Memorandum

To:	WINIM Developments on behalf of Catholic Education Diocese of Parramatta
From:	The Transport Planning Partnership (TTPP)
Date:	2 August 2021
TTPP REF:	18173

RE: WESTMEAD CATHOLIC COMMUNITY
SIDRA MODELLING CALIBRATION AND VALIDATION

As requested, please find herein calibration and validation details of the SIDRA network modelling undertaken for the Westmead Catholic Community Education Precinct State Significant Development Application (SSD-10383).

Transport and Accessibility Impact Assessment

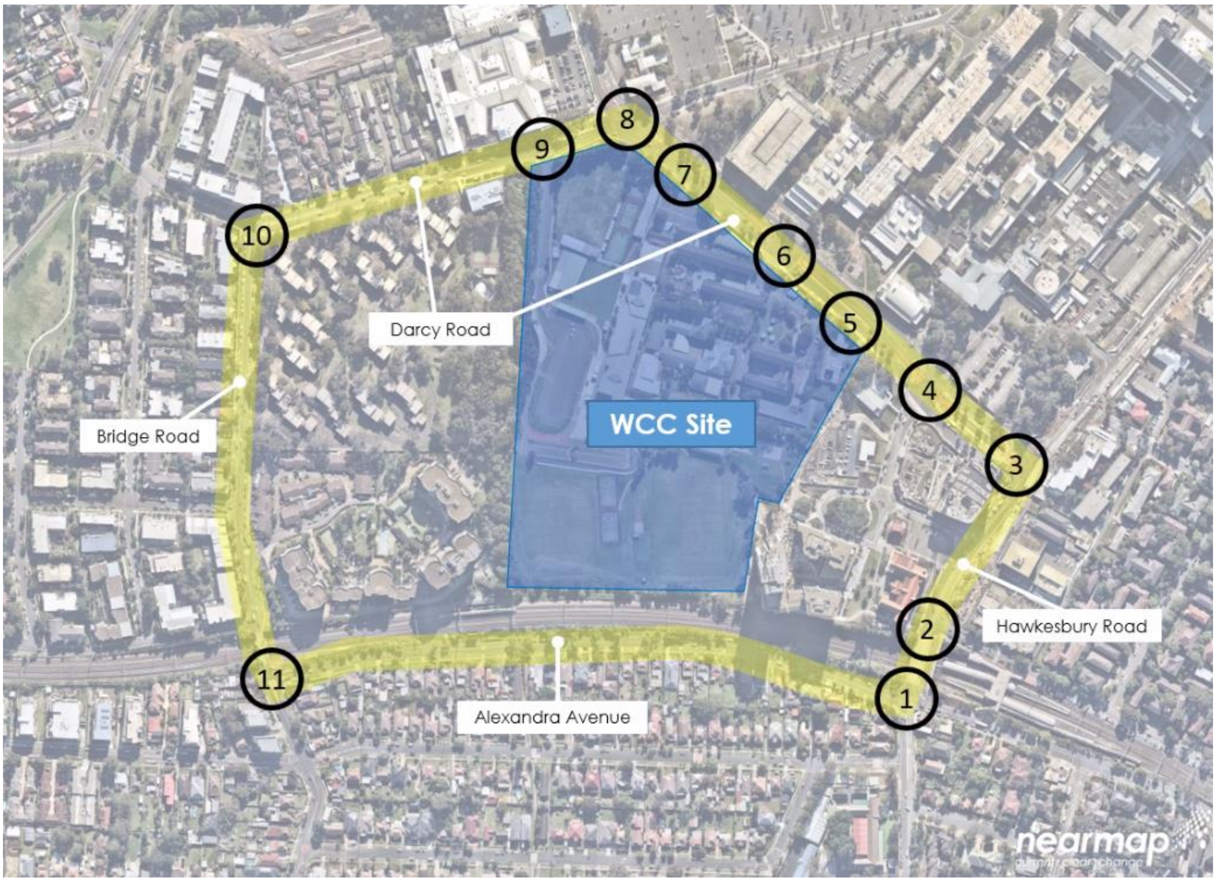
A traffic network model has been prepared to assess the impacts of the additional traffic generated by the proposed development. The modelling analysis was undertaken as part of a Transport and Accessibility Impact Assessment (TAIA) for the proposed development.

SIDRA Network 8 modelling software has been used for this assessment.

The intersections included in the SIDRA model are as follows and as shown in Figure 1.

1. Hawkesbury Road – Alexandra Avenue.
2. Hawkesbury Road – Railway Parade.
3. Hawkesbury Road – Darcy Road.
4. Darcy Road – UWS Car Park – Westmead Hospital.
5. Darcy Road – Site Access (proposed car park entry).
6. Darcy Road – Site Access (Catherine McAuley) – Westmead Hospital.
7. Darcy Road – Site Access (Catherine McAuley).
8. Darcy Road – Mons Road – Institute Road.
9. Darcy Road – Site Access (Mother Teresa).
10. Darcy Road – Bridge Road – Coles Car Park.
11. Alexandra Avenue – Bridge Road.

Figure 1: Darcy Road Automatic Tube Count Survey Results



Base Model Data

The existing traffic models have been developed using SIDRA Intersection 8 modelling software and road network and intersection configuration and traffic volumes collected on the following periods:

- Wednesday 17 October 2018 – 7.30am-9.00am
- Wednesday 17 October 2018 – 2.30pm-5.00pm.

Traffic turning movement surveys in the abovementioned periods were accompanied by an automatic tube count on Darcy Road across a period of 24 hours per day for seven days. The automatic tube count data identified the road network peak period occur between 7.00am-8.00am and 3.00pm-4.00pm. The survey results are shown graphically in Figure 2 while a breakdown of the hourly vehicle trips is presented in Table 1.

Figure 2: Darcy Road Automatic Tube Count Survey Results

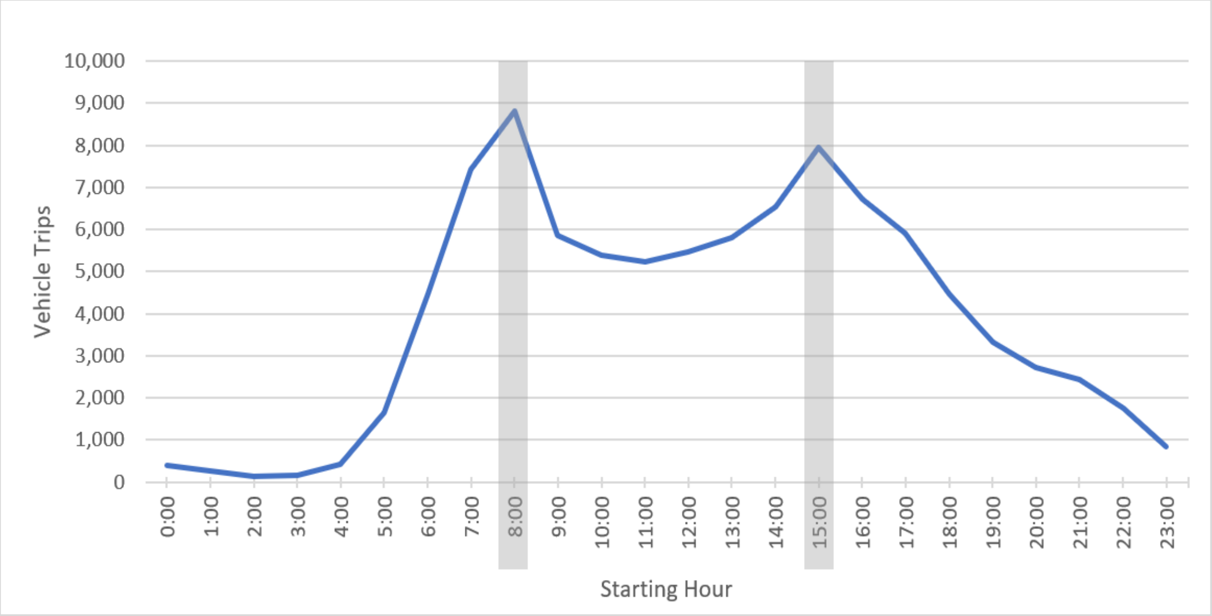


Table 1: Darcy Road Hourly Traffic Volumes

Starting Hour	Vehicles per Hour	Starting Hour	Vehicles per Hour
00:00	396	12:00	5466
01:00	257	13:00	5814
02:00	142	14:00	6525
03:00	169	**15:00 (PM Peak)**	**7940**
04:00	410	16:00	6725
05:00	1651	17:00	5896
06:00	4484	18:00	4464
07:00	7429	19:00	3311
08:00 (AM Peak)	**8805**	20:00	2712
09:00	5858	21:00	2439
10:00	5397	22:00	1745
11:00	5222	23:00	826

As identified in Figure 2 and Table 1, the surrounding road network peak periods occur between 8.00am-9.00am and 3.00pm-4.00pm.

Notably, traffic volumes in the identified peak hour (3pm-4pm) are 18% and 35% greater than the 4pm-5pm and 5pm-6pm typical commuter peak periods.

In the morning, traffic volumes in the identified peak hour (8am-9am) is 19% greater than the 7am-8am period.

Since automatic tube count data is recorded on a 60-minute basis, the above-mentioned peak hours have been reviewed against the turning movement survey data (which is recorded on a 15-minute basis). According to the turning movement survey data, the surrounding road network peak periods occur between 7.45am-8.45am and 3.00pm-4.00pm.

These peak periods correlate identically with the Darcy Road automatic tube count survey results, with the exception of a minor 15-minute period in the morning peak causing the peak hour to commence at 7.45am. Since turning movement surveys capture data more specifically on a 15-minute basis, the latter peak periods are taken as the local road network peak periods, namely:

- AM peak hour: 7.45am-8.45am
- PM peak hour: 3.00pm-4.00pm.

Base Model Calibration and Validation

In accordance with industry-wide practice, SCATS History data and LX data has been used to develop, calibrate and validate the SIDRA base case model. This methodology has been applied in accordance with submissions received from TfNSW and peer review comments made by Bitzios.

The previous SIDRA modelling has been updated based on SCATS History data, .LX data, and Traffic Control Signal (TCS) plans for each signalised intersection. The model inputs include the following:

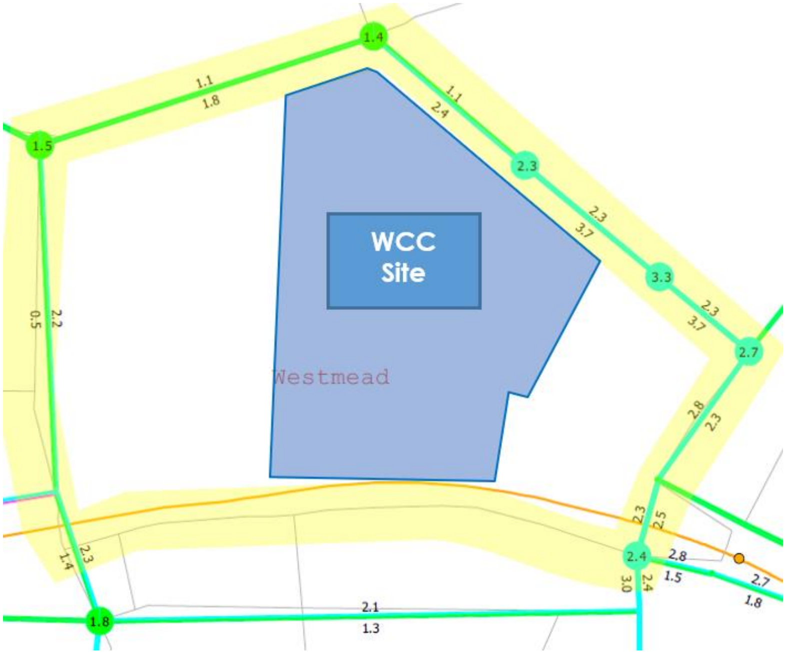
- Signal phasing arrangement.
- Phase timing.
- Phase frequency.
- Cycle times.
- Common control groups.
- Signal coordination and offsets.

The model inputs for each of the above parameters is presented late in this report.

Background Growth

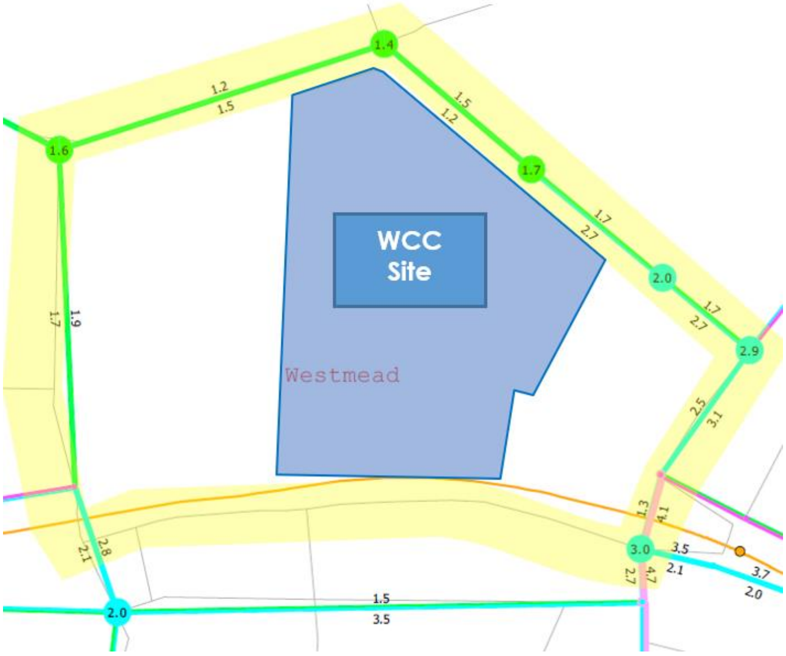
Traffic growth rates used in developing the future base models are based on the 2026 and 2036 Strategic Traffic Forecasting Model (STFM) plots received from Transport for NSW (TfNSW). STFM plots in the AM and PM peak periods (across 2-hours) are shown in Figure 4 to Figure 6.

Figure 3: STFM Plots: 2026 AM Peak



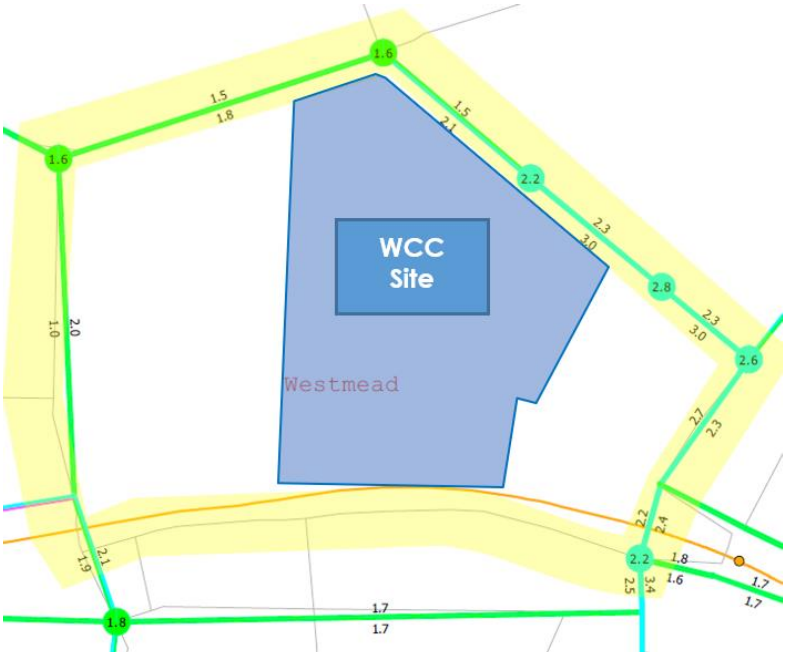
2011TZ SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL
Scenario 2026: 2026 SYDNEY TRAFFIC FORECASTING MODEL(LU2016V1.3)7-9AM(mf34)

Figure 4: STFM Plots: 2026 PM Peak



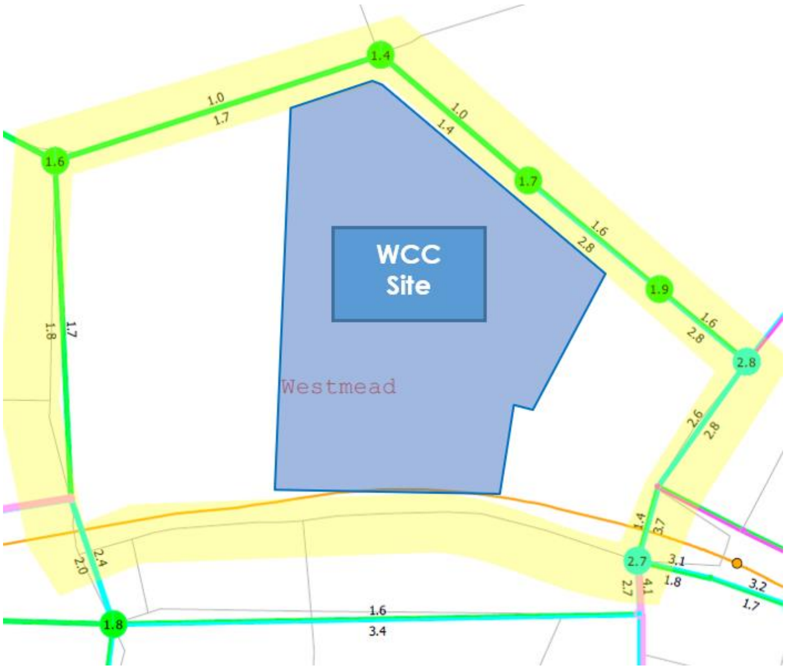
2011TZ SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL
Scenario 20260: 2026 SYDNEY TRAFFIC FORECASTING MODEL(LU2016V1.3)4-6PM(mf54)

Figure 5: STFM Plots: 2036 AM Peak



2011TZ SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL
Scenario 2036: 2036 SYDNEY TRAFFIC FORECASTING MODEL(LU2016V1.3)7-9AM(mf36)

Figure 6: STFM Plots: 2036 PM Peak



2011TZ SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL
Scenario 20360: 2036 SYDNEY TRAFFIC FORECASTING MODEL(LU2016V1.3)4-6PM(mf56)

Traffic Modelling Scenarios

- Scenario 0: Existing conditions (base case) - this scenario included baseline traffic with no development traffic.
- Scenario 1: 2023 Future conditions with background traffic growth (no development) – this scenario included the traffic growth rates applied to the baseline traffic to estimate the future traffic in Year 2023 without the development traffic.
- Scenario 2: 2023 Future conditions with background traffic growth and development - this scenario included the Year 2023 future base traffic with the additional trips associated with the proposed development.
- Scenario 3: 2033 Future conditions with background traffic growth (no development) - this scenario included the traffic growth rates applied to the baseline traffic to estimate the future traffic in Year 2033 without the development traffic.
- Scenario 4: 2033 Future conditions with background traffic growth and development - this scenario included the Year 2033 future base traffic with the additional trips associated with the proposed development.

The modelled traffic values are presented in Figure 7 to Figure 11.

Figure 7: Traffic Volumes - Scenario 0

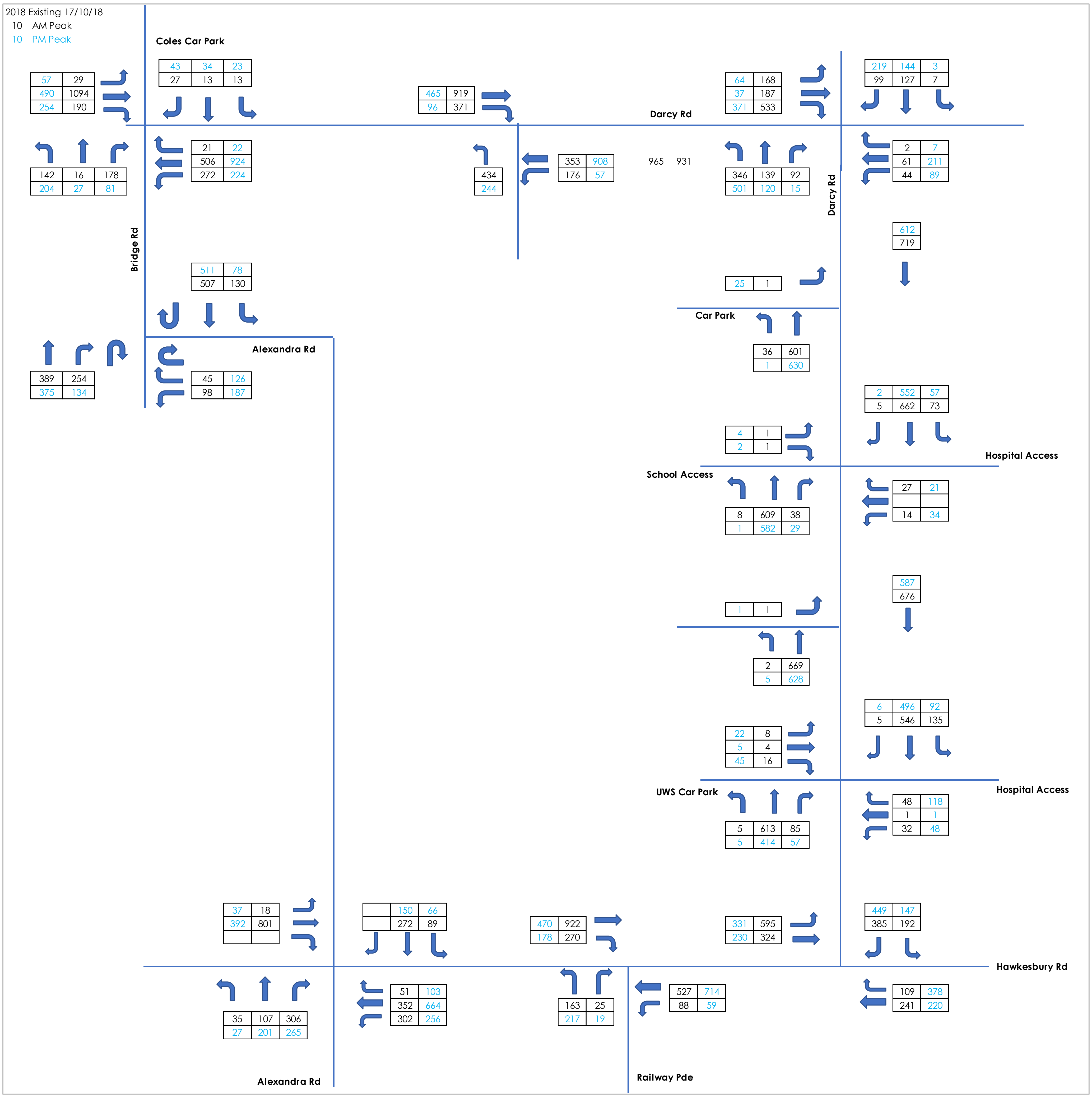


Figure 8: Traffic Volumes - Scenario 1

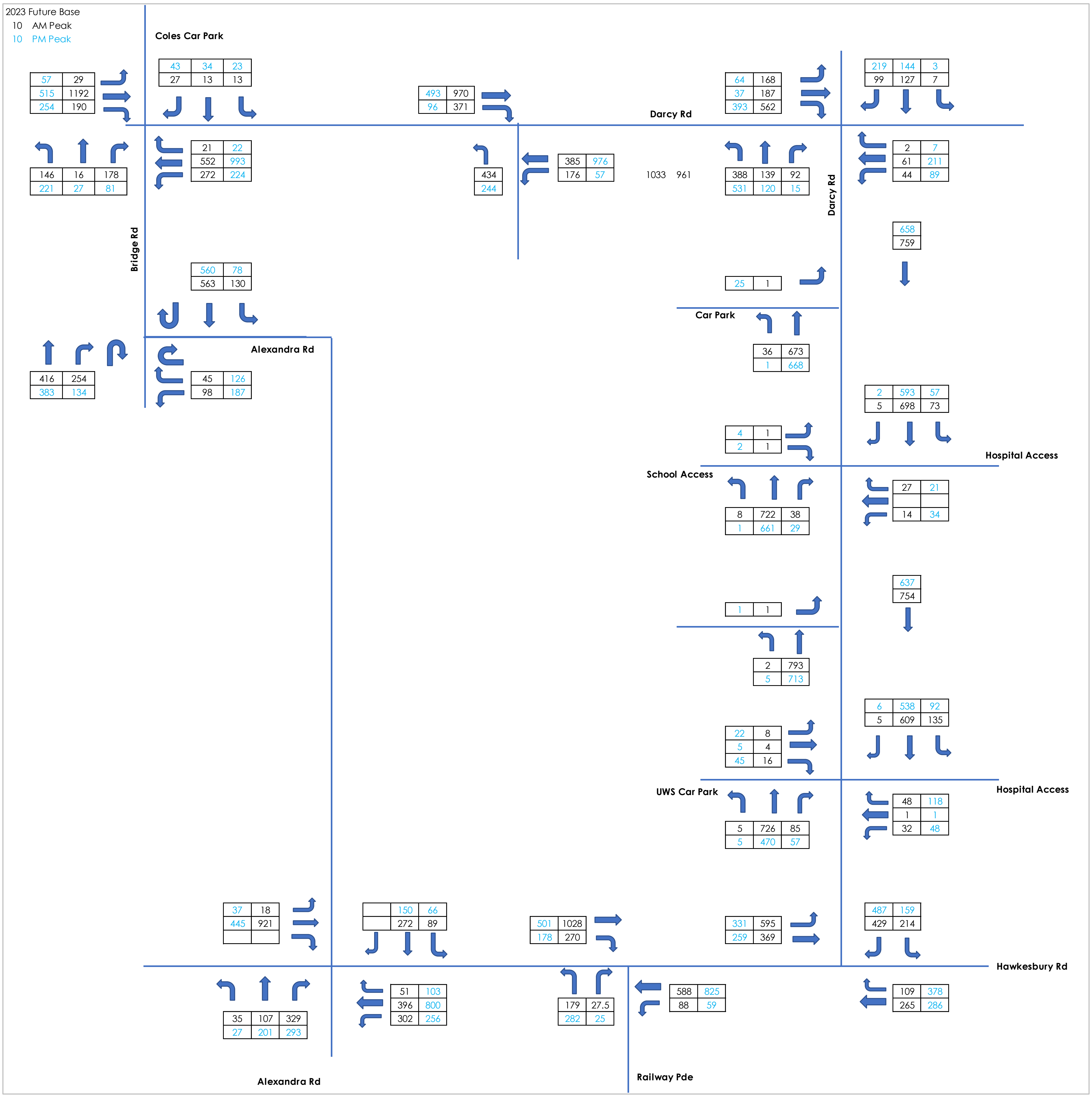


Figure 9: Traffic Volumes - Scenario 2

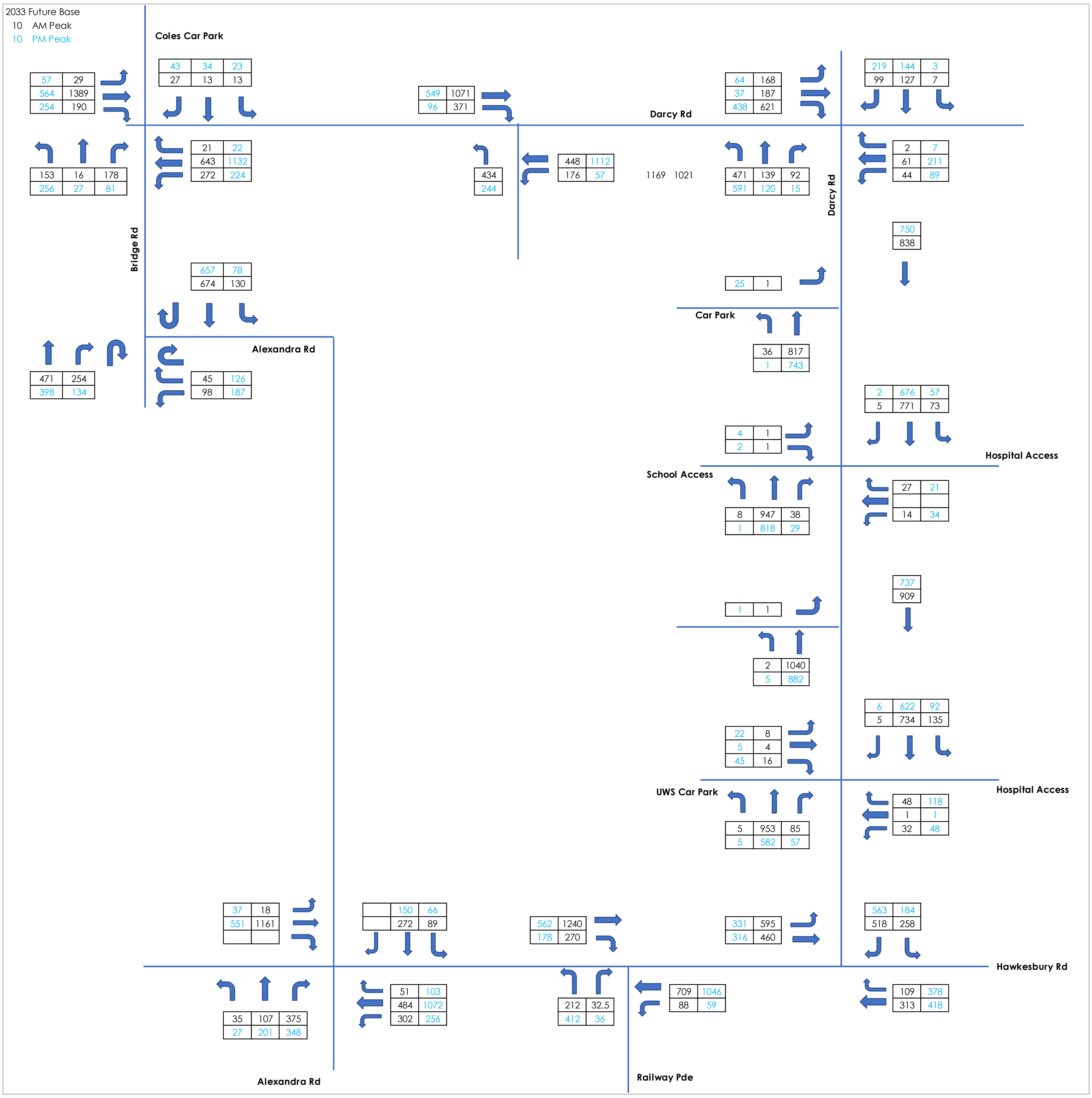


Figure 10: Traffic Volumes - Scenario 3

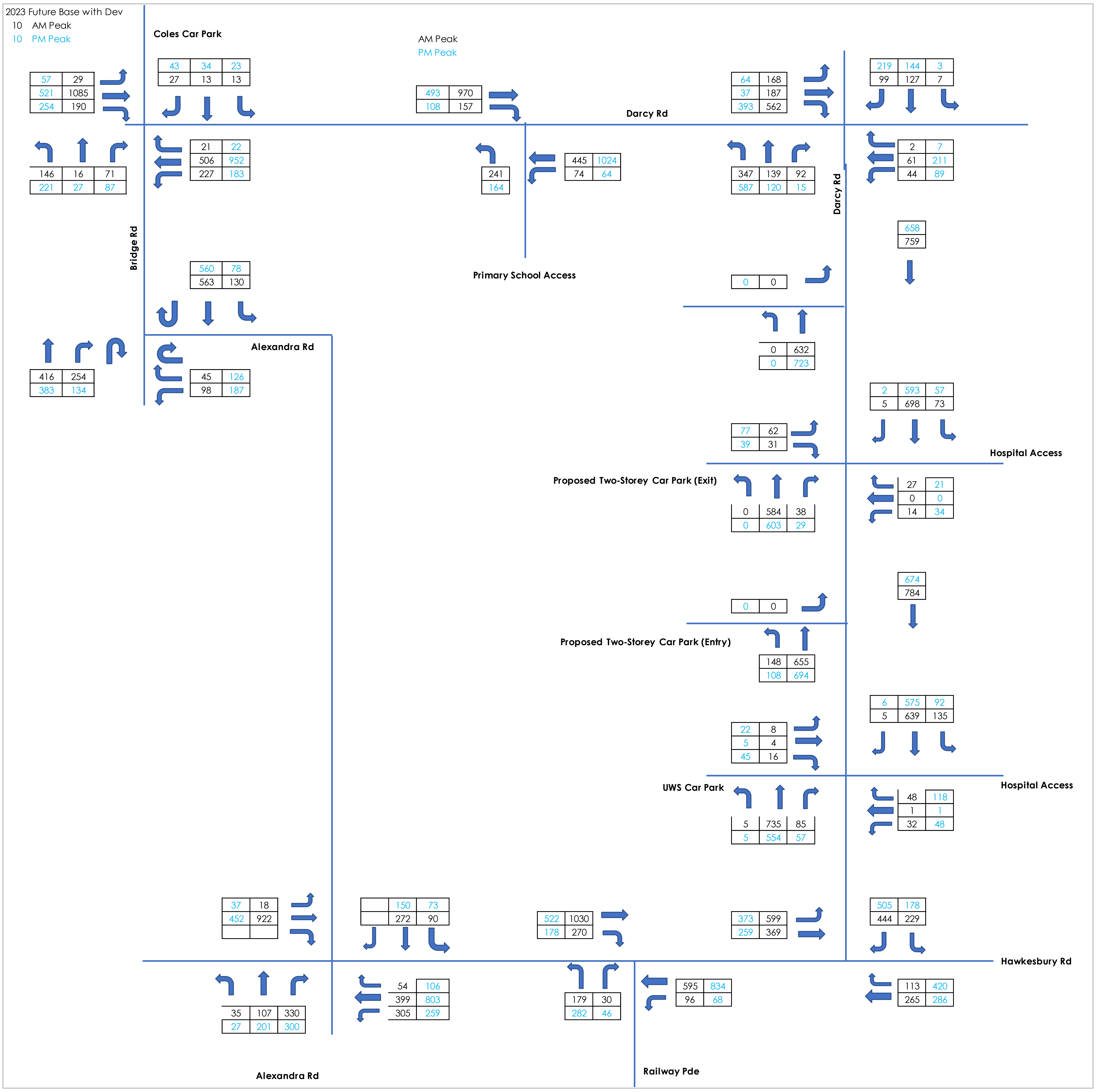
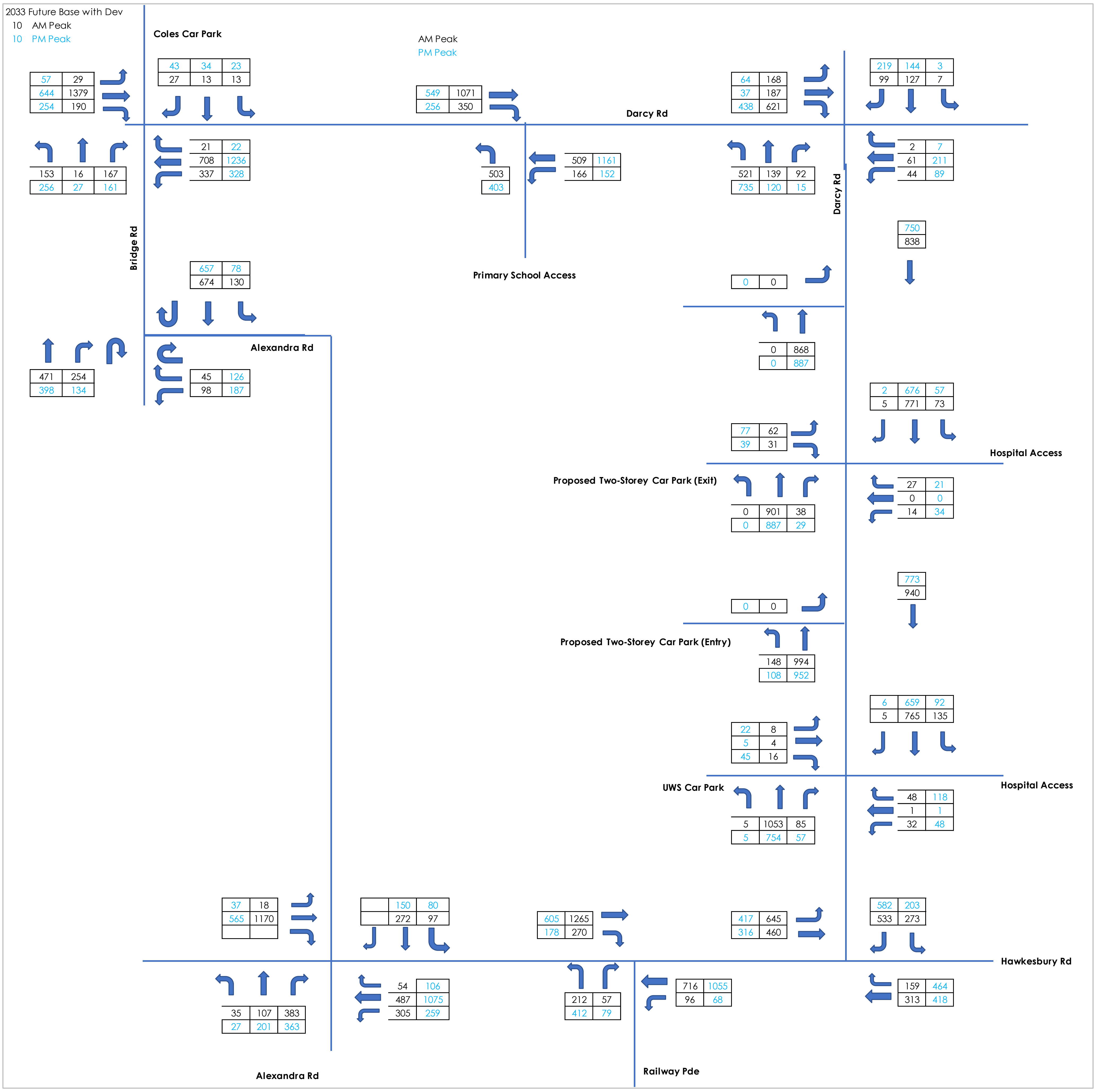


Figure 11: Scenario 4 Traffic Volumes



SIDRA Modelling Existing Model Inputs and Assumptions

Intersection Layout Configuration

All intersections have been configured based on site observations and Nearmap aerial imagery captured at the time of completing the modelling analysis. TCS plans for signalised intersections have been used as a basis in developing the intersection layout and phasing arrangement.

The intersection layout and lane configuration were checked in-line with on-site observations. This includes:

- Number of lanes on each approach.
- Traffic lane movement restrictions.
- Lane widths.
- Pedestrian crossings on intersection approaches
- Pedestrian protection (input into SIDRA in accordance with .LX data).

Two intersections have been modified since the traffic surveys were undertaken, namely:

1. Darcy Road – Mons Road – Institute Road which had undergone upgrades after the October 2018 traffic surveys were conducted.
2. Darcy Road – Hawkesbury Road which had undergone changes due to the commencement of construction works as part of the Parramatta Light Rail project.

Changes at these intersections are described in further detail below.

1. Darcy Road – Institute Road – Mons Road

After the October 2018 traffic surveys were conducted as part of this Project, the intersection of Darcy Rd – Institute Rd – Mons Rd had undergone upgrades. The upgrades included a left turn slip lane on the Darcy Road west approach and installation of a “No Right Turn” restriction on the Darcy Road south-east approach. As a result of the upgrades, amendments by TfNSW were made to the signal phasing arrangement and intersection cycle time.

From Nearmap aerial imagery, the intersection upgrades were carried out at the end of 2018 into early 2019. Figure 12 shows the intersection arrangement prior to the upgrades (which the existing modelling scenario has been based upon) while Figure 13 shows the current intersection arrangement with the upgrades (which future modelling scenarios have been based upon).

Therefore, the base case modelling for this intersection has been carried out based on the geometric layout, signal phasing, and cycle time prior to the intersection upgrade. Signal data has been extracted from the SCATS History data and .LX data which have been obtained for the same day which the traffic surveys were undertaken.

Figure 12: Darcy Road – Mons Road – Institute Road – Previous Configuration

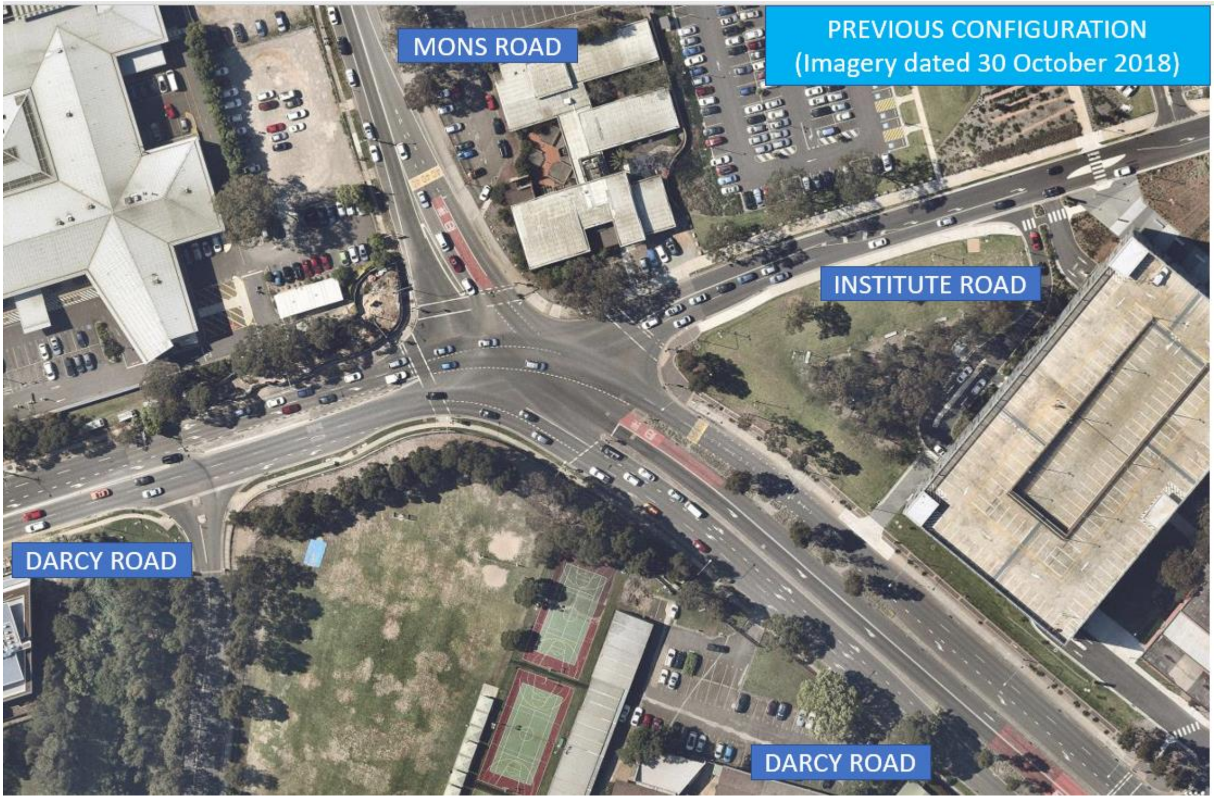


Figure 13: Darcy Road – Mons Road – Institute Road – Current Configuration

2. Darcy Road – Hawkesbury Road

After the October 2018 traffic surveys were conducted as part of this Project, construction works as part of the Parramatta Light Rail project had commenced at the intersection of Darcy Rd – Hawkesbury Rd had. Construction works resulted in the following changes:

- North leg: Three lanes including a dedicated bus lane reduced to one lane.
- South leg: Three lanes including a dedicated bus lane reduced to one lane.
- West leg: Three lanes reduced to two lanes.

Figure 14 shows the intersection arrangement prior to PLR construction (existing modelling scenario has been based upon) while Figure 15 shows the current intersection arrangement under construction works.

The intersection configuration is expected to change throughout the PLR construction phase in order to accommodate road works, as required.

However, future modelling scenarios for the Proposal in years 2023 and 2033 have been based upon the ultimate intersection configuration with PLR. Information of the ultimate intersection layout, signal phasing and phase timings has been obtained from the PLR Project Team via TfNSW.

TTPP has sought this information under a confidentiality agreement with TfNSW, and thus, the specific details cannot be provided in this public documentation. Notwithstanding, the details have been input into the future SIDRA models of which TfNSW is undertaking its review.

Figure 14: Darcy Road – Hawkesbury Road – Previous Configuration

Figure 15: Darcy Road – Hawkesbury Road – Current Configuration

TCS Plans, SCATS History Data and .LX Data

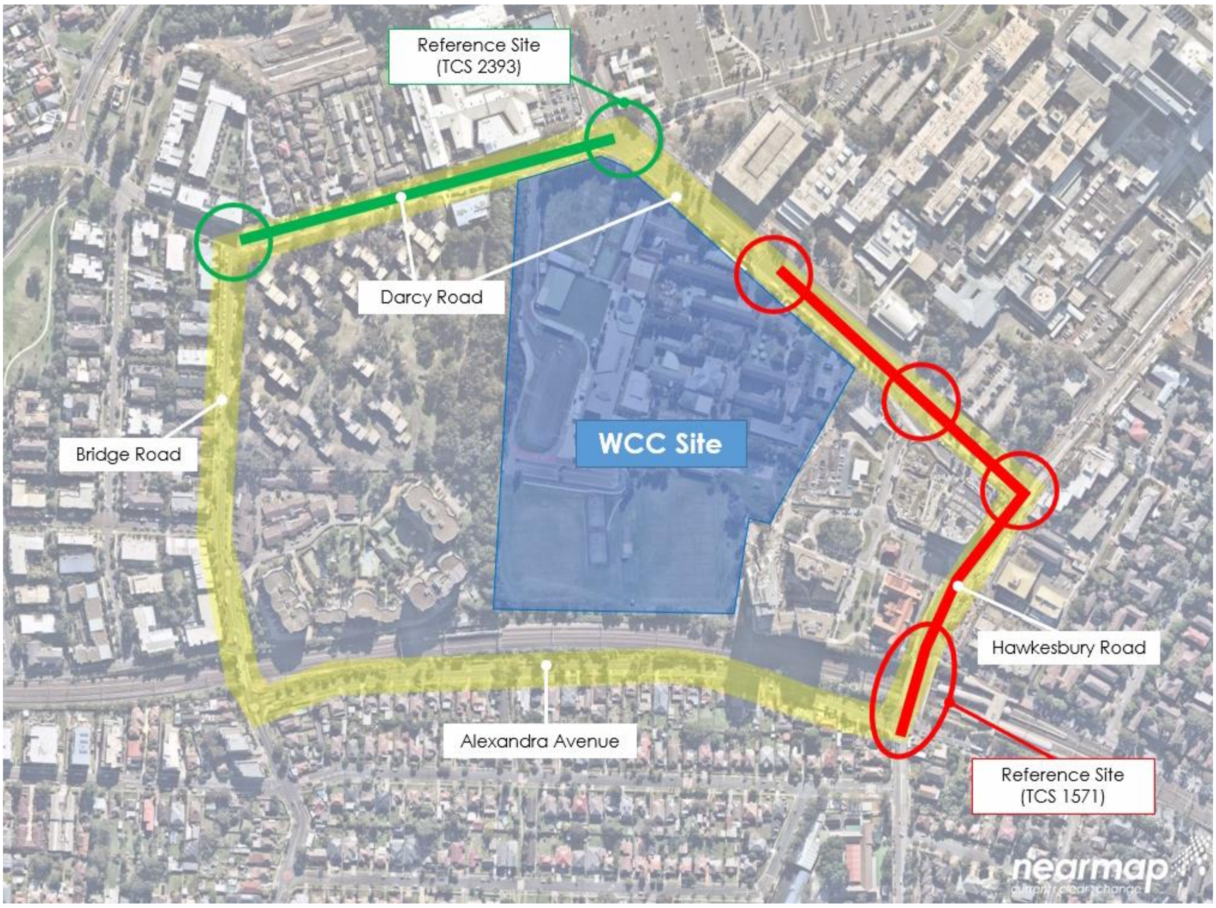
Traffic Signal Control (TCS) plans, SCATS History data, and .LX data have been obtained from TfNSW for the same day which the traffic surveys were undertaken. This information includes the traffic signal phasing arrangement, phase timing and frequency, cycle timing, common control groups, and signal coordination and offsets.

Within the surrounding road network there are two sets of signal coordination, namely:

- Along Darcy Road and Hawkesbury Road, between Catherine McAuley - Hospital Access and Alexandra Road intersections, and
- Along Darcy Road between Bridge Road and Mons Road-Institute Road intersections.

The two sets of coordinated signals and the reference site for the corresponding coordinated signal are illustrated in Figure 16.

Figure 16: Sets of Coordinated Signals



SIDRA Network modelling software is limited to the application of one set of signal coordination per network only. Given that the Darcy-Hawksbury set of signal coordination forms the larger group of coordinated signals within the surrounding network, this was the adopted signal coordination in the model. Signal offsets which have been adopted in the model are presented in Table 2.

Table 2: Darcy-Hawksbury Signal Coordination and Offset

TCS No.	Intersection	Signal Coordination With	Offset
AM Peak			
1571	Hawkesbury Rd – Alexandra Ave and Hawkesbury Rd – Railway Pde	Reference site (no offset)	
1631	Hawkesbury Rd – Darcy Rd	TCS 1571	0 s offset from ref. site
3281	Darcy Road – UWS Car Park – Westmead Hospital	TCS 1571	0 s offset from ref. site
3282	Darcy Road – Catherine McAuley – Westmead Hospital	TCS 1571	0 s offset from ref. site
PM Peak			
1571	Hawkesbury Rd – Alexandra Ave and Hawkesbury Rd – Railway Pde	Reference site (no offset)	
1631	Hawkesbury Rd – Darcy Rd	TCS 1571	-5 s offset from ref. site
3281	Darcy Road – UWS Car Park – Westmead Hospital	TCS 1571	-5 s offset from ref. site
3282	Darcy Road – Catherine McAuley– Westmead Hospital	TCS 1571	-5 s offset from ref. site

Signal phasing arrangements, phase timing, cycle times, and phase frequency information which has been extracted from the SCATS History data and applied in the model is presented in Table 3.

In accordance with comments provided by TfNSW, the maximum cycle time at each signalised intersection has been adopted in the existing and future modelling scenarios (which are based on maximum phase times). Excerpts from TfNSW's submissions addressed to DPIE (dated 29 March 2021) addressing this point are provided as follows:

- Base and future intersections do not use the current intersections maximum cycle length but have adopted the cycle length operating at the time of inspection.
- Existing Maximum Phase Splits were not used.

It is noted that the initial method of model calibration and validation was based upon data collected from site observations which included queue length data. Whilst this methodology was accepted in practice, it was commented by TfNSW (and Bitzios) that SCATS History data and .LX data be obtained for the revised model calibration and validation. Therefore, the revised modelling has been prepared in accordance with this advice. This methodology has been verbally acknowledged and agreed by TfNSW in the most recent meetings with the Planning Delivery Unit (PDU), DPIE, and TfNSW held on 13 July and 26 July 2021.

It is noted that the Hawkesbury Road – Alexandra Avenue and Hawkesbury – Railway Parade intersections operate under a common control group (CCG) as indicated by the TCS plan.

TCS plans, showing the signal phasing arrangements in detail, are given in Attachment One.

SCATS History data and .LX data have been provided in Appendix B of the updated TAIA.

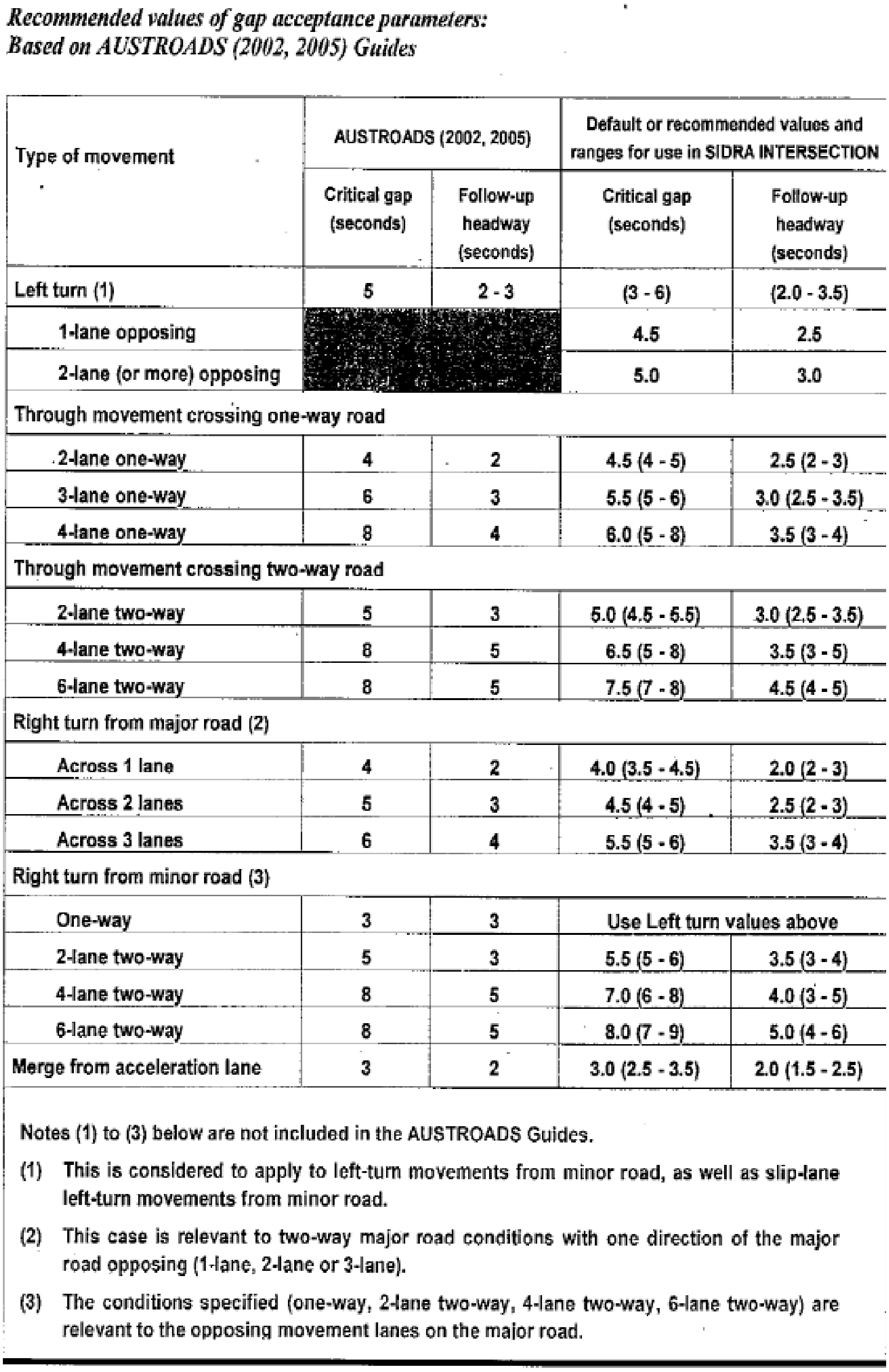
Table 3: Signalised Intersection Phase and Cycle Times

TCS No.	Modelled Signalised Intersection	Phase Times and Cycle Times (s)		Phase Frequency	
		AM Peak	PM Peak	AM Peak	PM Peak
1571	Hawkesbury Road – Alexandra Avenue and Hawkesbury Road – Railway Parade _*Intersections operate under a CCG_	A = 56 B = 15 C = 18 D = 28 E = 30 **Cycle time = 147**	A = 50 B = 29 C = 19 D = 26 E = 33 **Cycle time = 157**	A = 92% B = 35% C = 96% D = 100% E = 96%	A = 93% B = 19% C = 96% D = 100% E = 93%
1631	Hawkesbury Road – Darcy Road	A = 49 B = 28 C = 32 D = 17 E = 19 **Cycle time = 145**	A = 34 B = 26 C = 43 D = 17 E = 22 **Cycle time = 145**	A = 96% B = 92% C = 100% D = 58% E = 96%	A = 100% B = 92% C = 100% D = 54% E = 100%
3281	Darcy Road – UWS Car Park – Westmead Hospital	A = 82 D = 18 E = 24 G = 22 **Cycle time = 145**	A = 76 D = 18 E = 24 G = 18 **Cycle time = 136**	A = 96% D = 100% E = 88% G = 96%	A = 93% D = 100% E = 85% G = 78%
3282	Darcy Road – Catherine McAuley Access – Westmead Hospital Access	A = 94 D = 31 E = 14 **Cycle time = 139**	A = 111 B = 26 E = 13 **Cycle time = 150**	A = 100% D = 96% E = 96%	A = 92% D = 100% E = 64%
2393	Darcy Road – Mons Road – Institute Road	A = 49 B = 21 C = 14 D = 18 E = 36 F = 19 **Cycle time = 157**	A = 45 B = 17 C = 15 D = 19 E = 33 F = 20 G = 12 **Cycle time = 161**	A = 92% B = 96% C = 76% D = 92% E = 100% F = 24%	A = 100% B = 92% C = 63% D = 100% E = 100% F = 75% G = 54%
1630	Darcy Road – Bridge Road- Coles Car Park	A = 111 D = 26 E = 13 **Cycle time = 140**	A = 77 D = 31 E = 24 **Cycle time = 132**	A = 96% D = 100% E = 96%	A = 93% D = 100% E = 96%

Gap Acceptance

Gap acceptance for turning movements at all intersections have been maintained in accordance with the SIDRA default values which are in-line with the recommended values in Appendix E of the RMS Traffic Modelling Guidelines as shown in Figure 17.

Figure 17: Recommended Gap Acceptance Parameters



Recommended values of gap acceptance parameters:
Based on AUSTROADS (2002, 2005) Guides

Type of movement	AUSTROADS (2002, 2005)		Default or recommended values and ranges for use in SIDRA INTERSECTION	
	Critical gap (seconds)	Follow-up headway (seconds)	Critical gap (seconds)	Follow-up headway (seconds)
Left turn (1)	5	2 - 3	(3 - 6)	(2.0 - 3.5)
1-lane opposing			4.5	2.5
2-lane (or more) opposing			5.0	3.0
Through movement crossing one-way road				
2-lane one-way	4	2	4.5 (4 - 5)	2.5 (2 - 3)
3-lane one-way	6	3	5.5 (5 - 6)	3.0 (2.5 - 3.5)
4-lane one-way	8	4	6.0 (5 - 8)	3.5 (3 - 4)
Through movement crossing two-way road				
2-lane two-way	5	3	5.0 (4.5 - 5.5)	3.0 (2.5 - 3.5)
4-lane two-way	8	5	6.5 (5 - 8)	3.5 (3 - 5)
6-lane two-way	8	5	7.5 (7 - 8)	4.5 (4 - 5)
Right turn from major road (2)				
Across 1 lane	4	2	4.0 (3.5 - 4.5)	2.0 (2 - 3)
Across 2 lanes	5	3	4.5 (4 - 5)	2.5 (2 - 3)
Across 3 lanes	6	4	5.5 (5 - 6)	3.5 (3 - 4)
Right turn from minor road (3)				
One-way	3	3	Use Left turn values above	
2-lane two-way	5	3	5.5 (5 - 6)	3.5 (3 - 4)
4-lane two-way	8	5	7.0 (6 - 8)	4.0 (3 - 5)
6-lane two-way	8	5	8.0 (7 - 9)	5.0 (4 - 6)
Merge from acceleration lane	3	2	3.0 (2.5 - 3.5)	2.0 (1.5 - 2.5)

Notes (1) to (3) below are not included in the AUSTROADS Guides.

(1) This is considered to apply to left-turn movements from minor road, as well as slip-lane left-turn movements from minor road.

(2) This case is relevant to two-way major road conditions with one direction of the major road opposing (1-lane, 2-lane or 3-lane).

(3) The conditions specified (one-way, 2-lane two-way, 4-lane two-way, 6-lane two-way) are relevant to the opposing movement lanes on the major road.

Source: RMS Traffic Modelling Guidelines

Capacity Adjustment

Capacity adjustment inputs have been maintained as the SIDRA default values, with the exception of the Mother Teresa site access which has been adjusted in accordance with the site conditions as observed at the time of the traffic surveys.

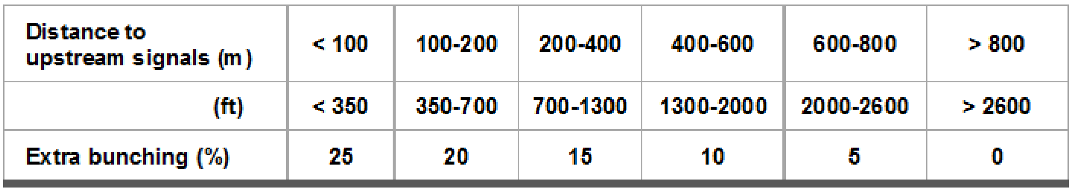
Notably, the Kiss and Drop facility, which is accessed via this driveway, has recently been upgraded to improve the site conditions (as explained in Sections 6.7 and 8.4 of the updated TAIA report) . Therefore, the future operating conditions of this intersection in reality would be expected to be better than the conditions shown by the modelling.

Extra Bunching

Site observations and traffic survey footage captured vehicles arriving and departing intersections in platoons as a result of multiple traffic signals along Darcy Road and Hawkesbury Road being located closely together.

As such, an extra bunching factor has been applied to intersection approaches adjacent to signalised intersections along Darcy Road and Hawkesbury Road. Extra bunching factors have been applied in accordance with Table 5.2.1 of the SIDRA Intersection 8 User Guide which has been reproduced in Figure 18 below. Distances to upstream signals are based on measurements taken from Nearmap aerial imagery.

Figure 18: Extra Bunching Factors



Distance to upstream signals (m)	< 100	100-200	200-400	400-600	600-800	> 800
(ft)	< 350	350-700	700-1300	1300-2000	2000-2600	> 2600
Extra bunching (%)	25	20	15	10	5	0

Source: SIDRA Intersection 8 User Guide

SIDRA Modelling Results

SIDRA modelling results for existing and future scenarios and mitigation measures have been presented and discussed in detail in Chapter 8 of the updated TAIA report.

Summary

The Transport Planning Partnership (TTPP) has prepared an updated Transport and Accessibility Impact Assessment in response to comments provided by the agencies throughout the Response to Submissions stage of the SSD Application.

As requested by DPIE, the calibration and validation details of the SIDRA network modelling have been provided in this report.

We trust the above is to your satisfaction. Should you have any queries regarding the above or require further information, please do not hesitate to contact the undersigned on 8437 7800.

Yours sincerely,

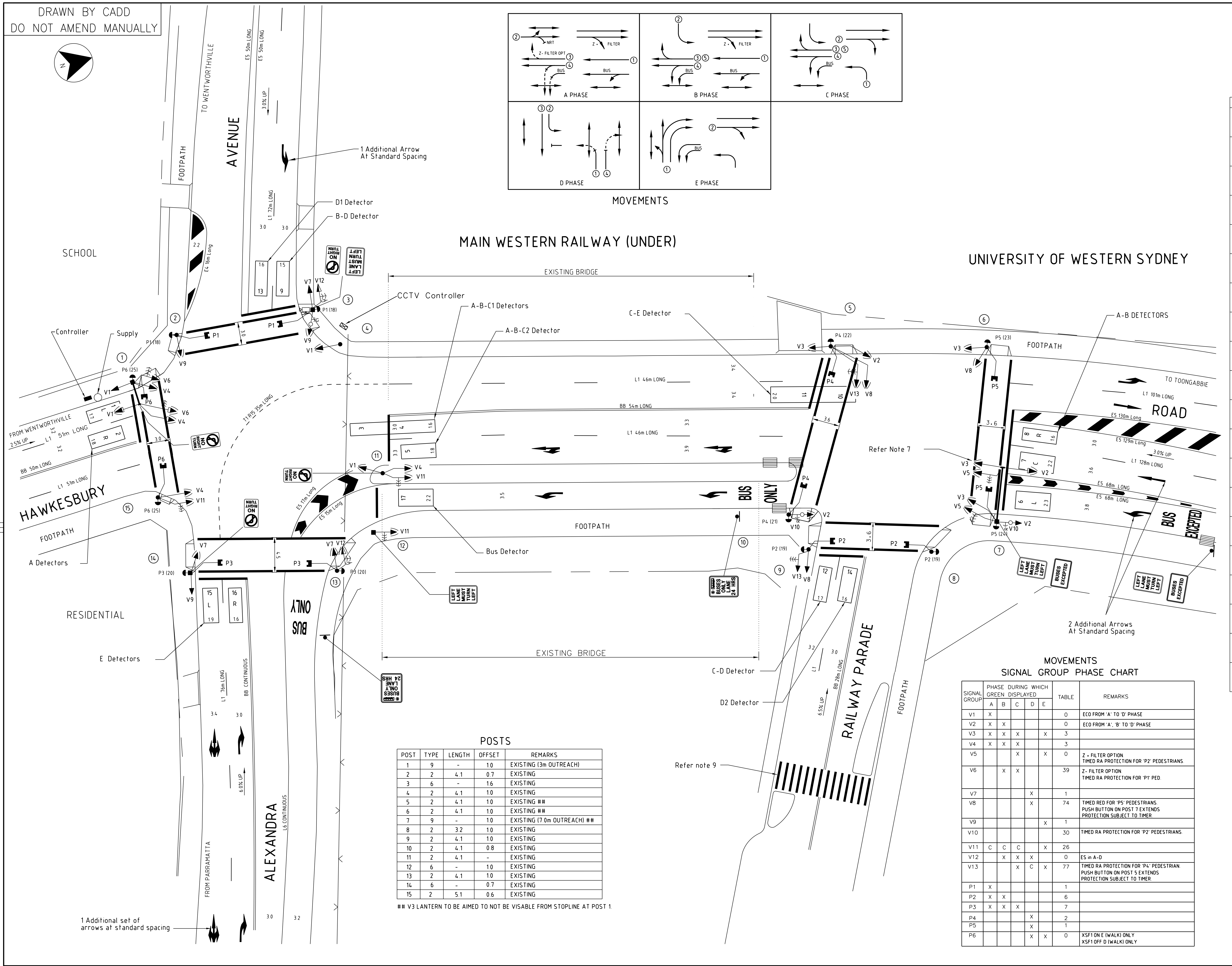
Ken Hollyoak
Director

Attachment One:

Traffic Control Signal (TCS) Plans

7000.205.VV.1571

DATE IN SERVICE : 10/11/1978



MOVEMENTS

DETECTOR SPECIFICATION

DETECTOR	SPECIFICATIONS				
A	FN	A(L)	A(E2)		
	SG/PS	$\overline{A}$	A		
	DS	-	-		
A-B-C1 App & Dep	FN	B(PR)	B(E5)		C(E5)
	SG/PS	A	B		C
	DS	-	A(NEXT). $\overline{C(NEXT)}$		A(NEXT). $\overline{B(NEXT)}$
A-B-C1 Approach	FN	A(L).B(L).C(L)		A(E3)	
	SG/PS	$\overline{V4}$		A	
	DS	-		$\overline{A-B-C1(PR)}$. $\overline{B(NEXT)}$. $\overline{C(NEXT)}$	
Cont A-B-C1 Approach	FN	B(E3)		C(E3)	
	SG/PS	B		C	
	DS	$\overline{C(NEXT)}$		$\overline{B(NEXT)}$	
A-B-C2	FN	A(L)	A(E4)		B(E4)
	SG/PS	$\overline{V4}$	A		B
	DS	$\overline{C}$	$\overline{B(NEXT)}$. $\overline{C(NEXT)}$		$\overline{P3(PB)}$.$\overline{A(NEXT)}$. $\overline{C(NEXT)}$
Cont A-B-C2	FN	C(E4)			
	SG/PS	C			
	DS	$\overline{P3(PB)}$.$\overline{A(NEXT)}$. $\overline{B(NEXT)}$			
A-B	FN	A(L).B(L)	A(E1)		B(E1)
	SG/PS	$\overline{V2}$	A		B
	DS	-	$\overline{B(NEXT)}$		$\overline{A(NEXT)}$
B-D	FN	B(PR)	B(E2)	D(E2)	
	SG/PS	$\overline{B}$. $\overline{D}$	B	D	
	DS	$\overline{D}$	$\overline{D(NEXT)}$	$\overline{B(NEXT)}$	
C-E App	FN	C(L)	C(E2)	E(E2)	
	SG/PS	$\overline{V3}$	C	E	
	DS	-	$\overline{E(NEXT)}$	$\overline{C(NEXT)}$	
C-E Dep and app	FN	C	C(E2)	E(E2)	
	SG/PS	A.B	C	E	
	DS	-	$\overline{E(NEXT)}$	$\overline{C(NEXT)}$	
C-D	FN	C(PR)	C(E1)	D(E1)	
	SG/PS	$\overline{C}$.$\overline{D}$	C	D	
	DS	$\overline{D}$	$\overline{D(NEXT)}$	$\overline{C(NEXT)}$	
D1	FN	D(L)	D(E3)		
	SG/PS	$\overline{D}$	D		
	DS	-	-		
D2	FN	D(L)	D(E4)		
	SG/PS	$\overline{D}$	D		
	DS	-	-		
E	FN	E(L)	E(E1)		
	SG/PS	$\overline{E}$	E		
	DS	-	-		
P1 PB	FN	A(PB)	E(L)		
	SG/PS	$\overline{P1(WALK)}$	A. $\overline{P1(WALK)}$		
	DS	-	$\overline{B}$.$\overline{C}$.$\overline{D}$.$\overline{E}$		
P2 PB	FN	A(PB)		C(L)	
	SG/PS	$\overline{V2}$.$\overline{P2(WALK)}$		V2. $\overline{P2(WALK)}$	
	DS	$\overline{B}$		$\overline{C}$.$\overline{D}$	
P3 PB	FN	A(PB)	E(L)		
	SG/PS	$\overline{P3(WALK)}$	A. $\overline{P3(WALK)}$		
	DS	-	$\overline{B}$.$\overline{C}$.$\overline{D}$.$\overline{E}$		
P4 PB	FN	D(PB)	A(L)		
	SG/PS	$\overline{P4(WALK)}$	D. $\overline{P4(WALK)}$		
	DS	-	$\overline{A}$.$\overline{B}$.$\overline{C}$.$\overline{E}$		
P5 PB	FN	D(PB)	A(L)		
	SG/PS	$\overline{P5(WALK)}$	D. $\overline{P5(WALK)}$		
	DS	-	$\overline{A}$.$\overline{B}$.$\overline{C}$.$\overline{E}$		
P6 PB	FN	E(PB)	D(PB)	A(L)	
	SG/PS	$\overline{E}$	$\overline{D}$	E.D. $\overline{P6(WALK)}$	
	DS	XSF1	$\overline{XSF1}$	$\overline{A}$.$\overline{B}$.$\overline{C}$	

MOVEMENTS
SIGNAL GROUP PHASE CHART

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAYED					TABLE	REMARKS
	A	B	C	D	E		
V1	X					0	ECO FROM 'A' TO 'D' PHASE
V2	X	X				0	ECO FROM 'A', 'B' TO 'D' PHASE
V3	X	X	X		X	3	
V4	X	X	X			3	
V5			X		X	0	Z + FILTER OPTION. TIMED RA PROTECTION FOR 'P2' PEDESTRIANS.
V6		X	X			39	Z- FILTER OPTION. TIMED RA PROTECTION FOR 'P1' PED.
V7				X		1	
V8				X		74	TIMED RED FOR 'P5' PEDESTRIANS. PUSH BUTTON ON POST 7 EXTENDS PROTECTION SUBJECT TO TIMER.
V9					X	1	
V10						30	TIMED RA PROTECTION FOR 'P2' PEDESTRIANS.
V11	C	C	C		X	26	
V12		X	X	X		0	ES in A-D
V13			X	C	X	77	TIMED RA PROTECTION FOR 'P4' PEDESTRIAN. PUSH BUTTON ON POST 5 EXTENDS PROTECTION SUBJECT TO TIMER.
P1	X					1	
P2	X	X				6	
P3	X	X	X			7	
P4				X		2	
P5				X		1	
P6				X	X	0	XSF1 ON E (WALK) ONLY XSF1 OFF D (WALK) ONLY

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	9	-	1.0	EXISTING (3m OUTREACH)
2	2	4.1	0.7	EXISTING
3	6	-	1.6	EXISTING
4	2	4.1	1.0	EXISTING
5	2	4.1	1.0	EXISTING ##
6	2	4.1	1.0	EXISTING ##
7	9	-	1.0	EXISTING (7.0m OUTREACH) ##
8	2	3.2	1.0	EXISTING
9	2	4.1	1.0	EXISTING
10	2	4.1	0.8	EXISTING
11	2	4.1	-	EXISTING
12	6	-	1.0	EXISTING
13	2	4.1	1.0	EXISTING
14	6	-	0.7	EXISTING
15	2	5.1	0.6	EXISTING

V3 LANTERN TO BE AIMED TO NOT BE VISABLE FROM STOPLINE AT POST 1.

NOTES

1. THIS SITE IS SCATS LINKED.
2. SPECIAL STOP SIGN R1-4 IS PLACED ON POSTS 3, 9 & 14.
3. ALL PUSH BUTTONS ARE AUDIO TACTILE.
4. KERB RAMPS TO BE CONSTRUCTED AT ALL PEDESTRIAN CROSSINGS IN ACCORDANCE WITH MODEL DRAWING MD.R173.B01.A.1.
5. COLOURED PAVEMENT ON BUS ONLY LANE TO BE PROVIDED IN ACCORDANCE WITH RTA SPECIFICATION R110 AND TECHNICAL DIRECTION 99/9. REFERENCE TO DRAWING LS-2020106 FOR THE COLOURED PAVEMENT LOCATION.
6. CIVIL ROAD WORKS AS SHOWN ON DRAWING RF-2030106.
7. 'V3' & 'V5' RT LANTERNS ON POST 7 ARE 200mm TO REDUCE VISIBILITY FROM STOP LINE AT POST 1.
8. CCTV CAMERA MOUNTED ON POST 3.
9. MFC, ASSOCIATED KERB BLISTERS & SIGNPOSTING TO BE REMOVED UPON SIGNALISATION OF RAILWAY PARADE.

A ORIGINAL ISSUE

B ISSUE: JI SM814 08/03/2012
MODIFY LANTERN LABELLING,
DETECTOR LOGIC, MOVEMENT
DIAGRAMS.
WAE COMPLETED BY CORRIGAN
ELECTRIC'S.
CCTV CAMERA HOUSING RELOCATED
REMOVED: CIVIL SET-OUT DETAILS.
T.J.B/T.E.B 24/08/2012

PUBLIC UTILITY LEGEND	
HYDRANT	☐
STOP VALVE	▲
GAS VALVE	#
SEWER MANHOLE	⊗
TELECOM PIT	◪
ELECT LIGHT POLE	ơ
POWER POLE	○
STAY POLE	⊘
TELEPHONE BOX	🅃
TELECOM PILLAR	◒

REFERENCE PLANS	
SYMBOLS/ABBS.	VD003-6
STD POSIT	VD001-5
DET SCHED EXP	VD018-10
PRES. DETECT	VC005-17
SSG DIS. SEQ.	VD018-8
SURVEYOR : LCPL	
DATE : 2005	

U.B.D.Ref. 190 M16
I.S.G. CO-ORDS. E: 298 680 N: 1 257 600

DESIGNED B.A.

CHECKED T.B.

SITE CHECKED
PP
RECOMMENDED

DESIGN APPROVAL
APPROVED
POSITION SENIOR ENGINEER
DATE 21/9/06

DESIGN PREPARED BY
MAUNSELL | AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

RTA RECOMMENDED
RECOMMENDED
Paul
POSITION NETWORK OPERATIONS LEADER
DATE 29.9.06

RTA ACCEPTANCE
RECOMMENDED
POSITION
DATE

ACCEPTED
POSITION ROAD NETWORK MANAGER
DATE 9.10.06

Roads and Traffic Authority,N.S.W

HOLROYD COUNCIL AREA
TRAFFIC SIGNALS AT
HAWKESBURY RD, ALEXANDRA AVE AND RAILWAY PDE
WESTMEAD

DESIGN LAYOUT

TCS No 1571

EXISTING ☒ PROPOSED ☐

CADD FILE: VV.1571_13B.dgn

SCALE: SCALE 1:200 AT B1 SIZE 2 0 2 4 6 8 10

ISSUE B

FILE 205 TS 251

SUPERSEDES SHEET/ISSUE 13/A

REGN. 7000.205.VV.1571

SHEET 13

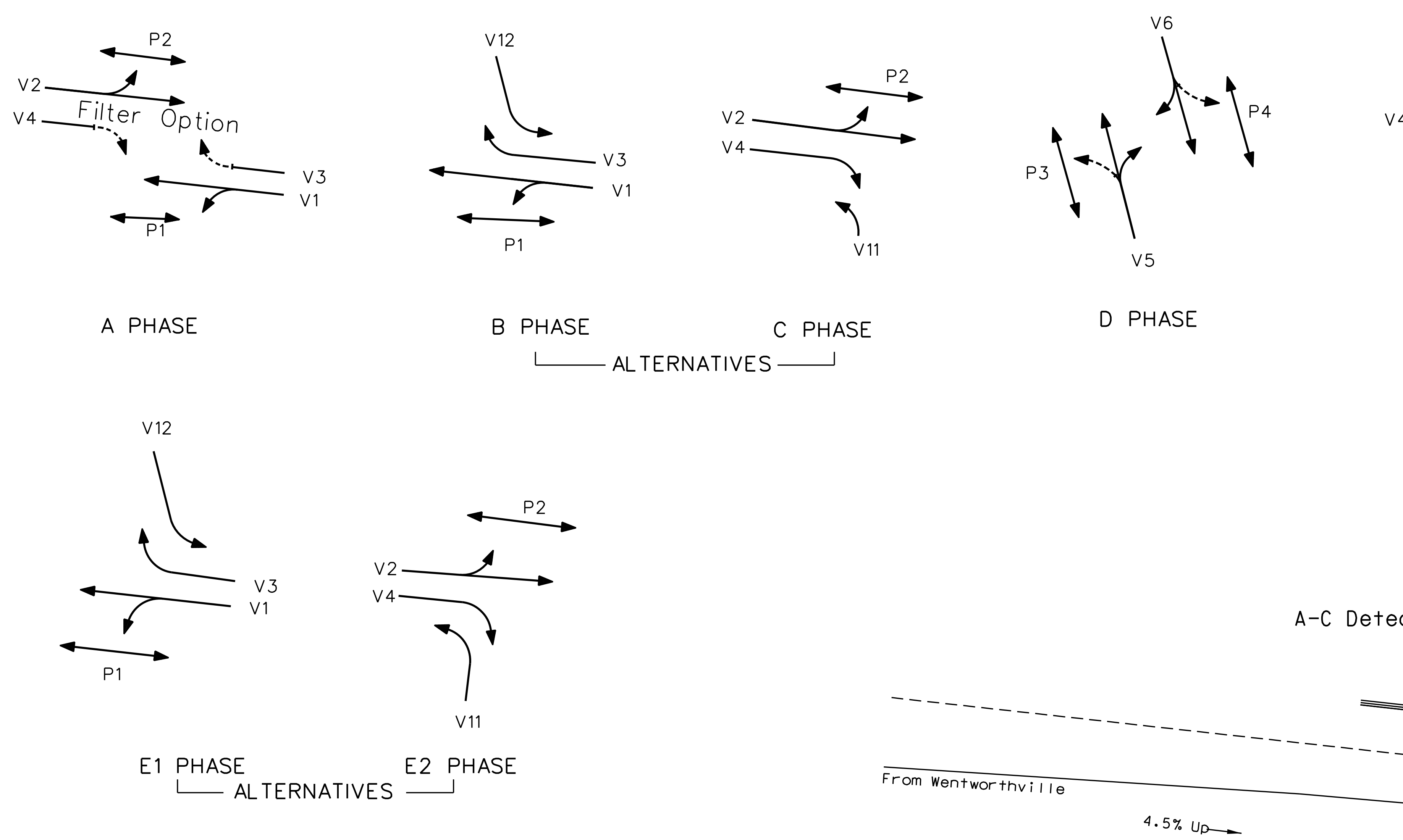
24/08/2012 10:27:09 AM K:*Signals*TCS*vv1500-vv1599*vv1571*VV1571_13B.dgn

7000.354.VV.1630

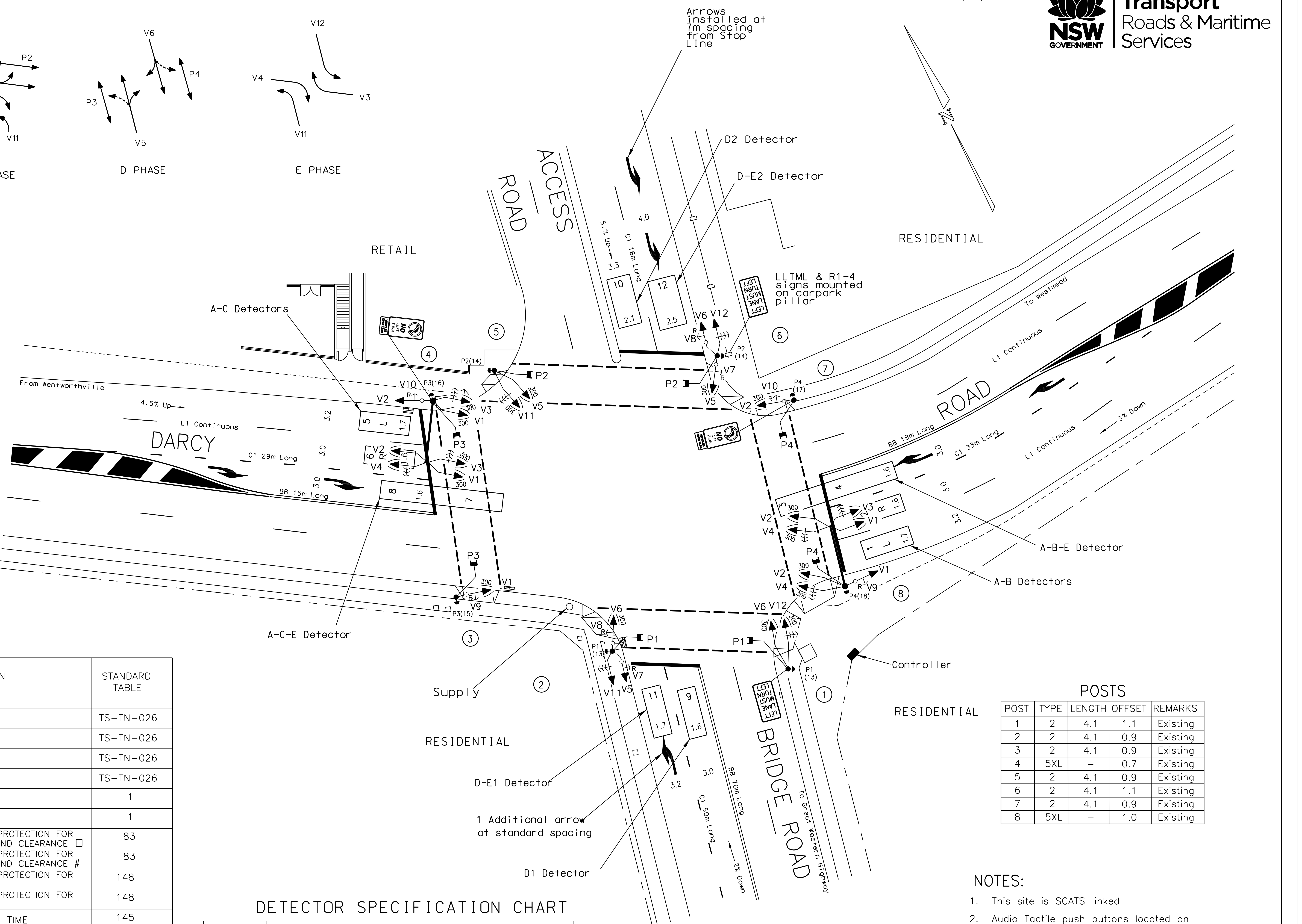
DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 1/12/1995

NSW GOVERNMENT Transport Roads & Maritime Services



MOVEMENTS



POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.1	Existing
2	2	4.1	0.9	Existing
3	2	4.1	0.9	Existing
4	5XL	–	0.7	Existing
5	2	4.1	0.9	Existing
6	2	4.1	1.1	Existing
7	2	4.1	0.9	Existing
8	5XL	–	1.0	Existing

NOTES:

1. This site is SCATS linked
2. Audio Tactile push buttons located on post 1, 2, 3, 4, 5, 6, 7 and 8
3. Special STOP sign (R1–4) attached to posts 2 & carpark pillar adjacent Post 6.
4. Single Diamond Overlap phasing in accordance with standard TS–TN–026.

SIGNAL GROUP / PHASE CHART

SIGNAL GROUP	PHASE WHEN GREEN							OVERLAPS PERMITTED	OVERLAP CONDITIONS	DURATION OF R.A.	STANDARD TABLE
	A	B	C	D	E	E1	E2				
V1	X	X				X		E1/A/B B/A A/E1*	*P1 NOT RUNNING		TS–TN–026
V2	X		X				X	E2/A/C C/A A/E2*	*P2 NOT RUNNING		TS–TN–026
V3		X			X	X		E/E1 B/E			TS–TN–026
V4			X		X		X	E/E2 C/E			TS–TN–026
V5				X							1
V6				X							1
V7										TIMED RA PROTECTION FOR P4 WALK AND CLEARANCE ☐	83
V8										TIMED RA PROTECTION FOR P3 WALK AND CLEARANCE #	83
V9										TIMED RA PROTECTION FOR P1 WALK	148
V10										TIMED RA PROTECTION FOR P2 WALK	148
V11			X		X		X	C/D* C/E E/E2		# ARROW TIME	145
V12		X			X	X		E/A*		☐ ARROW TIME	145
P1	X	X				X		E1/A/B			109
P2	X		X				X	E2/A/C			109
P3				X							2
P4				X							2

PB ON POST 4 EXTENDS RA PROTECTION SUBJECT TO TIMER
☐ PB ON POST 8 EXTENDS RA PROTECTION SUBJECT TO TIMER

DETECTOR SPECIFICATION CHART

Detector	Specifications			
D–E1	FN	E2(PR)	D(E3)	E(E3)
	SG/PS	$\overline{V5}.\overline{V11}$	D	E
	DS	$\overline{D}$	RED NEXT	RED NEXT
D–E2	FN	E1(NL)	D(E4)	E(E4)
	SG/PS	$\overline{V6}.\overline{V12}$	D	E
	DS	$\overline{D}$	RED NEXT	RED NEXT

A ORIGINAL ISSUE

'B' ISSUE - Amended design re-approval details. M.M 05/2013

'B' ISSUE - Recon WAE LLTML signs added, D3 det now D-E2 CNJ 05/2013

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
DET SCHED EXP	VD018–10
PRES. DETECT	VC005–17
SSG DIS. SEQ.	VD018–8
VEH. GROUP OP	TS–TN–019
DET. LOGIC OP	TS–TN–020
PED. MOVEMENT OP	TS–TN–021
SURVEYOR : Mapstead & Ass.	
DATE : 2008	

U.B.D.Ref 190 J14
I.S.G. CO–ORDS E: 298 030 N: 1 258 090
DESIGNED VCT
CHECKED AM
RW
SITE CHECKED
AM
RECOMMENDED

DESIGN APPROVAL
APPROVED
ROSS NETTLE
POSITION DIRECTOR
DATE 25.08.10
DESIGN PREPARED BY
TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

RMS ACCEPTANCE
RECOMMENDED
Neil C. Leitch
POSITION N.O.T.L.
DATE 15.3.12
ACCEPTED
POSITION RN Mgr
DATE 16/3/12

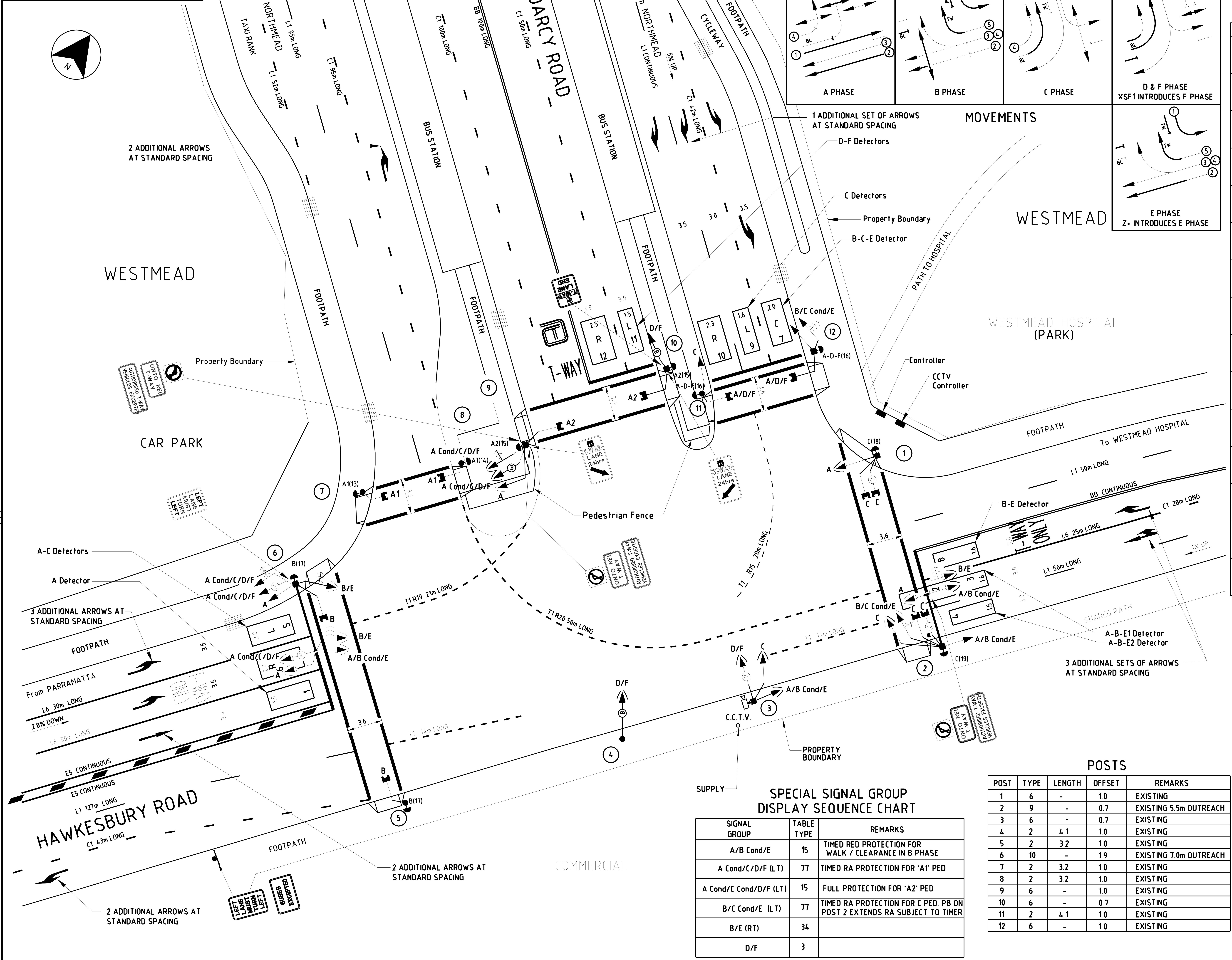
ROADS AND MARITIME SERVICES
PARRAMATTA CITY COUNCIL AREA
TRAFFIC SIGNALS AT THE INTERSECTION OF
DARCY ROAD, BRIDGE ROAD
AND ACCESS ROAD
WESTMEAD
DESIGN LAYOUT
TCS No 1630

EXISTING ☒ PROPOSED ☐
CADD FILE: VV1630_4C.dgn
SCALE 5 0 (1:200) 5 10
ISSUE C
FILE 354 TS 518
SUPERSEDES SHEET/ISSUE 4B
REGN. 7000.354.VV.1630
SHEET 4

7000.354.VV.1631

DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 11/08/80



DETECTOR SPECIFICATION

DETECTOR	SPECIFICATIONS					
A	FN	A(L)	A(E1)			
	SG/PS	$\overline{A}$	A			
	DS	–	–			
A-B-E1 App.&Dep.	FN	B(PR)	E(PR)	B(E4)	E(E4)	
	SG/PS	A	A	B	E	
	DS	–	Z+	A(NEXT)	A(NEXT)	
A-B-E1 App.	FN	A(L).B(L)	E(L)	A(E3)		B(E3)
	SG/PS	$\overline{A}.\overline{B}.\overline{E}$	$\overline{A}.\overline{B}.\overline{E}$	A		B
	DS	–	Z+	$\overline{\text{A-B-E1(PR)}}.\ \overline{\text{B(NEXT)}}.\ \overline{\text{E(NEXT)}}$		$\overline{\text{A(NEXT)}}.\ \overline{\text{E(NEXT)}}$
A-B-E1 App. CONT	FN	E(E3)				
	SG/PS	E				
	DS	$\overline{\text{A(NEXT)}}.\ \overline{\text{B(NEXT)}}$				
A-B-E2	FN	A(L)	A(E2)	B(E2)	E(E2)	
	SG/PS	$\overline{A}.\overline{B}.\overline{E}$	A	B	E	
	DS	–	$\overline{\text{B(NEXT)}}.\ \overline{\text{E(NEXT)}}$	$\overline{\text{A(NEXT)}}.\ \overline{\text{E(NEXT)}}$	$\overline{\text{A(NEXT)}}.\ \overline{\text{B(NEXT)}}$	
A-C	FN	C(PR)	A(E4)	C(E4)		
	SG/PS	$\overline{A}.\overline{C}$	A	C		
	DS	$\overline{A}$	$\overline{\text{C(NEXT)}}$	$\overline{\text{A(NEXT)}}$		
B-C-E	FN	B(PR)	E(PR)	B(E1)	C(E1)	E(E1)
	SG/PS	$\overline{B}.\overline{C}.\overline{E}$	$\overline{B}.\overline{C}.\overline{E}$	B	C	E
	DS	$\overline{C}$	Z+.$\overline{C}$	$\overline{\text{C(NEXT)}}.\ \overline{\text{E(NEXT)}}$	$\overline{\text{B(NEXT)}}.\ \overline{\text{E(NEXT)}}$	$\overline{\text{B(NEXT)}}.\ \overline{\text{C(NEXT)}}$
B-E	FN	B(L)	E(L)	B(E5)	E(E5)	
	SG/PS	$\overline{B/E}$	$\overline{B/E}$	B	E	
	DS	–	Z+	$\overline{\text{E(NEXT)}}$	$\overline{\text{B(NEXT)}}$	
C	FN	C(L)	C(E2)			
	SG/PS	$\overline{C}$	C			
	DS	–	–			
D-F	FN	D(L)	F(L)	D(E1)	F(E1)	
	SG/PS	$\overline{D/F}$	$\overline{D/F}$	D	F	
	DS	–	XSF1	F$\overline{\text{(NEXT)}}$	D$\overline{\text{(NEXT)}}$	
A1 P.B.	FN	A(PB)	C(L)			
	SG/PS	$\overline{\text{A1(WALK)}}$	A. $\overline{\text{A1(WALK)}}$			
	DS	–	$\overline{B}.\overline{C}.\overline{D}.\overline{E}.\overline{F}$			
A2 P.B.	FN	A(PB)	B(L)			
	SG/PS	$\overline{\text{A2(WALK)}}$	A. $\overline{\text{A2(WALK)}}$			
	DS	–	$\overline{B}.\overline{C}.\overline{D}.\overline{E}.\overline{F}$			
A-D-F P.B.	FN	A(PB)		REWALK		
	SG/PS	$\overline{\text{A/D/F(WALK)}}$		A/D/F. $\overline{\text{A/D/F(WALK)}}$		
	DS	$\overline{D}.\overline{F}$		$\overline{B}.\overline{C}.\overline{E}$		
B P.B.	FN	B(PB)	A(L)			
	SG/PS	$\overline{\text{B(WALK)}}$	B. $\overline{\text{B(WALK)}}$			
	DS	-	$\overline{A}.\overline{C}.\overline{D}.\overline{E}.\overline{F}$			
C P.B.	FN	C(PB)	A(L)			
	SG/PS	$\overline{\text{C(WALK)}}$	C. $\overline{\text{C(WALK)}}$			
	DS	–	$\overline{A}.\overline{B}.\overline{D}.\overline{E}.\overline{F}$			

NOTES

1. THIS SITE IS SCATS LINKED.
2. SPECIAL STOP SIGN R1-4 IS PLACED ON POSTS 10 AND 12.
3. ALL PUSH BUTTONS ARE AUDIO TACTILE EXCEPT ON POSTS 8, 9, 10 & 11 WHICH ARE TACTILE ONLY.
4. CCTV MOUNTED ON POST No.3.
5. NINE ASPECT LANTERNS TO BE MOUNTED HORIZONTALLY ON POSTS 6 AND 9.

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE CHART

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B Cond/E	15	TIMED RED PROTECTION FOR WALK / CLEARANCE IN B PHASE
A Cond/C/D/F (LT)	77	TIMED RA PROTECTION FOR 'A1' PED
A Cond/C Cond/D/F (LT)	15	FULL PROTECTION FOR 'A2' PED
B/C Cond/E (LT)	77	TIMED RA PROTECTION FOR C PED. PB ON POST 2 EXTENDS RA SUBJECT TO TIMER
B/E (RT)	34	
D/F	3	

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	6	-	1.0	EXISTING
2	9	-	0.7	EXISTING 5.5m OUTREACH
3	6	-	0.7	EXISTING
4	2	4.1	1.0	EXISTING
5	2	3.2	1.0	EXISTING
6	10	-	1.9	EXISTING 7.0m OUTREACH
7	2	3.2	1.0	EXISTING
8	2	3.2	1.0	EXISTING
9	6	-	1.0	EXISTING
10	6	-	0.7	EXISTING
11	2	4.1	1.0	EXISTING
12	6	-	1.0	EXISTING

'B' ISSUE - RECONSTRUCTION WAE.
B LANTERN WAS A COND/C COND/D/F. A &
A/C PED NOW A1 & A2 PEDS.
CORRIGAN'S 11/07

PUBLIC UTILITY LEGEND	
HYDRANT	□
STOP VALVE	▲
GAS VALVE	⌗
SEWER MANHOLE	⊗
TELECOM PIT	◪
ELECT LIGHT POLE	ơ
POWER POLE	○
STAY POLE	⌀
TELEPHONE BOX	🅃
TELECOM PILLAR	◕

REFERENCE PLANS	
SYMBOLS/ABBS.	VD003-6
STD POSIT	VD001-5
DET SCHED EXP	VD018-10
PRES. DETECT	VC005-17
SSG DIS. SEQ.	VD018-8
SURVEYOR : LCPL	
DATE : 2005	

U.B.D.Ref. 190 M15
I.S.G. CO-ORDS. E: 298 802 N: 1 257 820
DESIGNED B.A.
CHECKED T.B.
SITE CHECKED
RECOMMENDED

DESIGN APPROVAL
APPROVED
POSITION PROJECT MANAGER
DATE 16.6.06
DESIGN PREPARED BY
MAUNSELL | AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

RTA RECOMMENDED
RECOMMENDED
POSITION NETWORK OPERATIONS LEADER
DATE 16.6.06

RTA ACCEPTANCE
CONFIRMATION
POSITION
DATE
ACCEPTED
POSITION ROAD NETWORK MANAGER
DATE 16.6.06

Roads and Traffic Authority,N.S.W

PARRAMATTA CITY COUNCIL AREA
TRAFFIC SIGNALS AT
HAWKESBURY ROAD, DARCY ROAD
WESTMEAD

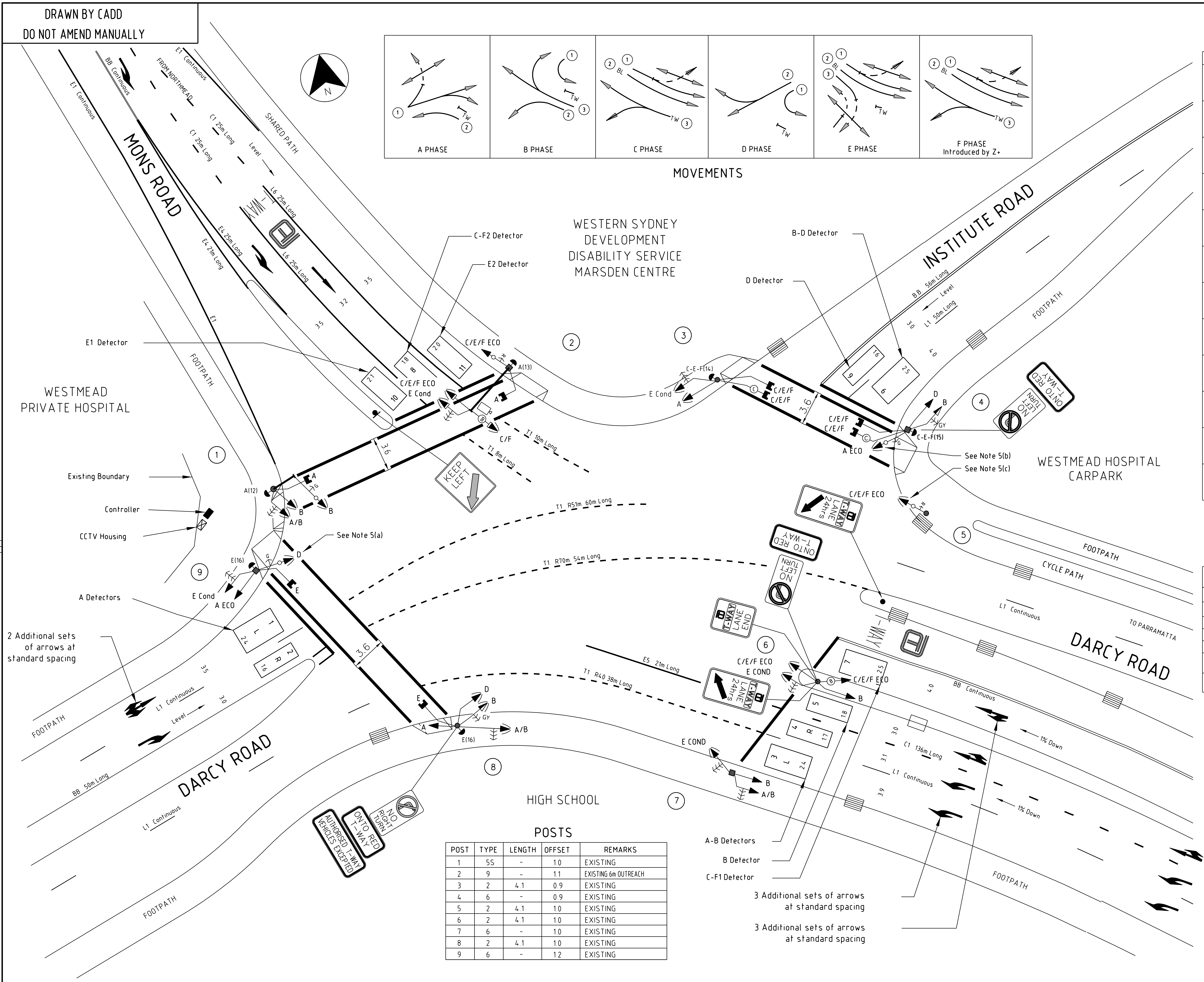
DESIGN LAYOUT
TCS No 1631

EXISTING ☒ PROPOSED ☐
CADD FILE: VV1631_16B.dgn
SCALE 1 : 200 2 0 2 4 6 8 10m
ISSUE B
FILE 354 TS 458
SUPERSEDES SHEET/ISSUE 16A
REGN. 7000.354.VV.1631
SHEET 16

7000.354.VV.2393

DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 20.03.07



DETECTOR SPECIFICATION

DETECTOR	SPECIFICATIONS				
A	FN	A(L)	A(E1)		
	SG/PS	$\overline{A}$	A		
	DS	-	-		
A-B	FN	A(L)	A(E2)	B(E2)	
	SG/PS	$\overline{A/B}$	A	B	
	DS	-	$\overline{B(NEXT)}$	$\overline{A(NEXT)}$	
B	FN	B(L)	B(E3)		
	SG/PS	$\overline{B}$	B		
	DS	-	-		
B-D	FN	D(PR)	B(E1)	D(E1)	
	SG/PS	$\overline{D}$	B	D	
	DS	-	$\overline{D(NEXT)}.\overline{B-D(PR)}$	-	
C-F1	FN	C(L)	F(L)	C(E1)	F(E1)
	SG/PS	$\overline{C/F}$	$\overline{C/F}$	C	F
	DS	-	Z+	$\overline{F(NEXT)}$	$\overline{C(NEXT)}$
C-F2	FN	C(L)	F(L)	C(E2)	F(E2)
	SG/PS	$\overline{C/E/F}$	$\overline{C/E/F}$	C	F
	DS	-	Z+	$\overline{F(NEXT)}$	$\overline{C(NEXT)}$
D	FN	D(L)	D(E2)		
	SG/PS	$\overline{D}$	D		
	DS	-	-		
E1	FN	E(L)	E(E1)		
	SG/PS	$\overline{E}$	E		
	DS	-	-		
E2	FN	E(L)	E(E2)		
	SG/PS	$\overline{C/E/F}$	E		
	DS	-	-		
A P.B.	FN	A(PB)	B(L)		
	SG/PS	$\overline{A(WALK)}$	A.$\overline{A(WALK)}$		
	DS	-	$\overline{B}.\overline{C}.\overline{D}.\overline{E}.\overline{F}$		
C-E-F P.B.	FN	E(PB)	A(L)		
	SG/PS	$\overline{E(WALK)}$	C/E/F. $\overline{C/E/F(WALK)}$		
	DS	-	$\overline{A}.\overline{B}.\overline{D}$		
E P.B.	FN	E(PB)	A(L)		
	SG/PS	$\overline{E(WALK)}$	E.$\overline{E(WALK)}$		
	DS	-	$\overline{A}.\overline{B}.\overline{C}.\overline{D}.\overline{F}$		

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE CHART

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B (LT)	11	
B (LT)	-	LATE START FROM A,C,D,E,F
C/E/F	-	OVERLAP NOT PREMITTED FROM E TO C,F
C/E/F(LT)	30	TIMED RA PROTECTION 'C/E/F' PEDESTRIAN
C/F ECO	3	ECO TO A AND E PHASES
E Cond (LT)	78	TIMED RA PROTECTION 'A' PEDESTRIAN PB ON POST 2 EXTENDS RA SUBECT TO TIMER
E/COND (RT)	72	FULL PROTECTION FOR E PED

NOTES

1. THIS SITE IS SCATS LINKED.
2. SPECIAL STOP SIGN R1-4 IS PLACED ON POSTS 2 & 4.
3. ALL PUSH BUTTONS ARE AUDIO TACTILE
4. CCTV CAMERA MOUNTED POST 2.

5.(a) THE GREEN ASPECT ON 'D' LANTERN IS FITTED WITH 400MM VISOR AND VERTICAL LOUVRES.

(b) THE GREEN ASPECT ON 'A' LANTERN IS FITTED WITH 400MM VISOR AND VERTICAL LOUVRES.

(c) THE GREEN ASPECT ON 'C/E/F' LANTERN IS FITTED WITH 400MM VISOR AND VERTICAL LOUVRES.

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	5S	-	1.0	EXISTING
2	9	-	1.1	EXISTING 6m OUTREACH
3	2	4.1	0.9	EXISTING
4	6	-	0.9	EXISTING
5	2	4.1	1.0	EXISTING
6	2	4.1	1.0	EXISTING
7	6	-	1.0	EXISTING
8	2	4.1	1.0	EXISTING
9	6	-	1.2	EXISTING

A ORIGINAL ISSUE

B ISSUE
RELOCATED: KERB DESIGN AND FOOTPATH AS PER RTA DESIGN. POST 8. PEDESTRIAN RAMP AND DRAINAGE PIT. WESTBOUND LINEMARKING ON DARCY RD.
REMOVED: CENTRE LINE TO DARCY RD. REDUNDANT DRAINAGE PITS ON MONS RD.
ADDED: MEDIAN ISLAND TO DARCY RD.
LCPL27/10/06

C ISSUE
NEW SITE WAE.
CCTV CAMERA ADDED
CORRIGAN'S 02/07

D ISSUE JI SM595 16/09/09
ADDED: 400mm VISORS & VERT LOUVRES TO GREEN ASPECT 'D' LANT POST 9, 'A' LANT POST 4 & 'C/E/F' LANT POST 5. NOTE 5.
D.A. 09/11/09

PUBLIC UTILITY LEGEND	
HYDRANT	☐
STOP VALVE	▲
GAS VALVE	⌗
SEWER MANHOLE	⊗
TELECOM PIT	◪
ELECT LIGHT POLE	○
POWER POLE	○
STAY POLE	⊘
TELEPHONE BOX	T
TELECOM PILLAR	◒

REFERENCE PLANS	
SYMBOLS/ABBS.	VD003-6
STD POSIT	VD001-5
DET SCHED EXP	VD018-10
PRES. DETECT	VC005-17
SSG DIS. SEQ.	VD018-8
SURVEYOR : LCPL	
DATE : 2005	

U.B.D.Ref. 190 L14
I.S.G. CO-ORDS. E: 298 380 N: 1 258 187
DESIGNED R.W.
CHECKED J.B.
SITE CHECKED
RECOMMENDED

DESIGN APPROVAL
APPROVED
POSITION PROJECT MANAGER
DATE 16.05.06
DESIGN PREPARED BY
MAUNSELL | AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

RTA RECOMMENDED
RECOMMENDED
POSITION NETWORK OPERATIONS LEADER
DATE 16.05.06

RTA ACCEPTANCE
CONFIRMATION
POSITION
DATE
ACCEPTED
POSITION RNMgr
DATE 16-5-2006

Roads and Traffic Authority,N.S.W

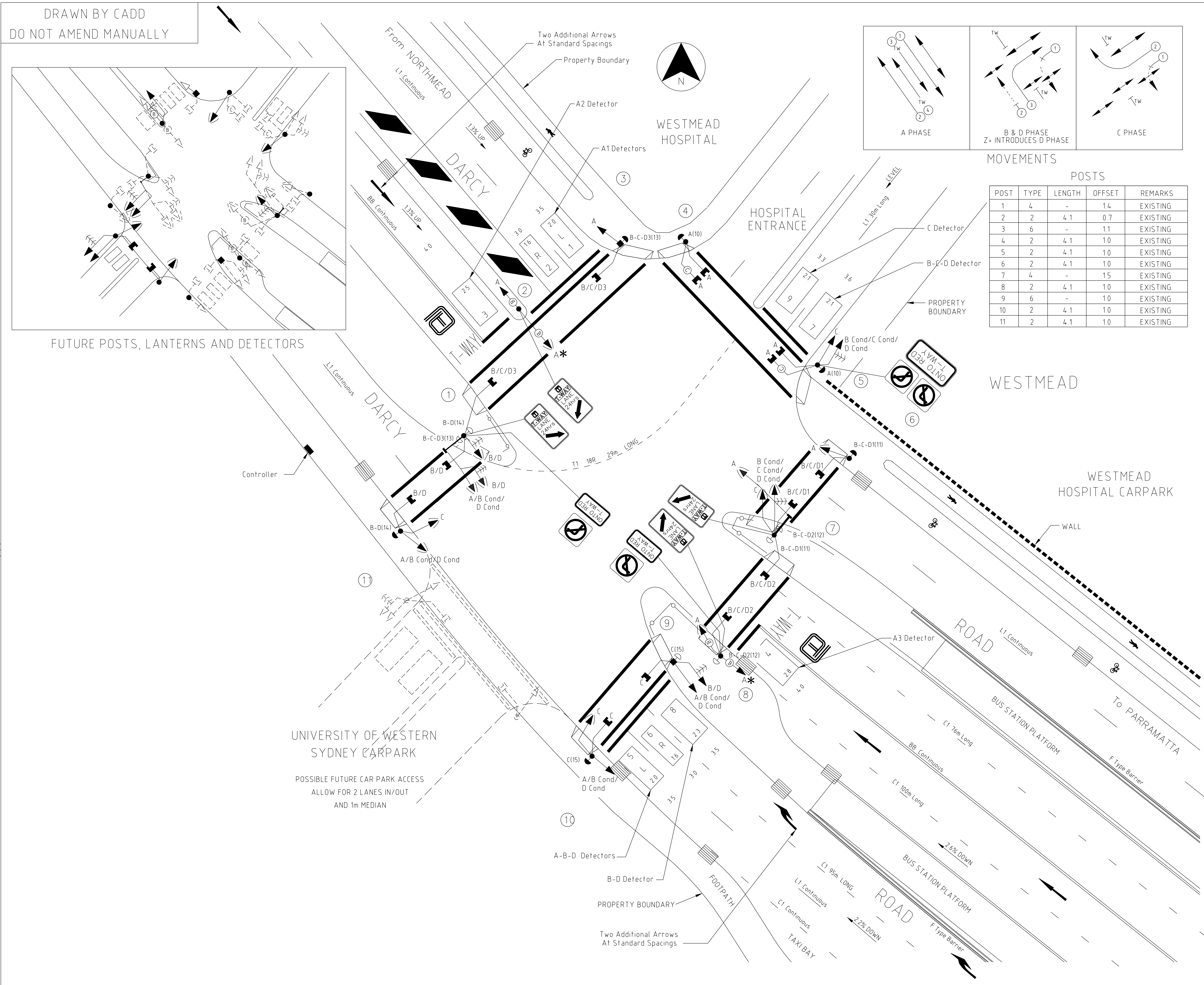
PARRAMATTA CITY COUNCIL AREA
TRAFFIC SIGNALS AT
DARCY ROAD, MONS ROAD AND NORTH WEST T-WAY
WESTMEAD

DESIGN LAYOUT
TCS No 2393

EXISTING ☒ PROPOSED ☐
CADD FILE: VV.2393_1D.dgn
SCALE SCALE 1:200 2 0 2 4 6 8 10
ISSUE D
FILE 354 TS 568
SUPERSEDES SHEET/ISSUE 1/C
REGN. 7000.354.VV.2393
SHEET 1

DRAWN BY CADD
DO NOT AMEND MANUALLY

DATE IN SERVICE : 27/05/98



FUTURE POSTS, LANTERNS AND DETECTORS

A PHASE

B & D PHASE
Z+ INTRODUCES D PHASE

C PHASE

MOVEMENTS

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	4	-	1.4	EXISTING
2	2	4.1	0.7	EXISTING
3	6	-	1.1	EXISTING
4	2	4.1	1.0	EXISTING
5	2	4.1	1.0	EXISTING
6	2	4.1	1.0	EXISTING
7	4	-	1.5	EXISTING
8	2	4.1	1.0	EXISTING
9	6	-	1.0	EXISTING
10	2	4.1	1.0	EXISTING
11	2	4.1	1.0	EXISTING

DETECTOR SPECIFICATION

DETECTOR	SPECIFICATIONS					
A1	FN	A(L)	A(E1)			
	SG/PS	$\overline{A}$	A			
	DS	-	-			
A2	FN	A(L)	A(E3)			
	SG/PS	$\overline{A}$	A			
	DS	-	-			
A3	FN	A(L)	A(E4)			
	SG/PS	$\overline{A}$	A			
	DS	-	-			
A-B-D	FN	A(L)		A(E2)	B(E2)	D(E2)
	SG/PS	$\overline{A/B\ Cond/D\ Cond}$		A	B	D
	DS	-		$\overline{B(NEXT)}$. $\overline{D(NEXT)}$	$\overline{A(NEXT)}$. $\overline{D(NEXT)}$	$\overline{A(NEXT)}$. $\overline{B(NEXT)}$
B-C-D	FN	B(PR)	D(PR)	B(E1)	C(E1)	D(E1)
	SG/PS	$\overline{B}$. $\overline{C}$. $\overline{D}$	$\overline{B}$. $\overline{C}$. $\overline{D}$	B	C	D
	DS	$\overline{C}$	Z+ .$\overline{C}$	$\overline{C(NEXT)}$. $\overline{D(NEXT)}$	$\overline{B(NEXT)}$. $\overline{D(NEXT)}$	$\overline{B(NEXT)}$. $\overline{C(NEXT)}$
B-D	FN	B(L)	D(L)	B(E3)	D(E3)	
	SG/PS	$\overline{B/D}$	$\overline{B/D}$	B	D	
	DS	-	Z+	$\overline{D(NEXT)}$	$\overline{B(NEXT)}$	
C	FN	C(L)	C(E2)			
	SG/PS	$\overline{C}$	C			
	DS	-	-			
A P.B.	FN	A(PB)	C(L)			
	SG/PS	$\overline{A(WALK)}$	A. $\overline{A(WALK)}$			
	DS	-	$\overline{B}$. $\overline{C}$. $\overline{D}$			
B-C-D1 P.B.	FN	B(PB)		A(L)		
	SG/PS	$\overline{B/C/D}$. $\overline{B/C/D1(WALK)}$		B/C/D. $\overline{B/C/D1(WALK)}$		
	DS	$\overline{C}.\overline{D}$		$\overline{A}$		
B-C-D2 P.B.	FN	B(PB)		A(L)		
	SG/PS	$\overline{B/C/D}$. $\overline{B/C/D2(WALK)}$		B/C/D. $\overline{B/C/D2(WALK)}$		
	DS	$\overline{C}.\overline{D}$		$\overline{A}$		
B-C-D3 P.B.	FN	B(PB)		A(L)		
	SG/PS	$\overline{B/C/D}$. $\overline{B/C/D3(WALK)}$		B/C/D. $\overline{B/C/D3(WALK)}$		
	DS	$\overline{C}.\overline{D}$		$\overline{A}$		
B-D P.B.	FN	B(PB)		A(L)		
	SG/PS	$\overline{B/D}$. $\overline{B/D(WALK)}$		B/D . $\overline{B/D(WALK)}$		
	DS	$\overline{D}$		$\overline{A}.\overline{C}$		
C P.B.	FN	C(PB)	A(L)			
	SG/PS	$\overline{C(WALK)}$	C. $\overline{C(WALK)}$			
	DS	-	$\overline{A}$. $\overline{B}$. $\overline{D}$			

SPECIAL SIGNAL GROUP
DISPLAY SEQUENCE CHART

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B Cond/D Cond	15	TIMED PED PROTECTION FOR B/D WALK & CLEARANCE
B Cond/C Cond/D Cond (LT)	Similar 45	TIMED RA PROTECTION FOR B/C/D1 PEDESTRIAN
B/D (RT)	34	
B/C/D1 P.B.	PED	WALK & CLEARANCE OVERLAP PERMITTED B<-->C<-->D
B/C/D2 P.B.	PED	WALK & CLEARANCE OVERLAP PERMITTED B<-->C<-->D
B/C/D3 P.B.	PED	WALK & CLEARANCE OVERLAP PERMITTED B<-->C<-->D

NOTES

1. THIS SITE IS SCATS LINKED.
2. SPECIAL STOP SIGN R1-4 IS PLACED ON POST 5.
3. ALL PUSH BUTTONS ARE AUDIO TACTILE (POSTS 1,7,8 & 9 ARE TACTILE ONLY BUTTONS).
4. PROVISION MADE IN CABLING AND DUCTING FOR FUTURE UNIVERSITY OF WESTERN SYDNEY ACCESS OPPOSITE HOSPITAL ACCESS AND SINGLE DIAMOND OVERLAP PHASING IN ACCORDANCE WITH VDQ18-5. AN ADDITIONAL DETECTOR SCREEN CABLE PROVIDED FOR FUTURE RIGHT TURN DETECTOR ON DARCY ROAD NORTHERN APPROACH.

7000.354.VV.3281

'B' ISSUE - TWAY WAE
PED'S B/C/D1, B/C/D2 &
B/C/D3 LABELLING
INTERCHANGED.
CORRIGANS 6/07

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 : LCPL	
TELECOM PILLAR	⊖	DATE : 2005	

U.B.D.Ref. 190 M15
I.S.G. CO-ORDS. E: 298 704 N: 1 257 927
DESIGNED B.A.
CHECKED T.B.
SITE CHECKED
RECOMMENDED

DESIGN APPROVAL
APPROVED
POSITION PROJECT MANAGER
DATE 9.6.06
DESIGN PREPARED BY
MAUNSELL | AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

RTA RECOMMENDED
RECOMMENDED
Paul
POSITION NETWORK OPERATIONS LEADER
DATE 13.6.06

RTA ACCEPTANCE
CONFIRMATION
POSITION
DATE
ACCEPTED
POSITION ROAD NETWORK MANAGER
DATE 14.6.06

Roads and Traffic Authority,N.S.W

PARRAMATTA CITY COUNCIL AREA
TRAFFIC SIGNALS AT
DARCY ROAD, WESTMEAD HOSPITAL ACCESS
AND NORTH WEST T-WAY
WESTMEAD

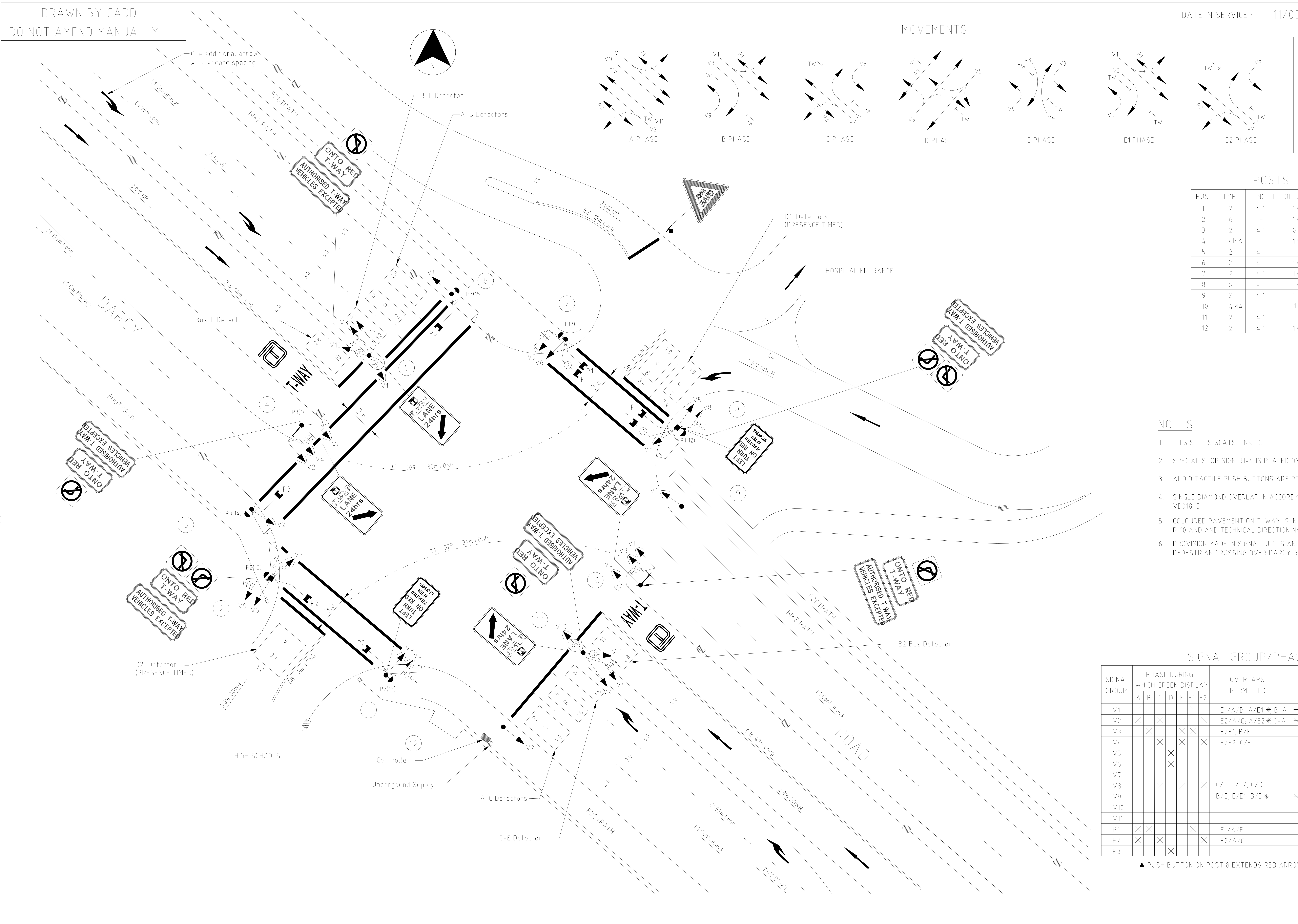
DESIGN LAYOUT
TCS No 3281

EXISTING ☒ PROPOSED ☐
CADD FILE: VV.3281_7B.dgn
SCALE 1:200 2 0 2 4 6 8 10m
ISSUE B
FILE 354 TS 545
SUPERSEDES SHEET/ISSUE 1 A
REGN. 7000.354.VV.3281
SHEET 7

DRAWN BY CADD
DO NOT AMEND MANUALLY

7000.354.VV.3282

DATE IN SERVICE : 11/03/98



POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	EXISTING
2	6	-	1.0	EXISTING
3	2	4.1	0.7	EXISTING
4	4MA	-	1.9	EXISTING
5	2	4.1	-	EXISTING
6	2	4.1	1.0	EXISTING
7	2	4.1	1.0	EXISTING
8	6	-	1.0	EXISTING
9	2	4.1	1.2	EXISTING
10	4MA	-	1.1	EXISTING
11	2	4.1	-	EXISTING
12	2	4.1	1.0	EXISTING

NOTES

1. THIS SITE IS SCATS LINKED.
2. SPECIAL STOP SIGN R1-4 IS PLACED ON POST 3 & 9.
3. AUDIO TACTILE PUSH BUTTONS ARE PROVIDED ON POSTS 3, 4,5, 8, 9 & 10.
4. SINGLE DIAMOND OVERLAP IN ACCORDANCE WITH STANDARD DRAWING VD018-5.
5. COLOURED PAVEMENT ON T-WAY IS IN ACCORDANCE WITH SPECIFICATION R110 AND AND TECHNICAL DIRECTION No 99/9
6. PROVISION MADE IN SIGNAL DUCTS AND CABLING FOR FUTURE PEDESTRIAN CROSSING OVER DARCY ROAD SOUTH

SIGNAL GROUP/PHASE CHART

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAY							OVERLAPS PERMITTED	OVERLAPS CONDITIONS	DURATION OF RA
	A	B	C	D	E	E1	E2			
V1	✕	✕				✕		E1/A/B; A/E1 ✳; B-A	✳ P1 NOT RUNNING	
V2	✕		✕				✕	E2/A/C; A/E2 ✳; C-A	✳ P2 NOT RUNNING	
V3		✕			✕	✕		E/E1, B/E		
V4			✕		✕		✕	E/E2, C/E		
V5				✕						
V6				✕						
V7										▲ ARROW TIME
V8			✕		✕		✕	C/E, E/E2, C/D		
V9		✕			✕	✕		B/E, E/E1, B/D ✳	✳ P3 NOT DEMANDED	▲ ARROW TIME
V10	✕									
V11	✕									
P1	✕	✕				✕		E1/A/B		
P2	✕		✕				✕	E2/A/C		
P3				✕						

▲ PUSH BUTTON ON POST 8 EXTENDS RED ARROW SUBJECT TO TIMER.

ORIGINAL ISSUE

B ISSUE – T-WAY WAE
POST 2 RELOCATED AWAY
FROM O/H POWER
CABLES.
CORRIGAN 02/07

PUBLIC UTILITY LEGEND	
HYDRANT	☐
STOP VALVE	△
GAS VALVE	⌗
SEWER MANHOLE	⊗
TELECOM PIT	▨
ELECT LIGHT POLE	○
POWER POLE	○
STAY POLE	⊘
TELEPHONE BOX	T
TELECOM PILLAR	⊖

REFERENCE PLANS	
SYMBOLS/ABBS.	VD003-6
STD POSIT	VD001-5
DET SCHED EXP	VD018-10
PRES. DETECT	VC005-17
SSG DIS. SEQ.	VD018-8
CABLE INST	SHEET 8
CABLE CHART	SHEET 9
SURVEYOR : LCPL	
DATE : 2005	

U.B.D.Ref. 190 L15
I.S.G. CO-ORDS. E: 298 564 N: 1 258 045

DESIGNED R.W.
CHECKED T.B.

SITE CHECKED
PP
RECOMMENDED

DESIGN APPROVAL
APPROVED
POSITION PROJECT MANAGER
DATE 16.6.06

DESIGN PREPARED BY
MAUNSELL | AECOM
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

RTA RECOMMENDED
RECOMMENDED
Paul
POSITION NETWORK OPERATIONS LEADER
DATE 16.6.06

RTA ACCEPTANCE
CONFIRMATION
POSITION
DATE

ACCEPTED
POSITION ROAD NETWORK MANAGER
DATE 16.6.06

Roads and Traffic Authority,N.S.W

PARRAMATTA CITY COUNCIL AREA
TRAFFIC SIGNALS AT
DARCY ROAD, HIGH SCHOOL ENTRANCE
AND NORTH WEST T-WAY WESTMEAD
WESTMEAD

DESIGN LAYOUT
TCS No 3282

EXISTING ☒ PROPOSED ☐
CADD FILE: VV 3282__7B.dgn
SCALE SCALE 1:200 2 0 2 4 6 8 10m
ISSUE B
FILE 354.TS.544
SUPERSEDES SHEET/ISSUE 4
REGN. 7000.354.VV.3282
SHEET 7