
Stormwater Quality Management Plan

for

Plantation Retirement Resorts

Vertical Retirement Village

at

Lot 8002 Baringa Drv, Aura

Job Ref: SC-10007

January 2024

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2024/1474
Date: 08 May 2024



AMENDED IN RED

By: Andrew McKnight
Date: 08 May 2024



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Affected Properties	
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RP Description	8002 SP309500
Prepared For	Plantation Retirement Resorts
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INTRODUCTION

1.1. Background

This report is to accompany and be considered part of an application to Economic Development Queensland (EDQ) to gain a Development Approval for a proposed Vertical Retirement Village development on Lot 8002 Baringa Drv, Aura. This application seeks a PDA Development Permit for a Material Change of Use for Multiple Residential Unit Dwellings - stages 1 and 2.

1.2. Scope

Empire Engineering Pty Ltd was commissioned by Plantation Retirement Resorts to develop a Stormwater Quality Management Plan to outline stormwater management strategies for the proposed development in accordance with the relevant Local and State Government standards. A stormwater quality management strategy has been developed in accordance with relevant Sunshine Coast Council (SCC) guidelines and the State Planning Policy (SPP, 2017) and PDA Guideline No. 13 Engineering standards - Stormwater quality. The requirements are met through modelling the pollutant export generated by the proposed development and appropriately implementing stormwater quality improvement devices (SQID's).

1.3. Proposed Development

Preliminary architectural drawings prepared by OGE Group Architects depict a proposed residential 92 unit development with associated ground floor parking and associated access driveways.

2.0 SITE CHARACTERISTICS

2.1. Location

The subject site is rectangular in shape, has an area of 0.79Ha with direct road frontage access off Evans Lane, Lukin Tce and Baringa Drv. The remaining northern boundary adjoins Lot 9048, a drainage reserve.

2.2. Topography and Drainage

The site generally falls from west to east. There is approximately 1m of fall across the lot. Earthworks for the site were previously completed as part of the Aura Estate, as such the site is generally cleared of large vegetation with low growing grass coverage.

The downstream receiving environment is Council's road reserve. The road has a developed storm water system in the form of an underground piped drainage system. There is a storm water field inlet pit located within the site boundary to the corner of Lukin Tce & Baringa Drv. A DN600 pipe connection, conveying the storm water run-off from the development site to the larger downstream drainage network. This is the lawful point of discharge established for the site at the time of the estate subdivision.

There are no upslope external catchments traversing the subject site.



Figure 1.0 – Subject Site

(courtesy Nearmaps)

2.3. Design Objectives

Design objectives for stormwater quality management are that the development protects or enhances the environmental value and water quality of receiving waters within or downstream of the site prior to discharge. Triggers for development of lots exceeding 2,500m² or for urban purposes within population centres greater than 3000 persons require the application of Water Sensitive Urban Design (WSUD) load reduction targets. The scope typically encompasses the operational 'post construction' phase of the development however 'construction phase' water quality is briefly addressed in this report.

Development must incorporate the principles of Water Sensitive Urban Design (WSUD) in accordance with 'Urban Stormwater - Queensland Best Practice Environmental Management Guidelines' and current industry standards (e.g. Environmental Protection (Water) Policy, Queensland State Planning Policy 2017 – water quality).

Erosion and Sediment Control must be designed in accordance with the recommendations contained within the Environment Protection Agency's (EPA) 'Best Practice Urban Stormwater Management – Erosion and Sediment Control', International Erosion Control Association's (IECA) – 'Best Practice Erosion & Sediment Control' and 'Queensland Urban Drainage Manual' (QUDM).

3.0 STORMWATER QUALITY MANAGEMENT

3.1. Construction Phase

Table 3.1 has been adapted from Table C4.1 of Brisbane City Council's (BCC) *Stormwater Best Management Practices 2000* and details the typical stormwater pollutants which may be generated during the construction phase of the development.

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags and off-cuts
Sediment	Unprotected exposed soils and stockpiles during earthworks and building
Hydrocarbons	Fuel and oil spills, leaks from construction equipment
Toxic Materials	Cement slurry, solvents, cleaning agents, wash waters
pH Altering Substances	Cement slurry, wash waters

Table 3.1 - Typical Construction Phase Pollutants

The following ESC measures should typically be implemented prior to the commencement of construction:

- Education of all site workers in sediment and erosion procedures;
- Specified storage areas for construction materials and plant that are bunded to prevent any spillages from escaping.

Table 3.2 illustrates the State Planning Policy objectives for construction phase stormwater quality that the erosion and sediment control plan to be submitted with the operational works approval is required to achieve.

Issue		Design objectives
Drainage control	Temporary drainage works	- Design life and design storm for temporary drainage works: - Disturbed area open for <12 months—1 in 2-year ARI event - Disturbed area open for 12–24 months—1 in 5-year ARI event - Disturbed area open for > 24 months—1 in 10-year ARI event - Design capacity excludes minimum 150 mm freeboard - Temporary culvert crossing—minimum 1 in 1-year ARI hydraulic capacity
Erosion control	Erosion control measures	- Minimise exposure of disturbed soils at any time - Divert water run-off from undisturbed areas around disturbed areas - Determine the erosion risk rating using local rainfall erosivity, rainfall depth, soil-loss rate or other acceptable methods - Implement erosion control methods corresponding to identified erosion risk rating
Sediment control	Sediment control measures Design storm for sediment control basins Sediment basin dewatering	- Determine appropriate sediment control measures using: - Potential soil loss rate, or - Monthly erosivity, or - Average monthly rainfall - Collect and drain stormwater from disturbed soils to sediment basin for design storm event: - Design storm for sediment basin sizing is 80th% five-day event or similar - Site discharge during sediment basin dewatering: - TSS < 50 mg/L TSS, and - Turbidity not >10% receiving waters turbidity, and - pH 6.5–8.5
Water quality	Litter and other waste, hydrocarbons and other contaminants	- Avoid wind-blown litter; remove gross pollutants - Ensure there is no visible oil or grease sheen on released waters - Dispose of waste containing contaminants at authorised facilities
Waterway stability and flood flow management	Changes to the natural waterway hydraulics and hydrology	For peak flow for the 1-year and 100-year ARI event, use constructed sediment basins to attenuate the discharge rate of stormwater from the site

Table 3.2 - Construction Phase Stormwater Quality Objectives

3.2. Operational Phase

During the operational stage of the development, the following impacts have been identified in relation to stormwater runoff and water quality of the receiving waterways:

- Gross pollutants which include human derived litter, coarse sediment and vegetation
- Sediment and suspended solids
- Nutrients such as phosphorous and nitrogen

To target these potential pollutants stormwater quality improvement devices (SQID's) are proposed to be incorporated within the design.

3.2.1. Water Quality Objectives

The water quality objectives (WQO's) for this site were determined in accordance with State Planning Policy (SPP, 2017) as follows

Pollutant	Minimum Reduction Targets
Total Suspended Sediments (TSS)	80%
Total Phosphorus (TP)	60%
Total Nitrogen (TN)	45%
Gross Pollutants (>5mm)	90%

Table 3.3 - Water Quality Objectives

3.2.2. Pollutant Export Modelling

John Connor Online (JCO) has been utilised to create a compliant MUSIC model to calculate pollutant loads from the proposed development and predict performance characteristics of the proposed treatment train. Modelling parameters used were adopted from the *Water by Design "Music Modelling Guidelines for South-East Queensland"*.

3.2.3. Treatment Nodes

The following devices have been used in the treatment train to reduce these pollutant loads to achieve WQO's for this site. Refer to Appendix B for JCO modelling setup and results.

Atlan Filter – an underground cartridge filter system that incorporates an upflow treatment process that maximises surface treatment area. Flow through the filter cartridges utilises a self-regulating siphon which results in low maintenance and high performance stormwater treatment. The design proposed is:

- o Lot 8002 - 10 x 690mm Cartridges;

Atlan Stormsack GPT Baskets – A number of baskets installed to the top of field inlets to trap coarse sediment prior to entering the drainage system was modelled in line with the cartridge system. The design proposed is:

- o Lot 8002 – 3 x Baskets;

3.2.4. Effectiveness in Pollution Reduction

The water quality development model was set up with the incorporation of the above devices to reduce pollutant export to WQO levels. Table 3.4 indicates the predicted pollutant mean values of stormwater discharged from the site as calculated by JCO:

Pollutant	Percentage Load Reduction Catchment 'A'
Total Suspended Solids (TSS)	95.6
Total Phosphorus (TP)	60.3
Total Nitrogen (TN)	59.6
Gross Pollutants (>5mm)	100

Table 3.4 – Annual Load Based Pollutant Reduction

The JCO modelling results above indicate the proposed treatment train will adequately treat pollutants generated by stormwater runoff in accordance with the targets required of the Water Quality Objectives.

4.0 CONCLUSION

This report has outlined the stormwater management strategies to be adopted in the construction and operational works phase of the development which satisfies State and Council planning scheme policies.

A lawful point of discharge exists to the corner of Lukin Tce & Baringa Drv drainage network;

Primary and Tertiary water quality improvement devices are proposed including proprietary filter cartridges and gross pollutant baskets to satisfy the Water Quality Objectives.

APPENDIX A – CONCEPT STORMWATER MANAGEMENT PLAN

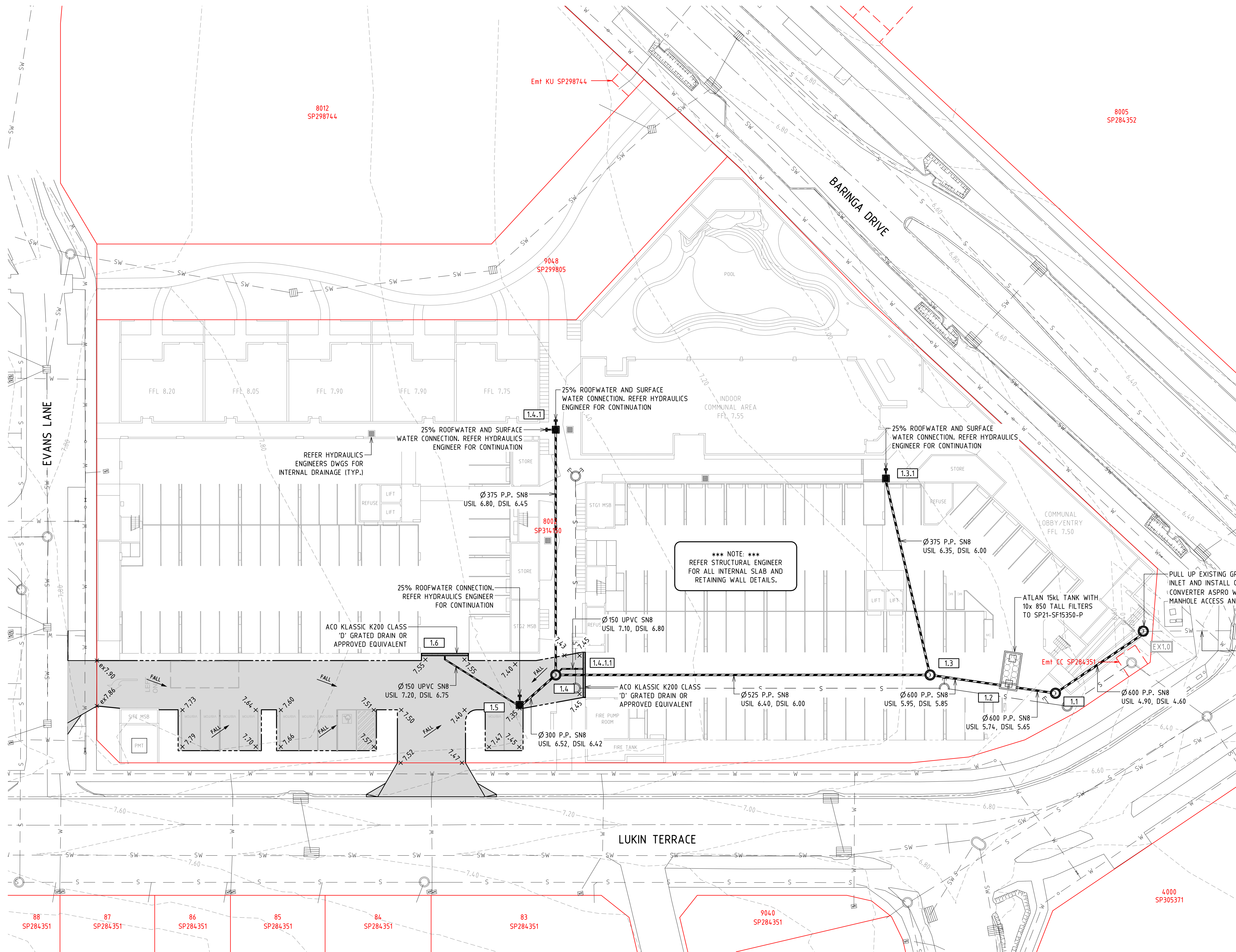
AMENDED IN RED

By: Andrew McKnight

Date: 08 May 2024



Updated to plan set
SC10007 Dwg No CO20
Issue C dated 27/03/2024

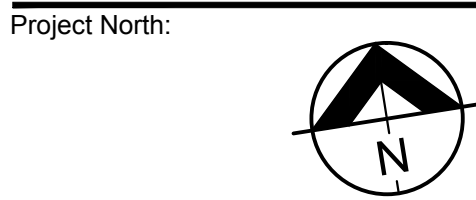


LEGEND

EXISTING	PROPOSED	
---	---	PROPERTY BOUNDARY
---	---	PROPERTY EASEMENT
---	---	KERB AND CHANNEL
---	---	KERB ONLY
---	---	EDGE OF CONCRETE
---	---	INVERT KERB
---	---	ROAD CROWN
---	---	DRAINAGE
---	---	SEWER
---	---	WATER
---	---	CONTOURS
---	---	BATTERS
---	---	RETAINING WALL
---	---	CONCRETE PAVEMENT. REFER DWG C030
---	---	SURFACE LEVEL
---	---	STRUCTURE NUMBER
---	---	DIRECTION OF FALL
---	---	600x600 TYPE 2 FIELD INLET U.N.O.
---	---	STD. CONC. Ø1050 MANHOLE U.N.O.

NOTE: REFER DWG C001 FOR STORMWATER NOTES AND C025 FOR SECTIONS AND DETAILS

ALL PITS TO BE FITTED WITH ATLAN GROSS POLLUTANT TRAP BASKETS 'STORMSACK' OR APPROVED EQUIVALENT.



Scales: 0 2.5 5.0 7.5 10.0 12.5m 1:250 at A1 1:500 at A3

Status: **FOR APPROVAL**
NOT FOR CONSTRUCTION

Date: JANUARY 2024	Scale: AS NOTED
Job Ref No: SC-10007	Drawing No: C020
	Issue: C

Issue	Amendment	Date	Dt	Notes
A	FOR APPROVAL	29.01.24	ACR	1. This is the property of the engineer, and may not be used, copied, or reproduced wholly, or in part without the express permission of the engineer. Infringement in any way may result in legal action.
B	PLAN AMENDMENTS	07.02.24	ACR	2. Figured dimensions take precedence over scaled.
C	RFI RESPONSE	27.03.24	ACR	3. Verify all dimensions on site.

Empire Engineering
ACN 112761510 ABN 21112761510

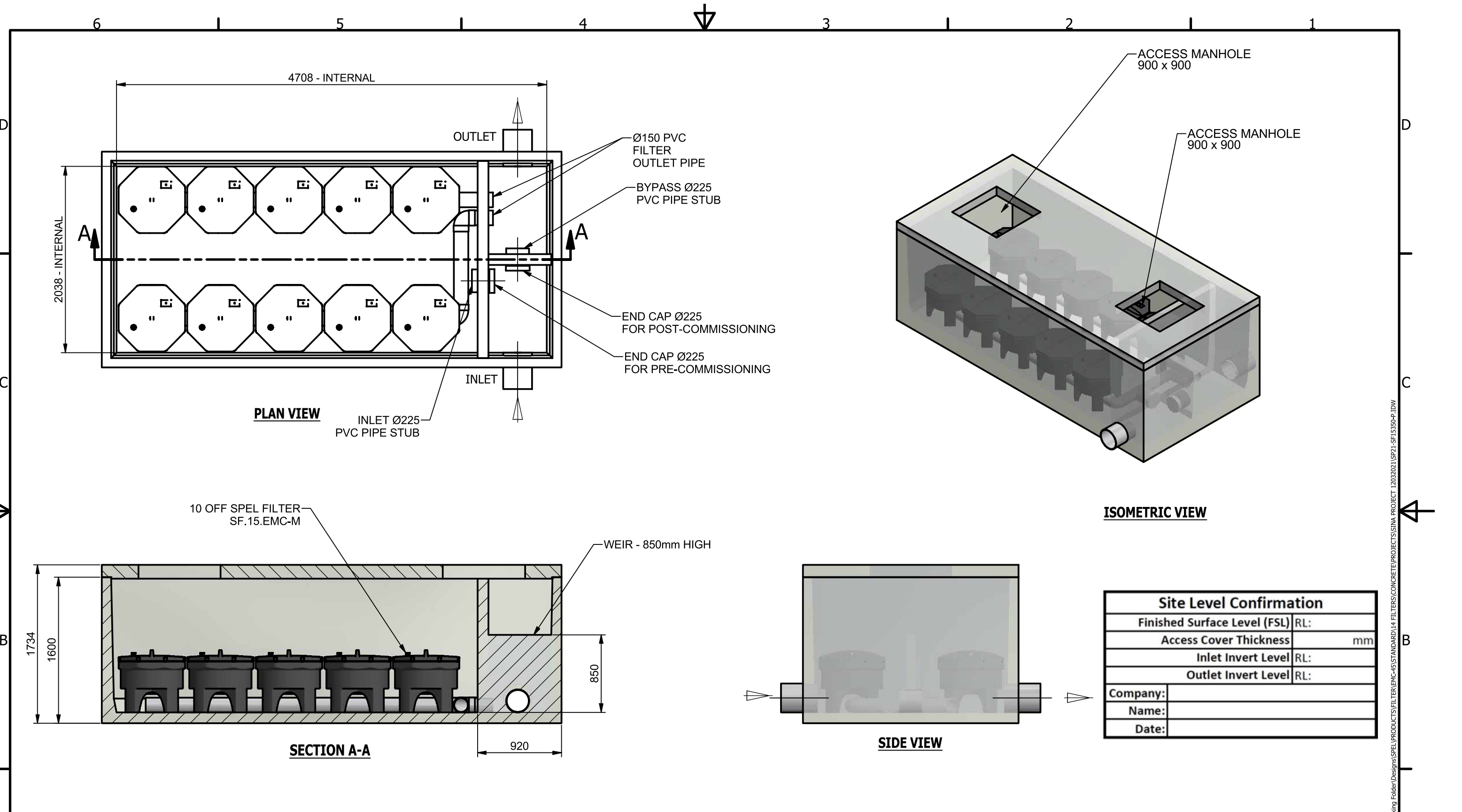
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Client: PLANTATION RETIREMENT RESORTS
Project: PROPOSED RETIREMENT RESORT
8002 BARINGA DRIVE,
BARINGA

Designed: SFD
Approved: [Signature]
Drawn: ACR
TROY PAULSEN / RPEQ: 6990

Title: SITWORKS AND DRAINAGE PLAN



TOLERANCE: All Dimensions to Closest 10 mm & +/- 30 mm

ALL INTERCONNECTING PIPEWORK, PITS AND ASSOCIATED DRAINAGE BY OTHERS

CLIENT:

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1	18/01/2020	M.MAKIN	INITIAL RELEASE	
REV	DATE	BY	DESCRIPTION	CHK

Drawn
M.MAKIN

Check

Verified

Approved

Request No.
RN210154

Date
12/03/2021

Date

Date

Date

Atlan
STORMWATER

PROJECT

TITLE
SPEL FILTER SYSTEM
SF.4521-10-29.CON
SPEL TANK - 15 kL
10 SPEL FILTER CARTRIDGES

SCALE
N.T.S

SIZE
A3

SHEET
1

REV
1

CUSTOMER CODE :
DWG No.
SP21-SF15350-P

E:\Vault Working Folder\Designs\SPEL PRODUCTS\FILTER\EMC-45\STANDARD\14 FILTERS\CONCRETE\PROJECTS\SINA PROJECT 12032021\SP21-SF15350-P.IDW

APPENDIX B – JCO WATER QUALITY MODELLING

Basic Information:

Project Name:	Lot 8002 Retirement
Assessor Name:	Mircea Stancu
Assessor Email:	mircea@cleanstormwater.com.au
City Council:	Sunshine Coast Regional
Address Line 1:	Lot 8002 Baringa Drive, Aura, QLD
Address Line 2:	
Development Type:	residentialMultiunit
Planning Permit No:	not provided

Model Details:

LAT: -26.808279, LNG: 153.081584

The Model has been checked against Sunshine Coast Regional's guidelines.

The treatment results in the report are based on the Authority's preferred meteo template for this location.



Source Nodes

Node Name	Node Type	Area(sqm)	% of Impervious	Height above the LPOD (mm)
Landscaped Areas	UrbanResidential landscape	1,050	0.00	1300
Paved Areas	UrbanResidential road	2,835	100.00	1300
Roof Areas	UrbanResidential roof	4,000	100.00	1300

Total Catchment Area(sqm): 7,885

* NOTE: Height above LPOD only considers fall required by treatment devices. Please ensure you also take into account fall through the Pits and Pipes system.

Treatment Nodes

Node Name	Node Type	Fall required from inlet to LPOD (mm)*	Fall required through this device (mm)*
Stormsacks 3 pits	Stormsacks	1300	450
10 tall filters	SPELFilter	850	850

* NOTE: Height above LPOD only considers fall required by treatment devices. Please ensure you also take into account fall through the Pits and Pipes system.

Treatment Train Effectiveness Result

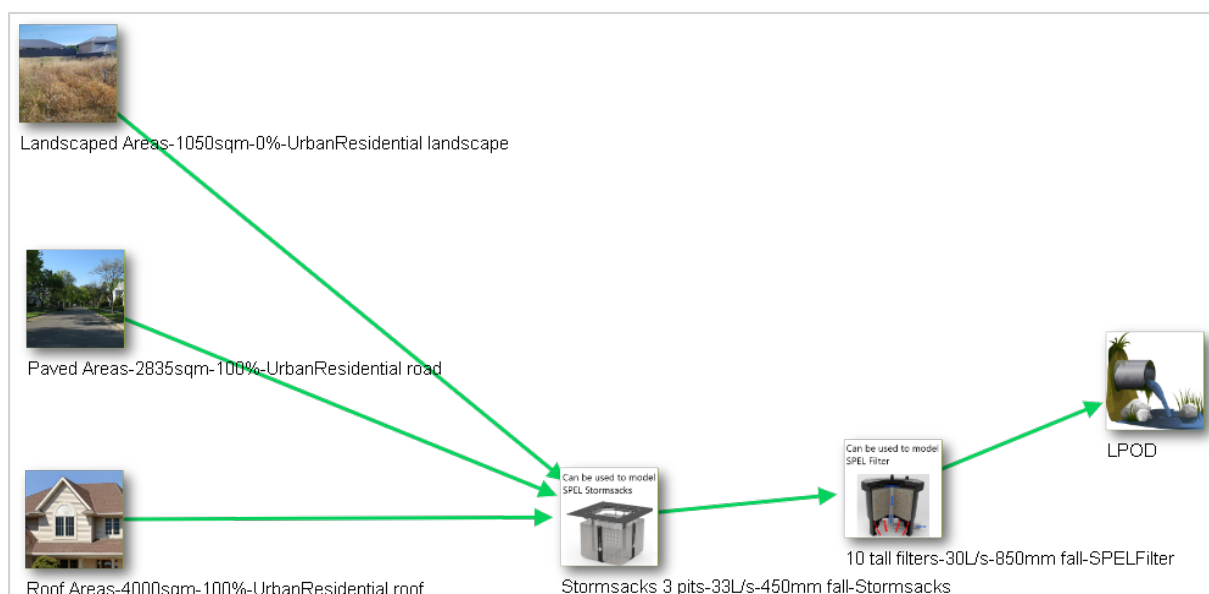
LPOD

	Sources	Residual Load	Percentage Reduction (%)	Authority Target Reduction (%)	Green Star Buildings Target Reductions	
					Credit Achievement	Exceptional Performance
Flow (ML/yr)	10.06	10.06	0.00	N/A	40.00	80.00
Total Gross (kg/yr)	209.26	9.22	95.59	90.00	90.00	95.00
Total Nitrogen (kg/yr)	20.80	8.40	59.62	45.00	45.00	60.00
Total Phosphorus (kg/yr)	3.66	1.45	60.30	60.00	65.00	70.00
Total Suspended Solid (kg/yr)	1856.73	356.73	80.79	80.00	85.00	90.00

Mass Balance

Treatment Name	GP Cap- tured (kg/yr)	Sediment Captured (kg/yr)	Cleanout Frequency (x/yr)	GP storage required (L)	Sediment Storage required (L)	Total Stor- age required (L)
Stormsacks 3 pits-33L/s-450mm fall-Stormsacks	193.87	980.47	2.00	559.25	408.53	967.78
10 tall filters-30L/s-850mm fall-SPELFilter	6.16	534.13	2.00	17.78	222.56	240.34

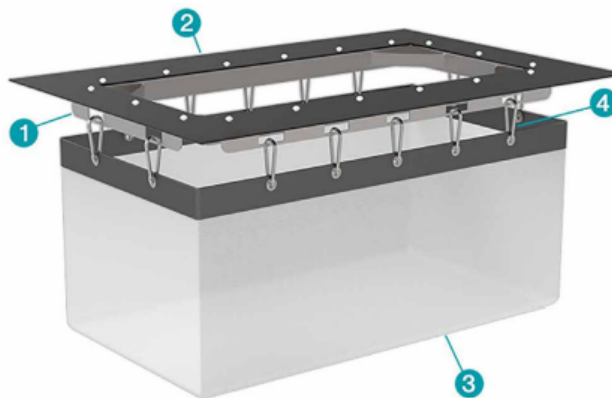
Treatment Trains



[Check this model online!](#)

Specifications and Typical Drawings - stormsacks

Features	
1.	1. Ultra-Durable Aluminium Frame • Available in 450x450mm, 600x600mm, 600x900mm and 900x900mm sizes • Custom pit arrangements upon request
2.	Black Poly Surround riveted to Frame • Can be cut to suit on site
3.	Reinforced Stormsack Bag • Bag has sewed eyelets • Square bottom design for even distribution
4.	Karabiners attach Bag to Frame for easy service & replacement
5.	Aluminium Support Angles & Fixings



Standard StormSack to suit Pit Sizes
450x450mm
600x600mm
900x600mm
900x900mm

Custom sizes (i.e. 1200x900mm) can be manufactured on short lead times

[Stormsacks brochure](#)

Treatment Device Name	Total High-flow bypass(L/s)
Stormsacks 3 pits	33

Specifications and Typical Drawings - spelfilter

SPELFilter



Treatment Device Name	Total High-flow bypass(L/s)
10 tall filters	30