APPENDIX H

SBSWMP & Flood Assessment Report

Prepared by:

Burchills Engineering

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332 – 334 Water Street, Fortitude Valley

Conceptual Stormwater Management Plan

Client: Pellicano Living Pty Ltd
Project No: BE220298
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December 2023

The experience **you deserve**

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Executive Summary

Burchills Engineering Solutions were engaged by Pellicano Living Pty Ltd to prepare a Conceptual Stormwater Management Plan (CSMP) for the proposed multi-storey residential unit complex at 332-334 Water Street, Fortitude Valley, which consists of seven individual lots and are properly described as lots 1, 11, 12 & 13 on RP10552 and lots 5, 6 & 94 on SP266307.

This CSMP has been prepared in accordance with the Brisbane City Council City Plan 2014 (BCC, 2022) and has referenced relevant guidelines relating to stormwater management to form the conceptual basis of the design strategy. The following conclusions have been made as a result of this report.

Stormwater Quantity

- The Lawful Points of Discharge (LPD) for the site have been defined as the sites southern boundary.
- Runoff produced over catchment A will be conveyed by the internal stormwater network and road infrastructure to the proposed stormwater management devices. From these devices, stormwater will be discharged to Water Street in a controlled manner via kerb adapters.
- Proposed on-site detention required to meet kerb and channel flow limits are as follows:
    - Tank A: 185m^3
- To satisfy the flood overlay code, the minimum crest level to the basement carparking entrance must be above the 2% AEP overland flow flood level, 12.95 mAHD.
- The building hydraulic consultant should consider a suitable location for the detention tank to surcharge in the event of a blockage or rainfall event in excess of the 1% AEP.

Stormwater Quality

- To achieve Brisbane City Council’s Water Quality Objectives, it is proposed to use ATLAN’s proprietary treatment devices.
- The required devices are as follows:
    - Catchment A
        - Six (6) 600x600 ATLAN Stormsacks; and,
        - Three (3) ATLAN Filter Cartridges within one (1) ATLAN Vault Precast Concrete Tank

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1. Introduction

Burchills Engineering Solutions were engaged by Pellicano Living Pty Ltd to prepare a Conceptual Stormwater Management Plan for the proposed residential unit complex at 332-334 Water Street, Fortitude Valley, which is properly described as lots 1, 11, 12 & 13 on RP10552 and lots 5, 6 & 94 on SP266307 and is situated within the Brisbane City Council local government area.

The subject site is situated within the Brisbane City Council (BCC) Local Government Area (LGA) and is zoned by the BCC City Plan Version 24 as '*Emerging Community*'.

1.1 Background

1.1.1 Regulatory Requirements and Technical Guidelines

The strategies proposed in this CSMP have been developed to address the requirements of the BCC City Plan Version 24 (BCC, 2022), and have also been prepared in accordance with the following guidelines:

- SC6.16 Infrastructure design planning scheme policy BCC City Plan v.24 (BCC, 2022);
- *State Planning Policy July 2014* (DSPIP, 2014)*;*
- Queensland Urban Drainage Manual Fourth Edition (IPWEAQ, 2017);
- Australian Rainfall & Runoff: A Guide to Flood Estimation (Ball J, 2016);
- Australian Government – Bureau of Meteorology (Bureau of Meteorology, n.d.);
- MUSIC Modelling Guidelines (Water By Design, 2010);
- WSUD Technical Guidelines for South East Queensland – Version 1 (Healthy Waterways, BCC, MBWCP, 2006);
- Concept Design Guidelines for Water Sensitive Urban Design - Version 1 (Water By Design, 2009);
- Deemed to Comply Solutions – Stormwater Quality Management (Water By Design, 2010);
- Maintaining Vegetated Stormwater Assets - Version 1 (Water By Design, 2012);
- Bioretention Technical Design Guidelines - Version1.1 (Water By Design, 2014);
- Urban Stormwater Quality Planning Guidelines 2010 (DERM, 2010); and
- Best Practice Erosion and Sediment Control (IECA, 2008).

1.2 Purpose

The main objectives of this CSMP have been established from the criteria set out in the BCC City Plan SC6.16 (BCC, 2014) and are summarised as follows:

- Prevent or minimise adverse social, environmental, and flooding impacts on the city's waterways, overland flow paths and constructed drainage network;
- Achieve acceptable levels of stormwater run-off quantity and quality by applying total water cycle management and water sensitive urban design principles.

1.3 Scope

To achieve the above-mentioned objectives, this CSMP details the following:

- Site description including:
  - Topography;
  - Soils; and
  - Vegetation.
- Erosion and Sediment;
  - Best Practice Erosion and Sediment Control Measures (IECA 2008) for the construction phase of the development;
- Stormwater Quantity:
  - Control measures to ensure no net increase in peak discharge from the subject site (up to the 1% Average Exceedance Probability (AEP));
- Stormwater Quality:
  - Methods to ensure quality objectives of the receiving waters are achieved, and the existing hydrological regime is maintained to an acceptable level.

2. Site Details

2.1 Location

The subject site is located at 332 – 334 Water Street, Fortitude Valley and consists of seven individual lots which are properly described as lot 1 on RP10553, Lots 11 & 12 on RP10552, Lot 13 on RP81335 and lots 5, 6 & 94 on SP266307. The site has a combined area of 5,379m^2 and is zoned by the BCC City Plan Version 23 as '*Emerging Community*'.

A locality plan is provided in Figure 2.1 below, which details the location of the subject site.

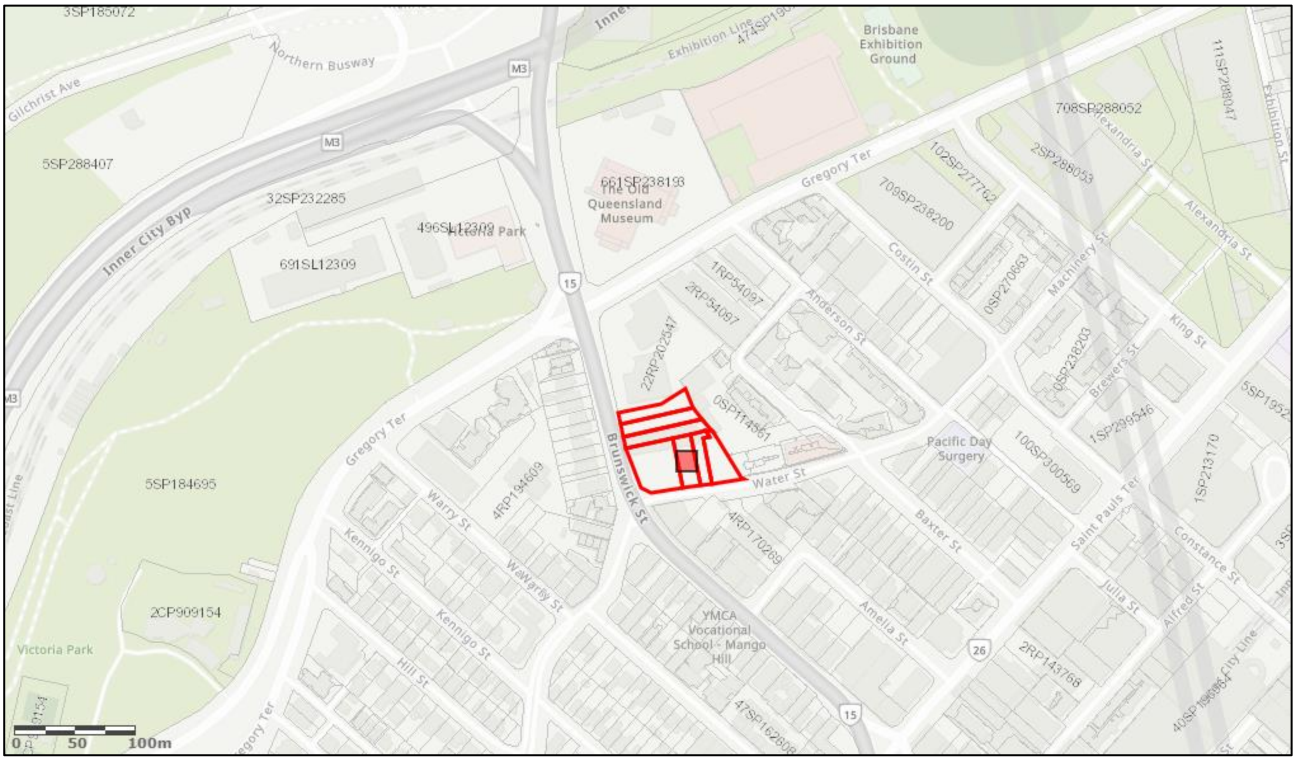


Figure 2.1 Site Locality Plan

2.2 Existing Land Uses and Vegetation

The subject site has been previously developed for commercial purposes however, buildings once present on the site have been demolished, leaving a site which is covered in hardstand and a partial basement structure. No vegetation is present on site.

The site is bound to the south by Water Street, to the west by Brunswick Street, to the north by multi-storey commercial building and to the east by a multi-storey residential unit complex. Figure 2.2 below provides an aerial photograph of the site in its current state.

Figure 2.2 Site Aerial Photograph

2.3 Existing Topography

The subject site generally grades towards the south east at approximately 5%. The highest point within the site is at the properties northern boundary at 20.1m AHD and the lowest on the southern boundary at 12.1m AHD. For further details regarding the catchment delineation, please refer to Appendix E.

2.4 Downstream Environment

Stormwater runoff from the site discharges via the properties southern boundary to kerb and channel infrastructure located in the Water Street road reserve. Stormwater is then conveyed within the kerb to the east along water street, before discharging to a gully pit adjacent the Water Street / Baxter Street intersection, which ultimately discharges into the Brisbane River.

2.4.1 Rainfall

The mean annual rainfall for the site has been estimated at 1011.5 mm from the data set obtained from the nearest Bureau of Meteorology (BOM) station number 040913 at Brisbane City.

2.5 Proposed Development

The development application proposes the establishment of a mixed-use development which will be spread across two, thirty-two storey highrise towers. The proposed development will deliver:

- 2677m^2 of commercial floor space spread across the ground floor and 5 commercial tenancies on level 2 of the Brunswick Street tower;
- 104 x Studio apartments in the Brunswick Street tower;
- 72 x 1 Bedroom apartments in the Brunswick Street tower;
- 54 x 2 Bedroom apartments in the Brunswick Street tower;
- 18 x 3 Bedroom apartments in the Brunswick Street tower;
- 115 x 1 Bedroom apartments in the Water Street tower;
- 86 x 2 Bedroom apartments in the Water Street tower;
- 27 x 1 Bedroom apartments in the Water Street tower;
- Residential amenities provided on the ground floor of the Water Street tower; and
- Residential, commercial and visitor parking spread across the ground level and three basement levels.

Figure 2.3 below provides an extract taken from the ground floor layout plan of the proposed development. For further details regarding the design of the proposed development, please refer to architectural drawings prepared by Woods Bagot Architects contained in Appendix A of this report.

Figure 2.3 Development Level 2 Floor Plan (Courtesy: Woods Bagot)

3. Stormwater Quantity Management

3.1 Overview

The following section of this report outlines the measures required to meet the above-mentioned objective in regard to stormwater quantity. In order to meet these objectives, it is necessary to ensure that post development discharge from the site will not create a worse situation for downstream property owners than that which existed prior to the development (i.e. non-worsening) (QUDM, 2017)

Considering that the pre-developed site is consists of 100% impervious area, the proposed development will not increase peak discharge from the site.

3.2 Drainage Catchment Parameters

Drainage catchments have been delineated using site survey, aerial imagery and development plans in the post developed scenario. Pre and post development catchment parameters are summarised in Table 3-1. Further catchment parameters used within the XP-SWMM model are included in Appendix C. Catchment plans are provided in Appendix E.

Table 3-1 Catchment Parameters

Scenario	Catchment ID	Total Area (ha)	Impervious %	Catchment Slope (%)
Pre-developed	A	0.539	100	5
Post-developed	A	0.539	86	5

3.2.1 Conveyance of Site Flows

In the current scenario, runoff from the site discharges via the site's south eastern boundary via overland sheet flow.

In the post-developed scenario, runoff produced over catchment A will be conveyed by the internal stormwater network and road infrastructure to the proposed stormwater management devices. From these devices, stormwater will be discharged to Water Street in a controlled manner via kerb adapters. Kerb adapters will be utilised to outlet stormwater discharge from the site as opposed to discharging directly into the existing stormwater infrastructure within Water Street. As the existing stormwater infrastructure within Water Street is comprised of a historical arch stormwater system, it was determined that it would not be appropriate to alter the existing infrastructure to allow for the proposed development flows to discharge directly into this system.

In the event of a blockage or events exceeding the 1% AEP, flows will discharge the site to Water Street via an emergency overland flow path.

Please refer to Burchill's Concept Drainage Plan, Drawing C300 in Appendix E.

3.2.2 Lawful Points of Discharge

The site has a single Lawful Point of Discharge (LPD) which has been defined for the subject site. Runoff produced over the site, currently discharges the site at the eastern extents of the southern boundary.

3.3 XP-SWMM Analysis

XP-SWMM (version 2019.1) software was utilised to model the performance of the proposed stormwater quantity control measures. This modelling software is a link-node model capable of performing hydrology and hydraulics of stormwater drainage systems simultaneously.

Laurenson's Hydrology has been adopted as the runoff routing method within XP-SWMM. Sub-catchment routing in this method is carried out using the Muskingum procedure, which is a storage routing method based on the storage equation.

Details of the assumptions and input parameters used within the XP-SWMM model inputs are included in Appendix C.

3.3.1 Rational Method Comparison

The Rational Method has been used to gain an initial understanding of the relative impact of the proposed development on peak flow rates at the site's LPD. The Rational Method is a basic method for assessing peak flow rates and is considered suitable given the catchment area is less than 500 ha and the time of concentration within the contributing catchments is less than 30 minutes (IPWEAQ, 2017).

It should be noted that although the Rational Method has been used as an initial estimate of site peak flows, it has not been used for the design of any mitigation measures nor has been used for calibration of the runoff XP-SWMM model. A comparison between the peak discharge values obtained using the Rational Method and the XP-SWMM model for the 1% AEP event at the Lawful Point of Discharge is contained in Table 3-2 below.

Table 3-2 Rational Method vs XP-SWMM Generated Peak Discharges

Scenario	Catchment ID	Rational (m^3/s)	XP-SWMM (m^3/s)	Difference (%)
Post-developed	A	0.44	0.40	9

The peak discharges generated by XP-SWMM and the Rational Method compare well and are considered acceptable for this assessment.

3.4 XP-SWMM Results

3.4.1 Performance of OSD

As mentioned above in Section 3.2.1 it was necessary to discharge site flow to Water St via kerb adapters as opposed to discharging directly to the existing stormwater infrastructure within Water Street. In order to be in accordance with the BCC Planning Scheme, it was required to mitigate peak discharge to allowable kerb adapter limits. Schedule 6.16 Infrastructure design planning scheme policy Chapter 7 Stormwater drainage – Part 7.6.3.1 Connection to kerb and channel of the BCC Planning Scheme limits discharge to the kerb and channel to 30L/s (0.03 m^3/s) per lot. To achieve this requirement peak discharge from the developed catchment (A) has been mitigated to 120L/s (0.12 m^3/s) in all events up to and including the 1% AEP. Considering that the predeveloped site was comprised of seven separate lots this was determined to be acceptable.

To confirm the performance of the proposed OSD system, a post-development model was constructed. These models were used to design detention systems to detain and mitigate post-developed flows to allowable discharge limits. A full range of events have been simulated for critical events.

A summary of the modelling results for different ARI events is contained in Table 3-3. Results of the modelling indicate the proposed system is capable of maintaining the pre-development peak discharges for the all storm events up to the 1% AEP event at LPD A.

Table 3-3 Post-Development (Mitigated) Peak Discharges from Catchment A

AEP Event (%)	Catchment A	
	Median Critical Event	Peak Discharge (m^3/s)

1%	10min TP4	0.117
2%	10min TP4	0.096
5%	10min TP5	0.086
10%	10min TP5	0.078
18%	10min TP3	0.070
39%	10min TP3	0.060
63%	15min TP4	0.050

3.5 On Site Detention (OSD) Details

The proposed OSD system is to be implemented to ensure a non-worsening of peak discharges at the LPD.

Table 3-4 below contains the details of the proposed OSD systems within the subject site.

Table 3-4 OSD Details

Detention ID	Outlet Structures		100yr ARI Total Detention Volume (m^3)
	Orifice	Kerb Adapter	
A1	0.15m dia. @ base	4 x 150mm wide x 100mm high	185

3.6 Surcharge Allowance

The building hydraulic consultant should consider a suitable location for the detention tank to surcharge in the event of a blockage or rainfall event in excess of the 1% AEP.

3.7 Overland Flow Flood Planning Area – Flood Assessment

Brisbane City Council's City Plan identifies the development site as being affected by overland flow flooding triggering a flood assessment for the site. Shown below in Figure 3.1 is an excerpt from the BCC City Plan flood overlay map indicating that Lot 11 on RP10552 is affected by overland flow.

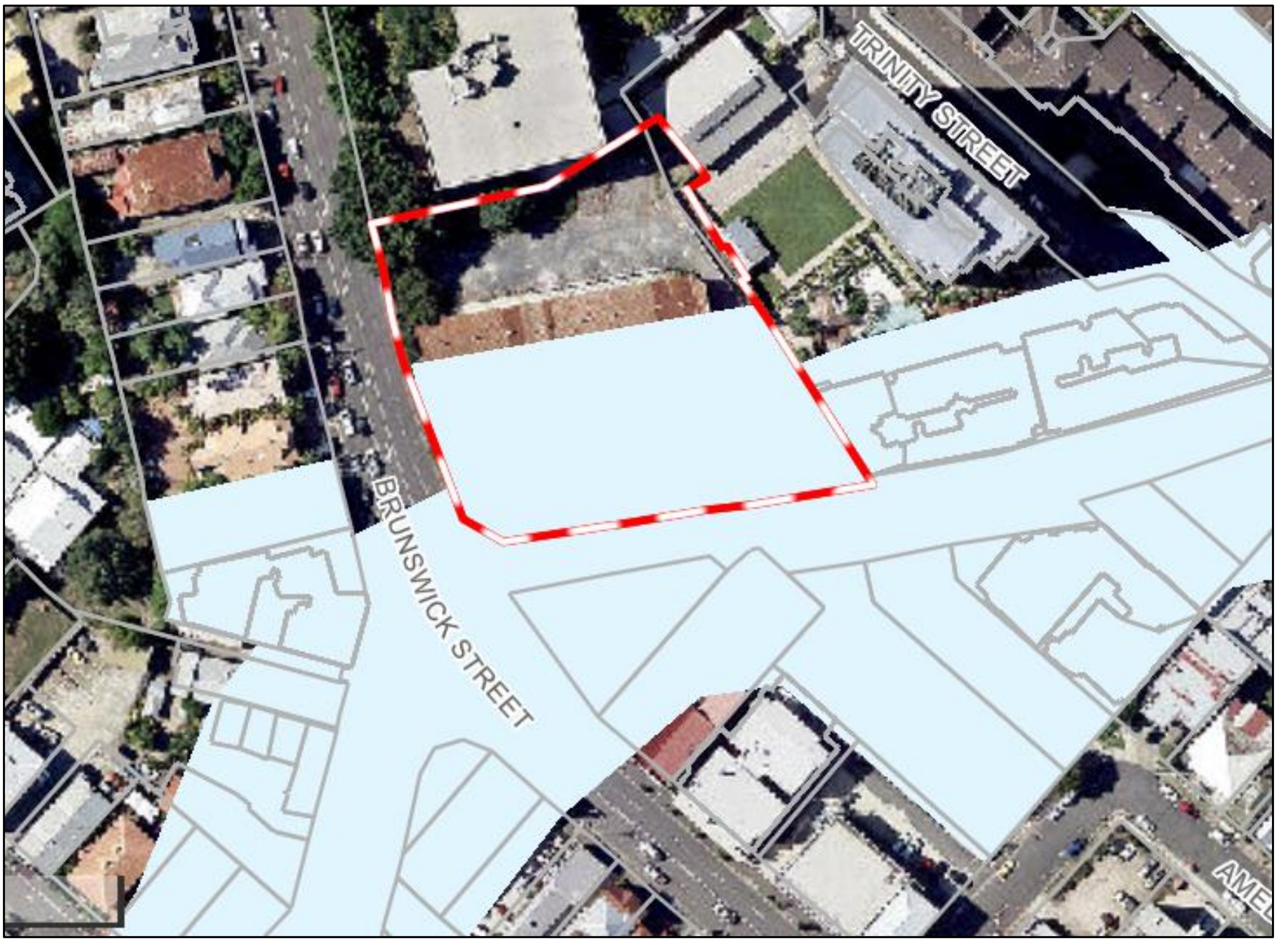


Figure 3.1 Overland Flow Flood Planning Area (Brisbane City Council, 2022)

The overland flow flood planning area is derived from the Citywide Creek and Overland Flow Path Mapping Flood Study which comprises of a series of 27 individual sub-models which cover the entire Brisbane City Council. As per Table 8.2.11.3.D—Flood planning categories for development types of the City Plan, the assigned design floor level for Basement parking entry is to be above the 2% AEP overland flood level + 300mm. The 2% AEP peak flood height data for the central sub-model was provided by BCC and the results were analysed. Mapping results indicate that only a small portion along the sites southern boundary is affected by the overland flow path through Water Street in the 2% AEP design event. Shown below in Figure 3.2 is the 2% AEP peak flood height for the overland flow event.

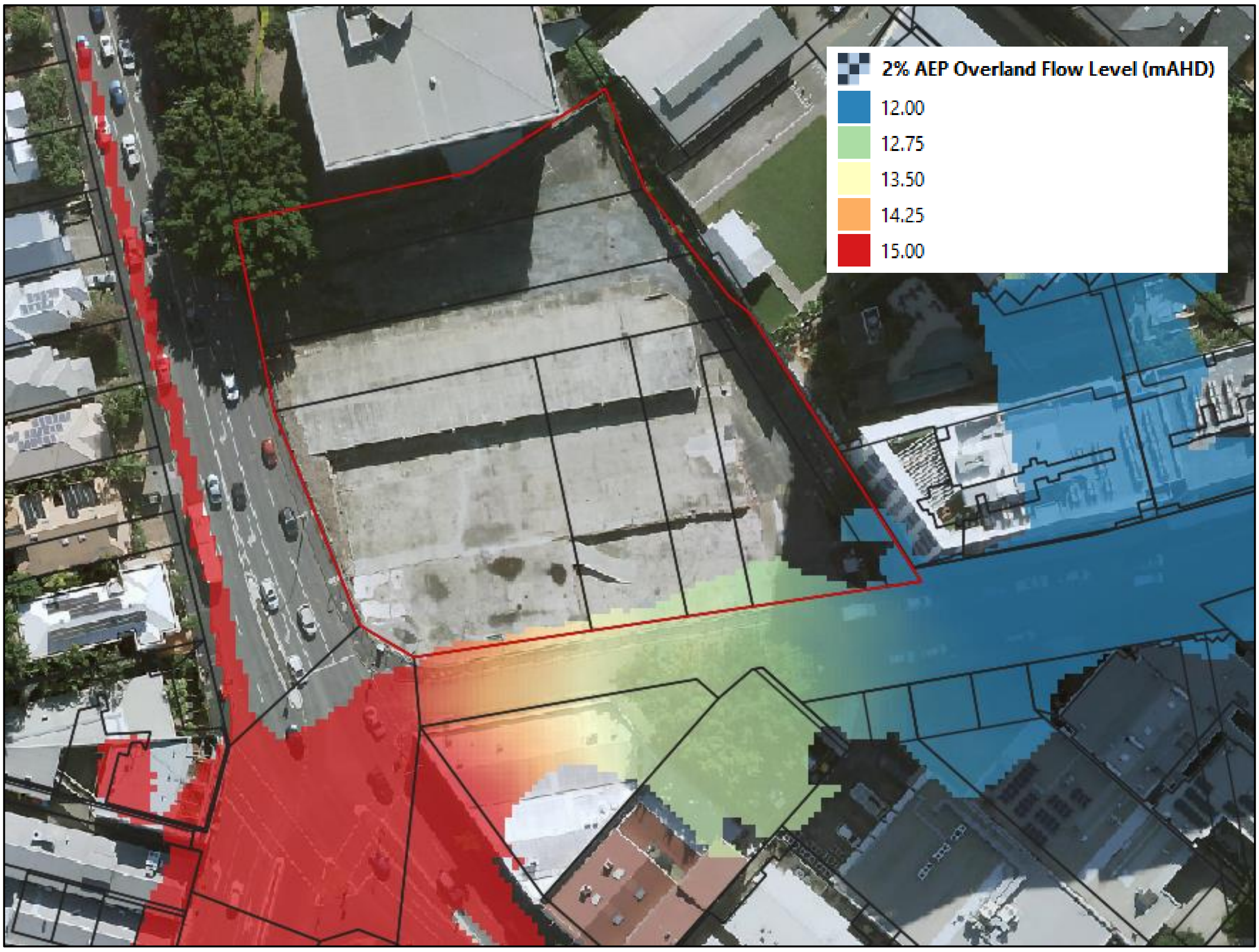


Figure 3.2 2% AEP Peak Overland Flow Flood Level (BCC, 2019)

Results indicate at the approximate location of the proposed basement carparking entry, the 2% AEP Overland Flow Flood Level is approximately 12.65 mAHD. To satisfy the the requirement of the BCC City plan the minimum design level for the access to the basement carparking is to be 12.95 mAHD. These values are summarised in Table 3-5 below.

Table 3-5 Design Flood Levels at Basement Carpark Entry

2% AEP Flood Level	12.65 mAHD
Design Flood Level	12.95 mAHD

Architectural design drawings indicate that the level at the entrance carpark is proposed to be 13.4 mAHD satisfying the minimum design level requirement. Shown below in Figure 3.3 is an extract from the architectural set indicating the proposed floor level at the basement car park entrance.

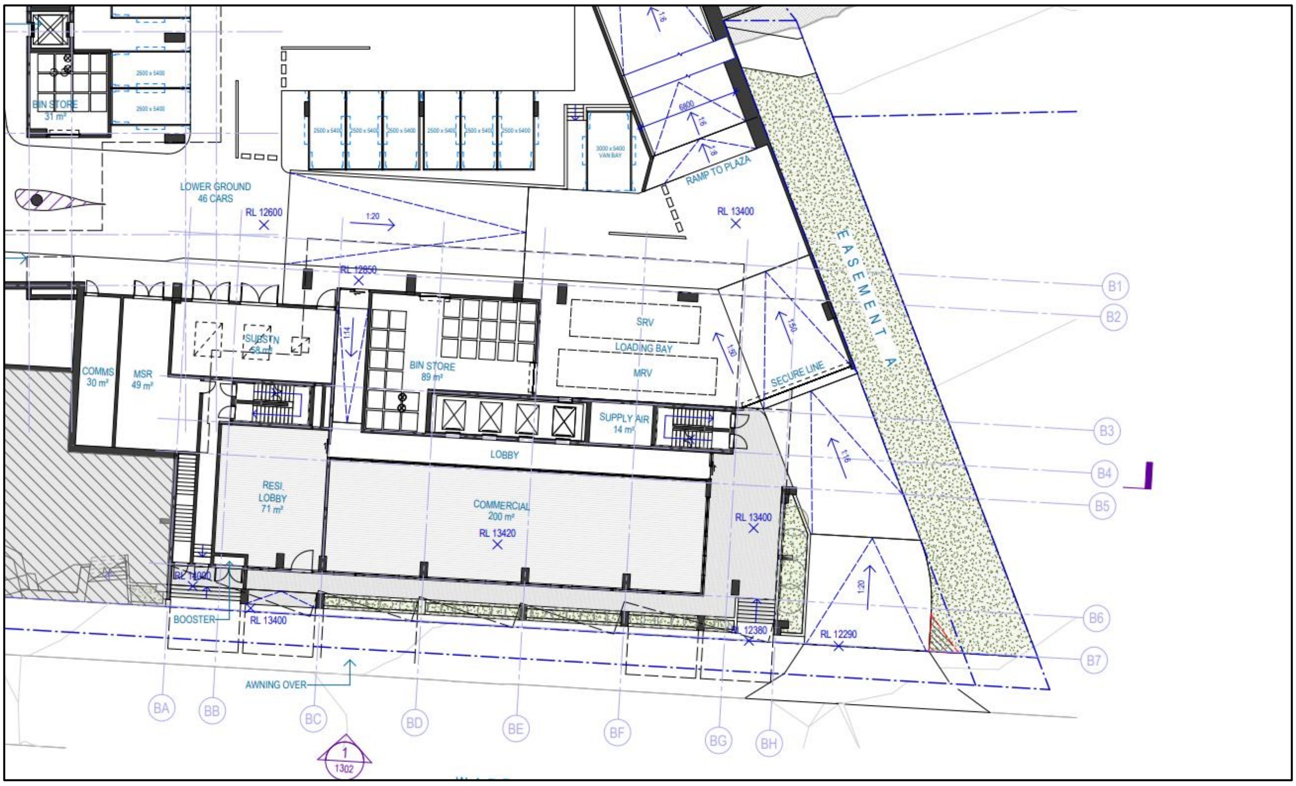


Figure 3.3 Proposed Basement Carpark Entrance Level (Woods Bagot, 2023)

It should be noted that as per the BCC City Plan, basement car parks must be suitably waterproofed and all air vents, air-conditioning ducts, pedestrian access and entry and exit ramps into the basement must comply with the applicable flood planning levels.

It is also recommended that all critical infrastructure is protected against or set above the 1% AEP overland flow flood level. Shown below in Figure 3.4 are the 1% AEP flood levels overlayed on the proposed architectural drawing for level 1 of the development.

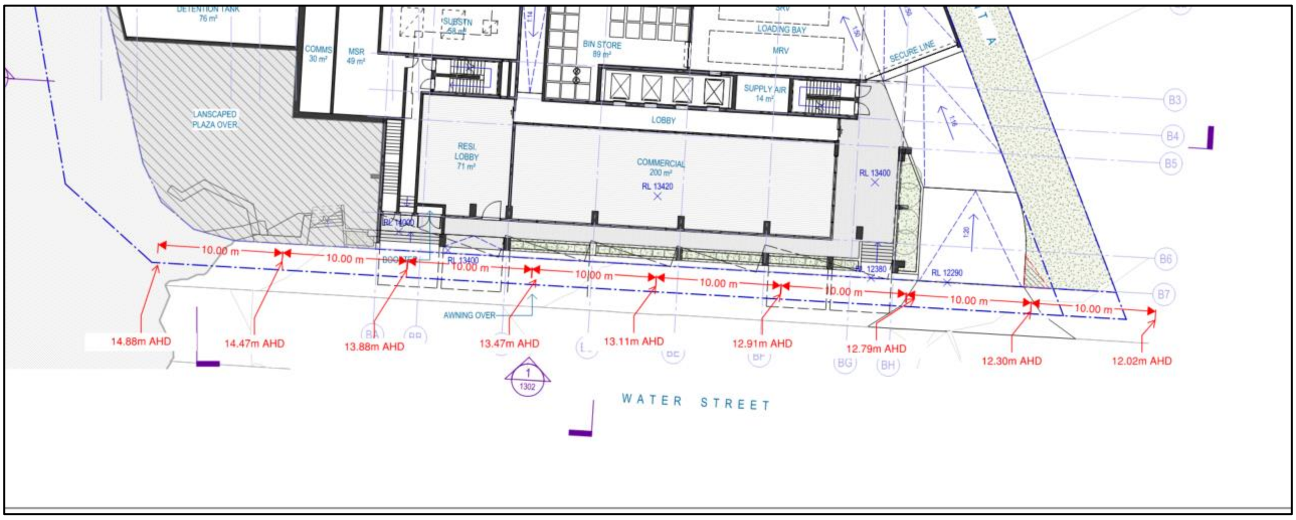


Figure 3.4 1% AEP Overland Flow Peak Flood Levels

4. Stormwater Quality Management Plan

4.1 Water Quality Objective (WQO)

In accordance with Schedule 6 of the BCC City Plan – Infrastructure design planning scheme policy, the total effect of permanent water quality control measures are to achieve reductions in the mean annual load generated by the development site at a minimum of:

- 90% for Gross Pollutants (>5mm);
- 80% for Total Suspended solids (TSS);
- 60% for Total Phosphorus (TP); and
- 45% for Total Nitrogen (TN).

4.2 Treatment Train

To ensure the above WQO's can be met at the site's LPD, a treatment train was proposed for the developed site and modelled using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software.

Further details of the MUSIC modelling are included in Appendix F.

4.2.1 ATLAN Treatment System

This CSMP proposes a ATLAN treatment system in order to achieve the required water quality objectives.

The conceptual parameters of the proposed ATLAN Stormsacks and ATLAN Filter Cartridges are presented below. The proposed treatment train elements will be located within internal stormwater pits and one (1) ATLAN vault precast concrete tank, respectively. The recommended filter configuration is as follows

- Catchment A
  - Six (6) 600x600 ATLAN Stormsacks; and,
  - Three (3) ATLAN Filter Cartridges within one (1) ATLAN Vault Precast Concrete Tank

A typical section of a ATLAN Filter has been included in Figure 5.1. The stormwater treatment system has been designed and will be installed by ATLAN.

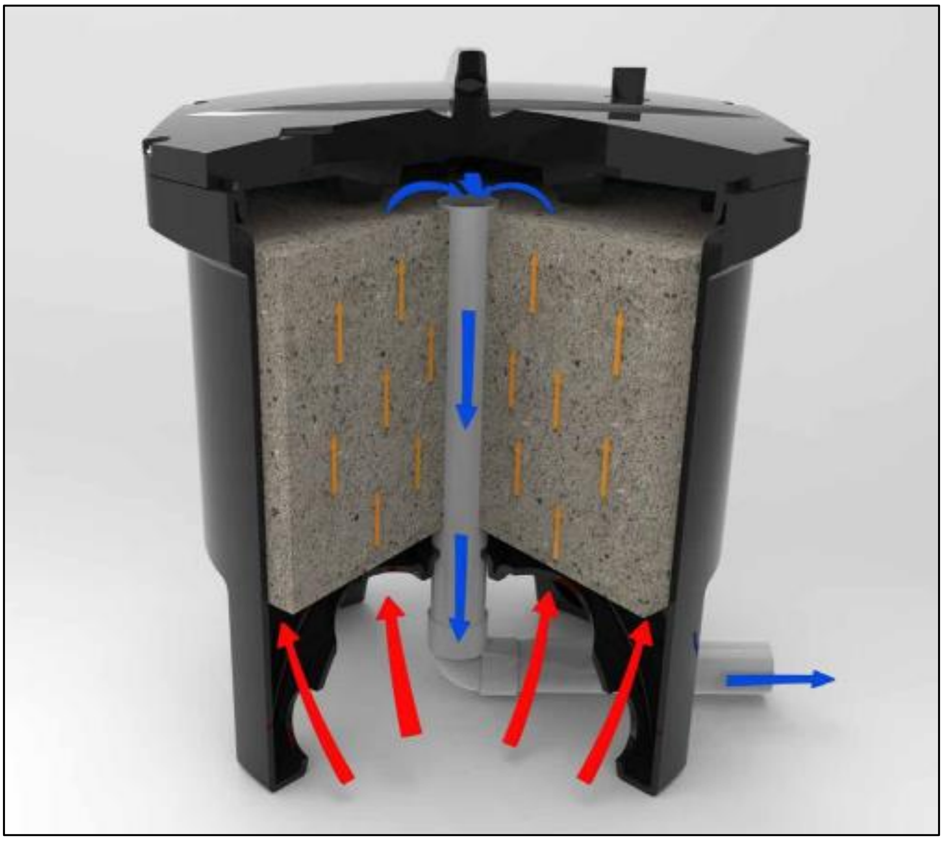


Figure 4.1 Typical ATLAN Filter (ATLAN, 2022)

Further details of the proposed treatment system are included in included in Appendix E of this report.

4.2.2 MUSIC Results

Results of the MUSIC modelling for the treatment train effectiveness are summarised in Table 4-1. The results indicate the 80%, 60%, 45% and 90% reduction target for TSS, TP, TN and gross pollutants respectively are achieved for the rainfall data set simulated.

Table 4-1 Treatment Train Effectiveness

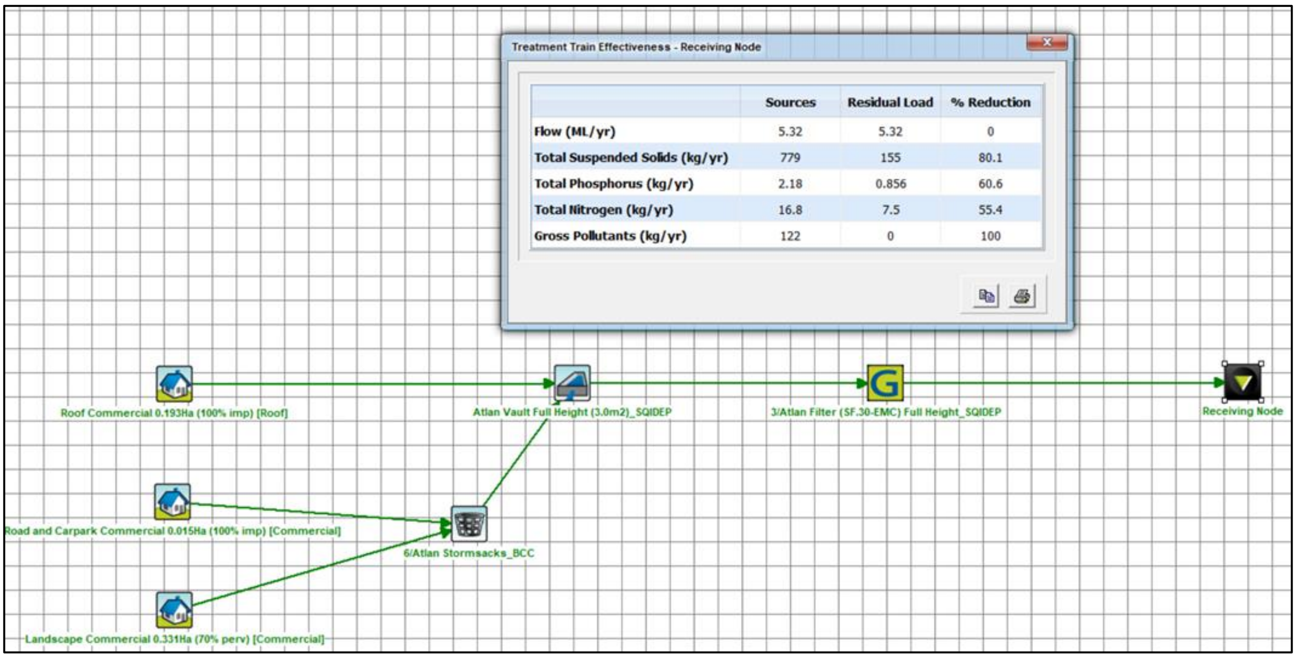
Pollutant	Inflows (kg/yr)	Outflows (kg/yr)	Reduction Achieved (%)	Water Quality Objective (%)
TSS	779	155	80.1	80
TP	2.18	0.86	60.6	60
TN	16.8	7.5	55.4	45
GP	122	0	100	90

NOTE: All simulations have been run with pollutant export estimation set to “stochastic generation”.

A screen capture of the MUSIC model and treatment train effectiveness results is presented in Figure 4.2.

NOTE: All simulations have been run with pollutant export estimation set to “stochastic generation”.

A screen capture of the MUSIC model and treatment train effectiveness results is presented in Figure 5.3.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	5.32	5.32	0
Total Suspended Solids (kg/yr)	779	155	80.1
Total Phosphorus (kg/yr)	2.18	0.856	60.6
Total Nitrogen (kg/yr)	16.8	7.5	55.4
Gross Pollutants (kg/yr)	122	0	100

Figure 4.2 Treatment Train Layout & MUSIC Results

5. Conclusion

This Conceptual Stormwater Management Plan (CSMP) has been prepared in accordance with the BCC City Plan 2014 and is to accompany the development application over this site for a multi-storey residential apartment building. The following conclusions have been made as a result of this report.

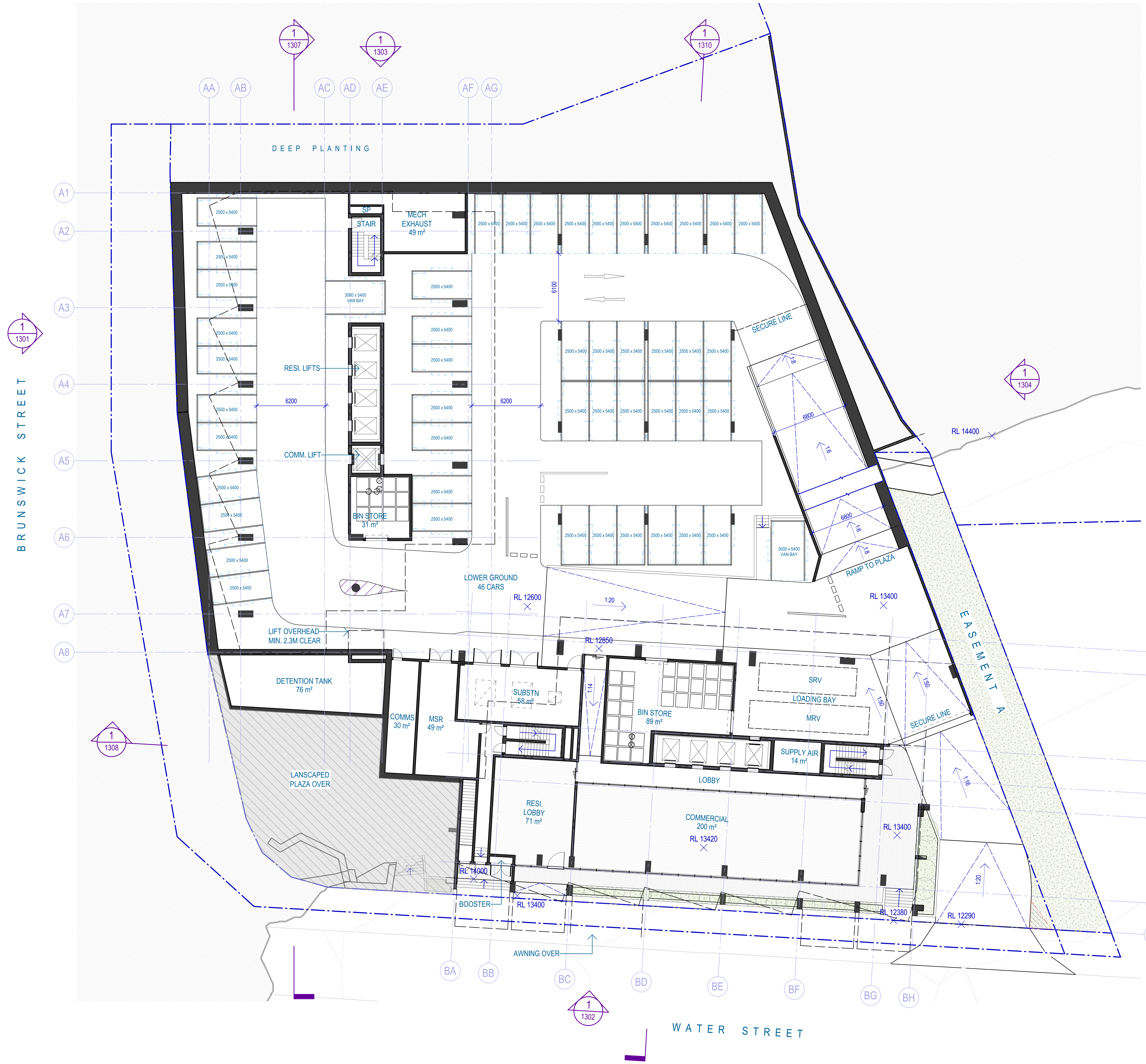
The Lawful Points of Discharge (LPD) for the site have been defined as the southern boundary of the site. Stormwater runoff will be detained and mitigated to allowable kerb and channel flow limits through the use of on-site detention devices.

The building hydraulic consultant should consider a suitable location for the detention tank to surcharge in the event of a blockage or rainfall event in excess of the 1% AEP.

As per the Brisbane City Council City Plan the minimum design floor level of the basement carpark access shall be 300mm above the 2% AEP overland flow level, 12.95 mAHD. The current design indicates that the entrance level to the carpark is 13.4 m AHD.

Water Quality Design Objectives prescribed by the State Planning Policy will be achieved through the use of ATLAN's proprietary treatment devices.

Appendix A – Proposed Plans of Development



FOR INFORMATION

WOODS BAGOT

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Project
332-334 WATER STREET

Sheet title
PLAN - LOWER GROUND

Project no.	Scale	Sheet size	© Woods Bagot
150536	1 : 200	A1	
Sheet no.	Revision	Date	
A- 1205	S	03/12/23	

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WOODS BAGOT

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Project
332-334 WATER STREET

Sheet title
PLAN - UPPER GROUND

Project no.
150536

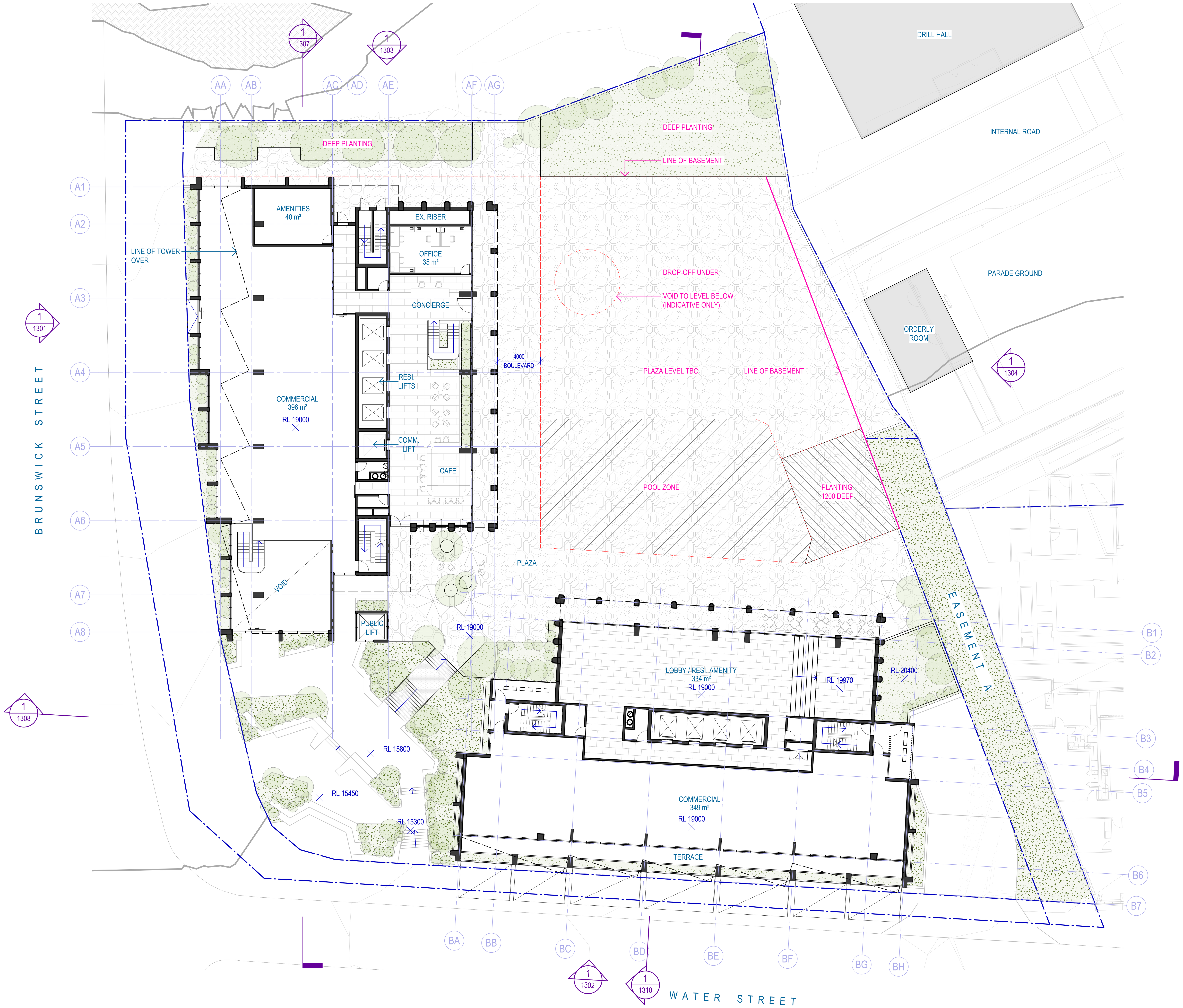
Sheet no.
A- 1206

Scale
1 : 200

Revision
N

Sheet size
A1

Date
03/12/23



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W—B WOODS BAGOT | Pellicano

Project
332-334 WATER STREET

Sheet title
PLAN - PLAZA

Project no.	Scale	Sheet size
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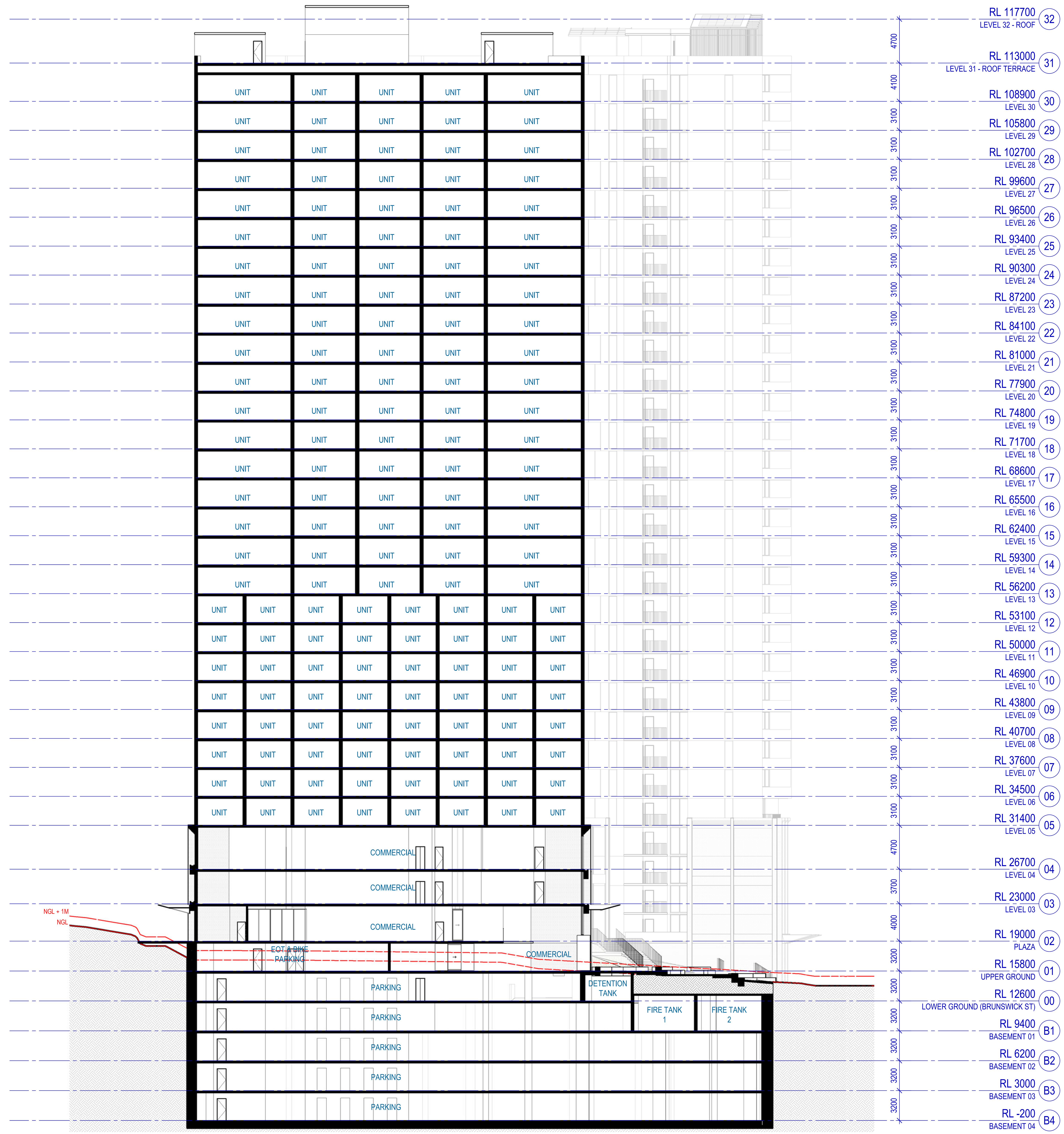
Sheet no.	Revision	Date
A- 1207	N	03/12/23



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W—B WOODS BAGOT Pellicano

Project
332-334 WATER STREET

Sheet title
SECTION - BRUNSWICK STREET TOWER

Project no. 150536

Scale 1 : 250

Sheet size A1

Sheet no. A- 1307

Revision M

Date 03/12/23

Appendix B – Time of Concentration and Rational Method Calculations

Post-Development Hydrology – Unmitigated

The total time of concentration calculated for the subject site contains a standard inlet time of 5 minutes. Table 6-1 presents a summary of the catchment parameters used for the calculated time of concentration for the post-development scenario.

Table 6-1 Time of Concentration for Post-Development Scenario

Catchment ID	A
Standard Inlet Time (minutes)	5
Slope (%)	1
Length of Pipe Flow (m)	70
Velocity (m/s)	1
tc (minutes)	1.17
TOTAL tc (minutes)	**6.17**

Design storm event flows across the site were derived using the Rational Method as per the above-mentioned manuals. This involved:

- Determination of a C10 value (derived in accordance with QUDM Table 4.05.3(b) and Council guidelines). A value of 0.53 and 60 were applied to the pre-development catchment and 0.75 was applied to the post-development catchment;
- Adoption of design rainfall using BoM IFD data; and
- Calculation of design flows through the site for Q100, Q50, Q20, Q10, Q5, Q2, Q1 and $Q3_{month}$, where $Q3_{month}$ is deemed to be 50% of Q1.

Summaries of the hydrologic calculations are contained in Table 6-2 for the post-development (un-mitigated) post scenario.

Table 6-2 Un-Mitigated Post-Development Hydrology

Catch.	Area (ha)	tc (min)	I_{100} (mm/hr)	C	Q_{100} (m³/s)	I_{50} (mm/hr)	C	Q_{50} (m³/s)	I_{20} (mm/hr)	C	Q_{20} (m³/s)	I_{10} (mm/hr)	C	Q_{10} (m³/s)	I_5 (mm/hr)	C	Q_5 (m³/s)	I_2 (mm/hr)	C	Q_2 (m³/s)	I_1 (mm/hr)	C	Q_{3month} (m³/s)
A1	0.54	6.17	292.19	1.00	0.44	263.60	0.99	0.39	225.70	0.90	0.30	196.34	0.86	0.25	169.51	0.82	0.21	135.15	0.73	0.15	108.23	0.69	0.11

Appendix C – XP-SWMM Input Parameters

Laurenson Routing Parameters

In this study, the "Laurenson" routing method was applied to XP-SWMM for hydrograph generation. To enable this method to be used, each catchment must be split into pervious (undeveloped) and impervious (developed) portions. Adopted parameters for the Laurenson routing method included:

The fraction impervious has been determined by analysis of aerial photographs and the proposed development layout;

- Manning Roughness coefficient (n):
  - Pervious portion: 0.035 to 0.05; and
  - Impervious portion: 0.015.

Initial Loss (IL) and Continuing Losses (CL) have been applied to the hydrologic model. Details of IL and CL parameters applied in the XP-SWMM model are presented in Table 6-3.

Table 6-3 Adopted Initial & Continuing Losses

Impervious Area		Pervious Area	
IL (mm)	CL (mm/hr)	IL (mm)	CL (mm/hr)
1	0	10	2.5

Analysis of the catchment has been undertaken to determine the average slope, with the results of this being applied to the model.

Table 6-4 Post-Development Catchment Parameters

Catchment	Impervious Area			Pervious Area		
	Area (ha)	Fraction Impervious (%)	Slope (%)	Area (ha)	Fraction Impervious (%)	Slope (%)
A1	0.466	100	1	0.073	0	1

Appendix D – MUSIC Input Parameters

Rainfall and Evapotranspiration Parameters

MUSIC modelling was based on 6-minute interval data obtained from the Bureau of Meteorology (BOM) for rainfall station 040659 Greenbank Thompson Rd, as summarised in Table 6-5.

Table 6-5 Meteorological and Rainfall Runoff Data Reporting Table

Input	Data Used in Modelling
Rainfall station	040659
Time step	6 minute
Modelling period	10 years
Mean annual rainfall (mm)	
Evapotranspiration	
Rainfall runoff parameters	Commercial
Pollutant export parameters	Commercial

Catchment Parameters

Based on the proposed land uses within the development, the subject site has been modelled as mixed land use as detailed in Table 6-6. The site has been divided into roof and ground level source nodes as per the architectural drawings included in Appendix E

Table 6-6 Land Use Parameters

Catchment ID	Area (ha)	Land use	Total Impervious (%)
A1 - Roof	0.193	Commercial	100
A1- Ground	0.331	Commercial	70
A2 - Roof	0.015	Commercial	100

The MUSIC catchment plan with full breakdown of roof and ground areas is presented in Appendix E. The pollutant loads and runoff parameters for each source node have been based on the data from the Water by Design MUSIC Modelling Guidelines (2010), as summarised in Table 6-7 and Table 6-8.

Table 6-7 Rainfall Runoff Parameters

Parameter	All Nodes
Landuse	Commercial
Rainfall threshold (mm)	1
Soil storage capacity (mm)	18
Initial storage (% capacity)	10
Field capacity (mm)	80
Infiltration capacity coefficient a	243
Infiltration capacity exponent b	0.6
Initial depth (mm)	50
Daily recharge rate (%)	0
Daily baseflow rate (%)	31
Daily deep seepage rate (%)	0

Table 6-8 Pollutant Load Parameters

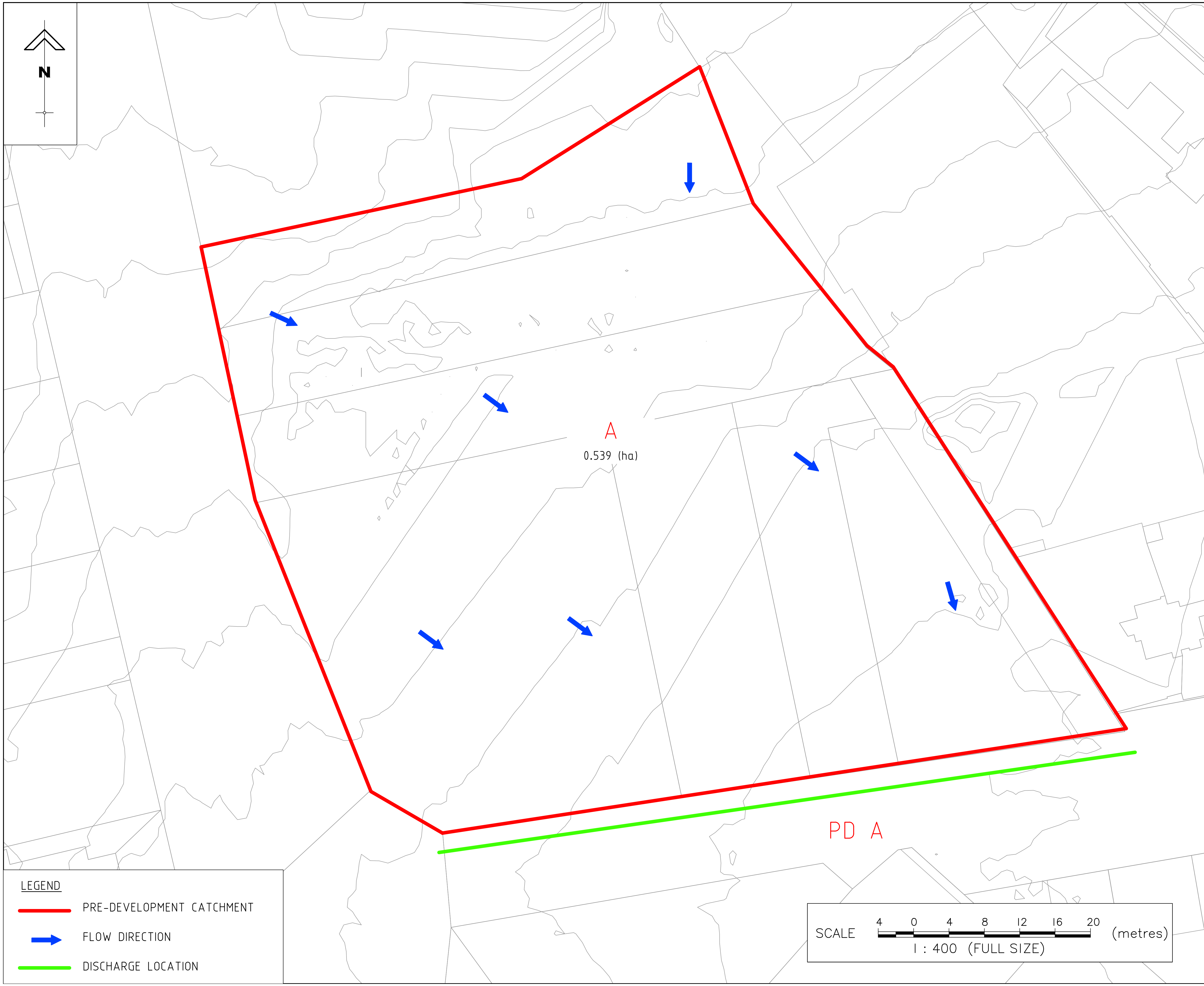
Commercial	Total Suspended Solids (log mg/L)		Total Phosphorous (log mg/L)		Total Nitrogen (log mg/L)	
	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Storm Flow Concentration	1.30(1) 2.43(2) 2.168(3)	0.38	-0.89(1) -0.30(2) -0.39(3)	0.34	0.37	0.34
Base Flow Concentration	0(1) 0.78(2,3)	0(1) 0.39(2,3)	0(1) -0.6(2,3)	0(1) 0.5	0(1) 0.32(2,3)	0(1) 0.30(2,3)

NOTE: (1) Values applied to “Roof” areas
(2) Values applied to “Road” areas
(3) Values applied to “Ground” areas

Treatment Node Parameters

The following sections describe the modelling parameters applied to MUSIC for each of the treatment nodes included as part of the water quality assessment.

Appendix E – Burchills Engineering Solutions Stormwater Drawings



LEGEND

- PRE-DEVELOPMENT CATCHMENT
- FLOW DIRECTION
- DISCHARGE LOCATION

PROPOSED -

332-334 WATER STREET, FORTITUDE VALLEY

FOR

-

ORIGINAL SCALE BEFORE REDUCTION

A3 0 10 20 30 40mm.

VER.	DESCRIPTION	APPR.	DATE
A	ORIGINAL ISSUE		14.09.22

REVISIONS

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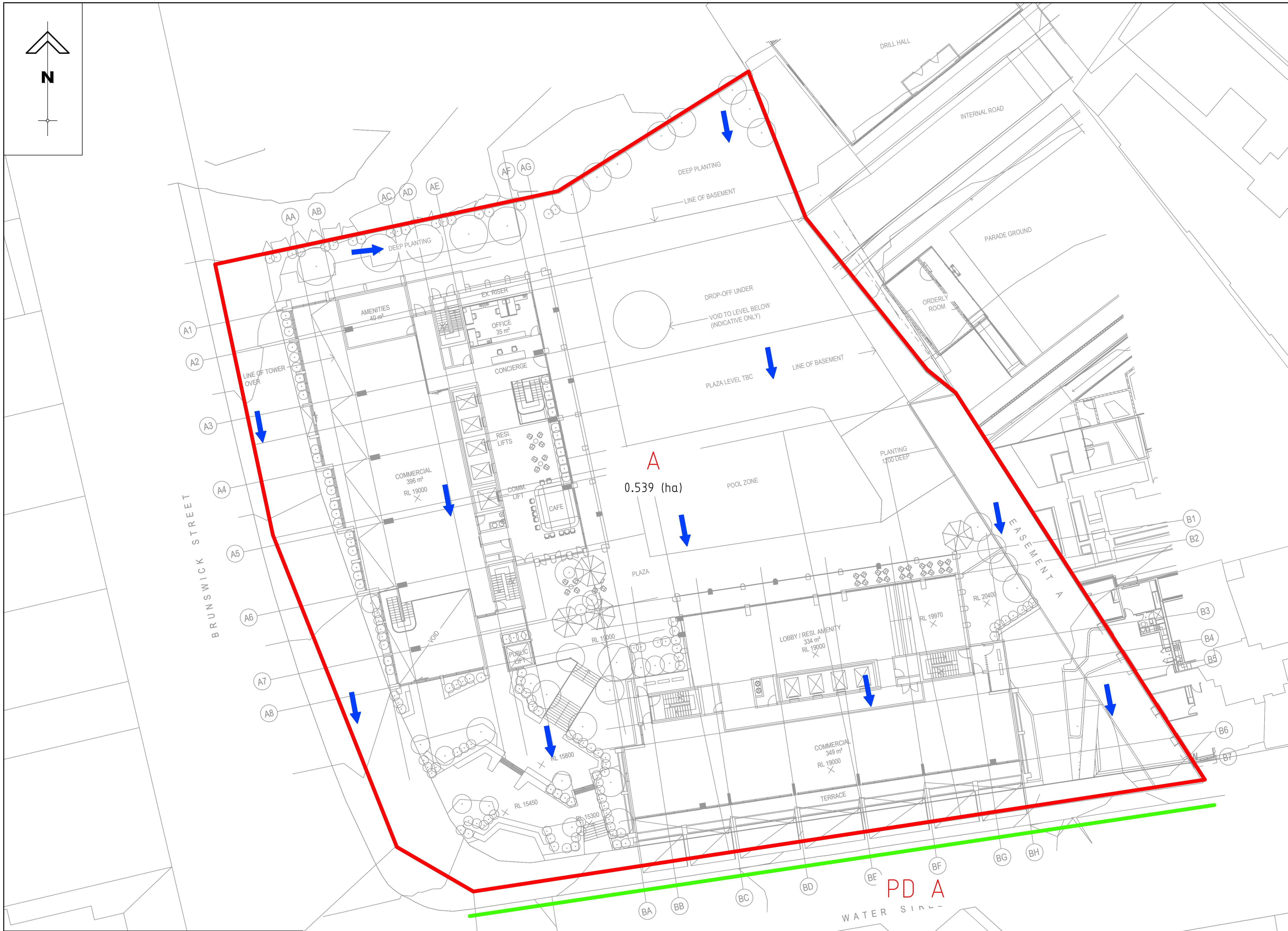
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

DRAWING TITLE :

PRE-DEVELOPMENT CATCHMENT PLAN

DEVEL. APPLIC. No. :	DATE : 14.09.22
PROJECT LEADER :	
DESIGNER :	
DRAFTSPERSON : TK	
CHECKED :	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	RPEQ No. :
SCALE : 1:400	DATUM : / FULL SIZE : A3
PROJECT No.: BE220298	DRAWING No. : N200 / VERSION: A



LEGEND

(red line)	POST-DEVELOPMENT CATCHMENT
(blue arrow)	FLOW DIRECTION
(green line)	DISCHARGE LOCATION

SCALE 4 0 4 8 12 16 20 (metres)
1 : 400 (FULL SIZE)

PROPOSED -

332-334 WATER STREET, FORTITUDE VALLEY

FOR

-

ORIGINAL SCALE BEFORE REDUCTION
A3 0 10 20 30 40mm.

VER.	DESCRIPTION	APPR.	DATE
A	ORIGINAL ISSUE		14.09.22

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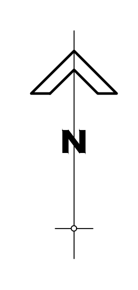
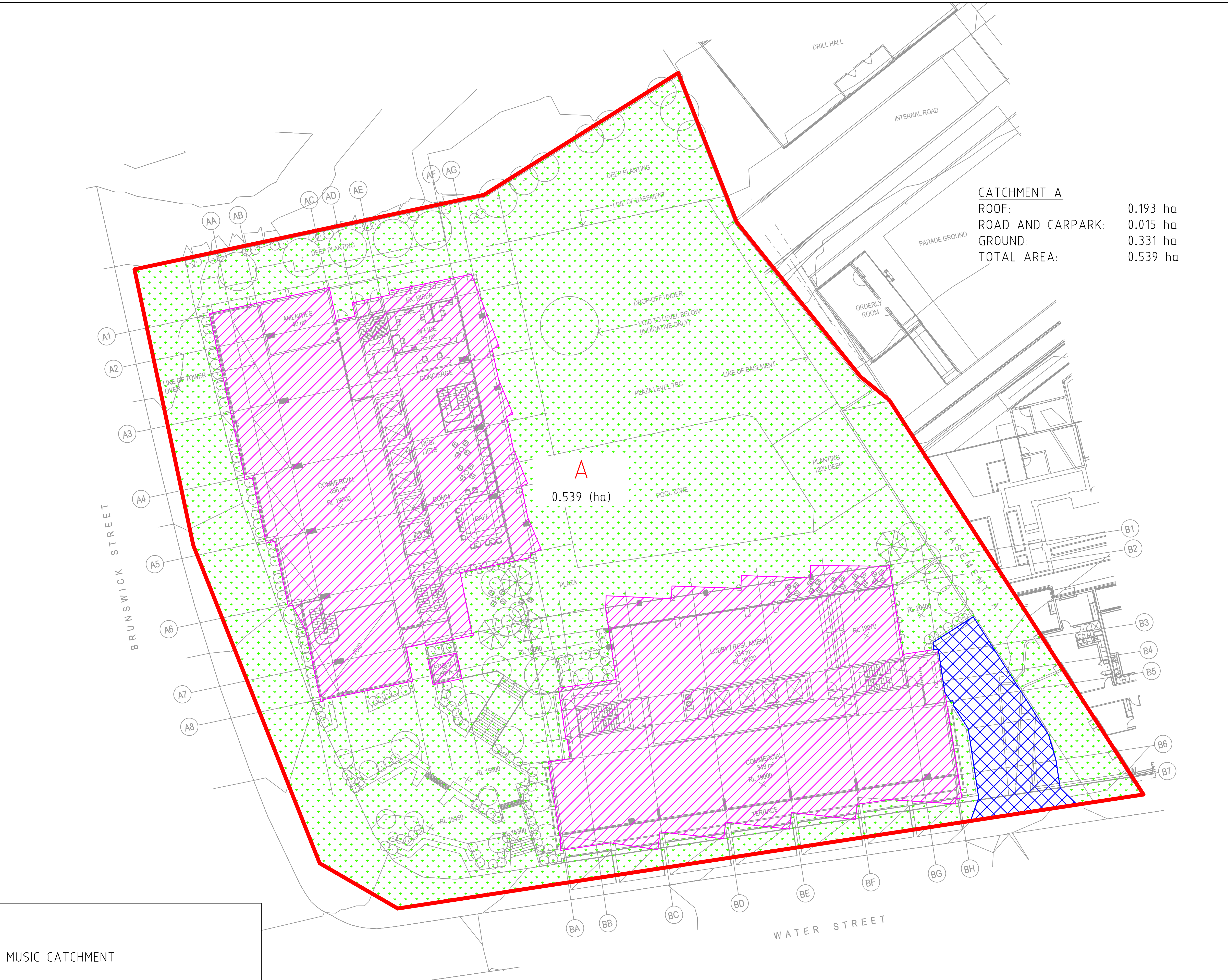
POST-DEVELOPMENT CATCHMENT PLAN

DEVEL. APPLIC. No. :	DATE : 14.09.22
PROJECT LEADER :	
DESIGNER :	
DRAFTSPERSON : TK	
CHECKED :	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	RPEQ No. :

SCALE : 1:400	DATUM :	FULL SIZE : A3
PROJECT No.: BE220298	DRAWING No. : N201	VERSION: A





CATCHMENT A

ROOF:	0.193 ha
ROAD AND CARPARK:	0.015 ha
GROUND:	0.331 ha
TOTAL AREA:	0.539 ha

LEGEND

- MUSIC CATCHMENT
- ROOF
- ROAD AND CARPARK
- GROUND

SCALE 4 0 4 8 12 16 20 (metres)

1 : 400 (FULL SIZE)

PROPOSED -

332-334 WATER STREET, FORTITUDE VALLEY

FOR

-

ORIGINAL SCALE BEFORE REDUCTION

A3 0 10 20 30 40mm.

VER.	DESCRIPTION	APPR.	DATE
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NOTE

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DRAWING TITLE :

MUSIC CATCHMENT PLAN

DEVEL. APPLIC. No. :	DATE : 14.09.22
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DESIGNER :	
DRAFTSPERSON : HD	
CHECKED :	

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