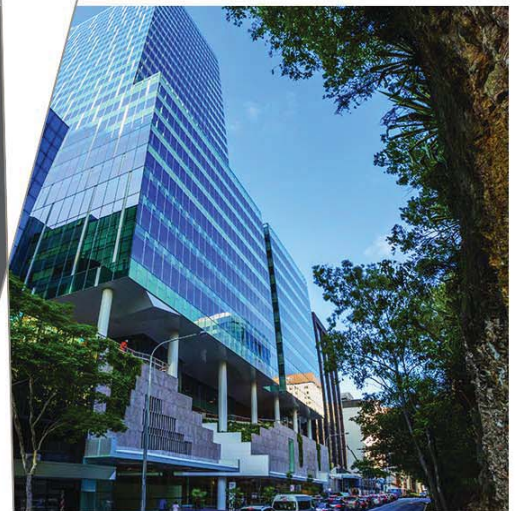


Stormwater Management Plan

Dalton Drive, Maroochydore - Stage 1

V171462



Prepared for

Maroochydore Spotlight Property 2 Pty Ltd
C/O Blueprint Group Australia Pty Ltd

21 November 2017

**PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL**

Approval no: DEV2017/893

Date: 26 February 2018



Queensland
Government

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Prepared for

Maroochydore Spotlight

Property 2 Pty Ltd C/O

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1	20/11/2017	Client review	NG	HM
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1 Introduction

Cardno has been engaged by Maroochydore Spotlight Property 2 Pty Ltd C/O Blueprint Group Australia Pty Ltd to prepare a Stormwater Management Plan to support the Material Change of Use (MCU) development application for Stage 1 of Lot 1 on SP202103. For Stage 1 it is proposed to develop part of this site for large format retail development including a Spotlight and other showroom tenancies.

The development application is being made to Economic Development Queensland (EDQ), rather than the Sunshine Coast Council, given the site is located within the Maroochydore City Centre (MCC) Priority Development Area (PDA). Therefore, assessment of the development is undertaken in accordance with the Development Scheme, and not the Planning Scheme (other than where the development scheme is called up by the Planning Scheme).

The development site is zoned Principal Centre (CBD).

2 Site Description

The site has an area of 4.35 hectares, of which 2.77 hectares will be developed as part of Stage 1. The site is bounded by Dalton Drive to the west and south, residential townhouses to the south-east and the Maroochydore City Centre (MCC) Priority Development Area (PDA) site, currently being developed by SunCentral Maroochydore to the north and north-east.

The site is grassed and relatively flat, with levels ranging from 1.7 to 4.1 mAHD. Approximately 40 percent of the site drains via sheet flow to the north and north-east into the neighbouring MCC site, with the remainder draining towards an existing headwall located in the south-east corner of the site. The headwall connects to a 1200 by 600mm RCBC which then connect to existing stormwater drainage in Dalton Drive.



Figure 2-1 Existing Site Drainage (SCC MyMaps)

3 Proposed Development

3.1 Summary

The proposed plan of development is provided in Appendix A. Stage 1 of the proposed development consists of a large format retail development and associated car parking. During Stage 1 of the development, vacant lots on the northern and southern boundaries will be retained. However, an access road to the south, connecting to Dalton Drive, will be provided during Stage 1. This access road will require filling over the existing stormwater connection, which has an invert level of 1.65 mAHD, and so a new connection point for the neighbouring vacant lot will be required, to ensure that this area can continue to freely drain. The roof area from the proposed building and the carpark area to the east and south of this building will be drained towards the south, replicating the existing catchment area draining towards this location.

The northern carpark area will have underground drainage directed towards the north-east corner, discharging to an existing vegetated channel, with an invert level of around 1.7 mAHD, in the neighbouring MCC site. No excavation will be required within the neighbouring property to allow this to freely drain. It was not possible to drain to the existing stormwater line in Dalton Drive, located to north-west, as this drainage was not designed to convey runoff from this site. As part of this development it is proposed to construct part of the future access road that will be required for access from the north, from the future MCC development. Part of this road reserve will extend into the neighbouring MCC site. Allowance for future drainage connections from this neighbouring lot will be required within this road reserve. During the ultimate development of the MCC site, the underground drainage will be extended, and will discharge into the proposed lake. The overland flow from the carpark area in major storm events will be directed towards the east, discharging to the proposed parkland area in the neighbouring MCC site.

This drainage plan was based on preliminary drainage plans and road grading prepared for the future development of the MCC site.

The developed case catchment plan has replicated the existing flow patterns on site.

3.2 Lawful Points of Discharge

The lawful point of discharge for flows directed towards the south is the existing headwall, located within the south-east corner of the site. This connects to Council drainage in Dalton Drive. The drainage network was established when the site was zoned by Maroochy Shire Council as Mixed Housing, which had an assumed fraction impervious of 0.60. Therefore the development, which will have an increased fraction impervious, will need to provide for detention on site so that the existing capacity of the downstream stormwater network is not exceeded. Detailed detention sizing and analysis of the proposed stormwater network will be required during Operational Works.

An agreement for lawful point of discharge, for flows directed towards the north, will be required from the neighbouring MCC development, as discharge from the site will be concentrated rather than sheet flowing into the neighbouring site. However, as the runoff has been directed towards an existing gully, no further excavation will be required within the neighbouring site, to allow this area to freely drain. Replication of existing flow patterns would have made future development of the neighbouring site more problematic. The proposed drainage plan has considered the future service and level requirements of the neighbouring site.

4 Required Minimum Floor Levels

The site will be affected by local and regional flood levels, which will need to be considered when defining the minimum floor and surface levels for the development.

The regional 1% Annual Exceedance Probability (AEP) peak flood level (at 2100) in the future neighbouring lake is proposed to be 3.23 mAHD. Appropriate freeboard above this regional flood level is required. Based on minimum freeboard requirements of 400mm within the PDA, a minimum floor level of 3.63 mAHD would be required. Carpark levels should also be set a maximum of 250mm below this 1% AEP regional flood level, i.e. a minimum surface level of 2.98 mAHD.

The local flood levels will determine the required minimum floor levels for this site, as the floor levels should be set 300mm above the local 1% AEP flood level. Based on preliminary road grading of the site, as shown in Appendix B, a minimum floor level of around **4.2 mAHD** would be required. This will be required to be confirmed during detailed design.

5 Stormwater Quality Objectives

5.1 Operational Phase

The stormwater quality design objectives applicable to the site, as outlined in Table B of the Department of Infrastructure, Local Government and Planning (DILGP) *State Planning Policy (SPP)* (July 2017) are:

- > Total Suspended Solids (TSS) – 80% removal of mean annual load from unmitigated development.
- > Total Phosphorous (TP) – 60% removal of mean annual load from unmitigated development.
- > Total Nitrogen (TN) – 45% removal of mean annual load from unmitigated development.
- > Gross Pollutants >5mm – 90% removal of mean annual load from unmitigated development.

5.2 Construction Stage

The construction phase stormwater quality design objectives applicable to the site are outlined in Table A of the DILGP *State Planning Policy* (July 2017).

The release limits for stormwater captured in a sediment basin are not to exceed the following limits:

- > Total Suspended Solids (TSS): 50 mg/L
- > pH: 6.5 – 8.0

Appropriate erosion and sediment control measures will be required to be designed, constructed and operated in accordance with the SPP 2017 guidelines.

6 Proposed Stormwater Quality Treatment

6.1 Summary

The proposed stormwater quality treatment for the site consists of:

- > Bio-retention gardens planted with trees within the northern carpark area;
- > 80kL rainwater tank used for toilet flushing and irrigation;
- > Stormwater360 Enviropod litter baskets on all field and kerb inlets; and
- > Jellyfish JF-1800-6-1.

The stormwater treatment required for the northern catchment area has been proposed to be provided by bio-retention gardens located within the car park. The majority of the bio-retention gardens will be located between the car park wheel stops, which will reduce the potential pedestrian access. These will be 1.3 metres wide with 1 in 2 batters to the top of the 50mm mulch layer. The filter width will be 0.9 metres wide with 1 in 2 batters. The filter depth will be 0.8 metres to allow for planting of trees. The extended detention depth will be 100mm and the field inlet will be located 50mm below the surrounding car park surface levels.

For the catchment area draining towards the south, end of line proprietary stormwater treatment is proposed to be utilised. This was due to the large amount of road and roof area that would be unable to be directed to at-source treatment. For the MUSIC modelling Jellyfish cartridges were used as these require minimal driving head and can provide pre-treatment of runoff before it enters a downstream detention tank, or potentially can be incorporated into the detention tank via an internal weir. The required arrangement will be determined during detailed design.

An 80kL rainwater tank has been assumed to be used for toilet flushing and irrigation. Half of the available roof area has been assumed to be directed towards the rainwater tank.

Litter baskets are assumed to be installed on all field and kerb inlets in order to remove litter and provide pre-treatment of flows entering the end of line treatment device.

6.2 Future Development Stages

During future development, the vacant lot to the north of Stage 1 will be developed. This will be required to provide its own treatment of runoff before discharging to the proposed stormwater network.

The development of the future lot on the southern boundary will be required to provide its own detention and treatment prior to stormwater being discharged off site. Alternatively, the treatment and detention also required for this lot could be incorporated into the end of line treatment system being proposed as part of Stage 1.

6.3 MUSIC Model

A MUSIC model was set up to determine the efficiency of the proposed treatment train for all stages of the development. The MUSIC model was set up using Version 6.2. The model used 6 minute timestep rainfall from Nambour, from 1989 to 1998. The MUSIC source nodes were based on the values for urban developments, as outlined in the MUSIC Modelling Guidelines – Version 1.0 2010 (Water by Design, 2010). The adopted source nodes are summarised in Table 6-1 and 6-2.

The catchment was broken down into the different source types. The properties of each sub-catchment are summarised in Table 6-3. The MUSIC model layout is shown in Figure 6-2

Table 6-1 Rainfall Runoff Parameters

Parameter	Commercial Source Node
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 6-2 Pollutant Export Parameters

		TSS Log ¹⁰ Values		TP Log ¹⁰ Values		TN Log ¹⁰ Values	
Parameter	Surface Type	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Commercial							
Baseflow	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Roads	0.78	0.39	-0.60	0.50	0.32	0.30
	Ground	0.78	0.39	-0.60	0.50	0.32	0.30
Stormflow	Roof	1.30	0.38	-0.89	0.34	0.37	0.34
	Roads	2.43	0.38	-0.30	0.34	0.37	0.34
	Ground	2.16	0.38	-0.39	0.34	0.37	0.34

Table 6-3 Catchment Areas and Proposed Stormwater Treatment

Catchment	Area (ha)	% Impervious	MUSIC Node	Proposed Treatment
A1	0.299	90	Commercial Road	17.1 m ² Bio-retention Garden, Enviropod Litter Baskets
A2	0.135	90	Commercial Road	17.1 m ² Bio-retention Garden, Enviropod Litter Baskets
A3	0.135	90	Commercial Road	17.1 m ² Bio-retention Garden, Enviropod Litter Baskets
A4	0.218	90	Commercial Road	17.1 m ² Bio-retention Garden, Enviropod Litter Baskets
A5	0.281	90	Commercial Road	31 m ² Bio-retention Garden, Enviropod Litter Baskets
A6	0.198	90	Commercial Road	24 m ² Bio-retention Garden, Enviropod Litter Baskets
B1	0.572	100	Commercial Roof	Half roof to 80kL Rainwater Tank, 1600 kL/year Re-use, Enviropod Litter Baskets and Jellyfish JF-1800-6-1
B2	0.931	90	Commercial Road	Enviropod Litter Baskets and Jellyfish JF-1800-6-1

The MUSIC catchments are shown in Figure 6-2.

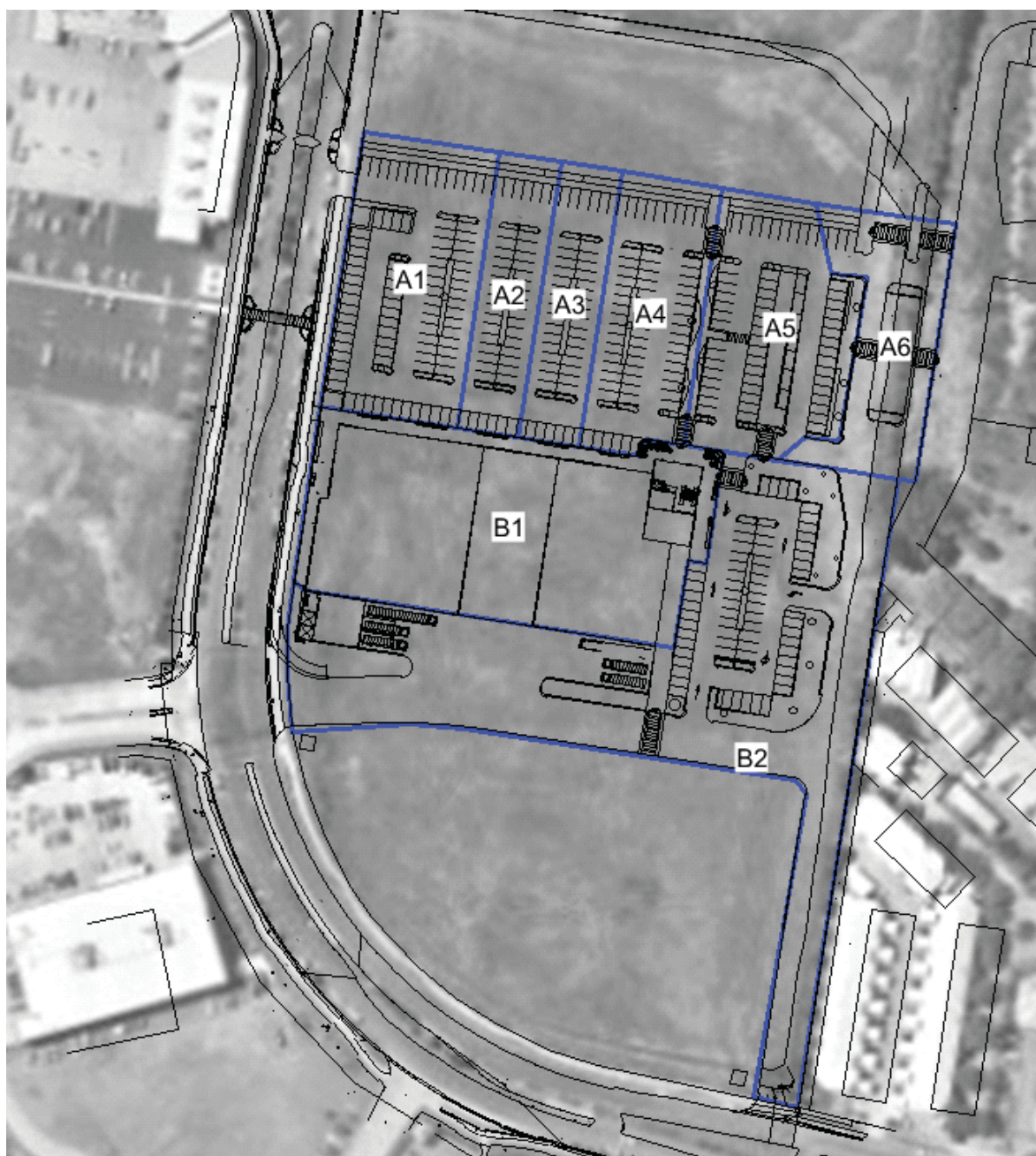


Figure 6-1 MUSIC Catchments

The removal efficiencies for the proprietary treatment devices were provided by the manufacturer. Details of the Stormwater360 Jellyfish and Enviropods are provided in Appendix C. No treatment of nutrients was assumed in MUSIC for the Enviropods as they have not been used in conjunction with the Stormfilters.

The details of the bio-retention gardens are provided in Table 6-4. The filter area for each device is provided in Table 6-3.

Table 6-4 Bio-retention Garden MUSIC Details

Parameter	Bio-retention Gardens
Extended Detention Depth (m)	0.1
Saturated Hydraulic Conductivity (mm/hr)	200
Filter Depth (m)	0.8
TN Content of Filter Media (mg/kg)	500
Orthophosphate Content of Filter Media (mg/kg)	20

An 80kL tank was assumed to be used for toilet flushing and irrigation. The irrigation rate was assumed to be 730 mm/year, which totalled 1600 kL/year of irrigation. The number of toilets was not known, and so toilet flushing was excluded from the analysis. The rainwater tank will be required to be topped up from mains water supply. Half of the available roof area was assumed to be drained towards the tank. The proposed tank will provide 74% of the non-potable water demand.

The proposed stormwater treatment layout is provided in Appendix B.

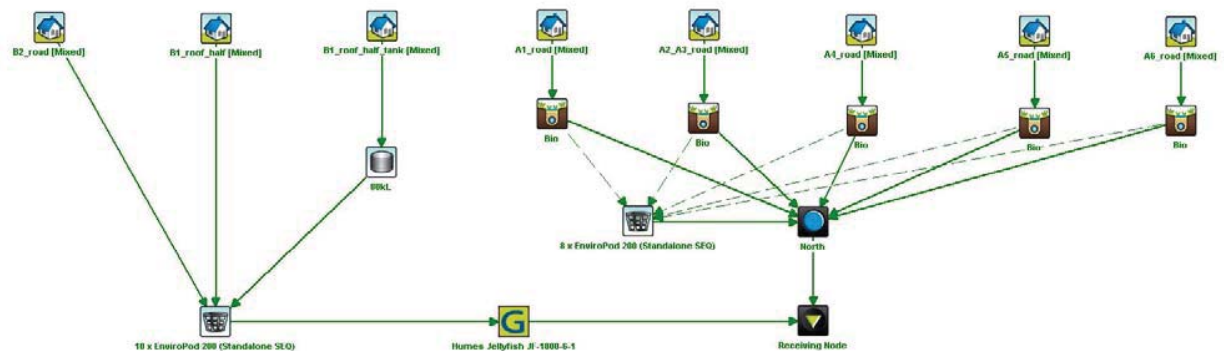


Figure 6-2 MUSIC Model Layout

6.4 MUSIC Model Results

The results of MUSIC are provided in Table 6-5. As demonstrated by this table the water quality objectives have been satisfied for all pollutants.

Table 6-5 MUSIC Model Results

Parameter	Mean Annual Load (kg/yr)		% Removal
	Sources	Residual	
Flow (ML/yr)	36.6	35.2	3.8
TSS	6080	687	88.7
TP	13.3	5.26	60.5
TN	108	57.8	46.5
GP	850	0.45	99.9

7 Maintenance

Maintenance of the stormwater quality devices is to be carried out by body corporate. The maintenance requirements of the proprietary products are to be carried out in accordance with manufacturer's guidelines. Maintenance of the bio-retention gardens should be carried out in accordance with Water by Design (2012) *Maintaining Vegetated Stormwater Assets (Version 1)* guidelines.

8 Conclusion

The proposed development of Stage 1 of Lot 1 on SP202103 has been shown through MUSIC modelling to satisfy the proposed stormwater quality requirements. The proposed stormwater treatment includes:

- > Bio-retention gardens planted with trees within the northern carpark area;
- > 80kL rainwater tank used for toilet flushing and irrigation;
- > Stormwater360 Enviropod litter baskets on all field and kerb inlets; and
- > Jellyfish JF-1800-6-1.

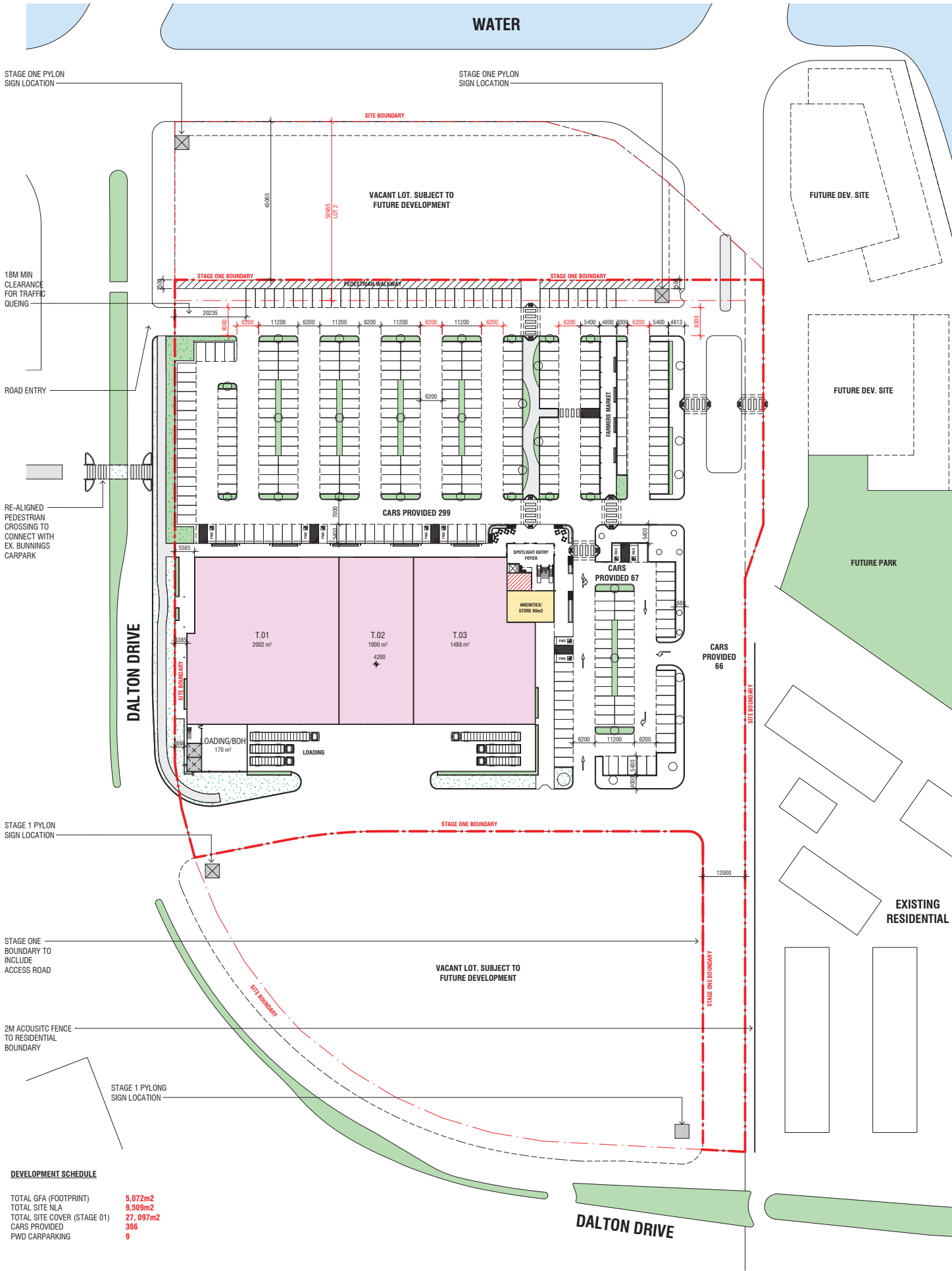
Further detailed modelling of the stormwater detention requirements will be necessary during the Operational Works stage.

Dalton Drive, Maroochydore - Stage 1

APPENDIX

A

PROPOSED LAYOUT



DEVELOPMENT SCHEDULE

TOTAL GFA (FOOTPRINT)	5,072m ²
TOTAL SITE NLA	9,509m ²
TOTAL SITE COVER (STAGE 01)	27,097m ²
CARS PROVIDED	366
PWD CARPARKING	9

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issue	date	revision	into	out
1	23/11/17	FINAL ISSUE AMENDMENTS	DP	PS
2	23/11/17	FINAL ISSUE	DP	PS
3	23/11/17	TRAFFIC AMENDMENTS	AJ	PS
4	16/11/17	DRAFT ISSUE	DP	PS
5	16/11/17	DRAFT ISSUE	DP	PS
6	16/11/17	DRAFT ISSUE	DP	PS
7	16/11/17	PRELIMINARY	DP	PS
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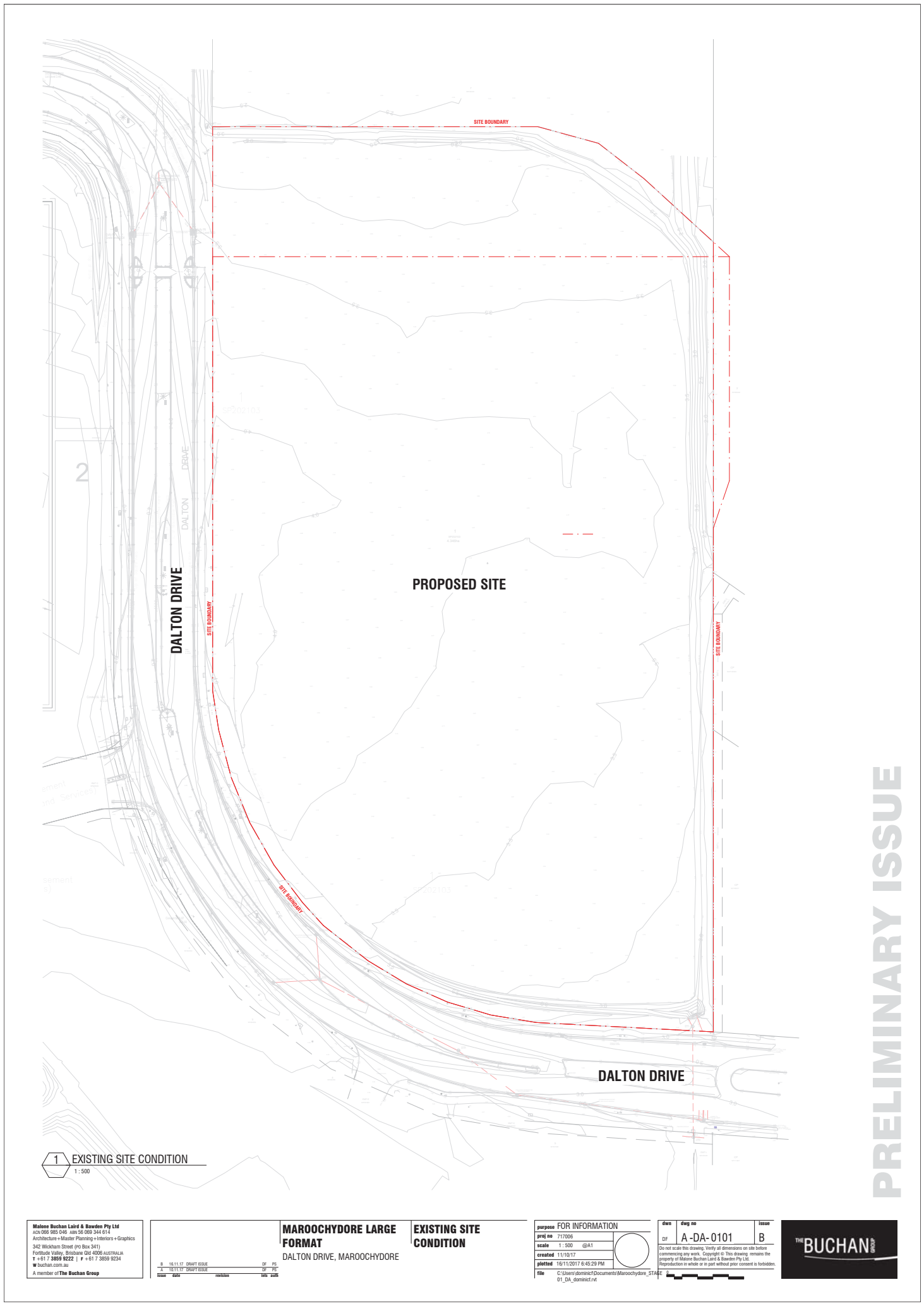
**MAROOCHYDORE LARGE
FORMAT RETAIL - STAGE
01**
DALTON DRIVE, MAROOCHYDORE

**PROPOSED
MASTERPLAN - STAGE
01**

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Author A-DA-0102 **K**
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PRELIMINARY ISSUE

1 EXISTING SITE CONDITION
1:500

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0 10.11.17 DRAFT ISSUE
10.11.17 DRAFT ISSUE
Issue Date revision 100 scale

**MAROOCHYDORE LARGE
FORMAT**
DALTON DRIVE, MAROOCHYDORE

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CONDITION**

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Issue B

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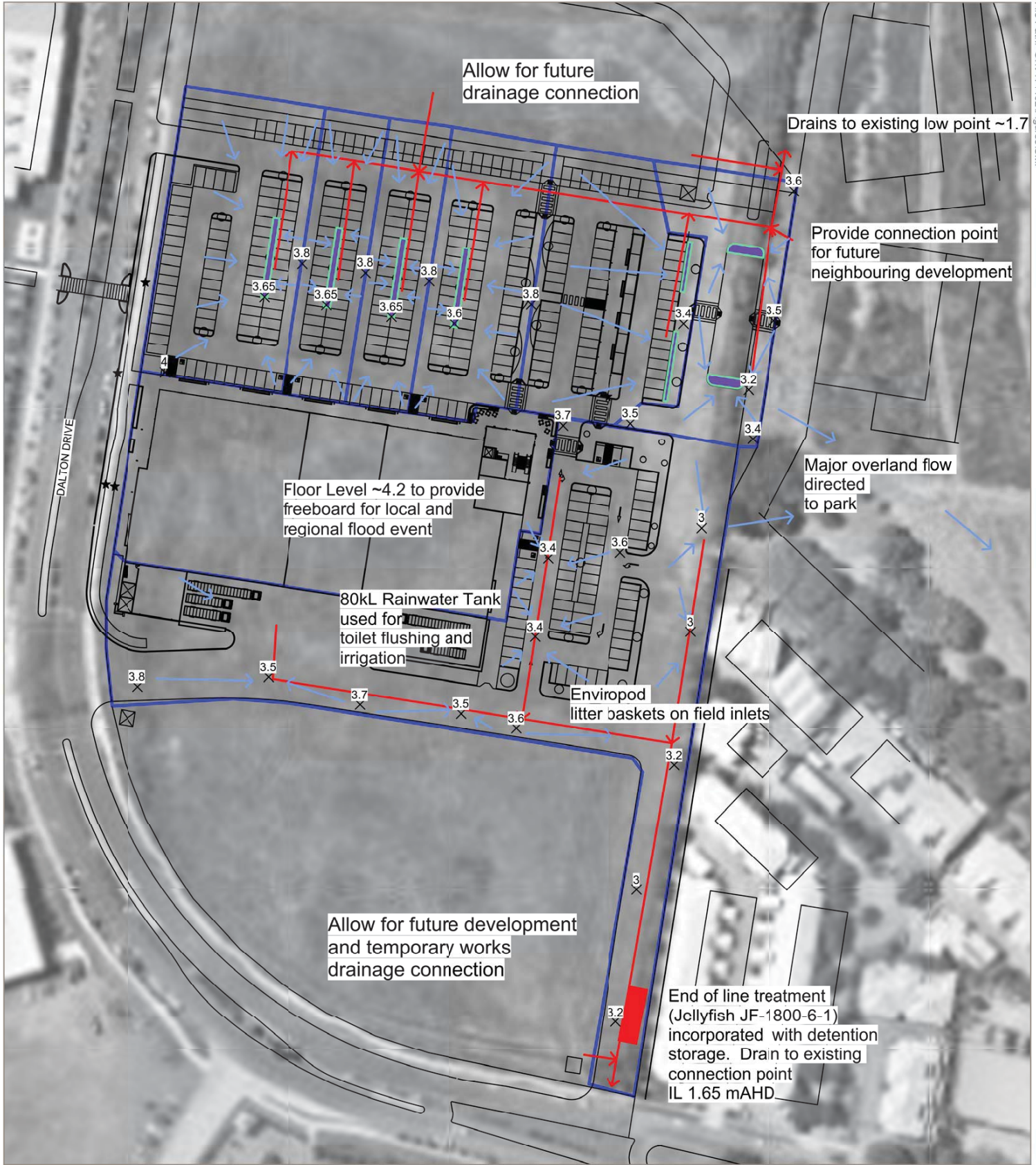


Dalton Drive, Maroochydore - Stage 1

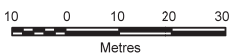
APPENDIX

B

PROPOSED STORMWATER
TREATMENT



Scale: 1:1,000



SHEET A3
Project No: V171462
Date: 24 November 2017
Revision Number:
Designed by:
Client Name: Maroochydore Spotlight Property 2 Pty Ltd

LEGEND

-  Bio-retention Garden
-  Stormwater Pipe
-  Overland Flow Path
-  WQ Treatment/ Detention Storage
-  Preliminary Surface Level
-  Catchment

Appendix B

Stormwater Management Plan

Maroochydore SP2 Stage 1



Dalton Drive, Maroochydore - Stage 1

APPENDIX

C

JELLYFISH DETAILS

JELLYFISH DESIGN NOTES

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. IF THE FLOW EXCEEDS THE TREATMENT FLOW THEN AN UPSTREAM BYPASS STRUCTURE IS REQUIRED

CARTRIDGE DEPTH [mm]	1375	1375
OUTLET INVERT TO STRUCTURE INVERT [mm]	1985	1985
CARTRIDGE RATE FOR HIGH FLOW / DRAINDOWN [L/s]	5 / 2.5	3.34 / 1.96
IL DIFFERENCE BETWEEN HF BYPASS AND JF OUTLET [mm]	457	305

JELLYFISH SECTION

JELLYFISH PLAN

Stormwater360

STORMWATER360 AUSTRALIA

JELLYFISH JF1800

STANDARD DETAIL

OFFLINE CONFIGURATION

DRAWING

1

A

CHK:XXX

DRN:XXX

FILE NAME: JF1800-GA-OF-1A

DATE: 13-03-17

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	XXX		
WATER QUALITY FLOW RATE (L/S)	XXX		
PEAK FLOW RATE (L/S)	XXX		
RETURN PERIOD OF PEAK FLOW (yrs)	XXX		
# OF CARTRIDGES REQUIRED (HF / DD)	XXX		
CARTRIDGE SIZE	XXX		
PRECAST VAULT WEIGHT	- kg		
PRECAST LID WEIGHT	- kg		
PIPE DATA:	I.L.	MATERIAL	DIAMETER
INLET PIPE #1	XXX	MATERIAL	XXX
OUTLET PIPE	XXX	MATERIAL	XXX
ANTI-FLOTATION BALLAST	XXX	XXX	XXX
NOTES/SPECIAL REQUIREMENTS:			

GENERAL NOTES

1. STORMWATER360 TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.

2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR STORMWATER360 AUSTRALIA REPRESENTATIVE. www.stormwater360.com.au

3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF THE PROJECT.

4. PRECAST STRUCTURE TO BE CONSTRUCTED BY STORMWATER360 AUSTRALIA IN ACCORDANCE WITH AS3600.

5. STRUCTURE AND ACCESS COVERS TO BE DESIGNED TO MEET AUSTRROADS T44 LOAD RATING WITH 0.0m TO 2.0m FILL MAXIMUM (CLASS D) UNLESS OTHERWISE NOTED.

6. JELLYFISH FILTER BY STORMWATER360 AUSTRALIA: PHONE 1300 354 722 OR VISIT www.stormwater360.com.au

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL, DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE SPECIFIC DESIGN CONSIDERATION AND SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER.

B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.

C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).

D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

E. CARTRIDGE INSTALLATION, BY STORMWATER360, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT STORMWATER360 TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION ON 1300 354 722

Jellyfish® Filter

Membrane Filtration

Our waterways. Our future.

Stormwater360
AUSTRALIA

Jellyfish® Filter

Highest Flow Rate/Lowest Head Loss



The Jellyfish Filter is a stormwater quality treatment technology featuring high surface area and high flow rate membrane filtration at low driving head. By incorporating pretreatment with light-weight membrane filtration, the Jellyfish Filter removes floatables, trash, oil, debris, TSS, fine silt-sized particles, and a high percentage of particulate-bound pollutants; including phosphorus and nitrogen, metals and hydrocarbons.

The high surface area membrane cartridges, combined with up flow hydraulics, frequent backwashing, and rinsable/reusable cartridges ensures long-lasting performance.

Features

- High surface area, high flow rate membrane filtration
- Highest design treatment flow rate per cartridge (5 L/S)
- Low driving head (typically 460 mm or 300)
- Lightweight cartridges with passive backwash
- Field performance verified

Benefits

- Long-lasting and effective stormwater treatment
- Compact system with a small footprint, lower construction cost
- Design Flexibility, lower construction cost
- Easy maintenance and low life-cycle cost
- Superior pollutant capture with confidence

Applications

- Urban development
- Highways, airports, seaports, and military installations
- Commercial and residential development, infill and redevelopment, and stormwater quality retrofit applications
- Industrial Sites



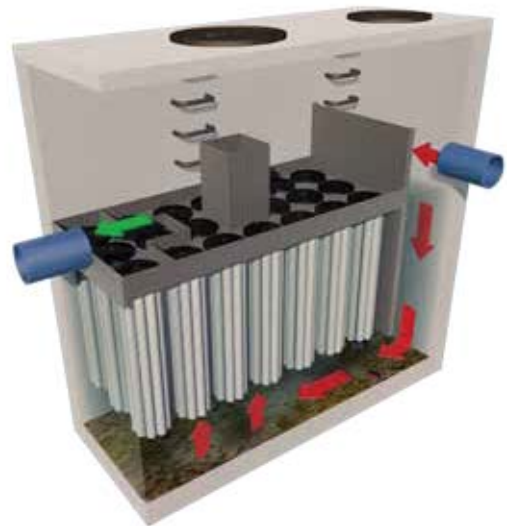
Kerb Inlet Jellyfish Filter is installed in a commercial development

Configurations

The Jellyfish Filter is available in a variety of configurations. Typically, 460 mm of driving head is designed into the system. For low drop sites, the designed driving head can be less.



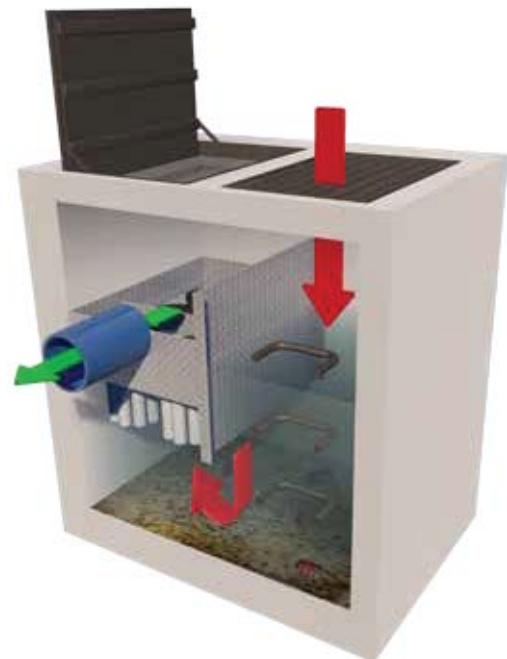
Manhole



Vault



Kerb Inlet



Grated Inlet

Inspection and Maintenance

Inspection and maintenance activities for the Jellyfish Filter typically include:

- Visual inspection of deck, cartridge lids, and maintenance access wall
- Vacuum extraction of oil, floatable trash/debris, pollutants and sediment from manhole sump.
- External rinsing and re-installing of filter cartridges.
- Replacement of filter cartridge tentacles as needed. Cartridge replacement intervals vary by site; replacement is anticipated every 2-5 years.



The Jellyfish Filter Cartridge Rinse



The Jellyfish Filter tentacle is light and easy to clean

Inspection Frequencies:

- A minimum of two inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
- Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
- Inspection is recommended after each major storm event.
- Immediately after an upstream oil, fuel or other chemical spill.

Next steps

Learn more

For more detailed technical information about Stormwater360 products and solutions, visit www.stormwater360.com.au

Connect with us

With more than 15 years experience in developing, installing and maintaining innovative and efficient site-specific stormwater management solutions, Stormwater360's highly qualified engineers and consultants can assist you with every aspect of your stormwater project.

Whether it's an initial in-house technical presentation, a request to inspect and clean your existing facility, or assistance with designing a specific stormwater management solution for your site, simply complete the enquiry form at stormwater360.com.au or call **1300 354 722** to speak to a Stormwater360 consultant.

Start a project

If you are ready to begin a project, our engineering team will provide you with everything you need, from a free preliminary design to MUSIC modelling, CAD drawings to maintenance frequency and associated costs schedules. To find out more, simply visit www.stormwater360.com.au and complete the Design Information Request form.

Stormwater360 supplies and maintains
a complete range of filtration,
hydrodynamic separation, screening and
oil/water separation technologies.

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EnviroPod[®]

Technical Design Manual



Stormwater360
AUSTRALIA

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1.1 Design and Operation

The EnviroPod® is a proven catchpit insert designed to be easily retrofitted into new and existing stormwater catchpits, requiring no construction or land take. It removes a significant portion of sediment, trash, debris and other pollutants from water entering the stormwater system, and can be installed in either curb inlet, standard pre-cast catchpits or manhole catchpits. Using low-cost passive screening and optional oil-adsorbent media, the EnviroPod® can be customised to meet site-specific requirements with interchangeable polyester mesh screens ranging from 100 to 1600 micron pore size. 200 micron filter mesh screening bags are supplied as standard (unless specified otherwise). This filter mesh has a moderate/high removal rate and a moderate maintenance requirement.

The EnviroPod is also effective as a pretreatment device for use in a treatment train with hydrodynamic separators, filtration, ponds, swales and wetlands. In many cases, it's often the most practical solution for retrofits.

Independently trialled and tested by city councils throughout Australia and New Zealand and with installation of over 7,000 units including North America, the EnviroPod® Filter is the premiere pit insert.

Design and Operation

The EnviroPod® consists of a screening bag supported by a filterbox and structural cage. Modular plastic deflector panels attach to the filterbox and guide the flow of water to the screening bag. The screening bag captures pollutants and allows the water to pass through to the outlet pipe. Optional absorbent material inside the screening bag captures oil and grease. Openings in the filterbox allow water to bypass the screening bag during high flow conditions to prevent surface flooding.

Configurations

The EnviroPod® is designed to simply insert into the gully pit below the grate and is mounted on aluminum rails anchored to the (gully) pit walls. The one configuration fits sump type grates, road gullies, kerb entry units etc. Plastic deflector panels seal against the pit walls and direct flow into the filterbox and through the mesh screens. There are mainly two standard sizes to fit most pre-cast (FRC & plastic included) regular and curb entry gullypits with varying plan dimensions between 500 x 500 up to 900 x 900. Custom designs are able to be fabricated for non-standard pits.

Maintenance

Maintenance of the EnviroPod is easy and straight forward. Simply lift the screening bag from the frame and dump out the captured pollutants. Alternatively, the bag can be vacuumed for even faster maintenance. If necessary, replace the oil absorbent media bags.

Capabilities

- ✓ Captures sediment, trash, debris and other pollutants before they enter the storm drain system
- ✓ Fits curb inlet and flat-grate gully pits
- ✓ Easy access — maintenance-friendly design
- ✓ Fits a range of gully pit sizes — ideal for retrofits
- ✓ Adjustable panels allows fine-tuning during installation for a perfect fit

Configurations

Table 1.

	EnviroPod - A	EnviroPod - C
Gully Pit Width, Min – Max (mm)	500 - 900	500 - 900
Gully Pit Length, Min – Max (mm)	730 - 900	450 – 750
Mesh Size ¹ (µm)	200, 1600	200, 1600
Mesh Size ¹ (µm)	135	60
Mesh Size ¹ (µm)	10-100	10-100
Bypass Flow Rate ² (L/s)	200+	130+

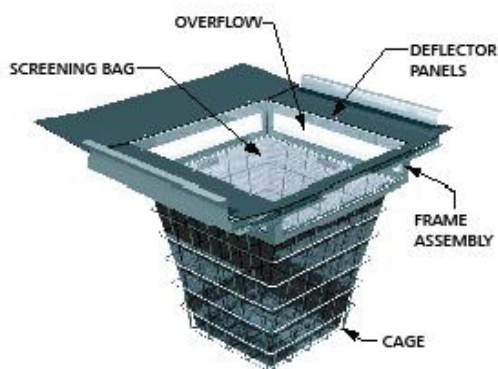


Figure 1. Standard EnviroPod Filter

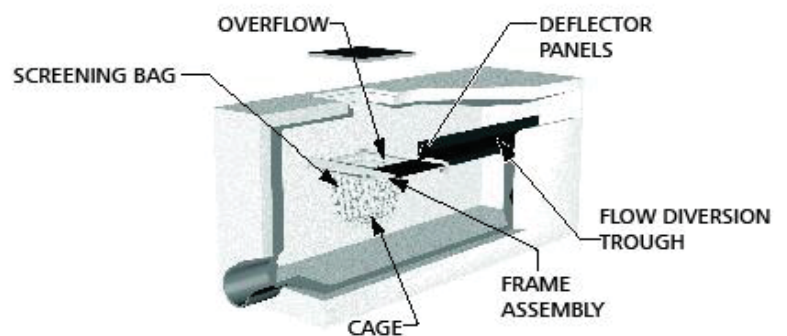


Figure 2. Gully Pit EnviroPod Filter configuration

1.2 Parameter Performance

1.2.1 Parameter Performance: Gross Pollutants and Coarse Sediment

Testing at the University of South Australia Urban Water Resources Centre found that the Enviropod unit retained all litter up to an approach flow of 100L/sec. On this basis and the design of the Enviropod Filter bag material which has a sieve aperture of 200 micron we can say with confidence that the Enviropod pre-treatment will retain 100% of Gross Pollutants and coarse sediment – defined by the Victoria Stormwater Committee as particles ranging from 500 to 5000 micron.

For full copies of the testing data please contact Stormwater360.

1.2.2 Parameter Performance: Gross Pollutants and Coarse Sediment

The Enviropod Filter is a gully pit insert designed to be easily retrofitted into new and existing stormwater gully pits, requiring no construction and no land take. Located at the source of stormwater contaminates the Enviropod Filter has interchangeable filters ranging from 100 micron to 4000 micron pore size. For Suspended Solids reduction application we recommend using a monofilament 200micron pore size filter bag (Enviropod 200).

The Enviropod filter relies on removing contaminants from stormwater by the mechanism of direct screening, guaranteeing debris and particles larger the pore size will be removed. Testing done in Auckland using an Enviropod 200micron filter shows a removal of up 97% Suspended Solids for particles 100 to 500micron in size (Butler, Ockleston, Foster, no date, pg 6).

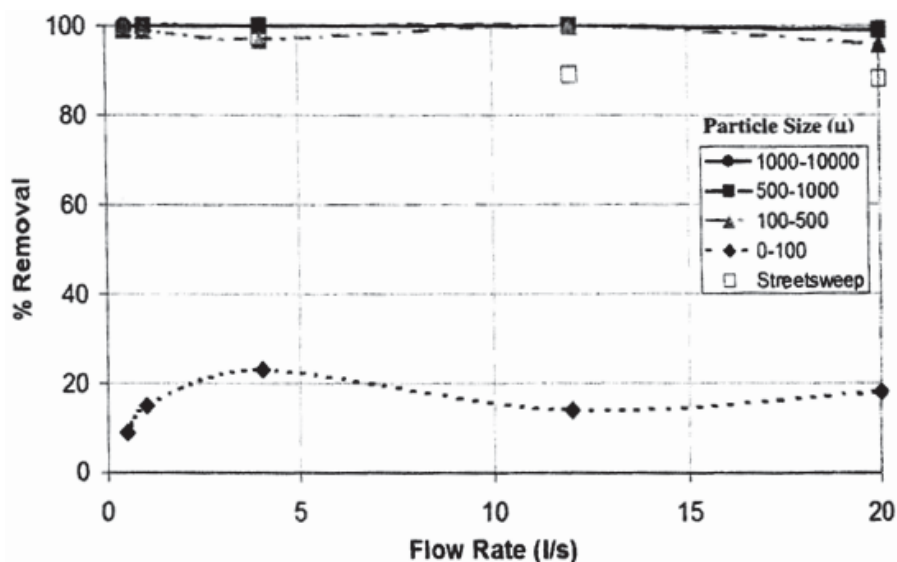


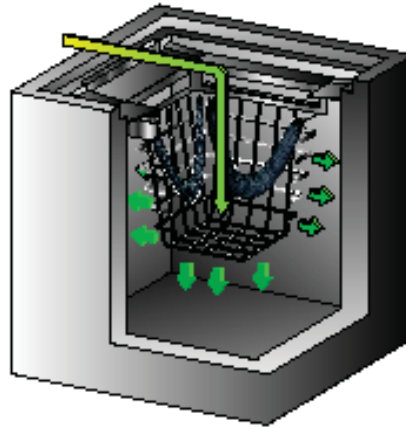
Figure 3. Percentage Removal for various particle sizes.

For full copies of the testing data please contact Stormwater360.

1.2.3 Parameter Performance: Oil and Grease

The EnviroPod uses a perlite based adsorbent material (optional) specially treated to enhance its natural ability to capture and retain oil and grease. The adsorbent material is contained in pouches that are designed to ensure maximum contact with stormwater as it enters the gully pit. Laboratory testing demonstrated that the oil adsorbent material can capture and retain three times its weight in oil.

Each EnviroPod is configured with oil adsorbent pouches around one side of the frame, at the top of the screening bag. During low flows, the water entering the catch basin contacts the oil adsorbent pouches before passing through the screening bag. During high flows, when the EnviroPod begins to bypass, the pouches skim floating oil and grease from the surface of the water retained in the screening bag.



The pouches are clipped to the screening bag for easy removal during maintenance. As the pouches capture oil, the adsorbent material darkens. When the pouches are nearly black they have almost reached their oil adsorbent capacity and should be replaced.

1.3 Inspection and Maintenance

EnviroPod installations vary due the vast number of gully pit configurations. These guidelines should apply to most cases as written. For the remaining cases, follow the general actions of these guidelines, varying them as necessary.

The maintenance crew is responsible for disposing of debris in accordance with all applicable regulations and is responsible for following all applicable regulations, including confined space entry requirements.

Contact the maintenance department at Stormwater360 for more information or to order EnviroPod bags and oil absorbent pouches.

Vacuum Truck Maintenance

1. Establish a safe working area per typical catch basin service activity.
2. Remove grate.
3. Vacuum accumulated debris from the upper portion of the catch basin.
4. Remove and inspect the oil absorbent pouches clipped to the inside of the EnviroPod bag. Replace with new pouches in step 8 if the pouches are dark with oil.
5. Vacuum contents from bag. Once most of the material is removed, remove the bag from the EnviroPod with two manhole cover hooks through the loops at the top of the bag.
6. Clean sediment and oils from sides of bag by shaking and/or brushing, taking care not to damage the bag.
7. Inspect the bag, replace if damaged.
8. Re-install oil absorbent pouches. Place bag in EnviroPod.
9. Replace grate.

Hand Maintenance

1. Establish a safe working area per typical catch basin service activity.
2. Remove manhole cover.
3. Remove any material that is in the trough through the curb inlet or manhole.
4. Remove the bag from the EnviroPod with two manhole cover hooks through the loops at the top of the bag. Excess debris should be scooped out first if the bag is near full.
5. Remove and inspect the oil absorbent pouches clipped to the inside of the bag. Replace with new pouches in step 9 if the pouches are dark with oil.
6. Pour contents of bag into disposal container.
7. Clean sediment and oils from sides of bag by shaking and/or brushing, taking care not to damage the bag.
8. Inspect bag, replace if damaged.
9. Re-install oil absorbent pouches in bag.
10. Place bag in EnviroPod. CRITICAL – There is a steel ring inside the bag. Make sure the loose ends are joined together in the connector tube.
11. Replace manhole cover.