

**PROPOSED WAHROONGA ADVENTIST
SCHOOL DEVELOPMENT**

FOX VALLEY ROAD, WAHROONGA

***Assessment of Transport, Traffic
and Parking Implications***

February 2015
(Rev H)

Reference 11161

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1. INTRODUCTION

This revised report has been prepared to supplement the State Significant Development (SSD) Application submitted to the Department of Planning and Environment for the proposed Wahroonga Adventist School development (relocated from its existing site nearby) within the 'Wahroonga Estate' on Fox Valley Road at Wahroonga (Figure 1).

The Wahroonga Adventist School (WAS) has operated for many years as an important element of the 'Wahroonga Estate' in providing for the needs of both the Seventh Day Adventist community as well as the broader population. Development of the Wahroonga Estate has been the subject of a Concept Approval (MP07_0166 MOD 5) and the proposed development of the Sydney Adventist Hospital and other elements of the Estate development have been the subject of separate detailed application processes.

The existing WAS, which is being relocated as part of the Estate development, comprises:

235 students (Preparatory to Year 6)

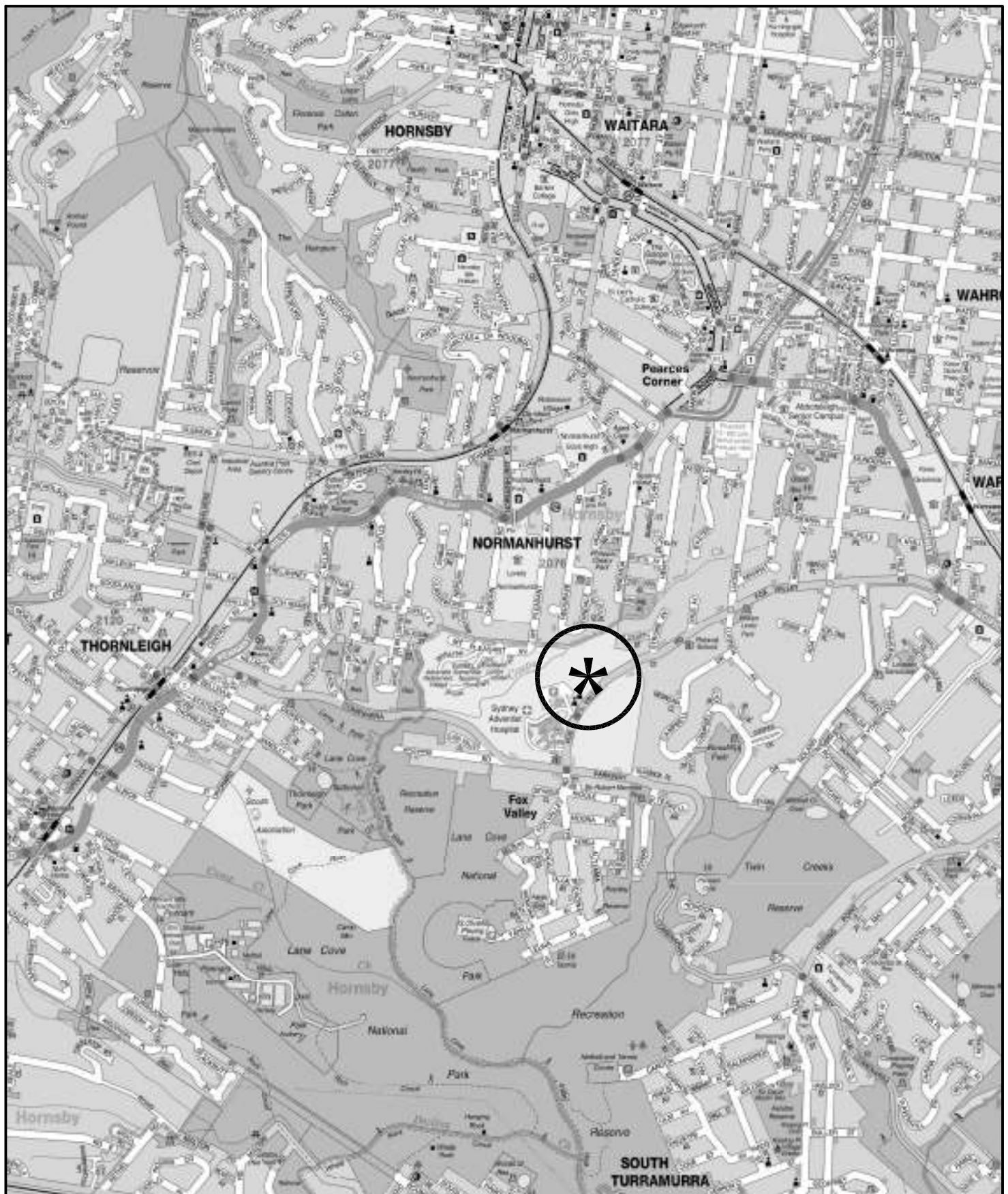
20 staff

The proposed school development is State significant and is planned to occur in stages as follows:

	Stage 1 (Middle School)	Stage 2 (Playing Area)	Stage 3 (Junior School East)	Stage 4 (Courts, Stores & Amenities)	Stage 5 (Junior School west)	Stage 6 (Senior School)	Total
Staff	30	-	18	-	-	9	57
Students	456	-	223	-	-	121	800

The purpose of this report is to:

- * describe the Concept Plan for development of the Wahroonga Estate and the other development processes which are occurring as well as the road network upgrading
- * describe the site and the proposed school development scheme
- * describe the road network serving the site and the prevailing traffic conditions
- * assess the potential traffic implications
- * assess the adequacy of the proposed parking provision
- * assess the suitability of the proposed vehicle access, internal circulation and servicing arrangements
- * respond to issues raised by authorities in response to the submitted application (although it is apparent that some of these responses were made without awareness of the latest submitted Traffic Report Rev E)



LEGEND



LOCATION

FIG 1

2. PROPOSED DEVELOPMENT SCHEME

2.1 SITE, CONTEXT AND EXISTING SCHOOL

The site (Figure 2) comprises 2 separate parcels located in the north eastern part of the large 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 the Estate and the existing school is located on the north western corner of 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 F3 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 of the Estate comprise:

- | | |
|-----------------------------|----------------------|
| * Sydney Adventist Hospital | * student hostel |
| * churches | * lodge and hostel |
| * SDA administration | * aged accommodation |
| * school | |

The existing school site which has vehicle access on Fox Valley Road.

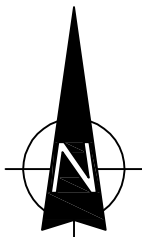
235 Students (Preparatory to Year 6)

20 Staff

The existing site is constrained and will be further impacted by dedication of land for the proposed upgrading of the intersection and widening of Fox Valley Road. Development of the Wahroonga Estate under the Concept Approval has necessitated the recent relocation part of the school into demountable buildings located on the southern part of the new site as a preliminary process.



LEGEND



WAHROONGA ESTATE

FIG 2

2.2 MASTER PLANNING

In the Final Preferred Project Report and Concept Plan, the Concept Approval identify the following elements to occur in the central church precinct:

- 9,000m² Education
- 3,200m² Place of Public Worship

The required road improvement works relative to these elements include:

- * upgrading of the of The Comenarra Parkway/Fox Valley Road and Pacific Highway/Fox Valley Road interections
- * upgrading of the principal hospital access on Fox Valley Road
- * provision of 2 traffic lanes in each direction along section of Fox Valley Road
- * provision of a new access road (for the school and adjacent residential dwellings) connecting to Fox Valley Road with a traffic signal controlled intersection

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 Approval. That report contains a detailed assessment of the traffic generation of all development elements and the proposed development of the relocated school is identified in the Precinct B Concept Plan amendment reproduced overleaf which incorporates the proposed new traffic signal controlled intersection adjacent to the school. An update report** on the sequencing of the road upgrade works was recently prepared as part of the process for finalising the Deed of Agreement with RMS.

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

** *Wahroonga Estate – Update Report on
Sequencing of Road Upgrade Works
GTA Consultants 2013*

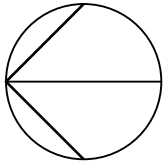


Notes:

- Conceptual building footprints shown on this drawing are by virtue suggestive of what might be able to be achieved on this land.
- Buildings which have not yet been designed for the purposes of development assessment are subject to future detailed design considerations.
- Building footprints on this drawing for future development may be subject to realignment in response to site specific constraints.
- All future building footprints will be in accordance with relevant legislation, environmental planning instruments and design codes, applicable to this land at the time of development assessment.

- Site Boundary
- Watercourses
- Detention Basins
- Existing Vegetation
- Managed Existing Vegetation
- Proposed Tree Planting
- Residential
- Seniors Living
- Educational
- Place of Public Worship
- Mixed Use
- Hospital and Hospital Related
- Commercial
- Existing Building Envelopes

figure 19(B) - the concept plan revised (refer to page 41 of the Final Preferred Project Report & Concept Plan)



5 - updated with approved MOD 4 / intersection amended	26/05/14
4 - driveways and pedestrian paths added	10/04/14
3 - re-issue for Section 75W Modification to the Concept Plan	18/12/13
2 - re-issue for Section 75W Modification to the Concept Plan	29/10/13

amendment **date**
note: all dimensions are to be verified on site and any discrepancies referred to the architect for determination, figured dimensions are to take precedence over scaled dimensions.

wahoonga estate redevelopment
mp 07-0166
sydney adventist church
precinct B concept plan amendment

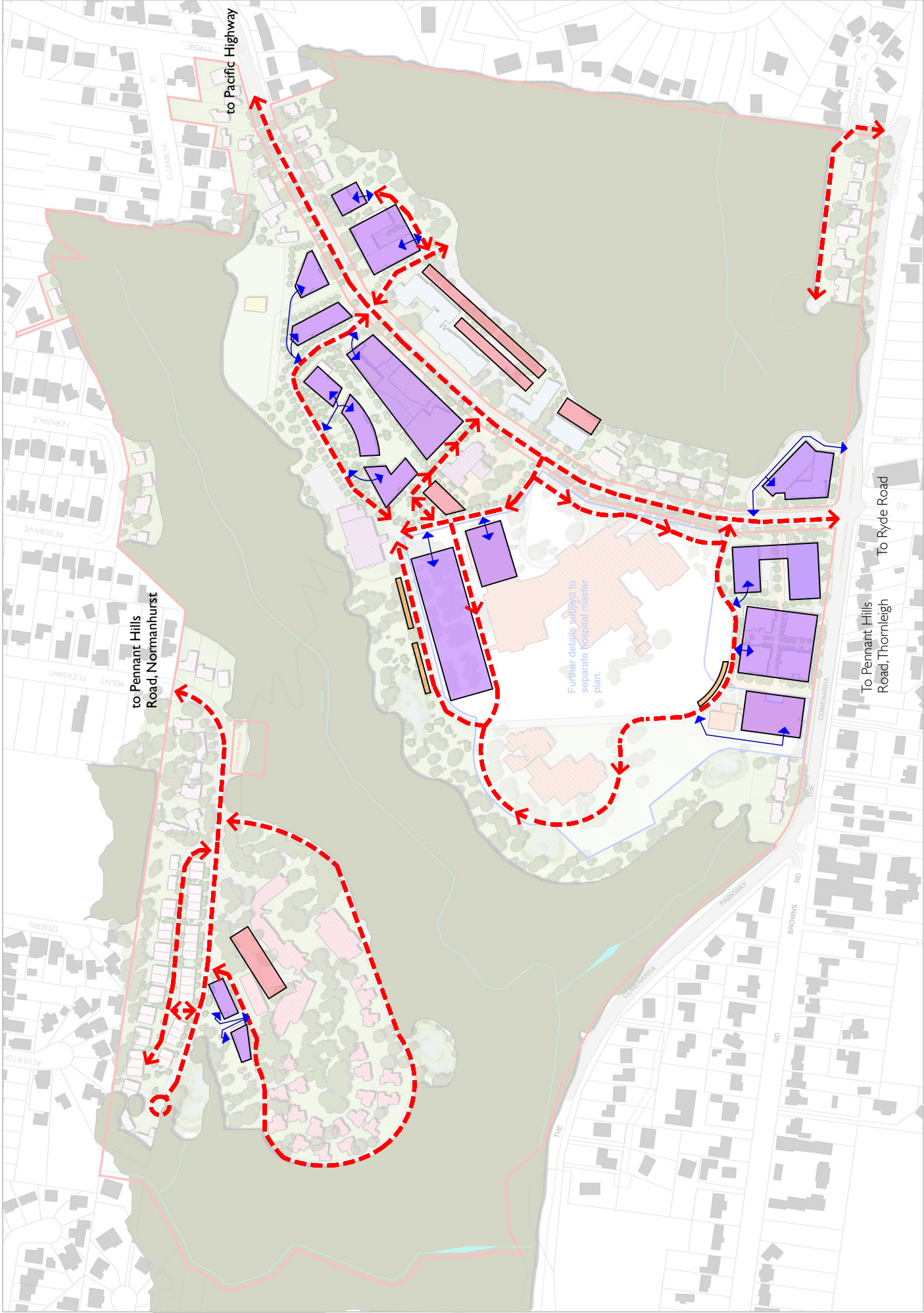
the concept plan

drawn pr
checked dmb
scale nts @ A3
job number dwg.no. / issue & amendment
1318.10 S75WV-01 /5

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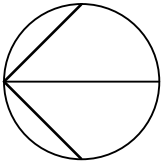




- Vehicular Access
- Subterranean Access
- Existing parking to be retained
- Additional Surface Parking
- Additional Subterranean Parking

* Hospital layout is only indicative and subject to separate hospital master plan

figure 78(A) - vehicular movement revised (refer to page 76 of the Final Preferred Project Report & Concept Plan)



4 - updated with approved MOD 4 / intersection amended	26/05/14
3 - driveways and pedestrian paths added	10/04/14
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1 - re-issue for Section 75W Modification to the Concept Plan	29/10/13
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wahroonga estate redevelopment
mp 07-0166
sydney adventist church
precinct B concept plan amendment

vehicular movement

drawn
checked
scale

pr
dmb
nts @ A3

job number
1318.10

dwg. no. / issue & amendment
S75WV-05 /4



Central Church Precinct

A cluster of residential apartments will take advantage of close links with the hospital, church, surrounding natural landscape and good access to Fox Valley Road.

The precinct has been laid out to achieve high levels of solar access and minimal overshadowing by buildings. A central square gives an address to all the buildings and provides a focal point for the community.

Strong pedestrian linkages to surrounding streets, open space, the church and hospital precinct will help to create an active public realm whilst encouraging walking within the campus.

Vehicle parking will primarily be provided beneath buildings. Some additional at-grade visitor parking and drop-off space will be provided.

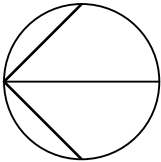
The character and treatment of the street edge along Fox Valley Road is important as it contributes to the approach to the Hospital. Additionally the relationship between the proposed residential flat buildings and the heritage ACA building is also important.

The building envelopes of the buildings along Fox Valley Road have been designed to create spaces between building mass to enable plantings and to break up the built form so to not be as dominating along Fox Valley Road.

Notes:

- Conceptual building footprints shown on this drawing are by virtue suggestive of what might be able to be achieved on this land.
- Buildings which have not yet been designed for the purposes of development assessment are subject to future detailed design considerations.
- Building footprints on this drawing for future development may be subject to realignment in response to site specific constraints.
- All future building footprints will be in accordance with relevant legislation, environmental planning instruments and design codes, applicable to this land at the time of development assessment.

figure 46(A) - precinct B: central church detail revised (refer to page 61 of the Final Preferred Project Report & Concept Plan)



5 - updated with approved MOD 4 / intersection amended	26/05/14
4 - driveways and pedestrian paths added	10/04/14
3 - re-issue for Section 75W Modification to the Concept Plan	18/12/13
2 - re-issue for Section 75W Modification to the Concept Plan	29/10/13
amendment	date

note: all dimensions are to be verified on site and any discrepancies referred to the architect for determination, figured dimensions are to take precedence over scaled dimensions.

wahroonga estate redevelopment
mp 07-0166
sydney adventist church
precinct B concept plan amendment

precinct B: detail
drawn pr
checked dmb
scale 1:2,000 @ A3
job number dwg. no. / issue & amendment
1318.10 S75W-03 /5



2.3 PROPOSED DEVELOPMENT

The initial relocation process has been undertaken with installation of 2 demountable classroom buildings on the southern part of the new site to accommodate some students and staff.

The proposed staged development works for the new educational establishment will comprise:

Stage 1 - Middle School

Excavation of the central part of the site to provide a basement parking and Set down/Pick up (SD/PU) facility. This four level school element will be constructed above the basement and vehicle access will be along the north-west edge of the site with a temporary access road to the future access road.

The existing demountable buildings together with Stage 1 (Preparatory to Year 8) will comprise:

456 Students

30 Teachers

There will be 39 parking spaces and 4 SD/PU spaces (plus queuing area) provided in the basement level.

Stage 2 - Playing Area

This area will be constructed on the western part of the separate Lot 2 located on the northern side of the future access road.

Stage 3 - Junior School (East)

Excavation of the northern part of the site to extend the basement parking and SD/PU area. This three-level school element will be constructed above the basement and vehicle access will comprise connection to portion of the new access road on the northern side of the site connecting to Fox Valley Road.

With the existing demountable buildings, Stages 1, 2 and 3 (Preparatory to Year 12) the school will comprise:

679 Students (60 Year 12)

48 Staff

There will be 77 parking spaces and 4 SD/PU spaces (plus queuing area) provided at the basement level. The proposed new traffic signal controlled intersection on Fox Valley Road is required to be operational prior to the occupation of Stage 3.

Stage 4 – Stores, Amenities and PE Courts

This will involve construction of a new pavilion and playing courts on the eastern parts of the separate Lot 2.

Stage 5 - Junior School (West)

This will involve construction of a new wing to the Junior School with associated outdoor play space.

Stage 6 - Senior School

Removal of the existing demountable buildings and excavation of the southern part of the site to extend the basement parking and SD/PU area. This four level school element will be constructed above the basement accessed through the Stage 3 connection to the new access road. With Stage 6 the school will comprise:

800 Students (90 Year 12)

57 Staff

There will be a total of 124 parking spaces and 7 SD/PU spaces (plus queuing area) provided at the basement level.

Details of the proposed development scheme, including the staging details, are provided on the plans prepared by Stanton Dahl Architects, which are reproduced in part in Appendix A.

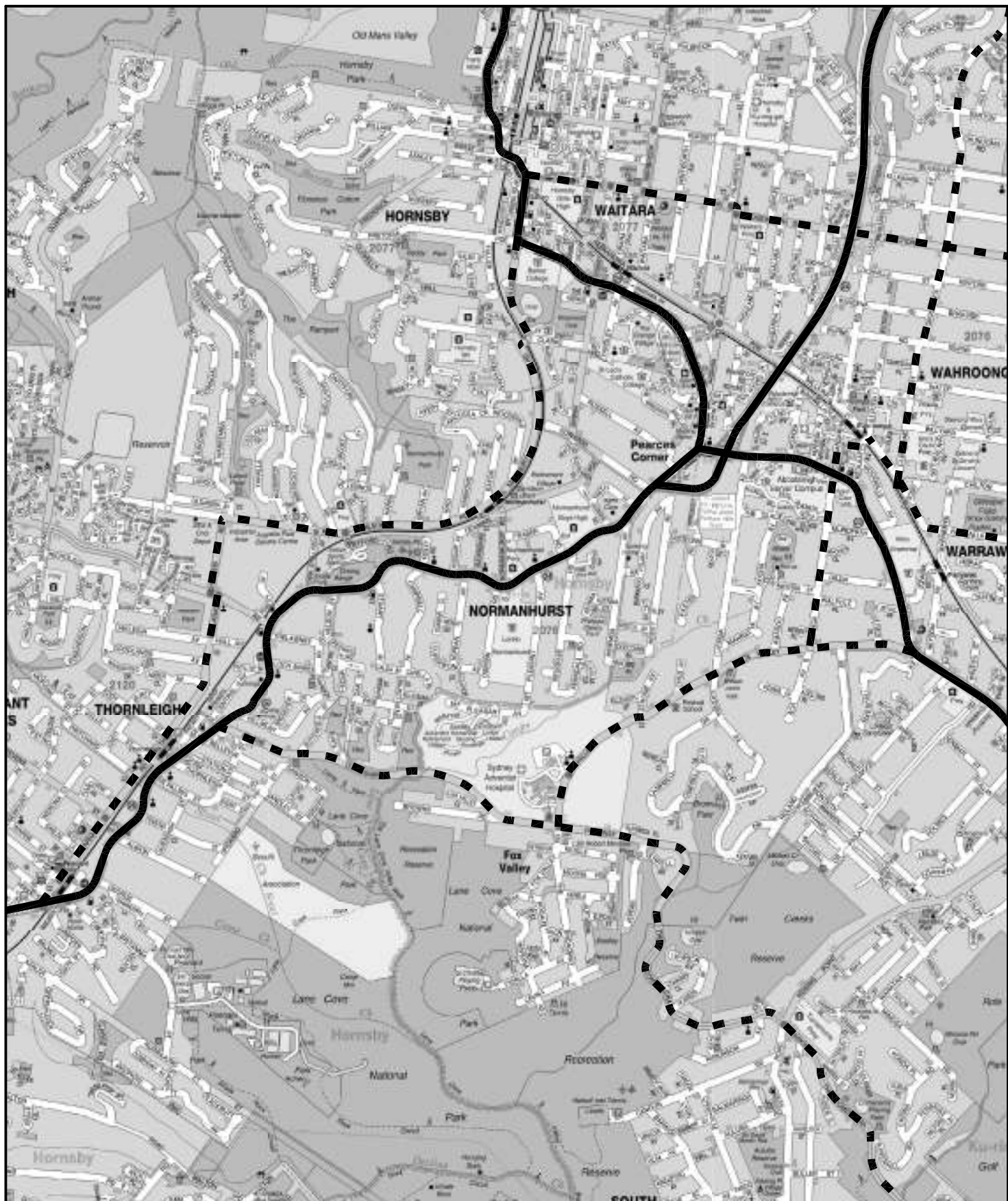
3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The existing road network serving the site (Figure 4) comprises:

- * *F3 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 F3/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.



LEGEND

-  ARTERIAL
-  SUB-ARTERIAL
-  COLLECTOR



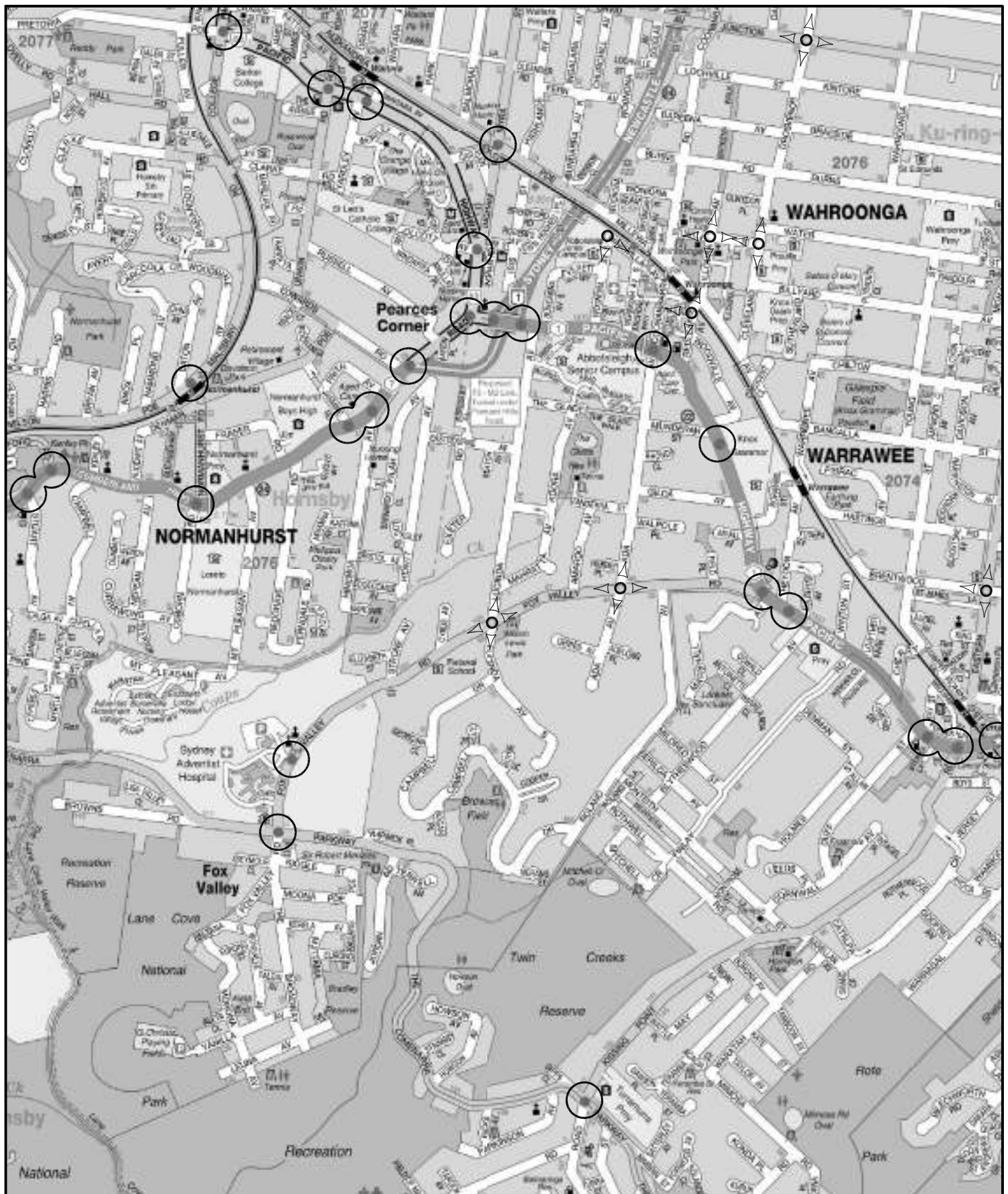
ROAD NETWORK

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 5) include:

- * traffic control signals at the intersection of The Comenarra Parkway and Fox Valley Road
- * traffic signals at the intersection of the Pacific Highway and Fox Valley Road
- * traffic control signals at the intersection of Fox Valley Road and the Hospital Access
- * 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/Coonanbarra Road intersection
- * the traffic signals at the Pacific Highway/F3/Pennant Hills Road complex



LEGEND

- TRAFFIC SIGNAL CONTROL
- ☆ ROUNDBOUT
- ➔ RESTRICTED TURNING MOVEMENT



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:

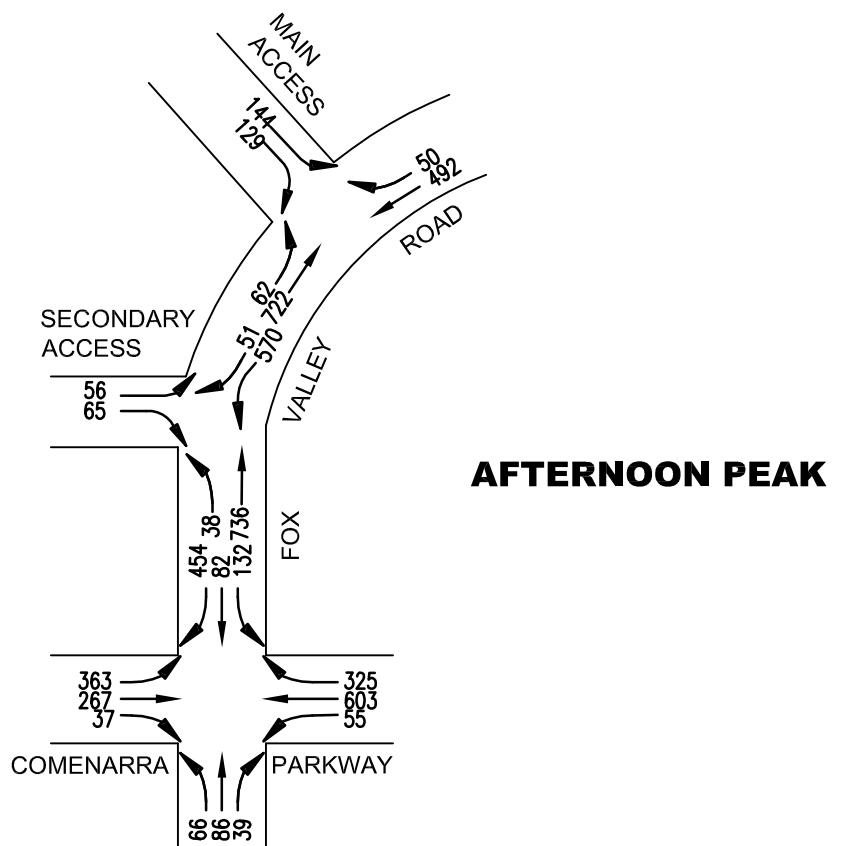
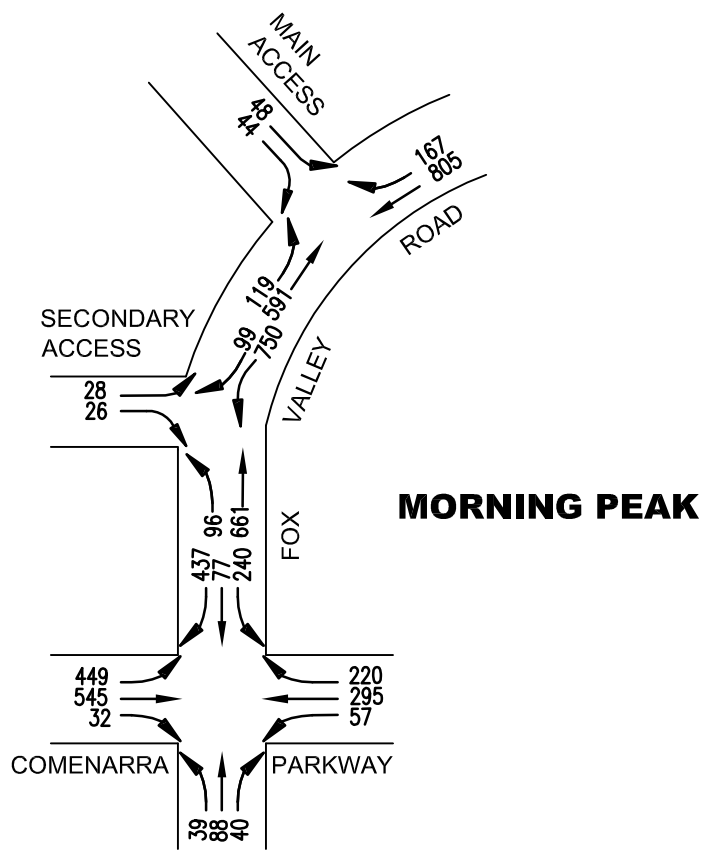
The Comenarra Parkway south of Fox Valley Way	14,137
The Comenarra Parkway north of Fox Valley Way	19,319
Fox Valley Way north of The Comenarra Parkway	16,535

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 on Figure 6. 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 applications.

The operational performance of the existing 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 for the existing circumstances are provided in the following while the criteria for assessing the modelling output are reproduced overleaf.

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

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.



LEGEND



**2012
EXISTING PEAK
TRAFFIC FLOWS**

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 FUTURE CIRCUMSTANCES

This projected total additional traffic generation on completion of the Estate development is as follows:

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

* The recent GTA report revised these projections to 827vtph and 497vtph, however the former represent some sensitivity provision.

The Concept Approval identified the nature and timing of the proposed road/intersection upgrades assessed as necessary to accommodate the projected additional traffic generation. Since that time there have been some design development (particularly in relation to the intersection of The Comenarra Parkway and Fox Valley Road). A 'deed' of agreement has been prepared with RMS in relation to the proposed road improvements and this incorporates the new traffic signal controlled intersection adjacent to the school site prior to the occupation of Stage 3 of the School. Details of the proposed road improvements at these intersections as well as those for the Fox Valley Road/Hospital Access and Pacific Highway/Fox Valley Road intersections are provided in Appendix B.

RMS have acknowledged that the revised upgrade arrangement for The Comenarra Parkway/Fox Valley Road intersection will provide a significantly better operational outcome compared to the arrangement which was assessed under Concept Plan approval and subsequent applications. It is noted that prior to the preparation of the earlier draft 'deed' plans were incorporated at the "last minute" indicating the provision of right turn bays at the hospital access and school access intersections. The basis to these particular plans has never been established nor do they form the basis for any of the traffic assessments undertaken to date. RMS has agreed that the right turn bays are not required and they are not incorporated on the current plans attached to the deed.

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

Transdev TSL-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 C.

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

4. TRAFFIC

A Condition of the Concept Approval for the Wahroonga Estate development required an assessment to be undertaken to establish the required timing of the identified road infrastructure works. That assessment report[♦] identified the projected additional school traffic movements (ie to that of the existing school) as follows:

	AM	PM*
2016	77	-
2017	153	-
2018	230	-
2019	230	-

* school generation occurs prior to on-street peak period

The assessed generation was based on a total of 800 students with completion of the K12 element and it is apparent that:

- * the now proposed school development will be entirely comparable with that assessed for the Concept Plan approval in relation to additional traffic generation except that the staged completions will now anticipated to extend out to 2023
- * the proposed new traffic signal controlled intersection adjacent to the school will facilitate safe and efficient access movements for pedestrians/cyclists and motor vehicles and this is required to be operational prior to the occupation of Stage 3 of the Junior School

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

The operational performance of the proposed access intersection with the completed school and residential elements (along the new access road) has been undertaken using SIDRA. The traffic generation of the existing school is contained within the recently recorded volumes at the access intersections albeit now spread between the existing school and the separate temporary demountable element on the development site.

The traffic generation of the existing school is established by “pro rata” with that of the additional elements as follows:

800 students less 235 students	
565 students	= 230 vtpH
235 students	= 96 vtpH
Total	= 326 vtpH*

** the recent GTA assessment is for a total of 225 vtpH*

The assessed generation for the proposed residential development is 90 vtpH along the new access road element and 37 vtpH for Fox Valley Road element. The projected through movements along Fox Valley Road approaching the intersection (less school and residential generated movements) for 2025 are as follows:

	AM	5 – 6 PM	3 – 4 PM
Northbound	600	900	720 (80%)*
Southbound	1,100	600	480 (80%)*

** a review of traffic survey results indicates that 3-4pm volumes are some 80% of 5-6pm volumes*

The assessed movements at the intersection for 2025 with completed development on the Estate are as follows:

		AM	5 – 6 PM	3 – 4 PM
Fox Valley Rd	NB	600	900	720
	LT	78	40	93
	RT*	-	-	-
	SB	1100	600	480
	RT	100	65	120
	LT	10	20	10
* Right turn prohibited				
Access	EB	5	5	5
	RT	103	25	100
	LT	135	35	78
	WB	5	5	5
	RT	20	10	10
	LT	10	5	5

Assessment of the operational performances of the intersection with these projected peak movements has been undertaken with SIDRA. The results indicating satisfactory performance are provided in Appendix D and summarised in the following:

AM		5 – 6 PM		3 – 4 PM	
LOS	AVD	LOS	AVD	LOS	AVD
B	17.2	B	17.6	B	17.5

It is apparent that:

- * the Comenarra Parkway/Fox Valley Road and Pacific Highway/Fox Valley Road intersections will provide a significant access points and improvements at these intersections as well as the Lucinda Avenue and Ada Avenue intersections are included in the project commitments
- * the Concept Plan and subsequent Halcrow assessment that the traffic generation of the completed school can be satisfactorily accommodated on the upgraded road network remains valid for the proposed school development

5. OTHER TRAVEL MODES

The proposed school will facilitate and encourage other travel modes including:

- * Walking
- * Cycling
- * Motor cycle
- * Public transport

The school will continue to encourage and facilitate car sharing/pooling for staff and parents/carers in the way that these elements are addressed in the Sustainable Transport Initiative Report by GTA Consultants (July 2010) for the Wahroonga Estate development.

Access and circulation for pedestrians and cyclists will be provided for with pedestrian and cycle route provisions as identified in the Final Preferred Project Report and Concept Plan. Provision will be made for 15 bicycle spaces while staff will have locker and shower access.

Pedestrians will have convenient connection to the footways along Fox Valley Road and the proposed new road while there will be some parking provision for motor cycles in the basement level.

Bus stops with shelters will be located on Fox Valley Road for normal route and school special services and the proposed traffic signal controlled intersection will facilitate the crossing movements of pedestrians and cyclists to/from the school.

6. PARKING

Ku-Ring-Gai Councils Car Parking DCP specifies a parking provision in relation to Primary and Secondary Schools as follows:

- 1 space per equivalent full-time employee, plus
- 1 space per 8 Year 12 students plus
- Provision of set down/pick up of students (SD/PU)

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

Stage 1

30 Staff	30 spaces + SD/PU
----------	-------------------

It is proposed to provide 39 spaces and 4 SD/PU spaces plus queuing. 12 car spaces within the SD/PU zone are nominated for restricted parking when SD/PU is not in use.

Stage 3

48 Staff	56 space + SD/PU
----------	------------------

It is proposed to provide 77 spaces and 4 SD/PU spaces plus queuing. 12 car spaces within the SD/PU zone are nominated for restricted parking when SD/PU is not in use.

Stage 6

57 Staff	
90 Year 12 Students	69 space + SD/PU

It is proposed to provide 124 spaces and 7 SD/PU spaces plus queuing. 18 car spaces within the SD/PU zone are nominated for restricted parking when SD/PU is not in use.

It is apparent that the proposed parking provision for each stage will comfortably comply with Council's DCP requirements. The SD/PU facility for students will be located in the basement and will have significant queuing capacity particularly on completion of the Stage 6 works. As such all SD/PU activity will occur on site and parents/carers will be directed to use this facility and not stand on Fox Valley Road or the new access road frontages.

Provision is made for mini bus vehicles to use the SD/PU facility while students will also use the bus service which runs along Fox Valley Road. The occasional use of large buses for school excursions will also be reliant on short term standing within the Fox Valley Road Bus Zone.

7. ACCESS, INTERNAL CIRCULATION AND SERVICING

ACCESS

The Stage 1 access arrangement will involve the temporary connection along the north west edge of the site from the existing temporary car park via the future access road with ingress and egress via the Hospital access road and through the traffic signals on Fox Valley Road. This access arrangement will also provide for light delivery access. There will also be a gated access on Fox Valley Road for light deliveries in a hardstand area in front of the Design and Technology room (access will be prohibited during school arrival/departure hours). For Stage 3, a section of the future new roadway on the northern side of the school building will be constructed with a driveway access for the basement carpark.

This vehicle access which will serve the completed school will have separated ingress and egress driveways complying with the design criteria of AS2890.1 and will have good sight distances available and suitably separated from the Fox Valley Road intersection. The proposed new traffic signal controlled intersection will facilitate the vehicle movements to/from the school via Fox Valley Road.

SAFETY

Application will be made to RMS (in the normal procedure) for installation of a 40kmph School Speed Zone on Fox Valley Road for Stage 1 and this will be extended into the new access road for Stage 3. The application will include a request to remove the restriction at the existing school. Suitable footways will be provided along the Fox Valley Road and new access road frontages with appropriate parking restrictions comprising:

- NO STOPPING on both sides of the new access road
- NO STOPPING and BUS ZONE on the Fox Valley Road frontage

The proposed new traffic signal controlled intersection will enhance the safety of pedestrians, cyclists and motorists travelling to/from the school.

INTERNAL CIRCULATION

The design of the basement carpark area will comply with the requirements of AS2890.1 and AS2890.6 (2 spaces) and the proposed one-way circulation system will ensure efficient vehicle movement with minimum potential conflict.

SERVICING

The minor servicing needs will be accommodated in the basement (using the SD/PU area out of school arrival/departure times) and the hardstand area on the Fox Valley Road frontage which will be limited to small vans (not in school arrival/departure times). Adequate parking will be available in the basement for service personnel and couriers etc.

8. DRAFT CONSTRUCTION TRAFFIC MANAGEMENT PLAN

A draft Construction Traffic Management Plan is provided in Appendix E based on the current awareness of requirements. This plan will be updated with more detail, subsequent to the engagement of a builder, for the Construction Certificate process.

9. ISSUES

A number of traffic and parking related issues have been raised by authorities in response to the application although it is apparent that some of the issues raised reflect an unawareness of the most recently submitted report (Rev E). These issues are responded to in the following:

TRANSPORT FOR NSW (28.11.14)

1. Construction Traffic Management Plan

A draft CTMP was incorporated in the report and it is normal for a Consent Condition to require a detailed CTMP for the Construction Certificate. Precise details for the CTMP can only be documented when a builder has been appointed and there is a greater awareness of proposed methodology, program, process and timing.

However, as indicated in the draft CTMP it is apparent that all work can be undertaken within the site and any external affectation will be limited to the on-street construction elements (eg. footway, driveways etc) which will be subject to preparation and submission for approval of Traffic Control Plans.

2. Sustainable Travel

The GTA report of July 2010 was prepared for the “hospital” development element. It would be expected that a Consent Condition will require a similar assessment for the School including a location specific Sustainable Travel Plan.

It is not apparent what meaning of the statement “*whether the new school will meet the safety requirements for 800 school children*” is when many parents and staff would identify that walking and cycling do not necessarily present the safest way for children to travel to/from school.

3. Access and Parking Design Compliance

Section 7 of the report provides the assessment for design compliance with AS2890.1 and 6. It is also normal for Consent Conditions to require certification of compliance for the Construction Certificate.

4. Other Travel Modes

It is understood that the “end of trip facilities” element of the Austroads Guidelines is derived from guidelines published in The Netherlands.

It is proposed to make facilitating provision for pedestrian and cyclists movements within the Estate as documented in the GTA report. However, responsibilities external to the Estate lie with Council and/or RMS. Councils Bicycle Plan indicates that future “on-road” bicycle lanes are proposed for Fox Valley Road and The Comenarra Parkway routes. However, it is not apparent:

- * how the road space will be achieved
- * whether the topography (ie the Comenarra Parkway) is appropriate

Council's Bike Plan identifies a projected cost range of \$25 – 30,000 for establishing the bike lanes along Fox Valley Road and The Commenara Parkway (Pacific Highway to Pennant Hills Road). However this is quite unrealistic when section/s of the route are relatively narrow and will require roadwidening works to enable allocation of bike lanes.

It is also apparent that if the on-road bike lanes are not physically separated from vehicles they would not provide appropriate safety for young school children. There is a vast difference between having a dedicated/separated off-road bicycle network (ie. The Netherlands) to having a potential on-road non-segregated facility so far as school children use is concerned. It is inevitable that virtually all parents (except for those living within the Estate) would be extremely reluctant to have their children cycle to/from school in the absence appropriate and safe network facilities.

If and when these facilities are made available by Council and/or RMS, it will be a simple matter to increase the availability of bicycle parking in the school. It is also relevant that Note 3 in the Austroads schedule indicates that it is appropriate to “*only make an initial 50% provision until demand is realised*”.

5. Set-down/Pick-up Facility and Bus Services

These provisions are already addressed in the report and are enunciated further in relation to Council's response.

ROADS AND MARITIME SERVICES (5.12.14)

1. Construction Traffic Management Plan

It is anticipated that Consent Conditions will require a detailed Construction Traffic Management Plan to be submitted for approval. The suggested duration of the curfew periods for trucks could be unnecessarily onerous particularly the 2pm starting time.

2. School Zone Provision

The comments appear to be errant in some respects for the established procedures. Schools are not responsible for installing or maintaining School Zone facilities nor do they propose where traffic management/control facilities are to be located (or exist). RMS is responsible for determining, approving, installing and maintaining School Zone facilities (at their cost) while Council is responsible for detail determination, approval, installation and maintenance of on-street parking restrictions and traffic facilities (non classified roads). RMS Australia Standard Supplements Circular 1.3 specifies that Councils Traffic Committee is responsible for approving any School Crossing.

The school will make application to RMS in respect of School Zones specifying:

- the staging/timing issues (ie the new access road)
- the need to remove at the existing School Zone

RMS will inspect the site and make arrangements for the appropriate installation and removal.

The other items raised are purely generic and will no doubt be incorporated into Consent Conditions.

KU-RING-GAI COUNCIL (5.12.14)

Key Issue – Front Boundary

This is addressed in Section 3.4 of the report.

Safety and Security

The proposed arrangements in the basement parking and SD/PU facility are further explained in the following:

“the layout requires SD/PU users to traverse the full extent of the carpark”

This is not correct. The central parking spaces which cars accessing the SD/PU will traverse past will be designated for teacher/staff use only and therefore will not be accessed in the SD/PU periods. The other spaces in the northern and southern areas (ie not traversed) will be allocated for Year 12 students, visitors and the supplementary queuing/waiting use. The only area in the basement which students will be permitted to access is the SD/PU footway area. Students will be strictly forbidden from walking to/from cars parked or queued in the basement. Parents/carers will be strictly forbidden from setting down or picking up students other than in the basement SD/PU facility.

Staff will be deployed to supervise and control movements in the basement area and the proposal presents a far superior outcome to reliance on an on-street SD/PU facility and complies with the DCP requirement for on-site SD/PU.

Landscape Comment – Widening of Fox Valley Road

Refer to Section 3.4 of report

Road Improvements and Staging

RMS (see comment in submission letter) has agreed with the Deed stipulation for provision of the traffic signals in Stage 3 and RMS is solely responsible for matters concerning traffic signals (ie. not Council). The existing signal controlled pedestrian crossings at the hospital access which are located only a short distance to the south will provide for pedestrians requiring to cross Fox Valley Road in the Stage 1 period.

Parking

This is confusing, the 1st paragraph requests justification to the quantum of parking proposed while the 2nd paragraph suggests that it is insufficient. Council's requirement for staff and Year 12 students is satisfied and the DCP also specifies that:

- where an auditorium (or similar) is proposed, additional parking is required
- provision is to be made on-site for SD/PU

The proposal entirely reflects these requirements.

Space No. 12 will reverse in and egress to the left out and the lift will not present any constraint on these movements while the “access area” for spaces 56 and 57 will comply with AS2890.6.

Public Transport

The travel mode for the existing school is not relevant particularly as it only caters for Preparatory to Year 6. The school will negotiate with the service provider to provide additional bus capacity however the service provider will only respond to this when the school expansion is in place.

Appropriate footway and bus shelter provisions will be made while provision of a BUS ZONE on the eastern side will be subject to Council and service provider approval. It is incorrect to state that the Deed of Agreement requires widening along Fox Valley Road between the Pacific Highway and the hospital entrance.

Pedestrian and Bicycle Facilities

As indicated in the preceding it would be appropriate for a Consent Condition to be established in relation to Sustainable Travel to supplement the GTA assessment for the Hospital. Council's Bike Plan (P13) states that DCP43 recommends bicycle parking for students at a rate of 2% of the car parking provided. This could be interpreted (as it is specified in other LGA codes) to mean the equivalent of 2 car spaces would equate to 2.5 spaces with 12 bike spaces per car space (i.e. total of 30 spaces). Alternatively if the Austroads 50% initial provision is applied to Council's identified quantum this would also equate to 30 spaces.

Management Plans

It would be appropriate for establish Consent Conditions in relation to any required detail management plans.

DEPARTMENTAL OF PLANNING AND ENVIRONMENT

Traffic, Transport and Access

5. Work Place Travel Plan and Transport Access Guide

It would be expected that Consent Conditions would require submission of these documents for the Construction Certificate process in the normal manner.

6. There are two options to the circumstance of students crossing to/from the playing fields.

Option 1: Install a Children's Crossing. The circumstance would comply with the RMS Guidelines however, approval to this facility would be required from Council's Traffic Committee. If a children's crossing is approved the road could be narrowed to only provide 1 lane each way with the appropriate parking restrictions.

Option 2: Require students to cross the access road at the Fox Valley Road intersection traffic signals.

7. It is proposed to provide a 3.5m wide (full width) paved footway along the entire school frontage. This proposal would enable Council to approve a designated "Shared Path" and for bicycle lanterns to be incorporated with the pedestrian lanterns at the intersection signals. There will be trees, light poles and parking sign stems along the back of the kerb however, this will maintain a minimum 2.5m clear path with appropriate set back from the travel lane. The school frontage boundary will be fenced and gated.

8. The issue of bicycle parking is responded to in the forgoing. Importantly the site does not and is unlikely to ever have connections to a segregated bicycle network suitable for use by school children. The road system (particularly the Comenarra Parkway is also not conducive to cycling and it is highly unlikely that parents or staff will take the responsibility to encourage young children to cycle to/from school in these circumstances.

If agreement is necessary in relation to the quantum of bicycle spaces to be provided, it would be suggested that Council's 60 spaces be relied on with the Austroads proviso of 50% initial with area identified for 100% (ie provide 30 spaces) which also equates to Council's DCP43 criteria.

9. The Traffic Report now provides an operational performance assessment for the Fox Valley Road/School Access intersection indicating a quite satisfactory outcome with completed Estate development. The potential impact on the other intersections has been addressed in the preceding studies and the "operation of the new intersection" will have no impact whatsoever on the performance of existing intersections in the surrounding road network.

The projected traffic generation of the school has been incorporated into the previous assessment of the operational performance of the Fox Valley Road/The Comenarra Parkway intersection. The staging, timing and design of the intersection upgrade are established in the Deed of Agreement.

10. CONCLUSION

The proposed new Wahroonga Adventist School will replace the existing nearby facility with a Preparatory to Year 12 capacity as envisaged in the Concept Plan for development of the Wahroonga Estate.

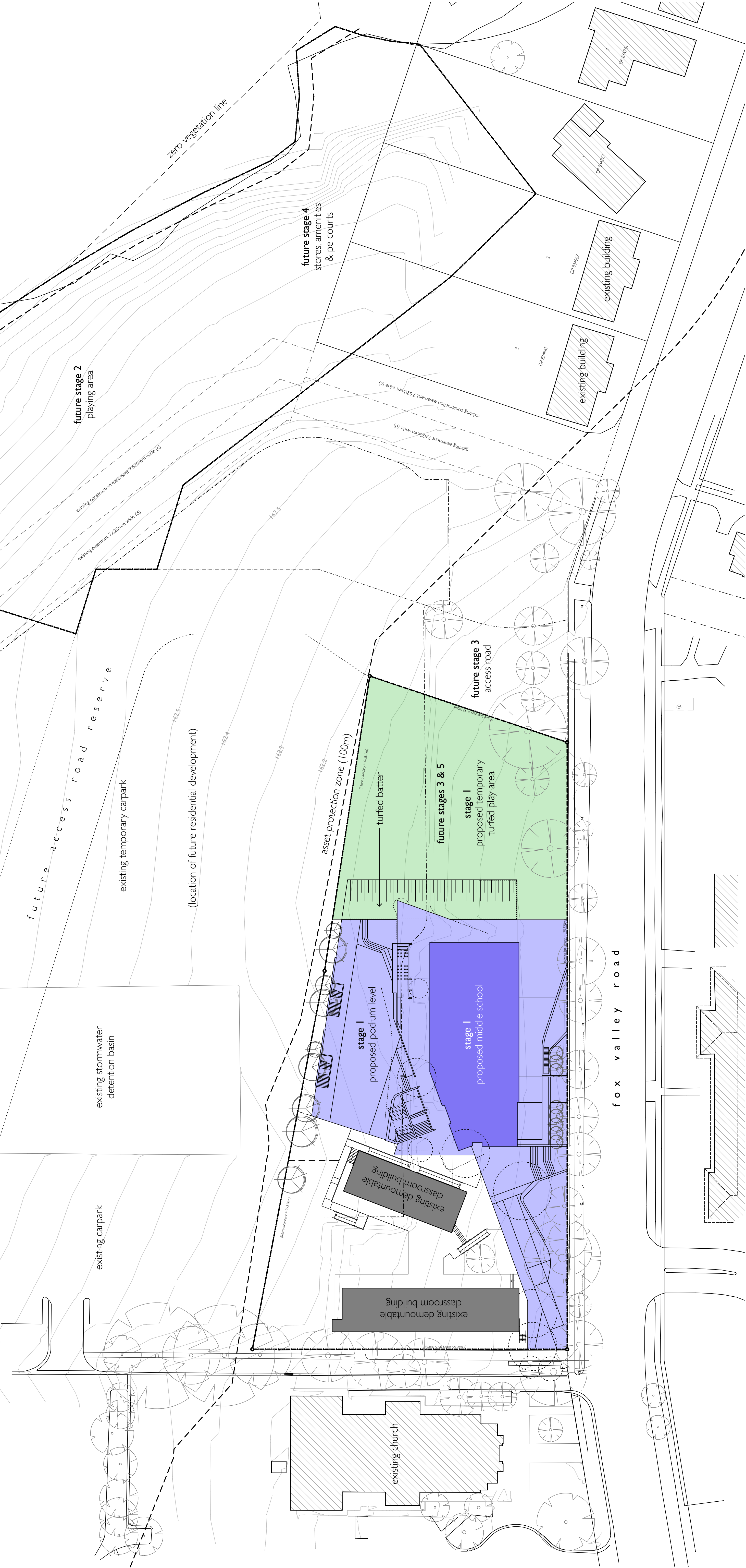
Assessment of the proposed development scheme and the authorities responses has concluded that:

- the proposal is consistent with Concept Plan
- there will not be any adverse traffic implications
- the proposed parking provision will be suitable and appropriate
- the proposed vehicle access, internal circulation and servicing arrangements including SD/PU facility will be satisfactory
- the issues raised by the authorities have been suitably satisfied and responded to

APPENDIX A

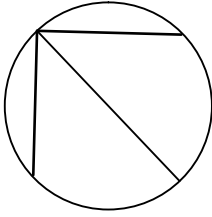
DEVELOPMENT PLANS

stage 1 - prep to year 8							
projected student and staff numbers							
	existing	stage 1	stage 2	stage 3	stage 4	stage 5	stage 6
total							
students	235	221					456
year 12 students (incl. in above)	nil	nil					nil
staff	20	10					30

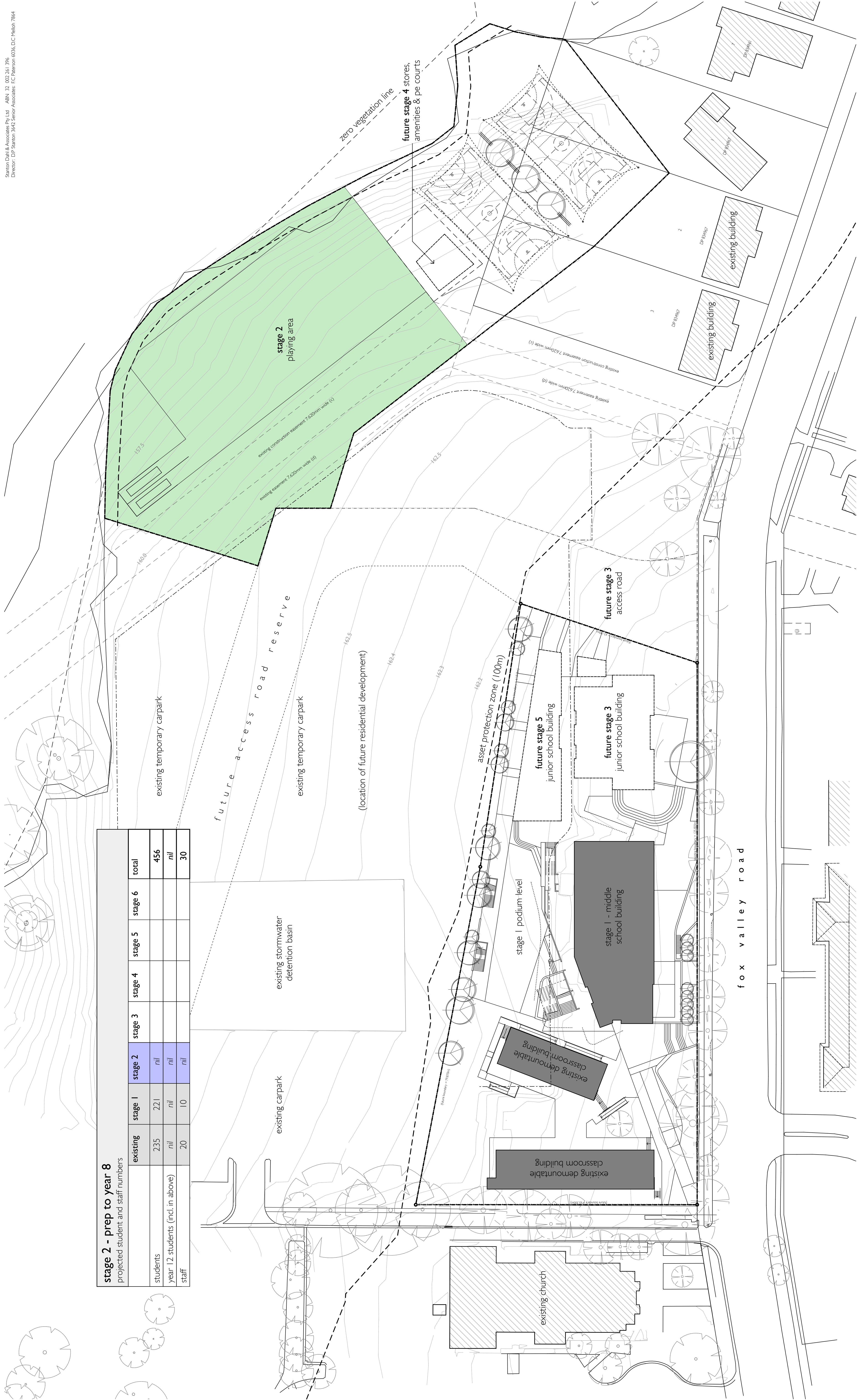


amendment		date
3 - staging revised / re-issue for state significant development application	06/02/15	
2 - re-issue for state significant development application	05/12/13	
1 - issue for state significant development application	27/03/13	
drawn		mc
checked		dmb
plot date		10/02/15
scale		1:400 @ A1

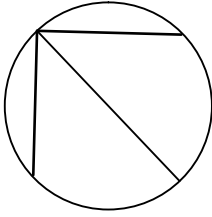
note: all dimensions are to be verified on site and any discrepancies referred to the architect for determination. figured dimensions are to take precedence over scaled dimensions.



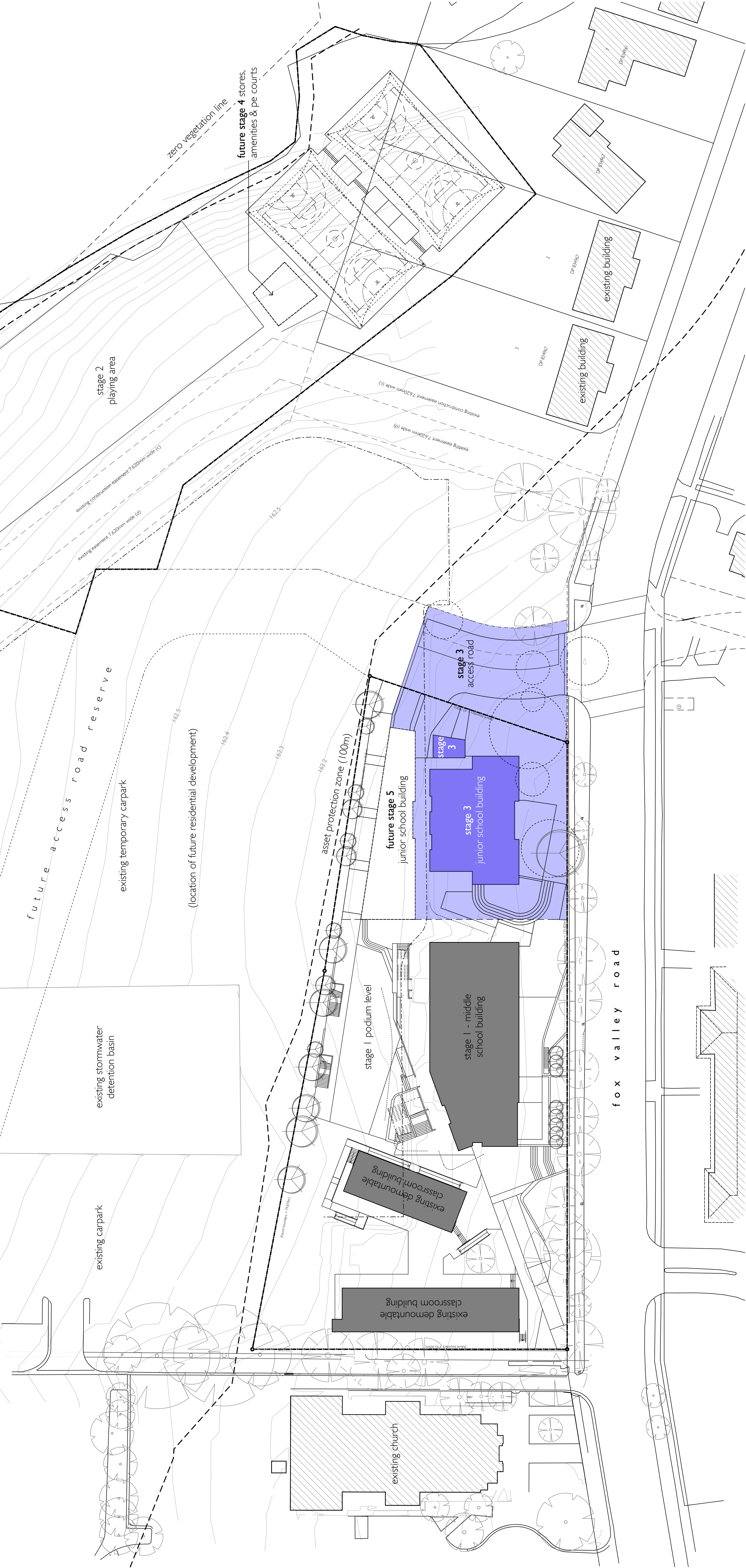
stage 2 - prep to year 8							
projected student and staff numbers							
	existing	stage 1	stage 2	stage 3	stage 4	stage 5	stage 6
total							
students	235	221	nil				456
year 12 students (incl. in above)	nil	nil	nil				nil
staff	20	10	nil				30



amendment		date
3 - staging revised / re-issue for state significant development application	06/02/15	
2 - re-issue for state significant development application	05/12/13	
1 - issue for state significant development application	27/03/13	
note: all dimensions are to be verified on site and any discrepancies referred to the architect for determination. figured dimensions are to take precedence over scaled dimensions.		

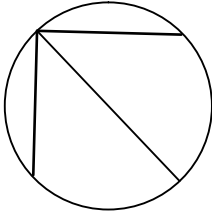


stage 3 - prep to year 12								
projected student and staff numbers								
	existing	stage 1	stage 2	stage 3	stage 4	stage 5	stage 6	total
students	235	221	nil	223				679
year 12 students (incl.in above)	nil	nil	nil	(60)				(60)
staff	20	10	nil	18				48

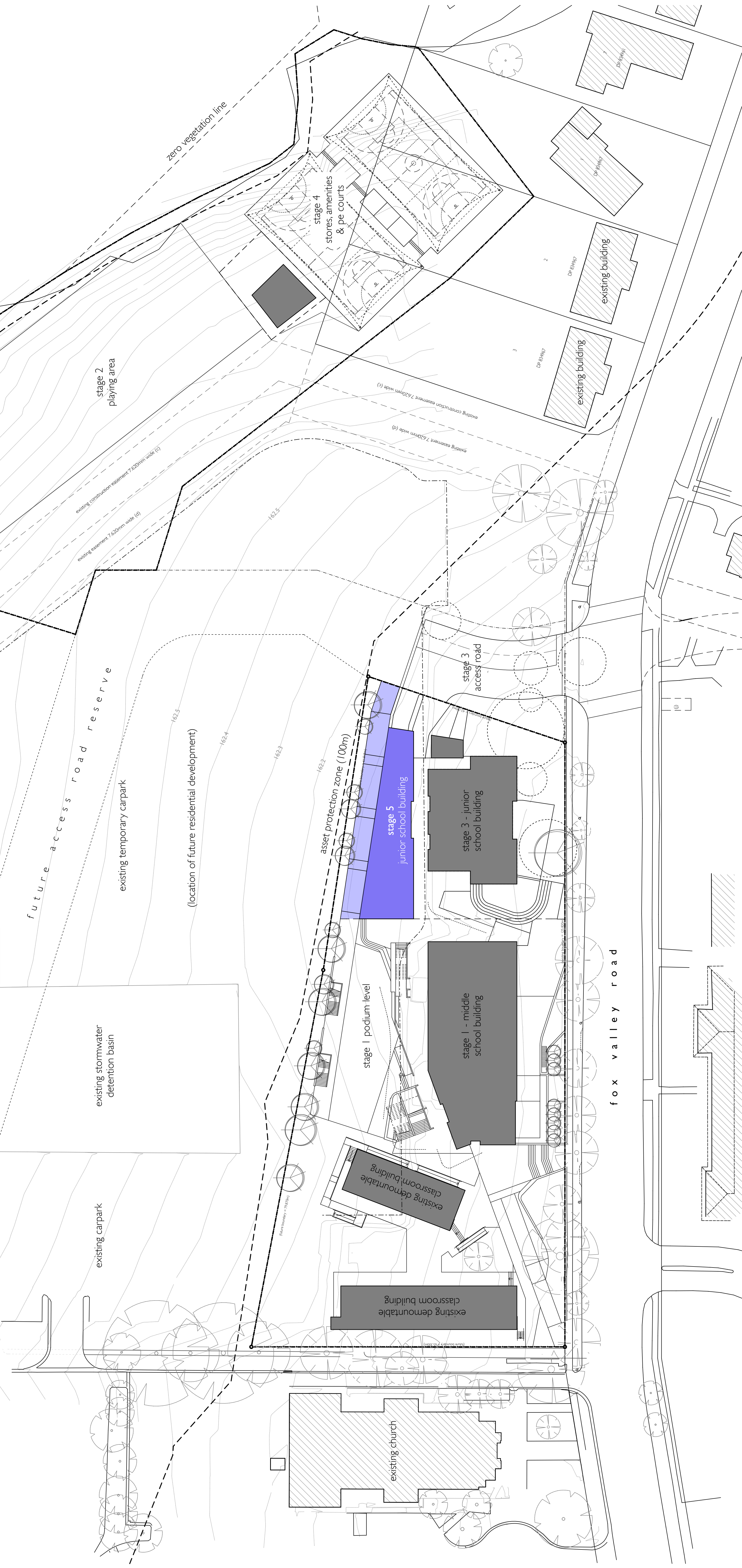


amendment		date
3 - staging revised / re-issue for state significant development application	06/02/15	
2 - re-issue for state significant development application	05/12/13	
1 - issue for state significant development application	27/03/13	
drawn		mc
checked		dmb
plot date		10/02/15
scale		1:400 @ A1

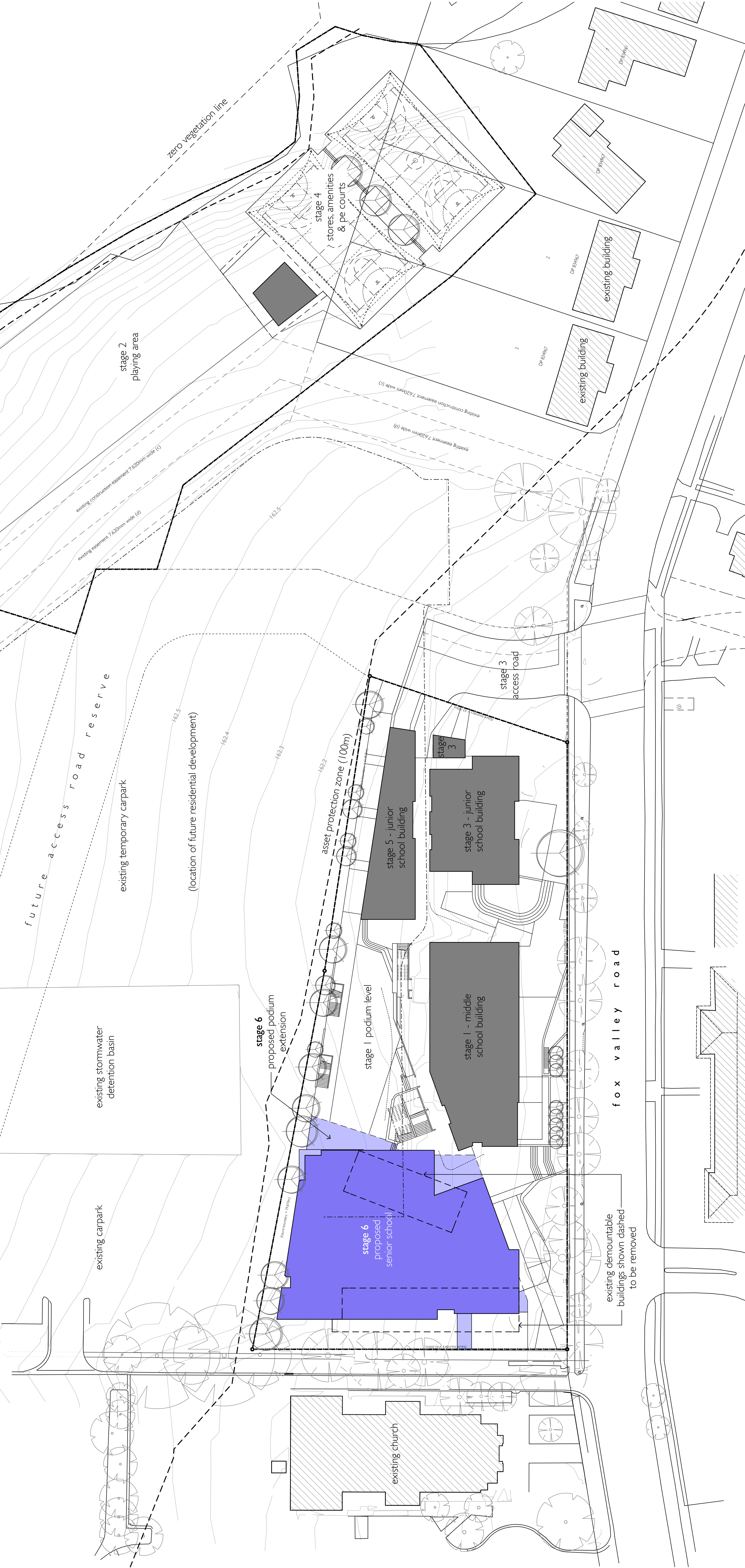
note: all dimensions are to be verified on site and any discrepancies referred to the architect for determination. figured dimensions are to take precedence over scaled dimensions.

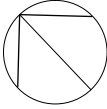


stage 5 - prep to year 12							
projected student and staff numbers							
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students	235	221	nil	223	nil	nil	
year 12 students (incl. in above)	nil	nil	nil	(60)	nil	nil	
staff	20	10	nil	18	nil	nil	
							total
							679
							(60)
							48



stage 6 - prep to year 12								
projected student and staff numbers								
	existing	stage 1	stage 2	stage 3	stage 4	stage 5	stage 6	total
students	235	221	nil	223	nil	nil	121	800
year 12 students (incl.in above)	nil	nil	nil	(60)	nil	nil	(30)	(90)
staff	20	10	nil	18	nil	nil	9	57



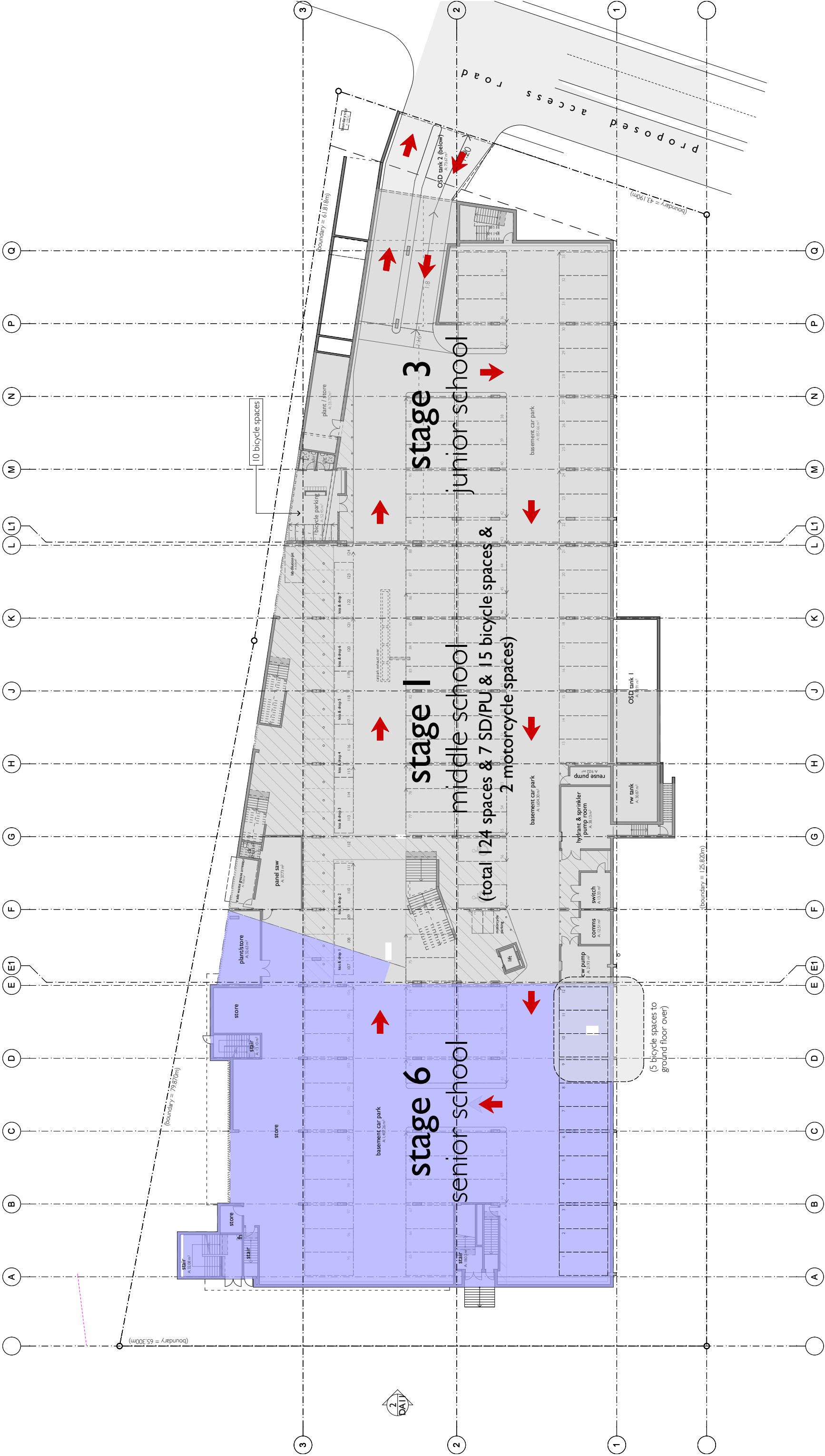


drawn
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scale
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date
06/02/15
05/12/13
02/08/13

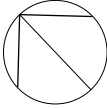
note: all dimensions are to be verified on site and any discrepancies referred to the architect
for determination. figured dimensions are to take precedence over scaled dimensions.

stage I



stanton dahl architects

wairoonga adventist school
for
fox valley road, wairoonga
seventh day adventist,
greater sydney conference
basement car park access - stage 6
job number
1318.11
dwg no. / issue & amendment
SK306/3



drawn jpk
checked se/db
date 11/02/15
scale 1:200 @ A1

amendment	date
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2 - re-issue for state significant development application	05/12/13
1 - issue for state significant development application	02/08/13

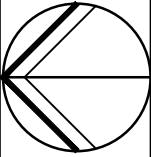
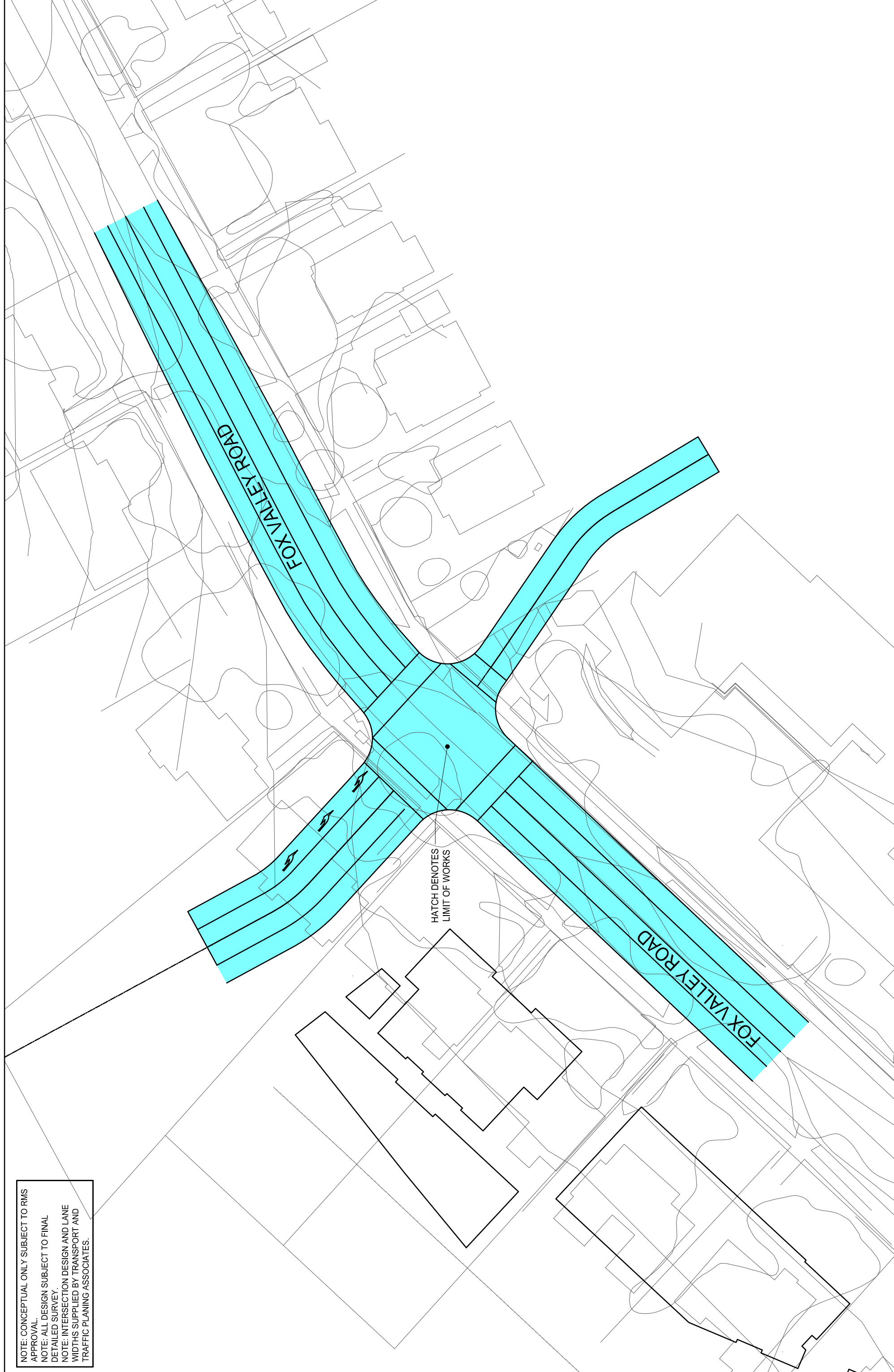
note: all dimensions are to be verified on site and any discrepancies referred to the architect for determination. figured dimensions are to take precedence over scaled dimensions.

stage 6

APPENDIX B

FUTURE INTERSECTION PLANS

NOTE: CONCEPTUAL ONLY SUBJECT TO RMS
APPROVAL.
NOTE: ALL DESIGN SUBJECT TO FINAL
DETAILED SURVEY.
NOTE: INTERSECTION DESIGN AND LANE
WIDTHS SUPPLIED BY TRANSPORT AND
TRAFFIC PLANNING ASSOCIATES.

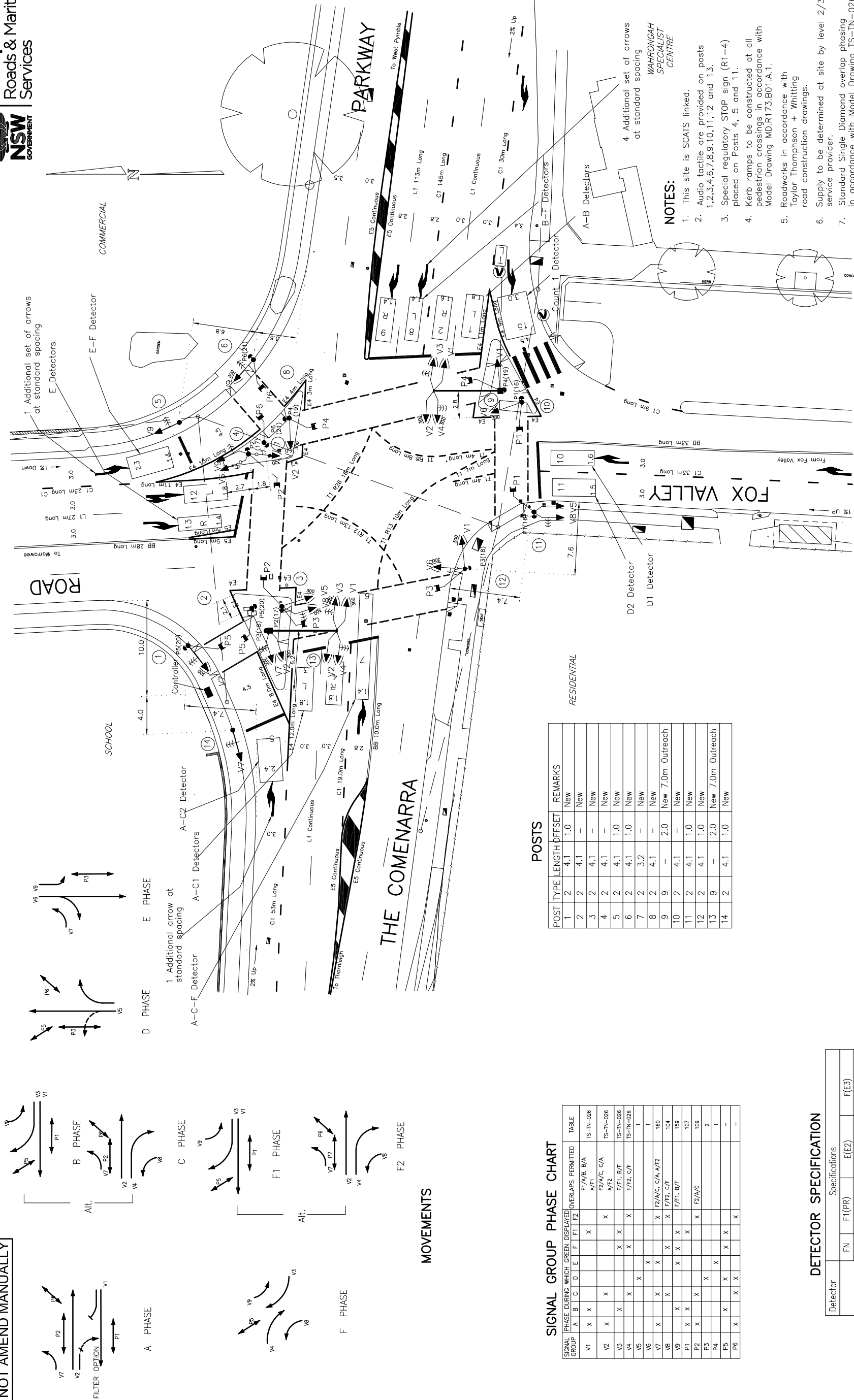


PROJECT
**WAHROONGA ESTATE
EXTERNAL ROAD WORKS**

DWG TITLE

**ULTIMATE OPTION
SHEET 7**

JOB NUMBER	DWG NUMBER	REVISION
09112	SK2.07	B
DRAWING SHEET SIZE = A3		



SIGNAL GROUP PHASE CHART									
SIGNAL GROUP	PHASE DURING GREEN DISPLAY					OVERLAPS PERMITTED		TABLE	
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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	F1/F, B/F	TS-TN-026
V4			X			X		F/F2, C/F	TS-TN-026
V5					X				1
V6					X				1
V7	X		X		X		X	F2/A/C, A/F2	160
V8		X		X		X	X	F/F2, C/F	104
V9		X			X	X		F/F1, B/F	159
P1	X	X				X	X		107
P2	X		X				X	F2/A/C	109
F3				X					2
P4					X				1
P5		X			X				—
P6	X		X	X		X	X		—

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7	2	3.2	—	New
8	2	4.1	—	New
9	9	—	2.0	New 7.0m Outreach
10	2	4.1	—	New
11	2	4.1	1.0	New
12	2	4.1	1.0	New
13	9	—	2.0	New 7.0m Outreach
14	2	4.1	1.0	New

DETECTOR SPECIFICATION				
Detector	Specifications			
	FN	F1(PR)	E(E2)	F(E3)
E - F	SG/PS	v ₉	E	F
	DS	B.E	RED NEXT	RED NEXT

A ORIGINAL ISSUE																																																																																									
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TELECOM PIT		TS-TN-050	DESIGNED RW	SITE CHECKED		POSITION DATE		REGN. 7000.238.VV.1310 SHEET ?																																																																																	
ELECT LIGHT POLE		TS-TN-021	PED. MOVEMENT OP																																																																																						
POWER POLE				SURVEYOR : N/A DATE :		TCS No 1310		DESIGN LAYOUT WAHROONGA																																																																																	
STAY POLE																																																																																									
TELEPHONE BOX				RECOMMENDED		RW		?																																																																																	
TELECOM PILLAR																																																																																									

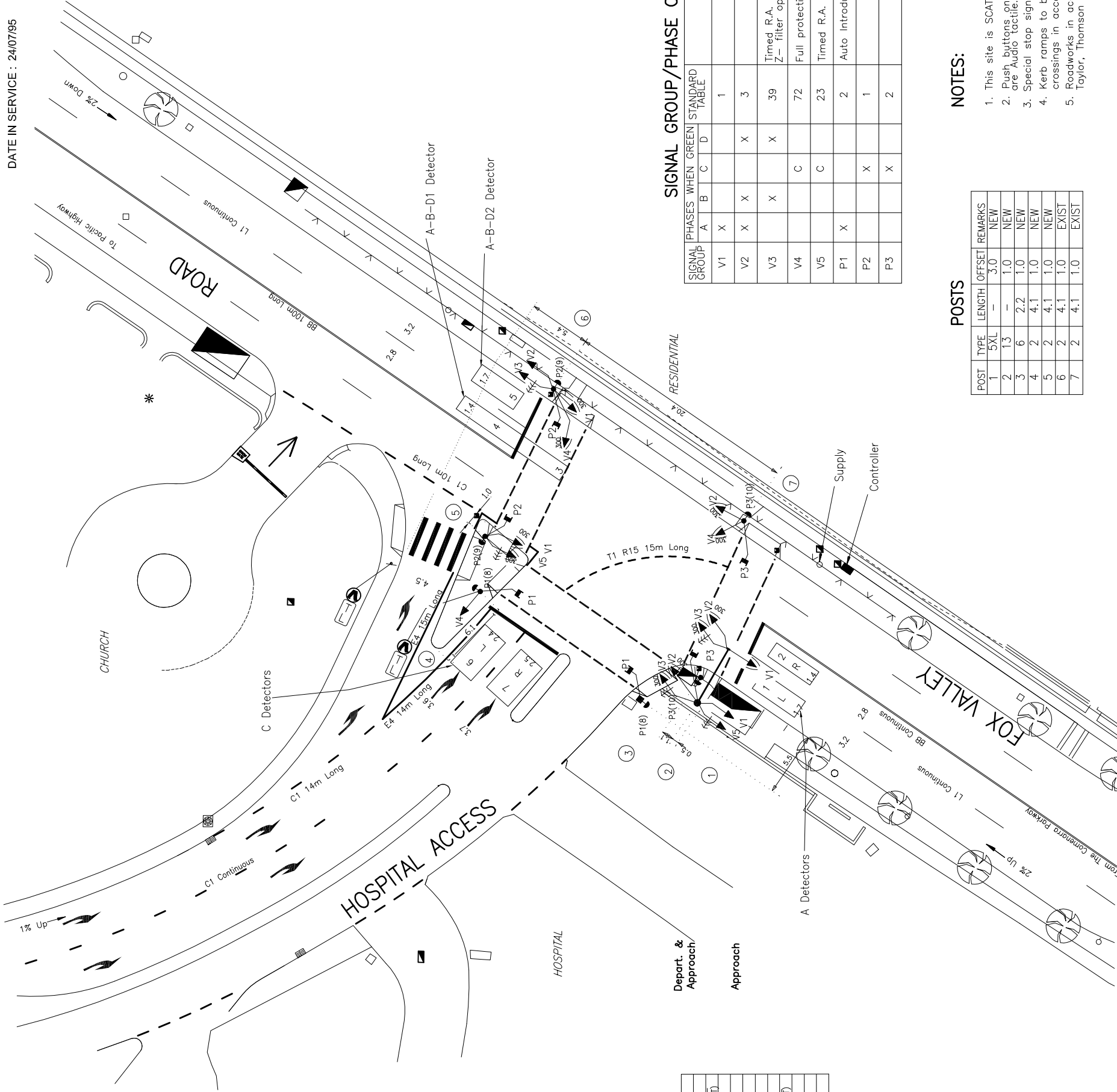
DRAWN BY CADD
DO NOT AMEND MANUALLY

7000.238.VV.3210

DATE IN SERVICE : 24/07/95



Transport
Roads & Maritime
Services



DETECTOR SPECIFICATION

DETECTOR	SPECIFICATION		
	FN	A(L)	A(E1)
A	SG	A	A
DS	—	—	—
FN	B(PR)	D(PR)	B(E1)
SG	A	A	B
DS	—	Z+	A(NEXT)
FN	A(L)B(L)	D(L)	A(E2)
SG	V2	V2	A(E2)
DS	—	Z+	A
FN	B(E2)	B	A-B-D1(PR)B(NEXT)D(NEXT)
SG	A(NEXT)D(NEXT)	A(NEXT)B(NEXT)	D(E2)
DS	A(L)	A(E3)	A(NEXT)B(NEXT)
FN	V3	A	B(E3)
SG	—	B(NEXT)D(NEXT)	A(NEXT)D(NEXT)
DS	D(E3)	D	B
FN	A(NEXT)B(NEXT)	C(L)	C(E1)
SG	C(L)	C	—
DS	—	—	—
FN	A(PR)	C(L)	A(L)
SG	P1(WALK)	A.P1(WALK)	B.C.D
DS	—	—	—
FN	C(PR)	A(L)	—
SG	P2(WALK)	C.P2(WALK)	A.B.D
DS	—	—	—
FN	C(PR)	A(L)	—
SG	P3(WALK)	C.P3(WALK)	A.B.D
DS	—	—	—

SIGNAL GROUP/PHASE CHART

SIGNAL GROUP	PHASES WHEN GREEN				REMARKS
	A	B	C	D	
V1	X			1	
V2	X	X		3	
V3		X		X	Timed R.A. protection for 'P1' ped. Z- filter option.
V4			C		72 Full protection during P3 Walk & Clearance
V5			C		23 Timed R.A. protection for 'P1' ped.
P1		X		2	Auto introduction subject to XSF1
P2			X	1	
P3			X	2	

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	5XL	—	3.0	NEW
2	13	—	1.0	NEW
3	6	2.2	1.0	NEW
4	2	4.1	1.0	NEW
5	2	4.1	1.0	NEW
6	2	4.1	1.0	EXIST
7	2	4.1	1.0	EXIST

NOTES:

1. This site is SCATS linked.
2. Push buttons on posts 2, 3, 4, 5, 6 and 7 are Audio tactile.
3. Special stop sign (R1-4) to be placed on posts 3 & 4.
4. Kerb ramps to be constructed at all marked foot crossings in accordance with Drawing MD.R173.B01.A1.
5. Roadworks in accordance with Taylor, Thomson and Whiting construction drawings.

A ORIGINAL ISSUE

ROADS AND MARITIME SERVICES
KU RING GAI COUNCIL AREA
TRAFFIC SIGNALS AT INTERSECTION OF
FOX VALLEY ROAD AND
SYDNEY ADVENTIST HOSPITAL ACCESS

RMS ACCEPTANCE
RECOMMENDED
POSITION
DATE

DESIGN APPROVAL
APPROVED
B. NETTLE
DIRECTOR
POSITION
DATE

U.B.D. Ref. MAP 153 H14
S.G. E: 309 182
CO-ORDS N: 1285 671
DESIGNED CT
CHECKED JS

REFERENCE PLANS
SYMBOLS/ABBS. V000348
STD POSIT V000145
PRES DETECT V000517
VEH GROUP OP TS-N409
DET LOGIC OP TS-N420
PED MOVEMENT OP TS-N421

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

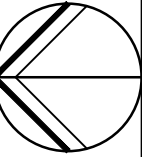
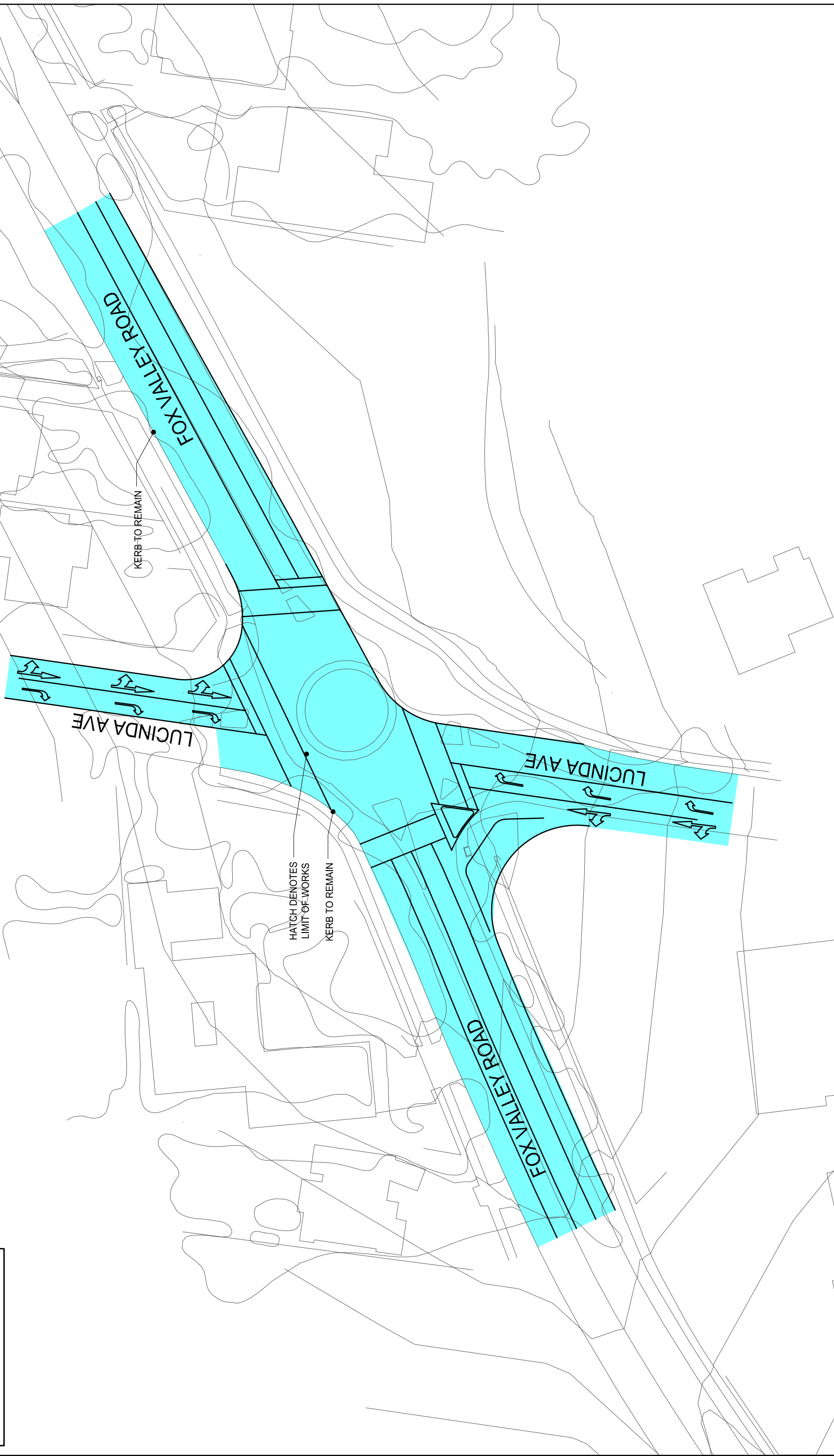
DATE : 2011
SURVEYOR: TTW
SITE CHECKED
RECOMMENDED

DESIGN PREPARED BY
Transport and Traffic Planning
Association

DESIGN LAYOUT
WAHROONGA
TCS No. 3210

REGN. 7000.238.VV.3210
SHEET 4

NOTE: CONCEPTUAL ONLY SUBJECT TO RMS
APPROVAL.
NOTE: ALL DESIGN SUBJECT TO FINAL
DETAILED SURVEY
NOTE: INTERSECTION DESIGN AND LANE
WIDTHS SUPPLIED BY TRANSPORT AND
TRAFFIC PLANNING ASSOCIATES.



PROJECT

WAHROONGA ESTATE
EXTERNAL ROAD WORKS

DWG TITLE

ULTIMATE OPTION
SHEET 8

JOB NUMBER

09112

DWG NUMBER

SK2.08

REVISION

B

DRAWING SHEET SIZE = A3

This site plan illustrates the proposed construction limits for the ADA Ave and Fox Valley Road intersection. The project area is highlighted in light blue. The plan shows ADA Ave running horizontally across the center, with Fox Valley Road intersecting it from the top and bottom. The intersection area, including the roundabout, is shaded in light blue. The roadways are labeled 'ADA AVE' and 'FOX VALLEY ROAD'. A legend indicates that the 'HATCH DENOTES LIMIT OF WORKS'. The plan also shows existing roadways, including a road labeled 'FOX VALLEY ROAD' at the top, and various property lines and building footprints. Arrows indicate traffic flow on the roads. A north arrow is located in the upper right corner of the plan.



NORTHROP
Bringing people, ideas & engineering together

WAHROONGA ESTATE EXTERNAL ROAD WORKS

**ULTIMATE OPTION
SHEET 9**

JOB NUMBER

DWG NUMBER

REVISION

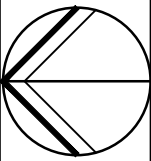
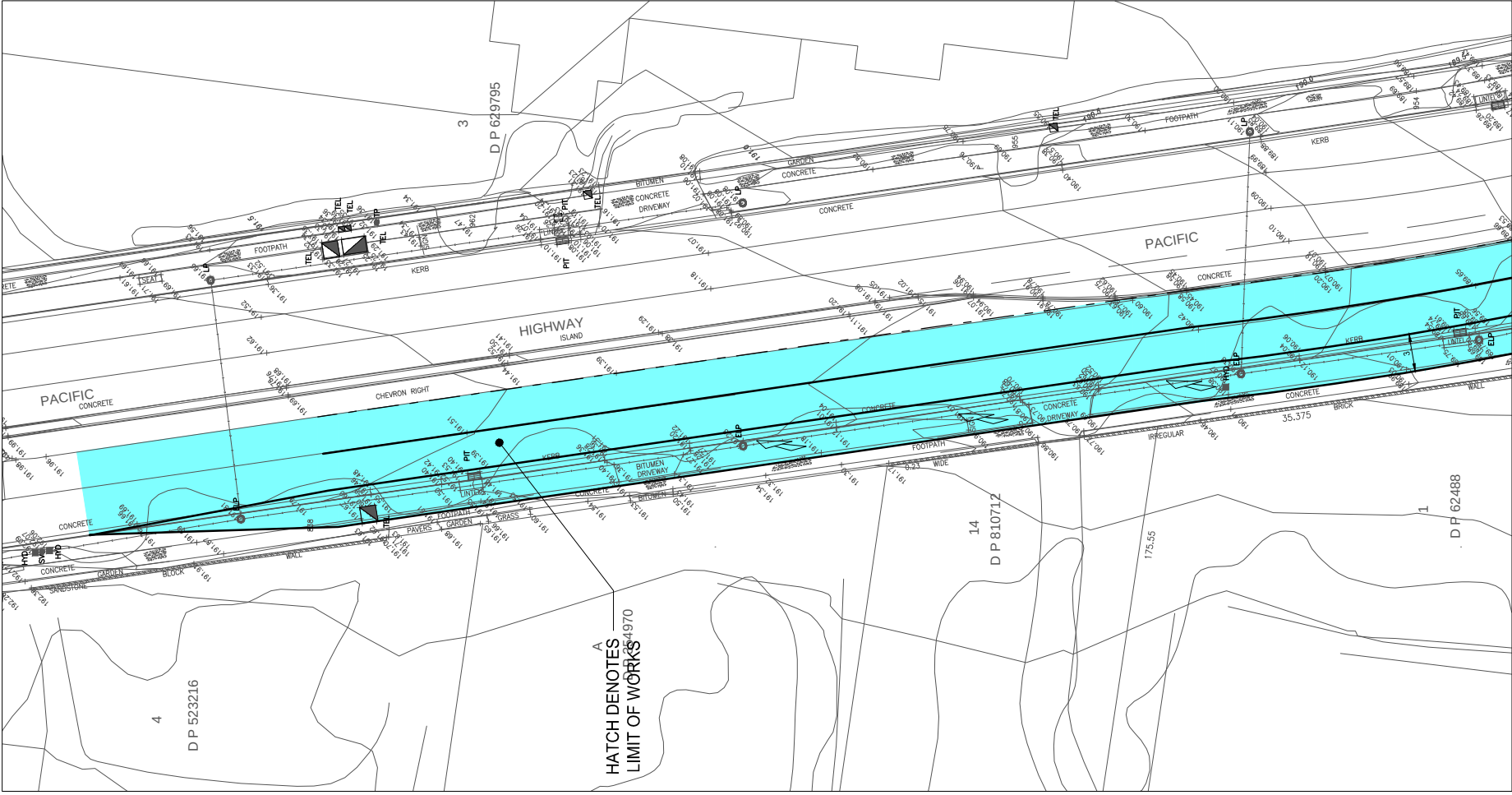
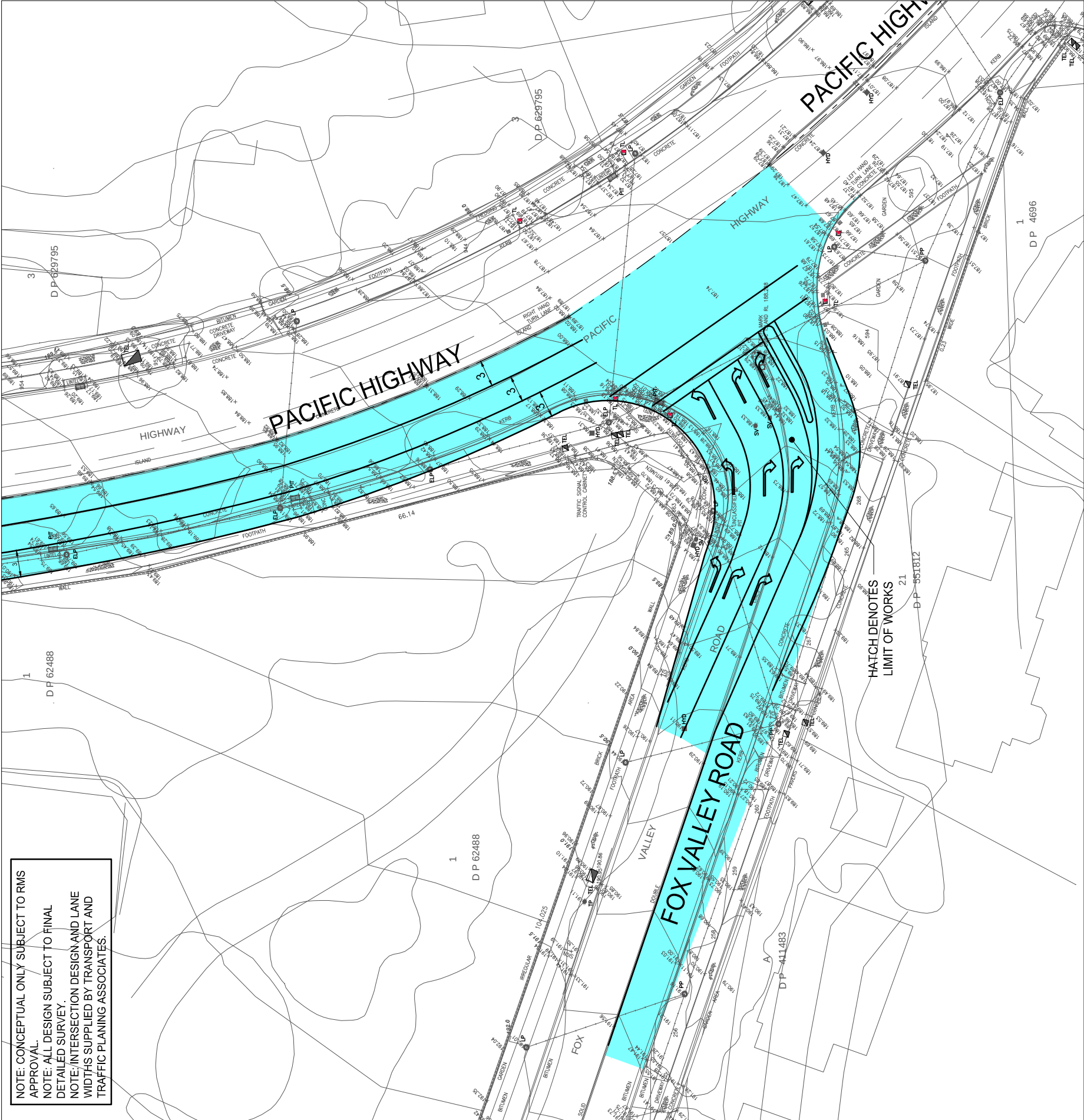
09112

SK2.09

B

DRAWING SHEET SIZE = A3

NOTE: CONCEPTUAL ONLY SUBJECT TO RMS
APPROVAL
NOTE: ALL DESIGN SUBJECT TO FINAL
DETAILED SURVEY.
NOTE: INTERSECTION DESIGN AND LANE
WIDTHS SUPPLIED BY TRANSPORT AND
TRAFFIC PLANNING ASSOCIATES.



PROJECT
**WAHROONGA ESTATE
EXTERNAL ROAD WORKS**

DWG TITLE

**ULTIMATE OPTION
SHEET 10**

JOB NUMBER

09112 SK2.10 B

DWG NUMBER

REVISION

DRAWING SHEET SIZE = A3

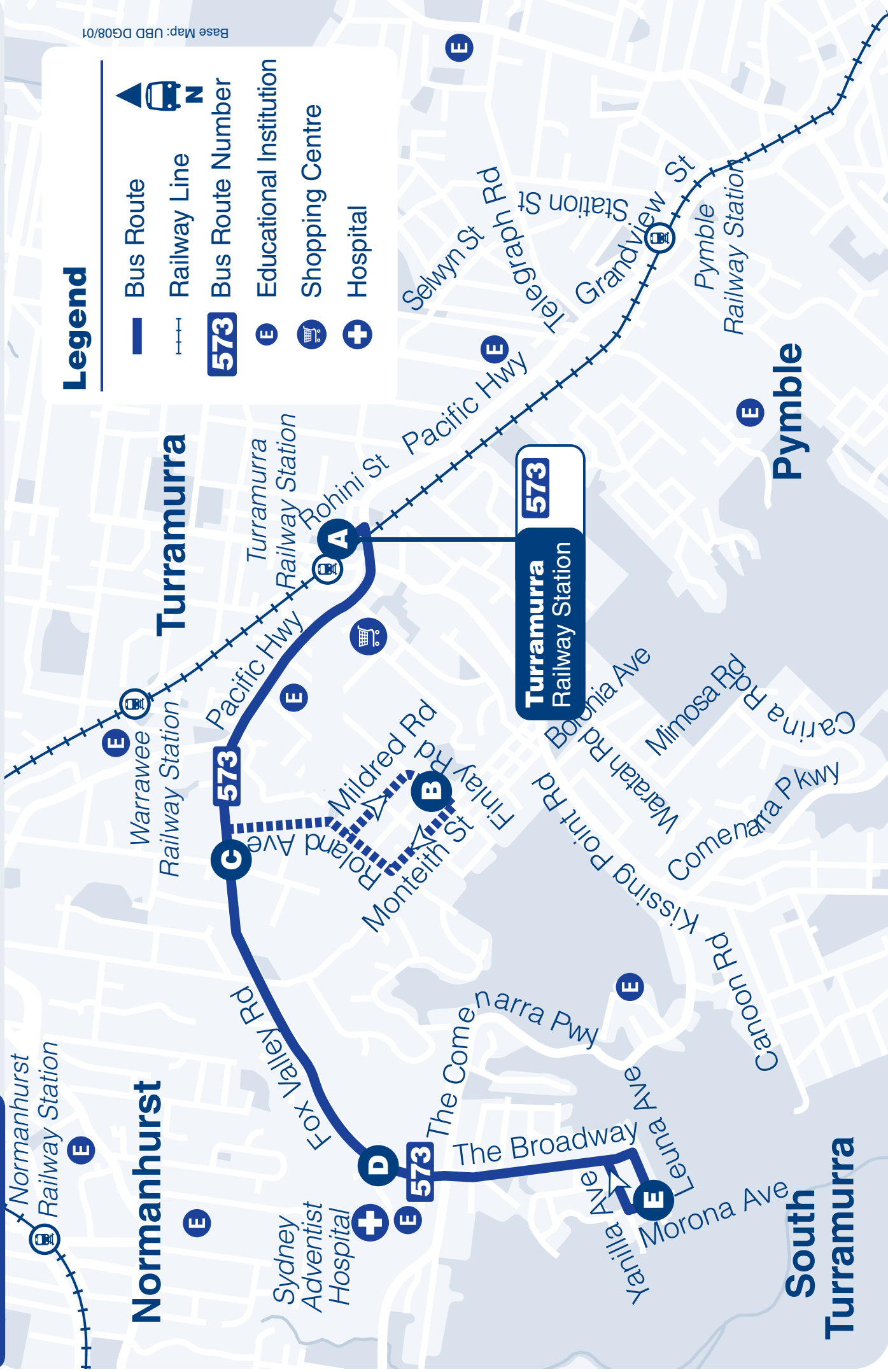
APPENDIX C

TRANSPORT SERVICES

Legend

-  Bus Route
-  Railway Line
- 573** Bus Route Number
-  Educational Institution
-  Shopping Centre
-  Hospital

Base Map: UBD DG08/01



Monday to Friday																	
map ref	Route Number	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573
		am	am	am	am	am	am	am	am	am	am	am	pm	pm	pm	pm	pm
A	Turrumurra Station (Rohini St)	5.59	6.16	6.30	6.41	6.52	...	...	...	...	...	...	...	...	...	...	...
B	Warrawee Valley (Finlay Rd)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
C	Roland Ave & Fox Valley Rd	6.05	6.22	6.36	6.48	7.03	7.28	7.36	8.15	8.51	9.54	10.52	11.54	12.50	1.47	2.50	3.54
D	SAN Sydney Adventist Hospital	6.08	6.25	6.39	6.51	7.06	7.31	7.39	8.18	8.54	9.57	10.55	11.57	12.53	1.49	2.53	3.57
E	Fox Valley (Leuna Ave)	6.12	6.29	6.43	6.55	7.10	7.35	...	...	...	...	...	...	...	...	...	...
F	SAN Sydney Adventist Hospital	6.15	6.32	6.46	6.59	7.13	7.38	...	...	...	...	...	...	...	...	...	...
G	Roland Ave & Fox Valley Rd	6.18	6.35	6.49	7.02	7.18	7.41	...	...	...	...	...	...	...	...	...	...
H	Warrawee Valley (Finlay Rd)	6.21	6.38	6.52	7.05	7.21	7.45	...	...	...	...	...	...	...	...	...	...
A	Turrumurra Station (Rohini St)	6.31	6.48	7.02	7.17	7.30	7.57	...	...	...	...	...	...	...	...	...	...

Saturday																	
map ref	Route Number	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573
		am	am	am	am	am	am	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm
A	Turrumurra Station (Rohini St)	8.50	9.50	10.50	11.50	12.50	1.50	2.50	3.50	4.50	5.50	...	...	...	...	...	...
G	Roland Ave & Fox Valley Rd	8.54	9.54	10.54	11.54	12.54	1.54	2.54	3.54	4.54	5.54	...	...	...	...	...	...
D	SAN Sydney Adventist Hospital	8.56	9.56	10.56	11.56	12.56	1.56	2.56	3.56	4.56	5.56	...	...	...	...	...	...
E	Fox Valley (Leuna Ave)	8.59	9.59	10.59	11.59	12.59	1.59	2.59	3.59	4.59	5.59	...	...	...	...	...	...
F	SAN Sydney Adventist Hospital	9.02	10.02	11.02	12.02	1.02	2.02	3.02	4.02	5.02	6.02	...	...	...	...	...	...
G	Roland Ave & Fox Valley Rd	9.05	10.05	11.05	12.05	1.05	2.05	3.05	4.05	5.05	6.05	...	...	...	...	...	...
A	Turrumurra Station (Rohini St)	9.10	10.10	11.10	12.10	1.10	2.10	3.10	4.10	5.10	6.10	...	...	...	...	...	...

See other side for route map

Easter Saturday services run to Public Holidays timetable. * No service on Christmas Day.

Sunday & Public Holidays*																	
map ref	Route Number	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573	573
		am	am	am	am	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm
A	Turrumurra Station (Rohini St)	9.50	11.50	1.50	3.50	5.50	...	...	...	...	...	...	...	...	...	...	...
G	Roland Ave & Fox Valley Rd	9.54	11.54	1.54	3.54	5.54	...	...	...	...	...	...	...	...	...	...	...
D	SAN Sydney Adventist Hospital	9.56	11.56	1.56	3.56	5.56	...	...	...	...	...	...	...	...	...	...	...
E	Fox Valley (Leuna Ave)	9.59	11.59	1.59	3.59	5.59	...	...	...	...	...	...	...	...	...	...	...
F	SAN Sydney Adventist Hospital	10.02	12.02	2.02	4.02	6.02	...	...	...	...	...	...	...	...	...	...	...
G	Roland Ave & Fox Valley Rd	10.05	12.05	2.05	4.05	6.05	...	...	...	...	...	...	...	...	...	...	...
A	Turrumurra Station (Rohini St)	10.10	12.10	2.10	4.10	6.10	...	...	...	...	...	...	...	...	...	...	...

Explanations

– Accessible buses operate this service. (For operational requirements Transdev reserves the right to substitute conventional buses.)



Get your group around town quickly and safely with Transdev - Shorelink Buses bus charter

Transdev - Shorelink Buses has a fleet of nearly 100 modern buses which are capable of fulfilling almost any requirement. Buses can seat up to 57 adult passengers. To discuss your requirements, please telephone us between 8.30am to 5.00pm Monday - Friday on 9457 8888.

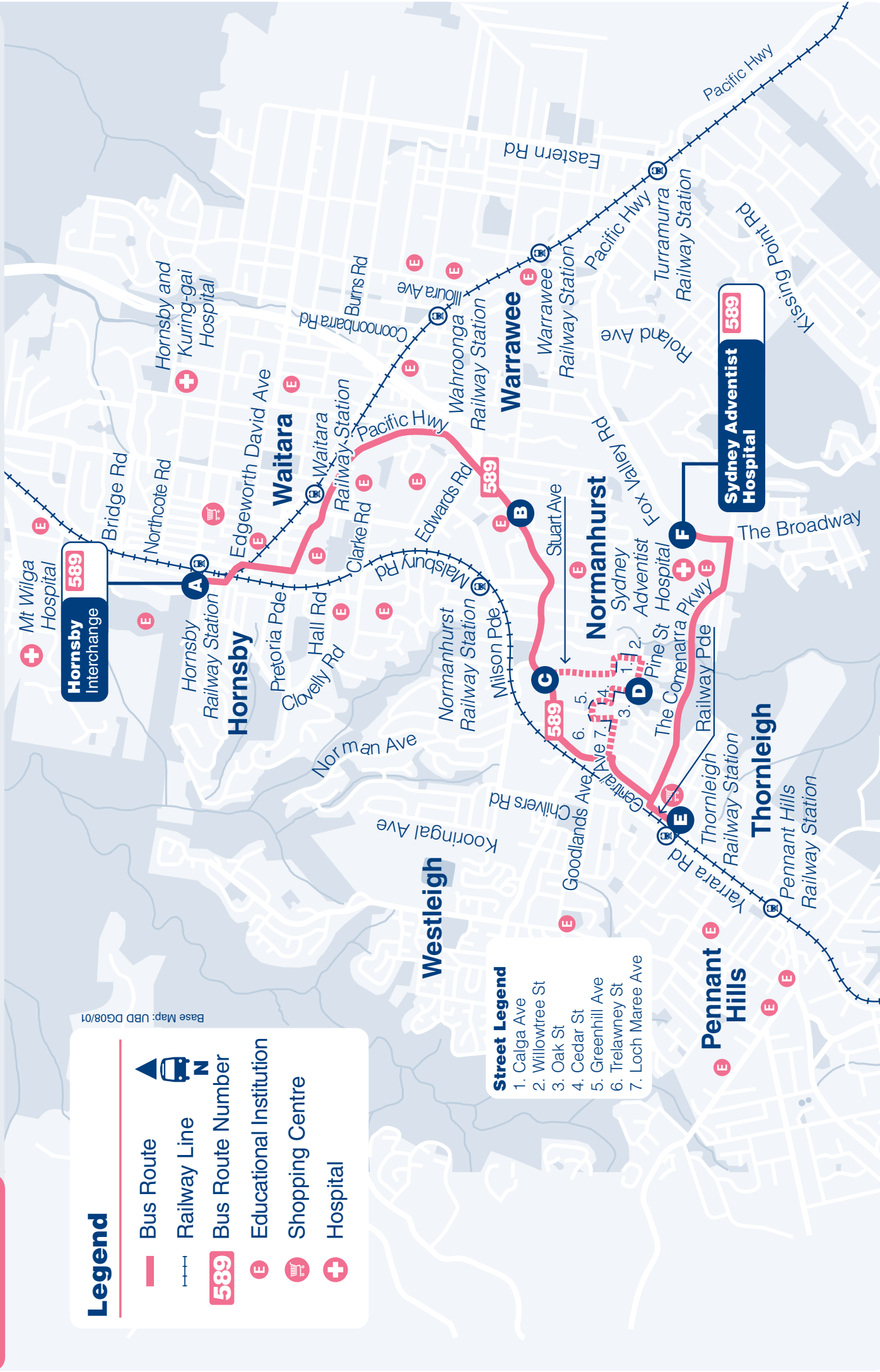
Legend

-  Bus Route
-  Railway Line
-  Bus Route Number
-  Educational Institution
-  Shopping Centre
-  Hospital

Street Legend

1. Calga Ave
2. Willowtree St
3. Oak St
4. Cedar St
5. Greenhill Ave
6. Trelawney St
7. Loch Maree Ave

Base Map: UBD DG08/01



Monday to Friday												
map ref	Route Number	589	589	589	589	589	589	589	589	589	589	589
		am	am	pm	pm	am	am	pm	pm	am	am	pm
A	Hornsby Station (Interchange)	6.30	7.30	8.30	12.30	1.30	2.45	3.30	4.25	5.20		
B	Normanhurst Boys High School	6.39	7.39	8.39	12.38	1.38	2.53	3.38	4.33	5.28		
C	Pennant Hills Rd & Stuart Ave	6.41	7.41	8.41	12.40	1.40	2.55	3.40	4.36	5.30		
D	Woodlands Estate (Oak St)	...	...	...	12.43	...	...	3.43	...	5.33		
E	Thornleigh Station (cnr Bellevue St & Railway Pde)	6.47	7.47	8.47	12.47	1.44	2.59	3.47	4.40	5.37		
F	SAN Sydney Adventist Hospital	6.55	7.55	8.55	12.52	1.49	3.09	3.52	4.47	5.42		

Saturday												
map ref	Route Number	589	589	589	589	589	589	589	589	589	589	589
		am	am	pm	pm	am	am	pm	pm	am	am	pm
A	Hornsby Station (Interchange)	9.16	11.16	2.26	4.26							
B	Normanhurst Boys High School	9.24	11.24	2.34	4.34							
C	Pennant Hills Rd & Stuart Ave	9.26	11.26	2.36	4.36							
D	Woodlands Estate (Oak St)	9.29	11.29	2.39	4.39							
E	Thornleigh Station (cnr Bellevue St & Railway Pde)	9.33	11.33	2.43	4.43							

Explanations

– Accessible buses operate this service. (For operational requirements Transdev reserves the right to substitute conventional buses.)

For additional services to Sydney Adventist Hospital on weekdays and weekends, please see route 573 timetable.

No service on Sunday, Public Holidays, Easter Saturday or Christmas Day

See other side for → route map

Monday to Friday												
map ref	Route Number	589	589	589	589	589	589	589	589	589	589	589
		am	am	am	am	am	am	pm	pm	pm	pm	pm
F	SAN Sydney Adventist Hospital	7.00	...	8.00	...	...	9.00	12.55	1.50	3.10	3.55	4.50
E	Thornleigh Station (cnr Bellevue St & Railway Pde)	7.08	7.52	8.08	...	8.31	9.07	1.02	1.57	3.19	4.02	4.57
D	Woodlands Estate (Oak St)	...	7.57	...	...	8.36	9.11	...	...	...	...	...
C	Pennant Hills Rd & Stuart Ave	...	8.02	...	...	J8.41	9.13	...	...	...	...	...
B	Normanhurst Boys High School	7.12	Y8.04	8.12	8.46	J8.49	9.20	1.06	2.01	3.23	4.07	5.02
A	Hornsby Station (Interchange)	7.19	8.17	8.19	8.56	9.06	9.27	1.13	2.08	3.30	4.19	5.14

Saturday												
map ref	Route Number	589	589	589	589	589	589	589	589	589	589	589
		am	am	pm	pm	am	am	pm	pm	am	am	pm
E	Thornleigh Station (cnr Bellevue St & Railway Pde)	9.34	11.34	2.44	4.44							
D	Woodlands Estate (Oak St)	9.38	11.38	2.48	4.48							
C	Pennant Hills Rd & Stuart Ave	9.42	11.42	2.52	4.52							
B	Normanhurst Boys High School	9.44	11.44	2.54	4.54							
A	Hornsby Station (Interchange)	9.55	11.55	3.04	5.04							

Explanations

J – Bus diverts via Normanhurst West Public School and Route 588 through Hornsby South to Hornsby.

Y – Bus diverts via Our Lady of the Rosary (Yardley).

– Accessible buses operate this service. (For operational requirements Transdev reserves the right to substitute conventional buses.)

For additional services to Sydney Adventist Hospital on weekdays and weekends, please see route 573 timetable.

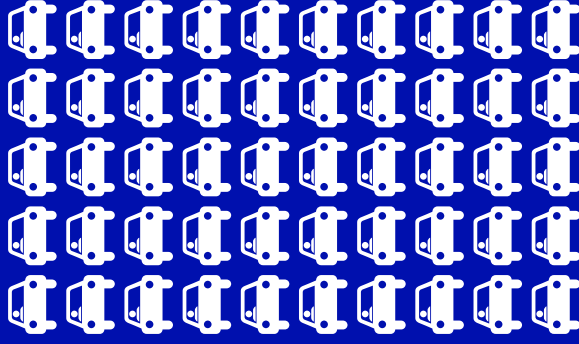
No service on Sunday, Public Holidays, Easter Saturday or Christmas Day

See other side for → route map



1 Bus

50 less cars



**Reduce greenhouse
gas emissions by
catching
a bus, train or ferry**

Fewer cars on the road will lead
to less traffic, noise and
congestion on Sydney's roads.

APPENDIX D

SIDRA RESULTS

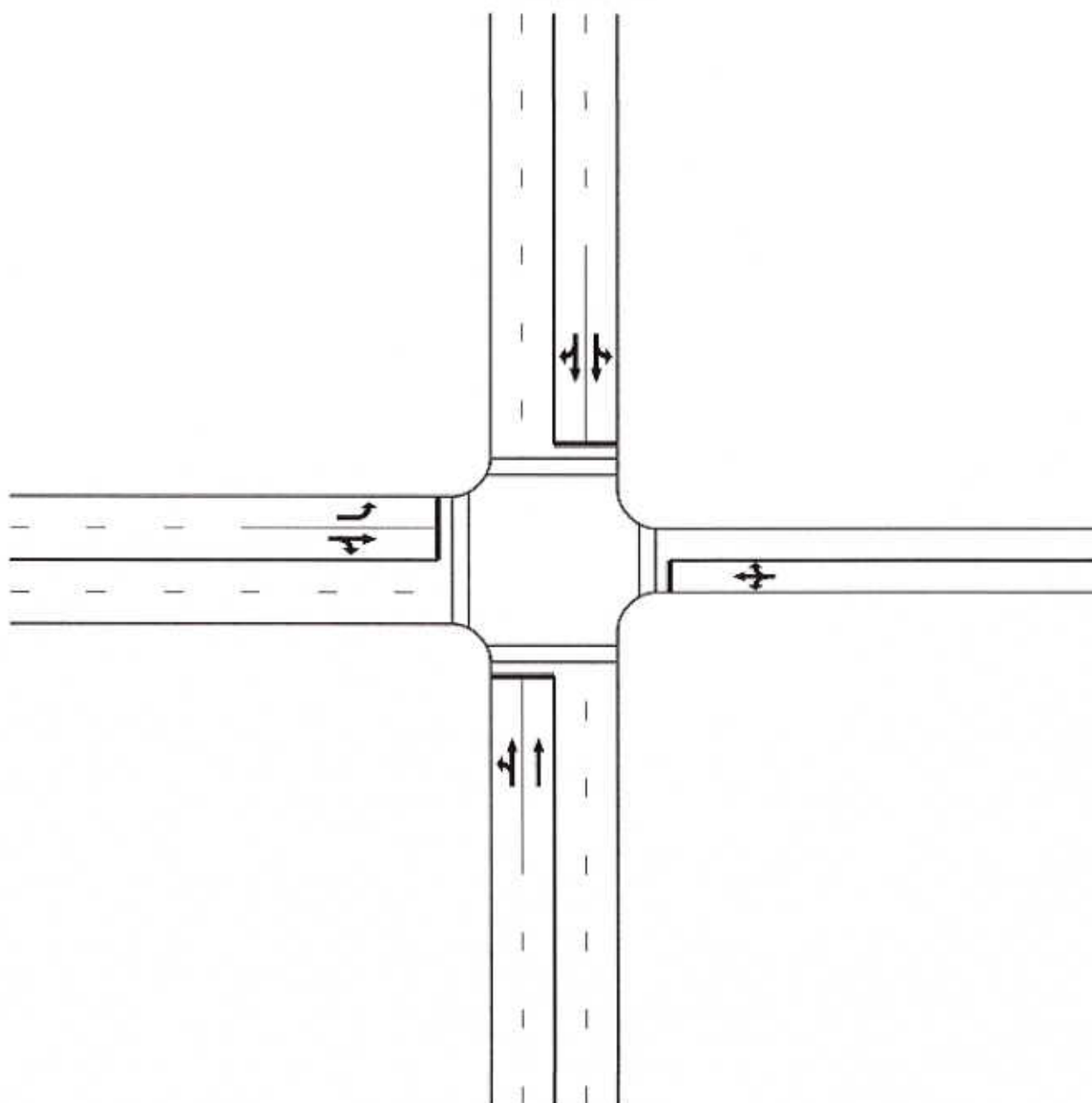


FOX VALLEY RD

ACCESS ROAD

ACCESS ROAD

FOX VALLEY RD



MOVEMENT SUMMARY

Site: FOX VALLEY ROAD AND
ACCESS AM

Signals - Fixed Time Cycle Time = 60 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	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: FOX VALLEY RD											
1	L	78	2.0	0.664	30.7	LOS C	9.3	66.1	0.95	0.88	34.1
2	T	600	2.0	0.664	22.4	LOS B	9.4	66.8	0.95	0.82	34.9
Approach		678	2.0	0.664	23.3	LOS B	9.4	66.8	0.95	0.83	34.8
East: ACCESS ROAD											
4	L	10	2.0	0.085	26.5	LOS B	0.8	5.6	0.78	0.73	34.9
5	T	5	2.0	0.085	18.2	LOS B	0.8	5.6	0.78	0.58	36.1
6	R	20	2.0	0.085	26.6	LOS B	0.8	5.6	0.78	0.74	34.9
Approach		35	2.0	0.085	25.4	LOS B	0.8	5.6	0.78	0.72	35.1
North: FOX VALLEY RD											
7	L	10	2.0	0.664	19.3	LOS B	14.6	103.6	0.78	0.94	41.8
8	T	1100	2.0	0.664	11.8	LOS A	14.6	103.6	0.81	0.71	42.3
9	R	100	2.0	0.664	21.4	LOS B	12.2	86.7	0.85	0.88	39.7
Approach		1210	2.0	0.664	12.7	LOS A	14.6	103.6	0.81	0.72	42.1
West: ACCESS ROAD											
10	L	135	2.0	0.138	15.9	LOS B	2.0	14.2	0.53	0.75	41.8
11	T	5	2.0	0.258	19.3	LOS B	2.6	18.4	0.83	0.66	35.1
12	R	103	2.0	0.258	27.6	LOS B	2.6	18.4	0.83	0.78	34.2
Approach		243	2.0	0.258	20.9	LOS B	2.6	18.4	0.66	0.76	38.1
All Vehicles		2166	2.0	0.664	17.2	LOS B	14.6	103.6	0.84	0.76	38.9

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	24.3	LOS C	0.1	0.1	0.90	0.90
P3	Across E approach	53	20.0	LOS C	0.1	0.1	0.82	0.82
P5	Across N approach	53	24.3	LOS C	0.1	0.1	0.90	0.90
P7	Across W approach	53	24.3	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		212	23.2	LOS C			0.88	0.88

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: FOX VALLEY ROAD AND
ACCESS PM

Signals - Fixed Time Cycle Time = 60 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: FOX VALLEY RD											
1	L	40	2.0	0.734	29.3	LOS C	13.1	93.2	0.94	0.93	35.2
2	T	900	2.0	0.734	21.1	LOS B	13.1	93.6	0.94	0.87	35.8
Approach		940	2.0	0.734	21.4	LOS B	13.1	93.6	0.94	0.87	35.8
East: ACCESS ROAD											
4	L	5	2.0	0.046	26.2	LOS B	0.4	3.2	0.77	0.72	35.3
5	T	5	2.0	0.046	17.9	LOS B	0.4	3.2	0.77	0.55	36.6
6	R	10	2.0	0.046	26.3	LOS B	0.4	3.2	0.77	0.73	35.3
Approach		20	2.0	0.046	24.1	LOS B	0.4	3.2	0.77	0.68	35.6
North: FOX VALLEY RD											
7	L	20	2.0	0.410	17.3	LOS B	7.4	52.6	0.64	0.94	42.8
8	T	600	2.0	0.410	10.6	LOS A	7.4	52.6	0.69	0.58	43.7
9	R	65	2.0	0.410	22.0	LOS B	5.6	40.2	0.78	0.86	39.0
Approach		685	2.0	0.410	11.9	LOS A	7.4	52.6	0.69	0.62	43.2
West: ACCESS ROAD											
10	L	35	2.0	0.041	17.6	LOS B	0.6	3.9	0.57	0.71	40.5
11	T	5	2.0	0.070	18.1	LOS B	0.7	4.8	0.78	0.57	36.3
12	R	25	2.0	0.070	26.4	LOS B	0.7	4.8	0.78	0.73	35.1
Approach		65	2.0	0.070	21.0	LOS B	0.7	4.8	0.66	0.71	37.9
All Vehicles		1710	2.0	0.734	17.6	LOS B	13.1	93.6	0.83	0.76	38.5

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	24.3	LOS C	0.1	0.1	0.90	0.90
P3	Across E approach	53	16.9	LOS B	0.1	0.1	0.75	0.75
P5	Across N approach	53	24.3	LOS C	0.1	0.1	0.90	0.90
P7	Across W approach	53	20.8	LOS C	0.1	0.1	0.83	0.83
All Pedestrians		212	21.6	LOS C			0.85	0.85

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: FOX VALLEY ROAD AND
ACCESS PM (3-4)

Signals - Fixed Time Cycle Time = 60 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	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: FOX VALLEY RD											
1	L	93	2.0	0.637	27.0	LOS B	10.3	73.2	0.90	0.87	36.1
2	T	720	2.0	0.637	18.7	LOS B	10.4	74.0	0.90	0.78	37.2
Approach		813	2.0	0.637	19.7	LOS B	10.4	74.0	0.90	0.79	37.1
East: ACCESS ROAD											
4	L	5	2.0	0.047	26.2	LOS B	0.4	3.2	0.77	0.72	35.3
5	T	5	2.0	0.047	17.9	LOS B	0.4	3.2	0.77	0.55	36.5
6	R	10	2.0	0.047	26.3	LOS B	0.4	3.2	0.77	0.73	35.3
Approach		20	2.0	0.047	24.2	LOS B	0.4	3.2	0.77	0.68	35.6
North: FOX VALLEY RD											
7	L	10	2.0	0.413	17.3	LOS B	7.5	53.2	0.64	0.95	42.8
8	T	480	2.0	0.413	9.9	LOS A	7.5	53.2	0.67	0.57	44.4
9	R	120	2.0	0.413	23.3	LOS B	4.2	29.6	0.84	0.82	37.3
Approach		610	2.0	0.413	12.7	LOS A	7.5	53.2	0.70	0.63	42.8
West: ACCESS ROAD											
10	L	78	2.0	0.091	17.9	LOS B	1.3	9.1	0.58	0.74	40.3
11	T	5	2.0	0.248	19.3	LOS B	2.5	17.8	0.82	0.66	35.2
12	R	100	2.0	0.248	27.5	LOS B	2.5	17.8	0.82	0.77	34.2
Approach		183	2.0	0.248	23.2	LOS B	2.5	17.8	0.72	0.76	36.6
All Vehicles		1626	2.0	0.637	17.5	LOS B	10.4	74.0	0.80	0.72	38.9

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	24.3	LOS C	0.1	0.1	0.90	0.90
P3	Across E approach	53	16.9	LOS B	0.1	0.1	0.75	0.75
P5	Across N approach	53	24.3	LOS C	0.1	0.1	0.90	0.90
P7	Across W approach	53	20.8	LOS C	0.1	0.1	0.83	0.83
All Pedestrians		212	21.6	LOS C			0.85	0.85

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.

APPENDIX E

CONSTRUCTION TRAFFIC MANAGEMENT PLAN

CONSTRUCTION VEHICLE ROUTE

Truck movements associated with the construction processes will approach and depart the site via Fox Valley Road to/from the highway and this will present a quite appropriate access arrangement for trucks.

TRUCK MOVEMENTS

The envisaged truck arrivals will be:

Stage 1	-	4 – 5 per day
Stage 2	-	2 – 3 per day
Stage 3	-	4 – 5 per day
Stage 4	-	? per day
Stage 5	-	? per day
Stage 6	-	4 – 5 per day

Truck will not be permitted to access the site during School arrival and departure times (i.e. 8 – 9am and 3 – 4pm School Days).

CONSTRUCTION HOURS

The anticipated hours of construction activity (subject to Consent Conditions) will indicatively be:

7.00am – 5.00pm	Monday to Friday
7.00am – 12.00noon	Saturday
No work	Sunday and public holidays

WORKS ZONE

No on-street WORKS ZONES are anticipated to be necessary as all activities will be confined to the site or adjacent temporary parking and/or builders compound zone.

CONSTRUCTION PROGRAM

A program has been identified for potential completion of the various work processes as follows:

Stage 1	-	18 months
Stage 2	-	6 months
Stage 3	-	18 months
Stage 4	-	6 months
Stage 5	-	12 months
Stage 6	-	18 months

CONSTRUCTION PROCESS

The proposed development will involve the undertaking of excavation, construction and fitout processes over an anticipated total period of up to 78 months.

CRANAGE AND MATERIALS HANDLING

Any required cranage and materials handling will be undertaken within the site.

SITE INDUCTION

All workers and visitors on the site will be subject to a formal 'site induction' process and all the inductions will be performed specific to each trade according to Workcover OH & S requirements.

TRAFFIC CONTROL PLANS

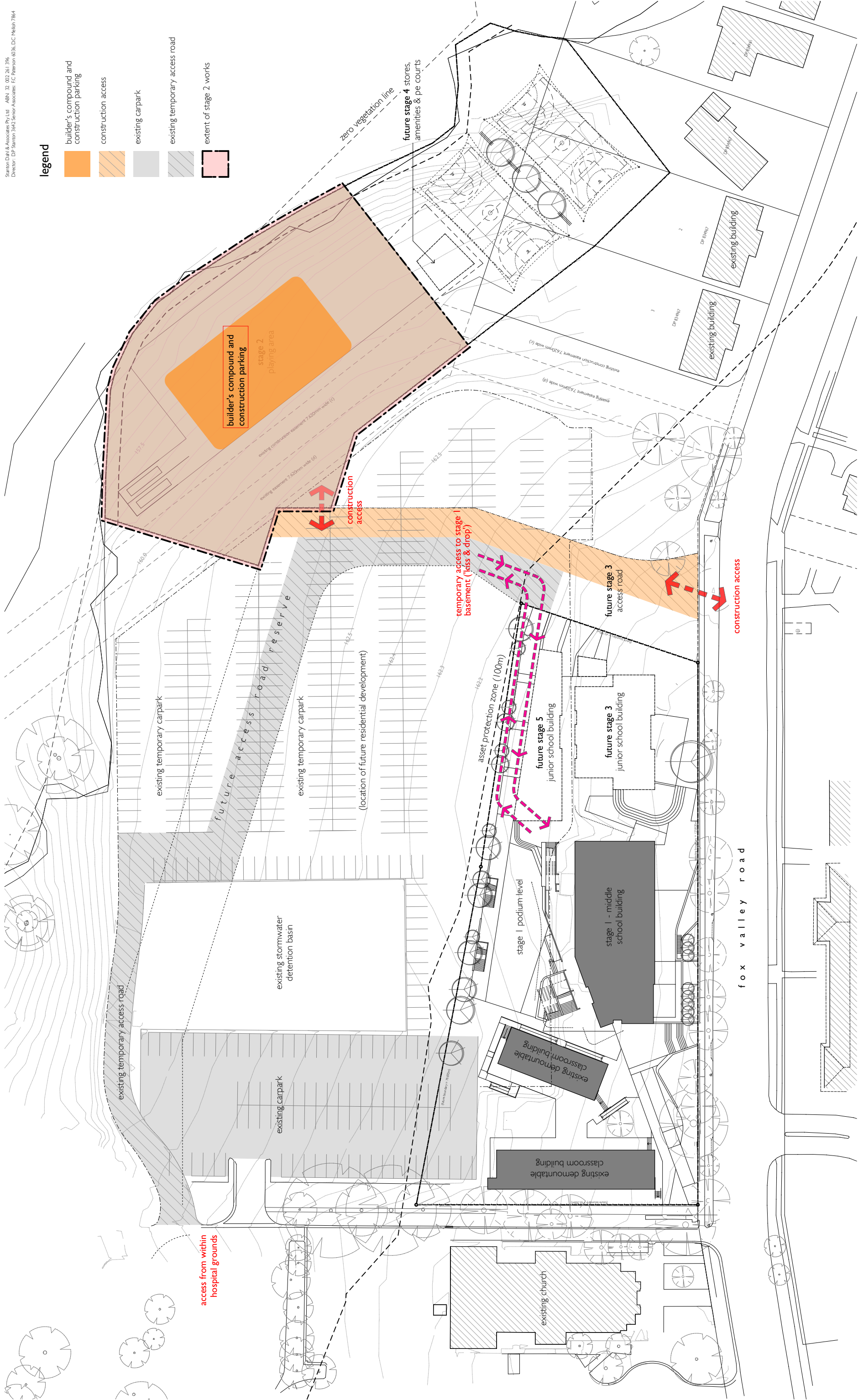
Any required Traffic Control Plans will be prepared by the Traffic Control Contractor and submitted for approval as required.

CONSTRUCTION TRAFFIC MANAGEMENT PLAN

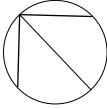
The principle elements of the construction traffic management plan are indicated on the stage plans overleaf.

legend

- builder's compound and construction parking
- construction access
- existing carpark
- existing temporary access road
- extent of stage 2 works



amendment	date
06/02/15	05/12/13
2 - staging revised / re-issue for state significant development application	
1 - re-issue for state significant development application	
note: all dimensions are to be verified on site and any discrepancies referred to the architect for determination. figured dimensions are to take precedence over scaled dimensions.	



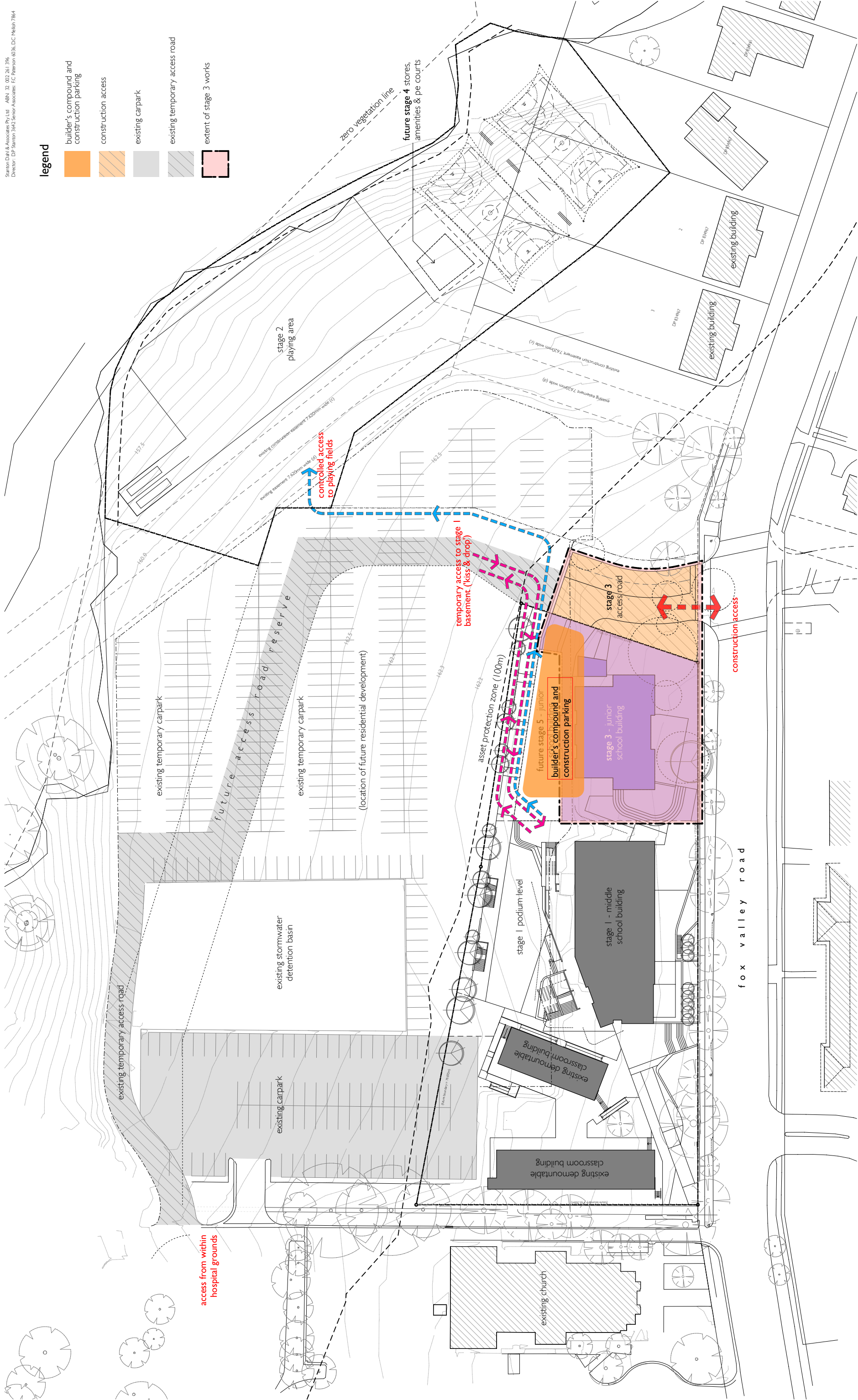
wahroonga adventist school
for
seventh day adventist,
greater sydney conference
construction access/parking - stage 2
job number
1318.10
dwg no. / issue & amendment
DA62/2

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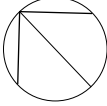


legend

- builder's compound and construction parking
- construction access
- existing carpark
- existing temporary access road
- extent of stage 3 works

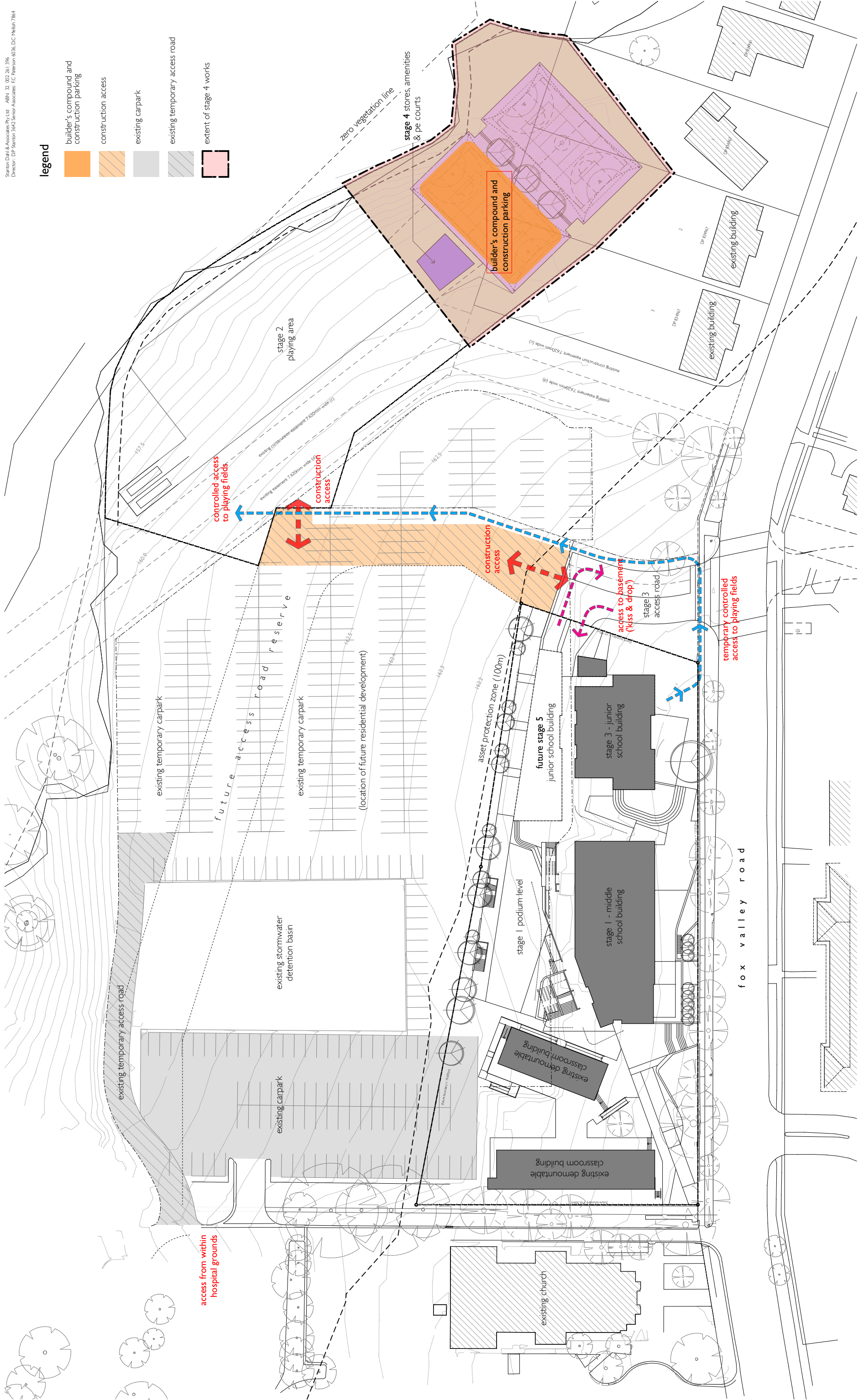


amendment	date
2 - staging revised / re-issue for state significant development application	06/02/15
1 - re-issue for state significant development application	05/12/13
note: all dimensions are to be verified on site and any discrepancies referred to the architect for determination. figured dimensions are to state precedence over scaled dimensions.	



legend

- builder's compound and construction parking
- construction access
- existing carpark
- existing temporary access road
- extent of stage 4 works



amendment	date
2 - staging revised / re-issue for state significant development application	06/02/15
1 - re-issue for state significant development application	05/12/13

note: all dimensions are to be verified on site and any discrepancies referred to the architect for determination. figured dimensions are to take precedence over scaled dimensions.

