01 EXISTING SITE PLAN 1:250 @ A1
0.01 -

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EXISTING SITE PLAN

issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
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01 EXISTING DETAILED SITE PLAN 1:200 @ A1
0.02 -

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TABLE OF DEVELOPMENT

HAWK'S NEST STAGE ONE APARTMENT YIELD					
LEVELS	LOCATION	1 BED	2 BED	3 BED	TOTAL
01	GROUND FLOOR	01	03	07	09 (31%)
02	LEVEL ONE	01	04	07	12 (46%)
03	LEVEL TWO	-	06		06 (23%)
04	LEVEL THREE (loft)		-	-	-
TOTAL		02 (07%)	13 (45%)	14 (48%)	29

CARPARKING REQUIREMENTS - GLSC			
UNIT TYPE	NUMBER	RATE	CARS REQURIED
1 BED	02	1.0	2
2 BED	13	1.2	15.6
3 BED	14	1.5	21
VISITOR	-	-	-
TRAILER	-	-	-
TOTAL			38.6
TOTAL PROVIDED			56

FSR CALCULATIONS			
SITE AREA(m^2)			3354
1 BED	2	76	152
2 BED	07	107	749
2 BED w' loft (type 1)	5	130	650
2 BED w' loft (type 2)	1	132	132
3 BED (type 1)	2	120	240
3 BED (type 2	2	145	290
3 BED (type 3)	4	126	504
3 BED (type 4)	4	120	480
3 BED (type 5)	2	110	220
TOTAL FLOOR SPACE(m^2)			3417
FSR			101.8%

November 2018 **BSA Reference: 14150**

Building Sustainability Assessments **Ph: (02) 4962 3439**
enquiries@buildingsustainability.net.au **www. buildingsustainability.net.au**

Important Note

The following specification was used to achieve the thermal performance values indicated on the Assessor Certificate and takes precedence over any other specification.
If different construction elements are applied then the Assessor Certificate is no longer valid.

Thermal Performance Specifications (does not apply to garage)

External Wall Construction	*Added Insulation*
Brick + cavity + core filled concrete block	R1.0
Internal Wall Construction	*Added Insulation*
Plasterboard on studs	none
P'board + furring channel + 190mm core filled concrete block + FC + P'board (party walls)	none
Ceiling Construction	*Added Insulation*
Plasterboard	R3.5 to ceilings adjacent to metal roof space
	R1.5 to ceilings adjacent to concrete roof & decks

Roof Construction	*Colour*	*Added Insulation*
Metal	Any	Foil + R1.0 blanket
Concrete	Any	none
Floor Construction	*Covering*	*Added Insulation*
Concrete	As drawn	R1.0 where open below

Windows	*Glass and frame type*	*U Value*	*SHGC Range*	*Area sq m*
Performance glazing Type A		*4.60*	*0.32 - 0.40*	Unit 403 & 406
Performance glazing Type B		*3.74*	*0.55 - 0.67*	Unit 403 & 406
Perf. glazing Type A		*4.50*	*0.45 - 0.55*	Unit 103,205,207,208,209,210,212,401,404,405
Perf. glazing Type B		*4.50*	*0.55 - 0.67*	Unit 103,205,207,208,209,210,212,401,404,405
ALM-001-01 A	Aluminium Type A Single clear	*6.70*	*0.51 - 0.63*	All other glazing
ALM-002-01 A	Aluminium Type B Single clear	*6.70*	*0.63 - 0.77*	All other glazing

Type A windows are awning windows, bifolds, casements, tilt 'n 'turn' windows, entry doors, french doors
Type B windows are double hung windows, sliding windows & doors, fixed windows, stacker doors, louvres

Skylights	*Glass and frame type*	*U Value*	*SHGC*	*Area sq m*

U and SHGC values are according to AFRC. Alternate products may be used if the U value is lower and the SHGC is within the range specified

External Window Shading *(eaves, verandahs, pergolas, awnings etc)*

All shade elements modelled as drawn

Ceiling Penetrations *(downlights, exhaust fans, flues etc)*

No adjustment has been made for losses to insulation arising from ceiling penetrations.

01 PROPOSED DEVELOPMENT PLAN 1:500 @ A3
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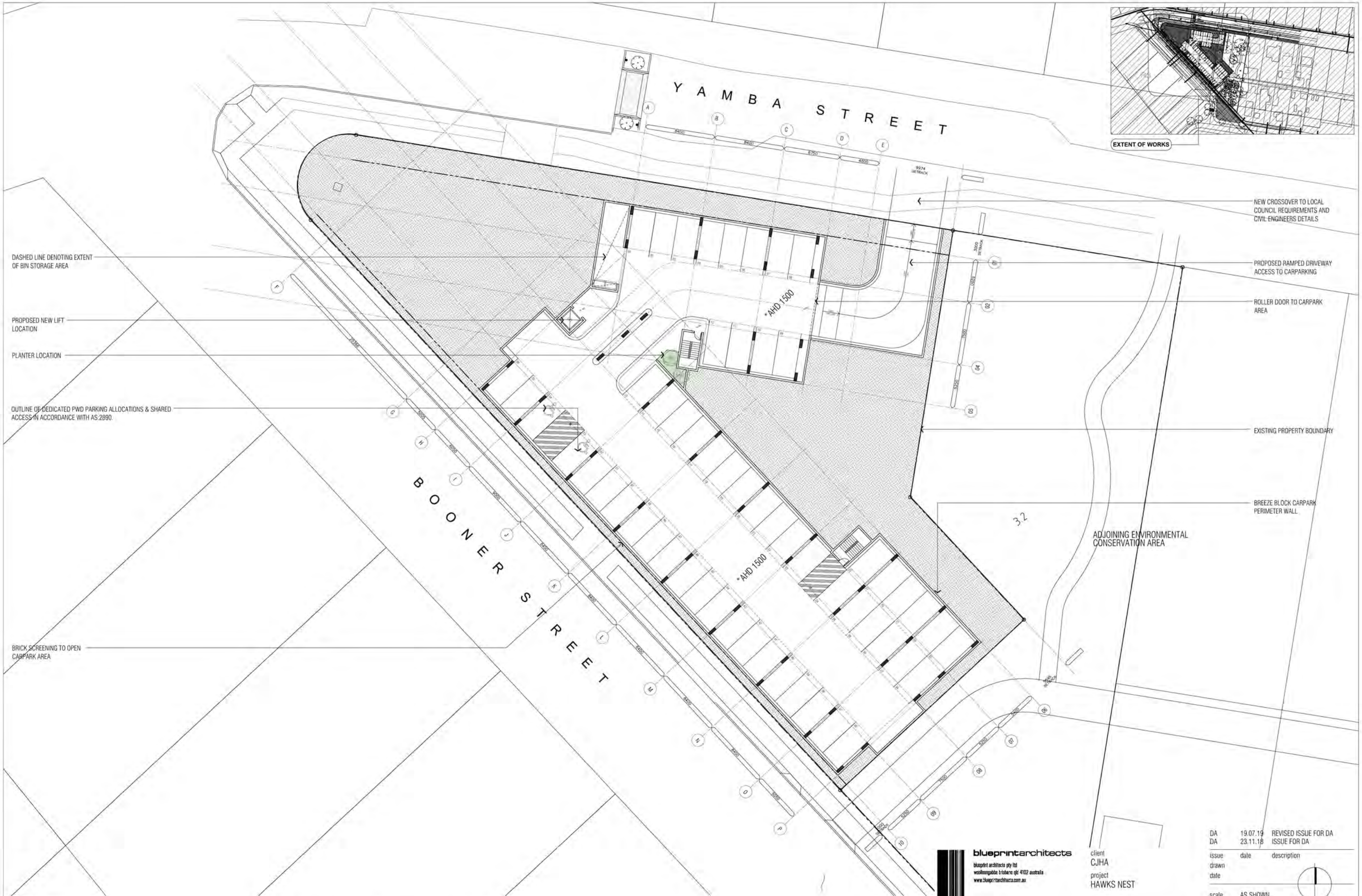

01 PROPOSED BASEMENT FLOOR PLAN 1:200 @ A3
1.02 -

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PROPOSED BASEMENT FLOOR PLAN

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DA	19.07.19	REVISED ISSUE FOR DA
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01 PROPOSED GROUND FLOOR PLAN 1:200 @ A3
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PROPOSED GROUND FLOOR PLAN

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date		
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A 1.02 DA

YAMBA STREET

BOONER STREET

PROPOSED LIFT LOCATION

ENTRY STAIR AN RAMP ROOF BELOW

LARGE VERNDAH AND GLAZING TO PROMOTE STREET VIEWS

BRICK FACADES TO MIRROR CURRENT LOCAL VERNACULAR

ENTRY STAIR AN RAMP ROOF BELOW

LARGE VOID AREAS FOR SITE PERMEABILITY AND AIR CIRCULATION

COMMUNAL DECK WITH OVERLOOK ONTO YAMBA STREET

COMMUNAL GATHERING AREA

OPEN AIR STAIRWAY AND COMBINED VIEWING PLATFORMS

VIEWING PLATFORM OUTLOOK TOWARDS NATURE RESERVE

TIMBER FLOORING TO OPEN AIR ACCESS WALKWAY. WALKWAYS TO PROMOTE CIRCULATION AND VENTILATION

INDIVIDUAL VERANDAH ACCESS AND GLAZING TO PROMOTE VENTILATION

ADJOINING ENVIRONMENTAL CONSERVATION AREA

01 PROPOSED LEVEL 01 FLOOR PLAN 1:200 @ A3
1.02 –

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PROPOSED LEVEL 01 FLOOR PLAN

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DA	23.11.18	ISSUE FOR DA
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date		
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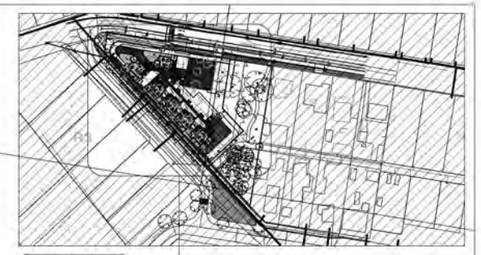
A 1.03 DA

YAMBA STREET

BOONER STREET



LARGE VERNDAH AND GLAZING TO PROMOTE STREET VIEWS

PROPOSED LIFT LOCATION

LARGE VERNDAH AND GLAZING TO PROMOTE STREET VIEWS

HIGH LEVEL PLANTERS TO CONTINUE SIGHT GREENING

VIEWING PLATFORM OUTLOOK TOWARDS NATURE RESERVE

VOID AREAS TO PROMOTE CROSS VENTILATION

ADJOINING ENVIRONMENTAL CONSERVATION AREA

R3.01

R3.02

R3.03

R3.04

R3.05

R3.06

01 PROPOSED LEVEL 02 FLOOR PLAN 1:200 @ A3
1.04 –

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PROPOSED LEVEL 02 FLOOR PLAN

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01 PROPOSED LEVEL 03 FLOOR PLAN 1:200 @ A3

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PROPOSED LEVEL 03 FLOOR PLAN

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YAMBA STREET

BOONER STREET

ADJOINING ENVIRONMENTAL CONSERVATION AREA

01 PROPOSED ROOF PLAN 1:200 @ A3
1.06 –

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01 PROPOSED BOONER STREET ELEVATION 1:400 @ A3

02 PROPOSED YAMBA STREET ELEVATION 1:400 @ A3

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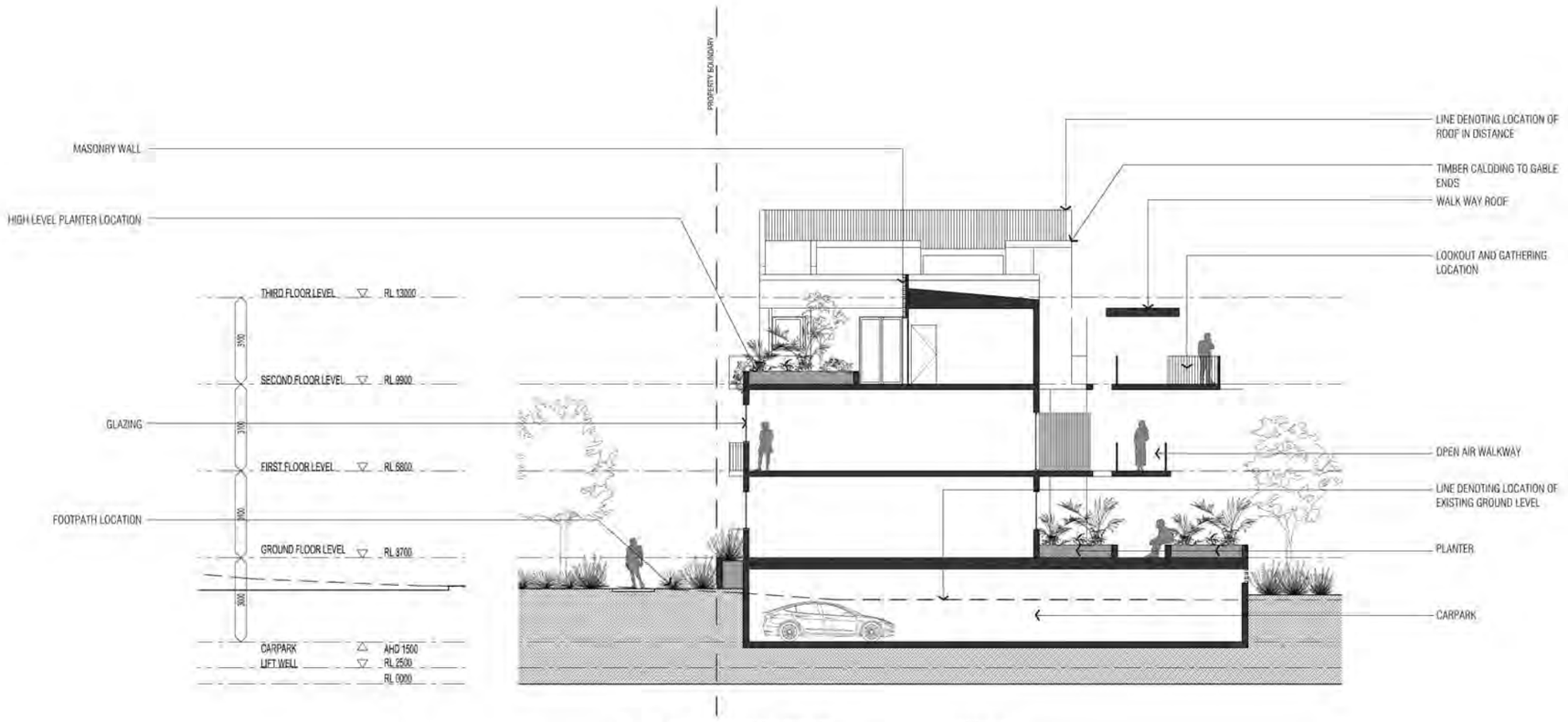

01 PROPOSED TYPICAL SECTION 1:200 @ A3

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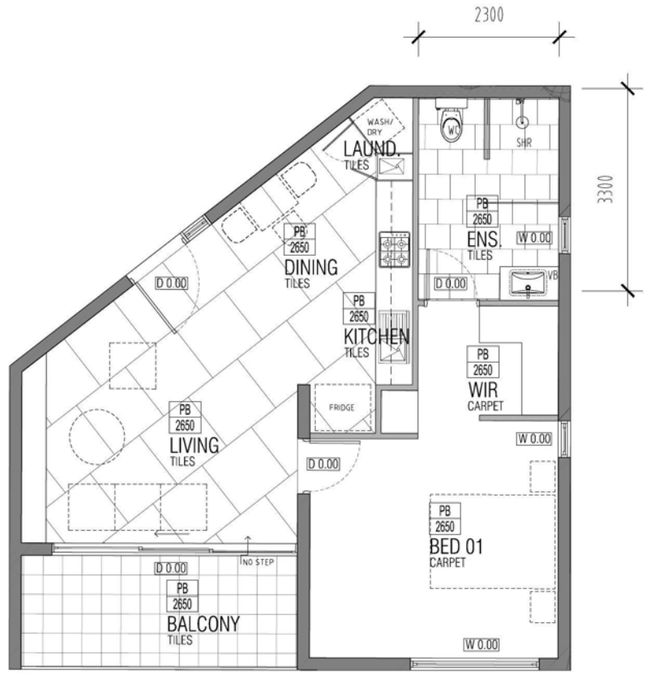

01 PROPOSED 1 BED 1:50 @ A1

INTERNAL FLOOR AREA - 43.7m²

EXTERNAL FLOOR AREA - 10.3m²

GROUND - ROOM 1.03
LEVEL 01 - ROOM 2.03

01 PROPOSED ROOM DETAIL PLAN 1:50 @ A1
3.01 - 1:100 @ A3

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01 PROPOSED 2 BED 1:50 @ A1

INTERNAL FLOOR AREA - 90.1m²

EXTERNAL FLOOR AREA - 33.1m²

GROUND - ROOM 1.06, 1.07, 1.08, 1.09
LEVEL 01 - ROOM 2.07, 2.08, 2.09, 2.10

02 PROPOSED 2 BED 1:50 @ A1

INTERNAL FLOOR AREA - 88.3m²

EXTERNAL FLOOR AREA - 25m²

LEVEL 01 - ROOM 2.04

02 PROPOSED ROOM DETAIL PLAN 1:50 @ A1
3.02 – 1:100 @ A3

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01 PROPOSED 3 BED – TYPE 01 1:50 @ A1

INTERNAL FLOOR AREA - 100.7m²

EXTERNAL FLOOR AREA - 28.6m²

GROUND - ROOM 1.10, 1.11
LEVEL 01 - ROOM 2.11, 2.12

02 PROPOSED 3 BED - TYPE 02 1:50 @ A1

INTERNAL FLOOR AREA - 101.1m²

EXTERNAL FLOOR AREA - 25m²

GROUND - ROOM 1.06
LEVEL 01 - ROOM 2.07

03 PROPOSED ROOM DETAIL PLAN 1:50 @ A1
3.03 – 1:100 @ A3

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03 PROPOSED 3 BED - TYPE 03 1:50 @ A1

INTERNAL FLOOR AREA - 104.1m²

EXTERNAL FLOOR AREA - 13.6m²

GROUND - ROOM 1.04, 1.05
LEVEL 01 - ROOM 2.05, 2.06

04 PROPOSED 3 BED - TYPE 04 1:50 @ A1

INTERNAL FLOOR AREA - 113.6m²

EXTERNAL FLOOR AREA - 37.6m²

GROUND - ROOM 1.01
LEVEL 01 - ROOM 2.01

04 PROPOSED ROOM DETAIL PLAN 1:50 @ A1
3.04 – 1:100 @ A3

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06 PROPOSED 3 BED - TYPE 06 1:50 @ A1

INTERNAL FLOOR AREA - 94.2m²

EXTERNAL FLOOR AREA - 24.5m²

GROUND - ROOM 1.02
LEVEL 01 - ROOM 2.02

05 PROPOSED ROOM DETAIL PLAN 1:50 @ A1
1:100 @ A3

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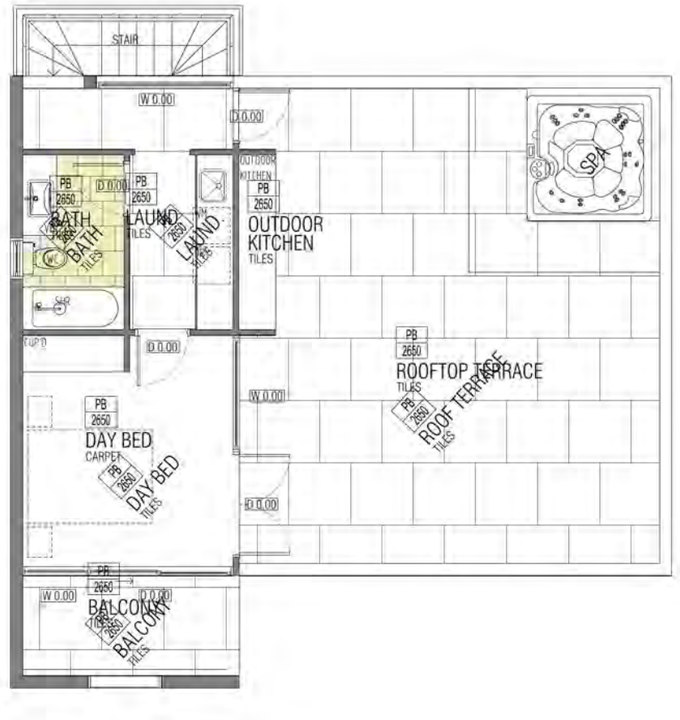
01 PROPOSED 2 BED LOFT - TYPE 01- LOWER LEVEL 1:50 @ A1

INTERNAL FLOOR AREA - 80.6m²

EXTERNAL FLOOR AREA - 24m²

LEVEL 02/03 ROOM 3.03, 3.04, 3.05, 3.06



02 PROPOSED 2 BED LOFT - TYPE 01 - LOFT LEVEL 1:50 @ A1

INTERNAL FLOOR AREA - 22.3m²

EXTERNAL FLOOR AREA - 52.6m²

LEVEL 02/03 ROOM 3.03, 3.04, 3.05, 3.06

06 PROPOSED ROOM DETAIL PLAN 1:50 @ A1

3.06 – 1:100 @ A3

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PROPOSED ROOM DETAIL PLANS

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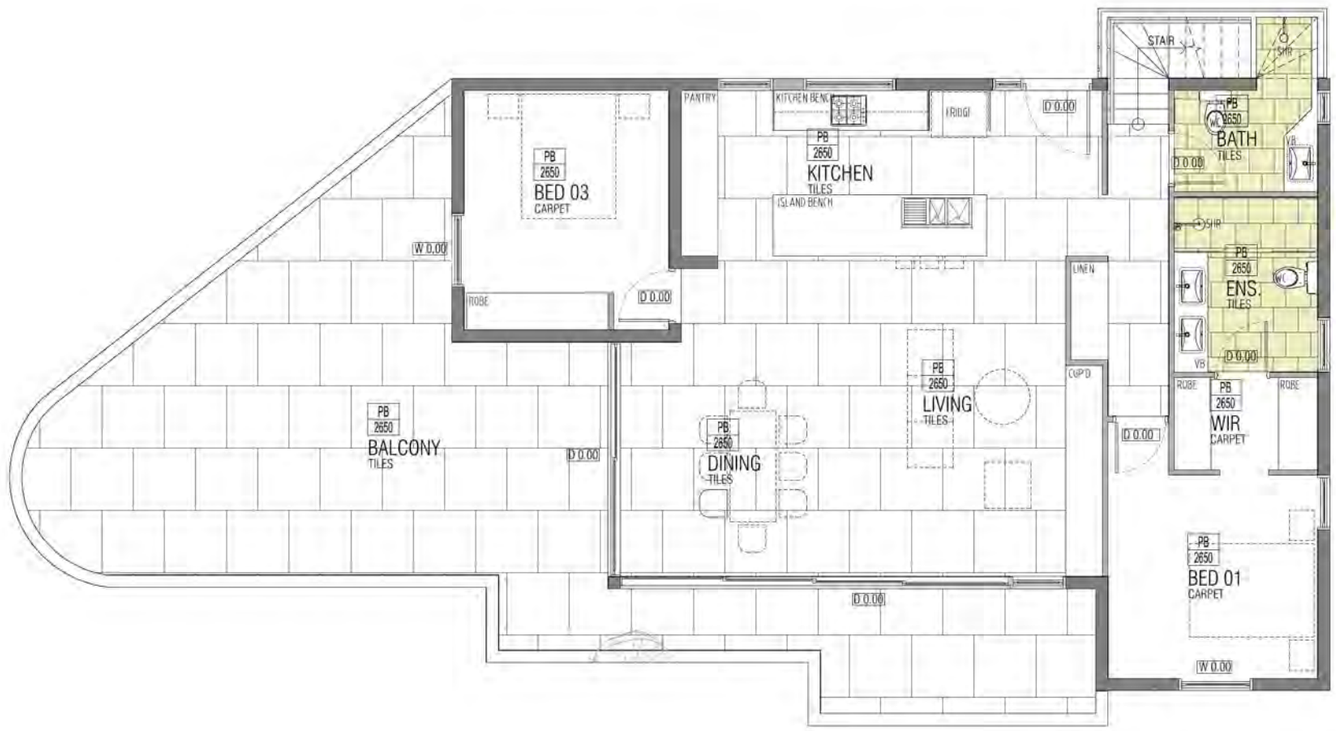
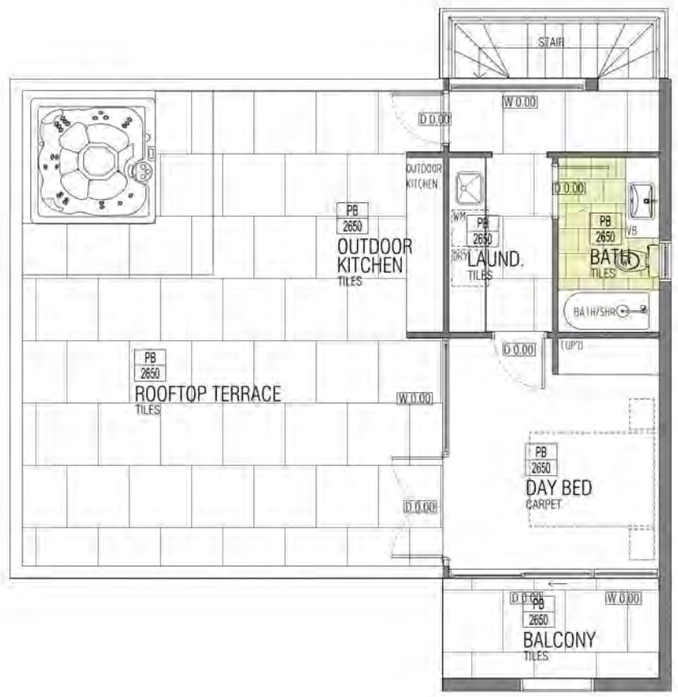


01 PROPOSED 3 BED LOFT - TYPE 02- LOWER LEVEL 1:50 @ A1

INTERNAL FLOOR AREA - 86.9m²

EXTERNAL FLOOR AREA - 66m²

LEVEL 02/03 ROOM 3.01



02 PROPOSED 3 BED LOFT - TYPE 02 - LOFT LEVEL 1:50 @ A1

INTERNAL FLOOR AREA - 22.3m²

EXTERNAL FLOOR AREA - 52.6m²

LEVEL 02/03 ROOM 3.01

07 PROPOSED ROOM DETAIL PLAN 1:50 @ A1

3.07 – 1:100 @ A3

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PROPOSED ROOM DETAIL PLANS

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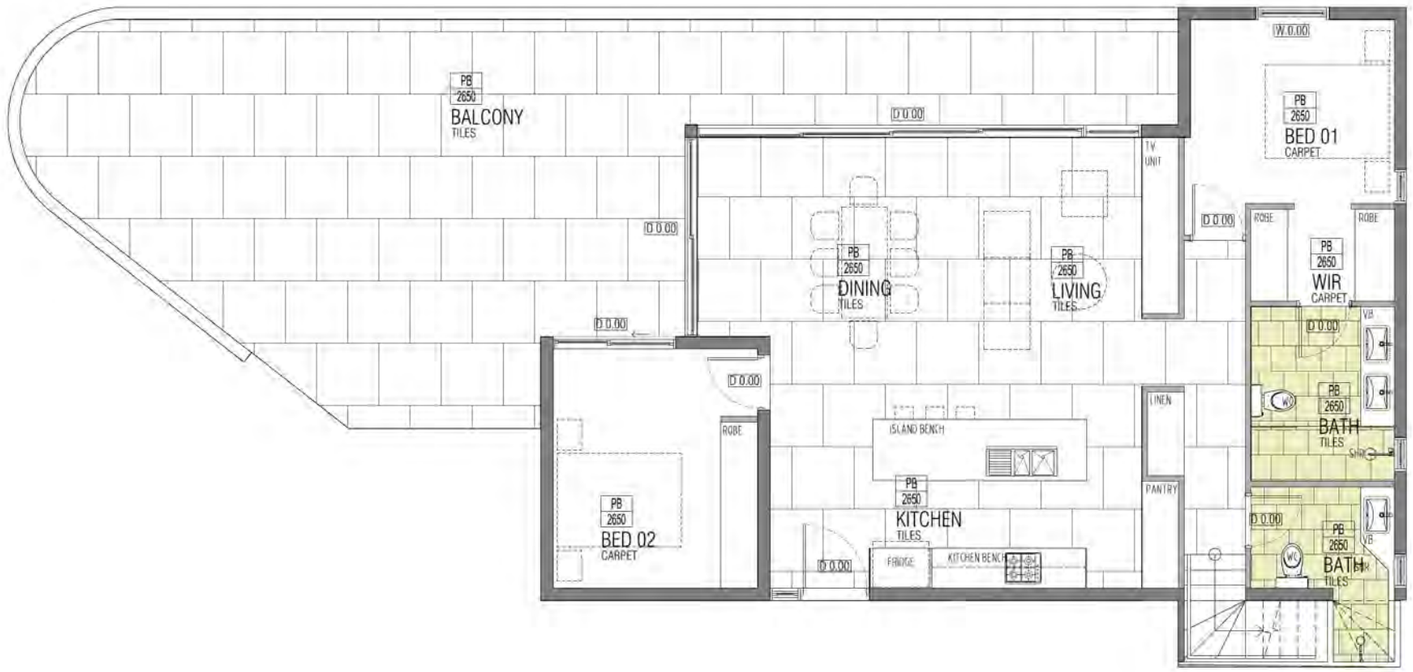
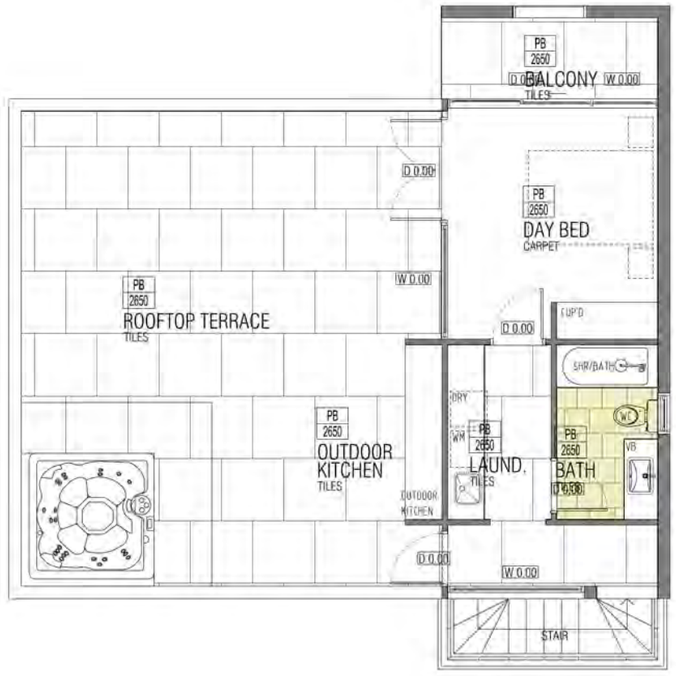


01 PROPOSED 3 BED LOFT - TYPE 03- LOWER LEVEL 1:50 @ A1

INTERNAL FLOOR AREA - 86.9m²

EXTERNAL FLOOR AREA - 78.5m²

LEVEL 02/03 ROOM 3.02



02 PROPOSED 3 BED LOFT - TYPE 03 - LOFT LEVEL 1:50 @ A1

INTERNAL FLOOR AREA - 22.3m²

EXTERNAL FLOOR AREA - 52.6m²

LEVEL 02/03 ROOM 3.02

08 PROPOSED ROOM DETAIL PLAN 1:50 @ A1

3.08 – 1:100 @ A3

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PROPOSED ROOM DETAIL PLANS

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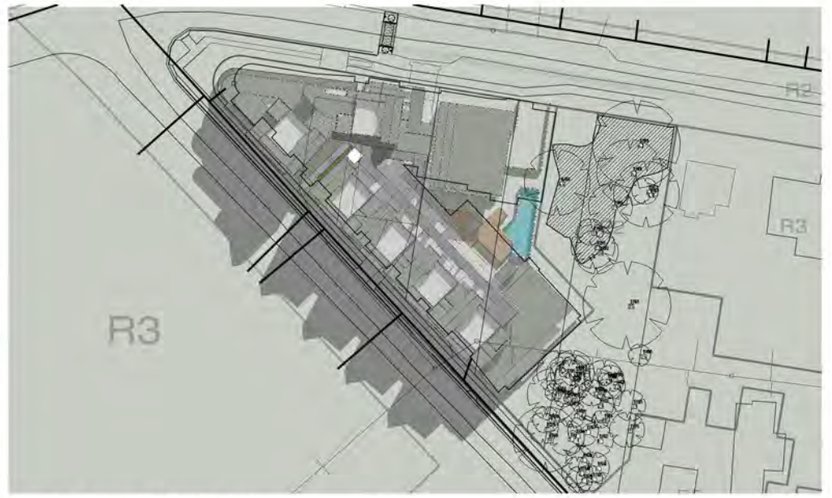
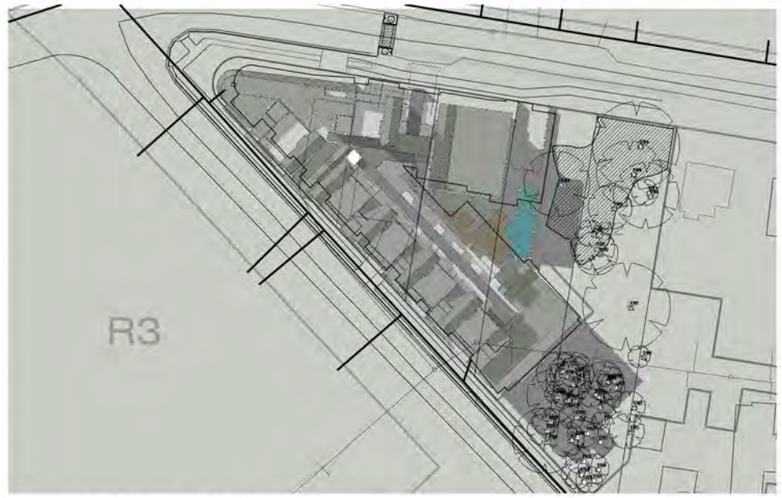
01 SUN STUDY - JUN 21ST - 9AM N.T.S
HAWKS NEST

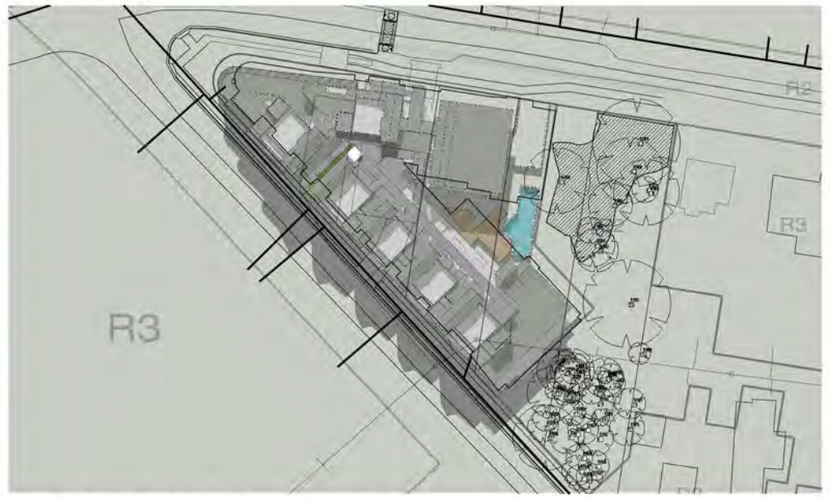


02 SUN STUDY - JUN 21ST - 10AM N.T.S
HAWKS NEST



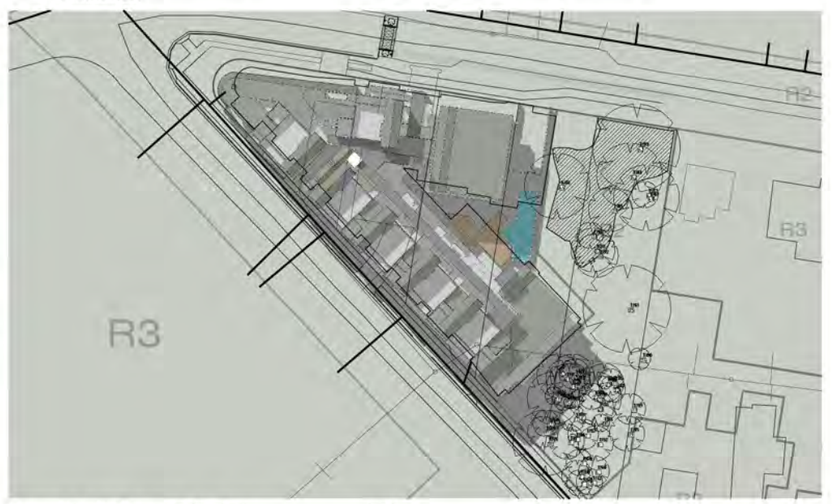
07 SUN STUDY - JUN 21ST - 3PM N.T.S
HAWKS NEST

03 SUN STUDY - JUN 21ST - 11AM N.T.S
HAWKS NEST



04 SUN STUDY - JUN 21ST - 12PM N.T.S
HAWKS NEST

05 SUN STUDY - JUN 21ST - 1PM N.T.S
HAWKS NEST



06 SUN STUDY - JUN 21ST - 2PM N.T.S
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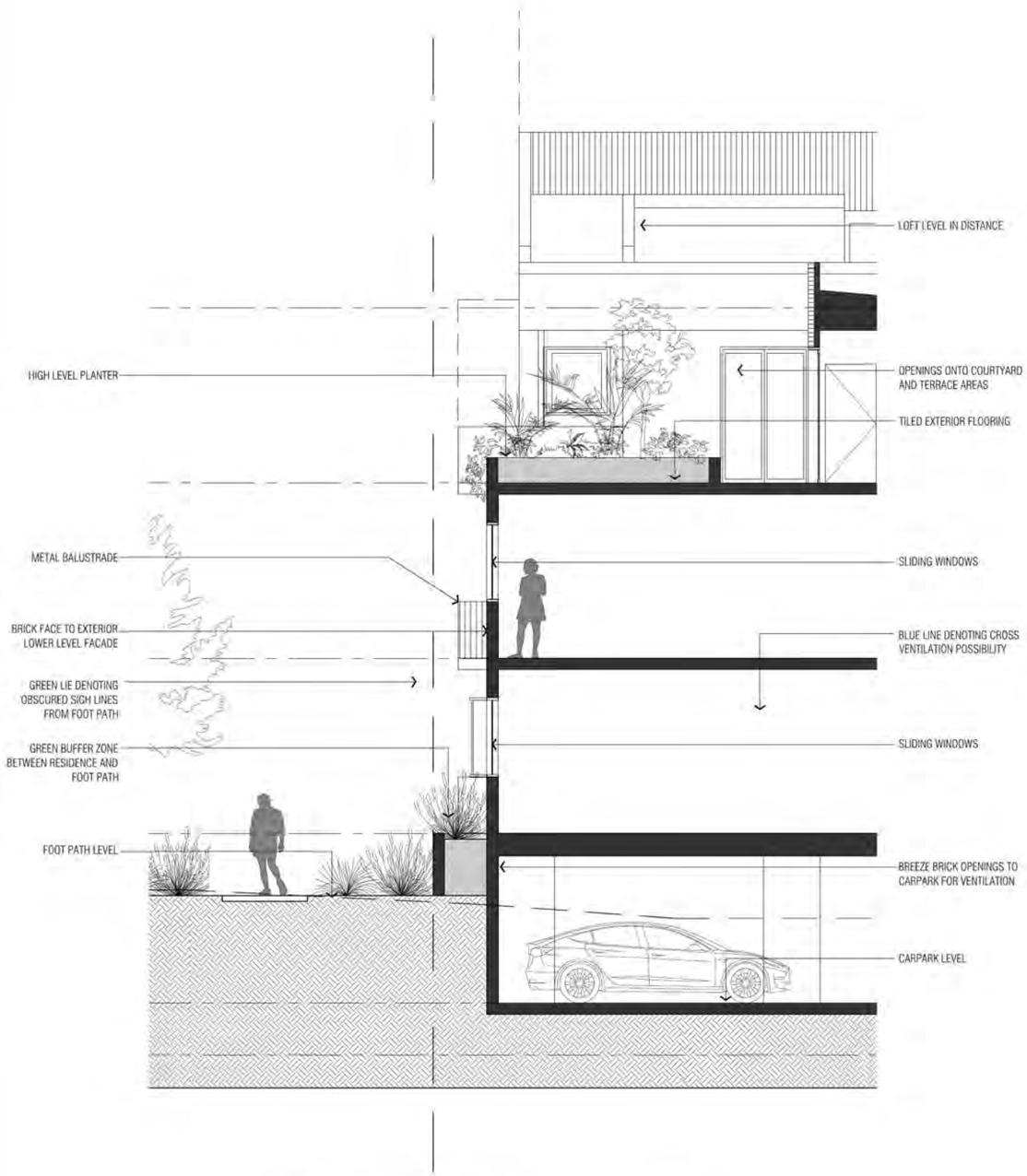
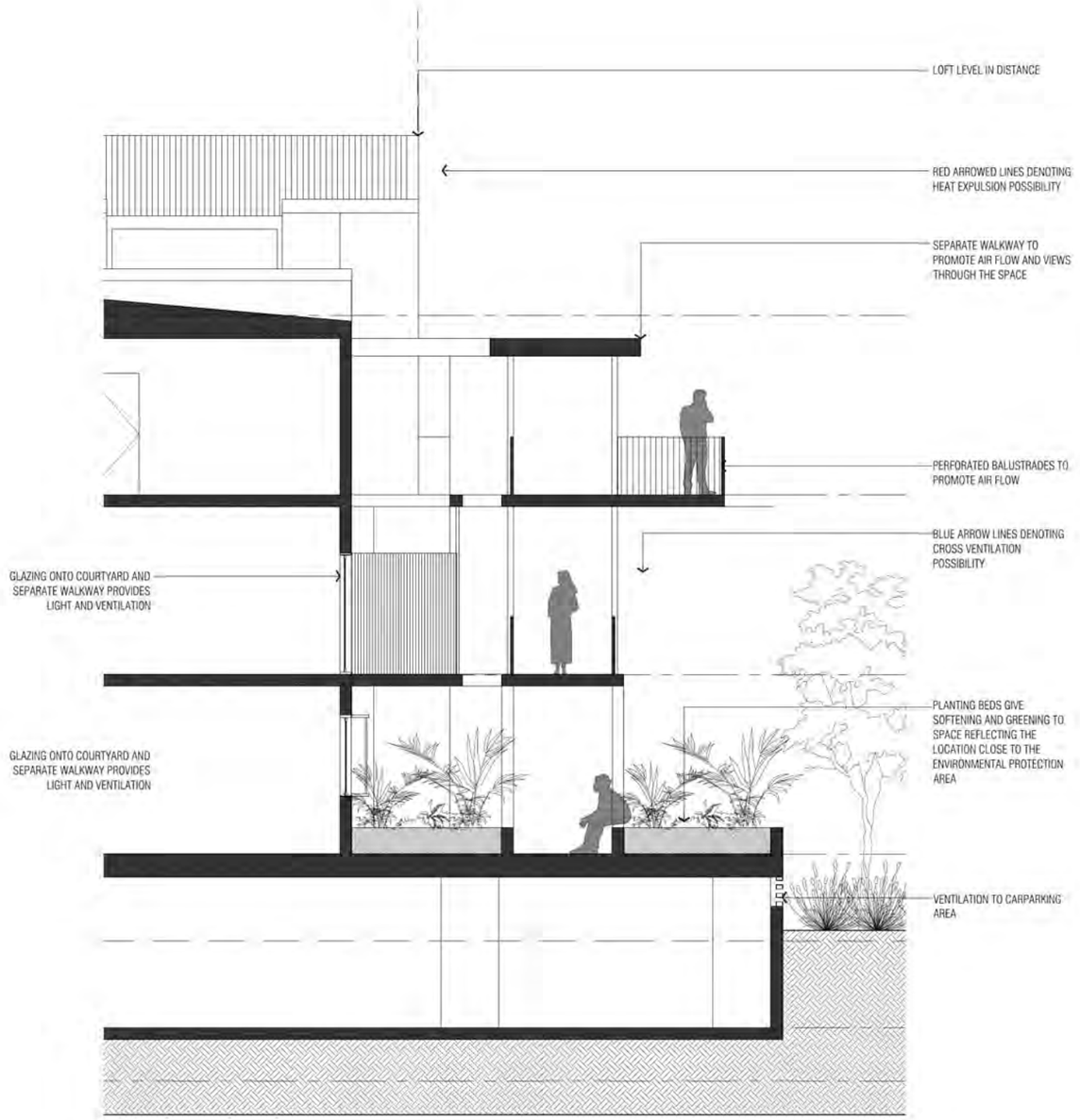


01 PROPOSED DETAIL SECTION 1:100 @ A3



02 PROPOSED DETAIL SECTION 1:400 @ A3

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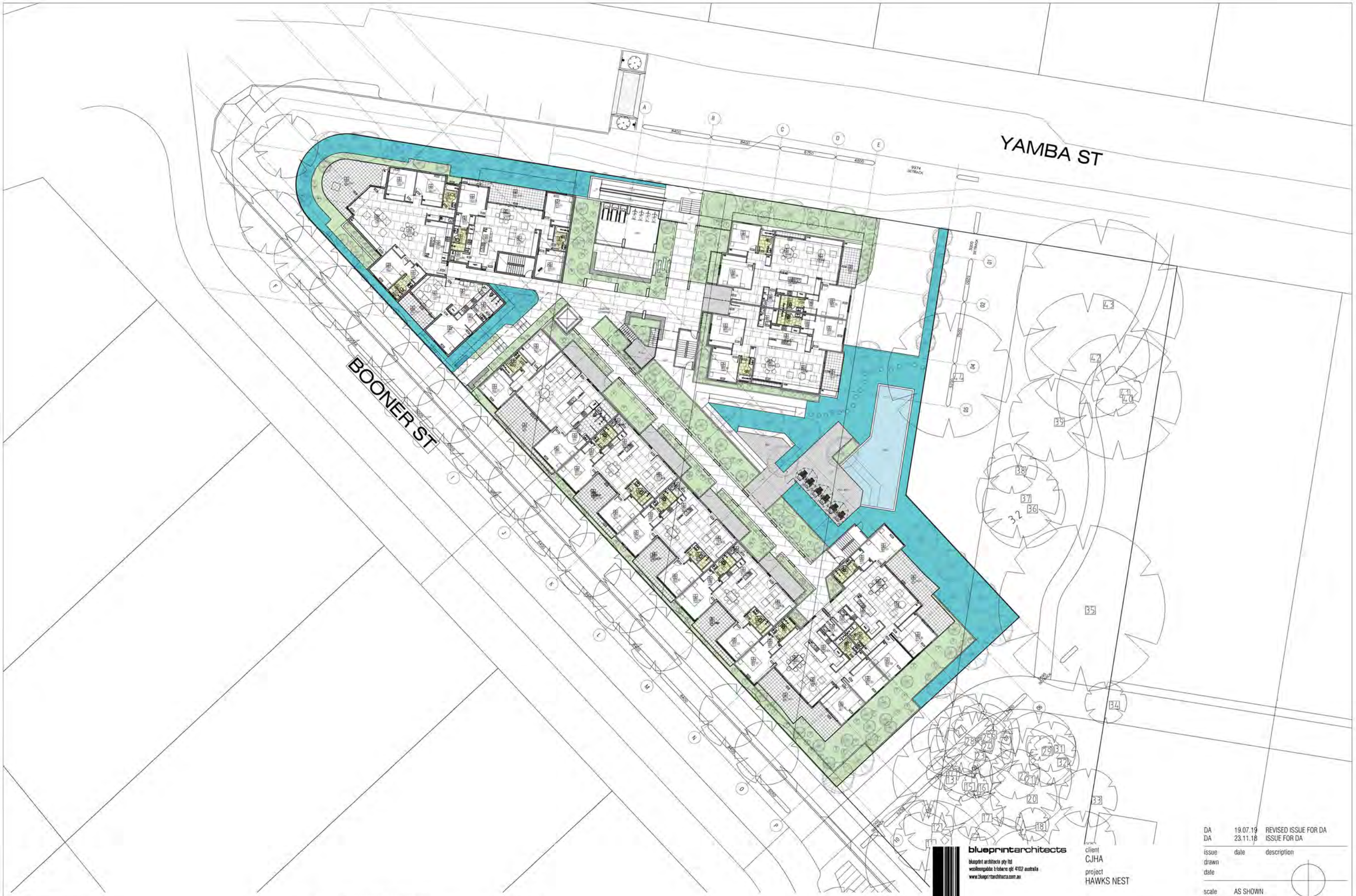
PROPOSED DESIGN SOLUTIONS

DA	19.07.19	REVISED ISSUE FOR DA
DA	23.11.18	ISSUE FOR DA

issue date description
drawn
date

scale AS SHOWN
approved

A 5.02 DA



01 PROPOSED DEEP PLANTING 1:200 @ A3

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client
CJHA

project
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drawing
PROPOSED DESIGN
ADG DEEP PLANTING

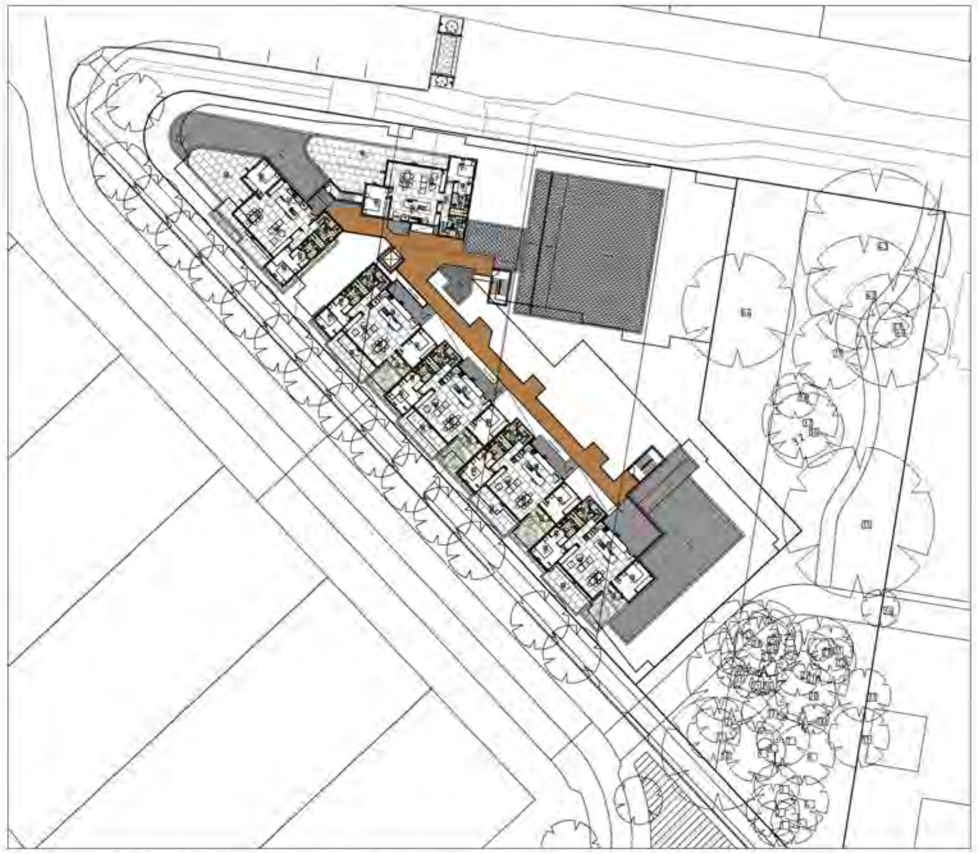
issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
DA	23.11.18	ISSUE FOR DA
drawn		
date		

scale AS SHOWN
approved

A 5.03 DA

01 PROPOSED COMMUNAL ZONES - GROUND FLOOR 1:1000@ A3

02 PROPOSED COMMUNAL ZONES - 1ST FLOOR 1:1000 @ A3



03 PROPOSED COMMUNAL ZONES - 2ND FLOOR 1:1000 @ A3

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drawing
PROPOSED DESIGN
COMMUNAL ZONES

issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
DA	23.11.18	ISSUE FOR DA

drawn
date
scale AS SHOWN
approved

A 5.04 DA

LYSAGHT ENSEAM CLADDING - COLRBOND BASALT

WEATHERTEX - WEATHERGROOVE NATURAL TIMBER CLADDING

PGH BRICKS - MANHATTAN CHELSEA
DARK ALUMINIUM WINDOWS - BASALT/MONUMENT

TEXTURED BRICK FACADE FEATURES

BREEZE BRICK

TIMBER FENCING

CRAZY PAVE

01 MATERIAL HEIRACHY - BUILDING SECTION N.T.S
3.00 -

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drawing
MATERIALS EXEMPLARS

issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
DA	23.11.18	ISSUE FOR DA

drawn
date
scale AS SHOWN
approved

project number | drawing number | issue

A 6.01 DA

01 PERSPECTIVE IMAGE 01 N.T.S

02 PERSPECTIVE IMAGE 02 N.T.S

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PERSPECTIVE IMAGES

issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
DA	23.11.18	ISSUE FOR DA

drawn
date
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03 PERSPECTIVE IMAGE 03 N.T.S

04 PERSPECTIVE IMAGE 04 N.T.S

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PERSPECTIVE IMAGES

issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
DA	23.11.18	ISSUE FOR DA

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approved

A 7.02 DA

05 PERSPECTIVE IMAGE 05 N.T.S

06 PERSPECTIVE IMAGE 06 N.T.S

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issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
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date

scale AS SHOWN
approved

A 7.03 DA

07 PERSPECTIVE IMAGE 07 N.T.S

08 PERSPECTIVE IMAGE 08 N.T.S

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PERSPECTIVE IMAGES

issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
DA	23.11.18	ISSUE FOR DA

drawn
date
scale AS SHOWN
approved

project number

A 7.04 DA

01 PERSPECTIVE IMAGE N.T.S
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CJHA

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drawing
PERSPECTIVE IMAGES

issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
DA	23.11.18	ISSUE FOR DA

drawn
date

scale AS SHOWN
approved

project number A 7.05 DA

02 PERSPECTIVE IMAGE N.T.S
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PERSPECTIVE IMAGES

issue	date	description
DA	19.07.19	REVISED ISSUE FOR DA
DA	23.11.18	ISSUE FOR DA

drawn
date

scale AS SHOWN
approved

project number

A 7.06 DA

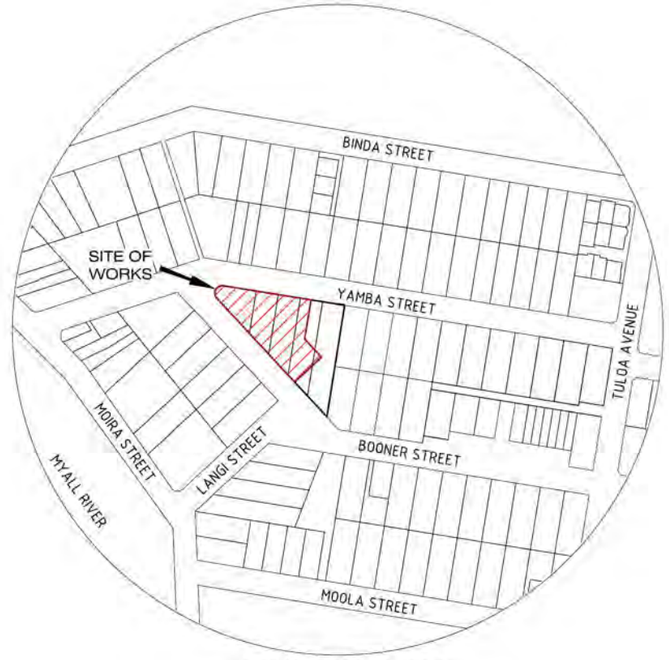
PROPOSED APARTMENT BUILDING
DA ROAD AND DRAINAGE PLANS

YAMBA STREET AND BOONER STREET

HAWKS NEST

Schedule of Drawings

Sheet	File Number	Description	Revision
1	21800098	TITLE PAGE, LOCALITY SKETCH & SCHEDULE OF DRAWINGS	B
2	21800099	OVERALL SITE PLAN	B
3	21800100	DEMOLITION & VEGETATION MANAGEMENT PLAN	B
4	21800101	YAMBA ST & BIOFILTER TYPICAL SECTION	B
5	21800102	YAMBA ST LONGITUDINAL SECTION & GENERAL DETAILS	B
6	21800103	YAMBA STREET CROSS SECTIONS	B
7	21800104	SITE CUT - FILL PLAN	B
8	21800105	CATCHMENT PLAN	B
9	21800106	TYPICAL EROSION & SEDIMENT CONTROL DETAILS PLAN	B
10	21800107	TYPICAL EROSION AND SEDIMENT CONTROL DETAILS AND NOTES	B



LOCALITY SKETCH
1:10,000

ORIGIN OF LEVELS

LAND & PROPERTY INFORMATION
(S.C.M.S)
PM 13145
RL 3.296 AHD

Designed By

TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS IN ENGINEERING, SURVEYING & PLANNING
PO Box 580 RAYMOND TERRACE Phone (02) 4987 1500

FILE : 21800098
JOB No. : 20800B
SHEET No. : 1 of 10
Plotted 09:26 18/07/19

S:\Clients\2008\20800B\Dwg\20800B Stage 1 Design.dwg

CONSTRUCT RAISED THRESHOLD (SEE DETAILS SHEET 5)

FUTURE KERBLINE

EXIST EB

ROAD CL

CONTOL/CUTLINE

REMOVE EXISTING DRIVEWAYS AND PATH. CONSTRUCT 2.5m SHARED PATHWAY Ch0-Ch45

REMOVE EXISTING DRIVEWAYS AND PATH. CONSTRUCT NEW EDGE STRIP, SHARED PATHWAY AND BIOFILTER Ch45-Ch114

YAMBA ST

EXTENT OF CONSTRUCTION

FUTURE CONSTRUCTION

CONSTRUCT 6.2m WIDE CONCRETE DRIVEWAY TO SD0101

EXISTING OVERHEAD POWER TO BE RELOCATED UNDERGROUND

PROPOSED MULTI-STOREY APARTMENT BUILDING SITE - SEE ARCHITECTURAL PLANS FOR DETAILS

EXISTING BUILDING TO BE DEMOLISHED

EXISTING BUILDING TO BE DEMOLISHED

BOONER ST

REMOVE EXISTING DRIVEWAY

REMOVE EXISTING SEWER

SITE DISCHARGE TO INFILTRATION ZONE IN PROPOSED PUBLIC RESERVE

FUTURE PATHWAY

E2 ZONED SECTIONS OF LOT 88 & 89 TO BE TRANSFERRED TO COUNCIL AT COMPLETION OF FUTURE DEVELOPMENT STAGES

FUTURE LANE EXTENSION

EXISTING SEWER TO BE RELOCATED

R2

R3

E2

R3

R3

102 DP16379

2 DP546826

1 DP1028295

2 DP1028295

106 DP746753

SP35499

108 DP746753

109 DP746753

110 DP746753

97 DP16379

SP65204

SP40665

SP68704

93 DP16379

92 DP16379

87 DP16379

86 DP16379

88 DP16379

66 DP16379

67 DP16379

LEGEND

- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- SURFACE INLET PIT
- PIT LABEL
- EXISTING CONTOURS
- 150mm CONC. EDGE STRIP
- GROUNDWATER RECHARGE AREA

1:500 of A3 sized plot

SERVICES SHOWN HERE ON HAVE BEEN LOCATED WHERE POSSIBLE BY FIELD SURVEY. THE EXCAVATOR/BUILDER MUST CONTACT 'DIAL BEFORE YOU DIG' BEFORE COMMENCING ANY WORK ON THE SITE.

DIAL BEFORE YOU DIG www.1100.com.au

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Amendment to match revised Architecturals	AV	CG	AV*	BL*	18/07/19*
A	Original Issue	AV	AV	CG*	BL*	31/08/18*

* Denote the original signature and date when revision was issued.

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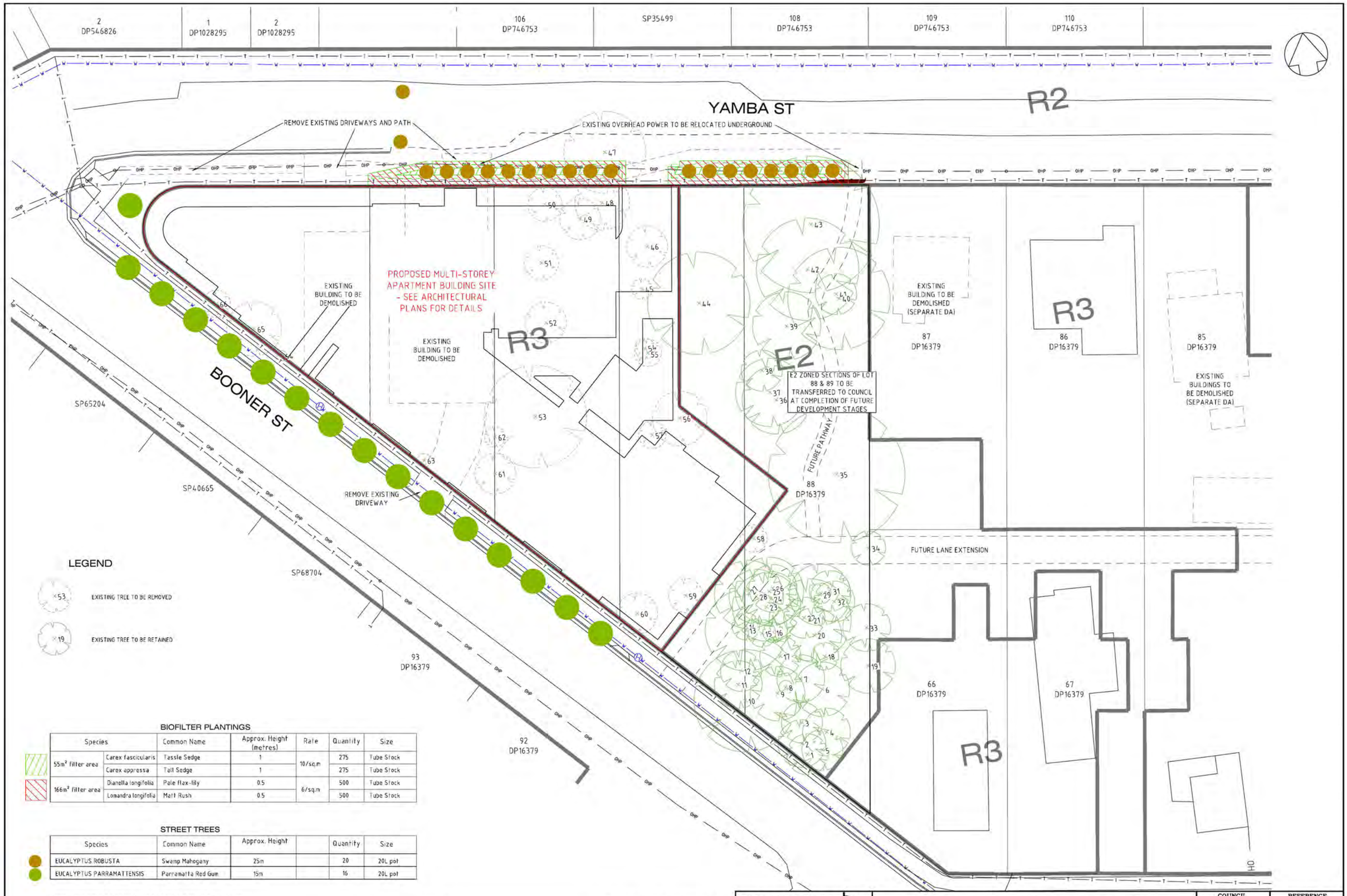
DEVELOPMENT CONSULTANTS
ENGINEERING, SURVEYING & PLANNING
2 Bourke St. P.O.Box 580
RAYMOND TERRACE 2324
Fax (02) 49871733 Phone (02) 49871500

PROPOSED APARTMENT BUILDING COMPLEX

LOT 88, 89 & 90 IN DP 16379 and LOT A & B IN DP 380119
YAMBA STREET & BOONER STREET, HAWKS NEST

COUNCIL: MIDCOAST	REFERENCE: 21800099
PARISH	SHEET SIZE: A3
SCALE: 1:500 on A3	SHEET No.: 2
DATE : Plotted 09:26 18/07/19	

CLIENT: CJHA Pty Ltd | JOB No.: 208008 | COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1 Design.dwg



LEGEND

53 EXISTING TREE TO BE REMOVED

19 EXISTING TREE TO BE RETAINED

BIOFILTER PLANTINGS

	Species		Common Name	Approx. Height (metres)	Rate	Quantity	Size
	55m² filter area	Carex fascicularis	Tassle Sedge	1	10/sq.m	275	Tube Stock
		Carex appressa	Tall Sedge	1		275	Tube Stock
	166m² filter area	Dianella longifolia	Pale flax-lily	0.5	6/sq.m	500	Tube Stock
		Lomandra longifolia	Matt Rush	0.5		500	Tube Stock

STREET TREES

Species	Common Name	Approx. Height		Quantity	Size
EUCALYPTUS ROBUSTA	Swamp Mahogany	25m		20	20L pot
EUCALYPTUS PARRAMATTENSIS	Parramatta Red Gum	15m		16	20L pot

NOTE: WEED SPECIES REMOVAL AND RE-VEGETATION OF E2 LANDS TO BE IN ACCORDANCE WITH APPROVED VEGETATION MANAGEMENT PLAN

0 2.5 5.0m
1:500 of A3 sized plot

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Amendment to match revised Architecturals	AV	CG	AV*	BL*	18/07/19*
A	Original Issue	AV	AV	CG*	BL*	31/08/18*

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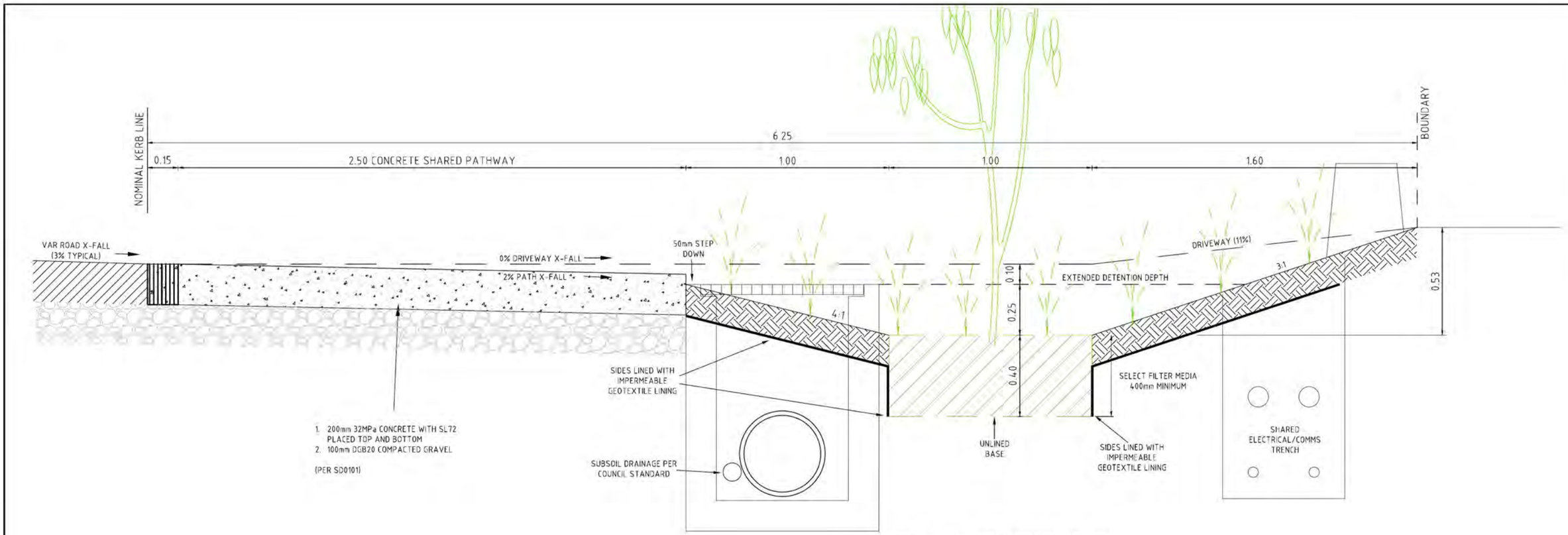
2 Bourke St. P.O.Box 580
RAYMOND TERRACE 2324
Fax (02) 49871733 Phone (02) 49871500

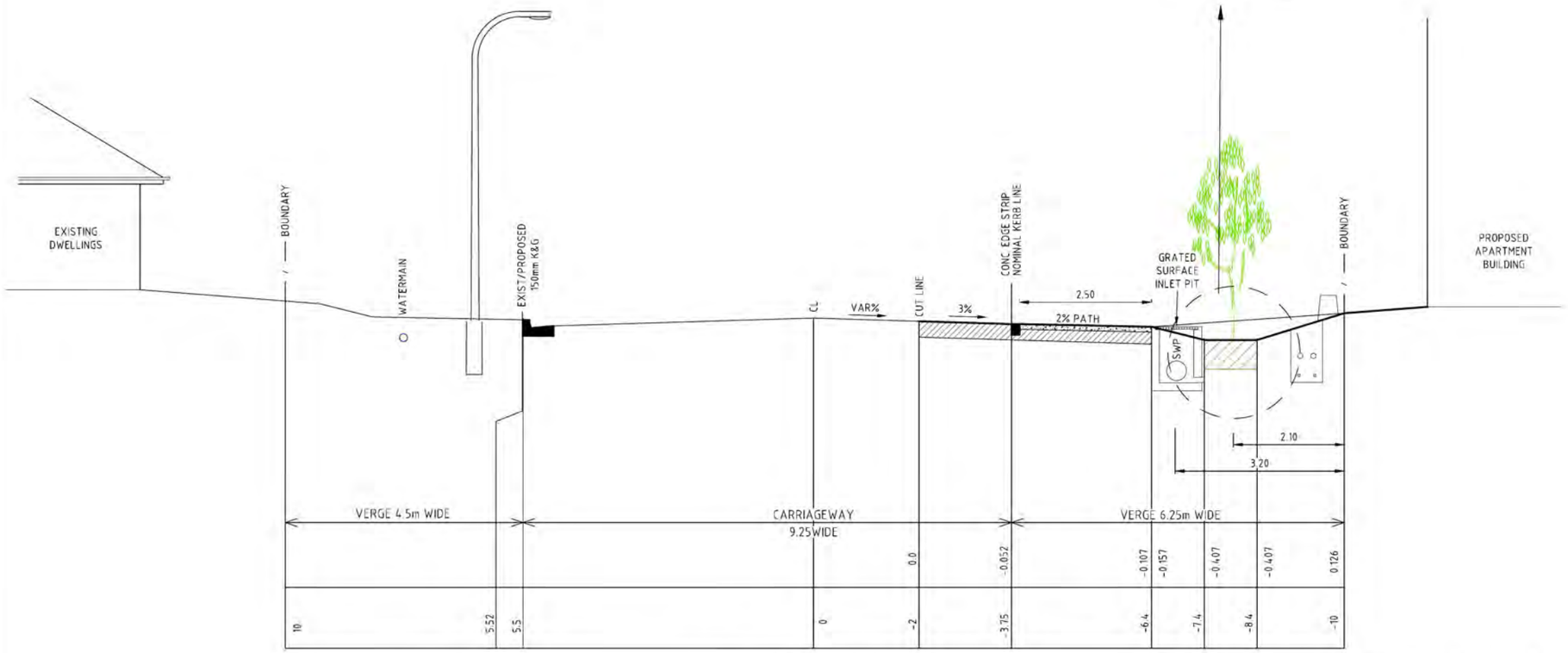
PROPOSED APARTMENT BUILDING COMPLEX
SITE DEMOLITION / VEGETATION MANAGEMENT PLAN
LOT 88, 89 & 90 IN DP 16379 and LOT A & B IN DP 380119
YAMBA STREET & BOONER STREET, HAWKS NEST

COUNCIL: MIDCOAST	REFERENCE: 21800100
PARISH	SHEET SIZE: A3
SCALE: 1:500 on A3	SHEET No.: 5
DATE : Plotted 09:26 18/07/19	

CLIENT: CJHA Pty Ltd | JOB No.: 208008 | COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1 Design.dwg



TYPICAL 5.0m WIDE VERGE PROFILE
WITH BIO-FILTER DETAIL



YAMBA STREET TYPICAL SECTION

SCALE 1:100

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Amendment to match revised Architecturals	AV	CG	AV*	BL*	18/07/19*
A	Original Issue	AV	AV	CG*	BL*	31/08/18*
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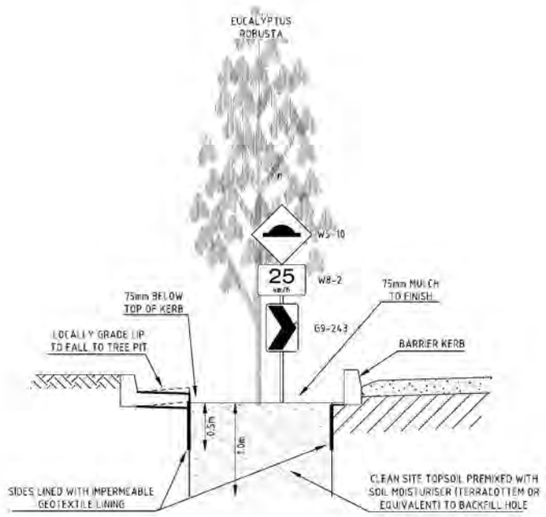
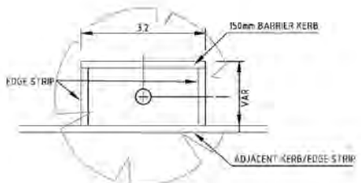
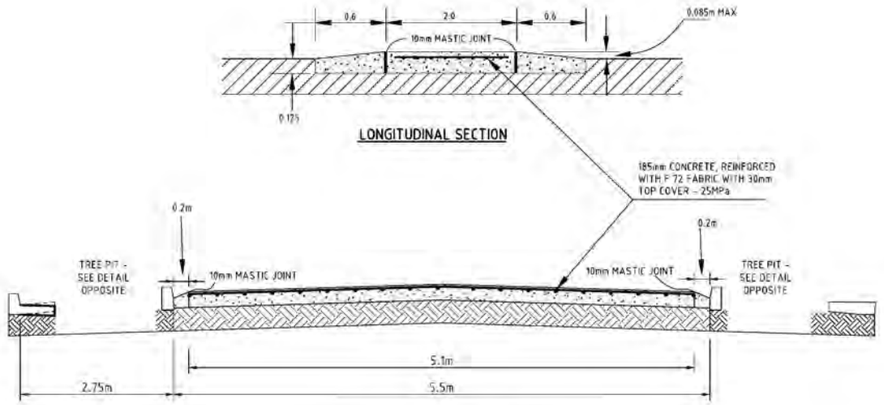
SCALE : 1:100 of A3 sized plot
SHEET No. :4
FILE : 21800101
JOB No. : 208008
DATE : Plotted 09:26 18/07/19
SHEET SIZE A3
COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1 Design.dwg



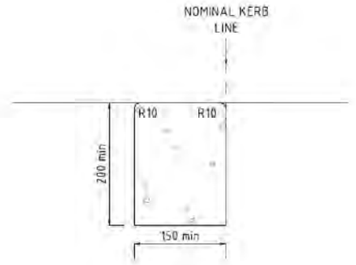
TREE SURROUND DETAIL
SECTION VIEW
(N.T.S.)



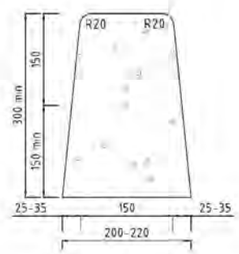
TREE SURROUND DETAIL
PLAN VIEW



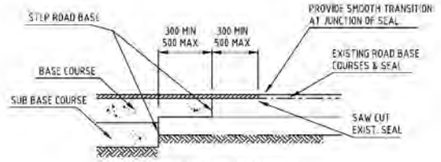
TRANSVERSE SECTION
TYPICAL THRESHOLD DETAIL
(N.T.S.)



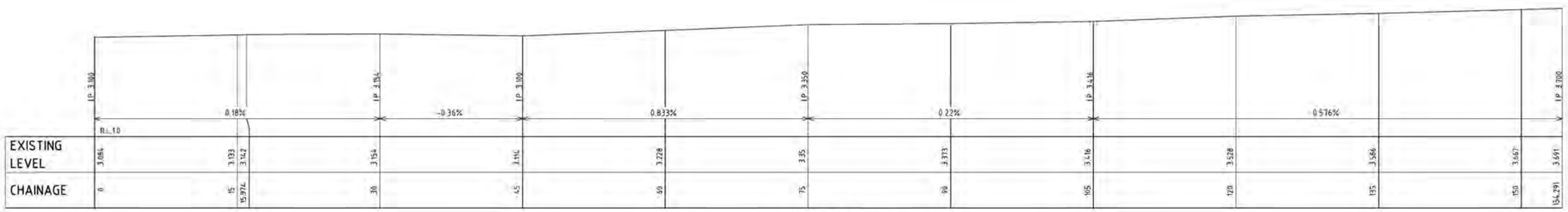
EDGE STRIP
ALL DETAILS PER MCC ST0107



SM BARRIER KERB
ALL DETAILS PER MCC ST0107



KEY JOINT DETAIL BETWEEN
NEW & EXISTING PAVEMENT
NOT TO SCALE



YAMBA ST CUTLINE
H=1:500 V=1:100

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Amendment to match revised Architecturals	AV	CG	AV*	BL*	18/07/19*
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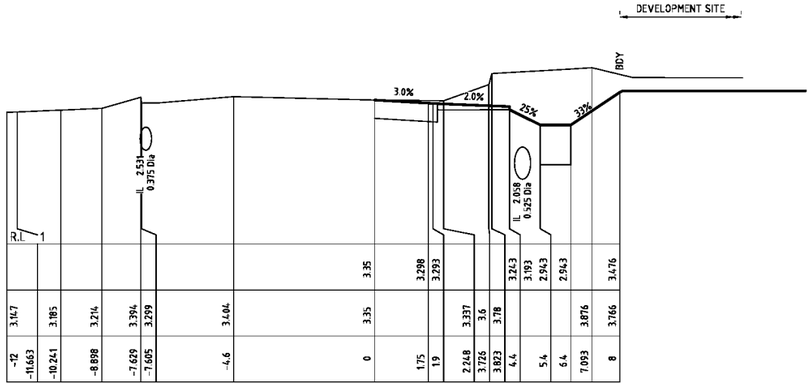
SCALE : AS SHOWN
SHEET No. : 5
JOB No. : 208008
FILE : 21800102
DATE : Plotted 09:25 18/07/19
SHEET SIZE A3
COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1 Design.dwg



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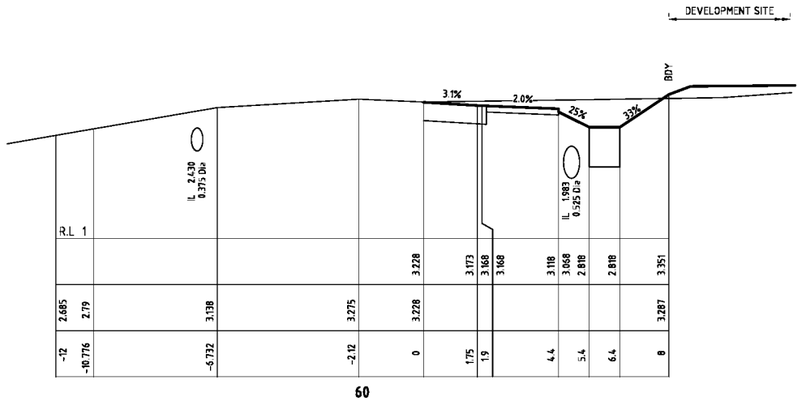

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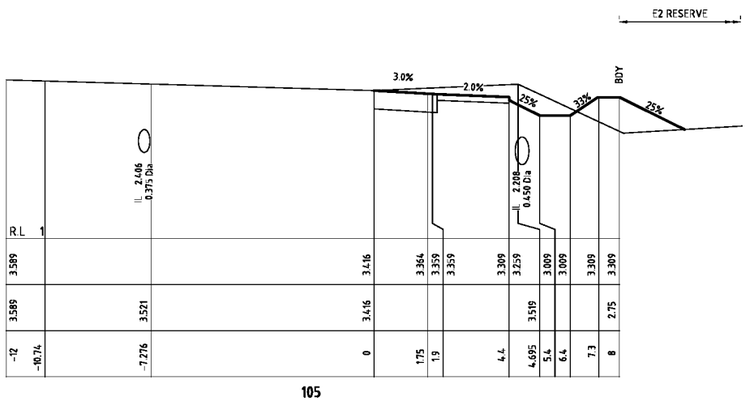

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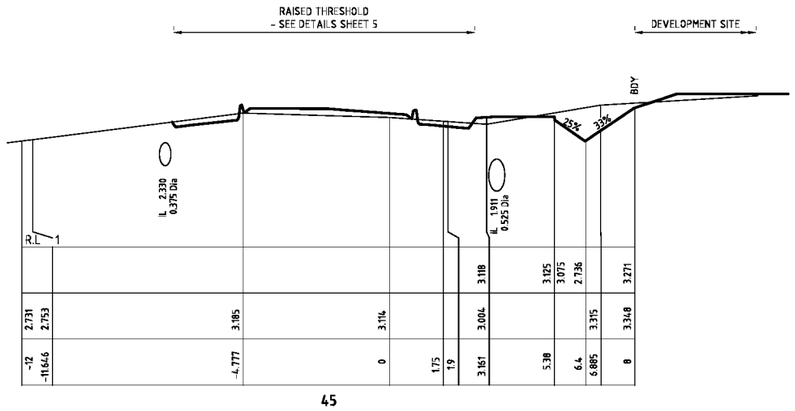

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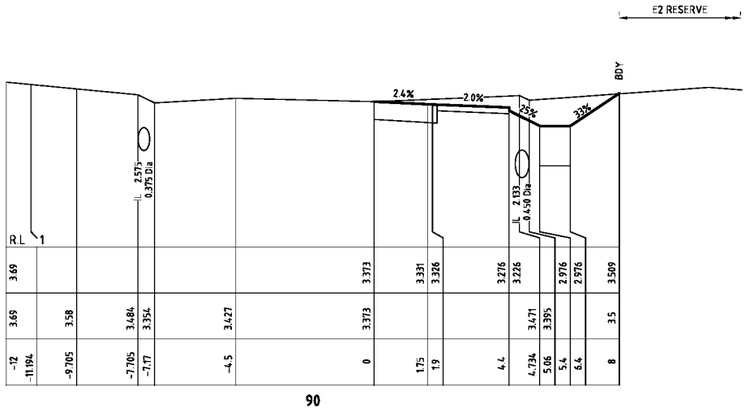

90

YAMBA ST CROSS SECTIONS

H=1:200 V=1:100

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Amendment to match revised Architecturals	AV	CG	AV*	BL*	18/07/19*
A	Original Issue	AV	AV	CG*	BL*	31/08/18*

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SCALE : AS SHOWN
SHEET No. :6
JOB No. : 208008
FILE : 21800103
DATE : Plotted 09:26 18/07/19
SHEET SIZE A3
COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1 Design.dwg

2 DP546826 | 1 DP1028295 | 2 DP1028295 | 106 DP746753 | SP35499 | 108 DP746753 | 109 DP746753 | 110 DP746753

YAMBA ST

R2

PROPOSED MULTI-STOREY
APARTMENT BUILDING SITE
BASEMENT CARPARK LEVEL 1.5m AHD
GROUND FLOOR LEVEL 4.5m AHD

R3

BOONER ST

E2

87 DP16379

R3

86 DP16379

85 DP16379

3

TEMPORARY
EXCESS
STOCKPILE SITE

SP65204

SP40665

SP68704

88 DP16379

93 DP16379

92 DP16379

66 DP16379

67 DP16379

R3

-4m to -3m
-3m to -2m
-2m to -1.5m
-1.5m to -1m
-1m to -0.5m
-0.5m to 0m
0m to 0.5m
0.5m to 1m
1m to 1.5m

VOLUME SUMMARY

CUT =	4200 m³	
FILL =	450 m³	
(SELECT IMPORT) =	(1,000 m³)	(ASSUME 300mm SLAB / PAVEMENT THICKNESS)
NET =	3750 m³ EXCESS	

CUT/FILL PLAN

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
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A	Original Issue	AV	AV	CG*	BL*	31/08/18*
*	Denote the original signature and date when revision was issued.					

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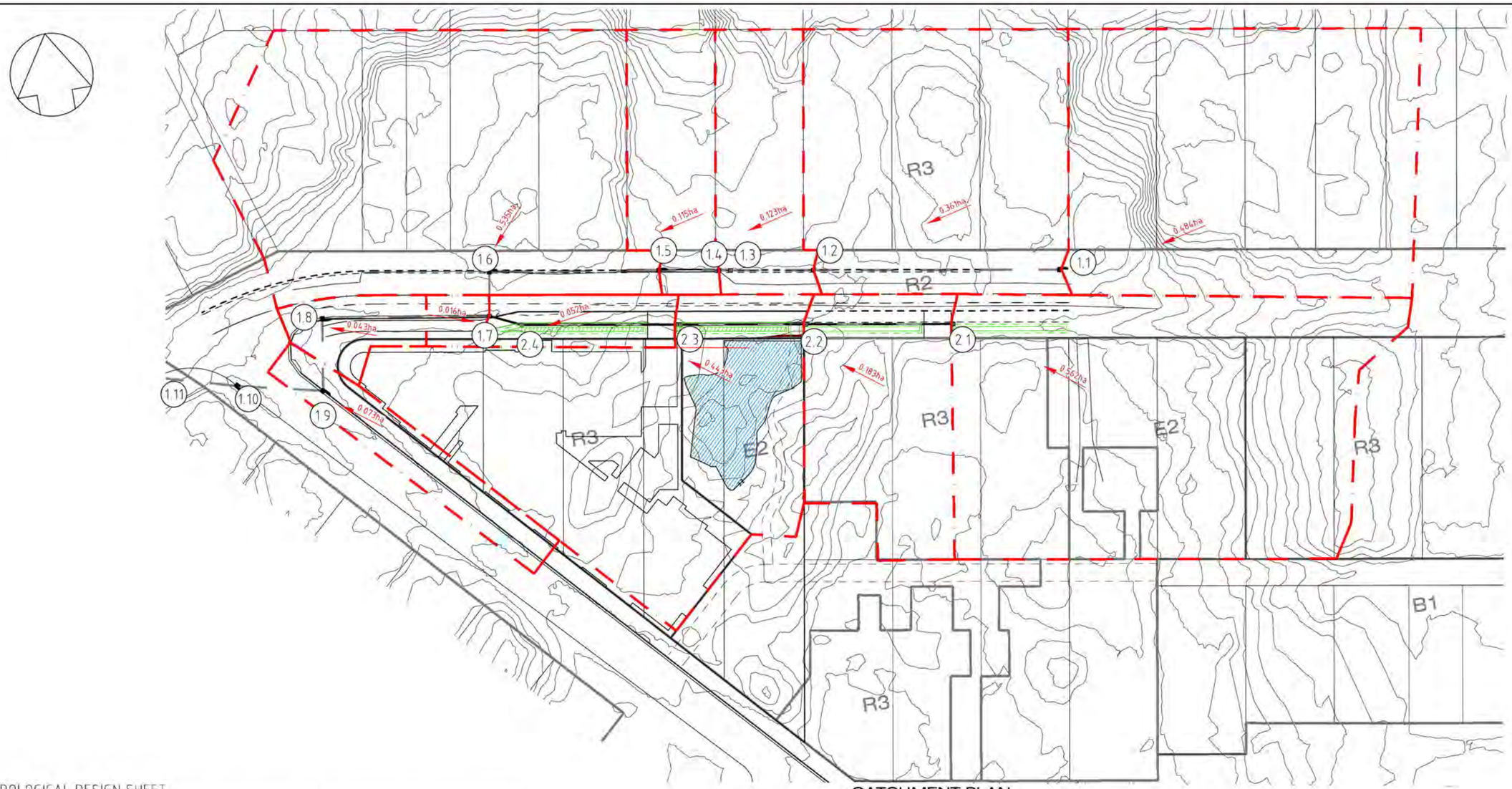
SCALE : 1:500 of A3 sized plot

SHEET No. :7 | FILE : 21800104 | SHEET SIZE A3

JOB No. : 208008 | DATE : Plotted 09:27 18/07/19

COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1 Design.dwg



CATCHMENT PLAN

HYDROLOGICAL DESIGN SHEET

PIT	LAND USE	FLOW LENGTH m	SLOPE %	'n'	TIME min	TIME min	INTENSITY mm/h	CODE	COEFF	AREA ha	C.A ha	SUM AREA ha	Q L/s	BY PASS L/s	TOTAL FLOW L/s	GUTTER SLOPE %	FLOW WIDTH m	PIT TYPE	LINTEL m	HFLOW L/s	BY FLOW L/s	BY PIT	KINEMATIC MIN TIME 5 MAX TIME 20 HAWKS NEST REMARKS
2.1	2 4 4	20 50 70	10 0.3 2	0.1	2.941 2.341 1.269	6.6	136 5Yr	-0.6	0.693	0.562	0.389	0.389	147		147	0.5	3.629	4		147		2.2	
2.2	2 4	30 40	3 0.3	0.1	5.478 1.873	7.4	130 5Yr	-0.6	0.693	0.183	0.127	0.127	46		46	0.5	2.284	4		46		2.3	
2.3	2 4	40 10	0.3 0.3	0.1	14.623 0.468	15.1	97 5Yr	-0.6	0.693	0.443	0.307	0.307	83		83	0.5	2.893	4		83		2.4	
2.4	2 4	10 25	3 0.3	0.010	0.578 1.170	5	150 5Yr	-0.6	0.693	0.052	0.036	0.036	15		15	0.5	1.407	4	1.8	15		1.7	
1.1	2 4	50 70	1 3	0.1	11.238 1.036	12.3	106 5Yr	-0.4	0.611	0.484	0.296	0.296	87		87	0.5	2.956	1	1.8	87		1.2	
1.2	2 4	50 50	1 0.3	0.1	11.469 2.341	13.8	101 5Yr	-0.4	0.611	0.361	0.221	0.221	62		62	0.5	2.577	1	1.8	62		1.3	
1.3	2			0.1		5	150 5Yr	-0.4	0.611							0.5	0	1	1.8	ADP		1.4	
1.4	2 4	50 10	1 0.5	0.1	11.110 0.363	11.5	109 5Yr	-0.4	0.611	0.123	0.075	0.075	23		23	0.5	1.698	1	1.8	23		1.5	
1.5	2 4	50 10	1 0.3	0.1	11.191 0.468	11.6	109 5Yr	-0.4	0.611	0.115	0.070	0.07	21		21	0.5	1.645	1	1.8	21		1.6	
1.6	2 4 4	20 50 30	5 0.3 0.3	0.1	3.690 2.341 1.494	7.4	130 5Yr	-0.4	0.611	0.535	0.327	0.327	118		118	0.5	3.329 0.05PH	1 SAG	1.8	118			
1.7	2 4	5 10	3 0.3	0.1	1.551 0.468	5	150 5Yr	-0.6	0.693	0.016	0.011	0.011	5		5	0.5	0.706	1	1.8	5		1.8	
1.8	2 4	5 25	3 0.3	0.1	1.627 1.170	5	150 5Yr	-0.6	0.693	0.043	0.030	0.03	12		12	0.5	1.284	1	1.8	12		1.9	
1.9	2 4	5 60	3 1	0.1	1.657 1.538	5	150 5Yr	-0.6	0.693	0.073	0.051	0.051	21		21	0.5	1.641 0.03PH	1 SAG	1.8	21			
1.10	2			0.1		5	150 5Yr	-0.6	0.693							0.5	0	1	1.8	ADP		1.11	

HYDRAULIC DESIGN SHEET

PIT	TIME	INTENSITY	AREAS	FLOW	LENGTH	DIAMETER	GRADE	H.G.L GRADE	VEL Q/A	K	HEAD LOSS	VEL CAP	PIPE VEL	PIPE CAP	PIPE TIME	C=C.W., N=MANNINGS MAX TIME 20 HAWKS NEST BY PASS=AREA AREA=ADP Q
	min	mm/hr	ha	L/s	m	mm	%	%	m/s		m	m/s	m/s	L/s	min	
LINE 2 2.1-2.2	6.6	136 5Yr	0.389	147	33.629 C0.0006	445	0.5	0.224	0.946	5.1	0.233	1.436	1.39	223	0.4	
2.2-2.3	7.4	130 5Yr	0.516	187	29.349 C0.0006	445	0.5	0.358	1.2	1.3	0.096	1.436	1.49	223	0.33	
2.3-2.4	15.1	96 5Yr	0.823	221	35.324 C0.0006	519	0.5	0.226	1.046	2	0.112	1.581	1.53	335	0.38	
2.4-1.7	15.5	95 5Yr	0.859	228	7.651 C0.0006	519	0.412	0.24	1.08	0.4	0.024	1.435	1.44	303	0.09	
LINE 1 1.1-1.2	12.3	105 5Yr	0.296	87	56.087 C0.0006	369	0	0.211	0.814	4.5	0.152	0.024	0.024	3	38.77	
1.2-1.3	20	85 5Yr	0.517	122	18.895 C0.0006	369	2.239	0.41	1.141	2.8	0.186	2.702	2.28	289	0.14	
1.3-1.4	20	85 5Yr	0.517	122	2.623 C0.0006	369	0.004	0.41	1.141	0.2	0.013	0.112	0.112	12	0.39	
1.4-1.5	20	85 5Yr	0.592	140	13.706 C0.0006	369	0.001	0.536	1.307	0.8	0.07	0.049	0.049	5	4.68	
1.5-1.6	20	85 5Yr	0.662	156	38.648 C0.0006	369	0.668	0.669	1.462	0.7	0.076	1.475	1.59	158	0.41	
1.6-1.7	20	85 5Yr	0.989	234	10.059 C0.0006	445	3.426	0.558	1.502	3.3	0.38	3.76	3.12	585	0.05	
1.7-1.8	20	85 5Yr	1.859	439	38.074 C0.0006	596	1.177	0.425	1.574	1.9	0.24	2.644	2.48	738	0.26	
1.8-1.9	20	85 5Yr	1.889	446	16.347 C0.0006	750	1.101	0.133	1.01	2.2	0.114	2.949	2.34	1303	0.12	
1.9-1.10	20	85 5Yr	1.94	458	17.677 C0.0006	750	0.5	0.14	1.037	0.3	0.016	1.987	1.79	878	0.16	
1.10-1.11	20	85 5Yr	1.94	458	18.021 C0.0006	750	0.5	0.14	1.037	0.2	0.011	1.987	1.79	878	0.17	

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Amendment to match revised Architecturals	AV	CG	AV*	BL*	18/07/19*
A	Original Issue	AV	AV	CG*	BL*	31/08/18*
*	Denote the original signature and date when revision was issued.					

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : 1:1000 of A3 sized plot (0 5 10m)
SHEET No. :8
JOB No. : 208008
FILE : 21800105
DATE : Plotted 09:27 18/07/19
SHEET SIZE A3
COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1Design.dwg

STANDARD SYMBOLS

Extent Of Works — EW

Sediment Fence

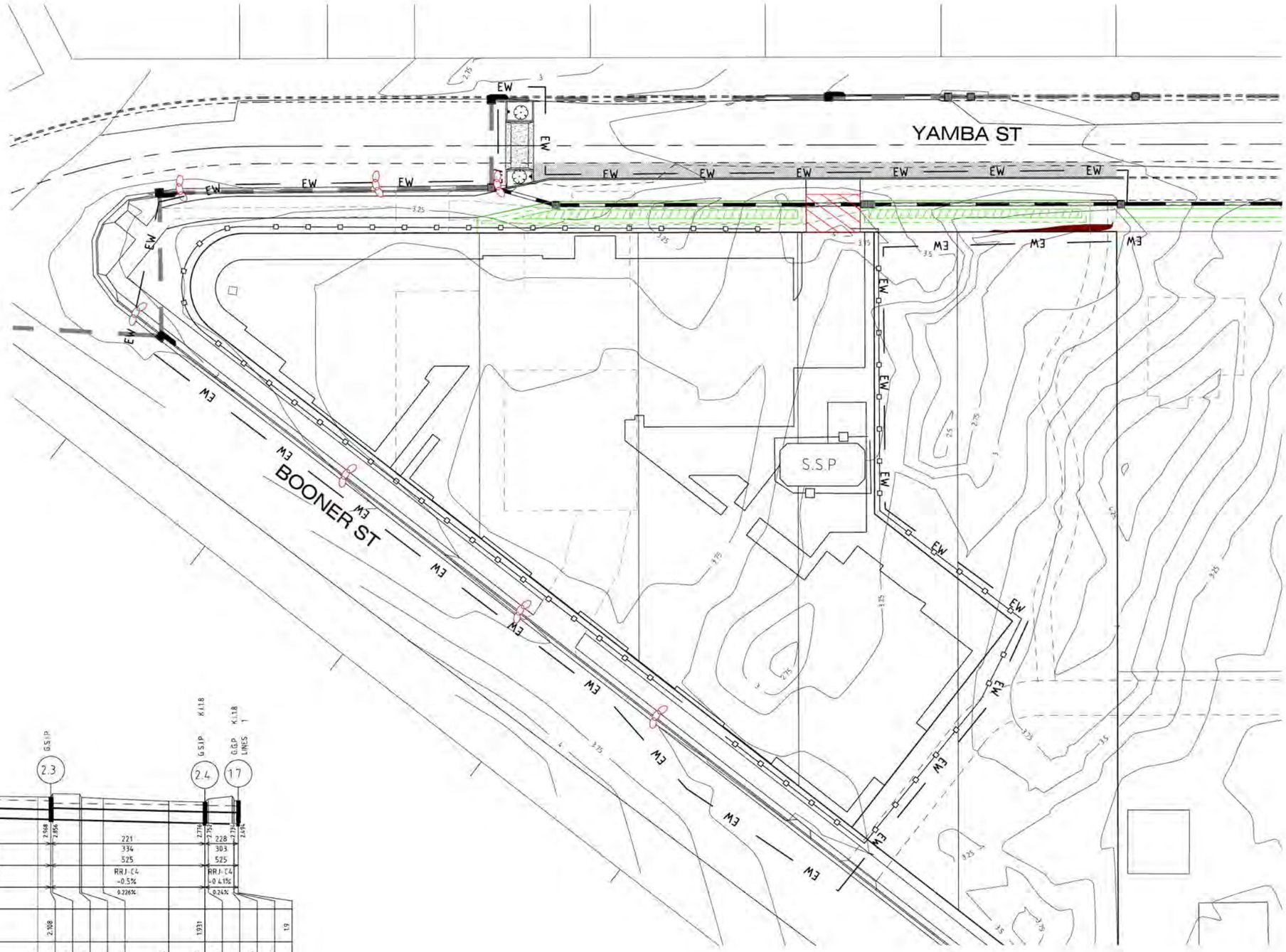
Soil Stock Pile — S.S.P

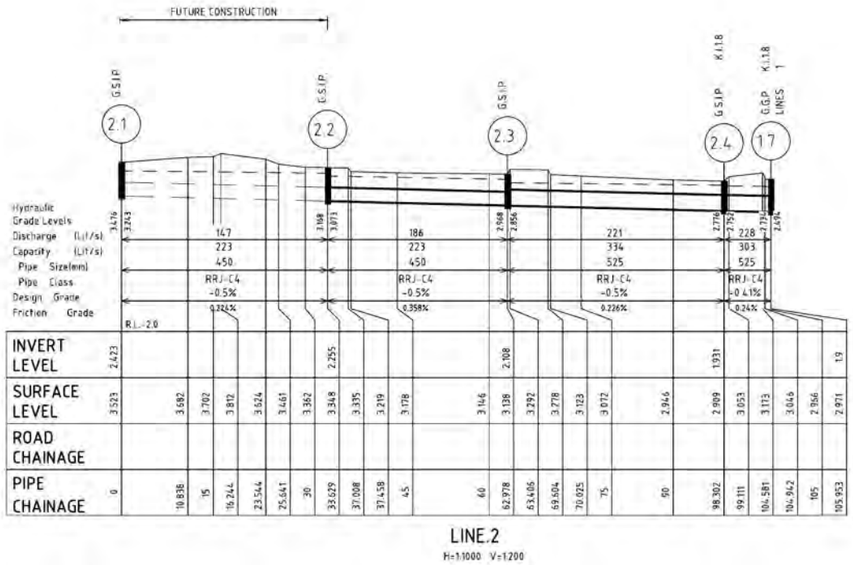
Site Safety Fencing — BF

Site Access with "Cattle Grid" shaker bars

Sandbag Sediment Trap

NOTE
FINAL LOCATION OF TEMPORARY BASIN AND SOIL STOCKPILES TO BE APPROVED BY THE CERTIFIER & SUPERINTENDENT PRIOR TO CONSTRUCTION





LINE.2
H=1:1000 V=1:200

TYPICAL EROSION AND SEDIMENT CONTROL DETAILS

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Amendment to match revised Architecturals	AV	CG	AV*	BL*	18/07/19*
A	Original Issue	AV	AV	CG*	BL*	31/08/18*

* Denote the original signature and date when revision was issued.

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : 2.5 5.00 1500 of A3 sized plot
SHEET No. :9
JOB No. : 208008
FILE : 21800106
DATE : Plotted 09:27 18/07/19
SHEET SIZE A3
COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1Design.dwg

SOIL & WATER MANAGEMENT NOTES

1. This plan is to be read in conjunction with other engineering plans and any written instructions that may be issued.

2. The contractor shall implement all soil erosion and sediment control measures prior to disturbance of the related catchment area and to the satisfaction of the Superintendent.

3. The location of "silt" fences, barrier fences, sediment traps, basins and other devices are indicative only and final locations are to be decided on site. Variations will be permitted to best suit the circumstances.

4. Construct both proposed dams before large scale disturbance of upstream lands. These dams are to be operated as sedimentation basins until all disturbed areas are stabilised. Captured water to be tested and flocculated as necessary (in line with The Blue Book recommendations) before release downstream. Captured water may also be re-used for dust suppression during construction.

5. Cleared vegetation must be disposed of by :-
i) chipping or mulching for future landscaping and usage, or
ii) transport to an approved landfill facility.

5. Temporary crossbanks (bunds constructed with earth, straw bales or sandbags), shall be constructed during roadworks to limit slope length, where possible, to 80 metres. These shall be constructed immediately prior to forecast rain and during temporary closure of the site, including weekends.

6. Temporary rehabilitation should be undertaken on disturbed areas where works have stopped and soils are expected to remain exposed for two months.

7. Sediment barriers (e.g. sandbags or straw bales) should be located upstream of stormwater inlet pits prior to the road surface being paved and lands upslope being rehabilitated.

8. At the conclusion of each day sand bags are to be placed at the end of completed sections of road pavement to prevent scouring.

9. The contractor will inspect all erosion and pollution control works at least weekly and following every rainfall event greater than 5mm, providing particular attention to the following matters :
   (a) Ensure drains operate effectively and initiate repair as required.
   (b) Remove spilled sand (or other materials) from hazard areas, including lands closer than 5 metres from likely areas of concentrated or high velocity flows such as waterways and paved areas.
   (c) Ensure rehabilitated lands have effectively reduced the erosion hazard and initiate upgrading or repair as appropriate.
   (d) Construct additional erosion and/or sediment control works as might become necessary to ensure the desired protection is given to downslope lands and waterways, i.e.,make ongoing changes to the plan.
   (e) Maintain erosion and sediment control measures in a functioning condition until all earthwork activities are completed and the site is rehabilitated.
   (f) Remove temporary soil conservation structures as a last activity in the rehabilitation program.

10. Utilise a single access only to the stock pile sites.

11. Do not taint clean catchment water with silt from the works.

12. Drop inlets which do not outlet to silt traps shall be blocked until all works are completed.

13. Rehabilitate the site as soon as possible after the completion of construction activities and within 10 working days. Lands where works are not to continue for more than 20 working days must be rehabilitated Such rehabilitation shall involve the spraying of a straw-bitumen mulch to the disturbed lands or equivalent.

14. Access areas limited to a maximum width of 10 (preferably 5) metres.

15. All positions shown are approximate and are best determined on site in conjunction with the superintendent.

16. Conformity with this plan shall in no way reduce the responsibility of the Contractor to protect against water damage during the course of the contract.

17. Topsoil and spoil shall be stockpiled in non-hazard areas and protected from surface run-off by diversion drains or similar. Stockpiles shall be surrounded on downstream sides by silt fencing. Stockpiles shall be suitably compacted to inhibit erosion. Where the stockpiling period exceeds four (4) weeks, the stockpile shall be seeded to encourage vegetation growth.

18. Topsoil shall be respread and stabilised as soon as possible. Disturbed areas shall be left with a scarified surface to encourage water infiltration and assist keying in topsoil.

19. The contractor shall provide a turf strip behind all kerb and gutter at completion of footpath formation.

20. The contractor shall maintain grass cover until all works have been completed including the maintenance period, by frequent watering and mowing where required.

21. All drainage works shall be constructed and stabilised as quickly as possible to minimise risk of erosion.

22. Vehicular traffic shall be controlled during construction confining access where possible to proposed or existing road alignments plus 3 metres. Areas to be left undisturbed shall be marked off.

23. Site access shall be restricted to a nominated point. The construction of a shake-down area will be required at the entry to the site.

24. Facilities and/or equipment must be provided for the application of water to disturbed areas to minimise the generation of airborne dust from any area disturbed by construction activities.

25. Material removed from sediment control structures must be disposed of in a way that does not pollute waters or bushland.

26. Waste disposal containers must be provided on site for the collection and disposal of all industrial and domestic type wastes generated on site.

27. Concrete wastes or washings from any concrete mixture or deliveries must not be deposited in any location where they can flow or be washed into waters.

28. Runoff from vehicle, construction plant or mobile plant maintenance and cleaning areas must be contained, collected and disposed of in a manner to prevent entry into any waters, including sediment retention ponds.

29. Fuelling of vehicles and construction plant must be carried out with an operator or driver present, and in a way that prevents any spillage occurring.

TEMPORARY CONSTRUCTION EXIT
SHAKE-DOWN FACILITY DETAIL (CATTLE GRID)

NOT TO SCALE

Construction Notes

1. Place stockpiles more than 2m (preferably 5m) from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2m in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Std Drawing 5-5) on the upslope side to divert water around stockpiles & sediment fences (Std Drawing 6-8) 1-2m downslope.

STOCKPILES SD 4-1

Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit flow if concentrated at one point to 50 l/s in the design storm, usually the 10yr event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5m long star pickets into ground at 2.5m intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE SD 6-8

TYPICAL EROSION AND SEDIMENT CONTROL NOTES

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
B	Amendment to match revised Architecturals	AV	CG	AV*	BL*	18/07/19*
A	Original Issue	AV	AV	CG*	BL*	31/08/18*
*	Denote the original signature and date when revision was issued.					

TATTERSALL LANDER Pty Ltd DEVELOPMENT CONSULTANTS

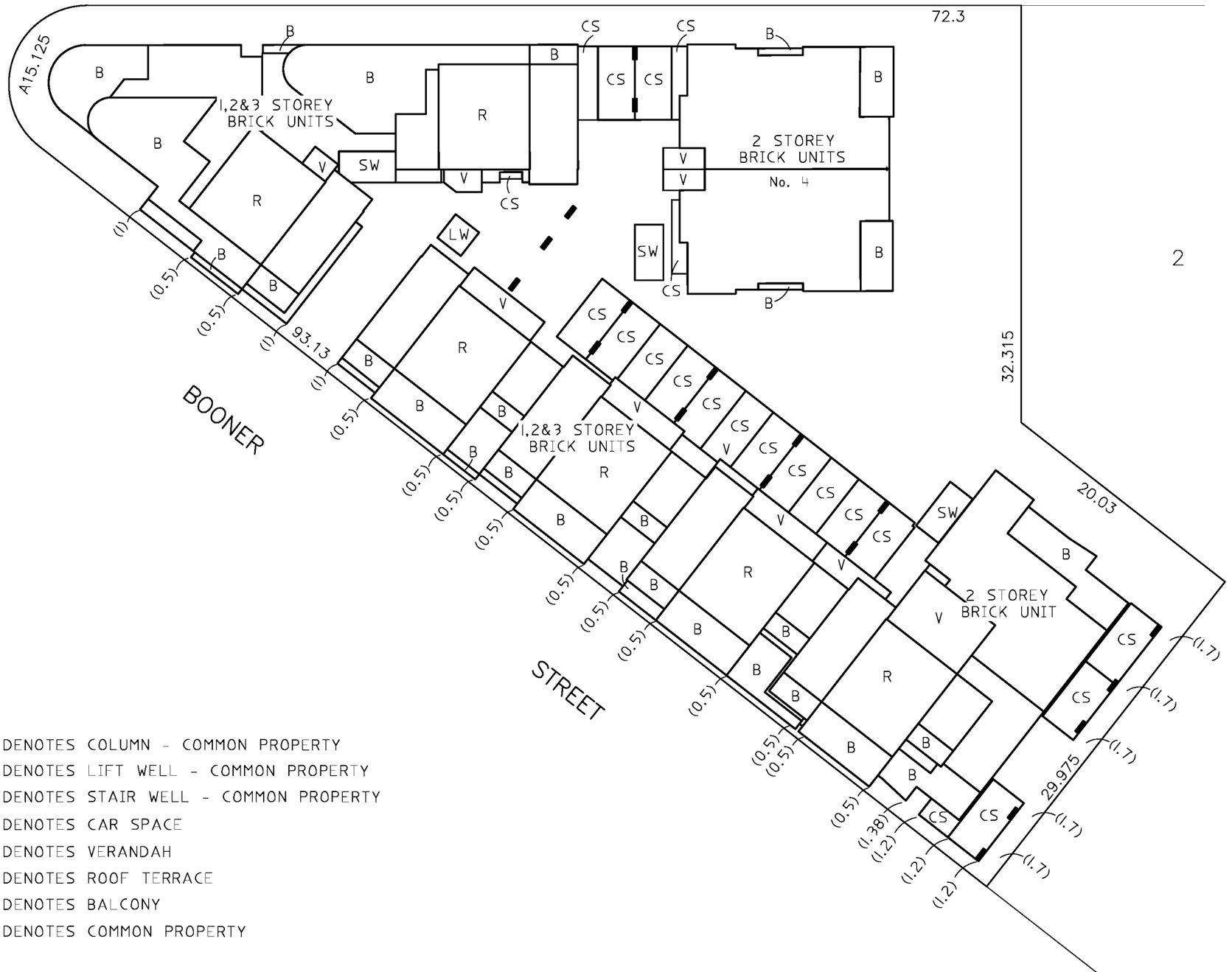
SCALE : 1:500 of A3 sized plot

SHEET No. :10 | FILE : 21800107 | SHEET SIZE A3

JOB No. : 208008 | DATE : Plotted 09:27 18/07/19

COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1 Design.dwg

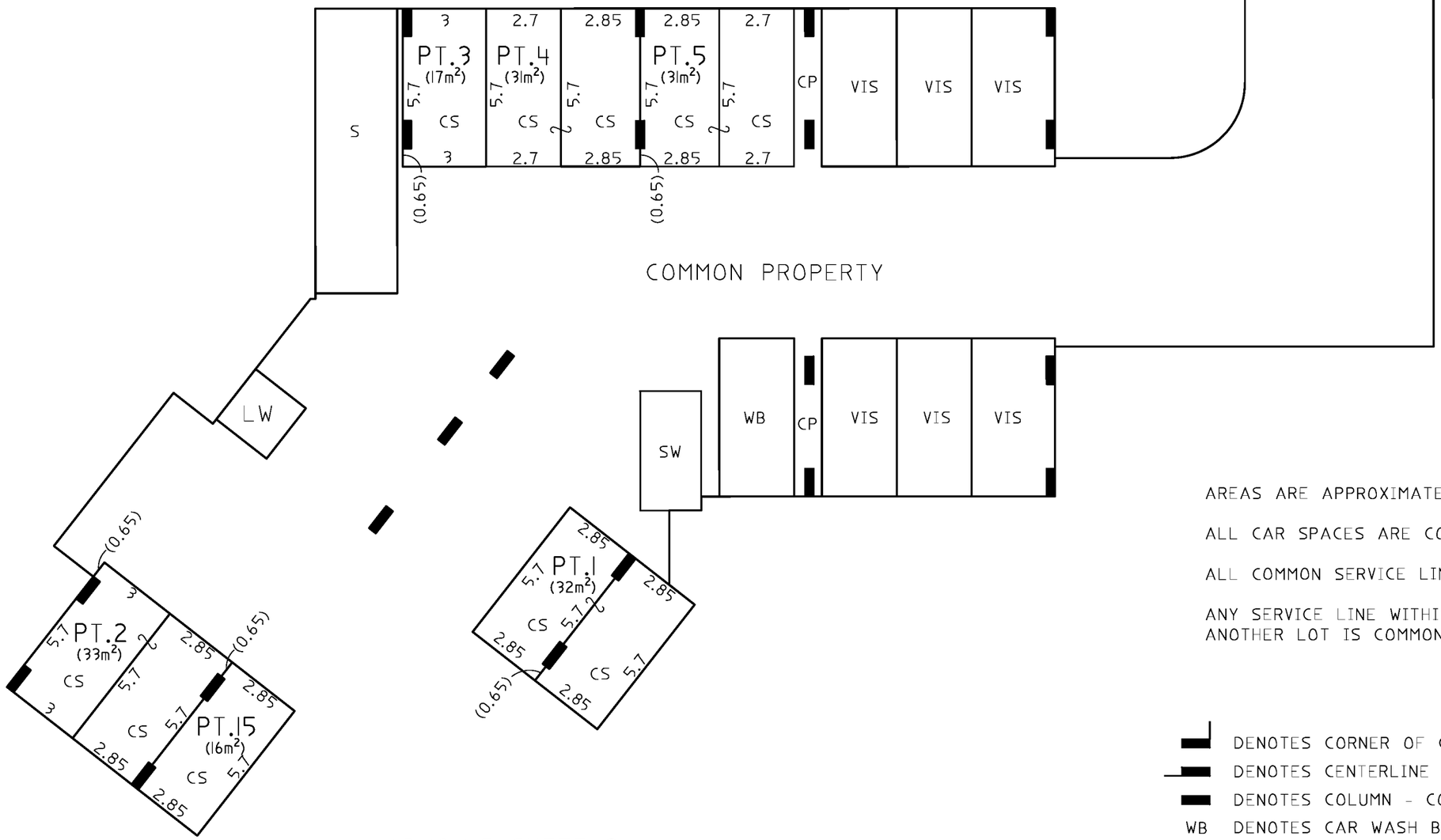
LOCATION PLAN



- DENOTES COLUMN - COMMON PROPERTY
- LW DENOTES LIFT WELL - COMMON PROPERTY
- SW DENOTES STAIR WELL - COMMON PROPERTY
- CS DENOTES CAR SPACE
- V DENOTES VERANDAH
- R DENOTES ROOF TERRACE
- B DENOTES BALCONY
- CP DENOTES COMMON PROPERTY

SURVEYOR Name: SCOTT J WARE Date: 24/07/2019 Reference: 208008	PLAN OF SUBDIVISION OF LOT 1 IN DP	LGA: MID-COAST Locality: HAWKES NEST Reduction Ratio: 1:350 Lengths are in metres	REGISTERED	SP **DRAFT PLAN** DIMENSIONS AND AREAS ARE SUBJECT TO FINAL SURVEY

BASEMENT



ADJOINS SHEET 3

AREAS ARE APPROXIMATE

ALL CAR SPACES ARE COVERED

ALL COMMON SERVICE LINES ARE COMMON PROPERTY.

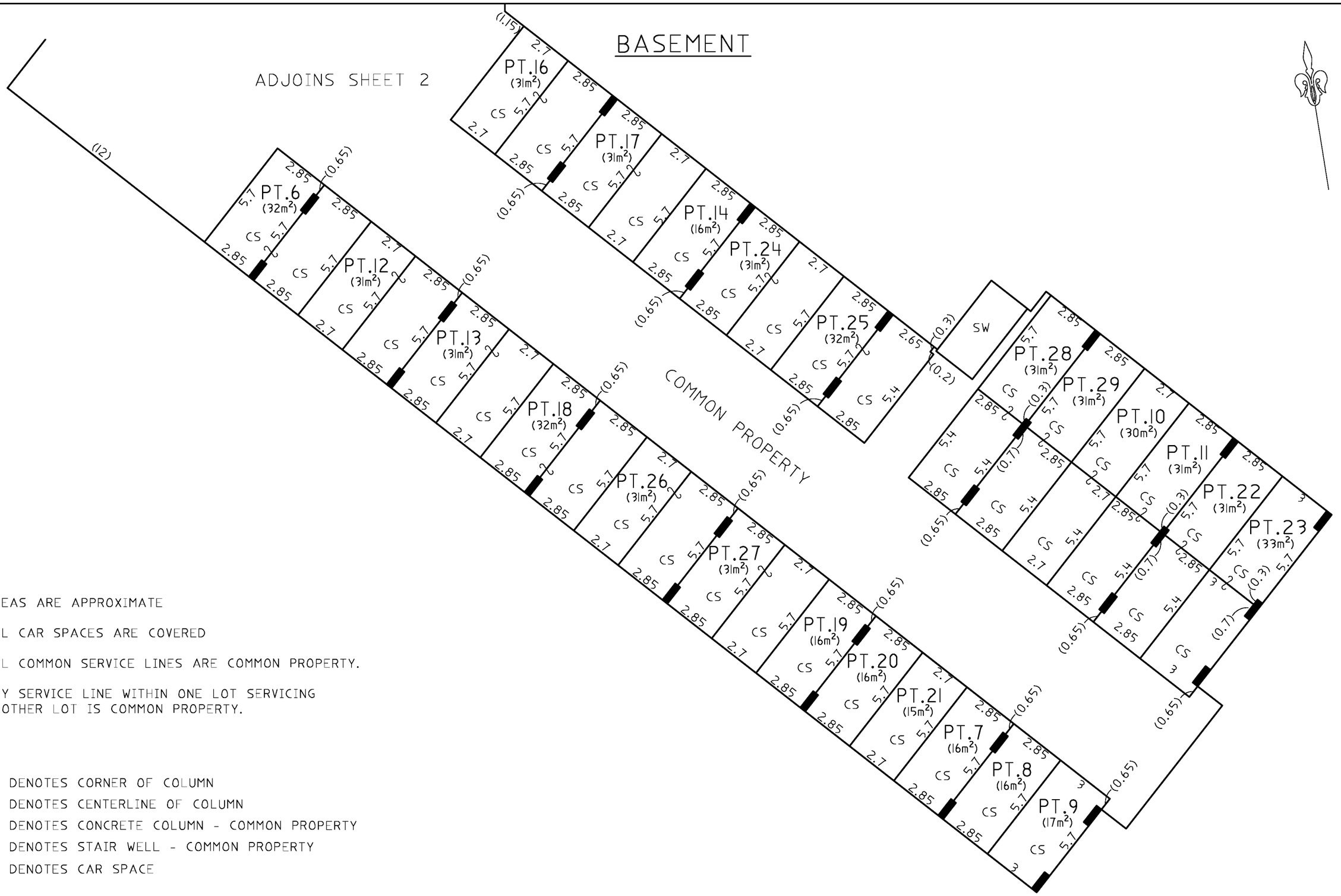
ANY SERVICE LINE WITHIN ONE LOT SERVICING ANOTHER LOT IS COMMON PROPERTY.

- DENOTES CORNER OF COLUMN
- DENOTES CENTERLINE OF COLUMN
- DENOTES COLUMN - COMMON PROPERTY

WB DENOTES CAR WASH BAY - COMMON PROPERTY
VIS DENOTES VISITOR CAR PARK - COMMON PROPERTY
S DENOTES STORAGE - COMMON PROPERTY
LW DENOTES LIFT WELL - COMMON PROPERTY
SW DENOTES STAIR WELL - COMMON PROPERTY
CS DENOTES CAR SPACE
CP DENOTES COMMON PROPERTY

SURVEYOR Name: SCOTT J WARE Date: 24/07/2019 Reference: 208008	PLAN OF SUBDIVISION OF LOT 1 IN DP	LGA: MID-COAST Locality: HAWKES NEST Reduction Ratio: 1:175 Lengths are in metres	REGISTERED	SP **DRAFT PLAN** DIMENSIONS AND AREAS ARE SUBJECT TO FINAL SURVEY

BASEMENT



AREAS ARE APPROXIMATE

ALL CAR SPACES ARE COVERED

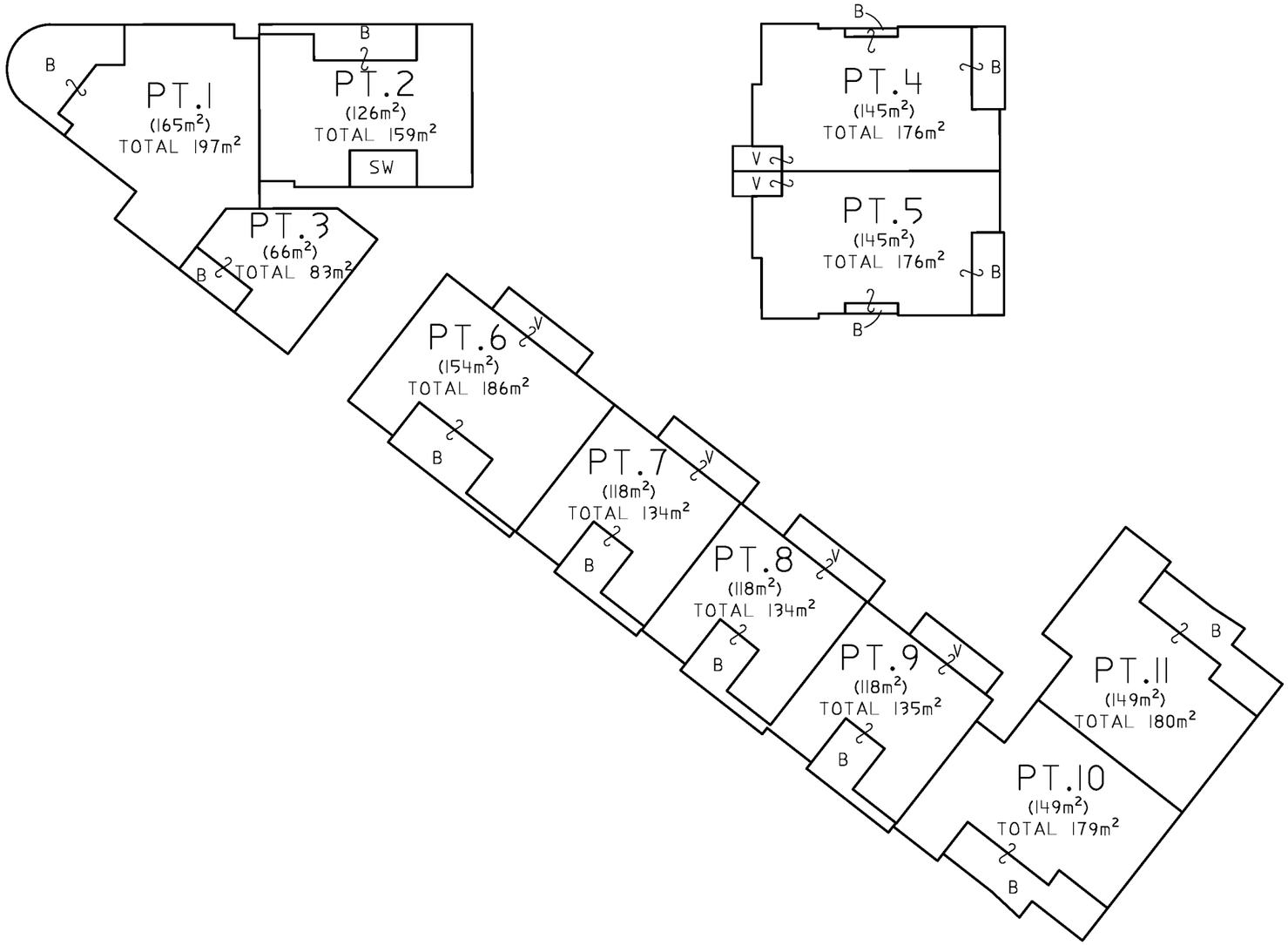
ALL COMMON SERVICE LINES ARE COMMON PROPERTY.

ANY SERVICE LINE WITHIN ONE LOT SERVICING ANOTHER LOT IS COMMON PROPERTY.

- DENOTES CORNER OF COLUMN
- DENOTES CENTERLINE OF COLUMN
- DENOTES CONCRETE COLUMN - COMMON PROPERTY
- SW DENOTES STAIR WELL - COMMON PROPERTY
- CS DENOTES CAR SPACE

SURVEYOR Name: SCOTT J WARE Date: 24/07/2019 Reference: 208008	PLAN OF SUBDIVISION OF LOT 1 IN DP	LGA: MID-COAST Locality: HAWKES NEST Reduction Ratio: 1:175 Lengths are in metres	REGISTERED	SP **DRAFT PLAN** DIMENSIONS AND AREAS ARE SUBJECT TO FINAL SURVEY

GROUND FLOOR



SW DENOTES STAIR WELL - COMMON PROPERTY
V DENOTES VERANDAH
B DENOTES BALCONY

AREAS ARE APPROXIMATE

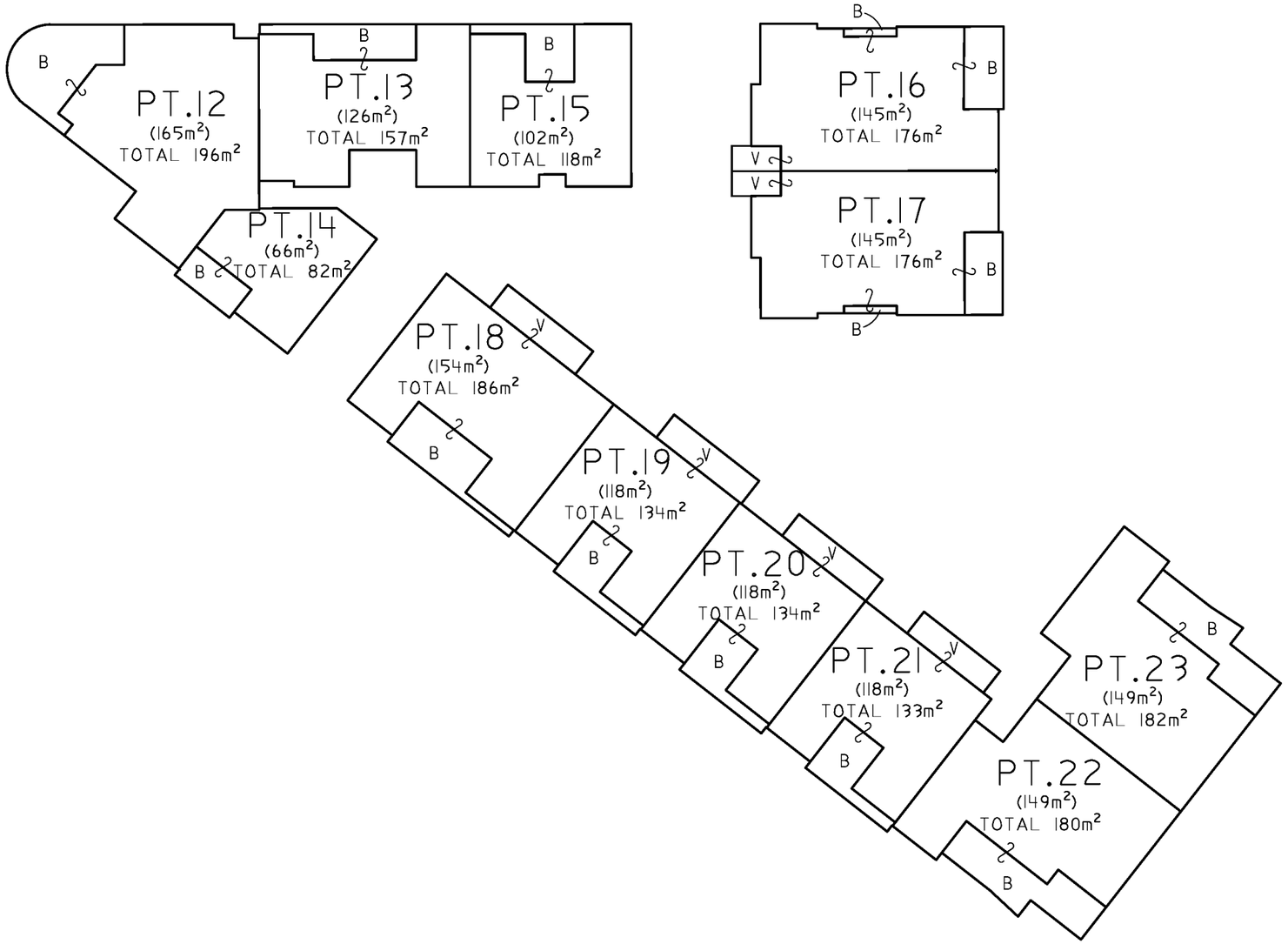
ALL COMMON SERVICE LINES ARE COMMON PROPERTY.

ANY SERVICE LINE WITHIN ONE LOT SERVICING ANOTHER LOT IS COMMON PROPERTY.

THE STRATUM OF THE BALCONIES & VERANDAHS ARE LIMITED IN HEIGHT TO 4 ABOVE THE UPPER SURFACE OF THEIR RESPECTIVE CONCRETE FLOOR SLAB EXCEPT WHERE COVERED WITHIN THIS LIMIT.

SURVEYOR Name: SCOTT J WARE Date: 24/07/2019 Reference: 208008	PLAN OF SUBDIVISION OF LOT 1 IN DP	LGA: MID-COAST Locality: HAWKES NEST Reduction Ratio: 1:350 Lengths are in metres	REGISTERED	SP **DRAFT PLAN** DIMENSIONS AND AREAS ARE SUBJECT TO FINAL SURVEY

FIRST FLOOR



FIRST FLOOR

V DENOTES VERANDAH

B DENOTES BALCONY

AREAS ARE APPROXIMATE

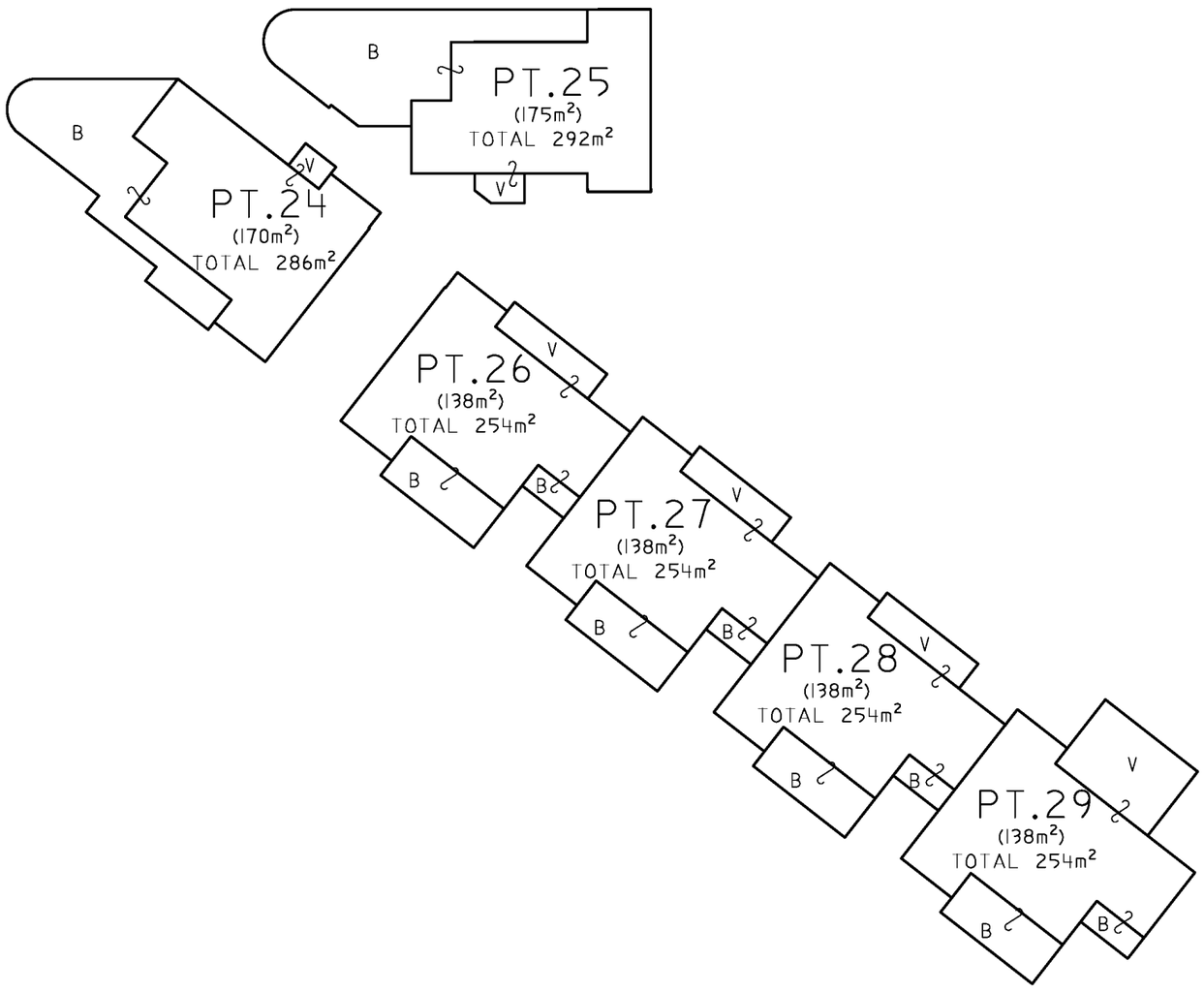
ALL COMMON SERVICE LINES ARE COMMON PROPERTY.

ANY SERVICE LINE WITHIN ONE LOT SERVICING ANOTHER LOT IS COMMON PROPERTY.

THE STRATUM OF THE BALCONIES & VERANDAHS ARE LIMITED IN HEIGHT TO 4 ABOVE THE UPPER SURFACE OF THEIR RESPECTIVE CONCRETE FLOOR SLAB EXCEPT WHERE COVERED WITHIN THIS LIMIT.

SURVEYOR Name: SCOTT J WARE Date: 24/07/2019 Reference: 208008	PLAN OF SUBDIVISION OF LOT 1 IN DP	LGA: MID-COAST Locality: HAWKES NEST Reduction Ratio: 1:350 Lengths are in metres	REGISTERED	SP **DRAFT PLAN** DIMENSIONS AND AREAS ARE SUBJECT TO FINAL SURVEY

SECOND FLOOR



V DENOTES VERANDAH

B DENOTES BALCONY

AREAS ARE APPROXIMATE

ALL COMMON SERVICE LINES ARE COMMON PROPERTY.

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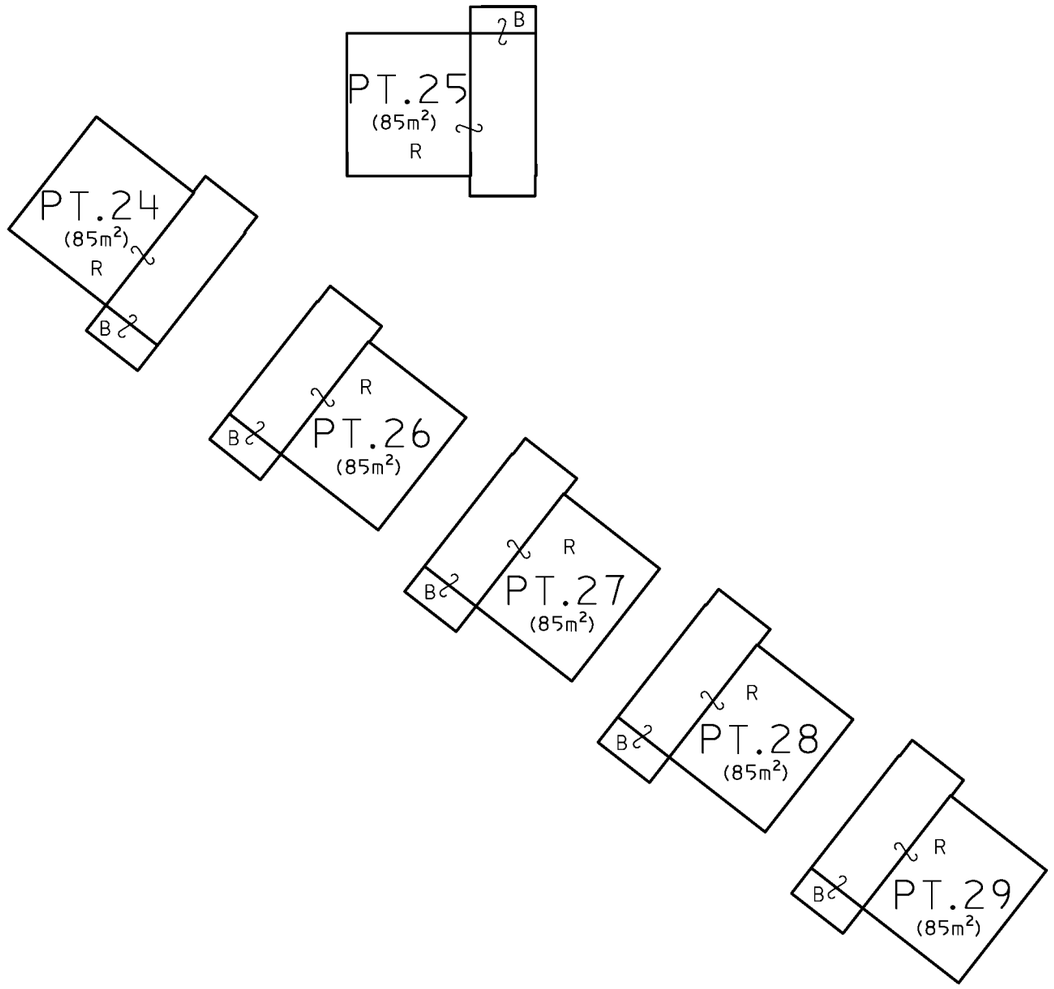
SURVEYOR Name: SCOTT J WARE Date: 24/07/2019 Reference: 208008	PLAN OF SUBDIVISION OF LOT 1 IN DP	LGA: MID-COAST Locality: HAWKES NEST Reduction Ratio: 1:350 Lengths are in metres	REGISTERED	SP **DRAFT PLAN** DIMENSIONS AND AREAS ARE SUBJECT TO FINAL SURVEY

THIRD FLOOR



R DENOTES ROOF TERRACE

B DENOTES BALCONY

AREAS ARE APPROXIMATE

ALL COMMON SERVICE LINES ARE COMMON PROPERTY.

ANY SERVICE LINE WITHIN ONE LOT SERVICING ANOTHER LOT IS COMMON PROPERTY.

THE STRATUM OF THE BALCONIES, VERANDAHS & ROOF TERRACES ARE LIMITED IN HEIGHT TO 4 ABOVE THE UPPER SURFACE OF THEIR RESPECTIVE CONCRETE FLOOR SLAB EXCEPT WHERE COVERED WITHIN THIS LIMIT.

SURVEYOR Name: SCOTT J WARE Date: 24/07/2019 Reference: 208008	PLAN OF SUBDIVISION OF LOT 1 IN DP	LGA: MID-COAST Locality: HAWKES NEST Reduction Ratio: 1:350 Lengths are in metres	REGISTERED	SP **DRAFT PLAN** DIMENSIONS AND AREAS ARE SUBJECT TO FINAL SURVEY

TATTERSALL LANDER PTY LTD

19th July 2019

OUR REF: 208008-L001012
YOUR REF: DA 283/2019

The General Manager
Great Lakes Council
PO Box 450
FORSTER NSW 2428

Attention: Robyn Shelley, Senior Assessment Planner

Dear Robyn,

RE: DEVELOPMENT APPLICATION DA 283/2019 4-12 YAMBA STREET, HAWKS NEST: RESIDENTIAL FLAT BUILDING AND ASSOCIATED TORRENS AND STRATA TITLE SUBDIVISION

Further to Council's RFI letter undated, but inferred as 15th February 2019, I can advise the following responses and note that this proposed building structure is a complicated building and the delays in resubmission have occurred to try to make it compliant with Council's requests:-

A. **EP&A Act Regulation 2000 and SEPP 65 (Verification Statement Required)** – refer attached

B. **EP&A Act Regulation 2000 (Information that must be included with an application)** – refer attached

C. **Apartment Design Guideline (ADG)**

ADG SECTION 03

A. Site analysis

Site description

The subject site is located on the corner of Booner and Yamba streets, Hawks Nest. It comprises of Lot 88, 89 & 90 in DP16379 and Lot A & B in DP380119.

Seen illustrated in Image 01 below the site sits in the Mid North Coast region of NSW. Located on the North West side of the suburb of Hawks Nest and is bounded by Yamba and Booner Streets and on its South Eastern boundary an E2 - Environmental Conservation Zone as listed on the LEP.

Tattersall Lander Pty Limited ABN 41 003 509 215
2 Bourke Street, RAYMOND TERRACE 2324 **All mail to**: PO Box 580
Telephone: (02) 4987 1500 **Fax**: (02) 4987 1733 **Email**: admin@tatland.com.au
www.tatland.com.au

Image 01 – Wider Context plan.
source: Google maps

The site is 3354m² with two existing low-density developments towards the North Western area. The Myall river is located to the West and Bennetts beach to the East.

Image 02 – Local context plan.
source: Google maps

B. Orientation

Visible in the floor plans DWG1.01-1.06 the design of the building formulates responses to site orientation, street orientation, enjoyment for significant views, retaining significant trees. The positional orientation allows for significant street frontages to provide areas of public amenity and interaction. With the central courtyard, significant northern aspects and sunlight have been designed to perforate into the site. The courtyard allows interaction of its occupiers towards the environmental land on the adjoining site continuing the bushland vernacular and coastal town feel.

Objective 3B-1
As seen on the plans DWG 1.01-1.06 significant aspects to street frontage have been achieved by orientating the two section of the building parallel to their respective streets.

The courtyard in the middle of the building design allows for northern aspect access to a significant amount of apartments

Objective 3B-2
Consideration into access to desirable aspects has been shown with the orientation of the building providing good sunlight access.'

As shown in the provided shadow diagram minimal overshadowing of neighbouring buildings has been achieved. DWG 5.01 shows neighbouring buildings on Booner street are subject to only minor blockages from sun in the early hours of June 21st and a minimum of 4 hours to neighbouring properties is achieved.

C. Public Domain interface

Objective 3C-1
Image 03 and Image 04 show a change in height of 1m between street level and finished floor level of the ground floor apartments, along with planting at ground floor level the building has been designed to allow street level surveillance while also providing visual privacy.

Visible in the provided elevations DWG 2.01 and example images DWG 7.03 permeable areas allowing landscaping and changes in elevation depth provide images of compliance to give a non-linear approach to the street frontage facades and give significant space for opportunities of street interaction between residents and the public domain.

A void or break between the buildings on both Yamba and Booner streets provides an area of significance for entry and landscaping details such as seating provide a continued interaction between street and private domains.

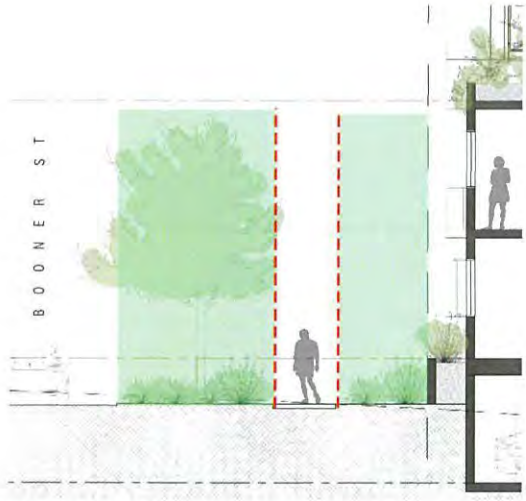


Image 03 – Public domain interface: streetscape planting

Image 04 – Public domain interface: visual privacy

Objective3C-2

Provided in DWG 1.02 Ground floor plan a large amount of landscaping has been achieved in order to soften the street level materiality. Mailboxes located on the floor plan show locations providing direct street access. Vents to the basement carparking as visible in Image 04 show a desire to provide softened landscaping in areas where venting may occur.

Significant access to bushland has been provided through the use of a central open courtyard area with meeting space and open communal areas facing towards this area. Access down landscaping by use of stairs and ramps allows residents to easily maintain a connection to the environmental protection or E2 zone adjacent to the subject site.

D. Communal and public open space

Objective 3D-1
Design inclusions such as communal gathering areas, common circulation areas and amenities for use on the ground floor the formation of strong communal design criteria for residents and public has been provided. See Image 05 as an example of areas throughout the scale of the building where areas of gathering are achieved.

An area of 1174m² or 35% of the site area has been achieved and provides the required 25% minimum communal open area. Sunlight throughout the year is prevalent in these areas and most have direct access to open sky and reside in areas of landscaping that have deep soil zones.

Objective 3D-2
As visible in DWG 1.02 Ground floor plan a variety of communal spaces have been provided for use by residents including seating, BBQ, Pool and Gym.

Objective 3D-3
The courtyard design allows significant views into communal open spaces and further locations of walkways with views into these areas provides safety.

Objective 3D-4
View lines into the building are possible from both Yamba and Booner streets. Clear accessible spaces for entry and sightlines make safe communal spaces. Landscaping that continues from footpath into communal areas provides a connection from the street.

Image 05 – Communal and public open spaces: Gathering zones

E. Deep soil zones

Objective 3E-1
As stated in Design criteria of Objective 3E-1 a site with and area greater than 1500m² is to provide a minimum 7% deep soil zone. The site in question provides a deep soil zone are of 457m² or 13.6% of the 3354m² site area.

As seen in image 06 below deep soil zones have been designed around basement carparking areas to provide anchorage for future and existing trees.

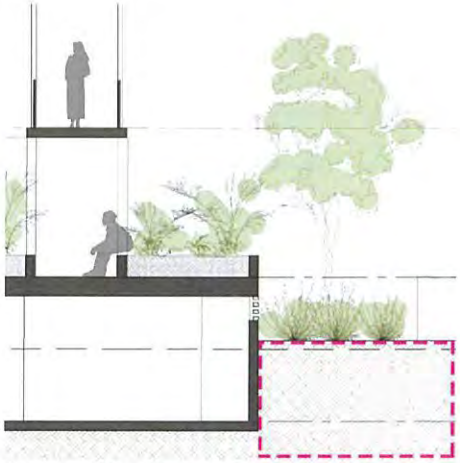


Image 06 – Deep planting

F. Visual privacy

Objective 3F-1

Design criteria for separation between on buildings of multiple storeys on different or adjacent sites is not applicable to the subject site. The designation of the environmental protection zone ensures that large separation between future context will be ensured.

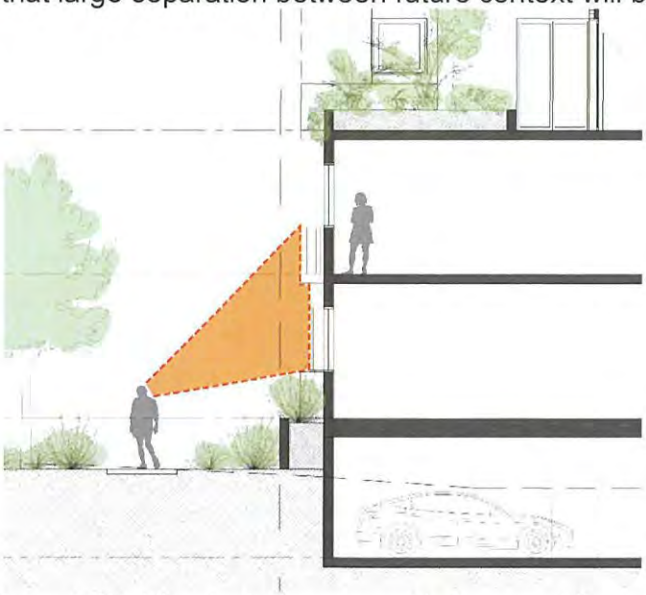


Image 07 – Visual privacy: screens between public and private

G. Pedestrian access entries

<u>Objective 3G-1</u>
Visible on DWG A-4.03 Ground floor plan entries from both the Booner and Yamba streets are visible. The entries are clearly visible through breaks in the building line and form with planting and pathways leading into the main communal areas of the design.

<u>Objective 3G-2</u>
Visibility through the site has been achieved through the large entries and permeable communal areas on the ground floor. The carpark is underground providing minimal effort to access these communal spaces and steps and ramps can be seen via access routes to these areas.

<u>Objective 3G-3</u>
The design of the building gives direct access to sight lines over the public pedestrian zones providing surveillance to these public areas.

H. Vehicle access

<u>Objective 3H-1</u>
The vehicle access points as visible on DWG A1.03 has been designed to be located behind the building line. The basement carpark entry is located on the lower side of Yamba street.

J. Bicycle and car parking – refer plans

<u>Objective 3J-1</u>

<u>Objective 3J-2</u>

<u>Objective 3J-3</u>

<u>Objective 3J-4</u>
<u>Objective 3J-5</u>

<u>Objective 3J-6</u>

ADJ SECTION 04

Amenity

A. Solar and daylight access

<u>Objective 4A-1</u>

Solar and daylight access have been incorporated into the design of the building through the use of variation in building depth, balcony space and a central courtyard.

The design has achieved a percentage of 55% of apartments within the complex that have access to the stipulated 3 hours of direct sunlight at mid-winter.

The Booner street frontage poses a disadvantage to provide agreeable percentages of 70% in Objective 4A-1 of ADG section 04 as the main aspect along this street frontage faces South West.

Considerations in other areas of the ADG including Passive street surveillance and Public domain interface have configured the building to follow the line and sit parallel to Booner street.

As seen in Image 08, a section through Yamba street frontage, sunlight represented as orange arrows penetrates these spaces significantly at the winter solstice, into rooms within the apartments and private open spaces.

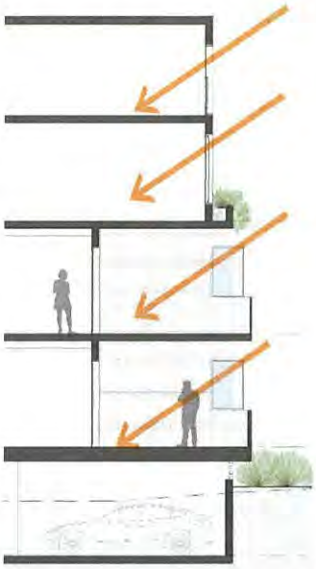


Image 08 – Solar daylight access: Yamba Street

Objective 4A-2

The provided courtyard area is fully accessible and open to the sky as stated in Design guidance of Objective 4A-2. Living spaces are given access to high value aspects and kitchen and service areas are provided with access to high level windows and reflected light from communal areas. Communal areas receive large amounts of light and reflected light with access to these light void spaces is seen in Image 00 below.

Seen in Image 09 the separated walkway and courtyard areas have been designed to allow penetration of sunlight into the communal walkway and private open space for apartments facing south. The design maximises the use of dual aspect apartments by providing space for light infiltration between the communal walkway and public open and living spaces.

Image 09 – Solar daylight access

Objective 4A-3
Awning devices located on windows with aspects that may incur sunlight in unwanted summer months have been used. These shading devices also provide privacy screening at the same time. Depth and privacy of balcony areas has also given significant shading to private areas within the complex and communal and transitional spaces are provided with significant shading to maximize comfort in the warmer months. The use of soft landscape and non-reflective surfaces contributes to these areas of refuge.

B. Natural ventilation

Objective 4B-1 & 4B-3
In order to achieve natural ventilation and the movement of sufficient volumes of air through the building a dual aspect design has been incorporated with almost equal opening totals through the section and abiding by the requirements in Objective 4B-3. 100% of apartments have access to cross ventilation. Ventilation is varying in size and openness appropriate and applicable to the locality of each apartment and its location within the floor plan. Seen below in Image 10 the depth and access of various windows and doors providing access to ventilation on both sides of the design achieves optimal air flow criteria.

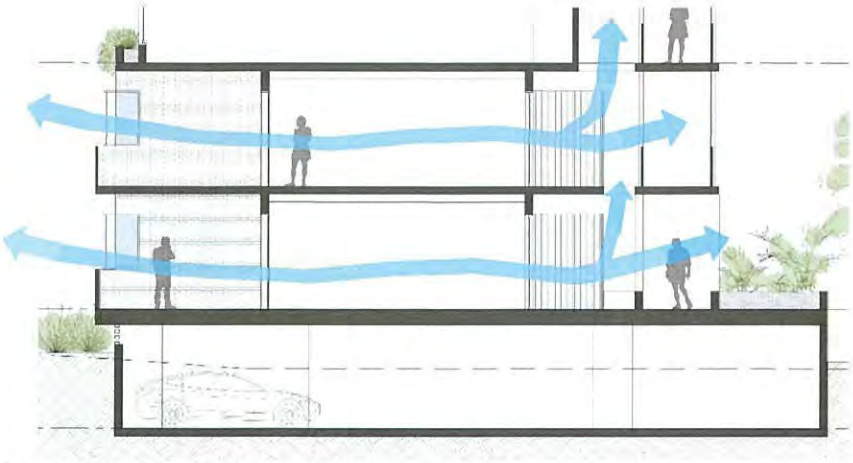


Image 10 – Ventilation and air movement

Objective 4B-2

Various configurations of apartment floor plans and sectional differences have been designed to incorporate air flow and ventilation objectives. All apartments have been designed to follow cross ventilation guidelines and in the current layout single aspect apartments without significant openings to courtyard or secondary aspect zones R1.02, R2.02, R2.04 have been provided louvre windows to access cross ventilation on opposite end to large balcony sliding doors.

As seen in Image 11 below, courtyard and walkway separation have provided stack effect ventilation to apartment aspects towards these areas. This has further provided design criteria signifying the ability of the building to deal sufficiently with ventilation and the expulsion of undesired and introduction of desired air flow.

Image 11 – Ventilation: void space hot air expulsion

C. Ceiling heights

Objective 4C-1
A minimum ceiling height of 2700mm has been achieved in habitable rooms as stipulated in Objective 4C-1 of section4 of the ADG.

Objective 4C-2
The building complies with this design guideline by maximising ceiling height in the living, dining and kitchen areas as well as the bedrooms while non-habitable areas filtering off these spaces such as bathroom and laundry areas have lower ceilings to a minimum of 2400mm.

See below Image 12 showing a general cross section of an apartment with the living space ceiling height noted.

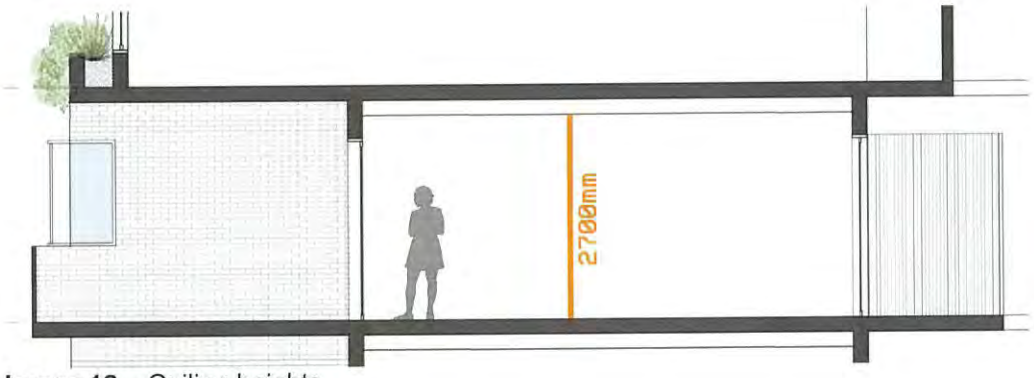


Image 12 – Ceiling heights

D. Apartment size and layout

Objective 4D-1
Section 4 of the ADG requires well laid out and functional rooms that provide a high standard of amenity. As seen in DWG A 4.01 the typical 1-bedroom layout comprises an internal floor area of 58.3m² above the required 50m².

DWG 4.02 shows typical 2-bedroom layout designs. The two types abide to the minimum 70m² as set out in the design criteria.

Type 01 = 90.1m²
Type 02 = 88.3m²

DWG 4.06, 4.07 and 4.08 show the 2-bedroom loft designs with minimum targets achieved above the required 70m².

Type 01 = 102.9m²
Type 02 = 109.2m²
Type 03 = 109.2m²

DWG A-4.03, 4.04 4.05 show the 3-bedroom design types. All abide with the minimum requirement of 90m².

Type 01 = 100.7m²
Type 02 = 101.1m²
Type 03 = 104.1m²
Type 04 = 113.6m²

Objective 4D-2
As seen on floor plans DWG A1.02-1.05 apartments are designed to be open plan and Design crtieris stipulates room depths from glazing lines do not exceed the maximum 8m.

Objective 4D-3
A common Master bedroom area of 12m² exceeding the required 10m². All bedroom dimensions abide to the 3m minimum dimensions as outlined in section 02 of the 4D-3 design criteria and living rooms present large open plan areas that abide to the minimum dimensions required in section 03.

Joinery for wardrobes provides adequate space and are designed to meet the minimum 1.5m requirements and master beds have WIR spaces that exceed the required 1.8m of space.

See DWG 4.01-4.08.

E. Private open space and balconies

Objective 4E-1
Design criteria for Private open space and balconies provides requirements for these areas. As seen in DWG 4.01-4.08 the minimum requirements for private open spaces has been achieved and often exceeds these requirements.

Objective 4E-2
The open plan nature of the designs of each apartment has meant that accessible primary open space adjacent to living and dining rooms has been provided.

Objective 4E-3
A combination of semi-transparent and solid balustrades and fencing have been designed to give surveillance to public spaces. Metal balustrades to mirror a local vernacular have been used and shutters to windows where applicable have been used to provide screening to private areas.

Objective 4E-4
Relative to the building height hierarchy, aspect and street relationship various balcony types including solid and semi-transparent metal balustrades have ben used to keep strong relationship with street corridors and public spaces.

F. Common circulation and spaces

Objective 4F-1
Large communal spaces directly adjacent to circulation corridors as is evident throughout the floor plans has allowed the building to provide comfortable flor of traffic and access. Separated walkways instead of corridors provide areas of circulation with large amounts natural light inclusion as seen in Image 00. These walkway spaces also provide the ability to provide dual aspects apartments promoting light, ventilation and sections where gathering and meeting can occur.

The maximum 12 apartments for lift core and circulation access has been achieved as provided in Design guidance for Objective 4F-1.

Ground floor – 11 apartments
1st floor – 12 apartments
2nd floor – 6 apartments

Objective 4F-2
Good transitional space and sight lines avoiding tight corridors have been achieved with a 1500mm walkway as access between apartments. Straight sight lines into circulation areas from connective zones provides good surveillance throughout each floor level.

G. Storage

Objective 4G-1
Objective 4G-2

H. Acoustic privacy

Objective 4H-1
Acoustic privacy between apartments have been achieved through high rating materials that provide a sufficient buffer of noise. Adequate separation from other buildings is provided by site locality and windows and doors are located towards significant aspects that provide sufficient orientation away from noise sources.

Objective 4H-2
The use of hallways and corridors between living and bedroom or private spaces has achieved the separation required between zones. Joinery and cupboard space as seen in apartment layouts supports buffers between thee zones.

J. Noise pollution

Objective 4J-1, 4J-2
The site location is not impacted by significant or hostile noise environments and pollution. Noise from communal spaces is buffered through the use of strategic planting and walkway. Balcony depth and glazing help to limit the infiltration of noise into apartments from streets zones.

Configuration

K. Apartment mix

Objective 4K-1, 4K-2
A variety of different apartments size and layout has been provided. See DWG A1.02-1.05 and DWG A4.01-4.08. The

L. Ground floor apartments

Objective 4L-1,4L-2
Ground floor apartments have been designed to provide good visual surveillance to public pathways and street scapes without compromising privacy. Large openings, glazing and balconies have been orientated to face landscaped footpath areas. The 1m elevation off the street to ground floor level is provided and acts as a buffer along with landscaping to provide privacy from public areas.

M. Facades

Objective 4M-1,4M-2
The design of the building provides a variety of different materials and textured to create a composition representing the local vernacular of both built and environmental forms.

The local brick low set brick buildings are mirrored in building form through a textured brick façade located on the first two floors. The light-coloured brick represents site locality closeness to the beach. Timber elements high up in the design are incorporated to provide materiality representing the bushland character and local protected environmental zones.

Varying depth provides visual privacy in areas and creates shadow to give texture and form to the overall scale.

N. Roof design

Objective 4N-1, 4N-2, 4N-3
The high-level loft roof combines local look and feel by combining popular roof forms of gable and skillion style. The roof design looks to provide new form whilst appealing to existing local vernacular. The strong form provides a noticeable style and the change in slope and form breaks the "flatness" through peaks and troughs.

Loft style apartments on the upper level have been given habitable roof space with the use of a large terrace space that provides views and sunlight access.

The segregated and non-continual nature of the roof provides area where light and air ventilation into areas below.

O. Landscape design

Objective 4O-1, 4O-2
A large and diverse amount of areas for planting have been provided and permeable deep planting areas provide the ability to applicate many different species on site. The use of landscaping scale through out different areas within the sight offers a composition that creates a balance of shaded and open areas. Street landscaping level change and plant variety provides scale and context to the public and private areas.

P. Planting on structures

Objective 4P-1, 4P-2, 4P-3

Significant thought has been given to provide planting at various level through the building design. High level planting areas can bee seen in DWG 2.01 Elevations. These planting areas provide areas of interest from the public domain and promote visual connection between public and private areas.

Q. Universal design

Objective 4Q-1, 4Q-2, 4Q-3

Silver level design for Class 2 buildings provides design guidance for key structural and spatial elements.

Design considerations have been made to incorporate appropriate steps to provide areas of clearances.

R. Adaptive reuse

Objective 4R-1, 4R-2

The building form is intended to provide a new aesthetic for future use and development within the Hawks Nest precinct while providing indications of local vernacular and character. The use of contemporary and local materials and colours give indication of building locality and context. Light coloured bricks on lower levels combine local material use with local beach atmosphere. Aesthetics to tactile materiality provide a solid lower form signifying connection to the ground while texture within the built form give a contemporary finish. The use of timber cladding to upper levels and terraces connect the building form to the surrounding bushland area. The use of high-level landscaping provides visual connection and cements the complementary nature of the design.

The use of colours consistent with the local bushland and beach zones compliment the locality while roof forms and scale provide consistent design form that aligns directly local vernacular culminating in a design that embodies the local context while providing scale and character aimed to provide unique interpretation to future context.

S. Mixed reuse

Objective 4S-1, 4S-2

Evidence related to street context has been provided in sections relating to public domain interface and communal open space. The design aims to provide activation to these street level areas and supports a variety of diverse activities in both public and private format.

Mixed use from public domain interface seen via communal gathering areas and activities are located in context to ground floors. These areas remain separate but easily accessible from private areas.

Car parking facilities provided on basement level separates communal space and parking to provide a secure and concealed area for vehicle storage.

Gate access to both Yamba and Booner street entries are provided. These gated locations stipulate the separation of public and private space and provide secure entry for residences for safe passage to and from residences.

T. Awnings and signage

Objective 4T-1, 4T-2
Protective roofed zones provide cover from local elements and relate in size and material to their surrounding context within the building form.

Signage for easy access and entry understanding can be seen at locations where integration of the elements is appropriately needed. They contribute to wayfinding as well as general building context that give easy understanding to circulation around and entry into the site.

Performance

U. Energy efficiency

Objective 4U-1, 4U-2
Solar access to various apartment types and communal open spaces is outlined in section 4A. Areas of passive energy efficiency coupled with material thermal mass provide design solutions that contribute to overall energy performance. The use of high thermal mass elements on walls and floors that have high solar access during winter months provides passive heating techniques appropriate to comfort of residents. Shading and appropriate landscaping provide areas of shading contributing to the cooling of the building along with access to ventilation during peak summer months.

V. Water management and conservation

The BASIX report has stipulated the use of a 20,000 litre water tank to be used on site for rainwater collection. Apartments will be individually metered. Drought tolerant plants have been used through out the site to minimize water use.

W. Waste Management

A large waste storage area is located on the Basement floor plan as see in DWG 1.01 Basement floor plan. A bin chute has been used to provide efficient transportation of waste into the storage facility. The waste disposal chute is located near areas of circulation for convenience.

X. Building maintenance

Objective 4X-1, 4X-2, 4X-3
Design solutions to help with shading and water infiltration in the form of window hoods are provided in section not under cover. These exterior blinds will be either fixed in place or manually operated depending on their location and requirement. Most windows and doors are easily accessed from apartments and can be cleaned when required.

Materials around the building design have been chosen for durability in the form of single brick veneer walls and colorbond metal roofing. These materials are expected to weather over time while providing a consistent finish and are easily cleaned and maintained.

D. Great Lakes Development Control Plan 2014 – Front Setbacks

Council's primary DCP controls for medium density development front setbacks are prescribed in section 6.9.1, viz:

- The front setback requirement is a minimum of 4.5 metres at all levels.
- On corner allotments, a minimum setback of 3m to the secondary street frontage from the building must be provided.

The residential flat building is non-compliant with these setbacks.

Notwithstanding, DCP section 6.9.3 prescribes what are termed 'Coastal Town Centre Additional Controls for Hawks Nest'. The controls state:

(1) Street building alignment and street setbacks are to comply with the setbacks shown in the street alignment and setback plan; and

(2) In the situation of an inconsistency between the street alignment and setback plans and the development controls in this section, the provisions of the plans shall take precedence (our emphasis).

The plan is located below.

The building is compliant with the Booner Street setback. A minimum 3 metre setback is required to the majority of the Yamba Street frontage and this has been achieved.

We note that this plan is replicated in Council's amended DCP.

The shortest existing residential dwelling setbacks in Yamba Street are between 7 and 8 metres. It is noted that the Booner/Yamba Street Precinct specified having smaller setbacks within the area defined by the plan – i.e. primary function is to promote built form with lesser requirements for larger setbacks, enabling associated flexibility and opportunities in siting and design; to recognise the Booner/Yamba Street precinct as an important location for medium density development (having regard to its distinction from the remainder of the land defined in the plan).

Note that under normal circumstances a public path is within 1m of the boundary line but in our case there is a dedicated 3.6m wide biofilter to the southern boundary of the pathway from the boundary in Yamba Street. The minimum depth from the public path to the original building/ building articulation varied from 4.2m to 4.9m and this is consistent with the intent of the controls. The amended building location now complies with what is considered an inferior outcome but it now complies with the numbers rather than the intent.

Council's request for a minimum of 6m setback is not understood. Adjoining development setbacks are not relevant in this location and are inconsistent with above indicated controls.

- **Land Dedication**

It is not considered that a Planning Agreement is necessary for the transfer of the E2 land to Council. The SoEE clearly indicates that it is the intention of the developer to transfer the E2 land to Council at an appropriate time. The issue that the developer has is if it transfers the land early, Council will restrict the developer from undertaking relevant development activities (roads and services) that are likely to be required for the servicing of development lands to the east. It is suggested that Council accept that the land will be rehabilitated as per the submitted VMP (Council can require this as a Condition of Consent that will ensure that rehabilitation is undertaken with this DA) and transferred at an appropriate time.

Comments relating to a Plan of Management, costings etc appear to be misplaced as a VMP with relevant details was submitted with the Application. Consideration of Public Access (assumed to be a pathway) is not considered relevant at this time as it would rely on this structure to be located on private land (until it is transferred to Council in a few years time) and to be potentially relocated and redesigned if a road from the east was to be required for the future lot development. It may be possible to have this pathway allowed for in the rehabilitation designs, but I think that it would be more relevant to discuss this issue at a later date.

E. Engineering Comments

The intention of sight lines under AS2890.1 Figure 3.3, requiring splays within the building of 2mx2.5m depth are on the basis that pedestrians would/could be actually at that point of exit for the vehicle. The original design on Yamba Street clearly had biofilters of sufficient width to allow a vehicle to exit the building and be fully visible prior to crossing the footpath area, ie the public access point between the building and the footpath was already in excess of the AS requirement. Amendments to the building design has now moved and focussed the building away from Booner Street onto Yamba Street. A 3m offset from the building to the boundary to Yamba Street has been achieved.

In this location we have tried to accommodate a request to realign intersections at Booner/Yamba Streets and Booner/Langi Streets. Given that the development no linger interacts with Booner Street, Council's request for realignment of intersections and narrowing of pavements is initially rejected.

In saying this, the only way that these intersections can be realigned is for pavement to be narrowed as per the attached plan, which has been endorsed by Busways as acceptable. This email correspondence is dated 29th April 2019 requesting Council advice as to any further information. No response has been received so it has been assumed that the design is acceptable. Please note further discussion with Council needs to be undertaken if it is decided that the intersections will need to be realigned to ensure that the ecological benefits (water quality credits) of the narrower pavement and reconstruction costs that will be bourn by the development are able to be credited to the developer, into the future. Until those agreements are in writing there is no acceptance by the developer for the costs involving the redesign and reconstruction of Booner Street.

The request for a traffic assessment is considered extreme, a waste of resources and unnecessary. Under the proposal to reduce the width of Booner Street, yet to be confirmed by Council but inferred as acceptable, the carry capacity of Booner Street is as a local link road, capable of servicing 100 dwellings and/or 30 lots. That section of Booner Street services 11 lots or about 10 dwelling units (now excluding the developments) so the rationale for a TIA is not justified. As regards Yamba Street, it is currently a Local road, built to a Collector width and capable of servicing 100-500 lots or 2000-8000 vpd (Council's engineering design tables). Given that there are 39 lots fronting Yamba Street, mostly single detached dwellings, the road is completely over designed and the need for a TIA to consider impacts on this road are not justified.

F. **Waste Management Plan required- Use of the site** - refer attached plans

G. **Water Quality**

These details were provided with the original application and are again attached.

Should you require any further information or have any questions, please do not hesitate to contact this office.

Kind regards
TATTERSALL LANDER PTY LTD

Bob Lander
Director

Enclosures

STORMWATER MANAGEMENT REPORT

for

PROPOSED RESIDENTIAL APARTMENT DEVELOPMENT

BOONER ST AND YAMBA ST HAWKS NEST

LOT 88, 89 & 90 IN DP 16379 and LOT A & B IN DP 380119

Prepared by

TATTERSALL LANDER PTY LTD

Development Consultants

August 2018

TATTERSALL LANDER PTY LTD

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1.0 INTRODUCTION

This report has been prepared to support a development application for a multi-unit residential apartment building proposal.

The site of the proposed development Lot 88, 89 & 90 in DP16379 and Lot A & B in DP380119 and is located on Yamba and Booner Streets, Hawks Nest.

Figure 1: Locality Diagram

2.0 BACKGROUND INFORMATION

The site is currently a series of residential properties within the central township of Hawks Nest. In recognition of the location, Council and the owners have previously organised a rezoning to encourage redevelopment and increased densities. The majority of the site is now zoned R3, with an accompanying E2 corridor to facilitate koala movements through the site.

3.0 SITE CONTEXT

Three of the existing lots are currently vacant and have been partially cleared in the past. Vegetation is a mix of native trees, introduced weed species and grasses. The two corner lots host commercial buildings and carparks/driveways.

The topography is best described as generally flat, with various local undulations across the site. Levels range from 3.2m to 4.5m AHD. Soils are sandy in nature, and these high infiltration rates make meeting Water Quality targets more challenging.

Photo 1: Existing Lots 89 & 90

Photo 2: Existing Lot B – Existing Bottle Shop

4.0 PROPOSED DEVELOPMENT

It is proposed to build a five-storey, 33 unit residential strata apartment building and associated infrastructure including driveways, services, and drainage works. Concurrent reconstruction of the Booner Street frontage in the road reserve will allow undergrounding of existing overhead power and the opportunity has been taken to include addition of WSUD treatment measures.

It is proposed to address stormwater impacts with a combination of a rainwater harvesting/reuse system, street scale biofilters and an informal infiltration area.

5.0 WATER QUALITY TARGETS

The combined footprint of the residential component of the development is 3350sq.m, with an additional 1967sq.m of E2 lands to ultimately be dedicated to Council as Public Reserve.

The Water Sensitive Design section of the Great Lakes Council Development Control Plan states that a water quality treatment train for this development should meet the pollution reduction targets in Table 1 below:

Table 1: Stormwater Quality Targets

Gross Pollutants (GP)	90%
Total Suspended Solids (TSS)	Neutral or Beneficial Effect
Total Phosphorus (TP)	Neutral or Beneficial Effect
Total Nitrogen (TN)	Neutral or Beneficial Effect

6.0 CONSTRAINTS AND OPPORTUNITIES / BEST PLANNING PRACTICES

Best-planning practices have been considered in the planning process for this site. The sandy nature of the existing site presents some challenges to meeting Water Quality targets, as does the fact it is an existing neighbourhood and drainage pipes and catchments are already set.

The proposal seeks to address much of the required Water Quality treatment via roof water capture and reuse in a centralised rainwater harvesting system. In order to try and maintain existing runoff mechanisms, overflow from the large harvesting tank will discharge initially into the natural depression in the adjacent E2 corridor for discharge via infiltration. Overflow from this arrangement will flow into the Yamba St drainage system.

Inclusion of biofiltration in the Yamba Street reconstruction will also provide additional treatment to currently untreated road runoff.

7.0 SOIL AND WATER MANAGEMENT

A critical time for increase pollutant loads is during construction, and with this in mind, current practice recommends guidelines from Landcom's "Blue Book". Erosion and sediment control measures should be designed and specified in accordance with the "Blue Book" guidelines, and to Council satisfaction, and be inspected and maintained during the construction phase. This will assist in ensuring adherence to pollutant prevention measures, particularly the removal of suspended solids (sediment).

As the construction footprint will be in excess of 2,500sq.m, typically it would be expected that a detailed Soil and Water Management Plan would need to be prepared for construction stage prior to release of the Construction Certificate. This would normally include calculations of likely soil loss during construction, instructions on preferred construction sequence and limiting land disturbance, and calculations for the provision and sizing of any temporary sedimentation basin to cover the period of civil works.

As a general comment on this site, the combination of flat grades and high permeability sandy soils are likely to limit any significant risk of erosion and sedimentation issues. The following RUSLE calculation illustrates this (references are to "The Blue Book" – Managing Urban Stormwater, Landcom, 2004);

2-year 6hour Intensity = 11.5mm/hr	(former GLC Engineering Dept)
R = 2860	(Eq 2 App A)
K = 0.001	(Tab 14 App C)
LS = 0.19 (1% Slope for 80m)	(Tab A1 App A)
P = 1.3	(Tab A2 App A)
C = 1.0 (bare earth during construction)	

The resulting computed soil loss is therefore calculated as 0.27m^3/ha/yr, or 0.09m^3/yr on this site. As this is far less than 150 m^3/yr trigger in The Blue Book, so no sedimentation basin would be required (S6.3.2 (d)), and the erosion risk should be able to be adequately addressed with standard construction erosion control measures such as silt fencing and sandbagging.

8.0 INTEGRATED WATER CYCLE MANAGEMENT

All created strata lots will be serviced with reticulated water and sewer from the MidCoast Water Services network. There is no reticulated recycled water network available in Hawks Nest.

In line with BASIX and WSUD principles, runoff from the proposed building is to be directed into a large central rainwater harvesting tank for reuse within the units (toilet) and external use. Details of expected reuse rates are specified further in Section 10 of this report.

9.0 STORMWATER MANAGEMENT - HYDROLOGY

The nature of urban development is that it can increase the amount of impervious surface in a catchment, which in turn can decrease runoff times and create higher peak flow rates. It is important with new developments that measures are put in place to prevent increases in runoff from the site and resulting downstream flash flooding.

This particular proposal is not a greenfield subdivision, it is a redevelopment of an existing residential area. A complete public stormwater system already exists in the surrounding streets, maintained by Council and presumably designed and built in accordance with appropriate engineering principles. This system has been operating for decades with no known capacity issues – (it is noted that several grated pits have recently been installed on the northern side of Yamba Street, presumably to address inlet capacity issues, but this is external to the development catchment anyway). The proposed drainage works associated with the biofilter installation will do the same by introducing additional inlet capacity on the southern side of Yamba Street.

Overall, the post-development percentage impervious across the five lots equates to only 49%, which should have been adequately accounted for in the original design. As such, no detention storage is proposed with this development.

It is noted that the large scale stormwater harvesting system and biofilter system will provide some degree of additional storage that will also help reduce runoff rates (dependant on tank storage levels at the time of the storm event). More-so, directing overflows into the natural low point preserved in the E2 lands (and formalised by the proposed Yamba St construction) will provide around 200cubic metres of additional detention storage before any discharge at all enters the public drainage network. Geotechnical testing to support this development by Cardno found in-situ permeability of $2.5x10^{-4}$ to $3.5x10^{-4}$ m/s, or 900 to 1260mm/hr.

10.0 STORMWATER MANAGEMENT – WATER QUALITY MODEL

10.1 BACKGROUND

The quality of runoff generated by the site is important to ensure the preservation of the downstream environments as an increased proportion of impervious area can lead to a subsequent increase in the quantities of phosphorus and nitrogen entering potential storm water runoff. The aim of this section of the study is to determine what measures need to be undertaken as part of this development to meet the water quality objectives set out in Table 1 in Section 5 of this report.

10.2 MUSIC MODELLING

MUSIC is the Model for Urban Stormwater Improvement Conceptualisation, developed by the Cooperative Research Centre for Catchment Hydrology. MUSIC provides the ability to model both quality and quantity of runoff generated by catchments. Therefore, MUSIC can simulate annual stormwater volumes, and expected annual pollutant loadings.

MUSIC is designed to model stormwater runoff systems in urban catchments. It is used to simulate a range of temporal and spatial scales. Catchment modelling can be performed for areas up to 100 km^2, with times steps from 6 minutes to 24 hours to match the range of spatial scale. This enables long term modelling of continuous historical rainfall data from pluviograph sources and reflects the ability to account for temporal variation in data for an annual rainfall series directly.

MUSIC also has the ability to model a number of treatment devices and measure their effectiveness in terms of the quantity and quality of runoff downstream. This allows determination of the degree of reduction in annual pollutant loadings.

It is important to note that the MUSIC simulation relies heavily on input variables and it is usually recommended that MUSIC models be calibrated to local conditions wherever possible. When calibration is not possible default values can be used, or

variables can be sourced from values recommended for stormwater modelling in NSW from a technical report prepared for the DECC by the Co-operative Research Centre titled "*Stormwater Flow and Quality, and the Effectiveness of Non-Proprietary Stormwater Treatment Measures*" (Fletcher et al, 2004).

Given the scale of the proposed development site and hence the MUSIC model, it was determined to be unreasonable to perform a calibration in this instance.

10.2.1 CLIMATE / RAINFALL

To accurately model a site of this size, continuous rainfall record spanning at least five years with a six minute timestep is required. Rainfall data was obtained from the Bureau of Meteorology in the form of a historic pluviograph record from the Williamstown rainfall gauge. It is situated approximately 34km from the site and is of similar elevation and temporal pattern.

The rainfall record was analysed, and the ten years of data between the dates of 1/1/1997 and 31/12/2006 was chosen. This was based on advice received for a peer-reviewed MUSIC model carried out by Tattersall Lander on another development in the Tea Gardens area. This data produced a mean annual rainfall of 1131mm. It was noted that the long term average rainfall (obtained from the Bureau of Meteorology) for Nelson Bay (approximately 5km from the site) is 1348mm. The ten year pluviograph data was scaled appropriately to bring the mean annual rainfall in line with this long term average (again based on advice received for the previous model). For the purpose of this report, all rainfall events in the nominated ten year period have been modelled.

10.2.2 EVAPORATION

To accurately model the outcome of water quality treatment measures, monthly potential evapotranspiration (PET) data is required. Monthly average areal potential evapotranspiration values were read from maps in the 'Climate Atlas of Australia, Evapotranspiration' (BoM, 2001), and are displayed below in Table 2:

Table 2: Monthly Areal Potential Evapotranspiration Figures

Month	Potential Evapotranspiration (mm)
January	180
February	135
March	135
April	90
May	70
June	50
July	50
August	70
September	95
October	135
November	150
December	175
Total	**1335**

10.2.3 NODE PARAMETERS

The MUSIC model was used to simulate the pollutant export generated during a ten year period of average rainfall. Geotechnical investigations indicate that the predominant soil types on site is sand. Rainfall-runoff parameters for Sand soils were adopted from Section 3.6.4.3 of the Draft NSW MUSIC Modelling Guidelines (2010) and typical pollutant concentrations derived from Fletcher et al. The adopted parameters can be seen in Figure 2 and Table 3 below.

Note that a Rainfall Threshold of 1.50 mm/day was adopted for the "Sealed Road" node and 0.30 mm/day was adopted for the "Roof" node per Table 3.6 in the Draft NSW MUSIC Modelling Guidelines (2010). A Rainfall Threshold of 1.00 mm/day adopted for all other nodes.

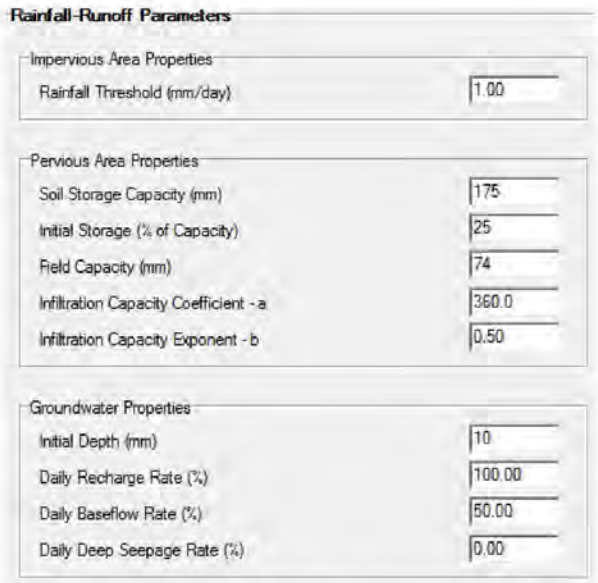


Figure 2: Adopted Rainfall-Runoff MUSIC Parameters

Table 3: Adopted MUSIC Pollutant Generation Parameters

	Residential	Roof	Road
Baseflow TSS Mean (mg/L)	16	-	16
Stormflow TSS Mean (mg/L)	140	20	270
Baseflow TP Mean (mg/L)	0.14	-	0.14
Stormflow TP Mean (mg/L)	0.25	0.13	0.5
Baseflow TN Mean (mg/L)	1.3	-	1.3
Stormflow TN Mean (mg/L)	2	2	2.2

10.2.4 EXISTING FLOW & POLLUTANT ANALYSIS

The existing site was modelled to simulate the current pollutant loads from the site. Generally speaking the existing sandy soils mean there is little runoff generated from the undeveloped sections of the site. Runoff from the rooves and pavement areas currently discharge from the site without treatment.

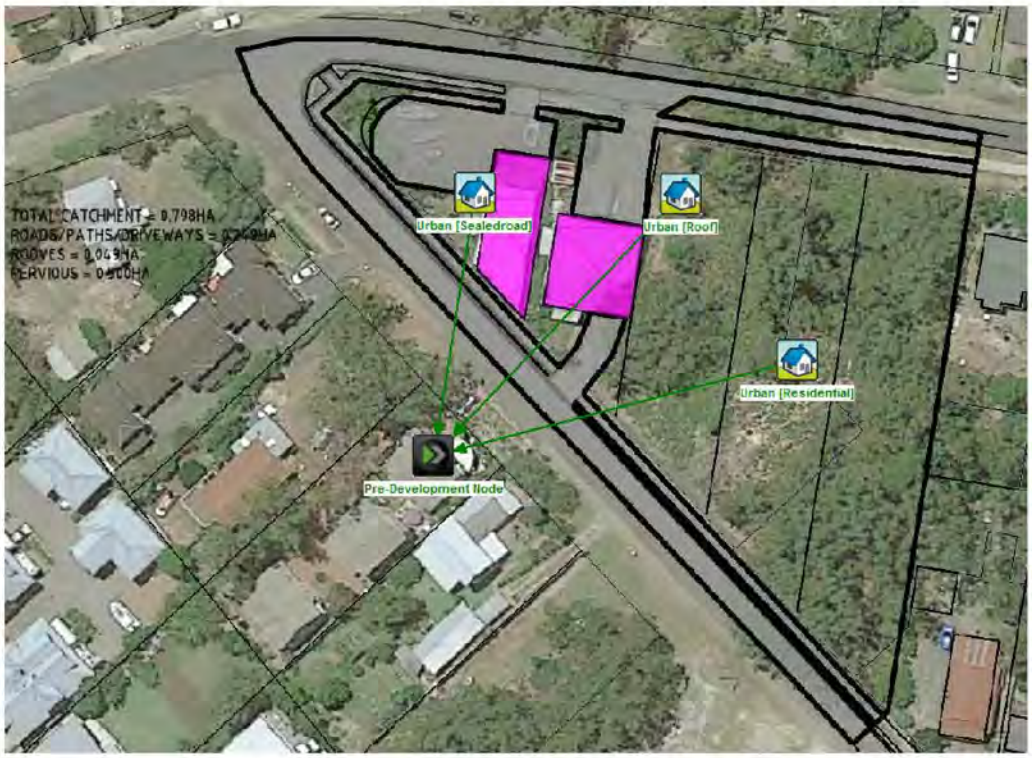


Figure 3: Existing State MUSIC Model

10.2.5 PROPOSED DEVELOPMENT FLOW & POLLUTANT ANALYSIS

The proposed development was modelled to determine expected pollutant loads and the effectiveness of the proposed water treatment measures. The catchment was broken up into different areas depending on the surface type, including;

- Roofs areas (measured directly off architectural design plans), and modelled as "Roof" nodes with 100% impervious area;
- All road and driveway areas (measured directly off design plans) were modelled as "Sealed Road" nodes with 100% impervious area;
- The swimming pool area (measured directly off architectural design plans was removed from the overall catchment, as discharge from the pool is diverted into the sewer system;
- Remaining urban pervious area (verges, landscape areas and public reserve) were modelled as residential nodes with 10% DCIA;

Modelled treatment nodes include;

- Rainwater tanks. A large centralised 20kl (min) tank is to be installed to capture water off the building roof areas. This captured water has been modelled for reuse in toilet and external uses only. Internal reuse rates of 0.36kL/day/dwelling were adopted for a dwelling with 3 occupants from Table 3-12 in the 2010 Draft NSW MUSIC Modelling Guidelines. An external reuse rate of 88kL/day/dwelling was taken from the 2015 NSW MUSIC modelling guidelines for multi-residential dwellings. It has been assumed that 100% of the roof areas will be connected to the tanks;
- Biofiltration measures have been incorporated into the redesign of Yamba Street, treating runoff from the existing pavement, verge and setback areas. Features include a 0.25m detention depth, 0.4m filter depth and 54sq.m filter area across the length of the currently proposed construction. The base of the systems will be unlined to take advantage of the sandy soils. There is further potential to continue this configuration in future redevelopments up Yamba Street.

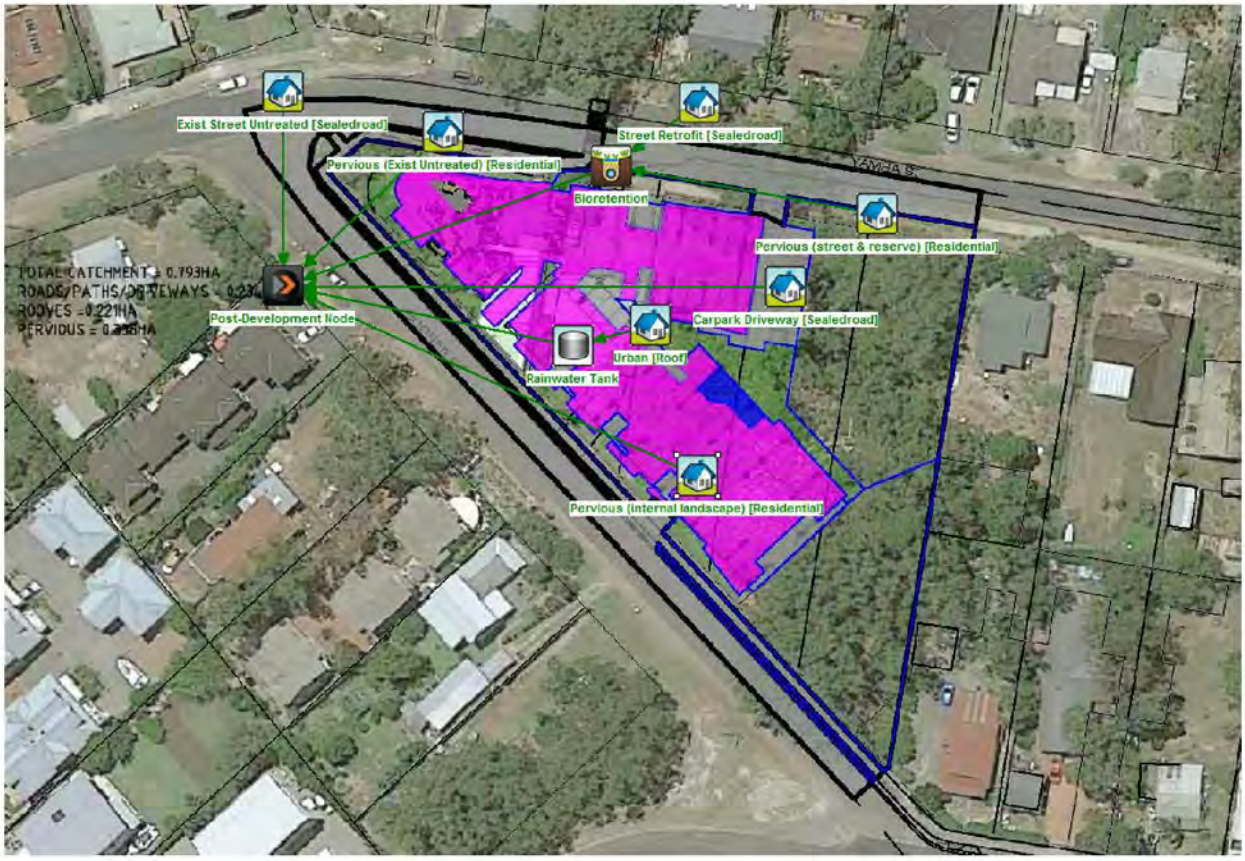


Figure 4: Proposed Development MUSIC Model

10.2.6 COMPARISON OF POLLUTANT RESULTS

Pre and post development pollutant loads are compared in the table below, and demonstrate that the Stormwater Quality Targets have been met.

Table 4: Comparison of Pre and Post-Development Pollutant Loads

	Pre-Developed	Post-Developed	NoBE Compliant
TSS (kg/yr)	1,200	898	Yes
TP (kg/yr)	2.39	1.81	Yes
TN (kg/yr)	13.0	10.9	Yes
GP (kg/yr)	112	63.6	Yes

* NoBE = Neutral or Beneficial Effect

11.0 COSTS

Installation of the rainwater tank and reticulation pump system will be undertaken at the developers expense. Ongoing operation and maintenance will be undertaken by the strata body corporation.

All stormwater infrastructure within the public road reserve will be installed at the developer's expense and will be handed over to Council as public assets.

Is it expected that the finalisation of the biofiltration systems will be deferred until the building construction is essentially completed, ensuring building activities don't compromise the newly constructed devices.

Council have previously confirmed that they believe adequately sized and designed biofiltration basins are the most cost-effective method for achieving adequate water quality treatment of urban runoff. Council are now in ownership of numerous biofiltration assets and would have a reasonable understanding of the typical ongoing maintenance costs of operating these assets in local conditions. As such, detailed assessment of ongoing maintenance costs has not been prepared as it would not provide better information that what Council already has.

12.0 OPERATION AND MAINTENANCE PLAN

12.1 BIOFILTERS

The biofilter systems that are installed in Yamba Street will need to be maintained by Council, and it is expected that would fall under the general works routinely conducted by Council maintenance staff. Council are in possession of numerous biofilter assets of similar design and should have suitably skilled and educated staff to inspect and maintain the system without further instruction. Their experience in maintaining these assets within the local environmental conditions would generally take precedence over generic guidelines otherwise available.

As a general comment, regular maintenance is required to ensure water treatment measures continue to operate in an effective way. These tasks should be performed every three months or after heavy storm events. The maintenance schedule in Appendix B has been prepared as a typical template to direct staff undertaking routine maintenance and is based on Raingardens and Bioretention Tree Pits Maintenance Plan Example, prepared by the Facility for Advancing Water Biofiltration, Monash University. Relevant sections have been reproduced and/or modified for the specific site conditions. As the biofiltration systems will be public assets, Council should already have adequately trained and skilled staff and settled biofiltration maintenance regimes and should defer to these.

All biofilter maintenance activities will need to commence as soon as biofilters are planted and brought online and continue for the life of the development.

12.2 RAINWATER HARVESTING TANK

The singular large tank within the development needs to be maintained in the same way as other smaller housing rainwater tanks. This includes checking and cleaning gutters, any first flush devices and inlet strainers regularly (quarterly), servicing the pump system as recommended by the pump supplier (typically bi-annually) and irregular tank cleaning and desludging (as required).

13.0 CONCLUSIONS

The results derived from modelling procedures indicate that long term water quality and quantity constraints are appropriately addressed in the proposed development, through the following measures:

- Construction of biofiltration swales in Yamba St,
- Installation of a 20kL (minimum) rainwater tank in the proposed strata building,
- Disposal via a groundwater recharge infiltration zone

More so, the modelling demonstrates that the development will actually have a positive impact on stormwater pollutant levels. From a stormwater quality and quantity perspective, approval is recommended.

14.0 REFERENCES

Draft NSW MUSIC Modelling Guidelines, 2010, BMT WBM

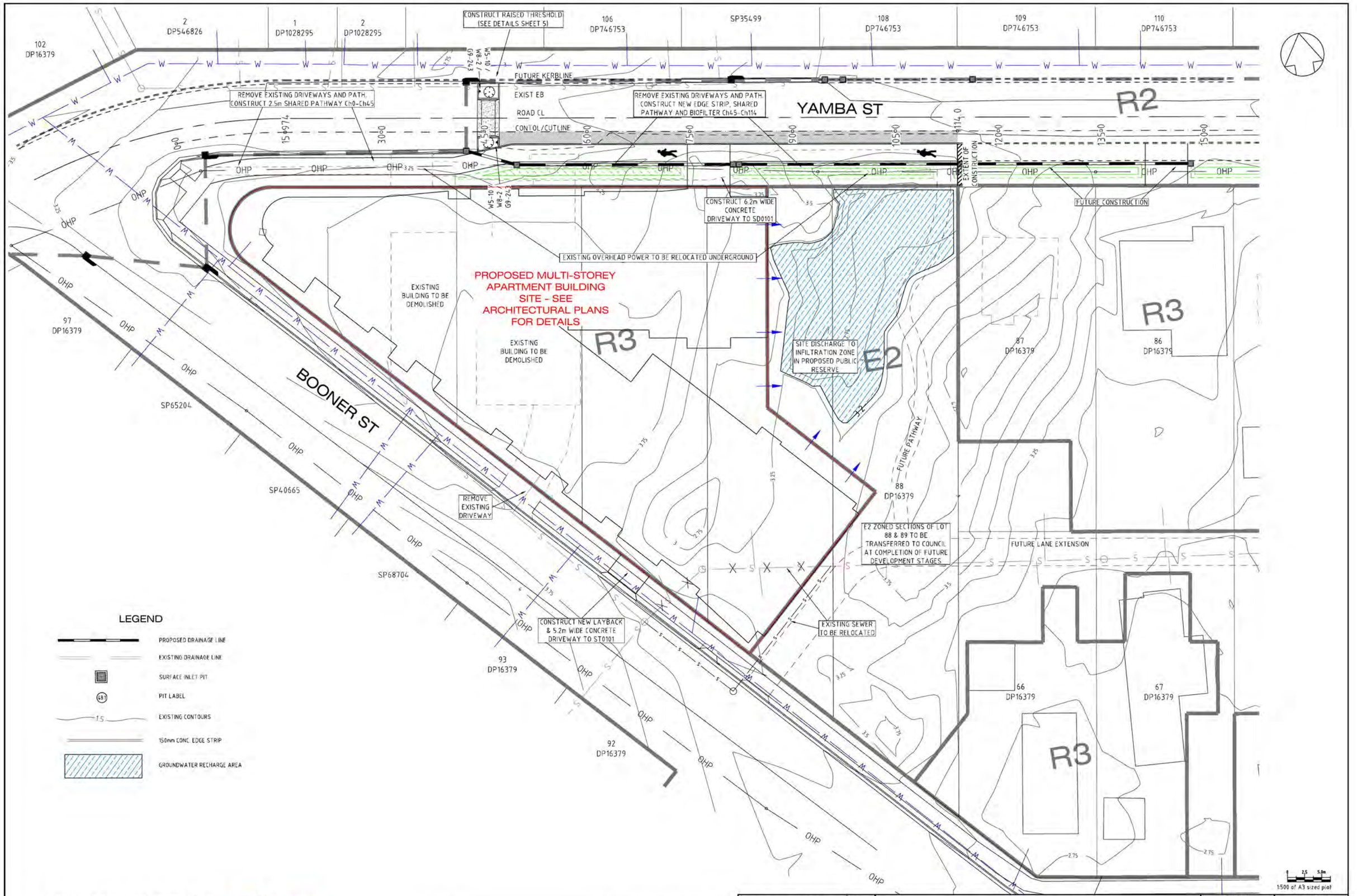
Music Version 5.0 User Manual, 2011, eWater

Policy 11: Land Development Guidelines, Section 13 Water Sensitive Urban Design, 2007, Gold Coast Council

Stormwater Flow and Quality, and the Effectiveness of Non-Proprietary Stormwater Treatment Measures, 2004, Fletcher et al

WSUD Engineering Procedures: Stormwater, 2005, Melbourne Water

APPENDIX A: PROPOSED LAYOUT & DETAIL PLANS



LEGEND

- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- SURFACE INLET PIT
- PIT LABEL
- EXISTING CONTOURS
- 150mm CONC. EDGE STRIP
- GROUNDWATER RECHARGE AREA

SERVICES SHOWN HERE ON HAVE BEEN LOCATED WHERE POSSIBLE BY FIELD SURVEY. THE EXCAVATOR/BUILDER MUST CONTACT 'DIAL BEFORE YOU DIG' BEFORE COMMENCING ANY WORK ON THE SITE.

DIAL BEFORE YOU DIG www.1100.com.au

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
A	Original Issue	AV	AV	CG*	BL*	31/8/18*

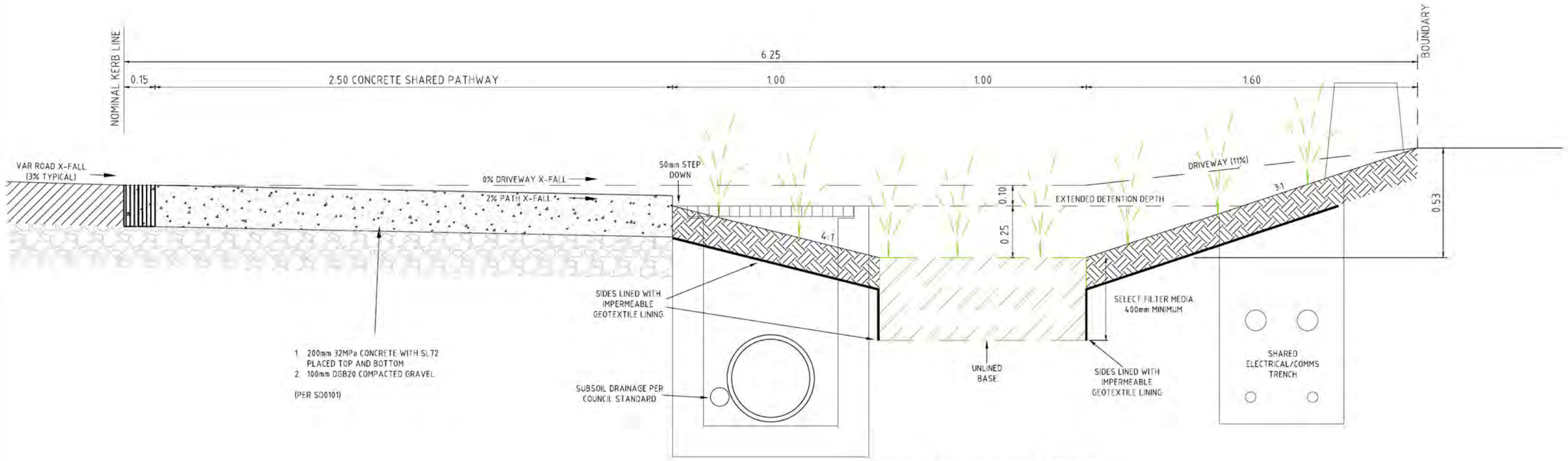
* Denote the original signature and date when revision was issued.

TATTERSALL LANDER PTY LTD
DEVELOPMENT CONSULTANTS
ENGINEERING, SURVEYING & PLANNING
2 Bourke St. P.O.Box 580
RAYMOND TERRACE 2324
Fax (02) 49871733 Phone (02) 49871500

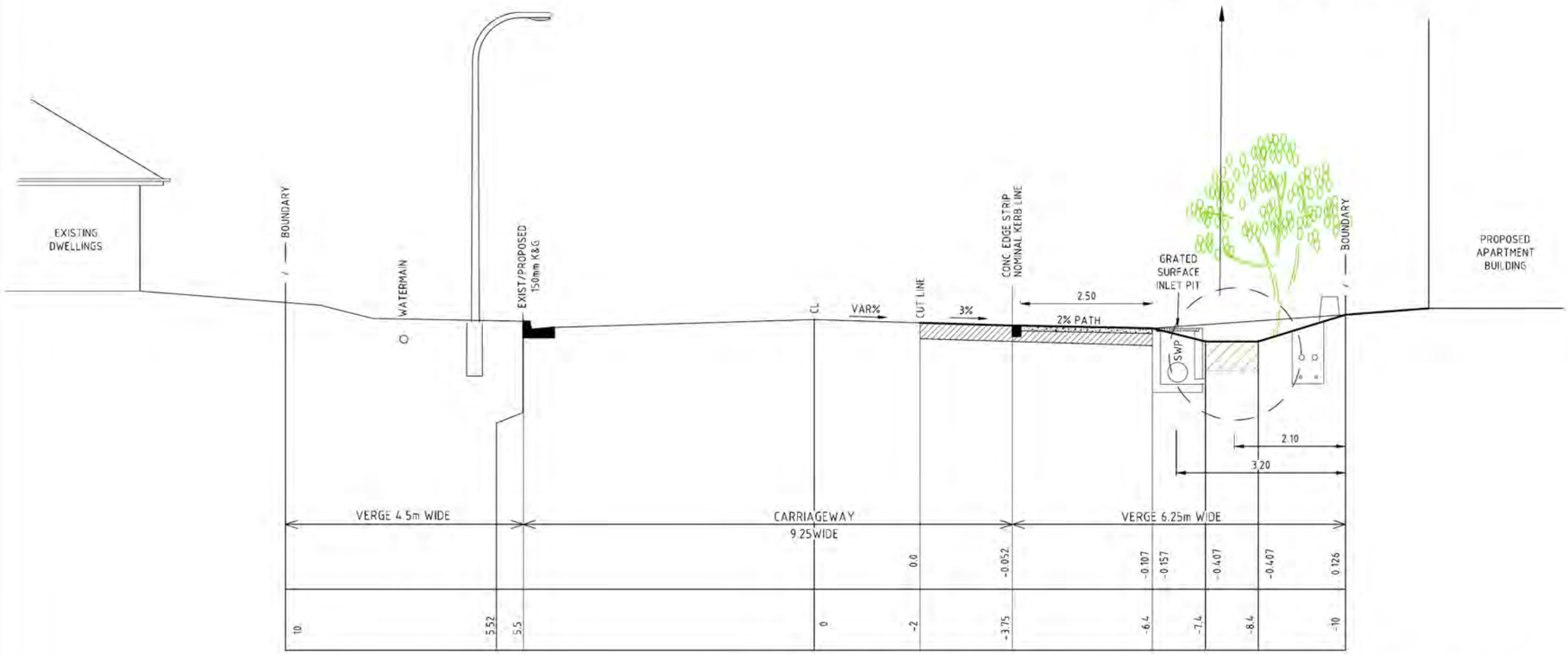
PROPOSED APARTMENT BUILDING COMPLEX

LOT 88, 89 & 90 IN DP 16379 and LOT A & B IN DP 380119 YAMBA STREET & BOONER STREET, HAWKS NEST

COUNCIL: MIDCOAST	REFERENCE: 21800099
PARISH:	SHEET SIZE: A3
SCALE: 1:500 on A3	SHEET No.: 2
DATE: Plotted 11:18 03/09/18	
CLIENT: CJHA Pty Ltd	JOB No.: 208008
COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1 Design.dwg	



TYPICAL 5.0m WIDE VERGE PROFILE
WITH BIO-FILTER DETAIL



YAMBA STREET TYPICAL SECTION

SCALE 1:100

REV	DETAILS OF AMENDMENT	DESIGNED	DRAWN	CHECKED	APPROVED	DATE
A	Original Issue	AV	AV	CG*	BL*	31/8/18*
*	Denote the original signature and date when revision was issued.					

TATTERSALL LANDER Pty Ltd
DEVELOPMENT CONSULTANTS

SCALE : 1:100 of A3 sized plot
SHEET No. : 4
JOB No. : 208008
FILE : 21800101
DATE : Plotted 11.18 03/09/18
SHEET SIZE: A3
COMPUTER FILE : S:\Clients\2008\208008\Dwg\208008 Stage 1 Design.dwg

APPENDIX B: BIOFILTER MAINTENANCE TASKS

A. Filter Media Tasks

Sediment Deposition	Remove sediment build up from the surface of bioretention swales Frequency – 3 monthly after rain
Holes or scour	Infill any holes in the filter media. Check for erosion or scour and repair, provide energy dissipation (rocks & pebbles etc) if necessary Frequency – 3 monthly after rain
Filter media surface porosity	Inspect for the accumulation of an impermeable layer (such as oily or clayey sediment) that may have formed on the surface of the filter media. A symptom may be that water remains ponded in the swale for more than a few hours after a rain event. Repair minor accumulations by raking away any mulch on the surface and scarifying the surface of the filter media between plants Frequency – 3 monthly after rain
Litter Control	Check for litter (including organic litter) in and around bioretention swales. Remove both organic and anthropogenic litter to ensure flow paths and infiltration through the filter media are not hindered. Frequency – 3 monthly after rain

B. Horticultural Tasks

Pests and Diseases	Assess plants for disease, pest infection, stunted growth or senescent plants. Treat or replace as necessary. Reduced plant density reduces pollutant removal and infiltration performance Frequency – 3 monthly after rain
Maintain original plant densities	Inspect condition of all plants. Replace and dead plants immediately to maintain a minimum density of 4 plants per square metre Frequency – 3 monthly after rain
Drought / Extreme Heat	In periods of prolonged drought or extreme heat, the condition of plantings and site lawn coverage should to be monitored for signs of stress. Watering may be required to ensure plant survival Frequency – As required

Weeds	It is important to identify the presence of any rapidly spreading weeds as they occur. The presence of such weeds can reduce dominate species distributions and diminish aesthetics. Weed species can also compromise the systems long term performance. Inspect for and manually remove weed species. Application of herbicide should be limited to a wand or restrictive spot spraying due to the fact that the swales are directly connected to the stormwater system Frequency – 3 monthly after rain
Grassed buffer strip	Grassed buffer strips treat runoff as it flows off the roads, before it enters the bioretention swales. Maintaining a healthy grass cover is important, but the use of fertilisers should be kept to a minimum given their proximity to the drainage network
Lawn Fertiliser	Healthy site grass coverage is important for pollutant treatment, topsoil erosion control and aesthetics. However, if not correctly used, fertilisers can damage the downstream environment. A low Phosphorus fertiliser with restricted leaching properties such as a Fused Calcium Magnesium Phosphate or TNN Industries 'Formula 1', or equivalent is ideal. The application of fertiliser should be restricted to a maximum of twice a year

C. Drainage Tasks

Perforated Pipe	Ensure that perforated pipes are not blocked to prevent filter media and plants from becoming waterlogged. A small steady clear flow of water may be observed discharging from the perforated pipe at its connection into the downstream pit some hours after rainfall. Note that smaller rainfall events after dry weather may be completely absorbed by the filter media and not result in flow. Remote camera (eg CCTV) inspection of pipelines for blockage and structural integrity could be useful. Flushing of lines from the flushing points may be required. Frequency – 6 monthly after rain
High flow inlet pits, overflow pits and other stormwater junction pits	Ensure inflow areas and grates over pits are clear of litter and debris and in good and safe condition. A blocked grate would cause nuisance flooding of adjoining areas. Inspect for dislodged or damaged pit covers and ensure general structural integrity. Remove sediment from pits and entry sites (likely to be an irregular occurrence in mature catchment). Frequency – monthly and occasionally after rain