



STORMWATER TREATMENT TRAIN WSUD REPORT SELF STORAGE PREMISES AND SIGNAGE

12 WILLIAM STREET
BROOKVALE NSW

REVISION DA
DATE: 13 MARCH 2024

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1.0 INTRODUCTION

This report has been prepared by ATB Consulting Engineers as commissioned by Design Workshop Australia (DWA) Architects to provide a stormwater treatment train report for a Proposed Self Storage Premises and Signage at 12 William Street Brookvale NSW. The stormwater treatment train will be designed to achieve the stormwater pollution reduction targets outlined within Northern Beaches Council Water Management for Development Policy relating to water sensitive urban design.

The stormwater treatment train as proposed will be managed privately and the assets will not be passed on to Northern Beaches Council.

1.1 EXISTING (PRE-DEVELOPMENT) SITE

The Site is bounded William Street.

The Site is irregularly shaped and approximately 517.30m² in total area, which was previously developed for domestic purposes. It has a main frontage and access to William Street. The site falls to the rear of the boundary varying from RL 13.47-11.76.

The site is currently surrounded by existing commercial and residential developments.



Figure 1. Location of the Site (image source: Sixmaps).

1.2 PROJECT DESCRIPTION

The proposed development is for a Mixed Use Development at the abovementioned address, consisting of four levels of underground Basement carpark, five levels (GF to Level 4) of Commercial spaces, and 11 (eleven) levels of residential units (Level 5 to Level 15)(see Figure 2).

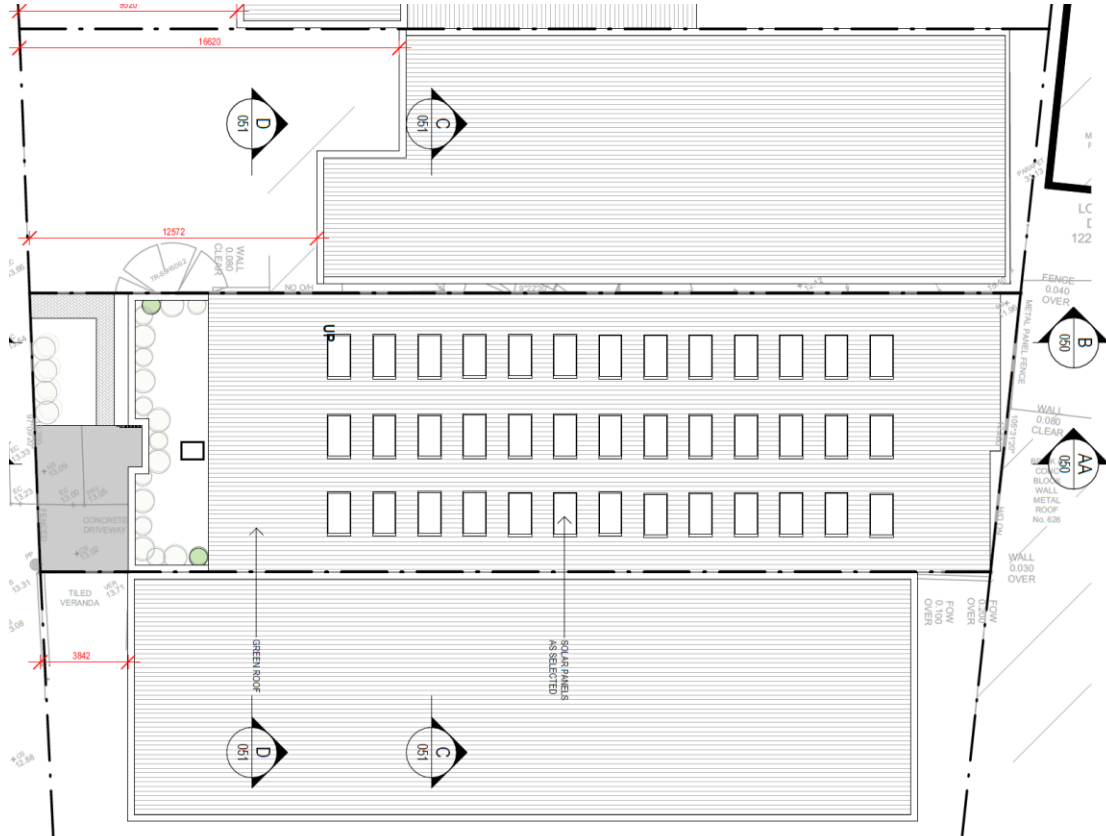


Figure 2. Proposed Site Plan by PRD Architects.

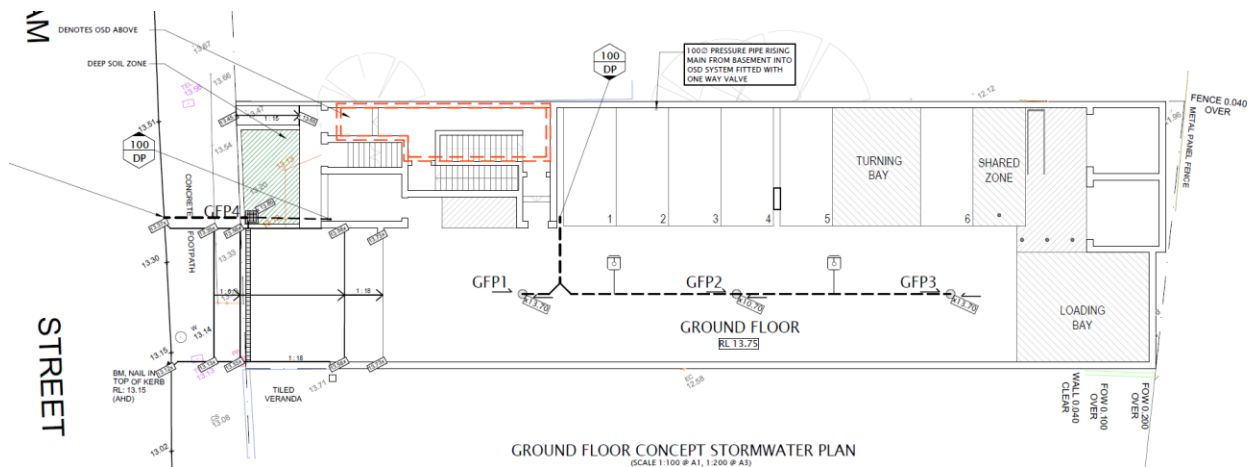


Figure 3. Stormwater drainage layout by ATB.

Flows generated from the proposed development will be diverted to and treated by an adequately sized stormwater filtering chamber at the south east corner of the site and discharged into Council underground stormwater pipe on Ellen Street, which is currently collecting stormwater from the Site (see Stormwater plan by ATB).

This report has been prepared in conjunction with architectural plans prepared by PRD Architects and stormwater documentation prepared by ATB Consulting Engineers.

2.0 TARGET POLLUTION REDUCTIONS

Northern Beaches City Council Water Sensitive Urban Design Policy requires for the incorporation of water sensitive urban design for a variety of development types. Addressing these requirements will ensure proper water quality management techniques and improvement measures will be implemented into the proposed industrial development to minimize any negative impacts on the natural water cycle and to ensure the health of any aquatic ecosystems is protected.

Pollutant	Performance Requirements
Total Phosphorous	65% reduction in the post development mean annual load
Total Nitrogen	45% reduction in the post development mean annual load
Total Suspended Solids	85% reduction in the post development mean annual load
Gross Pollutants	90% reduction in the post development mean annual load ¹ (for pollutants greater than 5mm in diameter)
pH	6.5 - 8.5
Hydrology	The post-development peak discharge must not exceed the pre-development peak discharge for flows up to the 2 year ARI

Figure 4. Target pollution reductions for the proposed development (extracted from Northern Beaches City council WMP).

The Proposed Self Storage Premises and Signage at the subject site will be considered as Self storage premises with the relevant target pollution reductions highlighted Northern beaches City Council WMP (Section 8.1.1).

The stormwater treatment train design will be required to meet the target pollution reductions as shown in Figure 4.

3.0 PROPOSED WATER CYCLE MANAGEMENT PLAN

3.1 STORMWATER DRAINAGE

The stormwater drainage design is outlined within the stormwater plans prepared by ATB Consulting Engineers. The catchment area characteristics for proposed stormwater system are outlined within Figure 5 below.

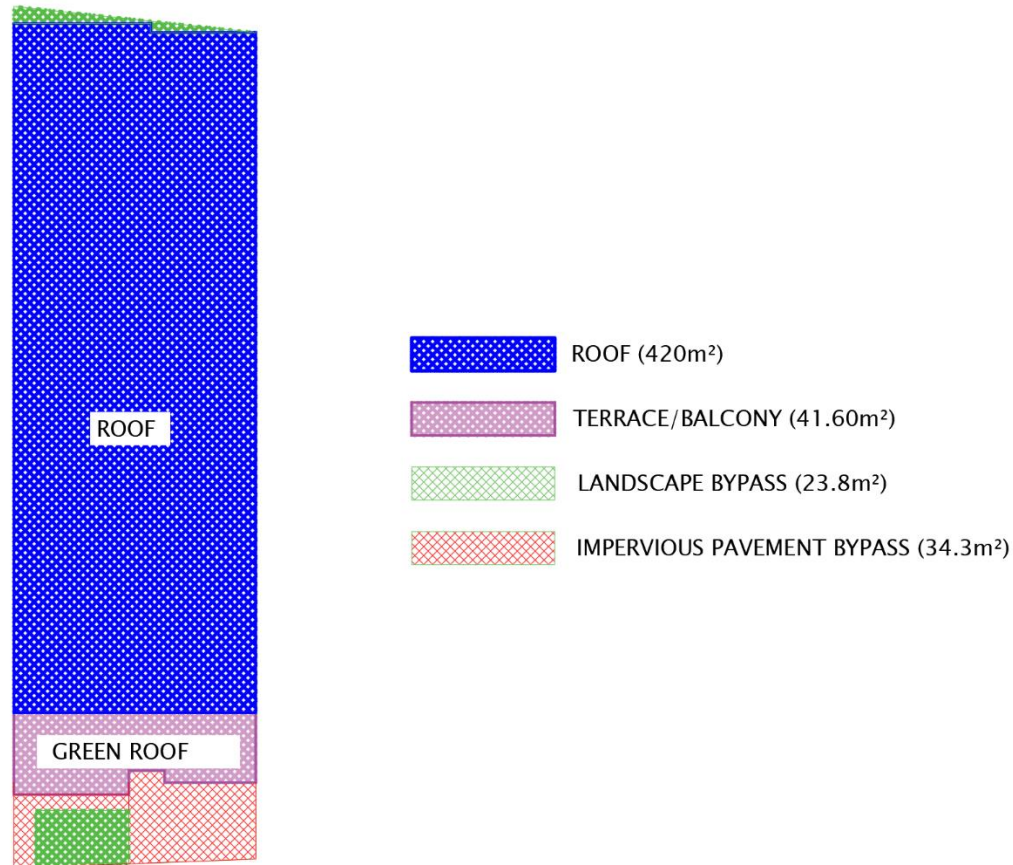


Figure 5. Catchment area breakdown for MUSIC Model.

3.2 PROPOSED TREATMENT TRAIN

- All impervious area on the subject site will drain to Stormwater Pits system as shown in the stormwater plans prepared by ATB Consulting Engineers.
- The treatment system will include 3x690mm PSorb filters (MCC) in WSUD Chamber by Oceanprotect or similar.
- Typical details of the chamber layout and Stormfilter cartridges are provided within Appendix A as provided by Oceanprotect.
- Any stormwater flows in excess of the treatable water flows will be diverted away from the Stormfilter cartridges by means of internal weirs in WSUD chambers.

4.0 WATER QUALITY MODELLING

4.1 INTRODUCTION

The performance of the proposed stormwater treatment train was modelled using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) Version 6.2.1 developed by eWater. MUSIC utilizes algorithms derived from research undertaken by eWater and others on the known performance of stormwater quality improvement structures currently in use within Australia.

4.2 MUSIC CALIBRATION

We have modelled the catchment in MUSIC in accordance with the following guidelines & parameters;

- Music version 6.3.0
- Rainfall Station 66062 Sydney Observatory Hill, 6 Minute Time Step 1981 To 1985
- Sydney Catchment Management Authority (CMA) Source Node(s) utilizing modified % impervious area, rainfall threshold, soil properties & pollutant concentrations
- No drainage routing between nodes.

4.3 MODEL SETUP

The MUSIC model setup is based on all roofwater and surface stormwater diverted to WSUD Chamber pits and then to receiving node. The proposed water treatment layout is shown in Figure 6.

In addition to using proprietary devices, we have also modelled detention (WSUD Chambers) as part of the treatment train of devices.

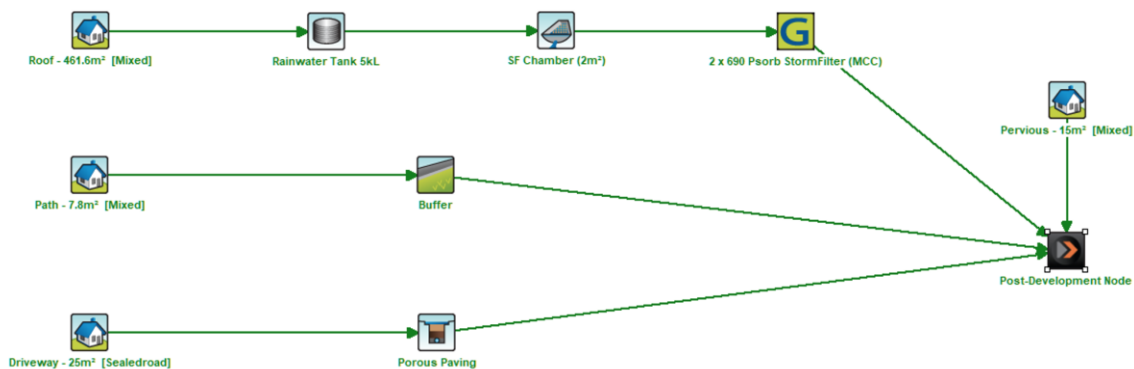


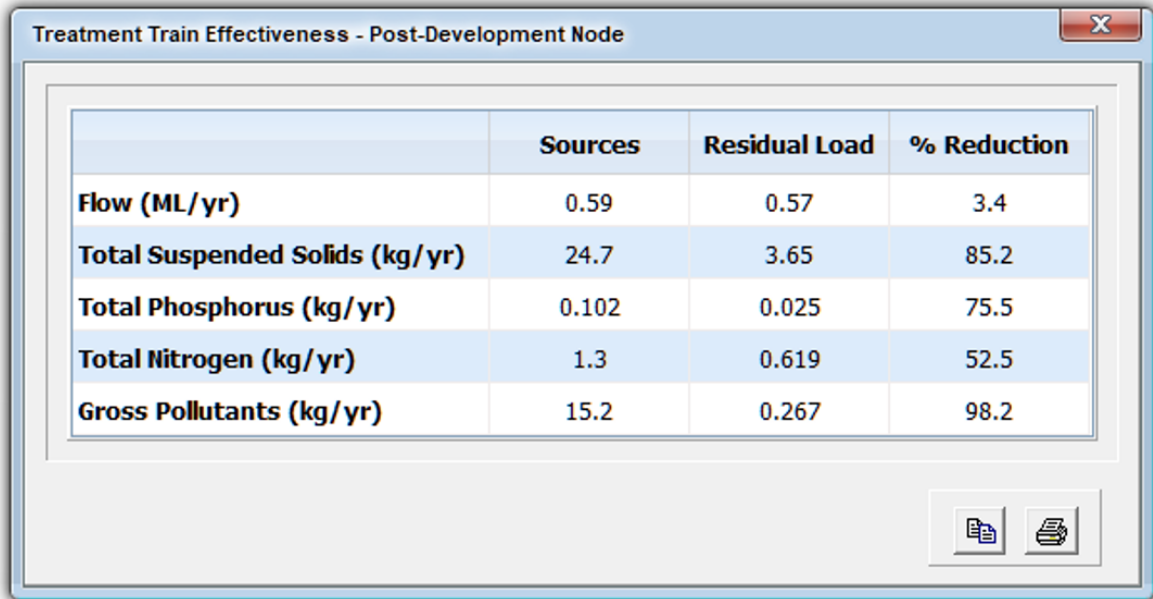
Figure 6. MUSIC model schematic

4.4 MODELLING RESULTS

We have modelled the systems to meet Water Sensitive Urban Design targets of;

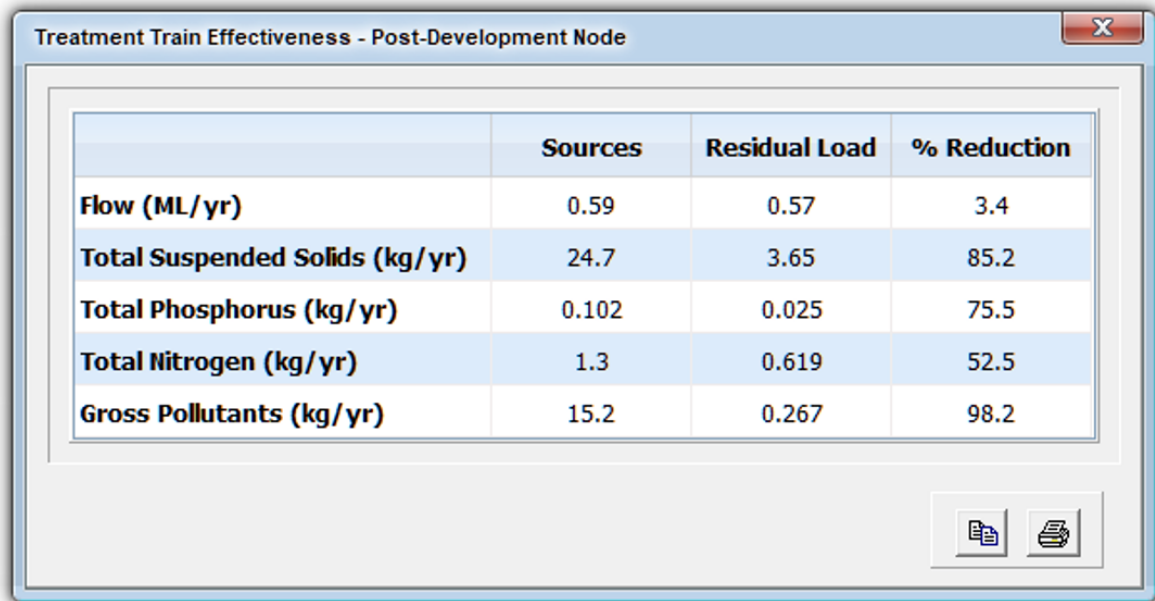
- 85% TSS Reduction
- 65% TP Reduction
- 45% TN Reduction.
- 90% Gross Pollutant Reduction

The performance of the stormwater treatment train was predicted as shown in



	Sources	Residual Load	% Reduction
Flow (ML/yr)	0.59	0.57	3.4
Total Suspended Solids (kg/yr)	24.7	3.65	85.2
Total Phosphorus (kg/yr)	0.102	0.025	75.5
Total Nitrogen (kg/yr)	1.3	0.619	52.5
Gross Pollutants (kg/yr)	15.2	0.267	98.2

Table 1 below after running the MUSIC model. It was found that the target pollution reductions were exceeded for all pollutant types.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	0.59	0.57	3.4
Total Suspended Solids (kg/yr)	24.7	3.65	85.2
Total Phosphorus (kg/yr)	0.102	0.025	75.5
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Table 1. MUSIC Model Predicted Stormwater Treatment Performance

5.0 MANAGEMENT

All of the proposed water quality treatment structures/devices are to be managed and maintained by the proponent who would engage a suitably qualified maintenance contractor who would undertake the required maintenance work annually at the very least or periodically should any issues arise.

6.0 CONCLUSION

A suitable stormwater treatment train design was produced as outlined within this report. The performance of the proposed stormwater treatment train was assessed using MUSIC water quality modelling software and it was found that the target pollution reductions were exceeded for all pollution types. Therefore, the proposed stormwater treatment train as designed is considered to be suitable for the Proposed Self Storage Premises Development at 12 Williams Street, Brookvale NSW.

DISCLAIMER

This report has been prepared for the use of the stated client and for the specific purpose described in the introduction and is not to be used for any other specific purpose or by any other person or corporation. ATB Consulting Engineers Pty Ltd. accept no responsibility for any loss or damage suffered howsoever arising to any person or cooperation who may use or rely on this report in contravention of the terms of this disclaimer.

Due consideration has been given to site conditions and to appropriate legislation and documentation available at the time of preparation of the report. As these

elements are liable to change over time, the report should be considered current at the time of preparation only.

The report relies on information supplied by the client and on findings obtained using accepted survey and assessment methodology. Specific survey methodology is described in the relevant section of the report.

While due care was taken during field survey and report preparation, ATB Consulting Engineers Pty Ltd accepts no responsibility for any omission that may have occurred due to the nature of the survey methodology.

Conclusion to the report are professional opinions and ATB Consulting Engineers Pty Ltd cannot guarantee acceptance or consent of the relevant determining/consent authorities.

For & on behalf of
ATB Consulting Engineers Pty Limited



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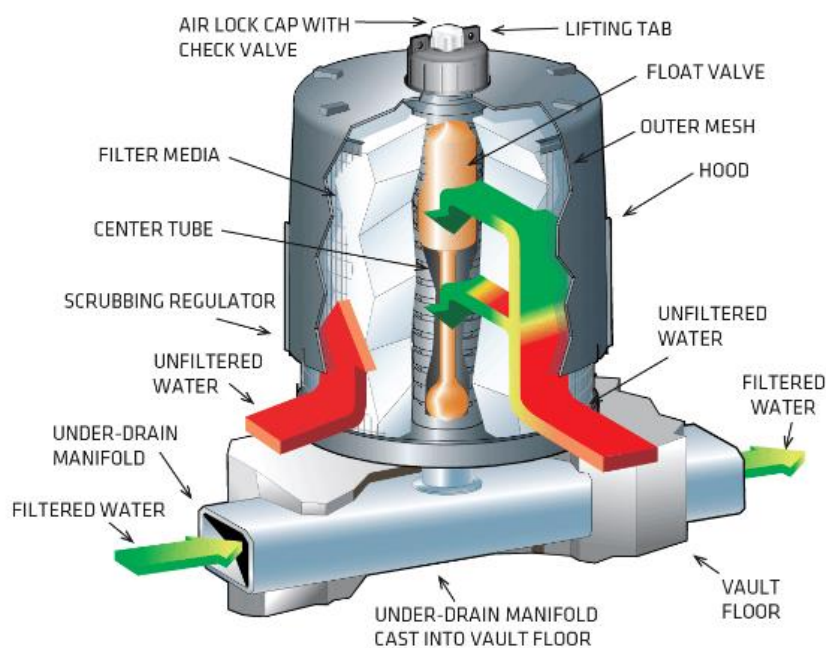
APPENDIX A: TYPICAL DETAILS OF STORMFILTER- OCEANPROTECT

StormFilter

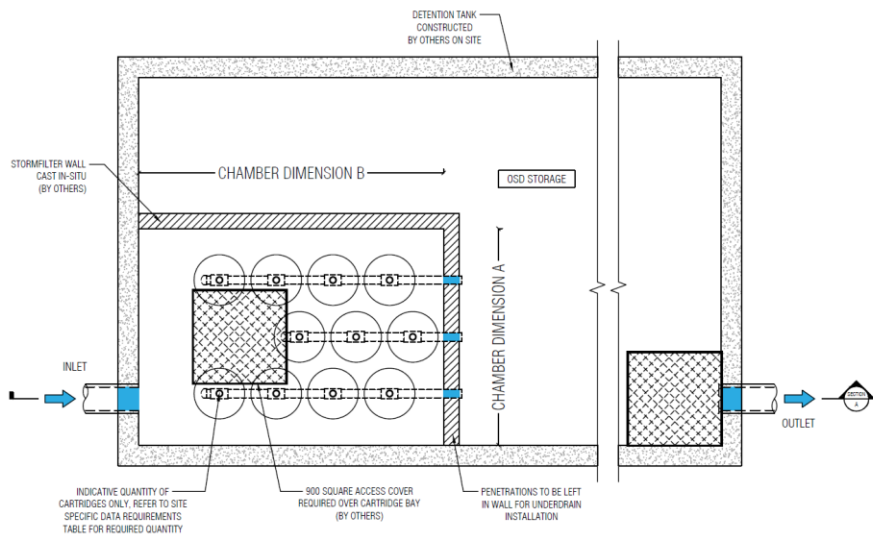
The Stormwater Management StormFilter™ cleans stormwater through a patented passive filtration system, effectively removing pollutants to meet the most stringent regulatory requirements.

The StormFilter stormwater treatment system uses rechargeable, self-cleaning, media-filled cartridges to absorb and retain the most challenging pollutants from stormwater runoff including total suspended solids, hydrocarbons, nutrients, soluble heavy metals, and other common pollutants.

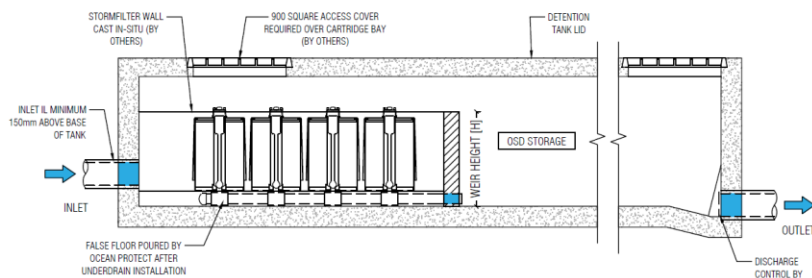
The siphon actuated, high surface area cartridges draw stormwater evenly through the filter media, providing efficient, effective stormwater treatment, while the self-cleaning hood prevents surface binding, ensure maximum media contact, and prolongs cartridge life.



STRUCTURAL DETAIL



PLAN LAYOUT



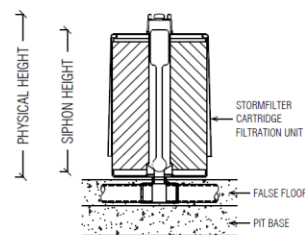
SECTION A

LAST MODIFIED: 07-03-19

STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.

CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600
TYPICAL WEIR HEIGHT [H] (mm)	920	690	540
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39



STORMFILTER CARTRIDGE DETAIL

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
NUMBER OF CARTRIDGES REQ'D	
SIPHON HEIGHT (310 / 460 / 690)	
MEDIA TYPE (ZPG / PSORB)	
WATER QUALITY FLOW RATE (L/S)	
DIMENSION A	
DIMENSION B	

TOTAL CARTRIDGE BAY AREA (A x B)
TO MATCH AREA REQUIRED BY MUSIC
MODELLING OR COUNCIL SPECIFIC
REQUIREMENTS

GENERAL NOTES

1. INLET AND OUTLET PIPES TO BE IN ACCORDANCE WITH APPROVED PLANS.
2. A HIGH FLOW BYPASS ARRANGEMENT OR DISSIPATION STRUCTURE MAY BE REQUIRED TO MINIMISE RE-SUSPENSION OF SOLIDS OR ANY SIGNIFICANT INERTIAL FORCES ON THE CARTRIDGES.
3. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
4. SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.
5. THE INVERT LEVEL OF THE INLET PIPE MUST BE GREATER THAN THE RL OF THE FALSE FLOOR WITHIN THE CARTRIDGE CHAMBER.
6. CONCRETE STRUCTURE AND ACCESS COVERS DESIGNED AND PROVIDED BY OTHERS. ACCESS COVERS TO BE A MINIMUM 900 X 900 ABOVE CARTRIDGES. OH&S REGARDING ACCESS COVERS AND TANK ACCESS TO BE ASSESSED BY OTHERS ON SITE.
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES.
8. DRAWINGS NOT TO SCALE.

INSTALLATION NOTES

1. UNDERDRAIN AND FALSE FLOOR INSTALLED BY OCEAN PROTECT.



PHONE: 1300 354 722

www.oceanprotect.com.au

OCEAN PROTECT
STORMFILTER SYSTEM
DETENTION TANK ARRANGEMENT
SPECIFICATION DRAWING