Cardno
Shaping the Future

Central Hills Business Park Hardware Development TIA

FINAL

Prepared for
Dart West Developments PTY LTD

transportation | traffic | engineering | planning

SEPTEMBER 2010

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DOCUMENT CONTROL

Report Title Sub Title					
Version	**Date**	**Author**		**Reviewer**	
		Name	**Initials**	**Name**	**Initials**
Working Draft	17 August 2010	Neill Miller	NM	Kieron Hendicott	KH
Final Draft	1 September 2010	Neill Miller	NM	Anissa Levy	AL
Final	3 September 2010	Neill Miller	NM	Kieron Hendicott	KH
Final v2	17 September 2010	Neill Miller	NM	Kieron Hendicott	KH
Final v3	22 September 2010	Neill Miller	NM	Kieron Hendicott	KH
Final v4	22 September 2010	Neill Miller	NM	Kieron Hendicott	KH

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Appendices

1 INTRODUCTION

1.1 BACKGROUND

Cardno has been commissioned by Dart West Developments PTY LTD to undertake a Traffic Impact Assessment (TIA) to support the planned development of a hardware store development within the Central Hills Business Park (CHBP) in the Camden Local Government Area (LGA), in the South West of Sydney. Cardno has previously undertaken various studies relating to the Central Hills Business Park, from which relevant data was used in structuring this assessment.

This assessment is intended to demonstrate that the proposed development will have minimal impact on the external road network. It will also address car parking demands and provision of facilities for other transport modes, such as walking, cycling and public transport.

1.2 SCOPE OF WORK

The purpose of this report is to investigate the traffic and transportation impacts of the proposed hardware store development on the surrounding road network.

This report includes the following scope of work:

- Identify traffic generating potential of the proposed development. Discussion will be provided with respect to the consistency of this with the overall previous modelling undertaken for CHBP.
- Identify the car parking requirements of the proposed developments based on an empirical assessment of the expected demand in comparison with previous similar studies undertaken.
- Provide comment on the design of the access, car park and internal road layout.
- Complete a swept path analysis for service vehicles entering/exiting the development.
- Review sustainable transport options (pedestrian, cycle, public transport) for the development.

1.3 REFERENCE MATERIAL

In preparing this report reference has been made to the following material:

- Camden Council DCP 2006.
- Turner Road Precinct DCP 2007.
- RTA Guide to Traffic Generating Developments.
- AustRoads – Part 14 Bicycles
- Central Hills Business Park Traffic Impact Assessment, Cardno, November 2009.
- Oran Park and Turner Road Precinct Plan Transport Assessment, Maunsell/AECOM, April 2009.

2 PROPOSED DEVELOPMENT

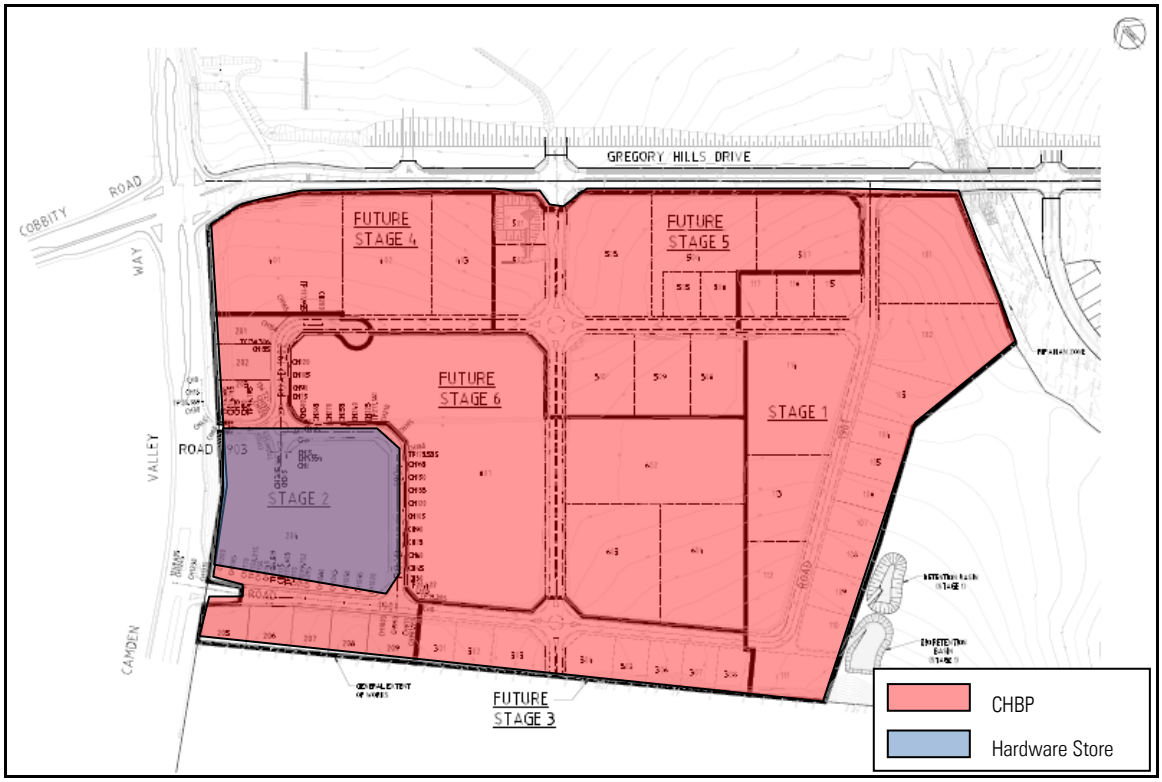
2.1 SITE LOCATION

The proposed hardware store development is situated within the CHBP in the south west of Sydney. The CHBP is bounded by Gregory Hills Drive to the north, Camden Valley Way to the west and is flanked by two additional areas of employment land to the north and south. The hardware store development is located in the southern section of the CHBP on Lot 204, refer to **Figure 2.1** below, The development will front three roads:

- Camden Valley Way (arterial road) to the west of the subject site. No direct vehicular access is proposed off Camden Valley Way, which is anticipated to carry approximately 45,000 veh/day.
- Road 1901 (collector road) to the south of the subject site, which is anticipated to carry approximately 5,800 veh/day.
- Road 1904 (industrial access road) to the north and east of the subject site, which is anticipated to carry approximately 1,700 veh/day.

The surrounding land uses include Business Park, Industrial and Roadside Service developments within the CHBP, Business Development north of Gregory Hills Drive and residential development located further east along Gregory Hills Drive.

Figure 2.1 Site Location



2.2 DEVELOPMENT PROPOSAL

The proposed development will comprise a hardware store. **Figure 2.2** illustrates the development plan and **Table 2.1** shows the development area schedule. Complete development plans are provided in Appendix A.

Figure 2.2 Development Plan

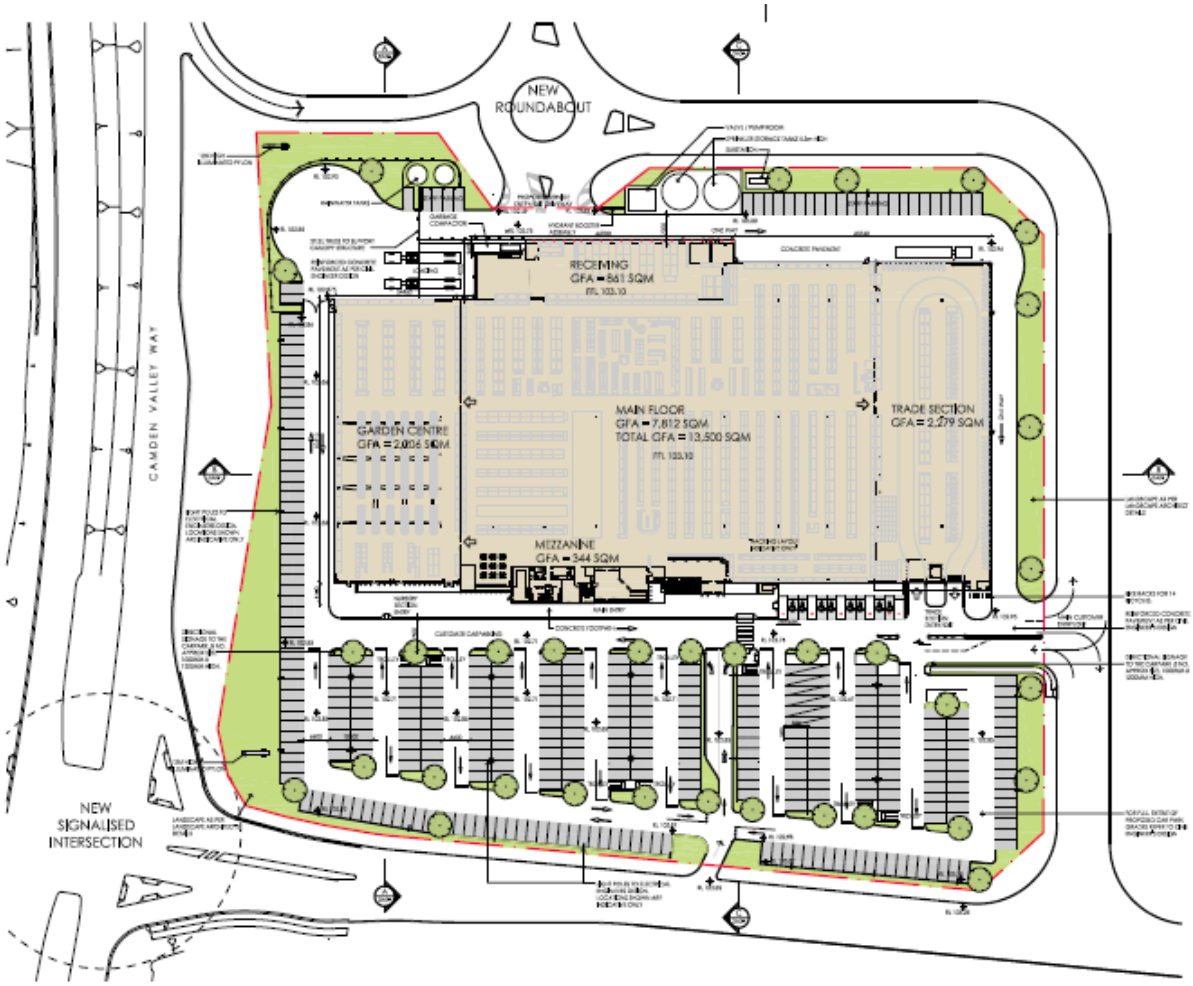


Table 2.1 Development Details

Component	Area (m^2)
Site Area	33,581m^2
Hardware Store	13,500m^2 (Gross Floor Area – GFA)

The development proposes a car park with a total of 364 spaces, including 8 disabled spaces and 6 trailer parking spaces. It will contain a left in only access from the southern boundary along Road 1901, an all movements access on the eastern boundary along Road 1904, and an all movements service access on the northern boundary via a roundabout, which will be predominantly used by service vehicles entering and exiting the site accessing the service facilities on the northern boundary of the site.

3 TRAFFIC OPERATION ASSESSMENT

3.1 CENTRAL HILLS BUSINESS PARK TRAFFIC GENERATION

Cardno has previously assessed the traffic impact of the development of the CHBP based on the proposed Master Plan in the "*Central Hills Business Park Traffic Impact Assessment (November 2009)*". The study found that the total site would generate 3,636 trips/peak hour.

It is important to note, for the context of this assessment, the number of trips were generated by the zones in which the hardware store development proposed were assumed. In the CHBP TIA the land use associated with those zones were Business Park and Roadside Services type developments and generated 234 trips/peak hour.

Based on these traffic generation estimates, intersection analysis was undertaken for the internal road network in the CHBP TIA. It was found that the intersection of Road 1901 with Road 1904 will operate at Level of Service A in both the AM and PM peak periods, with minimal delays on all approaches.

The intersection of Camden Valley Way with Road 1901 was assessed in the "*MWT Analysis Memo (July 2008)*". It was found that the intersection will operate at Level of Service B in both the AM and PM peaks.

Due to amendments to the Master Plan layout of the CHBP the roundabout at the northern access to the site along Road 1904 did not exist in previous studies, and operation of this intersection has been considered as part of this assessment in Section 3.4.

3.2 HARDWARE STORE DEVELOPMENT TRAFFIC GENERATION

The traffic generation rates for hardware store developments are not specified in the RTA Guide to Traffic Generating Developments or Council's DCP. **Table 3.1** below identifies the rates calculated through surveys undertaken in previous Cardno studies.

The traffic generation rates adopted for this study, based on the Cardno surveys, are:

- 3.63 trips / 100m^2 / hour for the weekday PM peak hour.
- 7.00 trips / 100m^2 / hour for the weekend peak hour.

Applying these rates to the development yields outlined in Section 2.2 the total trips generated will be 490 trips for the weekday PM peak hour and 945 trips in the weekend peak hour.

While we note the weekend traffic generation of the site is significantly higher than the weekday peak hour traffic generation, the assessment considers the impacts of the weekday peak as this is the worst case scenario for the adjacent road network. During the weekend, the traffic from the adjacent land uses within CHBP is expected to be significantly lower than the 3,636 veh/hour discussed previously, and the background road network volumes on the adjacent road network are also significantly lower than the weekday peak, and therefore traffic impacts are expected to be less.

Table 3.1 Traffic Generation Rates

Source	Site	Location	Gross Floor Area (m^2)	Traffic Generation Rate (trips/100m^2)	
				Thursday Peak	Saturday Peak
Cardno Grogan Richards Traffic Surveys	Bunnings	Thomastown	10,625	2.56	5.11
		Scoresby	11,883	4.30	8.09
		Altona	9,199	3.77	6.06
		Nunawading	13,793	3.13	7.34
		Hoppers Crossing	11,169	3.21	6.46
		Mooroolbark	9,367	4.00	9.30
		Mornington	10,599	4.45	6.66
		Average		**3.63**	**7.00**

3.3 OVERALL NET TRAFFIC GENERATION

As noted above, in previous studies undertaken with respect to the CHBP, the land uses assumed for the subject site were Business Park and Roadside Services land uses. **Table 3.2** below shows the comparison of traffic generated by the subject development for the different land uses and the overall difference in traffic generated by the CHBP for each case.

Table 3.2 Traffic Generation Comparison (Weekday PM Peak)

Source	Land Use	Peak Hour Trips
Central Hills Business Park		
Previous Study (Cardno)	Mixed Uses	3,636
Subject Site		
Previous Study (Cardno)	Business Park / Roadside Services	234
Proposed Development	Hardware Store	490
	Difference	256
	CHBP Total With Development	3,892
	Net Percentage Increase in Total CHBP Traffic	7%

Note that this figure represents the total trips generated by the site based on a total of all land uses proposed, and does not represent the total "external trips" for estimating the traffic impact on external road network components.

It is likely that the external trips departing CHBP to the adjacent road network would be smaller than this due to the interaction of complementary land uses within CHBP, for example, land uses developed within the CHBP that are established to provide services exclusive to the catchment (i.e. taverns, convenience facilities, food establishments) as well as land uses that interact with similar clientele or interrelated uses (e.g. automotive repair workshops and automotive part suppliers).

Additional assessment of the traffic impacts of the development (with the exception of the northern access roundabout due to the change in intersection control) was not deemed warranted due to the relative small percentage increase (7%) in the overall traffic generation of the CHBP due to the change in land use, and the likelihood that external trips will not significantly increase. The previous assessment of the CHBP development, as a whole, made assumptions about the type of use of individual sites in the absence of this information being available. It was anticipated that some sites would have greater than assumed traffic generation and other less, however, overall this is to be expected and it was assumed that this would average out over time.

3.4 NORTHERN ACCESS INTERSECTION OPERATION

The proposed intersection of Road 1904 with the northern development access is proposed as a single lane circulating roundabout to be used exclusively to provide access for service vehicles to the loading dock and service facilities on the northern side of the building. No regular patron access will be encouraged via this access with signposting provided accordingly.

The roundabout layout comprises a single circulating lane with one lane on each approach, and the western leg being designated as an entry only approach. The southern leg of the intersection will provide access for service vehicles to the proposed development.

Again, the assessment was only undertaken for the weekday PM peak period as it this represents the worst case scenario for the adjacent road network as while the Saturday peak period would generate a larger volume of traffic from the proposed development, the surrounding land uses would generate considerably less traffic on the weekend peak, and service vehicle movements are not expected to be significant on a weekend.

3.4.1 Traffic Distribution

A spreadsheet model was used to distribute the development traffic onto the surrounding road network. Background traffic growth was obtained from previous studies of the CHBP site. For this assessment it was assumed that heavy vehicles would only access the site from the northern access, with all other vehicles accessing the site from the eastern and southern accesses.

To ensure a conservative assessment, service vehicle volumes of 80 veh/hour using this roundabout were modelled. Note that this represents greater than 15% of total peak hour traffic generated by the site in the weekday peak, and represents 40 entry and 40 exit movements at the intersection.

The assessment also modelled use of this access exclusively by heavy vehicles (100% heavy vehicle use), and high heavy vehicle percentages in adjacent traffic (10%) which is representative of the land uses and expected traffic composition in the area.

3.4.2 Intersection Operation

The intersection operating performance was assessed using SIDRA 3.2 software. **Table 3.3** below provides the movement summary data for the AM and PM peak periods. Full summary data of the operating performance is presented in Appendix B.

Table 3.3 Intersection Analysis Results

Intersection	Intersection Control	Peak Traffic Period			
		Degree of Saturation	Delay (s)	95th %ile Queue (m)	Level of Service
Road 1904 / Northern Access	Roundabout	0.175	12.1	8	A

The results above show that the roundabout of Road 1904 with the northern access will operate at a satisfactory level of service during the peak traffic period. Traffic entering the intersection will experience minimal delays and short queue lengths on all approaches, in particular, queues entering the roundabout from the slip off ramp from Camden Valley Way are minor.

4 CAR PARKING REVIEW

4.1 CAR PARKING REQUIREMENTS

Car parking requirements for hardware stores are not defined in the Camden Council DCP 2006 or in the RTA Guide to Traffic Generating Developments. The car parking requirements for the proposed development have been assessed considering previous surveys and studies undertaken by Cardno. The parking requirements for the hardware store adopted for this study are shown in **Table 4.1** below.

Table 4.1 Parking Generation Rates

Source	Site	Location	Gross Floor Area (m^2)	Parking Space Rate (spaces/100m^2)	
				Thursday Peak	Saturday Peak
Cardno Grogan Richards Traffic Surveys	Bunnings	Scoresby	11,883	-	2.51
		Nunawading	13,793	1.48	2.84
		Hoppers Crossing	11,169	-	1.74
		Mornington	10,599	-	2.39
			Average	**1.48**	**2.37**
			Median	**1.48**	**2.45**

The requirements for parking for the development at the above mentioned rates are shown in **Table 4.2** below. The median rate for the Saturday peak was used as it represents a worst case scenario.

Table 4.2 Parking Requirements

Gross Floor Area (m^2)	Rate (per 100m^2 GFA)	Spaces
Hardware Store		
13,500	2.45	331

The above table indicates that the development requires 331 spaces to cater for the expected parking demands from the proposed land uses.

4.2 CAR PARKING PROVISION

The car park for the proposed development will provide a total of 364 spaces, including 8 disabled spaces and 6 trailer parking spaces. The car parking provision requirements according to previous surveys and studies show a surplus of 33 spaces in the proposed car spaces provided.

5 CAR PARK DESIGN AND SERVICE ARRANGEMENTS

5.1 CAR PARK DESIGN

The car parking layout has been reviewed in accordance with the Camden Council DCP, which references the off street car park standards AS2890.1 and AS2890.2.

All car parking space bay dimensions for cars meet the minimum requirements set out in AS2890.1:2004 for a user class 3A (Short term, high turnover parking). The minimum aisle width required of 6.6 metres is also met. All disabled car parking spaces comply with minimum specifications.

The car park layout comprises two distinct carpark nodes separated by east-west and north-south circulating aisles, with the primary circulation aisle established along the southern side of the hardware store with disabled parking spaces near the store entrance.

As previously mentioned, a left in only driveway access is proposed on the southern entrance, leading into a one-way circulating aisle connecting to the main east-west circulating aisle. This has been designed as driveway type access (rather than a formal deceleration lane and intersection style access). The frontage road is designed with a moderate speed environment (50-60km/h) and the style of access proposed is not an unexpected access type in an urban environment. Managing driver expectations and consistency will help to reduce the potential for accidents in a road environment.

An all movements access will be located on the eastern side of the site, which establishes the primary east-west circulation aisle through the site. A further all movements, service vehicle access, is proposed via the roundabout on the northern boundary of the site.

A rear one-way circulation roadway is provided around the site, although it is primarily intended for use by emergency and service vehicles.

5.2 SERVICE VEHICLES

Provision for service vehicles has been made on the northern side of the hardware store, with provision for refuse service via a roll on/roll off compactor arrangement collected via a Refuse Collection Vehicle (RCV) accessed via a service bay which also provides service facilities for Articulated Vehicles (AV). An additional service bay for an AV is provided at the north east corner of the site which will service the trade component of the site.

Swept path analysis was undertaken for the design service vehicles (AV and RCV), which are 19m and 10m in length respectively.

It is proposed that the service vehicles will enter/exit the site from the northern boundary, with the exception of AV's servicing the trade component, which are required to exit via the main eastern access via the one-way circulation road.

The swept path analysis, provided in Appendix C demonstrates that the service vehicles will be able to manoeuvre themselves in and out of the site without any issues.

This is of particular importance at the northern roundabout to ensure that external traffic is not impeded. The site design and swept path assessment demonstrates that AV's can access the site, and not conflict with external road users while entering/exiting. The roundabout has been designed to provide for AV access and incorporates an appropriately sized splitter island and additional linemarking for delineation.

Excellent visibility is provided for AV's at this location, and any potential conflicts occur internal to the site, which are resolved by one AV waiting for the other to pass.

6 ENVIRONMENT AND OTHER ISSUES

6.1 PEDESTRIANS

Pedestrian access to the site will be provided adjacent to the car park entrance on the eastern side of the site. Provision will be made for pedestrians external to the site connecting to a footpath on the southern side of the circulating aisle, which in turn connects to a formal pedestrian crossing located at the entrance to the store. This corresponds to desire lines from the eastern carpark node to the store entry.

No formal pedestrian crossing facilities are proposed on the western section of the car park, however a generous footpath is provided along the frontage of the store which will attract pedestrians from the western carpark node crossing informally to this footpath. Traffic volumes on the circulation road are expected to be lower at this location, and this informal crossing facility is considered appropriate.

Disabled customers will access the hardware store along the footpath located adjacent to the disabled parking along the store frontage.

The southern circulating aisle pedestrian link extends from the carpark to the site boundary, to connect to the external pedestrian network proposed as part of the subdivision on the opposite side of Road 1904.

6.2 CYCLIST PARKING PROVISION

The bicycle parking requirements for the proposed development have been assessed considering AustRoads – Part 14 Bicycles. The parking requirements for the hardware store is not specifically considered in AustRoads – Part 14 Bicycles, however the rate for light industry set out in Chapter 10 of Part 3 was assumed appropriate and states the following requirements be met:

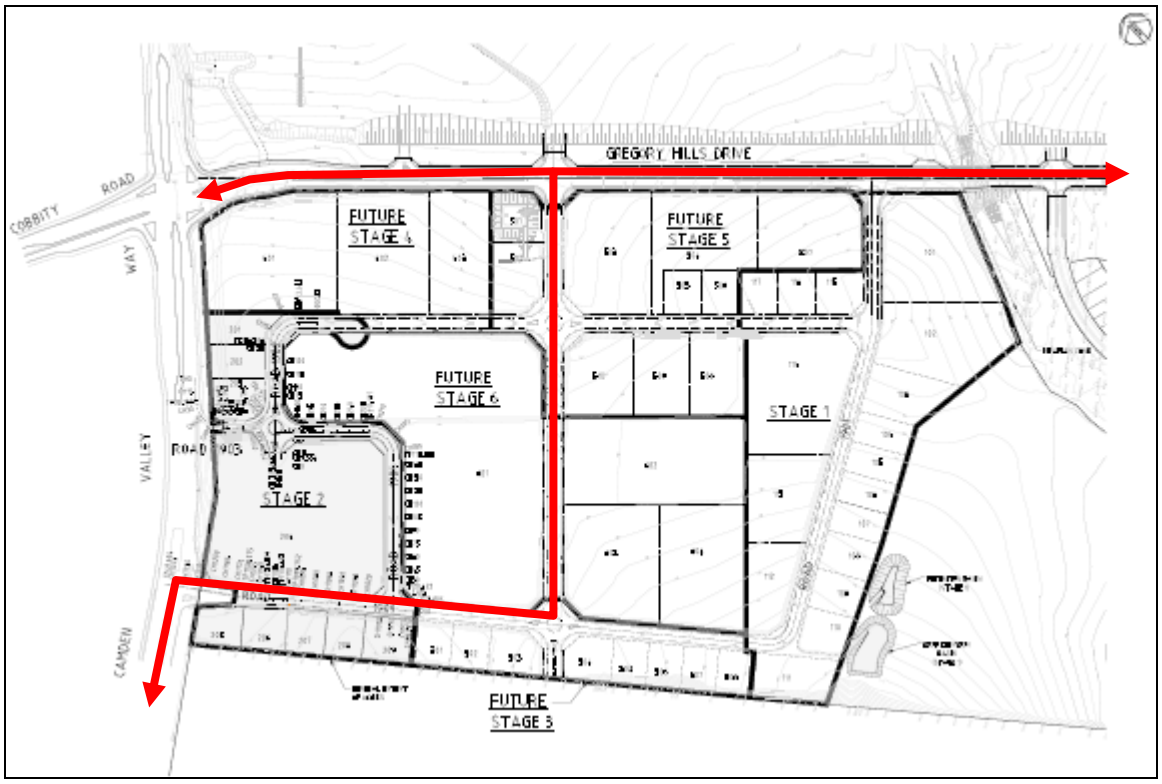
- 1 space/1000m^2 GFA

The requirements for parking for the development at the above mentioned rates are 14 spaces. The bicycle parking can be provided in the form of bicycle racks and should conform to AustRoads – Part 14 Bicycles.

6.3 PUBLIC TRANSPORT

The planned public transport route in the vicinity of the proposed development is illustrated in **Figure 6.1** below. Currently the bus stop locations have not been identified; however based on good public transport planning principles, it is expected that one will exist near the intersection of Road 1901 with Road 1904. Provision of a bus stop at this location should be encouraged to assist with providing a good alternative transportation outcome at the site.

Figure 6.1 Public Transport Route



7 CONCLUSION

This traffic assessment has been prepared to support the planned development of a hardware store within the Central Hills Business Park in the Camden Local Government Area. This assessment demonstrates that the proposed development will have minimal impact on the external road network, as identified through the Central Hills Business Park Traffic Impact Assessment, and will satisfactorily meet car parking requirements.

The traffic generation rates adopted for this study was 3.63 trips / 100m^2 (weekday peak hour) and 7.00 trips / 100m^2 (weekend peak hour) and was based on previous studies undertaken by Cardno for similar developments. Applying this rate to the development yields outlined in Section 2.2 the total trips generated will be 490 trips / weekday peak hour and 945 trips / weekend peak hour.

The car park for the proposed development will provide a total of 364 spaces, including 8 disabled spaces and 6 trailer parking spaces. The car parking provision requirements according to previous studies undertaken by Cardno on similar developments show a surplus of 33 spaces will be provided.

Swept path analyses were undertaken for the design service vehicles and showed that the service vehicles will be able to manoeuvre around the site without any issues. It was assumed that the majority of service vehicle movements will be to/from the northern access to the site.

Suitable pedestrian access will be provided to and within the proposed development, with adequate bicycle parking to be installed. It is expected that a bus stop will exist near the intersection of Road 1901 with Road 1904. The pedestrian, bicycle and public transport amenities will help reduce the impact the proposed development will have on the external road network.

APPENDICES

Appendix A

Plans of Development

DRAWING REGISTER

DRWG. NO.	DRWG TITLE	SCALE
DA 01	TITLE SHEET	NTS.
DA 02	EXISTING SITE CONDITIONS	1:500 on A1
DA 03	SITE PLAN	1:500 on A1
DA 04	FLOOR PLANS	1:250 on A1
DA 05	ROOF PLAN	1:250 on A1
DA 06	ELEVATIONS	1:250 on A1
DA 07	ELEVATIONS	1:250 on A1
DA 08	SECTIONS	1:250 on A1
DA 09	PYLON SIGN DETAILS	1:50 on A1

NEARMAP IMAGE

1 / - Locality Plan
Scale NTS.

2 / - Conceptual Perspective
Scale N.T.S.

DA SUBMISSION

Title Sheet

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LEFFLER SIMES ARCHITECTS

ISSUE	AMENDMENT	DATE	CHK'D
P1	ISSUED FOR CLIENT REVIEW	24.08.10	JAJ
P2	ISSUED FOR CLIENT REVIEW	31.08.10	JAJ
A	DA SUBMISSION	03.09.10	JAJ

Project Oxygen

Camden Valley Way,Central Hills,NSW

DA01 A

Project 2882
Date AUG 2010
Scale NTS
Drawn MC

DA SUBMISSION

Existing Site Conditions

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ISSUE	AMENDMENT	DATE	CHK'D
P1	ISSUED FOR CLIENT REVIEW	24.08.10	JAJ
A	DA SUBMISSION	03.09.10	JAJ
B	EXISTING SITE CONDITIONS AMENDED	14.09.10	JAJ

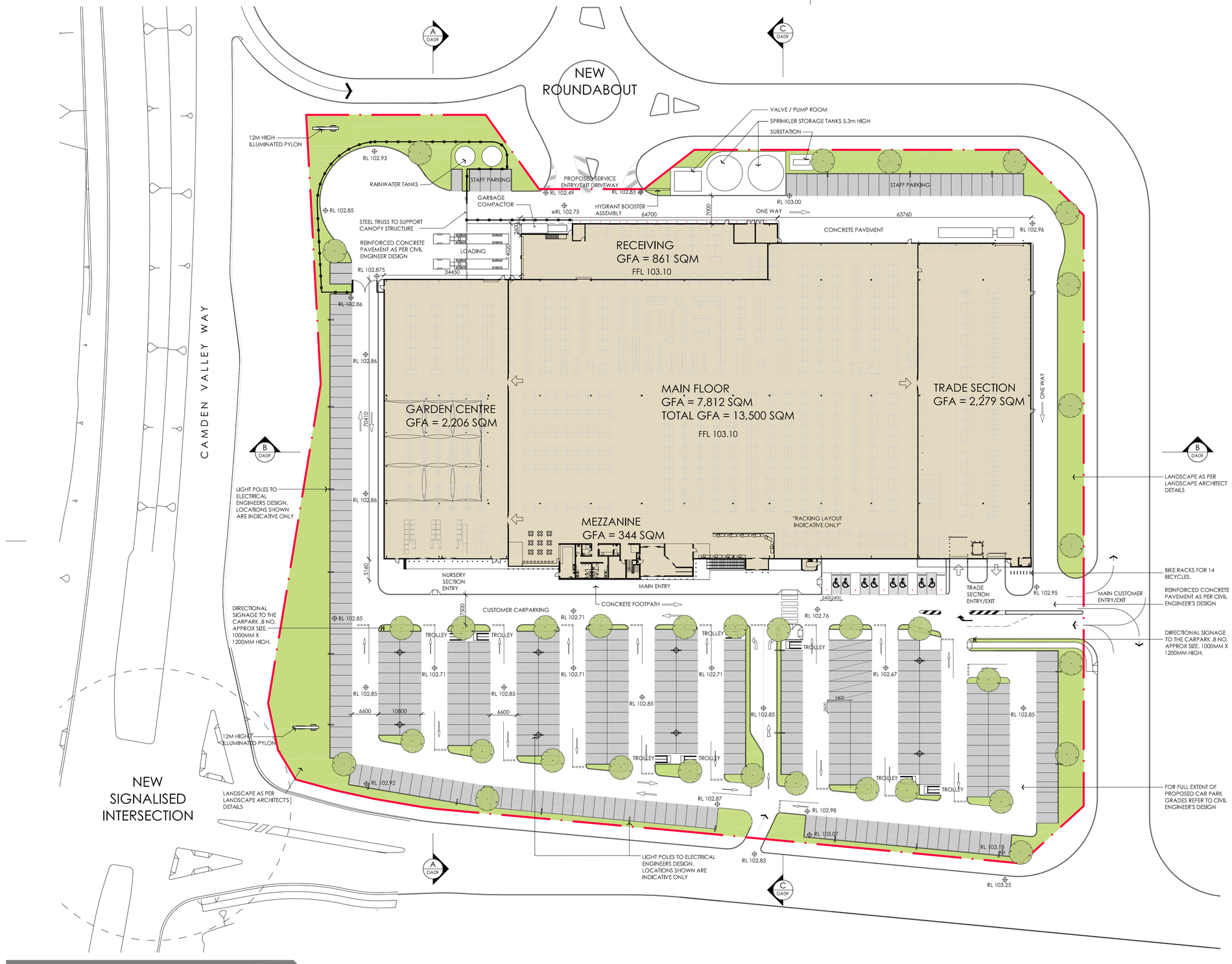
Project Oxygen

Camden Valley Way,Central Hills,NSW

0 10 20 30 50

DA02 B

Project 2882
Date AUG 2010
Scale 1:500@A1
Drawn MC



NO PLANNING ADVICE HAS BEEN SOURCED FROM COUNCIL AND LOCAL AUTHORITIES IN THE PREPARATION OF THIS SITE MASTERPLAN. ALL SETBACKS, PLOT RATIOS, LANDSCAPE AREAS, CAR PARKING NUMBERS AND THE LIKE ARE SUBJECT TO COUNCIL APPROVAL.

ENTRIES, EXITS & CAR PARKING LAYOUTS ARE PRELIMINARY ONLY AND SUBJECT TO TRAFFIC ENGINEER'S DESIGN.

SITE BOUNDARIES AND SITE AREAS INDICATIVE ONLY & SUBJECT TO CONFIRMATION BY LICENSED SURVEYOR.

SITE AREA: = 33,656 SQM

HARDWARE GFA = 13,500 SQM

SITE COVERAGE = 40.1%

CARSPACES (TOTAL) = 364

CARPARKING RATIO = 1:37 SQM

DA SUBMISSION

Site Plan

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LEFFLER SIMES ARCHITECTS

ISSUE	AMENDMENT	DATE	CHK'D
P5	ISSUED FOR CLIENT REVIEW	24.08.10	JAJ
P6	ISSUED FOR CLIENT REVIEW	31.08.10	JAJ
A	DA SUBMISSION	03.09.10	JAJ
B	DA SUBMISSION	08.09.10	JAJ
C	PLANOGRAM ADDED	14.09.10	JAJ
D	EXTRA LANE ADDED TO ENTRY	20.09.10	JAJ
E	CARPARKING NUMBERS CONFIRMED	22.09.10	JAJ

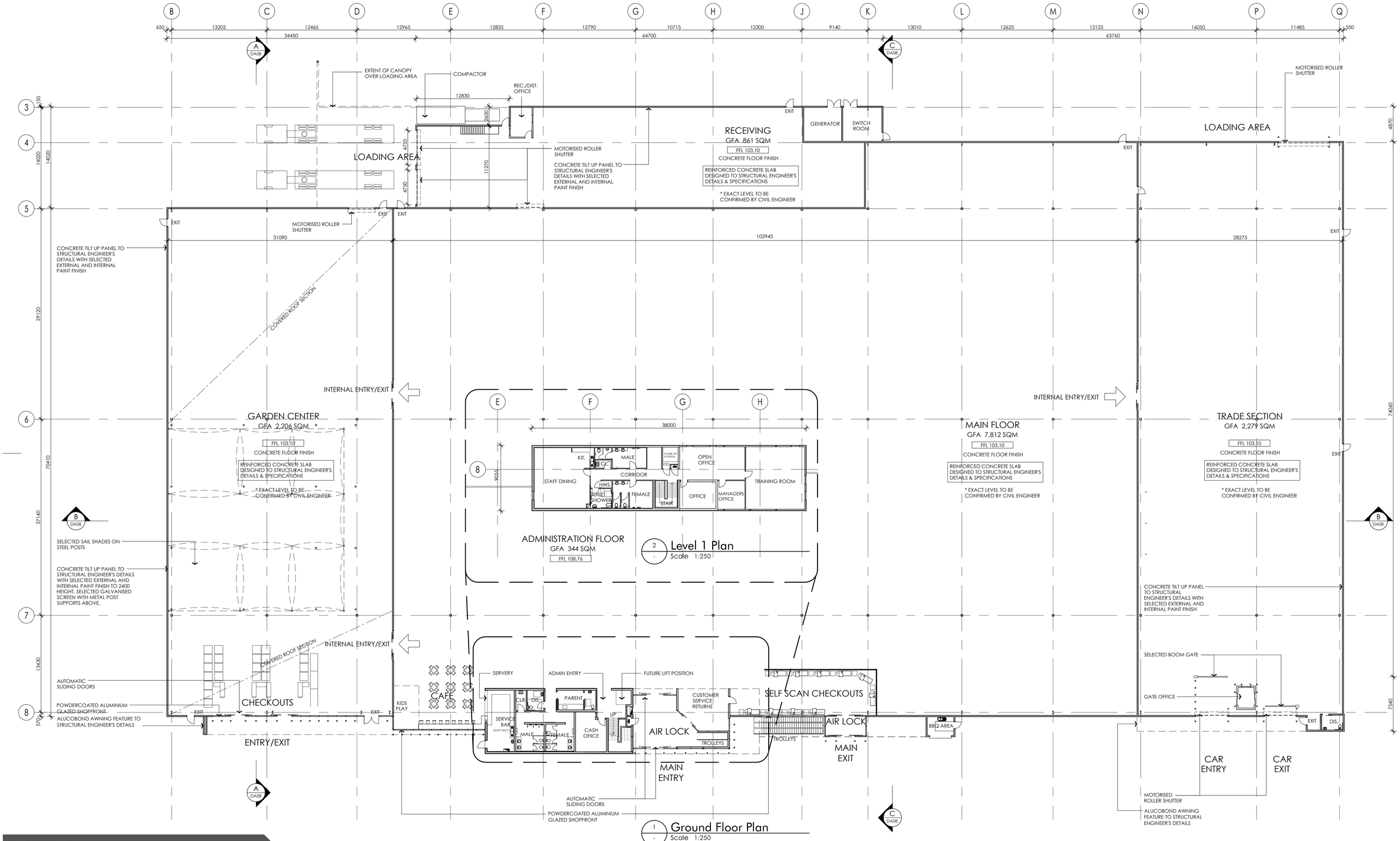
Project Oxygen

Camden Valley Way,Central Hills,NSW

0 10 20 30 50

DA03 E

Project 2882
Date JUNE 2010
Scale 1/500@A1
Drawn JAJ



DA SUBMISSION

Floor Plans

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LEFFLER SIMES ARCHITECTS

ISSUE	AMENDMENT	DATE	CHK'D
P1	ISSUED FOR CLIENT REVIEW	24.08.10	JAJ
P2	KITCHEN UNITS INDICATED	31.08.10	JAJ
A	DA SUBMISSION	03.09.10	JAJ

Project Oxygen

Camden Valley Way,Central Hills,NSW

0 5 10 15 25

DA04 A

Project 2882
Date AUG 2010
Scale 1:250@A1
Drawn MC

Appendix B

SIDRA Analysis

SIDRA INTERSECTION

Movement Summary

Northern Access Intersection

Peak Traffic Period

Roundabout

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)
Hardware Store Access (S)										
2	T	19	100.0	0.078	6.8	LOS A	5	0.38	0.47	32.8
3	R	24	100.0	0.078	16.3	LOS B	5	0.38	0.69	43.4
Approach		**43**	**100.0**	**0.078**	**12.1**	**LOS B**	**5**	**0.38**	**0.59**	**40.8**
New E leg										
4	L	14	100.0	0.151	8.4	LOS A	7	0.15	0.47	39.8
6	R	193	9.8	0.150	11.6	LOS B	7	0.15	0.65	33.5
Approach		**207**	**15.9**	**0.150**	**11.4**	**LOS B**	**7**	**0.15**	**0.64**	**34.0**
New N leg										
7	L	209	10.0	0.175	6.3	LOS A	8	0.31	0.51	38.0
8	T	7	100.0	0.175	4.1	LOS A	8	0.31	0.29	35.7
Approach		**216**	**13.0**	**0.176**	**6.3**	**LOS A**	**8**	**0.31**	**0.50**	**37.9**
New W leg										
10	L	35	8.6	0.143	4.8	LOS A	6	0.37	0.47	32.6
11	T	98	10.2	0.143	5.8	LOS A	6	0.37	0.49	50.6
12	R	19	100.0	0.143	15.1	LOS B	6	0.37	0.70	43.5
Approach		**152**	**21.1**	**0.143**	**6.7**	**LOS A**	**6**	**0.37**	**0.51**	**47.5**
All Vehicles		**618**	**22.0**	**0.175**	**8.5**	**LOS A**	**8**	**0.28**	**0.56**	**40.2**

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

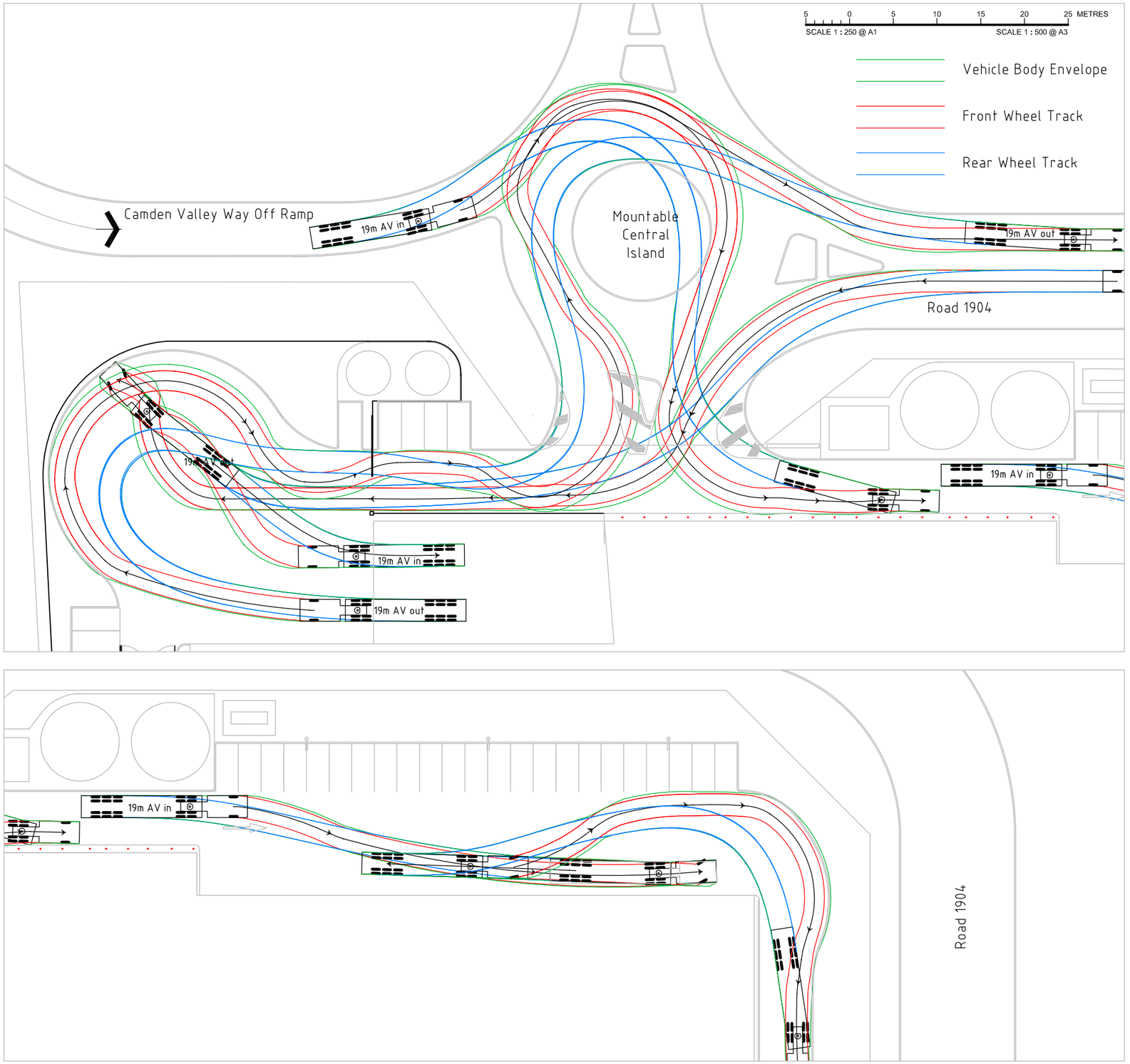
SIDRA SOLUTIONS

Site: Hardware Shop Roundabout

Appendix C

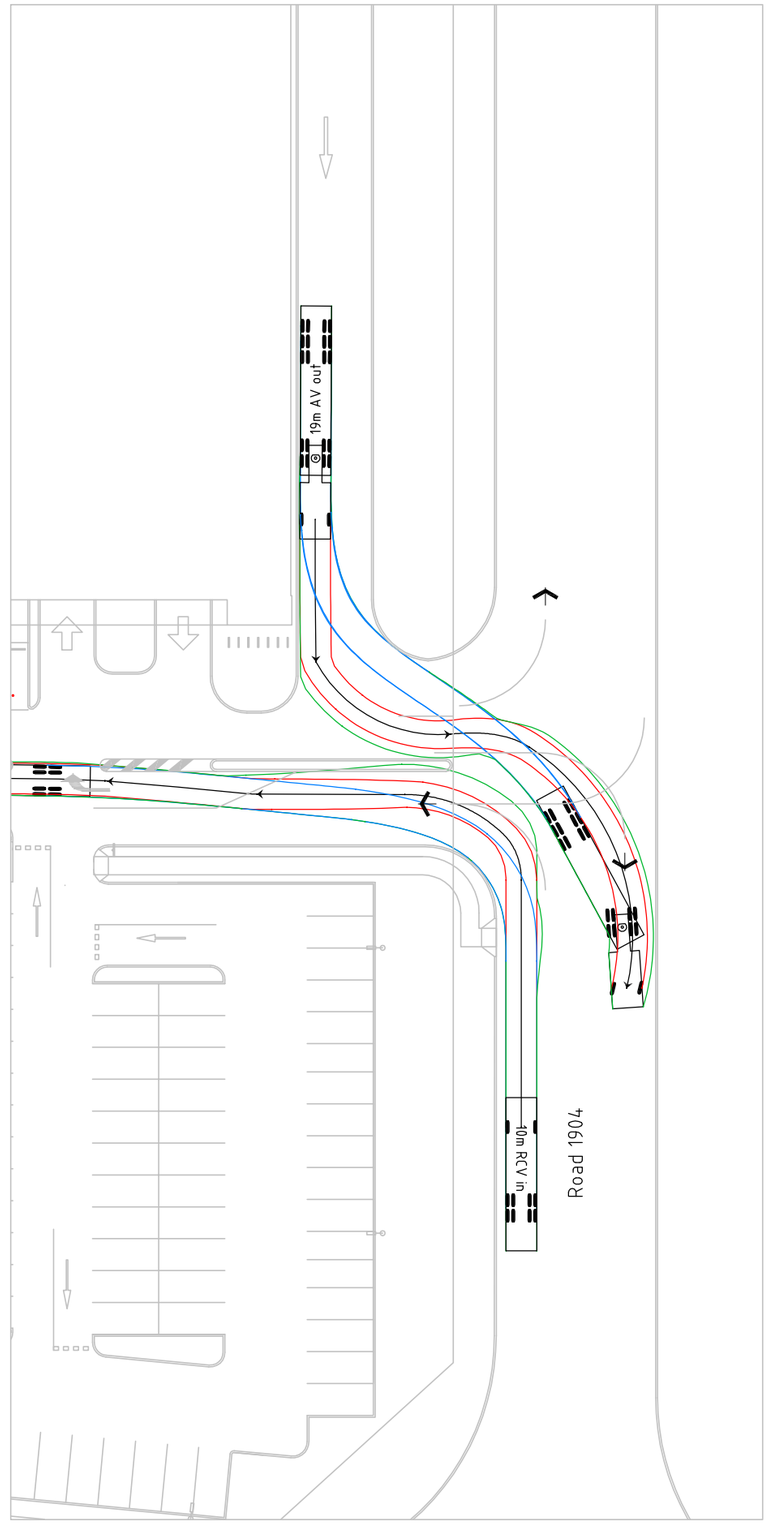
Swept Path Evaluation

Northern Entry Roundabout Swept Paths



North-east Corner AV Circulation

Eastern Entry Swept Paths



REV	DATE	REVISIONS	DRN	CHK
2	21/09/2010	Amended Development Plans	KH	AL
1	02/09/2010	Development Application Issue	NM	AL

ARCHITECT:

	PREPARED	CHECKED
DESIGNED:	NM	AL
DRAWN:	KH	

APPROVED: AL — PROJECT DIRECTOR — DATE

REVIEWED: AL — PROJECT MANAGER — DATE

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Swept Path Evaluation

DRAWING STATUS:

DRAWING NUMBER: CES01182-001

REV: 2