4th April 2024

FE_23124

37-59 Maranoa Road Kingston
STORMWATER MANAGEMENT PLAN

Prepared for: Nicholas Property Holdings

flüssig ENGINEERS

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Document Information

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37 – 59 Maranoa Road Kingston **SWMP Report**	Nicholas Property Holdings	FE _23124	**Max W. Möller** *BEng, FIEAust, EngExec, CPEng, NER, APEC Engineer, IntPE (Aus)* *Managing Director / Principal Hydraulic Engineer*

Document Initial Revision

REVISION 00	Staff Name	Signature	Date
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Authorised by	Max W. Moller ***Principal Hydraulic Engineer***		04/04/2024

Document Revision History

Rev No.	Description	Reviewed by	Authorised by	Date
01	SWMP report update	Max W. Moller	Max W. Moller	02/05/2024

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1. Introduction

Flüssig Engineers have been engaged by Nicholas Property Holdings to undertake a site-specific Stormwater Management Plan (SWMP) for 37 – 59 Maranoa Road Kingston including, but not limited to, lot drainage analysis including stormwater drainage and MUSIC Modelling to stated stormwater quality standards. The purpose of this report is to determine the hydraulic characteristics and stormwater infrastructure capacity of a 2% AEP storm event and treatment on the existing and post-development scenarios.

1.1 Scope

This engagement includes:

- Post-construction drainage capacity at 2% AEP of new design.
- Post-construction overland flow behaviour of new stormwater design.

2. Site Characteristics

2.1 Site Location

37–59 Maranoa Road Kingston Tasmania is located in the municipality of the **Kingborough Council.** The site is approximately 5,944 m² with a proposed new roof area of 3533 m² and new paved area of approximately 1,549 m². The land use of the catchment is zoned community purpose, residential and industrial, with the specific site being General Business.

Figure 1. Approximate development location, 37–59 Maranoa Road Kingston

2.2 Topography

The proposed development is approximately 5,944m² in area, draining from approximately 83.00m AHD to 79.00m AHD towards the south-eastern corner of the lot.

As can be seen by the topography in Figure 2, pre-development terrain significantly slopes to the easterly and northerly corners of the lot.

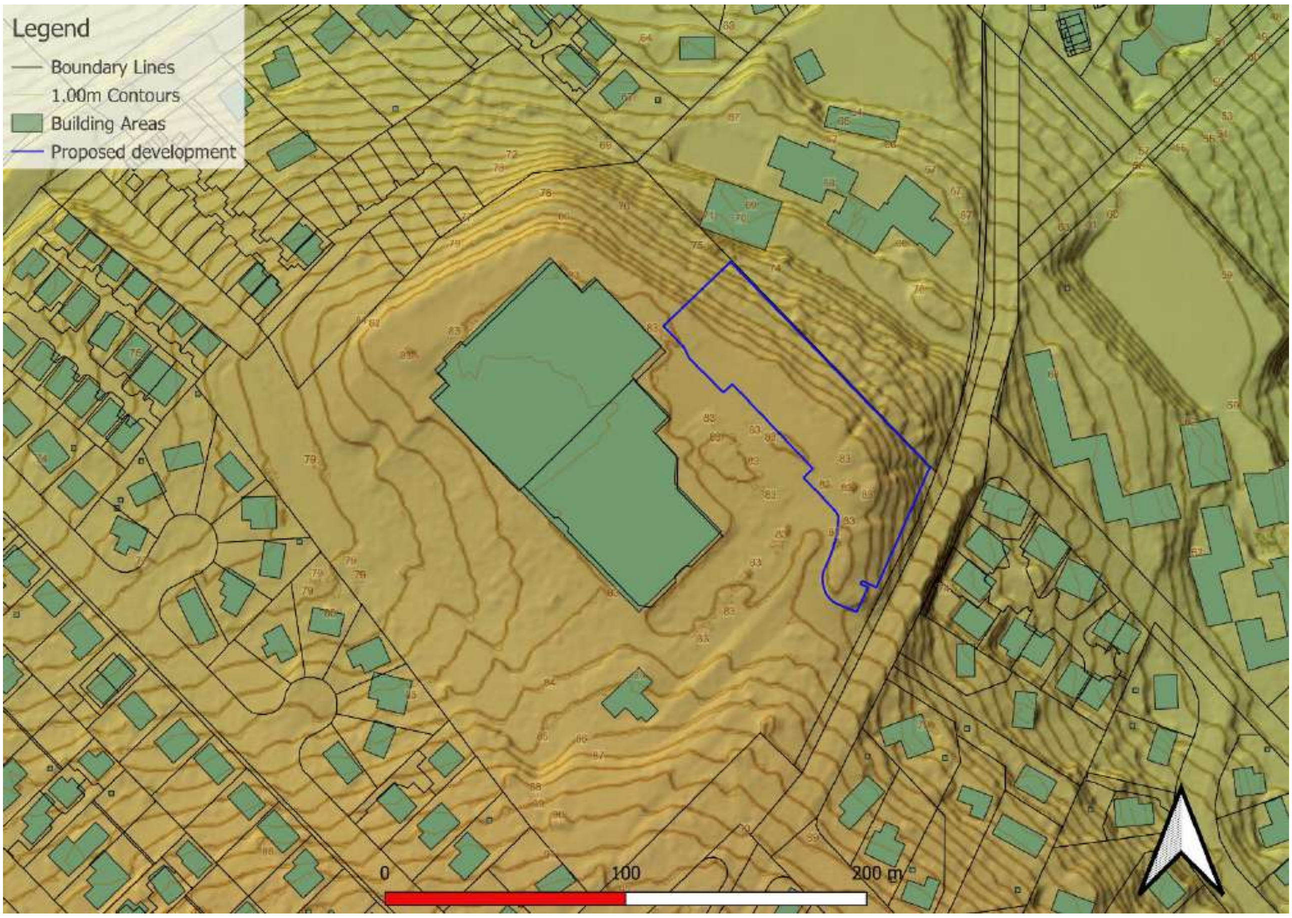


Figure 2. 1m DEM (Hill shade) of Lot Area, 37 – 59 Maranoa Rd, Kingston

3. Proposal

3.1 Proposed Development

The proposed development consists of seven warehouses and two showrooms within the boundary. Design of the development was undertaken by Matt Kennedy Drafting & Design as shown in Figure 3.

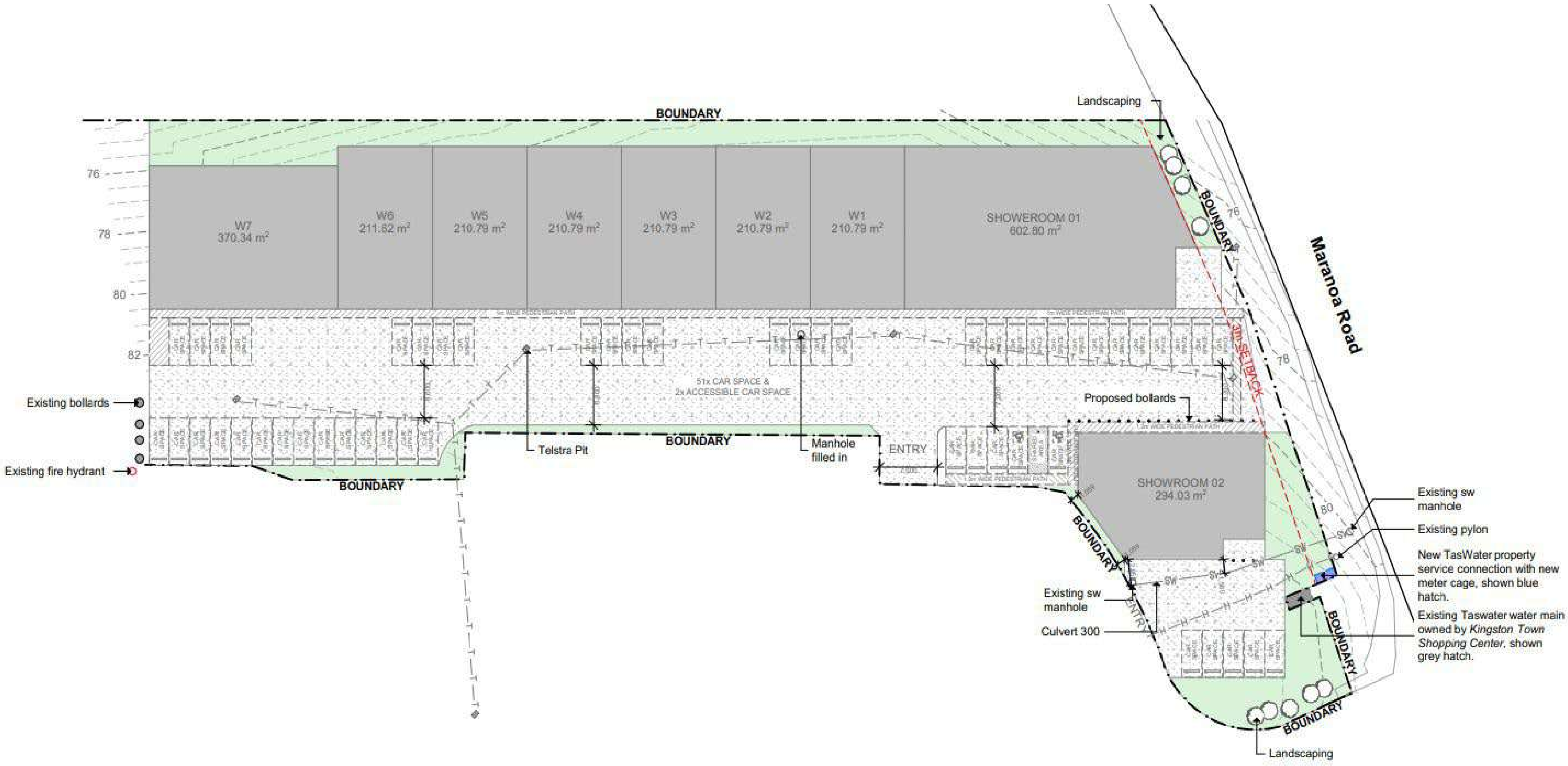


Figure 3. Planning design of development (Matt Kennedy Drafting & Design)

4. Survey Data

All survey data was supplied by the client as a processed AutoCAD file. The provided data has been incorporated into various software to undertake the analysis.

5. Stormwater Quantity

5.1 Catchment Conditions

The contributing catchment for 37 – 59 Maranoa Rd, Kingston is approximately 18.9 ha. The catchment area extends from the southern side to the south-eastern side of the of the development site.

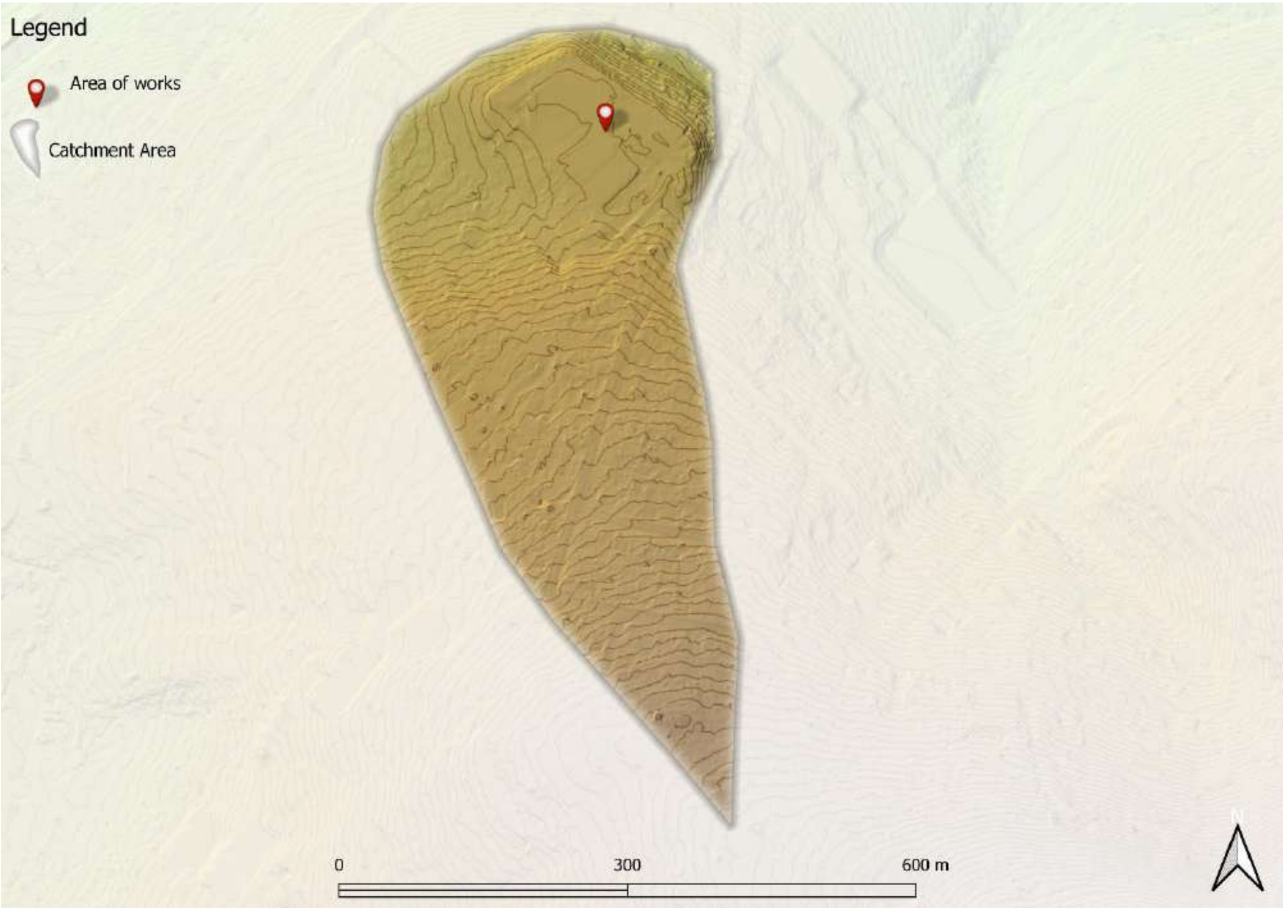


Figure 4. Contributing approximate catchment, 37 – 59 Maranoa Rd, Kingston

5.2 Land use

Land use for the site, both pre- and post-development, were derived from plans and aerial imagery. Land use values are as follows in Table 1.

Table 1. Land Use Area

	Pre-Development		Post-Development	
Land Use	**Area (m^2)**	**% Total land**	**Area (m^2)**	**% Total land**
Total Impervious	0	0	5082	85.50
Total Pervious	5944	100.00	862	14.50

5.3 Stormwater runoff Coefficient (C)

See Table 2 for stormwater runoff coefficient (C) values were taken directly from best practices.

Table 2. Stormwater runoff Coefficients

Land Use	C
Road/Driveway	0.9
Open Channel	0.3
Roof	1.0
Gravel	0.5

5.4 Development Runoff

Stormwater runoff from the development site has been assessed under pre- and post-development models to determine the potential impact the proposed development has on the immediate local flows. As per planning guidelines, it is a requirement that this does not deteriorate from pre to post development.

Table 3. Site Characteristics

Catchment	Area (m^2)	Maximum Slope (%)	Total Land use pervious/ impervious (m^2)
Pre-Development	5944	24.0	5944 / 000
Post-Development	5944	5.0	5082 / 862

6. Model Results

As per best practices for the stormwater runoff, the post-development allowable site discharge must not exceed the pre-development site discharge. As can be seen from Table 4, this is exceeded in the 2% AEP by a permissible site discharge of 23.74L/s. Therefore, the site must detain the difference using an onsite stormwater detention (OSD) system.

Table 4. Discharge volume rates and required detention of pre-post scenarios in 2% storm.

Design Event (AEP)	Permissible Site Discharge (L/s)	Post-development discharge (L/s)	Required Development Detention (L)
2%	23.74	153.02	87,260

6.1 On-Site Detention Sizing and Configuration

As shown in Table 4, the permissible site discharge is exceeded from the proposed development and needs to be detained or otherwise agreed. The sections below outline the storage requirements for this exceedance.

6.2 Development Detention

As can be seen from Table 4, after allowance has been made to detain impervious areas, the total volume discharged in the storm event still exceeds pre-development flows. Therefore, the proposed development will require minimum detention of 87,260L. Refer to “APPENDIX B Calculations”.

Stormwater from the site is serviced by a network of drainage pipes and several stormwater pits. All stormwater drainage from asphalt driveway impervious areas and roof impervious areas will be directed to an onsite stormwater detention (OSD) system consisting of an underground detention tank system with a minimum of 87,260L capacity, located towards the southeast of the development. Stormwater will drain from the underground detention tank system to the public main (existing DN450) via a new DN375 at the southeast boundary of the lot. The underground detention tank system (AtlanChamber CHA1200, minimum 87,260L) requires yearly maintenance (unless otherwise specified). More detailed information regarding maintenance is provided in Section 7.6.

6.3 1% AEP Overland Flow Path (OFP)

As per Kingborough Council requirements, runoff for the 1% AEP is not required to be captured by infrastructure nor detained onsite in an OSD. However, the 1% AEP storm must be able to drain through the site and not cause additional impedance on the neighbouring lots or future residents. APPENDIX C – 1% AEP Overland Flow Path attached shows the post development overland flow path for the site in the event of a 1% AEP storm.

6.4 Quantity Summary

The SWMP quantity report has been designed from best practice design and guidelines. The following is a summary of the requirements for stormwater management for the proposed development in 37-59 Maranoa Rd, Kingston.

1. Storage requirements from the proposed development would require minimum 87,260L of total detention volumes for the development. AtlanChamber CHA1200 will be used as the underground detention tank to be situated in entrance of the southeast boundary of the lot.
2. The 1% AEP runoff overland flow paths can be directed from the development site via new car parks. Internal driveways are graded away from buildings directing overland flow paths away from habitable areas.

7. Water Quality

Water quality modelling for the site has been undertaken with the urban stormwater improvement conceptualisation software MUSIC. The modelling conducted in MUSIC has been done in accordance with MUSIC Modelling Guidelines and the Tasmanian State Stormwater Strategy. This document provides a guide to water quality modelling methodology and outlines the assumptions that should be made when selecting input parameters.

Recommendations for the improvement of the water quality on site would include the diversion of stormwater flows from the development to primary treatment system (treatment train). This would reduce the pollutants in the receiving waters further and be a safe design option if future usage of this sub catchment provides higher pollutant storm water runoff.

7.1 Stormwater Quality Treatment (construction phase)

During construction, many pollutants are generated from various sources. These pollutants can easily be captured in stormwater runoff and introduced into the downstream receiving environment polluting the waterways. Listed below are some of the main construction phase pollutants:

- Litter from construction – material packaging, paper, plastic, food packaging, off cuts etc.
- Sediment erosion and transports from excavated material and fresh surfaces.
- Hydrocarbons – equipment and machinery
- Toxic material – cement, solvents, paints, cleaning agents etc.
- pH altering substances – cement, cleaning agents etc.

Construction phase pollutants should be planned and mitigated for by a designed site-specific SWMP as part of the drawing set. This should detail controls including but not limited to:

- Diversion of upslope water (where applicable)

- Stabilised exit/ entry points
- Minimise site disturbance where possible
- Implement sediment control along downslope boundaries
- Appropriate location and protection for stockpiles
- Capture on-site runoff that may contain pollutants
- Maintain control measures
- Stabilise site after disturbance (revegetate etc.)

7.2 Stormwater Quality Modelling

Stormwater pollutant modelling for the 37-59 Maranoa Road, Kingston development was undertaken using Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software, version 6.3.0, under the guidelines of the State Stormwater Strategy and Interim Planning Scheme.

This model splits the catchment into the following typical areas:

- Industrial Catchment (warehouse and showroom roof)
- Driveway Catchment (sealed asphalt internal driveway)

The following fraction impervious land areas has been adopted in the modelling as per the concept design measurements. See Table 5 below for fraction imperviousness (fi).

Table 5. Adopted Fraction Impervious

Catchment Area (m^2)	Asphalt internal driveway		Roof		Garden	
	Area (m^2)	fi	Area (m^2)	fi	Area (m^2)	fi
5944	1549	0.9	3533	1	862	0.03

7.3 Council Planning Quality Removal Standards

The TPS has adopted the pollutant removal targets and best practice from the State Stormwater Strategy 2010. See Table 6 for target removal rates.

Table 6. State Stormwater Strategy Pollutant Removal Targets

Parameter	Result Pollutant Retention on Developed Site
Total Suspended Solids (TSS)	80%
Total Phosphorous (TP)	45%
Total Nitrogen (TN)	45%
Gross Pollutants	90%

7.4 Treatment Train

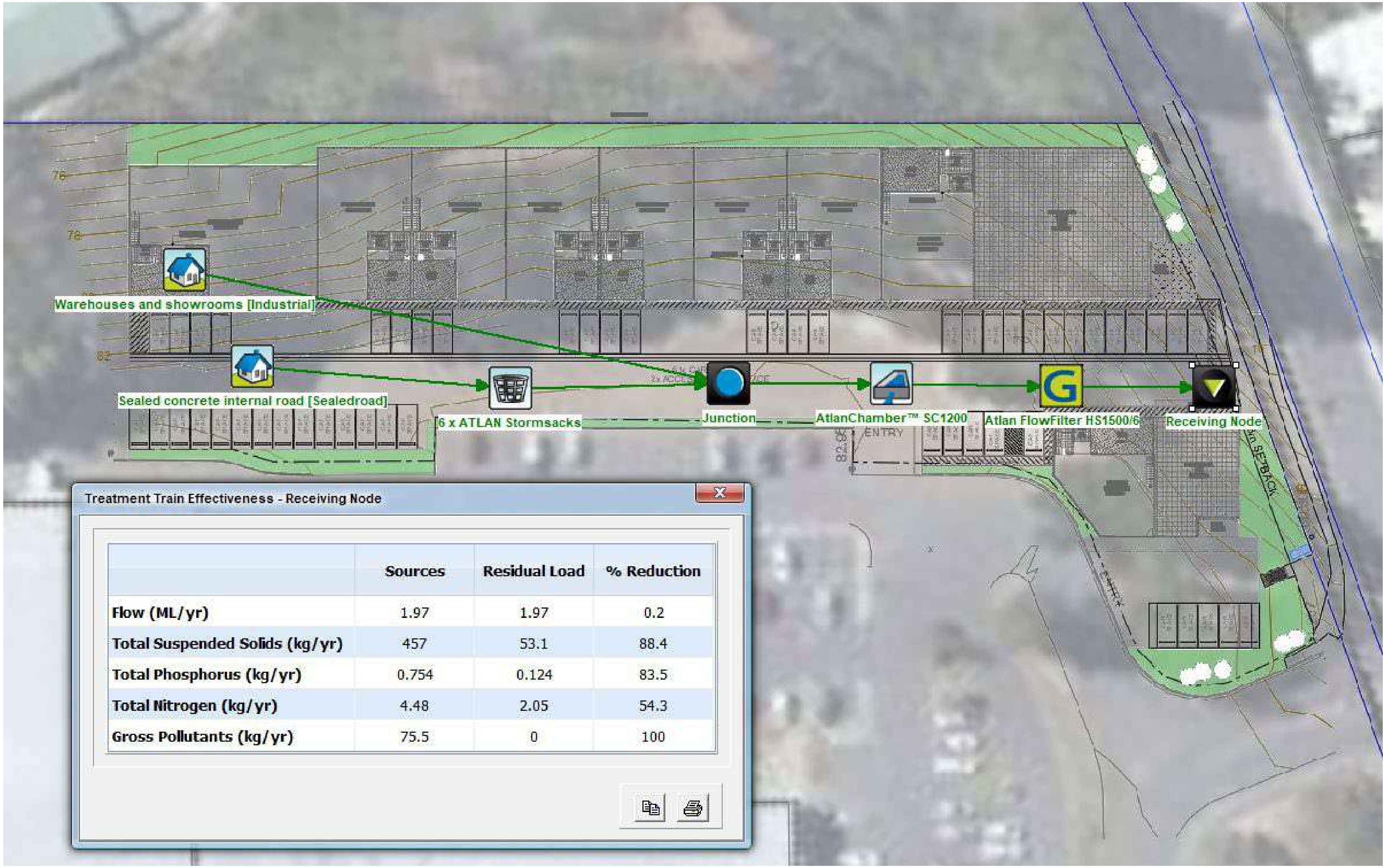
To achieve stormwater pollutant removal targets outlined above and considering site constraints, this model utilised 6 x Atlan Stormsacks (or similar), Atlan Flowfilter HS1500/6 (or similar), Atlan Chamber CHA1200 (or similar).

The treatment train consists of asphalt internal driveway and roof draining through the grated pits via stormwater infrastructure to the Atlan Stormsacks (within grated pits) Atlan Chamber CHA1200 followed by the Atlan Flowfilter (or similar) within the site boundary.

Properties of each treatment product can be seen in Table 9. Should an alternative similar product be selected it needs to have equal or greater removal properties.

Table 7. Atlan Flowfilter HS.1500/6 Properties

Properties	Atlan Flowfilter HS.1500/6
Are the proposed pollutant reduction efficiencies independently verified using a method suited to local conditions?	Y
Does the data provided include performance results under dry weather flows (to account for potential pollutant leeching?)	Y
It the assumed high-flow bypass rate consistent with manufacturer specifications?	Y
High Flow by-pass (m^3/s)	0.024
Low Flow (m^3/s)	0.000
Suspended Solids (TSS) Input (mg/L) Suspended Solids (TSS) Output (mg/L)	1000.00 116.00
Phosphorous (TP) Input (mg/L) Phosphorous (TP) Output (mg/L)	100.00 16.5
Nitrogen (TN) Input (mg/L) Nitrogen (TN) Output (mg/L)	100.00 45.7
Gross Pollutants (GP) Input (mg/L) Gross Pollutants (TP) Output (mg/L)	100.00 0.00



	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.97	1.97	0.2
Total Suspended Solids (kg/yr)	457	53.1	88.4
Total Phosphorus (kg/yr)	0.754	0.124	83.5
Total Nitrogen (kg/yr)	4.48	2.05	54.3
Gross Pollutants (kg/yr)	75.5	0	100

Figure 5. MUSIC Treatment Train Effectiveness Result

7.5 Quality Results

The MUSIC pollutant load reductions are detailed in Table below. As can be seen when comparing the MUSIC results to the required state stormwater strategy target load reductions, the specified treatment train outlined above and as seen in Figure 5 show that all targets either meet or exceed state reduction targets.

Table 8. Pollutant Removal Achieved vs Targets.

Parameter (kg/year)	Target Load Reduction (%)	MUSIC Results	SW Targets Achieved (Y/N)
Total Suspended Solids (TSS)	80.0	88.4	Y
Total Phosphorous (TP)	45.0	83.5	Y
Total Nitrogen (TN)	45.0	54.3	Y
Total Pollutants (GP)	90.0	100.0	Y

Based on the water quality assessment using the MUSIC software, it is found that the pollutant reduction improvement can be achieved by adopting the Stormwater Quality Improvement Devices (SQIDs) specified in Table 9.

Table 9. Required SQIDS

Stormwater Quality Improvement Device	
Atlan Flowfilter HS.1500/6 or Similar	1 Unit
Atlan Stormsacks or Similar	6 units
Atlan Chamber CHA1200 (4.8m x 19.7m)	1 x 96kL

7.6 SQID Maintenance

To ensure ongoing operation of all treatment systems, the developer would be required to perform regular maintenance on all treatment devices to ensure they remain in good working order. This would include, but not be limited to, the information described in Table 10.

Table 10. Concept Maintenance Plan

Task	Action	Frequency
General Cleaning	Clear all debris/pollutants from gutters and tank filters, ensure operational	Every 3 months
Specialised cleaning and inspection	Inspect all gutters, downpipes, inflow, and outflow – clean and flush if required. Visually inspect all filters and main device/tank for defects. Replace if required.	Yearly
Maintenance	Perform detailed inspection and maintenance of tanks, and associated infrastructure by a qualified person.	Every 5 years

The above maintenance plan is generic and based on removal rates and best practice advice. Specific maintenance plans should be created for each specific device upon purchasing or confirmation of design.

7.7 Quality Summary

Flüssig Engineers recommends the following to be undertaken to ensure the ongoing stormwater quality from the developed site:

1. Construction quality control should be implemented to prevent pollution during construction.
2. Installation of treatment devices in the order specified in this document (Figure 5), not including individual lot devices.
3. Maintenance plans need to be created and adhered to ensure the ongoing operation of the systems.

Flüssig Engineers note that some of the specified treatment products are proprietary products and although suitable in this instance, does not limit the developer to this product. However, any product selected by the developer should meet removal properties of these products for the MUSIC model to be valid.

Flüssig Engineers notes that if the installation of SQIDs may not be feasible due to site restrictions. Should this be the case, Flüssig Engineers recommends a contribution to Council for improvements to public stormwater treatment systems downstream be made in lieu of the installation of SQIDs.

8. Conclusion

The post-development quantity and quality scenarios for the Stormwater Management Plan for 37- 59 Maranoa Road have been investigated. Post-development quantity and quality have been assessed against the stormwater management best practices, and the State Stormwater Strategy to ensure the post-development flows meet specified standards.

The following conclusions were derived in this report:

1. A comparison of the post-development peak flows for the 2% AEP storm event were undertaken against the pre-development flows, resulting in an increase in site discharge.
2. Detention underground tank totalling a minimum of 87,260L is required for the 2% storm runoff for the proposed development and associated infrastructure.
3. The 1% AEP runoff overland flow paths can be directed from the development site via new car parks. Internal driveways are graded away from buildings directing overland flow paths away from habitable areas.
4. SQIDS designed and sized using MUSIC can achieve required pollutant removal through the installation of treatment devices.

Under the Stormwater Management Plan, the development site will meet current specified standards for both quantity and quality control.

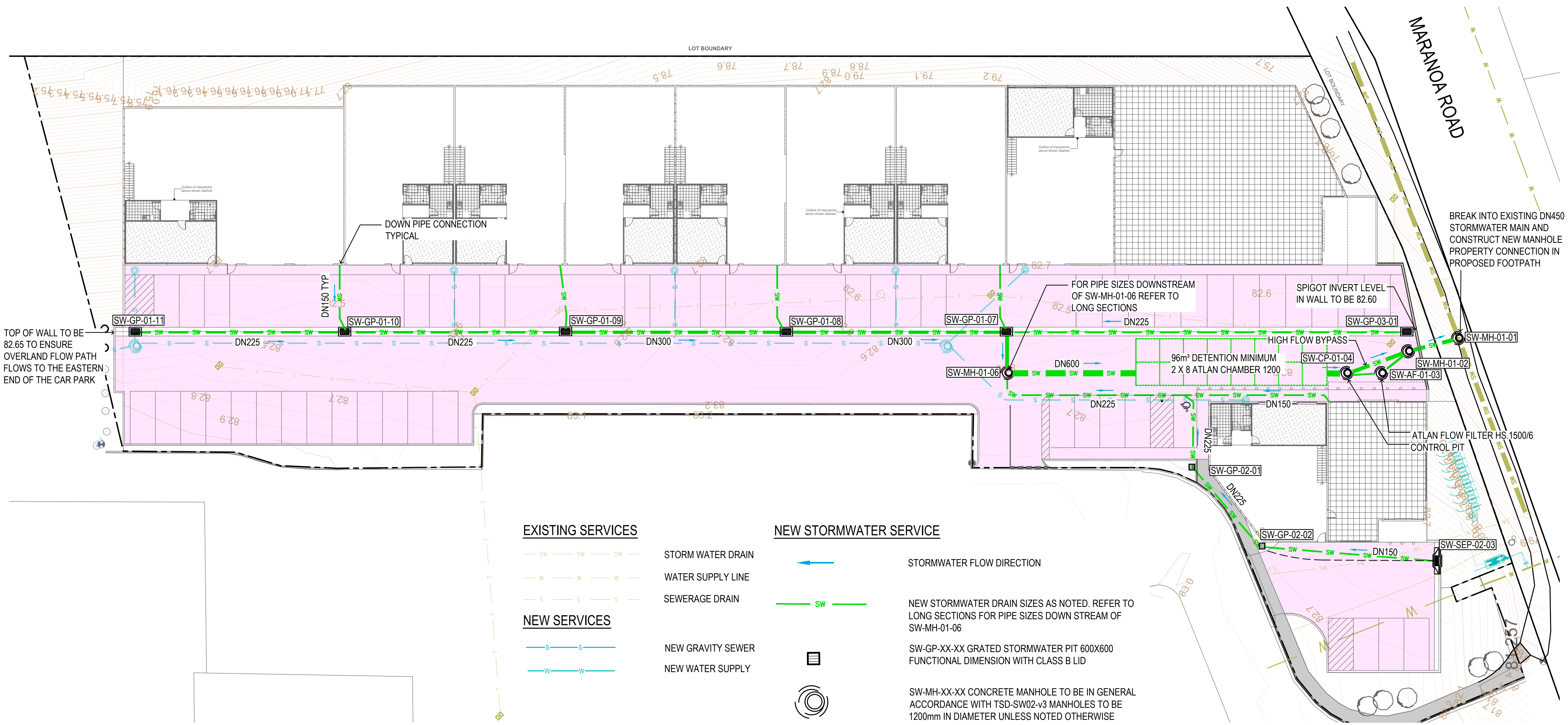
10. Limitations

Flüssig Engineers were engaged by **Nicholas Property Holdings** in representation of the developer of 37- 59 Maranoa Rd, Kingston development for the purpose of a site-specific stormwater management plan as per stormwater management best practices. This study is deemed suitable for purpose at the time of undertaking the study. If conditions of the development change, the plan will need to be reviewed against all changes.

This report is to be used in full and may not be used in part to support any other objective other than what has been outlined within, unless specific written approval to do otherwise is granted by Flüssig Engineers.

Flüssig Engineers accepts no responsibility for the accuracy of third-party documents supplied for the purpose of this stormwater management plan.

APPENDIX A – On-site Detention Concept Design



EXISTING SERVICES

STORM WATER DRAIN

WATER SUPPLY LINE

SEWERAGE DRAIN

NEW SERVICES

NEW GRAVITY SEWER

NEW WATER SUPPLY

NEW STORMWATER SERVICE

STORMWATER FLOW DIRECTION

NEW STORMWATER DRAIN SIZES AS NOTED. REFER TO LONG SECTIONS FOR PIPE SIZES DOWN STREAM OF SW-MH-01-06

SW-GP-XX-XX GRATED STORMWATER PIT 600X600 FUNCTIONAL DIMENSION WITH CLASS B LID

SW-MH-XX-XX CONCRETE MANHOLE TO BE IN GENERAL ACCORDANCE WITH TSD-SW02-v3 MANHOLES TO BE 1200mm IN DIAMETER UNLESS NOTED OTHERWISE

SW-GP-XX-XX NEW STORMWATER GRATED V PIT TO BE IN GENERAL ACCORDANCE WITH TSD-SW14-v3

SW-SEP-XX-XX - SIDE ENTRY PIT TO BE IN GENERAL ACCORDANCE WITH SIDE ENTRY PIT TYPE 3 ON TSD-SW09-v3

STORMWATER PLAN

SCALE 1:400

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REV:	DESCRIPTION:	BY:	DATE:
P2	PLANNING	RU	07/05/24
P1	PLANNING	RU	01/05/24
P0	PLANNING	RU	03/04/24

STATUS: PLANNING

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CLIENT: NICHOLAS PROPERTY HOLDINGS

PROJECT: CIVIL, HYDRAULIC AND STORMWATER SERVICES

SITE: 37-59 MARANOA ROAD, KINGSTON

TITLE: STORMWATER SERVICES PLAN

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:500	07/05/24	RU	MM
PROJECT NO:	DRAWING NO:		REVISION:
FE-23124	H-100		P2

APPENDIX B – On-site Detention Calculations

flüssig ENGINEERS

59 Maranoa Rd, Kingston TAS 7050
Nicholas Property Holdings

Designed: MA
Project No.: 23124

59 Maranoa Rd, Kingston TAS 7050

STORMWATER DETENTION V5.05

Flussig Engineers

Location: Kingston TAS
Site: 5082m² with tc = 20 and tcs = 15 mins.
PSD: AEP of 2%, Underground rectangular tank PSD = 23.74L/s
Storage: AEP of 2%, Underground rectangular tank volume = 87.26m³

Design Criteria

(Custom AEP IFD data used)

Location = Kingston TAS
Method = E (A)RI 2001,A(E)P 2019

PSD annual exceedance probabiliy (APE) = 2 %
Storage annual exceedance probabiliy (APE) = 2 %

Storage method = U (A)bove,(P)ipe,(U)nderground,(C)ustom

Site Geometry

Site area (As) = 5082 m² = 0.5082 Ha
Pre-development coefficient (Cp) = 0.30
Post development coefficient (Cw) = 0.97

Total catchment (tc) = 20 minutes
Upstream catchment to site (tcs) = 15 minutes

Coefficient Calculations

Pre-development

Zone	Area (m²)	C	Area * C
Concrete	0	0.90	0
Roof	0	1.00	0
Gravel	0	0.50	0
Garden	5082	0.30	1525
Total	5082	m²	1525

Cp = ΣArea*C/Total = 0.300

Post development

Zone	Area (m²)	C	Area * C
Concrete	1549	0.90	1394
Roof	3533	1.00	3533
Gravel	0	0.50	0
Garden	0	0.30	0
Total	5082	m²	4927

Cw = ΣArea*C/Total = 0.970

Permissible Site Discharge (PSD) (AEP of 2%)

PSD Intensity (I) = 55.9 mm/hr — For catchment tc = 20 mins.
Pre-development (Qp = Cp*I*As/0.36) = 23.66 L/s
Peak post development (Qa = 2*Cw*I*As/0.36) = 153.02 L/s — =(2.739 x I) — Eq. 2.24

Storage method = U (A)bove,(P)ipe,(U)nderground,(C)ustom
Permissible site discharge (Qu = PSD) = 23.735 L/s

Above ground - Eq 3.8

0 = PSD² - 2*Qa/tc*(0.667*tc*Qp/Qa + 0.75*tc+0.25*tcs)*PSD + 2*Qa*Qp
Taking x as = PSD and solving
a = 1.0 b = -318.5 c = 7241.9
PSD = -b±√(b²-4ac)/(2a)
PSD = 24.646 L/s

Below ground pipe - Eq 3.3

Qp = PSD*[1.6*tcs/{tc*(1-2*PSD/(3*Qa))}-0.6*tcs$^{2.67}$/{tc*(1-2*PSDp/(3*Qa))}$^{2.67}$]
= 23.66
PSD = 24.468 L/s

Below ground rectangular tank - Eq 3.4

t =tcs/(tc*(1-2*PSD/(3*Qa))) = 0.836
Qp = PSD*[0.005-0.455*t+5.228*t²-1.045*t³-7.199*t⁴+4.519*t⁵]
= 23.66
PSD = 23.735 L/s

Design Storage Capacity (AEP of 2%)

Above ground (Vs) = [0.5*Qa*td-[(0.875*PSD*td)(1-0.917*PSD/Qa)+(0.427*td*PSD²/Qa)]]*60/10³ m³ — Eq 4.23
Below ground pipe (Vs) = [(0.5*Qa-0.637*PSD+0.089*PSD²/Qa)*td]*60/10³ m³ — Eq 4.8
Below ground rect. tank (Vs) = [(0.5*Qa-0.572*PSD+0.048*PSD²/Qa)*td]*60/10³ m³ — Eq 4.13

td (mins)	I (mm/hr)	Qa (L/s)	Above Vs (m³)	Pipe Vs (m³)	B/G Vs (m³)
5	106.7	292.1			39.77
14	68.5	187.6			67.51
18	59.5	162.8			73.44
22	52.8	144.5			77.70
27	46.5	127.5			81.59
31	42.7	116.9			83.94
35	39.6	108.4			85.82
39	37.0	101.3			87.36
44	34.3	93.9			88.92
48	32.5	89.0			89.95

Table 1 - Storage as function of time for AEP of 2%

Type	td (mins)	I (mm/hr)	Qa (L/s)	Vs (m³)
Above				
Pipe				
B/ground	38.7	37.2	101.8	**87.26**

Table 2 - Storage requirements for AEP of 2%

Frequency of operation of Above Ground storage

Qop2 = 0.75 Cl 2.4.5.1
Qp2 =Qop2*Qp1 (where Qp1=PSD) = 18.48 L/s at which time above ground storage occurs
I = 360*Qp2/(2*Cw*As*10³) = 6.7 mm/h — Eq 4.24

Period of Storage

Time to Fill:
Above ground (tf) = td*(1-0.92*PSD/Qa) — Eq 4.27
Below ground pipe (tf) = td*(1-2*PSD/(3*Qa)) — Eq 3.2
Below ground rect. tank (tf) = td*(1-2*PSD/(3*Qa)) — Eq 3.2

Time to empty:
Above ground (te) = (Vs+0.33*PSD²*td/Qa*60/10³)*(1.14/PSD)*(10³/60) — Eq 4.28
Below ground pipe (te) = 1.464/PSD*(Vs+0.333*PSD²*td/Qa*60/10³)*(10³/60) — Eq 4.32
Below ground rect. tank (te) = 2.653/PSD*(Vs+0.333*PSD²*td/Qa*60/10³)*(10³/60) — Eq 4.36

Storage period (Ps = tf + te) — Eq 4.26

Type	td (mins)	Qa (L/s)	Vs (L/s)	tf (mins)	te (mins)	Ps (mins)
Above						
Pipe						
B/ground	38.7	101.8	87.3	32.7	170.5	203.2

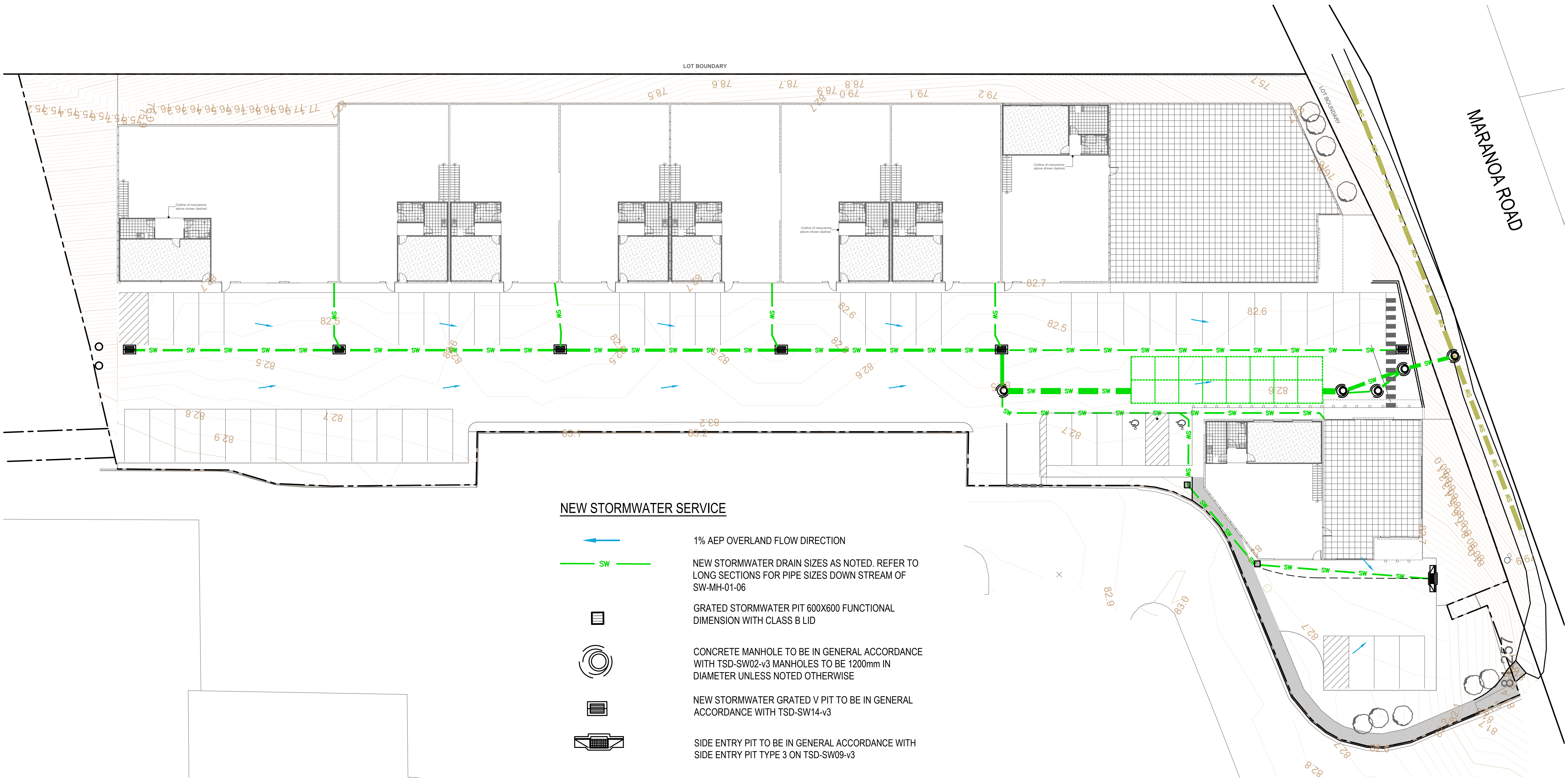
Table 3 - Period of Storage requirements for AEP of 2%

Orifice

Permissible site discharge (Qu=PSD) = 23.74 L/s (Underground storage)
Orifice coefficient (CD) = 0.61 For sharp circular orifice
Gravitational acceration (g) = 9.81 m/s²
Maximum storage depth above orifice (H) = 1200 mm
Orifice flow (Q) = CD*Ao*√(2*g*H)

Therefore:
Orifice area (Ao) = 8019 mm²
Orifice diameter (D = √(4*Ao/π)) = 101.0 mm

APPENDIX C – 1% AEP Overland Flow Path



NEW STORMWATER SERVICE

1% AEP OVERLAND FLOW DIRECTION

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SIDE ENTRY PIT TO BE IN GENERAL ACCORDANCE WITH SIDE ENTRY PIT TYPE 3 ON TSD-SW09-v3

1% AEP OVERLAND FLOW PATH

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2. WORK TO FIGURED DIMENSIONS ONLY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S, SERVICE ENGINEER'S AND FLUSSIG ENGINEERS DRAWINGS AND SPECIFICATIONS.

REV:	DESCRIPTION:	BY:	DATE:
01	SW LAYOUT UPDATE	MA	07.05.24

STATUS: PLANNING

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CLIENT: NICHOLAS PROPERTY HOLDINGS

PROJECT: CIVIL, HYDRAULIC AND STORMWATER SERVICES

SITE: 37-59 MARANOA ROAD, KINGSTON

TITLE: 1% AEP OVERLAND FLOW PATH

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:400	04.04.24	MA	MM
PROJECT NO: FE-23124	DRAWING NO: -		REVISION: 01

<u>Contact Project Manager:</u> Max Möller

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AtlanChamber

Modular Stormwater Storage & Detention

atlan.com.au

Atlan STORMWATER

Document Set ID: 4511060
Version: 1, Version Date: 11/09/2024

AtlanChamber is an inground modular arch system which is used for on-site detention, retention and infiltration applications.

The system is encased by an impermeable LLDPE liner which is sealed and watertight. The open-bottom arches allow the stormwater runoff to balance across the tank through the clean aggregate stone (20-50mm ballast) which surround the arches.

FEATURES

- High density polypropylene
- Injection molding
- Large capacity to fit tight footprints
- Robust continuous true elliptical arch design
- Integrated handles
- Open chamber design
- Pollutant removal solution

BENEFITS

DESIGN FLEXIBILITY

Our extensive range of 4 different arch heights provides freedom in design, and the ability to increase tank volume to suit your available footprint.

TRAFFICABILITY

Not only can the AtlanChamber be implemented in landscape areas, but the structural design of the arch also allows for superior load ratings which comply with AS5100 and W80 wheel loads. This allows the system to be installed in areas such as carparks, transport depots, and driveways.

FAST INSTALLATION

The arches are lightweight and are easily handled. The system requires less components than other like-systems and can save contractors days in install time.

EASY MAINTENANCE

Our patented Isolator Row allows easy maintenance. Pollutants are captured upon entering the tank and prevented from spreading throughout.

SPECIFICATION

The AtlanChamber is very easy to specify using our ‘Ready-Reckoner’ tables (see following pages.) These allow for multiple applications.

APPLICATIONS

- Shopping centre OSD in car parks
- Commercial and industrial OSD
- Recreational grounds and sports fields
- Stormwater harvesting
- Bioretention and infiltration

MATERIALS

- Injection molded PP chambers
- Ribbed for structural strength
- End caps and chambers
- Handles for ease of handling

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ISOLATER ROW

Our patented Isolator Row is a row of AtlanChambers (inlet row) wrapped in a woven geo-textile fabric. This fabric provides an effective pollutant removal mechanism which targets gross pollutants and suspended solids.

Whilst we recommend a Gross Pollutant Trap prior to the AtlanChamber system, the Isolator Row will serve as a Gross Pollutant Trap where pollutants will be separated and contained, which allows for ease of maintenance.

The Isolator Row was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OHS rules for confined space entries.

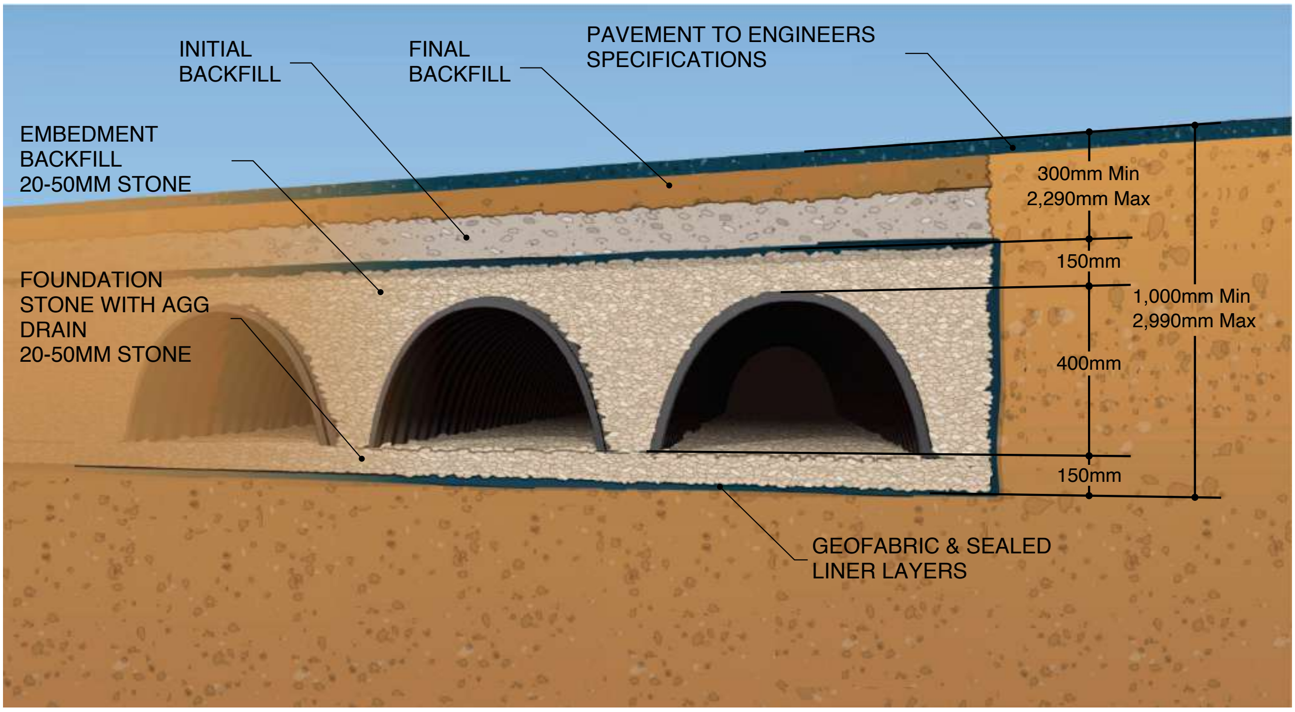
Maintenance is accomplished with the JetVac process, which utilises a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming.

Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles.

Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 1200mm are best. Most JetVac reels have over 100m of hose allowing maintenance of an Isolator Row up to 50 chambers long. The JetVac process shall only be performed on AtlanChamber that have woven geotextile (as specified by Atlan) over their angular base stone.

TECHNICAL SPECIFICATIONS

CHA400



ATLANCHAMBER CHA400 (400mm HIGH - MIN 1,000mm INSTALLED DEPTH)

		CHAMBERS WIDE QUANTITY (WIDTH)									
CHAMBERS LONG QUANTITY (LENGTH)	QTY	1 (1.5M)	2 (2.5m)	3 (3.5m)	4 (4.5m)	5 (5.5m)	6 (6.6m)	7 (7.6m)	8 (8.6m)	9 (9.6m)	10 (10.6M)
	1 (4.40m)	2m^3	3m^3	5m^3	6m^3	8m^3	9m^3	11m^3	12m^3	14m^3	15m^3
	2 (6.60m)	3m^3	6m^3	8m^3	10m^3	13m^3	15m^3	17m^3	20m^3	22m^3	24m^3
	3 (8.80m)	4m^3	8m^3	11m^3	14m^3	17m^3	20m^3	24m^3	27m^3	30m^3	33m^3
	4 (10.90m)	6m^3	10m^3	14m^3	18m^3	22m^3	26m^3	30m^3	34m^3	38m^3	42m^3
	5 (13.10m)	7m^3	12m^3	17m^3	22m^3	27m^3	32m^3	36m^3	41m^3	46m^3	51m^3
	6 (15.30m)	8m^3	14m^3	20m^3	25m^3	31m^3	37m^3	43m^3	49m^3	55m^3	60m^3
	7 (17.50m)	9m^3	16m^3	22m^3	29m^3	36m^3	43m^3	49m^3	56m^3	63m^3	70m^3
	8 (19.60m)	10m^3	18m^3	25m^3	33m^3	41m^3	48m^3	56m^3	63m^3	71m^3	79m^3
	9 (21.80m)	11m^3	20m^3	28m^3	37m^3	45m^3	54m^3	62m^3	71m^3	79m^3	88m^3
	10 (24.0m)	12m^3	22m^3	31m^3	41m^3	50m^3	59m^3	69m^3	78m^3	87m^3	97m^3
	11 (26.10m)	14m^3	24m^3	34m^3	44m^3	55m^3	65m^3	75m^3	85m^3	96m^3	106m^3
	12 (28.3m)	15m^3	26m^3	37m^3	48m^3	59m^3	70m^3	82m^3	93m^3	104m^3	115m^3
	13 (30.5m)	16m^3	28m^3	40m^3	52m^3	64m^3	76m^3	88m^3	100m^3	112m^3	124m^3
	14 (32.6m)	17m^3	30m^3	43m^3	56m^3	69m^3	82m^3	94m^3	107m^3	120m^3	133m^3
	15 (34.8m)	18m^3	32m^3	46m^3	60m^3	73m^3	87m^3	101m^3	115m^3	128m^3	142m^3
	16 (37.0m)	19m^3	34m^3	49m^3	63m^3	78m^3	93m^3	107m^3	122m^3	137m^3	151m^3
	17 (39.2m)	21m^3	36m^3	52m^3	67m^3	83m^3	98m^3	114m^3	129m^3	145m^3	160m^3
	18 (41.30m)	22m^3	38m^3	55m^3	71m^3	87m^3	104m^3	120m^3	137m^3	153m^3	169m^3
	19 (43.5m)	23m^3	40m^3	57m^3	75m^3	92m^3	109m^3	127m^3	144m^3	161m^3	178m^3
	20 (45.7m)	24m^3	42m^3	60m^3	79m^3	97m^3	115m^3	133m^3	151m^3	169m^3	188m^3
	21 (47.8m)	25m^3	44m^3	63m^3	82m^3	101m^3	120m^3	139m^3	159m^3	178m^3	197m^3

Document Set ID: 4511060
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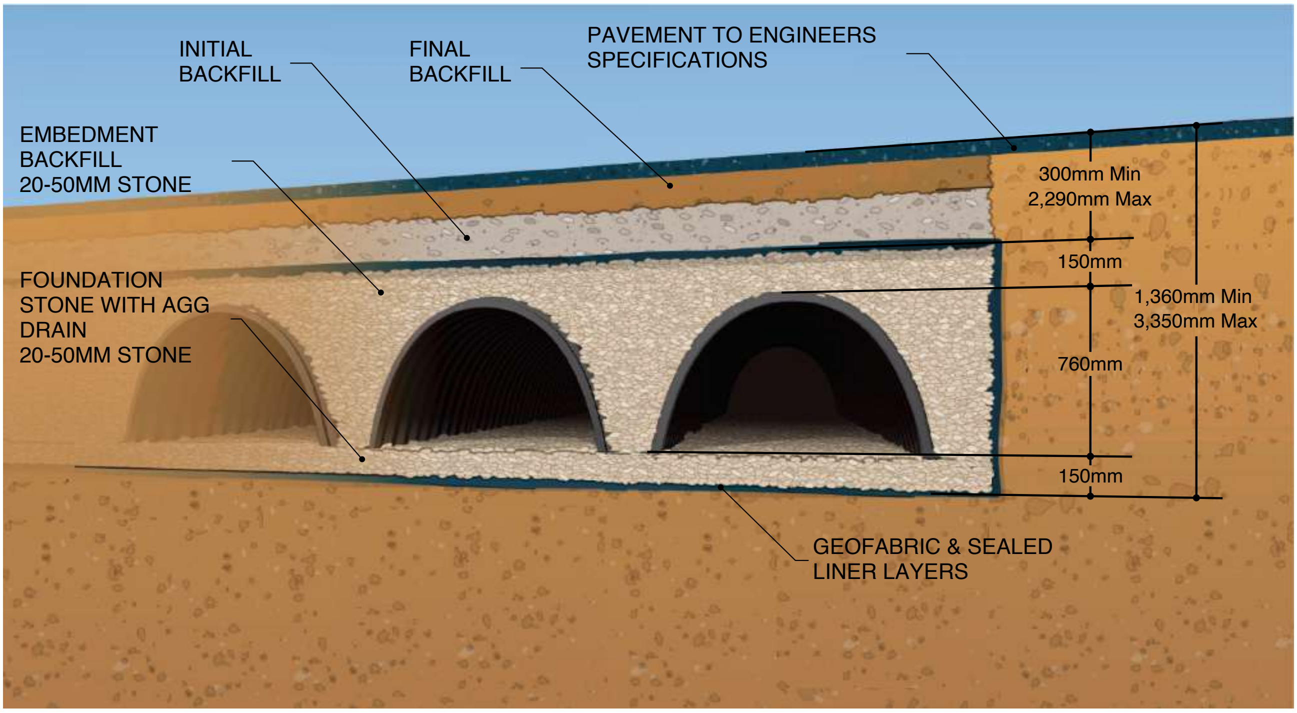
TECHNICAL SPECIFICATIONS

CHA750 *ALSO, IN CHA-750-D (DEEP BURIAL)



ATLANCHAMBER CHA750 (750mm HIGH - MIN 1,355mm INSTALLED DEPTH)

CHAMBERS LONG QUANTITY (LENGTH)	CHAMBERS WIDE QUANTITY (WIDTH)										
	QTY	1 (1.9M)	2 (3.4m)	3 (4.8m)	4 (6.2m)	5 (7.7m)	6 (9.1m)	7 (10.6m)	8 (12m)	9 (13.5m)	10 (14.9M)
	1 (4.50m)	5m^3	8m^3	12m^3	16m^3	20m^3	24m^3	28m^3	31m^3	35m^3	39m^3
	2 (6.60m)	7m^3	13m^3	19m^3	25m^3	31m^3	37m^3	43m^3	49m^3	55m^3	61m^3
	3 (8.80m)	10m^3	18m^3	26m^3	34m^3	42m^3	50m^3	58m^3	66m^3	74m^3	82m^3
	4 (10.90m)	12m^3	22m^3	33m^3	43m^3	53m^3	63m^3	73m^3	83m^3	94m^3	104m^3
	5 (13.10m)	15m^3	27m^3	39m^3	52m^3	64m^3	76m^3	89m^3	101m^3	113m^3	125m^3
	6 (15.20m)	17m^3	32m^3	46m^3	61m^3	75m^3	89m^3	104m^3	118m^3	133m^3	147m^3
	7 (17.40m)	20m^3	36m^3	53m^3	69m^3	86m^3	103m^3	119m^3	136m^3	152m^3	169m^3
	8 (19.60m)	22m^3	41m^3	60m^3	78m^3	97m^3	116m^3	134m^3	153m^3	172m^3	190m^3
	9 (21.70m)	25m^3	46m^3	67m^3	87m^3	108m^3	129m^3	150m^3	170m^3	191m^3	212m^3
	10 (23.9m)	28m^3	50m^3	73m^3	96m^3	119m^3	142m^3	165m^3	188m^3	211m^3	234m^3
	11 (26.0m)	30m^3	55m^3	80m^3	105m^3	130m^3	155m^3	180m^3	205m^3	230m^3	255m^3
	12 (28.2m)	33m^3	60m^3	87m^3	114m^3	141m^3	168m^3	195m^3	222m^3	250m^3	277m^3
	13 (30.3m)	35m^3	64m^3	94m^3	123m^3	152m^3	181m^3	211m^3	240m^3	269m^3	298m^3
	14 (32.5m)	38m^3	69m^3	100m^3	132m^3	163m^3	195m^3	226m^3	257m^3	289m^3	320m^3
	15 (34.6m)	40m^3	74m^3	107m^3	141m^3	174m^3	208m^3	241m^3	275m^3	308m^3	342m^3
	16 (36.8m)	43m^3	78m^3	114m^3	150m^3	185m^3	221m^3	256m^3	292m^3	328m^3	363m^3
	17 (39.0m)	45m^3	83m^3	121m^3	158m^3	196m^3	234m^3	272m^3	309m^3	347m^3	385m^3
	18 (41.10m)	48m^3	88m^3	128m^3	167m^3	207m^3	247m^3	287m^3	327m^3	367m^3	406m^3
	19 (43.3m)	50m^3	92m^3	134m^3	176m^3	218m^3	260m^3	302m^3	344m^3	386m^3	428m^3
	20 (45.4m)	53m^3	97m^3	141m^3	185m^3	229m^3	273m^3	317m^3	362m^3	406m^3	450m^3
	21 (47.6m)	55m^3	102m^3	148m^3	194m^3	240m^3	286m^3	333m^3	379m^3	425m^3	471m^3

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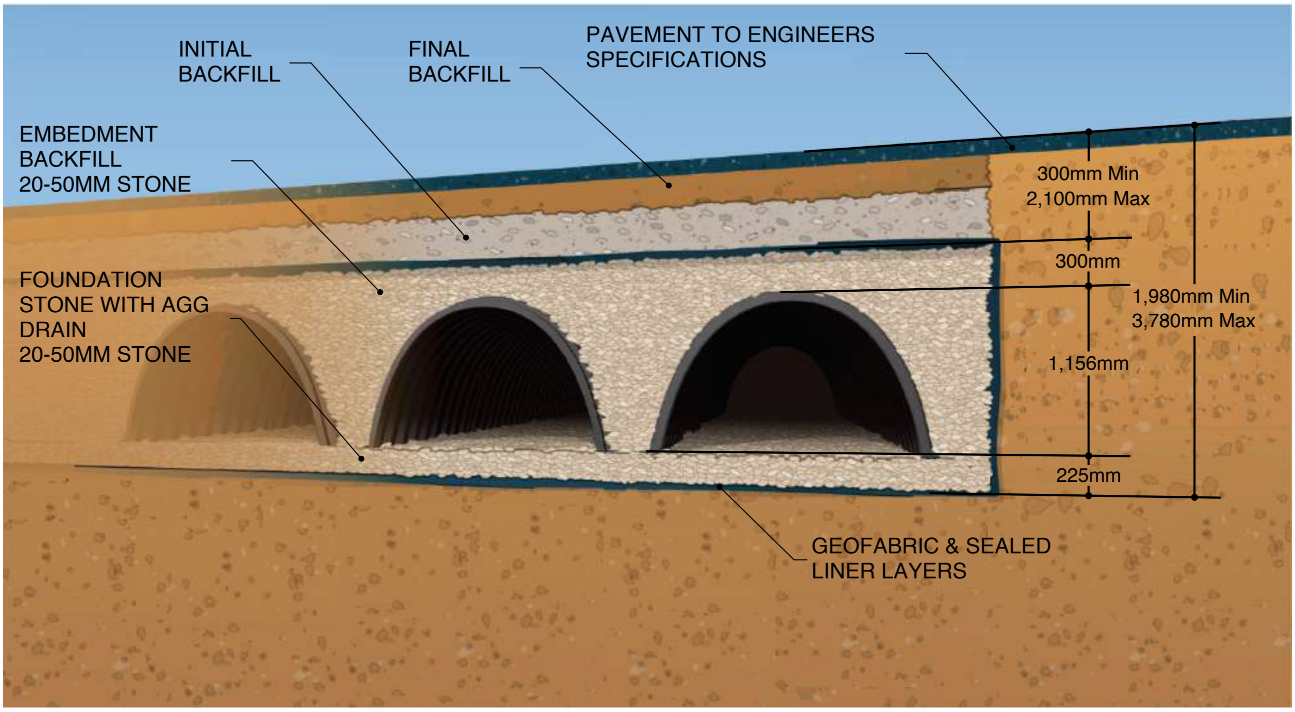
TECHNICAL SPECIFICATIONS

CHA1200



ATLANCHAMBER CHA1200 (1,200mm HIGH - MIN 2,000mm INSTALLED DEPTH)

	CHAMBERS WIDE QUANTITY (WIDTH)									
CHAMBERS LONG QUANTITY (LENGTH) QTY	1 (2.60M)	2 (4.80m)	3 (6.90m)	4 (9.10m)	5 (11.30m)	6 (13.50m)	7 (15.70m)	8 (17.80m)	9 (20.0m)	10 (22.2M)
1 (4.60m)	10m^3	20m^3	29m^3	38m^3	47m^3	57m^3	66m^3	75m^3	84m^3	94m^3
2 (6.70m)	16m^3	31m^3	45m^3	59m^3	74m^3	88m^3	102m^3	117m^3	131m^3	145m^3
3 (8.90m)	22m^3	41m^3	61m^3	80m^3	100m^3	119m^3	139m^3	158m^3	178m^3	197m^3
4 (11.10m)	28m^3	52m^3	77m^3	101m^3	126m^3	151m^3	175m^3	200m^3	224m^3	249m^3
5 (13.20m)	33m^3	63m^3	93m^3	122m^3	152m^3	182m^3	212m^3	241m^3	271m^3	301m^3
6 (15.40m)	39m^3	74m^3	109m^3	144m^3	178m^3	213m^3	248m^3	283m^3	318m^3	352m^3
7 (17.60m)	45m^3	85m^3	125m^3	165m^3	205m^3	244m^3	284m^3	324m^3	364m^3	404m^3
8 (19.70m)	50m^3	96m^3	141m^3	186m^3	251m^3	276m^3	321m^3	366m^3	411m^3	456m^3
9 (21.90m)	56m^3	106m^3	157m^3	207m^3	257m^3	307m^3	357m^3	407m^3	458m^3	508m^3
10 (24.10m)	62m^3	117m^3	172m^3	228m^3	283m^3	338m^3	3941m^3	449m^3	504m^3	560m^3
11 (26.30m)	68m^3	128m^3	188m^3	249m^3	309m^3	370m^3	430m^3	491m^3	551m^3	611m^3
12 (28.40m)	73m^3	139m^3	204m^3	270m^3	335m^3	401m^3	467m^3	532m^3	598m^3	653m^3
13 (30.60m)	79m^3	150m^3	220m^3	291m^3	362m^3	432m^3	503m^3	574m^3	644m^3	715m^3
14 (32.80m)	85m^3	161m^3	236m^3	312m^3	388m^3	464m^3	539m^3	615m^3	691m^3	767m^3
15 (34.90m)	90m^3	171m^3	252m^3	333m^3	414m^3	495m^3	576m^3	657m^3	738m^3	818m^3
16 (37.10m)	96m^3	182m^3	268m^3	354m^3	440m^3	526m^3	612m^3	698m^3	784m^3	870m^3
17 (39.30m)	102m^3	193m^3	284m^3	375m^3	466m^3	558m^3	649m^3	740m^3	831m^3	922m^3
18 (41.40m)	108m^3	204m^3	300m^3	396m^3	493m^3	589m^3	685m^3	781m^3	878m^3	974m^3
19 (43.60m)	113m^3	215m^3	316m^3	417m^3	519m^3	620m^3	722m^3	823m^3	924m^3	1026m^3
20 (45.80m)	119m^3	226m^3	332m^3	438m^3	545m^3	651m^3	758m^3	864m^3	971m^3	1077m^3
21 (47.90m)	125m^3	236m^3	348m^3	460m^3	571m^3	683m^3	794m^3	906m^3	1018m^3	1129m^3

NOTE: Standard sizing has been used to calculate this table, the chamber systems have been sized with one manifold. This table should be used as a sizing guide, Atlan will confirm sizing for your project on a site-specific basis.

AtlanChamber

Modular Stormwater Storage & Detention

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Joy in water

'We believe clean waterways are a right not a privilege and we work to ensure a joy in water experience for you and future generations.'

Andy Hornbuckle

Atlan STORMWATER

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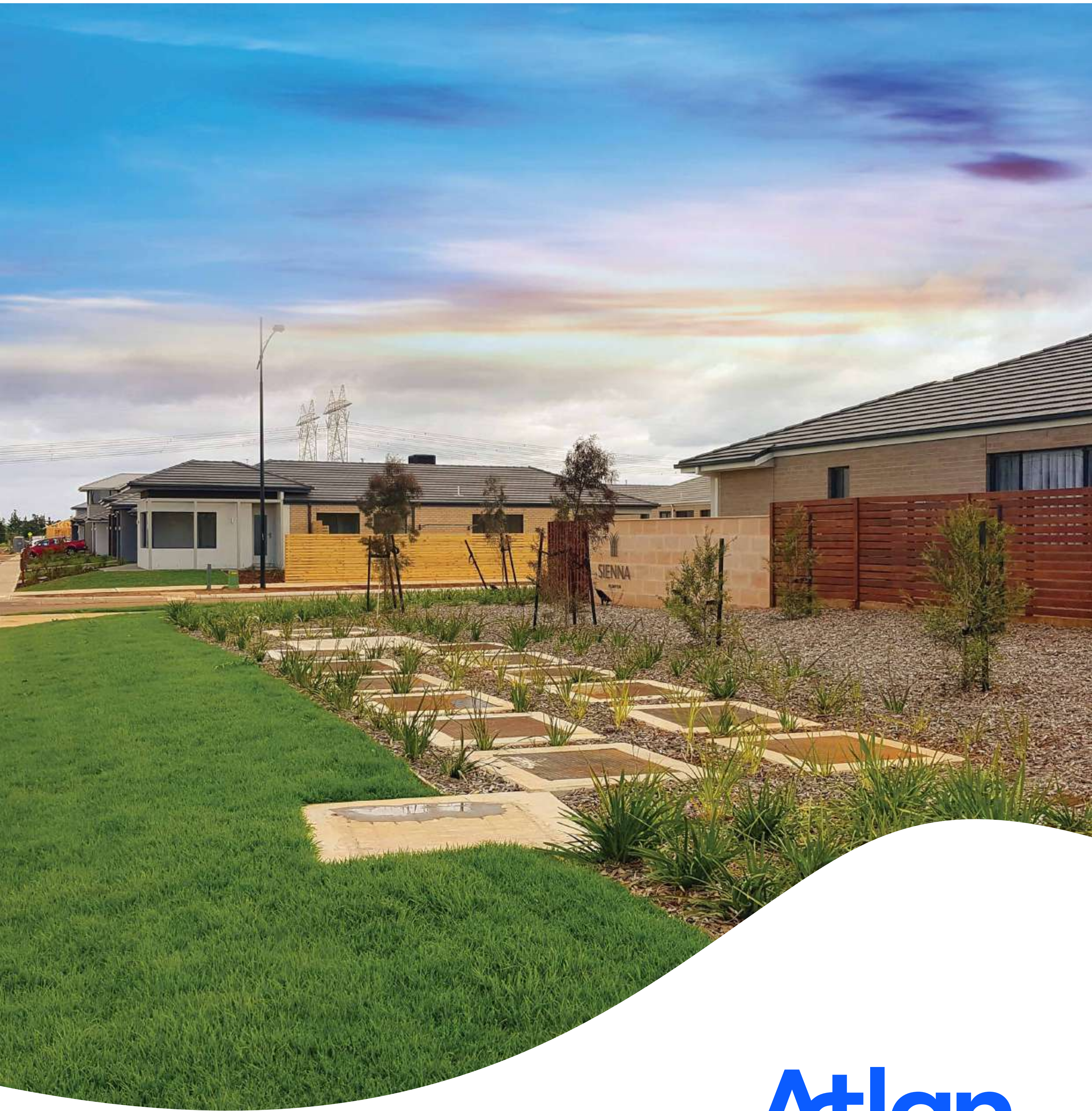
0723

FlowFilter

Cartridge filter for tertiary stormwater treatment



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Atlan
STORMWATER

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Version: 1, Version Date: 11/09/2024

FlowFilter is a specialist stormwater filtration system that is purpose-built to reduce the footprint of WSUD on constrained projects. Manufactured, designed, and engineered in Australia using fibre-reinforced polymer (FRP) this generational asset is supplied with a 25-year warranty & 100-year design life.

This innovative approach to stormwater treatment uses an up-flow filtration process. With minimal head drop required between inlet and outlet, these devices are suitable for installation on flat sites or low gradient developments. The stormwater is treated within the unit by the following processes: sedimentation, filtration, adsorption, and precipitation.

The FlowFilter has been extensively laboratory and field tested for the removal of pollutants – including heavy metals, total suspended solids (TSS), and nutrients (Phosphorous and Nitrogen).

APPLICATIONS

- Car parks & shopping centres
- Council depots
- Industrial estates
- Heavy vehicle maintenance
- Transport depots & loading bays
- Tunnels
- Highways & transport corridors
- Recycling yards
- Airport aprons & tarmacs

FEATURES

- Manufactured, designed, and engineered in Australia at our FRP production facility.
- Lightweight, easy to install and minimal on-site lifting requirements (no crane required).
- Reduced on-site footprint.
- Up-flow filtration process suitable for flat sites requiring only 250 mm of hydraulic head.
- Scalable sizes with variable cartridge configurations from 1 to 39 filter cartridges.
- Treatment flow rates from 2.5 litres per second (LPS) to 156 litres per second installed in offline configuration.
- Custom-designed inline systems available.
- Installed in trafficable and non trafficable applications.

SPECIFICATIONS

MODEL	NO. CARTRIDGE	TFR	ID (m)	HEIGHT (m)	INLET/ OUTLET (mm)
400 SERIES					
HS.400/1	1	2.5 LPS	1.13	1.5	100
HS.400/2	2	5 LPS			
HS.400/3	3	7.5 LPS			
1200 SERIES					
HS.1200/4	4	12 LPS	1.20	2.60	225
1500 SERIES					
HS.1500/4	4	16 LPS	1.50	2.00	225
HS.1500/5	5	20 LPS			
HS.1500/6	6	24 LPS			
1850 SERIES					
SHS.1850/7	7	28 LPS	1.85	2.00	225
2200 SERIES					
HS.2200/7	7	28 LPS	2.20	2.50	225
HS.2200/8	8	32 LPS			
HS.2200/9	9	36 LPS			
2500 SERIES					
HS.2500/10	10	40 LPS	2.50	2.70	300
HS.2500/11	11	44 LPS			
HS.2500/12	12	48 LPS			
HS.2500/13	13	52 LPS			
HS.2500/14	14	56 LPS			
HS.2500/15	15	60 LPS			
HS.2500/16	16	64 LPS			
3000 SERIES					
HS.3000/17	17	68 LPS	3.00	2.85	300
HS.3000/18	18	76 LPS			
HS.3000/19	19	76 LPS			
HS.3000/20	20	80 LPS			
HS.3000/21	20	84 LPS			
3500 SERIES					
HS.3500/22	22	88 LPS	3.50	2.95	375
HS.3500/23	23	92 LPS			
HS.3500/24	24	96 LPS			
HS.3500/25	25	100 LPS			
HS.3500/26	26	104 LPS			
HS.3500/27	27	108 LPS			
HS.3500/28	28	112 LPS			
HS.3500/29	29	116 LPS			
HS.3500/30	30	120 LPS			
HS.3500/31	31	124 LPS			
4000 SERIES					
HS.4000/32	32	128 LPS	4.00	3.25	375
HS.4000/33	33	132 LPS			
HS.4000/34	34	136 LPS			
HS.4000/35	35	140 LPS			
HS.4000/36	36	144 LPS			
HS.4000/37	37	148 LPS			
HS.4000/38	38	152 LPS			
HS.4000/39	39	156 LPS			

Tested Treatment Efficiencies*

POLLUTANT	EFFICIENCY
Gross Pollutants (GP)	100%
Total Suspended Solids (TSS)	85%
Total Phosphorus (TP)	66%
Total Nitrogen (TN)	43%
Petroleum Hydrocarbon	82%

*Contact Atlan to confirm approved performance for the project LGA

Operating System

1. Stormwater from catchment enters the offline FlowFilter inlet.
2. Sediment is retained within the sump area.
3. Filter cartridges operate in an up-flow process. The fine sediment is physically removed, and dissolved pollutants are precipitated and adsorptively bound to the filtration media.
4. Treated water flows from cartridges to outlet and into downstream water network.

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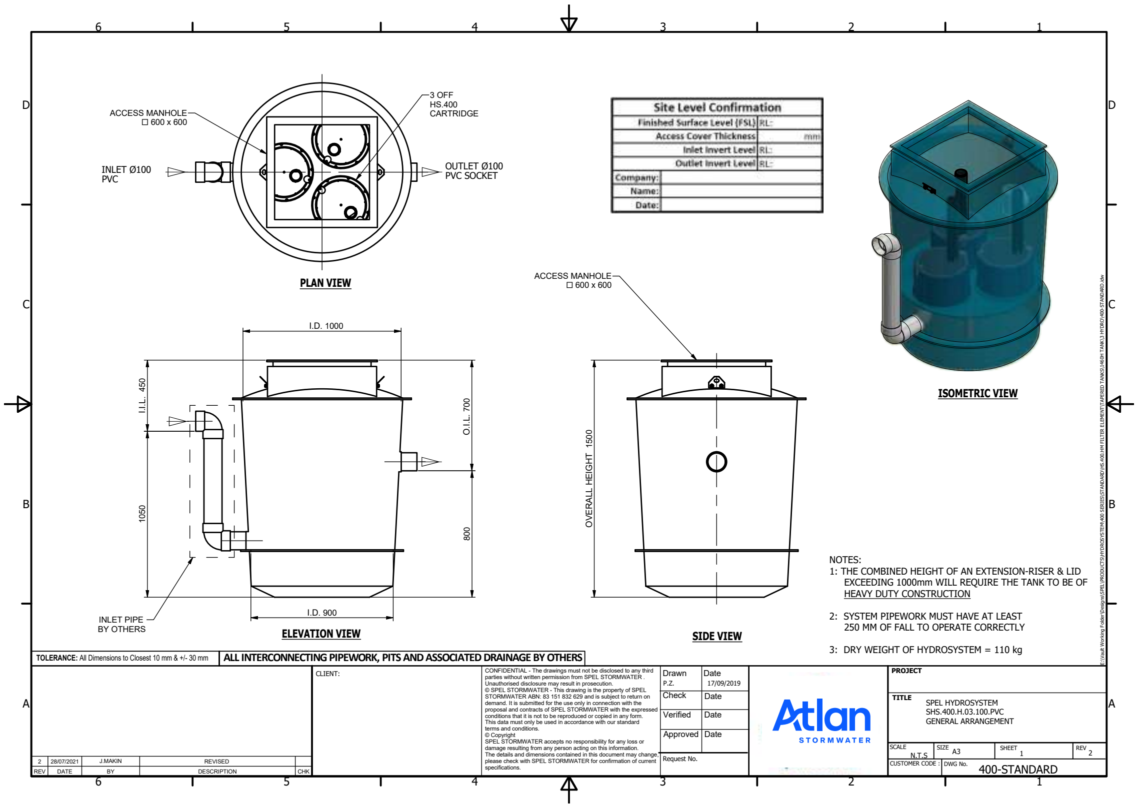
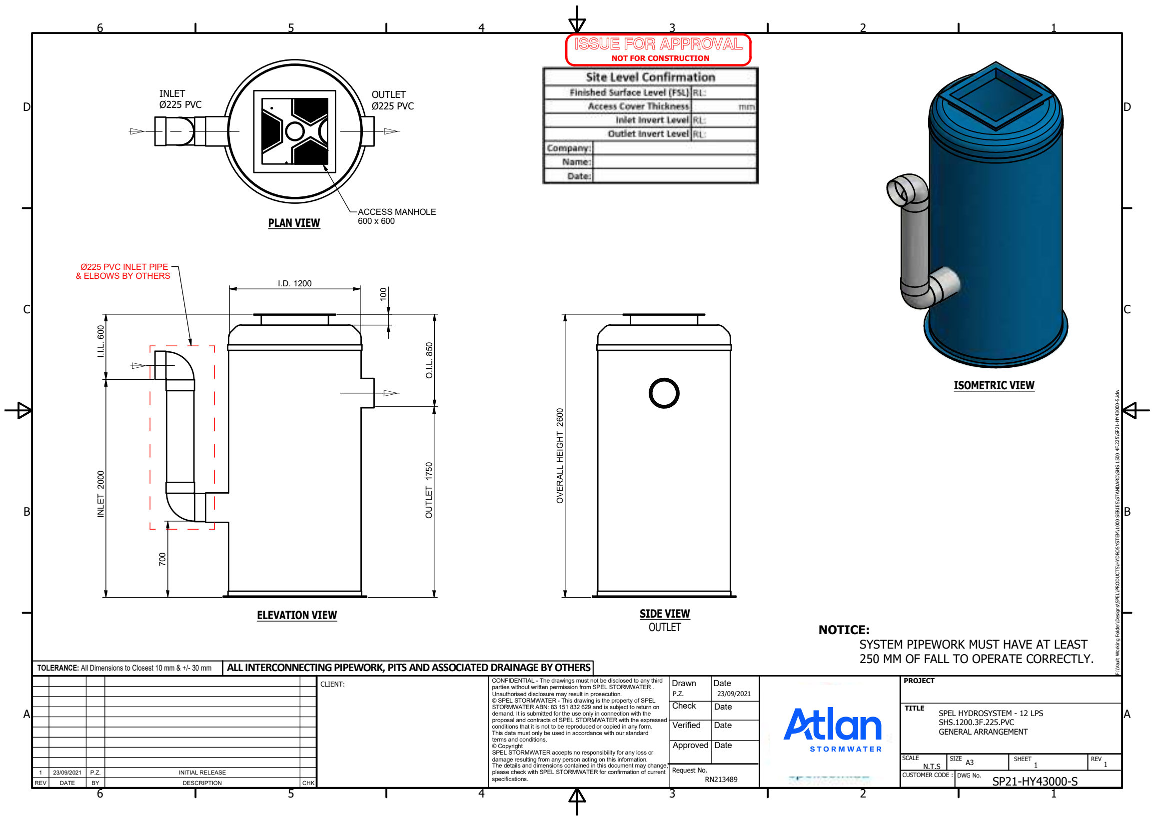
DRAWINGS

Model HS.400



Model HS.1200



DRAWINGS

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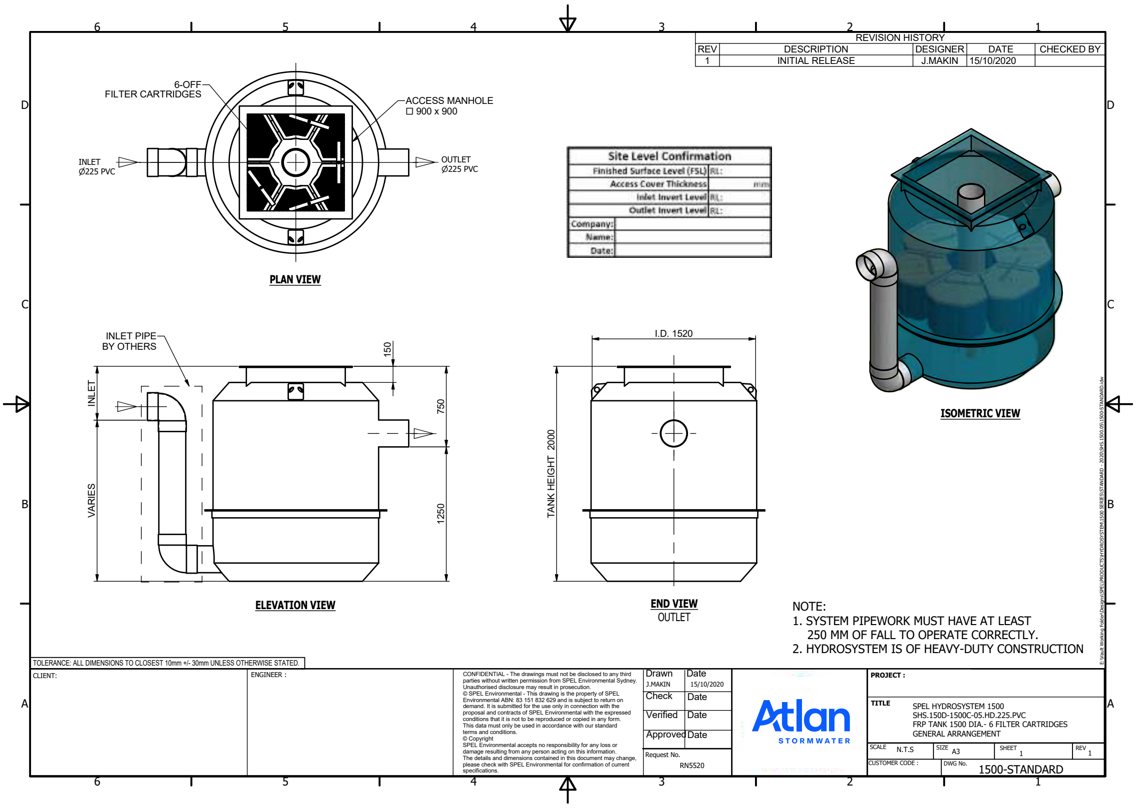
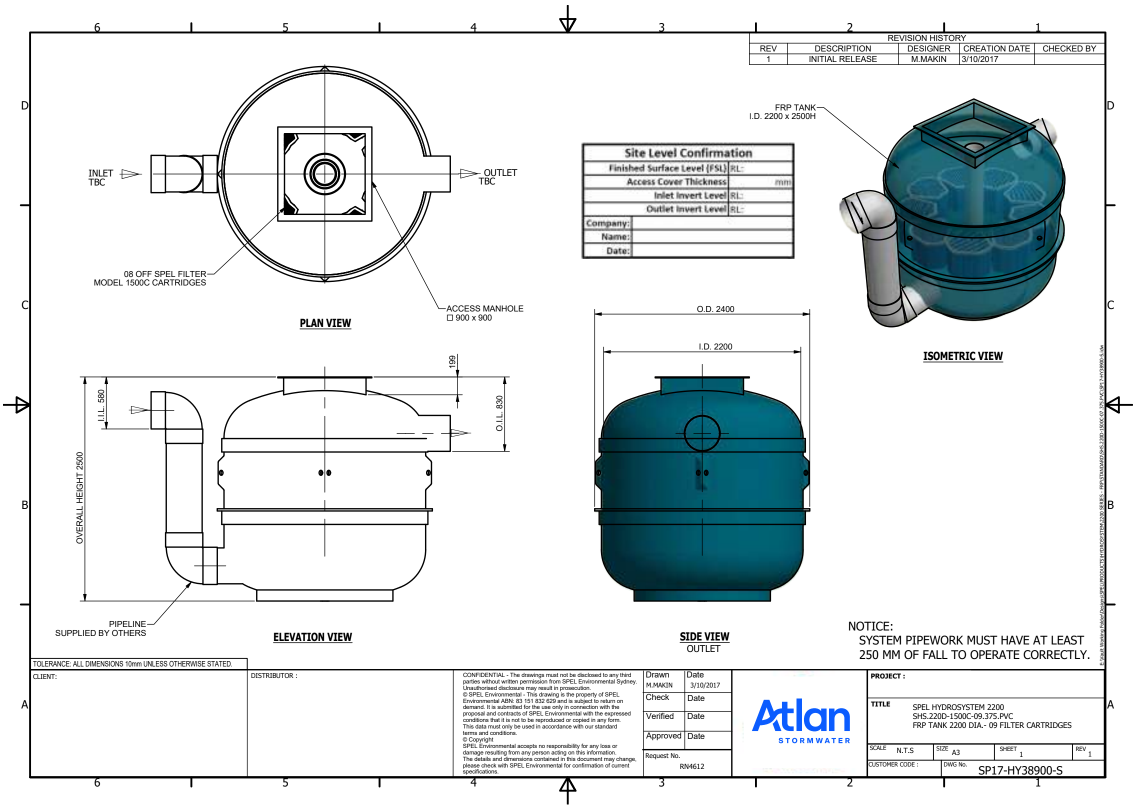


Model HS.2200



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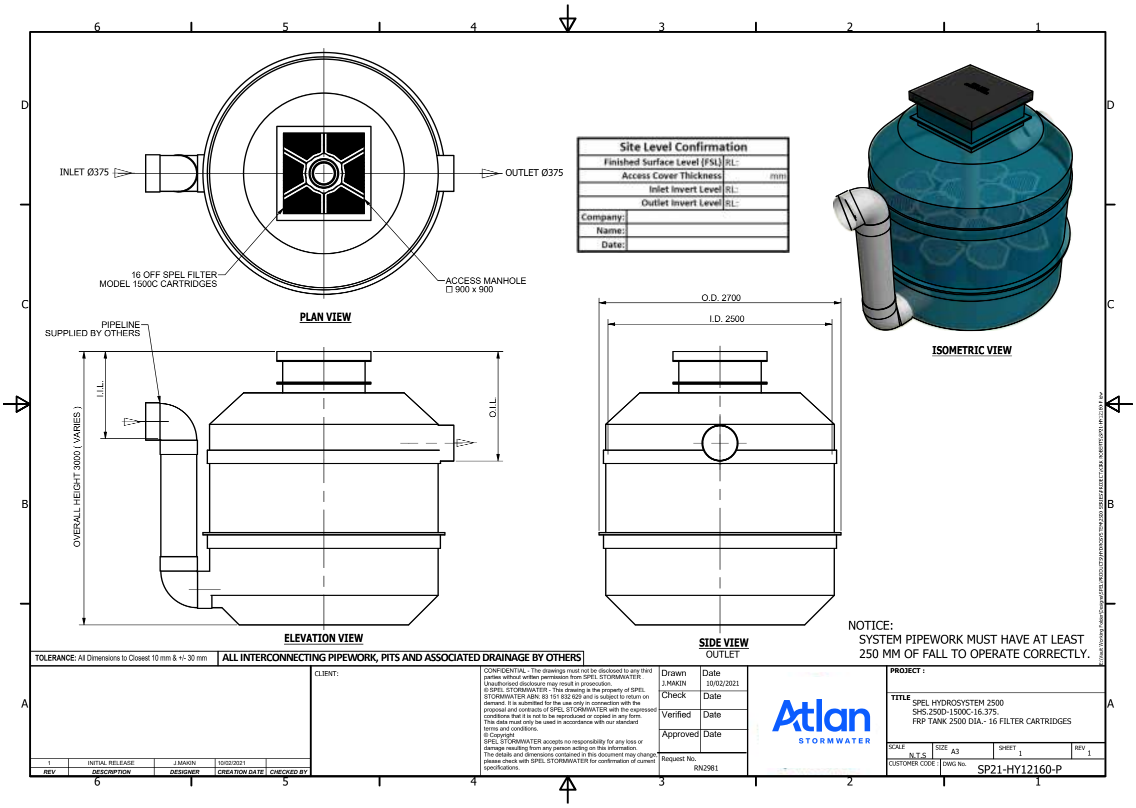
DRAWINGS

Model HS.2500



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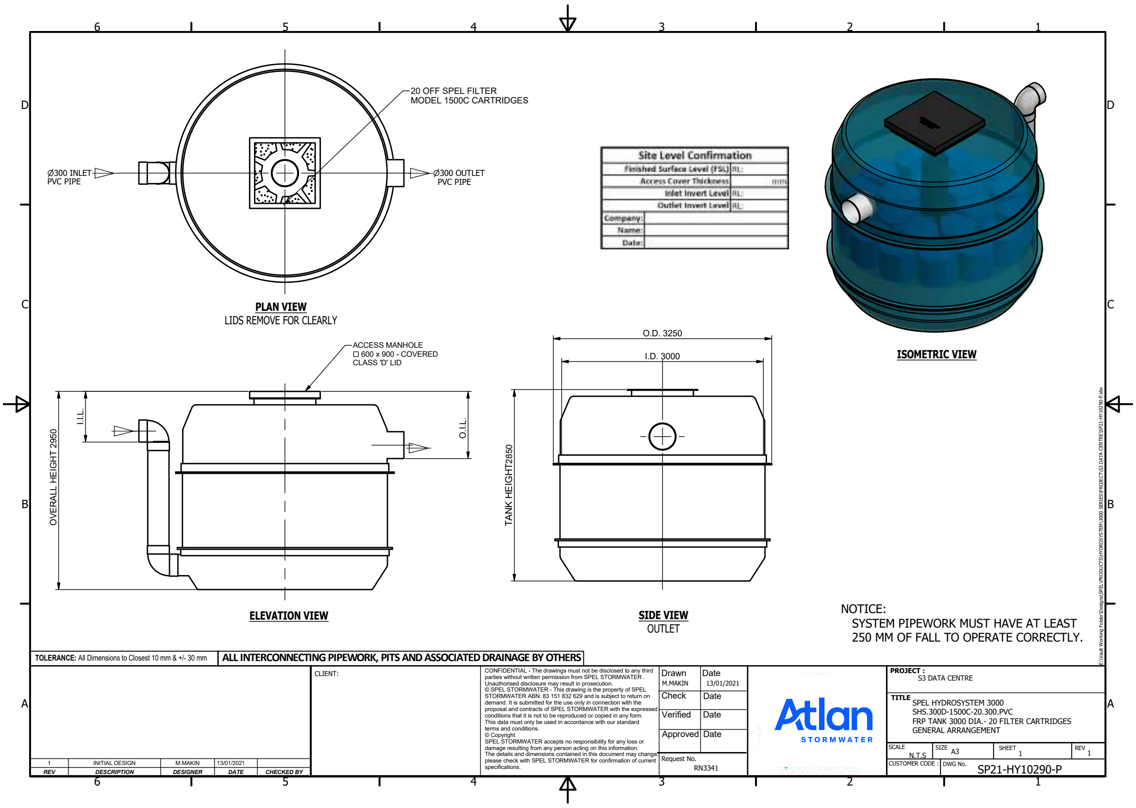

DRAWINGS

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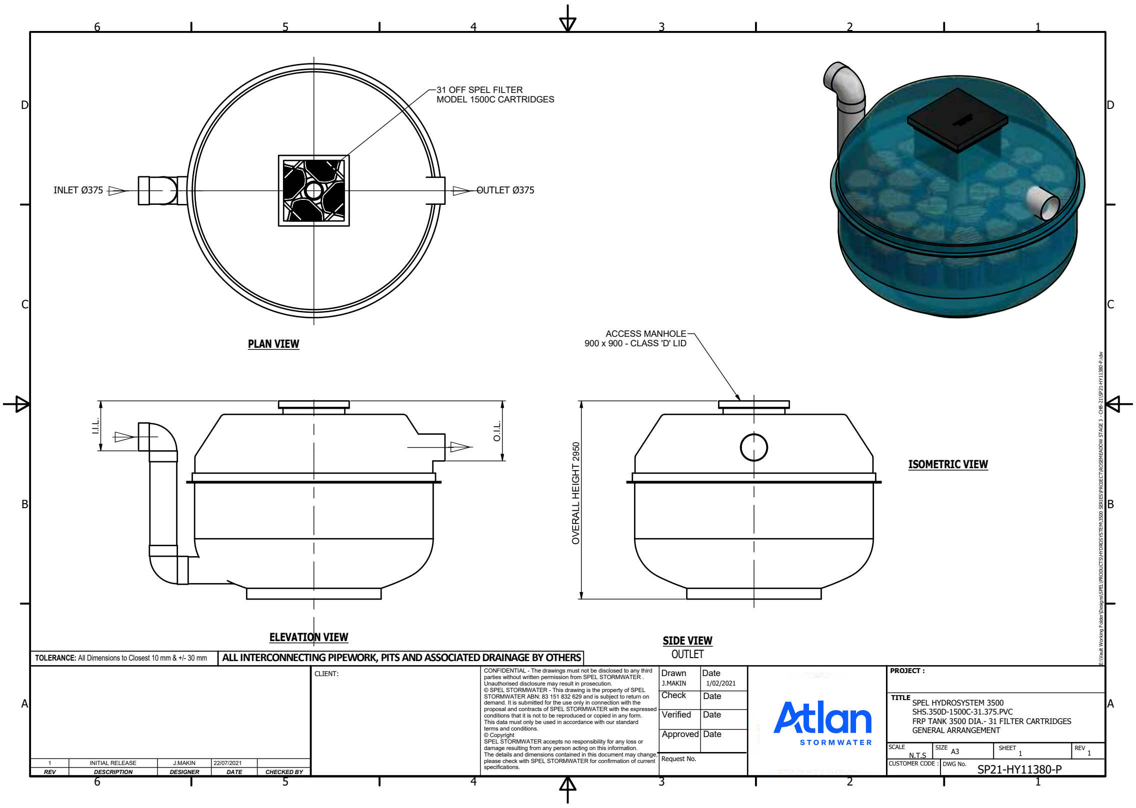

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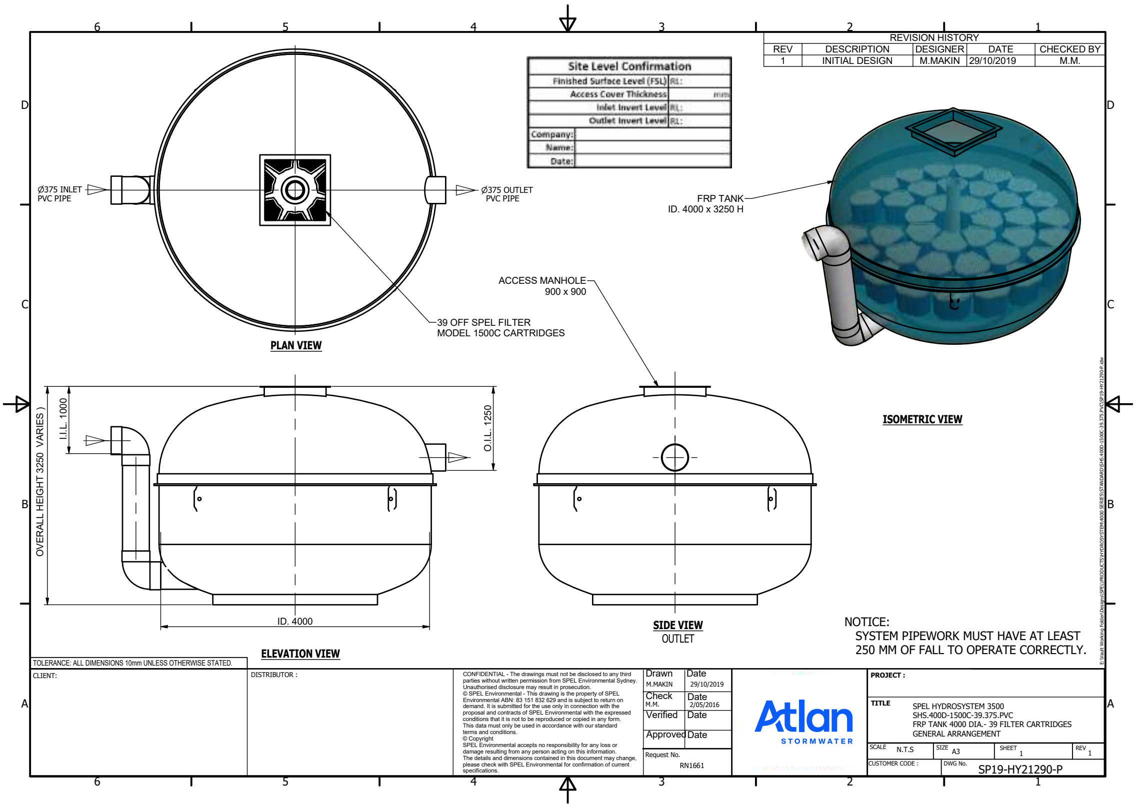

FlowFilter

Cartridge filter for tertiary stormwater treatment

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Joy in water

‘We believe clean waterways are a right not a privilege and we work to ensure a joy in water experience for you and future generations.’

Andy Hornbuckle

Atlan STORMWATER

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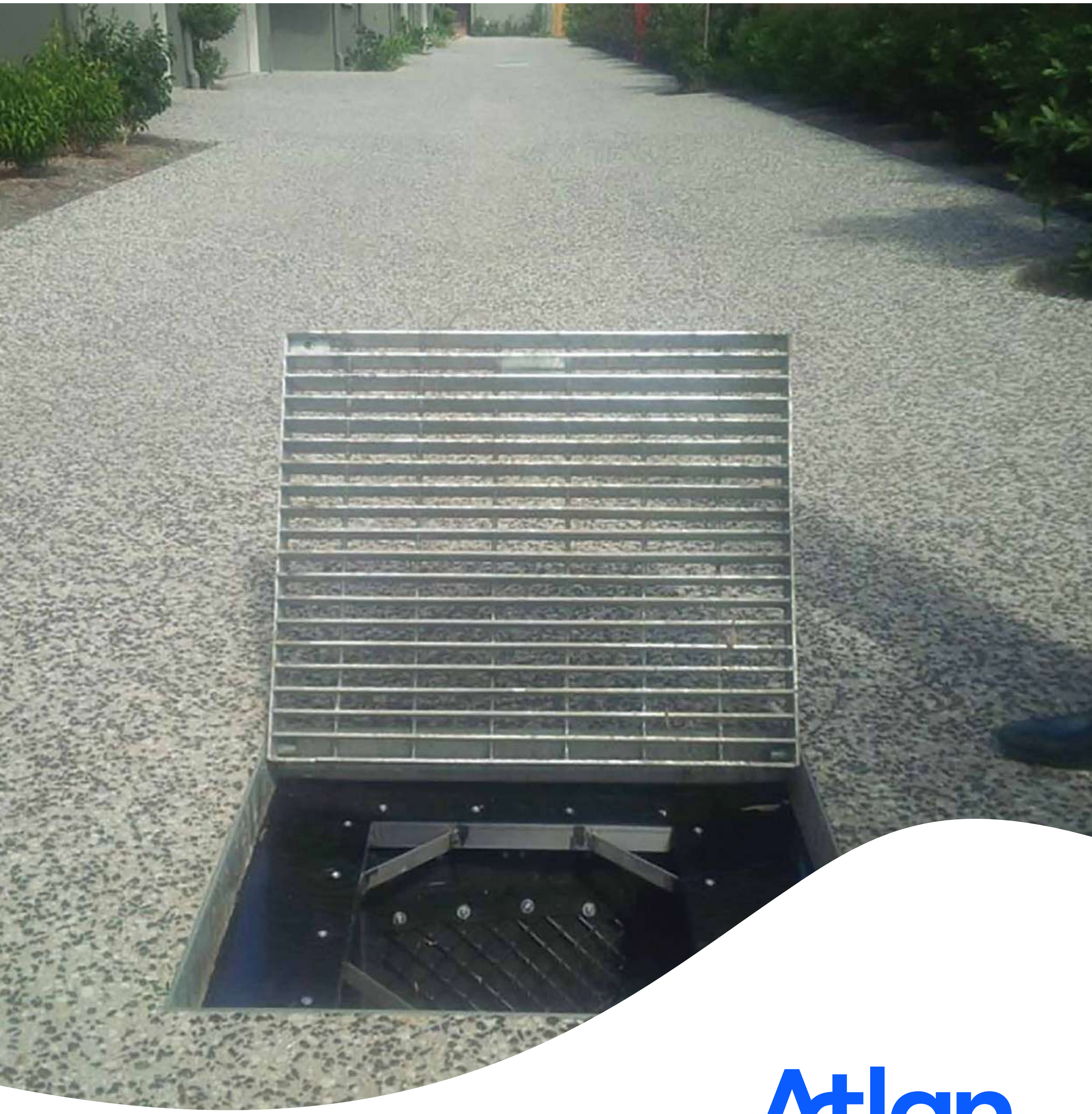
StormSack

At-Source Gross Pollutant Trap



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The Atlan StormSack is specifically designed for the capture of gross pollutants, sediment, litter, and oil and grease. Ideally suited for storm drain retrofits, the StormSack's unique design allows maintenance to be performed using conventional vacuum suction equipment.

StormSack filtration solutions are highly engineered water quality devices that are deployed directly in the stormwater system to capture contaminants close the surface for ease of maintenance. Easily retrofitted into new or existing structures, StormSack filtration technology is a decentralized approach to stormwater treatment that essentially repurposes traditional site infrastructure and customizes it to meet specific site water quality goals. In this way, it satisfies important objectives of today's LID (Low Impact Development) criteria.

From an operations perspective, catch basins with StormSack filters are also easier and quicker to clean out because pollutants are trapped just under the grate.

APPLICATIONS

- Council storm drain retrofits
- Commercial / retail / residential
- Litter prone urban areas
- Scrap metal / solid waste / oil storage
- Part of treatment train
- Construction sediment / erosion

BENEFITS

- Can be modelled in MUSIC in conjunction with bio-retention
- Low cost gross pollutant capture
- Quick & easy installation
- Simple maintenance
- At-source capture
- Adjusts to custom pit sizes

The StormSack was introduced to the Australian market in 2012 and field testing is underway at several locations in South-east Queensland. Laboratory testing has shown capture of 99.99% of gross pollutants up to the bypass flow rate. Further results will be provided as they become available.

Recommended minimum clearance from bottom of StormSack to inside bottom of vault is 50mm. Typical frame adjustability range of 127mm in each direction.

HOW IT WORKS

This technology is a post developed stormwater treatment system. The StormSack provides effective filtration of solid pollutants and debris typical of urban runoff, while utilising existing or new storm drain infrastructure. The StormSack is designed to rest on the flanges of conventional catch basin frames and is engineered for most hydraulic and cold climate conditions.

Installation procedures shall include removing the storm grate, cleaning the ledge of debris and solids, measuring catch basin clear opening and adjusting flanges to rest on the grate support ledge. Install StormSack with splash guard under curb opening so the adjustable flanges are resting on the grate support ledge. Install corner filler pieces. Reinstall storm grate directly on support flanges rise shall be no more than 3mm.

FEATURES

POLLUTANT	EFFICIENCY
Gross Pollutants (GP)	100%
Total Suspended Solids (TSS)	61%
Total Phosphorus (TP)	28%
Total Nitrogen (TN)	45%

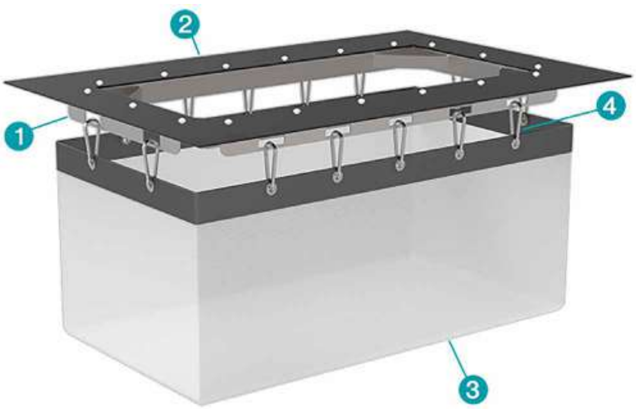
*Contact Atlan to confirm approved performance for the project LGA

MAINTENANCE

Typically the StormSack is serviceable from the street level, and therefore maintenance does not require confined space entry into the catch basin structure. The unit is designed to be maintained in place with a vacuum hose attached to a sweeper or a vactor truck. Use only Atlan replaceable parts.

Application	Regulatory Issue	Target Pollutants
Council Storm Drain Retrofits	At-source litter capture	Sediment, Litter, O&G
Commercial/Retail/Residential	Stormwater Compliance	Sediment, Litter, O&G
Litter Prone Urban Areas	Cost effective litter control	Litter ≥ 5 mm
Scrap Metal/Solid Waste/Oil Storage/Etc	Industrial Multi-Sector General Permit	Gross Pollutants, O&G
Part of Treatment Train	Council Stormwater Quality Improvement Targets	Sediment, Litter, O&G
Construction Sediment/Erosion	Sediment Control Plan	Sediment/Erosion Control

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.	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

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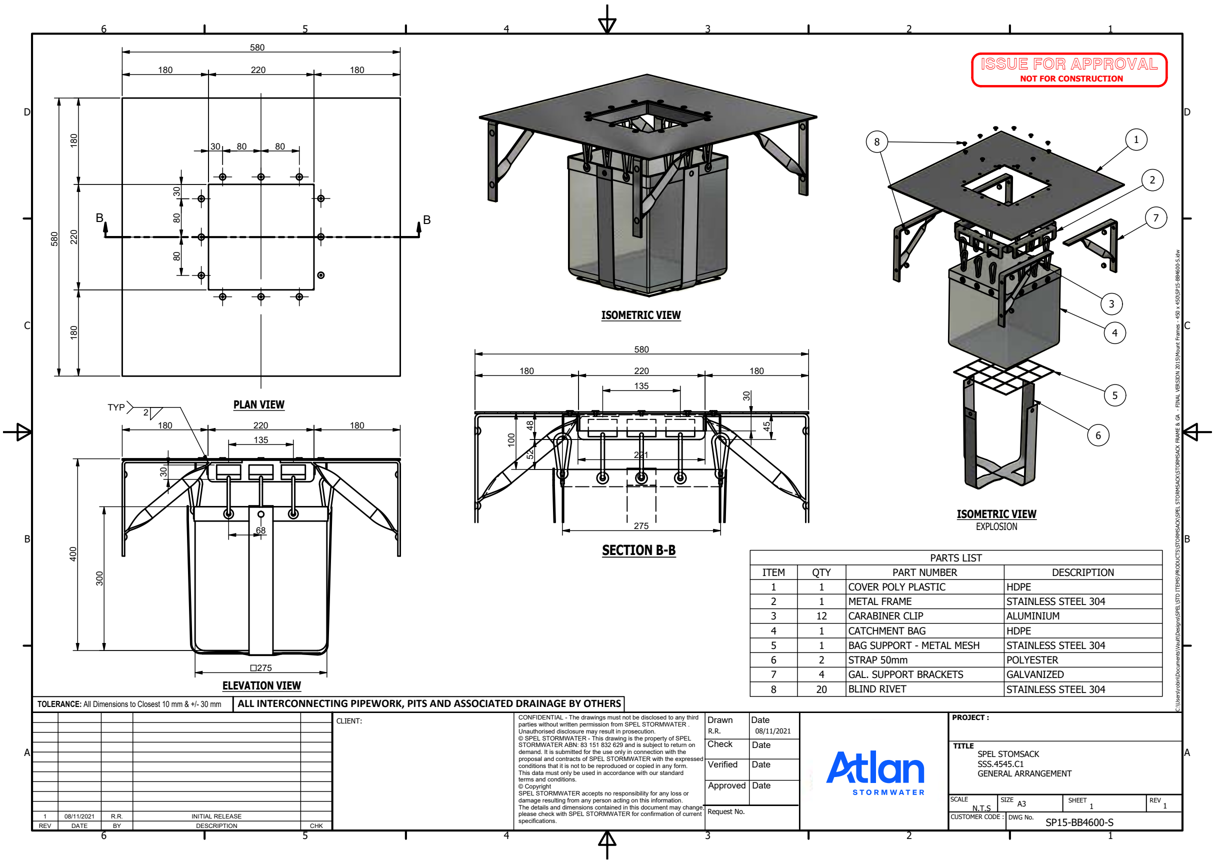
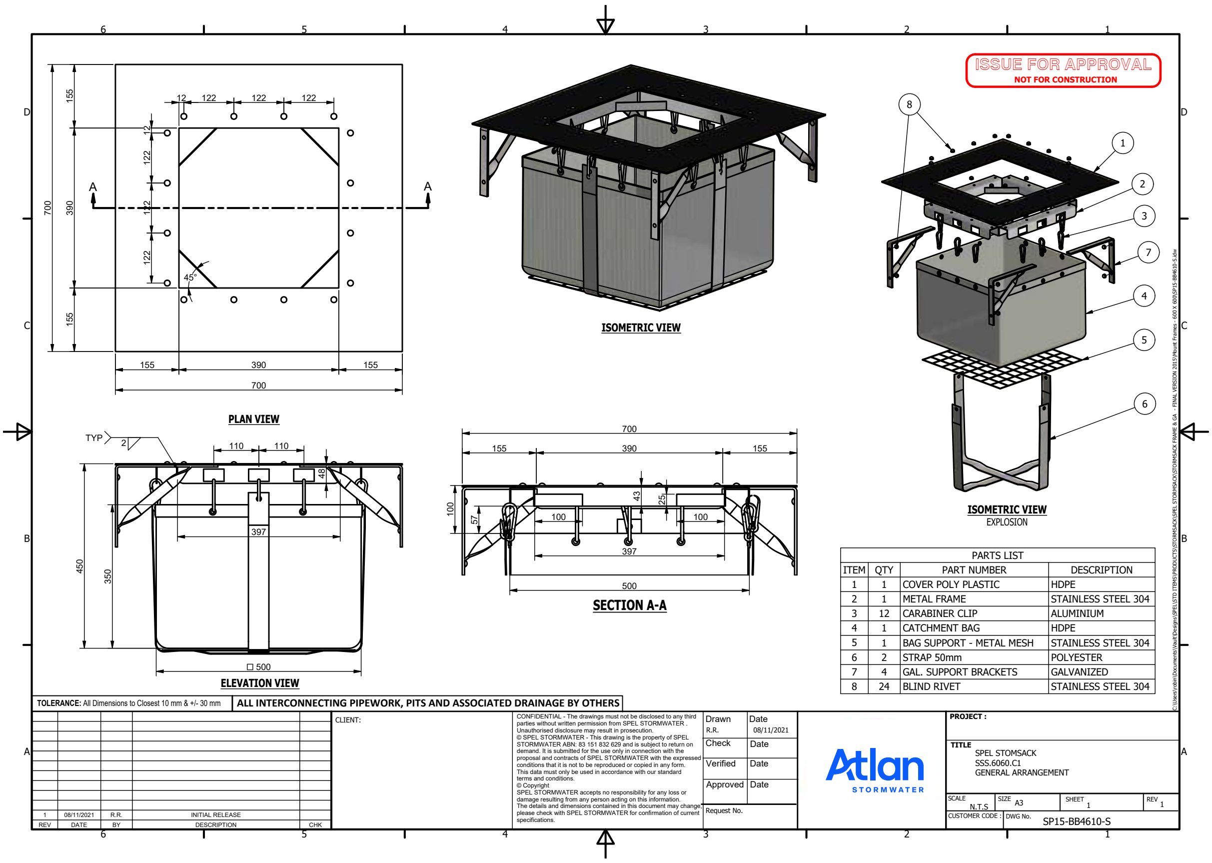
TECHNICAL DRAWINGS

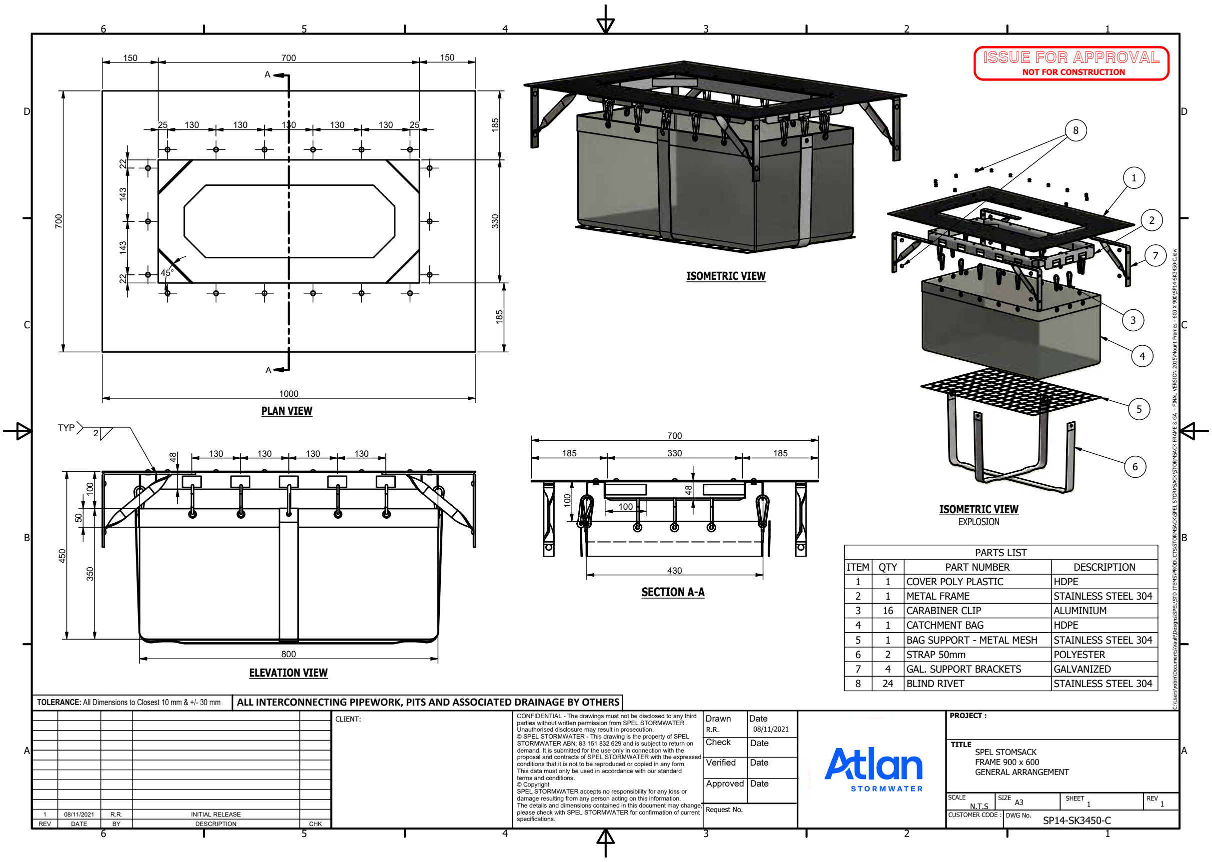


ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	COVER POLY PLASTIC	HDPE
2	1	METAL FRAME	STAINLESS STEEL 304
3	12	CARABINER CLIP	ALUMINIUM
4	1	CATCHMENT BAG	HDPE
5	1	BAG SUPPORT - METAL MESH	STAINLESS STEEL 304
6	2	STRAP 50mm	POLYESTER
7	4	GAL. SUPPORT BRACKETS	GALVANIZED
8	20	BLIND RIVET	STAINLESS STEEL 304



ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	COVER POLY PLASTIC	HDPE
2	1	METAL FRAME	STAINLESS STEEL 304
3	12	CARABINER CLIP	ALUMINIUM
4	1	CATCHMENT BAG	HDPE
5	1	BAG SUPPORT - METAL MESH	STAINLESS STEEL 304
6	2	STRAP 50mm	POLYESTER
7	4	GAL. SUPPORT BRACKETS	GALVANIZED
8	24	BLIND RIVET	STAINLESS STEEL 304

TECHNICAL DRAWINGS



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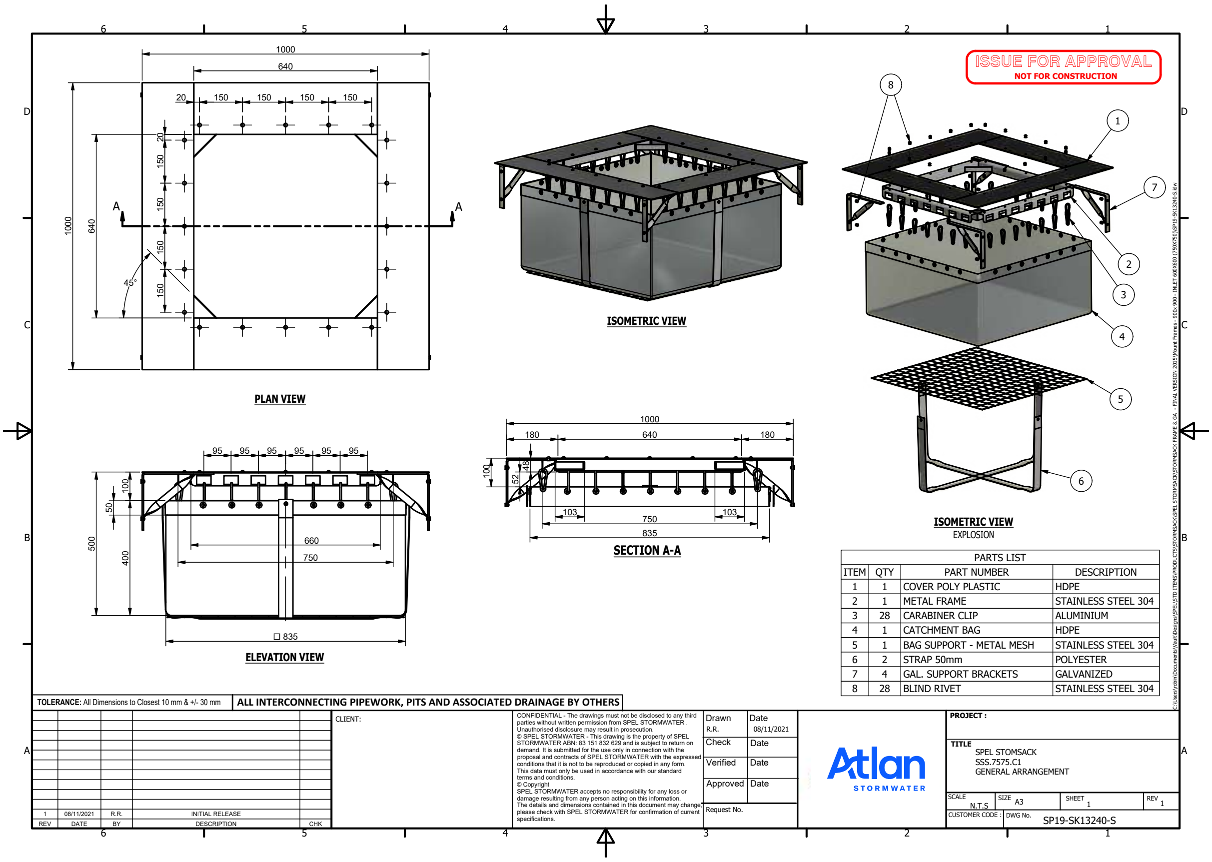
2	1	METAL FRAME	STAINLESS STEEL 304
3	16	CARABINER CLIP	ALUMINIUM
4	1	CATCHMENT BAG	HDPE
5	1	BAG SUPPORT - METAL MESH	STAINLESS STEEL 304
6	2	STRAP 50mm	POLYESTER
7	4	GAL. SUPPORT BRACKETS	GALVANIZED
8	24	BLIND RIVET	STAINLESS STEEL 304



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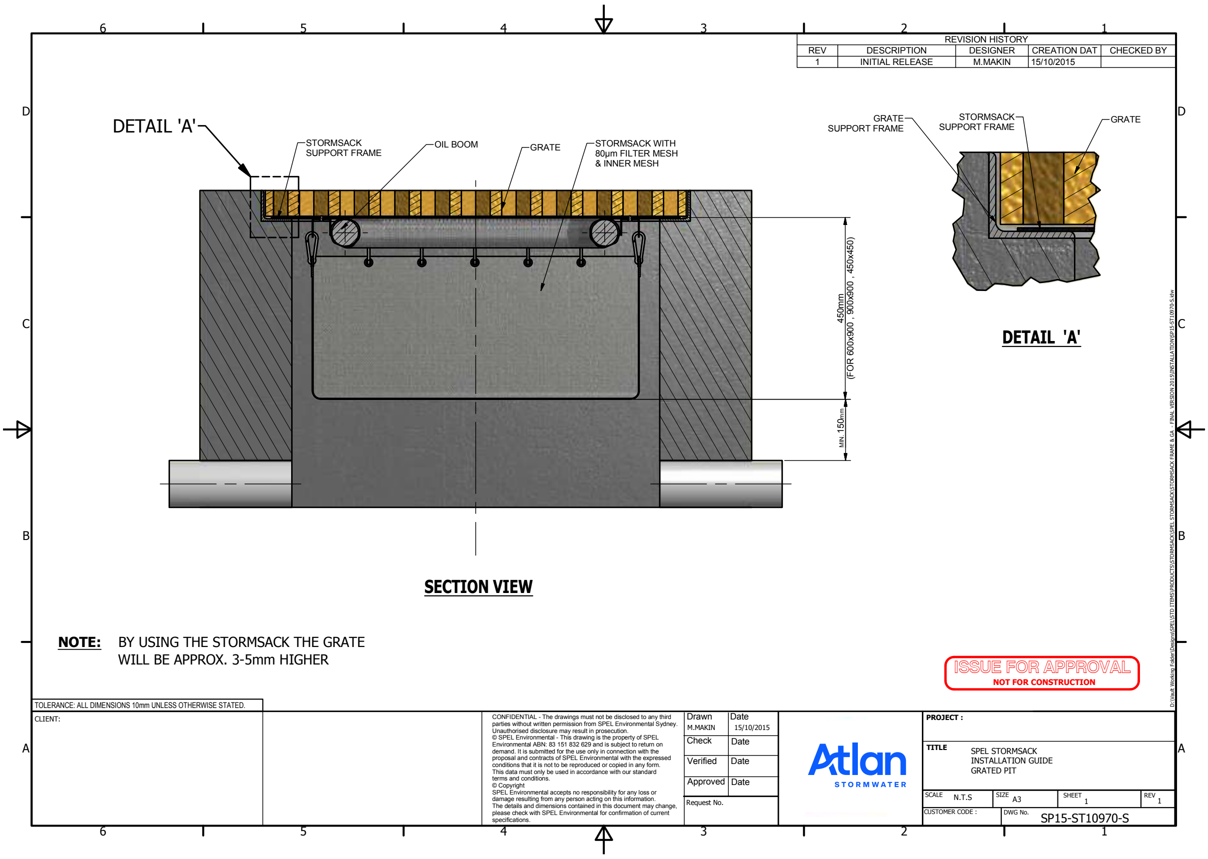
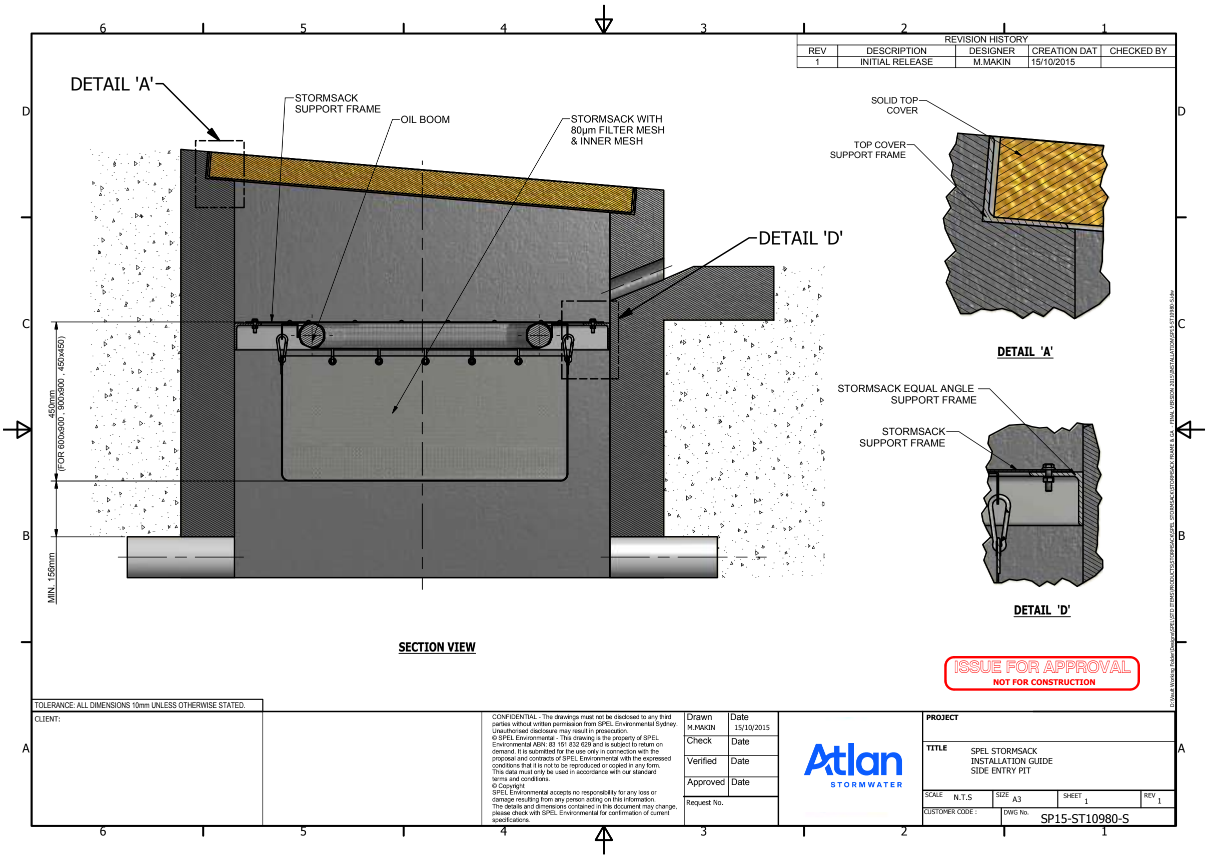
1	1	COVER POLY PLASTIC	HDPE
2	1	METAL FRAME	STAINLESS STEEL 304
3	28	CARABINER CLIP	ALUMINIUM
4	1	CATCHMENT BAG	HDPE
5	1	BAG SUPPORT - METAL MESH	STAINLESS STEEL 304
6	2	STRAP 50mm	POLYESTER
7	4	GAL. SUPPORT BRACKETS	GALVANIZED
8	28	BLIND RIVET	STAINLESS STEEL 304

INSTALLATION DETAILS





StormSack

At-Source Gross Pollutant Trap

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'We believe clean waterways are a right not a privilege and we work to ensure a joy in water experience for you and future generations.'

Andy Hornbuckle

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