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Job Number: **18NL157-T4** **Date:** **24th April, 2019**

Traffic Management Report for

23-29 Harvey Avenue, Moorebank, NSW

Prepared by

LOKA CONSULTING ENGINEERS PTY LTD

Nermein Loka

BSC, ME, MIE(AUST), CPEng, NPER, RPEQ

Senior Civil Engineer

Accredited Certifier

Director

Table of Contents

1. Introduction

Loka Consulting Engineers Pty Ltd has been engaged by Pagano Architects to provide a Traffic Management Report for the site at 23-29 Harvey Avenue, Moorebank, NSW (refer to Figure 1-1 and Figure 1-2).

A Traffic Management Plan and Report is required for the proposed development to identify the impacts of the proposal on the local street network and mitigation measures required to ameliorate any impacts. This includes:

- A description of the site and details of the development proposal;
- A review of the road network in the vicinity of the site, and traffic conditions on that road network;
- A review of the geometric design features of the proposed car parking facilities for compliance with the relevant codes and standards; and
- An assessment of the adequacy and suitability of the quantum of off-street car parking provided on site.

Figure 1-1 Subject site (from SIX maps)

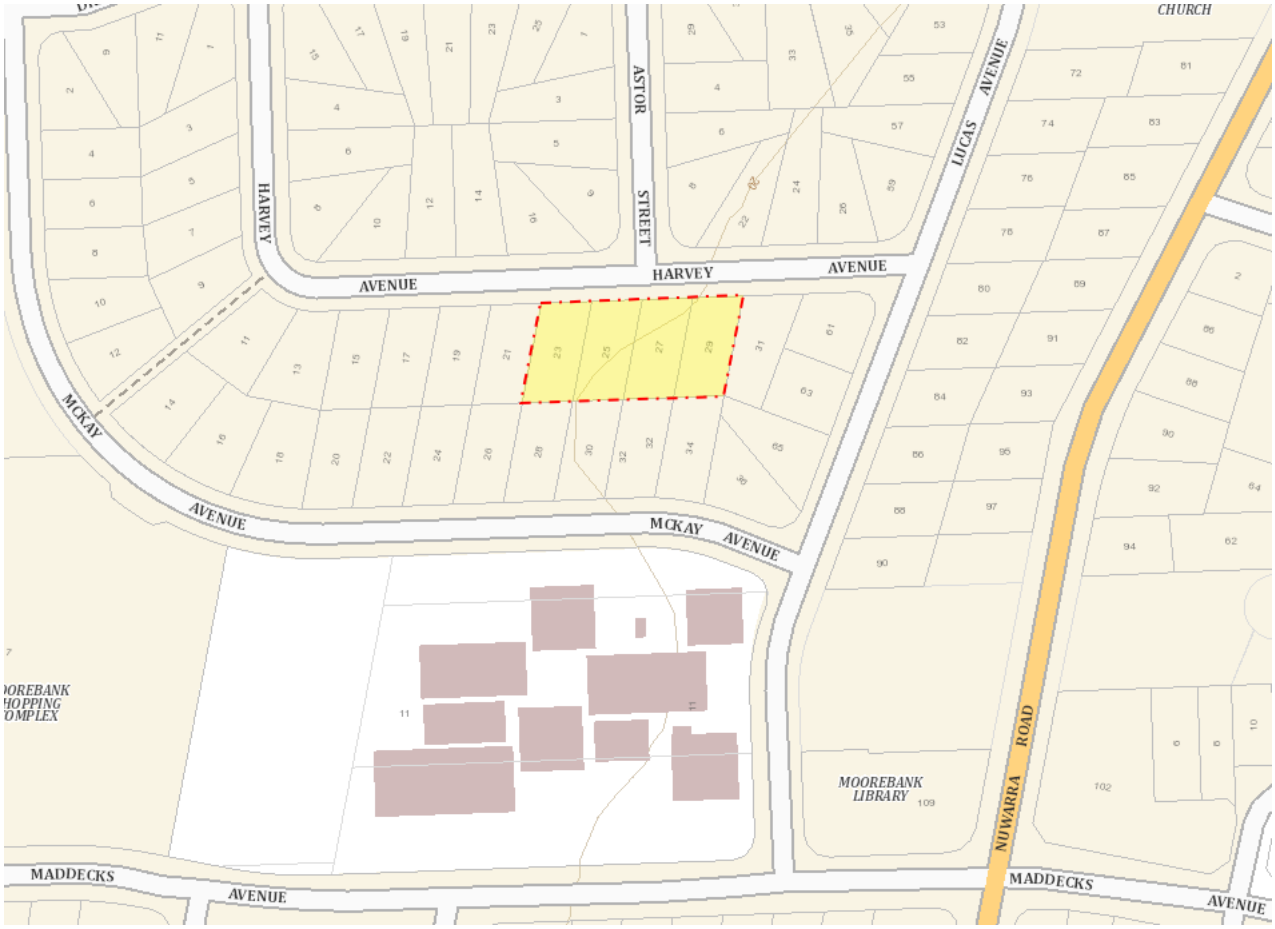


Figure 1-2 Site location (from SIX maps)

2. Proposed Development

The proposed development will facilitate the construction of a residential flat building with a site area of approximately 2745.2 m^2.

The proposed development is bounded by

- 31 Harvey Ave on the East,
- 21 Harvey Ave on the West,
- Harvey Ave on the North, and
- 28-34 McKay Ave on the South.

The development consists of 2 basement levels, 1 ground level and 5 upper levels. The 2 basement levels will be used primarily as car parking with entry from Harvey Ave. Ground level and 5 upper levels will be used for residence.

2.1.Public Transportations

1. It takes 4 minutes walking (350m) from the site to 230 Newbridge Rd bus stop (refer to figure 2-1).
2. It takes 4 minutes walking (350m) from the site to Nuwarra Public School, Maddecks Ave bus stop (refer to figure 2-2).

Table 2-1 shows the bus line name; routes and the time between two successive trips. Refer to Transport NSW for accurate details.

Bus stop	Line Name	Route	Weekday interval	Weekday hours	Weekend interval	Weekend hours
1	903	Liverpool to Chipping Norton (Loop Service)	60min	06:20 – 19:05	120min	09:17 – 17:17
	M90	Burwood to Liverpool	15min	05:06 – 22:51	20min	07:32 – 20:00
2	902	Holsworthy to Liverpool via Moorebank	30min	05:35 – 20:52	60min	15:30 – 18:30
	902X	Sandy Point to Holsworth via Voyager Point	90min	07:22 – 8:00		

Table 2-1 Bus line, route, and time

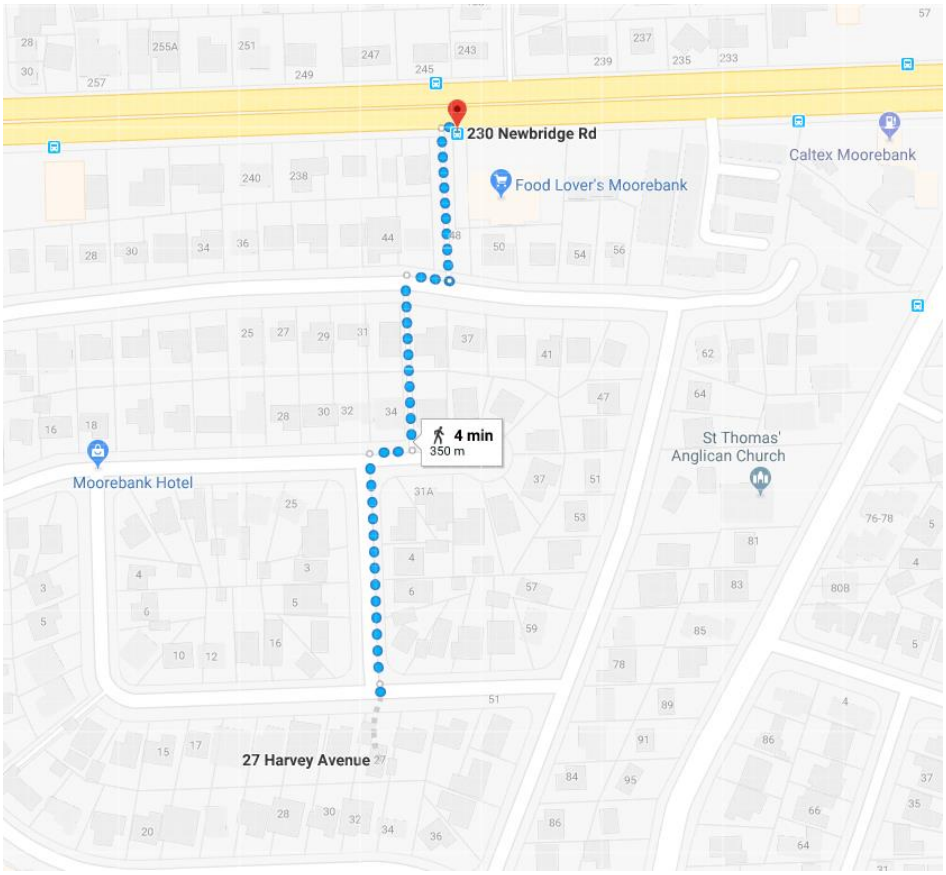


Figure 2-1 Site to bus stop (from Google maps)

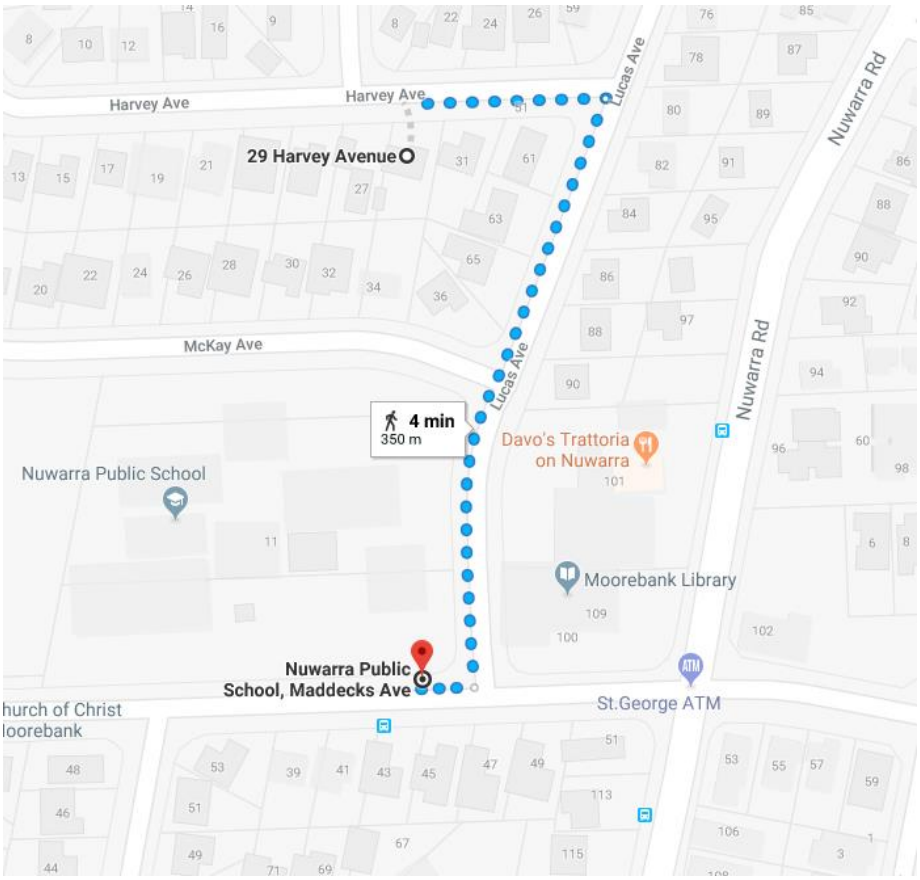


Figure 2-2 Site to bus stop (from Google maps)

3. Off Street Parking Provision

3.1. Car parking

The subject site is in an accessible area according to State Environmental Planning Policy (Affordable Rental Housing) 2009;

- less than 400m walking distance from 230 Newbridge Rd bus stop
- M90 service from this bust stop operates every 15 min from 05:06-22:51 on weekdays and every 20min from 07:32-20:00 on weekends.

Therefore, the following car parking rates according to SEPP 2009 are used for a residential flat building as shown in Table 3-1.

Land use	Minimum number of car parking spaces
Residential flat building	at least 0.5 parking spaces are provided for each dwelling containing 1 bedroom, at least 1 parking space is provided foreach dwelling containing 2 bedrooms and at least 1.5 parking spaces are provided for each dwelling containing 3 or more bedrooms

Table 3-1 Off-street car parking space provision rate

Units and bedrooms provided are summarized in Table 3-2.

Level	1-bed	2-bed	3-bed	Total
Level 5	1	6	1	8
Level 4	1	6	1	8
Level 3	1	6	1	8
Level 2	5 (inc. 1 studio)	6	1	12
Level 1	5 (inc. 1 studio)	6	1	12
Ground	3	5	2	10
Total	16	35	7	58

Table 3-2 Bedroom summary

Required minimum parking spaces for the proposed development is shown in Table 3-3.

Parking type	Unit type	Unit amount	Parking rate	Required spaces	Proposed spaces
Residential	1-bed	16	0.5	8	60 (59 with future adaptable units)
	2-bed	35	1	35	
	3-bed	7	1.5	10.5	
	Total			**53.5**	

Table 3-3 Required minimum car parking spaces

The design complies with the requirement from SEPP 2009.

Ground floor and basement architectural plan of the proposed development has been prepared by Pagano Architects and is attached in Appendix A.

3.2.Bicycle parking

According to NSW Government “Planning guidelines for walking and cycling”, the following bicycle parking spaces are required as shown in Table 3-4.

Land use	Rate (long-term)	Rate (short-term)	Number of units	Required minimum spaces
RFB	20-30% of units	5-10% of units	58	12 (long term) + 3 (shot term) = 15

Table 3-4 Required minimum bicycle parking spaces

15 bicycle parking spaces are provided on Basement 2 according to AS2890.3: 1993.

The design complies with the requirement from NSW Government “Planning guidelines for walking and cycling”.

4. Car Park and Driveway Layout

4.1.Driveway and Ramp Design

The design of the driveway, internal roadways & ramps, and car parking spaces must comply with relevant Australian Standards; details are shown in the architectural plan. Table 4-1 and Table 4-2 assess the compliance of the site to Australian Standard and Liverpool Council DCP.

FEATURE	AS 2890.1:2004	Liverpool Council DCP	Architectural Plan	Compliance
Driveway width	• 3.0 to 5.5 for Category 1. • 6.0 to 9.0 for Category 2.	6-9m combined for 25-100 parking spaces with "minor" street frontage Max. 6m for residential	Class 1A parking facility Local frontage road 60 proposed car spaces Category 1 access facility From street frontage to boundary line: 6.6m	The design is complied with AS 2890.1 and Liverpool Council DCP
Ramp width	• One-way – 3.0m minimum between kerbs • Two- way – 5.5m minimum between kerbs • Note: 300mm clearance on both side when there is a high kerb or barrier on both sides.	1-15 spaces and length <= 40m 3.6m 15-40 spaces 5m Over 40 spaces 6-6.5m	Ramp 1 (GF to B1) 6m with 300mm kerb on each side Ramp 2 (B1 to B2) 6m with 300mm kerb on each side	The design is complied with AS 2890.1 and Liverpool Council DCP
Ramp grade	Longer than 20m – 1:5 maximum. Up to 20m long – 1:4 maximum. Transition grade no more than 1:8. First 6m no more than 1:20. Changes of grade no more than 1:8.	To comply with AS2890.1 Max. 5% within 6m of the site boundary or any pedestrian way Transition zone 1:12 Max. 1:6 if length more than 20m, or 1:5 if less than 20m	Ramp 1 (GF to B1) 5.912m @ flat (RL 20.60) 2.000m @ 1:8 (RL 20.35) 10.20m @ 1:6 (RL 18.65) 2.000m @ 1:8 (RL 18.40) Ramp 2 (B1 to B2) 2.000m @ 1:8 (RL 18.15) 12.50m @ 1:5 (RL 15.65) 2.000m @ 1:8 (RL 15.40)	The design is complied with AS 2890.1 However, it is not complied with Liverpool Council DCP
Headroom	2.2m min between the floor and an	To comply with AS2890.1	At Ramp 1 (GF to B1)	The design is complied with AS 2890.1

	overhead obstruction. Headroom above each dedicated space and adjacent shared area should be a minimum of 2.5m.		2.68m min. clearance at roller door (refer to drawing A05.03). At B1 3.2m (refer to drawing A05.03). At B2 2.8m (refer to drawing A05.02).	and Liverpool Council DCP

Table 4-1 Driveway and ramp design

Ground floor and basement architectural plan of the proposed development has been prepared by Pagano Architects and is attached in Appendix A.

4.2.Dimensions of Parking Spaces

The design of the car parking spaces should be in compliance with AS 2890.1 and AS 2890.6.

FEATURE	AS/NZS 2890.1, 2890.3 & 2890.6	Liverpool Council DCP	Architectural Plan	Compliance
Residential parking space	5.4m x 2.4m. Additional 300mm when adjacent a wall	5.4m x 2.4m. Additional 300mm when adjacent a wall	All parking spaces are 5.4m x 2.4m. Additional 300mm widening is provided when adjacent a wall	The design is complied with AS 2890.1 and Liverpool Council DCP
Disabled parking space	5.4m x 2.4m adjacent a 5.4m x 2.4m shared zone	5.4m x 3.2m.	6.0m x 3.8m proposed for future adaptable units	The design is complied with AS4299 and Liverpool Council DCP However, it is not complied with AS2890.6
Aisle Widths	5.8m minimum	6.2m	B1 5.8m min 7.2m max B2 5.8m min 7.2m max	The design is complied with AS 2890.1 However, it is not complied with Liverpool Council DCP
Blind aisle	1m extension beyond the last parking space	1m extension beyond the last parking space	B1 1.2m min 1.8m max	The design is complied with AS 2890.1 and

			B2 1.6m min 1.9m max	Liverpool Council DCP
Bicycle parking space	1.7m x 0.6m		1.7m x 0.6m	The design is complied with AS 2890.3
Bicycle parking aisle	1.5m		1.9	The design is complied with AS 2890.3

Table 4-2 Dimensions of parking spaces

As required in AS 2890.1:2004, a triangular area with 2.5m (face to driveway) by 2.0m (face to street) will be kept clear of obstructions to visibility (Refer to Figure 4-1).

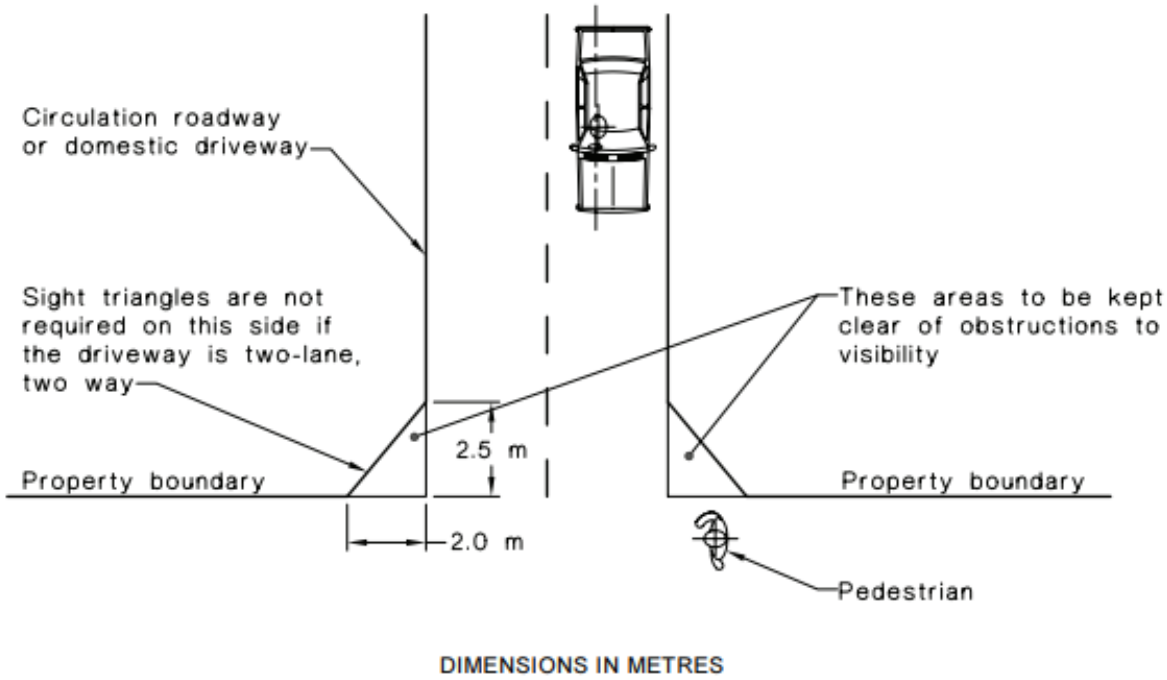


Figure 4-1 AS 2890.1:2004 requirement

In accordance with AS 2890.1:2004, sight triangle is hatched in red and shown in the following Figure 4-2.

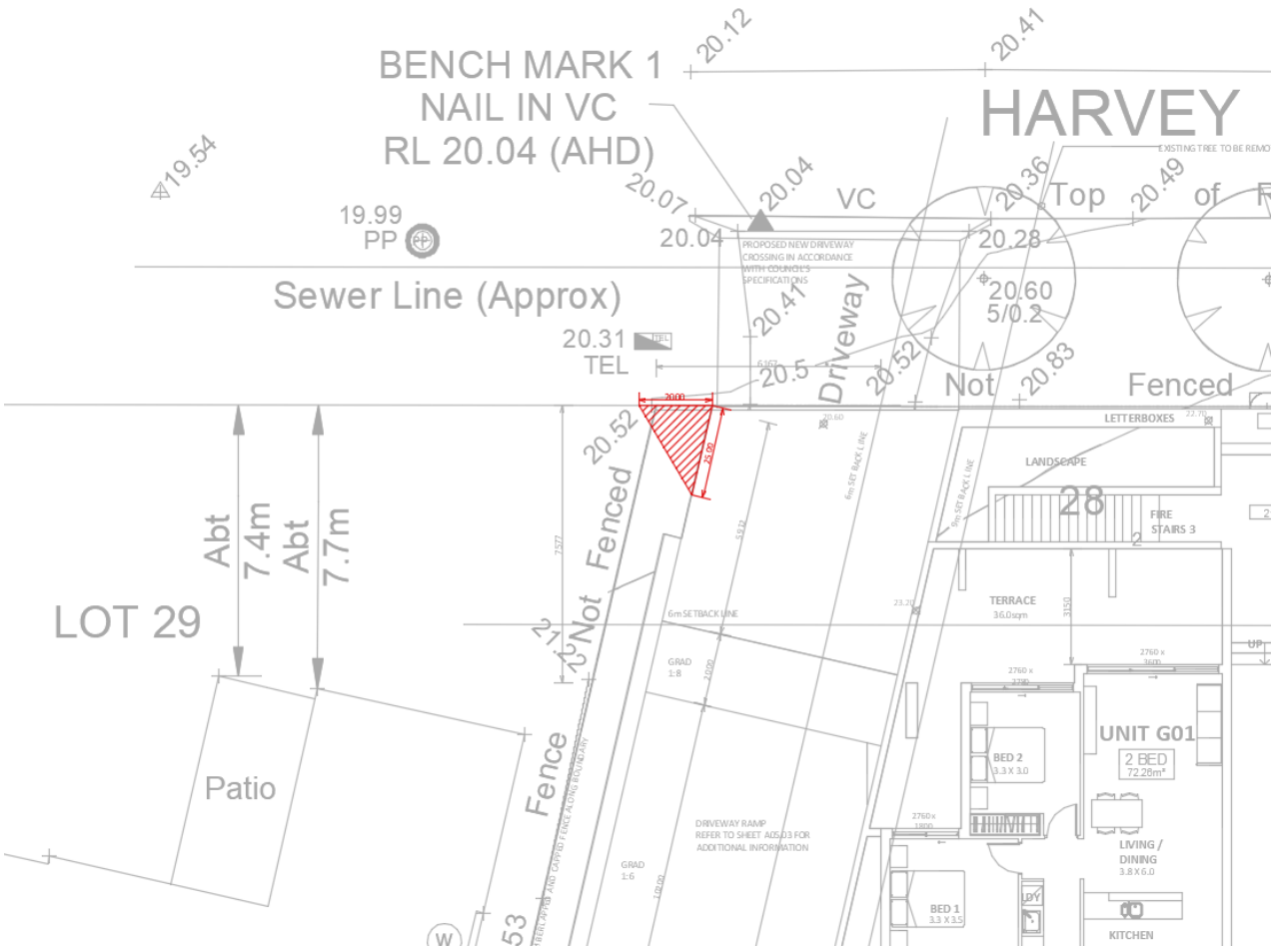


Figure 4-2 Sight triangle

According to ground floor plan, it can be seen that there are no obstructions within the sight triangle.

The design complies with sight triangle requirement.

5. Traffic Generation

An indication of the traffic generation potential of the development proposal is provided in accordance with Roads and Maritime Services (RMS) publication 'Guide to Traffic Generating Developments 2002'.

RMS guidelines are based on an extensive survey of a wide range of land uses. The subject site is identified as a high density residential flat building (more than 20 units). The rate and corresponding peak hour vehicle trips are given in Table 5-1 below.

High density RFB	Rate	Number of proposed unit	Weekday peak hour vehicle trips
Metropolitan Sub-Regional Centres	0.29 trips per unit	58	17

Table 5-1 Traffic generated by proposed development

The existing site is comprised of 4 allotments with each containing a single dwelling. Based on RMS guidelines, the existing site is identified as dwelling housing. Hence, the following is expected:

- Daily vehicle trips = 9.0 per dwelling; and
- Weekday peak hour vehicle trips = 0.85 per dwelling.

For the existing site comprised of 4 single dwelling houses, there is a traffic generation potential of approximately 4 vehicles per hour during peak periods. The future trips should be discounted by the existing trips, which is shown in Table 5-2 below.

Traffic Generation Potential	Weekday peak hour vehicle trips
Future	17
Existing	4
Net	13

Table 5-2 Project net Increase in peak hour traffic generation potential

According to the table above, there will be net increase of 13 peak hour vehicle trips in traffic generation potential for the proposed development.

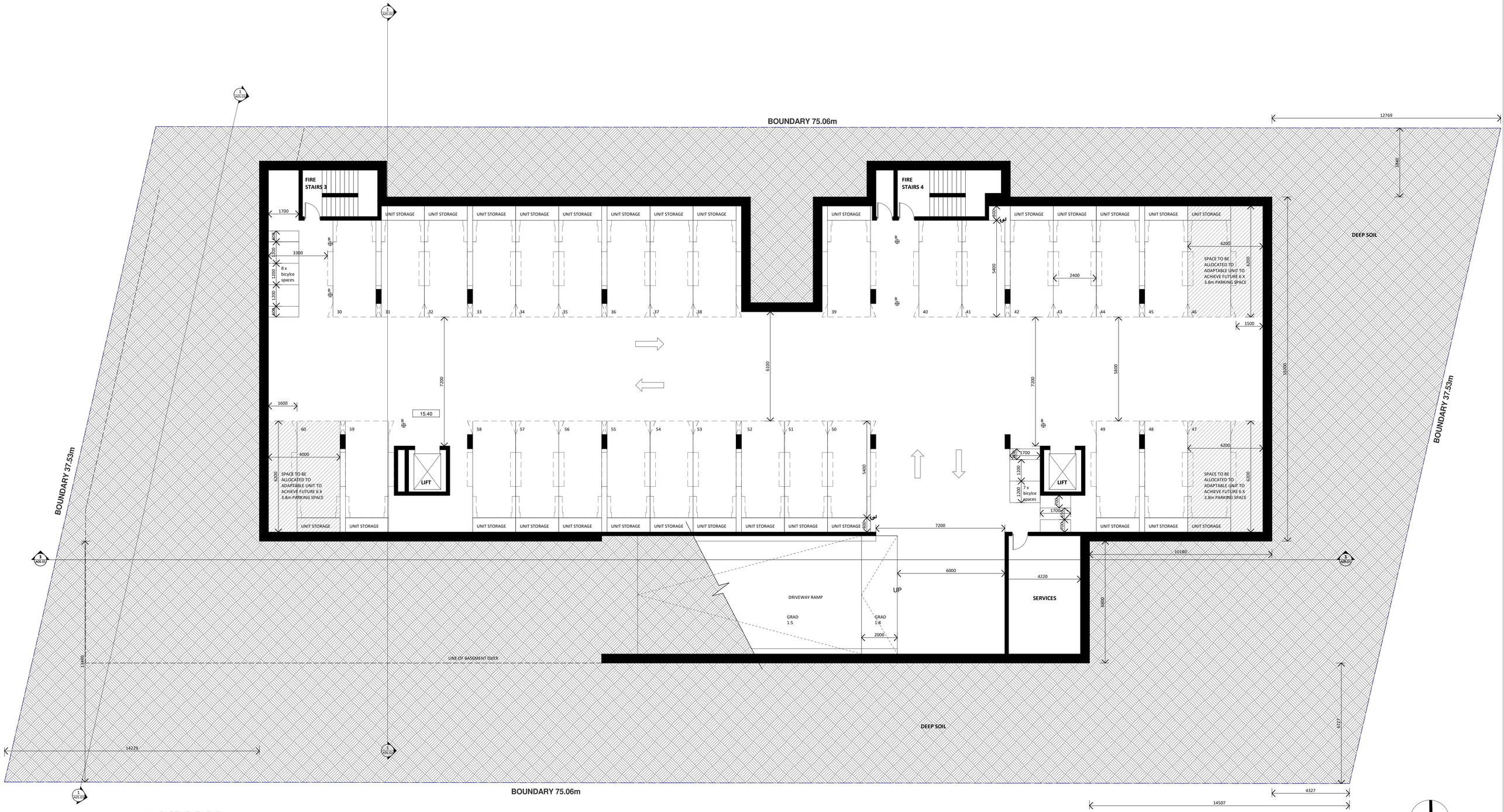
6. Swept Path Analysis

To ensure all vehicles enter and exit the site in a forward direction, swept path analysis has been conducted in the Appendix B.

It is our opinion that the proposed car parking and driveway comply with Australia Standard.

APPENDIX **A**

Architectural Plan



1 BASEMENT LEVEL 2
1 : 100

No.	Description	Date
A	DRAFT - For Consultant Coordination	2018.05.08
B	DRAFT - Consultant Coordination	2018.06.06
C	DRAFT - Traffic Comments added	2018.07.09
D	Development Application	2018.07.25
E	DEP & Engineering Amendments	2019.04.23

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DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

Basement Level 2 Plan

Jim Shi

23-29 Harvey Ave, MOOREBANK

Date	08.05.2018	Job No.	1801
Sheet No.	A03.01		
Scale at A1	1 : 100	Stage	DA
Issue.	E		

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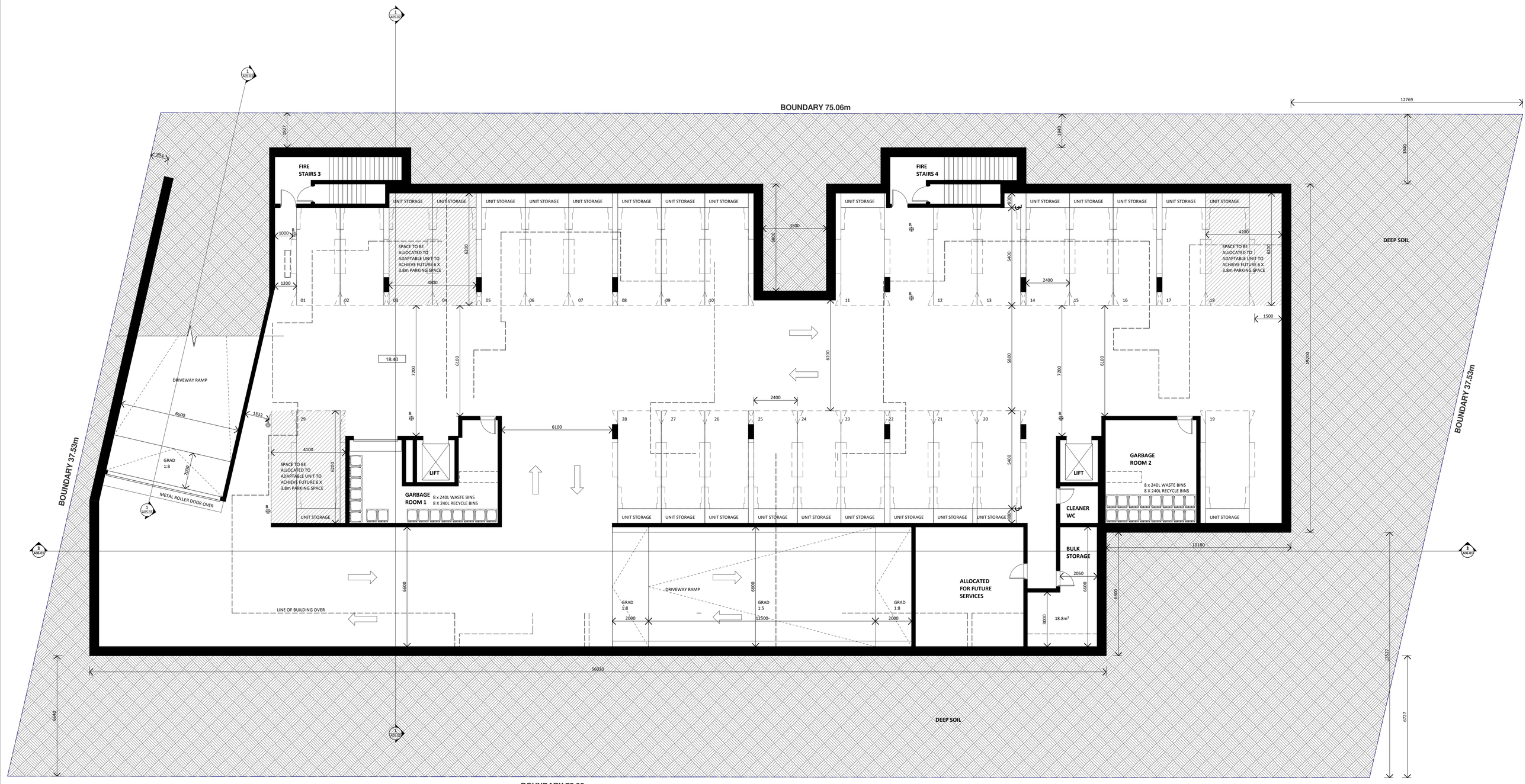

1 BASEMENT LEVEL 1
1 : 100

DEVELOPMENT APPLICATION

NOT FOR CONSTRUCTION

No.	Description	Date
A	DRAFT - For Consultant Coordination	2018.05.08
B	DRAFT - Consultant Coordination	2018.06.06
C	DRAFT - Traffic Comments added	2018.07.09
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Basement Level 1 Plan

Jim Shi

23-29 Harvey Ave, MOOREBANK

Date 08.05.2018	Job No. 1801	Sheet No. A03.02
Scale at A1 1 : 100	Stage DA	Issue. E

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HARVEY AVENUE

BENCH MARK 1
NAIL IN VC
RL 20.04 (AHD)

EXISTING TREE TO BE REMOVED
EXISTING TREE TO REMAIN
PROPOSED NEW DRIVEWAY CROSSING IN ACCORDANCE WITH COUNCIL'S SPECIFICATIONS
EXISTING TREE TO BE REMOVED
EXISTING TREE TO REMAIN

BOUNDARY 75.06m
BOUNDARY 37.53m
BOUNDARY 37.53m

6m SETBACK LINE
3m SETBACK LINE
9m SETBACK LINE

LETTERBOXES
FIRE STAIRS 3
FIRE STAIRS 4
FIRE STAIRS 1
FIRE STAIRS 2
LANDSCAPE
RAMP
GATE
UP
TERRACE 36.0sqm
TERRACE 62.9sqm
TERRACE 65.6sqm
TERRACE 45.1sqm
COMMUNAL OPEN SPACE TO LANDSCAPE ARCHITECT'S DETAILS
DEEP SOIL LANDSCAPE
DRIVEWAY RAMP REFER TO SHEET A05.03 FOR ADDITIONAL INFORMATION
TIMBER LAPPED AND CAPPED FENCE ALONG BOUNDARY
EXISTING TREE TO REMAIN

UNIT G01
2 BED
72.26m²
BED 2 3.3 X 3.0
BED 1 3.3 X 3.5
LIVING / DINING 3.8 X 6.0
KITCHEN
LDY
ST
BATH

UNIT G02
ADAPTABLE
3 BED
97.58m²
BED 1 3.8 X 3.2
ENS
BED 2 3.0 X 3.0
BED 3 3.0 X 3.0
LIVING / DINING
KITCHEN
TERRACE 54.4sqm

UNIT G03
1 BED
57.99m²
BED 1 3.2 X 3.0
LIVING / DINING 3.8 X 3.0
KITCHEN
TERRACE 15.0sqm

UNIT G04
2 BED
77.61m²
BED 1 3.5 X 3.0
BED 2 3.0 X 3.0
LIVING / DINING 4.1 X 6.4
KITCHEN
TERRACE 24.3sqm

UNIT G05
2 BED
73.65m²
BED 1 3.7 X 3.0
BED 2 3.0 X 3.0
LIVING / DINING
KITCHEN
LDY
BATH
ST
TERRACE 62.9sqm

UNIT G06
3 BED
93.92m²
BED 1 3.7 X 3.2
BED 3 3.0 X 3.0
BED 2 3.7 X 3.0
LIVING / DINING
KITCHEN
ENS
BATH
ST
LDY
TERRACE 65.6sqm

UNIT G07
1 BED
58.47m²
BED 1 3.2 X 3.0
LIVING / DINING 3925
KITCHEN
LDY
ST
BATH
TERRACE 18.2sqm

UNIT G08
1 BED
58.25m²
BED 1 3.5 X 3.0
LIVING / DINING 3800
KITCHEN
LDY
ST
BATH
TERRACE 15.0sqm

UNIT G09
2 BED
79.31m²
BED 1 3.5 X 3.0
BED 2 3.5 X 3.0
LIVING / DINING 4000
KITCHEN
LDY
ST
BATH
TERRACE 35.5sqm

UNIT G10
2 BED
70.80m²
BED 1 3.2 X 3.3
BED 2 2.9 X 3.3
LIVING / DINING
KITCHEN
LDY
ST
BATH
TERRACE 45.1sqm

LOBBY RL 22.00
LOBBY RL 23.00
SERVICES
GARBAGE ROOM
CHUTE
LIFT
UNDERGROUND RAINWATER TANK 5000L TO ENG'S DETAILS
FILTER CHAMBER
COMMUNAL OPEN SPACE TO LANDSCAPE ARCHITECT'S DETAILS
TIMBER LAPPED AND CAPPED FENCE ALONG BOUNDARY

LOT 16 LOT 17 LOT 18 LOT 19 LOT 20

No.	Description	Date
B	DRAFT - Consultant Coordination	2018.06.06
C	DRAFT - Consultant Coordination	2018.06.19
D	DRAFT - Traffic Comments added	2018.07.09
E	Development Application	2018.07.25
F	DEP & Engineering Amendments	2019.04.23

DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION

Ground Level Plan

Jim Shi

23-29 Harvey Ave, MOOREBANK

Date	Job No.	Sheet No.
08.05.2018	1801	A03.03
Scale at A1	Stage	Issue.
1 : 100	DA	F

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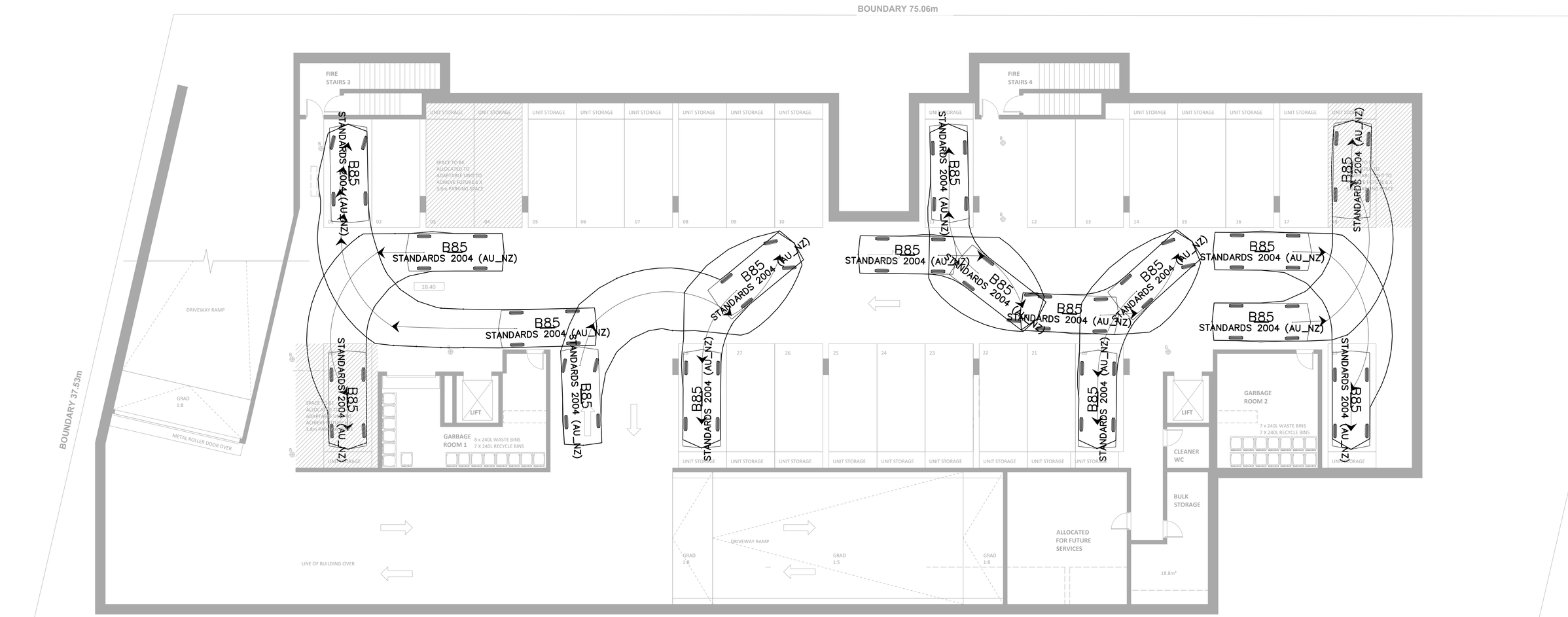
APPENDIX **B**

Swept Path Analysis



SWEPT PATH ANALYSIS BASEMENT 1 ENTRY

SCALE 1:100

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B	FOR D.A. APPROVAL	N.L.	C.K.	10-07-18
A	FOR D.A. APPROVAL	N.L.	C.K.	03-07-18

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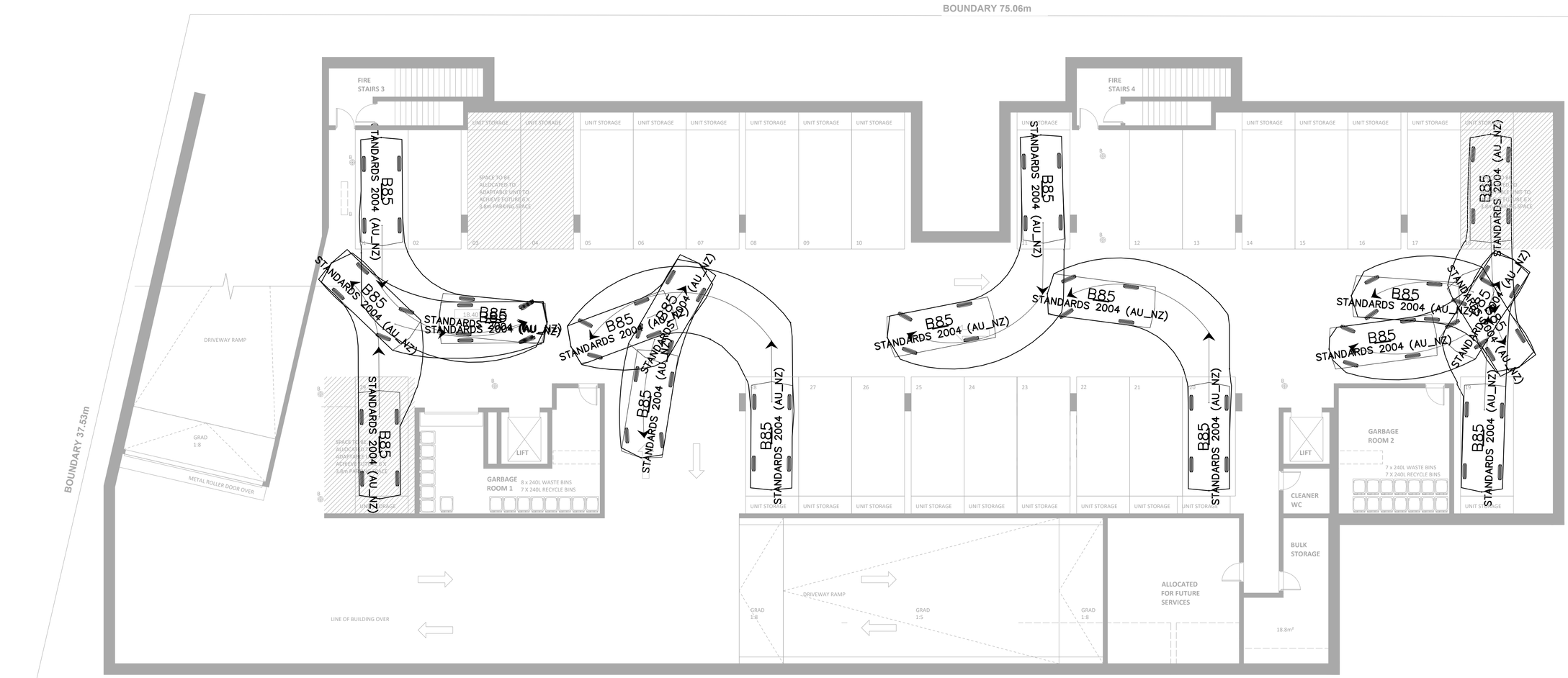
PROJECT
PROPOSED RFB
23–29 HARVEY AVENUE
MOOREBANK

N

SHEET SUBJECT
SWEPT PATH ANALYSIS
BASEMENT 1 ENTRY

PROJECT 23-29 Harvery Avenue, Moorebank, NSW			
DATE JUL 18	DRAWN C.K.	DESIGNED N.L.	CHECKED N.L.
SCALE @ A1 1 : 100 U.N.O		JOB No 18NL157	
AUTHORISED NERMEIN LOKA		DWG No T01	REV C



SWEPT PATH ANALYSIS BASEMENT 1 EXIT

SCALE 1:100

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PROJECT
PROPOSED RFB
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SHEET SUBJECT
SWEPT PATH ANALYSIS
BASEMENT 1 EXIT

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DATE JUL 18	DRAWN C.K.	DESIGNED N.L.	CHECKED N.L.
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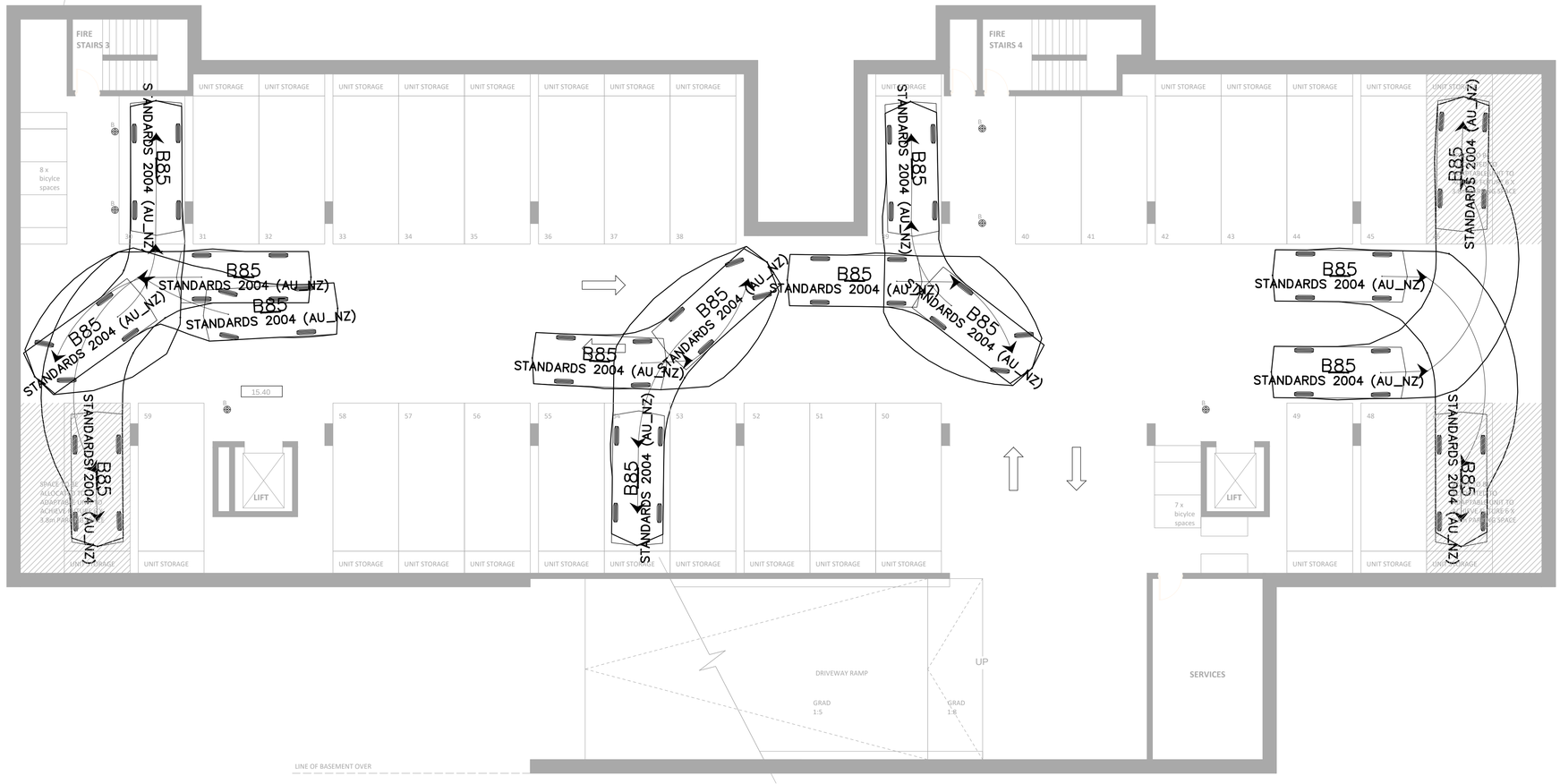
AUTHORISED NERMEIN LOKA		DWG No T02	REV C



SWEPT PATH ANALYSIS BASEMENT 2 ENTRY

SCALE 1:100

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A	FOR D.A. APPROVAL	N.L.	C.K.	03-07-18					

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SHEET SUBJECT
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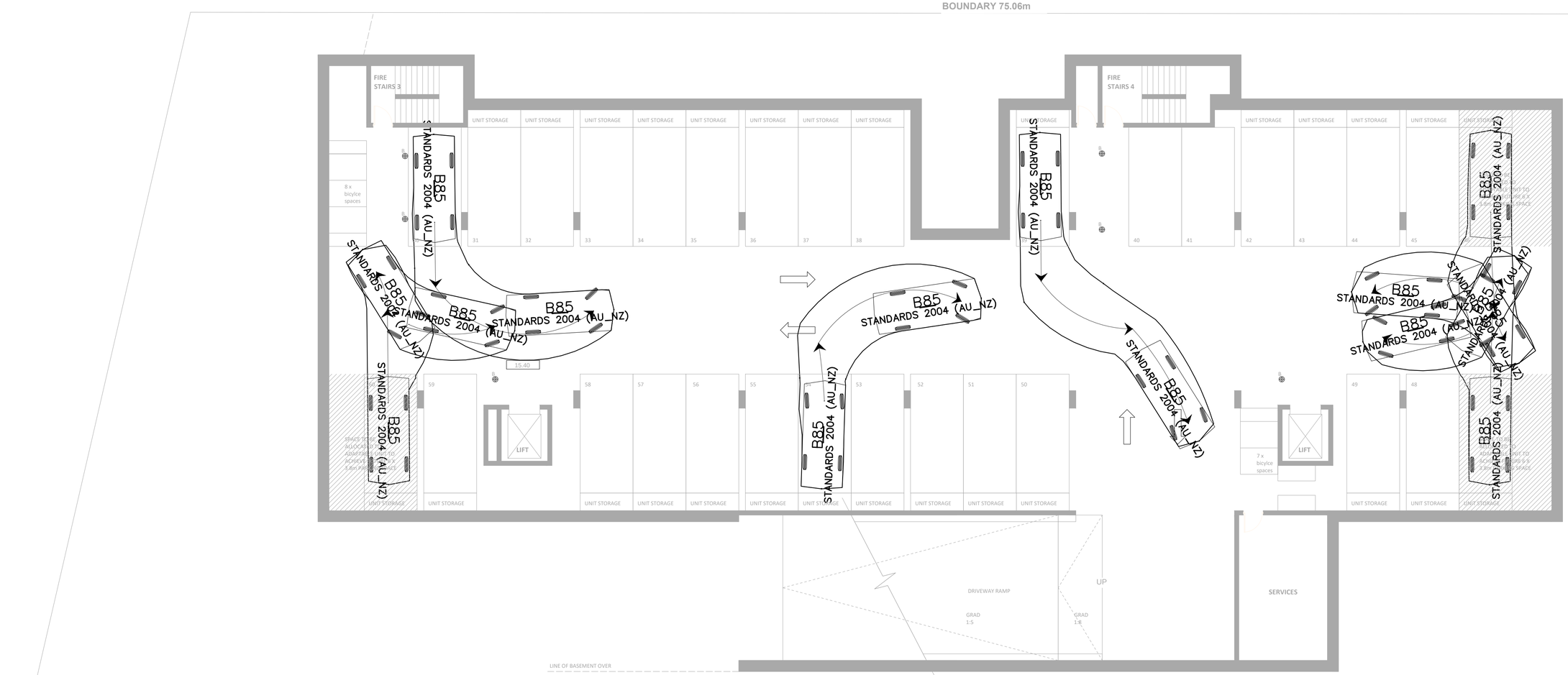
SCALE @ A1 1 : 100 U.N.O		JOB No 18NL157	
AUTHORISED NERMEIN LOKA		DWG No T03	REV C



SWEPT PATH ANALYSIS BASEMENT 2 EXIT

SCALE 1:100

A1 0 1 2 3 4 5 6 7 8 9 10

No	AMENDMENT	ENG	DRAFT	DATE
C	FOR D.A. APPROVAL	N.L.	A.E.	24-04-19
B	FOR D.A. APPROVAL	N.L.	C.K.	10-07-18
A	FOR D.A. APPROVAL	N.L.	C.K.	03-07-18

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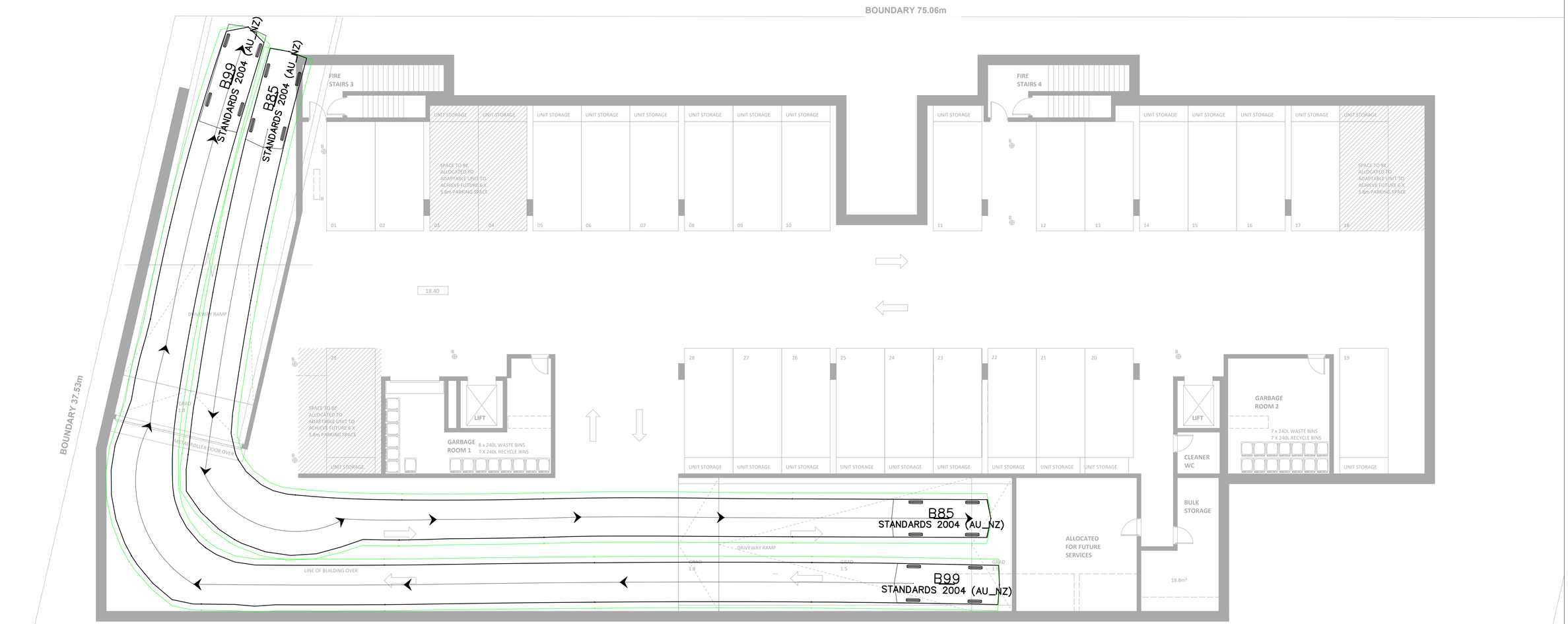
PROJECT
PROPOSED RFB
23–29 HARVEY AVENUE
MOOREBANK

N

SHEET SUBJECT
SWEPT PATH ANALYSIS
BASEMENT 2 EXIT

PROJECT 23-29 Harvery Avenue, Moorebank, NSW			
DATE JUL 18	DRAWN C.K.	DESIGNED N.L.	CHECKED N.L.
SCALE @ A1 1 : 100 U.N.O		JOB No 18NL157	
AUTHORISED NERMEIN LOKA		DWG No T04	REV C



SWEPT PATH ANALYSIS B99 PASSING B85

SCALE 1:100

A1 0 1 2 3 4 5 6 7 8 9 10

No	AMENDMENT	ENG	DRAFT	DATE
A	FOR D.A. APPROVAL	N.L.	A.E.	24-09-19

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SWEPT PATH ANALYSIS
BASEMENT B99 PASSING
B85

PROJECT 23-29 Harvery Avenue, Moorebank, NSW			
DATE JUL 18	DRAWN C.K.	DESIGNED N.L.	CHECKED N.L.
SCALE @ A1 1 : 100 U.N.O		JOB No 18NL157	
AUTHORISED NERMEIN LOKA		DWG No T05	REV A