

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2019/1047

Date: 21st December 2020



Robert
Bird
Group

Site Services and Stormwater Management Report **Holiday Inn Express Hotel, Maroochydore**

Issue: B

30 October 2020

Prepared For: TSA Management Pty Ltd

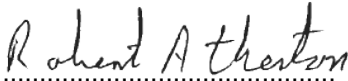
Project No.: 19305

Document No.: 19305-RBG-ZZ-XX-RP-CV-00001

Report Amendment Register

Issue Ref	Amended Section(s)	Issue / Amendment Details	Author(s)	Reviewer	Date
A	All	First Issue	Marcellus Ng	Ian McCubbin	03/06/19
B		Reissued for Revised DA	Robert Atherton	Ian McCubbin	30/10/20

REVISION/ISSUE AUTHOR:



Robert Atherton

Signing for and on behalf of

Robert Bird Group Pty Ltd

Date: 30 October 2020

REVIEWER:



Ian McCubbin

Signing for and on behalf of

Robert Bird Group Pty Ltd

Date: 30 October 2020

PLANS AND DOCUMENTS
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Appendix B	Concept Erosion and Sediment Control Plan
Appendix C	Concept Stormwater Plan
Appendix D	MUSIC Results
Appendix E	State Planning Policy Codes
Appendix F	Ocean Protect
Appendix G	Pavement Construction and Signage Plan

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1 Purpose of Document

This document has been prepared by Robert Bird Group (**RBG**) as part of the Development Application submission to the Economic Development Queensland (**EDQ**) for the proposed residential development located south west corner of Fairway Drive and First Avenue, Maroochydore, QLD.

The purpose of this report is to address the engineering infrastructure that will be required to service the proposed development.

This report was prepared using information obtained from the following sources:

- Architectural Plans of the proposed development prepared by Kann Finch Group Pty Ltd (Issued: 21 October 2020);
- Sunshine Coast City Council MyMaps;
- Dial-Before-You-Dig (DBYD) Services; and
- Maroochydore City Centre Civil Works – Stage 1 Engineering Drawings by Cardno provided by Suncentral.

2 Introduction

2.1 Project Description

The proposed development is located on land parcel Lot 70 on SP305312. With a total site area of 2535m².

It is located within a new subdivision on the western side of the intersection of First Avenue and Fairway Drive, and also bounded by Lightning Lane.

The site is located within Precinct 3 (Core Business) zone of the proposed Maroochydore Cite Centre. The subject site is identified as Lots G2 and G3 within Stage 1A of the development. The Maroochydore Cite Centre proposal has been approved by Economic Development Queensland (EDQ) and is currently under construction.

Proposal Details

The proposed development includes one single ground floor consisting of retail areas, Hotel Servicing areas and carparking. There are 8 levels of residential rooms for hotel guest, with Level 8 containing a communal pool. The proposed development is documented by Kann Finch Group.

Vehicle Access and Parking

Vehicle entry can be accessed on Lightning Lane, located on the western boundary of the site. There are 30 parking bays located on the ground level.

2.2 Topography

The proposed site has been excavated to a minimum earthworks level, which ranges from RL2.21 to RL1.72 for 56m length. Existing survey for the site indicates that the site grades to a low point in the northern corner of the site.

Due to poor quality subgrade materials on site, the Ground Floor Level is to be constructed using a suspended slab supported by piles with a retaining wall around the perimeter to prevent stormwater entering the void under the Ground Floor Slab.

Minor detailed earthworks will be required under the proposed Electrical Transformer in order for the Transformer Earthing to be installed. It is proposed to construct a retaining wall under the Transformer and Switch Room so that fill can be placed in accordance with Energex requirements to allow the Transformer to be earthed.

2.3 Location

The site is located on the corner of Fairway Drive and Lightning Lane, Maroochydore, QLD. There is currently no street number assigned.



Figure 2.3 – Site Location

Image by Nearmap © 2019

3 Density

Density calculations are based on the development yield provided by Kann Finch. Table 3.1 below provide a summary of the proposed land usage of the site.

Table 3.1 Development Summary

DEVELOPMENT TYPE	QUANTITY
Multiple Dwelling Residential	181 rooms
Retail Space	185 m ²

4 Stormwater

4.1 Existing Infrastructure

According to SCC MyMaps information, there is an existing 900mm RCP stormwater pipe located on the northern side of Fairway Drive within a stormwater easement.

The construction drawings by Cardno identifies stormwater infrastructure surrounding the site in all directions. There are four gully pits for possible stormwater connection for the proposed site.

4.2 Flooding

4.2.1 Regional Flooding

A waterway (Maud Channel) is located approximately 240m southwest of the subject site. Flood modelling of the extent of water was completed by Cardno as part of the EDQ Approval. The “Maroochydore City Centre Addendum to Cornmeal Creek Flood Study” dated 11 September 2017 (ref2494-02) identifies a 1% AEP flood level incorporating climate change as being RL 2.75m at the midpoint in the precinct. Allowing for the appropriate freeboard of 0.3m, the minimum development level is defined as being RL3.05m for the subject site.

4.3 Lawful Point of Discharge

The lawful point of discharge for the site discharge will be directly to the existing stormwater network, which was recently constructed as part of the subdivision. The proposed discharge point for the development has been identified as the existing connection on Lightning Lane adjacent the western corner of the site. In order to accommodate the proposed stormwater quality treatment devices, the existing pipe is expected to be reconstructed at an increased depth.

The existing stormwater pipe and pit located in the south east corner of the site will be demolished and a new stormwater pit will be constructed within the road reserve with a temporary drainage connection installed to drain the balance lot. Refer to Appendix C for details.

4.4 Proposed Stormwater Quantity

The infrastructure for the Maroochydore City Centre subdivisional works have been designed to cater for a fully impervious catchment. As some landscaping is proposed to the development, the peak discharge for the site will not exceed the design assumptions for the catchment.

As noted in Section 4.3, the proposed development will utilise one discharge point in lieu of the existing four. An assessment of the downstream piped drainage system determined that the system does not exceed the desired operation capacity under the requirements of QUDM. It is noted that the piped connection to the existing maintenance hole in Lightning Lane may be to be upsized to cater for the major storm event should a suitable surcharge location not be feasible within the site boundary.

5 Stormwater Quality Management

5.1 Stormwater Quality Treatment Train

The proposed development will consist of landscaped areas, concrete footpaths, driveways and roofs. The following stormwater quality improvement devices (SQID's) may suit the characteristic of the proposed development and the constraints of the site. A selection of these devices will be implemented to the proposed development:

Table 5.1 – Proposed SQIDs

SQID	DISCUSSION
Ocean Protect Oceanguard	Oceanguard (gully pit basket) is designed to remove gross pollutants, coarse sediment and associated pollutants (Hydrocarbons, metals & nutrients) at high flows. Refer to Appendix F for details.
Ocean Protect Stormfilter	Stormfilter improves the quality of stormwater runoff by removing non-point source pollutants, including sediment, oil and grease, soluble metals, nutrients, organics, and trash and debris. Refer to Appendix F for details.

5.2 MUSIC Model Parameters

The input parameters used in the MUSIC modelling for each proposed SQID are as listed below:

- Stormfilter and Oceanguard nodes (SFEP USE 2011B) supplied by Ocean Protect. Refer to Appendix F for details.

5.3 MUSIC Results

The MUSIC modelling results for the post-development scenario can be found in Appendix D and are summarised in Table 5.3 below.

Table 5.3 – MUSIC Modelling Results – Post Development Scenario (Residential Development with Stormwater Treatment)

POLLUTANT	MIN WQO'S (%)	OBJECTIVES ACHIEVED (%)
Total Suspended Solids	80	85.1
Total Phosphorous	60	67.3
Total Nitrogen	45	48.5
Gross Pollutants	90	100

The results in Table 5.3 have demonstrated that the proposed development will achieve all WQO's required by EDQ.

5.4 Operational Phase

The proposed development will consist of approximately half roof area, with the remaining being terrace and vehicle trafficked area. Pollutants generated from the proposed development will be treated by stormwater quality treatment system prior to discharge into the existing network.

5.5 Maintenance Plans

Maintenance for the SQID's proposed for the development is to be consistent with the requirements of this report and the manufacturer's recommendations. The general requirement of maintenance during the operational phase will be:

- Ocean Protect Oceanguard and Stormfilter
 - o In accordance with the manufacturer's recommendations / owner's manual.

6 Construction Phase Stormwater Quality Management Options

6.1 Pre-Construction

Before construction activities begin, the following measures need to be implemented to ensure minimal disturbance and adverse water quality impacts. These measures may be adopted in a staged approach and may be implemented prior to commencement of construction in any one section of the project.

- Sediment fences constructed to the perimeter of the construction area as required.
- Designation of areas for plant and construction material storage.
- Immediate stabilisation of disturbed areas as required.
- Monitoring of stormwater quality discharging from the development and the implementation of additional measures / modification of existing measures if the quality of stormwater discharging from the site will have a negative impact.
- Designation and marking of transport routes across the site to minimise dust disturbance.
- Drainage structure protection devices installed to existing stormwater inlet structures within the site, and within the roadways adjacent to the site.
- Education of site personnel to the sediment and erosion control measures implemented on site.

6.2 During Construction

Runoff is proposed to be directed to a sump pit before discharging into stormwater utilities. The sump pit is to be located to suit the construction program as required. Measures to mitigate water quality impacts during construction will include:

- Provision of pump out facilities to the sump pit.
- Construction activities to be confined within the necessary construction area(s).
- Regular inspection and maintenance of the erosion control measures. Following rainfall events greater than 20 mm, inspection of erosion control measures and removal of collected material shall be undertaken. Replacement of any damaged equipment shall be performed immediately.
- Monitoring of water quality impacts from construction activities as appropriate.

7 Fairway Drive Parking Realignment

The existing landscaped area between the existing parking areas in Fairway Drive is to be removed and reinstated with new pavement. The existing stormwater gully pit in this area will be converted to match the proposed Vee Channel to be constructed. Parking signage will be amended to create a Loading Zone for 3 Car Spaces and a 5 min Parking Zone for 2 Car Spaces. Refer to Appendix G for details.

8 Water Supply

8.1 Existing Infrastructure

According to the construction drawing by Cardno, there are water mains surrounding all boundaries of the proposed site.

8.2 Point of Connection

There are two connection points located on Lightning Lane for the proposed site. Following amalgamation of the Lots, one connection will be utilised for the development and the other abandoned. Further details of water connections will be subject to further detailed design by the hydraulic consultant.

9 Sewerage

9.1 Existing Infrastructure

Existing 675mm diameter sewerage main is located on the northern side of Fairway Drive; location of the existing sewer services can be found under the Unity Water DBYD system. According to the construction drawings by Cardno, 150mm diameter sewer connections can be found on the north eastern boundary of the site on Fairway Drive.

9.2 Point of Connection

Two 150mm diameter connections are located to the site, on Fairway Drive and Lightning Lane. Following amalgamation of the Lots, one connection will be utilised for the development and the other abandoned. Further details of sewer connections will be subject to further detailed design by the hydraulic consultant.

10 Electrical Supply

According to the DBYD and site survey information, Energex cables are located adjacent to the proposed site which runs along the property boundaries in all directions. Further investigation should be carried out by the electrical consultant to determine the extent of any upgrading works that may be required due to the proposed development.

11 Telecommunications

The site survey information indicates telecommunication cables surrounds the site. Further investigation shall be carried out by the services consultant to determine the extent of any upgrading works that may be required due to the proposed development.

12 Conclusions

The site is adequately serviced by public utilities. All information discussed in this report is inferred from Sunshine Coast Council MyMaps information, Dial-Before-You-Dig records and Civil Construction plans for the City Centre subdivision. Existing water and sewer reticulation mains are located immediately adjacent to the site.

The site has electrical, telecommunication and gas services located adjacent to the site. If any of these services require an upgrade, this will be confirmed and addressed by the relevant service consultants at the detail design stage of the project.

13 References

Architectural Plans by Kann Finch Group Pty Ltd

Dial Before You Dig

Sunshine Coast Council MyMaps

DSDIP's State Planning Policy Code: Water Quality

Queensland Urban Drainage Manual

Satellite imagery from Nearmap

Maroochydore City Centre Civil Works – Stage 1 Engineering Drawings by Cardno provided by Suncentral

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Appendix A Architectural Plans by Kann Finch



PRO-INVEST GROUP
HI EX HOTEL DEVELOPMENT
Lot 74 SUN CENTRAL
MAROOCHYDORE

Amended DA Package 21.10.2020



DA DRAWING SCHEDULE

DA.00.00	COVER SHEET	R	21.10.2020
DA.00.01	SITE LOCATION PLAN	D	21.10.2020
DA.00.02	PRECINCT DEVELOPMENT PRINCIPLES	D	21.10.2020
DA.00.03	SITE ANALYSIS	D	21.10.2020
DA.00.04	SITE LOT PLAN	M	21.10.2020
DA.00.05	DESIGN ANALYSIS DIAGRAMS	G	21.10.2020
DA.01.01	SITE PLAN	N	21.10.2020
DA.02.01	GROUND FLOOR PLAN	V	21.10.2020
DA.02.03	LEVEL 1 PLAN	V	21.10.2020
DA.02.04	LEVEL 2-7 TYPICAL PLAN	T	21.10.2020
DA.02.05	LEVEL 8 POOL- PLANT FLOOR PLAN	Q	21.10.2020
DA.02.06	LEVEL 9 PLANT FLOOR PLAN	D	21.10.2020
DA.03.01	NORTH ELEVATION	L	21.10.2020
DA.03.02	EAST ELEVATION	L	21.10.2020
DA.03.03	SOUTH ELEVATION	L	21.10.2020
DA.03.04	WEST ELEVATION	L	21.10.2020
DA.03.05	SECTION 01	L	21.10.2020
DA.03.06	SECTION 02	J	21.10.2020
DA.04.01	GBA SCHEDULE	R	21.10.2020
DA.04.02	GFA DIAGRAMS & SCHEDULE	K	21.10.2020
DA.05.01	PRECEDENT IMAGES	G	21.10.2020
DA.05.02	PRECEDENT IMAGES	G	21.10.2020
DA.05.03	VIEW LOOKING WEST	J	21.10.2020
DA.05.04	VIEW LOOKING SOUTH	M	21.10.2020
DA.05.05	VIEW LOOKING NORTH	K	21.10.2020
DA.05.06	BIRDS EYE VIEW	J	21.10.2020

DESIGN AMENDMENTS INCLUDE:

- DELETION OF UPPER PARKING LEVEL
- ASSOCIATED RE-PLANNING OF GROUND LEVEL PARKING LAYOUTS
- PARKING PROVISION REDUCED TO 30 CARS
- MINOR CHANGES TO PERIMETER LANDSCAPING AND FENCING TO FAIRWAY DRIVE AND LIGHTNING LANE
- HOTEL FLOOR PLATE EXTENDED TO ADD 2 ROOMS PER FLOOR (EXTRA 14 ROOMS)
- TOTAL NUMBER OF HOTEL ROOMS INCREASED TO 181
- LEVEL 8 PLANTROOM SIZE INCREASED TO SUIT EXTENDED FLOOR PLATE.
- ASSOCIATED CHANGES TO TOWER FACADES.

AMENDED DA PACKAGE



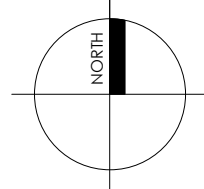
AMENDED DA PACKAGE

Rev.	Revision Description	Chk.	Date
D	Amended DA Package		21.10.2020
C	DA Submission Endorsement		2019.06.03
B	General Update		2019.03.08
A	Initial Issue		2019.03.01

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the Architect/Engineer/Designer prior to commencement of work

Client

PRO-INVEST GROUP



Project

HI EX HOTEL DEVELOPMENT

Lot 74 SUN CENTRAL
MAROOCHYDORE

KANNFINCH

Kann Finch Group Pty Ltd 50 Carrington St Sydney NSW 2000
ACN 139 614 798 Tel +61 2 9299 4111 www.kannfinch.com
Nominated Architect: Stephen Jamison NSW ARB Reg No 5108

Drawing

SITE LOCATION PLAN

Scales
@ A1

Drawn
RF

Checked
SJ

Drawing No.

DA.00.01

Revision

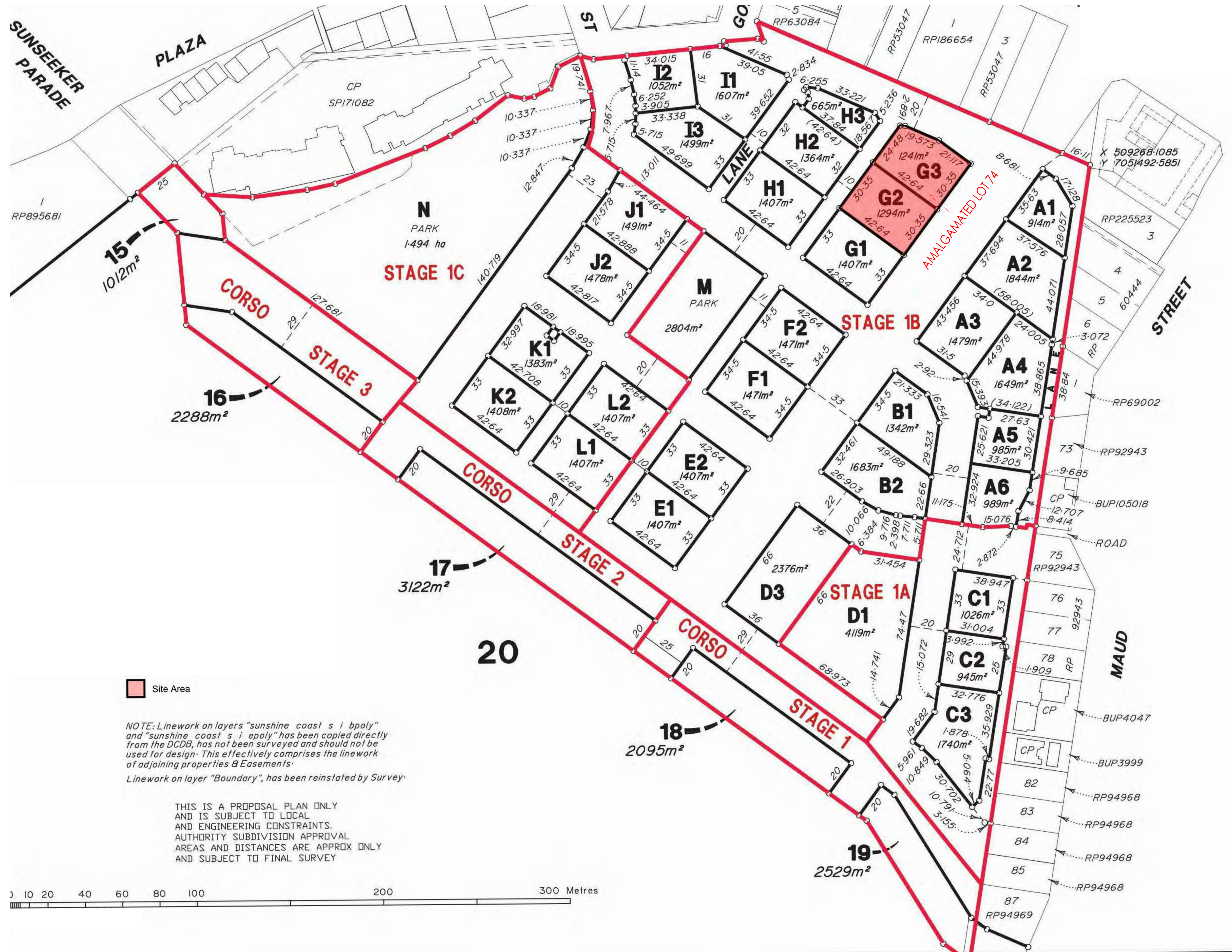
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Project No.

6668

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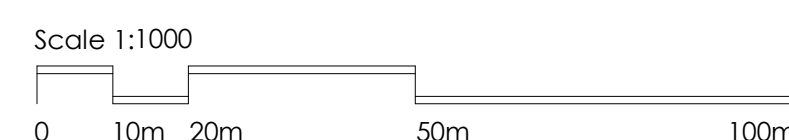
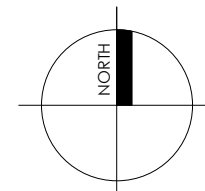




M	Amended DA Package	21.10.2020
L	DA Submission Endorsement	2019.06.03
K	General Update	2019.03.08
J	Initial Issue	2019.03.01
Rev.	Revision Description	Chk. Date
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Client

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Project

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MAROOCHYDORE

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Nominated Architect: Stephen Jamison NSW ARB Reg No 5108

Drawing

SITE LOT PLAN

Scales
1 : 1000 @ A1

Drawn
RF

Checked
SJ

Drawing No.

DA.00.04

Revision

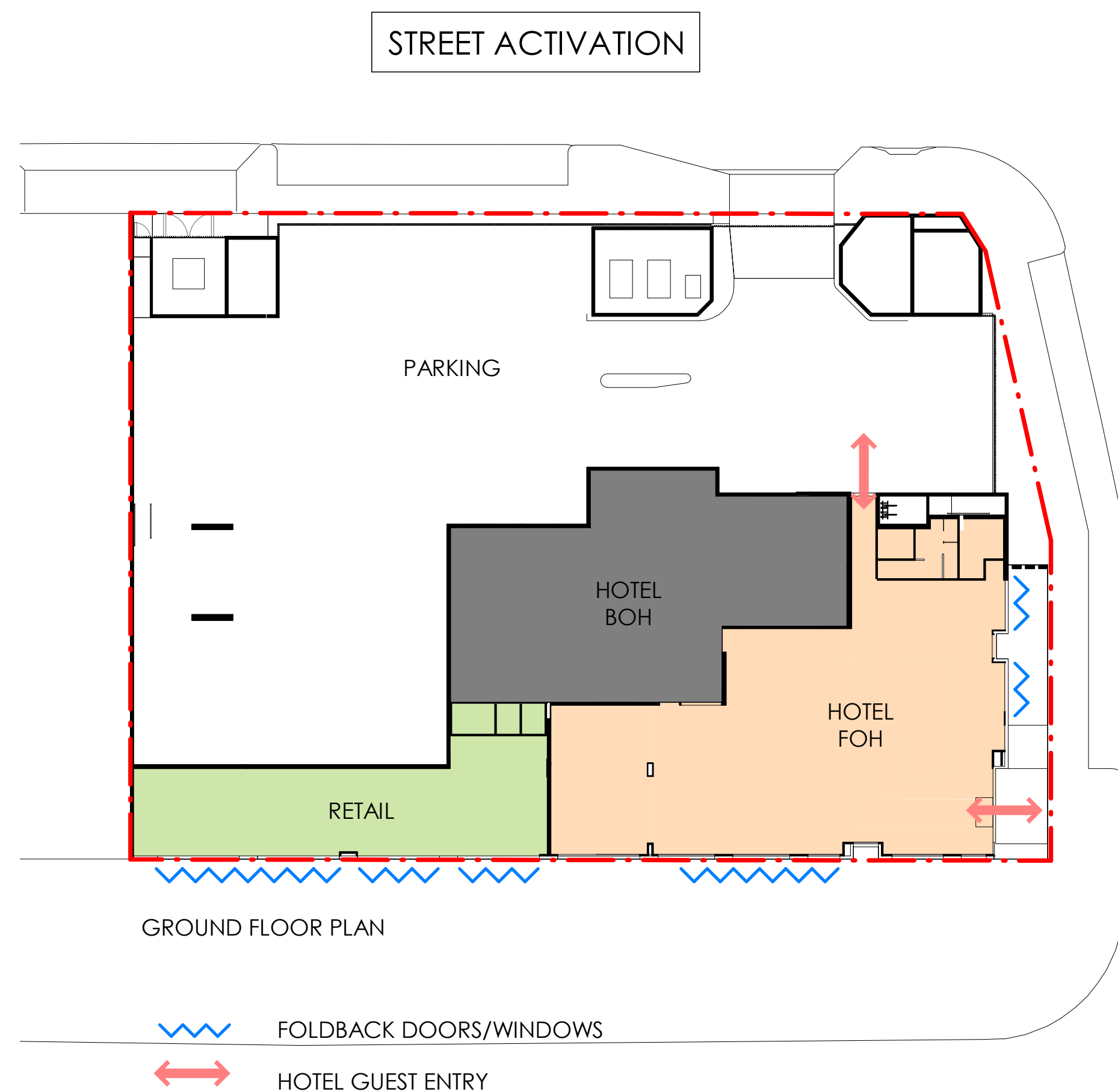
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Project No.

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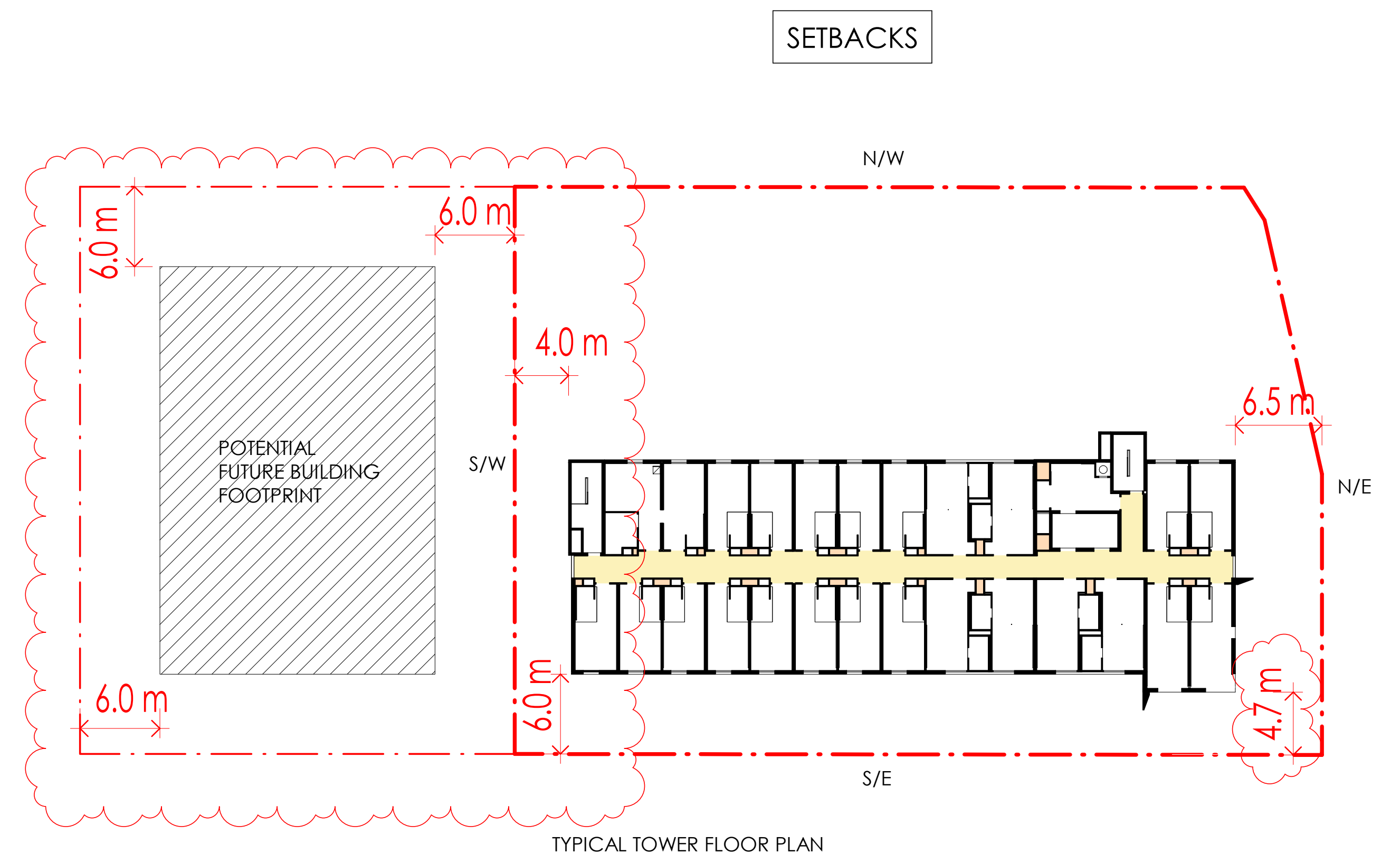
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AMENDED DA PACKAGE



NOTES:

- RETAIL SPACES WILL HAVE FULL HEIGHT FOLDBACK DOORS
- HOTEL FOYER & GREAT ROOM WILL HAVE FOLDBACK WINDOWS
- GLAZING TO PRIMARY STREET FRONTAGES IS APPROX. 80% OF WALL AREA BELOW AWNING (MINIMUM REQUIREMENT 65%)



NOTES:

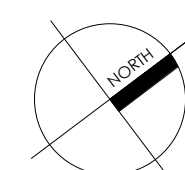
- PRECINCT 3 DEVELOPMENT PROVISIONS NOMINATE 6.0M STREETFRONT SETBACK FOR UPPER LEVELS (4+)
- SETBACK TO N/E CORNER REDUCED TO 4.7M, BUT BALANCE OF FACADE MAINTAINS 6.0M SETBACK
- SETBACK TO S/W BOUNDARY REDUCED TO 4.0M, BUT PROPOSED BUILDING IS ONLY 8 STOREYS HIGH

Rev.	Revision Description	Chk.	Date
G	Amended DA Package		21.10.2020
F	General Update		2019.11.08
E	Modified DA Submission		2019.07.10
D	DA Submission Endorsement		2019.06.03

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Nominated Architect: Stephen Jamison NSW ARB Reg No 5108

Drawing

DESIGN ANALYSIS DIAGRAMs

Scales
1 : 300 @ A1

Drawn
RF

Checked
SJ

Drawing No.

DA.00.05

Revision

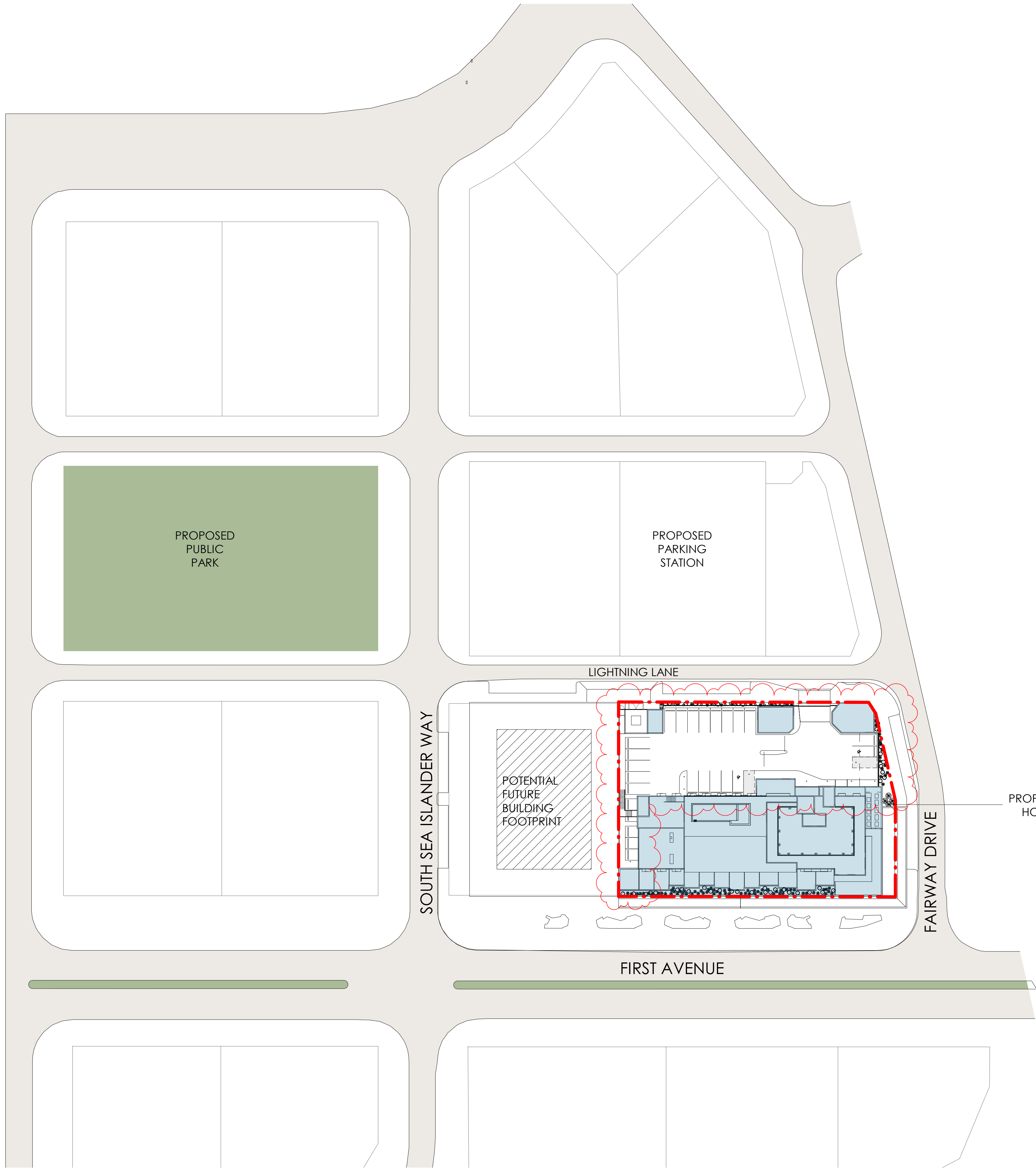
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Project No.

6668

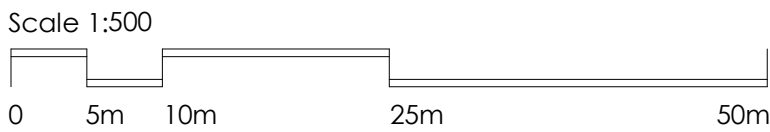
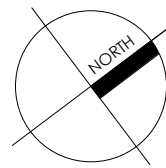
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AMENDED DA PACKAGE



N	Amended DA Package	21.10.2020
M	Modified DA Submission	2019.07.10
L	DA Submission Endorsement	2019.06.03
K	General Update	2019.03.08
Rev.	Revision Description	Chk. Date
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Project
HI EX HOTEL DEVELOPMENT
Lot 74 SUN CENTRAL
MAROOCHYDORE

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Drawing
SITE PLAN

Scales
1 : 500 @ A1

Drawn
RF
Checked
SJ

Drawing No.
DA.01.01
Revision
N
Project No.
6668

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AMENDED DA PACKAGE



PARKING SCHEDULE

Ground
TOTAL

30
30

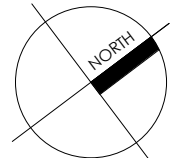
FAIRWAY DRIVE

AMENDED DA PACKAGE

Rev.	Revision Description	Chk.	Date
V	Amended DA Package		21.10.2020
U	Parking and Guest Room Modifications		2020.09.30
T	General Update		2019.11.08
S	Fire Pump Room, Landscape modified		2019.08.08

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Scale 1:100
0 1m 2m 5m 10m

Project
HI EX HOTEL DEVELOPMENT
Lot 74 SUN CENTRAL
MAROOCHYDORE

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ACN 139 614 798 Tel +61 2 9299 4111 www.kannfinch.com
Nominated Architect: Stephen Jamison NSW ARB Reg No 5108

Drawing
GROUND FLOOR PLAN

Scales
1 : 100 @ A1

Drawn
RF

Checked
SJ

Drawing No.
DA.02.01
Revision
V
Project No.
6668

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PARKING SCHEDULE

Ground	30
TOTAL	30

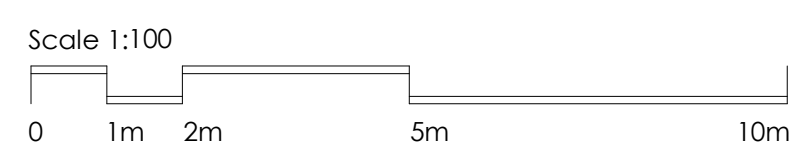
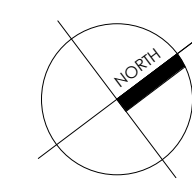
ROOM SCHEDULE MATRIX

Level	Room Type	Keys
L1	Suite	6
L1	King Split	8
L1	King	8
L1	Double Queen	2
L1	Accessible RH	1
L2	Suite	6
L2	Standard	10
L2	King Split	6
L2	Double Queen	2
L2	Accessible LH	1
L3	Suite	6
L3	Standard	10
L3	King Split	6
L3	Double Queen	2
L3	Accessible RH	1
L4	Suite	6
L4	Standard	10
L4	King Split	6
L4	Double Queen	2
L4	Accessible LH	1
L5	Suite	6
L5	Standard	16
L5	Double Queen	2
L5	Accessible RH	1
L6	Suite	6
L6	Standard	16
L6	Double Queen	2
L6	Accessible LH	1
L7	Suite	6
L7	Standard	16
L7	Double Queen	2
L7	Accessible RH	1
L8 Pool	Suite	2
L8 Pool	Standard	2
L8 Pool	Double Queen	2
Grand total		181

Rev.	Revision Description	Chk.	Date
V	Amended DA Package		21.10.2020
U	Parking and Guest Room Modifications		2020.09.30
T	General Update		2019.11.08
S	Fire Pump Room, Landscape modified		2019.08.08

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Project
HI EX HOTEL DEVELOPMENT
Lot 74 SUN CENTRAL
MAROOCHYDORE

KANNFINCH
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Nominated Architect: Stephen Jamison NSW ARB Reg No 5108

Drawing
LEVEL 1 PLAN

Scales
1:100 @ A1

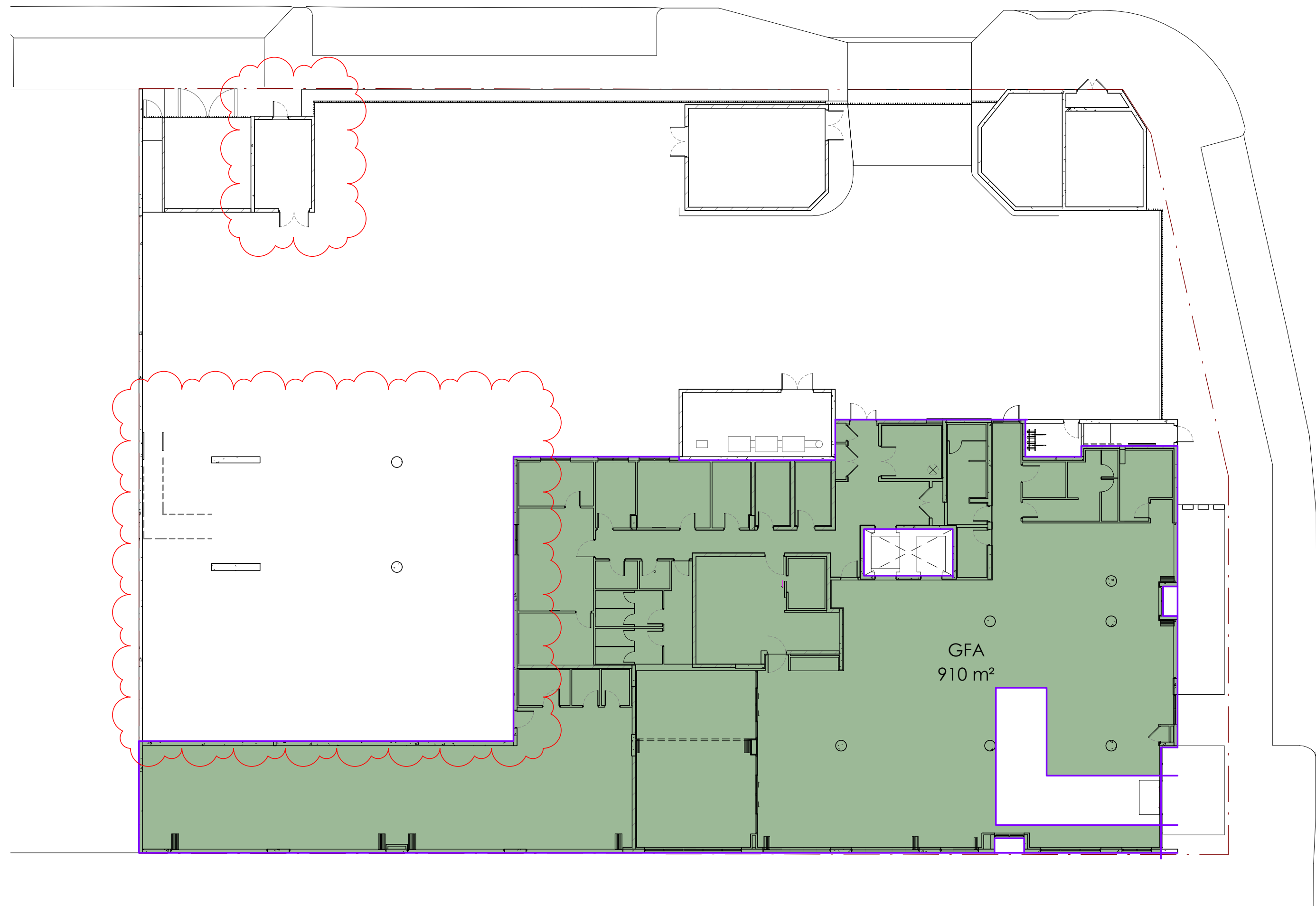
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RF

Checked
SJ

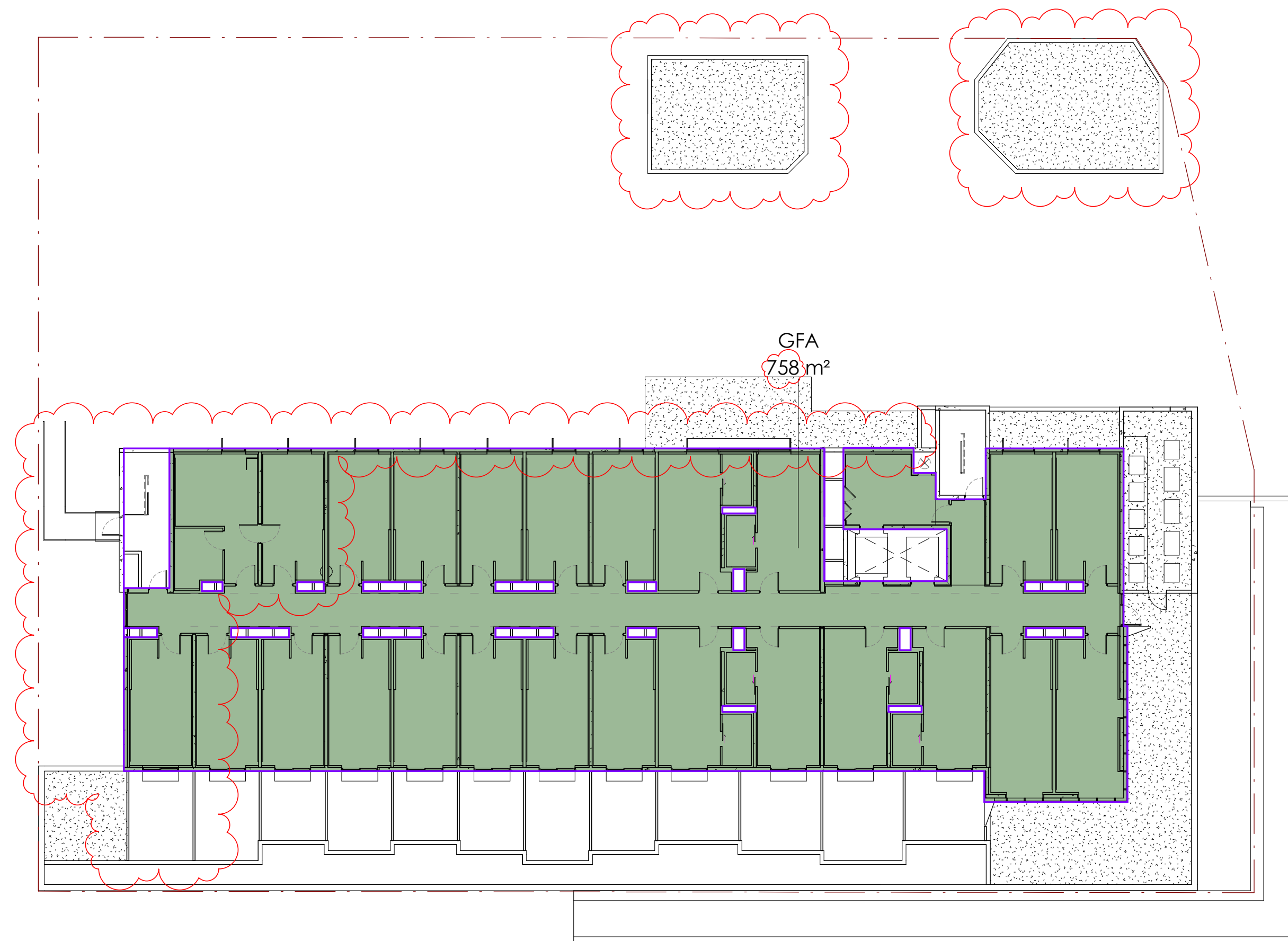
Drawing No.
DA.02.03
Revision
V
Project No.
6668

26/10/2020 3:58:11 PM: Plot Date

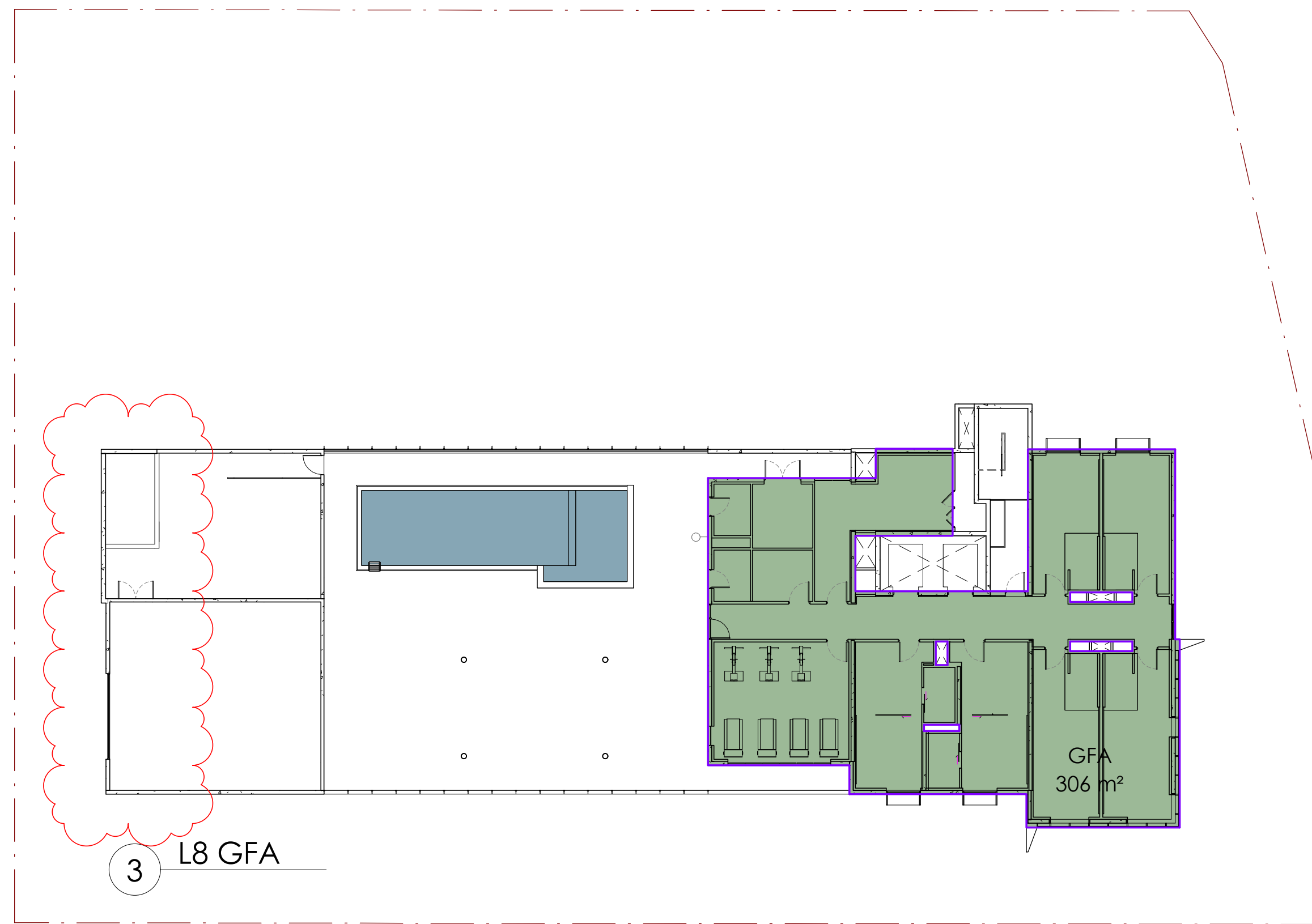
AMENDED DA PACKAGE



1 Ground GFA



2 L1 GFA (L2 - L7 SIM)



3 L8 GFA

Gross Floor Area (GFA) The total floor area of all storeys of a building (measured from the outside of the external walls or the centre of a common wall), other than areas used for the following:

- a. building services, plant and equipment
- b. access between levels
- c. ground floor public lobby
- d. a mall
- e. the parking, loading and manoeuvring of motor vehicles
- f. unenclosed private balconies whether roofed or not.

Area Schedule (GFA)			
Level	Area per Level	Number of Levels	Total Area
Ground	910 m ²	1	910 m ²
L1	758 m ²	7	5305 m ²
L8 Pool	306 m ²	1	306 m ²
			6521 m ²

K	Amended DA Package	21.10.2020
J	General Update	2019.11.08
I	Modified DA Submission	2019.07.10
H	DA Submission Endorsement	2019.06.03
Rev.	Revision Description	Chk. Date
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Client

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Project

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MAROOCHYDORE

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Drawing

GFA DIAGRAMS & SCHEDULE

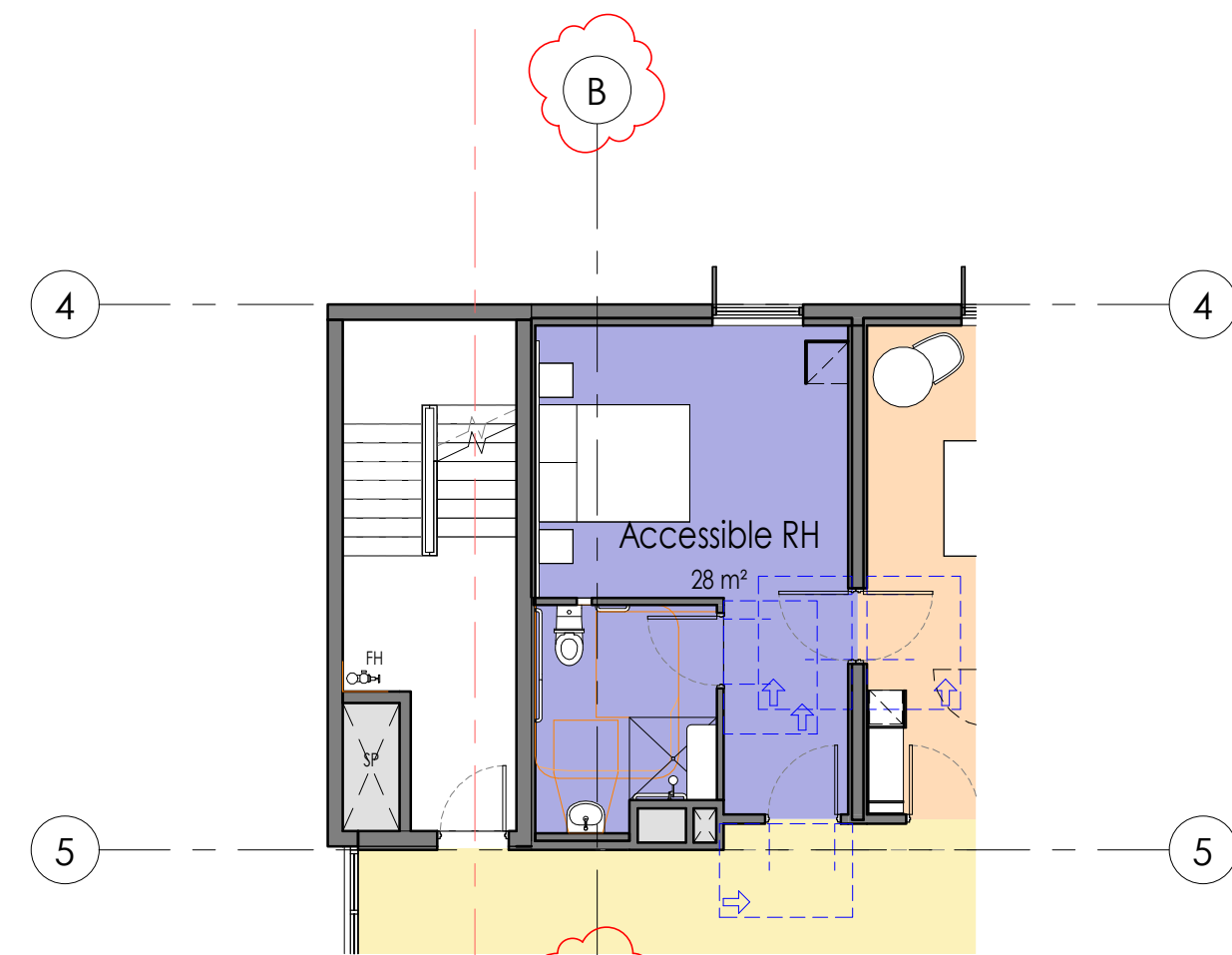
Drawing No. **DA.04.02**
Revision **K**

Scales **1 : 200 @ A1**

Drawn **RF** Checked **SJ**

Project No. **6668**

20/10/2020 10:21:28 PM: Plot Date



2 Level 3,5,7 Partial Plan - RH Accessible Room
1 : 100



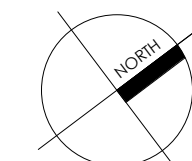
1 Level 2-7 Floor Plan
1 : 100

ROOM SCHEDULE MATRIX

Level	Room Type	Keys
L1	Suite	6
L1	King Split	8
L1	Double Queen	2
L1	Accessible RH	1
L2	Suite	6
L2	Standard	10
L2	King Split	6
L2	Double Queen	2
L2	Accessible LH	1
L3	Suite	6
L3	Standard	10
L3	King Split	6
L3	Double Queen	2
L3	Accessible RH	1
L4	Suite	6
L4	Standard	10
L4	King Split	6
L4	Double Queen	2
L4	Accessible LH	1
L5	Suite	6
L5	Standard	16
L5	Double Queen	2
L5	Accessible RH	1
L6	Suite	6
L6	Standard	16
L6	Double Queen	2
L6	Accessible LH	1
L7	Suite	6
L7	Standard	16
L7	Double Queen	2
L7	Accessible RH	1
L8 Pool	Suite	2
L8 Pool	Standard	2
L8 Pool	Double Queen	2
Grand total		181

Rev.	Revision Description	Chk.	Date
T	Amended DA Package		21.10.2020
S	Parking and Guest Room Modifications		2020.09.30
R	General Update		2019.11.08
Q	Updated Fire Tanks + Egress		2019.07.22
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Scale 1:100
0 1m 2m 5m 10m

Project
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Lot 74 SUN CENTRAL
MAROOCHYDORE

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Drawing
LEVEL 2-7 TYPICAL PLAN

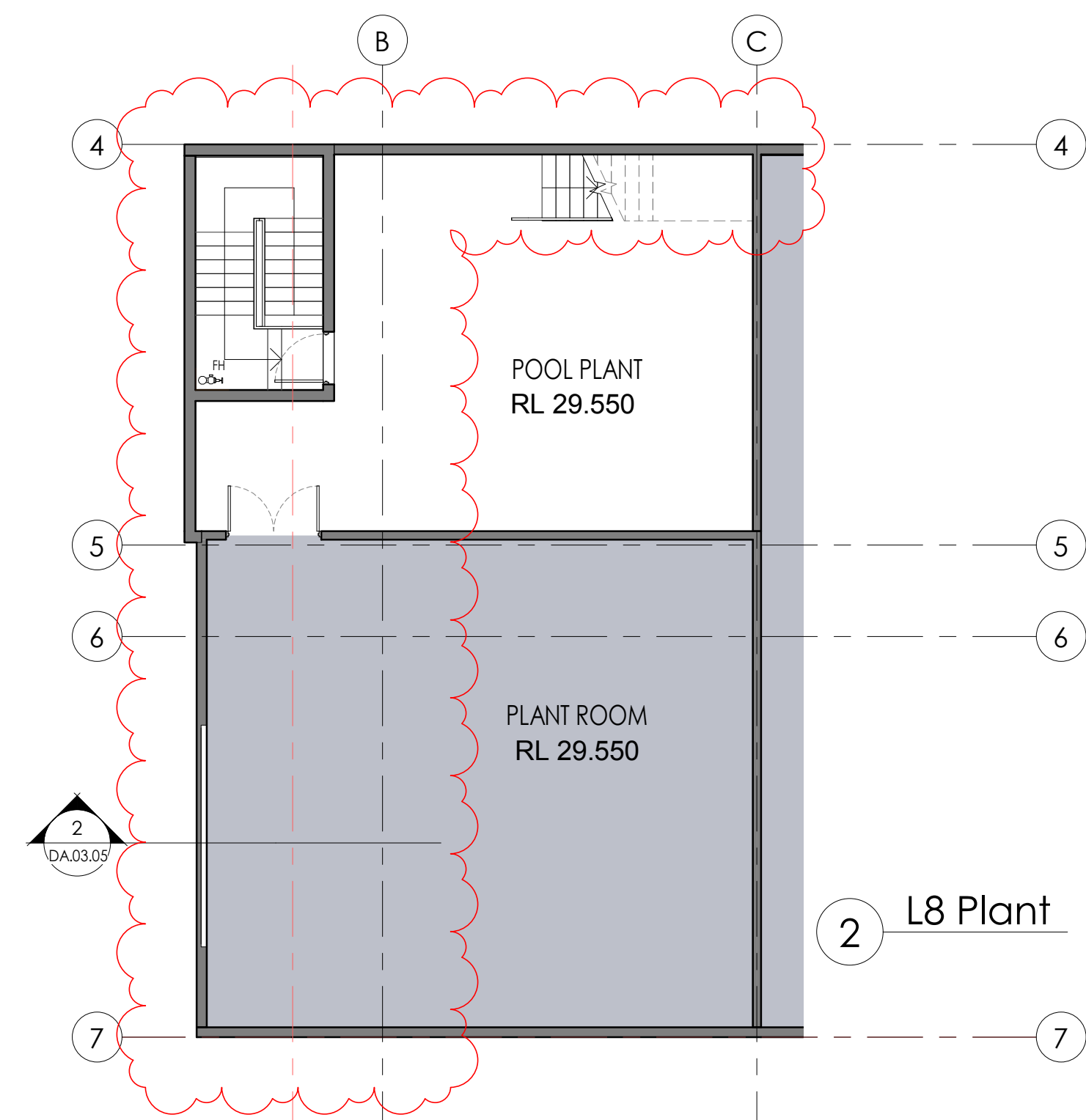
Scales
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Drawn
RF
Checked
SJ

Drawing No.
DA.02.04
Revision
T
Project No.
6668

20/10/2020 10:19:45 PM: Plot Date

AMENDED DA PACKAGE



2 L8 Plant

1 DA.03.06



1 L8 Pool

ROOM SCHEDULE MATRIX		
Level	Room Type	Keys

L1	Suite	6
L1	King Split	8
L1	King	8
L1	Double Queen	2
L1	Accessible RH	1

L2	Suite	6
L2	Standard	10
L2	King Split	6
L2	Double Queen	2
L2	Accessible LH	1

L3	Suite	6
L3	Standard	10
L3	King Split	6
L3	Double Queen	2
L3	Accessible RH	1

L4	Suite	6
L4	Standard	10
L4	King Split	6
L4	Double Queen	2
L4	Accessible LH	1

L5	Suite	6
L5	Standard	16
L5	Double Queen	2
L5	Accessible RH	1

L6	Suite	6
L6	Standard	16
L6	Double Queen	2
L6	Accessible LH	1

L7	Suite	6
L7	Standard	16
L7	Double Queen	2
L7	Accessible RH	1

L8 Pool	Suite	2
L8 Pool	Standard	2
L8 Pool	Double Queen	2

Grand total		181
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Scale 1:100
0 1m 2m 5m 10m

Project
HI EX HOTEL DEVELOPMENT
Lot 74 SUN CENTRAL
MAROOCHYDORE

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Drawing
LEVEL 8 POOL- PLANT FLOOR PLAN

Drawing No.
DA.02.05
Revision
Q

Scales
1 : 100 @ A1

Drawn
RF

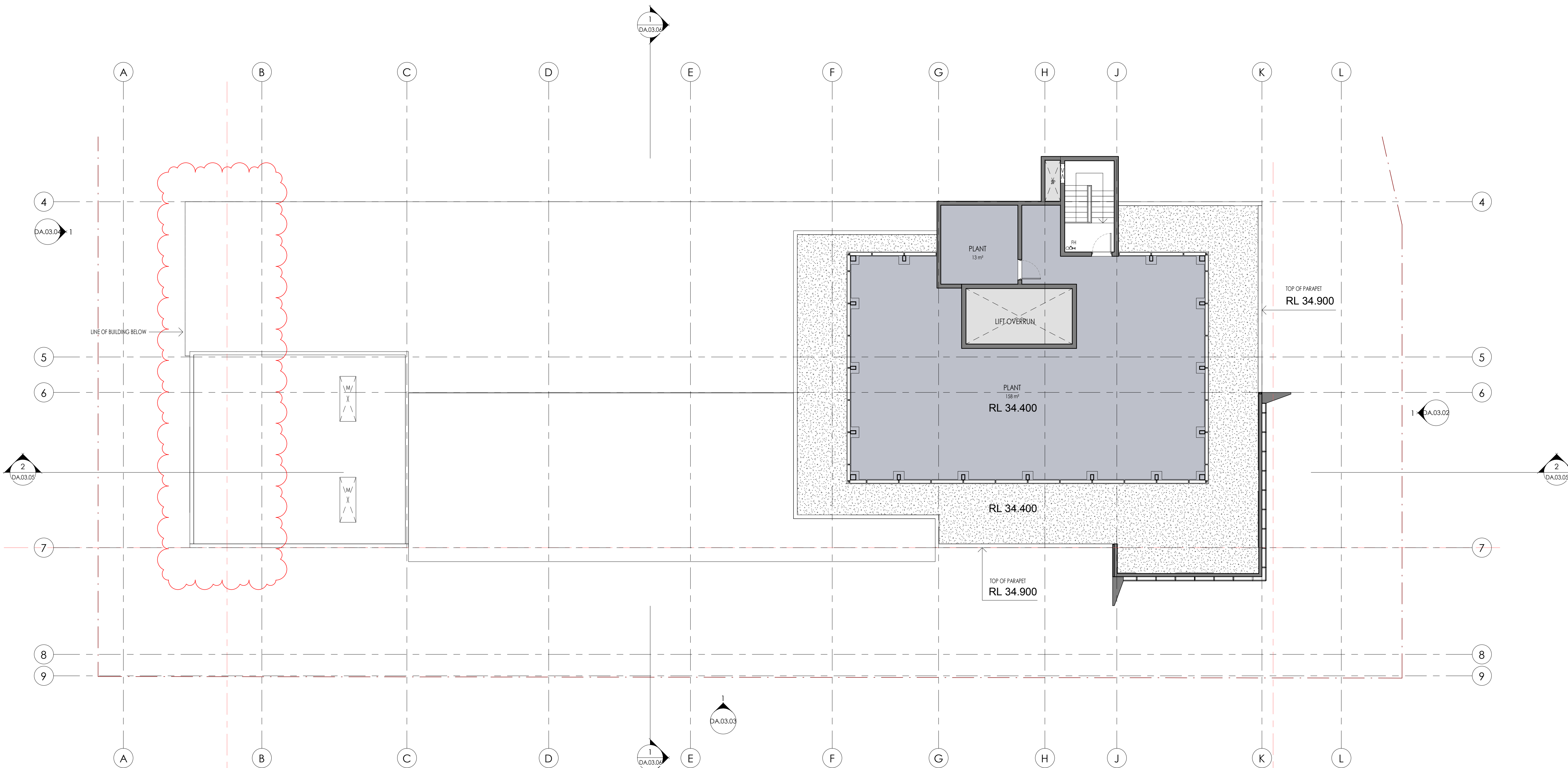
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Project No.
6668

20/10/2020 10:19:48 PM: Plot Date

Rev.	Revision Description	Chk.	Date
Q	Amended DA Package		21.10.2020
P	Parking and Guest Room Modifications		2020.09.30
O	General Update		2019.11.08
N	Modified DA Submission		2019.07.10

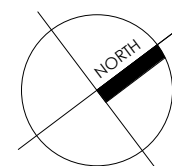
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Rev.	Revision Description	Chk.	Date
D	Amended DA Package		21.10.2020
C	Parking and Guest Room Modifications		2020.09.30
B	General Update		2019.11.08
A	Modified DA Submission		2019.07.10

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Scale 1:100
0 1m 2m 5m 10m

Project
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Lot 74 SUN CENTRAL
MAROOCHYDORE

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Drawing
LEVEL 9 PLANT FLOOR PLAN

Scales
1 : 100 @ A1

Drawn
RF

Checked
SJ

Drawing No.
DA.02.06
Revision
D
Project No.
6668

20/10/2020 10:19:49 PM: Plot Date

AMENDED DA PACKAGE



Rev.	Revision Description	Chk.	Date
L	Amended DA Package		21.10.2020
K	Parking and Guest Room Modifications		2020.09.30
J	General Update		2019.11.08
I	Fire Pump Room, Landscape modified		2019.08.08

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Lot 74 SUN CENTRAL
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Drawing

NORTH ELEVATION

Scales
1 : 100 @ A1

Drawn
RF

Checked
SJ

Drawing No.

DA.03.01

Revision

L

Project No.

6668

26/10/2020 3:58:34 PM: Plot Date

AMENDED DA PACKAGE



L	Amended DA Package	21.10.2020
K	Parking and Guest Room Modifications	2020.09.30
J	General Update	2019.11.08
I	Modified DA Submission	2019.07.10

Rev. Revision Description Chk. Date

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Project
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Lot 74 SUN CENTRAL
MAROOCHYDORE

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Drawing
EAST ELEVATION

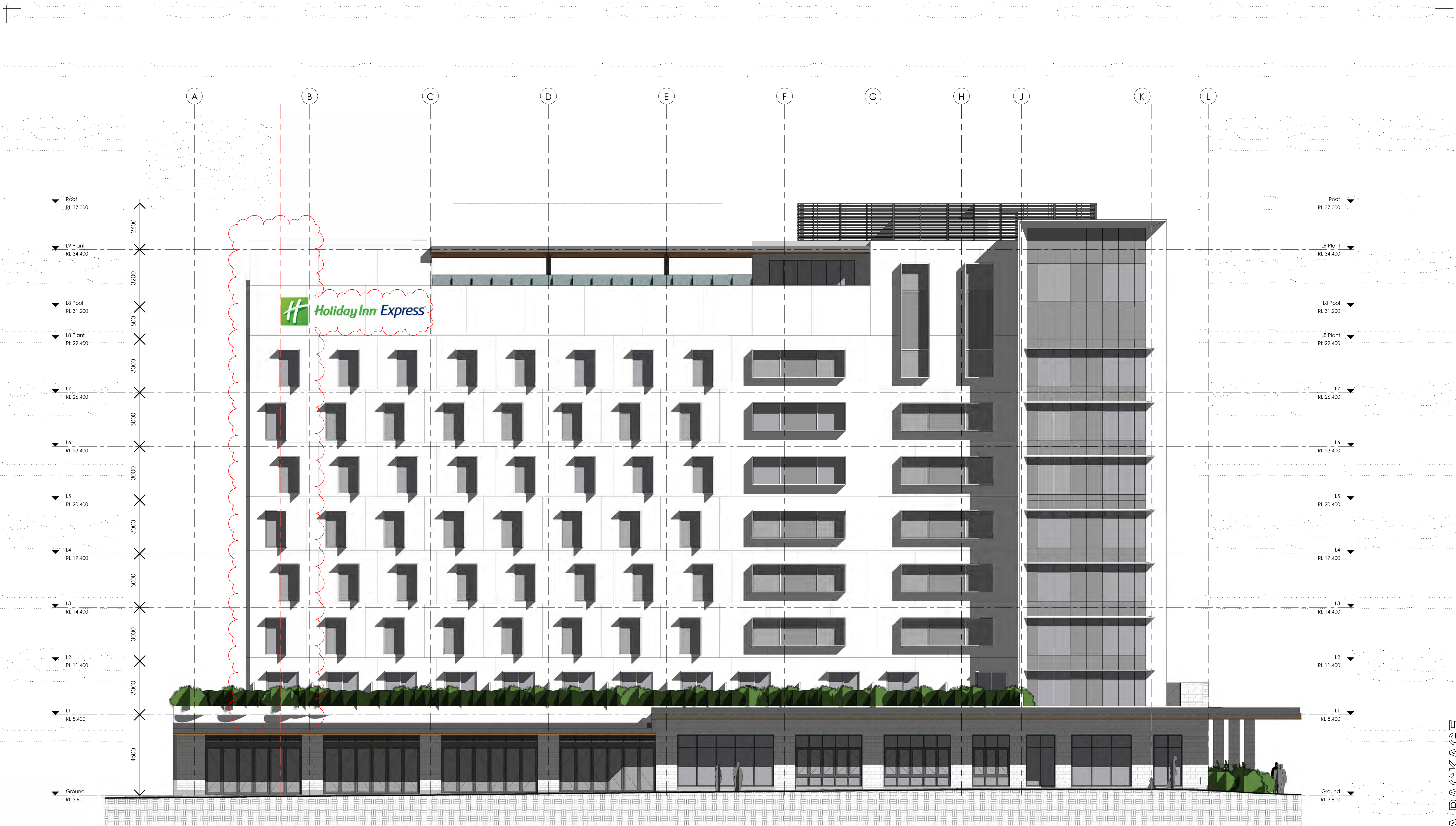
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Drawn
RF
Checked
SJ

Drawing No.
DA.03.02
Revision
L
6668

20/10/2020 10:20:27 PM: Plot Date

AMENDED DA PACKAGE



Rev.	Revision Description	Chk.	Date
L	Amended DA Package		21.10.2020
K	Parking and Guest Room Modifications		2020.09.30
J	General Update		2019.11.08
I	Updated Fire Tanks + Egress		2019.07.22

DO NOT SCALE from this drawing. Use given dimensions only.
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Project
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Lot 74 SUN CENTRAL
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Drawing
SOUTH ELEVATION

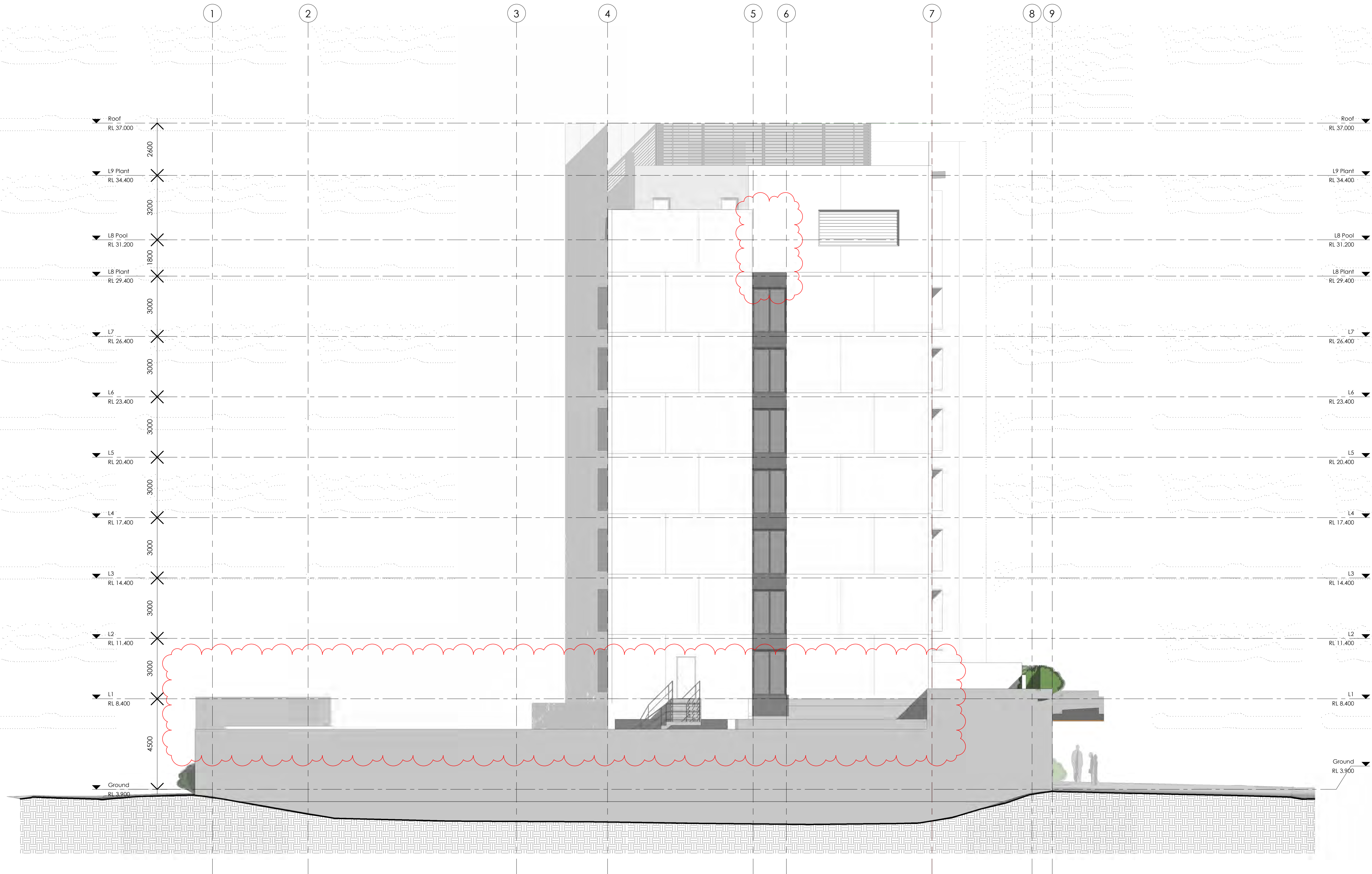
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Drawn
RF
Checked
SJ

Drawing No.
DA.03.03
Revision
L
Project No.
6668

22/10/2020 1:02:44 PM: Plot Date

AMENDED DA PACKAGE



L	Amended DA Package	21.10.2020
K	Parking and Guest Room Modifications	2020.09.30
J	General Update	2019.11.08
I	Updated Fire Tanks + Egress	2019.07.22

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Drawing
WEST ELEVATION

Scales
1 : 100 @ A1

Drawn
RF

Checked
SJ

Drawing No.
DA.03.04
Revision
L
6668

20/10/2020 10:21:17 PM: Plot Date

AMENDED DA PACKAGE

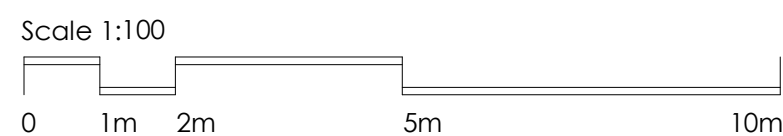


AMENDED DA PACKAGE

Rev.	Revision Description	Chk.	Date
L	Amended DA Package		21.10.2020
K	General Update		2019.11.08
J	Updated Fire Tanks + Egress		2019.07.22
I	Modified DA Submission		2019.07.10

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Project
HI EX HOTEL DEVELOPMENT
Lot 74 SUN CENTRAL
MAROOCHYDORE

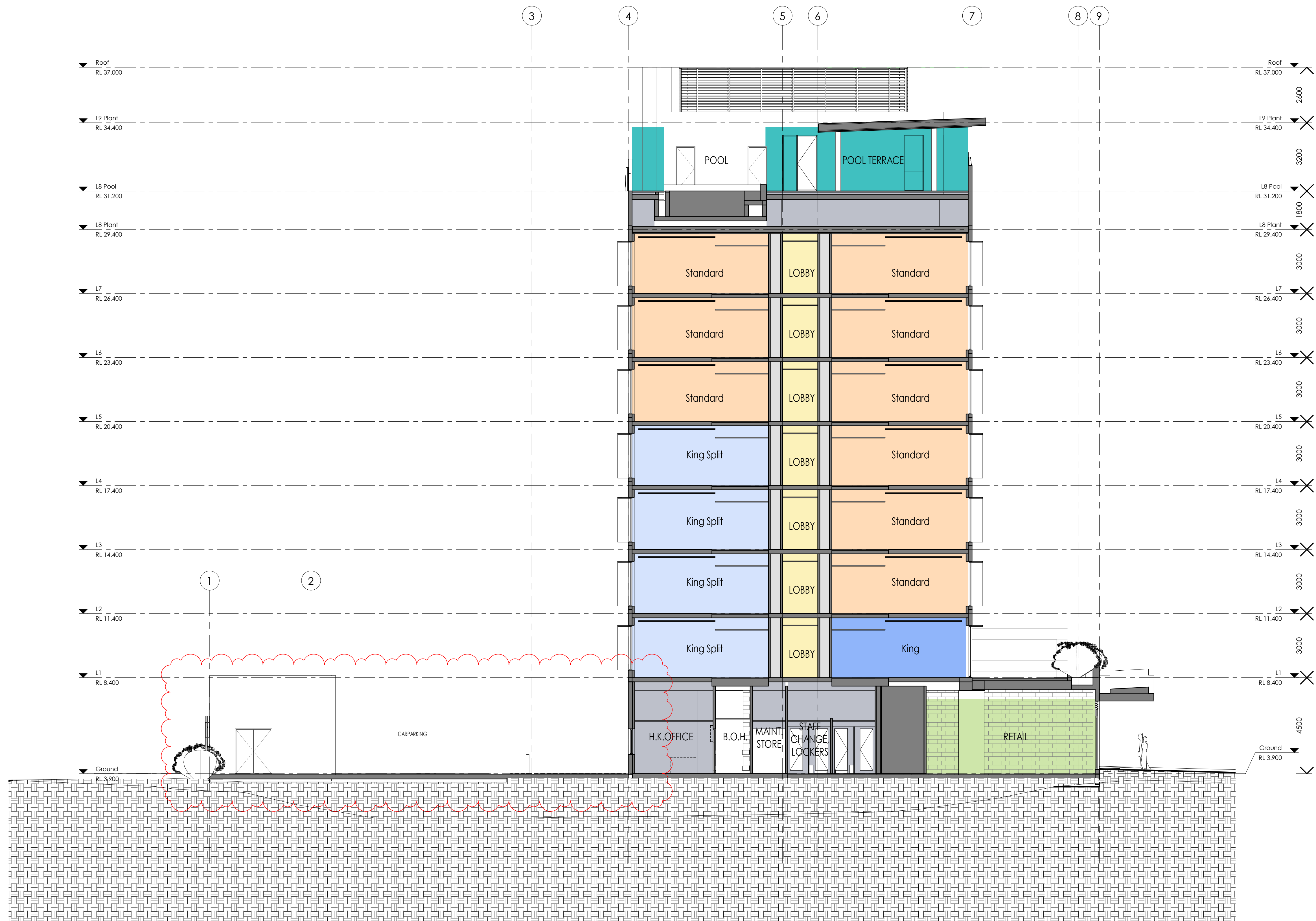
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Drawing
SECTION 01

Scales
1 : 100 @ A1

Drawn
RF
Checked
SJ

Drawing No.
DA.03.05
Revision
L
Project No.
6668
20/10/2020 10:21:20 PM: Plot Date



J	Amended DA Package	21.10.2020
I	General Update	2019.11.08
H	Modified DA Submission	2019.07.10
G	DA Submission Endorsement	2019.06.03

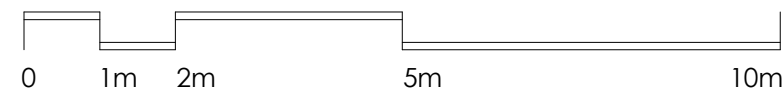
Rev. Revision Description Chk. Date

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Scale 1:100



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Drawing

SECTION 02

Scales
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Drawn
RF

Checked
SJ

Drawing No.

DA.03.06

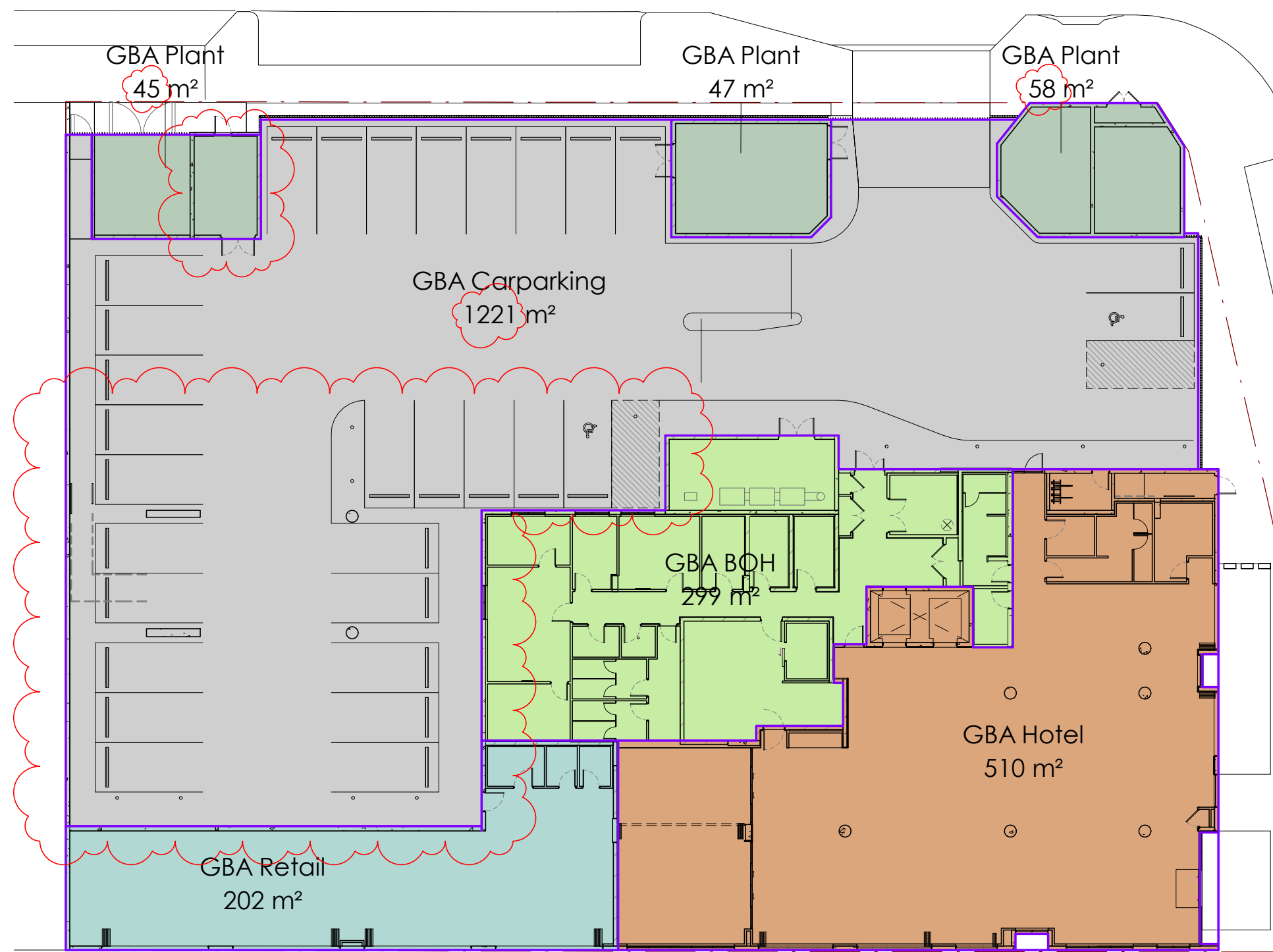
Revision

J

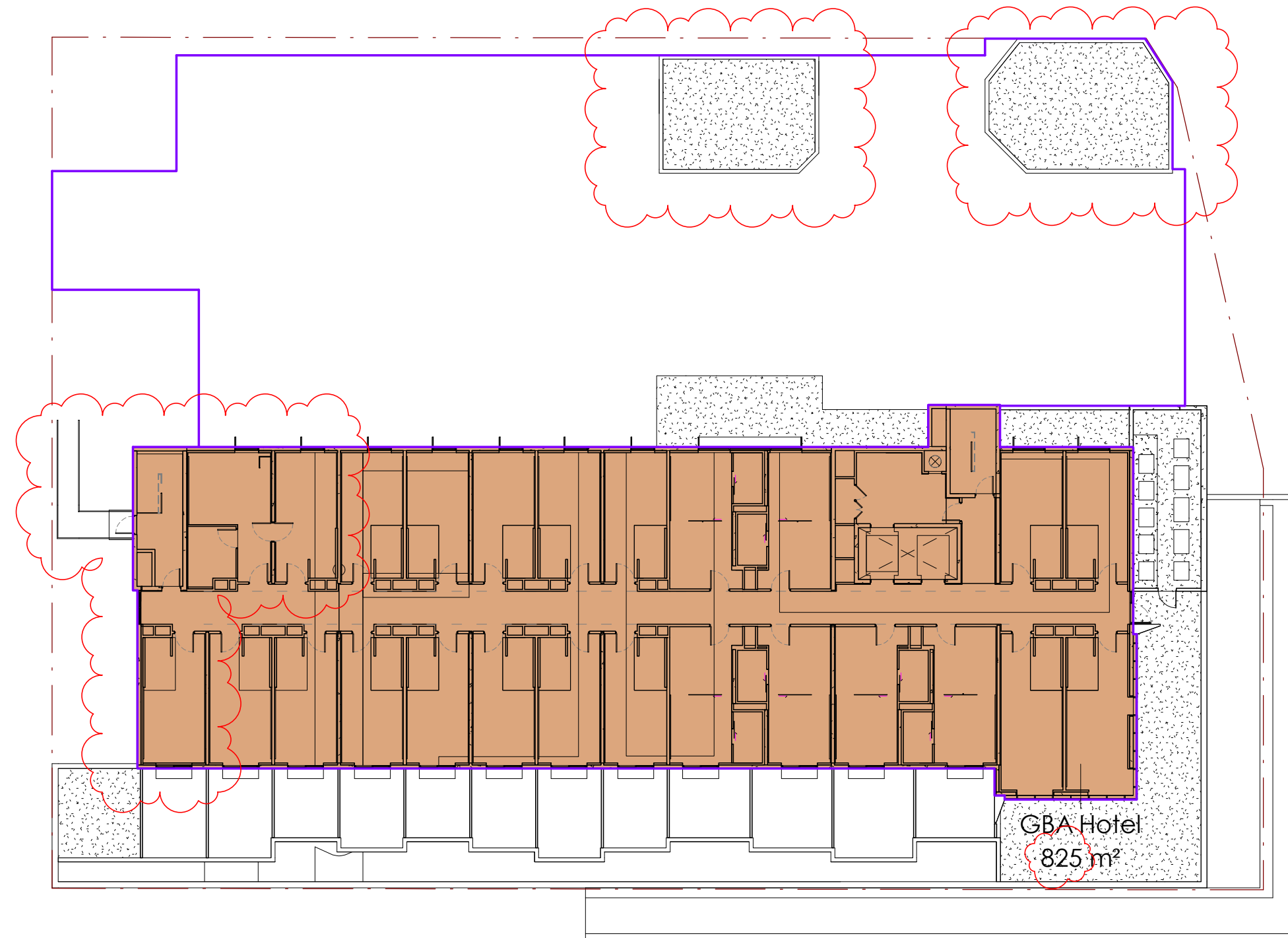
Project No.
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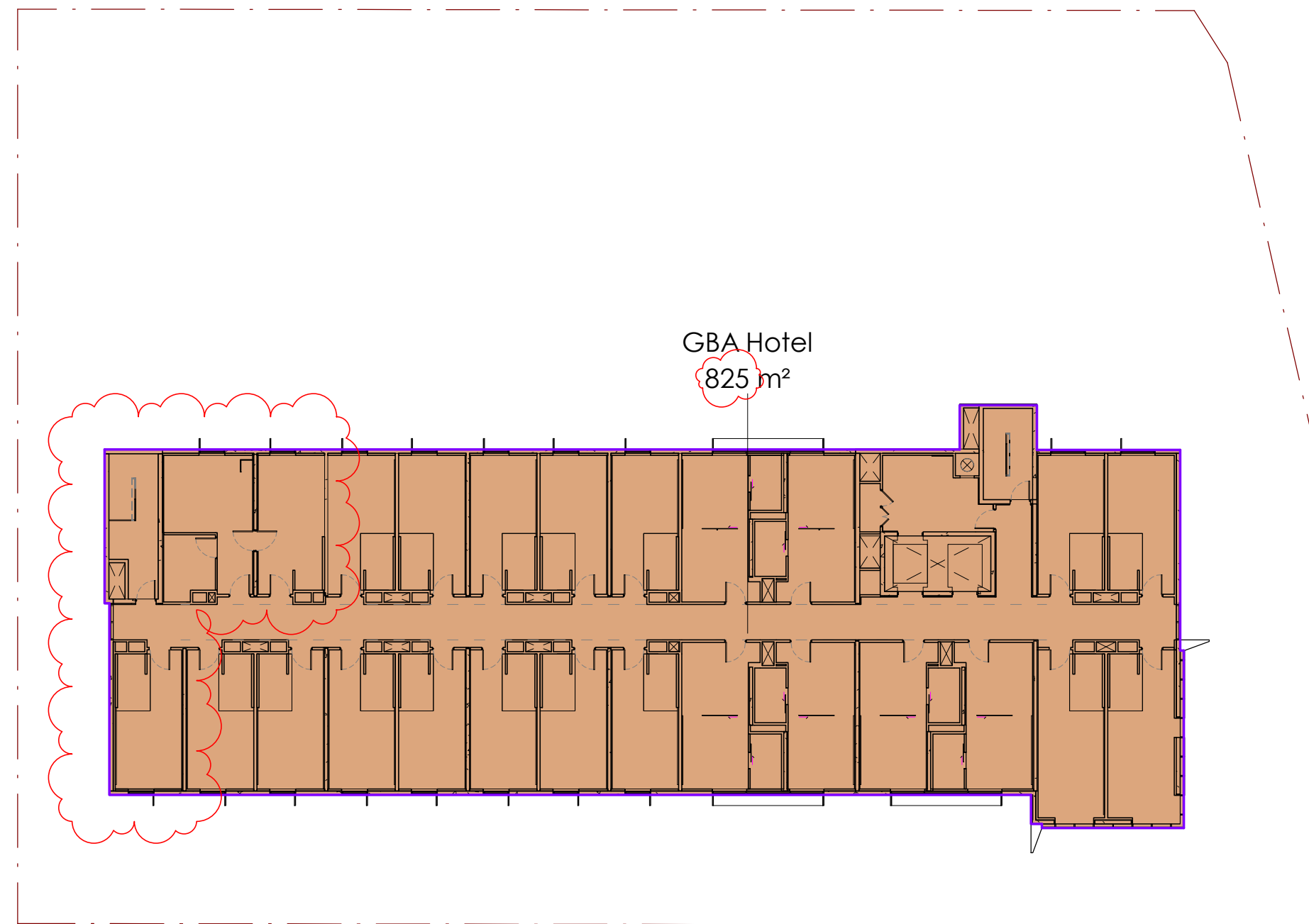


1 Ground GBA

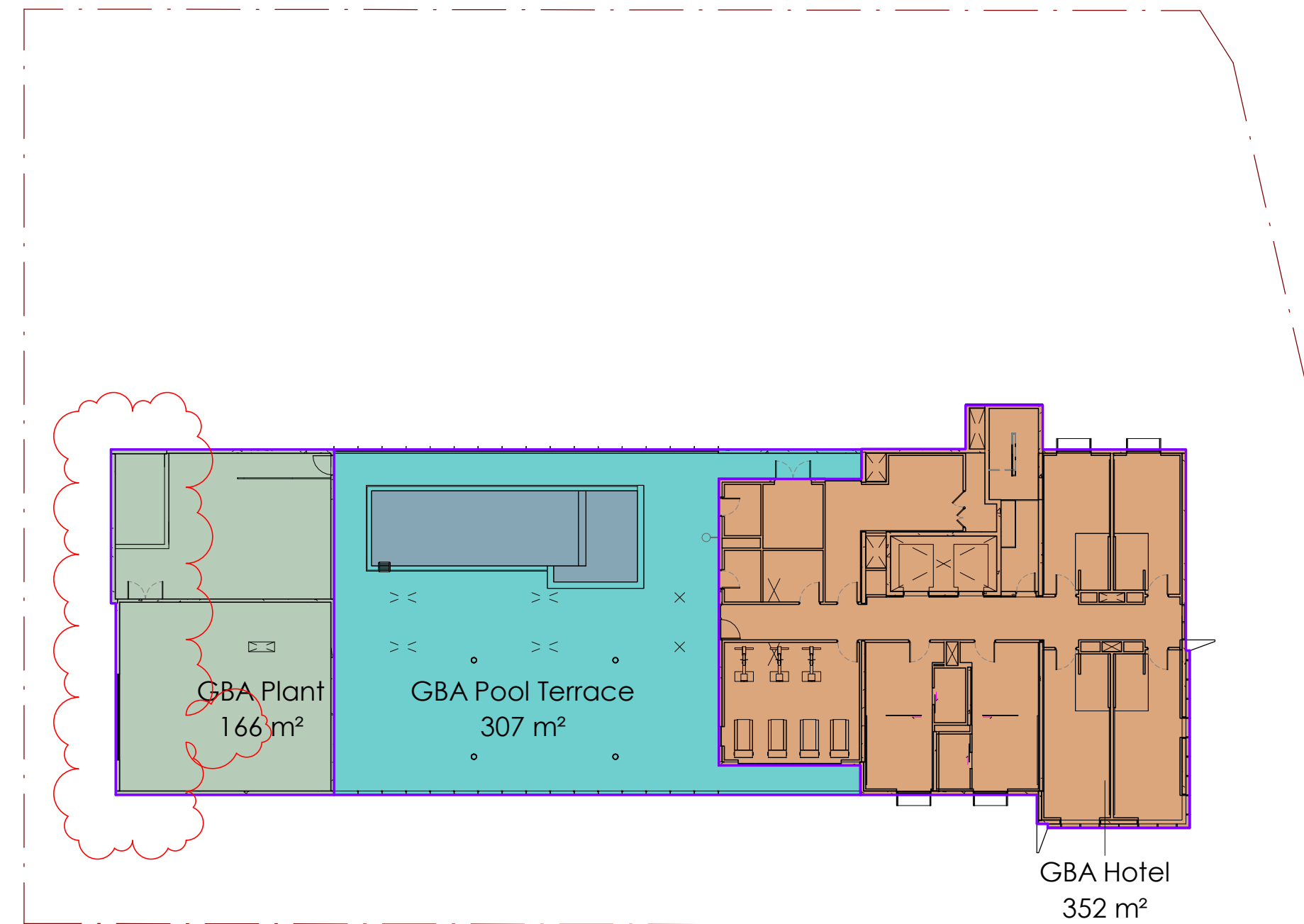


2 Level 1 GBA

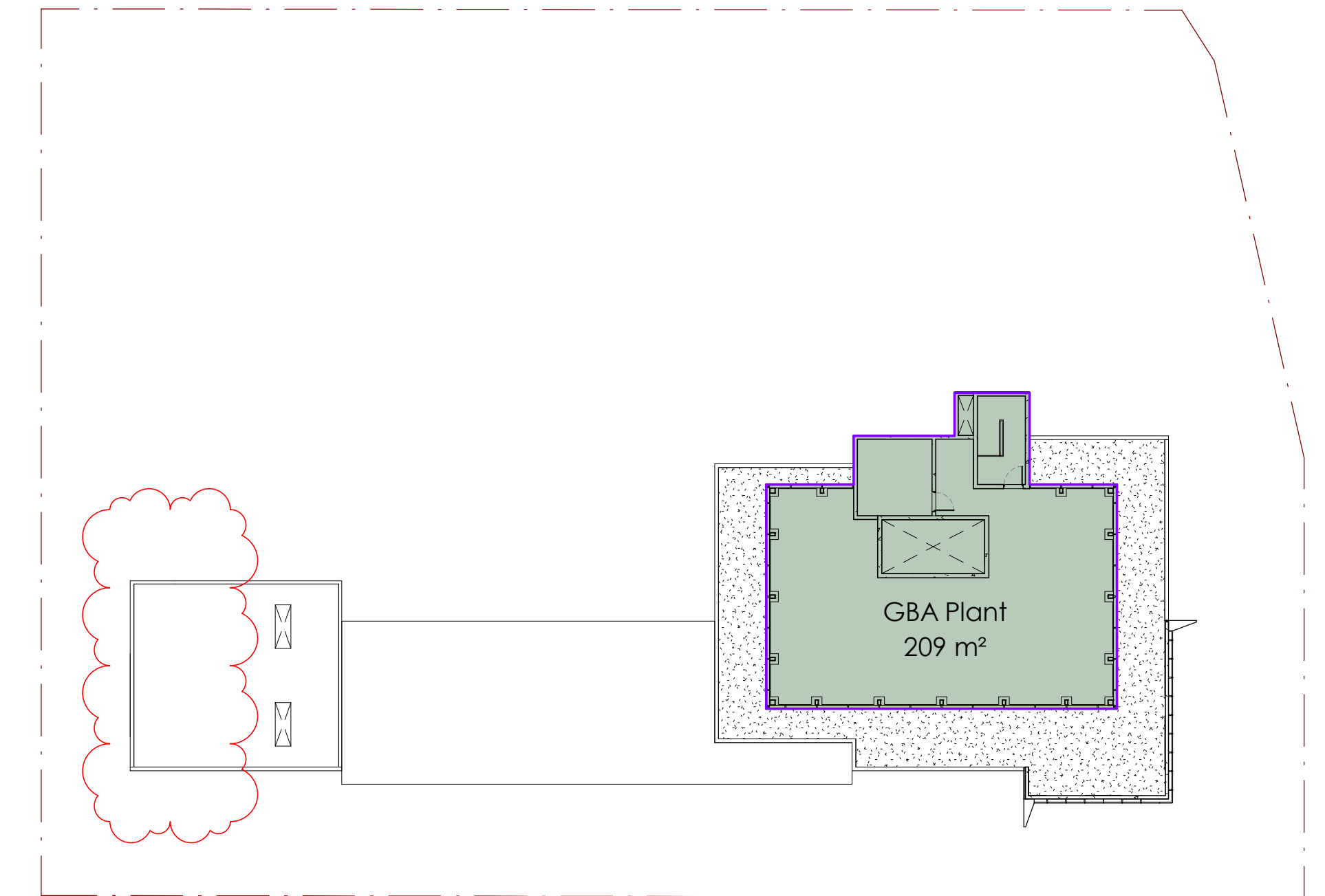
Area Schedule (GBA)				
Name	Level	Number of Levels	Area	Total Area
GBA BOH	Ground	1	299 m²	299 m²
GBA Carparking	Ground	1	1221 m²	1221 m²
GBA Hotel	Ground	1	510 m²	510 m²
GBA Hotel	L1	1	825 m²	825 m²
GBA Hotel	L2	6	825 m²	4950 m²
GBA Hotel	L8 Pool	1	352 m²	352 m²
				6637 m²
GBA Plant	Ground	1	45 m²	45 m²
GBA Plant	Ground	1	47 m²	47 m²
GBA Plant	Ground	1	58 m²	58 m²
GBA Plant	L8 Pool	1	166 m²	166 m²
GBA Plant	L9 Plant	1	209 m²	209 m²
				524 m²
GBA Pool Terrace	L8 Pool	1	307 m²	307 m²
				307 m²
GBA Retail	Ground	1	202 m²	202 m²
				202 m²
				9191 m²



3 Level 2 - 7 GBA



4 Level 8 GBA

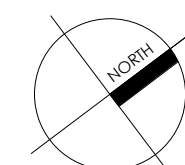


5 Level 9 GBA

R	Amended DA Package		21.10.2020
Q	General Update		2019.11.08
P	Updated GBA Schedule		2019.09.26
O	Modified DA Submission		2019.07.10
Rev.	Revision Description	Chk.	Date
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Drawing

GBA SCHEDULE

Scales
1 : 250 @ A1

Drawn
RF

Checked
SJ

Drawing No.

DA.04.01

Revision

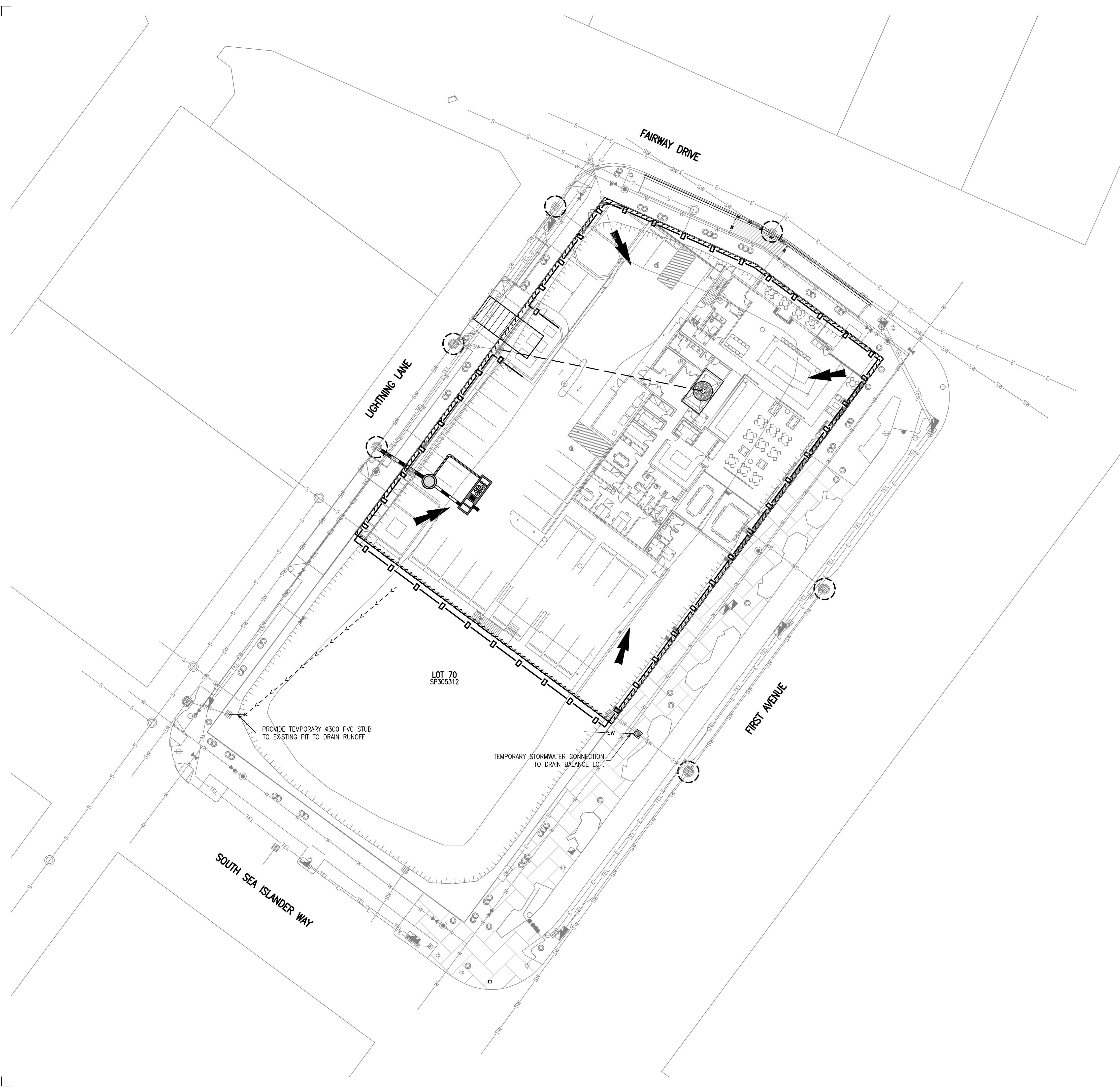
R

Project No.
6668

20/10/2020 10:21:26 PM: Plot Date

AMENDED DA PACKAGE

Appendix B Concept Erosion and Sediment Control Plan

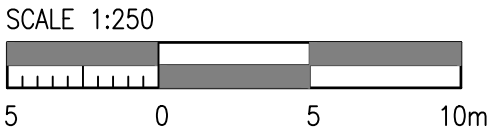


LEGEND

- PROPOSED SEDIMENT FENCE
- PROPOSED CATCH DRAIN
- PROPOSED PUMP LINE
- PROPOSED INLET PROTECTION SAG
- PROPOSED VIBRATION GRID
- DIRECTION OF FALL FROM LOTS
- PROPOSED SUMP PIT

EROSION AND SEDIMENT CONTROL NOTES

- THESE NOTES SHALL BE READ IN CONJUNCTION WITH:
A. GENERAL NOTES AND DISCLAIMERS FOR PROJECT
B. ENVIRONMENTAL NOTES FOR THE PROJECT, AND
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A PLAN TO THE LOCAL AUTHORITY SPECIFYING THE STAGING OF THE VARIOUS EROSION AND SEDIMENT CONTROLS DURING THE DIFFERENT CONSTRUCTION PHASES.
- EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED BY THE CONTRACTOR AS BEING REQUIRED FOR THE FIRST CONSTRUCTION PHASE ARE TO BE PLACED PRIOR TO ANY CLEARING AND GRUBBING, AND ANY OTHER EARTHWORKS.
- ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO REMAIN OPERATIONAL UNTIL THE SITE IS ACCEPTED "ON MAINTENANCE" BY THE LOCAL AUTHORITY.
- EROSION AND SEDIMENT CONTROL DEVICES MUST COMPLY WITH:
A. LOCAL AUTHORITY GUIDELINES
B. IECA 2008, BEST PRACTICE EROSION AND SEDIMENT CONTROL INTERNATIONAL EROSION CONTROL ASSOCIATION (AUSTRALASIA), PICTON NSW.
- UNDER NO CIRCUMSTANCES IS SILT TO BE ALLOWED TO LEAVE THE SITE.
- PRIOR TO THE RELEASE ON ANY STORMWATER RELEASED FROM THE SITE IS TO MEET THE FOLLOWING CRITERIA:
A TOTAL SUSPENDED SOLIDS < 50 MG/L, AND
B TURBIDITY < 100 NTU
C PH 6.5 TO 8.5
- WHERE POSSIBLE, WATER QUALITY SAMPLES COLLECTED SHOULD BE TESTED IN A LABORATORY BEFORE DISCHARGE TO PROVE THAT SUSPENDED SOLID CONTENT IS BELOW RECOMMENDED LEVEL. IT IS STRONGLY RECOMMENDED THAT SUFFICIENT WATER TESTING IS CONDUCTED IN ORDER TO ENABLE A SITE-SPECIFIC CALIBRATION BETWEEN SUSPENDED SOLIDS CONCENTRATIONS (MG/L) AND NTU TURBIDITY READINGS. THIS WOULD ALLOW UTILISATION OF TURBIDITY METERS TO DETERMINE WHEN WATER QUALITY IS LIKELY TO HAVE REACHED THE EQUIVALENT OF 50 MG/L. A MINIMUM OF 10 WATER SAMPLES ALL IN THE RANGE OF 20 – 150 MG/L ARE REQUIRED TO ESTABLISH A RELATIONSHIP BETWEEN SUSPENDED SOLIDS AND TURBIDITY.
- IF THE LEVEL OF TOTAL SUSPENDED SOLIDS EXCEEDS 50 MG/L, THEN THE STORMWATER RUNOFF HELD IN THE SEDIMENT BASIN IS TO BE FLOCCULATED WITH A SUITABLE FLOCCULENT OR COAGULANT AT A RATE TO BE DETERMINED BY TEST RESULTS. THE STORMWATER RUNOFF IS TO BE HELD UNTIL THE TOTAL SUSPENDED SOLIDS ARE < 50 MG/L.
- AN ON SITE REGISTER LOGGING RAINFALL DATES, WATER QUALITY ANALYSIS RESULTS AND RELEASE DATES. THE REGISTER IS TO BE KEPT ONSITE AND MADE AVAILABLE FOR INSPECTION UPON REQUEST.
- ALL EROSION AND SEDIMENT CONTROL DEVICES ARE TO BE INSPECTED WITH A MINIMUM FREQUENCY OF WEEKLY, AND PRIOR TO ANY EXPECTED RAINFALL, AND AFTER ANY RAINFALL. ANY DAMAGE OR DEVICE FAILURE IS TO BE REPAIRED / MANAGED AS REQUIRED.
- ANY EROSION AND SEDIMENT CONTROL DEVICES NOT PERFORMING ADEQUATELY ARE TO BE SUPPLEMENTED WITH ADDITIONAL MEASURES, THAT COMPLY WITH THE RELEVANT GUIDELINES. THE SUPERINTENDENT IS TO BE ADVISED OF THE DETAILS OF ANY ADDITIONAL MEASURES PROPOSED.
- ALL EROSION AND SEDIMENT CONTROL DEVICES ARE TO BE MAINTAINED IN WORKING ORDER AT ALL TIMES. ANY DAMAGE TO ANY DEVICE IS TO BE IMMEDIATELY RECTIFIED.
- THE CONTRACTOR SHALL MINIMISE THE EXTENT OF AREAS DISTURBED BY EARTHWORKS AT ANY ONE TIME, AND SHALL RETAIN EXISTING VEGETATION COVER WHERE POSSIBLE.
- ALL DISTURBED SURFACES ARE TO BE REHABILITATED AS SHOWN ON THE DRAWINGS / SPECIFIED IN THE SPECIFICATIONS. IF REHABILITATION METHODS ARE NOT SHOWN / SPECIFIED THEN DISTURBED AREAS ARE TO BE REHABILITATED WITH GRASS SEED APPLIED AT A RATE OF 30kg OF SEED PER HECTARE. ALL SEEDED AREAS ARE TO BE WATERED UNTIL 90% GROUND COVER IS ACHIEVED.
- TOPSOIL STOCKPILES ARE TO BE NOT GREATER THAN 1m IN HEIGHT.
- ALL TOPSOIL STOCKPILES THAT ARE TO REMAIN FOR LONGER THAN 4 WEEKS ARE TO BE SEEDED WITH RYE, OATS OR MILLET SEEDS AT A RATE OF 20kg OF SEED PER HECTARE OF STOCKPILE. ALL STOCKPILES ARE TO BE LOCATED CLEAR OF WATERCOURSE AND DRAINAGE WORKS.
- ALL NON-TOPSOIL STOCKPILES THAT ARE TO REMAIN LONGER THAN 4 WEEKS ARE TO BE COVERED WITH BLACK PLASTIC.



P2	PRELIMINARY DESIGN					MN	IM	30.10.20
P1	PRELIMINARY DESIGN					MN	IM	03.06.19
Rev	Revision	Description				By	App	Date
Scale	1	2	3	4	5	6	7	8

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ACN 010 580 248

Client
PRO INVEST GROUP

Project
HI EX SUNSHINE COAST

Title
**CONCEPT EROSION AND
SEDIMENT CONTROL PLAN**

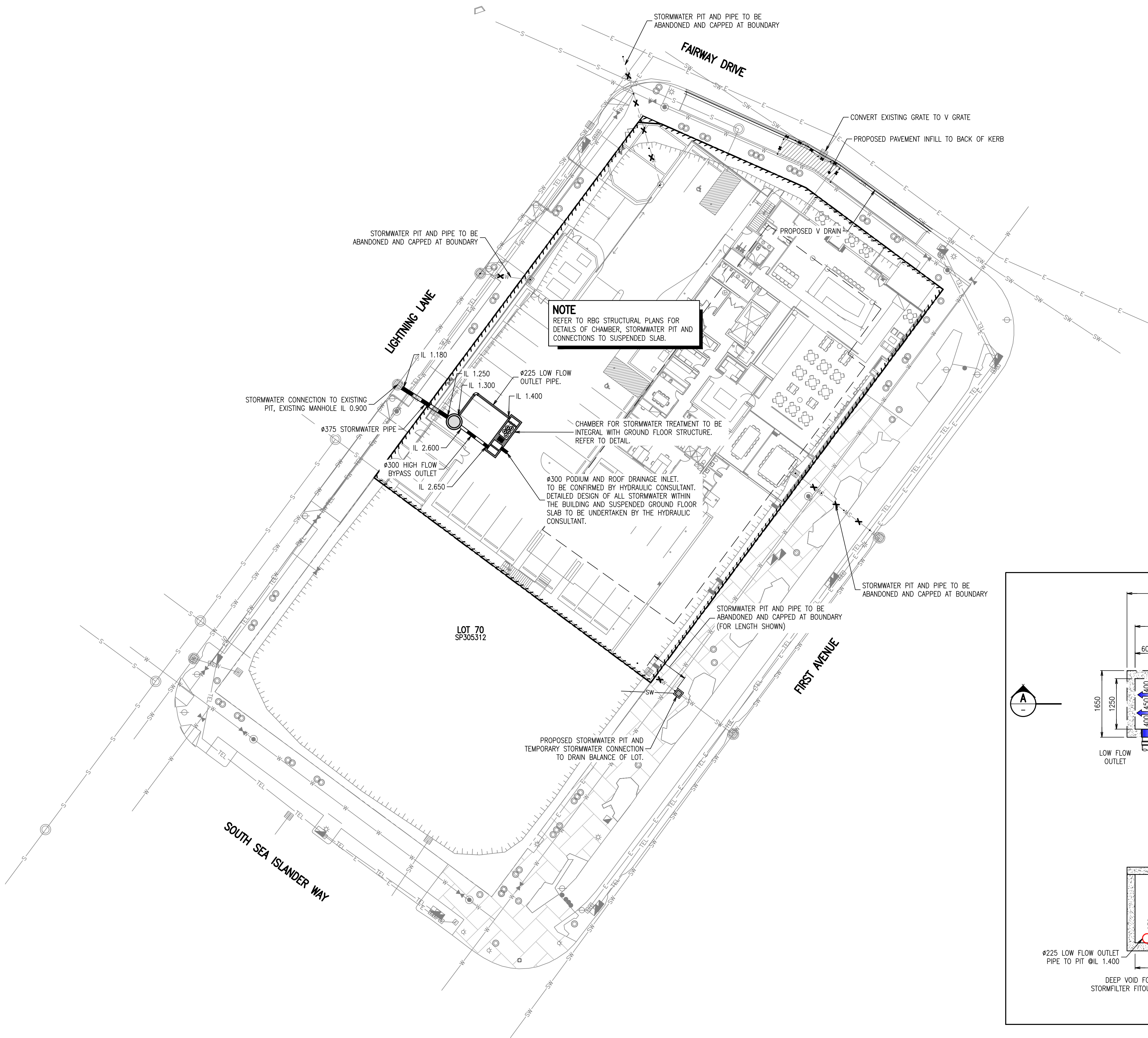
Date JUNE 2019	Drawn M.NG
Scale at A1 1:250	Designer M.NG
	Design Checker —
Job Number 19305C	Approved I.McCUBBIN

NOT FOR CONSTRUCTION

Drawing Number Revision

Appendix C Concept Stormwater Plan

DRAINAGE WITHIN THE BUILDING FOOTPRINT IS INDICATIVE ONLY. REFER TO HYDRAULIC CONSULTANT'S DRAWINGS FOR DETAILS.



	EXISTING STORMWATER PIPE
	EXISTING SWALE
	EXISTING STORMWATER MAINTENANCE HOLE
	EXISTING STORMWATER PIT
	PROPOSED STORMWATER PIPE
	PROPOSED STORMWATER MAINTENANCE HOLE
	PROPOSED STORMWATER MAINTENANCE HOLE LID
	PROPOSED STORMWATER FIELD INLET PIT
	PROPOSED STORMWATER TANK UNDER GROUND
	SERVICE TO BE DEMOLISHED/ABANDONED

1. THESE NOTES SHALL BE READ IN CONJUNCTION WITH:
A. GENERAL NOTES AND DISCLAIMERS FOR THE PROJECT, AND
B. ROADWORKS NOTES FOR THE PROJECT.
2. STORMWATER DRAINAGE PIPES SHALL BE REINFORCED CONCRETE PIPE CLASS 2 U.N.O.
3. STORMWATER DRAINAGE PIPES LESS THAN OR EQUAL TO 900mm DIAMETER SHALL BE SPIGOT AND SOCKET AND RUBBER RING JOINTED.
4. STORMWATER DRAINAGE PIPES GREATER THAN 900mm DIAMETER SHALL BE FLUSH JOINT PIPES JOINTED WITH EXTERNAL ELASTOMERIC BANDS (SAND BANDS).
5. STORMWATER DRAINAGE PIPES ARE TO BE BEDDED IN ACCORDANCE WITH THE LOCAL AUTHORITY'S STANDARD DRAWINGS, U.N.O.
6. MANHOLES ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE LOCAL AUTHORITY'S STANDARD DRAWINGS, U.N.O.
7. HEADWALLS AND OUTLETS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE LOCAL AUTHORITY'S STANDARD DRAWINGS, U.N.O.
8. ALL ACCESS COVERS AND GRATES SHALL BE MANUFACTURED AND SUPPLIED IN ACCORDANCE WITH AS3996.
9. OUTLET LOCATIONS ARE TO BE CONFIRMED ON SITE BY THE ENGINEER (ROBERT BIRD GROUP) PRIOR TO THE COMMENCEMENT OF STORMWATER DRAINAGE CONSTRUCTION.
10. STRUCTURE LOCATIONS ARE TO BE CONFIRMED ON SITE BY THE ENGINEER (ROBERT BIRD GROUP) PRIOR TO THE COMMENCEMENT OF STORMWATER DRAINAGE CONSTRUCTION.
11. SURFACE LEVELS AS SHOWN ON THE LONGITUDINAL SECTIONS ARE AS FOLLOWS:
 - THE CENTRE OF STRUCTURE FOR MAINTENANCE HOLES.
 - THE TOP OF WALL (WEIR) FOR FIELD INLETS.
 - THE INVERT OF KERB AND CHANNEL FOR KERB INLET GULLIES.
 - THE TOP OF HEADWALL FOR OUTLETS.

P3	PRELIMINARY DESIGN	MN	IM	30.10.20
P2	PRELIMINARY DESIGN	MN	IM	03.06.19
P1	PRELIMINARY DESIGN	MN	IM	30.05.19

Rev	Revision	Description					By	App	Date
Scale	1	2	3	4	5	6	7	8	

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Client
PRO INVEST GROUP

Project
HI EX SUNSHINE COAST

Title
CONCEPT STORMWATER PLAN

Date	Drawn
JUNE 2019	M.NG
Scale at A1	Designer
1:250	M.NG
	Design Checker

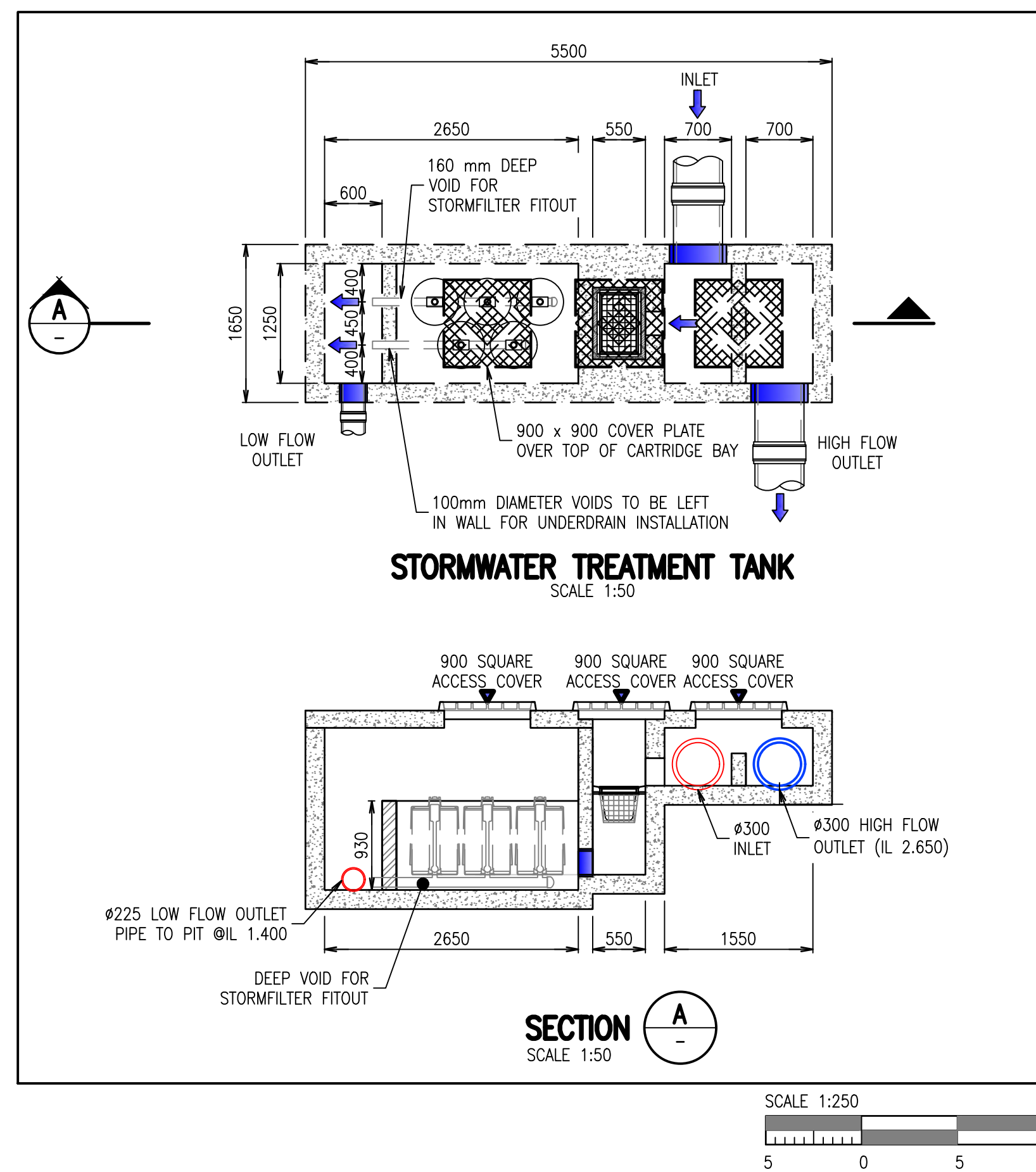
Job Number
19305C

Approved
I.McCUBBIN

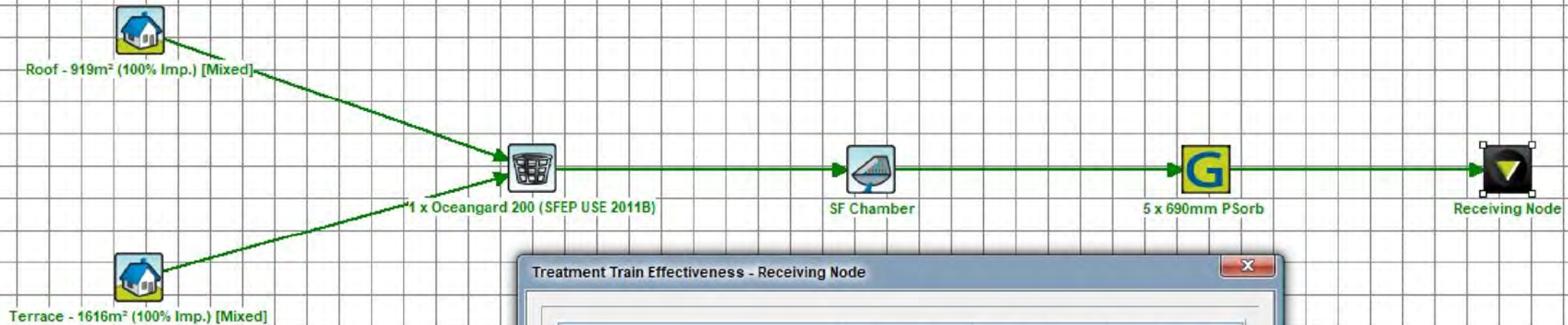
NOT FOR CONSTRUCTION

Drawing Number	Revision
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C6-01 P3



Appendix D MUSIC Results



Treatment Train Effectiveness - Receiving Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	3.2	3.2	0
Total Suspended Solids (kg/yr)	465	69.5	85.1
Total Phosphorus (kg/yr)	1.33	0.436	67.3
Total Nitrogen (kg/yr)	10.1	5.22	48.5
Gross Pollutants (kg/yr)	73.4	0	100

Appendix E State Planning Policy Codes

State code 8: Coastal development and tidal works

Table 8.2.1: All development

Performance outcomes	Acceptable outcomes	Response
Development in the erosion prone area		
PO1 Development does not occur in the erosion prone area unless the development: 1. is one of the following types of development: a. coastal-dependent development; or b. temporary, readily relocatable or able to be abandoned; or c. essential community infrastructure; or d. redevelopment of an existing permanent building or structure that cannot be relocated or abandoned; and 2. cannot feasibly be located elsewhere.	No acceptable outcome is prescribed.	Complies with PO1. Minimum floor level is achieved, refer to Cardno flood study.
PO2 Development other than coastal protection work: 1. avoids impacting on coastal processes; and 2. ensures that the protective function of landforms and vegetation is maintained. Note: In considering reconfiguring a lot applications, the state may require land in the erosion prone area to be surrendered to the State for coastal management purposes under the <i>Coastal Protection and Management Act 1995</i>. Where the planning chief executive receives a copy of a land surrender requirement or proposed land surrender notice under the <i>Coastal Protection and Management Act 1995</i>, this must be considered in assessing the application.	No acceptable outcome is prescribed.	Complies with PO2. Minimum floor level is achieved, refer to Cardno flood study.
PO3 Development is located, designed and constructed to minimise the impacts from coastal erosion by: 1. locating the development as far landward as practicable; or	No acceptable outcome is prescribed.	Complies with PO3. Minimum floor level is achieved, refer to Cardno flood study.

Performance outcomes	Acceptable outcomes	Response
2. where it is demonstrated that 1 is not feasible, mitigate or otherwise accommodate the risks posed by coastal erosion.		
PO4 Development does not significantly increase the risk or impacts to people and property from coastal erosion.	No acceptable outcome is prescribed.	Complies with PO4. No increase of impact from development.
PO5 Development other than coastal protection work avoids directly or indirectly increasing the severity of coastal erosion either on or off the site.	No acceptable outcome is prescribed.	Complies with PO5. No increase of impact from development.
PO6 In areas where a coastal building line is present, building work is located landward of the coastal building line unless coastal protection work has been constructed to protect the development.	No acceptable outcome is prescribed.	Complies with PO6. Refer to Cardno flood study.
Artificial waterways		
PO7 Development of artificial waterways, canals and dry-land marinas minimises impacts on coastal resources by: 1. maintaining the tidal prism volume of the natural waterway to which it is connected 2. demonstrating a whole-of-life strategy for the disposal of dredged material.	No acceptable outcome is prescribed.	Not applicable for this application.
Coastal protection work		
PO8 Works for beach nourishment minimise adverse impacts on coastal processes and avoid any increase in the severity of erosion on adjacent land by: 1. sourcing sand from an area that does not adversely impact on the active beach system 2. ensuring imported sand is compatible with natural beach sediments and coastal processes of the receiving beach.	No acceptable outcome is prescribed.	Not applicable for this application.
PO9 Erosion control structures are only constructed where there is an imminent threat to buildings or infrastructure of value, and there is no feasible option for either:	No acceptable outcome is prescribed.	Not applicable for this application.

Performance outcomes	Acceptable outcomes	Response
1. beach nourishment; or 2. relocation or abandonment of structures. Statutory Note: The monetary value of buildings or infrastructure should be more than the cost of associated erosion control structures.		
PO10 Erosion control structures minimise interference with coastal processes, or any increase to the severity of erosion on adjacent land by: 1. locating the erosion control structure as far landward as practicable and directly adjacent to the structure it is intended to protect 2. where required and feasible, importing sand to the site to mitigate any increase in the severity of erosion 3. the design of the structure.	No acceptable outcome is prescribed.	Not applicable for this application.
Water quality		
PO11 Development: 1. maintains or enhances environmental values of receiving waters 2. achieves the water quality objectives of Queensland waters 3. avoids the release of prescribed water contaminants to tidal waters. Note: See Environmental Protection (Water) Policy 2009 for the relevant water quality objectives.	No acceptable outcome is prescribed.	Complies with PO11. Refer to Site Services and Stormwater Management Report.
Category C and R areas of vegetation		
PO12 Development: 1. avoids impacts on category C areas of vegetation and category R areas of vegetation; or 2. minimises and mitigates impacts on category C areas of vegetation and category R areas of vegetation after demonstrating avoidance is not reasonably possible.	No acceptable outcome is prescribed.	Not applicable for this application.

Performance outcomes	Acceptable outcomes	Response
Public use of and access to state coastal land		
PO13 Development maintains or enhances public use of and access to and along state coastal land (except where this is contrary to the protection of coastal resources or public safety).	No acceptable outcome is prescribed.	Not applicable for this application.
PO14 Private marine development ensures that works: 1. are used for marine access purposes only 2. minimise the use of state coastal land 3. do not interfere with access between navigable waterways and adjacent properties.	No acceptable outcome is prescribed.	Not applicable for this application.
PO15 Development ensures erosion control structures are located within the premises they are intended to protect unless there is no feasible alternative.	No acceptable outcome is prescribed.	Complies with PO15. Refer to Site Services and Stormwater Management Report.
Matters of state environmental significance		
PO16 Development: 1. avoids impacts on matters of state environmental significance; or 2. minimises and mitigates impacts on matters of state environmental significance after demonstrating avoidance is not reasonably possible; and 3. provides an offset if, after demonstrating all reasonable avoidance, minimisation and mitigation measures are undertaken, the development results in an acceptable significant residual impact on a matter of state environmental significance. Statutory note: For Brisbane core port land, an offset may only be applied to development on land identified as E1 Conservation/Buffer, E2 Open Space or Buffer/Investigation in the Brisbane Port LUP precinct plan. For the Brisbane Port LUP, see www.portbris.com.au. Note: Guidance for determining if the development will have a significant residual impact on the matter of state environmental	No acceptable outcome is prescribed.	Not applicable for this application.

Performance outcomes	Acceptable outcomes	Response
significance is provided in the Significant Residual Impact Guideline, Department of State Development, Infrastructure and Planning, 2014. Where the significant residual impact is considered an acceptable impact on the matter of state environmental significance and an offset is considered appropriate, the offset should be delivered in accordance with the <i>Environmental Offsets Act 2004</i> .		

Table 8.2.2: All operational work

Performance outcomes	Acceptable outcomes	Response
Private marine development		
PO17 Private marine development does not require the construction of coastal protection work, shoreline or riverbank hardening or dredging for marine access purposes.	No acceptable outcome is prescribed.	Not applicable for this application.
Disposal of solid waste or dredged material from artificial waterways		
PO18 Solid waste from land and dredged material from artificial waterways is not disposed of in tidal water unless it is for beneficial reuse.	No acceptable outcome is prescribed.	Not applicable for this application.
Disposal of dredged material other than from artificial waterways		
PO19 Dredged material is returned to tidal water where this is needed to maintain coastal processes and sediment volume.	No acceptable outcome is prescribed.	Not applicable for this application.
PO20 Where it is not needed to maintain coastal processes and sediment volume, the quantity of dredged material disposed to tidal water is minimised through beneficial reuse or disposal on land.	No acceptable outcome is prescribed.	Not applicable for this application.
All dredging and any disposal of dredged material in tidal water		
PO21 All dredging and any disposal of dredged material in tidal water is: 1. demonstrated to be safe with regard to protection of the marine environment and by meeting the National Assessment Guidelines for Dredging 2009, Department of Environment and Energy, 2009, or later version; and 2. supported by a monitoring and management plan that protects the marine environment and that complies with the National Assessment Guidelines for Dredging 2009, Department of Environment and Energy,	No acceptable outcome is prescribed.	Not applicable for this application.

Performance outcomes	Acceptable outcomes	Response
2009, or later version.		
Reclamation		
PO22 Development does not involve reclamation of land below tidal water, other than for the purposes of: 1. coastal-dependent development, public marine development or community infrastructure; or 2. strategic ports, priority ports, boat harbours or strategic airports and aviation facilities, in accordance with a statutory land use plan or master plan, where there is a demonstrated net benefit for the state or region and no feasible alternative exists; or 3. coastal protection work or work necessary to protect coastal resources or coastal processes.	No acceptable outcome is prescribed.	Not applicable for this application.

Table 8.2.3: Operational work which is not assessed by local government

Performance outcomes	Acceptable outcomes	Response
PO23 Works are located and designed such that they continue to operate safely during and following a defined storm tide event.	AO23.1 Tidal work is designed and located in accordance with the Guideline: Building and engineering standards for tidal works, Department of Environment and Heritage Protection, 2017.	Complies with PO23. Minimum floor level is achieved, refer to Cardno flood study.

State code 10: Taking or interfering with water

Table 10.2.2: Operational works

Performance outcomes	Acceptable outcomes	Response
General		
PO1 Works do not adversely impact on the natural riverine ecosystem.	No acceptable outcome is prescribed.	Complies with PO1.
PO2 Works do not adversely impact other users' ability to access the resource.	No acceptable outcome is prescribed.	Complies with PO2.
PO3 Works do not adversely impact on the physical integrity of the watercourse.	No acceptable outcome is prescribed.	Complies with PO3.
PO4 Works are consistent with any of the following, to the extent they are relevant to the proposed development: 1. a water plan 2. a water management protocol 3. a moratorium notice issued under the <i>Water Act 2000</i>. Note: Moratorium notices are published on the Department of Natural Resources and Mines website. An example of a requirement in a water plan is a prescribed setback distance for new water bores from other existing water bores. These requirements will be different for each water plan.	No acceptable outcome is prescribed.	Complies with PO4. Refer to Site Service and Stormwater Management report.
Underground water		
PO5 Works maintain the natural ecosystem processes of the underground water system.	No acceptable outcome is prescribed.	Not applicable to this application.
PO6 Works minimise impacts on connectivity between underground water and water in a watercourse, lake or spring.	No acceptable outcome is prescribed.	Not applicable to this application.
Overland flow water		
PO7 Works must not take overland flow water unless the works are:	No acceptable outcome is prescribed.	Complies with PO4. Refer to Site Service and Stormwater Management report.

Performance outcomes	Acceptable outcomes	Response
- for an activity prescribed by regulation under the <i>Water Act 2000</i>; or - for reconfiguring existing works; or - in a limited catchment area identified in a water plan; or - for contaminated agricultural run-off water; or - part of an environmentally relevant activity or under an environmental authority; or - incidental to capturing coal seam gas water; or - consistent with a water entitlement; or - for the purpose of water sensitive urban design; for developments in urban areas.		
PO8 Works minimise the impact on receiving waters and neighbouring properties.	AO8.1 Works are in accordance with a certified report, or the works are for: - the taking of contaminated agricultural runoff water where the volume is less than the volume of the limited capacity identified in a water plan or water management protocol; or - if no limited capacity is identified the capacity is less than 12 megalitres of contaminated agricultural run-off water; or - taking for stock and domestic purposes; or - taking overland flow water under a water entitlement.	Not applicable for this application.
PO9 Works are located, constructed and operated in a way that minimises adverse impacts on neighbouring properties.	AO9.1 Works are contained within the property boundaries. AND	Complies with AO9.1. Refer to Site Services and Stormwater Management report.
	AO9.2 At full supply level, the area inundated is contained within the property boundaries. AND	Not applicable for this application.
	AO9.3 Bywash resulting from the works and any water diverted away from contaminated areas exits the property as close as practicable to the same location to which it exited the property boundary prior to construction of the works.	Not applicable for this application.
Reconfiguring existing works		
PO10 Construction of new works must not increase	AO10.1 Construction of new works must not result in	

Performance outcomes	Acceptable outcomes	Response
the overall take of overland flow water.	an increase any of the following: 1. the capacity of the works to store water; or 2. the rate at which the works take water; or 3. the average volume of water taken by the works.	
PO11 Works must not involve reconfiguration of natural water bodies or bunded areas.	No acceptable outcome is prescribed.	Not applicable for this application.
PO12 Works must not involve reconfiguration of the storage capacity of any of the following: 1. a lake that was not used for irrigation or other intensive stocking or production; or 2. land being used for irrigated or dryland agriculture or areas surrounded by levees designed to prevent the land becoming inundated; or 3. naturally occurring infield storages.	No acceptable outcome is prescribed.	Not applicable for this application.
PO13 New works must be located within the same premises as the existing works.	No acceptable outcome is prescribed.	Complies with PO13. Refer to Site Services and Stormwater Management report.
Limited catchment areas		
PO14 In the limited catchment areas, any works for storing water must not: 1. be larger than necessary for storing water other than overland flow water; or 2. be able to take floodwater overflowing from any adjacent watercourse. Note: Limited catchment areas are listed in table 10.3.1.	AO14.1 In the limited catchment areas, the incidental take of overland flow water: 1. is located within the sub-catchment/management area listed in table 10.3.1, column 2 for the relevant limited catchment area; and 2. is stored in a local catchment area that is less than or equal to the area of the limited catchment area specified in table 10.3.1, column 3.	Not applicable for this application.
Contaminated agricultural run-off water		
PO15 Works to take contaminated agricultural run-off water must: 1. demonstrate that there is no alternative way to take the water by using or reconfiguring existing works 2. be no larger than necessary to contain contaminated agricultural run-off water or tailwater 3. minimise the volume of water that becomes	No acceptable outcome is prescribed.	Not applicable for this application.

Performance outcomes	Acceptable outcomes	Response
contaminated agricultural run-off water 4. where practicable, allow for water that is not contaminated agricultural run-off water or tailwater to be passed through the works. Note: The design of the works should have regard to relevant industry guidelines and best practice environmental management.		
Coal seam gas		
PO16 Works only capture overland flow water necessary for the operation of the environmentally relevant activity or environmental authority under the <i>Environmental Protection Act 1994</i> .	No acceptable outcome is prescribed.	Not applicable for this application.
Environmentally relevant activity		
PO17 Any storage for the works must: 1. be no larger than necessary to store coal seam gas water for the beneficial use of the resource under chapter 8 of the <i>Waste Reduction and Recycling Act 2011</i> 2. minimise the volume of overland flow water taken 3. not be able to take floodwater from any adjacent watercourse 4. not contain coal seam gas water that could be stored in an existing alternative storage.	No acceptable outcome is prescribed.	Not applicable for this application.

State code 22: Environmentally relevant activities

Table 22.2.2: Material change of use

Performance outcomes	Acceptable outcomes	Response
All ERAs		
PO1 Development is suitably located and designed to avoid or mitigate environmental harm to the acoustic environment.	AO1.1 Development meets the acoustic quality objectives for sensitive receptors identified in the Environmental Protection (Noise) Policy 2008.	Complies with PO1. A construction management plan will be lodged by contractors.
PO2 Development is suitably located and designed to avoid or mitigate environmental harm to the air environment.	AO2.1 Development meets the air quality objectives of the Environmental Protection (Air) Policy 2008.	Complies with PO2. A construction management plan will be lodged by contractors.
PO3 Development, other than intensive animal industry for poultry farming, is suitably located and designed to avoid or mitigate environmental harm on adjacent sensitive land uses caused by odour.	No acceptable outcome is prescribed.	Not applicable for this application.
PO4 Development is suitably located and designed to avoid or mitigate environmental harm to the receiving waters environment.	AO4.1 Development meets the management intent, water quality guidelines and objectives of the Environmental Protection (Water) Policy 2009.	Complies with PO4. Refer to Site Services and Stormwater Management report.
PO5 Development is designed to include elements which: 1. prevent or minimise the production of hazardous contaminants and waste as by-products; or 2. contain and treat hazardous contaminants on-site rather than releasing them into the environment; and 3. provide secondary containment to prevent the accidental release of hazardous contaminants to the environment from spillage or leaks.	No acceptable outcome is prescribed.	Not applicable for this application.
PO6 Environmentally hazardous materials located on site are stored to avoid or minimise their release into the environment due to inundation during flood	No acceptable outcome is prescribed.	Not applicable for this application.

State Development Assessment Provisions – version 2.4

State code 22: Environmentally relevant activities

Performance outcomes	Acceptable outcomes	Response
events.		
All development – matters of environmental significance		
PO7 Development: 1. avoids impacts on matters of state environmental significance; or 2. minimises and mitigates impacts on matters of state environmental significance after demonstrating avoidance is not reasonably possible; and 3. provides an offset if, after demonstrating all reasonable avoidance, minimisation and mitigation measures are undertaken, the development results in an acceptable significant residual impact on a matter of state environmental significance. Statutory note: For Brisbane core port land, an offset may only be applied to development on land identified as E1 Conservation/Buffer, E2 Open Space or Buffer/Investigation in the Brisbane Port LUP precinct plan. For the Brisbane Port LUP, see www.portbris.com.au. Note: Guidance for determining if the development will have a significant residual impact on a matter of state environmental significance is provided in the Significant Residual Impact Guideline, Department of State Development, Infrastructure and Planning, 2014. Where the significant residual impact is considered an acceptable impact on the matter of state environmental significance and an offset is considered appropriate, the offset should be delivered in accordance with the <i>Environmental Offsets Act 2014</i>.	No acceptable outcome is prescribed.	Not applicable for this application.
Category C areas and category R areas of vegetation		
PO8 Development: 1. avoids impacts on category C areas of vegetation and category R areas of vegetation; or	No acceptable outcome is prescribed.	Not applicable for this application.

Performance outcomes	Acceptable outcomes	Response
2. minimises and mitigates impacts on category C areas and category R areas of vegetation after demonstrating avoidance is not reasonably possible.		
Intensive animal industry – poultry farming (ERA 4(2))		
PO9 Poultry farming development (where farming more than 200,000 birds) is suitably located and designed to avoid or mitigate environmental harm on adjacent sensitive land uses caused by odour.	AO9.1 For poultry farming involving 300,000 birds or less, development meets the separation distances as determined using the S-factor methodology to: 1. a sensitive land use in a rural zone; and 2. boundary of a non-rural zone. OR	Not applicable for this application.
	AO9.2 Development meets the separation distances as determined by odour modelling using the following criteria: 1. 2.5 odour units, 99.5 percent, 1 hour average for a sensitive land use in a rural zone; or 2. 1.0 odour units, 99.5 percent, 1 hour average for the boundary of a non-rural zone. Statutory note: Guidance for determining if the development will cause environmental harm caused by odour is provided in the Development of Meat Chicken Farms in Queensland, Department of Agriculture and Fisheries, 2016 and the Guideline – Odour Impact Assessment from Developments, Department of Environment and Heritage Protection, 2013.	Not applicable for this application.

State Planning Policy July 2014

SPP Code: Water Quality

Performance Outcomes and Acceptable Solutions

Plan to avoid/ minimise new impacts

Performance Outcomes		Acceptable Outcomes	Proposal Compliance Response
PO1	The development is planned and designed considering the land use constraints of the site for achieving stormwater design objectives.	AO1.1 A site stormwater quality management plan (SQMP) is prepared, and: a) is consistent with any local area stormwater management planning, and b) provides for achievable stormwater quality treatment measures meeting design objectives listed below in Table A (construction phase) and Table B (post construction phase), or current best practice environmental managements, reflecting land use constraints, such as: • erosive, dispersive, sodic and/or saline soil types • landscape features (including landform) • acid sulfate soil and management of nutrients of concern • rainfall erosivity. <i>Editor's note: Local area stormwater management planning may include Urban Stormwater Quality Management Plans, or Catchment or waterway management plans, Healthy Waters Management Plans, Water Quality Improvement Plans, Natural Resource Management Plans.</i>	Complies with AO1.1: The area of the proposed site is greater than 2,500m² and Best management practices (BMP's) have been proposed for the proposed development. A SQMP has been prepared by RBG as part of the Site Services and Stormwater Management Report to support the development application.
		AO2.1 A wastewater management plan (WWMP) is prepared by a suitably qualified person and addresses: a) wastewater type, and b) climatic conditions, and c) water quality objectives (WQOs), and d) best-practice environmental management, and	Complies with AO2.1: Not applicable to this development. No waste water other than stormwater and sewer is expected from the proposed development.
PO2	Development does not discharge wastewater to a waterway or off site unless demonstrated to be best practice environmental management for that site.	AO2.2 The WWMP provides that wastewater is managed in accordance with a waste management hierarchy that:	Complies with AO2.2: Not applicable to this development.

Performance Outcomes	Acceptable Outcomes	Proposal Compliance Response
PO3 Any non-tidal artificial waterway is located in a way that is compatible with the land use constraints of the site for protecting water environmental values in existing natural waterways.	a) avoids wastewater discharges to waterways, or b) if wastewater discharge to waterways cannot practicably be avoided, minimises wastewater discharge to waterways by re-use, recycling, recovery and treatment for disposal to sewer, surface water and groundwater. AO3.1 If the proposed development involves a non-tidal artificial waterway: a) environmental values in downstream waterways are protected, and b) any groundwater recharge areas are not affected, and c) the location of the waterway incorporates low lying areas of a catchment connected to an existing waterway, and d) existing areas of ponded water are included, and AO3.2 Non-tidal artificial waterways are located: a) outside natural wetlands and any associated buffer areas, and b) to minimise disturbing soils or sediments, and c) to avoid altering the natural hydrologic regime in acid sulphate soil and nutrient hazardous areas.	Complies with AO3.1: Not applicable to this development. Complies with AO3.2: Not applicable to this development.
PO4 Any non-tidal artificial waterway is located in a way that is compatible with existing tidal waterways.	AO4.1 Where a non-tidal artificial waterway is located adjacent to, or is connected to, a tidal waterway by means of a weir, lock, pumping system or similar: a) there is sufficient flushing or a tidal range of >0.3m, or b) any tidal flow alteration does not adversely impact on the tidal waterway, or c) there is no introduction of salt water into freshwater environments.	Complies with AO4.1: Not applicable to this development.

Design to avoid / minimise new impacts

Performance Outcome		Acceptable Outcome	Proposal Compliance Response
PO5	Stormwater does not discharge directly to a non-tidal artificial waterway without treatment to manage stormwater quality management.	AO5.1 Any non-tidal artificial waterway is designed and managed for any of the following end-use purposes: a) amenity including aesthetics, landscaping and recreation, or b) flood management, or c) stormwater harvesting as part of an integrated water cycle management plan, or d) aquatic habitat, and	Complies with AO5.1: Not applicable to this development.
		AO5.2 The end-use purpose of any non-tidal artificial waterway is designed and operated in a way that protects water environmental values.	Complies with AO5.1: Not applicable to this development.

Construct to avoid / minimise new impacts

Performance Outcome		Acceptable Outcome	Proposal Compliance Response
PO6	Construction activities for the development avoid or minimise adverse impacts on stormwater quality.	AO6.1 An erosion and sediment control plan (ESCP) demonstrates that release of sediment-laden stormwater is avoided for the nominated design storm, and minimised when the nominated design storm is exceeded, by addressing design objectives listed below in Table A (construction phase) or local equivalent, for: a) drainage control, and b) erosion control, and c) sediment control, and d) water quality outcomes, and	Complies with AO6.1: An ESC program and drawing have been prepared as part of the Site Service and Stormwater Management report. Further details will be lodged with the Operational Works Submission.
		AO6.2 Erosion and sediment control practices (including any proprietary erosion and sediment control products) are designed, installed, constructed, operated, monitored and maintained, and any other erosion and sediment control practices are carried out in accordance with local conditions and appropriate recommendations from a suitably qualified person, or	Complies with AO6.2: Refer AO6.1.

Performance Outcome	Acceptable Outcome	Proposal Compliance Response
	AO6.2 The ESCP demonstrates how stormwater quality will be managed in accordance with an acceptable regional or local guideline so that target contaminants are treated to a design objective at least equivalent to Acceptable Outcome AO6.1.	Complies with AO6.2: Refer AO6.1.

Operate to avoid / minimise new impacts

Performance Outcome	Acceptable Outcome	Proposal Compliance Response
P07 Operational activities for the development avoid or minimises changes to waterway hydrology from adverse impacts of altered stormwater quality and flow.	AO7.1 Development incorporate stormwater flow control measure to achieve the design objectives set out below in and Table B (post construction phase). The operational phases for the development comply with design objectives in Table B (post construction phase), or current best practice environmental management, including management of frequent flows, and peak flows.	Complies with AO7.1: Refer AO1.1. Stormwater detention is not required for this development.
P08 Any treatment and disposal of waste water to a waterway accounts for: - the applicable water quality objectives for the receiving waters, and - adverse impact on ecosystem health or receiving waters, and - in waters mapped as being of high ecological value, the adverse impacts of such releases and their offset.	AO8.1 Implement the WWMP prepared in accordance with AO2.1.	Complies with AO8.1: Not applicable to this development.
P09 Wastewater discharge to a waterway is managed in a way that maintains ecological processes, riparian vegetation, waterway integrity, and downstream ecosystem health.	AO9.1 Wastewater discharge waterways is managed to avoid or minimize the release of nutrients of concern so as to minimize the occurrence, frequency and intensity of coastal algal blooms, and AO9.2 Development in coastal catchments avoids or minimises and appropriately manages soil disturbance or altering natural hydrology, and	Complies with AO9.1 and AO9.2: Not applicable to this development.

Performance Outcome	Acceptable Outcome	Proposal Compliance Response
PO10 Any non-tidal artificial waterway is managed and operated by suitably qualified persons to achieve water quality objectives in natural waterways.	AO9.3 Development in coastal catchments: a) avoids lowering groundwater levels where potential or actual acid sulphate soils are present, and b) manages wastewaters so that: (i) the pH of any wastewater discharged is maintained between 6.5 and 8.5 to avoid mobilisation of acid, iron, aluminium, and metals, and (ii) holding times of neutralised wastewaters ensures the flocculation and removal of any dissolved iron prior to release, and (iii) visible iron floc is not present in any discharge, and (iv) precipitated iron floc is contained and disposed of, and (v) wastewater and precipitates that cannot be contained and treated for discharge on site are removed and disposed of through trade waste or another lawful method.	Complies with AO9.3: Not applicable to this development.
	AO10.1 Any non-tidal artificial waterway is designed, constructed and managed under the responsibility of a suitably qualified registered professional engineer, Queensland (RPEQ) with specific experience in establishing and managing artificial waterways, and AO10.2 Monitoring and maintenance programs adaptively manage water quality in any non-tidal artificial waterway to achieve relevant water-quality objectives downstream of the waterway, and AO10.3 Aquatic weeds are managed in any non-tidal artificial waterway to achieve a low percentage of coverage of the water surface area (less than 10%). Pests and vectors (such as mosquitoes) are managed through avoiding stagnant water areas, providing for native fish predators, and any other best practices for monitoring and treating pests, and	Complies with AO10.1, AO10.2, AO10.3, AO10.4: Not applicable to this development.

Performance Outcome	Acceptable Outcome	Proposal Compliance Response
	AO10.4 Any non-tidal artificial waterway is managed and operated by a responsible entity under agreement for the life of the waterway. The responsible entity is to implement a deed of agreement for the management and operation of the waterway that: a) identifies the waterway, and b) states a period of responsibility for the entity, and c) states a process for any transfer of responsibility for the waterway, and d) states required actions under the agreement for monitoring the water quality of the waterway and receiving waters, and e) states required actions under the agreement for maintaining the waterway to achieve the outcomes of this code and any relevant conditions of a development approval, and f) identifies funding sources for the above, including bonds, infrastructure charges or levies.	Complies with AO10.4: Not applicable to this development

Appendix F Ocean Protect



StormFilter

Operations & Maintenance Manual

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Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the StormFilter as recommended by the manufacturer.

The StormFilter is designed and sized to meet stringent regulatory requirements. It removes the most challenging target pollutants (including fine solids, soluble heavy metals, oil, and soluble nutrients) using a variety of media. For more than two decades, StormFilter has helped clients meet their regulatory needs and, through ongoing product enhancements, the design continues to be refined for ease of use and improved performance.

Why do I need to perform maintenance?

Adhering to the inspection and maintenance schedule of each stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most of all ensures the long term effective operation of the StormFilter.

Health and Safety

Access to a StormFilter unit requires removing heavy access covers/grates, and it is necessary to enter into a confined space. Pollutants collected by the StormFilter will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your StormFilter require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel. As a result, it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the StormFilter, precautions should be taken in order to minimise (or, if possible, prevent) contact with sediment and other captured pollutants by maintenance personnel. The following personal protective equipment (PPE) is subsequently recommended:

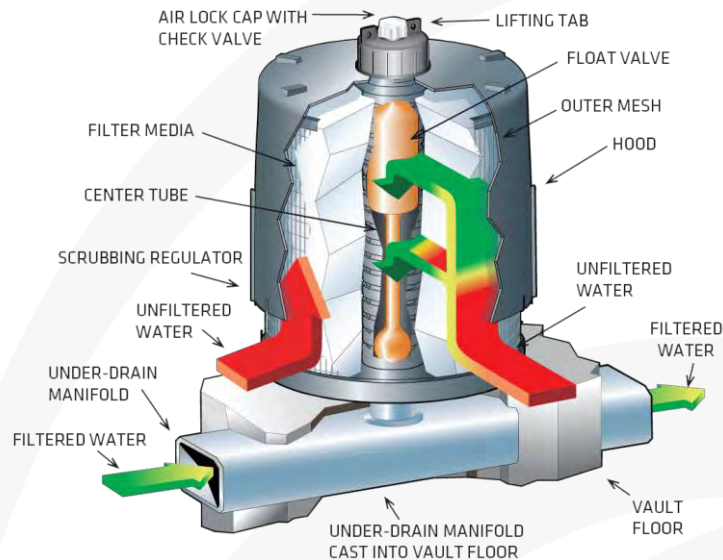
- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

During maintenance activities, it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site-specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

Whilst some aspects of StormFilter maintenance can be performed from surface level, there will be a need to enter the StormFilter system (confined space) during a major service. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry applications.

How does it Work?

Stormwater enters the cartridge chamber, passes through the filtration media and begins filling the cartridge center tube. When water reaches the top of the cartridge the float valve opens and filtered water is allowed to drain at the designed flow rate. Simultaneously, a one-way check valve closes activating a siphon that draws stormwater evenly throughout the filter media and into the center tube. Treated stormwater is then able to discharge out of the system through the underdrain manifold pipework.



As the rain event subsides, the water level outside the cartridge drops and approaches the bottom of the hood, air rushes through the scrubbing regulators releasing the water column and breaking the siphon. The turbulent bubbling action agitates the surface of the cartridge promoting trapped sediment to drop to the chamber floor. After a rain event, the chamber is able to drain dry by way of an imperfect seal at the base of the float valve.

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically, the StormFilter requires an inspection every 6 months with a minor service at 12 months. Additionally, as the StormFilter cartridges capture pollutants the media will eventually become occluded and require replacement (expected media life is 1-3 years).

Primary Types of Maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the StormFilter.

	Description of Typical Activities	Frequency
Inspection	Visual Inspection of cartridges & chamber Remove larger gross pollutants Perform minimal rectification works (if required)	Every 6 Months
Minor Service	Evaluation of cartridges and media Removal of accumulated sediment (if required) Wash-down of StormFilter chamber (if required)	Every 12 Months
Major Service	Replacement of StormFilter cartridge media	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Inspection

The purpose of the inspecting the StormFilter system is to assess the condition of the StormFilter chamber and cartridges. When inspecting the chamber, particular attention should be taken to ensure all cartridges are firmly connected to the connectors. It is also an optimal opportunity to remove larger gross pollutants and inspect the outlet side of the StormFilter weir.

Minor Service

This service is designed to ensure the ongoing operational effectiveness of the StormFilter system, whilst assessing the condition of the cartridge media.

1. Establish a safe working area around the access point(s)
2. Remove access cover(s)
3. Evaluate StormFilter cartridge media (if exhausted schedule major service within 6 months)
4. Measure and record the level of accumulated sediment in the chamber
(if sediment depth is less than 100 mm skip to step 9)
5. Remove StormFilter cartridges from the chamber
6. Use vacuum unit to removed accumulated sediment and pollutants in the chamber
7. Use high pressure water to clean StormFilter chamber
8. Re-install StormFilter cartridges
9. Replace access cover(s)

Major Service (Filter Cartridge Replacement)

For the StormFilter system a major service is reactionary process based on the outcomes from the minor service, specifically the evaluation of the cartridge media.

Trigger Event	Maintenance Action
Cartridge media is exhausted ^[1]	Replace StormFilter cartridge media ^[2]

[1] Multiple assessment methods are available, contact Ocean Protect for assistance

[2] Replacement filter media and components are available for purchase from Ocean Protect.

This service is designed to return the StormFilter device back to optimal operating performance

1. Establish a safe working area around the access point(s)
2. Remove access cover(s)
3. By first removing the head cap, remove each individual cartridge hood to allow access to the exhausted media.
4. Utilise a vacuum unit to remove exhausted media from each cartridge
5. Use vacuum unit to remove accumulated sediment and pollutants in the chamber
6. Use high pressure water to clean StormFilter chamber
7. Inspect each empty StormFilter cartridges for any damage, rectify damage as required
8. Re-fill each cartridge with media in line with project specifications
9. Re-install replenished StormFilter cartridges
10. Replace access cover(s)

Additional Types of Maintenance

Occasionally, events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the StormFilter unit should be inspected and cleaned. Specifically, all captured pollutants and liquids from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. Additionally, it will be necessary to inspect the filter cartridges and assess them for contamination, depending on the type of spill event it may be necessary to replace the filtration media.

Blockages

In the unlikely event that flooding occurs upstream of the StormFilter system the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

1. Inspect the upstream diversion structure (if applicable) ensuring that it is free of debris and pollutants
2. Inspect the StormFilter unit checking the underdrain manifold as well as both the inlet and outlet pipes for obstructions (e.g. pollutant build-up, blockage), which if present, should be removed.

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the StormFilter after a major storm event. The focus is to inspect for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary damaged components should be replaced and accumulated pollutants should be removed and disposed.

Disposal of Waste Materials

The accumulated pollutants found in the StormFilter must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filter media has been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

Maintenance Services

With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our StormFilter system we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement media for cartridges.

For more information please visit www.OceanProtect.com.au



StormFilter
Technical Design Guide

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Introduction

The Ocean Protect StormFilter® is an underground stormwater treatment device comprised of one or more structures that house rechargeable, media-filled cartridges that trap particulates and adsorb pollutants from stormwater runoff such as total suspended solids, hydrocarbons, nutrients, metals, and other common pollutants.

With media options to target multiple or specific pollutants, multiple system configurations, and field and laboratory performance verified by the most stringent stormwater technology evaluation organisations, the StormFilter provides engineers with the most flexible and reliable manufactured treatment technology available.

Operational Overview

During a storm, runoff percolates through the filtration media and starts filling the cartridge central tube. The air inside the hood is purged through a one-way check valve as the water rises. When water reaches the top of the float, buoyant forces pull the float free and allow filtered water to exit the cartridge.

A siphon is established within each cartridge that draws water uniformly across the full height of the media profile ensuring even distribution of pollutants and prolonged media longevity.

As the storm subsides and the water level in the structure starts falling, a hanging water column remains under the cartridge hood until the water level reaches the scrubbing regulators at the bottom of the hood. Air then rushes through the regulators breaking the siphon and creating air bubbles that agitate the surface of the filter media causing accumulated sediment to settle on the treatment bay floor. This unique surface-cleaning mechanism helps prevent surface blinding and further extends cartridge life.

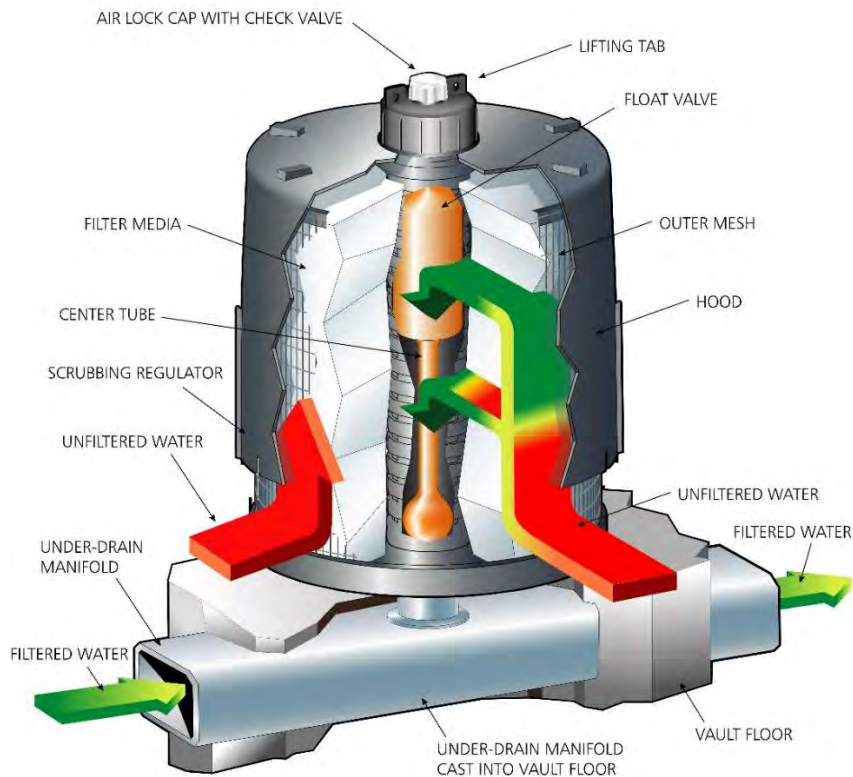


Figure 1: StormFilter cartridge components

Features

Media Options

The StormFilter system has the ability to operate with a variety of media options. These options are designed to target site or regulatory specific requirements. The current range of options is as follows:

- PhosphoSorb™
- ZPG™
- Perlite

PhosphoSorb™ (PSorb) media is the most advanced option available and is suited to most applications. Produced locally in Australia by Ocean Protect, PSorb achieves the optimum combination of pollutant removal and cost-effective treatment.

PSorb is a lightweight Perlite-based media coated in activated alumina. It removes Total Suspended Solids and Nutrients including some soluble forms of both Nitrogen and Phosphorus. PSorb media was developed to improve not only performance but also to provide a longer service life and to reduce OH&S risk by drastically reducing cartridge weight.

The other primary media option utilised by Ocean Protect is our ZPG™ media. It consists of Perlite, Zeolite and Granular Activated Carbon and was Ocean Protect's original regulatory approved media for treating Total Suspended Solids and Nutrients.

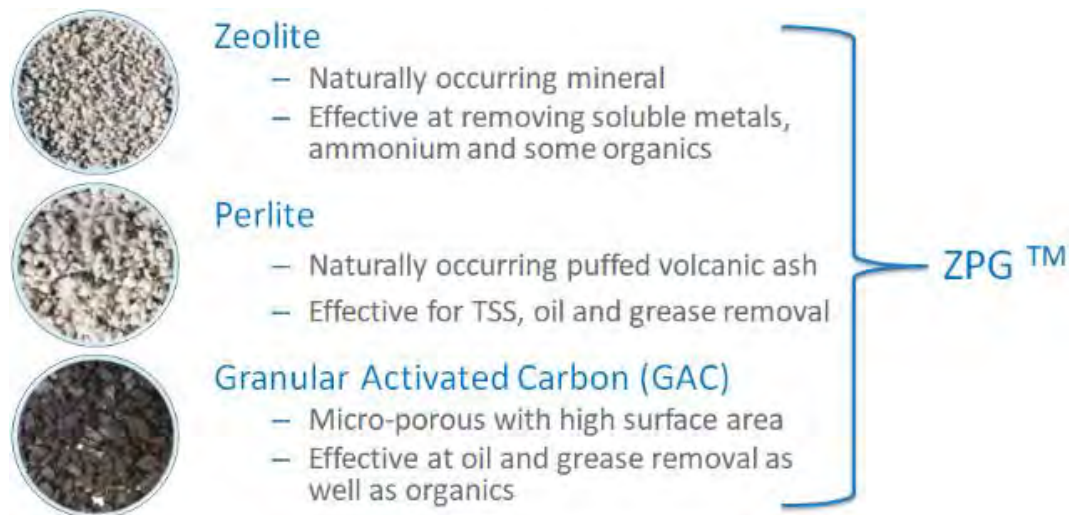


Figure 2: ZPG Media Overview

Cartridge Options

The StormFilter cartridge is available in three size options 310, 460 and 690 (Refer Table 1). The 690 StormFilter cartridge delivers most cost effective solution within these options. It has the highest flow rate and the largest filtration surface area and sediment capacity, however it requires a greater head loss and physical height to achieve this. In comparison the 460 and 310 cartridge options are best utilised when either physical height or head loss are a limiting factor.

The physical height of the cartridge must not be confused with the cartridge naming convention. Refer to table 1 for the physical cartridge height when needing to utilise the StormFilter cartridges in a shallow height unit.

The flow rate through each cartridge media option is controlled by a flow restrictor disc (orifice) that is located at the base of each cartridge. Reducing the flow rate across the uniform media depth increases pollutant removal and the Mass Load Capacity of each cartridge.

Cartridge Name / Siphon Height (mm)	690	460	310
Physical Height (H) mm	840	600	600
Typical Weir Height from outlet (Head Loss, mm)	920	690	540
Flow Rate ZPG (L/s)	1.60	1.10	0.70
Flow Rate PSorb (L/s)	0.90	0.46	0.39

Table 1: StormFilter cartridge details

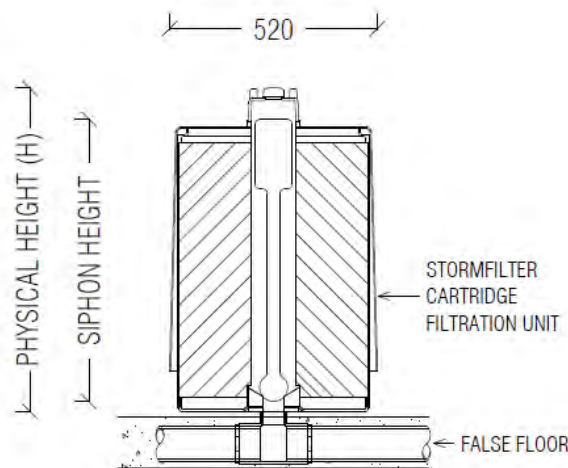


Figure 3: StormFilter cartridge dimensions

Configurations

The StormFilter cartridge system can be housed in a variety of ways such that it suits the site specific requirements for flowrate, hydraulics, accessibility and footprint restrictions. The standard configurations offered by Ocean Protect include pre-cast concrete tanks, detention and above ground pre-fabricated tanks.

Pre-cast concrete StormFilter systems can house the cartridges within manholes, pits or vaults. These systems are simple to install, as they arrive on site after being manufactured offsite to suit site specific requirements (pipe size, inlet/outlet orientation, levels etc.).



Figure 4: Pre-cast concrete manholes

Alternatively detention tanks constructed for water quantity requirements, can incorporate the StormFilter system into the design. Typically a separated water quality chamber (cartridge bay area) is constructed inside the larger tank. With this approach Ocean Protect performs the installation of the underdrain pipework manifold within the chamber, including the encasement of it in a concrete false floor.

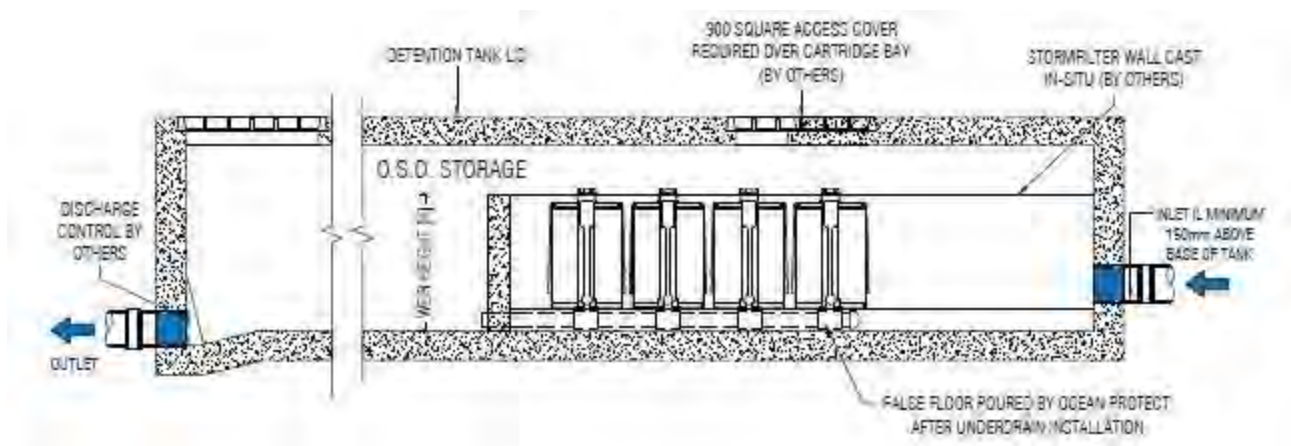


Figure 5: Detention system, sectional view

Above ground pre-fabricated tanks are also available, and are ideal for utilisation when treating downpipe flows. Often utilised when space is limited (boundary to boundary) they are available in both aluminium and HDPE and are custom built to suit the site specific requirements.



Figure 6: Aluminium StormFilter tank

Performance and Select Approvals

While laboratory testing provides a means to generate hydraulic and basic performance data, all filtration devices should also be complemented with long-term field data evaluations. As a minimum, field studies should generally comply with a recognised field testing protocol, for example, the Technology Acceptance Reciprocity Partnership (TARP) or the Technology Assessment Protocol – Ecology (TAPE) in the USA.

To be considered valid, all field monitoring programs should be peer reviewed by a reputable third party and replicate local pollutant concentrations including soluble fractions of nutrients together with rainfall. Ocean Protect has undertaken such field testing both locally in Australia and overseas, copies of the supporting articles are available upon request.

Globally there are over 220,000 StormFilter cartridges installed and since 2001 the StormFilter system has been successfully installed in a variety of applications to meet regulatory requirements set by authorities throughout Australia.

Specifically StormFilter has been accepted by some of the most stringent stormwater quality regulators around the globe including;

- Brisbane City Council
- Gold Coast City Council
- Blacktown City Council
- Washington State Department of Ecology (TAPE) GULD – Basic, Phosphorus
- New Jersey Department of Environmental Protection (NJ DEP)
- North Carolina Department of Environmental Quality (NC DEQ)
- Maine Department of Environmental Protection (ME DEP)

Please contact your Ocean Protect representative to obtain the StormFilter approval status in your area.

Maintenance

All stormwater quality improvement devices require routine maintenance. The question is how often and how much it will cost. Proper evaluation of long-term maintenance costs should be a consideration when selecting a treatment device. The StormFilter has been optimized to reduce long-term maintenance costs with proven, repeatable performance in the laboratory and in the field.

Reduce Life Cycle Costs

StormFilter has been designed for predictable maintenance intervals ranging from 1 to 3 years, resulting in fewer maintenance events and reduced life-cycle costs compared to other filtration devices.

Easy to maintain

All StormFilter structures provide access for inspection, media replacement, and washing of the structure. Visual indicators for maintenance are observable from the surface. Our Cartridge replacement program provides refurbished cartridges that are shipped to your site ready to install. Ocean Protect arranges for empty cartridges to be picked up and shipped back, reducing cartridge costs and environmental impact.

Maintenance support

Ocean Protect provides flexible options and contract terms. A detailed maintenance guide and mass load calculation spreadsheet is available upon request.

For further information please refer to the StormFilter Operations and Maintenance Manual ([click here](#)).

Design Basics

The design requirements of any StormFilter system is detailed in 3 typical steps.

1. Hydraulic Design
2. Water Quality Design
3. Mass Load Design

1. Hydraulic Design

All StormFilters must be designed to ensure that the hydraulic requirements of the system are met without adversely impacting the upstream hydraulics (limiting the likelihood of localised flooding). Table 1 (page 4) details the head loss for each cartridge size option. The designer must initially select a cartridge option and ensure the corresponding head loss can be catered for.

For a StormFilter system head loss does not have to equal head drop. If the head loss is not able to be fully achieved through a differential of height between the inlet and outlet pipes, then a minimum head drop of 100mm is required across the system with the balance of the head loss being impacted upstream. The minimum head drop is required to ensure that all inlet pipes enter the chamber above the concrete false floor.

StormFilter cartridges have a unique backflush mechanism that is passively activated at the end of each storm peak to increase the longevity of each cartridge. Consequently, captured pollutants are stored within the system and in order to minimise scour peak flows into the cartridge bay need to be limited. Specifically when peak flows surpass 80-100L/s StormFilter cartridges need to be arranged off-line.

It is also necessary to consider the impacts that tail water/submergence has on all stormwater treatment devices. In order to maintain an effective driving head for the StormFilter system the weir height should be adjusted accordingly. Please be aware that permanent submergence will blind all stormwater treatment devices utilising media. In the case of the StormFilter system, regardless of the storm intensity/duration the system will always drain relatively dry.

2. Water Quality Design

Ocean Protect recommends and uses the widely endorsed Model for Urban Stormwater Improvement Conceptualisation (MUSIC), which makes it easy to correctly sizing an appropriate StormFilter system for your site.

A complimentary design service which includes MUSIC modelling is provided by the Ocean Protect engineering team. Simply email your project details to design@oceanprotect.com.au or alternatively you can always call one of our engineers for a discussion or to arrange a meeting in your office. The team will provide you with an efficient design containing details of the devices required to meet your water quality objectives together with budget estimates, product drawings and the MUSIC (.sqz) file.

Alternatively, you can download the MUSIC treatment nodes for the Ocean Protect products from our website (www.oceanprotect.com.au).

When designing/modelling a StormFilter system for water quality purposes in MUSIC, two (2) treatment nodes are typically utilised in series. These are the detention/sedimentation node located immediately upstream of a generic treatment node.

For the detention node there are a number of parameters that need to be entered to ensure the node is representative of its effectiveness within the treatment train: surface area, extended detention depth, k-values, equivalent pipe diameter etc. For guidance on all of these variables please refer to the StormFilter design pack or contact Ocean Protect.

For the StormFilter system the generic treatment node is utilised with relevant removal efficiencies inserted. These parameters can vary based on the jurisdiction (authority) of your project, relevant details can be obtained from Ocean Protect. The high-flow bypass figure is adjusted within the node to represent the treatable flow rate required to obtain water quality targets. Once finalised this figure can be divided by the relevant cartridge flow rate to obtain the number of cartridges.

All details such as drawings, specifications and maintenance manuals can also be downloaded for integration into your project's documentation. Additionally the Ocean Protect team is available to review your model and provide additional assistance and guidance on the configuration of the StormFilter system(s) for your project.

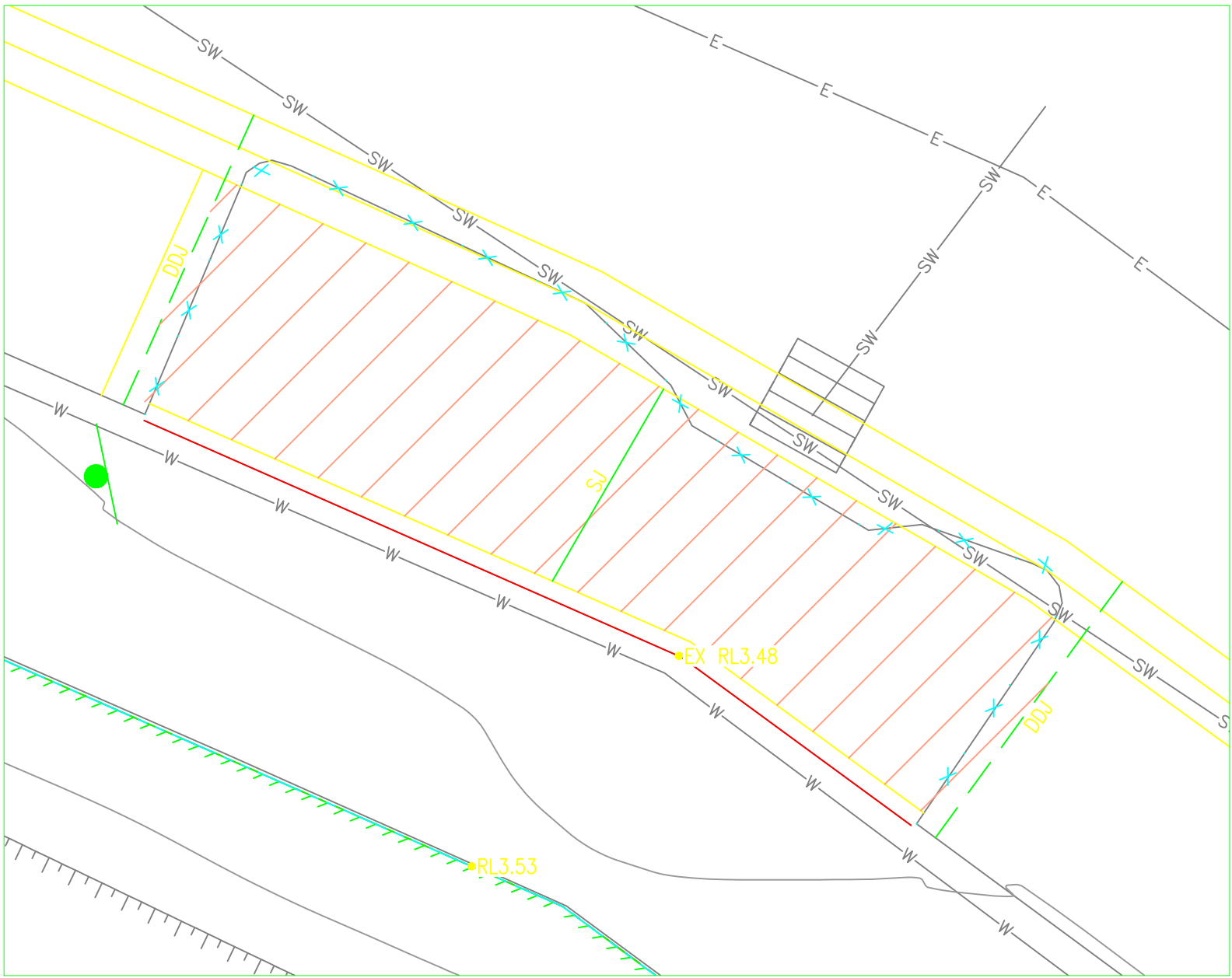
3. Mass Load Design

At the completion of your water quality design process (as above) it is necessary that maintenance frequency is considered in order to prevent excessive ongoing maintenance requirements. Ocean Protect recommends a minimum maintenance frequency of 12 months.

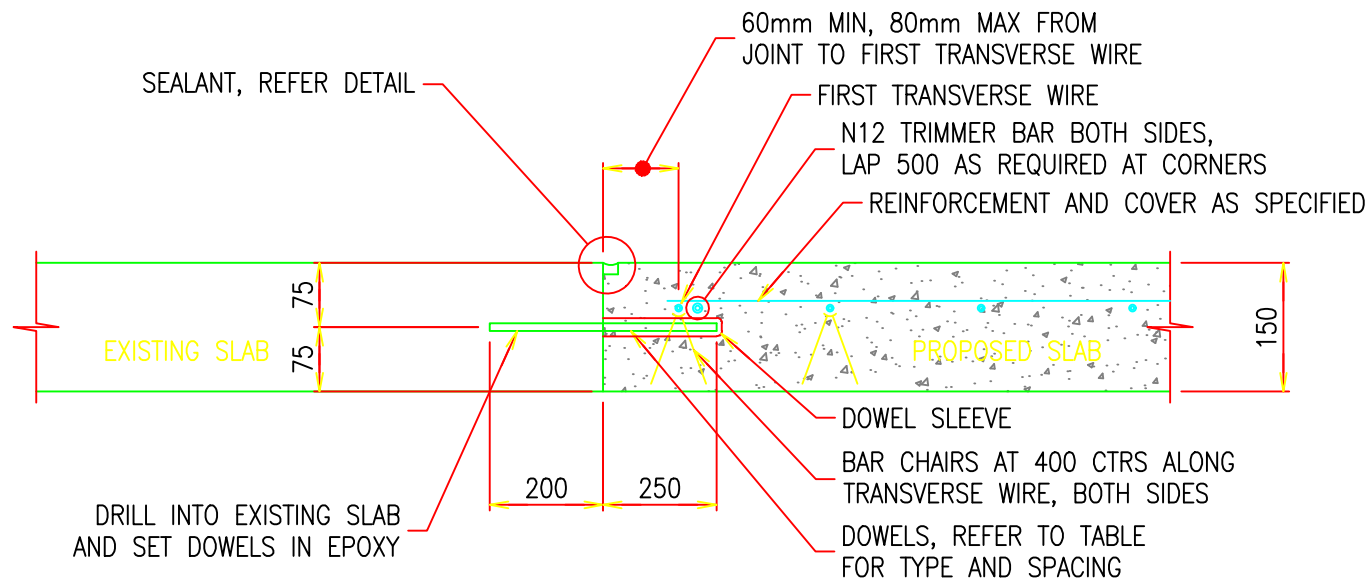
All filtration devices occlude overtime, consequently they have a maximum sediment capacity (TSS load). By analysing the mean annual load figures for the StormFilter generic treatment node, the total annual retained TSS can be determined. To determine the minimum cartridge quantity required by mass load design, the annual retained TSS should be divided by the relevant cartridge sediment capacity. The Ocean Protect team can provide assistance and details on this process.

In determining the final cartridge quantity for your project, you must utilise the largest number of cartridges obtained from undertaking Water Quality and Mass Load design steps.

Appendix G Pavement Construction and Signage Plan



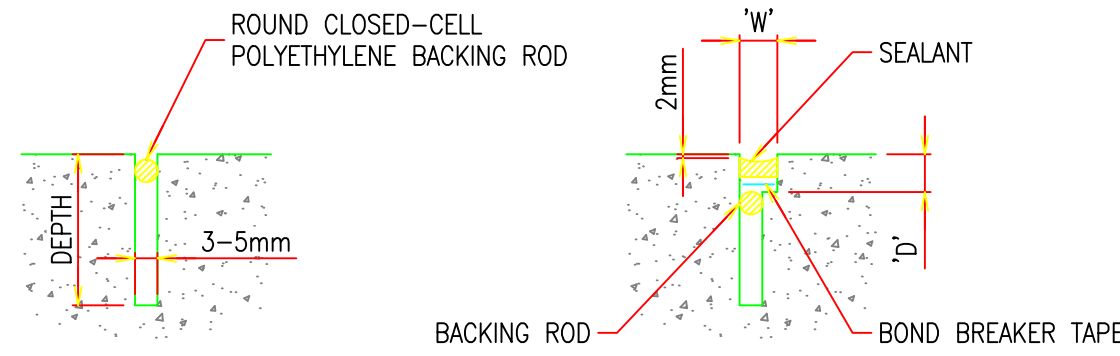
INSET
SCALE 1:50



DRILLED DOWEL JOINT (DDJ) DETAIL
SCALE 1:10

NOTES

- WHERE EXISTING SLAB TOP EDGE IS BADLY CHIPPED SAW CUT PARALLEL TO EDGE AND REMOVE.
- CBR AND TRAFFIC LOADING FOR PAVEMENT TO MATCH EXISTING.



STEP 1
SAWN JOINT CUT AND SEALANT DETAILS
SCALE 1:10

STEP 1:

INITIAL CUT TO DEPTH 'T'/4 WITHIN 1 DAY OF POURING CONCRETE. INSERT POLYURETHANE BACKING ROD TO PREVENT INGRESS OF DIRT UNTIL SEALANT APPLIED (MIN 28 DAYS LATER). ROD DIAMETER TO BE MIN. 1.25 x CUT WIDTH.

STEP 2:

REMOVE ALL DIRT FROM SAW CUT, USING HIGH PRESSURE COMPRESSED AIR. REPLACE BACKING ROD WITH LARGER DIAMETER IF LOOSE. PUSH BACKING ROD INTO SAW CUT 1mm BELOW DEPTH 'D'. IF NECESSARY, REMOVE AND REPLACE BACKING ROD. WIDEN SAW CUT TO WIDTH 'W' AND DEPTH 'D' WITH ADDITIONAL SAW CUT/CUTS. REMOVE ALL FOREIGN MATERIAL USING HIGH PRESSURE WATER WASH. DRY USING HIGH PRESSURE COMPRESSED AIR AND ALLOW ADDITIONAL 16 HRS TO DRY THOROUGHLY. INSTALL POLYETHYLENE BOND BREAKER TAPE. PRIME FACES OF CUT CONCRETE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS INSTALL SEALANT AS SPECIFIED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. 'W' AND 'D' NOTED IN STEP 2 ABOVE ARE DEPENDENT ON THE SEALANT MANUFACTURERS REQUIREMENTS AND THE JOINT SPACING. RBG HAVE APPROVED THE SEALANTS AND PRIMERS SHOWN IN THE ATTACHED TABLES. IF THE CONTRACTOR WISHES TO USE A DIFFERENT SEALANT TYPE, THE CONTRACTOR IS TO PROVIDE RBG WITH FULL DETAILS OF THE MANUFACTURERS REQUIREMENTS INCLUDING A TABLE OF JOINT DIMENSIONS FOR DIFFERENT JOINT SPACING FOR RBG APPROVAL.

SEALANT/PRIMER TYPES		
LOCATION	SEALANT	PRIMER
AREAS SUBJECT TO FUEL SPILLAGE	THIOFLEX 600	FOSROC PRIMER 14
OTHER EXTERNAL PAVEMENTS	EMER-ROAD SEAL SL	FOSROC PRIMER 10

NOTES

ALTERNATIVE SEALANTS MUST HAVE:

- MOVEMENT ACCOMMODATION FACTOR +/- 50%
- PRIMER TO MANUFACTURER'S SPECIFICATION
- INSTALLATION TO MANUFACTURER'S RECOMMENDATIONS
- PRIOR APPROVAL BY SUPERINTENDENT.

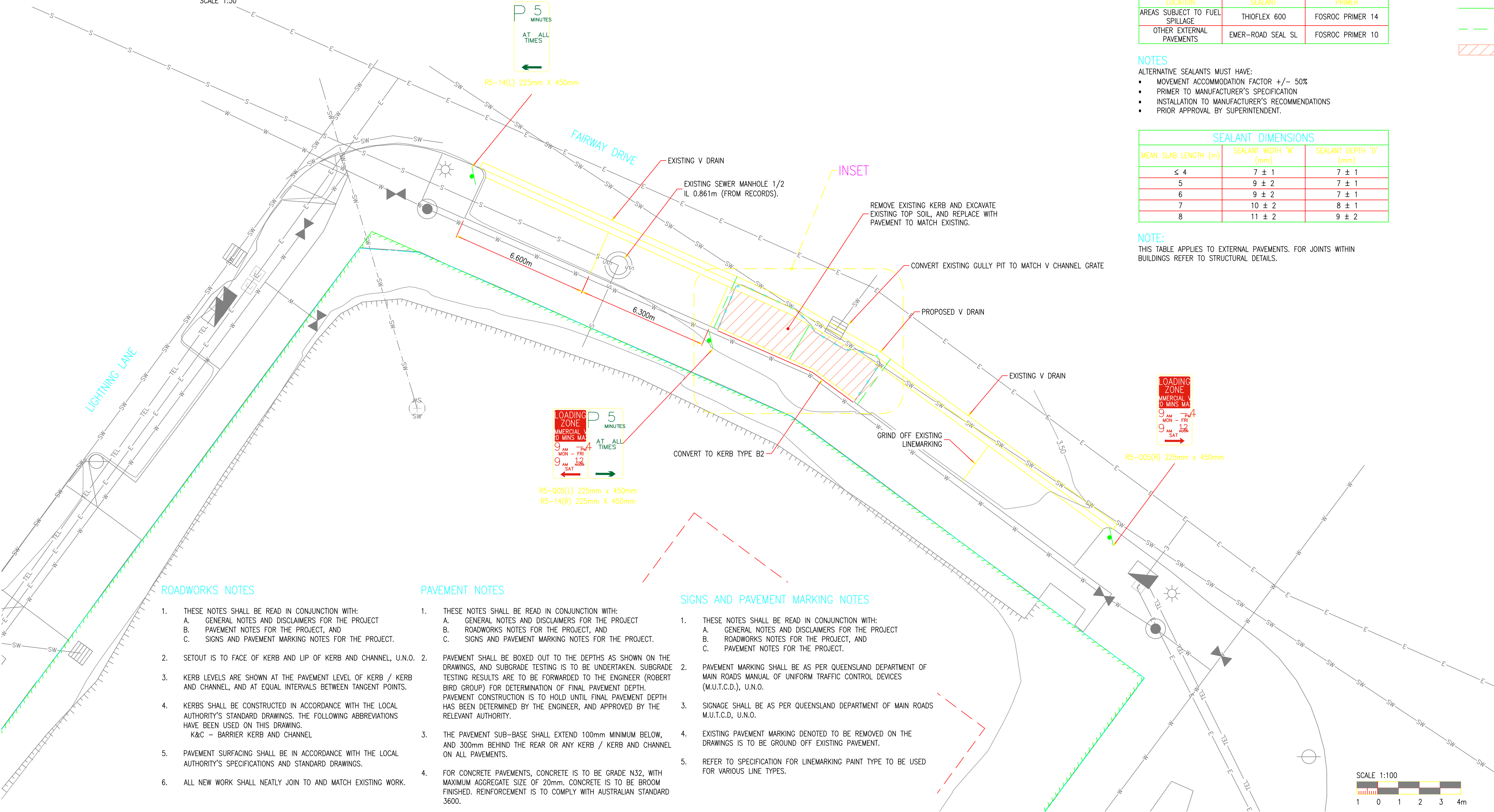
SEALANT DIMENSIONS		
MEAN SLAB LENGTH (m)	SEALANT WIDTH 'W' (mm)	SEALANT DEPTH 'D' (mm)
≤ 4	7 ± 1	7 ± 1
5	9 ± 2	7 ± 1
6	9 ± 2	7 ± 1
7	10 ± 2	8 ± 1
8	11 ± 2	9 ± 2

NOTE:

THIS TABLE APPLIES TO EXTERNAL PAVEMENTS. FOR JOINTS WITHIN BUILDINGS REFER TO STRUCTURAL DETAILS.

LEGEND

	EXISTING KERB RAMP
	EXISTING BANK
	EXISTING GAS MAIN
	EXISTING TELSTRA CABLE
	EXISTING ELECTRICITY LINE
	EXISTING STORMWATER PIPE
	EXISTING STORMWATER MAINTENANCE HOLE
	EXISTING SEWER MAIN
	EXISTING SEWER MAINTENANCE HOLE
	EXISTING WATER MAIN
	EXISTING BOUNDARY
	EXISTING KERB TO BE REMOVED
	PROPOSED SIGNAGE
	PROPOSED CHANNEL
	PROPOSED KERB
	PROPOSED BUILDING OUTLINE
	PROPOSED SAWN JOINT
	PROPOSED SAW CUT OF EXISTING CONCRETE, AND DRILLED DOWEL JOINT
	PROPOSED PAVEMENT TYPR C6



ROADWORKS NOTES

- THESE NOTES SHALL BE READ IN CONJUNCTION WITH:
 - GENERAL NOTES AND DISCLAIMERS FOR THE PROJECT
 - PAVEMENT NOTES FOR THE PROJECT, AND
 - SIGNS AND PAVEMENT MARKING NOTES FOR THE PROJECT.
- SETOUT IS TO FACE OF KERB AND LIP OF KERB AND CHANNEL, U.N.O.
- KERB LEVELS ARE SHOWN AT THE PAVEMENT LEVEL OF KERB / KERB AND CHANNEL, AND AT EQUAL INTERVALS BETWEEN TANGENT POINTS.
- KERBS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LOCAL AUTHORITY'S STANDARD DRAWINGS. THE FOLLOWING ABBREVIATIONS HAVE BEEN USED ON THIS DRAWING.
K&C - BARRIER KERB AND CHANNEL
- PAVEMENT SURFACING SHALL BE IN ACCORDANCE WITH THE LOCAL AUTHORITY'S SPECIFICATIONS AND STANDARD DRAWINGS.
- ALL NEW WORK SHALL NEATLY JOIN TO AND MATCH EXISTING WORK.

PAVEMENT NOTES

- THESE NOTES SHALL BE READ IN CONJUNCTION WITH:
 - GENERAL NOTES AND DISCLAIMERS FOR THE PROJECT
 - ROADWORKS NOTES FOR THE PROJECT, AND
 - SIGNS AND PAVEMENT MARKING NOTES FOR THE PROJECT.
- PAVEMENT SHALL BE BOXED OUT TO THE DEPTHS AS SHOWN ON THE DRAWINGS, AND SUBGRADE TESTING IS TO BE UNDERTAKEN. SUBGRADE TESTING RESULTS ARE TO BE FORWARDED TO THE ENGINEER (ROBERT BIRD GROUP) FOR DETERMINATION OF FINAL PAVEMENT DEPTH. PAVEMENT CONSTRUCTION IS TO HOLD UNTIL FINAL PAVEMENT DEPTH HAS BEEN DETERMINED BY THE ENGINEER, AND APPROVED BY THE RELEVANT AUTHORITY.
- THE PAVEMENT SUB-BASE SHALL EXTEND 100mm MINIMUM BELOW, AND 300mm BEHIND THE REAR OR ANY KERB / KERB AND CHANNEL ON ALL PAVEMENTS.
- FOR CONCRETE PAVEMENTS, CONCRETE IS TO BE GRADE N32, WITH MAXIMUM AGGREGATE SIZE OF 20mm. CONCRETE IS TO BE BROOM FINISHED. REINFORCEMENT IS TO COMPLY WITH AUSTRALIAN STANDARD 3600.

SIGNS AND PAVEMENT MARKING NOTES

- THESE NOTES SHALL BE READ IN CONJUNCTION WITH:
 - GENERAL NOTES AND DISCLAIMERS FOR THE PROJECT
 - ROADWORKS NOTES FOR THE PROJECT, AND
 - PAVEMENT NOTES FOR THE PROJECT.
- PAVEMENT MARKING SHALL BE AS PER QUEENSLAND DEPARTMENT OF MAIN ROADS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.), U.N.O.
- SIGNAGE SHALL BE AS PER QUEENSLAND DEPARTMENT OF MAIN ROADS M.U.T.C.D., U.N.O.
- EXISTING PAVEMENT MARKING DENOTED TO BE REMOVED ON THE DRAWINGS IS TO BE GROUND OFF EXISTING PAVEMENT.
- REFER TO SPECIFICATION FOR LINEMARKING PAINT TYPE TO BE USED FOR VARIOUS LINE TYPES.

P1 PRELIMINARY DESIGN		MN IM 16.09.19	
Rev	Description	By	Date
1	1	1	1

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DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS
REFER TO GENERAL NOTES UNLESS NOTED OTHERWISE

Structural, Civil & Construction
Engineering Consultant

RobertBirdGroup
Member of the Surbana Jurong Group

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PRO INVEST GROUP

Project
HI EX SUNSHINE COAST

Title
**PAVEMENT CONSTRUCTION
AND SIGNAGE PLAN**

Date **SEPTEMBER 2019** Drawn **M.M.G.**
Scale at A1 Designer **M.M.G.**
1:100 Design Checker
Job Number Approved
19305C **L.McCUBBIN**

NOT FOR CONSTRUCTION

Drawing Number Revision

SKC-190916-MN-1



Robert
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Group

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