

NAXOS

ENGINEERS

SITE BASED STORMWATER MANAGEMENT QUANTITY & QUALITY

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2024/1566

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Queensland
Government

PROPOSED MULTIPLE DWELLING AND FOOD AND DRINK OUTLET

9 HERCULES STREET, HAMILTON QLD 4007

CLARENCE PROPERTY DIVERSIFIED FUND

ASSESSING AUTHORITY: Economic Development Queensland
REPORT NUMBER: Version 3
DATE PREPARED: November 2024
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

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2.0 INTRODUCTION

Naxos Engineers Pty Ltd has been engaged by our client Clarence Property Diversified Fund to prepare a Site-Based Stormwater Management Report for the proposed Development at 9 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 DTS, Project No. : BNE200753 (Appendix A)
- Brisbane City Council 'Community Mapping' Data (Appendix B)
- Brisbane City Council Floodwise Report (Appendix C)
- Brisbane City Council Interactive Mapping (Appendix D)
- Architectural drawings prepared by Jackson Teece (Project No. 2023072)

2.2.SITE LOCATION

The site is located at 9 Hamilton Street, Hamilton QLD 4007, see below the site 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 in the suburb of Hamilton, approximately 6 kilometers east of the Brisbane CBD. The site address is 9 Hercules Street, Hamilton QLD 4007 and is formally described as Lot 645 on SL 2184.

4.2.SITE DESCRIPTION

The total Development Site area is 1841 m² and in its current state slopes from the southeast corner to the northwest corner. A large majority of the subject site is covered by the existing building, the existing alleyway that runs along the southern boundary slopes gently towards the Hercules street kerb and channel (west).

Refer to Appendix A for Detail Survey.

Figure 4-2 AERIAL PHOTOGRAPH



4.3.EXISTING LAND USE

The existing use for Lot 645 on SL 2184 is a two storey, slab on ground brick building, with multiple commercial tenancies within. 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 consists of the following areas (Refer to table below).

Table 4-1 PRE-DEVELOPMENT STORMWATER CATCHMENT AREAS

Pre-Development Stormwater Catchment Areas - Total Site Area (1841m ²)		
Impervious Area	1841 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 directly to the existing gully pit (108081728) which is located within the Hercules Street frontage. Therefore, this Gully Pit has been identified as the Development's existing Lawful Point of Discharge.

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 5.3. below for further details.

Refer to Appendix B for Brisbane City Council Community Mapping Data, Appendix C for FloodWise Property Report and Appendix D for BCC interactive mapping.

Figure 4-3 HERCULES STREET – SITE FRONTAGE - 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 28 story building. The proposed Development will consist of 189 dwellings, 3 levels of basement parking and 3 levels of podium parking, as well as a variety of non-residential uses including retail areas, common recreational areas, etc.

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

The proposed Development is assumed to have a fraction impervious of 0.90, based on QUDM Table 4.5.1 – Development Types vs. Fraction Impervious, with the site considered at the higher end of the 'High Density – Urban Residential' category.

Table 5-2 POST-DEVELOPMENT AREAS

Post-Development Stormwater Catchment Areas – Total Site Area (1841m ²)		
Impervious Area	1657 m ²	90 %
Pervious Area	184 m ²	10 %

5.2.DEVELOPED STORMWATER DISCHARGE

The proposed Development can be considered as 90 % impervious area and comprises of roof, hardstand, and pavement areas. The remaining area of the proposed Development site is considered pervious and consists of approximately 10 %. The pervious area is predominantly planting, green spaces, deep planting and roof top planting.

The Development sites' lawful point of discharge has been identified as the existing Gully Pit (108081728) located adjacent to the site along Hercules Street as shown in Figure 4-3.

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. 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.

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

5.3. FLOOD SUMMARY

The proposed Development site is subject to flooding, as detailed in the Brisbane City Council (BCC) FloodWise Property Report (Appendix C) and BCC Interactive Mapping (Appendix D). The table below summarises key information extracted from the FloodWise Property Report.

Table 5-3 PROPERTY INFORMATION SUMMARY

Description	Level (mAHD)	Source
20% AEP	N/A	
5% AEP	N/A	
2% AEP	N/A	
1% AEP	2.2	River (Brisbane River)
1% AEP	2.5	Stormtide (Moreton Bay)
RFL*	2.2	River
DFL **	2.5	

*Residential Flood Level

** Defined Flood Event Level

The table indicates that during a 1% AEP flood event, the minimum storm tide level (DFL) is 2.5 mAHD, and the minimum Brisbane River level is 2.2 mAHD. The FloodWise Property Report also identifies that the site is affected by a Medium Storm Tide Inundation event. For further details, refer to the FloodWise Property Report in Appendix C.

5.4. 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).

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

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

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 5-5.

The proposed Development is of Mixed use as highlighted in Section 5.1 above.

Ground Floor will contain non-residential uses which are classed as *Retail*.

The residential tenancies are classified as "Multiple Dwelling", and the hotel rooms are classified as "Short-term Accommodation" 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
Sales	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
Short-term Accommodation (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 Development including the ground floor Retail spaces 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.

5.5.REQUIRED FLOOD IMMUNITY LEVELS FOR BRISBANE RIVER FLOODING

It is noted that the proposed Development has been identified as a BCA Class 2 building and hence will be assessed appropriately.

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 maneuvering area	Category D
	Essential electrical services of a Class 2 or Class 3 building	Category A
	Basement parking entry	Category C + 300mm

As mentioned in Section 5.3, the Development site is only affected by Brisbane River flooding. 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 minimum design flood floor levels are required for the proposed Development.

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

Brisbane River Flooding

The Table below uses the information provided in Tables 5-3, 5-6 and 5-7 to calculate the minimum flood immunity levels.

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

	Category of Flood Planning Levels (Refer Table 5-6)	Minimum Design Level (m AHD) (Refer Table 5-7)	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	2.5
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	N/A	N/A
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

5.6.REQUIRED FLOOD IMMUNITY LEVELS FOR MEDIUM STORM TIDE INUNDATION

As mentioned in Section 5.3 the Development site is affected by Medium Storm Tide Inundation and hence will be assessed appropriately.

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 analysed and compared to the results from Table 5-8.

Table 5-9 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	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
Medium storm-tide inundation area sub-category					

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 5-10 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 Table below.

Medium Storm Tide Flooding

The Table below uses the information provided in Tables 5-9 and 5-10 to calculate the minimum flood immunity levels.

Table 5-11 MEDIUM STORM-TIDE INUNDATION DESIGN LEVELS – CLASS 1-4

	Category of Flood Planning Levels (Refer Table 5-6)	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

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

The Results from the Brisbane River and Medium Storm-Tide minimum residential floor levels within Table 5-9 and 5-11 are compared in the below Table, it is noted that to ensure the highest flood immunity the higher of the two values will be adopted for the proposed Development.

Flood Event Comparison

Table 5-12 COMPARISON OF FLOOD IMMUNITY LEVELS – CLASS 1-4

	Brisbane River Minimum Level (m AHD)	Medium Storm- Tide inundation Minimum Level (m AHD)	Adopted Level (m AHD)
Habitable Room	2.7	3.6	3.6
Non-habitable room including patio and courtyard	2.5	3.4	3.4
Non-habitable part of a Class 2 or Class 3 building excluding the essential services control room	2.5	3.4	3.4
Parking located in the building undercroft of a multiple dwelling	2.5	3.4	3.4
Carport, unroofed car park; vehicular manoeuvring area	2.1	2.2	2.2
Essential electrical services of a Class 2 or Class 3 building only	2.7	3.6	3.6
Basement parking entry	2.8	3.4	3.4

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 summarize 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 G.

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)
Fraction Impervious:	100 %
Run-off Co-efficient C10:	0.900 (QUDM – Table 4.5.3 'C ₁₀ Values')
1 Hour Rainfall Intensity (¹ I ₁₀):	65 mm/hr
Area (ha):	0.1840

Table 6-13 PRE-DEVELOPMENT DISCHARGE

ARI (yr)	C	I (mm/hr)	Pre-Development Discharge (m3/s)
1	0.720	114	0.042
2	0.765	128	0.050
5	0.855	175	0.077
10	0.900	206	0.095
20	0.945	237	0.115
50	1.000	277	0.142
100	1.000	308	0.157

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 off QUDM – Section 4.6)
Fraction Impervious:	90 %
Run-off Co-efficient C ₁₀ :	0.880 (QUDM – Table 4.5.3 'C ₁₀ Values')
1 Hour Rainfall Intensity (¹ I ₁₀):	65 mm/hr
Area (ha):	0.1840

Table 6-14 POST-DEVELOPMENT DISCHARGE

ARI (yr)	C	I (mm/hr)	Post-Development Discharge (m ³ /s)
1	0.704	114	0.041
2	0.748	128	0.049
5	0.836	175	0.075
10	0.880	206	0.093
20	0.924	237	0.112
50	1.000	277	0.142
100	1.000	308	0.158

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 6-15 PRE-DEVELOPMENT vs POST-DEVELOPMENT (UN-MITIGATED)

ARI Storm Event (yr)	Pre-Developed Condition (m3/s)	Post-Development Condition (m3/s)	Difference +/- (m3/s)
1	0.042	0.041	- 0.001
2	0.050	0.049	- 0.001
5	0.077	0.075	- 0.002
10	0.095	0.093	- 0.002
20	0.115	0.112	- 0.003
50	0.142	0.142	0.000
100	0.157	0.158	+ 0.001

The table above indicates a minimal change 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, the Pre-Development Fraction Impervious is 100%.

Therefore, no on-site detention is proposed.

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 7-16 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 2500m ² 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 2500m ²	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 7-17 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, ASPHALT 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 is 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 and 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 8-18 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 site's 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 8-4 EXAMPLE FILTER BASKET 1



Figure 8-5 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 site's 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 ensuring 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 DISCHARGE

The Development sites' lawful point of discharge has been identified as the existing Gully Pit (108081728) located adjacent to the site along Hercules Street as shown in Figure 4-3.

11.2. STORMWATER QUANTITY

As demonstrated in Table 6-15 the Pre and Post Development figures show negligible change 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 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.

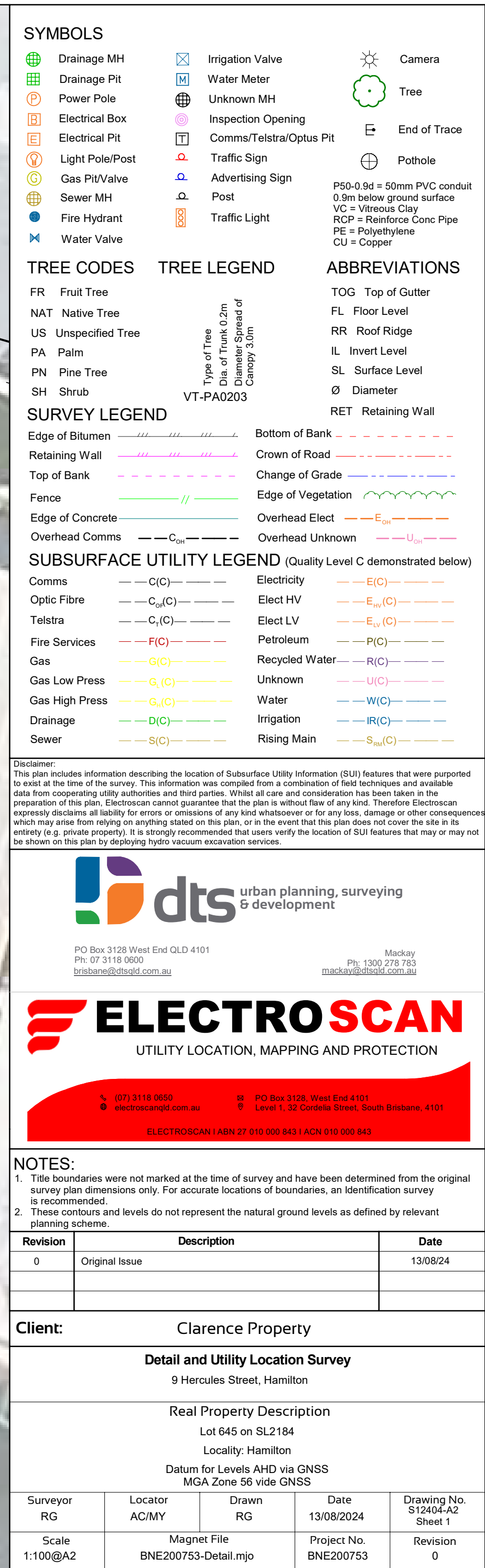
- Filter Baskets

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





CLASSIFICATION OF SUBSURFACE UTILITY INFORMATION (SUI) - AS 5488-2019

Labeling utility information by a Quality Level allows the user of this information to understand clearly how the information was collected and then place an appropriate amount of reliance on it. Project risks related to underground utilities can then be properly managed.

Quality Level A:
Information is of the highest possible level of accuracy and is obtained by exposing the underground utility using a non-destructive excavation (potholing) technique. The vertical information for this locating method is to the top or shallowest part of the located service. The 3D location is recorded by survey as an X, Y, Z coordinate.

Quality Level B:
Information is collected by designating the horizontal and vertical location of underground utilities by using Electro Magnetic Induction (EMI). This is the most common form of utility locating and although an X, Y and Z position can be established it is not always entirely accurate due to differing electromagnetic fields, soil conditions and multiple banks of cables affecting the locating signal.

Quality Level C:
Information is collected by correlating the survey by Ground Penetrating Radar (GPR) and/or visible utility surface features such as marker plates or water hydrants and acquired Dial-Before-You-Dig plans to "draw" a string which shows the approximate position of services. This method does not usually show multiple banks of cables and does not usually show three dimensional information.

Quality Level D:
Information is the most basic level of utility locations using information based on a combination of existing Dial-Before-You-Dig plans, other available existing records, cursory site inspections or anecdotal evidence. SUI shown as Quality Level D should always be treated as an indication of the potential presence of a service only and should not be used for design.

Drainage MH

Drainage Pit

Power Pole

Electrical Box

Electrical Pit

Light Pole/Post

Gas Pit/Valve

Sewer MH

Fire Hydrant

Water Valve

Irrigation Valve

Water Meter

Unknown MH

Inspection Opening

Comms/Telstra/Optus Pit

Traffic Sign

Advertising Sign

Post

Traffic Light

Camera

Tree

End of Trace

Pothole

P50-0.9d = 50mm PVC conduit
0.9m below ground surface
VC = Vitreous Clay
RCP = Reinforce Conc Pipe
PE = Polyethylene
CU = Copper

SURVEY LEGEND

Edge of Bitumen

Retaining Wall

Top of Bank

Fence

Edge of Concrete

Overhead Comms

Bottom of Bank

Crown of Road

Change of Grade

Edge of Vegetation

Overhead Elect

Overhead Unknown

SYMBOLS

FR Fruit Tree

NAT Native Tree

US Unspecified Tree

PA Palm

PN Pine Tree

SH Shrub

TOG Top of Gutter

FL Floor Level

RR Roof Ridge

IL Invert Level

SL Surface Level

Ø Diameter

RET Retaining Wall

Tree Codes

FR Fruit Tree

NAT Native Tree

US Unspecified Tree

PA Palm

PN Pine Tree

SH Shrub

Tree Legend

Type of Tree

Dia. of Trunk 0.2m

Diameter Spread of Canopy 3.0m

VT-PA0203

Abbreviations

TOG Top of Gutter

FL Floor Level

RR Roof Ridge

IL Invert Level

SL Surface Level

Ø Diameter

RET Retaining Wall

SURVEY LEGEND

Edge of Bitumen

Retaining Wall

Top of Bank

Fence

Edge of Concrete

Overhead Comms

Bottom of Bank

Crown of Road

Change of Grade

Edge of Vegetation

Overhead Elect

Overhead Unknown

SUBSURFACE UTILITY LEGEND

Comms

Optic Fibre

Telstra

Fire Services

Gas

Gas Low Press

Gas High Press

Drainage

Sewer

Electricity

Elect HV

Elect LV

Petroleum

Recycled Water

Unknown

Water

Irrigation

Rising Main

SURVEY LEGEND

Edge of Bitumen

Retaining Wall

Top of Bank

Fence

Edge of Concrete

Overhead Comms

Bottom of Bank

Crown of Road

Change of Grade

Edge of Vegetation

Overhead Elect

Overhead Unknown

SUBSURFACE UTILITY LEGEND

Comms

Optic Fibre

Telstra

Fire Services

Gas

Gas Low Press

Gas High Press

Drainage

Sewer

Electricity

Elect HV

Elect LV

Petroleum

Recycled Water

Unknown

Water

Irrigation

Rising Main

Disclaimer:
This plan includes information describing the location of Subsurface Utility Information (SUI) features that were purported to exist at the time of the survey. This information was compiled from a combination of field techniques and available data from cooperating utility authorities and third parties. Whilst all care and consideration has been taken in the preparation of this plan, Electroscan cannot guarantee that the plan is without flaw of any kind. Therefore Electroscan expressly disclaims all liability for errors or omissions of any kind whatsoever or for any loss, damage or other consequences which may arise from relying on anything stated on this plan, or in the event that this plan does not cover the site in its entirety (e.g. private property). It is strongly recommended that users verify the location of SUI features that may or may not be shown on this plan by deploying hydro-vacuum excavation services.

dts

urban planning, surveying & development

PO Box 3128 West End QLD 4101
Ph: 07 3118 0600
brisbane@dtsqld.com.au

Mackay
Ph: 1300 278 783
mackay@dtsqld.com.au

ELECTROSCAN

UTILITY LOCATION, MAPPING AND PROTECTION

(07) 3118 0650

electroscanqld.com.au

PO Box 3128, West End 4101
Level 1, 32 Cordelia Street, South Brisbane, 4101

ELECTROSCAN | ABN 27 010 000 843 | ACN 010 000 843

NOTES:
1. Title boundaries were not marked at the time of survey and have been determined from the original survey plan dimensions only. For accurate locations of boundaries, an Identification survey is recommended.
2. These contours and levels do not represent the natural ground levels as defined by relevant planning scheme.

Revision	Description	Date
0	Original Issue	13/08/24

Client:

Clarence Property

Detail and Utility Location Survey

9 Hercules Street, Hamilton

Real Property Description

Lot 645 on SL2184

Locality: Hamilton

Datum for Levels AHD via GNSS

MGA Zone 56 wide GNSS

Surveyor

RG

Locator

AC/MY

Drawn

RG

Date

13/08/2024

Drawing No.

S12404-A2 Sheet 2

Scale

1:100@A2

Magnet File

BNE200753-Detail.mjo

Project No.

BNE200753

Revision

0



Disclaimer:

This plan includes information describing the location of Subsurface Utility Information (SUI) features that were purposed to exist at the time of the survey. This information was compiled from a combination of field techniques and available data from cooperating utility authorities and third parties. While all care and consideration has been taken in the preparation of this plan, Electracan cannot guarantee that the plan is without fault of any kind. Therefore Electracan expressly disclaims all liability for errors or omissions of any kind whatsoever or for any loss, damage or other consequences which may arise from relying on anything stated on this plan, or in the event that this plan does not cover the site in its entirety (e.g. private property). It is strongly recommended that users verify the location of SUI features that may or may not be shown on this plan by deploying hydro vacuum excavation services.



dts urban planning, surveying
& development

PO Box 3128 West End QLD 4101
Ph: 07 3118 0600
bribsane@dtsqld.com.au

Mackay
Ph: 1300 278 783
mackay@dtsqld.com.au



ELECTROSCAN

UTILITY LOCATION, MAPPING AND PROTECTION

(07) 3118 0650
📞 brisbane@electroscanqld.com.au

PO Box 3128, West End 4101
📮 Level 1, 32 Cordelia Street, South Brisbane, 4101

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NOTES:

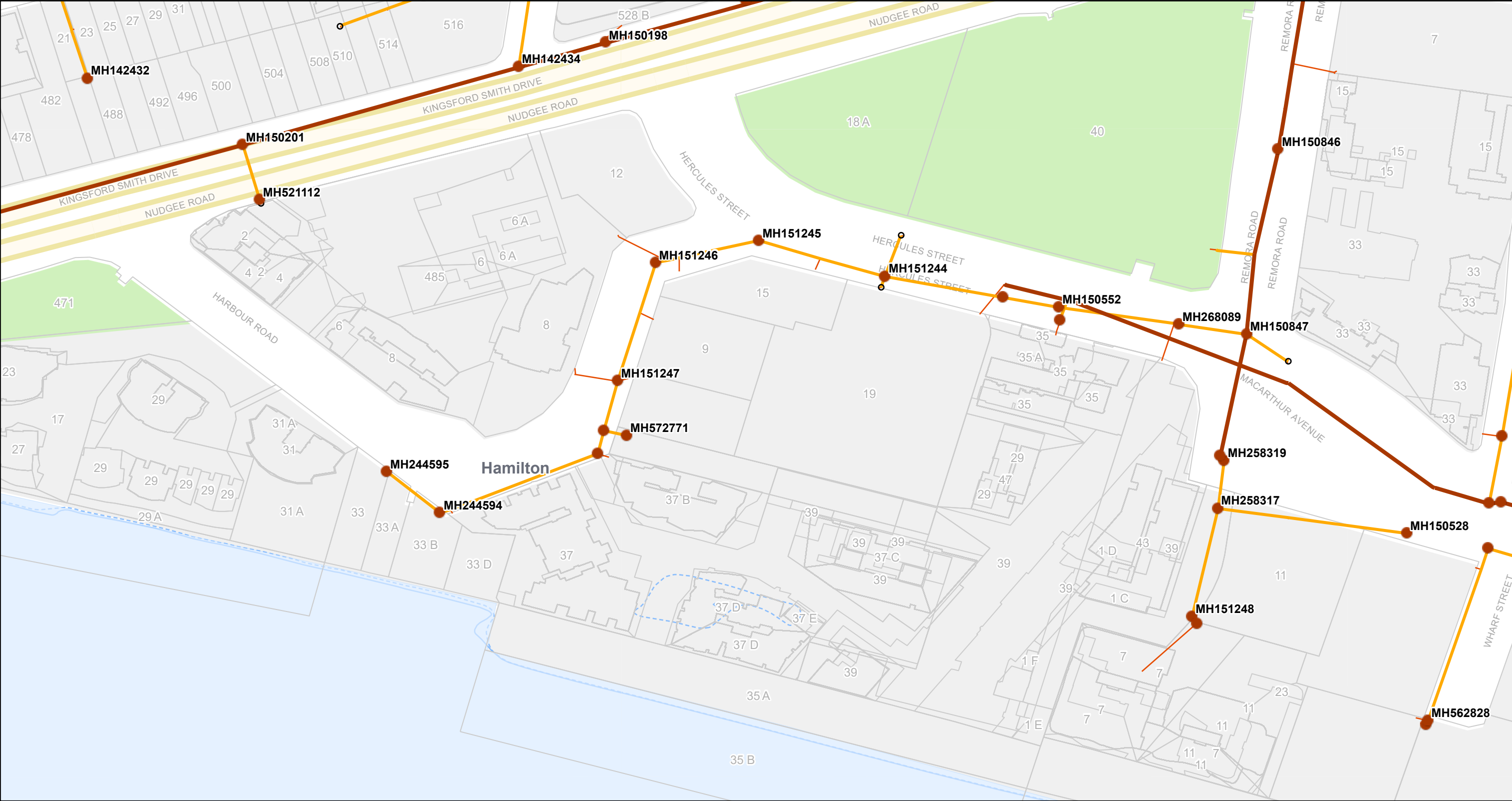
1. Title boundaries were not marked at the time of survey and have been determined from the original survey plan dimensions only. For accurate locations of boundaries, an Identification survey is recommended.
2. The contours and levels do not represent the natural ground levels as defined by relevant planning scheme.

Revision	Description	Date
0	Original Issue	13/08/24

Client:					Clarence Property				
Detail and Utility Location Survey									
9 Hercules Street, Hamilton									
Real Property Description									
Lot 645 on SL2184									
Locality: Hamilton									
Datum for Levels AHD via GNSS									
MGA Zone 56 vide GNSS									
Surveyor RG		Locator AC/MY		Drawn RG		Date 13/08/2024		Drawing No. S12404-A2 Sheet 3	
Scale 1:100@A2		Magnet File BNE200753-Detail.mjo				Project No. BNE200753		Revision 0	

Appendix B – COMMUNITY MAPPING RESULTS

Community Maps



7/25/2024, 3:29:42 PM

Sewer Manholes

MANHOLE

Sewer Fitting

END CAP

TRUNK MAIN

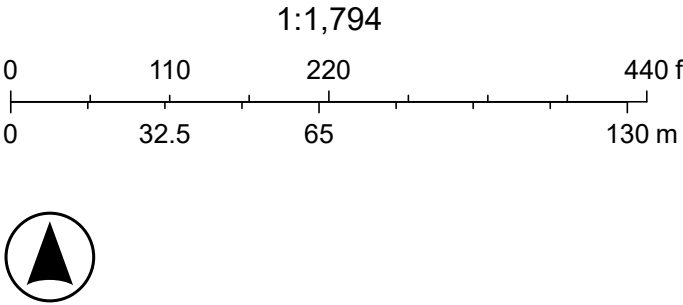
RETICULATION MAIN

Sewer Service

SERVICE

Sewer Gravity Main

Property Parcel



Community Maps



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1:1,794

- End Structure

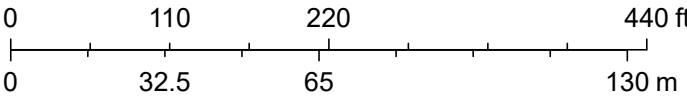
Stormwater Manhole

Pipe End Outlet Pipe

Gully
- GULLY CONNECT

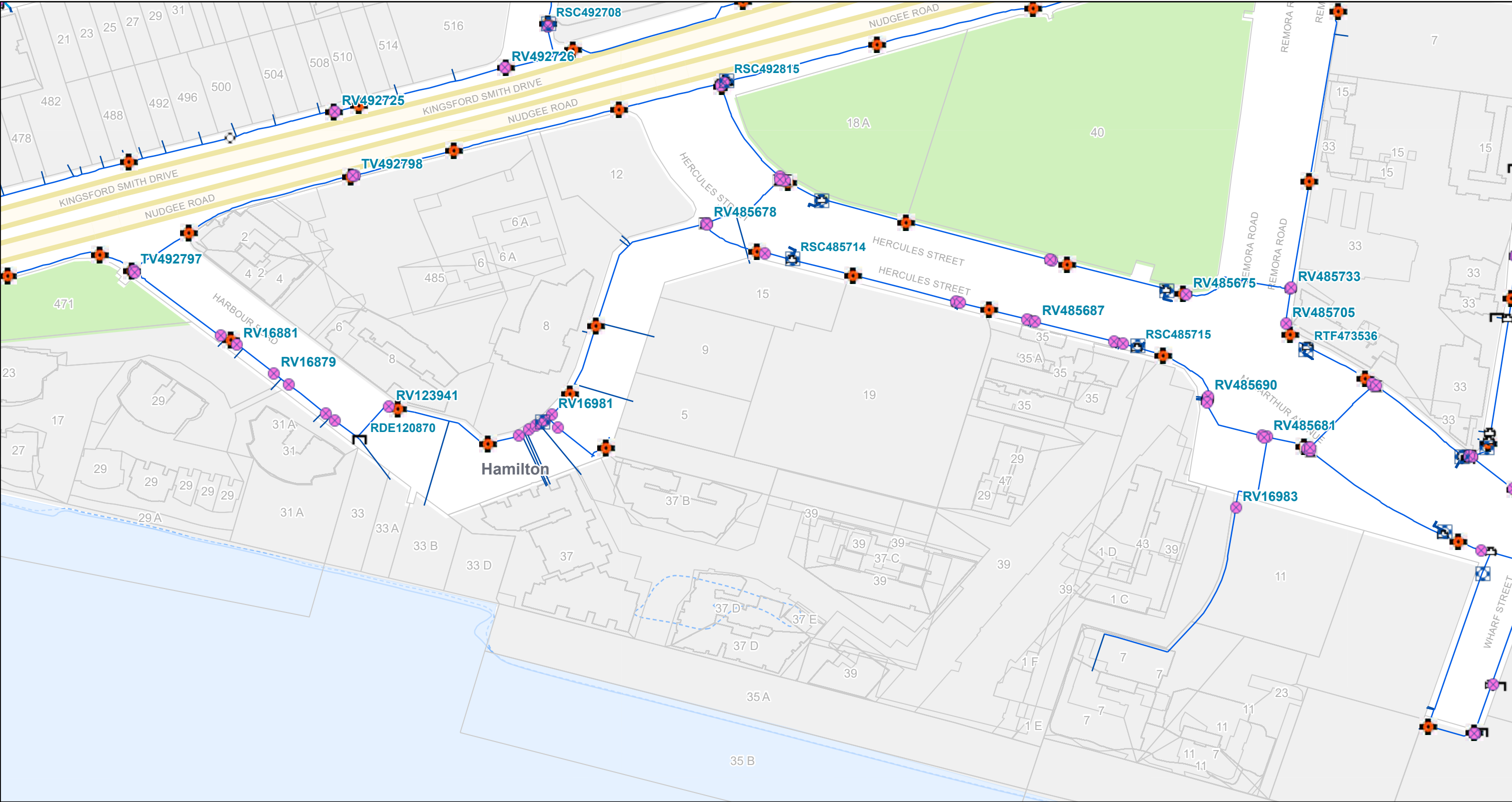
ROOF WATER

Property Parcel
- DRAIN



Department of Resources and Brisbane City Council

Community Maps



7/25/2024, 3:29:34 PM

1:1,794

Water Control Valve

 Scour

Water System Valve

 GATE

Water Fitting

 END CAP

 REDUCER

 TEE

Water Hydrant

 PILLAR HYDRANT

 INGROUND HYDRANT

Water Pressure Main

 Reticulation Main

Scour Main

 Scour Main

Water Service

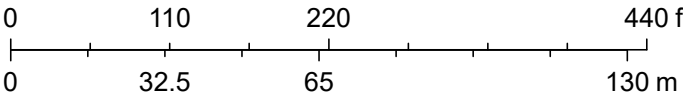
 SERVICE

COMMON SERVICE

 COMMON SERVICE

Property Parcel

 Property Parcel



Appendix C – FLOODWISE PROPERTY REPORT

FloodWise Property Report

9 HERCULES ST, HAMILTON 4007
Lot 645 on SL2184



Dedicated to a better Brisbane

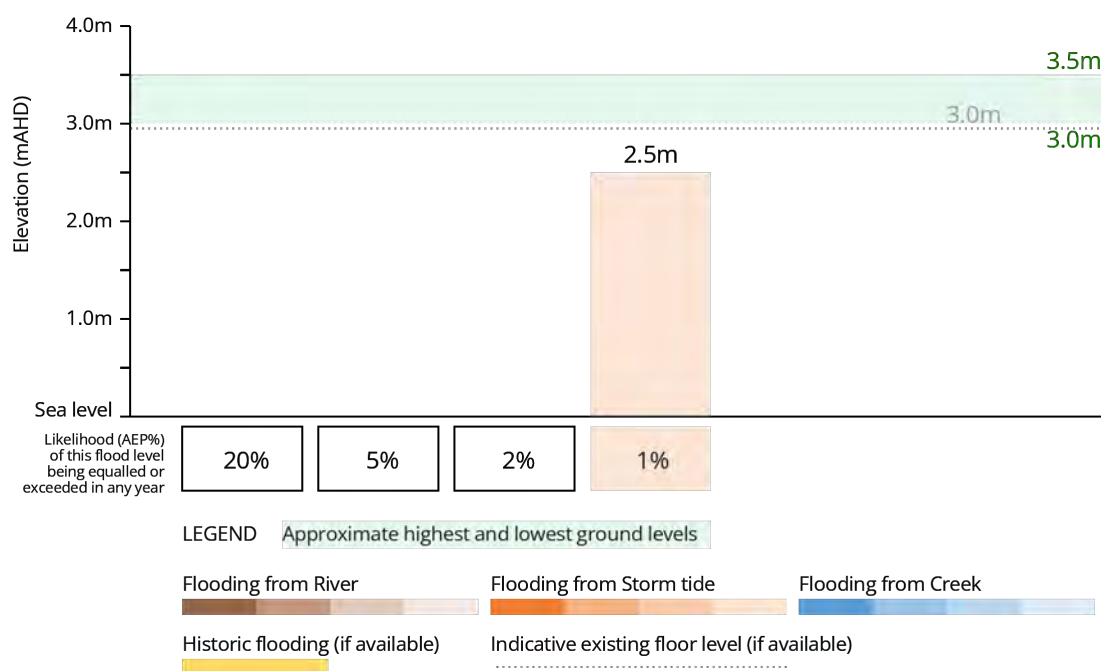
THE PURPOSE OF THIS REPORT IS FOR BUILDING AND DEVELOPMENT

Brisbane City Council's FloodWise Property Report provides technical flood planning information including estimated flood levels, habitable floor level requirements and more. This report uses the adopted flood planning information in Brisbane City Plan 2014, that guides how land in Brisbane is used and developed for the future. Find out more about [planning and building](#). To understand how to be resilient and prepare for floods, visit Council's [Be Prepared](#) web page. Find more information about [how to read a FloodWise Property Report](#).

Graph showing only the highest source/type of flooding for 1%, 2%, 5% and 20% likelihoods. Also shows historic flood levels.

Other flood types and levels may be present and will be listed in the Flood Planning Information table below. This graph does not include overland flow flooding. If applicable, overland flow information is shown in the Planning and Development Information section below.

NOTE: See Useful Definitions section to explain terminology.



Combined 1% AEP for river, creek and storm tide flood extent (if applicable) from the adopted Brisbane City Plan 2014.

Read more about [Brisbane City Plan 2014](#).



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Are you resilient and ready for flood?

- Sign up to the Brisbane Severe Weather Alert at brisbane.qld.gov.au/beprepared
- Visit bom.gov.au for the latest weather updates.
- Have an evacuation plan, emergency kit and important phone numbers ready.
- Observe where water flows from and to during heavy rain.
- Consider how flood-resilient building techniques will have you home faster and with less damage.

Life threatening emergencies
000 Police/fire/ambulance
(mobiles **000** and **112**)

State Emergency Service (SES) **132 500**
Energex **13 19 62**
Brisbane City Council **3403 8888**

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.

Find more information about [planning and building](#) in Brisbane or talk to a Development Services Planning Information Officer via Council's Contact Centre on (07) 3403 8888.

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) / Comment	Data Quality Code
Minimum ground level	3.0	C
Maximum ground level	3.5	C
Indicative existing floor level	3.0	C
Source of highest flooding	Stormtide	

Flood Planning Information

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 and Development Information section below for further information.

Note t his t able does not include overland flow. If overland flow is applicable to this property, refer to the Flood Planning and Development section below for further information.

Likelihood / Description	Level (mAHD)	Source
20%	N/A	
5%	N/A	
2%	N/A	
1%	2.2	River (Brisbane River)
1%	2.5	Stormtide (Moreton Bay)
0.2%	N/A	
Residential Flood Level (RFL)	2.2	River (Brisbane River)
Minimum Habitable Floor Level (dwelling house)	N/A*	

* Council may not have this data available. Customers are recommended to engage a Registered Professional Engineer of QLD (RPEQ) for further advice. For information on seeking Planning Advice, please visit www.brisbane.qld.gov.au/planning-and-building.

Flood Planning and 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](#).

Flood planning areas (FPA)		
River	Creek / waterway	Overland flow
FPA4		Not Applicable

To find more information about Council's flood planning areas (FPAs) for Brisbane River and Creek/waterway flooding to guide future building and development in flood prone areas, please review [Council's Flood Planning Provisions](#).

Coastal hazard overlay code

The Coastal hazard overlay code of Council's planning scheme uses the following information to provide guidelines when conducting new developments. 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 Council's [planning scheme](#).

Coastal hazard overlay sub-categories
Medium storm-tide inundation area

Note: Where land is identified within one for more flood planning areas on the Flood overlay or is identified within one of the Storm tide inundation area sub-categories on the Coastal hazard overlay, the assessment criteria that provides 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, please consult a Registered Professional Engineer of Queensland (RPEQ).

Useful Flood Information 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.

- **0.2% AEP** - A flood event of this size is considered rare but may still occur. A flood of size or larger has a 1 in 500 chance or a 0.2% probability of occurring in any year.
- **1% AEP** - A flood of this size or larger has a 1 in 100 chance or a 1% probability of occurring in any year.
- **2% AEP** - A flood of this size or larger has a 1 in 50 chance or a 2% probability of occurring in any year.
- **5% AEP** - A flood of this size or larger has a 1 in 20 chance or a 5% probability of occurring in any year.
- **20% AEP** - A flood of this size or larger has a 1 in 5 chance or a 20% probability of occurring in any year.

Data quality

- **Data Quality Code A** - Level data based on recent surveyor report or approved as-constructed drawings.
- **Data Quality Code B** - Level data based on ground-based mobile survey or similar.
- **Data Quality Code C** - Level data derived from Airborne Laser Scanning or LiDAR information.

Defined Flood Level (DFL) - The DFL is used for commercial and industrial development. The Defined flood level (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/s. DFL is only applicable for non-residential uses affected by Brisbane River flooding.

Flood planning area (FPA) - Council has developed five Flood planning areas (FPAs) as part of Brisbane City Plan 2014 Flood overlay mapping for Brisbane River, Creek/waterway flooding and Overland flow to guide future building and development in flood prone areas. Storm tide flooding is mapped separately. The FPAs are designed to recognise the flood hazard for different flooding types. Flood hazard is a combination of frequency of flooding, the flood depth, and the speed at which the water is travelling. [Find more information here.](#)

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 (dwelling house) - 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 as required by the Brisbane City Plan 2014.

Indicative existing floor level - The approximate level in metres AHD of the lowest habitable floor in the existing building (excluding apartments). The data is sourced from a range of sources with varying accuracy levels.

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.

Residential flood level (RFL) - This flood level for the Brisbane River equates to the 1% annual exceedance probability (AEP) flood level.

To learn more, visit [Brisbane City Council's Flood Information Hub](#)

Brisbane City Council's Online Flood Tools

Council provides several online flood tools:

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

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 and ask to talk to a Development Services Planning Information Officer

- visit brisbane.qld.gov.au/planning-building

Council's Planning Scheme - The Brisbane City Plan 2014 (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.

Disclaimer

1. Defined flood levels and residential flood levels, minimum habitable floor levels and indicative existing floor levels are determined from the best available information to Council at the date of issue. These levels, for a particular property, may change if more detailed information becomes available or changes are made in the method of calculating levels.
2. Council makes no warranty or representation regarding the accuracy or completeness of a FloodWise Property Report. Council disdaims any responsibility or liability in relation to the use or reliance by any person on a FloodWise Property Report.

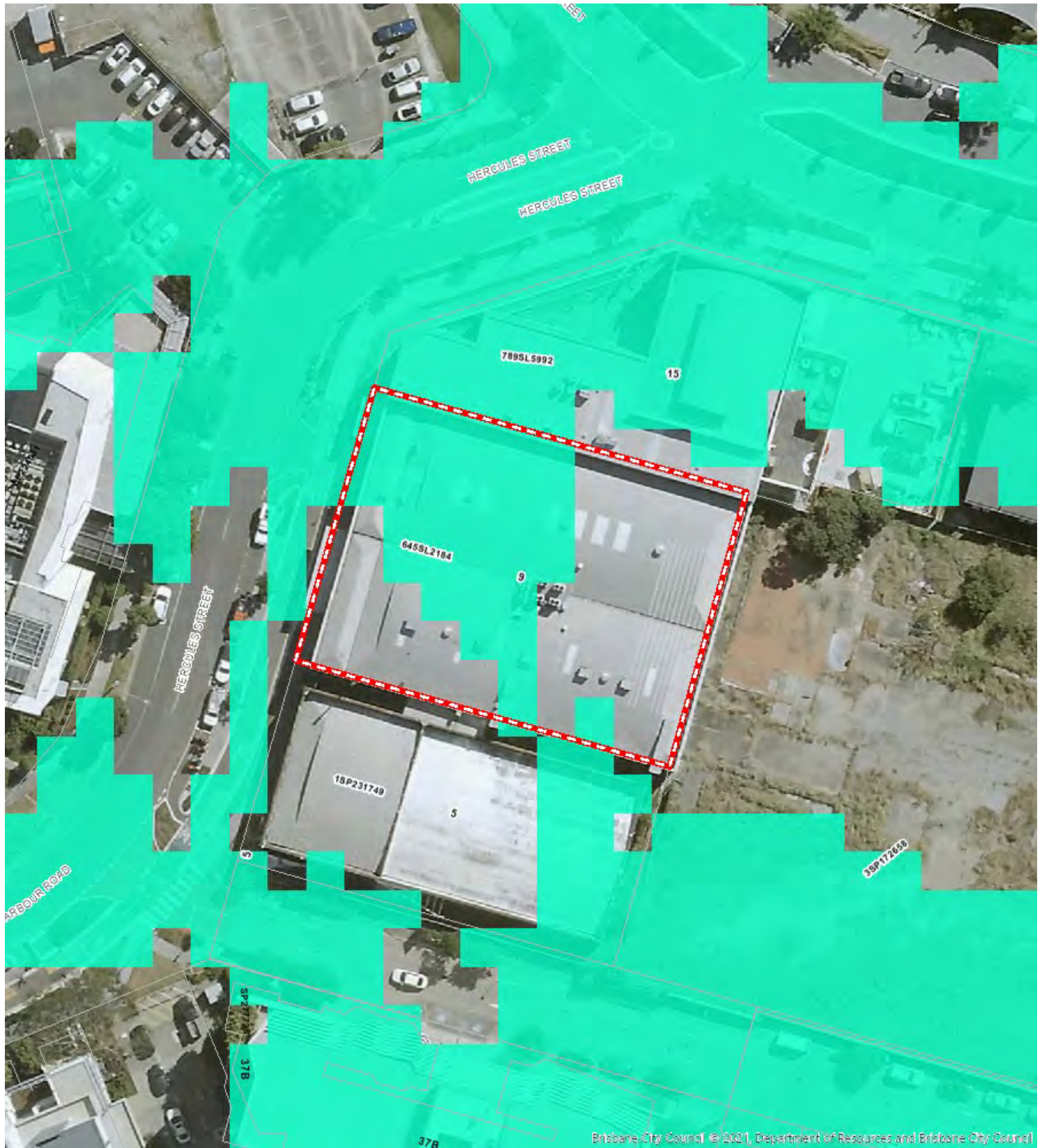


Planning to build or renovate?

For information, guidelines, tools and resources to help you track, plan or apply for your development visit 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



Coastal management district

Coastal management district

Erosion prone area - coastal erosion

Erosion prone area - coastal erosion

Erosion prone area - permanent inundation due to sea level rise at 2100

Erosion prone area - permanent inundation due to sea level rise at 2100

Storm-tide inundation area

High storm-tide inundation area

Storm-tide inundation area

Medium storm-tide inundation area

Local Government Authorities

LGA boundary

Property boundaries holding

Property Holding



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

Appendix E – ARCHITECTURAL PLANS

9 HERCULES STREET

9 HERCULES STREET, HAMILTON

DEVELOPMENT APPLICATION

000_DRAWING SCHEDULE

DRAWING LIST

SHEET NO	SHEET NAME	REVISION
DA-000	COVER SHEET	A
DA-001	DEVELOPMENT SUMMARY	A
DA-030	SITE PLAN	A
DA-108	FLOOR PLAN - BASEMENT 2	A
DA-109	FLOOR PLAN - BASEMENT 1	A
DA-110	FLOOR PLAN - GROUND FLOOR	A
DA-111	FLOOR PLAN - LVL 01 TO LVL 03 (PODIUM TYPICAL)	A
DA-112	FLOOR PLAN - LVL 04 (COMMUNAL)	A
DA-113	FLOOR PLAN - LVL 05 TO LVL 22	A
DA-114	FLOOR PLAN - LVL 23 TO LVL 27	A
DA-120	ROOF PLAN - ROOFTOP RECREATION	A
DA-200	ELEVATIONS - 01	A
DA-201	ELEVATIONS - 02	A
DA-300	SECTIONS - 01	A
DA-400	3D PERSPECTIVE 01	A
DA-401	3D PERSPECTIVE 02	A
DA-402	3D PERSPECTIVE 03	A
DA-403	3D PERSPECTIVE 04	A
DA-404	3D PERSPECTIVE 05	A
DA-405	3D PERSPECTIVE 06	A
DA-406	3D PERSPECTIVE 07	A
DA-600	GFA AREA PLANS	A
DA-601	COMMUNAL AREA CALCULATION	A
DA-602	LANDSCAPE AREA CALCULATION	A
DA-800	SHADOW DIAGRAMS 21 JUN & DEC 9AM/12PM/3PM	A
DA-801	SHADOW DIAGRAMS 21 MAR & SEP 9AM/12PM/3PM	A



SITE DETAILS

ADDRESS 9 HERCULES STREET, HAMILTON

RPD LOT 645 ON SL2184

WARD HAMILTON

LOCAL AUTHORITY EDQ

SITE AREA 1841 m²

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A	DA ISSUE	JDP	15/10/24

Project No.

2023072

Project

9 HERCULES STREET

Drawing

COVER SHEET

Drawing Number

DA-000

Revision

A

JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4469), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338

DEVELOPMENT SUMMARY

LEVELS	APT. NUMBER	APT TYPE	UNIT. AREA	APT COUNT	TOTAL
PODIUM TYPICAL					
LEVEL 01-03 PODIUM	P1-01	1C	63.6 m²	3	190.80 m²
LEVEL 01-03 PODIUM	P1-02	1D	53.4 m²	3	160.20 m²
LEVEL 01-03 PODIUM	P1-03	2E	83.8 m²	3	251.40 m²
LEVEL 01-03 PODIUM	P1-04	2F	102.1 m²	3	306.30 m²
			302.9 m²	12	908.70 m²
PODIUM 04					
LEVEL 04 PODIUM	P4-001	2H	135.5 m²	1	135.50 m²
LEVEL 04 PODIUM	P4-002	1E	67.2 m²	1	67.20 m²
LEVEL 04 PODIUM	P4-003	2G	128.9 m²	1	128.90 m²
			331.6 m²	3	331.60 m²
LOWER RESI. TYPICAL					
LEVEL 05-22	01-01	2A	91.7 m²	18	1650.60 m²
LEVEL 05-22	01-02	2B	96.8 m²	18	1742.40 m²
LEVEL 05-22	01-03	1A	66.6 m²	18	1198.80 m²
LEVEL 05-22	01-04	2A	90.2 m²	18	1623.60 m²
LEVEL 05-22	01-05	2C	93.7 m²	18	1686.60 m²
LEVEL 05-22	01-06	1B	71.7 m²	18	1290.60 m²
LEVEL 05-22	01-07	3A	116.9 m²	18	2104.20 m²
LEVEL 05-22	01-08	2C	93.9 m²	18	1690.20 m²
			721.5 m²	144	12987.00 m²
UPPER RESI. TYPICAL					
LEVEL 23-27	23-01	4A	190.1 m²	5	950.50 m²
LEVEL 23-27	23-02	3B	153.3 m²	5	766.50 m²
LEVEL 23-27	23-03	2D	94.9 m²	5	474.50 m²
LEVEL 23-27	23-04	2C	93.7 m²	5	468.50 m²
LEVEL 23-27	23-05	1B	71.7 m²	5	358.50 m²
LEVEL 23-27	23-06	3A	116.9 m²	5	584.50 m²
			720.6 m²	30	3603.00 m²
TOTAL			2076.6 m²	189	17830.30 m²

LANDSCAPE CALCULATION

LEVEL	LANDSCAPE TYPE	AREA
GROUND FLOOR	DEEP PLANTING	47.37 m²
LEVEL 01-03 PODIUM	LANDSCAPE	46.15 m²
LEVEL 04 - PODIUM	LANDSCAPE	429.57 m²
LEVEL 24 - ROOFTOP	LANDSCAPE	80.04 m²
TOTAL LANDSCAPE		603.12 m²

APARTMENT TYPE

APT TYPE	BED No	APT COUNT
1A	1 BED	18
1B	1 BED	23
1C	1 BED	3
1D	1 BED	3
1E	1 BED	1
2A	2 BED	36
2B	2 BED	18
2C	2 BED	41
2D	2 BED	5
2E	2 BED	3
2F	2 BED	3
2G	2 BED	1
2H	2 BED	1
3A	3 BED	23
3B	3 BED	5
4A	4 BED	5
TOTAL APT		189

APARTMENT - No. BEDS

No. BED	TOTAL APT.	BED
1 BED	48	48
2 BED	108	216
3 BED	28	84
4 BED	5	20
TOTAL	189	368

PARKING REQUIREMENTS

PARKING TYPE	PDA RATES	EXTENT	REQ.	PROVIDED
RESI	0.75 SPACE PER UNIT	189	142	185
VISITOR	0.15 SPACE PER UNIT	189	29	29
PWD	0.02 SPACE PER UNIT	189	4	4
RETAIL	2 SPACES PER 100 SQM GFA	194.2	4	4
TOTAL CAR PARKS				222

PARKING PROVIDED PER LEVEL

LEVEL	NO.
B2 - BASEMENT	51
B1 - BASEMENT	51
LEVEL 01	40
LEVEL 02	40
LEVEL 03	40
TOTAL CAR PARKS	222

GFA CALCULATION

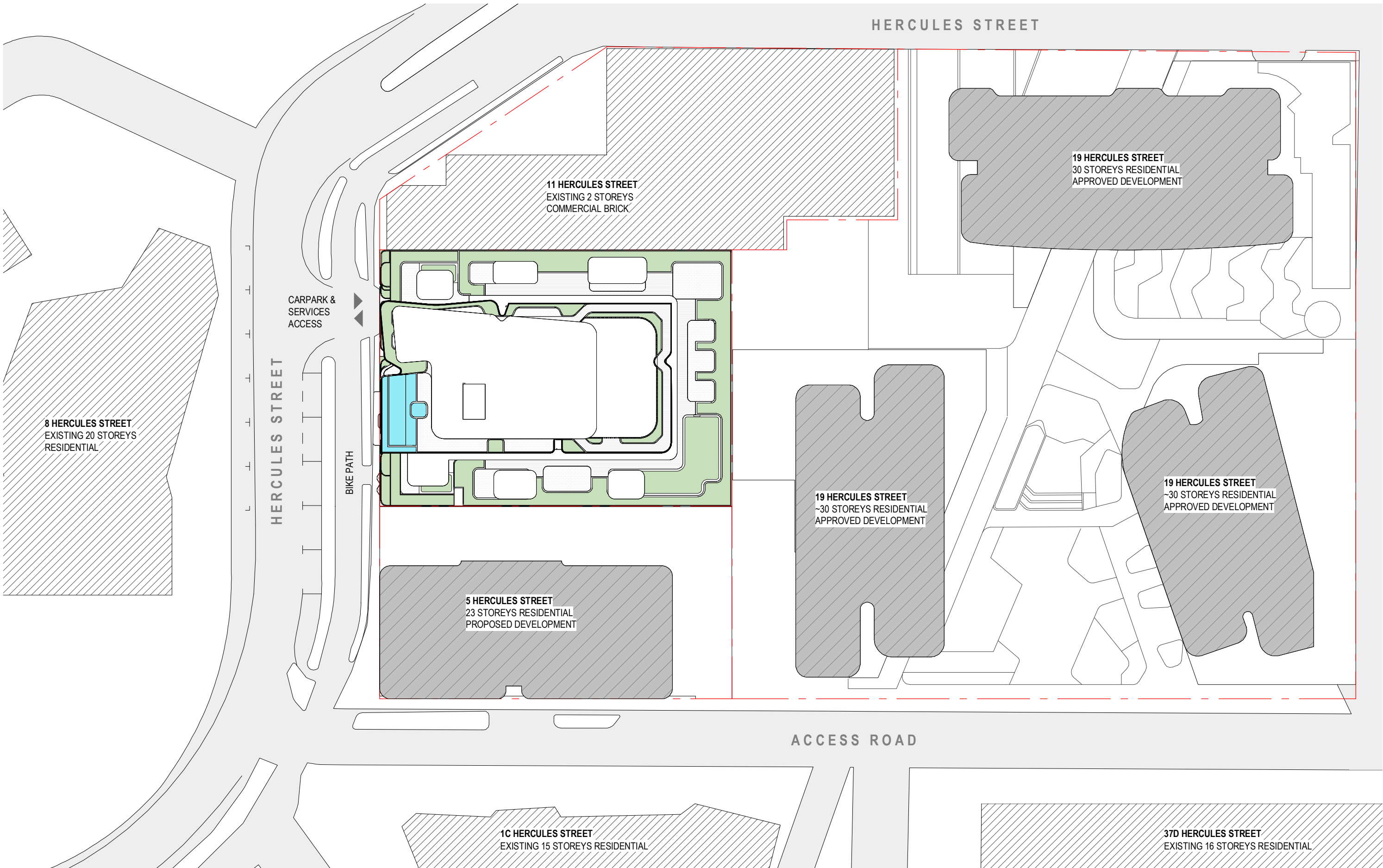
LEVELS	No. OF LEVELS	GFA AREA
GROUND FLOOR	1	194.20 m²
LEVEL 01-03 PODIUM	3	809.40 m²
LEVEL 04 - PODIUM	1	218.40 m²
LEVEL 01-18	18	11514.60 m²
LEVEL 19-23	5	3197.50 m²
TOTAL GFA		15934.10 m²

PROPOSED PLOT RATION: 15934.10m² /1841m²8.655

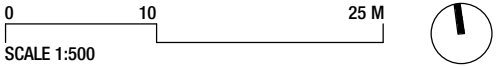
COMMUNAL AREA CALCULATION

LEVELS	AREA TYPE	AREA
GROUND FLOOR	COMMUNAL REC.	156 m²
GROUND FLOOR	COMMUNAL REC.	16 m²
LEVEL 04 - PODIUM	COMMUNAL REC.	636 m²
LEVEL 24 - ROOFTOP	COMMUNAL REC.	1305 m²
TOTAL AREA		2113 m²

	GFA	%	AREA
COMMUNAL REQUIRED	15934.10 m²	15.00%	2390.1
COMMUNAL PROVIDED	15934.10 m²	13.26%	2113.0



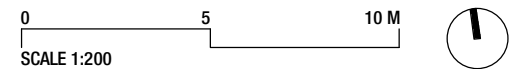
NEIGHBOURING BUILDINGS ARE BASED ON THE INFORMATION KNOWN, SUPPLIED TO AND GATHERED BY JACKSON TEECE.





LEGEND

- CARPARKS 2400x5400
- CARPARKS 2500x5400
- CARPARKS 2600x5400



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Project No.
2023072

Project
9 HERCULES STREET

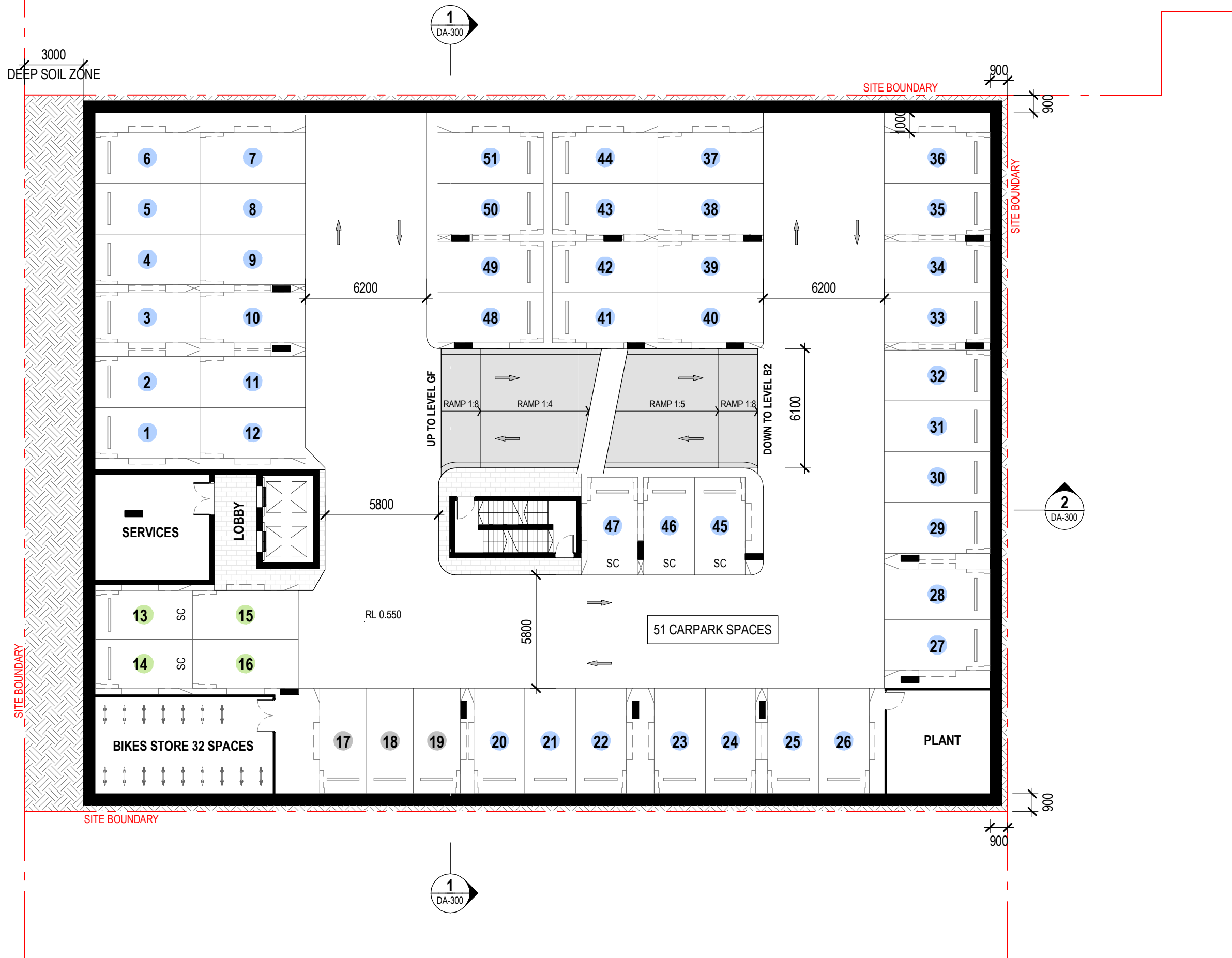
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FLOOR PLAN - BASEMENT 2

Drawing Number
DA-108

Revision
A

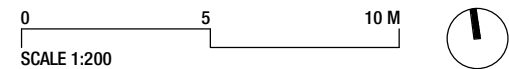
JACKSON TEECE
Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4469), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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Drawing
FLOOR PLAN - BASEMENT 1

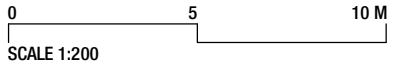
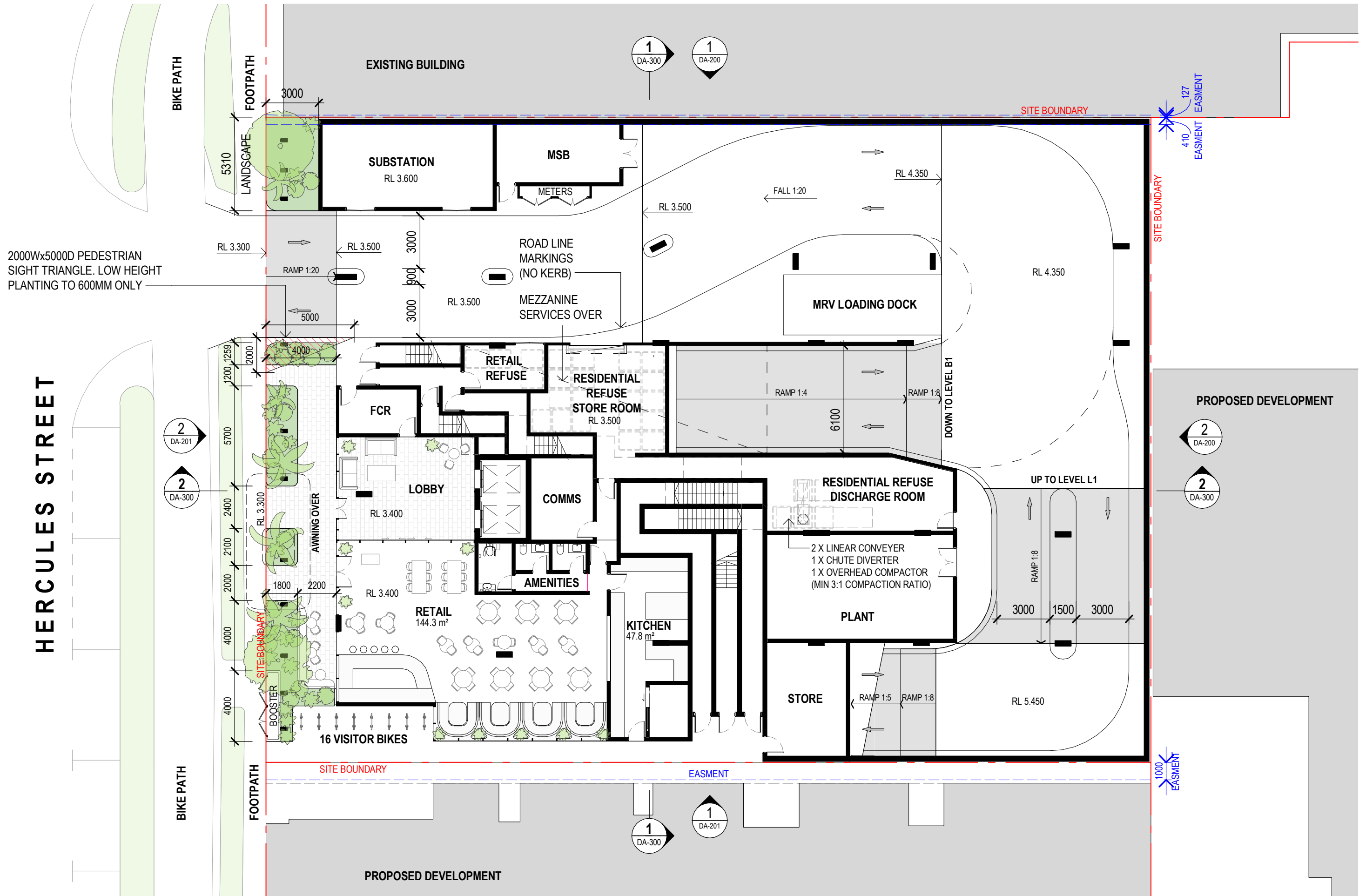
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JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4469), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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Project No.

2023072

Project

9 HERCULES STREET

Drawing

FLOOR PLAN - GROUND FLOOR

Drawing Number

DA-110

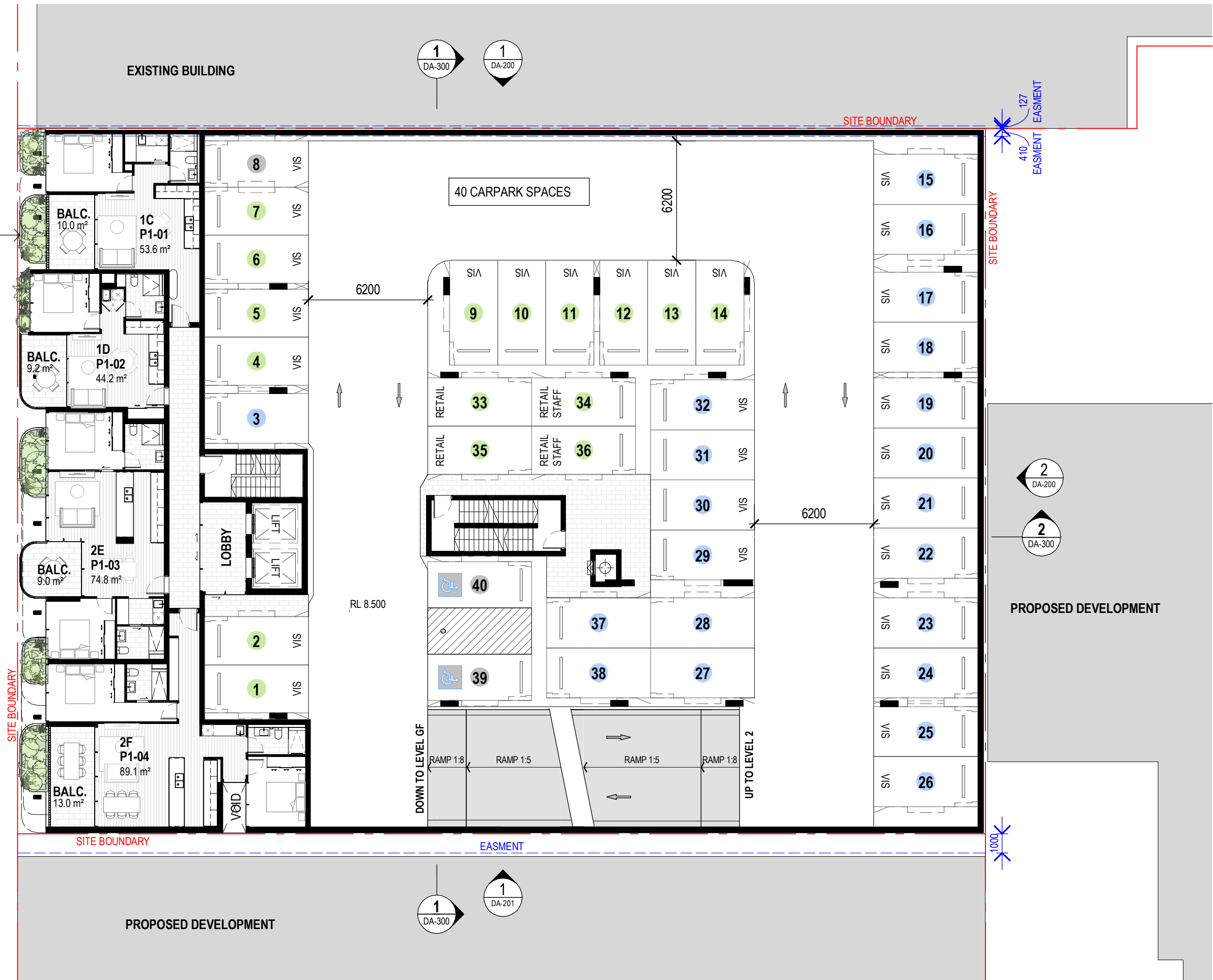
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JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4465), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



LEGEND

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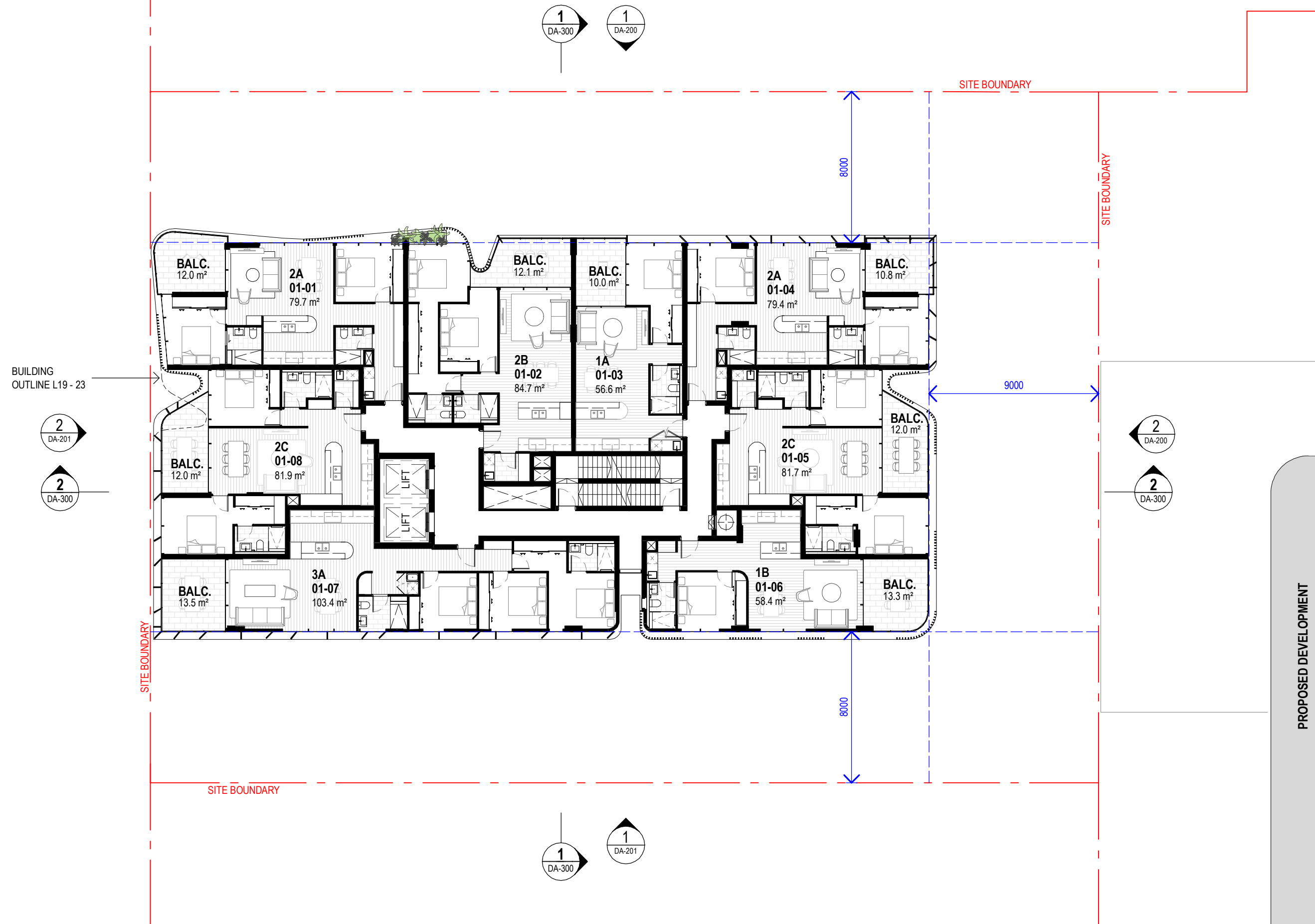
Project
9 HERCULES STREET

Drawing
**FLOOR PLAN - LVL 01 TO LVL 03
(PODIUM TYPICAL)**

Drawing Number
DA-111

Revision
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JACKSON TEECE
Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4465), Daniel Hudson (4261)
brisbane@jacksonteece.com
Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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2023072

Project

9 HERCULES STREET

Drawing

FLOOR PLAN - LVL 05 TO LVL 22

Drawing Number

DA-113

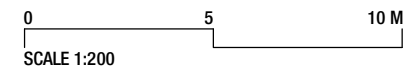
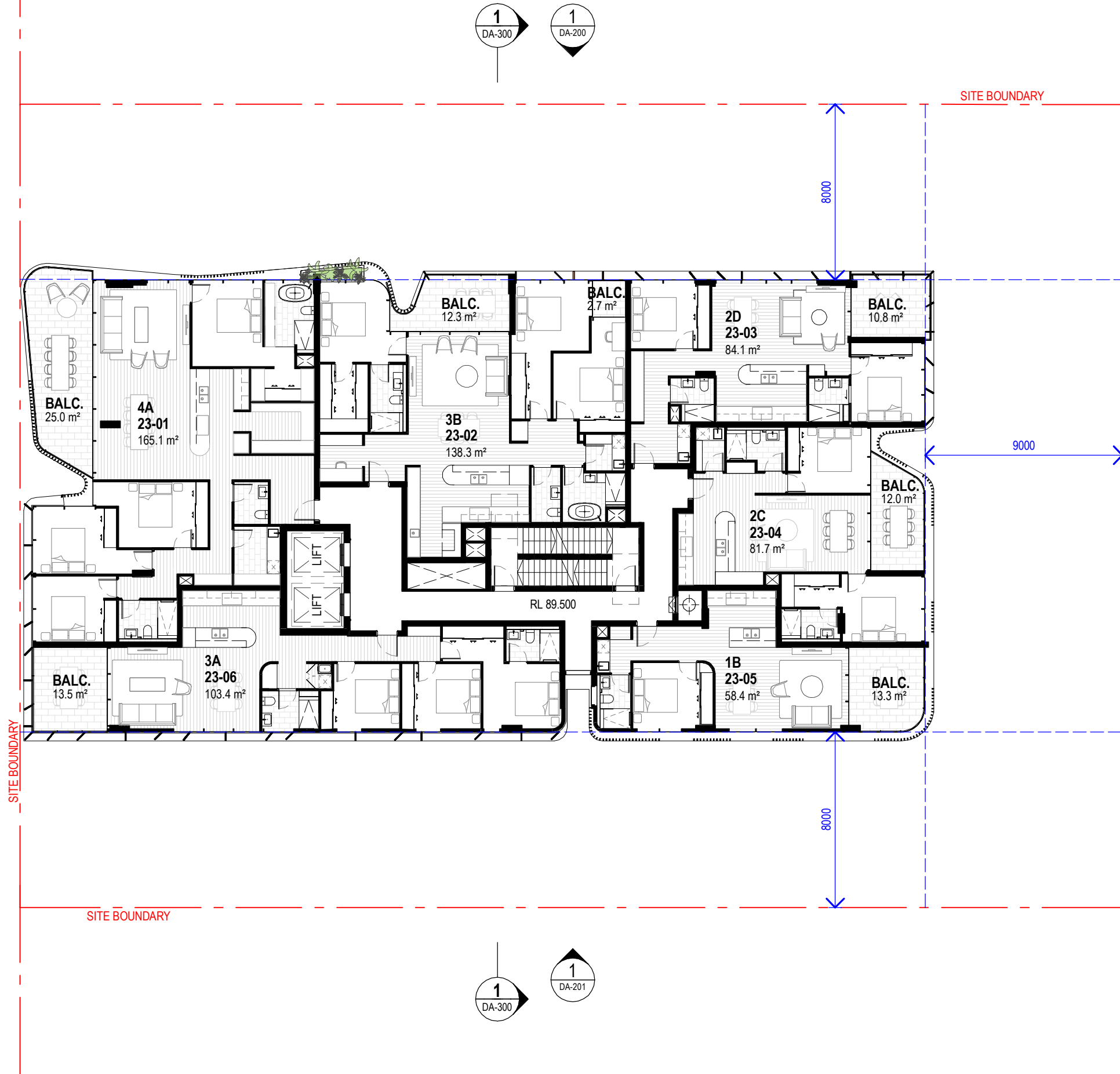
Revision

A

JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4469), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



PROPOSED DEVELOPMENT

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Project
9 HERCULES STREET

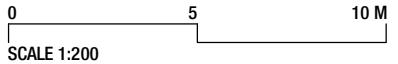
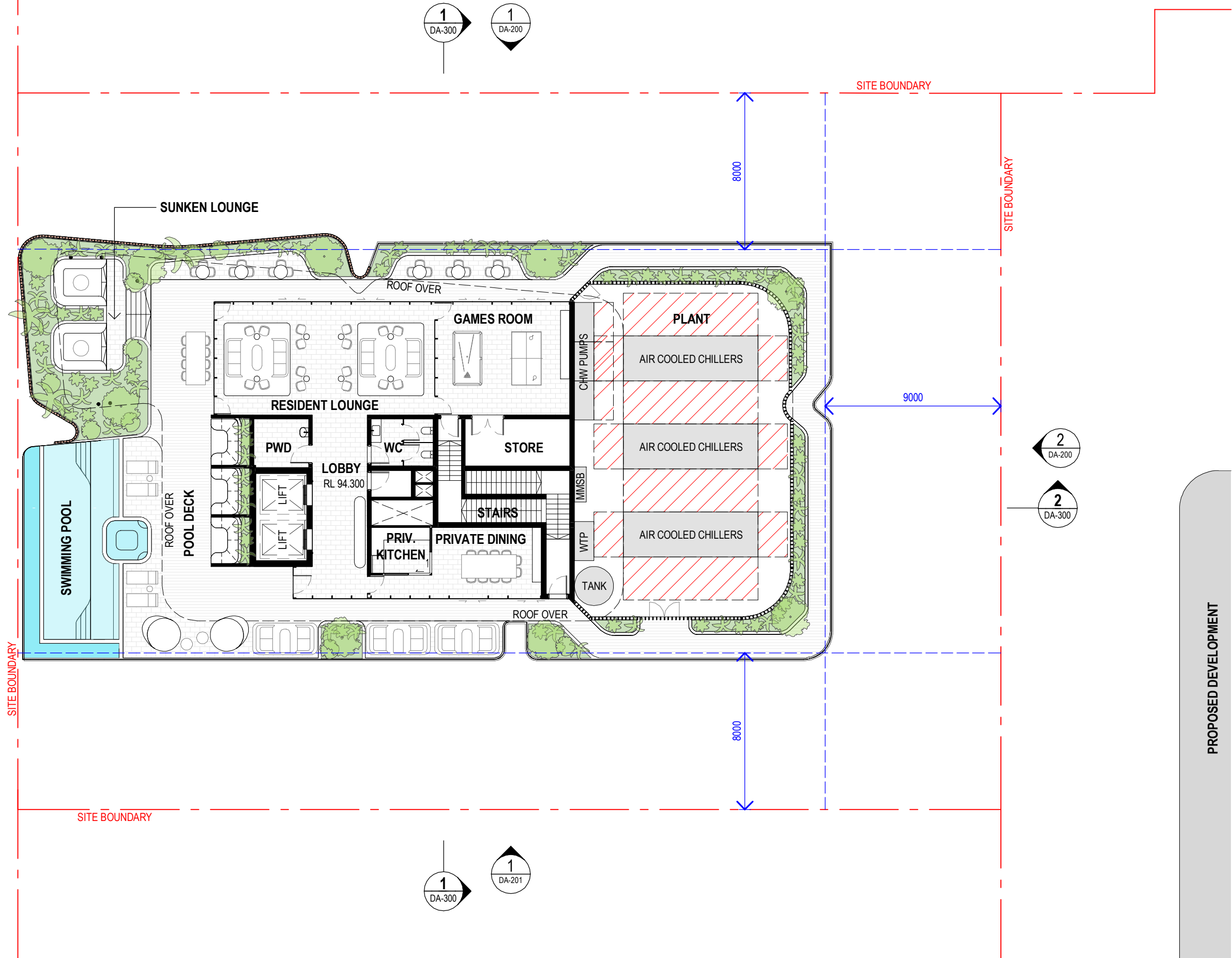
Drawing
FLOOR PLAN - LVL 23 TO LVL 27

Drawing Number
DA-114

Revision
A

JACKSON TEECE
Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4468), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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6	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.
2023072

Project
9 HERCULES STREET

Drawing
ROOF PLAN - ROOFTOP RECREATION

Drawing Number
DA-120

Revision
A

JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4465), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338

PROPOSED DEVELOPMENT

MATERIAL PALETTE



01 BRICK FACADE
COLOUR GREY VARIATION



02 PRECAST CONCRETE
COLOUR OFF - WHITE



03 OFF FORM CONCRETE
COLOUR CONCRETE FINISH



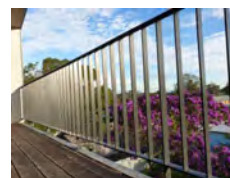
04 BATTEN SCREENING
COLOUR COPPER COLOUR 01



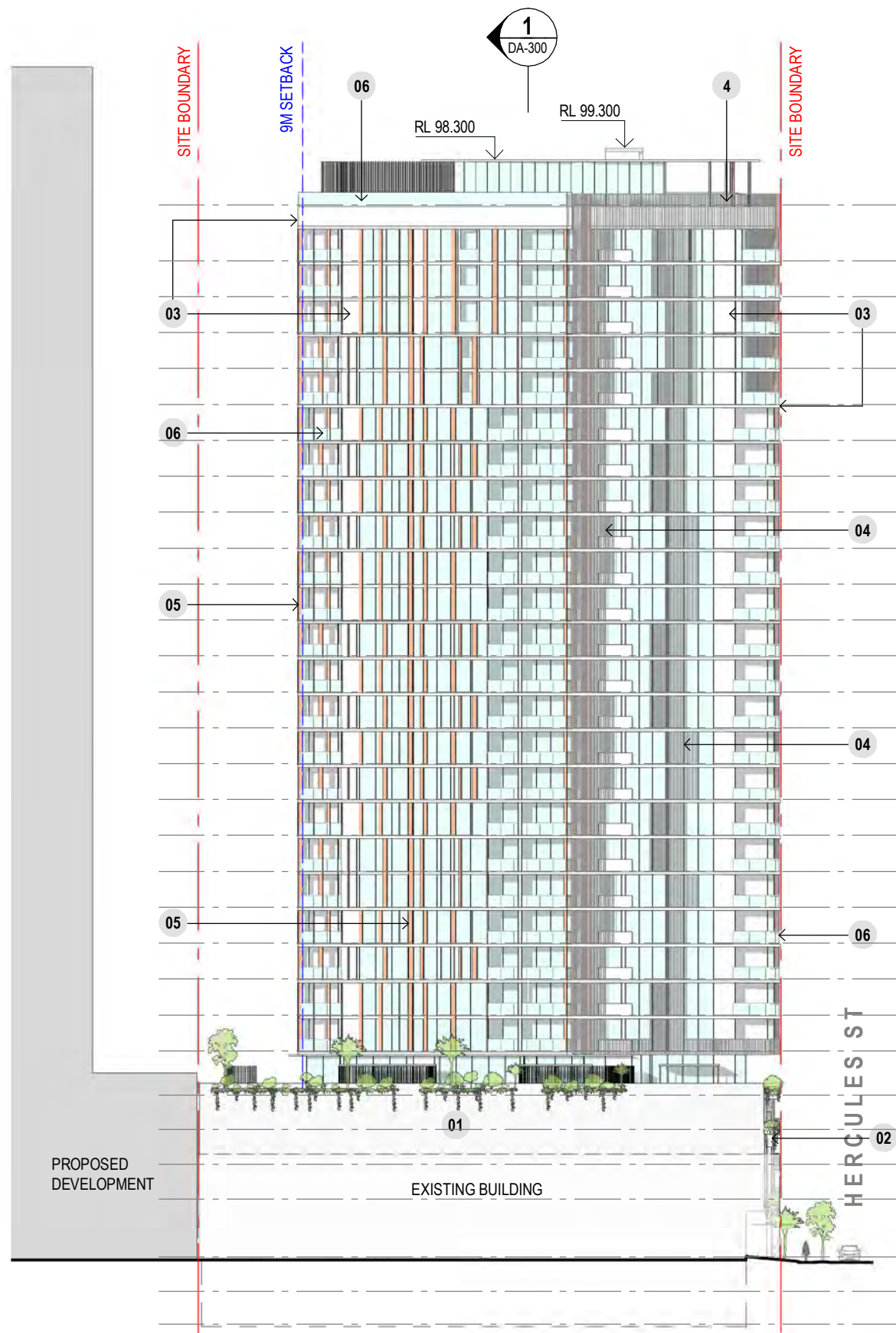
05 SUNSHADE - BLADES
COLOUR COPPER COLOUR 02



06 GLASS BALUSTRADE
COLOUR DARK GREY HANDRAIL



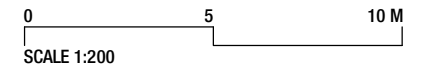
07 ROD BALUSTRADE
COLOUR DARK GREY



1 NORTH ELEVATION
1 : 500



2 EAST ELEVATION
1 : 500



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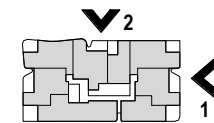
Rev.	Description	Issued	Date
1	DRAFT CONCEPT	HF	20/08/24
2	DRAFT DA ISSUE	JDP	11/09/24
3	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.
2023072

Project
9 HERCULES STREET

Drawing
ELEVATIONS - 01

Key Plan



Drawing Number
DA-200

Revision
A

JACKSON TEECE
Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4465), Daniel Hudson (4261)
brisbane@jacksonteece.com
Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338

MATERIAL PALETTE



01 BRICK FACADE
COLOUR GREY VARIATION



02 PRECAST CONCRETE
COLOUR OFF - WHITE



03 OFF FORM CONCRETE
COLOUR CONCRETE FINISH



04 BATTEN SCREENING
COLOUR COPPER COLOUR 01



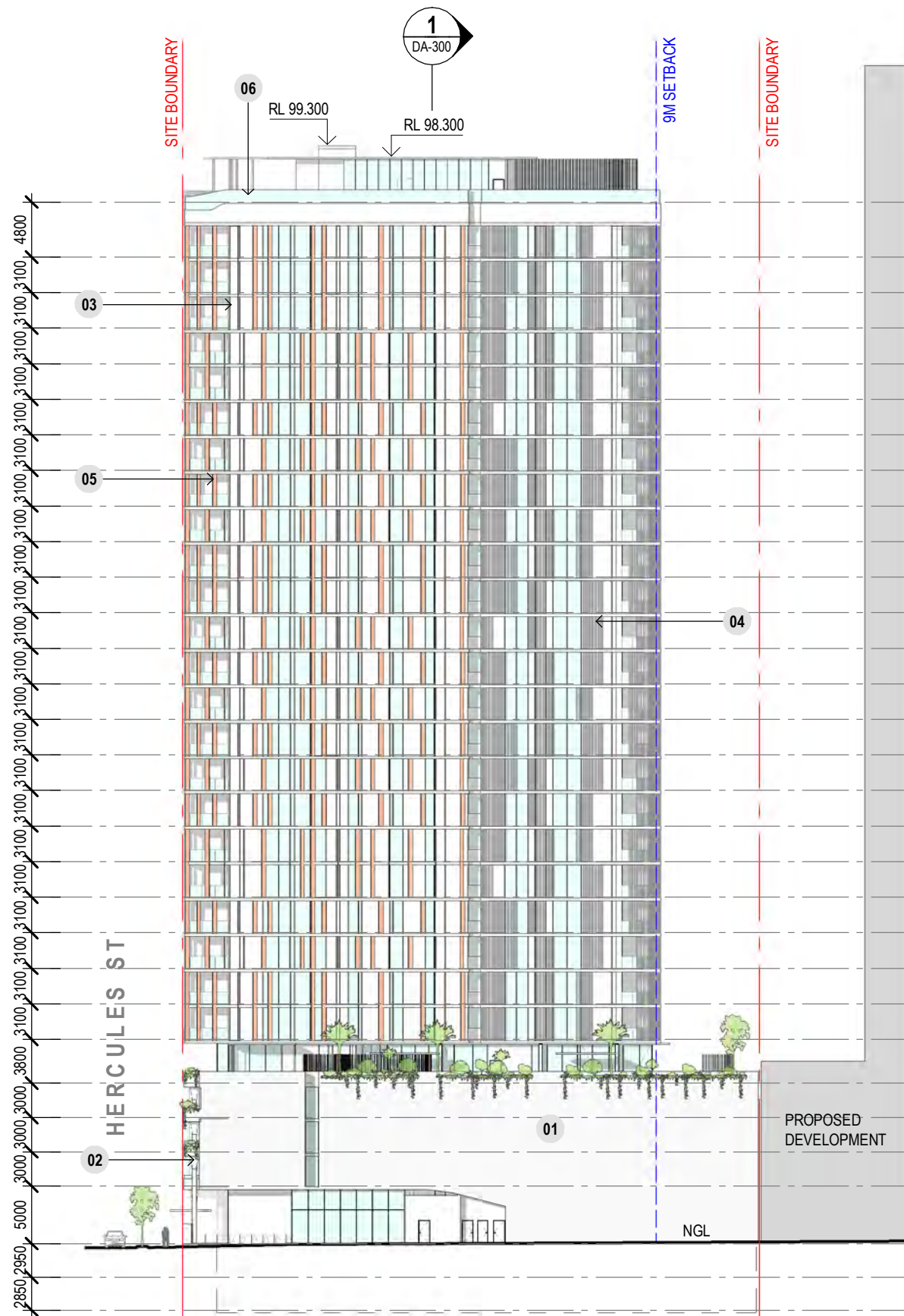
05 SUNSHADE - BLADES
COLOUR COPPER COLOUR 02



06 GLASS BALUSTRADE
COLOUR DARK GREY HANDRAIL



07 ROD BALUSTRADE
COLOUR DARK GREY



1 SOUTH ELEVATION
1 : 500



2 ELEVATION - WEST
1 : 500

0 10 25 M
SCALE 1:500

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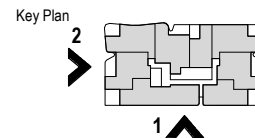
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Rev.	Description	Issued	Date
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2	DRAFT DA ISSUE	JDP	11/09/24
3	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.
2023072

Project
9 HERCULES STREET

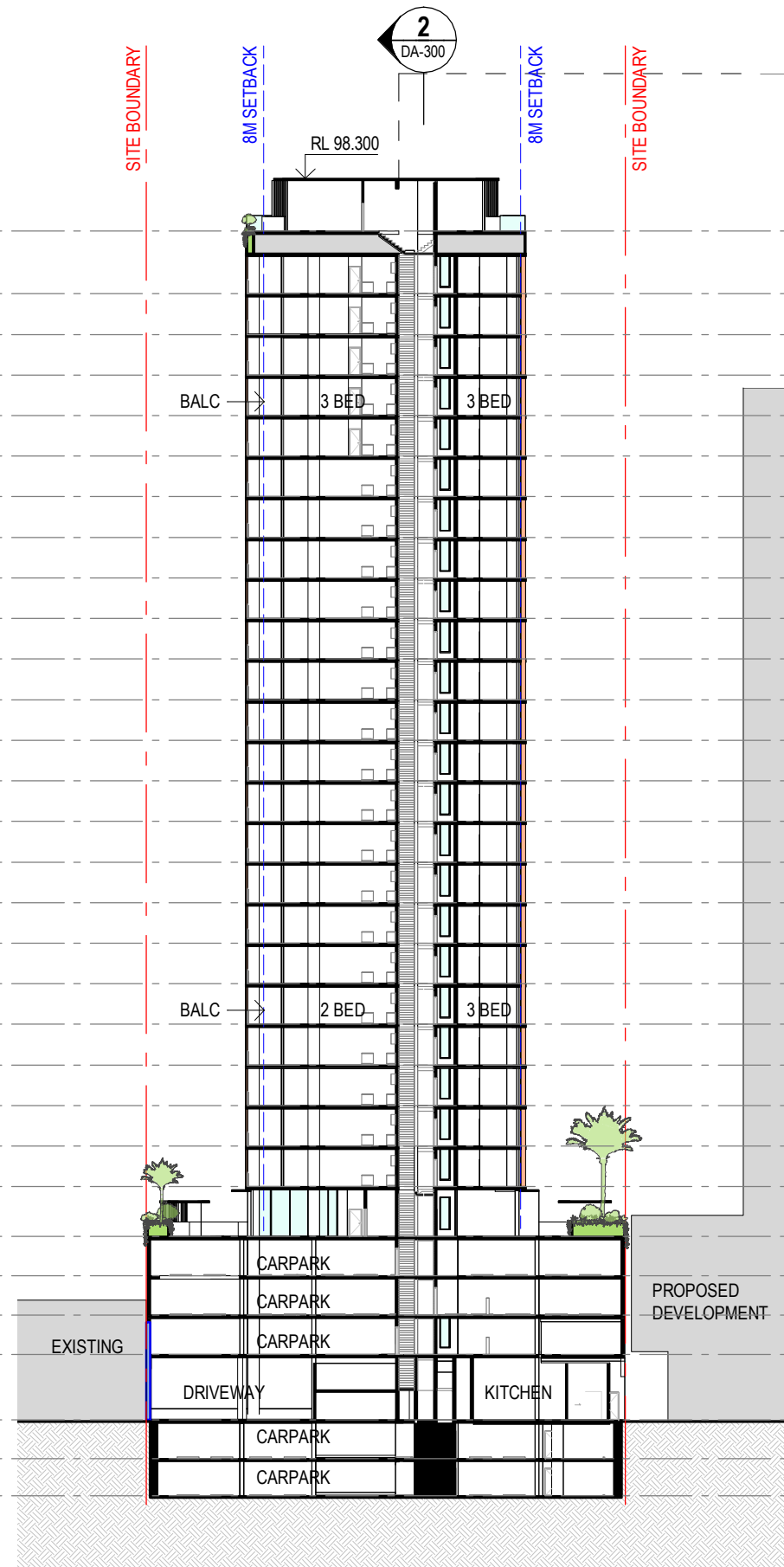
Drawing
ELEVATIONS - 02



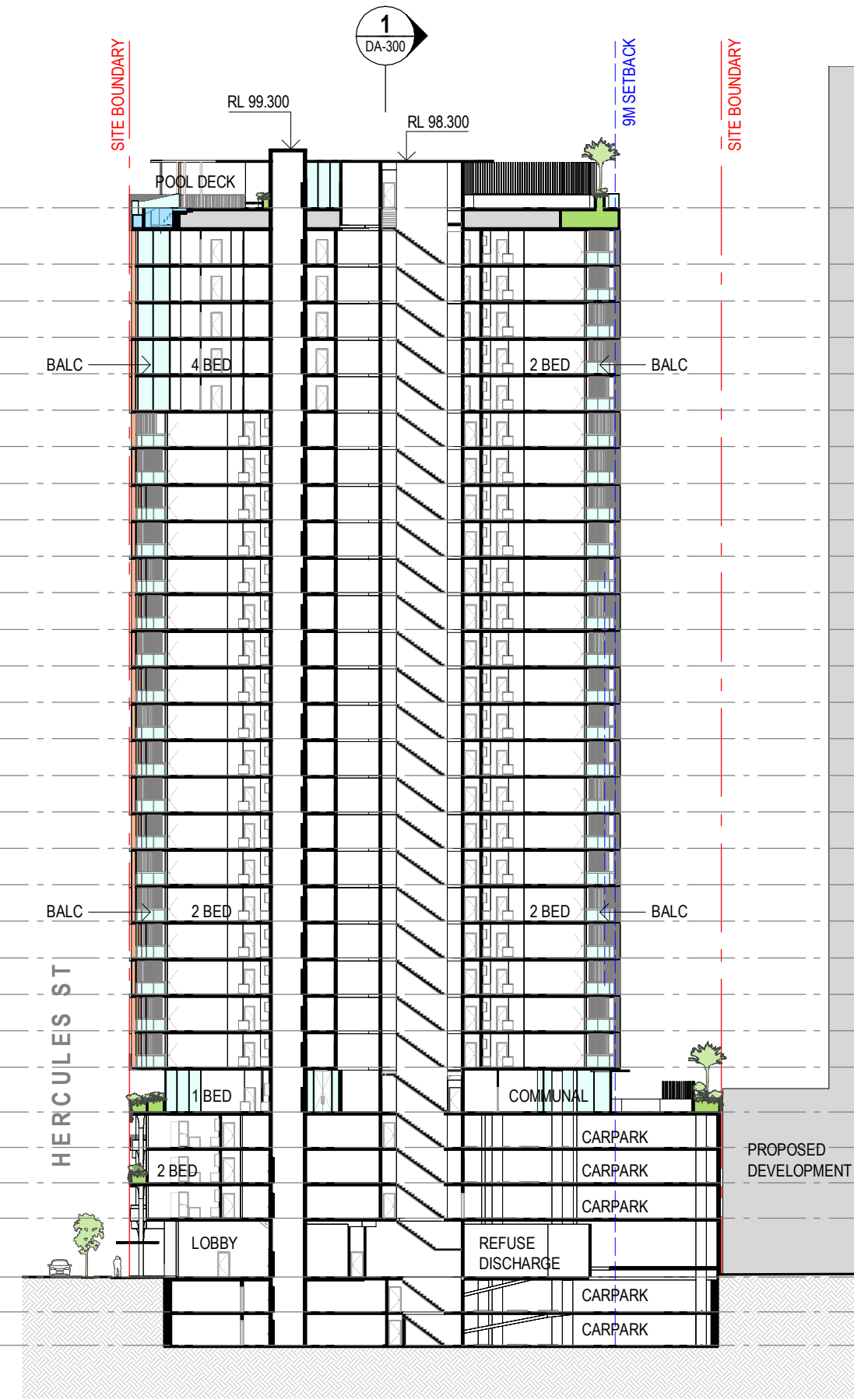
Drawing Number
DA-201

Revision
A

JACKSON TEECE
Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4465), Daniel Hudson (4261)
brisbane@jacksonteece.com
Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338

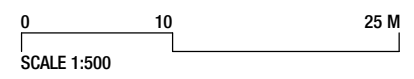


1 BUILDING SECTION 01
1 : 500



2 BUILDING SECTION 02
1 : 500

ROOF TOP	RL 94.300	4800
LEVEL 27	RL 89.500	3100
LEVEL 26	RL 86.400	3100
LEVEL 25	RL 83.300	3100
LEVEL 24	RL 80.200	3100
LEVEL 23	RL 77.100	3100
LEVEL 22	RL 74.000	3100
LEVEL 21	RL 70.900	3100
LEVEL 20	RL 67.800	3100
LEVEL 19	RL 64.700	3100
LEVEL 18	RL 61.600	3100
LEVEL 17	RL 58.500	3100
LEVEL 16	RL 55.400	3100
LEVEL 15	RL 52.300	3100
LEVEL 14	RL 49.200	3100
LEVEL 13	RL 46.100	3100
LEVEL 12	RL 43.000	3100
LEVEL 11	RL 39.900	3100
LEVEL 10	RL 36.800	3100
LEVEL 09	RL 33.700	3100
LEVEL 08	RL 30.600	3100
LEVEL 07	RL 27.500	3100
LEVEL 06	RL 24.400	3100
LEVEL 05	RL 21.300	3800
LEVEL 04	RL 17.500	3000
LEVEL 03	RL 14.500	3000
LEVEL 02	RL 11.500	3000
LEVEL 01	RL 8.500	5000
GROUND FLOOR	RL 3.500	2850
B1 - BASEMENT	RL 0.550	2950
B2 - BASEMENT	RL -2.300	



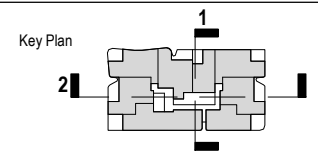
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4	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.
2023072

Project
9 HERCULES STREET

Drawing
SECTIONS - 01



Drawing Number
DA-300

Revision
A

JACKSON TEECE
Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4465), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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Plot Date: 31/10/2024 10:36:32 AM

Rev.	Description	Issued	Date
2	DRAFT CONCEPT	HF	20/08/24
3	DRAFT DA ISSUE	JDP	11/09/24
4	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.

2023072

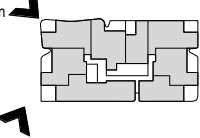
Project

9 HERCULES STREET

Drawing

3D PERSPECTIVE 01

Key Plan



Drawing Number

DA-400

Revision

A

JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4468), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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Plot Date: 31/10/2024 10:36:50 AM

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3	DRAFT DA ISSUE	JDP	11/09/24
4	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.

2023072

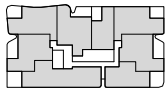
Project

9 HERCULES STREET

Drawing

3D PERSPECTIVE 02

Key Plan



Drawing Number

DA-401

Revision

A

JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4468), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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Plot Date: 31/10/2024 10:37:01 AM

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4	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.

2023072

Project

9 HERCULES STREET

Drawing

3D PERSPECTIVE 03

Key Plan



Drawing Number

DA-402

Revision

A

JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4468), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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Plot Date: 31/10/2024 10:37:13 AM

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4	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.

2023072

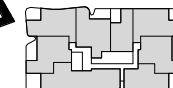
Project

9 HERCULES STREET

Drawing

3D PERSPECTIVE 04

Key Plan



Drawing Number

DA-403

Revision

A

JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4468), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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Plot Date: 31/10/2024 10:37:24 AM

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4	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.

2023072

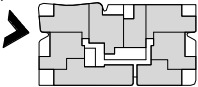
Project

9 HERCULES STREET

Drawing

3D PERSPECTIVE 05

Key Plan



Drawing Number

DA-404

Revision

A

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ABN 67 113 377 012
Nominated Architects
Damian Barker (4468), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
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A	DA ISSUE	JDP	15/10/24

Project No.

2023072

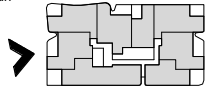
Project

9 HERCULES STREET

Drawing

3D PERSPECTIVE 06

Key Plan



Drawing Number

DA-405

Revision

A

JACKSON TEECE

Jackson Teece (Queensland) Pty Ltd Trading as Jackson Teece
ABN 67 113 377 012
Nominated Architects
Damian Barker (4468), Daniel Hudson (4261)
brisbane@jacksonteece.com

Brisbane
Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



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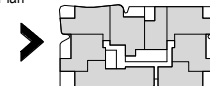
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4	FOR APPROVAL	JDP	27/09/24
A	DA ISSUE	JDP	15/10/24

Project No.
2023072

Project
9 HERCULES STREET

Drawing
3D PERSPECTIVE 07

Key Plan



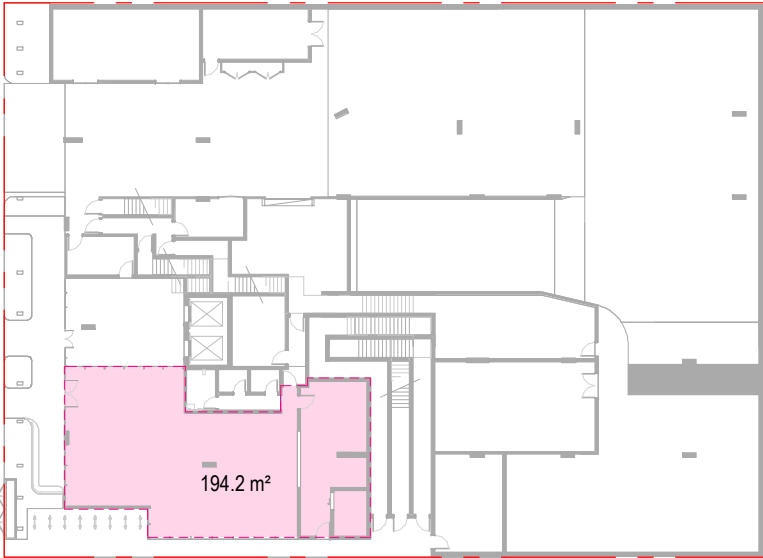
Drawing Number
DA-406

Revision
A

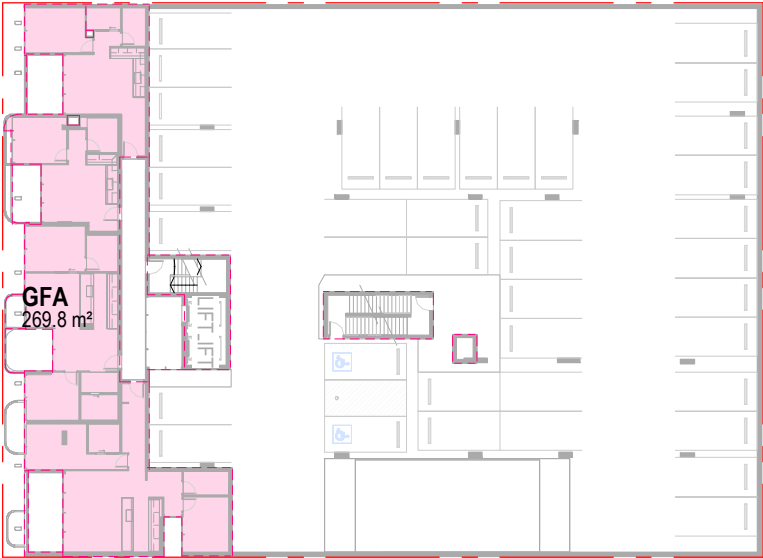
JACKSON TEECE

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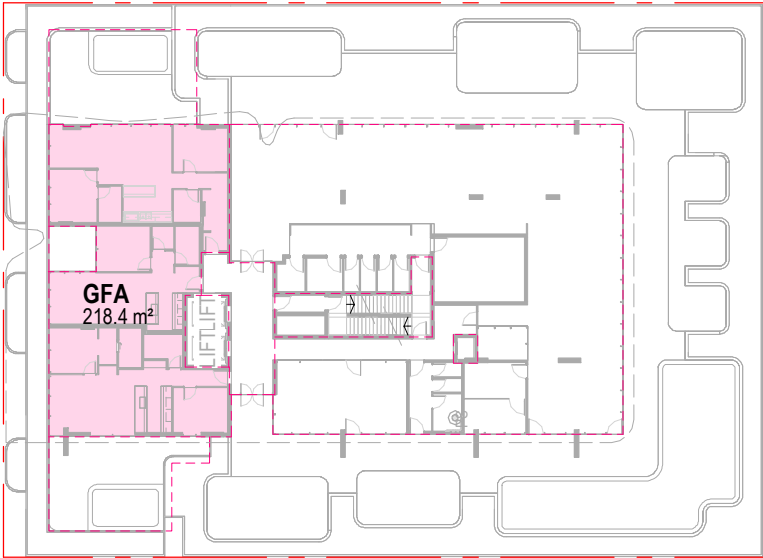
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Level 20, 344 Queen Street, Brisbane,
QLD 4000 Australia
T +61 7 3236 2771
F +61 7 3236 2338



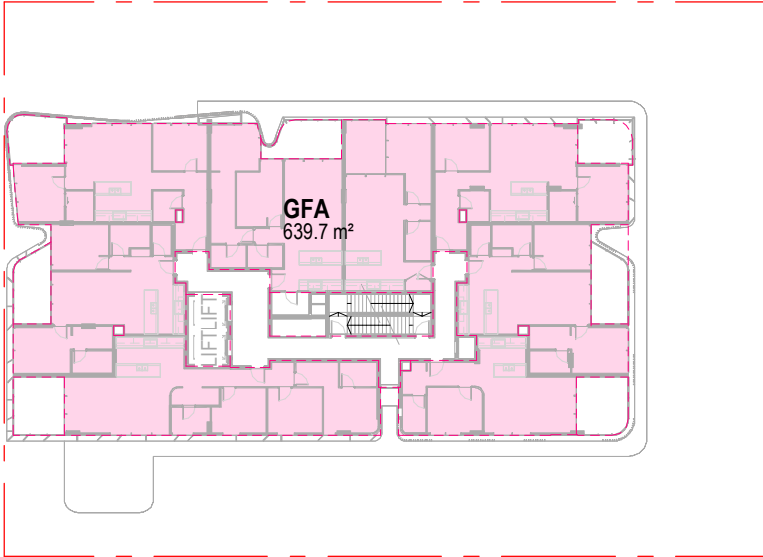
1 GFA - GROUND FLOOR



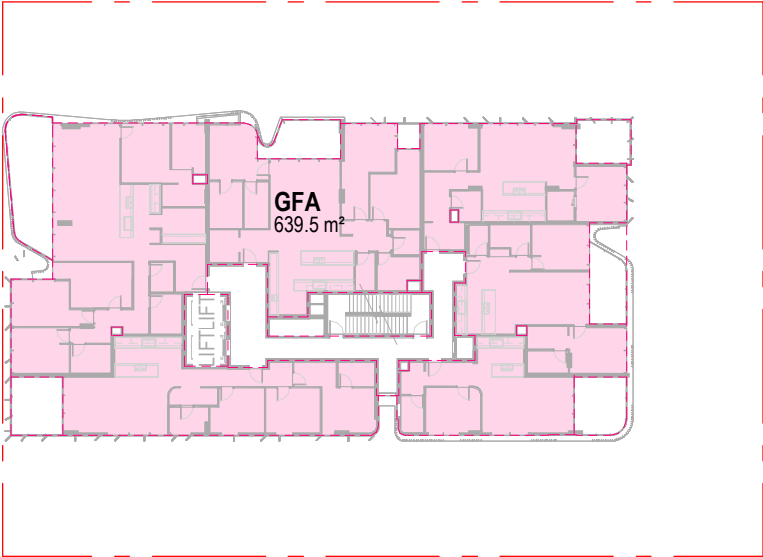
2 GFA - LEVEL 01 -03 TYPICAL PODIUM



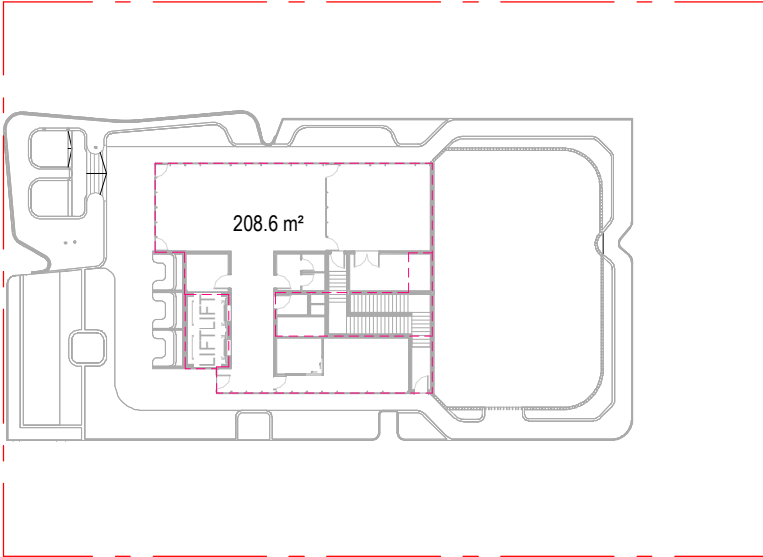
3 GFA- LEVEL 04



4 GFA - LEVEL 05 -22



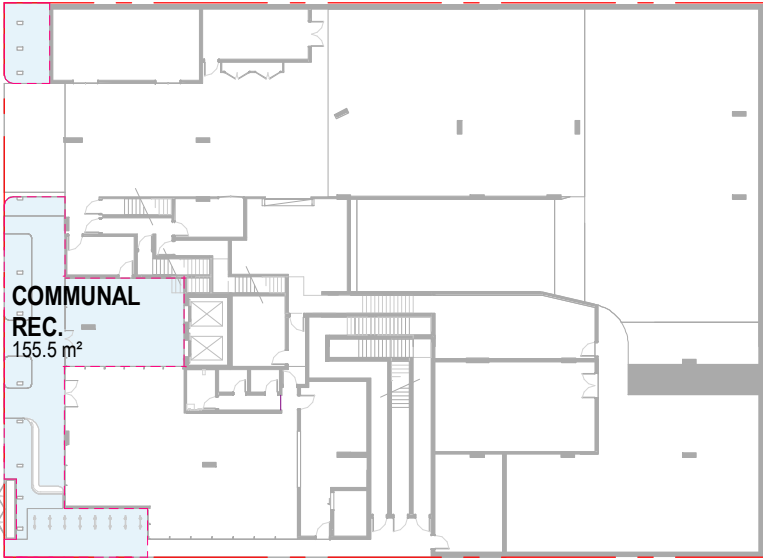
5 GFA - LEVEL 23-27



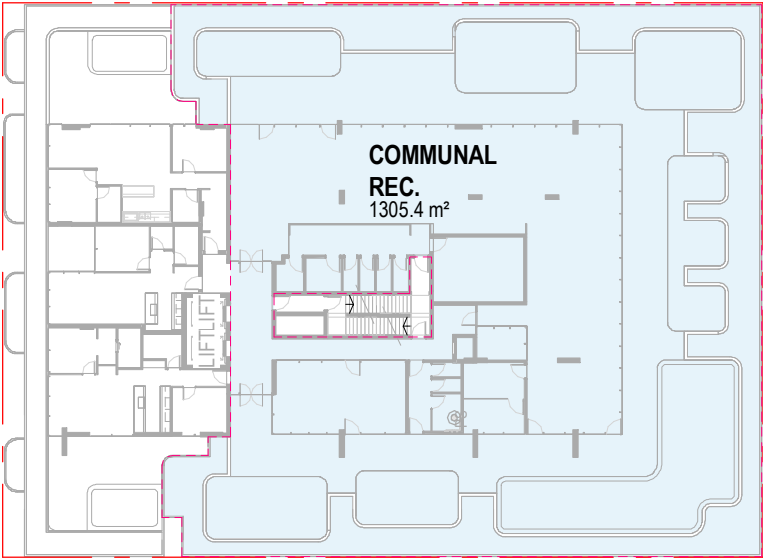
6 GFA - LEVEL 28 ROOF TOP

GFA CALCULATION

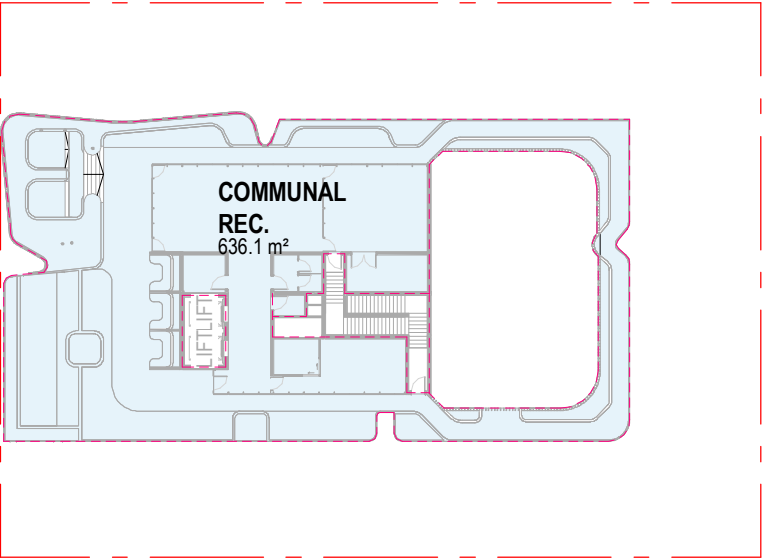
LEVELS	No. OF LEVELS	GFA AREA
GROUND FLOOR	1	194.20 m²
LEVEL 01-03 PODIUM	3	809.40 m²
LEVEL 04 - PODIUM	1	218.40 m²
LEVEL 01-18	18	11514.60 m²
LEVEL 19-23	5	3197.50 m²
TOTAL GFA		15934.10 m²



1 COMMUNAL AREA - GROUND



2 COMMUNAL AREA - LEVEL 04



3 COMMUNAL AREA - LEVEL 28 ROOF TOP

GFA CALCULATION

LEVELS	No. OF LEVELS	GFA AREA
GROUND FLOOR	1	194.20 m²
LEVEL 01-03 PODIUM	3	809.40 m²
LEVEL 04 - PODIUM	1	218.40 m²
LEVEL 01-18	18	11514.60 m²
LEVEL 19-23	5	3197.50 m²
TOTAL GFA		15934.10 m²

COMMUNAL AREA CALCULATION

LEVELS	AREA TYPE	AREA
GROUND FLOOR	COMMUNAL REC.	156 m²
GROUND FLOOR	COMMUNAL REC.	16 m²
LEVEL 04 - PODIUM	COMMUNAL REC.	636 m²
LEVEL 24 - ROOFTOP	COMMUNAL REC.	1305 m²
TOTAL AREA		2113 m²

	GFA	%	AREA
COMMUNAL REQUIRED	15934.10 m²	15.00%	2390.1
COMMUNAL PROVIDED	15934.10 m²	13.26%	2113.0



1 GROUND FLOOR LANDSCAPE



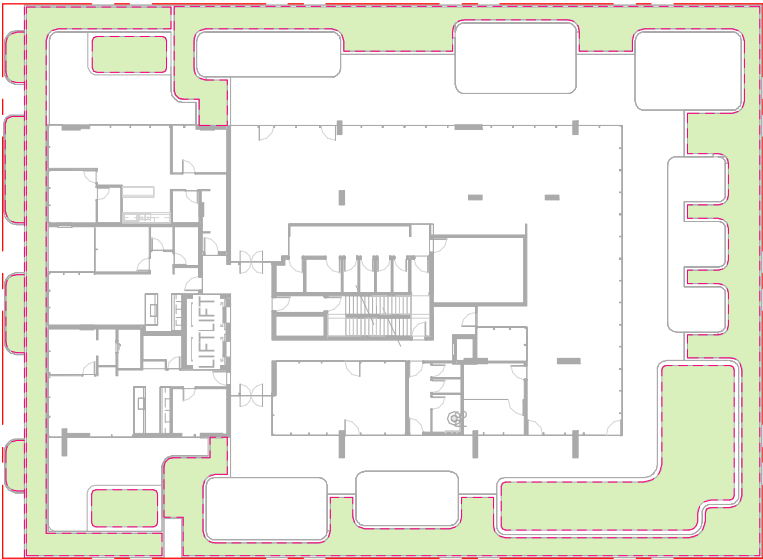
2 LEVEL 01 LANDSCAPE



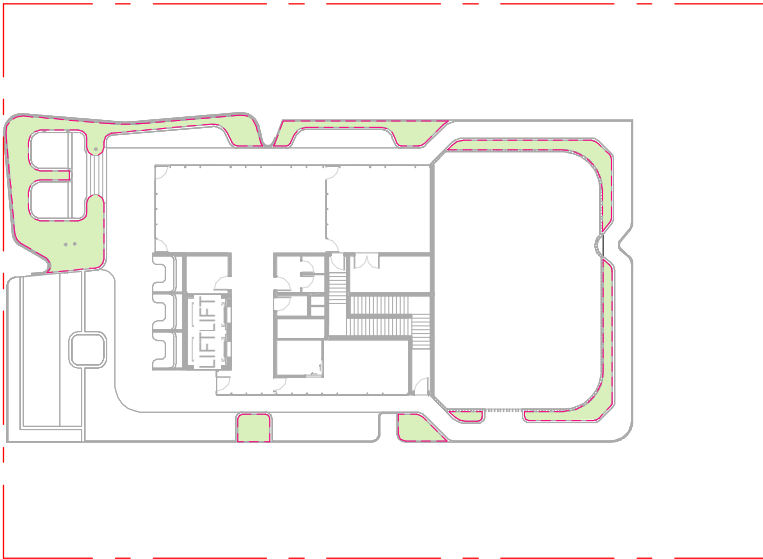
3 LEVEL 02



4 LEVEL 03
1 : 500



5 LEVEL 04 LANDSCAPE



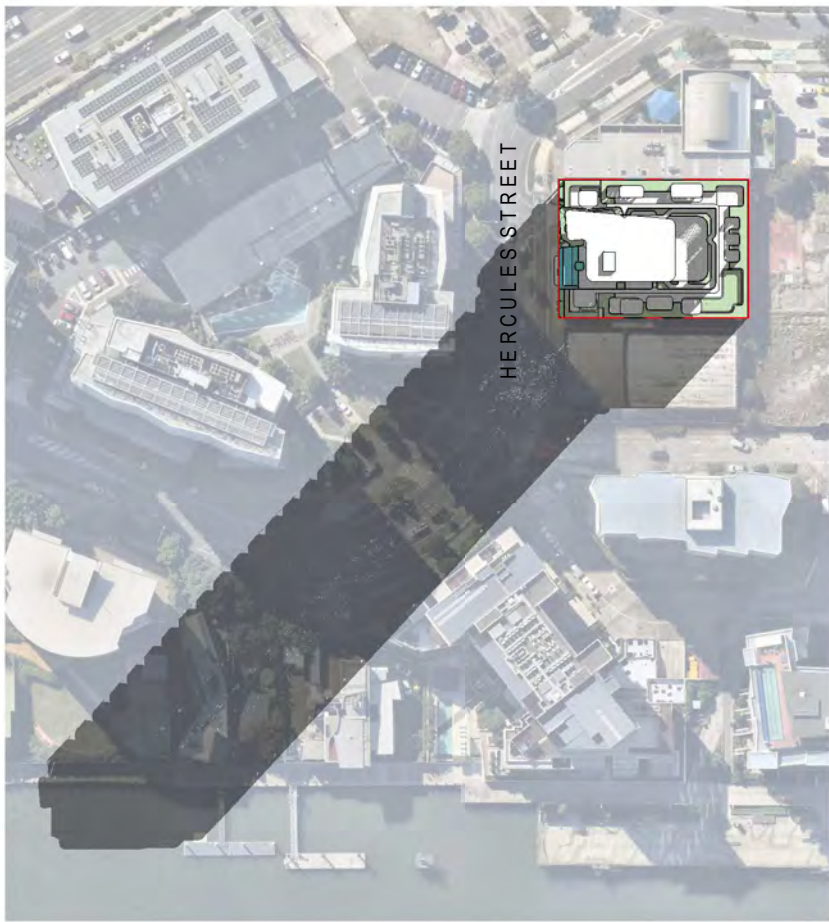
6 ROOF TOP LANDSCAPE

LANDSCAPE TYPE

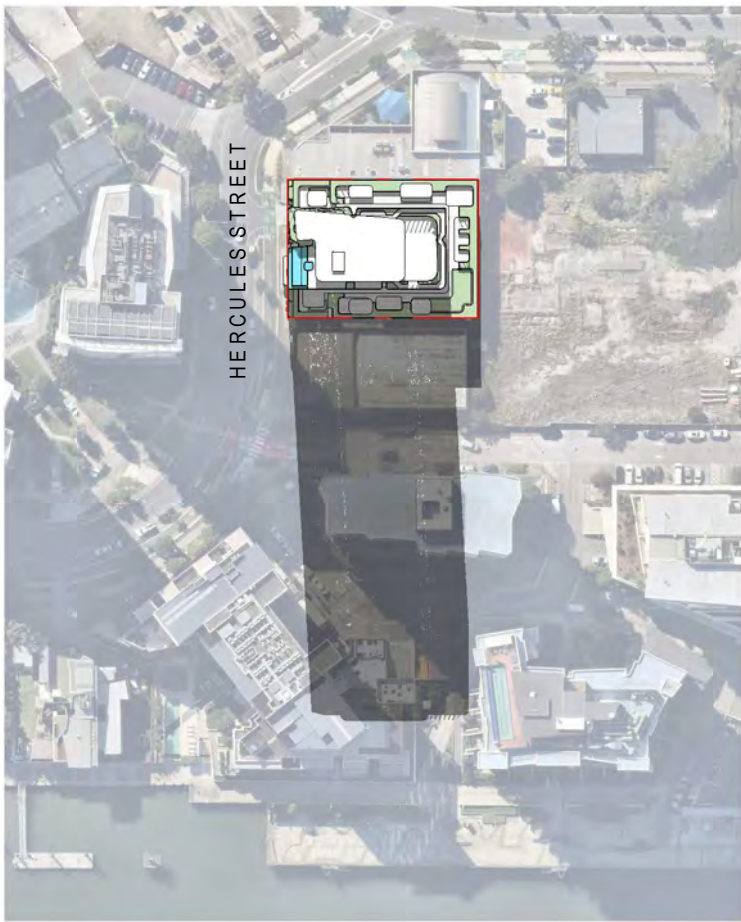
- DEEP PLANTING
- LANDSCAPE

LANDSCAPE CALCULATION

LEVEL	LANDSCAPE TYPE	AREA
GROUND FLOOR	DEEP PLANTING	47.37 m²
LEVEL 01-03 PODIUM	LANDSCAPE	46.15 m²
LEVEL 04 - PODIUM	LANDSCAPE	429.57 m²
LEVEL 24 - ROOFTOP	LANDSCAPE	80.04 m²
TOTAL LANDSCAPE		603.12 m²



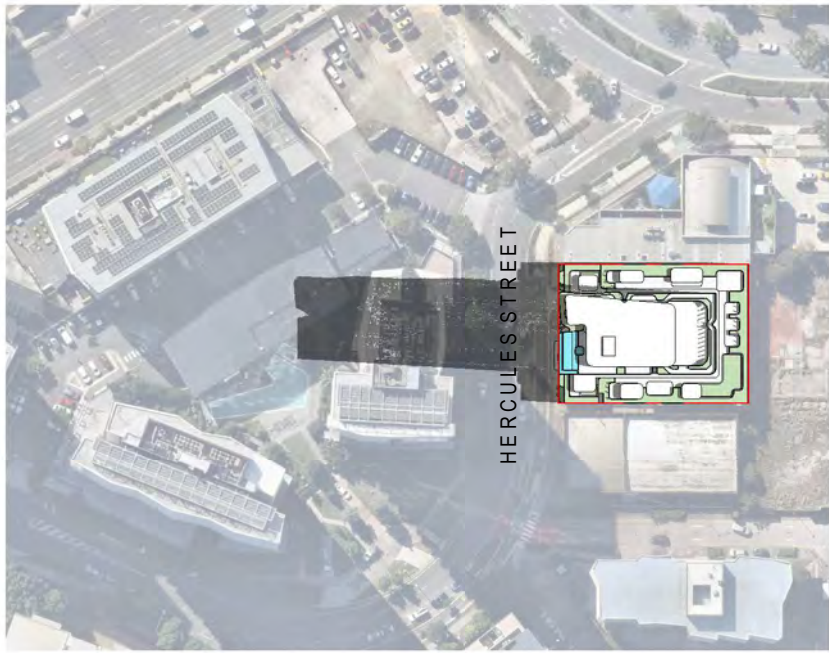
1 SUN ANALYSIS 21ST JUNE 9AM



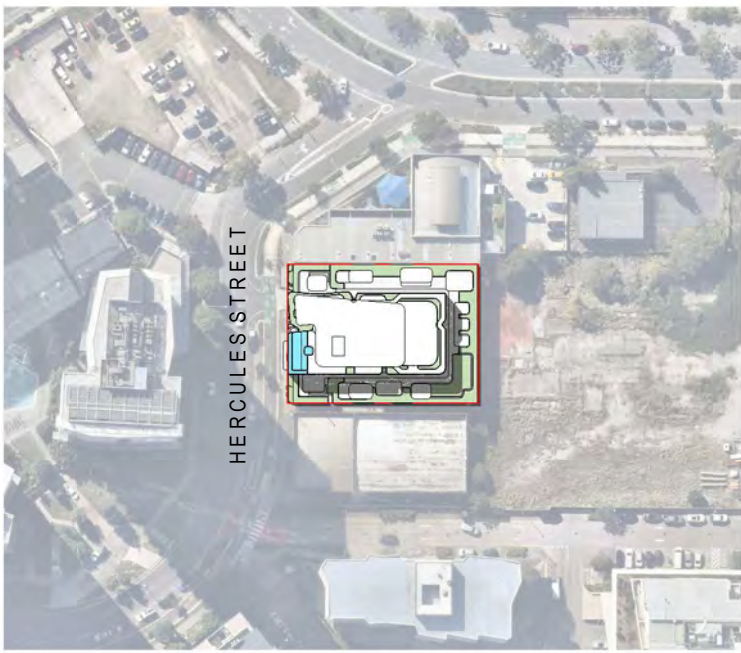
2 SUN ANALYSIS 21ST JUNE 12PM



3 SUN ANALYSIS 21ST JUNE 3PM



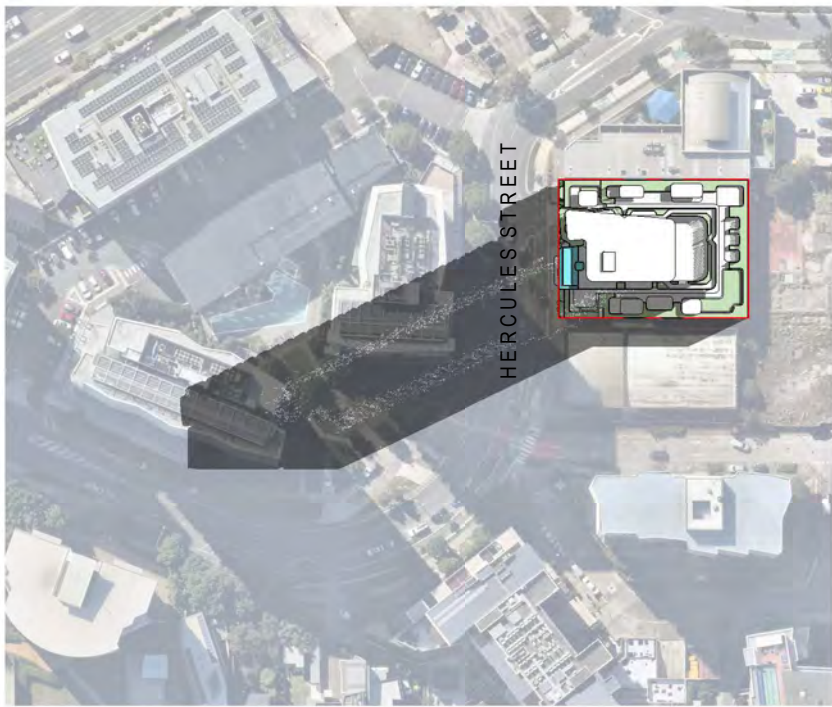
4 SUN ANALYSIS 21ST DECEMBER 9AM



5 SUN ANALYSIS 21ST DECEMBER 12PM



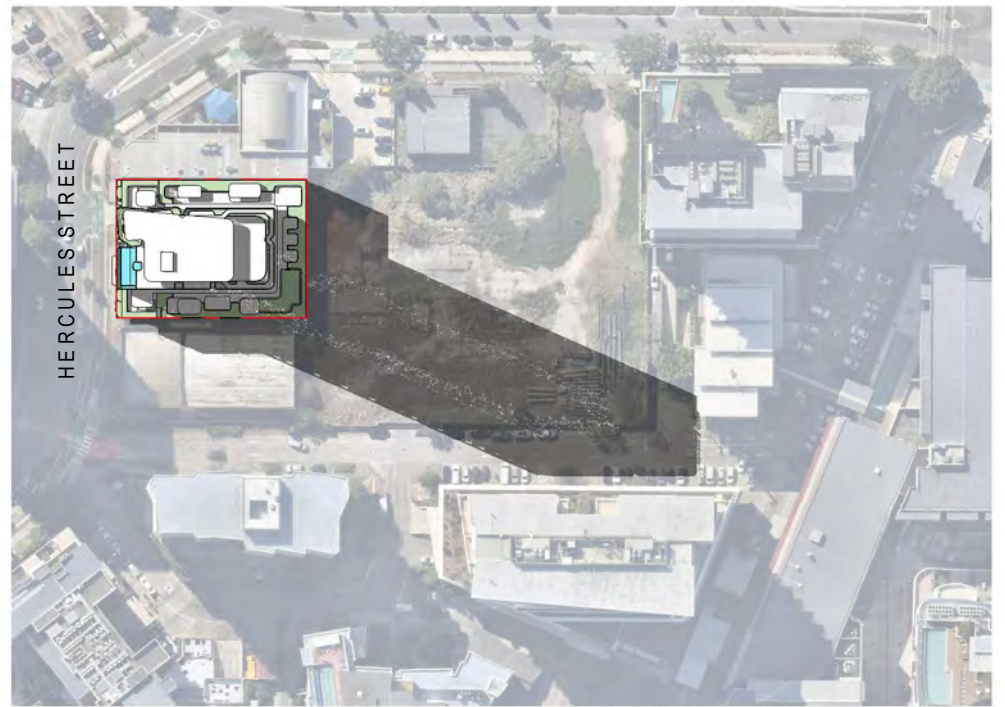
6 SUN ANALYSIS 21ST DECEMBER 3PM



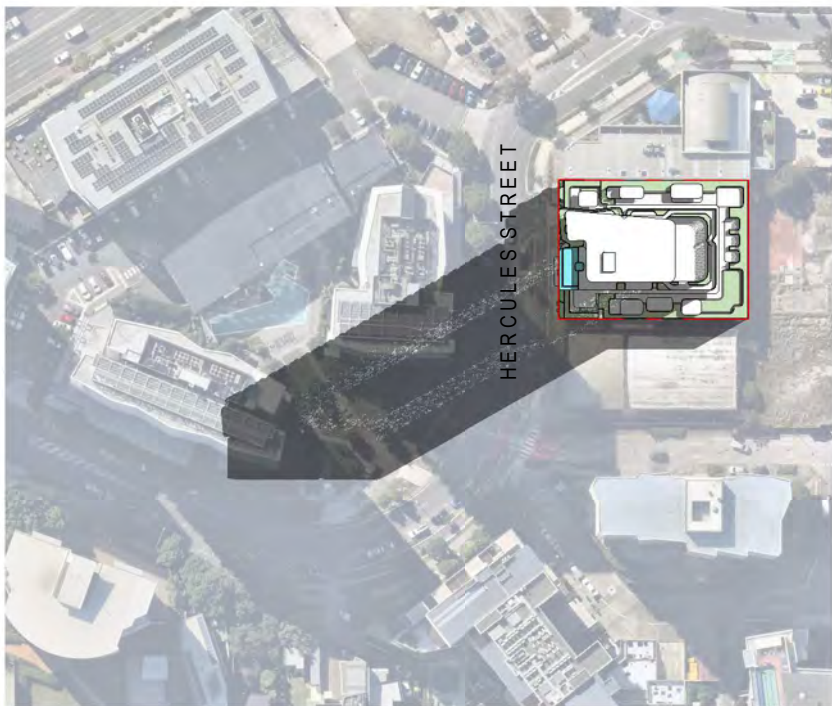
1 SUN ANALYSIS 21ST MARCH 9AM



2 SUN ANALYSIS 21ST MARCH 12PM



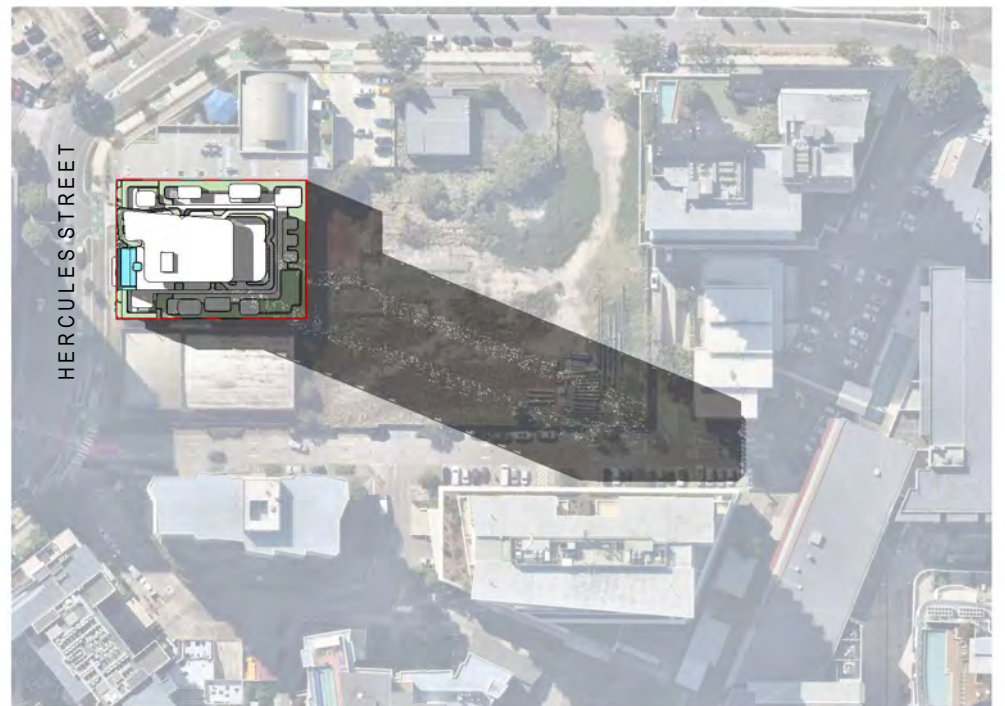
3 SUN ANALYSIS 21ST MARCH 3PM



4 SUN ANALYSIS 21ST SEPTEMBER 9AM

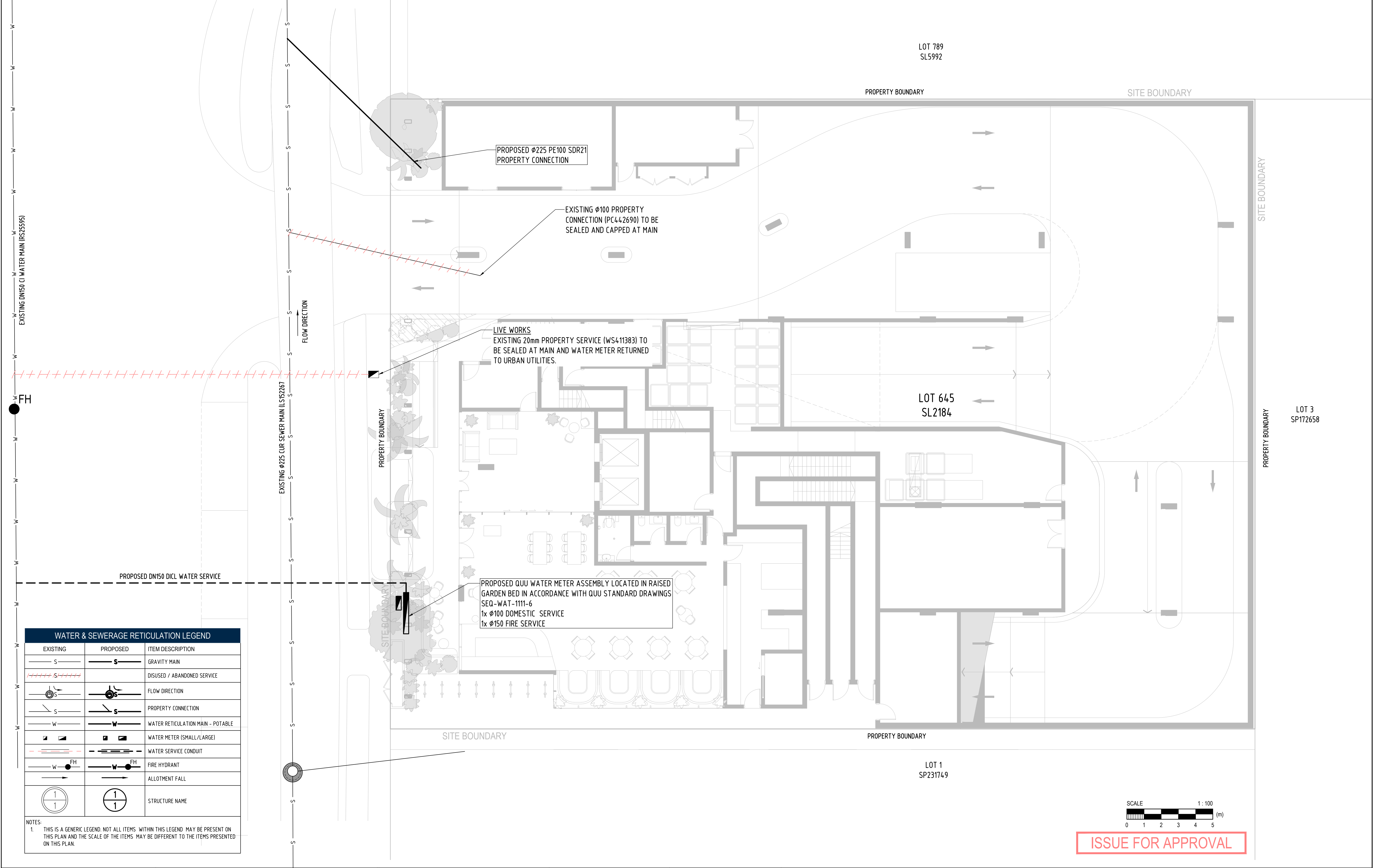


5 SUN ANALYSIS 21ST SEPTEMBER 12PM



6 SUN ANALYSIS 21ST SEPTEMBER 3PM

Appendix F - CONCEPT PLANS



WATER & SEWERAGE RETICULATION LEGEND		
EXISTING	PROPOSED	ITEM DESCRIPTION
		GRAVITY MAIN
		DISUSED / ABANDONED SERVICE
		FLOW DIRECTION
		PROPERTY CONNECTION
		WATER RETICULATION MAIN - POTABLE
		WATER METER (SMALL/LARGE)
		WATER SERVICE CONDUIT
		FIRE HYDRANT
		ALLOTMENT FALL
		STRUCTURE NAME

NOTES:
1. THIS IS A GENERIC LEGEND. NOT ALL ITEMS WITHIN THIS LEGEND MAY BE PRESENT ON THIS PLAN AND THE SCALE OF THE ITEMS MAY BE DIFFERENT TO THE ITEMS PRESENTED ON THIS PLAN.

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	06.08.2024	PRELIMINARY ISSUE	NP
B	31.10.2024	ISSUE FOR APPROVAL	JB

Associated Consultant:
JACKSON TEECE

Approved: GREGG TYQUIN
RPEQ. 1528
Date:
Drawn: NP
Design: NP
Checked: GT
Supervisor: GF

DISCLAIMER NOTE:
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North:

Orig. Dwg. Size
A1

Size of Land:
1841 M²
Scale:
1:100

Client:
Project:

CONCEPT SERVICES PLAN

CLARENCE PROPERTY DIVERSIFIED FUND
PROPOSED MULTI-RESIDENTIAL DEVELOPMENT
9 HERCULES ST, HAMILTON, QLD 4007

Job No.
25-007
Drawing No.
SK003

Revision:
B

Appendix G – RATIONAL METHOD CALCULATIONS

STORMWATER IFD INPUT

Input Required

Project Number	25-007
Project Address	Hercules Street
Description	IFD
Designer	JB
Date	26.07.2024

NAXOS

ENGINEERS

T 1300 598 544

E info@naxosengineers.com.au

50 Leichhardt Street, Spring Hill QLD 4000

PO Box 224, Spring Hill QLD 4004

NAXOSENINEERS.COM.AU

Refer: <http://www.bom.gov.au/water/designRainfalls/index.shtml>

IFD Design Rainfall Intensity (mm/h)

Issued:	26.07.2024
Location Label:	Hamilton
Requested coordinate:	Latitude 27.4397 Longitude 153.068
Nearest grid cell:	Latitude 27.4375 (S) Longitude 153.06 €

		Duration		Annual Exceedance Probability: (AEP) / Average Recurrence Interval						
				0.632	0.5	0.2	0.1	0.05	0.02	0.01
		Time	Minutes	1	2	5	10	20	50	100
BOM IFD Input ARR 2016	BOM IFD Input ARR 1987	1	1	159.00	180.00	245.00	288.00	331.00	386.00	428.00
		2	2	132.00	150.00	206.00	244.00	282.00	333.00	373.00
		3	3	124.00	141.00	192.00	228.00	263.00	310.00	346.00
		4	4	119.00	134.00	183.00	216.00	249.00	292.00	325.00
		5	5	114.00	128.00	175.00	206.00	237.00	277.00	308.00
		10	10	93.40	106.00	143.00	168.00	193.00	224.00	248.00
	BOM IFD Input ARR 1987	15	15	79.20	89.60	122.00	143.00	163.00	190.00	210.00
		20	20	68.90	78.00	106.00	125.00	143.00	166.00	184.00
		25	25	61.20	69.20	94.10	111.00	127.00	148.00	164.00
		30	30	55.10	62.30	84.80	100.00	115.00	134.00	149.00
		45	45	42.90	48.50	66.20	78.30	90.10	106.00	118.00
		60	60	35.50	40.10	54.90	65.00	75.00	88.40	98.80
		90	90	26.80	30.40	41.70	49.60	57.40	68.00	76.30
		2	120	21.90	24.80	34.20	40.80	47.30	56.30	63.30
		3	180	16.50	18.70	25.80	30.90	36.00	43.00	48.60
		4.5	270	12.40	14.10	19.60	23.50	27.50	33.10	37.50
		6	360	10.20	11.60	16.20	19.50	22.90	27.60	31.30
		9	540	7.80	8.90	12.50	15.10	17.80	21.50	24.50
		12	720	6.46	7.39	10.50	12.70	15.00	18.20	20.70
	BOM IFD Input ARR 2016	18	1080	4.97	5.72	8.18	9.96	11.80	14.40	16.50
		24	1440	4.13	4.77	6.88	8.42	10.00	12.30	14.10
		30	1800	3.57	4.13	6.01	7.38	8.80	10.80	12.50
		36	2160	3.16	3.67	5.38	6.62	7.91	9.74	11.20
		48	2880	2.60	3.03	4.48	5.54	6.64	8.22	9.53
		72	4320	1.94	2.28	3.40	4.23	5.09	6.34	7.38
		96	5760	1.55	1.83	2.74	3.42	4.12	5.15	6.00
		120	7200	1.29	1.52	2.28	2.85	3.44	4.29	5.00
		144	8640	1.11	1.30	1.94	2.42	2.92	3.64	4.24
		168	10080	0.97	1.13	1.68	2.09	2.52	3.13	3.64

STORMWATER DISCHARGE CALCULATION

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



Project Number	25-007
Project Address	Hercules Street
Description	IFD
Author	JB
Date	26.07.2024

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 Description	Pre-Development	Post-Development
Catchment Area (m ²)	1841	1841
Total Area (ha)	0.184	0.184
Impervious Area (m ²)	1841	1657
Pervious Area (m ²)	0	184

Fraction Impervious Details

Calculated Fraction Impervious fi	1.000	0.900
Manually override Fraction Impervious (fi)		
Fraction Impervious (fi) used	1.000	0.900
Is Fraction Impervious (fi) is less than 0.2 (If Yes soil properties required)	NO	NO
Soil Description		
Soil Permeability		

1 hour rainfall intensity (¹I₁₀) Details

65

IFD value calculated from IFD Input (mm/hr)	65.00
Manually override IFD value (mm/hr)	
IFD value used (mm/hr)	65.00

Discharge Coefficient C₁₀ Details

QUDM 10 year Discharge Coefficient C ₁₀	0.900	0.880
Manually override Discharge Coefficient C ₁₀		0.88
10 year Discharge Coefficient C ₁₀ used:	0.900	0.880

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 x C ₁₀	mm/hr	Q _y	C _y = F _y x C ₁₀	mm/hr	Q _y
1	0.80	0.720	114	0.042	0.704	114	0.041
2	0.85	0.765	128	0.050	0.748	128	0.049
5	0.95	0.855	175	0.077	0.836	175	0.075
10	1.00	0.900	206	0.095	0.880	206	0.093
20	1.05	0.945	237	0.115	0.924	237	0.112
50	1.15	1.000	277	0.142	1.000	277	0.142
100	1.20	1.000	308	0.158	1.000	308	0.158

Rational Method

$$Q = CIA / 360$$

Appendix H - FILTER BASKET OPERATION & MAINTENANCE MANUAL



Model Number

Job Number

SPEL StormSack

OPERATIONS & MAINTENANCE

www.spel.com.au

Manual Introduction

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.

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 Alloy 5052-H32
- e. Lifting Tabs: Aluminium Alloy 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.

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

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 participate 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.

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.

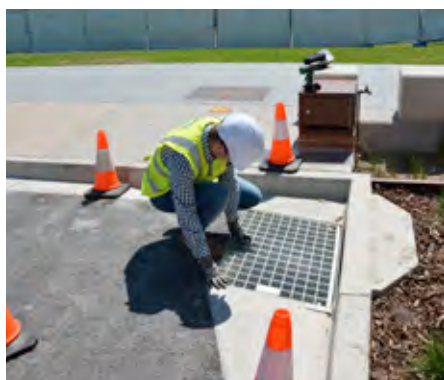
It is also recommended that additional monitoring is conducted following moderate to extreme rainfall events, especially when previous months have had little or no rainfall.



2. Gully Pit Cover Removal

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

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 from 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

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.

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



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