SECTION 4.55 APPLICATION

PROJECT:
IVANHOE ESTATE (LOT C1)
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

PROJECT No:
5800

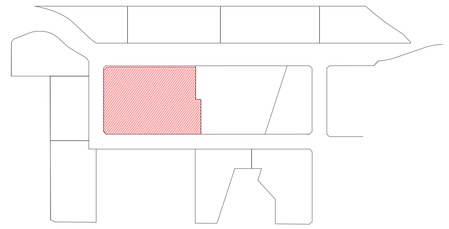
DATE:
9 DECEMBER 2020

ISSUE:
B

ARCHITECT:

CANDALEPAS ASSOCIATES
309 SUSSEX STREET
SYDNEY NSW 2000
T: 9283 7755 F: 9283 7477

LOCATION PLAN:



DRAWING SCHEDULE

S455 1000 COVER SHEET

S455 1050 SITE PLAN

S455 1102 BASEMENT 3 FLOOR PLAN
S455 1103 BASEMENT 2 FLOOR PLAN
S455 1104 BASEMENT 1 FLOOR PLAN

S455 1105 LOWER GROUND FLOOR PLAN
S455 1106 UPPER GROUND FLOOR PLAN
S455 1107 LEVEL 1 FLOOR PLAN
S455 1108 LEVEL 2 FLOOR PLAN
S455 1109 LEVEL 3 – 4 FLOOR PLAN
S455 1110 LEVEL 5 – 12 FLOOR PLAN
S455 1111 LEVEL 13 FLOOR PLAN
S455 1112 LEVEL 14 – 19 FLOOR PLAN
S455 1113 ROOF PLAN

S455 1150 ADAPTABLE UNIT FLOOR PLANS

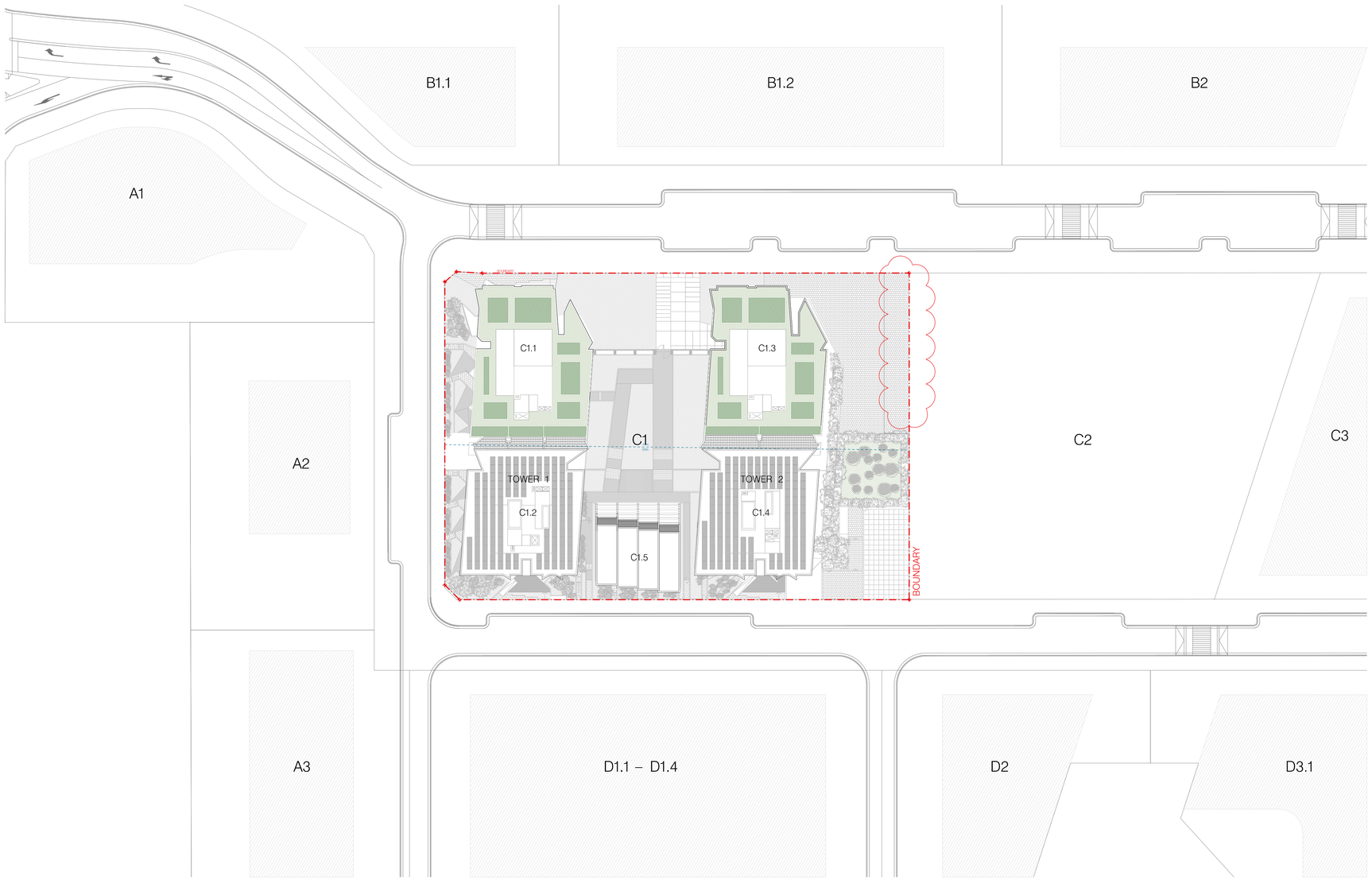
S455 1200 SECTION A
S455 1201 SECTION B
S455 1202 SECTION C

S455 1300 NORTH EAST ELEVATION
S455 1301 NORTH WEST ELEVATION
S455 1302 NORTH WEST INTERNAL ELEVATION
S455 1303 SOUTH EAST ELEVATION
S455 1304 SOUTH EAST INTERNAL ELEVATION
S455 1305 SOUTH WEST ELEVATION

S455 1600 SOLAR & VENTILATION DIAGRAMS – SHEET 1
S455 1601 SOLAR & VENTILATION DIAGRAMS – SHEET 2
S455 1602 SOLAR & VENTILATION DIAGRAMS – SHEET 3

S455 1850 AREA CALCULATIONS

S455 1851 APARTMENT STORAGE AREA CALCULATIONS



01 – SITE PLAN
1:500

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Drawing Original Size	Description
B	08.12.20	A1	FOR SUB TO CLIENT
A	02.12.20		FOR SUB TO CLIENT

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NSW ARCHITECTS REG No. – 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:500@A1 / 1:1000@A3
0 50 100 200m

NORTH

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: SITE PLAN
DRAWING No. S4.55–1050

JOB No. 5800
ISSUE B

01 — BASEMENT 3 FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Drawing Original Size: A1
B	09.12.20	FOR S4.55 TO CLIENT
A	02.12.20	FOR S4.55 TO CLIENT

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

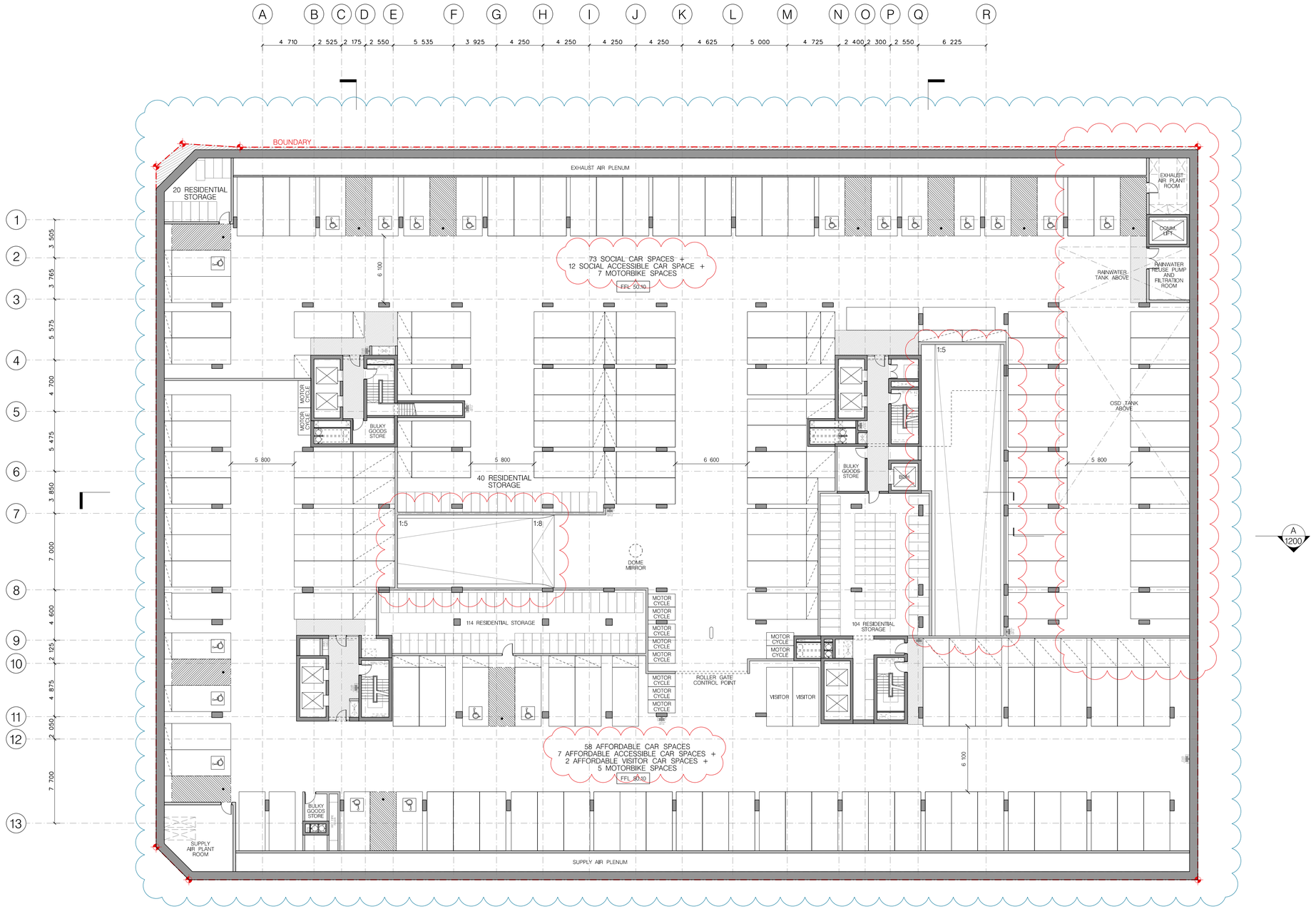
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK-FP

DRAWING:
BASEMENT 3 FLOOR PLAN

DRAWING No.
S4.55–1102

JOB No. 5800

ISSUE B



01 — BASEMENT 2 FLOOR PLAN
1:200

MAJOR AMENDMENTS MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size
B	09.12.20	FOR S4.55 TO CLIENT	A1
A	02.12.20	FOR S4.55 TO CLIENT	

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

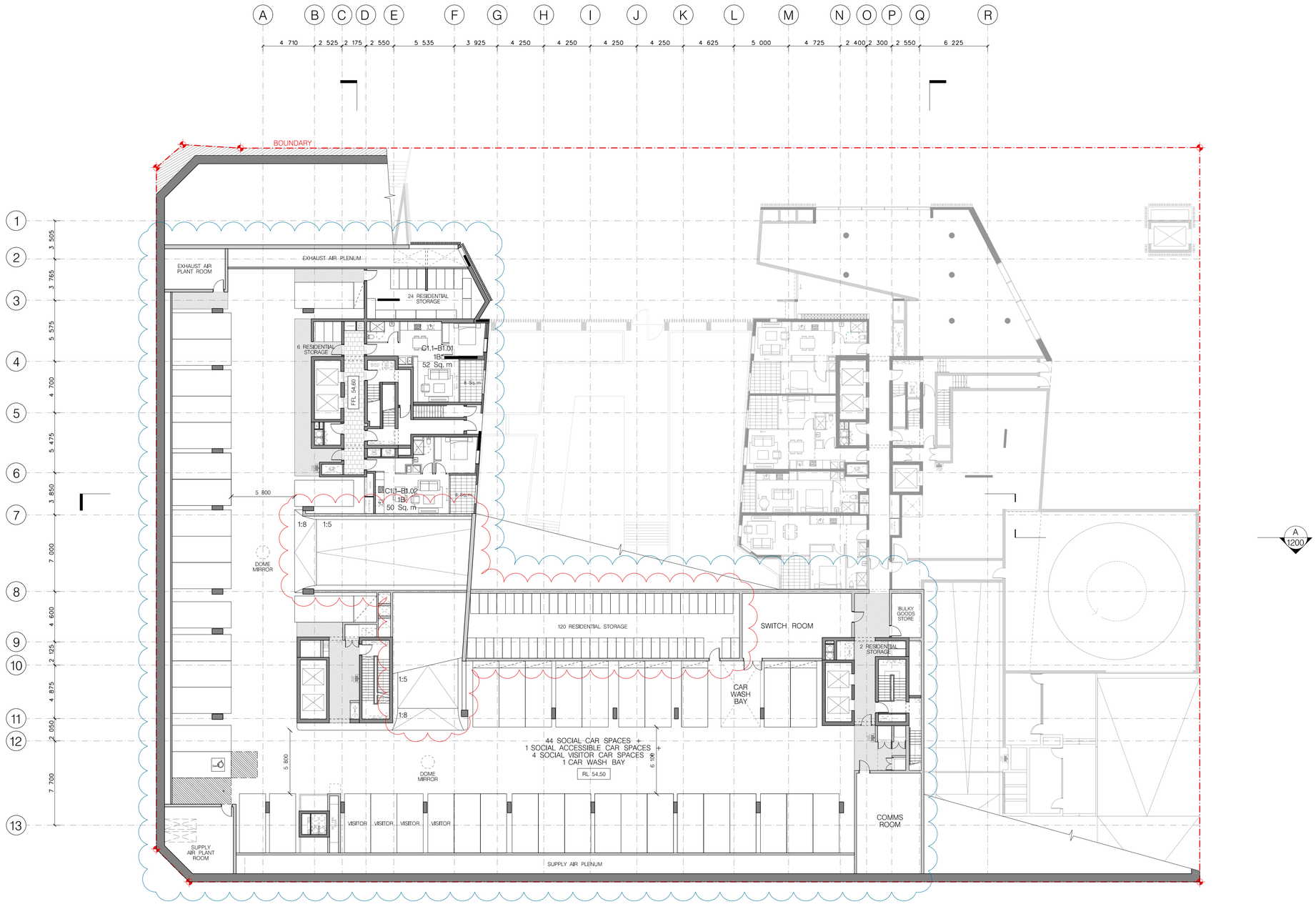
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK+FP

DRAWING:
BASEMENT 2 FLOOR PLAN
DRAWING No.
S4.55–1103

JOB No. 5800
ISSUE B



01 — BASEMENT 1 FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

B.	03.12.20	FOR S4.55 TO CLIENT	A1
A.	02.12.20	FOR S4.55 TO CLIENT	
Issue	Date	Description	

Drawing Original Size

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK-FP

DRAWING:
BASEMENT 1 FLOOR PLAN

DRAWING No.
S4.55–1104

JOB No. 5800

ISSUE B

01 — LOWER GROUND FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size
B	09.12.20	FOR S4.55 TO CLIENT	A1
A	02.12.20	FOR S4.55 TO CLIENT	

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: LOWER GROUND FLOOR PLAN
DRAWING No. S4.55–1105

JOB No. 5800
ISSUE B

01 — UPPER GROUND FLOOR PLAN
1:200

MAJOR AMENDMENTS
MINOR AMENDMENTS

Issue	Date	Description
B	09.12.20	FOR S4.55 TO CLIENT
A	02.12.20	FOR S4.55 TO CLIENT

Drawing Original Size: A1

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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
UPPER GROUND FLOOR PLAN

DRAWING No.
S4.55–1106

JOB No. 5800
ISSUE B

SOCIAL ILU

LEVEL 1 PLAN

01 – LEVEL 1 FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size: A1
B	09.12.20	FOR SALES TO CLIENT	
A	03.12.20	FOR SALES TO CLIENT	

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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

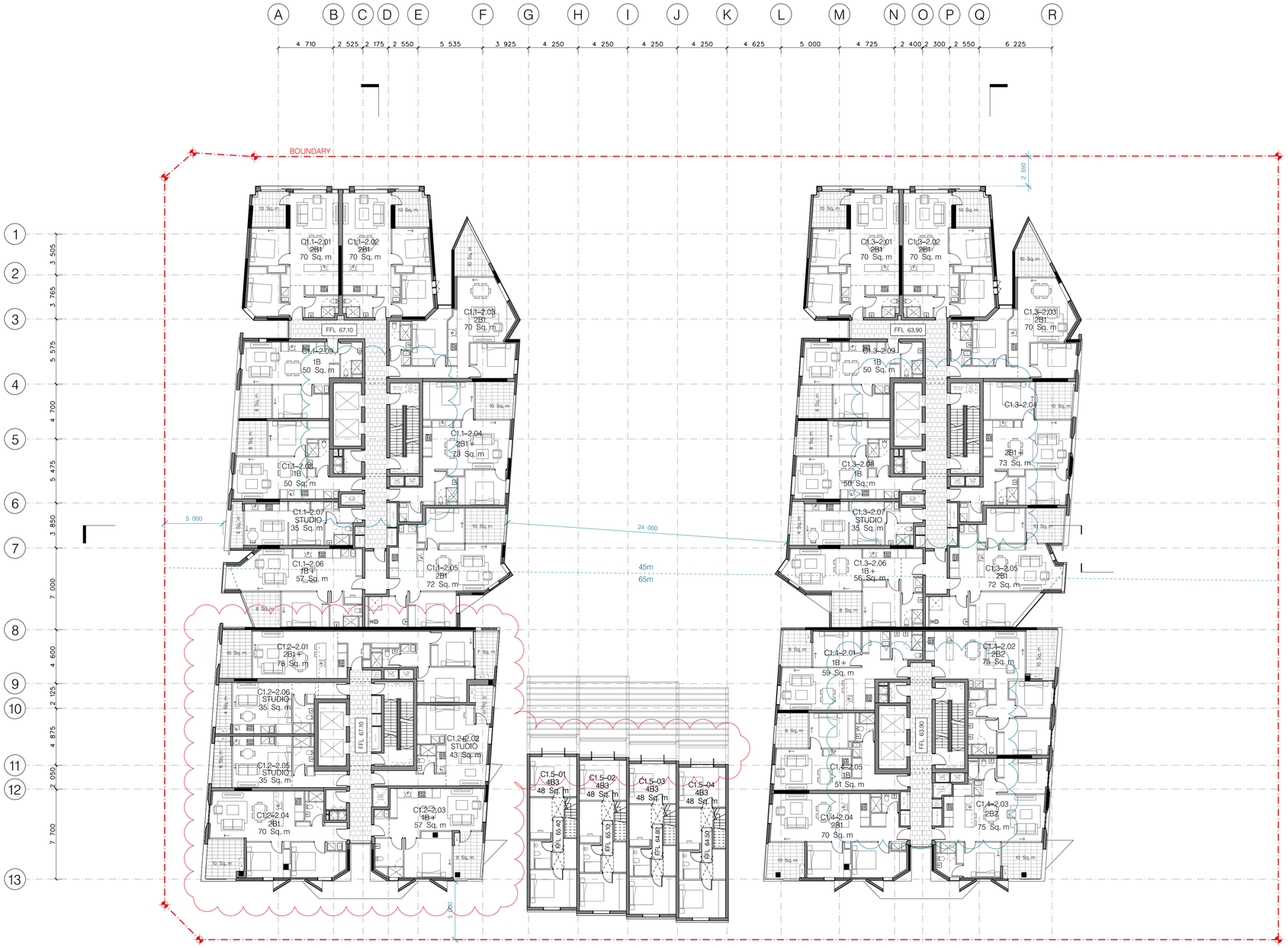
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: BR
DRAWN BY: MK/FP

DRAWING:
LEVEL 1 FLOOR PLAN

DRAWING No.
S4.55–1107

JOB No. 5800

ISSUE B



SOCIAL ILU

LEVEL 2 PLAN

A 1200

01 – LEVEL 2 FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description
B	09.12.20	FOR S4.55 TO CLIENT
A	03.12.20	FOR S4.55 TO CLIENT

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

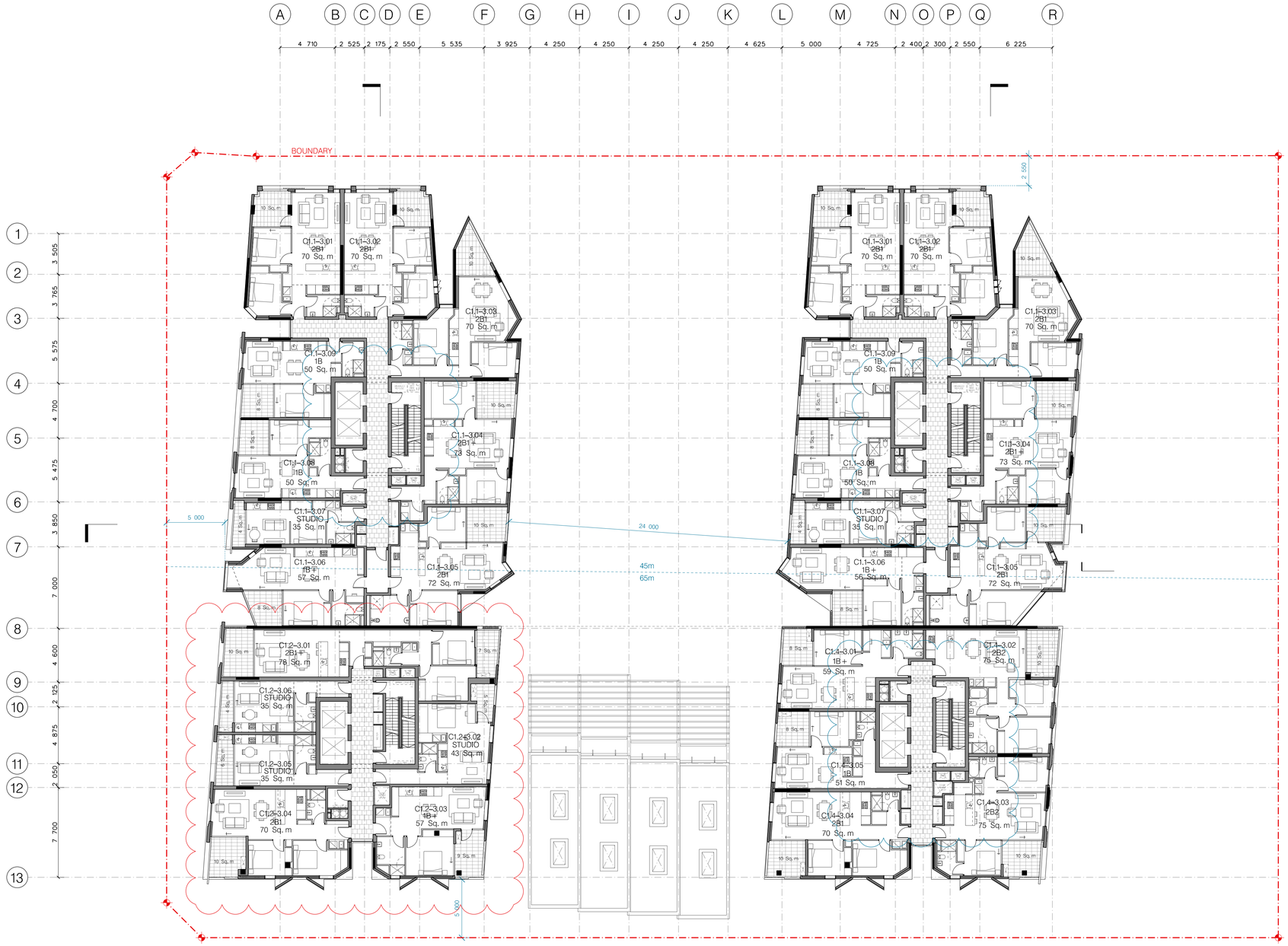
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
LEVEL 2 FLOOR PLAN

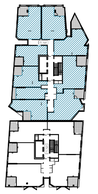
DRAWING No.
S4.55–1108

ISSUE
B

JOB No.
5800



SOCIAL ILU



LEVELS 3–4 PLAN

A 1200

01 – LEVEL 3 – 4 FLOOR PLAN
1:200

Rev	Date	Description	Drawing Original Size
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A	02.12.20	FOR SALE TO CLIENT	

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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

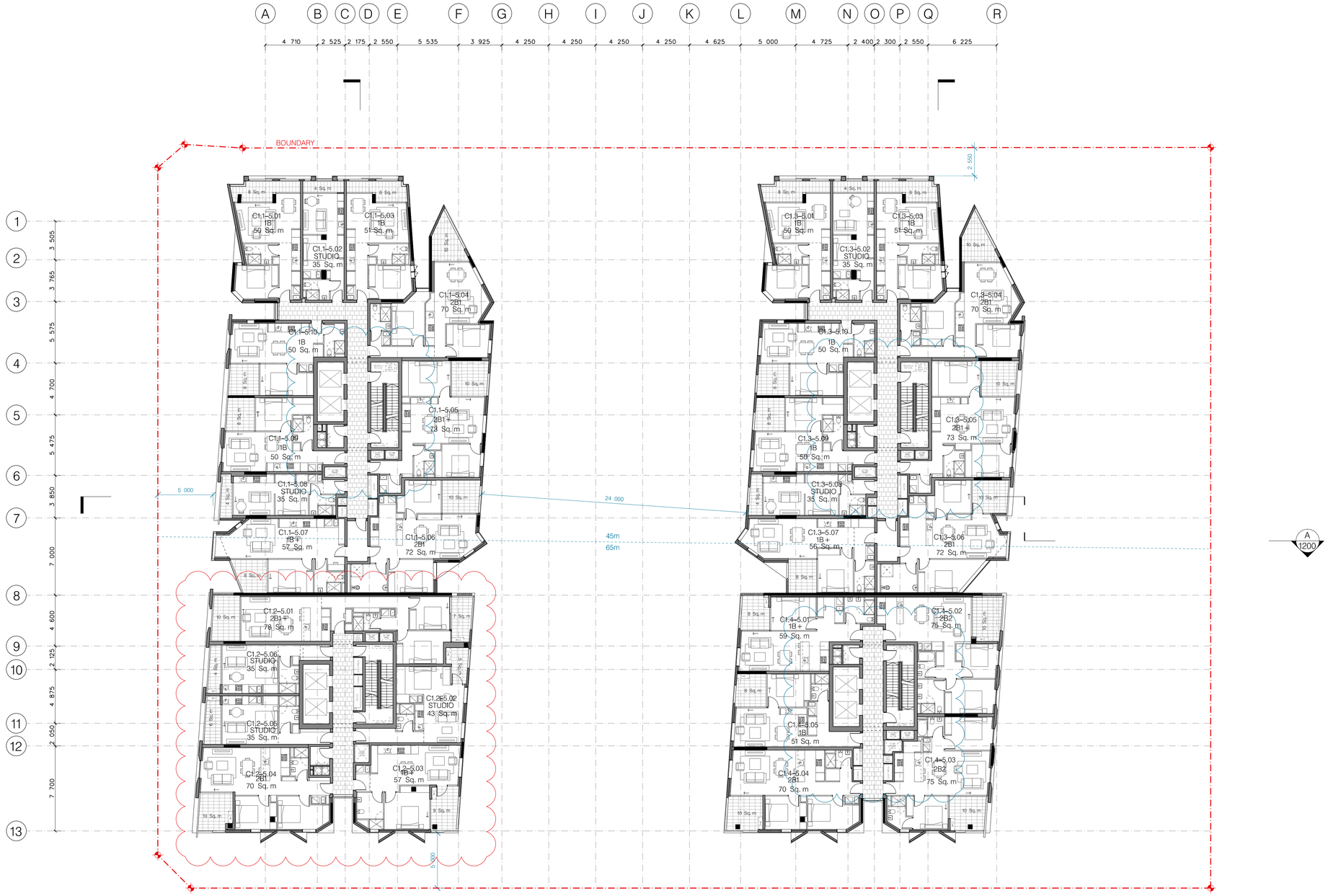
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
LEVEL 3 – 4
FLOOR PLAN

DRAWING No.
S4.55–1109

ISSUE
B

JOB No.
5800



01 / – LEVEL 5 – 12 FLOOR PLAN
1:200

MAJOR AMENDMENTS MINOR AMENDMENTS

Issue	Date	Description
B	09.12.20	FOR S4.55 TO CLIENT
A	02.12.20	FOR S4.55 TO CLIENT

Drawing Original Size: A1

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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

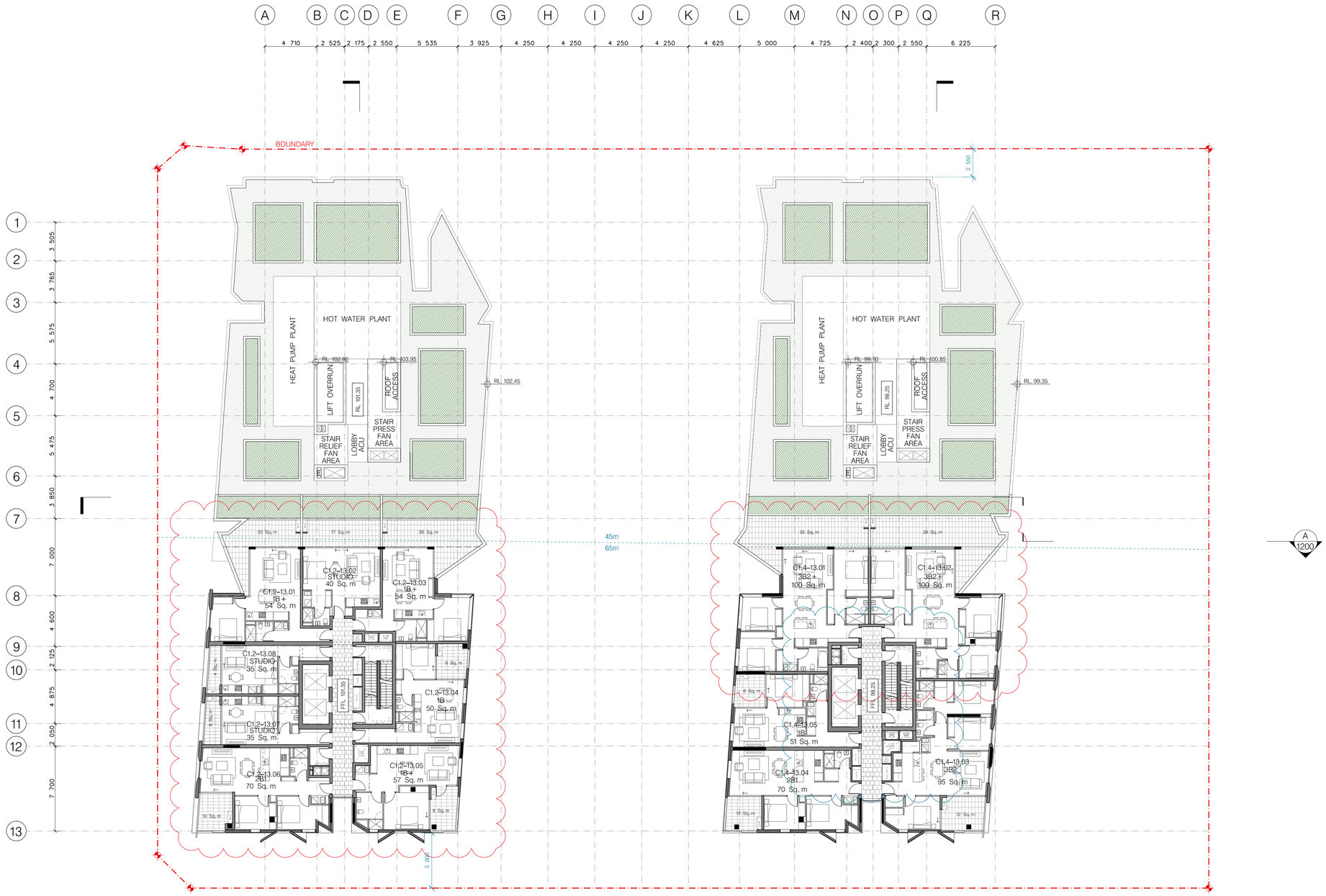
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
LEVEL 5 – 12 FLOOR PLAN

DRAWING No.
S4.55–1110

JOB No. 5800
ISSUE B



A 1200
B 1201
C 1202

01 — LEVEL 13 FLOOR PLAN
1:200

MAJOR AMENDMENTS
MINOR AMENDMENTS

Issue	Date	Drawing Original Size	Description
B	09.12.20	A1	FOR S4.55 TO CLIENT
A	02.12.20		FOR S4.55 TO CLIENT

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NSW ARCHITECTS REG No,– 5773

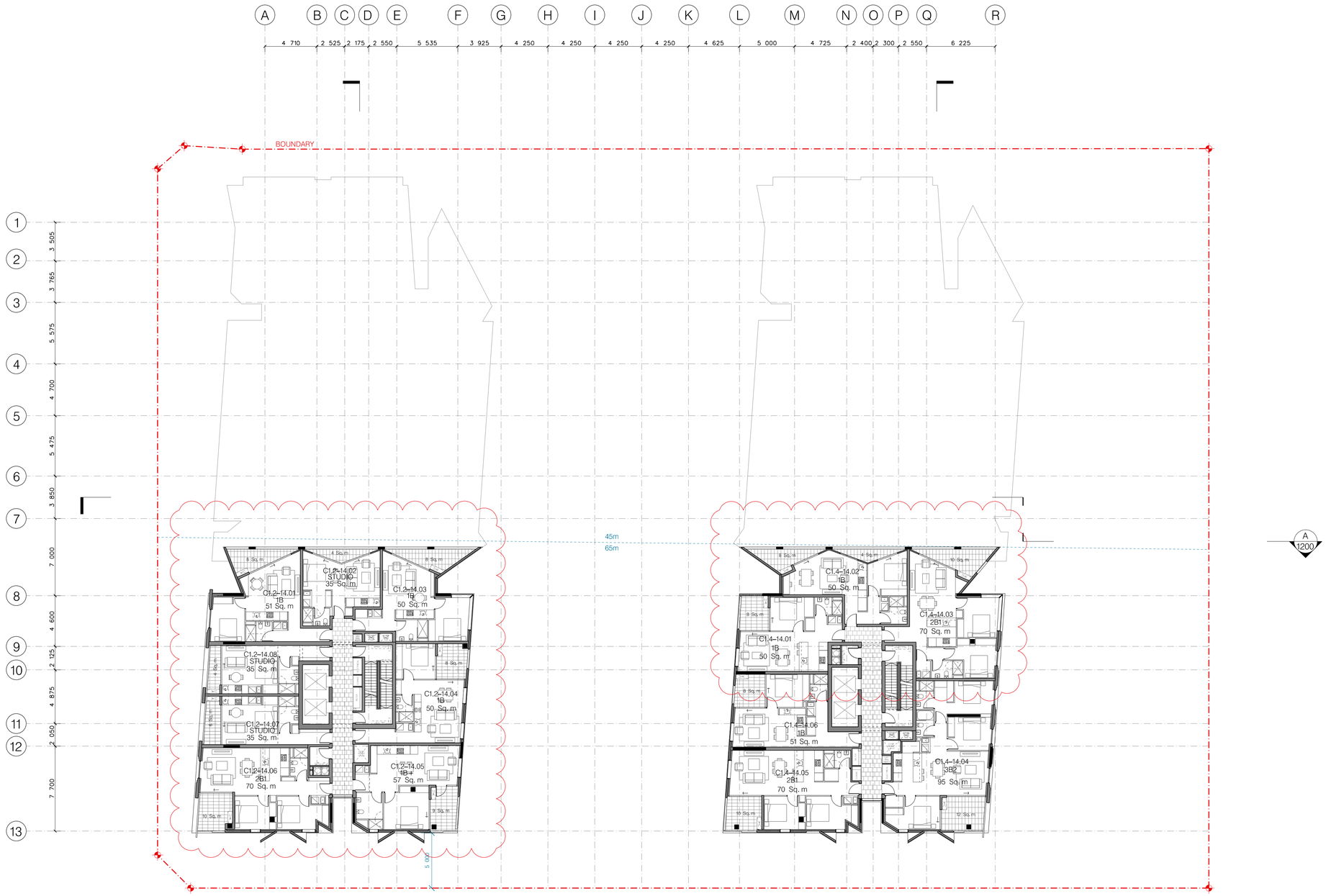
PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
LEVEL 13 FLOOR PLAN
DRAWING No.
S4.55–1111

JOB No. 5800
ISSUE B



A 1200

B 1201

C 1202

01 – LEVEL 14 – 19 FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Drawing Original Size	Description
B	09.12.20	A1	FOR S4.55 TO CLIENT
A	02.12.20		FOR S4.55 TO CLIENT

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

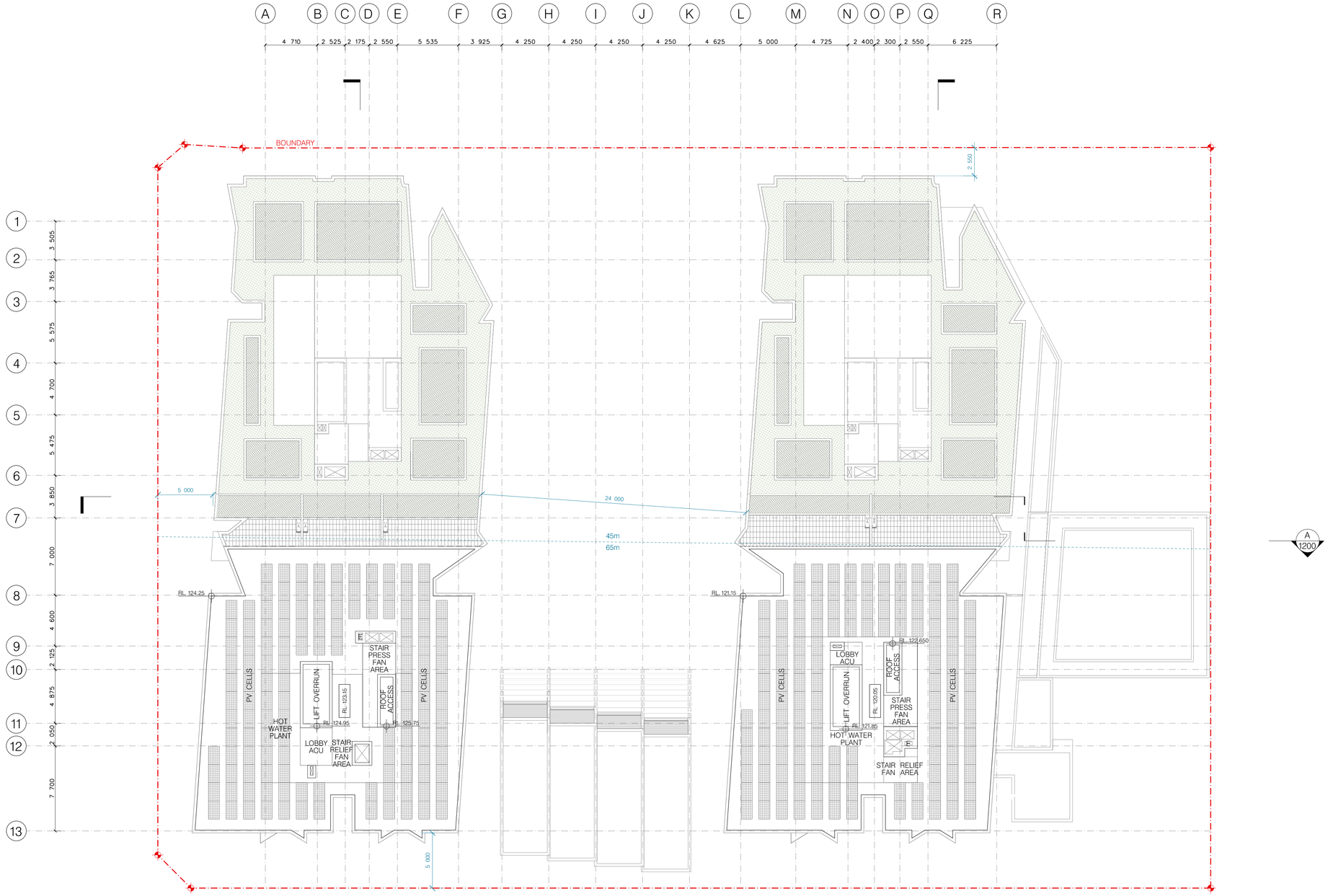
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
LEVEL 14 – 19 FLOOR PLAN

DRAWING No.
S4.55–1112

JOB No. 5800

ISSUE B



B 1201

C 1202

A 1200

01 — ROOF PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size
B	09.12.20	FOR S4.55 TO CLIENT	A1
A	03.12.20	FOR S4.55 TO CLIENT	

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

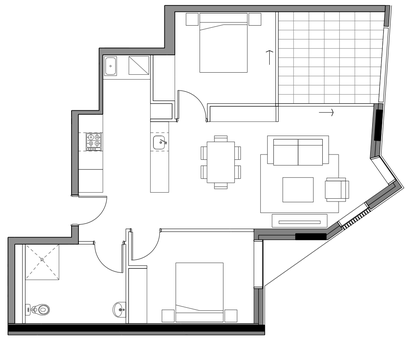
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

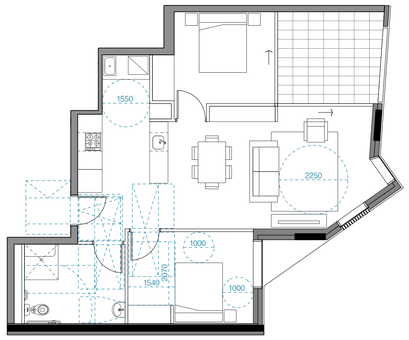
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: ROOF PLAN
DRAWING No. S4.55–1113

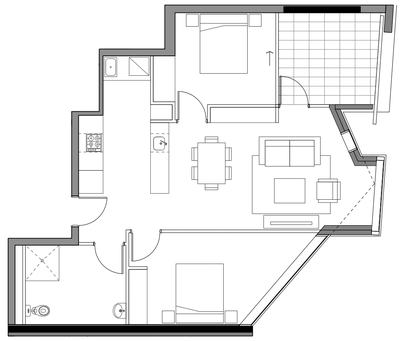
JOB No. 5800
ISSUE B



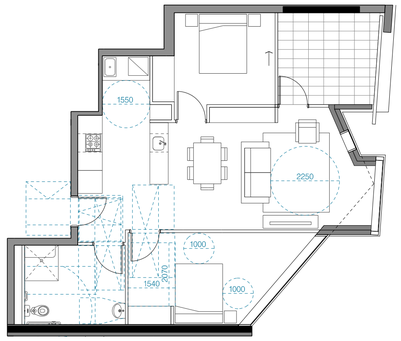
01 — 2–BED UNIT PRE ADAPTATION
1:100 6x SOCIAL UNITS LEVELS UG–5



02 — 2–BED UNIT POST ADAPTATION
1:100

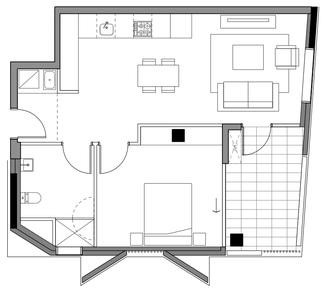


03 — 2–BED UNIT PRE ADAPTATION
1:100 7x SOCIAL UNITS LEVELS UG–6

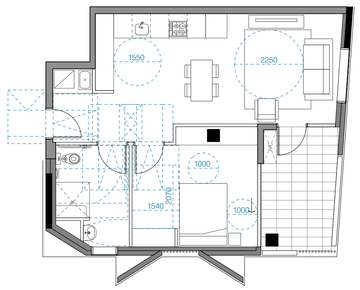


04 — 2–BED UNIT POST ADAPTATION
1:100

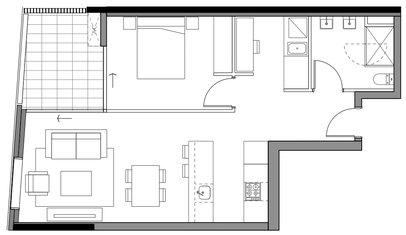
09 — TYPICAL FLOOR KEY PLAN
1:750



05 — 1–BED UNIT PRE ADAPTATION
1:100 7x AFFORDABLE UNITS LEVELS 2–8

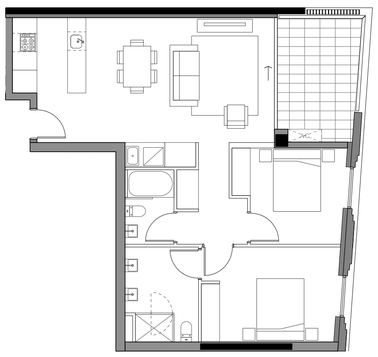


06 — 1–BED UNIT POST ADAPTATION
1:100

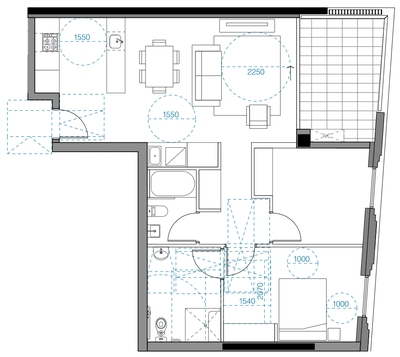


07 — 1–BED UNIT PRE ADAPTATION
1:100 3x MARKET UNITS LEVELS 2–4

08 — 1–BED UNIT POST ADAPTATION
1:100



09 — 2–BED UNIT PRE ADAPTATION
1:100 3x MARKET UNITS LEVELS 1–3



10 — 2–BED UNIT POST ADAPTATION
1:100

MAJOR AMENDMENTS

MINOR AMENDMENTS

B	08.12.20	FOR S4.55 TO CLIENT	A1
A	02.12.20	FOR S4.55 TO CLIENT	
Issue	Date	Description	

Drawing Original Size

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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:100@A1 / 1:200@A3
0 0.5m 1m 2m 4m

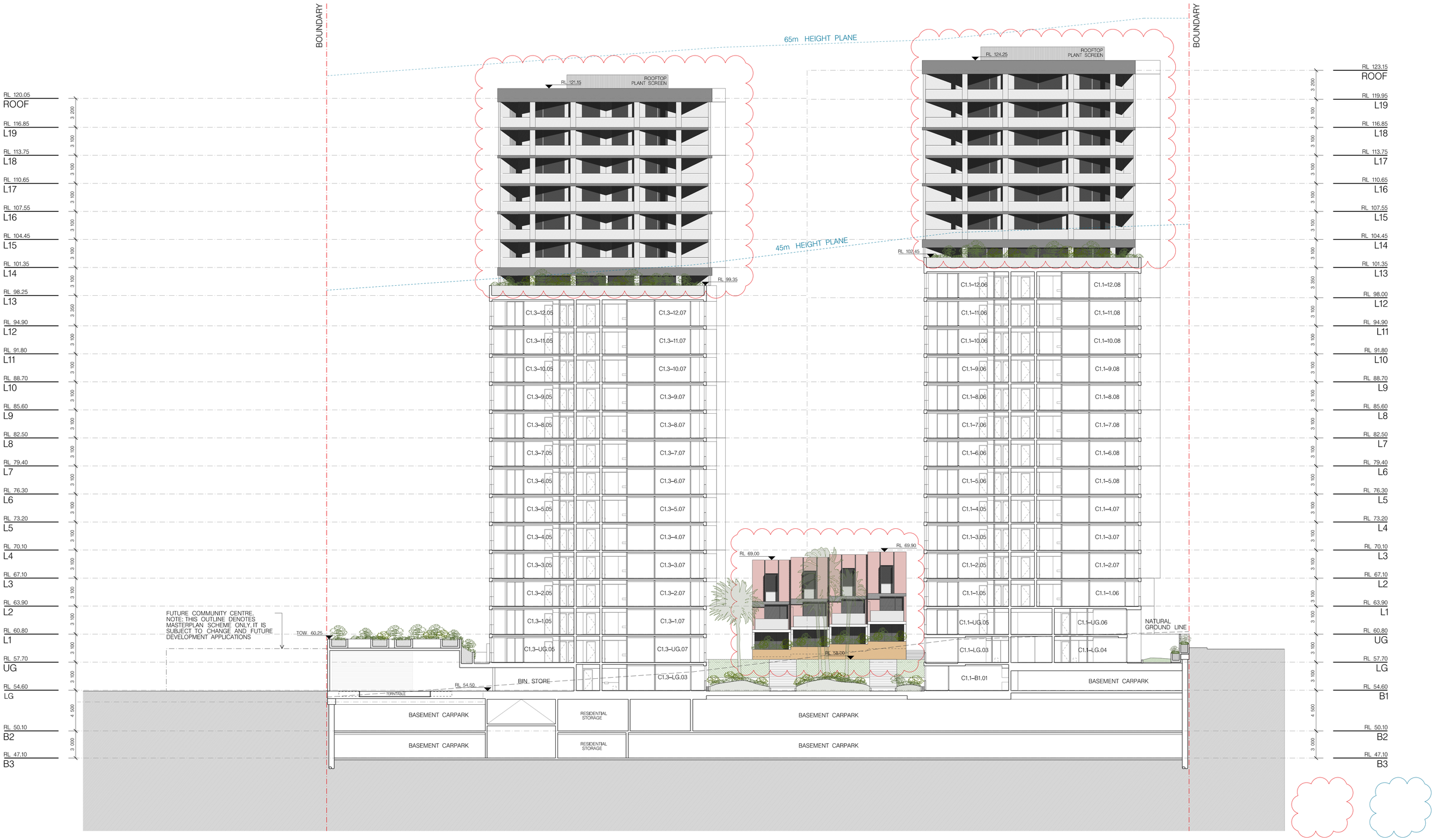
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
ADAPTABLE UNIT FLOOR PLANS

DRAWING No.
S4.55–1150

JOB No. 5800

ISSUE B



01 — SECTION A
1:200

Issue	Date	Drawing Original Size	Description
B	09.20	A1	FOR S4.55 TO CLIENT
A	02.20		FOR S4.55 TO CLIENT

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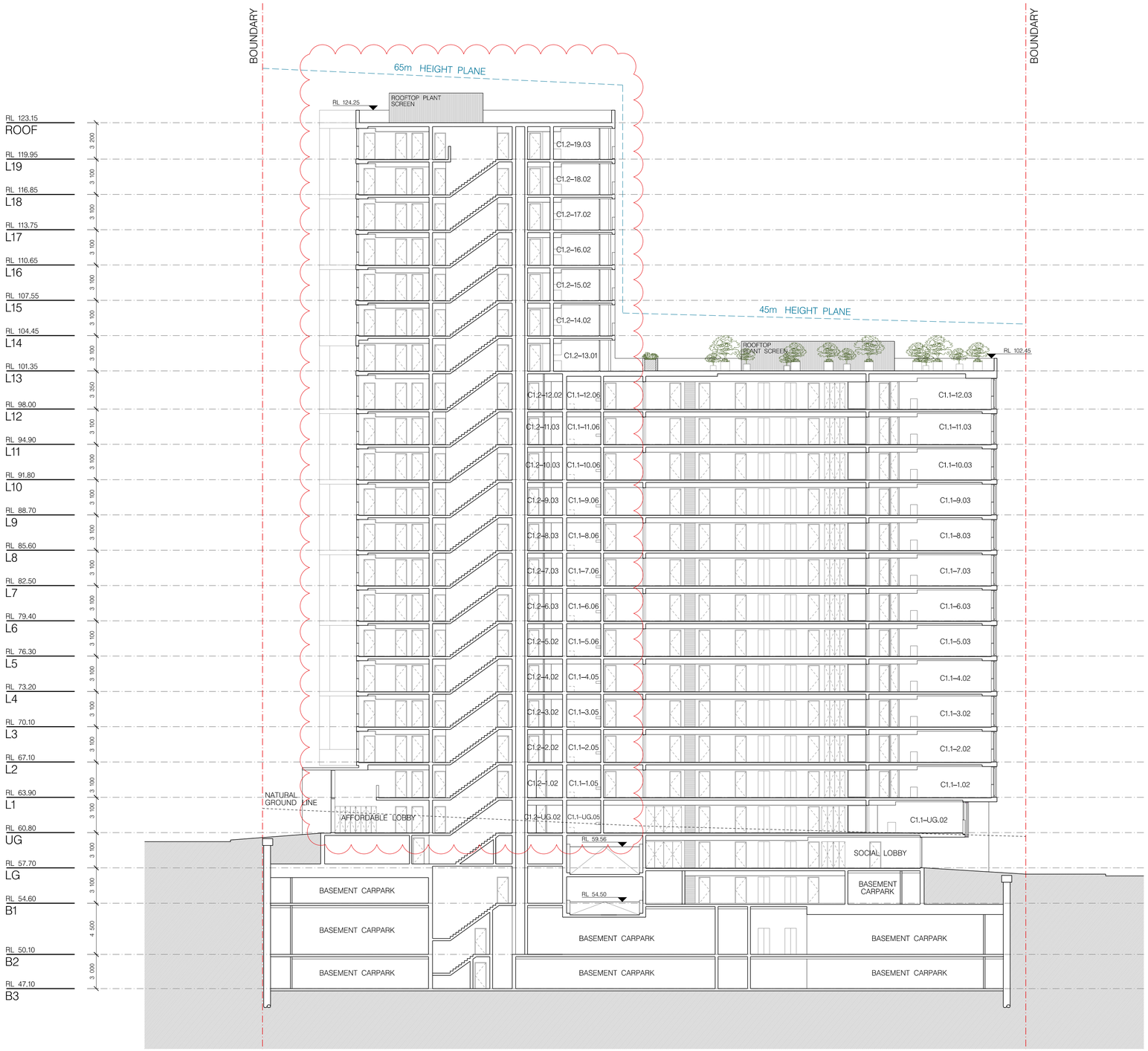
PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: SECTION A
DRAWING No. S4.55–1200
JOB No. 5800
ISSUE B



MAJOR AMENDMENTS

MINOR AMENDMENTS

01 SECTION B
1:200

Issue	Date	Drawing Original Size	Description
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A	02.01.20		FOR S4.55 TO CLIENT

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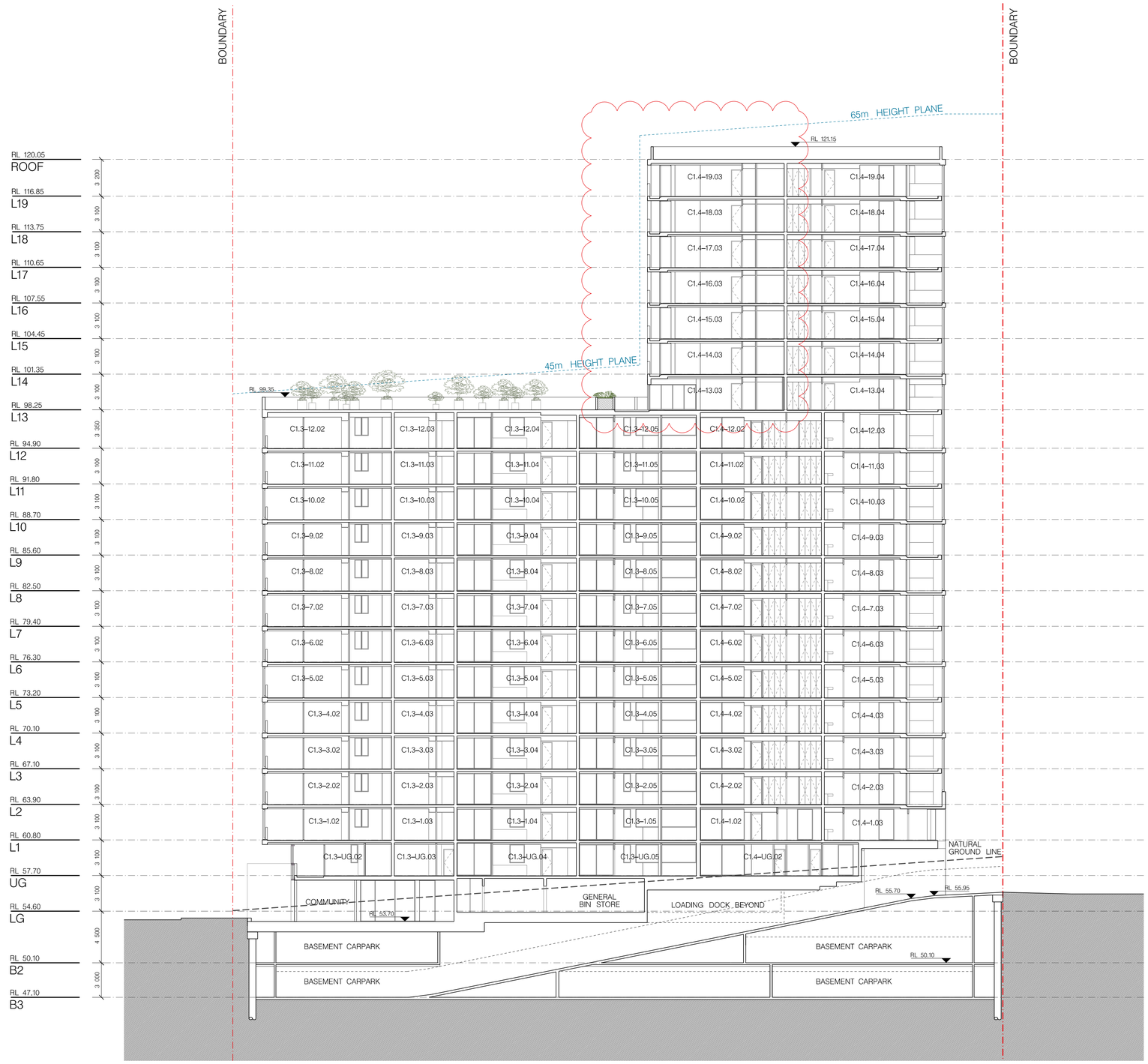
PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: SECTION B
DRAWING No. S4.55–1201

JOB No. 5800
ISSUE B



MAJOR AMENDMENTS

MINOR AMENDMENTS

01 SECTION C
1:200

Issue	Date	Drawing Output Size	Description
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A	02.12.20		FOR S4.55 TO CLIENT

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

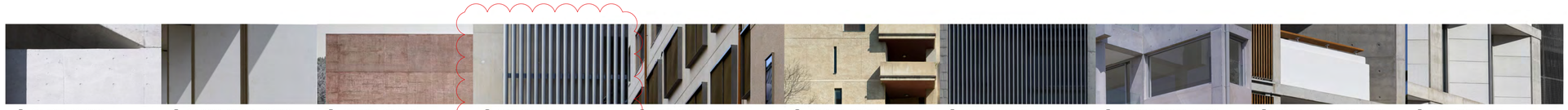
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: SECTION C
DRAWING No. S4.55–1202

JOB No. 5800
ISSUE B

01 — NORTH EAST ELEVATION
1:200



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– PEDEVILLA ARCHITECTS

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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description
B	09.12.20	FOR S4.55 TO CLIENT
A	02.12.20	FOR S4.55 TO CLIENT

Drawing Original Size: A1

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NSW. ARCHITECTS REG No.– 5773

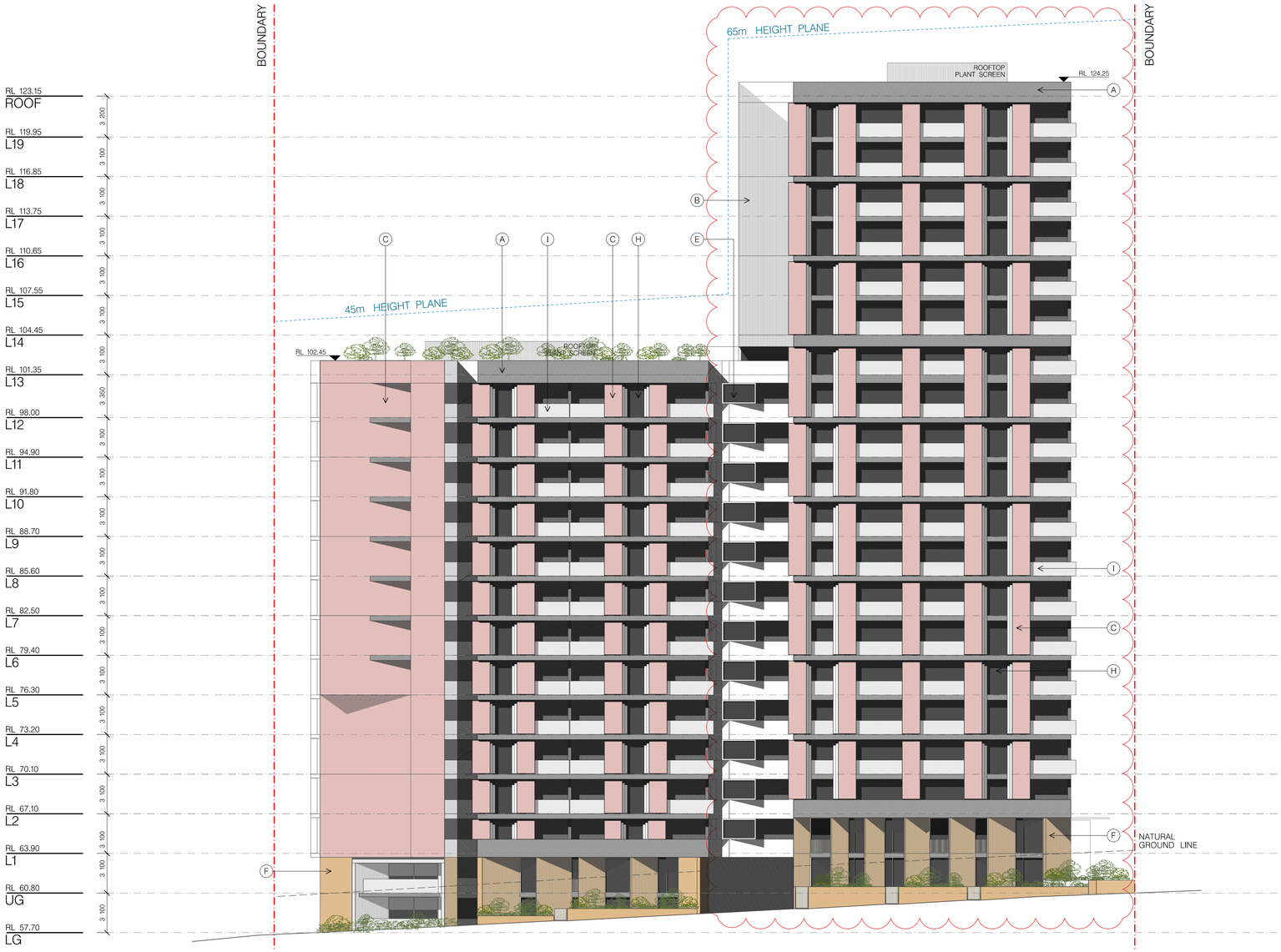
PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

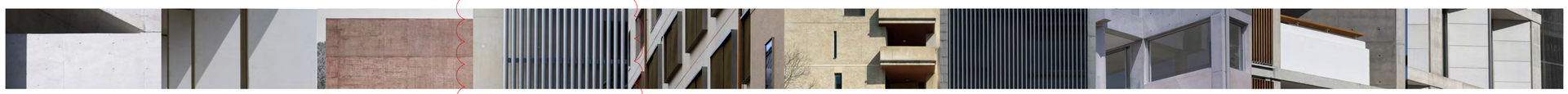
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
NORTH EAST ELEVATION
DRAWING No.
S4.55–1300

JOB No. 5800
ISSUE B



01 — NORTH WEST ELEVATION
1:200



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MAJOR AMENDMENTS

MINOR AMENDMENTS

B 28.8.20 FOR S4.55 TO CLIENT
A 05.12.20 FOR S4.55 TO CLIENT
Issue Date Description

Drawing Original Size: A1

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NSW ARCHITECTS REG No. – 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

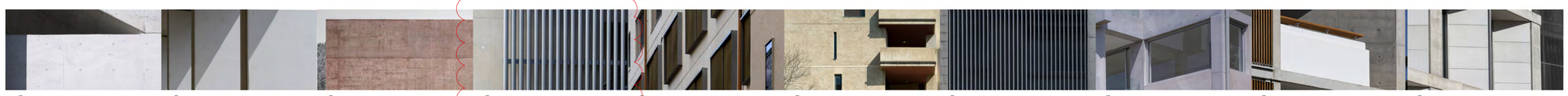
DRAWING:
NORTH WEST ELEVATION

DRAWING No.
S4.55–1301

JOB No. 5800

ISSUE B

01 — NORTH WEST INTERNAL ELEVATION
1:200



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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawn by	Chkd
B	08.12.20	FOR SUB TO CLIENT		
A	02.12.20	FOR SUB TO CLIENT		

A1

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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

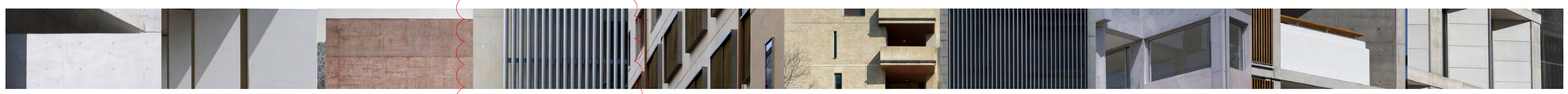
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
NORTH WEST INTERNAL ELEVATION
DRAWING No.
S4.55–1302

JOB No. 5800
ISSUE B

01 — SOUTH EAST ELEVATION
1:200



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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size
B	03.12.20	FOR S4.55 TO CLIENT	A1
A	02.12.20	FOR S4.55 TO CLIENT	

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NSW ARCHITECTS REG No. – 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

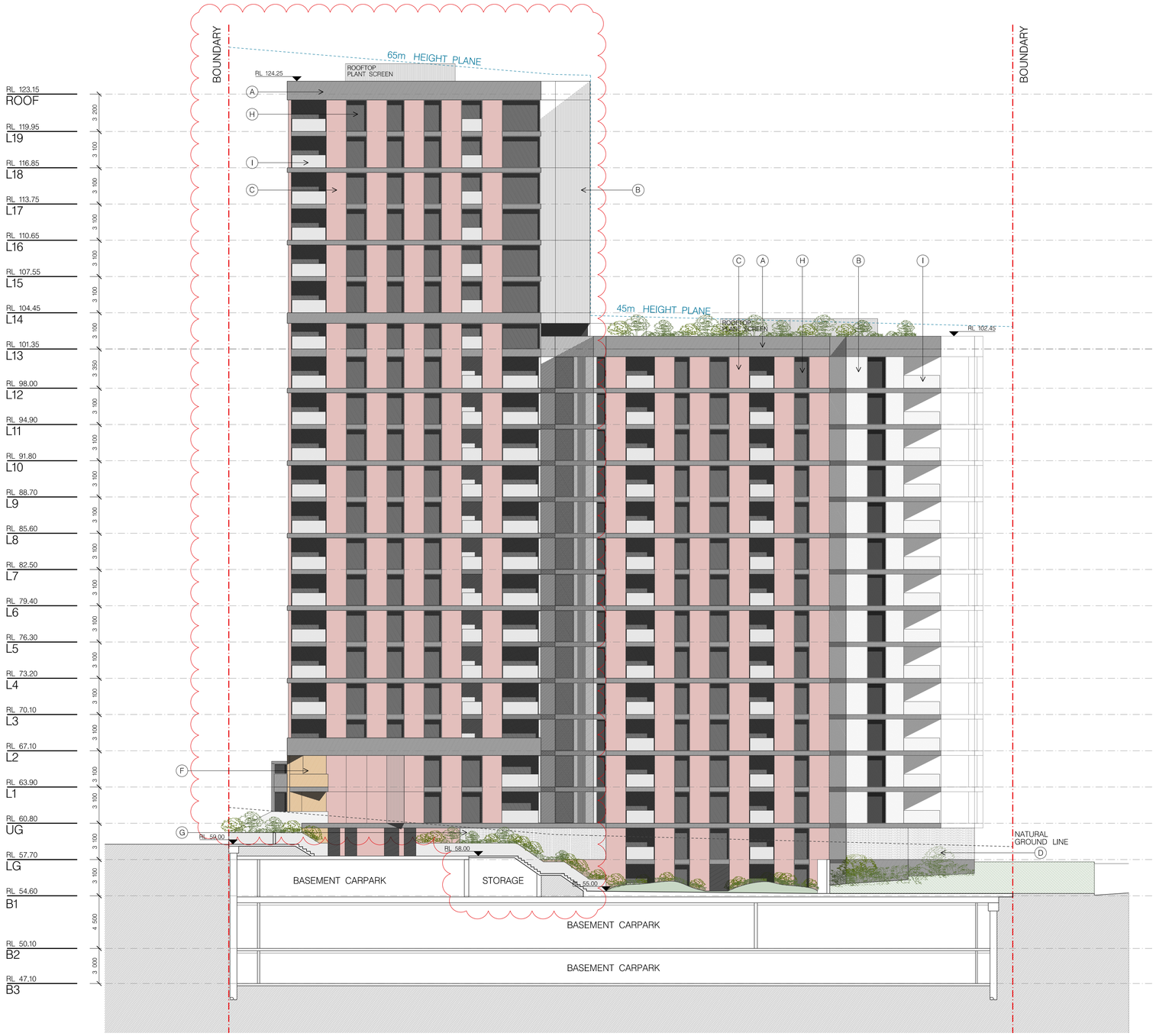
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
SOUTH EAST ELEVATION

DRAWING No.
S4.55–1303

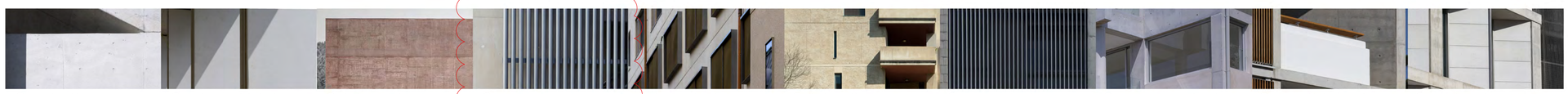
JOB No. 5800

ISSUE B



01 — SOUTH EAST INTERNAL ELEVATION

1:200



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Ⓘ PAINTED CONCRETE BALUSTRADE
PRESIDENT AVENUE APARTMENTS
– CANDALEPAS ASSOCIATES

Ⓙ FIBRE CEMENT SHEET
QT PERTH
– CANDALEPAS ASSOCIATES

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size
B	28.02.20	FOR S4.55 TO CLIENT	A1
A	05.02.20	FOR S4.55 TO CLIENT	

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NSW ARCHITECTS REG No. – 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

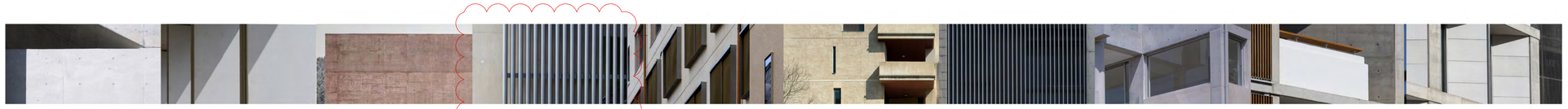
DRAWING:
SOUTH EAST INTERNAL ELEVATION

DRAWING No.
S4.55–1304

JOB No. 5800

ISSUE B

01 — SOUTH WEST ELEVATION
1:200



Ⓐ OFF-FORM CONCRETE
ALL SAINTS PRIMARY SCHOOL
– CANDALEPAS ASSOCIATES

Ⓑ COLOURED PRECAST CONCRETE
PELICAN STREET APARTMENTS
– CANDALEPAS ASSOCIATES

Ⓒ COLOURED CONCRETE
WEST TYROL FIRE STATION
– PEDEVILLA ARCHITECTS

Ⓓ WHITE METAL TUBES
PUNCHBOWL MOSQUE (SIMILAR)
– CANDALEPAS ASSOCIATES

Ⓔ STEEL WINDOW BOXES
QT MELBOURNE
– CANDALEPAS ASSOCIATES

Ⓕ COLOURED CONCRETE
THE POINT APARTMENTS
– CANDALEPAS ASSOCIATES

Ⓖ ALUMINIUM LOUVRES
REVOLUTION APARTMENTS
– CANDALEPAS ASSOCIATES

Ⓗ ALUMINIUM FRAMED GLAZING
FRANCIS STREET APARTMENTS
– CANDALEPAS ASSOCIATES

Ⓘ PAINTED CONCRETE BALUSTRADE
PRESIDENT AVENUE APARTMENTS
– CANDALEPAS ASSOCIATES

Ⓙ FIBRE CEMENT SHEET
QT PERTH
– CANDALEPAS ASSOCIATES

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size: A1
B	09.12.20	FOR S4.55 TO CLIENT	
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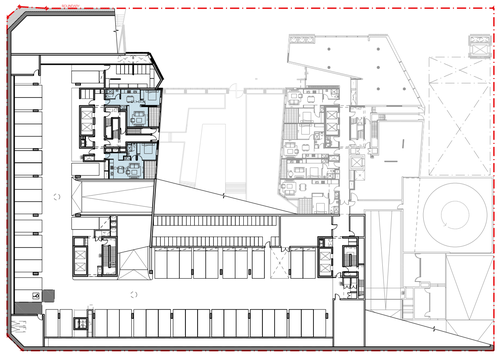
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

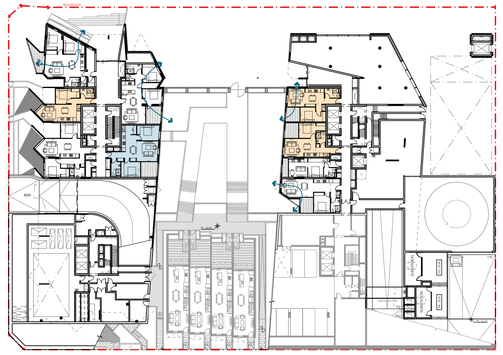
DRAWING:
SOUTH WEST ELEVATION
DRAWING No.
S4.55–1305

JOB No. 5800
ISSUE B



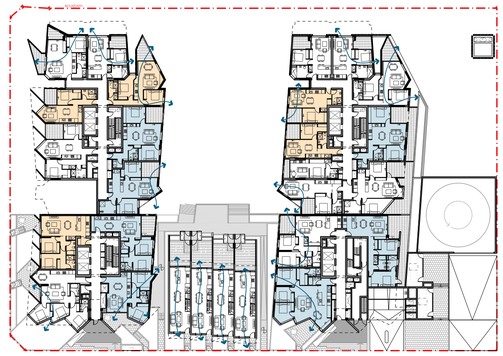
BASEMENT 1

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	0 UNITS
AFFORDABLE	– UNITS
MARKET	– UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	– UNITS
MARKET	– UNITS
NATURAL CROSS VENTILATION	
SOCIAL	0 UNITS
AFFORDABLE	– UNITS
MARKET	– UNITS
TOTAL NO. UNITS	2 UNITS



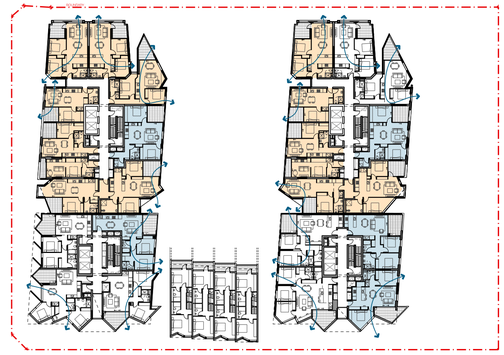
LOWER GROUND

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	3 UNITS
AFFORDABLE	– UNITS
MARKET	– UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	1 UNITS
AFFORDABLE	– UNITS
MARKET	– UNITS
NATURAL CROSS VENTILATION	
SOCIAL	4 UNITS
AFFORDABLE	– UNITS
MARKET	– UNITS
TOTAL NO. UNITS	9 UNITS



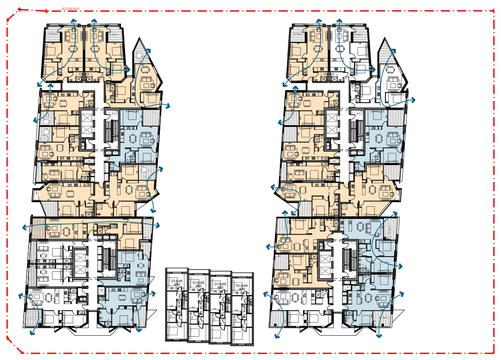
UPPER GROUND

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	4 UNITS
AFFORDABLE	1 UNITS
MARKET	– UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	3 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
NATURAL CROSS VENTILATION	
SOCIAL	8 UNITS
AFFORDABLE	2 UNITS
MARKET	6 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	26 UNITS



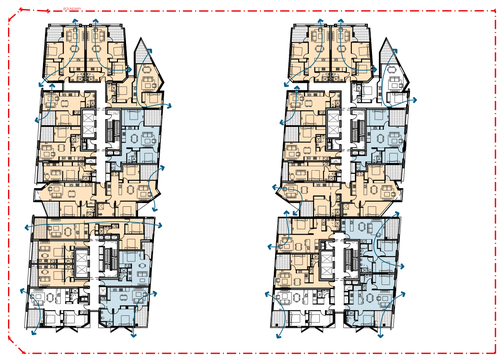
LEVEL 1

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	12 UNITS
AFFORDABLE	0 UNITS
MARKET	0 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	1 UNITS
MARKET	2 UNITS
NATURAL CROSS VENTILATION	
SOCIAL	10 UNITS
AFFORDABLE	3 UNITS
MARKET	3 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	24 UNITS



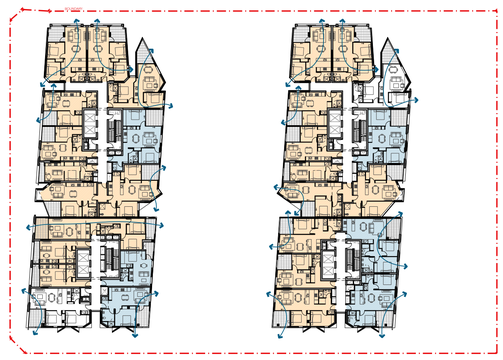
LEVEL 2

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	12 UNITS
AFFORDABLE	1 UNITS
MARKET	2 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
NATURAL CROSS VENTILATION	
SOCIAL	10 UNITS
AFFORDABLE	3 UNITS
MARKET	4 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	27 UNITS



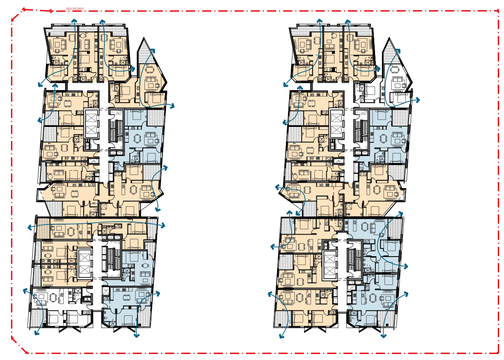
LEVEL 3

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	13 UNITS
AFFORDABLE	3 UNITS
MARKET	2 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
NATURAL CROSS VENTILATION	
SOCIAL	10 UNITS
AFFORDABLE	3 UNITS
MARKET	4 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	27 UNITS



LEVEL 4

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	13 UNITS
AFFORDABLE	3 UNITS
MARKET	3 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
NATURAL CROSS VENTILATION	
SOCIAL	10 UNITS
AFFORDABLE	3 UNITS
MARKET	4 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	27 UNITS



LEVEL 5

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	15 UNITS
AFFORDABLE	3 UNITS
MARKET	3 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
NATURAL CROSS VENTILATION	
SOCIAL	10 UNITS
AFFORDABLE	3 UNITS
MARKET	4 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	29 UNITS

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size: A1
B	08.12.20	FOR S4.55 TO CLIENT	
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EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: NOT TO SCALE

NORTH

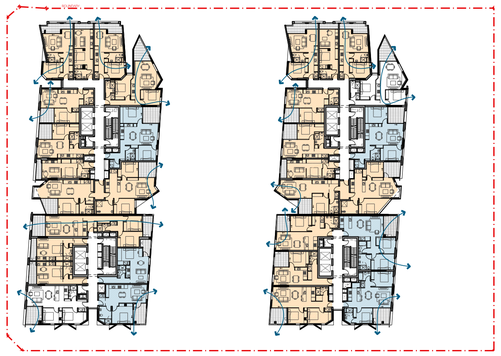
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
SOLAR & VENT CALCULATIONS

DRAWING No.
S4.55–1600

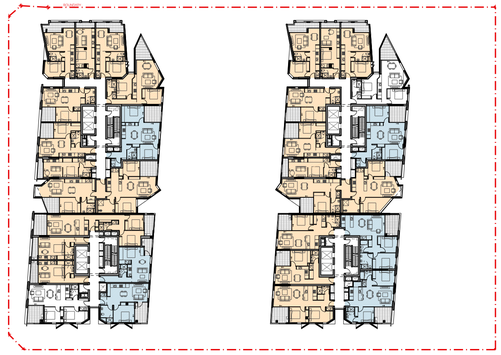
JOB No. 5800

ISSUE B



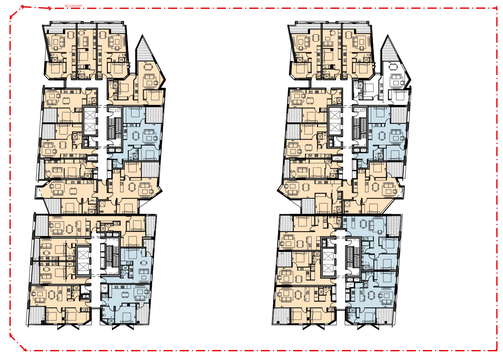
LEVEL 6

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	15 UNITS
AFFORDABLE	3 UNITS
MARKET	3 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
NATURAL CROSS VENTILATION	
SOCIAL	10 UNITS
AFFORDABLE	3 UNITS
MARKET	4 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	29 UNITS



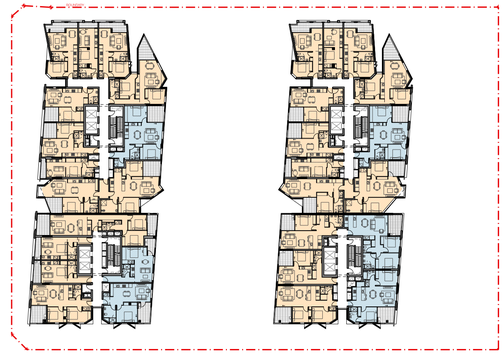
LEVEL 7

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	15 UNITS
AFFORDABLE	3 UNITS
MARKET	3 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	29 UNITS



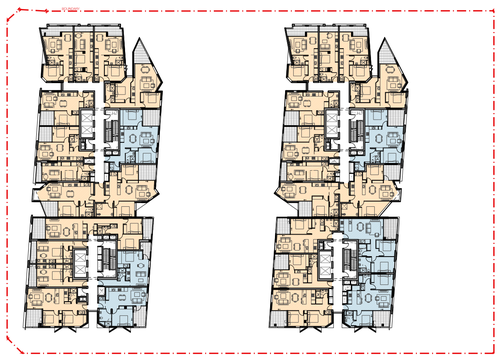
LEVEL 8

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	15 UNITS
AFFORDABLE	4 UNITS
MARKET	3 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	29 UNITS



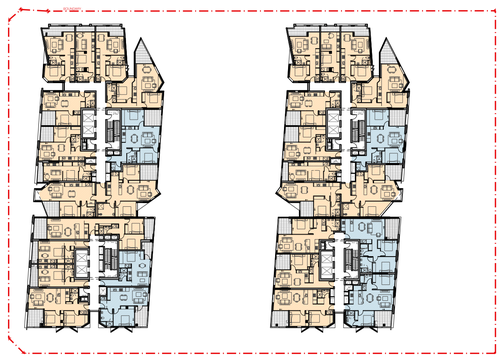
LEVEL 9

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	16 UNITS
AFFORDABLE	4 UNITS
MARKET	3 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	29 UNITS



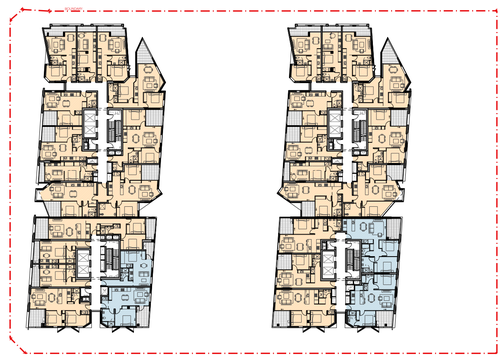
LEVEL 10

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	16 UNITS
AFFORDABLE	4 UNITS
MARKET	3 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	29 UNITS



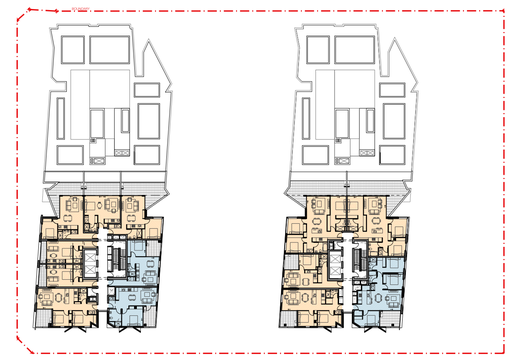
LEVEL 11

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	16 UNITS
AFFORDABLE	4 UNITS
MARKET	3 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	2 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	29 UNITS



LEVEL 12

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	18 UNITS
AFFORDABLE	4 UNITS
MARKET	3 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	0 UNITS
AFFORDABLE	2 UNITS
MARKET	2 UNITS
TOTAL NO. UNITS (INCLUDING DUAL KEY)	29 UNITS



LEVEL 13

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	6 UNITS
MARKET	4 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	2 UNITS
MARKET	1 UNITS
TOTAL NO. UNITS	13 UNITS

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size:
A	03.12.20	FOR S4.55 TO CLIENT	A1
B	02.02.21	FOR S4.55 TO CLIENT	

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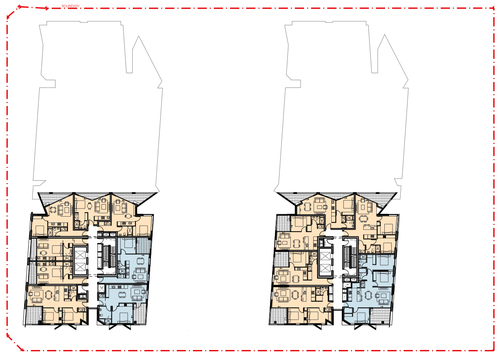
CLIENT:
FRASERS PROPERTY IVANHOE
SCALE: NOT TO SCALE

NORTH

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

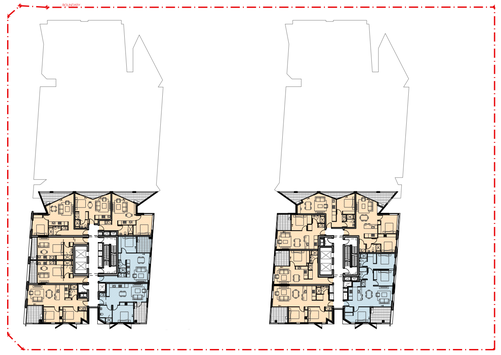
DRAWING:
SOLAR & VENT CALCULATIONS
SHEET 2
DRAWING No.
S4.55–1601

JOB No. 5800
ISSUE B



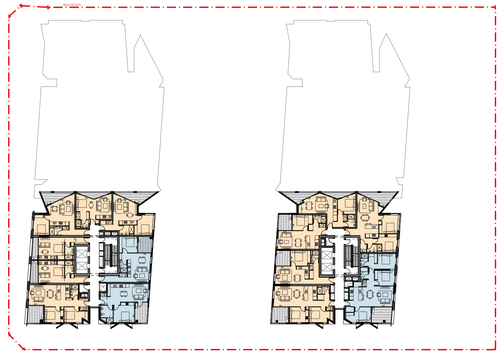
LEVEL 14

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	6 UNITS
MARKET	5 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	2 UNITS
MARKET	1 UNITS
TOTAL NO. UNITS	14 UNITS



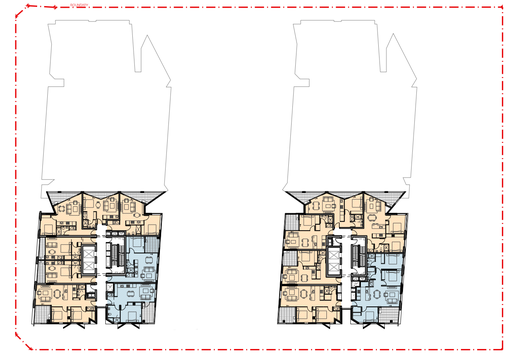
LEVEL 15

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	6 UNITS
MARKET	5 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	2 UNITS
MARKET	1 UNITS
TOTAL NO. UNITS	14 UNITS



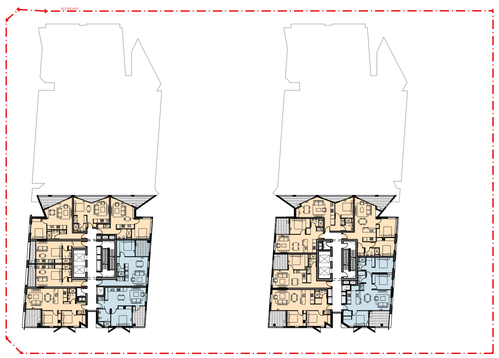
LEVEL 16

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	6 UNITS
MARKET	5 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	2 UNITS
MARKET	1 UNITS
TOTAL NO. UNITS	14 UNITS



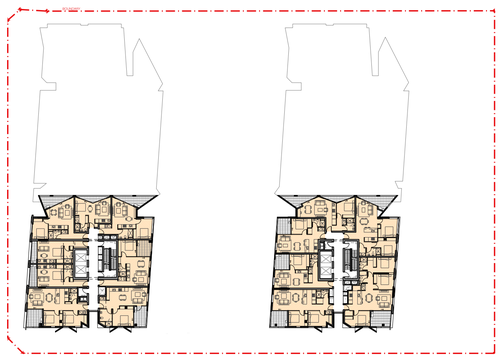
LEVEL 17

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	6 UNITS
MARKET	5 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	2 UNITS
MARKET	1 UNITS
TOTAL NO. UNITS	14 UNITS



LEVEL 18

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	6 UNITS
MARKET	5 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	2 UNITS
MARKET	1 UNITS
TOTAL NO. UNITS	14 UNITS



LEVEL 19

CALCULATIONS FOR JUNE 21, 9AM – 3PM	TOTAL
MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	8 UNITS
MARKET	6 UNITS
NO DIRECT SOLAR ACCESS	
SOCIAL	– UNITS
AFFORDABLE	0 UNITS
MARKET	0 UNITS
TOTAL NO. UNITS	14 UNITS

SOLAR ACCESS/CROSS VENT SUMMARY BY LEVEL

	MINIMUM 2 HOURS OF DIRECT SOLAR ACCESS				NO DIRECT SOLAR ACCESS				CROSS VENTILATION			
	SOCIAL	AFFORD.	MARKET	TOTAL	SOCIAL	AFFORD.	MARKET	TOTAL	SOCIAL	AFFORD.	MARKET	TOTAL
BASEMENT 1	0	–	–	0	2	–	–	2	0	–	–	0
LOWER GROUND	3	–	–	3	1	–	–	1	4	–	–	4
UPPER GROUND	4	1	–	5	3	2	2	7	8	2	6	16
LEVEL 1	12	0	0	12	2	1	2	5	10	3	3	16
LEVEL 2	12	1	2	15	2	2	2	6	10	3	4	17
LEVEL 3	13	3	2	18	2	2	2	6	10	3	4	17
LEVEL 4	13	3	3	19	2	2	2	6	10	3	4	17
LEVEL 5	15	3	3	21	2	2	2	6	10	3	4	17
LEVEL 6	15	3	3	21	2	2	2	6	10	3	4	17
LEVEL 7	15	3	3	21	2	2	2	6	–	–	–	–
LEVEL 8	15	4	3	22	2	2	2	6	–	–	–	–
LEVEL 9	16	4	3	23	2	2	2	6	–	–	–	–
LEVEL 10	16	4	3	23	2	2	2	6	–	–	–	–
LEVEL 11	16	4	3	23	2	2	2	6	–	–	–	–
LEVEL 12	18	4	3	25	0	2	2	4	–	–	–	–
LEVEL 13	–	6	4	10	–	2	1	3	–	–	–	–
LEVEL 14	–	6	5	11	–	2	1	3	–	–	–	–
LEVEL 15	–	6	5	11	–	2	1	3	–	–	–	–
LEVEL 16	–	6	5	11	–	2	1	3	–	–	–	–
LEVEL 17	–	6	5	11	–	2	1	3	–	–	–	–
LEVEL 18	–	6	5	11	–	2	1	3	–	–	–	–
LEVEL 19	–	8	6	14	–	0	0	0	–	–	–	–
TOTAL	183	81	66	330	28	37	32	97	72	20	29	121
TOTAL NO. UNITS (INC. DUAL KEY)	234	130	107	471	234	130	107	471	126	38	36	200
PERCENTAGE	78%	62%	62%	70%	12%	29%	30%	21%	57%	53%	81%	61%

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Drawing Original Size: A1
B	08.12.20	FOR S4.55 TO CLIENT
A	02.12.20	FOR S4.55 TO CLIENT

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NSW ARCHITECTS REG No. – 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE
SCALE: NOT TO SCALE

NORTH

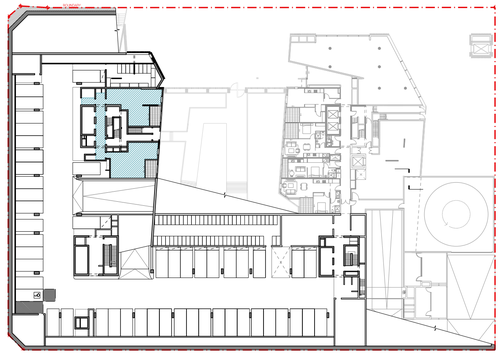
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
SOLAR & VENT CALCULATIONS SHEET 3

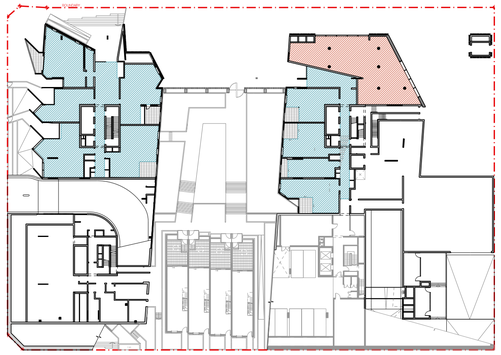
DRAWING No.
S4.55–1602

JOB No. 5800

ISSUE B

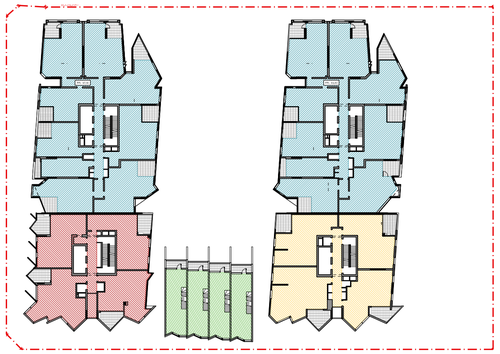


BASEMENT 1

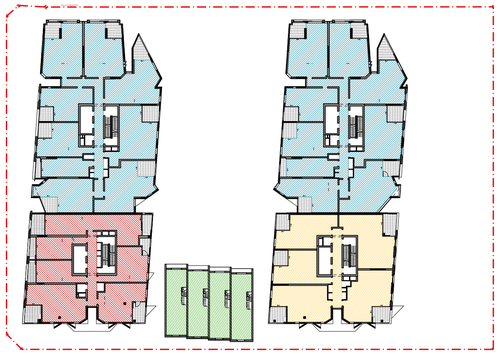


LOWER GROUND

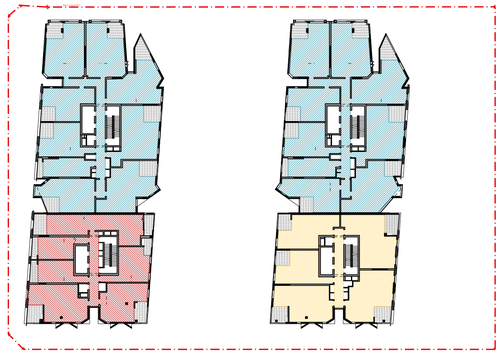
UPPER GROUND



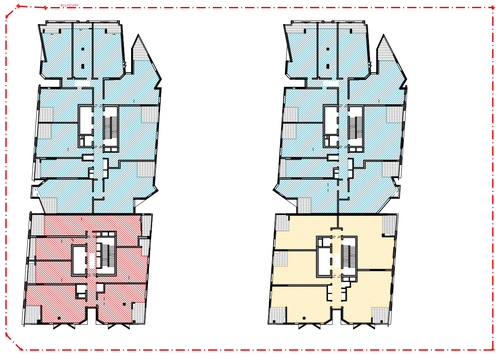
LEVEL 1



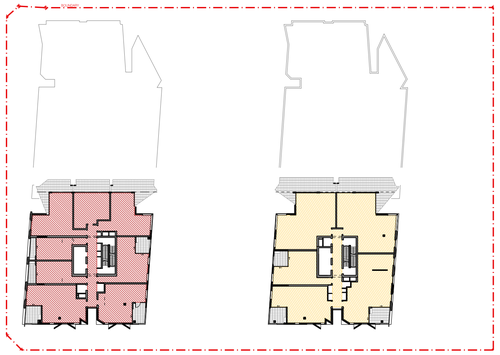
LEVEL 2



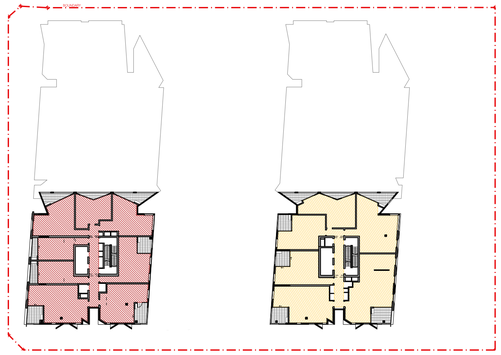
LEVELS 3 – 4



LEVELS 5 – 12



LEVEL 13



LEVELS 14 – 19

GFA CALCULATIONS

LOT AREA	6,390 sqm (APPROX.)
TOTAL GROSS FLOOR AREA (GFA)	33,480 sqm

SOCIAL

	TOWER 1 – C1.1		TOWER 2 – C1.3		TOTAL	
LEVEL	TOTAL UNITS	AREA (sqm)	TOTAL UNITS	AREA (sqm)	TOTAL UNITS	AREA (sqm)
BASEMENT 1	02	135	–	–	02	135
LOWER GROUND	05	430	04	275	09	705
UPPER GROUND	07	530	09	595	16	1125
LEVEL 01	09	630	09	630	18	1260
LEVEL 02	09	630	09	630	18	1260
LEVEL 03	09	630	09	630	18	1260
LEVEL 04	09	630	09	630	18	1260
LEVEL 05	10	625	10	625	20	1250
LEVEL 06	10	625	10	625	20	1250
LEVEL 07	10	625	10	625	20	1250
LEVEL 08	10	625	10	625	20	1250
LEVEL 09	10	625	10	625	20	1250
LEVEL 10	10	625	10	625	20	1250
LEVEL 11	10	625	10	625	20	1250
LEVEL 12	10	625	10	625	20	1250
TOTAL	130	8,615	129	8,390	259	17,005

AFFORDABLE

	TOWER 1 – C1.2	
LEVEL	TOTAL UNITS	AREA (sqm)
UPPER GROUND	04	370
LEVEL 01	04	350
LEVEL 02	06	360
LEVEL 03	06	360
LEVEL 04	06	360
LEVEL 05	06	360
LEVEL 06	06	360
LEVEL 07	06	360
LEVEL 08	06	360
LEVEL 09	06	360
LEVEL 10	06	360
LEVEL 11	06	360
LEVEL 12	06	360
LEVEL 13	08	450
LEVEL 14	08	435
LEVEL 15	08	435
LEVEL 16	08	435
LEVEL 17	08	435
LEVEL 18	08	435
LEVEL 19	08	435
TOTAL	130	7,740

MARKET

	TOWER 2 – C1.4	
LEVEL	TOTAL UNITS	AREA (sqm)
UPPER GROUND	03	325
LEVEL 01	04	375
LEVEL 02	05	375
LEVEL 03	05	375
LEVEL 04	05	375
LEVEL 05	05	375
LEVEL 06	05	375
LEVEL 07	05	375
LEVEL 08	05	375
LEVEL 09	05	375
LEVEL 10	05	375
LEVEL 11	05	375
LEVEL 12	05	375
LEVEL 13	05	460
LEVEL 14	06	440
LEVEL 15	06	440
LEVEL 16	06	440
LEVEL 17	06	440
LEVEL 18	06	440
LEVEL 19	06	440
TOTAL	103	7,925

TERRACES

LEVEL	TOTAL UNITS	AREA (sqm)
UPPER GROUND	04	215
LEVEL 01	–	195
LEVEL 02	–	200
TOTAL	04	610

COMMUNITY

	TOWER 1		TOWER 2	
LEVEL	TOTAL TENANCIES	AREA (sqm)	TOTAL TENANCIES	AREA (sqm)
LOWER GROUND	–	–	01	200
TOTAL			01	200

UNIT MIX

	SOCIAL		AFFORDABLE		MARKET		TOTAL	
UNIT TYPE	NO.	MIX	NO.	%	NO.	%	NO.	%
STUDIO	42	16%	54	41%	–	–	96	19%
1 BED	118	46%	39	30%	41	38%	198	40%
2 BED	99	38%	36	28%	51	48%	186	38%
3 BED	–	–	1	1%	11	10%	12	2%
4 BED	–	–	–	–	4	4%	4	1%
TOTAL	259		130		107		496	

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Drawing	Description
A	06.12.20	FOR S4.55 TO CLIENT
B	02.12.20	FOR S4.55 TO CLIENT

A1

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:600@A1 / 1:1200@A3

0 5 10 30m

DATE: SEP 2020

CHECKED 1: MK

CHKD2/APPD: JW

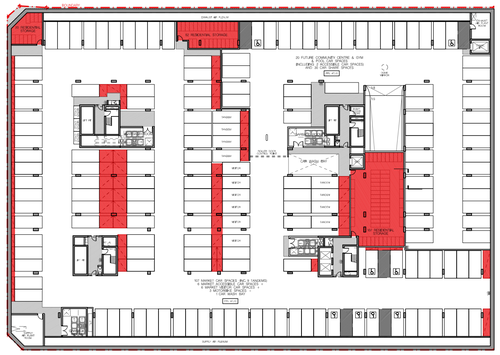
DRAWN BY: MK/FP

DRAWING:
AREA CALCULATIONS

DRAWING No.
S4.55–1850

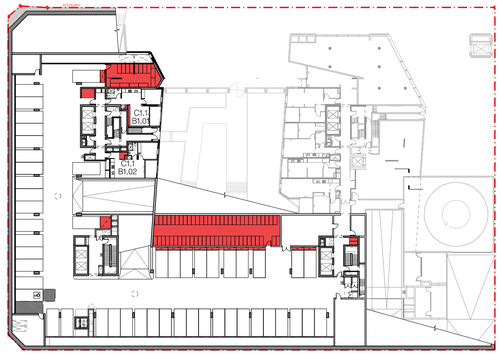
JOB No. 5800

ISSUE B

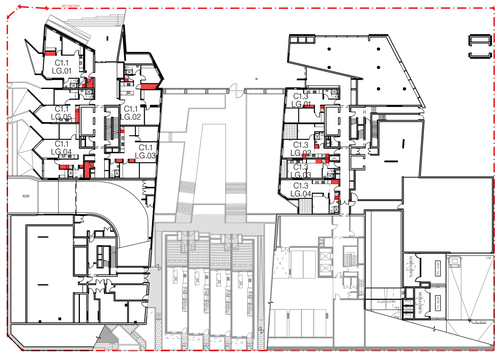


BASEMENT 3

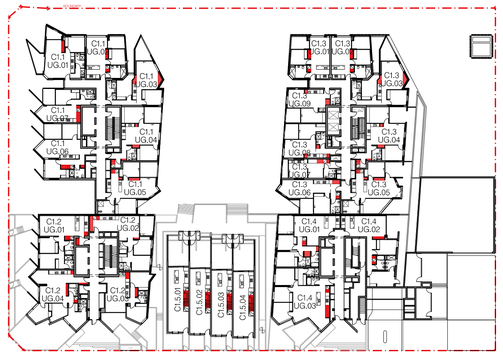
BASEMENT 2



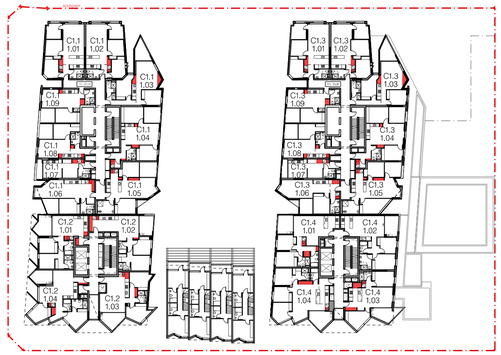
BASEMENT 1



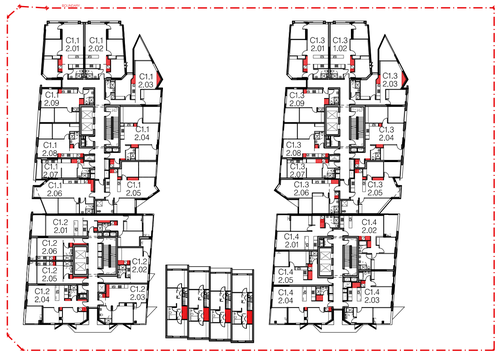
LOWER GROUND



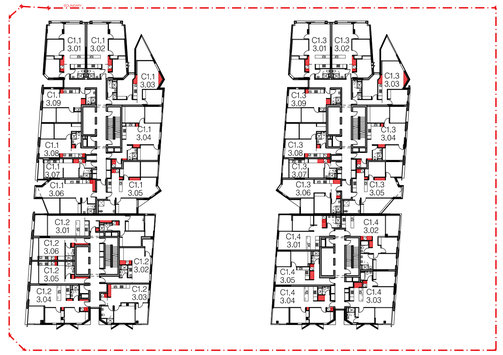
UPPER GROUND



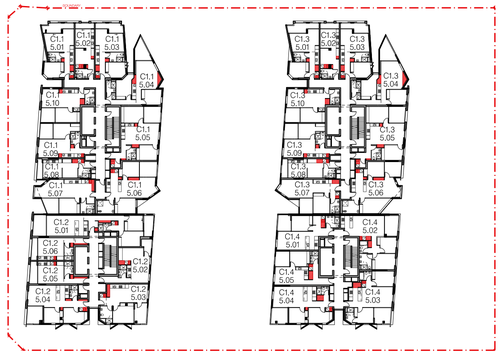
LEVEL 1



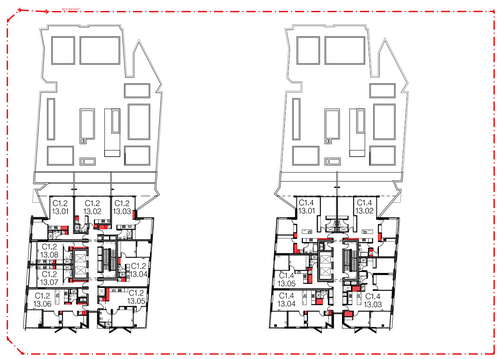
LEVEL 2



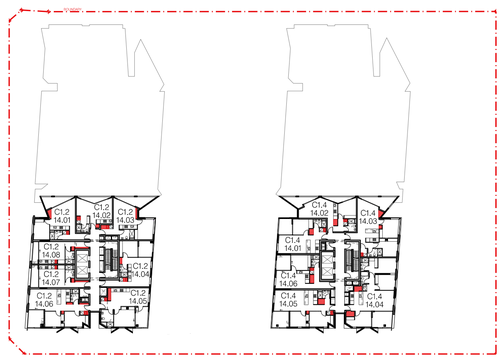
LEVELS 3 – 4



LEVELS 5 – 12



LEVEL 13



LEVELS 14 – 19

STORAGE AREA CALCULATIONS

BUILDING C1.1

LEVEL	APT. No.	TYPE	INTERNAL STORAGE (CBM)	EXTERNAL STORAGE (CBM)	TOTAL STORAGE (CBM)
BASEMENT 1	B1.01	1B	4	2	6
	B1.02	1B	4	2	6
LOWER GROUND	LG.01	2B	4	4	8
	LG.02	2B	8	2	10
	LG.03	2B	4	4	8
	LG.04	2B	4	4	8
	LG.05	1B	4	2	6
UPPER GROUND	UG.01	1B	3	3	6
	UG.02	1B	3	3	6
	UG.03	2B	5	3	8
	UG.04	2B	4	4	8
	UG.05	2B ADP.	4	4	8
	UG.06	2B	4	4	8
	UG.07	1B	4	2	6
LEVEL 1–4	1.01	2B	4	4	8
	1.02	2B	4	4	8
	1.03	2B	5	3	8
	1.04	2B	4	4	8
	1.05	2B ADP.	4	4	8
	1.06	1B	3	3	6
	1.07	ST	2	2	4
	1.08	1B	3	3	6
	1.09	1B	3	3	6
LEVEL 5–12	5.01	1B	3	3	6
	5.02	ST	2	2	4
	5.03	1B	4	2	6
	5.04	ST	5	3	8
	5.05	2B	4	4	8
	5.06	2B ADP.	4	4	8
	5.07	1B	3	3	6
	5.08	ST	2	2	4
	5.09	1B	3	3	6
	5.10	1B	3	3	6

BUILDING C1.2

LEVEL	APT. No.	TYPE	INTERNAL STORAGE (CBM)	EXTERNAL STORAGE (CBM)	TOTAL STORAGE (CBM)
UPPER GROUND	UG.01	2B	4	4	8
	UG.02	2B	5	3	8
	UG.03	2B	4	4	8
	UG.04	3B	5	5	10
LEVEL 1	1.01	2B	4	4	8
	1.02	2B	5	3	8
	1.03	2B	4	4	8
	1.04	2B	4	4	8
LEVEL 2–12	2.01	2B	3	3	6
	2.02	ST	2	2	4
	2.03	1B ADP.	4	2	6
	2.04	2B	4	4	8
	2.05	ST	3	2	5
	2.06	ST	3	2	5
LEVEL 13	13.01	1B	3	3	6
	13.02	ST	2	2	4
	13.03	1B	4	2	6
	13.04	1B	3	3	6
	13.05	1B	4	2	6
	13.06	2B	4	4	8
	13.07	ST	3	2	5
	13.08	ST	3	2	5
LEVEL 14–19	14.01	1B	3	3	6
	14.02	ST	2	2	4
	14.03	1B	4	2	6
	14.04	1B	3	3	6
	14.05	1B	4	2	6
	14.06	2B	4	4	8
	14.07	ST	3	2	5
	14.08	ST	3	2	5

BUILDING C1.3

LEVEL	APT. No.	TYPE	INTERNAL STORAGE (CBM)	EXTERNAL STORAGE (CBM)	TOTAL STORAGE (CBM)
LOWER GROUND	LG.01	1B	3	3	6
	LG.02	1B	3	3	6
	LG.03	ST	2	2	4
	LG.04	1B	3	3	6
UPPER GROUND	UG.01	1B	3	3	6
	UG.02	1B	3	3	6
	UG.03	2B	5	3	8
	UG.04	2B	4	4	8
	UG.05	2B ADP.	4	4	8
	UG.06	1B	3	3	6
	UG.07	ST	3	2	5
	UG.08	1B	3	3	6
	UG.09	1B	3	3	6
LEVEL 1–4	1.01	2B	4	4	8
	1.02	2B	4	4	8
	1.03	2B	5	3	8
	1.04	2B	4	4	8
	1.05	2B ADP.	4	4	8
	1.06	1B	3	3	6
	1.07	ST	2	2	4
	1.08	1B	3	3	6
	1.09	1B	3	3	6
LEVEL 5–12	5.01	1B	3	3	6
	5.02	ST	2	2	4
	5.03	1B	3	3	6
	5.04	2B	5	3	8
	5.05	2B	4	4	8
	5.06	2B ADP.	4	4	8
	5.07	1B	3	3	6
	5.08	ST	2	2	4
	5.09	1B	3	3	6
	5.10	1B	3	3	6

BUILDING C1.4

LEVEL	APT. No.	TYPE	INTERNAL STORAGE (CBM)	EXTERNAL STORAGE (CBM)	TOTAL STORAGE (CBM)
UPPER GROUND	UG.01	2B	5	3	8
	UG.02	2B	4	4	8
	UG.03	3B	5	5	10
LEVEL 1	1.01	2B	5	3	8
	1.02	2B ADP.	4	4	8
	1.03	2B	7	2	9
	1.04	3B	5	5	10
LEVEL 2–12	2.01	1B ADP.	5	2	7
	2.02	2B ADP.	4	4	8
	2.03	2B	4	4	8
	2.04	2B	5	3	8
	2.05	1B	3	3	6
LEVEL 13	13.01	3B	6	4	10
	13.02	3B	5	5	10
	13.03	3B	7	3	10
	13.04	2B	5	3	8
	13.05	1B	3	3	6
LEVEL 14–19	14.01	1B	3	3	6
	14.02	1B	3	3	6
	14.03	2B	4	4	8
	14.04	3B	7	3	10
	14.05	2B	5	3	8
	14.06	1B	3	3	6

BUILDING C1.5

LEVEL	APT. No.	TYPE	INTERNAL STORAGE (CBM)	EXTERNAL STORAGE (CBM)	TOTAL STORAGE (CBM)
UPPER GROUND	01	4B	8	2	10
	02	4B	8	2	10
	03	4B	8	2	10
	03	4B	8	2	10

MAJOR AMENDMENTS

MINOR AMENDMENTS

LEGEND

RESIDENTIAL APARTMENT STORAGE

B 4 | 03.12.20 | FOR S4.55 TO CLIENT
A 3 | 02.12.20 | FOR S4.55 TO CLIENT
Issue | Date | Description | A1
Drawing Original Size

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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:600@A1 / 1:1200@A3
0 5 10 30m

NORTH

DATE: SEP 2020
CHECKED 1: SS
CHKD2/APPD: EP
DRAWN BY: SS

DRAWING:
APARTMENT STORAGE AREA CALCULATIONS

DRAWING No.
S4.55–1851

JOB No. 5800

ISSUE B

ES

ADJACENT RESIDENTIAL PROPERTIES

FUTURE STAGE 8
DEVELOPMENT AREA

FUTURE STAGE A
DEVELOPMENT AREA

FUTURE
DRIVEWAY
03

3 x Pb
TABLE & CHAIR CHESS SET

01
L_3001

3 x Pb
TABLE & CHAIR CHESS SET

ADJOINS L1_1101

ADJOINS L1_1104

PV01
PV02

+ 57.50

5 x Fm

1 x Fm

4 x Fm

MAIN STREET

13 x Fm

1 x Aj

+ 58.0

2 x Aj

NEIGHBOURHOOD
GARDEN PLAY

INTERIM STAGE 1 PLAZA

+ 57.3
+ 56.5
3 x Cf
2 x Cb
+ 55.00
2 x Cf
+ 54.00
+ 53.50
+ 57.5

4 x Up

1 x Up

1 x Cb

4 x Hf

FUTURE COMMUNITY CENTRE. NOTE: THIS
OUTLINE DENOTES MASTER PLAN
SCHEME ONLY. IT IS SUBJECT TO CHANGE
AND FUTURE DEVELOPMENT CHANGES

CAR PARK ENTRY

+ 58.00

LOWER GROUND FLOOR
FFL 57.70

1 x Cf

LOWER GROUND FLOOR
FFL 54.60

FFL 53.7

+ RL 63.15

+ 54.88

ADJOINS L1_1103

C1

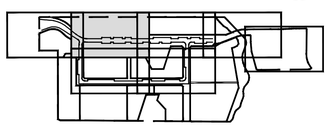
FFL 54.60

C1

ADJOINS L1_1105

REFERENCE MAP

NORTH



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K	S4.55 FOR APPROVAL	16.12.20
J	UPDATE TO C1 LANDSCPAE	15.12.20
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H	FOR APPROVAL	16.10.18
G	FOR APPROVAL	02.05.18
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A	PRELIMINARY DRAFT	23.01.18

REV	DESCRIPTION	DATE

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K S4.55 FOR APPROVAL

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HASSELL

PROJECT

IVANHOE ESTATE
STAGE 01 DEVELOPMENT APPLICATION
MACQUARIE PARK, NSW 2113

DRAWING TITLE

GENERAL ARRANGEMENT (2 0F 8)

STATUS

FOR APPROVAL

SCALE @ A1	DRAWN	CO-ORD	REVIEWED	APPROVED
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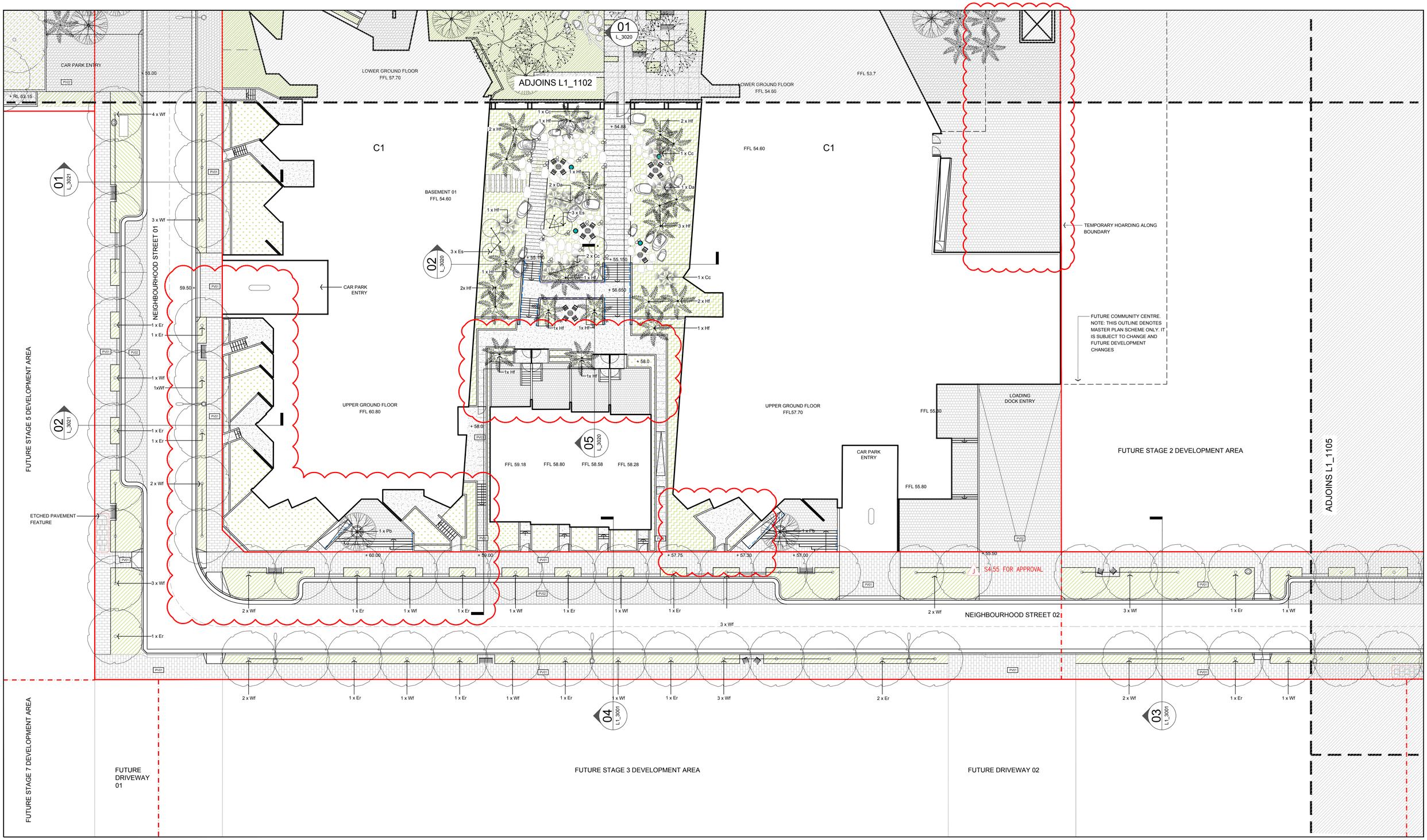

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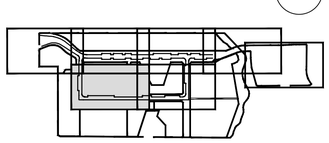

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HASSELL

PROJECT

IVANHOE ESTATE
STAGE 01 DEVELOPMENT APPLICATION
MACQUARIE PARK, NSW 2113

DRAWING TITLE

GENERAL ARRANGEMENT (3 OF 8)

STATUS

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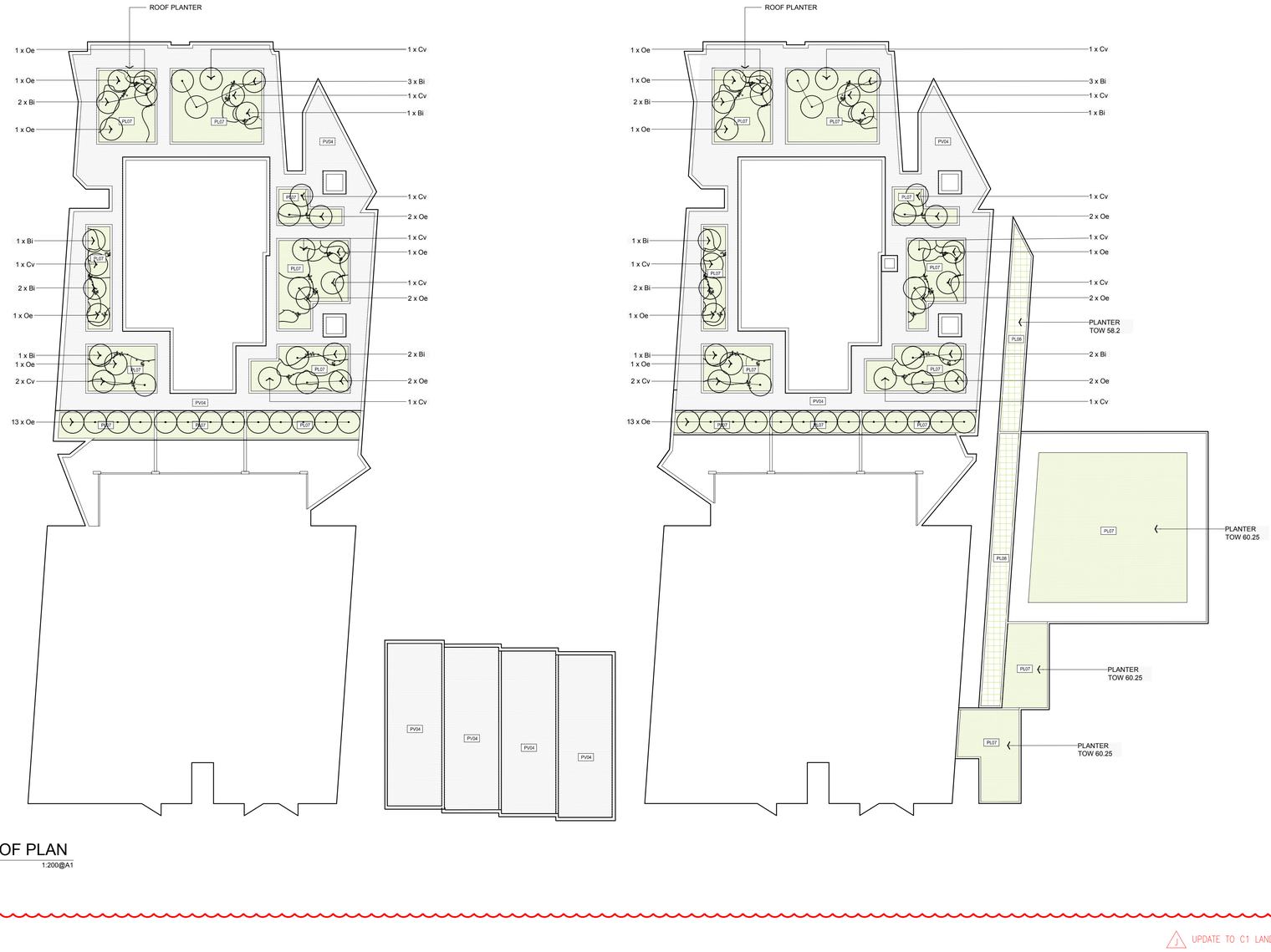

PL03 C1 ROOF PLAN
1:200@A1

UPDATE TO C1 LANDSCAPE

REFERENCE MAP NORTH

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STAGE 01 DEVELOPMENT APPLICATION
MACQUARIE PARK, NSW 2113

DRAWING TITLE

C1 ROOF PLAN

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for a better
future /

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LOT C1 - IVANHOE ESTATE

BASIX SUMMARY REPORT

DECEMBER 2020

CONFIDENTIAL

LOT C1 - IVANHOE ESTATE

BASIX SUMMARY REPORT

FRASERS PROPERTY

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REV	DATE	DETAILS
0	23/02/2018	Draft Issue
1	14/03/2018	Amended Draft Report
2	27/03/2018	Amended rainwater capacity
3	08/05/2018	Updated apartment appliances and fixtures
4	27/09/2019	Report for DA Submission
5	22/10/2019	Updated shower WELS Rating
6	16/12/2020	Updated for C1 Affordable Modification

	NAME	DATE	SIGNATURE
Prepared by:	David Jewkes	16/12/2020	
Reviewed by:	Katie Fallowfield	16/12/2020	
Approved by:	Katie Fallowfield	16/12/2020	

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OUR REF: PS107138-191022-CM-C1 BASIX REPORT_REV6
DECEMBER 2020

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EXECUTIVE SUMMARY

An ESD strategy has been developed for the proposed development at Lot C1 - Ivanhoe Estate in Macquarie Park. Building C1 consists of two towers, each with a social housing and market component and ground floor town houses, resulting in the following break up for the apartments

BUILDING	APARTMENT USE	NAME
Tower 1	Social	C1.1
	Affordable	C1.2
Tower 2 +	Social	C1.3
	Market	C1.4
Town Houses	Market	C1.5

This report demonstrates how the development meets the statutory requirements for single occupancy dwellings under Section J and BASIX.

BASIX requires the following benchmarks to be met:

- Water—Minimum target of 40% potable water use reduction compared to the NSW average
- Thermal comfort—Meeting a set of NatHERS modelled maximum heating and cooling loads determined by the BASIX tool according to the development type and climate zone. For this development, the thresholds are as follows:
    - Heating maximum 40 MJ/m² average across all units, maximum 45.4 MJ/m² for any individual unit
    - Cooling maximum 26 MJ/m² average across all units, maximum 29.5 MJ/m² for any individual unit
- Energy—Minimum energy consumption reduction, compared to the NSW average, of:
    - 25% for buildings C1.1, C1.2, C1.3 and C1.4
    - 45% for building C1.5

The proposed development achieves a BASIX Water score of 42 for C1.1, C1.2, C1.3 and C1.4 and 40 for C1.5

Water efficiency in the building has been achieved through the following:

- Water efficient fittings
- 30kL rainwater tank used for irrigation

The proposed development achieves a BASIX Energy score of 26 for C1.1, C1.2, C1.3 and C1.4 and 46 for C1.5

The energy requirements set out under BASIX are different for buildings of different heights. As such buildings C1.1, C1.2, C1.3 and C1.4 which are 12 and 19 storey buildings have been calculated on a separate BASIX certificate to C1.5, a 3-storey building.

Energy consumption in multi-unit residential buildings is heavily influenced by the utilisation and servicing of the common areas. HVAC and artificial lighting systems in the basement and lobbies has been carefully designed to reduce energy demands.

Simple energy efficiency measures, such as the provision of efficient fittings and fixtures will deliver energy consumption reductions in the dwellings. These include:

- Efficient central DHW heating systems
- Lighting will consist of dedicated low energy light fittings with efficient controls to limit unnecessary usage
- Clothes drying lines will be installed in each apartment
- Solar PV panels installed on both towers, totaling 115kW

1 INTRODUCTION

An ESD strategy has been developed for the proposed development at Lot C1 - Ivanhoe Estate in Macquarie Park. This report demonstrates how the development meets the statutory requirements for single occupancy dwellings under Section J and BASIX.

1.1 BASIX

BASIX is an online tool that is used to rate the energy and water efficiency and thermal comfort performance of residential dwellings in NSW. The tool sets minimum energy and water reduction targets which must be met through the design of the building and the selection of fixtures and fittings.

BASIX applies to all new dwellings including single dwellings, townhouses and low-rise, mid-rise and high-rise developments in NSW.

Design inputs including location, size, construction and glazing materials, water sources, equipment and fittings are used to determine the potential energy and water consumption of a new home or dwelling.

BASIX assesses three main categories:

1. Water;
2. Thermal Comfort;
3. Energy.

Thermal comfort is assessed by simulation in accordance with the Nationwide House Energy Rating Scheme (NatHERS) modelling protocol. This requires the modelling of each assessable dwelling by an accredited assessor, working with NatHERS accredited software.

NatHERS modelling assesses the potential of the dwelling to provide thermal comfort passively, thereby reducing energy requirements for heating and cooling. The annual heating and cooling loads calculated are entered into the BASIX tool to determine if the dwelling satisfies the maximum heating and cooling loads set for the dwelling in its climate zone.

The heating and cooling loads also effect the 'Energy' score, with more efficient dwellings contributing to an improved score in the 'Energy' section. The 'Energy' score is also effected by other inputs such as efficiency of appliances, heating and cooling system selection, hot water systems and factors such as use of renewable energy systems.

1.1.1 SOURCES OF INFORMATION

This BASIX assessment has relied on the following documentation for inputs and methodology

→ Architectural plan drawings from Candalepas Associates

Drawing	Date	Revision
S4.55 – 1102 Basement 3 floor plan	December 2020	B
S4.55 – 1103 Basement 2 floor plan	December 2020	B
S4.55 – 1104 Basement 1 floor plan	December 2020	B
S4.55 – 1105 Lower Ground Floor Plan	December 2020	B
S4.55 – 1106 Upper Ground Floor Plan	December 2020	B

Drawing	Date	Revision
S4.55 – 1107 Level 1 Floor Plan	December 2020	B
S4.55 – 1108 Level 2 Floor Plan	December 2020	B
S4.55 – 1109 Level 3 – 4 Floor Plan	December 2020	B
S4.55 – 1110 Level 5 – 12 Floor Plan	December 2020	B
S4.55 – 1111 Level 13 Floor Plan	December 2020	B
S4.55 – 1112 Level 14 – 19 Floor Plan	December 2020	B
S4.55 – 1113 Roof Plan	December 2020	B

→ Architectural elevation and section drawings from Candalepas Associates

Drawing	Date	Revision
S4.55 – 1200 North East Elevation	December 2020	B
S4.55 – 1200 North West Elevation	December 2020	B
S4.55 – 1200 North West Internal Elevation	December 2020	B
S4.55 – 1200 South East Elevation	December 2020	B
S4.55 – 1200 South East Internal Elevation	December 2020	B
S4.55 – 1200` South West Elevation	December 2020	B

→ NatHERS Technical Note – Nationwide House Energy Rating Scheme (NatHERS), Requirements for NatHERS assessments – version June 2019

→ BASIX Thermal Comfort Protocol 27 November 2020

1.1.2 ACCREDITED NATHERS SIMULATION SOFTWARE

FirstRate5 is provided by Sustainability Victoria and is accredited for simulating the thermal performance of dwellings in Australian climates under the NatHERS software accreditation protocol.

FirstRate5 version 5.3.0a(3.21) has been used in the assessment of this project, in accordance with the NatHERS Technical Note and the BASIX Thermal Comfort Protocol.

Inputs including dwelling geometry, space uses, orientation, climate zone, building materials and shading from adjacencies and obstructions are used to calculate heating and cooling loads for the dwelling. Resulting loads that are within the heating and cooling thresholds set under the BASIX protocol will satisfy the thermal comfort targets of BASIX.

1.2 LIMITATIONS

The results from the NatHERS modelling shown within this report are limited in accuracy by factors including the following:

→ Actual energy consumption will be affected by variations in the climate, installed equipment, occupants and their behaviour which modelling does not account for;

→ Construction details being consistent with the design documentation provided;

→ Orientation and apartment layout being as shown on the drawings.

They should not be interpreted for any purpose other than for assessing the thermal comfort section of BASIX.

2 BASIX

The purpose of the BASIX analysis is to benchmark the proposed development against average NSW residential performance parameters, including:

- Water
- Thermal comfort
- Energy

BASIX requires the following benchmarks to be met:

- Water—Minimum target of 40% potable water use reduction compared to the NSW average
- Thermal comfort—Meeting a set of NatHERS modelled maximum heating and cooling loads determined by the BASIX tool. For this development, they are as follows:
    - Heating maximum 40 MJ/m² average across all units, maximum 45.4 MJ/m2 for any individual unit
    - Cooling maximum 26 MJ/m² average across all units, maximum 29.5 MJ/m2 for any individual unit
- Energy—Minimum required target of 20% and 45% energy consumption reduction compared to the NSW average, according to building type and number of storeys

The BASIX certificate(s) for the development are included in Appendix A.

2.1 WATER

Water efficiency in the building has been achieved through the following:

- Water efficient fittings as shown in Table 2.1 below

Table 2.1 Water Fixtures Performance

Fitting	WELS rating	Flow rate
Toilet	4 Star	3.2/4L dual flush
Bathroom taps	5 Star	6L/min
Kitchen taps	5 Star	6L/min
Showers	4 Star	>6 but <= 7.5L/min
Dishwashers (Buildings C1.2, C1.4, C1.5)	3.5 Star	<1L/place setting
Washing machines (Building C1.2)	3.5 Star	-

- Rainwater harvesting and reuse. A 30kL rainwater tank is included in the building which will collect water from 2500m² of roof area. The water will be used to irrigate 1300m² of landscaped area.

2.2 THERMAL COMFORT

Thermal comfort (NatHERS) modelling is employed in accordance with the BASIX protocol, to determine heating and cooling loads attributed to achieving acceptable thermal comfort in each dwelling. The results of NatHERS modelling demonstrate that the architectural design can manage thermal loads within the apartments to meet and exceed the minimum benchmark for this location.

The maximum allowable thermal loads for a development in this location are shown in Table 2.2. The predicted average thermal loads achieved in this development are shown in the same table for comparison.

Table 2.2 NatHERS Thermal Comfort Performance

	Heating	Cooling
Maximum individual dwelling load (set by BASIX)	45.4 MJ / m²	29.5 MJ / m²
Average maximum load across project (set by BASIX)	40 MJ / m²	26 MJ / m²
Average load achieved in Lot C1 - Ivanhoe Estate	**29.8 MJ / m²**	**16.7 MJ / m²**

2.2.1 MODELLING INPUTS

This section identifies inputs for windows, shading and constructions used in NatHERS modelling on all the dwellings.

GLAZING

Table 2.3 identifies the glazing properties (window total values only) used in the NatHERS models.

Table 2.3 Glazing properties

Location	Window type	Type	Glass	Frame	U-value	SHGC
All south facing apartments in C1.2 and C1.4 **All C1.5 town houses**	Sliding window/doors and fixed windows	Double glazed aluminium frame	Clear float	Aluminium	4.8	0.59
	Awning windows	Double glazed aluminium frame	Clear float	Aluminium	4.8	0.51
All other apartments	Sliding window/doors and fixed windows	Single glazed aluminium frame	Clear Low-e	Aluminium	5.4	0.58
	Awning windows	Single glazed aluminium frame	Clear low-e	Aluminium	5.4	0.49

SHADING

Shading of the external building fabric alters the impact of solar loads on the internal conditions of each dwelling. NatHERS modelling accounts for sources of fixed shading that can impact each dwelling.

Note that models have accounted for the following:

- → The overhang of any balconies above each dwelling;
- → Overshadowing from adjacent buildings; and
- → Projecting balcony separator walls and other 'wing-wall'-type geometry between dwellings.

Holland blinds have been modelled as required by the NatHERS protocol, but are not required to be installed as part of the development.

CONSTRUCTIONS

Table 2.4 identifies the wall, floor, ceiling and roof construction properties used as part of the NatHERS models.

Table 2.4 Construction Properties

	Construction	Insulation
External walls	Precast concrete panels with plasterboard lining on studs	R2.5 bulk added insulation

	Construction	Insulation
Party walls (between dwellings)	Precast concrete, plasterboard lining	No added insulation
Internal walls (within dwellings)	Lightweight plasterboard stud walls	No added insulation
Walls to corridors, common areas, stairwells and lift core	Precast concrete, plasterboard lining	R1.0 added insulation
Roof	Concrete slab	R4.0 added insulation
Ceilings	Plasterboard lined	No added insulation
Floors (between apartments)	Concrete slab	No added insulation
Suspended floors (above carparks or outside air)	Suspended concrete slab	R2.0 added insulation

2.2.2 MODELLING RESULTS

This section describes the results from NatHERS modeling. In summary, the dwelling design identified in the stamped drawings can achieve the minimum thermal comfort requirements of BASIX without amendments.

Area adjusted heating and cooling loads and preliminary star ratings for the development are identified in Table 2.5.

Table 2.5 Area adjusted heating and cooling average loads for the development

Building / Block	Heating Load (MJ/m²)	Cooling Load (MJ/m²)	Total Load (MJ/m²)	Star Rating
C1	30.9	18.0	48.9	6.2
C2	24.5	16.9	41.3	6.8
C3	32.3	17.8	50.1	6.1
C4	32.3	13.4	45.7	6.4
C5	18.8	24.2	43.0	6.7
Total	**29.8**	**16.7**	**46.5**	**6.4**

For individual apartment loads refer to Appendix B.

2.2.3 MODELLING CONCLUSION

The results of NatHERS modelling demonstrate the apartments can meet the minimum requirements of the Thermal Comfort section of BASIX.

The NatHERS group Universal Certificate(s) are included in Appendix B.

Stamped plans for submission in conjunction with the BASIX certificate are included in Appendix C.

2.3 ENERGY

2.3.1 COMMON AREAS

Energy consumption in multi-unit residential buildings is heavily influenced by the utilisation and servicing of the common areas. HVAC and artificial lighting systems in car parks, and lobbies need to be carefully designed to reduce energy demands.

The common areas will use:

- → Efficient mechanical ventilation systems with appropriate controls to avoid overuse
- → Natural ventilation where possible
- → High efficacy light fittings
- → Lighting control systems in all spaces such as motion sensors where appropriate, or timeclock and BMS control
- → Car park mechanical ventilation controlled by carbon monoxide sensors and VSD fans

Further details of the proposed energy strategy for the common areas of the residential portion of the building are summarised in Table 2.6.

Table 2.6 Energy strategies for the common areas

Energy Item	Strategy
Lift motors	Gearless traction with VVVF motors
Lighting	Basement carpark — fluorescent; Zoned switching with motion sensor Lifts — light emitting diode; Connected to lift call button Garbage rooms — fluorescent; Motion sensors Plant areas and switch rooms — fluorescent; Manual on/manual off Bike storage — fluorescent; Motion sensors Ground floor lobby — fluorescent; Daylight sensor and motion sensors Hallways—compact fluorescent; Zoned switching with motion sensor
Ventilation	Basement carpark —ventilation (exhaust only); carbon monoxide monitor + VSD fan Garbage rooms—ventilation exhaust only Plant areas and switch rooms—ventilation exhaust only; thermostatically controlled Bike storage — ventilation exhaust only Ground floor lobby — Air conditioning Hallways— tempered mechanical ventilation

2.3.2 DWELLINGS

Domestic hot water (DHW), space heating and comfort cooling account for up to 60% of the energy use of an average residential dwelling. Targeting these systems as a priority will support the greatest energy consumption reductions.

Simple energy efficiency measures, such as the provision of efficient fittings and fixtures can deliver energy consumption reductions.

The dwellings will include the following initiatives:

- Heat pump DHW heating systems
- Lighting will consist of dedicated low energy light fittings with efficient controls to limit unnecessary usage
- Clothes drying lines will be installed in each apartment
- High Energy Star-rated appliances will be installed in each apartment (see Table 2.7).

Table 2.7 Energy strategies for the dwellings

ENERGY ITEM	SOCIAL (C1.1 AND C1.3)	AFFORDABLE (C1.2)	MARKET (C1.4, C1.5)
Central DHW heating system	Air sourced electric heat pump		
Lift motors	Gearless traction with VVVF motors		
Appliances	→ Cooktop - Electric → Oven – Electric → Refrigerator – not specified → Dishwashers - not specified → Clothes dryers - not specified → Washing Machines – not specified	→ Cooktop - Induction → Oven – Electric → Refrigerator – not specified → Dishwashers – 3.5-4 star → Clothes dryers – 2.5 star → Washing Machines – 3.5-4 star	→ Cooktop - Induction → Oven – Electric → Refrigerator – 3.5-4 star → Dishwashers – 3.5-4 star → Clothes dryers – 2.5 star → Washing Machines – not specified
Heating and cooling	Ceiling fans for cooling (living and bed) Radiators connected to a central heat pump for the living rooms	Ceiling fans for cooling (bed only) A/C with an EER of 2.5-3 for heating and cooling (living room only)	A/C with an EER of 2.5-3.0 (living and bed)
Lighting	Dedicated low energy light fittings to limit unnecessary usage		
Ventilation	→ Bathroom ventilation – ducted to façade or roof → Laundry ventilation - ducted to façade or roof → Kitchen ventilation - ducted to façade or roof		

APPENDIX A

BASIX CERTIFICATES

APPENDIX A-1
C1.1-C1.4 BASIX CERTIFICATE

BASIX® Certificate

Building Sustainability Index www.basix.nsw.gov.au

Multi Dwelling

Certificate number: 919971M_03

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 10/09/2020 published by the Department. This document is available at www.basix.nsw.gov.au

This certificate is a revision of certificate number 919971M_02 lodged with the consent authority or certifier on 19 November 2019 with application SSD-8903.

It is the responsibility of the applicant to verify with the consent authority that the original, or any revised certificate, complies with the requirements of Schedule 1 Clause 2A, 4A or 6A of the Environmental Planning and Assessment Regulation 2000

Secretary
Date of issue: Thursday, 17 December 2020
To be valid, this certificate must be lodged within 3 months of the date of issue.

NSW GOVERNMENT | Planning, Industry & Environment

Project summary	
Project name	Ivanhoe Estate C1.1-C1.4_03
Street address	Herring Road Macquarie Park 2113
Local Government Area	Ryde City Council
Plan type and plan number	deposited 1
Lot no.	1
Section no.	-
No. of residential flat buildings	4
No. of units in residential flat buildings	493
No. of multi-dwelling houses	0
No. of single dwelling houses	0

Project score		
Water	✔ 42	Target 40
Thermal Comfort	✔ Pass	Target Pass
Energy	✔ 26	Target 25

Certificate Prepared by
Name / Company Name: WSP Australia Pty Ltd
ABN (if applicable): 80078004798

Description of project

Project address	
Project name	Ivanhoe Estate C1.1-C1.4_03
Street address	Herring Road Macquarie Park 2113
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Plan type and plan number	deposited 1
Lot no.	1
Section no.	-

Project type	
No. of residential flat buildings	4
No. of units in residential flat buildings	493
No. of multi-dwelling houses	0
No. of single dwelling houses	0

Site details	
Site area (m²)	6000
Roof area (m²)	2500
Non-residential floor area (m²)	0.0
Residential car spaces	310
Non-residential car spaces	20

Common area landscape	
Common area lawn (m²)	900.0
Common area garden (m²)	400.0
Area of indigenous or low water use species (m²)	0.0

Assessor details	
Assessor number	20/1972
Certificate number	J8P5NXS8A2
Climate zone	56
Ceiling fan in at least one bedroom	No
Ceiling fan in at least one living room or other conditioned area	No

Project score		
Water	✔ 42	Target 40
Thermal Comfort	✔ Pass	Target Pass
Energy	✔ 26	Target 25

Description of project

The tables below describe the dwellings and common areas within the project

Residential flat buildings - C1.1, 130 dwellings, 14 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.01	2	69.9	0.0	0.0	0.0
1.05	2	73.8	0.0	0.0	0.0
1.09	1	50.5	0.0	0.0	0.0
2.04	2	72.8	0.0	0.0	0.0
2.08	1	49.8	0.0	0.0	0.0
3.03	2	70.5	0.0	0.0	0.0
3.07	1	35.0	0.0	0.0	0.0
4.02	2	70.1	0.0	0.0	0.0
4.06	2	56.7	0.0	0.0	0.0
5.01	1	52.7	0.0	0.0	0.0
5.05	2	72.8	0.0	0.0	0.0
5.09	1	49.6	0.0	0.0	0.0
6.03	1	51.7	0.0	0.0	0.0
6.07	1	56.7	0.0	0.0	0.0
7.01	1	52.7	0.0	0.0	0.0
7.05	2	72.8	0.0	0.0	0.0
7.09	1	49.6	0.0	0.0	0.0
8.03	1	51.7	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.02	2	70.1	0.0	0.0	0.0
1.06	1	56.7	0.0	0.0	0.0
2.01	2	69.9	0.0	0.0	0.0
2.05	2	73.8	0.0	0.0	0.0
2.09	2	50.5	0.0	0.0	0.0
3.04	2	72.8	0.0	0.0	0.0
3.08	1	49.8	0.0	0.0	0.0
4.03	2	70.5	0.0	0.0	0.0
4.07	1	35.0	0.0	0.0	0.0
5.02	1	35.2	0.0	0.0	0.0
5.06	2	73.8	0.0	0.0	0.0
5.10	1	50.4	0.0	0.0	0.0
6.04	2	70.5	0.0	0.0	0.0
6.08	1	35.0	0.0	0.0	0.0
7.02	1	35.2	0.0	0.0	0.0
7.06	2	73.8	0.0	0.0	0.0
7.10	1	50.4	0.0	0.0	0.0
8.04	2	70.5	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.03	2	70.5	0.0	0.0	0.0
1.07	1	35.0	0.0	0.0	0.0
2.02	2	70.1	0.0	0.0	0.0
2.06	1	56.7	0.0	0.0	0.0
3.01	2	69.9	0.0	0.0	0.0
3.05	2	73.8	0.0	0.0	0.0
3.09	1	50.5	0.0	0.0	0.0
4.04	2	72.8	0.0	0.0	0.0
4.08	1	49.8	0.0	0.0	0.0
5.03	2	51.7	0.0	0.0	0.0
5.07	1	56.7	0.0	0.0	0.0
6.01	1	52.7	0.0	0.0	0.0
6.05	2	72.8	0.0	0.0	0.0
6.09	1	49.6	0.0	0.0	0.0
7.03	1	51.7	0.0	0.0	0.0
7.07	1	56.7	0.0	0.0	0.0
8.01	1	52.7	0.0	0.0	0.0
8.05	2	72.8	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.04	2	72.8	0.0	0.0	0.0
1.08	1	49.8	0.0	0.0	0.0
2.03	2	70.5	0.0	0.0	0.0
2.07	1	35.0	0.0	0.0	0.0
3.02	2	70.1	0.0	0.0	0.0
3.06	1	56.7	0.0	0.0	0.0
4.01	2	69.9	0.0	0.0	0.0
4.05	2	73.8	0.0	0.0	0.0
4.09	1	50.5	0.0	0.0	0.0
5.04	2	70.5	0.0	0.0	0.0
5.08	1	35.0	0.0	0.0	0.0
6.02	1	35.2	0.0	0.0	0.0
6.06	2	73.8	0.0	0.0	0.0
6.10	1	50.4	0.0	0.0	0.0
7.04	2	70.5	0.0	0.0	0.0
7.08	1	35.0	0.0	0.0	0.0
8.02	1	35.2	0.0	0.0	0.0
8.06	2	73.8	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
8.07	1	56.7	0.0	0.0	0.0
9.01	1	52.7	0.0	0.0	0.0
9.05	2	72.8	0.0	0.0	0.0
9.09	1	49.6	0.0	0.0	0.0
10.03	1	51.7	0.0	0.0	0.0
10.07	1	56.7	0.0	0.0	0.0
11.01	1	52.7	0.0	0.0	0.0
11.05	2	72.8	0.0	0.0	0.0
11.09	2	70.5	0.0	0.0	0.0
12.03	1	51.7	0.0	0.0	0.0
12.07	1	56.7	0.0	0.0	0.0
B1.01	1	55.5	0.0	0.0	0.0
LG.03	2	74.1	0.0	0.0	0.0
UG.02	1	54.9	0.0	0.0	0.0
UG.06	2	79.9	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
8.08	1	35.0	0.0	0.0	0.0
9.02	1	35.2	0.0	0.0	0.0
9.06	2	73.8	0.0	0.0	0.0
9.10	1	50.4	0.0	0.0	0.0
10.04	2	70.5	0.0	0.0	0.0
10.08	1	35.0	0.0	0.0	0.0
11.02	1	35.2	0.0	0.0	0.0
11.06	2	73.8	0.0	0.0	0.0
11.10	1	50.4	0.0	0.0	0.0
12.04	2	70.5	0.0	0.0	0.0
12.08	1	35.0	0.0	0.0	0.0
B1.02	1	47.8	0.0	0.0	0.0
LG.04	1	50.3	0.0	0.0	0.0
UG.03	2	74.5	0.0	0.0	0.0
UG.07	1	52.3	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
8.09	1	49.6	0.0	0.0	0.0
9.03	1	51.7	0.0	0.0	0.0
9.07	1	56.7	0.0	0.0	0.0
10.01	1	52.7	0.0	0.0	0.0
10.05	2	72.8	0.0	0.0	0.0
10.09	1	49.6	0.0	0.0	0.0
11.03	1	51.7	0.0	0.0	0.0
11.07	2	56.7	0.0	0.0	0.0
12.01	1	52.7	0.0	0.0	0.0
12.05	2	72.8	0.0	0.0	0.0
12.09	1	49.6	0.0	0.0	0.0
LG.01	2	81.2	0.0	0.0	0.0
LG.05	2	79.9	0.0	0.0	0.0
UG.04	2	72.8	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
8.10	1	50.4	0.0	0.0	0.0
9.04	2	70.5	0.0	0.0	0.0
9.08	1	35.0	0.0	0.0	0.0
10.02	1	35.2	0.0	0.0	0.0
10.06	2	73.8	0.0	0.0	0.0
10.10	1	50.4	0.0	0.0	0.0
11.04	2	70.5	0.0	0.0	0.0
11.08	1	35.0	0.0	0.0	0.0
12.02	1	35.2	0.0	0.0	0.0
12.06	2	73.8	0.0	0.0	0.0
12.10	1	50.4	0.0	0.0	0.0
LG.02	1	41.0	0.0	0.0	0.0
UG.01	1	62.3	0.0	0.0	0.0
UG.05	2	73.8	0.0	0.0	0.0

Residential flat buildings - C1.3, 129 dwellings, 14 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.01	2	69.9	0.0	0.0	0.0
1.05	2	71.6	0.0	0.0	0.0
1.09	1	51.4	0.0	0.0	0.0
2.04	2	70.3	0.0	0.0	0.0
2.08	1	50.6	0.0	0.0	0.0
3.03	2	69.8	0.0	0.0	0.0
3.07	1	35.1	0.0	0.0	0.0
4.02	2	70.1	0.0	0.0	0.0
4.06	1	59.6	0.0	0.0	0.0
5.01	1	52.7	0.0	0.0	0.0
5.05	2	69.3	0.0	0.0	0.0
5.09	1	50.6	0.0	0.0	0.0
6.03	1	51.7	0.0	0.0	0.0
6.07	1	59.6	0.0	0.0	0.0
7.01	1	52.7	0.0	0.0	0.0
7.05	2	69.3	0.0	0.0	0.0
7.09	1	50.6	0.0	0.0	0.0
8.03	1	51.7	0.0	0.0	0.0
8.07	1	59.6	0.0	0.0	0.0
9.01	1	52.7	0.0	0.0	0.0
9.05	2	69.3	0.0	0.0	0.0
9.09	1	50.6	0.0	0.0	0.0
10.03	1	51.7	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.02	2	70.1	0.0	0.0	0.0
1.06	1	59.6	0.0	0.0	0.0
2.01	2	69.9	0.0	0.0	0.0
2.05	2	71.6	0.0	0.0	0.0
2.09	1	51.4	0.0	0.0	0.0
3.04	2	70.3	0.0	0.0	0.0
3.08	1	50.6	0.0	0.0	0.0
4.03	2	69.8	0.0	0.0	0.0
4.07	1	35.1	0.0	0.0	0.0
5.02	1	35.2	0.0	0.0	0.0
5.06	2	73.4	0.0	0.0	0.0
5.10	1	51.4	0.0	0.0	0.0
6.04	2	69.3	0.0	0.0	0.0
6.08	1	35.1	0.0	0.0	0.0
7.02	1	35.2	0.0	0.0	0.0
7.06	2	73.4	0.0	0.0	0.0
7.10	1	51.4	0.0	0.0	0.0
8.04	2	69.3	0.0	0.0	0.0
8.08	1	35.1	0.0	0.0	0.0
9.02	1	35.2	0.0	0.0	0.0
9.06	2	73.4	0.0	0.0	0.0
9.10	1	51.4	0.0	0.0	0.0
10.04	2	69.3	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.03	2	69.8	0.0	0.0	0.0
1.07	1	35.1	0.0	0.0	0.0
2.02	2	70.1	0.0	0.0	0.0
2.06	1	59.6	0.0	0.0	0.0
3.01	2	69.9	0.0	0.0	0.0
3.05	2	71.6	0.0	0.0	0.0
3.09	1	51.4	0.0	0.0	0.0
4.04	2	70.3	0.0	0.0	0.0
4.08	1	50.6	0.0	0.0	0.0
5.03	1	51.7	0.0	0.0	0.0
5.07	1	59.6	0.0	0.0	0.0
6.01	1	52.7	0.0	0.0	0.0
6.05	2	69.3	0.0	0.0	0.0
6.09	1	50.6	0.0	0.0	0.0
7.03	1	51.7	0.0	0.0	0.0
7.07	1	59.6	0.0	0.0	0.0
8.01	1	52.7	0.0	0.0	0.0
8.05	2	69.3	0.0	0.0	0.0
8.09	1	50.6	0.0	0.0	0.0
9.03	1	51.7	0.0	0.0	0.0
9.07	1	59.6	0.0	0.0	0.0
10.01	1	52.7	0.0	0.0	0.0
10.05	2	69.3	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.04	2	70.3	0.0	0.0	0.0
1.08	1	50.6	0.0	0.0	0.0
2.03	2	69.8	0.0	0.0	0.0
2.07	1	35.1	0.0	0.0	0.0
3.02	2	70.1	0.0	0.0	0.0
3.06	1	59.6	0.0	0.0	0.0
4.01	2	69.9	0.0	0.0	0.0
4.05	2	71.6	0.0	0.0	0.0
4.09	1	51.4	0.0	0.0	0.0
5.04	2	69.3	0.0	0.0	0.0
5.08	1	35.1	0.0	0.0	0.0
6.02	1	35.2	0.0	0.0	0.0
6.06	2	73.4	0.0	0.0	0.0
6.10	1	51.4	0.0	0.0	0.0
7.04	2	69.3	0.0	0.0	0.0
7.08	1	35.1	0.0	0.0	0.0
8.02	1	35.2	0.0	0.0	0.0
8.06	2	73.4	0.0	0.0	0.0
8.10	1	51.4	0.0	0.0	0.0
9.04	2	69.3	0.0	0.0	0.0
9.08	1	35.1	0.0	0.0	0.0
10.02	1	35.2	0.0	0.0	0.0
10.06	2	73.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
10.07	1	59.6	0.0	0.0	0.0
11.01	1	52.7	0.0	0.0	0.0
11.05	2	69.3	0.0	0.0	0.0
11.09	1	50.6	0.0	0.0	0.0
12.03	1	51.7	0.0	0.0	0.0
12.07	1	59.6	0.0	0.0	0.0
LG.01	1	51.4	0.0	0.0	0.0
UG.01	1	54.6	0.0	0.0	0.0
UG.05	2	72.3	0.0	0.0	0.0
UG.09	1	51.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
10.08	1	35.1	0.0	0.0	0.0
11.02	1	35.2	0.0	0.0	0.0
11.06	2	73.4	0.0	0.0	0.0
11.10	1	51.4	0.0	0.0	0.0
12.04	2	69.3	0.0	0.0	0.0
12.08	1	35.1	0.0	0.0	0.0
LG.02	1	50.6	0.0	0.0	0.0
UG.02	1	54.9	0.0	0.0	0.0
UG.06	1	59.6	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
10.09	1	50.6	0.0	0.0	0.0
11.03	1	51.7	0.0	0.0	0.0
11.07	1	59.6	0.0	0.0	0.0
12.01	1	52.7	0.0	0.0	0.0
12.05	2	69.3	0.0	0.0	0.0
12.09	1	50.6	0.0	0.0	0.0
LG.03	1	35.0	0.0	0.0	0.0
UG.03	2	70.7	0.0	0.0	0.0
UG.07	1	35.1	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
10.10	1	51.4	0.0	0.0	0.0
11.04	2	69.3	0.0	0.0	0.0
11.08	1	35.1	0.0	0.0	0.0
12.02	1	35.2	0.0	0.0	0.0
12.06	2	73.4	0.0	0.0	0.0
12.10	1	51.4	0.0	0.0	0.0
LG.04	1	57.2	0.0	0.0	0.0
UG.04	2	73.3	0.0	0.0	0.0
UG.08	1	50.6	0.0	0.0	0.0

Residential flat buildings - C1.4, 104 dwellings, 20 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.01	2	80.3	0.0	0.0	0.0
2.01	1	57.2	0.0	0.0	0.0
2.05	1	52.6	0.0	0.0	0.0
3.04	2	70.8	0.0	0.0	0.0
4.03	2	74.9	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.02	2	79.3	0.0	0.0	0.0
2.02	2	76.6	0.0	0.0	0.0
3.01	1	57.2	0.0	0.0	0.0
3.05	1	52.6	0.0	0.0	0.0
4.04	2	70.8	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.03	1	71.3	0.0	0.0	0.0
2.03	2	74.9	0.0	0.0	0.0
3.02	2	76.6	0.0	0.0	0.0
4.01	1	57.2	0.0	0.0	0.0
4.05	1	52.6	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
1.04	3	95.3	0.0	0.0	0.0
2.04	2	70.8	0.0	0.0	0.0
3.03	2	74.9	0.0	0.0	0.0
4.02	2	76.6	0.0	0.0	0.0
5.01	1	57.2	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
5.02	2	75.8	0.0	0.0	0.0
6.01	1	57.2	0.0	0.0	0.0
6.05	1	52.6	0.0	0.0	0.0
7.04	2	70.8	0.0	0.0	0.0
8.03	2	74.0	0.0	0.0	0.0
9.02	2	75.8	0.0	0.0	0.0
10.01	1	57.2	0.0	0.0	0.0
10.05	1	52.6	0.0	0.0	0.0
11.04	2	70.8	0.0	0.0	0.0
12.03	2	74.0	0.0	0.0	0.0
13.02	1	44.2	0.0	0.0	0.0
13.06	1	52.6	0.0	0.0	0.0
14.04	2	74.8	0.0	0.0	0.0
15.02	1	40.0	0.0	0.0	0.0
15.06	1	52.6	0.0	0.0	0.0
16.04	2	74.8	0.0	0.0	0.0
17.02	1	40.0	0.0	0.0	0.0
17.06	1	52.6	0.0	0.0	0.0
18.04	2	74.8	0.0	0.0	0.0
19.02	1	40.0	0.0	0.0	0.0
19.06	1	52.6	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
5.03	2	74.0	0.0	0.0	0.0
6.02	2	75.8	0.0	0.0	0.0
7.01	1	57.2	0.0	0.0	0.0
7.05	1	52.6	0.0	0.0	0.0
8.04	2	70.8	0.0	0.0	0.0
9.03	2	74.0	0.0	0.0	0.0
10.02	2	75.8	0.0	0.0	0.0
11.01	1	57.2	0.0	0.0	0.0
11.05	1	52.6	0.0	0.0	0.0
12.04	2	70.8	0.0	0.0	0.0
13.03	3	101.4	0.0	0.0	0.0
14.01	2	72.2	0.0	0.0	0.0
14.05	2	70.5	0.0	0.0	0.0
15.03	3	91.2	0.0	0.0	0.0
16.01	2	72.2	0.0	0.0	0.0
16.05	2	70.5	0.0	0.0	0.0
17.03	3	91.2	0.0	0.0	0.0
18.01	2	72.2	0.0	0.0	0.0
18.05	2	70.5	0.0	0.0	0.0
19.03	3	91.2	0.0	0.0	0.0
UG.01	2	80.3	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
5.04	2	70.8	0.0	0.0	0.0
6.03	2	74.0	0.0	0.0	0.0
7.02	2	75.8	0.0	0.0	0.0
8.01	1	57.2	0.0	0.0	0.0
8.05	1	52.6	0.0	0.0	0.0
9.04	2	70.8	0.0	0.0	0.0
10.03	2	74.0	0.0	0.0	0.0
11.02	2	75.8	0.0	0.0	0.0
12.01	1	57.2	0.0	0.0	0.0
12.05	1	52.6	0.0	0.0	0.0
13.04	2	74.8	0.0	0.0	0.0
14.02	1	40.0	0.0	0.0	0.0
14.06	1	52.6	0.0	0.0	0.0
15.04	2	74.8	0.0	0.0	0.0
16.02	1	40.0	0.0	0.0	0.0
16.06	1	52.6	0.0	0.0	0.0
17.04	2	74.8	0.0	0.0	0.0
18.02	1	40.0	0.0	0.0	0.0
18.06	1	52.6	0.0	0.0	0.0
19.04	2	74.8	0.0	0.0	0.0
UG.02	2	69.8	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
5.05	1	52.6	0.0	0.0	0.0
6.04	2	70.8	0.0	0.0	0.0
7.03	2	74.0	0.0	0.0	0.0
8.02	2	75.8	0.0	0.0	0.0
9.01	1	57.2	0.0	0.0	0.0
9.05	1	52.6	0.0	0.0	0.0
10.04	2	70.8	0.0	0.0	0.0
11.03	2	74.0	0.0	0.0	0.0
12.02	2	75.8	0.0	0.0	0.0
13.01	2	72.2	0.0	0.0	0.0
13.05	2	70.5	0.0	0.0	0.0
14.03	3	91.2	0.0	0.0	0.0
15.01	2	72.2	0.0	0.0	0.0
15.05	2	70.5	0.0	0.0	0.0
16.03	3	91.2	0.0	0.0	0.0
17.01	2	72.2	0.0	0.0	0.0
17.05	2	70.5	0.0	0.0	0.0
18.03	3	91.2	0.0	0.0	0.0
19.01	2	72.2	0.0	0.0	0.0
19.05	2	70.5	0.0	0.0	0.0
UG.03	1	106.5	0.0	0.0	0.0

Residential flat buildings - C1.2, 130 dwellings, 20 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
1.01	2	72.9	0.0	0.0	0.0
2.01	1	77.1	0.0	0.0	0.0
2.05	1	33.2	0.0	0.0	0.0
3.03	2	48.6	7.6	0.0	0.0
4.01	1	76.6	0.0	0.0	0.0
4.05	1	33.1	0.0	0.0	0.0
5.03	2	48.6	7.6	0.0	0.0
6.01	1	76.6	0.0	0.0	0.0
6.05	1	33.1	0.0	0.0	0.0
7.03	2	48.6	7.6	0.0	0.0
8.01	1	76.6	0.0	0.0	0.0
8.05	1	33.1	0.0	0.0	0.0
9.03	2	48.6	7.6	0.0	0.0
10.01	1	76.6	0.0	0.0	0.0
10.05	1	33.1	0.0	0.0	0.0
11.03	2	48.6	7.6	0.0	0.0
12.01	1	76.6	0.0	0.0	0.0
12.05	1	33.1	0.0	0.0	0.0
13.03	3	54.4	0.0	0.0	0.0
13.07	1	33.1	0.0	0.0	0.0
14.03	3	35.9	0.0	0.0	0.0
14.07	2	67.7	0.0	0.0	0.0
15.03	3	35.9	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
1.02	2	73.8	0.0	0.0	0.0
2.02	2	43.5	0.0	0.0	0.0
2.06	1	32.7	0.0	0.0	0.0
3.04	2	68.3	0.0	0.0	0.0
4.02	2	43.2	0.0	0.0	0.0
4.06	1	33.0	0.0	0.0	0.0
5.04	2	68.3	0.0	0.0	0.0
6.02	2	43.2	0.0	0.0	0.0
6.06	1	33.0	0.0	0.0	0.0
7.04	2	68.3	0.0	0.0	0.0
8.02	2	43.2	0.0	0.0	0.0
8.06	1	33.0	0.0	0.0	0.0
9.04	2	68.3	0.0	0.0	0.0
10.02	2	43.2	0.0	0.0	0.0
10.06	1	33.0	0.0	0.0	0.0
11.04	2	68.3	0.0	0.0	0.0
12.02	2	43.2	0.0	0.0	0.0
12.06	1	33.0	0.0	0.0	0.0
13.04	2	49.4	0.0	0.0	0.0
13.08	1	33.0	0.0	0.0	0.0
14.04	2	48.8	0.0	0.0	0.0
14.08	1	33.1	0.0	0.0	0.0
15.04	2	48.8	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
1.03	1	72.4	0.0	0.0	0.0
2.03	2	48.6	7.6	0.0	0.0
3.01	1	76.6	0.0	0.0	0.0
3.05	1	33.1	0.0	0.0	0.0
4.03	2	48.6	7.6	0.0	0.0
5.01	1	76.6	0.0	0.0	0.0
5.05	1	33.1	0.0	0.0	0.0
6.03	2	48.6	7.6	0.0	0.0
7.01	1	76.6	0.0	0.0	0.0
7.05	1	33.1	0.0	0.0	0.0
8.03	2	48.6	7.6	0.0	0.0
9.01	1	76.6	0.0	0.0	0.0
9.05	1	33.1	0.0	0.0	0.0
10.03	2	48.6	7.6	0.0	0.0
11.01	1	76.6	0.0	0.0	0.0
11.05	1	33.1	0.0	0.0	0.0
12.03	2	48.6	7.6	0.0	0.0
13.01	2	55.1	0.0	0.0	0.0
13.05	2	48.6	7.6	0.0	0.0
14.01	2	33.0	0.0	0.0	0.0
14.05	2	49.7	0.0	0.0	0.0
15.01	2	33.0	0.0	0.0	0.0
15.05	2	49.7	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
1.04	2	81.2	0.0	0.0	0.0
2.04	2	68.2	0.0	0.0	0.0
3.02	2	43.2	0.0	0.0	0.0
3.06	1	33.0	0.0	0.0	0.0
4.04	2	68.3	0.0	0.0	0.0
5.02	2	43.2	0.0	0.0	0.0
5.06	1	33.0	0.0	0.0	0.0
6.04	2	68.3	0.0	0.0	0.0
7.02	2	43.2	0.0	0.0	0.0
7.06	1	33.0	0.0	0.0	0.0
8.04	2	68.3	0.0	0.0	0.0
9.02	2	43.2	0.0	0.0	0.0
9.06	1	33.0	0.0	0.0	0.0
10.04	2	68.3	0.0	0.0	0.0
11.02	2	43.2	0.0	0.0	0.0
11.06	1	33.0	0.0	0.0	0.0
12.04	2	68.3	0.0	0.0	0.0
13.02	1	41.4	0.0	0.0	0.0
13.06	1	67.7	0.0	0.0	0.0
14.02	1	51.4	0.0	0.0	0.0
14.06	1	48.6	7.6	0.0	0.0
15.02	1	51.4	0.0	0.0	0.0
15.06	1	48.6	7.6	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
15.07	2	67.7	0.0	0.0	0.0
16.03	3	35.9	0.0	0.0	0.0
16.07	2	67.7	0.0	0.0	0.0
17.03	3	35.9	0.0	0.0	0.0
17.07	2	67.7	0.0	0.0	0.0
18.03	3	35.9	0.0	0.0	0.0
18.07	2	67.7	0.0	0.0	0.0
19.03	3	35.9	0.0	0.0	0.0
19.07	2	67.7	0.0	0.0	0.0
UG.03	1	68.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
15.08	1	33.1	0.0	0.0	0.0
16.04	2	48.8	0.0	0.0	0.0
16.08	1	33.1	0.0	0.0	0.0
17.04	2	48.8	0.0	0.0	0.0
17.08	1	33.1	0.0	0.0	0.0
18.04	2	48.8	0.0	0.0	0.0
18.08	1	33.1	0.0	0.0	0.0
19.04	2	48.8	0.0	0.0	0.0
19.08	1	33.1	0.0	0.0	0.0
UG.04	1	91.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
16.01	2	33.0	0.0	0.0	0.0
16.05	2	49.7	0.0	0.0	0.0
17.01	2	33.0	0.0	0.0	0.0
17.05	2	49.7	0.0	0.0	0.0
18.01	2	33.0	0.0	0.0	0.0
18.05	2	49.7	0.0	0.0	0.0
19.01	2	33.0	0.0	0.0	0.0
19.05	2	49.7	0.0	0.0	0.0
UG.01	2	82.5	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
16.02	1	51.4	0.0	0.0	0.0
16.06	1	48.6	7.6	0.0	0.0
17.02	1	51.4	0.0	0.0	0.0
17.06	1	48.6	7.6	0.0	0.0
18.02	1	51.4	0.0	0.0	0.0
18.06	1	48.6	7.6	0.0	0.0
19.02	1	51.4	0.0	0.0	0.0
19.06	1	48.6	7.6	0.0	0.0
UG.02	2	73.8	0.0	0.0	0.0

Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - C1.1

Common area	Floor area (m²)
Lift car (No.1)	-
Hallway/lobby type C1.1	520.0

Common area	Floor area (m²)
Lift car (No.2)	-

Common area	Floor area (m²)
Switch room (No. 1)	15.0

Common areas of unit building - C1.3

Common area	Floor area (m²)
Lift car (No.5)	-
Hallway/lobby type C1.3	530.0

Common area	Floor area (m²)
Lift car (No.6)	-

Common area	Floor area (m²)
Plant or service room (No. 2)	20.0

Common areas of unit building - C1.4

Common area	Floor area (m²)
Lift car (No.7)	-

Common area	Floor area (m²)
Lift car (No.8)	-

Common area	Floor area (m²)
Hallway/lobby type C1.4	440.0

Common areas of unit building - C1.2

Common area	Floor area (m²)
Lift car (No.3)	-
Hallway/lobby type C1.2	430.0

Common area	Floor area (m²)
Lift car (No.4)	-

Common area	Floor area (m²)
Plant or service room (No. 1)	20.0

Common areas of the development (non-building specific)

Common area	Floor area (m²)
Car park area (No. 1)	14000.0

Common area	Floor area (m²)
Garbage room (No. 1)	30.0

Common area	Floor area (m²)
Bike store	45.0

Common area	Floor area (m²)
Ground floor lobby type (No. 1)	200.0

Common area	Floor area (m²)
Hallway/lobby type (No. 5)	400.0

Common area	Floor area (m²)

Schedule of BASIX commitments

1. Commitments for Residential flat buildings - C1.1
    - (a) Dwellings
        - (i) Water
        - (ii) Energy
        - (iii) Thermal Comfort
    - (b) Common areas and central systems/facilities
        - (i) Water
        - (ii) Energy

2. Commitments for Residential flat buildings - C1.3
    - (a) Dwellings
        - (i) Water
        - (ii) Energy
        - (iii) Thermal Comfort
    - (b) Common areas and central systems/facilities
        - (i) Water
        - (ii) Energy

3. Commitments for Residential flat buildings - C1.4
    - (a) Dwellings
        - (i) Water
        - (ii) Energy
        - (iii) Thermal Comfort
    - (b) Common areas and central systems/facilities
        - (i) Water
        - (ii) Energy

4. Commitments for Residential flat buildings - C1.2
    - (a) Dwellings

(i) Water
(ii) Energy
(iii) Thermal Comfort

(b) Common areas and central systems/facilities
(i) Water
(ii) Energy

5. Commitments for multi-dwelling houses

6. Commitments for single dwelling houses

7. Commitments for common areas and central systems/facilities for the development (non-building specific)
(i) Water
(ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for Residential flat buildings - C1.1

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install: (aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and (bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔ ✔	✔ ✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	4 star (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	no	-	-	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
None	-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must:			
(aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and		✔	
(bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔	
(h) The applicant must install in the dwelling:			
(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✔	
(bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and		✔	✔
(cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔	
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1	individual fan, ducted to façade or roof	manual on / timer off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual on / timer off

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitch
All dwellings	ceiling fans	ceiling fans	central heating system 1 (zoned)	central heating system 1 (zoned)	2	1 (dedicated)	yes	yes	yes	yes	0	no

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	electric cooktop & electric oven	-	yes	-	-	-	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✔		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✔	

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✔	✔
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✔	✔	✔
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✔	✔	✔

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
1.06	36.6	22.4
1.07	9.3	29.1
1.08	17.1	17.4
1.09	33.6	19.4
2.06	32.3	27.6
2.07	9.7	28.8
2.08	22.0	21.2
2.09	34.1	19.0
3.01	9.1	23.2
3.02	9.9	22.1
3.04	37.3	11.4
3.05	39.5	10.8
3.06	38.2	10.3
3.07	10.0	28.5

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
3.08	21.7	14.8
3.09	34.4	19.0
4.01	12.0	20.5
4.02	12.8	19.7
4.03	35.2	19.3
4.04	42.2	10.0
4.05	32.3	10.7
4.06	28.8	16.5
4.07	13.2	24.3
4.08	24.0	14.9
4.09	38.9	16.2
5.01	34.8	18.5
5.02	26.1	28.0
5.03	35.0	17.1
5.04	35.2	19.4
5.05	42.7	9.9
5.06	40.5	10.9
5.07	31.8	15.1
5.08	13.5	24.7
5.09	22.4	14.8
5.10	44.3	20.4
6.01	34.8	18.6
6.02	26.5	27.4
6.03	34.3	16.6
6.04	36.2	18.8
6.05	41.9	10.1
6.06	33.1	10.4

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
6.07	32.4	14.9
6.08	13.9	24.5
6.09	24.9	15.3
6.10	35.8	17.1
7.01	35.2	17.3
7.02	26.9	28.4
7.03	39.0	17.7
7.04	34.8	19.3
7.05	43.0	10.4
7.06	33.2	10.5
7.07	32.7	14.6
7.08	14.1	25.0
7.09	24.9	15.0
7.10	36.3	17.3
8.01	35.5	17.3
8.02	27.2	27.7
8.03	39.5	18.1
8.05	42.2	10.3
8.06	33.4	10.7
8.07	33.2	14.3
8.08	14.4	24.6
8.09	25.3	14.9
8.10	35.8	16.7
9.01	38.2	16.9
9.02	28.3	25.6
9.03	42.5	17.5
9.04	36.3	19.1

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
9.05	44.3	10.0
9.07	35.4	14.1
9.08	16.0	23.1
9.09	27.1	14.4
9.10	39.0	18.0
10.01	38.3	16.9
10.02	28.7	25.4
10.03	42.6	16.7
10.04	34.4	19.3
10.05	36.4	9.0
10.07	35.7	13.7
10.08	16.2	22.8
10.09	27.4	14.5
10.10	39.6	17.8
11.01	38.6	17.1
11.02	28.8	26.2
11.03	32.4	21.2
11.04	33.3	20.6
11.05	43.6	9.7
11.06	44.5	11.2
11.07	43.8	15.1
11.08	16.3	22.0
11.09	27.5	14.2
11.10	33.2	17.3
12.01	45.0	18.3
12.02	35.9	25.6
12.03	38.7	26.2

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
12.04	35.9	28.0
12.05	42.0	13.2
12.06	44.2	11.3
12.07	44.1	15.5
12.08	23.5	22.7
12.09	36.7	15.4
12.10	44.3	18.7
B1.01	27.7	17.9
B1.02	29.6	23.4
LG.01	29.6	15.5
LG.02	35.2	13.2
LG.03	26.9	14.9
LG.04	14.0	11.8
LG.05	19.4	19.4
UG.01	30.1	23.6
UG.02	41.8	17.2
UG.03	29.0	24.6
UG.04	34.4	12.0
UG.05	45.1	10.0
UG.06	28.4	13.3
UG.07	29.9	26.1
1.01, 2.01	10.1	23.4
1.02, 2.02	11.2	22.3
1.03, 2.03	30.9	23.6
1.04, 2.04	35.6	11.5
1.05, 2.05	35.5	12.0
3.03, 8.04	34.8	19.4

	Thermal loads	
Dwelling no.	**Area adjusted heating load (in mJ/m²/yr)**	**Area adjusted cooling load (in mJ/m²/yr)**
All other dwellings	35.1	11.3

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	**Ventilation system type**	**Ventilation efficiency measure**	**Primary type of artificial lighting**	**Lighting efficiency measure**	**Lighting control system/BMS**
Lift car (No.1)	-	-	light-emitting diode	connected to lift call button	Yes
Lift car (No.2)	-	-	light-emitting diode	connected to lift call button	Yes
Switch room (No. 1)	ventilation supply only	thermostatically controlled	light-emitting diode	manual on / manual off	Yes
Hallway/lobby type C1.1	ventilation (supply + exhaust)	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	Yes

Central energy systems	Type	Specification
Central hot water system (No. 1)	electric heat pump - air sourced	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Central heating system (No. 1)	radiators + heated water	Energy source: electric boiler
Lift (No. 1)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 16
Lift (No. 2)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 16

2. Commitments for Residential flat buildings - C1.3

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install: (aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and (bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔ ✔	✔ ✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	4 star (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	no	-	-	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
None	-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must:			
(aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and		✔	
(bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔	
(h) The applicant must install in the dwelling:			
(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✔	
(bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and		✔	✔
(cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔	
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1	individual fan, ducted to façade or roof	manual on / timer off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual on / timer off

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitch
All dwellings	ceiling fans	ceiling fans	central heating system 2 (zoned)	central heating system 2 (zoned)	2	1 (dedicated)	yes	yes	yes	yes	0	no

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	electric cooktop & electric oven	-	yes	-	-	-	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✔		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✔	

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✔	✔
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✔	✔	✔
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✔	✔	✔

	Thermal loads	
Dwelling no.	**Area adjusted heating load (in mJ/m²/yr)**	**Area adjusted cooling load (in mJ/m²/yr)**
1.01	11.9	22.4
1.02	11.7	22.1
1.03	22.2	28.8
1.04	32.7	11.9
1.05	31.0	13.9
1.06	26.8	14.7
1.07	28.5	26.1
1.08	38.8	18.5
1.09	30.6	19.6
2.01	10.7	21.9
2.02	10.2	22.0
2.03	24.8	23.6
2.04	36.5	13.5
2.05	32.5	13.8

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
2.06	27.8	14.5
2.07	29.2	26.2
2.08	28.2	17.0
2.09	31.6	18.8
3.01	13.4	19.3
3.02	13.0	19.5
3.03	26.7	23.3
3.04	33.7	12.2
3.05	36.0	14.1
3.06	31.9	11.8
3.07	33.1	22.6
3.08	37.5	14.1
3.09	35.9	16.6
4.01	13.6	19.6
4.02	10.4	18.6
4.03	26.0	22.7
4.04	34.4	12.0
4.05	34.2	14.0
4.06	32.6	11.4
4.07	33.2	22.5
4.08	37.9	13.5
4.09	35.9	16.9
5.01	38.1	18.2
5.02	19.3	21.3
5.03	25.2	25.3
5.04	27.6	22.5
5.05	34.6	12.0

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
5.06	37.0	11.9
5.07	32.6	11.2
5.08	32.9	22.0
5.09	36.2	16.9
5.10	40.5	17.3
6.01	38.2	17.8
6.02	26.2	25.1
6.03	34.0	18.8
6.04	27.1	22.9
6.05	35.2	12.3
6.06	35.3	13.4
6.07	31.5	11.2
6.08	31.8	22.3
6.09	36.4	16.7
6.10	39.0	16.6
7.01	38.4	17.1
7.02	26.5	24.7
7.03	34.5	19.3
7.04	27.4	22.8
7.05	35.6	12.1
7.06	35.5	13.6
7.07	28.6	11.0
7.08	29.7	22.4
7.09	36.3	17.1
7.10	41.0	19.4
8.01	38.5	16.9
8.02	26.9	24.6

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
8.03	34.9	19.7
8.04	27.7	22.6
8.05	35.9	11.9
8.06	35.8	13.4
8.07	24.6	11.3
8.08	27.6	22.4
8.09	35.1	13.6
8.10	41.3	19.9
9.01	40.7	16.4
9.02	28.4	22.7
9.03	37.5	18.2
9.04	29.9	20.7
9.05	38.2	10.8
9.06	38.1	13.2
9.07	24.6	11.2
9.08	27.3	23.0
9.09	34.8	12.6
9.10	41.9	19.3
10.01	40.7	16.2
10.02	28.7	22.7
10.03	37.8	18.0
10.04	29.1	20.0
10.05	38.5	10.7
10.06	38.4	12.6
10.07	23.9	11.3
10.08	25.0	22.9
10.09	32.6	12.7

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
10.10	39.4	19.2
11.01	40.3	15.9
11.02	28.9	22.5
11.03	38.1	18.4
11.04	29.2	19.8
11.05	42.7	11.7
11.06	44.4	13.4
11.07	23.8	11.6
11.08	23.5	22.9
11.09	31.1	12.7
11.10	37.8	18.7
12.01	40.1	17.3
12.02	36.0	23.7
12.03	43.5	18.8
12.04	33.8	24.2
12.05	44.3	16.8
12.06	44.8	13.3
12.07	31.8	11.7
12.08	24.1	21.5
12.09	40.4	14.5
12.10	42.9	19.2
LG.01	39.4	22.0
LG.02	37.3	19.4
LG.03	40.6	24.1
LG.04	40.2	25.2
UG.01	37.5	12.0
UG.02	37.1	11.9

	Thermal loads	
Dwelling no.	**Area adjusted heating load (in mJ/m²/yr)**	**Area adjusted cooling load (in mJ/m²/yr)**
UG.03	20.0	29.3
UG.04	32.9	13.6
UG.05	35.8	13.5
UG.06	26.0	16.9
UG.07	45.1	22.7
UG.08	26.1	17.8
All other dwellings	44.8	20.5

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	**Ventilation system type**	**Ventilation efficiency measure**	**Primary type of artificial lighting**	**Lighting efficiency measure**	**Lighting control system/BMS**
Lift car (No.5)	-	-	light-emitting diode	connected to lift call button	Yes
Lift car (No.6)	-	-	light-emitting diode	connected to lift call button	Yes
Plant or service room (No. 2)	ventilation exhaust only	thermostatically controlled	light-emitting diode	manual on / manual off	Yes
Hallway/lobby type C1.3	ventilation (supply + exhaust)	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	Yes

Central energy systems	Type	Specification
Central hot water system (No. 3)	electric heat pump - air sourced	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Central heating system (No. 2)	radiators + heated water	Energy source: electric boiler
Lift (No. 5)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 23
Lift (No. 6)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 23

3. Commitments for Residential flat buildings - C1.4

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install: (aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and (bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔ ✔	✔ ✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	4 star (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	no	-	3.5 star	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
None	-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must:			
(aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and		✔	
(bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔	
(h) The applicant must install in the dwelling:			
(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✔	
(bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and		✔	✔
(cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔	
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1	individual fan, ducted to façade or roof	manual on / timer off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual on / timer off

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitch
1.03, 2.01, 2.05, 3.01	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.5 - 4.0 (zoned)	1-phase airconditioning EER 3.5 - 4.0 (zoned)	1	1 (dedicated)	yes	yes	yes	yes	0	no
All other dwellings	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.0 - 3.5 (zoned)	1-phase airconditioning EER 3.5 - 4.0 (zoned)	1-phase airconditioning EER 3.5 - 4.0 (zoned)	2	1 (dedicated)	yes	yes	yes	yes	0	no

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	induction cooktop & electric oven	4 star	yes	3.5 star	-	2 star	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✔		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✔	
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✔	✔
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✔	✔	✔
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✔	✔	✔

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
1.01	24.1	20.3
1.02	28.9	12.3
1.03	43.9	22.5
1.04	37.3	17.1
2.01	30.4	15.6
2.02	29.1	11.5
2.03	34.7	12.9
2.04	34.5	15.5
2.05	31.8	17.2

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
3.01	32.7	11.6
3.02	32.6	9.5
3.03	38.0	10.9
3.04	33.8	12.4
3.05	34.5	13.7
4.01	33.0	11.9
4.02	33.3	9.4
4.03	38.6	10.3
4.04	34.3	12.2
4.05	34.8	13.5
5.01	31.3	12.0
5.02	32.9	9.3
5.03	37.4	11.4
5.04	33.9	10.9
5.05	27.5	14.1
6.01	32.1	12.2
6.02	33.4	9.2
6.03	40.7	10.2
6.04	37.4	10.5
6.05	27.8	14.2
7.01	34.5	11.9
7.02	33.7	9.3
7.03	41.1	10.3
7.04	37.7	10.5
7.05	28.0	13.9
8.01	30.8	11.6
8.02	34.0	9.0

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
8.03	41.4	10.3
8.04	38.0	10.4
8.05	28.3	14.0
9.01	31.4	11.1
9.02	36.1	8.9
9.03	43.5	9.6
9.05	30.5	13.6
10.01	31.2	11.2
10.02	36.4	8.8
10.03	43.8	9.8
10.04	40.8	9.7
10.05	30.7	13.6
11.01	31.0	11.5
11.02	36.6	8.7
11.03	44.0	9.5
11.04	40.5	9.7
11.05	30.7	13.7
12.01	30.9	11.6
12.02	36.8	8.7
12.03	43.6	9.6
12.04	40.2	9.7
12.05	31.1	14.0
13.01	18.4	23.3
13.02	25.3	27.4
13.03	26.1	26.3
13.04	28.3	8.2
13.05	37.7	9.2

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
13.06	29.8	11.1
14.01	30.2	13.0
14.02	26.5	27.1
14.03	23.0	18.6
14.04	28.7	7.4
14.05	28.4	9.8
14.06	34.6	14.9
15.01	29.6	13.1
15.02	26.3	26.8
15.03	22.9	18.5
15.04	28.6	7.3
15.05	37.2	9.7
15.06	33.6	14.9
16.01	28.4	13.0
16.02	26.1	26.5
16.03	23.0	18.5
16.04	28.5	7.6
16.05	35.8	9.5
16.06	32.2	14.9
17.01	27.0	13.0
17.02	26.2	26.4
17.03	23.2	18.2
17.04	28.4	7.5
17.05	34.4	9.6
17.06	31.0	14.9
18.01	26.2	13.1
18.02	26.3	26.5

	Thermal loads	
Dwelling no.	**Area adjusted heating load (in mJ/m²/yr)**	**Area adjusted cooling load (in mJ/m²/yr)**
18.03	13.3	18.4
18.04	28.2	7.3
18.05	33.9	9.7
18.06	30.3	15.0
19.01	36.5	15.0
19.02	32.1	27.8
19.03	30.4	18.5
19.04	35.2	8.7
19.06	37.7	15.7
UG.01	25.5	11.7
UG.02	37.6	15.3
UG.03	9.3	22.6
All other dwellings	40.6	9.8

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	**Ventilation system type**	**Ventilation efficiency measure**	**Primary type of artificial lighting**	**Lighting efficiency measure**	**Lighting control system/BMS**
Lift car (No.7)	-	-	light-emitting diode	connected to lift call button	Yes
Lift car (No.8)	-	-	light-emitting diode	connected to lift call button	Yes
Hallway/lobby type C1.4	air conditioning system	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	Yes

Central energy systems	Type	Specification
Central hot water system (No. 4)	electric heat pump - air sourced	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Lift (No. 7)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 23
Lift (No. 8)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 23

4. Commitments for Residential flat buildings - C1.2

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install: (aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and (bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔ ✔	✔ ✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	4 star (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	no	4 star	3.5 star	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
None	-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must:			
(aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and		✔	
(bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔	
(h) The applicant must install in the dwelling:			
(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✔	
(bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and		✔	✔
(cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔	
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 2	individual fan, ducted to façade or roof	manual on / timer off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual on / timer off

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitch
1.02, 1.03, 1.04	1-phase airconditioning EER 3.0 - 3.5	ceiling fans	1-phase airconditioning EER 3.5 - 4.0	-	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	no
14.07, 15.07, 16.07, 17.07, 18.07	1-phase airconditioning EER 3.0 - 3.5	ceiling fans	1-phase airconditioning EER 3.5 - 4.0	-	2	1	yes	yes	yes	yes	0	no
2.06, 3.06, 4.06, 5.05, 6.05, 7.05, 8.05, 9.05, 10.05, 11.05, 12.05, 13.07, 13.08, 14.08, 15.08, 16.08, 17.08, 18.08	1-phase airconditioning EER 3.0 - 3.5	ceiling fans	1-phase airconditioning EER 3.5 - 4.0	-	1	1	yes	yes	yes	yes	0	no
All other dwellings	1-phase airconditioning EER 3.0 - 3.5	ceiling fans	1-phase airconditioning EER 3.5 - 4.0	-	2	1 (dedicated)	yes	yes	yes	yes	0	no

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	electric cooktop & electric oven	-	yes	3.5 star	4 star	2 star	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✔		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✔	
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✔	✔
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✔	✔	✔
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✔	✔	✔

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
1.01	14.6	12.1
1.02	30.1	11.9
1.03	26.1	16.4
1.04	28.5	16.5
2.01	21.9	8.8
2.02	12.8	12.3
2.03	31.7	13.8
2.04	17.2	14.8
2.05	14.5	26.7
2.06	16.3	29.4
3.01	23.5	7.7
3.02	13.9	9.6
3.03	34.2	12.0
3.04	18.8	11.2
3.05	17.7	23.1
3.06	19.0	27.4
4.01	23.8	8.0
4.02	14.3	9.5
4.03	34.8	11.9
4.04	19.4	11.1
4.05	18.3	23.4
4.06	19.4	26.5
5.01	23.9	7.8
5.02	14.6	9.6
5.03	35.2	11.1
5.04	19.7	11.3
5.05	18.7	23.2

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
5.06	19.9	25.8
6.01	24.3	8.0
6.02	14.7	10.4
6.03	35.6	11.3
6.04	20.1	11.0
6.05	19.1	23.3
6.06	20.3	25.9
7.01	24.4	8.4
7.02	14.8	10.2
7.03	35.7	11.1
7.04	20.3	11.0
7.05	19.4	22.9
7.06	20.8	24.6
8.01	24.5	8.3
8.02	14.9	10.2
8.03	36.0	11.5
8.04	20.6	10.8
8.05	19.7	23.0
8.06	21.0	25.3
9.01	25.7	8.0
9.02	15.9	9.4
9.03	38.0	11.6
9.04	22.2	9.5
9.05	21.6	20.8
9.06	22.6	24.5
10.01	25.9	8.2
10.02	15.9	9.6

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
10.04	22.4	9.4
10.05	21.9	20.4
10.06	23.0	24.2
11.01	25.7	8.1
11.02	15.7	9.8
11.03	38.2	11.7
11.04	22.5	9.3
11.05	22.0	20.9
11.06	22.9	23.7
12.01	25.8	7.9
12.02	15.9	9.9
12.03	38.1	11.7
12.04	22.6	9.3
12.05	22.1	20.9
12.06	23.1	23.5
13.01	20.2	22.4
13.02	19.5	27.6
13.03	21.2	26.8
13.04	43.6	11.0
13.06	28.3	14.3
13.07	22.4	20.2
13.08	21.1	23.9
14.01	21.2	23.4
14.02	9.9	20.8
14.03	23.4	29.1
14.05	42.8	10.9
14.07	28.4	14.0

	Thermal loads	
Dwelling no.	Area adjusted heating load (in mJ/m²/yr)	Area adjusted cooling load (in mJ/m²/yr)
14.08	22.5	20.1
15.01	21.4	22.8
15.02	9.9	20.3
15.03	23.4	28.9
15.05	42.5	11.0
15.07	28.6	14.0
15.08	22.7	20.4
16.01	21.6	23.1
16.02	10.0	20.0
16.03	23.3	28.6
16.04	20.4	24.0
16.05	42.2	11.0
16.07	28.8	13.9
16.08	22.9	20.0
17.01	21.8	23.6
17.02	10.1	20.3
17.03	23.4	27.7
17.04	20.3	24.1
17.05	41.8	10.9
17.07	28.7	14.1
17.08	22.9	20.5
18.01	22.0	23.8
18.02	10.2	20.5
18.03	23.5	27.6
18.04	20.2	23.7
18.05	41.3	11.1
18.06	38.2	11.8

	Thermal loads	
Dwelling no.	**Area adjusted heating load (in mJ/m²/yr)**	**Area adjusted cooling load (in mJ/m²/yr)**
18.07	28.8	13.7
18.08	23.1	20.7
19.01	31.5	26.7
19.02	17.2	22.7
19.03	23.9	27.5
19.04	26.2	28.0
19.05	39.5	11.3
19.06	44.7	12.9
19.07	13.3	12.7
19.08	7.1	13.8
UG.01	4.0	16.5
UG.02	43.4	10.6
UG.03	22.0	19.3
UG.04	4.0	29.3
10.03, 14.06	38.2	11.9
13.05, 17.06	38.3	11.9
14.04, 15.04	20.5	24.1
All other dwellings	38.3	12.0

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	**Ventilation system type**	**Ventilation efficiency measure**	**Primary type of artificial lighting**	**Lighting efficiency measure**	**Lighting control system/BMS**
Lift car (No.3)	-	-	light-emitting diode	connected to lift call button	Yes
Lift car (No.4)	-	-	light-emitting diode	connected to lift call button	Yes
Plant or service room (No. 1)	ventilation supply only	thermostatically controlled	light-emitting diode	manual on / manual off	Yes
Hallway/lobby type C1.2	ventilation (supply + exhaust)	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	Yes

Central energy systems	Type	Specification
Central hot water system (No. 2)	electric heat pump - air sourced	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Lift (No. 3)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 16
Lift (No. 4)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 16

7. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	20000.0	To collect run-off from at least: - 2000.0 square metres of roof area of buildings in the development - 0.0 square metres of impervious area in the development - 0.0 square metres of garden/lawn area in the development - 0.0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 1300.0 square metres of common landscaped area on the site - car washing in 2 car washing bays on the site

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

	Common area ventilation system		Common area lighting		
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Car park area (No. 1)	ventilation exhaust only	carbon monoxide monitor + VSD fan	light-emitting diode	zoned switching with motion sensor	Yes
Garbage room (No. 1)	ventilation exhaust only	-	light-emitting diode	manual on / manual off	Yes
Bike store	ventilation exhaust only	time clock or BMS controlled	light-emitting diode	motion sensors	Yes
Ground floor lobby type (No. 1)	air conditioning system	time clock or BMS controlled	light-emitting diode	daylight sensor and motion sensor	Yes
Hallway/lobby type (No. 5)	air conditioning system	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	Yes

Central energy systems	Type	Specification
Alternative energy supply	Photovoltaic system	Rated electrical output (min): 115.0 peak kW
Other	Building management system installed?: yes Active power factor correction installed?: yes	-

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✔" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✔" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✔" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

APPENDIX A-2
C1.5 BASIX CERTIFICATE

BASIX® Certificate

Building Sustainability Index www.basix.nsw.gov.au

Multi Dwelling

Certificate number: 896458M_02

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 06/10/2017 published by the Department. This document is available at www.basix.nsw.gov.au

Secretary
Date of issue: Tuesday, 22 October 2019
To be valid, this certificate must be lodged within 3 months of the date of issue.

NSW GOVERNMENT Planning & Environment

Project summary	
Project name	Ivanhoe Estate C1.5_02
Street address	Herring Road Macquarie Park 2113
Local Government Area	Ryde City Council
Plan type and plan number	deposited 1
Lot no.	1
Section no.	-
No. of residential flat buildings	1
No. of units in residential flat buildings	4
No. of multi-dwelling houses	0
No. of single dwelling houses	0

Project score		
Water	✔ 40	Target 40
Thermal Comfort	✔ Pass	Target Pass
Energy	✔ 46	Target 45

Certificate Prepared by
Name / Company Name: WSP Australia Pty Ltd
ABN (if applicable): 80078004798

Description of project

Project address	
Project name	Ivanhoe Estate C1.5_02
Street address	Herring Road Macquarie Park 2113
Local Government Area	Ryde City Council
Plan type and plan number	deposited 1
Lot no.	1
Section no.	-
Project type	
No. of residential flat buildings	1
No. of units in residential flat buildings	4
No. of multi-dwelling houses	0
No. of single dwelling houses	0
Site details	
Site area (m^2)	300
Roof area (m^2)	200
Non-residential floor area (m^2)	0.0
Residential car spaces	0
Non-residential car spaces	0

Common area landscape	
Common area lawn (m^2)	0.0
Common area garden (m^2)	0.0
Area of indigenous or low water use species (m^2)	0.0
Assessor details	
Assessor number	101142
Certificate number	X2VQQ188WY
Climate zone	56

Project score		
Water	✔ 40	Target 40
Thermal Comfort	✔ Pass	Target Pass
Energy	✔ 46	Target 45

Description of project

The tables below describe the dwellings and common areas within the project

Residential flat buildings - C1.5, 4 dwellings, 3 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
1	4 or more bedrooms	123.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
2	4 or more bedrooms	123.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
3	4 or more bedrooms	123.4	0.0	0.0	0.0

Dwelling no.	No. of bedrooms	Conditioned floor area (m^2)	Unconditioned floor area (m^2)	Area of garden & lawn (m^2)	Indigenous species (min area m^2)
4	4 or more bedrooms	123.4	0.0	0.0	0.0

No common areas specified.

Schedule of BASIX commitments

1. Commitments for Residential flat buildings - C1.5
    - (a) Dwellings
        - (i) Water
        - (ii) Energy
        - (iii) Thermal Comfort
    - (b) Common areas and central systems/facilities
        - (i) Water
        - (ii) Energy

2. Commitments for multi-dwelling houses

3. Commitments for single dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)
    - (i) Water
    - (ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for Residential flat buildings - C1.5

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✔	✔	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✔	✔
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✔	✔
(e) The applicant must install: (aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and (bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✔ ✔	✔ ✔
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✔	✔	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✔	
(g) The pool or spa must be located as specified in the table.	✔	✔	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✔	✔	✔

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded
All dwellings	4 star (> 6 but <= 7.5 L/min)	4 star	5 star	5 star	no	-	3.5 star	-	-	-	-	-	-	-

	Alternative water source							
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
None	-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✔	✔	✔
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✔	✔
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✔	✔
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✔	✔

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✔	✔	✔
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must: (aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and (bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✔ ✔	
(h) The applicant must install in the dwelling: (aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below; (bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✔ ✔ ✔	✔
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✔	

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1	individual fan, ducted to façade or roof	interlocked to light	individual fan, ducted to façade or roof	interlocked to light	individual fan, ducted to façade or roof	interlocked to light

	Cooling		Heating		Artificial lighting						Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
All dwellings	1-phase airconditioning EER 3.5 - 4.0	1-phase airconditioning EER 3.5 - 4.0	1-phase airconditioning EER 3.5 - 4.0	1-phase airconditioning EER 3.5 - 4.0	4	1 (dedicated)	yes	yes	yes	yes	0	no

	Individual pool		Individual spa		Appliances & other efficiency measures							
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	induction cooktop & electric oven	-	yes	3.5 star	-	2 star	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✔		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✔	

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✔	✔
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✔	✔	✔
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✔	✔	✔

	Thermal loads	
Dwelling no.	**Area adjusted heating load (in mJ/m²/yr)**	**Area adjusted cooling load (in mJ/m²/yr)**
1	24.8	24.3
2	13.3	24.7
3	13.6	24.1
All other dwellings	23.5	23.8

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✔	✔
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✔	✔	✔
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✔	✔	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✔	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✔	✔
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✔	✔

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✔	✔
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✔	✔
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✔	✔	✔

Central energy systems	Type	Specification
Central hot water system (No. 1)	electric heat pump - air sourced	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Alternative energy supply	Photovoltaic system	Rated electrical output (min): 2.0 peak kW

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✔" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✔" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✔" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

APPENDIX B

NATHERS CERTIFICATES

APPENDIX B-1
C1.1-C1.4 NATHERS CERTIFICATES

Nationwide House Energy Rating Scheme — Class 2 summary

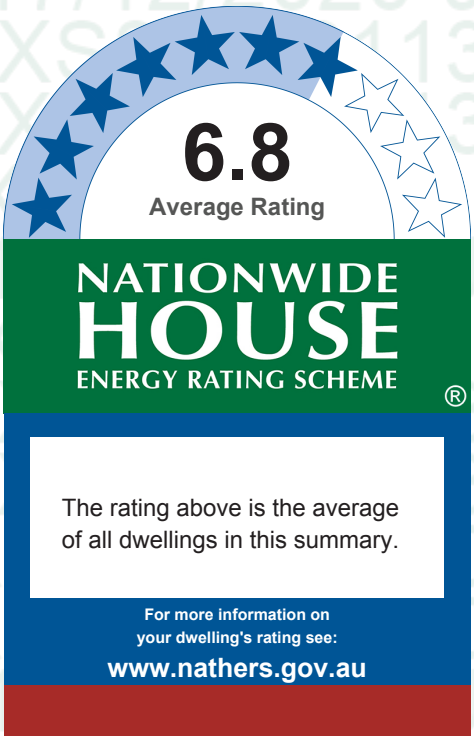
Generated on 17 Dec 2020 using FirstRate5 v5.3.0a

Property

Address Herring Road, Macquarie Park, NSW, 2113

Lot/DP

NatHERS climate zone



Accredited assessor

Christopher Mann

WSP

chris.mann@wsp.com

0411644164

Accreditation No. DMN/20/1972

Assessor Accrediting Organisation DMN

Verification

To verify this certificate, scan the QR code or visit https://www.fr5.com.au/QRCodeLanding?PublicId=J8P5NXS8A2&GrpCert=1 When using either link, ensure you are visiting www.fr5.com.au.

Summary of all dwellings

Certificate number and link	Unit number	Heating load (MJ/m²/p.a.)	Cooling load (MJ/m²/p.a.)	Total load (MJ/m²/p.a.)	Star rating
0JMLW0VT7N		23.3	28.6	51.9	5.9
LMWLUWW7MS		10.2	20.5	30.7	7.6
PXAQZUGKZG		22.2	9.5	31.7	7.5
IDI0UEGPKT		26.1	16.4	42.5	6.7
9FF2A6UZZ3		42.5	11	53.5	5.8
41JKXPLSUK		4	29.3	33.3	7.4
BB8XY16UMD		23	24.2	47.2	6.3

Continued over

National Construction Code (NCC) requirements

The NCC's requirements for NatHERS-rated houses are detailed in 3.12.0(a)(i) and 3.12.5 of the NCC Volume Two. For apartments the requirements are detailed in J0.2 and J5 to J8 of the NCC Volume One.

In NCC 2019, these requirements include minimum star ratings and separate heating and cooling load limits that need to be met by buildings and apartments through the NatHERS assessment. Requirements additional to the NatHERS assessment that must also be satisfied include, but are not limited to: insulation installation methods, thermal breaks, building sealing, water heating and pumping, and artificial lighting requirements. The NCC and NatHERS Heating and Cooling Load Limits (Australian Building Codes Board Standard) are available at www.abcb.gov.au.

State and territory variations and additions to the NCC may also apply.

Summary of and links to all dwellings (continued)

Certificate number and link	Unit number	Heating load (MJ/m²/p.a.)	Cooling load (MJ/m²/p.a.)	Total load (MJ/m²/p.a.)	Star rating
O3DMUZCX6J		14.8	10.2	25	8.1
JOJ8QEGJ32		18.8	11.2	30	7.7
61QMOR6XO0		19.4	11.1	30.5	7.6
9N6OVBEA2F		16.3	29.4	45.7	6.4
PWTDDRPPQ9		24.5	8.3	32.8	7.4
PDQL9LF1I4		18.7	23.2	41.9	6.8
MOMNV8NFHK		25.9	8.2	34.1	7.4
VCSN3BHE4T		28.4	14	42.4	6.7
QA7798QU04		20.5	24.1	44.6	6.5
XTQTFXUXM4		26.2	28	54.2	5.8
HCM4W78Z2X		24.3	8	32.3	7.4
V01C0YOMSY		34.8	11.9	46.7	6.4
26FQ4J2GJH		20.3	11	31.3	7.6
UGQRXM4NJY		20.6	10.8	31.4	7.5
LGKKURT3Q4		37	15.3	52.3	5.9
9NRNGM6B2W		22.4	20.2	42.6	6.7
ASGYSVR0X4		14.9	10.2	25.1	8.1
8VF5RT0I6V		23.4	27.7	51.1	5.9
MQ8UL7BYCN		20.1	11	31.1	7.6
P28FU0EFTW		20.3	25.9	46.2	6.4
G7R06FD54M		17.7	23.1	40.8	6.9
KQT688KZ76		38.2	11.9	50.1	6.1
VL99GEOKOV		21.2	23.4	44.6	6.5
AW4QTK3KTR		22.9	20	42.9	6.7
IINPD228GD		13.9	9.6	23.5	8.2
BV5AUORTE6		21.6	20.8	42.4	6.7
7RV2WCFN3P		19.7	23	42.7	6.7
YRIJZFOB78		20.8	24.6	45.4	6.4
5NNL7AEJH2		15.7	9.8	25.5	8
433Z03PT5J		23.4	28.9	52.3	5.9
HV2ABXF2RV		42.8	10.9	53.7	5.8
QIDEWKO2XZ		23.9	27.5	51.4	5.9
5H0EMZYKSD		19	27.4	46.4	6.4
FVYQ6SK9OS		38.3	12	50.3	6.1
9P7GY6VNUN		23.8	8	31.8	7.5
D0534XHM4C		28.3	14.3	42.6	6.7
PRSPF06PIS		10.1	20.3	30.4	7.6

Continued over

Summary of and links to all dwellings (continued)

Certificate number and link	Unit number	Heating load (MJ/m²/p.a.)	Cooling load (MJ/m²/p.a.)	Total load (MJ/m²/p.a.)	Star rating
3NXR2VZVV5		19.4	22.9	42.3	6.7
8OWCEBK2E7		32.8	23.4	56.2	5.6
QO3OX2BDVR		22.6	9.3	31.9	7.5
Z002O869QB		23.1	20.7	43.8	6.6
C2QGLM0WZB		35.6	11.3	46.9	6.3
OPBYK087AI		31.5	26.7	58.2	5.4
ULCMBRCB5M		21.1	23.9	45	6.5
LPR2HT0L7R		14.5	26.7	41.2	6.8
Z9P6VHSEO2		20.3	24.1	44.4	6.5
5T9Y2T66GU		20.2	23.7	43.9	6.6
8KG4ZSYSE8		38.2	11.7	49.9	6.1
WJV3J0LD4O		25.8	7.9	33.7	7.4
AMNBXW0Q1M		21	25.3	46.3	6.4
45IE6LY60Z		22	19.3	41.3	6.8
TT3ZGPTWR5		27.6	12	39.6	6.9
VNW74B3SN1		15.9	9.4	25.3	8.1
SFBLKARE3W		15.9	9.9	25.8	8
HLJKXI5A1S		43.6	11	54.6	5.7
SI46QG7H9P		23.9	7.8	31.7	7.5
65OYQT070A		43.4	10.6	54	5.8
MWFI17EDT5		22.9	23.7	46.6	6.4
QUFHL08PJZ		28.5	16.5	45	6.4
OLKHC06LGT		38.2	11.9	50.1	6.1
ONCBTMSGFH		38.3	11.9	50.2	6.1
4U1FDBYSS4		28.8	13.9	42.7	6.7
YP6IGZJ77H		21.5	8.9	30.4	7.6
T4UTTCHCZZ		24.4	8.4	32.8	7.4
734C89M2I6		22.5	20.1	42.6	6.7
QI2VRIY5PA		19.4	26.5	45.9	6.4
2AHNIZDE9S		19.7	11.3	31	7.6
JZ3B8Y8K57		21.6	23.1	44.7	6.5
F4807XC7UB		22.9	20.5	43.4	6.6
VBIEMFYXIX		9.9	20.3	30.2	7.7
EOVRZ3HWFL		41.3	11.1	52.4	5.9
XGMP5QM44A		26.5	26.1	52.6	5.9
WDWI3XJROV		22.4	9.4	31.8	7.5

Continued over

Summary of and links to all dwellings (continued)

Certificate number and link	Unit number	Heating load (MJ/m²/p.a.)	Cooling load (MJ/m²/p.a.)	Total load (MJ/m²/p.a.)	Star rating
BFUBYTS7UT		38.2	11.8	50	6.1
NY0YKG7CXQ		22.6	24.5	47.1	6.3
Y26CM1XT2N		36	11.5	47.5	6.3
2GDUNPU03K		23.1	23.5	46.6	6.4
B9MWRTC877		17.2	22.7	39.9	6.9
88D4HV4YZ7		38.3	11.9	50.2	6.1
ML3E2UQYI5		22.1	20.9	43	6.7
J2ST1VPVTI		17.2	14.8	32	7.4
UOCE7SYXSK		4	16.5	20.5	8.4
PG5D8JKIBH		21.2	26.8	48	6.2
CVMWU1M8TA		28.8	13.7	42.5	6.7
SNSBXUWKY2		19.9	25.8	45.7	6.4
UZEEVUHIP4		19.9	16.6	36.5	7.2
TALLZ61U8A		28.7	14.1	42.8	6.7
1F8XU65D80		38.1	11.7	49.8	6.1
F00E1SR6ET		31.7	13.8	45.5	6.4
7XBW1LVC5K		21.8	23.6	45.4	6.4
HR6UTSZPF7		10	20	30	7.7
ORL7EYF7IV		30.1	11.9	42	6.7
ZLL5IUGSVO		22	20.9	42.9	6.7
W7JCPECPH9		23.4	29.1	52.5	5.9
88AQZMKQ18		18.3	23.4	41.7	6.8
KXEWJ335YZ		9.3	22.6	31.9	7.5
KZWMVA4N60		21.9	8.8	30.7	7.6
7OPSVUR3AU		35.7	11.1	46.8	6.3
4DQ2MKVSUO		20.2	22.4	42.6	6.7
8FDBNWZLNO		14.6	9.6	24.2	8.2
NSRG4VCGAL		23.5	27.6	51.1	5.9
7NTN652R1L		14.3	9.5	23.8	8.2
45XCP4BZBG		25.7	8	33.7	7.4
LZUUC40RH8		38.3	12	50.3	6.1
GZ2MZ8XO18		20.4	24	44.4	6.5
B9DOFF1M8Q		22	23.8	45.8	6.4
BW9D9YYX0X		22.5	9.3	31.8	7.5
NS57188DTH		20.5	24.1	44.6	6.5
67CTUFM6CA		44.7	12.9	57.6	5.5

Continued over

Summary of and links to all dwellings (continued)

Certificate number and link	Unit number	Heating load (MJ/m²/p.a.)	Cooling load (MJ/m²/p.a.)	Total load (MJ/m²/p.a.)	Star rating
15FUXCPS8Q		12.8	12.3	25.1	8.1
GVEAXZXAY4		22.7	20.4	43.1	6.7
SGWAXPSF0X		14.7	10.4	25.1	8.1
RLH6FYKU2X		25.5	11.7	37.2	7.1
XUG72CAL9A		21.4	22.8	44.2	6.6
5S3G0OULCK		15.9	9.6	25.5	8
DN02JBPMHG		19.1	23.3	42.4	6.7
2O8L9ZOEK5		39.5	11.3	50.8	6
IEDVKNPMF9		34.2	12	46.2	6.4
N7VUHY844F		35.2	11.1	46.3	6.4
LXVMTWEX0S		42.2	11	53.2	5.8
XRQ0WCFKMN		28.6	14	42.6	6.7
GZK8P26NFE		9.9	20.8	30.7	7.6
AQMXY65ODQ		38	11.6	49.6	6.1
7CDK82CT2F		14.6	12.1	26.7	7.9
PVXHOSDOK2		41.8	10.9	52.7	5.9
VV9NBBDFL5		21.9	20.4	42.3	6.7
FC7QJC9QFH		25.7	8.1	33.8	7.4
Average		24.3	16.9	41.2	6.8

Explanatory notes

About this report

This summary rating is the average rating of all NCC Class 2 dwellings in a development. The individual dwellings' ratings are a comprehensive, dynamic computer modelling evaluation of a home, using the floorplans, elevations and specifications to estimate the energy load. It addresses the building layout, orientation and fabric (i.e. walls, windows, floors, roofs and ceilings), but does not cover the water or energy use of appliances, or energy production of solar panels. For more details about an individual dwelling's assessment, refer to the individual dwelling's NatHERS Certificate (accessible via link).

Accredited Assessors

To ensure the NatHERS Certificate is of a high quality, always use an accredited or licenced assessor. NatHERS accredited assessors are members of a professional body called an Assessor Accrediting Organisation (AAO). AAOs have specific quality assurance processes in place, and continuing professional development requirements, to maintain a high and consistent standard of assessments across the country.

Any questions or concerns about this report should be directed to the assessor in the first instance. If the assessor is unable to address these questions or concerns, the AAO specified on the front of this certificate should be contacted.

Disclaimer

The format of the NatHERS Certificate was developed by the NatHERS Administrator. However the content, input and creation of the NatHERS Certificate is by the assessor. It is the responsibility of the assessor who prepared this certificate to use NatHERS accredited software correctly and follow the NatHERS Technical Notes to produce a NatHERS Certificate.

APPENDIX B-2
C1.5 NATHERS CERTIFICATES

Nationwide House Energy Rating Scheme* — Class 2 summary

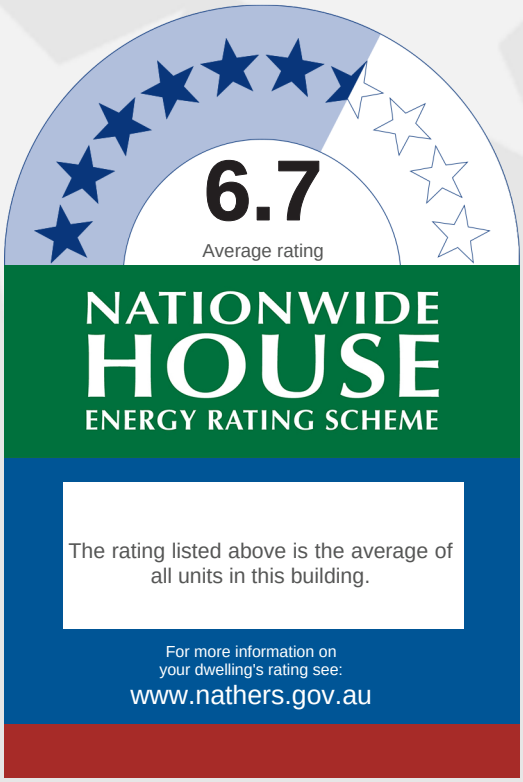
Certificate Number: **X2VQQ188WY** Date of Certificate: **27 Sep 2019** ★ Average star rating: **6.7**

Assessor details

Accreditation number:	**101142**
Name:	**Christopher Mann**
Organisation:	**WSP**
Email:	**chris.mann@wsp.com**
Phone:	**0411644164**
Declaration of interest:	**No potential conflicts of interest to declare**
Software:	**FirstRate5 v5.2.10b**
AAO:	**ABSA**

Dwelling details

Address:	**Building C1.5 - Ivanhoe Estate**
Suburb:	**Macquarie Park**
State:	**NSW**
Postcode:	**2113**



Summary of all dwellings

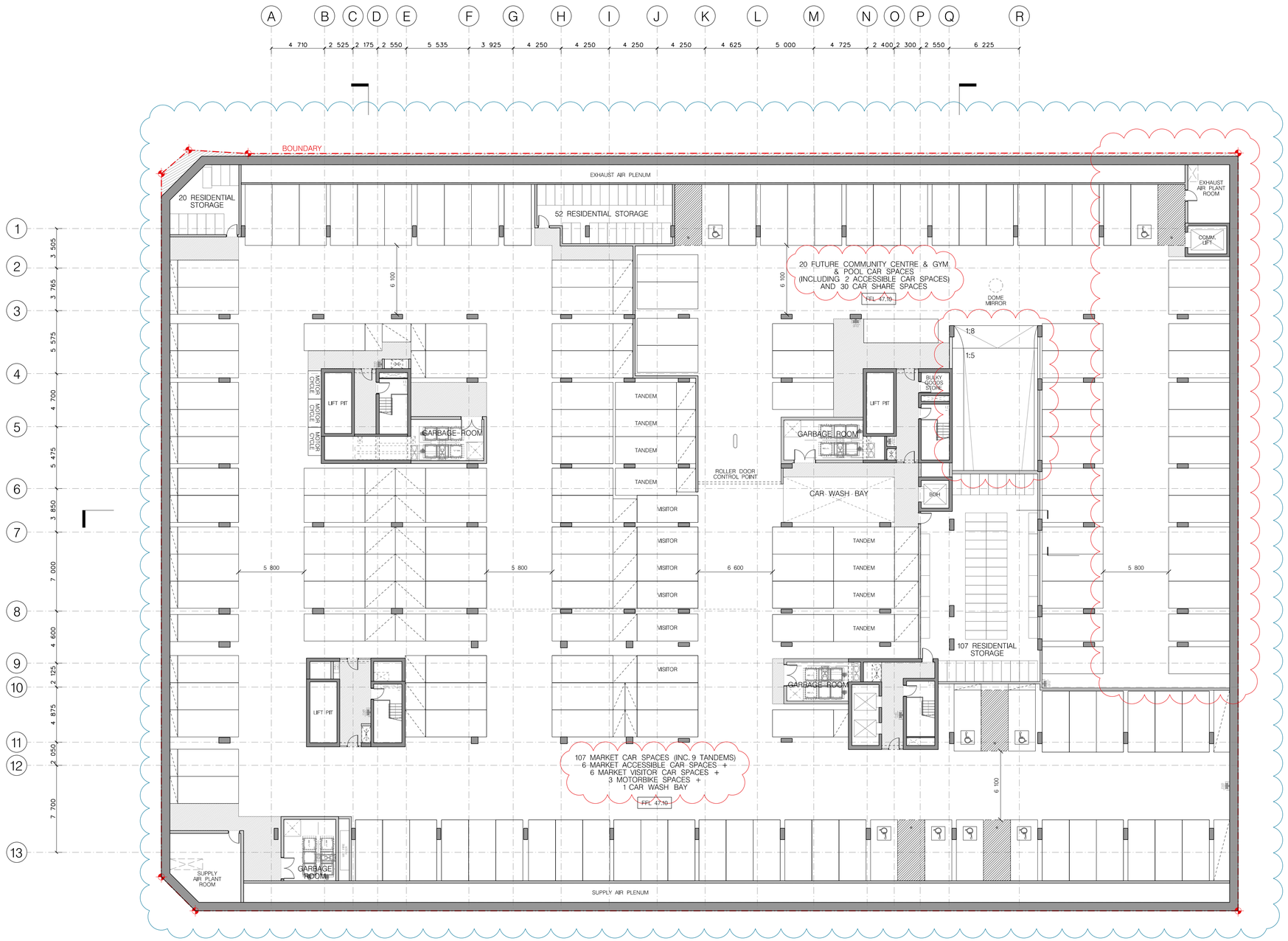
Certification details

		Annual thermal performance loads (MJ/m2)			
Certificate number	**Unit number**	**Heating load**	**Cooling load**	**Total load**	**Star rating**
7N6O4O8G0C	C1.5-01	24.8	24.3	49.1	6.2
E2XKV1ELVM	C1.5-02	13.3	24.7	38	7.1
57M887AKVU	C1.5-03	13.6	24.1	37.7	7.1
TARW87PQ99	C1.5-04	23.5	23.8	47.3	6.3
				This building achieves an average star rating of:	**6.7**

* Nationwide House Energy Rating Scheme (NatHERS) is an initiative of the Australian, state and territory governments. For more details see www.nathers.gov.au

APPENDIX C

STAMPED DRAWINGS



Location	Window type	Type	Glass	Frame	U-value	SHGC
All south facing apartments in C1.2 and C1.4	Sliding window/doors and fixed windows	Double glazed aluminium frame	Clear float	Aluminium	4.8	0.59
	Awning windows	Double glazed aluminium frame	Clear float	Aluminium	4.8	0.51
All C1.5 town houses						
All other apartments	Sliding window/doors and fixed windows	Single glazed aluminium frame	Clear Low-e	Aluminium	5.4	0.58
	Awning windows	Single glazed aluminium frame	Clear low-e	Aluminium	5.4	0.49

	Construction	Insulation
External walls	Precast concrete panels with plasterboard lining on studs	R2.5 bulk added insulation
Party walls (between dwellings)	Precast concrete, plasterboard lining	No added insulation
Internal walls (within dwellings)	Lightweight plasterboard stud walls	No added insulation
Walls to corridors, common areas, stairwells and lift core	Precast concrete, plasterboard lining	R1.0 added insulation
Roof	Concrete slab	R4.0 added insulation
Ceilings	Plasterboard lined	No added insulation
Floors (between apartments)	Concrete slab	No added insulation
Suspended floors (above carparks or outside air)	Suspended concrete slab	R2.0 added insulation

A 1200

B 1201

C 1202

01 — BASEMENT 3 FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020

6.8 Average star rating

NATIONWIDE HOUSE ENERGY RATING SCHEME www.nathers.gov.au

Assessor Christopher Mann
Accreditation No. DMN/20/1972
Address Herring Road, Macquarie Park, NSW, 2113

https://www.fr5.com.au/QRCodeLanding?PublicId=J8P5NXS8A2&GrpCert=1

Issue	Date	Drawing Original Size: A1
B	09.12.20	FOR S4.55 TO CLIENT
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F: 02 9283 7477
E: architects@candalepas.com.au
NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

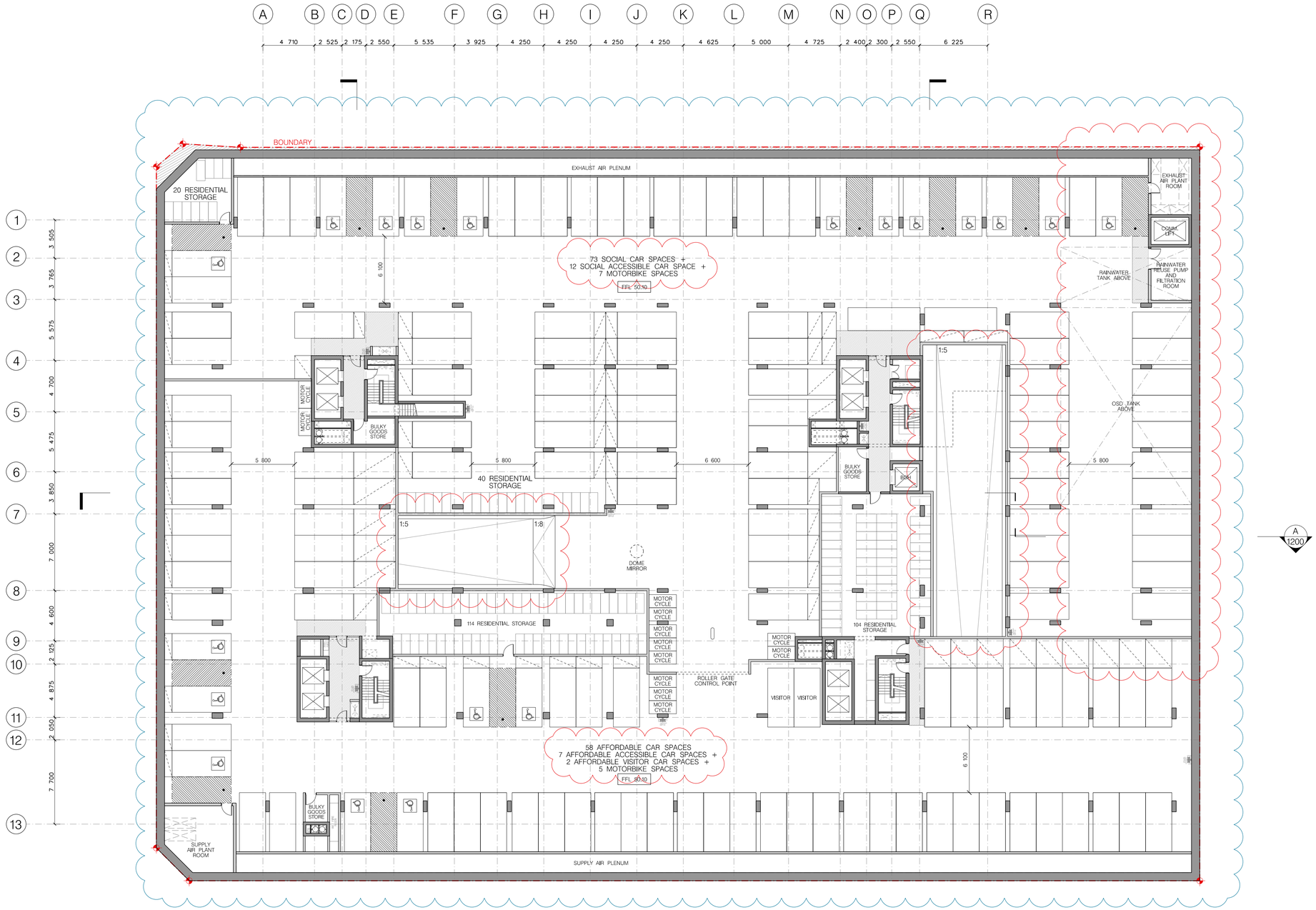
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
BASEMENT 3 FLOOR PLAN

DRAWING No.
S4.55–1102

JOB No. 5800

ISSUE B



A 1200

B 1201

C 1202

01 — BASEMENT 2 FLOOR PLAN
1:200

MAJOR AMENDMENTS MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020
6.8 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME www.nathers.gov.au
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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

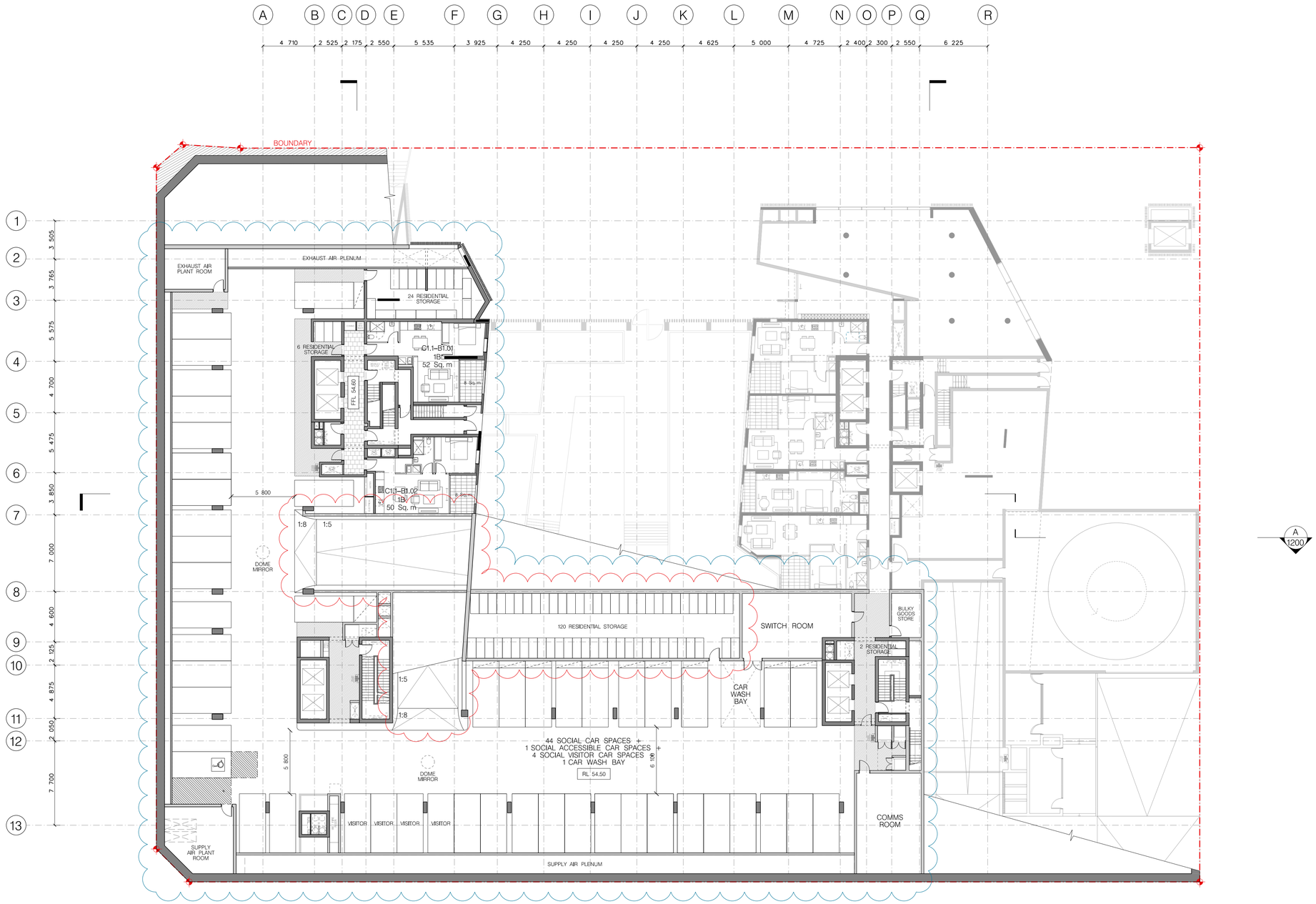
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK+FP

DRAWING: BASEMENT 2 FLOOR PLAN
DRAWING No. S4.55–1103

JOB No. 5800
ISSUE B



01 — BASEMENT 1 FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020

6.8 Average star rating

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EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK-FP

DRAWING:
BASEMENT 1 FLOOR PLAN

DRAWING No.
S4.55–1104

JOB No. 5800

ISSUE B

01 — LOWER GROUND FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

6.8 Average star rating
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IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: LOWER GROUND FLOOR PLAN
DRAWING No. S4.55–1105

JOB No. 5800
ISSUE B

NEIGHBOURHOOD STREET

01 — UPPER GROUND FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020
6.8 Average star rating
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IVANHOE ESTATE
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0 5m 10m
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CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
UPPER GROUND FLOOR PLAN
DRAWING No.
S4.55–1106

JOB No. 5800
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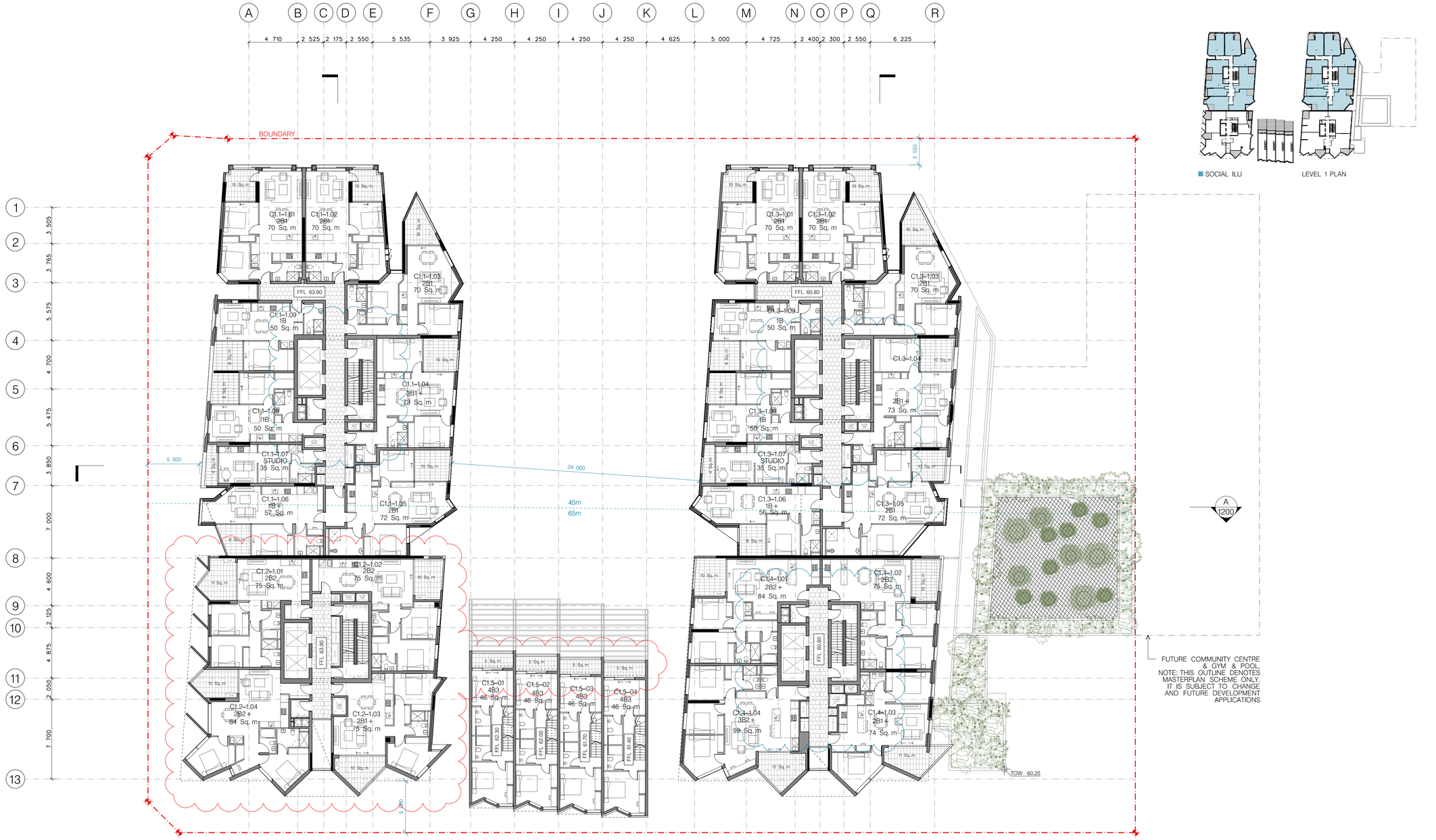

SOCIAL ILU

LEVEL 1 PLAN

01 – LEVEL 1 FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020
6.8 Average star rating
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A	02.12.20	FOR SALES TO CLIENT	

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

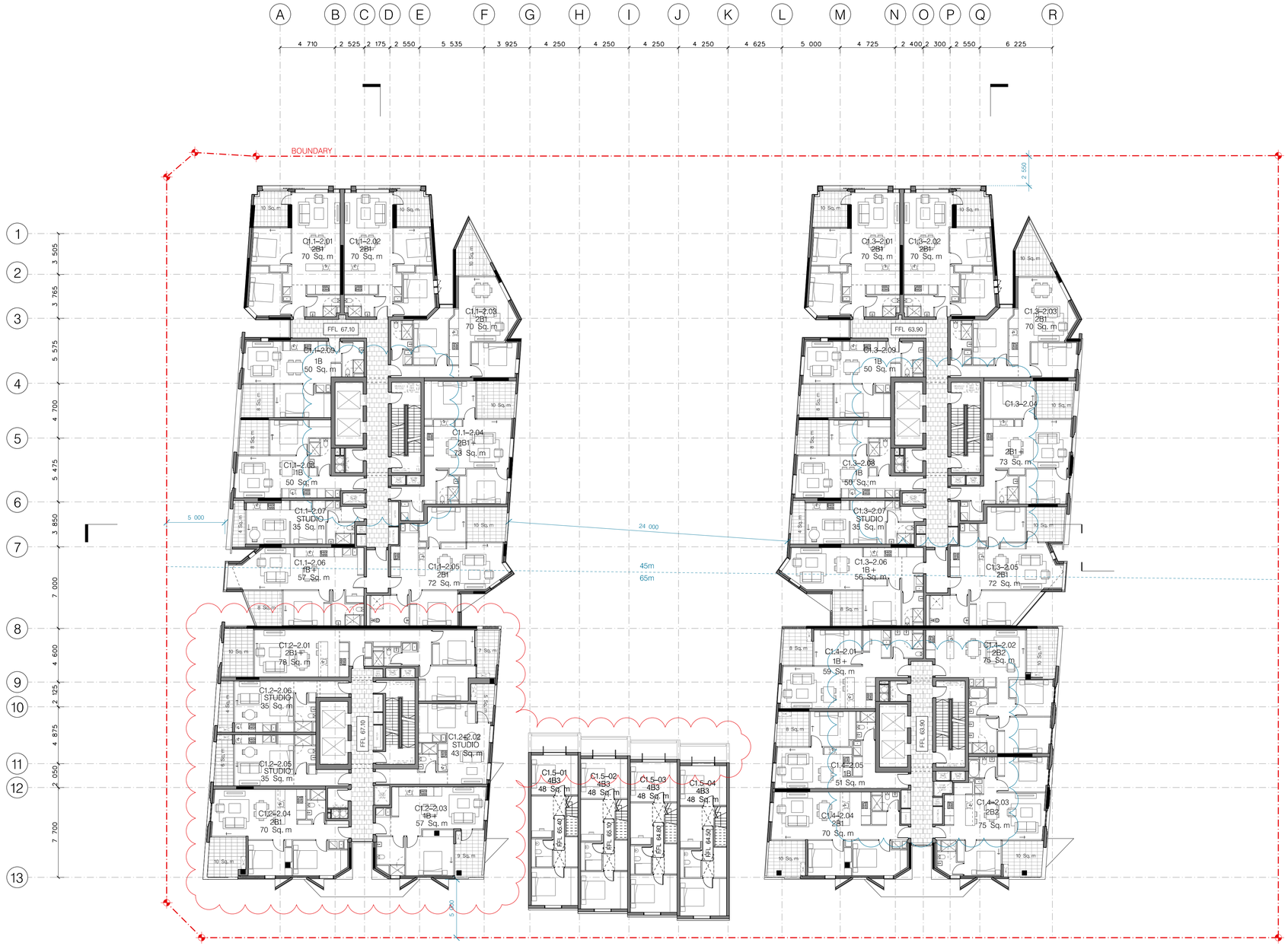
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

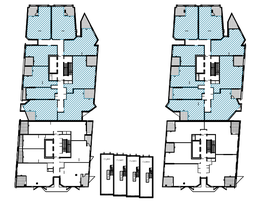
NORTH

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: BR
DRAWN BY: MK/FP

DRAWING:
LEVEL 1 FLOOR PLAN
DRAWING No.
S4.55–1107

JOB No. 5800
ISSUE B





SOCIAL ILU LEVEL 2 PLAN

A 1200

01 LEVEL 2 FLOOR PLAN
1:200

MAJOR AMENDMENTS MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020
6.8 Average star rating
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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

DATE: SEP 2020
CHECKED 1: MK
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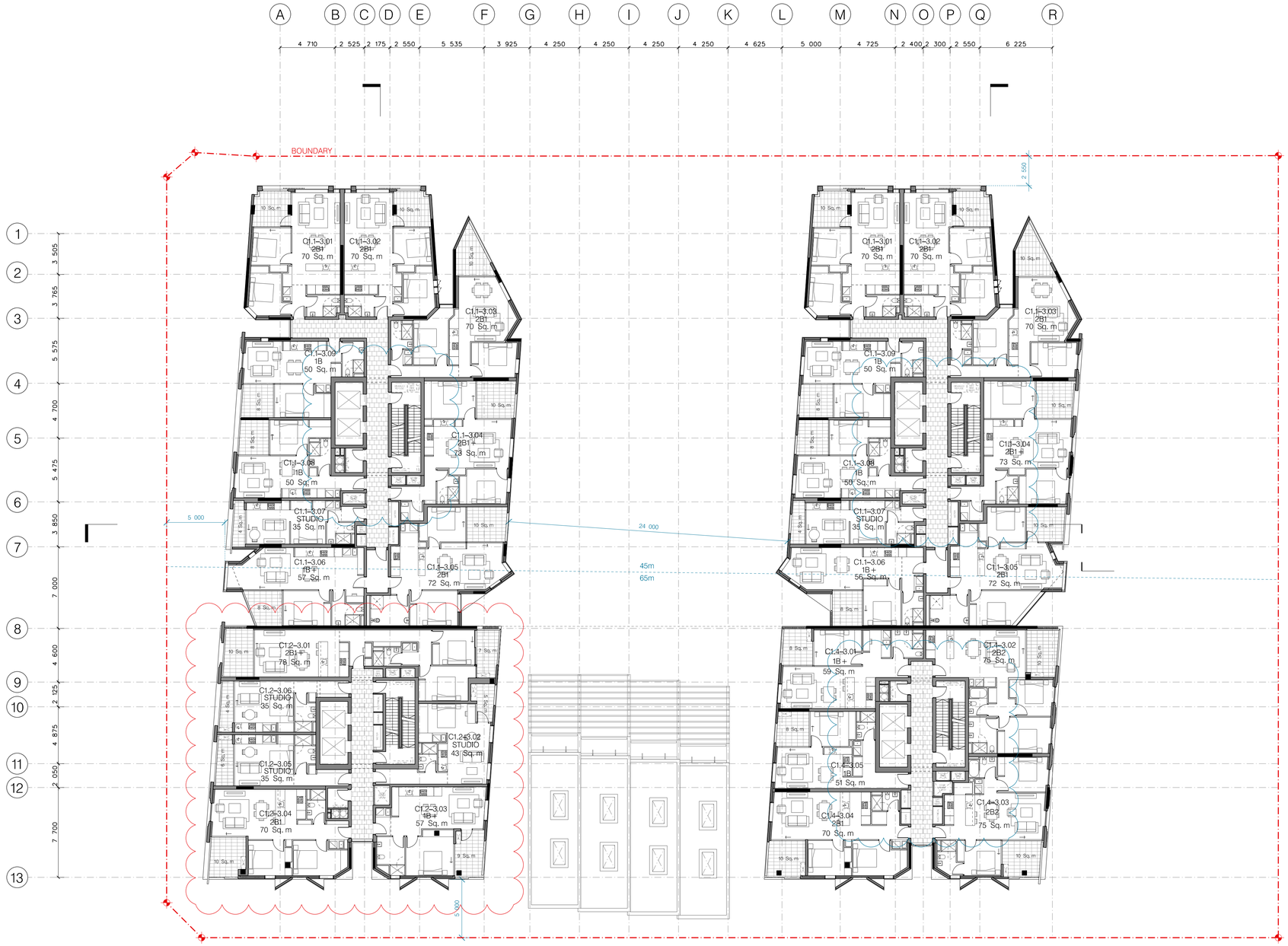
DRAWN BY: MKFP

DRAWING:
LEVEL 2 FLOOR PLAN
DRAWING No.
S4.55–1108

JOB No. 5800
ISSUE B



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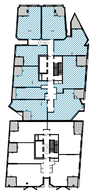

LEVELS 3–4 PLAN

01 – LEVEL 3 – 4 FLOOR PLAN
1:200

J8P5NXS8A2 17/12/2020
6.8 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME www.nathers.gov.au
Assessor Christopher Mann
Accreditation No. DMN/20/1972
Address Herring Road, Macquarie Park, NSW, 2113
https://www.fr5.com.au/QRCodeLanding?PublicId=J8P5NXS8A2&GrpCert=1

Issue	Date	Description
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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

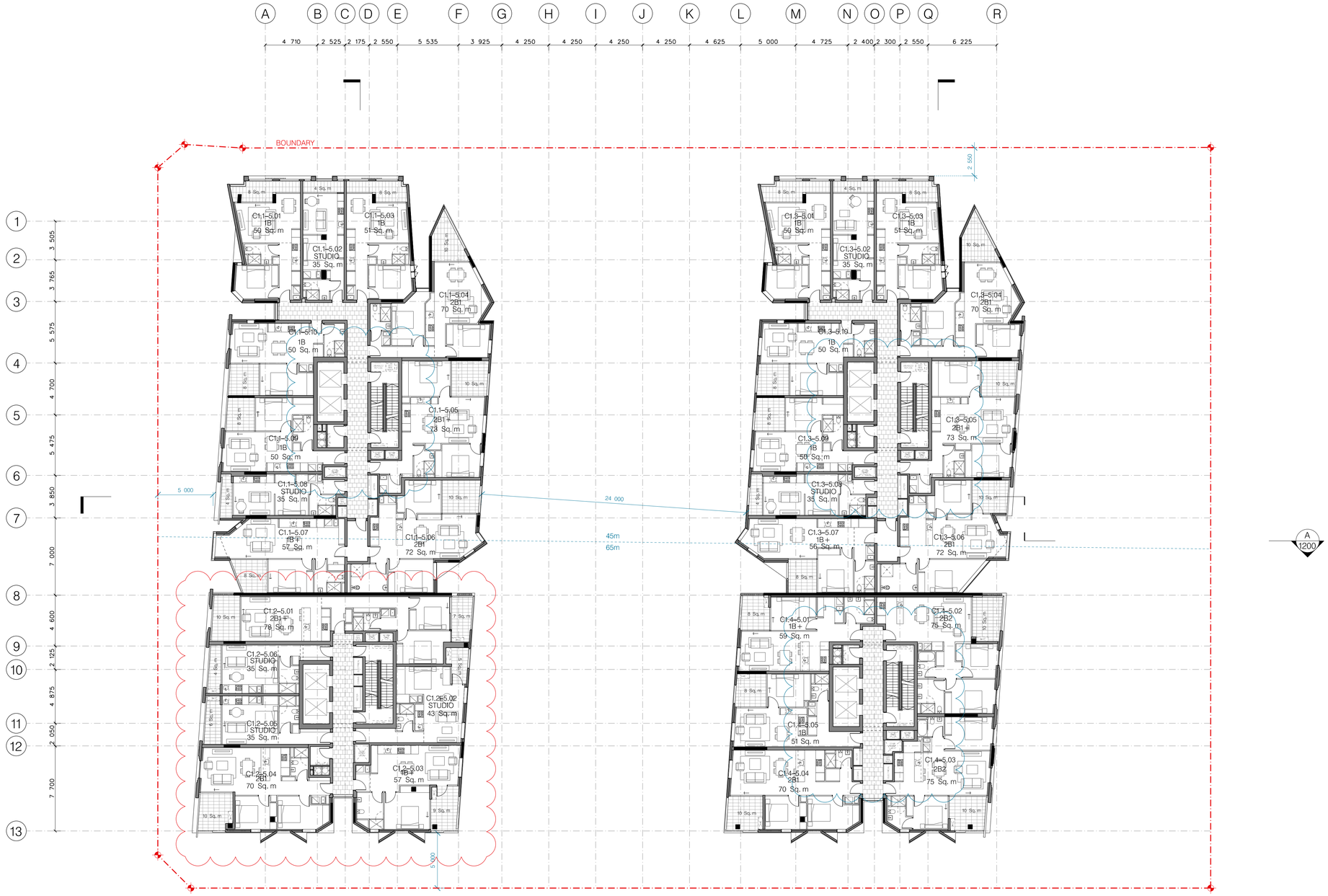
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MKFP

DRAWING:
LEVEL 3 – 4 FLOOR PLAN

DRAWING No.
S4.55–1109

JOB No. 5800

ISSUE B



A 1200

B 1201

C 1202

01 – LEVEL 5 – 12 FLOOR PLAN
1:200

MAJOR AMENDMENTS MINOR AMENDMENTS

6.8 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME www.nathers.gov.au
J8P5NXS8A2 17/12/2020
Assessor Christopher Mann
Accreditation No. DMN/20/1972
Address Herring Road, Macquarie Park, NSW, 2113
https://www.fr5.com.au/QRCodeLanding?PublicId=J8P5NXS8A2&GrpCert=1

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E: architects@candalepas.com.au
NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
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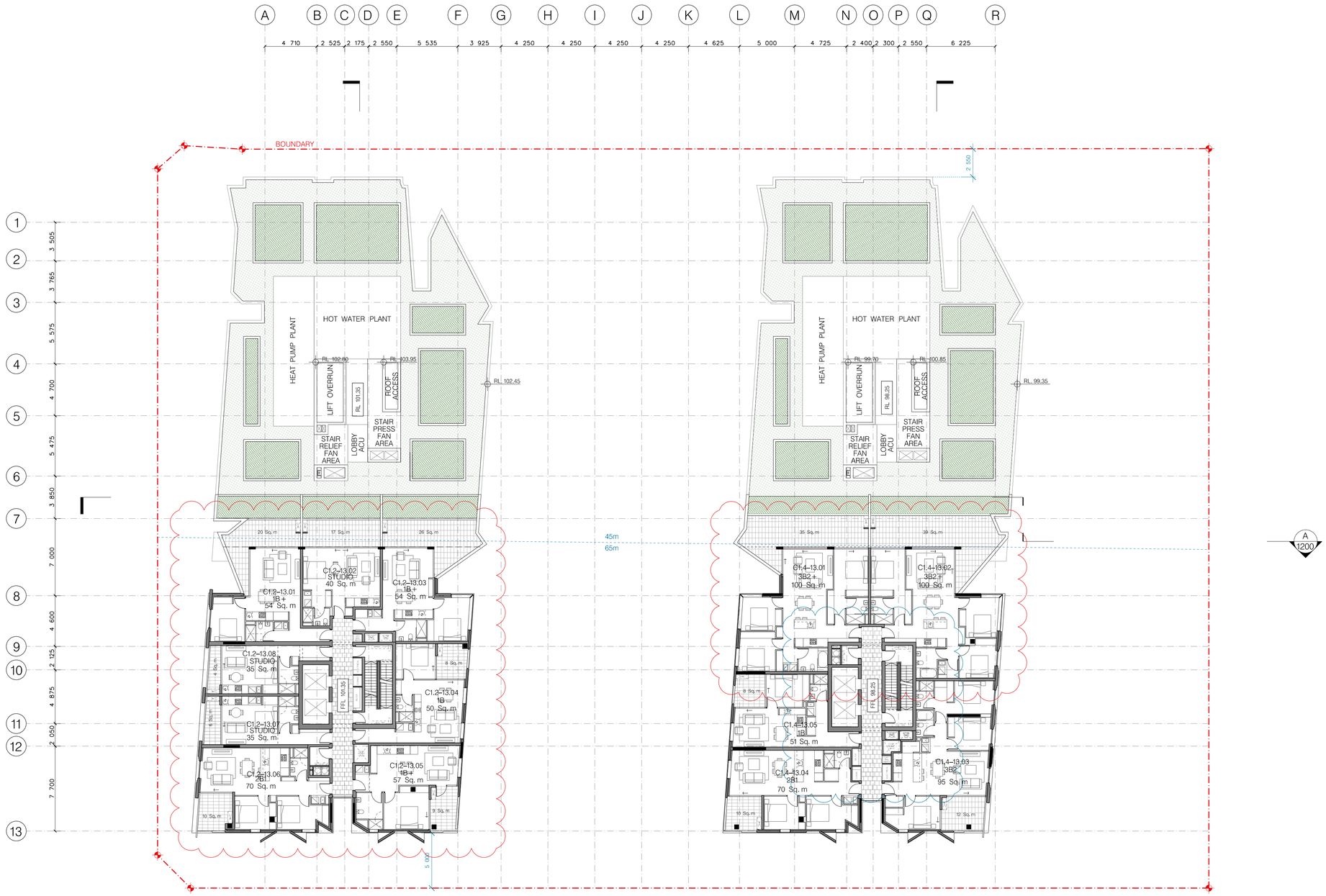
DRAWN BY: MK/FP

DRAWING: LEVEL 5 – 12 FLOOR PLAN
DRAWING No. S4.55–1110

JOB No. 5800
ISSUE B



A 1200

B 1201

C 1202

01 — LEVEL 13 FLOOR PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020
6.8 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
www.nathers.gov.au
Assessor Christopher Mann
Accreditation No. DMN/20/1972
Address Herring Road, Macquarie Park, NSW, 2113
https://www.fr5.com.au/QRCodeLanding?PublicId=J8P5NXS8A2&GrpCert=1

Issue	Date	Drawing / Original Size	Description
B	08.2020	A1	FOR S4.55 TO CLIENT
A	02.2020		FOR S4.55 TO CLIENT

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SYDNEY NSW 2000
T: 02 9283 7755
F: 02 9283 7477
E: archihects@candalepas.com.au
NSW ARCHITECTS REG No,– 5773

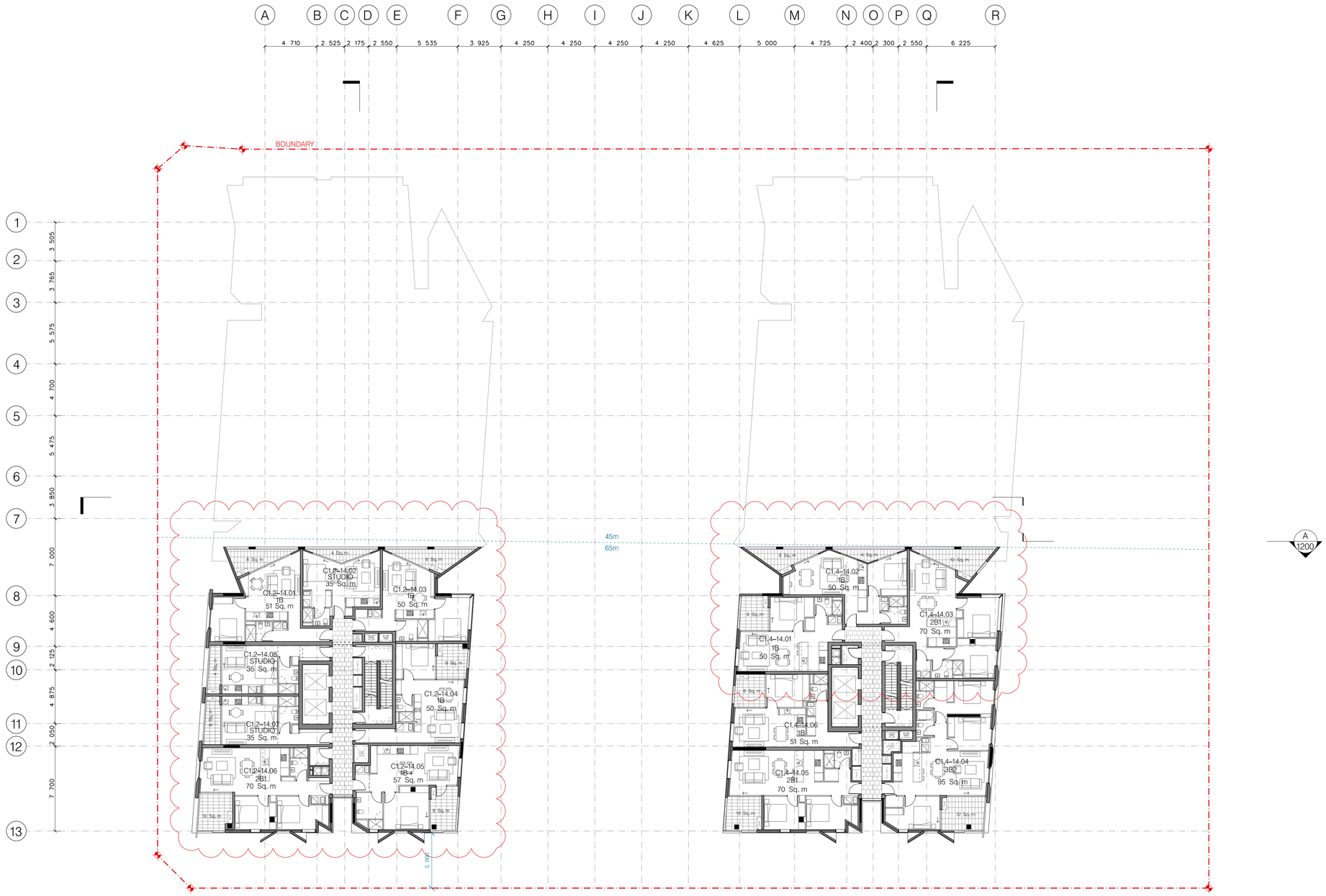
PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
LEVEL 13 FLOOR PLAN
DRAWING No.
S4.55–1111

JOB No. 5800
ISSUE B



01 — LEVEL 14 – 19 FLOOR PLAN
1:200

MAJOR AMENDMENTS MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020

6.8 Average star rating — NATIONWIDE HOUSE ENERGY RATING SCHEME — www.nathers.gov.au

Assessor Christopher Mann
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A	02.12.20		FOR S4.55 TO CLIENT

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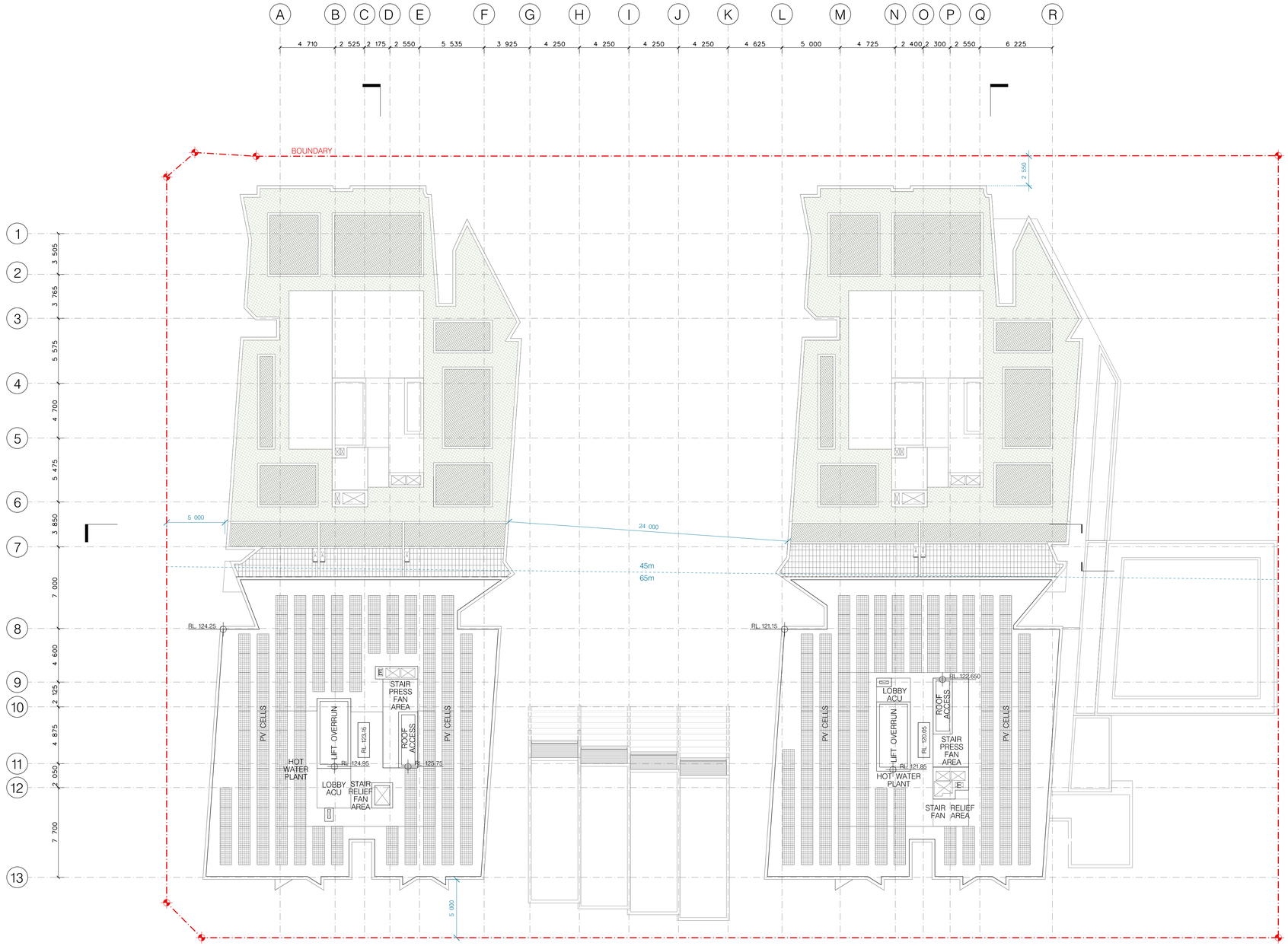
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
LEVEL 14 – 19 FLOOR PLAN
DRAWING No.
S4.55–1112

JOB No. 5800
ISSUE B



01 / – ROOF PLAN
1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

6.8 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME www.nathers.gov.au

J8P5NXS8A2 17/12/2020
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Accreditation No. DMN/20/1972
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Issue	Date	Description	Drawing Original Size
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A	02.12.20	FOR S4.55 TO CLIENT	

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

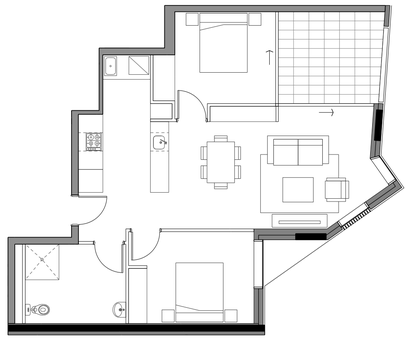
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

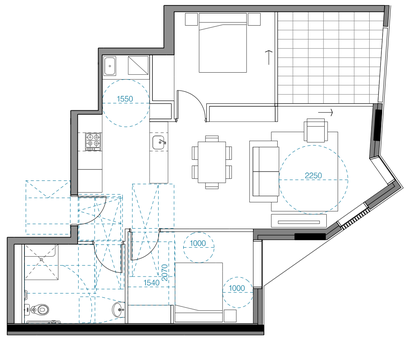
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: ROOF PLAN
DRAWING No. S4.55–1113

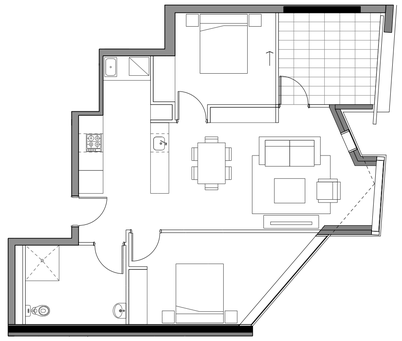
JOB No. 5800
ISSUE B



01 — 2–BED UNIT PRE ADAPTATION
1:100 6x SOCIAL UNITS LEVELS UG–5



02 — 2–BED UNIT POST ADAPTATION
1:100



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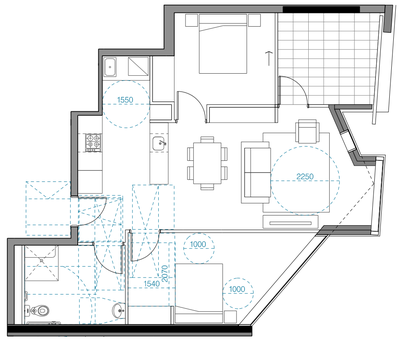
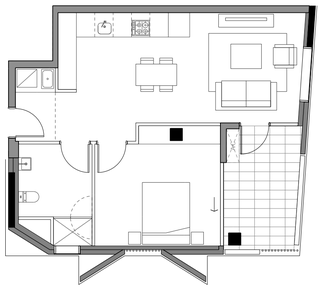
1:100 7x SOCIAL UNITS LEVELS UG–6

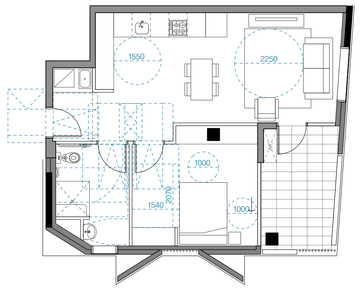


04 — 2–BED UNIT POST ADAPTATION
1:100

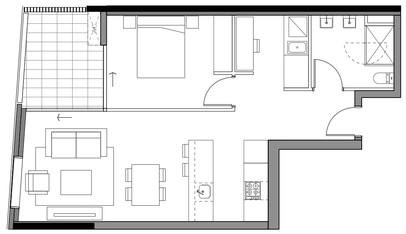
09 — TYPICAL FLOOR KEY PLAN
1:750



05 — 1–BED UNIT PRE ADAPTATION
1:100 7x AFFORDABLE UNITS LEVELS 2–8

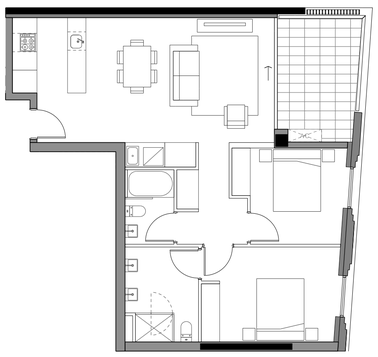


06 — 1–BED UNIT POST ADAPTATION
1:100

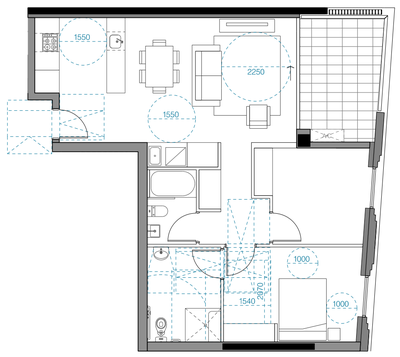


07 — 1–BED UNIT PRE ADAPTATION
1:100 3x MARKET UNITS LEVELS 2–4

08 — 1–BED UNIT POST ADAPTATION
1:100



ADAPTATION
KET UNITS LEVELS 1–3



10 — 2–BED UNIT POST ADAPTATION
1:100

MAJOR AMENDMENTS

MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020
6.8 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
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Issue	Drawing Update	Description
A	(06.12.20)	FOR S4.55 TO CLIENT
B	02.12.20	FOR S4.55 TO CLIENT

A1

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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

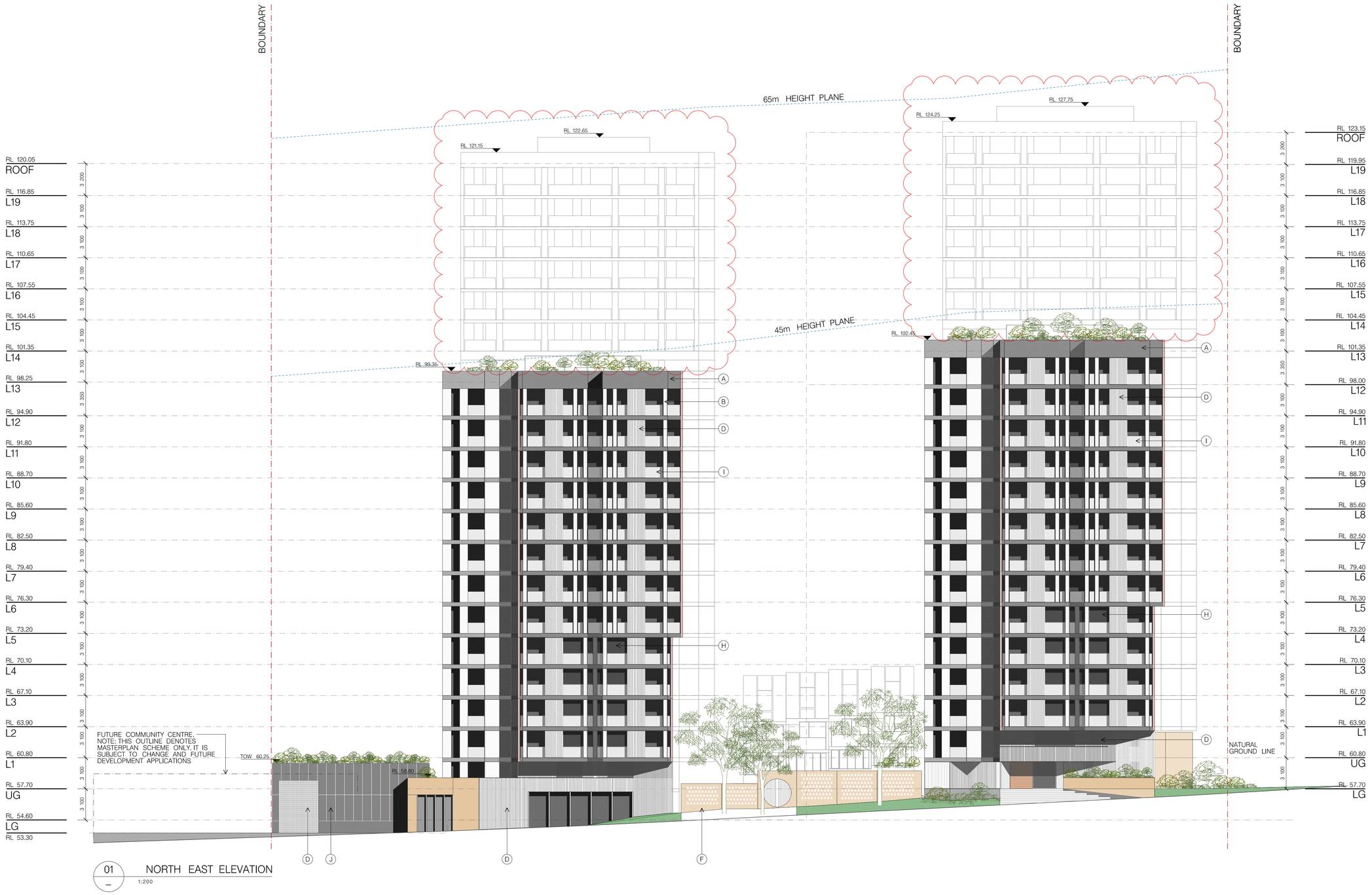
SCALE: 1:100@A1 / 1:200@A3
0 0.5m 1m 2m 4m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

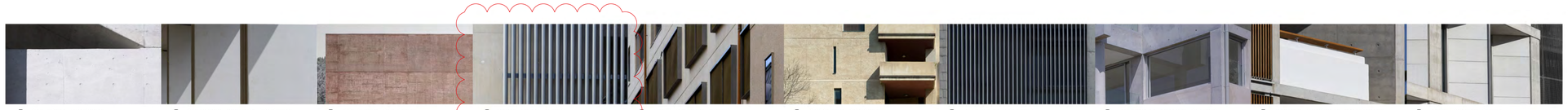
DRAWING:
ADAPTABLE UNIT FLOOR PLANS

DRAWING No.
S4.55–1150

JOB No. 5800
ISSUE B



01 — NORTH EAST ELEVATION
1:200



Ⓐ OFF-FORM CONCRETE
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– CANDALEPAS ASSOCIATES

Ⓑ COLOURED PRECAST CONCRETE
PELICAN STREET APARTMENTS
– CANDALEPAS ASSOCIATES

Ⓒ COLOURED CONCRETE
WEST TYROL FIRE STATION
– PEDEVILLA ARCHITECTS

Ⓓ WHITE METAL TUBES
PUNCHBOWL MOSQUE (SIMILAR)
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QT MELBOURNE
– CANDALEPAS ASSOCIATES

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– CANDALEPAS ASSOCIATES

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REVOLUTION APARTMENTS
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MAJOR AMENDMENTS

MINOR AMENDMENTS

J8P5NXS8A2 17/12/2020
6.8
Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
www.nathers.gov.au
Assessor Christopher Mann
Accreditation No. DMN/20/1972
Address
Herring Road,
Macquarie Park,
NSW, 2113
https://www.fr5.com.au/QRCodeLanding?PublicId=J8P5NXS8A2&GrpCert=1

Issue	Date	Drawing Original Size	Description
B	08.05.20	A1	FOR S4.55 TO CLIENT
A	02.05.20		FOR S4.55 TO CLIENT

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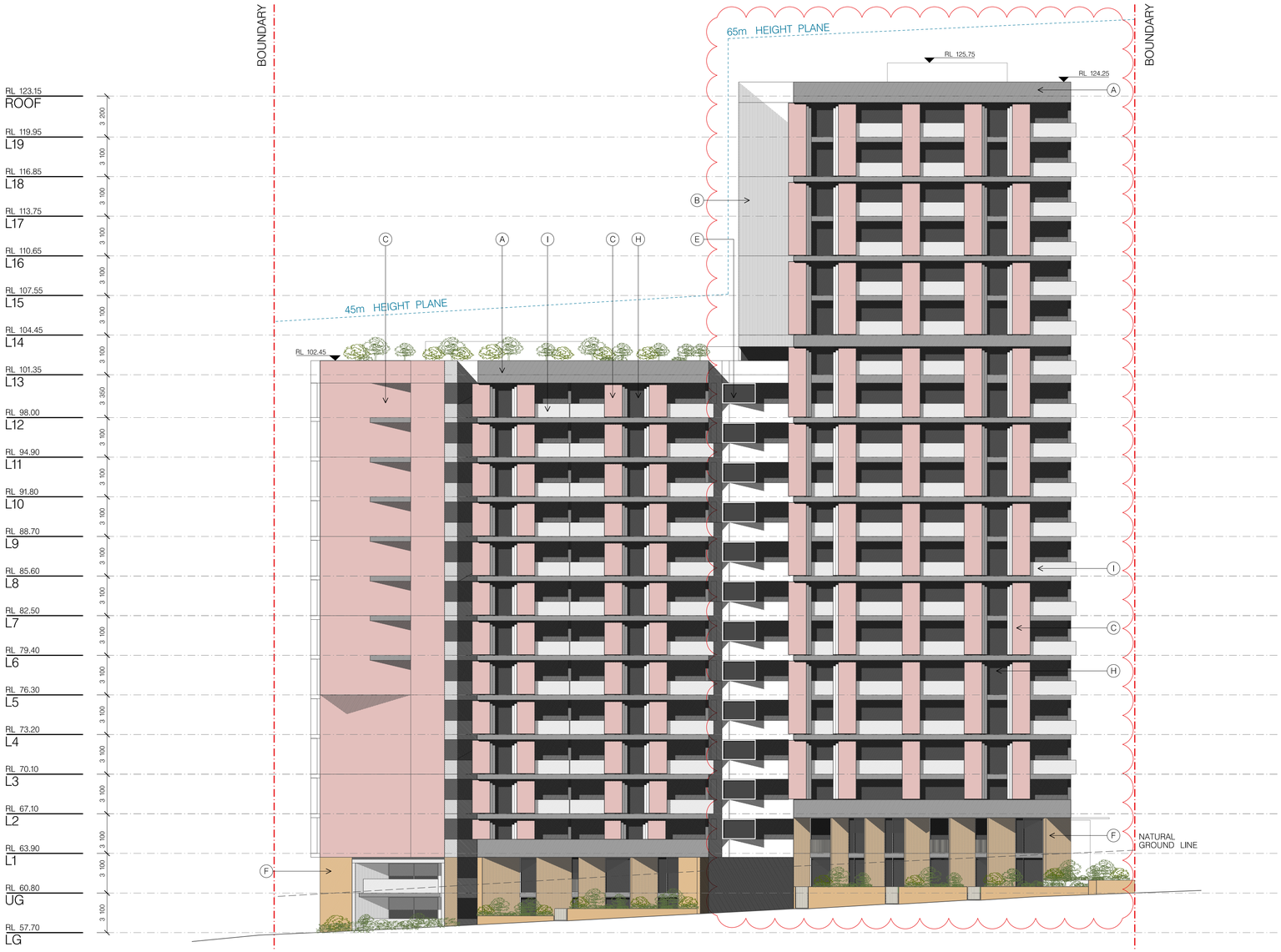
PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

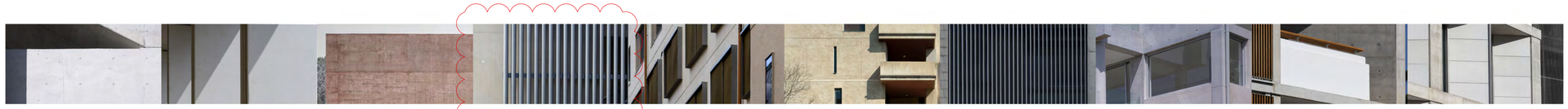
DRAWING:
NORTH EAST ELEVATION
DRAWING No.
S4.55–1300

JOB No. 5800
ISSUE B



01 — NORTH WEST ELEVATION

1:200



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– CANDALEPAS ASSOCIATES

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WEST TYROL FIRE STATION
– PEDEVILLA ARCHITECTS

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PUNCHBOWL MOSQUE (SIMILAR)
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Ⓔ STEEL WINDOW BOXES
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– CANDALEPAS ASSOCIATES

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– CANDALEPAS ASSOCIATES

MAJOR AMENDMENTS

MINOR AMENDMENTS

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J8P5NXS8A2 17/12/2020

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IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: NORTH WEST ELEVATION

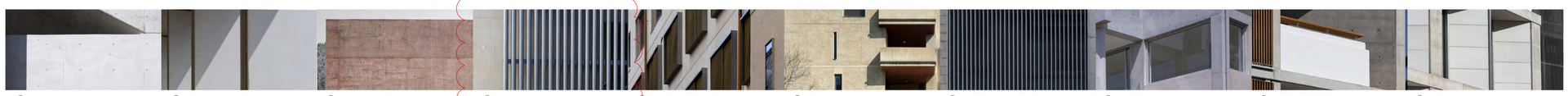
DRAWING No. S4.55–1301

JOB No. 5800

ISSUE B

01 — NORTH WEST INTERNAL ELEVATION

1:200



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Issue	Date	Drawn by	Description
B	08.12.20	CA	FOR SIA/S.10 CLIENT
A	02.12.20	CA	FOR SIA/S.10 CLIENT

A1

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EPPING ROAD, MACQUARIE PARK

CLIENT:
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SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

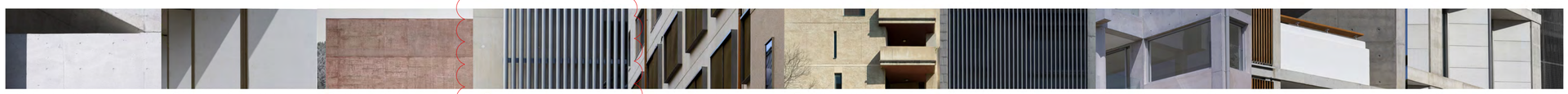
DRAWING:
NORTH WEST INTERNAL ELEVATION

DRAWING No.
S4.55–1302

JOB No.
5800

ISSUE
B

01 — SOUTH EAST ELEVATION
1:200



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QT MELBOURNE
– CANDALEPAS ASSOCIATES

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MINOR AMENDMENTS

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Accreditation No. DMN/20/1972
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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

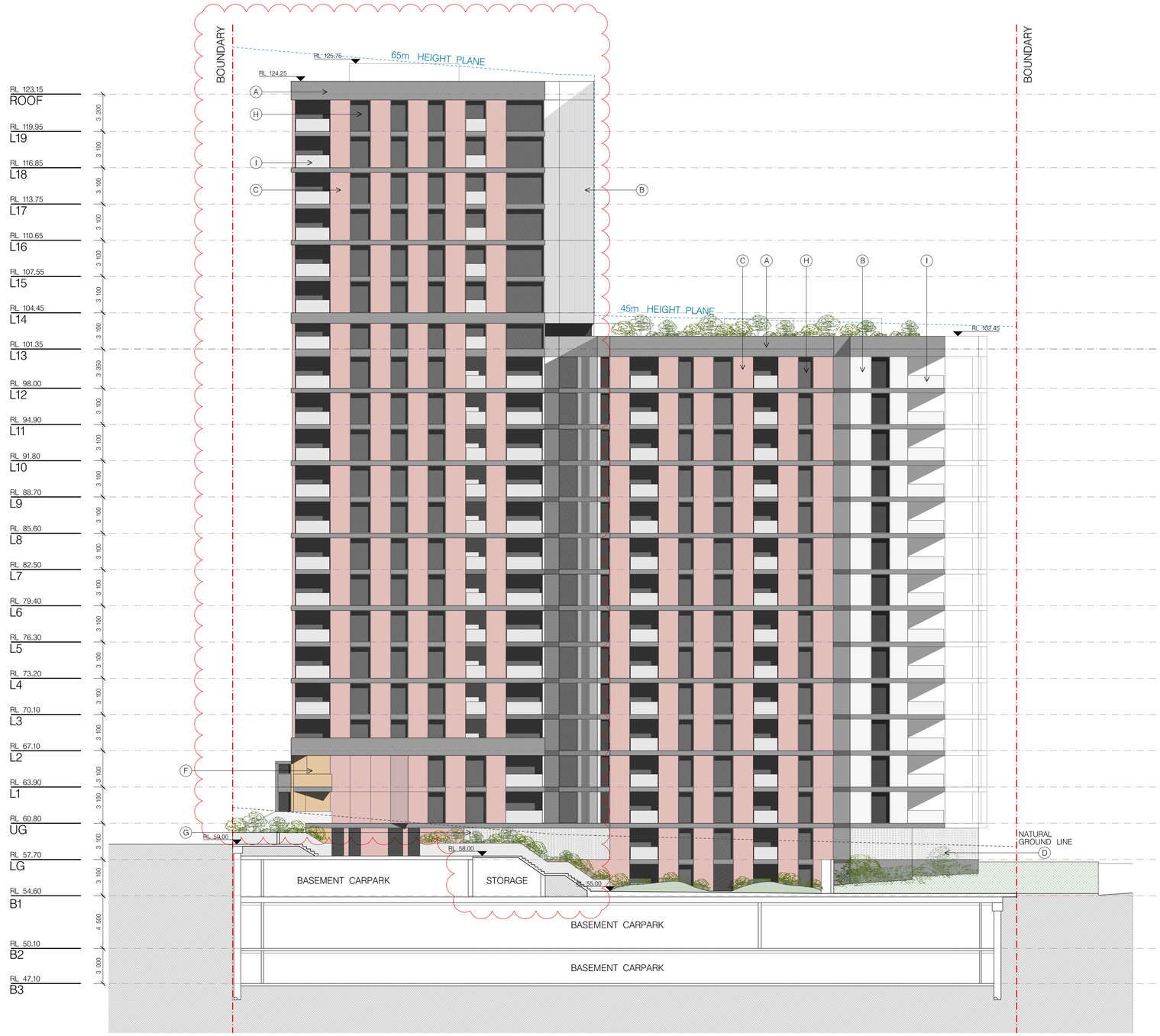
DATE: SEP 2020
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MKFP

DRAWING:
SOUTH EAST ELEVATION

DRAWING No.
S4.55–1303

JOB No. 5800

ISSUE B



01 — SOUTH EAST INTERNAL ELEVATION
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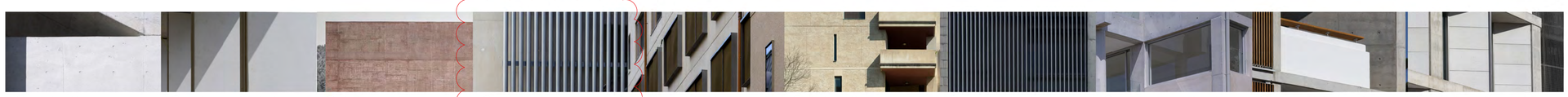

Ⓐ OFF-FORM CONCRETE
ALL SAINTS PRIMARY SCHOOL
– CANDALEPAS ASSOCIATES

Ⓑ COLOURED PRECAST CONCRETE
PELICAN STREET APARTMENTS
– CANDALEPAS ASSOCIATES

Ⓒ COLOURED CONCRETE
WEST TYROL FIRE STATION
– PEDEVILLA ARCHITECTS

Ⓓ WHITE METAL TUBES
PUNCHBOWL MOSQUE (SIMILAR)
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PRESIDENT AVENUE APARTMENTS
– CANDALEPAS ASSOCIATES

Ⓙ FIBRE CEMENT SHEET
QT PERTH
– CANDALEPAS ASSOCIATES

MAJOR AMENDMENTS

MINOR AMENDMENTS

6.8 Average star rating NATIONWIDE HOUSE ENERGY RATING SCHEME www.nathers.gov.au
J8P5NXS8A2 17/12/2020
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DATE: SEP 2020
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DRAWING:
SOUTH EAST INTERNAL ELEVATION

DRAWING No.
S4.55–1304

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ISSUE B

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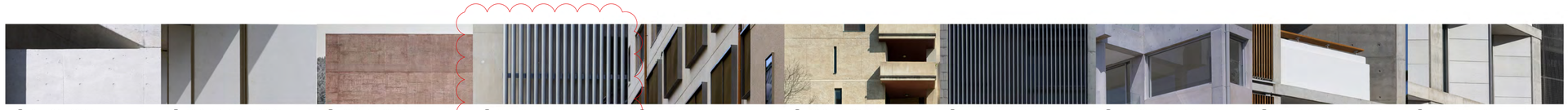

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DRAWING:
SOUTH WEST ELEVATION

DRAWING No.
S4.55–1305

JOB No. 5800

ISSUE B

Revision
10 December 2020

C

SEPP 65 DESIGN VERIFICATION STATEMENT

Project No 5800

Ivanhoe Estate
Lot C1
S4.55 Modification

Prepared on behalf of

Aspire Consortium
Frasers Property Ivanhoe
Mission Australia Housing

Prepared by

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SECTION 1.0 SUMMARY

Introduction

This report supports a S4.55 modification to the Development Application for Stage 1 of the Ivanhoe Estate redevelopment, a State Significant Development (SSD) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It has been prepared for Aspire Consortium on behalf of NSW Land and Housing Corporation.

Revisions to the original report that accompanied the Development Application are highlighted in red

Background

In September 2015 the Ivanhoe Estate was rezoned by DPE as part of the Macquarie University Station (Herring Road) Priority Precinct, to transform the area into a vibrant centre that benefits from the available transport infrastructure and the precinct's proximity to jobs, retail and education opportunities within the Macquarie Park corridor.

The Ivanhoe Estate is currently owned by NSW Land and Housing Corporation and previously comprised 259 social housing dwellings. The redevelopment of the Ivanhoe Estate is part of the NSW Government Communities Plus program, which seeks to deliver new communities where social housing blends with private and affordable housing, with good access to transport, employment, improved community facilities and open space.

The Communities Plus program seeks to leverage the expertise and capacity of the private and non-government sectors. As part of this program, Aspire Consortium, comprising Frasers Property Australia, Citta Property Group and Mission Australia Housing, was selected as the successful proponent to develop the site in July 2017.

In April 2020, Minister for Planning and Public Spaces granted consent to the Concept Master Plan Development Application for the precinct (SSD 8707) and the Stage 1 Development Application (SSD 8903) which included Lot C1 (the subject of this amendment), as well as Lot A1 and part of the infrastructure network.

Site Description

The Ivanhoe Estate site is located in Macquarie Park near the corner of Epping Road and Herring Road within the Ryde Local Government Area (LGA). The site is approximately 8.2 hectares and previously accommodated 259 social housing dwellings, comprising a mix of townhouse and four storey apartment buildings set around a cul-de-sac street layout. An aerial photo of the site before it was cleared in preparation for development is provided at Figure 1 below.

Immediately to the north of the site are a series of four storey residential apartment buildings. On the north-western boundary, the site fronts Herring Road and a lot that is currently being redeveloped with two apartment towers (Neue by Coli). Epping Road runs along the south-western boundary of the site and Shrimptons Creek, an area of public open space, runs along the south-eastern boundary. Vehicle access to the site is via Herring Road.

Ivanhoe Estate comprised of 17 individual lots owned and managed by the NSW Land and Housing Corporation. The Masterplan site also incorporates adjoining land, being a portion of Shrimptons Creek and part of the commercial site at 2-4 Lyonpark Road. This land is included to facilitate a bridge crossing and road connection to Lyonpark Road.

Figure 1 – Ivanhoe Estate site

Overview of the Proposed Modification

This modification to the Stage 1 Development Application seeks consent for the following changes to building C1 design, which is part of the first stage of works, pursuant to the Ivanhoe Estate Masterplan under Section 4.22 of the EP&A Act.

Summary of changes:

1. Allotment boundary
2. Apartment mix
3. Internal configuration
4. Basement configuration
5. Change to residential uses (affordable housing) and use of non-residential area (community rooms)
6. External materials (timber screens replaced with non-combustible material)
7. Egress paths
8. Roof plant configuration and access

The drawings that accompany the S4.55 application depict all the detailed amendments with clouds highlighting the changes.

An image of the Masterplan, identifying Buildings A1 and C1 and illustrating the road network, is provided at Figure 2 below.

Figure 2 – Ivanhoe Estate Masterplan

The proposed development for Lot C1 may be summarised as follows:

- Construction of 2x residential towers comprising of 14 storeys of social housing and 20 storeys of market and affordable housing.
- Provision of a total of 259 social apartments (including 25 dual key apartments and 45 Independent Living Units),130 affordable and 107 market apartments (including 4 standalone terraces).
- Ground floor community rooms tenancy at the base of Tower 2.
- 3 levels of basement carparking for residents, staff, visitors, community rooms and carshare operator.
- Landscaping to the central communal open space, public domain and Level 13 rooftop as documented by Hassell.

We confirm that Mr Angelo Candalepas of Candalepas Associates directed the design of the enclosed development application, which is represented by drawings S4.55 1000, 1050, 1100-1113, 1150, 1200-1202, 1300-1305, 1600-1602, 1850, and 1851. Further Mr Candalepas is registered as an architect in accordance with the NSW Architects Act 2003.

We confirm that the enclosed documentation achieves the design principles set out in *State Environmental Planning Policy 65 - Design Quality of Residential Flat Development* ('SEPP65') and has been designed with regard to the publication *Apartment Design Guide* ('ADG').

SECTION 2.0 DESIGN QUALITY PRINCIPLES

PRINCIPLE NO. 1: CONTEXT AND NEIGHBOURHOOD CHARACTER

Good design responds and contributes to its context. Context is the key natural and built features of an area, their relationship and the character they create when combined. It also includes social, economic, health and environmental conditions.

The development is located towards the Northern corner of the Ivanhoe Estate, and will be one of the initial buildings fronting the proposed Main Street upon entry from Herring Road. The site is also bound by two neighbourhood streets and a public park as shown in Figure 3.

The site is approximately 6,390 square metres in area, with a cross fall of up to 9m. The proposal consists of two tower forms, to ensure maximum solar access is available to the development. There is a 45m / 65m height limit across the centre of the site, which determines the 14 / 20 storey split between the towers. To accommodate the site fall, the tower forms are split over four level changes across the site.

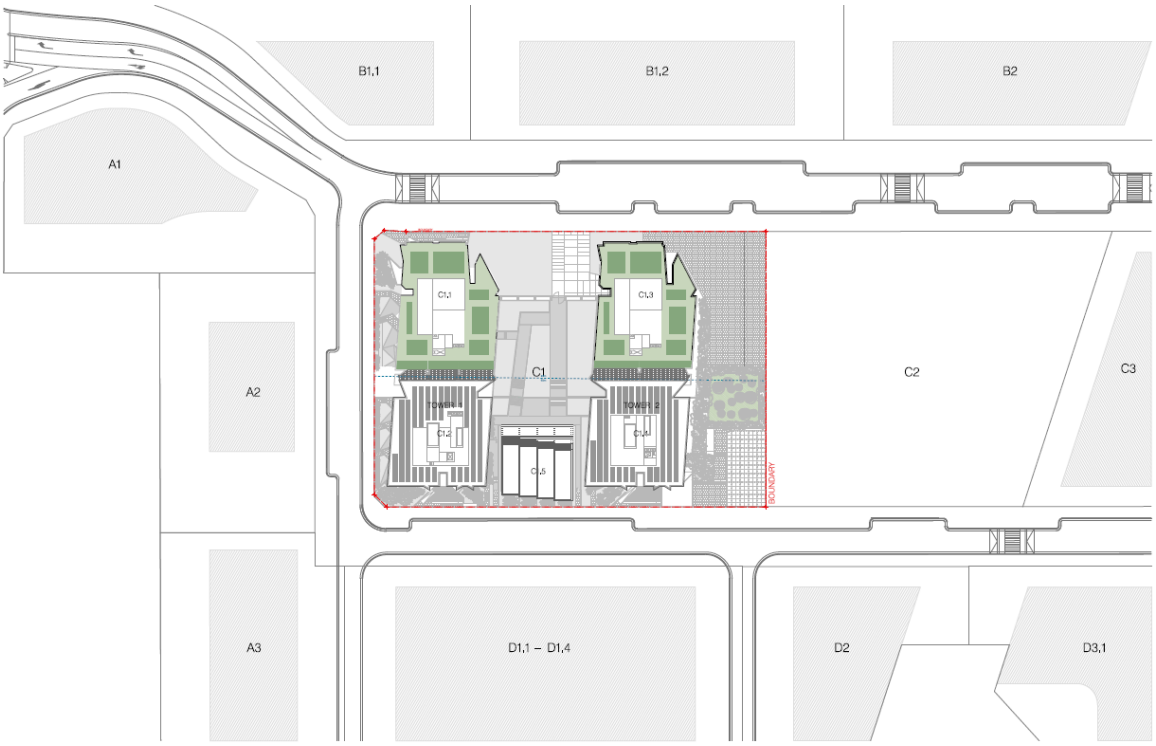


Figure 3 – C1 Site plan

The proposed siting allows for a generous landscaped communal open space between the towers. This area is also occupied by four standalone market terraces fronting the neighbourhood street to the South. Refer to landscaping documentation by Hassell for further details of the communal open space.

PRINCIPLE NO. 2: BUILT FORM AND SCALE

Good design achieves a scale, bulk and height appropriate to the existing or desired future character of the street and surrounding buildings.

Good design also achieves an appropriate built form for a site and the building's purpose, in terms of building alignments, proportions, building type and the manipulation of building elements.

The building massing responds directly to the height limits and solar access available to the development. The slight 'tilt' of the two tower forms ensure that 2 hours of direct sunlight (between 9am-11am) are available to the Northern and Eastern facades at midwinter as shown in Figure 4. Solar analysis has been based on the current indicative design of the Ivanhoe Masterplan. Proposed setbacks from boundaries ensure compliance with ADG separation to neighbouring developments.

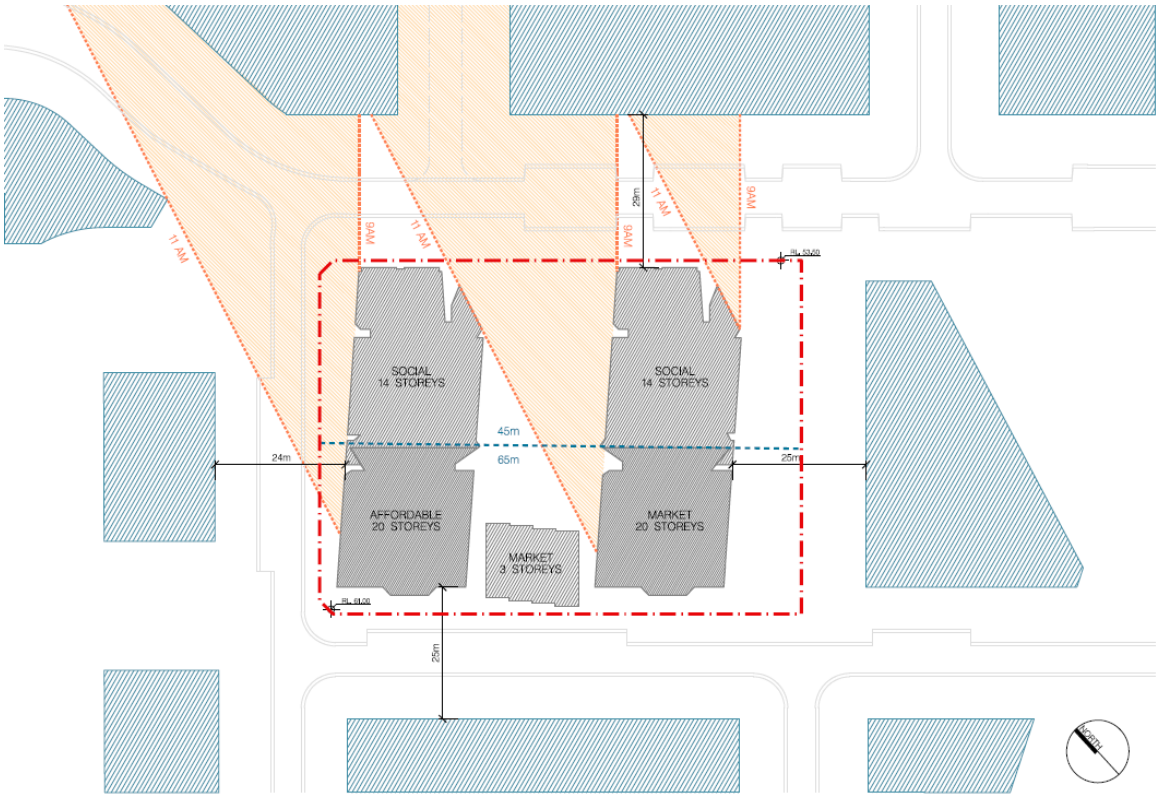


Figure 4 – Site controls

Scale has been largely driven by the 45m / 65m height limit through the centre of the site. Figure 5 shows how the tower forms are shaped by this control. Market housing has been located within the 65m (20 storey) height zone, with social housing located within the 45m (14 storey) height zone.

The 3 storey standalone terraces located between the towers respond to the townhouses proposed in adjacent lots along the Neighbourhood Street. These terraces will establish a precedent for subsequent stages.

The tower massing is consistent with the proposed built form envelopes of the Masterplan as shown in Figure 6.

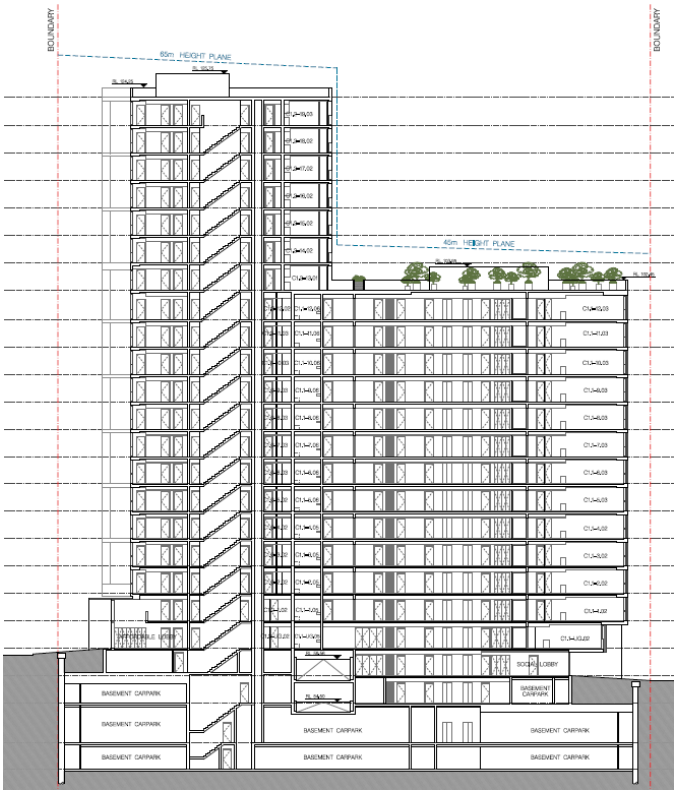


Figure 5 – Tower 1 Section and height plane controls

Figure 6 – Site massing diagram prepared by Bates Smart

PRINCIPLE NO. 3: DENSITY

Good design achieves a high level of amenity for residents and each apartment, resulting in a density appropriate to the site and its context.

The proposed development consists of 2x residential towers providing a total of 259 social apartments (including 25 dual key apartments and 45 ILUs), 130 affordable apartments and 107 market apartments (including 4 standalone terraces) over 14 and 20 storeys respectively. The total gross floor area proposed is 33,435 square metres, which results in a density consistent with the overall Ivanhoe Masterplan.

The proposal seeks to ensure that the increase in scale and density on the site achieves a positive outcome for the precinct and provides a human scale at street level. This aligns with the desired future character of the Ivanhoe Estate.

Refer to Principle No. 6 for further information regarding amenity.

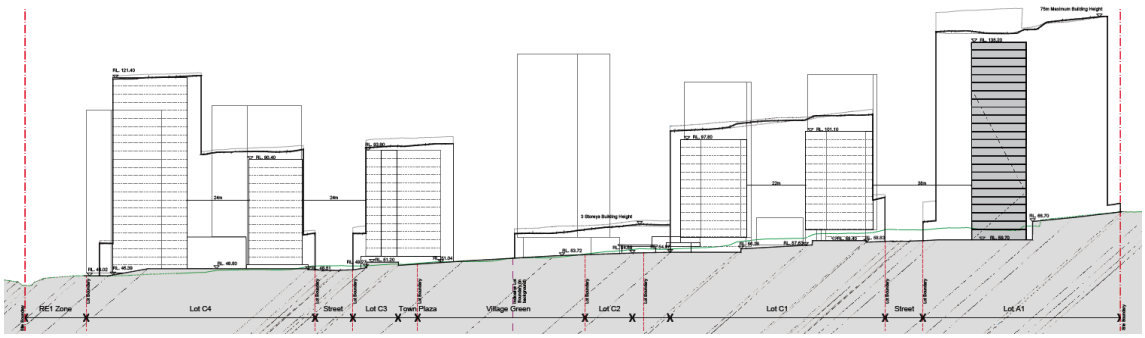


Figure 7– Main Street elevation prepared by Bates Smart

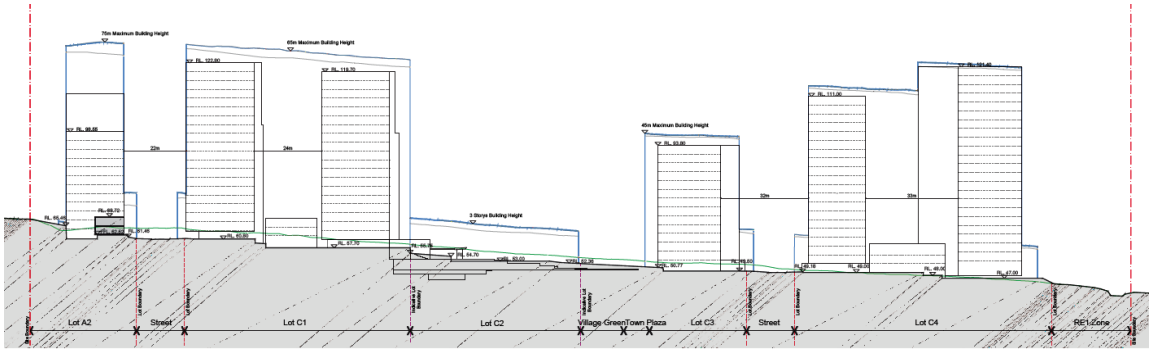


Figure 8– Neighbourhood Street elevation prepared by Bates Smart

PRINCIPLE NO. 4: SUSTAINABILITY

Good design combines positive environmental, social and economic outcomes.

Good sustainable design includes use of natural cross ventilation and sunlight for the amenity and liveability of residents and passive thermal design for ventilation, heating and cooling reducing reliance on technology and operation costs.

The proposed development includes numerous initiatives that contribute to the efficient use of resources, through sustainable design measures and actively managed systems. These can be summarised as follows:

- Orientation of the tower forms to maximise solar access to the development.
- Minimum of 70% of apartments receiving 2 hours of direct sunlight to the main living spaces at midwinter.
- Minimum of 60% of apartments receiving natural cross ventilation to main living spaces.
- Operable glazing to allow natural ventilation and reduce heating and cooling requirements.
- Screened elements and deep recesses on the façade to reduce excessive solar gain and moderate occupant privacy, whilst also allowing for natural ventilation and daylight to the adjacent living space.
- Selection of low maintenance materials.

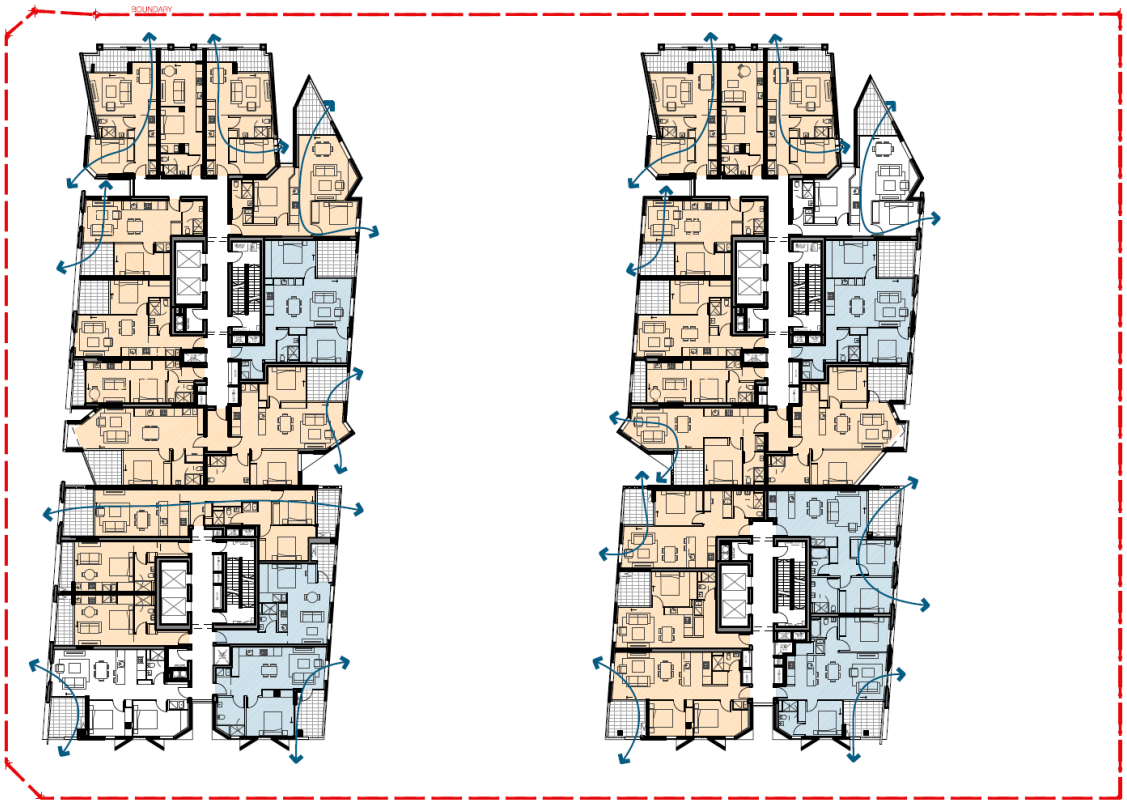


Figure 9 – Solar access and cross ventilation for a typical floorplate

The proposal meets the targets set out in the Building & Sustainability Index (BASIX), as documented in the Environment Report prepared by WSP.

PRINCIPLE NO. 5: LANDSCAPE

Good design recognises that together landscape and buildings operate as an integrated and sustainable system, resulting in attractive developments with good amenity.

The proposal includes several areas dedicated to landscaping, which have been integrated into the overall building design.

The central communal open space between the towers provides a generous offering to the residents. Various level changes are accommodated within the podium to assist with the significant cross site fall.

Each entrance lobby for both social and market housing has been recessed into the façade, providing further opportunity for landscaped elements as part of the building approach for residents. Private open spaces located along neighbourhood streets include a landscaping buffer to the public domain. This not only creates privacy for residents, but also offers further 'greening' of the streetscape.

The rooftops of the social housing at Level 13 are also proposed to be landscaped. This will provide an attractive outlook for neighbouring dwellings, assist in shielding rooftop plant and mitigate the urban heat island effect.

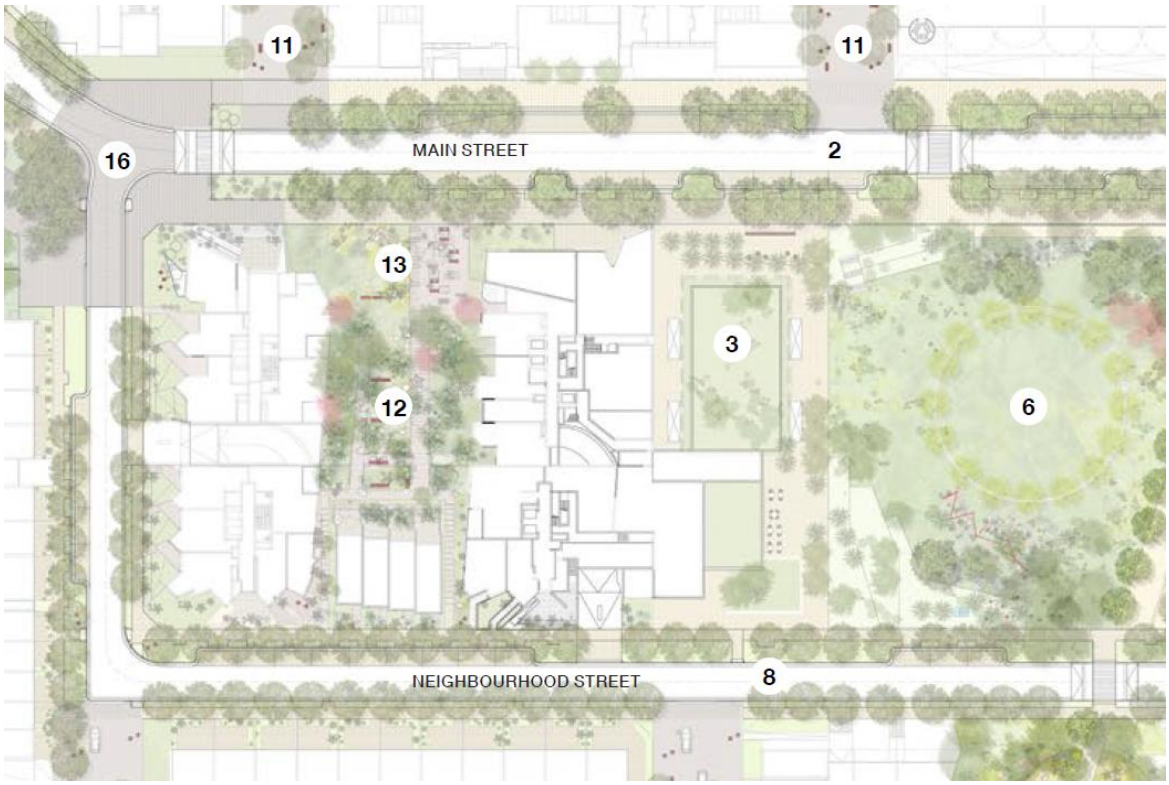


Figure 10 – Landscaping plan prepared by Hassell

Refer to associated documentation by Hassell for further landscaping details.

PRINCIPLE NO. 6: AMENITY

Good design positively influences internal and external amenity for residents and neighbours. Achieving good amenity contributes to positive living environments and resident well-being.

Residential apartments within the proposed development have been planned to maximise amenity. This has been considered in relation to solar access, visual privacy, cross ventilation and outlook, and ensures consistency with ADG requirements.

The overall building massing and placement on the site has been largely driven by opportunity for solar access. As such, a minimum of 70% of dwellings receive 2 hours of direct sunlight to living areas in midwinter. The use of inset balconies ensures the private open space offered is usable, particularly within a tower typology where additional protection from the surrounding environment is necessary.

The façade utilises screens, precast panels, and deep recesses to enhance resident wellbeing. These elements have been carefully placed to prevent overlooking and shield excessive solar gain, whilst allowing daylight penetration. Openings are maximised where living areas and balconies are located, with reduced openings to bedrooms offering increased privacy. The result is an articulated composition which carefully considers the amenity offered to apartments. Refer to Principle No. 9 for further detail.

There are two separate entrances to the basement carpark designated for social, affordable and market residents as shown in Figure 11. The ramp off the Neighbourhood Street to the North-West of the site provides access to Basement Levels 1 and 2 for 201 x social and affordable dwelling car spaces (including 6 x visitor spaces). The ramp located in the Southern corner of the site provides access to Basement Level 3 for 7 x community centre car spaces (subject to further DA for lot C2), 13 pool and gym spaces (subject to further DA for lot C2), 30 Car Share spaces and 119 x market car spaces (including 6 x visitor spaces). A total of 370 x car spaces are provided in the development.

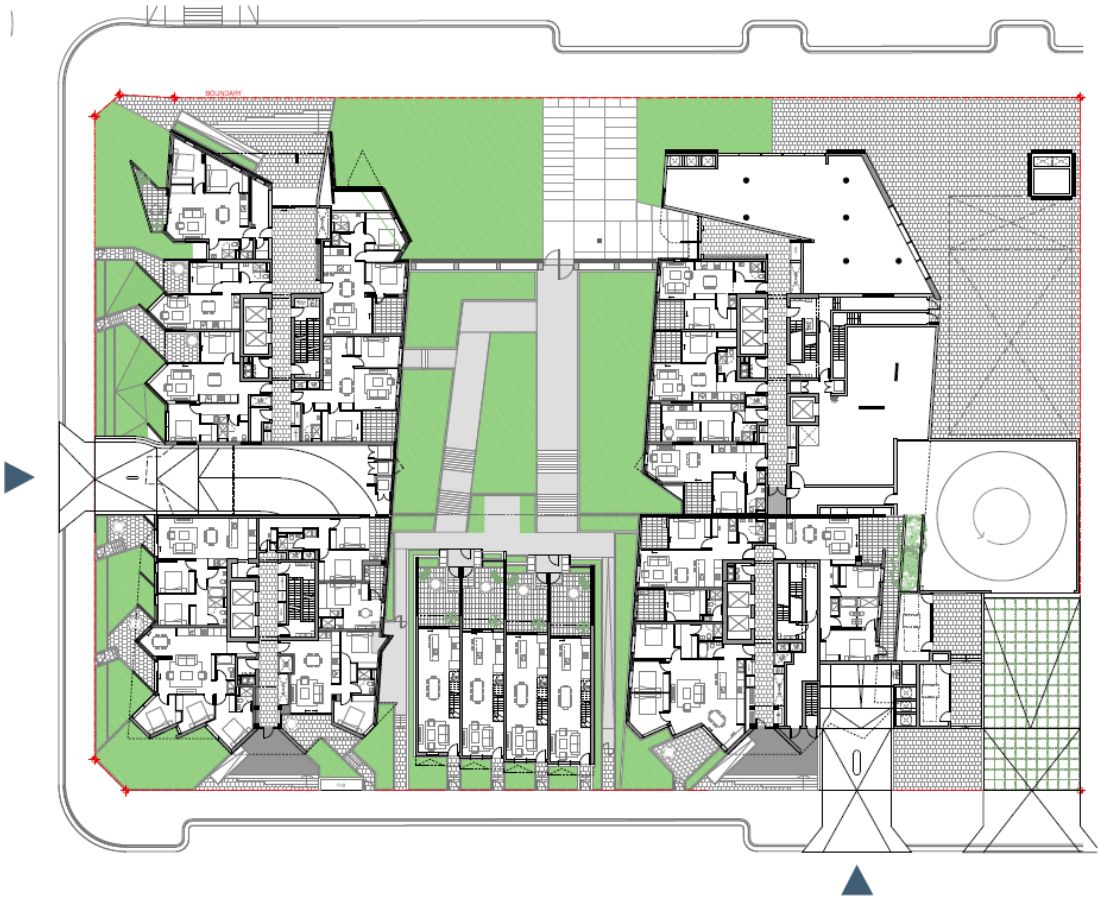


Figure 11 – Basement carpark entry locations

492 x bicycle spaces are provided throughout the basement levels (1 per dwelling). This is achieved through a combination of designated bicycle storage areas, and storage cages located directly adjacent to car spaces which are able to accommodate bicycles.

Waste chutes for both garbage and recycling are provided at each residential level, and are conveniently located adjacent to lift cores. Temporary waste rooms are located at the base of each chute and at lower ground level at the Southern corner, where a loading dock is also provided for garbage collection.

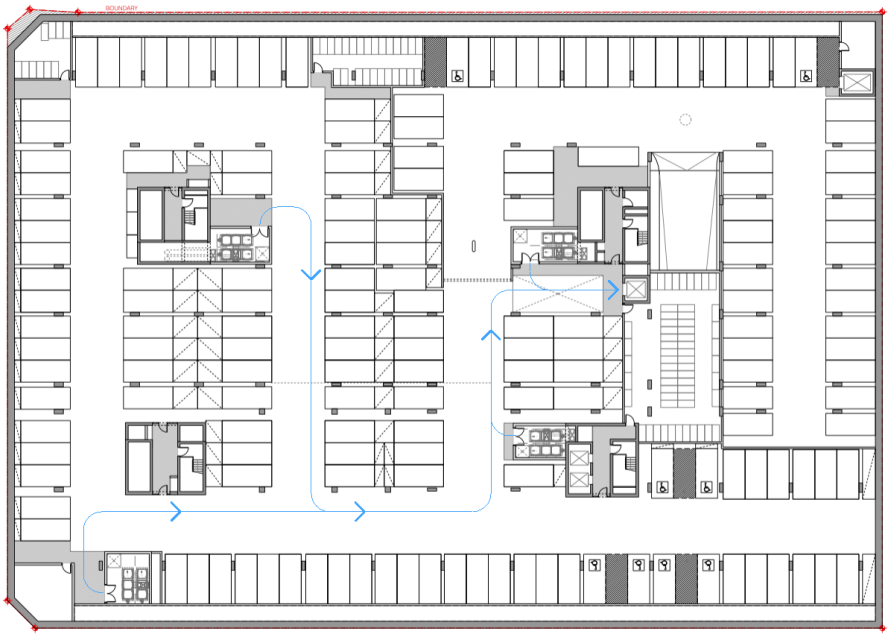


Figure 12.1 – Basement Level 3 plan showing waste strategy

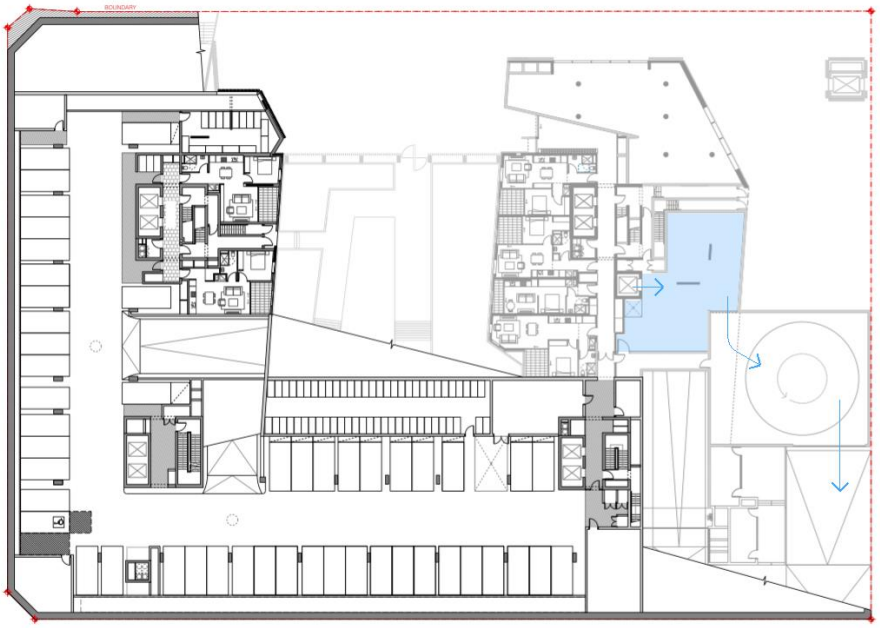


Figure 13.2 – Basement Level 1 plan showing waste strategy

PRINCIPLE NO. 7: SAFETY

Good design optimises safety and security within the development and the public domain. It provides for quality public and private spaces that are clearly defined and fit for the intended purpose. Opportunities to maximise passive surveillance of public and communal areas promote safety.

The design proposes the following security measures to restrict and control communal access in and around the proposed development:

- Residential entry points and circulation areas are clearly identified and securable.
- Ground floor units with street frontages have private front gardens and direct access into their units. This offers passive surveillance of the adjoining public domain as shown in Figure 13.
- Central location of the communal open space allows passive surveillance from neighbouring towers. Access is controlled via gates at both entry points from the public domain.
- Screened windows at lower levels offer privacy whilst allowing for passive surveillance.
- High quality architectural lighting throughout the development will assist in securing the area at night.

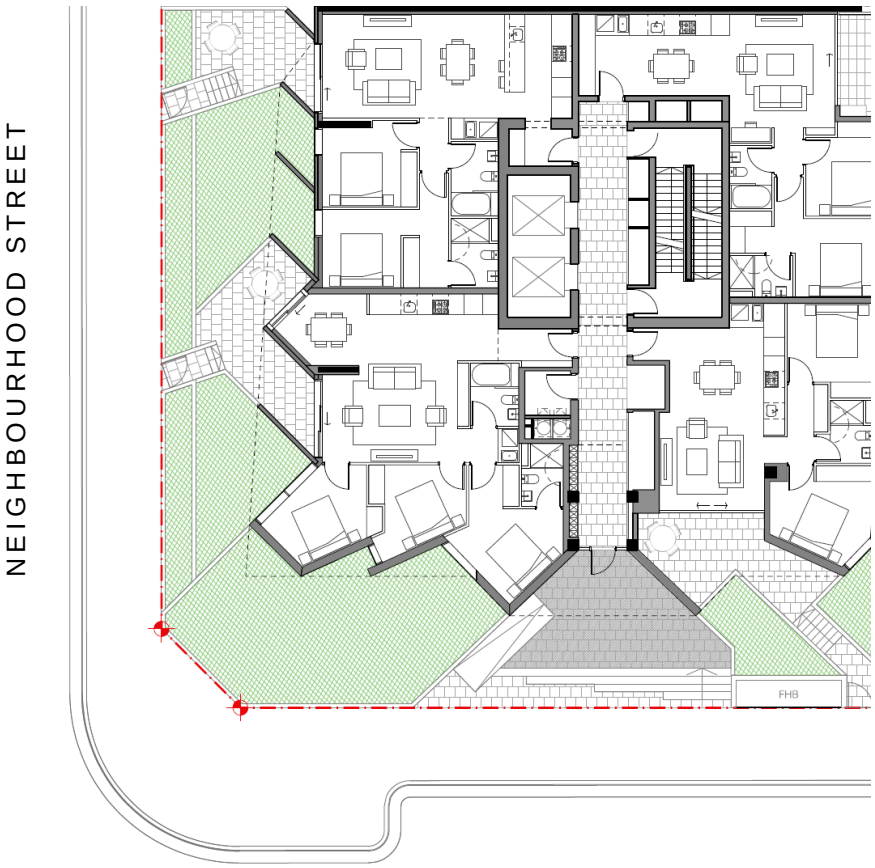


Figure 14 – Ground floor apartments and entry lobbies offer passive surveillance of the public domain

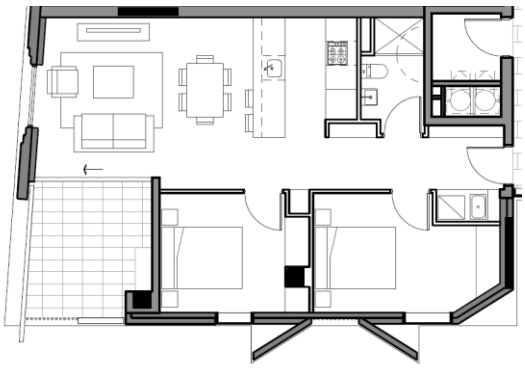
Refer to CPTED Report prepared by Ethos Urban for further information.

PRINCIPLE NO. 8: HOUSING DIVERSITY AND SOCIAL INTERACTION

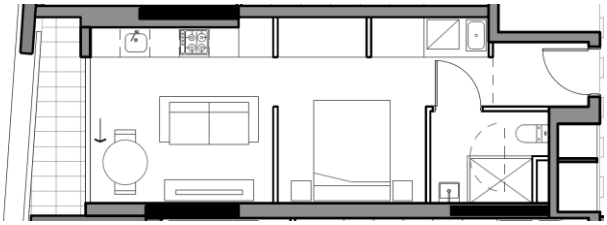
Good design achieves a mix of apartment sizes, providing housing choice for different demographics, living needs and household budgets.

Apartment planning has been carefully considered throughout the development, to ensure layouts remain universal and flexible to provide for a range of occupants. Solar access has played a significant role, with living rooms generally located on the façade with adjoining inset balconies. Internal apartment areas and room sizes have been designed in accordance with ADG requirements.

2B Social

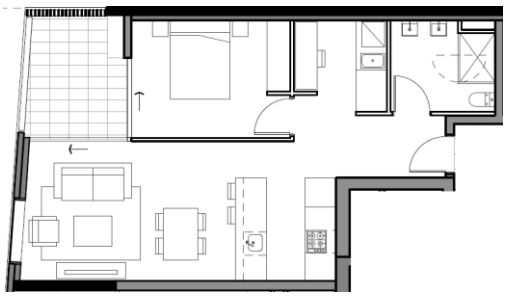


2B Affordable



ST Social

1B Social



1B Market

Figure 15 – Typical apartment types

Sample furniture arrangements of typical apartment types are shown in Figure 15. Storage is conveniently located adjacent to open plan living areas, with supplementary storage located within the basement levels. Island benches have been provided to kitchens in 2 and 3 bedroom apartments where possible. Studio apartments have been designed to ensure privacy is offered to areas where beds are located. Refer to Appendix A for further information regarding ADG compliance.

The development provides both social and either affordable or market housing within each tower. The resulting scheme sets a precedent for combining tenures across the Ivanhoe Masterplan, with a focus on achieving 'tenure blindness'. The proposal ensures the same amenity is offered to residents across all housing types, enabling a diverse range of occupants to co-exist equally.

Tenure	*Dwelling Type*	*Number*	*Mix*
Social	Studio	42	16%
	1B	118	46%
	2B	99	38%
Total		259 (including 25 dual key and 45 ILUs)	
Affordable	Studio	54	41%
	1B	39	30%
	2B	36	28%
	3B	1	1%
Total		130	
Market	Studio	-	
	1B	41	38%
	2B	51	48%
	3B	11	10%
	4B	4	4%
Total		107	

All social apartments incorporate the Livable Housing Guideline's silver level universal design features, and 5% of market and affordable apartments are designed to be wheelchair adaptable.

A variety of housing types are also offered within the development, including terraces as shown in Figure 16. This provides a choice to appeal to varying demographics and ensures future demands of the area are met.

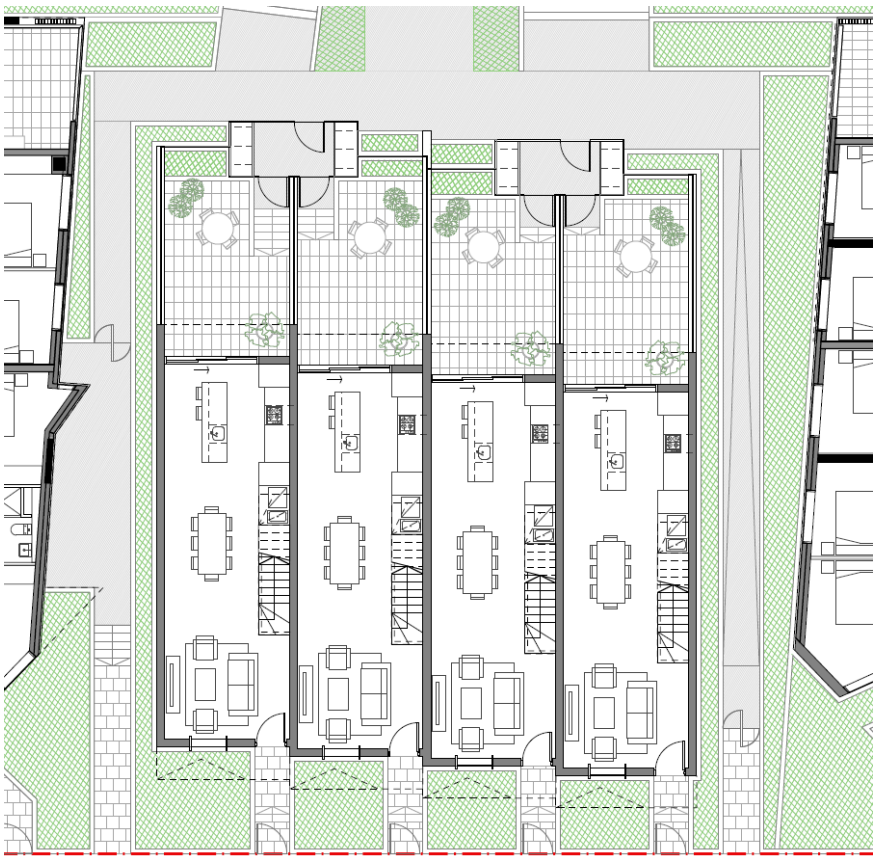


Figure 16 – Terrace and maisonette style apartments offered within the development

PRINCIPLE NO. 9: AESTHETICS

Good design achieves a built form that has good proportions and a balanced composition of elements, reflecting the internal layout and structure. Good design uses a variety of materials, colours and textures.

The proposed development is intended to set a precedent for quality design with respect to the future built environment of the Ivanhoe Estate.

Façade articulation has been carefully considered as a means of breaking down the scale of the towers, as well as providing a balanced composition which responds to internal apartment planning. A detailed layering of precast panels, screens, façade recesses and colour have been used to ensure a high quality architectural expression, and offer amenity to apartments as described in Principle No. 6.

Materials including a combination of coloured precast and off-form concrete, aluminium and timber louvres, painted steel and glazing offer a variety of textures and colours which contribute to the overall façade articulation as shown in Figure 17. Warm pink and sandstone hues have been selected as a response to the Masterplan Design Guidelines. These materials are considered appropriate for the local climate, are durable and require low maintenance.

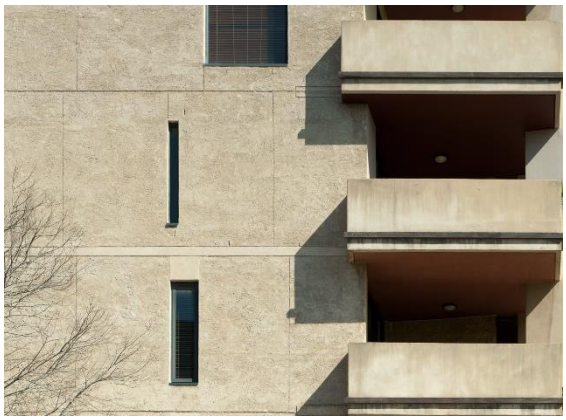
The result is a considered overall building design which responds to the principles of scale, proportion and composition. The façade detail and proposed finishes will offer a positive contribution to the desired future character of the area.

Figure 17 – Perspective view prepared by Doug & Wolf

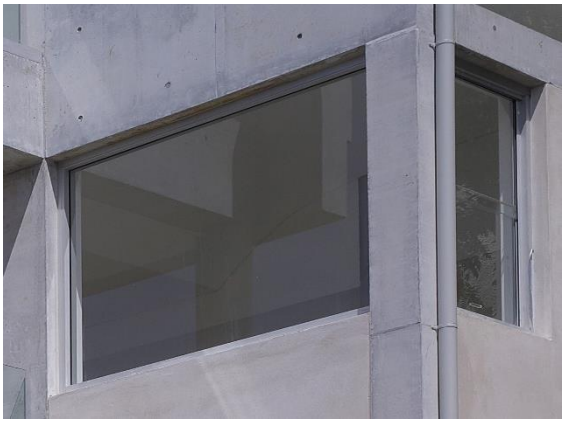
Off-form concrete

Steel window boxes

Powdercoated aluminium tubes



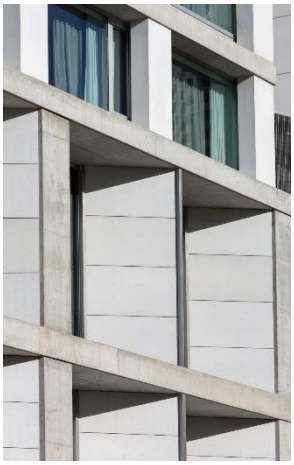
Coloured concrete



Aluminium framed glazing

Aluminium louvres

Precast concrete



Fibre Cement sheet

Coloured concrete

Painted concrete balustrades

Figure 18 – Proposed material palette

North-East (Main Street) Elevation

The Main Street Elevation has been developed in line with the Masterplan Design Guidelines, with the façade protruding above Level 1 and a reduced setback to the lot boundary. The result is a more civic expression fronting Main Street, with generous ground floor entrances.

A – Precast concrete

B – Painted tubes

C – Painted concrete balustrades

D – Aluminium framed glazing

E – Coloured precast concrete

Figure 19 – North-East elevation material palette

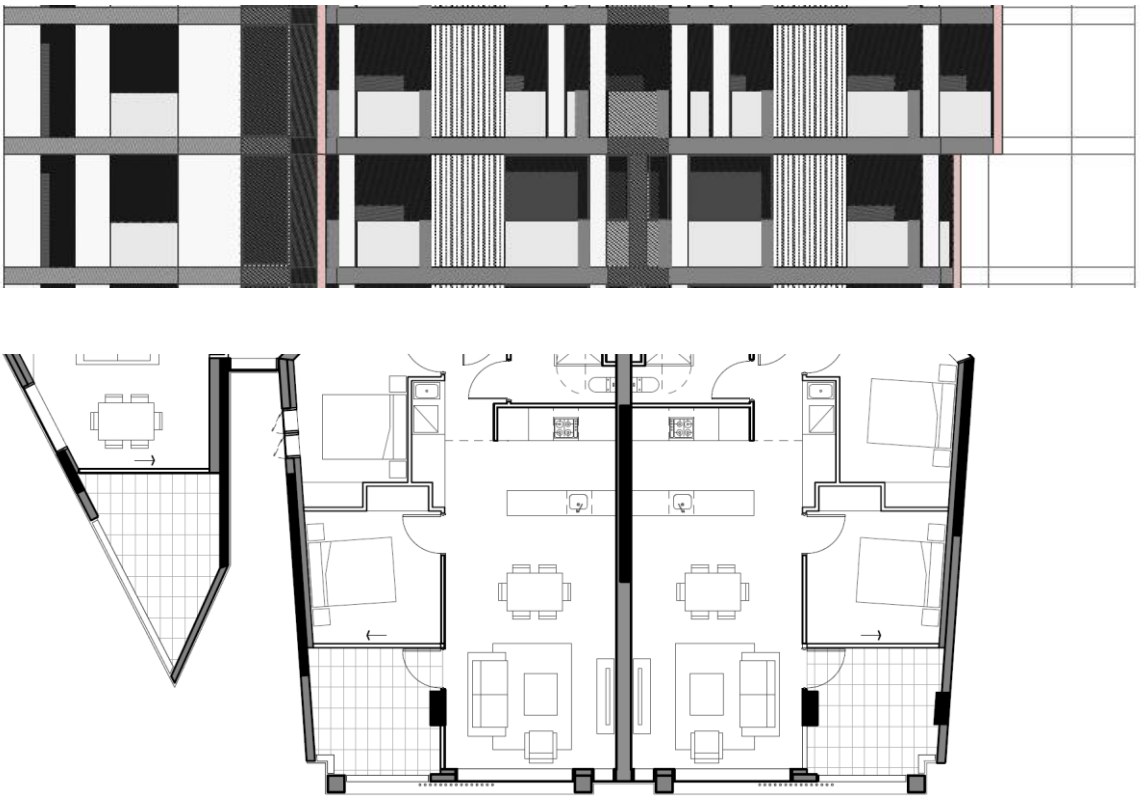


Figure 20 – North-East façade detail

Aluminium powdercoated screens are proposed along this façade, to assist with privacy and shading from excess solar gain. There is a subtle shift above Level 5 where the floorplate changes, with an additional 'pop-out' window opening up the corners of the towers to capture the Northern aspect as shown in Figure 19. A dramatic recess between apartments creates opportunity for cross ventilation, with an angled façade designed to capture the critical hours of sunlight between 9am and 11am in midwinter.

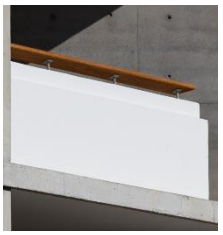
Figure 21 – North-East façade detail

North-West and South-East Elevations

The Eastern and Western elevations facing the Neighbourhood Street and Town Square establish a system of overlapping precast panels to create façade articulation. The use of double height panels on the areas spanning 20 storeys help to mitigate the perceived height of the towers. The resulting composition is of balanced proportions, which carefully reduces the apparent scale of the development.

A – Coloured precast concrete

B – Aluminium framed glazing


C – Painted concrete balustrades

D – Steel window boxes

E – Coloured precast concrete

Figure 22 – North-West elevation material palette

A series of coloured precast panels are layered across these facades, which directly relate to the apartment planning beyond. Openings are maximised to living areas and balconies, with a stepped detail introduced to frame areas of glazing as shown in Figure 22. The result is a façade which appears more solid and private where bedrooms are located, and opens up to enhance outlook to living areas.

Figure 23 – North-West façade detail

Deep recesses are also used on these elevations, as a means of breaking down the massing of the towers. From an amenity perspective, these recesses also allow for cross-ventilating apartments, and offer an external outlook to the ends of common corridors. Steel 'pop-out' window boxes are proposed within the recesses, which project from the apartment to capture sunlight as shown in Figure 23.

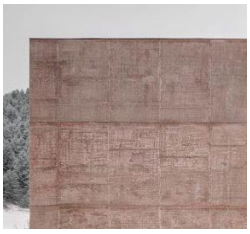
Figure 24 – North-West façade detail

Figure 25– South-East elevation

The South-East elevation has more areas of solid panels due to the Southern aspect and a greater number of bedrooms located on the facade.

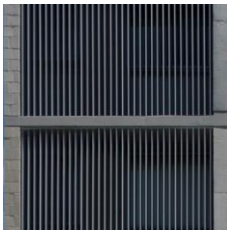
South-West (Neighbourhood Street) Elevation

The Southern elevation adopts a similar system of two-storey precast panels. The approach is more playful, with various elements projecting and turning across the height of the façade. Being predominantly South facing, the composition is more solid in appearance with façade articulation playing a greater role.


A – Coloured precast concrete

B – Aluminium framed glazing

C – Painted concrete balustrade


D – Aluminium louvres

E – Coloured precast concrete

Figure 26 – South-West elevation material palette

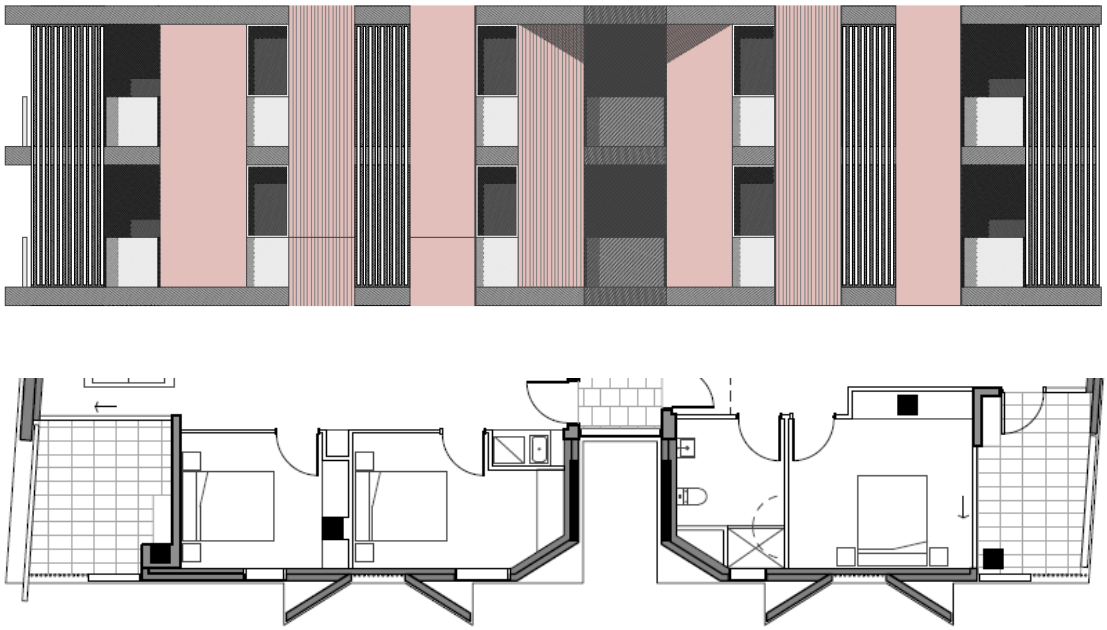


Figure 27 – South-West façade detail

Aluminium louvres have been introduced on this façade to offer privacy as shown in Figure 26. The central deep 'slots' provide an external outlook for common corridors, and align with the expressed entry lobbies at ground. Due to the orientation towards the Neighbourhood Street, a 5m setback to the lot boundary has been respected in line with the Masterplan Design Guidelines.

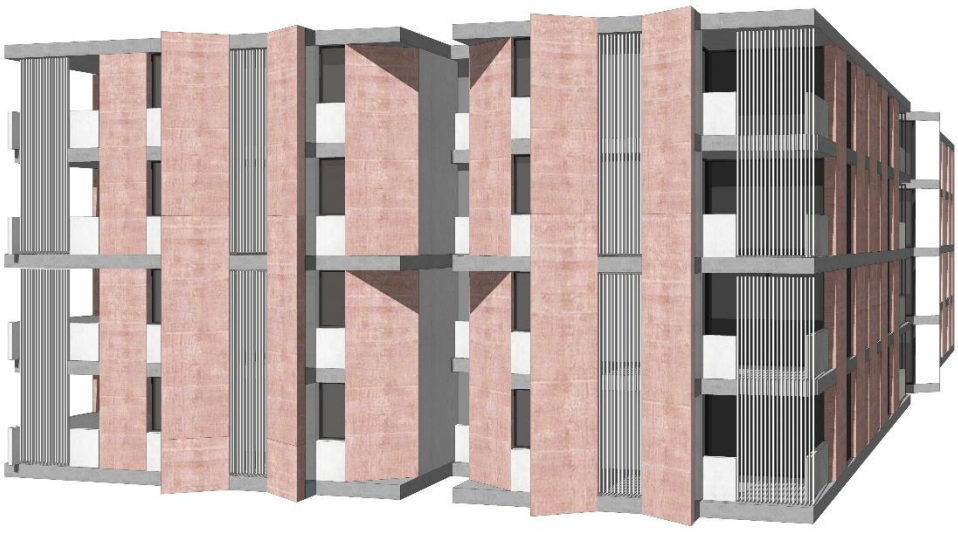
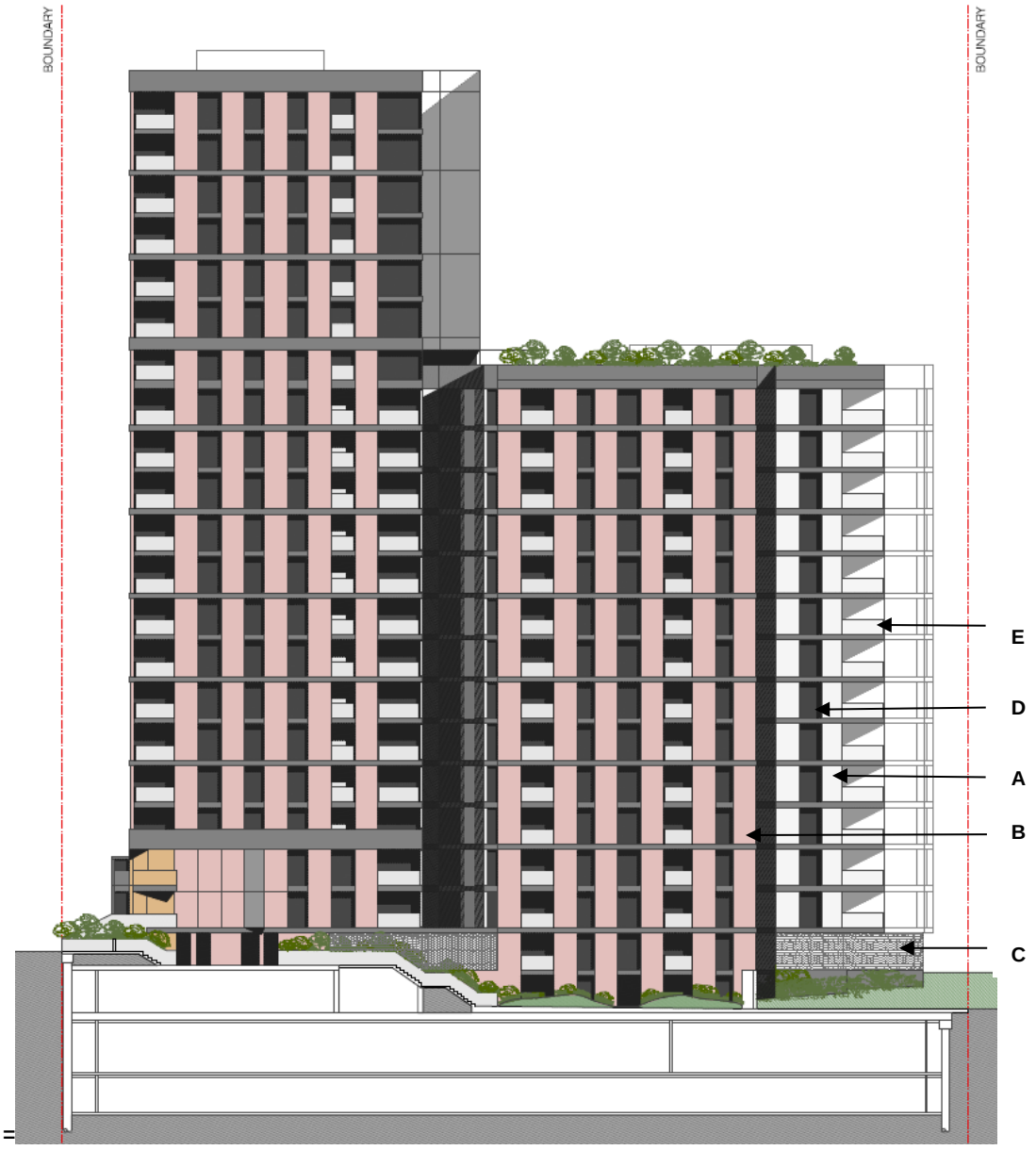
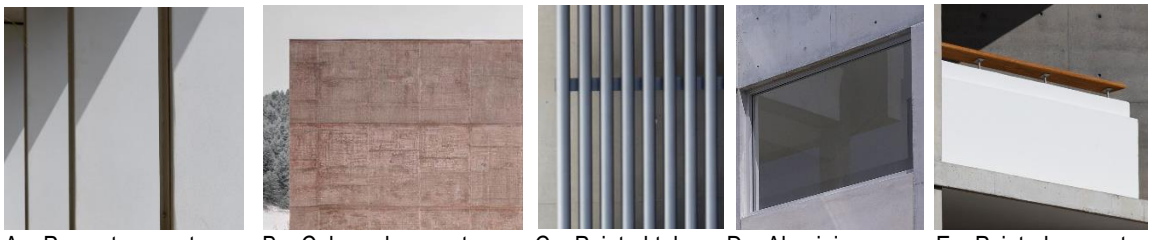


Figure 28 – South-East façade detail

South-East and North-West Internal Elevations

As a result of the massing approach for this particular lot, the internal elevations have been considered in a slightly different manner to the perimeter elevations. An ordered system of coloured precast panels are arranged according to use beyond, and extend to the base of the towers.





A – Precast concrete | B – Coloured precast concrete | C – Painted tubes | D – Aluminium framed glazing | E – Painted concrete balustrades

Figure 29– South-East Internal elevation material palette

Similar to the Eastern and Western elevations, openings are larger to living and balcony areas to maximise outlook. Double storey panels have also been used to break down the scale of the towers. These facades are designed to provide a consistent enclosure framing the communal open space.

Podium

As per the Masterplan Design Guidelines, a two-storey podium expression has been introduced at ground level, to assist the interface between the tower forms and public domain. Landscaping has also been carefully integrated into the design to provide a softening of building edges, as well as offering further amenity to the development.

The façade fronting Main Street is of a more civic nature, with a generous neighbourhood garden and garden wall to the communal open space beyond. Timber louvres are used to add texture and frame recessed entry lobbies.

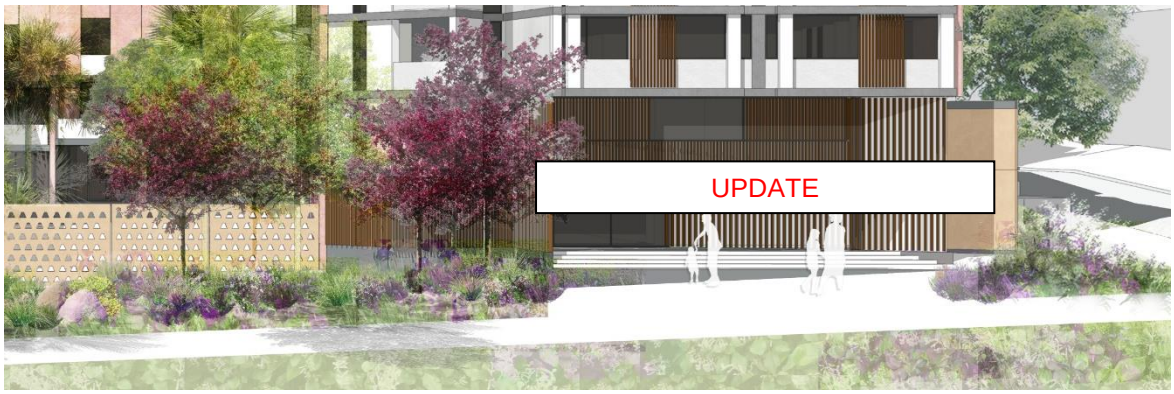


Figure 30 – Garden wall and entry lobby to the North-East elevation

The podium expression is continued around the West and South elevations fronting Neighbourhood Streets, in the form of larger 3 bedroom and terrace style apartments. Projecting blade walls channel views and offer outlook down the street, whilst also assisting with privacy as shown in Figure 30. Sandstone coloured precast is used as a 'solid' masonry base, consistent with objectives of the Masterplan Design Guidelines. This also ties in with the sandstone base proposed at neighbouring Lot A1.

Figure 31 – Blade walls and sandstone hues along the North-West elevation

Direct street access is offered to ground level apartments on these frontages, with landscaped planting buffers to offer privacy and amenity. The standalone terraces located between the towers are stepped in both plan and elevation, to deal with level changes and break down massing as shown in Figure 31. As opposed to the Main Street façade, the Neighbourhood Street facades tend to project beyond the principle building line above. The result is a more intimate and human scale suited to the predominantly residential area.

Figure 32 – Terraces and maisonette apartments along the South-West elevation

At the base of the South-eastern boundary, a future community centre outline - which will be subject to further design development and approval - is shown adjacent to the public park. Therefore, the design for this area takes this future development into consideration, where a temporary fibre cement cladding will be applied where the future development will be placed – as shown in figure 32. Planter boxes and extensive planting where considering at the roof of the loading dock and in front of Upper Ground units to minimise heat island effects and improve the amenity of these units.

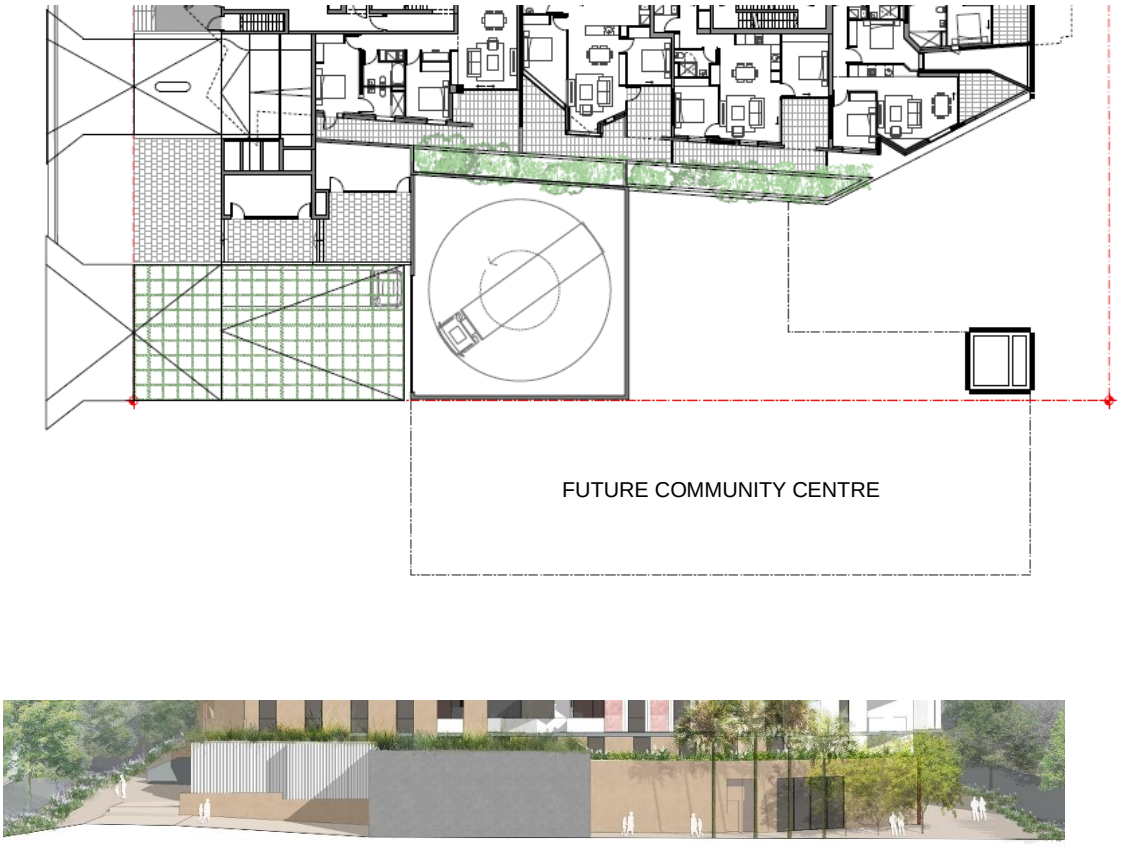


Figure 33 –South-East elevation

The two substations are proposed to be located in the Southern corner of the development, which will be separated from the residential towers, adjacent to the loading dock and carpark entries. Carpark entries have also been carefully integrated into the façade design to ensure they do not adversely impact the public domain.

APPENDIX A: COMPLIANCE TABLE | SEPP 65 APARTMENT DESIGN GUIDE

ADG CRITERIA	COMPLIANCE
Part 3: SITING THE DEVELOPMENT	
3A Site Analysis	
Objective 3A-1 *Site analysis illustrates that design decisions have been based on opportunities and constraints of the site conditions and their relationship to the surrounding context.*	Complies. Refer to Principle No. 1 within this report.
3B Orientation	
Objective 3B-1 *Building types and layouts respond to the streetscape and site while optimising solar access within the development.*	Complies. Refer to Principle No. 2 within this report.
Objective 3B-2 *Overshadowing of neighbouring properties is minimised during mid-winter.*	Complies. Overall massing has been coordinated across the Masterplan to minimise impacts of overshadowing.
3C Public Domain Interface	
Objective 3C-1 *Transition between private and public domain is achieved without compromising safety and security.*	Complies. Refer to Principle No. 7 within this report.
Objective 3C-2 *Amenity of the public domain is retained and enhanced.*	Complies.
3D Communal & Public Open Space	
Objective 3D- 1 *An adequate area of communal open space is provided to enhance residential amenity and to provide opportunities for landscaping.* *Design Criteria* *1. Communal open space has a minimum area equal to 25% of the site.* *2. Developments achieve a minimum of 50% direct sunlight to the principal usable part of the communal open space for a minimum of 2 hours between 9am and 3pm on 21 June (mid winter).*	Variation. (pre-existing : refer SSD 8903) 864sqm of communal open space is provided at ground level which has controlled access for use by residents. A minimum of 2 hours of sunlight is available to 50% of this area during mid winter. When the public communal open space is considered as per the Masterplan Design Guidelines (including the Neighbourhood Garden facing Main Street), a total of 1716sqm of communal open space is provided. This equates to 28% of the site area.
Objective 3D-2 *Communal open space is designed to allow for a range of activities, respond to site conditions and be attractive and inviting.*	Complies. Refer to documentation prepared by Hassell.
Objective 3D-3	Complies.

ADG CRITERIA	COMPLIANCE
Communal open space is designed to maximise safety.	Access is controlled via gates to the main communal open area.
Objective 3D-4 *Public open space, where provided, is responsive to the existing pattern and uses of the neighbourhood.*	Complies. Responds to proposed neighbourhood uses as part of the Ivanhoe Masterplan.
3E Deep Soil Zones	
Objective 3E-1 *Deep soil zones provide areas on the site that allow for and support healthy plant and tree growth. They improve residential amenity and promote management of water and air quality.* *Design Criteria* *1. Deep soil zones for sites >1500sqm are to meet a minimum dimension of 6m at 7% of the site area.*	Variation. (pre-existing : refer SSD 8903) Deep soil zones are provided in alternative locations around the Ivanhoe Masterplan to meet site-wide requirements.
3F Visual Privacy	
Objective 3F-1 *Adequate building separation distances are shared equitably between neighbouring sites, to achieve reasonable levels of external and internal visual privacy.* *Design Criteria* *1. Separation between windows and balconies is provided to ensure visual privacy is achieved. Minimum required separation distances from buildings to the side and rear boundaries are as follows: over 25m (9+ storeys)* *12m between habitable rooms and balconies* *6m between non-habitable rooms.*	Complies. 24m building separation is maintained to neighbouring Lots B1 and D1 to the North and South respectively. Variation. (pre-existing : refer SSD 8903) Average building separation distances of 24m are maintained to neighbouring Lot A2 to the West. Adjacent buildings in future stages are to incorporate privacy screens to address building separation distances.
Objective 3F-2 *Site and building design elements increase privacy without compromising access to light and air and balance outlook and views from habitable rooms and private open space.*	Complies. Screens and blade walls are utilised on the façade to achieve this. Refer to Principle No. 6 within this report.
3G Pedestrian Access and Entries	
Objective 3G-1 *Building entries and pedestrian access connects to and addresses the public domain.*	Complies.
Objective 3G-2 *Access, entries and pathways are accessible and easy to identify.*	Complies.
Objective 3G-3 *Large sites provide pedestrian links for access to streets and connection to destinations.*	Complies. An access controlled through site link is available for residents via the communal open space.
3H Vehicle Access	

ADG CRITERIA	COMPLIANCE
Objective 3H-1 *Vehicle access points are designed and located to achieve safety, minimise conflicts between pedestrians and vehicles and create high quality streetscapes.*	Complies. Carpark entries are integrated into the ground level façade.
3J Bicycle and Car Parking	
Objective 3J-1 *Car parking is provided based on proximity to public transport in metropolitan Sydney and centres in regional areas.*	Complies. Based on Ryde Council DCP rates.
Objective 3J-2 *Parking and facilities are provided for other modes of transport.*	Complies. Bicycle storage is incorporated in the basement.
Objective 3J-3 *Car park design and access is safe and secure.*	Complies.
Objective 3J-4 *Visual and environmental impacts of underground car parking are minimised.*	Complies.
Objective 3J-5 *Visual and environmental impacts of on-grade car parking are minimised.*	Not applicable. No on-grade car parking provided.
Objective 3J-6 *Visual and environmental impacts of above ground enclosed car parking are minimised.*	Not applicable. No above ground car parking provided.
Part 4: DESIGNING THE BUILDING	
4A Solar and Daylight Access	
Objective 4A-1 *To optimise the number of apartments receiving sunlight to habitable rooms, primary windows and private open space.* *Design Criteria* *1. Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9am and 3pm at midwinter.* *3. A maximum of 15% of apartments in a building receive no direct sunlight between 9am and 3pm at midwinter.*	1. Complies. 70% of apartments receive a minimum of 2 hours of direct sunlight between 9am and 3pm at midwinter. 3. Variation. (pre-existing : refer SSD 8903) 21% of apartments receive no direct sunlight between 9am and 3pm at midwinter. The building orientation was prioritised to maximise the number of apartments receiving a minimum 2 hours of sunlight midwinter. This resulted in an increased number of apartments receiving no sunlight midwinter. This requirement at the winter solstice represents the 'worst case' scenario. For the remainder of the year, the solar performance of the building will improve significantly.
Objective 4A-2 *Daylight access is maximised where sunlight is limited.*	Complies. Glazing is increased to living areas to ensure adequate daylight access is available.
Objective 4A-3	Complies.

ADG CRITERIA	COMPLIANCE
Design incorporates shading and glare control, particularly for warmer months.	Façade includes use of screening, recesses and louvres to assist with shading. Refer to Principle No. 6 within this report.
4B Natural Ventilation	
Objective 4B-1 *All habitable rooms are naturally ventilated.*	Complies.
Objective 4B-2 *The layout and design of single aspect apartments maximises natural ventilation.*	Complies.
Objective 4B-3 *The number of apartments with natural cross ventilation is maximised to create a comfortable indoor environment for residents.*	Complies.
4C Ceiling Heights	
Objective 4C-1 *Ceiling height achieves sufficient natural ventilation and daylight access.* *Design Criteria* *1. Measured from finished floor level to finished ceiling level, minimum ceiling heights are:* *Habitable rooms 2.7m* *Non-habitable 2.4m* *Mixed use 3.3m for ground and first floor*	Complies. 2.7m and 2.4m ceiling heights are provided for habitable and non-habitable rooms respectively. Variation. (pre-existing : refer SSD 8903) 3.3m is not provided for ground and first floor which consists largely of social housing. The likelihood of social housing being converted to an alternative use is very low. Areas provided for community rooms tenancy at ground level have an increased ceiling height.
Objective 4C-2 *Ceiling height increases the sense of space and provides for well proportioned rooms.*	Complies.
Objective 4C-3 *Ceiling heights contribute to the flexibility of building use over the life of the building.*	Complies.
4D Apartment Size and Layout	
Objective 4D-1 *The layout of rooms within an apartment is functional, well organised and provides a high standard of amenity.* *Design Criteria* *1. Apartments are required to have the following minimum internal areas:* *Studio 35sqm* *1B 50sqm* *2B 70sqm* *3B 90sqm* *The minimum internal areas include only one bathroom. Additional bathrooms increase the minimum internal area by 5sqm each.*	Complies.
2. Every habitable room must have a window in an external wall with a total minimum glass area of not	Complies.

ADG CRITERIA	COMPLIANCE
less than 10% of the floor area of the room. Daylight and air may not be borrowed from other rooms.	
Objective 4D-2 *Environmental performance of the apartment is maximised.* *Design Criteria* *1.Habitable room depths are limited to a maximum of 2.5 x the ceiling height.* *2. In open plan layouts (where the living, dining and kitchen are combined) the maximum habitable room depth is 8m from a window.*	Complies.
Objective 4D-3 *Apartment layouts are designed to accommodate a variety of household activities and needs.* *Design Criteria* *1. Master bedrooms have a minimum area of 10sqm and other bedrooms 9sqm (excluding wardrobe space).* *2. Bedrooms have a minimum dimension of 3m (excluding wardrobe space).* *3. Living rooms or combined living/dining rooms have a minimum width of:* *3.6m for studio and 1B* *4m for 2B and 3B* *4. The width of cross-over or cross-through apartments are at least 4m internally to avoid deep narrow apartment layouts.*	Complies.
4E Private Open Space and Balconies	
Objective 4E-1 *Apartments provide appropriately sized private open space and balconies to enhance residential amenity.* *Design Criteria* *1. All apartments are required to have primary balconies as follows:* *Studio 4sqm* *1B 8sqm min. depth 2m* *2B 10sqm min. depth 2m* *3B+ 12sqm min. depth 2.4m* *2. For apartments at ground level or on a podium or similar structure, a private open space is provided instead of a balcony. It must have a minimum area of 15sqm and a minimum depth of 3m.*	Variation. (pre-existing : refer SSD 8903) Podium level social apartments facing the communal open space do not have 15sqm of private open space. There is ample borrowed amenity for these apartments as a result of the outlook available to the communal open space. All balconies have been carefully integrated into the façade design of the building. Further all balconies can meet the appropriate functional requirements for an outdoor living area.
Objective 4E-2 *Primary private open space and balconies are appropriately located to enhance liveability for residents.*	Complies. All private open space is located directly adjacent to living areas.
Objective 4E-3	Complies. Inset balconies contribute to overall façade articulation.

ADG CRITERIA	COMPLIANCE
Private open space and balcony design is integrated into and contributes to the overall architectural form and detail of the building.	
Objective 4E-4 *Private open space and balcony design maximises safety.*	Complies.
4F Common Circulation and Spaces	
Objective 4F-1 *Common circulation spaces achieve good amenity and properly service the number of apartments.* *Design Criteria* *1. The maximum number of apartments off a circulation core on a single level is eight.* *2. For buildings of 10 storeys and over, the maximum number of apartments sharing a single lift is 40.*	Complies. All common corridors and lobbies offer an external outlook. Variation. (pre-existing : refer SSD 8903. Note quantities and tower names corrected below to match the plans submitted with the original application) 65 social apartments share a single lift in Tower C1.1 65 social apartments share a single lift in Tower C1.3 65 affordable apartments share a single lift in Tower C1.2 52 market apartments share a single lift in Tower C1.4 No more than 10 apartments are provided off a circulation core on a single level. Refer to letter CA-V01 prepared by WSP dated 19/2/18.
Objective 4F-2 *Common circulation spaces promote safety and provide for social interaction between residents.*	Complies.
4G Storage	
Objective 4G-1 *Adequate, well designed storage is provided in each apartment.* *Design Criteria* *1. In addition to storage in kitchens, bathrooms and bedrooms, the following storage is provided:* *Studio 4cbm* *1B 6cbm* *2B 8cbm* *3B 10cbm* *At least 50% of the required storage is to be located within the apartment.*	Complies.
Objective 4G-2 *Additional storage is conveniently located, accessible and nominated for individual apartments.*	Complies. Additional storage located in basement levels adjacent to carspaces or in dedicated storage areas.
4H Acoustic Privacy	
Objective 4H-1 *Noise transfer is minimised through the siting of buildings and building layout.*	Complies.
Objective 4H-2 *Noise impacts are mitigated within apartments through layout and acoustic treatments.*	Complies. Habitable areas are generally buffered from wet areas through the use of joinery.
4J Noise Pollution	

ADG CRITERIA	COMPLIANCE
Objective 4J-1 *In noisy or hostile environments the impacts of external noise and pollution are minimised through the careful siting and layout of buildings.*	Not applicable.
Objective 4J-2 *Appropriate noise shielding or attenuation techniques for the building design, construction and choice of materials are used to mitigate noise transmission.*	Refer to Acoustic Assessment prepared by Acoustic Logic.
4K Apartment Mix	
Objective 4K-1 *A range of apartment types and sizes is provided to cater for different household types now and into the future.*	Complies. Refer to Principle No. 8 within this report.
Objective 4K-2 *The apartment mix is distributed to suitable locations within the building.*	Complies. Each typical floorplate contains a varied apartment mix.
4L Ground Floor Apartments	
Objective 4L-1 *Street frontage activity is maximised where ground floor apartments are located.*	Complies. Ground floor apartments have direct access to neighbourhood streets or overlook the communal open area.
Objective 4L-2 *Design of ground floor apartments delivers amenity and safety for residents.*	Complies. Street access is controlled by gates and planting buffers. Passive surveillance of the public domain is also available.
4M Facades	
Objective 4M-1 *Building facades provide visual interest along the street while respecting the character of the local area.*	Complies. Refer to Principle No. 9 within this report.
Objective 4M-2 *Building functions are expressed by the façade.*	Complies.
4N Roof Design	
Objective 4N-1 *Roof treatments are integrated into the building design and positively respond to the street.*	Complies. Planting on roofs provides a 'softening' of the building edge, in addition to providing visual interest from the public domain.
Objective 4N-2 *Opportunities to use roof space for residential accommodation and open space are maximised.*	Complies. Landscaped roofs are visually accessible to apartments above Level 13 and above loading dock and along Lower Ground roof along South-Eastern boundary.
Objective 4N-3	Complies.

ADG CRITERIA	COMPLIANCE
Roof design incorporates sustainability features.	Planting is accommodated at the Level 13 roof to mitigate the urban heat island effect, and PV cells are proposed for the roofs over the Market towers.
4O Landscape Design	
Objective 4O-1 *Landscape design is viable and sustainable.*	Complies. Refer to documentation prepared by Hassell.
Objective 4O-2 *Landscape design contributes to the streetscape and amenity.*	Complies. Refer to documentation prepared by Hassell.
4P Planting on Structures	
Objective 4P-1 *Appropriate soil profiles are provided.*	Complies. Refer to documentation prepared by Hassell.
Objective 4P-2 *Plant growth is optimised with appropriate selection and maintenance.*	Complies. Refer to documentation prepared by Hassell.
Objective 4P-3 *Planting on structures contributes to the quality and amenity of communal and public open spaces.*	Complies. Refer to documentation prepared by Hassell.
4Q Universal Design	
Objective 4Q-1 *Universal design features are included in apartment design to promote flexible housing for all community members.*	Complies. All social housing meets Silver Level standards of Livable Housing Australia Design Guidelines and adaptable apartments are provided within social, affordable and market housing.
Objective 4Q-2 *A variety of apartments with adaptable designs are provided.*	Complies. Refer to Principle No. 8 within this report.
Objective 4Q-3 *Apartment layouts are flexible and accommodate a range of lifestyle needs.*	Complies. Refer to Principle No. 8 within this report.
4R Adaptive Reuse	
Objective 4R-1 *New additions to existing buildings are contemporary and complementary and enhance an area's identity and sense of place.*	Not applicable.
Objective 4R-2 *Adapted buildings provide residential amenity while not precluding future adaptive reuse.*	Not applicable.
4S Mixed Use	

ADG CRITERIA	COMPLIANCE
Objective 4S-1 *Mixed use developments are provided in appropriate locations and provide active street frontages that encourage pedestrian movement.*	Complies.
Objective 4S-2 *Residential levels of the building are integrated within the development, and safety and amenity are maximised for residents.*	Complies.
4T Awnings and Signage	
Objective 4T-1 *Awnings are well located and complement and integrate with the building design.*	Complies.
Objective 4T-2 *Signage responds to the context and desired streetscape character.*	Complies.
4U Energy Efficiency	
Objective 4U-1 *Development incorporates passive environmental design.*	Complies. Refer to Principle No. 4 within this report.
Objective 4U-2 *Development incorporates passive solar design to optimise heat storage in winter and reduce heat transfer in summer.*	Complies. Refer to Principle No. 4 within this report.
Objective 4U-3 *Adequate natural ventilation minimises the need for mechanical ventilation.*	Complies. Adequate natural ventilation is provided to all apartments.
4V Water Management and Conservation	
Objective 4V-1 *Potable water use is minimised.*	Refer to Environment Report prepared by WSP.
Objective 4V-2 *Urban stormwater is treated on site before being discharged to receiving waters.*	Refer to Stormwater and Drainage Assessment prepared by ADW Johnson.
Objective 4V-3 *Flood management systems are integrated into site design.*	Refer to Flood Impact Assessment prepared by BMT WBM.
4W Waste Management	
Objective 4W-1 *Waste storage facilities are designed to minimise impacts on the streetscape, building entry and amenity of residents.*	Complies. Temporary waste rooms are provided at the basement level 3 and a residential bin storage is provided at Lower Ground level adjacent to the loading dock for Council garbage truck collection. Townhouses have their own bin storage areas. Refer to Waste Management plan prepared by Elephants Foot.

ADG CRITERIA	COMPLIANCE
Objective 4W-2 *Domestic waste is minimised by providing safe and convenient source separation and recycling.*	Complies. Waste chutes located conveniently adjacent to lift cores. Refer to Waste Management plan prepared by Elephants Foot.
4X Building Maintenance	
Objective 4X-1 *Building design detail provides protection from weathering.*	Complies. Recesses within the façade, as well as screening and blade walls assist with weather protection.
Objective 4X-2 *Systems and access enable ease of maintenance.*	Complies.
Objective 4X-3 *Material selection reduces ongoing maintenance costs.*	Complies.

APPENDIX B: RESPONSE TO MASTERPLAN DESIGN GUIDELINES

OBJECTIVES	PROVISIONS	RESPONSE
01 North East Development Lots (B1-B2)		
A. To allow for a future pedestrian and cycle connection from Main Street to Peach Tree Avenue. *B. To provide opportunities for solar access to Main Street.*	*1. Lot B1 / B2 should be separated into three discrete buildings.* *2. Building separation should be sufficient width to provide a pedestrian and cycle connection to Peach Tree Avenue.*	Lot C1 is not impacted by this control. The proposed design of Lot C1 does not restrict future lots from complying with this control.
02 Public and Communal Open Space		
A. To retain and enhance the existing publicly accessible open space along Shrimptons Creek corridor. *B. To connect new public spaces to the existing open space network.* *C. To provide an adequate area of communal open space to enhance residential amenity and to provide opportunities for landscaping.*	*1. The Shrimptons Creek Corridor is to be embellished and dedicated to Council as public open space.* *2. A Village Green of 3,300sqm usable area should be provided between Lots C1 and C3. The remainder should be landscaped roof to building C2.* *3. A Forest Playground of 3,900sqm usable area should be provided between Lots D2 and D3.* *4. Publicly accessible open spaces should connect Shrimptons Creek, the Village Green, Town Square and Epping Road landscape corridor.* *5. Each lot should provide a mix of public and communal open space with a combined minimum area equal to 25% of the lot area, except Lots A1 and B3 which are not required to provide public or communal open space.*	Community rooms are provided at the base of Lot C1 at tower 2 adjoining the main street. Approximately 1716sqm is offered as both public and communal open space between the towers. This equates to 28% of the site area.
03 Deep Soil Zones		
A. To retain existing mature trees and support healthy tree growth. *B. To provide passive recreation opportunities.* *C. To promote management of water and air quality.*	*1. The area of deep soil within site, excluding RE1 zoned land, should be no less than 15%.* 2. *Deep soil zones should have a minimum dimension of 6m, except where they abut a side boundary or road reserve which also provides deep soil, where a minimum dimension of 3m is acceptable.*	Lot C1 is unable to achieve deep soil planting within the lot boundary. A precinct-wide approach has been adopted for deep soil planting given the large areas of public domain being delivered in future stages. The proposed design of Lot C1 does not prevent the masterplan from complying with this control.
04 Public Domain Interface		
A. To transition between private and public domain without compromising safety and security. *B. To retain and enhance the amenity of the Shrimptons Creek corridor.* *C. To maximise the amenity of new streets and public open spaces.*	*1. When fronting streets: terraces, balconies and courtyard apartments should have direct street entry, wherever possible.* *2. Apartments, balconies and courtyards fronting the Shrimptons Creek landscape corridor, Epping Road landscape corridor, or Village Green should be physically separated but provide passive surveillance.*	Ground floor apartments are provided with direct street entries. The proposed communal open space has controlled access from the public domain. The setback of the C1 communal open space offers a higher amenity to the public

OBJECTIVES	PROVISIONS	RESPONSE
	3. *Community and retail uses should provide an active frontage to the Village Green.* 4. *Communal open space should be clearly defined and separate from the public domain.*	domain along Main Street, allowing for the introduction of a Neighbourhood Garden.
05 Active Frontages		
A. *To provide active frontages with a distinctive civic character to Main Street.* B. *To ensure that public spaces and streets are activated along their edges.* C. *To maximise street frontage activity where ground floor apartments are located.* D. *To deliver amenity and safety for residents when designing ground floor apartments.*	1. *Buildings A1 and B3 should accommodate a childcare centre at ground level.* 2. *Buildings B2 and C3 should provide community uses at ground level fronting Main Street and the Village Green.* 3. *Building D3 should provide ground level office space for the community housing provider.* 4. *Direct street access should be provided to ground floor apartments.* 5. *Two-storey residential typologies should be considered on street frontages of apartment buildings fronting neighbourhood streets.*	Community rooms are provided along the base of C1 fronting the Town Square. Ground floor apartments are provided with direct street entries. Larger 3 bedroom and townhouse apartments are offered at ground levels activating Neighbourhood streets and providing passive surveillance.
06 Pedestrian and Vehicular Entry Locations		
A. *To provide building entries and pedestrian access that connects to and addresses the public domain.* B. *To provide accessible and easily identifiable building entries and pathways.* C. *To minimise conflicts between vehicles and pedestrians.* D. *To create high quality streetscapes.*	1. *Primary building entries should address the street.* 2. *Vehicle entries should avoid Main Street where possible.* 3. *Internal loading docks will be shared wherever possible to limit the amount of driveways to improve public amenity and streetscapes.* 4. *Loading docks will be used for both garbage collection and move ins / move outs where possible.* 5. *Where internal dedicated loading docks are not possible, on-street loading zones will be discretely located near building entries.*	The entry lobbies to C1 face Main Street to the North and the Neighbourhood Street to the South. Vehicular entries have been located off Neighbourhood Streets to the West and South.
07 Street Wall Height		
A. *To provide buildings that positively contribute to the physical definition of the public domain.* B. *To reduce the scale of buildings as perceived from the public domain.*	1. *On residential streets, buildings should express a 2-4 storey scale on the lowest levels of the building.*	A 2 storey podium expression has been introduced around the base of the C1 towers fronting the public domain. Refer to Principle No. 9 within this report for further detail.
08 Ground Level Street Setbacks		
A. *To provide buildings that positively contribute to the physical definition of the public domain.* B. *To transition between private and public domain without*	1. *On residential streets, the lower levels of buildings can be built to the lot boundary.* 2. *On Main Street, the lower levels of buildings should be setback a*	The standalone terraces fronting Neighbourhood Street have been brought forward towards the lot boundary to the South. Landscaped planting buffers are proposed between

OBJECTIVES	PROVISIONS	RESPONSE
compromising safety and security. C. *To provide a landscape design which contributes to the streetscape and residential amenity.*	*minimum of 2m from the lot boundary on average.* 3. *On residential streets, any setback zone should be landscaped to balance street activation and residential amenity.*	ground floor apartments and the public domain. On average, a 2m setback is maintained facing Main Street.
09 Upper Level Setbacks		
A. *To reduce the scale of buildings as perceived from the public domain.* B. *To minimise the adverse wind impact of down drafts from tall buildings.*	1. *On residential streets, upper floors of buildings should be setback a minimum of 4.75m from the lot boundary* 2. *On Main Street, upper levels of buildings can be built to the lot boundary, subject to building separation requirements of SEPP65.*	Upper floors have an average setback of 5m to the lot boundary to the South and West fronting Neighbourhood Streets. A reduced setback is proposed fronting Main Street to the North, whilst maintaining SEPP65 building separation requirements.
10 Rooftops		
A. *To maximise opportunities to use roof space for residential accommodation and open space.* B. *To incorporate sustainability features into the roof design.* C. *To minimise the visual impact of roof plant.*	1. *Private and communal roof terraces should be provided where possible.* 2. *Roofs that are overlooked by other buildings should provide either communal open space or landscape planting.* 3. *Plant areas should be screened from view.* 4. *Upper level roofs should accommodate solar panels.*	The roof space of Level 13 is utilised as an inaccessible landscaped roof. The landscaping will assist to shield rooftop plant, and mitigate the urban heat island effect. PV cells are proposed on the upper level roofs above the Market towers.
11 Façade Expression and Materials		
A. *To define and reinforce a distinctive character within the masterplan precinct.* B. *To express building functions.* C. *To create buildings which will improve with age.*	1. *The lower levels of residential buildings should use masonry as the predominant façade material.* 2. *White render should be avoided as the primary façade material.* 3. *Façade materials should be self-finished, durable and low maintenance.* 4. *Use of colour in building facades should focus on warm, naturally occurring hues.*	Precast concrete is proposed as the predominant façade material, featuring warm sandstone and pink hues. Refer to Principle No. 9 within this report for further detail.
12 Design Excellence		
A. *To ensure architectural diversity is achieved.* B. *To achieve a high standard of architectural and urban design, materials and detailing appropriate to the building type and location.* C. *To ensure the form and external appearance of the buildings improve the quality and amenity of the public domain.* D. *To ensure buildings meet sustainable design principles in*	1. *Architects should be selected from the Government Architect's 'Pre-qualification Scheme for Strategy and Design Excellence' or collaborate with a pre-qualified Architect.* 2. *No architect can design more than five blocks.* 3. *All detailed development applications should be designed in accordance with the principles of 'Better Placed'.* 4. *Each residential building will be designed to achieve a 5 Star Green Star Design & As Built rating.*	Candalepas Associates is listed under the Government Architect's Pre-Qualification Scheme for Strategy and Design Excellence. The design has been developed in accordance with the principles outlined in 'Better Placed'. The building will achieve a 5 Star Green Star Design & As Built Rating. Refer to

OBJECTIVES	PROVISIONS	RESPONSE
terms of sunlight, natural ventilation, wind, reflectivity, visual and acoustic privacy, safety and security and resource, energy and water efficiency.		Environment Report prepared by WSP for further detail.
13 Universal Design		
A. Universal design features are included in apartment design to promote flexible housing for all community members. *B. A variety of apartments with adaptable designs are provided.*	*1. 100% of social dwellings should incorporate the Livable Housing Guideline's silver level universal design features.* *2. 5% of market and affordable dwellings should be wheelchair adaptable to meet the requirements of AS4299 Class C.*	All social dwellings in C1 meet silver level standard of the Livable Housing Guideline. 5% of market and affordable dwellings are designed to be wheelchair adaptable.

APPENDIX C: RESPONSE TO DESIGN EXCELLENCE REVIEW

As part of the Design Excellence Strategy for the Ivanhoe Estate, an independent Design Review Panel was established to comment on the Stage 1 works.

The following items were identified in relation to Lot C1 through this process. The review panel responded positively to the scheme presented.

ITEM NO.	DESIGN REVIEW PANEL COMMENTS	RESPONSE
Lot C1		
1	*Angelo Candalepas presented the concept of building C1 and the design development process of C1 addressing the challenges of the density, solar and mixed tenures. Angelo also presented how the building design has addressed the Ivanhoe Estate Design Guidelines.*	Note.
2	*The architect has maximised the solar access to the North Western facades by adopting the 9am to 11am solar angle to generate the built form.*	Proposal was received positively by the review panel and will be further developed during the Design Development phase.
3	*Georgia from Hassell has presented the communal open space for building C1 and its interface with C1 building.*	Proposal was received positively by the review panel and will be further developed with Hassell during the Design Development phase.
4	*The panel queried about deep soil zones and the quality of planting in the communal open space. The panel recommended the project team to review the soil depth to allow for trees to mature in the future.*	Mounding has been utilised within the communal open space to ensure adequate soil depths are provided for mature trees. This will be further developed with Hassell during the Design Development phase.
5	*The panel queried the level changes within the communal open space. The panel suggested more definition between the public and private spaces.*	The standalone market terraces have been raised above the surrounding communal open space. Planter boxes have also been used to mediate between public and private open spaces. This will be further developed with Hassell during the Design Development phase.
6	*All attendees commended the architect's choice of the earthy pink colour of C1 façade, the proposed materials palette and façade detailing.*	Proposal was received positively by the review panel and will be further developed during the Design Development phase.
7	*The panel noted that rooftop gardens on Level 13 of the social buildings will not be accessible by residents due to operational preference from Mission Australia Housing and Land and Housing Corporation.*	This approach was accepted by the review panel.
8	*The panel chair queried about bicycle storage and storage cages for all residents. The architect explained that most residents will get a storage cage which doubles up as bicycle storage or they will have separate access to bicycle storage.*	This approach was accepted by the review panel.

Ref: 300001PM BMy/LF

13th November 2020

Frasers Property Australia
Level 2, 1C Homebush Bay Drive
RHODES NSW 2138

Attention: Robert Cauchi

Dear Robert,

RE: IVANHOE ESTATE STAGE 1 DEVELOPMENT APPLICATION
STORMWATER AND DRAINAGE ASSESSMENT ADDENDUM – BUILDING C1

1.0 BACKGROUND

ADW Johnson was previously engaged by the Aspire Consortium, to undertake a Stormwater and Drainage Assessment to accompany a State Significant Development Application (SSDA) for Stage 1 of the Ivanhoe Estate redevelopment.

The original Stormwater and Drainage Assessment (reference 300001-Stormwater and Drainage Assessment - Stage 1 Revision G, dated 5th October 2018) outlined the required stormwater devices to ensure the developments compliance with Ryde City Council's standards and was approved under SSDA 8903. The approved report is attached as **Appendix A** for information.

Throughout the detailed design process a number of changes have been made to the C1 site and Aspire are aiming to lodge a Section 4.55 modification to amend the current consent. This letter has been prepared to outline the impact of the changes on the stormwater controls proposed under the approved report and to outline the changes required to maintain compliance with Ryde Council's Standards. This letter should be read in conjunction with the approved report.

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2.0 PROPOSED CHANGES

As mentioned above, throughout the detailed design process a number of changes have been proposed to the C1 site. A number of these changes will have an impact on the proposed stormwater management system. These changes include:

- Modification of extents of basement levels;
- Modification of eastern lot boundary to accommodate change in basement extents;
- Additional impervious area on the lower ground level where the boundary has been modified;
- Location of the proposed rainwater and OSD tanks;
    - The tanks have been moved to a location to enable additional runoff to be captured.

It should be noted that the higher levels of the building, and specifically the roof outline, has not been amended from the approved design.

The abovementioned changes to the C1 site will have an impact on the stormwater controls outlined within the approved stormwater management plan and therefore updated modelling is required to ensure compliance with Council's requirements.

Drawings outlining the proposed changes to the C1 site can be seen in **Appendix B**.

3.0 STORMWATER QUANTITY

In accordance with Ryde Council's Stormwater Technical Manual, OSD systems are to be designed to ensure that the peak discharge in the **post developed 100 year ARI** storm event does not exceed the peak discharge in the **post developed 5 year ARI** storm event.

The changes outlined within section 2.0 will result in an increase in the peak discharge leaving the site and therefore modelling is required to ensure the proposed tank size remains suitable. The following sections of this report outline the updated modelling.

3.1 Catchment Parameters

In accordance with the approved report, to ensure the runoff generated by the C1 site is accurately calculated the lot has been split into three (3) sub catchments being roof, remaining lot captured and remaining lot not captured.

The sub catchment areas can be seen in **Appendix C** and **Table 1** below.

Table 1. Catchment Areas

CATCHMENT AREA (ha)			
Catchment	**Roof**	**Remaining Lot (Captured)**	**Remaining Lot (Not Captured)**
C1 - Original	0.298	0.224	0.113
C1 - Updated	0.298	0.334	0.037

As mentioned in section 2.0 the location of the tanks have been amended from the approved report to a location that allows additional runoff to be captured.

The remaining catchment parameters adopted for the modelling are consistent with the approved stormwater management plan.

3.2 Detention Modelling

Detention modelling was undertaken using the XP-RAFTS with the abovementioned catchment areas and the parameters outlined within the approved report.

A summary of the modelling results can be seen in **Table 2** below. For ease of comparison **Table 2** includes the results from the original report.

Table 2. RAFTS Results

Catchment	5 Year ARI Flow (m3/s)	100 Year ARI Flow - Without Detention (m3/s)	100 Year ARI Flow - With Detention (m3/s)	Rain Water Tank Size (kL)#	Detention Tank Size (m^3)
C1 - Original	0.182	0.313	0.180	30	100
C1 - Updated	0.218	0.375	0.218	30	115

 # Only a percentage of the actual tank volume was used in the modelling

It can be seen from **Table 2** that the proposed changes to the C1 site have resulted in the required tank size increasing by 15 m^3. The updated tank parameters can be seen in **Table 3** below.

Table 3. Detention Tank Parameters

Detention Tank	Volume (m^3)	Tank Depth (Excluding Emergency Weir*) (m)	Low Flow Orifice (mm)	Weir Length x Height (m)
C1 – Original	100	1.5	225	2m x 0.2m
C1 - Updated	115	1.5	290	2m x 0.2m

Adopting the abovementioned tank parameters will ensure that the C1 site complies with Councils' standards.

4.0 STORMWATER QUALITY

Similar to the stormwater quantity, the proposed changes to the C1 site will have an impact on the required stormwater quality devices and therefore updated modelling is required. The following sections outline the amended stormwater quality modelling.

4.1 Water Quality Modelling

Water quality modelling has been undertaken using the MUSIC modelling software using the catchment areas mentioned in section 3.1 and the parameters outlined within the approved report.

The results of the water quality modelling can be seen in **Table 4** overleaf.

Table 4. MUSIC Modelling Results

	Pollutant Load Reduction			
Catchment	**Gross Pollutants**	**Total Suspended Solids**	**Total Phosphorus**	**Total Nitrogen**
C1 - Original	100.0%	86.5%	65.2%	56.7%
C1 - Updated	100.0%	87.9%	65.9%	53.9%

4.2 Treatment Device Parameters

As per the approved report, stormwater quality modelling was undertaken using a system of rainwater tanks, litter baskets and Stormfilter cartridges. As the roof catchment has not been amended, the rainwater tank parameters adopted for the updated modelling were as per the approved report. The amended Stormfilter parameters can be seen in **Table 5** below.

Table 5. Stormfilter Parameters

	Tank Parameter				
Catchment	**Chamber Surface Area (m²)#**	**Extended Detention Depth (m)**	**Overflow Weir Width (m)**	**Overflow Pipe Diameter (mm)***	**Number of Cartridges**
A1 - Original	8.6	0.77	2	49	5
C1 - Updated	8.5	0.77	2	37	3

***** *Overflow pipe diameter is an equivalent diameter.*
 # It should be noted that the water quality chamber is separate to the rainwater tank and OSD tank volumes.

From **Table 5** above it can be seen that the proposed changes to the C1 site has resulted in a smaller water quality system being required to meet Council's water quality targets. The reduction in the system size can be explained by the modified location of the proposed tank which has now allowed more water to be captured, and therefore treated, than the previous design.

It should be noted that, in addition to the Stormfilter parameters outlined above, litter baskets should be provided within any surface inlet pit within the site.

5.0 POTABLE WATER CONSERVATION

A water balance for each lot was prepared in the original stormwater report to determine the most efficient rainwater tank size for each lot. It is noted that the water balance model is based upon two key parameters being the roof catchment area and the water reuse demand.

The reuse demand in the approved report was based upon an irrigation rate adopted for the sites pervious areas. Given the amendments to the site does not impact on the pervious site areas, and the fact the roof catchment area has not changed, the water balance completed in the approved report is still valid and further modelling is not required.

6.0 CONCLUSION

This letter was provided to assess the impact of the proposed changes to the C1 building site on the stormwater treatment devices adopted in the approved stormwater management plan for The Ivanhoe Estate Stage 1.

It has been found that the proposed building changes will have a minor impact on both the OSD tank and the water quality devices, however both of the proposed systems can be modified to cater for these changes.

We ask that you please do not hesitate to contact the undersigned should you require any additional information, seek clarification on any item or wish to further discuss.

Yours faithfully,

Ben Myles
Civil Engineer
ADW JOHNSON

Appendix A

APPROVED STAGE 1 REPORT

ADW JOHNSON PTY LIMITED
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Engineering

Working Beyond Expectations

Stormwater and Drainage Assessment

To accompany a Development Application for Stage 1 of Ivanhoe Estate - A State Significant Development

Property:
The land currently comprising Ivanhoe Estate, Herring Road, Macquarie Park as well as a portion of Shrimptons Creek and part of Lot 1 in DP 859537

Applicant:
Aspire Consortium on behalf of NSW Land and Housing Corporation

Date:
5th October 2018

adw johnson

Document Control Sheet

Issue No.	Amendment	Date	Prepared By	Checked By
A	DRAFT	23rd January 2018	BMY	IB
B	Modelling Updated	7th March 2018	BMY	IB
C	Appendix C added	16th March 2018	BMY	IB
D	Minor Wording	26th March 2018	BMY	IB
E	Minor Amendments	10th April 2018	BMY	IB
F	Amendments to C1	4th October 2018	BMY	IB
G	Image amended	5th October 2018	BMY	IB

Limitations Statement

This report has been prepared in accordance with and for the purposes outlined in the scope of services agreed between ADW Johnson Pty Ltd and the Client. It has been prepared based on the information supplied by the Client, as well as investigation undertaken by ADW Johnson and the sub-consultants engaged by the Client for the project.

Unless otherwise specified in this report, information and advice received from external parties during the course of this project was not independently verified. However, any such information was, in our opinion, deemed to be current and relevant prior to its use. Whilst all reasonable skill, diligence and care have been taken to provide accurate information and appropriate recommendations, it is not warranted or guaranteed and no responsibility or liability for any information, opinion or commentary contained herein or for any consequences of its use will be accepted by ADW Johnson or by any person involved in the preparation of this assessment and report.

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The Client should be aware that this report does not guarantee the approval of any application by any Council, Government agency or any other regulatory authority.

Executive Summary

This report supports a Development Application for Stage 1 of the Ivanhoe Estate redevelopment, a State Significant Development (SSD) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It has been prepared for Aspire Consortium on behalf of NSW Land and Housing Corporation.

As a part of the Stage 1 development application, a Stormwater and Drainage Assessment of the proposed development is required. This report has undertaken an assessment of the proposed development to determine compliance with the requirements set out in both the Secretary's Environmental Assessment Requirements (SEAR's) and Ryde Council's DCP 2014 in regards to stormwater drainage.

The Stage 1 development application includes lots A1 and C1, along with the public road network for the entire development.

Ryde Council's DCP 2014 requires the development to comply with requirements for onsite detention, water sensitive urban design and flooding. This report considers both the onsite detention and water quality aspects with the flooding impact assessment been done by a third party.

As detailed in the previous submission for the Ivanhoe Estate Masterplan, onsite detention (OSD) and water sensitive urban design (WSUD) requirements only need to apply to areas within the site that are to remain in private ownership. As such, all OSD and WSUD control measures were provided on lot prior to flows entering the public drainage system. A concept drainage plan was developed on this basis and consisted of an on lot private system and a public drainage system located within the proposed public road reserves.

Using the XP-RAFTS software, an onsite detention model was created, using a combination of rainwater tanks and designated detention tanks to attenuate peak flows to meet Council's requirements. It was found that a total of 155m^3 of dedicated detention storage was required, along with 50m^3 of storage within the rainwater tanks to meet the requirements set out by Ryde Council.

A water quality model was created in the MUSIC software to determine the required water quality treatment measures to meet Council's water quality targets. A treatment train of rainwater tanks, gross pollutant traps and media filtration devices was proposed for the development. An analysis of the MUSIC model indicated that the proposed treatment train not only met but exceeded the targets set by Council.

A water balance model was developed to determine the reduction in potable water for each building within Stage 1 of the development. This development proposes to reuse captured stormwater for irrigation and car washing purposes.

Erosion and sedimentation control plans were developed for the likely construction staging, to ensure that during construction, runoff generated on the site was adequately treated prior to it entering the downstream receiving waters. Required temporary stormwater works are also detailed on the erosion and sedimentation control plans. The erosion and sediment control plans will need to be regularly updated to adjust to changes in the proposed development over the life of the project.

The adjoining development to the northwest of the subject site currently drains, under easement, through the site to the existing drainage system within Ivanhoe Place. It was found that the proposed development would impact on this connection, however through the design of building A1, it is shown that a new connection can be provided.

This report shows that from a stormwater management perspective, the proposed development can adequately meet the requirements set out by both Ryde City Council and the SEAR's and as such, should be approved.

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1.0 Introduction

This report supports a Development Application for Stage 1 of the Ivanhoe Estate redevelopment, a State Significant Development (SSD) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It has been prepared for Aspire Consortium on behalf of NSW Land and Housing Corporation.

1.1 BACKGROUND

In September 2015 the Ivanhoe Estate was rezoned by DPE as part of the Macquarie University Station (Herring Road) Priority Precinct, to transform the area into a vibrant centre that benefits from the available transport infrastructure and the precinct's proximity to jobs, retail and education opportunities within the Macquarie Park corridor.

The Ivanhoe Estate is currently owned by NSW Land and Housing Corporation and comprises 259 social housing dwellings. The redevelopment of the Ivanhoe Estate is part of the NSW Government Communities Plus program, which seeks to deliver new communities where social housing blends with private and affordable housing, with good access to transport, employment, improved community facilities and open space.

The Communities Plus program seeks to leverage the expertise and capacity of the private and non-government sectors. As part of this program, Aspire Consortium, comprising Frasers Property Australia and Mission Australia Housing, were selected as the successful proponent to develop the site in July 2017.

In September 2017, DPE issued the Secretary's Environmental Assessment Requirements for a comprehensive Masterplan application that will establish the framework for the staged redevelopment of the site. This Development Application for Stage 1 of the Ivanhoe Estate redevelopment represents the first stage of detailed works pursuant to the Ivanhoe Estate Masterplan.

1.2 SITE DESCRIPTION

The Ivanhoe Estate site is located in Macquarie Park near the corner of Epping Road and Herring Road within the Ryde Local Government Area (LGA). The site is approximately 8.2 hectares and currently accommodates 259 social housing dwellings, comprising a mix of townhouse and four storey apartment buildings set around a cul-de-sac street layout. An aerial photo of the site is provided at **Figure 1** below.

Immediately to the north of the site are a series of four storey residential apartment buildings. On the north-western boundary, the site fronts Herring Road and a lot that is currently occupied by four former student accommodation buildings and is likely to be subject to redevelopment. Epping Road runs along the south-western boundary of the site and Shrimptons Creek, an area of public open space, runs along the south-eastern boundary. Vehicle access to the site is via Herring Road.

Ivanhoe Estate comprised of 17 individual lots owned and managed by the NSW Land and Housing Corporation. The Masterplan site also incorporates adjoining land, being a portion of Shrimptons Creek and part of the commercial site at 2-4 Lyonpark Road. This land is included to facilitate a bridge crossing and road connection to Lyonpark Road.

Figure 1: Ivanhoe Estate Site

1.2.1 Site Topography

The site generally falls from the north western corner, at the intersection of Epping and Herring Roads towards Shrimpton's Creek in the south eastern corner. As indicated in **Figure 2** overleaf, there is approximately 30m of fall across the site at an average grade of 7.5%.

The topography of 2-4 Lyonpark Road is very gentle with the site generally falling towards Shrimpton's Creek at an average slope of 1-2%. This is also indicated in **Figure 2** overleaf.

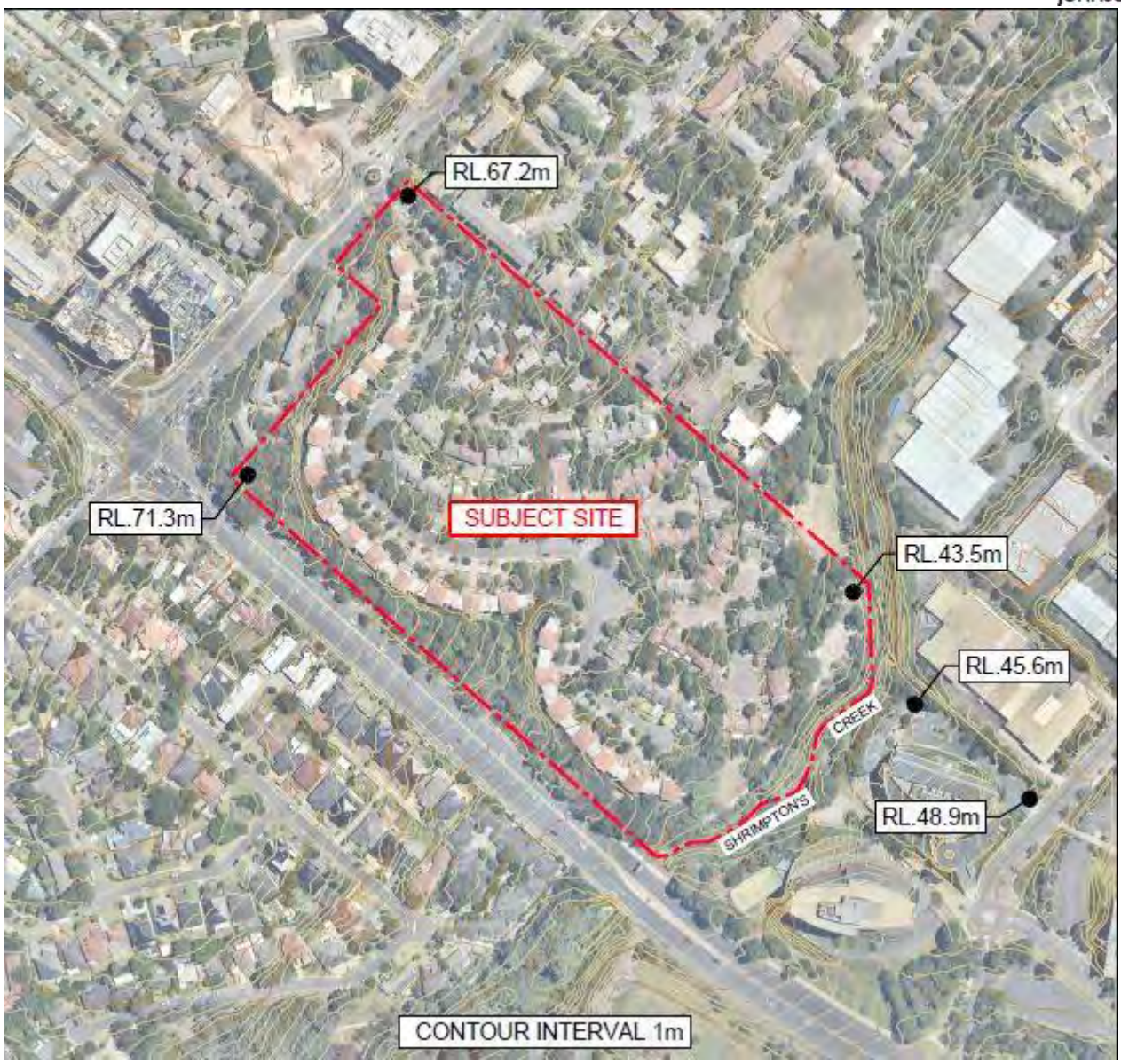


Figure 2: Existing Topography

1.2.2 Existing Stormwater Infrastructure

As mentioned in Section 1.2, the site currently consists of a mix of residential townhouses and apartment buildings set around a cul-de-sac street layout. Street drainage and interallotment drainage infrastructure currently drains runoff generated by the existing development south towards Shrimpton's Creek. There are currently three (3) outlet locations discharging into Shrimpton's Creek.

Prior to construction of the new development, all existing buildings, roads and associated infrastructure are to be demolished. As a part of this, the existing stormwater infrastructure is to be removed, with a new stormwater system to be constructed to cater for the new development.

It is noted that stormwater generated by the existing residential development to the North West of the subject site (Lot 1 D.P 609711) currently drains under easement through the site to the existing drainage system in Ivanhoe Place. Whilst the proposed development will impact on this connection, the design of building A1 has ensured that a connection will remain. This is discussed further in Section 6 of this report.

1.3 PROPOSED DEVELOPMENT

The proposed Stage 1 Development Application seeks consent for the first stage of detailed works within the Ivanhoe Estate, pursuant to the Ivanhoe Estate Masterplan under Section 4.22 of the EP&A Act. The Masterplan establishes the planning and development framework against which this Stage 1 Development Application will be assessed.

The Stage 1 Development Application seeks approval for:

- site preparation works, including tree removal, demolition of roads, services, and earthworks across the Ivanhoe Estate;
- the provision and augmentation of utilities and services infrastructure across the Ivanhoe Estate;
- the construction of all internal roads including public domain within the road reserves, and the bridge crossing and road connection to Lyonpark Road;
- the consolidation of existing lots and subdivision of the Ivanhoe Estate to reflect the revised road layout, open space, and provide superblocks corresponding to the Masterplan;
- the construction and use of Buildings A1 and C1 comprising residential uses (including social housing), a childcare centre, and retail / community spaces.

Despite the stage 1 development application seeking approval for works over the entire estate, it is proposed to deliver the works in accordance with the staging plan identified within the masterplan development application.

An image of the Masterplan, identifying Buildings A1 and C1 and illustrating the road network, is provided at **Figure 3** below.

Figure 3: Ivanhoe Estate Masterplan (Stage 1)

2.0 Authority Requirements

The proposed development is within the Ryde Council LGA and is therefore subject to the requirements of Ryde Council's Development Control Plan (DCP) 2014. Part 8.2 of Council's DCP contains specific information relating to the management of stormwater and contains the following documents:

- Stormwater Management Technical Manual;
- Water Sensitive Urban Design Guideline.

The proposed development is to satisfy the requirements of these documents and the broader Ryde Council DCP.

The development must also comply with the Secretary's Environmental Assessment Requirements (SEARs) provided by the NSW Department of Planning. A summary of the key SEARs requirements relating to this report can be seen below:

- *Prepare a Stormwater, Groundwater and Drainage Assessment;*
- *Detail Erosion, sediment and stormwater management controls during construction;*
- *Identify appropriate water quality management measures;*
- *Identify any water licensing requirements or other approvals;*
- *Prepare and integrated water management plan/drainage concept.*

The development is aiming to achieve a six (6) star Green Star communities rating and as such, is required to meet a number of stormwater objectives that are separate to the requirements of the SEAR's and Ryde Council's DCP 2014. As the Green Star communities rating is applied to the overall development, the requirements do not need to be considered in detail on a stage by stage basis. Details of the proposed measures to achieve the Green Star rating can be found in the Masterplan stormwater report.

2.1 STORMWATER QUANTITY

Ryde Council adopts a major/minor stormwater drainage philosophy for stormwater management throughout the LGA.

The minor drainage system is required to cater for runoff generated from all storm events up to and including the minor storm event without any surcharging within the system and minimising flow widths and ponding within the road carriageway. In accordance with the stormwater technical manual, the minor storm event for an urban residential development is the 20 year ARI storm event.

The road network and dedicated overland flow paths are to be provided to safely convey flows which exceed the capacity of the minor storm event up to and including the 100 year ARI storm event.

2.1.1 Onsite Detention (OSD)

Onsite detention systems are designed to minimise the effect of increased runoff from developments by attenuating peak stormwater flows leaving the site.

In accordance with Ryde Council's Stormwater Technical Manual, OSD systems are to be designed to ensure that the peak discharge in the **post developed 100 year ARI** storm event does not exceed the peak discharge in the **post developed 5 year ARI** storm event.

As outlined in the Stormwater and Drainage Assessment for the Ivanhoe Estate Masterplan development application submission, a meeting was held with Council to discuss the OSD requirements for the proposed development. Council advised that the detention requirements outlined within Ryde Council's Stormwater Technical Manual are only required to apply to the areas within the development that are to remain in private ownership.

Whilst the Stage 1 development application is for approval of the entire road network and lots A1 and C1 all OSD controls are to be applied to and contained within lots A1 and C1.

2.1.2 Shrimpton's Creek

As detailed in the Ivanhoe Estate Masterplan submission, Shrimpton's Creek is a second order watercourse which flows from west to east along the southern boundary of the proposed development site.

Shrimpton's Creek and its catchment has been analysed in the "Macquarie Park Floodplain Risk Management Study and Plan". This flood study, completed in 2011 considers the entire Shrimpton's Creek catchment on a regional scale and provides indicative flood extents within the Creek.

A further Study was undertaken as a part of the Ivanhoe Estate masterplan submission, detailing the impacts of the proposed development on Shrimpton's Creek and the surrounding areas. A copy of this report can be seen in **Appendix A.**

2.2 WATER SENSITIVE URBAN DESIGN

Through the management of potable water, wastewater and stormwater, water sensitive urban design (WSUD) aims to manage the effects of urban development on the water cycle. Ryde Council's "Water Sensitive Urban Design Guidelines" outline the requirements for WSUD within the Ryde LGA. This development aims to not only comply with the requirements set out by Council but exceed them.

2.2.1 Stormwater Quality

In order to comply with the WSUD requirements, the stormwater drainage system must effectively remove nutrients and gross pollutants from the site prior to runoff entering the downstream drainage infrastructure. The stormwater treatment objectives have been taken from the Ryde Council "Water Sensitive Urban Design Guidelines" document and can be seen below in **Table 1**.

Table 1 – Stormwater Treatment Objectives

Pollutant	Treatment Objective
Gross Pollutants	**90%** retention of the average annual load for particles and suspended solids
Suspended Solids	**85%** retention of the average annual load for particles and suspended solids
Total Phosphorus	**65%** retention of average annual pollutant load
Total Nitrogen	**45%** retention of average annual pollutant load

As outlined in the Stormwater and Drainage Assessment for the Ivanhoe Estate Masterplan development application submission, a meeting was held with Council to discuss the WSUD requirements for the proposed development. Council advised that the WSUD requirements outlined within Ryde Council's Stormwater Technical Manual are only required to apply to the areas within the development that are to remain in private ownership.

As with the OSD requirements, whilst the Stage 1 development application is for approval of the entire road network and lots A1 and C1 all WSUD controls are to be applied to and contained within lots A1 and C1.

2.2.2 Potable Water Conservation

The reduction of potable water usage can be achieved for a development through a number of methods, including the reuse of captured stormwater. This report details the requirements for stormwater reuse only, however it is noted that other methods may be used within the development.

Ryde Council requires that a water balance model be prepared to demonstrate how stormwater runoff from the site is reused. It should be noted that for a high-density development, as is proposed, it is extremely difficult to capture enough water to effectively reduce the extremely high potable water demand for internal uses. It has been decided at this stage for captured stormwater to be used for irrigation and car washing purposes only. It should be noted that other methods may be used within the development and these will be explored on a stage by stage basis as required.

This report will provide a water balance model to indicate how the captured stormwater is reused within the development.

3.0 Stormwater Quantity

As discussed in Section 2.0, this report will provide a drainage concept plan for Stage 1 of the Ivanhoe Estate project.

A concept stormwater drainage plan has been prepared to demonstrate how the stormwater runoff generated by the proposed development is captured and safely conveyed to Shrimpton's Creek.

As discussed in the Masterplan report, in order to achieve a six (6) star green star communities rating for the development, it is proposed to provide an end of line rain garden to cater for runoff generated by the public road reserves. It is noted that the Stage 1 development application includes the entire public road network, however as the Green Star requirements only need to be met for the entire development, the rain gardens will not be required in Stage 1. Despite this, in order to allow for the future rain gardens, the appropriate drainage pipework will be included within the Stage 1 development application.

As the Stage 1 development application is for the entire road network, along with lots A1 and C1, the concept stormwater plan has been developed for both the road network and the lots. It is noted however, that as Council do not require the roads to be detained or treated the public road network will not be included in the OSD or WSUD calculations found in this report.

The on lot drainage system has been designed to capture runoff from the lots and private access roads within the site, whilst the public drainage system has been designed to capture runoff generated by the public road network. The public drainage system will convey flows generated by both the lots and the road network to the receiving waters in Shrimpton's Creek.

The private system within the lots will capture and attenuate the flows generated within these lots before discharging to the public system. The private system consists of the following elements:

- Rainwater Tanks – Rainwater tanks will be used to capture and store runoff from roof areas for external reuse within the lots;
- OSD Tanks – OSD tanks will be used to attenuate peak flows before discharging into the public drainage system;
- Surface Drainage – Surface drainage pits will be provided to capture and convey runoff from both hardstand and pervious areas to the OSD tanks.

A plan showing the concept stormwater drainage system for the public road network can be seen in **Exhibit 1,** whilst a concept drainage plan for lots A1 and C1 can be seen in **Exhibit 2**.

3.1 ONSITE DETENTION

In accordance with Ryde Council's Stormwater Technical Manual, OSD systems are to be designed to ensure that the peak discharge in the **post developed 100 year ARI** storm event does not exceed the peak discharge in the **post developed 5 year ARI** storm event.

In accordance with the masterplan submission, it is proposed to use a series of rainwater tanks and dedicated OSD tanks located within the lots and under private roads to adequately attenuate the peak discharges generated by each lot. Runoff generated from the site is conveyed to the proposed tanks via the following systems:

- Roof Areas – Runoff generated from the building roofs is directed via the building hydraulics to rainwater tanks located within the basement of each building. Overflow from these rainwater tanks is then directed to an OSD tank.

  The most efficient rainwater tank sizes for each lot was provided by the building hydraulics engineer. A water balance model was performed on the rainwater tanks to determine the average volume available within the tanks at any given time. The average volume available within the tanks was adopted as available storage in the detention modelling. The water balance model is discussed further in Section 4.2.

- Remaining Lot Areas – Runoff generated from the remaining lot areas is captured in a series of surface drainage pits and conveyed to the detention tanks.

An XP-RAFTS model was created using the parameters outlined in the following sections in order to accurately model the proposed system.

3.1.1 Catchment Parameters

To ensure the runoff generated by each lot is accurately calculated the lots were split into subcatchments to reflect the conveyance systems discussed in Section 3.1 above.

The subcatchments areas were measured directly from the latest design plans for both A1 and C1 and can be seen in **Exhibit 2** and **Table 2** below**.**

Table 2. Catchment Areas

CATCHMENT AREA (ha)			
Catchment	**Roof**	**Remaining Lot (Captured)**	**Remaining Lot (Not Captured)**
A1	0.127	0.141	0.043
C1	0.298	0.224	0.113

In order to produce runoff hydrographs for each catchment, a number of hydrological parameters are required to be input into the XP-RAFTS model. These parameters include:

- Percentage of Impervious Area;
- Manning's 'n' – the Manning's 'n' coefficient is a measure of the surface roughness of a catchment;
- Average Catchment Slope.

The percentage of impervious area, Manning's 'n' and average catchment slopes were all estimated based upon the latest design plans for A1 and C1 respectively.

A summary of the parameters for lots A1 and C1 can be seen below in **Table 3.**

Table 3. Hydrological Parameters

Hydrological Parameter			
Catchment	**Impervious %**	**Manning's 'n'***	**Slope (%)**
A1 – Lot Captured	25%	0.035/0.015	1%
A1 – Lot not Captured	80%	0.035/0.015	10%
A1 – Roof	60%	0.05/0.01	1%
C1 – Lot Captured	40%	0.04/0.015	1%
C1 – Lot not Captured	60%	0.04/0.015	3%
C1 – Roof	60%	0.05/0.01	1%

* Manning's 'n' values are for Pervious/Impervious

3.1.2 Detention Modelling

Detention modelling was undertaken using an XP-RAFTS model in order to determine the size of the proposed detention tanks within lots A1 and C1 to achieve the requirements set out by Council.

Rainwater tanks were used in the model to supplement the storage volume provided by the proposed detention tanks. The rainwater tanks have been modelled to have an orifice 300mm from the top of the tank and as such, only provide a small amount of detention storage. The storage below the orifice does however, buffer the peak discharge generated by the roof catchments to assist in reducing the overall lot peak discharge.

Ryde Council's Stormwater Management Technical Manual indicates that XP-RAFTS models are suitable for use in sizing detention structures, however it is required that the flow rates calculated are checked against another method. In accordance with this, a DRAINS model was set up to provide a check of XP-RAFTS flow rates. A comparison of 5 year and 100 year post developed flows for the A1 and C1 catchments can be seen in **Table 4** below.

Table 4. DRAINS vs RAFTS

	RAFTS (5 Yr ARI) (m^3/s)	DRAINS (5 Yr ARI) (m^3/s)	Difference (%)	RAFTS (100 Yr ARI) (m^3/s)	DRAINS (100 Yr ARI) (m^3/s)	Difference (%)
A1 Roof	0.038	0.039	3%	0.067	0.068	2%
A1 Lot	0.032	0.036	11%	0.06	0.067	11%
C1 Roof	0.086	0.093	7%	0.148	0.159	7%
C1 lot	0.056	0.062	10%	0.1	0.112	11%
Combined	0.21	0.226	7%	0.37	0.4	8%

It can be seen from **Table 4** above that the flows calculated by DRAINS compare well with those calculated by the RAFTS model. The RAFTS model was generally found to produce slightly lower flows than the DRAINS model.

Based on this comparison, it was concluded that the RAFTS model was suitable to use for the detention modelling. The results of the detention modelling can be seen below in **Table 5.**

Table 5. RAFTS Results

Catchment	5 Year ARI Flow (m3/s)	100 Year ARI Flow - Without Detention (m3/s)	100 Year ARI Flow - With Detention (m3/s)	Rain Water Tank Size (kL)#	Detention Tank Size (m^3)
A1	0.087	0.154	0.087	20	55
C1	0.182	0.313	0.180	30	100
Total	0.269	0.467	0.267	50	155

 # Only a percentage of the actual tank volume was used in the modelling

It can be seen from **Table 5** above that, through the use of rainwater tanks and dedicated detention tanks, the post developed 1 in 100 year ARI peak discharges can be adequately attenuated back to the post developed 1 in 5 year ARI peak discharges.

Indicative rainwater and detention tanks for each lot can be seen in **Exhibit 2.** A screenshot of the XP RAFTS model can be seen in **Appendix B**.

3.1.3 Detention Tank Parameters

To ensure the 1 in 100 year ARI peak discharge is attenuated back to the 1 in 5 year ARI peak discharge, discharge control structures have been designed for each tank. Each tank has been designed with a low flow outlet and a high flow weir.

The high flow weir has been designed to cater for the 1 in 100 year ARI peak discharge, however it is an emergency overflow weir only and as such, has been placed above the 1 in 100 year level in the detention tank.

The tank configuration and outlet controls for each tank are summarised below in **Table 6.**

Table 6. Detention Tank Parameters

Detention Tank	Volume (m^3)	Tank Depth (Excluding Emergency Weir*) (m)	Low Flow Orifice (mm)	Weir Length x Height (m)
A1	55	1.5	170	1m x 0.2m
C1	100	1.5	225	2m x 0.2m

** Tank volume is based on a depth of 1.5m. Emergency weir to be placed above this level.*

It should be noted that as the detention tanks are to be incorporated into the basements of the proposed buildings, the final configuration of the tanks will be subject to confirmation by the building hydraulics engineers.

The configuration of the rainwater tanks is discussed in section 4.1.4. An indicative sketch showing two potential tank configurations can be seen in **Appendix C.** It should be noted that these are indicative only and are subject to final design by the building hydraulics engineers.

4.0 Water Sensitive Urban Design

Through the management of potable water, wastewater and stormwater, water sensitive urban design (WSUD) aims to manage the effects of urban development on the water cycle. Ryde Council's "Water Sensitive Urban Design Guidelines" outline the requirements for WSUD within the LGA.

4.1 STORMWATER QUALITY

The proposed stormwater drainage system, as discussed in Section 3 above, will incorporate a number of water quality treatment devices to effectively treat runoff generated by Stage 1 of the development prior to it being discharged to the receiving waters in Shrimpton's Creek.

As discussed in Section 2.2.1, water quality devices are only required to treat runoff generated by the proposed lots. As such, all water quality devices will be provided within the lots to treat runoff prior to it discharging to the public drainage network.

It is noted that an end of line rain garden will be provided at a future stage in order to meet the requirements of the Green Star communities' guidelines.

4.1.1 Treatment Devices

It is proposed to use a combination of at source and conveyance controls to treat the runoff prior to it entering the public drainage system. The proposed treatment train has been modelled in the water quality software "Model for Urban Stormwater Improvement Conceptualisation" (MUSIC) to demonstrate compliance with Council's treatment targets.

The following devices are proposed within the development to achieve the required targets:

Rainwater Tanks

Rainwater tanks are proposed within each building to capture and store runoff generated from the roof area for reuse. Each rainwater tank will be fitted with a first flush system to provide pretreatment prior to runoff entering the tanks.

Gross Pollutant Traps

It is proposed to provide Stormwater 360 "Enviropods" or Council approved equivalent litter traps in all grated surface inlet pits within the private stormwater system to capture gross pollutants and coarse sediments. Further details of the Stormwater 360 "Enviropod" can be seen in **Appendix D.**

Media Filtration

It is proposed to provide Stormwater 360 'Stormfilter" or council approved equivalent system. The "Stormfilter" is a proprietary media filtration device consisting of multiple cartridges that will be housed within the proposed OSD tanks. Further details of the "Stormfilter" cartridges can be seen in **Appendix D.**

As all of the proposed treatment devices are to be provided within the private lots, maintenance of all devices will be the lot owners and as such no maintenance burden is placed on council. Details of the required maintenance of the system will be provided at the CC stage of the development.

A graphical representation of the treatment train can be seen in **Figure 4** below.

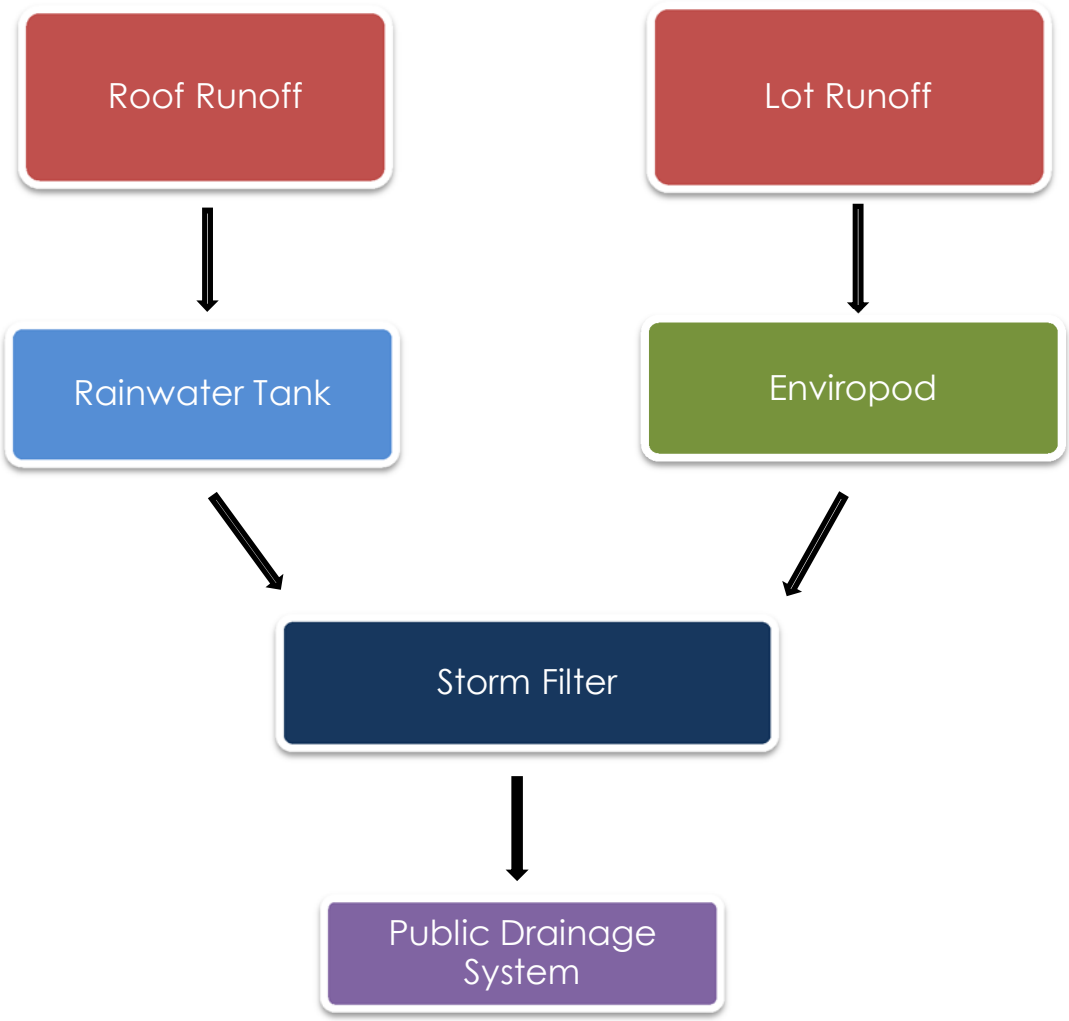


Figure 4: Proposed Treatment Train

4.1.2 MUSIC Parameters

The MUSIC model was set up in accordance with the "Using MUSIC in Sydney's Drinking Water Catchment" guidelines and Ryde Council's "Water Sensitive Urban Design Guidelines".

Catchment areas for the MUSIC modelling were adopted to correspond with those used within the detention model. Similar to the detention model, the overall catchments were broken down into smaller subcatchments in order to accurately determine the pollutant loads.

A summary of the catchment areas and parameters can be seen in Tables 2 and 3 in Section 3.1.1 above.

4.1.3 Water Quality Modelling

The MUSIC model was created using the parameters outlined above to determine compliance with council's water quality targets. The results of the water quality modelling can be seen in **Table 7** below.

Table 7. MUSIC Modelling Results

	Pollutant Load Reduction			
Catchment	**Gross Pollutants**	**Total Suspended Solids**	**Total Phosphorus**	**Total Nitrogen**
A1	100.0%	86.8%	67.1%	59.6%
C1	100.0%	86.5%	65.2%	56.7%

From **Table 7** above, it can be seen that the proposed treatment train of rainwater tanks, gross pollutant traps and media filtration devices not only meets, but exceeds the targets set by Council.

A screenshot of the MUSIC model can be seen in **Appendix E** whilst further details of the proposed treatment devices can be seen in section 4.1.4 below.

4.1.4 Treatment Device Parameters

The A1 and C1 catchments, as described in Section 3.1.1 above, have different characteristics and as such, require different configurations of the proposed treatment devices.

The treatment devices modelled for each catchment were chosen to achieve the required targets whilst also providing the most efficient solution for each catchment. The treatment device parameters for the rain water tanks and stormfilters can be seen below in **Tables 8 & 9,** whilst each catchment is to have Enviropods in all surface drainage pits.

Table 8. Rain water Tank Parameters

	Tank Parameter			
Catchment	**Volume (kL)**	**Surface Area (m^2)**	**Depth Above Overflow (m)**	**Overflow Pipe Diameter (mm)***
A1	20	13	0.3	270
C1	30	20	0.3	400

***** *Overflow pipe diameter is an equivalent diameter.*

Table 9. Stormfilter Parameters

	Tank Parameter				
Catchment	**Chamber Surface Area (m^2)**	**Extended Detention Depth (m)**	**Overflow Weir Width (m)**	**Overflow Pipe Diameter (mm)***	**Number of Cartridges**
A1	8.6	0.77	2	49	2
C1	8.6	0.77	2	49	5

***** *Overflow pipe diameter is an equivalent diameter.*

A sketch showing two potential tank configurations can be seen in **Appendix C.**

4.2 POTABLE WATER CONSERVATION

The reduction of potable water usage can be achieved for a development through a number of methods, including the reuse of captured stormwater. This report considers stormwater reuse only, however it is noted that other methods may be used throughout the development.

A water balance model was prepared for Stage 1 to determine the reduction in potable water consumption achieved through the reuse of stormwater captured within the rainwater tanks for irrigation purposes. Whilst the development will ultimately use captured stormwater for both irrigation and car washing purposes, the water balance model will only consider irrigation as the demand for car washing is unknown at this stage.

4.2.1 Water Balance Model Parameters

To accurately determine the potable water reduction for the development, a daily water balance model was set up for each individual building. In order to create the water balance model, the following parameters were required for each building:

- Catchment Area – As with the detention and water quality models, it was assumed that 50% of the roof catchment is a rooftop garden. Due to the expected low runoff from the rooftop garden (in the order of 4-5 l/s in the 1 year ARI event), it has been assumed for the water balance model that only 50% of the roof catchment reaches the tank.

- Water Demand – To determine the amount of water used each day within the lots a water demand is required. An irrigation rate for each catchment was provided by the landscape architects. A demand of **10,200 l/day** was adopted for catchment A1, whilst a demand of **15,400 l/day** was adopted for catchment C1.

- Daily Rainfall – To ensure consistency between models, the same rainfall data adopted within the MUSIC model was adopted for the water balance model.

The most efficient rainwater tank size for each lot was provided by the building hydraulics engineers and combined with the above parameters were used to perform a water balance model. The results of the water balance model can be seen in **Table 10** below.

Table 10. Water Balance Model Results

Block	Tank Size (kL)	Reduction in Potable Water *	Average Volume Available in tank (kL)#
A1	20	16.6%	17.2
C1	30	21.6%	24.0

***** *Reduction in potable water used for irrigation purposes only.*
#The average volume available in the tank was adopted in the OSD modelling as available storage.

It should be noted that reduction in potable water demand in **Table 10** above is for irrigation purposes only and does not consider car washing or internal building uses.

Table 10 also indicates that the average volume (empty space) available within the tanks. These volumes have been adopted within the OSD model as described in Section 3.1.2

5.0 Erosion and Sedimentation Control

Erosion and sedimentation control are an important part of any development to ensure downstream receiving waters are not adversely affected during construction.

The Stage 1 development application is for the entire public road network, along with lots A1 and C1, however it is likely that construction of the road network will be split into multiple stages.

As such, to ensure that there are no impacts to the downstream receiving waters at any stage during construction, detailed erosion and sediment control plans have been prepared for the likely construction staging of the development.

As the likely construction staging starts at the upstream end of the sites catchment, temporary stormwater works will be required to convey flows to the receiving waters in Shrimpton's Creek.

The likely construction staging can be seen in **Exhibit 3**, whilst the erosion and sediment control plans and required temporary works can be seen in **Exhibits 4-6**.

It should be noted that the erosion and sediment control plans contained within this report are provided as an indicative plan only and all erosion and sediment controls should be constantly updated during construction to ensure adequate protection is provided at all times.

6.0 Adjoining Development Drainage

As mentioned in Section 1.2.2, the existing development to the northwest of the site (Lot 1 D.P 609711) currently drains under easement through the proposed development site to the existing drainage system in Ivanhoe Place. The location of the existing stormwater line can be seen in **Figure 7** below.

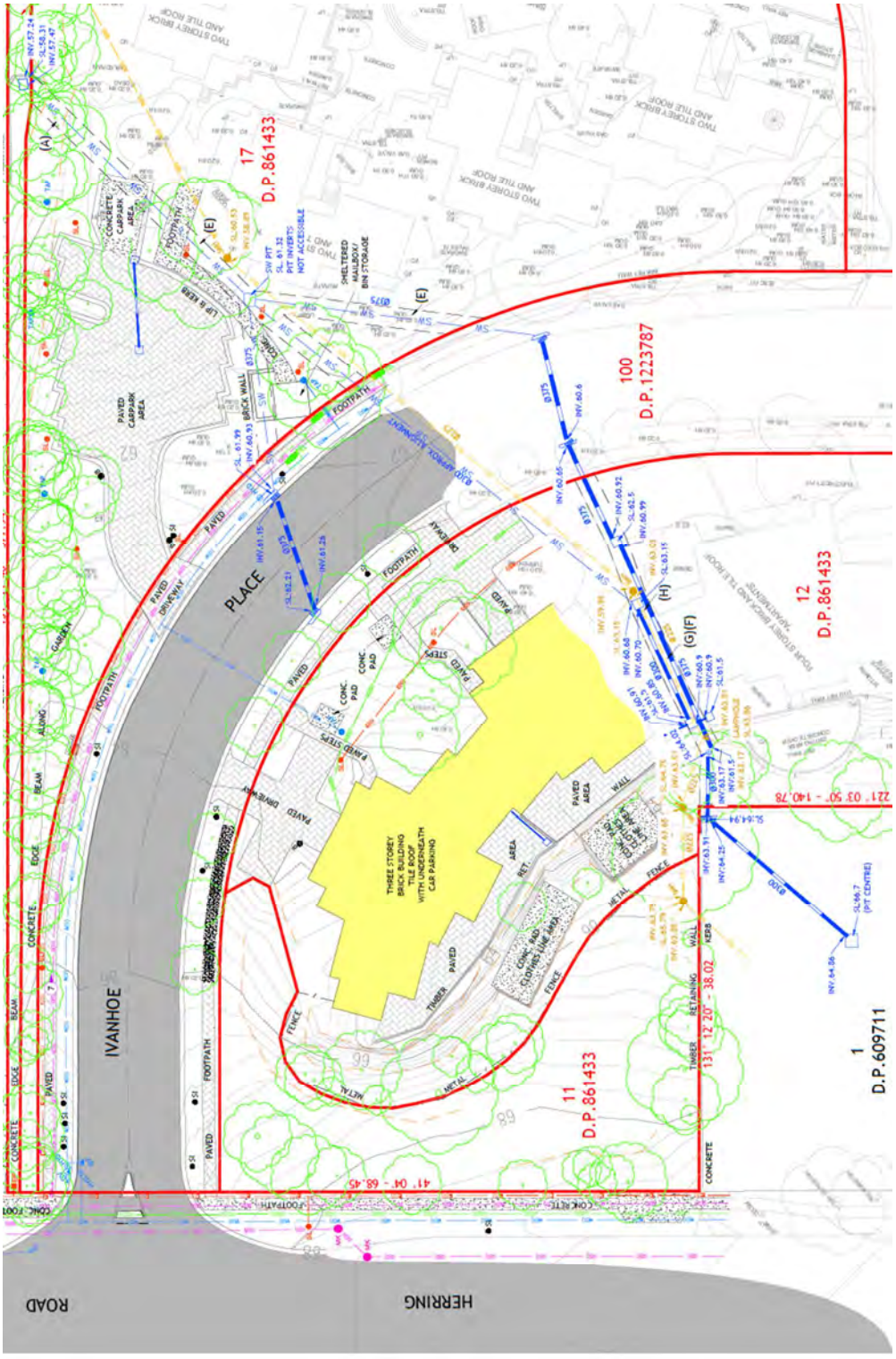


Figure 7: Adjoining Development Drainage

It can be seen from **Figure 7** that the adjoining site is currently drained via a 375mm dia stormwater pipe under the existing buildings and into the drainage system within the existing Ivanhoe Place. It is noted that Ivanhoe Place was never dedicated as public road and therefore the easement benefitting lot 1 DP 609711 does not extend to an existing public drainage system.

Based upon the proposed location and levels of building A1, it was found that the existing drainage infrastructure will need to be removed as a part of the proposed development.

In order to allow Lot 1 D.P. 609711 to continue to drain through Ivanhoe Estate, it is proposed to provide a piped stormwater system through the basement of building A1. This pipe system will drain through the basement of A1 and connect into the public drainage network located within the proposed road reserve.

This pipe system will be designed to cater for the 1 in 100 year ARI storm event, with an overland flow path to be provided on the podium level of building A1 to cater for emergency overland flows.

The final configuration of the proposed piped connection and overland flow path is subject to negotiation with the adjoining landowner and as such final details of the proposed system will be provided at the CC stage of the development.

Whilst final details are unavailable at this time, it is noted that a connection **will** be provided and as such, this issue will not pose a constraint to the development.

7.0 Groundwater Assessment

A groundwater assessment of the subject site has been undertaken by Douglas Partners and is detailed within their report.

8.0 Water Licensing Requirements and Other Approvals

Potable water for use within the site will be provided via the Sydney Water Corporation's existing carrier water mains, with this being supplemented by captured stormwater for reuse within buildings. No other permanent water sources are proposed to be utilised by the development and accordingly an ongoing water license for the site is not required.

Based upon the results of the geotechnical testing, it is likely that groundwater will be encountered in basement excavations and therefore dewatering will be required. The appropriate dewatering licenses will be obtained prior to construction commencing.

9.0 Conclusion

This report supports a Development Application for Stage 1 of the Ivanhoe Estate redevelopment, a State Significant Development (SSD) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It has been prepared for Aspire Consortium on behalf of NSW Land and Housing Corporation.

This report considered the stormwater drainage aspects of the proposed development, with specific focus on onsite detention and Water Sensitive Urban Design. Flood modelling within the adjacent Shrimpton's Creek was considered in a separate report.

In accordance with the Stormwater and Drainage Assessment for the Ivanhoe Estate Masterplan, OSD and WSUD requirements outlined within Ryde Council's Stormwater Technical Manual would only apply to the areas within the development that are to remain in private ownership. A concept drainage plan was developed on this basis and consisted of an on lot private system and a public drainage system located within the proposed public road reserves.

Through the use of rainwater tanks and dedicated detention tanks, it was shown that the private stormwater system could adequately attenuate peak flows generated by the proposed development and comply with the OSD requirements set out by Ryde Council. Similarly, through the use of rainwater tanks, gross pollutant traps and filtration devices, it was shown that the proposed development complies with the WSUD requirements set by Council.

In accordance with Council's requirements, a water balance model was developed to demonstrate how captured stormwater was reused within the site to reduce the demand on potable water. Whilst the development proposes to reuse captured stormwater for both irrigation and car washing purposes, only irrigation has been considered in the water balance model due to the car washing demand being unknown at this stage.

An erosion and sedimentation control plan was developed for the likely construction staging to ensure that during construction runoff generated on the site was adequately treated prior to it entering the downstream receiving waters. This plan will be regularly updated to adjust to changes in the proposed development over the life of the project.

The adjoining development to the northwest of the subject site currently drains, under easement, through the site to the existing drainage system in Ivanhoe Place. It was found that based upon the proposed location and level of building A1 that this connection would need to be removed. A new piped connection is to be provided through the basement of building A1 with an emergency overland flow path being provided on the podium level.

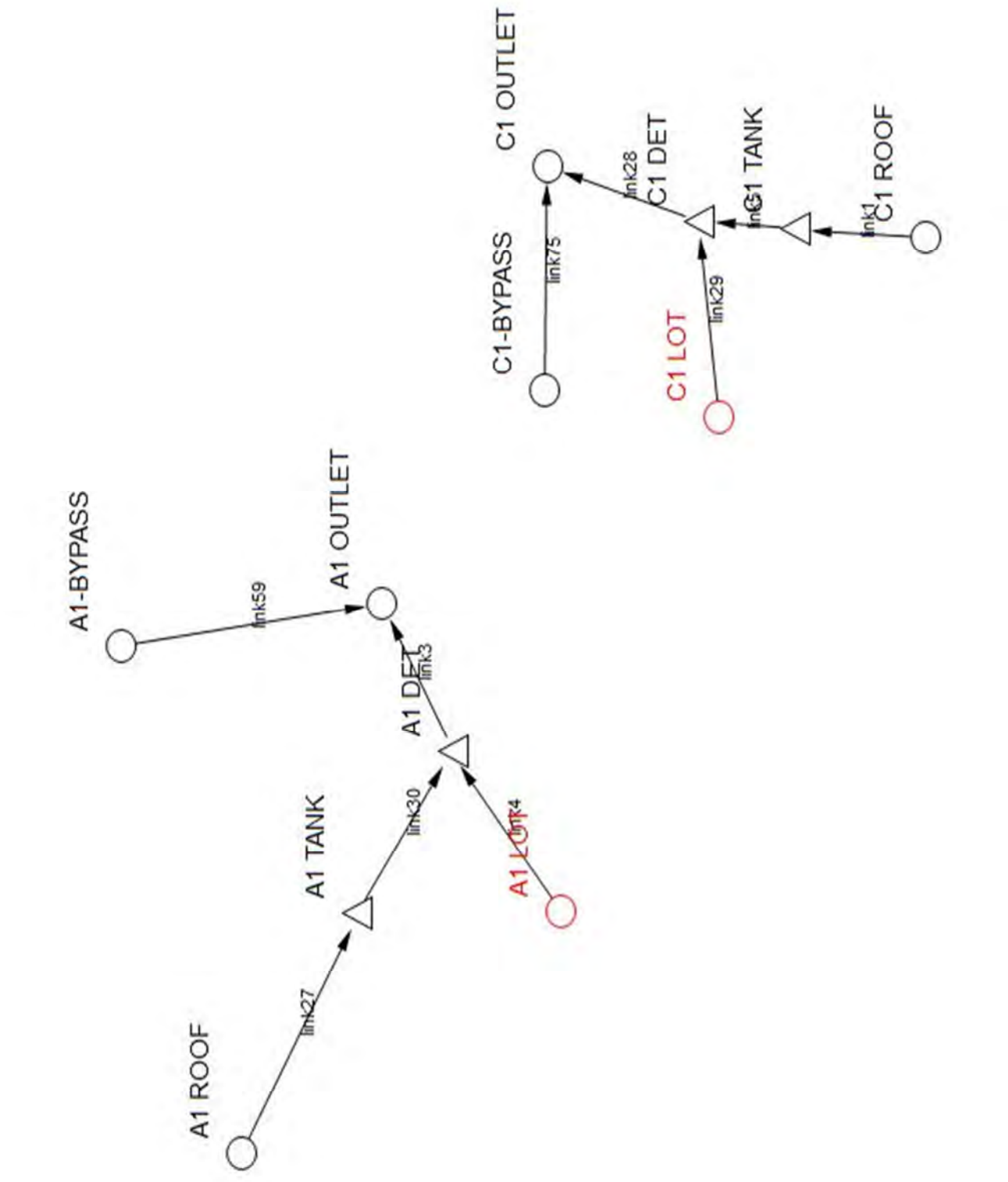
This report shows that from a stormwater management perspective, the proposed development can adequately meet the requirements set out by both Ryde City Council and the SEAR's and as such should be approved.

Appendix A

BMT WBM FLOODING REPORT

Appendix B

XP-RAFTS MODEL

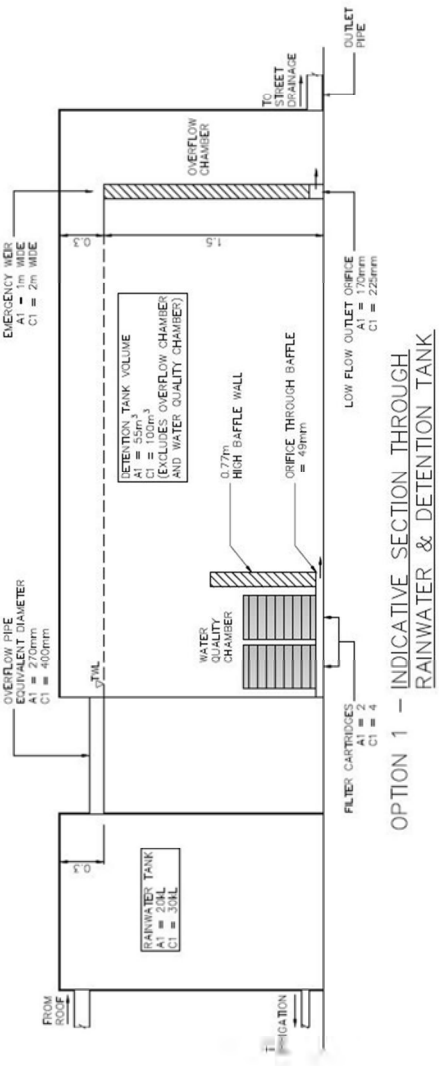


Appendix C

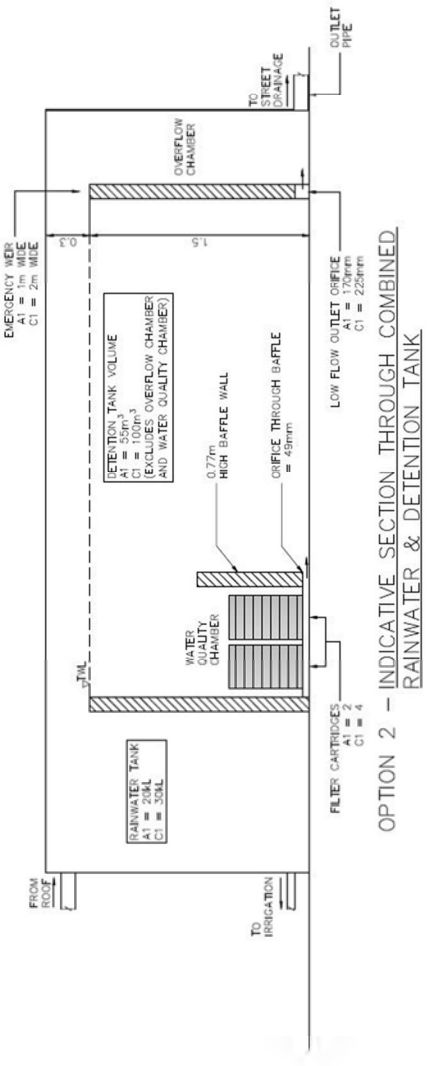
TANK DETAILS

NOTES:-

1. TANK DESIGNS ARE INDICATIVE ONLY AND ARE SUBJECT TO DETAILED DESIGN.
2. FINAL TANK CONFIGURATION SUBJECT TO BUILDING HYDRAULICS AND ARCHITECTURAL DESIGN.
3. OUTLET TO STREET DRAINAGE MAY BE PUMPED OR DRAINED VIA GRAVITY.
4. REFER TO STORMWATER 360 BROCHURE FOR STORMFILTER DETAILS



OPTION 1 – INDICATIVE SECTION THROUGH RAINWATER & DETENTION TANK



OPTION 2 – INDICATIVE SECTION THROUGH COMBINED RAINWATER & DETENTION TANK

Appendix D

STORMWATER 360 INFORMATION

EnviroPod®

Cost-effective, easily maintained gullypit insert

The EnviroPod is a proven gullypit insert that's been designed for easy retrofitting into new and existing stormwater gullypits, requiring no construction or land take. It removes a significant portion of sediment, litter, debris and other pollutants from water entering the stormwater system, and can be installed in either kerb inlet, standard pre-cast gullypits or manhole gullypits. Using low-cost passive screening and optional oil-adsorbent media, the EnviroPod can be customised to meet site-specific requirements with interchangeable polyester mesh screens ranging from 200 to 1600 micron pore size. Unless specified otherwise, 1600 micron filter mesh screening bags are supplied as standard.

> "Designed for easy fit into new or existing gully pits, the EviroPod® is a simple and effective solution for preventing gross pollutants from entering the stormwater system.

The EnviroPod is also effective as a pre-treatment device for use in a treatment train with hydrodynamic separators, filtration devices, ponds and wetlands. In many cases, it is often the most practical solution for retrofits.

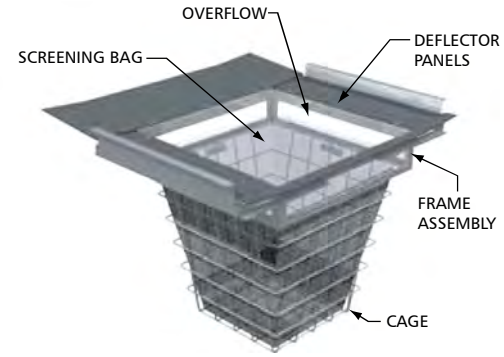
Independently trialled and tested by city councils throughout Australia and New Zealand, and with installation of over 15,000 units including North America, the EnviroPod filter is the premier gully pit insert.

How does it work?

As stormwater enters a storm grate or gullypit, it passes over the oil adsorbent pillows (optional) and into the screening bag. Litter, debris, and other pollutants larger than the screening bag aperture are captured and retained, while the oil adsorbent pillows reduce oil and grease. If the screening bag is full, or during high flows, overflow is released through the overflow apertures in the frame assembly.

Design and operation

The EnviroPod consists of a screening bag supported by a filter box and structural cage. Modular plastic deflector panels attach to the filter box and guide the flow of water to the screening bag. The screening bag captures pollutants and allows the water to pass through to the outlet pipe. Optional absorbent material inside the screening bag captures oil and grease. Openings in the filter box allow water to bypass the screening bag during high flow conditions to prevent surface flooding.



Capabilities

- Captures sediment, litter, debris and other pollutants before they enter the drainage system
- Fits a range of gullypit sizes – ideal for retrofits
- Easy access – maintenance friendly design, generally no confined space entry required
- Bypasses high flows with no moveable parts
- Adjustable panels allow fine-tuning during installation for a perfect fit

Configurations

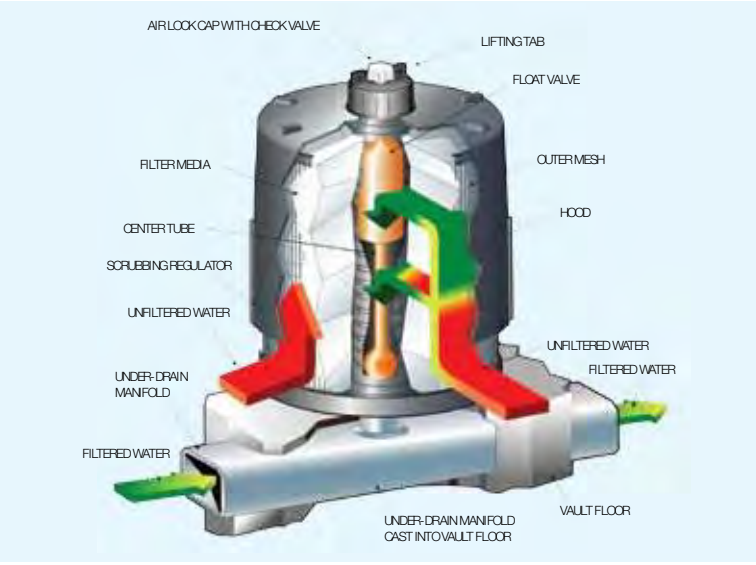
The kerb entry EnviroPod is inserted through the pit access cover and is supported by aluminium arms fixed to the kerb channel/pit wall.

The Drop-In EnviroPod is designed to simply insert into the gullypit below the grate, again supported by aluminium arms fixed to the kerb channel/wall pit. Plastic deflector panels seal against the pit walls and direct flow into the filter box and through the mesh screens. There are two standard sizes to fit most pre-cast regular and kerb entry gullypits. Custom designs can be fabricated for non-standard pits.

Installation, inspection and maintenance

Traffic control must be well planned when installing, inspecting or maintaining EnviroPod Filters. All standard rules and regulations governing traffic control and safety while working on the road must be rigidly followed at all times. All potential hazards must be identified and control methods put in place prior to installing, inspecting or maintaining filters.

The Stormwater Management StormFilter



Removing the most challenging target pollutants

The Stormwater Management StormFilter is a best management practice (BMP) designed to meet stringent regulatory requirements. It removes the most challenging target pollutants – including fine solids, soluble heavy metals, oil, and total nutrients (inc. soluble) – using a variety of media. For more than two decades, StormFilter has helped clients meet their regulatory needs and through product enhancements the design continues to be refined for ease of use.

Why StormFilter is the best filter available

Superior hydraulics

- External bypass – protects treatment chamber from high flows and ensures captured pollutants are not lost during low frequency, high intensity storm events
- Multiple cartridge heights – minimises head loss to fit within the hydraulic grade line and shrink system size, reducing installation costs
- Multiple StormFilter configurations in use across the country

Reliable longevity

- One-of-a-kind self-cleaning hood – prevents surface blinding, ensures use of all media, and prolongs cartridge life
- Customised maintenance cycles – fewer maintenance events compared to similar products, which reduces costs over the lifetime of the system
- 12 years of maintenance experience – predictable long-term performance comes standard

Proven performance

- Only filter on the Australian market tested within Australia achieving best practice guidelines, for TSS, TP and TN
- Qualifies for a minimum 2 EMI 5 Green star credits
- Achieve water quality goals with confidence – easy approval speeds development assessment process
- 8th generation product – design refined and perfected over two decades of research and experience

Maximising your land use and development profitability

StormFilter systems are utilised in below ground systems. The advantages this offers over above ground systems includes:

- Land space saving that enable an increase in development density and reduce sprawl
- The potential to add car parking, increase building size, and develop out parcels

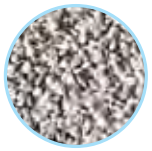
In addition, StormFilter's compact design reduces construction and installation costs by limiting excavation.

Media options

Our filtration products can be customised using different filter media to target site-specific pollutants. A combination of media is often recommended to maximise pollutant removal effectiveness.

PhosphoSorb™ is a lightweight media built from a Perlite-base that removes total phosphorus (TP) by adsorbing dissolved-P and filtering particulate-P simultaneously.

Perlite is naturally occurring puffed volcanic ash. Effective for removing TSS, oil and grease.



Zeolite is a naturally occurring mineral used to remove soluble metals, ammonium and some organics.

GAC (Granular Activated Carbon) has a micro-porous structure with an extensive surface area to provide high levels of adsorption. It is primarily used to remove oil and grease and organics such as PAHs and phthalates.

	PhosphoSorb	Perlite	ZPG	Zeolite	GAC
Sediments	•	•	•		
Oil and Grease	•	•	•		
Soluble Metals	•		•	•	
Organics			•	•	•
Nutrients	•	•	•	•	•
Total Phosphorus	•		•		

Note: Indicated media are most effective for associated pollutant type. Other media may treat pollutants, but to a lesser degree.

ZPG™ media, a proprietary blend of zeolite, perlite, and GAC.

Cartridge options

With multiple cartridge heights available, you now have a choice when fitting a StormFilter system onto your site.

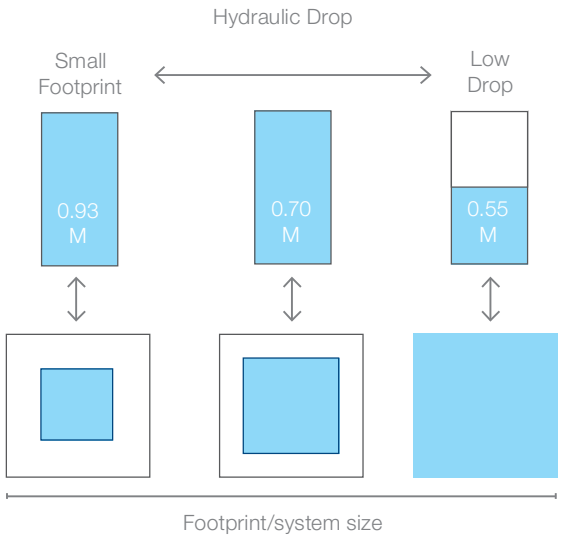
The 69cm cartridge provides 50% more treatment than the previously standard 46cm cartridge, which enables you to meet the same treatment standards with fewer cartridges, and via a smaller system.

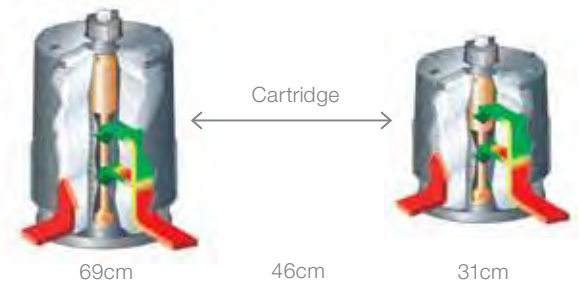
If you are limited by hydraulic constraints, the low drop cartridge provides filtration treatment with only 0.55m of headloss.

Cartridge flow rates

Cartridge Type	Hydraulic Drop	Treatment Capacity (l/sec)	
		0.7 l/s/m²	1.4 l/s/m²
StormFilter 69cm	0.93 m	0.71	1.42
StormFilter 46cm	0.70 m	0.47	0.95
StormFilter Low Drop	0.55 m	0.32	0.63

Selecting cartridge height





Configurations and applications

The StormFilter technology can be configured to meet your unique site requirements. Here are a few of the most common configurations, however many other configurations are available. A Stormwater360 engineer can assist you evaluate the best options for your site or you can find out more by downloading the StormFilter Configuration Guide from www.stormwater360.com.au

Upstream treatment configurations

The following suite of StormFilter configurations are easily incorporated on sites where WSUD is recommended. These low-cost, low-drop, point-of-entry systems also work well when you have a compact drainage area.

GullyPit StormFilter

Combines a gullypit, a high flow bypass device, and a StormFilter cartridge in one shallow structure.

- Treats sheet flow
- Uses drop from the inlet grate to the conveyance pipe to drive the passive filtration cartridge
- No confined space required for maintenance

Gully inlet

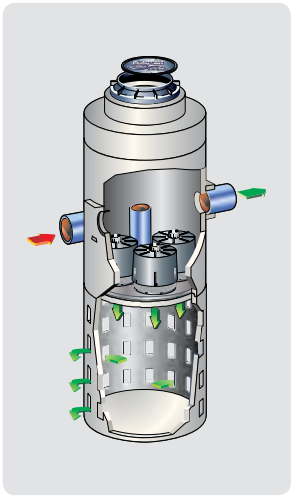
- Accommodates kerb inlet openings from 900 to 3000mm long
- Uses drop from the kerb inlet to the conveyance pipe to drive the passive filtration cartridges

Linear grate

- Can be designed to meet volume based sizing requirements
- Can be installed in place of and similar to a typical gullypit
- No confined space entry required for maintenance
- Accommodates up to 29 StormFilter cartridges

Infiltration/retrofit configuration infiltration

- Provides treatment and infiltration in one structure
- Available for new construction and retrofit applications
- Easy to install
- Re-charge groundwater and reduces run-off



Roof runoff treatment configuration

Down pipe

- Easily integrated into existing gutter systems to treat pollution from rooftop runoff
- Fits most downpipe configurations and sizes; single or dual-cartridge models available
- Treats up to 1300m^2 of rooftop area per dual-cartridge system

Downstream treatment configurations

Conventional stormwater treatment involves collecting, conveying and treating stormwater runoff with an end-of-pipe treatment system before discharging off-site. StormFilter configurations suitable for these applications are listed below and can be engineered to treat a wide range of flows.

Peak diversion

- Provides off-line bypass and treatment in one structure
- Eliminates material and installation cost of additional structures to bypass peak flows
- Reduces the overall footprint of the treatment system, avoiding utility and right-of-way conflicts
- Internal weir allows high peak flows with low hydraulic head losses
- Accommodates large inlet and outlet pipes (up to 900mm) for high flow applications

Vault / manhole

- Treats small to medium sized sites
- Simple installation – arrives on-site fully assembled
- May require off-line bypass structure

High flow

- Treats flows from large sites
- Consists of large, precast components designed for easy assembly on-site
- Configurations available, include, Panel Vault and Cast-In-Place

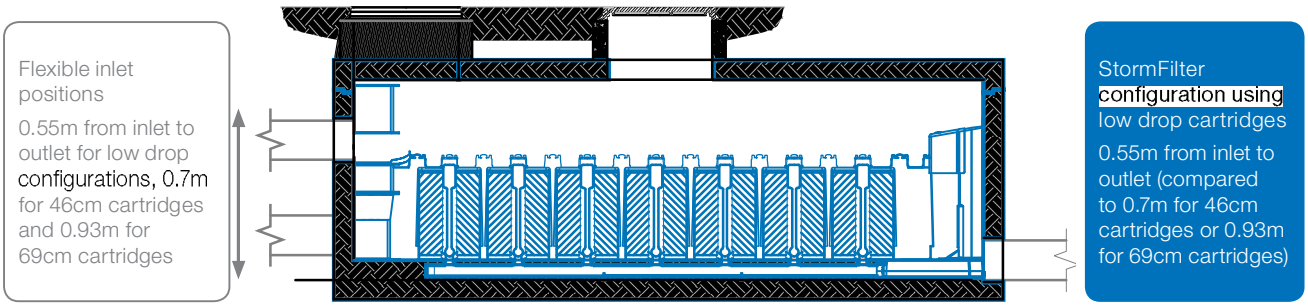
Volume

- Meets volume-based stormwater treatment regulations
- Captures and treats specific water quality volume (WQv)
- Provides treatment and controls the discharge rate
- Can be designed to capture all, or a portion, of the WQv

Filtration for low drop sites

Designing for limited drop

In some cases, site constraints limit the hydraulic drop that is available to drive the passive filtration cartridges. Following are a variety of solutions to either create the required drop or work around the limited drop without impacting the performance of the system.



Solutions for Low Drop Sites

Site modfications

Reduce pipe slope

Use an alternate pipe material with a lower Manning's n value for a portion of the site and reduce the pipe slope.

Reduce pipe cover

Use controlled density fill (CDF) at the front-end of the conveyance system to minimise pipe cover and raise the conveyance system. CDF, a method of pouring concrete with fine aggregate (sand vs. gravel) around pipe, allows the use of most pipe materials with limited cover.

Drain inlet treatment

Substitute several shallow inlet configurations for the single end-of-pipe system. Shallow options include the Catchpit/Gullypit StormFilter, CurbInlet StormFilter, Manhole StormFilter and the Linear StormFilter. These systems still require the normal drop (0.7m for 46cm cartridges) but utilise the drop into the conveyance system to drive the cartridges.

Provide pumping system

Stormwater360 offers the Integrated Pumping System (IPS), which can be designed in tandem with filtration system sizing.

Treatment system modfications

Use low drop cartridges

The StormFilter can be configured with low drop cartridges that activate at 31cm, reducing the overall head loss to only 0.55m, compared to 0.7m for the 46cm cartridge or 0.93m for the 69cm cartridge.

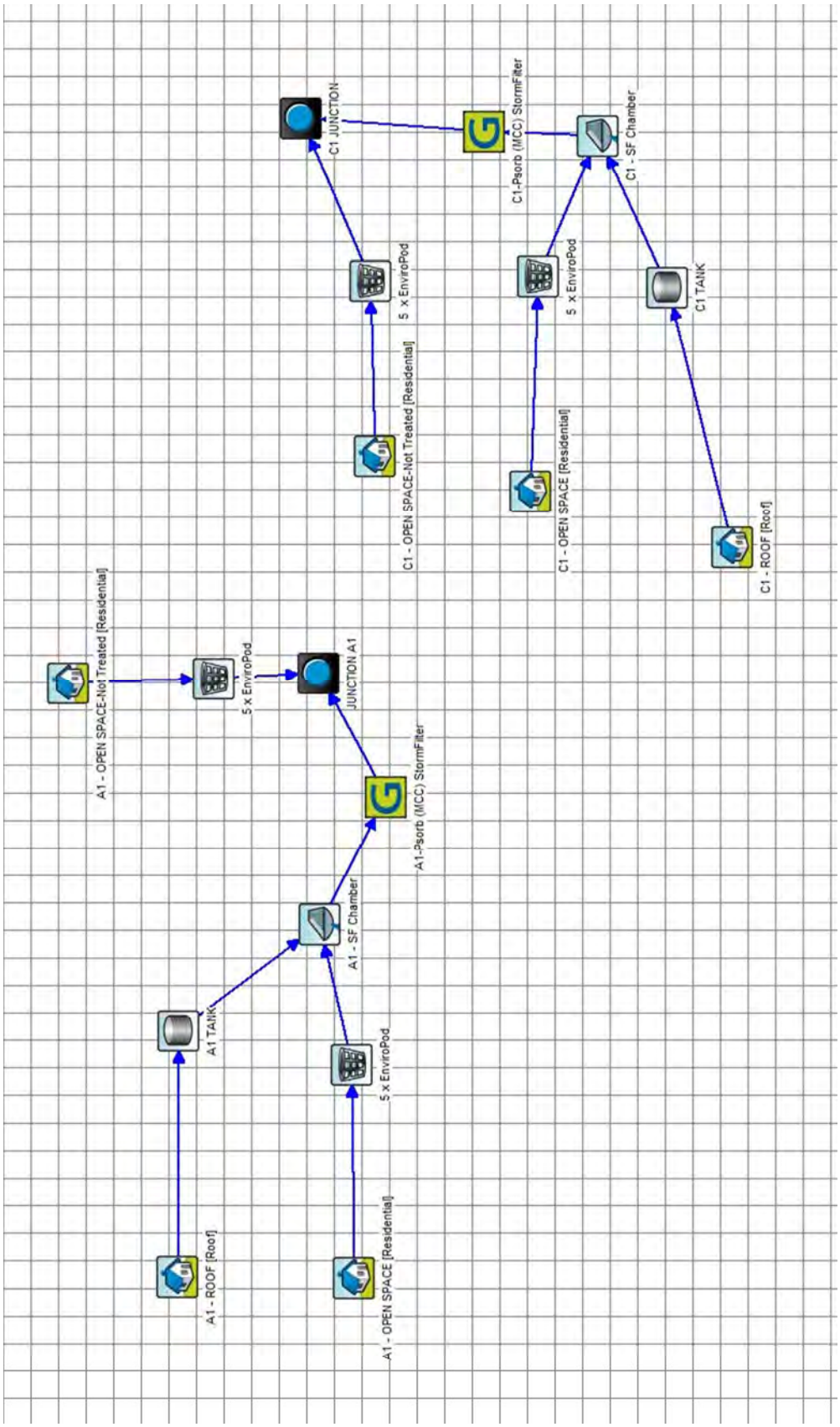
Surcharge the inlet pipe

Backing-up water into the conveyance system can create the necessary drop to drive the StormFilter cartridges. This will affect the HGL and increase the volume of water required to activate the cartridges, which could have a detrimental effect on system longevity. The following design modifications mitigate these risks:

- Confer with a Stormwater360 design engineer before surcharging the inlet pipe
- Verify this is an acceptable practice in your local jurisdiction
- Modify the overall system design to accommodate the increased HGL
- Calculate the additional treatment volume and consider using more cartridges

Appendix E

MUSIC MODEL



Exhibits

NOTE:
1. OUTLETS TO SHRIMPTONS CREEK SUBJECT TO DETAILED DESIGN

LEGEND

- SITE BOUNDARY
- STAGE 1 DA BOUNDARY
- PROPOSED LOT BOUNDARY
- EXISTING LOT BOUNDARY
- MAJOR CONTOURS
- MINOR CONTOURS
- PROPOSED KERB
- PROPOSED STORMWATER
- FUTURE STORMWATER
- PROPOSED STORMWATER OUTLET
- PROPOSED LINTEL
- PROPOSED GSIP
- INDICATIVE FUTURE RAIN GARDEN

HERRING ROAD

LYON PARK RO

EPPING ROAD

CREEK

SHRIMPTONS

FUTURE LOT B1.1

FUTURE DRIVEWAY No.5

FUTURE LOT B1.2

FUTURE DRIVEWAY No.3

FUTURE LOT B2

FUTURE LOT B3

LOT A1

ROAD No.1

FUTURE LOW FLOW BYPASS TO RAIN GARDEN

INDICATIVE FUTURE RAIN GARDEN LOCATION. TO BE CONFIRMED BY LANDSCAPE ARCHITECT

FUTURE LOT A2

LOT C1

ROAD No.2

FUTURE LOT C2

FUTURE LOT C3

ROAD No.3

FUTURE LOT C4

FUTURE DRIVEWAY No.4

FUTURE LOW FLOW BYPASS TO RAIN GARDEN

FUTURE DRIVEWAY No.1

FUTURE DRIVEWAY No.2

FUTURE LOT D2

FUTURE LOT A3

FUTURE LOT D1

FUTURE LOT D3

FUTURE LOT D4

CONCEPT STORMWATER PLAN

SCALE 1:1500

ver.	date	comment	drawn	pm	level information	scale (A3 original size)	notes
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drawing title:

STAGE 1 - CONCEPT STORMWATER PLAN

location: HERRING RD & EPPING RD, MACQUARIE PARK

council: RYDE CITY COUNCIL

dwg ref: 300001(1)-EX-001

client: ASPIRE

adw johnson
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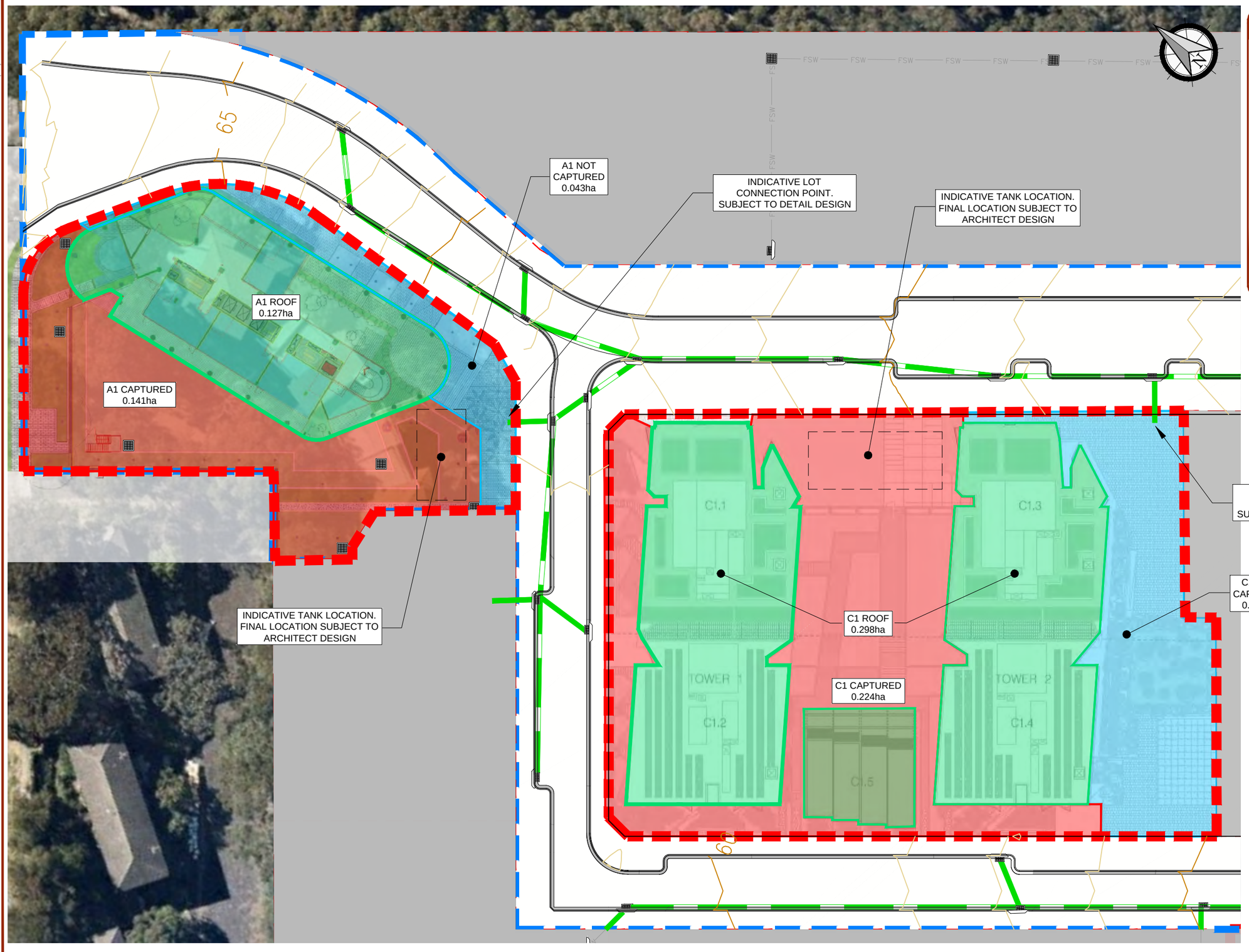
Plotted By: Ben Myles Plot Date: 04/10/18 9:39:17 AM Cad File: S:\300001\DRAWINGS\REPORT DRAWINGS\STAGE 1 STORMWATER\300001(1)-EX-001-C.DWG
this plan includes coloured information. If you have a black and white copy you do not have all of the information. This note is coloured RED.

300001(1)-EX-001-C



LEGEND

- OVERALL CATCHMENT AREA
- ROOF CATCHMENT AREA
- LOT AREA NOT CAPTURED
- LOT AREA CAPTURED
- INDICATIVE TANK LOCATION
- PROPOSED KERB
- PROPOSED STORMWATER
- PROPOSED LINTEL
- PROPOSED GSIP

NOTE:
1. STORMWATER PITS WITHIN LOTS SHOWN INDICATIVELY ONLY. FINAL LOCATION SUBJECT TO ARCHITECT DESIGN.

ver.	date	comment	drawn	pm	level information	scale (A3 original size)	notes
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drawing title:

STAGE 1 - CATCHMENT PLAN

location: HERRING RD & EPPING RD MACQUARIE PARK

council: RYDE CITY COUNCIL

dwg ref: 300001(1)-EX-002

client: ASPIRE

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*image source: Nearmap (20/11/2017)

STAGING PLAN

SCALE 1:1500

ver.	date	comment	drawn	pm	level information	scale (A3 original size)	notes
C	04.10.18	ISSUED FOR APPROVAL	KT	BM	DATUM: N/A CONTOUR INTERVAL: N/A	0 30 60 75m SCALE: 1:1500 (FULL)	

drawing title:

CONSTRUCTION STAGING

location: HERRING RD & EPPING RD, MACQUARIE PARK

council: RYDE CITY COUNCIL

dwg ref: 300001(1)-EX-003

client: ASPIRE

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working beyond expectations

Plotted By: Ben Myles Plot Date: 04/10/18 9:39:32AM Cad Files: S:\300001\DRAWINGS\REPORT DRAWINGS\STAGE1 STORMWATER\300001(1)-EX-003-C.DWG
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NOTE:
1. DETAILED EROSION AND SEDIMENT CONTROLS PLANS TO BE PROVIDED STAGE BY STAGE.
2. EROSION AND SEDIMENT CONTROLS TO SUIT THE SITE AT TIME OF CONSTRUCTION
3. FURTHER DETAILS AROUND TEMPORARY WORKS TO BE PROVIDED AT CC STAGE.

LEGEND

- SITE BOUNDARY
- STAGE BOUNDARY
- PROPOSED LOT BOUNDARY
- EXISTING LOT BOUNDARY
- PROPOSED KERB
- PROPOSED STORMWATER
- PROPOSED STORMWATER OUTLET
- SEDIMENT/SILT FENCING
- NO-GO FENCING
- DIVERSION DRAIN
- TEMPORARY SWALE
- STRAWBALES
- GRAVEL/SAND BAGS
- SITE ACCESS/SHAKER RAMP
- TEMPORARY SEDIMENT BASIN

HERRING ROAD
LYON PARK ROAD
EPPING ROAD
SHRIMPTONS
CREEK
LOT A1
LOT C1
ROAD No.1
ROAD No.2
ROAD No.3
TIE INTO SALES SUITE LEVELS
TEMPORARY TURNING HEAD
TEMPORARY BASIN
TEMPORARY BASIN
FUTURE RAIN GARDEN TO BE USED AS TEMPORARY SEDIMENT BASIN
FSW
65
60

STAGE 1A - EROSION AND SEDIMENT CONTROL/TEMPORARY WORKS PLAN

SCALE 1:1500

ver.	date	comment	drawn	pm	level information	scale (A3 original size)	notes
C	04.10.18	ISSUED FOR APPROVAL	KT	BM	DATUM: N/A CONTOUR INTERVAL: N/A	0 30 60 75m SCALE: 1:1500 (FULL)	

drawing title:
STAGE 1A - EROSION & SEDIMENT CONTROL/TEMPORARY WORKS PLAN

location: HERRING RD & EPPING RD, MACQUARIE PARK
council: RYDE CITY COUNCIL
dwg ref: 300001(1)-EX-004
client: ASPIRE

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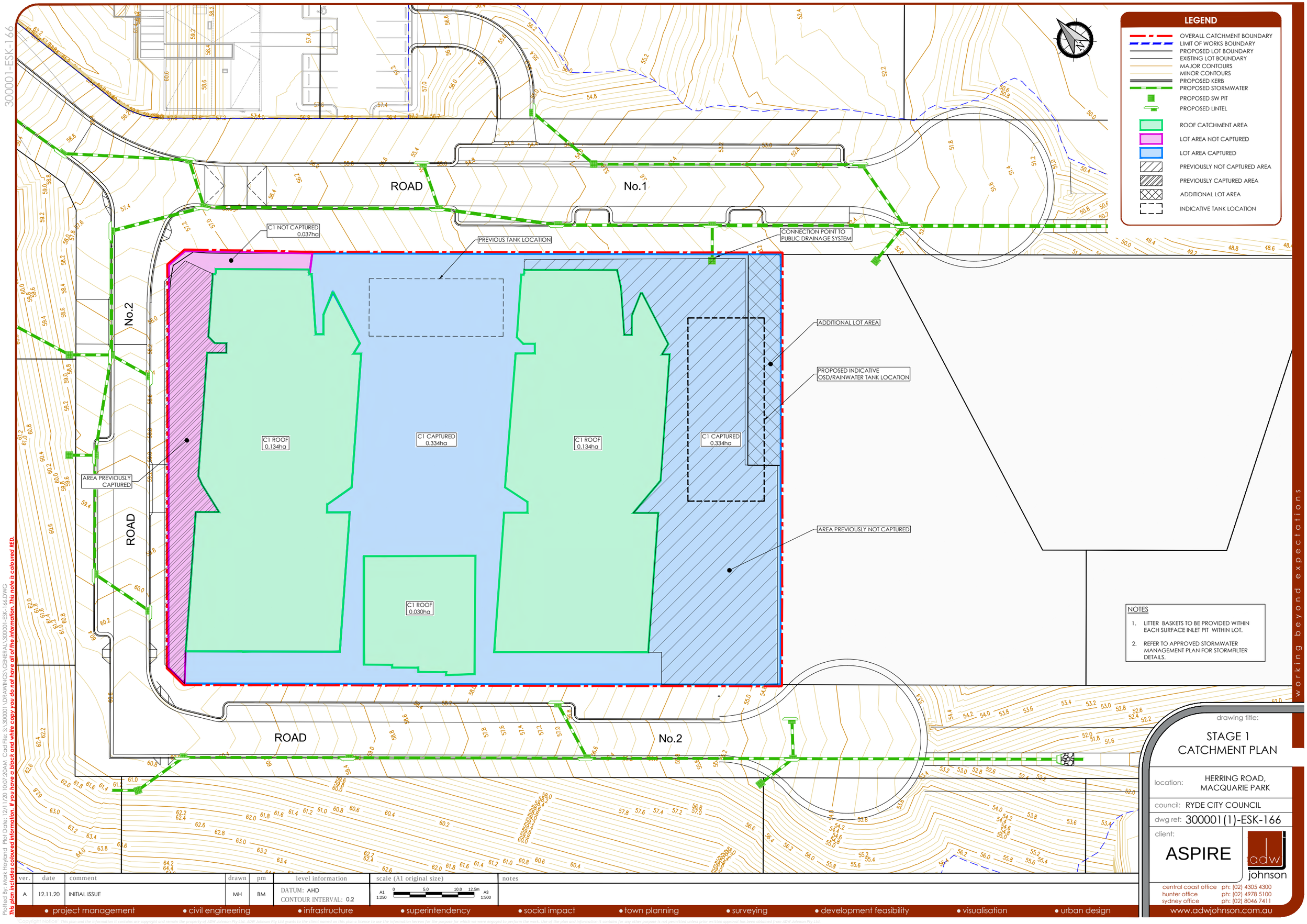
Appendix B

CATCHMENT PLAN

300001-ESK-166



ver.	date	comment	drawn	pm	level information	scale (A1 original size)	notes
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drawing title:

STAGE 1 CATCHMENT PLAN

location: HERRING ROAD, MACQUARIE PARK

council: RYDE CITY COUNCIL

dwg ref: 300001(1)-ESK-166

client: ASPIRE

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Plotted By: Mark Hoyland Plot Date: 12/11/20 10:07:20AM Cad File: S:\300001\DRAWINGS\GENERAL\300001-ESK-166.DWG
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Reference: 0555r04v03

16 December 2020

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Suite 5.02, Level 5, 1 Castlereagh Street
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Frasers Property Australia
Level 2, 1C Homebush Bay Drive
Rhodes NSW 2138

Attention: Robert Cauchi

Transport Statement for a Section 4.55 Application (SSD8903)

Dear Robert,

Ason Group has been commissioned by Frasers Property Australia to prepare a Transport Statement (TS) in support of Section 4.55 Application (S4.55) for Stage 1 of the Ivanhoe Estate development, specifically, amendments to the apartment mix associated with Building C1 (the Proposal) at Macquarie Park (the Site). This TS provides an assessment of the access, traffic and parking implications of the Proposal, which provides for:

- Residential (Market)
    - 41 x 1-bedroom apartments
    - 51 x 2-bedroom apartments
    - 11 x 3-bedroom apartments
    - 4 x 3-bedroom apartments
- Residential (Social Housing)
    - 42 x studio apartments
    - 118 x 1-bedroom apartments
    - 99 x 2-bedroom apartments
    - 0 x 3-bedroom apartments
- Residential (Affordable Housing)
    - 54 x studio apartments
    - 39 x 1-bedroom apartments
    - 36 x 2-bedroom apartments
    - 1 x 3-bedroom apartments
- 370 car parking spaces;
- Loading facility; and

- Community facility, gym / pool for residents, and car share facility.

The Site lies within the Ryde City Council (Council) Local Government Area (LGA), and as such key reference documents for the assessment include:

- Ryde Development Control Plan 2014 (DCP 2014);
- Ryde Local Environmental Plan 2014 (LEP 2014);
- Ason Group Traffic Impact Assessment – Ivanhoe Estate, Macquarie Park – Stage 1 (P0555r01v07); and
- Ason Group Traffic Impact Assessment – Ivanhoe Estate, Macquarie Park – Masterplan (0421r02v07).

This TS also references general access, traffic and parking guidelines, including:

- Australian Standard 2890.1:2004 Parking Facilities – Off-Street Car Parking (AS2890.1);
- Australian Standard 2890.2:2018 Parking Facilities – Off-Street Commercial Vehicle Facilities (AS2890.2);
- Australian Standard 2890.3:2015 Parking Facilities – Bicycle Parking (AS2890.3); and
- Australian Standard 2890.6:2009 Parking Facilities – Off-Street Parking for People with Disabilities (AS2890.6).

Background and The Proposal

The concept proposal (SSD-8707) and Stage 1 (SSD-8903) approval for Ivanhoe Estate, lodged by NSW Land and Housing Commission were approved by the Minister for Planning and Public Spaces on 30 April 2020.

The approved concept proposal (SSD-8707) includes:

- 3,300 new homes, including 950 for social housing, 128 affordable housing, and 273 seniors living homes
- 2.8 hectares of open space including new parks, a skatepark and playground
- A new primary school and two childcare centres
- A town plaza, new shops cafes and restaurants
- A new road connecting Herring Road with Lyonpark Road, including a new bridge over Shrimptons Creek
- 50 car share parking spaces within the overran Ivanhoe Estate Development.

The approved Stage 1 works (SSD-8903) consists of:

- Site preparation works, including tree removal and earthworks across the entire Ivanhoe Estate

- The provision and augmentation of utilities and services infrastructure across the entire Ivanhoe Estate
- The construction of the internal road network
- The consolidation of the existing lots and subdivision of the Ivanhoe Estate to reflect the revised road layout, open space, and provide superblocks corresponding to the master plan
- The construction and use of Buildings A1 and C1 in the norther western corner of the Ivanhoe Estate, comprising:
    - Building A1 with 269 apartments, 233 car parking spaces and a childcare centre
    - Building C1 with 471 apartments and 346 car parking spaces
    - Of the 740 apartments, 259 apartments were social dwellings.

Specifically, the following SSD-8903 conditions are relevant to this S4.55 assessment:

Number of Car Parking Spaces

B77. A maximum of 208 residential car parking spaces and 13 visitor car parking spaces and a minimum of 12 childcare centre car parking spaces are to be provided for Building A1. Details demonstrating compliance must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.

B78. A maximum of 328 residential car parking spaces, 15 visitor car parking spaces and three staff car parking spaces are to be provided for Building C1. Details demonstrating compliance must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.

B79. A minimum of 12 car share spaces must be provided within the site in association with Stage 1.

Number of Bicycle Parking Spaces

B81. The minimum number of bicycle parking spaces to be provided for the development shall comply with the table below. Details confirming the bicycle parking numbers must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.

Approval is now sought to modify the existing consent with the key changes that are relevant to this assessment:

- Change of the Stage 1 approved land use mix / apartment type and yield from within the Concept Approval due to the acceleration of delivering the affordable housing requirement of the development into the C1 building;
- Increase in total number of dwellings from 740 to a total of 765 dwellings, comprising 376 market apartments, 259 social housing, and 130 affordable apartments;
- Parking for 2,000 square metres of Retail / Community Use
- A total of 370 car parking spaces, comprising:

- 320 parking spaces for residential parkin g (including 12 visitor spaces) and remaining parking for community uses, and car share.

- Bicycle parking provision of 1 per dwelling (market, social, affordable) and visitor bicycle parking at a rate of 5% of dwelling yield.

Figure 1 and **Figure 2** provide Site plans of the Ground Floor and First Floor respectively, including the general layout of the tenancies and associated traffic circulation, loading and parking areas.

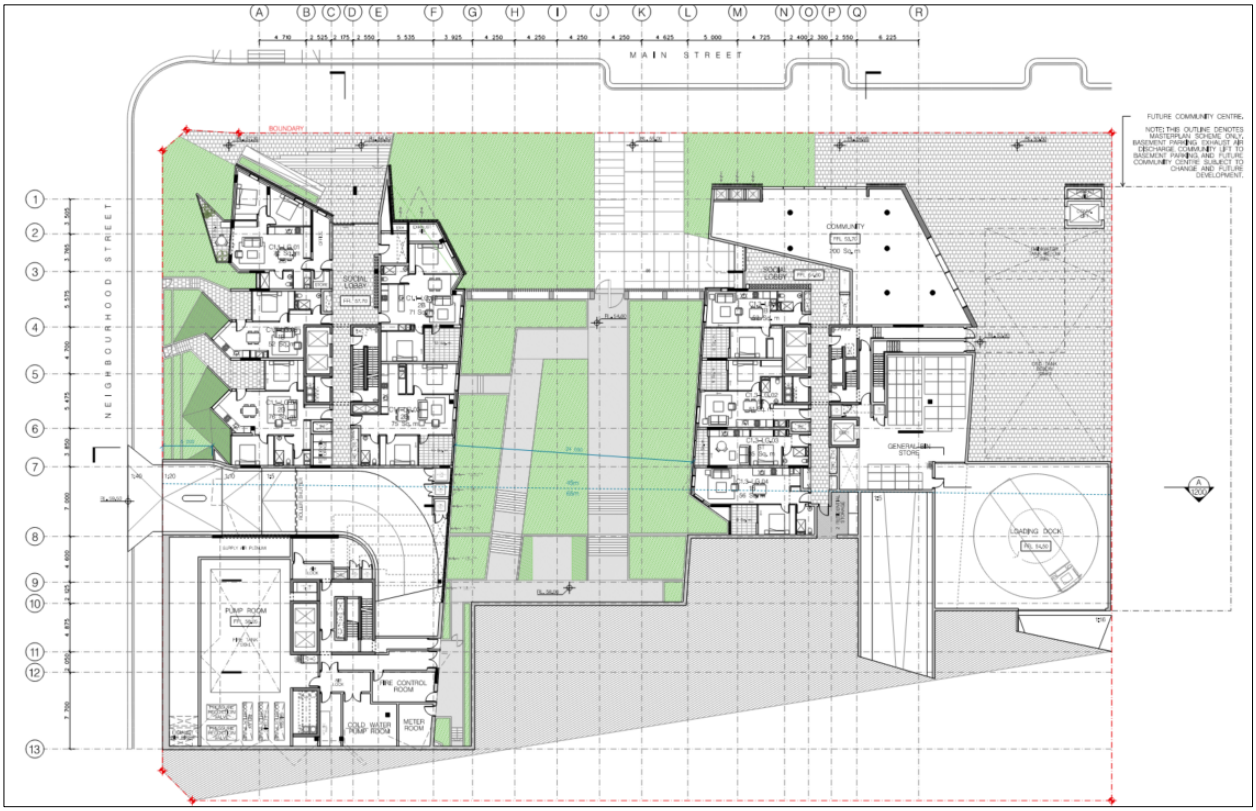


Figure 1: Proposal Site Plan – Lower Ground Floor

Figure 2: Proposal Site Plan – Upper Ground Floor

Table 1 (Building A1) and Table 2 (Building C1) provides a comparison between the approved development yield and the Proposal with respect to apartment yield and land use mix. For completeness of the assessment, we have included Building A1 in the mix.

Table 1: Site Land Use GFA Breakdown – Building A1 – No Change

Land Use	Approved Yield	Proposed Yield	Difference in Yield
Residential (Market) – Building A1			
Studio	7	7	-
1 Bed	111	111	-
2 Bed	141	141	-
3 Bed	10	10	-
4 Bed	-	-	-
Child Care Centre	75 Children	75 Children	-

Table 2: Site Land Use GFA Breakdown – Building C1 – Yield Modified

Land Use	Approved Yield	Proposed Yield	Difference in Yield
Residential (Market) – Building C1			
Studio	14	0	-14
1 Bed	61	41	-20
2 Bed	119	51	-68
3 Bed	14	11	-3
4 Bed	4	4	-
Residential (Social) – Building C1			
Studio	42	42	-
1 Bed	118	118	-
2 Bed	99	99	-
3 Bed	0	0	-
Residential (Affordable)			
Studio	0	54	+54
1 Bed	0	39	+39
2 Bed	0	36	+36
3 Bed	0	1	+1
Retail / Community	244m^2	200m^2	-44m^2
	Total Yield Difference		**Decrease of 105 Market Apartments** **Increase of 130 Affordable Apartments** **Net increase of 20 Apartments (Affordable)** **Reduction of 44m^2 GFA in community use**

Car Parking Assessment

Parking Requirements

Parking for the Proposal has been provided in accordance with the parking rate established in the and is summarised in **Table 3.**

Table 3: Proposal Car Parking Requirements – C1 only

Land Use	Yield	Parking Rate – as per approved rate of parking provision SSD-8903	Maximum Parking Requirement	Parking Provided
Residential (Market) – Building C1				
Studio	0	0 spaces per dwelling	0	0
1 Bed	41	0.6 spaces per dwelling	25	25
2 Bed	51	0.9 spaces per dwelling	46	46
3 Bed	11	1.4 spaces per dwelling	15	15
4 Bed	4	1.4 spaces per dwelling	6	6
Visitor	107	1 space per 20 units	5	6
Residential (Social) – Building C1				
Studio	42	0	0	0
1 Bed	118	0.6 spaces per dwelling	71	71
2 Bed	99	0.9 spaces per dwelling	89	89
3 Bed	0	1.4 spaces per dwelling	0	0
Visitor	259	1 space per 20 units	13	4
Residential (Affordable)				
Studio	54	0	0	0
1 Bed	39	0.6 spaces per dwelling	23	23
2 Bed	36	0.9 spaces per dwelling	32	32

3 Bed	1	1.4 spaces per dwelling	1	1
Visitor	130	1 space per 20 units	6	2
Community Use	2000m^2[1]	1 space / 100m^2	20	20
Car Share		1 space per 100 parking spaces and minimum of 50 spaces for overall Development[2]	Minimum 4 Maximum 50	30
Total			403	370

It is noted that the Affordable Housing and Housing for Seniors or People with a Disability SEPPs permit parking for the social housing at a minimum rate of 0.5 spaces per dwelling. On this basis, the parking proposed for the social dwellings is consistent with the requirements of the SEPP.

With reference to **Table 3**, the proposed car parking provision maintains the same rate of provision as approved in SSD-8903 for the dwelling component of the Stage 1 development. In addition, the proposal seeks the provision of car share in advance of future stages of the overall Ivanhoe Estate Development which formed part of the Concept Plan Approval (SSD-8707), and as such the Proposal is supportable in regard to parking provision.

Additional Parking Considerations

Motorcycle Parking

There is no requirement for the provision of motorcycle parking spaces established in either SSD-8707 or SSD-8903.

The Proposal will provide a total of 8 motorcycle parking spaces and considered supportable.

Bicycle Parking

Condition B81 of the SSD-8903 requires that bicycle parking be provided at a rate of 1 bicycle space per dwelling, with visitor bicycle parking spaces provided at a rate of 5% of the number of dwellings. Application of this rate to the 496 dwellings results in a requirement for 496 resident bicycle spaces plus 25 visitor bicycle parking spaces.

The Proposal will provide a total of 521 bicycle parking spaces and therefore compliance with the level of bicycle parking provision consistent with the rate of provision established in Condition B81 of SSD-8903.

Accessible Parking

[1] Subject to future DA for additional 1800m^2 of community use.
[2] As per Condition A18(k) of SSD-8707

Condition B73 requires that a minimum of 5% of dwellings be designed as Adaptable Dwellings.

The Proposal will provide a total of 14 accessible parking spaces.

Service Vehicles

No change is proposed to the loading arrangement proposed when compared to the approved development SSD-8903.

Traffic Generation

The forecast traffic generation of the Proposal references RMS Guide Update trip rates; **Table 3** provides a comparison of the approved traffic generation and proposed traffic generation of the Site further to the Proposal.

Table 4: Approved vs Proposed Traffic Generation

	Land Use	Yield	AM Peak		PM Peak	
			Trip Rate	Trips/hr	Trip Rate	Trips/hr
Approved	Market Dwellings	481	0.14 per unit	68	0.12 per unit	57
Approved	Social Dwellings	259	0.03 per unit	8	0.05 per unit	13
Approved	Child Care	75 Children	0.1 per child + 6 Staff	14	0.1 per child + 6 Staff	14
Approved	Ancillary Retail	525m^2	1 per 100m^2	5	1 per 100m^2	5
Approved	**Total Trip Generation**			**95**		**89**
Proposed	Market Dwellings	376	0.14 per unit	53	0.12 per unit	45
Proposed	Social Dwellings	259	0.03 per unit	8	0.05 per unit	13
Proposed	Affordable Units	130	0.12 per unit	16	0.10 per unit	13
Proposed	Community Use / Ancillary Retail	2,000m^2	1 per 100m^2	20	1 per 100m^2	20
Proposed	Child Care	75 Children	0.1 per child + 6 Staff	14	0.1 per child + 6 Staff	14
Proposed	**Total Trip Generation**			**111**		**105**
	Difference in Trip Generation			**+16**		**+16**

As shown in **Table 4**, the assessment forecasts that the Proposal would generate 16 trips more than the approved scheme in the respective AM and PM peak hours when compared to the approved development, which is a minor increase to the Stage 1 development and as such is supportable on traffic generation grounds.

Design Commentary

A comprehensive technical assessment of the revised Site plans indicates that the internal car parking layout, aisle roadways and loading are designed in accordance with the following relevant Australian Standards:

- AS2890.1:2004 for car parking areas;
- AS2890.2:2018 for loading areas; and
- AS2890.6:2009 for accessible (disabled) parking.

Based on the technical analysis, the following features of the proposed car parking areas are considered noteworthy:

- All resident parking spaces are provided in accordance with AS2890.1 for a Class 1A user, which requires a minimum space length of 5.4m, a minimum width of 2.4m and a minimum aisle width of 5.8m;
- The access ramp has been checked and are designed in accordance with AS2890.1;
- The loading space has been designed in accordance with AS2890.2 for a Medium Rigid Vehicle. The turntable has been afforded 500mm clearance in accordance with AS2890.2;
- All accessible parking spaces are provided in accordance with AS2890.6, which requires a space with a minimum space length of 5.4m, a clear width of 2.4m and located adjacent to a shared area of 5.4m long by 2.4m wide, with a bollard and hatch marking as required by AS2890.6; and
- All spaces located adjacent to obstructions greater than 150mm in height (including landscaping items) are provided with an additional width of 300mm.

The results of this analysis, which are presented on plans attached as **Attachment 1**, indicate that all necessary vehicular manoeuvres can be accommodated under the Proposal.

It is expected that any detailed construction drawings in relation to any modified areas of the car park or Site access would comply with these Standards. Furthermore, compliance with the above Standards already form the requirements of Conditions B77 and B78 of SSD-8903.

Conclusions

Further to a detailed assessment of the Proposal, Ason Group has concluded that:

- The car, motorcycle and accessible parking provided on-site are consistent with the Conditions of SSD-8903.
- The Proposal would generate an additional 16 vehicle trips for each of the AM and PM peak in comparison to the approved traffic generation.

- The proposed changes to the internal Site design will provide compliance with all relevant Australian Standards.

As such, Ason Group has determined that the Proposal is supportable on access, traffic and parking grounds.

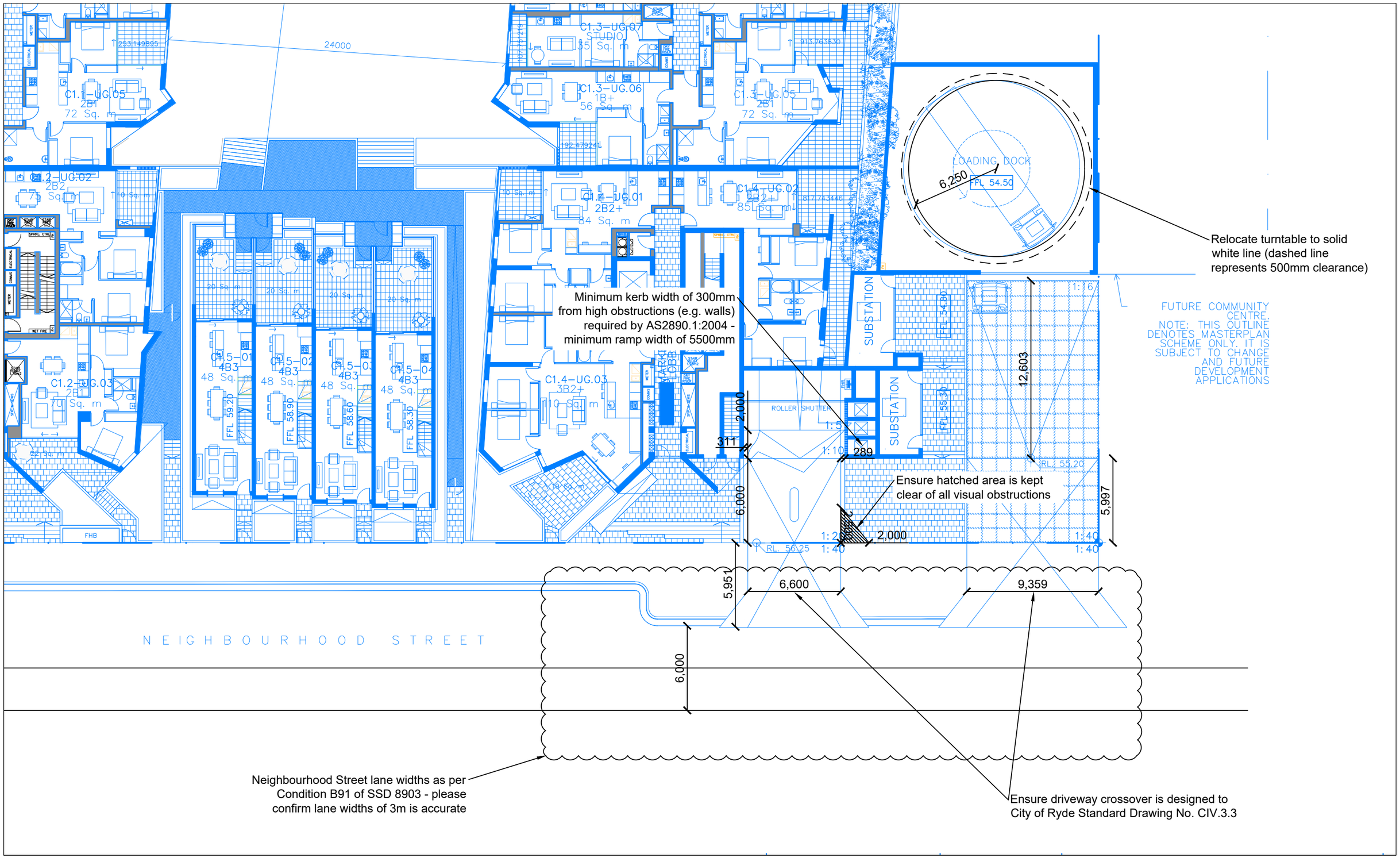
We trust the above is of assistance. If you have any questions or should you wish to discuss further, please feel free to contact the undersigned.

Yours sincerely,

Principal Lead – Traffic Management & Operations – Ason Group
Email: dora.choi@asongroup.com.au

Attachment(s): *1) Swept Path Analysis*

Attachment 1



Revision notes:

Rev:	Date:	Notes:
		Plan reference: S455 1106_FLOOR_PLAN_UG_ISSUE A

For information purposes only - not for construction

Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Design Review Upper Ground Floor

Date: 7-Dec-20

Scale @ A3: 1:250

Drawing Number: AG01

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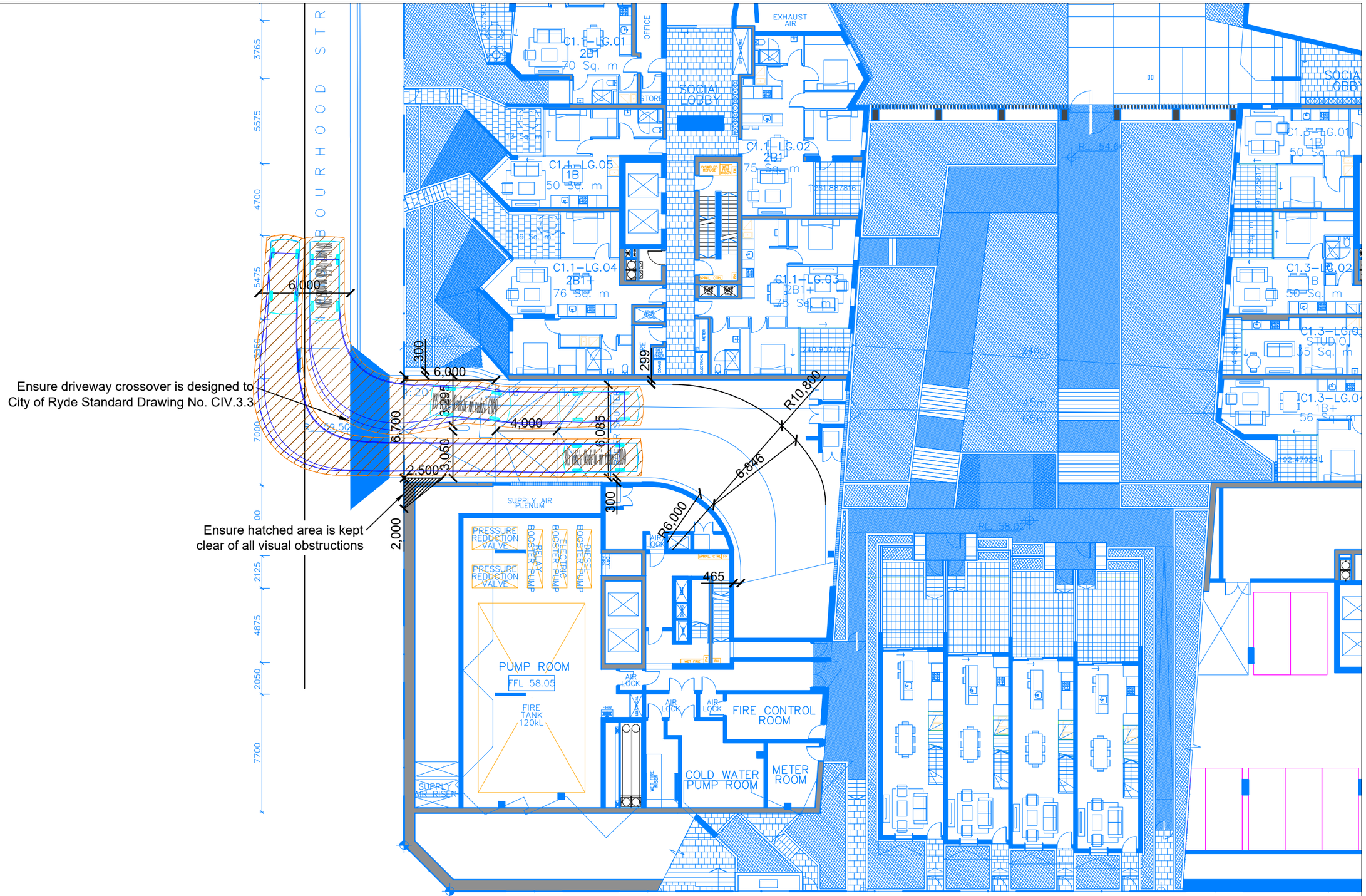

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Rev:	Date:	Notes:
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For information purposes only - not for construction

Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Design Review Lower Ground Floor

Date: 7-Dec-20

Scale @ A3: 1:250

Drawing Number: AG02

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Sydney NSW 2000
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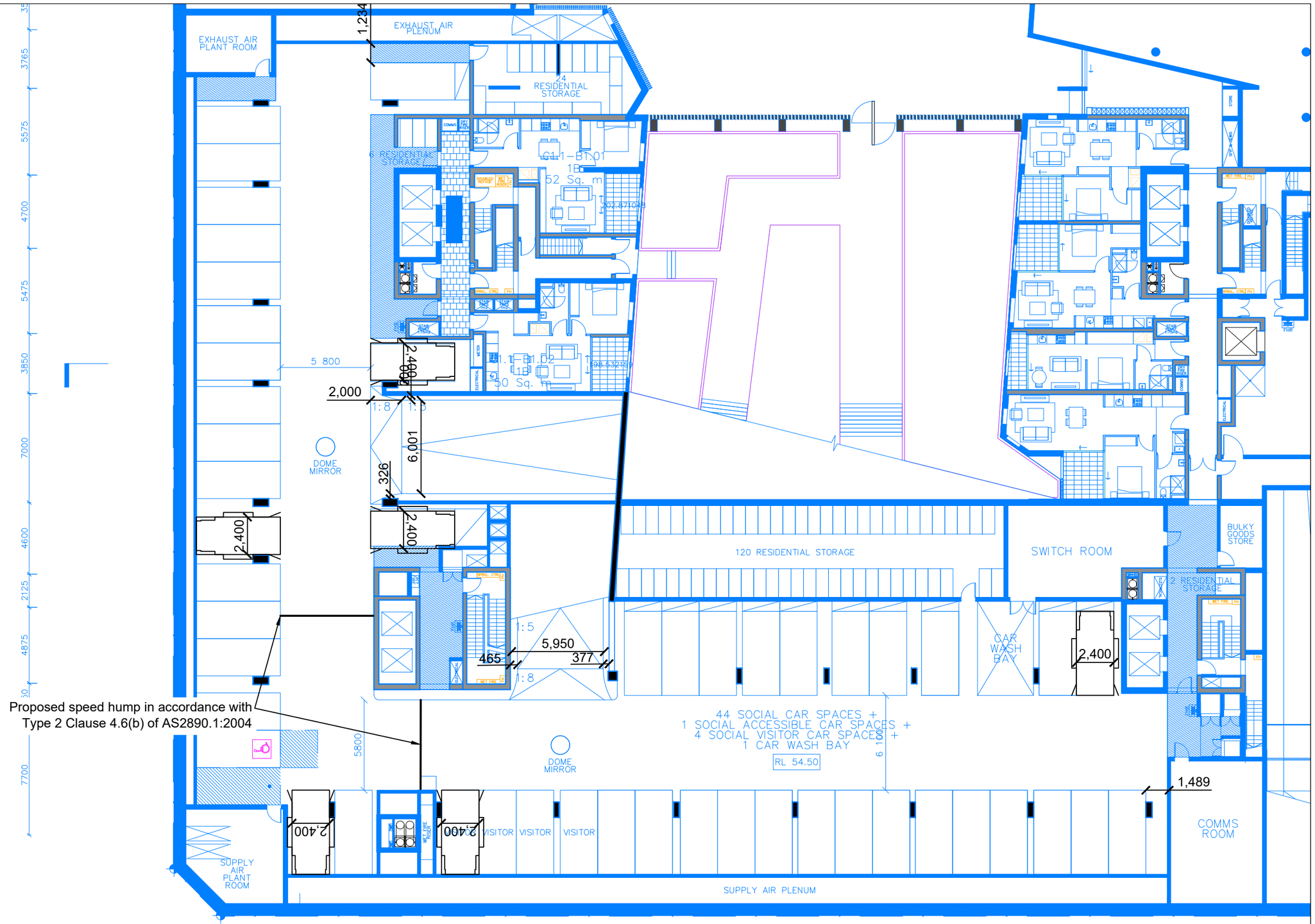

Revision notes:

Rev:	Date:	Notes:
		Plan reference: S455 1104_FLOOR_PLAN_B1_ISSUE A

For information purposes only - not for construction

Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Design Review Basement 1

Date: 7-Dec-20

Scale @ A3: 1:250

Drawing Number: AG03

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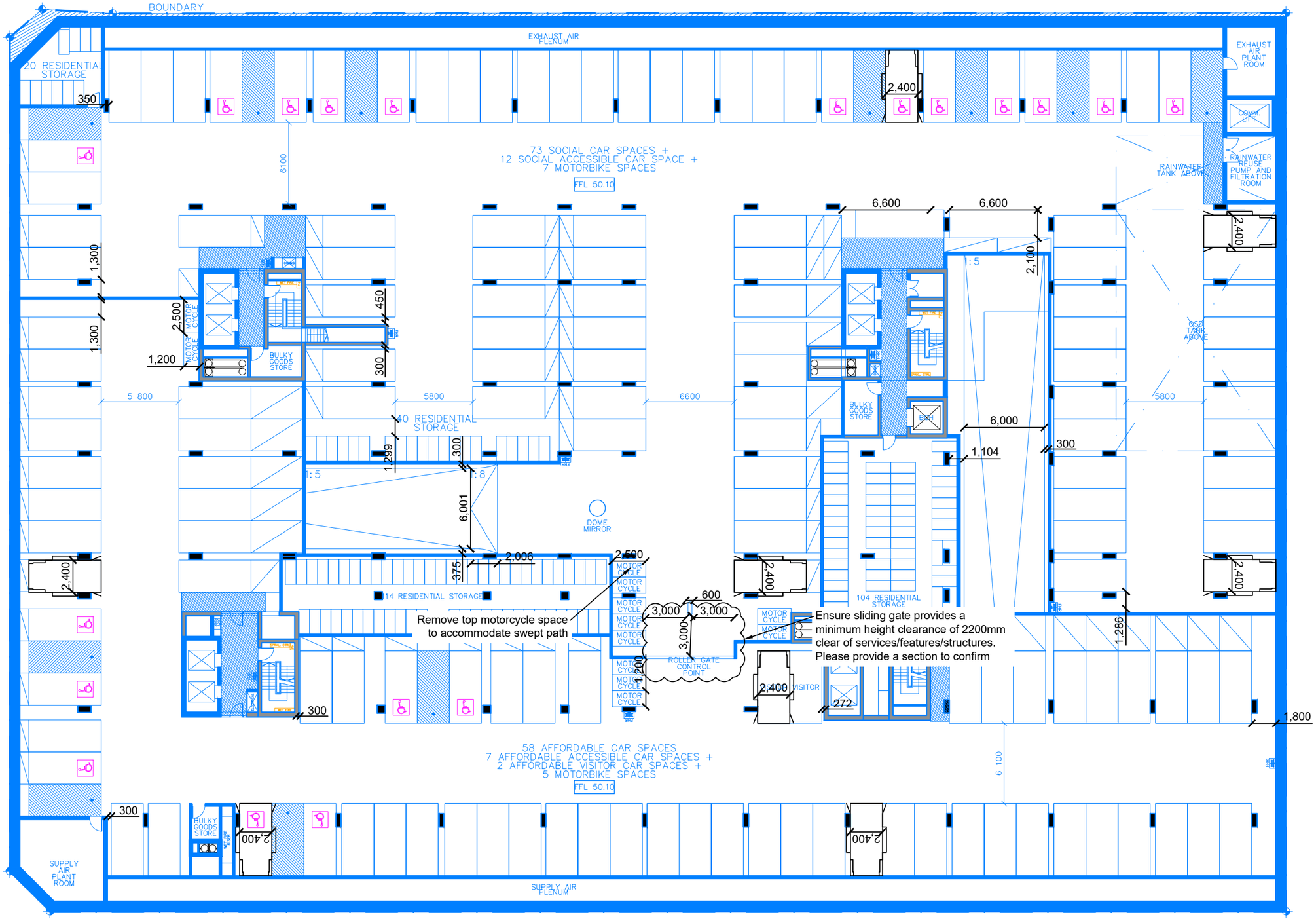

Revision notes:

Rev:	Date:	Notes:
		Plan reference: S455 1103_FLOOR_PLAN_B2_ISSUE A

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Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Design Review Basement 2

Date: 7-Dec-20

Scale @ A3: 1:300

Drawing Number: AG04

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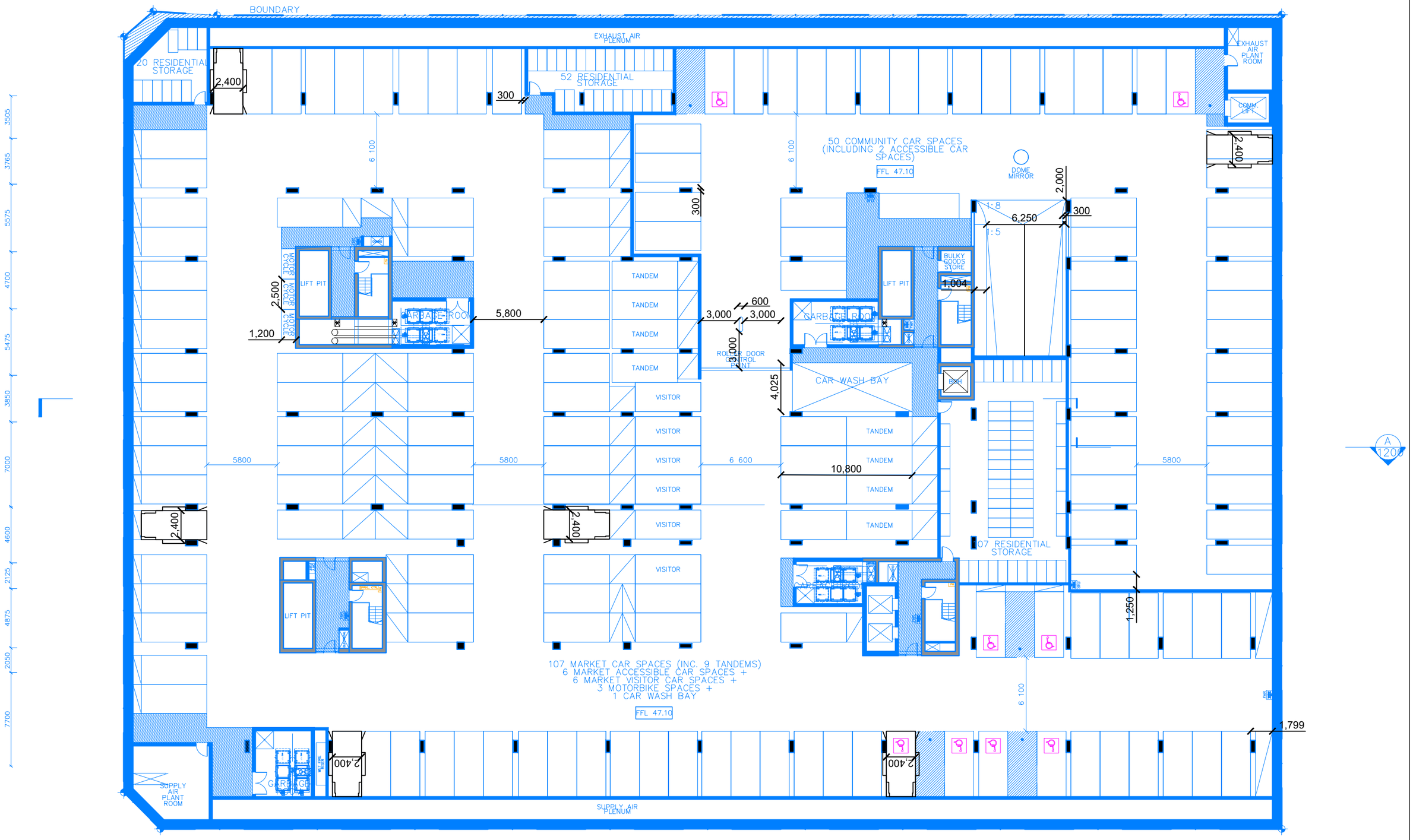
info@asongroup.com.au



Revision notes:

Rev:	Date:	Notes:
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Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Design Review Basement 3

Date: 7-Dec-20

Scale @ A3: 1:300

Drawing Number: AG05

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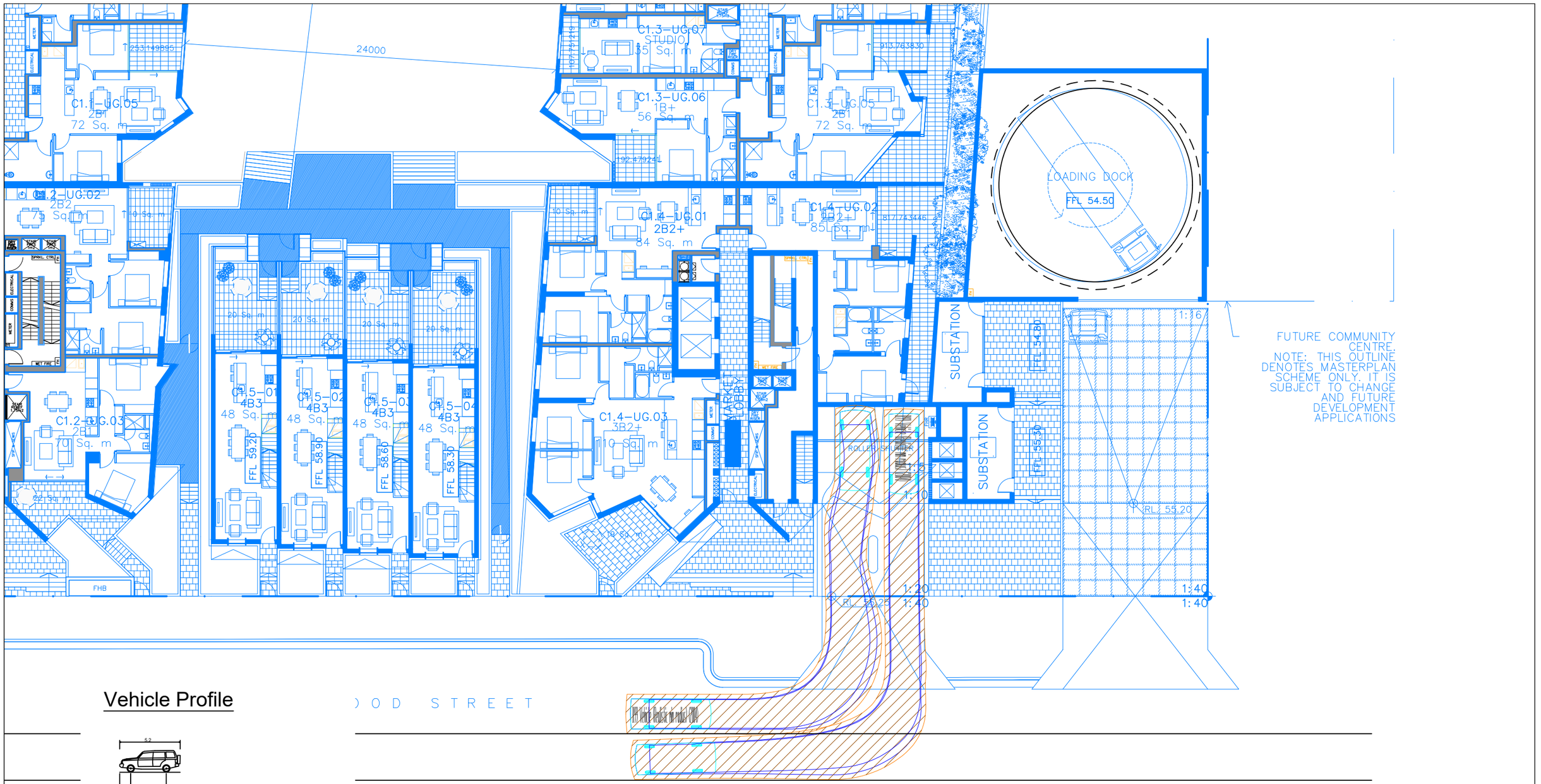
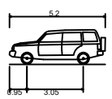


Vehicle Profile



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

Revision notes:

Rev:	Date:	Notes:
		Plan reference: S455 1106_FLOOR_PLAN_UG_ISSUE A

For information purposes only - not for construction

Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Swept Path Analysis Upper Ground Floor

Date: 7-Dec-20

Scale @ A3: 1:250

Drawing Number: AG06

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Sydney NSW 2000
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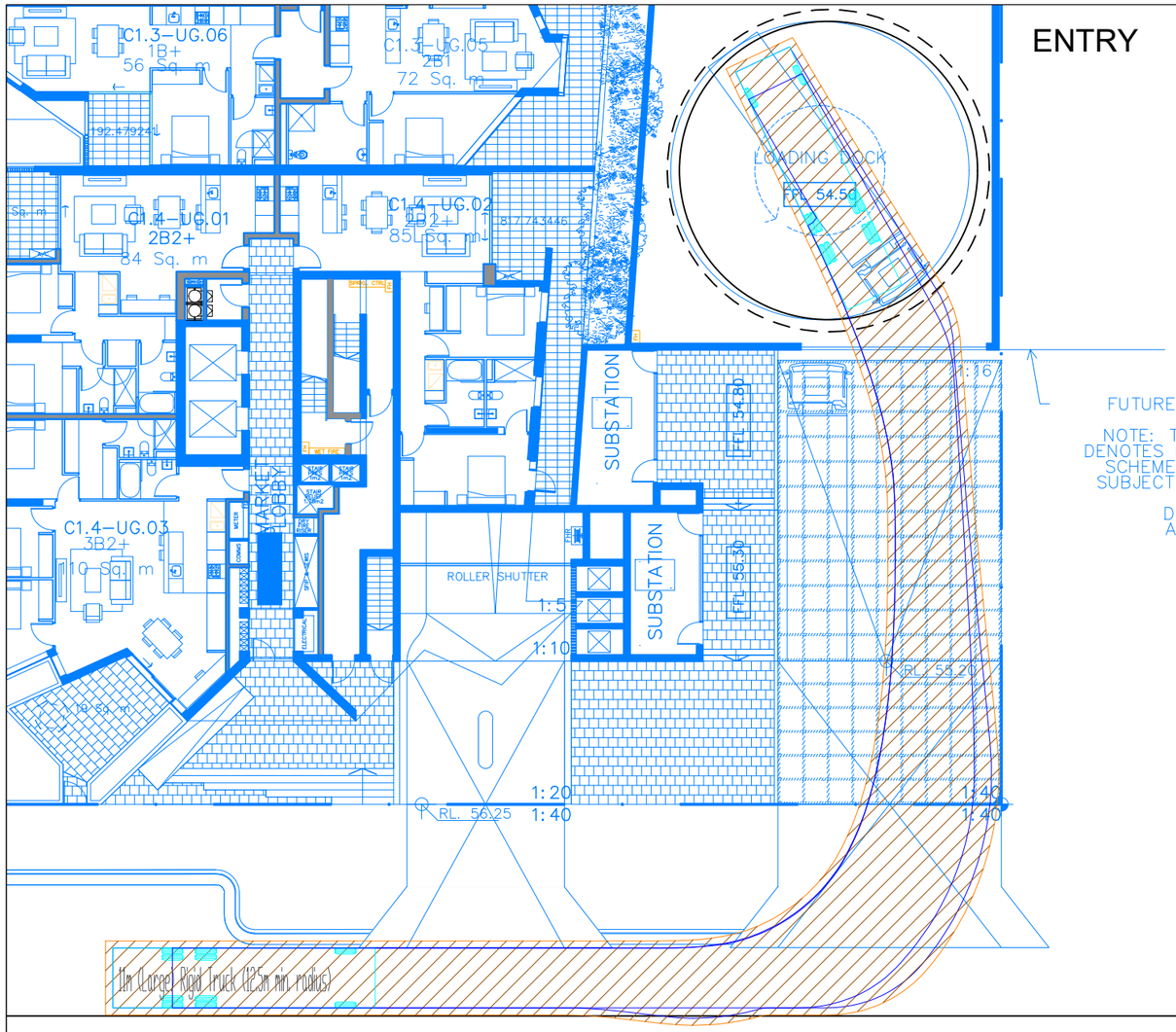
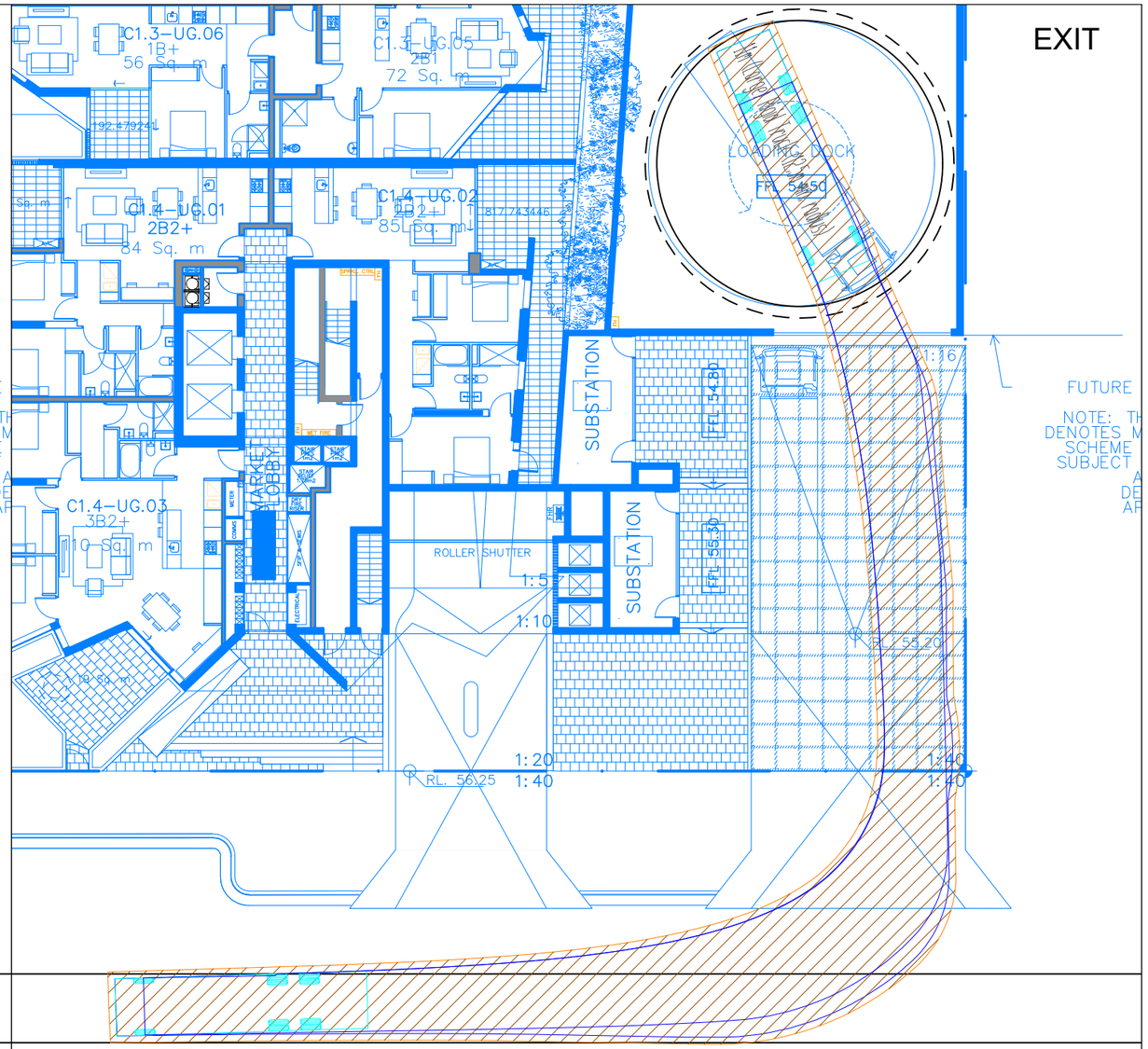
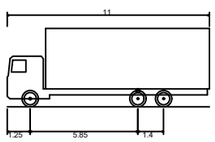
ENTRY



EXIT



Vehicle Profile



11m (Large) Rigid Truck (12.5m min. radius)	
Overall Length	11.000m
Overall Width	2.500m
Overall Body Height	4.250m
Min Body Ground Clearance	0.427m
Track Width	2.500m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	12.500m
Design Speed	5km/h

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ARCHITECT:
CANDALEPAS ASSOCIATES
309 SUSSEX ST
SYDNEY NSW 2000

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQ

CLIENT:
FRASERS PROPERTY

Revision notes:

Rev:	Date:	Notes:
		Plan reference: S455 1106_FLOOR_PLAN_UG_ISSUE A

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Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

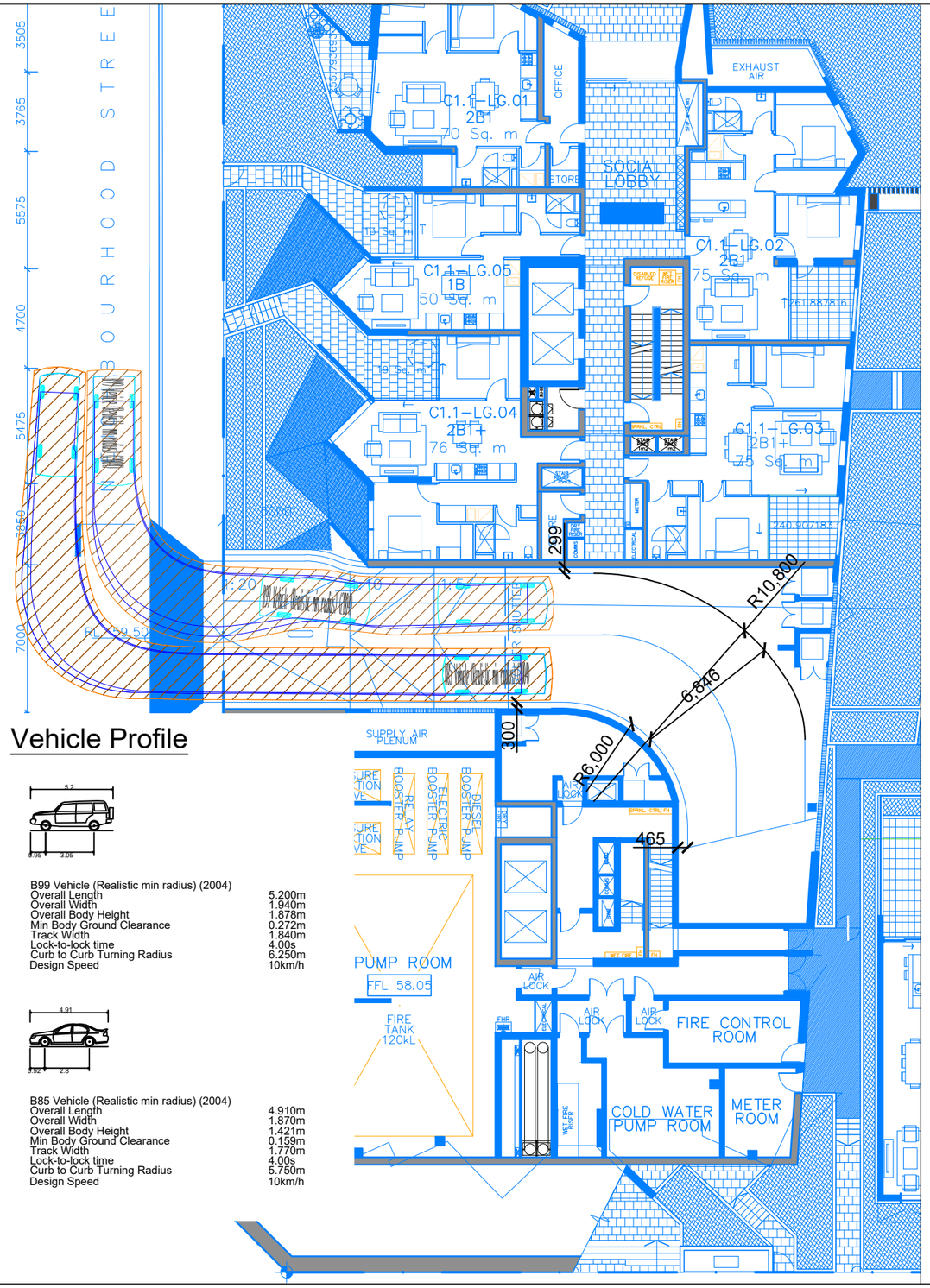
Drawing Title: Swept Path Analysis Upper Ground Floor

Date: 7-Dec-20

Scale @ A3: 1:250

Drawing Number: AG07

asongroup
Suite 5.02, Level 5, 1 Castlereagh Street
Sydney NSW 2000
info@asongroup.com.au



Vehicle Profile

B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m
Design Speed	10km/h

B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m
Design Speed	10km/h

Revision notes:

Rev:	Date:	Notes:
		Plan reference: S455 1105_FLOOR_PLAN_LG_ISSUE A

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Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Swept Path Analysis Lower Ground Floor

Date: 7-Dec-20

Scale @ A3: 1:250

Drawing Number: AG08

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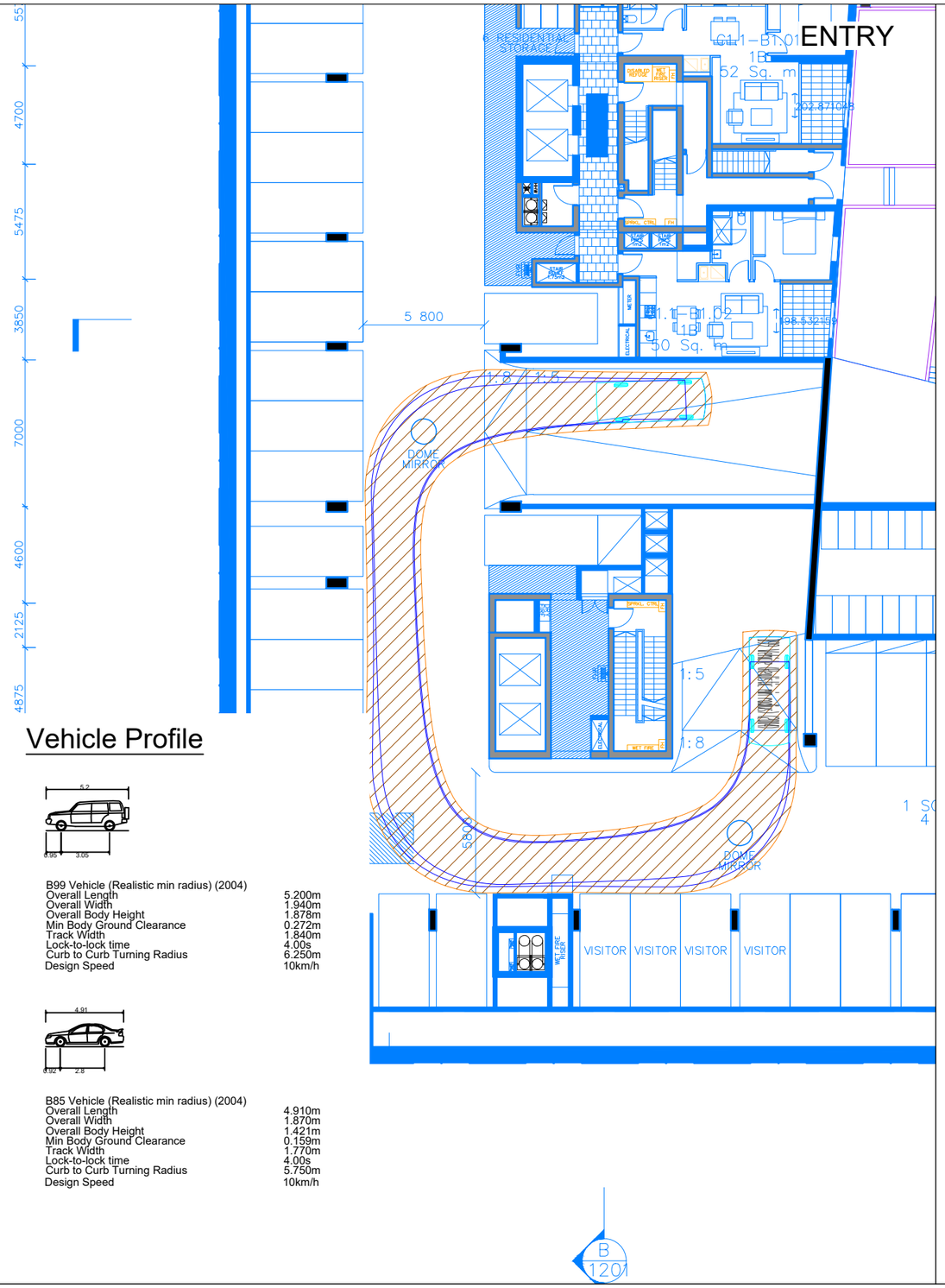

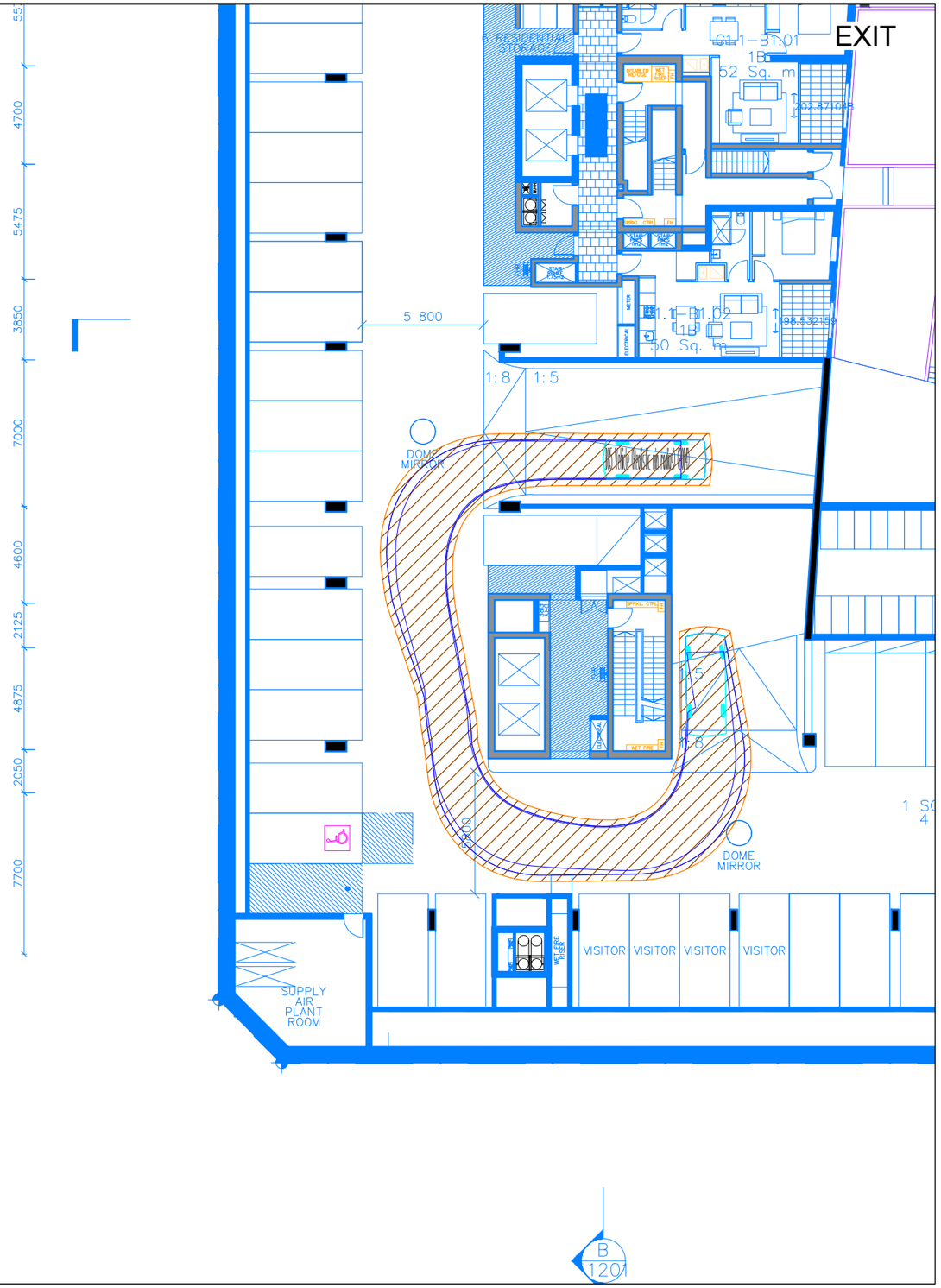

Vehicle Profile

B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m
Design Speed	10km/h

B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m
Design Speed	10km/h

B 1201

B 1201

Revision notes:

Rev:	Date:	Notes:
		Plan reference: S455 1104_FLOOR_PLAN_B1_ISSUE A

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Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Swept Path Analysis Basement 1

Date: 7-Dec-20

Scale @ A3: 1:250

Drawing Number: AG09

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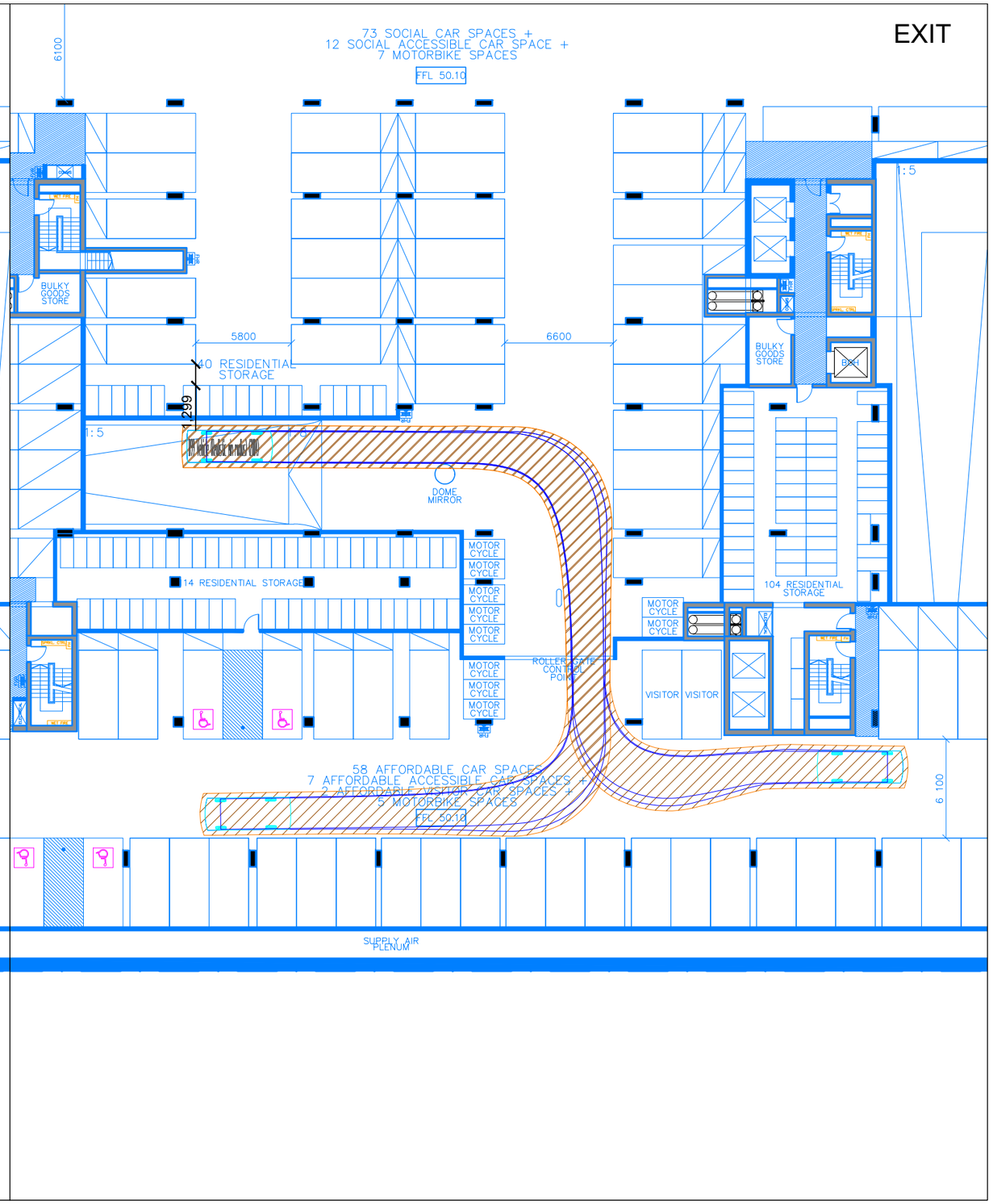

Vehicle Profile

B99 Vehicle (Realistic min radius) (2004)	
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m
Design Speed	10km/h

Revision notes:

Rev:	Date:	Notes:
		Plan reference: S455 1103_FLOOR_PLAN_B2_ISSUE A

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Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Swept Path Analysis Basement 2

Date: 7-Dec-20

Scale @ A3: 1:300

Drawing Number: AG10

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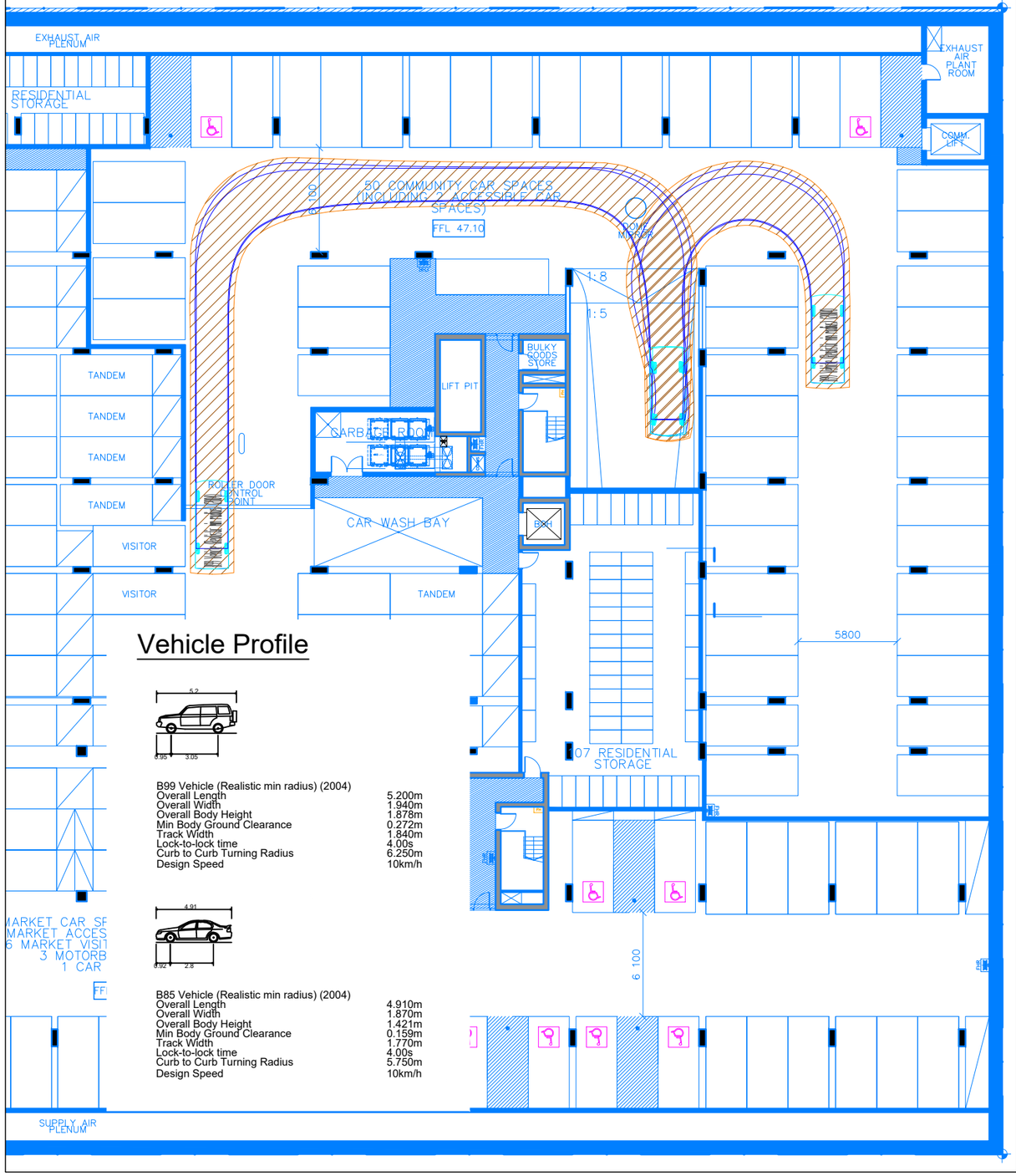
ENTRY

EXIT



Vehicle Profile

B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m
Design Speed	10km/h

B85 Vehicle (Realistic min radius) (2004)

Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m
Design Speed	10km/h

Revision notes:

Rev:	Date:	Notes:
		Plan reference: S455 1102_FLOOR_PLAN_B3_ISSUE A

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Drawn By: AT

Client: Frasers Property Australia

Project: 0555 Building C1, Ivanhoe Estate, Macquarie Park

Drawing Title: Swept Path Analysis Basement 3

Date: 7-Dec-20

Scale @ A3: 1:300

Drawing Number: AG11

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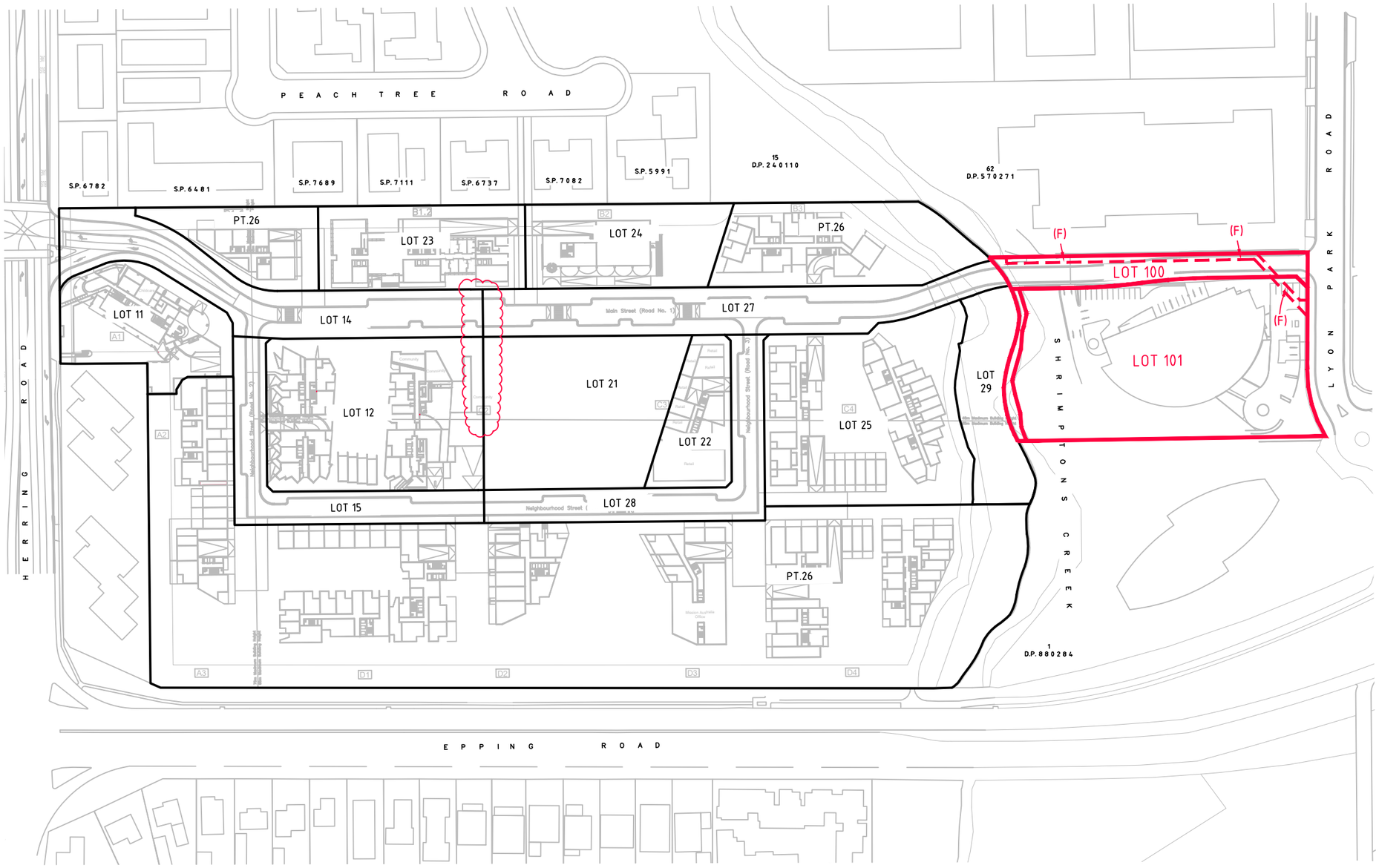
info@asongroup.com.au

LOCALITY: MACQUARIE PARK
LGA: RYDE

STAGE 1



EXISTING EASEMENTS:

(F) EASEMENT FOR DRAINAGE (R507051)

NOTES:

SERVICE EASEMENTS TO BE CREATED TO RELEVANT UTILITY AUTHORITIES REQUIREMENTS.

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF PLAN AT LAND AND PROPERTY INFORMATION OFFICE.

BASED ON DRAFT PLAN OF SUBDIVISION DATED: 22.7.19

SHEET 1 OF 9

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ORIGINAL SHEET SIZE A3
SURVEYOR: PM CHECKED: PM
DRAWN: RK DATE: 14.12.20

SCALE 1:2000
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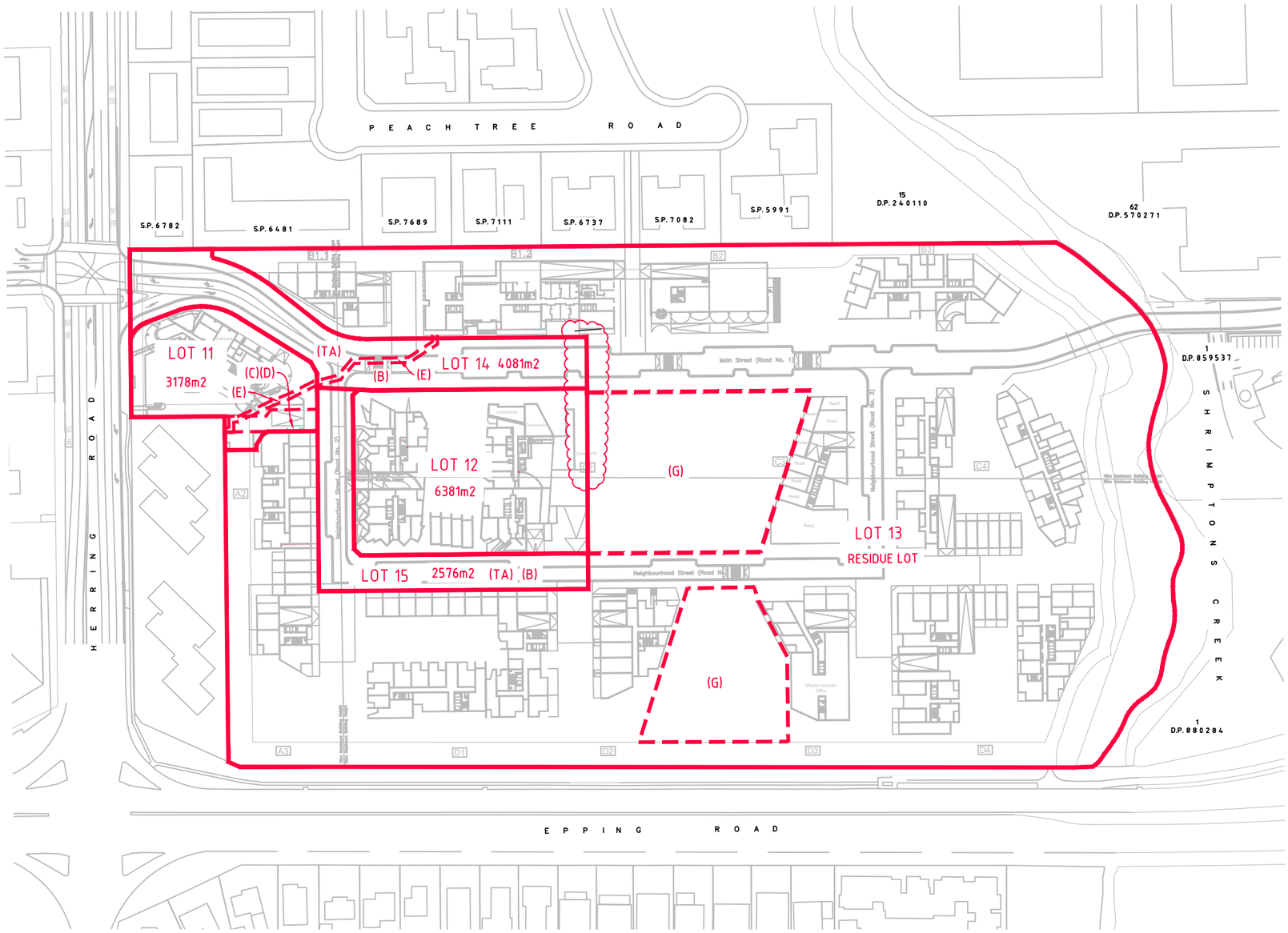
LENGTHS ARE IN METRES

FRASERS PROPERTY AUSTRALIA

PLAN OF PROPOSED SUBDIVISION OF
LOT 1 DP859537, LOTS 6-8, 10-20 DP861433,
LOT 5 DP740753, LOT 100 DP1223787 AND
LOT 101 DP1247443

LOCALITY: MACQUARIE PARK
LGA: RYDE

STAGE 2



PROPOSED EASEMENTS:

(A) EASEMENT FOR PUBLIC ACCESS
(B) EASEMENT FOR SERVICES
(C) EASEMENT FOR OVERLAND FLOW & EASEMENT DRAIN WATER
(D) RIGHT OF CARRIAGEWAY
(G) EASEMENT FOR PUBLIC PARK
(TA) TEMPORARY EASEMENT FOR PUBLIC ACCESS

EXISTING EASEMENTS:

(E) EASEMENT TO DRAIN WATER 2 WIDE & VARIABLE (D.P.1244080)

LOTS 10, 12 DP861433, LOT 100 DP1223787 AND LOT 101 DP1247443 HAVE EXISTING EASEMENTS NOT SHOWN ON THIS PLAN

NOTES:

IT IS INTENDED TO DEDICATE LOT 14 AS PUBLIC ROAD WITHIN 24 MONTHS OF THE COMPLETION OF STAGE 3.
IT IS INTENDED TO DEDICATE LOT 15 AS PUBLIC ROAD AT THE COMPLETION OF THE PROJECT.

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF PLAN AT LAND AND PROPERTY INFORMATION OFFICE.

BASED ON ARCHITECTURAL PLAN AS SUPPLIED:
BATES SMART ARCHITECTS
DRAWING No.DA02.MP.000
ISSUE 12 DATED 26.08.19

SHEET 2 OF 9

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SURVEYOR: PM CHECKED: PM
DRAWN: RK DATE: 14.12.20

SCALE 1:2000
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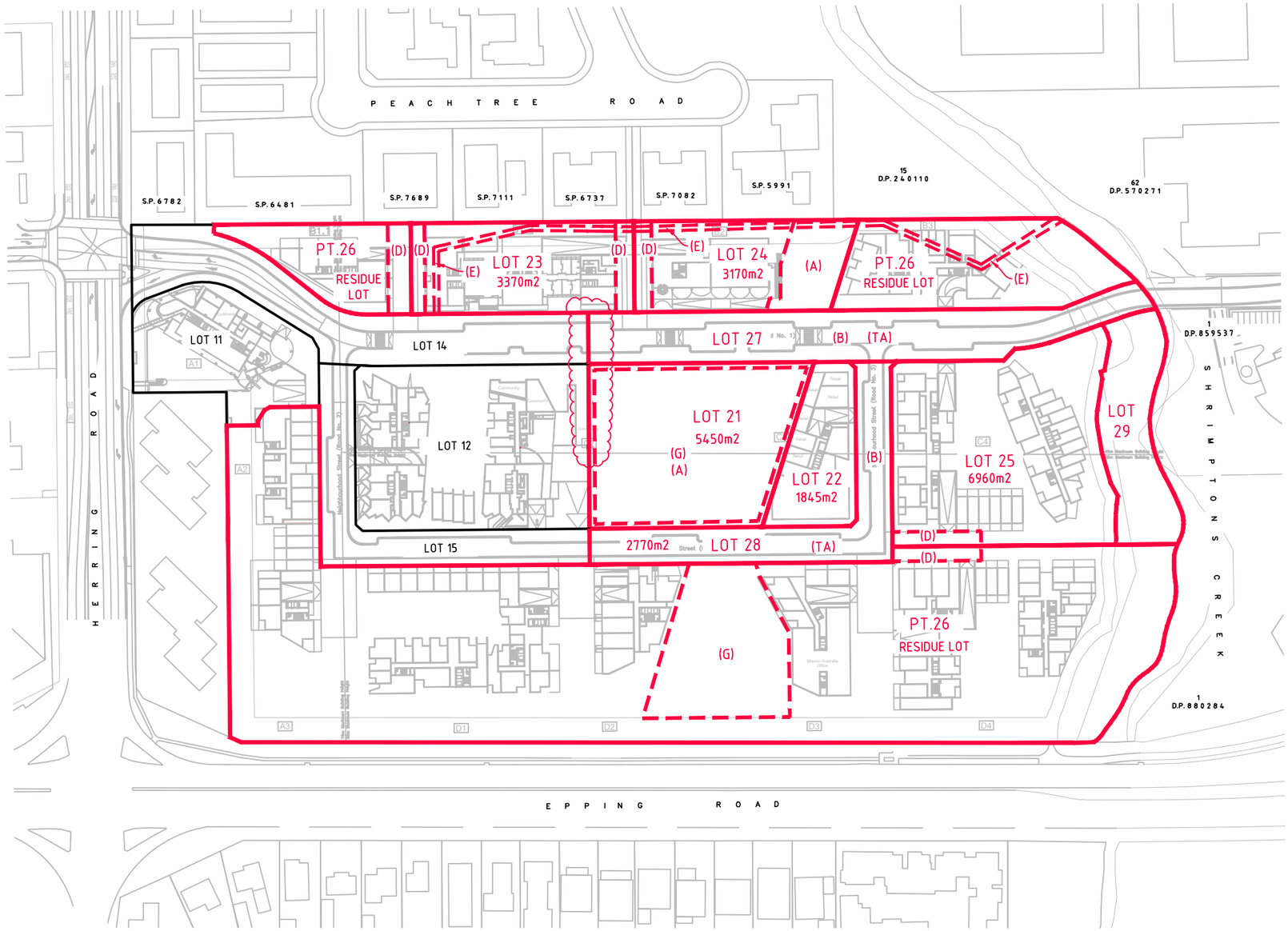
LENGTHS ARE IN METRES

FRASERS PROPERTY AUSTRALIA

PLAN OF PROPOSED SUBDIVISION OF LOT 1 DP859537, LOTS 6-8, 10-20 DP861433, LOT 5 DP740753, LOT 100 DP1223787 AND LOT 101 DP1247443

LOCALITY: MACQUARIE PARK
LGA: RYDE

STAGE 3



PROPOSED EASEMENTS:

(A) EASEMENT FOR PUBLIC ACCESS
(B) EASEMENT FOR SERVICES
(D) RIGHT OF CARRIAGEWAY
(G) EASEMENT FOR PUBLIC PARK
(TA) TEMPORARY EASEMENT FOR PUBLIC ACCESS

EXISTING EASEMENTS:

(E) EASEMENT TO DRAIN WATER 2 WIDE & VARIABLE (D.P.1244080)

LOTS 10, 12 DP861433, LOT 100 DP1223787 AND LOT 101 DP1247443 HAVE EXISTING EASEMENTS NOT SHOWN ON THIS PLAN

NOTES:

LOT 29 TO BE DEDICATED AS PUBLIC RESERVE AT A LATER DATE.

SERVICE EASEMENTS TO BE CREATED TO RELEVANT UTILITY AUTHORITIES REQUIREMENTS.

IT IS INTENDED TO DEDICATE LOT 27 AS PUBLIC ROAD WITHIN 24 MONTHS OF THE COMPLETION OF STAGE 3.
IT IS INTENDED TO DEDICATE LOT 28 AS PUBLIC ROAD AT THE COMPLETION OF THE PROJECT.

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF PLAN AT LAND AND PROPERTY INFORMATION OFFICE.

BASED ON ARCHITECTURAL PLAN AS SUPPLIED:
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DRAWN: RK DATE: 14.12.20

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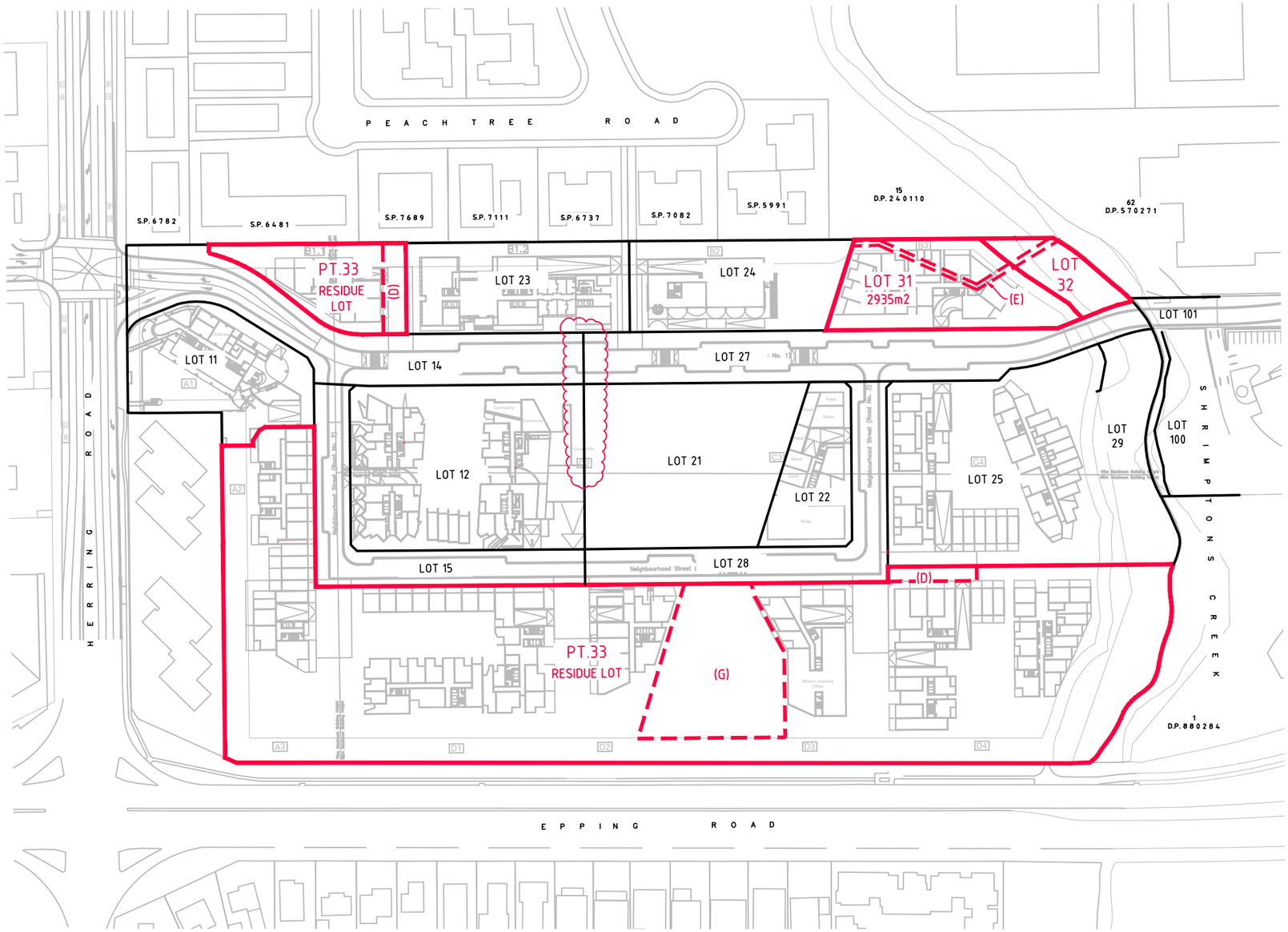
LENGTHS ARE IN METRES

FRASERS PROPERTY AUSTRALIA

PLAN OF PROPOSED SUBDIVISION OF
LOT 1 DP859537, LOTS 6-8, 10-20 DP861433,
LOT 5 DP740753, LOT 100 DP1223787 AND
LOT 101 DP1247443

LOCALITY: MACQUARIE PARK
LGA: RYDE

STAGE 4



PROPOSED EASEMENTS:

(A) EASEMENT FOR PUBLIC ACCESS
(B) EASEMENT FOR SERVICES
(D) RIGHT OF CARRIAGEWAY
(G) EASEMENT FOR PUBLIC PARK
(TA) TEMPORARY EASEMENT FOR PUBLIC ACCESS

EXISTING EASEMENTS:

(E) EASEMENT TO DRAIN WATER 2 WIDE & VARIABLE (D.P.1244080)

LOTS 10, 12 DP861433, LOT 100 DP1223787 AND LOT 101 DP1247443 HAVE EXISTING EASEMENTS NOT SHOWN ON THIS PLAN

NOTES:

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF PLAN AT LAND AND PROPERTY INFORMATION OFFICE.

BASED ON ARCHITECTURAL PLAN AS SUPPLIED:
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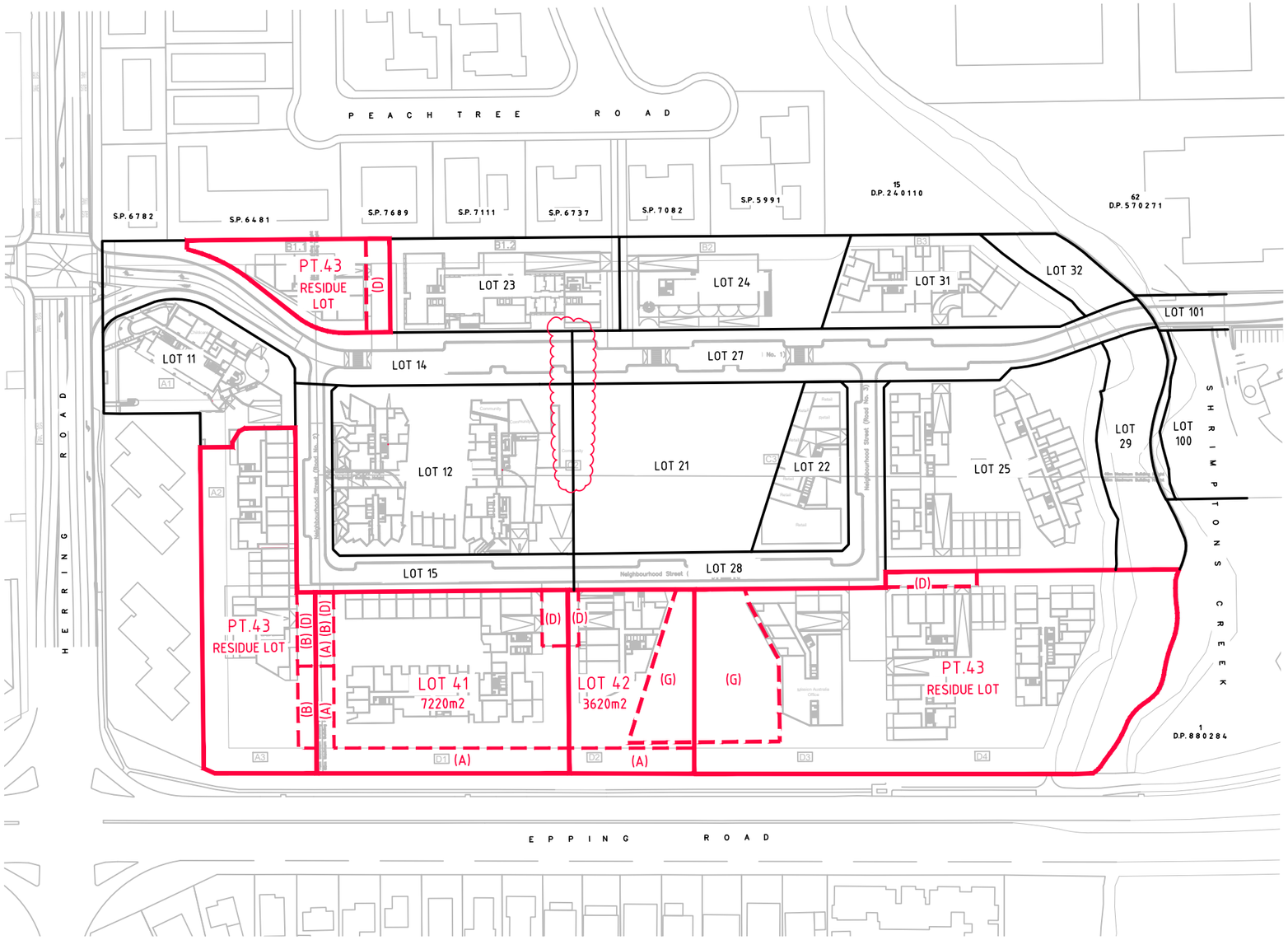
FRASERS PROPERTY AUSTRALIA

PLAN OF PROPOSED SUBDIVISION OF LOT 1 DP859537, LOTS 6-8, 10-20 DP861433, LOT 5 DP740753, LOT 100 DP1223787 AND LOT 101 DP1247443

LOCALITY: MACQUARIE PARK
LGA: RYDE

STAGE 5



PROPOSED EASEMENTS:

(A) EASEMENT FOR PUBLIC ACCESS
(B) EASEMENT FOR SERVICES
(D) RIGHT OF CARRIAGEWAY
(G) EASEMENT FOR PUBLIC PARK
(TA) TEMPORARY EASEMENT FOR PUBLIC ACCESS

EXISTING EASEMENTS:

(E) EASEMENT TO DRAIN WATER 2 WIDE & VARIABLE (D.P.1244080)

LOTS 10, 12 DP861433, LOT 100 DP1223787 AND LOT 101 DP1247443 HAVE EXISTING EASEMENTS NOT SHOWN ON THIS PLAN

NOTES:

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF PLAN AT LAND AND PROPERTY INFORMATION OFFICE.

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DRAWN: RK DATE: 14.12.20

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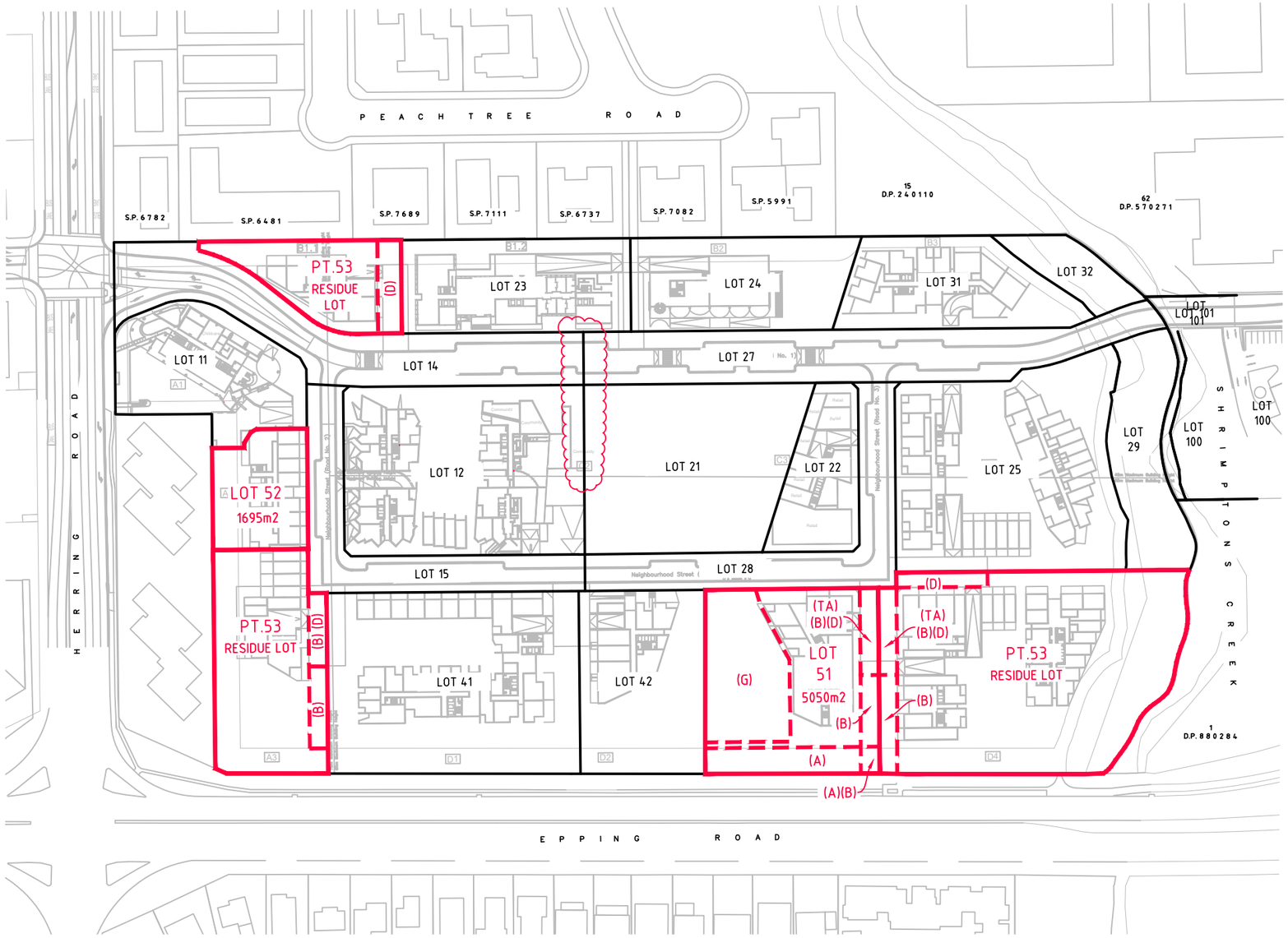
LENGTHS ARE IN METRES

FRASERS PROPERTY AUSTRALIA

PLAN OF PROPOSED SUBDIVISION OF
LOT 1 DP859537, LOTS 6-8, 10-20 DP861433,
LOT 5 DP740753, LOT 100 DP1223787 AND
LOT 101 DP1247443

LOCALITY: MACQUARIE PARK
LGA: RYDE

STAGE 6



PROPOSED EASEMENTS:

(A) EASEMENT FOR PUBLIC ACCESS
(B) EASEMENT FOR SERVICES
(D) RIGHT OF CARRIAGEWAY
(G) EASEMENT FOR PUBLIC PARK
(TA) TEMPORARY EASEMENT FOR PUBLIC ACCESS

EXISTING EASEMENTS:

LOTS 10, 12 DP861433, LOT 100 DP1223787 AND LOT 101 DP1247443 HAVE EXISTING EASEMENTS NOT SHOWN ON THIS PLAN

NOTES:

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF PLAN AT LAND AND PROPERTY INFORMATION OFFICE.

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DRAWN: RK DATE: 14.12.20

SCALE 1:2000
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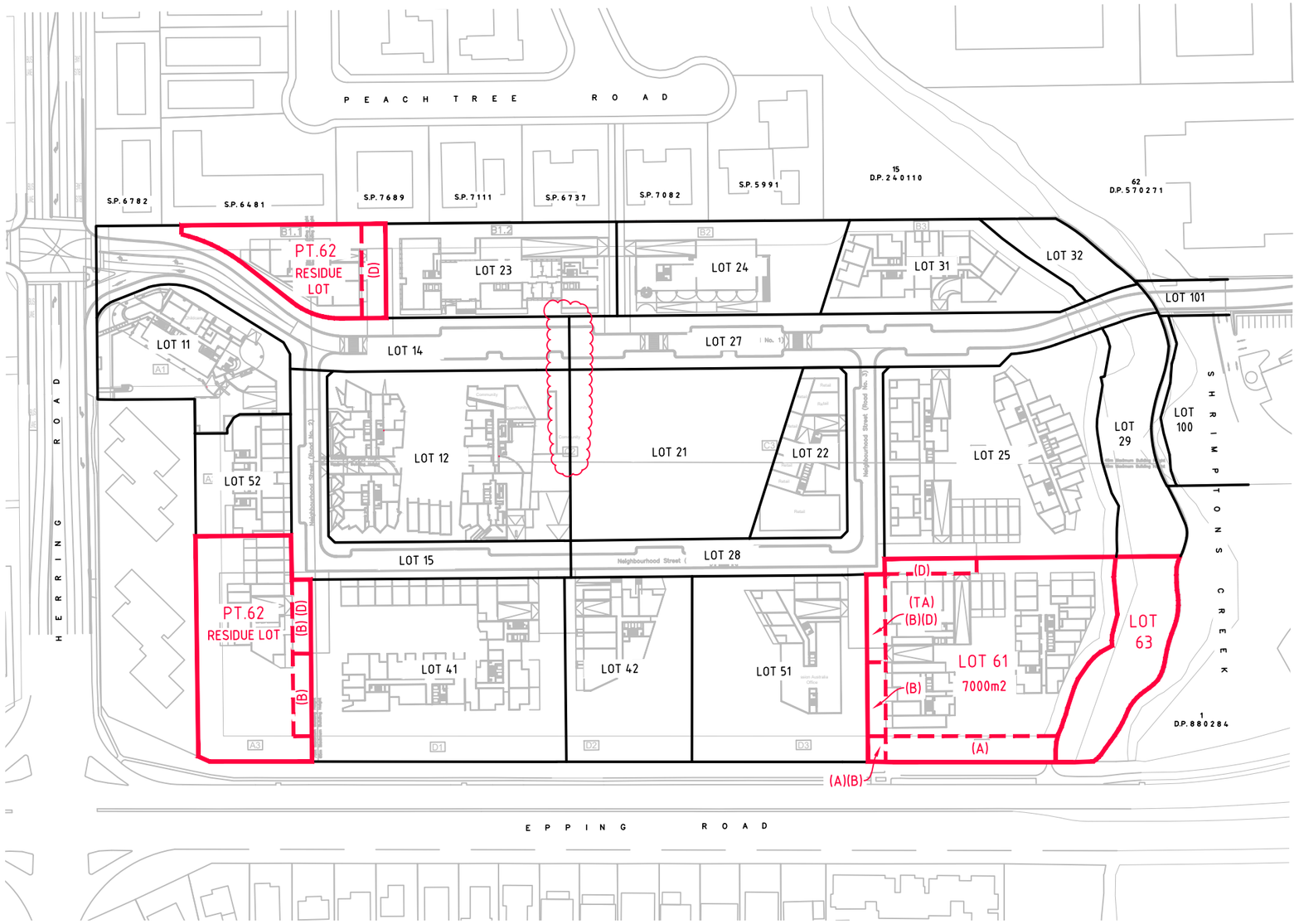
LENGTHS ARE IN METRES

FRASERS PROPERTY AUSTRALIA

PLAN OF PROPOSED SUBDIVISION OF
LOT 1 DP859537, LOTS 6-8, 10-20 DP861433,
LOT 5 DP740753, LOT 100 DP1223787 AND
LOT 101 DP1247443

LOCALITY: MACQUARIE PARK
LGA: RYDE

STAGE 7



PROPOSED EASEMENTS:

(A) EASEMENT FOR PUBLIC ACCESS
(B) EASEMENT FOR SERVICES
(D) RIGHT OF CARRIAGEWAY
(TA) TEMPORARY EASEMENT FOR PUBLIC ACCESS

EXISTING EASEMENTS:

LOTS 10, 12 DP861433, LOT 100 DP1223787 AND LOT 101 DP1247443 HAVE EXISTING EASEMENTS NOT SHOWN ON THIS PLAN

NOTES:

LOT 63 IS TO BE DEDICATED AS PUBLIC RESERVE AT A LATER DATE.

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF PLAN AT LAND AND PROPERTY INFORMATION OFFICE.

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ORIGINAL SHEET SIZE A3
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DRAWN: RK DATE: 14.12.20

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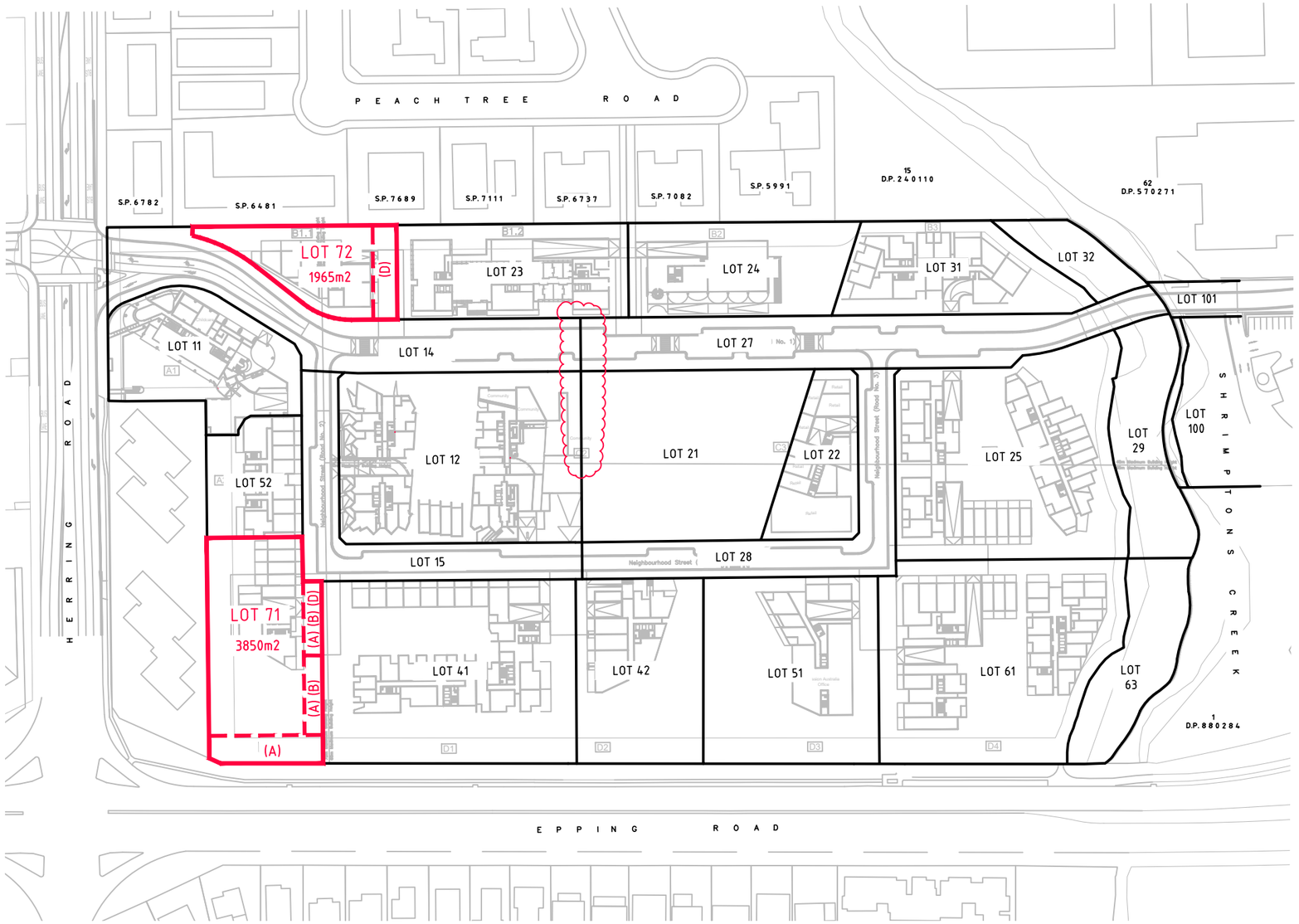
LENGTHS ARE IN METRES

FRASERS PROPERTY AUSTRALIA

PLAN OF PROPOSED SUBDIVISION OF
LOT 1 DP859537, LOTS 6-8, 10-20 DP861433,
LOT 5 DP740753, LOT 100 DP1223787 AND
LOT 101 DP1247443

LOCALITY: MACQUARIE PARK
LGA: RYDE

STAGE 8



PROPOSED EASEMENTS:

(A) EASEMENT FOR PUBLIC ACCESS
(B) EASEMENT FOR SERVICES
(D) RIGHT OF CARRIAGEWAY

EXISTING EASEMENTS:

LOTS 10, 12 DP861433, LOT 100 DP1223787 AND LOT 101 DP1247443 HAVE EXISTING EASEMENTS NOT SHOWN ON THIS PLAN

NOTES:

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF PLAN AT LAND AND PROPERTY INFORMATION OFFICE.

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ORIGINAL SHEET SIZE A3
SURVEYOR: PM CHECKED: PM
DRAWN: RK DATE: 14.12.20

SCALE 1:2000
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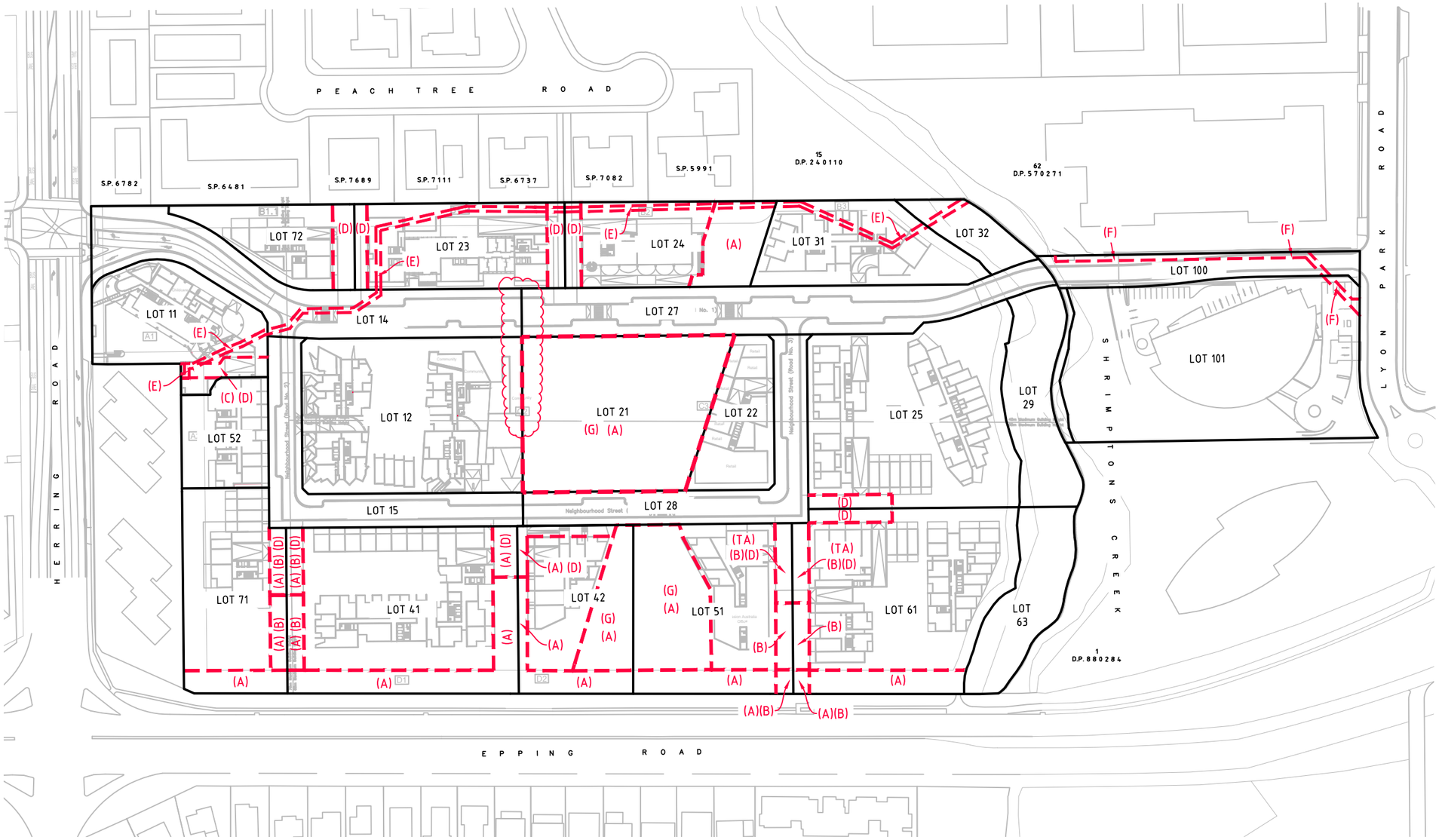
LENGTHS ARE IN METRES

FRASERS PROPERTY AUSTRALIA

PLAN OF PROPOSED SUBDIVISION OF LOT 1 DP859537, LOTS 6-8, 10-20 DP861433, LOT 5 DP740753, LOT 100 DP1223787 AND LOT 101 DP1247443

LOCALITY: MACQUARIE PARK
LGA: RYDE

EASEMENT SUMMARY



PROPOSED EASEMENTS:

(A) EASEMENT FOR PUBLIC ACCESS
(B) EASEMENT FOR SERVICES
(C) EASEMENT FOR OVERLAND FLOW & EASEMENT TO DRAIN WATER
(D) RIGHT OF CARRIAGEWAY
(G) EASEMENT FOR PUBLIC PARK
(TA) TEMPORARY EASEMENT FOR PUBLIC ACCESS

EXISTING EASEMENTS:

(E) EASEMENT TO DRAIN WATER 2 WIDE & VARIABLE (D.P.1244080)
(F) EASEMENT FOR DRAINAGE (R507051)

NOTES:

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AND REGISTRATION OF PLAN AT LAND AND PROPERTY INFORMATION OFFICE.

BASED ON ARCHITECTURAL PLAN AS SUPPLIED:
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Development & Environment Consultants
Registered Surveyors
Sydney: (02) 9283 6677 www.beveridgewilliams.com.au

CAD REFERENCE: 1601644-STAGING-200128.dwg

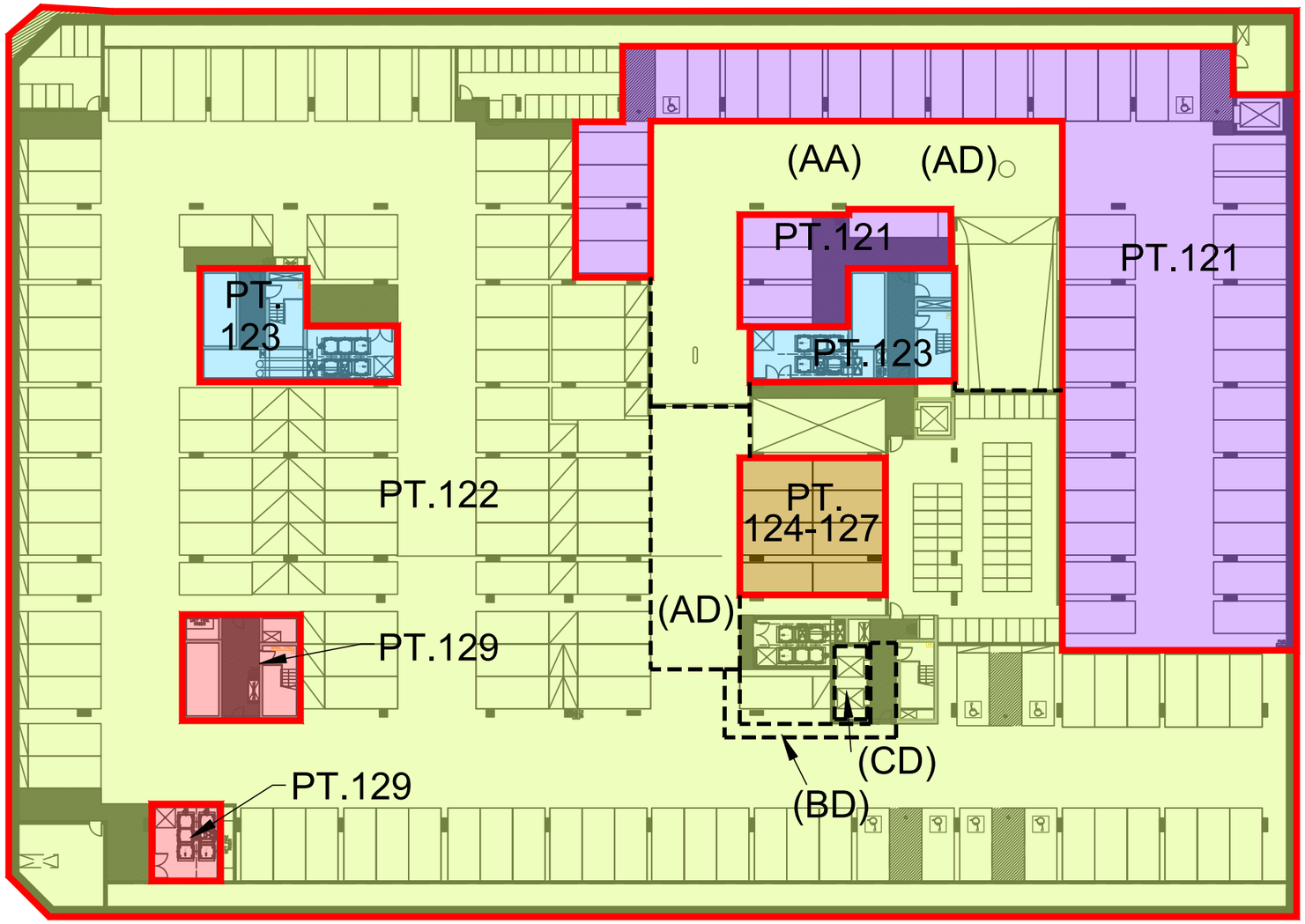
SURVEYORS REF. 1601644 VERSION 10
ORIGINAL SHEET SIZE A3
SURVEYOR: PM CHECKED: PM
DRAWN: RK DATE: 28.01.20

SCALE 1:2000
0 20 40 60 80
LENGTHS ARE IN METRES

FRASERS PROPERTY AUSTRALIA

PLAN OF PROPOSED SUBDIVISION OF
LOT 1 DP859537, LOTS 6-8, 10-20 DP861433,
LOT 5 DP740753, LOT 100 DP1223787 AND
LOT 101 DP1247443

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH (LIMITED IN STRATUM) (AA) BENEFITING LOT 121
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH (LIMITED IN STRATUM) (AD) BENEFITING LOTS 124 – 127
- EASEMENT FOR ACCESS 1 WIDE (LIMITED IN STRATUM) (BD) BENEFITING LOTS 124 – 127
- EASEMENT FOR ACCESS – LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CD) BENEFITING LOTS 124 – 127

ARCHITECHTURAL PLAN: 5800 S4.55-1102 ISSUE: P3

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AFTER CONSTRUCTION AND REGISTRATION OF PLAN AT THE NSW LAND REGISTRY SERVICES OFFICE

SITES OF EASEMENTS ARE SUBJECT TO DESIGN AND CONSTRUCTION VARIATIONS

LOTS 121-127 & 129 ARE STRATUM LOTS AT BASEMENT 3 AND ARE LIMITED IN DEPTH & HEIGHT TO THE CENTRE OF THE CONCRETE SLAB THAT FORMS THE FLOOR & CEILING.

- LOT 121 – COMMUNITY
- LOT 122 – MARKET
- LOT 123 – SOCIAL
- LOT 124 TO 127 – TERRACE
- LOT 129 – AFFORDABLE

BASEMENT 3

0 8 16 24
SCALE ON ORIGINAL DRAWING AT 1:400

VER	BY	AMENDMENTS	DATE
9	D.W.	S4.55 AMENDMENTS	24.11.20
10	D.W.	AMENDMENTS	2.12.20

Beveridge Williams
Registered Surveyors
Land Development
Consultants
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CLIENT: FRASERS PROPERTY AUSTRALIA

DETAILS: PLAN OF PROPOSED STRATUM SUBDIVISION OF LOT 12 DP

ORIGINAL SCALE 1:400

SHEET SIZE A3

SURVEYOR:	D.G.W.
DRAWN:	J.T.
CHECKED:	P.J.M.
SURVEY DATE:	12/11/2020
CAD REFERENCE:	1601644_STRATUM_201123

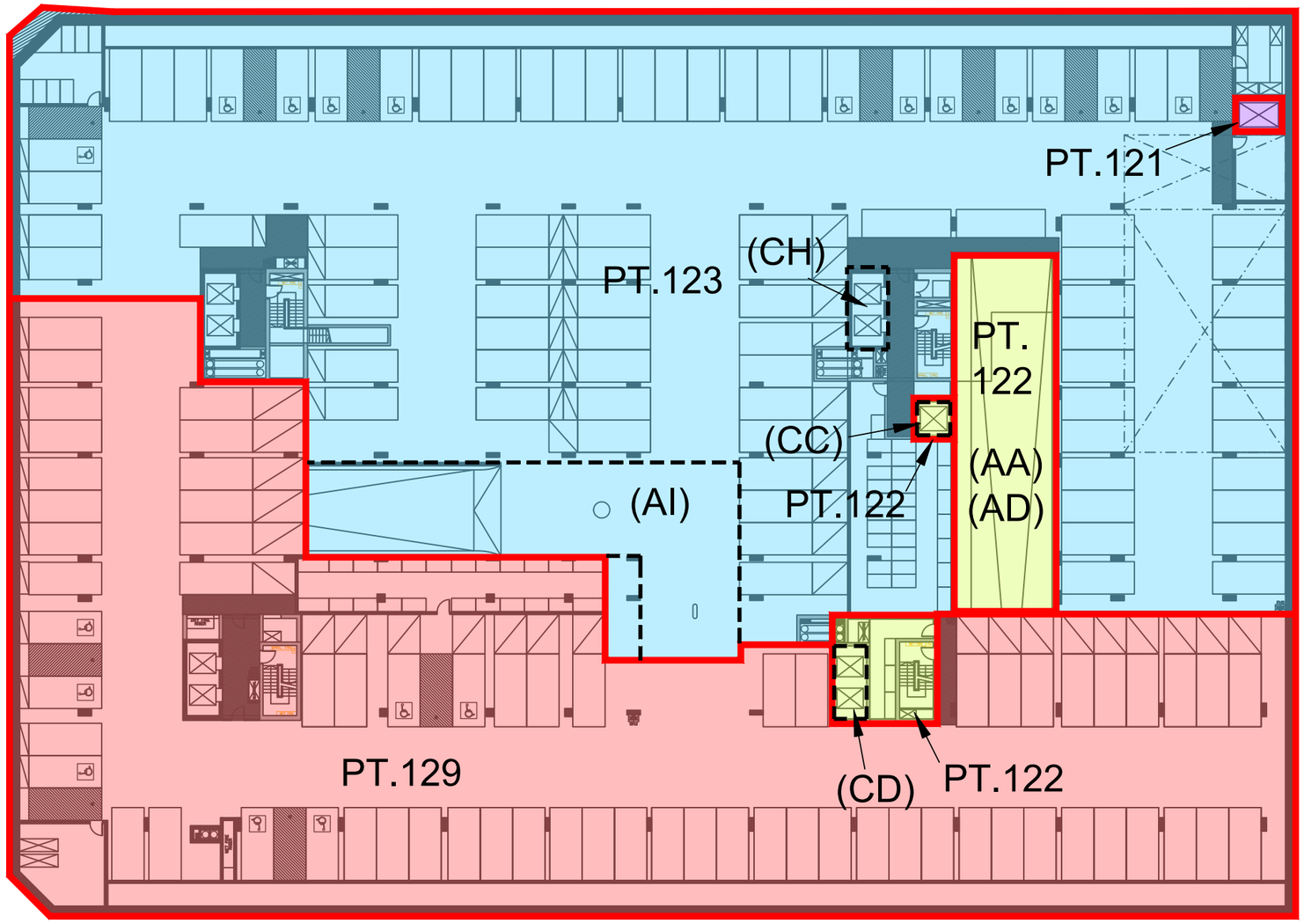
SHEET 1 OF 13

PROJECT No. 1601644

DRAWING REF. LOT 12 - STRATUM

VERSION 10

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



LOT 121 – COMMUNITY
LOT 122 – MARKET
LOT 123 – SOCIAL
LOT 129 – AFFORDABLE

BASEMENT 2

EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH (LIMITED IN STRATUM) (AA) BENEFITING LOT 121
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH (LIMITED IN STRATUM) (AD) BENEFITING LOTS 124 – 127
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH (LIMITED IN STRATUM) (AI) BENEFITING LOT 129
- EASEMENT FOR ACCESS – LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CC) BENEFITING LOT 123, 128, 129
- EASEMENT FOR ACCESS – LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CD) BENEFITING LOTS 124 – 127
- EASEMENT FOR ACCESS – LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CH) BENEFITING LOT 128

NOTE

- LOT 128 (SOCIAL ILU) REQUIRES RIGHTS FOR ACCESS AND PARKING AT THIS LEVEL WITHIN LOT 123 (SOCIAL) TO BE INCORPORATED INTO THE MANAGEMENT STATEMENTS THAT ACCOMPANY THE STRATUM AND STRATA PLANS

ARCHITECHTURAL PLAN: 5800 S4.55-1102 ISSUE: P3

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AFTER CONSTRUCTION AND REGISTRATION OF PLAN AT THE NSW LAND REGISTRY SERVICES OFFICE

SITES OF EASEMENTS ARE SUBJECT TO DESIGN AND CONSTRUCTION VARIATIONS

LOTS 121 – 123 & 129 ARE STRATUM LOTS AT BASEMENT 2 AND ARE LIMITED IN DEPTH & HEIGHT TO THE CENTRE OF THE CONCRETE SLAB THAT FORMS THE FLOOR & CEILING.

0 8 16 24
SCALE ON ORIGINAL DRAWING AT 1:400

VER	BY	AMENDMENTS	DATE
9	D.W.	S4.55 AMENDMENTS	24.11.20
10	D.W.	AMENDMENTS	2.12.20

Beveridge Williams
Registered Surveyors
Land Development
Consultants
(02) 9283 6677 www.beveridgewilliams.com.au

CLIENT: FRASERS PROPERTY AUSTRALIA

DETAILS: PLAN OF PROPOSED STRATUM SUBDIVISION OF LOT 12 DP

ORIGINAL SCALE 1:400

SHEET SIZE A3

SURVEYOR:	D.G.W.
DRAWN:	J.T.
CHECKED:	P.J.M.
SURVEY DATE:	12/11/2020
CAD REFERENCE:	1601644_STRATUM_201123

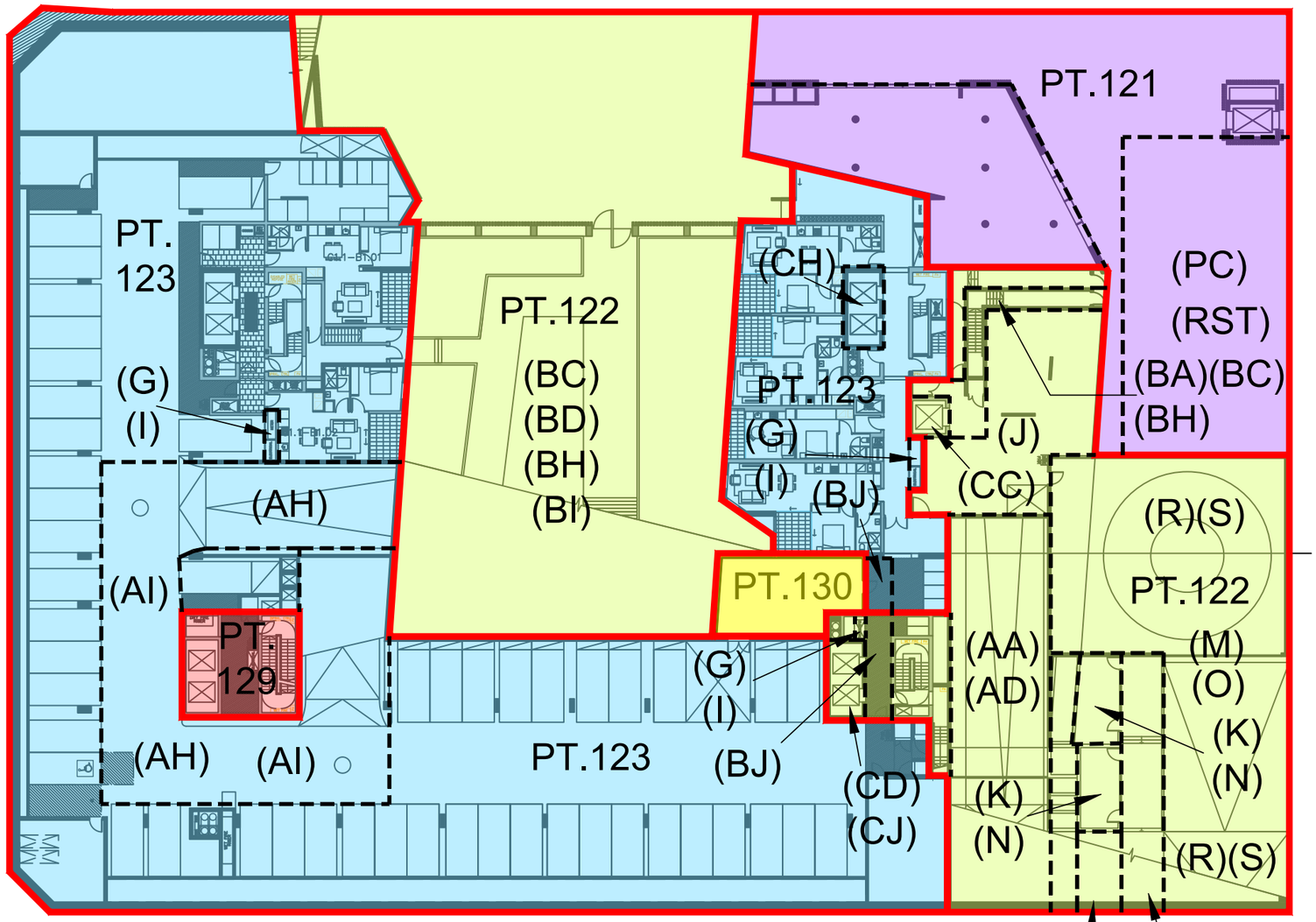
SHEET 2 OF 13

PROJECT No. 1601644
DRAWING REF. LOT 12 - STRATUM
VERSION 10

NOTE

- LOT 128 (SOCIAL ILU) REQUIRES RIGHTS FOR ACCESS AND PARKING AT THIS LEVEL WITHIN LOT 123 (SOCIAL) TO BE INCORPORATED INTO THE MANAGEMENT STATEMENTS THAT ACCOMPANY THE STRATUM AND STRATA PLANS

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH (LIMITED IN STRATUM)
  (AA) BENEFITING LOT 121 (AD) BENEFITING LOTS 124 – 127
  (AH) BENEFITING LOT 128 (AI) BENEFITING LOT 129
- EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM)
  (BA) BENEFITING LOT 121 (BC) BENEFITING LOT 123
  (BH) BENEFITING LOT 128 (BI) BENEFITING LOT 129
  (BD) BENEFITING LOTS 124 – 127 (BJ) BENEFITING LOT 130
- EASEMENT FOR ACCESS – LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CC) BENEFITING LOT 123, 128, 129
- EASEMENT FOR ACCESS – LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CD) BENEFITING LOTS 124 – 127
- EASEMENT FOR ACCESS – LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CH) BENEFITING LOT 128
- EASEMENT FOR ACCESS – LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CJ) BENEFITING LOT 130
- EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE (G) LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) LOCATION TO BE CONFIRMED
- EASEMENT FOR GARBAGE AND WASTE STORAGE VARIABLE WIDTH (LIMITED IN STRATUM) (J)
- EASEMENT FOR SUBSTATION PREMISES (K)
- EASEMENT TO ACCESS AND USE LOADING DOCK VARIABLE WIDTH (LIMITED IN STRATUM) (M)
- EASEMENT FOR UNDERGROUND CABLES VARIABLE WIDTH (N)
- RIGHT OF ACCESS VARIABLE WIDTH (O)
- POSITIVE COVENANT – OSD (PC) TO BE CONFIRMED
- RESTRICTION ON USE OF LAND – OSD & RWT (RST) TO BE CONFIRMED
- EASEMENT TO ACCESS GARBAGE VARIABLE WIDTH (LIMITED IN STRATUM) (R)
- POSITIVE COVENANT (GARBAGE COLLECTION AREA) (S)

- LOT 121 – COMMUNITY
- LOT 122 – MARKET
- LOT 123 – SOCIAL
- LOT 129 – AFFORDABLE
- LOT 130 – REAL UTILITIES (LOCATION TO BE CONFIRMED)

0 8 16 24

SCALE ON ORIGINAL DRAWING AT 1:400

ARCHITECHTURAL PLAN: 5800 S4.55-1102 ISSUE: P3

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AFTER CONSTRUCTION AND REGISTRATION OF PLAN AT THE NSW LAND REGISTRY SERVICES OFFICE

SITES OF EASEMENTS ARE SUBJECT TO DESIGN AND CONSTRUCTION VARIATIONS

LOTS 121 – 123, 129 & 130 ARE STRATUM LOTS AT BASEMENT 1 AND ARE LIMITED IN DEPTH & HEIGHT TO THE CENTRE OF THE CONCRETE SLAB THAT FORMS THE FLOOR & CEILING.

BASEMENT 1

VER	BY	AMENDMENTS	DATE
9	D.W.	S4.55 AMENDMENTS	24.11.20
10	D.W.	AMENDMENTS	2.12.20

Beveridge Williams
Registered Surveyors
Land Development
Consultants
(02) 9283 6677 www.beveridgewilliams.com.au

CLIENT: FRASERS PROPERTY AUSTRALIA

DETAILS: PLAN OF PROPOSED STRATUM SUBDIVISION OF LOT 12 DP

ORIGINAL SCALE 1:400

SHEET SIZE A3

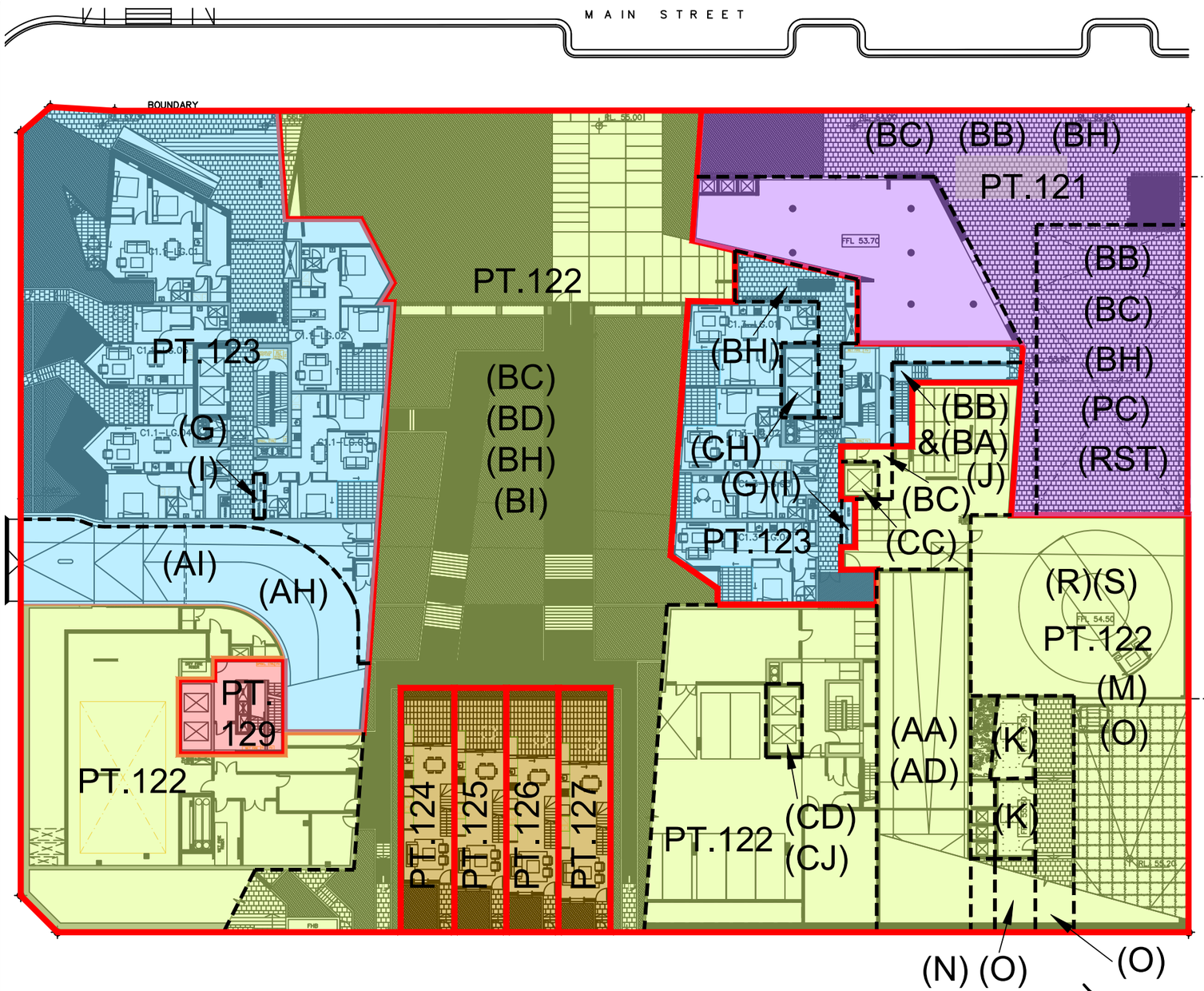
SURVEYOR:	D.G.W.
DRAWN:	J.T.
CHECKED:	P.J.M.
SURVEY DATE:	12/11/2020
CAD REFERENCE:	1601644_STRATUM_201123

SHEET 3 OF 13

PROJECT No. 1601644

DRAWING REF. LOT 12 - STRATUM

VERSION 10



- LOT 121 – COMMUNITY
- LOT 122 – MARKET
- LOT 123 – SOCIAL
- LOT 124 TO 127 – TERRACE
- LOT 129 – AFFORDABLE

0 8 16 24

SCALE ON ORIGINAL DRAWING AT 1:400

LOWER GROUND FLOOR

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK

EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH (LIMITED IN STRATUM) (A)
  (AA) BENEFITING LOT 121 (AD) BENEFITING LOTS 124 – 127
  (AI) BENEFITING LOT 129 (AH) BENEFITING LOT 128
- EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (B)
  (BA) BENEFITING LOT 121 (BB) BENEFITING LOT 122
  (BC) BENEFITING LOT 123 (BD) BENEFITING LOTS 124 – 127
  (BH) BENEFITING LOT 128 (BI) BENEFITING LOT 129
- EASEMENT FOR ACCESS LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (C)
  (CC) BENEFITING LOT 123, 128, 129 (CD) BENEFITING LOTS 124 – 127
  (CH) BENEFITING LOT 128 (CJ) BENEFITING LOT 130
- EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE (G) LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) LOCATION TO BE CONFIRMED
- EASEMENT FOR GARBAGE AND WASTE STORAGE VARIABLE WIDTH (LIMITED IN STRATUM) (J)
- EASEMENT FOR INDOOR SUBSTATION (K)
- EASEMENT TO ACCESS AND USE LOADING DOCK VARIABLE WIDTH (LIMITED IN STRATUM) (M)
- EASEMENT FOR UNDERGROUND CABLES VARIABLE WIDTH (N)
- RIGHT OF ACCESS VARIABLE WIDTH (O)
- POSITIVE COVENANT – OSD (PC) TO BE CONFIRMED
- RESTRICTION ON USE OF LAND – OSD (RST) TO BE CONFIRMED
- EASEMENT TO ACCESS GARBAGE VARIABLE WIDTH (LIMITED IN STRATUM) (R)
- POSITIVE COVENANT (GARBAGE COLLECTION AREA) (S)

ARCHITECHTURAL PLAN: 5800 S4.55-1102 ISSUE: P3
AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AFTER CONSTRUCTION AND REGISTRATION OF PLAN AT THE NSW LAND REGISTRY SERVICES OFFICE
SITES OF EASEMENTS ARE SUBJECT TO DESIGN AND CONSTRUCTION VARIATIONS
LOTS 121 – 127 & 129 ARE STRATUM LOTS AT LOWER GROUND FLOOR AND ARE LIMITED IN DEPTH & HEIGHT TO THE CENTRE OF THE CONCRETE SLAB THAT FORMS THE FLOOR & CEILING.

VER	BY	AMENDMENTS	DATE
9	D.W.	S4.55 AMENDMENTS	24.11.20
10	D.W.	AMENDMENTS	2.12.20

Beveridge Williams
Registered Surveyors
Land Development
Consultants
(02) 9283 6677 www.beveridgewilliams.com.au

CLIENT: FRASERS PROPERTY AUSTRALIA

DETAILS: PLAN OF PROPOSED STRATUM SUBDIVISION OF LOT 12 DP

ORIGINAL SCALE 1:400

SHEET SIZE A3

SURVEYOR:	D.G.W.
DRAWN:	J.T.
CHECKED:	P.J.M.
SURVEY DATE:	12/11/2020
CAD REFERENCE:	1601644_STRATUM_201123

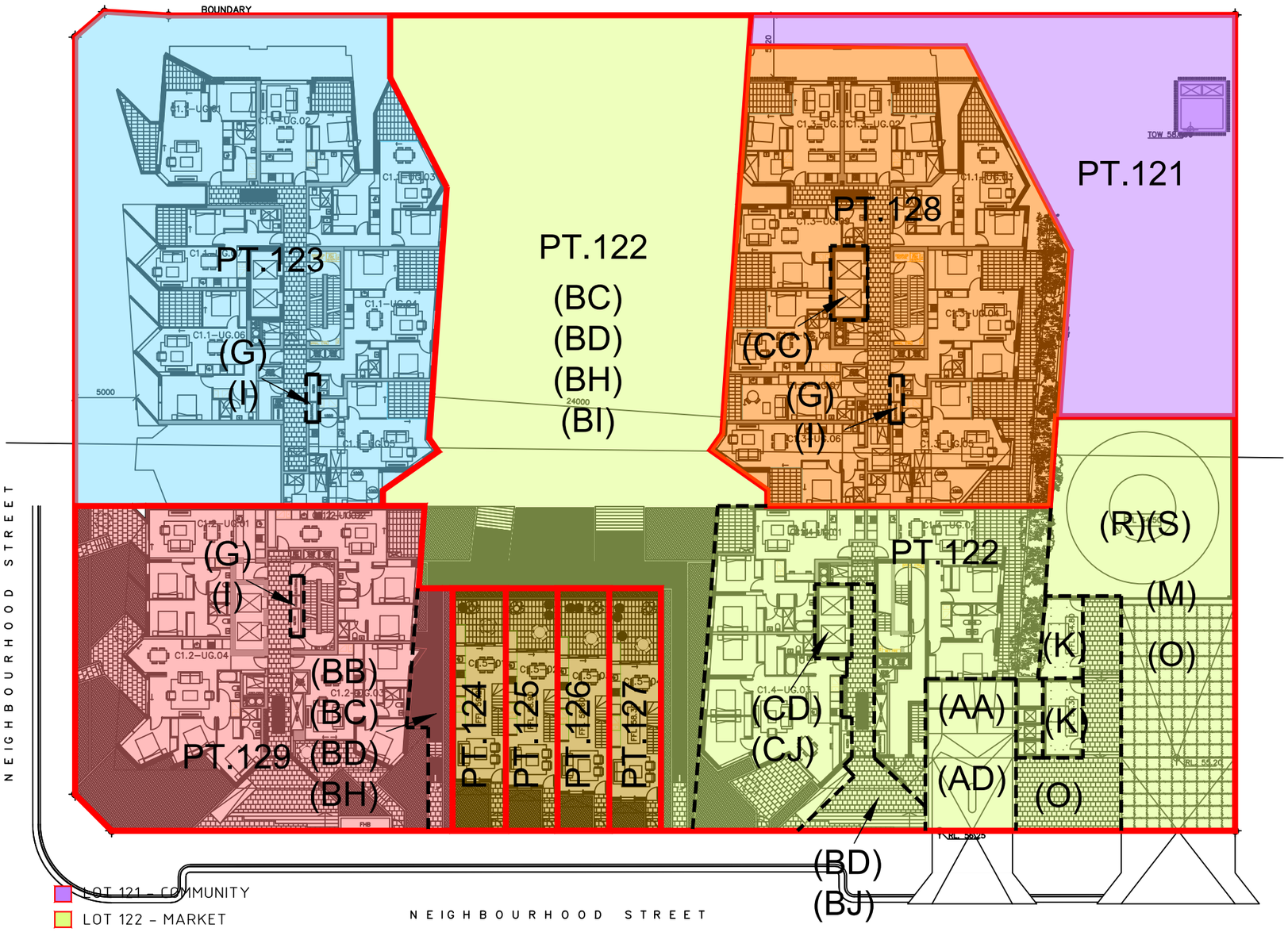
SHEET 4 OF 13

PROJECT No. 1601644

DRAWING REF. LOT 12 - STRATUM

VERSION 10

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



LOT 121 – COMMUNITY
LOT 122 – MARKET
LOT 123 – SOCIAL
LOT 124 TO 127 – TERRACE
LOT 128 – SOCIAL – ILUs
LOT 129 – AFFORDABLE

0 8 16 24
SCALE ON ORIGINAL DRAWING AT 1:400

UPPER GROUND FLOOR

EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH (LIMITED IN STRATUM) (A)
  (AA) BENEFITING LOT 121 (AD) BENEFITING LOTS 124 – 127
- EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (B)
  (BB) BENEFITING LOT 122 (BC) BENEFITING LOT 123
  (BH) BENEFITING LOT 128 (BI) BENEFITING LOT 129
  (BD) BENEFITING LOTS 124 – 127 (BJ) BENEFITING LOT 130
- EASEMENT FOR ACCESS LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (C)
  (CC) BENEFITING LOT 123 (CD) BENEFITING LOTS 124 – 127
  (CJ) BENEFITING LOT 130
- EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE (G) – LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) – LOCATION TO BE CONFIRMED
- EASEMENT FOR SUBSTATION PREMISES (K)
- EASEMENT TO ACCESS AND USE LOADING DOCK VARIABLE WIDTH (LIMITED IN STRATUM) (M)
- EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (O)
- EASEMENT TO ACCESS GARBAGE VARIABLE WIDTH (LIMITED IN STRATUM) (R)
- POSITIVE COVENANT (GARBAGE COLLECTION AREA) (S)

ARCHITECHTURAL PLAN: 5800 S4.55-1102 ISSUE: P3
AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AFTER CONSTRUCTION AND REGISTRATION OF PLAN AT THE NSW LAND REGISTRY SERVICES OFFICE
SITES OF EASEMENTS ARE SUBJECT TO DESIGN AND CONSTRUCTION VARIATIONS
LOTS 121 – 129 ARE STRATUM LOTS AT UPPER GROUND FLOOR AND ARE LIMITED IN DEPTH & HEIGHT TO THE CENTRE OF THE CONCRETE SLAB THAT FORMS THE FLOOR & CEILING.

VER	BY	AMENDMENTS	DATE
9	D.W.	S4.55 AMENDMENTS	24.11.20
10	D.W.	AMENDMENTS	2.12.20

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CLIENT: FRASERS PROPERTY AUSTRALIA

DETAILS: PLAN OF PROPOSED STRATUM SUBDIVISION OF LOT 12 DP

ORIGINAL SCALE 1:400

SHEET SIZE A3

SURVEYOR:	D.G.W.
DRAWN:	J.T.
CHECKED:	P.J.M.
SURVEY DATE:	12/11/2020
CAD REFERENCE:	1601644_STRATUM_201123

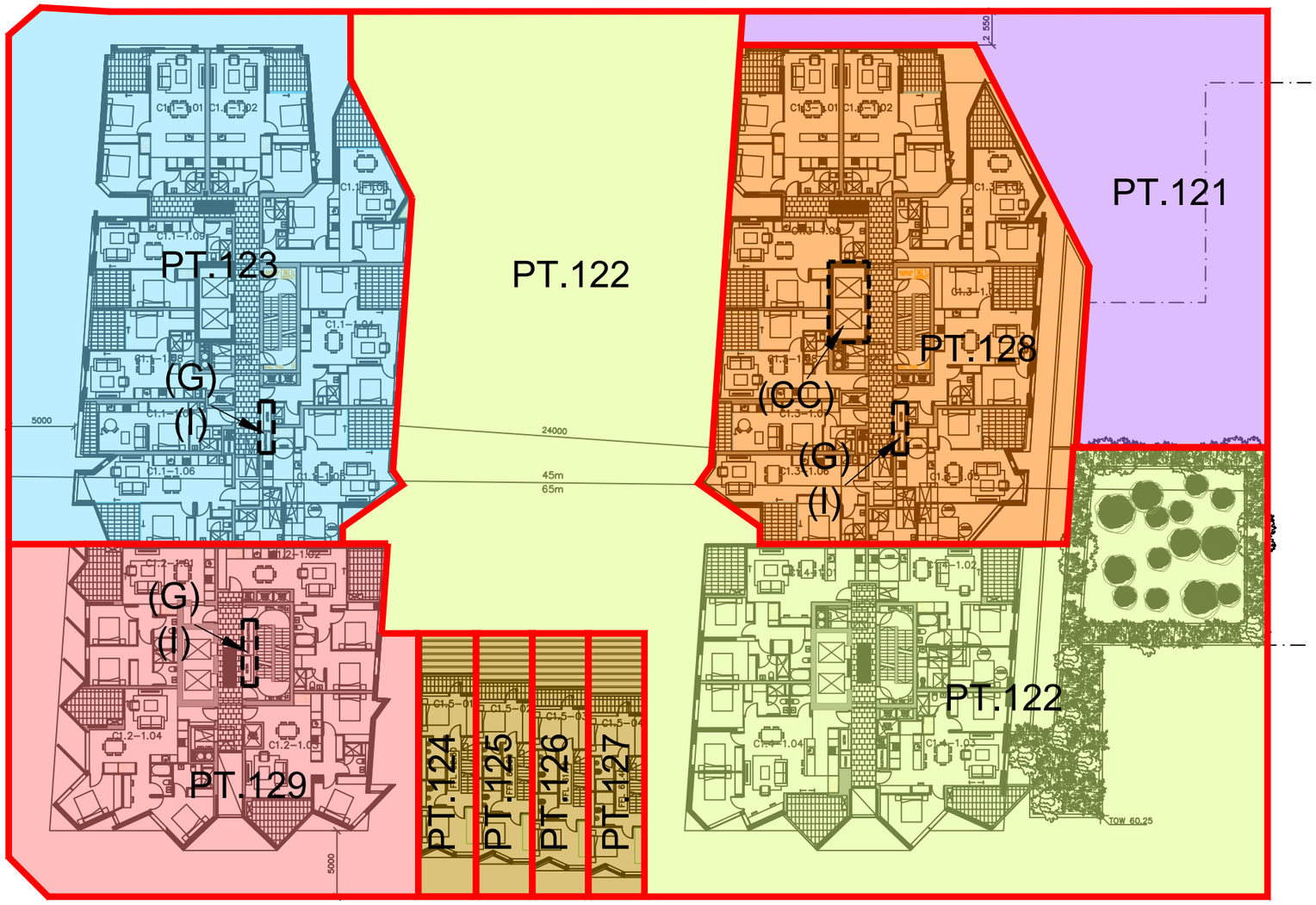
SHEET 5 OF 13

PROJECT No. 1601644

DRAWING REF. LOT 12 - STRATUM

VERSION 10

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- EASEMENT FOR ACCESS LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CC)-BENEFITS LOT 123
- EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE (G) - LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) - LOCATION TO BE CONFIRMED

- LOT 121 - COMMUNITY
- LOT 122 - MARKET
- LOT 123 - SOCIAL
- LOT 124 TO 127 - TERRACE
- LOT 128 - SOCIAL - ILUs
- LOT 129 - AFFORDABLE

ARCHITECHTURAL PLAN: 5800 S4.55-1102 ISSUE: P3

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AFTER CONSTRUCTION AND REGISTRATION OF PLAN AT THE NSW LAND REGISTRY SERVICES OFFICE
SITES OF EASEMENTS ARE SUBJECT TO DESIGN AND CONSTRUCTION VARIATIONS

LOTS 121 - 129 ARE STRATUM LOTS AT LEVEL 1 AND ARE LIMITED IN DEPTH & HEIGHT TO THE CENTRE OF THE CONCRETE SLAB THAT FORMS THE FLOOR & CEILING.

LEVEL 1

0 8 16 24
SCALE ON ORIGINAL DRAWING AT 1:400

VER	BY	AMENDMENTS	DATE
9	D.W.	S4.55 AMENDMENTS	24.11.20
10	D.W.	AMENDMENTS	2.12.20

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CLIENT: FRASERS PROPERTY AUSTRALIA

DETAILS: PLAN OF PROPOSED STRATUM SUBDIVISION OF LOT 12 DP

ORIGINAL SCALE 1:400

SHEET SIZE A3

SURVEYOR:	D.G.W.
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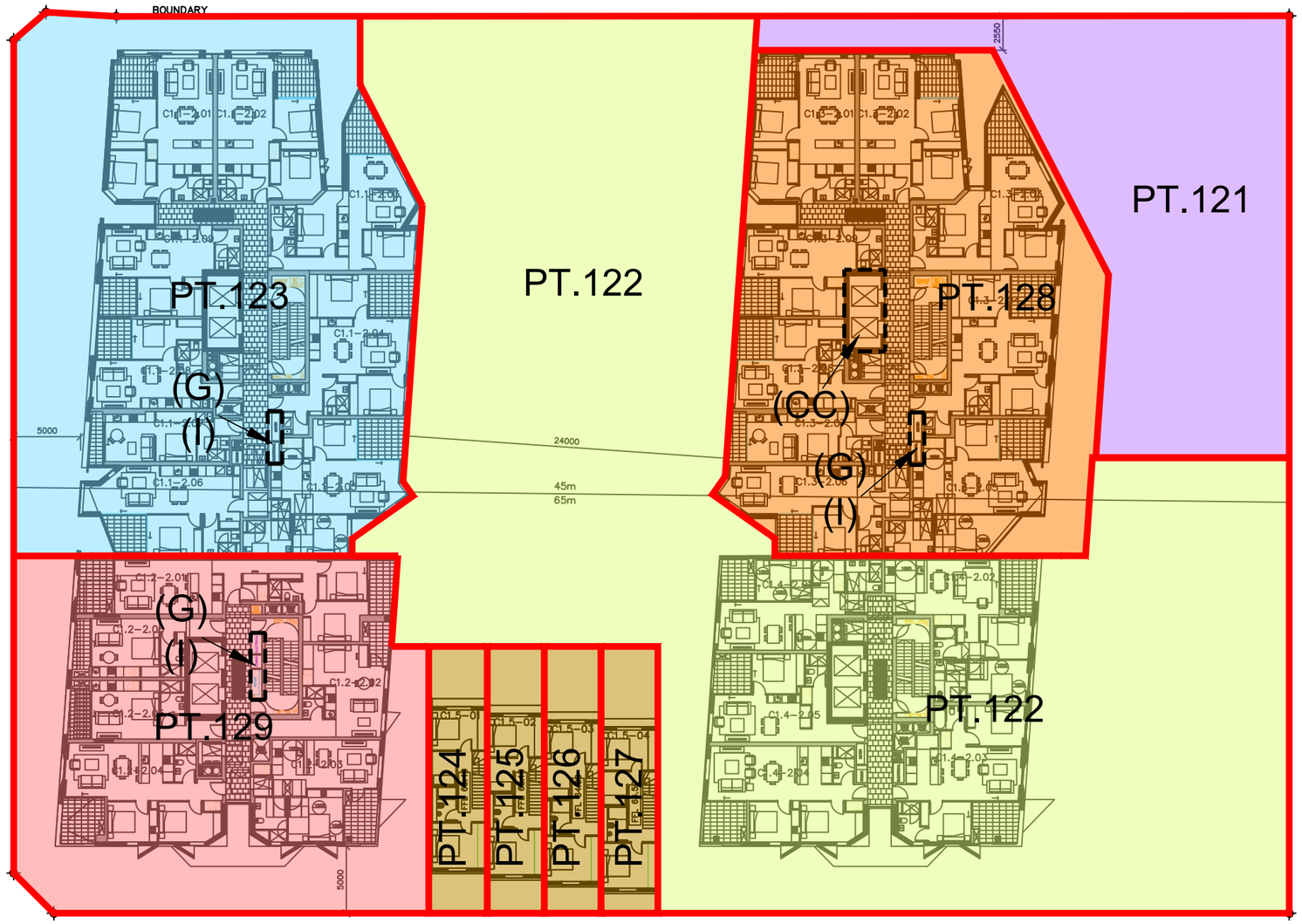
SURVEY DATE:	12/11/2020
CAD REFERENCE:	1601644_STRATUM_201123

SHEET 6 OF 13

PROJECT No. 1601644
DRAWING REF. LOT 12 - STRATUM
VERSION 10

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- EASEMENT FOR ACCESS LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CC) BENEFITING LOT 123
- EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE (G) – LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) – LOCATION TO BE CONFIRMED

ARCHITECHTURAL PLAN: 5800 S4.55-1102 ISSUE: P3

AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY AFTER CONSTRUCTION AND REGISTRATION OF PLAN AT THE NSW LAND REGISTRY SERVICES OFFICE
SITES OF EASEMENTS ARE SUBJECT TO DESIGN AND CONSTRUCTION VARIATIONS

LOTS 121 – 129 ARE STRATUM LOTS AT LEVEL 2 AND ARE LIMITED IN DEPTH & HEIGHT TO THE CENTRE OF THE CONCRETE SLAB THAT FORMS THE FLOOR & CEILING.

- LOT 121 – COMMUNITY
- LOT 122 – MARKET
- LOT 123 – SOCIAL
- LOT 124 TO 127 – TERRACE
- LOT 128 – SOCIAL – ILUs
- LOT 129 – AFFORDABLE

LEVEL 2

0 8 16 24
SCALE ON ORIGINAL DRAWING AT 1:400

VER	BY	AMENDMENTS	DATE
9	D.W.	S4.55 AMENDMENTS	24.11.20
10	D.W.	AMENDMENTS	2.12.20

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CLIENT: FRASERS PROPERTY AUSTRALIA

DETAILS: PLAN OF PROPOSED STRATUM SUBDIVISION OF LOT 12 DP

ORIGINAL SCALE 1:400

SHEET SIZE A3

SURVEYOR:	D.G.W.
DRAWN:	J.T.
CHECKED:	P.J.M.
SURVEY DATE:	12/11/2020
CAD REFERENCE:	1601644_STRATUM_201123

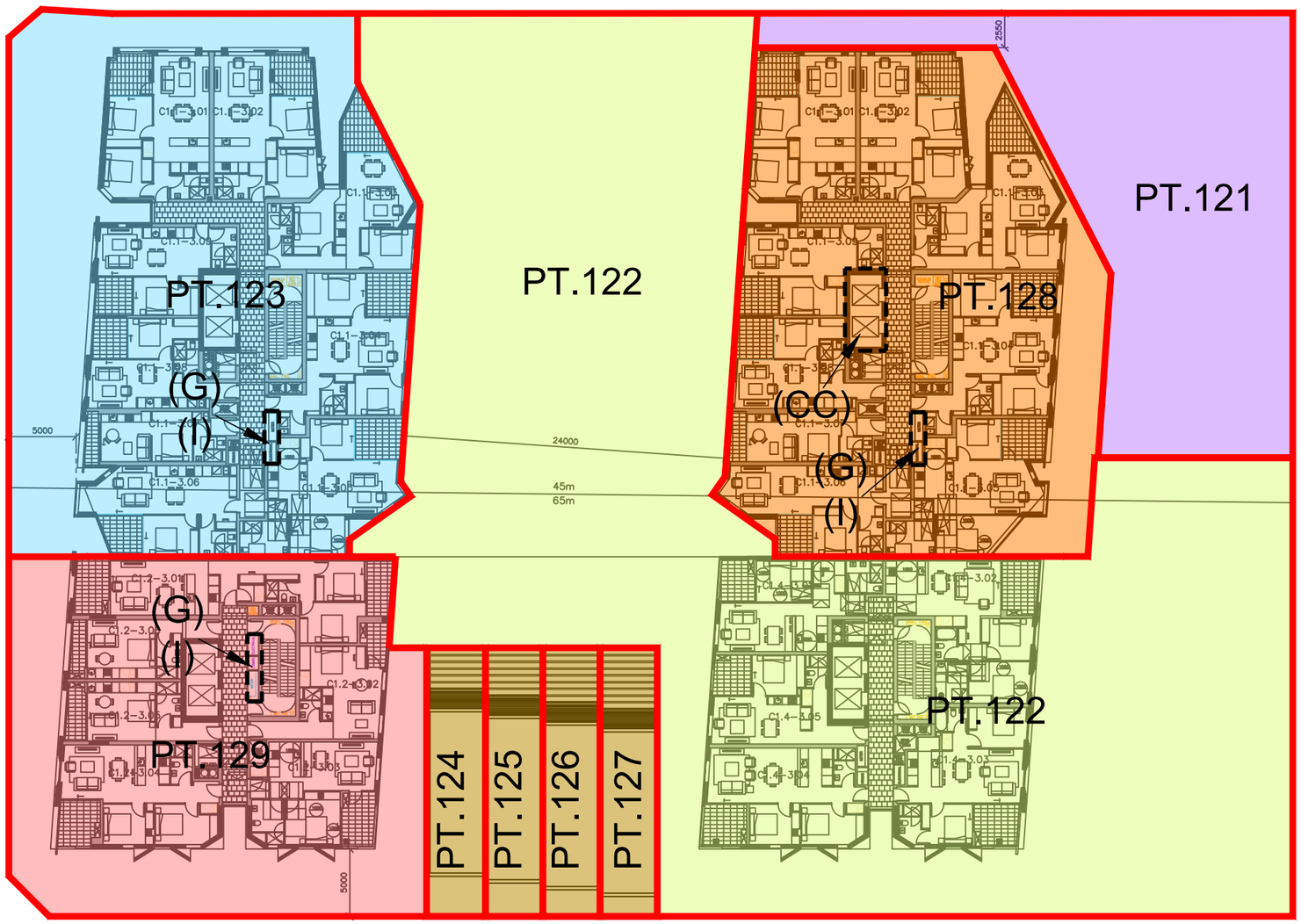
SHEET 7 OF 13

PROJECT No. 1601644

DRAWING REF. LOT 12 - STRATUM

VERSION 10

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- EASEMENT FOR ACCESS LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CC) BENEFITING LOT 123
- EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE (G) – LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) – LOCATION TO BE CONFIRMED

ARCHITECHTURAL PLAN: 5800 S4.55-1102 ISSUE: P3

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LOTS 121 – 129 ARE STRATUM LOTS AT LEVELS 3 & 4 AND ARE LIMITED IN DEPTH & HEIGHT TO THE CENTRE OF THE CONCRETE SLAB THAT FORMS THE FLOOR & CEILING.

- LOT 121 – COMMUNITY
- LOT 122 – MARKET
- LOT 123 – SOCIAL
- LOT 124 TO 127 – TERRACE
- LOT 128 – SOCIAL – ILUs
- LOT 129 – AFFORDABLE

LEVELS 3 & 4

0 8 16 24
SCALE ON ORIGINAL DRAWING AT 1:400

VER	BY	AMENDMENTS	DATE
9	D.W.	S4.55 AMENDMENTS	24.11.20
10	D.W.	AMENDMENTS	2.12.20

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SHEET SIZE A3

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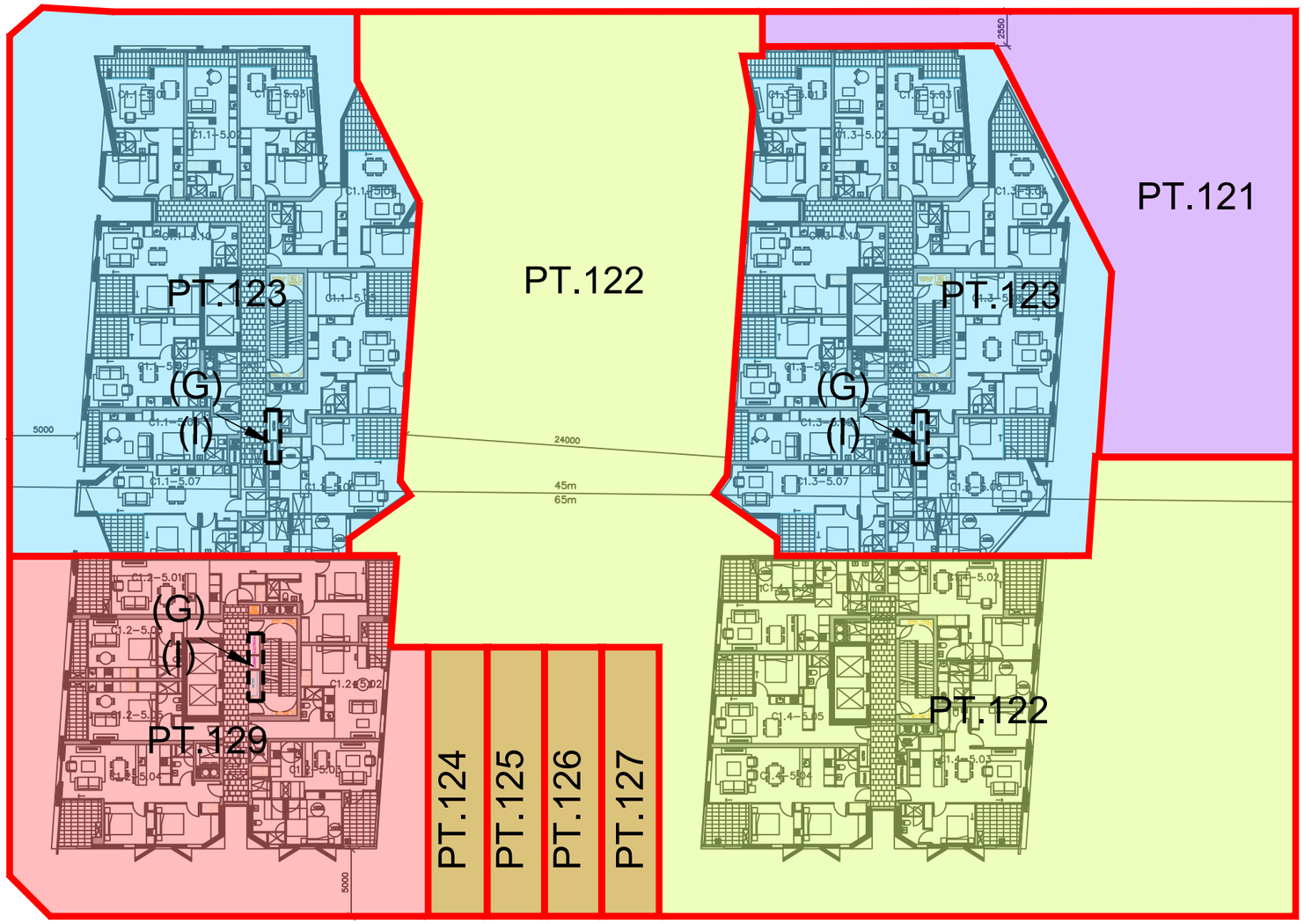
SHEET 8 OF 13

PROJECT No. 1601644
DRAWING REF. LOT 12 - STRATUM
VERSION 10

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE (G) – LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) – LOCATION TO BE CONFIRMED

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- LOT 121 – COMMUNITY
- LOT 122 – MARKET
- LOT 123 – SOCIAL
- LOT 124 TO 127 – TERRACE
- LOT 129 – AFFORDABLE

LEVELS 5 TO 12

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SCALE ON ORIGINAL DRAWING AT 1:400

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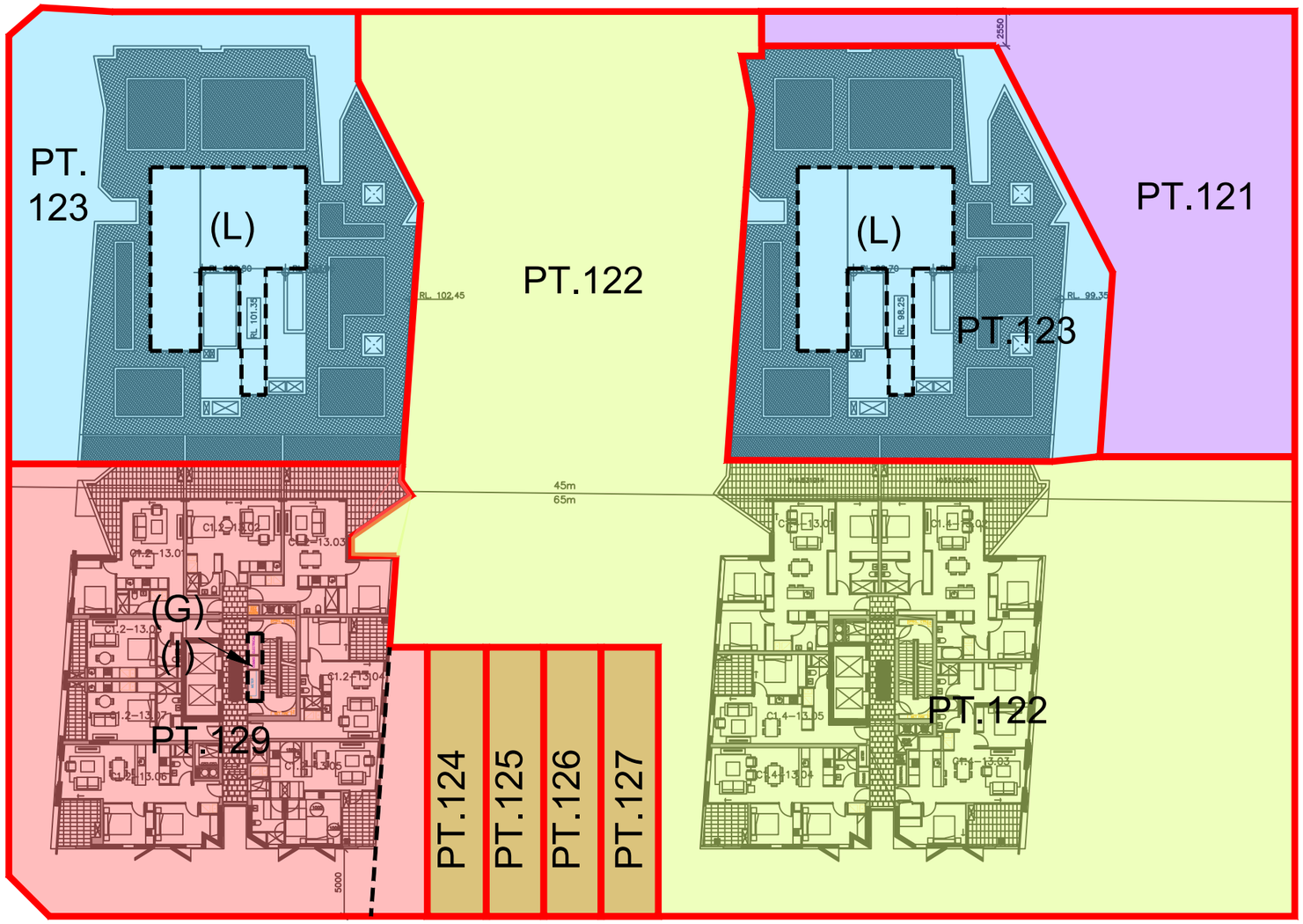
SHEET 9 OF 13

PROJECT No. 1601644

DRAWING REF. LOT 12 - STRATUM

VERSION 10

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



LOT 121 - COMMUNITY
LOT 122 - MARKET
LOT 123 - SOCIAL
LOT 124 TO 127 - TERRACE
LOT 129 - AFFORDABLE

LEVEL 13

EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE (G) - LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) - LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY HOT WATER PLANT AND INFRASTRUCTURE VARIABLE WIDTH (L)-LOCATION TO BE CONFIRMED

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SHEET 10 OF 13

PROJECT No. 1601644

DRAWING REF. LOT 12 - STRATUM

VERSION 10

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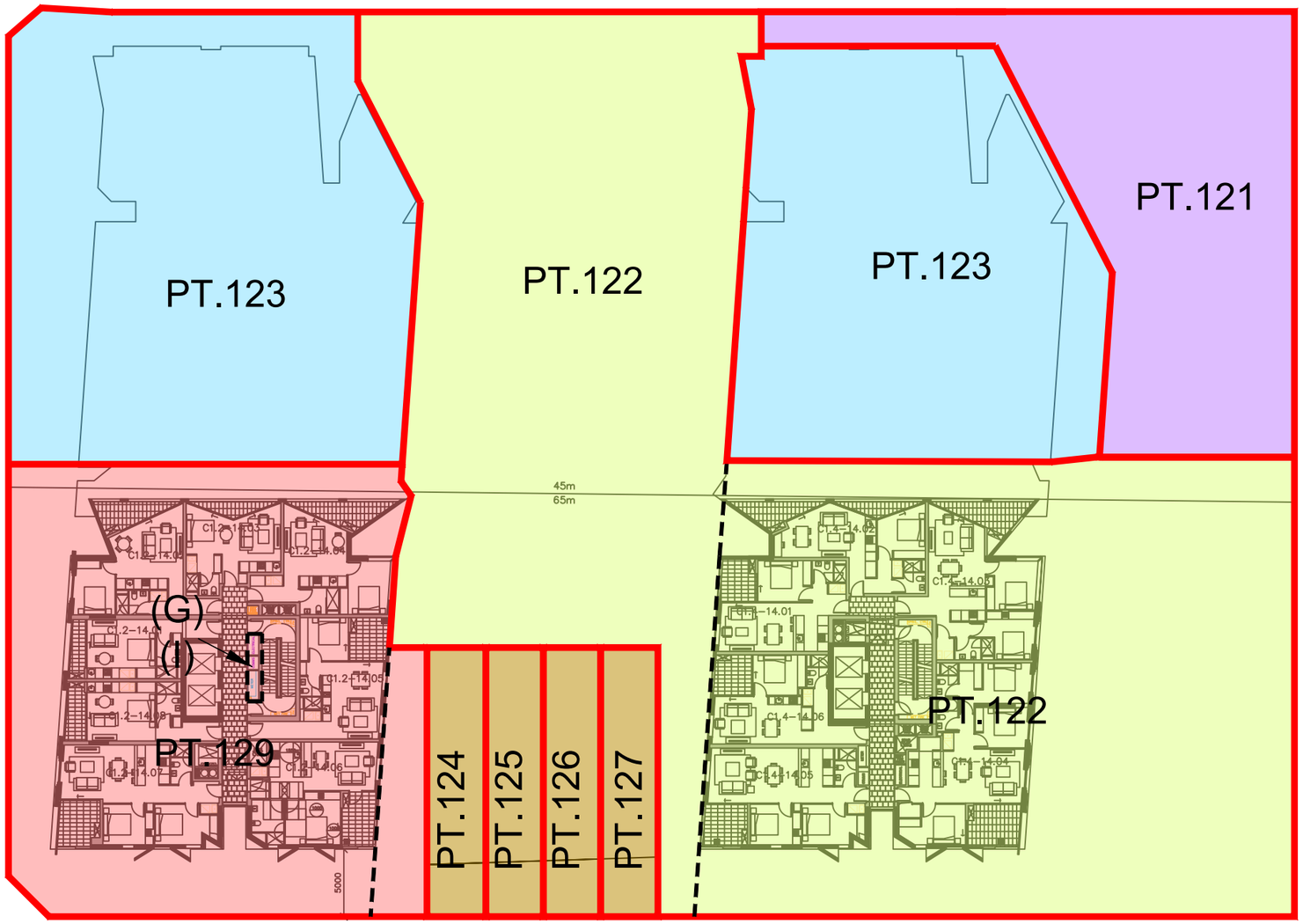
IVANHOE ESTATE, MACQUARIE PARK



EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE (G) – LOCATION TO BE CONFIRMED
- EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) – LOCATION TO BE CONFIRMED

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- LOT 121 – COMMUNITY
- LOT 122 – MARKET
- LOT 123 – SOCIAL
- LOT 124 TO 127 – TERRACE
- LOT 129 – AFFORDABLE

LEVELS 14 TO 19

0 8 16 24
SCALE ON ORIGINAL DRAWING AT 1:400

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SHEET SIZE A3

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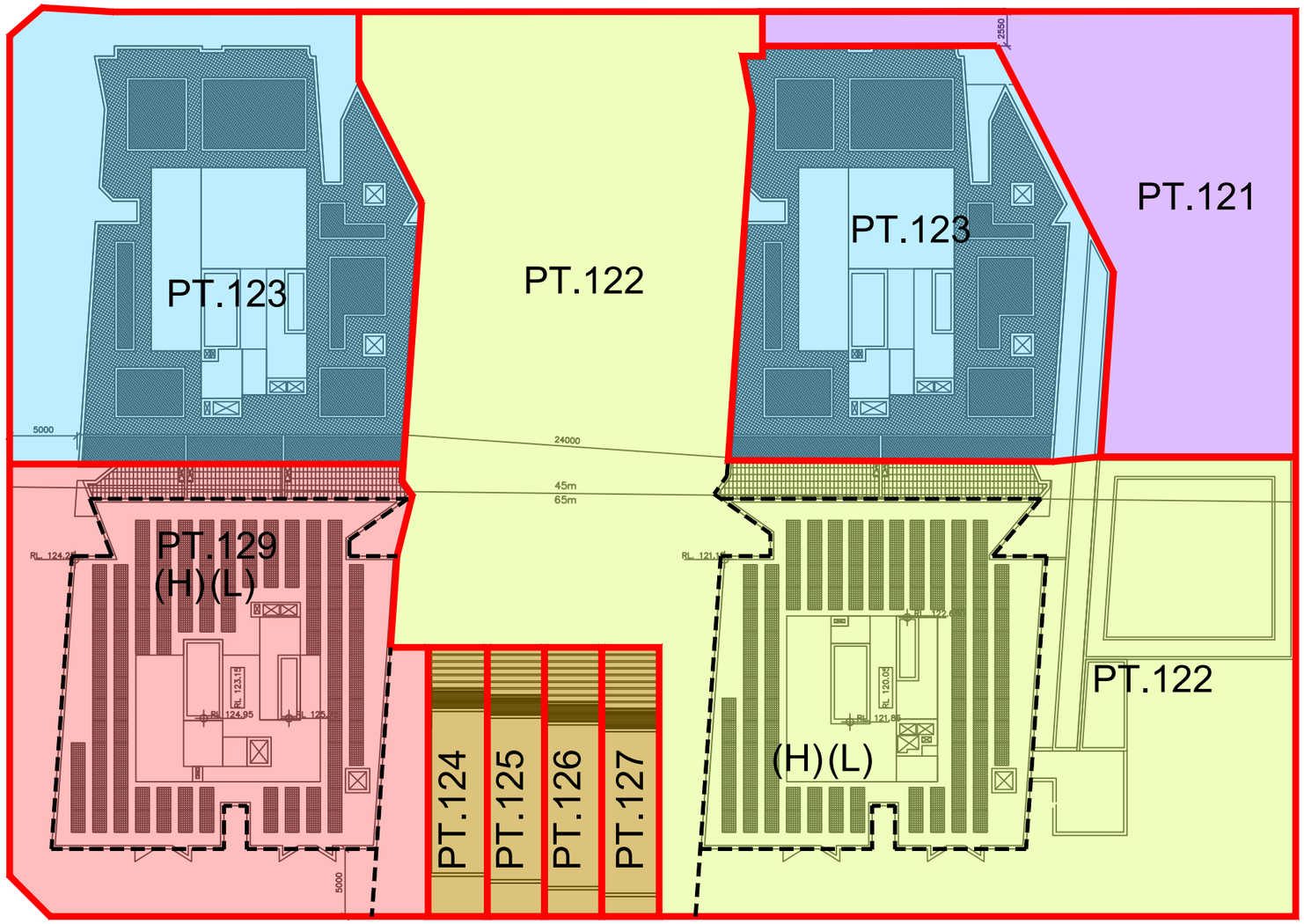
SHEET 11 OF 13

PROJECT No. 1601644
DRAWING REF. LOT 12 - STRATUM
VERSION 10

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK



LOT 121 – COMMUNITY
LOT 122 – MARKET
LOT 123 – SOCIAL
LOT 124 TO 127 – TERRACE
LOT 129 – AFFORDABLE

ROOF LEVEL

EASEMENTS (at this level)

- EASEMENT FOR SUPPORT & SHELTER (WHOLE OF LOT)
- EASEMENT FOR SERVICES (WHOLE OF LOT)
- EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
- EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
- EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
- EASEMENT FOR EMBEDDED UTILITY SOLAR GENERATION INFRASTRUCTURE VARIABLE WIDTH (LIMITED IN STRATUM) (H)
- EASEMENT FOR EMBEDDED UTILITY HOT WATER PLANT AND INFRASTRUCTURE VARIABLE WIDTH (LIMITED IN STRATUM) (L)

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SHEET 12 OF 13

PROJECT No. 1601644
DRAWING REF. LOT 12 - STRATUM
VERSION 10

STRATUM SUBDIVISION BLOCK C1
IVANHOE ESTATE, MACQUARIE PARK

PROPOSED EASEMENTS

(1) EASEMENT FOR SUPPORT AND SHELTER (WHOLE OF LOT)
(2) EASEMENT FOR SERVICES (WHOLE OF LOT)
(3) EASEMENT FOR EMERGENCY EGRESS PURPOSES (WHOLE OF LOT)
(4) EASEMENT FOR ACCESS TO SHARED FACILITIES (WHOLE OF LOT)
(5) EASEMENT FOR TEMPORARY CRANE SWING (WHOLE OF LOT)
(6) RIGHT OF CARRIAGE WAY VARIABLE WIDTH (LIMITED IN STRATUM) (AA) BENEFITING LOT 121 BURDENS LOT 122
(7) RIGHT OF CARRIAGE WAY VARIABLE WIDTH (LIMITED IN STRATUM) (AD) BENEFITING LOTS 124-127 BURDENS LOT 122
(8) RIGHT OF CARRIAGE WAY VARIABLE WIDTH (LIMITED IN STRATUM) (AH) BENEFITING LOT 128 BURDENS LOT 123
(9) RIGHT OF CARRIAGE WAY VARIABLE WIDTH (LIMITED IN STRATUM) (AI) BENEFITING LOT 129 BURDENS LOT 123
(10) EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (BA) BENEFITING LOT 121 BURDENS LOTS 122, 123
(11) EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (BB) BENEFITING LOT 122 BURDENS LOTS 121, 123, 129
(12) EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (BC) BENEFITING LOT 123 BURDENS LOTS 121, 123, 129
(13) EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (BD) BENEFITING LOTS 124-127 (INCL.) BURDENS LOTS 122, 129
(14) EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (BH) BENEFITING LOT 128 BURDENS LOTS 121, 122, 123, 129
(15) EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (BI) BENEFITING LOT 129 BURDENS LOTS 122
(16) EASEMENT FOR ACCESS VARIABLE WIDTH (LIMITED IN STRATUM) (BJ) BENEFITING LOT 130 BURDENS LOTS 122, 123
(17) EASEMENT FOR ACCESS - LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CC) BENEFITING LOT 123, 128, 129 BURDENS LOTS 122, 128
(18) EASEMENT FOR ACCESS - LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CD) BENEFITING LOTS 124-127 (INCL.) BURDENS LOT 122
(19) EASEMENT FOR ACCESS - LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CH) BENEFITING LOT 128 BURDENS LOT 123
(20) EASEMENT FOR ACCESS - LIFT VARIABLE WIDTH (LIMITED IN STRATUM) (CJ) BENEFITING LOT 130 BURDENS LOT 122
(21) EASEMENT FOR EMBEDDED UTILITY HOT WATER SERVICE INFRASTRUCTURE(G) BENEFITING LOT 130 BURDENS LOT 122, 123, 128, 129 LOCATION TO BE CONFIRMED
(22) EASEMENT FOR EMBEDDED UTILITY SOLAR GENERATION (H) BENEFITING LOT 130 BURDENS LOT 122, 129
(23) EASEMENT FOR EMBEDDED UTILITY ELECTRICITY SERVICE INFRASTRUCTURE (I) BENEFITING LOT 130 BURDENS LOT 122, 123, 128, 129 LOCATION TO BE CONFIRMED
(24) EASEMENT FOR GARBAGE AND WASTE STORAGE (J) BENEFITING LOT EVERY OTHER LOT BURDENS LOT 122
(25) EASEMENT FOR SUBSTATION PREMISES VARIABLE WIDTH (LIMITED IN STRATUM) (K) BENEFITING AUTHORITY AUSGRID BURDENS LOT 122
(26) EASEMENT FOR EMBEDDED UTILITY HOT WATER PLANT & INFRASTRUCTURE (L) BENEFITING LOT 130 BURDENS LOT 122, 123, 129
(27) EASEMENT FOR ACCESS AND USE OF LOADING DOCK VARIABLE WIDTH (LIMITED IN STRATUM) (M) BENEFITING LOT EVERY OTHER LOT BURDENS LOT 122
(28) EASEMENT FOR UNDERGROUND CABLES VARIABLE WIDTH (LIMITED IN STRATUM)(N) BENEFITING AUTHORITY AUSGRID BURDENS LOT 122
(29) RIGHT OF ACCESS VARIABLE WIDTH (LIMITED IN STRATUM (O) BENEFITING AUTHORITY AUSGRID BURDENS LOT 122
(30) POSITIVE COVENANT (ON-SITE DETENTION) (PC) (TBC) BENEFITING AUTHORITY RYDE COUNCIL BURDENS LOT 121
(31) RESTRICTION ON THE USE OF LAND (ON-SITE DETENTION & RAINWATER TANK) (TBC) BENEFITING AUTHORITY RYDE COUNCIL BURDENS LOT 121
(32) EASEMENT TO ACCESS GARBAGE VARIABLE WIDTH (LIMITED IN STRATUM) (R) BENEFITING AUTHORITY RYDE COUNCIL BURDENS LOT 122
(33) POSITIVE COVENANT (GARBAGE COLLECTION AREA) (S) BENEFITING AUTHORITY RYDE COUNCIL BURDENS LOT 122

NOTE

- LOT 128 (SOCIAL ILU) REQUIRES RIGHTS FOR ACCESS AND PARKING WITHIN LOT 123 (SOCIAL) AT BASEMENT LEVELS 1 & 2 TO BE INCORPORATED INTO THE MANAGEMENT STATEMENTS THAT ACCOMPANY THE STRATUM AND STRATA PLANS

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ORIGINAL SCALE 1:400

SHEET SIZE A3

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SHEET 13 OF 13

PROJECT No. 1601644
DRAWING REF. LOT 12 - STRATUM
VERSION 10

WASTE MANAGEMENT PLAN

IVANHOE ESTATE

Mixed Use Development

STAGE 1

PREPARED FOR

FRASERS PROPERTY AUSTRALIA
MISSION AUSTRALIA HOUSING

9/12/2020

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REVISIONS

Revision	Date	Prepared by	Reviewed by	Remarks
A	9/02/2018	J Elliot	A Armstrong	Draft
B	27/03/2018	J Elliot	A Armstrong	Amendment
C	28/03/2018	J Elliot	A Armstrong	Updated drawings
D	8/06/2018	J Elliot	A Armstrong	Final
E	17/10/2018	J Parker	A Armstrong	Amendment
F	10/11/2020	H Wilkes	A Armstrong	Draft Amendment
G	24/11/2020	H Wilkes	A Armstrong	Draft Amendment
H	9/12/2020	H Wilkes	A Armstrong	Amendment

EXECUTIVE SUMMARY

This waste management plan covers the ongoing management of waste generated by the mixed use development located at Ivanhoe Estate – Stage 1.

Waste audit and management strategies are recommended for new developments to provide support for the building design and promote strong sustainability outcomes for the building. All recommended waste management plans will comply with council codes and any statutory requirements. The waste management plan has three key objectives:

i. ***Ensure waste is managed to reduce the amount of waste and recyclables to land fill*** by assisting residents to segregate appropriate materials that can be recycled; displaying signage to remind and encourage recycling practices; and through placement of recycling and waste bins in the retail/community areas to reinforce these messages.

ii. ***Recover, reuse and recycle*** generated waste wherever possible.

iii. ***Compliance*** with all relevant codes and policies.

To assist in providing clean and well-segregated waste material, it is essential that this waste management plan is integral to the overall management of the building and clearly communicated to residents and tenants.

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GLOSSARY OF TERMS

TERM	DESCRIPTION
Baler	A device that compresses waste into a mould to form bales which may be self-supporting or retained in shape by wire ties and strapping
Chute	A ventilated, essentially vertical pipe passing from floor to floor of a building with openings as required to connect with hoppers and normally terminating at its lower end at the roof of the central waste room(s)
Collection Area/Point	The position or area where waste or recyclables are actually loaded onto the collection vehicle
Compactor	A Machine for compressing waste into disposable or reusable containers
Composter	A container/machine used for composting specific food scraps
Crate	A plastic box used for the collection of recyclable materials
Garbage	All domestic waste (Except recyclables and green waste)
Hopper	A fitting into which waste is placed and from which it passes into a chute or directly into a waste container. It consists of a fixed frame and hood unit (the frame) and a hinged or pivoted combined door and receiving unit
Recycling	Glass bottles and jars – PET, HDPE and PVC plastics; aluminium aerosol and steel cans; milk and juice cartons; soft drink, milk and shampoo containers; paper, cardboard, junk mail, newspapers and magazines
Green	Garden organics such as small branches, leaves and grass clippings, tree and shrub pruning, plants and flowers, and weeds
L	Litre(s)
Liquid Waste	Non-hazardous liquid waste generated by commercial premises that is supposed to be connected to sewer or collected for treatment and disposal by a liquid waste contractor (including grease trap waste)
Mobile Garbage Bin(s) (MGB)	A waste container generally constructed of plastic with wheels with a capacity in litres of 120, 240, 660, 1000 or 1100
Putrescible Waste	Component of the waste stream liable to become putrid. Usually breaks down in a landfill to create landfill gases and leachate. Typically applies to food, animal and organic products.

INTRODUCTION

This report supports a Development Application for Stage 1 of the Ivanhoe Estate redevelopment, a State Significant Development (SSD) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It has been prepared for Aspire Consortium on behalf of NSW Land and Housing Corporation.

BACKGROUND

In September 2015 the Ivanhoe Estate was rezoned by DPE as part of the Macquarie University Station (Herring Road) Priority Precinct, to transform the area into a vibrant centre that benefits from the available transport infrastructure and the precinct's proximity to jobs, retail and education opportunities within the Macquarie Park corridor.

The Ivanhoe Estate is currently owned by NSW Land and Housing Corporation and comprises 259 social housing dwellings. The redevelopment of the Ivanhoe Estate is part of the NSW Government Communities Plus program, which seeks to deliver new communities where social housing blends with private and affordable housing, with good access to transport, employment, improved community facilities and open space.

The Communities Plus program seeks to leverage the expertise and capacity of the private and non-government sectors. As part of this program, Aspire Consortium, comprising Frasers Property Australia and Mission Australia Housing, were selected as the successful proponent to develop the site in July 2017.

In September 2017, DPE issued the Secretary's Environmental Assessment Requirements for a comprehensive Masterplan application that will establish the framework for the staged redevelopment of the site. This Development Application for Stage 1 of the Ivanhoe Estate redevelopment represents the first stage of detailed works pursuant to the Ivanhoe Estate Masterplan.

SITE DESCRIPTION

The Ivanhoe Estate site is located in Macquarie Park near the corner of Epping Road and Herring Road within the Ryde Local Government Area (LGA). The site is approximately 8.2 hectares and currently accommodates 259 social housing dwellings, comprising a mix of townhouse and four storey apartment buildings set around a cul-de-sac street layout. An aerial photo of the site is provided at **Figure 1** below.

Immediately to the north of the site are a series of four storey residential apartment buildings. On the north-western boundary, the site fronts Herring Road and a lot that is currently occupied by four former student accommodation buildings and is likely to be subject to redevelopment. Epping Road runs along the south-western boundary of the site and Shrimptons Creek, an area of public open space, runs along the south-eastern boundary. Vehicle access to the site is via Herring Road.

Ivanhoe Estate comprised of 17 individual lots owned and managed by the NSW Land and Housing Corporation. The Masterplan site also incorporates adjoining land, being a portion of Shrimptons Creek and part of the commercial site at 2-4 Lyonpark Road. This land is included to facilitate a bridge crossing and road connection to Lyonpark Road.

Figure 1- Ivanhoe Estate site

OVERVIEW OF THE PROPOSED DEVELOPMENT

The proposed Stage 1 Development Application seeks consent for the first stage of detailed works within the Ivanhoe Estate, pursuant to the Ivanhoe Estate Masterplan under Section 4.22 of the EP&A Act. The Masterplan establishes the planning and development framework against which this Stage 1 Development Application will be assessed.

The Stage 1 Development Application seeks approval for:

- site preparation works, including tree removal, demolition of roads, services, and earthworks across the Ivanhoe Estate;
- the provision and augmentation of utilities and services infrastructure across the Ivanhoe Estate;
- the construction of all internal roads including public domain within the road reserves, and the bridge crossing and road connection to Lyonpark Road;

- the consolidation of existing lots and subdivision of the Ivanhoe Estate to reflect the revised road layout, open space, and provide superblocks corresponding to the Masterplan;
- the construction and use of Buildings A1 and C1 comprising residential uses (including social housing), a childcare centre, and retail / community spaces.

An image of the Masterplan, identifying Buildings A1 and C1 and illustrating the road network, is provided at **Figure 2** below.

Figure 2- Ivanhoe Estate Masterplan

CITY OF RYDE COUNCIL

The assessment of waste volumes is an estimate only and will be influenced by the development's management and occupant's attitude to waste disposal and recycling.

The residential waste and recycling will be guided by the services and acceptance criteria of the City of Ryde Council. The residential waste and recycling will be collected by council. The retail and commercial waste will be collected by private contractor.

All waste facilities and equipment are to be designed and constructed to be in compliance with the City of Ryde Council's DCP and Waste Management Strategy, Australian Standards and statutory requirements.

OBJECTIVES

- To ensure new developments and changes to existing developments are designed to maximise resource recovery (through waste avoidance, source separation and recycling);
- Encourage source separation of waste, reuse, and recycling by ensuring appropriate storage and collection facilities for waste, and quality design of waste facilities;
- Encourage techniques in demolition and construction which minimise waste generation, and which maximise the reuse and recycling of materials;
- Ensure appropriate, well-designed waste storage and collection facilities are provided and are accessible to occupants and service providers;
- Ensure wastes are handled and stored appropriately in order to minimise risk to health and safety associated with handling and disposing of waste and recycled material, and ensure optimum hygiene;
- Minimise adverse environmental and amenity impacts associated with waste management (including odour from waste and noise from collection activity);
- Discourage illegal dumping by providing on-site storage for waste awaiting collection by removal services;
- Ensure waste and recycling storage areas and handling systems for residential properties are designed to meet minimum requirements for Council's domestic waste collection services;
- Assist in achieving Federal and State Government waste minimisation targets in accordance with regional waste plans; and
- Minimise the overall environmental impacts of waste and foster the principles of ecologically sustainable development (ESD).

GENERATED WASTE VOLUMES

The assessment of projected waste volumes is a calculated estimate only and will be influenced by the development's management and occupant's waste disposal and recycling practices.

CONSTRUCTION AND DEVELOPMENT WASTE

The head contractor will be responsible for removing all construction-related waste offsite in a manner that meets all authority requirements. Construction waste management plans will be submitted with each stage Development Application. A letter from Bingo has been included in the Appendices of this report.

BUILDING MANAGER/WASTE CARETAKER

All waste equipment movements are to be managed by the building manager/cleaners at all times. No tenants or residents will be allowed to transport waste or recyclables from the waste room; tenants and residents will only transport their waste to the allocated bin room.

The building manager/cleaner duties include, but are not limited to, the following:

- general maintenance and cleaning of the chute doors on each level (Frequency dependent on waste generation and will be determined based upon building operation);
- organising, maintaining and cleaning the general and recycled waste holding areas (Frequency will depend on waste generation and will be determined based upon building operation);
- transporting of bins as required (to and from the temporary collection area until Stage 2 is operational);
- organising both garbage and recycled waste pick-ups as required;
- cleaning and exchanging all bins;
- ensure site safety for residents, children, visitors, staff and contractors;
- abide by all relevant OH&S legislation, regulations, and guidelines;
- assess any manual handling risks and prepare a manual handling control plan for waste and bin transfers; and
- provide to staff/contractors equipment manuals, training, health and safety procedures, risk assessments, and PPE to control hazards associated with all waste management activities

NOTE: It is the responsibility of the building manager to monitor the number of bins required for the development. As waste volumes may change according to the development's management and occupants' attitudes to waste disposal and recycling, bin numbers and sizes may need to be altered to suit the building operation.

REPORTING

It is recommended that building management ensure that all waste service providers submit monthly reports on all equipment movements and weights of any waste and recycling products removed from the development. Regular reviews of servicing should take place to ensure operational and economic best practise and to assist with sustainability reporting.

EDUCATION

Building management is responsible for creating and managing the waste management education process.

Educational material encouraging correct separation of garbage and recycling items must be provided to each resident to ensure correct use of the waste chute. This should include the correct disposal process for bulky goods (old furniture, large discarded items, etc.) It is recommended that information is provided in multiple languages to support correct practises and minimise the possibility of chute blockages as well as contamination in the collective waste bins.

It is also recommended that the owners' corporation website contain information for residents to refer to regarding use of the chute. Information should include:

- Directions on using the chute doors;
- Recycling and garbage descriptions (council provides comprehensive information);
- How to dispose of bulky goods and any other items that are not garbage or recycling;
- Residents' obligations to WHS and building management; and
- How to prevent damage or blockages to the chute (example below).

To prevent damage or blockage to rubbish chute DO NOT dispose of any newspapers, umbrellas, bedding, cigarettes, cartons, coat hangers, brooms, mops, large plastic wrappings from furniture, white goods, any sharp objects, hot liquid or ashes, oil, unwrapped vacuum dust, syringes, paint and solvents, car parts, bike parts, chemicals, corrosive and flammable items, soil, timber, bricks or other building materials, furniture, etc. down the chute.

It is expected that leasing arrangements with retail/commercial operations contain direction on waste management services and expectations.

SIGNAGE

The building manager/caretaker is responsible for waste room signage including safety signage (*see 0*). Appropriate signage must be prominently displayed on walls and above all bins, clearly stating what type of waste or recyclables is to be placed in the bin underneath.

All chute doors on all residential levels will be labelled with signs directing chute operations and use of chute door.

WASTE GENERATION TOTALS

RESIDENTIAL

Table 1: *Waste and Recycling Generation Calculations – Residential Units of Building C1*

Building/ Core	# Units	General Waste Generation Rate (L/unit/week)		Generated General Waste (L/week)	Recycling Generation Rate (L/unit/week)		Generated Recycling (L/week)
Building C1- Core 1	130	120		15600	80		10400
Building C1- Core 2	130	120		15600	80		10400
Building C1- Core 3	129	120		15480	80		10320
Building C1- Core 4	104	120		12480	80		8320
TOTAL	**493**			**59160**			**39440**
Bins and Collections		General Waste Bin Size (L)		1100	Recycling Bin Size (L)		660
		General Waste Bins per Week		57	Recycling Bins per Week		61
		General Waste Collections per Week		3	Recycling Collections per Week		2
		Total Genaral Waste Bins Required for Collection		19	Total Recycling Bins Required for Collection		31
		Number of Waste Bins Per Day	*Building C1- Core 1*	2.03	Number of Recycling Bins Per Day	*Building C1- Core 1*	2.25
			Building C1- Core 2	2.03		*Building C1- Core 2*	2.25
			Building C1- Core 3	2.01		*Building C1- Core 3*	2.23
			Building C1- Core 4	1.62		*Building C1- Core 4*	1.80

Table 2: *Waste and Recycling Generation Calculations – Residential Units of Building A1*

Building/ Core	# Units	General Waste Generation Rate (L/unit/week)	Generated General Waste (L/week)	Recycling Generation Rate (L/unit/week)	Generated Recycling (L/week)
Building A1	269	120	32280	80	21520
TOTAL	**269**		**32280**		**21520**
Bins and Collections		General Waste Bin Size (L)	1100	Recycling Bin Size (L)	660
		General Waste Bins per Week	29.3	Recycling Bins per Week	32.6
		General Waste Collections per Week	3	Recycling Collections per Week	2
		Total General Waste Bins Required for Collection	10	Total Recycling Bins Required for Collection	17

	Number of Waste Bins Per Day	4.2	Number of Recycling Bins Per Day	4.7

RESIDENTIAL BIN SUMMARY

Based on the estimated waste generated by the residential component of this development, the recommended bin quantities and collection frequencies are as follows:

General Waste: 29 x 1100L MGBs collected **3 x weekly**

Recycling: 48 x 660L MGBs collected **2 x weekly**

Service Bins: 5x 1100L MGB and 5x 660L MGBs

During operation, it is the responsibility of the building manager to monitor the number of bins required for the residential component. Waste and recycling volumes may change according to residents' attitudes to waste disposal and recycling, building occupancy levels or development's management. Any requirements for adjusting the capacity of the waste facilities can be achieved by changing the number of bins, the bin sizes or collection frequencies. Building management will be required to negotiate any changes to bins or collections with the collection service provider.

CHILDCARE

Table 3: *Calculated Waste Generation – Childcare*

Type	NLA (m^2)	Waste Calculation ($L/100m^2/day$)	Generated Waste (L/week)	Recycling Calculation ($L/100m^2/day$)	Generated Recycling (L/week)
Childcare	335	20	469	20	469
TOTAL	**335**		**469**		**469**

Table 4: *Stage 1 Bin Summary – Childcare*

Garbage			Recycling		
Bin Capacity (L)	**Quantity**	**Collection Rate** (times/week)	**Bin Capacity** (L)	**Quantity**	**Collection Rate** (times/week)
240	2	1	240	2	1

RETAIL/COMMUNITY

Table 5: *Development Total Waste Generation – Retail/Community*

Type	NLA (m^2)	Waste Calculation ($L/100m^2/day$)	Generated Waste (L/week)	Recycling Calculation ($L/100m^2/day$)	Generated Recycling (L/week)
Retail	490	50	1715	50	1715
TOTAL	**490**		**1715**		**1715**

Table 6: *Stage 1 Bin Summary – Retail/Community*

Garbage			Recycling		
Bin Capacity (L)	**Quantity**	**Collection Rate** (times/week)	**Bin Capacity** (L)	**Quantity**	**Collection Rate** (times/week)
1100	2	1	1100	2	1

WASTE MANAGEMENT

Dual chutes will be installed into each core of each building. Breakdown is as follows:

RESIDENTIAL

Each residential level will have two (2) chute doors installed for garbage and recycling disposal (*see APPENDIX C.1*).

Garbage discharge into 1100L MGBS and recycling discharge into 660L MGBs at the base of the chute system. There will also be two spare MGBs to be utilised during collection times, known as service bins. The discharge is located in the basement discharge room on the basement level of each.

Full bins will be transferred to one of multiple bin holding areas for collection.

WASTE HANDLING

WASTE

All residents of each building will be supplied with a collection area in each unit (generally in the kitchen, under bench or similar alternate area) to deposit garbage and collect recyclable material suitable for one days storage. Residents should wrap or bag their waste. Bagged waste should not exceed 3kg in weight or 35cm x 35cm x 35cm in dimension.
The caretaker/cleaner will be required to check the 240L MGB collecting waste from each chute, rotate full bins to the storage and collection area, and replace empty 240L MGB under each chute operation.

RECYCLING

Cardboard furniture boxes or large cardboard containers should not be included in the waste chute – a cardboard collection bin will be made available to residents to deposit flattened cardboard and will be managed by the waste caretaker. Bins will be located in the garbage and bulky goods area. This will be used for larger cardboard items such as packaging for televisions, pizza boxes, etc.

Recycling that travels via the recycling chute must not be bagged. It is recommended that residents use a crate or dedicated bin for collecting recyclables within the allocated residential space provided to ensure correct separation. Residents will then dispose of their recyclable materials in the recycling chute, one item at a time. Items should not be grouped in bags as this hinders the recycling recovery.

The caretaker/cleaner's duty is responsible for exchanging or emptying recyclable bins and storing them in the main bin storage room located on lower ground level, ready for collection.

TEMPORARY STORAGE OF BULKY GOODS

A room will be allocated in each of the residential buildings for the storage of discarded residential bulky items. These areas will be made available close to or within the bin holding room for each building. Each area will be a minimum of $5m^2$. It is envisaged that bulky goods will be managed by the building manager/waste caretaker. Residents will be required to liaise with building management regarding all bulky goods movements.

It is recommended that donations to charitable organisations be encouraged. Clean, sound furniture and household goods etc. are highly sought after to provide for the disadvantaged. Donations will be arranged with the assistance of the building manager/caretaker.

RETAIL/COMMUNITY

The tenants will be required to be responsible for their own storage of waste and recycling back of house (BOH). On completion of each trading day or as required, nominated staff/cleaners will transport their waste and recycling to the allocated retail/community waste area and place waste and recycling into the appropriate collection bins.

Food handling for food cooked or prepared, served and consumed on site will produce a typical waste composition of food scraps from plates, packaging waste and some plastics. Café or restaurant staff will be responsible for their waste management.

Tenants will be directed to transport empty milk/bread plastic crates to the BOH waste room for storage prior to collection by the supplier. All retail agreements with milk/bread vendors must include regular removal of redundant plastic crates to prevent build-up of material on site. Stacked crates can cause a safety hazard.

Cardboard is a major component of the waste generated by cafes/restaurants. All cardboard should be flattened (to save bin space), placed in and collected from bulk bins. Whilst cardboard is bulky, it is generally lightweight however it can be contaminated with food or liquid which makes it unsuitable for recycling.

On completion of each trading day or as required, nominated retail staff/cleaners will transport their waste and recycling, using the access corridor, to the retail/community waste room and place waste and recycling into the appropriate collection bins.

It is recommended that:

- all waste should be bagged and waste bins should be plastic lined;
- bagging of recyclables is not permitted;
- all waste collections located BOH during operations;
- individual recycling programs are recommended for retailers to ensure commingled recycling is separated correctly;
- any food and beverage tenant will make arrangements for storing used and unused cooking oil in a bunded storage area;
- the operator will organise grease interceptor trap servicing;

- a suitable storage area needs to be provided and affectively bunded for chemicals, pesticides and cleaning products;
- dry basket arresters need to be provided to the floor wastes in the food preparation and waste storage areas;
- washroom facilities should be supplied with collection bins for paper towels (if used);
- all flattened cardboard will be collected and removed to the waste room recycling MGB;
- restaurant and café tenant/s are supplied with waste and recycling collection receptacles back of house (BOH) to be transported by restaurant/cafe staff, building management/ cleaners to the collection area daily

NOTE: Subject to the stakeholders preference/capability (and as built constraints), bin sizes and quantities may be changed.

CHILDCARE CENTRE

It is expected that the contract cleaners appointed by the childcare centre will remove bagged waste and separated recycling from the allocated collection points and deposit it into the appropriate bins.

The child care centre may also appoint its own private waste services provider for garbage and recycling services. Alternately, building management will transport bins to the bin collection area and return empty bins to the child care centre.

Most recycling generated by child care centres include soiled nappies, wipes and change sheets. Dedicated waste bins are to be allocated for sorting and storage of general waste and disposable nappies. A recycling service for soiled disposable nappies should be investigated.

Secure destruction bins will be operated on a wheel in wheel out basis by the appointed contractor/s if required.

It is recommended that all amenities and work station areas be furnished with suitable recycling and waste collection receptacles.

Washroom facilities should be supplied with collection bins for paper towels (if used).

All staff will be responsible for management of their general waste and storage of same.

Staff tea points and food preparation areas will be supplied with a dedicated commingled collection receptacle for the collection of all recyclable glass and plastic items. Staff will be responsible for sorting this material and allocating recyclables into the correct collection facility.

WASHROOMS

Washroom facilities should be supplied with collection bins for paper towels (if used). Sanitary bins for female restroom facilities must also be arranged with an appropriate contractor.

Please note that all collection receptacles and bins should be branded with the appropriate stickers and the use of the Mobius loop or similar identifying recycling equipment.

OTHER RETAIL/COMMERCIAL WASTE

Tenants usually make their own arrangements for the disposal and recycling of toner cartridges and batteries. Disposal of hard, electronic, liquid waste and any detox (paint/chemicals) shall be organised with the assistance of the building management/cleaners.

GREEN WASTE

There will be green waste generated by the buildings landscaped areas. Any green waste will be collected and removed from site by the maintenance contractor during scheduled or arranged servicing of these areas.

Residents with gardens will be provided access to a green bin store on lower ground level of Building C1 which will house green bins.

OTHER WASTE STREAMS

Disposal or recycling of electronic, liquid waste and home detox (paint/chemicals) etc. shall be organised with the assistance of the building caretaker, where required. Recyclable electronic goods include batteries, equipment containing printed circuit boards, computers, televisions, fluorescent tubes and smoke detectors. These items may not be disposed in waste or recycling bins for safety and environmental reasons. Residents should be directed to Councils website for further information.

WASHROOM FACILITIES

Washroom facilities in retail and staff areas should be supplied with collection bins for paper towels (if used). Sanitary bins for female restroom facilities must also be arranged with an appropriate contractor.

Building management will monitor use and ensure waste bins are exchanged and cleaned.

COMMON AREAS

The lobbies, retail amenities and circulation areas will be supplied with suitably branded waste and recycling bins, where considered appropriate. Building management will monitor use and ensure bins are exchanged and cleaned (*see APPENDIX C for Waste Management Equipment*). These areas generate negligible waste however garbage and recycling receptacles should be placed in convenient locations.

USED COOKING OIL

Grease arrestors have been provided in both buildings for retail and childcare.

WASTE CHUTES

Waste chutes for each level of the residential building are supplied per the following specifications:

- either 510mm galvanised steel or 510mm recycled LLDPE polyethylene plastic;
- galvanised steel chute hoppers are wrapped with 50mm poly-wool R1.3 noise insulation foil to assist in noise reduction;
- penetrations on each building level at vertically perpendicular points with minimum penetration dimensions of 600mm x 600mm (square or round) are required to accommodate the chute installation;
- a wash down system and vent should also be included as part of the chute system;
- council and supplier require that all chutes are installed without offsets to achieve best practise operationally for the building; and
- two hour fire-rated (AS1530.4-2005) stainless steel refuse chute doors at each service level. All doors are to be fitted with a self-closing mechanism to meet BSA fire standards.

NOTE: Chute doors are installed after walls rendered, painted or when required. Information stickers will be placed on each chute door at each residential level.

EQUIPMENT SUMMARY

Table 7: *Development Equipment Summary*

Component	Part	Quantity	Notes
Chutes	Galvanised Steel / LLDPE Polyethylene Plastic	10	(*See APPENDIX C for Typical Chute Section*)
Equipment A	Suitable Bin Moving Equipment		
Equipment B	Volume handling equipment (5 x 2-bin 1100L linear track) (5 x 2-bin 660L linear track)	10	

WASTE ROOM AREAS

The areas allocated for waste storage and collection areas are detailed in the table below, and are estimates only. Final areas will depend on room and bin layouts.

Table 8: Waste Room Areas

Level	Waste Room Type	Equipment
B3	Chute Discharge Room – Building C1 Core 1	*Minimum* 1x 2-bin linear for 1100L MGBs (waste) 1x 2-bin linear for 660L MGBs (recycling) 1x 1100L MGB (service bin) 1x 660L MGB (service bin)
B3	Chute Discharge Room – Building C1 Core 2	*Minimum* 1x 2-bin linear for 1100L MGBs (waste) 1x 2-bin linear for 660L MGBs (recycling) 1x 1100L MGB (service bin) 1x 660L MGB (service bin)
B3	Chute Discharge Room – Building C1 Core 3	*Minimum* 1x 2-bin linear for 1100L MGBs (waste) 1x 2-bin linear for 660L MGBs (recycling) 1x 1100L MGB (service bin) 1x 660L MGB (service bin)
B3	Chute Discharge Room – Building C1 Core 4	*Minimum* 1x 2-bin linear for 1100L MGBs (waste) 1x 2-bin linear for 660L MGBs (recycling) 1x 1100L MGB (service bin) 1x 660L MGB (service bin)
B3	Chute Discharge Room – Building A1	*Minimum* 1x 2-bin linear for 1100L MGBs (waste) 1x 2-bin linear for 660L MGBs (recycling) 1x 1100L MGB (service bin) 1x 660L MGB (service bin)
LG	Residential Bin Holding Room – Building C1 (collection area)	19x 1100L MGBs (waste) 31x 660L MGBs (recycling)
	Residential Bin Holding Room – Building A1 (collection area)	10x 1100L MGBs (waste) 17x 660L MGBs (recycling)
LG	Bulky Goods Waste Storage Room – each building	Minimum 5m2 per building
LG	Retail/Community Waste Room	2x 1100L MGBs (waste) 2x 1100L MGBs (recycling)
LG	Childcare	2x 240L MGBs (waste) 2x 240L MGBs (recycling)

The waste room areas have been calculated based on equipment requirements and/or bin dimensions with an additional 70% of bin GFA factored in for manoeuvrability.

In addition, all doorways and passageways facilitating the movement of bins and/or bulky waste items must be at least 1500mm wide. The following table provides further waste room requirements.

Table 9: Waste Room Requirements

Waste Room Type	Waste Room Requirements
Chute Discharge Room	• Ceiling clearance height must be a minimum of 3000mm • The chute penetration must have a minimum 500mm clearance of any service pipes or other overhead obstacles (subject to penetration location) • All waste discharge points should be caged off to ensure the safety of any personnel accessing the waste room • 200mm clearance is required around compaction equipment • Where a chute offset is required, the angle of the offset must not exceed 40 degrees (Subject to number of consecutive offset and/pr up to 1500mm) • Where two sets of volume management equipment is placed under the chutes, a 200mm clearance is required between the equipment.
Residential Bin Holding Room and/or Bin Collection Area	• Bins must not be stacked in rows that are more than two bins deep
Bulky Goods Waste Storage Room	• May be a dedicated room or screened area within another waste room • Must be in close proximity to the collection area • Area must also be allocated for the segregation of e-waste, gas bottles, cardboard, etc. • Doorway should be a minimum of 1500mm wide
Retail/Commercial Waste Room	• In order to ensure staff safety, all bins should be arranged so they can be accessed without moving another bin

RESIDENTIAL

All basement discharge waste rooms must each accommodate dual chute outlets and the appropriate volume handling equipment.

Each building will have a bulky goods area of at least 5sqm.

RETAIL/COMMUNITY

All waste rooms must be able to hold all the designated waste bins with enough room to clean and safely manoeuvre bins. A bin wash down area is provided in this area.

BIN MOVING PATHS

The building manager is responsible for the transportation of bins as required from their designated operational locations to the bin holding room as required and returning them once emptied to resume operational use.

Transfer of bins should minimise manual handling where possible, as bins become heavy when full. The building manager must assess manual handling risks and provide any relevant documentation to key personal.

The routes along the bin moving path should;

- Allow for a continuous route that is wholly within the property boundary.
- Be free from obstruction and obstacles such as steps and kerbs.
- Be constructed of solid materials with a non-slip surface
- Be A minimum of 300mm wider than the largest bin used onsite.
- If bins are moved manually, the route must not exceed a grade of 1:14.
- If a bin moving device is used, the route cannot exceed the maximum operating grade of the device. This is typically a grade of 1:4, however this will vary depending on the model of bin moving device acquired for the site.

As the distance of the bin moving paths exceed 10m, a bin moving device is recommended to aid the movement of full bins. The developer is responsible for suppling all equipment required for moving bins this includes any bin lifters, bin moving devices and waste transfer bins. This equipment must be new and appropriate for the site. The developer should contact a bin-tug, trailer or tractor consultant to provide equipment recommendations.

Once the site is operational (and the developers is no longer involved) the building proprietors/strata will be responsible for maintaining, repairing and replacing waste management equipment.

Bins may have to be fitted with hitches to enable the simultaneous transportation of multiple bins to the collection area. Council must be informed of any hitch attachments required to be installed on bins.

COLLECTION OF WASTE

RESIDENTIAL

The garbage and recycling for this site will be collected by Council from the residential bin holding areas located in each building. This report assumes waste will be collected three times weekly and recycling twice weekly

Prior to collection day, the building manager will transport the bins from the Chute Discharge Rooms to the Residential Bin Holding Area on Ground Level to await collection. It is recommended that service bins are placed under the chute while servicing is occurring. Suitable bin moving equipment is also recommended to aid the movement of bins.

The collection vehicle will enter the site and park in the respective loading bays adjacent to the Residential Bin Holding Rooms. The waste collection staff will collect the bins directly from the Residential Bin Holding Rooms.

After servicing has been completed, the building manager is responsible for returning the bins to their operational locations.

RETAIL/COMMUNITY AND CHILDCARE

A private contractor will be engaged to collect the waste and recycling to agreed schedule. This report assumes waste and recycling will be collected a minimum of once weekly.

The collection vehicle will park in the closest loading bay to the respective waste room. The waste collection staff will collect the bins directly from the retail/community waste room and the childcare waste room.

GARBAGE ROOMS - CONSTRUCTION REQUIREMENTS

The garbage room will be required to contain the following facilities to minimise odours, deter vermin, protect surrounding areas, and make it a user-friendly and safe area:

- waste room floor to be sealed with a two pack epoxy;
- waste room walls and floor surface is flat and even;
- all corners coved and sealed 100mm up, this is to eliminate build-up of dirt;
- for residential: a hot and cold water facility with mixing facility and hose cock must be provided for washing the bins;
- for retail/commercial: a cold water facility with hose cock must be provided for washing the bins;
- any waste water discharge from bin washing must be drained to sewer in accordance with the relevant water board. (Sydney Water);
- tap height of 1.6m;
- storm water access preventatives (grate);
- all walls painted with light colour and washable paint;
- equipment electric outlets to be installed 1700mm above floor levels;
- the room must be mechanically ventilated;
- light switch installed at height of 1.6m;
- waste rooms must be well lit (sensor lighting recommended);
- optional automatic odour and pest control system installed to eliminate all pest types and assist with odour reduction – this process generally takes place at building handover – building management make the decision to install;
- all personnel doors are hinged and self-closing;
- waste collection area must hold all bins – bin movements should be with ease of access;
- conform to the Building Code of Australia, Australian Standards and local laws; and
- childproofing and public/operator safety shall be assessed and ensured

VENTILATION

Waste and recycling rooms must have their own exhaust ventilation system either;

- Mechanically - exhausting at a rate of 5L/m² floor area, with a minimum rate of 100L/s minimum; or
- Naturally - permanent, unobstructed, and opening direct to the external air, not less than one-twentieth (1/20) of the floor area

Mechanical exhaust systems shall comply with AS1668 and not cause any inconvenience, noise or odour problem.

STORM WATER PREVENTION & LITTER REDUCTION

Building management shall be responsible for the following to minimise dispersion of site litter and prevent stormwater pollution to avoid impact to the environment and local amenity:

- promote adequate waste disposal into the bins;
- secure all bin rooms (whilst affording access to staff/contractors);
- prevent overfilling of bins, keep all bin lids closed and bungs leak-free;
- take action to prevent dumping or unauthorised use of waste areas; and
- ensure collection contractors clean-up any spillage that may occur when clearing bins

REPORT CONDITIONS

The purpose of this report is to document an OWMP as part of a development application, which is supplied by EFRS with the following limitations:

- Drawings, estimates and information contained in this OWMP have been prepared by analysing the information, plans and documents supplied by the client and third parties including Council and other government agencies. The assumptions based on the information contained in the OWMP is outside the control of EFRS,
- The figures presented in the report are an estimate only – the actual amount of waste generated will be dependent on the occupancy rate of the building/s and waste generation intensity as well as the building management's approach to educating residents and tenants regarding waste management operations and responsibilities,
- The building manager will adjust waste management operations as required based on actual waste volumes (e.g. if waste is greater than estimated) and increase the number of bins and collections accordingly,
- The report will not be used to determine or forecast operational costs or prepare any feasibility study or to document any safety or operational procedures,
- The report has been prepared with all due care; however no assurance is made that the OWMP reflects the actual outcome of the proposed waste facilities, services, and operations, and EFRS will not be liable for plans or results that are not suitable for purpose due to incorrect or unsuitable information or otherwise,
- EFRS offer no warranty or representation of accuracy or reliability of the OWMP unless specifically stated,
- Any manual handling equipment recommended in this OWMP should be provided at the recommendation of the appropriate equipment provider who will assess the correct equipment for supply,
- Design of waste management equipment and systems must be approved by the supplier,
- EFRS cannot be held accountable for late changes to the design after the OWMP has been submitted to Council,
- EFRS will provide specifications and recommendations on bin access and travel paths within the OWMP, however it is the architect's responsibility to ensure the architectural drawings meet these provisions,
- EFRS are not required to provide information on collection vehicle swept paths, head heights, internal manoeuvring or loading requirements. It is assumed this information will be provided by a traffic consultant,
- Council are subject to changing waste and recycling policies and requirements at their own discretion.

This OWMP is only finalised once the Draft Watermark has been removed. If the Draft Watermark is present, the information in the OWMP is not confirmed.

USEFUL CONTACTS

Elephants Foot Recycling Solutions does not warrant or make representation for goods or services provided by suppliers.

City of Ryde Council Customer Service
Phone: 02 9952 8222 Email: cityofryde@ryde.nsw.gov.au

SULO MGB (MGB, Public Place Bins, Tugs and Bin Hitches)
Phone: 1300 364 388

CLOSED LOOP (Organic Dehydrator)
Phone: 02 9339 9801

ELECTRODRIVE (Bin Mover)
Phone: 1800 333 002 Email: sales@electrodrive.com.au

RUD (Public Place Bins, Recycling Bins)
Phone: 07 3712 8000 Email: Info@rud.com.au

CAPITAL CITY WASTE SERVICES
Phone: 02 9359 9999

REMONDIS (Private Waste Services Provider)
Phone: 13 73 73

SITA ENVIRONMENTAL (Private Waste Services Provider)
Phone: 13 13 35

NATIONAL ASSOCIATION OF CHARITABLE RECYCLING ORGANISATIONS INC. (NACRO)
Phone: 03 9429 9884 Email: information@nacro.org.au

PURIFYING SOLUTIONS (Odour Control)
Phone: 1300 636 877 Email: sales@purifyingsolutions.com.au

Elephants Foot Recycling Solutions (Chutes, Compactors and eDiverter Systems)
44 – 46 Gibson Avenue
Padstow NSW 2211
Free call: 1800 025 073

APPENDICES

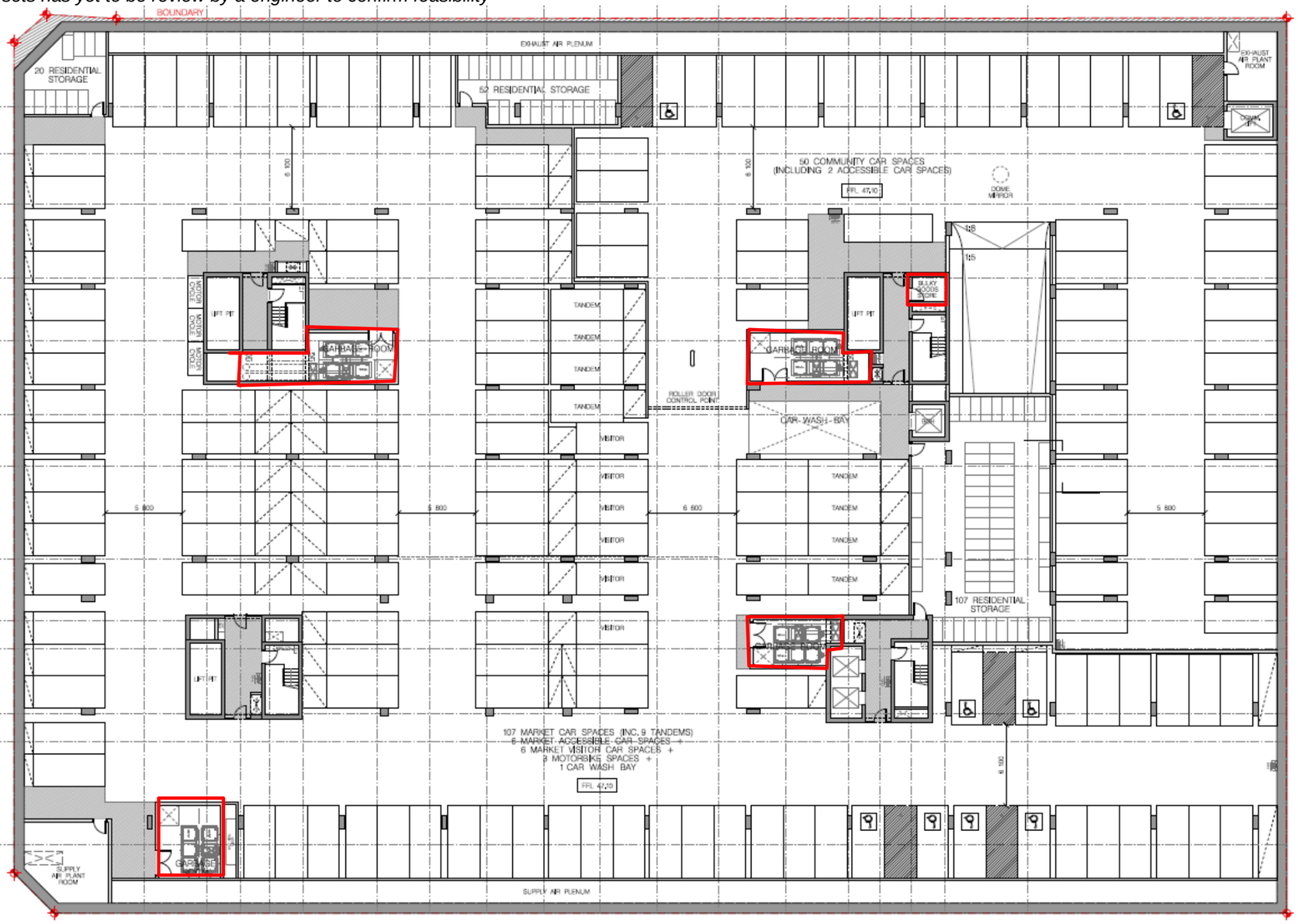
APPENDIX A DRAWING EXCERPTS

APPENDIX A.1 STAGING PLAN

Source: Bates Smart – Staging Plan 2018

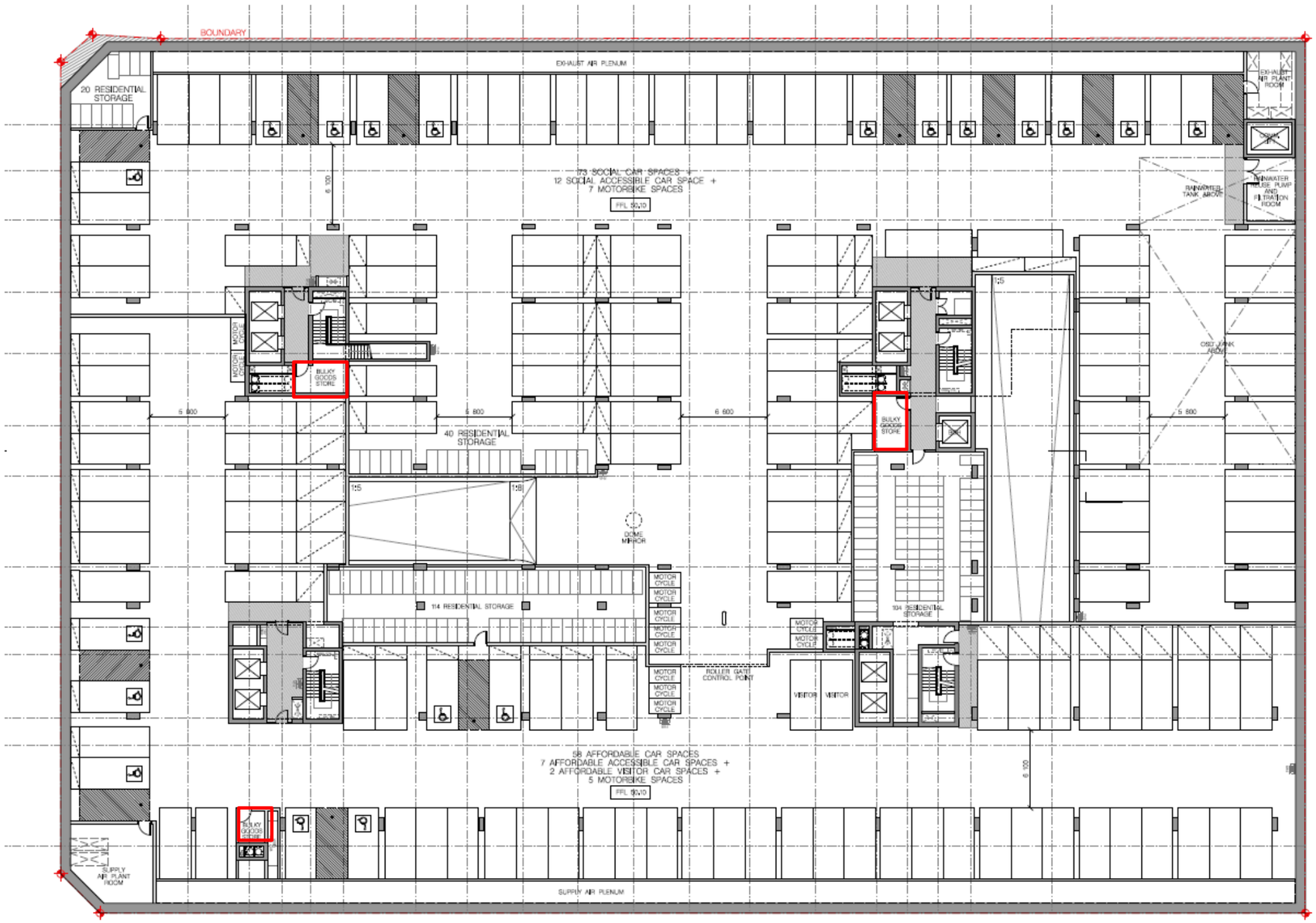
APPENDIX A.2 C1 BASEMENT LEVEL 3 – WASTE FACILITIES

Please note: The chute offsets has yet to be review by a engineer to confirm feasibility

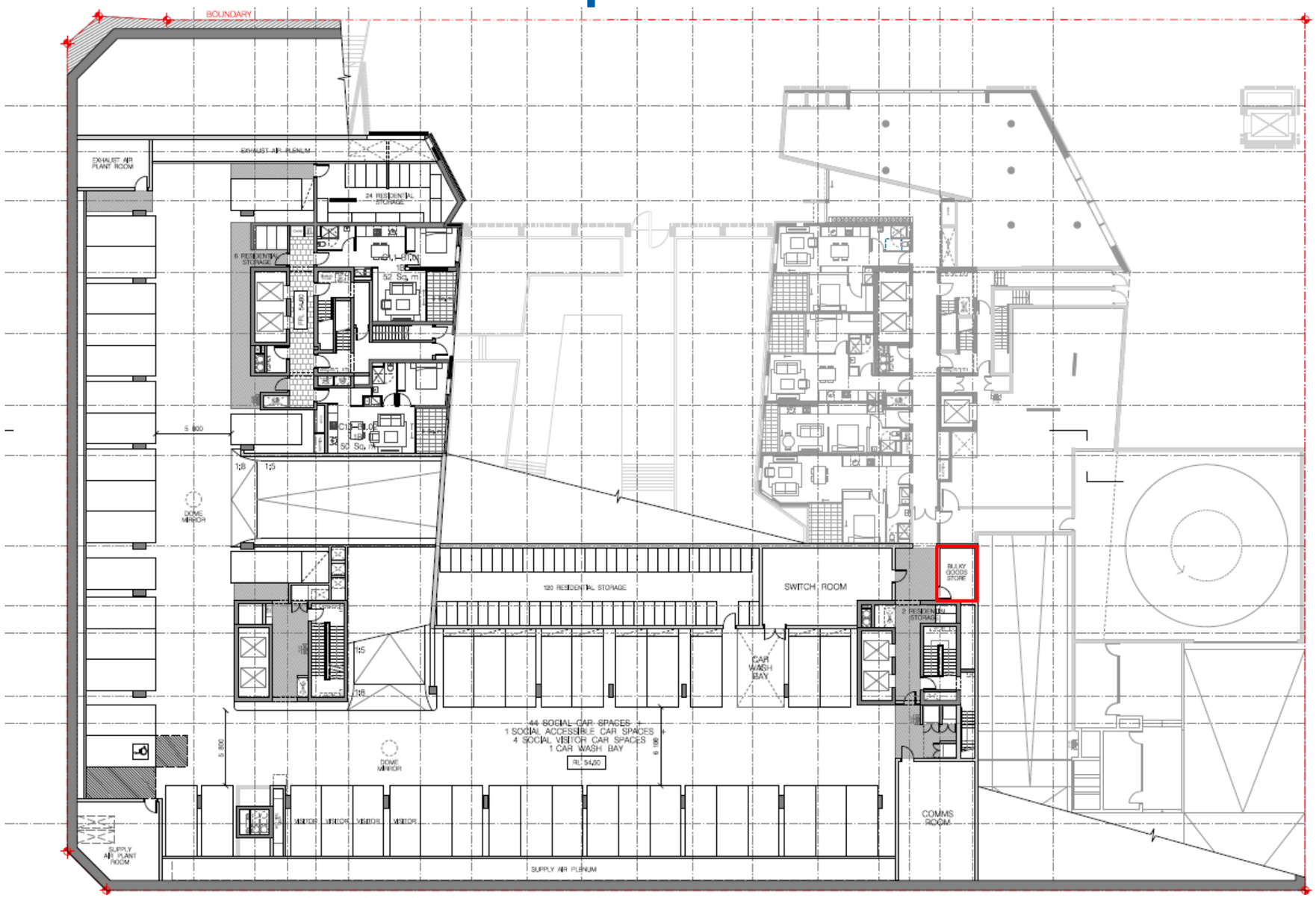


Source: Candalepas Associates, Drawing No. S4.55-1102, Rev A, Dec2020– Basement 3 Floor Plan

APPENDIX A.3 C1 BASEMENT LEVEL 1 & 2 – BULKY GOODS ROOMS

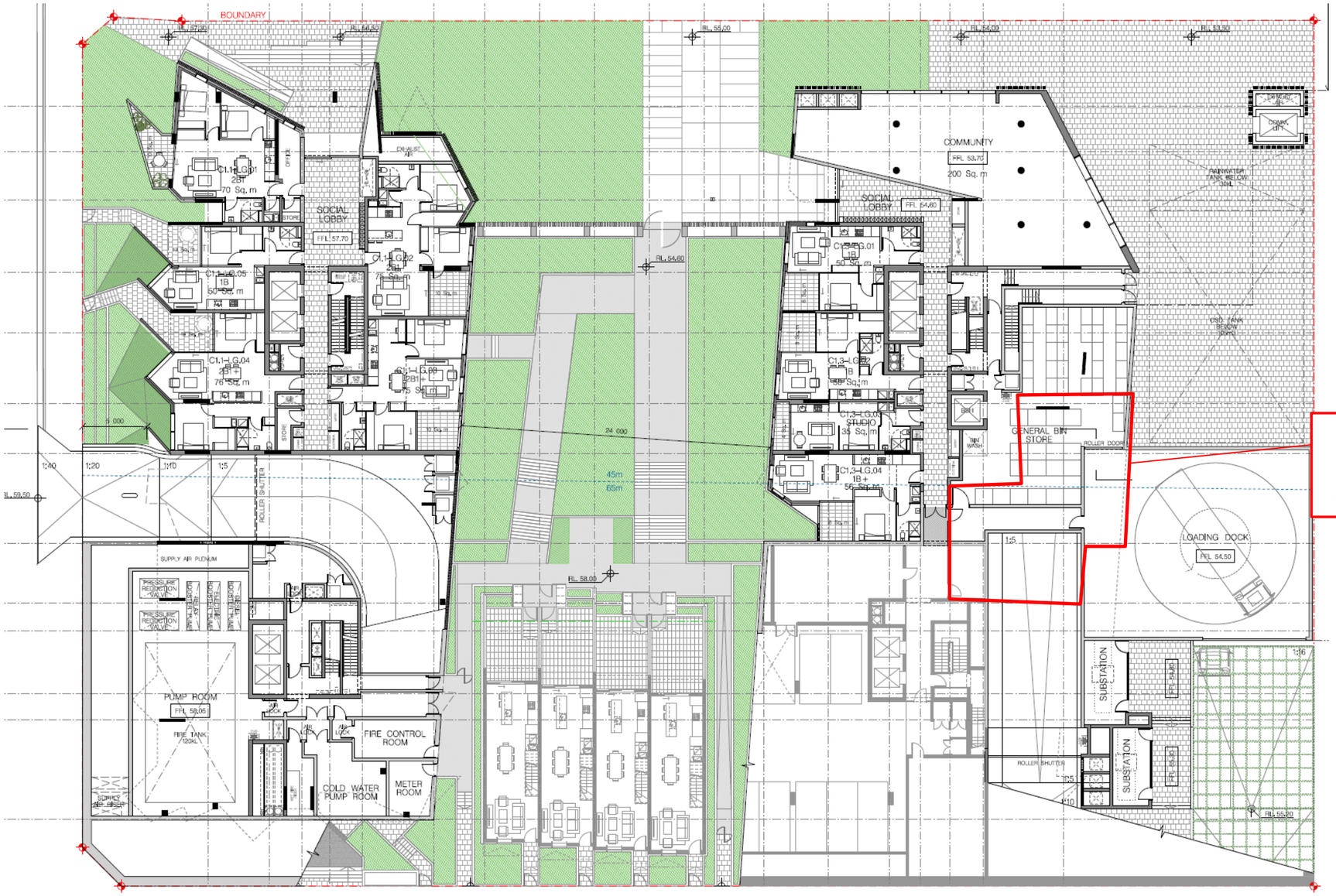


Source: Candalepas Associates, Drawing No. S4.55-1103, Rev A, Dec2020– Basement 2 Floor Plan



Source: Candalepas Associates, Drawing No. S4.55-1104, Rev A, Dec2020– Basement 1 Floor Plan

APPENDIX A.4 BUILDING C1 LOWER GROUND LEVEL – BUILDING C1 WASTE FACILITIES AND COLLECTION AREA



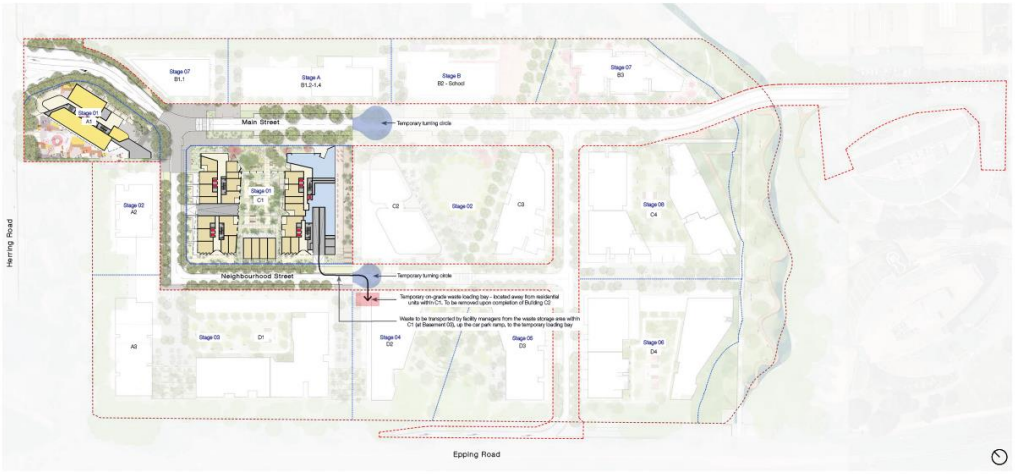
Building C1 Residential Bin Holding Area (collection area)

Source: Candalepas Associates, Drawing No. S4.55-1105 , Iss.A, Dec2020– Lower Ground Floor Plan

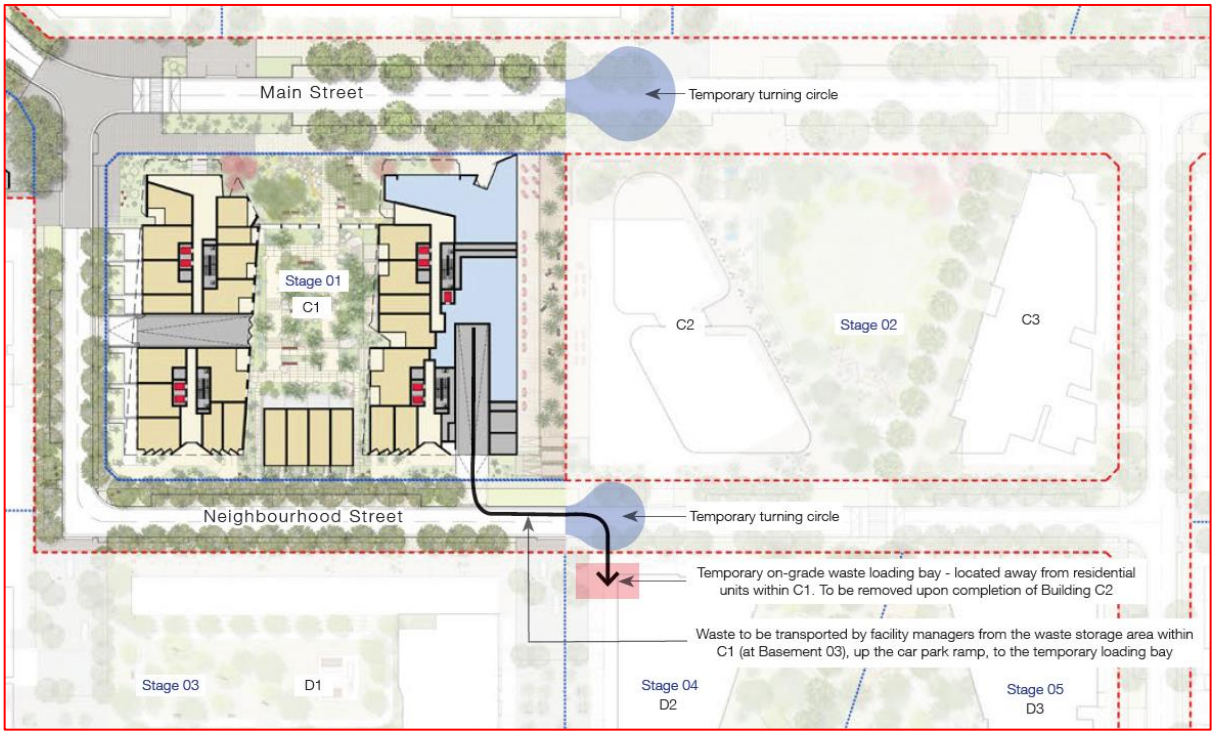
APPENDIX A.5 C1 TEMPORARY COLLECTION AREA

PHASE 02 - INITIAL ROAD CONSTRUCTION

Partial road construction only.
Temporary turning circles and on-grade waste loading for C1 (within Stage 04 / Lot D2)



BATESSMART.



Bingo Waste Services Pty Ltd
ABN: 43 162 988 623

PO Box 7, Enfield NSW 2136
T: 02 9737 0308 F: 02 9737 0351
enquiries@bingoindustries.com.au
www.bingoindustries.com.au

03/11/2016

To whom it may concern,

Bingo Industries will support and work closely with Frasers Property Australia to try and ensure the correct recyclable materials are placed into the bins, so that we can achieve a maximum of 1% construction waste to landfill through recycling.

Bingo has 6 state of the art waste recovery facilities strategically located around Sydney. They are based in Auburn, Banksmeadow, Minto, Mortdale, St Marys & Smithfield. Bingo Recycling Centres have an outstanding reputation in the waste industry. We have spent several million dollars in the last few years on recycling equipment and machinery, evolving into the best group of recycling facilities in Australia.

Our unique approach to recycling and sustainability has earned us an exclusive partnership with Planet Ark and put us at the forefront of the recycling industry.

Should you have any questions or require further information please feel free to contact me.

Kind Regards,

Nick Saad
Sales Manager – Skip Bins
0424 174 577

APPENDIX B BETTER PRACTICE GUIDE SPECIFICATIONS

APPENDIX B.1 BIN DIMENSIONS

Mobile bins

Mobile bins come in a variety of sizes and are designed for lifting and emptying by purpose-built equipment.

Mobile bins with capacities of up to 1700L must comply with *AS4123.6-2006 Mobile waste containers* which specifies standard sizes and sets out the colour designations for the bodies and lids of mobile waste containers indicating the type of materials they are used to collect.

The most common bin sizes are provided below, although not all sizes are shown. The dimensions are a guide only and differ slightly between manufacturers. Some bins have flat or domed lids and are used with different lifting devices. Refer to *AS4123.6-2006* for further details.

Table G1.1: Average dimension ranges for two-wheel mobile bins

Wheelie bin

Bin capacity	80L	120L		140L		240L	360L
Height (mm)	870	940	1065	1080	1100		
Depth (mm)	530	530		540		735	820
Width (mm)	450	485		500		580	600
Approximate footprint (m^2)	0.24	0.26–0.33		0.27-0.33		0.41–0.43	0.49
Approximate weight (kg)	8.5	9.5		10.4		15.5	23
Approximate maximum load (kg)	32	48		56		96	Not known

Sources include Sulo, Single Waste, Cleanaway, SUEZ, just wheelie bins and Perth Waste for two-wheel mobile bins

Table G1.2: Average dimension ranges for four-wheel bulk bins

Dome or flat lid container

Bin capacity	660L	770L	1100L	1300L	1700L
Height (mm)	1250	1425	1470	1480	1470
Depth (mm)	850	1100	1245	1250	1250
Width (mm)	1370	1370	1370	1770	1770
Approx footprint (m^2)	0.86–1.16	1.51	1.33–1.74	2.21	2.21
Approx weight (kg)	45	Not known	65	Not known	Not known
Approx maximum load (kg)	310	Not known	440	Not known	Not known

Sources include Sulo, Signal Waste, Cleanaway, SUEZ, Just Wheelie Bins and Perth Waste

SOURCE: Better Practice Guide For Resource Recovery In Residential Developments 2019, NSW Environmental Protection Authority

Waste signs

Signs and educational materials perform several functions including:

- informing residents why it is important to recover resources and protect the environment
- providing clear instructions on how to use the bins and services provided
- alerting people to any dangers or hazards within the bin storage areas.

All waste, recycling and organic bins should be Australian Standard colours and clearly and correctly labelled, such as by a sticker on the lid and/or the body of the bin.

Communal bin storage areas should be clearly signposted with signs outlining how to correctly separate waste into the bins provided. The local council responsible for waste services may be a good source of signs and posters and can advise on what signs are suitable.

Information on who to contact to find out more about the recycling and/or other resource recovery services in the building should also be displayed in communal areas, such as on a noticeboard.

The Planet Ark website also has resources available free of charge for use by businesses and councils. These signs can be found at businessrecycling.com.au/research/signage.cfm

Figure I1.1: Examples of waste wall posters (EPA supplied)

Figure I1.2: Examples of bin lid stickers (EPA supplied)

SOURCE: Better Practice Guide For Resource Recovery In Residential Developments 2019, NSW Environmental Protection Authority

Safety signs

The use of safety signs for waste resource recovery rooms must comply with *AS1319 Safety signs for occupational environments*. Safety signs must be used to regulate and control safety related to behaviour, warn of hazards and provide emergency information, including fire protection information. Suitable signs should be decided for each development as required.

Figure I3.1: Example safety signs

SOURCE: Better Practice Guide For Resource Recovery In Residential Developments 2019, NSW Environmental Protection Authority

APPENDIX B.3 TYPICAL RETAIL COLLECTION VEHICLE INFORMATION

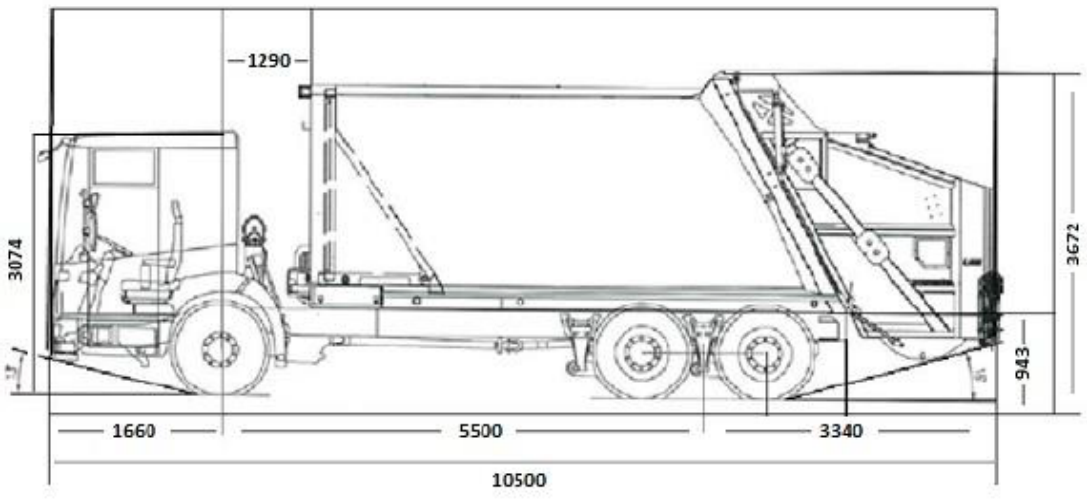
DESIGN SPECIFICATIONS REAR LOADED WASTE COLLECTION VEHICLES

NOTE: Small Residential Flat Buildings outlined in section 4.3 do not require on site waste allocation therefore no vehicle specifications have been provided of the 12.5m heavy Rigid Collection Vehicle.

The following dimensions are provided for a standard heavy rigid vehicle as identified in Australian Standard 2890.2:

Vehicle Class:	Heavy Rigid Vehicle Dimensions
Overall Length (m)	10.5
Operational Length (m)	12.5
Design Width (m)	2.8
Design Height (m)	3.7
Swept Circle (m)	22.5
Clearance (travel height) (m)	4.5
Weight Fully Loaded (tonnes)	22.5
Capacity (m^3)	24
Front Chassis Clearance	13^0
Rear Chassis Clearance	16^0

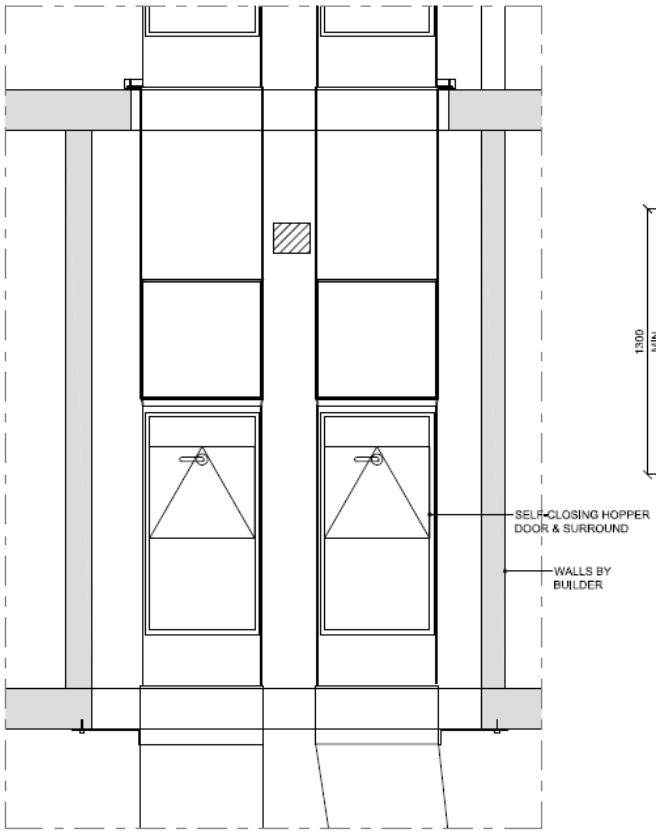
Standard dimensions sourced from AS 2890.2 Parking Facilities: Off-Street Commercial Vehicle Facilities



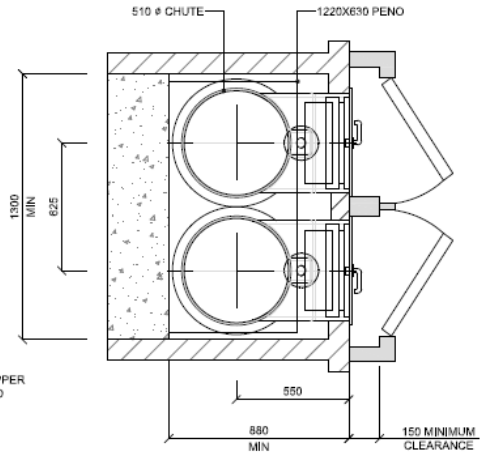
10.5m Heavy Rigid Waste Collection Vehicle specifications

APPENDIX C WASTE MANAGEMENT EQUIPMENT SPECIFICATIONS

APPENDIX C.1 TYPICAL WASTE CHUTE SPECIFICATIONS



TYPICAL DUAL CHUTE LAYOUT (510Ø)
SCALE 1:20



TYPICAL LLDPE PLASTIC TWIN CHUTE LAYOUT w/ADDED ENCLOSURE (510Ø) (STEEL SIMILAR)
SCALE 1:20

NOTE: ENCLOSURES ARE REQUIRED IF THE CHUTE OPENS DIRECTLY TO A CORRIDOR OR IS NOT LOCATED IN A WASTE ROOM.

Waste chutes are supplied per the following specifications:

- Either 510mm galvanised steel or 510mm recycled LLDPE polyethylene plastic;
- Galvanised steel chute hoppers are wrapped with 50mm poly-wool R1.3 noise insulation foil to assist in noise reduction;
- Penetrations on each building level at vertically perpendicular points with minimum penetration dimensions of 600mm x 600mm (square or round) are required to accommodate the chute installation;
- A wash down system and vent should also be included as part of the chute system;
- Council and supplier require that all chutes are installed without offsets to achieve best practise operationally for the building; and
- Two hour fire-rated (AS1530.4-2005) stainless steel refuse chute doors at each service level. All doors are to be fitted with a self-closing mechanism to meet BSA fire standards.

NOTE: Chute doors are installed after walls rendered, painted or when required. Information stickers will be placed on each chute door at each residential level.

APPENDIX C.2 TYPICAL LINEAR TRACKS FOR 1100L MGBs

ELEPHANTS FOOT RECYCLING SOLUTIONS
44-46 GIBSON AVE, PADSTOW NSW 2211
E info@elephantsfoot.com.au W elephantsfoot.com.au
Free Call: 1300 4 ELEPHANT (1300 435 374)

1100 LITRE LINEAR TRACK SYSTEM

PRODUCT INFORMATION

Elephants Foot 1100 Litre bin Linear Track System is a versatile waste handling solution for many types of multi-storey or multi-level developments. The Linear Track System collects waste or recycling being disposed from the floors above through the chute system, discharging the material via a hopper that feeds the bins. Electromechanically driven with automated operation, the system utilises linear motion to automatically change over full bins. Once all the bins are filled, an indicator light will illuminate signifying that the bins are ready for withdrawal and collection. Available with or without compaction unit, our standard 660 litre bin Linear Track System is available in the standard 2 bin option. Our 3 Bin option is available as a special order.

SPECIFICATIONS

System Control	Electric PLC
Power Supply	415 V AC / 10A / 5 PIN
Motor Size (kW)	1.1
Maximum bin load	440 kg
Noise (dBA)	<85
Bin Size (L)	1100
Cycle time (sec)	60
Bin Quantity options	2 or 3

OPTIONAL EXTRAS

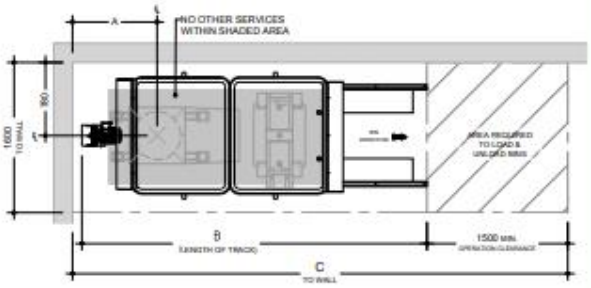
- Compaction unit – Please refer to the bin compactor product information sheet for details and specifications
- Enhanced safety add on's – Interlocking barriers, occupancy sensors or safety light curtains (presence sensing light barriers)
- Full bin SMS and email notification
- CMMS and BMS integration
- Extend warranty – Terms and conditions apply

STANDARD FEATURES & BENEFITS

- Simple operation with user friendly controls
- Increased waste servicing efficiency for the development.
- Automatic system control with manual override
- Robust unit construction for long performance life
- Low service and maintain costs
- Rotating flashing beacon (activated during operation)
- Quiet and efficient system operation
- Maximise safety for residents, caretakers and collectors
- Restrained design with minimal moving parts
- Can suit low ceiling clearances
- Floor contact components fully galvanised steel
- Retro fitting options to suit other chutes systems
- Compliant with relevant Building Codes and Standards
- Standard 12 month warranty

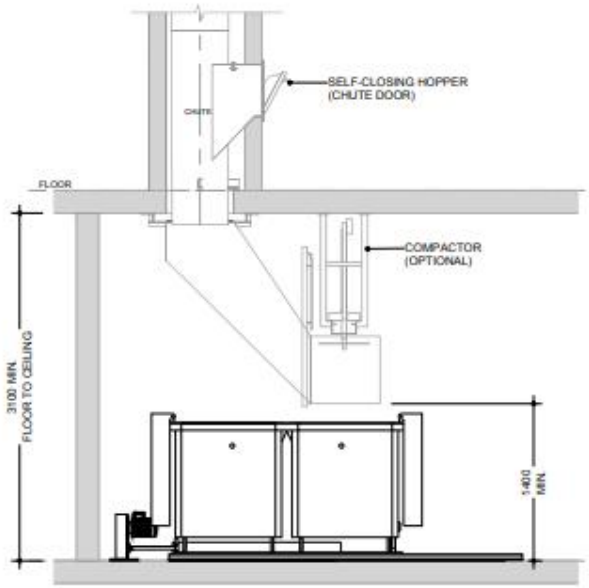
ELEPHANTS FOOT RECYCLING SOLUTIONS
44-46 GIBSON AVE, PADSTOW NSW 2211
E info@elephantsfoot.com.au W elephantsfoot.com.au
Free Call: 1300 4 ELEPHANT (1300 435 374)

LINEAR TRACK SYSTEM



1100 LITRE BIN

1100 LITRE BIN LINEAR TRACK SYSTEM			
No. of Bins	Reference (mm)		
	A	B	C
2	900	3700	5300
3	2100	5940	7550



Notes:

Bins not provided by Elephants Foot

Drawings shown are for general information purposes only and provide minimum equipment spacial requirements for waste room design.

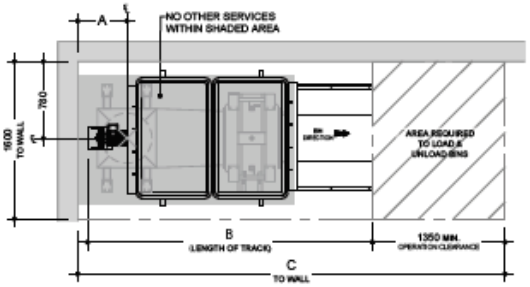
These drawings are not intended for site specific use or for construction. Each project is unique and will be designed to suit.

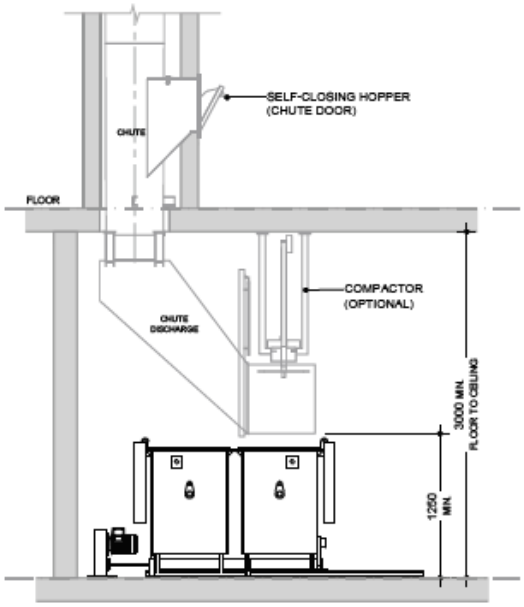
Additional equipment options, systems and configurations are available. For design assessment, information and advice, please contact an Elephants Foot design consultant on 1300 435 374

Please note: this is an example only – please refer to supplier's information and specification.

ELEPHANTS FOOT RECYCLING SOLUTIONS
44-46 GIBSON AVE, PADSTOW NSW 2211
E info@elephantsfoot.com.au W elephantsfoot.com.au
Free Call: 1300 4 ELEPHANT (1300 435 374)

LINEAR TRACK SYSTEM





660 LITRE BIN

660 LITRE BIN LINEAR TRACK SYSTEM			
No. of Bins	Reference (mm)		
	A	B	C
2	500	2950	4350
3	1450	4650	6050
4	2300	6300	7750

Notes:

Bins not provided by Elephants Foot

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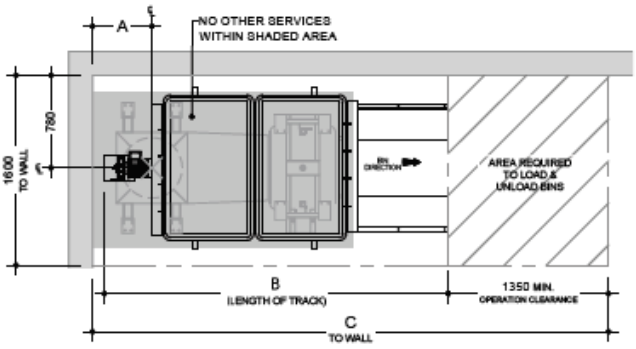
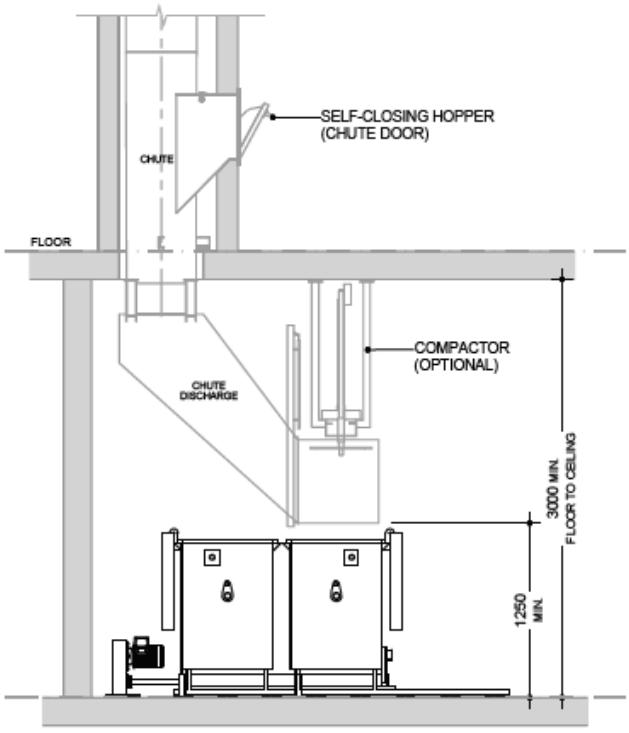
LINEAR TRACK SYSTEM





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	A	B	C
2	500	2950	4350
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Please note: this is an example only – please refer to supplier's information and specification.

mckenzie group
A Bureau Veritas Group Company
Sydney | Melbourne | Brisbane | Gold Coast
www.mckenzie-group.com.au | email@mckenzie-group.com.au

11/12/2020

Frasers Property Australia
C/o Robert Cauchi
Level 2,
1C Homebush Bay Drive,
Rhodes NSW 2138 Australia

Dear Robert,

Re: Ivanhoe Estate C1 – Regulatory Compliance Statement

We have reviewed the design documentation against the provisions of the Building Code of Australia 2019 Amendment 1. We confirm that, based on the below documentation, the project is capable of complying with the Building Code of Australia 2019 Amendment 1.

The following documentation was used in the assessment and preparation of this Statement:

Drawing No.	Title	Date	Drawn By	Issue
S4.55-1000	Cover Sheet	SEP 2020	Candalepas Associates	B
S4.55-1050	Site Plan	SEP 2020	Candalepas Associates	B
S4.55-1102	Basement 3 Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1103	Basement 2 Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1104	Basement 1 Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1105	Lower Ground Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1106	Upper Ground Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1107	Level 1 Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1108	Level 2 Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1109	Level 3-4 Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1110	Level 5-12 Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1111	Level 13 Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1112	Level 14-19 Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1113	Roof	SEP 2020	Candalepas Associates	B
S4.55-1150	Adaptable Floor Plan	SEP 2020	Candalepas Associates	B
S4.55-1200	Section A	SEP 2020	Candalepas Associates	B
S4.55-1201	Section B	SEP 2020	Candalepas Associates	B
S4.55-1202	Section C	SEP 2020	Candalepas Associates	B

Drawing No.	Title	Date	Drawn By	Issue
S4.55-1300	North East Elevation	SEP 2020	Candalepas Associates	B
S4.55-1301	North West Elevation	SEP 2020	Candalepas Associates	B
S4.55-1302	North West Internal Elevation	SEP 2020	Candalepas Associates	B
S4.55-1303	South East Elevation	SEP 2020	Candalepas Associates	B
S4.55-1304	South East Internal Elevation	SEP 2020	Candalepas Associates	B
S4.55-1305	South West Elevation	SEP 2020	Candalepas Associates	B
S4.55-1305	South West Elevation	SEP 2020	Candalepas Associates	B
S4.55-1600	Solar & Vent Calculations	SEP 2020	Candalepas Associates	B
S4.55-1601	Solar & Vent Calculations Sheet 2	SEP 2020	Candalepas Associates	B
S4.55-1602	Solar & Vent Calculations Sheet 3	SEP 2020	Candalepas Associates	B
S4.55-1850	Area Calculations	SEP 2020	Candalepas Associates	B
S4.55-1851	Apartment Storage Area Calculations	SEP 2020	Candalepas Associates	B

Yours faithfully

Alex Ciecko
Building Surveyor
McKenzie Group Consulting (NSW) Pty Ltd
ACN 093 211 995

Morris Goding
Access Consulting

Robert Couchi
Development Manager
Fraser Property Australia
Level 2, 1C, homebush Bay Drive
Rhodes NSW 2138

9th November 2020

Dear Robert

RE: Ivanhoe Estate Village – S4.55 Access Statement

This letter has been prepared by Morris Goding Access Consulting (MGAC) for Fraser Property Australia to support the S4.55 application for Ivanhoe Estate Village.

MGAC has reviewed and assessed the drawings and relevant documentation prepared in respect of the S4.55 application submission.

The MGAC Report dated 22nd November 2018 that supported the original Project Application concluded that the accessibility for the Ivanhoe Estate Stage 1 will be able to achieve the accessibility design requirements as set out in the DDA Access to Premises Standards.

On this basis, MGAC is of the opinion that the proposed S4.55 drawings do not require any additional supporting information, analysis or commentary at this stage of the design and compliance with DDA Premises Standards and Australian Standards can be achieved.

Yours faithfully,

Anthony Leuzzi
Associate Director
Morris Goding Access Consulting

Morris Goding
Access Consulting
ABN 70 414 330 060

Studio 6, Level 1
56 Bowman Street
Pyrmont NSW 20 09

T 02 9692 9322
F 02 9692 8433
W mgac.com.au

NSW
QLD
VIC

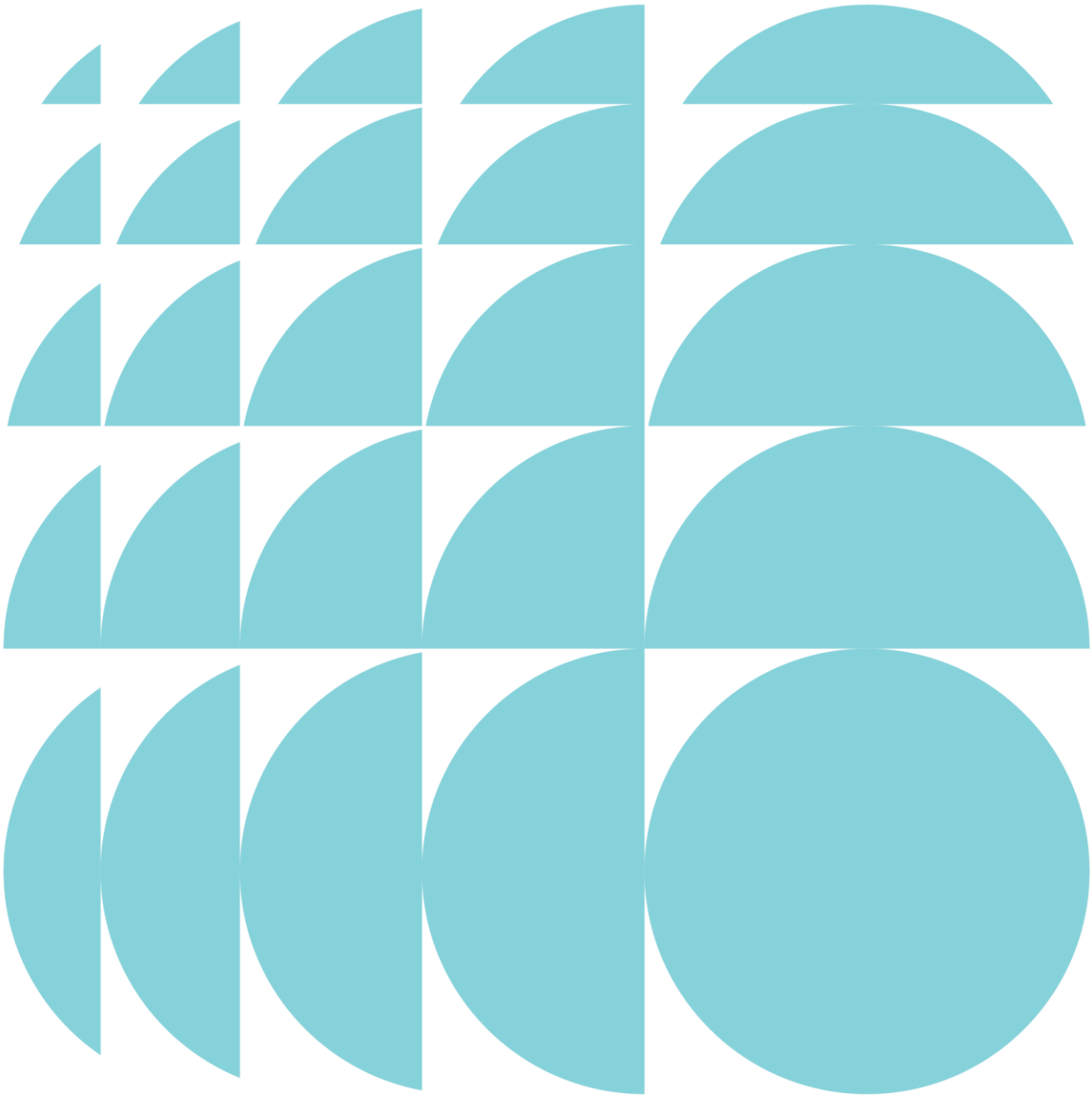
ETHOS URBAN

Statement of Environmental Effects

Ivanhoe Estate
Section 4.55(1A) Modification Application

Submitted to Department of Planning, Industry and Environment
On behalf of Frasers Property Australia

18 December 2020 | 17156



CONTACT

James McBride	Associate Director	jmcbride@ethosurban.com	0413 917 399

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This document has been prepared by:		This document has been reviewed by:	
Costa Dimitriadis	18 December 2020	James McBride	18 December 2020

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VERSION NO. 2	DATE OF ISSUE- 18 DEC 2020	REVISION BY CD	APPROVED BY JMC

Ethos Urban Pty Ltd
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1.0 Introduction

This application has been prepared by Ethos Urban on behalf of Frasers Property Australia pursuant to section 4.55(1A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to modify SSD-8903 relating to the Ivanhoe Estate (the site).

The key amendments relate to:

- The conversion of a portion of market dwellings to affordable housing dwellings in Building C1 resulting in amendments to apartment mix and overall yield. The amendment will result in an additional 25 dwellings however will not result in any significant material changes to the approved built form or GFA.
- Reconfiguration of the basement car park across all levels resulting in an additional 24 car parking spaces.
- Extension of the lot boundary to accommodate the provision of parking for community uses and car share spaces.

The fundamental reason for the modification is due to the brief of the Community Housing Provider which required the provision of all affordable housing dwellings approved with the Concept DA pursuant to SSD 8707 to be delivered in Stage 1. This effectively means that all 130 affordable housing dwellings will be bought forward from Stage 6 into Stage 1, resulting in the early delivery of affordable housing along with the provision of both social and market dwellings.

This application identifies the consent, describes the proposed modifications and provides a planning assessment of the relevant matters for consideration contained in section 4.55(1A) of the EP&A Act. It is based on the Architectural Plans provided by Candalepas Associates (see **Appendix A**) and other supporting technical information appended to the report (see Table of Contents).

2.0 Concept Approval

Development consent was granted by the Minister for Planning and Public Spaces for State Significant Development (SSD-8707), for the Ivanhoe Estate Masterplan, on 30 April 2020. The concept approval comprises:

- Approximately 3,300 residential dwellings including approximately 950 social and 128 affordable housing dwellings, and 273 seniors housing comprising of private and social independent living;
- A 120 bed residential aged care facility (RACF);
- A school accommodating approximately 430 places;
- Community uses including community centres, community rooms, meeting rooms and fitness areas;
- Minor retail development;
- maximum building heights and GFA for each development block;
- public domain landscape concept, including parks, streets and pedestrian connections;
- provision of the Ivanhoe Estate Design Guidelines to guide the detailed design of the future buildings; and
- vehicular and intersection upgrades.

The concept approval is currently the subject of a Section 4.55(1A) modification to amend Condition A30 relating to development contributions. This modification also anticipates amendments the subject of this application.

3.0 Consent proposed to be modified

Development consent was granted by the Minister for Planning and Public Spaces for State Significant Development (SSD-8903), Stage 1 of the Ivanhoe Estate development in Macquarie Park, on 30 April 2020. The development is pursuant to the Ivanhoe Estate Masterplan (SSD-8707) and comprises:

- Site preparation works, including removal of trees, demolition, bulk earthworks and excavation
- Construction of new roads, bridge over Shrimptons Creek and new road connection to Lyonpark Road
- Construction of two residential apartment buildings (Building A1 and Building C1) with basement car parking:
  - Building A1 with 269 apartments, 233 car parking spaces and a child centre
  - Building C1 with 471 apartments and 346 car parking spaces
- Landscaping and public domain works
- Amalgamation and subdivision

The consent has previously been modified to facilitate amendments to a number of conditions of consent to clarify specific requirements, timings, nominated personnel or address errors. The Section 4.55(1A) modification was approved on 10 November 2020. Therefore, the subject modification constitutes MOD 2 of SSD-8903.

4.0 Site Analysis

4.1 Site location and context

The site is located in Macquarie Park near the corner of Herring Road and Epping Road within the City of Ryde Council Local Government Area (LGA). It is located on the southern fringe of Macquarie Park, and is within approximately 500 metres of both Macquarie Shopping Centre and Macquarie University. The surrounding area is characterised by a mix of commercial and education uses, as well as student accommodation and residential dwellings. The site's locational context is shown at **Figure 1**.

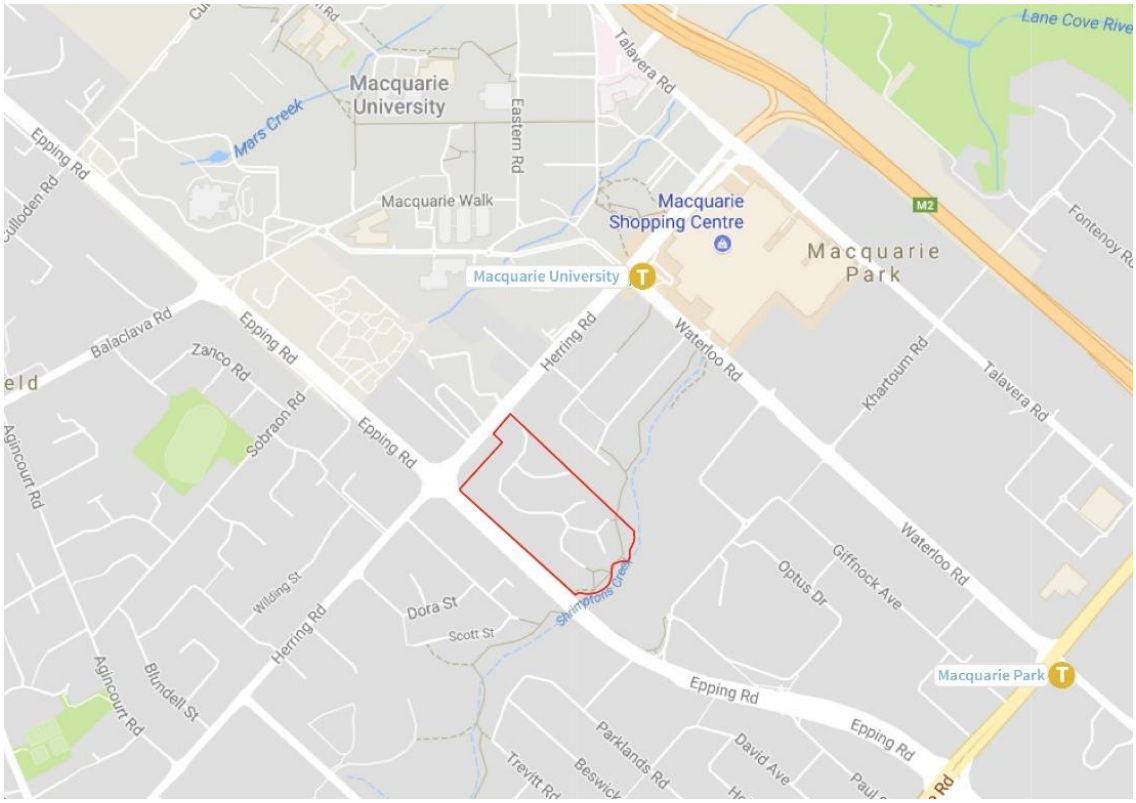


Figure 1 Locational context of Ivanhoe Estate (outlined in red)

Source: Google Maps & Ethos Urban

4.2 Site description

The Ivanhoe Estate site is approximately 8.2 hectares in area and comprises one consolidated allotment. The entire Ivanhoe Estate site, including all the internal roads, is owned and managed by LAHC. As noted above, the

Masterplan site also incorporates adjoining land, being a portion of Shrimptons Creek and Lot 1 DP 859537 (2-4 Lyon Park Road). 2-4 Lyonpark Road is owned by LIF Pty Ltd as trustee for Local Government Super and the owners of Shrimptons Creek is currently being determined by NSW Land and Property Information. In the interim, land ownership for Shrimptons Creek is established in accordance with the *ad medium filum* legal precedent, whereby the owner of a lot adjacent to a creek also owns a portion of the creek up to the centre point.

An aerial photo of the site is included at **Figure 2** below. An image identifying the surrounding development is included at **Figure 3**.

Figure 2 Aerial image of the site

Source: Nearmap & Ethos Urban

5.0 Proposed modifications to the consent

5.1 Modifications to the development

The proposed modifications seek to modify the development consent to facilitate the following changes to Building C1:

- Reduction in market dwellings from 212 to 107 apartments (reduction of 105 apartments);
- Provision of an additional 130 affordable housing apartments representing a net increase of 25 additional apartments in C1 from 471 to 496 apartments.
- Reduction in proposed gross floor area (GFA), with a proposal to deliver 33,480m^2 of GFA (reduction of 116m^2);
- Reconfiguration of the apartment mix as follows:
    - Studio apartments: 96
    - 1 bedroom apartments: 198
    - 2 bedroom apartments: 186
    - 3 bedroom apartments: 12
    - 4 bedroom apartments: 4
- Increase in car parking provision from 346 to 370 car spaces in line with the approved car parking rates.
- Extension of the lot boundary to the east to accommodate provision of community car spaces, pool and gym car spaces, car share and associated access.
- External design changes to the façades to facilitate internal reconfiguration of the apartment layouts.

The proposed modifications to Building C1 will not result in any changes to Building A1 or any civil works associated with Stage 1. Further, the proposal will not modify the overall dwelling yield pursuant to the Concept Approval given that the affordable housing dwellings have been brought forward from Stage 6 into Stage 1. However, it is noted that the total yield in Stage 1 will be increased from 740 to 765 dwellings.

The proposed changes are illustrated in the revised Architectural Plans prepared by Candelapas (**Appendix A**) and the revised Landscape Plans (**Appendix B**) and are discussed further below.

Figure 3 Perspective of Building C1

Source: Doug & Wolf

5.2 Design modifications

5.2.1 Provision of Affordable Housing

The modification proposes to bring forward the delivery of all 128 of the affordable housing dwellings approved with the Concept DA. To facilitate the provision of 130 affordable housing dwellings, there will be a reduction of market dwellings from 212 to 107 apartments. In total, the modification will marginally increase the dwelling yield within Building C1 from 471 to 496 apartments.

The provision of affordable housing dwellings have been achieved through the reduction of market dwellings and the reconfiguration of the internal building layout to Building C1.2. The provision of affordable housing dwellings has had the effect of revising the approved apartment mix however will not materially alter the approved building envelope and will ultimately result in the reduction of gross floor area in the order of 116m^2.

Figures 5 to **8** depicts the approved and proposed floor plans from Architectural Plans prepared by Candalepas and Associates.

Figure 4 Approved Upper Ground Floor Plan

Source/Notes: Candalepas Associates

Figure 5 Proposed Upper Ground Floor Plan

Source: Candalepas Associates

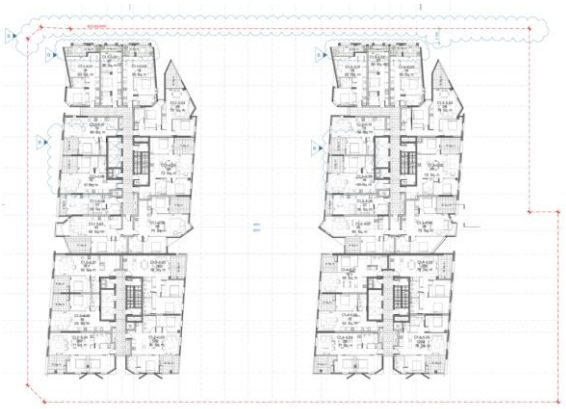


Figure 6 Approved Level 5-12 Plan

Source: Candalepas Associates

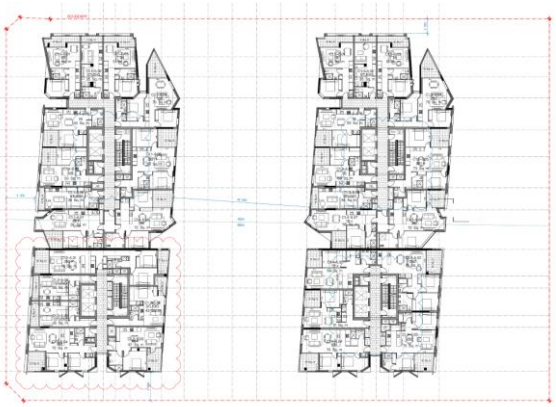


Figure 7 Proposed Level 5-12 Plan

Source/Notes: Candalepas Associates

5.2.2 Reconfiguration of Basement Design and Car Parking Provision

The basement design and car parking provision has been amended to account for the changes to the housing tenure of Building C1 and to facilitate car parking for the future community centre, pool and gym facilities in addition to car share spaces as required by the Concept Plan and Stage 1 consent. In total, the car park provision has been summarised in **Table 1**.

Table 1 Proposed Car Parking Provision – Building C1

Housing Tenure / Use	Proposed Allocation
Residential	320 (including 12 visitor spaces)
Community Uses	20
Car Share	30
Total	**370**

The layout of the car park has been amended to enhance circulation including the provision of a direct ramp from ground level to Basement Level 3 for car parking associated with the future community centre. This enables patrons of the community centre to access parking without traversing the residential car park. Other refinements to the basement design have also been incorporated to improve access and circulation. **Figures 9** and **10** depict the approved and proposed Basement Level 3 Plan from the Architectural Plans prepared by Candalepas and Associates.

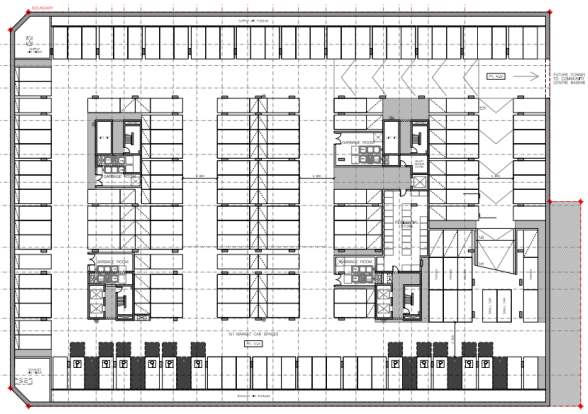


Figure 8 Approved Basement Level 3 Plan

Source: Candalepas Associates

Figure 9 Proposed Basement Level 3 Plan

Source: Candalepas Associates

5.2.3 Amendment to Lot Boundary

The lot geometry for block C1 has been revised to square off the eastern boundary. The amendment is required to facilitate car parking for the future community centre and associated access to the car parking area via a lift located on the ground plane adjacent to Main Street. The location of the lift core will enable efficient access to the future community centre and pool via the car park located within the basement of Building C1. **Figure 11** and **12** depict the approved and proposed change to the lot boundary.

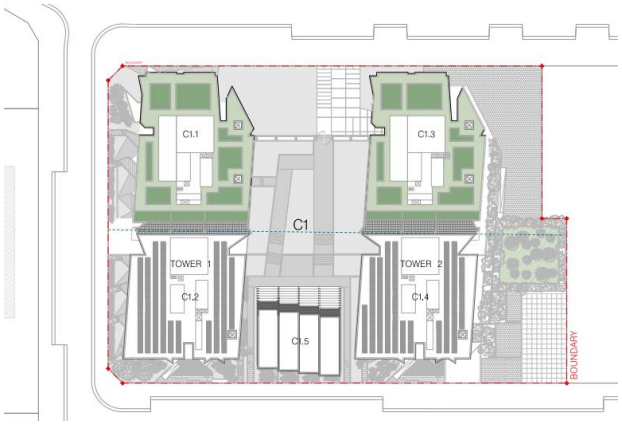


Figure 10 Approved Site Plan showing lot boundary

Source: Candalepas Associates

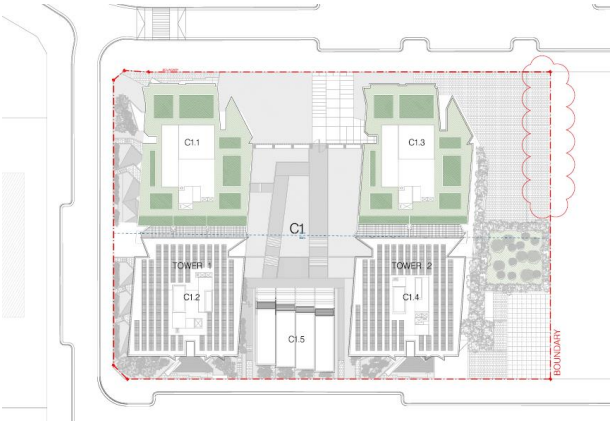


Figure 11 Proposed Site Plan with revised lot boundary

Source: Candalepas Associates

5.2.4 Roof Plant Configuration

The configuration and layout of rooftop plant and equipment has been modified to account for detailed design development and additional servicing requirements. Additionally, the extent of the lift overrun screening has marginally increased resulting in an additional height of 800mm to Building C1.2 and C1.4 respectively. It is noted that the additional height is limited to the lift overrun and that the proposal will comply with the maximum height of building standard of 45 and 65 metres respectively pursuant to the LEP and as prescribed by Condition B28 and D1.

5.2.5 Amendments to the Exterior Façades

The internal reconfiguration of apartments and associated balconies has consequently resulted in negligible changes to the exterior facades of Building C1.2 and C1.4. The changes relate to the north west, south east and south west elevations of Building C1. The changes do not significantly alter the aesthetic of the building and will not undermine the design integrity of the approved design which will continue to adopt pre-cast coloured concrete and off-form concrete with aluminium louvres to ensure a variety of colours and textures are maintained on all facades.

Figure 13 and **14** illustrate the approved and proposed South West Elevation Plans.

Figure 12 Approved South West Elevation

Source: Candalepas Associates

Figure 13 Proposed South West Elevation

Source: Candalepas Associates

5.3 Modifications to conditions

The proposed modifications described above necessitate amendments to the consent conditions which are identified below. Words proposed to be deleted are shown in ***~~bold strike through~~*** and words to be inserted are shown in ***bold italics***.

TERMS OF CONSENT

A2. The development may only be carried out:

a) In compliance with the conditions of this consent;
b) In accordance with all written directions of the Planning Secretary;
c) In accordance with the EIS, Response to Submissions and additional information;
d) In accordance with the management and mitigation measures.

Architectural Drawings prepared by Candalepas Associates (Building C1)			
Drawing No.	**Revision**	**Name of Plan**	**Date**
~~DA~~S4.55-1050	B	Site Plan	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1102	B	Basement 3	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1103	B	Basement 2	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1104	B	Basement 1	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1105	B	Lower Ground Floor	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1106	B	Upper Ground Floor	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1107	B	Level 1	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1108	B	Level 2	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1109	B	Level 3-4	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1110	B	Level 5-12	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1111	B	Level 13	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1112	B	Level 14-19	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1113	B	Roof Plan	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1150	B	Adaptable Units Floor Plans	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1200	***~~A~~ B***	Section A	***~~26/11/18~~* 09/12/20**
~~DA~~S4.55-1201	B	Section B	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1202	B	Section C	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1300	***~~A~~ B***	North East Elevation	***~~26/11/18~~ 09/12/20***
~~DA~~S4.55-1301	B	North West Elevation	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1302	B	North West Internal Elevation	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1303	B	South East Elevation	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1304	B	South East Internal Elevation	***~~16/09/19~~ 09/12/20***
~~DA~~S4.55-1305	***~~A~~ B***	South West Elevation	***~~26/11/18~~ 09/12/20***
Landscape Drawings prepared by Hassell			
Drawing No.	**Revision**	**Name of Plan**	**Date**
L1-1102	***~~J~~ K***	General Arrangement (2 of 8)	***~~02/09/19~~ 16/12/20***
L1-1103	***~~I~~ J***	General Arrangement (3 of 8)	***~~05/11/19~~ 05/12/20***
L1-1802	***~~I~~ J***	C1 Roof Plan	***~~05/11/19~~ 15/12/20***

Subdivision Plans prepared by Beveridge Williams			
Drawing No.	**Revision**	**Name of Plan**	**Date**
Sheet 1 of 9	10	Stage 1 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 2 of 9	10	Stage 2 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 3 of 9	10	Stage 3 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 4 of 9	10	Stage 4 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	28/01/20
Sheet 5 of 9	10	Stage 5 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 6 of 9	10	Stage 6 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 7 of 9	10	Stage 7 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 8 of 9	10	Stage 8 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 9 of 9	10	Easement Summary Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	28/01/20
Sheet 1 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 2 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 3 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 4 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 5 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 6 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 7 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 8 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 9 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 10 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 11 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 12 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 13 of 13	***10***	***Plan of Proposed Stratum Subdivision of Lot 12***	17/09/19

BASIX CERTIFICATION

B66. The development must be implemented and all BASIX commitments thereafter maintained in accordance with:

a) Building A1: BASIX Certificate No. 893728M_02
b) Building C1.1-C1.4: BASIX Certificate No. ~~**919971M_02.**~~ ***919971M_03***
c) Building C1.5: BASIX Certificate No. 896458M_02

An updated certificate must be issued if amendments are made.

The BASIX Certificate must be submitted to the Certifier with all commitments clearly shown on the Crown Building Works Certificate plans for each building.

NUMBER OF CAR PARKING SPACES

B78. A maximum of ~~***328***~~ ***308*** *residential car parking spaces,* ~~***15***~~ ***12*** *visitor car parking spaces,* and ~~**three staff car parking spaces**~~ ***20 community, pool and gym car parking spaces*** *are to be provided for Building C1. Details demonstrating compliance must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.*

B81. The minimum number of bicycle parking spaces to be provided for the development shall comply with the table below. Details confirming the bicycle parking numbers must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.

Bicycle parking allocation: Building C1	**Number**
Residential	~~***471***~~ ***496***
Visitors	~~***19***~~ ***25***

ENVIRONMENTAL PERFORMANCE

D12. Prior to the occupation or use of each building, the Applicant shall implement the commitments outlined in:

a) Building A1: BASIX Certificate No. 893728M_02
b) Building C1.1-C1.4: BASIX Certificate No. ~~***919971M_02.***~~ ***919971M_03***
c) Building C1.5: BASIX Certificate No. 896458M_02

An updated certificate must be issued if amendments are made.
The BASIX Certificate must be submitted to the Certifier with all commitments clearly shown on the Crown Building Works Certificate plans for each building.

6.0 Substantially the same development

Section 4.55(1A) (b) of the EP&A Act states that a consent authority may modify a development consent if *"it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all)*".

The development, as proposed to be modified, is substantially the same development as that originally approved in that it:

- No change is proposed to the use of land, comprising of residential land uses.
- No change is proposed to the capacity of the site, with the modifications largely contained within the approved building envelope.
- The proposed development will continue to provide an amenable and high quality residential development for a variety of households.
- The minor external design changes are driven by the reconfiguration of the internal layout and utilise the approved pallet of materials and finishes, ensuring a high-quality finish which keeps the original design intact.
- The qualitatively essential parts of the approved development also all remain largely intact, including the overall built form and scale, the impacts on surrounding development, traffic and parking, public domain, and amenity.

Table 2 Comparison between the proposed, as modified development and the original approval

Element	Approved	Proposed	Difference
Height	Building C1.1 - 44.3m (RL 102.45) Building C1.2 – 63.4m (RL 124.25) Building C1.3 – 44.7m (RL 99.35) Building C1.4 – 63.4m (RL 121.15)	Building C1.1 - 44.3m (RL 102.45) Building C1.2 – 63.4m (RL 124.25) Building C1.3 – 44.7m (RL 99.35) Building C1.4 – 63.4m (RL 121.15)	- - - -
GFA	33,596m^2	33,480m^2	-116m^2
Parking	346	370	+24
Apartment Yield	471	495	+25

7.0 Planning assessment

Section 4.55(1A) of the EP&A Act states that a consent authority may modify a development consent if "*it is satisfied that the proposed modification is of minimal environmental impact*". Under section 4.55(3) the consent Authority must also take into consideration the relevant matters to the application referred to in section 4.15(1) of the EP&A Act and the reasons given by the consent authority for the grant of the original consent. The EIS submitted with the original SSDA addressed compliance with the following relevant strategic and statutory plans and development control plans:

- NSW Premier's Priorities
- A Plan for Growing Sydney
- Towards Our Greater Sydney 2056
- Draft Greater Sydney Region Plan
- Draft North District Plan/North District Plan
- Environmental Planning and Assessment Act 1979
- Environmental Planning and Assessment Regulations 2000
- Biodiversity Conservation Act 2016
- Threatened Species Conservation Act 1995
- Roads Act 1993
- SEPP 55 – Remediation of Land
- SEPP (Infrastructure) 2007
- SEPP (State and Regional Development) 2011
- SEPP (Housing for Seniors or People with a Disability) 2004
- SEPP (State Significant Precincts) 2005
- SEPP (Vegetation in Non-rural Areas) 2017
- SEPP (Educational Establishments and Child Care Facilities) 2017
- Draft SEPP – Environment
- Environment Protection and Biodiversity Conservation Act 1999
- Guide to Traffic Generating Developments
- Ryde 2025 Community Strategic Plan
- Development Near Rail Corridors and Busy Roads – Interim Guideline
- City of Ryde Section 94 Development Contributions Plan 2007 (Interim Update 2014)
- Sydney's Bus Future 2013
- Sydney's Walking Future 2013
- Sydney's Cycling Future 2013
- NSW Planning Guidelines for Walking and Cycling
- NSW Long Term Transport Master Plan
- EIS Guidelines – Road and Relates Facilities
- Guide to Traffic Management – Part 12: Traffic Impacts of Development (AUSTROADS)
- Future Directions for Social Housing in NSW
- School Assets Strategic Plan

The EIS submitted with the original SSDA assessed the following environmental impacts of the proposed development:

- analysis of alternatives;
- ecologically sustainable development;

- visual and view impacts;
- wind;
- safety;
- contamination;
- child care centre;
- air quality and odour;
- geotechnical;
- contributions;
- public domain and public access;
- flora and fauna assessment;
- flooding;
- heritage and archaeology;
- design excellence;
- noise and vibration;
- utilities;
- fire safety; and
- staging.

The proposed modifications do not alter the approved development's compliance with the abovementioned statutory plans and instruments, nor does it introduce any additional environmental impacts beyond those mentioned above. As such, the following assessment considers only the matters relevant to the proposed modification under section 4.15(1) and demonstrates that the development, as proposed to be modified, will be of minimal environmental impact.

7.1 Compliance with environmental planning instruments

An assessment of the proposed modified development's compliance with relevant environmental planning instruments is contained within **Table 3** below.

Table 3 Summary of consistency with relevant strategies, EPIs, policies and guidelines

Instrument	Comments	
SEPP (Affordable Rental Housing) 2009	The proposed modification involves the provision of an additional 130 affordable housing units on the site, which have been designed to be consistent with the design criteria set out in Division 1 and Division 5 of the SEPP. A detailed assessment of these dwellings against the Affordable Rental Housing SEPP is detailed at **Section 7.1.1** below.	
SEPP (BASIX) 2004	A BASIX Report (**Appendix C**) has been issued for the proposed modified development.	
SEPP 65 (Design Quality of Residential Flat Development)	A detailed SEPP 65 assessment has been completed by Candalepas Associates for the residential components of building C1, demonstrating that the proposed modified development will continue to comply with the design criteria contained within the Apartment Design Guide (see **Appendix D**). Compliance with SEPP 65 is discussed in further detail in **Section 7.4**.	
Ryde LEP 2014	Cl. 2.2 – Zones	The proposed modification does not include any alterations to the approved land uses and therefore remains permissible with consent.
	Cl. 4.3 – Height of Buildings	The proposed modification does not include any alterations to the overall building height of Building C1 and will remain compliant with the height of building standard of 45 and 65m respectively.
	Cl. 4.4 – Floor Space Ratio	The proposed modified development includes a GFA of 33,480m, which constitutes a 116m^2 reduction to the development's GFA. Therefore, this does not impact the development's compliance with the Concept Plan.
	Cl. 6.4 – Stormwater Management	A Stormwater Management Plan has been prepared for the site (see **Appendix E** and **Section 7.9**) and details how the proposed modified development is consistent with the measures proposed in the Concept Plan including Water Sensitive Urban Design (WSUD) measures, on-site stormwater detention, and water cycle quality and quantity measures.

Instrument	Comments
Ryde DCP 2014	As a State Significant Development, the Ryde Development Control Plan 2014 (Ryde DCP) does not apply to Stage 1 of the Ivanhoe Estate Masterplan. The Ivanhoe Estate Masterplan and associated Urban Design Guidelines set the new vision for the site and have the same effect and purpose of a site-specific DCP. Together, they establish the parameters for future development in the form of building envelopes, and apply detailed objectives and design principles to shape the design development of buildings. This approach is in accordance with Section 4.22 of the EP&A Act that confirms that a Staged DA may be made setting out concept proposals (ie: the Masterplan) for the development of a site to which separate and future detailed proposals (i.e. the Stage 1 DA) are pursuant. A concept proposal may also be undertaken in lieu of the preparation of a site-specific DCP in accordance with Section 4.23 of the EP&A Act. Further, it is noted that SSD applications are treated differently to regular 'local' and 'regional' developments, with a range of other legislation not applying (Section 4.41 and 4.46 of the EP&A Act) and other legislation needing to be applied consistently with the terms of any SSD consent (Section 4.42 of the EP&A Act). Accordingly, in this instance development control plans are specifically excluded from being applicable to SSD applications per Clause 11 of the State Environmental Planning Policy (State and Regional Development) 2011.

7.1.1 State Environmental Planning Policy (Affordable Rental Housing) 2009

State Environmental Planning Policy (Affordable Rental Housing) 2009 (the ARH SEPP) sets out the standard for the development and maintenance of affordable rental housing in NSW.

Division 1 of the ARH SEPP applies to development that is permitted with consent under an environmental planning instrument, is located on a site that does not contain a heritage item and where all or part of the development is within an accessible area. The proposed development is permissible with consent under the Ryde LEP 2014 in the B4 Mixed Use zone, is not affected by a heritage item and is located within 500 metres of Macquarie University Station. Clause 13 of the SEPP permits an FSR bonus if at least 20% of the GFA of the development is to be used for affordable housing. Under the SEPP the term 'affordable housing' includes social housing. The key provisions of the ARH SEPP have been considered in the preparation of the SSDA and are addressed in **Table 4** below.

Table 4 Assessment against the ARH SEPP

Provision	Assessment
Division 1 – In-fill affordable housing	
Clause 13 – Floor space ratio	The Ivanhoe Estate Masterplan nominates a GFA cap for certain development on the site, which includes a specific breakdown of affordable and social housing and the respective FSR bonus that would apply. The Masterplan allows for the provision of a minimum of 128 affordable housing dwellings and a total of 76,497m^2 of all social housing types. The proposed modification to the development is consistent with the terms of the Masterplan in this respect, as there is 130 affordable housing dwellings proposed, resulting in a total of 7,740m^2 in addition to 17,005m^2 of social housing which remains within the permitted GFA of 76,497m^2 of social and affordable housing. It is noted that overall, there is a reduction of 116m^2 in GFA for Building C1 when compared to the original consent.
Clause 14 – Standards that cannot be used to refuse consent	The following standards set minimums that the consent authority cannot be used to refuse consent. It is noted that not achieving the standard is not a non-compliance.
1(b) If the site's area is at least 450m^2	The Estate is 8.2 hectares, and the block area for C1 is approximately 5,896m2
1(c) at least 30% of the site is landscaped.	When the public communal open space is considered as per the Masterplan Design Guidelines (including the Neighbourhood Garden facing Main Street and Town Square), a total of 1716m^2 of communal open space is provided. This equates to 28% of the site area.
1(d) 15% of the site is provided as a deep soil zone with a minimum dimension of 3 metres and (if practicable) at least two thirds of the deep	Deep soil zones are provided in alternative locations around the Masterplan site to meet sitewide requirements. 15% of the Estate will be provided as a deep soil zone, with a minimum dimension of 3 metres or more.

Provision	Assessment
soil zone is located at the rear of the site.	
1(e) 70% of living rooms and private open space receive at least 3 hours of direct sunlight between 9am and 3pm in mid-winter.	The analysis accompanying the Concept proposal demonstrates that Building C1 is capable of achieving at least 70% of dwellings with 2 hours of solar access in mid-winter, consistent with Design Criteria in the SEPP 65 Apartment Design Guide.
2(a) car parking (minimum rates) 1 bedroom – 0.4 space 2 bedrooms – 0.5 space 3 bedrooms – 1 space	As the application is made on behalf of Land and Housing Corporation and the proposed affordable housing will be managed by Mission Australia Housing, the car parking rates set out in 2(a) are relevant. The car parking provided in the shared basement for C1 is greater than the minimum parking required under this provision for the proposed mix of affordable housing.
2(b) dwelling size	The Architectural Plans at **Appendix A** demonstrate that the proposed affordable housing dwellings achieve the required dwelling sizes, which are generally consistent with the provisions of the Apartment Design Guide.
Clause 16 – Continued application of SEPP 65	SEPP 65 applies to the proposed development as it is development for the purpose of a residential apartment building. Compliance with SEPP 65 is set out in **Section 7.4** and **Appendix D**.
Clause 16A	The existing Ivanhoe Estate site has been used as social and affordable housing for approximately 30 years. The proposed redevelopment of the site is permissible with consent under the Ryde LEP and is consistent with the strategic vision for the Macquarie Park Priority Precinct, where homes are located in close proximity to employment and public transport.
Clause 17 – Must be used for affordable housing for 10 years	The affordable housing component of the development will be used as such for at least 10 years.

7.2 Consistency with the concept DA

Under Section 4.24 of the EP&A Act there is a requirement for the development to be consistent with the consent for the Concept Proposal. This modification application has been made with reference to the Ivanhoe Estate Masterplan and is consistent with, and pursuant to, the Masterplan (as amended). An assessment against the key features of the Masterplan has been provided in **Table 5** below.

Table 5 Consistency with the Concept Plan (Ivanhoe Estate Masterplan)

Component	Discussion
Land Uses	The proposed modification does not include any alterations to the approved land uses.
Gross Floor Area and Floor Space Ratio	33,480m^2, which is a reduction of 116m^2 from the approved GFA of 33,596 for building C1.
Built Form	Building C1 will continue to fit within the building envelope established under the Masterplan and will be consistent with the Ivanhoe Estate Design Guidelines. Further discussion regarding the proposed amendments to the built form of the development is provided in **Section 7.3**.
Building Heights	No modifications are proposed to the building height of the development. The building heights will remain between 45m to 65m, which is below the maximum building heights nominated in the Masterplan.
Access Arrangements	No change is proposed to the access arrangements.
Public Domain	The proposed modification does not include any notable changes to the public domain.
ESD	The proposed modification does not alter the development's achievement of sustainability targets.
Development Staging	The delivery of Building C1 is consistent with the indicative staging plan contained in the Masterplan, ensuring that social housing is provided concurrently with market housing.

7.3 Built form and urban design

7.3.1 Height

The height of Building C1 continues to be consistent with the maximum building heights prescribed under the Ryde LEP, which ranges between 45-65m within Block C1. The height limits were established as part of the Macquarie University Station (Herring Road) Priority Precinct process and the proposal is therefore consistent with the desired and emerging built form character of the centre. **Table 6** compares the approved building heights of Building C1 with the building heights as proposed to be modified.

Table 6 Building C1 height

Maximum building height	Approved building height	Proposed building height
45 metres	Building C1.1 - 44.3m (RL 102.45) Building C1.3 – 44.7m (RL 99.35)	Building C1.1 - 44.3m (RL 102.45) Building C1.3 – 44.7m (RL 99.35)
65 metres	Building C1.2 – 63.4m (RL 124.25) Building C1.4 – 63.4m (RL 121.15)	Building C1.2 – 63.4m (RL 124.25) Building C1.4 – 63.4m (RL 121.15)

7.3.2 Building façade design

The proposed modified development includes minor changes to the façade design. This involves the incorporation of white metal tubes into the façade to add further articulation of the building façade, in turn heightening the visual interest of the proposed modified development. Notwithstanding, the remainder of the building retains the same warm, naturally occurring hues, consistent with the colour scheme of the approved development. In turn, the development will continue to exhibit a design which responds to the principles of scale, proportion and composition, offering a positive contribution to the desired future character of the area.

7.4 Residential amenity

A revised SEPP 65 Design Statement has been prepared by Candalepas Associates in relation to the proposed modified development which assesses the proposal against the nine principles for apartment design quality contained within SEPP 65 (**Appendix D**). The SEPP 65 Design Statement confirms that the proposed modifications to the development will not impact the development's ability to exhibit the nine principles of quality apartment design.

7.5 Traffic impact

A revised Traffic Impact Statement has been prepared by Ason Group (**Appendix F**) which assesses the impact of the proposed modifications on car parking requirements, access, and traffic generation. These matters will be discussed under the following subheadings.

Car parking

The proposed modification seeks to amend the development consent to facilitate the provision of additional car parking spaces, with a total of 370 car parking spaces (including 30 car share spaces). The total of 370 car parking spaces is consistent with the maximum of 403 car parking spaces that are allowed to be accommodated within the development, pursuant with the rate of parking provision approved under SSD-8903. Specifically, the changes to car parking provision are specified in **Table 1** located in **Section 5.2.2**. The provision of car parking for social housing is consistent with the Affordable Housing SEPP's minimum parking rate of 0.5 spaces per dwelling.

Traffic generation

The forecast traffic generation of the proposed modified development has been derived through use of RMS Guide Update trip rates. Accordingly, a comparison of the approved traffic generation and traffic generation of the proposed modified development is provided in **Table 7** below.

Table 7 Comparison of traffic generation

	Land use	Yield	AM Peak		PM Peak	
			Trip Rate	Trips/hr	Trip Rate	Trips/hr
Approved	Market dwellings	481	0.14 per unit	68	0.12 per unit	57
Approved	Social dwellings	259	0.03 per unit	8	0.05 per unit	13
Approved	Childcare	75 children	0.1 per child and 6 staff	14	0.1 per child and 6 staff	14
Approved	Ancillary retail	525m^2	1 per 100m^2	5	1 per 100m^2	5
Approved	**Total trip generation**			**95**		**89**
Proposed	Market dwellings	376	0.14 per unit	53	0.12 per unit	45
Proposed	Social dwellings	259	0.03 per unit	8	0.05 per unit	13
Proposed	Affordable units	130	0.12 per unit	16	0.10 per unit	13
Proposed	Community use/ancillary retail	2000m^2	1 per 100m^2	20	1 per 100m^2	20
Proposed	Childcare	75 children	0.1 per child + 6 staff	14	0.1 per child + 6 staff	14
Proposed	**Total trip generation**			**111**		**105**
	Difference in trip generation			**+16**		**+16**

Source: Ason Group

As demonstrated in **Table 7** above, the proposed modifications to the development will generate 16 additional trips in AM and PM peak hours compared to the approved development, which is an inconsequential increase and as such is supportable on traffic generation grounds. It is also noted that the masterplan trip rates as a whole will be unchanged as the tenure change has resulted in reduced apartments in the latter stage.

Internal design

All the internal components of the proposed modified development have been designed in accordance with the relevant Australian Standards, as detailed in the Traffic Impact Statement (**Appendix F**).

7.6 Social housing

The proposed provision of affordable housing dwellings does not impact the development's ability to provide a mixture of housing, which is key to the Concept Plan vision for the site. This vision encompasses the Ivanhoe Estate Renewal facilitating the creation of a new mixed community on the site, including a range of housing tenures such as home ownership, private market rental, affordable rental housing, and social housing.

Ultimately, the proposed modification includes an additional 130 affordable housing apartments, which expedites the delivery of the affordable housing components on the site and allows for the provision of a mixture of uses throughout the development. Therefore, the modification allows for the achievement of the Concept Plan vision.

7.7 Subdivision

The proposed stratum subdivision for Building C1 has been altered to reflect the conversion of market dwellings into affordable housing dwellings and therefore align with the design and intended operation of Building C1. The proposed modifications are illustrated in the Draft Plan of Stratum Subdivision that accompanies the modification application at **Appendix G**. The easements included in the subdivision plans demonstrate how the proposed lots can be adequately serviced and accessed.

7.8 Waste management

An amended waste management plan has been prepared by Elephants Foot Recycling Solutions (EFRS) which considers the waste generated and the waste management measures of the development (as proposed to be modified) (**Appendix H**). It includes changes to the development's waste generation which has arisen as a result of the changes in residential density, with an additional 25 dwellings proposed. Notwithstanding, the management of waste generated remains the same with residential waste and recycling to be collected by Council and retail and commercial waste collected by a private contractor.

Waste generated by the operation of the mixed use buildings will continue to be stored and collected on site, and will be the responsibility of residents and tenants to transport waste to the holding facilities, and the building managers and contractors to manage waste for pick-up and disposal. Further, the expectation remains that leasing arrangements with retail/commercial operations contain direction on waste management services and expectations, and that residents will be educated on the correct separation of garbage and recycling items and the operation of garbage chutes and holding areas.

7.9 Potable water, drainage and stormwater

A revised Stormwater Management Plan has been prepared by ADW Johnson and accompanies the application at **Appendix E** to assess the impacts of the proposed modifications on stormwater management, focussing on water quantity, water quality and potable water conservation. These matters as proposed to be modified are discussed below.

Water quantity

The City of Ryde Council's Stormwater Technical Manual requires that OSD systems are designed to ensure that the peak discharge in the post developed 100 year ARI storm event does not exceed the peak discharge in the post developed 5 year ARI storm event. Given that the proposed modifications culminate in an increase in the peak discharge leaving the site, further modelling has been undertaken to ensure the proposed tank size is adequate to service the development. Accordingly, in order to meet Council's aforementioned requirements for OSD systems, the stormwater detention tank size has been increased by 15m^3.

Water quality

The nominated stormwater systems of the proposed modified development have been considered via MUSIC modelling to demonstrate compliance with Council's DCP treatment targets, as shown in **Table 8** below. This demonstrates that the proposed water quality measures will continue to meet and exceed Council's targets for Building C1.

Table 8 Compliance with water quality requirements

Pollutant	Target	Approved	Proposed	Compliance
Gross pollutant	90%	100%	100%	✓
Total suspended solids	85%	86.5%	87.9%	✓
Total phosphorus	60%	65.2%	65.9%	✓
Total nitrogen	45%	56.7%	53.9%	✓

Source: ADW Johnson + Ryde DCP 2014

Potable water conservation

A water balance was formulated in the original stormwater report that was based on two key parameters being the roof catchment area and the water reuse demand. The reuse demand was derived on the basis of an irrigation rate adopted for the site's pervious areas. The proposed amendments do not impact on the pervious areas of the site. Moreover, the roof catchment area is not proposed to be altered. As such, there are no proposed changes to the water balance produced in the approved stormwater report.

7.10 Building Code of Australia compliance

The proposed modified development will continue to comply with all the relevant requirements of the Building Code of Australia (BCA) and other requirements pertaining to accessibility, as demonstrated within the following reports:

- Building Code of Australia Statement prepared by McKenzie Group (**Appendix I**); and
- Accessibility Statement prepared by Morris Goding Accessibility Consulting (**Appendix J**).

8.0 Conclusion

The proposal seeks to amend the development consent to facilitate the following modifications to the development:

- The conversion of a portion of market dwellings to affordable housing dwellings in Building C1 resulting in amendments to apartment mix and overall yield. The amendment will result in an additional 25 dwellings however will not result in any significant material changes to the approved built form or GFA.
- Reconfiguration of the basement car park across all levels resulting in an additional 24 car parking spaces.
- Extension of the lot boundary to accommodate the provision of parking for community uses.

In accordance with section 4.55(1A) of the EP&A Act, Council may modify the consent as:

- the consent, as proposed to be modified, is substantially the same development as that originally approved;
- there will not be any significant adverse environmental or social impacts; and
- the proposed development remains consistent with the Masterplan.

In light of the above, we therefore recommend that the proposed modification is supported by the Department of Planning, Industry and Environment. We trust that this information is sufficient to enable a prompt assessment of the proposed modification.

Mr Richard Wood
Project Director
NSW Land and Housing Corporation
173 Sussex Street
SYDNEY NSW 2000

11 February 2021

Dear Mr Wood

Ivanhoe Estate redevelopment - Stage 1, Modification 2 (SSD-8903-Mod-2)
Modification Report

I refer to the Modification Report submitted for proposed modifications to the Ivanhoe Estate redevelopment Stage 1 (SSD-8903-Mod-2). The Department is requesting you provide additional information before accepting the Modification Report.

As per Attachment A in the Department's letter dated 9 February 2021, you are requested to submit the following additional information:

- Provide additional information/justification regarding car parking as follows:
  - Condition A18 (d) of the concept approval states 1 visitor car parking space must be provided per 20 apartments. The number of visitor parking spaces however is proposed to be reduced to 12 despite the number of apartments increasing to 496 (a rate of 1 space per 42 apartments).
  - Condition A18(k) of the concept approval specifies 0.5 car parking spaces must be provided for apartments that are subject to the ARH SEPP. 130 affordable housing apartments with 56 car parking spaces are proposed, a shortfall of 9 spaces.
  – The approved car parking for Building C1 under Condition B78 of SSD 8903 included 3 staff car parking spaces. Please clarify why these spaces are no longer required.
- Confirm whether the proposed changes to the basement will negate the need to construct a separate basement on the adjacent C2 block.
- Highlight the location of the proposed lift overrun screens which are increasing in height on the plans, including proposed RLs.
- Provide additional Vertical Transportation Advice given the proposed modification proposes a single lift to serve 65 social and affordable apartments within each of towers C1.1, C1.2 and C1.3.
- Confirm how many years earlier the affordable housing component of the redevelopment would be provided (compared to if it formed part of Stage 6) as a result of this modification.

Please provide a revised Modification Report to the Department that includes the additional information by 12 March 2021.

If you have any questions, please contact Andy Nixey on 9274 6379 or andy.nixey@planning.nsw.gov.au.

Yours sincerely,

Amy Watson
A/Director
Key Sites Assessments

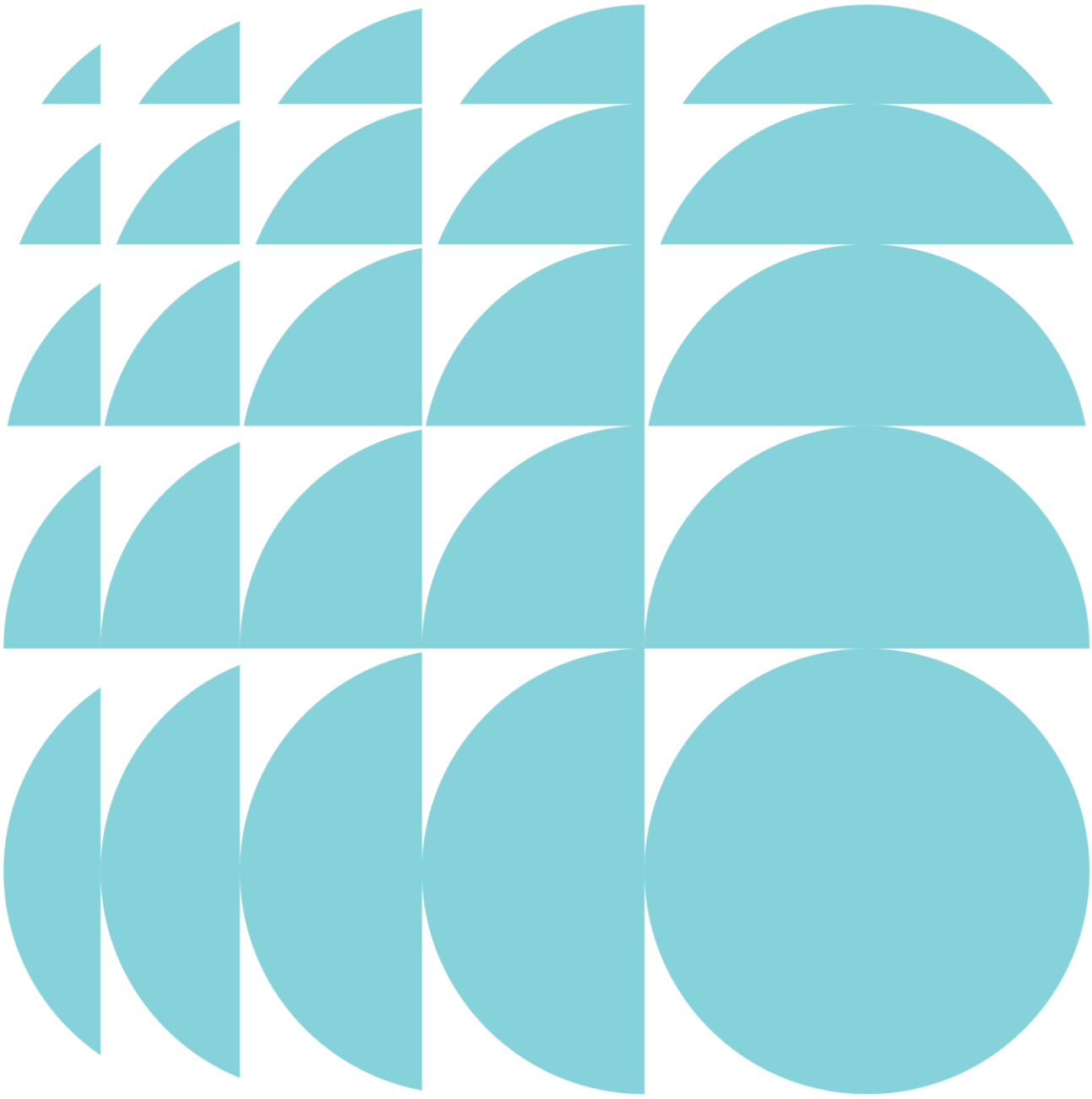
ETHOS URBAN

Statement of Environmental Effects

Ivanhoe Estate
Section 4.55(1A) Modification Application

Submitted to Department of Planning, Industry and Environment
On behalf of Frasers Property Australia

11 March 2021 | 17156



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This document has been prepared by:

Costa Dimitriadis 11 March 2021

This document has been reviewed by:

James McBride ## March 2021

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VERSION NO. 2	DATE OF ISSUE- 11 MARCH 2021	REVISION BY CD	APPROVED BY JMC

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H Waste Management Plan

Elephants Foot Recycling Solutions

I Building Code of Australia Statement

McKenzie Group

J Accessibility Statement

Morris Goding Accessibility Consulting

K Vertical Transportation Advice

WSP

1.0 Introduction

This application has been prepared by Ethos Urban on behalf of Frasers Property Australia pursuant to section 4.55(1A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to modify SSD-8903 relating to the Ivanhoe Estate (the site).

The key amendments relate to:

- The conversion of a portion of market dwellings to affordable housing dwellings in Building C1 resulting in amendments to apartment mix and overall yield. The amendment will result in an additional 25 dwellings however will not result in any significant material changes to the approved built form or GFA.
- Reconfiguration of the basement car park across all levels resulting in an additional 24 car parking spaces.
- Extension of the lot boundary to accommodate the provision of parking for community uses and car share spaces.

The fundamental reason for the modification is due to the brief of the Community Housing Provider which required the provision of all affordable housing dwellings approved with the Concept DA pursuant to SSD 8707 to be delivered in Stage 1. This effectively means that all 130 affordable housing dwellings will be bought forward from Stage 6 into Stage 1, resulting in the early delivery of affordable housing by approximately 4 years than originally planned along with the provision of both social and market dwellings.

This application identifies the consent, describes the proposed modifications and provides a planning assessment of the relevant matters for consideration contained in section 4.55(1A) of the EP&A Act. It is based on the Architectural Plans provided by Candalepas Associates (see **Appendix A**) and other supporting technical information appended to the report (see Table of Contents).

2.0 Concept Approval

Development consent was granted by the Minister for Planning and Public Spaces for State Significant Development (SSD-8707), for the Ivanhoe Estate Masterplan, on 30 April 2020. The concept approval comprises:

- Approximately 3,300 residential dwellings including approximately 950 social and 128 affordable housing dwellings, and 273 seniors housing comprising of private and social independent living;
- A 120 bed residential aged care facility (RACF);
- A school accommodating approximately 430 places;
- Community uses including community centres, community rooms, meeting rooms and fitness areas;
- Minor retail development;
- maximum building heights and GFA for each development block;
- public domain landscape concept, including parks, streets and pedestrian connections;
- provision of the Ivanhoe Estate Design Guidelines to guide the detailed design of the future buildings; and
- vehicular and intersection upgrades.

The concept approval is currently the subject of a Section 4.55(1A) modification to amend Condition A30 relating to development contributions. This modification also anticipates amendments the subject of this application.

3.0 Consent proposed to be modified

Development consent was granted by the Minister for Planning and Public Spaces for State Significant Development (SSD-8903), Stage 1 of the Ivanhoe Estate development in Macquarie Park, on 30 April 2020. The development is pursuant to the Ivanhoe Estate Masterplan (SSD-8707) and comprises:

- Site preparation works, including removal of trees, demolition, bulk earthworks and excavation
- Construction of new roads, bridge over Shrimptons Creek and new road connection to Lyonpark Road
- Construction of two residential apartment buildings (Building A1 and Building C1) with basement car parking:
  - Building A1 with 269 apartments, 233 car parking spaces and a child centre
  - Building C1 with 471 apartments and 346 car parking spaces
- Landscaping and public domain works
- Amalgamation and subdivision

The consent has previously been modified to facilitate amendments to a number of conditions of consent to clarify specific requirements, timings, nominated personnel or address errors. The Section 4.55(1A) modification was approved on 10 November 2020. Therefore, the subject modification constitutes MOD 2 of SSD-8903.

4.0 Site Analysis

4.1 Site location and context

The site is located in Macquarie Park near the corner of Herring Road and Epping Road within the City of Ryde Council Local Government Area (LGA). It is located on the southern fringe of Macquarie Park, and is within approximately 500 metres of both Macquarie Shopping Centre and Macquarie University. The surrounding area is characterised by a mix of commercial and education uses, as well as student accommodation and residential dwellings. The site's locational context is shown at **Figure 1**.

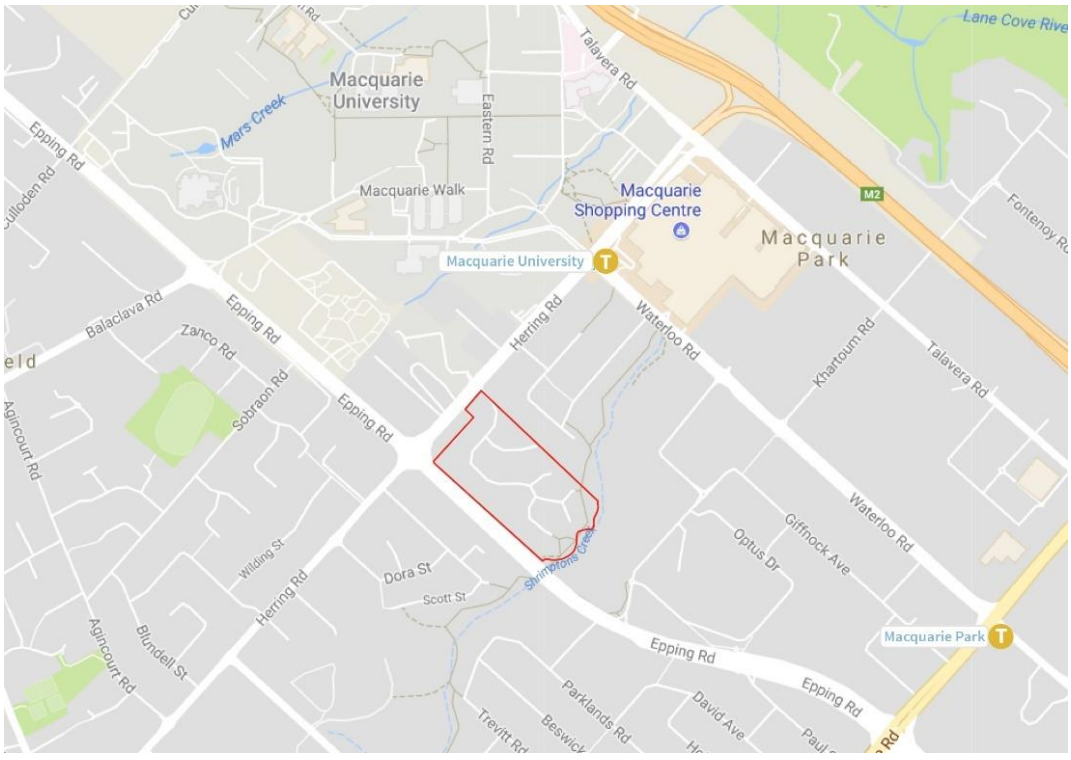

Figure 1 Locational context of Ivanhoe Estate (outlined in red)

Source: Google Maps & Ethos Urban

4.2 Site description

The Ivanhoe Estate site is approximately 8.2 hectares in area and comprises one consolidated allotment. The entire Ivanhoe Estate site, including all the internal roads, is owned and managed by LAHC. As noted above, the Masterplan site also incorporates adjoining land, being a portion of Shrimptons Creek and Lot 1 DP 859537 (2-4 Lyon Park Road). 2-4 Lyonpark Road is owned by LIF Pty Ltd as trustee for Local Government Super and the owners of Shrimptons Creek is currently being determined by NSW Land and Property Information. In the interim, land ownership for Shrimptons Creek is established in accordance with the *ad medium filum* legal precedent, whereby the owner of a lot adjacent to a creek also owns a portion of the creek up to the centre point.

An aerial photo of the site is included at **Figure 2** below. An image identifying the surrounding development is included at **Figure 3**.

Figure 2 Aerial image of the site

Source: Nearmap & Ethos Urban

5.0 Proposed modifications to the consent

5.1 Modifications to the development

The proposed modifications seek to modify the development consent to facilitate the following changes to Building C1:

- Reduction in market dwellings from 212 to 107 apartments (reduction of 105 apartments);
- Provision of an additional 130 affordable housing apartments representing a net increase of 25 additional apartments in C1 from 471 to 496 apartments.
- Reduction in proposed gross floor area (GFA), with a proposal to deliver 33,480m^2 of GFA (reduction of 116m^2);
- Reconfiguration of the apartment mix as follows:
    - Studio apartments: 96
    - 1 bedroom apartments: 198
    - 2 bedroom apartments: 186
    - 3 bedroom apartments: 12
    - 4 bedroom apartments: 4
- Increase in car parking provision from 346 to 375 car spaces in line with the approved car parking rates.
- Extension of the lot boundary to the east to accommodate provision of community car spaces, pool and gym car spaces, car share and associated access.
- External design changes to the façades to facilitate internal reconfiguration of the apartment layouts.

The proposed modifications to Building C1 will not result in any changes to Building A1 or any civil works associated with Stage 1. Further, the proposal will not modify the overall dwelling yield pursuant to the Concept Approval given that the affordable housing dwellings have been brought forward from Stage 6 into Stage 1. However, it is noted that the total yield in Stage 1 will be increased from 740 to 765 dwellings.

The proposed changes are illustrated in the revised Architectural Plans prepared by Candelapas (**Appendix A**) and the revised Landscape Plans (**Appendix B**) and are discussed further below.

Figure 3 Perspective of Building C1

Source: Doug & Wolf

5.2 Design modifications

5.2.1 Provision of Affordable Housing

The modification proposes to bring forward the delivery of all 128 of the affordable housing dwellings approved with the Concept DA. To facilitate the provision of 130 affordable housing dwellings, there will be a reduction of market dwellings from 212 to 107 apartments. In total, the modification will marginally increase the dwelling yield within Building C1 from 471 to 496 apartments.

The provision of affordable housing dwellings have been achieved through the reduction of market dwellings and the reconfiguration of the internal building layout to Building C1.2. The provision of affordable housing dwellings has had the effect of revising the approved apartment mix however will not materially alter the approved building envelope and will ultimately result in the reduction of gross floor area in the order of 116m^2.

Figures 5 to **8** depicts the approved and proposed floor plans from Architectural Plans prepared by Candalepas and Associates.

Figure 4 Approved Upper Ground Floor Plan

Source/Notes: Candalepas Associates

Figure 5 Proposed Upper Ground Floor Plan

Source: Candalepas Associates

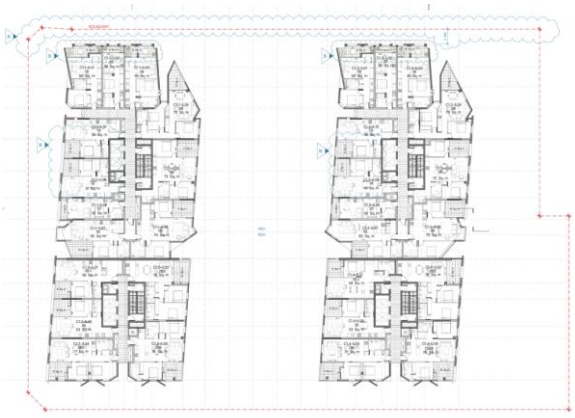

Figure 6 Approved Level 5-12 Plan

Source: Candalepas Associates

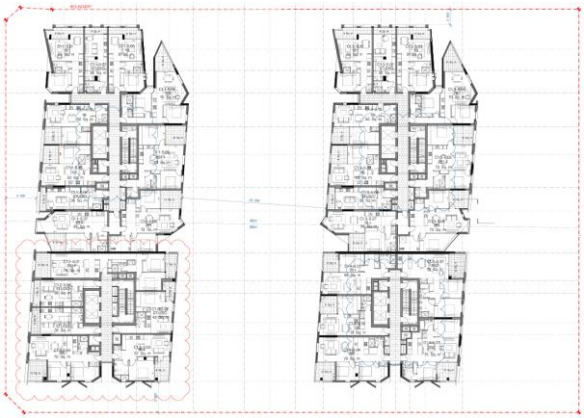

Figure 7 Proposed Level 5-12 Plan

Source/Notes: Candalepas Associates

5.2.2 Reconfiguration of Basement Design and Car Parking Provision

The basement design and car parking provision has been amended to account for the changes to the housing tenure of Building C1 and to facilitate car parking for the future community centre, pool and gym facilities in addition to car share spaces as required by the Concept Plan and Stage 1 consent. In total, the car park provision has been summarised in **Table 1**.

Table 1 Proposed Car Parking Provision – Building C1

Housing Tenure / Use	Proposed Allocation
Residential	325 (including 17 visitor spaces)
Community Uses	20
Car Share	30
Total	**375**

The layout of the car park has been amended to enhance circulation including the provision of a direct ramp from ground level to Basement Level 3 for car parking associated with the future community centre. This enables patrons of the community centre to access parking without traversing the residential car park. Other refinements to the basement design have also been incorporated to improve access and circulation. **Figures 9** and **10** depict the approved and proposed Basement Level 3 Plan from the Architectural Plans prepared by Candalepas and Associates.

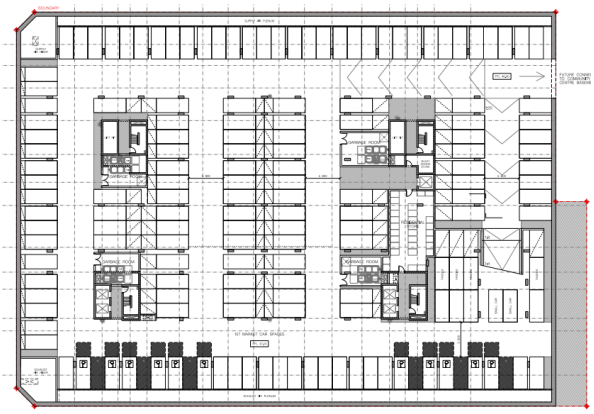

Figure 8 Approved Basement Level 3 Plan

Source: Candalepas Associates

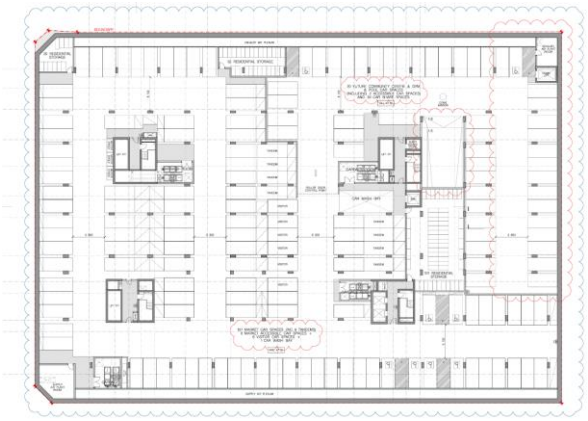

Figure 9 Proposed Basement Level 3 Plan

Source: Candalepas Associates

5.2.3 Amendment to Lot Boundary

The lot geometry for block C1 has been revised to square off the eastern boundary. The amendment is required to facilitate car parking for the future community centre and associated access to the car parking area via a lift located on the ground plane adjacent to Main Street. The location of the lift core will enable efficient access to the future community centre and pool via the car park located within the basement of Building C1. **Figure 11** and **12** depict the approved and proposed change to the lot boundary.

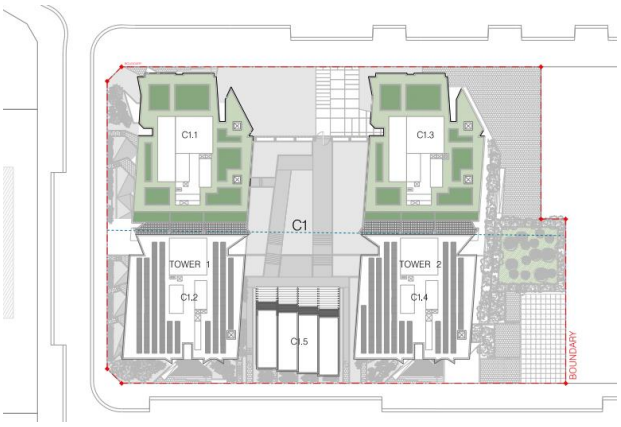

Figure 10 Approved Site Plan showing lot boundary

Source: Candalepas Associates

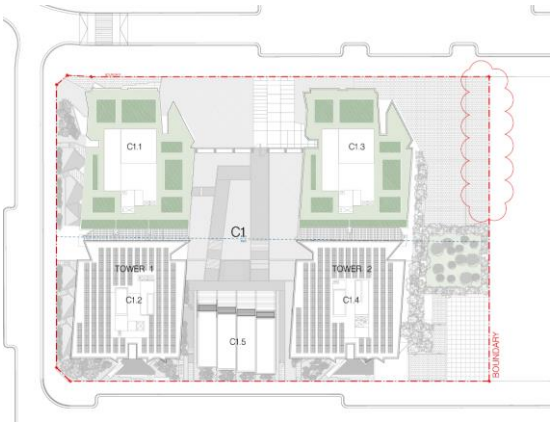

Figure 11 Proposed Site Plan with revised lot boundary

Source: Candalepas Associates

5.2.4 Roof Plant Configuration

The configuration and layout of rooftop plant and equipment has been modified to account for detailed design development and additional servicing requirements. Additionally, the screening devices for the lift overruns will have a height of 1500mm with finished RLs provided on the Architectural Plans in **Attachment A**. It is noted that the additional height is limited to the lift overrun and that the proposal will comply with the maximum height of building standard of 45 and 65 metres respectively pursuant to the LEP and as prescribed by Condition B28 and D1.

5.2.5 Amendments to the Exterior Façades

The internal reconfiguration of apartments and associated balconies has consequently resulted in negligible changes to the exterior facades of Building C1.2 and C1.4. The changes relate to the north west, south east and south west elevations of Building C1. The changes do not significantly alter the aesthetic of the building and will not undermine the design integrity of the approved design which will continue to adopt pre-cast coloured concrete and off-form concrete with aluminium louvres to ensure a variety of colours and textures are maintained on all facades.

The modification does not seek to increase the screening for the lift overruns. The extent has increased to cover the plant equipment on the roof. The Architectural Plans at **Attachment A** identify the finished RL of the lift overrun screens which will not exceed the maximum height of the lift overruns.

Figure 13 and **14** illustrate the approved and proposed South West Elevation Plans.

Figure 12 Approved South West Elevation

Source: Candalepas Associates

Figure 13 Proposed South West Elevation

Source: Candalepas Associates

Lift overrun screens

5.3 Modifications to conditions

The proposed modifications described above necessitate amendments to the consent conditions which are identified below. Words proposed to be deleted are shown in ***~~bold strike through~~*** and words to be inserted are shown in ***bold italics***.

TERMS OF CONSENT

A2. The development may only be carried out:

a) In compliance with the conditions of this consent;
b) In accordance with all written directions of the Planning Secretary;
c) In accordance with the EIS, Response to Submissions and additional information;
d) In accordance with the management and mitigation measures.

Architectural Drawings prepared by Candalepas Associates (Building C1)			
Drawing No.	**Revision**	**Name of Plan**	**Date**
~~**DA***S4.55***-**~~1050	B	Site Plan	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1102	~~**B**~~ ***C***	Basement 3	~~**16/09/19**~~ ***10/03/21***
~~**DA***S4.55***-**~~1103	~~**B**~~ ***C***	Basement 2	~~**16/09/19**~~ ***10/03/21***
~~**DA***S4.55***-**~~1104	~~**B**~~ ***C***	Basement 1	~~**16/09/19**~~ ***10/03/21***
~~**DA***S4.55***-**~~1105	B	Lower Ground Floor	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1106	B	Upper Ground Floor	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1107	B	Level 1	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1108	B	Level 2	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1109	B	Level 3-4	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1110	B	Level 5-12	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1111	~~**B**~~ ***C***	Level 13	~~**16/09/19**~~ ***24/02/21***
~~**DA***S4.55***-**~~1112	B	Level 14-19	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1113	~~**B**~~ ***C***	Roof Plan	~~**16/09/19**~~ ***24/02/21***
~~**DA***S4.55***-**~~1150	B	Adaptable Units Floor Plans	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1200	~~**A**~~ ***C***	Section A	~~**26/11/18**~~ ***24/02/21***
~~**DA***S4.55***-**~~1201	~~**B**~~ ***C***	Section B	~~**16/09/19**~~ ***24/02/21***
~~**DA***S4.55***-**~~1202	B	Section C	~~**16/09/19**~~ ***09/12/20***
~~**DA***S4.55***-**~~1300	~~**A**~~ ***C***	North East Elevation	~~**26/11/18**~~ ***24/02/21***
~~**DA***S4.55***-**~~1301	~~**B**~~ ***C***	North West Elevation	~~**16/09/19**~~ ***24/02/21***
~~**DA***S4.55***-**~~1302	~~**B**~~ **C**	North West Internal Elevation	~~**16/09/19**~~ ***24/02/21***
~~**DA***S4.55***-**~~1303	~~**B**~~ ***C***	South East Elevation	~~**16/09/19**~~ ***24/02/21***
~~**DA***S4.55***-**~~1304	~~**B**~~ ***C***	South East Internal Elevation	~~**16/09/19**~~ ***24/02/21***
~~**DA***S4.55***-**~~1305	~~**A**~~ ***C***	South West Elevation	~~**26/11/18**~~ ***24/02/21***
Landscape Drawings prepared by Hassell			
Drawing No.	**Revision**	**Name of Plan**	**Date**
L1-1102	~~**J**~~ ***K***	General Arrangement (2 of 8)	~~**02/09/19**~~ ***16/12/20***
L1-1103	~~**I**~~ ***J***	General Arrangement (3 of 8)	~~**05/11/19**~~ ***05/12/20***
L1-1802	~~**I**~~ ***J***	C1 Roof Plan	~~**05/11/19**~~ ***15/12/20***

Subdivision Plans prepared by Beveridge Williams			
Drawing No.	**Revision**	**Name of Plan**	**Date**
Sheet 1 of 9	10	Stage 1 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 2 of 9	10	Stage 2 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 3 of 9	10	Stage 3 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 4 of 9	10	Stage 4 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	28/01/20
Sheet 5 of 9	10	Stage 5 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 6 of 9	10	Stage 6 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 7 of 9	10	Stage 7 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 8 of 9	10	Stage 8 Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	~~**28/01/20**~~ ***14/12/20***
Sheet 9 of 9	10	Easement Summary Plan of Proposed Subdivision of Lot 1 DP859537, Lots 6-8, 10-20 DP861433, Lot 5 DP740753, Lot 100 DP1223787 and Lot 101 DP1247443	28/01/20
Sheet 1 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 2 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 3 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 4 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 5 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 6 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 7 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 8 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 9 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 10 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 11 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 12 of ***13*** ~~**12**~~	~~**8**~~ ***10***	Plan of Proposed Stratum Subdivision of Lot 12	~~**17/09/19**~~ ***2/12/20***
Sheet 13 of 13	***10***	***Plan of Proposed Stratum Subdivision of Lot 12***	17/09/19

BASIX CERTIFICATION

B66. The development must be implemented and all BASIX commitments thereafter maintained in accordance with:

a) Building A1: BASIX Certificate No. 893728M_02
b) Building C1.1-C1.4: BASIX Certificate No. ~~**919971M_02.**~~ ***919971M_03***
c) Building C1.5: BASIX Certificate No. 896458M_02

An updated certificate must be issued if amendments are made.

The BASIX Certificate must be submitted to the Certifier with all commitments clearly shown on the Crown Building Works Certificate plans for each building.

NUMBER OF CAR PARKING SPACES

B78. A maximum of ~~***328***~~ ***308*** *residential car parking spaces,* ~~***15***~~ ***17*** *visitor car parking spaces,* and ~~**three staff car parking spaces**~~ ***20 community, pool and gym car parking spaces*** *are to be provided for Building C1. Details demonstrating compliance must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.*

B81. The minimum number of bicycle parking spaces to be provided for the development shall comply with the table below. Details confirming the bicycle parking numbers must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.

Bicycle parking allocation: Building C1	**Number**
Residential	~~***471***~~ ***496***
Visitors	~~***19***~~ ***25***

ENVIRONMENTAL PERFORMANCE

D12. Prior to the occupation or use of each building, the Applicant shall implement the commitments outlined in:

a) Building A1: BASIX Certificate No. 893728M_02
b) Building C1.1-C1.4: BASIX Certificate No. ~~***919971M_02.***~~ ***919971M_03***
c) Building C1.5: BASIX Certificate No. 896458M_02

An updated certificate must be issued if amendments are made.
The BASIX Certificate must be submitted to the Certifier with all commitments clearly shown on the Crown Building Works Certificate plans for each building.

6.0 Substantially the same development

Section 4.55(1A) (b) of the EP&A Act states that a consent authority may modify a development consent if *"it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all)*".

The development, as proposed to be modified, is substantially the same development as that originally approved in that it:

- No change is proposed to the use of land, comprising of residential land uses.
- No change is proposed to the capacity of the site, with the modifications largely contained within the approved building envelope.
- The proposed development will continue to provide an amenable and high quality residential development for a variety of households.
- The minor external design changes are driven by the reconfiguration of the internal layout and utilise the approved pallet of materials and finishes, ensuring a high-quality finish which keeps the original design intact.
- The qualitatively essential parts of the approved development also all remain largely intact, including the overall built form and scale, the impacts on surrounding development, traffic and parking, public domain, and amenity.

Table 2 Comparison between the proposed, as modified development and the original approval

Element	Approved	Proposed	Difference
Height	Building C1.1 - 44.3m (RL 102.45) Building C1.2 – 63.4m (RL 124.25) Building C1.3 – 44.7m (RL 99.35) Building C1.4 – 63.4m (RL 121.15)	Building C1.1 - 44.3m (RL 102.45) Building C1.2 – 63.4m (RL 124.25) Building C1.3 – 44.7m (RL 99.35) Building C1.4 – 63.4m (RL 121.15)	- - - -
GFA	33,596m^2	33,480m^2	-116m^2
Parking	346	375	+24
Apartment Yield	471	495	+25

7.0 Planning assessment

Section 4.55(1A) of the EP&A Act states that a consent authority may modify a development consent if "*it is satisfied that the proposed modification is of minimal environmental impact*". Under section 4.55(3) the consent Authority must also take into consideration the relevant matters to the application referred to in section 4.15(1) of the EP&A Act and the reasons given by the consent authority for the grant of the original consent. The EIS submitted with the original SSDA addressed compliance with the following relevant strategic and statutory plans and development control plans:

- NSW Premier's Priorities
- A Plan for Growing Sydney
- Towards Our Greater Sydney 2056
- Draft Greater Sydney Region Plan
- Draft North District Plan/North District Plan
- Environmental Planning and Assessment Act 1979
- Environmental Planning and Assessment Regulations 2000
- Biodiversity Conservation Act 2016
- Threatened Species Conservation Act 1995
- Roads Act 1993
- SEPP 55 – Remediation of Land
- SEPP (Infrastructure) 2007
- SEPP (State and Regional Development) 2011
- SEPP (Housing for Seniors or People with a Disability) 2004
- SEPP (State Significant Precincts) 2005
- SEPP (Vegetation in Non-rural Areas) 2017
- SEPP (Educational Establishments and Child Care Facilities) 2017
- Draft SEPP – Environment
- Environment Protection and Biodiversity Conservation Act 1999
- Guide to Traffic Generating Developments
- Ryde 2025 Community Strategic Plan
- Development Near Rail Corridors and Busy Roads – Interim Guideline
- City of Ryde Section 94 Development Contributions Plan 2007 (Interim Update 2014)
- Sydney's Bus Future 2013
- Sydney's Walking Future 2013
- Sydney's Cycling Future 2013
- NSW Planning Guidelines for Walking and Cycling
- NSW Long Term Transport Master Plan
- EIS Guidelines – Road and Relates Facilities
- Guide to Traffic Management – Part 12: Traffic Impacts of Development (AUSTROADS)
- Future Directions for Social Housing in NSW
- School Assets Strategic Plan

The EIS submitted with the original SSDA assessed the following environmental impacts of the proposed development:

- analysis of alternatives;
- ecologically sustainable development;

- visual and view impacts;
- wind;
- safety;
- contamination;
- child care centre;
- air quality and odour;
- geotechnical;
- contributions;
- public domain and public access;
- flora and fauna assessment;
- flooding;
- heritage and archaeology;
- design excellence;
- noise and vibration;
- utilities;
- fire safety; and
- staging.

The proposed modifications do not alter the approved development's compliance with the abovementioned statutory plans and instruments, nor does it introduce any additional environmental impacts beyond those mentioned above. As such, the following assessment considers only the matters relevant to the proposed modification under section 4.15(1) and demonstrates that the development, as proposed to be modified, will be of minimal environmental impact.

7.1 Compliance with environmental planning instruments

An assessment of the proposed modified development's compliance with relevant environmental planning instruments is contained within **Table 3** below.

Table 3 Summary of consistency with relevant strategies, EPIs, policies and guidelines

Instrument	Comments	
SEPP (Affordable Rental Housing) 2009	The proposed modification involves the provision of an additional 130 affordable housing units on the site, which have been designed to be consistent with the design criteria set out in Division 1 and Division 5 of the SEPP. A detailed assessment of these dwellings against the Affordable Rental Housing SEPP is detailed at **Section 7.1.1** below.	
SEPP (BASIX) 2004	A BASIX Report (**Appendix C**) has been issued for the proposed modified development.	
SEPP 65 (Design Quality of Residential Flat Development)	A detailed SEPP 65 assessment has been completed by Candalepas Associates for the residential components of building C1, demonstrating that the proposed modified development will continue to comply with the design criteria contained within the Apartment Design Guide (see **Appendix D**). Compliance with SEPP 65 is discussed in further detail in **Section 7.4**.	
Ryde LEP 2014	Cl. 2.2 – Zones	The proposed modification does not include any alterations to the approved land uses and therefore remains permissible with consent.
	Cl. 4.3 – Height of Buildings	The proposed modification does not include any alterations to the overall building height of Building C1 and will remain compliant with the height of building standard of 45 and 65m respectively.
	Cl. 4.4 – Floor Space Ratio	The proposed modified development includes a GFA of 33,480m, which constitutes a 116m^2 reduction to the development's GFA. Therefore, this does not impact the development's compliance with the Concept Plan.
	Cl. 6.4 – Stormwater Management	A Stormwater Management Plan has been prepared for the site (see **Appendix E** and **Section 7.9**) and details how the proposed modified development is consistent with the measures proposed in the Concept Plan including Water Sensitive Urban Design (WSUD) measures, on-site stormwater detention, and water cycle quality and quantity measures.

Instrument	Comments
Ryde DCP 2014	As a State Significant Development, the Ryde Development Control Plan 2014 (Ryde DCP) does not apply to Stage 1 of the Ivanhoe Estate Masterplan. The Ivanhoe Estate Masterplan and associated Urban Design Guidelines set the new vision for the site and have the same effect and purpose of a site-specific DCP. Together, they establish the parameters for future development in the form of building envelopes, and apply detailed objectives and design principles to shape the design development of buildings. This approach is in accordance with Section 4.22 of the EP&A Act that confirms that a Staged DA may be made setting out concept proposals (ie: the Masterplan) for the development of a site to which separate and future detailed proposals (i.e. the Stage 1 DA) are pursuant. A concept proposal may also be undertaken in lieu of the preparation of a site-specific DCP in accordance with Section 4.23 of the EP&A Act. Further, it is noted that SSD applications are treated differently to regular 'local' and 'regional' developments, with a range of other legislation not applying (Section 4.41 and 4.46 of the EP&A Act) and other legislation needing to be applied consistently with the terms of any SSD consent (Section 4.42 of the EP&A Act). Accordingly, in this instance development control plans are specifically excluded from being applicable to SSD applications per Clause 11 of the State Environmental Planning Policy (State and Regional Development) 2011.

7.1.1 State Environmental Planning Policy (Affordable Rental Housing) 2009

State Environmental Planning Policy (Affordable Rental Housing) 2009 (the ARH SEPP) sets out the standard for the development and maintenance of affordable rental housing in NSW.

Division 1 of the ARH SEPP applies to development that is permitted with consent under an environmental planning instrument, is located on a site that does not contain a heritage item and where all or part of the development is within an accessible area. The proposed development is permissible with consent under the Ryde LEP 2014 in the B4 Mixed Use zone, is not affected by a heritage item and is located within 500 metres of Macquarie University Station. Clause 13 of the SEPP permits an FSR bonus if at least 20% of the GFA of the development is to be used for affordable housing. Under the SEPP the term 'affordable housing' includes social housing. The key provisions of the ARH SEPP have been considered in the preparation of the SSDA and are addressed in **Table 4** below.

Table 4 Assessment against the ARH SEPP

Provision	Assessment
Division 1 – In-fill affordable housing	
Clause 13 – Floor space ratio	The Ivanhoe Estate Masterplan nominates a GFA cap for certain development on the site, which includes a specific breakdown of affordable and social housing and the respective FSR bonus that would apply. The Masterplan allows for the provision of a minimum of 128 affordable housing dwellings and a total of 76,497m^2 of all social housing types. The proposed modification to the development is consistent with the terms of the Masterplan in this respect, as there is 130 affordable housing dwellings proposed, resulting in a total of 7,740m^2 in addition to 17,005m^2 of social housing which remains within the permitted GFA of 76,497m^2 of social and affordable housing. It is noted that overall, there is a reduction of 116m^2 in GFA for Building C1 when compared to the original consent.
Clause 14 – Standards that cannot be used to refuse consent	The following standards set minimums that the consent authority cannot be used to refuse consent. It is noted that not achieving the standard is not a non-compliance.
1(b) If the site's area is at least 450m^2	The Estate is 8.2 hectares, and the block area for C1 is approximately 5,896m2
1(c) at least 30% of the site is landscaped.	When the public communal open space is considered as per the Masterplan Design Guidelines (including the Neighbourhood Garden facing Main Street and Town Square), a total of 1716m^2 of communal open space is provided. This equates to 28% of the site area.
1(d) 15% of the site is provided as a deep soil zone with a minimum dimension of 3 metres and (if practicable) at least two thirds of the deep	Deep soil zones are provided in alternative locations around the Masterplan site to meet sitewide requirements. 15% of the Estate will be provided as a deep soil zone, with a minimum dimension of 3 metres or more.

Provision	Assessment
soil zone is located at the rear of the site.	
1(e) 70% of living rooms and private open space receive at least 3 hours of direct sunlight between 9am and 3pm in mid-winter.	The analysis accompanying the Concept proposal demonstrates that Building C1 is capable of achieving at least 70% of dwellings with 2 hours of solar access in mid-winter, consistent with Design Criteria in the SEPP 65 Apartment Design Guide.
2(a) car parking (minimum rates) 1 bedroom – 0.4 space 2 bedrooms – 0.5 space 3 bedrooms – 1 space	As the application is made on behalf of Land and Housing Corporation and the proposed affordable housing will be managed by Mission Australia Housing, the car parking rates set out in 2(a) are relevant. The car parking provided in the shared basement for C1 is greater than the minimum parking required under this provision for the proposed mix of affordable housing.
2(b) dwelling size	The Architectural Plans at **Appendix A** demonstrate that the proposed affordable housing dwellings achieve the required dwelling sizes, which are generally consistent with the provisions of the Apartment Design Guide.
Clause 16 – Continued application of SEPP 65	SEPP 65 applies to the proposed development as it is development for the purpose of a residential apartment building. Compliance with SEPP 65 is set out in **Section 7.4** and **Appendix D**.
Clause 16A	The existing Ivanhoe Estate site has been used as social and affordable housing for approximately 30 years. The proposed redevelopment of the site is permissible with consent under the Ryde LEP and is consistent with the strategic vision for the Macquarie Park Priority Precinct, where homes are located in close proximity to employment and public transport.
Clause 17 – Must be used for affordable housing for 10 years	The affordable housing component of the development will be used as such for at least 10 years.

7.2 Consistency with the concept DA

Under Section 4.24 of the EP&A Act there is a requirement for the development to be consistent with the consent for the Concept Proposal. This modification application has been made with reference to the Ivanhoe Estate Masterplan and is consistent with, and pursuant to, the Masterplan (as amended). An assessment against the key features of the Masterplan has been provided in **Table 5** below.

Table 5 Consistency with the Concept Plan (Ivanhoe Estate Masterplan)

Component	Discussion
Land Uses	The proposed modification does not include any alterations to the approved land uses.
Gross Floor Area and Floor Space Ratio	33,480m^2, which is a reduction of 116m^2 from the approved GFA of 33,596 for building C1.
Built Form	Building C1 will continue to fit within the building envelope established under the Masterplan and will be consistent with the Ivanhoe Estate Design Guidelines. Further discussion regarding the proposed amendments to the built form of the development is provided in **Section 7.3**.
Building Heights	No modifications are proposed to the building height of the development. The building heights will remain between 45m to 65m, which is below the maximum building heights nominated in the Masterplan.
Access Arrangements	No change is proposed to the access arrangements.
Public Domain	The proposed modification does not include any notable changes to the public domain.
ESD	The proposed modification does not alter the development's achievement of sustainability targets.
Development Staging	The delivery of Building C1 is consistent with the indicative staging plan contained in the Masterplan, ensuring that social housing is provided concurrently with market housing.

7.3 Built form and urban design

7.3.1 Height

The height of Building C1 continues to be consistent with the maximum building heights prescribed under the Ryde LEP, which ranges between 45-65m within Block C1. The height limits were established as part of the Macquarie University Station (Herring Road) Priority Precinct process and the proposal is therefore consistent with the desired and emerging built form character of the centre. **Table 6** compares the approved building heights of Building C1 with the building heights as proposed to be modified.

Table 6 Building C1 height

Maximum building height	Approved building height	Proposed building height
45 metres	Building C1.1 - 44.3m (RL 102.45) Building C1.3 – 44.7m (RL 99.35)	Building C1.1 - 44.3m (RL 102.45) Building C1.3 – 44.7m (RL 99.35)
65 metres	Building C1.2 – 63.4m (RL 124.25) Building C1.4 – 63.4m (RL 121.15)	Building C1.2 – 63.4m (RL 124.25) Building C1.4 – 63.4m (RL 121.15)

7.3.2 Building façade design

The proposed modified development includes minor changes to the façade design. This involves the incorporation of white metal tubes into the façade to add further articulation of the building façade, in turn heightening the visual interest of the proposed modified development. Notwithstanding, the remainder of the building retains the same warm, naturally occurring hues, consistent with the colour scheme of the approved development. In turn, the development will continue to exhibit a design which responds to the principles of scale, proportion and composition, offering a positive contribution to the desired future character of the area.

7.4 Residential amenity

A revised SEPP 65 Design Statement has been prepared by Candalepas Associates in relation to the proposed modified development which assesses the proposal against the nine principles for apartment design quality contained within SEPP 65 (**Appendix D**). The SEPP 65 Design Statement confirms that the proposed modifications to the development will not impact the development's ability to exhibit the nine principles of quality apartment design.

7.5 Traffic impact

A revised Traffic Impact Statement has been prepared by Ason Group (**Appendix F**) which assesses the impact of the proposed modifications on car parking requirements, access, and traffic generation. These matters will be discussed under the following subheadings.

Car parking

The proposed modification seeks to amend the development consent to facilitate the provision of additional car parking spaces, with a total of 375 car parking spaces (including 30 car share spaces). The total of 375 car parking spaces is consistent with the maximum of 403 car parking spaces that are allowed to be accommodated within the development, pursuant with the rate of parking provision approved under SSD-8903. Specifically, the changes to car parking provision are specified in **Table 1** located in **Section 5.2.2**. The provision of car parking for social housing is consistent with the Affordable Housing SEPP's minimum parking rate of 0.5 spaces per dwelling. With respect to car parking and basement design, the following is noted:

- The proposed modification includes 17 visitor car parking spaces, which aligns with the proposed modification that seeks to amend condition B78 to allow for the provision of 17 visitor spaces within Building C1. It is prudent to note that this represents an increase of two visitor car spaces for an additional 25 dwellings when compared with the parent consent. The minor departure from the condition requirement of 20 spaces as required by

Condition A18 of the Concept Approval is considered to be satisfactory given the strategic location of the site and the provision of car share spaces within the building.

- The proposed modification includes 58 car parking spaces and seven accessible parking spaces for a total of 65 car parking spaces dedicated for affordable housing apartments.
- The provision of staff car parking spaces pursuant to Condition B78 is unclear given that there are no staff members employed to run the community centre. It is possible that this is a typographical error due to the presence of a childcare in the adjacent A1 building. These three spaces have not been removed but they have alternatively been allocated as community spaces. Within the current approval community spaces were provided at a rate of 1 per 100m^2 (3 spaces) pursuant to condition A18 of the Concept Plan approval. As the proposed future C2 building (subject to a future DA) will contain a further 500m^2 of community space to achieve the requirements of condition A30 of the Concept Plan approval (700m^2 of community centre), and also a pool and gym of approximately 1,300m^2, the community parking provision has been increased to 20 to cater for the 2,000m^2 of community use space.
- The proposed modified development will cater for all parking requirements for Building C2, therefore negating the need for a separate basement to be constructed for the adjacent block.

Traffic generation

The forecast traffic generation of the proposed modified development has been derived through use of RMS Guide Update trip rates. Accordingly, a comparison of the approved traffic generation and traffic generation of the proposed modified development is provided in **Table 7** below.

Table 7 Comparison of traffic generation

	Land use	Yield	AM Peak		PM Peak	
			Trip Rate	Trips/hr	Trip Rate	Trips/hr
Approved	Market dwellings	481	0.14 per unit	68	0.12 per unit	57
Approved	Social dwellings	259	0.03 per unit	8	0.05 per unit	13
Approved	Childcare	75 children	0.1 per child and 6 staff	14	0.1 per child and 6 staff	14
Approved	Ancillary retail	525m^2	1 per 100m^2	5	1 per 100m^2	5
Approved	**Total trip generation**			**95**		**89**
Proposed	Market dwellings	376	0.14 per unit	53	0.12 per unit	45
Proposed	Social dwellings	259	0.03 per unit	8	0.05 per unit	13
Proposed	Affordable units	130	0.12 per unit	16	0.10 per unit	13
Proposed	Community use/ancillary retail	2000m^2	1 per 100m^2	20	1 per 100m^2	20
Proposed	Childcare	75 children	0.1 per child + 6 staff	14	0.1 per child + 6 staff	14
Proposed	**Total trip generation**			**111**		**105**
	Difference in trip generation			**+16**		**+16**

Source: Ason Group

As demonstrated in **Table 7** above, the proposed modifications to the development will generate 16 additional trips in AM and PM peak hours compared to the approved development, which is an inconsequential increase and as such is supportable on traffic generation grounds. It is also noted that the masterplan trip rates as a whole will be unchanged as the tenure change has resulted in reduced apartments in the latter stage.

Internal design

All the internal components of the proposed modified development have been designed in accordance with the relevant Australian Standards, as detailed in the Traffic Impact Statement (**Appendix F**).

7.6 Social housing

The proposed provision of affordable housing dwellings does not impact the development's ability to provide a mixture of housing, which is key to the Concept Plan vision for the site. This vision encompasses the Ivanhoe Estate Renewal facilitating the creation of a new mixed community on the site, including a range of housing tenures such as home ownership, private market rental, affordable rental housing, and social housing.

Ultimately, the proposed modification includes an additional 130 affordable housing apartments, which expedites the delivery of the affordable housing components on the site by four years and allows for the provision of a mixture of uses throughout the development. The modification will allow for the delivery of affordable housing on the site as early as September 2023, instead of the original approval which would result in affordable housing being delivered in late 2027. Therefore, the modification allows for the achievement of the Concept Plan vision.

7.7 Subdivision

The proposed stratum subdivision for Building C1 has been altered to reflect the conversion of market dwellings into affordable housing dwellings and therefore align with the design and intended operation of Building C1. The proposed modifications are illustrated in the Draft Plan of Stratum Subdivision that accompanies the modification application at **Appendix G**. The easements included in the subdivision plans demonstrate how the proposed lots can be adequately serviced and accessed.

7.8 Waste management

An amended waste management plan has been prepared by Elephants Foot Recycling Solutions (EFRS) which considers the waste generated and the waste management measures of the development (as proposed to be modified) (**Appendix H**). It includes changes to the development's waste generation which has arisen as a result of the changes in residential density, with an additional 25 dwellings proposed. Notwithstanding, the management of waste generated remains the same with residential waste and recycling to be collected by Council and retail and commercial waste collected by a private contractor.

Waste generated by the operation of the mixed use buildings will continue to be stored and collected on site, and will be the responsibility of residents and tenants to transport waste to the holding facilities, and the building managers and contractors to manage waste for pick-up and disposal. Further, the expectation remains that leasing arrangements with retail/commercial operations contain direction on waste management services and expectations, and that residents will be educated on the correct separation of garbage and recycling items and the operation of garbage chutes and holding areas.

7.9 Potable water, drainage and stormwater

A revised Stormwater Management Plan has been prepared by ADW Johnson and accompanies the application at **Appendix E** to assess the impacts of the proposed modifications on stormwater management, focussing on water quantity, water quality and potable water conservation. These matters as proposed to be modified are discussed below.

Water quantity

The City of Ryde Council's Stormwater Technical Manual requires that OSD systems are designed to ensure that the peak discharge in the post developed 100 year ARI storm event does not exceed the peak discharge in the post developed 5 year ARI storm event. Given that the proposed modifications culminate in an increase in the peak discharge leaving the site, further modelling has been undertaken to ensure the proposed tank size is adequate to service the development. Accordingly, in order to meet Council's aforementioned requirements for OSD systems, the stormwater detention tank size has been increased by 15m^3.

Water quality

The nominated stormwater systems of the proposed modified development have been considered via MUSIC modelling to demonstrate compliance with Council's DCP treatment targets, as shown in **Table 8** below. This demonstrates that the proposed water quality measures will continue to meet and exceed Council's targets for Building C1.

Table 8 Compliance with water quality requirements

Pollutant	Target	Approved	Proposed	Compliance
Gross pollutant	90%	100%	100%	✓
Total suspended solids	85%	86.5%	87.9%	✓

Pollutant	Target	Approved	Proposed	Compliance
Total phosphorus	60%	65.2%	65.9%	✓
Total nitrogen	45%	56.7%	53.9%	✓

Source: ADW Johnson + Ryde DCP 2014

Potable water conservation

A water balance was formulated in the original stormwater report that was based on two key parameters being the roof catchment area and the water reuse demand. The reuse demand was derived on the basis of an irrigation rate adopted for the site's pervious areas. The proposed amendments do not impact on the pervious areas of the site. Moreover, the roof catchment area is not proposed to be altered. As such, there are no proposed changes to the water balance produced in the approved stormwater report.

7.10 Building Code of Australia compliance

The proposed modified development will continue to comply with all the relevant requirements of the Building Code of Australia (BCA) and other requirements pertaining to accessibility, as demonstrated within the following reports:

- Building Code of Australia Statement prepared by McKenzie Group (**Appendix I**); and
- Accessibility Statement prepared by Morris Goding Accessibility Consulting (**Appendix J**).

7.11 Lift provision

Vertical Transportation advice has been prepared by WSP (**Appendix K**) to justify the inclusion of a single lift to service all apartments in towers C1.1, C1.2 and C1.3.

Notwithstanding the Apartment Design Guide's recommended lift provision, WSP note that a single lift can adequately service 65 apartments, with this alternative solution being consistent with international design criteria outlined by Chartered Institute of Building Services Engineers and the design of similar buildings.

8.0 Conclusion

The proposal seeks to amend the development consent to facilitate the following modifications to the development:

- The conversion of a portion of market dwellings to affordable housing dwellings in Building C1 resulting in amendments to apartment mix and overall yield. The amendment will result in an additional 25 dwellings however will not result in any significant material changes to the approved built form or GFA.
- Reconfiguration of the basement car park across all levels resulting in an additional 24 car parking spaces.
- Extension of the lot boundary to accommodate the provision of parking for community uses.

In accordance with section 4.55(1A) of the EP&A Act, Council may modify the consent as:

- the consent, as proposed to be modified, is substantially the same development as that originally approved;
- there will not be any significant adverse environmental or social impacts; and
- the proposed development remains consistent with the Masterplan.

In light of the above, we therefore recommend that the proposed modification is supported by the Department of Planning, Industry and Environment. We trust that this information is sufficient to enable a prompt assessment of the proposed modification.

SSD Modifications

Lodgement Date: 12/03/2021

Project Name: MOD 2 - Changes to Building C1
Case ID: SSD-8903-Mod-2

Proponent Details

Project Owner Info

Title	Mr
First Name	Richard
Last name	Wood
Role/Position	Project Director
Phone	0413917399
Email	cdimitriadis@ethosurban.com
Address	173 SUSSEX STREET SYDNEY , New South Wales, 2000 , AUS

Company Info

Are you applying as a company/business?

Yes

Company Name	New South Wales Land and Housing Corporation
ABN	24960729253

Primary Contact Info

Are you the primary contact?

No

Primary Contact

Anna Nowland

Title	Ms
First Name	Anna
Last Name	Nowland
Role / Position	Consultant
Phone	0294094935
Email	anowland@ethosurban.com

Political Donations

Do you need to disclose a political donation?

No

Modification Details

Project Info

Project Name	MOD 2 - Changes to Building C1
Additional Capital Investment Value(excl GST)	AUD0.00
Additional Operation Jobs	0
Additional Construction Jobs	0

Modification Description

Amendments relate to:
-The conversion of a portion of market dwellings to affordable housing dwellings in Building C1 resulting in amendments to apartment mix and yield, namely in an additional 25 dwellings, however no significant material changes to the approved built form or GFA.
-Reconfiguration of basement car park across all levels resulting in an additional 24 car parking spaces.
-Extension of the lot boundary to accommodate the provision of parking for community uses and car share spaces

How is the modification substantially the same as the original development?

Refer to the attached modification report.

Site Details

Site Information

Site Name	Ivanhoe Estate
Site Address (Street number and name)	Ivanhoe Place, Wilcannia Way, Nyngan Way, Cobar Way and Narromine Way

Local Government Area

Local Government	District Name	Region Name	Primary Region
City of Ryde	North District	Sydney	◉

State Significant Development - Identified Site

Is your proposal on an Identified Site?

Yes

Identified Site Name
NSW Land and Housing Corporation Sites

Landowner's Consent

Is Landowner's consent required?
Yes

Do you have evidence of all Land Owners' consent?
Yes

Attachments

File Name Owner's Consent

Statutory Context

Modification Type

Section 4.55(1A) – involving minimal environmental impact, where the development as originally approved remains substantially the same

Critical Habitat and Threatened Species

Is the land, or part of the land, critical habitat?

No

Is the development likely to significantly affect threatened species, populations or ecological communities, or their habitats?

No

Is the development biodiversity compliant? (refer to Schedule 1, Part 1, clause 1(2) of the Environmental Planning and Assessment Regulation)

Yes

Approvals - Part1

A permit under section 201, 205 or 219 of the *Fisheries Management Act 1994*?*

No

An approval under Part 4, or an excavation permit under Section 139, of the *Heritage Act 1977*?*

No

An Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974*?*

No

A bush fire safety authority under Section 100B of the Rural Fires Act 1997?*

No

A water use approval under Section 89, a water management work approval under Section 90 or an activity approval under Section 91 of the *Water Management Act 2000*?*

No

Approvals - Part2

Do you require any of the following approvals from Section 4.42 of the EP&A Act in order to carry out the development:

An aquaculture permit under Section 144 of the *Fisheries Management Act 1994*?*

No

An approval under Section 15 of the *Coal Mine Subsidence Compensation Act 1961*?*

No

A mining lease under the *Mining Act 1992*?*

No

A petroleum production lease under the *Petroleum (Onshore) Act 1991*?*

No

An environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (for any of the purposes referred to in Section 43 of that Act)?*

No

A consent under Section 138 of the *Roads Act 1993*?*

No

A licence under the *Pipelines Act 1967*?*

No

Modification Report

Attachments

File Name	Ivanhoe Estate Stage 1 - S.4.55(1A) Report
File Name	Appendix K - Vertical Transportation Letter
File Name	Appendix F - Traffic Statement
File Name	Appendix A - Architectural Drawings
File Name	Appendix J - Accessibility Statement
File Name	Appendix I - BCA Statement
File Name	Appendix H - Waste Management Plan
File Name	Appendix G - Plan of Stratum Subdivision
File Name	Appendix E - Stormwater Managerment Plan
File Name	Appendix D - SEPP 65 Design Statement
File Name	Appendix C - BASIX REPORT
File Name	Appendix B - Landscape Plans

01 — BASEMENT 3 FLOOR PLAN

1:200

MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description
C	02.03.21	FOR S4.55 TO CLIENT
B	25.02.21	FOR S4.55 TO CLIENT
A	03.12.20	FOR S4.55 TO CLIENT

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
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NORTH

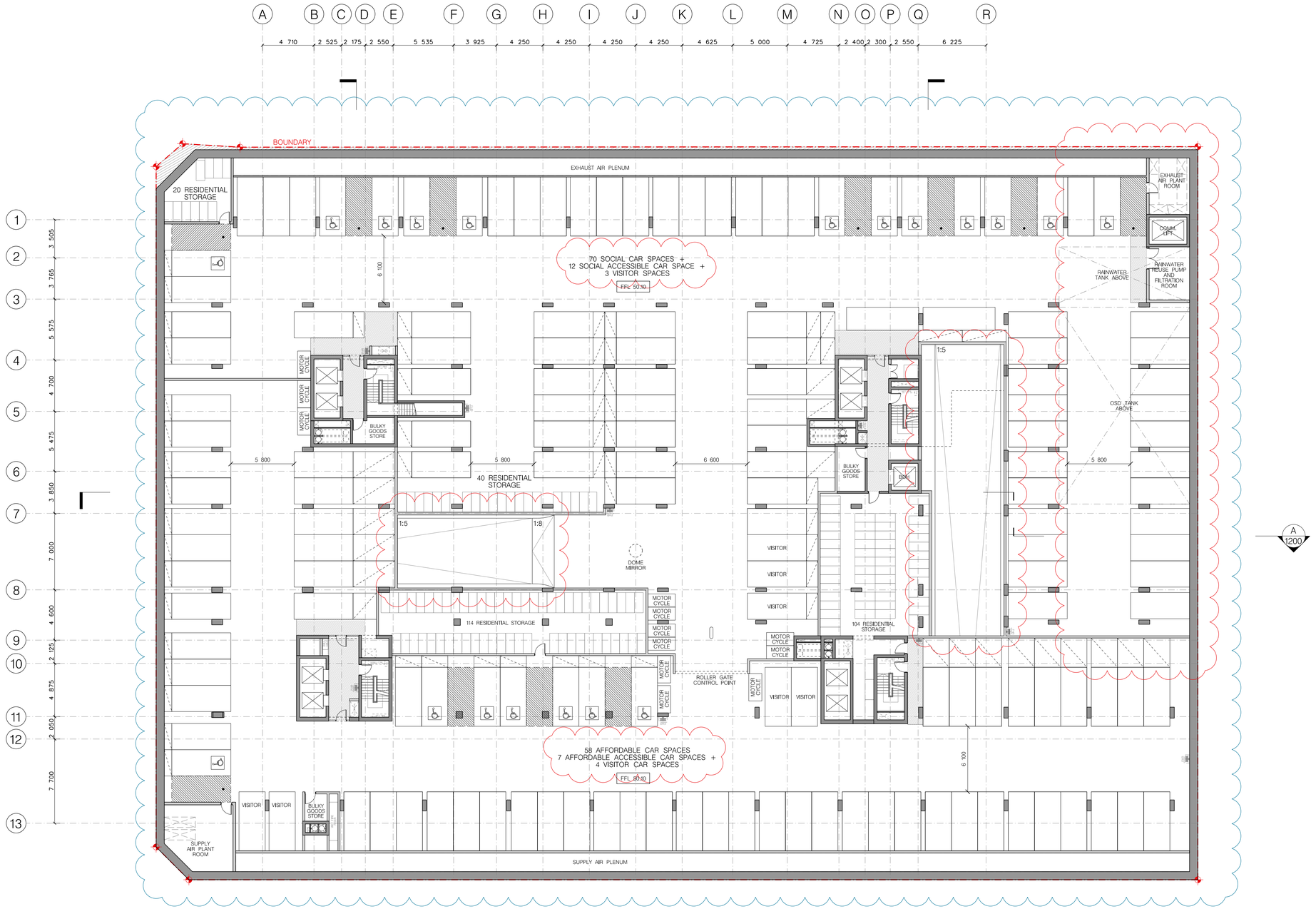
DATE: MAR 2021
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK-FP

DRAWING:
BASEMENT 3 FLOOR PLAN

DRAWING No.
S4.55–1102

JOB No. 5800

ISSUE C



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MAJOR AMENDMENTS MINOR AMENDMENTS

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A	02.25.20		FOR S4.55 TO CLIENT

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DRAWING No. S4.55–1103

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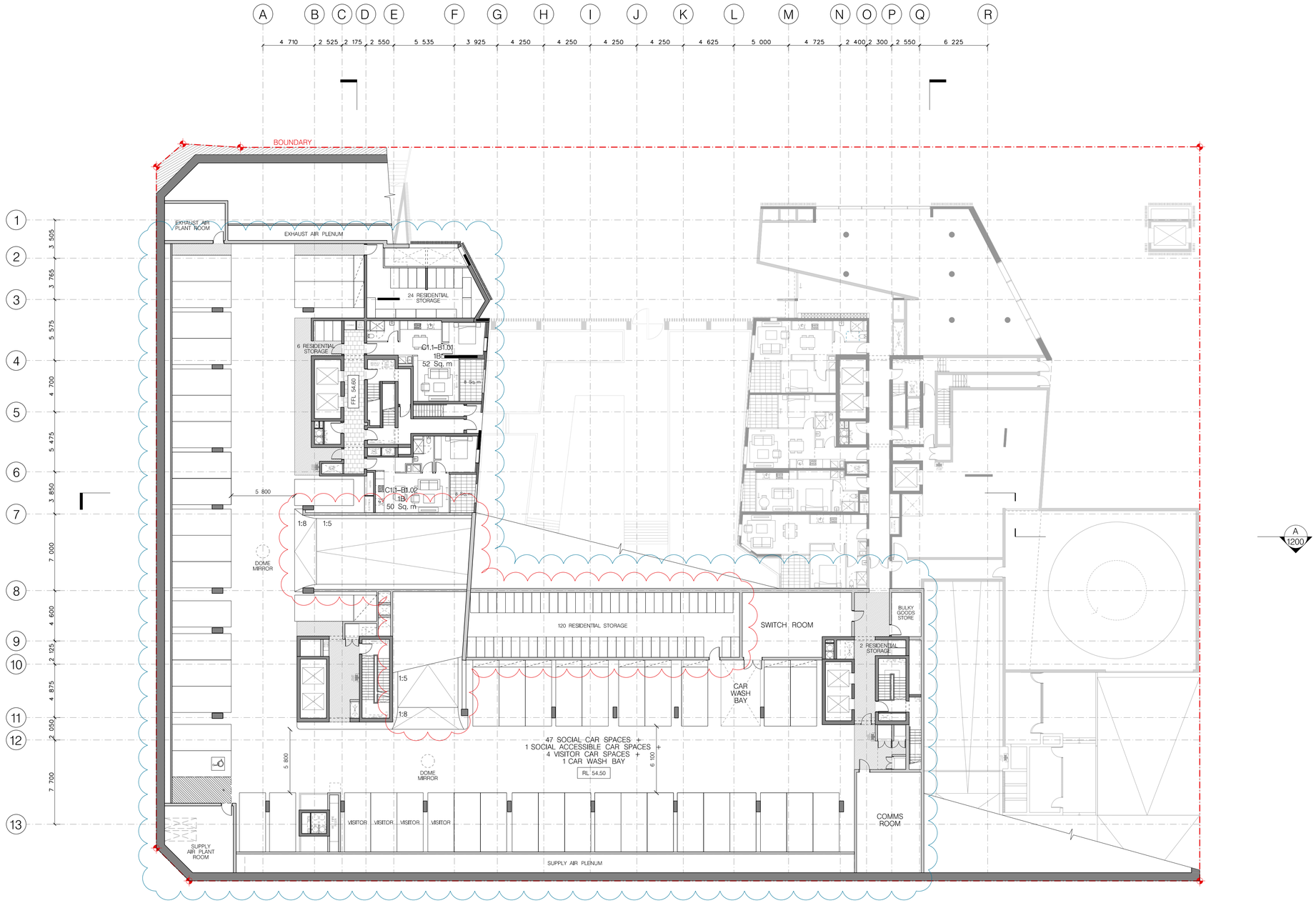

01 — BASEMENT 1 FLOOR PLAN
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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Drawing Original Size: A1
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A	03.12.20	FOR S4.55 TO CLIENT

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CLIENT:
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S4.55–1104

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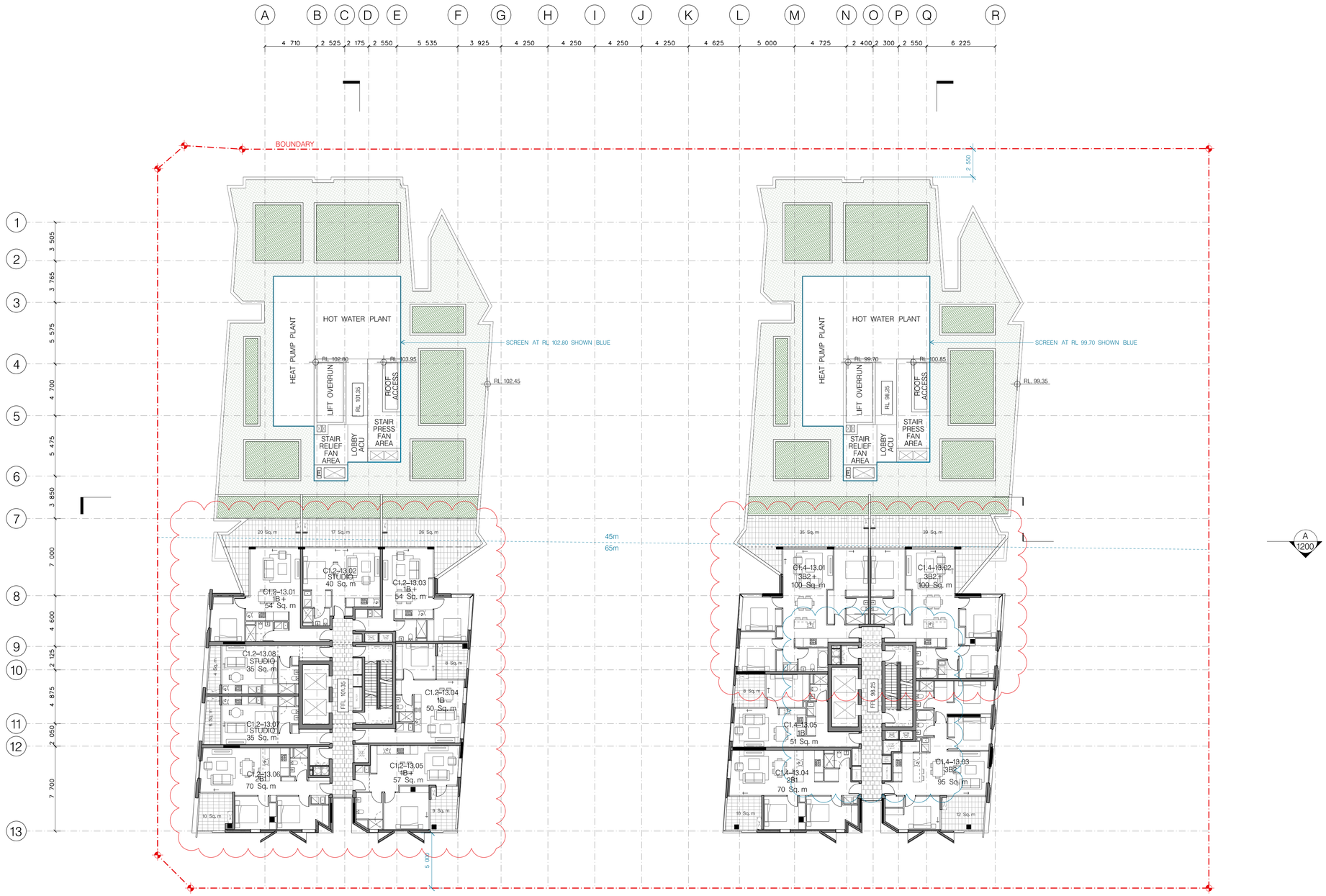

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C 1202

01 – LEVEL 13 FLOOR PLAN
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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Drawing Original Size	Description
C	04.02.21	A1	FOR S4.55 TO CLIENT
B	03.02.21		FOR S4.55 TO CLIENT
A	02.02.21		FOR S4.55 TO CLIENT

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DRAWING: LEVEL 13 FLOOR PLAN
DRAWING No. S4.55–1111

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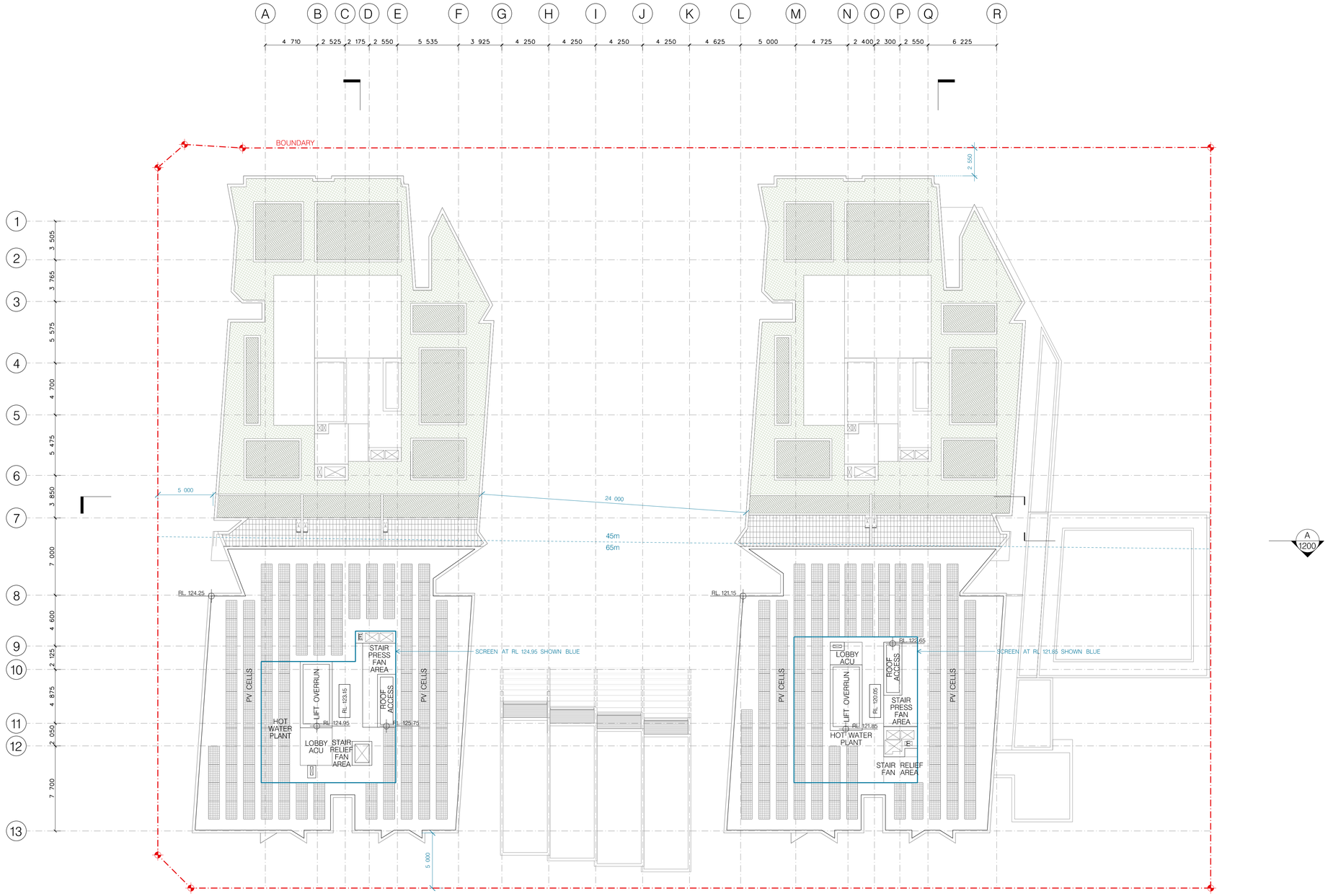

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MAJOR AMENDMENTS

MINOR AMENDMENTS

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A	03.12.20	FOR S4.55 TO CLIENT	

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EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

NORTH

DATE: FEB 2021
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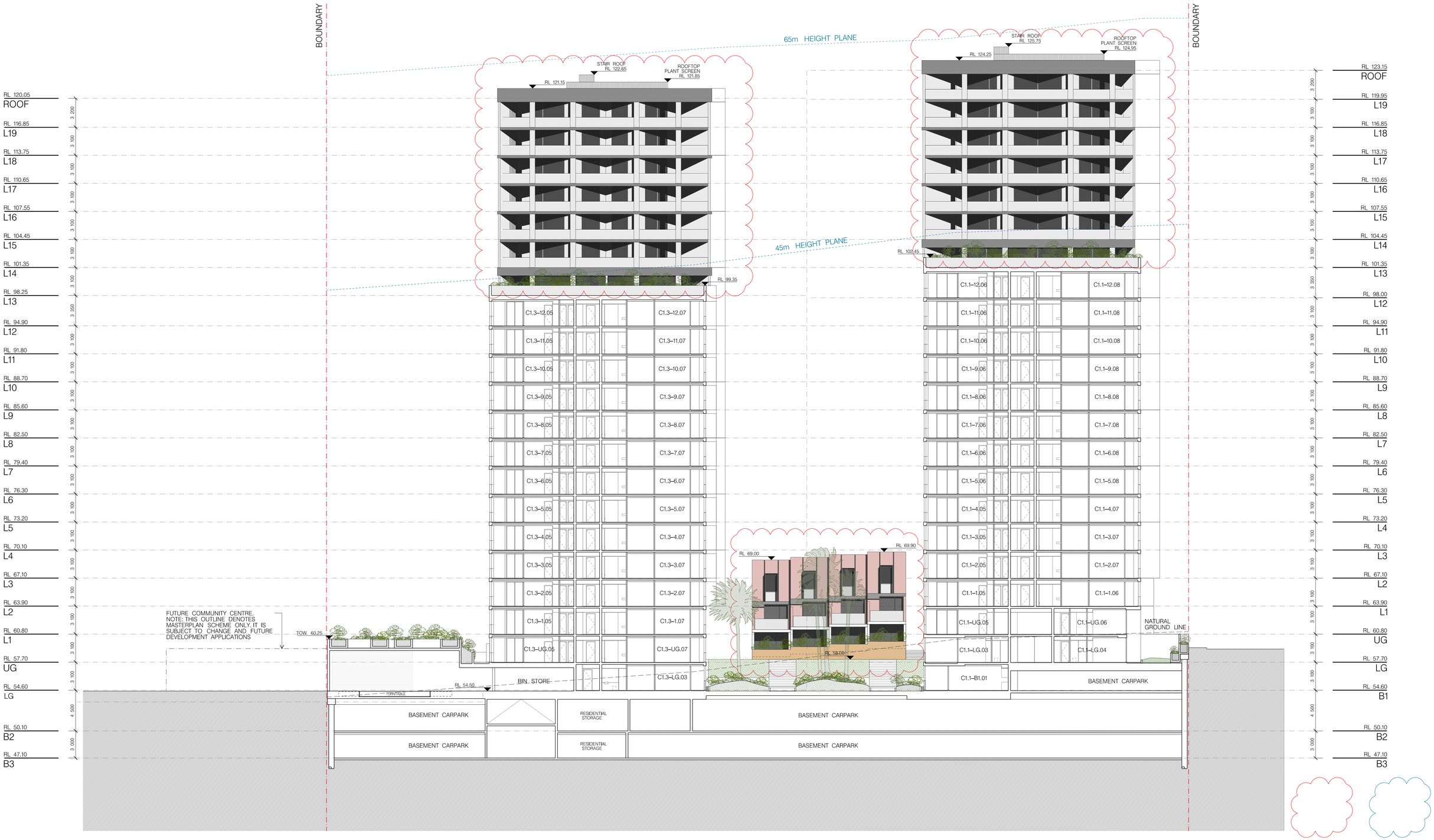
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: ROOF PLAN
DRAWING No. S4.55–1113

JOB No. 5800
ISSUE C



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MAJOR AMENDMENTS
MINOR AMENDMENTS

Issue	Date	Drawing Original Size	Description
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F	02.02.21		FOR S4.55 TO CLIENT
E	02.02.21		FOR S4.55 TO CLIENT

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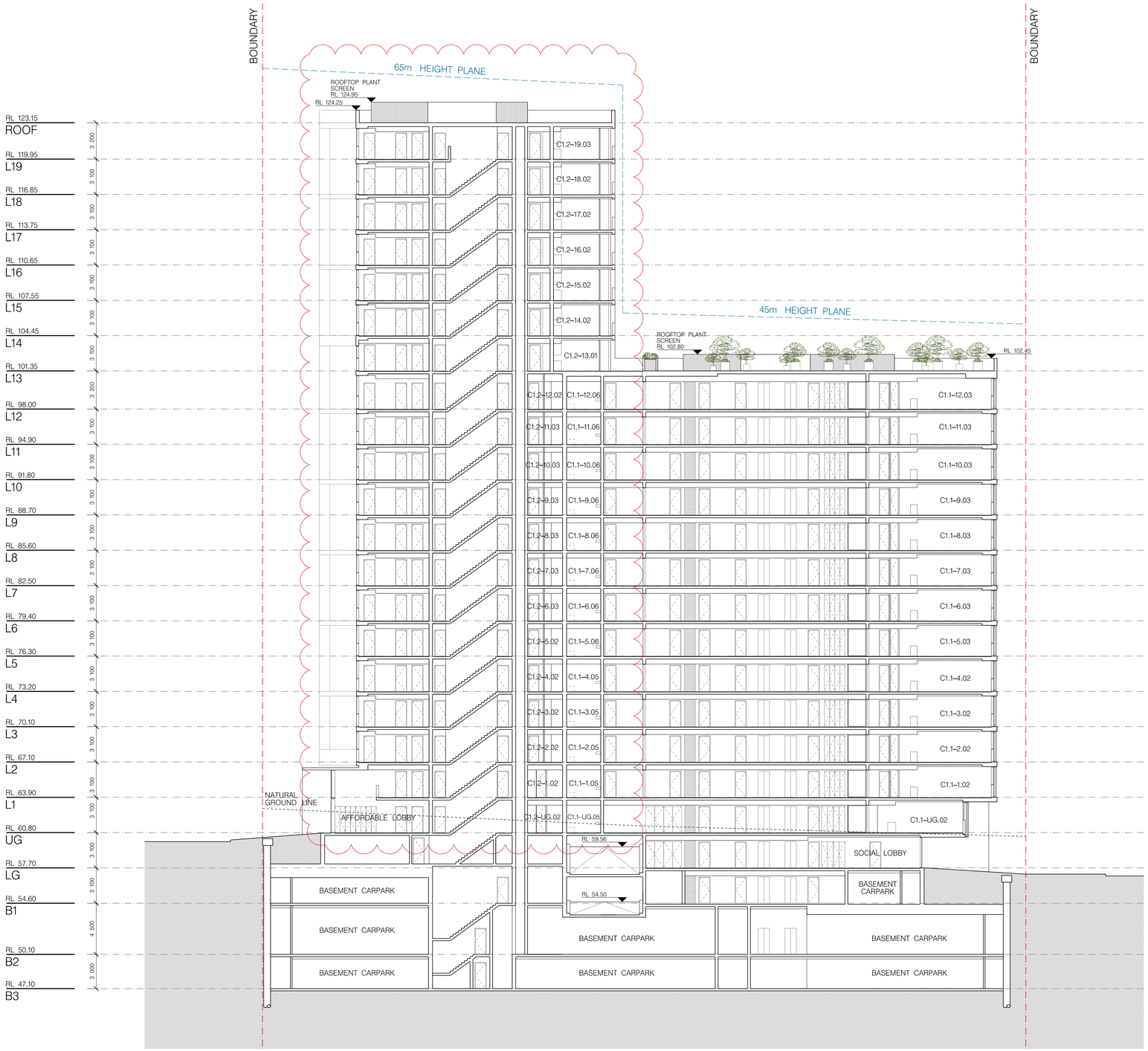
NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: FEB 2021
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING: SECTION A
DRAWING No. S4.55–1200
JOB No. 5800
ISSUE C



MAJOR AMENDMENTS

MINOR AMENDMENTS

01 SECTION B
1:200

Issue	Date	Drawing Original Size	Description
G	04.02.21	A1	FOR S4.55 TO CLIENT
F	03.02.21		FOR S4.55 TO CLIENT
E	02.02.21		FOR S4.55 TO CLIENT

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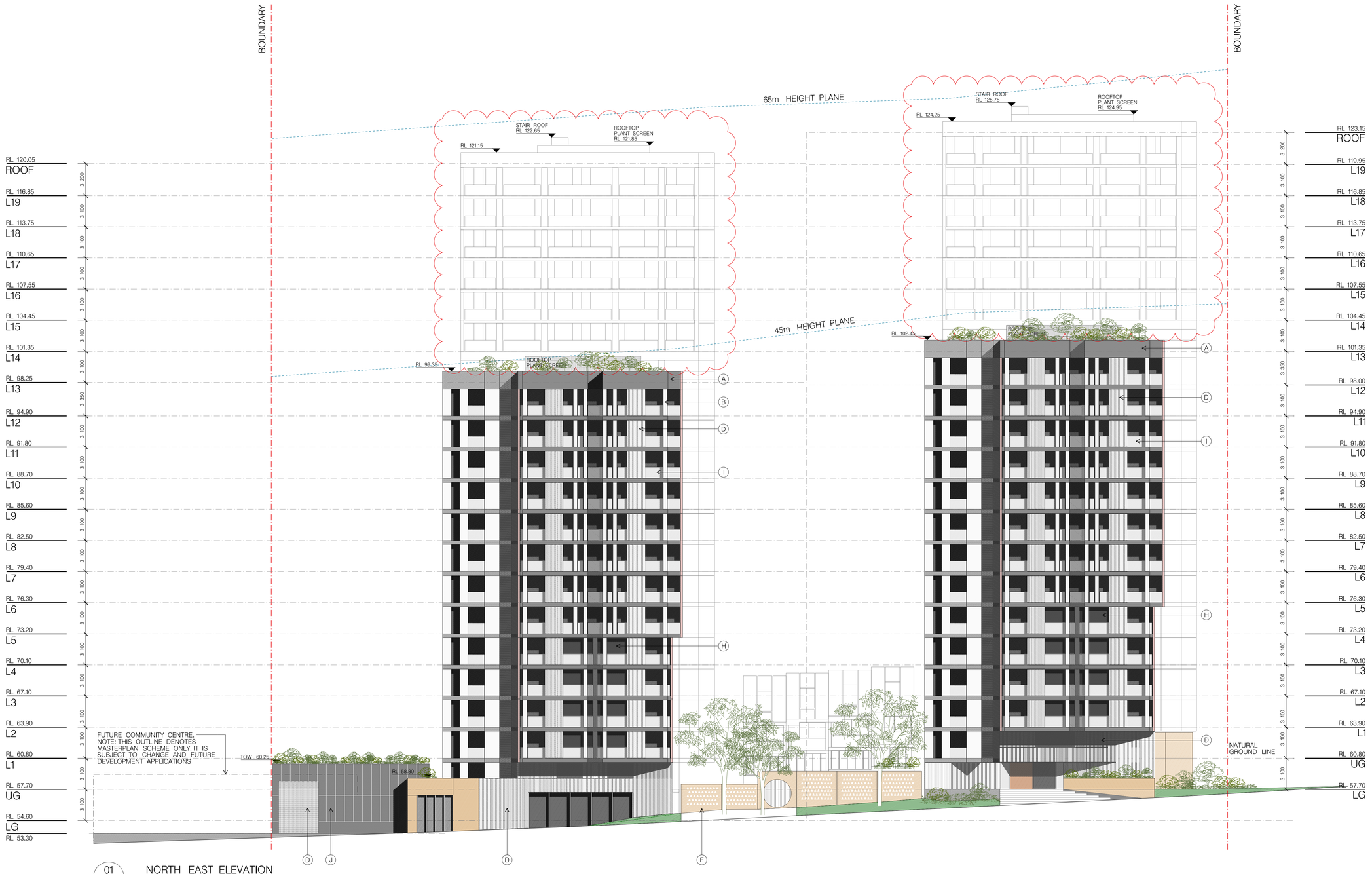
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

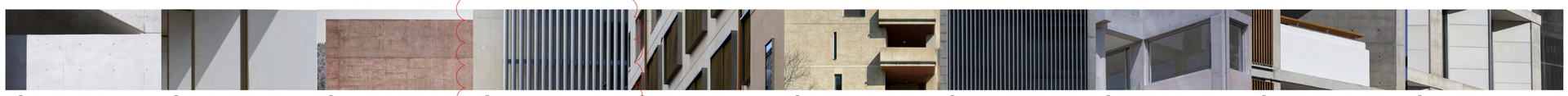
DATE: FEB 2021
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK+FP

DRAWING: SECTION B
DRAWING No. S4.55–1201

JOB No. 5800
ISSUE C



01 — NORTH EAST ELEVATION
1:200



Ⓐ OFF-FORM CONCRETE
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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Drawing Original Size	Description
C	04.05.21	A1	FOR S4.55 TO CLIENT
B	03.03.21		FOR S4.55 TO CLIENT
A	02.25.21		FOR S4.55 TO CLIENT

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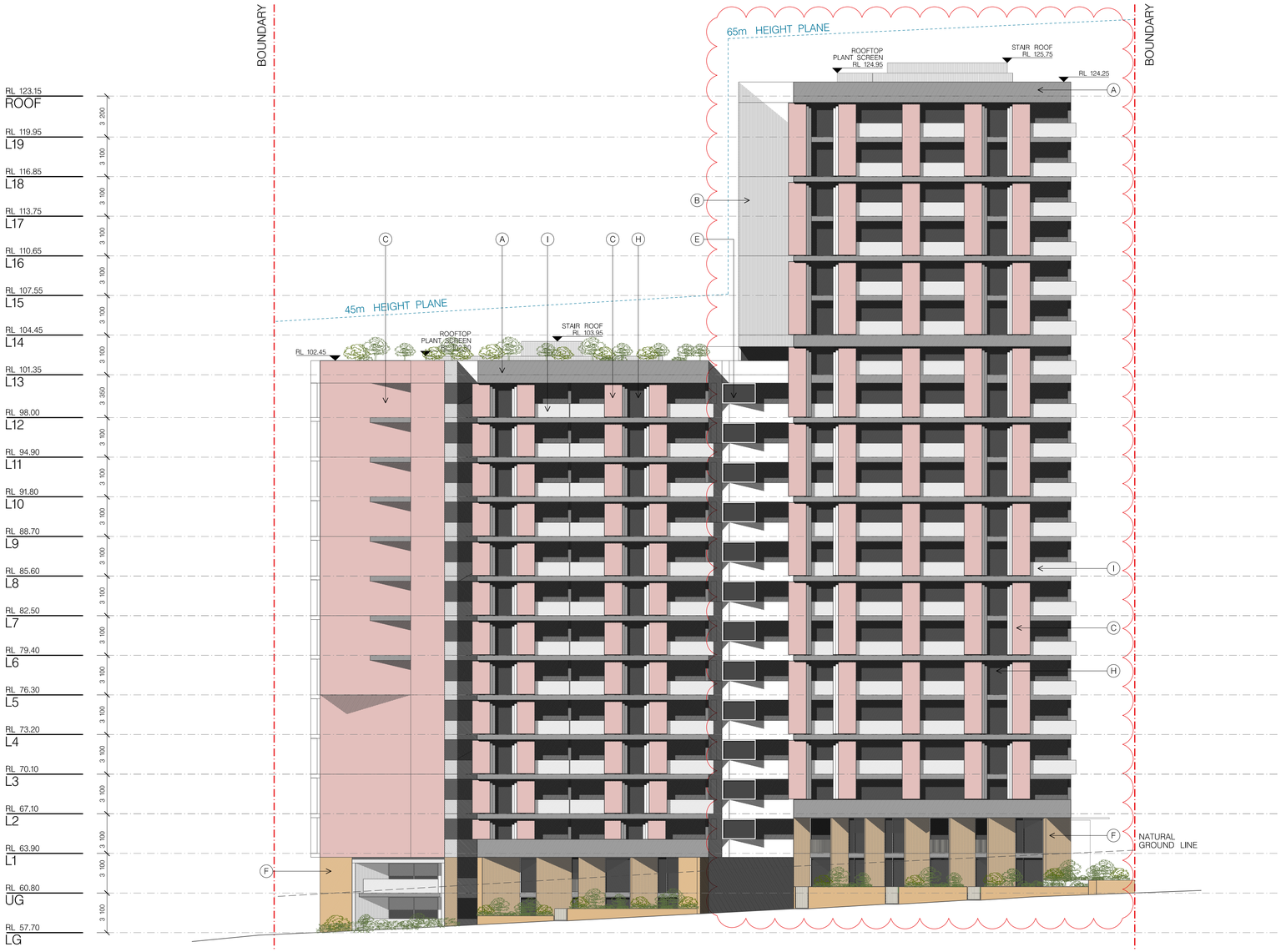
PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: FEB 2021
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

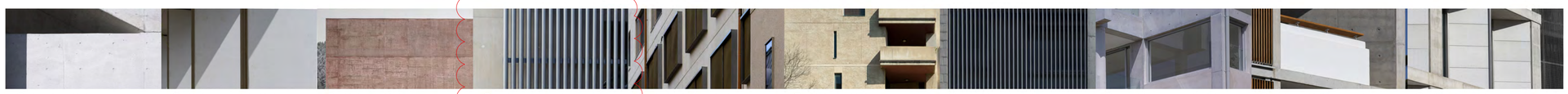
DRAWING: NORTH EAST ELEVATION
DRAWING No. S4.55–1300

JOB No. 5800
ISSUE C



01 — NORTH WEST ELEVATION

1:200



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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description
A	24.02.21	FOR S4.55 CLIENT REVIEW
B	01.03.21	FOR S4.55 CLIENT REVIEW
C	05.03.21	FOR S4.55 CLIENT REVIEW

Drawing Original Size: A1

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: FEB 2021
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
NORTH WEST ELEVATION

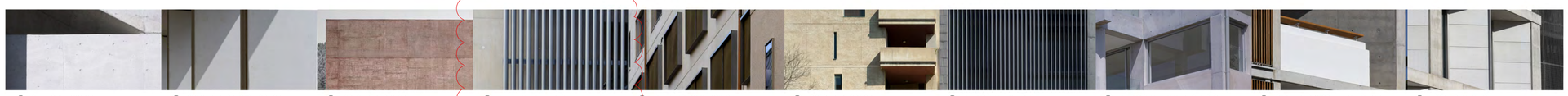
DRAWING No.
S4.55–1301

JOB No. 5800

ISSUE C

01 NORTH WEST INTERNAL ELEVATION

1:200



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– PEDEVILLA ARCHITECTS

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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Drawn by	Description
A	24.02.21	GBA	FOR S4.55 TO CLIENT
B	03.05.21	GBA	FOR S4.55 TO CLIENT
C	02.06.21	GBA	FOR S4.55 TO CLIENT

A1

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NSW ARCHITECTS REG No.– 5773

PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: FEB 2021
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
NORTH WEST INTERNAL ELEVATION

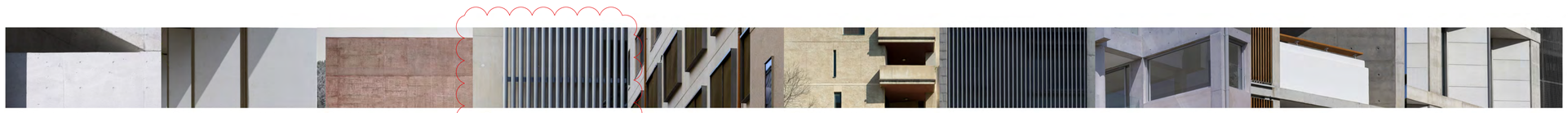
DRAWING No.
S4.55–1302

JOB No.
5800

ISSUE
C

01 — SOUTH EAST ELEVATION

1:200



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– CANDALEPAS ASSOCIATES

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WEST TYROL FIRE STATION
– PEDEVILLA ARCHITECTS

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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description	Drawing Original Size: A1
C	24.02.21	FOR S4.55 CLIENT REVIEW	
B	22.12.20	FOR S4.55 CLIENT REVIEW	
A	05.11.20	FOR S4.55 CLIENT REVIEW	

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK

CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

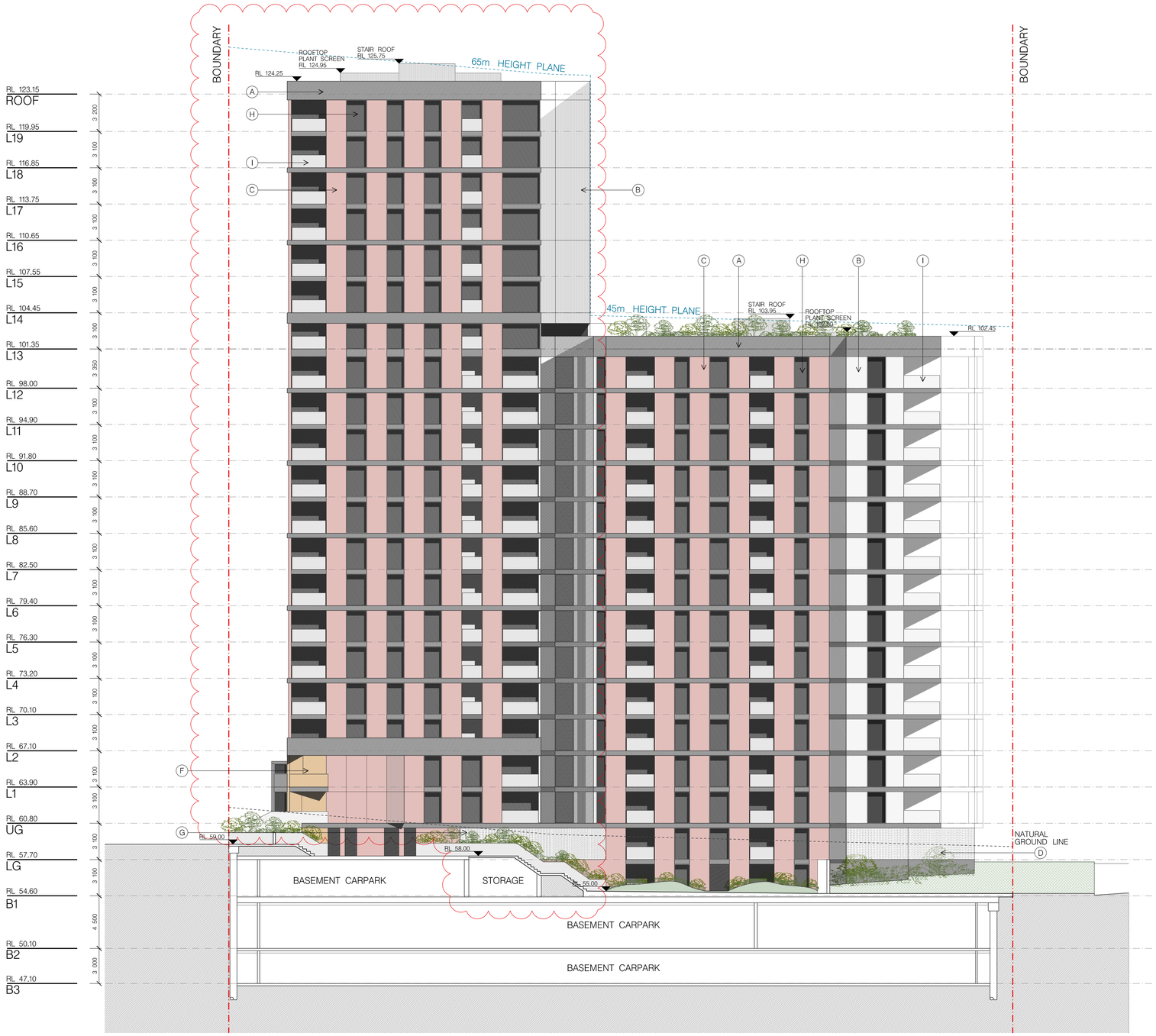
DATE: FEB 2021
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

DRAWING:
SOUTH EAST ELEVATION

DRAWING No.
S4.55–1303

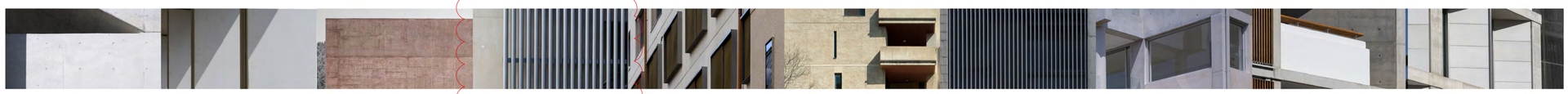
JOB No. 5800

ISSUE C



01 — SOUTH EAST INTERNAL ELEVATION

1:200



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WEST TYROL FIRE STATION
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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Description
A	24.02.21	FOR S4.55 TO CLIENT
B	22.03.21	FOR S4.55 TO CLIENT
C	01.12.21	FOR S4.55 TO CLIENT

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PROJECT:
IVANHOE ESTATE
EPPING ROAD, MACQUARIE PARK
CLIENT:
FRASERS PROPERTY IVANHOE

SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: FEB 2021
CHECKED 1: MK
CHKD2/APPD: JW
DRAWN BY: MK/FP

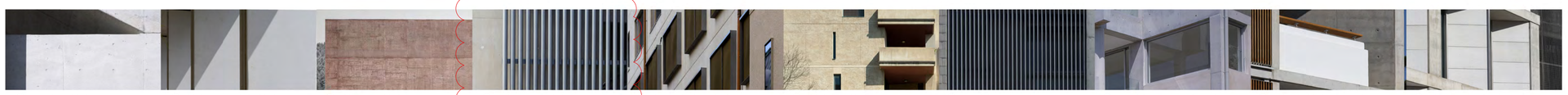
DRAWING:
SOUTH EAST INTERNAL ELEVATION

DRAWING No.
S4.55–1304

JOB No. 5800

ISSUE C

01 — SOUTH WEST ELEVATION
1:200



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MAJOR AMENDMENTS

MINOR AMENDMENTS

Issue	Date	Drawing Original Size: A1	Description
C	24.02.21		FOR S4.55 TO CLIENT
B	04.02.21		FOR S4.55 TO CLIENT
A	02.12.20		FOR S4.55 TO CLIENT

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FRASERS PROPERTY IVANHOE
SCALE: 1:200@A1 / 1:400@A3
0 5m 10m

DATE: FEB 2021
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DRAWING: SOUTH WEST ELEVATION
DRAWING No. S4.55–1305
JOB No. 5800
ISSUE C

Reference: 0555r04v04

11 March 2021

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+61 2 9083 6601
Suite 5.02, Level 5, 1 Castlereagh Street
Sydney NSW 2000
www.asongroup.com.au

Frasers Property Australia
Level 2, 1C Homebush Bay Drive
Rhodes NSW 2138

Attention: Robert Cauchi

Transport Statement for a Section 4.55 Application (SSD8903)

Dear Robert,

Ason Group has been commissioned by Frasers Property Australia to prepare a Transport Statement (TS) in support of Section 4.55 Application (S4.55) for Stage 1 of the Ivanhoe Estate development, specifically, amendments to the apartment mix associated with Building C1 (the Proposal) at Macquarie Park (the Site). This TS provides an assessment of the access, traffic and parking implications of the Proposal, which provides for:

- Residential (Market)
    - 41 x 1-bedroom apartments
    - 51 x 2-bedroom apartments
    - 11 x 3-bedroom apartments
    - 4 x 3-bedroom apartments
- Residential (Social Housing)
    - 42 x studio apartments
    - 118 x 1-bedroom apartments
    - 99 x 2-bedroom apartments
    - 0 x 3-bedroom apartments
- Residential (Affordable Housing)
    - 54 x studio apartments
    - 39 x 1-bedroom apartments
    - 36 x 2-bedroom apartments
    - 1 x 3-bedroom apartments
- 375 car parking spaces;
- Loading facility; and

- Community facility, gym / pool for residents, and car share facility.

The Site lies within the Ryde City Council (Council) Local Government Area (LGA), and as such key reference documents for the assessment include:

- Ryde Development Control Plan 2014 (DCP 2014);
- Ryde Local Environmental Plan 2014 (LEP 2014);
- Ason Group Traffic Impact Assessment – Ivanhoe Estate, Macquarie Park – Stage 1 (P0555r01v07); and
- Ason Group Traffic Impact Assessment – Ivanhoe Estate, Macquarie Park – Masterplan (0421r02v07).

This TS also references general access, traffic and parking guidelines, including:

- Australian Standard 2890.1:2004 Parking Facilities – Off-Street Car Parking (AS2890.1);
- Australian Standard 2890.2:2018 Parking Facilities – Off-Street Commercial Vehicle Facilities (AS2890.2);
- Australian Standard 2890.3:2015 Parking Facilities – Bicycle Parking (AS2890.3); and
- Australian Standard 2890.6:2009 Parking Facilities – Off-Street Parking for People with Disabilities (AS2890.6).

Background and The Proposal

The concept proposal (SSD-8707) and Stage 1 (SSD-8903) approval for Ivanhoe Estate, lodged by NSW Land and Housing Commission were approved by the Minister for Planning and Public Spaces on 30 April 2020.

The approved concept proposal (SSD-8707) includes:

- 3,300 new homes, including 950 for social housing, 128 affordable housing, and 273 seniors living homes
- 2.8 hectares of open space including new parks, a skatepark and playground
- A new primary school and two childcare centres
- A town plaza, new shops cafes and restaurants
- A new road connecting Herring Road with Lyonpark Road, including a new bridge over Shrimptons Creek
- 50 car share parking spaces within the overran Ivanhoe Estate Development.

The approved Stage 1 works (SSD-8903) consists of:

- Site preparation works, including tree removal and earthworks across the entire Ivanhoe Estate

- The provision and augmentation of utilities and services infrastructure across the entire Ivanhoe Estate
- The construction of the internal road network
- The consolidation of the existing lots and subdivision of the Ivanhoe Estate to reflect the revised road layout, open space, and provide superblocks corresponding to the master plan
- The construction and use of Buildings A1 and C1 in the norther western corner of the Ivanhoe Estate, comprising:
    - Building A1 with 269 apartments, 233 car parking spaces and a childcare centre
    - Building C1 with 471 apartments and 346 car parking spaces
    - Of the 740 apartments, 259 apartments were social dwellings.

Specifically, the following SSD-8903 conditions are relevant to this S4.55 assessment:

Number of Car Parking Spaces

B77. A maximum of 208 residential car parking spaces and 13 visitor car parking spaces and a minimum of 12 childcare centre car parking spaces are to be provided for Building A1. Details demonstrating compliance must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.

B78. A maximum of 328 residential car parking spaces, 15 visitor car parking spaces and three staff car parking spaces are to be provided for Building C1. Details demonstrating compliance must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.

B79. A minimum of 12 car share spaces must be provided within the site in association with Stage 1.

Number of Bicycle Parking Spaces

B81. The minimum number of bicycle parking spaces to be provided for the development shall comply with the table below. Details confirming the bicycle parking numbers must be submitted to the Certifier prior to the issue of the relevant Crown Building Works Certificate.

Approval is now sought to modify the existing consent with the key changes that are relevant to this assessment:

- Change of the Stage 1 approved land use mix / apartment type and yield from within the Concept Approval due to the acceleration of delivering the affordable housing requirement of the development into the C1 building;
- Increase in total number of dwellings from 740 to a total of 765 dwellings, comprising 376 market apartments, 259 social housing, and 130 affordable apartments;
- Parking for 2,000 square metres of Retail / Community Use
- A total of 375 car parking spaces, comprising:

- 325 parking spaces for residential parking (including 17 visitor spaces) and remaining parking for community uses, and car share.

- Bicycle parking provision of 1 per dwelling (market, social, affordable) and visitor bicycle parking at a rate of 5% of dwelling yield.

Figure 1 and **Figure 2** provide Site plans of the Ground Floor and First Floor respectively, including the general layout of the tenancies and associated traffic circulation, loading and parking areas.

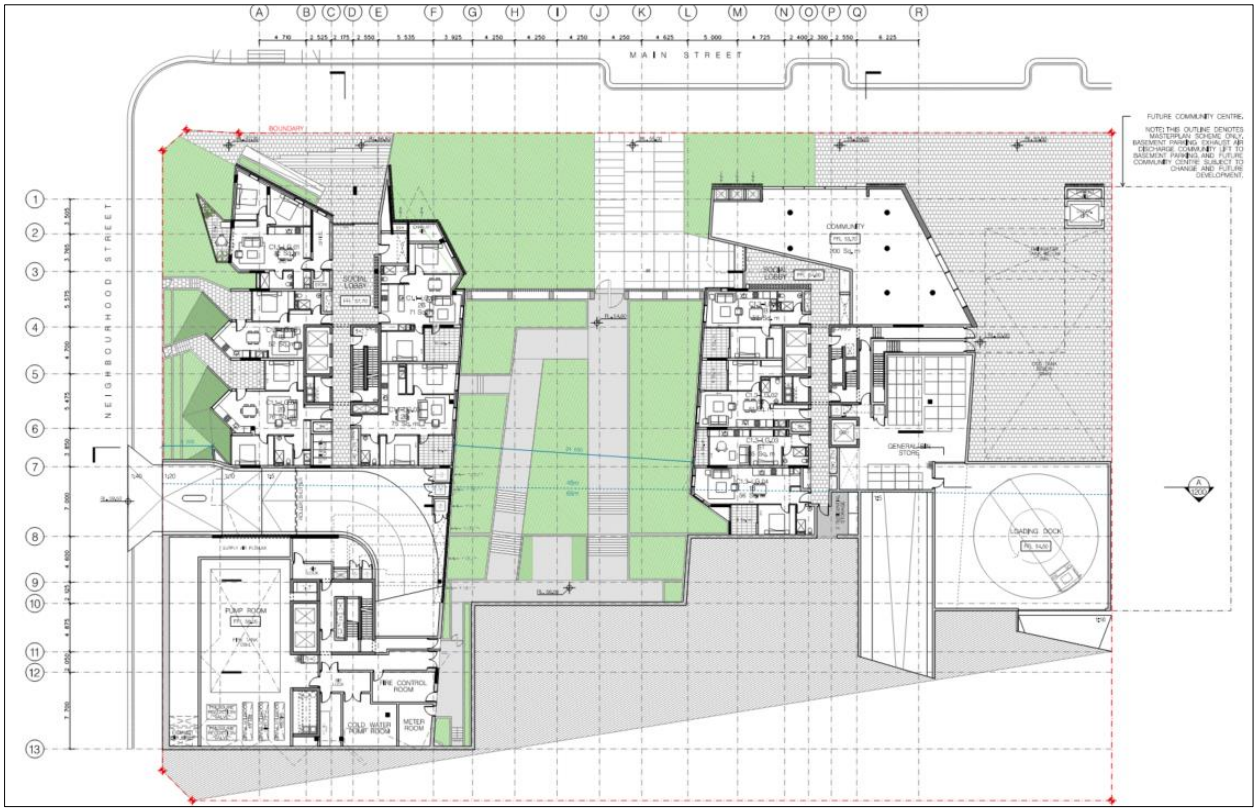

Figure 1: Proposal Site Plan – Lower Ground Floor

Figure 2: Proposal Site Plan – Upper Ground Floor

Table 1 (Building A1) and Table 2 (Building C1) provides a comparison between the approved development yield and the Proposal with respect to apartment yield and land use mix. For completeness of the assessment, we have included Building A1 in the mix.

Table 1: Site Land Use GFA Breakdown – Building A1 – No Change

Land Use	Approved Yield	Proposed Yield	Difference in Yield
Residential (Market) – Building A1			
Studio	7	7	-
1 Bed	111	111	-
2 Bed	141	141	-
3 Bed	10	10	-
4 Bed	-	-	-
Child Care Centre	75 Children	75 Children	-

Table 2: Site Land Use GFA Breakdown – Building C1 – Yield Modified

Land Use	Approved Yield	Proposed Yield	Difference in Yield
Residential (Market) – Building C1			
Studio	14	0	-14
1 Bed	61	41	-20
2 Bed	119	51	-68
3 Bed	14	11	-3
4 Bed	4	4	-
Residential (Social) – Building C1			
Studio	42	42	-
1 Bed	118	118	-
2 Bed	99	99	-
3 Bed	0	0	-
Residential (Affordable)			
Studio	0	54	+54
1 Bed	0	39	+39
2 Bed	0	36	+36
3 Bed	0	1	+1
Retail / Community	244m^2	200m^2	-44m^2
	Total Yield Difference		**Decrease of 105 Market Apartments** **Increase of 130 Affordable Apartments** **Net increase of 20 Apartments (Affordable)** **Reduction of 44m^2 GFA in community use**

Car Parking Assessment

Parking Requirements

Parking for the Proposal has been provided in accordance with the parking rate established in the and is summarised in **Table 3.**

Table 3: Proposal Car Parking Requirements – C1 only

Land Use	Yield	Parking Rate – as per approved rate of parking provision SSD-8903	Maximum Parking Requirement	Parking Provided
Residential (Market) – Building C1				
Studio	0	0 spaces per dwelling	0	0
1 Bed	41	0.6 spaces per dwelling	25	25
2 Bed	51	0.9 spaces per dwelling	46	46
3 Bed	11	1.4 spaces per dwelling	15	15
4 Bed	4	1.4 spaces per dwelling	6	6
Visitor	107	1 space per 20 units	5	6
Residential (Social) – Building C1				
Studio	42	0	0	0
1 Bed	118	0.6 spaces per dwelling	71	71
2 Bed	99	0.9 spaces per dwelling	89	89
3 Bed	0	1.4 spaces per dwelling	0	0
Visitor	259	1 space per 65 units	4	4
Residential (Affordable)				
Studio	54	0	0	0
1 Bed	39	0.6 spaces per dwelling	23	23
2 Bed	36	0.9 spaces per dwelling	32	32

3 Bed	1	1.4 spaces per dwelling	1	1
Visitor	130	1 space per 20 units	6	7
Community Use	2000m^2[1]	1 space / 100m^2	20	20
Car Share		1 space per 100 parking spaces and minimum of 50 spaces for overall Development[2]	Minimum 4 Maximum 50	30
Total			394	375

It is noted that the Affordable Housing and Housing for Seniors or People with a Disability SEPPs permit parking for the social housing at a minimum rate of 0.5 spaces per dwelling. On this basis, the parking proposed for the social dwellings is consistent with the requirements of the SEPP.

With reference to **Table 3**, the proposed car parking provision maintains the same rate of provision as approved in SSD-8903 for the dwelling component of the Stage 1 development. In addition, the proposal seeks the provision of car share in advance of future stages of the overall Ivanhoe Estate Development which formed part of the Concept Plan Approval (SSD-8707), and as such the Proposal is supportable in regard to parking provision.

Additional Parking Considerations

Motorcycle Parking

There is no requirement for the provision of motorcycle parking spaces established in either SSD-8707 or SSD-8903.

The Proposal will provide a total of 8 motorcycle parking spaces and considered supportable.

Bicycle Parking

Condition B81 of the SSD-8903 requires that bicycle parking be provided at a rate of 1 bicycle space per dwelling, with visitor bicycle parking spaces provided at a rate of 5% of the number of dwellings. Application of this rate to the 496 dwellings results in a requirement for 496 resident bicycle spaces plus 25 visitor bicycle parking spaces.

The Proposal will provide a total of 521 bicycle parking spaces and therefore compliance with the level of bicycle parking provision consistent with the rate of provision established in Condition B81 of SSD-8903.

Accessible Parking

[1] Subject to future DA for additional 1800m^2 of community use.
[2] As per Condition A18(k) of SSD-8707

Condition B73 requires that a minimum of 5% of dwellings be designed as Adaptable Dwellings.

The Proposal will provide a total of 14 accessible parking spaces.

Service Vehicles

No change is proposed to the loading arrangement proposed when compared to the approved development SSD-8903.

Traffic Generation

The forecast traffic generation of the Proposal references RMS Guide Update trip rates; **Table 3** provides a comparison of the approved traffic generation and proposed traffic generation of the Site further to the Proposal.

Table 4: Approved vs Proposed Traffic Generation

	Land Use	Yield	AM Peak		PM Peak	
			Trip Rate	Trips/hr	Trip Rate	Trips/hr
Approved	Market Dwellings	481	0.14 per unit	68	0.12 per unit	57
Approved	Social Dwellings	259	0.03 per unit	8	0.05 per unit	13
Approved	Child Care	75 Children	0.1 per child + 6 Staff	14	0.1 per child + 6 Staff	14
Approved	Ancillary Retail	525m^2	1 per 100m^2	5	1 per 100m^2	5
Approved	**Total Trip Generation**			**95**		**89**
Proposed	Market Dwellings	376	0.14 per unit	53	0.12 per unit	45
Proposed	Social Dwellings	259	0.03 per unit	8	0.05 per unit	13
Proposed	Affordable Units	130	0.12 per unit	16	0.10 per unit	13
Proposed	Community Use / Ancillary Retail	2,000m^2	1 per 100m^2	20	1 per 100m^2	20
Proposed	Child Care	75 Children	0.1 per child + 6 Staff	14	0.1 per child + 6 Staff	14
Proposed	**Total Trip Generation**			**111**		**105**
	Difference in Trip Generation			**+16**		**+16**

As shown in **Table 4**, the assessment forecasts that the Proposal would generate 16 trips more than the approved scheme in the respective AM and PM peak hours when compared to the approved development, which is a minor increase to the Stage 1 development and as such is supportable on traffic generation grounds.

Design Commentary

A comprehensive technical assessment of the revised Site plans indicates that the internal car parking layout, aisle roadways and loading are designed in accordance with the following relevant Australian Standards:

- AS2890.1:2004 for car parking areas;
- AS2890.2:2018 for loading areas; and
- AS2890.6:2009 for accessible (disabled) parking.

Based on the technical analysis, the following features of the proposed car parking areas are considered noteworthy:

- All resident parking spaces are provided in accordance with AS2890.1 for a Class 1A user, which requires a minimum space length of 5.4m, a minimum width of 2.4m and a minimum aisle width of 5.8m;
- The access ramp has been checked and are designed in accordance with AS2890.1;
- The loading space has been designed in accordance with AS2890.2 for a Medium Rigid Vehicle. The turntable has been afforded 500mm clearance in accordance with AS2890.2;
- All accessible parking spaces are provided in accordance with AS2890.6, which requires a space with a minimum space length of 5.4m, a clear width of 2.4m and located adjacent to a shared area of 5.4m long by 2.4m wide, with a bollard and hatch marking as required by AS2890.6; and
- All spaces located adjacent to obstructions greater than 150mm in height (including landscaping items) are provided with an additional width of 300mm.

The results of this analysis, which are presented on plans attached as **Attachment 1**, indicate that all necessary vehicular manoeuvres can be accommodated under the Proposal.

It is expected that any detailed construction drawings in relation to any modified areas of the car park or Site access would comply with these Standards. Furthermore, compliance with the above Standards already form the requirements of Conditions B77 and B78 of SSD-8903.

Conclusions

Further to a detailed assessment of the Proposal, Ason Group has concluded that:

- The car, motorcycle and accessible parking provided on-site are consistent with the Conditions of SSD-8903.
- The Proposal would generate an additional 16 vehicle trips for each of the AM and PM peak in comparison to the approved traffic generation.

- The proposed changes to the internal Site design will provide compliance with all relevant Australian Standards.

As such, Ason Group has determined that the Proposal is supportable on access, traffic and parking grounds.

We trust the above is of assistance. If you have any questions or should you wish to discuss further, please feel free to contact the undersigned.

Yours sincerely,

Principal Lead – Traffic Management & Operations – Ason Group
Email: dora.choi@asongroup.com.au

Attachment(s): *1) Swept Path Analysis*

Attachment 1

Our ref: PS106555-V-LTR-CA V01 Modified Stage 1 - Apartment Design Guide and Lift Provisioning Rev02

24 February 2021

Confidential

Robert Cauchi
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Robert,

Ivanhoe Stage 1 - Apartment Design Guide (ADG) Lift Provisioning

In response to the Planning, Industry and Environment letter dated 11th February 2021, reference 'Ivanhoe Estate redevelopment - Stage 1, Modification 2 (SSD-8903-Mod-2)'.

Modification Report We understand that ADG 4F-1 clause 2 states "for buildings of 10 storeys and over, the maximum number of apartments sharing a single lift is 40".

WSP have undertaken concept design for the lifts of the proposed Ivanhoe Stage 1 Building A1 and C1 development. Although the lift concept design does not strictly comply with ADG 4F-1 clause 2, it does meet international design criteria outlined by Chartered Institute of Building Services Engineers (CIBSE) and the design of similar buildings.

Based on our experience and supported by professional legal opinion and discussions on similar buildings, it has been established that the ADG is a guide and can be deviated from should calculations be provided to show that the lift concept design meets international benchmarks.

On this basis, the quantity of lifts prescribed by the ADG would be an over provision in this instance and therefore the ADG non-compliance is justified.

Yours sincerely

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National Lead

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