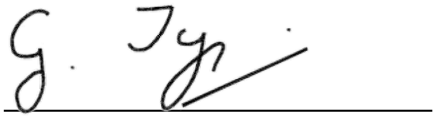
NAXOS
ENGINEERS

SITE BASED STORMWATER MANAGEMENT QUANTITY & QUALITY

PROPOSED UNIT (100) AND COMMERCIAL DEVELOPMENT
5 HERCULES ST, HAMILTON, 4007
LIMITLESS RESIDENTIAL NO.9 PTY LTD

ASSESSING AUTHORITY:	Economic Development Queensland
REPORT NUMBER:	C20-272 SBSMP Quantity & Quality
DATE PREPARED:	August 2022
APPLICATION No:	TBC

NAXOS ENGINEERS PTY LTD
ABN 65 613 555 687
PO Box 224, Spring Hill QLD 4004
1300 598 544
info@naxosengineers.com.au

DOCUMENTATION INFORMATION	
Publication Ref:	C20-272- SBSM – Quantity & Quality
Assessing Authority:	Economic Development Queensland
Application No.:	TBC
Address:	5 Hercules Street, Hamilton, QLD, 4007
Publication Date:	August 2022
Version Number:	Version 2
Version Author:	Sarah Donohoe
Authorised By	 Gregg Tyquin **RPEQ 1528**
Version Date:	8th August 2022

REVISION / CHECKING				
RE	ISSUE DATE	ISSUED BY	REVIEWED BY	REVISION TYPE
1	01.08.2022	Sarah Donohoe	Gregg Tyquin	Issue for DA Submission
2	08.08.2022	Sarah Donohoe	Gregg Tyquin	Minor Amendments

1.0 TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

2.0 INTRODUCTION

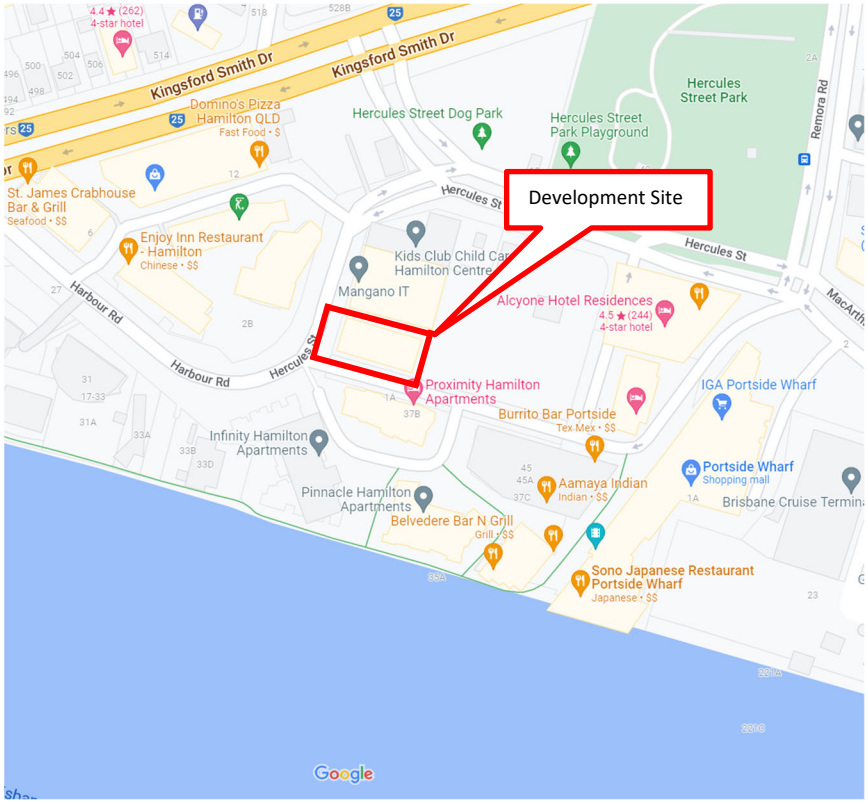
Naxos Engineers Pty Ltd has been engaged by our client Limitless Residential No.9 Pty Ltd. to prepare a Site-Based Stormwater Management Report for the proposed development at 5 Hercules Street, Hamilton, QLD, 4007. This Report will form part of the development application which will be submitted to Economic Development Queensland (EDQ) as supporting documentation for the proposed development.

2.1. AVAILABLE INFORMATION

- Detailed Survey Prepared By Bennet & Francis Pty Ltd, Ref No.: 022465.01 (Appendix A)
- Council eBiMAP2 Search Documentation (Appendix B)
- Brisbane City Council Floodwise Report (Appendix C)
- Brisbane City Council Interactive Mapping (Appendix D)
- Architectural drawings prepared by Plus Architecture, Ref No.: 70526 (Appendix E)

2.2. LOCALITY PLAN

Figure 2-1 SITE LOCATION



3.0 SCOPE OF REPORT

This Report will address the following stormwater issues:

- Identify the location of the lawful discharge points for the development,
- Prepare a stormwater concept plan for the proposed development,

STORMWATER QUANTITY

- Identify the increase in stormwater runoff that will be generated by the development (if any),
- If required identify management strategies to ensure that stormwater discharge from the development is maintained at pre-development flows for all storm events up to and including Q100, and
- Identify the location of the lawful discharge points for the development and demonstrate that the proposed stormwater discharge will not adversely affect the downstream properties and drainage systems.

STORMWATER QUALITY

- Identify the development sites classification (high or low risk) and the relevant planning policies and guidelines that the development must comply with,
- If applicable, identify Water Quality Objective.
- Identify a suitable "stormwater treatment train" aimed to comply with the set Water Quality Objectives.
- If applicable, demonstrate compliance to the determined Water Quality Objectives with the use of "Model for Urban Stormwater Improvement Conceptualisation" Software (MUSIC Version 6.0.1).
- Prepare a conceptual stormwater layout highlighting all stormwater quality treatment devices proposed for this development.
- Provide details on monitoring and maintenance requirements for all stormwater treatment devices incorporated within this development.

EROSION AND SEDIMENT CONTROL

- Provide details of an Erosion and Sediment Control Management Plan which can be developed at the later stage during Operational Work.

4.0 SITE CHARACTERISTICS

4.1. LOCATION

The development site is located approximately 6km North-East of the Brisbane City CBD. The site address is 5 Hercules Street, Hamilton, QLD, 4007 and is formally described as Lot 1 on SP 231749.

4.2. SITE DESCRIPTION

The development site in its current state slopes from the Eastern to Western Side towards Hercules Street. The total development site area is approximately 1382m² and has an average grade of 0.1%.

Refer to Appendix A for Detail Survey.

Figure 4-2 AERIAL PHOTOGRAPH

4.3. EXISTING LAND USE

The existing use for Lot 1 on SP 231749 is a single storey, slab on ground brick office and warehouse. There is no on-site allocated parking however there is street parking located along Hercules Street. The majority of the site extents consists of the building footprint and roof coverage with the remainder of the site consisting of concrete hardstand.

Refer to Appendix A for Detailed Site Survey

The existing developments catchment area consist of the following areas (Refer to table below).

Table 4-1 PRE-DEVELOPMENT STORMWATER CATCHMENT AREAS

Pre-Development Stormwater Catchment Areas - Total Site Area (1382m^2)		
Impervious Area	1382 m^2	100 %
Pervious Area	0 m^2	0 %

4.4. EXISTING STORMWATER DISCHARGE

Based on available information from Council, detailed survey undertaken for the site and on screen review, it appears that the existing buildings stormwater runoff collected from roofed areas are conveyed into roof water downpipes. The Stormwater is then discharged to the sites lawful point of discharge of existing kerb and channel located on Hercules Street which ultimately discharges into existing Gully Pit K18155876. Stormwater runoff over the rest of the site sheet flows over the natural/existing surface and discharges into the kerb and channel located on Hercules Street.

Refer to the Figures below for Street Views of the proposed development site which also highlight the existing stormwater infrastructure.

It is also noted the site is affected by numerous flood sources. Refer Section 3.5 below for further details.

Refer to Appendix B for Brisbane City Council e-BiMap2, Appendix C for FloodWise Property Report and Appendix D for BCC interactive mapping.

Figure 4-3 HERCULES STREET – SITE FRONTAGE - STREET VIEW – GOOGLE MAPS

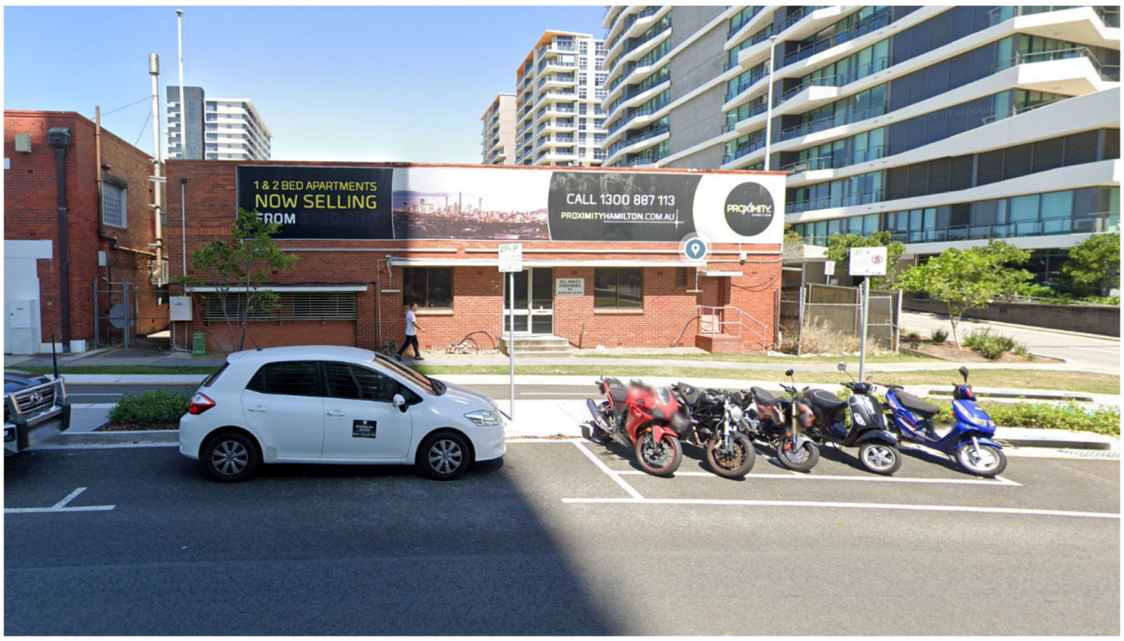
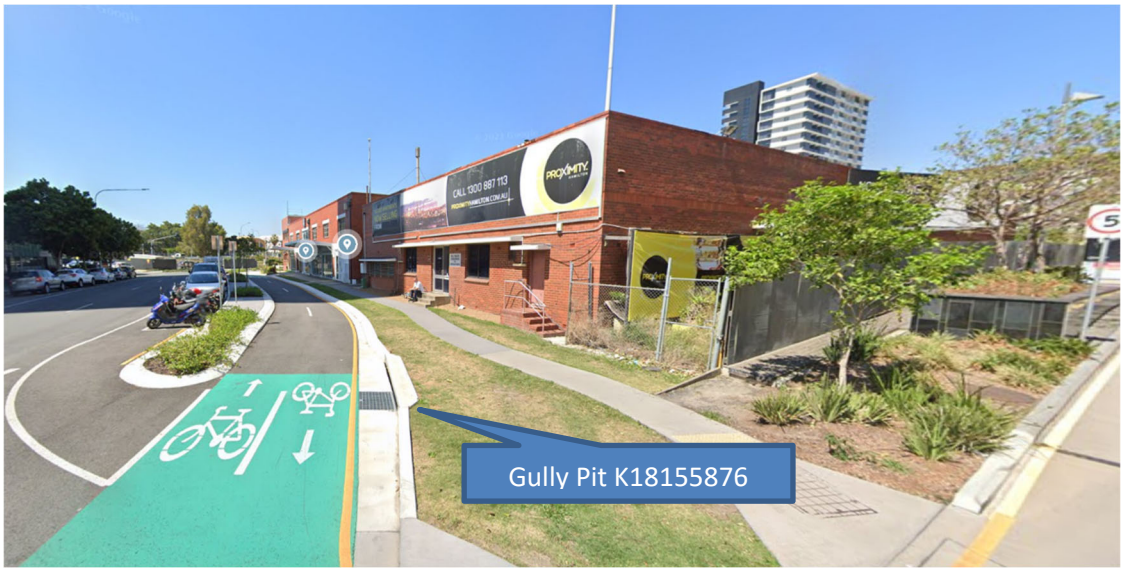


Figure 4-4 HERCULES STREET – SITE FRONTAGE AND DRAINAGE - STREET VIEW – GOOGLE MAPS

Figure 4-5 HERCULES STREET – DRAINAGE - STREET VIEW – GOOGLE MAPS



5.0 PROPOSED SITUATION

5.1. PROPOSED LAND USE

The proposal is to demolish the existing structure/s and infrastructure located on the existing site. Once demolition is completed, the proposal is to construct a new 24 storey, 2 basement development. The proposed development which will consist of 100 residential units and 445m² of non-residential uses.

The proposed development will consist of a total of five (5) levels of parking. Two (2) of which are basement carpark levels with the remaining parking located on Levels 1, 2 and 3.

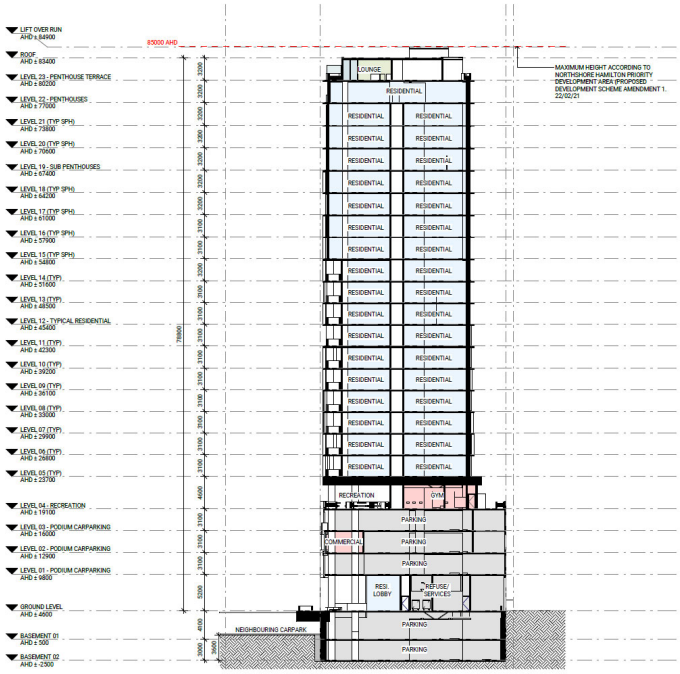
The proposed ground floor is mixed with Commercial and Residential Foyer areas and retail tenancies. Residential Units are located on Level 5 upwards to Level 24.

Common recreation areas for residents are provided on Level 4 and the Rooftop Terrace.

Retail Tenancies are located on Ground Floor and Commercial Tenancies are provided on Levels 1, 2 and 3 with a total of 445m² of non-residential floor area.

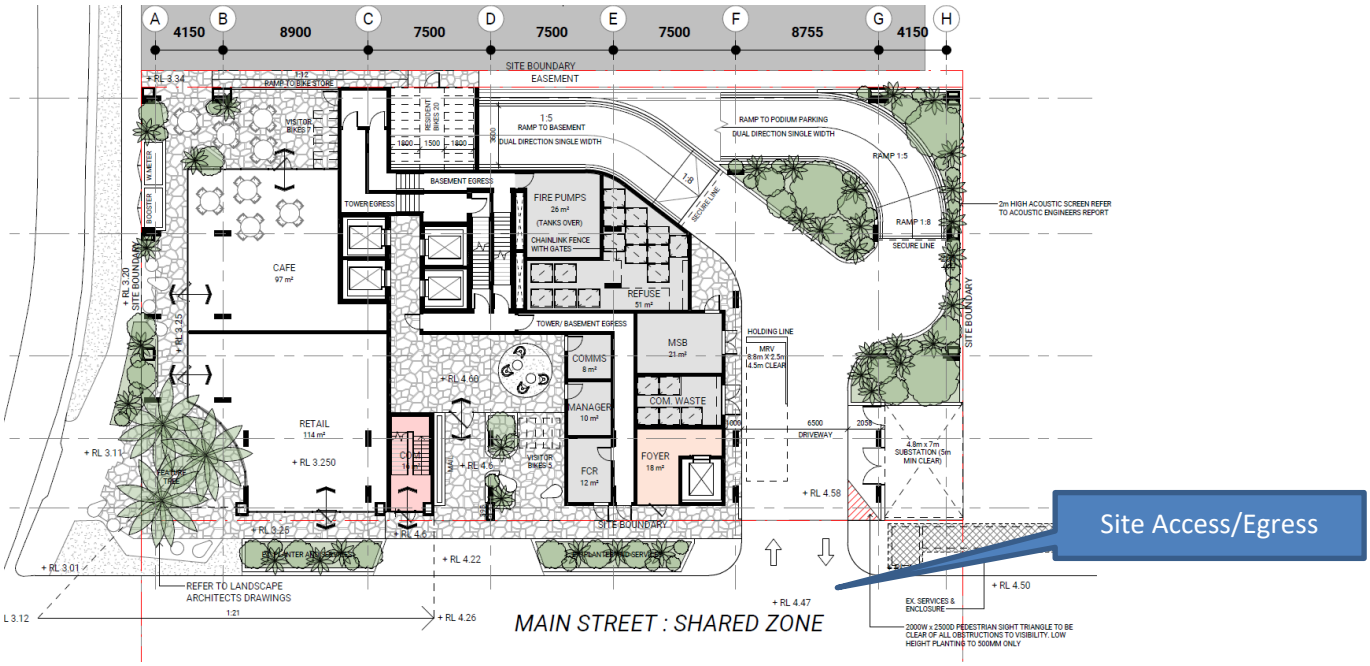
Refer Figure below for section view of the proposed development at the time of this report.

Figure 5-6 PROPOSED BUILDING SECTION B



Site access is proposed to be via Main Street which is a shared vehicular access with the adjacent development as shown in the Figure Below. It is noted that the site access is secured by access easement rights over main street.

Figure 5-7 PROPOSED SITE ACCESS



Majority of the proposed development site is Impervious with the remainder of the site being open to the sky for landscaping and deep planting. For the Post-Development Stormwater catchment properties refer to the table below.

Refer Appendix E for Architectural Plans.

Table 5-2 POST-DEVELOPMENT AREAS

Post-Development Stormwater Catchment Areas – Total Site Area (1382m^2)		
Impervious Area	1335 m^2	96.6 %
Pervious Area	47 m^2	3.4 %

5.2. DEVELOPED STORMWATER DISCHARGE

The proposed development has an impervious area of approximately 96.6% and comprises of roof, hardstand and pavement areas. The remaining area of the proposed development site is considered pervious and consists of approximately 3.4%. The pervious area is predominantly open space and consists of landscaping and deep planting.

Runoff from the proposed development roof areas shall be captured by a series of gutters and downpipes and be directed to the sites internal stormwater drainage system which directs the flows to the sites nominated lawful point of discharge on Hercules Street.

The un-roofed driveway and ground areas are to be captured by a series of field inlet pits fitted with Ocean Guard 200 filter baskets by Ocean Protect (or approved equivalent) prior to discharging to the sites nominated Lawful Point of Discharge being an existing Gully Pit (K18155876) located adjacent to the site along Hercules Street as shown in Figure 3-5. The internal drainage is to be designed by the Hydraulic Consultant during the operational works phase.

The Ocean Guard 200 Filter Baskets (or approved equivalent) will aid in removal of nutrients, gross pollutants and total suspended solids.

To promote sustainability, it is recommended that rainwater re-use tanks be utilised to harvest collected water from the roof areas for re-use in landscaping.
Refer to Appendix F for Concept Stormwater Drainage Plans for details.

5.3. BRISBANE CITY COUNCIL (BCC) FLOODWISE REPORT AND INTERACTIVE MAPPING SUMMARY

The proposed development site is affected by flooding. The extents of the flooding are highlighted in the Brisbane City Council (BCC) FloodWise Property Report (Appendix C) and BCC Interactive mapping (Appendix D). An extract of the FloodWise Property Report is shown in the table below.

Table 5-3 PROPERTY INFORMATION SUMMARY

Description	Level (mAHD)	Source
20% AEP	1.9	Stormtide
5% AEP	2.1	Stormtide
2% AEP	2.2	Stormtide
1% AEP	2.5	Stormtide
1% AEP	2.2	River
RFL*	2.2	River
DFL **	2.5	-

*Residential Flood Level

** Defined Flood Event Level

The above table indicates that during a 1% AEP flood event the minimum Stormtide level is 2.5mAHD and the minimum River level is 2.2mAHD. It is noted that the FloodWise Property Report indicates that the site is also affected by a Medium Storm Tide Inundation event. Refer to the FloodWise Property Report in Appendix C for additional information.

It is also noted that the site is affected by flooding that is highlighted in the BCC interactive mapping. The below image indicates that a significant surface area of the proposed development site is affected by the Brisbane River Flood event as shown in Appendix D.

Figure 5-8 BRISBANE RIVER FLOOD EXTENTS

5.1. LAND USE COMPATIBILITY WITH FLOOD HAZARD

The below table uses the Brisbane City Council City Plan 2014 to analyse the results from the FloodWise Property Report (Appendix C) and the results from the Interactive mapping (Appendix D).

Table 5-4 FLOOD OVERLAY SUB-CATEGORIES

Flood Overlay Sub-Categories	Applicable
Brisbane River flood planning area 1 sub-category	NO
Brisbane River flood planning area 2a sub-category	NO
Brisbane River flood planning area 2b sub-category	NO
Brisbane River flood planning area 3 sub-category	NO
Brisbane River flood planning area 4 sub-category	YES
Brisbane River flood planning area 5 sub-category	NO
Creek/waterway flood planning area 1 sub-category	NO
Creek/waterway flood planning area 2 sub-category	NO
Creek/waterway flood planning area 3 sub-category	NO
Creek/waterway flood planning area 4 sub-category	NO
Creek/waterway flood planning area 5 sub-category	NO
Overland flow flood planning area sub-category	NO

It is noted from the FloodWise Property Report that the proposed development site is affected by the Brisbane River Flood Planning Area 4.

Below is an abstract from Brisbane City Council's City Plan 2014 Part 8 Overlay Codes, Sub-Category 2.11 Flood Overlay Code, Table 8.2.11.3.C – *Land Use Compatibility with Flood Hazard* which determines the compatibility with the flood hazard type based upon the proposed development land use which are shown below in Table 4-5.

The proposed development is of Mixed use as highlighted in Section 4.1 above.
Ground Floor to Level 03 are of non-residential uses and are classed as *Commercial/Office Development (4 stories)* which under the Building Code of Australia (BCA) is classified as a Building Classification of 5.

The residential tenancies are classified as "Multiple Dwelling" in table 5-5 below.

Table 5-5 LAND USE COMPATIBILITY WITH FLOOD HAZARD

Industry Land Use	Brisbane River flood planning area						Creek/Waterway flood Planning area					Overland flow flood planning area
Sub-Category	5	4	3	2B	2A	1	5	4	3	2	1	# or C
Commercial/Office (4 Storeys) (BCA Building Class 5)	C	C	#	#	#	#	C	#	#	#	#	C
Carpark ancillary to another use	C	C	C	C	C	#	C	C	#	#	#	C
Multiple Dwelling (4+Stories)	C	C	C	#	#	#	C	#	#	#	#	C

C – Land use is compatible with the flood hazard subject to meeting all other relevant requirements.

– Flood risk assessment in accordance with requirements of the Flood planning scheme policy is required to demonstrate the use is compatible with the flood hazard.

As detailed in the table above the proposed Commercial/Office Development and residential tenancies are compatible with Flood Hazards subject to meeting all other relevant flood requirements. The other Flood Requirements are addressed in the following sections of this Report.

5.2. REQUIRED FLOOD IMMUNITY LEVELS FOR BRISBANE RIVER FLOODING

Based on Brisbane City Council's City Plan 2014 Part 8 Overlay Codes, Sub-Category 2.11 Flood Overlay Code Table 8.2.11.3.D – *Flood Planning Categories for development types* the following categories required for the proposed development are shown below in Table 5-6. Note that Table 5-6 is to be read in conjunction with Table 5-7.

Table 5-6 FLOOD PLANNING CATEGORIES

BCA building classification	Development types and design levels, assigned design floor or pavement levels	Category – refer to Table 8.2.11.3.L for flood planning levels
Class 1 - 4	Habitable Room	Category A
	Non-habitable room including patio and courtyard	Category B
	Non-habitable part of a Class 2 or Class 3 building excluding the essential services control room	Category B Risk management approach to Brisbane River flooding is permitted (refer to Flood planning scheme policy)
	Parking located in the building undercroft of a multiple dwelling	Category C
	Carport, unroofed car park; vehicular manoeuvring area	Category D
	Essential electrical services of a Class 2 or Class 3 building only	Category A
	Basement parking entry	Category C + 300mm
Class 5, Class 6, or Class 8	Building floor level	Category C Risk management approach to Brisbane River flooding is permitted (refer to Flood planning scheme policy)
	Garage or car park located in the building undercroft	Category C
	Carport or unroofed car park	Category D
	Vehicular access and manoeuvring areas	Category D
	Basement parking entry	Category C
	Essential electrical services	Class 5 & 6 – Category A
Class 7a	Refer to the relevant building class specified in this table	
Class 7b	Building floor level	Category C

		Risk management approach to Brisbane River flooding is permitted (refer to Flood planning scheme policy)
	Vehicular access and manoeuvring area	Category D
	Essential electrical services	Category C
Class 9	Building floor level	Category A
	Building floor level for habitable rooms in Class 9a or 9c where for a residential care facility	0.2% AEP flood
	Building floor level for a habitable rooms in Class 9b where involving children, such as a child care centre	0.2% AEP flood
	Garage or car park located in the building undercroft	Category C
	Carport or unroofed car park	Category D
	Vehicular access and manoeuvring areas	Category D
	Essential electrical services	Category A
Class 10a	Car parking facility	Refer to the relevant building class specified in this table
	Shed or the like	Category D
Class 10b	Swimming Pool	Category E
	Associated mechanical and electrical pool equipment	Category C
	Other Structures	Flood planning levels do not apply

Based on Brisbane City Council's (BCC) *Brisbane City Plan 2014* Part 8 Overlay Codes, Sub-Category 2.11 Flood Overlay Code Table 8.2.11.3.L – *Category of flood planning levels*, the following flood levels are required for the proposed development.

Noting Table 5-7 is to be read in conjunction with Table 5-6.

Table 5-8 and Table 5-9 is to be read in conjunction with Table 5-7.

Table 5-7 CATEGORIES OF FLOOD PLANNING LEVELS – BRISBANE RIVER

Flooding Source	Minimum design floor or pavement levels (m AHD) (refer to Table 8.2.11.3.D for assignment of these categories)				
	Category A	Category B	Category C	Category D	Category E
Brisbane River	RFL + 500mm	RFL + 300mm	DFL	5% AEP flood level	5% AEP flood level
Creek / Waterway	1% AEP flood level + 500mm	1% AEP flood level + 300mm	1% AEP flood level	1% AEP flood level	5% AEP flood level
Overland Flow	2% AEP flood level +500mm	2% AEP flood level + 300mm	2% AEP flood level	2% AEP flood level	5% AEP flood level

Class 1-4 (Residential)

Table 5-8 BRISBANE RIVER MINIMUM DESIGN LEVELS – CLASS 1-4 (RESIDENTIAL)

BCA building classification Class 1-4	Development types and design levels, assigned design floor or pavement levels	Minimum Design Level (m AHD) from Table above	Input Levels (m AHD)	Output (m AHD)
Habitable Room	Category A	RFL + 500m	2.2 + 0.5	2.7
Non-habitable room including patio and courtyard	Category B	RFL + 300m	2.2 + 0.3	2.5
Non-habitable part of a Class 2 or Class 3 building excluding the essential services control room	Category B Risk management approach to Brisbane River flooding is permitted (refer to Flood planning scheme policy)	RFL + 300m	2.2 + 0.3	2.5
Parking located in the building undercroft of a multiple dwelling	Category C	DFL	2.5	2.5
Carport, unroofed car park; vehicular manoeuvring area	Category D	5% AEP flood level	2.1	2.1
Essential electrical services of a Class 2 or Class 3 building only	Category A	RFL + 500mm	2.2 + 0.5	2.7
Basement parking entry	Category C + 300mm	DFL+ 300mm	2.5 + 0.3	2.8

Refer Table 5-3 for the Flood Level Inputs for the above table.

Class 5, 6 or 8 (Commercial / Retail)

Table 5-9 BRISBANE RIVER MINIMUM DESIGN LEVELS – CLASS 5, 6 OR 8 (COMMERCIAL / RETAIL)

BCA building classification Class 1-4	Development types and design levels, assigned design floor or pavement levels	Minimum Design Level (m AHD) from Table above	Input Levels (m AHD)	Output (m AHD)
Building floor level	Category C Risk management approach to Brisbane River flooding is permitted (refer to Flood planning scheme policy)	DFL	2.5	2.5
Garage or car park located in the building undercroft	Category C	DFL	2.5	2.5
Carport or unroofed car park	Category D	5% AEP flood level	2.1	2.1
Vehicular access and manoeuvring areas	Category D	5% AEP flood level	2.1	2.1
Basement parking entry	Category C	DFL	2.5	2.5
Essential electrical services	Class 5 & 6 – Category A	RFL + 500mm	2.2 + 0.5	2.7

Refer Table 5-3 for the Flood Level Inputs for the above table.

5.3. REQUIRED FLOOD IMMUNITY LEVELS FOR MEDIUM STORM TIDE INUNDATION

Based on Brisbane City Council's (BCC) *Brisbane City Plan 2014* Part 8 Overlay Codes, Sub-Category 2 Overlay Codes, 8.2.6 Costal hazard overlay code Table 8.2.6.3.C – *Categories of flood planning levels*. The following flood levels are to be analysis and compared to the results from Table 5-7.

Table 5-10 CATEGORIES OF FLOOD PLANNING LEVELS – MEDIUM STORM-TIDE INUNDATION

Flooding Source	Minimum design floor or pavement levels (m AHD) (refer to Table 8.2.11.3.D for assignment of these categories)				
	Category A	Category B	Category C	Category D	Category E
Storm-tide flooding within the: High storm-tide inundation area sub-category; or Medium storm-tide inundation area sub-category	3.1m AHD + 0.5m (1% AEP level at 2100 + 0.5m)	3.1m AHD + 0.3m (1% AEP level at 2100 + 0.3m)	3.1m AHD (1% AEP level at 2100)	2% AEP level	2% AEP level

The above table highlights the Medium Storm-tide inundation area sub-category and minimum required levels for specific building categories those values are as follows:

Table 5-11 MEDIUM STORM-TIDE INUNDATION MINIMUM DESIGN LEVELS

Category	Minimum Design Level (m AHD)	Output (m AHD)
A	3.1 + 0.5m	3.6
B	3.1 + 0.3m	3.4
C	3.1	3.1
D	2% AEP	2.2
E	2% AEP	2.2

The above output values have been used in the tables below.

Class 1-4 (Residential)

Table 5-12 MEDIUM STORM-TIDE INUNDATION DESIGN LEVELS – CLASS 1-4 (RESIDENTIAL)

BCA building classification Class 1-4	Development types and design levels, assigned design floor or pavement levels	Input Level (m AHD)	Output (m AHD)
Habitable Room	Category A	3.6	3.6
Non-habitable room including patio and courtyard	Category B	3.4	3.4
Non-habitable part of a Class 2 or Class 3 building excluding the essential services control room	Category B Risk management approach to Brisbane River flooding is permitted (refer to Flood planning scheme policy)	3.4	3.4
Parking located in the building undercroft of a multiple dwelling	Category C	3.1	3.4
Carport, unroofed car park; vehicular manoeuvring area	Category D	2.2	2.2
Essential electrical services of a Class 2 or Class 3 building only	Category A	3.6	3.6
Basement parking entry	Category C + 300mm	3.1 + 0.3	3.4

Class 5, 6 or 8 (Commercial / Retail)

Table 5-13 MEDIUM STORM-TIDE INUNDATION MINIMUM DESIGN – CLASS 5, 6 OR 8 (COMMERCIAL / RETAIL)

BCA building classification Class 1-4	Development types and design levels, assigned design floor or pavement levels	Input Levels (m AHD)	Output (m AHD)
Building floor level	Category C Risk management approach to Brisbane River flooding is permitted (refer to Flood planning scheme policy)	3.1	3.1
Garage or car park located in the building undercroft	Category C	3.1	3.1
Carport or unroofed car park	Category D	2.2	2.2
Vehicular access and manoeuvring areas	Category D	2.2	2.2
Basement parking entry	Category C	3.1	3.1
Essential electrical services	Class 5 & 6 – Category A	3.6	3.6

5.4. REQUIRED FLOOD IMMUNITY LEVEL COMPARISON – BRISBANE RIVER VS MEDIUM STORM TIDE INUNDATION

Class 1-4 (Residential)

Table 5-14 COMPARISON OF FLOOD IMMUNITY LEVELS – CLASS 1-4 (RESIDENTIAL)

BCA building classification Class 1-4	Development types and design levels, assigned design floor or pavement levels	Brisbane River Minimum Level (m AHD)	Medium Storm-Tide inundation Minimum Level (m AHD)	Adopted Level (m AHD)
Habitable Room	Category A	2.7	3.6	**3.6**
Non-habitable room including patio and courtyard	Category B	2.5	3.4	**3.4**
Non-habitable part of a Class 2 or Class 3 building excluding the essential services control room	Category B Risk management approach to Brisbane River flooding is permitted (refer to Flood planning scheme policy)	2.5	3.4	**3.4**
Parking located in the building undercroft of a multiple dwelling	Category C	2.5	3.4	**3.4**
Carport, unroofed car park; vehicular manoeuvring area	Category D	2.1	2.2	**2.2**
Essential electrical services of a Class 2 or Class 3 building only	Category A	2.7	3.6	**3.6**
Basement parking entry	Category C + 300mm	2.8	3.4	**3.4**

The above table is a comparison of the Brisbane River and Medium Storm-tide inundation minimum design flood levels. The highest minimum design levels have been adopted to ensure that minimum flood build requirements are met. From the table above the design levels for the Medium Storm-tide inundation values have been adopted for categories A, B, C and D for Residential Tenancies.

Class 5, 6 or 8 (Commercial / Retail)

Table 5-15 MEDIUM STORM-TIDE INUNDATION MINIMUM DESIGN – CLASS 5, 6 OR 8 (COMMERCIAL / RETAIL)

BCA building classification Class 1-4	Development types and design levels, assigned design floor or pavement levels	Brisbane River Minimum Level (m AHD)	Medium Storm-Tide inundation Minimum Level (m AHD)	Adopted Level (m AHD)
Building floor level	Category C Risk management approach to Brisbane River flooding is permitted (refer to Flood planning scheme policy)	2.5	3.1	**3.1**
Garage or car park located in the building undercroft	Category C	2.5	3.1	**3.1**
Carport or unroofed car park	Category D	2.1	2.2	**2.2**
Vehicular access and manoeuvring areas	Category D	2.1	2.2	**2.2**
Basement parking entry	Category C	2.5	3.1	**3.1**
Essential electrical services	Class 5 & 6 – Category A	2.7	3.6	**3.6**

The above table is a comparison of the Brisbane River and Medium Storm-tide inundation minimum design flood levels. The highest minimum design levels have been adopted to ensure that minimum flood build requirements are met. From the table above the design levels for the Medium Storm-tide inundation values have been adopted for categories A, C and D for Commercial / Retail Tenancies.

6.0 STORMWATER QUANTITY: RATIONAL METHOD

6.1. STORMWATER ANALYSIS

The 'Rational Method' was utilised to calculate the peak stormwater discharge for a series of storm events ranging from Q1 to Q100.

The following sections summarise the input values used within the 'Rational Method' and the corresponding peak discharge flows for both pre-development and post-development (Un-mitigated) scenarios.

Supporting 'Rational Method' calculations can be found in Appendix F.

6.2. PRE-DEVELOPMENT

The Rational Method (in accordance with QUDM and Brisbane City Council's City Plan 2014 Chapter 7 – Stormwater Drainage) has been used to assess pre-development stormwater discharge.
The following parameters have been adopted:

Time of Concentration: 5 mins. (based off QUDM – Section 4.6)
Run-off Co-efficient C10: 0.9 (based on QUDM – Table 4.5.3)
Total Area (m²): 1382
Impervious Area (m²): 1382
Impervious Site Area (%): 100

Table 6-16 PRE-DEVELOPMENT DISCHARGE

ARI (yr)	C	I (mm/hr)	Pre-Development Discharge (m3/s)
1	0.720	113	0.031
2	0.765	127	0.037
5	0.855	174	0.057
10	0.900	205	0.071
20	0.945	236	0.086
50	1.000	276	0.106
100	1.000	306	0.117

6.3. POST-DEVELOPMENT

The Rational Method (in accordance with QUDM and Brisbane City Council's City Plan 2014 Chapter 7 – Stormwater Drainage) has been used to assess post-development stormwater discharge.

The following parameters have been adopted:

Time of Concentration: 5 mins. (based on QUDM – Section 4.6)

Run-off Co-efficient C10: 0.89 (based on QUDM – Table 4.5.3)

Total Area (m^2): 1382

Impervious Area (m^2): 1335

Impervious Site Area (%): 96.6

Pervious Area (m^2): 47

Pervious Site Area (%): 3.4

Table 6-17 POST-DEVELOPMENT DISCHARGE

ARI (yr)	C	I (mm/hr)	Post-Development Discharge (m3/s)
1	0.704	113	0.031
2	0.748	127	0.037
5	0.836	174	0.056
10	0.880	205	0.070
20	0.924	236	0.085
50	1.000	273	0.106
100	1.000	306	0.117

6.4. PRE-DEVELOPMENT vs POST-DEVELOPMENT (UN-MITIGATED)

A comparison of pre-development and post-development discharge flow rates (un-mitigated) from the development site highlights the net increase in post-development flows as noted below.

Table 6-18 PRE-DEVELOPMENT vs POST-DEVELOPMENT (UN-MITIGATED)

ARI Storm Event (yr)	Pre-Developed Conditions (m3/s)	Post-Development Conditions (m3/s)	Difference +/- (m3/s)
1	0.031	0.031	0.000
2	0.037	0.037	0.000
5	0.057	0.056	- 0.001
10	0.071	0.070	- 0.001
20	0.086	0.085	- 0.001
50	0.106	0.106	0.000
100	0.117	0.117	0.000

The table above indicates a minimal decrease in stormwater discharge from Pre to Post Development. In accordance with the Brisbane City Council City Plan 2014: V24.00/2022, Section *7.5.2 When to provide stormwater detention*, Section 3 Stormwater detention requirements may be waived where: *e) for infill development only, the development site has an existing actual impervious fraction greater than 60%.*

As shown in Table 4-1 PRE-DEVELOPMENT STORMWATER CATCHMENT AREAS the Actual Pre-Development Fraction Impervious is 100%. Therefore no on-site detention is proposed.

The proposed developments lawful point of discharge is the existing Gully Pit (K18155876) located along the Hercules Street site frontage (As per existing conditions).

Refer to Appendix F for Concept Stormwater Drainage Plans for details.

7.0 STORMWATER QUALITY

7.1. SITE CLASSIFICATION

The implementation of a suitable stormwater management plan for the proposed development is determined from the following:

- Identify if compliance with the State Planning Policy is required, or
- Implement Best Management Practice Guidelines for low risk sites as per local authority development guidelines.

Either compliance objective will still be designed based on the following key principles:

- The use of Water Sensitive Urban Design (WSUD) principles are to be adopted throughout the site where possible,
- Water Quality controls are to be considered under two separate phases of the development, the construction phase and the operational phase,
- The construction phase requires the assessment of the site during the construction and maintenance period of the development.
- The operational phase requires assessment of the site over the total life of the site and its water quality control measures.

7.2. STATE PLANNING POLICY ASSESSMENT

To determine whether compliance with the State Planning Policy 2017, Healthy Waters is required, it is required to undertake the State Planning Policies Checklist. Below is an extract from section 2.7 in table format. If any of the trigger questions are answered Yes, then compliance is expected with the State Planning Policy. If all trigger questions are answered No, then stormwater quality best management practices will be adopted.

Table 7-19 STATE PLANNING POLICY CHECKLIST – FOR RECEIVING WATERS

Development Application Types					
Material Change in Use MCU	Yes / No?	Reconfiguration of Lots ROL	Yes / No?	Operational Works	Yes / No?
A material change of use for an urban purpose that involves premises 2500m^2 or greater in size? **AND,** If yes:	NO	Reconfiguring a lot for an Urban purpose that involves premises 2500m2 or greater in size AND will result in six or more lots? OR	NO	Operational Works for an urban purpose that involves disturbing a land area 2500m²	NO
Will result in six or more dwellings; OR	N/A	Operational work for an urban purpose that involves disturbing a land area 2500m^2 or greater in size?	NO		
Will result in an impervious area greater than 25% of the NET development area?	N/A				

As demonstrated in the table above, none of the questions have answered 'Yes', therefore Naxos Engineers has identified that the development is deemed 'Low Risk' and will adopt a stormwater quality best practice approach as per section 3.9 of the Northshore Hamilton Urban Development Area Development Scheme July 2009.

7.3. POLLUTANT CONCERNS

The pollutants of concern are summarised below. These pollutants can have adverse environmental impacts within the downstream catchment. It is proposed to adopt Site-Based Water Sensitive Urban Design to provide capture and treatment to the below mentioned pollutants.

Table 7-20 TYPICAL POLLUTANTS

POLLUTANT	SOURCE
LITTER	PAPER, CONSTRUCTION PACKAGING, FOOD WASTE, CEMENT, OFF - CUTS
SEDIMENT	UNPROTECTED EXPOSED SOILS, STOCKPILES, EROSION
HYDROCARBONS	FUEL AND OIL SPILLS, LEAKS FROM MACHINERY
TOXIC MATERIALS	CEMENT SLURRY, ASHPALT PRIMER, SOLVENTS, CLEANING AGENTS
PH ALTERING SUBSTANCES	ACID SULPHATE SOILS, CEMENT SLURRY, WASH WATER
THERMAL POLLUTION	VEHICLES AND MACHINERY, INCREASED IMPERVIOUS AREAS

7.4. CONSTRUCTION PHASE

During the construction phase, the potential exists for significant increases in the amount of pollutants, particularly sediment, escaping from the site. During this period, an Erosion and Sediment Control Plan is required to be prepared as part of the overall Environmental Management Plan prepared for the construction phase.

An Erosion and Sediment Control Plan will be prepared during the detailed design phase of the development. This plan will be prepared in accordance with Local Authority Guidelines and with recognised industry standards. This plan may also be submitted to EDQ.

7.5. OPERATIONAL PHASE

As the premises less than 2,500m² in size, selection of appropriate Stormwater Quality Best Management Practices (SQBMP) is essential to improve stormwater quality through the prevention, minimisation and/or trapping of pollutants.

7.6. WATER QUALITY OBJECTIVES

Specific water quality objectives need not be identified for this development as the premises is less than 2,500m² in size, the development has been identified as 'low risk' for water quality. Understanding the expected pollutants for this type of development will assist in selection of which types of practices will be appropriately implemented for the pollutants of concern.

8.0 STORMWATER QUALITY BEST MANAGEMENT PRACTICES

8.1. SELECTION OF SQBMP's

There exist a number of publications describing the different types, functions, applications, and performance of many SQBMP's. Water Sensitive Urban Design should be used to look at the integration of SQBMP's within any Stormwater Quality Management Plan. Some of the more typical SQBMP's are listed in the below table for consideration.

Table 8-21 TYPICAL SQBMP'S

STORMWATER QUALITY BEST MANAGEMENT PRACTICES	
Treatment Device / Practice	Benefits
Site Maintenance	Reduce the amount of gross pollutants and sediment runoff generated by the development by maintaining vegetated areas and the removal of debris and litter.
Rubbish Bins	Reduce the amount of gross pollutants generated by the development by collecting and dumping litter and/or waste.
Filter Baskets (within inlet pits)	Reduction in gross pollutants and total suspended solids generated by the development by filtering water prior to entering the stormwater system which traps litter, debris and fine sediment.
Gross Pollutant Traps (GPT's)	Removal of gross pollutants generated by the development site. Some GPT's that are available on the market today can also remove hydrocarbons from runoff, thus reducing any oil and fuel pollutants generated by the development.
Rainwater Re-Use	Re-using generated site runoff for landscaping and irrigation purposes etc. will reduce pollutant loads generated by the development site.
Grass Swales	Directing site runoff to grass swales prior to discharging will have a reduction to the total pollutants generated by the development.
Sand Filters (Bio-Retention)	Directing site runoff to a bio-retention basin prior to discharging will have a reduction to the total pollutants generated by the development.

8.2. ADOPTED SQBMP's

When choosing to adopt selected SQBMP's, it is important to identify the expected pollutants that the proposed development will generate during its operational phase. A summary of the expected typical pollutants can be found within Table 6-7 of this Report.

Based on the expected pollutants and this development's expected residential activities, the following is a summary of the SQBMP's that are recommended to be adopted as a minimum.

- Site Maintenance -Rubbish Bins -Filter Baskets

Site Maintenance

As this development is a residential led mixed-use development, it is assumed that regular landscaping and general maintenance will occur including the removal of any rubbish or debris within the development by the Onsite Management thereby removing the gross pollutants on site.

Rubbish Bins

The development is required to have rubbish bins for general waste to remove gross pollutants generated by the development.

Filter Baskets

As part of the sites internal stormwater infrastructure, all inlet pits placed in hardstand and/or driveway areas are to be installed with Council-approved Filter Baskets to prevent debris and fine sediment entering the stormwater system. Filter Baskets are effective at removing gross pollutants and total suspended solids from stormwater runoff and are capable of operating under a high flow scenario (relative catchment).

Refer to Appendix H for Filter Basket Maintenance Documentation.

Figure 8-9 EXAMPLE FILTER BASKET 1

Figure 8-10 EXAMPLE FILTER BASKET 2

9.0 MONITORING AND MAINTENANCE

9.1. MAINTENANCE REQUIREMENTS

Routine maintenance of the proposed infrastructure is required to minimise the potential for untreated stormwater discharging from the site.

The stormwater treatment device(s) shall be maintained using the following documentation;

- Manufacturers specifications for proprietary stormwater management devices,
- Maintenance checklists and rectification works attached to this report.

9.2. MAINTENANCE FREQUENCY

More detailed performance information with regard to maintenance frequency and scheduled maintenance tasks for the site can be obtained by actively developing a maintenance log (refer below); however, it does not supersede maintenance requirements outlined in the manufacturers' specifications for proprietary elements of the SBSMP.

9.3. MAINTENANCE RECORD

A record of all maintenance checks for all stormwater controls on-site should be kept to evolve an appropriate maintenance routine to reflect the particular characteristics of the adopted treatment devices. It will also allow management of the site to refine the maintenance frequencies listed in this report, which were based on generic devices located in typical urban environments.

The record is to be used to create a chain of responsibility for maintenance and should include details of the following:

- The date of maintenance,
- The name of the persons performing the maintenance,
- What types of maintenance actions were performed for each water quality device,

The environmental state of the device including an estimate of the type and weight of litter removed and the amount of sediment captured where appropriate.

10.0 EROSION AND SEDIMENT MANAGEMENT

10.1. OBJECTIVES

The objective of Erosion and Sediment Management is to limit soil erosion and control sediment discharge from the proposed development by using suitable control devices during the four (4) primary phases; Existing, Earthworks, Construction and the Proposed Use.

Typical erosion and sediment control measures that will be incorporated into these development phases are highlighted in the following section.

10.2. EROSION & SEDIMENT MANAGEMENT DURING DEVELOPMENT PHASES

PHASE 1 - EXISTING

Prior to construction commencing, the following sediment and erosion control measures will be implemented to minimise disturbance and ensure water quality is maintained:

- Designation of transport routes to ensure minimal vegetation disturbance. Transport routes will have construction exits in accordance with IECA Aust Guidelines,
- Construction entry/exit to be installed and will comprise of a designed gravel pad or placement of hardwood logs in accordance with the IECA Aust Guidelines,
- Install sediment fences around the proposed site (along tow of batter alignment),
- Install check dams if required, and
- Install dust control fences adjacent to the proposed earthworks areas (along property boundary) if required.

PHASE 2 - EARTHWORKS AND PHASE 3 - CONSTRUCTION

The following measures will be undertaken to mitigate water quality impacts during construction phase:

- Sediment fences to be erected at the base of all batters and stockpiles to prevent sediment transportation off site,
- Turf filter strips to be placed along all road verges,
- Diversion swales to divert sediment laden water,
- Rock check dams are to be placed intermittently along diversion swales,
- Re-vegetation of all disturbed areas as soon as possible,
- All sediment control structures to be maintained in an effective manner and inspected after each stormwater event. No structure is to accumulate sediment above 40% of its capacity,

- Regular monitoring of water quality to determine the effectiveness of the sediment and erosion control measures.

PHASE 4 - PROPOSED DEVELOPMENT

Once construction is completed, the following strategies will be implemented to limit soil erosion and control sediment discharge leaving the site:

A monitoring program will be established for the stormwater treatment devices.

10.3. EROSION CONTROL MEASURES

The time of disturbance on-site should be kept to a minimum by ensuring that construction works immediately follow the earthworks phase. Consideration to staging works should be given to minimise the area of exposed works at any given time.

Areas that may be subject to concentrated flow and that have been cleared may require turfing to ensure gully erosion does not start.

Any overburden that is not to be taken off-site should be stockpiled nearby and covered to prevent the mobilization of any particles into the drainage system.

The remaining exposed areas of the site are to be damped down as deemed necessary by the site supervisor to prevent dust. All batters are to have mulch or erosion control mats installed immediately after achieving final level.

Dust fencing is to be installed around the perimeter of earthworks to prevent wind velocities at ground level over the site if required.

The site is to be landscaped and revegetated in accordance with the approved Landscape Plans immediately after completion of construction activities to minimise the risk of erosion from exposed earthworks.

10.4. SEDIMENT CONTROL MEASURES

With reference to the IECA Aust Guidelines and Current Best Practice methods, there are four fundamental sediment control principles that have been identified for use during construction for this development site and are as follows:

Construction Exit

A dedicated construction exit is to be located at the sites entry and exit point for vehicles. This exit will be established to facilitate the removal of soil, mud, dust and debris from the tyres of vehicles prior to leaving the construction site. The construction exit can comprise of a gravel pad designed or placement of hardwood logs, constructed and maintained in accordance with the IECA Aust Guideline. Alternatively, a vibratory grid system can be hired or constructed. The advantages of the grid system include ease of movement and they can be used for several years.

Sediment Fences

Sediment fencing is to be established down slope of any exposed earthworks where there is a risk of contaminated water leaving the site prior to clearing and site works commencing. Sediment fencing may be required at regular spacing down the disturbed grade to limit rutting caused by concentration of sheet flow. Sediment fences shall be used to protect any temporary stockpile areas on an as-needs basis. Sediment collected from sediment barriers is to be regularly removed and either taken off site as part of the earthworks phase of the proposed development or stockpiled for use during revegetation.

Sediment Barriers

Sediment barriers are to be constructed around all stormwater drainage inlet points where contaminated water may drain to. This will aid in ensuing sediments are settled out prior to flows entering the underground stormwater drainage system. Sediment barriers are to be gravel wrapped in geotextile ‘sausage’ or similar.

Turf Filter Strips

If required, turf filter strips approximately 600mm minimum wide can be placed on the upstream side of the proposed concreted footpath. These will act in conjunction with sediment fences to further treat any overland flow from the site. Turf filter strips are to be constructed and maintained in accordance with the IECA Aust Guidelines.

11.0 CONCLUSION

11.1. LAWFUL POINT OF DISHARGE

The lawful point of discharge has been identified as the existing Gully Pit (K18155876) located on the Hercules Street site frontage.

11.2. STORMWATER QUANTITY

As demonstrated in Table 6-18 the Pre and Post development figures show a decrease in the stormwater discharge due to the reduction in total impervious site area. Also mentioned in Section 6-4, no stormwater detention is proposed as the existing fraction impervious exceeds 60%. The stormwater runoff should not cause adverse impacts or actionable nuisances to the surrounding properties.

11.3. STORMWATER QUALITY

Stormwater quality improvement devices have been appropriately selected as to generally comply with Stormwater Quality Best Management Practices and incorporation of Water Sensitive Urban Design where possible.

The following is a summary of the minimum treatment devices and/or management practices required for the proposed development.

- Site Maintenance

Regular landscaping and general maintenance is to occur including the removal of any rubbish or debris within the development, removing the gross pollutants on site.

- Rubbish Bins

The development is required to have rubbish bins for general waste as to remove gross pollutants generated by the development.

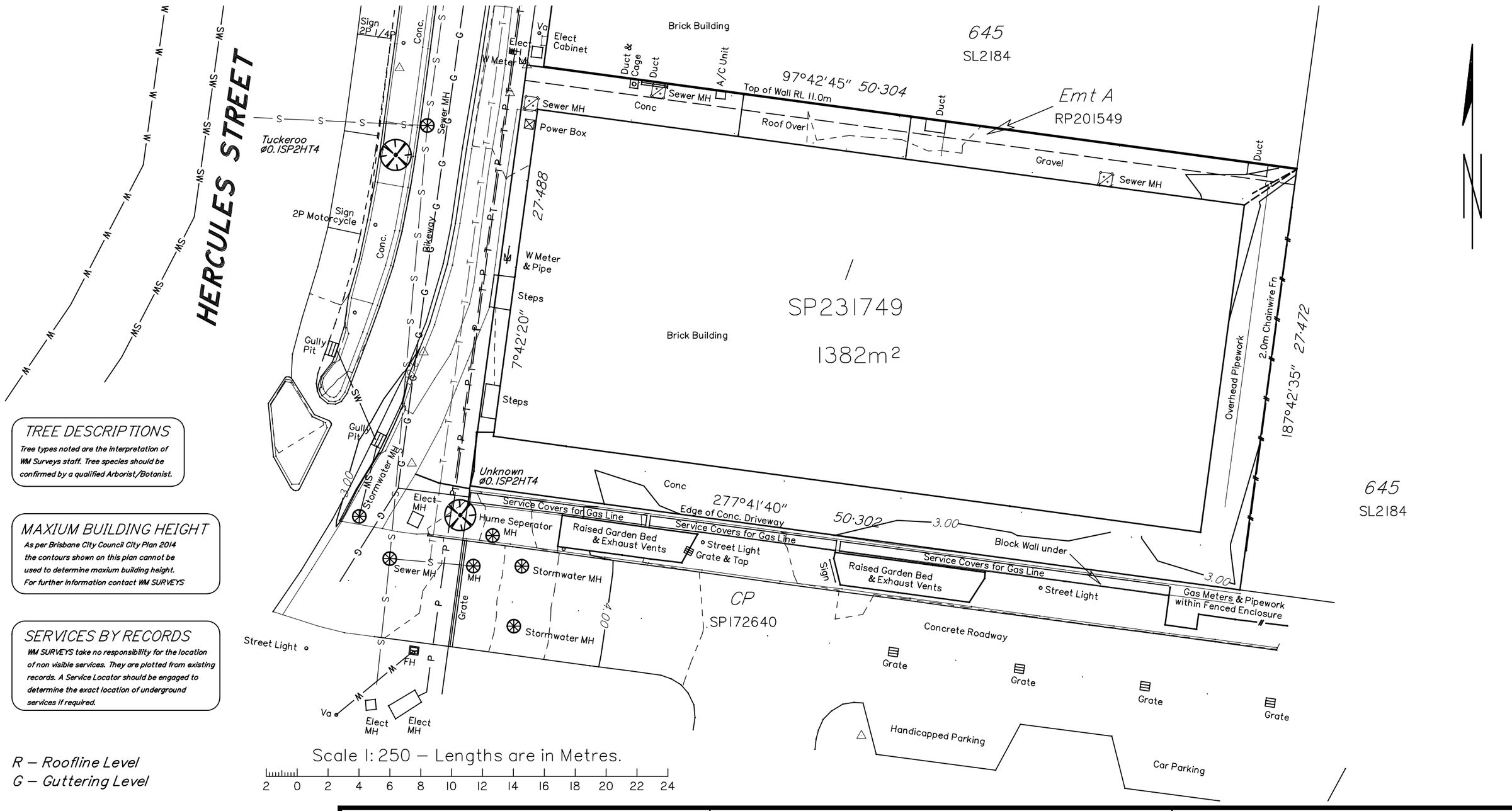
- Filter Baskets

Driveway inlets to be fitted with Filter Baskets to prevent debris and fine sediment entering the stormwater system. Filter Baskets are effective at removing gross pollutants and total suspended solids from stormwater runoff.

11.4. EROSION AND SEDIMENT CONTROL

An Erosion and Sediment Control (ESC) plan will be completed as part of the detailed design phase of this Development and shall incorporate the recommendations included within this Report. This Report and plan shall remain on site at all times, and it is the responsibility of the Contractor on-site to ensure the assembly and maintenance of all devices throughout the Development.

Appendix A – DETAILED SURVEY



TREE DESCRIPTIONS

Tree types noted are the interpretation of WM Surveys staff. Tree species should be confirmed by a qualified Arborist/Botanist.

MAXIUM BUILDING HEIGHT

As per Brisbane City Council City Plan 2014 the contours shown on this plan cannot be used to determine maxium building height. For further information contact WM SURVEYS

SERVICES BY RECORDS

WM SURVEYS take no responsibility for the location of non visible services. They are plotted from existing records. A Service Locator should be engaged to determine the exact location of underground services if required.

R – Roofline Level
G – Guttering Level

Scale 1: 250 – Lengths are in Metres.

2 0 2 4 6 8 10 12 14 16 18 20 22 24

ALL SERVICES ARE BY RECORDS ONLY.

— P — P — POWER
—T—T— U/G TELSTRA
—G—G— U/G GAS
—S—S— U/G SEWERAGE
—W—W— U/G WATERMAIN
—SW—SW— U/G STORMWATER

ISSUE:	DESCRIPTION	DATE	SIGNED
A	ORIGINAL ISSUE	14/6/22	WM

NOTE:

This plan has been prepared from a combination of field survey and existing records for the purpose of designing new constructions on the property, and should not be used for any other purpose. The property boundaries have not been marked at the time of survey and have been determined from a combination of field and plan measurements. Further survey work may need to be undertaken to determine the exact boundary position.
All visible services and features have been located by field measurements. If unable to have been located, services have been plotted by records and noted accordingly.
Prior to any construction or to determine exact location, the relevant Authority should be contacted for detailed locations.
This note forms an integral part of this plan.

CONTOUR & DETAIL SURVEY

Description

LAND at 5 HERCULES STREET
HAMILTON

LOT 1 on SP231749

Brisbane City Council

Datum

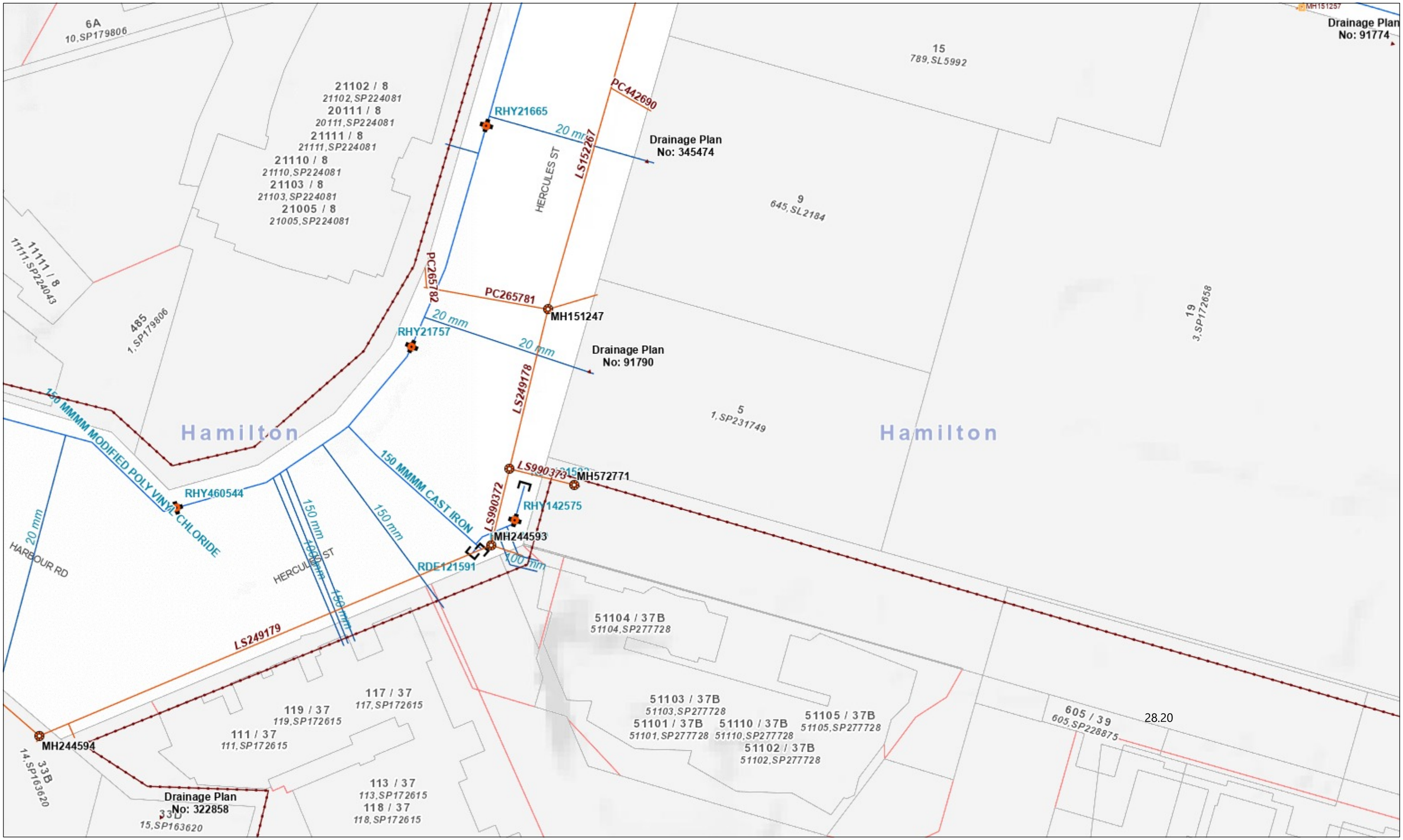
Datum for Levels ..... AHD
Levelled from PSM No.136690.....RL19.995m AHD

WM SURVEYS PTY LTD

P.O.Box 7220
Brendale QLD. 4500
warwick@wmsurveys.com.au
Ph 0419 685 538 Fax 07 3882 5168
ACN 133 397 065 ABN 91 133 397 065

FILE REF	2790DT–A.DWG
ISSUE:	A
Date	14/06/2022
Ref.	2790DT
Scale in Metres	1: 250 at A3

Appendix B – eBiMAP2



Print Date:
7/06/2022 - 9:34 PM

Projection:
Web Mercator Auxiliary Sphere

Notes:

N

Dedicated to a better Brisbane

Sewer and Water

25.0 0 12.0 18.8 25.0

Metres

Scale: 1:500

Legend

- Sewer Chamber
- INLINE FLUSHING POINT
- RODDING JOINT
- WYE
- INLET
- PIPE BRIDGE
- Sewer Manholes
- End
- SCOUR
- VACCUM - OFFLINE
- BUTTERFLY
- Sewer Network Structure -Treatn
- ODOUR CONTROL
- Sewer Pump Station
- Sewer Vertical Pressure Main
- Sewer Gravity Main - by Type
- OVERFLOW MAIN
- RETICULATION MAIN - OFFLINE
- MODEL LINK
- LOW PRESSURE MAIN - OFFLINE
- Sewer Drainage Plan Extension
- FLOW METER - OFFLINE
- BEND
- GIBAULT JOINT
- TEE
- SAMPLING STATION
- CONCRETE STOP
- Water Hydrant
- Service Valve, CLOSED
- PRIVATE
- SEQ - OFFLINE
- SEQWATER
- <all other values>
- LIFT PUMP
- Water Pressure Main - by Type
- Scour Main
- Property Holding
- CHAMBER
- OUTLET
- PROPERTY CONNECTION BOUNDA
- TEE
- OUTLET
- ANCHOR BLOCK
- MANHOLE
- Flume Pit
- VACCUM, AS CONSTRUCTED
- REFLUX - OFFLINE
- SEWER DOOR - OFFLINE
- TREATMENT PLANT, AS CONSTRUC
- WET WELL
- PUMP STATION
- Sewer Service
- SYPHON
- MODEL LINK
- OVERFLOW MAIN - OFFLINE
- LOW PRESSURE MAIN
- RISING MAIN - OFFLINE
- Water Device - All Other Assets
- PRESSURE GAUGE - OFFLINE
- PIGGING POINT
- TAPPING BAND
- RESERVOIR INLET
- <all other values>
- HEADWALL
- PILLAR HYDRANT
- Service Valve, OPEN
- QUU - NON POT
- PRIV - OFFLINE
- PRIVATE
- Water Sampling Point
- BOOSTER PUMP - OFFLINE
- Water - Model Link
- Water Service
- Sealed Plan
- CHAMBER - OFFLINE
- VACUUM LIFT
- JUNCTION
- REDUCER
- <all other values>
- HEAD WALL
- MANHOLE - OFFLINE
- Sewer Manhole Stub
- REFLUX
- Sewer System Valve - by Type
- GATE - OFFLINE
- TREATMENT PLANT - OFFLINE
- STORAGE FACILITY - OFFLINE
- PUMP STATION - OFFLINE
- Model Link
- DISCHARGE
- SYPHON - OFFLINE
- MODEL LINK - OFFLINE
- RISING MAIN
- VACUUM MAIN - OFFLINE
- FLOW METER
- LEVEL SENSOR - OFFLINE
- END CAP
- TAPPING
- RESERVOIR OUTLET
- Water Structures
- PIER
- INGROUND HYDRANT
- Water Network Structure - Reser
- SEQ - NON POT
- Water Network Structure Bounda
- QUU - OFFLINE
- Water Pumps
- BORE PUMP - OFFLINE
- Raw Water Main
- SERVICE
- Parcel
- Sewer Fitting - Main Fittings
- Sewer Fitting - All Other Fittings
- END CAP
- GIBAULT JOINT
- Sewer Structure - by Type
- PIER
- <all other values>
- Sewer Control Valve - by Type
- AIR - OFFLINE
- SEWER DOOR
- BUTTERFLY - OFFLINE
- Sewer Network Structure - All Fe
- WET WELL - OFFLINE
- Sewer Network Structure Bounda
- Service
- TRUNK MAIN
- DISCHARGE - OFFLINE
- <all other values>
- VACUUM MAIN
- Sewer Drainage Plan
- PRESSURE GAUGE
- <all other values>
- CROSS
- REDUCER
- SCOUR OUTLET
- ANCHOR BLOCK
- <all other values>
- <all other values>
- QUU
- PRIVATE - NON POT
- Water Pump Stations
- SEQWATER - OFFLINE
- BOOSTER PUMP
- LIFT PUMP - OFFLINE
- Reticulation Main
- MODEL LINK
- Parcel - Outside Brisbane
- END FLUSHING POINT
- JOINT
- BEND
- CROSS
- CONCRETE STOP
- Sewer Support Structure Bounda
- Sewer Manhole -All Other Types
- AIR
- SCOUR - OFFLINE
- GATE
- <all other values>
- STORAGE FACILITY
- ODOUR CONTROL - OFFLINE
- Sewer Vertical Gravity Main
- <all other values>
- RETICULATION MAIN
- TRUNK MAIN - OFFLINE
- Sewer Pressure Main - by Type
- MODEL LINK - OFFLINE
- Sewer Drainage Plan Joiner
- LEVEL SENSOR
- Water Fitting
- JOINT
- WYE
- CHEMICAL INJECTION POINT
- PIPE BRIDGE
- Water Chamber
- Water Service Valve
- SEQWATER
- QUU - OFFLINE
- QUU
- PRIVATE - OFFLINE
- BORE PUMP
- Water Vertical Pressure Main
- Trunk Main
- COMMON SERVICE

Appendix C – FLOODWISE PROPERTY REPORT

Brisbane City Council

FloodWise Property Report

Report Reference
1654601833468
07/06/2022 21:37:13

Dedicated to a better Brisbane

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

The FloodWise Property Report provides property or lot-based flood information for building and development requirements. This report provides information on estimated flood levels, habitable floor level requirements and more technical information on the four sources of flooding: river, creek / waterway, storm tide and overland flow. Refer to the Useful Definitions section for a glossary of terms.

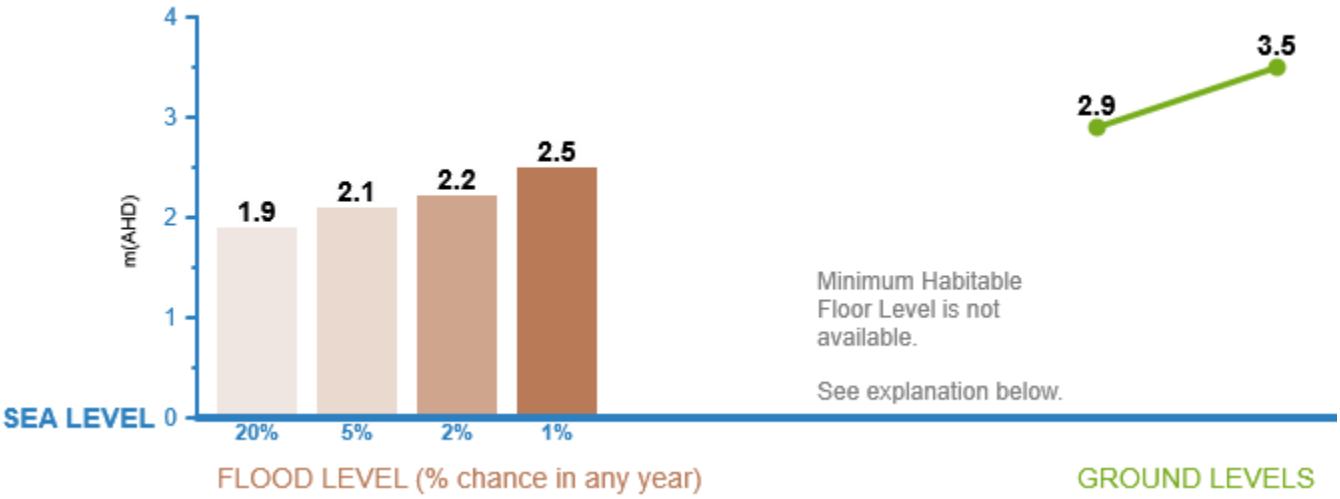
To find out more about how the contents of this report may affect building or development on this property, please visit www.brisbane.qld.gov.au/planning-building.For more general information about understanding your flood risk and how to prepare your property, family or business for potential flooding visit www.brisbane.qld.gov.au/beprepared

THIS IS A REPORT FOR:

Rateable Address: 5 HERCULES ST, HAMILTON QLD 4007

Lot Details: L.1 SP.231749

FLOOD LEVEL INFORMATION



EXPLANATION

m(AHD) - Metres Australia Height Datum. The level of 0.0m AHD is approximately mean sea level.

Flood Levels - The Flood level bar chart above shows the possible flooding level and percentage chance of that level being reached or exceeded in any year. If an orange bar shows, it is the calculated January 2011 flood level at this address or lot. Refer to 'Useful Definitions' for further information.

Minimum Habitable Floor Level - Applies to residential development only. Please refer to Council's planning scheme to learn how this may affect you. If a property is in an overland flow path, or a large allotment, a minimum habitable floor level cannot be provided. Refer flood and planning development flags below.

Ground Levels- The green line above shows this property's approximate lowest and highest ground levels based on latest available information (2019 airborne laser survey) to Council. If you are building, please confirm with a surveyor.

For further information and definitions please refer to the Useful Definitions page

FLOOD AND PLANNING DEVELOPMENT FLAGS

DEVELOPMENT FLAG(S)

This property may also be affected by one or more flood or property development overlays or flags. These include: LARGE ALLOTMENT

Please review the technical summary over page and refer to Council's planning scheme for further information.

Brisbane City Council

FloodWise Property Report

Dedicated to a better Brisbane

Report Reference
1654601833468

07/06/2022 21:37:13

TECHNICAL SUMMARY

This section of the FloodWise Property Report contains more detailed flood information for this property so surveyors, builders, certifiers, architects and engineers can plan and build in accordance with Council's planning scheme. For more information about building and development in Brisbane please visit www.brisbane.qld.gov.au/planning-building or talk to a Development Assessment Planning Information Officer via Council's Contact Centre on (07) 3403 8888.

THIS IS A REPORT FOR:

Rateable Address: 5 HERCULES ST, HAMILTON QLD 4007

Lot Details: L.1 SP.231749

PROPERTY INFORMATION (Summary)

The following table provides a summary of flood information for this property. More detailed flood level information is provided in the following sections of this report.

PROPERTY SUMMARY	LEVEL (mAHD)
Minimum Ground Level	2.9
Maximum Ground Level	3.5
Min Habitable Floor Level	Contact Council
Defined Flood Event Level	2.5
Defined Flood Event Level Source	STORMTIDE
Source of Highest Flooding	STORMTIDE
Flooding may also occur from	STORMTIDE,RIVER

ESTIMATED PEAK FLOODING LEVELS

The table below displays the peak estimated flood levels by probability for this property. Estimated flood level data should be used in conjunction with applicable planning scheme requirements - Refer to Flood Planning Development Information.

Note that the overland flow flooding level maybe higher than the levels below from other sources.

DESCRIPTION	LEVEL (mAHD)	SOURCE
20% AEP	1.9	STORMTIDE
5% AEP	2.1	STORMTIDE
2% AEP	2.2	STORMTIDE
1% AEP	2.5	STORMTIDE
1% AEP	2.2	RIVER
RFL	2.2	RIVER

FLOOD PLANNING DEVELOPMENT INFORMATION

This section of the FloodWise Property Report contains information about Council's planning scheme overlays. Overlays identify areas within the planning scheme that reflect distinct themes that may include constrained land and/or areas sensitive to the effects of development.

FLOOD OVERLAY CODE

The Flood overlay code of Council's planning scheme uses the following information to provide guidelines when developing properties. The table below summarises the Flood Planning Areas (FPAs) that apply to this property. Development guidelines for the FPAs are explained in Council's planning scheme, which is available from www.brisbane.qld.gov.au/planning-building.

FLOOD PLANNING AREAS (FPA)		
RIVER	CREEK/WATERWAY	OVERLAND FLOW
FPA4		Not Applicable

COASTAL HAZARD OVERLAY CODE

The coastal hazard overlay code of Council's planning scheme uses the following information to provide guidelines when conducting new development. The table below summarises the coastal hazard categories that apply to this property. Development guidelines for the following coastal hazard overlay sub-categories are explained in the planning scheme, which is available from www.brisbane.qld.gov.au/planning-building.

COASTAL HAZARD OVERLAY SUB-CATEGORIES
Medium Storm Tide Inundation Area

NOTE: Where land is identified within one or more flood planning area on the Flood Overlay, or is identified within a Storm Tide Inundation area on the Coastal Hazard Overlay, the assessment criteria that provide the highest level of protection from any source of flooding applies.

PROPERTY DEVELOPMENT FLAGS

Large Allotment - This property is either a Large Allotment of over 1000 square metres or is located within a Large Allotment. Flood levels may vary significantly across allotments of this size. Further investigations may be warranted in determining the variation in flood levels and the minimum habitable floor level across the site. For more information or advice, it is recommended you engage a Registered Professional Engineer of Queensland.

Brisbane City Council

FloodWise Property Report

Report Reference
1654601833468
07/06/2022 21:37:13

Dedicated to a better Brisbane

Useful Definitions

Australian Height Datum (AHD) - The reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.

Annual Exceedance Probability (AEP) – The probability of a flood event of a given size occurring in any one year, usually expressed as a percentage annual chance.

Defined Flood Level (DFL) - The DFL for Brisbane River flooding is a level of 3.7m AHD at the Brisbane City Gauge based on a flow of 6,800 m^3/s.

Maximum and Minimum Ground Level – Highest and lowest ground levels on the property based on available ground level information. A Registered Surveyor can confirm exact ground levels.

Minimum Habitable Floor Level – The minimum level in metres AHD at which habitable areas of development (generally including bedrooms, living rooms, kitchen, study, family and rumpus rooms) must be constructed.

Council's Planning Scheme - The City Plan (planning scheme) has been prepared in accordance with the Sustainable Planning Act as a framework for managing development in a way that advances the purpose of the Act. In seeking to achieve this purpose, the planning scheme sets out the Council's intention for future development in the planning scheme area, over the next 20 years.

Residential Flood Level (RFL) – Residential flood level (RFL) for the Brisbane River flooding equates to the 1% Annual Exceedance Probability flood level.

Rateable Address - A Lot or Property may have more than one street address. The address shown on this report is the address used by Council for the Lot or property selected.

Property - A property will contain 1 or more lots. The *Multiple Lot Warning* is shown if you have selected a property that contains multiple lots.

Brisbane City Council's Online Flood Tools

Council provides a number of online flood tools:

- to guide planning and development
- to help residents and businesses understand their flood risk and prepare for flooding.

Planning and Development Online Flood Tools

Council's online flood tools for planning and development purposes include:

- FloodWise Property Report
- Flood Overlay Code

For more information on Council's planning scheme and online flood tools for planning and development:

- phone 07 3403 8888 to talk to a Development Assessment Customer Liaison Officer
- visit www.brisbane.qld.gov.au/planning-building
- visit a Regional Business Centre.

Helping residents and businesses be prepared for flooding

Council has a range of free tools and information to help residents and businesses understand potential flood risks and how to be prepared. This includes:

- Flood Awareness Map
- Flooding in Brisbane – A Guide for Residents
- Flooding in Brisbane – A Guide for Businesses
- Early Warning Alert Service. Visit www.brisbane.qld.gov.au/earlywarning to register for email, home phone or SMS severe weather alert updates.

Note: The Flood Awareness Map shows four levels of flood likelihood from high likelihood (flooding is very likely to occur) through to very low likelihood (very rare and extreme flood events).

For more information on Council's online flood tools for residents and business:

- Visit www.brisbane.qld.gov.au/beprepared
- Phone (07) 3403 8888.

Brisbane City Council

FloodWise Property Report

Report Reference
1654601833468

07/06/2022 21:37:13

Dedicated to a better Brisbane

Disclaimer

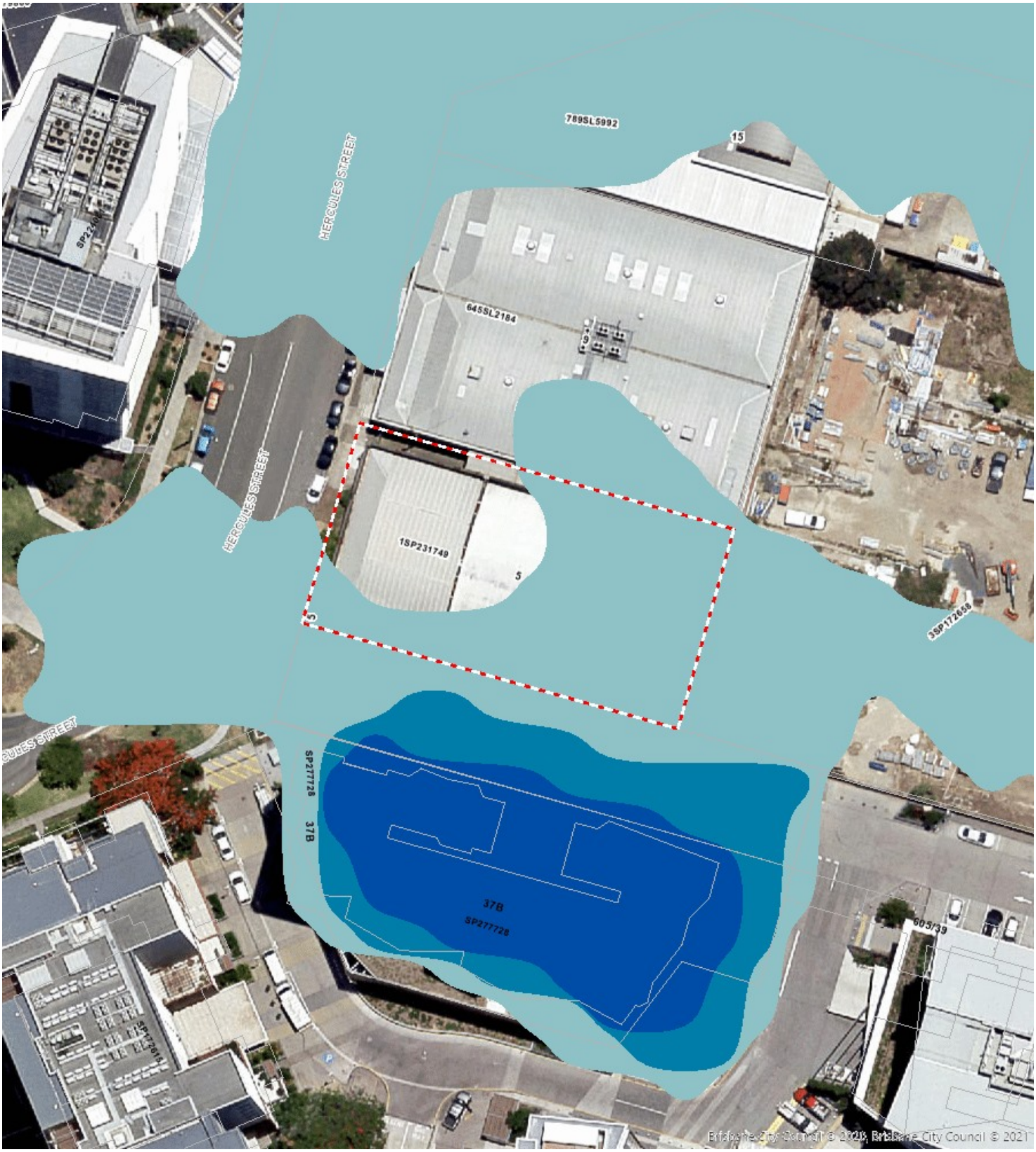
1. Defined Flood Levels and Residential Flood Levels, and the Minimum Habitable Floor Levels are determined from the best available information to Council at the date of issue. These flood levels, for a particular property, may change if more detailed information becomes available or changes are made in the method of calculating flood levels.
2. Council makes no warranty or representation regarding the accuracy or completeness of a FloodWise Property report. Council disclaims any responsibility or liability in relation to the use or reliance by any person on a FloodWise Property Report.

Planning to build or renovate?

For information, guidelines, tools and resources to help you track, plan or apply for your development visit **www.brisbane.qld.gov.au/planning-building**

You can also find the Brisbane City Plan 2014 and Neighbourhood Plans as well as other information and training videos to help with your building and development plans.

Appendix D – BCC INTERACTIVE MAPPING



Brisbane River flood planning area

Brisbane River flood planning area 1

Brisbane River flood planning area 2a

Brisbane River flood planning area 2b

Brisbane River flood planning area 3

Brisbane River flood planning area 4

Brisbane River flood planning area 5

Local Government Authorities

LGA boundary

property_boundaries_holding

Property Holding

Creek/waterway flood planning area


Creek/waterway flood planning area 1


Creek/waterway flood planning area 2


Creek/waterway flood planning area 3


Creek/waterway flood planning area 4


Creek/waterway flood planning area 5

Local Government Authorities


LGA boundary

property_boundaries_holding


Property Holding

Overland flow flood planning area

Overland flow flood planning area

Local Government Authorities

LGA boundary

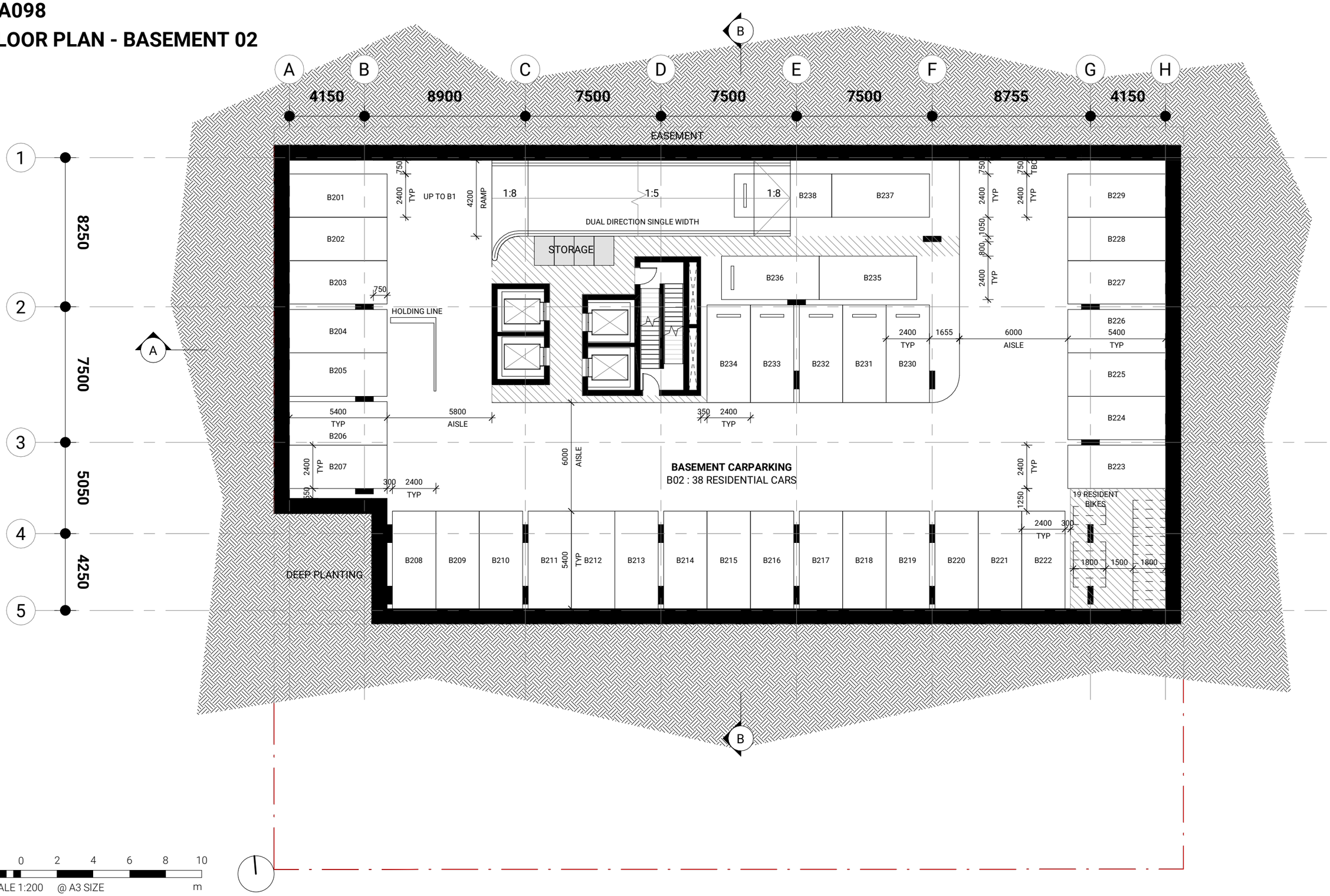
property_boundaries_holding

Property Holding

Appendix E – ARCHITECTURAL PLANS

plus architecture

DA098
FLOOR PLAN - BASEMENT 02

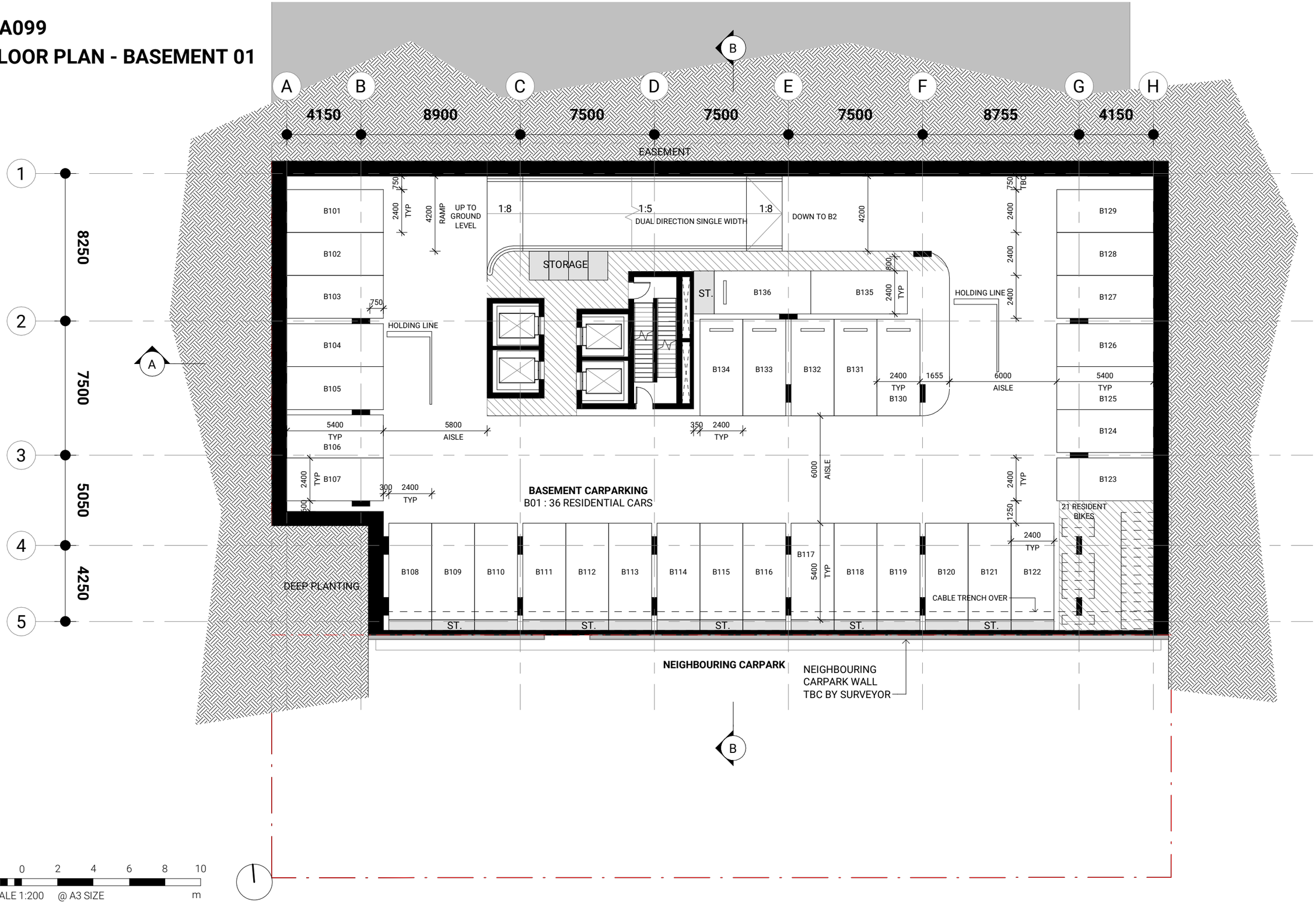


2 0 2 4 6 8 10
SCALE 1:200 @ A3 SIZE m

ISSUE 2
Date of Issue | 22.07.22

plus architecture

DA099
FLOOR PLAN - BASEMENT 01



2 0 2 4 6 8 10

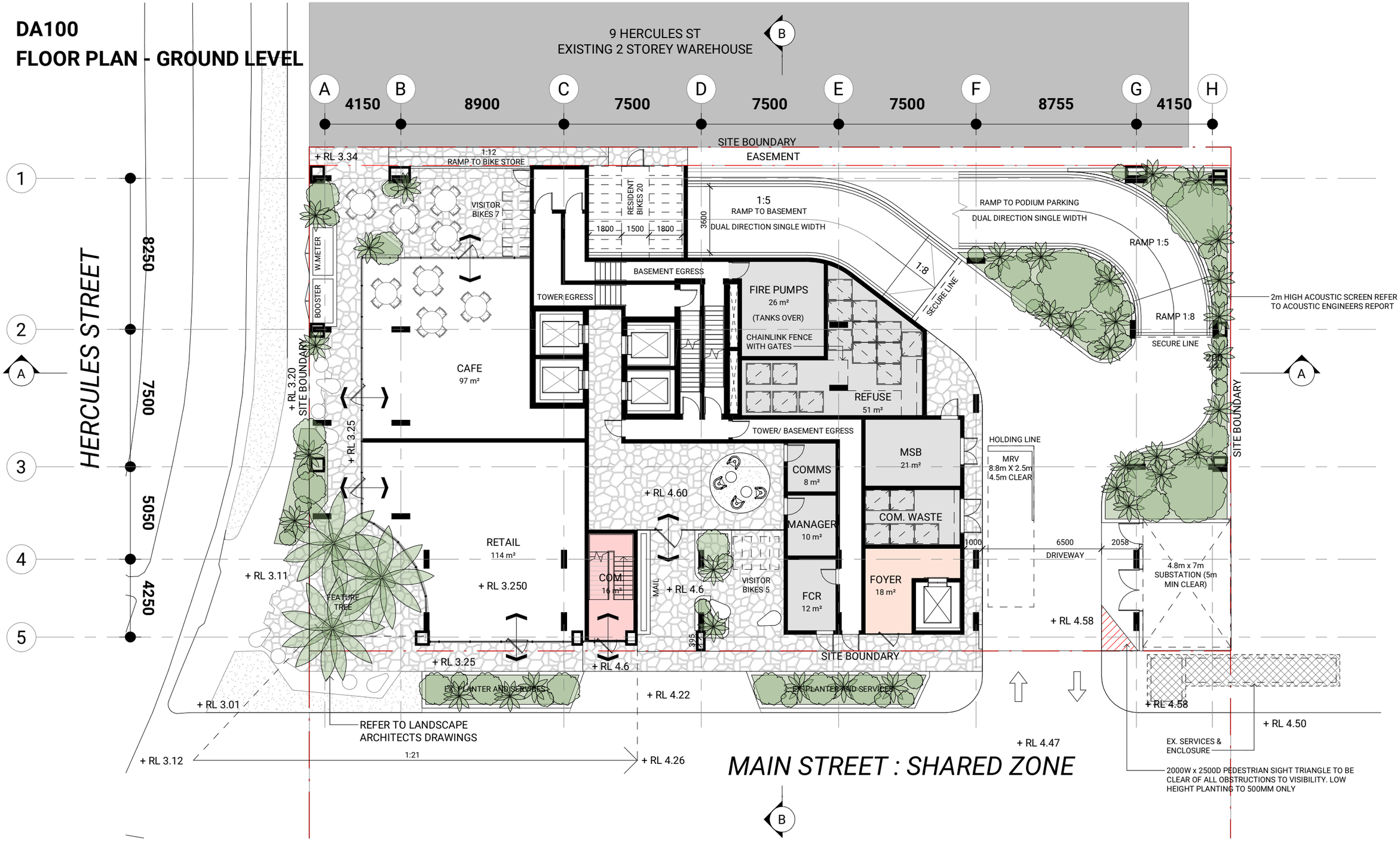
SCALE 1:200 @ A3 SIZE m

ISSUE 2

Date of Issue | 22.07.22

plus architecture

DA100
FLOOR PLAN - GROUND LEVEL

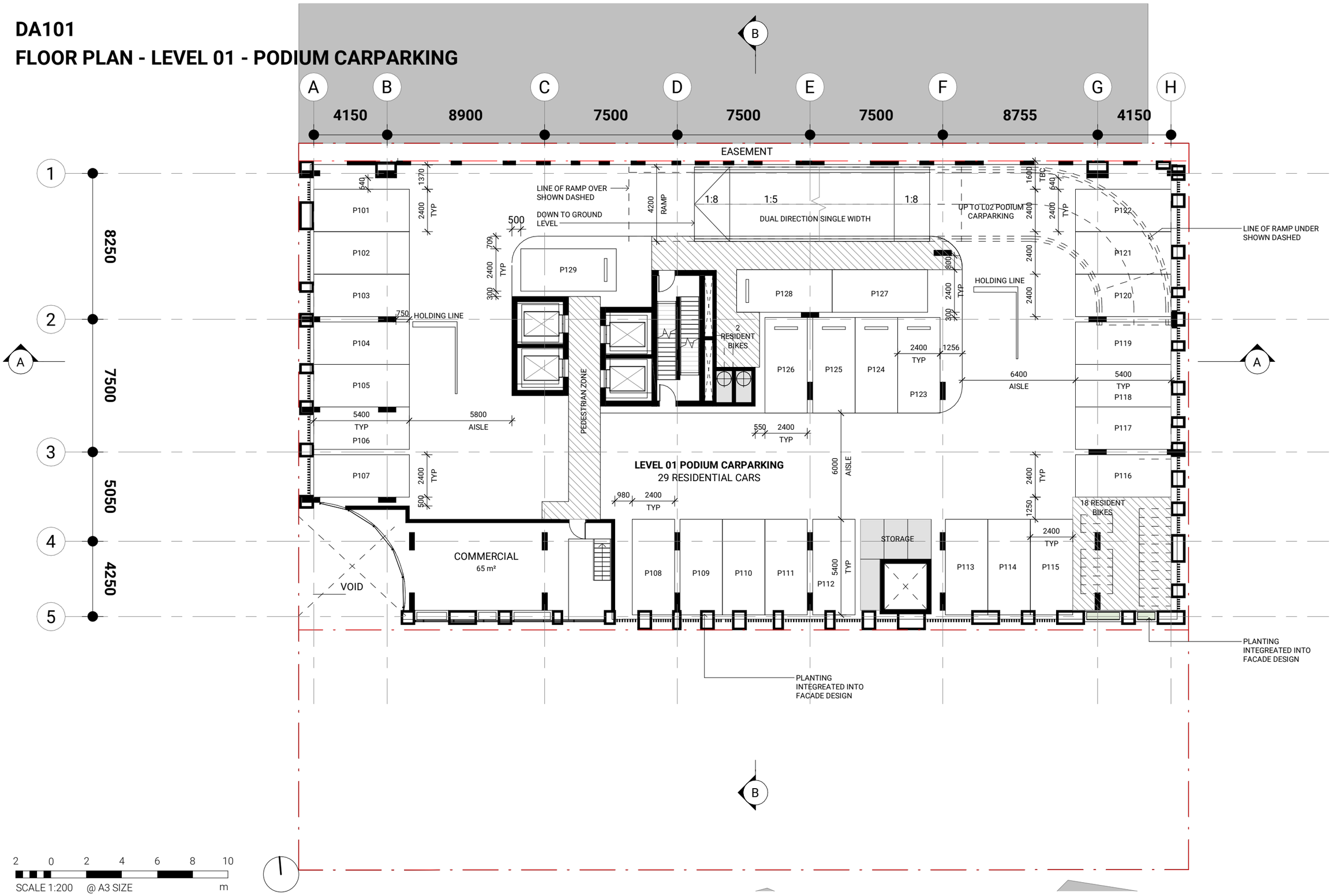


2 0 2 4 6 8 10 m

SCALE 1:200 @ A3 SIZE

ISSUE 2
Date of Issue | 22.07.22

DA101
FLOOR PLAN - LEVEL 01 - PODIUM CARPARKING

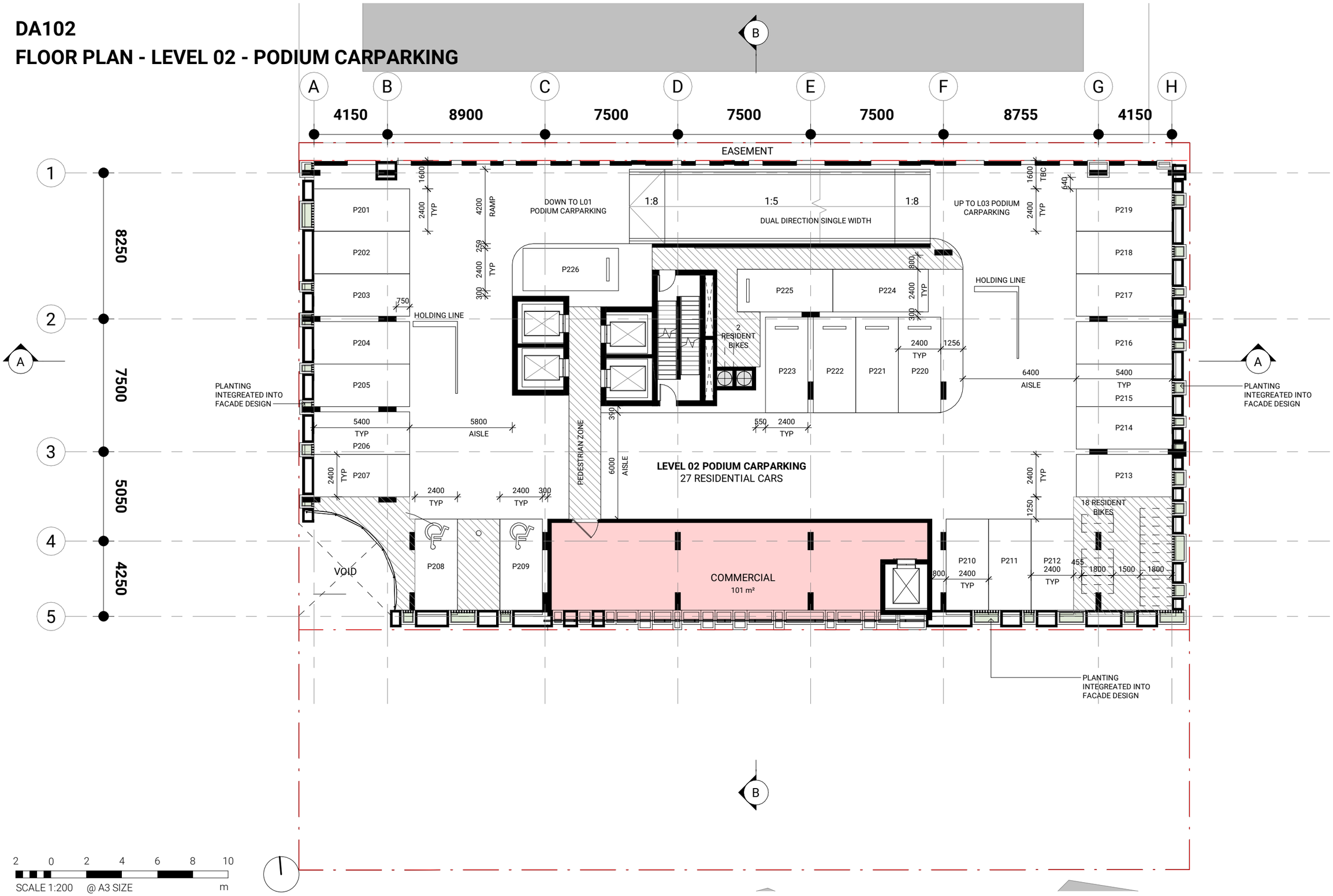


2 0 2 4 6 8 10 m

SCALE 1:200 @ A3 SIZE

ISSUE 2
Date of Issue | 22.07.22

DA102
FLOOR PLAN - LEVEL 02 - PODIUM CARPARKING

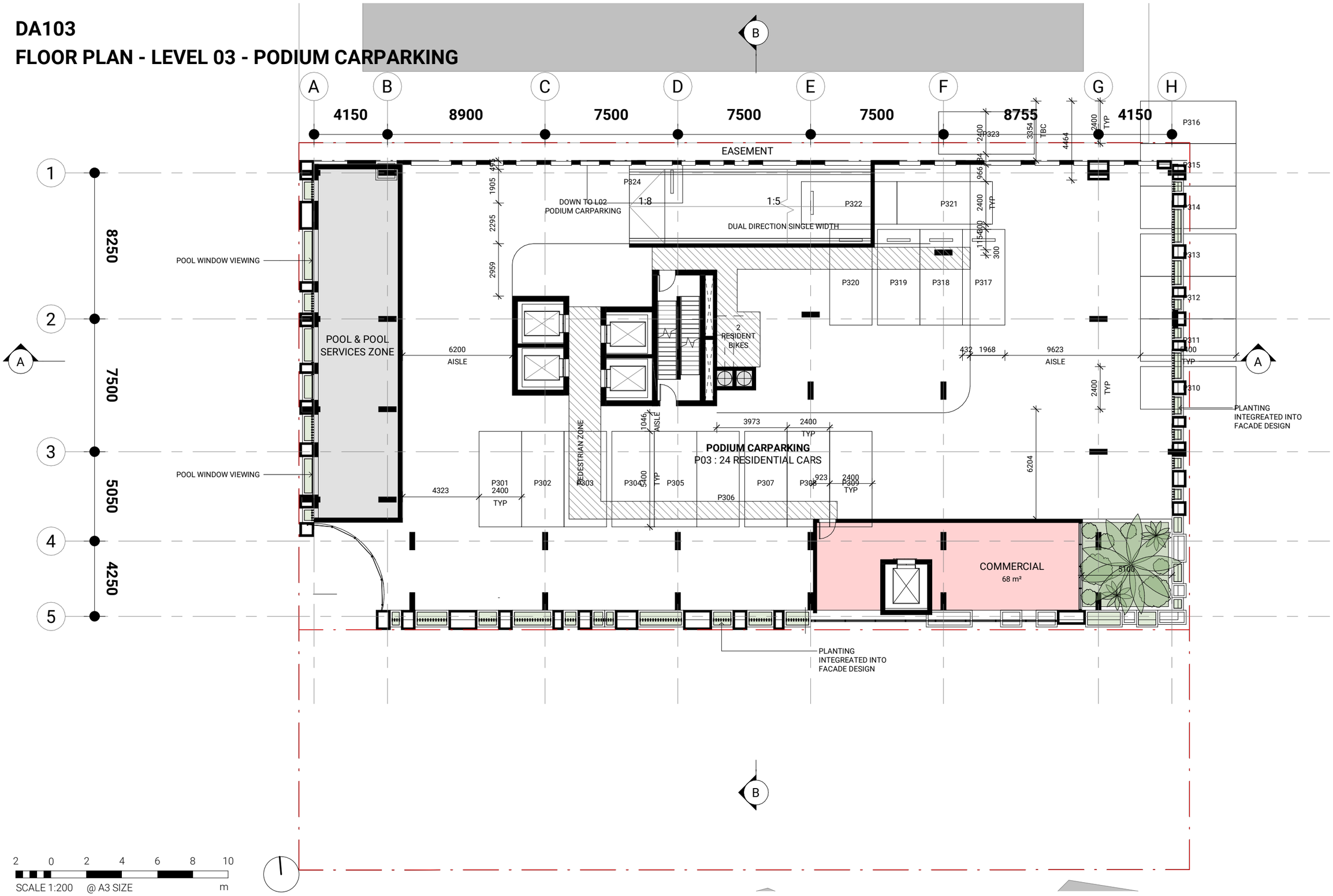


2 0 2 4 6 8 10 m

SCALE 1:200 @ A3 SIZE

ISSUE 2
Date of Issue | 22.07.22

DA103
FLOOR PLAN - LEVEL 03 - PODIUM CARPARKING



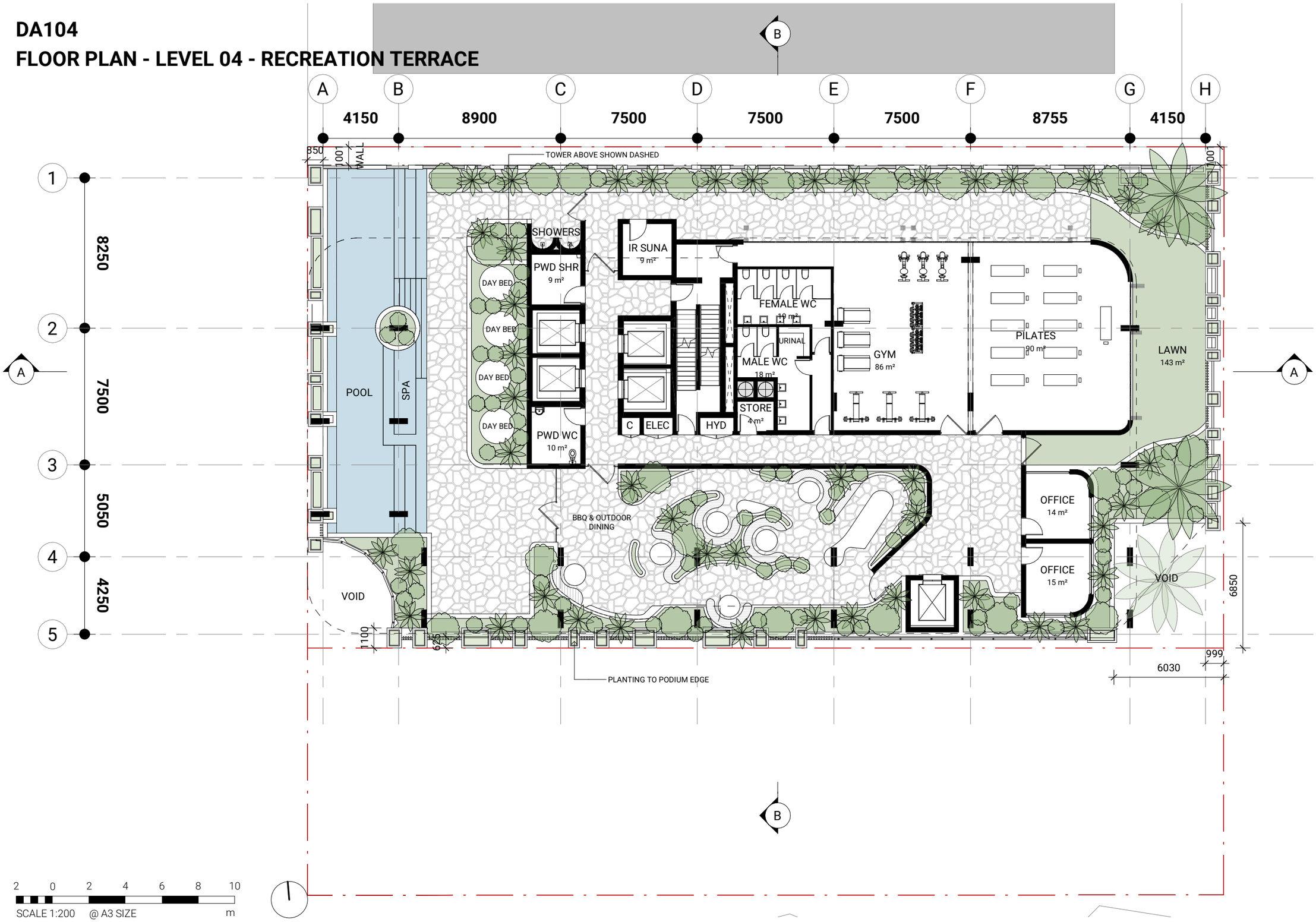
2 0 2 4 6 8 10

SCALE 1:200 @ A3 SIZE m

ISSUE 2

Date of Issue | 22.07.22

DA104
FLOOR PLAN - LEVEL 04 - RECREATION TERRACE



2 0 2 4 6 8 10

SCALE 1:200 @ A3 SIZE m

ISSUE 2
Date of Issue | 22.07.22

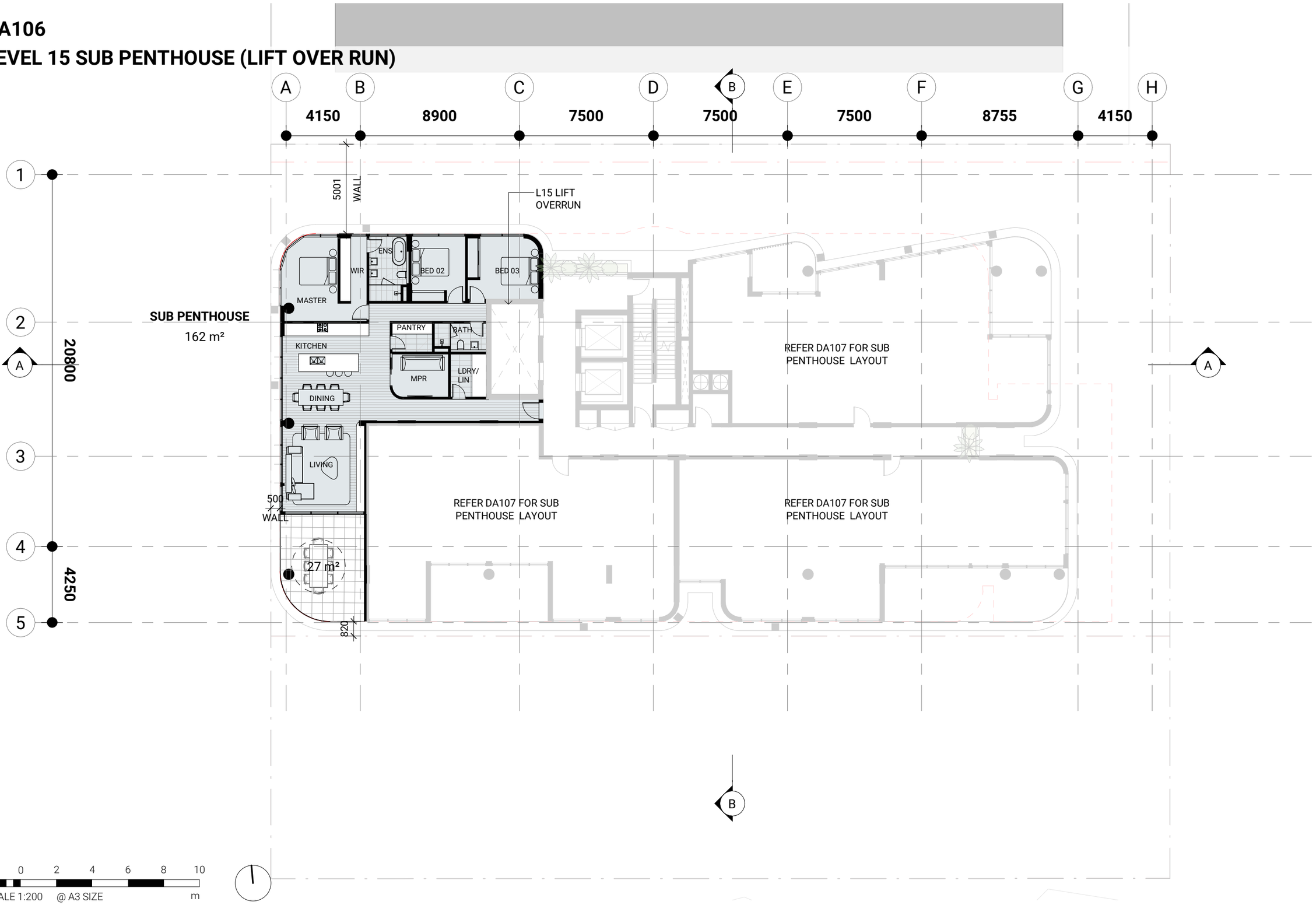
DA105
FLOOR PLAN - LEVELS 05-14 - TYPICAL

2 0 2 4 6 8 10 m

SCALE 1:200 @ A3 SIZE

ISSUE 2
Date of Issue | 22.07.22

DA106
LEVEL 15 SUB PENTHOUSE (LIFT OVER RUN)



2 0 2 4 6 8 10
SCALE 1:200 @ A3 SIZE m

ISSUE 2
Date of Issue | 22.07.22

70526 | UNTITLED | 5 HERCULES STREET, HAMILTON | BRISBANE

PLUS ARCHITECTURE

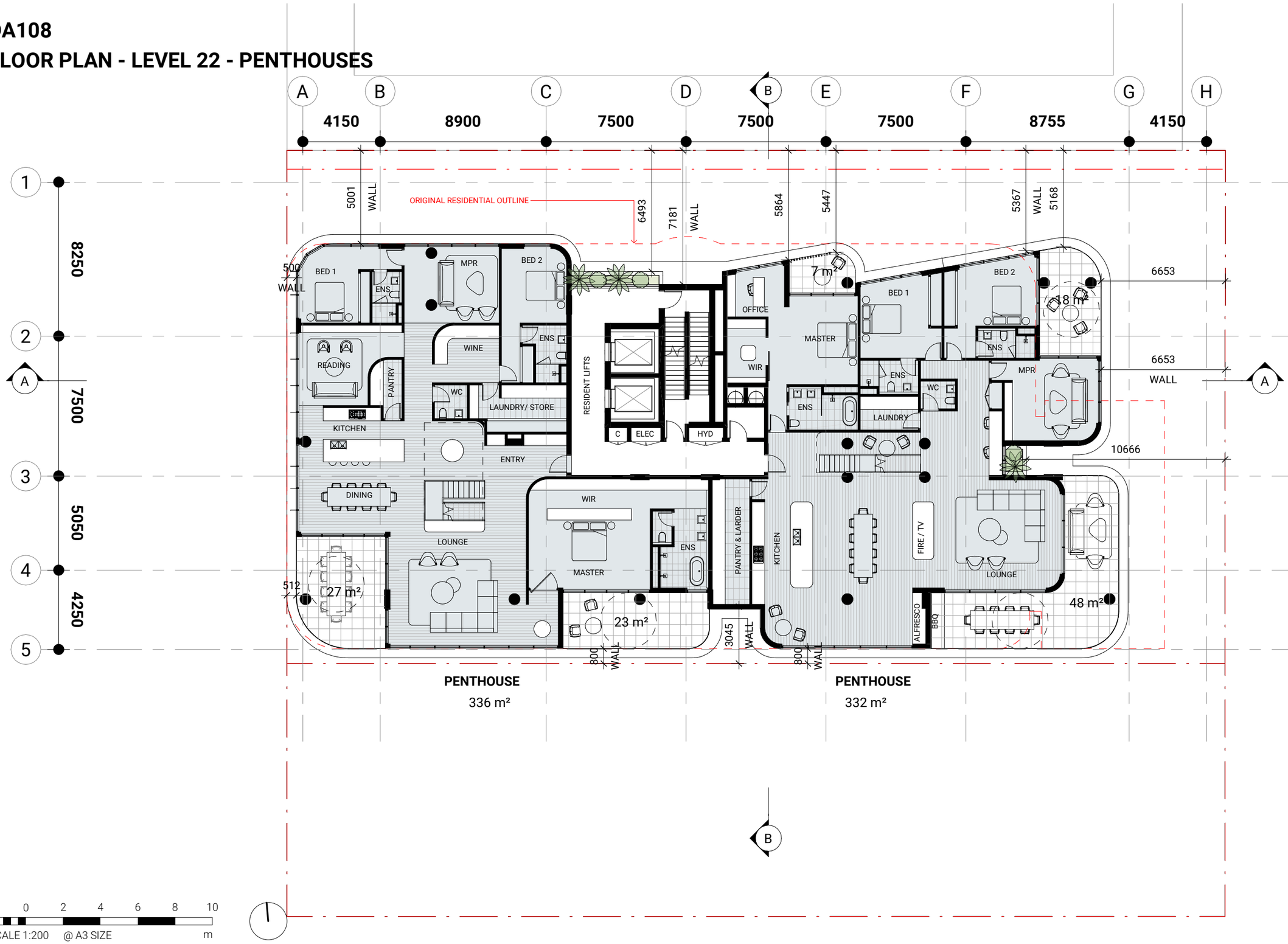
plus architecture

DA107
FLOOR PLAN - LEVELS 16-21 - SUB-PENTHOUSES

2 0 2 4 6 8 10
SCALE 1:200 @ A3 SIZE m

ISSUE 2
Date of Issue | 22.07.22

DA108
FLOOR PLAN - LEVEL 22 - PENTHOUSES



2 0 2 4 6 8 10

SCALE 1:200 @ A3 SIZE m

ISSUE 2

Date of Issue | 22.07.22

70526 | UNTITLED | 5 HERCULES STREET, HAMILTON | BRISBANE

PLUS ARCHITECTURE

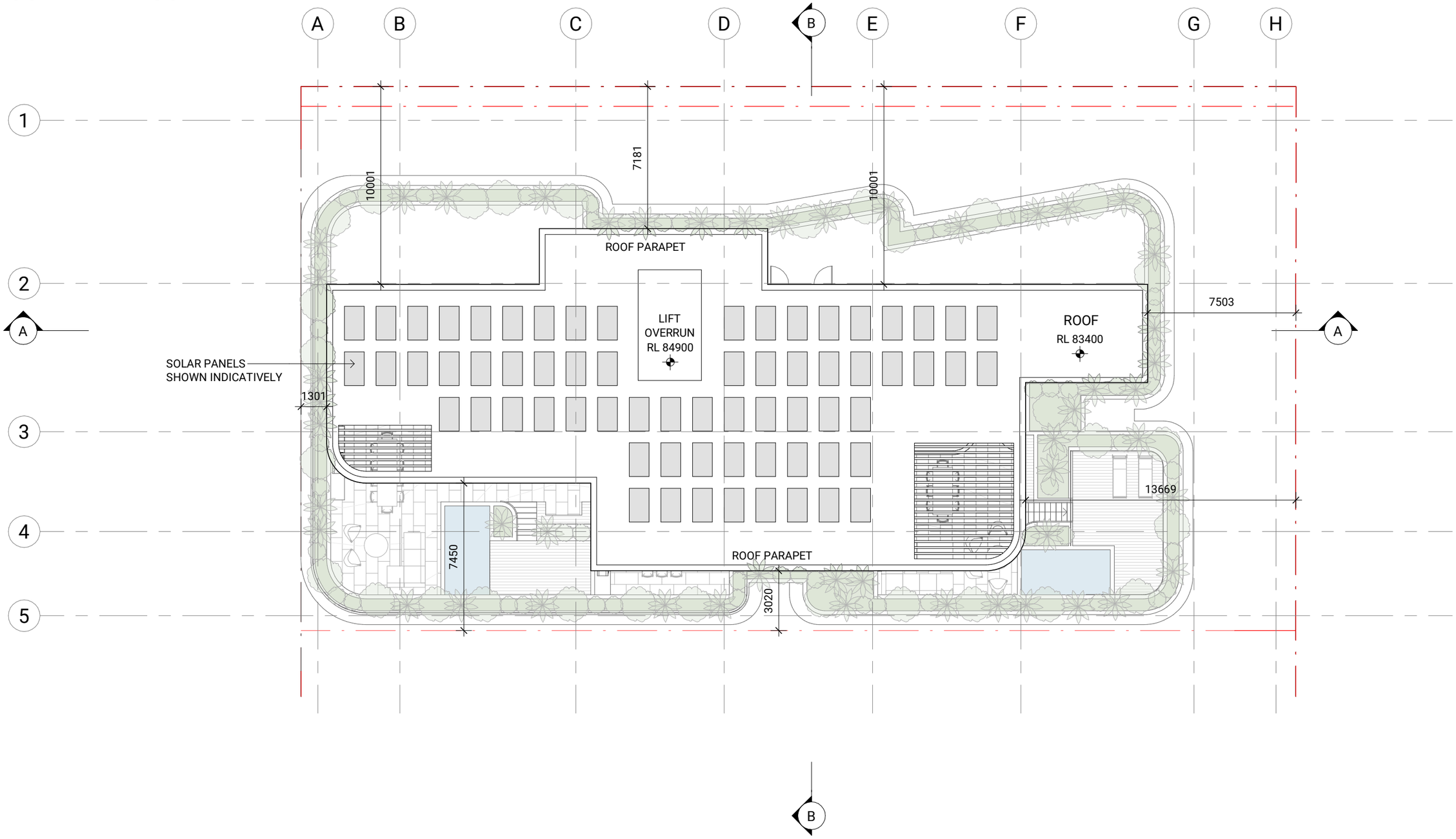
plus architecture

DA109
FLOOR PLAN - LEVEL 23 - ROOF TERRACE PLAN

2 0 2 4 6 8 10
SCALE 1:200 @ A3 SIZE m

ISSUE 2
Date of Issue | 22.07.22

DA110
FLOOR PLAN - ROOF PLAN



2 0 2 4 6 8 10

SCALE 1:200 @ A3 SIZE m

ISSUE 2
Date of Issue | 22.07.22

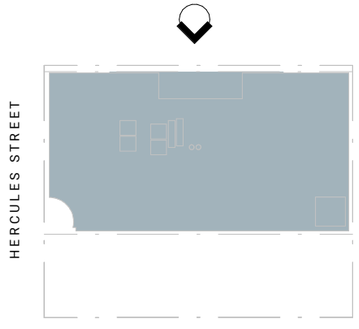
70526 | UNTITLED | 5 HERCULES STREET, HAMILTON | BRISBANE

PLUS ARCHITECTURE

DA200
ELEVATION - NORTH

MATERIAL LEGEND

BR BRICK PATTERN
BA1 VERTICAL CONCRETE BLADES (TOWER)
BA2 TIMBER LOOK BATTENS (PODIUM)
C1 CONCRETE TEXTURED FINISH
C2 COLOURED CONCRETE
F1 ALUMINIUM GLAZING SUITE
G1 TINTED GLAZING
G2 CLEAR GLAZING FEATURE MULLION
G3 CLEAR POOL WINDOW

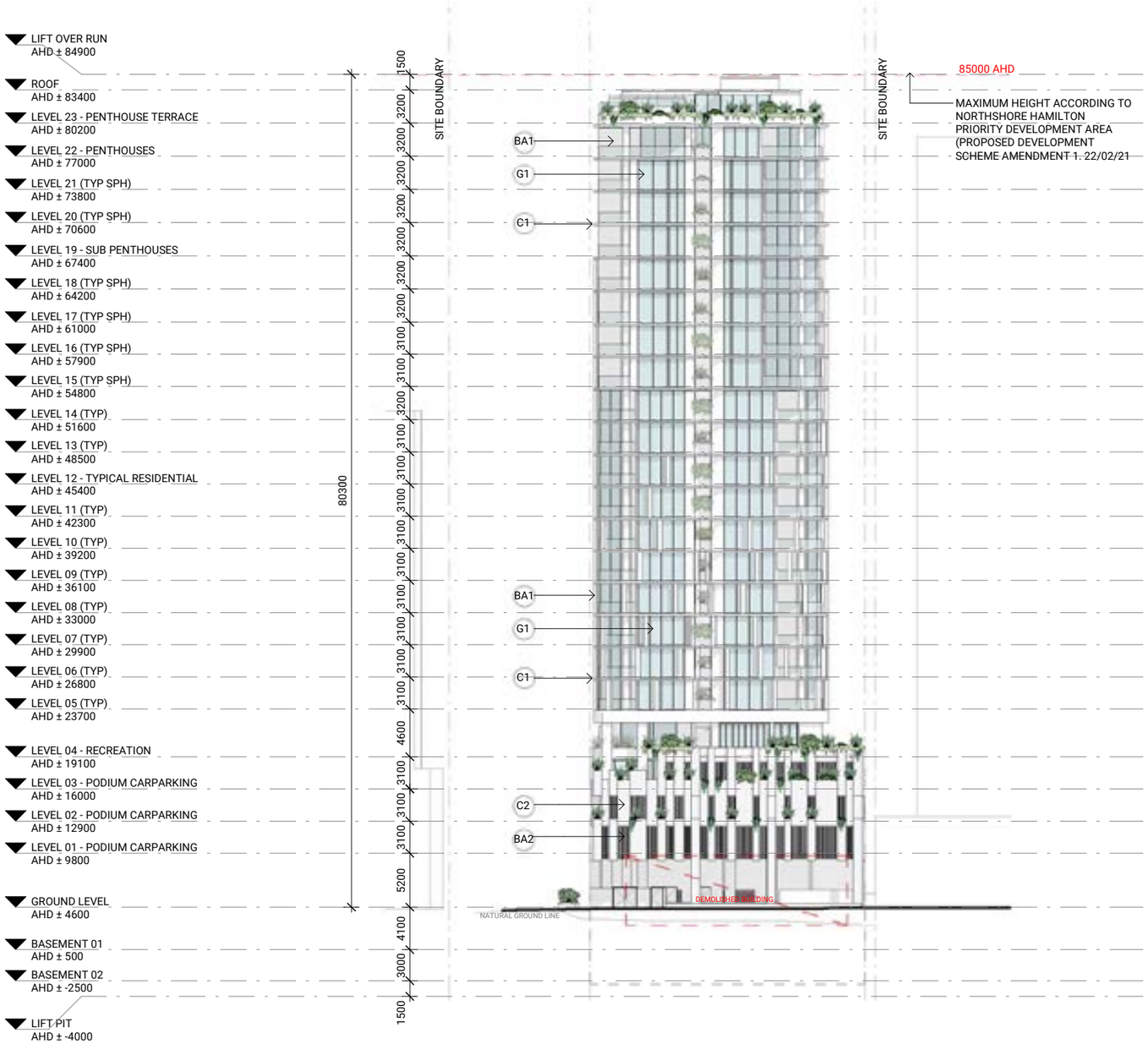


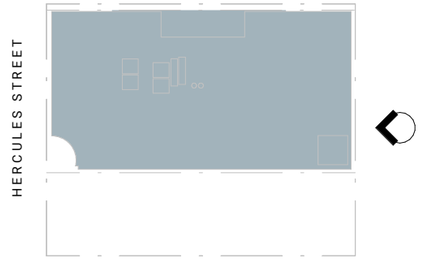
2 0 2 4 6 8 10
SCALE 1:200 @ A3 SIZE m

DA201
ELEVATION - EAST

MATERIAL LEGEND

BR BRICK PATTERN
BA1 VERTICAL CONCRETE BLADES (TOWER)
BA2 TIMBER LOOK BATTENS (PODIUM)
C1 CONCRETE TEXTURED FINISH
C2 COLOURED CONCRETE
F1 ALUMINIUM GLAZING SUITE
G1 TINTED GLAZING
G2 CLEAR GLAZING FEATURE MULLION
G3 CLEAR POOL WINDOW



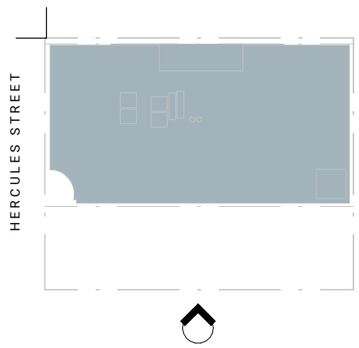


2 0 2 4 6 8 10
SCALE 1:200 @ A3 SIZE m

DA202
ELEVATION - SOUTH

MATERIAL LEGEND

BR BRICK PATTERN
BA1 VERTICAL CONCRETE BLADES (TOWER)
BA2 TIMBER LOOK BATTENS (PODIUM)
C1 CONCRETE TEXTURED FINISH
C2 COLOURED CONCRETE
F1 ALUMINIUM GLAZING SUITE
G1 TINTED GLAZING
G2 CLEAR GLAZING FEATURE MULLION
G3 CLEAR POOL WINDOW

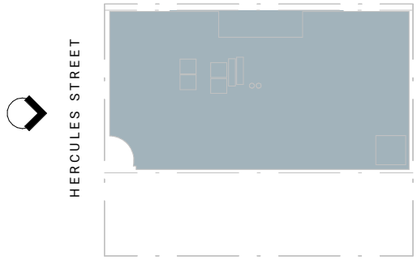


2 0 2 4 6 8 10
SCALE 1:200 @ A3 SIZE m

DA203
ELEVATION - WEST

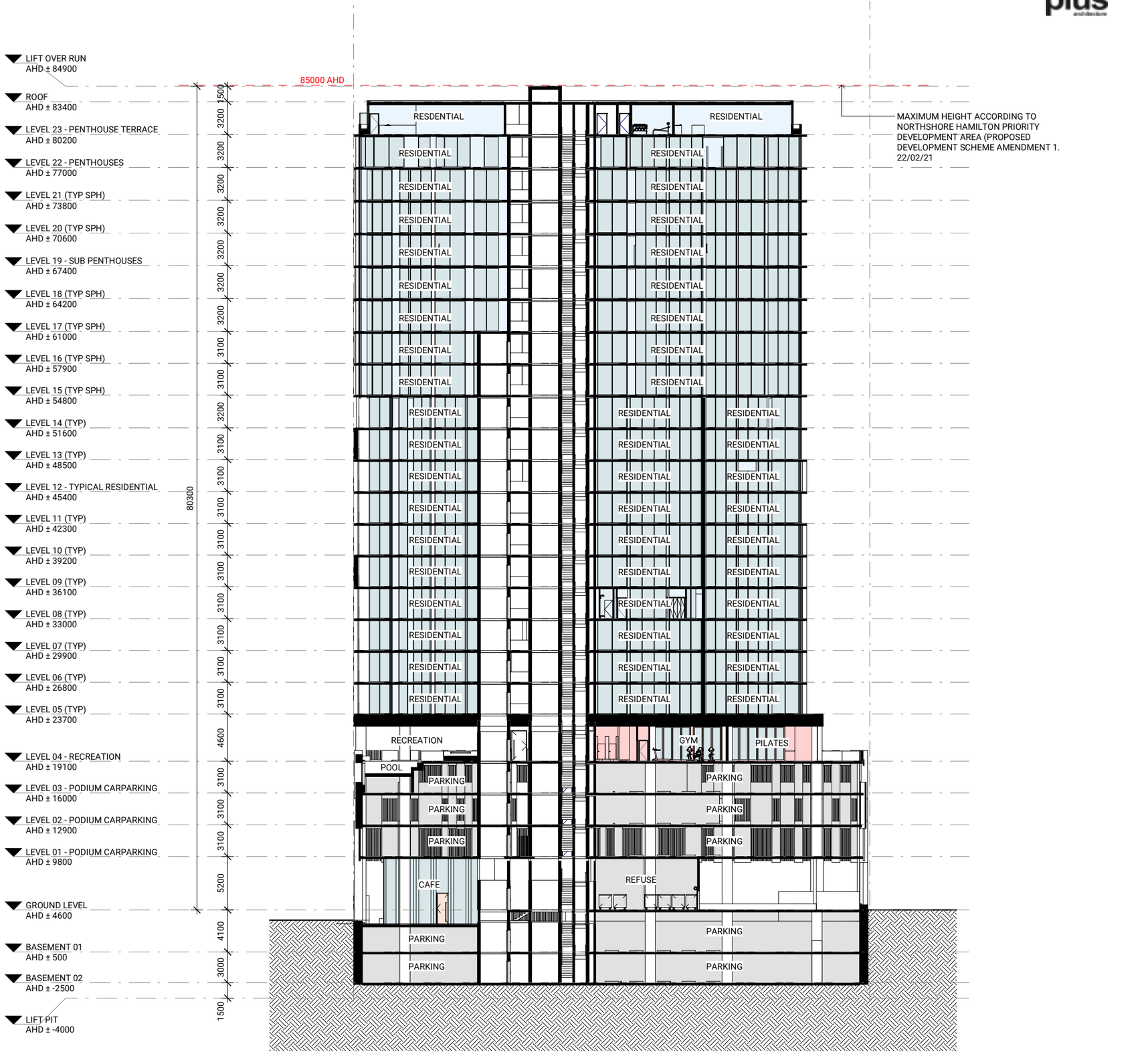
MATERIAL LEGEND

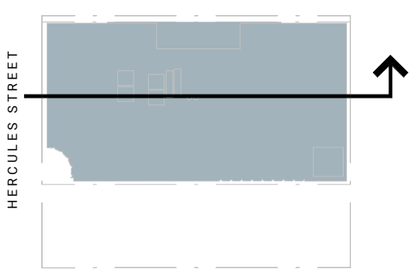
BR BRICK PATTERN
BA1 VERTICAL CONCRETE BLADES (TOWER)
BA2 TIMBER LOOK BATTENS (PODIUM)
C1 CONCRETE TEXTURED FINISH
C2 COLOURED CONCRETE
F1 ALUMINIUM GLAZING SUITE
G1 TINTED GLAZING
G2 CLEAR GLAZING FEATURE MULLION
G3 CLEAR POOL WINDOW



2 0 2 4 6 8 10
SCALE 1:200 @ A3 SIZE m

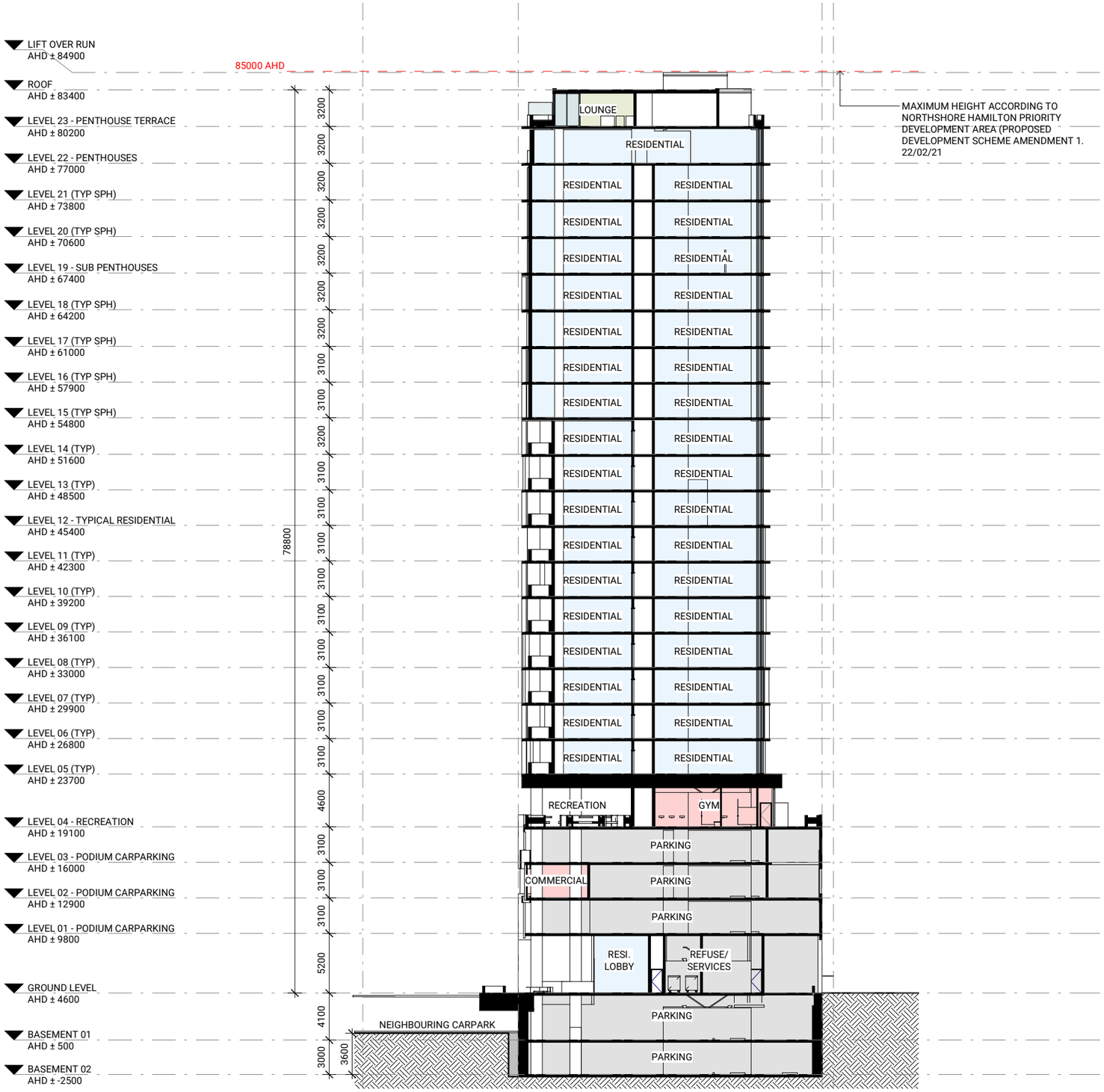
DA300
BUILDING SECTION A

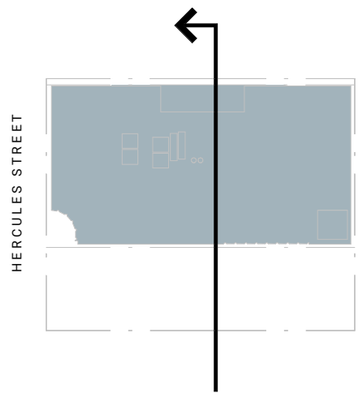




2 0 2 4 6 8 10
SCALE 1:200 @ A3 SIZE m

DA301
BUILDING SECTION B

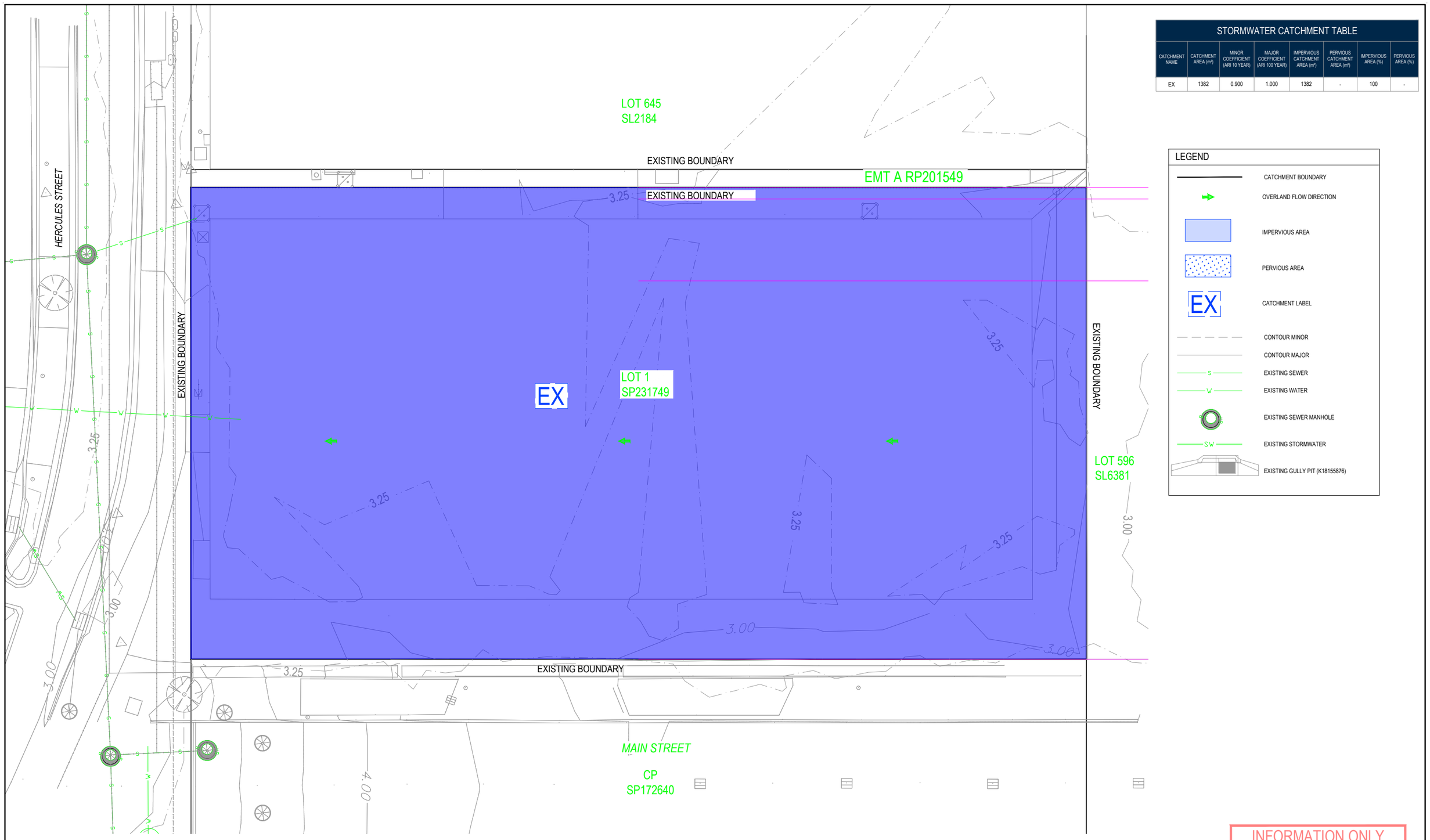




2 0 2 4 6 8 10

SCALE 1:200 @ A3 SIZE m

Appendix F - CONCEPT PLANS



STORMWATER CATCHMENT TABLE

CATCHMENT NAME	CATCHMENT AREA (m²)	MINOR COEFFICIENT (ARI 10 YEAR)	MAJOR COEFFICIENT (ARI 100 YEAR)	IMPERVIOUS CATCHMENT AREA (m²)	PERVIOUS CATCHMENT AREA (m²)	IMPERVIOUS AREA (%)	PERVIOUS AREA (%)
EX	1382	0.900	1.000	1382	-	100	-

LEGEND

- CATCHMENT BOUNDARY
- OVERLAND FLOW DIRECTION
- IMPERVIOUS AREA
- PERVIOUS AREA
- EX — CATCHMENT LABEL
- CONTOUR MINOR
- CONTOUR MAJOR
- S — EXISTING SEWER
- W — EXISTING WATER
- EXISTING SEWER MANHOLE
- SW — EXISTING STORMWATER
- EXISTING GULLY PIT (K18155876)

INFORMATION ONLY

SCALE 1 : 100 (m)
0 1 2 3 4 5

NAXOS ENGINEERS
T 1300 598 544
E info@naxosengineers.com.au
Level 1, Suite B
557 Gregory Terrace, Fortitude Valley, Qld 4006
PO Box 224, Spring Hill QLD 4004
NAXOSENGINEERS.COM.AU

AMENDMENTS

No.	DATE	DESCRIPTION	DRAWN
A	07.07.2022	PRELIMINARY ISSUE	SD
B	29.07.2022	ARCHITECTURAL UPDATE	SD

Associated Consultant:
PLUS ARCHITECTURE

Approved: RPEQ. Date:
Drawn: Design: Checked: Supervisor:

DISCLAIMER NOTE.

THIS PLAN WAS PREPARED FOR DISCUSSION AND ESTIMATING PURPOSES. THE LAYOUT SHOWN IS INDICATIVE ONLY AND MAY BE SUBJECT TO LOCAL AUTHORITY / GOVERNMENT REQUIREMENTS AND FURTHER DETAILED ENGINEERING DESIGN.

THIS PLAN SHALL NOT BE USED FOR CONSTRUCTION PURPOSES AND IS NOT TO BE USED FOR ANY OTHER PURPOSE OR BY ANY OTHER PERSON OR CORPORATION OTHER THAN LISTED AS THE "CLIENT" ON THIS PLAN.

NAXOS ENGINEERS PTY. LTD. ACCEPTS NO RESPONSIBILITY FOR ANY LOSS OR DAMAGE SUFFERED HOWEVER SO ARISING TO ANY PERSON OR CORPORATION WHO MAY USE OR RELY ON THIS PLAN IN CONTRAVENTION OF THE TERMS OF THIS CLAUSE. ALL COPIES OF THIS PLAN MUST INCLUDE THIS DISCLAIMER.

IMAGERY, CADASTRAL AND SURVEY DATA DISCLAIMER

WHILE EVERY CARE IS TAKEN BY NAXOS ENGINEERS PTY LTD TO ENSURE THE ACCURACY OF THE DATA SUPPLIED BY LOCAL AUTHORITIES, DIAL BEFORE YOU DIG (DBYD) RECORDS, AS CONSTRUCTED INFORMATION AND DETAILED SURVEY, WE MAKE NO REPRESENTATIONS OR WARRANTIES ABOUT ITS ACCURACY, RELIABILITY, COMPLETENESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE AND DISCLAIM ALL RESPONSIBILITY AND ALL LIABILITY (INCLUDING WITHOUT LIMITATION, LIABILITY IN NEGLIGENCE) FOR ALL EXPENSES, LOSSES, DAMAGES (INCLUDING INDIRECT OR CONSEQUENTIAL DAMAGE) AND COSTS WHICH MAY BE INCURRED AS A RESULT OF DATA BEING INACCURATE OR INCOMPLETE IN ANY WAY AND FOR ANY REASON.

STORMWATER CATCHMENT PRE-DEVELOPMENT

North:
Orig. Drg. Size A1
Size of Land: 0.1333
Scale:
Client: LIMITLESS RESIDENTIAL NO.9 PTY LTD
Project: PROPOSED UNIT (100) DEVELOPMENT AT 5 HERCULES STREET, HAMILTON
Job No. C20-272
Drawing No. SK001
Revision: B

STORMWATER CATCHMENT TABLE

CATCHMENT NAME	CATCHMENT AREA (m²)	MINOR COEFFICIENT (ARI 10 YEAR)	MAJOR COEFFICIENT (ARI 100 YEAR)	IMPERVIOUS CATCHMENT AREA (m²)	PERVIOUS CATCHMENT AREA (m²)	IMPERVIOUS AREA (%)	PERVIOUS AREA (%)
AA	1382	0.890	1.000	1335	47	96.6	3.4

LEGEND

- CATCHMENT BOUNDARY
- OVERLAND FLOW DIRECTION
- IMPERVIOUS AREA
- PERVIOUS AREA
- AA — CATCHMENT LABEL
- CONTOUR MINOR
- CONTOUR MAJOR
- S — EXISTING SEWER
- W — EXISTING WATER
- SEWER MANHOLE
- EXISTING GULLY PIT (K18155876)
- PROPOSED STORMWATER PIPE
- PROPOSED FIELD INLET
- PROPOSED WATER

INFORMATION ONLY

SCALE 1 : 100 (m) 0 1 2 3 4 5

NAXOS ENGINEERS
T 1300 598 544
E info@naxosengineers.com.au
Level 1, Suite B
557 Gregory Terrace, Fortitude Valley, Qld 4006
PO Box 224, Spring Hill QLD 4004
NAXOSENGINEERS.COM.AU

AMENDMENTS

No.	DATE	DESCRIPTION	DRAWN
A	07.07.2022	PRELIMINARY ISSUE	SD
B	29.07.2022	ARCHITECTURAL UPDATE	SD

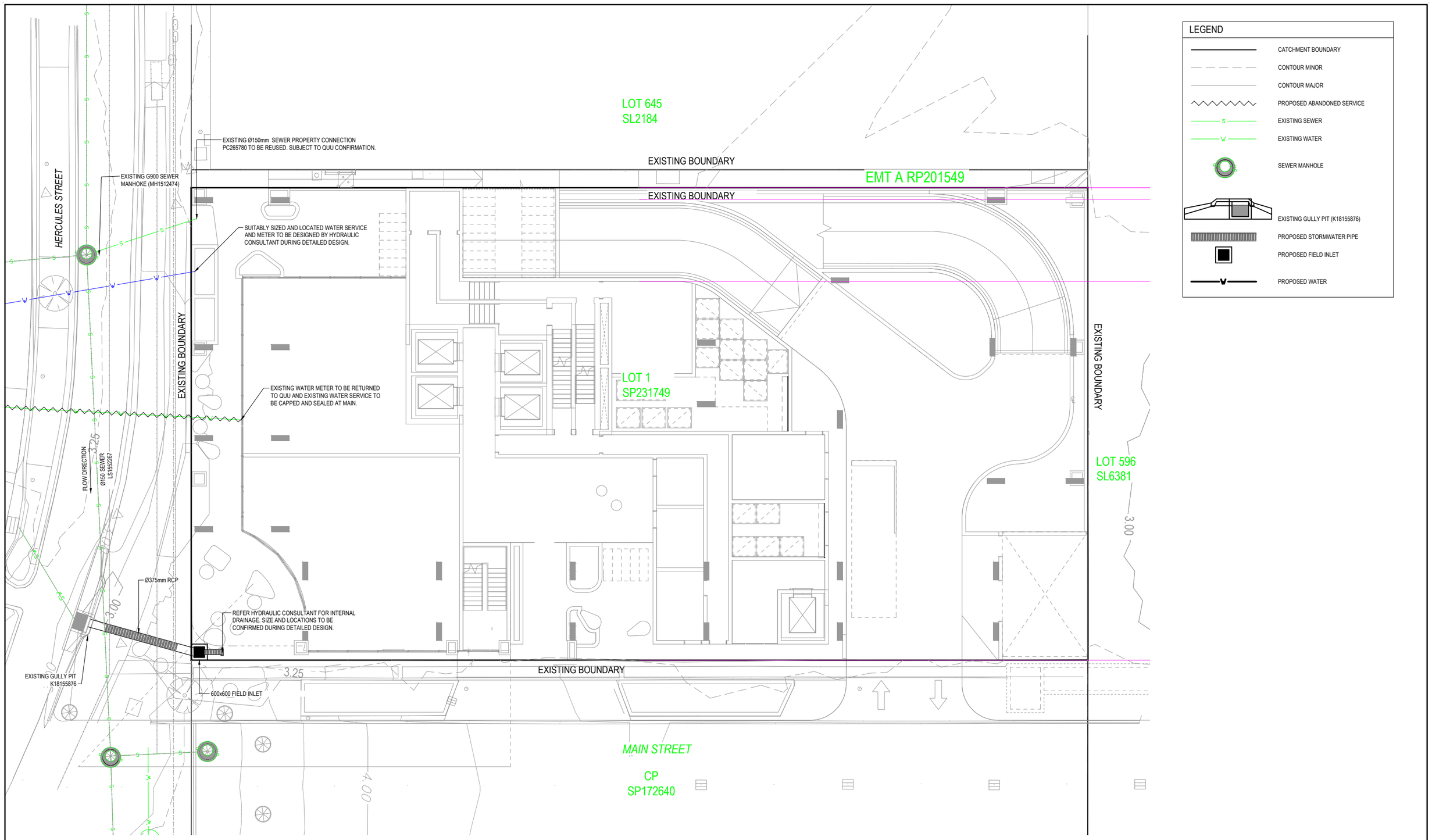
Associated Consultant:
PLUS ARCHITECTURE

Approved:
RPEQ. Date:

Drawn: Design: Checked: Supervisor:

STORMWATER CATCHMENT POST-DEVELOPMENT

North:
Orig. Drg. Size A1
Size of Land: 0.1333
Scale:
Client: LIMITLESS RESIDENTIAL NO.9 PTY LTD
Project: PROPOSED UNIT (100) DEVELOPMENT AT 5 HERCULES STREET, HAMILTON
Job No. C20-272
Drawing No. SK002
Revision: B



INFORMATION ONLY

SCALE 1 : 100
0 1 2 3 4 5 (m)

NAXOS
ENGINEERS
T 1300 598 544
E info@naxosengineers.com.au
Level 1, Suite B
557 Gregory Terrace, Fortitude Valley, Qld 4006
PO Box 224, Spring Hill QLD 4004
NAXOSENGINEERS.COM.AU

AMENDMENTS

No.	DATE	DESCRIPTION	DRAWN
A	07.07.2022	PRELIMINARY ISSUE	SD
B	29.07.2022	ARCHITECTURAL UPDATE	SD

Associated Consultant:
PLUS ARCHITECTURE

Approved:
RPEQ. Date:
Drawn: Design:
Checked: Supervisor:

DISCLAIMER NOTE:

THIS PLAN WAS PREPARED FOR DISCUSSION AND ESTIMATING PURPOSES. THE LAYOUT SHOWN IS INDICATIVE ONLY AND MAY BE SUBJECT TO LOCAL AUTHORITY / GOVERNMENT REQUIREMENTS AND FURTHER DETAILED ENGINEERING DESIGN.

THIS PLAN SHALL NOT BE USED FOR CONSTRUCTION PURPOSES AND IS NOT TO BE USED FOR ANY OTHER PURPOSE OR BY ANY OTHER PERSON OR CORPORATION OTHER THAN LISTED AS THE "CLIENT" ON THIS PLAN.

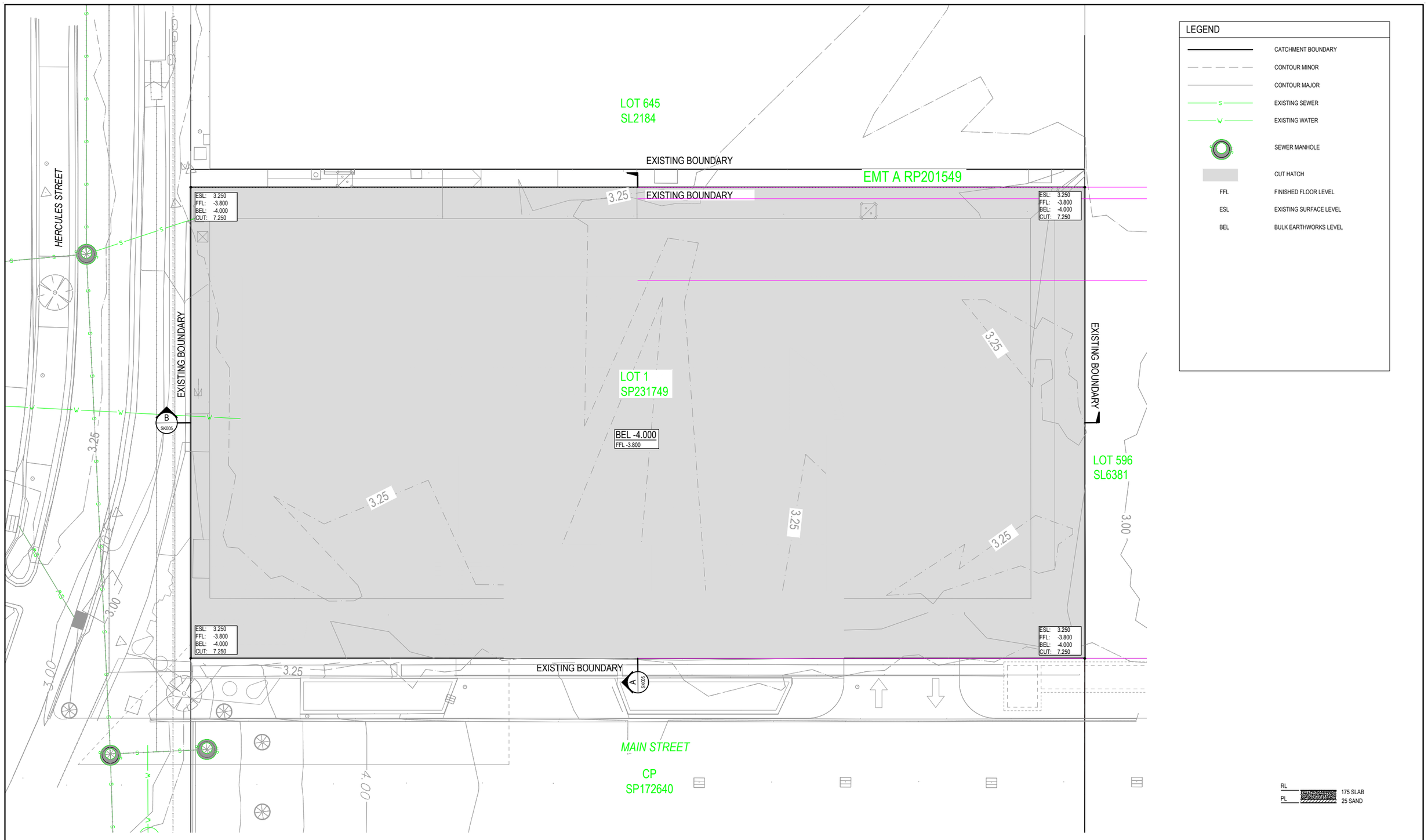
NAXOS ENGINEERS PTY. LTD. ACCEPTS NO RESPONSIBILITY FOR ANY LOSS OR DAMAGE SUFFERED HOWEVER SO ARISING TO ANY PERSON OR CORPORATION WHO MAY USE OR RELY ON THIS PLAN IN CONTRAVENTION OF THE TERMS OF THIS CLAUSE. ALL COPIES OF THIS PLAN MUST INCLUDE THIS DISCLAIMER.

IMAGERY, CADASTRAL AND SURVEY DATA DISCLAIMER

WHILE EVERY CARE IS TAKEN BY NAXOS ENGINEERS PTY LTD TO ENSURE THE ACCURACY OF THE DATA SUPPLIED BY LOCAL AUTHORITIES, DIAL BEFORE YOU DIG (DBYD) RECORDS, AS CONSTRUCTED INFORMATION AND DETAILED SURVEY, WE MAKE NO REPRESENTATIONS OR WARRANTIES ABOUT ITS ACCURACY, RELIABILITY, COMPLETENESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE AND DISCLAIM ALL RESPONSIBILITY AND ALL LIABILITY (INCLUDING WITHOUT LIMITATION, LIABILITY IN NEGLIGENCE) FOR ALL EXPENSES, LOSSES, DAMAGES (INCLUDING INDIRECT OR CONSEQUENTIAL DAMAGE) AND COSTS WHICH MAY BE INCURRED AS A RESULT OF DATA BEING INACCURATE OR INCOMPLETE IN ANY WAY AND FOR ANY REASON.

CONCEPT SERVICES PLAN

North:
Orig. Drg. Size A1
Size of Land: 0.1333
Scale:
Client: LIMITLESS RESIDENTIAL NO.9 PTY LTD
Project: PROPOSED UNIT (100) DEVELOPMENT AT 5 HERCULES STREET, HAMILTON
Job No. C20-272
Drawing No. SK003
Revision: B



LEGEND

- CATCHMENT BOUNDARY
- CONTOUR MINOR
- CONTOUR MAJOR
- S — EXISTING SEWER
- W — EXISTING WATER
- SEWER MANHOLE
- CUT HATCH
- FFL — FINISHED FLOOR LEVEL
- ESL — EXISTING SURFACE LEVEL
- BEL — BULK EARTHWORKS LEVEL

INFORMATION ONLY

SCALE 1 : 100
0 1 2 3 4 5 (m)

NAXOS ENGINEERS
T 1300 598 544
E info@naxosengineers.com.au
Level 1, Suite B
557 Gregory Terrace, Fortitude Valley, Qld 4006
PO Box 224, Spring Hill QLD 4004
NAXOSENGINEERS.COM.AU

AMENDMENTS

No.	DATE	DESCRIPTION	DRAWN
A	07.07.2022	PRELIMINARY ISSUE	SD
B	29.07.2022	ARCHITECTURAL UPDATE	SD

Associated Consultant:
PLUS ARCHITECTURE

Approved:
RPEQ. Date:
Drawn:
Design:
Checked:
Supervisor:

DISCLAIMER NOTE:

THIS PLAN WAS PREPARED FOR DISCUSSION AND ESTIMATING PURPOSES. THE LAYOUT SHOWN IS INDICATIVE ONLY AND MAY BE SUBJECT TO LOCAL AUTHORITY / GOVERNMENT REQUIREMENTS AND FURTHER DETAILED ENGINEERING DESIGN.

THIS PLAN SHALL NOT BE USED FOR CONSTRUCTION PURPOSES AND IS NOT TO BE USED FOR ANY OTHER PURPOSE OR BY ANY OTHER PERSON OR CORPORATION OTHER THAN LISTED AS THE "CLIENT" ON THIS PLAN.

NAXOS ENGINEERS PTY. LTD. ACCEPTS NO RESPONSIBILITY FOR ANY LOSS OR DAMAGE SUFFERED HOWEVER SO ARISING TO ANY PERSON OR CORPORATION WHO MAY USE OR RELY ON THIS PLAN IN CONTRAVENTION OF THE TERMS OF THIS CLAUSE. ALL COPIES OF THIS PLAN MUST INCLUDE THIS DISCLAIMER.

IMAGERY, CADASTRAL AND SURVEY DATA DISCLAIMER

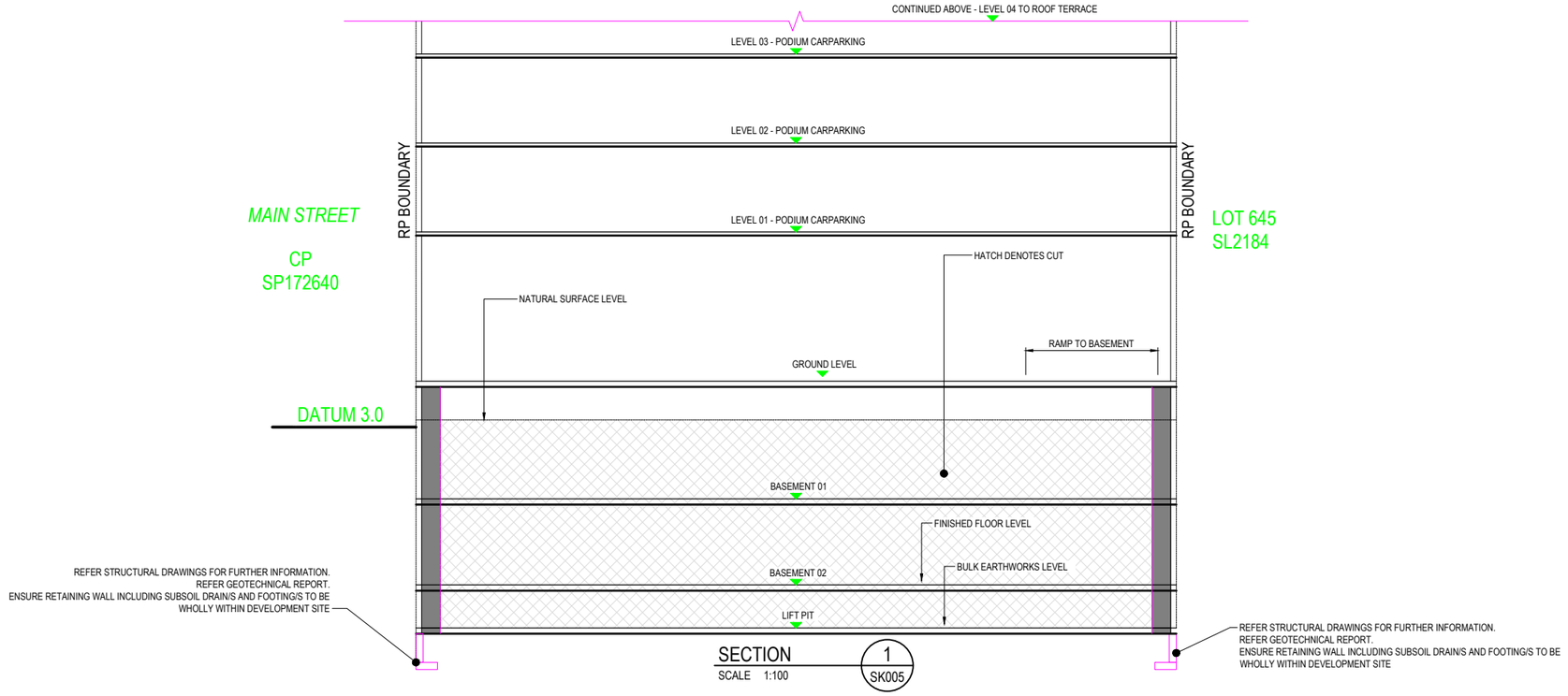
WHILE EVERY CARE IS TAKEN BY NAXOS ENGINEERS PTY LTD TO ENSURE THE ACCURACY OF THE DATA SUPPLIED BY LOCAL AUTHORITIES, DIAL BEFORE YOU DIG (DBYD) RECORDS, AS CONSTRUCTED INFORMATION AND DETAILED SURVEY, WE MAKE NO REPRESENTATIONS OR WARRANTIES ABOUT ITS ACCURACY, RELIABILITY, COMPLETENESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE AND DISCLAIM ALL RESPONSIBILITY AND ALL LIABILITY (INCLUDING WITHOUT LIMITATION, LIABILITY IN NEGLIGENCE) FOR ALL EXPENSES, LOSSES, DAMAGES (INCLUDING INDIRECT OR CONSEQUENTIAL DAMAGE) AND COSTS WHICH MAY BE INCURRED AS A RESULT OF DATA BEING INACCURATE OR INCOMPLETE IN ANY WAY AND FOR ANY REASON.

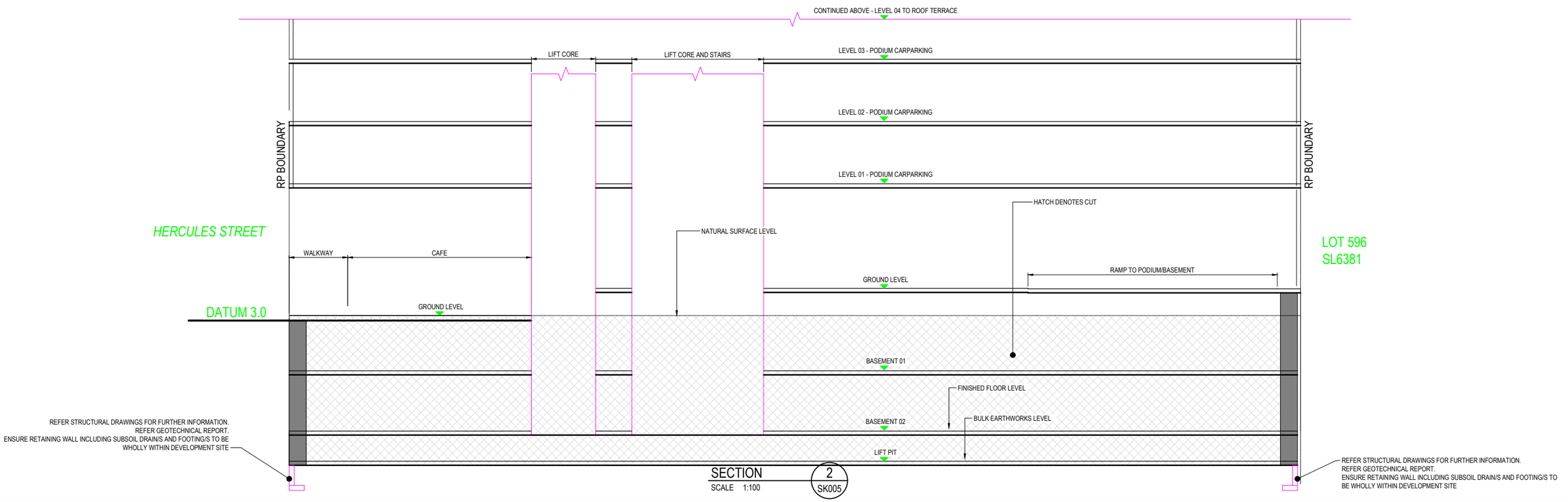
CONCEPT BULK EARTHWORKS PLAN

North:
Orig. Drg. Size A1
Size of Land: 0.1333
Scale:
Client: LIMITLESS RESIDENTIAL NO.9 PTY LTD
Project: PROPOSED UNIT (100) DEVELOPMENT AT 5 HERCULES STREET, HAMILTON
Job No. C20-272
Drawing No. SK004
Revision: B

INFORMATION ONLY

SCALE 1 : 100
0 1 2 3 4 5 (m)





NAXOS ENGINEERS
T 1300 598 544
E info@naxosengineers.com.au
Level 1, Suite B
557 Gregory Terrace, Fortitude Valley, Qld 4006
PO Box 224, Spring Hill QLD 4004
NAXOSENGINEERS.COM.AU

AMENDMENTS

No.	DATE	DESCRIPTION	DRAWN
A	07.07.2022	PRELIMINARY ISSUE	SD
B	29.07.2022	ARCHITECTURAL UPDATE	SD

Associated Consultant:
PLUS ARCHITECTURE

Approved:
RPEQ. Date:
Drawn: Design:
Checked: Supervisor:

DISCLAIMER NOTE:

THIS PLAN WAS PREPARED FOR DISCUSSION AND ESTIMATING PURPOSES. THE LAYOUT SHOWN IS INDICATIVE ONLY AND MAY BE SUBJECT TO LOCAL AUTHORITY / GOVERNMENT REQUIREMENTS AND FURTHER DETAILED ENGINEERING DESIGN.

THIS PLAN SHALL NOT BE USED FOR CONSTRUCTION PURPOSES AND IS NOT TO BE USED FOR ANY OTHER PURPOSE OR BY ANY OTHER PERSON OR CORPORATION OTHER THAN LISTED AS THE "CLIENT" ON THIS PLAN.

NAXOS ENGINEERS PTY. LTD. ACCEPTS NO RESPONSIBILITY FOR ANY LOSS OR DAMAGE SUFFERED HOWEVER SO ARISING TO ANY PERSON OR CORPORATION WHO MAY USE OR RELY ON THIS PLAN IN CONTRAVENTION OF THE TERMS OF THIS CLAUSE. ALL COPIES OF THIS PLAN MUST INCLUDE THIS DISCLAIMER.

IMAGERY, CADASTRAL AND SURVEY DATA DISCLAIMER

WHILE EVERY CARE IS TAKEN BY NAXOS ENGINEERS PTY LTD TO ENSURE THE ACCURACY OF THE DATA SUPPLIED BY LOCAL AUTHORITIES, DIAL BEFORE YOU DIG (DBYD) RECORDS, AS CONSTRUCTED INFORMATION AND DETAILED SURVEY, WE MAKE NO REPRESENTATIONS OR WARRANTIES ABOUT ITS ACCURACY, RELIABILITY, COMPLETENESS OR SUITABILITY FOR ANY PARTICULAR PURPOSE AND DISCLAIM ALL RESPONSIBILITY AND ALL LIABILITY (INCLUDING WITHOUT LIMITATION, LIABILITY IN NEGLIGENCE) FOR ALL EXPENSES, LOSSES, DAMAGES (INCLUDING INDIRECT OR CONSEQUENTIAL DAMAGE) AND COSTS WHICH MAY BE INCURRED AS A RESULT OF DATA BEING INACCURATE OR INCOMPLETE IN ANY WAY AND FOR ANY REASON.

CONCEPT BULK EARTHWORKS SECTIONS SHEET 1

North:
Orig. Drg. Size A1
Size of Land: 0.1333
Scale:
Client: LIMITLESS RESIDENTIAL NO.9 PTY LTD
Project: PROPOSED UNIT (100) DEVELOPMENT AT 5 HERCULES STREET, HAMILTON
Job No. C20-272
Drawing No. SK005
Revision: B

Appendix G – RATIONAL METHOD CALCULATIONS

STORMWATER DISCHARGE CALCULATION

Refer QUDM 4th Ed. Section 4.3, "The Rational Method"

Project Number	**C20-272**
Project Address	**5 Hercules Street, Hamilton**
Description	**Pre-Development Vs Post-Development**
Author	**SD**
Date	**29-Jul-22**

NAXOS ENGINEERS

NAXOS ENGINEERS PTY LTD
ABN 65 613 555 687
PO Box 224, Spring Hill QLD 4004
1300 598 544
info@naxosengineers.com.au

Catchment Details

Development Type	Pre-Development	Post-Development
Catchment Area (m^2)	1382	1382
Total Area (ha)	0.138	0.138
Impervious Area (m^2)	1382	1335
Pervious Area (m^2)	0	47

Fraction Impervious Details

Calculated Fraction Impervious fi (%)	1.000	0.966
Manually override Fraction Impervious (fi)		
Fraction Impervious (fi) used	1.000	0.966
Is Fraction Impervious (fi) is less than 0.2 (If Yes soil properties required)	NO	NO
Soil Description		
Soil Permeability		

1 hour rainfall intensity ($^1I_{10}$) Details

IFD value calculated from IFD Input (mm/hr)	64.40
Manually override IFD value (mm/hr)	
IFD value used (mm/hr)	64.40

Discharge Ceofficient C_{10} Details

QUDM 10 year Discharge Ceofficient C_{10}	0.900	0.890
Manually override Discharge Ceofficient C_{10}	0.9	0.89
10 year Discharge Ceofficient C_{10} used:	0.900	0.890

Time of Concentration T_c Details

Time of Concentration T_c (min.) :	5.000	5.000

		Pre-Development			Post-Development		
Flood Event	**Frequency Factor**	**Coeff. of Discharge**	**Intensity**	**Peak Discharge**	**Coeff. of Discharge**	**Intensity**	**Peak Discharge**
ARI	**F_y**	**$C_y = F_y \times C_{10}$**	**mm/hr**	**Q_y**	**$C_y = F_y \times C_{10}$**	**mm/hr**	**Q_y**
1	0.80	0.720	113	0.031	0.712	113	0.031
2	0.85	0.765	127	0.037	0.757	127	0.037
5	0.95	0.855	174	0.057	0.846	174	0.056
10	1.00	0.900	205	0.071	0.890	205	0.070
20	1.05	0.945	236	0.086	0.935	236	0.085
50	1.15	1.000	276	0.106	1.000	276	0.106
100	1.20	1.000	306	0.117	1.000	306	0.117

Rational Method

$Q = CIA / 360$

Appendix H - FILTER BASKET OPERATION & MAINTENANCE MANUAL

Model Number

Job Number

SPEL StormSack

OPERATIONS & MAINTENANCE

www.spel.com.au

SPEL ENVIRONMENTAL
INTEGRATED WATER SOLUTIONS

Manual Introduction

CHAPTER 1

Maintenance of the SPEL StormSack is essential to preservation of its condition to ensure lifetime operational effectiveness.

The SPEL StormSack is a highly engineered water quality device that is deployed directly in the stormwater system as primary treatment to capture contaminants close to the surface. To ensure full operational capacity, it is vital to ensure that the pollutants it captures are periodically removed, and filtration components are thoroughly cleaned.

Maintenance frequencies and requirements of the SPEL StormSack are dependent on the biological factors of the site in which it is situated. These factors can include excessive sediment loading or occurrence of toxic chemicals due to the natural and unnatural factors such as site erosion, chemical spills or extreme storms.

This manual has been designed by the SPEL StormSack Manufacturer the client or device owner in the maintenance of the SPEL StormSacks.

This manual should be used in conjunction with the relevant site traffic management and safety plans, as well as any other provided documentation from SPEL.

SPEL StormSack Specifications/Features

CHAPTER 2

1. General Description

The SPEL StormSack provides effective filtration of solid pollutants and debris typical of urban runoff, while utilising the existing or new storm drain infrastructure. The StormSack is designed to rest on the flanges of conventional catch basin frames and is engineered for most hydraulic and cold climate conditions.

Components:

a. Adjustable Flange and Deflector: Aluminium Alloy 6063-T6
b. Splash Guard: neoprene rubber
c. StormSack: woven polypropylene geotextile with US Mesh 20
d. Corner Filler: Aluminium Allow 5052-H32
e. Lifting Tabs: Aluminium Allow 5052-H32
f. Replaceable Oil Boom: polypropylene 3 inch (76 mm) diameter
g. Mesh Liner: HDPE, diamond configuration
h. Support Hardware: CRES 300 Series

Sizes:

STANDARD SPEL STORMSACK TO SUIT PIT SIZES

- 450x450mm
- 600x600mm
- 900x600mm
- 900x900mm

Custom sizes (i.e. 1200x900mm) can be manufactured on short lead times.

Health and Safety

CHAPTER 3

1. Personal Health & Safety

When carrying out maintenance operations of the SPEL StormSack all contractors and staff personnel must comply with all current workplace health and safety legislation.

The below measures should be adhered as practically as possible:

- Comply with all applicable laws, regulations and standards
- All those involved are informed and understand their obligations in respect of the workplace health and safety legislation.
- Ensure responsibility is accepted by all employees to practice and promote a safe and healthy work environment.

2. Personal Protective Equipment

When carrying out maintenance operations of the SPEL StormSack, wearing the appropriate personal protective equipment is vital to reducing potential hazards. Personal protective equipment in this application includes:

- Eye protection
- Safety apron
- Fluorescent safety vest
- Form of skin protection
- Puncture resistant gloves
- Steel capped safety boots

3. Maintenance of the SPEL StormSacks is a specialist activity.

When carrying out maintenance operations of the SPEL StormSack, factors such as equipment handling methods, pollutants and site circumstances can impose potential risks to the maintainer and nearby civilians.

4. Captured Pollutants

The material captured by the SPEL StormSack can be harmful and needs to be handled correctly. The nature and amount of the captured pollutants depends on the characteristics of the site. Pollutants can include from organic material such as leaves and sticks through to debris such as plastics, glass and other foreign objects such as syringes.

5. Site Circumstances

It is essential that Occupational Safety and Health guidelines and site specific safety requirements are followed at all times. It is important that all following steps specified by SPEL are carried out to ensure safety in the entire maintenance operation. The general workplace hazards associated with working outdoors also need to be taken into account.

6. Equipment Handling

Handling activities such as a removing the drain grate a well as managing pedestrians and other non-worker personnel at the site should be exercised in accordance with specified safety procedures and guidelines.

CHAPTER 3

7. Confined Spaces

Confined space entry procedures are not covered in this manual. It is requested that all personnel carrying out maintenance of the SPEL StormSack must evaluate their own needs for confined space entry and compliance with occupational health and safety regulations

When maintenance operations cannot be carried out from the surface and there is a need to enter confined space, only personnel that currently hold a Confined Space Entry Permit are allowed to enter the confined space. All appropriate safety equipment must be worn, and only trained personnel are permitted to use any required breathing apparatus gear. Necessary measures and controls must always be exercised to meet the confined space entry requirements. Non trained staff are not permitted to participle in any confined space entries.

8. Traffic Management

Typically stormwater gully pits are situated on roads and carparks, or adjacent to roads in a footpath or swale. As traffic requirements vary depending on the circumstance of the site, separate traffic control plans should be prepared for each site.

The specific road safety requirements for each site can be obtained from the relevant road authority to ensure all maintenance operations comply with the laws and regulations. State government publications can also be useful to find out the signage requirements, placement of safety cones and barricades that are required when working on public roads.

Operations

CHAPTER 4

1. General Monitoring

The SPEL Stormsack must be checked on a regular basis to analyse whether it requires maintenance or cleaning.

As gully pit grates are usually quite heavy, it is vital to exercise the correct lifting techniques and also ensure that the area surrounding the open pit is shielded from access of non-work personnel.

To ensure optimal performance of the SPEL Stormsack, the material collected by the filter bag should not exceed the level of approximately a half to two thirds of the total bag depth. When this material collected is showing signs of exceeding this level they should be scheduled to be emptied.

It is also recommended that additional monitoring is conducted following moderate to extreme rainfall events, especially when previous months have had little or no rainfall.

2. Gully Pit Cover Removal

CHAPTER 4

Opening a Hinged Pit Cover

A. Insert the lifting hooks beneath the grate

B. Check hinge points are not damaged and debris is not caught in the hinge area

C. Fully open pit grate, ensuring that the grate will stay in the open position without any external forces applied. Grates that do not remain open without being held, should be removed or secured during maintenance activities.

Opening a Non-Hinged Pit Cover

A. Place lifting hooks beneath grate, where possible in the four corners of the grate. Concrete lids may have Gatic lifting points, a key arrangement or holes in the lid, which may require special equipment such as Gatic lifters. Alternatively if safe to do so grip the grade with your hands.

B. Position each person on either side of the grate.

C. Lift the grate, ensuring that good heavy lifting posture is used at all times.

D. Place the grate on angle on the gutter, to allow for the lifting hooks to be removed.

E. For extremely heavy one-piece grates and concrete Gatic covers, insert the lifters in place and slide the lids back.

3. Cleaning Methods

CHAPTER 4

Cleaning using an inductor truck

A. Open Gully pit
B. Place the indicator hose, suck out all of the sediment, organic leaf material, litter and other materials that were collected in the filter bag
C. Allow the filter bag to be sucked up in the inductor hose for a few seconds to allow for the filter mesh pores to be cleaned.
D. Use the inductor hose to remove any build-up of material around the overflows and in the bottom of the pit.
E. Remove filter back from pit
F. Remove any sediment and litter caught in the Gully pit grate
G. Back opening channels are to be cleared of any debris to ensure flow is not hindered.
H. Thoroughly examine the structural integrity of the filter bag and frame.
I. Reinstate filter bag and gully pit covers

Hand Maintenance

A. Open Gully pit
B. Using the correct lifting technique, lift the StormSack out by the diagonal lifting corners fitted to the frame.
C. For extremely heavy and overfilled bags either use a hydraulic lifting arm to lift the StormSack, or remove excess material using a shovel or etc. Take care not to damage the bag when removing litter form the bag.
D. Lift the StormSack clear of the stormwater pit.



E. Position the StormSack over the collection bin or vehicle.
F. Lift and empty the bag by holding the bottom lifting loops only.
G. Brush the StormSack with a stiff brush to remove the sediment from the filter pores.
H. Thoroughly examine the structural integrity of the filter bag and frame.
I. Reinstate StormSack and gully pit covers.



4. SPEL StormSack Post Maintenance Inspection

CHAPTER 4

After the SPEL Stormsack has been removed, emptied and cleaned, it should be thoroughly examined to sure that:

- There is no movement or damage to the Cage
- There is no movement or damage to the plastic pit seals
- Structural integrity is in good condition including all fixings, joints and connections.
- The filter bag pores are not clogged
- The filter bag is not damaged in anyway.

The gully pit, pipe inlet/outlets and its cover should also be inspected to ensure there is no damage, debris build up or any potential to cause the SPEL StormSack to operate inefficiently.

5. Material Disposal

Collected materials can be potentially harmful to humans and the environment.

Once all captured material from the SPEL Stormsack has been removed, it must be taken off site and disposed of at a transfer station or a similar approved disposal site.

CHAPTER 4

6. SPEL StormSack Repairs

Depending on the extent of the damage to the SPEL StormSack unit, it can usually be repaired.

Small tears to the filter bag can be repaired by either sewing the tear back together with additional fabric to increase the strength of the stitching, or by sewing a patch of filter material onto the filter bag.

If large tears or irreparable damage to the frame and structure are present, it is advisable to replace the components.

All required spare parts can be sourced from SPEL Environmental at a cost to the owner of the SPEL Stormsack.

7. Emergency Procedures

Spills and blockages can be detrimental to the performance of a stormwater management system, potentially damaging the surrounding built infrastructure, waterways and environment.

Spill Procedures

In the event of a spill discharging into a gully pit, all effected sediment must be removed from the filter bags and the filter bags are to be removed and replaced with new filter bags. All additional cleaning as a result of the spill should also be carried out in accordance with the normal operation procedures.

Blockages

In the unlikely event of surface flooding around a gully pit which has a SPEL StormSack fitted, the following steps should be carried out:

A. Check the overflow bypass.

B. If overflow is clear and surface flooding still exists remove the SPEL StormSack and check the outlet pipe for blockages. Removal of the SPEL StormSack can be difficult if clogged with sediment and holding water.

C. If the filter is clogged brush the side walls to dislodge particles trapped at the interface allowing water to flow through the filter.

D. If the outlet pipe is blocked, it is likely that a gully sucker truck will be required to unblock it. Litter can be removed from the SPEL StormSack using the gully sucker truck before the SPEL StormSack is removed. If a gully sucker truck is not available and the SPEL StormSacks need to be removed by hand follow the below steps.

   i. Remove excess debris by hand or brush the side of the filter bag

   ii. Remove entire SPEL Stormsack by taking hold of the inside of the frame.

   iii. Unblock the outlet pipe

HEAD OFFICE

PO Box 6144
Silverwater NSW 1811

100 Silverwater Rd
Silverwater NSW 2128

Phone: +61 2 8705 0255
Fax: +61 2 8014 8699

DESIGN OFFICES

New South Wales	61 2 8705 0255
Canberra	61 2 6128 1000
Queensland	61 7 3271 6960
Victoria & Tasmania	61 3 5274 1336
South Australia	61 8 8275 8000
West Australia	61 8 9350 1000
Northern Territory	61 2 8705 0255
New Zealand	64 9 276 9045

www.spel.com.au

SPEL ENVIRONMENTAL
INTEGRATED WATER SOLUTIONS