

**PROPOSED
RESIDENTIAL DEVELOPMENT
ALBERT AVENUE AND THOMAS STREET,
CHATSWOOD**

***Assessment of Traffic and
Parking Implications***

September 2012

Reference 12045

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1. INTRODUCTION

This report has been prepared to accompany a S75w Application to the Department of Planning and Infrastructure for modification of the existing consent (MP09-0066) to replace the approved commercial tower element with serviced apartment tower and other minor amendments on the site with frontages to Albert Avenue and Thomas Street at Chatswood (Figure 1).

Chatswood CBD is subject to continuing new development as part of the urban consolidation reflecting its regional role with excellent public transport services. The development site, having been occupied by a Council carpark for many years, is bounded by Albert Avenue and Thomas Street adjacent to the railway station on the south-western edge of the CBD.

The approved development scheme comprised:

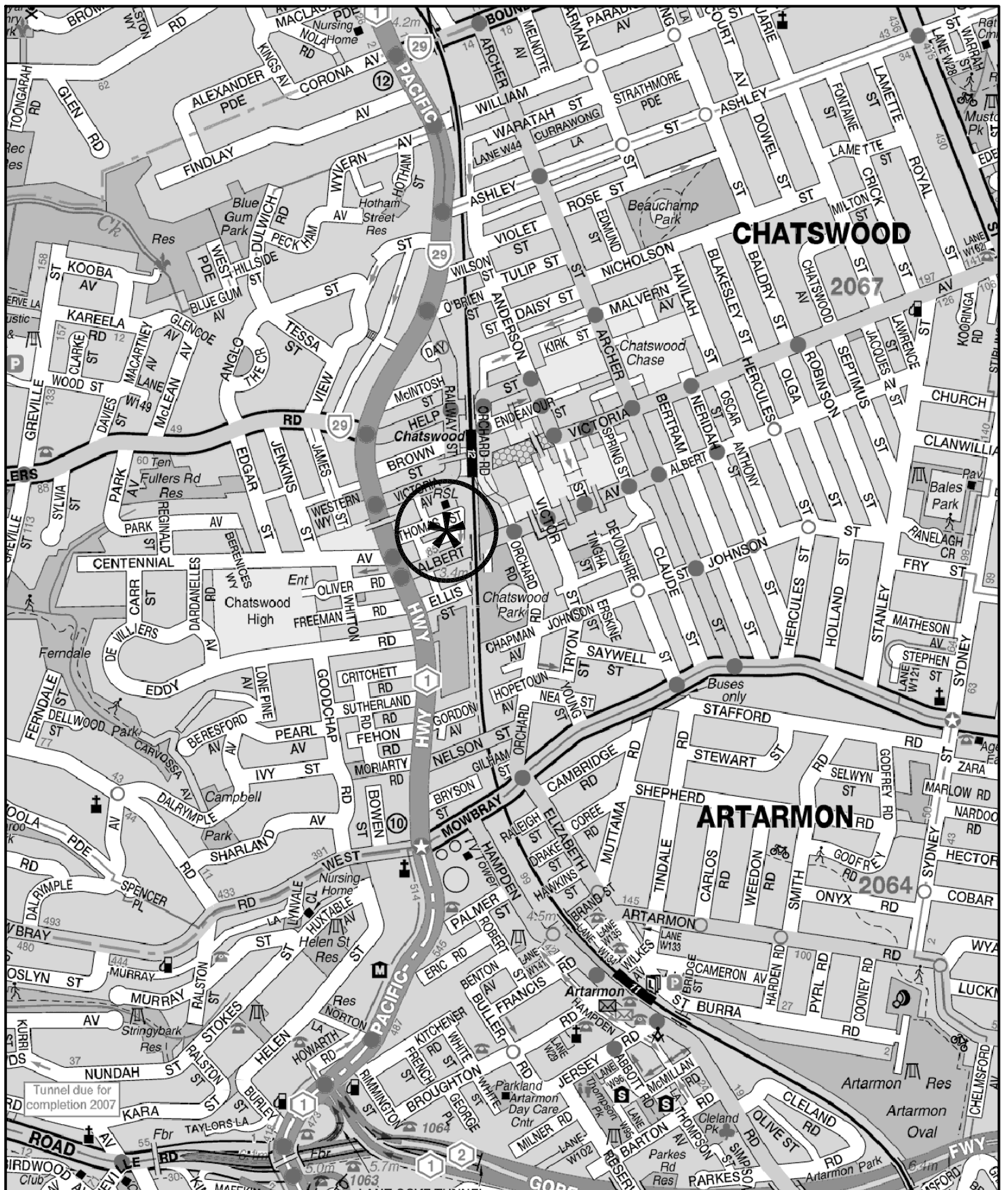
- * 19,091m² NFA office floorspace
- * 208 residential apartments
- * 2,031m² NFA retail floorspace
- * 506 parking spaces including 250 public parking spaces

The proposed amended scheme comprises:

- * 241 residential apartments
- * 302 serviced apartments
- * Child Care Centre
- * 486m² retail floorspace
- * 504 parking spaces including 250 public parking spaces

The purpose of this report is to:

- * describe the site its context and the approved development
- * describe the proposed modified development scheme
- * describe the existing road network and traffic conditions and the future circumstances
- * assess the appropriateness of the proposed parking provision
- * assess the potential traffic implications
- * assess the vehicle access, internal circulation and servicing arrangements.



LEGEND



LOCATION

FIG 1

2. DEVELOPMENT SCHEME

2.1 SITE, CONTEXT AND EXISTING USE

The development site has been a Council public carpark for many years and comprises a consolidation of three parcels of land with frontages to Albert Avenue, Thomas Street, Fleet Lane and Albert Lane as follows:

-	Southern section	2,716m ²
-	Northern section	1,361m ²
-	Fleet Lane section	245m ²
	Total	4,322m²

The site is located in the south-western sector of The Chatswood CBD adjacent to the railway station and just to the south of the Victoria Avenue 'strip'.

The existing Council carpark accommodates some 150 spaces with accesses (ingress and egress) provided on the Albert Avenue, Thomas Street and Fleet Lane frontages. As part of the development scheme the central section of Fleet Lane will be closed and incorporated into the site.

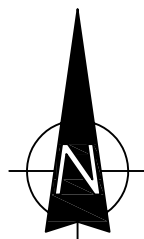
2.2 APPROVED DEVELOPMENT

The approved development (MP09-0066) comprised:

Commercial	19,091m ² NFA
Retail	2,031m ² NFA
Residential	208 apartments



LEGEND



SITE

FIG 2

The basement carparking comprised:

- 192 spaces for residents
- 64 spaces for commercial/retail
- 250 spaces for public (Council)

Total 506 spaces

Vehicle access for the basement parking comprised ingress/egress on Albert Avenue (left-turn IN/OUT) and egress to Thomas Street. The consent also required that provision was made for an access connection from Thomas Street to Fleet Lane. Details of the proposed scheme are shown on the plans prepared by PTW Architects which are reproduced in Appendix A.

2.3 PROPOSED DEVELOPMENT MODIFICATION

The application proposes to:

- * change the approved commercial tower element to a service apartment tower
- * change the mix and number of apartments in the approved residential tower
- * delete some of the retail and commercial floorspace
- * provide a Child Care Centre
- * modify the ground level podium and basement layouts

The proposed modified development will comprise:

Residential Apartments

90 x 1 Bed

131 x 2 Bed

20 x 3 Bed

Total 241 Apartments

Serviced Apartments

1 x Studio

242 x 1 Bed

54 x 2 Bed

5 x 3 Bed

Total 302 Apartments

Child Care Centre

49 Children

Retail

486m²

Parking

151 Residential Apartments

75 Serviced Apartments

15 Visitors

10 Child care

3 Retail

Total 254 spaces

250 public spaces

Total 504 spaces

Vehicle access will reflect the existing approved arrangement with:

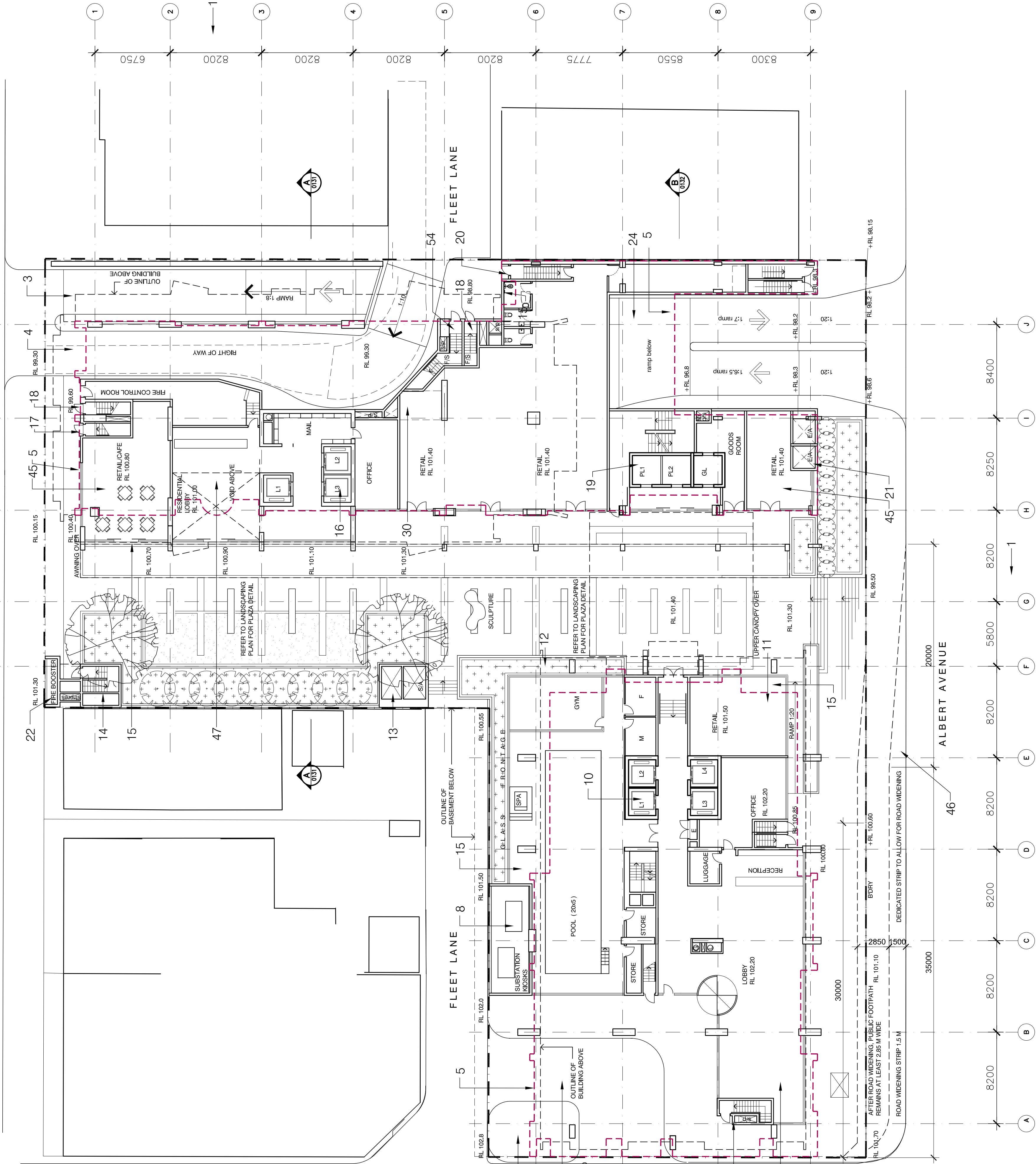
- Ingress/Egress on Albert Avenue (LT IN/OUT)
- Egress to Thomas Street
- Porte cochere access on the corner of Albert Lane and Fleet Lane
- Access connection from Thomas Street to Fleet Lane (southbound)

Details of the proposed modified development scheme are proved on the plans prepared by PTW which accompany the application and are reproduced in part overleaf.

LEGEND

- 1. GRID ADJUSTED
- 2. CHANGE OF USE FROM COMMERCIAL TO SERVICED APARTMENTS - SK-006
- 3. ADDITIONAL VEHICLE EXIT FROM BASEMENT 1 TO THE THOMAS STREET FRONTAGE - SK- 003
- 4. RIGHT OF WAY FROM FLEET LANE - SK-002
- 5. OUTLINE OF EA APPROVED GROUND LEVEL
- 6. PORTE COSHERE ADDED
- 7. FIRE STAIR RELOCATED
- 8. SUBSTATION RELOCATED
- 9. GROUND FLOOR TO SERVICED APARTMENT TOWER REDESIGN TO ACCOMMODATE LOBBY, SWIMMING POOL, GYM AND OFFICE SPACE.
- 10. TOWER LIFTS RELOCATED, NUMBER REDUCED.
- 11. RETAIL RELOCATED
- 12. LANDSCAPE AREA INCREASED
- 13. S/A RISER INCREASED
- 14. FIRE STAIR LOCATION ADJUSTED
- 15. BUILDING OUTLINE EXTENDED
- 16. RESIDENTIAL BUILDING LIFT RELOCATED, LOBBY REDESIGNED
- 17. FIRE CONTROL ROOM, FIRE EGRESS FROM BASEMENT RELOCATED
- 18. FIRE EGRESS FROM TOWER RELOCATED
- 19. PUBLIC LIFTS & STAIRS RELOCATED
- 20. CONNECTION BETWEEN RETAIL AND BACK OF THE HOUSE ADDED
- 21. CAR PARKING E/A RIBERS ADDED
- 22. FIRE BOOSTER ADDED
- 24. REDUCED FLOOR AREA OVER CAR PARKING ENTRY
- 30. PLANT DELETED
- 43. RETAIL REDUCED
- 46. LAYBY REMOVED
- 47. RESIDENTIAL LOBBY MOVED/REDESIGNED
- 54. EGRESS FROM BASEMENT RELOCATED

1 GROUND FLOOR PLAN
1:200



C. Section 75W Submission	19.07.12
B. EA Submission	18.12.09
A. submitted for Test of adequacy	09.11.09

Do not scale from drawings. Verify all dimensions on site before commencing work. Copying or the reproduction of this drawing is strictly prohibited without the consent of PTW Architects P/L.

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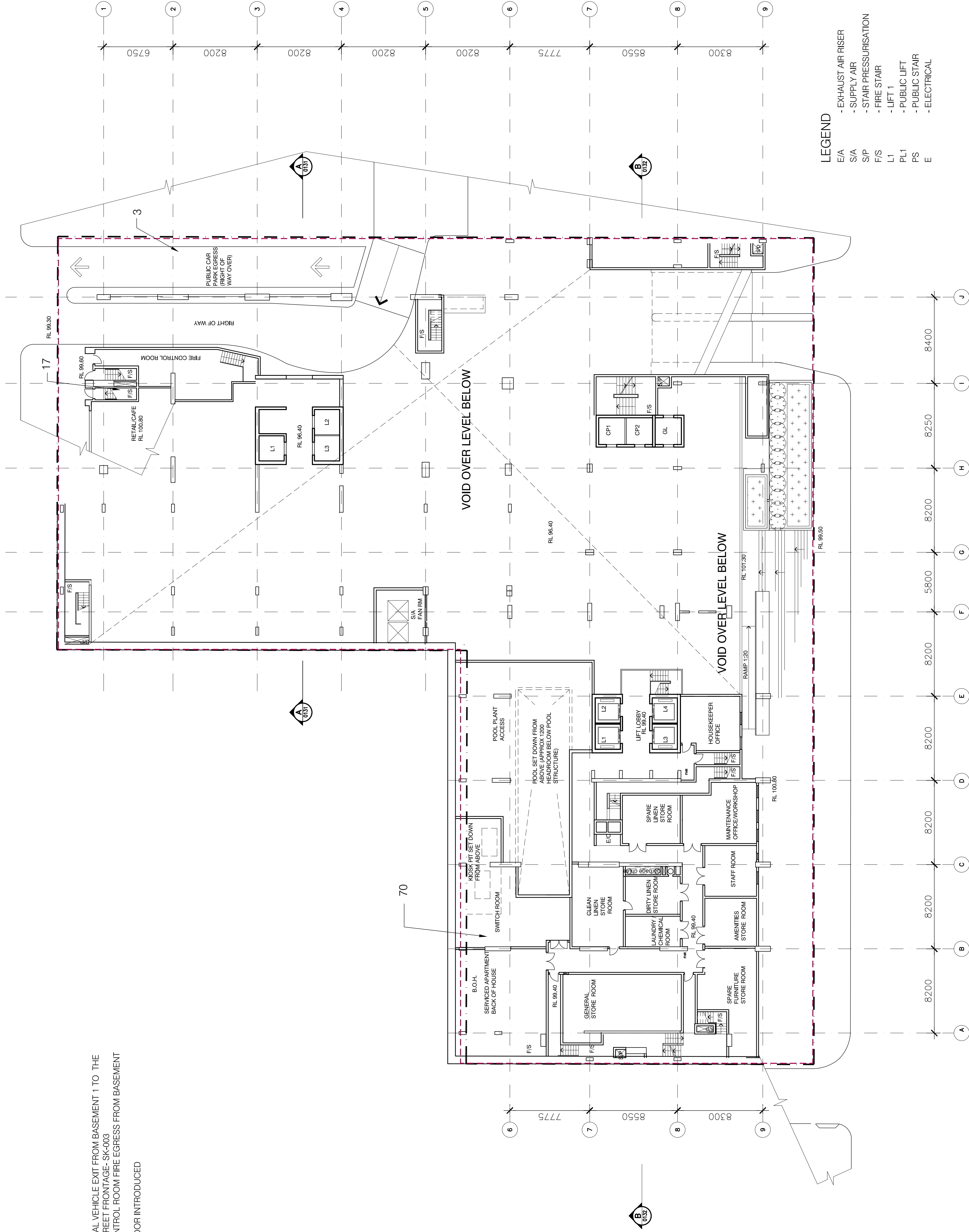
Consultants

Planner
Structural
Services
Landscapes
Acoustics
Traffic

MERITON THOMAS STREET
Thomas Street/ Albert Avenue
Chatswood NSW 2067

Project No. 212007
Scale: 1:200@A1:1:400@A3
Date: 10/9/2009
Drawn DH
Checked EA
Approved SP

GROUND FLOOR PLAN
A-0100 C
SECTION 75 W SUBMISSION



LEGEND

3. ADDITIONAL VEHICLE EXIT FROM BASEMENT 1 TO THE THOMAS STREET FRONTAGE- SK-003

17. FIRE CONTROL ROOM FIRE EGRESS FROM BASEMENT RELOCATED

70. NEW FLOOR INTRODUCED

SECTION 75W SUBMISSION	19.07.12
------------------------	----------

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PTW

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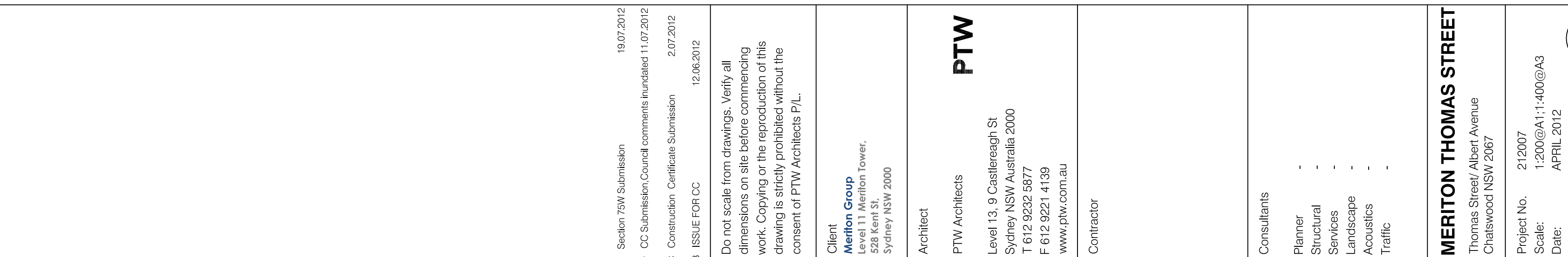
Planner	-
Structural	-
Services	-
Landscape	-
Acoustics	-
Traffic	-
Consultants	

MERITON THOMAS STREET
Thomas Street/ Albert Avenue
Chatswood NSW 2067

Project No. 212007
 Scale: 1:200@A1;1:400@A3
 Date: APRIL 2012
 Drawn EA/RB
 Checked EA
 Approved SP

MEZZANINE
UPPER BASEMENT 1
A-0110 C
SECTION 75 W SUBMISSION

1 MEZZANINE PLAN
1:200



Planner -

- Structural
- Services
- Landscape
- Acoustics
- Traffic

Scale: 1:200@A1;1:400@A3

Date: APRIL 2012

MERITON THOMAS STREET
Thomas Street/ Albert Avenue
Chatswood NSW 2067

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 Scale: 1:200@A1;1:400@A3
 Date: APRIL 2012
 Drawn EA/DH
 Checked EA
 Approved SP

1 —
2 —
3 —
4 —
5 —
6m —

BASEMENT 1 PLAN

A-0111 E
SECTION 75 W SUBMISSION

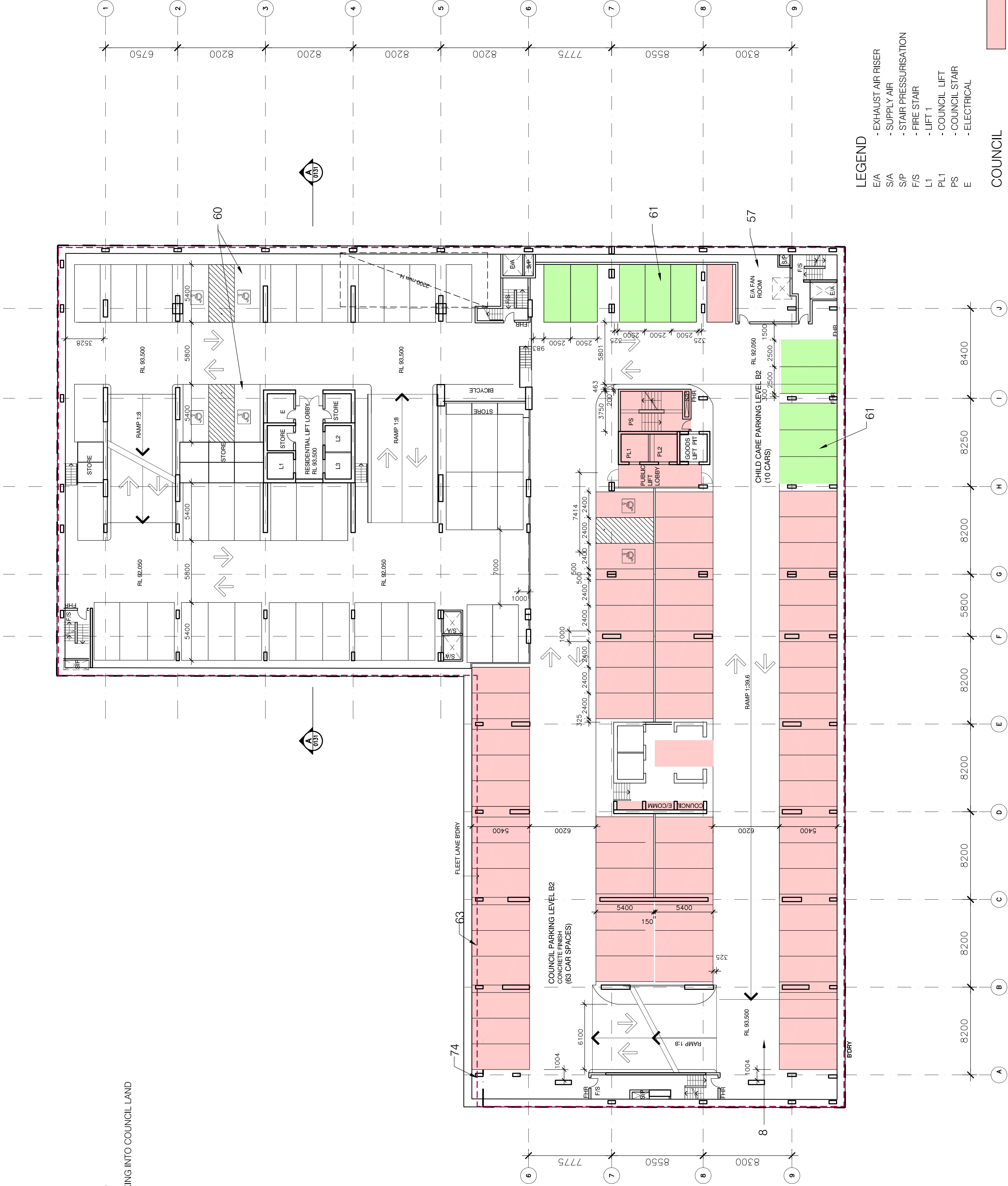
1 BASEMENT 1 PLAN
1:200

LEGEND

2. CHANGE OF USE FROM COMMERCIAL TO APARTMENTS - SK-006
8. SUBSTATION RELOCATED.
44. BASEMENT EXTENDED
58. SERVICED APARTMENT/ EMPLOYEES PARKING
59. PUBLIC PARKING RELOCATED
63. EA APPROVED BASEMENT OUTLINE

LEGEND

- 57. PLANT ROOM ENLARGED
- 60. DISABLE PARKING SPACES ADDED
- 61. CHILD CARE PARKING INTRODUCED
- 63. EA APPROVED BASEMENT OUTLINE
- 74. ENCROACHMENT OF THE CAR PARKING INTO COUNCIL LAND



1 BASEMENT 2 PLAN
1:200

E Section 75W Submission 19.07.2012
D CC Submission Council comments furnished 11.07.2012
C Construction Certificate Submission 2.07.2012
B ISSUE FOR CC 12.06.2012

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Services -
Landscape -
Acoustics -
Traffic -

MERITON THOMAS STREET
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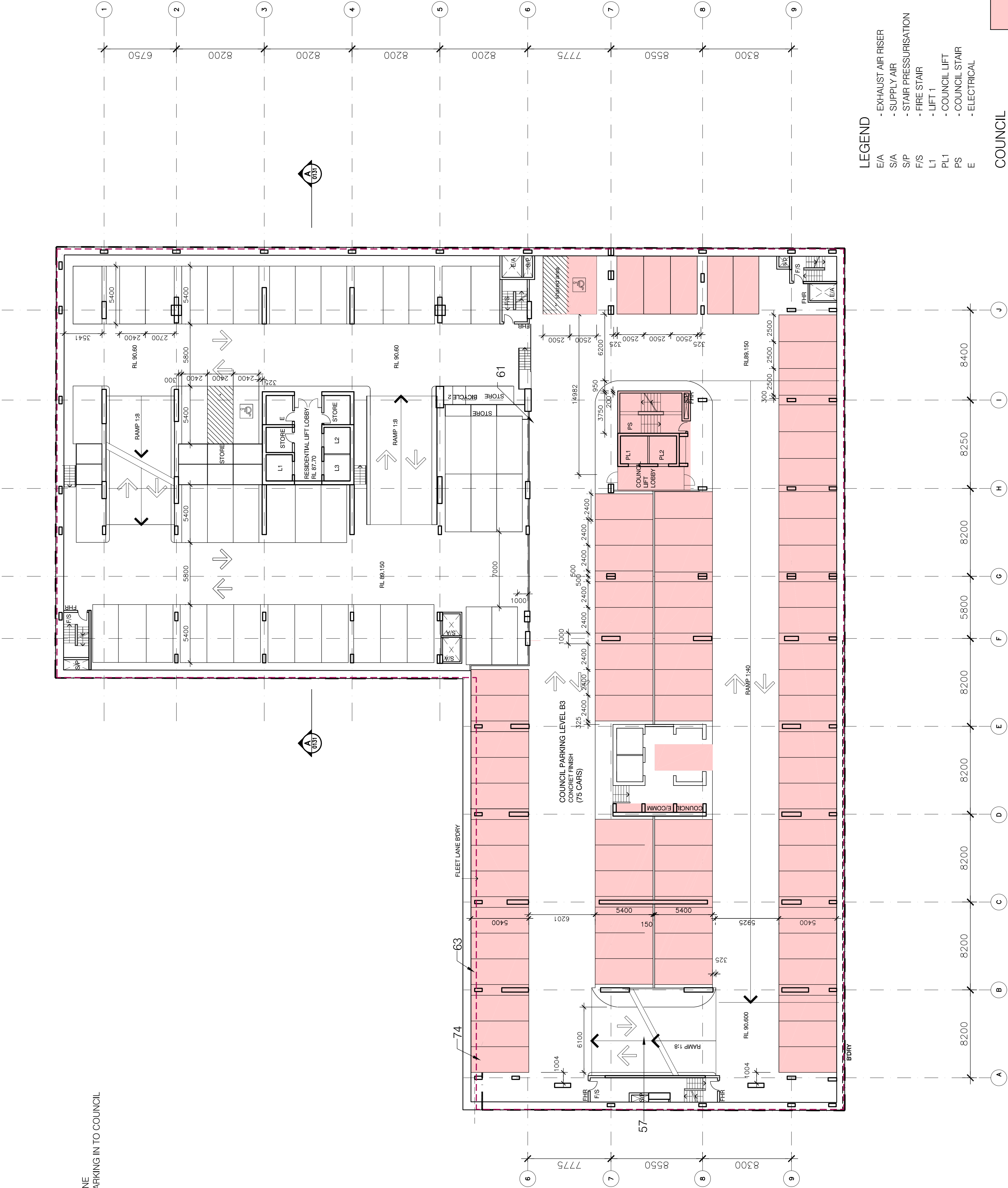
Project No. 212007
Scale: 1:200@A1;1:400@A3
Date: APRIL 2012
Drawn: EADH
Checked: EA
Approved: SP

BASEMENT 2 PLAN

A-0112 E
SECTION 75 W SUBMISSION

LEGEND

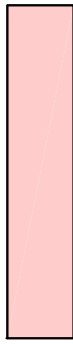
- 63. EA APPROVED BASEMENT OUTLINE
- 74. ENCROACHMENT OF THE CAR PARKING IN TO COUNCIL LAND



LEGEND

- E/A - EXHAUST AIR RISER
- S/A - SUPPLY AIR
- S/P - STAIR PRESSURISATION
- F/S - FIRE STAIR
- L1 - LIFT 1
- PL1 - COUNCIL LIFT
- PS - COUNCIL STAIR
- E - ELECTRICAL

COUNCIL



1 BASEMENT 3 PLAN
1:200

E. Section 75W Submission	19.07.2012
D. CC Submission Council comments funded 11.07.2012	
C. Construction Certificate Submission	2.07.2012
B. ISSUE FOR CC	12.06.2012

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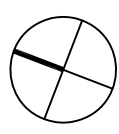
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Contractor

Consultants	
Planner	-
Structural	-
Services	-
Landscape	-
Acoustics	-
Traffic	-

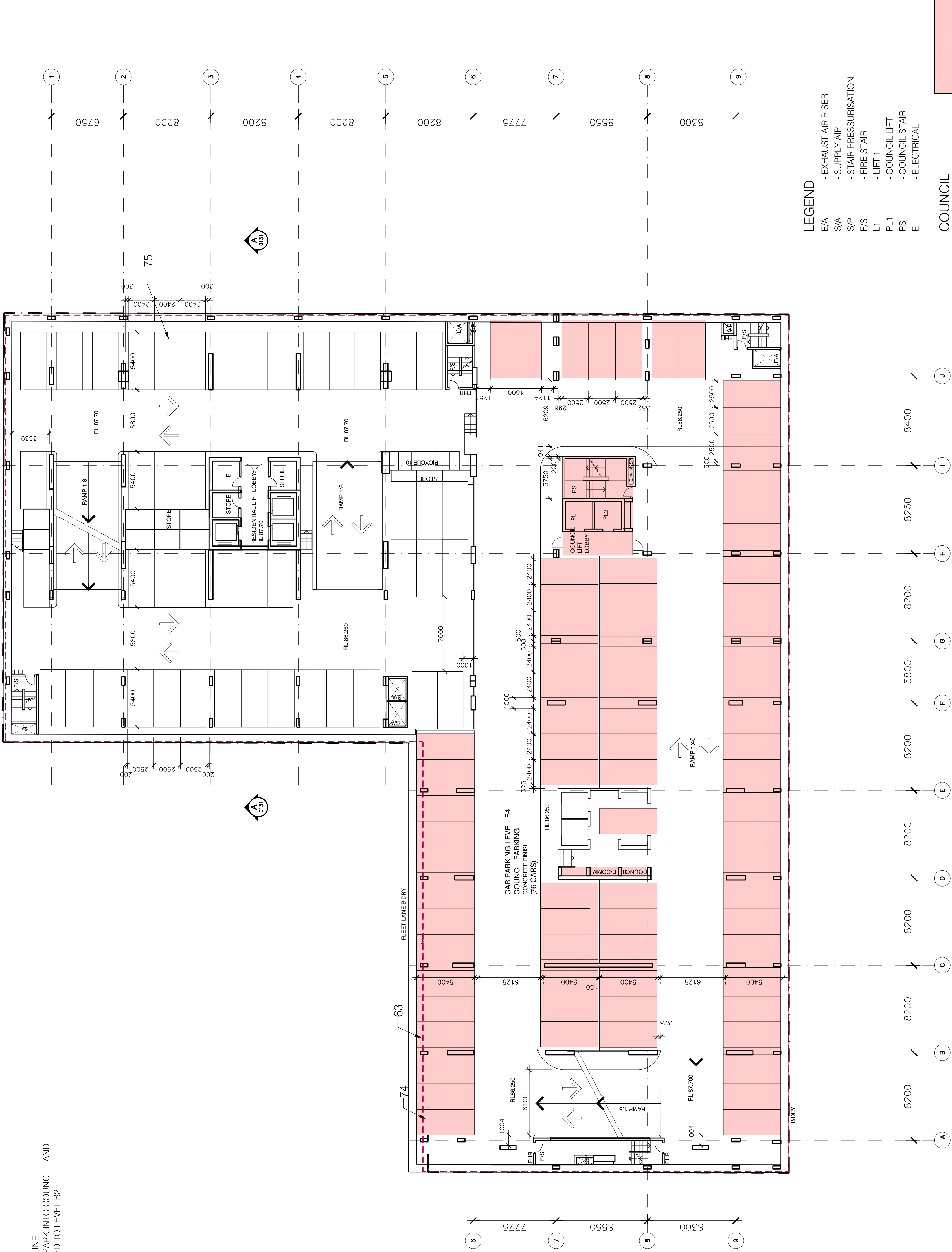
MERITON THOMAS STREET
Thomas Street Albert Avenue
Chatswood NSW 2067

Project No.	212007
Scale:	1:200@A1:1:400@A3
Date:	APRIL 2012
Drawn	EA/RB
Checked	EA
Approved	SP



LEGEND

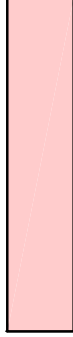
- 63. EA APPROVED BASEMENT OUTLINE
- 74. ENCROACHMENT OF THE CAR PARK INTO COUNCIL LAND
- 75. DISABLE PARKING PLACE MOVED TO LEVEL B2



LEGEND

- E/A - EXHAUST AIR RISER
- S/A - SUPPLY AIR
- S/P - STAIR PRESSURISATION
- F/S - FIRE STAIR
- L1 - LIFT 1
- PL1 - COUNCIL LIFT
- PS - COUNCIL STAIR
- E - ELECTRICAL

COUNCIL



E. Section 75W Submission 19.07.2012
D. CC Submission Council comments funded 11.07.2012
C. Construction Certificate Submission 2.07.2012
B. ISSUE FOR CC 12.06.2012

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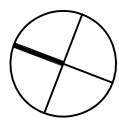
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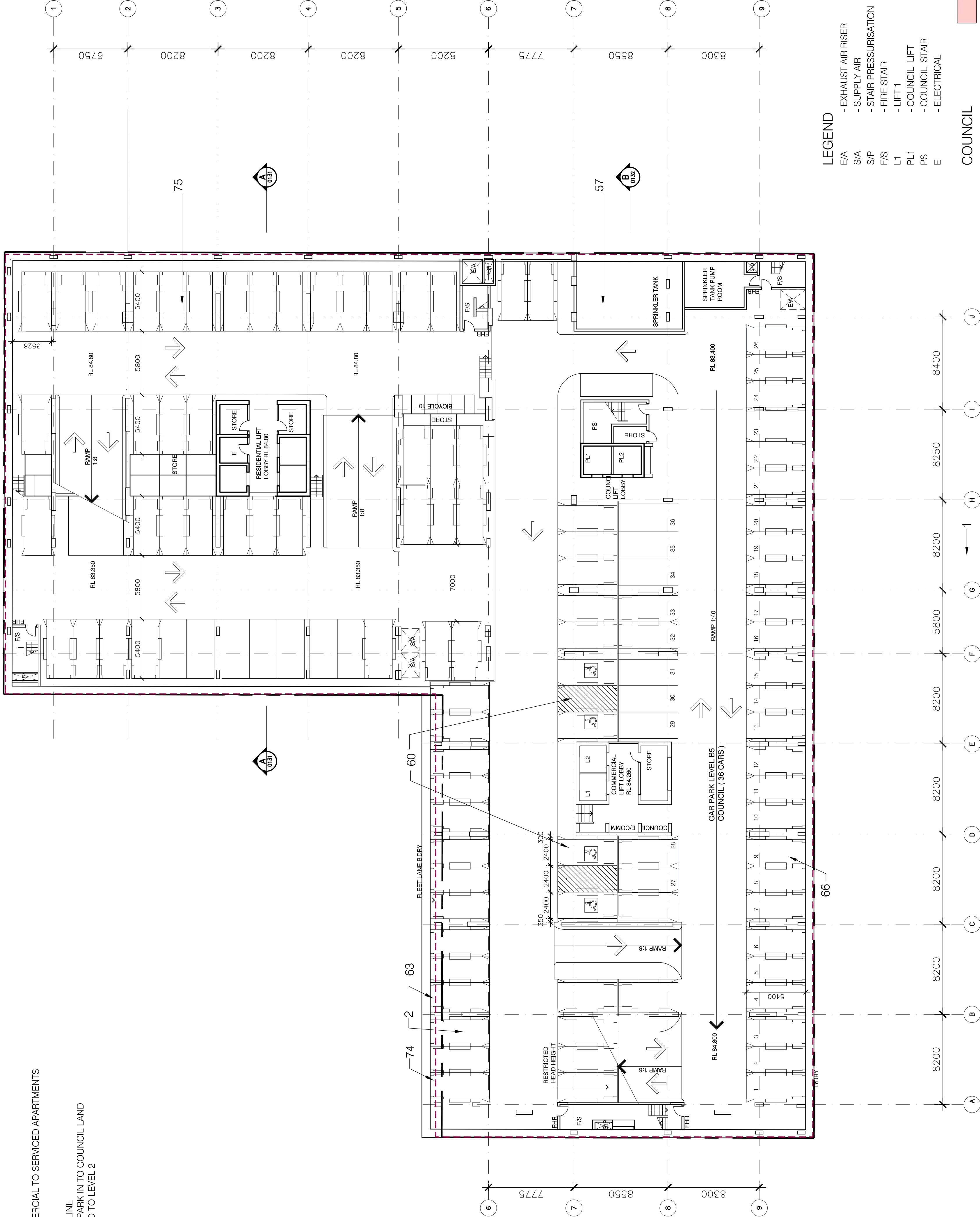
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Project No. 212007
Scale: 1:200@A1;1:400@A3
Date: APRIL 2012
Drawn: EA/RB
Checked: EA
Approved: SP



LEGEND

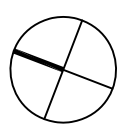
- 2. CHANGE OF USE FORM COMMERCIAL TO SERVICED APARTMENTS
- 57. PLANT ROOM ENLARGED
- 60. DISABLE SPACES ADDED
- 63. EA APPROVED BASEMENT OUTLINE
- 74. ENCROACHMENT OF THE CAR PARK IN TO COUNCIL LAND
- 75. DISABLE CAR PARK RELOCATED TO LEVEL 2



1 BASEMENT 5 PLAN
1:200

MERITON THOMAS STREET
Thomas Street/ Albert Avenue
Chatswood NSW 2067

Project No. 212007
Scale: 1:200@A1:1:400@A3
Date: 05/2012
Drawn: EA/RB
Checked: EA
Approved: SP



BASEMENT 5 PLAN

A-0115 E
SECTION 75 W SUBMISSION

E. Section 75W Submission 19/07/2012
D. CC Submission Council comments funded 11/07/2012
C. Construction Certificate Submission 2/07/2012
B. ISSUE FOR CC 12/06/2012
A. EA Submission 18/12/09

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- LEGEND**
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 - L1 - LIFT 1
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COUNCIL

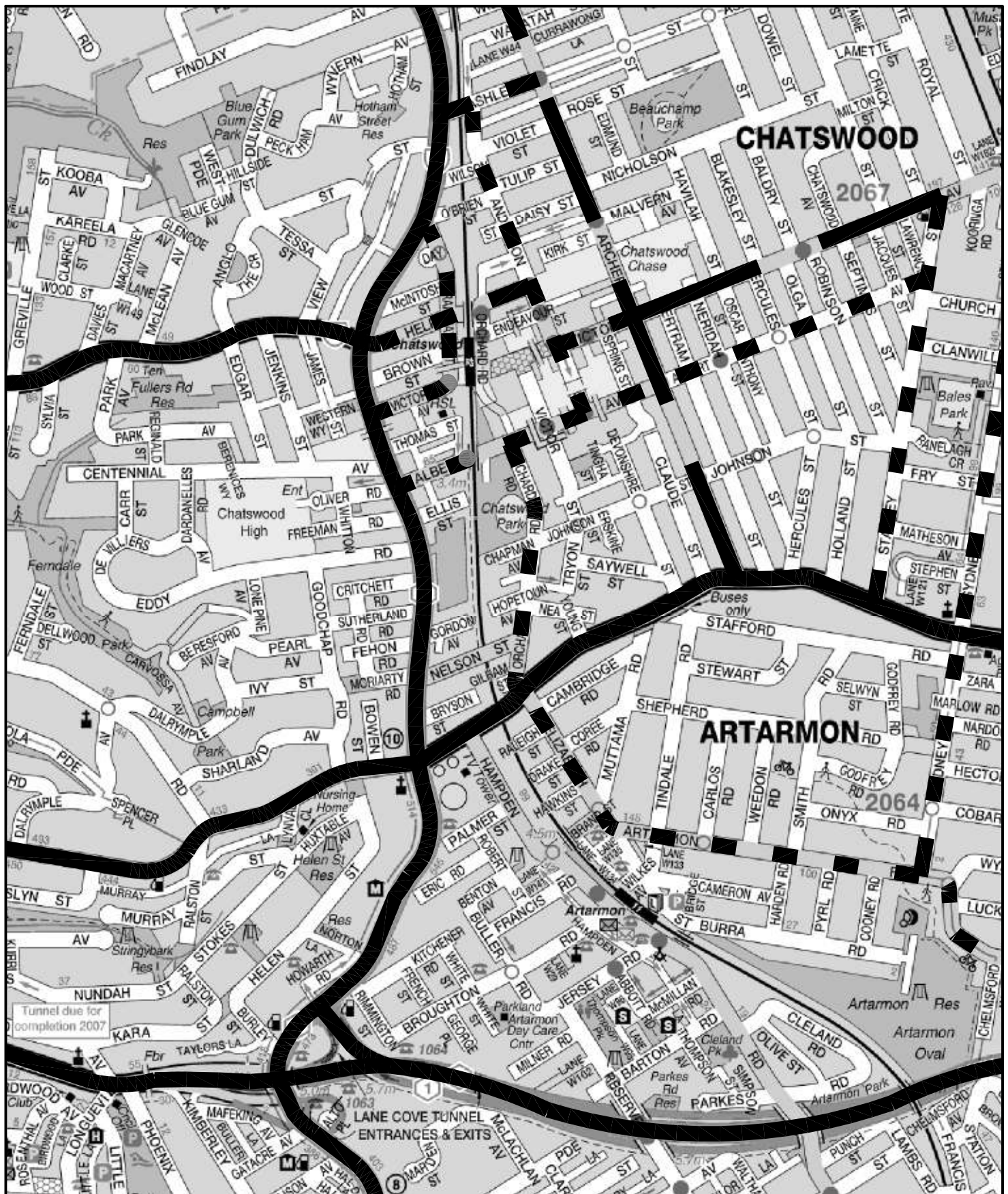
3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The road network serving the development site (Figure 3) is dominated by:

- * *Pacific Highway* - a State Road and arterial route being the principal link between the City and Hornsby
- * *Delhi Road, Mowbray Road and Boundary Street* - State Roads and sub-arterial routes connecting and/or crossing the Highway
- * *Archer Street* - Regional Road and major collector road route connecting between Mowbray Road and Boundary Road
- * *Help Street – Victoria Avenue* - a major collector road route through the town centre
- * *Albert Avenue* - a collector road connecting to the Highway and running parallel to Victoria Avenue
- * *Orchard Street and Anderson Street* - collector roads connecting to Albert Avenue.

Albert Avenue is straight/level with a 12.8 metres wide carriageway (widening at the western connection to the Highway) as is Thomas Street while Fleet Lane is some 9 metres wide and Thomas Lane has a variable width (ie wider in the northern section).



LEGEND

- ARTERIAL
- SUB-ARTERIAL
- COLLECTOR



ROAD NETWORK

FIG 3

3.2 TRAFFIC CONTROLS

The traffic controls which have been applied to the road system in the vicinity of the site comprise:

- * the traffic signals at the Albert Avenue/Pacific Highway intersection. Details provided on the design plan reproduced overleaf include:
 - tidal flow lane arrangement in the Highway
 - 3 lanes westbound and 1 lane eastbound in Albert Avenue
- * the traffic signals at the Albert Avenue and Thomas Lane intersection including the ONE WAY southerly restriction on Thomas Lane. Details provided on the plan reproduced overleaf
- * the traffic control signals at the Pacific Highway/Victoria Avenue intersection which provides for right-turn movements into Victoria Road
- * the ONE WAY westerly restriction on Oliver Road at the Pacific Highway intersection
- * the 50 kmph speed restrictions except for the 40 kmph restriction in the CBD core area and 60 kmph on the Highway
- * the NO STOPPING restrictions along the Pacific Highway and Albert Avenue (western part)
- * the central median island in Pacific Highway across the Thomas Street intersection.

LEGEND



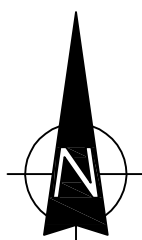
TRAFFIC SIGNAL CONTROL



ROUNDBOUT



RESTRICTED TURNING MOVEMENT



TRAFFIC CONTROLS

FIG 4

DRAWN USING CAD
 DO NOT AMEND MANUALLY

0010.490.VV.0882

SIGNAL GROUP PHASE CHART

SIGNAL GROUP	A	B	C	D	E	E1	E2	OVERLAPS PERMITTED	REMARKS	TABLE
V1	X	X				X		A/B A/E1 Ø E1/A/B	Ø P1 Not Running.	VD018-5
V2	X		X				X	A/C A/E2 Ø E2/A/C	Ø P2 Not Running.	VD018-5
V3		X			X	X		B/E E/E1		VD018-5
V4			X		X		X	C/E E/E2		VD018-5
V5				X						1
V6		X		X	*	X		B/D ● B/E E/E1 D/E	*Timed RA protection for P3 ped Ø P3 not demanded.	106
V7	X	*	X	*	X		X	*E2/A/C/D D/E2 ● A/D D/A ●	*Timed RA protection for P2 ped Ø P2 not demanded.	112
P1	X	X				X		E1/A/B		104
P2	X		X				X	E2/A/C		101
P3				X						102

NOTES

- This site is SCATS linked.
- Special stop signs R1-202 to be placed on Post 1.
- This site operates to standard VD 018-5.
- Candy Bar locations shown thus :
 - NORTHBOUND mode.....●
 - SOUTHBOUND mode.....○
- Mode switch to be installed in the controller to allow switching from the outside, marked as follows: NORTHBOUND/SOUTHBOUND.
- Mode switch is to be connected to detector 16. In the ON position, the NORTHBOUND mode is selected.
- "V2" Phase lantern assemblies are focussed such that they are not visible at the southbound stop line of TCS No.892.
- "V2" lantern 400mm long visors in green aspect only.
- A-B2 detector to operate as B-E1 detector in SOUTHBOUND mode.
- A-B2 detector to operate as A-B detector in NORTHBOUND mode.
- A-C2 detector to operate as A-C detector in SOUTHBOUND mode.
- A-C2 detector to operate as C-E2 detector in NORTHBOUND mode
- Civil works shown on Plan Reg. No. 0010.490.RC.2500
- Detector 17 provides additional strategic output for detector 3.
- Detector 18 provides additional strategic output for detector 6.
- All push buttons are audio tactile.

A ORIGINAL ISSUE

PLAN REDRAWN J/1 4887
 PROVIDE TIDAL FLOW
 USING CANDY BARS
 REPLACE POST 5, TYPE 6
 REMOVE V5 LANTERN POST 6
 S.E. 2/4/93
 B ISSUE
 M.A.T.
 J.H. 7/7/93
 C ISSUE
 MAE (SITE CHECKED)
 LAMSON/MAYER 4/94
 D ISSUE
 RELOCATED POSTS 5,6,7,8
 ADDED LT BAY TO SUIT NEW
 CIVIL WORKS
 TEH 5-2-96

E Issue J1 EEN 97/040
 Relocated posts 1,5,7 & 8
 Post 7 was type 6, post 1 was type 2, A11 P.B.s.
 converted to A.T. Plan altered as per MAE.
 D.C. 7/7/98
 F Issue J1 SS23 19/11/98
 Removed: A Ø filter position.
 Relabelled detectors.
 Renumbered det's & notes.
 Added: signs post 3 & 6.
 notes 5,6,10,11 & 12.
 V4 lantern post 6
 Altered: SGP chart, mov't diag, detector spec, notes.
 post chart, pov't marking.
 GAP to MAE 6/4/99

C Issue J1 SS23
 Altered:Detector Spec, Movement diag, Det labels & numbers, V5 Lantern on post 5.
 Added:Candy bar locations and 400 visors on V7 signal group
 GAP 29/06/99

REFERENCE PLANS		U.B.O-REF.	MAP195 H11
Specification	SVTCS/7	L.S.G.	E 316465
Det. Sched. Exp.	VD018-10	CO-ORDS	N 1228614
SSG Dis. Sec.	VD018-8	DESIGNEDJ.ZOUTENDYK..... DATE.....17.5.1993.....	
S.D.O.	VD018-5		
		D.REID	RECOMMENDED
		20.5.1993	DATE.....

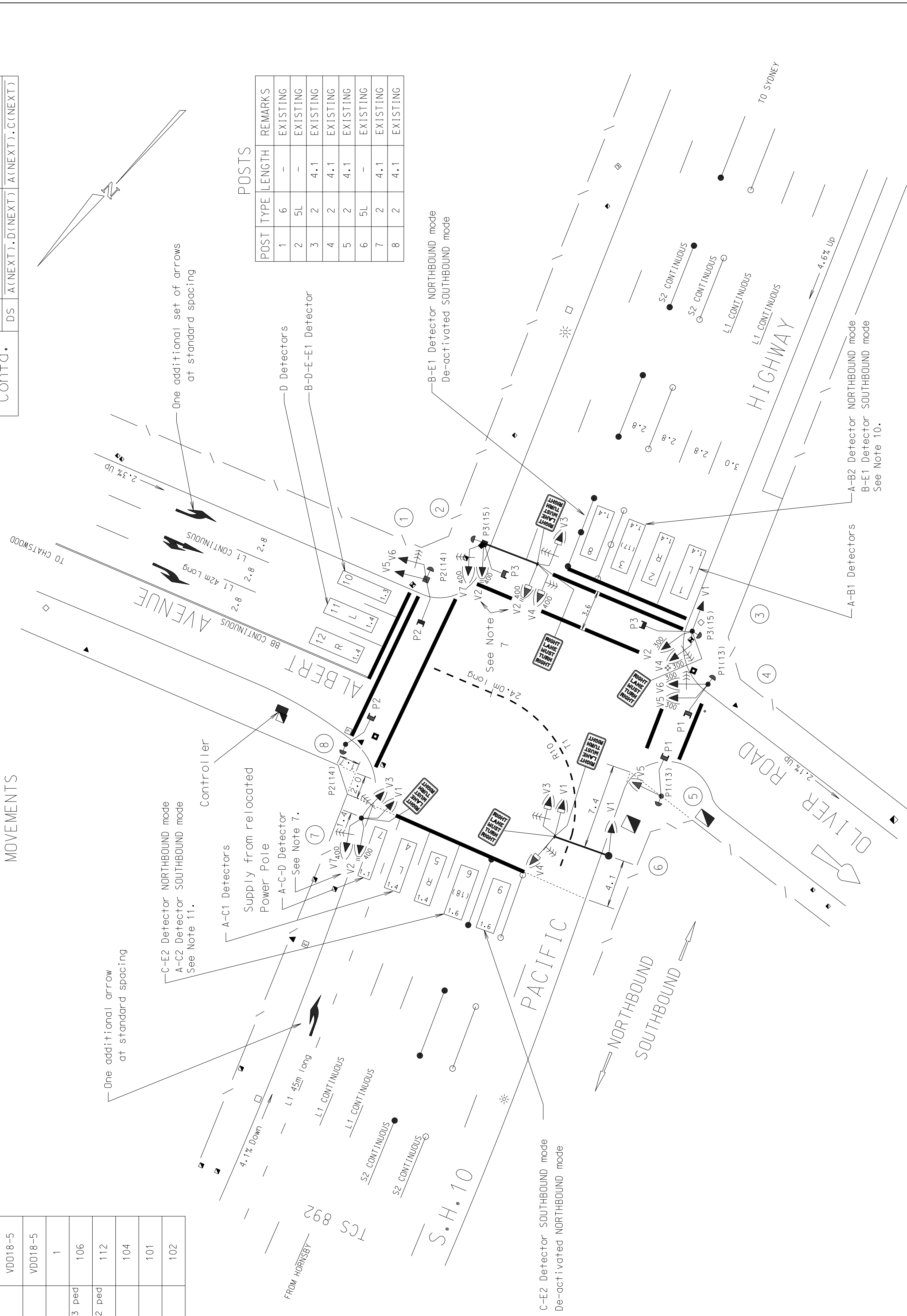
APPROVED
*A.J. Dwyer*.....
 DESIGN ENGINEER
 DATE.....17.5.1993.....
 ACCEPTED
*S.H.*.....
 20.5.1993
 DATE.....

ROADS AND TRAFFIC AUTHORITY OF NSW
 CITY OF WILLOUGHBY
 S.H.10 PACIFIC HIGHWAY,
 ALBERT AVENUE AND
 OLIVER ROAD
 CHATSWOOD

SYDNEY REGION		SHEET 9	
SCALE	5 0 5 10	SUPERSEDES SHEET	1/N
FILE	490 TS 148	ISSUE	
REGN.			
0010.490.VV.0882			

DESIGN LAYOUT

DRAWING FILE : WV0882.9G.DGN
 ARCHIVE LOCATION : WV0800-WV0899/WV0882



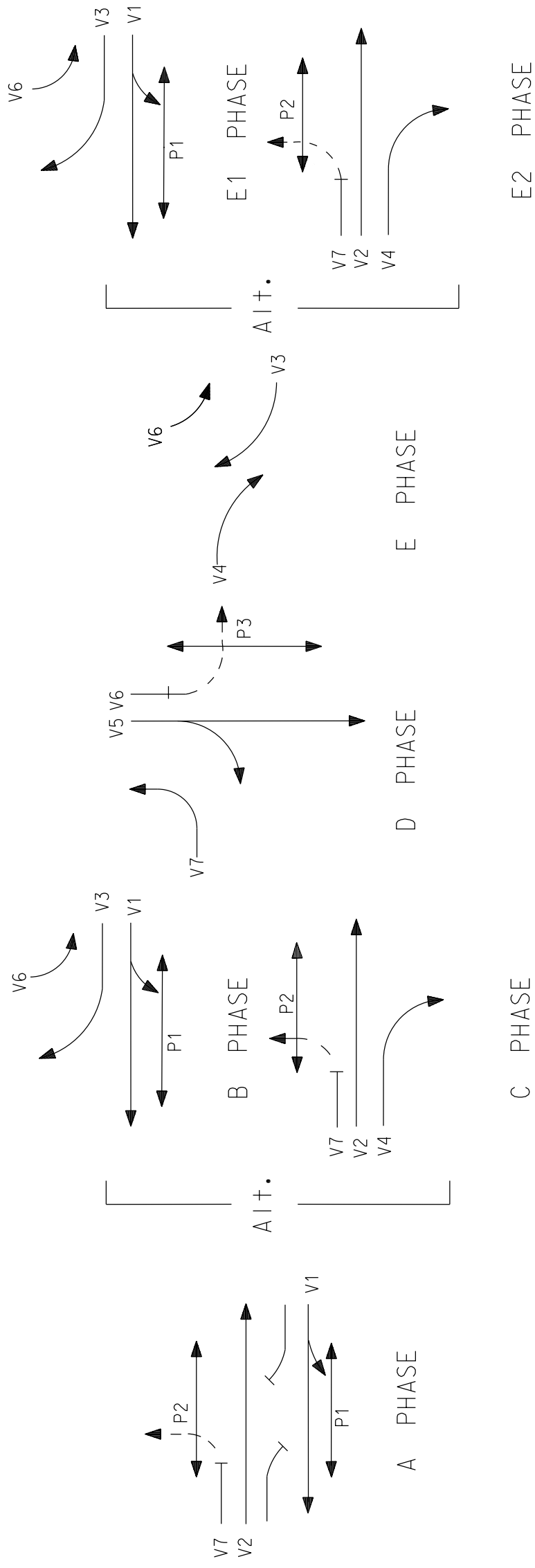
POSTS

POST	TYPE	LENGTH	REMARKS
1	6	-	EXISTING
2	5L	-	EXISTING
3	2	4.1	EXISTING
4	2	4.1	EXISTING
5	2	4.1	EXISTING
6	5L	-	EXISTING
7	2	4.1	EXISTING
8	2	4.1	EXISTING

DETECTOR SPECIFICATION

Detector	Specifications					
	FN	E1(PR)	D(E2)	E(E3)	B(PR)	B(E3)
B-D-E-E1	SG/PS	B.D.E.	D	E	B.D.E.	B
	DS	D	RED(NEXT)	RED(NEXT)	Z-D	RED(NEXT)
A-C-D	FN	D(PR)	D(CL)	A(E6)		
	SG/PS	A.C.D	A/C	A		
	DS	A.C	A-C-D(NG)	C(NEXT)-D(NEXT)		
A-C-D Contd.	FN	C(E4)	C	D(E3)		
	SG/PS			D		
	DS	A(NEXT)-D(NEXT)	A(NEXT)-C(NEXT)			

MOVEMENTS



3.3 TRAFFIC CONDITIONS

An indication of the prevailing traffic conditions on the road system serving the site is provided by traffic surveys undertaken as part of this study which are reproduced in Appendix B and summarised in the following:

		AM	PM
Pacific Highway	Northbound	1607	1826
	Right-turn	200	191
	Left-turn	11	12
	Southbound	2625	1670
	Right-turn	18	56
	Left-turn	195	189
Albert Avenue	Westbound	33	63
	Right-turn	135	392
	Left-turn	38	158

The operational performance of this intersection has been analysed using SIDRA and the results for the morning and afternoon peak periods are summarised in the following while the criteria for interpreting the results are reproduced overleaf:

	AM	PM
LOS	A	B
DS	0.896	0.855
AVD	13.4	14.9

It is apparent that the operational performance of the intersection is relatively satisfactory although traffic flows in reality are at times disrupted by the congestion along the Highway (in peak traffic periods).

Traffic surveys have also been undertaken at the Albert Avenue/Albert Lane, Albert Lane/Fleet Lane and Albert Lane/Thomas Street intersections. The results of those surveys are provided in the following:

		AM	PM
Albert Avenue	Westbound	201	607
	Right-turn	132	100
	Eastbound	299	333
	Left-turn	96	47
Albert Lane	Southbound	2	5
	Right-turn	5	6
	Left-turn	45	74
Albert Lane	Northbound	210	134
	Right-turn	18	15
	Southbound	44	64
	Left-turn	4	2
Fleet Lane	Right-turn	1	12
	Left-turn	8	21
Thomas Street	Eastbound	94	33
	Right-turn	19	4
	Westbound	33	53
	Left-turn	46	57
Albert Lane	Right-turn	208	145
	Left-turn	8	14

It is apparent that there is a significant northbound movement from Albert Avenue along Albert Lane to Thomas Street (east) and Victoria Avenue/Railway Street.

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and accident study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays Roundabouts require other control mode	At capacity and requires other control mode

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**¹ both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

¹ the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs

The results of other surveys undertaken at intersections in the vicinity are provided in the following:

		AM	PM
Pacific Highway	Northbound	1496	2126
	Right-turn	208	156
	Southbound	2043	1697
	Left-turn	26	37
Victoria Avenue	Right-turn	93	107
	Left-turn	87	143
Albert Avenue	Eastbound	236	327
	Right-turn	180	94
	Westbound	206	670
	Left-turn	158	128
Orchard Road	Right-turn	44	41
	Left-turn	177	71
Railway Street	Northbound	83	146
	Right-turn	82	116
	Left-turn	59	108
	Southbound	213	93
	Right-turn	31	68
	Left-turn	89	171
Help Street	Eastbound	359	412
	Right-turn	89	61
	Left-turn	2	6
	Westbound	267	335
	Right-turn	98	198
	Left-turn	295	89

The operational performance of these intersections as modeled with SIDRA is summarised in the following:

	AM		PM	
	LOS	AVD	LOS	AVD
Pacific Highway/Victoria Avenue	A	7.9	A	8.8
Albert Avenue/Orchard Road	B	18.3	B	15.9
Railway Street/Help Street	B	17.9	B	19.3

These results indicate a relatively satisfactory operational performance. Traffic delays and congestion are experienced on the road system in Chatswood at times, however these circumstances are related to:

- * major intersections on the Pacific Highway (Boundary Street, Fullers Road/ Help Street and Mowbray Road)
- * Victoria Avenue through the heart of the CBD
- * Archer Street/Victoria Avenue intersection
- * retail centre carpark accesses.

Nevertheless, there are locations in the CBD area where flexible access is available and approach and departure can be achieved without undue delay. Also residential and serviced apartments do not engender significant traffic generation (as compared to retail/commercial floor space) because of:

- * lower generation rate per m² floor space
- * excellent public transport is within easy walking distance for residents
- * employment, retail and restaurant/entertainment facilities and available close by

3.4 PUBLIC TRANSPORT SERVICES

Chatswood CBD has excellent access for public transport services including:

Railway Services

The North Shore and Western Lines operate through Chatswood Railway Station which is located just to the north of the site. These lines provide 13 trains per hour in the morning and afternoon peak periods and there are currently some 32,000 passengers passing through the station each day.

Bus Services

There are services provided by 3 operators accessing Chatswood as well as 2 interstate operators with some 460 scheduled services operating each day out of the rail interchange and 220 per day operating out of Railway Street.

There is also excellent provisions for pedestrian access and circulation within the CBD (eg Victoria Mall) as well as provisions for bicycle access.

4. FUTURE ROAD AND TRAFFIC CIRCUMSTANCES

Landuse

Chatswood is a developing Regional Centre with excellent public transport services and there are numerous recent, current, approved and proposed landuse developments in the centre. These developments include:

- * Chatswood Civic Place
- * Chatswood Interchange Complex
- * Proposed Student Accommodation on Albert Avenue (adjoining the site)
- * Albert Avenue/Archer Street
- * Archer Street Carpark Site
- * the subject development

Road Network and Traffic

Council engaged the consultant GHD to prepare a traffic model reflecting the future traffic circumstances consequential to the identified landuse development and a range of road and traffic management works. For that traffic assessment process the traffic model adopted a future traffic generation outcome for the subject site (with discount for existing) of:

AM		PM		SAT MD	
IN	OUT	IN	OUT	IN	OUT
80	64	64	80	10	10

Details of the options for road and traffic management works which were assessed in Council's study are provided in Appendix C. The resolved proposals include:

- * widening of Albert Avenue between the Pacific Highway east of Albert Lane (1 additional westbound lane)
- * introduction of a one-way northbound flow in Thomas Lane between Fleet Lane and Thomas Street
- * prohibition of the right turn movements into and out of Albert Lane at Albert Street

5. ACCESS AND TRAFFIC

Access

The proposed vehicle access provisions comprise:

- * ingress and egress for the carpark and loading docks on Albert Avenue located towards the eastern boundary. This access will be restricted to left-turn IN/OUT movements by a central median island in Albert Avenue
- * egress for the carpark to Thomas Street
- * porte cochere style access for the serviced apartments on the corner of Albert Lane and Fleet Street

These accesses will be located where there are excellent site distances available and will accommodate all vehicles requiring to use the respective accesses including refuse furniture and delivery trucks for the loading docks. The proposed development scheme will also provide a public road link between Thomas Street and Fleet Lane.

Traffic

The existing Council carpark on the site accommodates some 150 spaces and the assessed traffic generation of these spaces during the morning and afternoon peak periods is as follows:

	AM	PM
Ingress	30	20
Egress	10	50
Total	40	70

The projected traffic generation of the approved development scheme as provided in the Traffic Study* for the application was as follows:

	AM		PM	
	IN	OUT	IN	OUT
Residential Apartments (208)	8	40	40	8
Commercial/Retail	28	2	2	28
Public	40	10	20	60
Total	76	52	62	96
Grand Total	128		158	

Criteria in relation to the traffic generation of residential apartments is provided by the RMS Guide to Traffic Generating Development as follows:

High Density Apartments	-	0.24 vtph per apartment
(CBD Environment)		(AM and PM peak)

The “Chatswood Town Precinct” development Traffic Assessment provided the results of surveys of existing apartments which indicated an intrinsic traffic generation rate for residential apartments in Chatswood CBD of less than 0.16 vtph.

There is no published criteria in relation to the peak traffic generation of serviced apartments. However these engender lower car usage characteristics albeit with some higher taxi and set down/pick up rates. The site has excellent access to public transport services as well as shopping and restaurant/entertainment facilities. Some comparison can be made between residential apartment and accommodation hotel generation rates indicating a peak rate of some 0.10 vtph per apartment.

TTPA have undertaken surveys of public parking stations in CBD environments (not shopping centre carparks) and these are typified the Kent Street carpark in the

* *Proposed Mixed Use Development
Albert Avenue and Thomas Street Chatswood
Traffic and Parking Assessment
Transport and Traffic Planning Associates October 2009*

Sydney CBD which exhibits a traffic generation rate in peak periods of 0.32 vtpH per space. This assessment is supported by an assessment undertaken by Sinclair Knight Merz for the City of Sydney of the demand characteristics at public parking stations in the Sydney CBD which reveal generation rates per space of 0.22 to 0.32 vtpH. The generation rate at Chatswood would be similar although the morning peak would be somewhat lower at 0.20 vtpH due to the relative absence of retail activity at this time.

Thus the projected total traffic generation of the proposed development is as follows:

	AM		PM	
	IN	OUT	IN	OUT
Residential - 241 apartments	10	48	48	10
Serviced - 302 apartments	5	25	25	5
Child Care	10	10	10	10
Public - 250 spaces	40	10	30	50
Total	65	93	113	75
Grand Total	158		188	

The projected generalised distribution of generated traffic is as follows:

	Approach	Depart
Highway from north	40%	-
Highway from south	40%	-
Thomas street/Albert Lane	20%	
Albert Avenue Left Turn	-	40%
Thomas Street	-	60%

The projected distribution of difference in traffic movements (ie to that of the approved development) will be as follows:

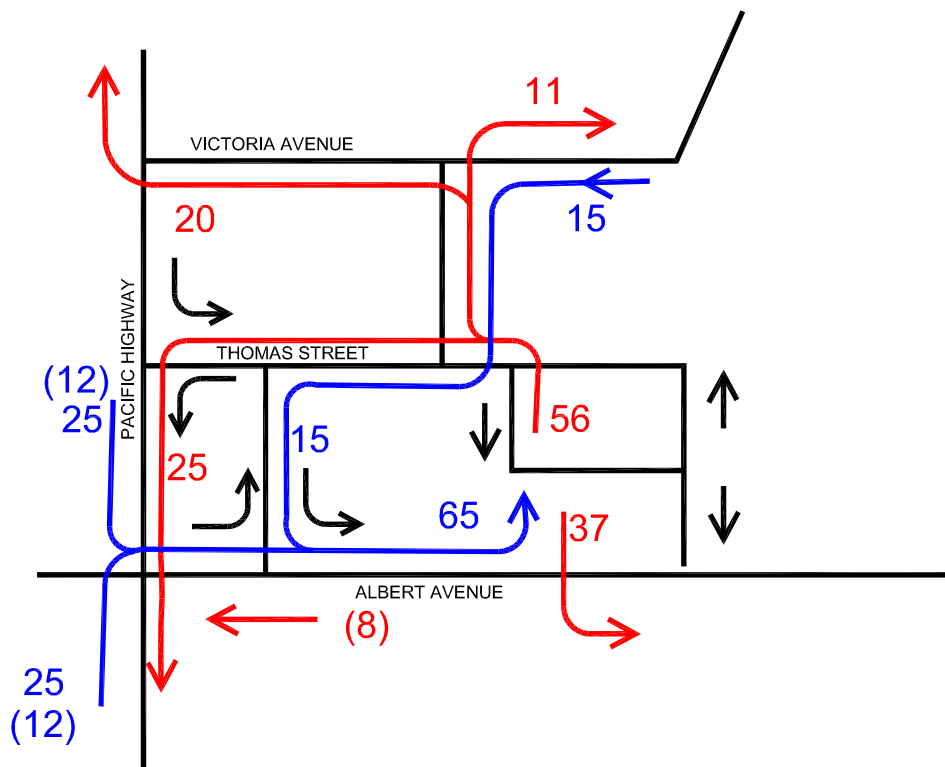
	Additional to Approved	
	AM	PM
Total	30 tph	30 vtpH
Pacific Highway/Albert Avenue	15 vtpH	15 vtpH

The operational performance of access intersections on the basis of the assessed additional trips consequential to the previously approved development incorporating the traffic from the CTPP and CTI developments was modelled using SIDRA. The results of that modelling indicating a satisfactory outcome are summarised in the following:

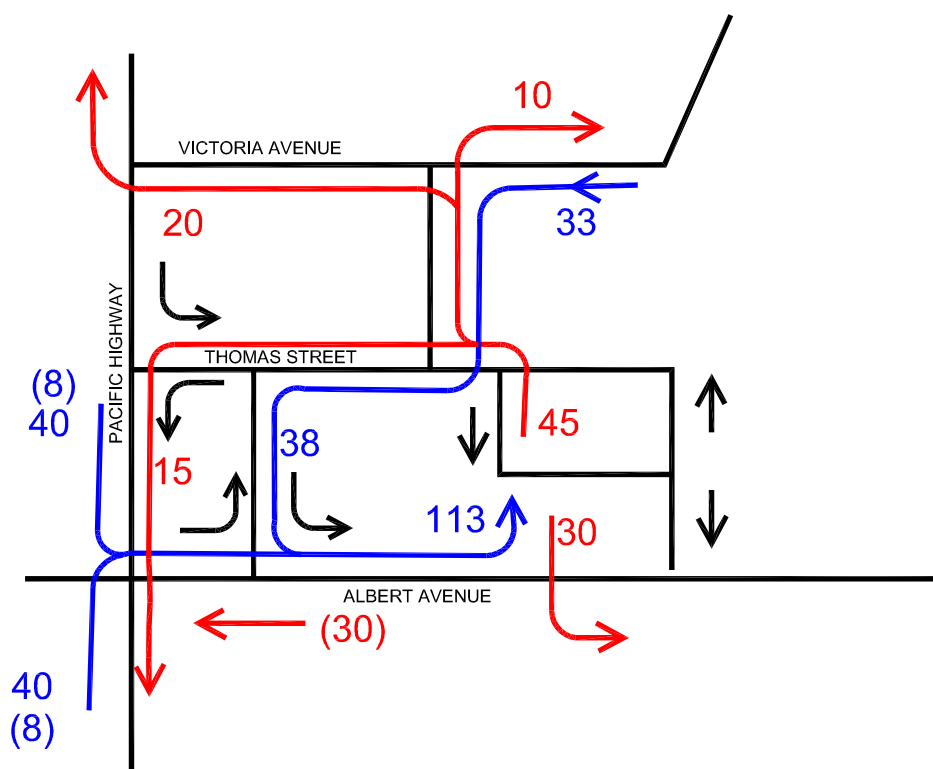
	AM		PM	
	LOS	AVD	LOS	AVD
Pacific Highway/Albert Avenue	A	13.8	D	15.1
Albert Avenue/Orchard Road	B	20.3	B	24.4

The additional traffic generation of the revised development scheme will only be some 15 vtpd through the highway intersection and some 5 vtpd through the Albert Avenue intersections.

These additional traffic movements will represent less than 1 vehicle trip each 2 cycles of the traffic signals in the morning and afternoon peaks and will therefore be entirely imperceptible in terms of traffic modelling. This is particularly the case when the highway intersection accommodates a total of some 5,000 vph in the morning and afternoon peak periods and the subject development will make available land for the proposed widening of Albert Avenue.



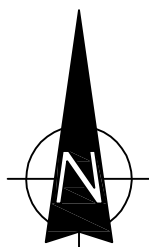
AM PEAK



PM PEAK

LEGEND

- INGRESS
- EGRESS
- () () EXISTING



FUTURE TRAFFIC
VOLUMES

6. PARKING, INTERNAL CIRCULATION AND SERVICING

Parking

An indication of the parking provision relevant to the proposed development is provided by reference to the Willoughby DCP and the RMS Development Guidelines* and other relevant criteria as follows:

		WDCP	RMS
Studio	-	0.5 spaces	Not Specified
1 bed	-	1.0 space	0.4 spaces
2 bed	-	1.0 space	0.7 spaces
3 bed	-	1.25 space	1.2 spaces
Visitor	-	1 per 4 apartment	5 to 7 spaces per apartment
			<i>“however Councils may wish to reduce this for developments close to public transport”</i>

The RMS Guidelines do not contain criteria for Serviced Apartments however the Willoughby DCP Clause C.4.2D specifies 0.25 spaces for each apartment plus 1 space per 2 staff.

The WDCP specifies carparking provision for a Work Based Child Care Centre in Chatswood CBD as follows:

Staff	-	minimum 2 spaces *
SD/PU	-	1 space per 10 children **

*spaces to be marked and exclusively available 7am-6.30pm

**spaces to be marked and exclusively available 7am-9.30am and 4pm-6.30pm

* Guide to Traffic Generating Development
Roads and Traffic Authority December 2002

WDCP Clause 4.1.A makes provision for departure from the criteria for circumstances including the following:

1. *Availability and accessibility of other public parking*

The development will include a 250 space public parking station and there are numerous other public parking stations within convenient walking distance of the site.

2. *Accessibility of public transport and the probable transport mode of users*

The development site is located immediately adjacent to the railway station and bus interchange. As such high capacity/frequency public transport services are very conveniently located and there will be a high level of travel mode for public transport.

3. *Proximity of bicycle routes*

Chatswood CBD has a highly developed bicycle network which can be accessed adjacent to the site frontages.

4. *Existing and likely future traffic volumes on the road network and the nature of the network*

The road network serving Chatswood CBD experiences significant congestion in places and the railway line, highway and the Victoria Plaza present barriers to traffic movements and circulation. Accordingly it is desirable to reduce traffic generation in new development by constructing the parking provision particularly for workers on the site.

5. *The impact of not providing parking*

The roads in the vicinity of the site are subject to period/resident excepted parking restrictions. Commuter parking extends beyond that to the limit of reasonable walking distance hence the constrained provision of parking will not result in adverse implications.

The proposed parking provision for the development scheme is as follows:

Residential Apartments

90 x one-bedroom @ 0.4 spaces	-	36 spaces
131 x two-bedroom @ 0.69 spaces	-	91 spaces
20 x three-bedroom @ 1.2 spaces	-	24 spaces
Total		151 spaces
Visitors @ 1 per 16 apartments	-	15 spaces
Total		- 166 spaces

Serviced Apartments

302 apartments @ 0.25 spaces	-	75 spaces
------------------------------	---	-----------

Child Care Centre

49 children plus 2 staff @ 1 per 6	-	10 spaces
------------------------------------	---	-----------

Retail – 486m ²	-	3 spaces
Public	-	250 spaces
Total	-	504 spaces

The proposed parking provision will be quite adequate and appropriate for the development having regard for the DCP provisions for ‘departure’ and representing a “constrained” provision in keeping current Department of Planning and Infrastructure policies whilst retaining the public parking element to support the Town Centre.

Internal Circulation

The internal circulation arrangements will adopt a flexible two-way system throughout with the carparking for the various development elements located in separate basement areas. The layout of the basement areas will comply with the design requirements of AS 2890.1, 2 and 6 particularly in relation to ramps, aisles, bays and manoeuvring areas.

The public parking will be operated as a public parking station with ‘central pay’ provisions and a ‘Parking Management Plan’ will be prepared as part of the Construction Certificate documentation.

Servicing

Separate loading docks will be provided for the residential and serviced apartment elements accommodating MRV's (8.8 metres) and trucks (9.5-10.5 metres) from Albert Avenue as shown on the turning path diagrams in Appendix C. Small service vehicles will also access this area while service personnel etc will be able to use the visitor and public parking spaces.

This provision will be quite suitable for the servicing requirements of the proposed development while any occasional requirement for a large truck to service the site will be accommodated by the available kerbspace in Thomas Street and Albert Avenue.

7. CONCLUSION

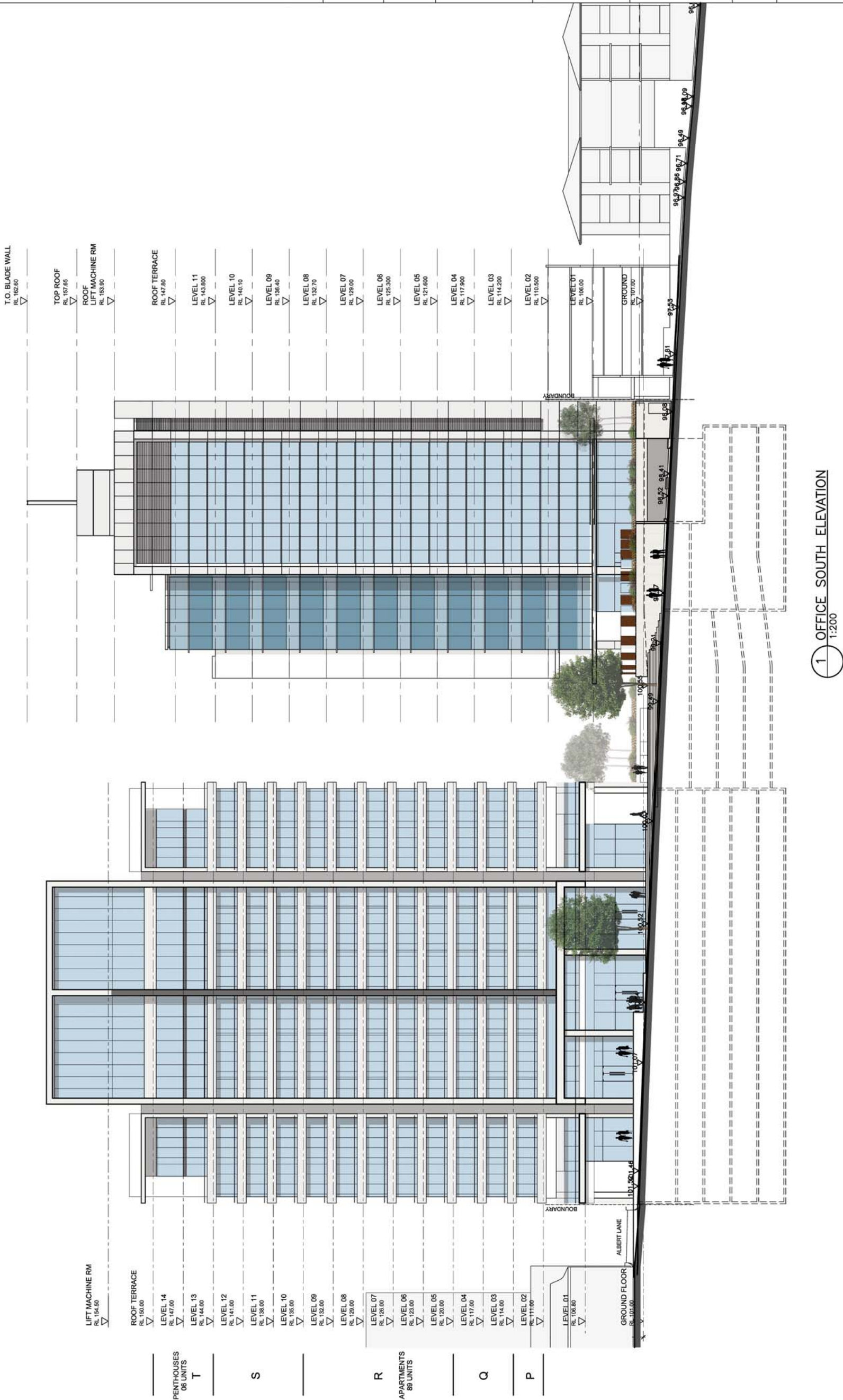
The superfluous Council carpark site with frontages to Thomas Street and Albert Avenue at Chatswood presents an ideal opportunity for a new mixed use development which will complement the evolving CBD environment.

Assessment of the proposed S75W development scheme which comprises residential and serviced apartment elements along with a Child Care Centre and retail has concluded that:

- * there will be no adverse traffic implications
- * the proposed parking provision will comply with relevant contemporary criteria and the requirements of the development
- * the proposed vehicle access and circulation arrangements will be suitable and appropriate.

APPENDIX A

APPROVED DEVELOPMENT



Do not scale from drawings verify all dimensions on site before commencing work. Copying or the reproduction of this drawing is strictly prohibited without the consent of PTW Architects P/L.

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Consultants	-	GEORGE FLOTH PTY LTD GEORGE FLOTH PTY LTD
Structural	-	Site Image
Mech/Elec		Transport and Traffic Planning Associates
Fire/Hydr.		
QS		
Landscape		
Traffic		

THOMAS STREET PLAZA
Address: Thomas Street/ Albert Avenue S
Chatswood NSW 2067

Project No.	208.027.10
Scale:@A1	1:200
Date:	30/07/2008
Drawn	AL
Checked	AB

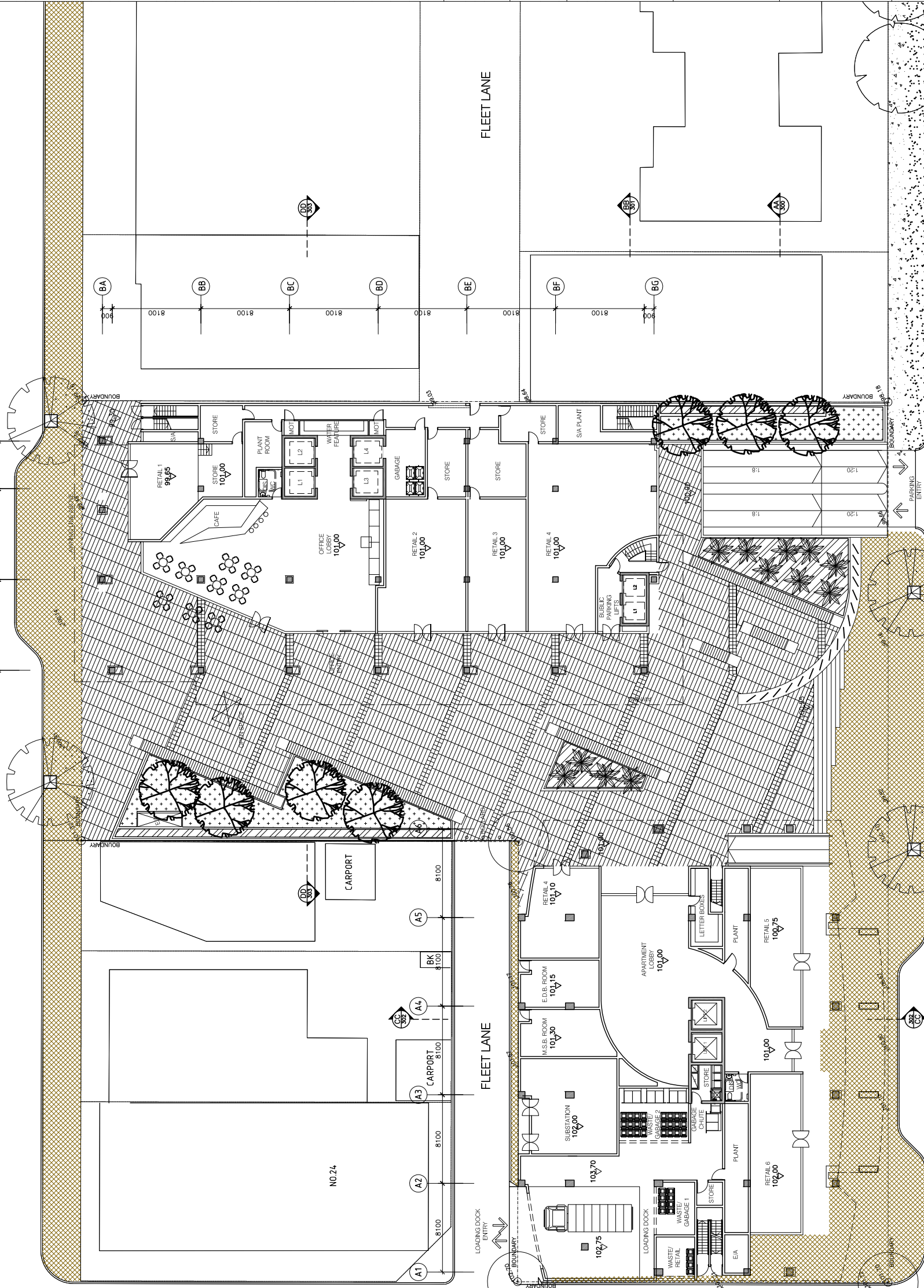


OFFICE
SOUTH ELEVATION
DA 205
DA ISSUE

THOMAS STREET

THOMAS STREET

B3 B5 B6 B7



2 OFFICE GROUND FLOOR PLAN
1:200

1 RESIDENTIAL GROUND FLOOR PLAN
1:200

ALBERT AVENUE

NO.781

NO.767

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Client	Wellas Thomas Pty Ltd Lot22, Level 4 12 Thomas Street Chatswood NSW 2067		
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Consultants	Structural - GEORGE FLOTH PTY LTD Mech/Elec - GEORGE FLOTH PTY LTD Fire/Hydr. - QS - Site Image Landscape - Transport and Traffic Planning Traffic - Associates		
THOMAS STREET PLAZA Address: Thomas Street/ Albert Avenue Site Chatswood NSW 2067			
Project No.	208.027.10		
Scale:@A1	1:200		
Date:	30/07/2008		
Drawn	AL		
Checked	AB		
Approved			
0	2	4	10m
RESIDENTIAL & OFFICE GROUND FLOOR PLAN DA 100 DA ISSUE			

THOMAS STREET

THOMAS STREET

B7

B6

B5

B3

B2

B3

B5

B6

B7

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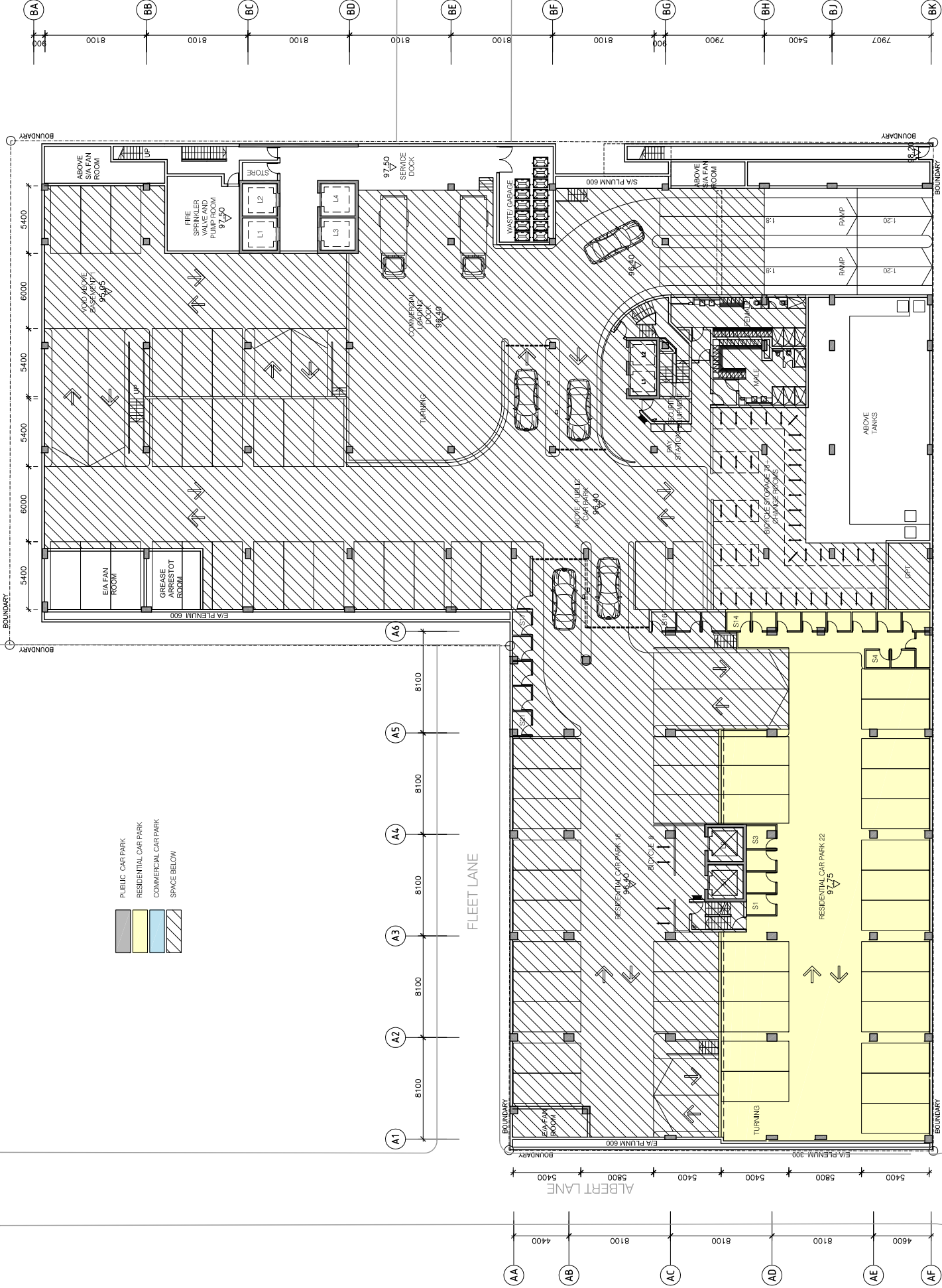
B2

B3

B5

B6

B7



1 BASEMENT 1 PLAN
1:200

ALBERT AVENUE

THOMAS STREET PLAZA

Address: Thomas Street/ Albert Avenue Site
Chatswood NSW 2067

Project No. 208.027.10
Scale: @A1 1:200
Date: 30/07/2008
Drawn: AL
Checked: AB
Approved:

0 2 4 10m

BASEMENT 1 PLAN

DA 150
DA ISSUE

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Fire/Hydr.
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Traffic
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Associates

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Mech/Elec
Fire/Hydr.
QS
Landscape
Traffic
Site Image
Transport and Traffic Planning
Associates

THOMAS STREET PLAZA
Address: Thomas Street/ Albert Avenue Site
Chatswood NSW 2067

THOMAS STREET PLAZA

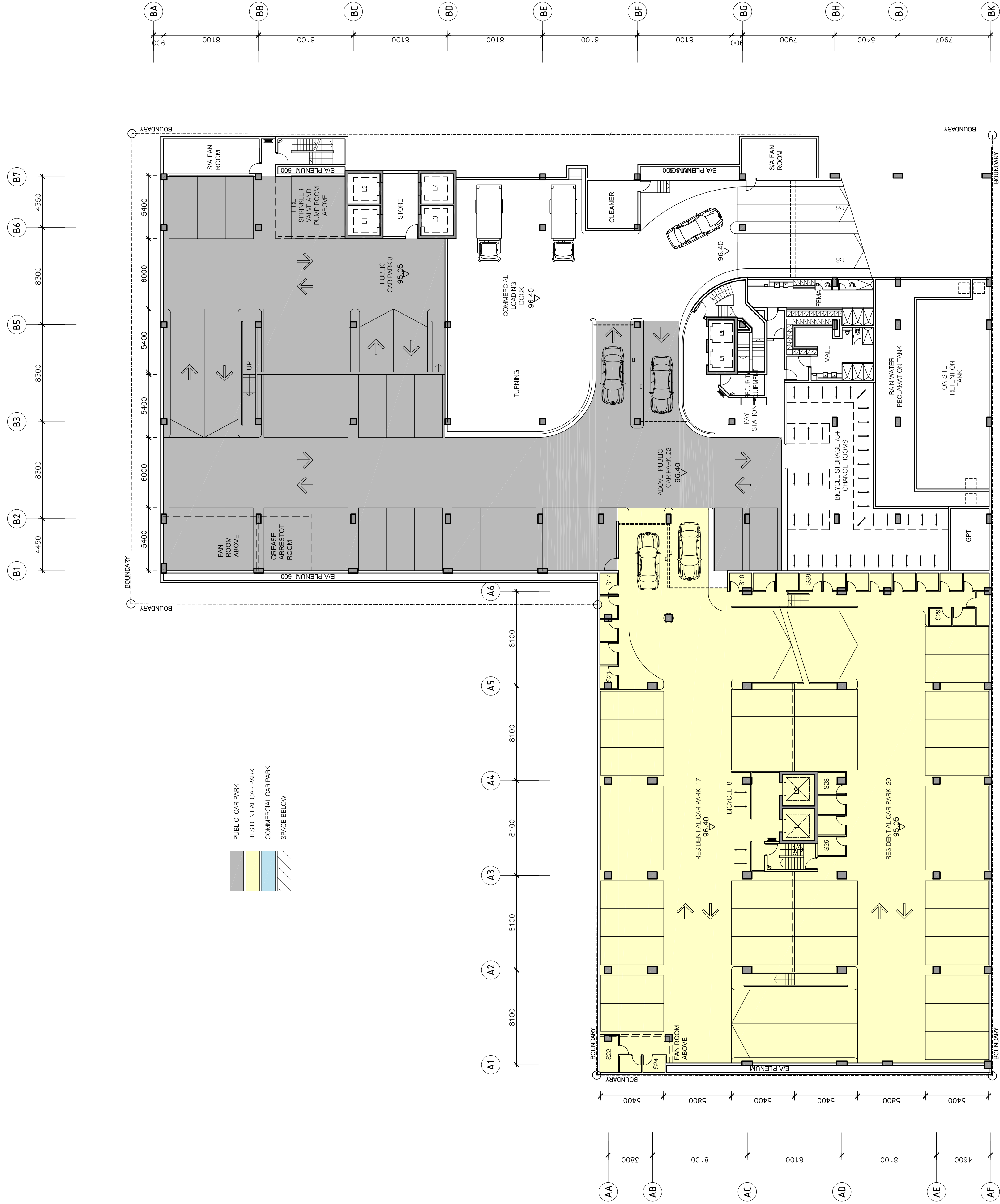
Address: Thomas Street/ Albert Avenue Site
Chatswood NSW 2067

Project No. 208.027.10
Scale: @A1 1:200
Date: 30/07/2008
Drawn: AL
Checked: AB
Approved:

0 2 4 10m

BASEMENT 1 PLAN

DA 150
DA ISSUE



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Consultants	
Structural	- GEORGE FLOTH PTY LTD
Mech/Elec	GEORGE FLOTH PTY LTD
Fire/Hydr.	-
QS	Site Image
Landscape	Transport and Traffic Planning
Traffic	Associates

THOMAS STREET PLAZA
Address: Thomas Street/ Albert Avenue Site
Chatswood NSW 2067

Project No.	208.027.10
Scale:@A1	1:200
Date:	30/07/2008
Drawn	AL
Checked	AB
Approved	

A vertical scale bar with markings at 0, 2, 4, and 10m.

BASEMENT 2 PLAN

DA 151
DA ISSUE

APPENDIX B

TRAFFIC SURVEY RESULTS



R.O.A.R. DATA

Reliable, Original & Authentic Results

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

Client : T.T.P.A.

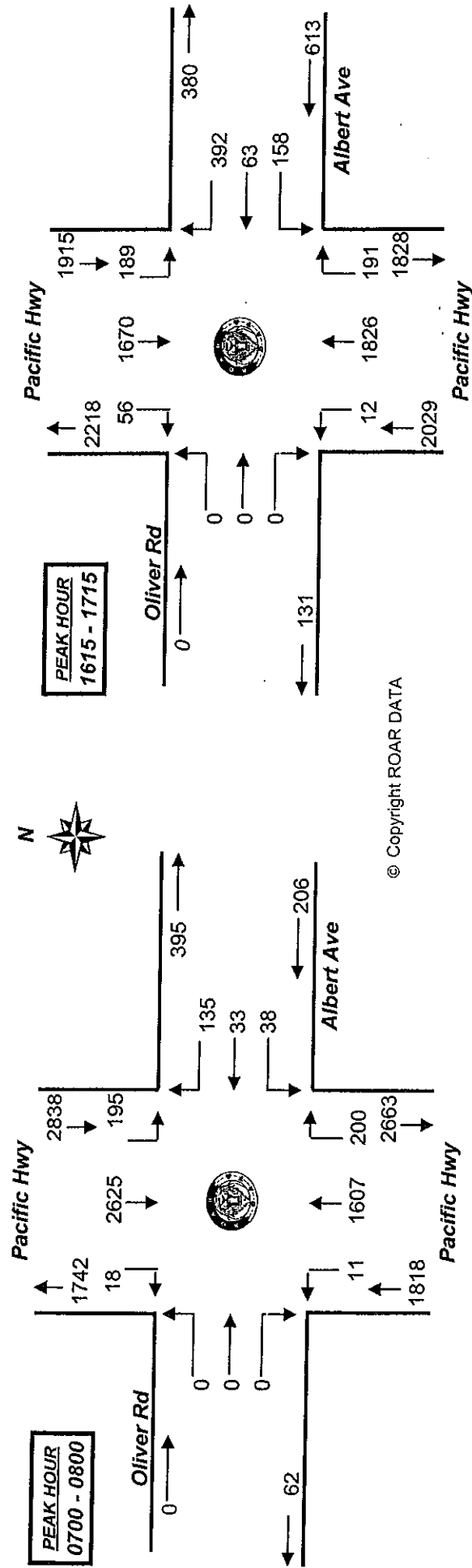
Job No/Name : 2320 Chatswood Albert L

Day : Thursday

All Vehicles	NORTH				WEST				SOUTH				EAST																
	Pacific Hwy				Oliver Rd				Pacific Hwy				Albert Ave																
	L	I	R	TOT	L	I	R	TOT	L	I	R	TOT	L	I	R	TOT													
	Time Per																												
	0700 - 0715	39	681	6					2	371	33	7	1	19	1159	1600 - 1615	48	391	6				2	434	49	41	16	92	1079
	0715 - 0730	35	798	1					2	384	29	7	7	26	1289	1615 - 1630	47	410	17				4	392	43	46	21	98	1078
	0730 - 0745	35	568	3					3	404	64	12	11	35	1135	1630 - 1645	47	480	11				5	386	41	26	10	107	1113
	0745 - 0800	86	578	8					4	448	74	12	14	55	1279	1645 - 1700	57	385	18				1	536	48	39	16	100	1200
	0800 - 0815	58	519	16					6	359	51	12	14	47	1082	1700 - 1715	38	395	10				2	512	59	47	16	87	1166
	0815 - 0830	73	479	10					10	440	65	15	15	61	1168	1715 - 1730	47	367	9				2	445	45	45	20	84	1064
	0830 - 0845	66	512	21					4	392	61	22	31	53	1162	1730 - 1745	31	417	11				1	390	46	30	15	84	1025
	0845 - 0900	86	456	13					4	417	99	13	32	51	1171	1745 - 1800	41	434	14				4	535	75	51	10	61	1225
	Period End	478	4591	78					35	3215	476	100	125	347	9445	Period End	356	3279	96	0	0	0	21	3630	406	325	124	713	8950

		NORTH			WEST			SOUTH			EAST			
		Pacific Hwy			Oliver Rd			Pacific Hwy			Albert Ave			
Peak Time	Peak Time	L	I	R	L	I	R	L	I	R	L	I	R	
		TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	
0700 - 0800	1600 - 1700	195	2625	18	0	0	0	11	1607	200	38	33	135	4862
0715 - 0815	1615 - 1715	214	2463	28	0	0	0	15	1595	218	43	46	163	4785
0730 - 0830	1630 - 1730	252	2144	37	0	0	0	23	1651	254	51	54	198	4664
0745 - 0845	1645 - 1745	283	2088	55	0	0	0	24	1639	251	61	74	216	4691
0800 - 0900	1700 - 1800	283	1966	60	0	0	0	24	1608	276	62	92	212	4583
PEAK HOUR		195	2625	18	0	0	0	11	1607	200	38	33	135	4862

		NORTH			WEST			SOUTH			EAST			
		Pacific Hwy			Oliver Rd			Pacific Hwy			Albert Ave			
Peak Time	Peak Time	L	I	R	L	I	R	L	I	R	L	I	R	
		TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	TOT	
1600 - 1700	1600 - 1700	199	1666	52	0	0	0	12	1748	181	152	63	397	4470
1615 - 1715	1615 - 1715	189	1670	56	0	0	0	12	1826	191	158	63	392	4557
1630 - 1730	1630 - 1730	189	1627	48	0	0	0	10	1879	193	157	62	378	4543
1645 - 1745	1645 - 1745	173	1564	48	0	0	0	6	1883	198	161	67	355	4455
1700 - 1800	1700 - 1800	157	1613	44	0	0	0	9	1882	225	173	61	316	4480
PEAK HOUR		189	1670	56	0	0	0	12	1826	191	158	63	392	4557



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K.O.A.R. DATA

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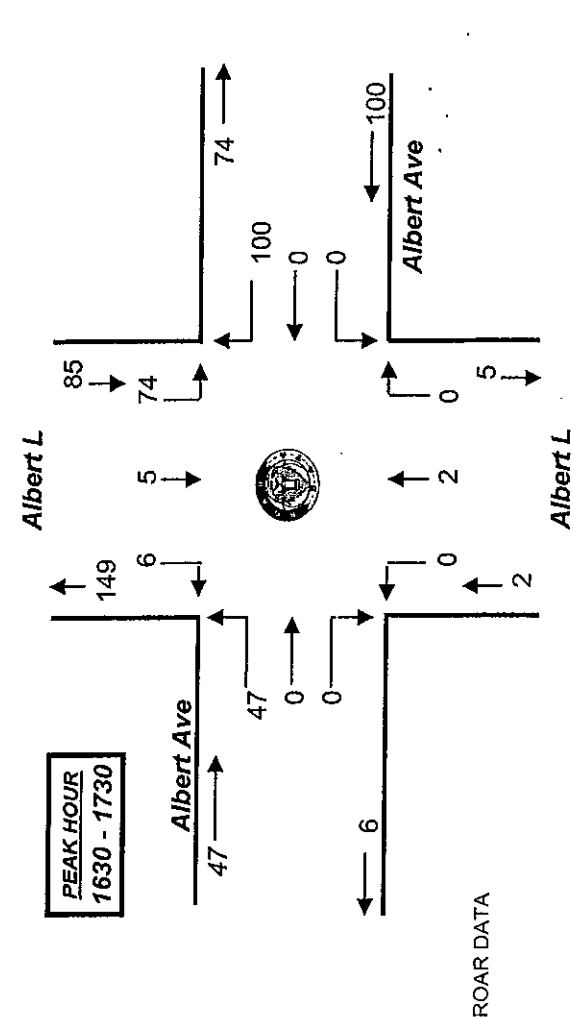
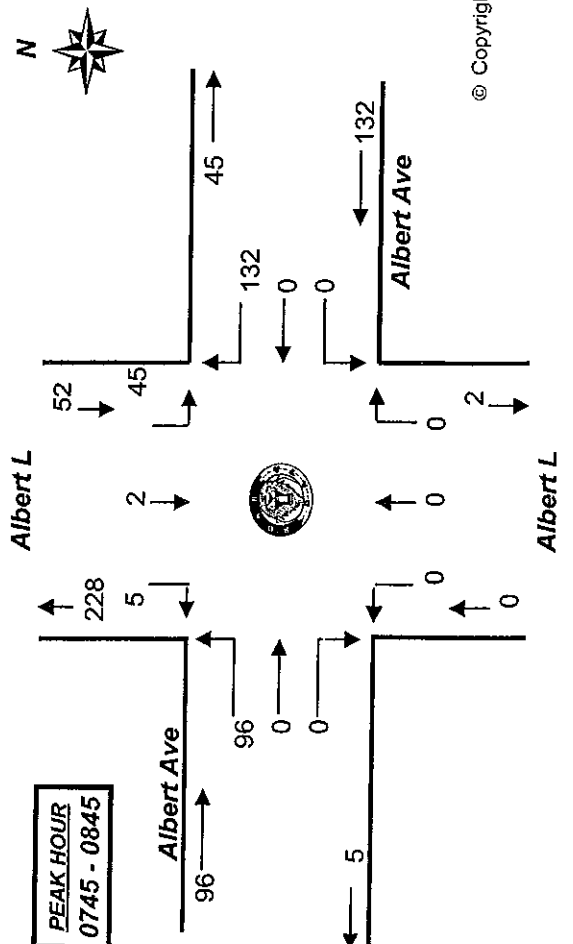
Client : T.T.P.A.

Job No/Name : 2320 Chatswood Albert L

Day : Thursday

All Vehicles		NORTH			WEST			SOUTH			EAST		
		Albert L			Albert Ave			Albert L			Albert Ave		
Time Per	TOT	L	I	R	L	I	R	L	I	R	L	I	R
0700 - 0715	28	1	1	1	15			1			9		
0715 - 0730	32	10	0	0	10			1			11		
0730 - 0745	58	9	0	0	28			1			20		
0745 - 0800	78	9	2	1	36			0			30		
0800 - 0815	75	11	0	0	23			0			41		
0815 - 0830	66	15	0	2	20			0			29		
0830 - 0845	61	10	0	2	17			0			32		
0845 - 0900	76	13	0	1	22			0			40		
Period End	474	78	3	7	171	0	0	3	0	0	212	0	0

All Vehicles		NORTH			WEST			SOUTH			EAST		
		Albert L			Albert Ave			Albert L			Albert Ave		
Time Per	TOT	L	I	R	L	I	R	L	I	R	L	I	R
1600 - 1615	54	15	3	1	14			0			21		
1615 - 1630	52	17	1	1	7			0			26		
1630 - 1645	55	14	1	0	17			1			22		
1645 - 1700	63	23	1	0	9			1			29		
1700 - 1715	61	21	2	3	11			0			24		
1715 - 1730	55	16	1	3	10			0			25		
1730 - 1745	46	17	2	1	8			0			18		
1745 - 1800	66	19	2	3	17			0			25		
Period End	452	142	13	12	93	0	0	2	0	0	190	0	0



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R.O.A.R. DATA

Reliable, Original & Authentic Results

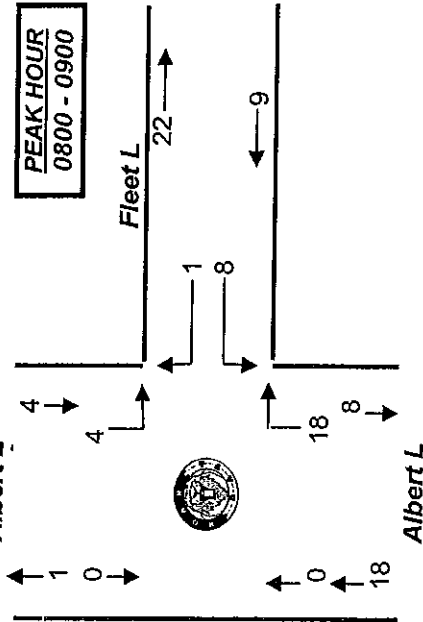
Ph.88196847, Fax 88196849, Mob.0418-239019

All Vehicles

Time Per	NORTH			EAST			SOUTH		
	Albert L	I	L	Fleet L	R	L	Albert L	I	TOTAL
0700 - 0715			0	0	0	1	0	0	1
0715 - 0730			2	1	1	1	2	2	6
0730 - 0745			1	0	0	2	4	4	7
0745 - 0800			2	0	0	1	7	7	10
0800 - 0815			1	0	0	1	5	5	7
0815 - 0830			1	0	0	3	2	2	6
0830 - 0845			1	0	0	2	4	4	7
0845 - 0900			1	1	1	2	7	7	11
Period End	0	9	9	2	2	13	31	0	55

Peak Per	NORTH			EAST			SOUTH		
	Albert L	I	L	Fleet L	R	L	Albert L	I	TOTAL
0700 - 0800	0	5	5	1	5	13	0	0	24
0715 - 0815	0	6	6	1	5	18	0	0	30
0730 - 0830	0	5	5	0	7	18	0	0	30
0745 - 0845	0	5	5	0	7	18	0	0	30
0800 - 0900	0	4	4	1	8	18	0	0	31

PEAK HR	0	4	1	8	18	0	0	31
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Client : T.T.P.A.

Job No/Name : 2320 Chatswood Albert L

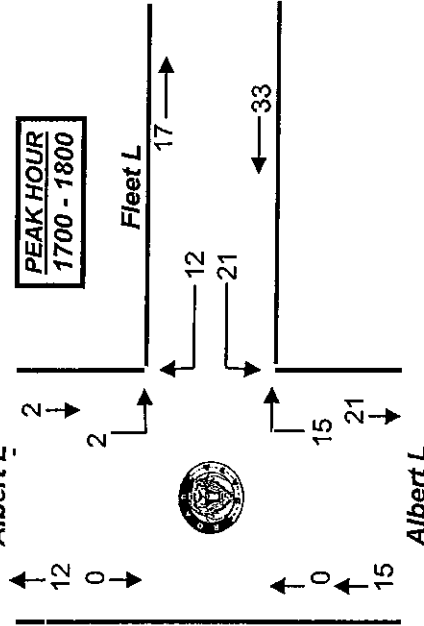
Day : Thursday

All Vehicles

Time Per	NORTH			EAST			SOUTH		
	Albert L	I	L	Fleet L	R	L	Albert L	I	TOTAL
1600 - 1615			2	3	3	6			17
1615 - 1630			1	1	5	3			10
1630 - 1645			1	3	4	3			11
1645 - 1700			0	3	7	1			11
1700 - 1715			1	5	4	3			13
1715 - 1730			1	4	6	3			14
1730 - 1745			0	2	4	1			7
1745 - 1800			0	1	7	8			16
Period End	0	6	6	22	43	28	0	0	99

Peak Per	NORTH			EAST			SOUTH		
	Albert L	I	L	Fleet L	R	L	Albert L	I	TOTAL
1600 - 1700	0	4	4	10	22	13	0	0	49
1615 - 1715	0	3	3	12	20	10	0	0	45
1630 - 1730	0	3	3	15	21	10	0	0	49
1645 - 1745	0	2	2	14	21	8	0	0	45
1700 - 1800	0	2	2	12	21	15	0	0	50

PEAK HR	0	2	12	21	15	0	0	50
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All Vehicles

Client : T.T.P.A.

Job No/Name : 2320 Chatswood Albert L

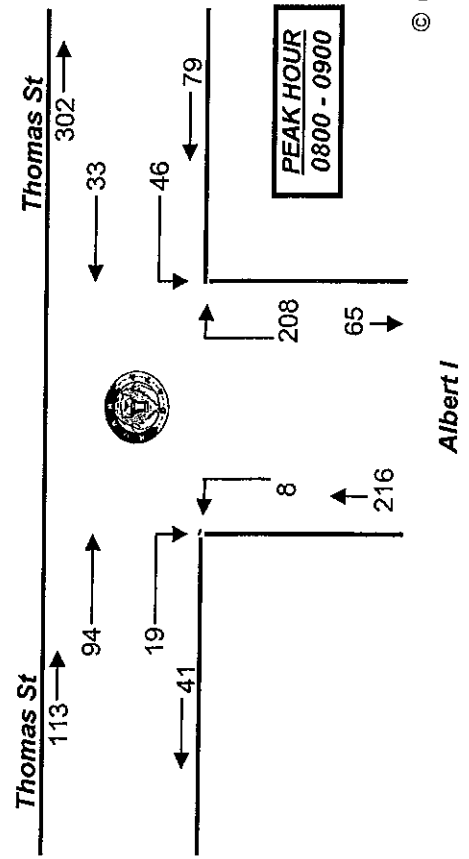
Day : Thursday

All Vehicles

Time Per	WEST			SOUTH			EAST		
	Thomas St			Albert I			Thomas St		
	I	R	TOTAL	L	R	TOTAL	L	R	TOTAL
0700 - 0715	11	0	11	0	20	20	3	5	39
0715 - 0730	22	2	24	3	18	21	12	4	61
0730 - 0745	18	2	20	1	40	41	5	8	74
0745 - 0800	19	4	23	1	53	54	12	5	94
0800 - 0815	26	5	31	0	57	57	12	12	112
0815 - 0830	16	4	20	2	56	58	14	6	98
0830 - 0845	28	6	34	1	46	47	7	11	99
0845 - 0900	24	4	28	5	49	54	13	4	99
Period End	164	27	191	13	339	352	78	55	676

Peak Per	WEST			SOUTH			EAST		
	Thomas St			Albert I			Thomas St		
	I	R	TOTAL	L	R	TOTAL	L	R	TOTAL
0700 - 0800	70	8	78	5	131	136	32	22	268
0715 - 0815	85	13	98	5	168	173	41	29	341
0730 - 0830	79	15	94	4	206	210	43	31	378
0745 - 0845	89	19	108	4	212	216	45	34	403
0800 - 0900	94	19	113	8	208	216	46	33	408

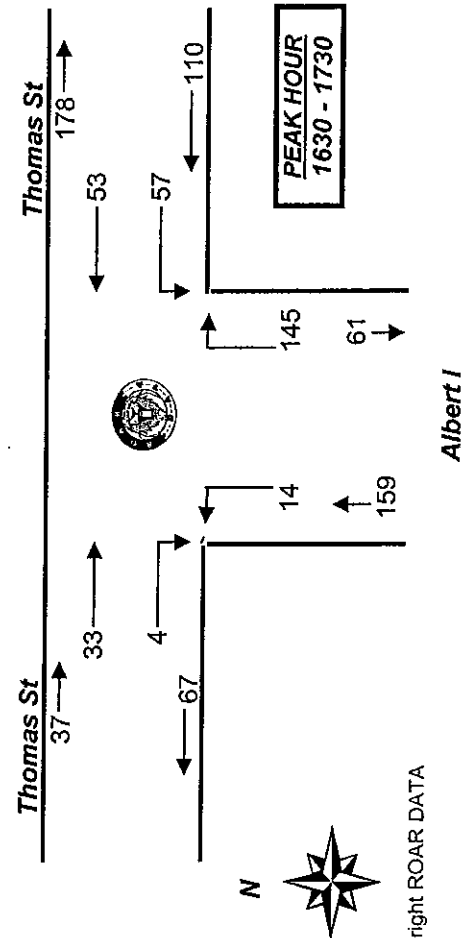
PEAK HR	94	19	8	208	46	33	408
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Time Per	WEST			SOUTH			EAST		
	Thomas St			Albert I			Thomas St		
	I	R	TOTAL	L	R	TOTAL	L	R	TOTAL
1600 - 1615	3	3	6	2	35	37	14	34	91
1615 - 1630	2	1	3	2	25	27	16	18	64
1630 - 1645	7	0	7	3	36	39	10	13	69
1645 - 1700	9	2	11	2	44	46	14	10	81
1700 - 1715	9	2	11	5	31	36	18	17	82
1715 - 1730	8	0	8	4	34	38	15	13	74
1730 - 1745	7	2	9	1	31	32	11	15	67
1745 - 1800	10	1	11	3	33	36	12	21	80
Period End	55	11	66	22	269	291	110	141	608

Peak Per	WEST			SOUTH			EAST		
	Thomas St			Albert I			Thomas St		
	I	R	TOTAL	L	R	TOTAL	L	R	TOTAL
1600 - 1700	21	6	27	9	140	149	54	75	305
1615 - 1715	27	5	32	12	136	148	58	58	296
1630 - 1730	33	4	37	14	145	159	57	53	306
1645 - 1745	33	6	39	12	140	152	58	55	304
1700 - 1800	34	5	39	13	129	142	56	66	303

PEAK HR	33	4	14	145	57	53	306
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APPENDIX C

ROAD NETWORK OPTIONS



16 February 2009

To	James Brocklebank, Matthew Wilson		
Copy to	Steven Head, David Sung		
From	Benjamin Taylor	Tel	(03) 8687 8526
Subject	Chatswood Traffic Study- Proposed Options Treatments	Job no.	21/17241

James, Matthew

As discussed please find the following proposed options treatments to be tested as part of the Chatswood Traffic Study.

The options are described in sections 1 and 2.

Diagrams of the location of the treatments are available in section 3. These diagrams do not include detailed plans showing the actual modifications.

The additional treatments to Malvern Ave, Pacific Hwy parking ban and the re-opening of Malvern Ave are included in the treatments.

Each of these treatments include the known changes that will occur in the modelled area before 2013. These known changes are:

- ▶ Rebuilt Chatswood Interchange, including retention of One Way eastbound on Endeavour St;
- ▶ Help St widening to 6 lanes between Orchard & Railway;
- ▶ Albert Ave widening to 4 lanes under rail line;
- ▶ TCS on Albert Ave at Thomas Lane, inc pedestrian phase to Frank Channon Walk;
- ▶ Thomas Lane re-opened for 1 way southbound;
- ▶ Archer St, widening along frontage of 63A Archer to provide for extended right turn bay on southbound approach to Albert Ave;
- ▶ Ban right turn out of Chatswood Chase carpark at Victoria/Neridah and right turn phase for eastbound out of Neridah;
- ▶ Right turn phase into Malvern (eastbound) from Archer (northbound);
- ▶ PM peak right turn ban northbound on Archer at Ashley – has been introduced;
- ▶ Albert Ave widening west of Crispe Lane for extra lane;
- ▶ Fleet lane closed through Thomas st carpark site; and
- ▶ Reintroduction of NB flow in Albert Lane in place of current 2 way



1 2013 Design Year

The following options will be tested with 2013 Design Year Traffic Volumes

1.1 2013-A

- Pacific Hwy/Mowbray Road- provision of dual right turning lanes from Pacific Hwy to Mowbray Road (South to East);
- Pacific Hwy/Boundary St- provision of dual right turning lanes from Pacific Hwy to Boundary St (South to East) and widening of Boundary St approach to Pacific Hwy; and
- Ban Parking on Pacific Hwy SB between Boundary St and Help St during all modelled time periods (unless already banned)

1.2 2013-B

- All treatments in 2013-A;
- Northern Bypass of Chatswood CBD via Help St and Wattle Lane- widening of Wattle Lane to provide 1 lane in each direction;
- Victoria Ave Bus Only- provision of bus lanes on Victoria Ave and Anderson St between Endeavour St and Archer St. Left turn at Anderson/Victoria (North to East) for buses only. No access to Victoria Ave West from Archer St/Victoria Ave intersection;
- Closure of Spring St @ Victoria Ave;
- Albert Ave/Archer St- provision of right turn lane from Albert Ave to Archer St (East to North) ; and
- Re-opening of Malvern Ave between Archer St and Havilah St (*if required*).

1.3 2013- C

- All treatments in 2013-B
- Signalise pedestrian crossing at Victoria Ave/Railway St (current Zebra crossing outside Chatswood Railway Station)

This option will be tested but will not have full reporting.



2 2018 Design Year

The following options will be tested with 2018 Design Year Traffic Volumes

2.1 2018- A

- Pacific Hwy/Mowbray Road- provision of dual right turning lanes from Pacific Hwy to Mowbray Road (South to East);
- Pacific Hwy/Boundary St- provision of dual right turning lanes from Pacific Hwy to Boundary St (South to East) and widening of Boundary St approach to Pacific Hwy; and
- Ban Parking on Pacific Hwy SB between Boundary St and Help St during all modelled time periods (unless already banned)

This option involves the same infrastructure as 2013-A but will be tested with 2018 predicted volumes.

2.2 2018-B

- All treatments in 2018-A;
- Northern Bypass of Chatswood CBD via Help St and Wattle Lane- widening of Wattle Lane to provide 1 lane in each direction;
- Victoria Ave Bus Only- provision of bus lanes on Victoria Ave and Anderson St between Endeavour St and Archer St. Left turn at Anderson/Victoria (North to East) for buses only. No access to Victoria Ave West from Archer St/Victoria Ave intersection; and
- Closure of Spring St @ Victoria Ave.
- Albert Ave/Archer St- provision of right turn lane from Albert Ave to Archer St (East to North) ; and
- Re-opening of Malvern Ave between Archer St and Havilah St (*if required*).

This option involves the same infrastructure as 2013-A but will be tested with 2018 predicted volumes.

2.3 2018-C

- All treatments in 2013-B
- Pacific Hwy/Albert Ave/Centennial Ave- closure of Centennial Ave to remove TCS site 892 (Pacific Hwy/Centennial Ave signals). Widening of Oliver Road to allow 2-way traffic. Re-configuration of Pacific Hwy/Albert Ave signal operations.
- Archer St/Boundary St- extension of Bus Lane on Archer St approach to Boundary St by widening on western side of Archer St and banning of parking on eastern side.

2.4 2018-D

- All treatments in 2013-C
- Signalise pedestrian crossing at Victoria Ave/Railway St (current Zebra crossing outside Chatswood Railway Station)

This option will be tested but will not have full reporting.

3 Treatment Diagrams

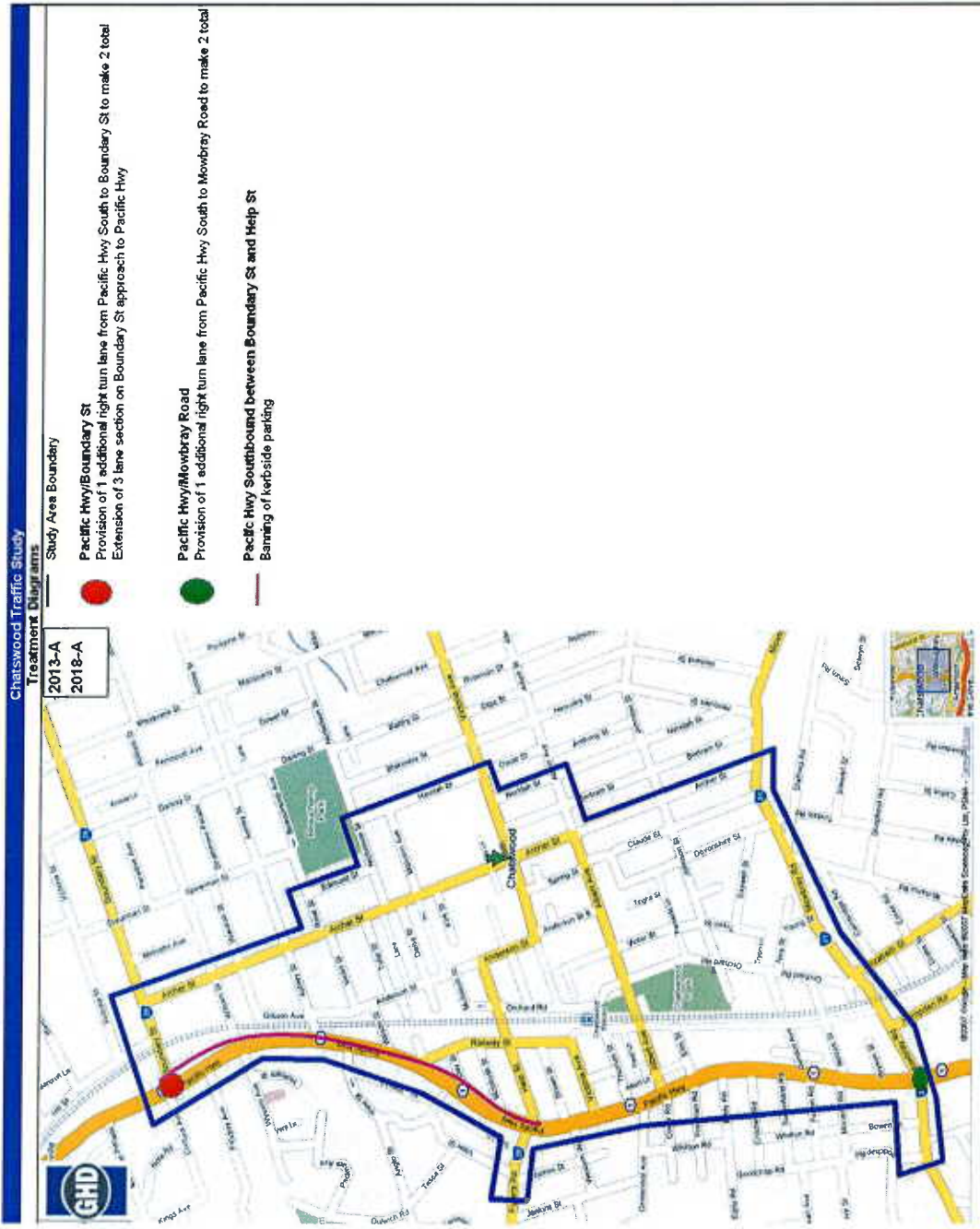


Figure 3.1 2013-A and 2018-A Treatments

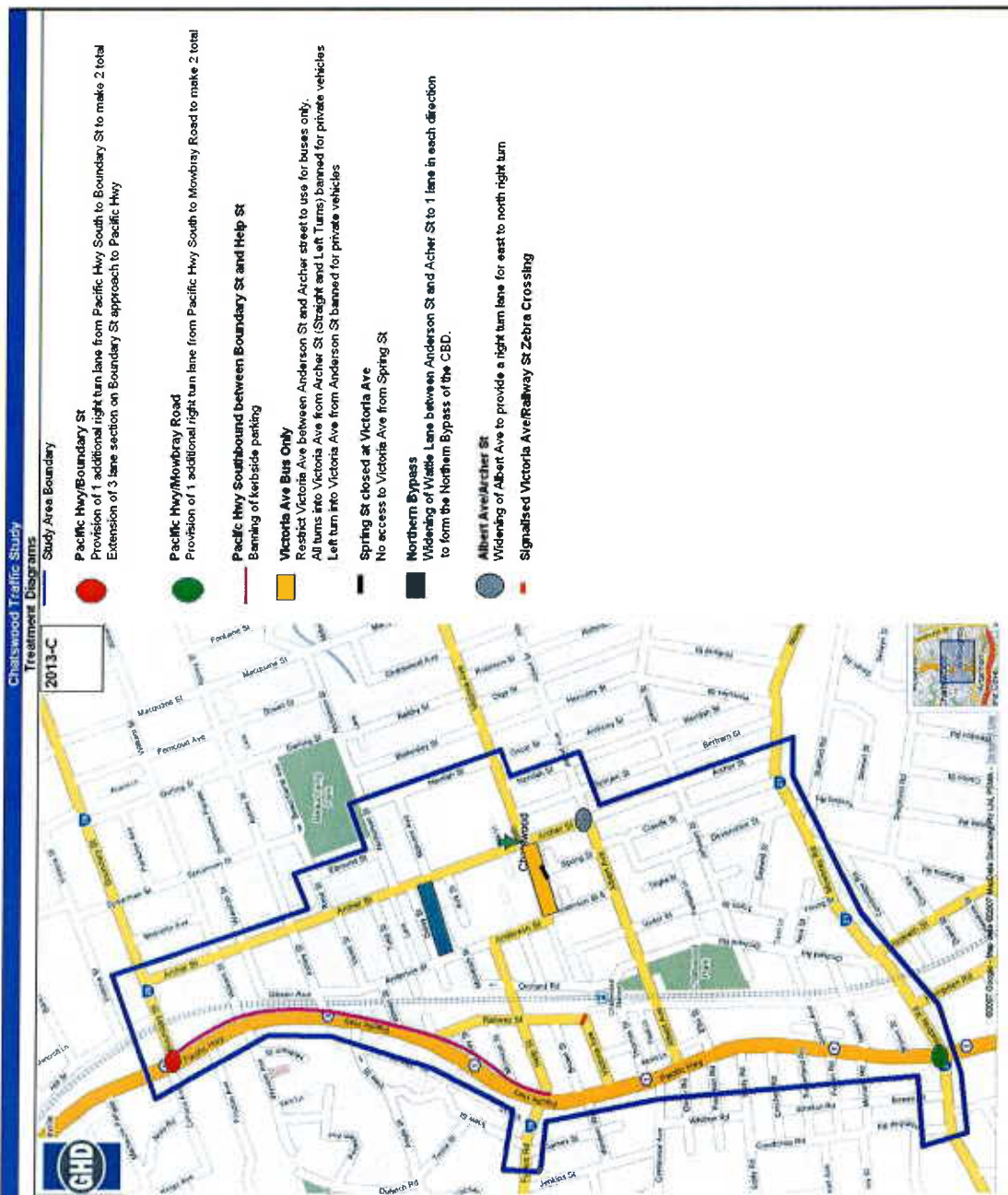


Figure 3.3 2013-C Treatments

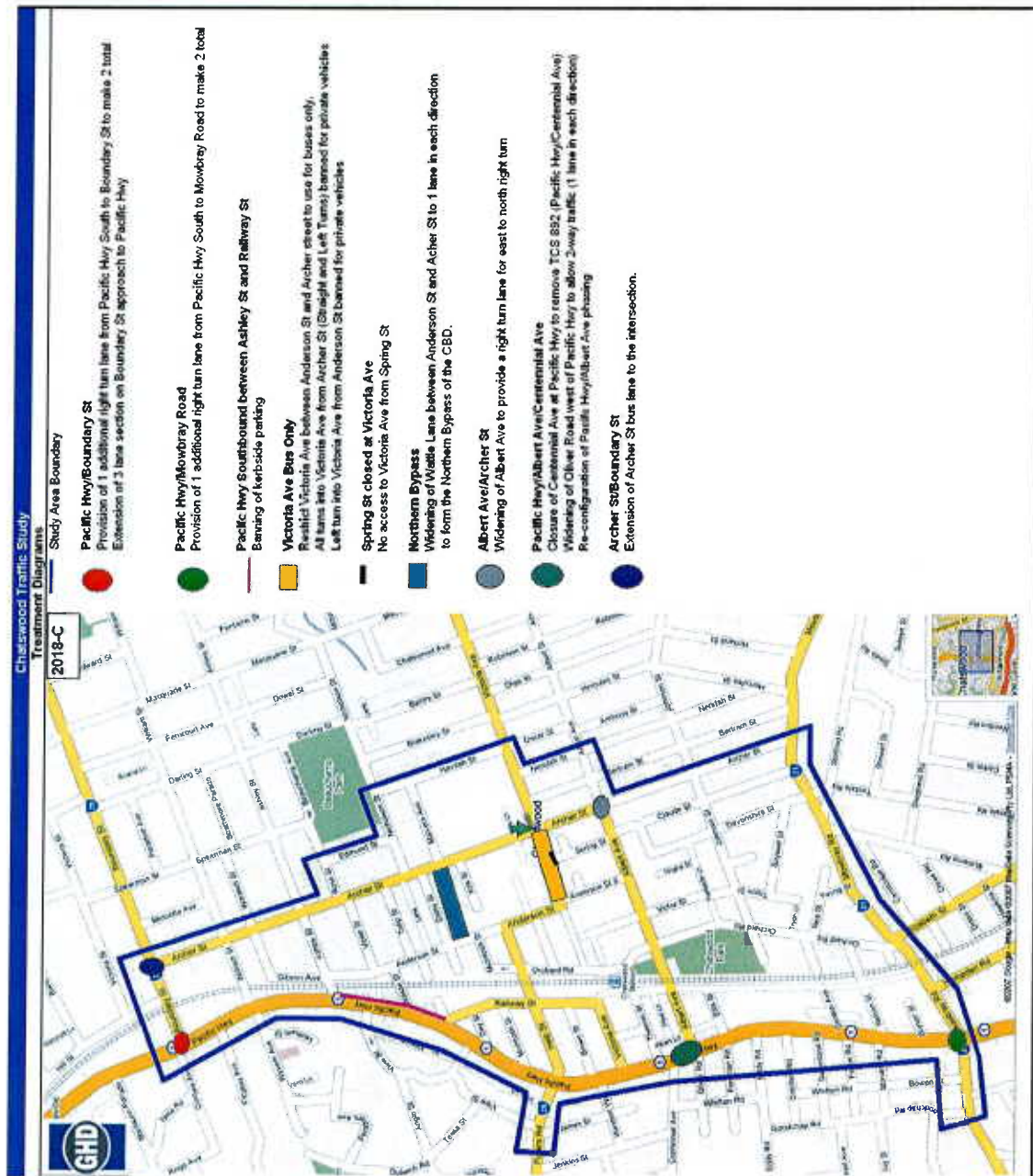


Figure 3.4 2018-C Treatments

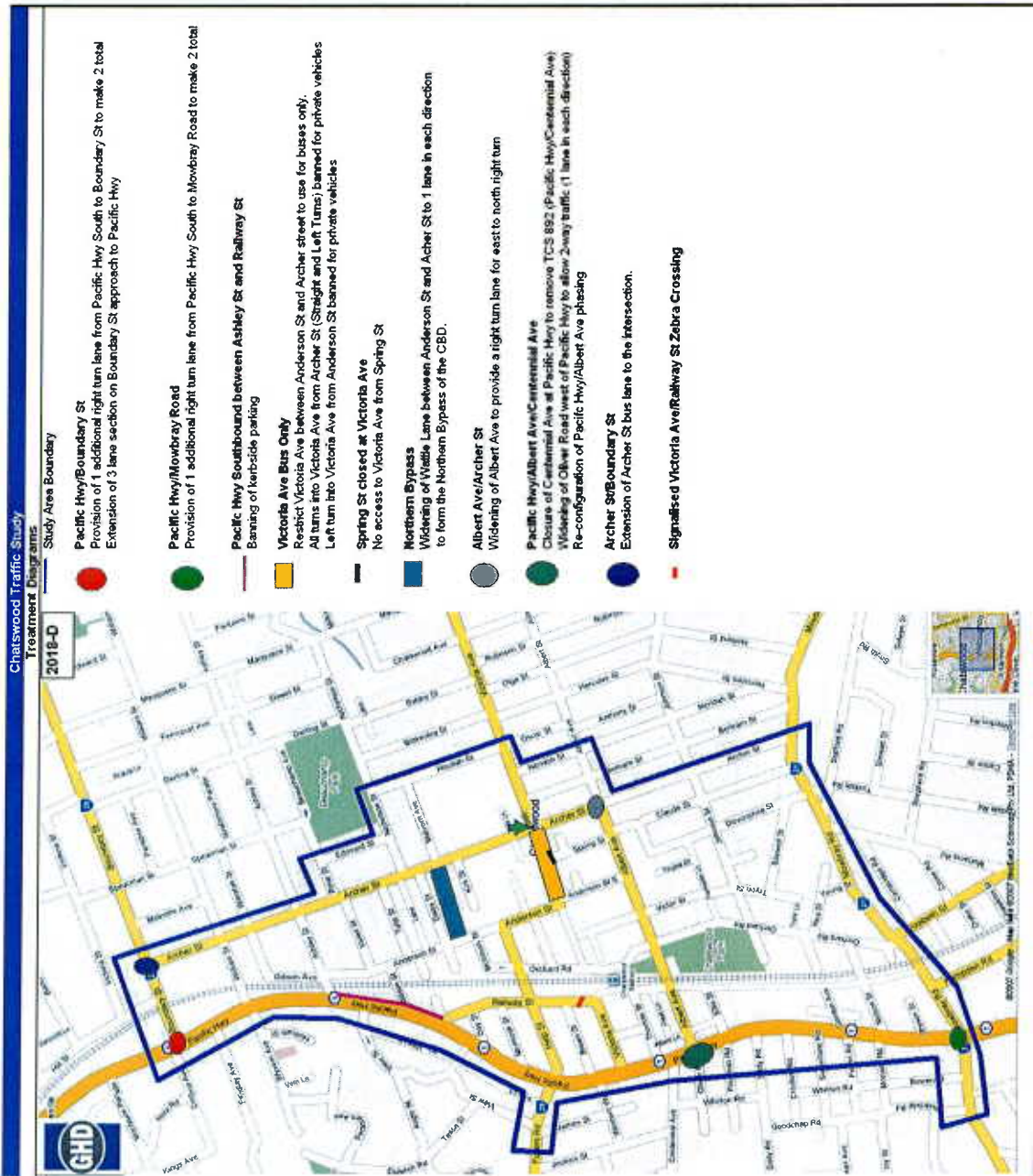
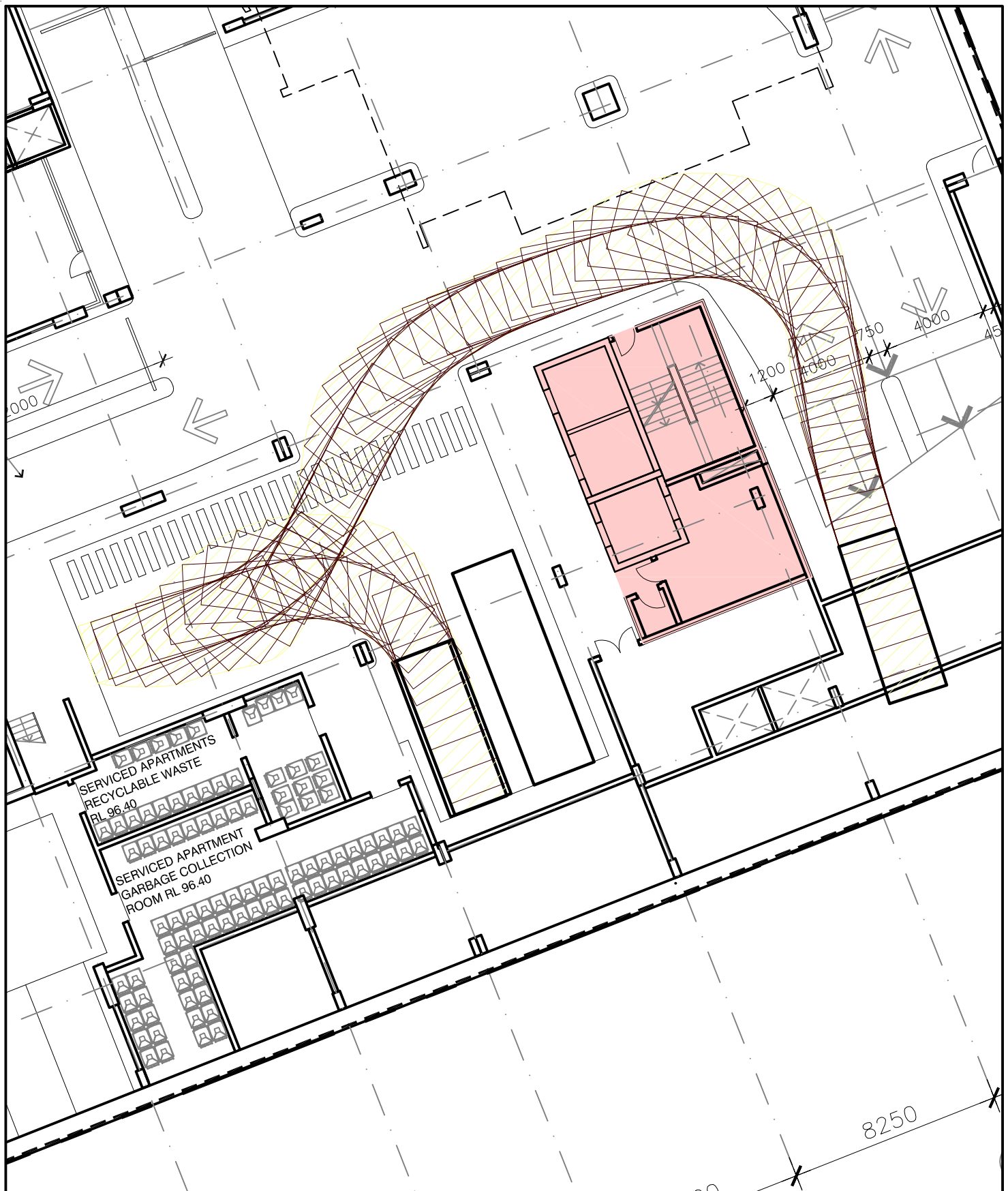


Figure 3.5 2018-D Treatments

APPENDIX D

TURNING PATH ASSESSMENT



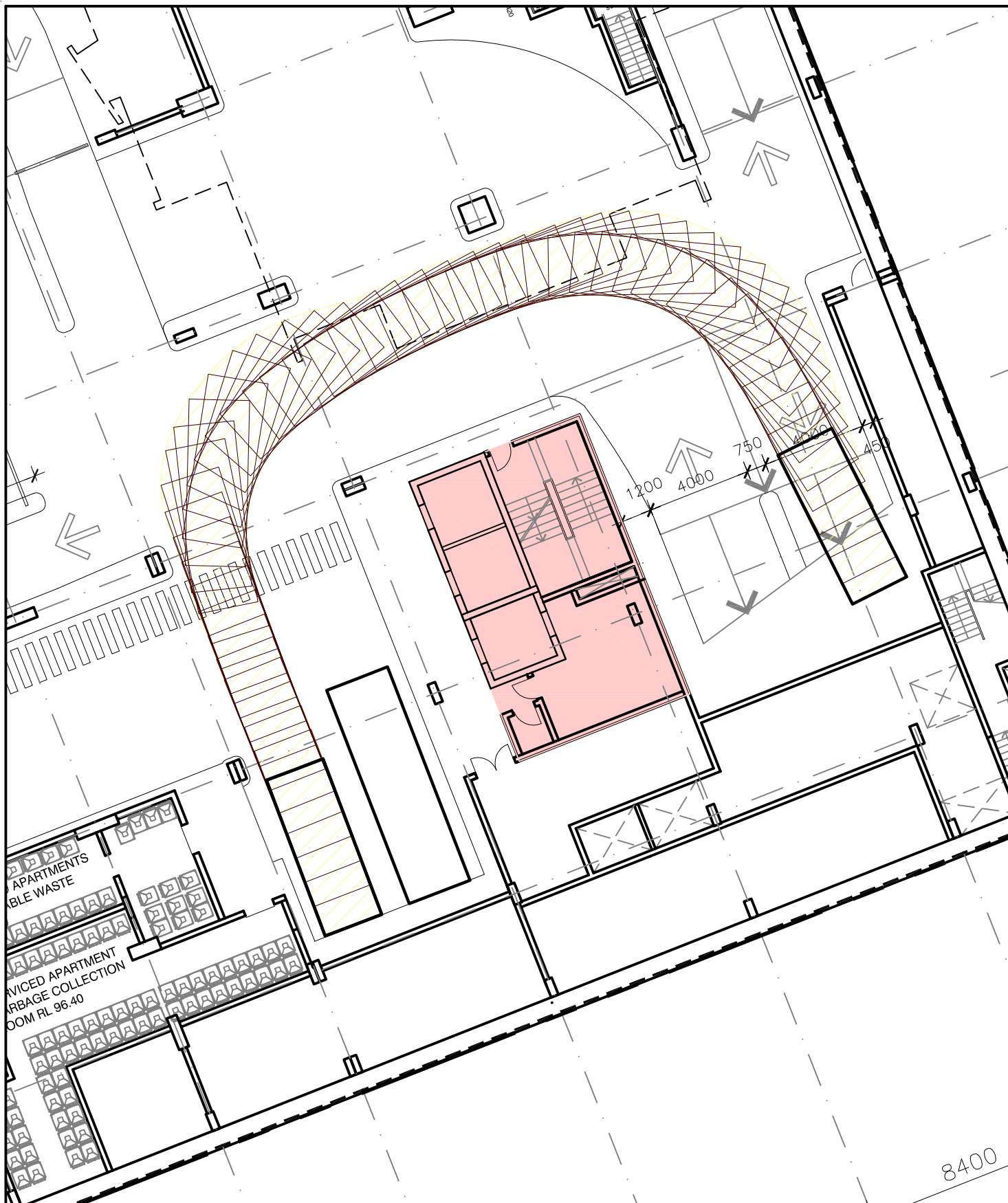
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF A 6.4m RIGID
VEHICLE ENTERING THE SITE**

SP 1



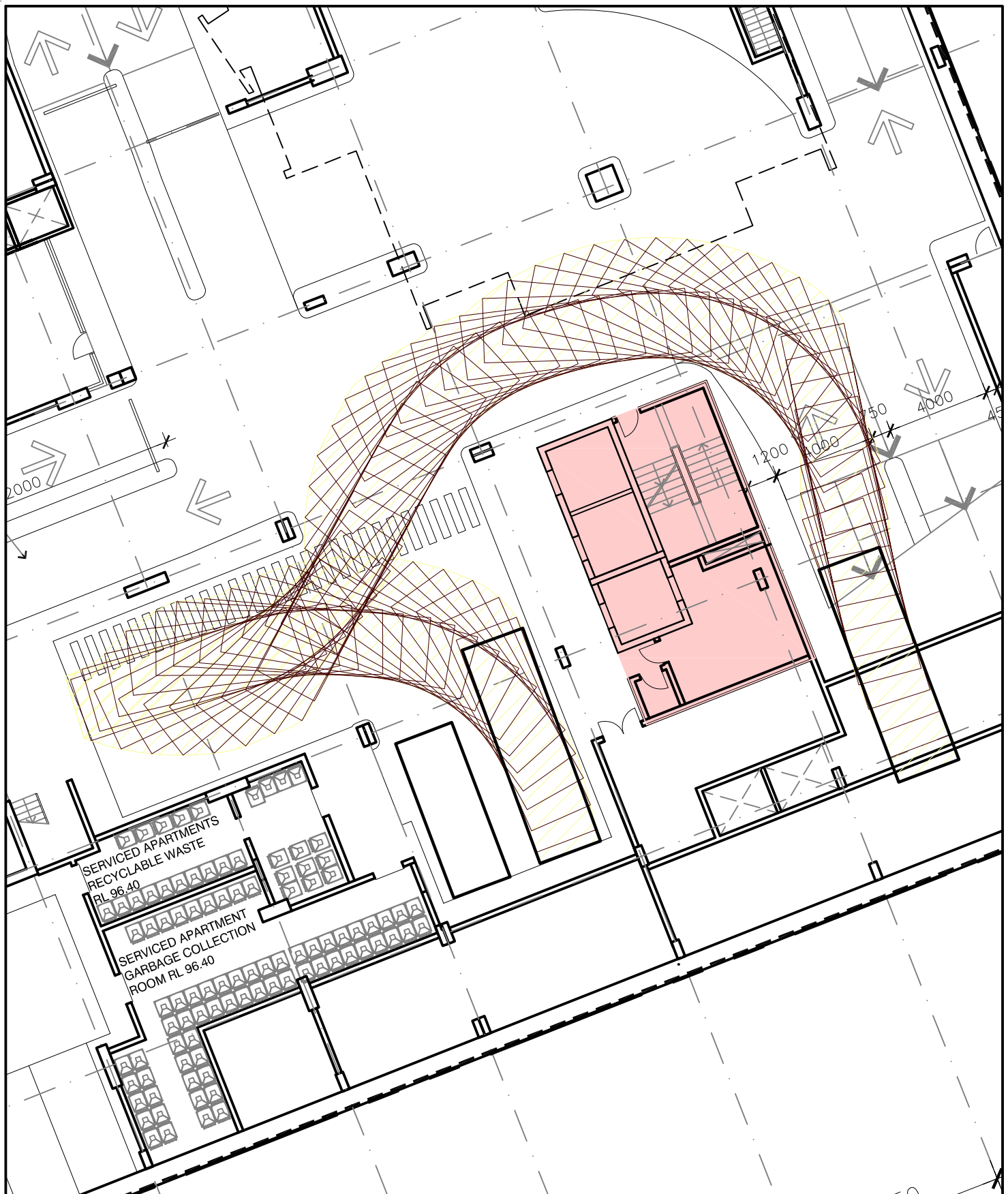
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF A 6.4m RIGID
VEHICLE EXITING THE SITE**

SP 2



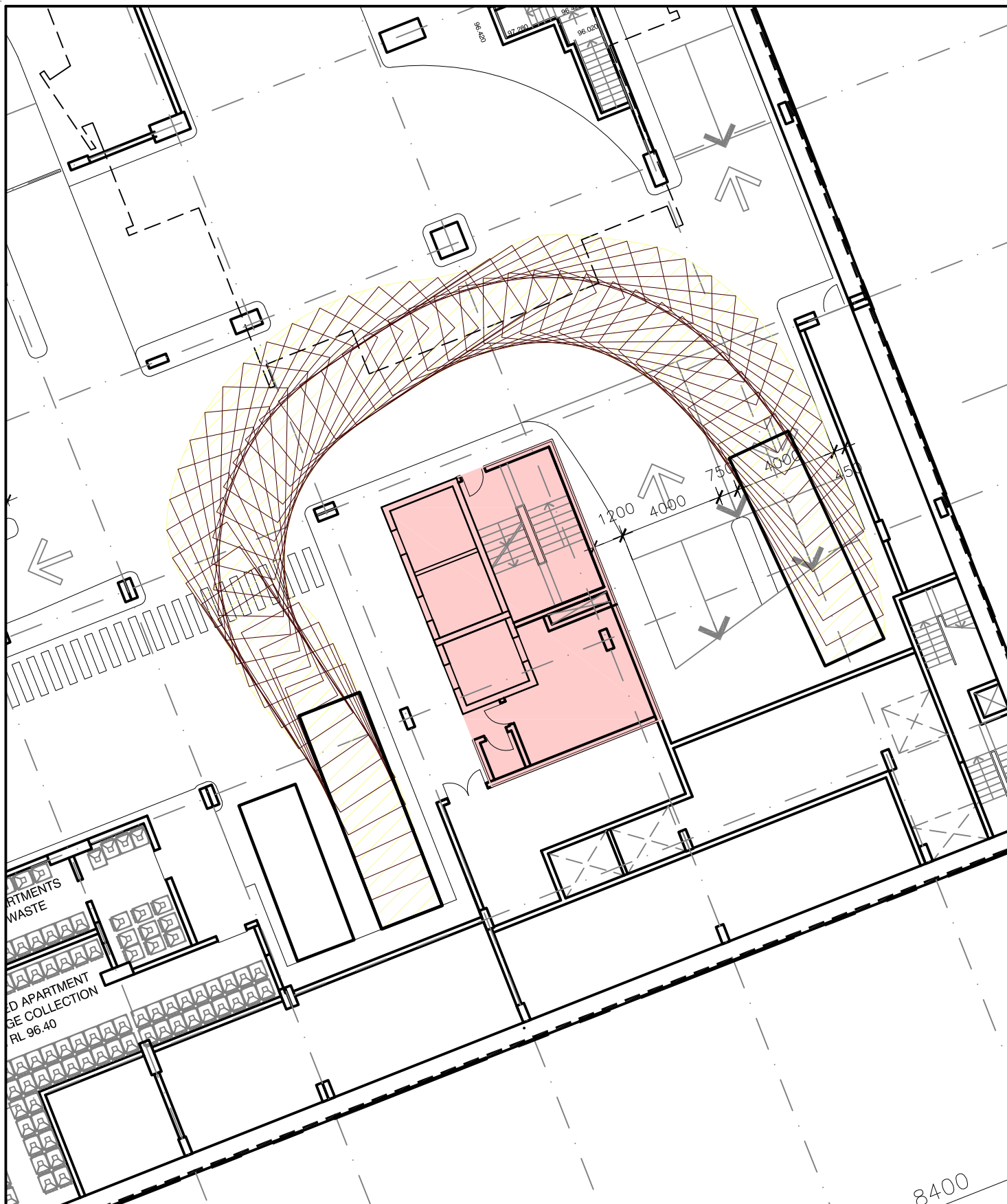
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF AN 8.8m RIGID
VEHICLE ENTERING THE SITE**

SP 3



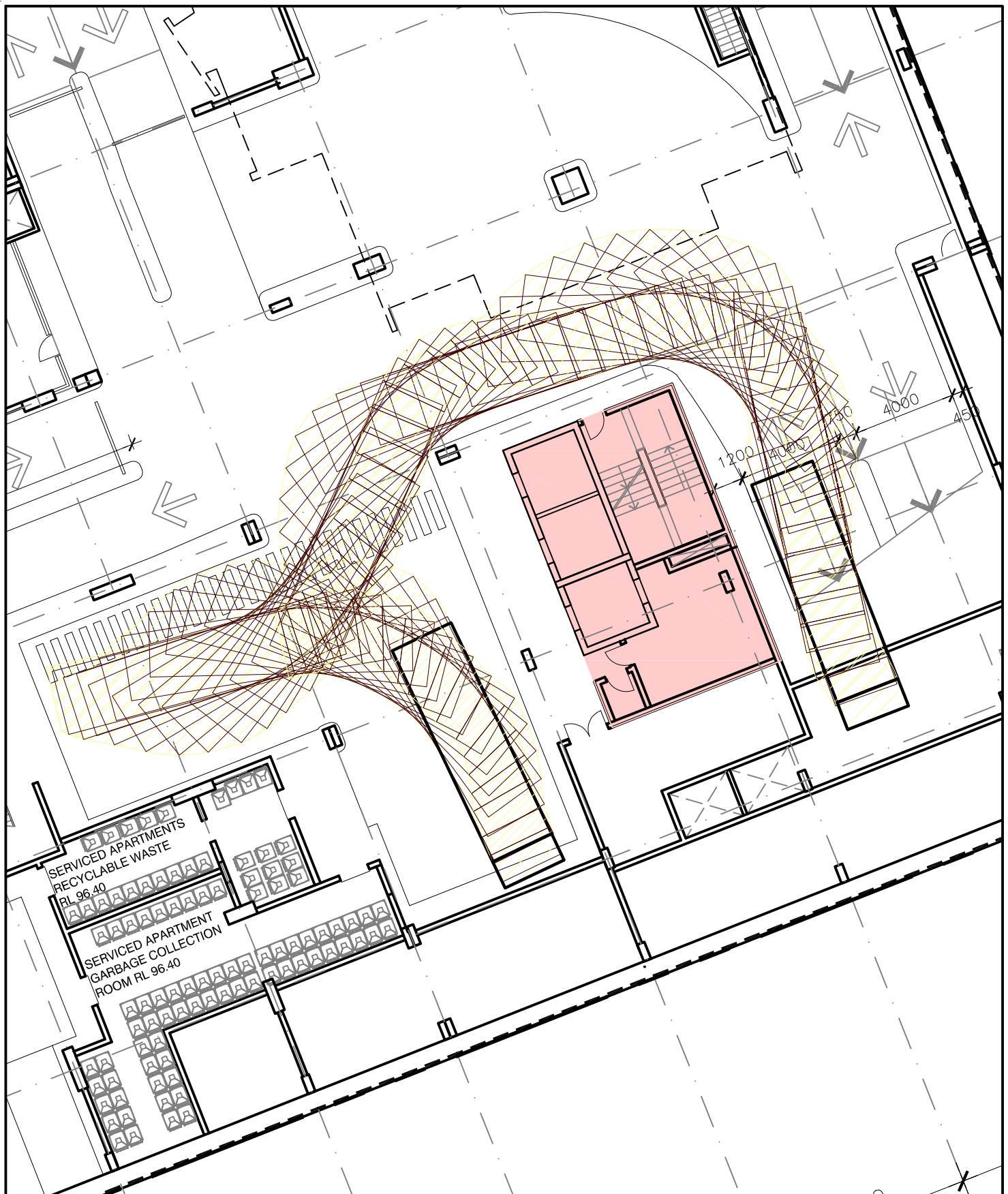
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF AN 8.8m RIGID
VEHICLE EXITING THE SITE**

SP 4



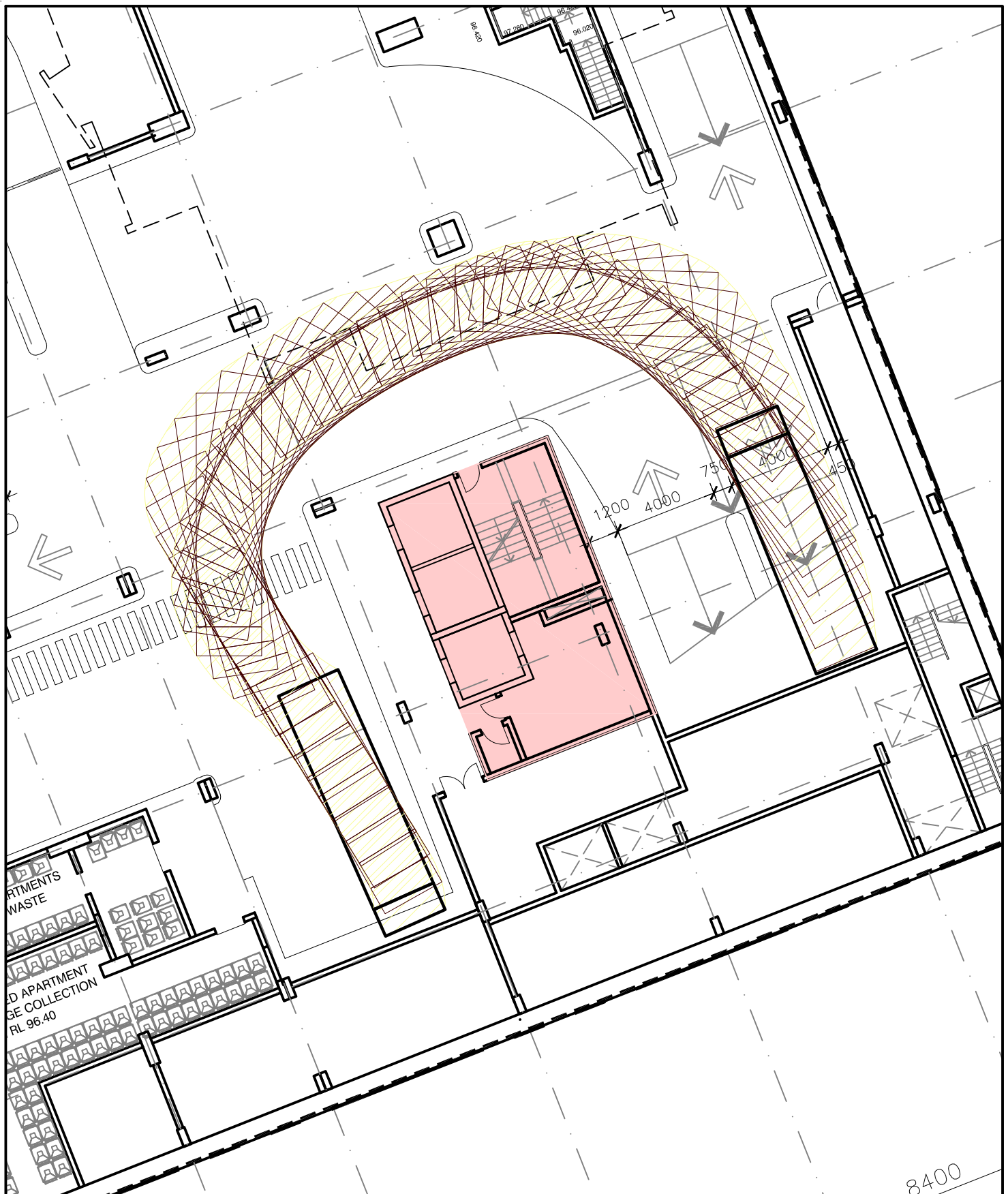
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF A 10.2m REFUSE
VEHICLE ENTERING THE SITE**

SP 5



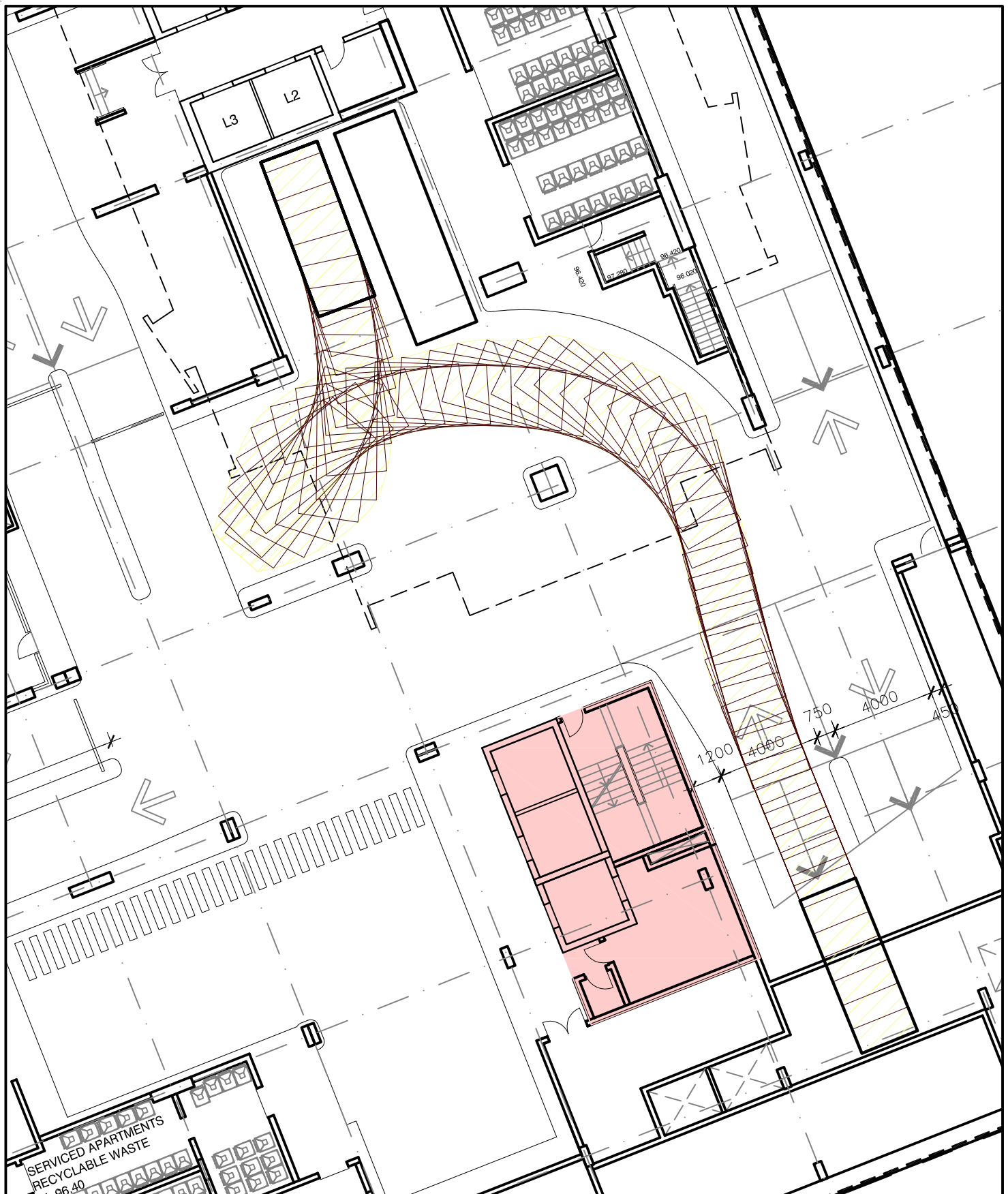
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This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF A 10.2m REFUSE
VEHICLE EXITING THE SITE**

SP 6



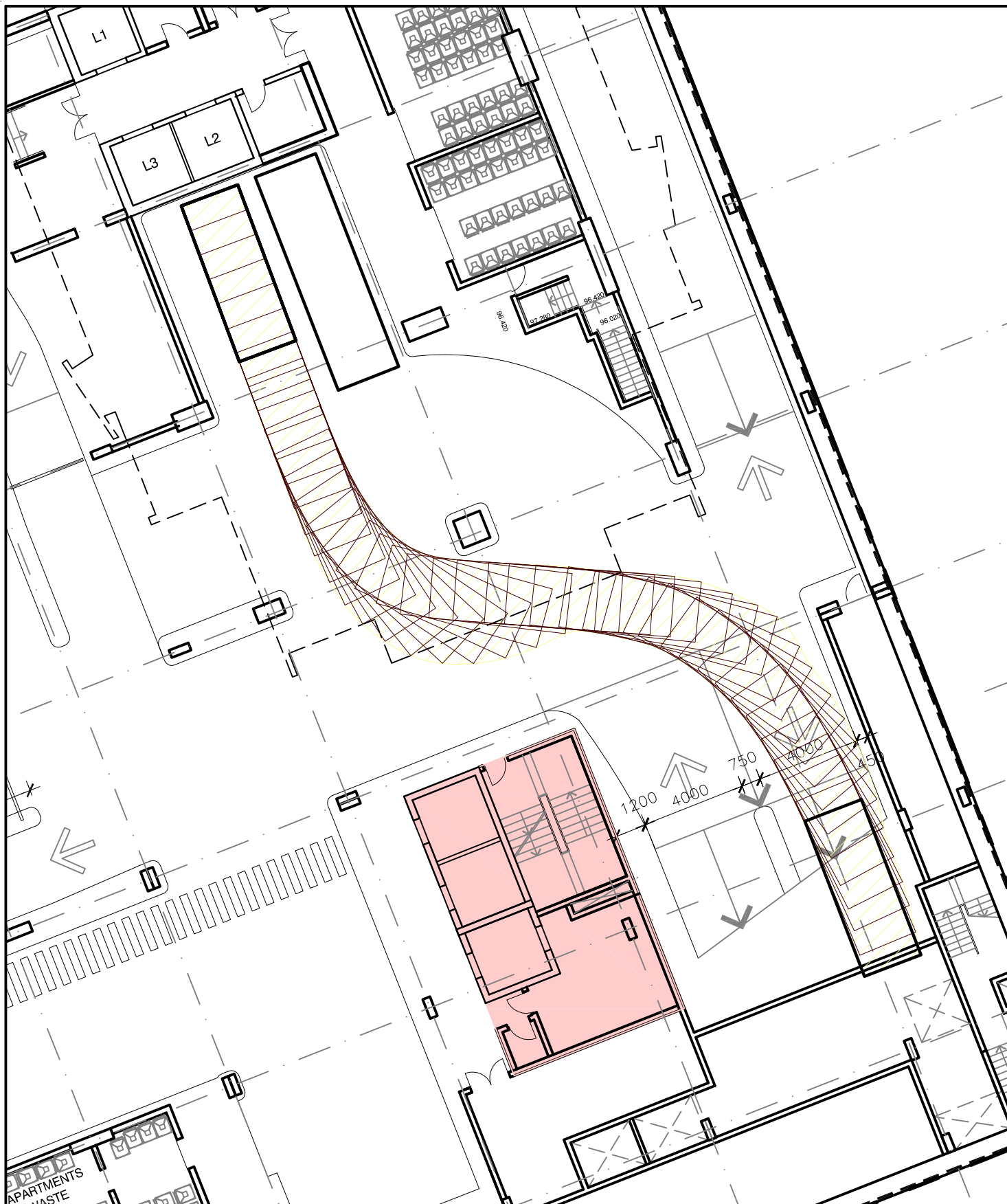
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austrorads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF A 6.4m RIGID
VEHICLE ENTERING THE SITE**

SP 7



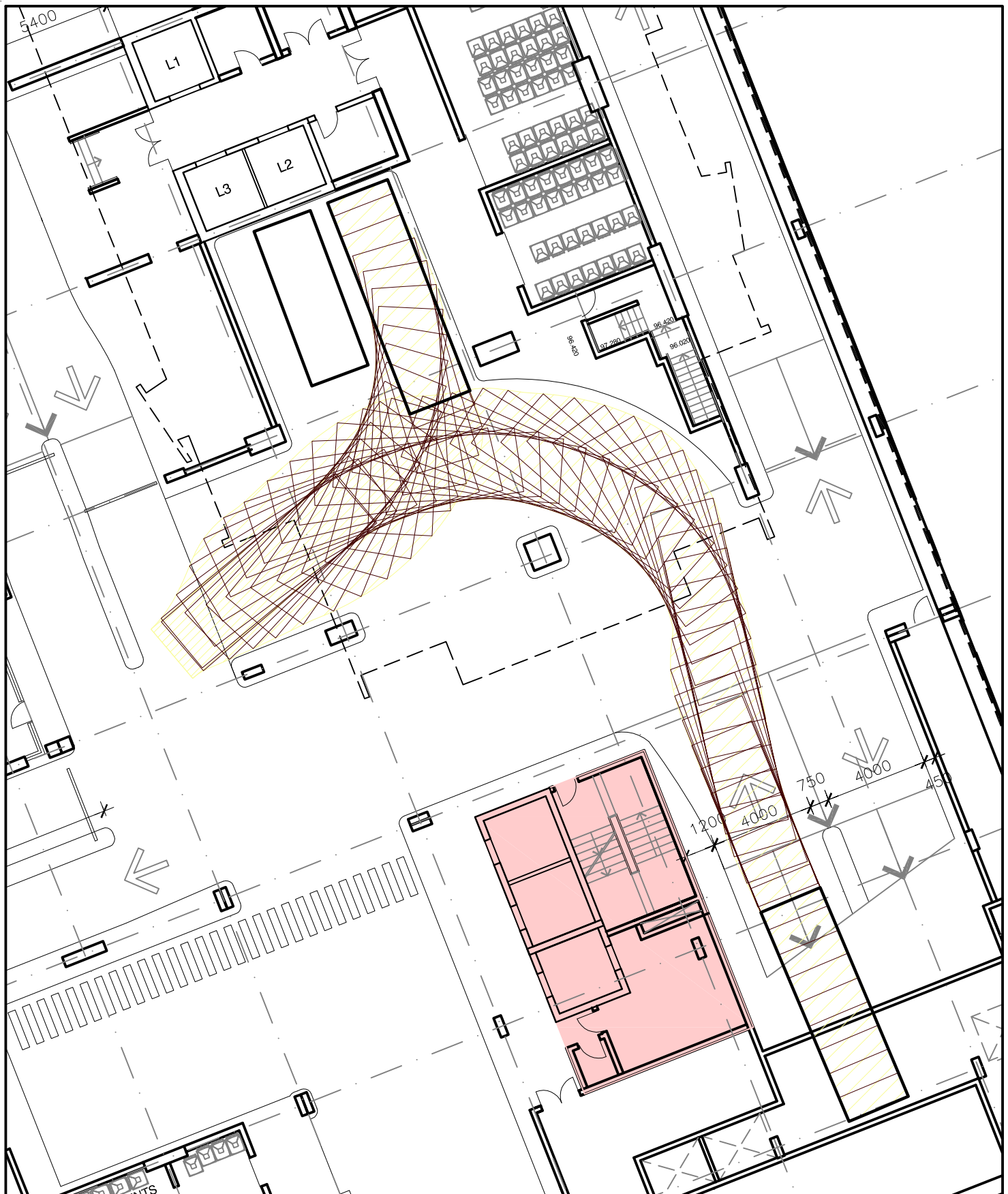
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF A 6.4m RIGID
VEHICLE EXITING THE SITE**

SP 8



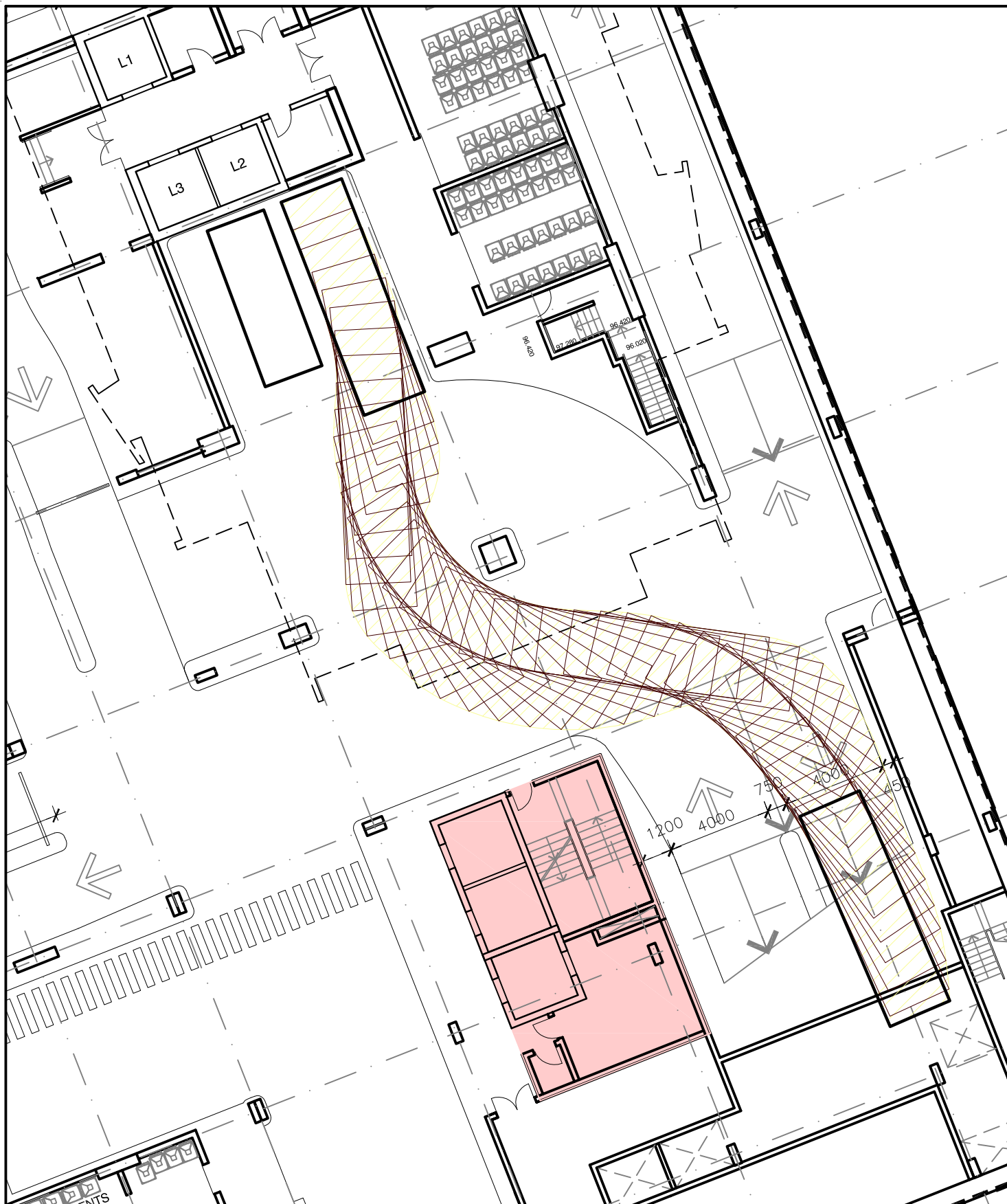
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF AN 8.8m RIGID
VEHICLE ENTERING THE SITE**

SP 9



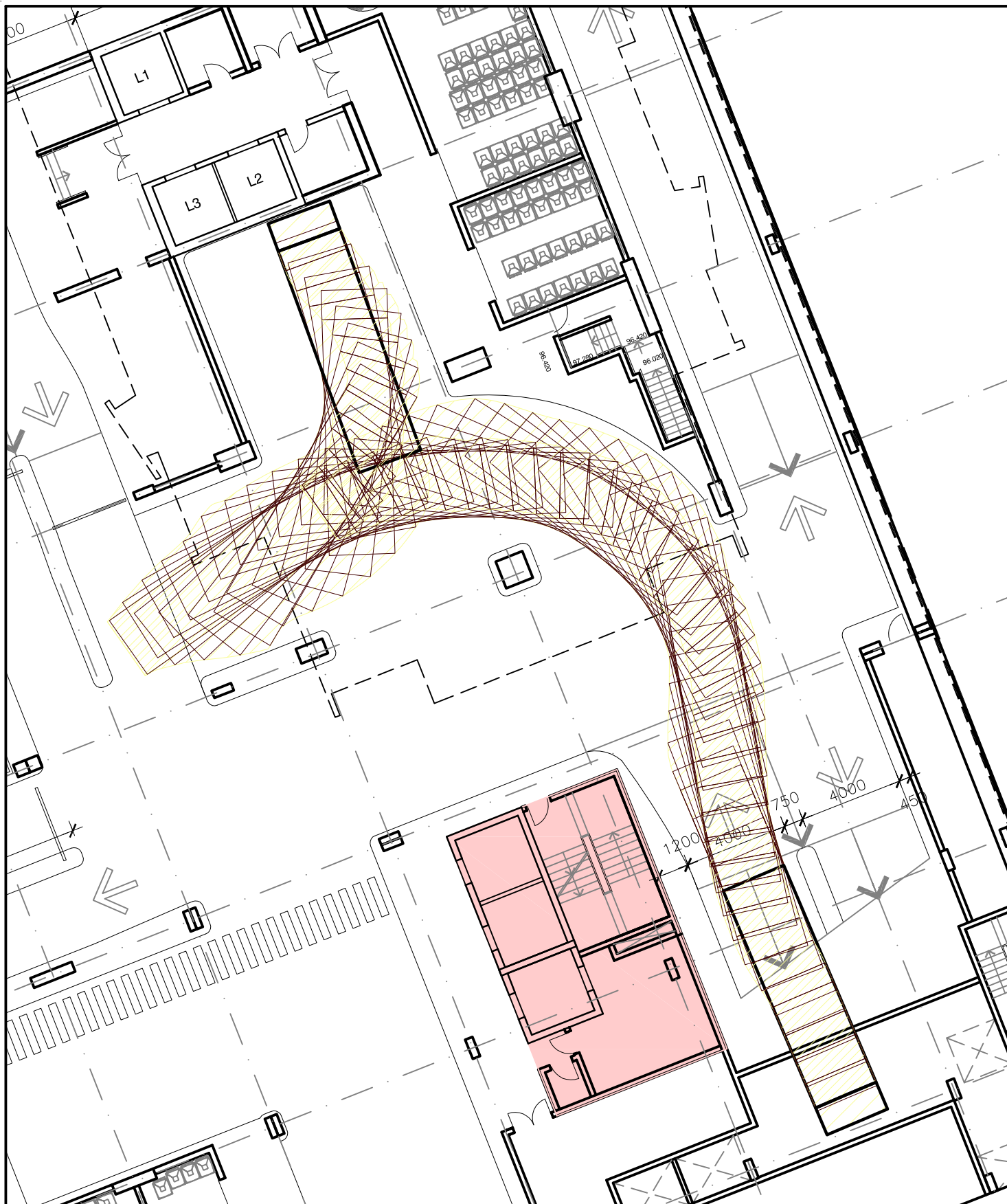
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This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF AN 8.8m RIGID
VEHICLE EXITING THE SITE**

SP 10



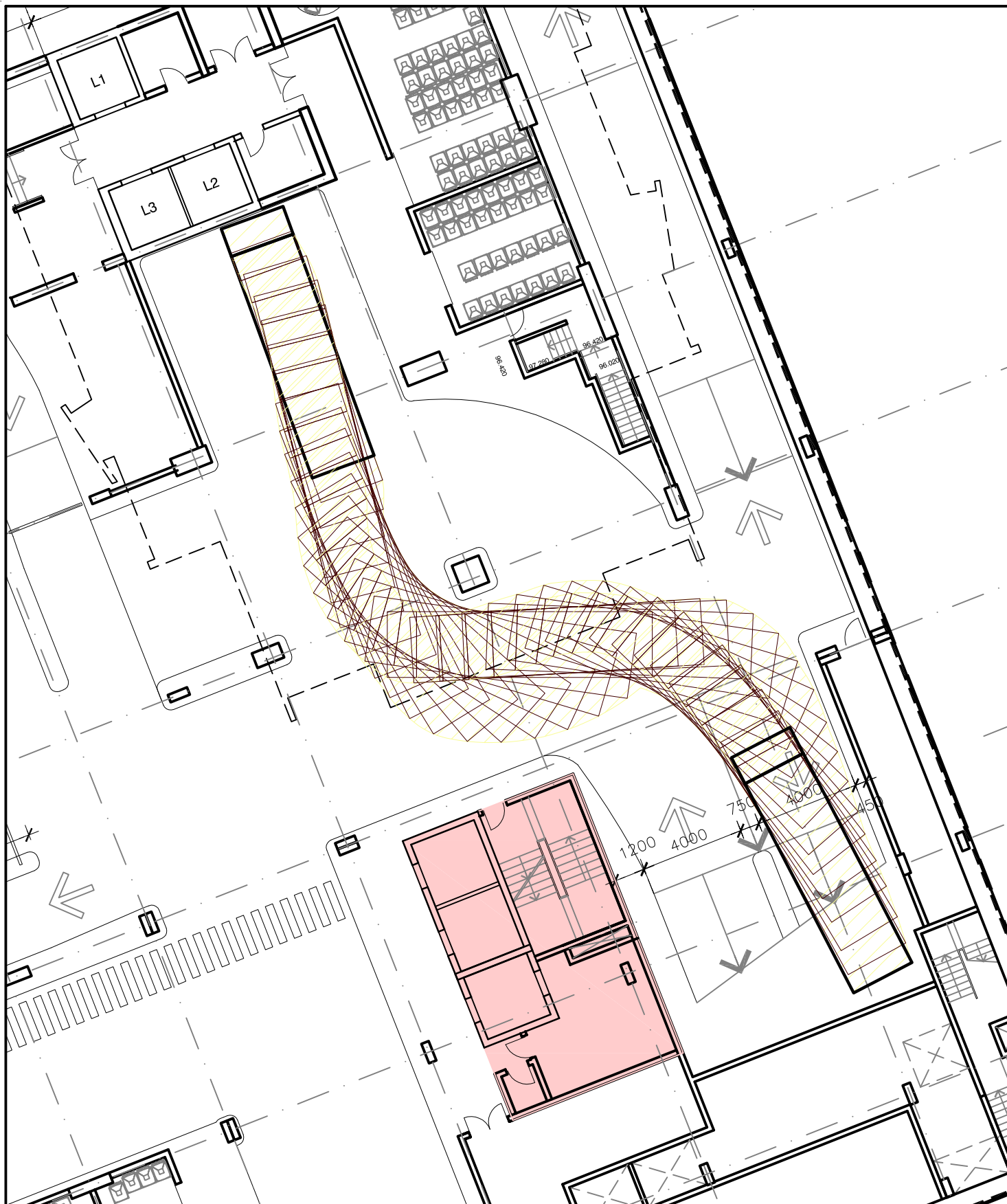
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This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF A 10.2m REFUSE
VEHICLE ENTERING THE SITE**

SP 11



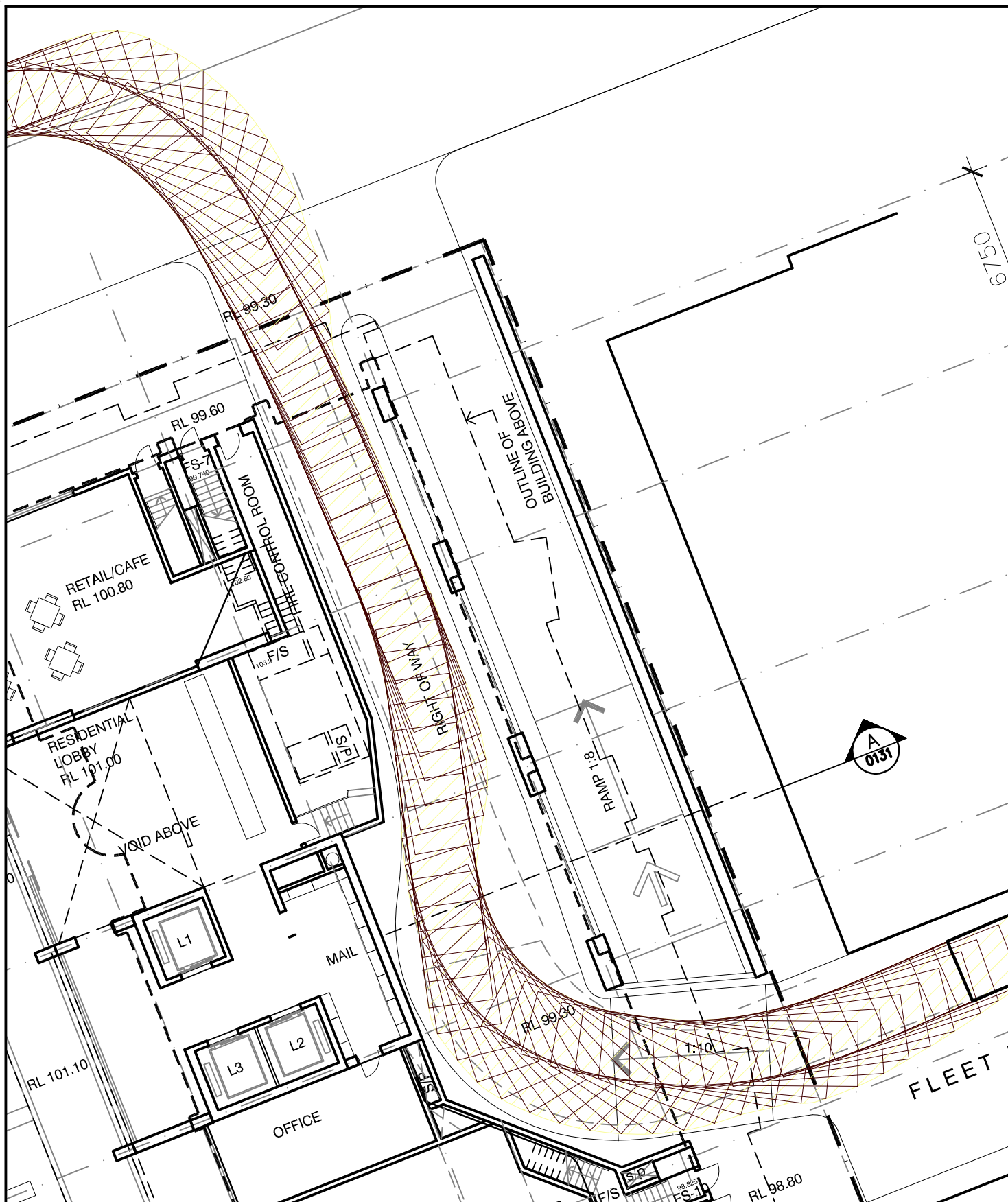
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF A 10.2m REFUSE
VEHICLE EXITING THE SITE**

SP 12



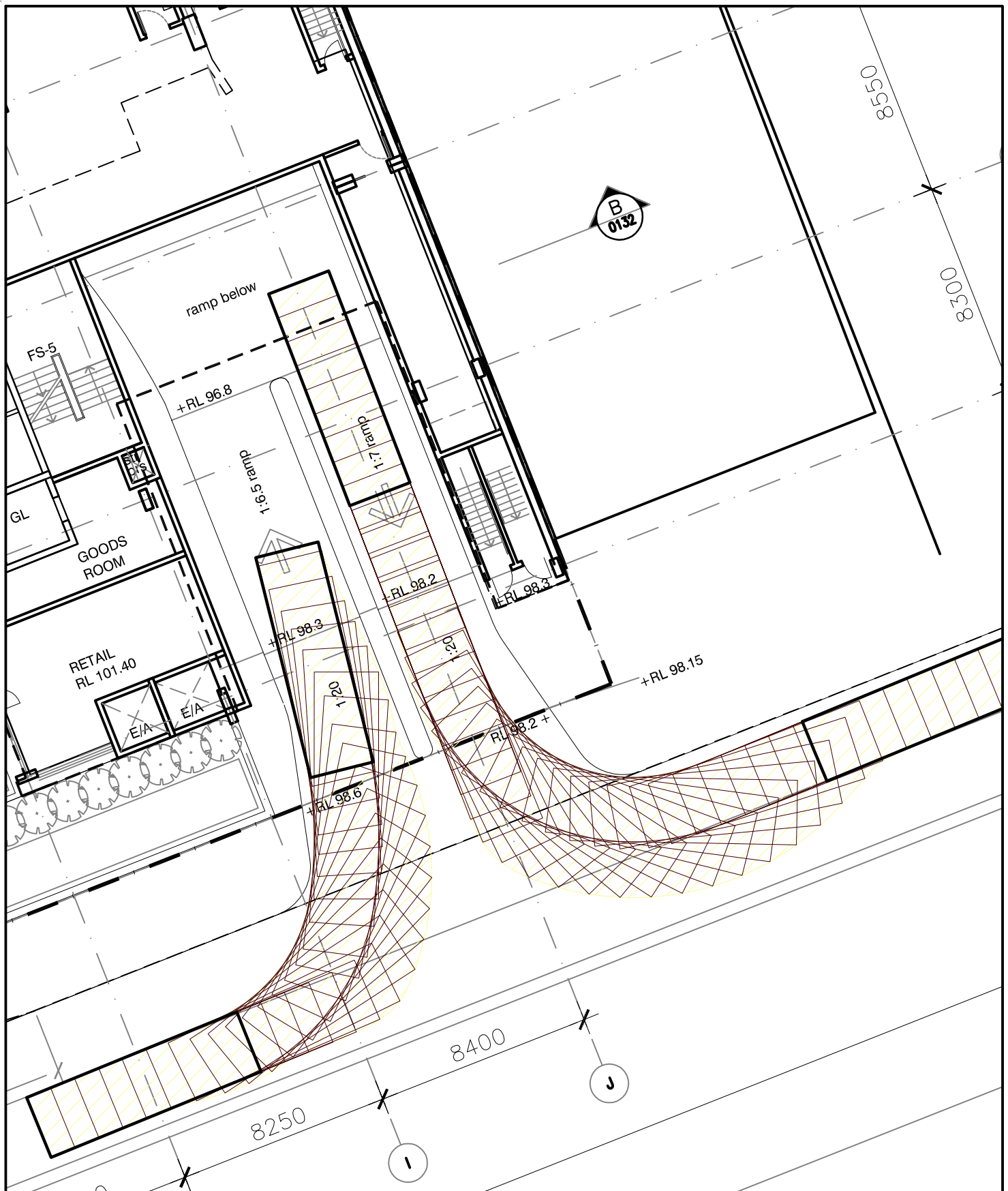
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



SWEPT PATH ANALYSIS OF AN 8.8m RIGID VEHICLE

SP 13



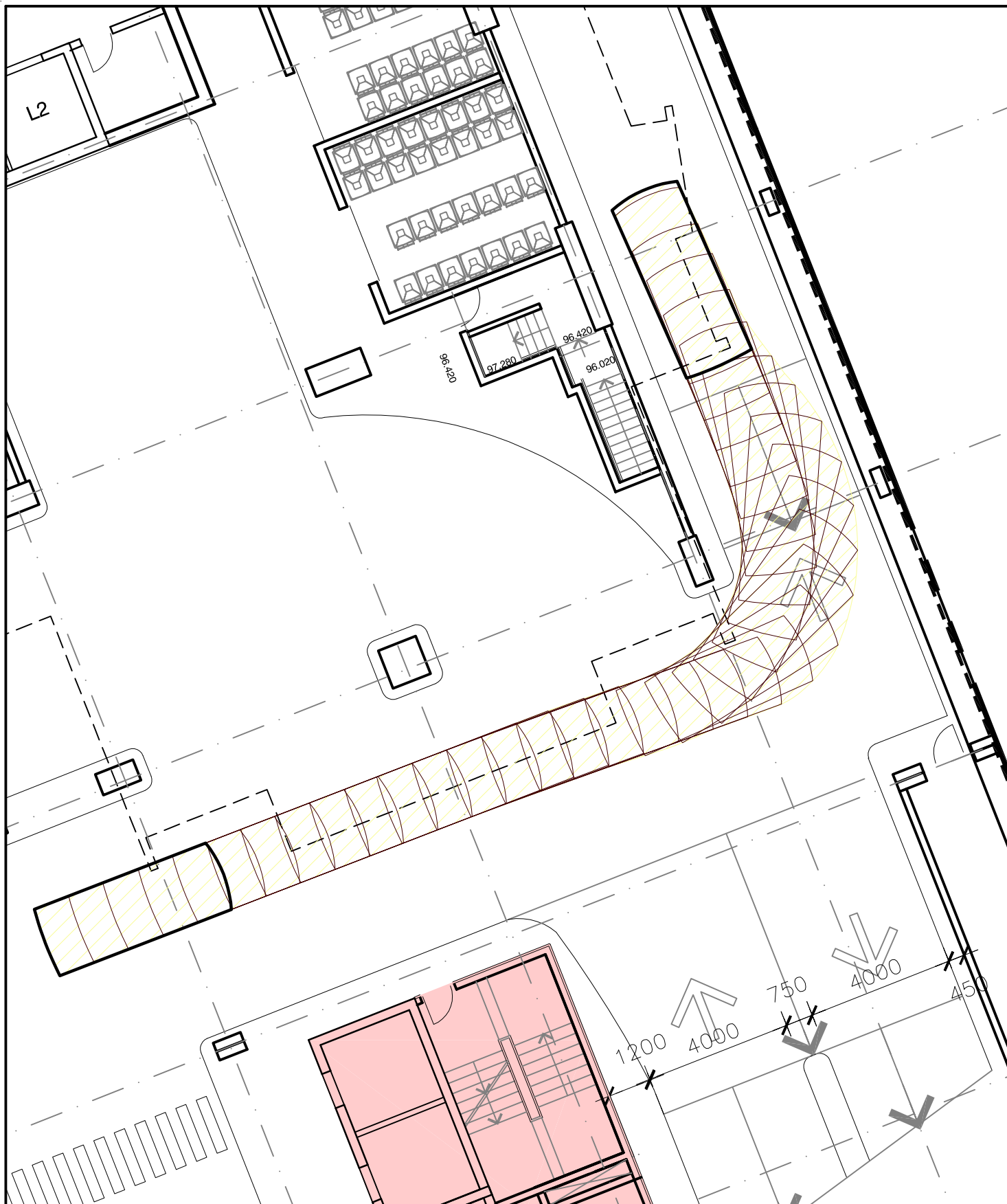
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF AN 8.8m RIGID
VEHICLE ENTERING AND
EXITING THE SITE**

SP 14



LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 in conjunction with AutoCAD 2012. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



**SWEPT PATH ANALYSIS
OF A 99th PERCENTILE
VEHICLE EXITING THE SITE**

SP 15