

No 3 Circle Square, Manchester

SuDS Verification Report

Curtins Ref: CS3-CUR-03-XX-RP-C-92003

Revision: P02

Issue Date: 11 July 2025

Client Name: Bruntwood

Client Address: Union, 2-10 Albert Square, M2 6LW, Manchester

Site Address: Circle Square 3, Manchester

Rev	Description	Issued by	Checked	Date
P01	Draft Issue	JC	ATL	07 July 2025
P02	Additional Photos Added	JC	ATL	11 July 2025

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Reviewed	Signature	Date
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Final Construction Drawings

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Flood Defence Consent – Reference NW_South_2016_528

S106 Approval – Reference EC4436

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Drainage Components Manufacturer's Information

1 Introduction

1.1 Project Background

Curtins have been appointed by Bruntwood to provide a SuDS Verification Report for the proposed below ground drainage design for Circle Square 3, Manchester.

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 40% for climate change. As the flows are being attenuated within 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.

1.2 Planning Condition

This report has been produced in order to satisfy the discharge requirements of Condition 11 which is as follows:

11) No development hereby permitted shall be occupied until details of the implementation, maintenance and management of the sustainable drainage scheme have been submitted to and approved by the local planning authority. The scheme shall be implemented and thereafter managed and maintained in accordance with the approved details. Those details shall include:

- (a) Verification report providing photographic evidence of construction as per design drawings;
- (b) As built construction drawings if different from design construction drawings;
- (c) Management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime.

Reason: To manage flooding and pollution and to ensure that a managing body is in place for the sustainable drainage system and there is funding and maintenance mechanism for the lifetime of the development. This condition is imposed in light of national policies within the NPPF and NPPG and local policies EN08 and EN14.

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 networks on site are private drainage network.

The drainage network is a separate foul and surface water system within the development. The foul network discharges to a public combined sewer.

The surface water drainage discharges to the River Medlock to the north of the site.

2.2 Foul Drainage

The private foul drainage within the site connects to an existing manhole, which was constructed as part of the wider Circle Square masterplan. The masterplan drainage flows south and connects to the existing 375mm diameter combined sewer, adjacent to Princess St.

The peak flow from the site has been determined as 26.7 l/s, based on a total of 1453.8 Discharge Units, provided by the M&E Designer.

The as-built drainage drawings are attached in appendix A.

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 a manhole within Brancaster Road, which was constructed as part of an earlier phase of the Circle Square masterplan. The existing drainage within Brancaster Road then discharges to the River Medlock, via an existing outfall pipe.

The restricted discharge from the site has been set at the following rates, as agreed with MCC and the EA:

- 1-Year Storm Event: 25.0 l/s
- 30-Year Storm Event: 58.0 l/s
- 100-Year Storm Event: 73.0 l/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 is an Attenuation Tank under the soft landscaped area (Symphony Gardens). This provides approximately 317m³ of attenuation volume.

As part of the design, a single water quality treatment phase was required for the full site area, and two treatment stages were required for trafficked areas.

A Smart Filter Chamber has been installed downstream of the flow control device, which provides a single treatment stage for the full site.

Secondary treatment stages are provided by a combination of tree pit/ filter drains and also Smart Gully Filter Adaptors fitted in gulleys/ drainage channel outlets within Cloak St.

The as-built drainage drawings are attached in the appendix A. The drawings show the main surface water drainage runs and attenuation tanks as constructed with the outstanding information relating to phase 2 and 3 works which is due to be complete within the following months.

2.4 Approvals

A Section 106 agreement was approved by United Utilities as part of an earlier phase of the Circle Square masterplan (Ref EC4436).

A Flood Defence Consent was agreed with the EA as part of an earlier phase of the Circle Square masterplan. (Ref NW_South_2016_528)

Copies of the approvals are available 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.

The following elements have been recorded to date:

- Attenuation Tank
- Flow Control Chambers
- Smart Filter Chamber
- Smart Gully Filter Adaptors
- Tree Pits/ Filter Strips

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 Installation



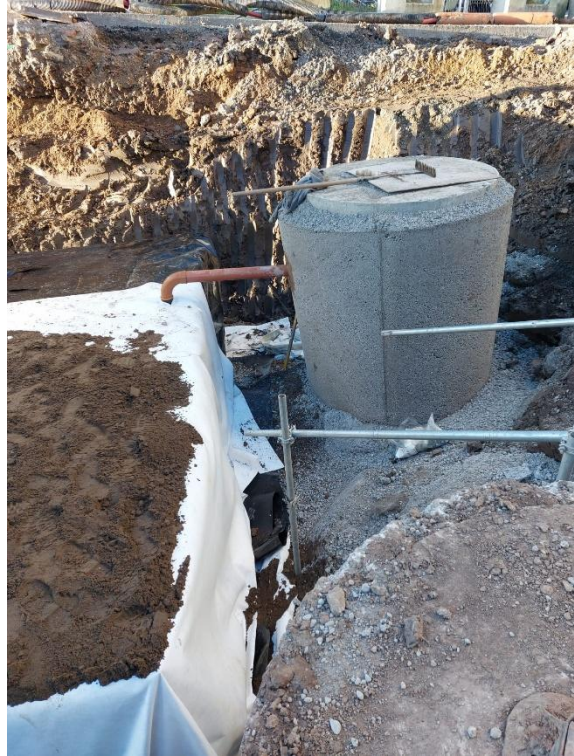


Figure 3 – Flow Control Chamber (Orifice Plate)



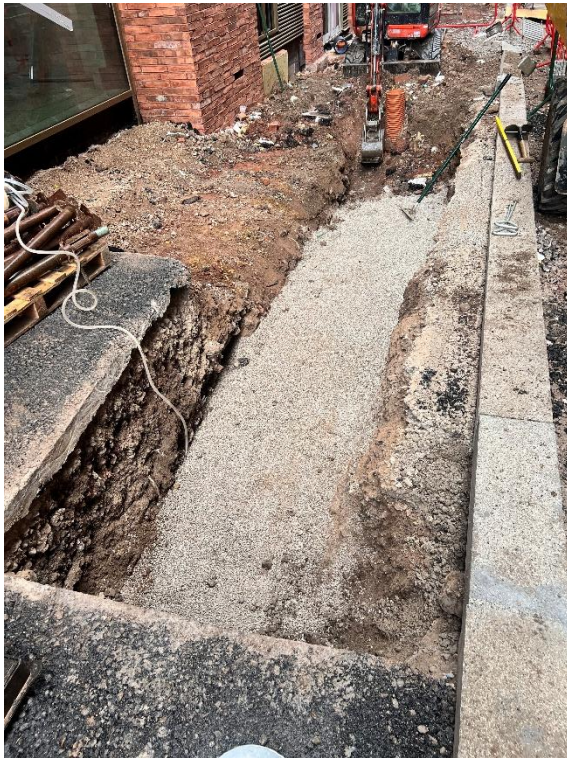
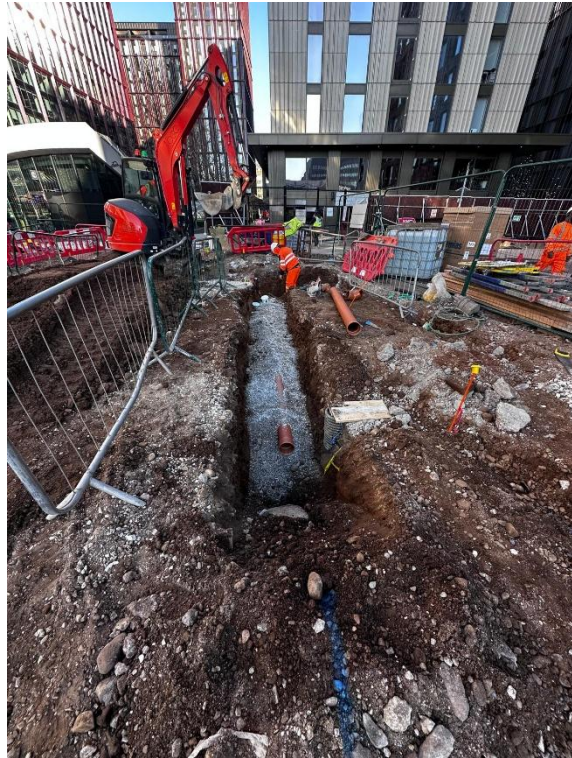
Figure 4 – Smart Filter Chamber

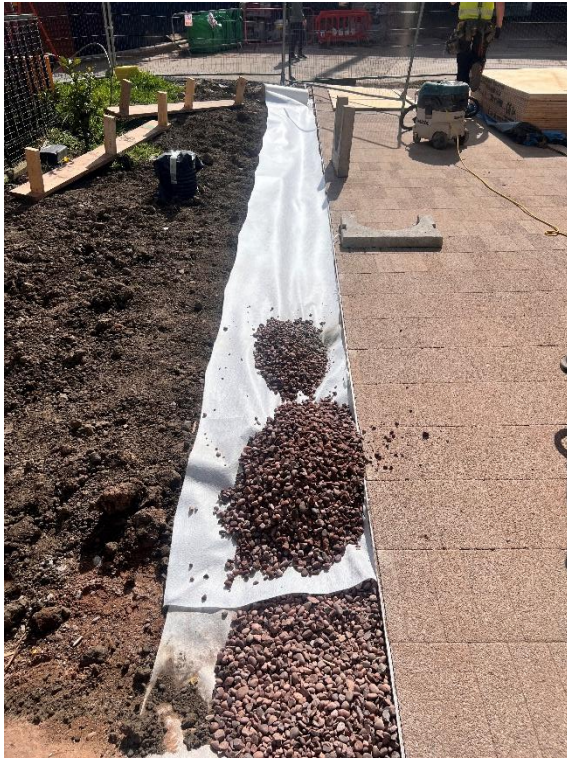
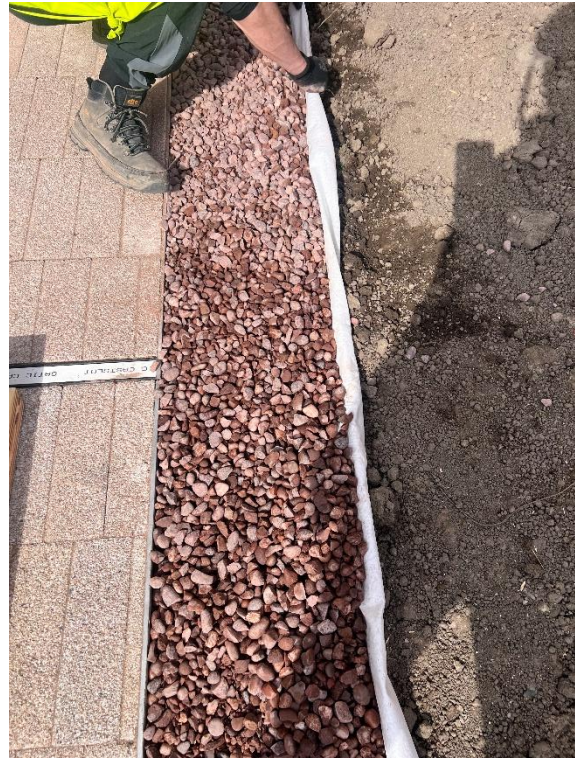


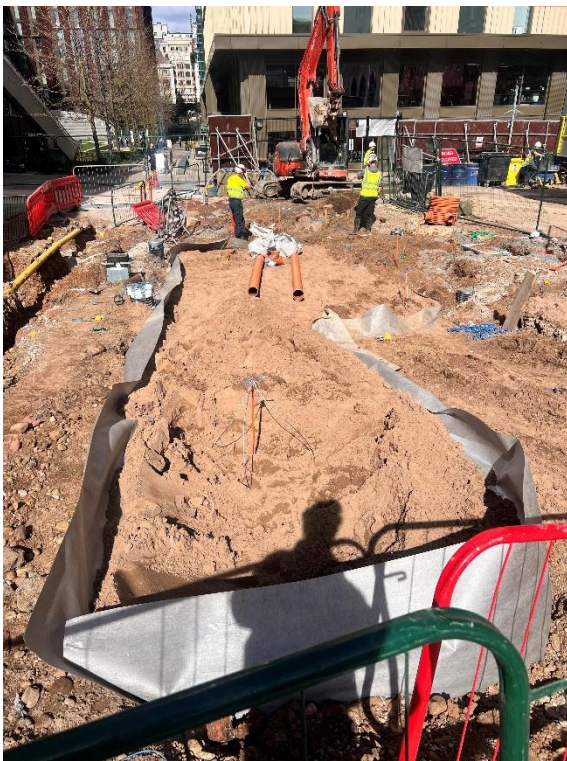
Figure 5- Smart Gully Filter Adaptors



Figure 6 – Tree Pits/ Filter Strips









3.3 CCTV Survey and As-built Information

A number of CCTV Surveys have been completed on the installed drainage network, ranging between April and June 2025. The CCTV survey covers all foul and service water drainage within the scheme.

The as-built surface and foul water CCTV drainage surveys have been reviewed and indicate the drainage has been constructed to the required standards, in accordance with the survey information provided.

The survey confirms at this time; the drainage network was in general good condition however there one location where some remedial works are required. This is located on the foul drainage network, upstream of Manhole MHF01A.

We would recommend that a lining repair is carried out to this section in order to smooth out the run and prevent the holding of water. The CCTV providers should be consulted to confirm the detail of the remedial works for this section. The remedial works should be carried out as soon as practicably possible; however, this will not have major implications for the drainage network in the short term.

There have been a number of minor changes to the drainage through the construction phase. These have been necessary due to on-site issues. The changes do not have an impact on the overall drainage philosophy, and the drainage design is still in line with the requirements of the Planning Approval.

The drainage drawings have been updated to include the as-constructed details provided by the contractor, and are available in Appendix A.

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
- Attenuation Tank
- Flow Control Unit – Orifice Plate
- Smart Filter Chamber and Smart Gully Adaptors

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 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 L014-CUR-52-01.ZZ-D-C-52001 - 52003.

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 L014-CUR-52-01.ZZ-D-C-52001 - 52003.

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 are 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 L014-CUR-52-01.ZZ-D-C-52001 - 52003.

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	3-monthly, 48 hours after large storms.

	provide a flat area or berm adjacent to the paving.	
Remedial Action	Inspect sumps and outlet pipes and rod through poorly performing channels and outlets as initial remediation.	As required.
	<p>Inspect for evidence of poor operation and/or weed growth. If required, take remedial action.</p> <p>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.</p>	3-monthly, 48 hours after large storms.
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).
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4.5 Attenuation Tanks

The location of the attenuation tanks is indicated on Curtin's drainage drawings L014-CUR-52-01.ZZ-D-C-52001 - 52003.

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.

4.6 Flow Control Chamber (Orifice Plate)

The location of the Flow Control Chamber is indicated on Curtin's drainage drawings L014-CUR-52-01.ZZ-D-C-52001 - 52003.

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.

4.7 Smart Filter Chamber and Smart Gully Adaptors

The locations of the Smart Filter Chamber and Smart Gully Adaptors are indicated on Curtin's drainage drawings L014-CUR-52-01.ZZ-D-C-52001 - 52003.

The Smart Filters are intended for a first and/ or second stage treatment for water quality.

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

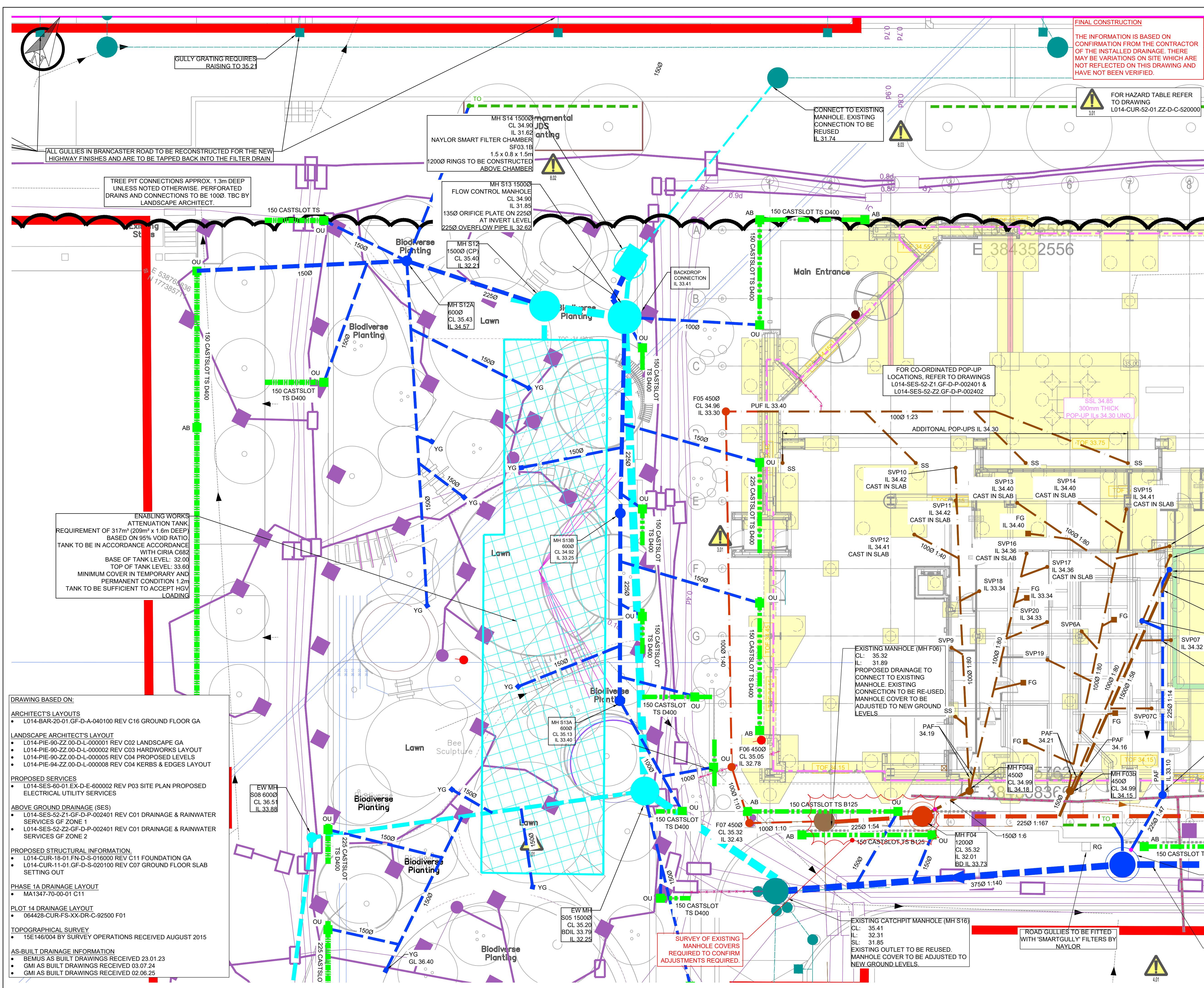
Access for maintenance has been provided by locating within the Smart Filter Chamber, or within Gulleys and Linear Drain Outlet boxes.

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 chamber containing Smart Filters.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets and outlets 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 filter chambers.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets/outlets.	Required.

Appendix A

Final Construction Drawings



FINAL CONSTRUCTION
THE INFORMATION IS BASED ON
CONFIRMATION FROM THE CONTRACTOR
OF THE INSTALLED DRAINAGE. THERE
MAY BE VARIATIONS ON SITE WHICH ARE
NOT REFLECTED ON THIS DRAWING AND
HAVE NOT BEEN VERIFIED.

FOR HAZARD TABLE REFER
TO DRAWING
L014-CUR-52-01-ZZ-D-C-520000

GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- FOR GENERAL NOTES REFER TO DRAWING SA-CUR-XX-00-DR-C-92502.
- FURTHER CO-ORDINATION REQUIRED BETWEEN EXTERNAL SERVICES AND THE PROPOSED DRAINAGE.

KEY:

EXISTING DRAINAGE

- AS CONSTRUCTED SW DRAINAGE
- AS CONSTRUCTED FOUL DRAINAGE
- PRE-DEVELOPMENT DRAINAGE (ASSUMED ABANDONED - TBC)
- DRAINAGE TO BE ABANDONED/ REMOVED

ENABLING WORKS DRAINAGE (AS CONSTRUCTED)

- ENABLING WORKS SW DRAINAGE
- ENABLING WORKS PROPOSED CELLULAR ATTENUATION STORAGE

PROPOSED DRAINAGE

- PROPOSED SW DRAINAGE
- PROPOSED FOUL DRAINAGE
- PROPOSED LINEAR DRAINAGE CHANNEL GATIC CASTSLOT TREADSAFE

RG ROAD GULLY
YG YARD GULLY
TO 1000 TREE PIT DRAIN/ OUTLET
SVP FOUL CONNECTION
SVP SOIL VENT PIPE
AAV AIR ADMITTANCE VALVE
FG FOUL GULLY
RWP RAINWATER PIPE
PROPOSED FILTER DRAIN
PROPOSED FOUNDATION
CHANGE IN SLAB LEVEL
PROPOSED EXTERNAL SERVICES

CR	CONSTRUCTION RECORD ISSUE	07.07.25	JC	ATL
C06	UPDATED TO LATEST LA PLAN	03.02.25	ATL	HS
C05	UPDATED TO LATEST LA PLAN	15.11.24	ATL	HS
C04	SURFACE DRAINAGE FEATURES UPDATED	27.09.24	ATL	ATL
C03	ADDITIONAL DRAINAGE ADDED	05.01.24	JC	ATL
C02	CONSTRUCTION ISSUE	24.10.23	ATL	CG
Rev:	Description:	Date:	By:	Chkd:

CONSTRUCTION RECORD

Project: **NO 3 CIRCLE SQUARE**

Orig Title: **PROPOSED DRAINAGE 1:100 LAYOUT SHEET 1**

Drawn By	ATL	Designed By	ATL	Checked By	MW
Project No.	080355	Date	23.05.22	Scales	As A1
Project No - Originator - Function - Spatial - Form - Discipline - Number					Revision
L014 - CUR - 52 - 01-ZZ - D - C - 520001					CR1

DRAWING BASED ON:

ARCHITECT'S LAYOUTS

- L014-BAR-20-01.GF-D-A-040100 REV C16 GROUND FLOOR GA

LANDSCAPE ARCHITECT'S LAYOUT

- L014-PIE-90-ZZ-00-D-L-000001 REV C02 LANDSCAPE GA
- L014-PIE-90-ZZ-00-D-L-000002 REV C03 HARDWORKS LAYOUT
- L014-PIE-90-ZZ-00-D-L-000005 REV C04 PROPOSED LEVELS
- L014-PIE-94-ZZ-00-D-L-000008 REV C04 KERBS & EDGES LAYOUT

PROPOSED SERVICES

- L014-SES-60-01.EX-D-E-600002 REV P03 SITE PLAN PROPOSED ELECTRICAL UTILITY SERVICES

ABOVE GROUND DRAINAGE (SES)

- L014-SES-52-21.GF-D-P-002401 REV C01 DRAINAGE & RAINWATER SERVICES GF ZONE 1
- L014-SES-52-22.GF-D-P-002401 REV C01 DRAINAGE & RAINWATER SERVICES GF ZONE 2

PROPOSED STRUCTURAL INFORMATION.

- L014-CUR-18-01.FN-D-S-016000 REV C11 FOUNDATION GA
- L014-CUR-11-01.GF-D-S-020100 REV C07 GROUND FLOOR SLAB SETTING OUT

PHASE 1A DRAINAGE LAYOUT

- MA1347-70-00-01 C11

PLOT 14 DRAINAGE LAYOUT

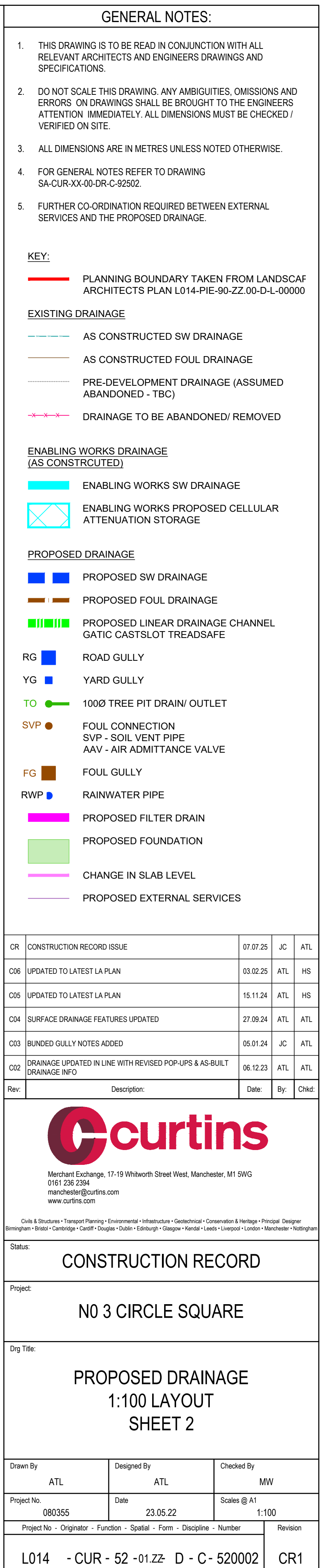
- 064428-CUR-FS-XX-DR-C-92500 F01

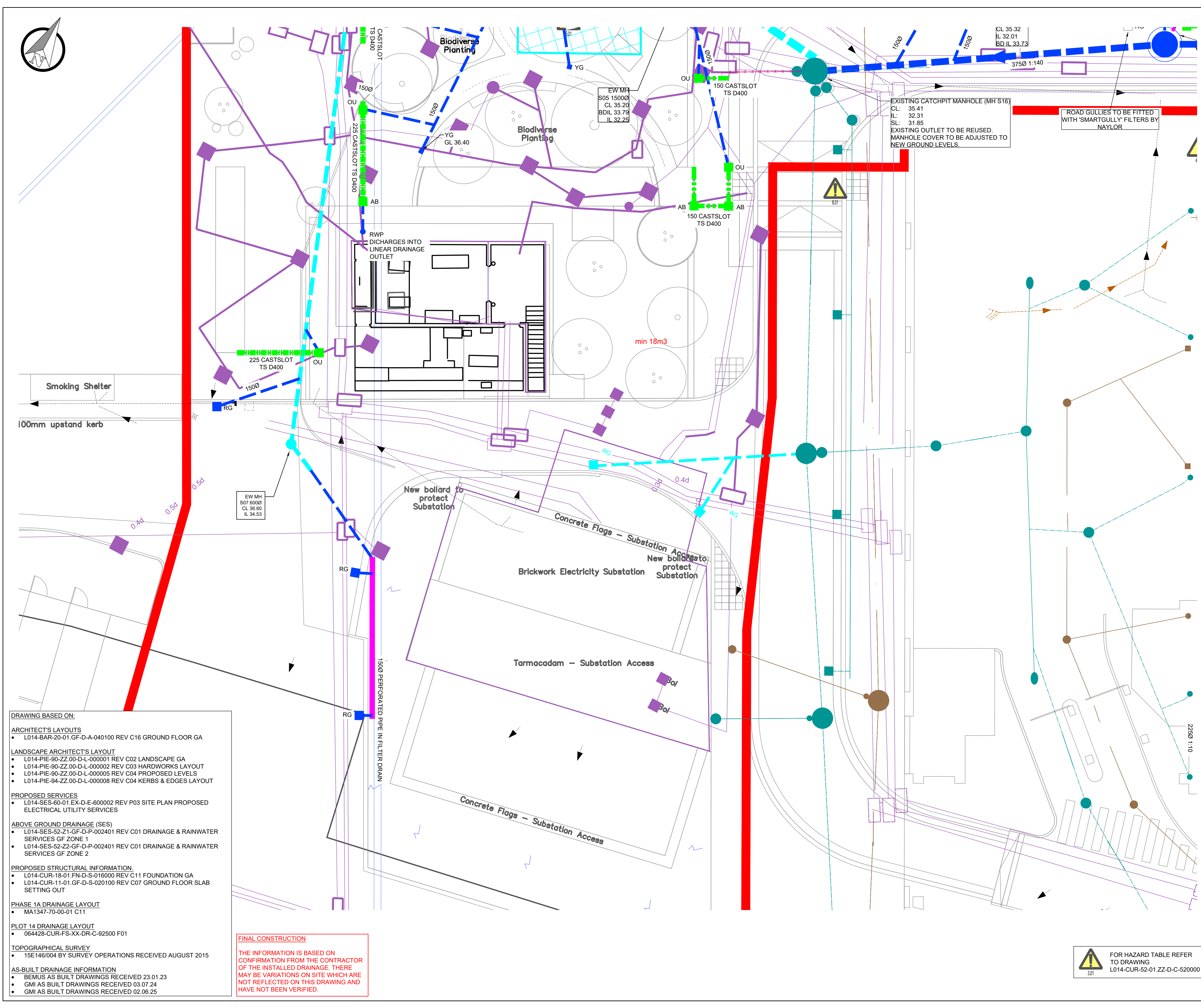
TOPOGRAPHICAL SURVEY

- 15E146/004 BY SURVEY OPERATIONS RECEIVED AUGUST 2015

AS-BUILT DRAINAGE INFORMATION

- BEMUS AS BUILT DRAWINGS RECEIVED 23.01.23
- GMI AS BUILT DRAWINGS RECEIVED 03.07.24
- GMI AS BUILT DRAWINGS RECEIVED 02.06.25





1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
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3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
4. FOR GENERAL NOTES REFER TO DRAWING SA-CUR-XX-00-DR-C-92502.
5. FURTHER CO-ORDINATION REQUIRED BETWEEN EXTERNAL SERVICES AND THE PROPOSED DRAINAGE.

PLANNING BOUNDARY TAKEN FROM LANDSCAPE ARCHITECTS PLAN L014-PIE-90-ZZ.00-D-L-00000

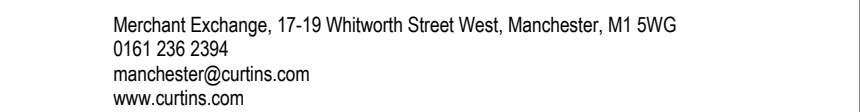
	AS CONSTRUCTED SW DRAINAGE
	AS CONSTRUCTED FOUL DRAINAGE
	PRE-DEVELOPMENT DRAINAGE (ASSUMED ABANDONED - TBC)
	DRAINAGE TO BE ABANDONED/ REMOVED

	ENABLING WORKS SW DRAINAGE
	ENABLING WORKS PROPOSED CELLULAR ATTENUATION STORAGE

 PROPOSED SW DRAINAGE
 PROPOSED FOUL DRAINAGE
 PROPOSED LINEAR DRAINAGE CHANNEL
 GATIC CASTSLOT TREADSAFE

RG		ROAD GULLY
YG		YARD GULLY
TO		100Ø TREE PIT DRAIN/ OUTLET
SVP		FOUL CONNECTION SVP - SOIL VENT PIPE AAV - AIR ADMITTANCE VALVE
FG		FOUL GULLY
RWP		RAINWATER PIPE
		PROPOSED FILTER DRAIN
		PROPOSED FOUNDATION
		CHANGE IN SLAB LEVEL
		PROPOSED EXTERNAL SERVICES

CR	CONSTRUCTION RECORD ISSUE	07.07.25	JC	ATL
C02	UPDATED TO LATEST LA PLAN	03.02.25	ATL	HS
C01	CONSTRUCTION ISSUE	15.11.24	ATL	HS
P03	ISSUE TO INCLUDE BEMUS AS BUILT ENABLING WORKS DRAINAGE	16.02.23	CS	CG
P02	ISSUED FOR PLANNING CONDITION DISCHARGE	16.12.22	ATL	CG
P01	ISSUED FOR STAGE 4	18.11.22	ATL	MW
Rev:	Description:	Date:	By:	Chkd:



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

Project: _____

N0 3 CIRCLE SQUARE

Drg Title:

Drawn By ATL	Designed By ATL	Checked By MW
Project No. 080355	Date 23.05.22	Scales @ A1 1:100

L014	- CUR - 52 -01.ZZ-	D - C - 520003	CR1
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DRAWING BASED ON:

ARCHITECT'S LAYOUTS

- L014-BAR-20-01.GF-D-A-040100 REV C16 GROUND FLOOR GA

LANDSCAPE ARCHITECT'S LAYOUT

- L014-PIE-90-ZZ.00-D-L-000001 REV C02 LANDSCAPE GA
- L014-PIE-90-ZZ.00-D-L-000002 REV C03 HARDWORKS LAYOUT
- L014-PIE-90-ZZ.00-D-L-000005 REV C04 PROPOSED LEVELS
- L014-PIE-94-ZZ.00-D-L-000008 REV C04 KERBS & EDGES LAYOUT

PROPOSED SERVICES

- L014-SES-60-01.EX-D-E-600002 REV P03 SITE PLAN PROPOSED ELECTRICAL UTILITY SERVICES

ABOVE GROUND DRAINAGE (SES)

- L014-SES-52-Z1-GF-D-P-002401 REV C01 DRAINAGE & RAINWATER SERVICES GF ZONE 1
- L014-SES-52-Z2-GF-D-P-002401 REV C01 DRAINAGE & RAINWATER SERVICES GF ZONE 2

PROPOSED STRUCTURAL INFORMATION.

- L014-CUR-18-01.FN-D-S-016000 REV C11 FOUNDATION GA
- L014-CUR-11-01.GF-D-S-020100 REV C07 GROUND FLOOR SLAB SETTING OUT

PHASE 1A DRAINAGE LAYOUT

- MA1347-70-00-01 C11

PLOT 14 DRAINAGE LAYOUT

- 064428-CUR-FS-XX-DR-C-92500 F01

TOPOGRAPHICAL SURVEY

- 15E146/004 BY SURVEY OPERATIONS RECEIVED AUGUST 2015
- AS-BUILT DRAINAGE INFORMATION**
- BEMUS AS BUILT DRAWINGS RECEIVED 23.01.23
 - GMI AS BUILT DRAWINGS RECEIVED 03.07.24
 - GMI AS BUILT DRAWINGS RECEIVED 02.06.25

FINAL CONSTRUCTION

THE INFORMATION IS BASED ON
CONFIRMATION FROM THE CONTRACTOR
OF THE INSTALLED DRAINAGE. THERE
MAY BE VARIATIONS ON SITE WHICH ARE
NOT REFLECTED ON THIS DRAWING AND
HAVE NOT BEEN VERIFIED.



FOR HAZARD TABLE REFER
TO DRAWING
L014-CUR-52-01.ZZ-D-C-520000

Appendix B

Flood Defence Consent – Reference NW_South_2016_528

S106 Approval – Reference EC4436



Flood Defence Consent

Water Resources Act 1991 and associated byelaws

Oxford Property Trading Ltd
City Tower
Piccadilly Plaza
Manchester
M1 4BT

**Consent applying to outfall and
works within 8 m easement at**
Oxford Road/Charles Street
Manchester

Consent number
NW_South_2016_528

Effective from
17 February 2016

Disclaimer

The Environment Agency does not accept any responsibility for the design and construction of the works referred hereto and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.

Our approval is given solely on river morphology, flow, ecology, and other land drainage criteria. It should not be regarded by the applicant as in any way approving the design and soundness of the proposed structure, other than in relation to its impact on flows in the watercourse and its flood plain

This Consent does not free you from the need to obtain other licences, consents, approvals (including bye-law consents) or permissions (including planning permission) which may be required in law or in order to comply with any duties or responsibilities for conservation or protection of the environment. You should ensure that the works are carried out in a proper manner so as not to adversely affect the watercourse. A copy of the Special Requirements issued by the Environment Agency is available upon request. Work should be completed as quickly as possible once started.

The works shall be carried out at your own risk and responsibility. We accept no responsibility for any loss or damage howsoever caused arising from the carrying out or construction of the works. We may occasionally make observations on health and safety aspects of the work, however this should not be taken in any way whatsoever to imply that we have a role in ensuring site safety, nor that we have approved any contractors plans.

Land ownership is not a material consideration in determining this consent. Where you are not the owner of the land (including riverbeds and other water bodies) referred to in this consent, you must obtain suitable permission from the landowner prior to the commencement of works. This Consent does not confer any rights of entry or rights over property.

If you undertake works in contravention of Section 109 of the Water Resources Act, 1991 (Restriction on erection of structures in, over or under main river), or of the terms of this consent, we may remove, alter or pull down the works and recover from you the expenses incurred in doing so.

The responsibility to ascertain the location of any services, which may be affected by the proposed works, lies solely with the Applicant/Agent.

The contents of this consent must be brought to the attention of your contractor.

If you believe that conditions have been unreasonably imposed then you have a right of appeal.

Consent

Water Resources Act 1991 and associated byelaws



Environment
Agency

Flood Defence Consent

Control of works affecting watercourses and/or flood defences

Consent number **NW_South_2016_528**

To **Oxford Property Trading Ltd**
City Tower
Piccadilly Piazza
Manchester
M1 4BT

The Environment Agency, in exercise of its powers under Water Resources Act 1991 and associated byelaws and subject to the conditions overleaf, hereby grants its consent in relation to the works or operations described in this Consent.

Watercourse: Medlock

Location: Oxford Road/Charles Street Manchester

NGR: 384234, 397406

Description of works: New outfall from Flood Compensation Zone, Landscaping, Paving and SuD's features, localised 5m pinchpoint within 8m of the River wall and Localised lowering of the River Wall at the Rain Garden.

As detailed on plans and sections:

- External works layout MA1347-60-00-01 Rev A
- External works layout MA1347-60-00-02 Rev A
- Drainage layout MA1347-70-00-01 Rev B
- Flood Compensation and undercroft drainage zone MA1347-70-00-06
- Landscape proposals PL1502-P1A-001 Issue 00
- Medlock walk cross section PL1502-1A-201 Issue 00
- Medlock walk cross section PL1502-1A-202 Issue 00
- Proposed drainage details Phase 1A MA1347-70-10-04 Rev A
- Proposed drainage details Phase 1A MA1347-70-10-05 Rev A

The Agency does not accept any responsibility for the design and construction of the works referred hereto and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.

This Consent shall come into effect on **17 February 2016**

Signed on behalf of the Environment Agency

A handwritten signature in black ink, reading 'P. Costello', enclosed in a rectangular box.

Peter Costello

Partnerships and Strategic Overview Team Leader

Date of signing

17/02/2016

Conditions

This consent is granted subject to the following conditions:

1.1 General

- 1.1.1 All reasonable care should be taken to ensure that the watercourse is kept free of foreign matter and floating debris during the construction period and on completion.
- 1.1.2 Works should be carried out in such a way as to ensure minimum obstruction to flows in the watercourse at all times.
- 1.1.3 These works should be carried out in such a way as to minimise disturbance to the existing banks and bed of the watercourse.
- 1.1.4 On completion of the works all debris and surplus material shall be removed from the banks of the watercourse. The bed and banks of the watercourse which have been disturbed by the works, shall be reinstated to the satisfaction of the Area Flood Risk Manager.
- 1.1.5 The integrity of the flood defences should be maintained at all times.

1.2 Timing

- 1.2.1 The Works referred to in this Consent shall be commenced within one year of the date of issue, otherwise a further application for Consent must be made. The works shall be completed within two years of the date of commencement unless such date is extended with the prior written agreement of the Agency.
- 1.2.2 At least 7 working days' prior written notice of commencement of the works and written notification of completion must be given to the Environment Agency. Please email PSOWarrington@environment-agency.gov.uk stating your consent reference

1.3 Temporary works

- 1.3.1 There shall be no stock piling or storing of materials within the channel.
- 1.3.2 There shall be no stock piling or storing of materials in the floodplain unless in broken heaps parallel to the direction of flood flow.

1.4 Site Specific

- 1.4.1 Under no circumstances must there be a reduction in the existing cross sectional area of the existing channel.
- 1.4.2 All invasive works should adhere to the existing knotweed code of practice guidance document (<https://www.gov.uk/government/publications/japanese-knotweed-managing-on-development-sites>). Any proposed herbicide spraying near the river will need consent from the Agency (refer to webpage <https://www.gov.uk/government/publications/application-to-use-herbicides-in-or-near-water>) for advice.

Other information

This Note does not form part of the Certificate of Authorisation.

Pollution Prevention

You are reminded that it is an offence under Regulation 38 of The Environmental Permitting (England and Wales) Regulations 2010 to cause or knowingly permit a water discharge activity or ground water activity. Care must be taken to ensure that neither the watercourse nor groundwater becomes polluted, particularly by, for example diesel fuel, petrol and oil from machinery. All fuels, oils and chemicals must be stored securely and any large containers left on site must be bunded. Care should also be taken when filling machinery to ensure that diesel/petrol/oil is not spilt on the ground. Spillages must not be washed away, but absorbed by some medium and then removed from site to a suitable licensed waste facility. Any such incidents must be reported to the Environment Agency immediately (Emergency Tel No 0800 807060). Copies of the Environment Agency's Pollution Prevention Guidelines (PPG5) and (PPG6) are either attached for your information or if not available upon request.

Disturbance of bed and bank material in watercourses should be minimised, including when carrying out excavations. An appropriate silt control system should also be considered if material is likely to be disturbed. In-river vehicle tracking should be kept to an absolute minimum.

Any waste generated in the course of the works must be disposed of in accordance with the provision of the Environmental Protection Act 1990. Persons carrying waste are required by law to register with the Environment Agency as a Waste Carrier (subject to certain exceptions). The deposit, keeping, treating or disposal of waste should only take place at premises licensed by the Environment Agency to receive the waste (subject to certain exceptions and exemptions). When you give waste to someone else, details of the transfer of waste should be described on a document called a Duty of Care Transfer Note.

If the waste contains any properties that are hazardous to health or the environment, the waste will be classed as 'Hazardous Waste' as defined in the Hazardous Waste Regulations 2005. These Regulations place specific requirements on the producer and carrier of such waste. Further information can be found on the Agency's website (www.gov.uk/environment-agency) or by contacting the National Customer Contact Centre on 03708 506506.

The activity of importing waste into the site for use as part of the construction process, for example hardcore, must be registered by Environment Agency as an exempt activity under the Waste Management Licensing Regulations 1994.

Flood Risk Management

The structure(s) must be removed immediately, for any reason, at the request of the Area Flood Risk Manager.

You must ensure that any structure is clear and free of rubbish, silt and debris at all times. Regular inspections of the structure should also be carried out and the appropriate maintenance work undertaken.

Fisheries

You are strongly advised to inform the appropriate Angling Association/Interests of your proposals (where applicable), before commencing work, since the issue of a Flood Defence Consent by this Agency will not protect you from any claim for nuisance or damage which may be attributed to your works.

The free passage of fish must be maintained at all times, unless otherwise agreed in advance with the Agency.

Under the terms of the Salmon and Freshwater Fisheries Act 1975, it is an offence to cause or knowingly permit to flow, or put, into any waters containing fish, any liquid or solid matter to such an extent as to cause the water to be poisonous or injurious to fish or the spawning grounds, spawn or food of fish.

Biodiversity

Natural environments such as watercourses are important as habitats in their own right and for the plants and animals they support. There are several Acts and Regulations that ensure these special features are protected and you should be aware of and comply with this legislation. A list of relevant legislation can be found in our working method guidance.

The list of species and actions below are not exhaustive and the applicant should consult the relevant legislation regarding other concerns.

A licence for works affecting protected species may be required from Natural England. You should consult their standing advice for more information on this.

Otters and their places of rest are protected. Otters are widespread and significant tree works or works to the banks have the risk of disturbing otters and damaging their Holts. You should make an assessment of the risk to otters and where required a survey should be undertaken by a suitably qualified ecologist. Note otters sometimes lie up in drains/small watercourses so wherever possible drain entrances should be kept clear.

Bats and their habitats are protected. Bats are often found in structures and trees on or adjacent to watercourses. If your works are likely to affect structures such as bridges, walls, culverts or buildings you must consider impacts on bats. An appropriate assessment of risk and, where required a survey should be undertaken by a suitably qualified ecologist.

Water voles and their habitat are protected. If water voles are present on your site you need to consider the impacts of your work on them and an

appropriate assessment of risk and where required survey should be undertaken by a suitably qualified ecologist.

Native Crayfish are protected. When undertaking works where native crayfish are present you need to consider the impacts of your works and an appropriate assessment of risk and where required survey should be undertaken by a suitably qualified ecologist.

Vegetation

No bankside vegetation within 7m of the watercourse is to be removed unless strictly necessary. In such cases, trees/shrubs should be limbed or coppiced, and the root base to be left intact. Scrub vegetation as possible should be retained, as this provides valuable wildlife habitat.

Trees should be protected from the works in accordance with British Standard 5837, "Trees in relation to construction", and contractors' working areas shall be clearly marked out and boundaries adhered to.

Any bankside trees or vegetation damaged or removed during the works should be replaced with native species of local provenance appropriate to the local habitat.

Birds

Breeding birds and their nests are protected under the Wildlife and Countryside Act 1981. If your work is taking place within or close to the main bird breeding season (1st March to 31st July) you should consider the impacts of your works and an appropriate assessment of risk should be undertaken.

Invasive Non-native species

The Wildlife and Countryside Act makes it an offence to cause certain species to spread in the wild. If these species are present on your site you need to have a plan for how you will manage them and any waste containing them during your work.

Bio security

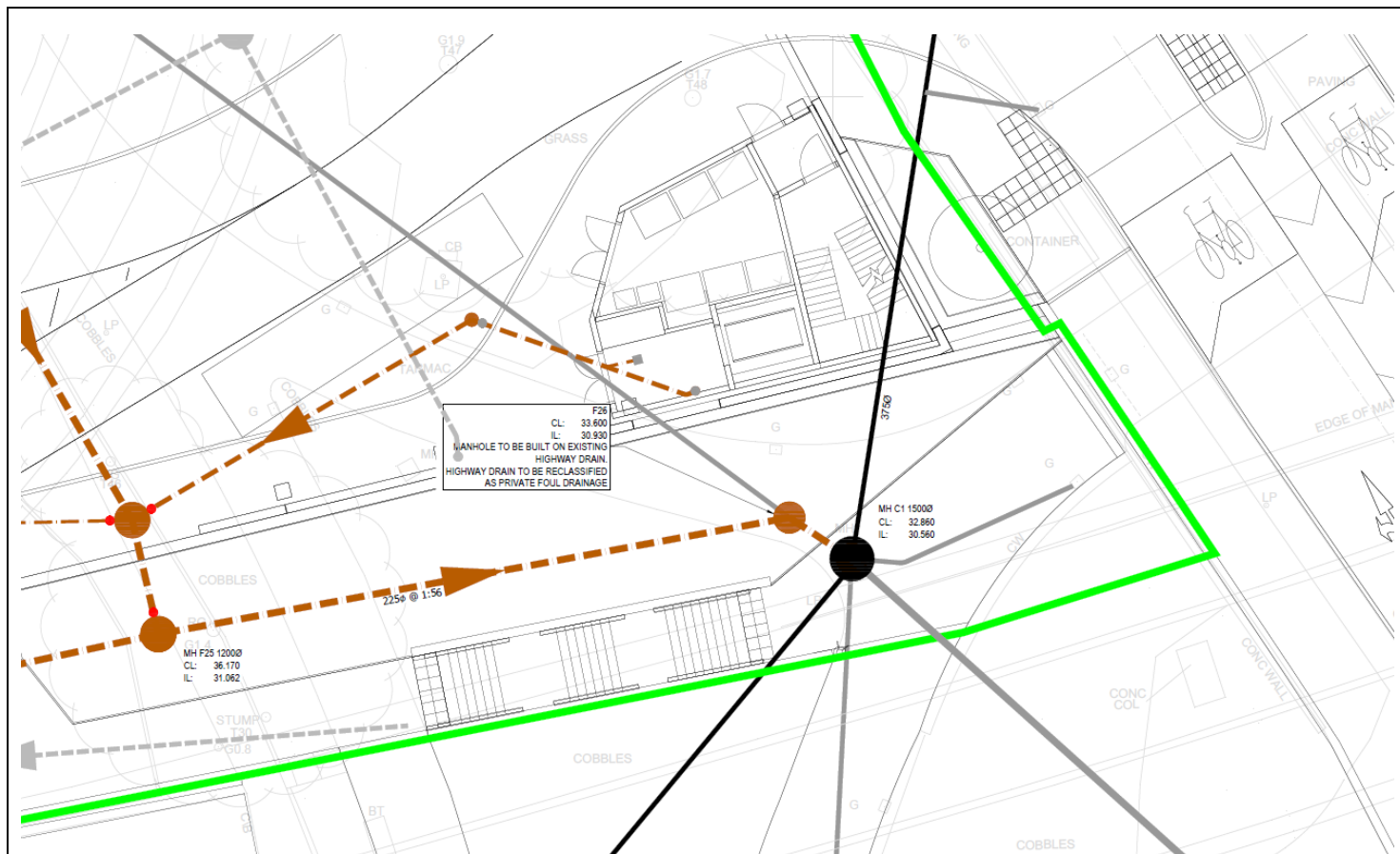
When travelling or working between watercourses there is a high risk of transferring problem species or diseases between watercourses.

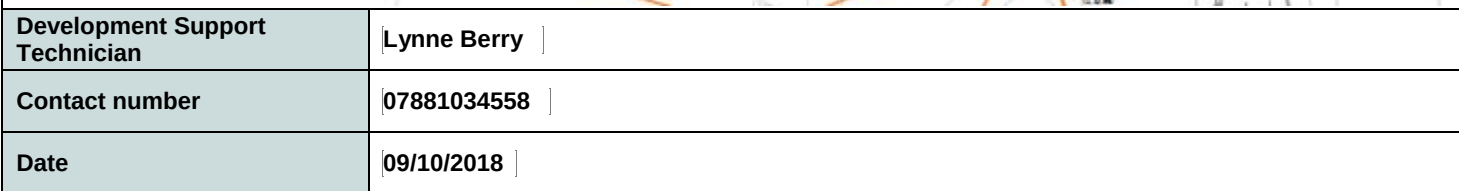
This can be avoided by following the advice of the [‘check, clean, dry’](#) campaign. Simple measures such as checking for and cleaning mud and bits of vegetation from boots, equipment and machines and allowing them to dry (ideally in sunlight) can prevent the spread of problem species.

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



United Utilities Reference Number:		EC4436					
Applicant details							
Applicant name		Simon Chesworth					
Applicant address (including postcode)		Bruntwood Circle Square 14 Limited C/O Bruntwood Ltd Albert Square Manchester M2 6LW					
Applicant email		Simon.chesworth@bruntwood.co.uk and Andy Losty <Andy.Losty@curtins.com>					
Site details: The site / property which is proposed for connection to the public sewer							
		Plot 1, Circle Square, Upper Brook Street, Manchester, M1					
<h2>APPROVED</h2> <p>Your application for connection to the public sewer has been approved, to be made via a new connection:</p>							
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		Other - please see comments box					
Sewer connection type		Foul	☒	Surface water	☐	Combined	☐
<p>This approval is valid for 12 months from the date below.</p> <p>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.</p>							
Comments							
<p>Approval granted for the 225mm Foul only connection via the utilisation of a private drain within the site boundary that shows to communicate with the 375mm Combined sewer that crosses the site through to Brook Street (as per your revised drawing below 064428-CUR-00-00-DR-C-92-530-P02)</p> <p>Surface water to watercourse</p> <p>Based on the information supplied by Andy Losty 05/10/19 that the private highway drain which is located in the land, the ownership of this has been transferred and the section of re-used drain only takes foul drainage</p> <p>Please note, if you are proposing to connect to an existing, unchartered drain or sewer then it is the developers 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.</p>							





Appendix C

Drainage Components Manufacturer's Information

Construction Sequence

Installation procedures should be carried out in accordance with the Health and Safety at Work Etc. Act (1974) and any other relevant legislation. Special attention should be paid to temporary work requirements in excavations.

Excavate to the required plan dimensions and level, ensuring that the excavation orientation will allow easy installation of connecting pipework. Consideration should be given to maintaining construction plant access for reinstating around the installed Variobox units. A minimum 300mm working space is required around the structure but 500mm is recommended for safe working practice.

Ensure that the ground bearing capacity at the formation level is sufficient for the proposed operational loads. The base of the excavation should be smooth and level, free of large stones and soft spots. Any soft spots should be excavated and replaced with suitable compacted granular material.

a) Attenuation Application

Place and compact a 100mm thick bedding layer of coarse sand. The base should be level and free of any undulations. Line the base and sides of the excavation with a 300g needle punched non-woven protective geotextile before placement of the impermeable geomembrane.

Install the geomembrane. Hewitech or the contractor seal the joints by wedge welding in accordance *Ciria 698 Site Handbook For The Construction of SUDS*, making an allowance for the connecting pipework or adaptors. To ensure that the integrity of the geomembrane has been maintained, it is recommended that an inspection of the material is carried out, and welded joints are air tested in accordance with *Ciria 698 Site Handbook for the Construction of SUDS*.

If water is present, we recommend that the excavation depth is over dug by 200mm, with a base layer of 'TERRAM' overlaid by 150mm of compacted 'Type 1 road stone', topped off with a 50mm layer of pipe bedding. A sump should be excavated below the base layer of stone to allow the extraction of water via a drainage pump.

Variobox shear connectors (Detail 05) are placed between all layers of Variobox units to give structural support to the tank. Sufficient Variobox clips (Detail 06) are placed connecting Variobox units to maintain rigidity of the tank prior to backfilling the sides, the adjacent units being connected with two Variobox clips.

Place the Variobox shear connector into the recess at the edge of the unit, two number per unit as indicated Detail 05. Install the next layer of Variobox units, positioning the units in the upper layer so that they exactly mirror the position of the units in the lower layer. Repeat the above procedure until the necessary depth of Variobox structure has been achieved.

Pipe connections to the tank are made via flange adaptors which are attached to the Variobox units with tie wraps.

A Variobox attenuation structure requires ventilation to ensure proper hydraulic performance. Consideration should be given as to how this ventilation is to be installed, generally utilising a vent pipe to the downstream manhole (Detail 01), or alternatively a vertical vent pipe (Detail 02). One 110mm vent pipe per 750m2 of drained area is recommended within *CIRIA C580 Structural Design of Modular Geocellular Drainage Tanks*.

Complete the geomembrane encapsulation of the entire Variobox structure, forming and testing joints where appropriate. Complete the geotextile protective fleece encapsulation of the Variobox structure, re-examining the geotextile for damage and joint integrity.

Contractor

Backfill around the sides of the encapsulated units, forming a thick layer of coarse sand or Class 6H selected granular material immediately adjacent to the units. Where required, remaining excavated areas around the units should be backfilled with Class 6N or 6P selected granular material, in accordance with *MCHW, Volume 1, Series 600* or similarly approved specification.

Above the wrapped Variobox units, place and lightly compact a minimum 100mm thick layer of either coarse sand or Class 6H selected granular material (with 100% passing the 5mm sieve), in accordance with *MCHW, Volume 1, Series 600*.

Final backfilling of the installation is dependent on the expected operational loads. (NB. Compaction plant over and immediately adjacent to the Variobox units shall not exceed 2300 kg/m width).

Field conditions (e.g. landscaped areas)

The backfill material that lies within 300mm above the Variobox units should be free from particles exceeding 40mm in diameter, in accordance with Class 8 material to *MCHW, Volume 1, Series 600*. Final backfilling up to finished ground level may be achieved using selected as-dug material. Backfill material should be placed and compacted in layers no greater than 300mm, or in compliance with the approved specification.

Lightly trafficked (eg restricted access car park)

Backfill with Class 1 or 2 material in accordance with *MCHW, Volume 1, Series 600*. Backfill material should be placed and compacted in layers not greater than 150mm. Where the Variobox units are installed beneath a paved area, the pavement sub-base may form part of the backfill material provided that minimum cover depths are maintained.

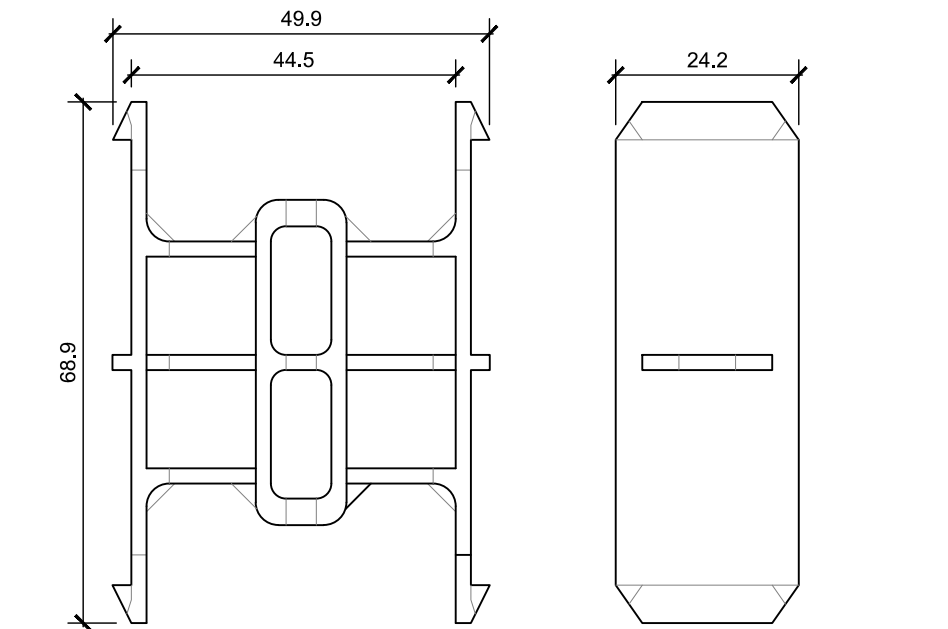
Heavily trafficked (e.g. service areas or roads)

Contact Hewitech for further information and guidance.

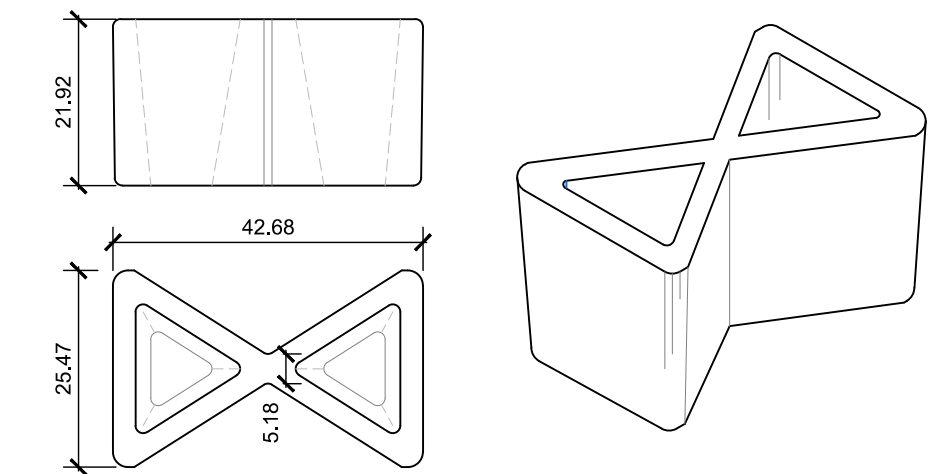
Complete pavement construction or landscaping over the Variobox system.

It should be noted that infiltration systems are not generally installed under roads due to the reduction in load bearing capacity of saturated soils. Specialist advice should be sought where this type of installation is proposed.

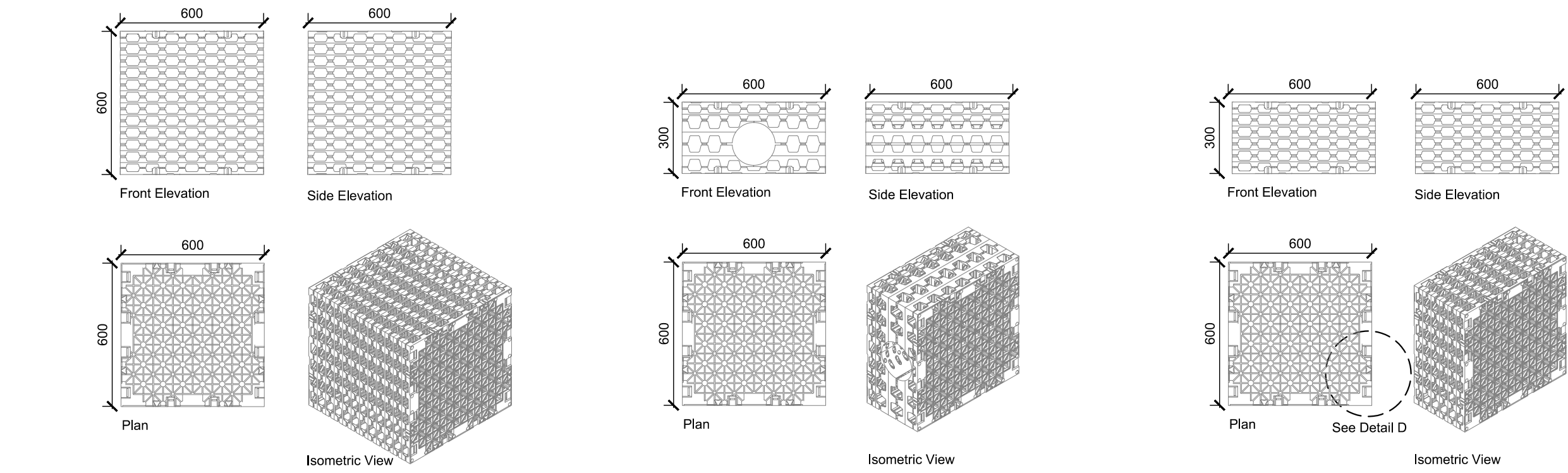
In attenuation systems, where groundwater may be present, a boyancy check should be undertaken by a qualified engineer to ensure that the imposed overburden pressure exceeds any uplift forces generated.



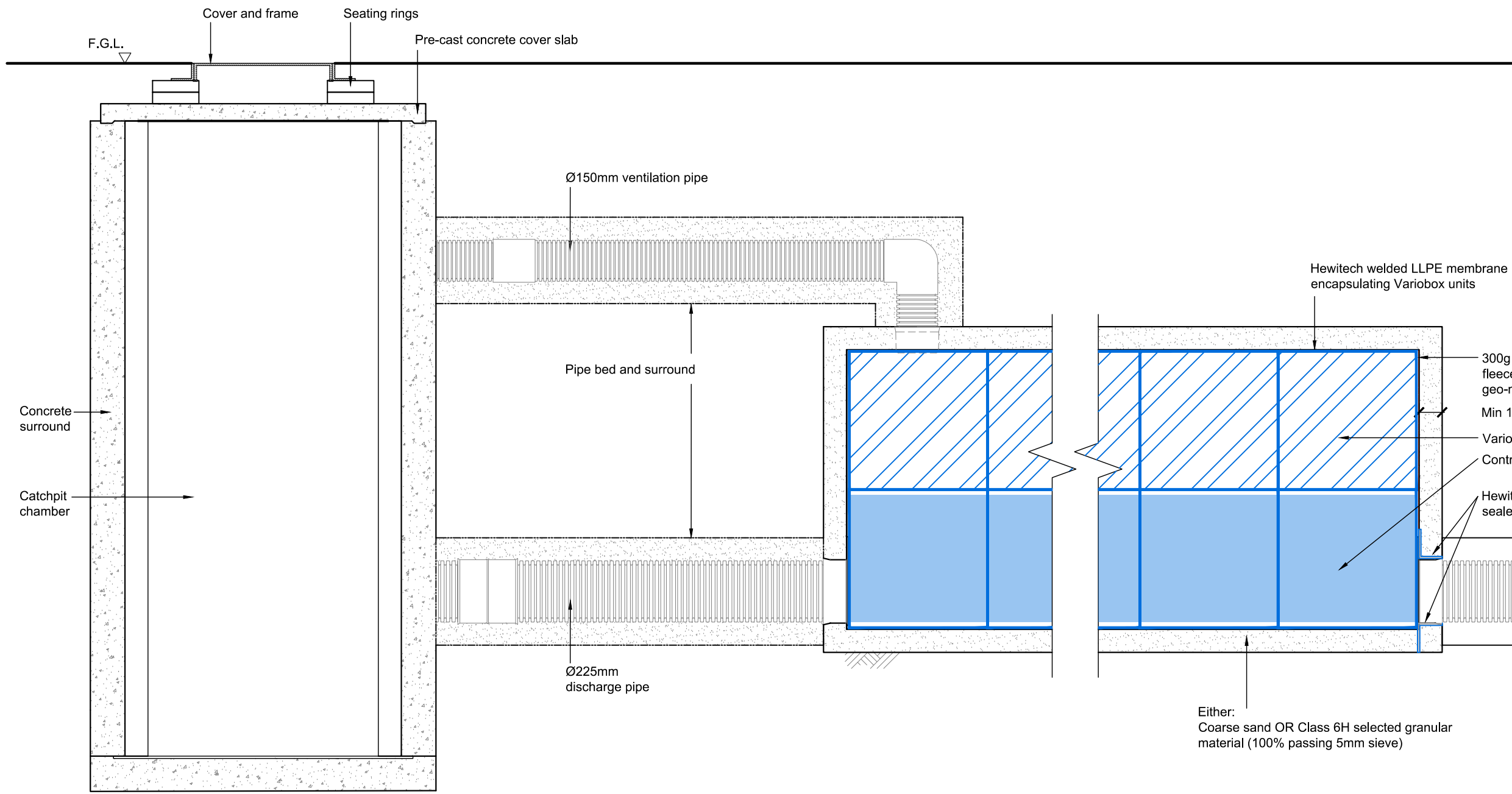
05 Variobox Twin Connector: 2 layers
Scale 1:1



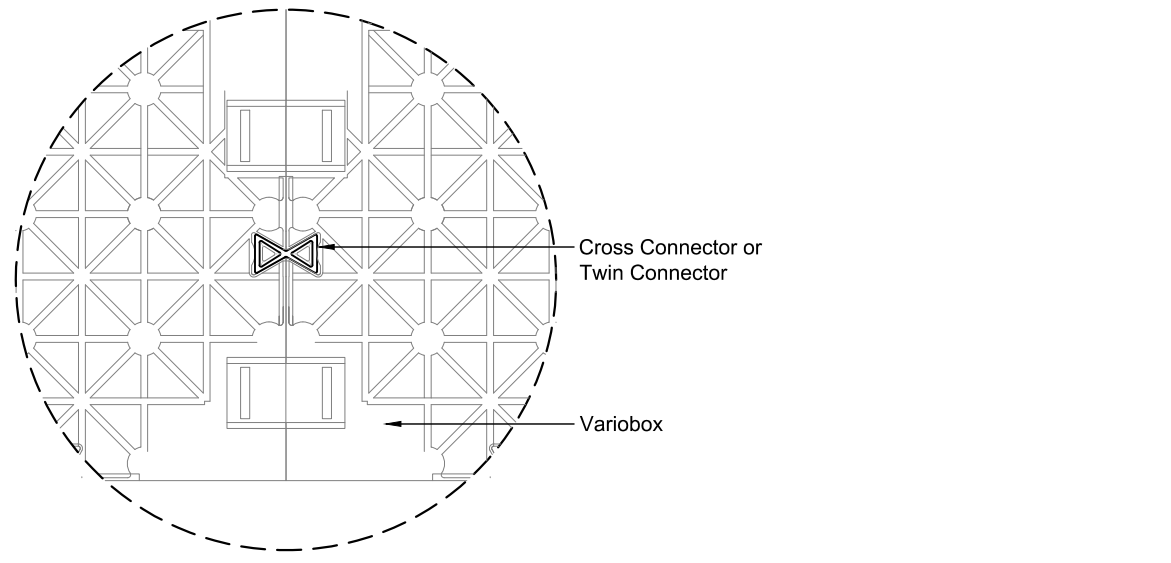
06 Cross Connector: single layer
Scale 1:1



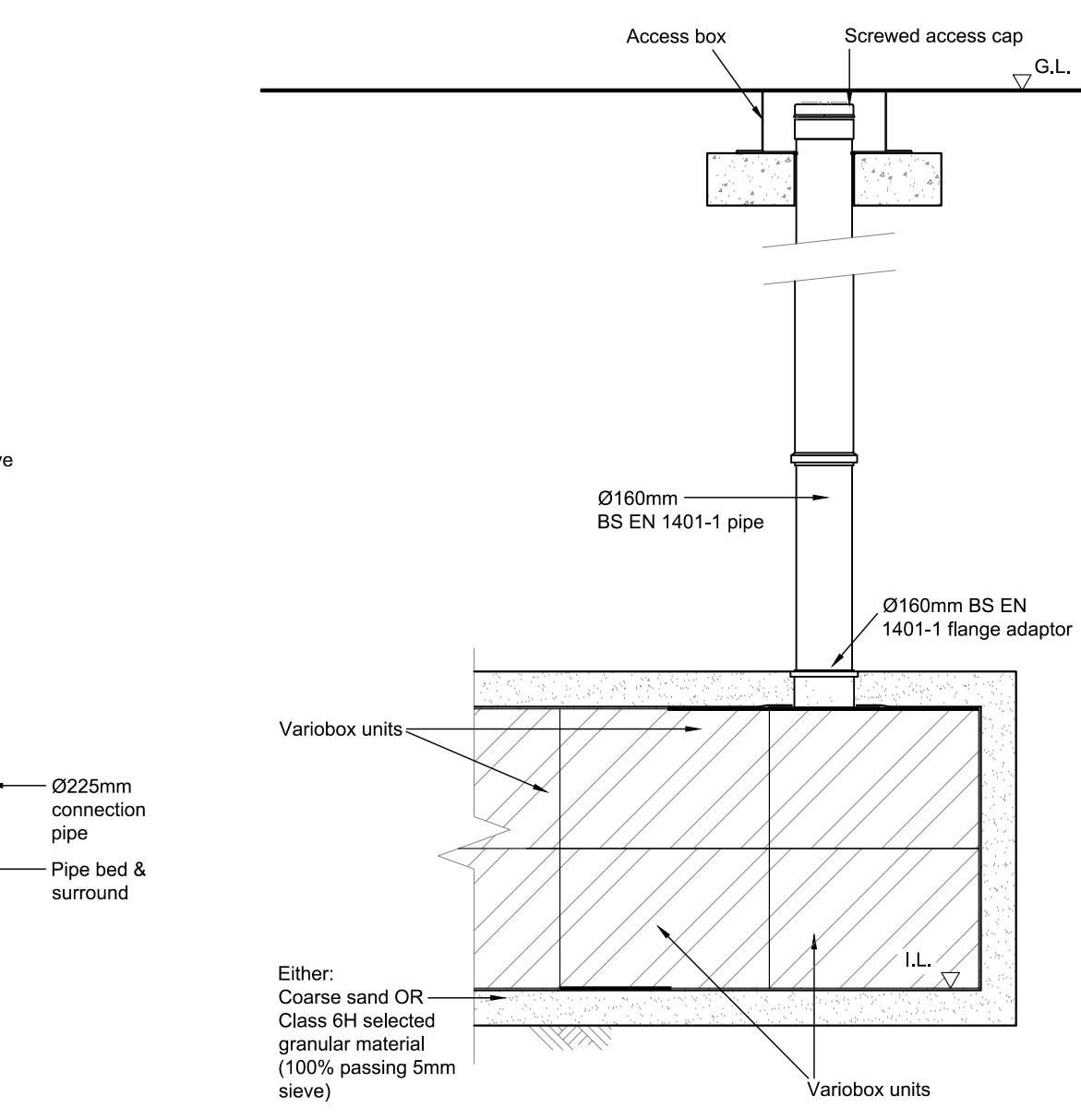
A Variobox Plus 600x600mm
Scale 1:20
B Variobox Plus 300x600mm w/channel
Scale 1:20
C Variobox Plus 300x600mm
Scale 1:20
D Variobox Plus Connection Detail
Scale 1:5



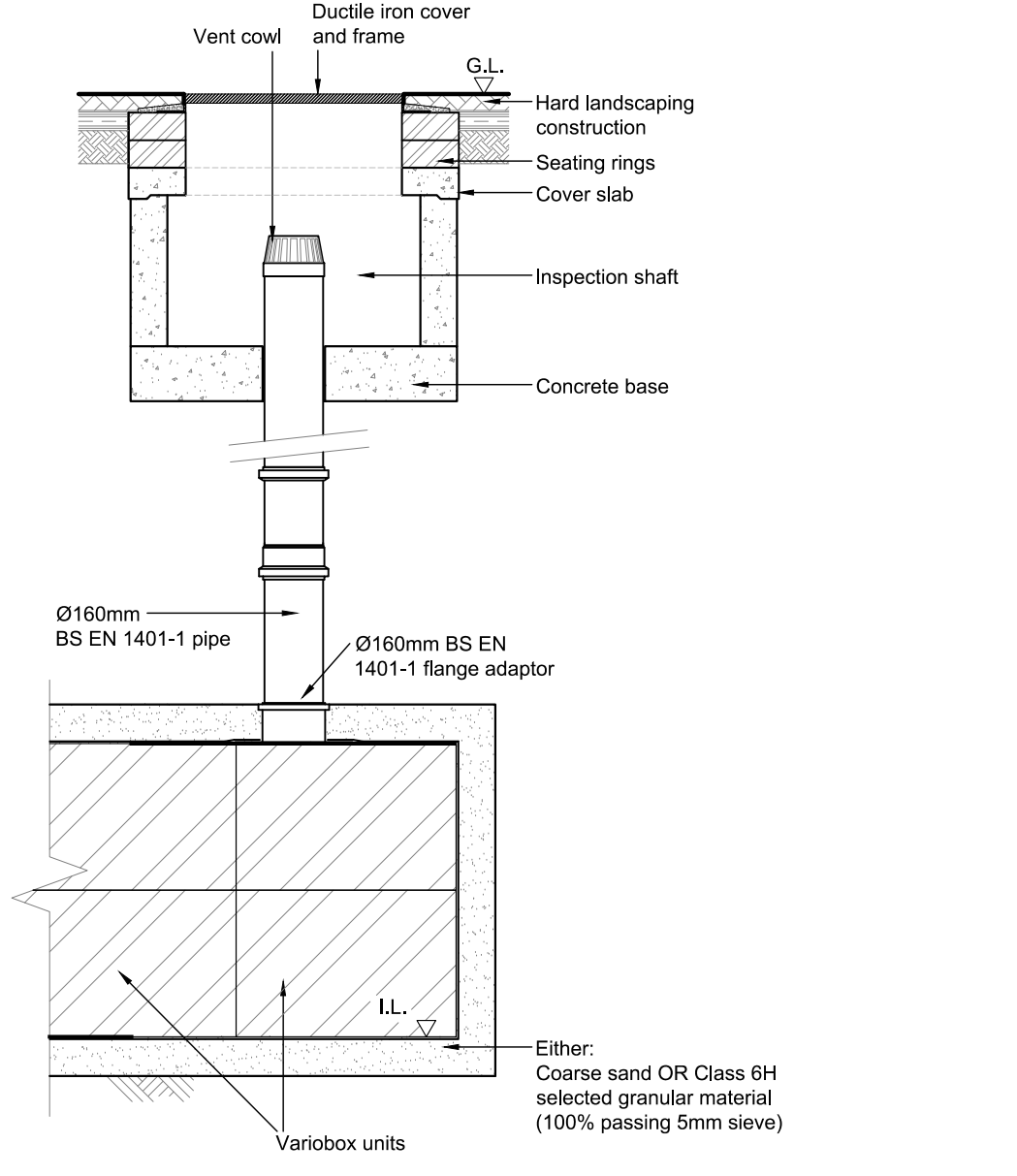
01 Typical Installation with Vent to Downstream Manhole
Scale 1:20



D Variobox Plus Connection Detail
Scale 1:5



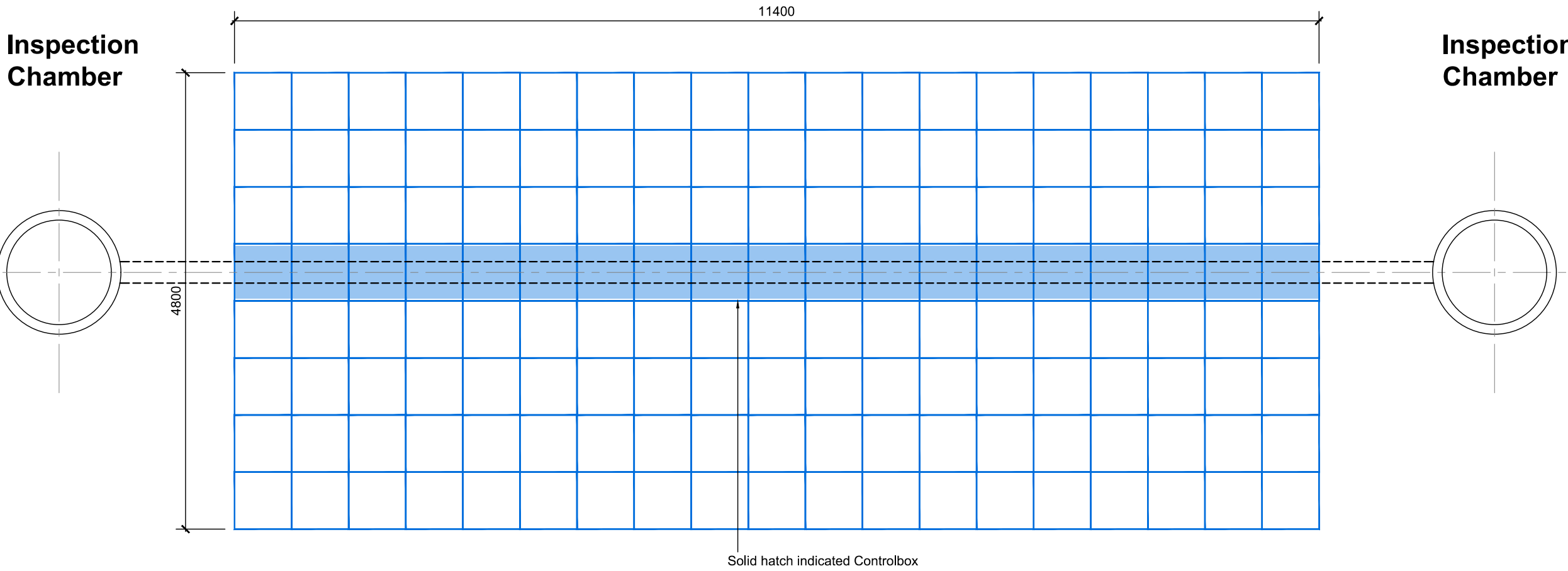
02 Vertical Vent Pipe Connection - Field Conditions
Scale 1:20



03 Vertical Vent Pipe Connection - Hard Landscape
Scale 1:20

Variobox Plus Specification				
Ultimate Compressive Strength at Yield kn/m ²	Vertical	700		
Ultimate Compressive Strength at Yield kn/m ²	Lateral	200		
	Type 200	Type 300	Type 400	Type 600
Length	600 mm	600 mm	600 mm	600 mm
Width	600 mm	600 mm	600 mm	600 mm
Height	200mm	300mm	400mm	600mm
Structure Volume m ³	0.072	0.108	0.144	0.216
Storage Volume m ³	0.0684	0.1026	0.1368	0.2052
Weight	3.6kg	5.4kg	7.2kg	10.8kg
Colour	Black	Black	Black	Black

Variobox Traffic Specification				
Ultimate Compressive Strength at Yield kn/m ²	Vertical	400		
Ultimate Compressive Strength at Yield kn/m ²	Lateral	100		
	Type 200	Type 300	Type 400	Type 600
Length	600 mm	600 mm	600 mm	600 mm
Width	600 mm	600 mm	600 mm	600 mm
Height	200mm	300mm	400mm	600mm
Structure Volume m ³	0.072	0.108	0.144	0.216
Storage Volume m ³	0.0684	0.1026	0.1368	0.2052
Weight	3.6kg	5.4kg	7.2kg	10.8kg
Colour	Green	Green	Green	Green



04 Typical Installation
Scale 1:50

CELLULAR STORAGE
11400 x 4800 x 1200mm DEEP
Structure Volume = 65.7m³ storage
95% void ratio = 62.4m³
No. of Crates = 304units

NOTES
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This information is of a generic nature and is provided for guidance purposes only. Final determination of the suitability of any information or material for your intended use will be site specific, and as such the manner of use is your sole responsibility, for which you must assume all risk and liability in this regard. This information is not intended to have any legal effect, whether by way of advice, representation or warranty.
Particular application and specific site conditions can be discussed in further detail with our technical representative.

REV DATE 25/10/12 DRAWN ACS CHECK



Unit 2, Andoversford Industrial Estate
Andoversford
Cheltenham,
Gloucestershire
GL54 4LB
Tel: +44 (0)1242 821678
email: sales@hewitech.co.uk
web: www.hewitech.co.uk

PROJECT EMAIL ADDRESS sales@hewitech.co.uk
PROJECT Standard Details
TITLE Vatiobox Plus
Standard Attenuation Details
SCALE @ A1 As Shown
PROJECT NO. 12-086
DRAWING NO. 0001
REV



Drop-Man Kit - Strap DMKDM-S

Instructions



Green-tech endeavour to ensure that the information given on this technical data sheet is accurate, but accept no liability for its use or its suitability for particular application.

Rabbit Hill Business Park, Great North Road, Arkendale, Knaresborough HG5 0FF

T: 01423 332100 E: sales@green-tech.co.uk W: www.green-tech.co.uk Facebook: @greentechuk Twitter: @greentechltd

Installation Method

1. Excavate the tree pit to the required size.
2. Place all Drop-Man anchor plates in a tripod fashion outside the rootball diameter ensuring that the end loop is sitting $\frac{3}{4}$ up from the bottom of the rootball (see fig 1).
3. Back fill part of the excavation to cover the Drop-Man anchors and consolidate the soil.
4. Install tree rootball.
5. Thread the free end of the tensioning strap (which is attached to the ratchet tensioner) through the D-rings evenly over the rootball.
6. Pass one end of the strap through the bottom ratchet slot (Fig:2) and pass the strap back on itself (Fig:3)
7. Pull the strap tight and cut off the remaining excess strap leaving approximately 50mm through the ratchet.
8. With the short tail of strap (about 50mm) protruding, pump the ratchet until the rootball is secure.
9. Whilst using the ratchet tensioner check that each leg of the strap is centered on the rootball, as per Fig:1.
10. Remove all equipment and any spare strap section from the pit.
11. Back fill the pit to cover the rootball and continue until the pit is back to ground level.
12. Always ensure newly installed trees are re-checked after 3 days to allow for settlement.

Fig: 1



Fig: 2



Fig: 3



Rootball

Information table

Stem circumference in cm	Rootball ø* in cm	Rootball height* in cm	Rootball weight* in kg
12 - 14	40	55 - 60	50
14 - 16	50	55 - 60	100
16 - 18	50	55 - 60	135
18 - 20	60	55 - 60	150
20 - 25	60 - 65 - 70	55 - 60	250
25 - 30	70 - 75	± 70	350
30 - 35	80 - 90	± 70	550
35 - 40	90 - 100	± 70	750
40 - 45	110	± 80	800
45 - 50	120 - 140	± 80	1.200
50 - 60	130 - 140	± 80	1.500
60 - 70	170	80 - 110	1.500 - 1.800
70 - 80	170 - 180	80 - 110	2.000 - 3.000
80 - 90	180 - 200	80 - 110	3.000 - 4.000
90 - 100	200 - 220	80 - 110	4.000 - 5.500
100 - 120	220 - 240	80 - 110	5.500 - 7.500
120 - 140	240 - 260	80 - 110	7.500 - 10.000

* Please note all heights and weights are averages and can be used as **indication** only.

Some trees are rootballed with a Holmac rootball machine and other rootballs are made using an Opitz or Damcon rootball machine. Because of the difference in machinery, rootball sizes may vary. The size of the rootball depends on the girth of the stem and the volume of the canopy.



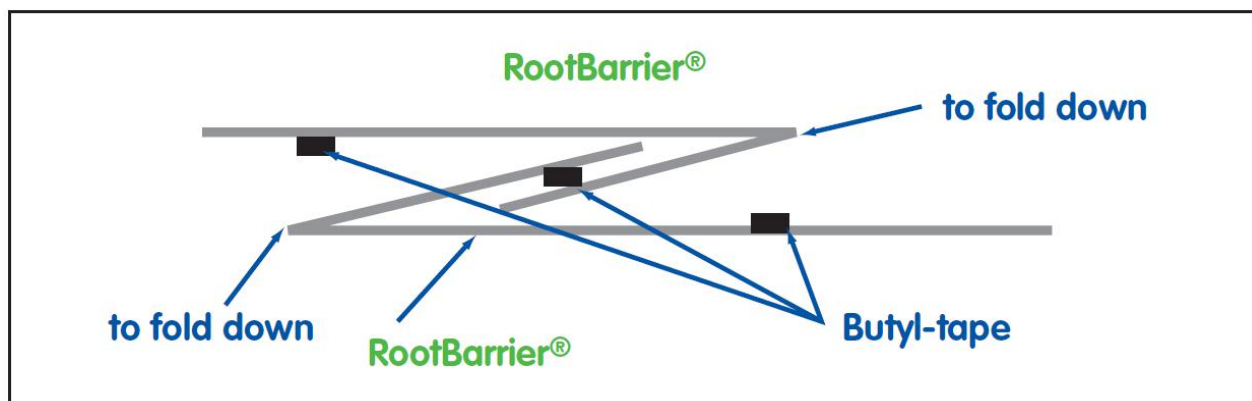
gtRootbarrier Installation Guide

Installation Steps:

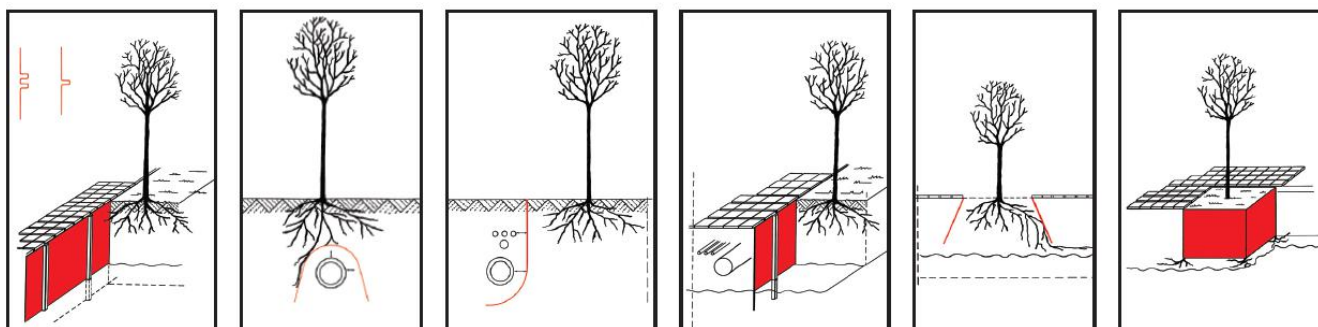
1. Dig a trench or tree hole
2. Roll out gtRootbarrier beside the trench or the tree hole and cut to the right length.
3. For trench planting over 50m in length, use a 1m overlap and butyl joining tape to secure 2 sheets of gtRootbarrier.
4. For planting around tree, shrubs or plants utilise a 50cm overlap and butyl joining tape to secure 2 sheets of gtRootbarrier.
5. Place gtRootbarrier with its smooth, coated side towards the roots of the tree.
6. Check overlaps, joins and position of gtRootbarrier
7. Fill in the trench or tree hole.

These are general instructions. The installer will have to make allowances for local conditions.

Rootbarrier Joining Guide:



Rootbarrier® Applications:



Green-tech endeavour to ensure that the information given on this technical data sheet is accurate, but accept no liability for its use or its suitability for particular application.

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October 2024

SmartSponge

The Naylor SmartSponge is a unique hydrocarbon removal system designed to remove the oil and permanently bond it into the molecular structure of the material so it cannot be removed under any circumstances. The subsequent waste material can be recycled via a waste to energy facility. SmartSponge is available in different product ranges, they include smart gully adaptors, smart chambers, urban filters and skimmers.



Material	SmartSponge is a proprietary combination of synthetic polymers with a unique molecular structure that is chemically selective to hydrocarbons.
Colour	White/cream
Performance	Has the capacity to absorb up to five times its own weight (depending on the type of oil contaminant) and remove up to 95% of the hydrocarbons present in stormwater run-off. Smart Sponge has a minimum mitigation index of 0.7 for hydrocarbons. Packs have a typical expected life between 1-3 years.
Maintenance	Recommended that the packs are weighed monthly for the first 3 months to track absorption rate, this will then give you a greater understanding as to how often maintenance is required. The maintenance is based on contamination rate of the water. Typically, a 6-month inspection is recommended but it can be dependent on the application. For more information on maintenance and installation please see our brochure which is available on the website.
Disposal	Spent packs are classified as hazardous waste, so will need to be disposed of an authorized facility. Visit www.gov.uk/hazardous-waste-disposal for more details. Please follow guidelines correctly to make sure you are not causing harm to the environment.

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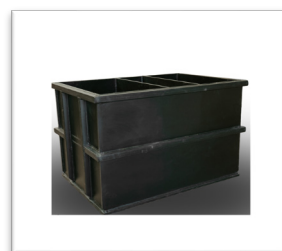
Smart Gully Adaptor (SGA)		
Code	Dimensions(mm)	Pack QTY
SGA01 - 12	260x160x75	12
SMPK66-2.5	150X150X62.5	



Passive Skimmers		
Code	Dimensions(mm)	Pack QTY
PS1313	330x330	40
PS1818	457X457	20
PS2727	686X686	10



Line Skimmers			
Code	Length(m)	Dry Weight(kg)	Pack QTY
LS104-10	1.2	0.7	10
LS110-04	3	1.9	4
LS303-04	1.2	2.2	4
LS308-04	2.4	4.4	4
LS408-04	2.4	5.9	4



Smart Filter Chamber				
Code	Dimensions (m)	No of 380x380 Smart Paks	Max Flow (l/s)	Max oil capacity (litres)
SF03.1A	0.8 x 1.2 x 1.2	4	44	48
SF03.1B	0.8 x 1.2 x 1.2	8	88	96
SF03.2A	1.2 x 1.8 x 2.0	12	130	144
SF03.2B	1.2 x 1.8 x 2.0	24	265	288
SF03.2C	1.2 x 1.8 x 2.0	32	350	384
SF03.3A	1.2 x 1.8 x 2.0	40	425	480



Smart Brake		
Code	Dimensions(mm)	Pack QTY
SB01-30302	360x330x330	1
SB02-38382	400x400x400	1



Smart Stop		
Code	Dimensions(mm)	Pack QTY
SS01-30302	360x330x330	1
SS01-38382	400x400x400	1

For further product information, please see our SmartSponge brochure, which you can find on our website in the Resource hub.

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THE SMARTER SOLUTION TO:

Remove hydrocarbons from carriageway run-off

"In tests, Wiltshire County Council reduced hydrocarbon concentrations in their road gullies from 8,000ppm to 1ppm"

Smart Gully® Range

The clever push fit design incorporates a finned rubber gasket ensuring a snug fit replacing the rodding bung ensuring no loss of hydraulic capacity or engineering design. Smart Gully® incorporates the unique Smart Sponge® technology that removes hydrocarbons from stormwater.

The Smart Gullies® have a Smart Gully Adaptor® already fitted and are supplied complete with a purpose designed Smart Pak® already installed and are available for both plastic and concrete gullies.

Range table (Complete Smart Gully® units)

Prod No.	Description	Dims (mm)
SGCO2	Concrete Smart Gully®	375 ID 900 deep
SGCO3	Concrete Smart Gully®	450 ID 750 deep
SGCO4	Concrete Smart Gully®	450 ID 900 deep
SGCO5	Concrete Smart Gully®	450 ID 1050 deep
SGP67004	Plastic Smart Gully®	450 ID 900 deep x 160 outlet
SGP67005	Plastic Smart Gully®	450 ID 750 deep x 160 outlet
SGP67003	Plastic Smart Gully®	450 ID 900 deep x 178 outlet
SGP67009	Plastic Smart Gully®	450 ID 750 deep x 178 outlet
SGP67002	Plastic Smart Gully®	375 ID 750 deep x 178 outlet
SGV07536	Vitrified Clay Smart Gully®	300 ID 610 deep x 100 outlet
SGV07537	Vitrified Clay Smart Gully®	300 ID 610 deep x 150 outlet
SGV07545	Vitrified Clay Smart Gully®	375 ID 760 deep x 150 outlet
SGV07556	Vitrified Clay Smart Gully®	450 ID 915 deep x 150 outlet

* all Smart Gullies® c/w 1 x Adaptor.

The special Smart Gully Adaptors® (SGA) are also available for retrofitting in existing gullies:



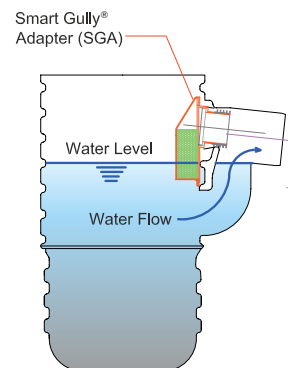
SGA - Backplate



SGA - Frontplate

Range table (Smart Gully Adaptor® units & spares)

Prod No.	Description	Dims (mm)
SGA01 - 12	Smart Gully Adaptor® (body only)	H260 x W160 x D75 Not including spigot
SGA02 - 12	Smart Gully Adaptor® c/w Smart Pak & seal	H260 x W160 x D75 Not including spigot
SGS01	Smart Seal for SGA (spare)	100 x 110 dia
SMPK66-2.5	Smart Sponge® Smart Pak refill	150 x 150 x 62.5



Naylor Smart Gully® Showing SGA inserted into rodding eye, resulting in no reduction in flow.

Smart Sponge® technology is based on its proprietary blend of synthetic polymers aimed at removal of hydrocarbons and oil derivatives from surface water.

This unique process creates a very porous structure with hydrophobic and oleophilic characteristics capable of selectively removing hydrocarbons while allowing high flow through rates for water.

As hydrocarbons are absorbed into its structure, the Smart Sponge® swells and maintains porosity and filtering capabilities.



The Smart Sponge® unique molecular structure is based on innovative polymer technologies that are chemically selective to hydrocarbons.

The SGA's have a purpose designed Smart Pak® fitted to absorb the hydrocarbons - it is specially designed to last 12 months in a worst case scenario and maintenance is simplicity itself and takes just a few seconds.

The Smart Sponge® technology transforms the pollutants into a stable solid waste for easy recycling.

Smart Sponge® waste to energy finalises the closed-loop solution with the spent Smart Sponge® creating 10,000-18,000 BTU per pound with no resulting waste product.

Smart Sponge® can also be used as an anti-microbial technology capable of destroying disease causing micro-organisms from surface water such as E.coli, Streptococcus and Enterococci to name but a few.

The Smart Sponge® Family

Smart Filter® Chamber Range

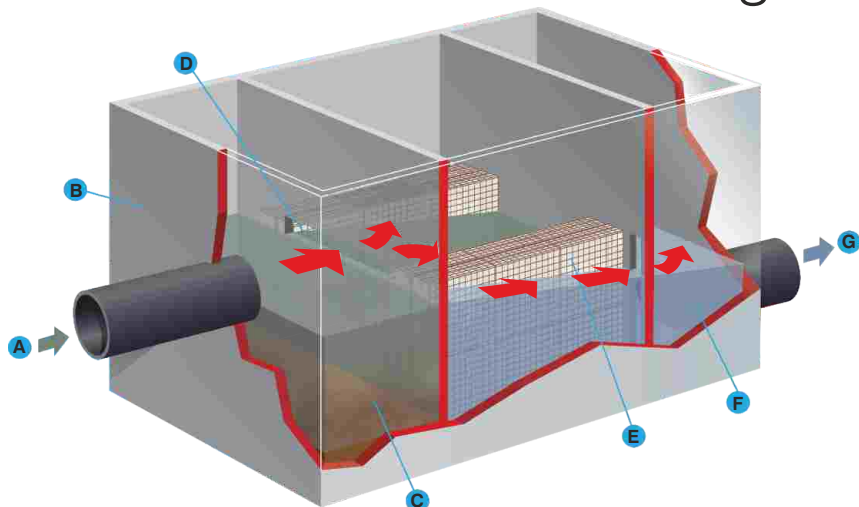


Diagram Key

- A. Inflow
- B. Lightweight composite chamber with vehicle loading capability
- C. Chamber with weir to trap sediment
- D. Flow passes through Smart Paks and through side orifices
- E. Smart Paks to absorb hydrocarbons
- F. Collection chamber with outlet to sewer
- G. Outflow

Note: Arrows show direction of water flow

Smart Filters® for Highways, Large Catchment Areas etc:

Specifically designed for extreme storm events and larger flow situations, the basic principles of the smaller Smart Filters® can be adapted to virtually any flow and also adapted to site restrictions.

The Smart Filters® come in several standard modular chamber sizes but can also be manufactured bespoke to suit specific site conditions. Contaminated wastewater enters the system into a settlement chamber and passes through an orifice into a distribution chamber and then is passed through the Smart Sponge® units (Paks) which removes up to 95% of all hydrocarbons. The cleaned water then passes through purpose designed side orifices to exit the treatment chamber via the outlet pipe.



Smaller Smart Filter® being lowered into position

Smart Filter's® Advantages:

- Treats 100% of the storm flow
- Removes 95% of hydrocarbons
- Removes heavy metals & silts
- Can cope with extreme conditions
- Shallow excavations
- Low head drop
- Modular design
- Virtually any flow catered for
- Waste product 100% recyclable
- Easy maintenance procedure

Prod No.	Description	Dimensions WxLxH	Treated Flow (l/s)	Max Flow (l/s)	380 x 380 Smart Paks	Pak Height (no.)	Aux Silt Capacity	Max Oil Capacity	Head Drop across unit
SF03.1A	Smart Filter® 44 l/s Flow, c/w 200mm dia pipes	0.8 x 1.2 x 1.2	10.9	44	4	1	190 litres	48 litres	380mm
SF03.1B	Smart Filter® 88 l/s Flow, c/w 300mm dia pipes	0.8 x 1.2 x 1.2	21.7	88	8	1	75 litres	96 litres	380mm
SF03.2A	Smart Filter® 130 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	32.6	130	12	1	210 litres	144 litres	380mm
SF03.2B	Smart Filter® 265 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	70.4	265	24	2	420 litres	288 litres	760mm
SF03.2C	Smart Filter® 350 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	94	350	32	2	75 litres	384 litres	760mm
SF03.3A	Smart Filter® 400 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	117	425	40	2	275 litres	480 litres	760mm

N.B. A suitable hydrodynamic separator (HDS) should be utilised prior to the Smart Filter® to remove the majority of silt from entering the filter. An auxiliary silt storage, is provided as a fail safe on all units. Treated Flow calculations are calculated according to first flush effect for typical storms.