servicing arrangements will be suitable and the design will comply with Australian Standards

APPENDIX A

DEVELOPMENT PLANS

Architectural floor plan of a medical facility. The plan shows a central corridor system connecting various rooms. On the left side, there are several consult rooms (L1-001 to L1-004), a reception area (L1-001), a staff room (L1-009), and medical records workstations (L1-005). The top right features a cafe terrace (L1-005) and a main entry (L1-005). The bottom right includes a public carpark (RL 79.30) and a pump room (L1-001). The plan also shows a riser (L1-005) and a stairwell (L1-005). The site boundary is indicated by a red line, and the plan includes various annotations such as '1100 HIGH RENDERED WALL', 'CARPARK ENTRY', and 'FIRE / SPRINKLER TANK OVER - REFER TO ENGINEERS DETAILS'. The plan is divided into sections by grid lines A through I and 1 through 10.

PROJECT NO:	10271
DATE:	18/05/16
SCALE:	1 : 100 @ A0
DRAWING:	A2.202
REVISION:	C



NOTE:
FLOOR PLAN UNDER REVIEW - ISSUED FOR INFORMATION ONLY

- LEGEND:
- NOTE: DRAWINGS TO BE PRINTED IN COLOUR
- LIFT - CONSULTING
 - LIFT - DAY PATIENTS
 - LIFT - INPATIENTS / STAFF
 - LIFT - BOH / STRETCHER
 - RECEPTION
 - STAIRS
 - CIRCULATION

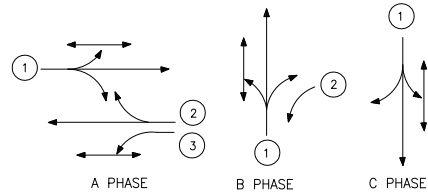
- WALL TYPES :
- NOTE: DRAWINGS TO BE PRINTED IN COLOUR
- 2 HR FR WALLS
 - 1 HR FR WALLS
 - SMOKE WALLS
 - AFS WALLS
 - BLOCKWORK WALLS
 - CONCRETE WALLS
 - PLASTERBOARD WALLS WITH METAL STUDS
- ACOUSTIC, WATER-PROOFING AND HIGH IMPACT LININGS ARE TBC
- ALLOW FOR IMPACKCHEK LININGS TO WARD ROOMS
- ALLOW FOR LEAD LINING TO 2400mm HIGH IN ECT AND TMS ROOMS
- PLYWOOD BACKING FROM FLOOR TO CEILING IN ALL DIRTY AND CLEAN UTILITY ROOMS AND STORE ROOMS
- DRAWING CAN BE PRINTED AT 1:200 @ A2

APPENDIX B

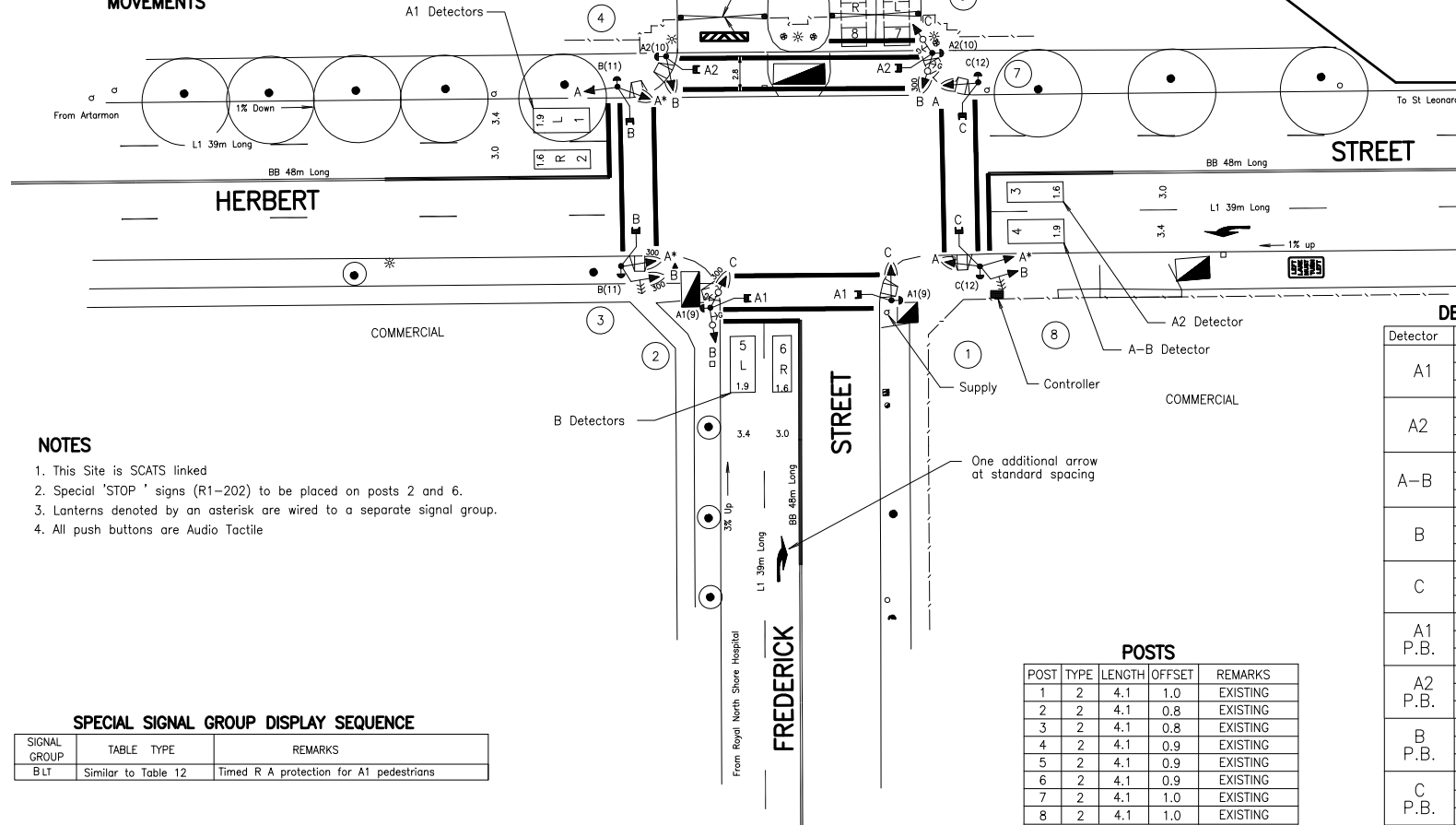
INTERSECTION PLANS

DRAWN BY CADD
DO NOT AMEND MANUALLY

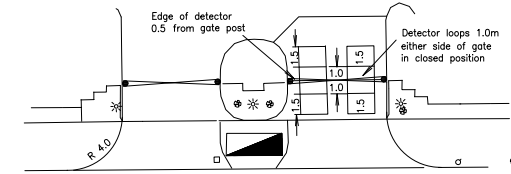
DATE IN SERVICE : 00/00/00



MOVEMENTS



SETOUT 'A'



DETECTOR SPECIFICATION

Detector	Specifications			
	FN	A(L)	A(E1)	
A1	SG/PS	A	A	
	DS	-	-	
A2	FN	A(L)	A(E2)	
	SG/PS	A	A	
	DS	-	-	
A-B	FN	B(PR)	B(CL)	A(E3)
	SG/PS	A(B)	A	B
	DS	A+A1(PB)	A-B(NG)	B(NEXT)
B	FN	B(L)	B(E1)	
	SG/PS	B	B	
	DS	-	-	
C	FN	C(L)	C(E1)	
	SG/PS	C	C	
	DS	-	-	
A1 P.B.	FN	A1(PB)	B(L)	
	SG/PS	A1(WALK)	A.A(WALK)	
	DS	-	B.C	
A2 P.B.	FN	A2(PB)	B(L)	
	SG/PS	A2(WALK)	A.A(WALK)	
	DS	-	B.C	
B P.B.	FN	B(PB)	A(L)	
	SG/PS	B(WALK)	B.B(WALK)	
	DS	-	A.C	
C P.B.	FN	C(PB)	A(L)	
	SG/PS	C(WALK)	C.C(WALK)	
	DS	-	A.B	

NOTES

1. This Site is SCATS linked
2. Special 'STOP' signs (R1-202) to be placed on posts 2 and 6.
3. Lanterns denoted by an asterisk are wired to a separate signal group.
4. All push buttons are Audio Tactile

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
BLT	Similar to Table 12	Timed R A protection for A1 pedestrians

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	EXISTING
2	2	4.1	0.8	EXISTING
3	2	4.1	0.8	EXISTING
4	2	4.1	0.9	EXISTING
5	2	4.1	0.9	EXISTING
6	2	4.1	0.9	EXISTING
7	2	4.1	1.0	EXISTING
8	2	4.1	1.0	EXISTING

A ORIGINAL ISSUE
B Issue Office Instruction
C Issue - Signal Contractor
D Issue - Signal Contractor
E Issue - Signal Contractor
F Issue - Signal Contractor
G Issue - Signal Contractor
H Issue - Signal Contractor
I Issue - Signal Contractor
J Issue - Signal Contractor
K Issue - Signal Contractor
L Issue - Signal Contractor
M Issue - Signal Contractor
N Issue - Signal Contractor
O Issue - Signal Contractor
P Issue - Signal Contractor
Q Issue - Signal Contractor
R Issue - Signal Contractor
S Issue - Signal Contractor
T Issue - Signal Contractor
U Issue - Signal Contractor
V Issue - Signal Contractor
W Issue - Signal Contractor
X Issue - Signal Contractor
Y Issue - Signal Contractor
Z Issue - Signal Contractor

22/4/99
TMAX P/L 9/99

PUBLIC UTILITY LEGEND
HYDRANT
STOP VALVE
GAS VALVE
SEWER MANHOLE
TELECOM PIT
ELECT LIGHT POLE
POWER POLE
STAY POLE
TELEPHONE BOX
TELECOM PILLAR

REFERENCE PLANS
SYMBOLS/ABRS
STD POST
DET SCHED EXP
PRES DETECT
SSO DIS SEQ
DESIGNED
CHECKED
SURVEYOR
DATE

U.S.D. Ref. MAP 215 M2
I.S.G. E: 317 845
CO-ORDS N: 1 248 365
G P REYNOLDS
M. A. CLEVER
J J ZOUTENDYK
DATE

APPROVED
F D REID
MANAGER, URBAN
CIVIL DESIGN
DATE 20/10/98
THIS DRAWING IS
RECOMMENDED FOR
ADVICE
NETWORK OPERATIONS
TEAM LEADER
DATE 15/11/98
Manager Local Network
Services
DATE 15/11/98
Roads and Traffic Authority, N.S.W.
WILLOUGHBY CITY COUNCIL
TRAFFIC SIGNALS AT THE JUNCTION OF
HERBERT STREET AND FREDERICK STREET
ST LEONARDS
DESIGN LAYOUT
TCS No 3518

DESIGN OFFICE PARRAMATTA - SYDNEY TECHNICAL SERVICES
CADD FILE: W3518_1C.dgn
SCALE 5 0 (1:200) 5 10
FILE 480 TS 303
SUPERSEDES SHEET/ISSUE 1/B
REGN. 7000.490.W.3518
SHEET 1
COPYRIGHT ROADS AND TRAFFIC AUTHORITY



APPENDIX C

TRAFFIC SURVEY RESULTS

Location Herbert Street and Frederick Street, St. Leonard
 Client T/T.P.A.
 Job No/Name 14011
 Day/Date Thursday, 13/11/2014

Roundabout

All Vehicles	NORTH Reserve Road				EAST Frederick Street				SOUTH Reserve Road				WEST Commercial Buildings				TOTAL
15 MIN (SAMPLE)	L	T	U	R	L	T	U	R	L	T	U	R	L	T	U	R	
0700 - 0715																	0
0715 - 0730																	0
0730 - 0745																	0
0745 - 0800																	0
0800 - 0815					35	8	2	55									100
0815 - 0830	74	62	1	8													145
0830 - 0845									0	21	0	11					32
0845 - 0900													2	3	0	0	5
Period End	74	62	1	8	35	8	2	55	0	21	0	11	2	3	0	0	
1500 - 1515																	0
1515 - 1530																	0
1530 - 1545																	0
1545 - 1600	93	9	0	5													107
1600 - 1615					21	16	0	110									147
1615 - 1630									1	91	3	42					137
1630 - 1645													2	3	0	0	5
1645 - 1700																	0
1700 - 1715																	0
1715 - 1730																	0
1730 - 1745																	0
1745 - 1800																	0
Period End	93	9	0	5	21	16	0	110	1	91	3	42	2	3	0	0	678

All Vehicles	NORTH Herbert Street			WEST Sitas			SOUTH Herbert Street			EAST Frederick Street			TOTAL
Time Per.	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0715	1	81	48	1	0	0	44	45	0	23	2	91	335
0715 - 0730	0	89	27	0	0	1	59	67	0	15	2	101	362
0730 - 0745	1	106	37	1	4	0	53	70	0	8	2	107	388
0745 - 0800	1	114	24	0	2	1	54	62	3	15	1	94	370
0800 - 0815	1	126	34	1	4	0	58	73	1	15	2	125	443
0815 - 0830	2	198	49	0	5	2	61	104	1	15	2	107	545
0830 - 0845	2	176	42	4	2	3	68	106	1	25	2	120	553
0845 - 0900	3	210	39	2	4	3	79	137	1	25	3	117	623
Period End	11	1105	300	9	21	10	476	664	7	140	16	861	3619
1500 - 1515	1	111	13	0	10	7	56	90	0	48	1	104	440
1515 - 1530	1	141	16	2	9	3	68	76	0	48	2	109	476
1530 - 1545	1	114	23	1	6	0	71	106	1	43	2	114	482
1545 - 1600	1	137	18	2	8	9	75	134	0	45	1	109	541
1600 - 1615	4	184	26	3	11	14	79	109	0	30	0	125	567
1615 - 1630	1	157	19	2	14	7	61	104	0	43	0	133	540
1630 - 1645	2	153	18	2	17	5	73	90	0	18	1	156	534
1645 - 1700	1	159	21	1	14	2	69	76	0	20	0	138	500
1700 - 1715	2	167	14	0	11	12	66	118	0	15	1	153	561
1715 - 1730	2	156	22	0	6	11	71	92	0	18	1	169	548
1730 - 1745	0	146	14	1	4	3	63	108	0	20	0	151	511
1745 - 1800	0	134	9	0	3	1	66	116	0	28	0	133	490
Period End	16	1739	218	14	113	74	822	1218	1	373	9	1594	13429

APPENDIX D

SIDRA RESULTS

MOVEMENT SUMMARY

Site: FREDERICK HERBERT AM

Signals - Fixed Time Cycle Time = 110 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: HERBERT ST											
1	L	266	2.0	0.437	22.8	LOS B	6.3	44.6	0.47	0.75	36.9
2	T	420	2.0	0.482	16.3	LOS B	11.7	83.2	0.56	0.49	39.9
3	R	4	2.0	0.482	24.5	LOS B	11.7	83.2	0.56	0.97	37.3
Approach		690	2.0	0.482	18.9	LOS B	11.7	83.2	0.52	0.59	38.7
East: SHOP ACCESS											
4	L	7	2.0	0.167	64.1	LOS E	0.4	2.7	0.97	0.65	21.7
5	T	15	2.0	0.223	57.0	LOS E	1.3	8.9	0.99	0.70	22.2
6	R	8	2.0	0.223	65.2	LOS E	1.3	8.9	0.99	0.71	22.0
Approach		30	2.0	0.223	60.8	LOS E	1.3	8.9	0.98	0.69	22.0
North: HERBERT ST											
7	L	8	2.0	0.620	14.3	LOS A	3.7	26.4	0.36	1.02	44.5
8	T	715	2.0	0.875	8.4	LOS A	13.1	93.1	0.44	0.40	46.7
9	R	164	2.0	0.875	25.6	LOS B	13.1	93.1	0.74	0.92	36.1
Approach		887	2.0	0.875	11.6	LOS A	13.1	93.1	0.50	0.51	44.3
West: FREDERICK ST											
10	L	80	2.0	0.412	38.6	LOS C	3.5	24.9	0.77	0.76	29.2
11	T	9	2.0	0.412	30.4	LOS C	3.5	24.9	0.77	0.60	30.1
12	R	468	2.0	0.852	54.8	LOS D	26.5	188.8	1.00	0.94	23.9
Approach		557	2.0	0.852	52.1	LOS D	26.5	188.8	0.96	0.91	24.6
All Vehicles		2164	2.0	0.875	25.0	LOS B	26.5	188.8	0.63	0.64	35.0

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	34.4	LOS D	0.1	0.1	0.79	0.79
P3	Across E approach	53	20.4	LOS C	0.1	0.1	0.61	0.61
P5	Across N approach	53	34.4	LOS D	0.1	0.1	0.79	0.79
P7	Across W approach	53	20.4	LOS C	0.1	0.1	0.61	0.61
All Pedestrians		212	27.4	LOS C			0.70	0.70

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: FREDERICK HERBERT PM

Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: HERBERT ST											
1	L	288	2.0	0.487	26.8	LOS B	7.2	51.1	0.67	0.79	34.6
2	T	437	2.0	0.612	20.3	LOS B	12.4	88.5	0.77	0.67	36.8
3	R	1	2.0	0.612	28.5	LOS B	12.4	88.5	0.77	0.92	35.5
Approach		726	2.0	0.612	22.9	LOS B	12.4	88.5	0.73	0.72	35.8
East: SHOP ACCESS											
4	L	9	2.0	0.154	47.3	LOS D	0.3	2.5	0.95	0.66	26.1
5	T	50	2.0	0.601	42.1	LOS C	3.5	25.0	1.00	0.80	26.0
6	R	35	2.0	0.601	50.4	LOS D	3.5	25.0	1.00	0.80	25.9
Approach		94	2.0	0.601	45.7	LOS D	3.5	25.0	1.00	0.78	25.9
North: HERBERT ST											
7	L	8	2.0	0.621	18.6	LOS B	5.5	39.3	0.53	0.96	41.4
8	T	611	2.0	0.877	15.1	LOS B	12.9	91.9	0.69	0.62	40.1
9	R	84	2.0	0.877	29.6	LOS C	12.9	91.9	0.91	0.93	34.6
Approach		703	2.0	0.877	16.9	LOS B	12.9	91.9	0.72	0.67	39.3
West: FREDERICK ST											
10	L	135	2.0	0.472	29.6	LOS C	3.9	28.0	0.77	0.77	33.1
11	T	2	2.0	0.472	21.4	LOS B	3.9	28.0	0.77	0.61	34.2
12	R	523	2.0	0.879	46.6	LOS D	23.6	168.3	1.00	0.99	26.3
Approach		660	2.0	0.879	43.1	LOS D	23.6	168.3	0.95	0.94	27.4
All Vehicles		2183	2.0	0.879	28.0	LOS B	23.6	168.3	0.81	0.77	33.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	25.6	LOS C	0.1	0.1	0.80	0.80
P3	Across E approach	53	22.5	LOS C	0.1	0.1	0.75	0.75
P5	Across N approach	53	25.6	LOS C	0.1	0.1	0.80	0.80
P7	Across W approach	53	22.5	LOS C	0.1	0.1	0.75	0.75
All Pedestrians		212	24.1	LOS C			0.78	0.78

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: FREDERICK RESERVE AM

Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RESERVE RD											
1	L	2	2.0	0.134	9.3	LOS A	0.7	5.2	0.48	0.67	47.5
2	T	84	2.0	0.134	8.5	LOS A	0.7	5.2	0.48	0.62	47.7
3	R	44	2.0	0.134	12.5	LOS A	0.7	5.2	0.48	0.77	45.3
Approach		130	2.0	0.134	9.8	LOS A	0.7	5.2	0.48	0.67	46.8
East: FREDERICK ST											
4	L	140	2.0	0.393	9.8	LOS A	2.5	18.1	0.56	0.70	46.9
5	T	33	2.0	0.393	8.9	LOS A	2.5	18.1	0.56	0.66	46.9
6	R	220	2.0	0.393	13.0	LOS A	2.5	18.1	0.56	0.77	44.7
Approach		393	2.0	0.393	11.5	LOS A	2.5	18.1	0.56	0.73	45.6
North: RESERVE RD											
7	L	296	2.0	0.415	8.1	LOS A	3.1	22.0	0.27	0.60	48.4
8	T	248	2.0	0.415	7.2	LOS A	3.1	22.0	0.27	0.52	48.9
9	R	32	2.0	0.415	11.2	LOS A	3.1	22.0	0.27	0.73	46.0
Approach		576	2.0	0.415	7.9	LOS A	3.1	22.0	0.27	0.57	48.5
West: ACCESS											
10	L	8	2.0	0.024	9.5	LOS A	0.1	0.8	0.48	0.64	47.5
11	T	12	2.0	0.024	8.6	LOS A	0.1	0.8	0.48	0.58	47.7
12	R	2	2.0	0.024	12.6	LOS A	0.1	0.8	0.48	0.74	45.2
Approach		22	2.0	0.024	9.3	LOS A	0.1	0.8	0.48	0.62	47.4
All Vehicles		1121	2.0	0.415	9.4	LOS A	3.1	22.0	0.40	0.64	47.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

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

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: FREDERICK RESERVE PM

Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RESERVE RD											
1	L	4	2.0	0.663	15.8	LOS B	7.0	49.6	0.86	1.02	42.0
2	T	364	2.0	0.663	15.0	LOS B	7.0	49.6	0.86	1.01	42.2
3	R	168	2.0	0.663	19.0	LOS B	7.0	49.6	0.86	1.05	40.3
Approach		536	2.0	0.663	16.2	LOS B	7.0	49.6	0.86	1.02	41.6
East: FREDERICK ST											
4	L	83	2.0	0.423	8.1	LOS A	3.3	23.4	0.28	0.57	48.1
5	T	64	2.0	0.423	7.2	LOS A	3.3	23.4	0.28	0.50	48.6
6	R	440	2.0	0.423	11.2	LOS A	3.3	23.4	0.28	0.68	45.6
Approach		587	2.0	0.423	10.4	LOS A	3.3	23.4	0.28	0.64	46.3
North: RESERVE RD											
7	L	372	2.0	0.388	9.0	LOS A	2.8	20.1	0.51	0.65	47.3
8	T	36	2.0	0.388	8.1	LOS A	2.8	20.1	0.51	0.60	47.4
9	R	20	2.0	0.388	12.1	LOS A	2.8	20.1	0.51	0.73	45.3
Approach		428	2.0	0.388	9.1	LOS A	2.8	20.1	0.51	0.65	47.2
West: ACCESS											
10	L	8	2.0	0.046	15.4	LOS B	0.3	2.0	0.83	0.79	42.4
11	T	12	2.0	0.046	14.5	LOS B	0.3	2.0	0.83	0.77	42.6
12	R	2	2.0	0.046	18.4	LOS B	0.3	2.0	0.83	0.82	40.6
Approach		22	2.0	0.046	15.2	LOS B	0.3	2.0	0.83	0.78	42.3
All Vehicles		1573	2.0	0.663	12.1	LOS A	7.0	49.6	0.55	0.77	44.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

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

Roundabout Capacity Model: SIDRA Standard

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: FREDERICK HERBERT AM -
POST DEV

Signals - Fixed Time Cycle Time = 120 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: HERBERT ST											
1	L	277	2.0	0.460	22.6	LOS B	6.7	47.5	0.45	0.75	37.0
2	T	420	2.0	0.466	15.9	LOS B	11.9	84.4	0.52	0.46	40.3
3	R	4	2.0	0.466	24.1	LOS B	11.9	84.4	0.52	0.98	37.4
Approach		701	2.0	0.466	18.6	LOS B	11.9	84.4	0.49	0.58	38.9
East: SHOP ACCESS											
4	L	7	2.0	0.182	69.7	LOS E	0.4	2.9	0.98	0.65	20.5
5	T	15	2.0	0.243	62.8	LOS E	1.4	9.8	0.99	0.70	20.9
6	R	8	2.0	0.243	71.0	LOS F	1.4	9.8	0.99	0.71	20.8
Approach		30	2.0	0.243	66.6	LOS E	1.4	9.8	0.99	0.69	20.8
North: HERBERT ST											
7	L	8	2.0	0.615	15.4	LOS B	4.1	29.3	0.40	1.01	43.6
8	T	715	2.0	0.869	8.7	LOS A	12.1	86.5	0.45	0.41	46.5
9	R	172	2.0	0.869	23.4	LOS B	12.1	86.5	0.65	0.90	37.2
Approach		895	2.0	0.869	11.6	LOS A	12.1	86.5	0.49	0.51	44.3
West: FREDERICK ST											
10	L	82	2.0	0.454	41.3	LOS C	3.9	27.7	0.77	0.76	28.2
11	T	9	2.0	0.454	33.1	LOS C	3.9	27.7	0.77	0.60	29.0
12	R	470	2.0	0.856	58.6	LOS E	28.9	205.5	1.00	0.94	23.0
Approach		561	2.0	0.856	55.6	LOS D	28.9	205.5	0.96	0.91	23.7
All Vehicles		2187	2.0	0.869	25.9	LOS B	28.9	205.5	0.62	0.64	34.5

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	36.8	LOS D	0.1	0.1	0.78	0.78
P3	Across E approach	53	20.4	LOS C	0.1	0.1	0.58	0.58
P5	Across N approach	53	36.8	LOS D	0.1	0.1	0.78	0.78
P7	Across W approach	53	20.4	LOS C	0.1	0.1	0.58	0.58
All Pedestrians		212	28.6	LOS C			0.68	0.68

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: FREDERICK HERBERT PM -
POST DEV

Signals - Fixed Time Cycle Time = 80 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: HERBERT ST											
1	L	294	2.0	0.498	26.8	LOS B	7.4	52.4	0.68	0.79	34.5
2	T	437	2.0	0.612	20.3	LOS B	12.4	88.5	0.77	0.67	36.8
3	R	1	2.0	0.612	28.5	LOS B	12.4	88.5	0.77	0.92	35.5
Approach		732	2.0	0.612	22.9	LOS B	12.4	88.5	0.73	0.72	35.8
East: SHOP ACCESS											
4	L	9	2.0	0.154	47.3	LOS D	0.3	2.5	0.95	0.66	26.1
5	T	50	2.0	0.601	42.1	LOS C	3.5	25.0	1.00	0.80	26.0
6	R	35	2.0	0.601	50.4	LOS D	3.5	25.0	1.00	0.80	25.9
Approach		94	2.0	0.601	45.7	LOS D	3.5	25.0	1.00	0.78	25.9
North: HERBERT ST											
7	L	8	2.0	0.623	18.7	LOS B	5.5	39.5	0.53	0.96	41.4
8	T	613	2.0	0.880	15.2	LOS B	13.0	92.7	0.70	0.63	40.0
9	R	84	2.0	0.880	29.8	LOS C	13.0	92.7	0.92	0.94	34.5
Approach		705	2.0	0.880	17.0	LOS B	13.0	92.7	0.72	0.67	39.3
West: FREDERICK ST											
10	L	145	2.0	0.506	29.8	LOS C	4.2	30.2	0.77	0.77	33.0
11	T	2	2.0	0.506	21.5	LOS B	4.2	30.2	0.77	0.62	34.1
12	R	537	2.0	0.902	50.5	LOS D	25.6	182.6	1.00	1.02	25.1
Approach		684	2.0	0.902	46.0	LOS D	25.6	182.6	0.95	0.97	26.5
All Vehicles		2215	2.0	0.902	29.1	LOS C	25.6	182.6	0.81	0.78	32.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	25.6	LOS C	0.1	0.1	0.80	0.80
P3	Across E approach	53	22.5	LOS C	0.1	0.1	0.75	0.75
P5	Across N approach	53	25.6	LOS C	0.1	0.1	0.80	0.80
P7	Across W approach	53	22.5	LOS C	0.1	0.1	0.75	0.75
All Pedestrians		212	24.1	LOS C			0.78	0.78

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: FREDERICK RESERVE AM -
POST DEV

Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RESERVE RD											
1	L	2	2.0	0.135	9.3	LOS A	0.7	5.3	0.49	0.68	47.5
2	T	84	2.0	0.135	8.5	LOS A	0.7	5.3	0.49	0.62	47.6
3	R	44	2.0	0.135	12.5	LOS A	0.7	5.3	0.49	0.77	45.3
Approach		130	2.0	0.135	9.9	LOS A	0.7	5.3	0.49	0.67	46.8
East: FREDERICK ST											
4	L	140	2.0	0.402	9.8	LOS A	2.6	18.7	0.57	0.70	46.8
5	T	33	2.0	0.402	9.0	LOS A	2.6	18.7	0.57	0.66	46.8
6	R	230	2.0	0.402	13.0	LOS A	2.6	18.7	0.57	0.77	44.6
Approach		403	2.0	0.402	11.5	LOS A	2.6	18.7	0.57	0.74	45.5
North: RESERVE RD											
7	L	325	2.0	0.434	8.1	LOS A	3.3	23.7	0.27	0.60	48.3
8	T	248	2.0	0.434	7.2	LOS A	3.3	23.7	0.27	0.52	48.9
9	R	32	2.0	0.434	11.3	LOS A	3.3	23.7	0.27	0.73	45.9
Approach		605	2.0	0.434	7.9	LOS A	3.3	23.7	0.27	0.57	48.4
West: ACCESS											
10	L	8	2.0	0.024	9.5	LOS A	0.1	0.8	0.49	0.64	47.5
11	T	12	2.0	0.024	8.7	LOS A	0.1	0.8	0.49	0.59	47.7
12	R	2	2.0	0.024	12.6	LOS A	0.1	0.8	0.49	0.74	45.2
Approach		22	2.0	0.024	9.3	LOS A	0.1	0.8	0.49	0.62	47.4
All Vehicles		1160	2.0	0.434	9.4	LOS A	3.3	23.7	0.40	0.64	47.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

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

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: FREDERICK RESERVE PM -
POST DEV

Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: RESERVE RD											
1	L	4	2.0	0.685	16.9	LOS B	7.6	53.8	0.89	1.07	41.1
2	T	364	2.0	0.685	16.2	LOS B	7.6	53.8	0.89	1.06	41.2
3	R	168	2.0	0.685	20.2	LOS B	7.6	53.8	0.89	1.09	39.4
Approach		536	2.0	0.685	17.4	LOS B	7.6	53.8	0.89	1.07	40.7
East: FREDERICK ST											
4	L	83	2.0	0.447	8.1	LOS A	3.6	25.6	0.29	0.57	48.1
5	T	64	2.0	0.447	7.3	LOS A	3.6	25.6	0.29	0.50	48.6
6	R	476	2.0	0.447	11.3	LOS A	3.6	25.6	0.29	0.67	45.6
Approach		623	2.0	0.447	10.4	LOS A	3.6	25.6	0.29	0.64	46.2
North: RESERVE RD											
7	L	384	2.0	0.398	9.0	LOS A	2.9	21.0	0.51	0.65	47.2
8	T	36	2.0	0.398	8.1	LOS A	2.9	21.0	0.51	0.60	47.3
9	R	20	2.0	0.398	12.2	LOS A	2.9	21.0	0.51	0.73	45.3
Approach		440	2.0	0.398	9.1	LOS A	2.9	21.0	0.51	0.65	47.1
West: ACCESS											
10	L	8	2.0	0.048	16.0	LOS B	0.3	2.1	0.85	0.80	41.9
11	T	12	2.0	0.048	15.1	LOS B	0.3	2.1	0.85	0.78	42.1
12	R	2	2.0	0.048	19.1	LOS B	0.3	2.1	0.85	0.83	40.1
Approach		22	2.0	0.048	15.8	LOS B	0.3	2.1	0.85	0.79	41.8
All Vehicles		1621	2.0	0.685	12.4	LOS A	7.6	53.8	0.56	0.79	44.4

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

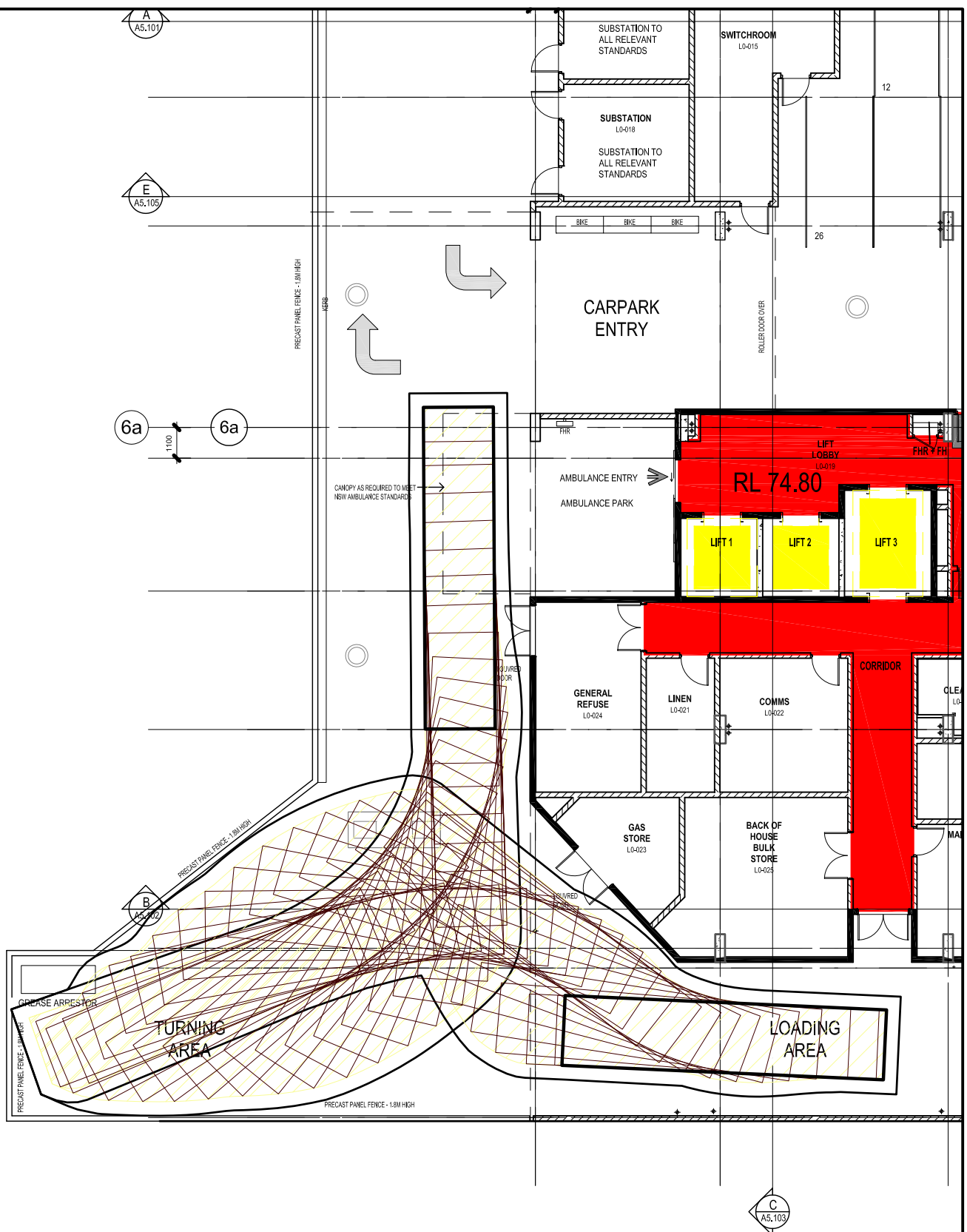
Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

APPENDIX E

TURNING PATH ASSESSMENT



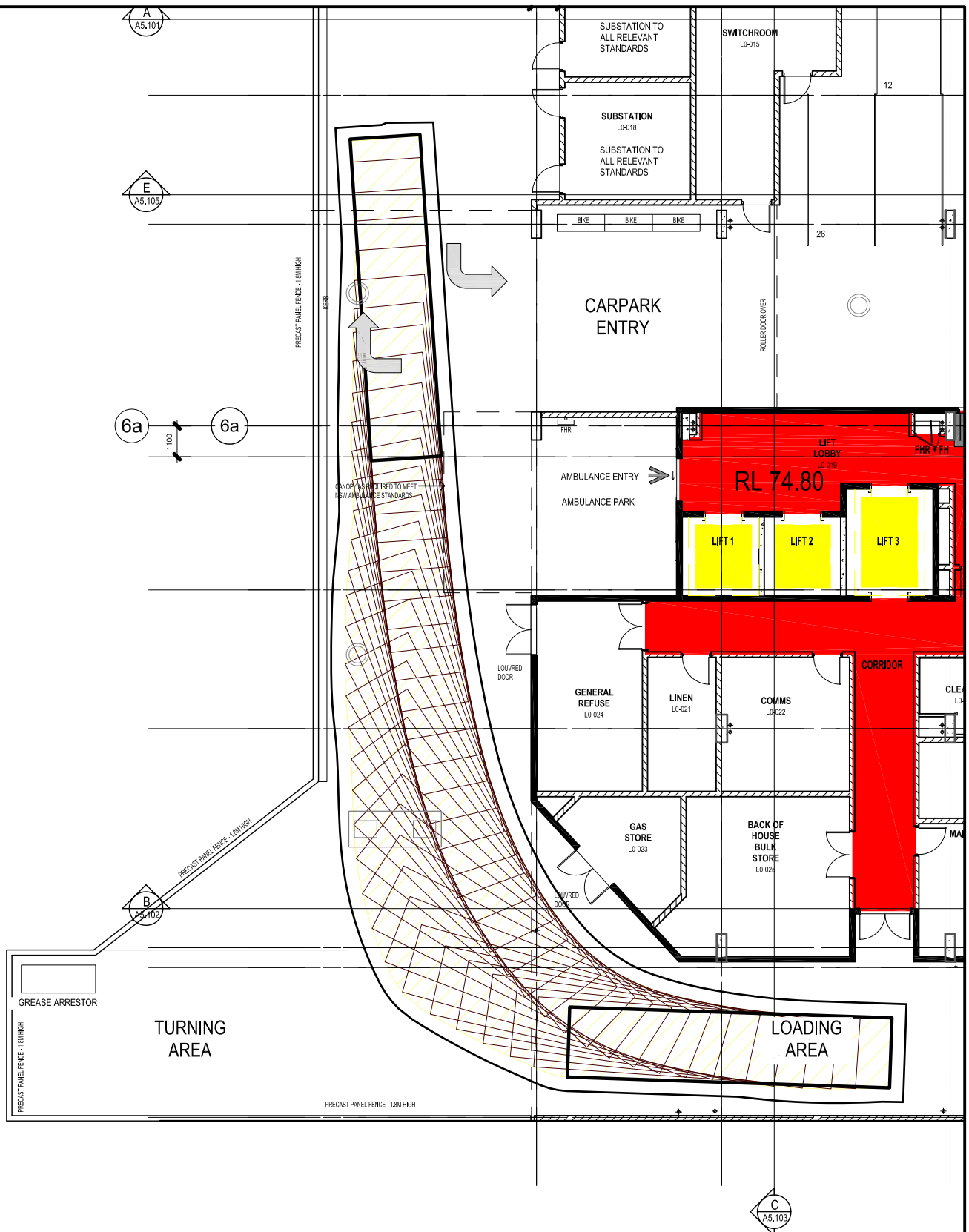
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



SWEPT PATH ANALYSIS OF AN 11.5m RIGID VEHICLE ENTERING THE SITE

SP 1



LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF AN 11.5m RIGID
VEHICLE EXITING THE SITE**

SP 2