

Rodney Street, Ancoats

Verification Report & Maintenance Strategy

Curtins Ref: RODSTA-CUR-00-XX-T-C-92002

Revision: P03

Issue Date: 09 September 2025

Client Name: Wates Construction Ltd

Site Address: Land to the West of Rodney Street, Manchester, M4 6JJ

Rev	Description	Issued by	Checked	Date
P01	Draft Issue	JC	CS	24 March 2025
P02	Updated to suit as-built information received	JC	CS	18 June 2025
P03	Updated to suit as-built information received	JC	CS	09 September 2025

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Reviewed	Signature	Date
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Contents

1 Introduction	4
2 Drainage Strategy	6
3 Verification	7
4 General Maintenance	17

Appendices

Appendix A

As-built Drainage Information

Appendix B

United Utilities Approval - 03667830

Appendix C

Drainage Components Manufacturer's Information

1 Introduction

1.1 Project Background

Curtins have been appointed by Wates Construction Ltd to provide a verification and maintenance plan for the proposed below ground drainage design for Rodney Street, Ancoats, Manchester, M4 6JJ.

The report is based on currently available information and best practice guidance.

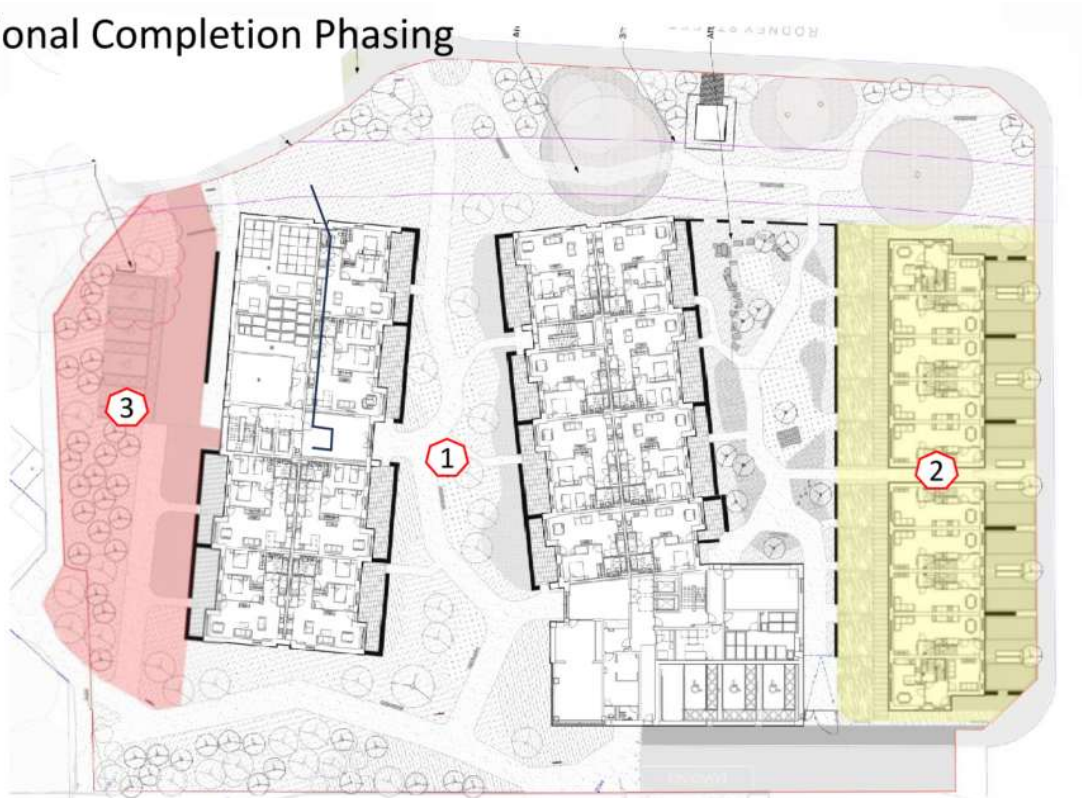
Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

The surface water network has been designed to accommodate the 1 in 100-year storm rainfall event plus 45% for climate change. As the flows are generally being attenuated on site features there will be a period of time after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs appropriate action should be taken.

Construction of the drainage network has been split into 3 phases, see figure 1. This report will verify the phases separately, as Curtins received the as-built information as each stage was completed.

Figure 1 – Phasing plan

Sectional Completion Phasing



1.2 Planning Condition

This report has been produced in order to satisfy the discharge requirements of Condition 5 which is as follows:

5) Notwithstanding the details submitted on the Flood Risk Assessment and Drainage Strategy (079056-CUR-00-XX-RP-D-92001, V02) stamped as received by the City Council, as Local Planning Authority, on the 20 June 2022 (a) the development shall not commence (other than enabling works including site clearance and service diversions) until a scheme for the drainage of surface water from the development has been submitted for approval in writing by the City Council as the Local Planning Authority. This shall include:

- Consideration of an alternative green SuDS solution (such as SuDS enabled street trees) if practicable;
- Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event with allowance for 45% climate change in any part of a building;
- Assessment of overland flow routes for extreme events that are diverted away from buildings (including basements). Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site.
- Hydraulic calculation of the proposed drainage system;
- Construction details of flow control and SuDS elements.

(b) The development shall then be constructed in accordance with the approved details, within an agreed timescale.

Reason - To promote sustainable development, secure proper drainage and to manage the risk of flooding and pollution pursuant to policies SP1, EN14 and DM1 of the Manchester Core Strategy (2012).

1.3 Scope of the Maintenance Strategy

This report demonstrates the below ground drainage which has been installed for the development site and provides product information to inform future maintenance requirements.

This manual is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details only. Where proprietary products are specified the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.

2 Drainage Strategy

2.1 General

The drainage network on site is a private drainage network.

The drainage network is a separate foul and surface water system within the development. Both systems discharge to the same outfall, a new manhole constructed on the public combined water sewer within Wadeford Close.

2.2 Foul Drainage

Proposed flows have not been determined in detail, however, based on Sewer Sector Guidance Appendix C Design and Construction Guidance for the Construction of Sewers cl. B3.1 we have assumed 4000 l/d/d (litres per dwelling per day). The peak foul discharge is therefore estimated as 5.92 l/s based on 128 dwellings. United Utilities has agreed that the foul water can discharge at an unrestricted rate.

The as-built drainage drawings are attached in the appendix A. The drawings show the completed foul drainage network for all 3 phases.

2.3 Surface Water Drainage

Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated for up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments and services.

Assessment was completed at preliminary design stage to confirm the most viable method of discharge was connection to the combined public sewer at a restricted rate.

The on-site surface water network is based on a gravity drainage system serving the site with a flow restriction.

The Surface Water network discharges into the existing public combined sewer within Wadeford Close via a new manhole at a restricted rate of 5.0l/s

The drainage network provides capacity to accommodate the volumes of surface water generated during the 1:100 year storm event + 45% allowance for climate change whilst maintaining the maximum flow restriction.

There are two below ground cellular attenuation tanks located on site. Attenuation Tank A, located in the north of the site, provides approximately 49m³ and Attenuation Tank B, located to the south of the site, provides approximately 155m³.

In addition to the attenuation tanks, SUD's features such as permeable paving and rain gardens have been provided throughout the site in an effort to reduce the quantity and rate that the surface water run-off enters the pipework.

The as-built drainage drawings are attached in the appendix A. The drawings show the completed surface drainage network for all 3 phases.

2.4 Approvals

The connection to the public sewer in Wadeford Close has been approved under a Section 106 Agreement referenced 03667830.

Correspondence with United Utilities is enclosed in Appendix B.

3 Verification

3.1 Introduction

The Verification section has been developed with reference to the drainage design details and philosophy provided in section 2 of this report. Manchester City Council requirements are to verify the installation of the drainage and SuDS to confirm by photographic record that this has been installed.

At the time when the first draft of this report was written, phase 1 had reached practical completion and phase 2 & 3 had been partially constructed and was to be completed at a later stage. The main drainage runs, and attenuation had been installed however rain gardens and permeable paving were yet to be installed. Construction of phase 2 & 3 has now been completed. The report has now been updated to include as-built information from all 3 phases.

The following elements have been recorded to date:

- Attenuation Tanks (2 No.)
- Flow Control Chambers (2 No)
- Permeable Paving
- Rain Gardens

A CCTV survey has also been provided along with as-built record information for part of the main drainage works to the site.

3.2 Photographic Information

Figure 2 - Attenuation Tank A Installation



Figure 3 - Attenuation Tank A Installation



Figure 4 - Attenuation Tank A Installation



Figure 5 - Attenuation Tank B Installation



Figure 6 - Attenuation Tank B Installation



Figure 7 - Attenuation Tank B Installation



Figure 8 - Attenuation Tank B Installation



Figure 9 – Flow control Manhole S05 Installation



Figure 10 – Flow control Manhole S27 Installation



Figure 11 – Permeable Paving installation



Figure 12 – Permeable Paving installation



Figure 13 – Rain Garden



Figure 14 – Rain Garden



Figure 15 – Rain Garden installation



Figure 16 – Rain Garden



Figure 17 – Rain Garden



Figure 18 – Rain Garde



3.3 CCTV Survey and As-built information

A CCTV Survey was completed on the installed drainage network in July 2024. The CCTV survey covers all drainage within Phase 1 and the main drainage runs within Phase 2 & 3.

The as-built surface and foul water CCTV drainage survey has been reviewed and indicates the drainage has been installed correctly.

The survey confirms at this time, the drainage network was in general good condition however there are 3 damaged pipes noted in the survey report.

The 3 damaged pipes are:

- Pop-up – F20 (Displaced joint)
- Pop-up – F22 (Deformed)
- Pop-up – F30 (Displaced joint)

We recommend the three damaged pipes are repaired to avoid ground contamination and blockages caused by the displaced joints.

There are a number of drains that have not been included in the CCTV report. A list of the drainage runs not included has been issued back to the contractor. It is recommended that a survey of the outstanding runs is completed prior to handover.

Following the completion of phase 2 & 3, it is also recommended that a CCTV survey is carried out on the new drainage runs to complete the survey of the sitewide network.

4 General Maintenance

4.1 Components

This section is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details. Where proprietary products are specified, the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.

The following components have been included within the drainage design for the proposed development:

- Inspection, Manhole and Catchpit Chambers
- Pipes
- Drainage Channels and Gullies
- Permeable Paving
- Attenuation Tank
- Flow Control Unit – Hydrobrake

The location of all drainage is indicated on Curtins drainage drawings enclosed in Appendix A.

A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.

It is assumed that the maintenance of the private drainage network will be the responsibility of an on-site facilities management team.

The surface water network has been designed to accommodate the 1 in 100 year storm rainfall event plus an allowance for 45% climate change particular to the requirements of the site. As the flows are generally being attenuated on site and within SuDs features there will be a period of time after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs appropriate action should be taken as noted below.

It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event.

Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

Long-term management practices include monthly sweeping of external paved areas. The sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilised during storm events and transported to the drainage system.

During the winter months, drainage features such as gullies and channels should be cleared of ice, snow, debris or litter.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the filter drains and the upstream/downstream chambers.¹

4.2 Inspection, Manhole and Catchpit Chambers

The locations of the chambers are indicated on Curtins drainage drawings RODSTA-CUR-XX-XX-DR-C-92500 Drainage Layout

Access points have been located at the head of each run, at a change in direction and at a change of pipe size in accordance with Building Regulations Part H.

The appropriate barriers and signage should be installed during any opening of manholes to warn site users/pedestrians.

When accessing chambers, the latest Health and Safety legislation should be adhered to.

The appropriate health and safety equipment must be used when accessing manholes. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the Facilities Maintenance Manager prior to any access.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Initial inspection should be provided as post construction CCTV survey.	N/A
	Inspect for evidence of poor operation via water level in chambers. If required take remedial action.	3-monthly, 48 hours after large storms.
Occasional maintenance	Check and remove large vegetation growth near pipe runs.	6 monthly
Remedial actions	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.

4.3 Pipes

The locations of the pipes are indicated on Curtins drainage drawings RODSTA-CUR-XX-XX-DR-C-92500 Drainage Layout

Pipes are proprietary products, and the materials can vary across the site and as such where used the manufacture's recommendations should be followed. Regardless of the product used the pipes are fully compliant with the Curtins drainage specification.

Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleansing where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.

Access for maintenance is provided through access chambers and manholes.

Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection should be provided as post construction CCTV survey.	N/A
Regular maintenance\ inspection	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Check and remove large vegetation growth near pipe runs.	Monthly or as required
Remedial Action	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.

4.4 Drainage Channels and Gullies

The locations of the drainage channels and gullies are indicated on Curtins drainage drawings RODSTA-CUR-XX-XX-DR-C-92500 Drainage Layout

Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details.

Channels and gullies installed have removable covers to allow cleaning and clearing of debris and silt.

Channel units can be cleaned through the use of a high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.

The appropriate barriers and signage should be installed during any opening of gullies/channel outlet boxes to warn site users/pedestrians.

Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers are allowed to move within their frame, this may cause damage to the frame or seating.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the car park drainage.

Manufacturers information is enclosed in Appendix C.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection.	Half yearly and after large storms.
Regular maintenance\ inspection	Litter and debris removal	Monthly or as required.
	Check and remove large vegetation growth near gully gratings.	Monthly or as required
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	3-monthly, 48 hours after large storms.
Remedial Action	Inspect sumps and outlet pipes and rod through poorly performing channels and outlets as initial remediation.	As required.
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action. Inspect silt accumulation rates and establish appropriate brushing	3-monthly, 48 hours after large storms.

	frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	
Regular maintenance\ inspection	Brushing and Vacuuming	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required and as per landscape architect's specification.
	Removal of weeds	As required.
Remedial Action	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure. This could include replacement of the jointing and bedding material. The upper geotextiles layer may also need replacing if clogged and Terram 1000 has a life span of 25 years.	As required (if infiltration performance is reduced as a result of significant clogging).

4.5 Permeable pavements

The location of the permeable pavements are indicated on Curtin's drainage drawings RODSTA-CUR-XX-XX-DR-C-92500 Drainage Layout

The pavement should be inspected regularly for clogging, litter, weeds and water ponding, preferably during and after heavy rainfall to check effective operation. Permeable pavements need to be regularly cleaned of silt and other sediments to preserve their infiltration capacity. The SuDS Manual indicates that sweeping once per year is sufficient for most sites, however the sweeping frequency should be adjusted to suit site specific conditions and should also be informed by annual inspection reports.

The below table outlines the proposed operation and maintenance regime for permeable pavements. This is adapted from The SuDS Manual (C753).

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall or reduced frequency as required, based on site- specific observations of clogging - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediments
Occasional maintenance	Stabilise and mow contributing and advancement areas	As required
	Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying	As required –once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required

4.6 Attenuation Tanks

The location of the attenuation tanks are indicated on Curtin's drainage drawings RODSTA-CUR-XX-XX-DR-C-92500 Drainage Layout

The attenuation tanks are geocellular units and are intended for storage of surface water run-off from the site up to and including the 1 in 100 year plus 45% climate change event to reduce the rate of run-off into the downstream network and to minimise flood risk.

The geocellular units are proprietary products and therefore manufacturer's recommendations should also be taken into consideration.

Access for maintenance has been provided by catchpit manhole chambers upstream and downstream of the tank. Vents are also provided to the upstream manholes.

Manufacturers information is enclosed in Appendix C.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets, outlets and overflows for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets, outlets and overflows.	As required.

4.7 Flow Control Units

The location of the Flow Control Chambers is indicated on Curtin's drainage drawings RODSTA-CUR-XX-XX-DR-C-92500 Drainage Layout

The flow control units are intended for source control and flow restriction.

The flow controls are a Hydro-brake Optimum unit and is a proprietary product; therefore, manufacturer's recommendations should also be taken into consideration.

Access for maintenance has been provided by locating within a manhole chamber.

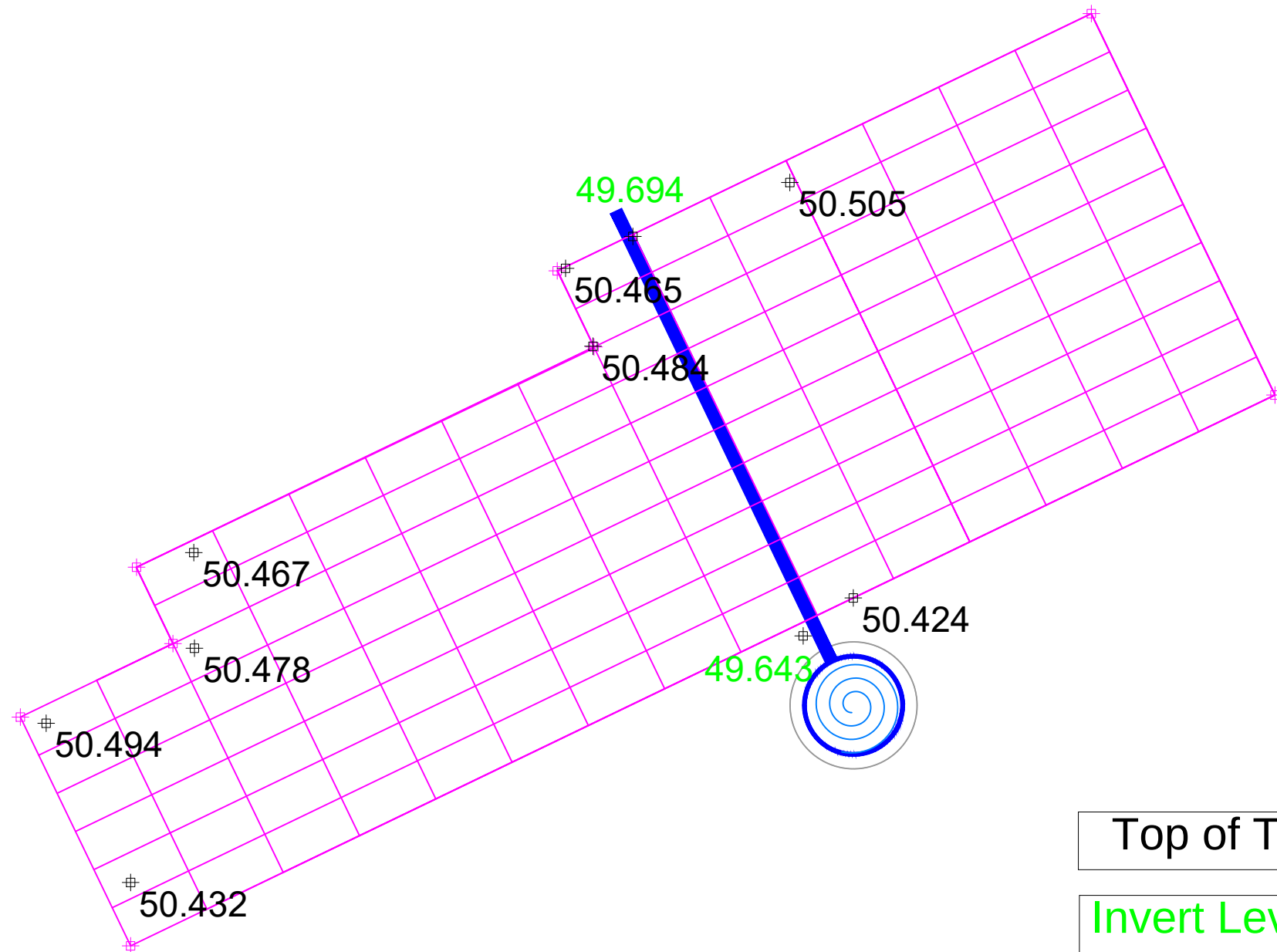
Manufacturers information is enclosed in Appendix C.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures and flow control chambers.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets.	As required.

Appendix A

As-built Information

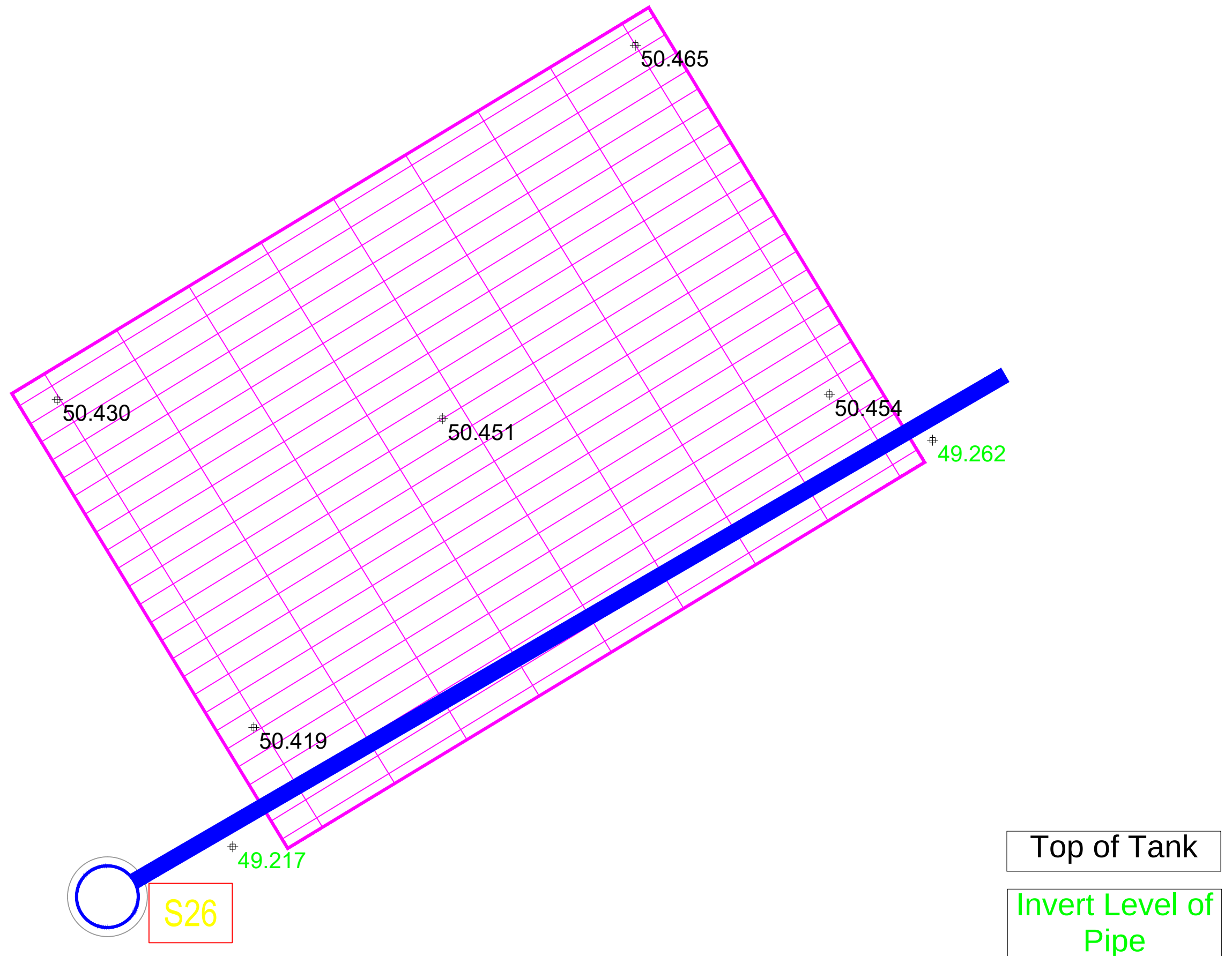
ATTENUATION TANK A

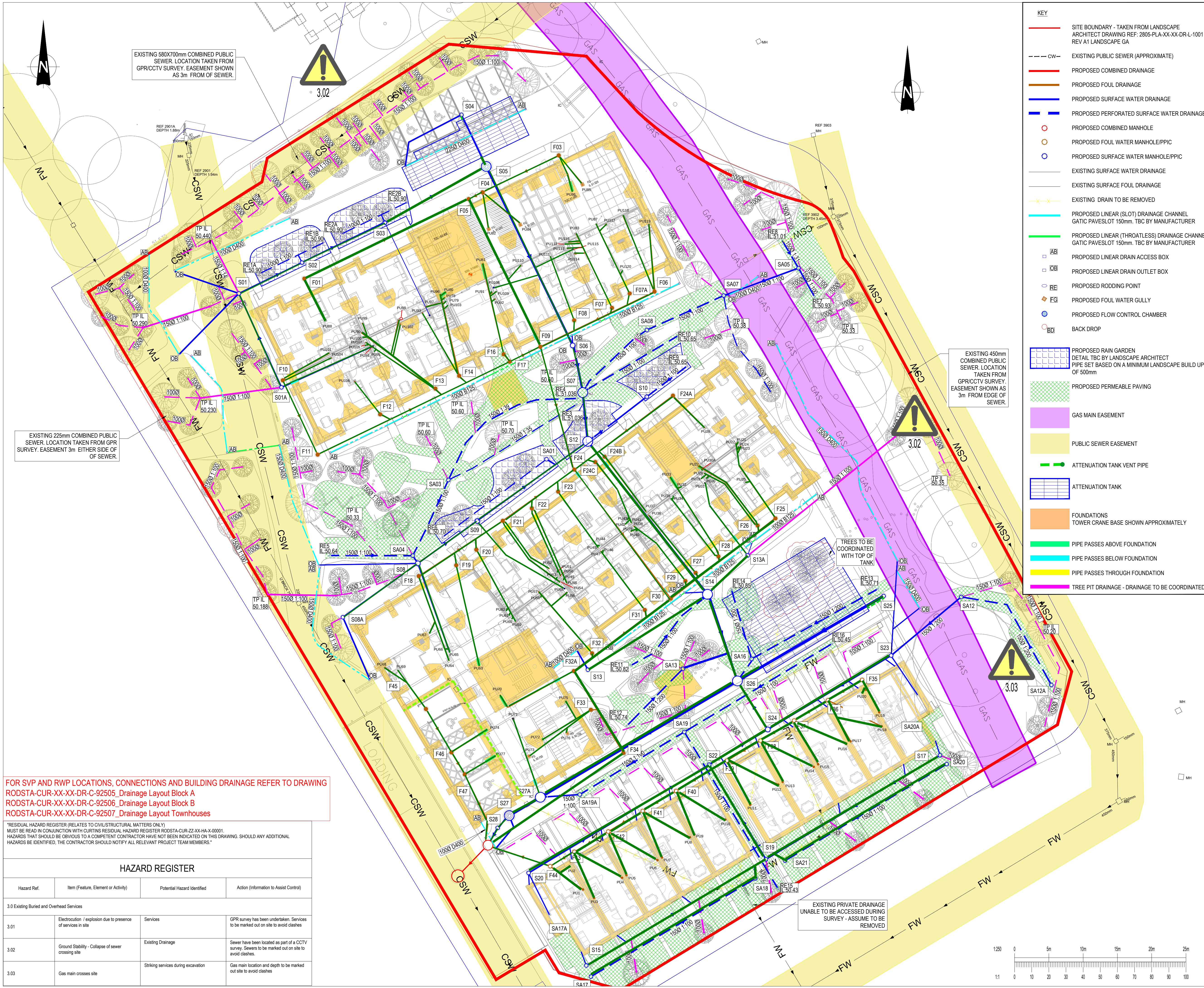


Top of Tank

Invert Level of
Pipe

ATTENUATION TANK B





GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- REFER TO DRAWING RODSTA-CUR-XX-XX-DR-C-92530- FOR GENERAL DRAINAGE NOTES.

DRAWING IS BASED ON:

- LANDSCAPE ARCHITECT - LAYER STUDIO DRAWING RODSTA-LYR-XX-ZZ-D-L-1001-GENERAL ARRANGEMENT REV A1
- TOPOGRAPHICAL & GRP UTILITY SURVEY - SURVEY OPERATION REF: 21G134/001 AUG 2021.
- "ESP" SITE INVESTIGATION: UK21.5551 PHASE I & II GEO-ENVIRONMENTAL ASSESSMENT - LAND OF RODNEY STREET, MANCHESTER (ISSUE 1)
- M&E DRAWING RODSTA-MET-A-00-DR-M-5201-S3-P06 - Above Ground Drainage Services Ground Floor AND RODSTA-MET-B-00-DR-M-5210 - Above Ground Drainage Services Ground Floor
- FOUNDATIONS BASED ON;
RODSTA-CUR-B-ZZ-M-S-0001 BLOCK A FOUNDATIONS RECEIVED 28.06.23
RODSTA-CUR-B-ZZ-M-S-0001 BLOCK B FOUNDATIONS RECEIVED 28.06.23
RODSTA-CUR-TA-ZZ-M-S-0001 TA FOUNDATIONS RECEIVED 03.07.23

C06	CONSTRUCTION UPDATE	23/11/23	JC	CS
C05	CONSTRUCTION UPDATE	25/10/23	JC	CS
C04	CONSTRUCTION UPDATE	20/09/23	CS	CS
C03	CONSTRUCTION UPDATE	07/09/23	CS	CG
C02	CONSTRUCTION UPDATE	28/07/23	CS	CG
C01	CONSTRUCTION ISSUE	20/07/23	CS	CG
P07	STAGE 4B UPDATE	27/02/23	CS	CG
P06	STAGE 4B	30/08/22	LK	CG
P05	DRAFT STAGE 4 ISSUE	05/08/22	LK	CG
P04	ISSUED FOR PLANNING	09/06/22	LK	CG
P03	STAGE 3 ISSUE	27/05/22	LK	AR
P02	DRAFT STAGE 3 ISSUE	13/05/22	LK	CG
P01	STAGE 2	20/10/21	CG	CG

Rev:	Description:	Date:	By:	Chkd:

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Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kentish • Leeds • Liverpool • London • Manchester • Nottingham

Status: **CONSTRUCTION**

Project: **RODNEY STREET**

Orig Title: **DRAINAGE LAYOUT**

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	20/10/21	CG	CG	CG

Scale: 1:200

Project No:	Originator:	Volume:	Level:	Type:	Role:	Category/Number:	Rev:
RODSTA- CUR - XX - XX - DR - C -						92500 - C06	

FOR SVP AND RWP LOCATIONS, CONNECTIONS AND BUILDING DRAINAGE REFER TO DRAWING
RODSTA-CUR-XX-XX-DR-C-92505_Drainage Layout Block A
RODSTA-CUR-XX-XX-DR-C-92506_Drainage Layout Block B
RODSTA-CUR-XX-XX-DR-C-92507_Drainage Layout Townhouses

HAZARD REGISTER			
Hazard Ref.	Item (Feature, Element or Activity)	Potential Hazard Identified	Action (Information to Assist Control)
3.0 Existing Buried and Overhead Services			
3.01	Electrocution / explosion due to presence of services in site	Services	GRP survey has been undertaken. Services to be marked out on site to avoid clashes
3.02	Ground Stability - Collapse of sewer crossing site	Existing Drainage	Sewer have been located as part of a CCTV survey. Sewers to be marked out on site to avoid clashes.
3.03	Gas main crosses site	Striking services during excavation	Gas main location and depth to be marked out site to avoid clashes

Appendix B

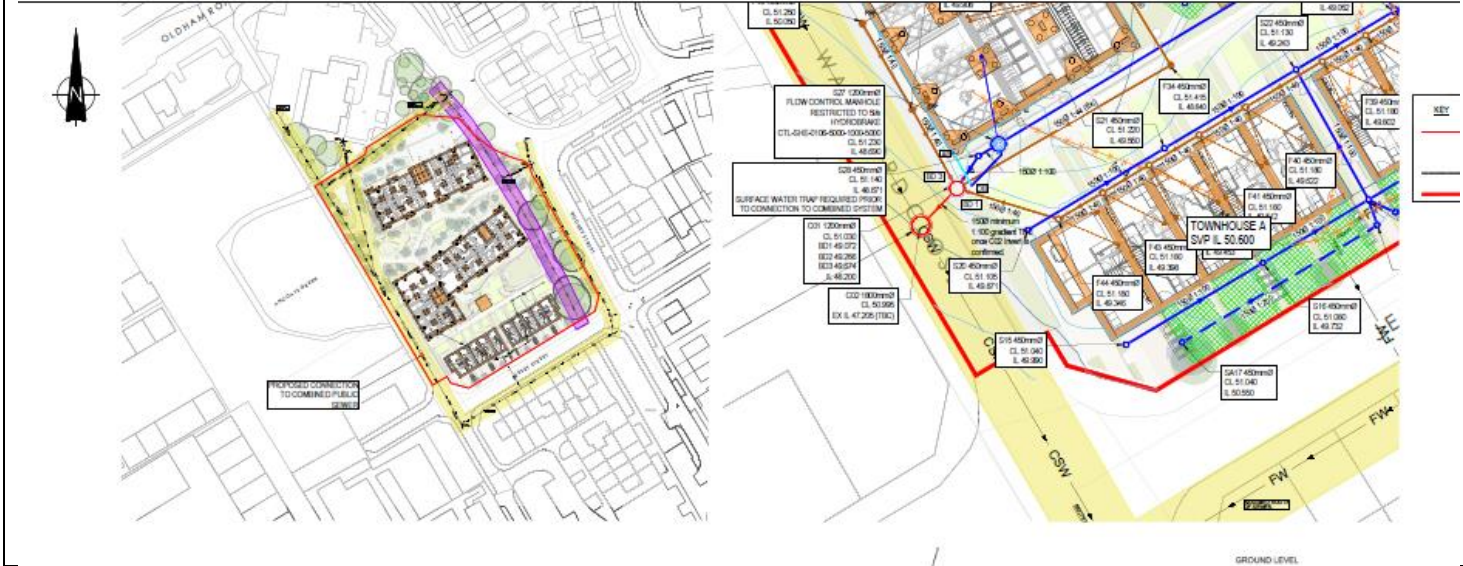
United Utilities Approval – Reference 03667830

S106 Part 1 'Application to connect to a public sewer' Approval Notice



United Utilities Reference Number:						
Applicant details						
Applicant name	Tom Maguire					
Applicant address (including postcode)	Wates Construction Ltd 2nd Floor Building 3, Think Park, Mosley Road, Trafford Park, Manchester, M17 1FQ					
Applicant email	Tom.Maguire@wates.co.uk					
Site details: The site / property which is proposed for connection to the public sewer						
Site address (including postcode)	Rodney Street Manchester					
APPROVED						
Your application for connection to the public sewer has been approved, to be made via a new connection:						
To a private drain	☐	You may appoint your contractor and advise your appointed building control body (who should inspect the work). United Utilities should be advised when this work is complete.				
Direct to the public sewer	☒	Further action required You may now appoint an appropriately qualified contractor. Your appointed contractor is responsible for obtaining authorisation to work on a public sewer. (The S106 Part 2 application form ' Request for permission to work on a public sewer ' is available on our website; unitedutilities.com).				
Mode of connection approved	New manhole					
Sewer connection type	Foul	☐	Surface water	☐	Combined	☒
This approval is valid for 12 months from the date below. This approval does not grant access to third party land, permission should be sought if required between applicant and land owner If the new connection renders access unsafe or is otherwise detrimental to the manhole or sewer, a new/upgraded manhole will be requested.						
Comments						
Approval granted for a 150mm combined connection to the existing 375mm combined sewer in Wadeford close via a new manhole attenuation indicated with a flow control restricted to 5l/s as per your plan below The new manhole must be constructed in line with United Utilities standard details with the appropriate openings, ring size, benching/pipe configuration, channels and landing. Please ensure a plan of your proposals is submitted with your contractors Part 2 application. For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist it could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme. Please note, if you are proposing to connect to an existing, unchartered drain or sewer then it is the developer's responsibility to confirm that it communicates with the Public Sewer.						

Connections may be made to private lateral drains or to existing neighbouring drain. A part 1 approval does not give permission to access third party land. The applicant must seek permission from the relevant land owner.



Developer Services Inspector	Lynne Berry
Contact number	07881 034558
Date	28/02/2023

Appendix C

Drainage Components Manufacturer's Information



Selecting the right design objective for your Hydro-Brake® Optimum vortex flow control

© Hydro International 2024

Selecting the right design objective for your Hydro-Brake® Optimum

This document provides an overview of the **Hydro-Brake® Optimum** vortex flow control's **unique design objectives**. These objectives help design engineers and specifiers optimise their drainage designs; finding the balance between complying with flow limits and storage volumes, and/or providing a physical unit that meets site requirements or has lower maintenance commitments.

The keystone of a drainage design

In any drainage system, the flow control is a vital component of the design. Its' performance ensures that the amount of surface water flow from a development complies with regulations, and it also dictates the amount of storage that is needed to store any excess flow volume, which in turn can significantly effect installation and overall project costs. **In general, the better performing the flow control is, the less storage that will be required.**

There is a trade off between the type and performance of a drainage systems' flow control and the amount of storage that is required. Consideration should also be given to the robustness of the flow control and any possible maintenance commitment.

Hydro International offers a range of different types of Hydro-Brake® flow controls, some are vortex flow controls and some are not. See a summary of our full range at the end of this document.

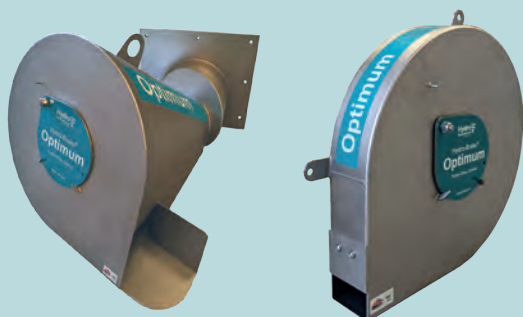
Hydro-Brake® Optimum vortex flow control

The Hydro-Brake® Optimum is our most popular and versatile vortex flow control. It can control storm, foul or combined flows from less than 1 l/s up to 550 l/s. It has a proven track record with over **14,000 units installed worldwide**.



Tested and validated performance

For peace of mind, the performance, strength and durability of the Hydro-Brake® Optimum has been independently assessed, approved and certified by both the BBA (Certification no. 08/4596) and the WRC (Certification no. PT/503/0422) to control stormwater or combined flows.



Benefits of the Hydro-Brake® Optimum

- The most efficient hydraulic performance, with optimised Flush-Flo™ and Kick-Flo® points on the discharge curve, resulting in a significantly reduced storage volume requirement.
- Quality product made in stainless steel to withstand the force of flowing water.
- Reduced blockage risk; can be sized so that the unit has the largest possible orifice sizes and still meet the maximum design flow.
- Standard, Hydraulically Efficient, Hydro-Brake® Optimum units are supplied with an adjustable inlet.
- Conical shaped option for use where there is no room for a sump or for control of foul or combined flows.
- To make installation quicker and easier the Hydro-Brake® Optimum has a range of mounting options.
- Complex flow controls with two Hydro-Brake® Optimum units working together to meet multiple flow rates.
- Mesh guards to provide protection from blockage are an option for smaller units.
- Low whole life costs and minimal maintenance due to no moving parts and no power requirement.
- The majority of units are fitted with a bypass door to enable drain down of the system should a blockage occur.



From left to right: curved mounting plate, push fit and the lug fit, which is our standard mounting.

- Hydro-Brake® Optimum can be supplied ready fitted into a manhole chamber (with or without a weir wall) for simple plug-and-play installation. There are no set-up or commissioning requirements.



A **unique aspect** of the Hydro-Brake® Optimum is that it offers set design objectives, giving engineers the ability to **tailor** a unit to a **specific need** at a given flow and head.

(HE) Minimise upstream storage

Our most popular and highest performing unit, the HE design objective is optimised to **minimise the upstream storage**.

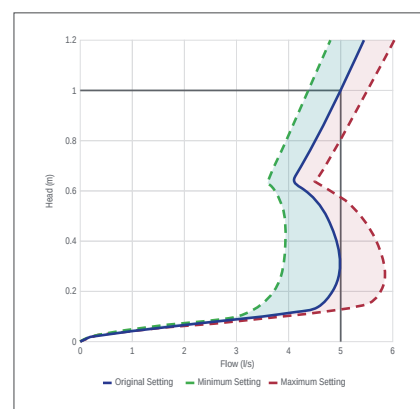
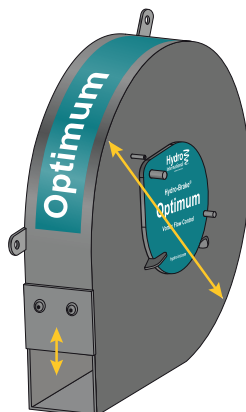
The design curve for the HE Hydro-Brake® Optimum units will match the Flush-Flo™ point as close as possible to the design point, which means that the device will pass forward as much flow as possible during the earlier stages of a storm, reducing the amount of water that needs to be stored upstream.

Future-proof feature on surface water HE units

Surface water (S-Type) HE Hydro-Brake® Optimum flow controls are now fitted with an adjustable inlet as standard. This enables engineers to future-proof their design with up to a plus or minus 20% change in design flow should additional developments or urban creep cause an increase in flows, saving the cost of a replacement flow control.

The minimise upstream storage (HE) design objective is the default option in our Online Design Tool and with the design flow and head entered, the tool will return an S-Type HE unit with a unique triple hydraulic design characteristic showing the adjustment range.

- The blue line is the the original setting and how the Hydro-Brake® Optimum will be supplied. This remains the most hydraulically efficient setting for the given design flow and head and is the same as any previous HE specifications.
- The dashed green line is the minimum setting which is when the inlet is at its most restricted, providing the lowest flow rate possible for the Hydro-Brake® Optimum.
- The dashed red line is the maximum setting which is when the inlet is at its most open, allowing the largest amount of flow to pass through the Hydro-Brake® Optimum.

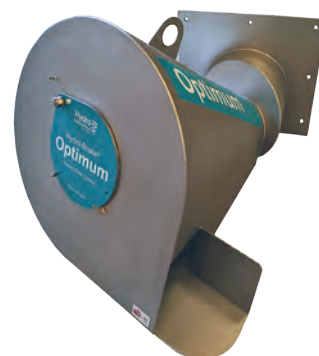


Hydro-Brake® Optimum for foul / combined flows

For foul or combined flows a Conical (C-Type) Hydro-Brake® Optimum will be returned by the Online Design Tool.

With a **large inlet** to reduce the risk of blockage, the conical unit is ideal for control of foul or combined sewer flows. It can also be used for surface water systems with high flow rates where space is restricted or where a **sump is not possible**.

The adjustable inlet can be added to Conical Hydro-Brake® Optimum units as an optional extra by selecting the **'Future proof'** option in the Online Design Tool.

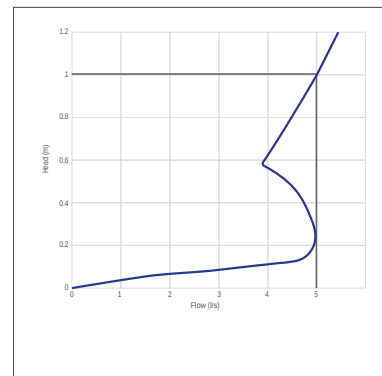


Minimise blockage risk (CL)

This objective makes the inlet and outlet openings as large as possible whilst still delivering the same design flow, **minimising the risk of blockage**.

This option can be applied to units for both surface water (S-Type) and foul/combined (C-Type) flows.

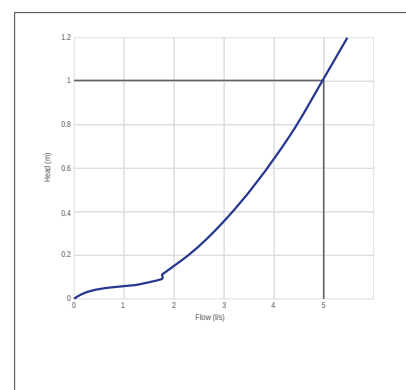
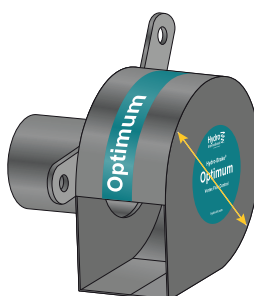
Adding an adjustable inlet to adjust the flow by reducing the inlet size is therefore counterintuitive meaning the adjustable inlet is not available for the CL objective.



Linear discharge profile (CU)

This objective generates a discharge characteristic as close to linear as possible, providing similar hydraulic performance to an orifice plate, but with **internal clearances approximately two to four times larger**

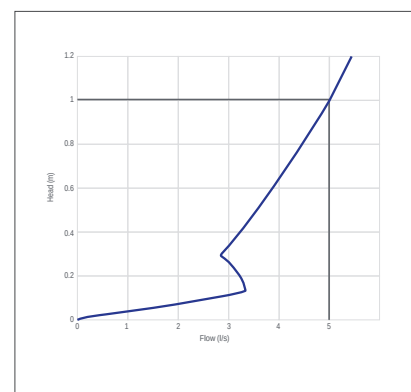
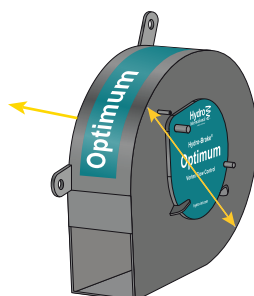
Units designed with this objective will be as small as possible, making the size too small to fit an adjustable inlet



Fit to outlet pipe (XP)

This new objective enables engineers to fit a Hydro-Brake® Optimum to a **specified pipe diameter**, whilst **maximising the hydraulic efficiency** that can be achieved for that pipe size.

It is also possible to reduce the Flush-Flo™ point to reduce the size of the device. If the exact available space is known then the Flush-Flo™ point may be tuned to give the **most hydraulically efficient performance within the space available**, whilst meeting the same design flow. This makes it ideal for retrofit into existing chambers.



Design complex systems

Custom Flush-Flo™ points can be specified, enabling the design of precise ‘complex flow control’ arrangements where the pre-developed hydrology is aligned to the post-developed site.

Low flows

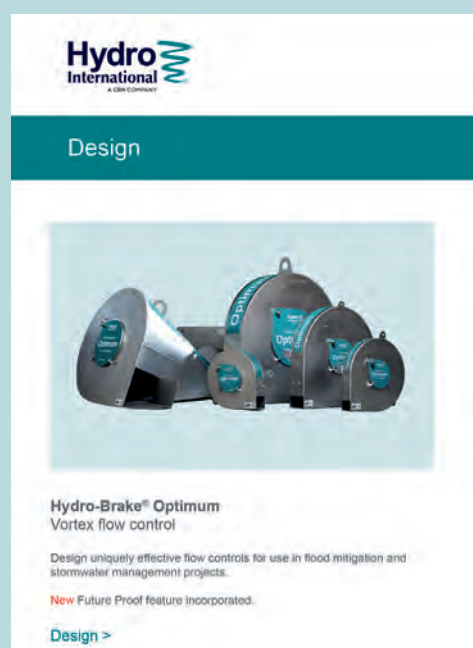
There are now a variety of industry guidance documents applied at national and regional levels and they are not totally consistent in terms of their stance on minimum flow rates or minimum flow control sizes.

The approaches range from BS8582:2013, which states “controls smaller than 25 mm are possible if protected [from blockage]” up to the advice given by water companies. This advice can set a minimum acceptable opening size for adoptable flow controls for surface water only systems of >50 mm for protected orifices and >100 mm for unprotected orifices.



Download our white paper to find out more about low flows
<https://hydro-int.com/en/download-going-flow-white-paper>

Design your own Hydro-Brake® Optimum with our Online Design Tool



Register free to try out some of own Hydro-Brake® Optimum designs sing the different design objectives.

Project designs can be saved and submitted for a free review by our expert technical team if required. General arrangement drawings and quotes can also be requested from the tool for any saved design.

hydro-int.design

Using other design tools

Hydro-Brake® Optimum is available in the hydraulic modelling packages AutoDesk InfoDrainage®, Causeway Flow and Site3D.

The new adjustable inlet has been included in the latest version of Causeway Flow, but to model the new adjustable inlet in other packages, engineers should contact Hydro International for the triple head / discharge curve and hydraulic data for manual input.

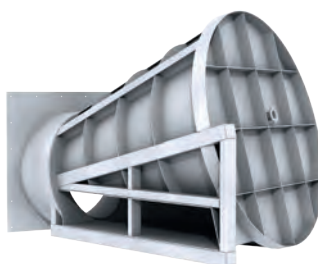
Our full range of Hydro-Brake® Flow Controls

As a brand leader for vortex flow controls for more than 40 years, Hydro International continues to set the standard in flow control management technologies. The Hydro-Brake® Flow Control Series is a comprehensive and versatile toolbox of precision-engineered devices for flow attenuation and control that can help deliver compliant schemes with scaleable, precision flow control performance.

Every device in the series is tested and manufactured to exacting standards and wherever possible, independently accredited to provide the reassurance of reliable, repeatable through-life operation.



[Hydro-Brake® Optimum](#)



[Hydro-Brake® Flood](#)



[Hydro-Brake® Agile](#)



[Hydro-Brake® Orifice](#)

Hydro-Brake® Flow Control selection guide

Features	Hydro-Brake® Optimum	Hydro-Brake® Flood	Hydro-Brake® Agile	Hydro-Brake® Orifice
Suitability	Most sites, from very low to very high flow rates	For watercourses; Flood storage reservoirs	Constrained sites with stringent discharge consents	Unconstrained sites with generous discharge consents
Flow Range (l/s) *	0.7 – 550	550 – 12,000	4.5 – 100	2.5 – 100
Head Range (m) *	0.4 – 4.0	1.5 – 10	0.4 – 2.4	0.25 – 2.0
Ability to Match Greenfield Discharge Rate	Very good	n/a	Good	Not suited to all sites
Moving Parts	No	No	Yes	No
Future Proof	Adjustable inlet fitted as standard on Hydraulically Efficient units	Option that can be designed in	No	No
External Power Requirement	No	No	No	No
Constant Discharge	No	No	Yes	No
On-site Storage	Low	Low	Very low	Unconstrained
Risk of Blockage	Very low	Very low	Not suited to all sites	Not suited to all sites

* flows and heads outside of these ranges may be possible (contact Hydro International to discuss)



Learn more about our flow control, storage and treatment solutions with a CPD for you and your colleagues.

Book a CPD for you and your colleagues

email: cpdrequests@hydro-int.com
or visit: hydro-int.com/uk-cpd

For help with sizing and pricing

call: **01275 337937**
or email: stormwater@hydro-int.com

Patent: www.hydro-int.com/patents

Hydro International

Unit 2 Rivermead Court, Kenn Business Park
Windmill Road, Kenn, Clevedon, BS21 6FT

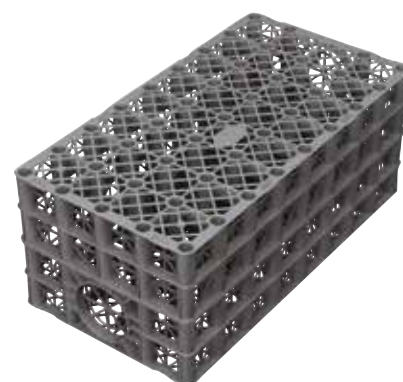
Call: +44 (0)1275 878371

Email: stormwater@hydro-int.com

Visit: hydro-int.com

Product code: PSM1

The Polystorm cell made of virgin material, has a 44 tonnes/m² compressive strength. It is ideally suited for retention, attenuation or infiltration under trafficked or loaded areas at greater depths, such as car parks, housing and commercial developments. An efficient and versatile solution for SuDS compliance, it is hard-wearing, lightweight and provides a 95% void ratio for maximum water capture.



Key Benefits

- Compressive strength of 44 tonnes/m²
- Ideal for retention, attenuation or infiltration applications with a suitable geomembrane or geotextile
- Designed for trafficked and loaded conditions
- BBA approved
- Visual and maintenance access can be achieved when used in conjunction with Polystorm Access & Inspect
- Can be used as part of a value engineered hybrid system with Polystorm Xtra & Polystorm Lite
- Integrated inlet and outlet
- 3D flow throughout the structure
- 95% void ratio
- 100% recyclable
- 50 years creep limited life expectancy

Technical Support

Detailed guidance and assistance is available.

For further information, please contact our Technical Team on **+44 (0) 1509 615100** or email civils@polypipe.com



ELEMENT	VALUE
PHYSICAL PROPERTIES	
Length	1m
Width	0.5m
Depth	0.4m
Total volume	0.2m ³
Unit weight	9kg
Unit storage volume	0.19m ³ (190 litres)
Void ratio	95%
SHORT TERM COMPRESSIVE STRENGTH	
Vertical	Maximum 440kN/m ² **
Lateral	Maximum 63kN/m ² **
SHORT TERM DEFLECTION	
Vertical	83kN/m ² per mm
Lateral	4.2kN/m ² per mm
OTHER PROPERTIES	
Maximum burial depths:	
Light trafficked	3.7m***
Non-trafficked	3.8m***

* Each unit includes 4 Clips and 2 Shear Connectors.

** Compressive strength at yield, maximum recommended value for design purposes.

*** Based on ground conditions being dense sand and gravel with no groundwater present using the calculation methodology detailed within CIRIA C680 (2008). Where ground conditions differ please consult our water management solutions technical department on +44 (0) 1509 615100.

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