Water Cycle Management Plan to Support Development Application

133 Somersby Falls Rd, Somersby

Prepared for Stateline Asphalts Pty Ltd

Our Ref: 23053-WCMP-1.2

6 November 2024

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1 Executive Summary

Cubo Consulting Pty Ltd has been engaged by Stateline Asphalts Pty Ltd to prepare a water cycle management plan (WCMP) to support the development application (DA) submission to the Central Coast Council for the proposed industrial development at 133 Somersby Falls Rd, Somersby.

The report concludes that:

1. Peak post development flow rates can be kept near to or below pre-development flow rates in all storm events up to and including the 1% AEP storm with the proposed onsite detention system.
2. Water quality requirements can be met with the proposed treatment train.
3. The design satisfies the requirements of Central Coast Council DCP 2022, Chapter 3.1.

Supporting design drawings are contained at **Appendix A**.

Yours Faithfully,

Prepared by

Doug Black
Engineer

2 Background Information

This document presents the WCMP to support the complying development certification submission to the Central Coast Council for the proposed industrial development at Lot 3 DP712505, 125 Somersby Falls Road, Somersby.

3 Site Context

The proposed development site is bound to the east by Somersby Falls Rd and surrounded by vegetation from all other sides.

The proposed development site has an area of approximately 1.01 ha and is generally sloping, generally falling at a grade of approximately 6.5 percent from the northwest corner of the property to the southeast corner of the property frontage on Somersby Falls Rd. Based on soil samples from nearby sites, the underlying soils are predominantly sandy soils with low run off.

Aerial photography of the existing site is presented in Figure 3-1 below.

Figure 3-1 Existing Site (Source – SIX Maps)

4 Proposed Development

The proposed development is an asphalt processing facility with offices and parking.

Proposed plans for the site are contained at **Appendix A**.

5 Stormwater Plan

This WCMP has been developed to align with the objectives in Central Coast Council's Chapter 3.1 (Floodplain Management and Water Cycle Management) from DCP 2022. These include to:

1) Maintain and restore natural water balance whilst reducing the cost of providing and maintaining water infrastructure in a sustainable and efficient manner.
2) Reduce risk to life and damage to property by restricting and controlling building and other development so that it minimises risks to residents and those involved in rescue operations during floods.
3) Reduce nuisance and high-level flooding and the cost of providing and maintaining flood mitigation infrastructure whilst improving water quality in streams and groundwater.
4) Reduce potable water demand by using stormwater as a resource.
5) Protect and enhance natural water systems (creeks, rivers, wetlands, estuaries, lagoons and groundwater systems).
6) Protect and enhance the water quality, by improving the quality of stormwater runoff from the urban catchments.
7) Integrate stormwater management systems into the landscape in a manner that provides multiple benefits, including water quality protection, stormwater retention and detention, public open space and recreational and visual amenity.

5.1 Site Constraints

Site constraints include the following:

- The legal point of connection to discharge stormwater from the site is via an interalotment drainage pit in the south-east corner of the property.
- Stormwater runoff from properties to the north and west should be diverted by swales within the boundaries of the property.

5.2 Water Conservation Target

In accordance with DCP 2022, Section 3.1.11.1 the target for potable water reduction is 40%.

It is recommended that the additions and alterations incorporate the following WELS rated devices to meet the 40% reduction in potable water:

- 4-star dual-flush toilets
- 3-star showerheads
- 4-star taps (for all taps other than bath outlets and garden taps)
- Water efficient washing machines and dishwashers, wherever possible.

Dual Plumbing

As noted in Section 5.3.1 of this report, rainwater reuse is proposed for landscape irrigation and toilet flushing within the office facilities and caretaker's accommodation.

5.3 Water Retention Target

The minimum Stormwater Retention Volume (SRV) as required by DCP 2022, Section 3.1.11.2.4 is calculated from the following formula.

$SRV = 0.01A(0.02F)^2$ where: SRV = stormwater retention volume (m^3)

A = total site area (m^2) – 10,107 m^2

F = fraction impervious (%) – 76%

Developed site imperviousness is estimated to be 93%, thus the required stormwater retention volume is as follows:

Stormwater Retention Volume (SRV) = 233.4 m³

The proposed development will have a 234m^3 detention tank. This will ensure the Central Coast Council Water Retention Target is met.

5.3.1 Rainwater Tank

DCP 2022 Section 3.1.11.2.4 recommends water usage for residential households to be 5 L/day per square metre of roof area. As the development includes a 347m^2 building containing an office, driver amenities and caretaker facilities.

The roof area of the office and amenities building is 347 m^2. This equates to 1,735 L of water usage per day. Based on Table 3 of DCP 2022 Section 3.1.11.2.4, toilet flushing, and landscape irrigation are estimated to each account for 20% of the total water usage, 40% in total or 4,858L/week.

The total roof area of the proposed development directed to the rainwater tank is approximately 347m^2. Based on an average annual rainfall at Somersby of 1,140 mm, the available weekly rainwater supply is 7,586 L.

A 10kL rainwater tank will provide water for 14 days (from full). The rainwater tank will need to be installed with a mains water top up system and should include a first flush device. All downpipes should be connected to the rainwater tank.

5.4 Site Discharge Index (SID)

The Site Discharge Index (SID) as described in Section 6.7.7.3.3 of DCP 2013 is calculated from the following equation for:

$$SID = \frac{\text{Area of Impervious Site Directly Connected to Street – (50 m}^2\text{)}}{\text{Total Site Area – 10,100 (m}^2\text{)}}$$

The proposed development connects the almost entire paved area of the developed site to the proposed site treatment devices. Only the front portion of the vehicle access crossing within front boundary setback drains directly to the street, This portion of the driveway has a total area of approximately 50m^2.

The development's SID is therefore:

Site Development Index (SID) = 0.5%

DCP 2022, Section 3.1.11.3.3 requires the SID to be less than 10%. The development's SID is therefore in compliance with this requirement.

5.5 MUSIC Model

A MUSIC model (set up shown in Figure 5-1) was prepared for the development site to determine the pollutant reduction of the treatment train.

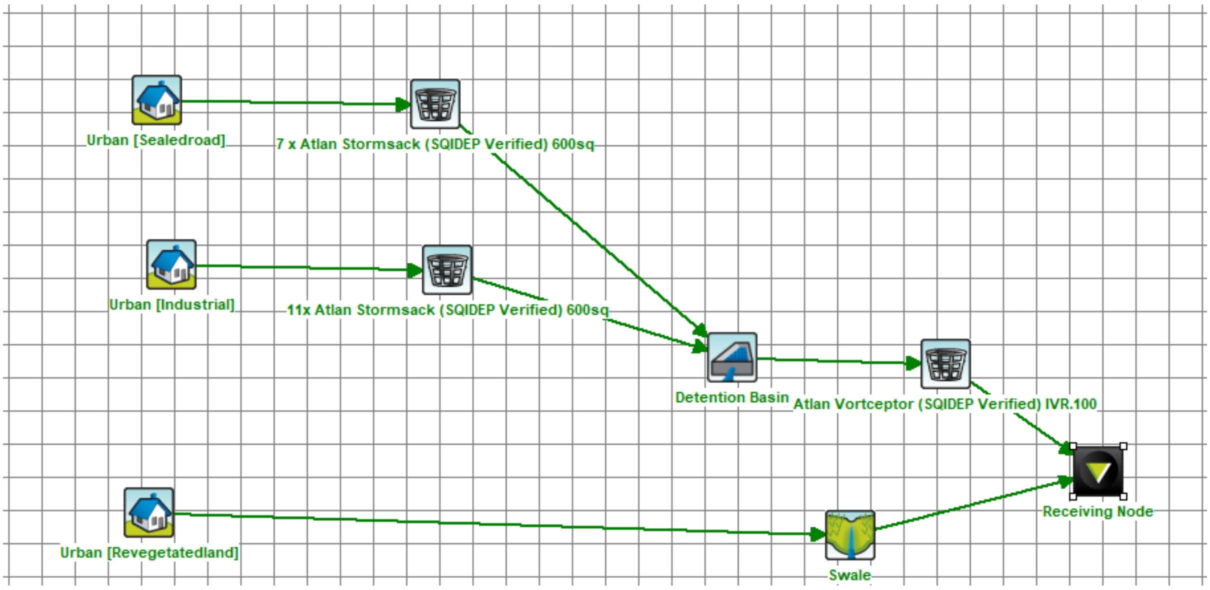

Figure 5-1 MUSIC model arrangement

Central Coast Council requires, as a minimum, the following reductions in total pollutant load, compared to untreated runoff from the predeveloped site.

Table 5-1 Minimum pollutant reduction targets

Pollutant	Minimum Reduction
Total Suspended Solids (TSS)	80%
Total Phosphorus (TP)	45%
Total Nitrogen (TN)	45%
Gross Pollutants	80%

5.5.1 Base Information

The MUSIC model was prepared in computer model Version 6.3.1908.

MUSIC modelling parameters were adopted using the Central Coast Council upland MUSIC-link data. The model was run using Sydney rainfall data over a rainfall period of 20 years (January 1974 to December 1993) at a time-step of 6 minutes.

Areas for each input node were as follows:

- Northern retaining wall and landscaping (Urban Sealed Roads) to treatment train – 550 m^2, 60% impervious
- Paved Site (Urban Industrial) to treatment train – 7,750 m^2, 100% impervious
- Southern and eastern landscaping (Revegetated Land) – 930 m^2, 0% impervious

5.5.2 Treatment Nodes

The treatment nodes proposed as part of the water cycle treatment train include:

1. Pit Insert Baskets (ATLAN Stormsacks – SQIDEP verified)

2. Detention Basin (ATLAN Megavault)
3. Swale
4. GPT (ATLAN Vortceptor IVR.100 – SQIEP verified)

5.5.3 Pit Insert Baskets

The model includes pit insert baskets in each pit in the paved areas, ATLAN (formerly SPEL) Stormsacks. The Stormsack collects litter, sediment, and bound oils at the pit. The product brochure has been included in **Appendix D**.

5.5.4 Detention Tank

A detention tank has been included in the MUSIC model with volume based on the information in Section 5.6.4. The product brochure has been included in **Appendix D**.

5.5.5 GPT

A GPT has been modelled at the end of the treatment train, in this case an ATLAN (formerly SPEL) Vortceptor IVR.100. This unit collects various pollutants that make it through the stormsacks, and treats flows of up to 100L/s. The product Brochure has been included in Appendix D.

5.5.6 Swale

The landscaped areas have been assumed to fall to a swale, concentrating flows to the receiving node.

5.5.7 Results

Results of the MUSIC model are summarised in the table below. The full MUSIC-link report is contained at **Appendix B**.

Table 5-2 Summary of MUSIC model results

Pollutant	Minimum Reduction	Achieved Reduction	Comments
Flow		0.2%	
Total Suspended Solids (TSS)	80%	98.2%	Treatment is greater than target
Total Phosphorus (TP)	45%	92.5%	Treatment is greater than target
Total Nitrogen (TN)	45%	62%	Treatment is close to target
Gross Pollutants	80%	100%	Treatment is greater than target

The results show that the treatment train meets all the pollutant reduction targets for required by Central Coast Council.

5.6 DRAINS Model

A DRAINS model has been developed for the site based on the stormwater plan (see **Appendix A**) to ensure the development meets Central Coast Council site discharge requirements.

5.6.1 Model Parameters

The model was set up in DRAINS version 2023.06.8578.17142 based on the following parameters:

Parameter	Value
Paved (impervious area depression storage	1 mm
Supplementary area depression storage	1 mm
Grassed (pervious) area depression storage	5 mm
Soil Type	2
Rainfall	Specific to the site
Antecedent Moisture Condition	3

5.6.2 Catchments

Critical duration is estimated using the Kinematic Wave equation based on the following parameters:

$$t_c = \frac{6.94(L.n^*)^{0.6}}{I^{0.4}.S^{0.3}}$$

where: t_c is the time of concentration
L is the overland flow path length = 70 m of pervious and 30 m for impervious
n^* is the surface roughness coefficient = 0.1 for grassed areas and 0.012 for impervious areas
S is the site slope = variable between 1% and 30%
I is the rainfall intensity in mm/hr, this is set during each run of the DRAINS model

Five (5) minutes is typically considered to be the minimum critical duration for catchment modelling, and so has been adopted for all catchments within the model.

The predeveloped site was estimated to be 0% impervious.

The post-developed site used the following total impervious and pervious areas:

- Impervious area = 7,479 m^2
- Pervious area = 2,281 m^2

The full roof area of the office is assumed to drain to the rainwater tank then to the on-site detention system. The rainwater tank was assumed to be full and omitted from the model.

5.6.3 Results

Results of the DRAINS model are contained in **Appendix C**. The peak outflows from the DRAINS model are summarised in Table 5-3 below.

Table 5-3 Summary of DRAINS peak outflows

Storm Event	Predeveloped Flows (L/s)	Developed Flows (L/s)	Comments
1EY	95	58	Developed flows less than predeveloped flows
50%	146	68	Developed flows less than predeveloped flows
20%	250	92	Developed flows less than predeveloped flows
10%	362	120	Developed flows less than predeveloped flows
5%	445	251	Developed flows less than predeveloped flows
2%	554	324	Developed flows less than predeveloped flows
1%	666	431	Developed flows less than predeveloped flows

The results show that the proposed OSD meets the Central Coast Council requirements of restricting post-development flows to within pre-development flows.

These results comply with the DCP 2022 and achieve the intent of restricting peak flows.

5.6.4 On-Site Detention

The proposed OSD volume will be provided by the detention tank. The proposed OSD will have the following:

- Invert level = 222.8 m AHD
- Top water level of 226.01 m AHD (1%AEP)

The tank is proposed to be constructed of 10 ATLAN Megavault units, 2.9m internal height, for a total void volume of 234m^3.

Outlet controls will be downstream of the detention tank at splitter Pit 1/2, which will have:

- 155 mm diameter low level outlet at IL 222.7 m AHD directing low flows to the ATLAN Vortceptor
- 375mm penetration at invert level 225.2 m AHD allowing some flows in events greater than 10% AEP to bypass the GPT
- An overflow weir at IL 226.2 in the south-east corner of the carpark for extreme events.

Details of the detention tank are contained in **Appendix A**.

5.7 Overland Drainage Target

5.7.1 Upstream Catchment

Topographical conditions suggest little of the upstream catchment will flow through the site. On street kerb and gutter will prevent flows from entering the site.

5.8 Flooding Target

The site is outside flood affected areas.

6 Operation and Maintenance Plan

Operations and maintenance of the pollution control measures should be carried out to manufacturers specifications.

7 References

BMT WBM Pty Ltd. (August 2010). *Draft New South Wales MUSIC Modelling Guidelines*.

Central Coast Council. (2022). *Development Control Plan 2022*

8 Appendices

APPENDIX A

A. Cubo Drawings

APPENDIX B

B. MUSIC Model Outputs

APPENDIX C

C. DRAINS Model Outputs

APPENDIX D

D. Third Party Product Brochures

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PROPOSED ASPHALT PROCESSING PLANT
For: STATELINE ASPHALT PTY LTD
133 SOMERSBY FALLS ROAD, SOMERSBY NSW

DRAWING REGISTER - CIVIL WORKS

23053-CI-000	COVER SHEET, DRAWING REGISTER & LOCALITY PLAN
23053-CI-010	CIVIL SITE PLAN
23053-CI-055	STORMWATER DRAINAGE - LONG SECTIONS SHEET 1
23053-CI-056	STORMWATER DRAINAGE - LONG SECTIONS SHEET 2
23053-CI-060	BULK EARTHWORKS SITE PLAN
23053-CI-150	SWEPT PATHS - HEAVY RIGID DELIVERY VEHICLE
23053-CI-152	SWEPT PATHS - ARTICULATED DELIVERY VEHICLE
23053-CI-154	SWEPT PATHS - ASPHALT DELIVERY VEHICLE
23053-CI-156	SWEPT PATHS - TRUCK & DOG DELIVERY VEHICLE
23053-CI-200	SEDIMENT AND EROSION CONTROL PLAN
23053-CI-210	SEDIMENT AND EROSION CONTROL DETAILS
23053-CI-215	BLUE BOOK CALCULATIONS

LOCALITY PLAN

NTS

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COVER SHEET, LOCALITY PLAN AND DRAWING REGISTER

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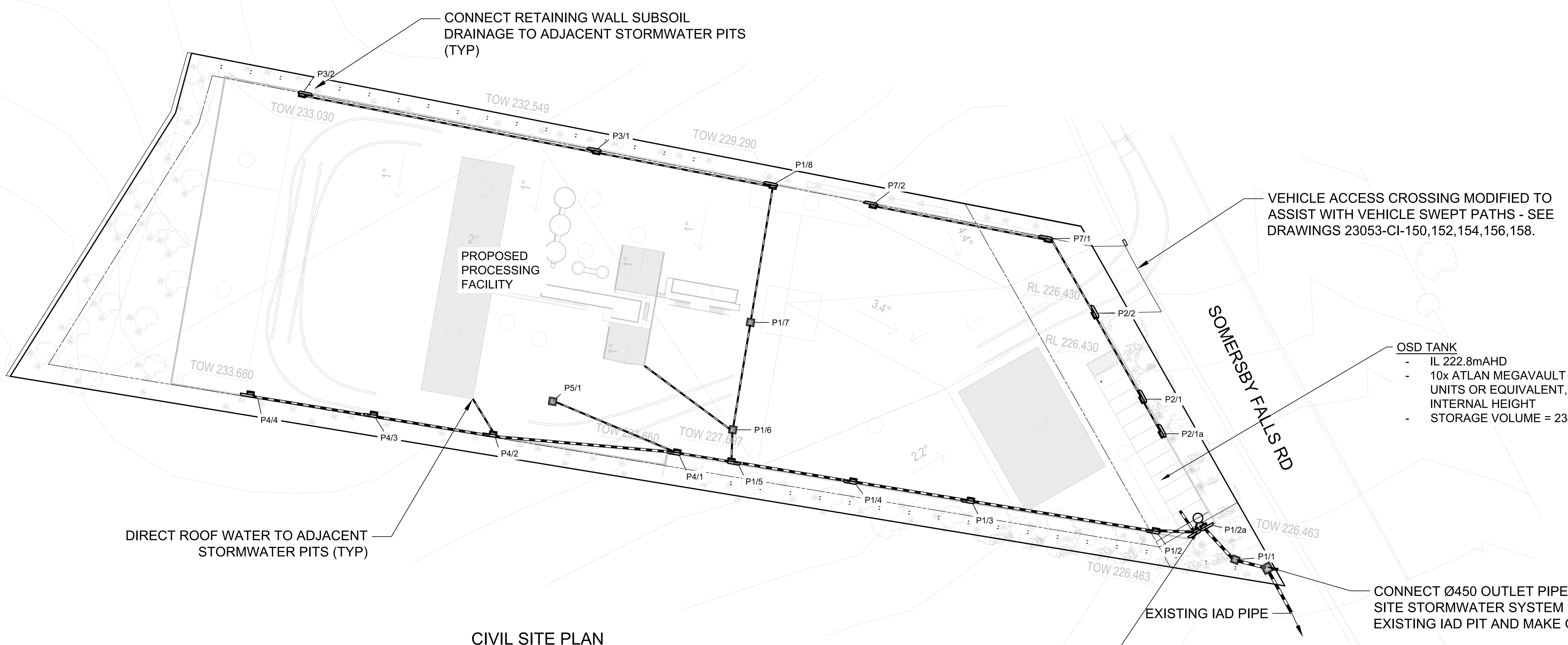
ALL STORMWATER PITS TO BE FITTED WITH ATLAN STORMSACK WITH OIL BOOMS(TYP)



CIVIL SITE PLAN

SCALE 1:400

DRAINAGE CONTROL SPLITTER PIT
- LOW LEVEL Ø155 SHARP EDGED ORIFICE IL 222.70 DIRECTING FLOWS TO ATLAN 'VORTCEPTOR' MODEL IVR.100.REFER MANUFACTURER'S DETAILS.
- Ø375 TO OSD CHAMBER IL 222.80
- HIGH LEVEL Ø375 PENETRATION FOR LARGE EVENTS IL 225.1

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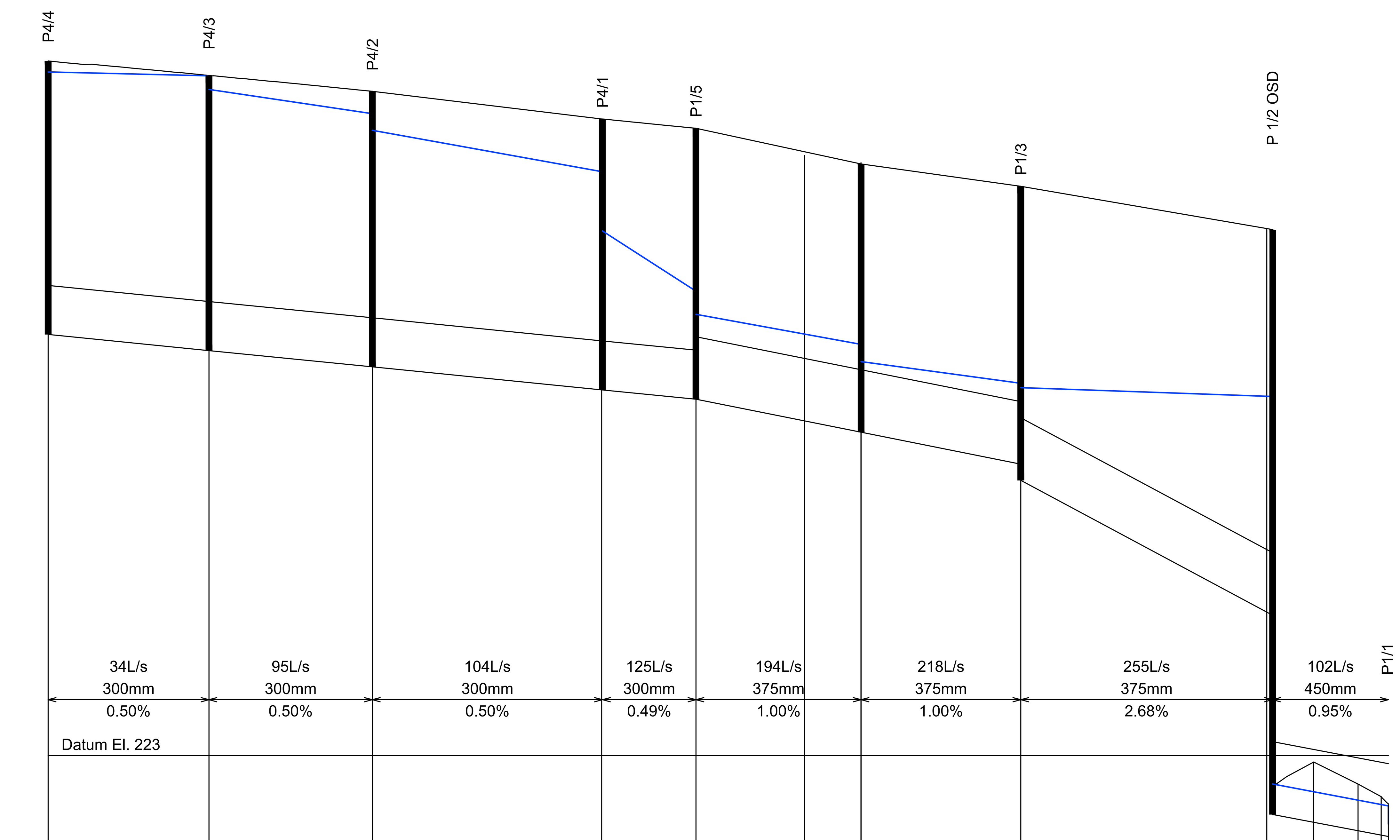

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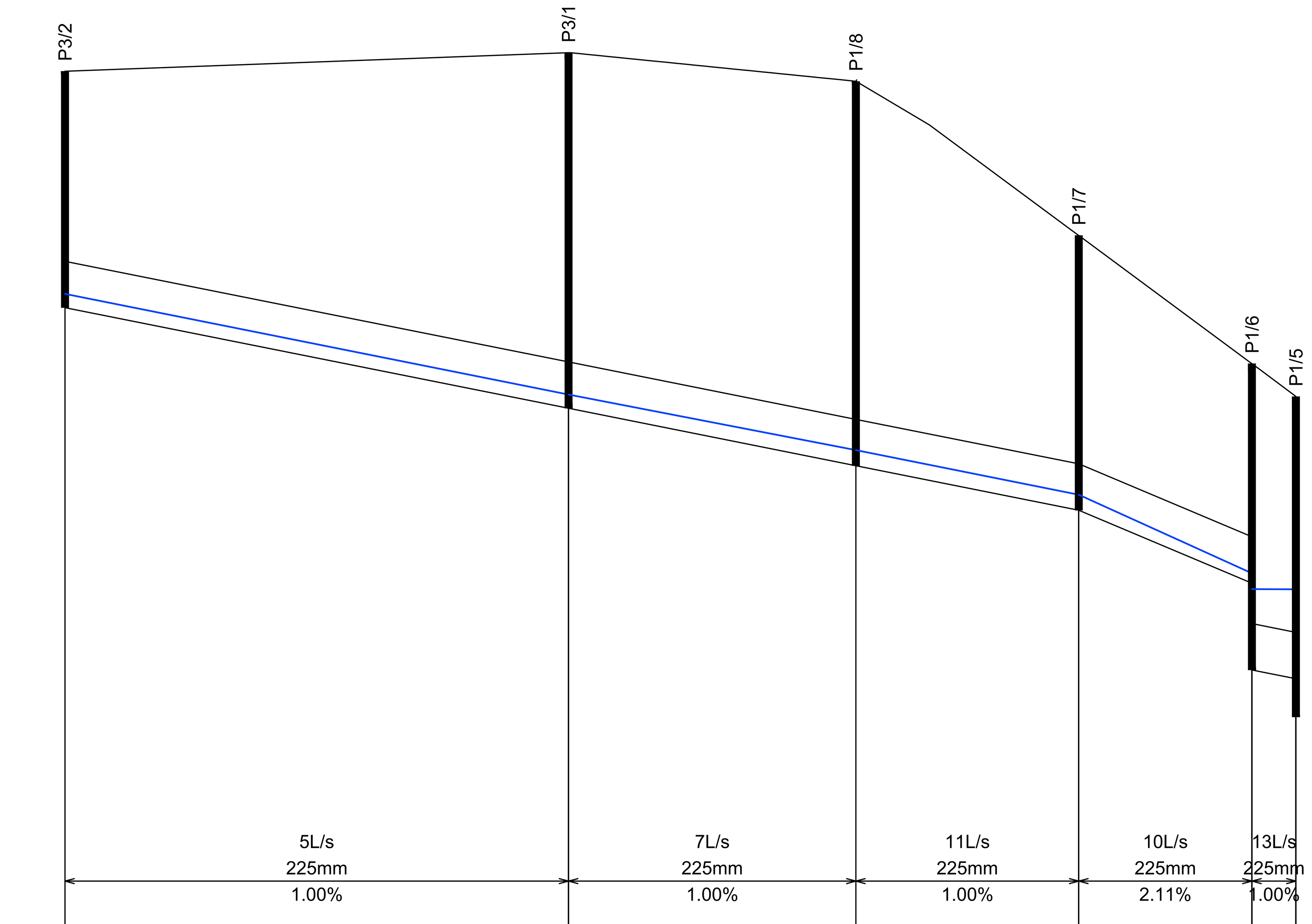

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STORMWATER DRAINAGE - LONG SECTIONS SHEET 1

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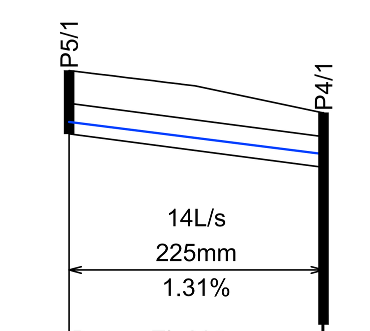

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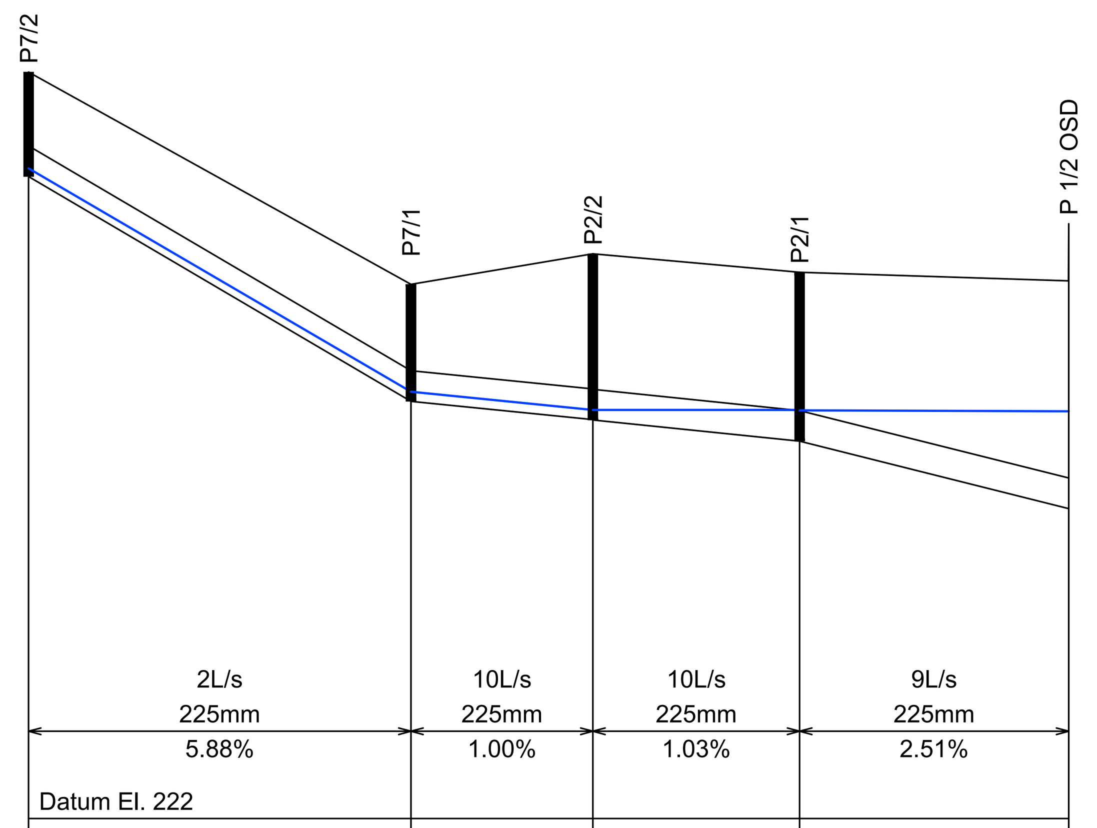

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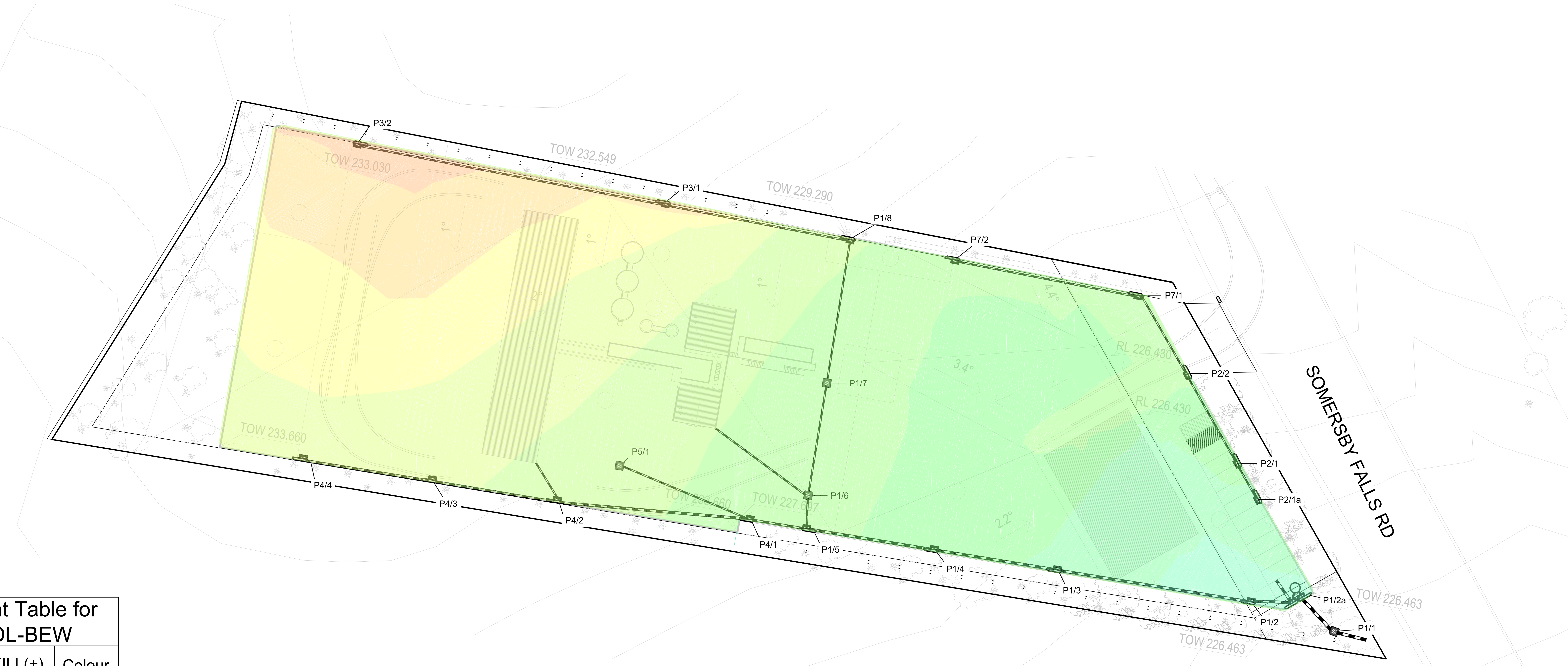

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BULK EARTHWORKS SITE PLAN
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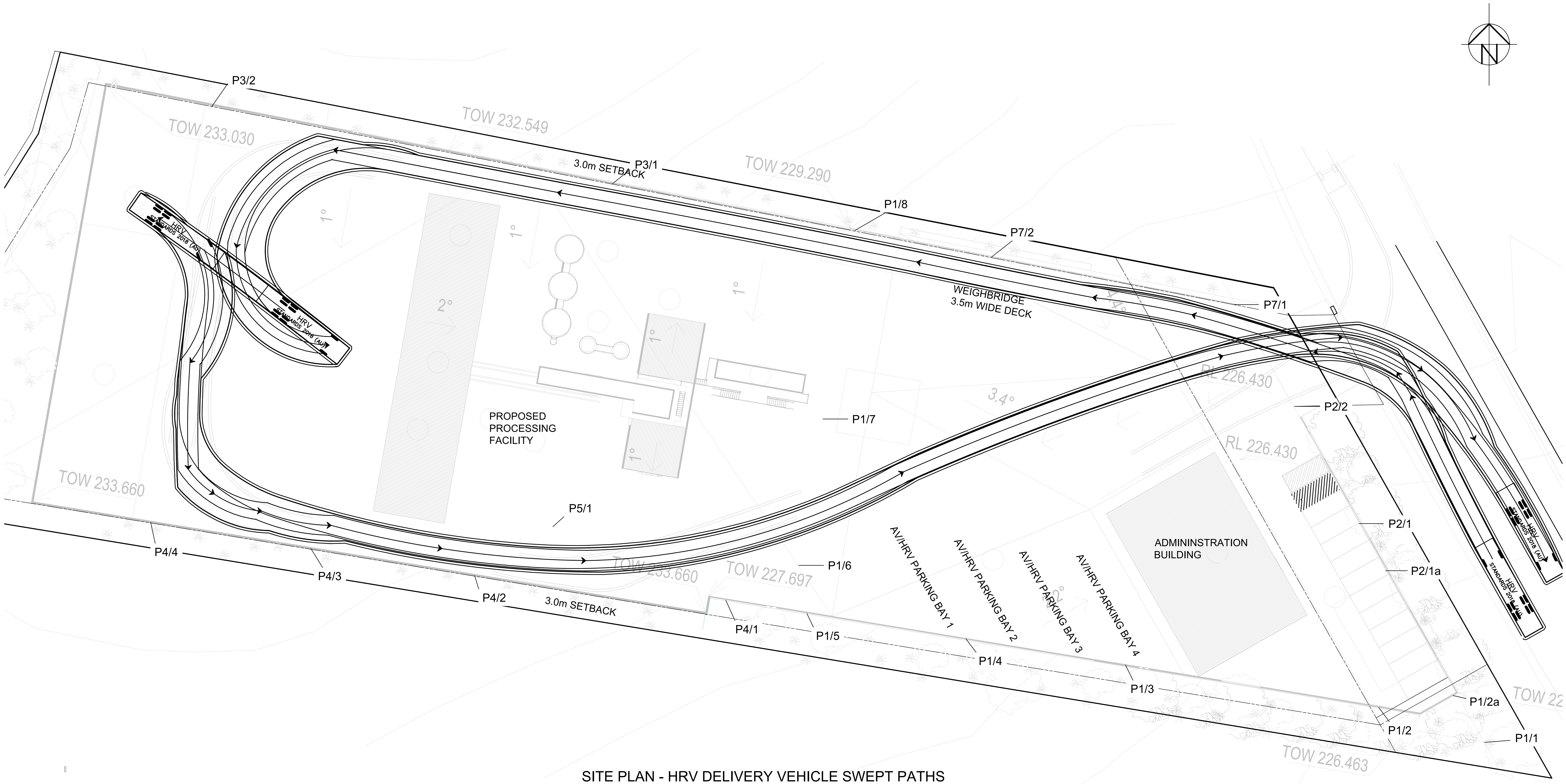
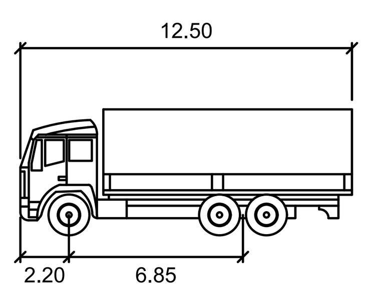


SITE PLAN - HRV DELIVERY VEHICLE SWEPT PATHS

SCALE 1:250



HRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.7

REV	DATE	REVISIONS	DRN	CHK
4	6/11/24	REVISED - FOR APPROVAL	IB	DB
3	4/11/24	REVISED - FOR APPROVAL	IB	DB
2	17/05/24	REVISED - FOR APPROVAL	IB	DB
1	1/11/23	PRELIMINARY	IB	DB

0 5 10 15 20 25m
SCALE 1:250 @A1

DESIGNED: IB
DRAWN: DB
CHECKED: VC
RECOMMENDED:
PROJECT MANAGER DATE
DATUM: AHD
A1
COORDINATE SYSTEM:
APPROVED:
PROJECT DIRECTOR DATE

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PROPOSED ASPHALT PROCESSING FACILITY
133 SOMERSBY FALLS ROAD
SOMERSBY
SWEPT PATHS - HEAVY RIGID DELIVERY VEHICLE

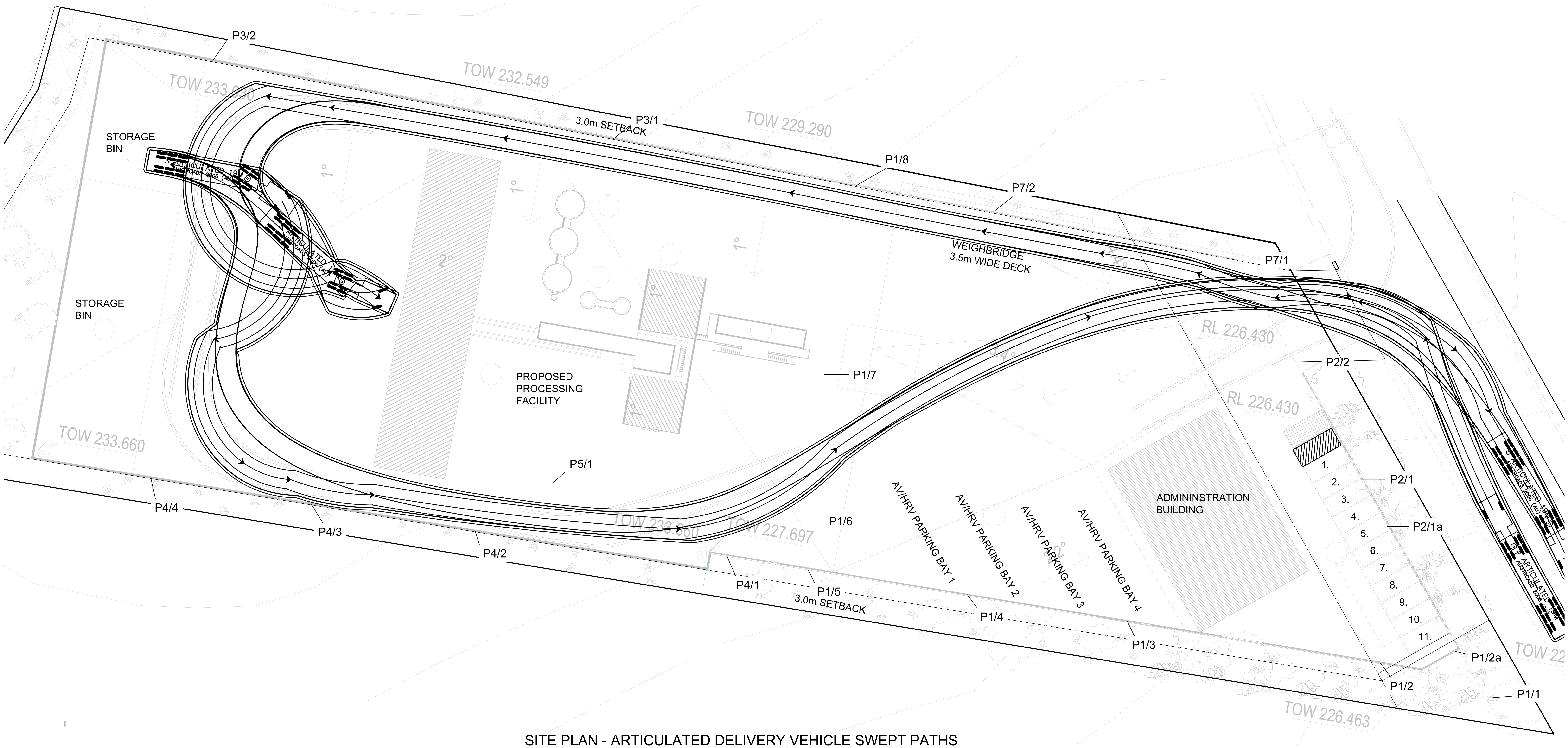
DRAWING STATUS:
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

DRAWING NUMBER: 23053-CI-150
REV: 4

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm A1 ON ORIGINAL

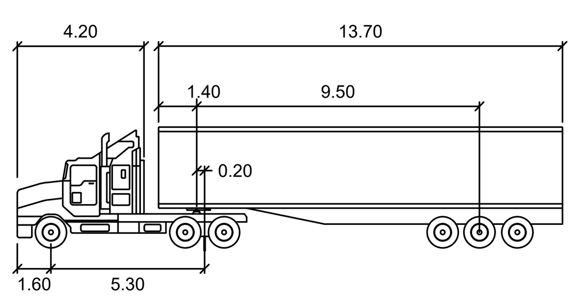
DEVICE NAME : AUTOCAD PDF (GENERAL DOCUMENTATION).PC3

DATE PLOTTED: 06 November, 2024 - 5:11pm



SITE PLAN - ARTICULATED DELIVERY VEHICLE SWEPT PATHS

SCALE 1:250



S ARTICULATED 19M

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.7
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

XREFs: X23053CIVIL; X23053SURVEY; X23053SitePlan20241031; X23053SitePlan20241106; x23053 civil export 20241106
CAD FILE: C:\Users\douglasblack\AppData\Local\Temp\AcPublish_21400\23053-CI-150 Swept Paths.dwg

REV	DATE	REVISIONS	DRN	CHK
4	6/11/24	REVISED - FOR APPROVAL	IB	DB
3	4/11/24	REVISED - FOR APPROVAL	IB	DB
2	17/05/24	REVISED - FOR APPROVAL	IB	DB
1	1/11/23	PRELIMINARY	IB	DB

0 5 10 15 20 25m
SCALE 1:250 @A1

DESIGNED: IB
DRAWN: DB
CHECKED: VC
RECOMMENDED:
PROJECT MANAGER DATE
DATUM: AHD
A1
COORDINATE SYSTEM:
APPROVED:
PROJECT DIRECTOR DATE

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PROPOSED ASPHALT PROCESSING FACILITY
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SOMERSBY
SWEPT PATHS - ARTICULATED DELIVERY VEHICLE

DRAWING STATUS: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
DRAWING NUMBER: 23053-CI-152
REV: 4

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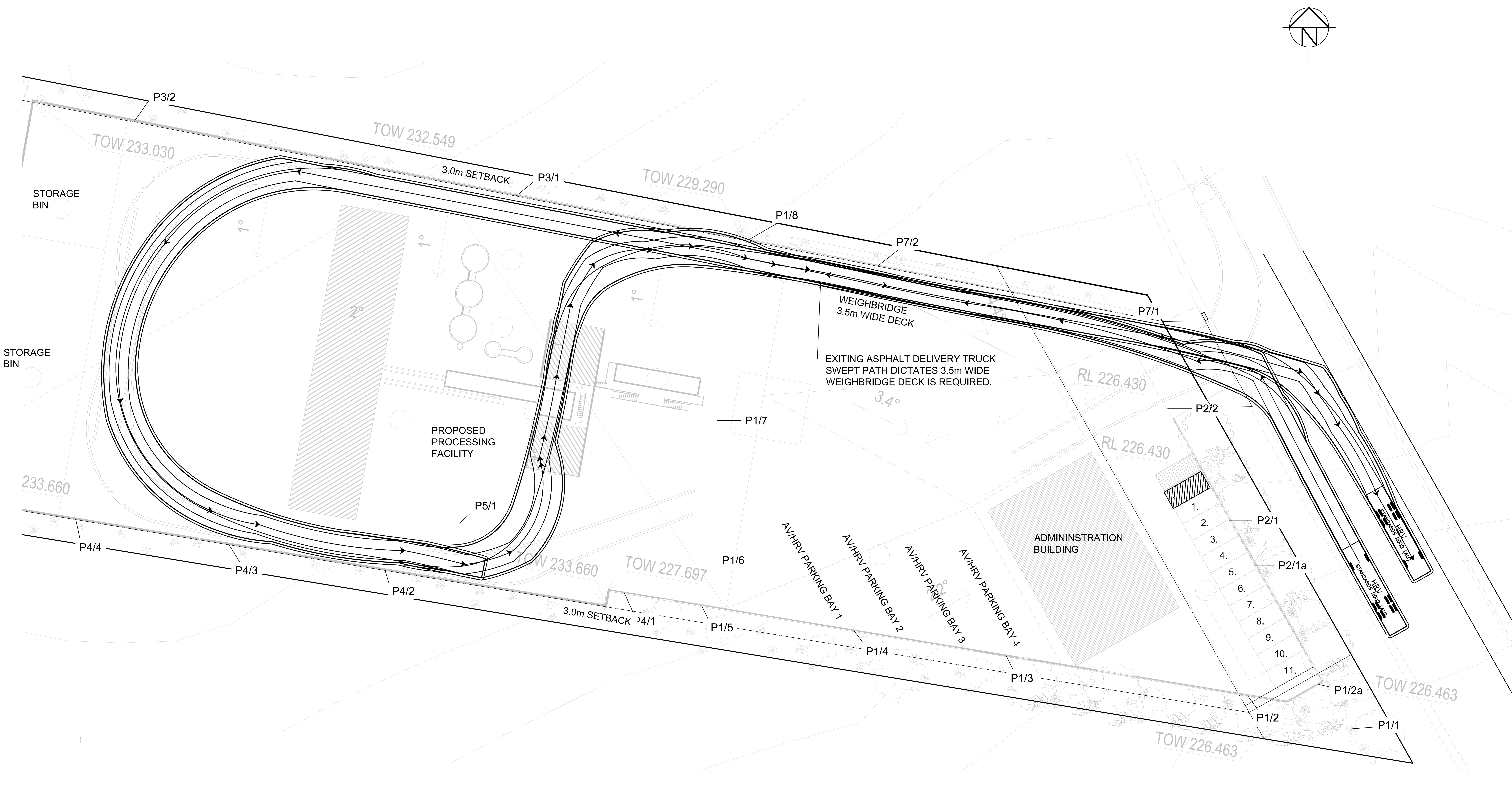

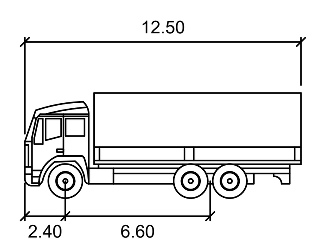

HRV

		meters
Width	:	2.50
Track	:	2.50
Lock to Lock Time	:	6.0
Steering Angle	:	35.2

SITE PLAN - ASPHALT DELIVERY VEHICLE SWEPT PATHS

SCALE 1:250

REV	DATE	REVISIONS	DRN	CHK
4	6/11/24	REVISED - FOR APPROVAL	IB	DB
3	4/11/24	REVISED - FOR APPROVAL	IB	DB
2	17/05/24	REVISED - FOR APPROVAL	IB	DB
1	1/11/23	PRELIMINARY	IB	DB

0 5 10 15 20 25m
SCALE 1:250 @A1

DESIGNED: IB
DRAWN: DB
CHECKED: VC
RECOMMENDED:
PROJECT MANAGER DATE
DATUM: AHD A1
COORDINATE SYSTEM:
APPROVED:
PROJECT DIRECTOR DATE

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133 SOMERSBY FALLS ROAD
SOMERSBY
SWEPT PATHS - ASPHALT DELIVERY VEHICLE

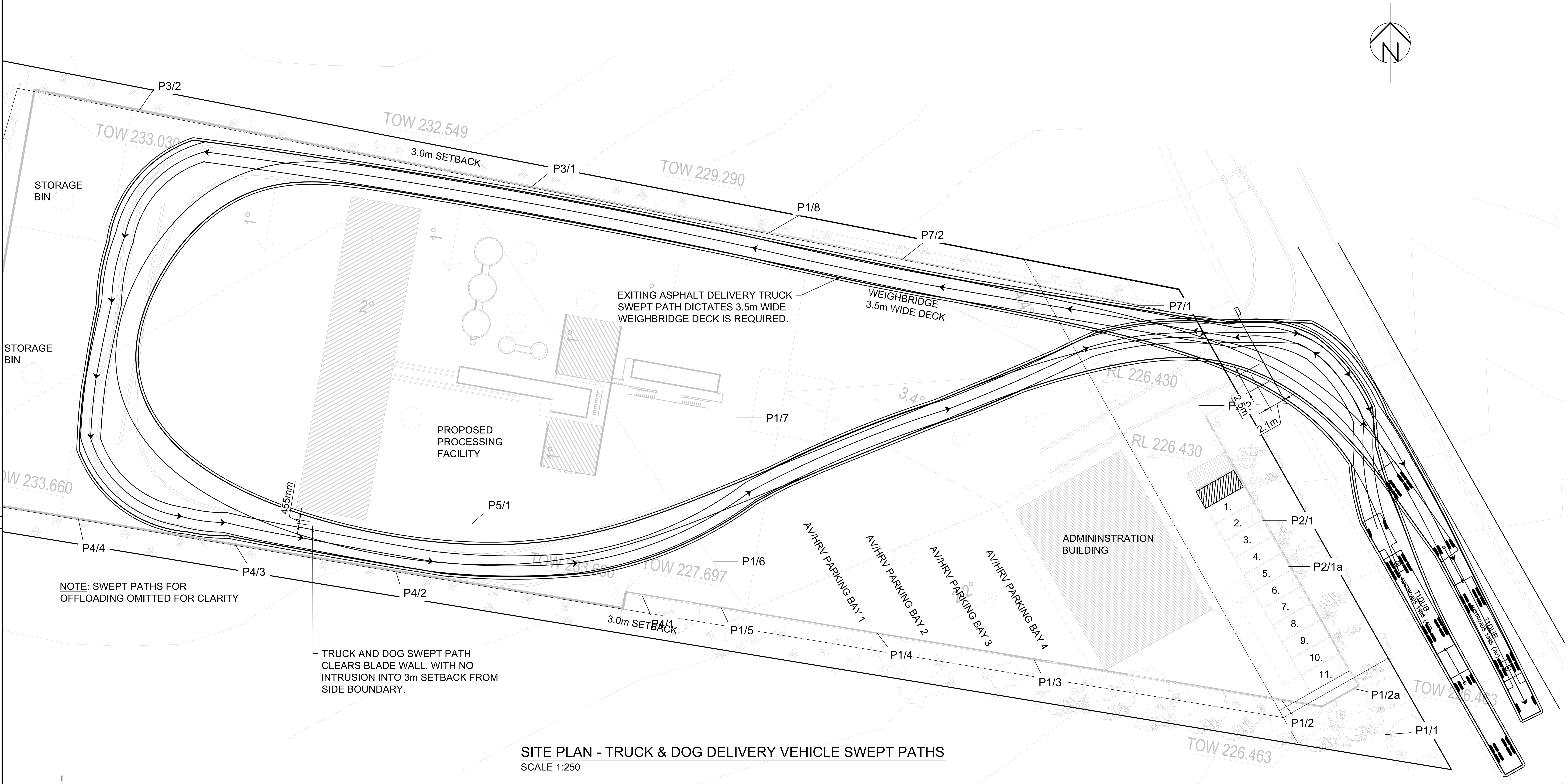
DRAWING STATUS:
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
DRAWING NUMBER: 23053-CI-154
REV 4

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm A1 ON ORIGINAL

DEVICE NAME : AUTOCAD PDF (GENERAL DOCUMENTATION).PC3

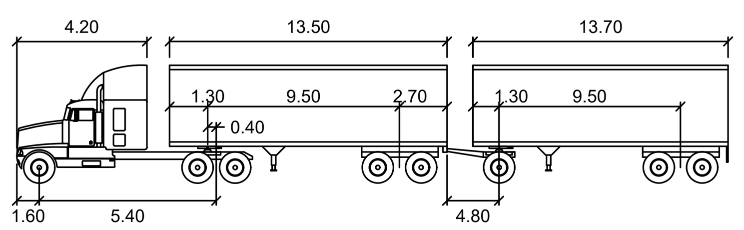
DATE PLOTTED: 06 November, 2024 - 5:12pm

XREFs: X23053CIVIL; X23053SURVEY; X23053SitePlan20241031; X23053SitePlan20241106; x23053 civil export 20241106
CAD FILE: C:\Users\douglasblack\AppData\Local\Temp\AcPublish_21400\23053-CI-150 Swept Paths.dwg



SITE PLAN - TRUCK & DOG DELIVERY VEHICLE SWEPT PATHS

SCALE 1:250



T1DUB

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.0
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

REV	DATE	REVISIONS	DRN	CHK
4	6/11/24	REVISED - FOR APPROVAL	IB	DB
3	4/11/24	REVISED - FOR APPROVAL	IB	DB
2	17/05/24	REVISED - FOR APPROVAL	IB	DB
1	1/11/23	PRELIMINARY	IB	DB

0 5 10 15 20 25m
SCALE 1:250 @A1

DESIGNED: IB
DRAWN: DB
CHECKED: VC
RECOMMENDED:
PROJECT MANAGER DATE
DATUM: AHD A1
COORDINATE SYSTEM:
APPROVED:
PROJECT DIRECTOR DATE

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PROPOSED ASPHALT PROCESSING FACILITY
133 SOMERSBY FALLS ROAD
SOMERSBY
SWEPT PATHS - TRUCK & DOG DELIVERY VEHICLE

DRAWING STATUS: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
DRAWING NUMBER: 23053-CI-156
REV 4

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DEVICE NAME : AUTOCAD PDF (GENERAL DOCUMENTATION).PC3
DATE PLOTTED: 06 November, 2024 - 5:12pm
XREFs: X23053CIVIL; X23053SURVEY; X23053SitePlan20241031; X23053SitePlan20241106; x23053 civil export 20241106
CAD FILE: C:\Users\douglasblack\AppData\Local\Temp\AcPublish_21400\23053-CI-150 Swept Paths.dwg

DEVICE NAME : AUTOCAD PDF (GENERAL DOCUMENTATION).PC3

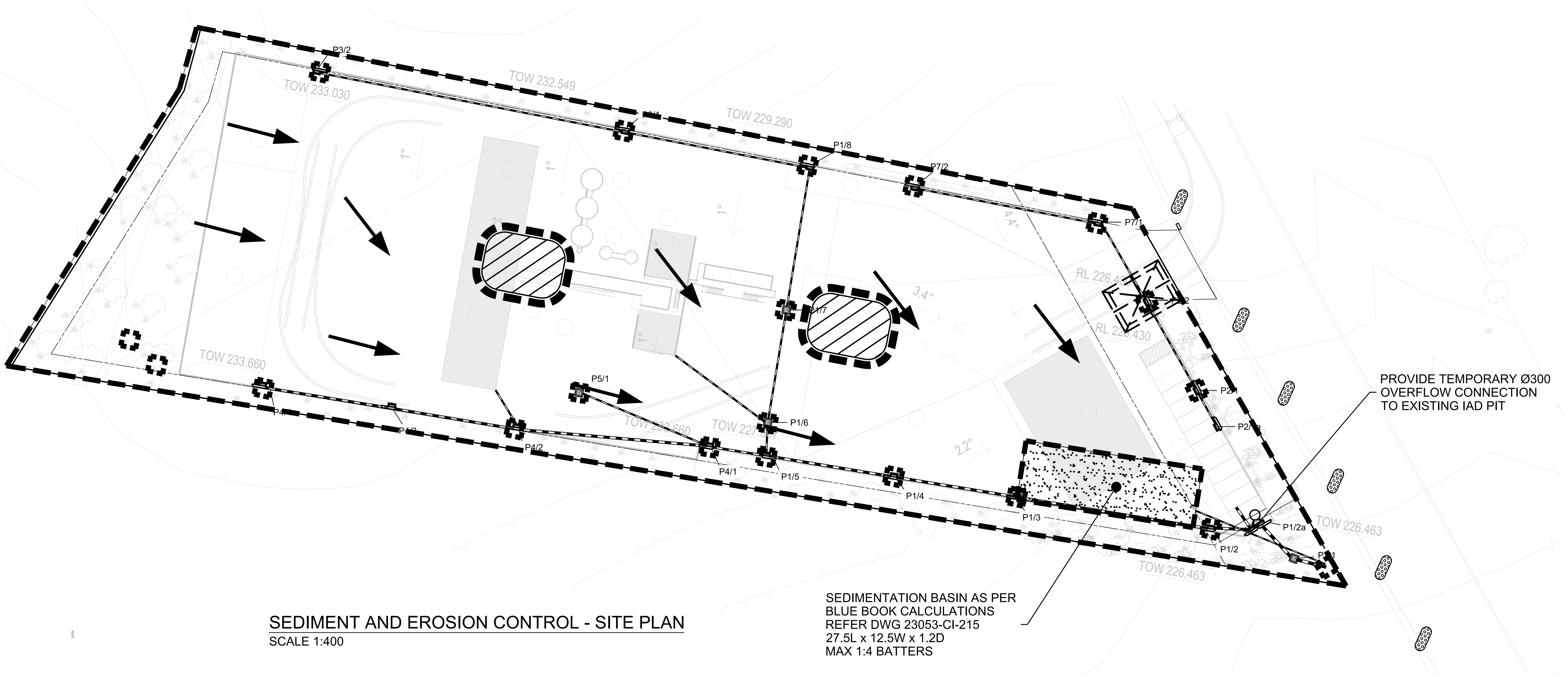
DATE PLOTTED: 06 November, 2024 - 5:12pm

LEGEND :

- TEMPORARY SURFACE INLET SEDIMENT TRAP OR GROSS POLLUTANT TRAP TO BE PROVIDED
- SILT FENCE
- TEMPORARY CONSTRUCTION VEHICLE EXIT
- TEMPORARY STOCKPILE OF TOPSOIL SURROUNDED WITH SILT FENCE
- SURFACE RUNOFF
- DIVERSION BANK AND CHANNEL
- GRAVEL FILLED SAUSAGE

EROSION AND SEDIMENT CONTROL NOTES:

1. DISTURBED AREAS TO BE KEPT TO A MINIMUM.
2. CONTROL CLEANWATER FROM ABOVE THE SITE, THROUGH THE SITE, OR AROUND THE SITE.
3. KEEP CLEAN WATER SEPARATE TO DIRTY WATER.
4. CONSERVE ALL TOPSOIL, STOCKPILE, AND PROTECT FOR REUSE ON SITE.
5. PROTECT ALL DISTURBED AREAS FROM EROSION.
6. MINIMISE SEDIMENTATION.
7. MAINTAINALL EROSION AND SEDIMENT CONTROL MEASURES UNTIL COMPLETE REHABILITATION IS ACHIEVED.
8. EROSION/SEDIMENT CONTROL MEASURES TO CONFORM WITH EROSION AND SEDIMENT CONTROL PLAN FOR SUBDIVISION WORKS.



SEDIMENT AND EROSION CONTROL - SITE PLAN

SCALE 1:400

XREF's: X23053CIVIL; X23053SURVEY; X23053SitePlan20241031; X23053SitePlan20241106; x23053 civil export 20241106
CAD FILE: C:\Users\douglasblack\AppData\Local\Temp\AcPublish_21400\23053-CI-200 SED.dwg

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3	4/11/24	REVISED - FOR APPROVAL	IB	DB
2	17/05/24	REVISED - FOR APPROVAL	IB	DB
1	1/11/23	PRELIMINARY	IB	DB

0 10 20 30 40m
SCALE 1:400 @A1

DESIGNED: IB
DRAWN: DB
CHECKED: VC
RECOMMENDED:
PROJECT MANAGER DATE
DATUM: AHD
A1
COORDINATE SYSTEM:
APPROVED:
PROJECT DIRECTOR DATE

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133 SOMERSBY FALLS ROAD
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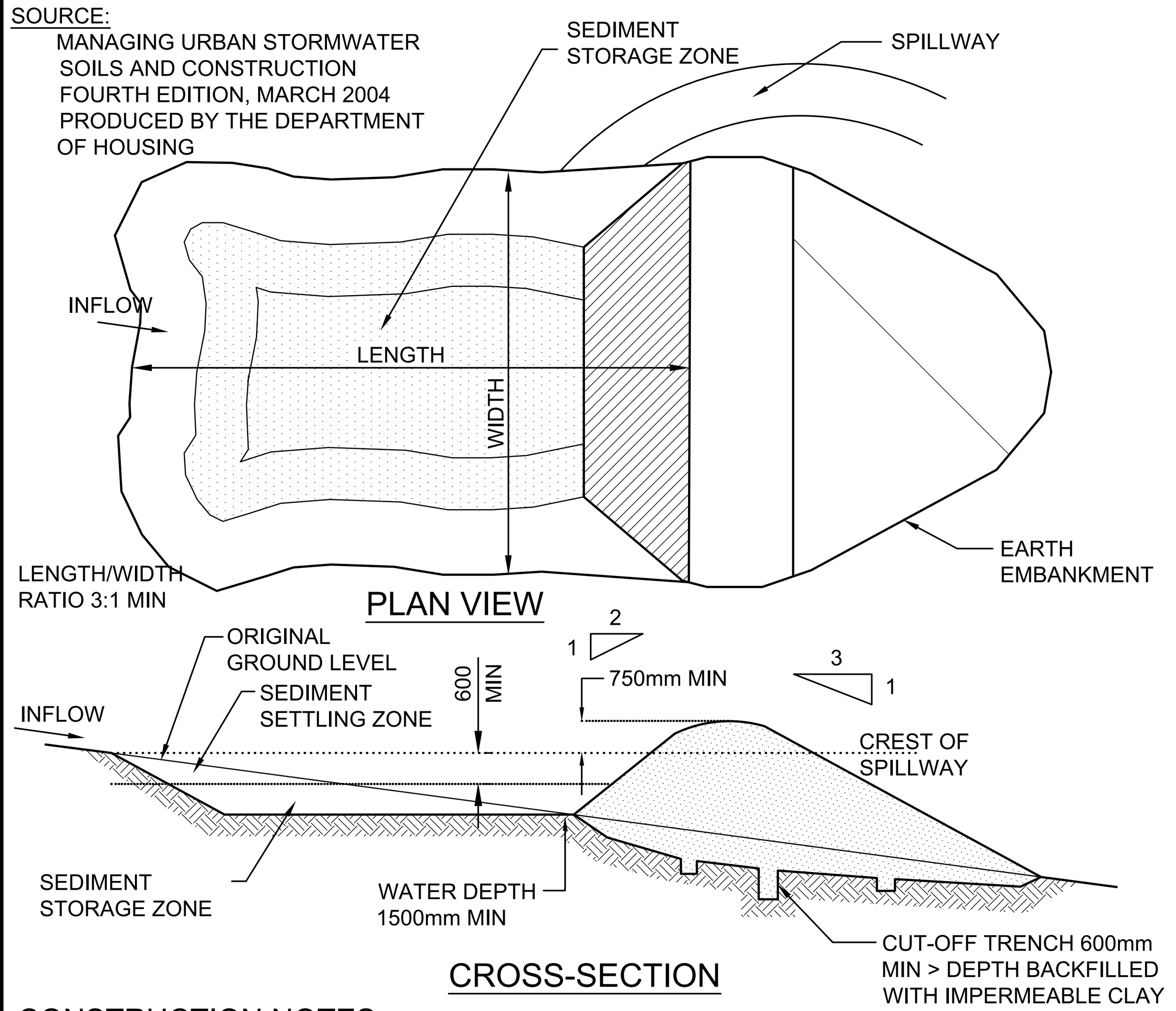
SEDIMENT AND EROSION CONTROL PLAN

DRAWING STATUS: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

DRAWING NUMBER: 23053-CI-200
REV 4

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm A1 ON ORIGINAL

SOURCE:
MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
FOURTH EDITION, MARCH 2004
PRODUCED BY THE DEPARTMENT
OF HOUSING

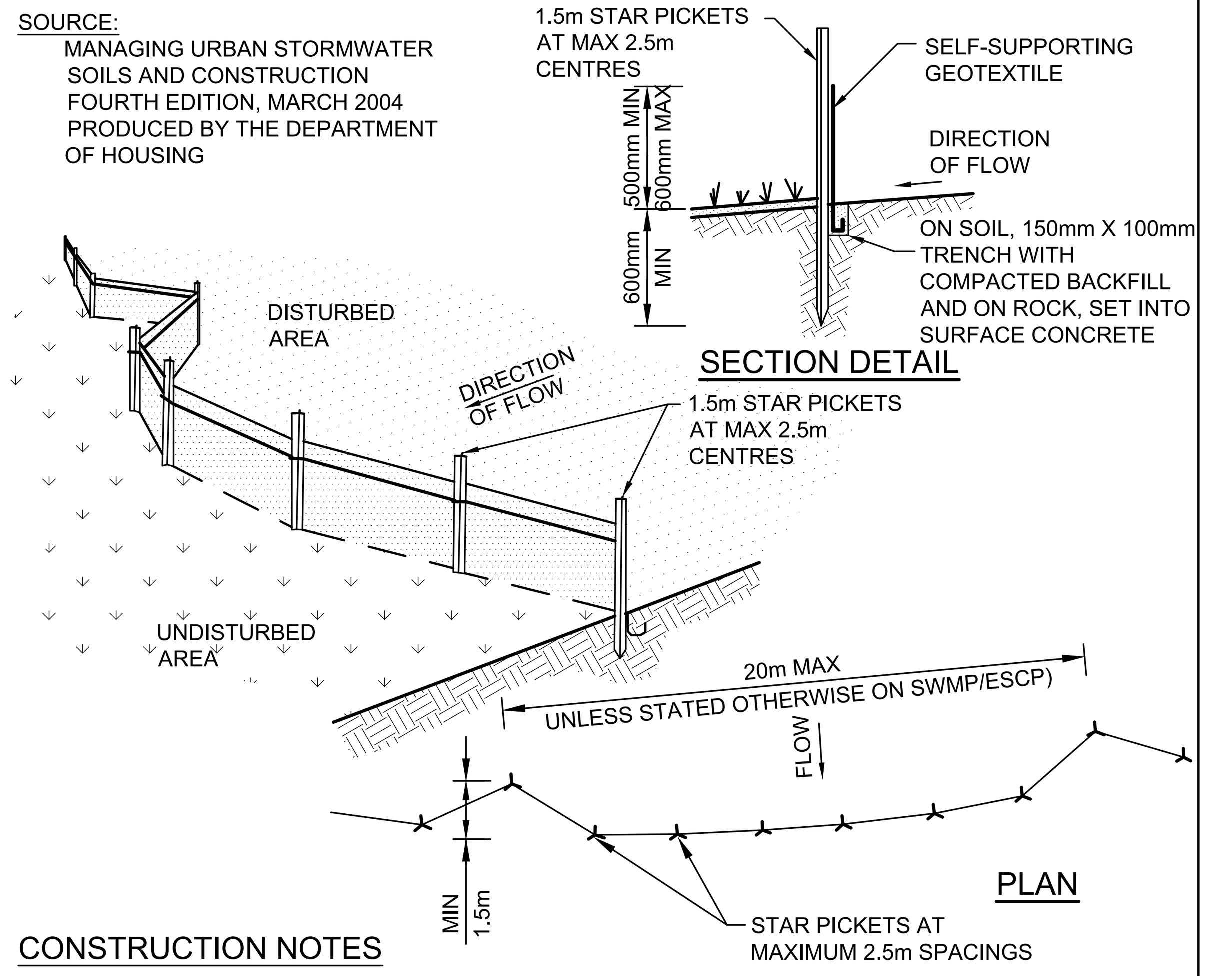


CONSTRUCTION NOTES:

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. CONSTRUCT A CUT-OFF TRENCH 500 MM DEEP AND 1200 MM WIDE ALONG THE CENTRELINE OF THE EMBANKMENT EXTENDING TO A POINT ON THE GULLY WALL LEVEL WITH THE RISER CREST.
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95 PER CENT STANDARD PROCTOR DENSITY.
4. SELECT FILL FOLLOWING THE SWMP THAT IS FREE OF ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL.
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100 MM TO HELP BOND COMPACTED FILL TO THE EXISTING SUBSTRATE.
6. SPREAD THE FILL IN 100 MM TO 150 MM LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT.
7. CONSTRUCT THE EMERGENCY SPILLWAY.
8. REHABILITATE THE STRUCTURE FOLLOWING THE SWMP.

EARTH BASIN - WET — SD 6-4
(APPLIES TO TYPE 'D' AND TYPE 'F' SOILS ONLY)

SOURCE:
MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
FOURTH EDITION, MARCH 2004
PRODUCED BY THE DEPARTMENT
OF HOUSING

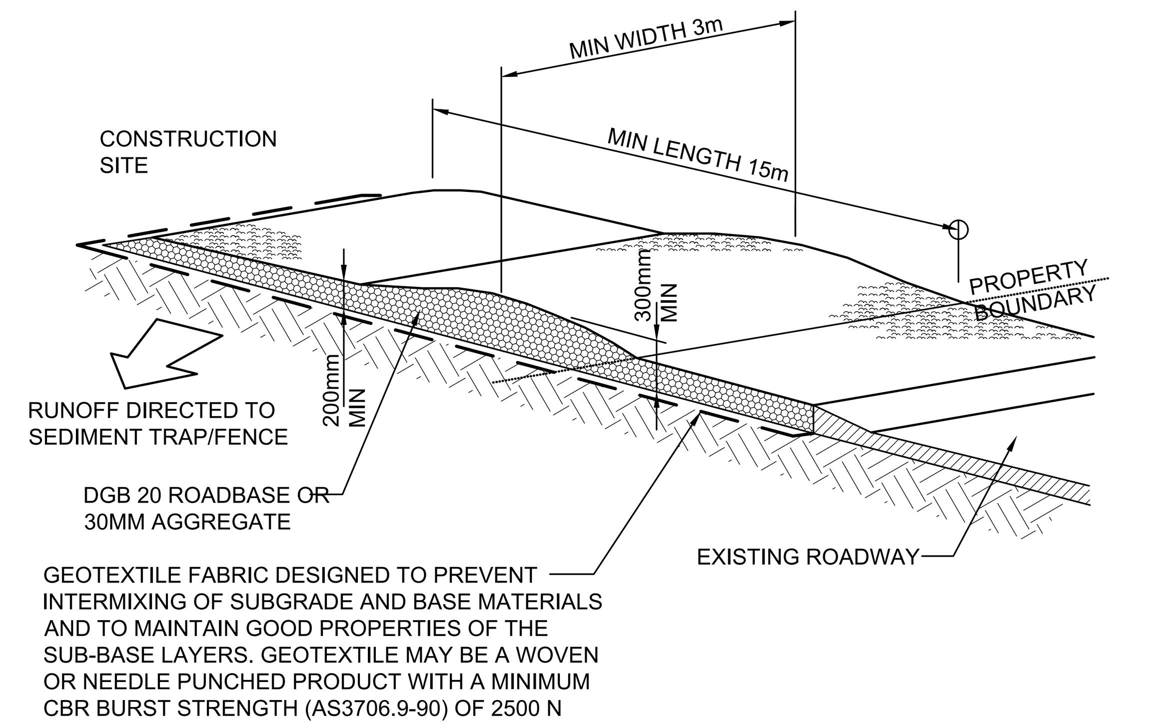


CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALL THE 10 YEAR EVENT.
2. CUT A 150 MM DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUNDAT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH, FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150 MM OVERLAP.
6. BACKFILL TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE

SEDIMENT FENCE — SD 6-8

SOURCE:
MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
FOURTH EDITION, MARCH 2004
PRODUCED BY THE DEPARTMENT
OF HOUSING

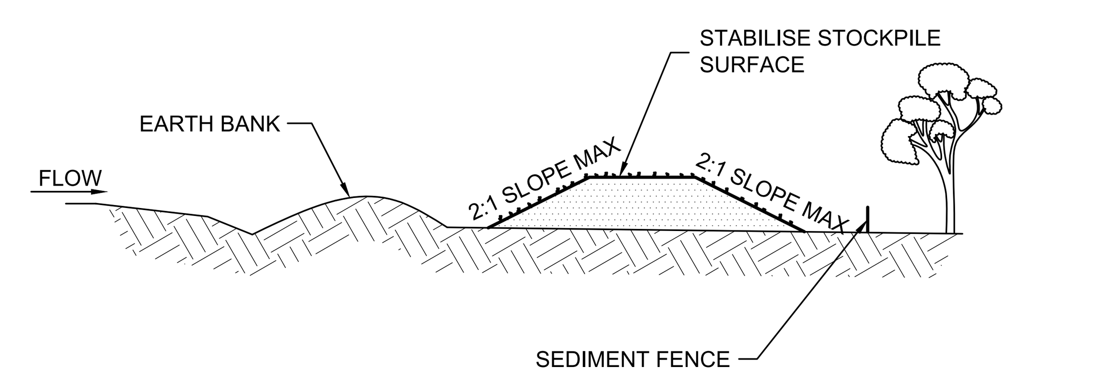


CONSTRUCTION NOTES:

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200MM THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30MM AGREGATE.\
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE

STABILISED SITE ACCESS — SD 6-14

SOURCE:
MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
FOURTH EDITION, MARCH 2004
PRODUCED BY THE DEPARTMENT
OF HOUSING

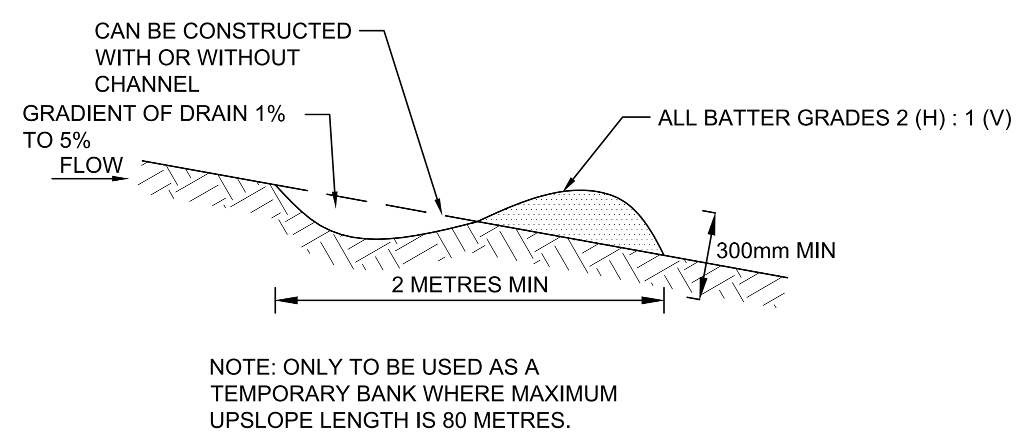


CONSTRUCTION NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METERS IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCSE (STANDARD DRAWING 6-8) 1 TO 2 METRES DOWNSLOPE.

STOCKPILES — SD 4-1

SOURCE:
MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
FOURTH EDITION, MARCH 2004
PRODUCED BY THE DEPARTMENT
OF HOUSING



NOTE: ONLY TO BE USED AS A TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.

CONSTRUCTION NOTES:

1. BUILD WITH GRADIENTS BETWEEN 1% AND 5%.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

EARTH BANK (LOW FLOW) — SD 5-5

SOURCE:
MANAGING URBAN STORMWATER
SOILS AND CONSTRUCTION
FOURTH EDITION, MARCH 2004
PRODUCED BY THE DEPARTMENT
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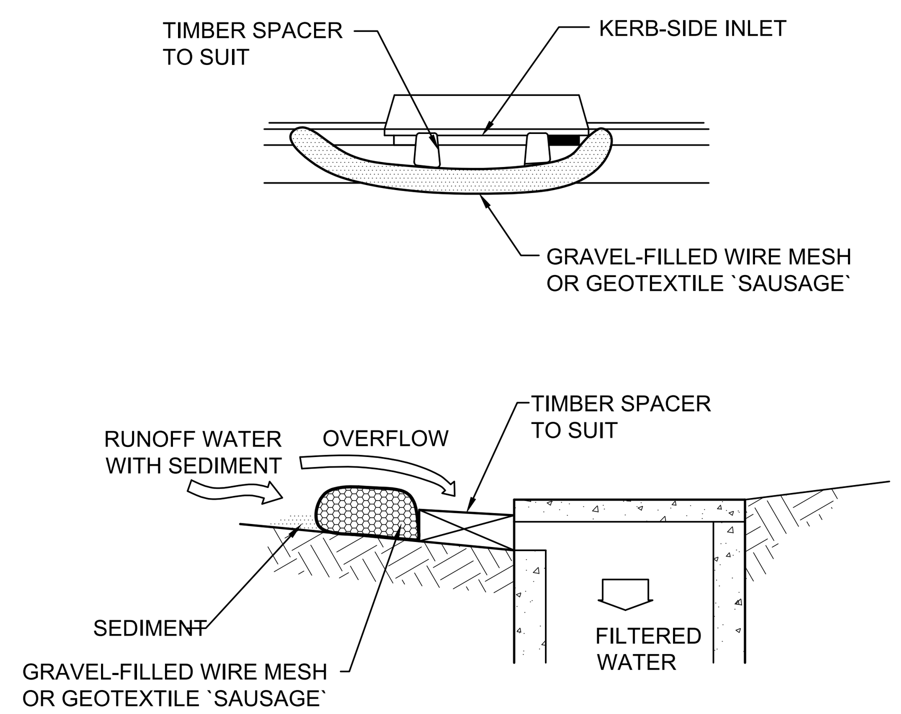


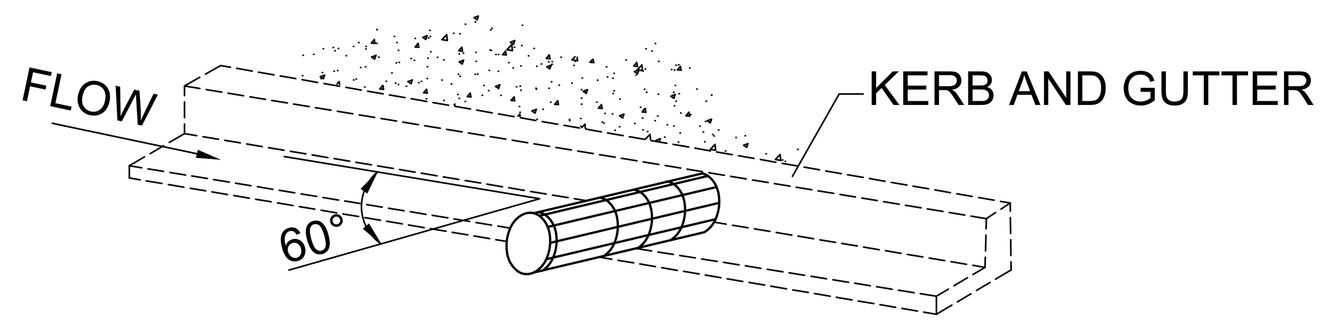
NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES:

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150MM HIGH X 400MM WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT - LADEN WATERS CANNOT PASS BETWEEN.

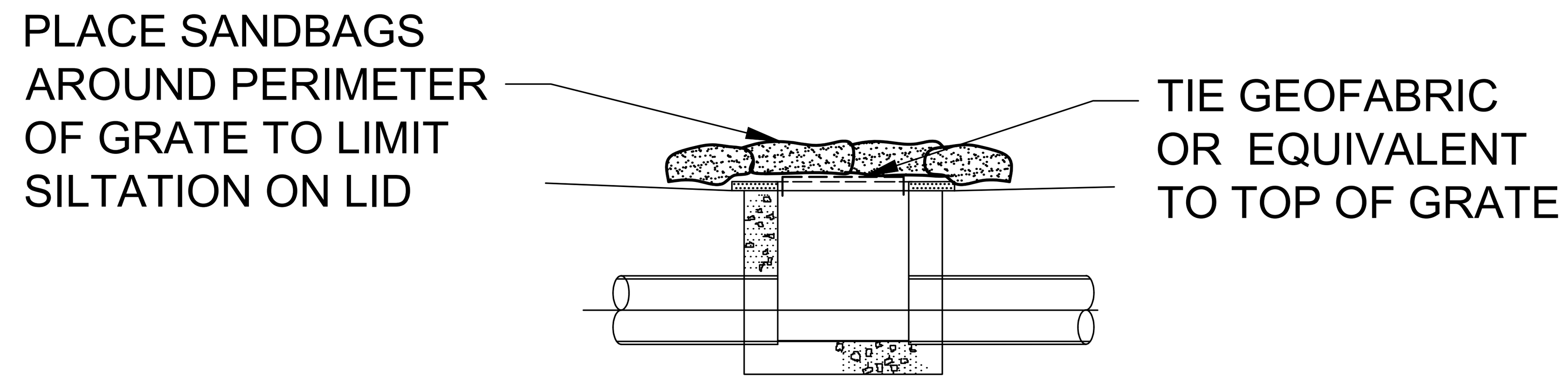
MESH AND GRAVEL INLET FILTER — SD 6-11

NOTE:
SEDIMENT BARRIERS TO BE USED ONLY WHERE ROAD WIDTHS PERMITS AND WHERE SAFETY TO PASSING TRAFFIC IS NOT AFFECTED



GRAVEL FILLED SAUSAGE
TEMPORARY GUTTER GROSS POLLUTANT/SEDIMENT TRAP

COARSE GRAVEL ROLLED IN NETTING MATERIAL TOTALING
200mm HIGH & PLACED HARD AGAINST FACE OF KERB



TEMPORARY SURFACE INLET SEDIMENT TRAP OR GROSS POLLUTANT TRAP

WHEN USED AS A GROSS POLLUTANT TRAP
STRUCTURE SHALL BE REGULARLY DESILTED

REV	DATE	REVISIONS	DRN	CHK
4	6/11/24	REVISED - FOR APPROVAL	IB	DB
3	4/11/24	REVISED - FOR APPROVAL	IB	DB
2	17/05/24	REVISED - FOR APPROVAL	IB	DB
1	1/11/23	PRELIMINARY	IB	DB

0 10 20 30 40m
SCALE 1:400 @A1

DESIGNED: IB
DRAWN: DB
CHECKED: VC
RECOMMENDED:
PROJECT MANAGER DATE
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COORDINATE SYSTEM:
APPROVED:
PROJECT DIRECTOR DATE

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PROPOSED ASPHALT PROCESSING FACILITY
133 SOMERSBY FALLS ROAD
SOMERSBY
SEDIMENT AND EROSION CONTROL DETAILS

DRAWING STATUS: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
DRAWING NUMBER: 23053-CI-210 REV 4

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm A1 ON ORIGINAL

DEVICE NAME : AUTOCAD PDF (GENERAL DOCUMENTATION).PC3
DATE PLOTTED: 06 November, 2024 - 5:12pm
XREFs: X23053CIVIL; X23053SURVEY; X23053SitePlan20241031; X23053SitePlan20241106; x23053 civil export 20241106
CAD FILE: C:\Users\douglasblack\AppData\Local\Temp\AcPublish_21400\23053-CI-200 SED.dwg

Site area	Sub-catchment or Name of Structure	Notes
	All	
Total catchment area (ha)	1.01	
Disturbed catchment area (ha)	1.01	

Soil analysis (enter sediment type if known, or laboratory particle size data)

Sediment Type (C, F or D) if known:	D	From Appendix C (if known)
Soil Texture Group	D	Automatic calculation from above

Rainfall data

Design rainfall depth (no of days)	5	See Section 6.3.4 and, particularly, Table 6.3 on pages 6-24 and 6-25.
Design rainfall depth (percentile)	85	
x-day, y-percentile rainfall event (mm)	45.8	
Rainfall R-factor (if known)	3300	Only need to enter one or the other here
IFD: 2-year, 6-hour storm (if known)		

RUSLE Factors

Rainfall erosivity (R-factor)	3300	Auto-filled from above
Soil erodibility (K-factor)	0.023	RUSLE LS factor calculated for a high rill/interrill ratio.
Slope length (m)	75	
Slope gradient (%)	5	
Length/gradient (LS-factor)	1.14	
Erosion control practice (P-factor)	1.3	
Ground cover (C-factor)	1	

Sediment Basin Design Criteria (for Type D/F basins only. Leave blank for Type C basins)

Storage (soil) zone design (no of months)	2	Minimum is generally 2 months
Cv (Volumetric runoff coefficient)	0.69	See Table F2, page F-4 in Appendix F

Calculations and Type D/F Sediment Basin Volumes

Soil loss (t/ha/yr)	113	
Soil Loss Class	1	See Table 4.2, page 4-13
Soil loss (m3/ha/yr)	87	Conversion to cubic metres
Sediment basin storage (soil) volume (m3)	15	See Sections 6.3.4(i) for calculations
Sediment basin settling (water) volume (m3)	319	See Sections 6.3.4(i) for calculations
Sediment basin total volume (m3)	334	

REV	DATE	REVISIONS	DRN	CHK
4	6/11/24	REVISED - FOR APPROVAL	IB	DB
3	4/11/24	REVISED - FOR APPROVAL	IB	DB
2	17/05/24	REVISED - FOR APPROVAL	IB	DB
1	1/11/23	PRELIMINARY	IB	DB

0 10 20 30 40m
SCALE 1:400 @A1

DESIGNED: IB
DRAWN: DB
CHECKED: VC
RECOMMENDED: PROJECT MANAGER DATE
DATUM: AHD
A1
COORDINATE SYSTEM:
APPROVED: PROJECT DIRECTOR DATE

CUBO CONSULTING PTY LTD
ABN: 46 610 277 462
Suite 6, 220 The Entrance Road, Erina NSW
Phone: (02) 4326 0990 Email: admin@cubo.net.au

STATELINE ASPHALTS PTY LTD
PROPOSED ASPHALT PROCESSING FACILITY
133 SOMERSBY FALLS ROAD
SOMERSBY
BLUE BOOK CALCULATIONS

DRAWING STATUS: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
DRAWING NUMBER: 23053-CI-215
REV 4

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150mm A1 ON ORIGINAL

MUSIC-*link* Report

Project Details		Company Details	
Project:	23053 - 133 Somersby Falls Rd	**Company:**	Cubo Consulting
Report Export Date:	5/11/2024	**Contact:**	Doug Black
Catchment Name:	23053 v4	**Address:**	
Catchment Area:	0.923ha	**Phone:**	4326 0990
Impervious Area*:	87.54%	**Email:**	doug.black@cubo.au
Rainfall Station:	66062 SYDNEY		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1974 - 31/12/1993 11:54:00 PM		
Mean Annual Rainfall:	1297mm		
Evapotranspiration:	1261mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.35		
Study Area:	Upland		
Scenario:	Central Coast Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Receiving Node	**Reduction**	**Node Type**	**Number**	**Node Type**	**Number**
Flow	0.191%	Detention Basin Node	1	Urban Source Node	3
TSS	98.2%	Swale Node	1		
TP	92.4%	GPT Node	3		
TN	61.9%				
GP	100%				

Comments

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
GPT	11x Atlan Stormsack (SQIDEP Verified) 600sq	Hi-flow bypass rate (cum/sec)	None	99	0.275
GPT	7 x Atlan Stormsack (SQIDEP Verified) 600sq	Hi-flow bypass rate (cum/sec)	None	99	0.175
GPT	Atlan Vortceptor (SQIDEP Verified) IVR.100	Hi-flow bypass rate (cum/sec)	None	99	0.1
Receiving	Receiving Node	% Load Reduction	None	None	0.191
Receiving	Receiving Node	GP % Load Reduction	90	None	100
Receiving	Receiving Node	TN % Load Reduction	45	None	61.9
Receiving	Receiving Node	TP % Load Reduction	45	None	92.4
Receiving	Receiving Node	TSS % Load Reduction	80	None	98.2
Swale	Swale	Bed slope	0.02	0.05	0.03
Urban	Urban	Baseflow Total Nitrogen Mean (log mg/L)	0.11	0.11	0.11
Urban	Urban	Baseflow Total Nitrogen Mean (log mg/L)	-0.05	-0.05	-0.05
Urban	Urban	Baseflow Total Nitrogen Mean (log mg/L)	0.11	0.11	0.11
Urban	Urban	Baseflow Total Phosphorus Mean (log mg/L)	-0.85	-0.85	-0.85
Urban	Urban	Baseflow Total Phosphorus Mean (log mg/L)	-1.22	-1.22	-1.22
Urban	Urban	Baseflow Total Phosphorus Mean (log mg/L)	-0.85	-0.85	-0.85
Urban	Urban	Baseflow Total Suspended Solids Mean (log mg/L)	1.2	1.2	1.2
Urban	Urban	Baseflow Total Suspended Solids Mean (log mg/L)	1.15	1.15	1.15
Urban	Urban	Baseflow Total Suspended Solids Mean (log mg/L)	1.2	1.2	1.2
Urban	Urban	Stormflow Total Nitrogen Mean (log mg/L)	0.3	0.3	0.3
Urban	Urban	Stormflow Total Nitrogen Mean (log mg/L)	0.3	0.3	0.3
Urban	Urban	Stormflow Total Nitrogen Mean (log mg/L)	0.34	0.34	0.34
Urban	Urban	Stormflow Total Phosphorus Mean (log mg/L)	-0.6	-0.6	-0.6
Urban	Urban	Stormflow Total Phosphorus Mean (log mg/L)	-0.66	-0.66	-0.66
Urban	Urban	Stormflow Total Phosphorus Mean (log mg/L)	-0.3	-0.3	-0.3
Urban	Urban	Stormflow Total Suspended Solids Mean (log mg/L)	2.15	2.15	2.15
Urban	Urban	Stormflow Total Suspended Solids Mean (log mg/L)	1.95	1.95	1.95
Urban	Urban	Stormflow Total Suspended Solids Mean (log mg/L)	2.43	2.43	2.43

Only certain parameters are reported when they pass validation

PIT / NODE DETAILS Version 15

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is	Internal Width (mm)	Inflow is Misaligned	Minor Safe Pond Depth (m)	Major Safe Pond Depth (m)
N PreDev	Node					223		0		339940.1	6301959		1207811		No					
P6/1	OnGrade	NSW RTA S	SA3		1	227.519		0	0	339730.8	6301955	No	23228351	1 x Ku	No	New				
P4/4	OnGrade	NSW RTA S	SA1		1	227.29		0	0	339748.7	6301953	No	6	1 x Ku	No	New				
P4/3	OnGrade	NSW RTA S	SA3		1	227.201		0	0	339768.3	6301950	No	8556886	1 x Ku	No	New				
P4/2	OnGrade	NSW RTA S	SA2		1	227.103		0	0	339788.2	6301947	No	7	1 x Ku	No	New				
P4/1	OnGrade	NSW RTA S	SA2		1	226.932		0	0	339816.5	6301944	No	8556887	1 x Ku	No	New				
P1/5	OnGrade	NSW RTA S	SA3		1	226.874		0	0	339827.9	6301942	No	9	1 x Ku	No	New				
P1/4	OnGrade	NSW RTA S	SA2		1	226.654		0	0	339847.7	6301937	No	8556888	1 x Ku	No	New				
P1/3	OnGrade	NSW RTA S	SA2		1	226.516		0	0	339867.4	6301935	No	11	1 x Ku	No	New				
P3/2	OnGrade	NSW RTA S	SA1		18	228.572		0	0	339753.5	6302003	No	5	1 x Ku	No	New				
P3/1	OnGrade	NSW RTA S	SA1		1	228.669		0	0	339805.1	6301993	No	8556883	1 x Ku	No	New				
P1/8	OnGrade	NSW RTA S	SA1		2.1	228.519		0	0	339834.5	6301987	No	1	1 x Ku	No	New				
P1/7	OnGrade	SIP	600 mm Sqre SIP		1	227.715		0	0	339830.7	6301964	No	8556942	1 x Ku	No	New				
P1/6	OnGrade	SIP	600 mm Sqre SIP		1	227.046		0	0	339827.8	6301947	No	8556944	1 x Ku	No	New				
P5/1	OnGrade	SIP	600 mm Sqre SIP		18	227.266		0	0	339797.8	6301951	No	8556940	1 x Ku	No	New				
P7/2	OnGrade	NSW RTA S	SA1		18	227.899		0	0	339851.2	6301984	No	23226351	1 x Ku	No	New				
P7/1	Sag	NSW RTA S	SA2	1	1	226.222	0.15	0	0	339880.8	6301978	No	23227351	1 x Ku	No	New			0.05	0.15
P2/2	OnGrade	NSW RTA S	SA1		1	226.463		0	0	339888.1	6301966	No	8	1 x Ku	No	New				
P2/1	OnGrade	NSW RTA S	SA1		1	226.316		0	0	339896	6301952	No	10	1 x Ku	No	New				
N LS SE	Node					223		0		339885.1	6301918		23223432		No					
N LS S	Node					224		0		339816.7	6301929		23223443		No					
N DS	Node					222		0		339913.5	6301912		23223455		No					
P1/2a	Node					226		0		339902.4	6301918		23222986		No					
P1/1	Node					222.5		0		339911.3	6301925		13		No					

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length	id
P 1/2 OSD	222.7	1		None						339897.8	6301930	No			34106333
	222.8	83.8													
	225.6	83.8													
	225.65	2.43													
	226	2.43													
	226.05	200													
	226.4	400													
	226.5	1000													
	226.7	2000													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor	Rainfall Multiplier
C PreDev	N PreDev	1.0107	0	100	0	5	5	2										0				1
C P6/1	P6/1	0.1137	50	50	0	5	5	2										0				1
C P4/3	P4/3	0.1324	100	0	0	5	4	2										0				1
C P4/2	P4/2	0.019	100	0	0	5	5	2										0				1
C P1/5	P1/5	0.1515	100	0	0	5	5	2										0				1
C P1/4	P1/4	0.0472	100	0	0	5	5	2										0				1
C P1/3	P1/3	0.0654	100	0	0	5	5	2										0				1
C P1/2	P 1/2 OSD	0.1968	100	0	0	5	5	2										0				1
C P3/2	P3/2	0.013	35	65	0	5	5	2										0				1
C P3/1	P3/1	0.0072	50	50	0	5	5	2										0				1
C P1/8	P1/8	0.01	50	50	0	5	5	2										0				1
C P5/1	P5/1	0.0485	100	0	0	5	5	2										0				1
C P7/2	P7/2	0.0058	50	50	0	5	5	2										0				1
C P7/1	P7/1	0.0189	75	25	0	5	5	2										0				1
C LS	N LS SE	0.0532	0	100	0	5	5	2										0				1
C LS West	N LS S	0.0686	0	100	0	5	5	2										0				1
C Front LS	P1/1	0.0248	0	100	0	5	5	2										0				1

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)					
Pipe-31	P6/1	P4/4	18.06	225.691	225.601	0.5	uPVC, unde	225	242	0.012	New	1	P6/1	0	0.011046	227.519	1.40436	227.56	1.61795	227.407	2.34332	227.376	3.23292	
Pipe-18	P4/4	P4/3	19.866	225.601	225.501	0.5	uPVC, unde	300	303	0.012	New	1	P4/4	0	0.01118	227.29	0.439772	227.288	0.456047	227.288	0.460156	227.288	0.482352	
Pipe-17	P4/3	P4/2	20.176	225.501	225.401	0.5	uPVC, unde	300	303	0.012	New	1	P4/3	0	0.01118	227.201	0.529039	227.198	0.550248	227.199	1.52925	227.194	1.55046	
Pipe-20	P4/2	P4/1	28.426	225.401	225.258	0.5	uPVC, unde	300	303	0.012	New	1	P4/2	0	0.011046	227.103	0.35384	227.102	0.376032	227.102	1.35516	227.099	1.37835	
Pipe-19	P4/1	P1/5	11.55	225.258	225.201	0.49	uPVC, unde	300	303	0.012	New	1	P4/1	0	0.01118	226.932	0.757002	226.928	0.76818	226.928	1.75713	226.923	1.76831	
Pipe-22	P1/5	P1/4	20.396	225.201	224.997	1	uPVC, unde	375	386	0.012	New	1	P1/5	0	0.010198	226.874	13.4109	226.706	13.8344	226.852	20.3846	226.662		
Pipe-21	P1/4	P1/3	19.732	224.997	224.8	1	uPVC, unde	375	386	0.012	New	1	P1/4	0	0.011045	226.662	0.201803	226.8	0.732974	226.795	0.86244	226.793	1.07628	
Pipe-7	P1/3	P 1/2 OSD	31.089	224.7	223.867	2.68	uPVC, unde	375	386	0.012	New	1	P1/3	0	0.01118	226.516	30.3857	226.255	31.078	226.249				
Pipe-34	P3/2	P3/1	52.538	227.338	226.813	1	uPVC, unde	225	242	0.012	New	1	P3/2	0	0.01118	228.572	52.5268	228.669						
Pipe-14	P3/1	P1/8	29.98	226.813	226.513	1	uPVC, unde	225	242	0.012	New	1	P3/1	0	0.01118	228.669	0.162975	228.669	1.16337	228.664	2.16279	228.659	3.16319	
Pipe-27	P1/8	P1/7	23.255	226.513	226.281	1	uPVC, unde	225	242	0.012	New	1	P1/8	0	0.01118	228.52	0.082035	228.527	0.450114	228.559	7.66311	228.292	23.2438	
Pipe-26	P1/7	P1/6	18.068	226.281	225.9	2.11	uPVC, unde	225	242	0.012	New	1	P1/7	0	0.01118	227.715	18.0568	227.046						
Pipe-24	P1/6	P1/5	4.587	225.447	225.401	1	uPVC, unde	225	242	0.012	New	1	P1/6	0	0.010998	227.045	0.451096	227.029	0.917211	227.012	4.57598	226.875		
Pipe-28	P5/1	P4/1	20.086	226.765	226.501	1.31	uPVC, unde	225	242	0.012	New	1	P5/1	0	0.01077	227.265	0.60779	227.258	0.751892	227.256	1.63117	227.246	1.77119	
Pipe-36	P7/2	P7/1	30.219	227.074	225.297	5.88	uPVC, unde	225	242	0.012	New	1	P7/2	0	0.011181	227.898	0.219067	227.889	1.21948	227.846	2.21892	227.803	3.21933	
Pipe-35	P7/1	P2/2	14.38	225.297	225.153	1	uPVC, unde	225	242	0.012	New	1	P7/1	0	0.011662	226.281	0.026925	226.366	0.122798	226.342	0.386393	226.346	0.830585	
Pipe-11	P2/2	P2/1	16.339	225.15	224.982	1.03	uPVC, unde	225	242	0.012	New	1	P2/2	0	0.011181	226.034	0.39251	226.042	0.892929	226.052	0.938098	226.485	1.18695	
Pipe-12	P2/1	P 1/2 OSD	21.264	224.982	224.449	2.51	uPVC, unde	225	242	0.012	New	1	P2/1	0	0.011046	226.317	0.075328	226.319	0.369765	226.328	0.665199	226.337	1.30214	
Pipe-8	P1/2a	P1/1	14.312	222.636	222.5	0.95	Concrete, u	450	450	0.013	New	1	P1/2a	0	0.011181	222.816	0.201312	222.815	1.75866	222.87	5.09844	222.96	10.5624	

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storm (m)	SafeDepth Minor Storm (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id	U/S IL	D/S IL	Length (m)
B24-4	P6/1	P4/4	0.2				7.5 m road	0.3	0.15	0.4	1.27	50	23222976	227.519	227.29	18.06
OF123919	P4/4	P4/3	0.2				7.5 m road	0.3	0.15	0.4	0.45	50	23223049	227.29	227.201	19.9
B16-5	P4/3	P4/2	0.3				7.5 m road	0.3	0.15	0.4	0.49	50	8556901	227.201	227.103	20.176
OF123922	P4/2	P4/1	0.3				7.5 m road	0.3	0.15	0.4	0.61	50	23223064	227.103	226.932	28.2
B17-6	P4/1	P1/5	0.3				7.5 m road	0.3	0.15	0.4	0.5	50	8556900	226.932	226.874	11.55
OF123931	P1/5	P1/4	0.2				7.5 m road	0.3	0.15	0.4	1.08	100	23223133	226.874	226.654	20.3
B18-7	P1/4	P1/3	0.2				7.5 m road	0.3	0.15	0.4	0.7	100	8556899	226.654	226.516	19.732
B7-8	P1/3	P 1/2 OSD	0.6				7.5 m road	0.3	0.15	0.4	0.86	100	27	226.516	226.3	31.089
B8-9	P 1/2 OSD	P1/1	0.1	226.2	5	2	Swale with	0.32	0.2	0.6	24.78	0	26	226	222.702	14.312
B3-4	P3/2	P6/1	0.4				7.5 m road	0.3	0.15	0.4	2.56	50	23222975	228.572	227.519	50.049
B14	P3/1	P1/7	0.3				4 m wide p	0.3	0.15	0.4	1.94	50	23222973	228.669	227.715	49.261
B1	P1/8	P1/7	0.3				4 m wide p	0.3	0.15	0.4	1.71	50	23222971	228.519	227.715	47.071
B20-19	P1/7	P1/6	0.3				4 m wide p	0.3	0.15	0.4	3.7	50	8556978	227.715	227.046	18.068
B19-6	P1/6	P1/5	0.1				4 m wide p	0.3	0.15	0.4	3.75	50	8556976	227.046	226.874	4.587
B21-17	P5/1	P4/1	0.1				4 m wide p	0.3	0.15	0.4	1.66	50	23222970	227.266	226.932	20.086
B27-26	P7/2	P7/1	0.2				7.5 m road	0.3	0.15	0.4	5.55	10	23222967	227.899	226.222	30.219
OF123938	P7/1	P1/1	0.4				Swale with	0.45	0.3	1	5.17	50	23223187	226.372	223	65.2

B12-13	P2/2	P2/1	0.3	7.5 m road	0.3	0.15	0.4	0.9	50	30	226.463	226.316	16.339
B13-8	P2/1	P 1/2 OSD	0.4	7.5 m road	0.3	0.15	0.4	0.32	50	28	226.316	226.249	21.264
OF123954	N LS SE	P1/1	0.2	Deep Swal	1	0.5	0.6	1.83	0	23223460	223	222.5	27.3
OF123952	N LS S	N LS SE	0.7	Deep Swal	1	0.5	0.6	1.44	100	23223447	224	223	69.4
OF123956	P1/1	N DS	0.1	Deep Swal	1	0.5	0.6	3.73	0	23223468	222.5	222	13.4

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover	Cover (m)	
Pipe-31	uPVC, unde	242	0.5	1.43	
Pipe-18	uPVC, unde	303	0.5	1.38	
Pipe-17	uPVC, unde	303	0.5	1.39	
Pipe-20	uPVC, unde	303	0.5	1.36	
Pipe-19	uPVC, unde	303	0.5	1.36	
Pipe-22	uPVC, unde	386	0.5	1.25	
Pipe-21	uPVC, unde	386	0.5	1.26	
Pipe-7	uPVC, unde	386	0.5	-1.56	Unsafe
Pipe-34	uPVC, unde	242	0.5	0.99	
Pipe-14	uPVC, unde	242	0.5	1.61	
Pipe-27	uPVC, unde	242	0.5	1.19	
Pipe-26	uPVC, unde	242	0.5	0.9	
Pipe-24	uPVC, unde	242	0.5	1.23	
Pipe-28	uPVC, unde	242	0.5	0.18	Unsafe
Pipe-36	uPVC, unde	242	0.5	0.58	
Pipe-35	uPVC, unde	242	0.5	0.6	
Pipe-11	uPVC, unde	242	0.5	0.64	
Pipe-12	uPVC, unde	242	0.5	-2	Unsafe
Pipe-8	Concrete, u	450	0.6	-0.49	Unsafe

This model has no pipes with non-return valves

DRAINS results prepared from Version 2024.07.8959.15835

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivi (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
P6/1	227.42		0.046		0.1	0	None
P4/4	227.27		0.006		0.02	0.001	Inlet Capacity
P4/3	227.21		0.061		0	0.001	Outlet System
P4/2	226.97		0.056		0.14	0	None
P4/1	226.62		0.026		0.31	0.001	Inlet Capacity
P1/5	225.86		0.043		1.01	0.005	Inlet Capacity
P1/4	225.54		0.021		1.12	0.001	Inlet Capacity
P1/3	225.3		0.02		1.22	0.002	Inlet Capacity
P3/2	227.41		0.007		1.16	0	None
P3/1	226.88		0.004		1.78	0	None
P1/8	226.59		0.005		1.92	0	None
P1/7	226.36		0		1.35	0	None
P1/6	225.87		0		1.18	0	None
P5/1	226.89		0.027		0.37	0.008	Inlet Capacity
P7/2	227.14		0.003		0.76	0	None
P7/1	225.37	226.24	0.01	0.1	0.85	0	Inlet Capacity
P2/2	225.23		0		1.23	0	None
P2/1	225.23		0		1.09	0.001	Inlet Capacity
N LS SE	223.05		0.047				
N LS S	224.04		0.035				
P1/2a	222.82		0				
P1/1	222.58		0.061				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
C PreDev	0.362	0	0.362	5	5	2	10% AEP, 15 min burst, Storm 5
C P6/1	0.045	0.029	0.019	5	5	2	10% AEP, 15 min burst, Storm 3
C P4/3	0.061	0.061	0	5	4	2	10% AEP, 5 min burst, Storm 1
C P4/2	0.009	0.009	0	5	5	2	10% AEP, 5 min burst, Storm 1
C P1/5	0.07	0.07	0	5	5	2	10% AEP, 5 min burst, Storm 1
C P1/4	0.022	0.022	0	5	5	2	10% AEP, 5 min burst, Storm 1
C P1/3	0.03	0.03	0	5	5	2	10% AEP, 5 min burst, Storm 1
C P1/2	0.091	0.091	0	5	5	2	10% AEP, 5 min burst, Storm 1
C P3/2	0.005	0.002	0.003	5	5	2	10% AEP, 15 min burst, Storm 5
C P3/1	0.003	0.002	0.001	5	5	2	10% AEP, 15 min burst, Storm 3
C P1/8	0.004	0.003	0.002	5	5	2	10% AEP, 15 min burst, Storm 3
C P5/1	0.022	0.022	0	5	5	2	10% AEP, 5 min burst, Storm 1
C P7/2	0.002	0.001	0.001	5	5	2	10% AEP, 15 min burst, Storm 3
C P7/1	0.008	0.006	0.002	5	5	2	10% AEP, 15 min burst, Storm 10
C LS	0.019	0	0.019	5	5	2	10% AEP, 15 min burst, Storm 5
C LS West	0.025	0	0.025	5	5	2	10% AEP, 15 min burst, Storm 5
C Front LS	0.009	0	0.009	5	5	2	10% AEP, 15 min burst, Storm 5

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe-31	0.044	0.96	227.369	227.267	10% AEP, 15 min burst, Storm 3
Pipe-18	0.045	0.62	227.245	227.208	10% AEP, 15 min burst, Storm 9
Pipe-17	0.098	1.35	227.12	226.965	10% AEP, 15 min burst, Storm 10
Pipe-20	0.105	1.45	226.867	226.621	10% AEP, 15 min burst, Storm 4
Pipe-19	0.125	1.73	226.246	225.864	10% AEP, 15 min burst, Storm 10
Pipe-22	0.194	1.66	225.722	225.536	10% AEP, 15 min burst, Storm 10
Pipe-21	0.217	1.86	225.432	225.3	10% AEP, 15 min burst, Storm 4
Pipe-7	0.252	2.15	225.273	225.218	10% AEP, 15 min burst, Storm 6
Pipe-34	0.005	0.47	227.41	226.885	10% AEP, 10 min burst, Storm 6
Pipe-14	0.007	0.58	226.885	226.595	10% AEP, 15 min burst, Storm 5
Pipe-27	0.011	0.81	226.595	226.362	10% AEP, 15 min burst, Storm 6
Pipe-26	0.01	1.35	226.362	225.951	10% AEP, 15 min burst, Storm 6
Pipe-24	0.013	0.27	225.865	225.864	10% AEP, 15 min burst, Storm 4
Pipe-28	0.014	0.82	226.859	226.621	10% AEP, 5 min burst, Storm 1
Pipe-36	0.002	0.22	227.138	225.373	10% AEP, 15 min burst, Storm 3
Pipe-35	0.01	0.84	225.373	225.229	10% AEP, 15 min burst, Storm 10
Pipe-11	0.01	0.8	225.229	225.229	10% AEP, 15 min burst, Storm 9
Pipe-12	0.009	0.2	225.225	225.218	10% AEP, 15 min burst, Storm 9
Pipe-8	0.102	1.61	222.824	222.689	10% AEP, 1 hour burst, Storm 7

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
B24-4	0	0	0.346	0	0	0	0	
OF123919	0.001	0.03	0.206	0.079	0.04	1.78	0.57	10% AEP, 5 min burst, Storm 1

B16-5	0.001	0.005	0.215	0.043	0.02	0.56	0.43	10% AEP, 5 min burst, Storm 1
OF123922	0	0	0.24	0	0	0	0	
B17-6	0.001	0.035	0.217	0.082	0.05	1.86	0.61	10% AEP, 5 min burst, Storm 1
OF123931	0.005	0.025	0.319	0.07	0.05	1.46	0.81	10% AEP, 5 min burst, Storm 1
B18-7	0.001	0.03	0.257	0.076	0.05	1.66	0.69	10% AEP, 5 min burst, Storm 1
B7-8	0.002	0.091	0.285	0.106	0.09	2.66	0.82	10% AEP, 5 min burst, Storm 1
ATLAN Vor	0.079	0.079						10% AEP, 1 hour burst, Storm 7
Ori ML	0.023	0.023						10% AEP, 1 hour burst, Storm 7
B8-9	0	0	0.327	0	0	0	0	
B3-4	0	0.022	0.725	0.057	0.04	1.62	0.91	10% AEP, 15 min burst, Storm 3
B14	0	0	1.265	0	0	0	0	
B1	0	0	1.188	0	0	0	0	
B20-19	0	0	1.426	0	0	0	0	
B19-6	0	0.035	1.413	0.027	0.03	4	1.84	10% AEP, 5 min burst, Storm 1
B21-17	0.008	0.008	1.17	0.021	0.02	4	1.98	10% AEP, 5 min burst, Storm 1
B27-26	0	0	0.658	0	0	0	0	
OF123938	0	0.004	0.755	0.042	0.02	0.33	0.57	10% AEP, 15 min burst, Storm 5
B12-13	0	0	0.291	0	0	0	0	
B13-8	0.001	0.044	0.174	0.094	0.05	2.25	0.59	10% AEP, 5 min burst, Storm 1
OF123954	0.038	0.038	1.382	0.048	0.03	1.39	0.65	10% AEP, 15 min burst, Storm 5
OF123952	0.024	0.039	1.44	0.054	0.03	1.43	0.65	10% AEP, 15 min burst, Storm 5
OF123956	0.12	0.12	1.22	0.077	0.09	1.61	1.2	10% AEP, 1 hour burst, Storm 7

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
P 1/2 OSD	225.22	205.7	0.102	0	0.102

Run Log for DRAINS v2024.07.8959.15835 - 23053 v9 20241105
{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2024.07.8959.15835 - 23053 v9 20241105.drn run at 13:41:39 on 5/11/2024 using Watercom Drains v2024.07.8959.15835

No water upwelling from any pit.
Freeboard was less than 0.15m at P4/2, P4/3, P4/4, P6/1
Flows were safe in all overflow routes.

DRAINS results prepared from Version 2024.07.8959.15835

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivi (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
P6/1	227.57		0.082		0	0.028	Outlet System
P4/4	227.38		0.055		0	0.032	Outlet System
P4/3	227.32		0.156		0	0.119	Outlet System
P4/2	227.22		0.149		0	0.113	Outlet System
P4/1	227.08		0.169		0	0.131	Outlet System
P1/5	226.98		0.25		0	0.131	Outlet System
P1/4	226.77		0.288		0	0.127	Outlet System
P1/3	226.58		0.331		0	0.011	Outlet System
P3/2	227.47		0.012		1.1	0	None
P3/1	227.06		0.007		1.61	0	None
P1/8	227.19		0.01		1.33	0	None
P1/7	227.14		0		0.57	0	None
P1/6	227.01		0		0.04	0	None
P5/1	227.26		0.048		0.01	0.017	Inlet Capacity
P7/2	227.16		0.006		0.74	0	None
P7/1	226.21	226.25	0.018	0.1	0.01	0	Inlet Capacity
P2/2	226.17		0		0.29	0	None
P2/1	226.18		0		0.13	0.002	Inlet Capacity
N LS SE	223.07		0.088				
N LS S	224.06		0.064				
P1/2a	223.12		0				
P1/1	222.65		0.12				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
C PreDev	0.666	0	0.666	5	5	2	1% AEP, 10 min burst, Storm 1
C P6/1	0.08	0.046	0.034	5	5	2	1% AEP, 5 min burst, Storm 1
C P4/3	0.108	0.108	0	5	4	2	1% AEP, 5 min burst, Storm 1
C P4/2	0.015	0.015	0	5	5	2	1% AEP, 5 min burst, Storm 1
C P1/5	0.123	0.123	0	5	5	2	1% AEP, 5 min burst, Storm 1
C P1/4	0.038	0.038	0	5	5	2	1% AEP, 5 min burst, Storm 1
C P1/3	0.053	0.053	0	5	5	2	1% AEP, 5 min burst, Storm 1
C P1/2	0.16	0.16	0	5	5	2	1% AEP, 5 min burst, Storm 1
C P3/2	0.009	0.004	0.006	5	5	2	1% AEP, 10 min burst, Storm 1
C P3/1	0.005	0.003	0.002	5	5	2	1% AEP, 5 min burst, Storm 1
C P1/8	0.007	0.004	0.003	5	5	2	1% AEP, 5 min burst, Storm 1
C P5/1	0.039	0.039	0	5	5	2	1% AEP, 5 min burst, Storm 1
C P7/2	0.004	0.002	0.002	5	5	2	1% AEP, 5 min burst, Storm 1
C P7/1	0.014	0.012	0.003	5	5	2	1% AEP, 5 min burst, Storm 1
C LS	0.035	0	0.035	5	5	2	1% AEP, 10 min burst, Storm 1
C LS West	0.045	0	0.045	5	5	2	1% AEP, 10 min burst, Storm 1
C Front LS	0.016	0	0.016	5	5	2	1% AEP, 10 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe-31	0.054	1.17	227.511	227.379	1% AEP, 5 min burst, Storm 1
Pipe-18	0.049	0.68	227.359	227.324	1% AEP, 20 min burst, Storm 2
Pipe-17	0.107	1.49	227.287	227.222	1% AEP, 5 min burst, Storm 1
Pipe-20	0.11	1.53	227.183	227.084	1% AEP, 15 min burst, Storm 3
Pipe-19	0.154	2.14	227.031	226.976	1% AEP, 20 min burst, Storm 4
Pipe-22	0.256	2.19	226.887	226.773	1% AEP, 5 min burst, Storm 1
Pipe-21	0.31	2.65	226.688	226.58	1% AEP, 10 min burst, Storm 6
Pipe-7	0.367	3.14	226.388	226.006	1% AEP, 10 min burst, Storm 6
Pipe-34	0.009	0.73	227.415	227.06	1% AEP, 10 min burst, Storm 8
Pipe-14	0.021	0.45	227.06	227.186	1% AEP, 10 min burst, Storm 7
Pipe-27	0.033	0.73	227.167	227.142	1% AEP, 5 min burst, Storm 1
Pipe-26	0.045	0.98	227.099	227.006	1% AEP, 20 min burst, Storm 10
Pipe-24	0.055	1.21	226.986	226.976	1% AEP, 10 min burst, Storm 5
Pipe-28	0.023	0.5	227.104	227.084	1% AEP, 5 min burst, Storm 1
Pipe-36	0.004	0.26	227.162	226.208	1% AEP, 10 min burst, Storm 1
Pipe-35	0.019	0.41	226.195	226.175	1% AEP, 25 min burst, Storm 1
Pipe-11	0.02	0.43	226.175	226.185	1% AEP, 20 min burst, Storm 7
Pipe-12	0.02	0.43	226.134	226.006	1% AEP, 20 min burst, Storm 10
Pipe-8	0.386	2.55	223.122	222.907	1% AEP, 25 min burst, Storm 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
B24-4	0.028	0.028	1.131	0.066	0.06	1.34	0.89	1% AEP, 10 min burst, Storm 1
OF123919	0.032	0.087	1.509	0.114	0.08	2.94	0.68	1% AEP, 5 min burst, Storm 1

B16-5	0.119	0.124	1.464	0.124	0.09	3.26	0.77	1% AEP, 5 min burst, Storm 1
OF123922	0.113	0.117	1.383	0.117	0.1	3.04	0.83	1% AEP, 5 min burst, Storm 1
B17-6	0.131	0.183	1.46	0.14	0.12	3.79	0.83	1% AEP, 10 min burst, Storm 8
OF123931	0.131	0.161	1.171	0.118	0.13	3.08	1.09	1% AEP, 10 min burst, Storm 7
B18-7	0.127	0.157	1.329	0.126	0.11	3.34	0.91	1% AEP, 20 min burst, Storm 8
B7-8	0.011	0.167	1.258	0.129	0.12	3.44	0.92	1% AEP, 5 min burst, Storm 1
ATLAN Vor	0.087	0.087						1% AEP, 25 min burst, Storm 6
Ori ML	0.284	0.284						1% AEP, 25 min burst, Storm 6
B8-9	0	0	0.331	0	0	0	0	
B3-4	0	0.04	1.172	0.058	0.06	1.68	1.01	1% AEP, 10 min burst, Storm 1
B14	0	0	1.457	0	0	0	0	
B1	0	0	1.457	0	0	0	0	
B20-19	0	0	1.426	0	0	0	0	
B19-6	0	0.065	1.413	0.041	0.03	4	2.02	1% AEP, 10 min burst, Storm 8
B21-17	0.017	0.02	1.454	0.026	0.03	4	2.01	1% AEP, 10 min burst, Storm 5
B27-26	0	0.001	0.658	0.009	0	0.1	0	1% AEP, 10 min burst, Storm 1
OF123938	0	0.008	1.587	0.053	0.04	0.43	0.67	1% AEP, 10 min burst, Storm 1
B12-13	0	0	1.23	0	0	0	0	
B13-8	0.002	0.078	1.487	0.11	0.07	2.79	0.65	1% AEP, 5 min burst, Storm 1
OF123954	0.076	0.076	1.382	0.072	0.06	1.57	0.82	1% AEP, 10 min burst, Storm 1
OF123952	0.044	0.077	1.44	0.079	0.06	1.63	0.78	1% AEP, 10 min burst, Storm 1
OF123956	0.431	0.431	1.22	0.152	0.27	2.21	1.77	1% AEP, 25 min burst, Storm 6

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
P 1/2 OSD	226.01	240.3	0.371	0	0.371

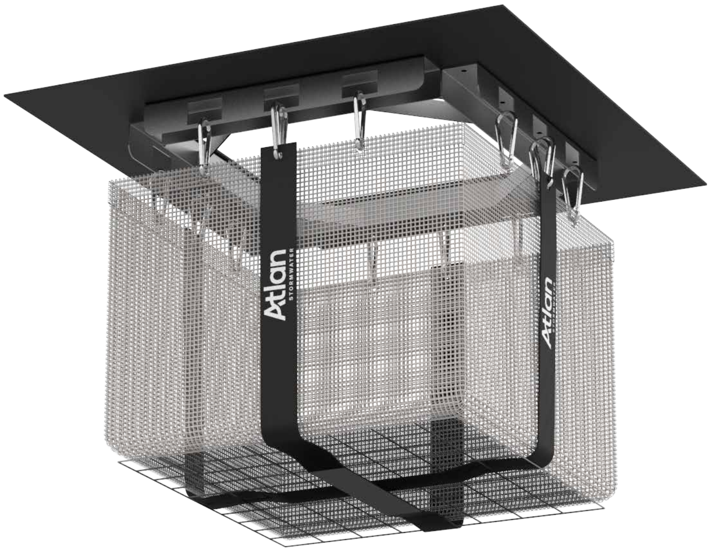
Run Log for DRAINS v2024.07.8959.15835 - 23053 v9 20241105
{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2024.07.8959.15835 - 23053 v9 20241105.drn run at 13:44:24 on 5/11/2024 using Watercom Drains v2024.07.8959.15835

Upwelling occurred at: P1/4, P4/4
Freeboard was less than 0.15m at P1/3, P2/1, P1/5, P7/1, P1/6, P4/1, P4/2, P5/1, P4/3, P6/1
Flows were safe in all overflow routes.

StormSack

At-Source Gross Pollutant Trap

atlan.com.au



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

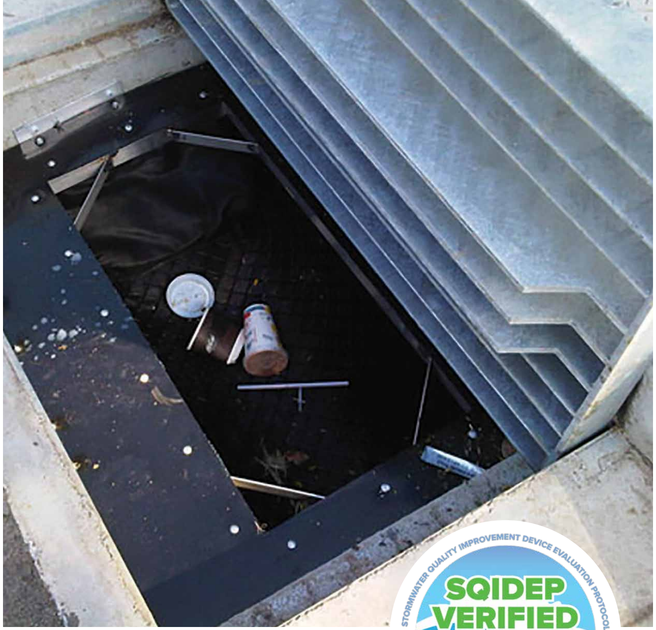
- Council storm drain retrofits
- Commercial / retail / residential
- Litter prone urban areas
- Scrap metal / solid waste / oil storage
- Part of treatment train
- Construction sediment / erosion

BENEFITS

- Can be modelled in MUSIC in conjunction with bioretention or other Atlan systems
- Low cost, gross pollutant capture
- Quick and 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 to suit typical project constraints.

Installation procedures includes removing the storm grate, cleaning the frame of debris and solids, measuring catch basin clear opening and trimming 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.

TESTED TREATMENT EFFICIENCIES*

POLLUTANT	EFFICIENCY
Gross Pollutants (GP)	100%
Total Suspended Solids (TSS)	45%
Total Phosphorus (TP)	47%
Total Nitrogen (TN)	25%

*Contact Atlan to confirm approved performance for the project LGA

MAINTENANCE

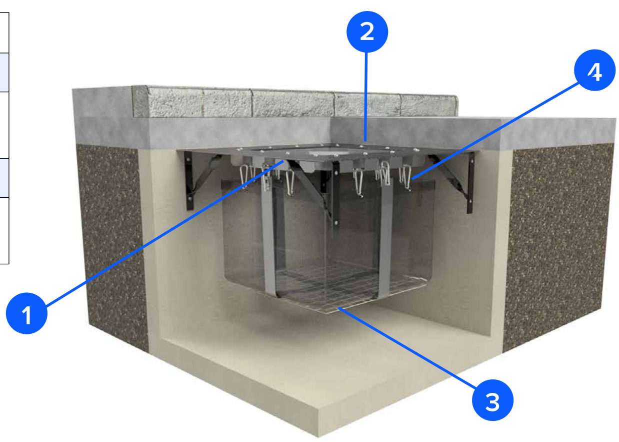
Typically the StormSack is serviceable from ground level, and therefore maintenance does not require confined space entry. The unit is designed to be maintained in place with a vacuum hose attached to a sweeper or a vacuum truck. Use only Atlan replaceable parts.

StormSack is SQIDEP approved after passing Stormwater Australia's rigorous testing and performance assessment process.

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.	Aluminium frame
2.	Black poly surround secured to frame • Can be cut to suit on site
3.	Reinforced StormSack bag
4.	Carabiners attach bag to frame for easy service and replacement

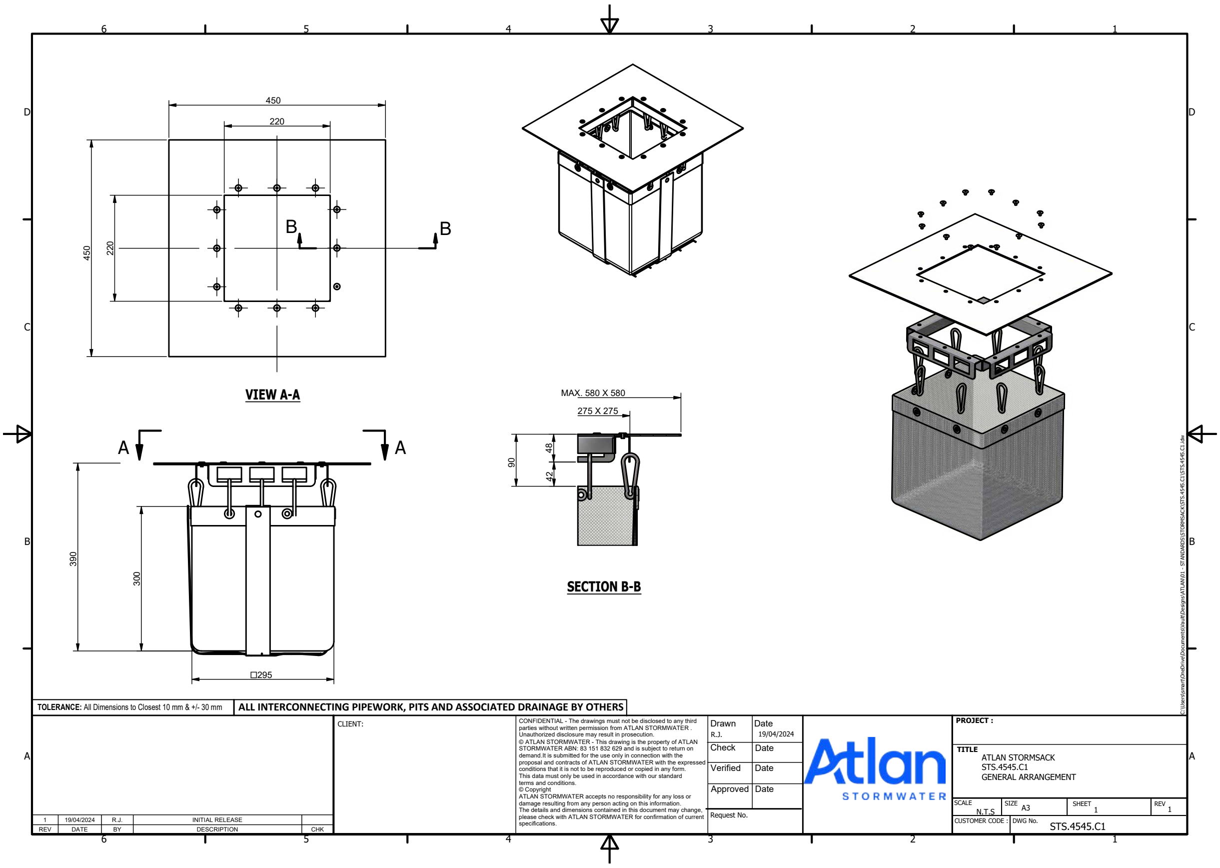
FEATURES

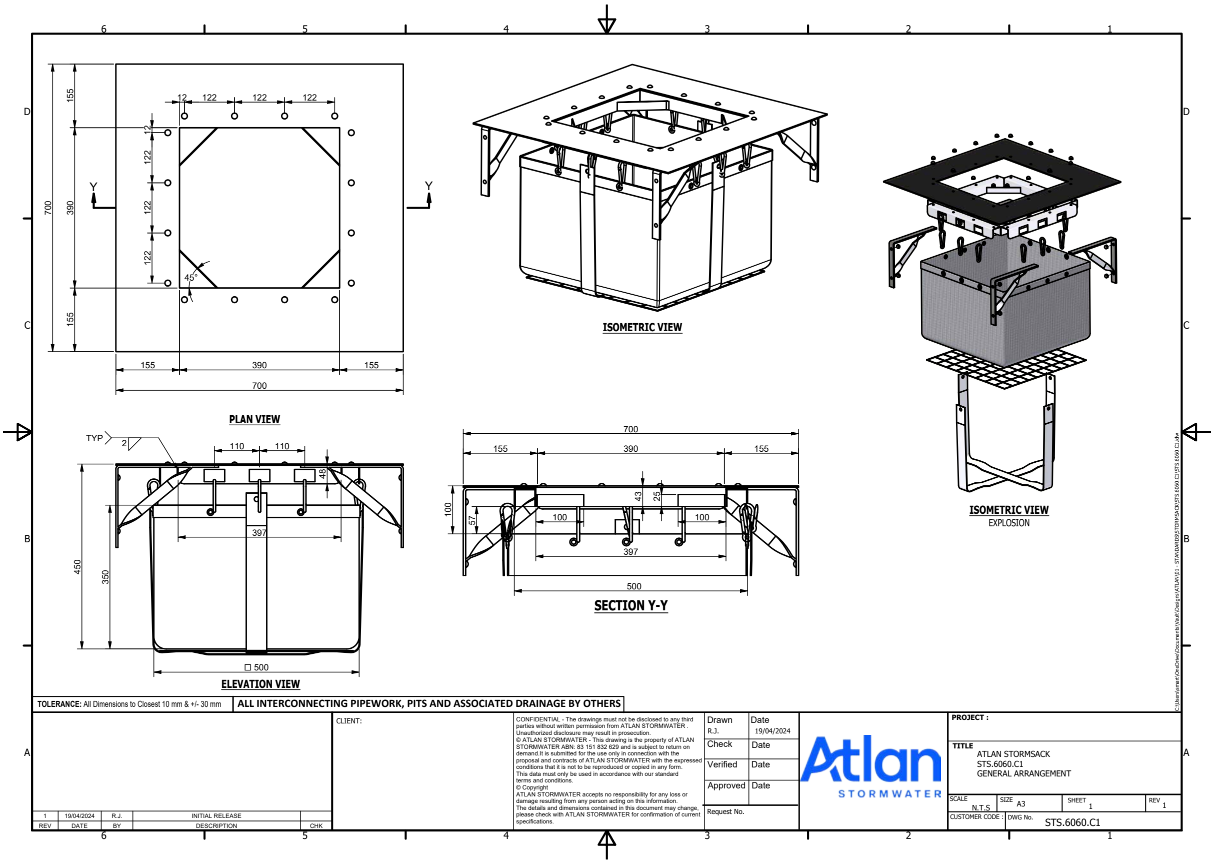


Standard StormSack to suit Pit Sizes
450x450mm
600x600mm
900x600mm
900x900mm

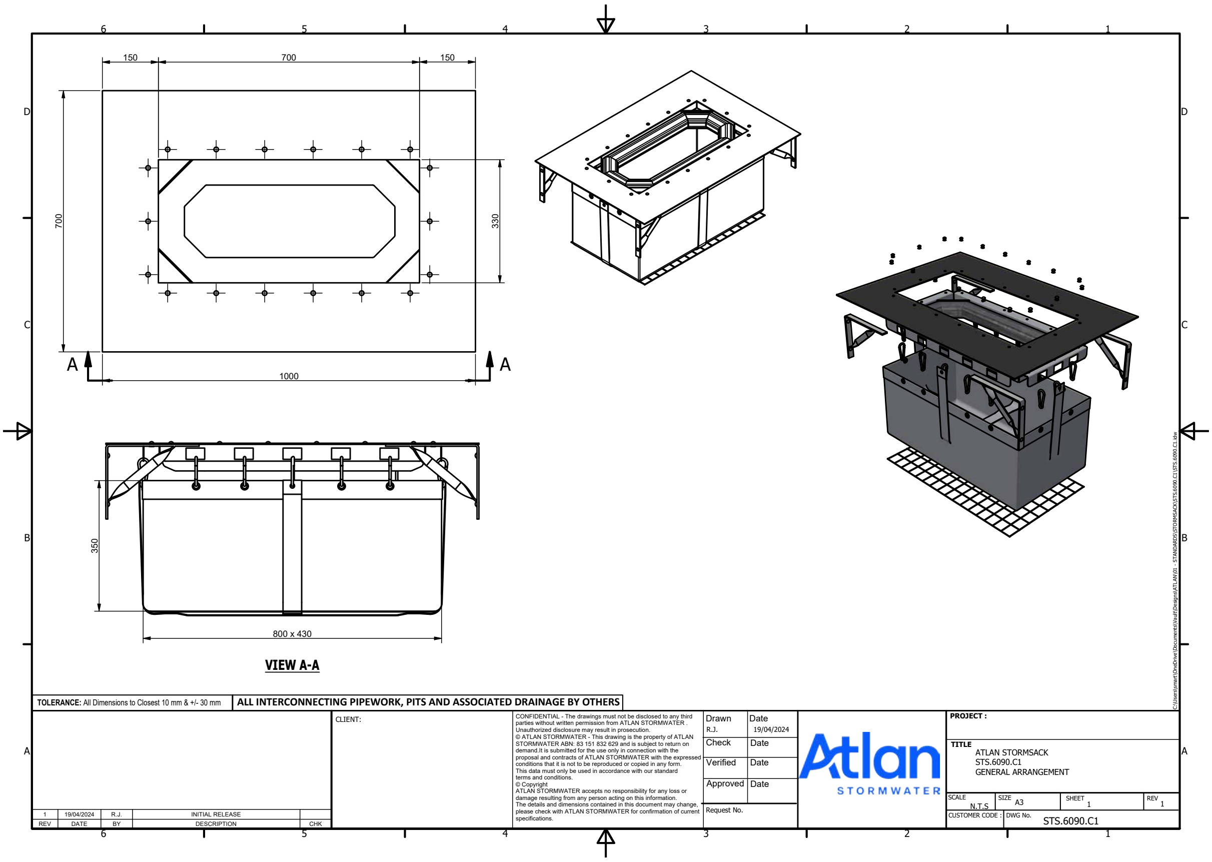
Custom sizes (i.e. 1200x900mm) can be manufactured on short lead times

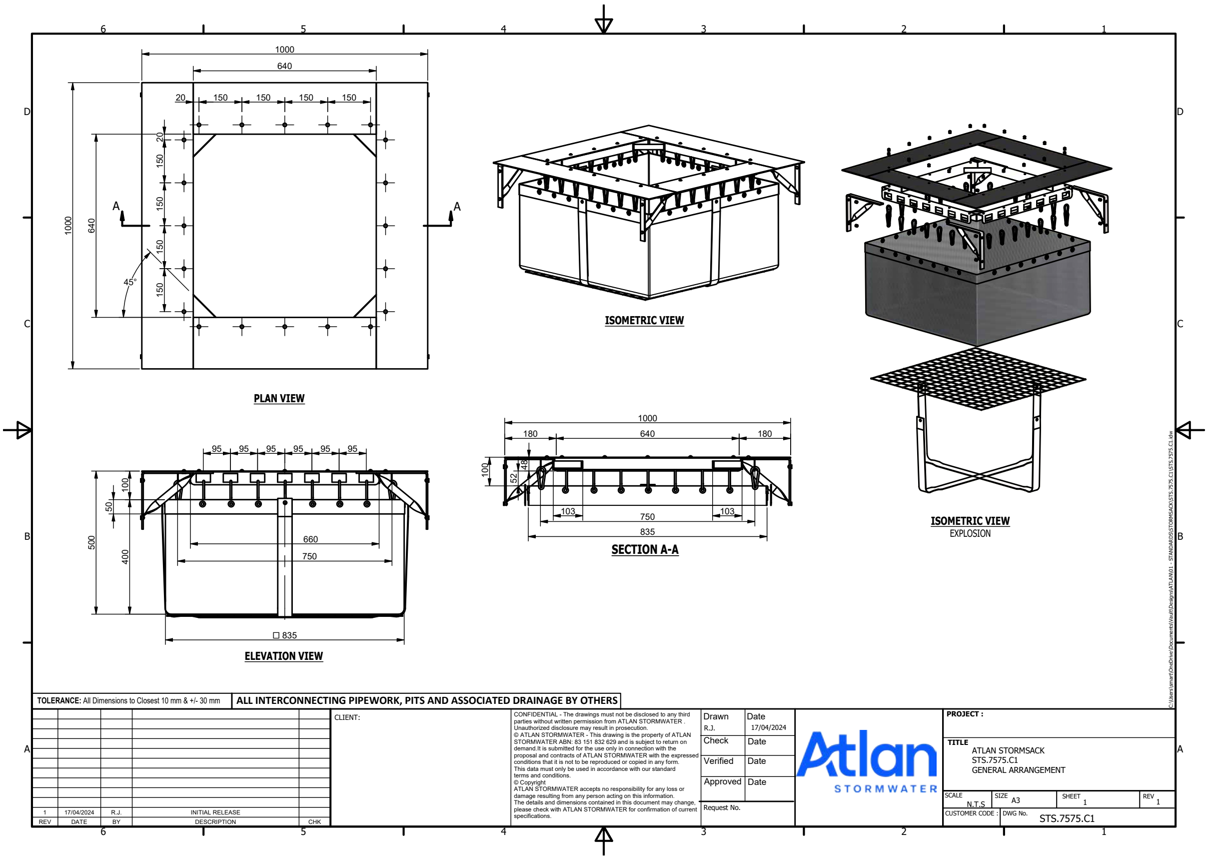
TECHNICAL DRAWINGS





TECHNICAL DRAWINGS





StormSack

At-Source Gross Pollutant Trap

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1024

MegaVault

On-site Stormwater Detention System

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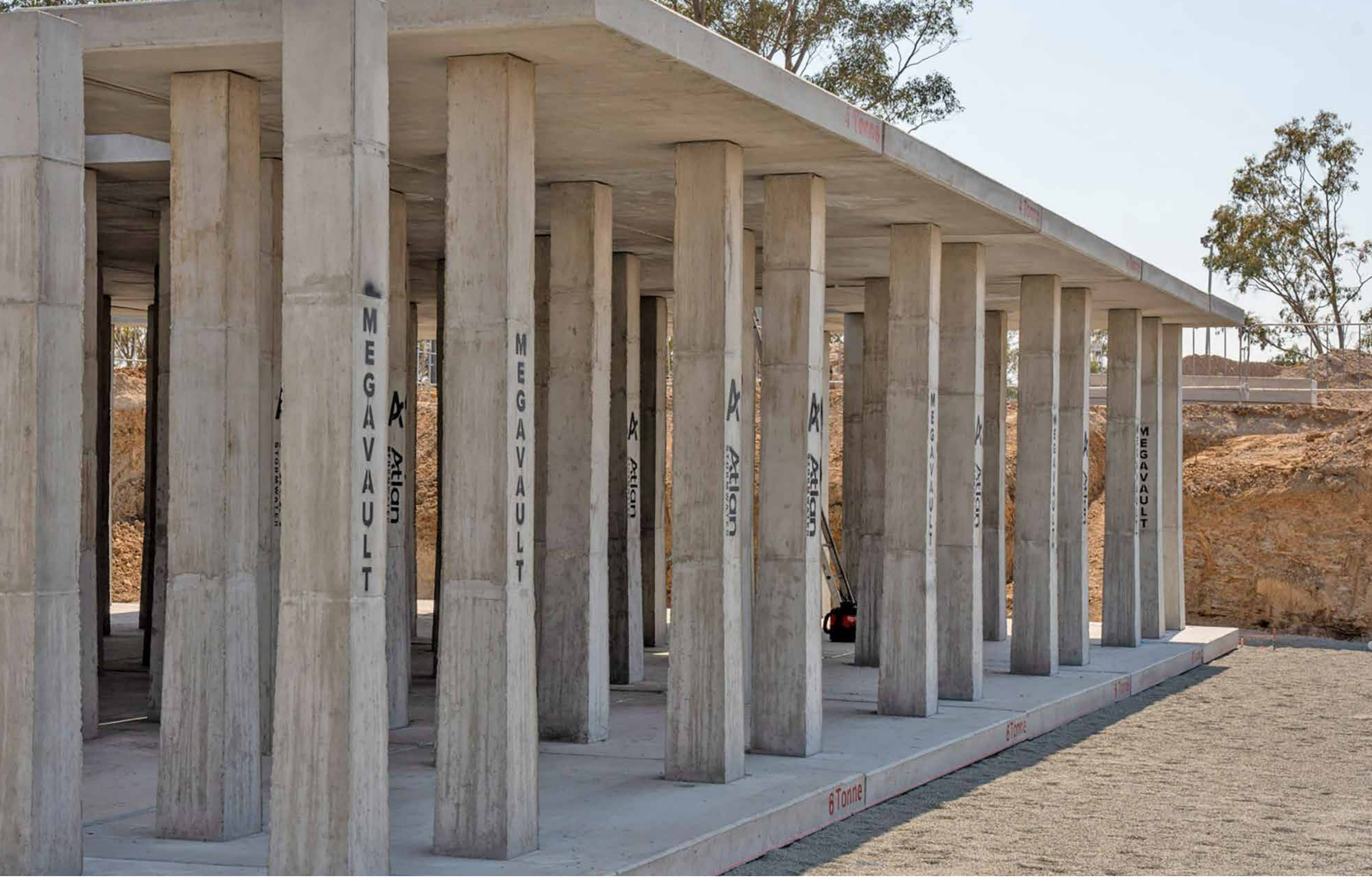
Atlan
STORMWATER



OVERVIEW

The MegaVault delivers an industry-leading answer for medium to large stormwater detention scenarios.

The inspiration of the MegaVault is based on ancient architecture and fundamental principles of cost-effective and efficient stormwater management. These systems have been improved and optimised with the assistance of modern precast concrete technology.

FEATURES

The MegaVault On-site Stormwater Detention (OSD) System meets legislative requirements for on-site detention, and its condensed footprint guarantees the delivery of high-yield usable land area.

This system has been designed and engineered to maximise the desired outcomes of safety-in-design with respect to manufacture, installation and life-cycle maintenance applicable to larger OSD requirements.

MegaVault is a Registered Australian Design (Design no. 202315550).

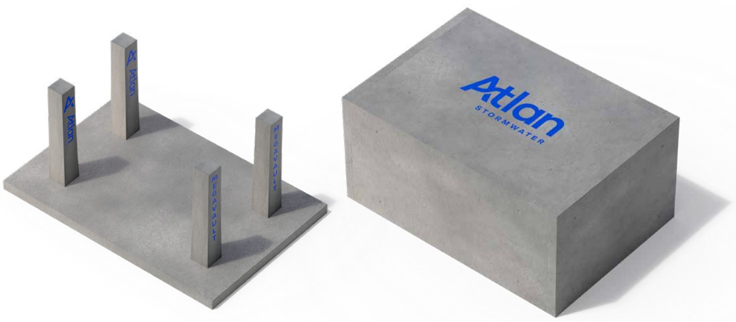
Just like the Atlan Vault, the MegaVault works hand in hand with Atlan filtration devices to achieve the requirements of Stormwater Quality and Quantity Management Plans to satisfy site design needs for SPP (State Planning Policy), local government and council requirements.

TECHNICAL DATA

SYSTEM INTERNAL HEIGHT (m)	VOLUME PER UNIT(L)
1.0	8.370
1.5	12.565
2.5	20.955
3.0	25.150

* System height can be further tailored to suit site requirements in increments of 100mm up to 3000mm.

MODULE DIMENSION	3600mm L x 2400mm W
INTERNAL HEIGHT	1000mm to 3000mm
VOLUME PER MODULE	8.37kL to 25.150 kL
TRAFFICABLE LOADINGS	20kPa or W80 Wheel Loadings
MINIMUM COVER	200mm
MAXIMUM COVER	3000mm (Cover over 3000mm, contact Atlan)
BEARING CAPACITY	150kPa min



Standard MegaVault
Isometric View

The MegaVault is engineered to meet Australian Standards and is designed to suit 20kPa surcharge or W80 loading criteria with 3m fill. Contact the team at Atlan to collaborate on special projects that require higher loadings or more customised solutions.

The MegaVault system provides unparalleled versatility in overcoming footprint, configuration and depth constraints which leads this system to be one of the most sought after solutions for storing/retaining water on developments by both civil, hydraulic and consulting engineers alike.

The size of each component is designed to maximise freight and installation efficiencies.

BENEFITS

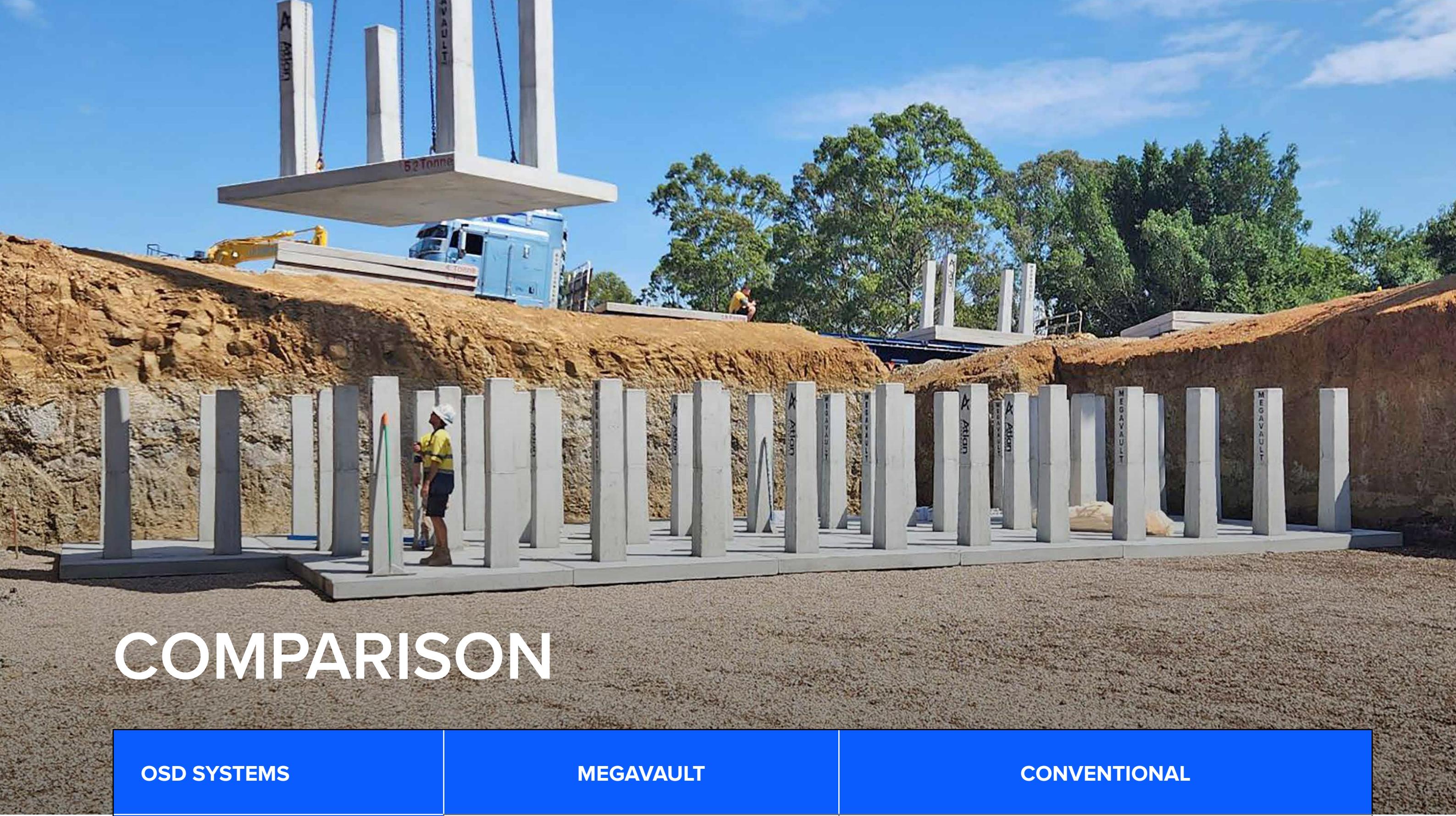
- Cost efficient construction
- Fast fabrication and installation
- Superior structural outcomes
- Improved site efficiencies & safe work practices
- Condensed OSD footprint
- Versatile depth capability
- Superior product quality

APPLICATIONS

This system allows for maximised use of available land by allowing the on-site stormwater detention to be located underneath development sites, carparks, driveways, or parklands.Open road SM1600 rated builds are available by request.

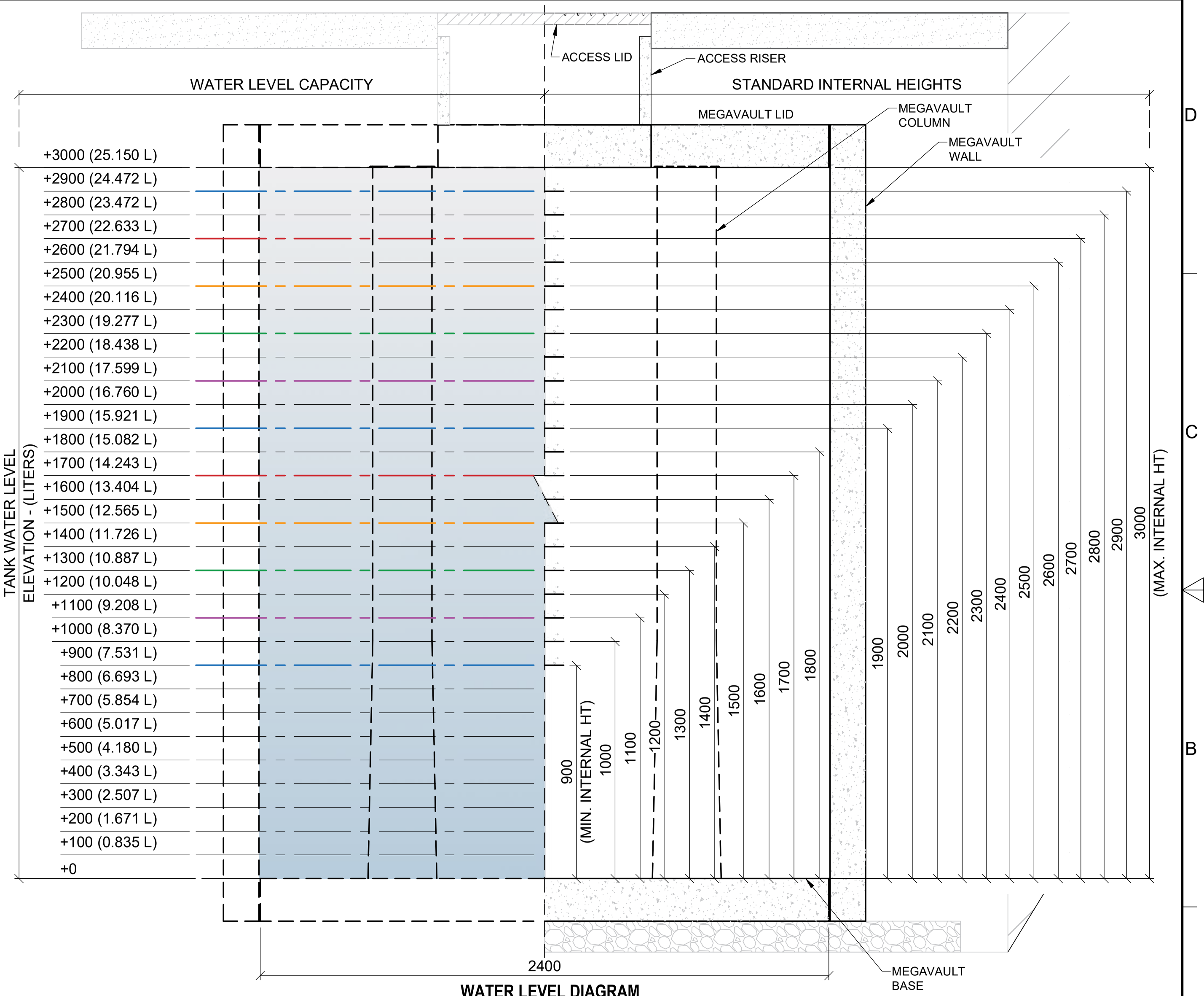
- Residential, commercial and industrial developments
- Retail sites
- Subdivisions
- Urban infrastructure

50 YEAR CONCRETE - DESIGN LIFE

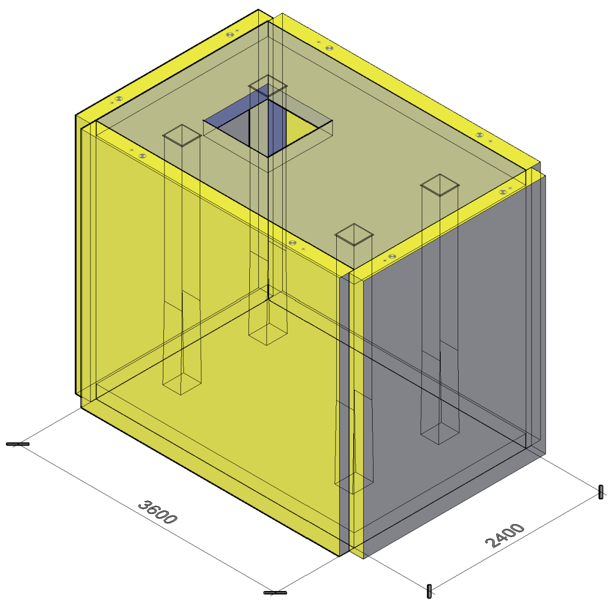


COMPARISON

OSD SYSTEMS	MEGAVAULT	CONVENTIONAL
STRUCTURAL ENGINEERING	All required structural certification provided by Atlan Stormwater and Engineering Partners minimising onsite inspections and increasing construction efficiency.	Structural engineering requires 'Hold Points' and visual inspection to ensure correct construction methods are achieved. Potential delays and risk of trade error is higher.
CONSTRUCTION PROGRAM EFFICIENCIES	Construction timeline savings of up to 90% can be achieved, with a guaranteed reduction of labour required on site.	Multiple trades required to complete the scope providing a slower construction timeline and increased risk of poor weather and delays.
SAFETY	Reduces the amount of labour required to complete the works. Significantly decreased open excavation time. Minimises the requirement of Confined Space Entry during tank construction.	Increased time with an open excavation due to increased sub-contractor involvement. Co-ordination on safety plans and inductions with increased involvement and supervision required. Exposed reinforcement contributing to trip hazards. Confined Space Entry is required.
ENVIRONMENTAL IMPACT	• Minimal construction waste. • Decreased excavation time. • Decreases risk of silt release. • No concrete truck washouts required.	• Increased construction waste from palletised construction materials to complete the scope. • Concrete truck washouts required.
QUALITY	Tanks constructed to ISO9001 Quality Standards. Atlan Stormwater engineering partners provide product 'sign-off'.	Hold points and visual sign off by the project Certified Engineers.
ORGANISATIONS REQUIRED	Atlan Stormwater offer a 'Turnkey' Solution from design and manufacture through to construction.	Multiple trades.



WATER LEVEL DIAGRAM



MEGAVAULT TANK SIZE

REVISION HISTORY

REV	DESCRIPTION	DRAWN	DATE	APPROVED
1	INITIAL ISSUE	C.C	26/01/2024	

Australian Registered Design No. 202315550.
International design rights pending.

DRAWN BY: C.C	DATE: 26/01/2024
CHECKED BY: G.T	DATE: 26/01/2024
VERIFIED BY:	DATE:
APPROVED BY:	DATE:
DRAWING REQUEST NUMBER:	

Atlan STORMWATER

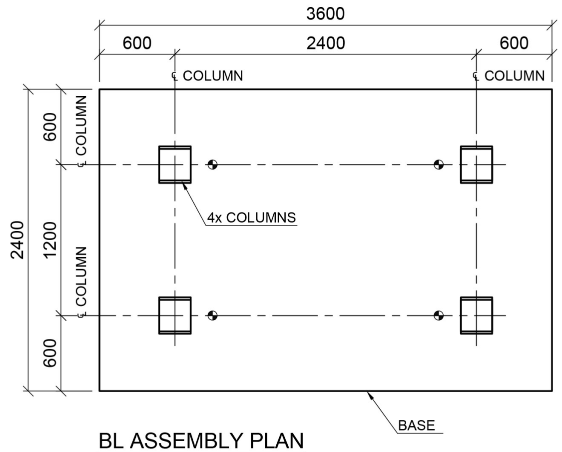
TITLE:
ATLAN MEGAVAULT
MEV.3624
MEGAVAULT TANK
GENERAL WATER LEVEL DIAGRAM

PROJECT:	SIZE:	SHEET:	REV:
MEGAVAULT	A3	1	1

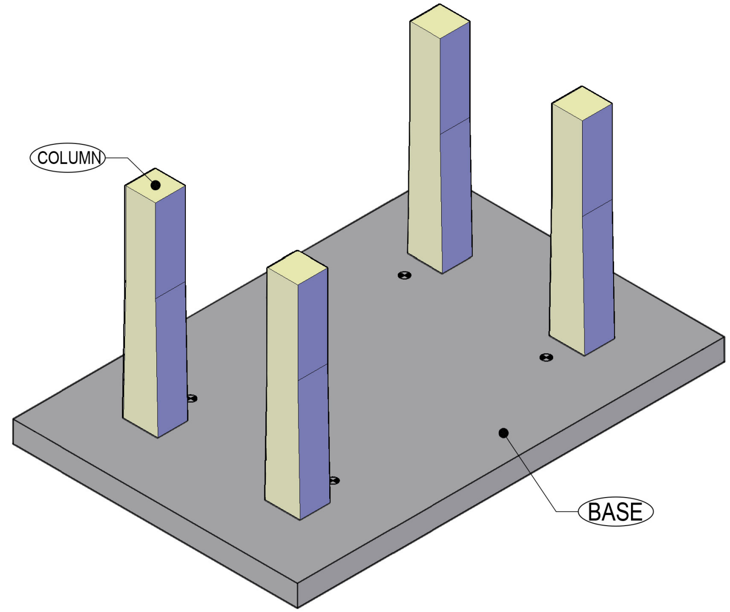
SCALE:	DWG No:
N.T.S	MEV.3624.3000.01

LIFTING REQUIREMENTS

BL ASSEMBLY:
- 4x 5t PSA LIFTING CLUTCHES SPREADER BEAM
- MINIMUM 3.5m LONG LIFTING CHAINS



BL ASSEMBLY PLAN



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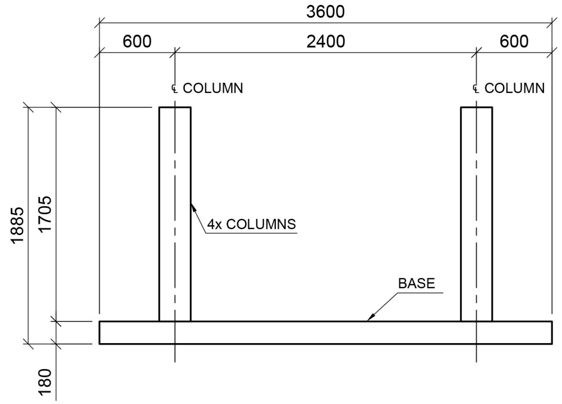
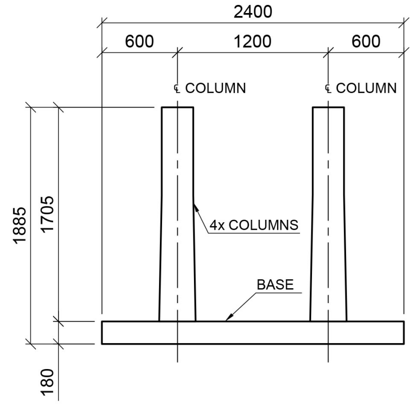


BL ASSEMBLY LONG ELEVATION



BL ASSEMBLY SHORT ELEVATION

BL 13-OFF

VOL.= 2.00 m³
WT. = 5.00 t.

" PSA LIFTERS OR EQUIVALENT TO BE USED "
50 MPa MINIMUM COMPRESSIVE STRENGTH OF CONCRETE.

REINFORCEMENT TAKE OFF.

CAST- IN ITEMS.

ISSUE FOR CONSTRUCTION

REVISION HISTORY

REV	DESCRIPTION	DRAWN	DATE	APPROVED
1	INITIAL ISSUE	R.D	13/11/2023	
2	GENERAL AMENDMENTS	R.D	30/11/2023	
A	ISSUE FOR CONSTRUCTION	D.J	11/12/2023	

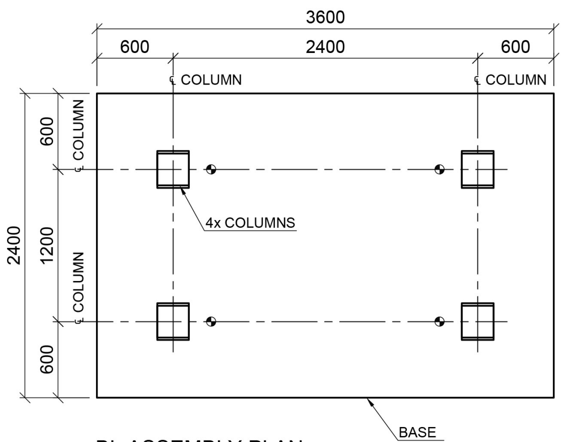
Australian Registered Design No. 202315550.
International design rights pending.

DRAWN BY: D.J	DATE: 11/12/2023
CHECKED BY: G.T	DATE: 11/12/2023
VERIFIED BY:	DATE:
APPROVED BY:	DATE:
DRAWING REQUEST NUMBER:	

Atlan STORMWATER

TITLE:
ATLAN MEGAVAULT
1x MEV.3624.1800, 13x MEV.3624.1700
MEGAVAULT TANK
BASE LEGS ASSEMBLY

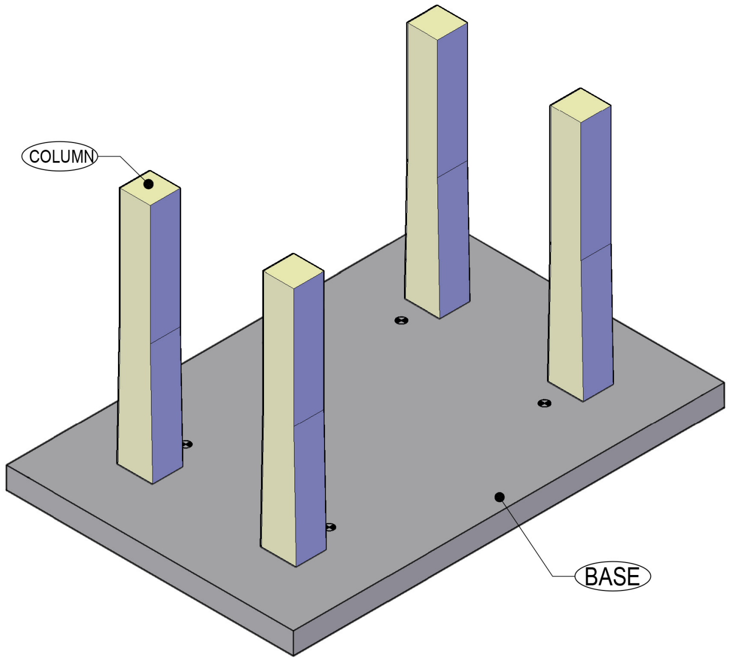
PROJECT:	SIZE:	SHEET:	REV:
64-72 WARNERS BAY RD, WARNERS BAY	A3	1	A
SCALE: N.T.S	DWG No: 210418.C.01.20.01		



BL ASSEMBLY PLAN

LIFTING REQUIREMENTS

BL ASSEMBLY:
- 4x 5t PSA LIFTING CLUTCHES SPREADER BEAM
- MINIMUM 3.5m LONG LIFTING CHAINS



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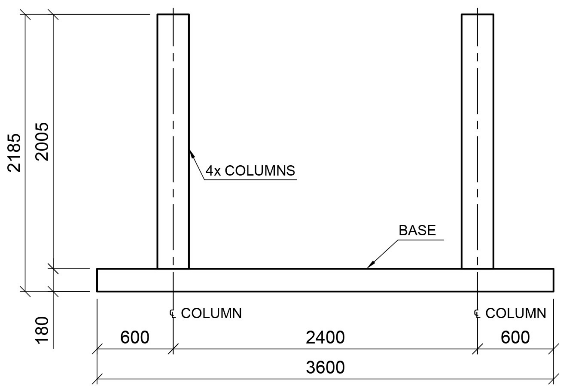
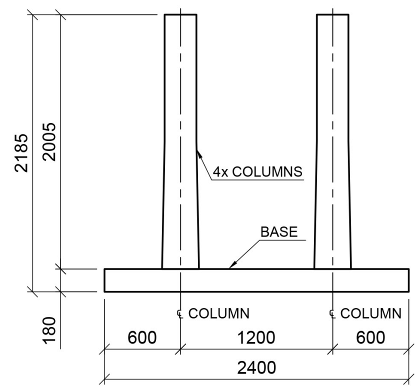


BL ASSEMBLY LONG ELEVATION



BL ASSEMBLY SHORT ELEVATION

BL 6-OFF

VOL.= 2.08 m³
WT. = 5.19 t.

" PSA LIFTERS OR EQUIVALENT TO BE USED "
50 MPa MINIMUM COMPRESSIVE STRENGTH OF CONCRETE.

ISSUE FOR CONSTRUCTION

REINFORCEMENT TAKE OFF.

CAST- IN ITEMS.

REVISION HISTORY

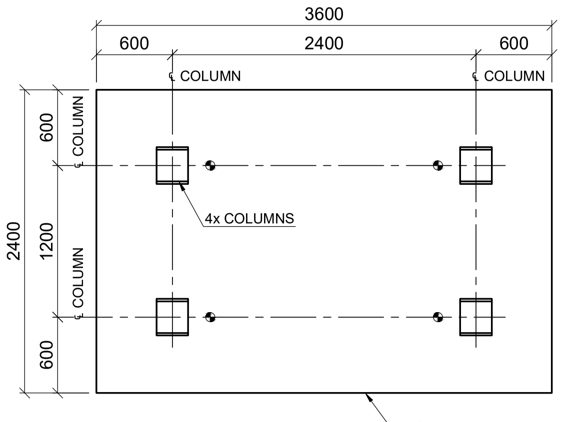
REV	DESCRIPTION	DRAWN	DATE	APPROVED
1	INITIAL ISSUE	D.J	06/11/2023	
2	ADDITIONAL FILTER AND WEIR	D.J	10/11/2023	
A	ISSUE FOR CONSTRUCTION	D.J	10/11/2023	

DRAWN BY D.J	DATE 06/11/2023
CHECKED BY G.T	DATE 06/11/2023
VERIFIED BY	DATE
APPROVED BY	DATE
DRAWING REQUEST NUMBER:	

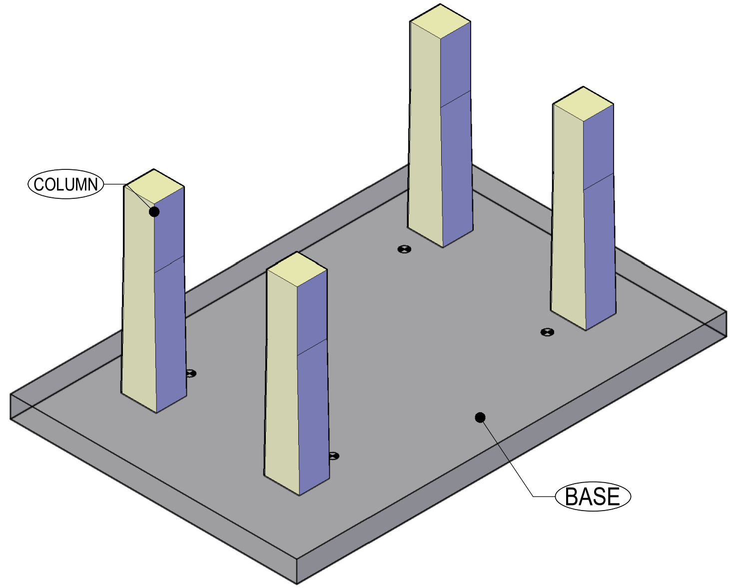
Atlan STORMWATER

TITLE:
ATLAN MEGAVAULT
6x MEV.3624.2000
MEGAVAULT TANK
BASE LEGS ASSEMBLY

PROJECT: LITTLE LOCALS RIPLEY	SIZE: A3	SHEET: 1	REV: A
SCALE: N.T.S	DWG No: 35685.C.01.20.01		



BL ASSEMBLY PLAN



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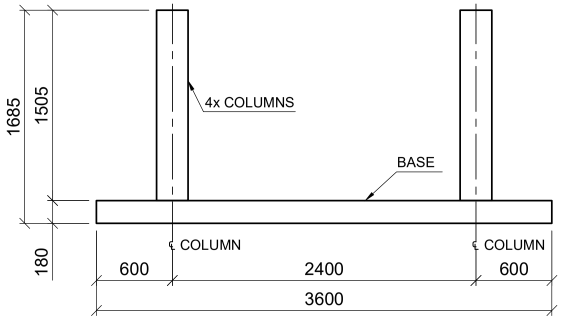
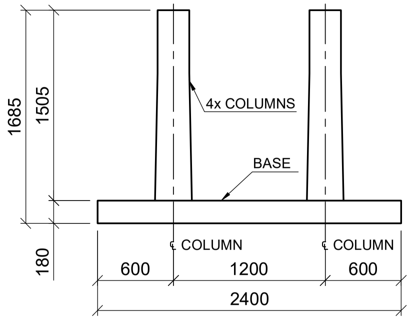


BL ASSEMBLY LONG ELEVATION



BL ASSEMBLY SHORT ELEVATION

REVISION HISTORY

REV	DESCRIPTION	DRAWN	DATE	APPROVED
1	INITIAL ISSUE	D.J	30/05/2024	

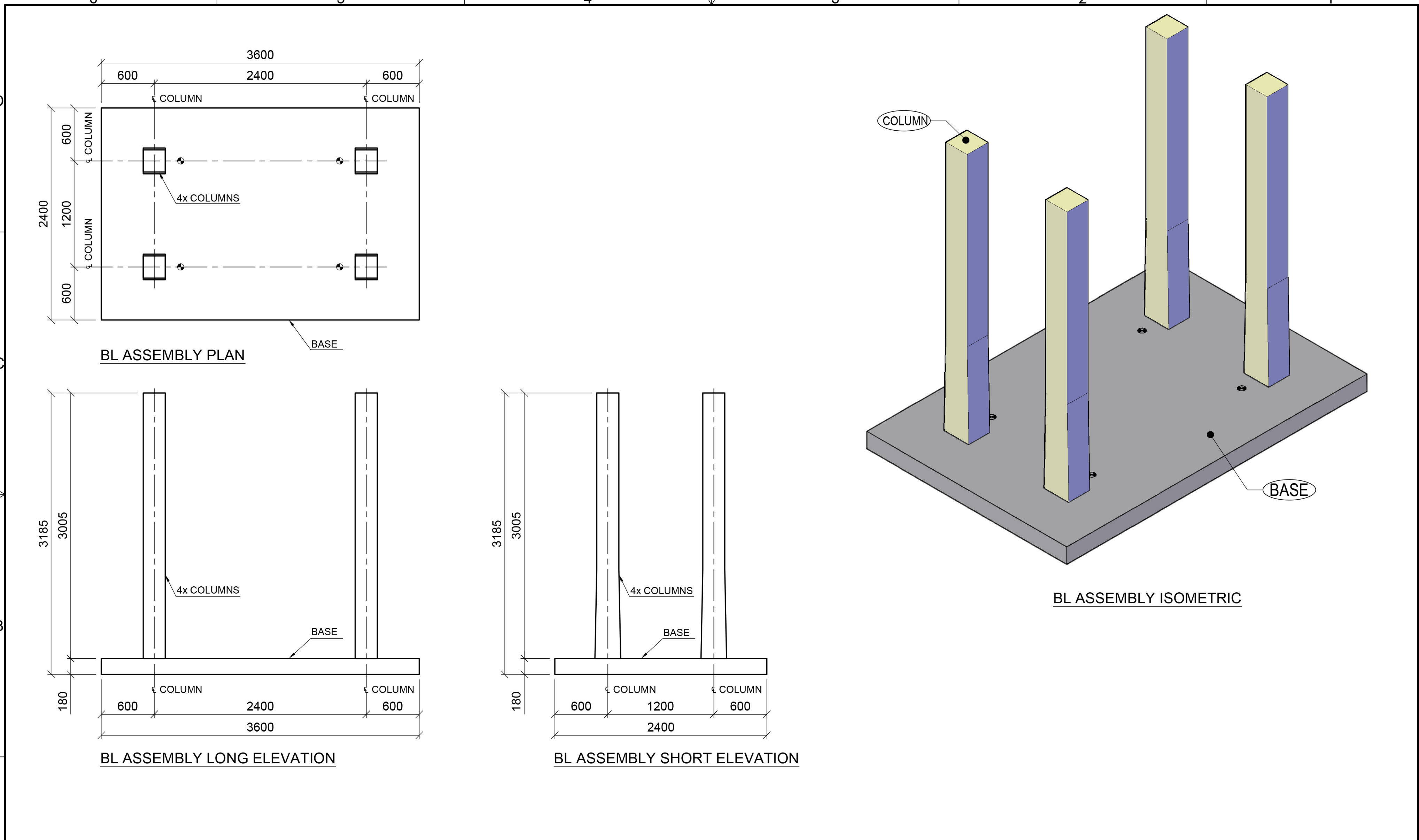
DRAWN BY: D.J	DATE: 30/05/2024
CHECKED BY: G.T	DATE: 30/05/2024
VERIFIED BY	DATE
APPROVED BY	DATE
WORKS ORDER NUMBER:	

Atlan STORMWATER

TITLE:
ATLAN MEGAVAULT
MEV.3624.1500
MEGAVAULT TANK
BASE LEGS ASSEMBLY

PROJECT:	SIZE:	SHEET:	REV:
1500 INTERNAL	A3	1	1

SCALE:	DWG No:
N.T.S	MEV.3624.1500.16



REVISION HISTORY

REV	DESCRIPTION	DRAWN	DATE	APPROVED
1	INITIAL ISSUE	C.C	05/12/2023	

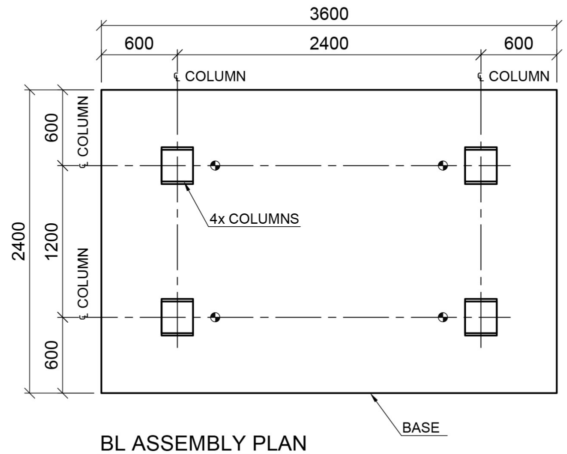
Australian Registered Design No. 202315550.
International design rights pending.

DRAWN BY	DATE
C.C	05/12/2023
CHECKED BY	DATE
G.T	05/12/2023
VERIFIED BY	DATE
APPROVED BY	DATE
WORKS ORDER NUMBER:	

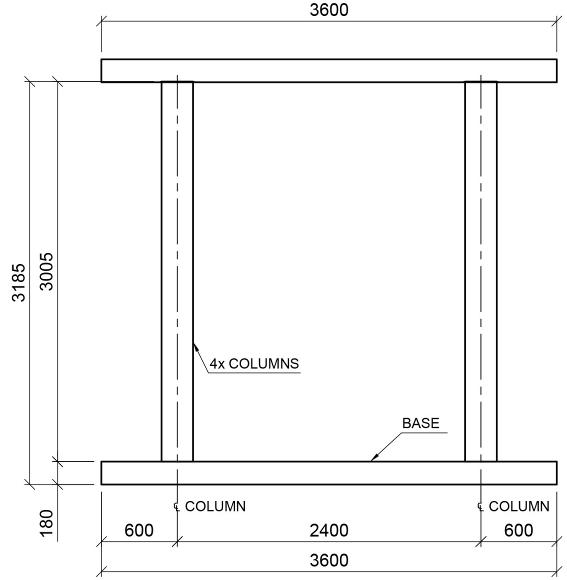
Atlan STORMWATER

TITLE:
ATLAN MEGAVAULT
MEV.3624.3000
MEGAVAULT TANK
BASE LEGS ASSEMBLY

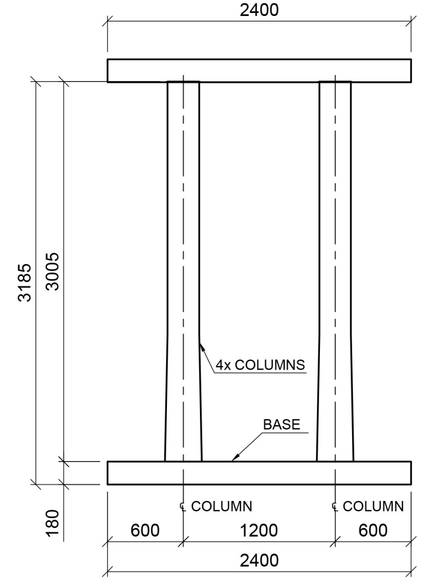
PROJECT: 3000 INTERNAL	SIZE: A3	SHEET: 1	REV: 1
SCALE: N.T.S	DWG No: MEV.3624.3000.01		



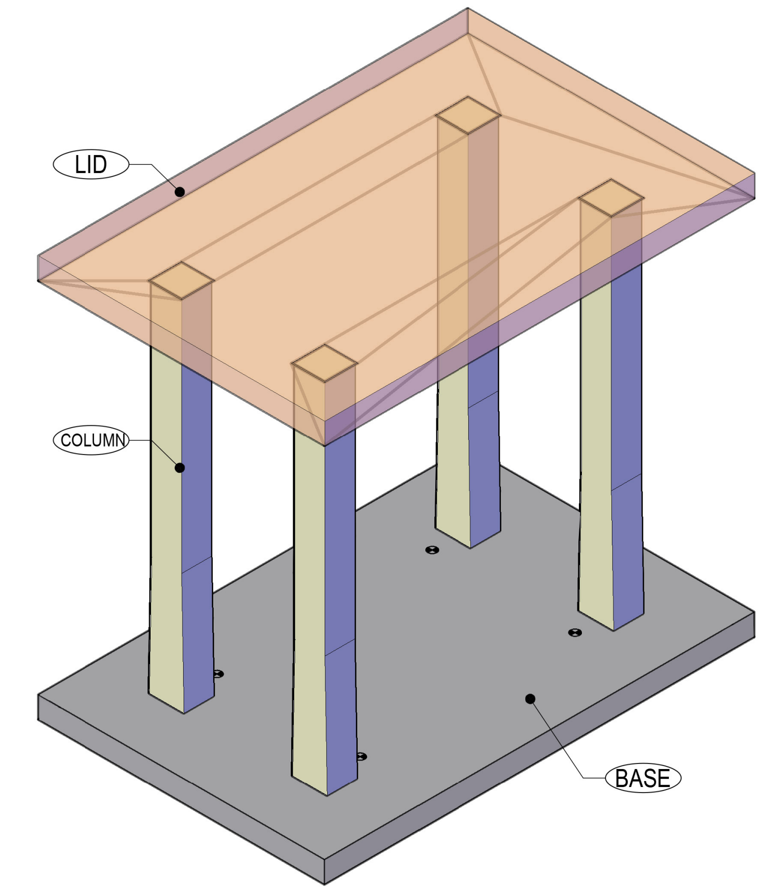
BL ASSEMBLY PLAN



BL ASSEMBLY LONG ELEVATION



BL ASSEMBLY SHORT ELEVATION



BL ASSEMBLY ISOMETRIC

REVISION HISTORY

REV	DESCRIPTION	DRAWN	DATE	APPROVED
1	INITIAL ISSUE	C.C	05/12/2023	

Australian Registered Design No. 202315550.
International design rights pending.

DRAWN BY	DATE
C.C	05/12/2023
CHECKED BY	DATE
G.T	05/12/2023
VERIFIED BY	DATE
APPROVED BY	DATE
WORKS ORDER NUMBER:	

Atlan STORMWATER

TITLE:
ATLAN MEGAVAULT
MEV.3624.3000
MEGAVAULT TANK
BASE LEGS ASSEMBLY

PROJECT:	SIZE:	SHEET:	REV:
3000 INTERNAL	A3	1	1

SCALE:	DWG No:
N.T.S	MEV.3624.3000.02

MegaVault

On-site Stormwater Detention System

Atlan STORMWATER

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0724

Vortceptor

Hydrodynamic GPT

SQIDEP VERIFIED
STORMWATER QUALITY IMPROVEMENT DEVICE EVALUATION PROTOCOL

Atlan
STORMWATER

atlan.com.au

Overview

The Vortceptor Gross Pollutant Trap (GPT) is a non-blocking vortex style separator that has a unique screen and treatment action producing low vortex conditions resulting in excellent pollution removal performance and resulting high water quality outcomes.

It separates and captures gross pollutants, sediments, silt, total suspended solids, some nutrients and oil and grease.

The single piece Vortceptor GPT is delivered to site fully assembled saving on installation time and crane costs. The fibreglass design can be installed in all types of trafficable zones, including vehicular truck (Class D).^

The Vortceptor is designed to meet requirements for a diverse range of applications. Designed with versatility in mind, these fibreglass reinforced polymer (FRP) GPTs are available in inline and offline configurations to meet your project specifications.

An offline configuration places the separation chamber adjacent to the diversion chamber. This allows bypass to occur and is beneficial in high flow rate applications.

In an inline treatment configuration, the diversion chamber and separation chamber are integrated – with the device situated 'inline' with incoming and outgoing flows. This is often beneficial for retrofit applications in existing drainage systems.

TESTED TREATMENT EFFICIENCIES*

POLLUTANT	EFFICIENCY
Gross Pollutants (GP)	100%
Total Suspended Solids (TSS)	93%
Total Phosphorus (TP)	86%
Total Nitrogen (TN)	49%

*Contact Atlan to confirm approved performance for the project LGA

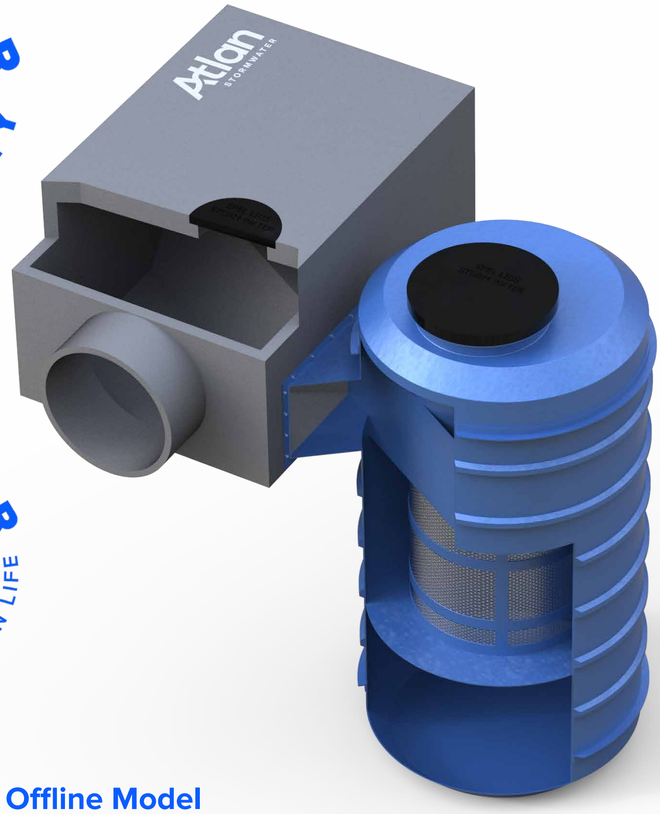

STORMWATER AUSTRALIA
Stormwater Quality Improvement Device Evaluation Protocol (SQIDEP)
VERIFICATION CERTIFICATE

Vorceptor is SQIDEP approved after passing Stormwater Australia's rigorous testing and performance assessment process.

Applications

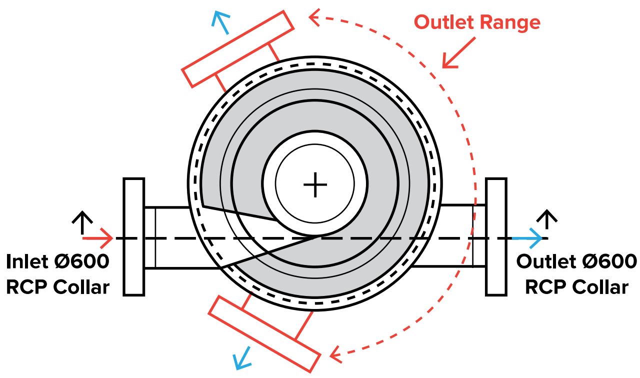
- Shopping Precinct
- Commercial Zones
- Recreational Grounds
- Industrial Areas
- Beaches & Park
- Residential Development

^ Subject to the installation of an engineered cast in situ concrete slab.



Inline Model

The Vortceptor Inline series is useful for constrained sites with a treatment flow rate that is relative to the bypass flow rates. The Inline Vortceptor has a flexible pipe configuration with the outlet pipe being able to rotate in excess of 180° around the system. The Inline Vortceptor is available with or without internal bypass to suit installation on low flow diversions.

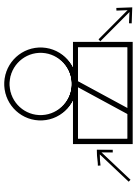


Offline Model

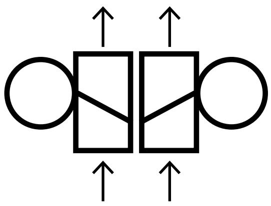
The Vortceptor Offline series is used when the bypass flows are high, or greater than the flows required to pass through the Inline range. There are various advantages of the Offline series including the ability to divert treated flow water to a tertiary asset independently to the bypassed stormwater and the ability to adjust the system to cater for trailwater and external catchments.

You can also include:

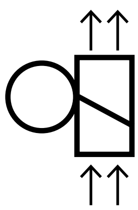
1. Angled inlet/outlet connections
2. Multiple pipes or culverts
3. Back to back twin units - for greater treatment flow requirements
4. Bifurcation or splitting of flows



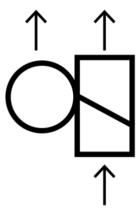
1. Angled up to 45°



3. Back to back units



2. Multiple pipes or culverts



4. Split treated/ bypass flow

Vortex Style GPT Inline Series

The Inline series is manufactured from the standard single tank dia below. Custom systems are also available.

Models	Dimensions (mm)					Capacities			
	Internal Diameter	Overall Width	Depth Below Invert	Manhole Size (mm)	Max Pipe Size (mm)	Sump Capacity (m^3)	Floatables Volume (m^3)	Treatable Flow Rate (L/s)	Max Flow Rate (L/s)
INLINE SERIES									
SVI.025 (L/R)	1200	1370	1400	600x 600	450	1.2	0.06	26	280
SVI.055 (L/R)	1800	1970	1650	900x 900	525	2.7	0.22	55	380
SVI.055.M (L/R)	2200	2370	1585		525	3.2	0.22	55	750
SVI.100/15 (L/R)	1500	1670	1900	1000 DIA Internal 600x 600	600	3.1	0.20	100	700
SVI.160/22 (L/R)	2200	2370	2400		750	3.4	0.39	160	940
SVI.200/22 (L/R)	2200	2370	2900		750	3.1	0.39	200	990
SVI.300/22 (L/R)	2200	2370	3100		750	4.5	0.83	300	1050
SVI.400/22 (L/R)	2200	2370	3000		750	3.4	0.83	400	1180
SVI.400/25 (L/R)	2500	2670	2900		900	5.5	0.83	400	1650
SVI.400/30 (L/R)	3000	3170	3500		900	10	1.5	400	2500
SVI.500/30 (L/R)	3000	3170	3500		1050	10	1.5	500	1650
SVI.500/35 (L/R)	3500	3670	4000		1050	10	1.5	500	1900

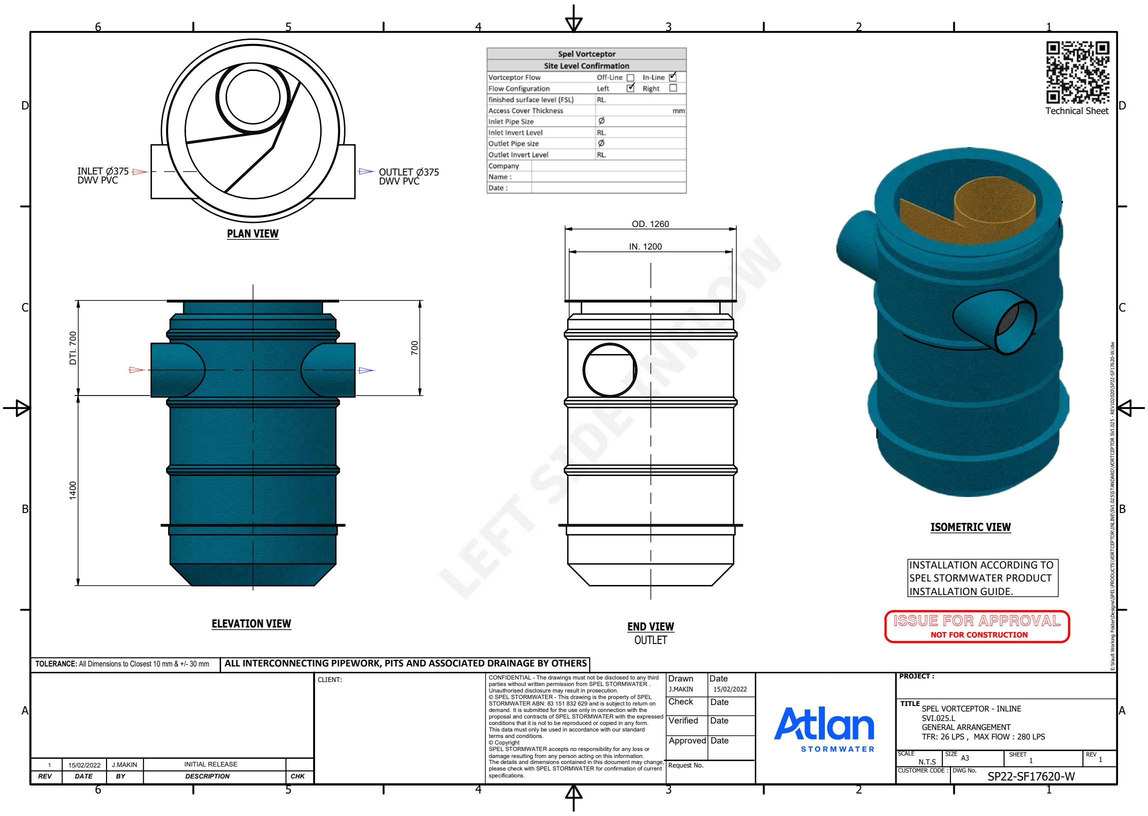
Vortex Style GPT Offline Series

The Offline series is manufactured from the standard single tank dia below. Custom systems are also available.

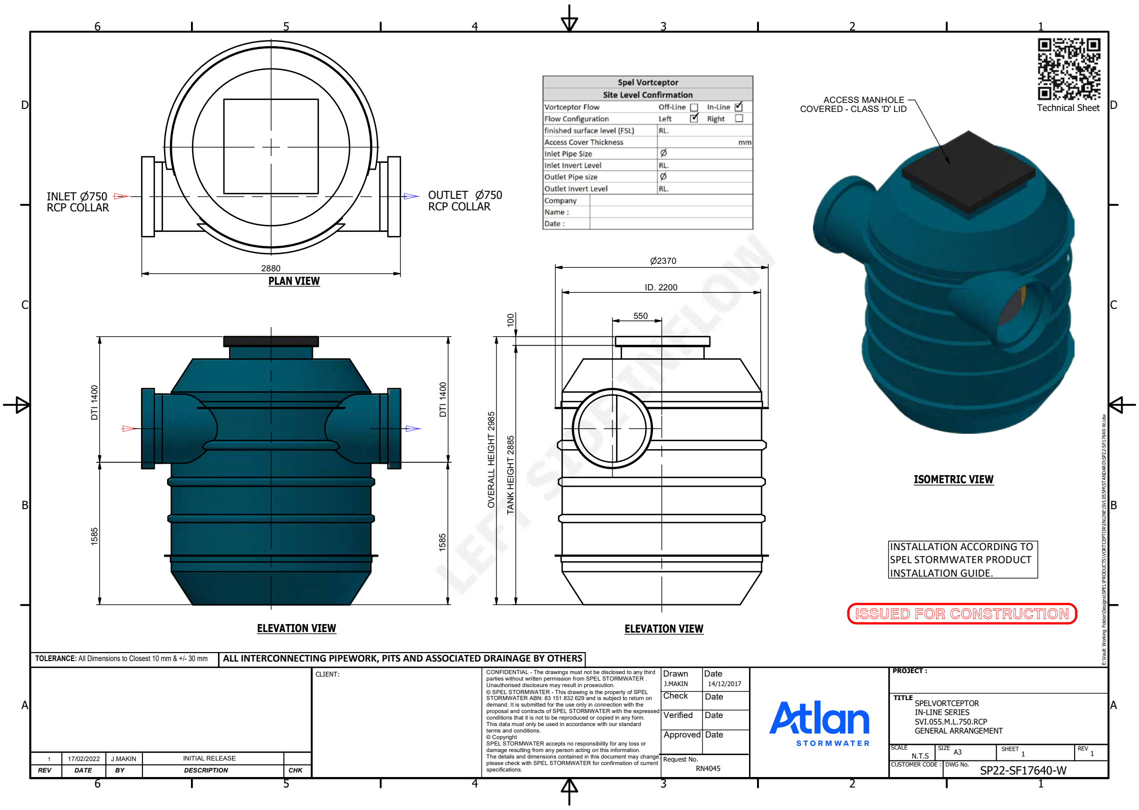
Models	Dimensions (mm)				Capacities			
	Internal Diameter	Overall Width	Depth below invert	Manhole Size (mm)	Sump Capacity (m^3)	Floatables Volume (m^3)	Treatable Flow Rate (L/s)	Bypass Flow Rate (L/s)
OFFLINE SERIES								
SVO.096 (L/R)	1500	1670	1725	1000 DIA Internal 600x600	2.0	0.35	96	PROJECT SPECIFIC DESIGN
SVO.140 (L/R)	1500	1670	2025		2.3	0.35	140	
SVO.180 (L/R)	1500	1670	2325		3.0	0.35	180	
SVO.220 (L/R)	2200	2350	2800		4.5	1.1	220	
SVO.360 (L/R)	2200	2350	3080		6.0	1.1	360	
SVO.530 (L/R)	3000	3150	3200		8.5	2.8	530	
SVO.800 (L/R)	3000	3150	4200		8.5	2.8	800	
SVO.810 (L/R)	4000	4150	3400		19.3	5.65	800	
SVO.1200 (L/R)	4000	4150	4000		19.3	5.65	1200	
SVO.1600 (L/R)	4000	4150	4600		19.3	5.65	1600	

INLINE DRAWINGS

Inline Model SVI.025

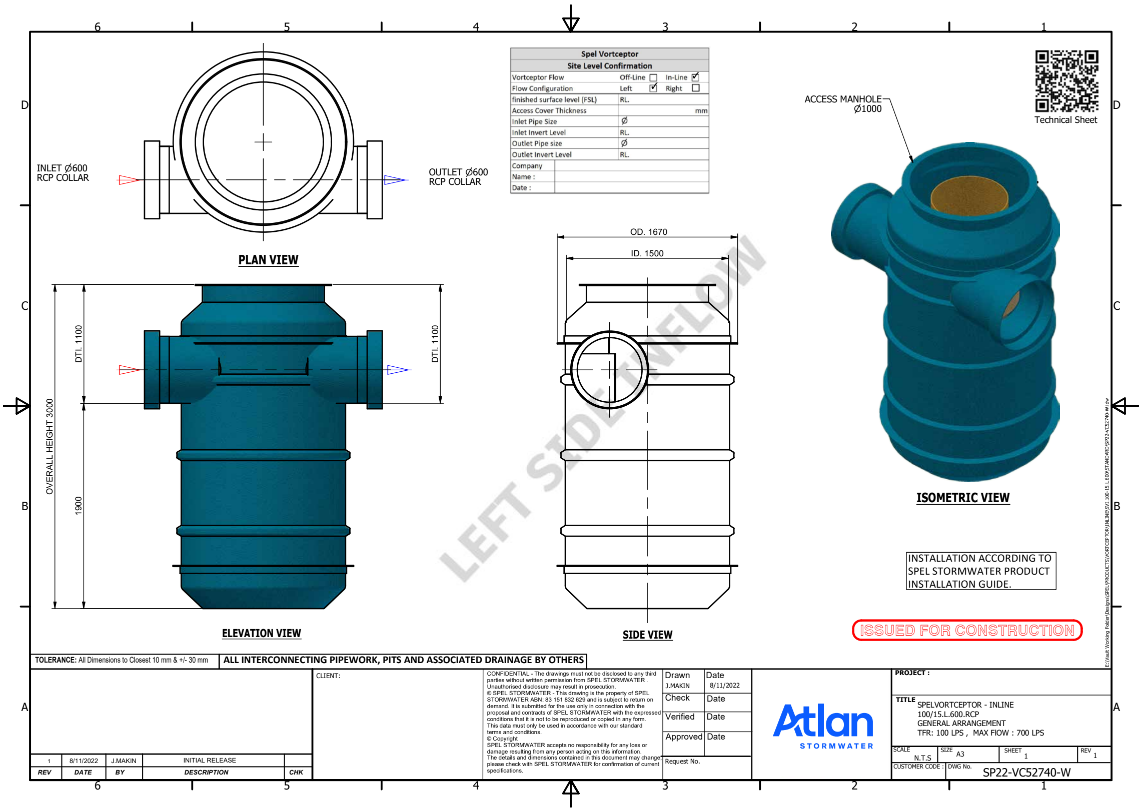


Inline Model SVI.055

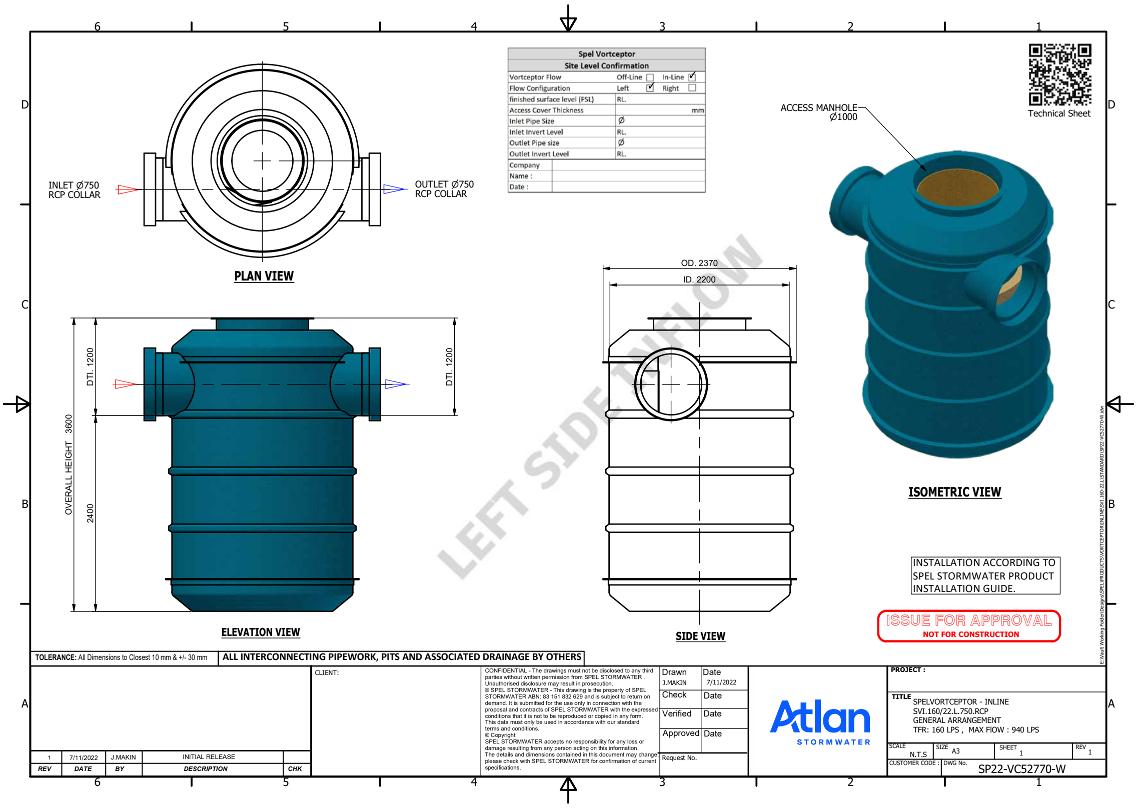


INLINE DRAWINGS

Inline Model SVI.100/15

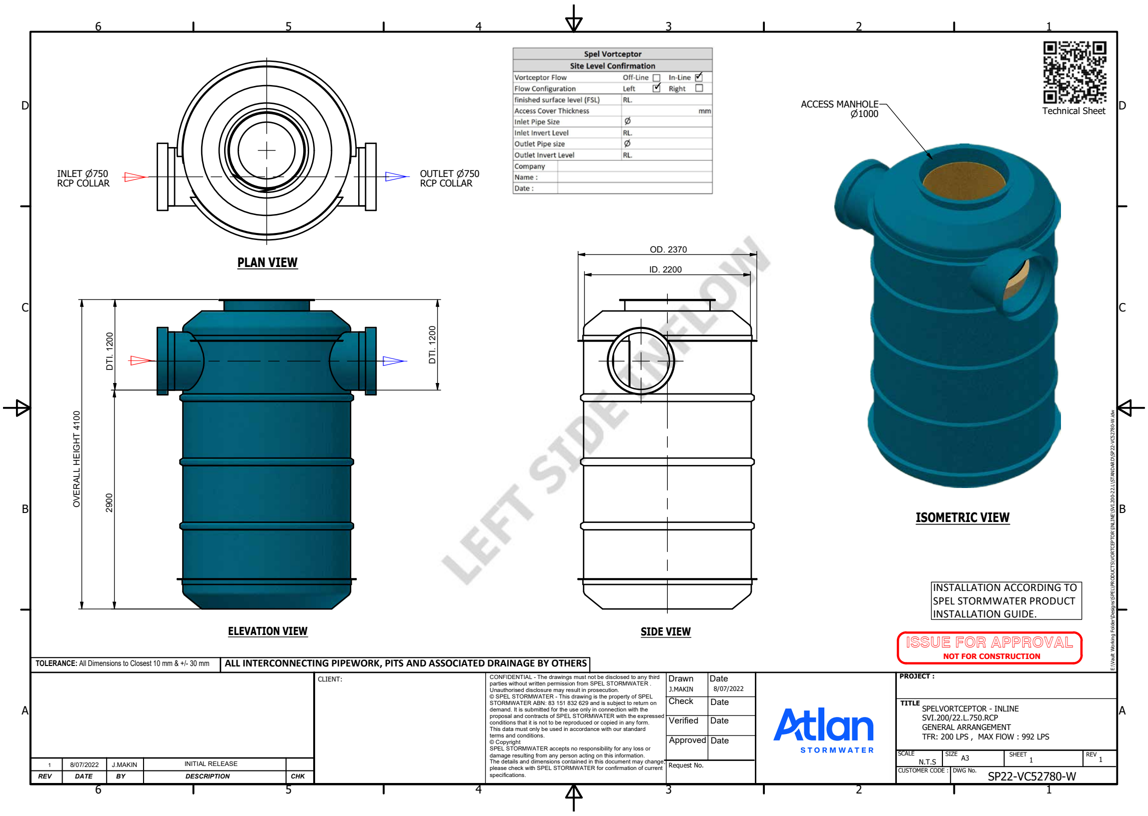


Inline Model SVI.160/22

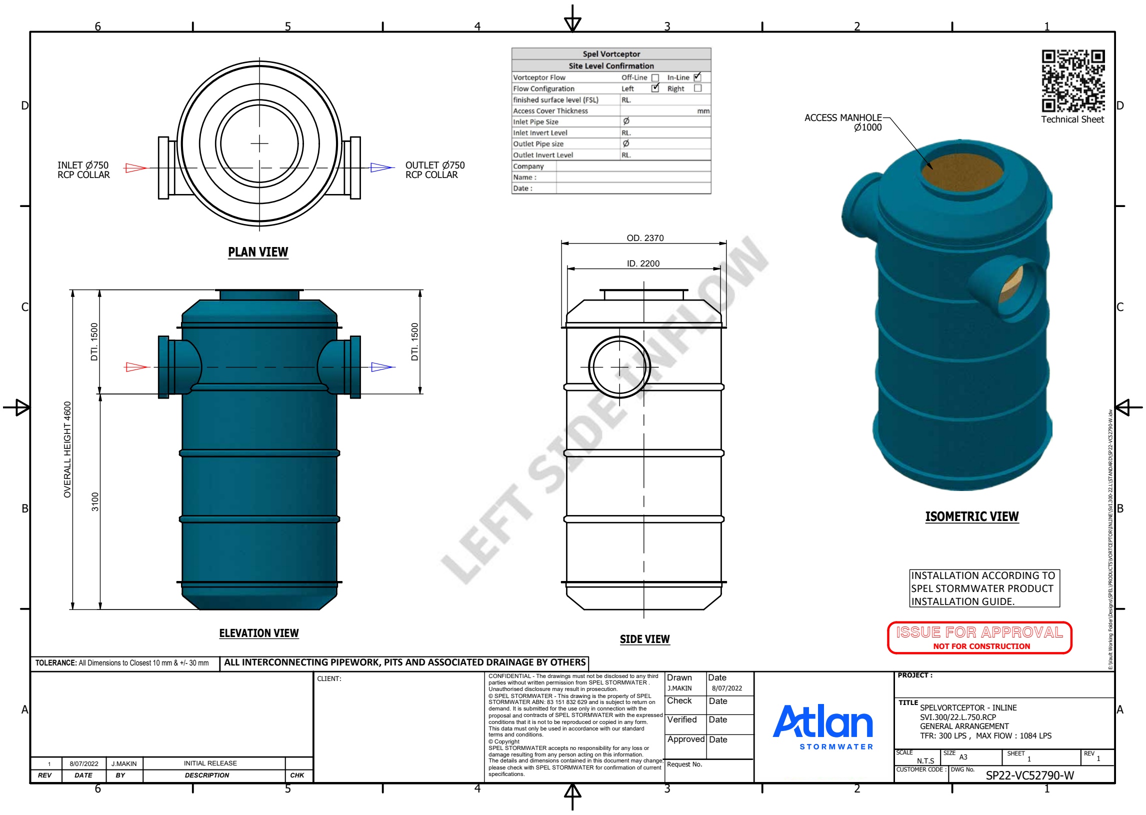


INLINE DRAWINGS

Inline Model SVI.200/22

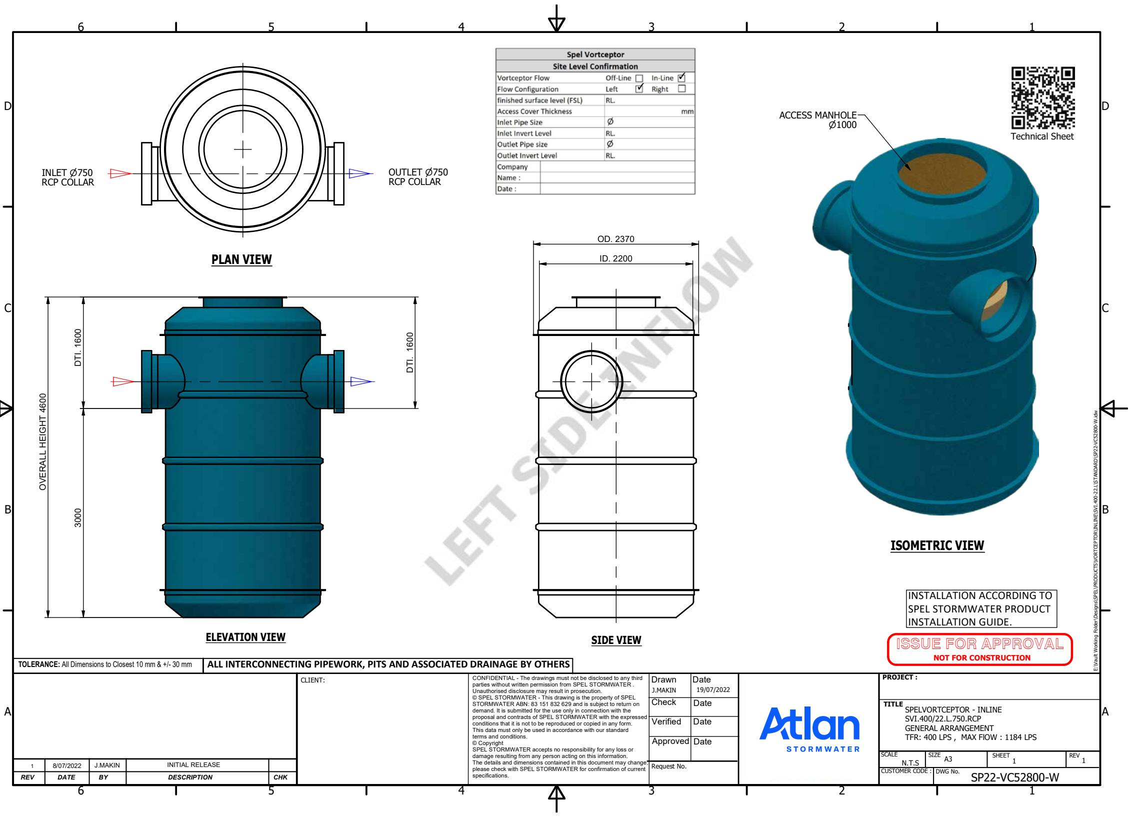


Inline Model SVI.300/22

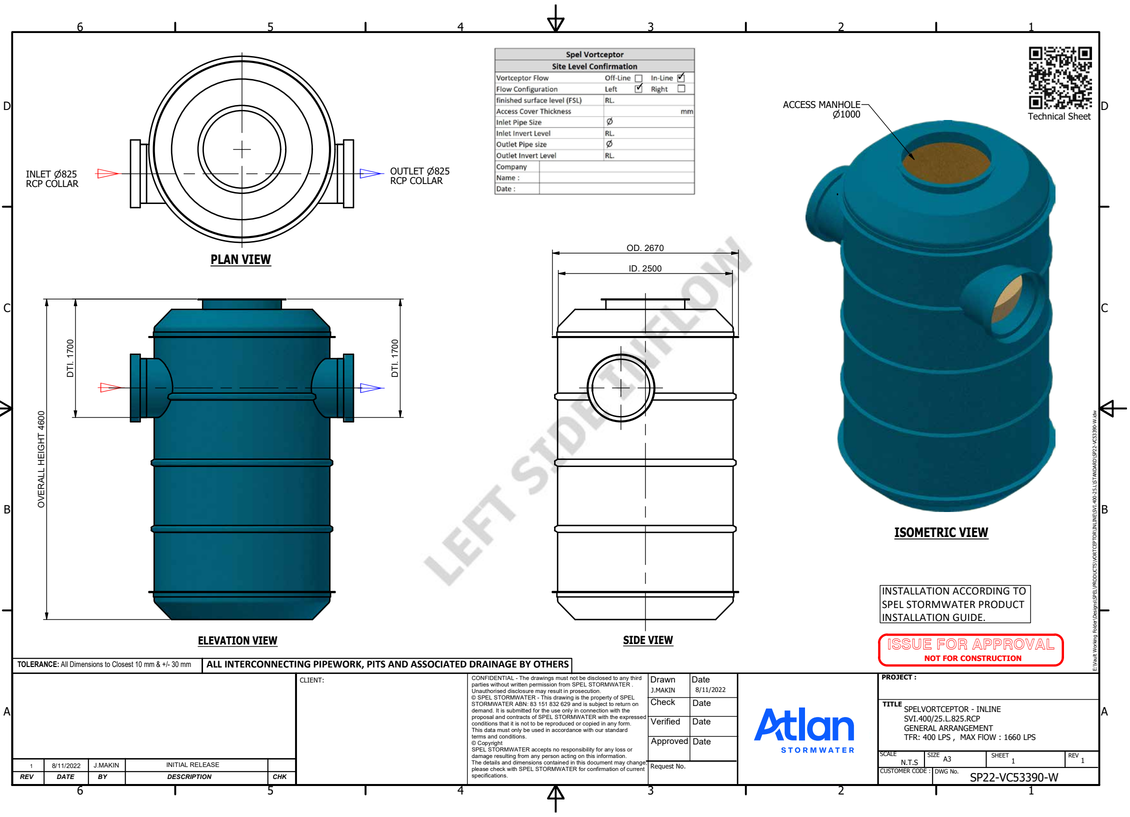


INLINE DRAWINGS

Inline Model SVI.400/22

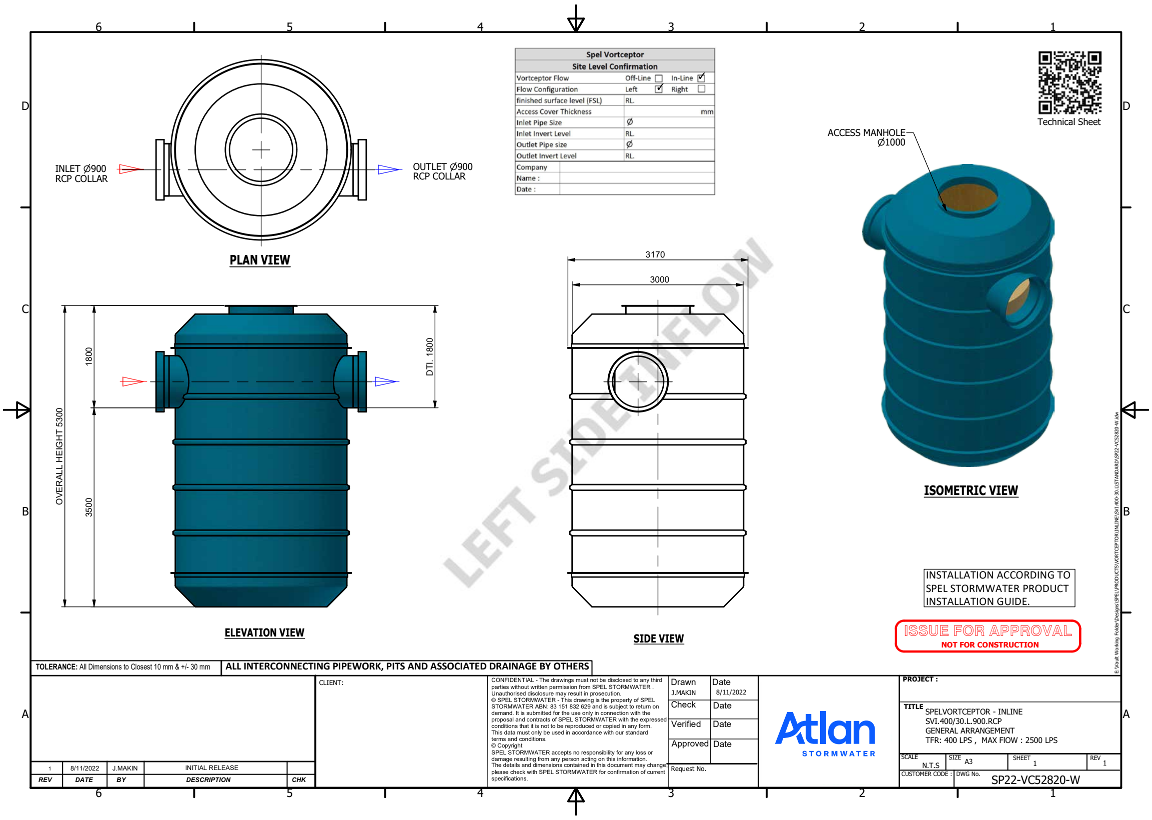


Inline Model SVI.400/25

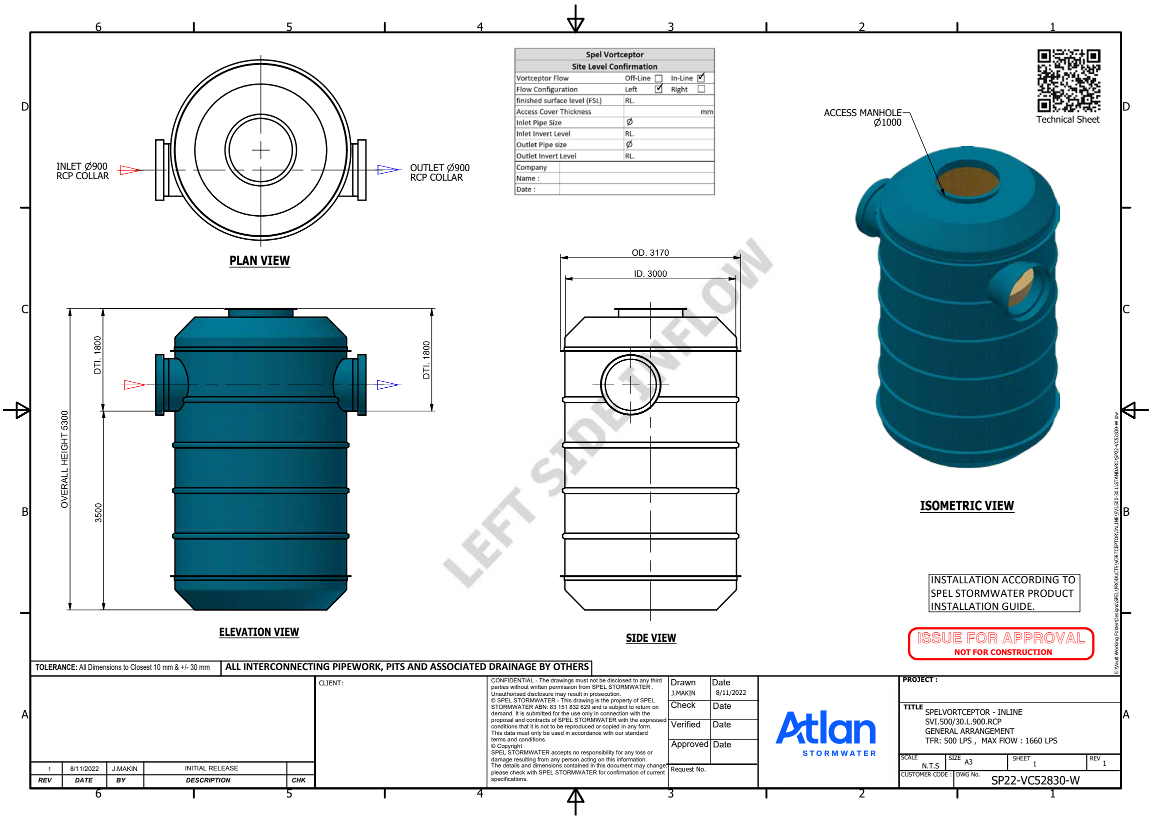


INLINE DRAWINGS

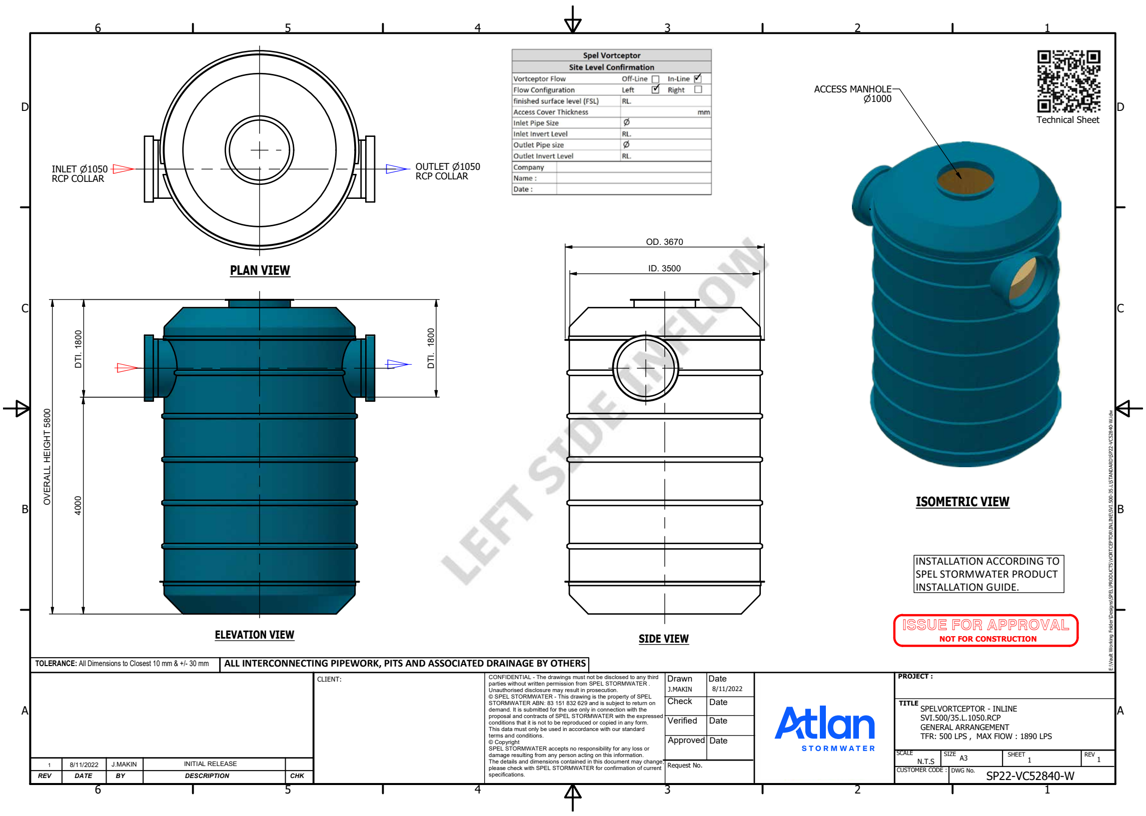
Inline Model SVI.400/30



Inline Model SVI.500/30

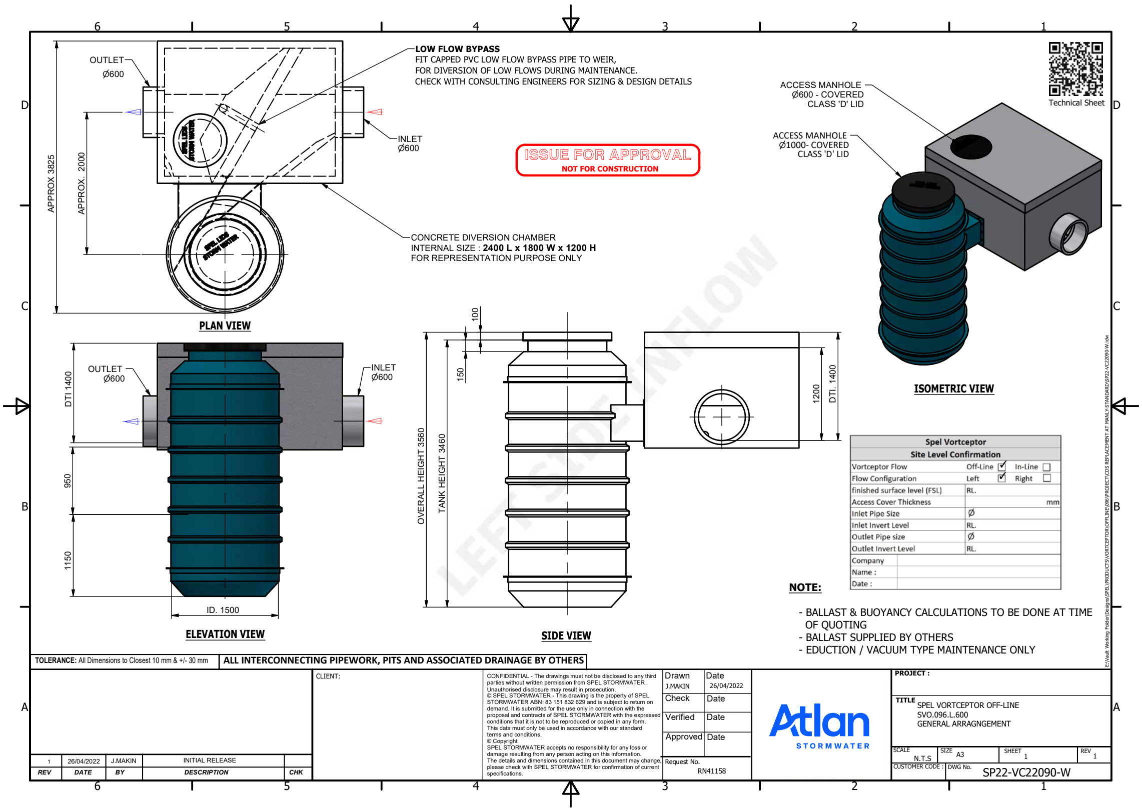


Inline Model SVI.500/35

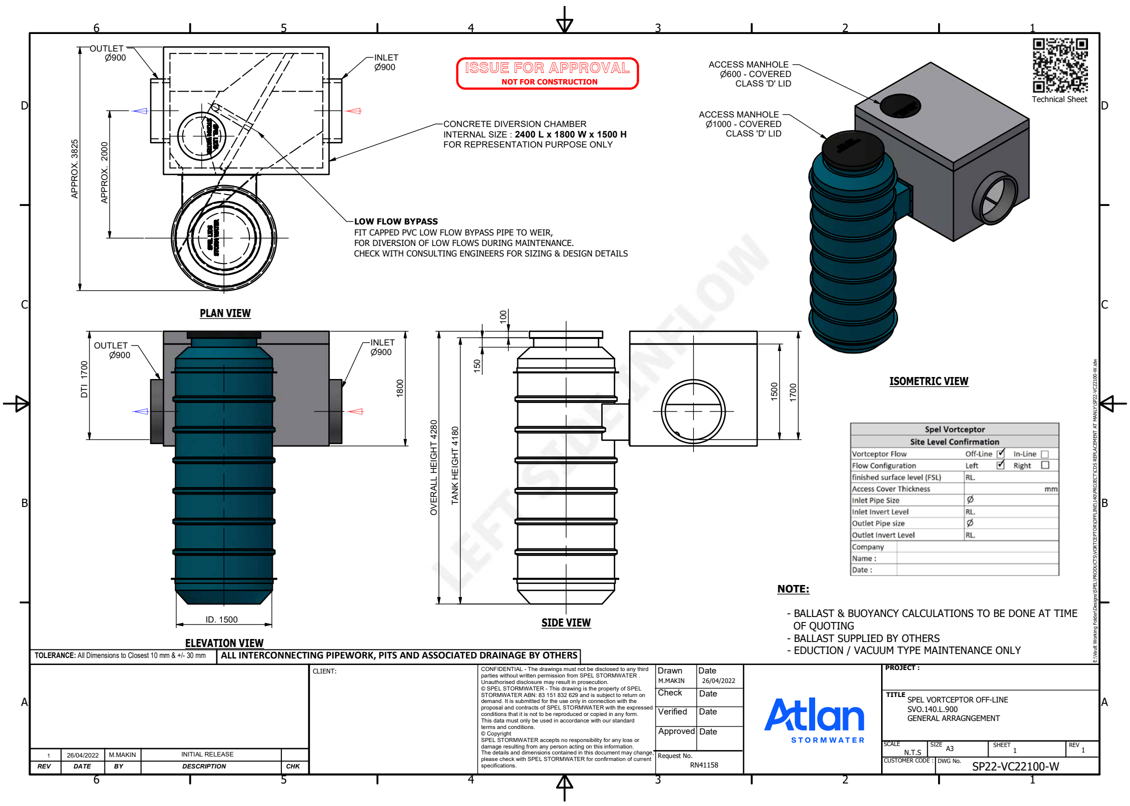


OFFLINE DRAWINGS

Offline Model SVO.096

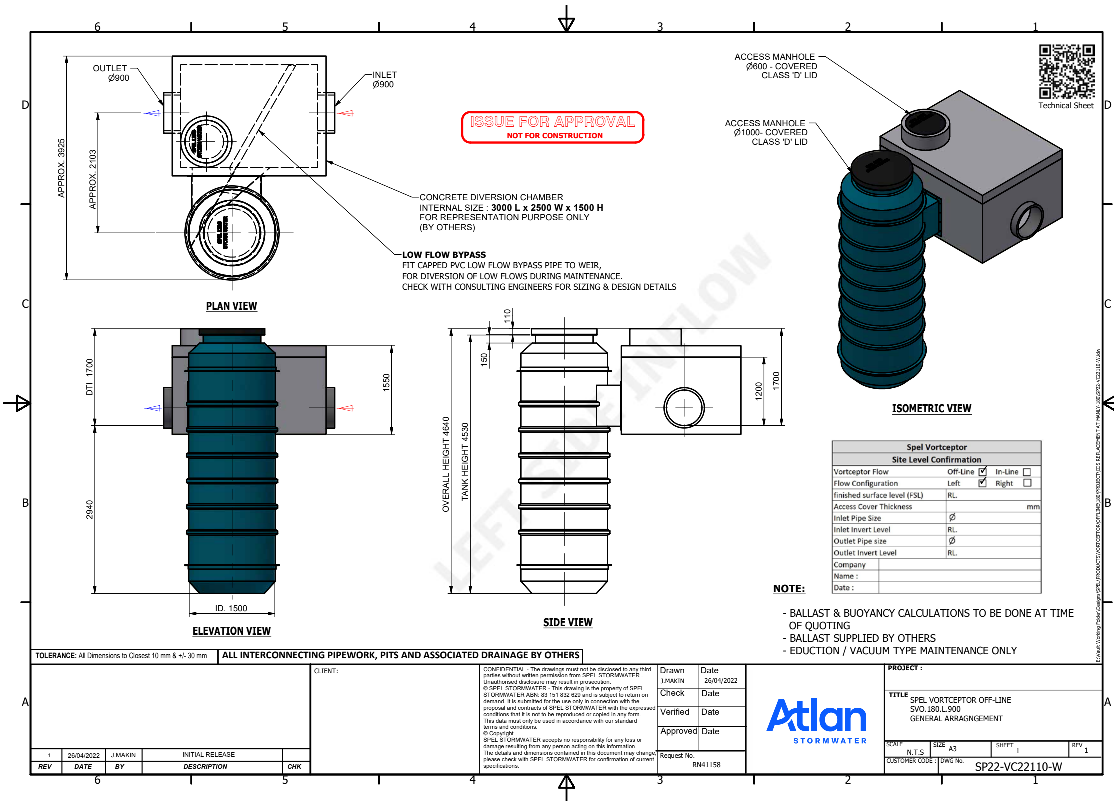


Offline Model SVO.140

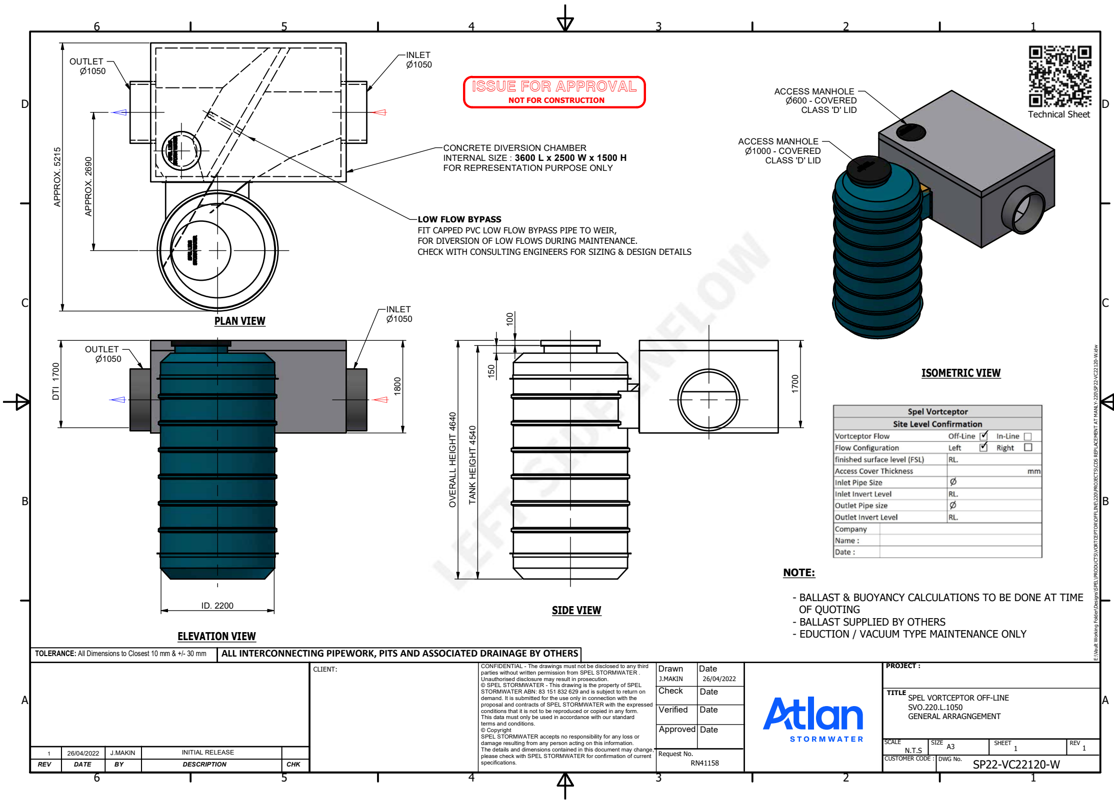


OFFLINE DRAWINGS

Offline Model SVO.180

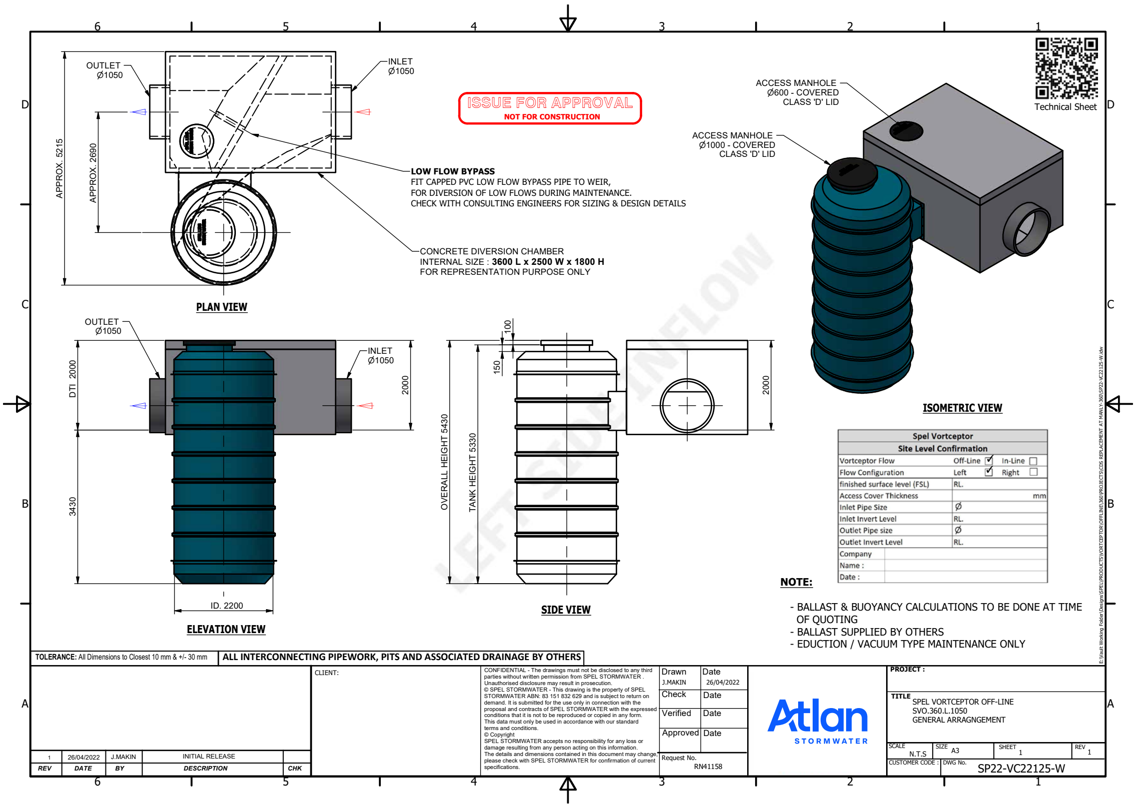


Offline Model SVO.220

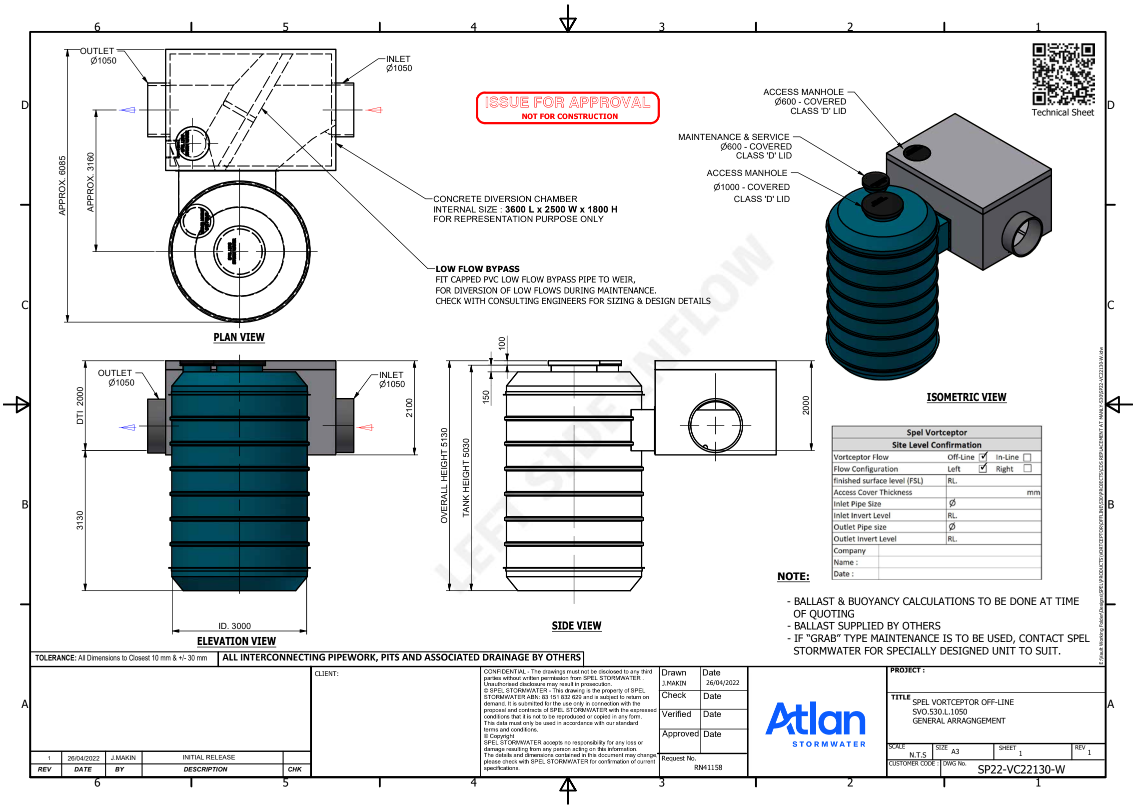


OFFLINE DRAWINGS

Offline Model SVO.360

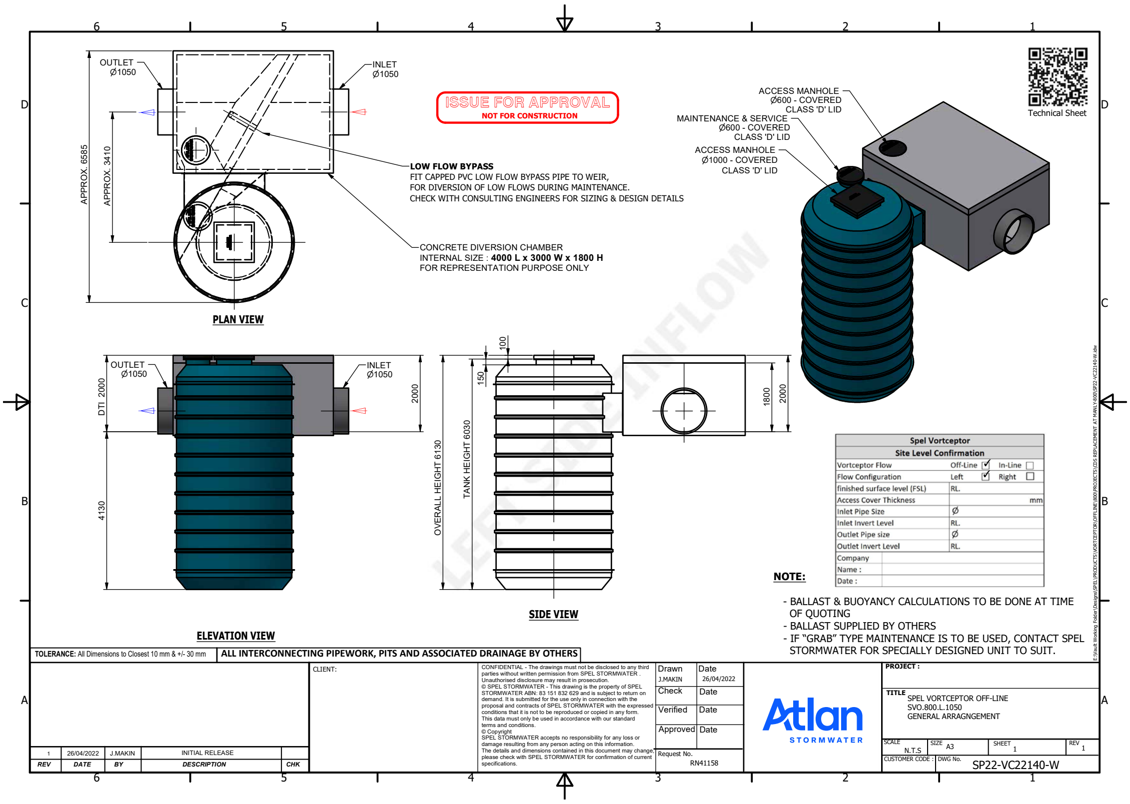


Offline Model SVO.530

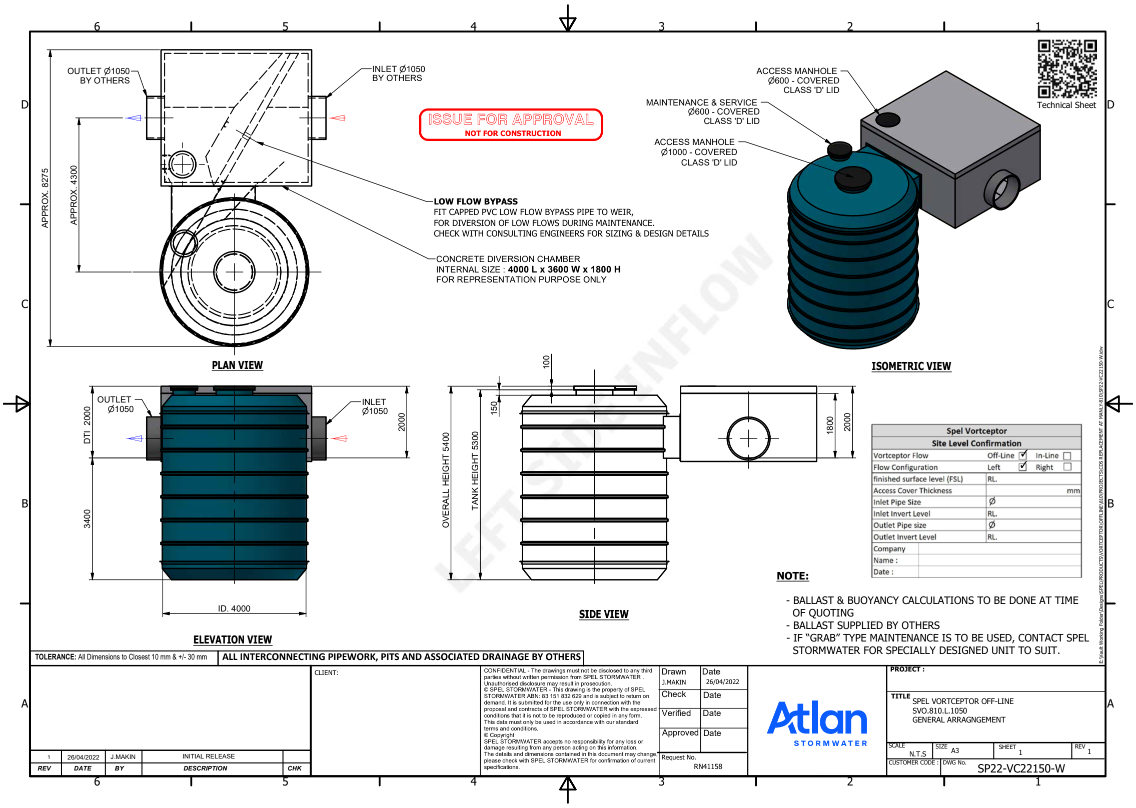


OFFLINE DRAWINGS

Offline Model SVO.800

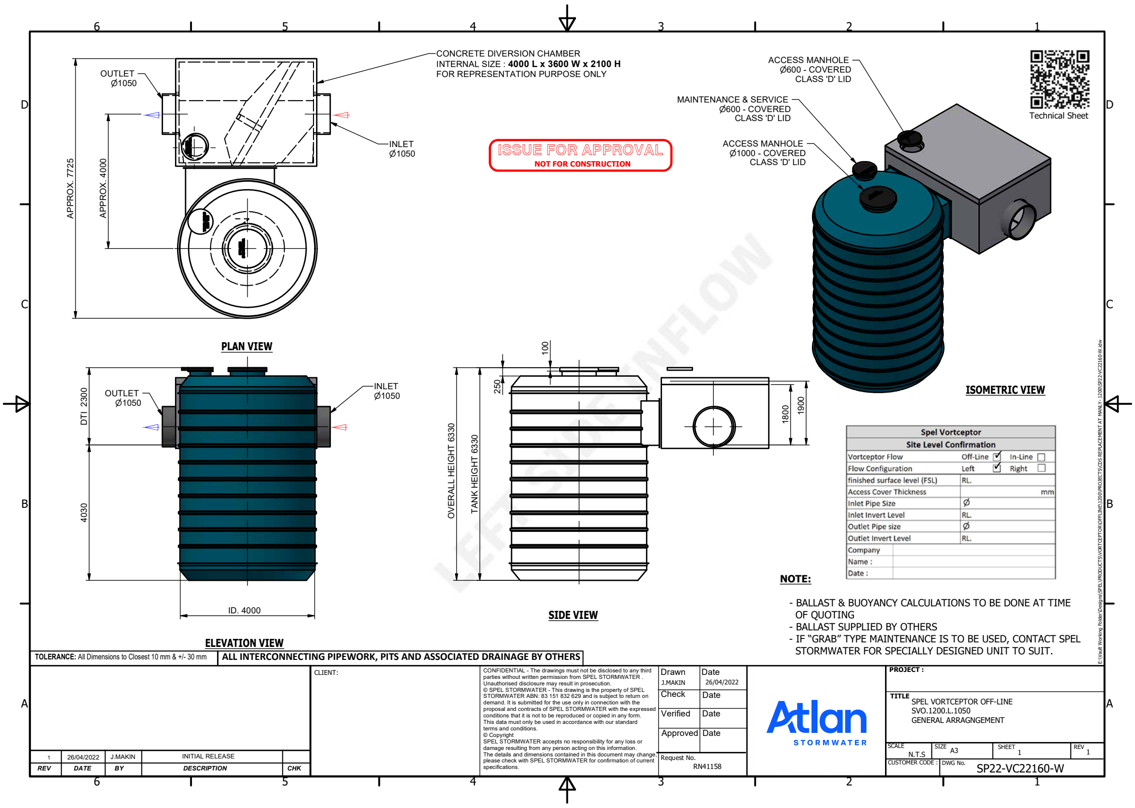


Offline Model SVO.810

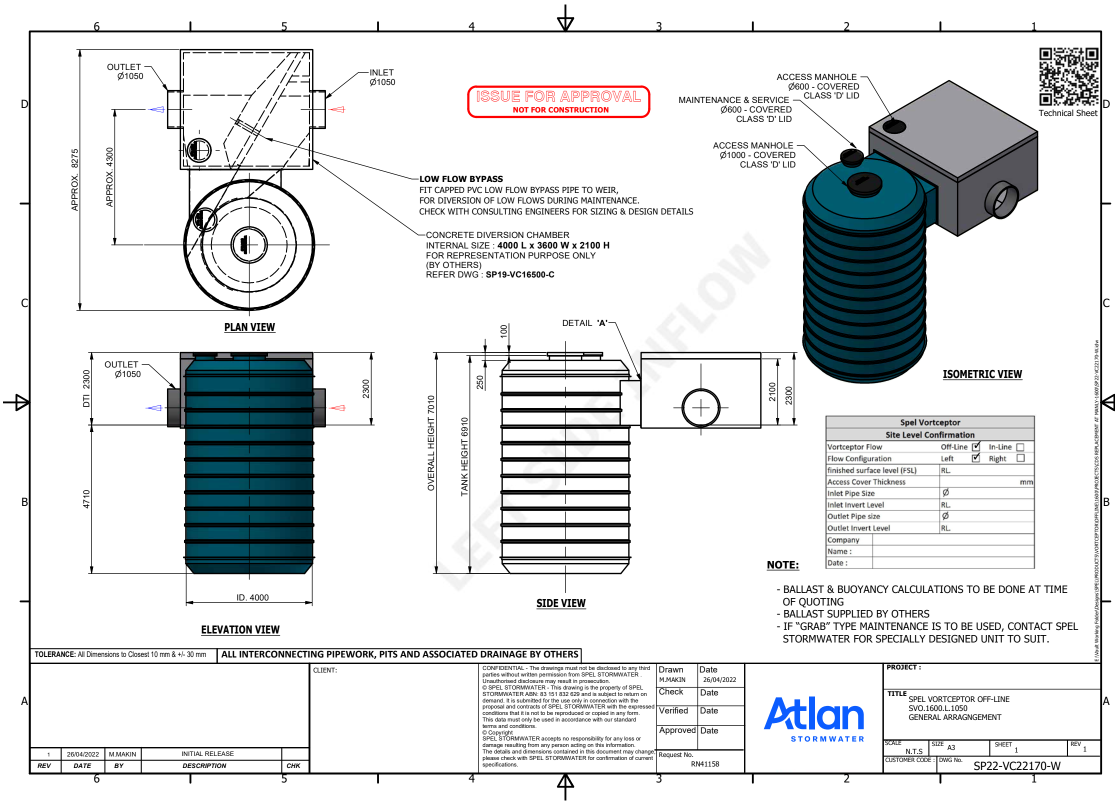


OFFLINE DRAWINGS

Offline Model SVO.1200



Offline Model SVO.1600

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