Woolacotts.
CONSULTING ENGINEERS

Residential Flat Building

26 Tupia Street, Botany

Stormwater Management Report

22-356 03 February 2023

Contents

Document control

Rev No	Date	Revision details	Approved	Verified	Prepared
A	18.11.2022	Issue for Review	JC		LN
B	03.02.2023	Issue for Review	JC		LN

1. Introduction

The planning proposal describes a new residential development at 26 Tupia Street, Botany (The Site). Refer to Figure 1 for the location of The Site. The development comprises 3 four-storey buildings, with 2 underground basements.

This report has been prepared to address stormwater management issues associated with the proposed development, including the proposed stormwater drainage network, on-site detention, water quality, overland flow and sediment and erosion control.

The Site is located within the Bayside City Council Local Government Area (LGA). As such, this report has been prepared in accordance with the Botany Development Control Plan (BDCP) 2013 and Department of Planning and Environment's (DPE's) Local Plan Making Guidelines. This scope will include the following:

- Water cycle management strategy, including stormwater and water sensitive urban design (WSUD).
- Riparian assessment.
- Preliminary cost estimates.

Figure 1: Site Location

2. Existing Conditions

The existing site consists of three industrial buildings with a shared driveway and parking lots - refer Figure 1. The total existing site area is approximately 8000m² of which approximately 65% is currently impervious. The Site generally falls to the south-east towards Sir Joseph Banks Park at a grade of approximately 1%.

3. Proposed Development

The proposed development involves the demolition of the existing buildings and construction of 3 four-storey buildings, with 2 underground basements. Most of the site is covered by the proposed building's roof and paved area. The finished floor level for the proposed development is 4.0m AHD. Refer to Figure 2 for the proposed ground floor layout of the building.

Figure 2: Proposed Building Layout

(SOURCE DOCUMENT: *Cotteeparker Job No 6641 – Drawing Sk2003 – Dated 1 February 2023*).

4. Water Cycle Management

The stormwater management requirements for the site were obtained from the Botany Development Control Plan (BDCP) 2013.

The following sections address the stormwater management issues associated with the proposed drainage network, on-site detention, stormwater quality, overland flow and sediment and erosion control.

4.1 Stormwater Drainage Network

The proposed stormwater drainage network for the site consists of a below-ground pit and pipe network collecting runoff from the roof, paved areas and landscape areas. This network has been sized for up to and including 1% AEP storm events.

The roof area is directed to a below-ground 10kL rainwater tank located in the garden area at the southern corner of the site. Overflow from the rainwater tank discharges via a stormwater pipe to an On-site Detention (OSD) tank also located in the garden area at the southern corner of the proposed buildings.

The OSD tank contains water quality devices that treat the stormwater runoff before it is discharged into a lake in Sir Joseph Banks Park. Refer to Figure 3 below.

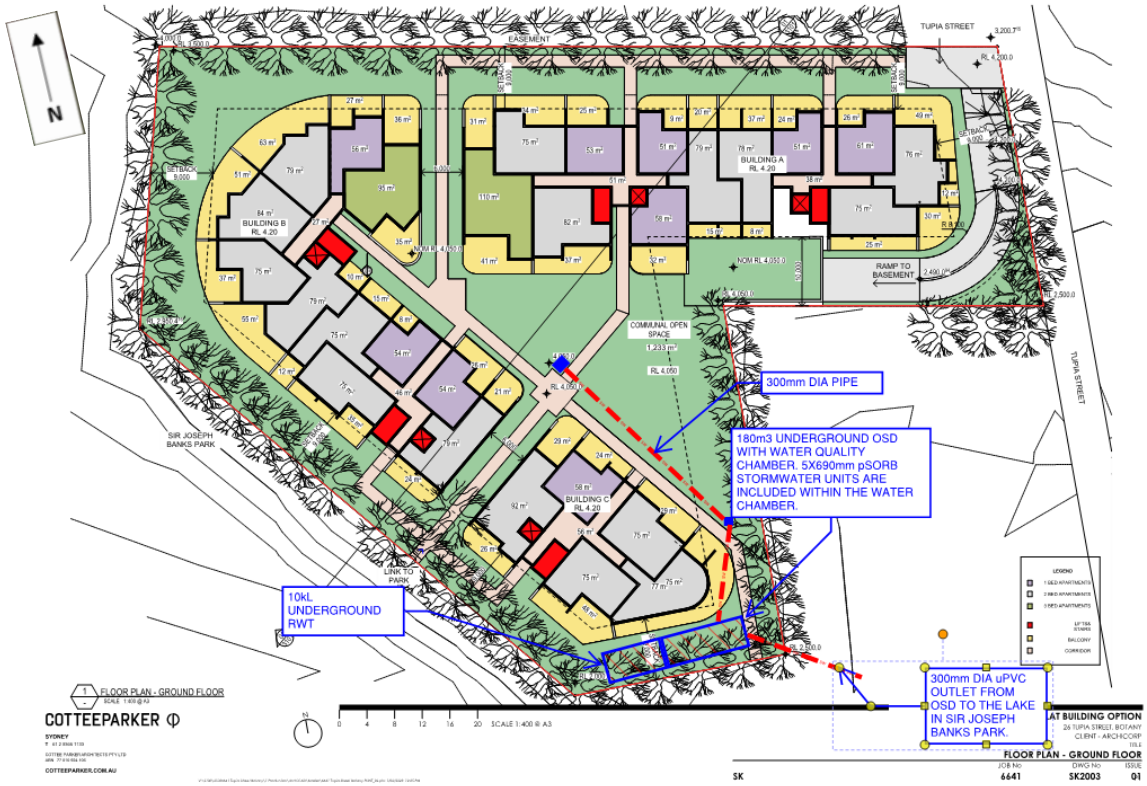

Figure 3: Discharge Point

4.2 On-site Stormwater Detention

BDCP 2013 requires on-site detention (OSD) systems for new developments. Therefore, an on-site stormwater detention system is proposed for the site.

OSD needs to detain the stormwater runoff generated by the development for all storm durations up to and including 1% AEP events. The permissible site discharge (PSD) from the site shall be designed to restrict the discharge to 20% AEP event peak flow under the “State of Nature” condition of the site (i.e. the site is totally grassed/turfed) for all storm events.

An OSD tank of 180m³ is proposed within the garden area at the southern boundary. The OSD tank has a 250mm diameter orifice to meet the PSD requirements. The outlet of the OSD tank discharges to a lake located in Sir Joseph Banks Park. Refer Figure 3.

A minimum 10kL below-ground rainwater tank is proposed for reuse. This tank will be a part of the proposed OSD. All the roof areas will be directed to the rainwater tank. Roof guttering, downpipes and associated pipework are to be sized for the 1% AEP storm event. Overflow from roof areas in the event of a downpipe blockage are directed via surface flows to the OSD tank for all minor and major storm events.

For developments with a total catchment area (i.e. site area plus other areas draining to the site) of more than 3000sq.m (0.3ha), a full Hydraulic Grade Line (HGL) analysis of the proposed stormwater system shall be submitted to Council.

4.3 Stormwater Quality

In part 3G: Stormwater Management of BBDC 2013, new developments with a total site area greater than 1,500m2 or provision of more than ten (10) car parking bays, shall include MUSIC modelling which shall be undertaken by the engineers to ensure the stormwater pollutant reduction targets have been achieved. These targets are summarised below:

- 40% reduction in Total Nitrogen (TN)
- 55% reduction in Total Phosphorus (TP)
- 80% reduction in Total Suspended Solids (TSS)
- 90% reduction in Gross Pollutants

The proposed stormwater drainage system has been designed to incorporate treatment devices that ensure the quality of discharged water meets the requirements outlined above. These treatment devices include gross pollutant traps, rainwater tank, OSD tank, and secondary treatment devices.

Ocean Protect Enviropods or approved equivalent have been proposed at all grated inlet pits as a pre-treatment device in the treatment train. They are effective in retaining litter, debris, and other pollutants as runoff enters the drainage system.

The OSD tank manages excess runoff generated by newly constructed impervious areas. The OSD’s outlet restricts the outflow of runoff leaving the site.

An Ocean Protect stormfilter system consisting of 5x690mm PSorb cartridges is proposed for the detention tank. The filters are effective in reducing the total suspended solids and reducing the total phosphorus and total nitrogen levels.

The 10m³ rainwater tank allows for water re-use, reducing the volume of stormwater runoff entering Council's drainage system.

Details of the catchment areas input values are outlined in Figure 4.

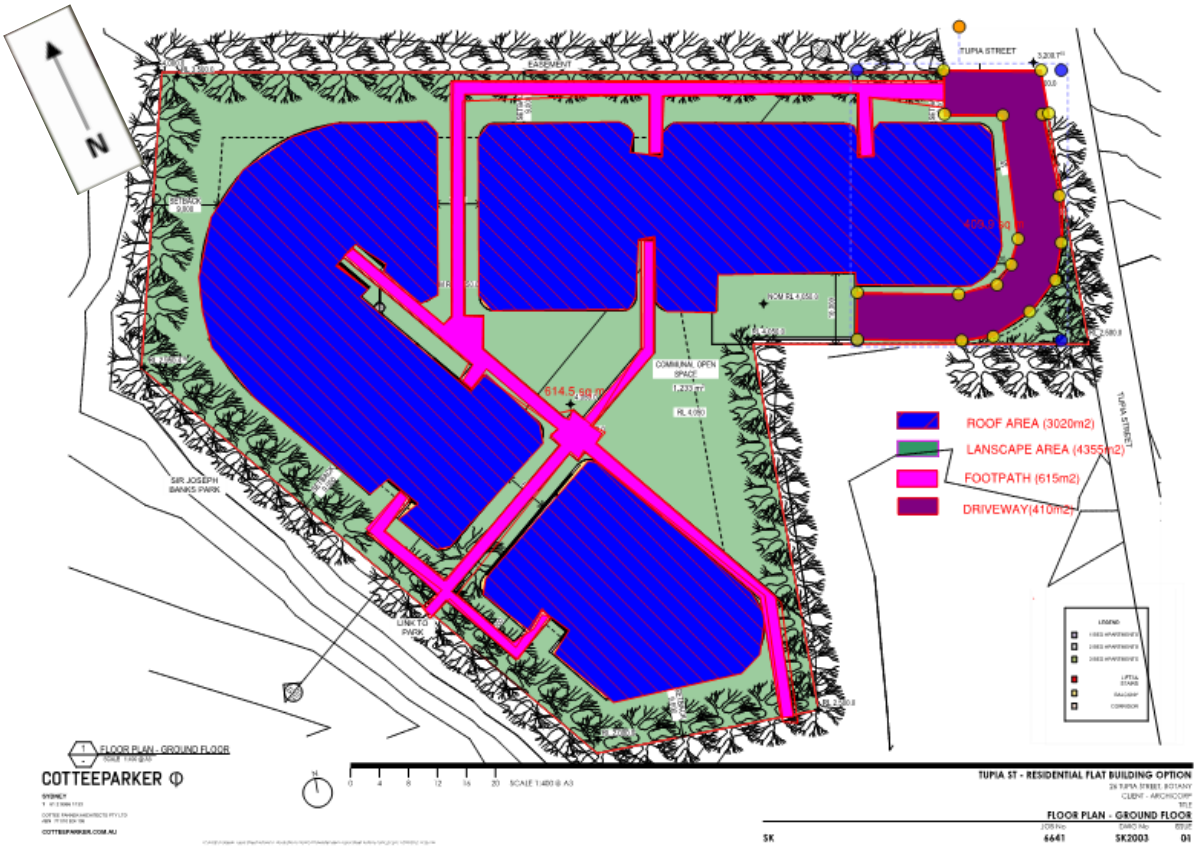

Figure 4. Roof and Non-roof Areas Utilized in MUSIC Model

A Model for Urban Stormwater Improvement Conceptualisation (MUSIC) has been developed as a conceptual design tool for the purpose of estimating generated pollution within the catchment area. The model has been used to demonstrate the performance of implemented stormwater quality improvement systems.

These treatment devices were modelled in MUSIC to determine the overall effectiveness of the proposed treatment train. The treatment rate achieved by the system is:

- Gross pollutants – 100% average annual load reduction
- Total suspended solids – 82.4% average annual load reduction
- Total Phosphorous – 59.5% average annual load reduction

- Total Nitrogen – 40% average annual load reduction

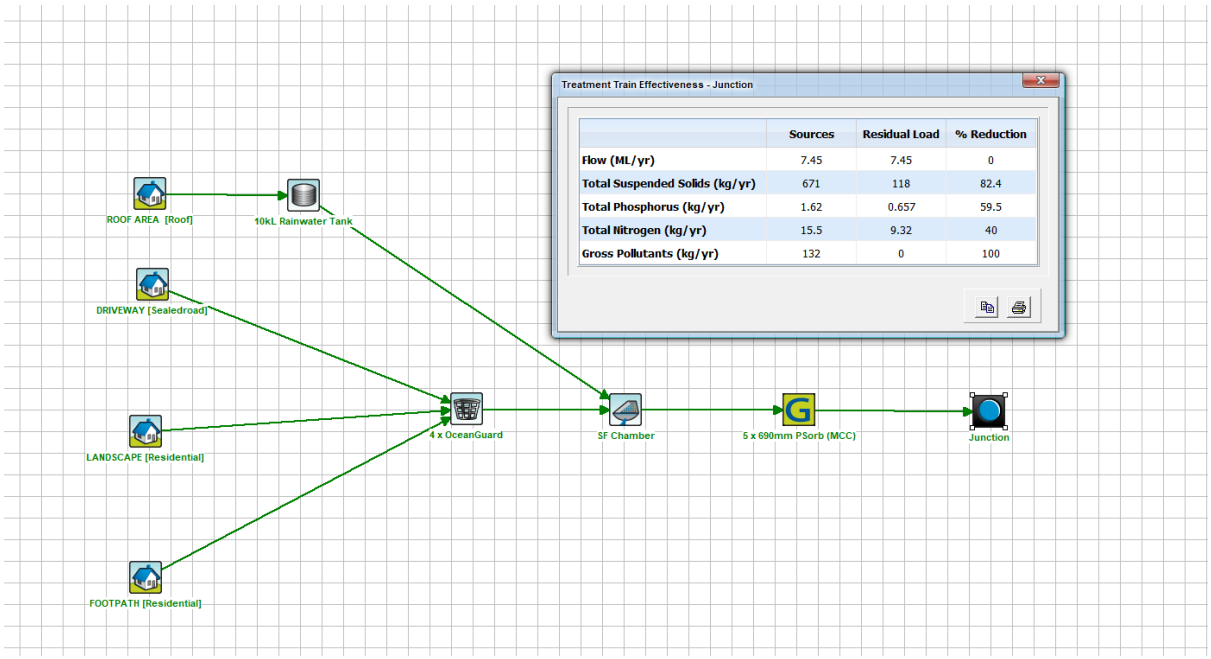

Figure 5: MUSIC Model Treatment Train

4.4 Soil and Water Management (Erosion and Sediment Control)

Erosion and sediment control measures will be provided during construction in accordance with the *Blue Book (Managing Urban Stormwater – Soils and Construction 4th Edition)*. Measures to be provided include:

- Silt fences on the low side of the site
- Construction exit/entry
- Silt traps at Council pits on Anderson Street.

5. Overland Flow Flooding

A Flood Impact Assessment (FIA) prepared by BMT indicates that the Site is located within the floodplain and is susceptible to overland flooding. Existing low-lying catchment topography results in floodwaters ponding within the Site, with high depths present along the southern boundary of the Site in particular.

The FIA determined that hazardous floodwaters may result at the Site and in the vicinity, with inundation from the north along Tupia Street and low-lying parkland areas from the east and west. The relevant flood levels with respect to the Site once developed, as established by the FIA are as per the table below:

Location	1% AEP Flood Level (mAHD)	PMF Level (mAHD)
Building A	3.9	4.2
Building B	3.9	4.2
Building C	3.9	4.0
Driveway (D)	3.9	4.2

Table 1 Post-Development Design

The FIA presents the flood management and mitigation design of the development, including proposed FFL requirements and the proposed FEMP shelter-in-place strategy. The recommended finished floor level of the development is tied to the post-development PMF level and varies between 4.0 mAHD (for the Building C) to 4.2 mAHD (for Buildings A and B).

6. Riparian Assessment.

The site does not include waterfront land, therefore, an assessment on riparian is not required as per the current council DCP.

7. Preliminary cost estimates

The concept drainage networks associated with the water treatment units are prepared for concept design only. The quantity of treatment units is subject to change once the architectural plans are finalised.

6. Conclusion

The proposed stormwater management measures for the proposed site include a stormwater drainage network, on-site detention, and water quality treatment devices.

The stormwater drainage network consists of a subsurface pit and pipe network to a rainwater tank/OSD tank. The OSD tank contains water quality treatment devices and discharges to the lake in Sir Joseph Banks Park.

The site is affected by overland flooding and the recommended flood plannings are as per the Flood Impact Assessment prepared by BMT.

Soil and water management measures will be provided in accordance with the “Blue Book” (*Managing Urban Stormwater – Soils and Construction*).

Appendix A - Drawings

1 / - FLOOR PLAN - GROUND FLOOR
SCALE 1:400 @ A3

COTTEEPARKER

SYDNEY
T 61 2 9366 1133

COTTEE PARKER ARCHITECTS PTY LTD
ABN 77 010 924 106

COTTEEPARKER.COM.AU

V:\2100\21006641 Tupia Street Botany\1 Production\ArchiCAD\Master\6641 Tupia Street Botany PUNT_02.pln: 1/02/2023: 12:05 PM

AT BUILDING OPTION
26 TUPIA STREET, BOTANY
CLIENT - ARCHICORP
TITLE
FLOOR PLAN - GROUND FLOOR

	JOB No	DWG No	ISSUE
SK	6641	SK2003	01