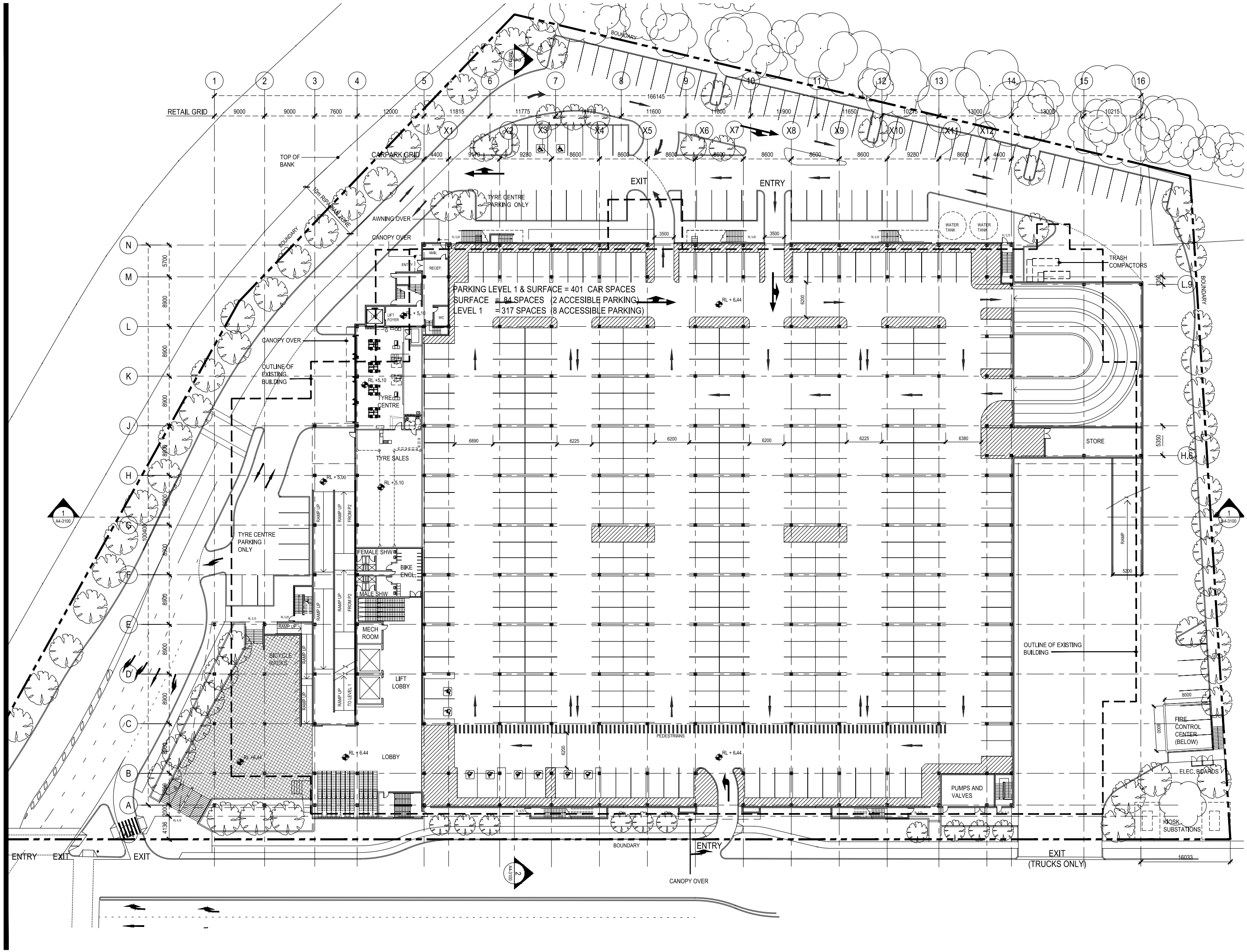

COSTCO WHOLESALE

AUBURN 01

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COSTCO WHOLESALE CORPORATION

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Costco.com

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stleonards@hughestrueman.com.au

McGREGOR COXALL

LANDSCAPE ARCHITECTURE
URBAN DESIGN
EIA

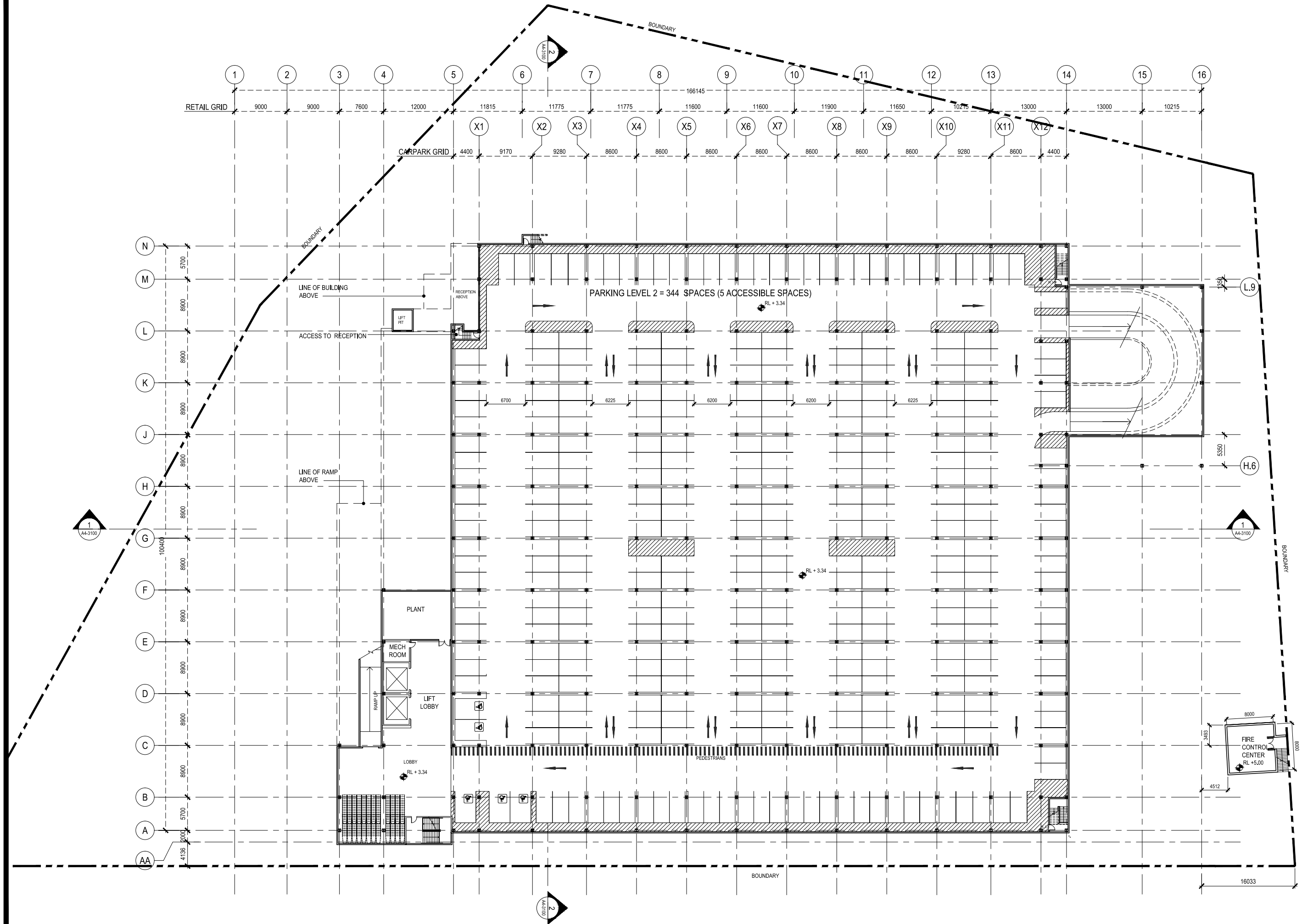
SCALE:1:250

△	DATE	DESCRIPTION
A	14/09/09	REVISION PART 3A
B	28/09/09	SUBMISSION PART 3A
C	22/01/10	REVISED SUBMISSION PART 3A
D	08/02/10	REVISED SUBMISSION PART 3A

FEBRUARY 08, 2010

GROUND FLOOR PLAN
PARKING 1

A1-2002-DA



SCALE: 1:250

0 1 2 4 6m

	DATE	DESCRIPTION
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B	28/09/09	SUBMISSION PART 3A
C	22/01/10	REVISED SUBMISSION PART 3A
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FEBRUARY 08, 2010

BASEMENT FLOOR PLAN
PARKING 2

A1-2001-DA

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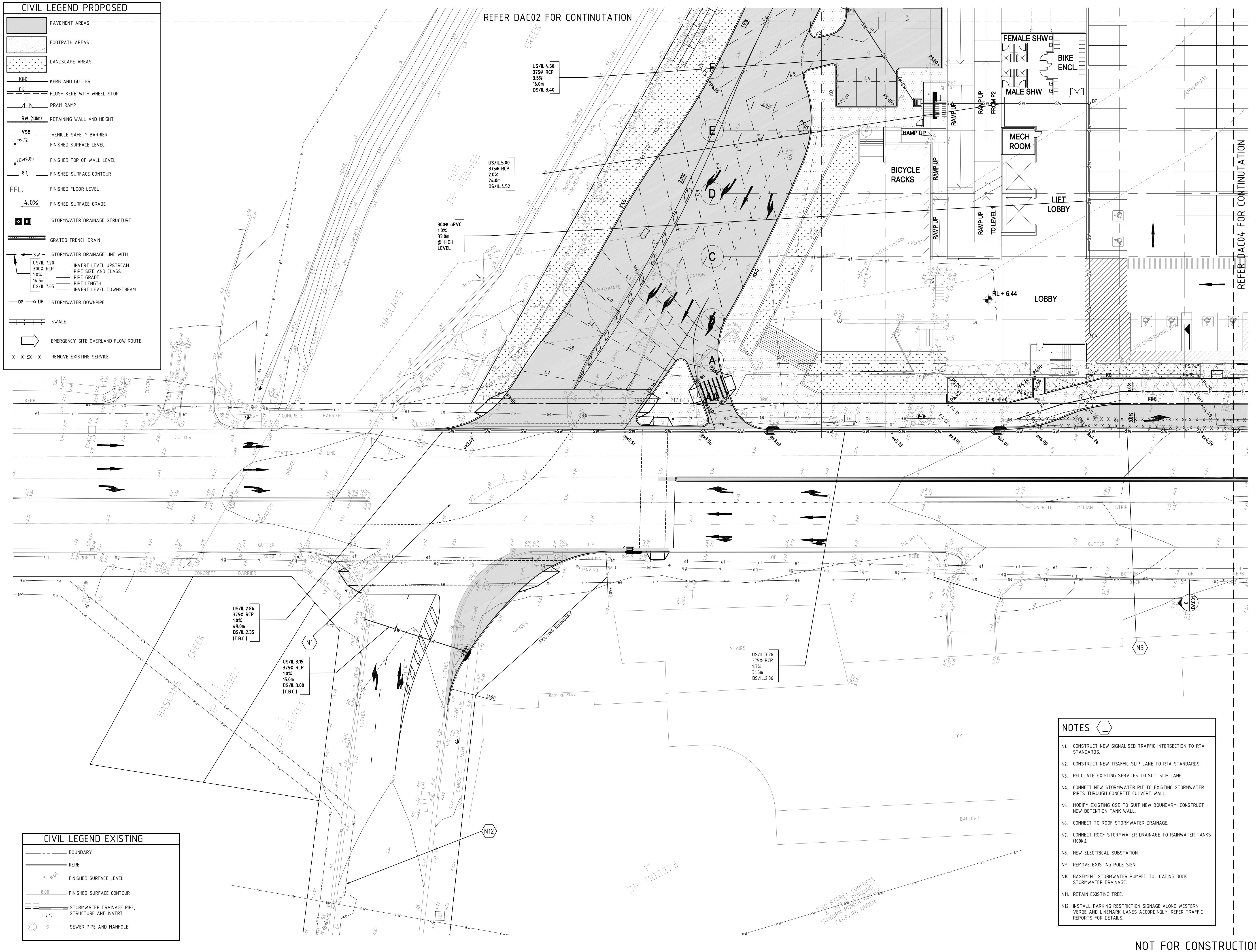
Appendix B Relevant Civil Plans



CIVIL LEGEND PROPOSED

- PAVEMENT AREAS
- FOOTPATH AREAS
- LANDSCAPE AREAS
- K&G — KERB AND GUTTER
- FK — FLUSH KERB WITH WHEEL STOP
- PRAM RAMP
- RW (1.0m) — RETAINING WALL AND HEIGHT
- VSB — VEHICLE SAFETY BARRIER
- P8.12 — FINISHED SURFACE LEVEL
- TOW9.00 — FINISHED TOP OF WALL LEVEL
- 8.1 — FINISHED SURFACE CONTOUR
- FFL. — FINISHED FLOOR LEVEL
- 4.0% — FINISHED SURFACE GRADE
- STORMWATER DRAINAGE STRUCTURE
- GRATED TRENCH DRAIN
- SW — STORMWATER DRAINAGE LINE WITH
  - US/IL.7.20 — INVERT LEVEL UPSTREAM
  - 300Ø RCP — PIPE SIZE AND CLASS
  - 1.0% — PIPE GRADE
  - 14.5m — PIPE LENGTH
  - DS/IL.7.05 — INVERT LEVEL DOWNSTREAM
- DP — DP — STORMWATER DOWNPIPE
- SWALE
- EMERGENCY SITE OVERLAND FLOW ROUTE
- X SX X — REMOVE EXISTING SERVICE

CIVIL LEGEND EXISTING

- BOUNDARY
- KERB
- 8.60 — FINISHED SURFACE LEVEL
- 8.00 — FINISHED SURFACE CONTOUR
- IL.7.17 — STORMWATER DRAINAGE PIPE, STRUCTURE AND INVERT
- S — SEWER PIPE AND MANHOLE

NOTES

N1. CONSTRUCT NEW SIGNALISED TRAFFIC INTERSECTION TO RTA STANDARDS.

N2. CONSTRUCT NEW TRAFFIC SLIP LANE TO RTA STANDARDS.

N3. RELOCATE EXISTING SERVICES TO SUIT SLIP LANE.

N4. CONNECT NEW STORMWATER PIT TO EXISTING STORMWATER PIPES THROUGH CONCRETE CULVERT WALL.

N5. MODIFY EXISTING OSD TO SUIT NEW BOUNDARY. CONSTRUCT NEW DETENTION TANK WALL.

N6. CONNECT TO ROOF STORMWATER DRAINAGE.

N7. CONNECT ROOF STORMWATER DRAINAGE TO RAINWATER TANKS (100kl).

N8. NEW ELECTRICAL SUBSTATION.

N9. REMOVE EXISTING POLE SIGN.

N10. BASEMENT STORMWATER PUMPED TO LOADING DOCK STORMWATER DRAINAGE.

N11. RETAIN EXISTING TREE.

N12. INSTALL PARKING RESTRICTION SIGNAGE ALONG WESTERN VERGE AND LINEMARK LANES ACCORDINGLY. REFER TRAFFIC REPORTS FOR DETAILS.

NOT FOR CONSTRUCTION

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Plan — Scale 1:200 @ B1

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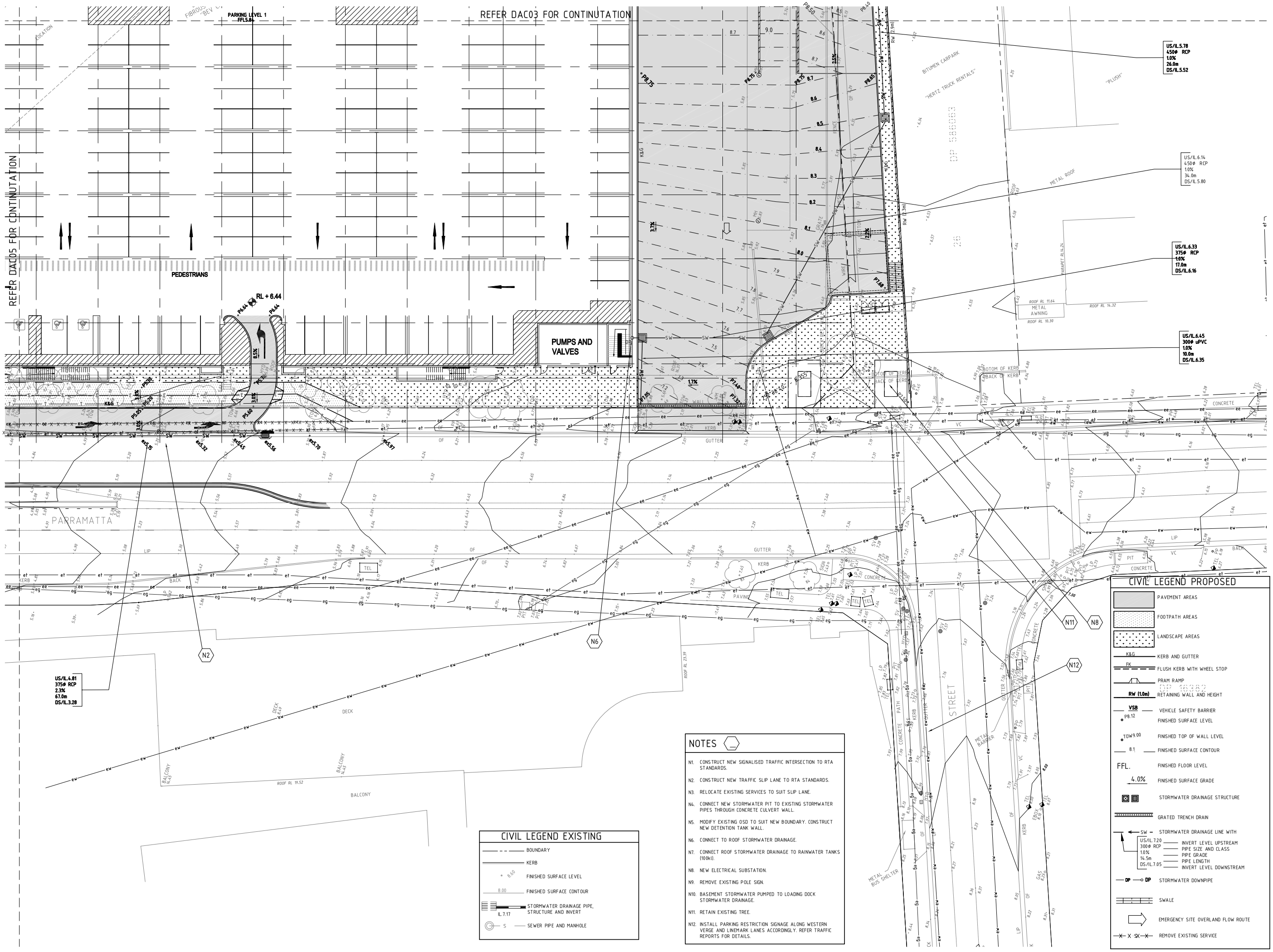
PM:

SITEWORKS PLAN
SHEET 4 OF 4

09S603DAC05



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Plan Scale 1:200 @ B1

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PM:

SITEWORKS PLAN
SHEET 3 OF 4

NOT FOR CONSTRUCTION

09S603DAC04

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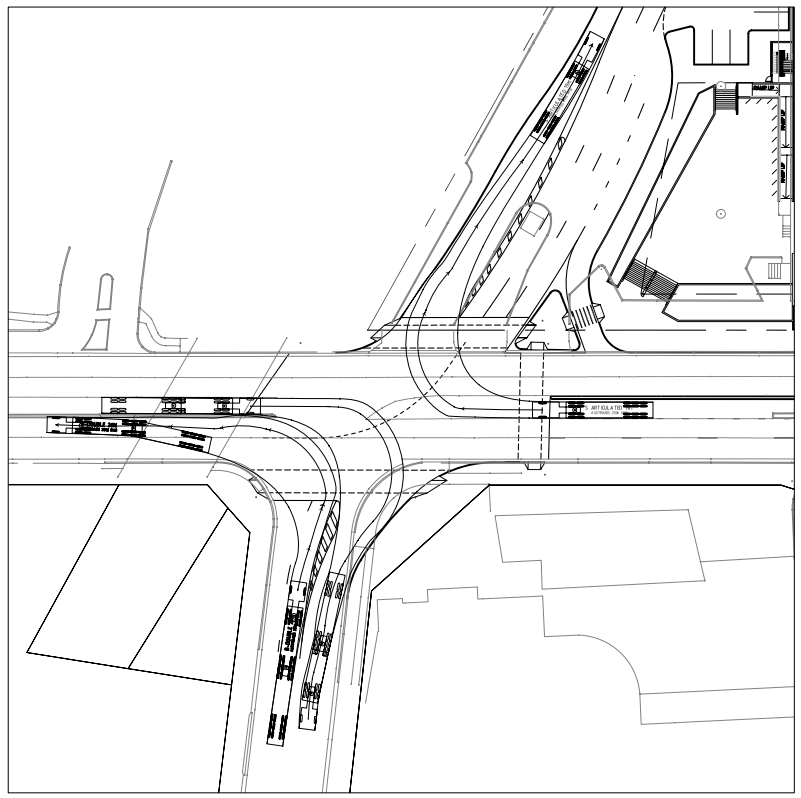
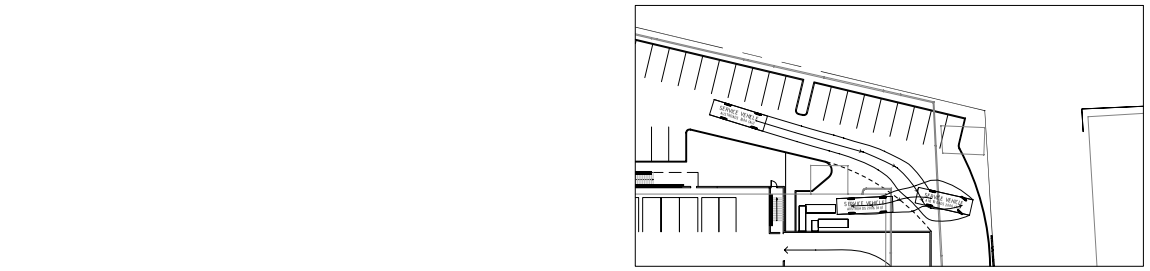
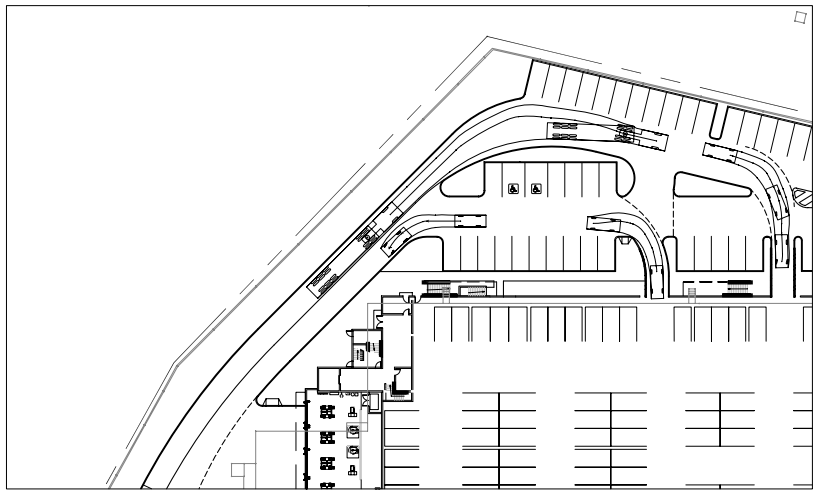
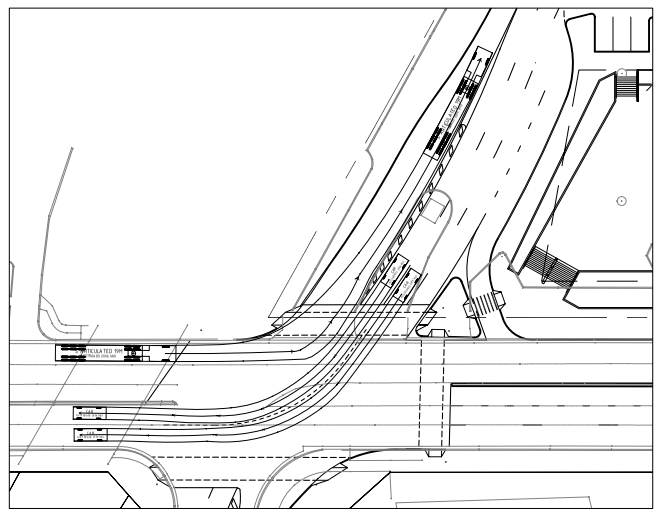
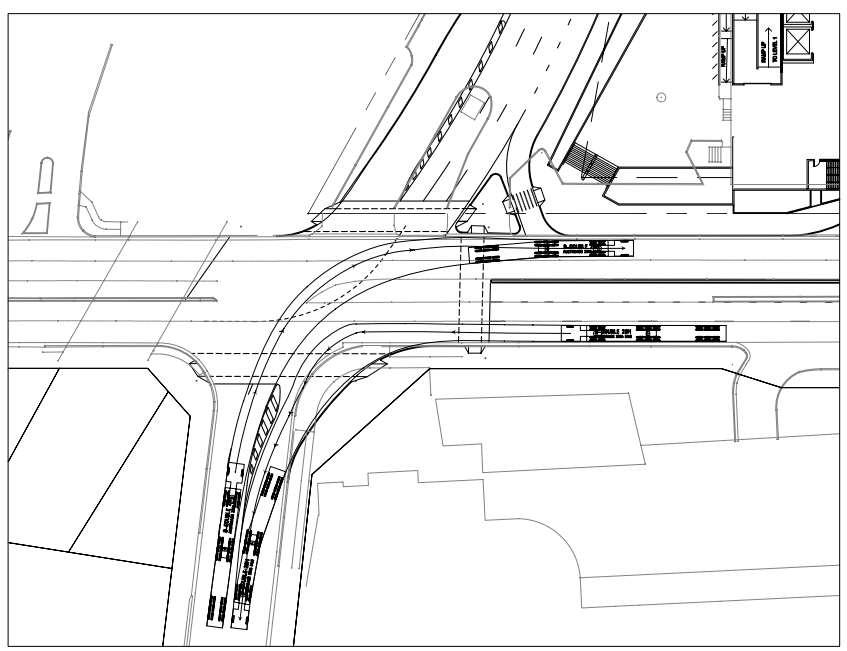
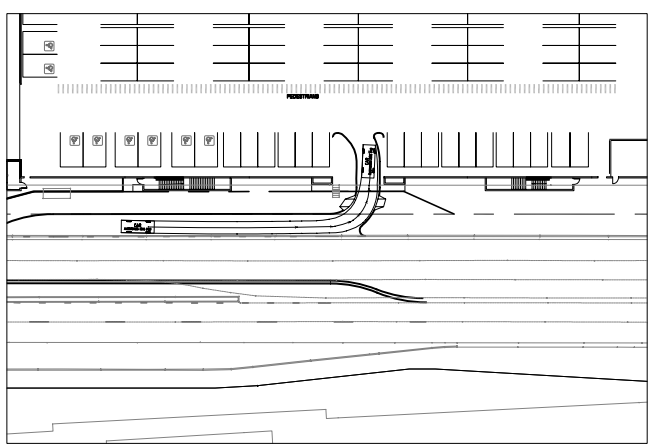


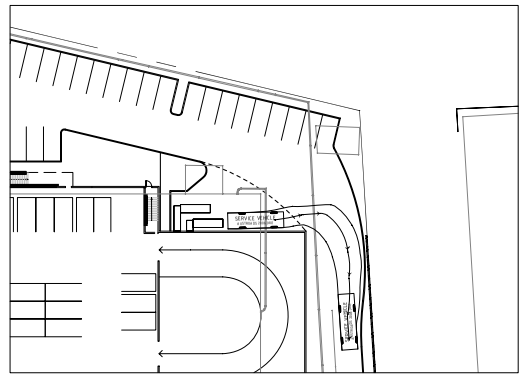


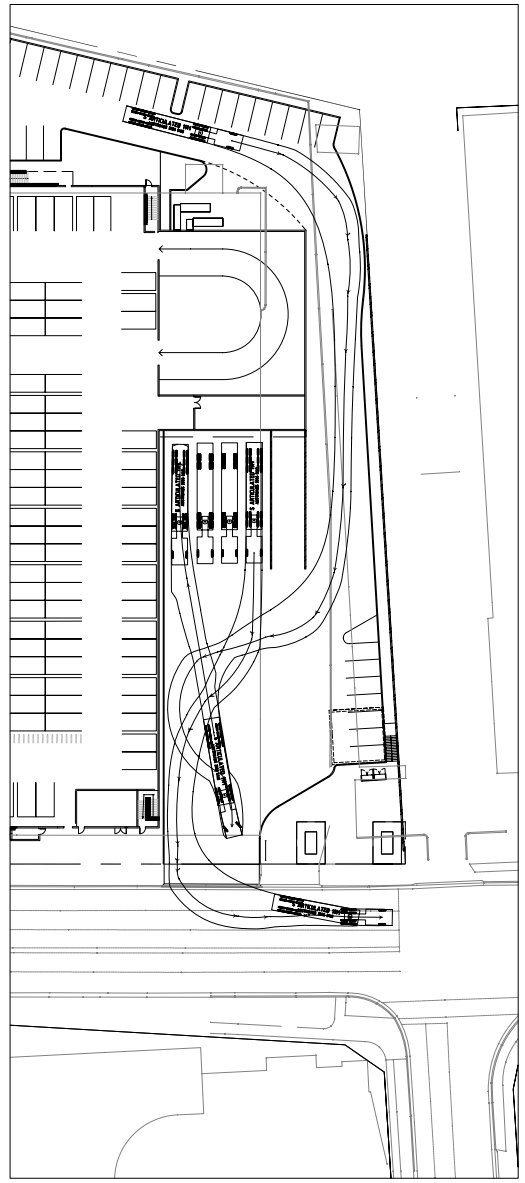


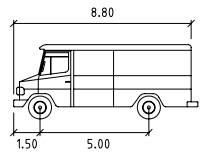






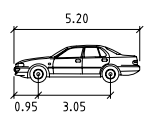






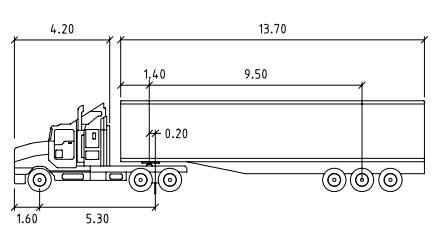
SERVICE VEHICLE meters

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



CAR meters

Width	:	1.94
Track	:	1.84
Lock to Lock Time	:	6.0
Steering Angle	:	33.5



S ARTICULATED 19M meters

Tractor Width	:	2.50	Lock to Lock Time	:	6.0
Trailer Width	:	2.50	Steering Angle	:	27.7
Tractor Track	:	2.50	Articulating Angle	:	70.0
Trailer Track	:	2.50			

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5 4 3 2 1 0 5 10
Plan Scale 1:200 @ B1

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G	08.02.10	RE-ISSUED FOR D.G. SUBMISSION

PM:

VEHICLE
MANOEUVRING PLAN

NOT FOR CONSTRUCTION

09S603DAC07

Appendix C Technical Note 6 (24/09/09)

Halcrow MWT
Suite 20, 809 Pacific Highway, Chatswood NSW 2067 Australia
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www.halcrow.com/australasia

Halcrow MWT

Technical Note

To	Ken Moon – Roads and Traffic Authority (RTA), NSW	**Project**	Costco development, Linfox site 19-21 Parramatta Road, Auburn
From	Bruce Masson		
Date	24 September 2009	**Ref**	CTLCHKtn06

Copy	Aleks Tancevski – RTA	Patrick Noone – Costco Wholesale
	James Hall – RTA	Nicholas Deeks – Costco Wholesale
	Eddie Swat – DoP	Andrew Duggan – JBA Urban Planning

INTRODUCTION

This Technical Note (TN) has been prepared in response to the RTA letter dated 16/09/09, setting out the RTA's Pre-DA advice for access arrangements to the proposed Costco Development at 19-21 Parramatta Road, Auburn. The letter is the RTA's formal response to our TN dated 16/09/09 (referred to as TN5).

The RTA letter raised a number of concerns regarding the latest access proposal for the Costco scheme. For clarity, the following summarises the RTA's current concerns regarding access:

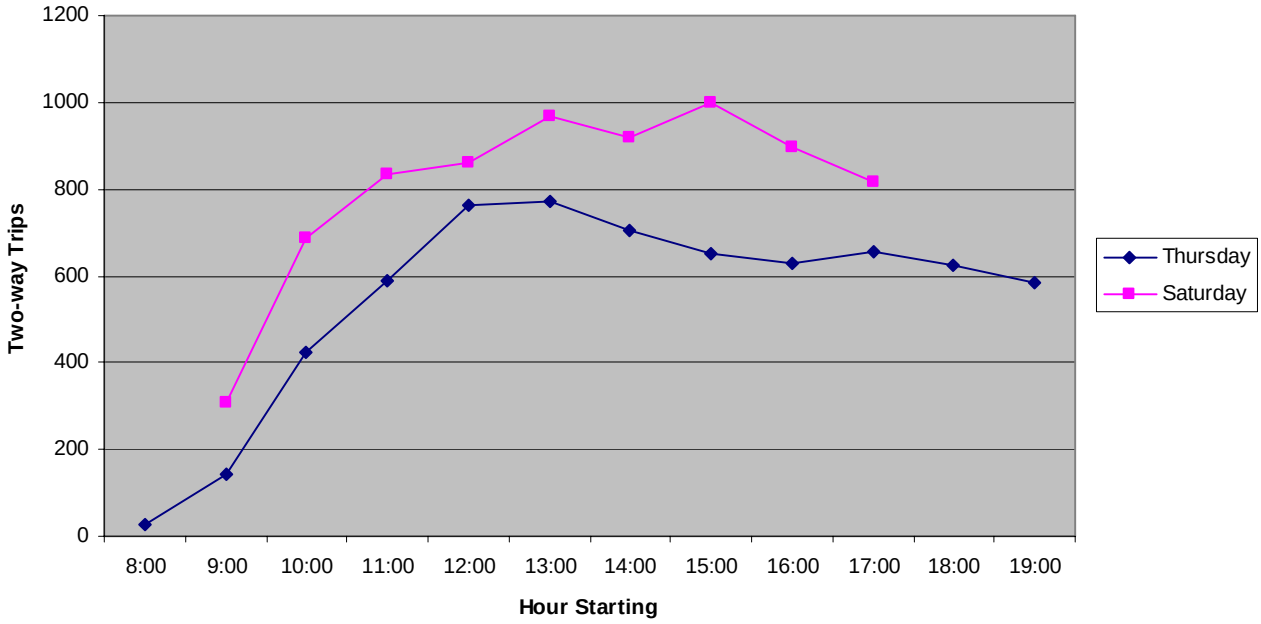
A. 10% reduction in Costco traffic generation during the 12-1pm on-road traffic peak;
B. Pedestrians crossing Parramatta Road in conflict with vehicles right-turning from Nyrang Street;
C. Queuing on Parramatta Road west approach towards Day Street;
D. Queuing of right-turning traffic on Parramatta Road east approach.

The letter also made reference to points 2, 3, 5, 6 and 7 raised in an earlier RTA letter dated 02/09/09. With regard to point 2 – Proposed Secondary Egress for Customers, we have taken onboard the RTA's concerns and the latest scheme option does not include it. The other points relate to design details and can be handled appropriately in detail design.

POINT A. – COSTCO SATURDAY TRAFFIC GENERATION

As set out in TN5, daily traffic profiles for the development have been developed on the basis of the data provided by Costco for their Chingford, London store. For completeness, the following Diagram 1 presents the predicted daily traffic profile for the proposed Auburn store, as presented in TN5.

Diagram 1 – Predicted Daily Vehicle Traffic Profiles (based on Chingford, UK store)



The original assessment assumed that the peak traffic generation of the store occurred at the exact same time as the peak on-road traffic period between 12-1pm. However, the profile assessment based on the Chingford store indicates that the peak traffic generation occurs during the 3-4pm hour and the traffic generation during the 12-1pm hour is 86% of the peak hour traffic generation.

Furthermore, TN5 provided an assessment of data from the UK TRICS database for all Saturday surveys of Discount Club/Wholesale retail stores. The following could be concluded from the assessment:

- The busiest peak hour is between 2-3pm;
- The second busiest is between 3-4pm; and
- The 12-1pm peak is 70% of the 2-3pm peak.

Attachment 1 presents a TRICS results print-out of the average Saturday traffic generation profile.

To support the Chingford and TRICS data, Costco has provided us with Door Count data for the Docklands, Melbourne store. The data is half-hourly and for a 7-day period from Saturday

12/09 to Friday 18/09. **Attachment 2** presents the Raw Door Count Data provided by Costco Australia.

The following is indicated by from the Door Count data:

- The busiest Saturday peak hour is between 4-5pm;
- The second busiest is between 2-3pm;
- The 12-1pm peak is the fourth busiest hour and 88% of the 4-5pm peak;
- The 5-6pm Thursday peak hour is 34% of the Saturday peak hour.

In accordance with Diagram 1, the following Diagram 2 presents a revised demand profile for the proposed Auburn store, based on the Melbourne store data.

Diagram 2 – Revised Daily Vehicle Traffic Profiles (based on Melbourne store)

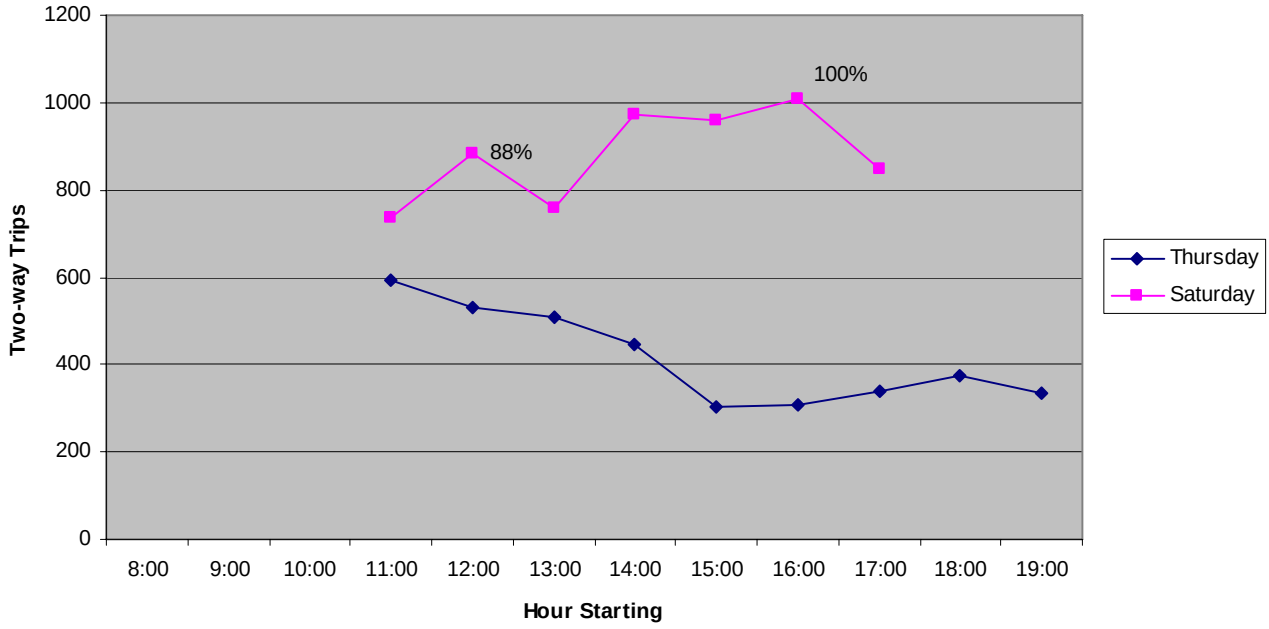


Diagram 2 shows that the 12-1pm Saturday peak is lower than the anticipated 4-5pm peak. Therefore, it is considered that the 10% reduction in to Saturday Peak hour trip rates is reasonable for the purpose of assessing traffic impact during the 12-1pm on-road peak.

Of particular relevance in relation to the door counts is that although the new Melbourne store is trading very well, the actual customer numbers at peak times are not particularly high. This is borne out by comparison of our traffic generation forecast with the door counts, bearing in mind that vehicles per hour arriving would almost always be less than the number of customers per hour walking in the door because of car passengers and non-car arrivals.

The comparison for the Melbourne store against our traffic generation estimates is as follows.

Saturday Busiest Hour:

- Traffic generation estimate for arrivals = 519 veh/hr;
- Door Count of arrivals at Melbourne store = 430 people/hr.

Thursday Evening:

- Traffic generation estimate for arrivals = 310 veh/hr;
- Door Count of arrivals at Melbourne store = 144 people/hr.

From this we conclude that our analysis is conservatively high and this should be borne in mind in considering the traffic impact of the proposal.

POINTS B. C. & D. – COSTCO ACCESS INTERSECTION PERFORMANCE

As a result of the capacity testing undertaken to date, we have concerns that the SIDRA model may not appropriately account for the effects of co-ordination along the Parramatta Road network local to the site in its calculation of queue lengths. Therefore, we also modelled Parramatta Road using SCATES software.

The SCATES model was built for the intersections on Parramatta Road from Silverwater Road/St. Hilliers Road intersection in the west, to the Hill Road/Bombay Street intersection in the east. This model was run under 2009 traffic flows and validated against observed queues.

The model was then run for a future 2021 Saturday Peak hour (with both natural traffic growth and Costco traffic added on). These flows are presented on **Attachment 3**. The Phase Plan for the Costco access intersection was amended to incorporate the pedestrian phasing specified in the RTA's letter of 16/09/09.

The phase plan can be summarised as follows:

- Phase A1 – Diamond Lead for right-turners from Parramatta Road approaches;
- Phase A2 – East approach extension with pedestrians across Nyrang Street;
- Phase A – West and East approaches, right-turns held and pedestrians across Costco access;
- Phase B1 – Costco access with pedestrians across Parramatta East approach;
- Phase B – Nyrang Street.

The analysis was conducted only for the Saturday situation as the Costco weekday evening traffic generation is much lower and the previous analysis indicated that there would be no traffic problems at these times.

The following table presents the SCATES results for the 2021 Saturday peak hour assessment.

Table 1 – 2021 with Development, SCATES Study Network Performance Results

Parramatta Road Intersection with:	SCATES	
	Ave. Delay (sec/veh)	Level of Service
Silverwater Rd-St Hilliers Rd	52	D
Alban St	1	A
Day St	22	B
Costco Access-Nyrang St	21	B
John St	30	C
Hill Road-Bombay St	37	C
Total System	24	B

The SCATES determined Levels of Service (LoS) were comparable to those calculated by SIDRA.

For the proposed Costco access intersection, the following table provides the SCATES performance results by approach and movement.

Table 2 – 2021 with Development, Costco Access Intersection SCATES Results

Approach	Mvt	LoS	Queue (m)	Required Turn Bay Length (m)
Parramatta Rd - West	L	F	6	-
	T	A	36	-
	R	A	6	62
Nyrang St - South	L	E	24	34
	T	F	18	-
	R	F	6	70
Parramatta Rd - East	L	A	6	-
	T	A	18	-
	R	F	6	32
Costco Access - North	L	B	24	-
	T	D	12	-
	R	D	42	51

In addition to the results above, the SCATES analysis found that the optimum cycle time for the study network is 140s. This accords with observed cycle time measurements taken on site as well as the operation of other sections of linked signalised intersections along Parramatta Road.

Furthermore, the SCATES modelling determine the following as the optimum phase splits for the proposed Costco Access intersection:

- Phase A1 = 9%
- Phase A2 = 9%
- Phase A = 56%
- Phase B1 = 19%
- Phase B = 7%

The SCATES model outputs average queue lengths, but does specify required turning-bay lengths for 95th percentile queues and these are indicated on Table 2. These indicate that with the revised cycle time, phase splits and better accounting for co-ordination benefits the previously perceived queuing problems would not in fact occur.

Notwithstanding this, for consistency with the previous analysis we re-analysed the site access intersection using SIDRA with the SCATES signal timings incorporated. The following table presents the results of the new SIDRA analysis. Relevant SIDRA Movement Summary and Phasing Summary are appended at **Attachments 4 and 5** respectively.

Table 3 – 2021 with Development, Costco Access Intersection SCATES Results

Approach	Mvt	LoS	95% Queue (m)	Critical Distance (m)
Parramatta Rd - West	L	A	157	200
	T	A	167	200
	R	F	61	60
Nyrang St - South	L	E	64	-
	T	F	54	-
	R	F	54	-
Parramatta Rd - East	L	A	62	-
	T	A	62	-
	R	E	105	106
Costco Access - North	L	A	31	-
	T	E	26	-
	R	E	63	-
All Vehicles		B	167	-

The results presented in Table 3 above show that:

- The 95th percentile queue on the Parramatta Road west approach is 167m. The distance between the proposed intersection and the Day Street intersection is approximately 200m;
- The 95th percentile queue for the right-turn bay on Parramatta Road east approach is 105m. The length of the proposed turn bay is 106m.

Furthermore, the Movement Summary (**Attachment 4**) shows that the Parramatta Road approaches would both operate with a LoS A.

CONCLUSION

From the revised analysis we conclude that:

- The revised traffic generation for the proposal that has regard to relative traffic generation at different times of the day is appropriate; and
- That the revised intersection analysis that incorporates the RTA's traffic signal phasing requirements indicates that the site access intersection as now designed would operate satisfactorily.

Halcrow

September 2009

TRIP RATE for Land Use 01 - RETAIL/B - CASH AND CARRY - WHOLESALE AND CLUBS

ATTACHMENT 1

VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00	1	9280	0.000	1	9280	0.000	1	9280	0.000
01:00 - 02:00	1	9280	0.000	1	9280	0.011	1	9280	0.011
02:00 - 03:00	1	9280	0.000	1	9280	0.000	1	9280	0.000
03:00 - 04:00	1	9280	0.011	1	9280	0.011	1	9280	0.022
04:00 - 05:00	1	9280	0.000	1	9280	0.000	1	9280	0.000
05:00 - 06:00	1	9280	0.000	1	9280	0.011	1	9280	0.011
06:00 - 07:00	2	8290	0.187	2	8290	0.133	2	8290	0.320
07:00 - 08:00	3	6927	0.289	3	6927	0.135	3	6927	0.424
08:00 - 09:00	5	6916	0.425	5	6916	0.272	5	6916	0.697
09:00 - 10:00	8	7775	1.225	8	7775	0.352	8	7775	1.577
10:00 - 11:00	10	8723	2.041	10	8723	1.226	10	8723	3.267
11:00 - 12:00	10	8723	2.383	10	8723	1.888	10	8723	4.271
12:00 - 13:00	10	8723	2.312	10	8723	2.249	10	8723	4.561
13:00 - 14:00	9	8881	2.739	9	8881	2.435	9	8881	5.174
14:00 - 15:00	7	10176	3.487	7	10176	3.056	7	10176	6.543
15:00 - 16:00	7	10176	3.014	7	10176	3.208	7	10176	6.222
16:00 - 17:00	7	10176	2.322	7	10176	3.207	7	10176	5.529
17:00 - 18:00	7	10176	1.155	7	10176	2.586	7	10176	3.741
18:00 - 19:00	4	10363	0.451	4	10363	0.975	4	10363	1.426
19:00 - 20:00	3	9393	0.142	3	9393	0.405	3	9393	0.547
20:00 - 21:00	1	9280	0.022	1	9280	0.119	1	9280	0.141
21:00 - 22:00	1	9280	0.054	1	9280	0.000	1	9280	0.054
22:00 - 23:00	1	9280	0.022	1	9280	0.011	1	9280	0.033
23:00 - 24:00	1	9280	0.032	1	9280	0.022	1	9280	0.054
Total Rates:			22.313			22.312			44.625

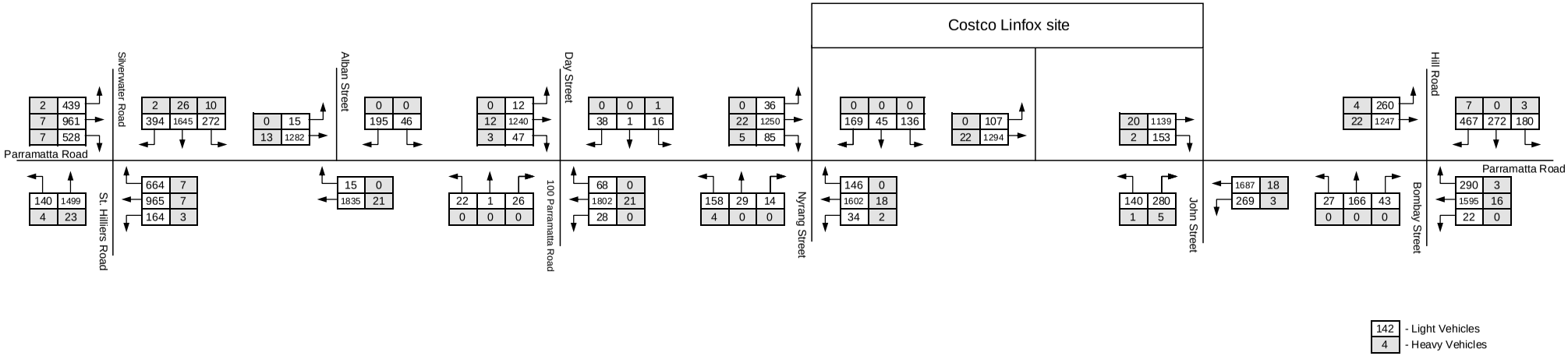
Parameter summary

Trip rate parameter range selected:	4200 - 17453 (units: sqm)
Survey date date range:	01/01/81 - 28/09/09
Number of weekdays (Monday-Friday):	0
Number of Saturdays:	10
Number of Sundays:	0
Surveys manually removed from selection:	0

Docklands Door Count

Time	12th Sept Saturday	13th Sept Sunday	14th Sept Monday	15th Sept Tuesday	16th Sept Wednesday	17th Sept Thursday	18th Sept Friday	WK Total
10:30	287	350	179	130	180	143	173	1442
11:00	173	178	147	109	143	121	118	989
11:30	141	255	132	123	95	131	111	988
12:00	198	132	145	102	96	114	115	902
12:30	179	314	128	119	113	113	121	1087
13:00	143	274	130	94	148	118	132	1039
13:30	181	205	124	108	178	98	125	1019
14:00	225	285	110	79	102	98	103	1002
14:30	190	213	99	99	58	91	109	859
15:00	200	319	55	99	79	77	90	919
15:30	210	344	102	79	69	52	101	957
16:00	238	260	88	56	63	61	74	840
16:30	192	215	69	67	102	70	94	809
17:00	235	79	98	62	103	78	90	745
17:30	127		72	64	59	66	98	486
18:00	103		99	92	113	79	116	602
18:30	26		101	59	79	80	106	451
19:00			80	74	96	60	148	458
19:30			68	69	70	83	118	408
20:00			38	47	33	44	84	246
20:30			9	30	9	10	19	77
Total	**3,048**	**3,423**	**2,073**	**1,761**	**1,988**	**1,787**	**2,245**	**16,325**

Thursday Evening Peak



Saturday Midday Peak

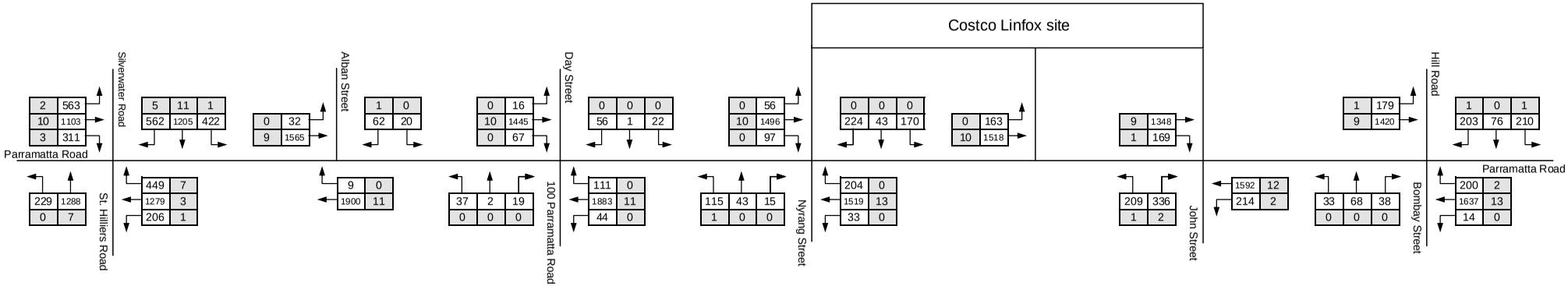


Figure: n/a **Title:** 2021 Design year traffic flows (Sat. 10% reduction)

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ATTACHMENT 3

ATTACHMENT 4

SIDRA INTERSECTION

Movement Summary

Costco Primary Signalised Access_Version 2

Saturday Peak Assessment

Signalised - Fixed time **Cycle Time = 140 seconds**

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Nyrang St (S)										
1	L	116	0.9	0.463	68.4	LOS E	64	0.97	0.79	19.6
2	T	43	0.0	1.055	147.0	LOS F	54	1.00	1.12	10.5
3	R	15	0.0	1.054	152.8	LOS F	54	1.00	1.12	11.2
Approach		**174**	**0.6**	**1.054**	**95.1**	**LOS F**	**64**	**0.98**	**0.90**	**15.5**
Parramatta Rd (E)										
4	L	33	0.0	0.664	9.9	LOS A	62	0.15	0.69	46.0
5	T	1532	0.8	0.667	2.4	LOS A	62	0.15	0.14	56.2
6	R	204	0.0	0.799	63.9	LOS E	105	0.99	0.88	20.4
Approach		**1769**	**0.7**	**0.799**	**9.7**	**LOS A**	**105**	**0.24**	**0.23**	**47.2**
Costco Access (N)										
7	L	170	0.0	0.426	9.9	LOS A	31	0.34	0.62	35.3
8	T	43	0.0	0.315	59.2	LOS E	26	0.93	0.69	18.9
9	R	224	0.0	0.479	66.8	LOS E	63	0.98	0.79	18.8
Approach		**437**	**0.0**	**0.479**	**43.9**	**LOS D**	**63**	**0.72**	**0.71**	**23.0**
Paramatta Rd (W)										
10	L	56	0.0	0.790	14.2	LOS A	157	0.45	0.72	41.6
11	T	1506	0.7	0.791	8.3	LOS A	167	0.47	0.43	48.9
12	R	97	0.0	0.816	79.7	LOS F	61	1.00	0.84	18.1
Approach		**1659**	**0.6**	**0.817**	**12.7**	**LOS A**	**167**	**0.50**	**0.46**	**44.4**
All Vehicles		**4039**	**0.6**	**1.055**	**18.3**	**LOS B**	**167**	**0.43**	**0.41**	**38.4**

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	20.6	LOS C	0	0.54	0.54
P3	50	64.1	LOS F	0	0.96	0.96
P5	50	24.0	LOS C	0	0.59	0.59

ATTACHMENT 4

All Peds	**150**	**36.3**	**LOS C**	**0**	**0.70**	**0.70**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

SIDRA SOLUTIONS

Site: Sat 2021 SCATES Phase Split-Rev1
X:\CTLCHK - Costco Linfox\SIDRA\Linfox Site\MAIN COSTCO ACCESS_SIDRA 3_V02.aap
Processed Sep 23, 2009 03:24:15PM

A0379, Unregistered, Large Office
Produced by SIDRA Intersection 3.2.2.1563

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ATTACHMENT 5

SIDRA INTERSECTION

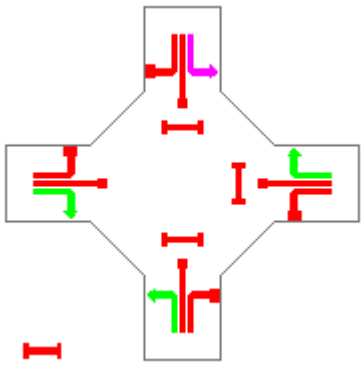
Phasing Summary

Costco Primary Signalised Access_Version 2

Saturday Peak Assessment

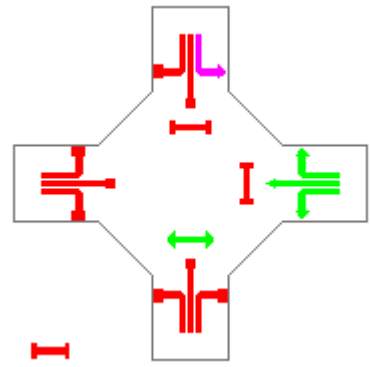
C = **140** seconds
Cycle Time Option: **User-specified cycle time**
Phase times specified by the user.

Phase A1



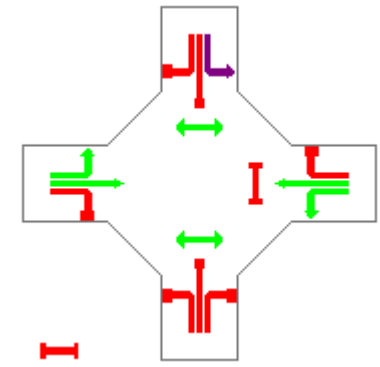
Green Time = **9** seconds
Phase Time = **15** seconds
Phase Split = **11** %

Phase A2



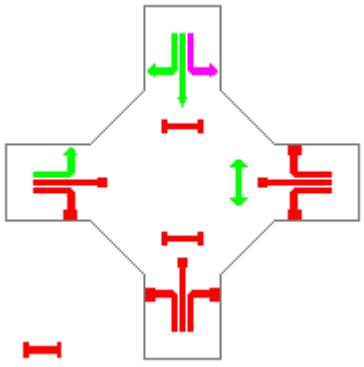
Green Time = **7** seconds
Phase Time = **13** seconds
Phase Split = **9** %

Phase A



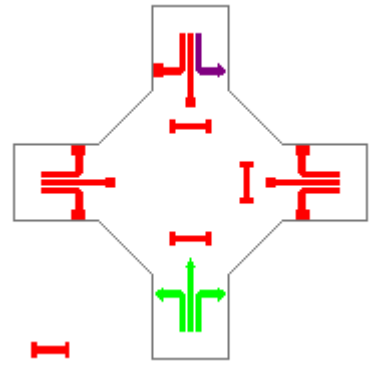
Green Time = **72** seconds
Phase Time = **78** seconds
Phase Split = **56** %

Phase B1



Green Time = **18** seconds
Phase Time = **24** seconds
Phase Split = **17** %

Phase B



Green Time = **4** seconds
Phase Time = **10** seconds
Phase Split = **7** %

Normal Movement	Permitted/Opposed
Slip-Lane	Opposed Slip-Lane
Stopped Movement	Continuous
Turn On Red	

ATTACHMENT 5

SIDRA SOLUTIONS

Site: Sat 2021 SCATES Phase Split-Rev1
X:\CTLCHK - Costco Linfox\SIDRA\Linfox Site\MAIN COSTCO ACCESS_SIDRA 3_V02.aap
Processed Sep 23, 2009 03:24:15PM

A0379, Unregistered, Large Office
Produced by SIDRA Intersection 3.2.2.1563

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Appendix D Technical Note 7 (02/10/09)

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Technical Note

To	Ken Moon – Roads and Traffic Authority (RTA), NSW	**Project**	Costco development, Linfox site 19-21 Parramatta Road, Auburn
From	Bruce Masson		
Date	02 October 2009	**Ref**	CTLCHKtn07
Copy	Eddie Swat – DoP Patrick Noone – Costco Wholesale Nicholas Deeks – Costco Wholesale		Andrew Duggan – JBA Urban Planning Ken Dobinson

INTRODUCTION

This Technical Note (TN) has been prepared following a recent meeting of 29/09/09 with the RTA, regarding the RTA's Pre-DA advice for access arrangements to the proposed Costco Development at 19-21 Parramatta Road, Auburn. The agenda for the meeting was to discuss queries the RTA had with regard to our TN dated 24/09/09 (referred to as TN6) and associated SCATES and SIDRA traffic modelling.

The RTA raised a couple of points that can be summarised as follows:

1. The Nyrang Street phase (referred to as Phase B in TN6) should run for a minimum green time of 6s;
2. SIDRA INTERSECTION coordination benefits should not be applied to the right-turn movement from the east approach to the Costco store access;
3. Subject to implementation of the above, the operation of the intersection should meet the RTA's performance criteria particularly with regard to queuing on the west approach and on the right-turn bay of the east approach.

It is worth noting that the RTA also raised a couple of additional areas that should be given consideration. The first was the impact of signalising the Nyrang Street intersection and the likely reassignment of traffic flows on the local study network. This was linked to the RTA's Point 1. above, with the requested 6s minimum green time providing an allowance for possible traffic increases due to diversions.

Secondly, the RTA suggested that the John Street intersection should be investigated with a view to determining whether improvements to this intersection could allow for a reduction in the length of the existing eastbound right-turn bay to John Street which would allow an increase in the length of the proposed right-turn bay for westbound traffic accessing the Costco store.

Points 1. and 2. have been taken onboard and the SIDRA model(s) have been amended accordingly. The remainder of this TN sets out the methodology employed based upon the recommendations made by the RTA so that the intersection(s) meet the relevant performance measures.

2021 REASSIGNED FLOWS

Attachment 1 presents the anticipated 2021 traffic flows with traffic growth and development traffic, presented previously as Attachment 3 of TN6. As a result of the comments from the RTA, consideration has been given to the possible impact the implementation of signals at the Nyrang Street intersection could have. At present it is likely that traffic accessing Parramatta Road from the precinct local to Nyrang and John Streets (including the Lidcombe Power Centre retail mall) prefers to use the John Street intersection due to the assistance of the traffic signals. This would similarly be the case for traffic arriving from the west on Parramatta Road that wants to access this precinct.

The provision of traffic signals at Nyrang Street is expected to result in the diversion of some John Street traffic to Nyrang Street. The primary relieved movement (in terms of reduced traffic volumes) would be the right-turn from Parramatta Road (west) to John Street; secondary relief would be gained by the left and right-turn movements from John Street. Based on this, the following reassignment assumptions have been made:

1. ***Right-turn from Parramatta Road (west) to John Street*** – It is assumed that 15% of the right-turning traffic at John Street would reassign to the right-turn at the proposed Nyrang Street intersection;
2. ***Left-turn from John Street to Parramatta Road (west)*** – It is assumed that 10% of left-turners from John Street would reassign to the proposed Nyrang Street intersection;
3. ***Right-turn from John Street to Parramatta Road (east)*** – It is assumed that 10% of right-turners from John Street would reassign to the proposed Nyrang Street intersection.

Based on these assumptions, **Attachment 2** presents the 2021 development traffic flows with traffic reassigned.

ADDITIONAL SCHEME AMENDMENTS

The following amendments to the access arrangement are proposed and are shown on the plan at **ATTACHMENT 3**:

1. Increase the right-turn lane on Parramatta Road (westbound) at the proposed Costco access intersection to 110m (NOTE: accounting for a midblock taper, the length of Parramatta Road between Nyrang Street and John Street can accommodate 190m of back-to-back queuing space);
2. Increase the right-turn lane on Parramatta Road (eastbound) at the proposed Costco access intersection to 80m;
3. Implement parking restrictions along the western side of Nyrang Street adjacent to the existing brewery for a distance of 140m to provide two lanes on the approach to the Parramatta Road intersection;
4. Decrease the right-turn lane on Parramatta Road (eastbound) at the existing John Street intersection to 80m;
5. Implement parking restrictions along the western side of John Street adjacent to the Lidcombe Power Centre for a distance of 140m to provide two lanes on the approach to the Parramatta Road intersection.

INTERSECTION PERFORMANCE

SIDRA INTERSECTION analysis of the Costco store access intersection and the John Street intersection has been undertaken and the results for the 2021 Saturday midday network peak hour are presented in Tables 1 and 2 respectively.

Table 1 – 2021 with Development, Costco Access Intersection SIDRA Results

Approach	Mvt	LoS	95% Queue (m)	Available Distance (m)
Nyrang St - South	L	E	70	140
	T	F	66	-
	R	F	66	-
Parramatta Rd - East	L	B	88	206
	T	A	89	206
	R	E	110	110
Costco Access - North	L	B	36	44
	T	E	26	38
	R	E	63	-
Parramatta Rd - West	L	B	187	196
	T	B	196	196
	R	E	72	80
All Vehicles		**C**	**-**	**-**

Table 2 – 2021 with Development, John Street Intersection SIDRA Results

Approach	Mvt	LoS	95% Queue (m)	Available Distance (m)
John St - South	L	E	137	140
	R	E	137	-
Parramatta Rd - East	L	C	301	312
	T	B	303	312
Parramatta Rd - West	T	A	51	205
	R	E	78	80
All Vehicles		**C**	**-**	**-**

The results presented in Tables 1 and 2 above show that:

- The 95th percentile queue on the Parramatta Road west approach at the Costco site access intersection is 187-196m. The distance between the proposed intersection and the Day Street intersection is approximately 196m;
- The 95th percentile queue for the right-turn movement on Parramatta Road east to the Costco store is 110m versus a proposed bay length of 110m;
- The 95th percentile queue on the Parramatta Road east approach at the John Street intersection is 301-303m. The distance to the Hill Road intersection is approximately 312m;
- The 95th percentile queue for the right-turn movement on Parramatta Road west to John Street is 78m versus a proposed bay length of 80m.

The results above and the attached SIDRA outputs (**Attachment 4** for the Costco site access intersection and **Attachment 5** for the John Street intersection) conclude that the revised access scheme would operate satisfactorily in terms of queues and delays. Relevant SIDRA models will be forwarded with this TN.

Finally, preliminary assessments of the Thursday evening and a weekday morning 2021 with development flows have been undertaken. The assessment concludes that the Saturday scenario continues to be the most significant in terms of traffic on the network and that the revised access arrangement set out above would continue to operate satisfactorily during both of these periods.

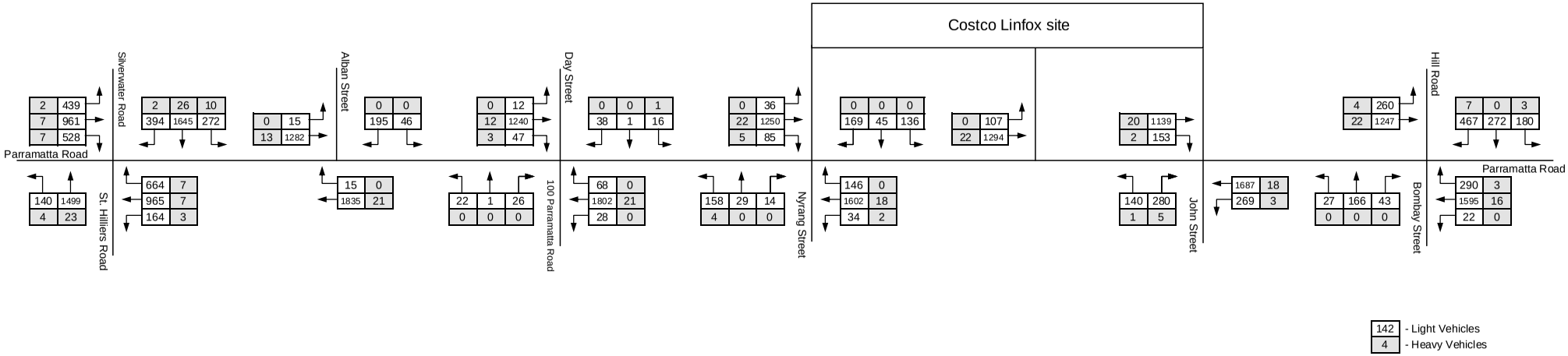
CONCLUSION

The points raised by the RTA at the meeting of 29/09/09 have been incorporated in to revised SIDRA modelling of the proposed Costco store access intersection and the intersection of John Street with Parramatta Road. Achievable improvements to the local road network have been included and the resulting SIDRA analysis concludes that the revised access scheme would operate satisfactorily in terms of queues and delays.

Halcrow

October 2009

Thursday Evening Peak



Saturday Midday Peak

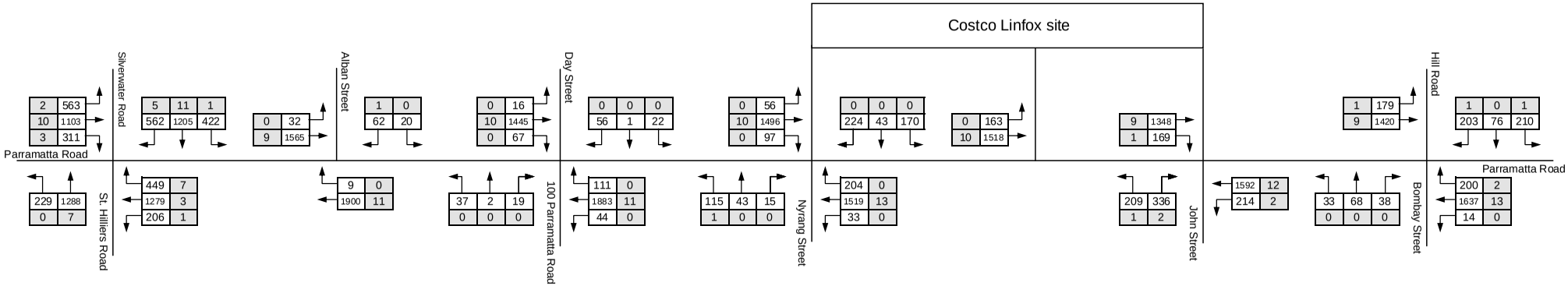


Figure: n/a **Title:** 2021 Design year traffic flows (Saturday Temporal Flows)

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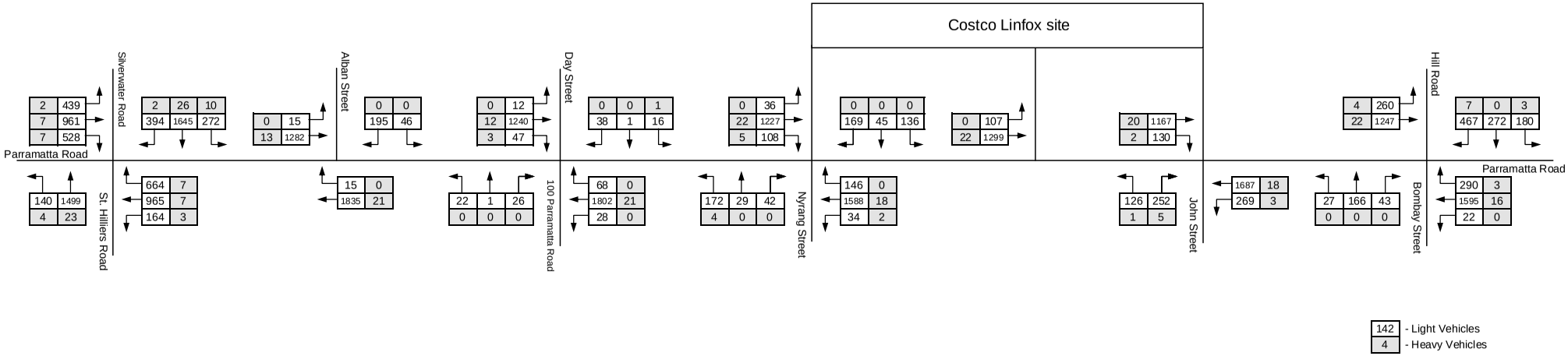
Thursday Evening Peak



Saturday Midday Peak

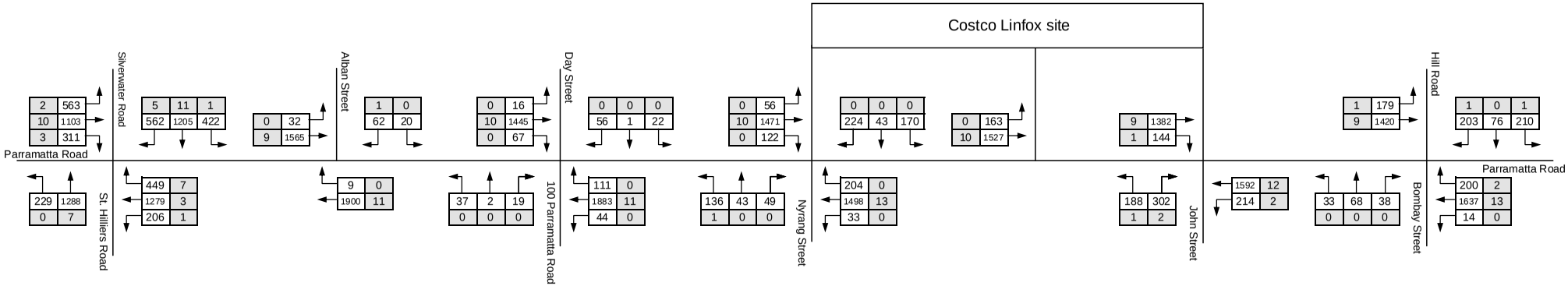


Figure: n/a **Title:** 2021 Reassigned Design Flows

Halcrow MWT

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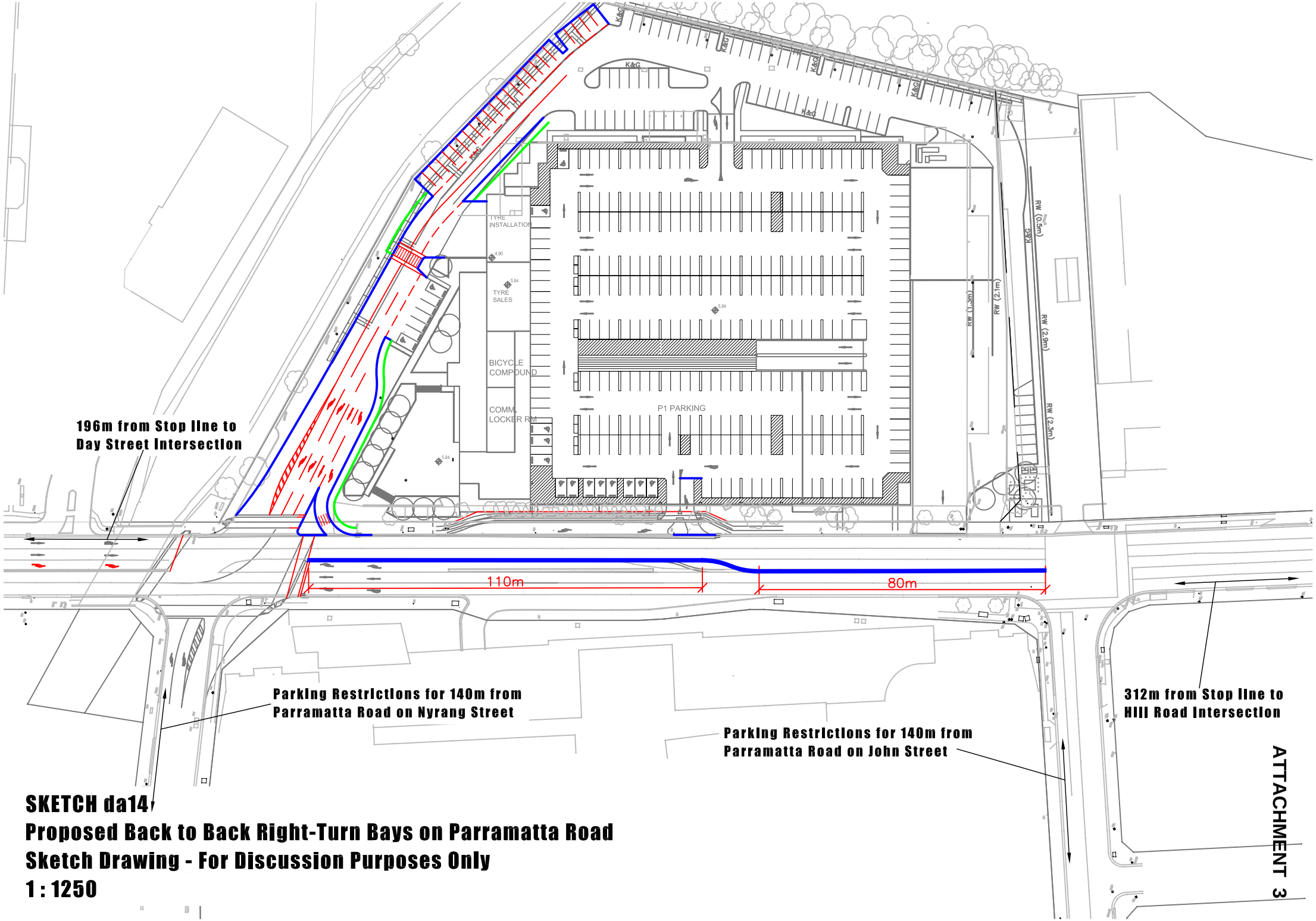
ATTACHMENT 2



SKETCH da14

Proposed Back to Back Right-Turn Bays on Parramatta Road

Sketch Drawing - For Discussion Purposes Only

1 : 1250

ATTACHMENT 3

ATTACHMENT 4

SIDRA INTERSECTION

Movement Summary

Costco Primary Signalised Access_Version 3

Saturday Peak Assessment

Signalised - Fixed time **Cycle Time = 140 seconds**

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Nyrang St (S)										
1	L	137	0.7	0.399	61.6	LOS E	70	0.93	0.80	20.9
2	T	43	0.0	0.968	99.7	LOS F	66	1.00	1.08	14.1
3	R	49	0.0	0.968	105.5	LOS F	66	1.00	1.08	14.7
Approach		**229**	**0.4**	**0.969**	**78.1**	**LOS E**	**70**	**0.96**	**0.91**	**17.8**
Parramatta Rd (E)										
4	L	33	0.0	0.719	11.3	LOS B	88	0.23	0.71	44.5
5	T	1511	0.9	0.717	3.9	LOS A	89	0.23	0.21	54.2
6	R	204	0.0	0.799	73.9	LOS E	110	1.00	0.92	18.5
Approach		**1748**	**0.7**	**0.799**	**12.2**	**LOS B**	**110**	**0.32**	**0.30**	**44.7**
Costco Access (N)										
7	L	170	0.0	0.469	12.1	LOS B	36	0.40	0.64	34.2
8	T	43	0.0	0.315	59.2	LOS E	26	0.93	0.69	18.9
9	R	224	0.0	0.479	66.8	LOS E	63	0.98	0.79	18.8
Approach		**437**	**0.0**	**0.479**	**44.7**	**LOS D**	**63**	**0.75**	**0.72**	**22.8**
Paramatta Rd (W)										
10	L	56	0.0	0.810	16.7	LOS B	187	0.56	0.76	39.5
11	T	1481	0.7	0.812	10.8	LOS B	196	0.57	0.52	46.3
12	R	122	0.0	0.711	77.7	LOS E	72	1.00	0.84	18.4
Approach		**1659**	**0.6**	**0.812**	**15.9**	**LOS B**	**196**	**0.60**	**0.55**	**41.6**
All Vehicles		**4073**	**0.6**	**0.968**	**20.9**	**LOS C**	**196**	**0.52**	**0.48**	**36.6**

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	50	24.6	LOS C	0	0.59	0.59
P3	50	64.1	LOS F	0	0.96	0.96
P5	50	25.8	LOS C	0	0.61	0.61

ATTACHMENT 4

All Peds	**150**	**38.2**	**LOS D**	**0**	**0.72**	**0.72**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

Following Queue
- Density for continuous movement

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ATTACHMENT 4

SIDRA INTERSECTION

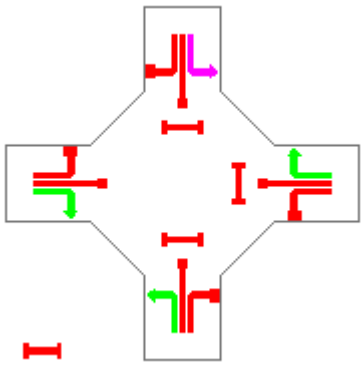
Phasing Summary

Costco Primary Signalised Access_Version 3

Saturday Peak Assessment

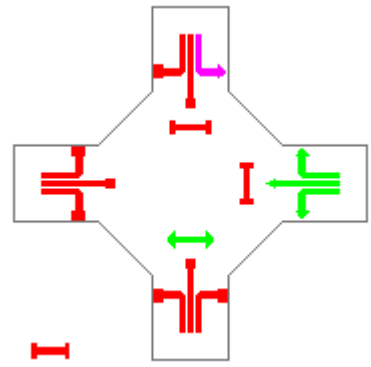
C = **140** seconds
Cycle Time Option: **User-specified cycle time**
Phase times specified by the user.

Phase A1



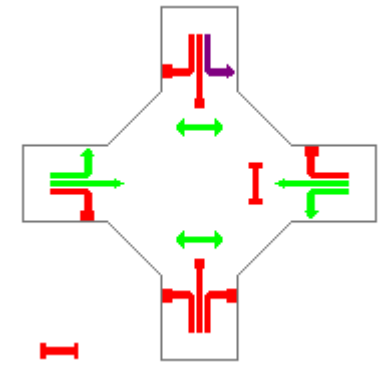
Green Time = **13** seconds
Phase Time = **19** seconds
Phase Split = **14** %

Phase A2



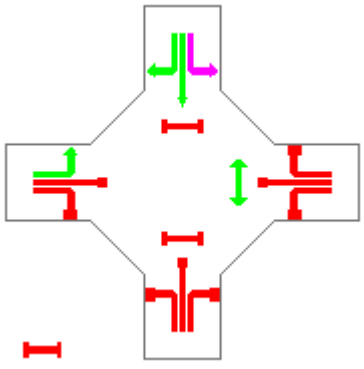
Green Time = **3** seconds
Phase Time = **9** seconds
Phase Split = **6** %

Phase A



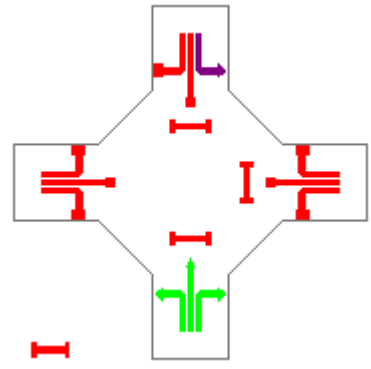
Green Time = **69** seconds
Phase Time = **75** seconds
Phase Split = **54** %

Phase B1



Green Time = **18** seconds
Phase Time = **24** seconds
Phase Split = **17** %

Phase B



Green Time = **7** seconds
Phase Time = **13** seconds
Phase Split = **9** %

Normal Movement	Permitted/Opposed
Slip-Lane	Opposed Slip-Lane
Stopped Movement	Continuous
Turn On Red	

ATTACHMENT 4

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ATTACHMENT 5

SIDRA INTERSECTION

Movement Summary

John Street Intersection

Saturday Peak Assessment

Signalised - Fixed time **Cycle Time = 140 seconds**

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
John Street (S)										
1	L	199	0.5	0.748	65.3	LOS E	137	1.00	0.89	20.2
3	R	320	0.6	0.747	68.3	LOS E	137	1.00	0.89	19.6
Approach		**519**	**0.6**	**0.747**	**67.2**	**LOS E**	**137**	**1.00**	**0.89**	**19.8**
Parramatta Rd (E)										
4	L	227	0.9	0.858	24.6	LOS C	301	0.74	0.86	34.7
5	T	1688	0.8	0.858	16.4	LOS B	303	0.73	0.68	41.3
Approach		**1916**	**0.8**	**0.858**	**17.4**	**LOS B**	**303**	**0.73**	**0.70**	**40.5**
Parramatta Rd (W)										
11	T	1464	0.6	0.533	2.3	LOS A	51	0.13	0.12	56.5
12	R	153	0.7	0.649	62.4	LOS E	78	0.93	0.95	22.0
Approach		**1617**	**0.6**	**0.649**	**8.0**	**LOS A**	**78**	**0.20**	**0.19**	**49.2**
All Vehicles		**4052**	**0.7**	**0.858**	**20.0**	**LOS C**	**303**	**0.55**	**0.52**	**38.1**

Pedestrian Movements

Mov ID	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
P1	53	12.9	LOS B	0	0.43	0.43
P3	53	45.6	LOS E	0	0.81	0.81
All Peds	**106**	**29.2**	**LOS C**	**0**	**0.62**	**0.62**

Symbols which may appear in this table:

Following Degree of Saturation
x = 1.00 for Short Lane with resulting Excess Flow
* x = 1.00 due to minimum capacity

Following LOS
- Based on density for continuous movements

ATTACHMENT 5

Following Queue
- Density for continuous movement

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ATTACHMENT 5

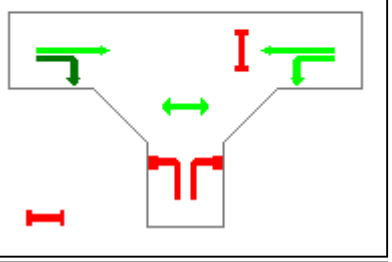
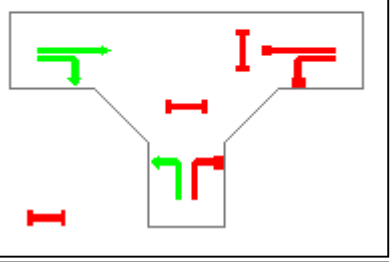
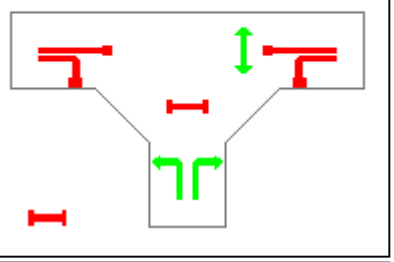
SIDRA INTERSECTION

Phasing Summary

John Street Intersection

Saturday Peak Assessment

C = **140** seconds
Cycle Time Option: **User-specified cycle time**
Phase times specified by the user.

Phase A	Phase A1	Phase B
		
Green Time = **82** seconds Phase Time = **88** seconds Phase Split = **63** %	Green Time = **11** seconds Phase Time = **17** seconds Phase Split = **12** %	Green Time = **29** seconds Phase Time = **35** seconds Phase Split = **25** %

Normal Movement	Permitted/Opposed
Slip-Lane	Opposed Slip-Lane
Stopped Movement	Continuous
Turn On Red	

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