SYDNEY ADVENTIST HOSPITAL PROPOSED RESIDENTIAL DEVELOPMENT

FOX VALLEY ROAD, WAHROONGA

Assessment of Transport, Traffic and Parking Implications

May 2014
(Rev F)

Reference 12080

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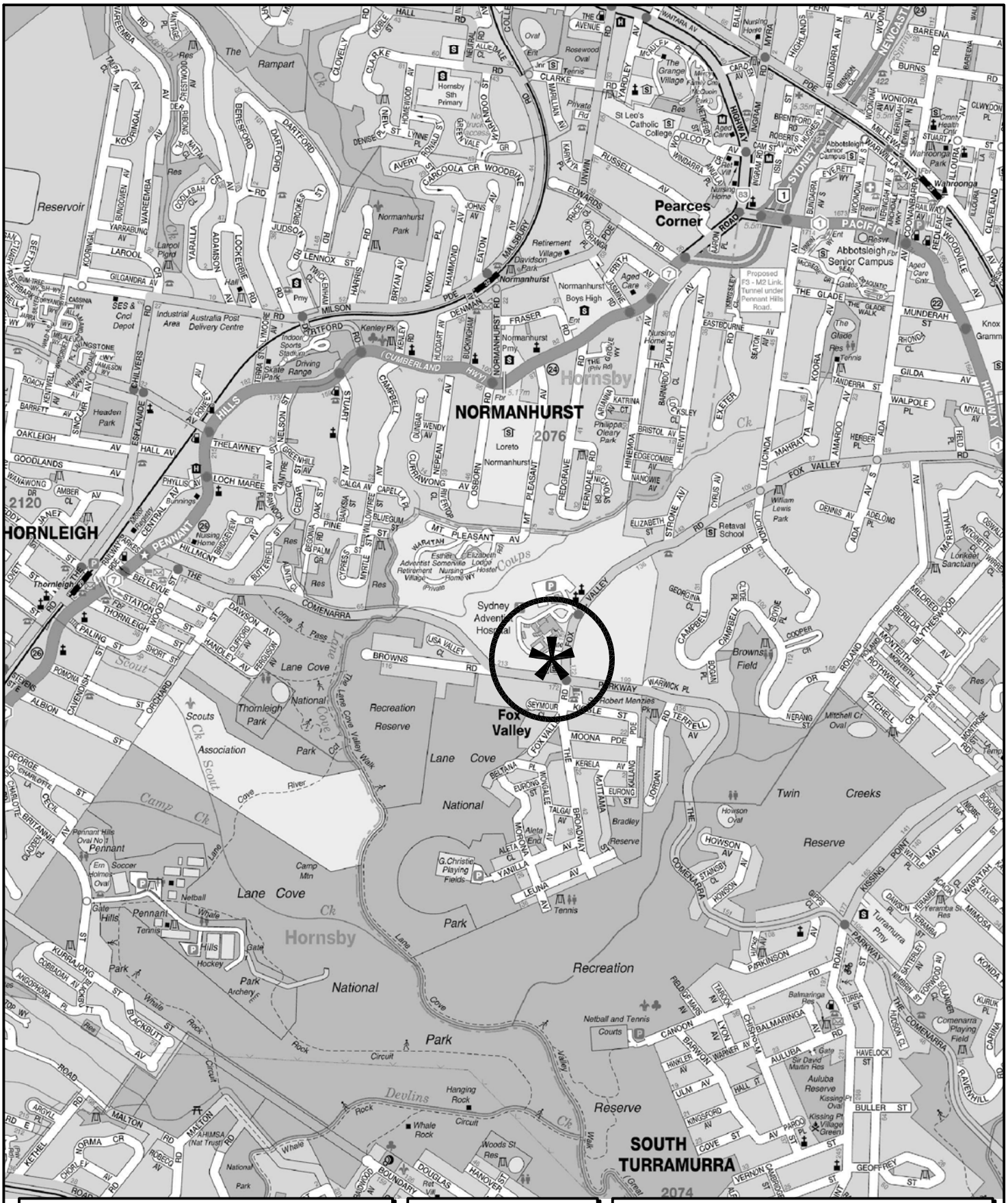
1. INTRODUCTION

This report has been prepared to accompany a Development Application to Ku-ring-gai Council for a portion of the proposed residential element of the Central Hospital Precinct within the approved Concept Plan for the development of the 'Wahroonga Estate' on Fox Valley Road at Wahroonga (Figure 1).

The proposed SPD Residential development will comprise a total of 186 apartments for students and staff engaged in the hospital operations and related educational activities. The development will involve 4 buildings over basement carparking.

The purpose of this report is to:

* describe the site as well as details of the Final Preferred Project Report, the Concept Approval and the DG's Assessment
* describe the proposed portion of residential development
* describe the road network serving the site and the prevailing traffic conditions as well as the projected circumstances as contained in the Final Preferred Project Report
* assess the potential traffic implications of the development scheme
* assess the appropriateness of the proposed parking provision
* assess the suitability of the proposed access, internal circulation and servicing arrangements



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LOCATION

FIG 1

2. PROPOSED DEVELOPMENT SCHEME

2.1 SITE, CONTEXT AND EXISTING CIRCUMSTANCES

The site (Figure 2) is located in the southern part of the large Sydney Adventist Wahroonga Estate landholding which occupies a total area of some 56 ha extending along the northern side of The Comenarra Parkway spanning Fox Valley Road. There are a number of diverse uses located throughout this Estate, and the portion containing residential development is currently part of Wahroonga Adventist School located adjacent to The Comenarra Parkway and Fox Valley Road intersection.

The Estate is located just to the south of the convergence of major road routes comprising the Pacific Highway, Pennant Hills Road and the M1 Sydney – Newcastle Freeway. The expansive Lane Cove National Park extends to the south along the Lane Cove River, while the immediate adjoining areas largely comprise single residential dwellings.

The existing elements which surround the site comprise:

- Sydney Adventist Hospital
- churches
- SDA Pacific Regional Headquarters, media and administration
- dwelling houses
- student hostel
- lodge and hostel
- aged accommodation

The existing vehicle accesses for these elements are located along Fox Valley Road and include a traffic signal controlled intersection at the principal hospital access and a secondary hospital precinct access located to the north of the Comenarra Parkway. There is a temporary 'construction vehicle' access located on The Comenarra Parkway frontage to the west of Fox Valley Road.

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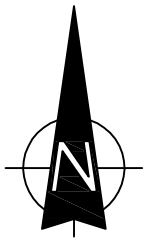

SITE

FIG 2

2.2 CONCEPT PLAN

The Concept Plan and the Concept Approval along with the Director Generals Assessment Report identify that the Central Hospital Precinct in which the proposed residential site is located will comprise:

- 3 dwelling houses
- 105 private residential apartment dwellings
- 13,000m^2 of student accommodation

The required road improvement works relative to these elements (amongst others) include:

* Upgrading of the intersection of The Comenarra Parkway and Fox Valley Road
* Upgrading of the principal site access on Fox Valley Road
* Provision of 2 traffic lanes in each direction along Fox Valley Road

The required timing of these and the other road upgrade works for the Estate development were the subject of a report* prepared as a requirement of the Concept Plan Approval. That report contains a detailed assessment of the traffic generation of all development elements including those in the Central Hospital Precinct.

2.3 PROPOSED DEVELOPMENT

The proposed SPD Residential development will involve 4 building blocks with a total of 12,096.77m^2 GFA comprising:

- 126 Units (9 accessible) for students
- 35 x 1-bed (10 accessible) and 25 x 2-bed residential dwellings

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* *Wahroonga Estate – Traffic Report*
Timing of Upgrade Works
Halcrow Sept 2010

There will be a total of 184 parking spaces provided in the basement levels including 46 visitor spaces and 32 car share spaces with vehicle access through the internal road system connecting to Fox Valley Road at the primary and secondary Hospital accesses. A driveway will also be provided on the Fox Valley Road frontage for refuse vehicle access.

Full details of the proposed development scheme are provided on the architectural plans prepared by MBMO Architects, which accompany the Development Application and are reproduced in part in Appendix A.

3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The existing road network serving the site (Figure 3) comprises:

- *M1 Sydney - Newcastle Freeway* – a major arterial route which terminates at the Pacific Highway and Pennant Hills Road interchange

- *Pacific Highway* – a State Highway and arterial route which extends between the Hornsby and the Harbour Crossing

- *Pennant Hills Road* – a State Road and part of the Cumberland Highway arterial route connecting between the M1/Pacific Highway and the Hume Highway at Liverpool

- *The Comenarra Parkway* – a Regional Road and major collector route connecting between Ryde Road and Pennant Hills Road

- *Fox Valley Road* – a Regional Road and collector route connecting between Pacific Highway and The Comenarra Parkway

- *Kissing Point Road* – a Regional Road and minor collector route connecting between Pacific Highway and The Comenarra Parkway.

Barriers to the road network are presented by the Lane Cove River/ National Park, with its steep eroded valleys, and the railway lines. The other roadways in the area between The Comenarra Parkway, Pacific Highway and Pennant Hills are only local access roads although there is some through traffic infiltration along Lucinda Road and Roland Avenue.

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- ARTERIAL
- SUB-ARTERIAL
- COLLECTOR

N

ROAD NETWORK

FIG 3

3.2 TRAFFIC CONTROLS

The existing traffic controls which have been applied to the road system in the vicinity of the site (Figure 4) include:

* traffic control signals at the intersection of The Comenarra Parkway and Fox Valley Road (see Appendix B details)

* traffic control signals at the intersection of Fox Valley Road and the Hospital Access (see Appendix B details)

* traffic signals at the intersection of the Pacific Highway and Fox Valley Road

* the general 60 kmph speed limit along The Comenarra Parkway and 50 kmph restriction along Fox Valley Way. A 40 kmph (school hours) speed zone is applied to sections of Fox Valley Road and The Comenarra Parkway in the vicinity of the school

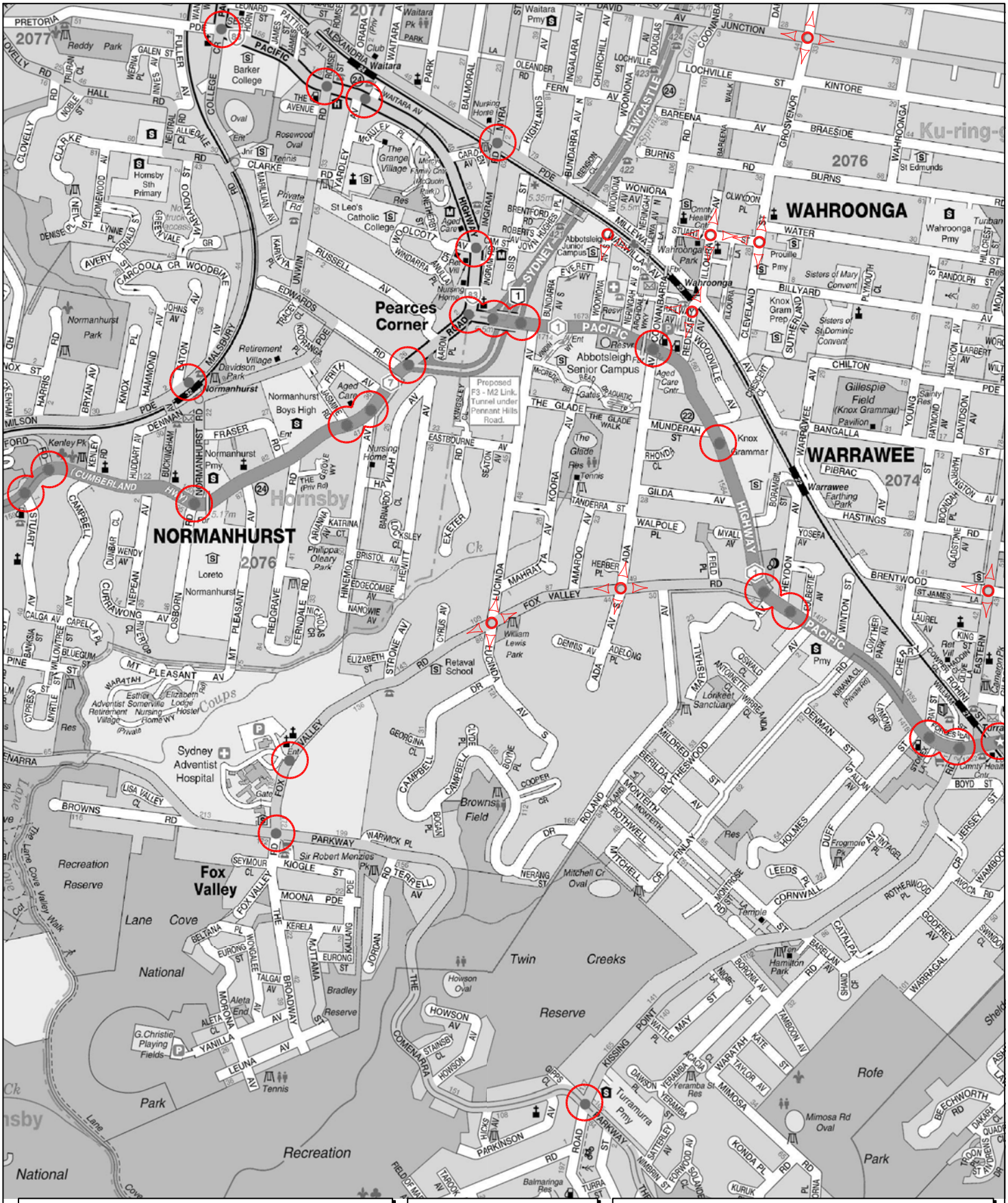
* the sections of NO STOPPING restrictions along The Comenarra Parkway and Fox Valley Road in the vicinity of the site

* the BUS ZONES located on Fox Valley Road

* the ('single lane') roundabouts on Fox Valley Road at the Lucinda Avenue and Ada Avenue intersections

* the traffic signals at The Comenarra Parkway/Kissing Point Road and The Comenarra Parkway/Pennant Hills Road intersections

* the traffic signals at the Pacific Highway/Ada Avenue/Coonabarra Road intersection



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- TRAFFIC SIGNAL CONTROL
- ROUNDABOUT
- RESTRICTED TURNING MOVEMENT

N

TRAFFIC CONTROLS

FIG 4

3.3 TRAFFIC CONDITIONS

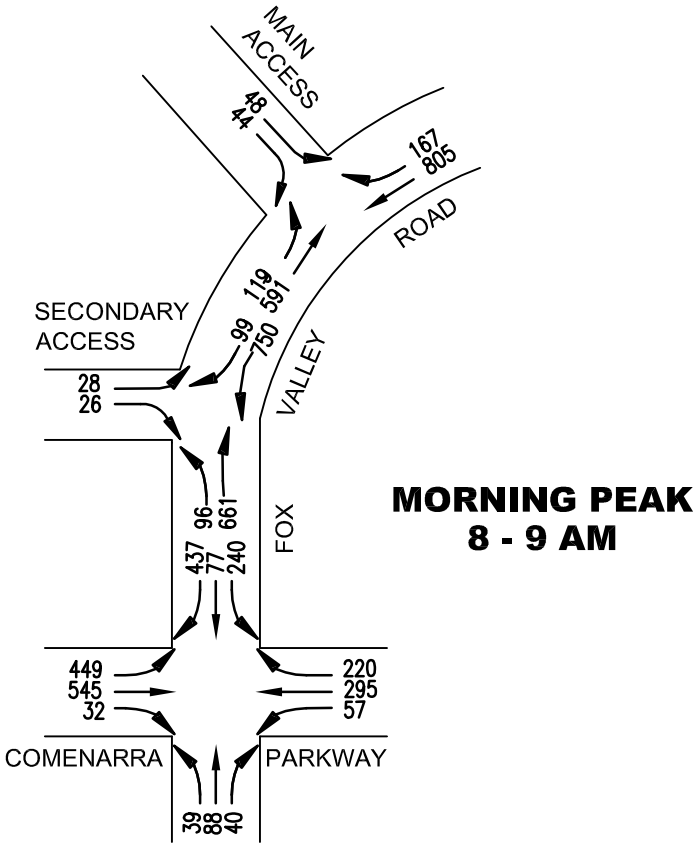
An indication of the traffic conditions on the road system serving the Hospital is provided by data published by the RMS and traffic surveys undertaken for this study. The data published by the RMS is expressed in terms of Annual Average Daily Traffic (AADT) and the latest available volumes are provided in the following:

The Comenarra Parkway south of Fox Valley Way	14,137
The Comenarra Parkway north of Fox Valley Way	19,319
Fox Valley Way north of The Comenarra Parkway	16,535

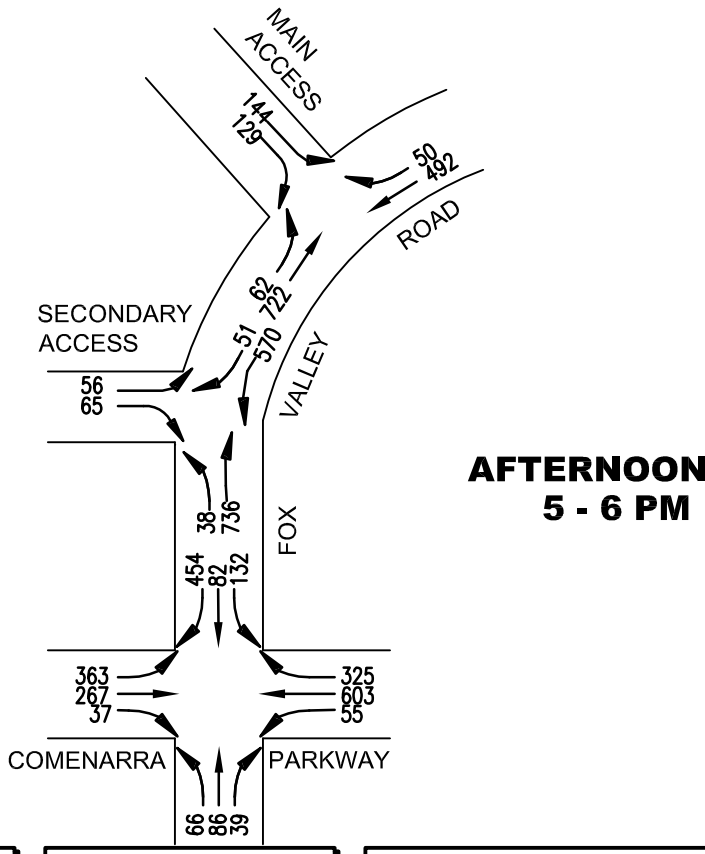
The traffic volumes along the arterial roadways in the area experience fluctuations related to normal peak periods, weekend periods and holiday periods. The latter influence is relatively significant in this area as a consequence of the M1 route and its heavy usage in relation to travel to/from the Central Coast.

Traffic surveys have been recently been undertaken during the morning and afternoon peak periods at the intersections serving the site and the results of these surveys are provided in Appendix C and summarised on Figure 5. It is noted that the recently recorded volumes are relatively similar to those recorded for the various preceding traffic studies for the Estate and Hospital developments.

The operational performance of the intersections in the immediate vicinity of the site was assessed for the Concept Plan and Hospital traffic studies using the SIDRA modelling software. The results of that assessment are provided in the following while the criteria for assessing the modelling output are reproduced overleaf.



MORNING PEAK
8 - 9 AM



AFTERNOON PEAK
5 - 6 PM

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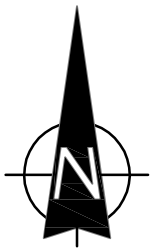


2012 EXISTING PEAK TRAFFIC FLOWS

FIG 5

The Comenarra Parkway/Fox Valley Road	**AM Peak**	**PM Peak**
Level of service	F	E
Av Vehicle Delay	75	58

Fox Valley Road/Main Hospital Access	**AM Peak**	**PM Peak**
Level of service	C	B
Av Vehicle Delay	29.7	17.3

Fox Valley Road/Secondary Hospital Access	**AM Peak**	**PM Peak**
Level of Service	NA	NA
Av Vehicle Delay	5.2	6.4

The results of this assessment indicate that the level of service at The Comenarra Parkway/Fox Valley Road is nearing capacity under the current peak traffic demands and constrained road geometry/signal phasing circumstances.

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 FUTURE CIRCUMSTANCES

The Halcrow traffic assessment of September 2010 prepared for the Final Preferred Project Report identified upgrade arrangements for the intersection of The Comenarra Parkway and Fox Valley Road. Details of these staged proposals are provided in Appendix D and improvements were also proposed at the main access intersection for the Hospital on Fox Valley Road with the provision of left turn slip lane. The study assessment of the ultimate operational performance of the intersection of The Comenarra Parkway and Fox Valley was as follows:

	AM	**PM**
Level of Service	D	C
Average Vehicle Delay	44	36

This projected outcome was based on the assessed total additional traffic generation on completion of the Estate development of:

AM			**PM**		
IN	**OUT**	**TOTAL**	**IN**	**OUT**	**TOTAL**
516	361	887	276	266	542

Subsequent assessment as part of the detail road design process has identified that a significantly better upgrade could be achieved at the intersection of The Comenarra Parkway and Fox Valley Road with the introduction of left turn slip lanes. This modified proposal provides the benefits of signal controlling the conflict between left turning vehicles and pedestrians and substantially reducing the length of the pedestrian crossings across The Comenarra. Details of the now proposed road and traffic signal works for this intersection and the principal Hospital Access intersection are provided in Appendix E (these designs have been submitted to RMS for approval).

It is noted that there is an Estate requirement for upgrade of road infrastructure through Deed of Agreement with RMS. The extent of required upgrade to road infrastructure is dictated in the Concept Approval.

3.5 TRANSPORT SERVICES

The existing public transport services relevant to the site comprise:

Rail Services

Thornleigh Railway Station on the Main Northern Line is located some 2 kms to the west along The Comenarra Parkway. Wahroonga, Warrawee and Turramurra Railway Stations on the North Shore Line are located some 3 kms to the east along Fox Valley Road.

Frequent high capacity rail services connecting to the metropolitan and Central Coast rail systems are accessed at these stations which are also connected to the site by the public bus services.

Bus Services

TransdevTSL-Shorelink operates two routes which provide access for the site:

- *Route 573* – this service along Fox Valley Road (loop) connects to Turramurra Railway Station.

- *Route 589* – this service operates along Pennant Hills Road and The Comenarra Parkway and connecting with Thornleigh, Waitara and Hornsby Railway Stations. SAH has provided funds for the purchase of the bus for the service provider to operate this service which runs through the hospital site.

Details of these bus services are provided in Appendix F.

The current level of usage of these services is only modest and there is significant spare seating and standing capacity.

4. TRAFFIC

The Concept Approval and DG's Assessment in relation to the residential element in the Central Hospital Precinct provide for:

- 13,000m^2 of student accommodation
- 105 residential flat building dwellings
- 3 dwelling houses

The Halcrow traffic assessment of Sept 2010 was developed for the Preferred Project Report (PPR) on which the Concept Approval was based. The PPR identified the following development:

- Residential: 108 dwellings
- Student: 301 dwellings

The proposed residential develop under this DA, being:

- 126 (or 6,540.49m^2) student accommodation
- 70 residential flat building dwelling

is clearly within the bounds of the Halcrow traffic assessment of September 2010 that informed the Concept Approval.

On this basis the overall traffic generation outcome will be below that assessed for the Concept Approval. Further assessment will be made when further residential developments within the Central Hospital Precinct are pursued through separate DA's.

Notably, the purpose of the traffic assessment at the Concept Approval stage was to gauge the overall impact of the project in order to set appropriate road and traffic performance benchmarks to frame consent conditions for external roadworks.

The assessment ‘locked in’ the traffic and parking expectations of the residential components of the redevelopment.

This reflected in the Concept Approval Conditions whereby only non-residential components were to be subject to further impact assessment at the DA stage due to their variable nature.

5. PARKING

The Concept Approval carparking requirements in relation to the residential components are as follows:

Student accommodation	(0.5 spaces per unit)
1 bedroom unit	(0.5 spaces per unit)
2 bedroom unit	(1 space per unit)
Visitors	(1 per 4 units)
Car share	(1 per 6 units)

This development proposes to provide a total of 184 spaces in the basement levels comprising:

Student accommodation	63 spaces	(0.5 space per unit)
Residential accommodation	42.5 or 43 spaces	(0.5 spaces per 1 bed unit and 1.0 space per 2 bed)
Visitors @ 1 per 4	46 spaces	
Car share @ 1 per 6	32 spaces	
Total:	**184 spaces**	

The now proposed carparking provision is in line with the Concept Plan approval criteria.

6. ACCESS, INTERNAL CIRCULATION AND SERVICING

ACCESS

The existing vehicle accesses on Fox Valley Road will be retained being:

- the principal traffic signal controlled intersection
- the secondary access located to the north of The Comenarra Parkway

The circumstances/capacity of these accesses will be enhanced as follows:

Principal Access – provide a third approach lane in the access as a left-turn 'slip lane' and allow the right-turn egress to be made in two lanes.

Secondary Access – remove the kerbside parking along the Fox Valley Road.

These vehicle accesses have operated satisfactorily in these locations for many years and will accommodate all vehicles requiring to access the site.

Because of the significant fall in levels across the site towards The Comenarra Parkway, it is not feasible to provide access for Council's refuse vehicle on the internal access road to service the garbage stores on basement level. It is therefore proposed to provide refuse vehicle access on The Comenarra Parkway frontage located at the eastern boundary. The driveways for this access will be arranged so that vehicles will only be able to turn left IN and OUT and this will be supplemented with a Management Plan agreed with Council. There are numerous existing driveways along this section of The Commenara Parkway where sight distances are satisfactory and the proposed left IN/OUT only arrangement for Councils refuse vehicles will be quite satisfactory and this is now supported by Concept Plan Modification approved by Department of Planning & Infrastructure (DPI).

INTERNAL CIRCULATION

There is a significant provision of disabled driver parking spaces and the design of the carpark areas including bays, ramps, aisles etc will comply with the AS 2890.1 and AS 2890.6 criteria.

SERVICING

There will only be very minor requirements for service vehicles and service personnel (trades etc) and small vans will be able to use the visitor spaces. Council's SRV refuse vehicle will be able to use the separate designated access on The Comenarra Parkway while any occasional large delivery vehicle will be able to stand, in the Hospital service dock area for a short period or on the access roadway. Details of the turning path assessment for the Council refuse vehicle are provided in Appendix G.

7. CONCLUSION

The proposed residential development in the Central Hospital Precinct is an element of the Wahroonga Estate development which is subject to Concept Approval under a Part 3A Application. Assessment of the development scheme which is to be submitted to Council has concluded that:

* the proposed scheme is compliant with the provisions of the Concept Approval and DG's Assessment;

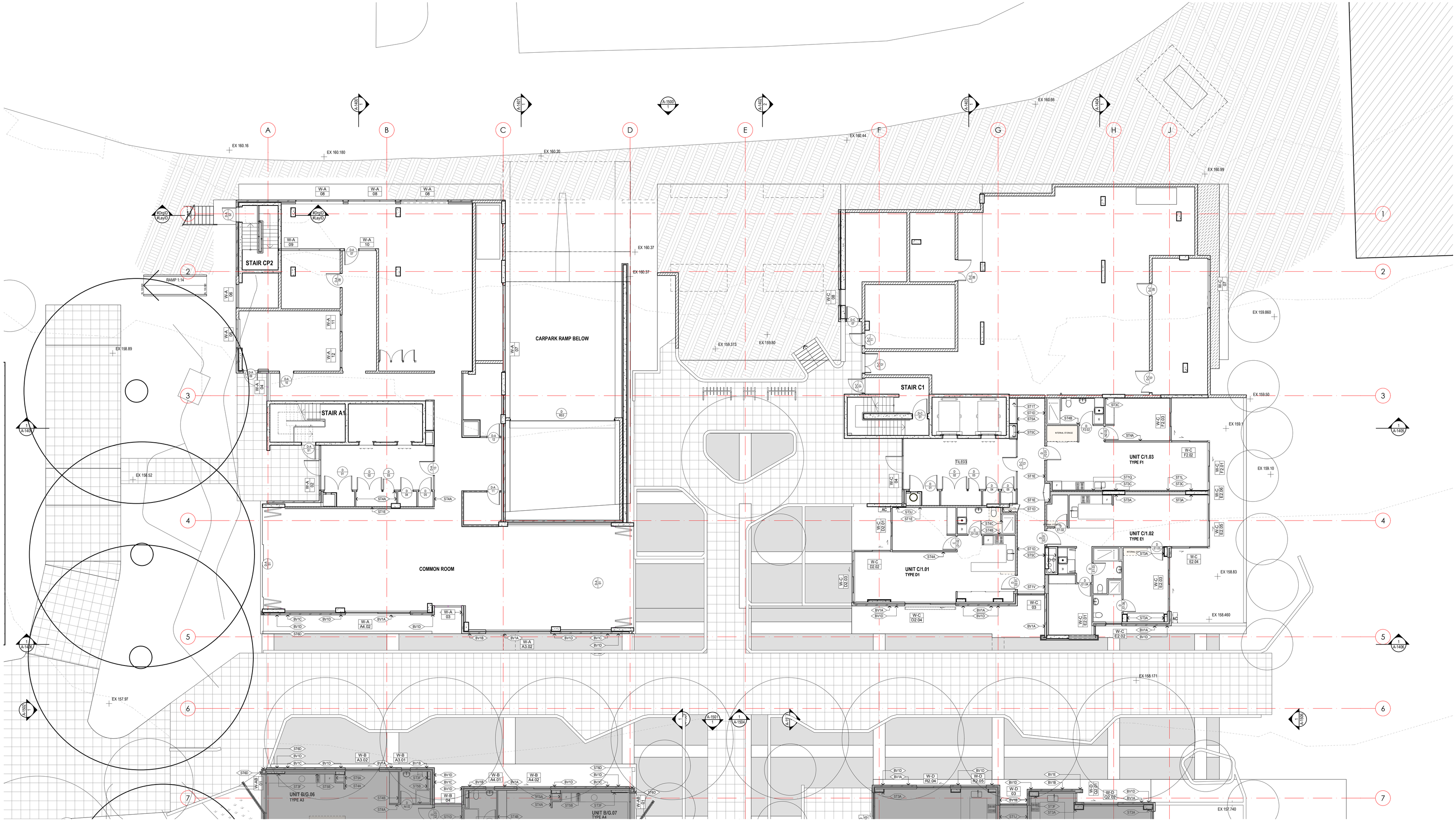
* the proposed parking provision will be suitable/appropriate and in compliance with the Concept Plan approval criteria;

* the projected traffic generation is within the bounds of the Halcrow traffic assessment of September 2010 that informed the Concept Approval, therefore, will not have any adverse traffic implications not already catered for in the required road upgrades identified in the Concept Approval;

* the proposed access, internal circulation and servicing arrangements will be suitable and appropriate.

APPENDIX A

DEVELOPMENT PLANS



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[P0]3	MS	29.04.14	Preliminary
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[P0]1	MS	07.04.14	Preliminary

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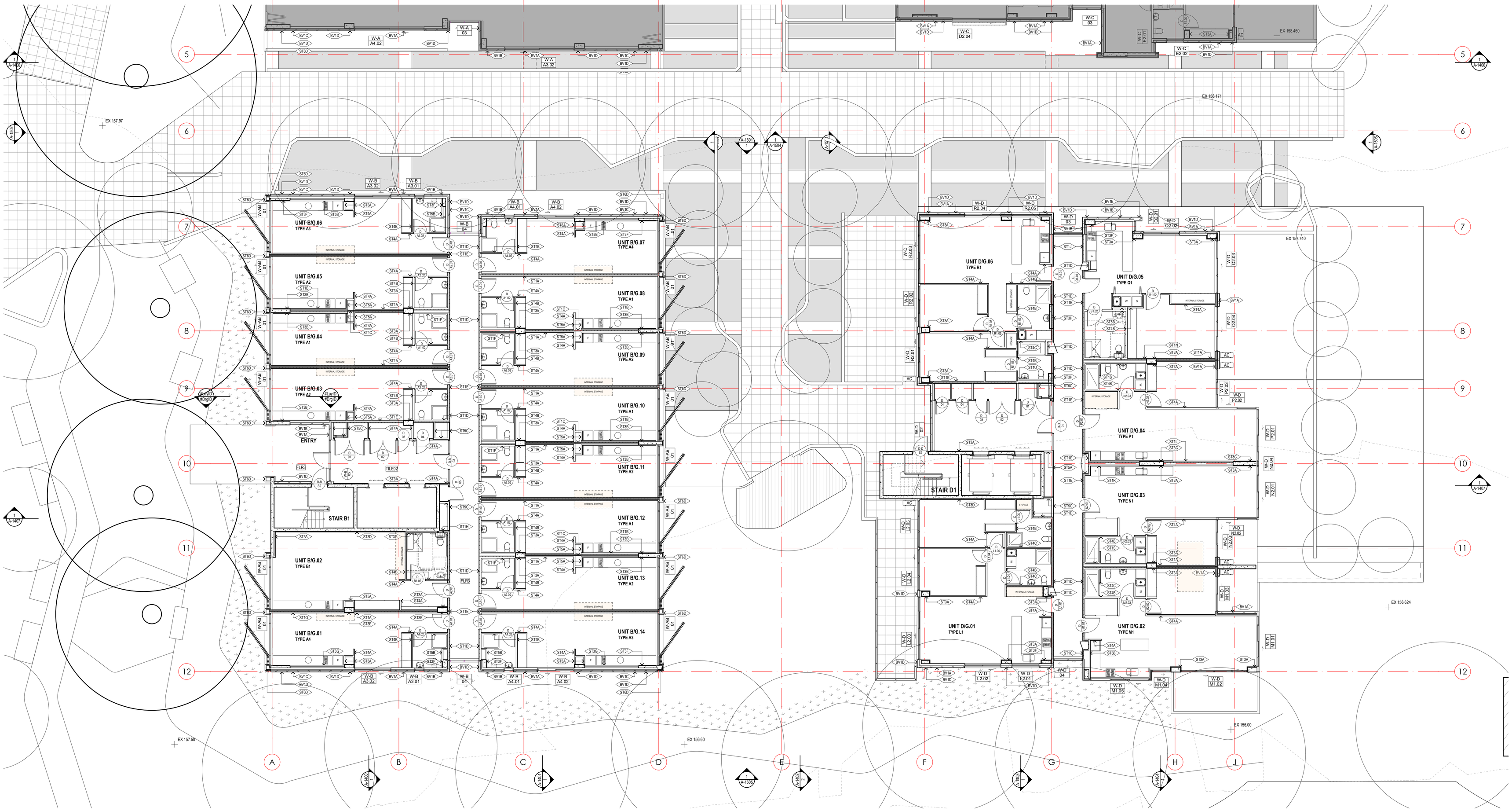

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[P01]	MS	07.04.14	Preliminary

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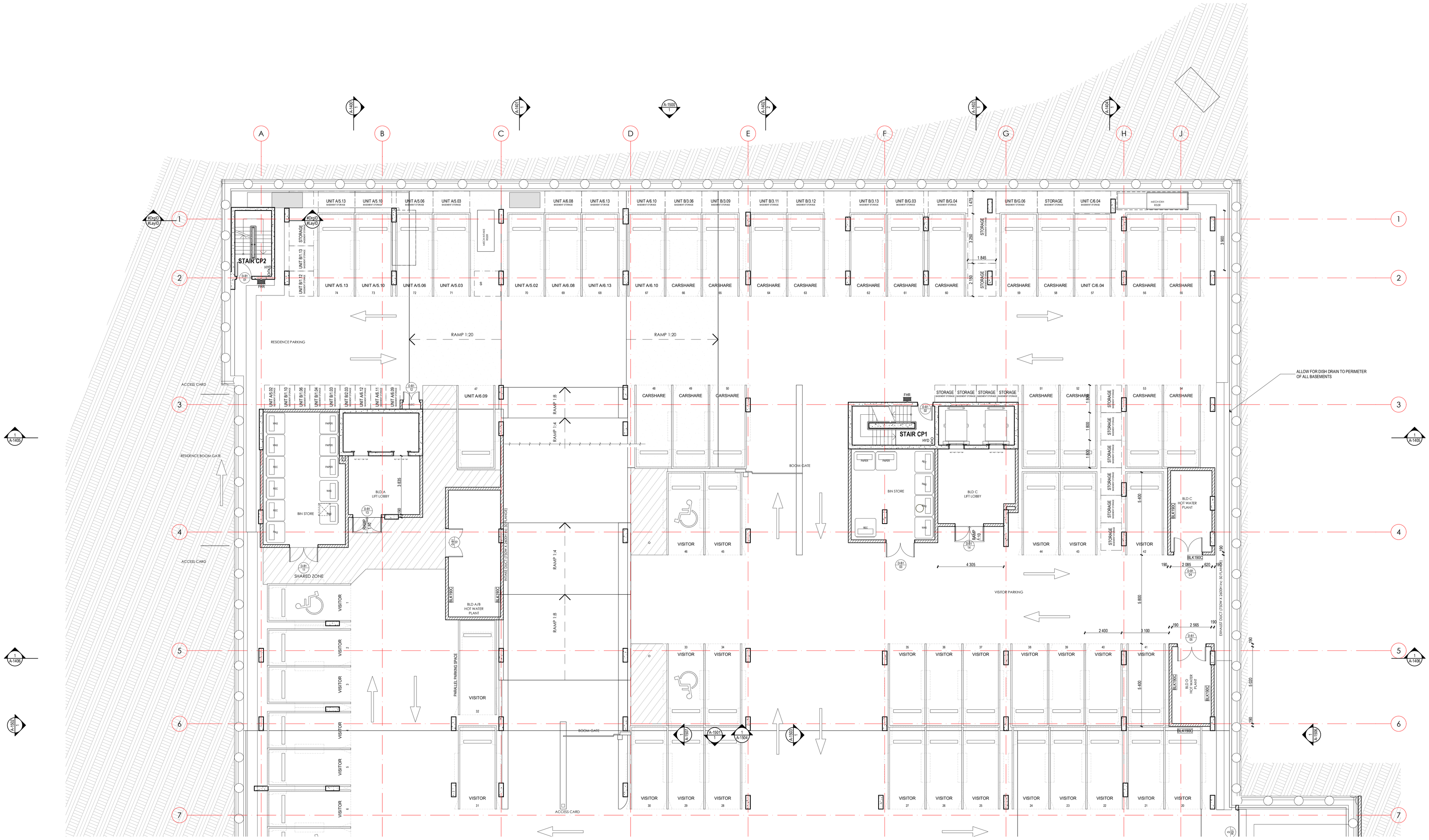

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phone : (02) 0000 0000
fax : (02) 0000 0000
email: email address

CONSULTANT
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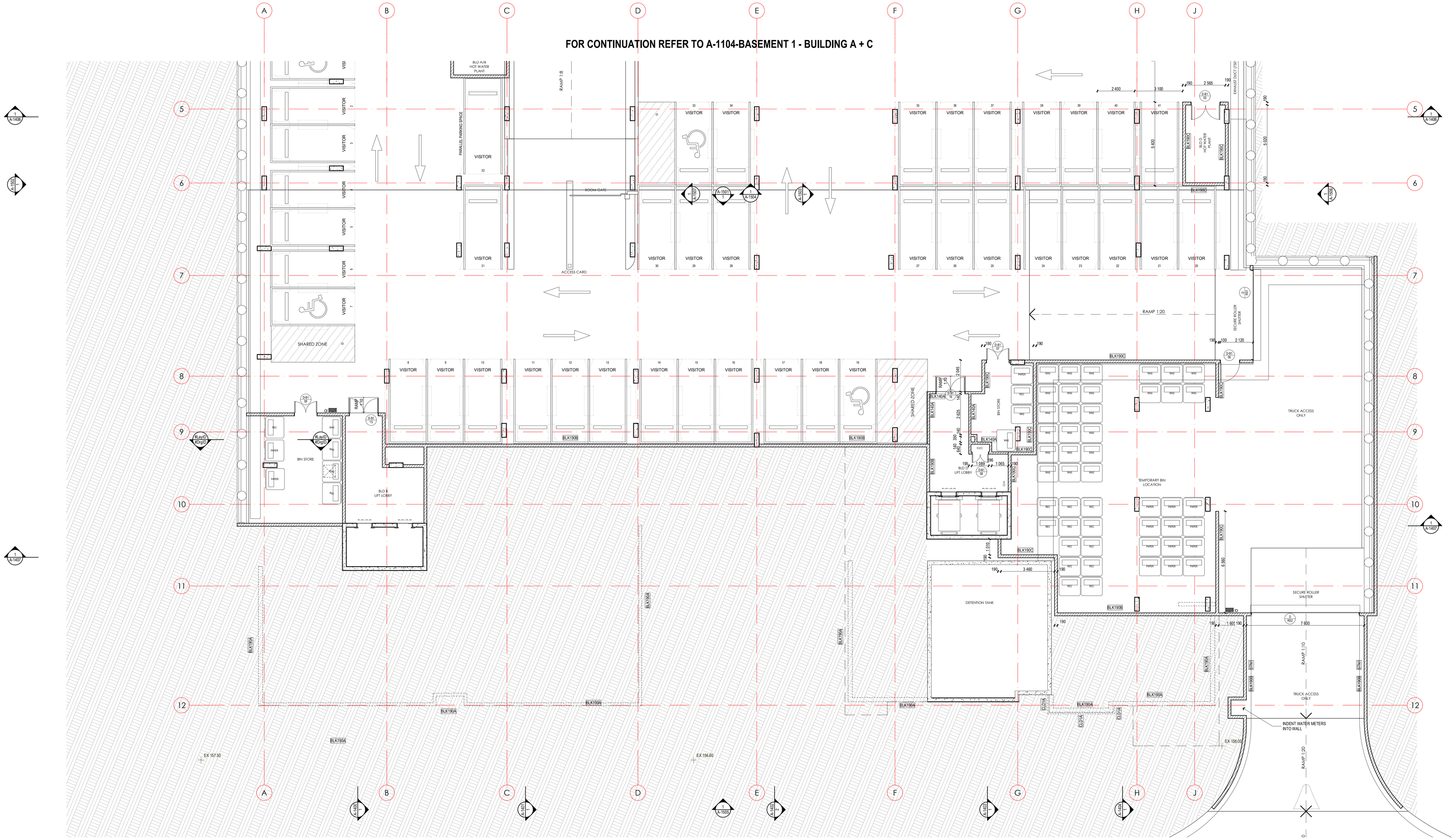
PROJECT:
SPD RESIDENTIAL
185 Fox Valley Road
Wahroonga

DRAWING TITLE:
BASEMENT 1 - BUILDING A + C

SCALE:	DATE:	DRAWN BY:	QA:
1:100 @B1	7/05/2014	MS	##

JOB No: **11042**
DRAWING NUMBER: **A-1104**
ISSUE: **[P05]**

FOR CONTINUATION REFER TO A-1104-BASEMENT 1 - BUILDING A + C



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No.	Initial	DATE	REVISION / ISSUE DETAILS
[P0]	MS	07.05.14	Preliminary
[P0]	MS	29.04.14	Preliminary
[P0]	MS	07.04.14	Preliminary

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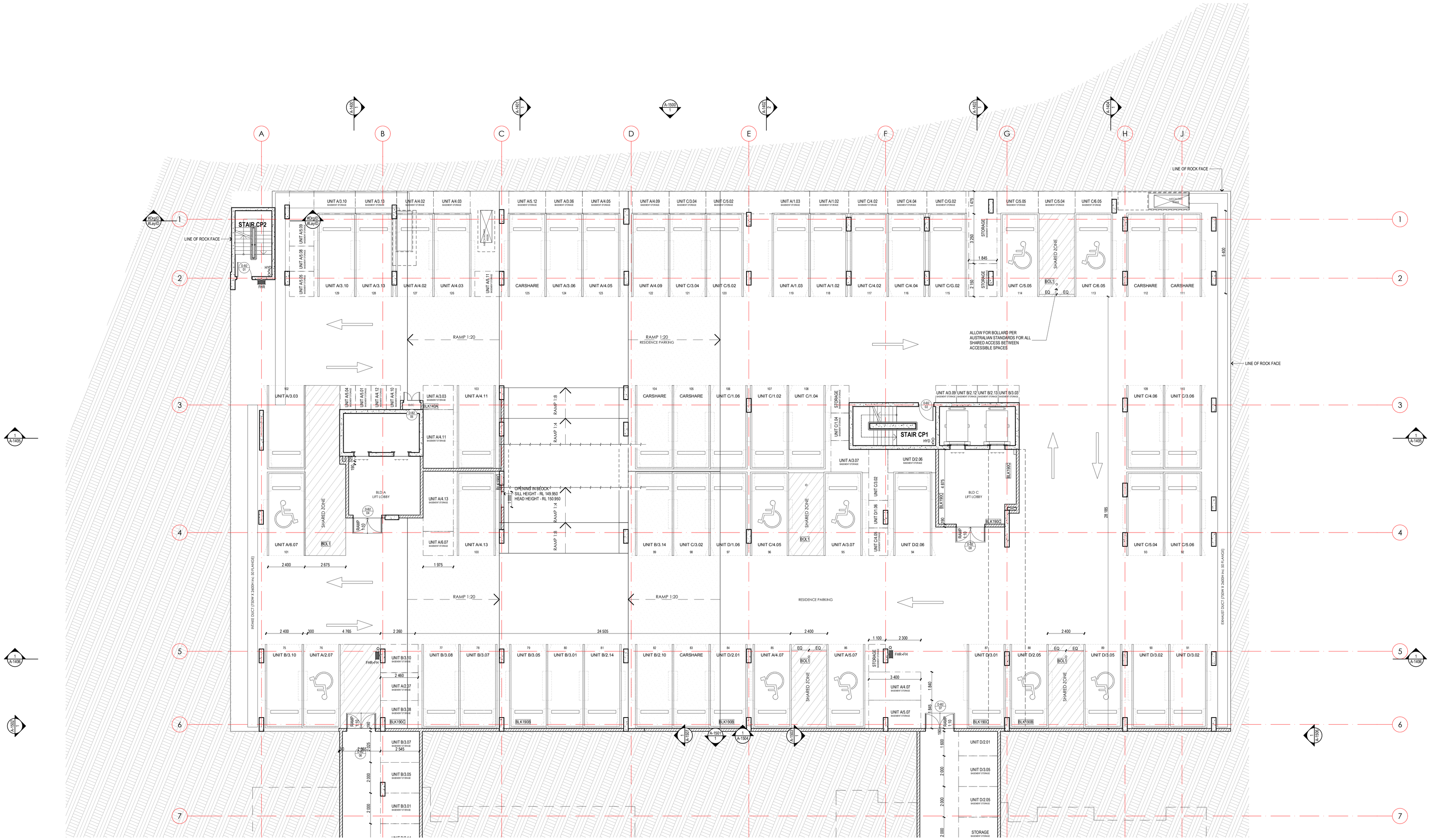
DRAWING TITLE:
BASEMENT 1 - BUILDING B + D

SCALE:	DATE:	DRAWN BY:	QA:
1:100 @B1	7/05/2014	MS	##

JOB No:	DRAWING NUMBER:	ISSUE:
11042	A-1105	[P03]



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[P0]	MS	07.05.14	Preliminary
[P0]	MS	29.04.14	Preliminary
[P0]	MS	14.04.14	Preliminary
[P0]	MS	07.04.14	Preliminary

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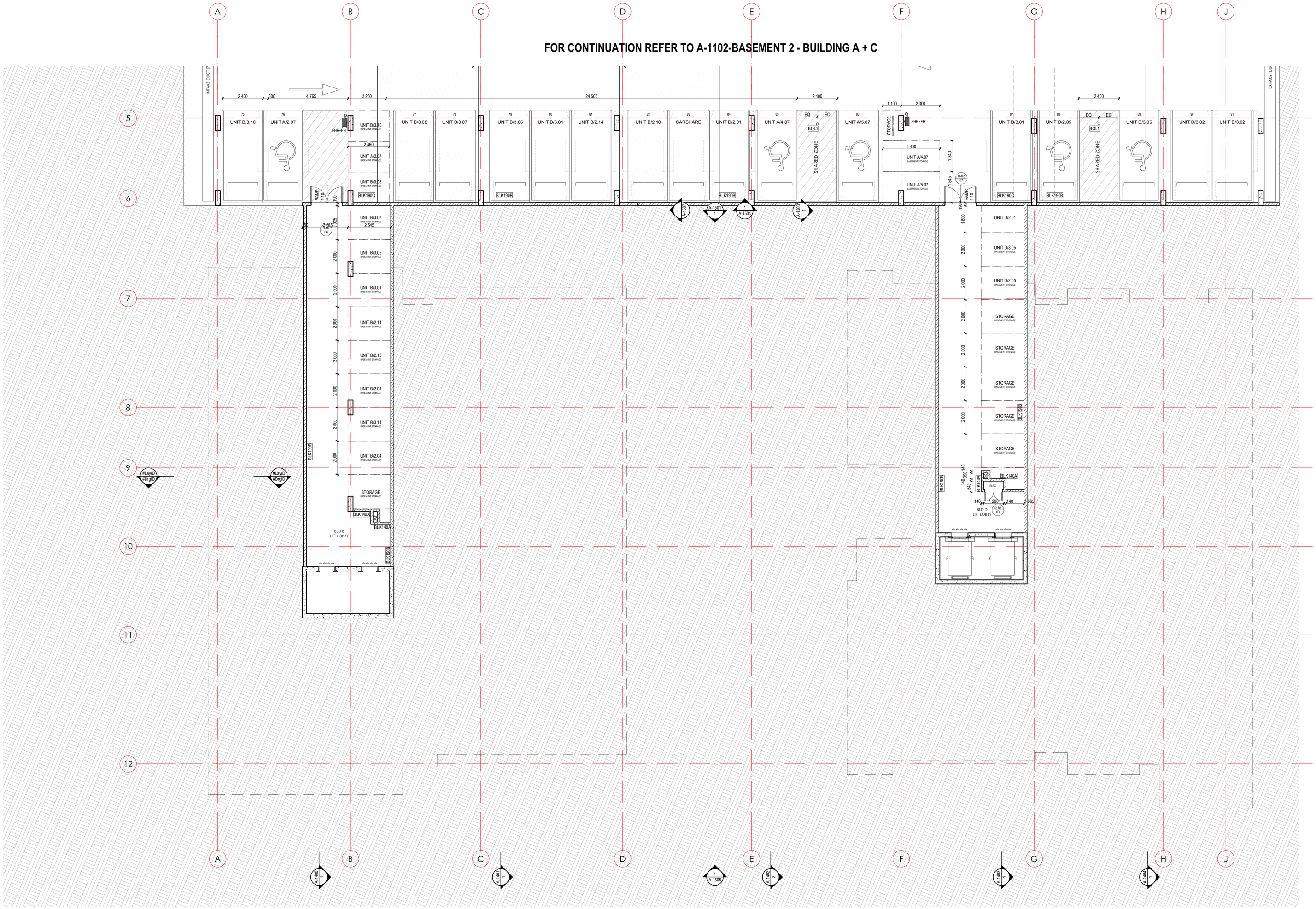
DRAWING TITLE:
BASEMENT 2 - BUILDING A + C

SCALE:		DATE:	DRAWN BY:	QA:
1:100	@B1	7/05/2014	MS	##

JOB No:	DRAWING NUMBER:	ISSUE:
11042	A-1102	[P04]

FOR CONTINUATION REFER TO A-1102-BASEMENT 2 - BUILDING A + C



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No.	Initial	DATE	REVISION / ISSUE DETAILS
[P0]	MS	07.05.14	Preliminary
[P0]	MS	29.04.14	Preliminary
[P0]	MS	07.04.14	Preliminary

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DRAWING TITLE:
BASEMENT 2 - BUILDING B + D

SCALE:	DATE:	DRAWN BY:	QA:	JOB No:	DRAWING NUMBER:	ISSUE:
1:100 @B1	7/05/2014	MS	## ##	11042	A-1103	[P03]

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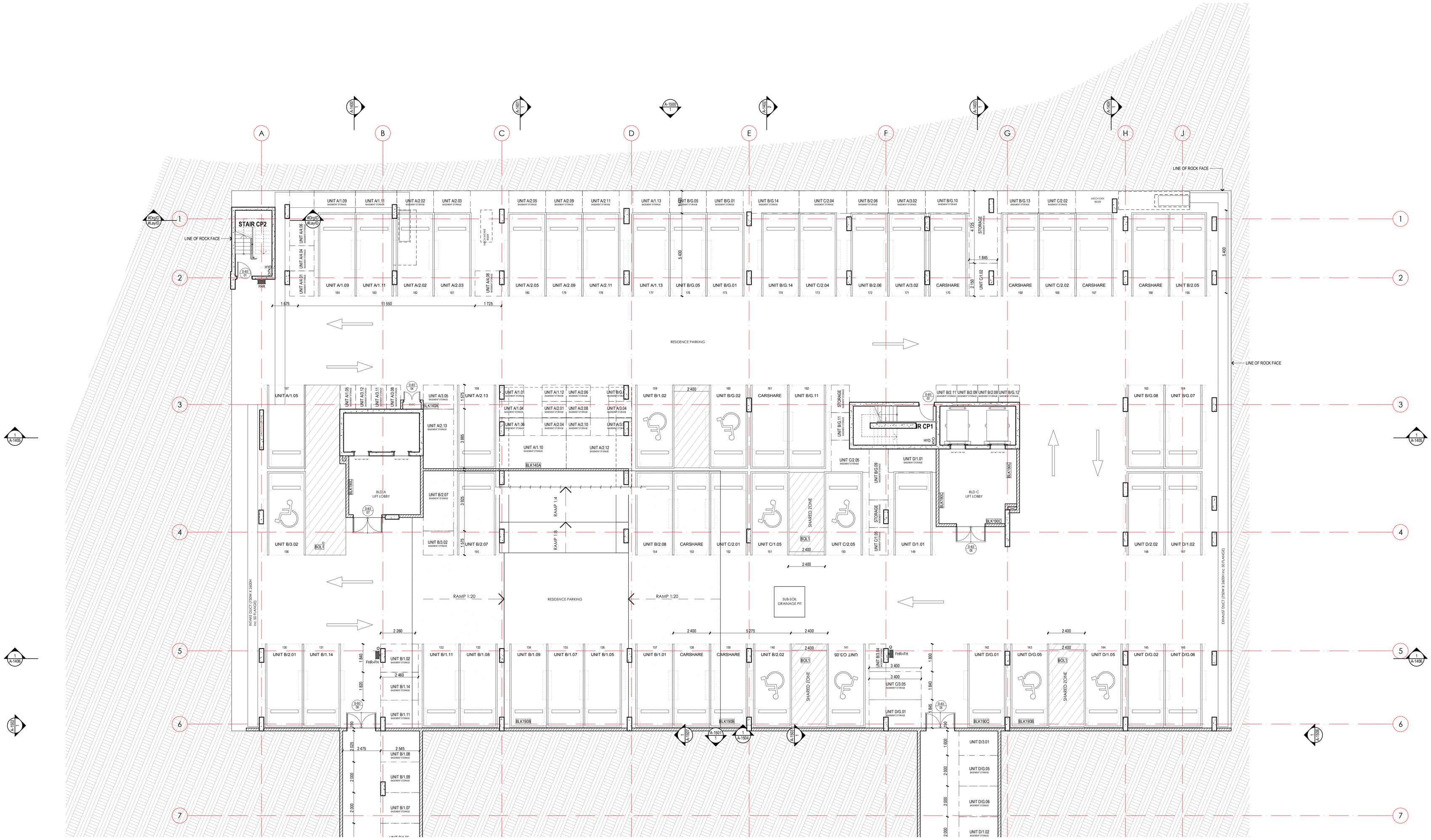

FOR CONTINUATION REFER TO A-1101-BASEMENT 3 - BUILDING B + D

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[P0]	MS	07.05.14	Preliminary
[P0]	MS	29.04.14	Preliminary
[P0]	MS	14.04.14	Preliminary
[P0]	MS	07.04.14	Preliminary

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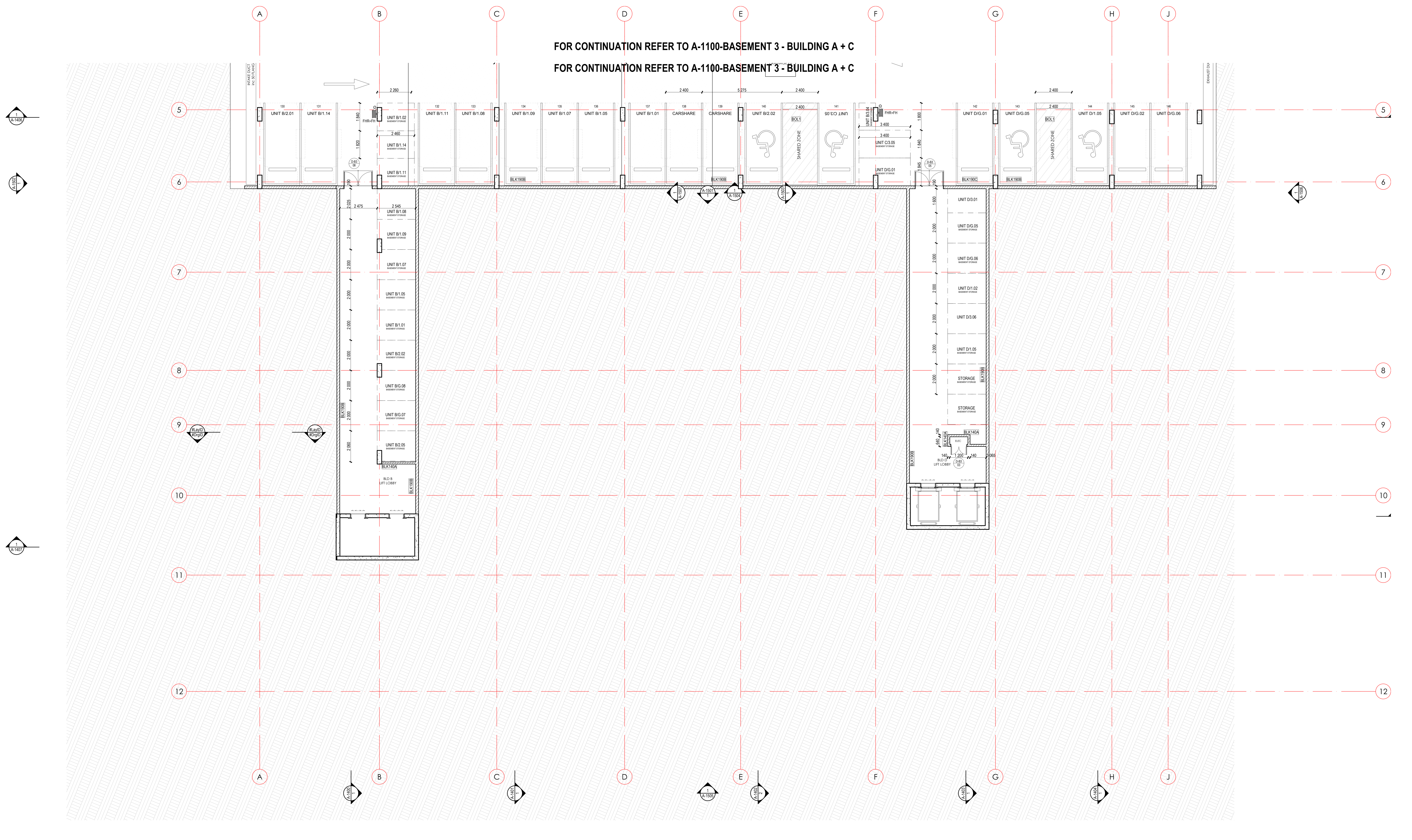
PROJECT:
SPD RESIDENTIAL
185 Fox Valley Road
Wahroonga

DRAWING TITLE:
BASEMENT 3 - BUILDING A + C

SCALE:	DATE:	DRAWN BY:	QA:	JOB No:	DRAWING NUMBER:	ISSUE:
1:100 @B1	7/05/2014	MS	# #	11042	A-1100	[P04]

11042 C1-2013.pln



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No.	Initial	DATE	REVISION / ISSUE DETAILS
[P04]	MS	07.05.14	Preliminary
[P02]	MS	29.04.14	Preliminary
[P01]	MS	07.04.14	Preliminary

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Wahroonga

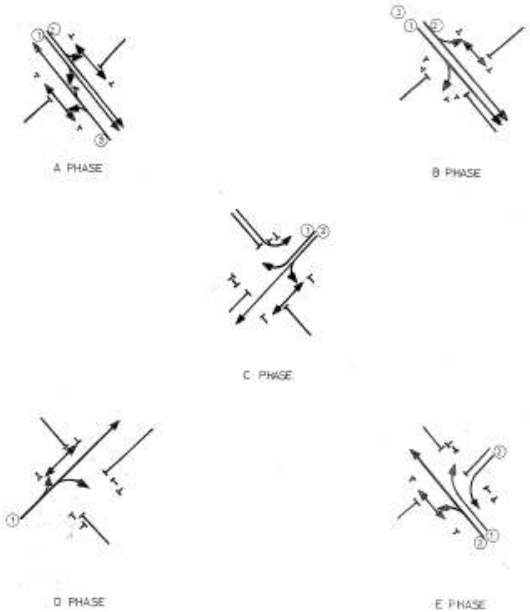
DRAWING TITLE:
BASEMENT 3 - BUILDING B + D

SCALE:		DATE:	DRAWN BY:	QA:	JOB No:	DRAWING NUMBER:	ISSUE:
1:100	@B1	7/05/2014	MS	## ##	11042	A-1101	[P04]

APPENDIX B

EXISTING INTERSECTION PLANS

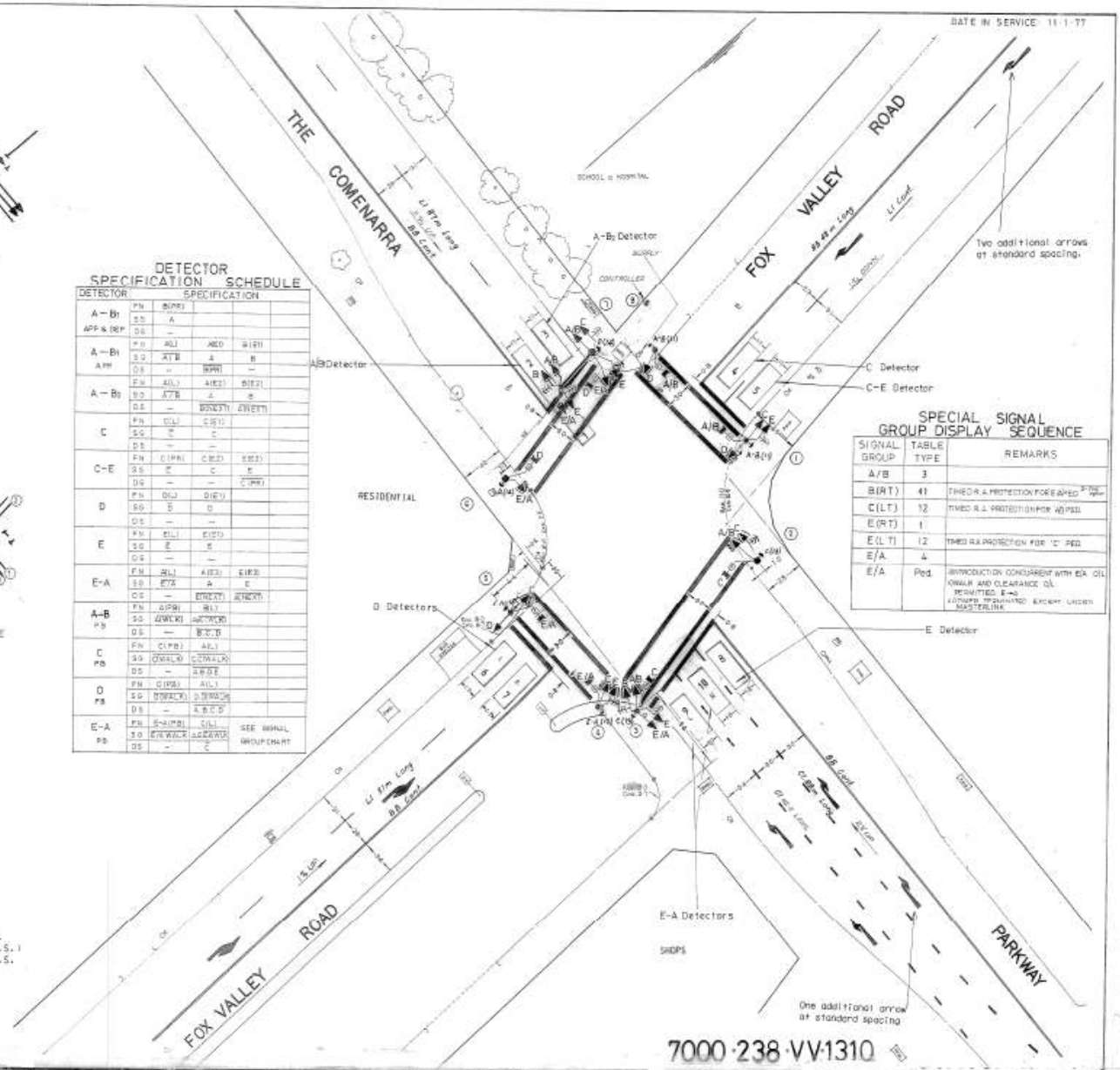
DATE IN SERVICE 11-1-77



MOVEMENT DIAGRAMS

DETECTOR SPECIFICATION SCHEDULE

DETECTOR		SPECIFICATION			
A – B1 APP & DEP	FN	B(PR)			
	SG	A			
	DS	–			
A – B1 APP	FN	A(L)	A(E2)	B(E2)	
	SG	A/B	A	B	
	DS	–	BDWKT(1)	ADWKT(1)	
A – B2	FN	A(L)	A(E2)	B(E2)	
	SG	A/B	A	B	
	DS	–	BDWKT(1)	ADWKT(1)	
C	FN	C(L)	C(E1)		
	SG	C	C		
	DS	–	–		
C–E	FN	C(PR)	C(E2)	E(E2)	
	SG	E	C	E	
	DS	–	–	C(PR)	
D	FN	D(L)	D(E1)		
	SG	D	D		
	DS	–	–		
E	FN	E(L)	E(E1)		
	SG	E	E		
	DS	–	–		
E–A	FN	A(L)	A(E2)	E(E2)	
	SG	E/A	A	E	
	DS	–	BDWKT(1)	ADWKT(1)	
A–B PB	FN	A(PR)	B(L)		
	SG	ADWCR	ADWCR		
	DS	–	B.C.D		
C PB	FN	C(PB)	A(L)		
	SG	CDWALK	CDWALK		
	DS	–	A.B.D.E		
D PB	FN	D(PB)	A(L)		
	SG	DDWALK	DDWALK		
	DS	–	A.B.C.D		
E–A PB	FN	E-A(PB)	E(L)	SEE SIGNAL GROUP CHART	
	SG	E/A WALK	ADEWALK		
	DS	–	C		



SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B	3	
B(RT)	41	TIMED R.A. PROTECTION FOR B APRED
C(LT)	12	TIMED R.A. PROTECTION FOR A(R) PSEL
E(RT)	1	
E(LT)	12	TIMED R.A. PROTECTION FOR 'C' PED
E/A	4	
E/A	Ped	INTRODUCTION CONCURRENT WITH E/A CIL (WALK AND CLEARANCE CIL PERMITTED. E→A EXTENDED REQUIRED EXCEPT UNDER MASTERLINK

POSTS

POST	TYPE	LENGTH	REMARKS
1	2	4.1	EXISTING
2	6	–	EXISTING
3	2	4.1	EXISTING
4	2	4.1	EXISTING
5	2	4.1	EXISTING
6	6	–	EXISTING
T	5½	–	EXISTING
8	2	4.1	EXISTING

NOTES

1. This site is S.C.A.T.S. linked.
2. All push buttons are audio tactile.
3. Special regulatory Stop Signs (R1-202) to be placed on posts 1&5.
4. For details of the Automatic Network Travel Time System (A.N.T.T.S.) installed at this site, refer to plan number VE542-13. The A.N.T.T.S. antennais mounted on post number 3.

DESIGN LAYOUT

7000-238-VV-1310

THIS PLAN HAS BEEN TAKEN TO THE SITE OF THE WORK AND COMPARED WITH THE SITUATION. V.H. 88-8-26

REFERENCE		PLUS	
Cons. Plan(s)	21-260-2	LED Ref.	153 110
Signal Dwg.	21-260-1		
Surveyed Alig.	2000-1-2		
Standard Alig.	2000-1-3		
Signal Plans	2000-1-7	Cols. 1/4	
Signal Schd.	2000-1-8	Cols. 1/4	
Type 3 Pref.	PM102	Col. 1	
Signal Cir. Data	21-260-6	Fld. Book 180	Pag No 20
AUTHORITY TO COST		SUP. Man 27 Ref. L9	

DEPT. MOTOR TRANSPORT, N.S.W.
TRAFFIC PLANNING & MANAGEMENT BRANCH

THE COMENARRA PARKWAY, FOX VALLEY ROAD

WAHROONGA

TCS 1310

SCALE	1 : 200
Supersedes	
Design	
Drawn	
Checked	
Passed	
Approved	Chief Traffic Planner
ISSUE	A B C D E F G H J K L M N
SHEET No	1
FILE No	238-75-265

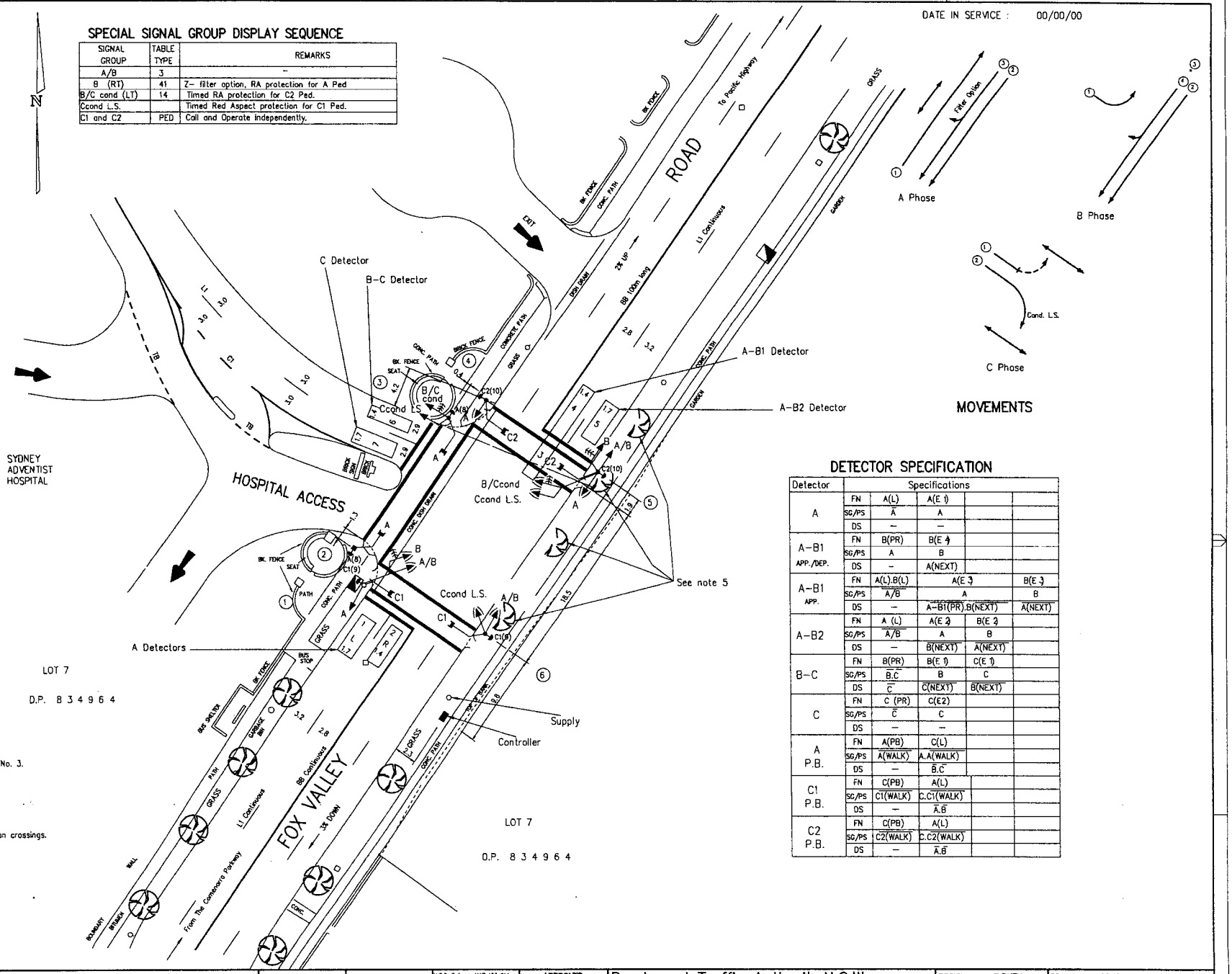
DRAWN USING CAD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 00/00/00

7000.238.VV.3210

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B	3	–
B (RT)	41	Z– filter option, RA protection for A Ped
B/C cond (LT)	14	Timed RA protection for C2 Ped.
Ccond L.S.		Timed Red Aspect protection for C1 Ped.
C1 and C2	PED	Call and Operate independently.



POSTS

POST	TYPE	LENGTH	REMARKS
1	ELP	—	EXIST
2	6	—	EXIST
3	2	4.1	EXIST
4	2	4.1	EXIST
5	2	4.1	EXIST
6	2	4.1	EXIST

DETECTOR SPECIFICATION

Detector	Specifications				
A	FN	A(L)	A(E 1)		
	SG/PS	$\overline{A}$	A		
	DS	–	–		
A–B1 APP./DEP.	FN	B(PR)	B(E 4)		
	SG/PS	A	B		
	DS	–	A(NEXT)		
A–B1 APP.	FN	A(L).B(L)	A(E 3)		B(E 3)
	SG/PS	$\overline{A/B}$	A		B
	DS	–	$\overline{A–B1(PR)}$.$\overline{B(NEXT)}$		A(NEXT)
A–B2	FN	A (L)	A(E 2)	B(E 2)	
	SG/PS	$\overline{A/B}$	A	B	
	DS	–	$\overline{B(NEXT)}$	$\overline{A(NEXT)}$	
B–C	FN	B(PR)	B(E 1)	C(E 1)	
	SG/PS	$\overline{B.C}$	B	C	
	DS	$\overline{C}$	$\overline{C(NEXT)}$	$\overline{B(NEXT)}$	
C	FN	C (PR)	C(E2)		
	SG/PS	$\overline{C}$	C		
	DS	–	–		
A P.B.	FN	A(PB)	C(L)		
	SG/PS	$\overline{A(WALK)}$	$\overline{A.A(WALK)}$		
	DS	–	$\overline{B.C}$		
C1 P.B.	FN	C(PB)	A(L)		
	SG/PS	$\overline{C1(WALK)}$	$\overline{C.C1(WALK)}$		
	DS	–	$\overline{A.B}$		
C2 P.B.	FN	C(PB)	A(L)		
	SG/PS	$\overline{C2(WALK)}$	$\overline{C.C2(WALK)}$		
	DS	–	$\overline{A.B}$		

NOTES.

1. This site is SCATS linked.
2. Special Regulatory Stop Signs (R1–202) placed on post No. 3.
3. All Push Buttons are audio–tactile type.
4. Civil Work:
   (i) Roadworks in accordance with plan 9471RD.
   (ii) Developer shall construct kerb ramps at all pedestrian crossings.
5. Council to remove trees.

A	ORIGINAL ISSUE
B	ISSUE 23–08–95 DESIGN ALTERED TO SUIT WAE P. W. KIRBY
C	ISSUE WAE MOVED POSTS 5,6 & CONTROLLER TUPA 10/01/95

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/ABBS.	VD003–8
STD POSIT	VD001–5
DET SCHED EXP	VD018–10
PRES. DETECT	VC005–17
SSG DIS. SEQ.	VD018–8

Surveyor: Brunelli McClanahan Associates P/L Date: 1995

U.B.D. Ref. MAP 153 G14
I.S.G. E 309182
CO-ORDS N 1365671
DESIGNED R.N.
CHECKED R.N.
R.N. SITE CHECKED
R.N. RECOMMENDED

APPROVED
R. Mettle
Transport & Traffic Planning Associates
DATE

ACCEPTED
DATE

Roads and Traffic Authority, N.S.W

MUNICIPALITY OF KU RING GAI
FOX VALLEY ROAD AND
SYDNEY ADVENTIST HOSPITAL ACCESS
WAHROONGA

DESIGN LAYOUT TCS No 3210

REGION: SYDNEY
BRANCH: CONSULTANT SERVICES
LOGIN: TCSB
DGGS DRAWING FILE: VV3210_1C.DGG
SCALE 5 0 (1:200) 5 10
ISSUE C
FILE 238.TS.298
SUPERSEDES SHEET/ISSUE –
REGN. 7000.238.VV.3210
SHEET 1

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E:\WORKGROUP\... SYDNEY ADVENTIST HOSPITAL\DRAWING\SIG\0C2210_1C.dwg, 26/05/2009 7:58:19 AM

APPENDIX C

TRAFFIC SURVEY RESULTS

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : T.T.P.A.
Job No/Name : 4219 Wahroonga SAN Hospital
Day/Date : Monday 6th August 2012

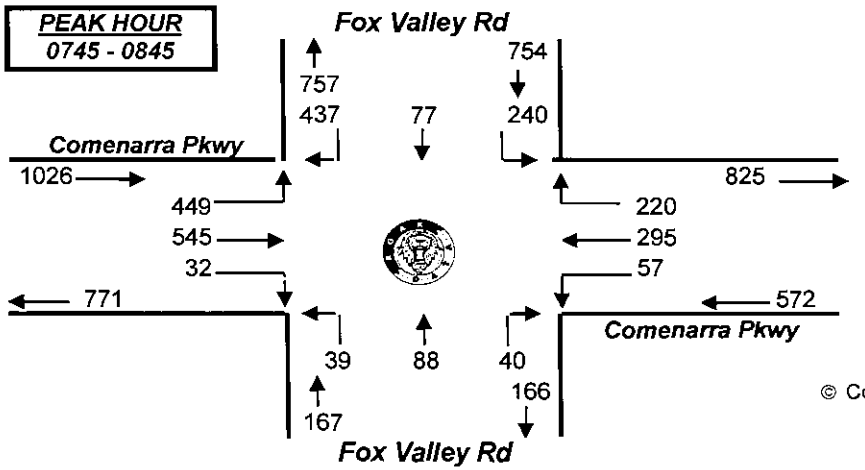
All Vehicles	NORTH Fox Valley Rd			WEST Comenarra Pkwy			SOUTH Fox Valley Rd			EAST Comenarra Pkwy			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0600 - 0615	15	2	30	60	62	4	4	1	6	0	15	8	**207**
0615 - 0630	21	3	29	84	99	1	1	4	6	4	22	21	**295**
0630 - 0645	18	4	47	110	122	7	1	1	5	0	29	40	**384**
0645 - 0700	22	7	59	169	136	5	7	18	8	5	28	39	**503**
0700 - 0715	25	17	97	96	147	8	5	7	12	5	48	28	**495**
0715 - 0730	48	15	120	88	118	3	11	14	15	3	57	44	**536**
0730 - 0745	62	16	132	112	138	7	8	27	20	7	76	45	**650**
0745 - 0800	62	8	108	111	152	4	10	23	11	15	56	53	**613**
0800 - 0815	78	17	96	105	128	10	12	21	11	15	88	54	**635**
0815 - 0830	43	20	106	102	124	9	7	17	9	8	77	46	**568**
0830 - 0845	57	32	127	131	141	9	10	27	9	19	74	67	**703**
0845 - 0900	27	30	87	110	118	14	8	23	10	12	61	32	**532**
Period End	**478**	**171**	**1038**	**1278**	**1485**	**81**	**84**	**183**	**122**	**93**	**631**	**477**	**6121**

All Vehicles	NORTH Fox Valley Rd			WEST Comenarra Pkwy			SOUTH Fox Valley Rd			EAST Comenarra Pkwy			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1515	50	29	181	99	87	17	18	24	10	15	127	77	**734**
1515 - 1530	32	10	75	73	46	9	12	6	3	8	76	43	**393**
1530 - 1545	40	14	120	89	61	9	14	20	6	13	132	89	**607**
1545 - 1600	26	16	99	78	52	10	17	21	10	13	130	77	**549**
1600 - 1615	42	13	100	96	73	13	9	14	9	15	132	95	**611**
1615 - 1630	41	21	125	71	58	5	9	13	8	4	141	81	**577**
1630 - 1645	30	28	125	96	69	9	14	24	8	16	164	96	**679**
1645 - 1700	28	11	106	79	58	5	11	19	9	20	145	88	**579**
1700 - 1715	37	26	93	95	56	9	20	25	10	7	115	63	**556**
1715 - 1730	37	17	130	93	84	14	21	18	12	12	179	78	**695**
1730 - 1745	32	9	122	70	74	7	9	12	4	8	164	65	**576**
1745 - 1800	17	23	119	83	63	8	11	16	10	5	146	56	**557**
Period End	**412**	**217**	**1395**	**1022**	**781**	**115**	**165**	**212**	**99**	**136**	**1651**	**908**	**7113**

	NORTH Fox Valley Rd			WEST Comenarra Pkwy			SOUTH Fox Valley Rd			EAST Comenarra Pkwy			
Peak Time	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0600 - 0700	76	16	165	423	419	17	13	24	25	9	94	108	**1389**
0615 - 0715	86	31	232	459	504	21	14	30	31	14	127	128	**1677**
0630 - 0730	113	43	323	463	523	23	24	40	40	13	162	151	**1918**
0645 - 0745	157	55	408	465	539	23	31	66	55	20	209	156	**2184**
0700 - 0800	197	56	457	407	555	22	34	71	58	30	237	170	**2294**
0715 - 0815	250	56	456	416	536	24	41	85	57	40	277	196	**2434**
0730 - 0830	245	61	442	430	542	30	37	88	51	45	297	198	**2466**
0745 - 0845	240	77	437	449	545	32	39	88	40	57	295	220	**2519**
0800 - 0900	205	99	416	448	511	42	37	88	39	54	300	199	**2438**
PEAK HOUR	**240**	**77**	**437**	**449**	**545**	**32**	**39**	**88**	**40**	**57**	**295**	**220**	**2519**

	NORTH Fox Valley Rd			WEST Comenarra Pkwy			SOUTH Fox Valley Rd			EAST Comenarra Pkwy			
Peak Time	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1500 - 1600	148	69	475	339	246	45	61	71	29	49	465	286	**2283**
1515 - 1615	140	53	394	336	232	41	52	61	28	49	470	304	**2160**
1530 - 1630	149	64	444	334	244	37	49	68	33	45	535	342	**2344**
1545 - 1645	139	78	449	341	252	37	49	72	35	48	567	349	**2416**
1600 - 1700	141	73	456	342	258	32	43	70	34	55	582	360	**2446**
1615 - 1715	136	86	449	341	241	28	54	81	35	47	565	328	**2391**
1630 - 1730	132	82	454	363	267	37	66	86	39	55	603	325	**2509**
1645 - 1745	134	63	451	337	272	35	61	74	35	47	603	294	**2406**
1700 - 1800	123	75	464	341	277	38	61	71	36	32	604	262	**2384**
PEAK HOUR	**132**	**82**	**454**	**363**	**267**	**37**	**66**	**86**	**39**	**55**	**603**	**325**	**2509**

PEAK HOUR
0745 - 0845



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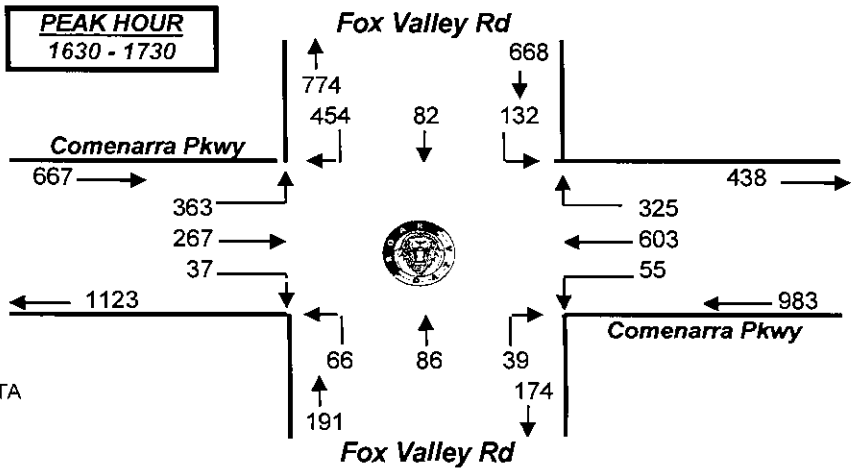
PEAK HOUR
1630 - 1730



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R.O.A.R. DATA

Reliable, Original & Authentic Results

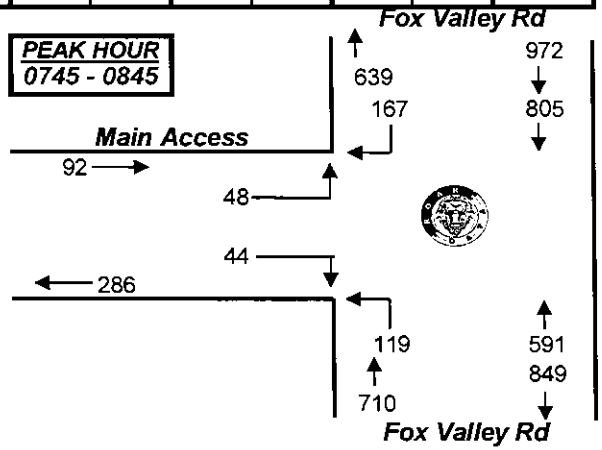
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : T.T.P.A.
Job No/Name : 4219 Wahroonga SAN Hospital
Day/Date : Monday 6th August 2012

All Vehicles

	NORTH		WEST		SOUTH		
	Fox Valley Rd		*Main Access*		*Fox Valley Rd*		
Time Per	**R**	**T**	**L**	**R**	**L**	**T**	**TOTAL**
0600 - 0615	4	32	0	3	6	48	**93**
0615 - 0630	21	63	4	1	16	85	**190**
0630 - 0645	33	69	11	5	24	106	**248**
0645 - 0700	30	89	10	11	38	134	**312**
0700 - 0715	22	155	6	5	20	98	**306**
0715 - 0730	37	181	11	6	23	112	**370**
0730 - 0745	28	210	7	13	20	117	**395**
0745 - 0800	50	190	13	12	26	139	**430**
0800 - 0815	34	191	15	6	19	143	**408**
0815 - 0830	45	223	8	14	36	143	**469**
0830 - 0845	38	201	12	12	38	166	**467**
0845 - 0900	56	172	11	7	37	146	**429**
Period End	**398**	**1776**	**108**	**95**	**303**	**1437**	**4117**

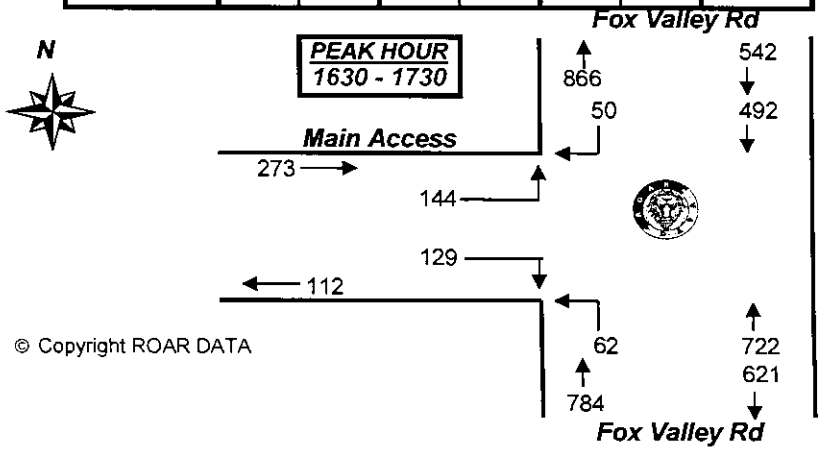
	NORTH		WEST		SOUTH		
	Fox Valley Rd		*Main Access*		*Fox Valley Rd*		
Peak Per	**R**	**T**	**L**	**R**	**L**	**T**	**TOTAL**
0600 - 0700	88	253	25	20	84	373	**843**
0615 - 0715	106	376	31	22	98	423	**1056**
0630 - 0730	122	494	38	27	105	450	**1236**
0645 - 0745	117	635	34	35	101	461	**1383**
0700 - 0800	137	736	37	36	89	466	**1501**
0715 - 0815	149	772	46	37	88	511	**1603**
0730 - 0830	157	814	43	45	101	542	**1702**
0745 - 0845	167	805	48	44	119	591	**1774**
0800 - 0900	173	787	46	39	130	598	**1773**
PEAK HR	**167**	**805**	**48**	**44**	**119**	**591**	**1774**



All Vehicles

	NORTH		WEST		SOUTH		
	Fox Valley Rd		*Main Access*		*Fox Valley Rd*		
Time Per	**R**	**T**	**L**	**R**	**L**	**T**	**TOTAL**
1500 - 1515	15	158	23	31	32	151	**410**
1515 - 1530	15	143	29	23	18	163	**391**
1530 - 1545	12	106	34	35	20	164	**371**
1545 - 1600	23	133	22	16	20	161	**375**
1600 - 1615	17	143	30	21	20	162	**393**
1615 - 1630	20	118	26	35	19	153	**371**
1630 - 1645	17	115	31	36	14	200	**413**
1645 - 1700	17	115	31	30	16	168	**377**
1700 - 1715	6	128	39	33	18	181	**405**
1715 - 1730	10	134	43	30	14	173	**404**
1730 - 1745	13	128	27	31	14	137	**350**
1745 - 1800	7	145	22	20	7	182	**383**
Period End	**172**	**1566**	**357**	**341**	**212**	**1995**	**4643**

	NORTH		WEST		SOUTH		
	Fox Valley Rd		*Main Access*		*Fox Valley Rd*		
Peak Per	**R**	**T**	**L**	**R**	**L**	**T**	**TOTAL**
1500 - 1600	65	540	108	105	90	639	**1547**
1515 - 1615	67	525	115	95	78	650	**1530**
1530 - 1630	72	500	112	107	79	640	**1510**
1545 - 1645	77	509	109	108	73	676	**1552**
1600 - 1700	71	491	118	122	69	683	**1554**
1615 - 1715	60	476	127	134	67	702	**1566**
1630 - 1730	50	492	144	129	62	722	**1599**
1645 - 1745	46	505	140	124	62	659	**1536**
1700 - 1800	36	535	131	114	53	673	**1542**
PEAK HR	**50**	**492**	**144**	**129**	**62**	**722**	**1599**



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Reliable, Original & Authentic Results

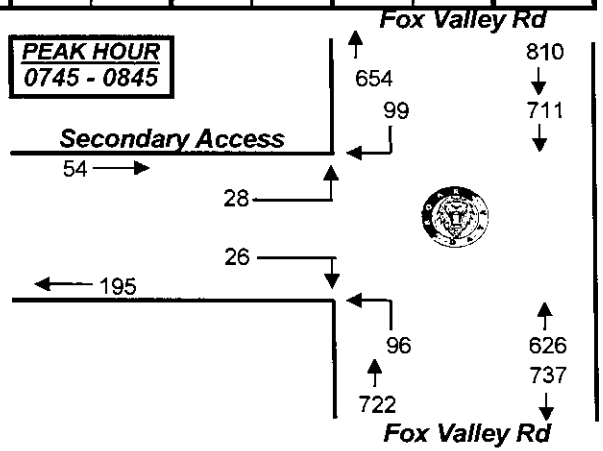
Ph.88196847, Fax 88196849, Mob.0418-239019

Client : T.T.P.A.
Job No/Name : 4219 Wahroonga SAN Hospital
Day/Date : Monday 6th August 2012

All Vehicles

	NORTH		WEST		SOUTH		
	Fox Valley Rd		*Secondary*		*Fox Valley Rd*		
Time Per	R	T	L	R	L	T	**TOTAL**
0600 - 0615	4	40	0	4	7	61	**116**
0615 - 0630	11	49	3	2	11	100	**176**
0630 - 0645	11	63	3	4	25	126	**232**
0645 - 0700	20	84	1	3	44	180	**332**
0700 - 0715	16	136	6	2	15	111	**286**
0715 - 0730	16	167	3	6	17	136	**345**
0730 - 0745	23	198	10	8	48	135	**422**
0745 - 0800	30	167	10	4	24	161	**396**
0800 - 0815	10	189	7	9	21	153	**389**
0815 - 0830	12	158	5	8	16	128	**327**
0830 - 0845	47	197	6	5	35	184	**474**
0845 - 0900	22	132	7	6	20	138	**325**
Period End	**222**	**1580**	**61**	**61**	**283**	**1613**	**3820**

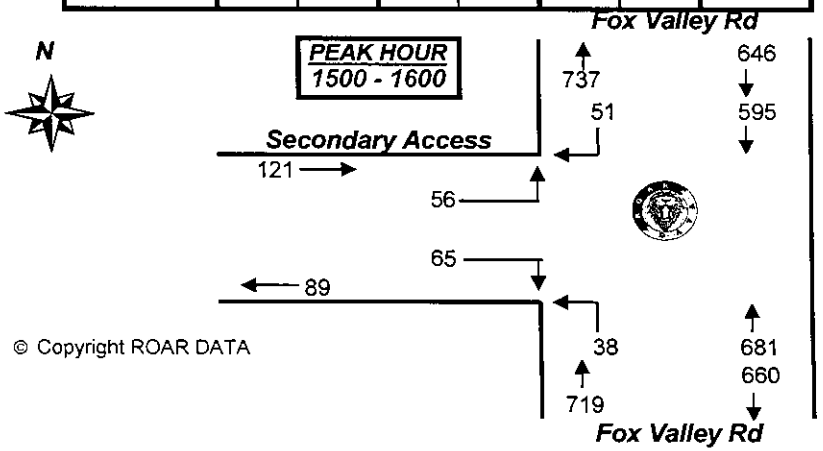
	NORTH		WEST		SOUTH		
	Fox Valley Rd		*Secondary*		*Fox Valley Rd*		
Peak Per	R	T	L	R	L	T	**TOTAL**
0600 - 0700	46	236	7	13	87	467	**856**
0615 - 0715	58	332	13	11	95	517	**1026**
0630 - 0730	63	450	13	15	101	553	**1195**
0645 - 0745	75	585	20	19	124	562	**1385**
0700 - 0800	85	668	29	20	104	543	**1449**
0715 - 0815	79	721	30	27	110	585	**1552**
0730 - 0830	75	712	32	29	109	577	**1534**
0745 - 0845	99	711	28	26	96	626	**1586**
0800 - 0900	91	676	25	28	92	603	**1515**
PEAK HR	**99**	**711**	**28**	**26**	**96**	**626**	**1586**



All Vehicles

	NORTH		WEST		SOUTH		
	Fox Valley Rd		*Secondary*		*Fox Valley Rd*		
Time Per	R	T	L	R	L	T	**TOTAL**
1500 - 1515	18	173	16	16	13	165	**401**
1515 - 1530	20	156	11	10	9	163	**369**
1530 - 1545	4	145	17	26	6	175	**373**
1545 - 1600	9	121	12	13	10	178	**343**
1600 - 1615	5	147	20	19	9	172	**372**
1615 - 1630	13	158	10	10	12	141	**344**
1630 - 1645	8	148	29	15	11	181	**392**
1645 - 1700	4	135	10	17	6	176	**348**
1700 - 1715	12	162	16	14	7	180	**391**
1715 - 1730	8	149	17	12	8	150	**344**
1730 - 1745	12	136	17	9	5	129	**308**
1745 - 1800	10	165	16	12	5	187	**395**
Period End	**123**	**1795**	**191**	**173**	**101**	**1997**	**4380**

	NORTH		WEST		SOUTH		
	Fox Valley Rd		*Secondary*		*Fox Valley Rd*		
Peak Per	R	T	L	R	L	T	**TOTAL**
1500 - 1600	51	595	56	65	38	681	**1486**
1515 - 1615	38	569	60	68	34	688	**1457**
1530 - 1630	31	571	59	68	37	666	**1432**
1545 - 1645	35	574	71	57	42	672	**1451**
1600 - 1700	30	588	69	61	38	670	**1456**
1615 - 1715	37	603	65	56	36	678	**1475**
1630 - 1730	32	594	72	58	32	687	**1475**
1645 - 1745	36	582	60	52	26	635	**1391**
1700 - 1800	42	612	66	47	25	646	**1438**
PEAK HR	**51**	**595**	**56**	**65**	**38**	**681**	**1486**



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APPENDIX D

PREVIOUSLY PROPOSED ROAD WORKS

DRAWN BY CADD
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DATE IN SERVICE : 00/00/00

RTA

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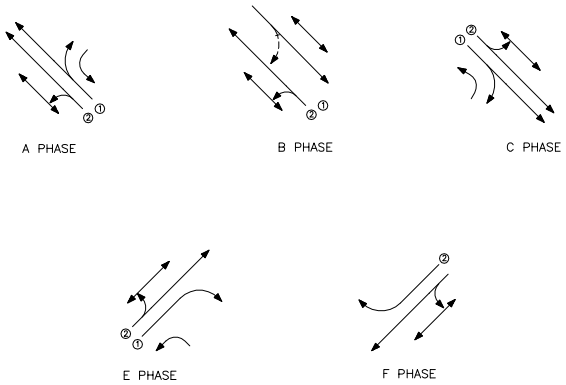
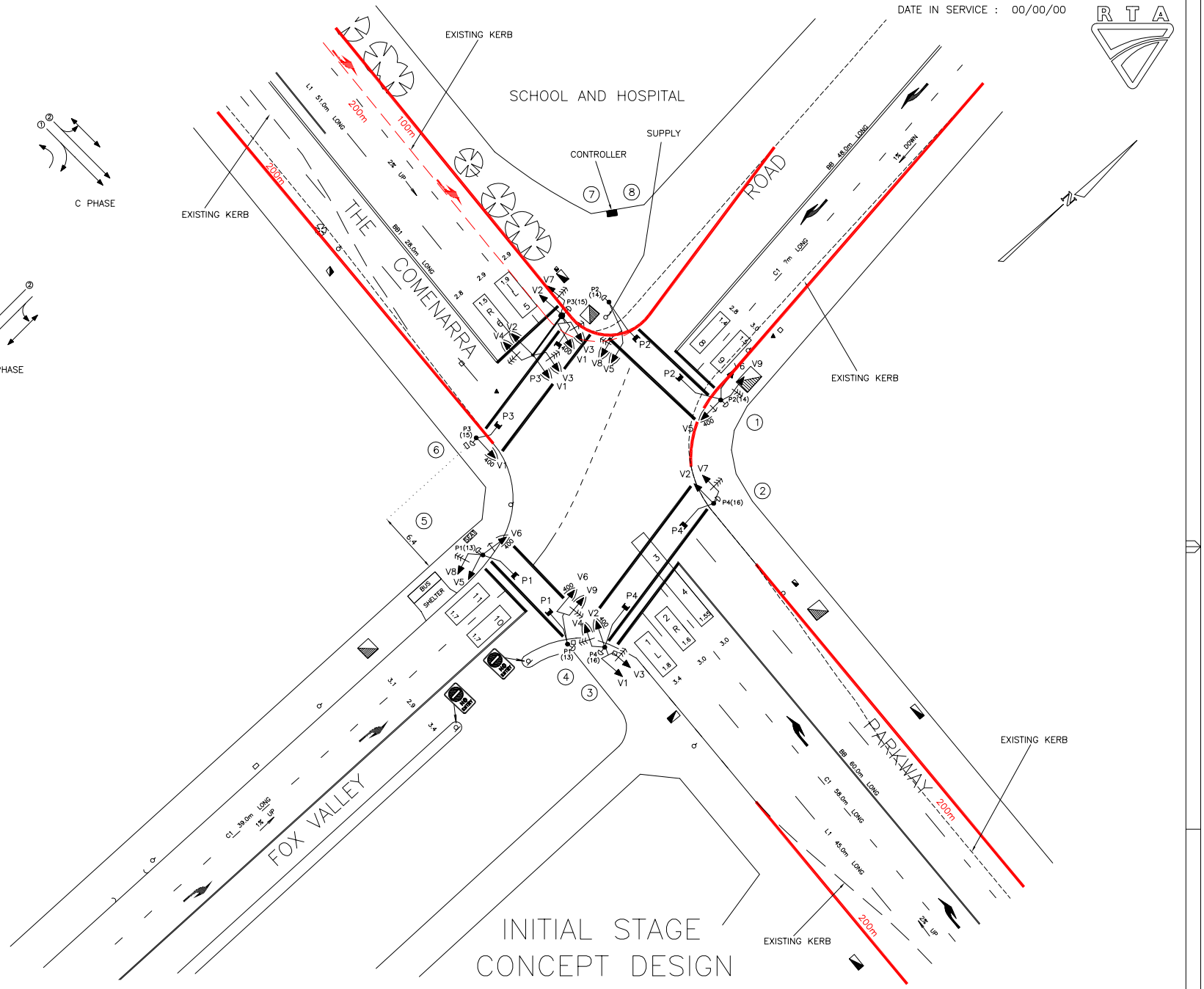


MOVEMENT DIAGRAMS



PUBLIC UTILITY LEGEND		REFERENCE PLANS	
HYDRANT	□	SYMBOLS/ABBS.	VD003-6
STOP VALVE	▲	STD POSIT	VD001-5
GAS VALVE	#	DET SCHED EXP	VD018-10
SEWER MANHOLE	⊗	PRES. DETECT	VC005-17
TELECOM PIT	◪	SSG DIS. SEQ.	VD018-8
ELECT LIGHT POLE	☾		
POWER POLE	○		
STAY POLE	⊘		
TELEPHONE BOX	☎	SURVEYOR : XXX	
TELECOM PILLAR	◕	DATE : XXX	

U.B.D. Ref. 153H15
I.S.G. E: 309182
CO-ORDS N:1265671
DESIGNED VCT
CHECKED AM
AM
SITE CHECKED
RW
RECOMMENDED

DESIGN APPROVAL
APPROVED
R.METTLE
POSITION DIRECTOR
DATE 12.07.10
DESIGN PREPARED BY
TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

RTA ACCEPTANCE
RECOMMENDED
POSITION .....
DATE .....
ACCEPTED
POSITION .....
DATE .....

Roads and Traffic Authority,N.S.W
MUNICIPALITY OF KU-RING-GAI
TRAFFIC SIGNALS AT THE INTERSECTION OF
THE COMENARRA PARKWAY AND
FOX VALLEY ROAD
WAHROONGA
DESIGN LAYOUT
TCS No 1310

REGION: SYDNEY
BRANCH: CONSULTANT SERVICES
LOGIN: TCSB
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SCALE 5 0 (1:200) 5 10
ISSUE ?
FILE 238TS265
SUPERSEDES SHEET/ISSUE 7K
REGN. 7000.238.VV.1310
SHEET ?

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RTA

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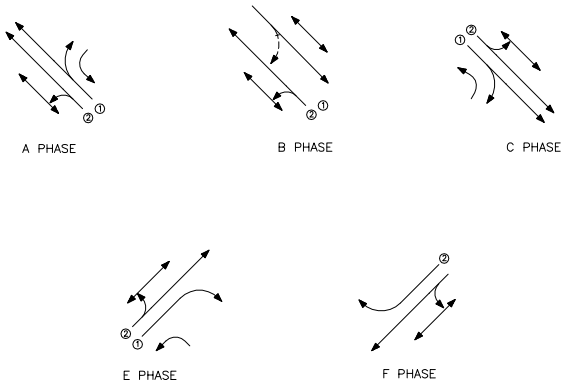
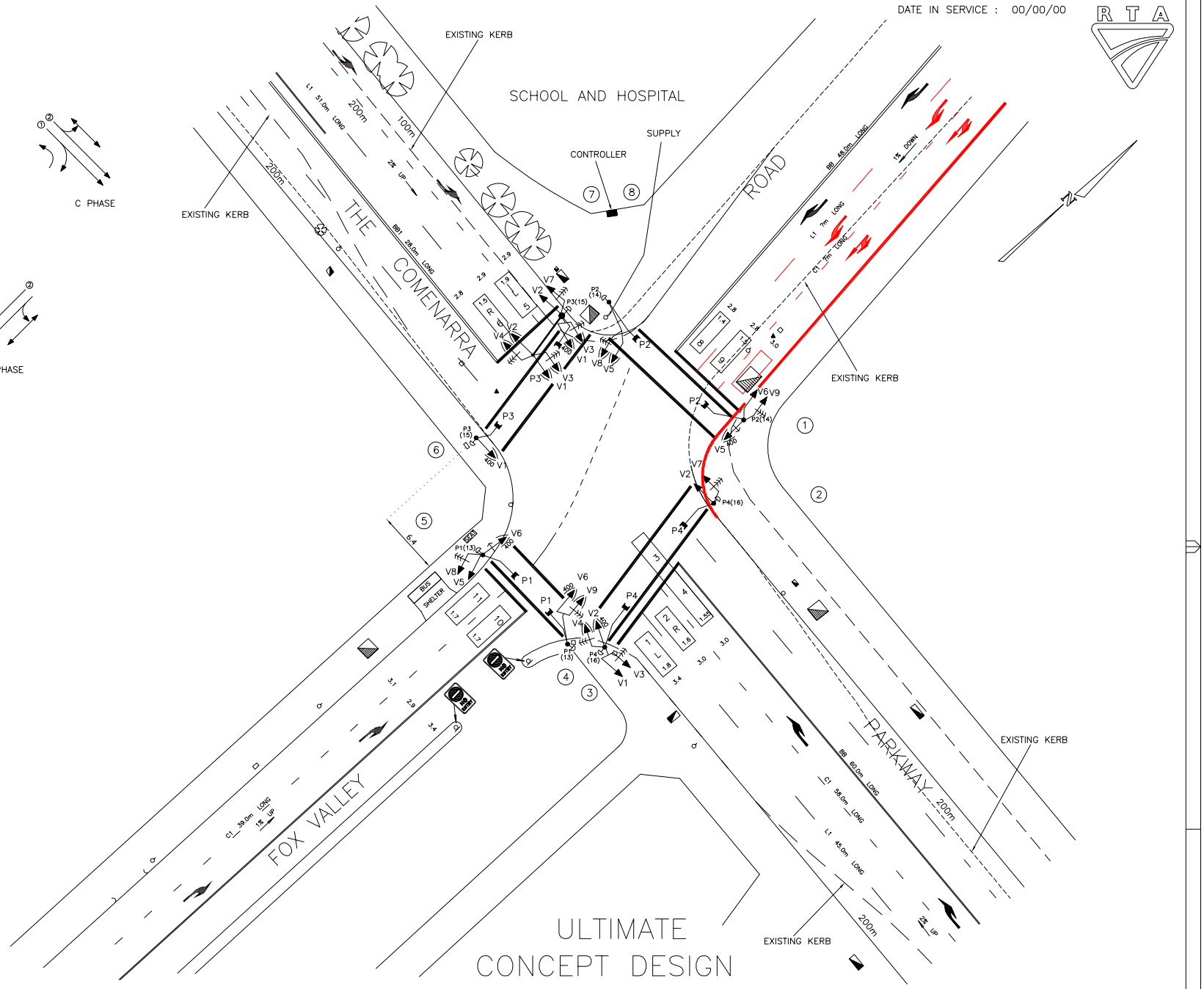


MOVEMENT DIAGRAMS



PUBLIC UTILITY LEGEND		REFERENCE PLANS	
HYDRANT	□	SYMBOLS/ABBS.	VD003-6
STOP VALVE	▲	STD POSIT	VD001-5
GAS VALVE	#	DET SCHED EXP	VD018-10
SEWER MANHOLE	⊗	PRES. DETECT	VC005-17
TELECOM PIT	◪	SSG DIS. SEQ.	VD018-8
ELECT LIGHT POLE	☾		
POWER POLE	○		
STAY POLE	⊘		
TELEPHONE BOX	☎	SURVEYOR : XXX	
TELECOM PILLAR	◕	DATE : XXX	

U.B.D. Ref. 153H15
I.S.G. E: 309182
CO-ORDS N:1265671
DESIGNED VCT
CHECKED AM
AM
SITE CHECKED
RW
RECOMMENDED

DESIGN APPROVAL
APPROVED
R.METTLE
POSITION DIRECTOR
DATE 12.07.10
DESIGN PREPARED BY
TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

RTA ACCEPTANCE
RECOMMENDED
POSITION .....
DATE .....
ACCEPTED
POSITION .....
DATE .....

Roads and Traffic Authority,N.S.W
MUNICIPALITY OF KU-RING-GAI
TRAFFIC SIGNALS AT THE INTERSECTION OF
THE COMENARRA PARKWAY AND
FOX VALLEY ROAD
WAHROONGA
DESIGN LAYOUT
TCS No 1310

REGION: SYDNEY
BRANCH: CONSULTANT SERVICES
LOGIN: TCSB
DGGS DRAWING FILE:VV1310_??.DWG
SCALE 5 0 (1:200) 5 10
ISSUE ?
FILE 238TS265
SUPERSEDES SHEET/ISSUE 7K
REGN. 7000.238.VV.1310
SHEET ?

A ORIGINAL ISSUE

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APPENDIX E

PROPOSED ROAD WORKS

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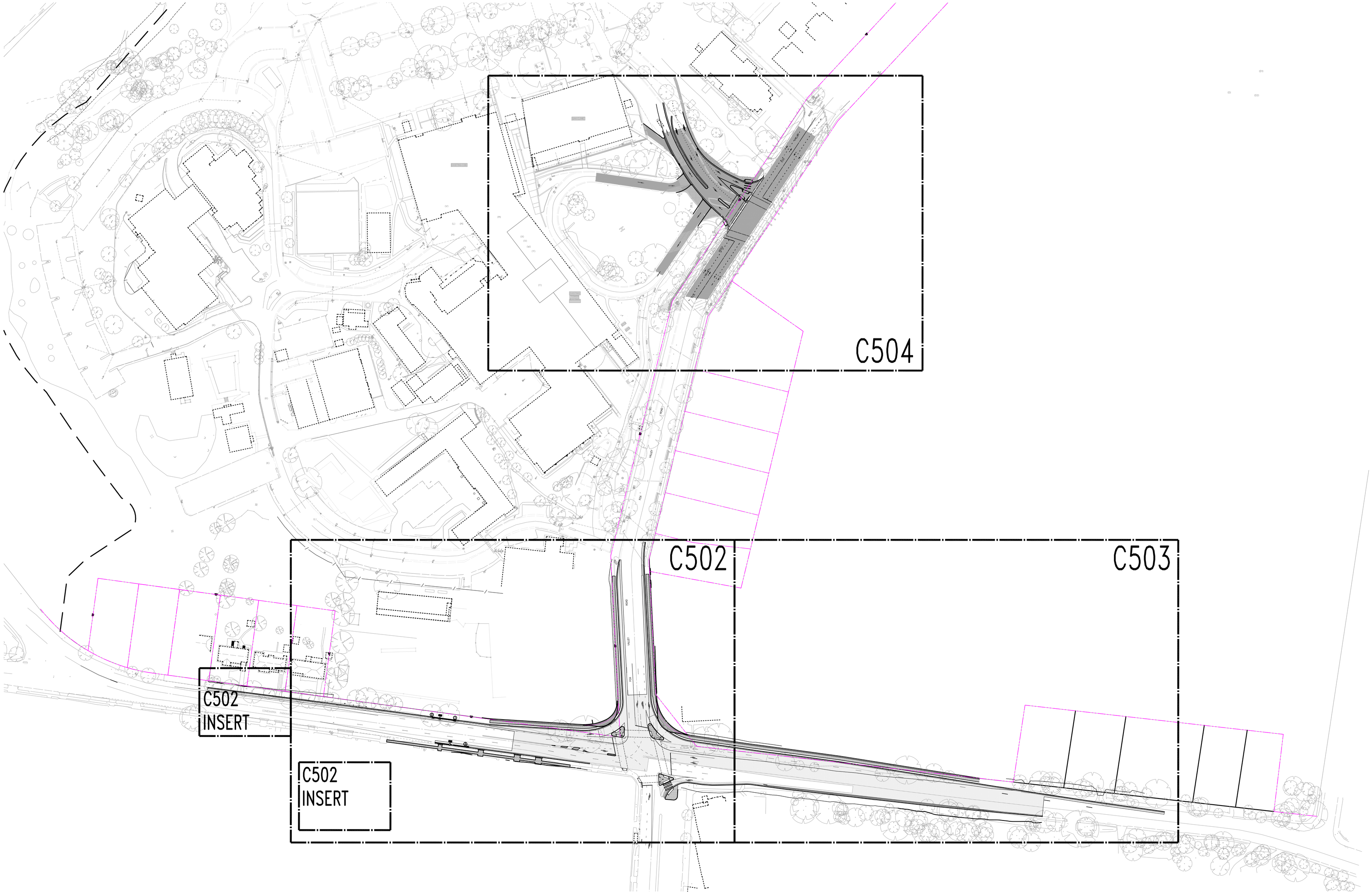

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B1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
04	ISSUE FOR INFORMATION	SB	MS	13.08.12
03	ISSUE FOR INFORMATION	SB	MS	24.05.12
02	ISSUE FOR APPROVAL	SB	MS	13.12.11
01	ISSUE FOR APPROVAL	SB	MS	28.11.11

Rev	Description	Eng	Draft	Date

Rev	Description	Eng	Draft	Date

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C401

Architect
MBMO
MORRIS BRAY MARTIN OLLMANN
186 - 188 WILLOUGHBY RD CROWS NEST NSW 2067
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Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Project
SYDNEY ADVENTIST HOSPITAL
FOX VALLEY ROAD
WAHROONGA

SYDNEY ADVENTIST HOSPITAL

Sheet Subject
OVERALL PLAN

Scale : B1	Drawn	Authorised
1:800	MS	

Job No	Part Code	Drawing No	Revision
111110	D	C501	04

Plot File Created: Aug 13, 2012 - 9:26am

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PAVEMENT LEGEND

NOTES

1. Asphaltic concrete shall conform to AS2150 and the specification
2. Pavement based on geotechnical report by

P1
- 50mm Thickness asphaltic concrete (AC14) with polymer modified (AE15) on
- 150mm Thickness asphaltic concrete (AC20) with polymer modified (AE15) on
- 200mm Stabilised compacted thickness fine crushed rock (DGS40)

P2
- 120mm Thickness concrete (fc=32MPa) with SL92 fabric (40 top cover) on
- 100mm Compacted thickness fine crushed rock (DGB 20)

P3
- 50mm Mill and Resheet asphaltic concrete (AC14) with polymer modified (AE15)

NOTE:
- ALLOW TO RELOCATE ALL SIGNAGE AND LIGHTING AS REQUIRED
- ALLOW TO ADJUST ALL SERVICES AND SERVICE PITS AS REQUIRED BY THE WORKS

FOR APPROVAL

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
05	ISSUE FOR INFORMATION	SB	MS	13.08.12										
04	ISSUE FOR INFORMATION	SB	MS	24.05.12										
03	ISSUE FOR APPROVAL	SB	MS	13.12.11										
02	ISSUE FOR APPROVAL	SB	MS	02.12.11										
01	ISSUE FOR APPROVAL	SB	MS	28.11.11										

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C401

Architect
MBMO
MORRIS BRAY MARTIN OLLMANN
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Project
SYDNEY ADVENTIST HOSPITAL
FOX VALLEY ROAD
WAHROONGA

Sheet Subject
COMENARRA PARKWAY AND FOX VALLEY ROAD INTERSECTION SITEWORKS PLAN SHEET 1

Scale : B1	Drawn	Authorised
1:250	MS	

Job No	Part Code	Drawing No	Revision
111110	D	C502	05

Plot File Created: Aug 13, 2012 - 9:11am

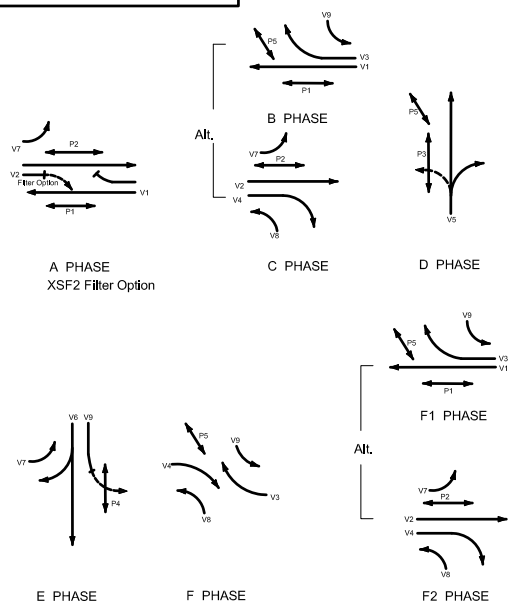
FileName: D:\C502.dwg - USER: mortos - Plot File Created: Aug 13, 2012 - 9:11am

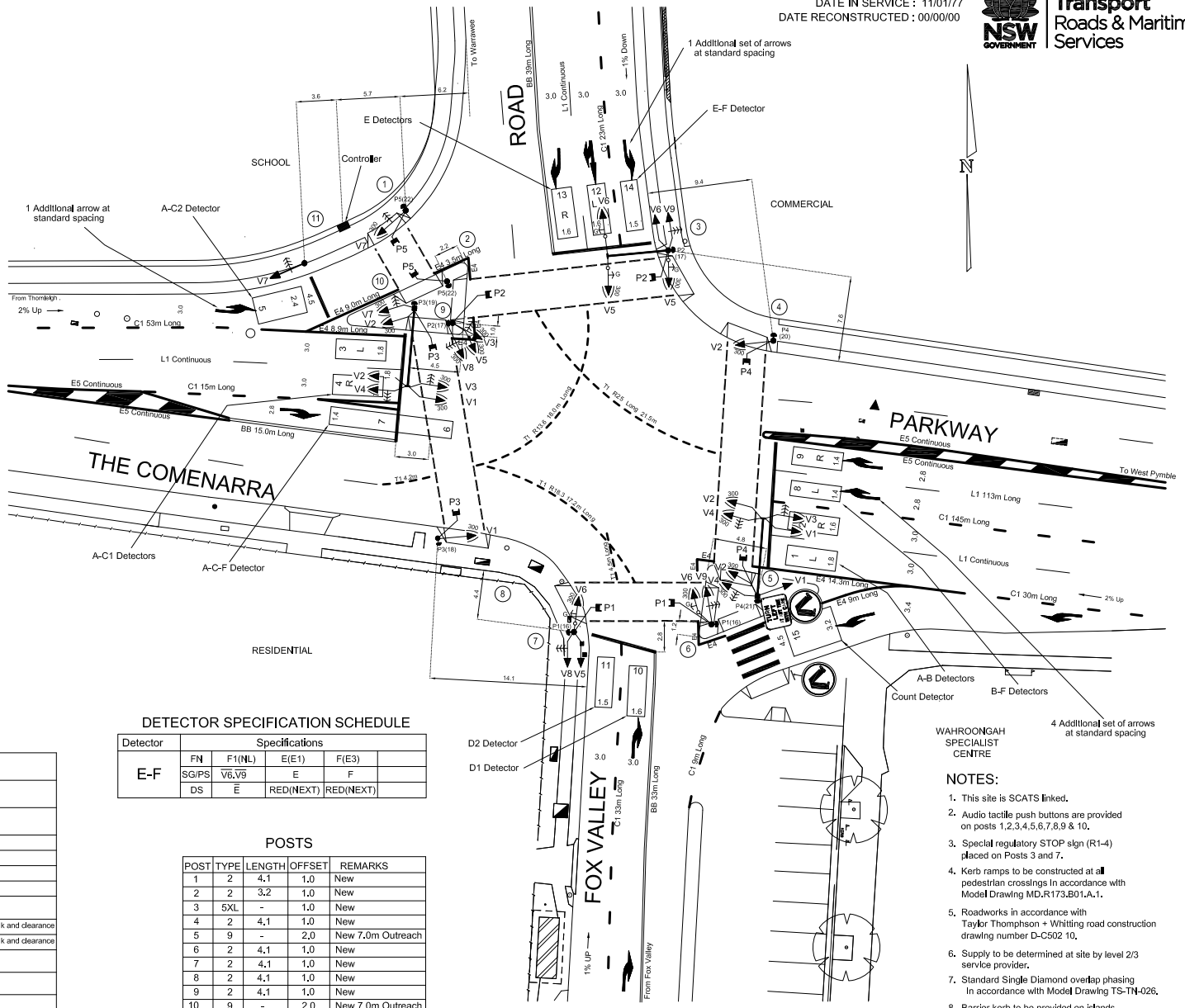
7000.238.VV.1310

DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 11/01/77
DATE RECONSTRUCTED : 00/00/00

NSW GOVERNMENT Transport Roads & Maritime Services





SIGNAL GROUP PHASE CHART

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAYED								OVERLAPS PERMITTED	TABLE	
	A	B	C	D	E	F	F1	F2			
V1	X	X					X		F1/A/B, B/A, A/F1	TS-TN-026	
V2	X		X					X	F2/A/C, C/A, A/F2	TS-TN-026	
V3		X				X	X		F/F1, B/F	TS-TN-026	
V4			X			X		X	F/F2, C/F	TS-TN-026	
V5				X						1	
V6					X					1	
V7	X		X		X			X	F2/A/C, C/A, A/F2	160	
V8			X			X		X	F/F2, C/F	145 *	Timed RA protection for P3 walk and clearance
V9		X			C	X	X		F/F1, B/F	146 #	Timed RA protection for P4 walk and clearance
P1	X	X					X		F1/A/B	109	Automatic introduction with V1 in the presence of XSF9
P2	X		X					X	F2/A/C	107	Automatic Introduction with V2 in the presence of XSF10
P3				X						2	
P4					X					2	
P5		X		X		X	X			-	Automatic introduction with V3 and V5 in the presence of XSF11

* PB on post 10 extends RA.
# PB on post 5 extends RA.

DETECTOR SPECIFICATION SCHEDULE

Detector	Specifications				
	FN	F1(NL)	E(E1)	F(E3)	
E-F	SG/PS	V6.V9	E	F	
	DS	E	RED(NEXT)	RED(NEXT)	

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	New
2	2	3.2	1.0	New
3	5XL	-	1.0	New
4	2	4.1	1.0	New
5	9	-	2.0	New 7.0m Outreach
6	2	4.1	1.0	New
7	2	4.1	1.0	New
8	2	4.1	1.0	New
9	2	4.1	1.0	New
10	9	-	2.0	New 7.0m Outreach
11	2	4.1	1.0	New

NOTES:

1. This site is SCATS linked.
2. Audio tactile push buttons are provided on posts 1,2,3,4,5,6,7,8,9 & 10.
3. Special regulatory STOP sign (R1-4) placed on Posts 3 and 7.
4. Kerb ramps to be constructed at all pedestrian crossings in accordance with Model Drawing MD.R173.B01.A.1.
5. Roadworks in accordance with Taylor Thompson + Whitting road construction drawing number D-C502 10.
6. Supply to be determined at site by level 2/3 service provider.
7. Standard Single Diamond overlap phasing in accordance with Model Drawing TS-TN-026.
8. Barrier kerb to be provided on islands housing mast arms.

A ORIGINAL ISSUE

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/ABBS.	VD003-6
STD POSIT	VD001-5
PRES. DETECT	VC005-17
VEH. GROUP OP	TS-TN-019
DET. LOGIC OP	TS-TN-020
PED. MOVEMNT OP	TS-TN-021
SURVEYOR : INSITES	
DATE : 26.03.2012	

U.B.D. Ref. Map 153 H15
I.S.G. E: 309 182
CO-ORDS N: 1 265 671
DESIGNED CT
CHECKED JS
CT
SITE CHECKED
JS
RECOMMENDED

DESIGN APPROVAL
APPROVED
R. NETTLE
POSITION DIRECTOR
DATE 15.08.2013
DESIGN PREPARED BY
TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

RMS ACCEPTANCE
RECOMMENDED
POSITION
DATE
ACCEPTED
POSITION
DATE

ROADS AND MARITIME SERVICES
KU-RING-GAI COUNCIL AREA
TRAFFIC SIGNALS AT THE INTERSECTION OF THE COMENARRA PARKWAY AND FOX VALLEY ROAD
WAHROONGA
DESIGN LAYOUT
TCS No 1310

EXISTING ☐ PROPOSED ☒
CADD FILE: VV1310_12A.dgn
SCALE 5 0 (1:200) 5 10
FILE 238 TS 265
SUPERSEDES SHEET/ISSUE 4A
ISSUE A
REGN. 7000.238.VV.1310
SHEET 12

$DATES $TIMES $FILES

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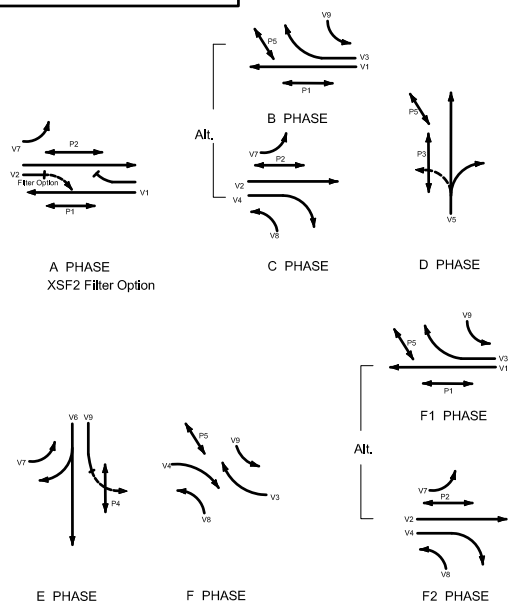
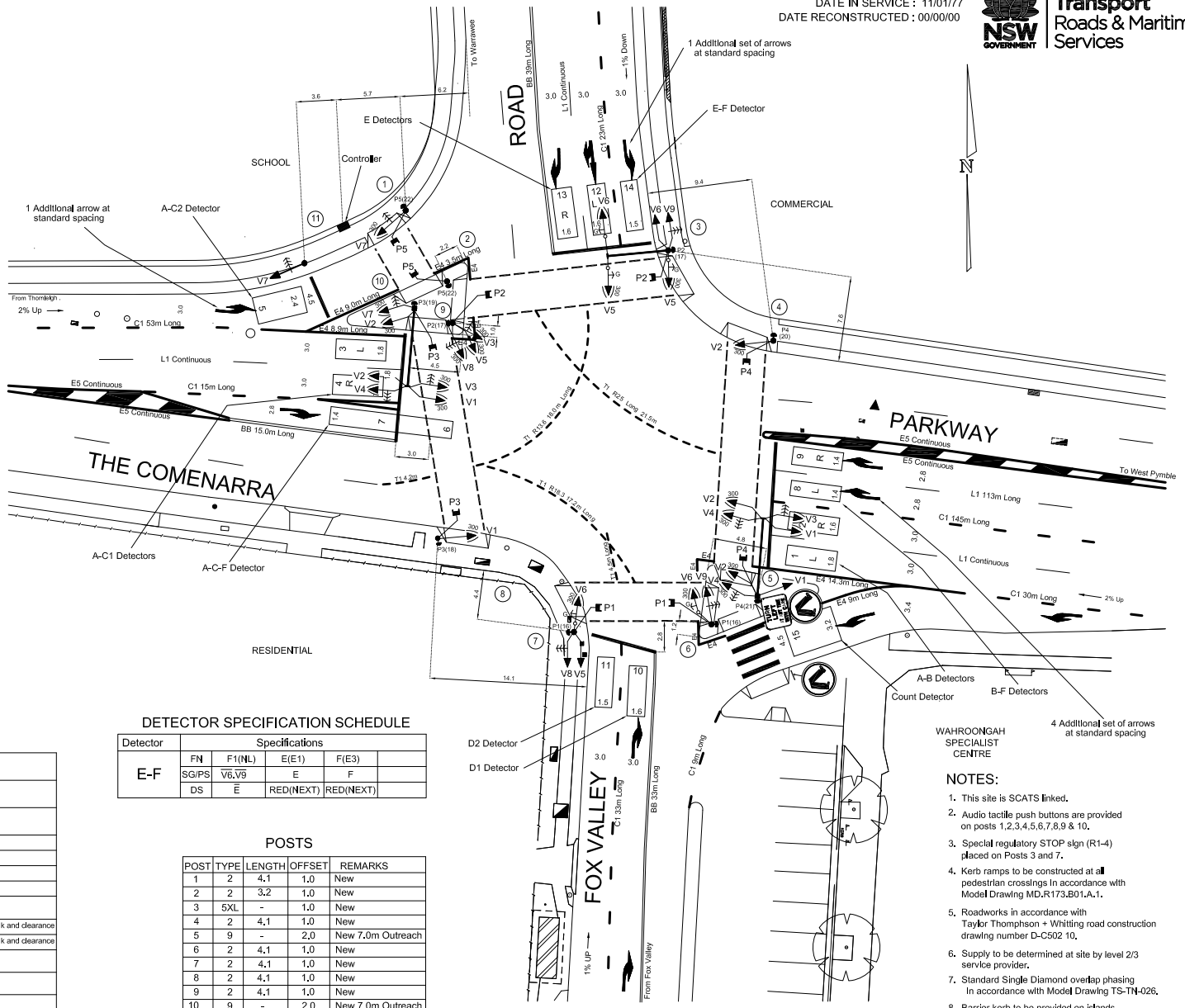
7000.238.VV.1310

DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 11/01/77
DATE RECONSTRUCTED : 00/00/00

NSW GOVERNMENT Transport Roads & Maritime Services





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	A	B	C	D	E	F	F1	F2			
V1	X	X					X		F1/A/B, B/A, A/F1	TS-TN-026	
V2	X		X					X	F2/A/C, C/A, A/F2	TS-TN-026	
V3		X				X	X		F/F1, B/F	TS-TN-026	
V4			X			X		X	F/F2, C/F	TS-TN-026	
V5				X						1	
V6					X					1	
V7	X		X		X			X	F2/A/C, C/A, A/F2	160	
V8			X			X		X	F/F2, C/F	145 *	Timed RA protection for P3 walk and clearance
V9		X			C	X	X		F/F1, B/F	146 #	Timed RA protection for P4 walk and clearance
P1	X	X					X		F1/A/B	109	Automatic introduction with V1 in the presence of XSF9
P2	X		X					X	F2/A/C	107	Automatic Introduction with V2 in the presence of XSF10
P3				X						2	
P4					X					2	
P5		X		X		X	X			-	Automatic introduction with V3 and V5 in the presence of XSF11

* PB on post 10 extends RA.
# PB on post 5 extends RA.

DETECTOR SPECIFICATION SCHEDULE

Detector	Specifications				
	FN	F1(NL)	E(E1)	F(E3)	
E-F	SG/PS	V6.V9	E	F	
	DS	E	RED(NEXT)	RED(NEXT)	

POSTS

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2	2	3.2	1.0	New
3	5XL	-	1.0	New
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6	2	4.1	1.0	New
7	2	4.1	1.0	New
8	2	4.1	1.0	New
9	2	4.1	1.0	New
10	9	-	2.0	New 7.0m Outreach
11	2	4.1	1.0	New

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A ORIGINAL ISSUE

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/ABBS.	VD003-6
STD POSIT	VD001-5
PRES. DETECT	VC005-17
VEH. GROUP OP	TS-TN-019
DET. LOGIC OP	TS-TN-020
PED. MOVEMNT OP	TS-TN-021
SURVEYOR : INSITES	
DATE : 26.03.2012	

U.B.D. Ref. Map 153 H15
I.S.G. E: 309 182
CO-ORDS N: 1 265 671
DESIGNED CT
CHECKED JS
CT
SITE CHECKED
JS
RECOMMENDED

DESIGN APPROVAL
APPROVED
R. NETTLE
POSITION DIRECTOR
DATE 15.08.2013
DESIGN PREPARED BY
TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

RMS ACCEPTANCE
RECOMMENDED
POSITION
DATE
ACCEPTED
POSITION
DATE

ROADS AND MARITIME SERVICES
KU-RING-GAI COUNCIL AREA
TRAFFIC SIGNALS AT THE INTERSECTION OF THE COMENARRA PARKWAY AND FOX VALLEY ROAD
WAHROONGA
DESIGN LAYOUT
TCS No 1310

EXISTING ☐ PROPOSED ☒
CADD FILE: VV1310_12A.dgn
SCALE 5 0 (1:200) 5 10
FILE 238 TS 265
SUPERSEDES SHEET/ISSUE 4A
ISSUE A
REGN. 7000.238.VV.1310
SHEET 12

$DATES $TIMES $FILES

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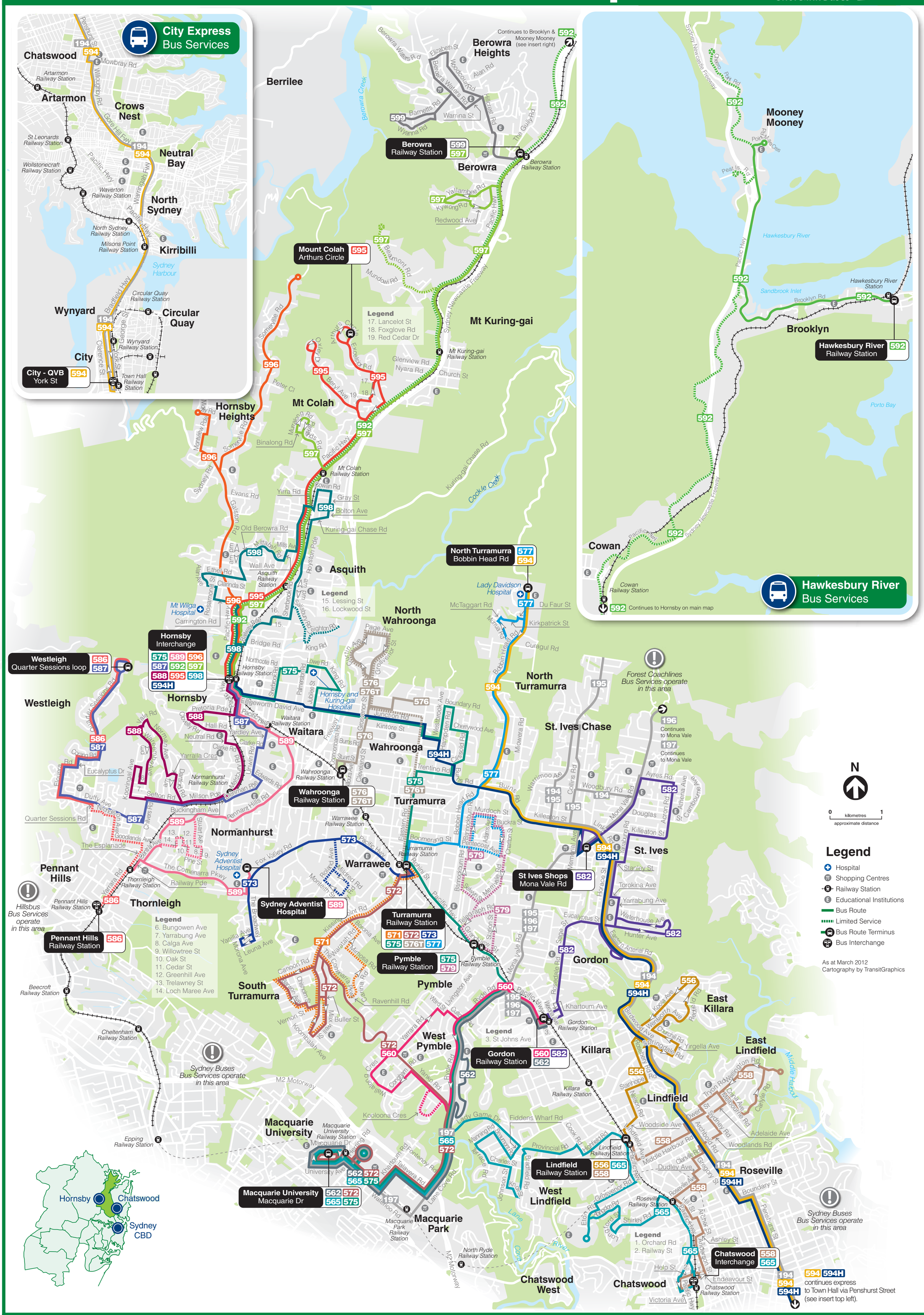
APPENDIX F

BUS SERVICE DETAIL

Bus Network Map

TRANSDEV
Shorelink Buses



www.shorelink.com.au

Monday to Friday

Fox Valley loop

map ref	Monday to Friday	♿			♿	♿	♿		♿	♿	♿	♿
	Route Number	573	573	573	573	573	573	573	573	573	573	573
A	Turramurra Station Rohini Street	05:56	06:11	06:26	06:41	06:56	…	07:30	08:05	08:47	09:50	10:48
B	Warrawee Valley Finlay Road	…	…	…	…	…	…	…	…	…	…	…
C	Roland Avenue & Fox Valley Road	06:02	06:17	06:32	06:48	07:07	07:26	07:36	08:15	08:51	09:54	10:52
D	SAN Sydney Adventist Hospital	06:05	06:20	06:35	06:51	07:10	07:29	07:39	08:18	08:54	09:57	10:55
E	Fox Valley Leuna Avenue	06:09	06:24	06:39	06:55	07:14	07:33	...	...	08:58	10:01	10:59
D	SAN Sydney Adventist Hospital	06:12	06:27	06:42	06:59	07:17	07:36	...	...	09:01	10:04	11:02
C	Roland Avenue & Fox Valley Road	06:15	06:30	06:45	07:02	07:22	07:39	...	...	09:04	10:07	11:05
B	Warrawee Valley Finlay Road	06:18	06:33	06:48	07:05	07:25	07:43	...	...	09:07	...	11:08
A	Turramurra Station Rohini Street	06:28	06:43	06:58	07:17	07:34	07:55	...	...	09:16	10:17	11:17

	Monday to Friday (continued...)	♿	♿	♿		♿	♿		♿	♿		♿
map ref	Route Number	573	573	573	573	573	573	573	573	573	573	573
A	Turramurra Station Rohini Street	11:50	12:42	13:42	14:42	15:44	16:26	16:53	17:24	17:43	18:17	18:39
B	Warrawee Valley Finlay Road	…	12:47	…	14:47	15:51	16:33	17:00	17:31	…	18:24	18:46
C	Roland Avenue & Fox Valley Road	11:54	12:50	13:47	14:50	15:54	16:36	17:03	17:34	17:48	18:27	18:49
D	SAN Sydney Adventist Hospital	11:57	12:53	13:49	14:53	15:57	16:39	17:06	17:37	17:51	18:30	18:52
E	Fox Valley Leuna Avenue	12:01	12:57	13:54	14:57	16:01	16:43	17:10	17:41	17:55	18:34	18:56
D	SAN Sydney Adventist Hospital	12:04	13:00	13:57	15:00	16:05	16:47	17:14	17:45	17:59	18:38	19:00
C	Roland Avenue & Fox Valley Road	12:07	13:03	14:00	15:06	16:08	16:50	17:17	17:48	18:02	18:41	19:03
B	Warrawee Valley Finlay Road	…	...	...	...	...	...	...	...	...	...	...
A	Turramurra Station Rohini Street	12:17	13:13	14:10	15:13	16:18	17:00	17:27	17:58	18:12	18:51	19:13

	Monday to Friday (continued...)			
map ref	Route Number	573	573	573
A	**Turramurra Station** Rohini Street	18:57	19:30	20:12
B	**Warrawee Valley** Finlay Road	…	19:37	20:19
C	Roland Avenue & Fox Valley Road	19:02	19:40	20:22
D	**SAN Sydney Adventist Hospital**	19:05	19:43	20:25
E	**Fox Valley** Leuna Avenue	19:09	19:46	20:28
D	**SAN Sydney Adventist Hospital**	19:13	19:50	20:32
C	Roland Avenue & Fox Valley Road	19:16	19:53	20:35
B	**Warrawee Valley** Finlay Road	…	…	…
A	**Turramurra Station** Rohini Street	19:24	20:03	20:45

	Saturday	♿	♿	♿	♿	♿	♿	♿	♿	♿	♿
map ref	Route Number	573	573	573	573	573	573	573	573	573	573
A	Turramurra Station Rohini Street	08:50	09:50	10:50	11:50	12:50	13:50	14:50	15:50	16:50	17:50
C	Roland Avenue & Fox Valley Road	08:54	09:54	10:54	11:54	12:54	13:54	14:54	15:54	16:54	17:54
D	SAN Sydney Adventist Hospital	08:56	09:56	10:56	11:56	12:56	13:56	14:56	15:56	16:56	17:56
E	Fox Valley Leuna Avenue	08:59	09:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59	17:59
D	SAN Sydney Adventist Hospital	09:02	10:02	11:02	12:02	13:02	14:02	15:02	16:02	17:02	18:02
C	Roland Avenue & Fox Valley Road	09:05	10:05	11:05	12:05	13:05	14:05	15:05	16:05	17:05	18:05
A	Turramurra Station Rohini Street	09:10	10:10	11:10	12:10	13:10	14:10	15:10	16:10	17:10	18:10

Monday to Friday

Hornsby to Sydney Adventist Hospital

map ref	Monday to Friday	♿	♿	♿	♿	♿	♿			♿
	Route Number	589	589	589	589	589	589	589	589	589
A	Hornsby Station Interchange Stand A	06:30	07:30	08:30	12:30	13:30	14:30	15:30	16:30	17:30
B	Normanhurst Boys High School	06:39	07:39	08:39	12:39	13:39	14:39	15:39	16:39	17:39
C	Pennant Hills Road & Stuart Avenue	06:41	07:41	08:41	12:41	13:41	14:41	15:41	16:41	17:41
D	Woodlands Estate Oak Street	...	...	...	12:43	...	...	15:43	...	17:43
E	Thornleigh Station Bellevue St & Railway Pde	06:46	07:46	08:46	12:47	13:46	14:46	15:47	16:46	17:47
F	SAN Sydney Adventist Hospital	06:55	07:55	08:55	12:57	13:55	14:55	15:57	16:55	17:57

	Saturday	♿	♿	♿	♿
map ref	Route Number	589	589	589	589
A	Hornsby Station Interchange Stand A	09:16	11:16	14:26	16:26
B	Normanhurst Boys High School	09:24	11:24	14:34	16:34
C	Pennant Hills Road & Stuart Avenue	09:26	11:26	14:36	16:36
D	Woodlands Estate Oak Street	09:29	11:29	14:39	16:39
E	Thornleigh Station Bellevue St & Railway Pde	09:33	11:33	14:43	16:43

Monday to Friday

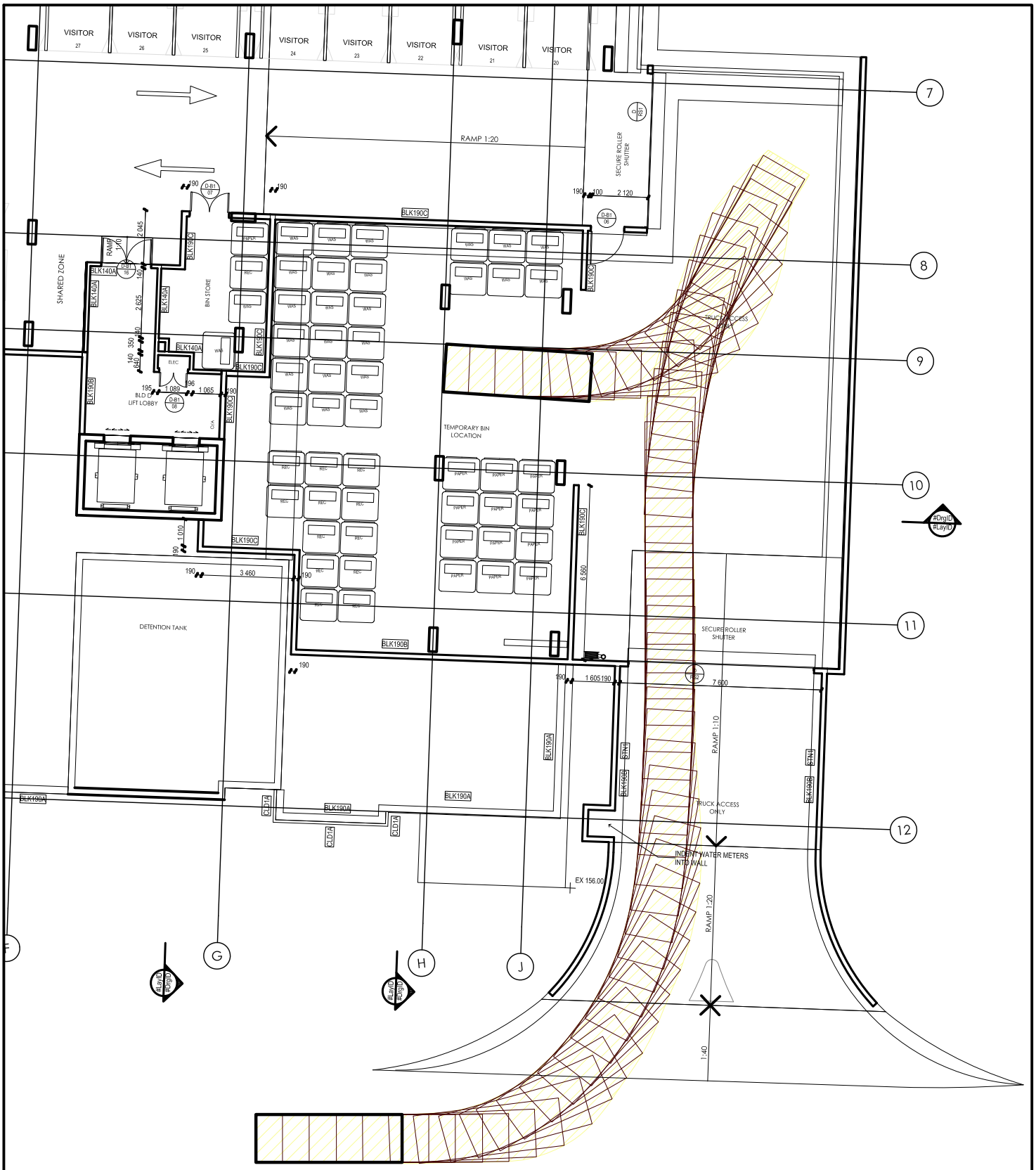
Sydney Adventist Hospital to Hornsby

map ref	Monday to Friday	♿		♿			♿	♿	♿	♿			♿
	Route Number	589	589	589	589	589	589	589	589	589	589	589	589
F	SAN Sydney Adventist Hospital	07:00	...	08:00	...	...	09:00	13:00	14:00	15:00	16:00	17:00	18:00
E	Thornleigh Station Bellevue St & Railway Pde	07:10	07:52	08:10	...	08:31	09:08	13:10	14:10	15:10	16:10	17:10	18:10
D	Woodlands Estate Oak Street	...	07:57	...	...	08:36	09:11	...	...	...	...	...	...
C	Pennant Hills Road & Stuart Avenue	07:14	08:02	...	...	J08:41	09:14	13:14	14:14	15:14	16:14	17:14	18:14
B	Normanhurst Boys High School	07:17	Y08:04	08:17	08:46	J08:49	09:20	13:17	14:17	15:17	16:17	17:17	18:17
A	Hornsby Station Interchange Stand A	07:25	08:17	08:25	08:58	09:06	09:27	13:25	14:25	15:25	16:25	17:25	18:25

	Saturday	♿	♿	♿	♿
map ref	Route Number	589	589	589	589
E	Thornleigh Station Bellevue St & Railway Pde	09:34	11:34	14:44	16:44
D	Woodlands Estate Oak Street	09:38	11:38	14:48	16:48
C	Pennant Hills Road & Stuart Avenue	09:42	11:42	14:52	16:52
B	Normanhurst Boys High School	09:44	11:44	14:54	16:54
A	Hornsby Station Interchange Stand A	09:55	11:55	15:04	17:04

APPENDIX G

TURNING PATH ASSESSMENT



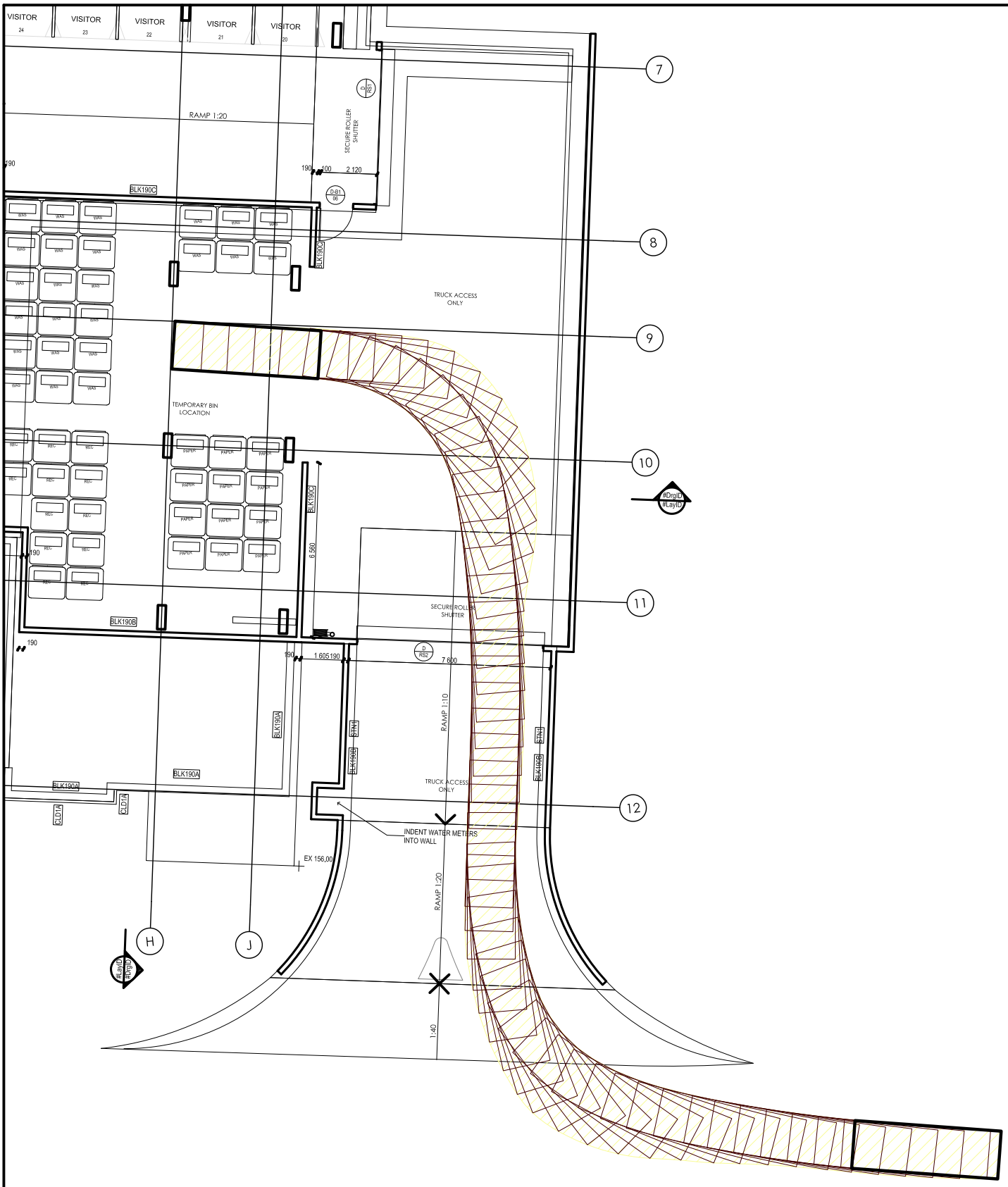
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. 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.

N

SWEPT PATH ANALYSIS OF A KU-RING-GAI REFUSE VEHICLE ENTERING THE SITE

SP 1



LEGEND

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N

SWEPT PATH ANALYSIS OF A KU-RING-GAI REFUSE VEHICLE EXITING THE SITE

SP 2