

TRANSPORT & INFRASTRUCTURE

Glencar Construction
Plot M Kingsway Business Park
Rochdale

Sustainable Drainage Management and
Maintenance Plan

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Plot M Kingsway Business Park
Rochdale

Sustainable Drainage Management and Maintenance Plan

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23.06.23

DOCUMENT ISSUE RECORD

Document Number:	KPM-BWB-DDG-XX-RP-D-1010
BWB Reference:	MCS2071

Revision	Date of Issue	Status	Author:	Checked:	Approved:
1	08.06.23	Draft	Ieva Baciulyte Senior Engineer	Paul Laidler Design Manager	Paul Laidler Design Manager
			IB	P. Laidler	P. Laidler
2	22.06.23	Planning	Ieva Baciulyte Senior Engineer	Paul Laidler Design Manager	Paul Laidler Design Manager
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3	23.06.23	Planning	Ieva Baciulyte Senior Engineer	Paul Laidler Design Manager	Paul Laidler Design Manager
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1. INTRODUCTION

Summary Information

- 1.1 This Sustainable Drainage Management and Maintenance Plan has been produced by BWB Consulting Ltd on behalf of Glencar Construction in respect of a site located off John Milne Way, Rochdale, approximate grid reference 391430, 411980. The proposed development comprises three warehousing units and an access road.
- 1.2 This report sets out the principles for the maintenance and management of the Sustainable Drainage Systems (SuDS) proposed for the site. Regular inspections and maintenance are crucial for the effective operation of green infrastructure.
- 1.3 This MP should be read in conjunction with the BWB Flood Risk Assessment (FRA) ref: KPM-BWB-ZZ-XX-RP-YE-0001_FRA and Sustainable Drainage Statement (SDS) ref: KPM-BWB-ZZ-XX-RP-CD-0001_SDS produced as part of the planning application.

Limitations

This report has been prepared for the sole use of the Client. No other third parties may rely upon or reproduce the contents of this report without the written permission of BWB. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors do not owe them any Duty of Care or Skill.

This document is for information only and is based on the general maintenance expectations for the Project specified and the SuDS features proposed. The details contained herein are based on the general requirements for operation and maintenance based on the CIRIA C753 'The SuDS Manual' dated 2015. The specific requirements of each feature will need to be considered and reviewed by the Adopting Local Highway Authority based on their requirements.

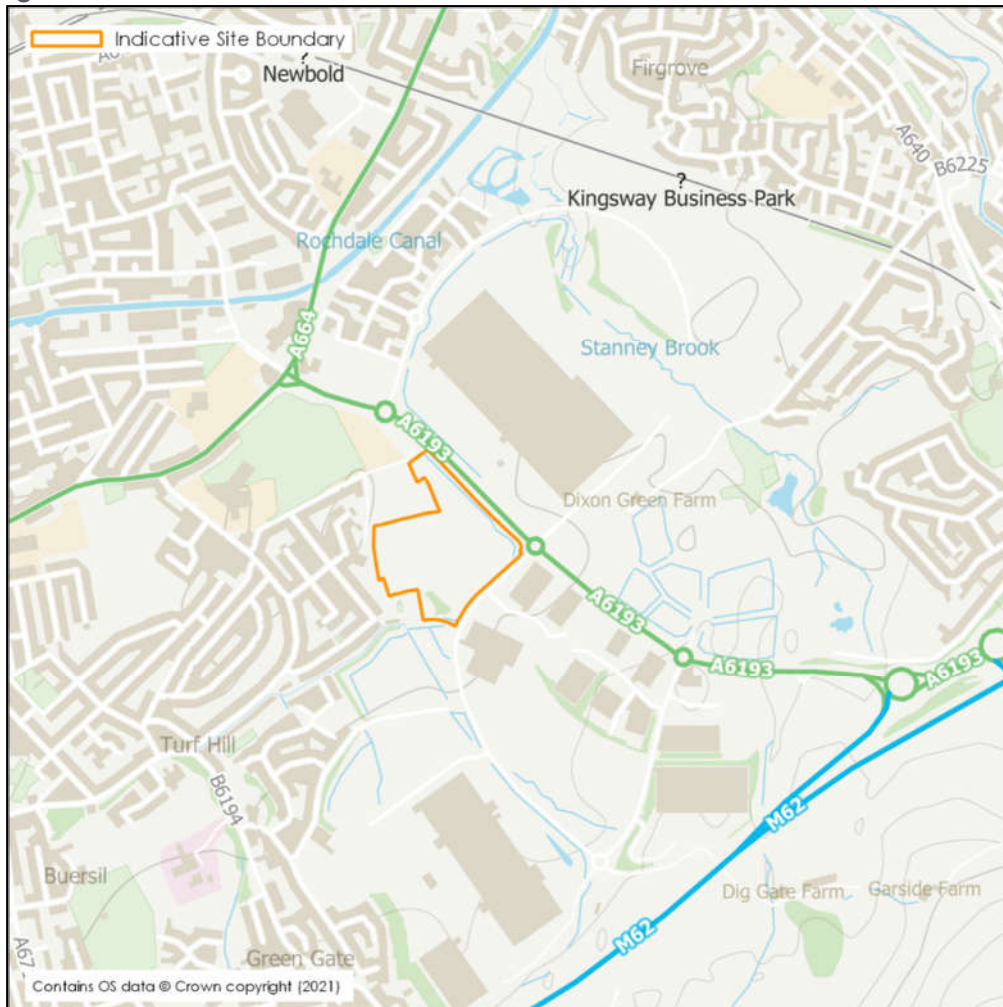
Inspection and maintenance aspects noted in this document will need to be reviewed and revised as necessary depending on the in-use performance and the information presented should be considered as a guide only.

2. THE SITE

Site Location

The site is located at the Kingsway Business Park near Rochdale. The location of the site is shown in Figure 2.1.

Figure 2.1: Site Location Plan



Site Description

The site forms an irregular shaped plot of land covering approximately 6.81 hectares.

The site was provided with an existing surface water drainage connection which conveyed surface water flows from the site to offsite sewers, ultimately discharging to existing attenuation ponds prior to discharge to the Stanney Brook.

Table 2.1: Site Details

Site Name	Plot M, Kingsway Business Park
Location	Rochdale
NGR (approx.)	391 430, 411 980
Application Site Area (ha)	6.81 ha
Development Type	Commercial
Lead Local Flood Authority	Rochdale Borough Council
Local Planning Authority	Rochdale Borough Council
Sewerage Undertaker	United Utilities

Proposed Development

The proposed development includes 3No distribution units with an associated access road. This has been constructed with completion being Summer 2023.

Proposed Surface Water Drainage Design

The proposed surface water drainage strategy incorporates SuDS which aim to reduce the impact of the development by replicating the natural runoff regime in a sustainable, cost-effective manner, whilst protecting water quality and reducing pollution.

The proposed drainage design has been developed as part of the wider drainage strategy for the Kingsway masterplan which allows for unrestricted discharge from the site up to the 100 year flow rate, with attenuation being provided for the additional water volumes for the 40% climate change allowance.

The primary storage feature for the site is the downstream attenuation ponds which provide storage for the 100 year event for the wider masterplan, including Plot M.

3. Management and Maintenance

During the development period and thereafter a maintenance and management regime will be adopted. The establishment and future success of the site is largely dependent on the standard and frequency of the subsequent maintenance and management it receives.

Maintenance responsibility should always be placed with an appropriate, long-term, accountable organisation. This often takes the form of a local or county council, sewerage undertaker or Management Companies. In this case, it is assumed a Management Company will be adopted.

It is understood that all adoptable drainage features shall be adopted by the Lead Local Flood Authority or the Local Highways Authority (both understood to be Rochdale Borough Council). For this particular scheme it is envisaged that all SuDS proposals will remain privately owned and managed.

The sustainable drainage measures proposed for the scheme include:

- Proprietary treatment systems
- Filter drains
- Attenuation storage tanks

The above SuDS features are supported by trapped gullies and sumps from linear drainage.

A specification for inspection and maintenance actions, including frequency of maintenance tasks required for each proposed SuDS, setting out a minimum standard to which the SuDS system must be maintained. This will include information relating to:

- Schedule of cleaning
- Inspection
- General repair and maintenance
- Replacement details and lifespan

For guidance relating to the maintenance of SuDS refer to the CIRIA C753 SuDS Manual¹, Part D and Part E Chapter 36. Also refer to CIRIA C753 SuDS Manual, Appendix B, Section B.8 for an indicative Maintenance Plan and Checklist.

Generally, maintenance will be in accordance with the specific requirements of each feature which are summarised in below paragraphs.

¹ The SuDS Manual C753" by CIRIA, 2015

Maintenance may require the input of specialists including proprietary suppliers and Landscape Architects / Installers / specialist consultants.

Proprietary Treatment Systems – Oil Interceptors

All oil interceptors that have been installed as part of the surface water drainage system shall be maintained in line with the specialist manufacturer's requirements. For location and type of interceptors refer to the proposed drainage layout in Appendix A. Data sheets along with the specific manufacturer's requirements are given Appendix B.

General maintenance requirements are highlighted in **Table A** below.

Table A: Maintenance of Oil Interceptors

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris and inspect for sediment oil and grease.	Six monthly
	Change the filter media	As recommended by the manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spills
Occasional Maintenance	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first six months of operation then every six months

Filter Drains

Operation and maintenance in accordance with local authority and/or water authority requirements where Adopted or in accordance with the Landscape Architects' specification and / or Clients' maintenance team requirements where to remain private (not adopted). Generally:

Table B: Maintenance of Filter Drains

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly or as required
	Inspect filter drain surface, inlet / outlet pipework and control systems for blockage, clogging, standing water and structural damage.	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies.	Half yearly
	Remove sediment from pre-treatment devices.	Half yearly or as required
Occasional Maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain using recommended methods (e.g. NJUG, 2007 or BS 3998:2110)	As required
	At locations with high pollution loads remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly or as required
	Clear perforated pipework of blockages	As required

Proprietary below ground Tank (including geocellular storage)

Operation and maintenance shall be in accordance with the tank manufacturers guidance and warranty requirements and will be product specific. Data sheets along with the specialist manufacturer's requirements are given in Appendix C. For location of the attenuation tanks refer to the proposed drainage layouts in Appendix A. General maintenance requirements are listed in **Table C** below.

Table C: Maintenance of Proprietary Below Ground Tank

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action.	Monthly for three months then annually
	Remove debris from the catchment surface.	Monthly
	For systems where infiltration enters into the tank from the above, check surface of filter material for blockage by sediment, algae or other material; remove and replace surface infiltration material as required.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually or as required.
Remedial Actions	Repair / rehabilitate inlets, outlets, overflows and vents	Annually or as required.
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Operation and Maintenance Requirements of the General Drainage Features

For the proposed drainage systems to perform effectively, it is essential that all inlet, outlets, flow control devices, gullies, pipes and manhole structures are monitored to ensure they remain operational. Any specific manufacturer recommendations should be adhered to in the first instance.

Following CIRIA guidance², during operational monitoring, the structures should be assessed against a range of criteria: condition, structural performance, hydraulic performance, environmental performance and health and safety.

Non return Valves

All non-return valves that are part of the surface water drainage system shall be inspected on a regular basis to ensure their optimum performance. Valves to be cleaned of any debris and silt to ensure that sealing or closing of the device is not affected. Valve flap to be checked regularly to ensure that it opens freely and has not been caught or damaged.

Any maintenance and repairs to be carried out by suitably qualified persons and in line with the specialist manufacturer's requirements.

Data sheets for the non-return valves are included in Appendix D. For location refer to the proposed drainage layout in Appendix A.

Flow Control Devices

All flow control devices that have been installed as part of the surface water drainage system shall be regularly inspected to ensure that the flow control chambers are free from debris that may obstruct the inlet to the flow control unit.

Should the flow control device become blocked a pivoting bypass door may be operated to drain down the chamber and enable access for repair / maintenance.

Any maintenance and repairs to be carried out by suitably qualified persons and in line with the specialist manufacturer's requirements.

For location of the flow control devices refer to the proposed drainage layouts in Appendix A. Data sheets can be found in Appendix E.

Penstocks

Penstocks that have been installed as part of the proposed surface water drainage system shall be inspected regularly to check for any damages and / or obstruction. Regular cleaning of the surface water drainage system shall be carried out regularly to prevent built up of debris and silt that may prevent the penstock from operating correctly.

Penstock to be tested regularly to ensure it is operational. Should any repairs be required these to be carried out by suitably qualified persons and in line with the specialist supplier's requirements.

² Culvert, screen and outfall manual (CIRIA, 2019)

For location of the penstock refer to the proposed drainage layout in Appendix A. Data sheets are included in appendix F.

Initial Inspections

In the months following construction, silt runoff and erosion will need to be managed rigorously until the disturbed soils have stabilised (through vegetation or other methods) to ensure structures do not become blocked. The frequency of inspections during this period should be determined based on the previous conditions reported on site and silt removal should be undertaken as required.

Ongoing Maintenance

The maintenance guidance for the drainage features on site is recorded in Table 3.15. In line with CIRIA definitions, inspections are separated into two categories, General and Principle, which are defined as follows:

A general inspection is the examination of all parts of a structure that can be inspected without specialist equipment.

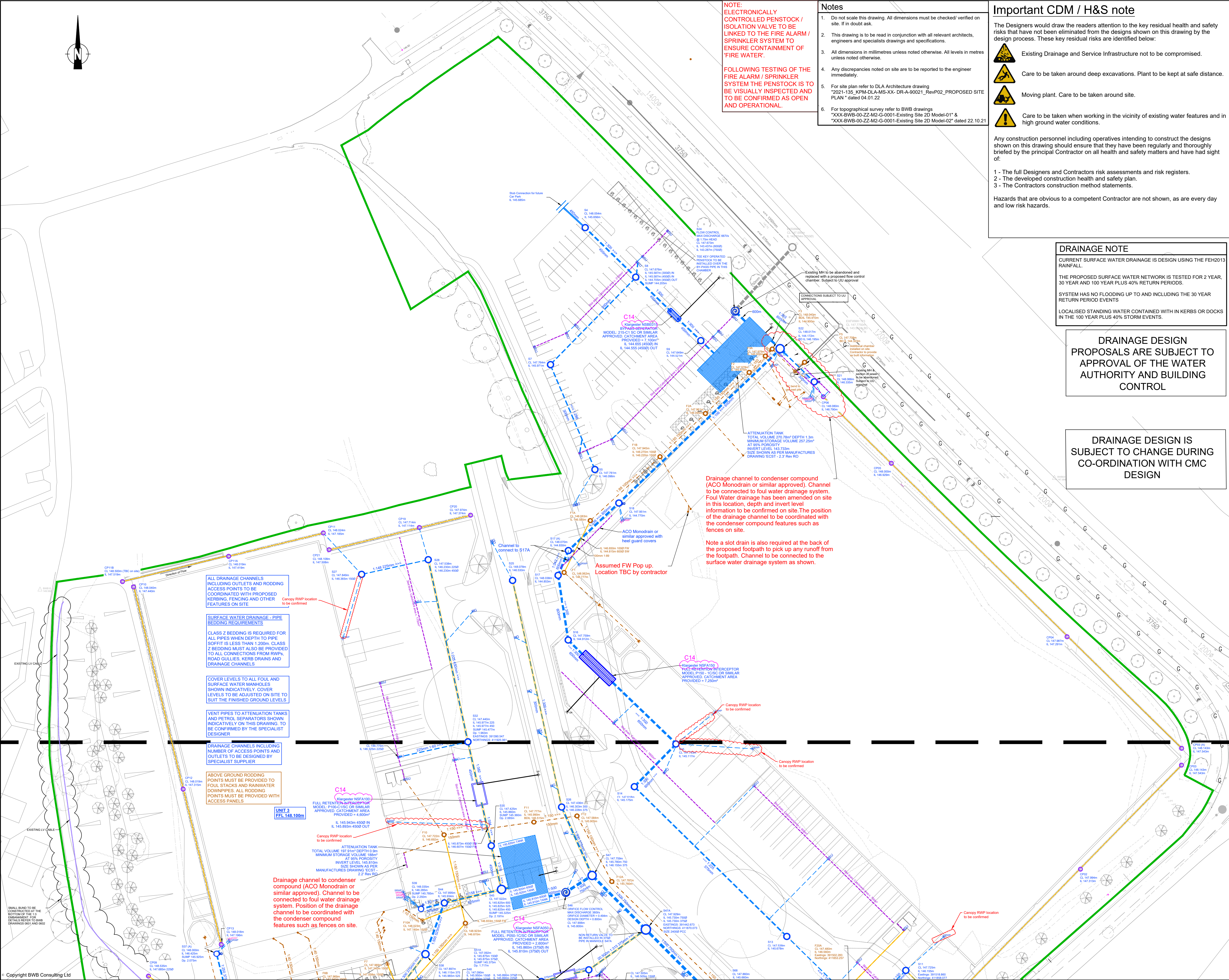
A principle inspection is defined as a close examination of all accessible parts, including adjacent earthworks, with man-entry or CCTV inspection taking place. (Pressure jetting may be required prior to CCTV inspection).

Table D: Maintenance of Drainage System

Maintenance Schedule	Required Action	By Whom?	Typical Frequency
Regular Inspection	Remove litter and debris	Suitably Trained Staff	Monthly, or as required
	General inspection of vortex flow control devices and other flow control installations (including orifice plates and penstocks if appropriate).	Suitably Trained Staff	Every 6 months, or after a large storm
	General inspection of inlet/outlet structures	Suitably Trained Staff	Every 6 months, or after a large storm
Occasional Maintenance	Principle inspection (CCTV or Man-Entry)	Suitably Trained Staff	Every 5 years, or as required
Remedial Actions	Blockage clearances	Civil Engineer	As required

Appendices

Appendix A - Drainage Layout



Important CDM / H&S note

The Designers would draw the readers attention to the key residual health and safety risks that have not been eliminated from the designs shown on this drawing by the design process. These key residual risks are identified below:

- Existing Drainage and Service Infrastructure not to be compromised.
- Care to be taken around deep excavations. Plant to be kept at safe distance.
- Moving plant. Care to be taken around site.
- Care to be taken when working in the vicinity of existing water features and in high ground water conditions.

Any construction personnel including operatives intending to construct the designs shown on this drawing should ensure that they have been regularly and thoroughly briefed by the principal Contractor on all health and safety matters and have had sight of:

- The full Designers and Contractors risk assessments and risk registers.
- The developed construction health and safety plan.
- The Contractors construction method statements.

Hazards that are obvious to a competent Contractor are not shown, as are every day and low risk hazards.

DRAINAGE NOTE

CURRENT SURFACE WATER DRAINAGE IS DESIGN USING THE FEH2013 RAINFALL.

THE PROPOSED SURFACE WATER NETWORK IS TESTED FOR 2 YEAR, 30 YEAR AND 100 YEAR PLUS 40% RETURN PERIODS.

SYSTEM HAS NO FLOODING UP TO AND INCLUDING THE 30 YEAR RETURN PERIOD EVENTS

LOCALISED STANDING WATER CONTAINED WITH IN KERBS OR DOCKS IN THE 100 YEAR PLUS 40% STORM EVENTS.

DRAINAGE DESIGN PROPOSALS ARE SUBJECT TO APPROVAL OF THE WATER AUTHORITY AND BUILDING CONTROL

DRAINAGE DESIGN IS SUBJECT TO CHANGE DURING CO-ORDINATION WITH CMC DESIGN

Drainage Key	
	Proposed Surface Water Drainage
	ACO Slot Drain - Refer to ACO Design
	ACO Kerb Drain - Refer to ACO Design
	Slot Drain - Gatic
	Catchpit Manhole
	Filter drain
	Surface Water Back Drop
	Gully
	Rain Water Pipe
	Siphonic Rain Water Pipe (Primary)
	Siphonic Rain Water Pipe (Secondary)
	Channel Drain Sump
	Surface Water Vented Access Chamber
	Cellular Attenuation Tank
	Full Retention Interceptor
	Petrol Interceptor Vent Pipe
	Proposed Foul Sewer Drainage
	Foul Back Drop
	Foul Pop Up
	Sprinkler Tank Drain Down
	Concrete Surround
	Existing Surface Water Drainage
	Existing Foul Sewer Drainage
	Surface Water Flow Control Chamber
	Site Boundary
	PPIC with 300mm concrete surround and load class D400 cover

C14	23.06.23	Drawing amended as clouded	JA	P.J.L
C13	25.05.23	Drawing amended as clouded	IB	P.J.L
C12	20.04.23	Drawing amended as clouded	IB	J.R
C11	26.02.23	Drainage in M1 car park amended to suit contractors comments and as built attenuation tank details. Drainage channels removed and gullies added on S38 Road as requested by R&C. Drainage to Units 2 and 3 amended to suit the updated finished levels. Drainage to condenser units added.	IB	J.R
C10	13.12.22	Drawing amended in line with latest drainage pop up locations and comments from contractor	IB	J.R
C09	17.11.22	Drainage amended to suit contractors comments	MH	J.R
C08	09.11.22	Foul pop ups in unit M1 amended and F3A added	MH	J.R
C07	08.11.22	Drainage updated to suit contractors comments	MH	J.R
C06	20.10.22	Bund filter drain location updated	JT	J.R
C05	19.10.22	Unit M1 foul drainage run lifted	JT	J.R
C04	10.10.22	Updated to suit Unit M3 siphonic requirement	JT	J.R
C03	07.10.22	Updated to suit confirmed Siphonics & attenuation tank details	JT	J.R
C02	12.09.22	Drainage updated to suit latest levels	JT	J.R
C01	22.06.22	Construction Issue	MM	J.R
T03	07.04.22	Revised to suit DLA comments	MM	J.R
T02	04.02.22	Outfall amended- See revision cloud	MM	J.R
T01	10.12.21	Tender Issue	DR	J.R
Rev	Date	Details of issue / revision	Drw	Rev

Issues & Revisions	
	☐ Birmingham | 0121 233 3322 ☐ Leeds | 0113 233 8000 ☐ London | 020 7407 3879 ☒ Manchester | 0161 233 4260 ☐ Nottingham | 0115 924 1100 www.bwbconsulting.com

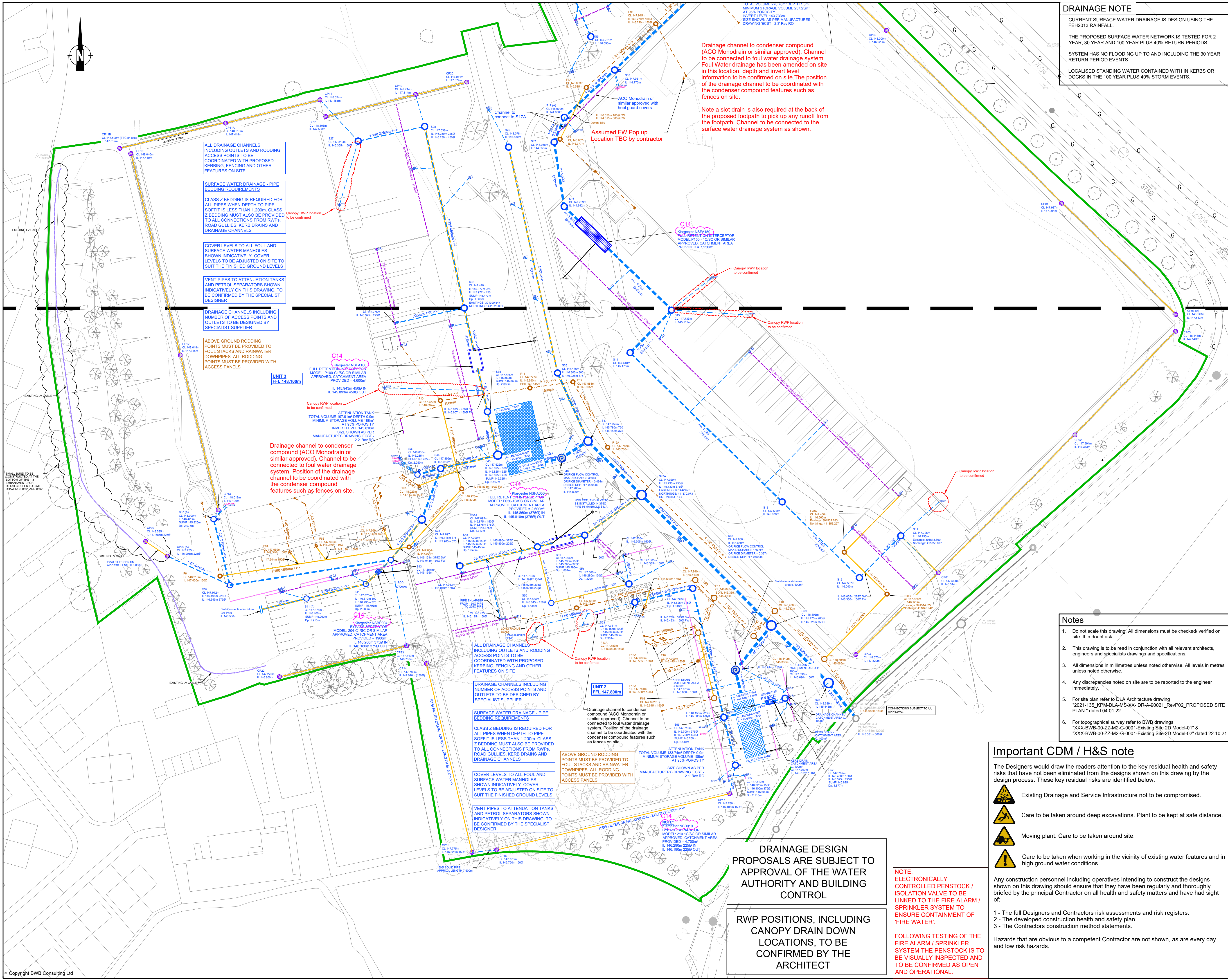
Client
Wilson Bowden

Glencar CONSTRUCTION

Project Title
Plot M Kingsway Business Park

Drawing Title
Proposed Drainage Layout Sheet 1

Drawn:	D Ryan	Reviewed:	J Roberts
BWB Ref:	MCS2071	Date:	Dec 21
Scale@A1:	1:500		
Drawing Status			
Construction Issue			
Project - Originator - Zone - Level - Type - Role - Number	Status	Rev	
G1135-BWB-XX-XX-DR-D-0501	A1	C14	



DRAINAGE NOTE

CURRENT SURFACE WATER DRAINAGE IS DESIGN USING THE FEH2013 RAINFALL.

THE PROPOSED SURFACE WATER NETWORK IS TESTED FOR 2 YEAR, 30 YEAR AND 100 YEAR PLUS 40% RETURN PERIODS.

SYSTEM HAS NO FLOODING UP TO AND INCLUDING THE 30 YEAR RETURN PERIOD EVENTS

LOCALISED STANDING WATER CONTAINED WITH IN KERBS OR DOCKS IN THE 100 YEAR PLUS 40% STORM EVENTS.

- Drainage Key**
- Proposed Surface Water Drainage
 - ACO Slot Drain - Refer to ACO Design
 - ACO Kerb Drain - Refer to ACO Design
 - Slot Drain - Gatic
 - Catchpit Manhole
 - Filter drain
 - Surface Water Back Drop
 - Gully
 - Rain Water Pipe
 - Siphonic Rain Water Pipe (Primary)
 - Siphonic Rain Water Pipe (Secondary)
 - Channel Drain Sump
 - Surface Water Vented Access Chamber
 - Cellular Attenuation Tank
 - Full Retention Interceptor
 - Petrol Interceptor Vent Pipe
 - Proposed Foul Sewer Drainage
 - Foul Back Drop
 - Foul Pop Up
 - Sprinkler Tank Drain Down
 - Concrete Surround
 - Existing Surface Water Drainage
 - Existing Foul Sewer Drainage
 - Surface Water Flow Control Chamber
 - Site Boundary
 - PPIC with 300mm concrete surround and load class D400 cover

C14	23.06.23	Drawing amended as clouded	JA	FJL
C13	20.04.23	Drawing amended as clouded	IB	JR
C12	26.02.23	Drainage in M1 car park amended to suit contractors comments and as built attenuation tank details. Drainage channels removed and gullies added on S38 Road as requested by RBC. Drainage to Units 2 and 3 amended to suit the updated finished levels. Drainage to condensers units added.	IB	JR
C11	13.12.22	Drainage amended in line with latest drainage pop up locations and comments from contractor	IB	JR
C10	01.12.22	Drainage amended to suit the latest RWP positions for all canopies. Surface water drainage to units 2 and 3 amended to suit the latest hydraulic calculations and clients comments.	IB	JR
C09	17.11.22	Drainage updated to suit contractors comments	MH	JR
C08	08.11.22	Drainage updated to suit contractors comments	MH	JR
C07	28.10.22	Amended to suit contractors comments	MH	JR
C06	20.10.22	Bund filter drain location updated	JT	JR
C05	19.10.22	Unit M1 foul drainage run lifted	JT	JR
C04	10.10.22	Updated to suit Unit M3 siphonic requirement	JT	JR
C03	07.10.22	Updated to suit confirmed Siphonics & attenuation tank details	JT	JR
C02	12.09.22	Drainage updated to suit latest levels	JT	JR
C01	22.06.22	Construction Issue	MM	JR
T02	07.04.22	Future B2 Car Park drainage removed	MM	JR
T01	10.12.21	Tender Issue	DR	JR
Rev	Date	Details of issue / revision	Drw	Rev

- Notes**
- Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
 - This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
 - All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
 - Any discrepancies noted on site are to be reported to the engineer immediately.
 - For site plan refer to DLA Architecture drawing "2021-135_KPM-DLA-MS-XX-DR-A-90021_RevP02_PROPOSED SITE PLAN" dated 04.01.22
 - For topographical survey refer to BWB drawings "XXX-BWB-00-ZZ-M2-G-0001-Existing Site 2D Model-01" & "XXX-BWB-00-ZZ-M2-G-0001-Existing Site 2D Model-02" dated 22.10.21

Important CDM / H&S note

The Designers would draw the readers attention to the key residual health and safety risks that have not been eliminated from the designs shown on this drawing by the design process. These key residual risks are identified below:

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- Care to be taken around deep excavations. Plant to be kept at safe distance.
- Moving plant. Care to be taken around site.
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- The Contractors construction method statements.

Hazards that are obvious to a competent Contractor are not shown, as are every day and low risk hazards.

DRAINAGE DESIGN PROPOSALS ARE SUBJECT TO APPROVAL OF THE WATER AUTHORITY AND BUILDING CONTROL

RWP POSITIONS, INCLUDING CANOPY DRAIN DOWN LOCATIONS, TO BE CONFIRMED BY THE ARCHITECT

NOTE:
ELECTRONICALLY CONTROLLED PENSTOCK / ISOLATION VALVE TO BE LINKED TO THE FIRE ALARM / SPRINKLER SYSTEM TO ENSURE CONTAINMENT OF 'FIRE WATER'.

FOLLOWING TESTING OF THE FIRE ALARM / SPRINKLER SYSTEM THE PENSTOCK IS TO BE VISUALLY INSPECTED AND TO BE CONFIRMED AS OPEN AND OPERATIONAL.

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☐ Manchester | 0161 233 4260
☐ Nottingham | 0115 924 1100
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Client
Wilson Bowden

Glencar CONSTRUCTION

Project Title
Plot M Kingsway Business Park

Drawing Title
Proposed Drainage Layout Sheet 2

Drawn:	D Ryan	Reviewed:	J Roberts
BWB Ref:	MCS2071	Date:	Dec 21
Scale:	Scale@A1: 1:500		

Drawing Status
Construction Issue

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
G1135-BWB-XX-XX-DR-D-0502	A1	C14

Appendix B - Oil Interceptors

011259
NSFA020 – NSFA065 Full Retention Separators
Installation & Maintenance Guidelines



Kingspan Environmental Service Contact Numbers:

GB: 0844 846 0500

NI: 028 3025 4077

IRL: 048 3025 4077

Enclosed Documents

DS0911P	NSFA020 – NSFA065 Full Retention Separators Sales Drawing
DS0859P	Neck & Coalescer Extension Details
PD0323	Oil Probe Fitting Details

Issue	Description	Date
04	CC1425 – Class 2 References Deleted	April 2018

HEALTH & SAFETY

These warnings are provided in the interest of safety. You must read them carefully before installing or using the equipment.

It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can be acquainted with the functioning of the equipment and the relevant warnings.

Installation should only be carried out by a suitably experienced contractor, following these guidelines.

We recommend the use of a dust mask and gloves when cutting GRP components.

Electrical work should be carried out by a qualified electrician.

Contaminated surface water can contain substances harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

Access covers should be selected with reference to the location of the unit and traffic loads to be accommodated. These are not (normally) part of the Separator supply.

When covers are removed precautions must be taken against personnel falling into the unit.

Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures.

Ensure that you are familiar with the safe working areas and accesses. Ensure that the working area is adequately lit.

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges.

OIL ALARM SYSTEMS

PPG3 recommends that the oil level alarm be fitted, tested and commissioned by a competent Installer. This is to ensure that the oil probe is calibrated correctly, raising an alarm when 90% of the oil storage volume is reached. Should the oil level alarm fail to provide an early warning, excessive oil could pass through the separator, thus polluting the environment. This could result in substantial cleanup costs and legal action being taken under the water resources act 1991.

MAINTENANCE

The correct ongoing maintenance is essential for the proper operation of the equipment. Operators who rely on oil level alarms to prompt them to service separators between maintenance intervals run the risk of polluting, should the alarms not work, hence the ongoing functional assessment of the oil alarm systems is fundamental if pollution incidents are to be avoided.

The removal of sediment and retained oil/grease should be carried out by a contractor holding the relevant permits to transport and dispose of such waste. The contractor must refer to the guidelines in this document.



**Kingspan Environmental
College Road North
Aston Clinton
Aylesbury
Buckinghamshire
HP22 5EW**

10

EN 858 : Separator systems for light liquids

GRP Glass Reinforced Plastic Tank

Full Retention Separators NS003 - NS200

Class 1 & 2

Watertightness	Passed
Structural Testing	Passed
Hydraulic efficiency	Passed

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Appendices

Separator Maintenance Log

1.0 Introduction

These Guidelines represent Best Practice for the installation of the above Full Retention Separator Units. Many years of specialist experience has led to the successful installation of thousands of separator units. It must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, a qualified specialist (e.g. Civil engineering consultant) must verify any information or advice given by employees or agents of the company regarding the design of an installation.

For guidance of Separator selection and application, please refer to the most recent issue of Environment Agency Guidelines No.3 (PPG3) and BS EN 858. Our Units have been independently tested by BSI and are certified as meeting the standards.

2.0 Handling & Storage

- 2.1. Care must be taken to ensure that units are not damaged during delivery and handling on site. Please take care and place unit so that it can not fall and become damaged.
- 2.2. The design requirements of our products will frequently mean that the centre of gravity of the unit is "offset". Care must therefore be taken to ensure that the unit is stable when lifting. Rainwater may also collect inside units, particularly if they have been stored on site prior to installation, adding weight and increasing instability. Check units before lifting and pump out any excess water.
- 2.3. When lifting units, use webbing slings of a suitable specification. Do not use chains.
- 2.4. A suitable spreader bar should be used to ensure that units are stable and that loads are evenly distributed during lifting. When lifting separators, a spreader bar should be used where the slings would otherwise be at an angle > 30 degrees to the vertical.
- 2.5. Lifting equipment should be selected by taking into account the unit weight, length and the distance of lift required on site.
- 2.6. We accept no responsibility for the selection of lifting equipment.
- 2.7. Whenever our units are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects, which may damage the unit. The units must be placed on ground, which is flat and level to evenly support the base of the unit. Do not roll separators.

3.0 Site Planning

The following points should be considered before installation of the equipment:

- 3.1. The discharge must have the consent of the relevant Environmental Regulator.
- 3.2. The installation should have Planning and Building Control approval.
- 3.3. Consider installing flow cut-off valves to isolate the separator in an emergency or during site cleaning operations. See Environment Agency Guidelines PPG3.
- 3.4. We will fit a tube to receive the alarm probe. This tube provides protection and ensures that the probe is positioned at the correct level to sense the oil build up. The tube design and probe level setting assumes the use of our standard oil alarm system and may not be suitable for other alarm supplier's equipment. The probe tube may be fitted either within the neck or within the body of the unit. It should be extended to ground level when fitted in the body of the tank and you should make provision to extend the tube to the required height before backfilling. Consult the alarm supplier's instructions for their detailed fitting installation instructions.
- 3.5. Consider venting of the unit. Comply with local regulations. In the UK, comply with the following regulations, for Petrol Stations: Health and Safety Guidance Note 41 (HS(G)41), for other applications: BS8301: 1985 (obsolescent) BS EN 752 Building Drainage. Adequate ventilation should be provided to the separator. The ventilation pipe should be as short as is practicable and be terminated not less than 2.5m above paving nor less than 1m above the head of an openable window or other opening into a building within a horizontal distance of 3m. Each neck should be vented independently, we advise against joining these below ground prior to their rising as vent stacks.
- 3.6. Uncontaminated run off such as roof water should be excluded from separators. (EA Guidelines PPG3.)

- 3.7. Consider installation of a sampling point downstream of the separator as there is no suitable facility to effectively sample the waste water from inside the unit. (Suggested in EN 858 Pt 1).
- 3.8. Ground conditions and water table level should be assessed. If the water table will be above the base of the units at any time of the year, adequate concrete backfill must be provided to avoid flotation. In poorly draining ground, consideration should also be given to the likelihood of flotation due to surface water collecting in the backfill, and an appropriate installation method devised to avoid this.
- 3.9. If the discharge is to a soakaway, a porosity test should be carried out as part of the assessment of suitability for sub-soil drainage.
- 3.10. The separator must be installed at a level that will allow connection to the incoming drain and a free discharge at the system outlet.
- 3.11. Do not install the unit deeper than necessary, if required, ensure that you purchase extension necks and coalescer extension chains. The minimum invert depth of the unit is shown on the customer drawing.
- 3.12. Adequate access must be provided for routine maintenance. Vehicles should not be permitted within a distance equal to the depth of the unit, unless suitable structural protection is provided to the installation.
- 3.13. There must be at least 1 metre of clear, level ground all around the access covers to allow for routine maintenance.
- 3.14. It is essential that a mains water supply is accessible for routine cleansing and refilling after removal of waste material and liquid.
- 3.15. Provide electrical supply for alarm system.
- 3.16. Installation should only be carried out by suitably qualified and experienced contractors in accordance with current Health and Safety Regulations. Electrical work should be carried out by a qualified electrician, working to the latest edition of IEE wiring regulations.
- 3.17. This unit is designed to operate with gravity in and out flows. The unit is not designed to operate with a pumped influent.

4.0 Installation – General

- 4.1. When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipework should be designed to minimise the risk of damage from differential movement of the unit(s) and/or surrounding material.
- 4.2. For separators with burial depths greater than 1000mm from cover level to the top of the unit, specific site conditions should be taken into consideration and the backfill designed to bear any loads which may be applied during and after installation to prevent the tank being subjected to these loads.
- 4.3. The excavation must be deep enough to provide bedding and cover depth as determined by the type of surface pavement and loading. Asphalt and concrete pads should extend a minimum of 300mm horizontally beyond the unit in all directions.
- 4.4. In situations where the excavation will not maintain a vertical wall, it will be necessary to shore up the side walls of the excavation with suitable trench sheets and bracing systems to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until the backfilling is complete, but before the concrete fully hardens.
- 4.5. In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be dewatered using suitable pumping equipment and this should continue until the installation is complete.
- 4.6. During installation care must be taken to ensure that the body of any unit is uniformly supported so that point loads through the unit are avoided.
- 4.7. The Concrete Specification is not a site specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES: C25 /30 C25 /30 C16 /20		REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30	270 - 280 Kg/M ³
	C20	220 - 230 Kg/M ³
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

5.0 Separator Installation

- 5.1. Excavate a hole of sufficient length and width to accommodate the tank and a minimum 300mm concrete surround and to a depth that allows for the burial depth of the unit plus concrete base slab.
- 5.2. Construct a suitable concrete base slab appropriate to site conditions. Ensure that the slab is flat and level.
- 5.3. When the concrete base slab has set enough to support the installed load, add a concrete haunch so as to provide even support under the unit, and then lower the unit onto the haunch using suitable webbing slings and lifting equipment.
- 5.4. Locate the float valve in the coalescer unit(s). Lift float valve and secure in the open position before filling and release when full. If the valve is not lifted during filling, it may "seat". The valve is fitted with cord to aid lifting. Add cord if extending the invert and fasten end to a convenient point.
- 5.5. **Pour no more than 300mm depth of clean water into the unit, avoiding shock loads. For units with more than one chamber, add water to each chamber simultaneously. DO NOT OVERFILL, the unit is not designed to hold water whilst unsupported. FILL THROUGH OUTLET AS WELL AS INLET.**
- 5.6. **Place concrete backfill to approximately 300mm depth under and to the sides of the tank ensuring good compaction to remove voids. DO NOT use vibrating pokers. Continue adding concrete backfill, simultaneously keeping the internal water level no more than 200mm above the backfill level at all times, until the backfill is just below the underside of the outlet drain, giving sufficient room to connect the inlet and outlet pipework.**
- 5.7. Connect inlet and outlet drains and vent pipes when safe access to the backfill can be gained.

PIPEWORK CONNECTIONS

In all cases, ensure that the outlet pipework level is maintained for correct operation. (Unless specified on the order, the fall across the unit will be as per the customer drawings). Small units are generally fitted with **PVCu spigots** to both the outlet and the inlet. Connect using the same size PVCu socket or a suitable reducer. Larger units are generally fitted with our own **GRP** manufactured sockets. The connecting pipework should be pushed into the socket and a joint made to fill in the gap using rope/hemp with a cement mortar or bonding mix. Ensure that the seal is secure and watertight before backfilling the pipe. Alternatively, proprietary **flex seal couplings** can be obtained to fit over the outside of the site pipework and the outside of the GRP socket. When using this connection method, please be aware that the outside GRP laminate is not perfectly regular and that you may need to use a sealant on the outside diameter of the GRP. Take care not to over tighten the coupling when connecting to the GRP and ensure that the seal is secure before backfilling the pipe. Drawing DS0185 provides the ID of our GRP sockets. The OD is variable, as the wall thickness can be up to 15-20 mm. If purchasing a flex seal coupling for use with clay/concrete, we suggest that a size 110 mm larger than the ID is selected.

5.8. Oil Level Alarm Neck fitting

We will fit a tube to receive the oil alarm probe. This provides protection and ensures that the probe is positioned at the correct level to sense oil build up. See alarm supplier information and ensure that the probe is placed within the tube and can be accessed from ground level.

Continue backfilling with concrete over the tank body to the required level. Build up a shell of concrete, minimum 225mm thick, around the access shaft(s). Temporarily strut the access shaft to avoid distortion.

- 5.9. Where we supply an extension shaft to meet a deeper invert requirement, a coalescer extension chain is also provided when needed. Remove the coalescer from the unit before adding the extension shaft(s). It is advisable to seal the joints on the extension shafts (particularly on sites with high ground water) with proprietary sealant or by GRP lamination (if skilled operatives are available). Temporarily strut the extension neck(s) to avoid distortion during back filling. Where more than one neck section is required to suit a deep invert, consider back-filling section by section. If the extension neck is too long, it can be trimmed using a fine-toothed saw. The original fixing hole bolting the coalescer to the neck should be sealed. Ensure that the vent socket if cut out, is replaced elsewhere. The maximum recommended inlet invert is 2000mm (using 500mm long extension sections). If you are installing a unit deeper than this then you must make your own arrangements for removing and replacing the coalescer. Consideration must be given to the depth of lift involved.
- 5.10. If extending the neck, remember to add a suitable length of cord to enable the float valve to be lifted when the unit is emptied. If the valve is not raised during filling then the float valve may stick at the base.
- 5.11. Coalescer. When refitting, ensure that the core tube is correctly seated onto the base fitting.
- 5.12. Continue back-filling, ensuring minimum 225mm concrete thickness around the access shaft/extension neck and alarm access tube (as applicable).
- 5.13. Mains powered alarm Systems. See alarm suppliers installation instructions. Lay 82mm diameter PVCu underground ducting between the alarm panel location and the alarm probe position. The ducting should be 500mm below ground level and fitted with a drawstring for later cable insertion. Any changes of direction should be by long radius bend. If necessary, drill a suitable hole in the access shaft adjacent to the alarm probe terminal box, to accept the ducting and seal.
- 5.14. In traffic areas a suitable top slab must be constructed. The top slab should bear on a suitable foundation to prevent superimposed loads being transmitted to the unit and access shafts. Loads applied to covers and frames must bear on the top slab, not the access shaft.
- 5.15. The unit should be filled with clean water up to the invert level of the outlet pipe. Ensure the unit identification is placed/marked inside the neck for future information. The unit is now ready for use.

6.0 Alarm Installation

- 6.1 Install the alarm probe and control panel, as per the Suppliers Alarm Installation Guidelines. Ensure that the probe is positioned correctly for the required storage of oil. The table below indicates the volume of oil stored and the depth of floating oil expected in the separation chamber.

Unit	Recommended Maximum Oil Storage volume	Max. Depth of floating oil (100 %) (Static)
NSFA020	200 litres	53mm
NSFA030	300 litres	60mm
NSFA040	400 litres	65mm
NSFA050	500 litres	70mm
NSFA065	650 litres	67mm

7.0 Operation

- 7.1 The unit is sized on treating a defined area and rainfall (50 mm/hour) EN 858 Part 1, and using the factor provided in the EA guidelines PPG 3. The entire flow up to the units listed flow rating is fully treated.
- 7.2 Units include a core tube with replaceable media. Separated Liquid enters the core tube after passing through the media, to the outlet. The coalescer media requires maintenance and replacement at intervals. See section 8.
- 7.3 Units are provided with a closure device, incorporating a float. As the level of oil builds up and forms a floating layer, so the float/closure device moves downward to prevent oily water being passed through the unit. The unit **MUST** be emptied after the closure device has operated. The coalescer media should be inspected and changed if fouled.
- 7.4 An oil probe should be positioned to detect the accumulation of oil when there is no or low flow conditions. It is a requirement to position the probe so that the alarm operates at 90% of the maximum recommended oil storage volume. **When the alarm operates, the oil should be removed. Accumulated silt should also be removed.**
- 7.5 These Separators are not effective for the removal of soluble or emulsified pollutants such as oil/detergent mixes found in vehicle wash effluents. With permission, such discharges may be drained to the foul sewer. See Environment Agency Guidelines PPG3. Or contact our Technical Sales Department for suitable alternative equipment.

8.0 Maintenance

Separated light liquid **must** be removed from the separator when the oil capacity has been reached.

- 8.1. An oil level alarm system is available which gives warning when the separated light liquid/water interface level reaches 90% of the maximum recommended oil storage volume.
- 8.2. Separators should be inspected at least every six months or more frequently if experience dictates. A log should be maintained detailing the depth of oil found, any volume removed and any silt removal or cleaning carried out. A specimen maintenance log is included in the appendices.
- 8.3. Every site is different, in respect to the amount and type of silt generated by the drain design and installation. Frequently, the site construction programme itself generates large and perhaps unusual quantities of silt and grit. We recommend that following the initial installation, an inspection of the separator contents be made to check that building rubble has not entered the unit. Further inspections at 3 and 6 months should be made so as to be able to assess the volumes of silt and oil accumulated. An inspection and emptying programme can then be defined following the first 6 months site experience. We recommend a maximum inspection interval of 6 months.
- 8.4. Coalescer media is a replaceable item and is available as a spare.
- 8.5. Alarm probes should be removed and cleaned with water whenever waste material is removed from the separator. Please note the alarm may alert until the liquid level is replaced. Consult the alarm supplier's literature.
- 8.6. If the unit is emptied, the float/closure device should be raised and then lowered after the unit has been refilled. (Do not lower it into an empty unit as the closure device will self seat)
- 8.7. **Separator waste is a “special waste” under the terms of The Waste Management Code of Practice. The Code imposes a duty of care on the waste producer to ensure that the Cleansing contractor is registered with the Environment Agency and that the final disposal of the waste is to a licensed facility.**
- 8.8. You should consider the purchase of a maintenance service, from a competent installer, which includes bi-annual inspections, removal of oil and silt, cleaning of the alarm probe and cleaning or replacement of the coalescer media (where appropriate).

Waste Removal Procedure – Oil & Silt

Oil should only be removed when there is no flow entering the unit. Isolate the unit and prevent flow from entering. Always remove the oil before attempting to remove the coalescer. If this is not done, when the coalescer is withdrawn, any excess oil may coat the media surface and when replaced could contaminate the effluent.

- 8.9. Remove the access cover and lower the desludging hose into the separation chamber. Draw off the surface oil.
- 8.10. When removing the silt, lower the desludging hose to the base of the tank and withdraw any grit or sludge that may be present. It is not necessary to remove all the liquid unless you need to ensure the unit has been fully emptied. Ensure that you access and clean all compartments.
- 8.11. Remove the alarm probe, clean with water and replace. Ensure that it is working correctly
- 8.12. Consider the period of time that the coalescer has been installed and consider removing and inspecting (cleaning or replacing) the coalescer media. If removed, ensure that it is correctly replaced. It is best to lower the liquid level when refitting. Replace the access covers.
- 8.13. Re-fill the separator with clean water up to the outlet level. The alarm may display an alarm condition until the separator is re-filled. Check alarm operation when unit full.
- 8.14. Check the float/closure device and raise, if it has self-seated.

Checking the Coalescer Assembly

- 8.15. Coalescers should be checked and cleaned regularly, also following a major incident replaced if necessary. It may be possible to squeeze/rinse out silt contamination from the media, but it is impossible to remove oil. Please contact Kingspan if you wish to purchase replacement coalescer foam media. Identify the type and size of separator (shown on labels inside the access neck).
- 8.16. Assemblies weighing less than 25 Kg may be removed by hand. Heavier assemblies should be lifted by mechanical means. Any lifting device employed must be capable of lifting:
 - In excess of the maximum assembly weight.
 - The assembly completely out of the access shaft.
 - Giving a smooth and controlled lift.
 - Swinging the assembly to one side clear of the access shaft.

Unit	Dry Weight (Kg) Core tube & media	Wet Weight (Kg) Core tube & media	Silted Weight (Kg) Core tube & media	Replacement media part no.
NSFA020	27 kg	40 kg	≈ 55 kg	402733
NSFA030	27 kg	40 kg	≈ 55 kg	402733
NSFA040	27 kg	40 kg	≈ 55 kg	402733
NSFA050	27 kg	40 kg	≈ 55 kg	402733
NSFA065	27 kg	40 kg	≈ 55 kg	402733

- 8.17. Ensure that the area around the access shaft is clear and that there is space to place the coalescer core tube assembly once removed. If space is not available it will be necessary to support the assembly over the access shaft e.g. by scaffold poles and platform.
- 8.18. Only remove the access cover when necessary to remove the assembly. Do not leave the access shaft uncovered and unattended.
- 8.19. It is recommended that core tubes be lifted by mechanical means, especially if it is suspected that the coalescer media be silted.

8.20. Removing the coalescer assembly.

- 8.21. A cut out is provided in the top of the coalescer tube to aid lifting. When the unit is installed the coalescer tube is bolted to the neck for transport. Deeper invert units are provided with a coalescer tube extension chain of the appropriate length.
- 8.22. Lift the assembly with a smooth and steady motion. Core tubes and media will become lighter as water drains from the exposed media. Allow the water to drain completely. Assemblies blocked with fine silt may be very heavy.

- 8.23. Fully extract the assembly and set it down adjacent to the access shaft. Consider cleaning or replacement of the media.

8.24. Cleaning the coalescer assembly /Media Replacement.

- 8.25. Hose down the assembly using clean water at normal pressure. (You may be able to return the cleaning water into the separator, if there is sufficient separator capacity.) Do not allow untreated cleaning water to pass out of the unit. Continue hosing media until the water runs clear. If the media is heavily contaminated with oil and silt it may not be possible to clean effectively by hosing and should be replaced.
- 8.26. When replacing the media, undo the banding. Slide media off the core tube and slide new media on. Ensure all the apertures on the core tube are covered by the media. Re-secure or replace banding. Consider replacing media every two years.

8.27. Replacing the coalescer assembly.

- 8.28. Position coalescer assembly over the access shaft and remove any safety coverings.
- 8.29. Lower the assembly steadily into the access shaft, orientate core tube correctly and locate over sump cone. Check the float/closure device is free to operate.

9.0 Emergencies

- 9.1. At sites where there is a high risk of spillage, spill kits containing drain seals, absorbent materials, disposal containers and other appropriate equipment should be held. In the event of a spillage on site, the material should be contained, (if a spill kit is not available, sand or soil may be used) and the Environment Agency notified immediately using the appropriate emergency hotline number listed in the Agency Guideline PPG3. Year 2012 – 0800 80 70 60

SEPARATOR MAINTENANCE LOG

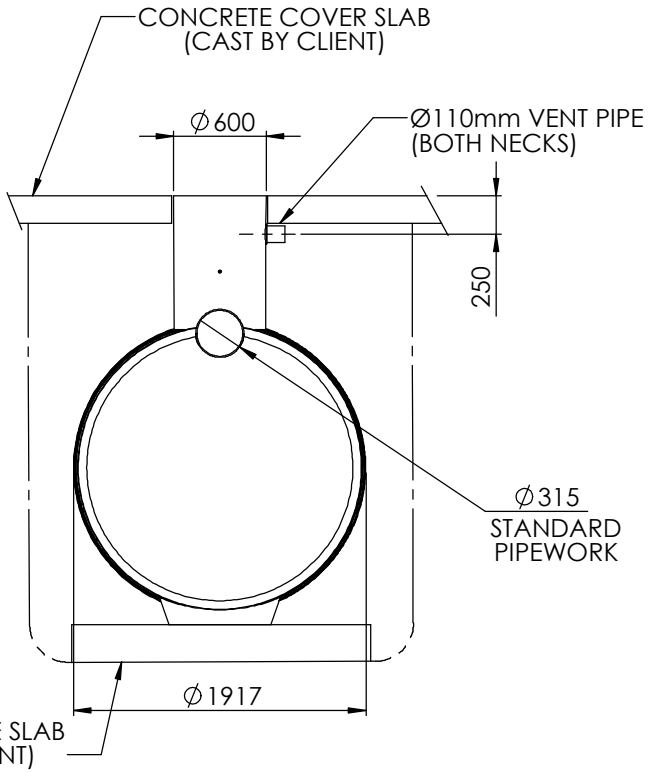
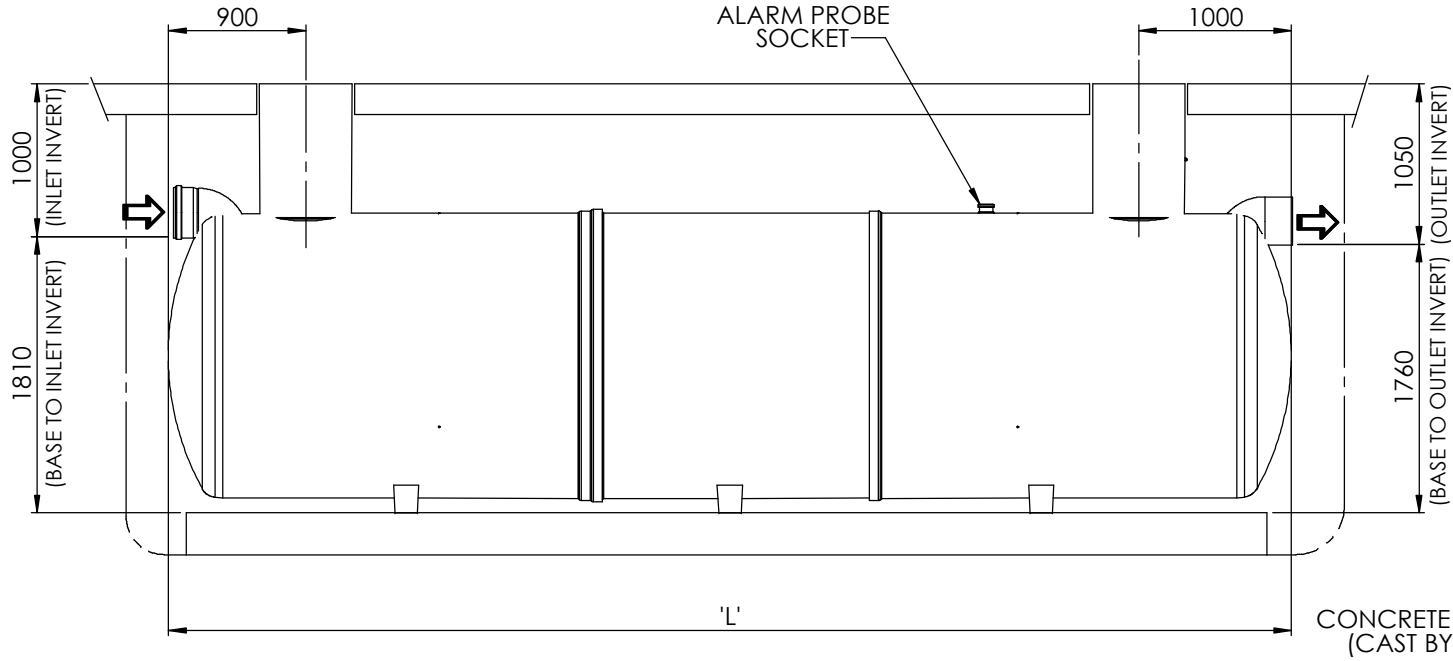
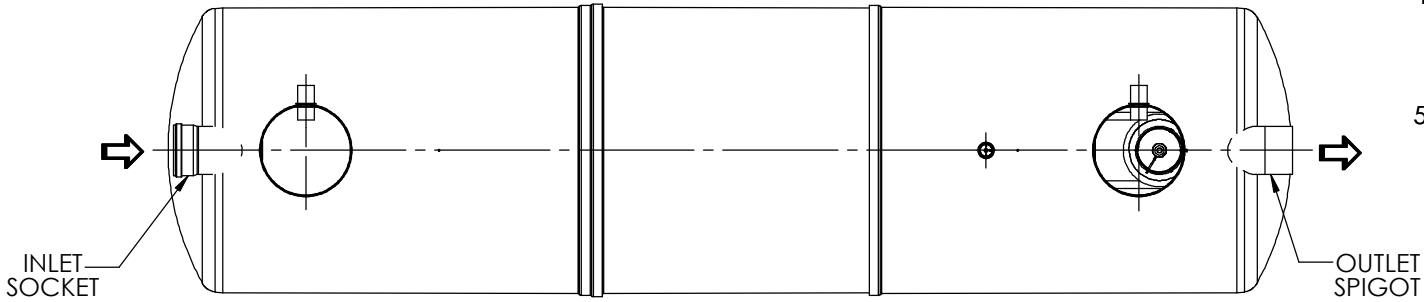
Site address/location	.....
Separator location	.....
Type of separator	.....
Nominal Flow	.....
Total capacity	.....

[illegible]

UNIT REF.	NOMINAL FLOW RATE (L/s)	APPROX. EMPTY WEIGHT (kg)	OVERALL LENGTH 'L'
NSFA020	20	575	3230
NSFA030	30	665	3960
NSFA040	40	740	4750
NSFA050	50	985	5790
NSFA065	65	1145	7360

NOTES:-

1. INLET/OUTLET PIPES ARE PLAIN PIPE Ø315mm PVCu. THE STANDARD EN858 STATES MINIMUM CONNECTION SIZES, UNITS ORDERED WITH DIFFERENT SIZED CONNECTIONS ARE NOT FULLY COMPLIANT WITH THE STANDARD.
2. EXTENSION NECKS FOR DEEPER INVERTS CAN BE PROVIDED IN 0.5m INCREMENTS, FOR ON SITE ASSEMBLY. MAXIMUM 2.0m INVERT RECOMMENDED.
3. ALL UNITS REQUIRE APPROPRIATE COVER AND FRAME TO SUIT APPLIED LOADINGS.
4. THIS DRAWING SHOULD BE USED FOR DIMENSIONAL INFORMATION ONLY. IT IS ESSENTIAL THAT THIS DRAWING IS READ IN CONJUNCTION WITH INSTALLATION GUIDELINES SUPPLIED WITH UNIT. (COPIES ARE AVAILABLE FROM OUR SALES DEPARTMENT).
5. THIS DRAWING IS ALSO AVAILABLE ON OUR WEBSITE www.kingspanenv.com



Issue	Date	Drawn by	Description	Material : Various	Tolerance : ± 5mm	Drawing : DS0911P NSFA020 - NSFA065 Full Retention Separators
04	03.04.18	T.Kelly	CC1425 - Class 2 Reference Deleted	Finish : n/a	Thickness : n/a	
03	29.10.14	T.Kelly	CC1151 - Cases Changed	Weight : n/a	Surface Area : n/a	
02	29.01.09	JC	Update Border			
All dimensions in mm			Scale: Not to scale	Kingspan reserve the right to alter the details of this drawing without prior notice. This drawing is copyright and may not be reproduced or used without the written permission of Kingspan.		

015050
NSFA080 – NSFA285 Full Retention Separators
Installation & Maintenance Guidelines



Contact Numbers:

UK:

Service Tel: +44 (0) 845 355 0555

Service Fax: +44 (0) 1264 325245

Ireland:

Service Tel: +44 (0) 28 302 54077

Service Fax: +44 (0) 28 302 60046

Enclosed Documents

DS0896P	NSFA080 – NSFA285 Full Retention Separators Sales Drawing
DS0859P	Neck & Coalescer Extension Details NSFA Full Retention Separators
PD0323	Oil Probe Fitting Details

Issue	Description	Date
04	CC1425 – Class 2 References Deleted	April 2018

HEALTH & SAFETY

These warnings are provided in the interest of safety. You must read them carefully before installing or using the equipment.

It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can be acquainted with the functioning of the equipment and the relevant warnings.

Installation should only be carried out by a suitably experienced contractor, following these guidelines.

We recommend the use of a dust mask and gloves when cutting GRP components.

Electrical work should be carried out by a qualified electrician.

Contaminated surface water can contain substances harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

Access covers should be selected with reference to the location of the unit and traffic loads to be accommodated. These are not (normally) part of the Separator supply.

When covers are removed precautions must be taken against personnel falling into the unit.

Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures.

Ensure that you are familiar with the safe working areas and accesses. Ensure that the working area is adequately lit.

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges.

OIL ALARM SYSTEMS

PPG3 recommends that the oil level alarm be fitted, tested and commissioned by a competent Installer. This is to ensure that the oil probe is calibrated correctly, raising an alarm when 90% of the oil storage volume is reached. Should the oil level alarm fail to provide an early warning, excessive oil could pass through the separator, thus polluting the environment. This could result in substantial cleanup costs and legal action being taken under the water resources act 1991.

MAINTENANCE

The correct ongoing maintenance is essential for the proper operation of the equipment. Operators who rely on oil level alarms to prompt them to service separators between maintenance intervals run the risk of polluting, should the alarms not work, hence the ongoing functional assessment of the oil alarm systems is fundamental if pollution incidents are to be avoided.

The removal of sediment and retained oil/grease should be carried out by a contractor holding the relevant permits to transport and dispose of such waste. The contractor must refer to the guidelines in this document.

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Appendices

Separator Maintenance Log



**Kingspan Environmental
College Road North
Aston Clinton
Aylesbury
Buckinghamshire
HP22 5EW**

10

EN 858 : Separator systems for light liquids

GRP Glass Reinforced Plastic Tank

Full Retention Separators NS003 - NS200

Class 1 & 2

Watertightness	Passed
Structural Testing	Passed
Hydraulic efficiency	Passed

1.0 Introduction

These Guidelines represent Best Practice for the installation of the above Full Retention Separator Units. Many years of specialist experience has led to the successful installation of thousands of separator units. It must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, a qualified specialist (e.g. Civil engineering consultant) must verify any information or advice given by employees or agents of the company regarding the design of an installation.

For guidance of Separator selection and application, please refer to the most recent issue of Environment Agency Guidelines No.3 (PPG3) and BS EN 858. Our Units have been independently tested by BSI and are certified as meeting the standards.

2.0 Handling & Storage

- 2.1. Care must be taken to ensure that units are not damaged during delivery and handling on site. Please take care and place unit so that it can not fall and become damaged.
- 2.2. The design requirements of our products will frequently mean that the centre of gravity of the unit is "offset". Care must therefore be taken to ensure that the unit is stable when lifting. Rainwater may also collect inside units, particularly if they have been stored on site prior to installation, adding weight and increasing instability. Check units before lifting and pump out any excess water.
- 2.3. When lifting units, use webbing slings of a suitable specification. Do not use chains.
- 2.4. A suitable spreader bar should be used to ensure that units are stable and that loads are evenly distributed during lifting. When lifting separators, a spreader bar should be used where the slings would otherwise be at an angle > 30 degrees to the vertical.
- 2.5. Lifting equipment should be selected by taking into account the unit weight, length and the distance of lift required on site.
- 2.6. We accept no responsibility for the selection of lifting equipment.
- 2.7. Whenever our units are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects, which may damage the unit. The units must be placed on ground, which is flat and level to evenly support the base of the unit. Do not roll separators.

3.0 Site Planning

The following points should be considered before installation of the equipment:

- 3.1. The discharge must have the consent of the relevant Environmental Regulator.
- 3.2. The installation should have Planning and Building Control approval.
- 3.3. Consider installing flow cut-off valves to isolate the separator in an emergency or during site cleaning operations. See Environment Agency Guidelines PPG3.
- 3.4. We will fit a tube to receive the alarm probe. This tube provides protection and ensures that the probe is positioned at the correct level to sense the oil build up. The tube design and probe level setting assumes the use of our standard oil alarm system and may not be suitable for other alarm supplier's equipment. The probe tube may be fitted either within the neck or within the body of the unit. It should be extended to ground level when fitted in the body of the tank and you should make provision to extend the tube to the required height before backfilling. Consult the alarm supplier's instructions for their detailed fitting installation instructions.
- 3.5. Consider venting of the unit. Comply with local regulations. In the UK, comply with the following regulations, for Petrol Stations: Health and Safety Guidance Note 41 (HS(G)41), for other applications: BS8301: 1985 (obsolescent) BS EN 752 Building Drainage. Adequate ventilation should be provided to the separator. The ventilation pipe should be as short as is practicable and be terminated not less than 2.5m above paving nor less than 1m above the head of an openable window or other opening into a building within a horizontal distance of 3m. Each neck should be vented independently, we advise against joining these below ground prior to their rising as vent stacks.

- 3.6. Uncontaminated run off such as roof water should be excluded from separators. (EA Guidelines PPG3.)
- 3.7. Consider installation of a sampling point downstream of the separator as there is no suitable facility to effectively sample the waste water from inside the unit. (Suggested in EN 858 Pt 1).
- 3.8. Ground conditions and water table level should be assessed. If the water table will be above the base of the units at any time of the year, adequate concrete backfill must be provided to avoid flotation. In poorly draining ground, consideration should also be given to the likelihood of flotation due to surface water collecting in the backfill, and an appropriate installation method devised to avoid this.
- 3.9. If the discharge is to a soakaway, a porosity test should be carried out as part of the assessment of suitability for sub-soil drainage.
- 3.10. The separator must be installed at a level that will allow connection to the incoming drain and a free discharge at the system outlet.
- 3.11. Do not install the unit deeper than necessary, if required, ensure that you purchase extension necks and coalescer extensions. The minimum invert depth of the unit is shown on the customer drawing.
- 3.12. Adequate access must be provided for routine maintenance. Vehicles should not be permitted within a distance equal to the depth of the unit, unless suitable structural protection is provided to the installation.
- 3.13. There must be at least 1 metre of clear, level ground all around the access covers to allow for routine maintenance.
- 3.14. It is essential that a mains water supply is accessible for routine cleansing and refilling after removal of waste material and liquid.
- 3.15. Provide electrical supply for alarm system.
- 3.16. Installation should only be carried out by suitably qualified and experienced contractors in accordance with current Health and Safety Regulations. Electrical work should be carried out by a qualified electrician, working to the latest edition of IEE wiring regulations.
- 3.17. This unit is designed to operate with gravity in and out flows. The unit is not designed to operate with a pumped influent.

4.0 Installation – General

- 4.1. When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipework should be designed to minimise the risk of damage from differential movement of the unit(s) and/or surrounding material.
- 4.2. For separators with burial depths greater than 1000mm from cover level to the top of the unit, specific site conditions should be taken into consideration and the backfill designed to bear any loads which may be applied during and after installation to prevent the tank being subjected to these loads.
- 4.3. The excavation must be deep enough to provide bedding and cover depth as determined by the type of surface pavement and loading. Asphalt and concrete pads should extend a minimum of 300mm horizontally beyond the unit in all directions.
- 4.4. In situations where the excavation will not maintain a vertical wall, it will be necessary to shore up the side walls of the excavation with suitable trench sheets and bracing systems to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until the backfilling is complete, but before the concrete fully hardens.
- 4.5. In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be dewatered using suitable pumping equipment and this should continue until the installation is complete.
- 4.6. During installation care must be taken to ensure that the body of any unit is uniformly supported so that point loads through the unit are avoided.

4.7. The Concrete Specification is not a site specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES: C25 /30 C25 /30 C16 /20		REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30	270 - 280 Kg/M ³
	C20	220 - 230 Kg/M ³
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

5.0 Separator Installation

- 5.1. Excavate a hole of sufficient length and width to accommodate the tank and a minimum 300mm concrete surround and to a depth that allows for the burial depth of the unit plus concrete base slab.
- 5.2. Construct a suitable concrete base slab appropriate to site conditions. Ensure that the slab is flat and level.
- 5.3. When the concrete base slab has set enough to support the installed load, add a concrete haunch so as to provide even support under the unit, and then lower the unit onto the haunch using suitable webbing slings and lifting equipment.
- 5.4. Locate the float valve in the coalescer unit(s). Lift float valve and secure in the open position before filling and release when full. If the valve is not lifted during filling, it may "seat". The valve is fitted with cord to aid lifting. Add cord if extending the invert and fasten end to a convenient point.
- 5.5. **Pour no more than 300mm depth of clean water into the unit, avoiding shock loads. For units with more than one chamber, add water to each chamber simultaneously. DO NOT OVERFILL, the unit is not designed to hold water whilst unsupported. FILL THROUGH OUTLET AS WELL AS INLET.**
- 5.6. **Place concrete backfill to approximately 300mm depth under and to the sides of the tank ensuring good compaction to remove voids. DO NOT use vibrating pokers. Continue adding concrete backfill, simultaneously keeping the internal water level no more than 200mm above the backfill level at all times, until the backfill is just below the underside of the outlet drain, giving sufficient room to connect the inlet and outlet pipework.**
- 5.7. Connect inlet and outlet drains and vent pipes when safe access to the backfill can be gained.

PIPEWORK CONNECTIONS

In all cases, ensure that the outlet pipework level is maintained for correct operation. (Unless specified on the order, the fall across the unit will be as per the customer drawings). Small units are generally fitted with **PVCu spigots** to both the outlet and the inlet. Connect using the same size PVCu socket or a suitable reducer. Larger units are generally fitted with our own **GRP** manufactured sockets. The connecting pipework should be pushed into the socket and a joint made to fill in the gap using rope/hemp with a cement mortar or bonding mix. Ensure that the seal is secure and watertight before backfilling the pipe. Alternatively, proprietary **flex seal couplings** can be obtained to fit over the outside of the site pipework and the outside of the GRP socket. When using this connection method, please be aware

015050-04 - Full Retention Separators NSFA080 – NSFA285 - I & O Guidelines
that the outside GRP laminate is not perfectly regular and that you may need to use a sealant on the outside diameter of the GRP. Take care not to over tighten the coupling when connecting to the GRP

and ensure that the seal is secure before backfilling the pipe. Drawing DS0185 provides the ID of our GRP sockets. The OD is variable, as the wall thickness can be up to 15-20 mm. If purchasing a flex seal coupling for use with clay/concrete, we suggest that a size 110 mm larger than the ID is selected.

5.8. Oil Level Alarm Neck fitting

We will fit a tube to receive the oil alarm probe. This provides protection and ensures that the probe is positioned at the correct level to sense oil build up. See alarm supplier information and ensure that the probe is placed within the tube and can be accessed from ground level.

Continue backfilling with concrete over the tank body to the required level. Build up a shell of concrete, minimum 225mm thick, around the access shaft(s). Temporarily strut the access shaft to avoid distortion.

- 5.9. Where we supply an extension shaft to meet a deeper invert requirement, a coalescer extension chain is also provided when needed. If there is a coalescer, remove it from the unit before adding the extension shaft(s). It is advisable to seal the joints on the extension shafts (particularly on sites with high ground water) with proprietary sealant or by GRP lamination (if skilled operatives are available). Temporarily strut the extension neck(s) to avoid distortion during back filling. Where more than one neck section is required to suit a deep invert, consider back-filling section by section. If the extension neck is too long, it can be trimmed using a fine-toothed saw. The original fixing hole bolting the coalescer to the neck should be sealed. Ensure that the vent socket if cut out, is replaced elsewhere. The maximum recommended inlet invert is 2000mm (using 500mm long extension sections). If you are installing a unit deeper than this then you must make your own arrangements for removing and replacing the coalescer. Consideration must be given to the depth of lift involved.
- 5.10. If extending the neck, remember to add a suitable length of cord to enable the float valve to be lifted when the unit is emptied. If the valve is not raised during filling then the float valve may stick at the base.
- 5.11. Coalescer. When refitting, ensure that the core tube is correctly seated onto the base fitting.
- 5.12. Continue back-filling, ensuring minimum 225mm concrete thickness around the access shaft/extension neck and alarm access tube (as applicable).
- 5.13. Mains powered alarm Systems. See alarm suppliers installation instructions. Lay 82mm diameter PVCu underground ducting between the alarm panel location and the alarm probe position. The ducting should be 500mm below ground level and fitted with a drawstring for later cable insertion. Any changes of direction should be by long radius bend. If necessary, drill a suitable hole in the access shaft adjacent to the alarm probe terminal box, to accept the ducting and seal.
- 5.14. In traffic areas a suitable top slab must be constructed. The top slab should bear on a suitable foundation to prevent superimposed loads being transmitted to the unit and access shafts. Loads applied to covers and frames must bear on the top slab, not the access shaft.
- 5.15. The unit should be filled with clean water up to the invert level of the outlet pipe. Ensure the unit identification is placed/marked inside the neck for future information. The unit is now ready for use.

6.0 Alarm Installation

- 6.1 Install the alarm probe and control panel, as per the Suppliers Alarm Installation Guidelines. Ensure that the probe is positioned correctly for the required storage of oil. The table below indicates the volume of oil stored and the depth of floating oil expected in the separation chamber.

Unit	Recommended Maximum Oil Storage volume	Max. Depth of floating oil (100 %) (Static)
NSFA080	800 litres	100mm
NSFA100	1000 litres	110mm
NSFA125	1250 litres	110mm
NSFA150	1500 litres	110mm
NSFA175	1750 litres	105mm
NSFA200	2000 litres	110mm
NSFA210	2100 litres	115mm
NSFA225	2250 litres	115mm
NSFA240	2400 litres	115mm
NSFA255	2550 litres	115mm
NSFA270	2700 litres	115mm
NSFA285	2850 litres	115mm

7.0 Operation

- 7.1 The unit is sized on treating a defined area and rainfall (50 mm/hour) EN 858 Part 1, and using the factor provided in the EA guidelines PPG 3. The entire flow up to the units listed flow rating is fully treated.
- 7.2 Units include a core tube with replaceable media. Separated Liquid enters the core tube after passing through the media, to the outlet. The coalescer media requires maintenance and replacement at intervals. See section 8.
- 7.3 Units are provided with a closure device, incorporating a float. As the level of oil builds up and forms a floating layer, so the float/closure device moves downward to prevent oily water being passed through the unit. The unit **MUST** be emptied after the closure device has operated. The coalescer media should be inspected and changed if fouled.
- 7.4 An oil probe should be positioned to detect the accumulation of oil when there is no or low flow conditions. It is a requirement to position the probe so that the alarm operates at 90% of the maximum recommended oil storage volume. **When the alarm operates, the oil should be removed. Accumulated silt should also be removed.**
- 7.5 These Separators are not effective for the removal of soluble or emulsified pollutants such as oil/detergent mixes found in vehicle wash effluents. With permission, such discharges may be drained to the foul sewer. See Environment Agency Guidelines PPG3. Or contact our Technical Sales Department for suitable alternative equipment.

8.0 Maintenance

Separated light liquid **must** be removed from the separator when the oil capacity has been reached.

- 8.1. An oil level alarm system is available which gives warning when the separated light liquid/water interface level reaches 90% of the maximum recommended oil storage volume.

- 8.2. Separators should be inspected at least every six months or more frequently if experience dictates. A log should be maintained detailing the depth of oil found, any volume removed and any silt removal or cleaning carried out. A specimen maintenance log is included in the appendices.
- 8.3. Every site is different, in respect to the amount and type of silt generated by the drain design and installation. Frequently, the site construction programme itself generates large and perhaps unusual quantities of silt and grit. We recommend that following the initial installation, an inspection of the separator contents be made to check that building rubble has not entered the unit. Further inspections at 3 and 6 months should be made so as to be able to assess the volumes of silt and oil accumulated. An inspection and emptying programme can then be defined following the first 6 months site experience. We recommend a maximum inspection interval of 6 months.
- 8.4. Coalescer media is a replaceable item and is available as a spare.
- 8.5. Alarm probes should be removed and cleaned with water whenever waste material is removed from the separator. Please note the alarm may alert until the liquid level is replaced. Consult the alarm supplier's literature.
- 8.6. If the unit is emptied, the float/closure device should be raised and lowered only after the unit has been refilled. (Do not lower it into an empty unit as the closure device will self seat)
- 8.7. **Separator waste is a “special waste” under the terms of The Waste Management Code of Practice. The Code imposes a duty of care on the waste producer to ensure that the Cleansing contractor is registered with the Environment Agency and that the final disposal of the waste is to a licensed facility.**
- 8.8. You should consider the purchase of a maintenance service, from a competent installer, which includes bi-annual inspections, removal of oil and silt, cleaning of the alarm probe and cleaning or replacement of the coalescer media (where appropriate).

Waste Removal Procedure – Oil & Silt

Oil should only be removed when there is no flow entering the unit. Isolate the unit and prevent flow from entering. Always remove the oil before attempting to remove the coalescer. If this is not done, when the coalescer is withdrawn, any excess oil may coat the media surface and when replaced could contaminate the effluent.

- 8.9. Remove the access cover and lower the desludging hose into the separation chamber. Draw off the surface oil.
- 8.10. When removing the silt, lower the desludging hose to the base of the tank and withdraw any grit or sludge that may be present. It is not necessary to remove all the liquid unless you need to ensure the unit has been fully emptied. Ensure that you access and clean all compartments.
- 8.11. Remove the alarm probe, clean with water and replace. Ensure that it is working correctly
- 8.12. Consider the period of time that the coalescer has been installed and consider removing and inspecting (cleaning or replacing) the coalescer media. If removed, ensure that it is correctly replaced and secured into position. It is best to lower the liquid level when refitting. Replace the access covers.
- 8.13. Re-fill the separator with clean water up to the outlet level. The alarm may display an alarm condition until the separator is re-filled. Check alarm operation when unit full.
- 8.14. Check the float/closure device and raise, if it has self-seated.

Checking the Coalescer Assembly

- 8.15. Coalescers should be checked and cleaned regularly, also following a major incident replaced if necessary. It may be possible to squeeze/rinse out silt contamination from the media, but it is impossible to remove oil. Please contact Kingspan if you wish to purchase replacement coalescer foam media. Identify the type and size of separator (shown on labels inside the access neck).
- 8.16. Assemblies weighing less than 25 Kg may be removed by hand. Heavier assemblies should be lifted by mechanical means. Any lifting device employed must be capable of lifting:
 - In excess of the maximum assembly weight.
 - The assembly completely out of the access shaft.

- Giving a smooth and controlled lift.
- Swinging the assembly to one side clear of the access shaft.

Units	Dry Weight (Kg) Core tube & media	Wet Weight (Kg) Core tube & media	Silted Weight (Kg) Core tube & media	Replacement media part no.
NSFA080 to NSFA285 Incl.	32 kg	45 kg	≈ 55 kg	402733

- 8.17. Ensure that the area around the access shaft is clear and that there is space to place the coalescer core tube assembly once removed. If space is not available it will be necessary to support the assembly over the access shaft e.g. by scaffold poles and platform.
- 8.18. Only remove the access cover when necessary to remove the assembly. Do not leave the access shaft uncovered and unattended.
- 8.19. It is recommended that core tubes be lifted by mechanical means, especially if it is suspected that the coalescer media be silted.

8.20. Removing the coalescer assembly.

- 8.21. A cut out is provided in the top of the coalescer tube to aid lifting. When the unit is installed the coalescer tube is bolted to the neck. Deeper invert units are provided with a coalescer tube extension chain of the appropriate length.
- 8.22. Lift the assembly with a smooth and steady motion. Core tubes and media will become lighter as water drains from the exposed media. Allow the water to drain completely. Assemblies blocked with fine silt may be very heavy.
- 8.23. Fully extract the assembly and set it down adjacent to the access shaft. Consider cleaning or replacement of the media.

8.24. Cleaning the coalescer assembly /Media Replacement.

- 8.25. Hose down the assembly using clean water at normal pressure. (You may be able to return the cleaning water into the separator, if there is sufficient separator capacity.) Do not allow untreated cleaning water to pass out of the unit. Continue hosing media until the water runs clear. If the media is heavily contaminated with oil and silt it may not be possible to clean effectively by hosing and should be replaced.
- 8.26. When replacing the media, undo the banding. Slide media off the core tube and slide new media on. Ensure all the apertures on the core tube are covered by the media. Re-secure or replace banding. Consider replacing media every two years.

8.27. Replacing the coalescer assembly.

- 8.28. Position coalescer assembly over the access shaft and remove any safety coverings.
- 8.29. Lower the assembly steadily into the access shaft, orientate core tube correctly and locate over sump cone. Check the float/closure device is free to operate.

9.0 Emergencies

- 9.1. At sites where there is a high risk of spillage, spill kits containing drain seals, absorbent materials, disposal containers and other appropriate equipment should be held. In the event of a spillage on site, the material should be contained, (if a spill kit is not available, sand or soil may be used) and the Environment Agency notified immediately using the appropriate emergency hotline number listed in the Agency Guideline PPG3. Year 2011 – 0800 80 70 60

Site address/location	.....
	
Separator location	.....
	
Type of separator	.....
Nominal Flow	.....
Total capacity	.....

[illegible]

015319
NSBE010-NSBE125 Class 1 Bypass Separator
Installation & Maintenance Guidelines



Kingspan Environmental Service Contact Numbers:

GB: 0844 846 0500

NI: 028 3025 4077

IRL: 048 3025 4077

Enclosed Documents

DS1155	NSBE010-NSBE030 Class 1 Bypass Separators
DS1254	NSBE036 Class 1 Bypass Separator
DS1224	NSBE040 & NSBE050 Class 1 Bypass Separators
DS1225	NSBE075-NSBE125 Class 1 Bypass Separators

Issue	Description	Date
05	CC1405 – Coalescer Chains were Pipes	Feb 2018

HEALTH & SAFETY

These warnings are provided in the interest of safety. You must read them carefully before installing or using the equipment.

It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can be acquainted with the functioning of the equipment and the relevant warnings.

Installation should only be carried out by a suitably experienced contractor, following these guidelines.

We recommend the use of a dust mask and gloves when cutting GRP components.

Electrical work should be carried out by a qualified electrician.

Contaminated surface water can contain substances harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

Access covers should be selected with reference to the location of the unit and traffic loads to be accommodated. These are not (normally) part of the Separator supply.

When covers are removed precautions must be taken against personnel falling into the unit.

Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures.

Ensure that you are familiar with the safe working areas and accesses. Ensure that the working area is adequately lit.

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges.

OIL ALARM SYSTEMS

PPG3 requires that the oil level alarm be fitted, tested and commissioned by a competent Installer. This is to ensure that the excessive oil probe is calibrated correctly, raising an alarm when 90% of the recommended maximum oil storage volume is reached. Should the oil level alarm fail to provide an early warning, excessive oil could pass through the separator, thus polluting the environment. This could result in substantial cleanup costs and legal action being taken under the water resources act 1991.

MAINTENANCE

The correct ongoing maintenance is essential for the proper operation of the equipment. Operators who rely on oil level alarms to prompt them to service separators between maintenance intervals run the risk of polluting should the alarms not work, hence the ongoing functional assessment of the oil alarm systems is fundamental if pollution incidents are to be avoided.

The removal of sediment and retained oil/grease should be carried out by a contractor holding the relevant permits to transport and dispose of such waste. The contractor must refer to the guidelines in this document.

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Appendices

Separator Maintenance Log

	
Kingspan Environmental College Road North Aston Clinton Aylesbury Buckinghamshire HP22 5EW United Kingdom	
13	
En 858 : Separator systems for light liquids	
GRP Glass Reinforced Plastic Tank	
Bypass Separators NSB003 - NSB150	
Class 1	
Watertightness	Passed
Structural Testing	Passed
Hydraulic Efficiency	Passed

1 Introduction

- 1.1.1 These Guidelines represent Best Practice for the installation of the above Separator Units. Many years of specialist experience has led to the successful installation of thousands of separator units. It must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, any information or advice given by our employees or agents regarding the design of an installation must be verified by a qualified specialist (e.g. Civil engineering consultant).
- 1.1.2 For guidance of Separator selection and application, please refer to the most recent issue of Environment Agency Guidelines pollution prevention guidelines No. 3 (PPG3).and BS En 858

1.2 Handling & Storage

- 1.2.1 Care must be taken to ensure that units are not damaged during delivery and handling on site. Please take care and place unit so that it cannot fall and become damaged
- 1.2.2 The design requirements of these products will frequently mean that the centre of gravity of the unit is “offset”. Care must therefore be taken to ensure that the unit is stable when lifting. Rainwater may also collect inside units, particularly if they have been stored on site prior to installation, adding weight and increasing instability. Check units before lifting and pump out any excess water.
- 1.2.3 When lifting units, use webbing slings of a suitable specification. Do not use chains.
- 1.2.4 A suitable spreader bar should be used to ensure that units are stable and that loads are evenly distributed during lifting. When lifting separators, a spreader bar should be used where the slings would otherwise be at an angle > 30 degrees to the vertical.
- 1.2.5 Lifting equipment should be selected by taking into account the unit weight, length and the distance of lift required on site.
- 1.2.6 We accept no responsibility for the selection of lifting equipment.
- 1.2.7 Whenever units are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects, which may damage the unit. The units must be placed on ground, which is flat, and level and the unit orientated onto its side with even support. Do not roll separators.

1.3 Site Planning

The following points should be considered before installation of the equipment:

- 1.3.1 The discharge must have the consent of the relevant Environmental Regulator.
- 1.3.2 The installation should have Planning and Building Control approval.
- 1.3.3 Consider installing flow cut-off valves to isolate the separator in an emergency or during site cleaning operations. See Environment Agency Guidelines PPG3.
- 1.3.4 We will fit a tube to receive the alarm probe. This tube provides protection and ensures that the probe is positioned at the correct level to sense the oil build up. The tube design and probe level setting assumes the use of our standard oil alarm system and may not be suitable for other alarm supplier's equipment. The probe tube may be fitted either within the neck or within the body of the unit. It should be extended to ground level when fitted in the body of the tank and you should make provision to extend the tube to the required height before backfilling. Consult the alarm supplier's instructions for their detailed fitting installation instructions.
- 1.3.5 Consider venting of the unit. Comply with local regulations. In the UK, comply with the following regulations. For Petrol Stations: Health and Safety Guidance Note 41 (HS(G)41). For other applications: BS8301: 1985 (obsolescent) BS EN 752 Building Drainage. Adequate ventilation should be provided to the separator. The ventilation pipe should be as short as is practicable and be terminated not less than 2.5m above paving nor less than 1m above the head of an openable window or other opening into a building within a horizontal distance of 3m. Each neck should be vented independently, we advise against joining these below ground prior to their rising as vent stacks.
- 1.3.6 Consider installation of a sampling point downstream of the separator. There is no suitable facility to effectively sample the wastewater from inside the unit.

- 1.3.7 Uncontaminated run off such as roof water should be excluded from separators. (EA Guidelines PPG3.)
- 1.3.8 Ground conditions and water table level should be assessed. If the water table will be above the base of the units at any time of the year, adequate concrete backfill must be provided to avoid flotation. In poorly draining ground, consideration should also be given to the likelihood of flotation due to surface water collecting in the backfill, and an appropriate installation method devised to avoid this.
- 1.3.9 If the discharge is to a soakaway, a porosity test should be carried out as part of the assessment of suitability for sub-soil drainage.
- 1.3.10 The separator must be installed at a level, which will allow connection to the incoming drain and a free discharge at the system outlet. The water table must be below the discharge outlet.
- 1.3.11 Do not install the unit deeper than necessary, ensure that you purchase extension shaft kits. The minimum invert depth of the unit is shown on the customer drawing.
- 1.3.12 Adequate access must be provided for routine maintenance. Vehicles should not be permitted within a distance equal to the depth of the unit, unless suitable structural protection is provided to the installation.
- 1.3.13 There must be at least 1 metre of clear, level ground all around the access covers to allow for routine maintenance.
- 1.3.14 It is essential that a mains water supply is accessible for routine cleansing and refilling after removal of waste material and liquid.
- 1.3.15 Provide electrical supply for alarm system.
- 1.3.16 Installation should only be carried out by suitably qualified and experienced contractors in accordance with current Health and Safety Regulations. Electrical work should be carried out by a qualified electrician, working to the latest edition of IEE wiring regulations.
- 1.3.17 This unit is designed to operate with gravity in and out flows. The unit is not designed to operate with a pumped influent.

2 Installation

2.1 Installation – General

- 2.1.1 When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipework should be designed to minimise the risk of damage from differential movement of the unit(s) and/or surrounding material.
- 2.1.2 For separators with burial depths greater than 1000mm from cover level to the top of the unit, specific site conditions should be taken into consideration and the backfill designed to bear any loads which may be applied during and after installation to prevent the tank being subjected to these loads.
- 2.1.3 The excavation must be deep enough to provide bedding and cover depth as determined by the type of surface pavement and loading. Asphalt and concrete pads should extend a minimum of 300mm horizontally beyond the unit in all directions.
- 2.1.4 In situations where the excavation will not maintain a vertical wall, it will be necessary to shore up the sidewalls of the excavation with suitable trench sheets and bracing systems to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until the backfilling is complete, but before the concrete fully hardens.
- 2.1.5 In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be dewatered using suitable pumping equipment and this should continue until the installation is complete.
- 2.1.6 During installation care must be taken to ensure that the body of the unit is uniformly supported so that point loads through the unit are avoided.
- 2.1.7 The concrete Specification is not a site specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES: C25 /30 C25 /30 C16 /20		REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30	270 - 280 Kg/M ³
	C20	220 - 230 Kg/M ³
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

2.2 Separator Installation

- 2.2.1 Excavate a hole of sufficient length and width to accommodate the tank and a minimum 225mm concrete surround and to a depth, which allows for the burial depth of the unit plus concrete base slab and haunch.
- 2.2.2 Construct a suitable concrete base slab appropriate to site conditions. Ensure that the slab is flat and level.
- 2.2.3 When the concrete base slab has set enough to support the installed load, add a concrete haunch so as to provide even support under the unit and then lower the unit onto the haunch using suitable webbing slings and lifting equipment.
- 2.2.4 **Pour no more than 300-mm depth of clean water into the unit, avoiding shock loads. For units with more than one chamber, add water to each chamber simultaneously. DO NOT OVERFILL; the unit is not designed to hold water whilst unsupported.**
- 2.2.5 **Place concrete backfill to approximately 300mm depth under and to the sides of the tank ensuring good compaction to remove voids. DO NOT use vibrating pokers. Continue adding concrete backfill, simultaneously keeping the internal water level no more than 200 mm above the backfill level at all times, until the backfill is just below the underside of the outlet drain, giving sufficient room to connect the inlet and outlet pipework.**
- 2.2.6 Connect inlet and outlet drains and vent pipes when safe access to the backfill can be gained.

2.3 Pipework Connections

- 2.3.1 In all cases, ensure that the outlet pipework level is maintained for correct operation. (Unless specified on the order, the fall across the unit will be as per the customer drawings).
- 2.3.2 Small units are generally fitted with **PVCu spigots** to both the outlet and the inlet.
- 2.3.3 Connect using the same size PVCu socket or a suitable reducer.
- 2.3.4 Larger units are generally fitted with **Our GRP** manufactured sockets.
- 2.3.5 The connecting pipework should be pushed into the socket. Ensure that the seal is secure and watertight before backfilling the pipe.

- 2.3.6 Alternatively, proprietary **flex seal couplings** can be obtained to fit over the outside of the site pipework and the outside of the GRP socket. When using this connection method, please be aware that the outside GRP laminate is not perfectly regular and that you may need to use a sealant on the outside diameter of the GRP. Take care not to over tighten the coupling when connecting to the GRP and ensure that the seal is secure before backfilling the pipe. Drawing 403144 provides the ID of our Bypass GRP sockets. The OD is variable, as the wall thickness can be up to 15-20 mm. If purchasing a flexseal coupling for use with clay /concrete, we suggest that a size 110 mm larger than the ID is selected.

2.4 Oil Level Alarm Neck Fitting

- 2.4.1 We will fit a tube to receive the oil alarm probe. This provides protection and ensures that the probe is positioned at the correct level to sense oil build up.
- 2.4.2 See alarm supplier information and ensure that the probe is placed within the tube and can be accessed from ground level.
- 2.4.3 Continue backfilling with concrete over the tank body to the required level. Build up a shell of concrete, minimum 225mm thick, around the access shaft(s). Temporarily strut the access shaft to avoid distortion.
- 2.4.4 Where we supply an extension shaft to meet a deeper invert requirement, a coalescer extension chain will be required. When fitting, ensure that the chain is fitted to just below the surface so that the coalescer can easily be removed. Remove the coalescer from the unit before adding the extension chain. When refitting, ensure that the coalescer is correctly inserted and fully pushed into the base fitting. This is important and you must ensure that the coalescer is correctly located before putting the unit in to operation.
- 2.4.5 It is advisable to seal the joints on the extension shafts (particularly on sites with high ground water) with proprietary sealant or by GRP lamination. Temporarily strut the extension neck(s) to avoid distortion during back filling. Where more than one neck section is required to suit a deep invert, consider back-filling section by section. If the extension neck is too long, it can be trimmed using a fine-toothed saw. The original fixing hole bolting the coalescer to the neck should be sealed.
- 2.4.6 Ensure that the vent socket if cut out, is replaced elsewhere. The maximum recommended inlet invert is 2000mm (using 500mm long extension sections). If you are installing a unit deeper than this then you must make your own arrangements for removing and replacing the coalescer. Consideration must be given to the depth of lift involved.
- 2.4.7 Continue back-filling, ensuring minimum 225mm concrete thickness around the access shaft/ extension neck and alarm access tube (as applicable).
- 2.4.8 Mains powered Alarm Systems. See alarm suppliers installation instructions. Lay 82mm diameter PVCu underground ducting between the alarm panel location and the alarm probe position. The ducting should be 500mm below ground level and fitted with a drawstring for later cable insertion. Any changes of direction should be by long radius bend. If necessary, drill a suitable hole in the access shaft adjacent to the alarm probe terminal box, to accept the ducting and seal.
- 2.4.9 In traffic areas a suitable top slab must be constructed. The top slab should bear on a suitable foundation to prevent superimposed loads being transmitted to the unit and access shafts. Loads applied to covers and frames must bear on the top slab, not the access shaft.
- 2.4.10 The unit should be filled with clean water up to the invert level of the outlet pipe. Ensure the unit identification is placed/ marked inside the neck for future information. The unit is now ready for use.

2.5 Alarm Installation

- 2.5.1 Install the alarm probe and control panel, as per the Suppliers Alarm Installation Guidelines. Ensure that the probe is positioned correctly for the required storage of oil. The table below indicates the maximum volume of oil to be stored and the depth of floating oil expected in the separation chamber.

Unit	Required Minimum Oil Storage volumes in litres	Max. (100%)Depth of floating oil (Static)
NSBE010	150 litres	320mm
NSBE015	225 litres	335mm
NSBE020	300 litres	335mm
NSBE025	375 litres	385mm
NSBE030	450 litres	385mm
NSBE040	600 litres	420mm
NSBE050	750 litres	430mm
NSBE075	1125 litres	430mm
NSBE100	1500 litres	435mm
NSBE125	1875 litres	435mm

3 Operation

- 3.1.1 The unit is sized on treating a defined area and rainfall (5 mm/hour) EN.858 Part 1 and using the factor provided in the Environment agency guidelines PPG3. (0.0018 = 6.5mm/hr) The unit will treat the entire flow i.e. NSBE015 will treat a flow of 15 litres per second. If the flow is greater than this then the excess flow will bypass the main treatment chamber. A NSBE015 unit will work in bypass mode over 15 and up to 150 litres per second. Flows in excess of this will back up on to the site. During a storm, the rain falls and flushes any surface debris, silt or oil into the tank. This first flush, up to the maximum rated flow is fully treated. As the severity of the storm increases, so does the rate of flow increase. The liquid entering the separator after the first flush tends to be cleaner and so, in lower risk applications, is allowed to bypass the oil separation chamber for directly discharge.
- 3.1.2 The bypass unit has three chambers. The entire flow up to the units listed flow rating is fully treated and passes through all chambers. (E.g. NSBE015 treats 15 litres per second.)
- 3.1.3 Flows in excess of this rating will bypass the separation chamber and the liquid passes untreated to the outlet chamber.
- 3.1.4 The first chamber will accumulate silt and grit. The maximum volume that can be retained is the rating x 100 e.g. a NSBE015 is capable of holding 1500 litres of silt.
- 3.1.5 The second / separating chamber is sized to separate oil at the rated flow rate and to accumulate the required oil storage volume. A NSBE015 maximum oil storage volume is 225 litres. An oil probe should be positioned to detect the accumulation of oil when there is no or low flow conditions. The probe should be positioned so that the alarm operates at 90% of the rated oil storage volume.
- 3.1.6 In bypass flow conditions, the flow moves directly from the inlet to the outlet chamber avoiding the separating chamber.
- 3.1.7 Separators are purchased as Class 1 units. Class 1 Bypass Separators are fitted with a removable coalescer which also includes media to further improve the discharge quality. The coalescer media requires maintenance.
- 3.1.8 Bypass Class 1 Separators are not effective for the removal of soluble or emulsified pollutants such as oil/detergent mixes found in vehicle wash effluents. With permission such discharges should be drained to the foul sewer. Consult our technical department for Separation equipment to meet these applications.

4 Maintenance

4.1 Waste Removal and Servicing

- 4.1.1 Separated light liquid **must** be removed from separator when the oil capacity has been reached.
- 4.1.2 An oil level alarm system is available for purchase which gives warning when the separated light liquid/water interface level reaches 90% of the maximum recommended oil storage volume.
- 4.1.3 Separators should be inspected at least every six months or more frequently if experience dictates. A log should be maintained detailing the depth of oil found, any oil volume removed and any silt removal or cleaning carried out. A specimen maintenance log is included in the appendices.
- 4.1.4 Every site is different, in respect to the amount and type of silt generated by the drain design and installation. Frequently, the construction programme itself generates large and perhaps unusual quantities of silt and grit. We do recommend that following the initial installation, an inspection of the separator contents be made to check that building rubble has not entered the unit. Further inspections at 3 and 6 months should be made so as to be able to assess the volumes of silt and oil accumulated. The inspection and emptying programme can then be defined following the first 6 months site experience. We recommend leaving a maximum interval between inspections of 6 months.
- 4.1.5 Alarm probes should be removed and cleaned with water whenever waste material is removed from the separator. Please note the alarm may alert until the liquid level is replaced.
- 4.1.6 **Separator waste is a “special waste” under the terms of The Waste Management Code of Practice. The Code imposes a duty of care on the waste producer to ensure that the Cleansing contractor is registered with the Environment Agency and that the final disposal of the waste is to a licensed facility.**
- 4.1.7 You should consider the purchase of a maintenance service, which includes bi-annual inspections, removal of oil and silt, cleaning of the alarm probe and cleaning or replacement of the coalescer (where appropriate).

4.2 Waste Removal Procedure – Oil & Silt

- 4.2.1 **Oil can only be effectively removed when there is no flow entering the unit. Isolate the unit and prevent flow from entering. Always remove the oil before attempting to remove the coalescer. If this is not done, when the coalescer is withdrawn the oil can coat the media surface and when replaced the oil may be forced through the media, contaminating the effluent.**
- 4.2.2 Remove the access cover and lower the desludging hose in to the separation chamber. Draw off the surface oil.
- 4.2.3 If removing the silt, lower the desludge hose to the base of the tank and empty the contents of the chamber. Ensure that you access and clean both the inlet and the separation compartments.
- 4.2.4 Remove the alarm probe, if fitted, clean with water and replace.
- 4.2.5 Consider the period of time that the coalescer has been installed and consider removing and inspecting (cleaning or replacing) the coalescer media. If removed, ensure that it is correctly replaced into position. Replace the access covers. It is best to lower the water level to aid re-fitting.
- 4.2.6 Re-fill the separator with clean water up to the outlet level.
- 4.2.7 If an alarm is fitted, it will display an alarm condition until the separator is re-filled. Check alarm operation when unit full.

4.3 Checking the Coalescer Assembly

- 4.3.1 Coalescers, where fitted, may be cleaned periodically to maintain efficiency. Coalescers should be checked following a major incident and replaced if necessary. Please contact us if you wish to purchase the coalescer media.
- 4.3.2 Identify the type and size of separator (shown on labels inside the access neck).

- 4.3.3 Assemblies weighing less than 25 Kg may be removed by hand. Heavier assemblies should be lifted by mechanical means. Any lifting device employed must be capable of lifting:
- 4.3.3.a In excess of the maximum assembly weight.
 - 4.3.3.b The assembly completely out of the access shaft.
 - 4.3.3.c Giving a smooth and controlled lift.
 - 4.3.3.d Swinging the assembly to one side clear of the access shaft.

Unit	Dry Weight (Kg)	Wet Weight (Kg)	Silted Weight (Kg)	Number Within unit	Replacement Media Part No.
NSBE010	5.7 kg	≈50 kg	≈60 kg	1	402862
NSBE015	6.2 kg	≈55 kg	≈65 kg	1	402864
NSBE020	6.2 kg	≈55 kg	≈65 kg	1	402864
NSBE025	12.0 kg	≈65 kg	≈75 kg	1	402866
NSBE030	12.0 kg	≈65 kg	≈75 kg	1	402866
NSBE040	21.0 kg	≈100 kg	≈200 kg	1	402885
NSBE050	21.0 kg	≈100 kg	≈200 kg	1	402885
NSBE075	21.0 kg	≈100 kg	≈200 kg	2	402885
NSBE100	21.0 kg	≈100 kg	≈200 kg	2	402885
NSBE125	21.0 kg	≈100 kg	≈200 kg	3	402885

- 4.3.4 Ensure that the area around the access shaft is clear and that there is space to place the assembly once removed. If space is not available it will be necessary to support the assembly over the access shaft. e.g. by scaffold poles and platform.
- 4.3.5 Only remove the access cover when necessary to remove the assembly. Do not leave the access shaft uncovered and unattended.
- 4.4 Removing the coalescer assembly.**
- 4.4.1 Undo and remove the bracket which secures the coalescer to the access shaft.
 - 4.4.2 Lift the assembly with a smooth and steady motion. Coalescers will become lighter as water drains from the exposed media. Allow the water to drain completely. Assemblies blocked with fine silt may be very heavy.
 - 4.4.3 Fully extract the assembly and set it down adjacent to the access shaft.
- 4.5 Cleaning the coalescer assembly/ Media Replacement.**
- 4.5.1 Hose down the assembly using clean water at normal pressure. If the media is heavily contaminated with oil and silt, it may not be possible to clean it effectively by hosing. Do not allow untreated cleaning water to pass out of the unit. Continue hosing until the water runs clear.
 - 4.5.2 To replace the media, undo the banding. Slide media off the core tube and slide new media on. Ensure all the apertures on the core tube are covered by the media. Re-secure or replace banding. Consider replacing media and banding every two years.
- 4.6 Replacing the coalescer assembly.**
- 4.6.1 Position it over the access shaft.
 - 4.6.2 Lower the assembly steadily into the access shaft ensuring that the end locates within the sump at the bottom of the tank.
 - 4.6.3 Replace the access cover.

5 Emergencies

- 5.1.1 At sites where there is a high risk of spillage, spill kits containing drain seals, absorbent materials, disposal containers and other appropriate equipment should be held. In the event of a spillage on site, the material should be contained, (if a spill kit is not available, sand or soil may be used) and the Environment Agency notified immediately using the appropriate emergency hotline number listed in the Agency Guideline PPG3. Year 2011 - **0800 80 70 60**

6 Warranty

The company will replace or, at its option, properly repair without charge any goods which are found to be defective and which cause failure in normal circumstances of use **within a period of twelve months from the date of delivery.**

This warranty is conditional upon:

- (a) the Buyer notifying the Company of any claim within Seven days of the failure becoming discernible.
- (b) the Company being allowed a reasonable opportunity to inspect the goods so as to confirm that they are defective.
- (c) the goods not having been modified, mishandled or misused and being used strictly in accordance with any relevant instructions issued by the Company.

The Company's liability under this Clause is limited to the repair or replacement of the defective goods, and does not cover costs of transport, installation or associated site costs, if applicable.

The Company's liability to replace or repair the goods is in lieu of and excludes all other warranties and conditions, and in particular (but without limitation) the Company shall have no liability of any kind for consequential loss or damage.

For any further advice, please us.

A warranty form is included in this package, to register your unit for warranty. Please complete ALL sections of the form, and return it at your earliest convenience.

001372

**NSBP003 – NSBP006 Class 1 Bypass Separator
Installation & Operation Guidelines**



Kingspan Environmental Service Contact Numbers:

GB: 0844 846 0500

NI: 028 3025 4077

IRL: 048 3025 4077

Enclosed Documents

DS0993P	NSBP003 – NSBP006 Class 1 Bypass Separator
DS1013P	NSBP003 - NSBP006 Installation Drawing
NSBPEXTzz	NSBP Neck Extension Assembly

Issue	Description	Date
05	CC1405 – Coalescer Extension Chains were Pipes	February 2018

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1 Introduction

- 1.1.1 These Guidelines represent Best Practice for the installation of the above Separator Units. Many years of specialist experience has led to the successful installation of thousands of separator units. It must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, any information or advice given by our employees or agents regarding the design of an installation must be verified by a qualified specialist (e.g. Civil engineering consultant).
- 1.1.2 For guidance of Separator selection and application, please refer to the most recent issue of Environment Agency Guidelines pollution prevention guidelines No. 3 (PPG3).and BS EN 858. Our units have been independently tested by BSI and are certified as meeting the standards.

1.2 Handling & Storage

- 1.2.1 Care must be taken to ensure that units are not damaged during delivery and handling on site. Please take care and place unit so that it cannot fall and become damaged
- 1.2.2 The design requirements of these products will frequently mean that the centre of gravity of the unit is “offset”. Care must therefore be taken to ensure that the unit is stable when lifting. Rainwater may also collect inside units, particularly if they have been stored on site prior to installation, adding weight and increasing instability. Check units before lifting and pump out any excess water.
- 1.2.3 When lifting units, use webbing slings of a suitable specification. Do not use chains.
- 1.2.4 A suitable spreader bar should be used to ensure that units are stable and that loads are evenly distributed during lifting. When lifting separators, a spreader bar should be used where the slings would otherwise be at an angle > 30 degrees to the vertical.
- 1.2.5 Lifting equipment should be selected by taking into account the unit weight, length and the distance of lift required on site.
- 1.2.6 We accept no responsibility for the selection of lifting equipment.
- 1.2.7 Whenever units are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects, which may damage the unit. The units must be placed on ground, which is flat, and level and the unit orientated onto its side with even support. Do not roll separators.

1.3 Site Planning

The following points should be considered before installation of the equipment:

- 1.3.1 The discharge must have the consent of the relevant Environmental Regulator.
- 1.3.2 The installation should have Planning and Building Control approval.
- 1.3.3 Consider installing flow cut-off valves to isolate the separator in an emergency or during site cleaning operations. See Environment Agency Guidelines PPG3.
- 1.3.4 We will fit a tube to receive the alarm probe. This tube provides protection and ensures that the probe is positioned at the correct level to sense the oil build up. The tube design and probe level setting assumes the use of our standard oil alarm system and may not be suitable for other alarm supplier's equipment. The probe tube is fitted within the neck of the unit. It should be extended to ground level when extension necks are required. Consult the alarm supplier's instructions for they're detailed fitting installation instructions.
- 1.3.5 Consider venting of the unit. Comply with local regulations. In the UK, comply with the following regulations. For Petrol Stations: Health and Safety Guidance Note 41 (HS(G)41). For other applications: BS8301: 1985 (obsolescent) BS EN 752 Building Drainage. Adequate ventilation should be provided to the separator. The ventilation pipe should be as short as is practicable and be terminated not less than 2.5m above paving nor less than 1m above the head of an openable window or other opening into a building within a horizontal distance of 3m. Each neck should be vented independently, we advise against joining these below ground prior to their rising as vent stacks.
- 1.3.6 Consider installation of a sampling point downstream of the separator. There is no suitable facility to effectively sample the wastewater from inside the unit.

- 1.3.7 Uncontaminated run off such as roof water should be excluded from separators. (EA Guidelines PPG3.)
- 1.3.8 Ground conditions and water table level should be assessed. If the water table will be above the base of the units at any time of the year, adequate concrete backfill must be provided to avoid flotation. In poorly draining ground, consideration should also be given to the likelihood of flotation due to surface water collecting in the backfill, and an appropriate installation method devised to avoid this.
- 1.3.9 If the discharge is to a soakaway, a porosity test should be carried out as part of the assessment of suitability for sub-soil drainage.
- 1.3.10 The separator must be installed at a level, which will allow connection to the incoming drain and a free discharge at the system outlet. The water table must be below the discharge outlet.
- 1.3.11 Do not install the unit deeper than necessary, ensure that you purchase extension shaft kits. The minimum invert depth of the unit is shown on the customer drawing.
- 1.3.12 Adequate access must be provided for routine maintenance. Vehicles should not be permitted within a distance equal to the depth of the unit, unless suitable structural protection is provided to the installation.
- 1.3.13 There must be at least 1 metre of clear, level ground all around the access covers to allow for routine maintenance.
- 1.3.14 It is essential that a mains water supply is accessible for routine cleansing and refilling after removal of waste material and liquid.
- 1.3.15 Provide electrical supply for alarm system.
- 1.3.16 Installation should only be carried out by suitably qualified and experienced contractors in accordance with current Health and Safety Regulations. Electrical work should be carried out by a qualified electrician, working to the latest edition of IEE wiring regulations.
- 1.3.17 This unit is designed to operate with gravity in and out flows. The unit is not designed to operate with a pumped influent.

2 Installation

2.1 Installation - General

- 2.1.1 When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipework should be designed to minimise the risk of damage from differential movement of the unit(s) and/or surrounding material.
- 2.1.2 For separators with burial depths greater than 1000mm from cover level to the top of the unit, specific site conditions should be taken into consideration and the backfill designed to bear any loads which may be applied during and after installation to prevent the tank being subjected to these loads.
- 2.1.3 The excavation must be deep enough to provide bedding and cover depth as determined by the type of surface pavement and loading. Asphalt and concrete pads should extend a minimum of 300mm horizontally beyond the unit in all directions.
- 2.1.4 In situations where the excavation will not maintain a vertical wall, it will be necessary to shore up the sidewalls of the excavation with suitable trench sheets and bracing systems to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until the backfilling is complete, but before the concrete fully hardens.
- 2.1.5 In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be dewatered using suitable pumping equipment and this should continue until the installation is complete.
- 2.1.6 During installation care must be taken to ensure that the body of the unit is uniformly supported so that point loads through the unit are avoided.
- 2.1.7 The Concrete Specification is not a site specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES: C25 /30 C25 /30 C16 /20		REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30 C20	270 - 280 Kg/M ³ 220 - 230 Kg/M ³
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

- 2.1.8 Pea Shingle - 6 mm to 10 mm rounded pea shingle, offering low point loading characteristics is considered to be the most suitable material for back filling in dry ground installation. (PEASHINGLE ONLY TO BE USED IN DRY SITE CONDITIONS).

2.2 Separator Installation

2.2.1 DRY GROUND CONDITIONS

- 2.2.2 Excavate the site, allowing for a minimum clearance on all sides and base of the unit of 200mm and level the base.
- 2.2.3 Ensure that the hole is kept dry. Should any rain or surface water collect in the hole, this should be pumped out.
- 2.2.4 A base of at least 200mm of lean mix concrete should be provided.
- 2.2.5 Lower the tank in the hole using a rope sling through the lifting points provided on the tank. Under no circumstances should the sling be attached to the inlet pipe or the outlet pipe.
- 2.2.6 Position the inlet pipe in line with the incoming drain. Note that the inlet and the outlet pipes are clearly embossed on the tank. The unique profile of the base will help to level the tank, but make sure the tank is in the truly upright position in order to maintain the 100mm fall between the inlet and outlet pipes.
- 2.2.7 After any concrete in the base has taken up it's initial set (usually after one day), ballast the tank by putting approximately 0.5m depth of water into it.
- 2.2.8 Backfill the space around the tank with pea gravel or similar material (PEASHINGLE ONLY TO BE USED IN DRY SITE CONDITIONS). The backfill should be free from organic material, large stones, brick or sharp objects. Backfilling should be carried out in layers, making sure that voids are not left under and around the sides of the tank and that there are no localized stress concentrations. Its is most important that the installer progressively fills the tank with water to the level above the backfill in order to stabilize pressures on the tank.
- 2.2.9 Remove any temporary covers and connect up the tank inlet and outlet pipes to your own pipework.
- 2.2.10 Backfilling can now proceed up to ground level in 300mm stages ensuring tank is ballasted in all chambers as you go.

- 2.2.11 A galvanized lockable manhole cover (600x600mm) and frame is to be fitted to suit specific site loadings, THE TANK MUST NOT BE LOAD BEARING. The top of the manhole should not be set below the local ground level. If necessary a further neck extension should be added to the tank to bring the cover up to ground level (see section 6).
- 2.2.12 Venting can be provided through the cover or a Tee piece arrangement on the outlet/inlet.
- 2.2.13 **WET GROUND CONDITIONS**
- 2.2.14 Excavate a hole to appropriate depth allowing at least 300mm for lean mix concrete and hard-core base. Allow for tank width plus at least 400mm with additional allowance for any necessary shuttering.
- 2.2.15 De-water the excavation using suitable pumping equipment. Ensure that the pump discharge does not saturate the ground in the immediate vicinity. In wet ground conditions the installer should ensure that the base is adequate to support the weight of the tank and its contents. If the base of the excavation is unstable, i.e. running sand or similar, excavate an additional 250-300mm below concrete levels and fill up with compacted hard-core. Place a sheet of polythene over the hard-core and up the sides of the excavation before putting in the concrete cradle.
- 2.2.16 Lay a bed of concrete (minimum 150mm thick) on top of the polythene at the base of the excavation. De-watering is to continue until you are satisfied that the concrete has cured.
- 2.2.17 Lower the tank onto the concrete bed, ensuring that the inlet and outlet are in the correct position. Ensure the tank is upright and then ballast it with water to a maximum of 500mm deep.
- 2.2.18 Haunch up the concrete bed at least 450mm all round the base, ensuring that all voids in the concrete are eliminated and at least 150mm of concrete is left below the tank base.
- 2.2.19 Backfill to the invert depth with concrete. Ensure that the water level inside the tank is maintained no more than 250-300mm above concrete backfill level. It is most important that the installer progressively fills the tank with water to a level above the backfill in order to stabilise pressure on the tank.
- 2.2.20 Backfill evenly all round the tank, consolidating in layers. The backfilling should start before the base has hardened and be a single continuous operation so that the tank has a full concrete jacket without joins.
- 2.2.21 DO NOT use vibrating rammers to consolidate concrete. DO NOT discharge concrete directly on to the tank. Ensure that the concrete is not too wet and that it is tamped in around the tank.
- 2.2.22 Align and connect pipework.
- 2.2.23 Build up a shell of concrete around the neck of the tank to 150-200mm thickness before completing the backfill with a suitable material. Care must be taken to avoid distortion of the neck whilst concreting this area.
- 2.2.24 Fit cover and frame. Apply surface finish e.g. turf
- 2.2.25 Do not empty tank until the concrete backfill has cured. Tanks may be left filled with water.

2.3 Pipework Connections

- 2.3.1 In all cases, ensure that the outlet pipework level is maintained for correct operation. (Unless specified on the order, the fall across the unit will be as per the customer drawings).
- 2.3.2 These units are fitted with **PVCu spigots** to both the outlet and the inlet.
- 2.3.3 Connect using the same size PVCu socket or a suitable reducer.
- 2.3.4 Ensure that the connecting pipework seal is secure and watertight before backfilling the pipe.
- 2.3.5 Alternatively, proprietary **flex seal couplings** can be obtained to fit over the outside of the site pipework. When using this connection method, ensure that the seal is secure before backfilling the pipe. If purchasing a flexseal coupling for use with clay /concrete, we suggest that a size 110 mm larger than the ID is selected.

2.4 Oil Level Alarm & Neck Fitting

- 2.4.1 We will fit a tube to receive the oil alarm probe. This provides protection and ensures that the probe is positioned at the correct level to sense oil build up.
- 2.4.2 See alarm supplier information and ensure that the probe is placed within the tube and can be accessed from ground level.
- 2.4.3 Continue backfilling with concrete/pea shingle (dry site) over the tank body to the required level. Build up a shell of concrete, minimum 225mm thick, around the access shaft(s). When using pea shingle continue to back fill up to required level. Temporarily strut the access shaft to avoid distortion.
- 2.4.4 Where we supply an extension shaft to meet a deeper invert requirement, a coalescer extension chain will be required. When fitting, ensure that the chain is secured to just below the surface so that the coalescer can easily be removed. Remove the coalescer from the unit before adding the extension chain. When refitting, ensure that the coalescer is correctly inserted and fully pushed into the base fitting. This is important and you must ensure that the coalescer is correctly located before putting the unit in to operation.
- 2.4.5 It is advisable to seal the joints on the extension shafts (particularly on sites with high ground water) with proprietary sealant. Temporarily strut the extension neck(s) to avoid distortion during back filling. Where more than one neck section is required to suit a deep invert, consider back-filling section by section. The original fixing hole bolting the coalescer to the neck should be sealed.
- 2.4.6 The maximum recommended inlet invert is 2000mm (using 500mm long extension sections). If you are installing a unit deeper than this then you must make your own arrangements for removing and replacing the coalescer. Consideration must be given to the depth of lift involved.
- 2.4.7 Continue back-filling, ensuring minimum 225mm concrete thickness around the access shaft/ extension neck. When using pea shingle back fill as required.
- 2.4.8 Mains powered Alarm Systems. See alarm suppliers installation instructions. Lay 82mm diameter PVCu underground ducting between the alarm panel location and the alarm probe position. The ducting should be 500mm below ground level and fitted with a drawstring for later cable insertion. Any changes of direction should be by long radius bend. If necessary, drill a suitable hole in the access shaft adjacent to the alarm probe terminal box, to accept the ducting and seal.
- 2.4.9 In traffic areas a suitable top slab must be constructed. The top slab should bear on a suitable foundation to prevent superimposed loads being transmitted to the unit and access shafts. Loads applied to covers and frames must bear on the top slab, not the access shaft.
- 2.4.10 The unit should be filled with clean water up to the invert level of the outlet pipe. Ensure the unit identification is placed/ marked inside the neck for future information. The unit is now ready for use.

2.5 Alarm Installation

- 2.5.1 Install the alarm probe and control panel, as per the Suppliers Alarm Installation Guidelines. Ensure that the probe is positioned correctly for the required storage of oil. The table below indicates the maximum volume of oil to be stored and the depth of floating oil expected in the separation chamber.

Unit	Recommended Minimum Oil Storage volumes in litres	Actual Oil Storage volume in litres	Max. (100%)Depth of floating oil (Static)
NSBP003	45 litres	107	210mm
NSBP004	60 litres	107	210mm
NSBP006	90 litres	107	210mm

3 Operation

- 3.1.1 The unit is sized on treating a defined area and rainfall (6.5 mm/hour) EN.858 Part 1 and using the factor provided in the Environment agency guidelines PPG3. (0.0018 = 6.5mm/hr) The unit will treat the entire flow i.e. NSBP003 will treat a flow of 3 litres per second. If the flow is greater than this then the excess flow will bypass the main treatment chamber. A NSBP003 unit will work in bypass mode over 3 and up to 30 litres per second. Flows in excess of this will back up on to the site. During a storm, the rain falls and flushes any surface debris, silt or oil into the tank. This first flush, up to the maximum rated flow is fully treated. As the severity of the storm increases, so does the rate of flow increase. The liquid entering the separator after the first flush tends to be cleaner and so, in lower risk applications, is allowed to bypass the oil separation chamber for directly discharge.
- 3.1.2 The bypass unit has three chambers. The entire flow up to the units listed flow rating is fully treated and passes through all chambers. (E.g. NSBP003 treats 3 litres per second.)
- 3.1.3 Flows in excess of this rating will bypass the separation chamber and the liquid passes untreated to the outlet chamber.
- 3.1.4 The first chamber will accumulate silt and grit. The maximum volume that can be retained is the rating x 100 e.g. a NSBP003 is capable of holding 300 litres of silt.
- 3.1.5 The second / separating chamber is sized to separate oil at the rated flow rate and to accumulate the required oil storage volume. A NSBP003 maximum oil storage volume is 45 litres. An oil probe should be positioned to detect the accumulation of oil when there is no or low flow conditions. The probe should be positioned so that the alarm operates at 90% of the rated oil storage volume.
- 3.1.6 In bypass flow conditions, the flow moves directly from the inlet to the outlet chamber avoiding the separating chamber.
- 3.1.7 Bypass Class 1 Separators are fitted with a removable coalescer which also includes media to further improve the discharge quality. The coalescer media requires maintenance.
- 3.1.8 Bypass Class 1 Separators are not effective for the removal of soluble or emulsified pollutants such as oil/detergent mixes found in vehicle wash effluents. With permission such discharges should be drained to the foul sewer. Consult our technical department for Separation equipment to meet these applications.

4 Maintenance

4.1 Waste Removal and Servicing

- 4.1.1 Separated light liquid **must** be removed from separator when the oil capacity has been reached.
- 4.1.2 An oil level alarm system is available for purchase which gives warning when the separated light liquid/water interface level reaches 90% of the maximum recommended oil storage volume.
- 4.1.3 Separators should be inspected at least every six months or more frequently if experience dictates. A log should be maintained detailing the depth of oil found, any oil volume removed and any silt removal or cleaning carried out. A specimen maintenance log is included in the appendices.
- 4.1.4 Every site is different, in respect to the amount and type of silt generated by the drain design and installation. Frequently, the construction programme itself generates large and perhaps unusual quantities of silt and grit. We do recommend that following the initial installation, an inspection of the separator contents be made to check that building rubble has not entered the unit. Further inspections at 3 and 6 months should be made so as to be able to assess the volumes of silt and oil accumulated. The inspection and emptying programme can then be defined following the first 6 months site experience. We recommend leaving a maximum interval between inspections of 6 months.
- 4.1.5 Alarm probes should be removed and cleaned with water whenever waste material is removed from the separator. Please note the alarm may alert until the liquid level is replaced.
- 4.1.6 **Separator waste is a “special waste” under the terms of The Waste Management Code of Practice. The Code imposes a duty of care on the waste producer to ensure that the Cleansing contractor is registered with the Environment Agency and that the final disposal of the waste is to a licensed facility.**

- 4.1.7 You should consider the purchase of a maintenance service, which includes bi-annual inspections, removal of oil and silt, cleaning of the alarm probe and cleaning or replacement of the coalescer (where appropriate).

4.2 Waste Removal Procedure – Oil & Silt

- 4.2.1 **Oil can only be effectively removed when there is no flow entering the unit. Isolate the unit and prevent flow from entering. Always remove the oil before attempting to remove the coalescer. If this is not done, when the coalescer is withdrawn the oil can coat the media surface and when replaced the oil may be forced through the media, contaminating the effluent.**
- 4.2.2 Remove the access cover and lower the desludging hose in to the separation chamber. Draw off the surface oil.
- 4.2.3 If removing the silt, lower the desludge hose to the base of the tank and empty the contents of the chamber. Ensure that you access and clean both compartments.
- 4.2.4 Remove the alarm probe, if fitted, clean with water and replace.
- 4.2.5 Consider the period of time that the coalescer has been installed and consider removing and inspecting (cleaning or replacing) the coalescer media. If removed, ensure that it is correctly replaced and secured into position. Replace the access covers. It is best to lower the water level to aid re-fitting.
- 4.2.6 Re-fill the separator with clean water up to the outlet level.
- 4.2.7 If an alarm is fitted, it will display an alarm condition until the separator is re-filled. Check alarm operation when unit full.

4.3 Checking the Coalescer Assembly

- 4.3.1 Coalescers, where fitted, may be cleaned periodically to maintain efficiency. Coalescers should be checked following a major incident and media replaced if necessary. Please contact us if you wish to purchase the coalescer media.
- 4.3.2 Identify the type and size of separator (shown on labels inside the access neck).
- 4.3.3 Assemblies weighing less than 25 Kg may be removed by hand. Heavier assemblies should be lifted by mechanical means. Any lifting device employed must be capable of lifting:
- 4.3.3.a In excess of the maximum assembly weight.
 - 4.3.3.b The assembly completely out of the access shaft.
 - 4.3.3.c Giving a smooth and controlled lift.
 - 4.3.3.d Swinging the assembly to one side clear of the access shaft.

Unit	Dry Weight (Kg)	Wet Weight (Kg)	Silted Weight (Kg)	Replacement Media Part No.
NSBP003	5.7 kg	≈50 kg	≈60 kg	402715
NSBP004	5.7 kg	≈50 kg	≈60 kg	402715
NSBP006	5.7 kg	≈50 kg	≈60 kg	402715

- 4.3.4 Ensure that the area around the access shaft is clear and that there is space to place the assembly once removed. If space is not available it will be necessary to support the assembly over the access shaft. e.g. by scaffold poles and platform.
- 4.3.5 Only remove the access cover when necessary to remove the assembly. Do not leave the access shaft uncovered and unattended.

4.4 Removing the coalescer assembly.

- 4.4.1 Undo any fixings which secure the coalescer to the access shaft (if fitted).
- 4.4.2 Lift the assembly with a smooth and steady motion. Coalescers will become lighter as water drains from the exposed media. Allow the water to drain completely. Assemblies blocked with fine silt may be very heavy.
- 4.4.3 Fully extract the assembly and set it down adjacent to the access shaft.

4.5 Cleaning the coalescer assembly/ Media Replacement.

- 4.5.1 Hose down the assembly using clean water at normal pressure. If the media is heavily contaminated with oil and silt, it may not be possible to clean it effectively by hosing. Do not allow untreated cleaning water to pass out of the unit. Continue hosing until the water runs clear.
- 4.5.2 To replace the media, undo the banding. Slide media off the core tube and slide new media on. Ensure all the apertures on the core tube are covered by the media. Re-secure or replace banding. Consider replacing media and banding every two years.

4.6 Replacing the coalescer assembly.

- 4.6.1 Position it over the access shaft.
- 4.6.2 Lower the assembly steadily into the access shaft ensuring that the end locates within the sump at the bottom of the tank. Re-secure the fixings (if fitted).
- 4.6.3 Replace the access cover.

5 Connection of Extension Neck

(Option in 1800L Tanks only)

- 5.1.1 See the accompanying illustration.
- 5.1.2 Remove existing lid by unscrewing 8 screws and lifting off lid.
- 5.1.3 Apply mastic around flange of tank that joins to extension neck.
- 5.1.4 Place extension neck onto flange of the tank and screw down using 8 fixings.
- 5.1.5 Please refer to drawing NSBPEXTzz
- 5.1.6 Apply mastic to top face of extension piece that is joining to cover.
- 5.1.7 Place lid on top of extension neck and screw down using 8 fixings.
- 5.1.8 Backfill in 200mm stages with concrete (wet site) or peashingle (dry site), bracing neck during each stage until you reach the cover level.
- 5.1.9 For traffic area loading ensures you refer to tank installation section.

6 Emergencies

- 6.1.1 At sites where there is a high risk of spillage, spill kits containing drain seals, absorbent materials, disposal containers and other appropriate equipment should be held. In the event of a spillage on site, the material should be contained, (if a spill kit is not available, sand or soil may be used) and the Environment Agency notified immediately using the appropriate emergency hotline number listed in the Agency Guideline PPG3. Year 2012 - **0800 80 70 60**

HEALTH & SAFETY

These warnings are provided in the interest of safety. You must read them carefully before installing or using the equipment.

It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can be acquainted with the functioning of the equipment and the relevant warnings.

Installation should only be carried out by a suitably experienced contractor, following these guidelines.

We recommend the use of a dust mask and gloves when cutting GRP components.

Electrical work should be carried out by a qualified electrician.

Contaminated surface water can contain substances harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

Access covers should be selected with reference to the location of the unit and traffic loads to be accommodated. These are not (normally) part of the Separator supply.

When covers are removed precautions must be taken against personnel falling into the unit.

Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures.

Ensure that you are familiar with the safe working areas and accesses. Ensure that the working area is adequately lit.

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges.

OIL ALARM SYSTEMS

PPG3 requires that the oil level alarm be fitted, tested and commissioned by a competent Installer. This is to ensure that the excessive oil probe is calibrated correctly, raising an alarm when 90% of the recommended maximum oil storage volume is reached. Should the oil level alarm fail to provide an early warning, excessive oil could pass through the separator, thus polluting the environment. This could result in substantial cleanup costs and legal action being taken under the water resources act 1991.

MAINTENANCE

The correct ongoing maintenance is essential for the proper operation of the equipment. Operators who rely on oil level alarms to prompt them to service separators between maintenance intervals run the risk of polluting should the alarms not work, hence the ongoing functional assessment of the oil alarm systems is fundamental if pollution incidents are to be avoided.

The removal of sediment and retained oil/grease should be carried out by a contractor holding the relevant permits to transport and dispose of such waste. The contractor must refer to the guidelines in this document.

SEPARATOR MAINTENANCE LOG



Site address/location

Separator location

Type of separator

Nominal Flow

Total capacity

[illegible]

SEPARATOR MAINTENANCE LOG



Site address/location

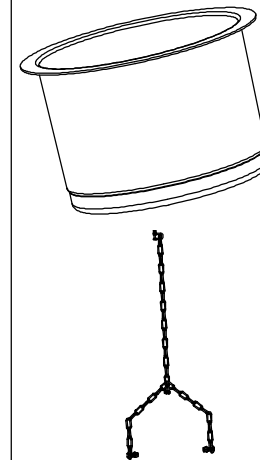
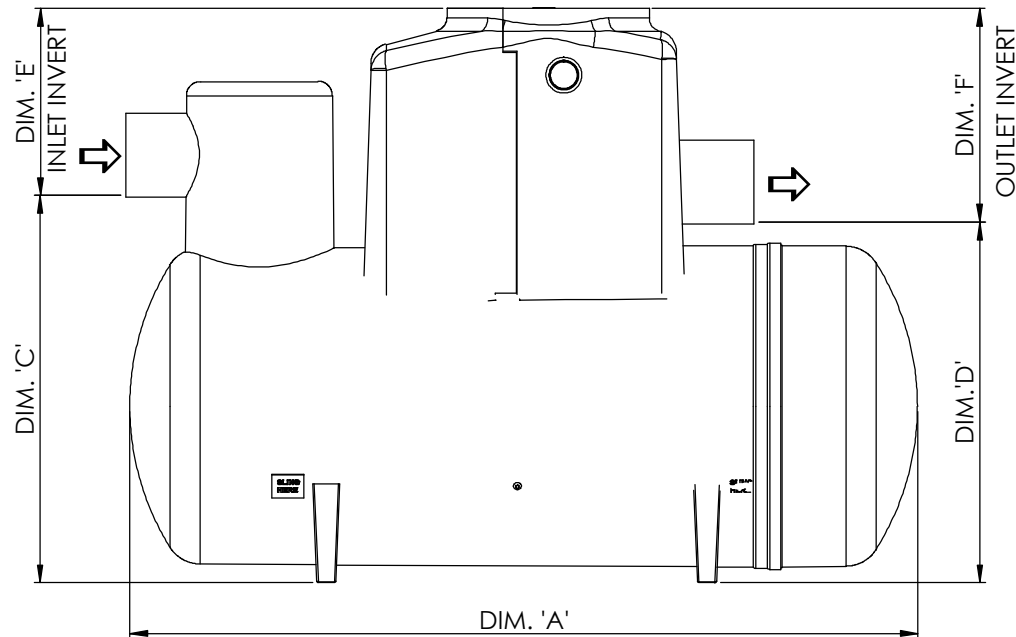
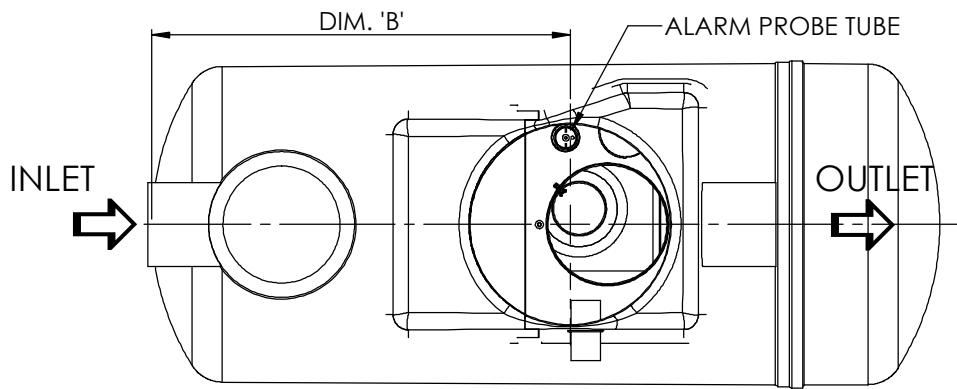
Separator location

Type of separator

Nominal Flow

Total capacity

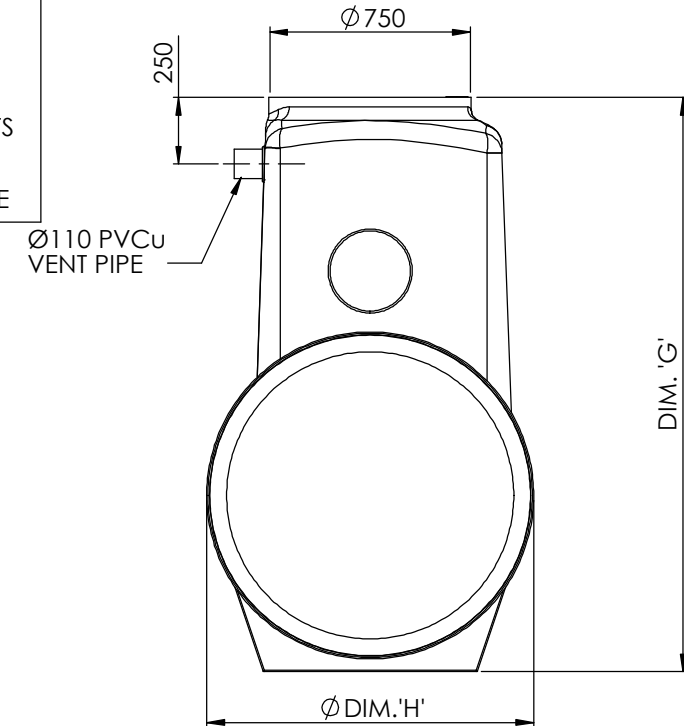
[illegible]



EXTENSION PARTS
(IF REQUIRED)
INCLUDED IN
PRODUCT CODE

NOTES

1. UNITS ARE SUPPLIED WITH THE STANDARD (MINIMUM) PIPEWORK SIZE, AND ORIENTATION SHOWN ON THE DRAWING. THE STANDARD EN858-1 STATES MINIMUM CONNECTION SIZES, UNITS ORDERED WITH DIFFERENT SIZE CONNECTIONS MAY NOT BE FULLY COMPLIANT WITH THE STANDARD. PLEASE CONSULT OUR SALES DEPARTMENT FOR DETAILS OF AVAILABLE OPTIONS, BUT PLEASE NOTE WE DO NOT ALTER INTERNAL PIPEWORK.
2. ALL UNITS SUPPLIED ARE CLASS 1 AND INCLUDE A COALESCER.
3. EXTENSION PARTS FOR DEEPER INVERTS CAN BE PROVIDED FOR ON SITE ASSEMBLY.
4. ALL UNITS REQUIRE APPROPRIATE CONCRETE BASE, COVER AND FRAME TO SUIT APPLIED LOADINGS.
5. THIS DRAWING SHOULD BE USED FOR DIMENSIONAL INFORMATION ONLY.
6. A Ø76mm TUBE IS SUPPLIED TO HOUSE AN OIL ALARM PROBE.



UNIT	NOMINAL FLOW (l/sec.)	DIM.'A'	DIM.'B'	DIM.'C'	DIM.'D'	DIM.'E'	DIM.'F'	DIM.'G'	DIM.'H'	STD. PIPE Ø	APPROX. EMPTY WEIGHT (kg)	FALL ACROSS UNIT
NSBE010	10.0	2070	1095	1450	1350	700	800	2150	1220	315	160	100
NSBE015	15.0	2950	1560	1450	1350	700	800	2150	1220	315	200	100
NSBE020	20.0	3893	2016	1450	1350	700	800	2150	1220	375	220	100
NSBE025	25.0	3575	1900	1680	1580	700	800	2380	1420	375	300	100
NSBE030	30.0	4265	2263	1680	1580	700	800	2380	1420	450	325	100

Please check with Kingspan Environmental that this drawing is the latest issue

Issue	Date	Drawn by	Approved by	Description
07	14.2.18	T.Kelly		CC1405 - Coalescer Extension Chains were Pipe
06	11.11.14	T.Kelly		CC1191 - Alarm Probe Tube Re-Positioned

Material : Various

Finish :

Weight :

Tolerance :

Thickness : n/a

Surface Area :

Drawing : DS1155

Page 1 of 2

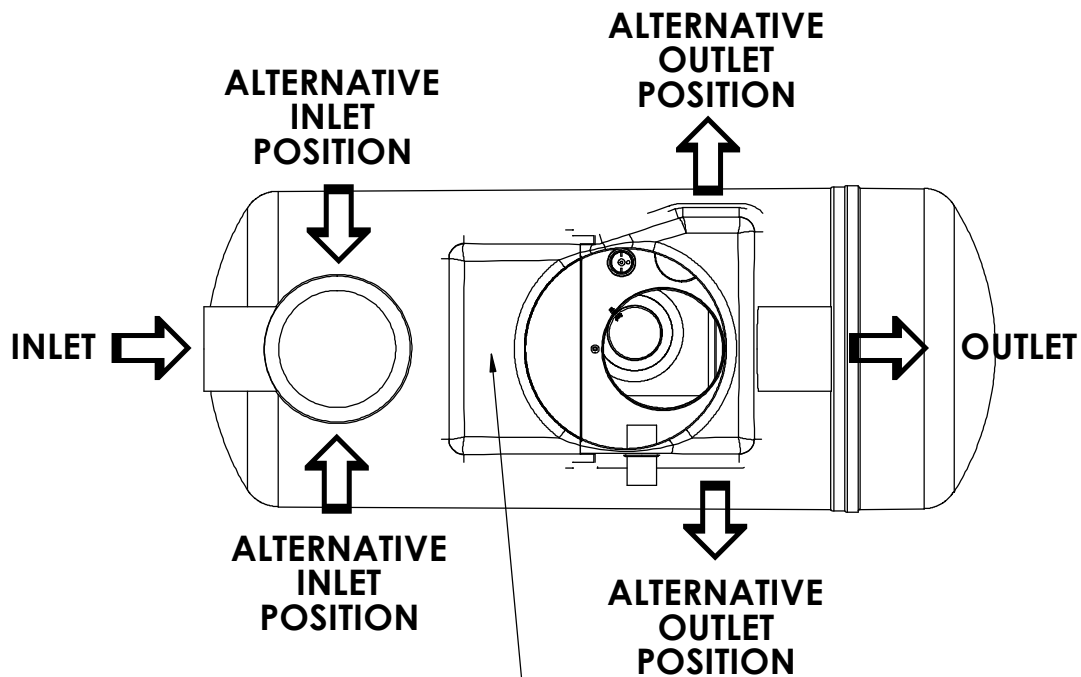
NSBE010 - NSBE030 Bypass Separators

All dimensions in mm

Scale: Not to scale

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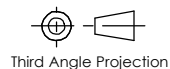


Please Note:-
Due to the physically small size of the NSBE010, the inlet pipe, all orientation options, is fitted directly into this turret.

Pipe Orientation Options		
OPTION A 	OPTION B 	OPTION C
OPTION D 	OPTION E 	OPTION F
OPTION G 	OPTION H 	OPTION K

Material : Various	Tolerance (unless stated) :	Drawing : DS1155 NSBE010 - 030 BYPASS SEPARATORS
Finish :	Thickness : n/a	
Weight : 226.56 Kg	Surface Area : m ²	
Modelled By :		

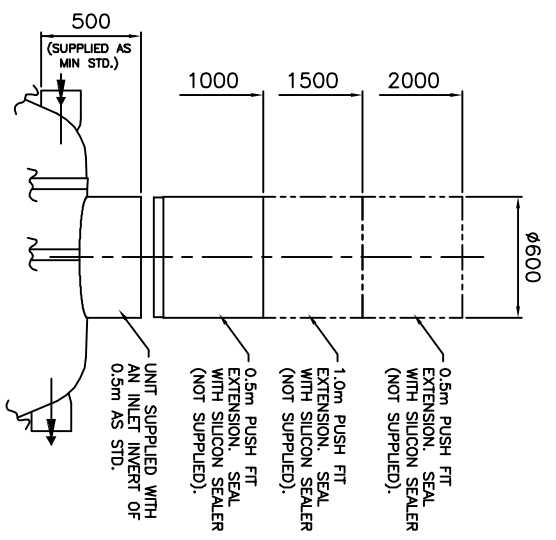
All Dimensions In mm Scale: Do Not Scale



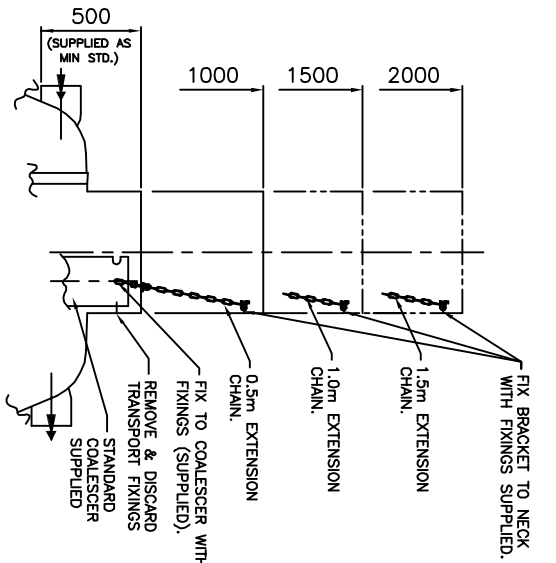
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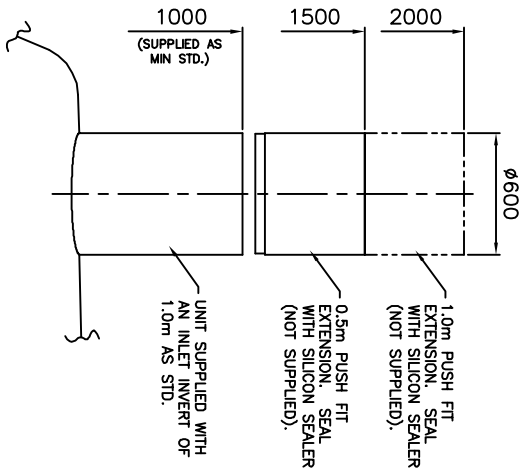
NSFA010 & NSFA015
NECK EXTENSIONS



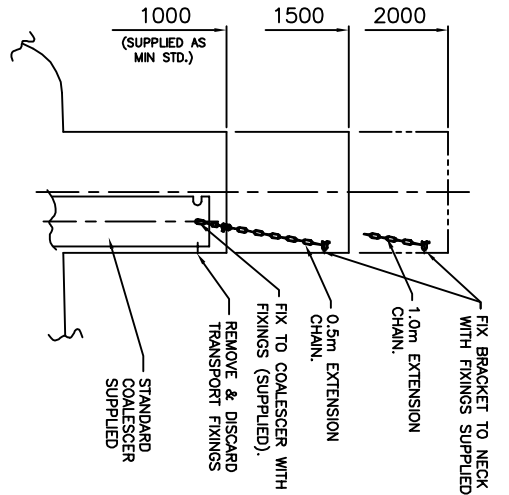
NSFA010 & NSFA015
COALESCER EXTENSIONS



NSFA020-NSFA065
NECK EXTENSIONS



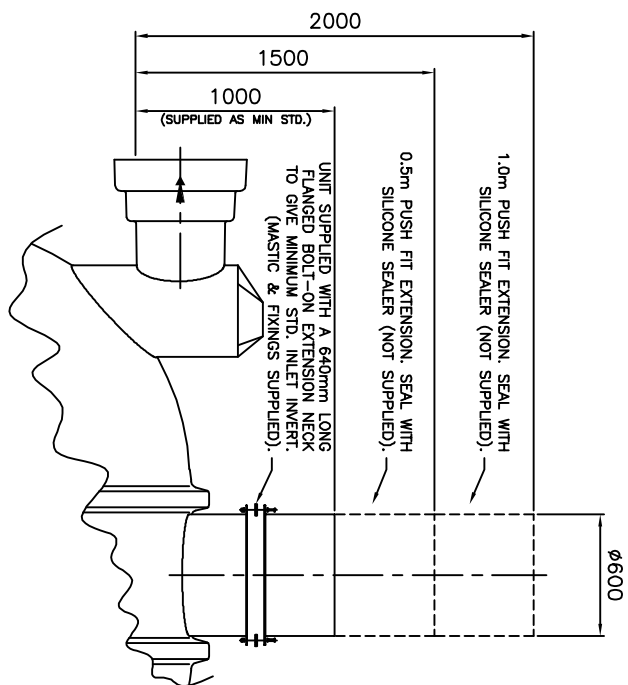
NSFA020-NSFA065
COALESCER EXTENSIONS



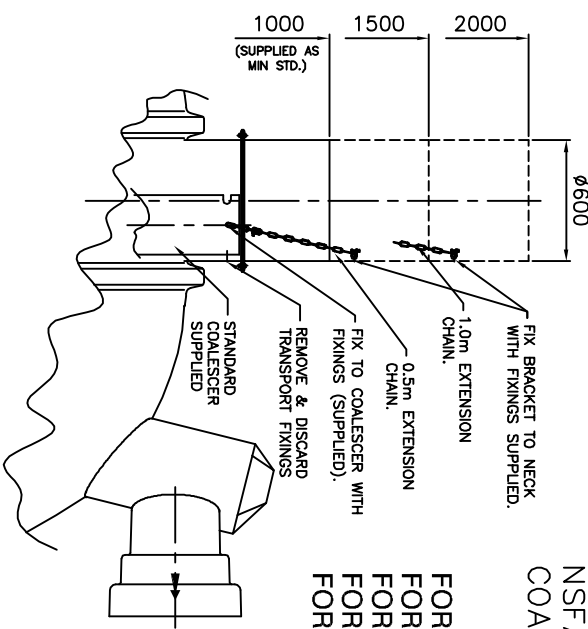
ORDER:- NSFAEXTA1105, 1110 OR 1115 QTY. 1

ORDER:- NSFAEXTA1205 OR 1210 QTY. 1

NSFA080-NSFA285
NECK EXTENSIONS



NSFA080-NSFA285
COALESCER EXTENSIONS



FOR 080 & 100 ORDER:- NSFAEXTA2205 OR 2210 QTY. 1
FOR 125 & 150 ORDER:- NSFAEXTA3305 OR 3310 QTY. 1
FOR 175 & 200 ORDER:- NSFAEXTA4505 OR 4510 QTY. 1
FOR 210 TO 240 ORDER:- NSFAEXTA5605 OR 5610 QTY. 1
FOR 255 TO 285 ORDER:- NSFAEXTA6705 OR 6710 QTY. 1

NECK FITTING EXPLANATION ONLY
NECK(S) INCLUDED WITH COALESCER(S)

ISSUE	DATE	DRAWN	MODIFICATION
06	03.04.18	T.K.	CCI425 - Range Now to 285 : Class 2 Reference Deleted
05	06.11.17	T.K.	CCI405 - Coalescer Ext Now Chain : Necks Revised
04	18.08.09	P.T.C	CC712 - New Plastic Tank Range

ALL DIMENSIONS ARE IN MILLIMETRES - DO NOT SCALE

Kingspan
Environmental

NECK & COALESCER
EXTENSION DETAILS
NSFA SEPARATORS

SCALE: 1:20

SHEET SIZE: A2

DRAWING No. DS0859P

ISSUE: 06

Appendix C - Attenuation Tanks

Modular Geo-Void Systems

Total Water Management

Maintenance & Access



 ALDERBURGH

Contents

Maintenance Pages 2 to 5

Maintenance

Introduction

The purpose of maintenance regimes and preventative design measures is to ensure the sustainability of the hydraulic operation of the installation. The typical stated life of geocellular installations is 50 years.

Geocellular units invariably comprise plastic elements, sometimes referred to as 'crates' usually arranged in a stacking or interlocking configuration. The types of units available are diverse; however, many units have a complex internal structure of columns, end plates, cover plates and bracing. The units typically have an initial void ratio of 95% and allow water to be stored and flow virtually unimpeded between adjacent units. However, this complex internal structure, which provides the strength, contributes to the low weight and the relatively low cost of the units, also makes them difficult to access internally for inspection and maintenance once constructed and backfilled.

The units in attenuation applications are generally enclosed in a water tight sealed membrane, protective fleece geotextile and buried to varying depths and so direct visual inspection of the units is not possible in nearly all cases.

Therefore maintenance strategies are required that protect the geocellular units and reduce the rate of performance loss over the life of the installation, along with an allowance that some storage volume loss will inevitably occur. This is the approach adopted by most suppliers.

Damage to geocellular units

The performance of the geocellular units and therefore the installation could be severely affected by damage to the units.

Care will be required in the storage,

installation, back-filling and protection pre commissioning of the geocellular units. Damaged units should be discarded and replaced before installation.

Unit handling

The units must be stored appropriately and undamaged prior to use as sharp edges for instance could pierce the membrane from within once backfilled. In addition damaged units are likely to affect the structural performance of the tank.

Root damage and vegetation

Many units are placed within landscaping areas. In these cases care will have to be taken to ensure large trees do not exist nearby and large specimen trees are not planted as part of a vegetation scheme within a defined exclusion zone created around the installation. This distance could vary depending on the species and size of the vegetation being considered. However, a reasonable guide is that tree roots will extend as far as the mature height of the tree and therefore for a small/medium tree, such as Hawthorn, Rowan (Mountain Ash) or Ornamental Cherry a distance of 6 to 7 metres would be appropriate. For larger trees such as Oak over 20 m distance would be recommended. Specific guidance can be found in the NHBC standards Chapter 4 Foundations section 4.2 'Building Near Trees' concerning trees in proximity of building works. It should also be borne in mind that trees and their root systems will actively seek out water sources, typically leaking drains, and therefore infiltration systems or poorly sealed attenuation tanks could see root penetration over time if large trees are situated nearby. Positioning of installations should not be under the canopy of mature trees as there is a risk of damage to both the units via the roots and by destabilising or affecting the health of the tree.

Membrane damage

The geocellular units are wrapped in a relatively vulnerable membrane and the effective operation of the installation depends on this being watertight. For attenuation and storage installations, damage to the membrane will compromise the effectiveness of the whole installation. A leaking membrane will overtime likely lead to wash out of the surrounding backfill, which could further damage the units by concentrating load, allowing external wash through of materials into the tank and lead to subsidence due to loss of material at the surface, damaging pavements above.

The installation of the membrane is a specialist operation with the seams welded and tested during construction. Once covered and buried to varying depths repairs are difficult to detect, locate and access for repair.

Installation precautions often call for the first 150 to 400mm of backfill to be either non-compacted or with hand driven 'light' equipment only. A protective geotechnical 'fleece' layer is also provided around the membrane and a sand blinding layer beneath the installation to distribute loadings and ensure that there is no large or sharp debris present which could perforate the membrane.

There is no practical remedial maintenance that can be undertaken for the membrane and once installed; it is designed to last the life of the installation.

Damage in construction or operation

Due to the modular nature of the units and the way installations are formed, there is generally little that can be done in the form of straightforward repairs. If there is a structural local failure then this is likely to propagate through the installation and if flotation occurs during construction the units are likely to become distorted resulting in the removal and reassembly of the whole installation. The units are also vulnerable to damage post commission from installation of new unrelated services above or future construction activities. Warning tape / mesh a minimum 300mm above the units shall be provided below the covering pavement / surface material to prevent excavation on top of the units and above ground clear permanent signs should be placed to warn of the location and depth to the units.

Construction records and the recommended maintenance regime should be passed on to the client, usually contained within the CDM Health and Safety Manual.

Siltation

To enable the units to perform well during their operation and design life, siltation has to be considered as the primary maintenance issue. The hydraulic performance of the units will be affected and the capacity will gradually be reduced when materials are washed into or settle out of the water being stored and discharged through the unit. Once material has collected in the geocellular units it is usually difficult to remove due to the internal structure of the units.

In operation the volume of silt or suspended solids carried within the runoff or water carried into the units is dependent on the type and area being drained. However, a key consideration and time period of high risk is during the construction period. During this phase of works, either from the installation directly or from general construction activities within the development, surface water will be highly loaded with silt and other debris. Precautions and measures will have to be undertaken to prevent surface water entering the installation during the construction period. This can be done by sealing the pipework to isolate the geocellular units until they are ready to commission.

Guidance exists; see Table 6.1 below and from manufactures for the percentage loss of capacity for an installation due to siltation that can be allowed for in design. The guidance indicates a percentage loss of capacity during a 50 year design life period of between 2 to 8.5%. However, it is understood that manufacturers and designers conservatively allow up to 10% loss for siltation due to material that cannot be removed in the hydraulic design considerations. Table 6.1 displays the silt loading levels for various categories of runoff surfaces.

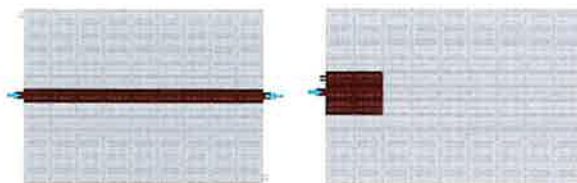
Silt loading levels and potential loss of storage

Location:	Worse case silt load (TSS):* (kg/ha/yr)	Max. potential loss of storage after 50 years:
Highways	723	7%
Commercial	840	8.5%
Low Density Residential	340	3%
High Density Residential	755	8%
Car Parks	762	8%
Roofs	216	2%

*CIWEM give typical silt loadings (in terms of Total Suspended Solids). The information is included in the following reference - D'Arcy B J, Ellis J B, Ferrier R C, Jenkins A and Dils R (2000). Diffuse pollution impacts, the environmental and economic impacts of diffuse pollution in the UK. CIWEM.

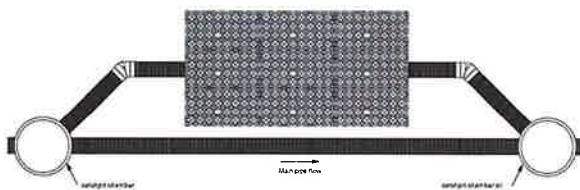
The general approach for siltation control is in the provision of external maintainable elements that prevent some materials entering the installation. An alternative approach is for low flow channels or sediment forebays to be provided. These can be regularly cleaned and maintained, thereby affording some protection to the main geocellular units/installation and slowing the rate, but not preventing, siltation. While these devices are generally effective they are subject to washout during storm events and very fine suspended solids will pass through. The sediment forebay is used in infiltration systems and allows an easily accessible section of the installation to be provided near to the inlet. Regular inspections of the forebay should be made and it should be cleaned as necessary.

In attenuation or storage installations a sediment tunnel is often specified and provided. This will allow the water to fill the tank efficiently and perform during use but also act as both the 'low flow' path and sediment trap where sediments are likely to build up. The tunnels are designed to be easily accessible and can be flushed through to clean.



Plan of geocellular installations showing a sediment tunnel and sediment forebay.

For both types of system, inspections are likely to be once a month initially after commissioning reducing to every three months and also after the first 'flood' event to assess the rate of siltation. Figure 6.1 above shows a plan view of the layout for both types of system.



Plan of geocellular installations showing an offline solution.

Installations should be provided with means of isolation via valves and it is recommended that offline bypass pipes are provided to allow low

flows to avoid the tank altogether, see Figure 6.2 above. Typically inspection chambers are provided at the inlet and outlet of the tank system. These will be easily accessible and may provide the means of undertaking survey work (CCTV) and also as the primary means of regular maintenance silt removal etc. Figure 6.3 below gives a diagrammatic view of a typical tank layout with fore and aft inspection chambers. The design of the catchpits can often include separators and silt traps to retain as much of the suspended materials as possible and assist in the maintenance.



Typical geocellular tank layout with inspection chambers/sediment catch pits details.

Inspection

The inspection of the units once installed and back filled is difficult to achieve for the entirety of the geocellular structure. In practice the internal structure can make it very difficult to undertake a CCTV survey, as the camera will snag and likely be lost. It is possible to undertake survey of the central pipework or manifold but this will leave the majority of the installation un-inspected. Nevertheless, these inspections can indicate the level of siltation, water levels and possibly unit damage present. To reach the geocellular units proprietary product specific units are often provided by the manufactures for inspection chambers etc. Should standard inspection chambers be used above units then consideration of the detailing will have to be made so that when loaded from above by vehicular movements etc. the load is not transmitted directly to the units resulting in damage. It should be noted that some geocellular units have an 'open' internal structure with little in the way of internal elements and these may be possible to CCTV survey and also jet out silt that may have built up. However, even if jetting is feasible large volumes of water will be required and the process can be expensive. The recommended frequency and type of inspection for geocellular tanks is given below in Table 6.2 below which is based on Table 13.2 from CIRIA C697 'The Suds Manual', but with the addition of the pre-commission survey.

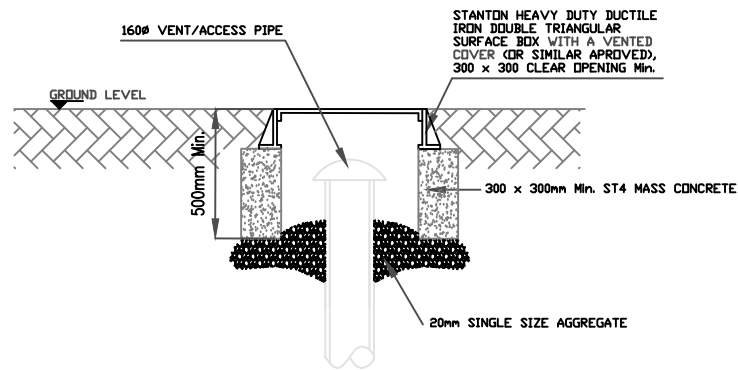
Recommended maintenance schedule

Maintenance schedule	Required Action	Recommended Frequency
At Commission	Inspect all areas to ensure free from construction debris and silt	Once at Commission
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial actions.	Monthly for 3 months then 6 monthly
	Debris removal from catchment surface (where may cause risk to performance)	Monthly
	Where rainfall infiltrates into blocks from above, check surface filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly (and after large storms)
	Remove sediment from pre treatment structures	Annually or as required
Remedial actions	Repair / rehabilitation of inlets, outlet, overflows and vents.	As required
Monitoring	Inspect / check all inlets, outlet, overflows and vents to ensure in good condition and operating as required.	Annually and after large storms

Maintenance strategies

In order to protect geocellular installations from damage, siltation and reduce onerous maintenance and inspection, systems are designed to protect the tanks from direct damage and intercept suspended solids. Recommended design measures and good practise to include in the specification for the installation are given below:

- Tanks are recommended to be designed to be “off-line” but “on-line” tanks incorporating a low flow bypass pipeline usually minimum 150mm in diameter is usually acceptable.
- Silt traps, hydrodynamic separators or similar should be installed “upstream” of the tank inlets.
- Allowance should be made for siltation and a percentage loss of capacity agreed over the design life of the installation.
- Where direct connections are to be made a temporary geotextile is recommended to be placed over/ around the units inlet pipes to prevent silt ingress during construction. This is removed prior to final commissioning.
- Isolation / Penstock control units should be provided to isolate the installation for maintenance and to prevent / control contaminated flows.
- Geocellular installation pipework / manifolds shall be CCTV accessible for inspection.
- No large shrubs to be planted over the geocellular installation plus or within 3m in all directions and 6m from small/medium specimen tree planting. Large trees such as Oaks should not be planted within 20m of the installation.
- Geocellular installation should not be constructed beneath the existing or the predicted full mature canopy of trees.
- A specialist contractor must be used for the sealing of the membrane which should be by automatic heat welding unit. Use of taped seams even on soakaway installations is not recommended.
- Warning tapes or a grid should be provided 300mm above the installation to visually indicate that there is a buried structure.
- Permanent above ground signage detailing location and depth should be provided.
- A pre agreed maintenance and inspection regime should be in place at handover to the client.



VENT BOX DETAIL
BY OTHERS
(OPTIONAL)

THE CONTRACTOR SHALL PROHIBIT THE MOVEMENT OF CONSTRUCTION PLANT ACROSS THE STORAGE TANK AND WHERE NECESSARY PROVIDE ADDITIONAL SUPPORT AND PROTECTION TO THE STRUCTURE. PARTICULARLY POST CONSTRUCTION. TEMPORARY FENCING CAN BE USED TO PROHIBIT TRADE STOCKS, PILLING MATERIALS, HEAVY PLANTS ETC.,

BACKFILL SUGGESTIONS OPTIONS AROUND THE SIDES OF ECO-CELL MODULAR UNIT TO PROTECT THE UNITS AND MEMBRANE DURING BACKFILLING OPERATIONS:

- SELECTED EXCAVATED MATERIAL IF SEEN SUITABLE BY THE SITE ENGINEER.
- BACKERBOARD HD (IS A PREMOULDED BOARD FOR USE AS PROTECTION AGAINST BACKFILL)

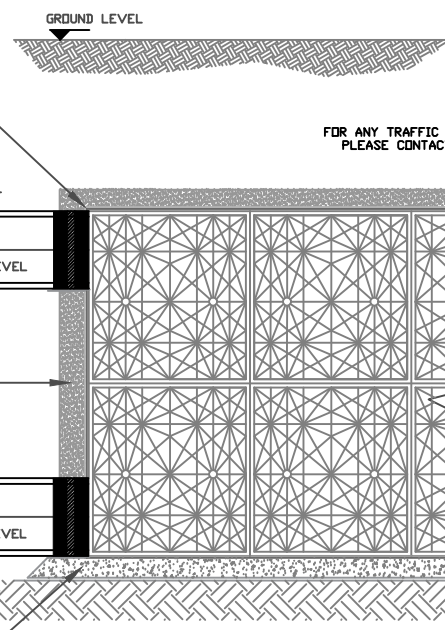
TO PROTECT THE WATERPROOF GEOMEMBRANE DURING BACKFILLING OPERATIONS, OVERLAY THE TOP AND SIDES WITH A GEDTEX 300 PP NEEDLE PUNCHED NON WOVEN GEOTEXTILE WITH A LAPPED JOINTS

INLET PIPE(S) DIA VARIES WITH CLASS S BEDDING

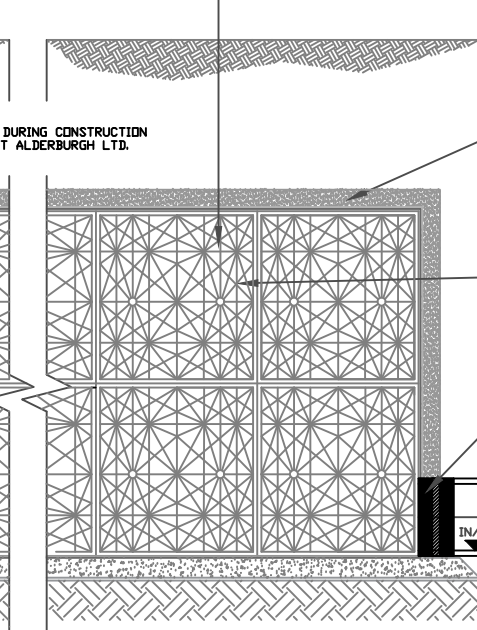
INLET PIPE(S) DIA VARIES WITH CLASS S BEDDING

TANK BASE LEVEL

FLAT, LEVEL, SMOOTH BASE WITH NO UNDULATIONS AND HAS 3-5% CBR



TYPICAL INLET PIPE CONNECTION



TYPICAL IN/OUTLET PIPE CONNECTION

TYPICAL DETAILS OF ATTENUATION TANK USING ECO-CELL MODULAR UNITS (SIDE VIEW)

ECO-CELL MODULES TO BE WRAPPED WITH TUFLEX AN IMPERMEABLE GEOMEMBRANE WITH A LAPPED HEAT WELD JOINTS.

SUGGESTIONS OPTIONS ABOVE THE ECO-CELL MODULAR UNIT TO PROTECT THE UNITS AND MEMBRANE DURING BACKFILLING OPERATIONS:

- SELECTED EXCAVATED MATERIAL IF SEEN SUITABLE BY THE SITE ENGINEER.
- BACKERBOARD HD (IS A PREMOULDED BOARD FOR USE AS PROTECTION AGAINST BACKFILL)
- 100 mm THICK COARSE SAND OR CLASS 6H SELECTED GRANULAR MATERIAL.

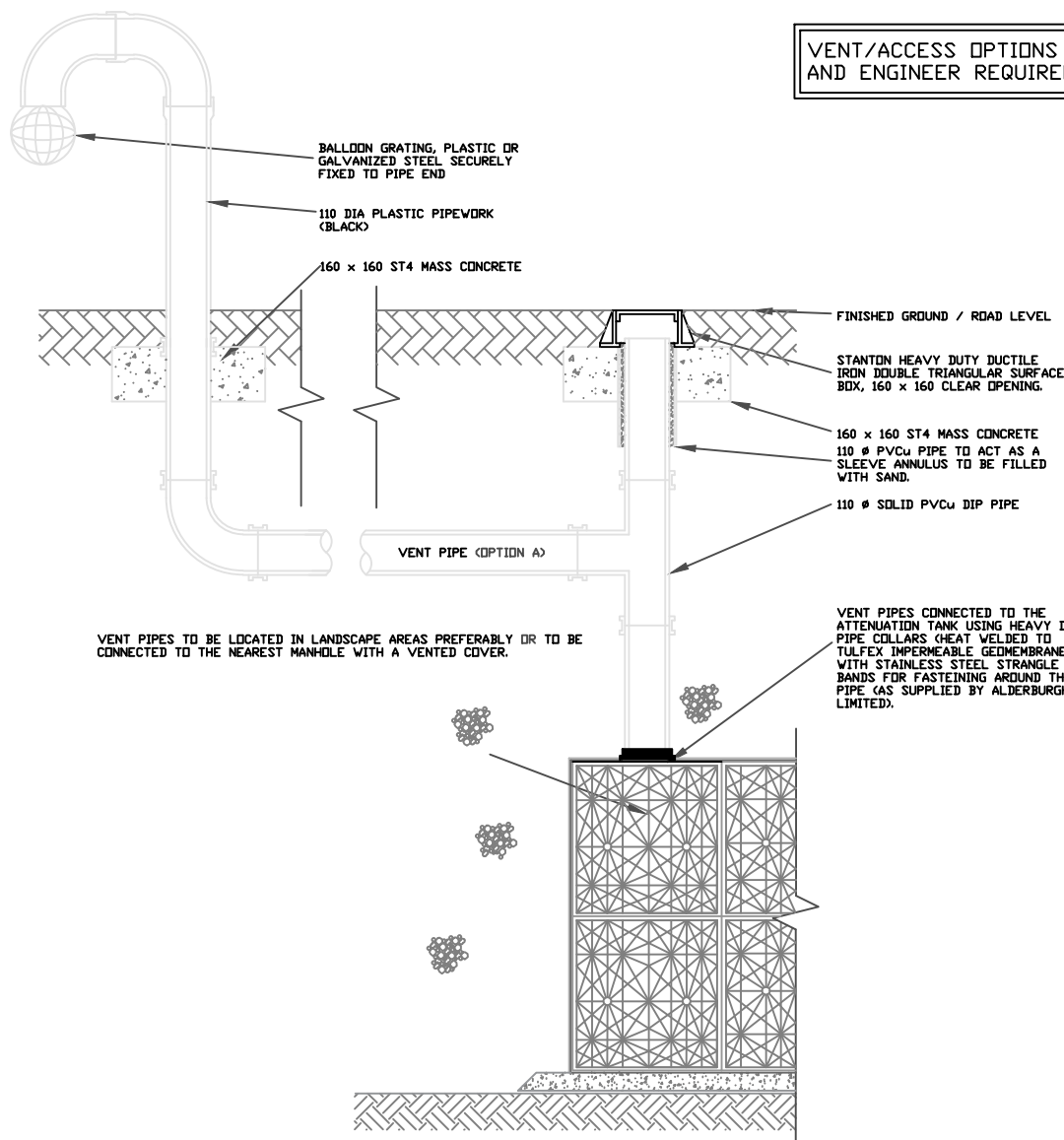
ECO-CELL MODULES (685 mm LONG x 410 mm WIDE x VARIES mm HIGH) ARRANGEMENTS AS SHOWN (AS SUPPLIED BY ALDERBURGH). MODULES CAN BE SECURED AS A 'HOUSE KEEPING' MEASURE WITH PLASTIC PROPRIETY CABLE TIES.

PIPES CONNECTED TO THE ATTENUATION TANK USING HEAVY DUTY PIPE COLLARS (HEAT WELDED TO THE TUFLEX IMPERMEABLE GEOMEMBRANE) WITH STAINLESS STEEL STRANGLE BANDS FOR FASTENING AROUND THE PIPE.

IN/OUTLET PIPE(S) DIA VARIES WITH CLASS S BEDDING

VENT/ACCESS OPTIONS TO SUIT SITE AND ENGINEER REQUIREMENTS

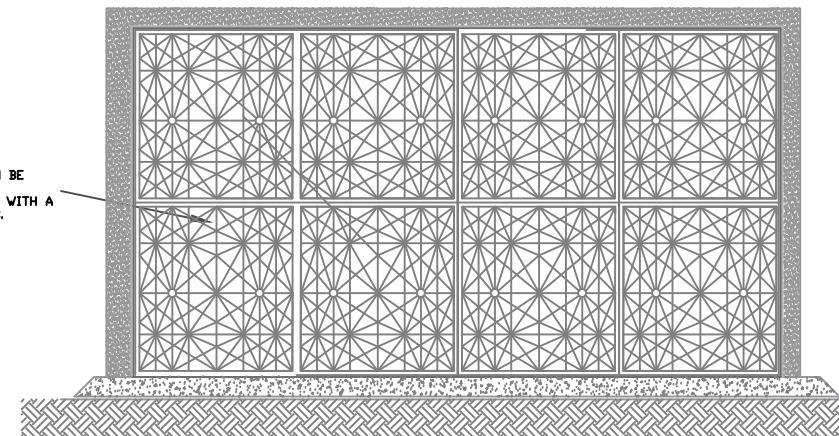
INLET/OUTLET PIPES MUST BE SUPPORTED WITH CONCRETE TO PROTECT IT DURING BACKFILLING



TYPICAL 160mm VENT/ACCESS PIPE CONNECTION

A 3 - 5% CBR HAS BEEN ASSUMED AT SUB-BASE LEVEL SHOULD THE CBR BE TESTED AND FOUND TO BE LESS THAN 3% THEN THE ENGINEER SHALL BE NOTIFIED. ALSO, ANY SOFT SPOTS FOUND AT SUB-BASE LEVEL SHALL BE REPORTED TO THE ENGINEER

ESS ECO-CELL MODULES TO BE WRAPPED WITH TUFLEX AN IMPERMEABLE GEOMEMBRANE WITH A LAPPED HEAT WELD JOINTS.



TYPICAL DETAILS OF ATTENUATION TANK USING ECO-CELL MODULAR UNITS (FRONT VIEW)

Notes :-

1. ALL STORAGE TANK DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS, METHOD STATEMENTS AND RECOMMENDATIONS OF ALDERBURGH LIMITED, ROCHDALE
2. THE LOCATION, SIZE AND DEPTH OF ALL EXISTING DRAINS / SEWERS AND SERVICES SHALL BE ESTABLISHED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS ON SITE. ANY DISCREPANCIES FROM THE INFORMATION INDICATED ON THESE DRAWINGS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
3. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
4. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE. IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.
5. ALL LEVELS AND DIMENSIONS SHALL BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORKS. ANY DISCREPANCIES SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
6. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS IN LINE WITH CURRENT LEGISLATION WHEN WORKING IN / NEAR CONFINED SPACES, DEEP EXCAVATIONS AND MACHINERY.
7. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY TO PROTECT PEDESTRIANS AND VEHICLES FROM THE WORKING AREAS.
8. TO PROTECT THE ECO-CELL MODULAR ATTENUATION / STORAGE TANK FROM CONSTRUCTION SITE DEBRIS, THE CONTRACTOR SHALL ENSURE THAT STOPPERS ARE SECURELY PLACED IN ALL CONNECTIONS IMMEDIATELY UPSTREAM OF THE TANK UNITS, ONLY TO BE REMOVED ONCE THE FINAL CLEANING OF THE ROADS / DRAINAGE HAS BEEN COMPLETED.
9. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE, NO DEBRIS SHALL BE PERMITTED TO ENTER THE TANK STORAGE SYSTEM.
10. NUMBER OF VENT UNITS DEPENDS ON THE SIZE OF THE TANK (REFER VENT DRAWING)
11. REFER SEQUENCE OF WORK DOCUMENT FOR DETAILED INSTALLATION METHODOLOGY (CONTACT ALDERBURGH LIMITED)

Notes :- All the Dimensions by Millimeters



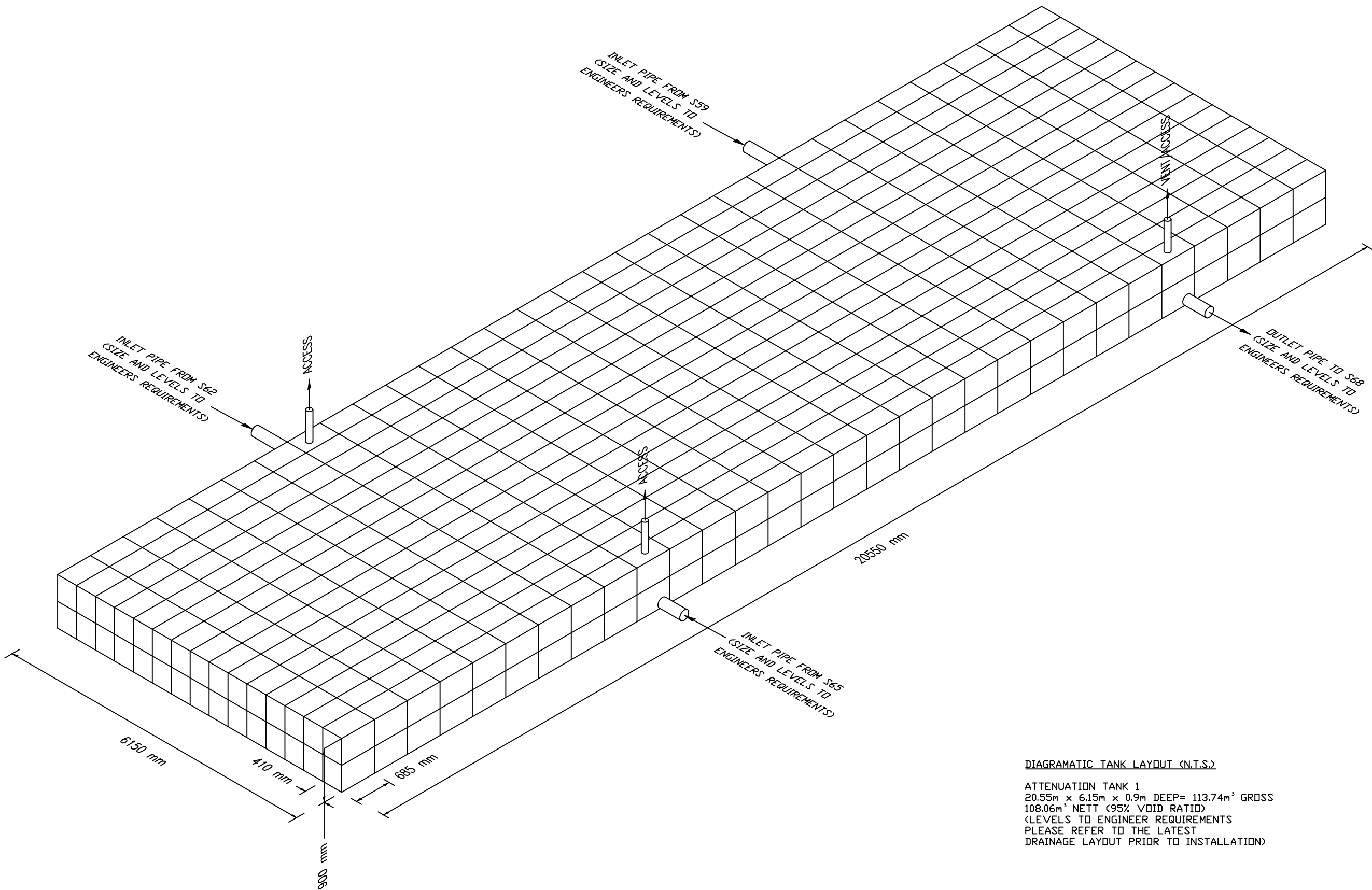
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PROJECT
KINGSWAY BUSINESS PLOT, PLOT M,
ROCHDALE
ATTENUATION TANK - DETAILS

TITLE
ATTENUATION/STORAGE TANK
DETAILS USING ECO-CELLS
MODULE

Scale N.T.S.	Drawn MI	Checked AY
Date 16/08/2022	Drawing No. ECST - 2.0	Revision R0

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DIAGRAMATIC TANK LAYOUT (N.T.S.)
ATTENUATION TANK 1
20.55m x 6.15m x 0.9m DEEP= 113.74m³ GROSS
108.06m³ NETT (95% VOID RATIO)
(LEVELS TO ENGINEER REQUIREMENTS
PLEASE REFER TO THE LATEST
DRAINAGE LAYOUT PRIOR TO INSTALLATION)

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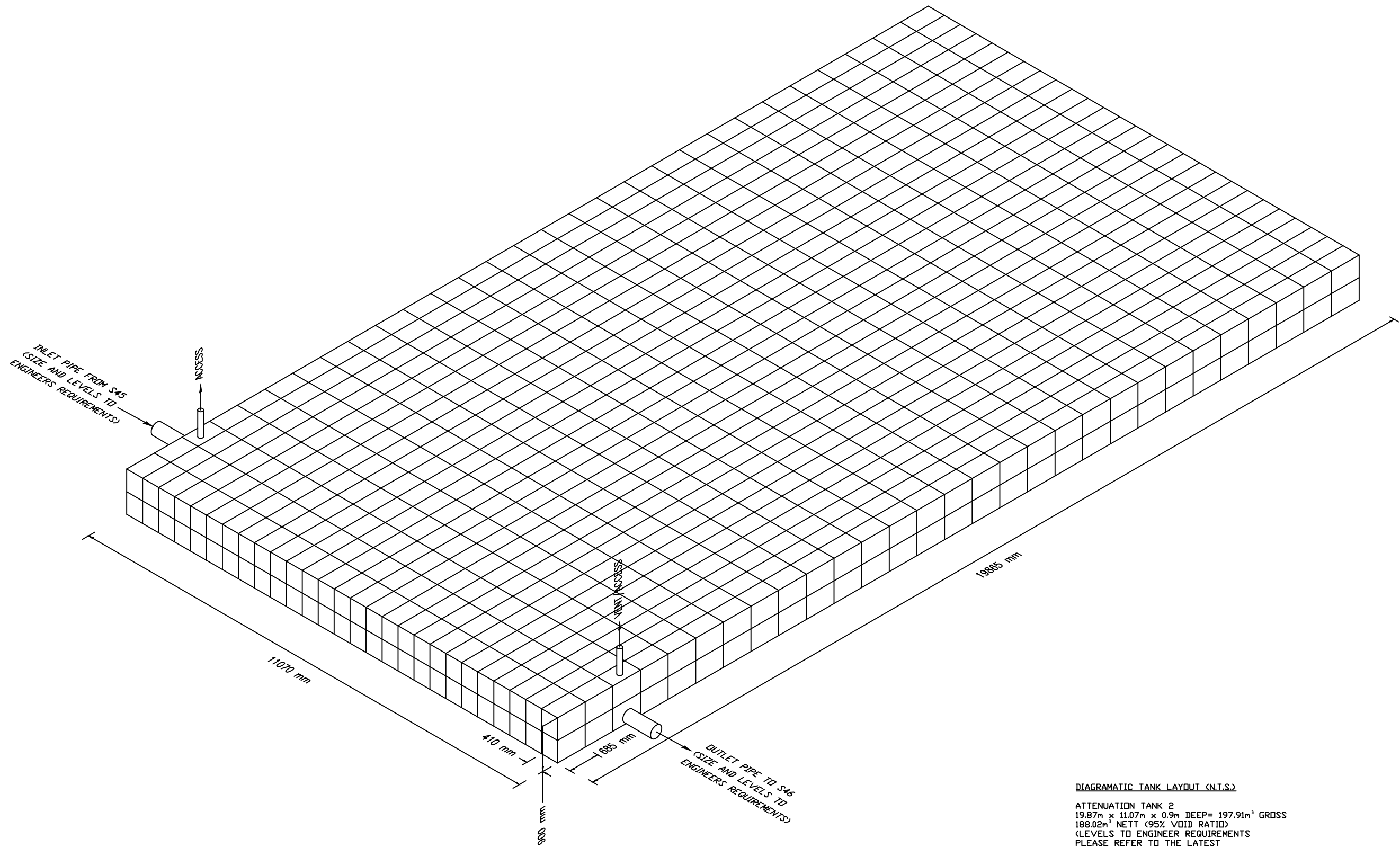
Notes :- All the Dimensions by Millimeters

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PROJECT
KINGSWAY BUSINESS PLOT, PLOT M,
ROCHDALE
ATTENUATION TANK 1 - LAYOUT

TITLE
ATTENUATION/STORAGE TANK
DETAILS USING ECO-CELLS
MODULE

Scale N.T.S.	Drawn MI	Checked AY
Date 16/08/2022	Drawing No. ECST - 2.1	Revision R0



DIAGRAMATIC TANK LAYOUT (N.T.S.)

ATTENUATION TANK 2
19.87m x 11.07m x 0.9m DEEP= 197.91m³ GROSS
188.02m³ NETT (95% VOID RATIO)
(LEVELS TO ENGINEER REQUIREMENTS
PLEASE REFER TO THE LATEST
DRAINAGE LAYOUT PRIOR TO INSTALLATION)

Notes :-

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9. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE, NO DEBRIS SHALL BE PERMITTED TO ENTER THE TANK STORAGE SYSTEM.
10. NUMBER OF VENT UNITS DEPENDS ON THE SIZE OF THE TANK (REFER VENT DRAWING)
11. REFER SEQUENCE OF WORK DOCUMENT FOR DETAILED INSTALLATION METHODOLOGY (CONTACT ALDERBURGH LIMITED)

Notes :- All the Dimensions by Millimeters



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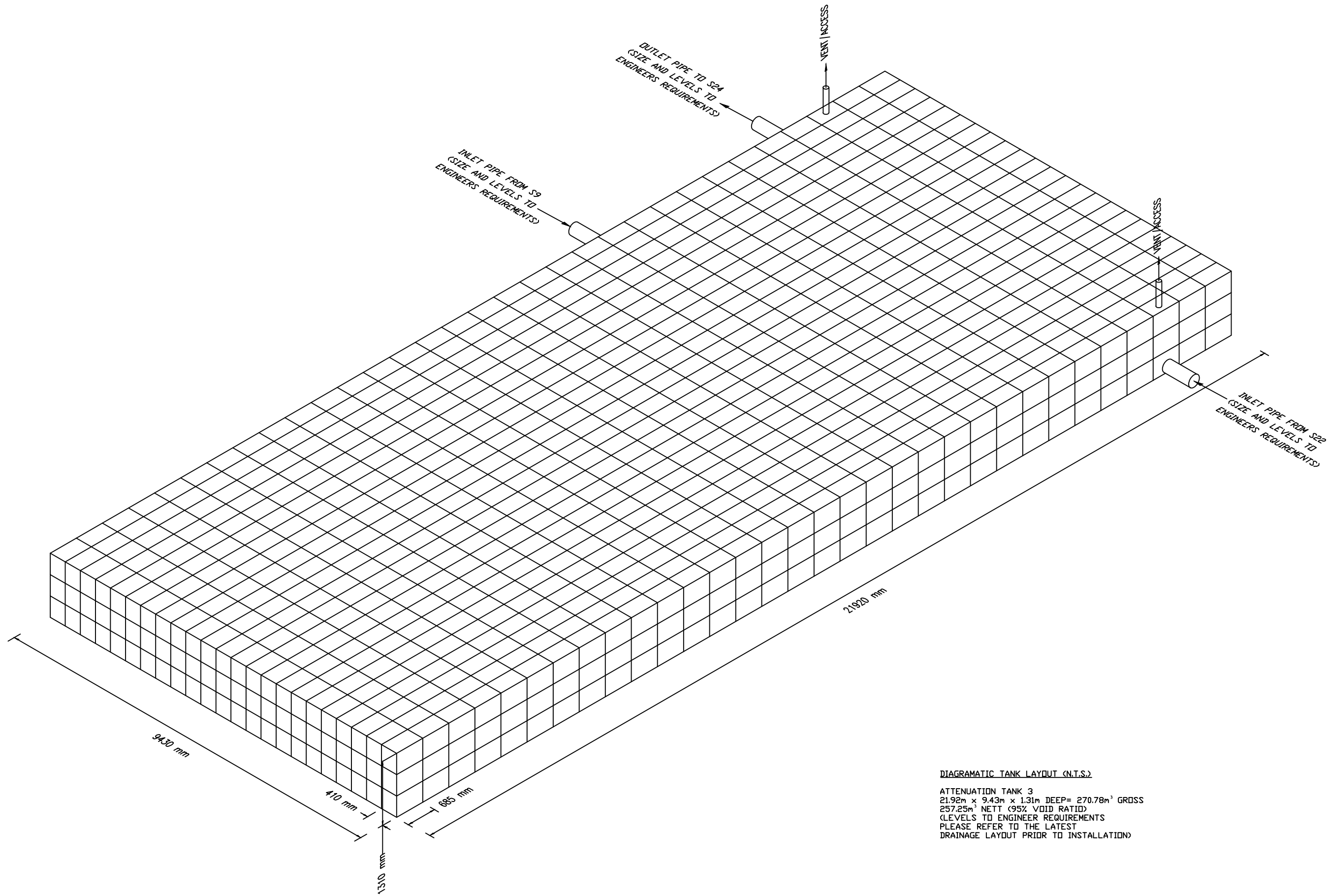
PROJECT

KINGSWAY BUSINESS PLOT, PLOT M,
ROCHDALE
ATTENUATION TANK 2 - LAYOUT

TITLE

ATTENUATION/STORAGE TANK
DETAILS USING ECO-CELLS
MODULE

Scale	Drawn	Checked
N.T.S.	MI	AY
Date	Drawing No.	Revision
16/08/2022	ECST - 2.2	R0



DIAGRAMATIC TANK LAYOUT (N.T.S.)
ATTENUATION TANK 3
21.92m x 9.43m x 1.31m DEEP= 270.78m³ GROSS
257.25m³ NETT (95% VOID RATIO)
(LEVELS TO ENGINEER REQUIREMENTS
PLEASE REFER TO THE LATEST
DRAINAGE LAYOUT PRIOR TO INSTALLATION)

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 10. NUMBER OF VENT UNITS DEPENDS ON THE SIZE OF THE TANK (REFER VENT DRAWING)
 11. REFER SEQUENCE OF WORK DOCUMENT FOR DETAILED INSTALLATION METHODOLOGY (CONTACT ALDERBURGH LIMITED)

Notes :- All the Dimensions by Millimeters



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PROJECT

KINGSWAY BUSINESS PLOT, PLOT M,
ROCHDALE
ATTENUATION TANK 3 - LAYOUT

TITLE

ATTENUATION/STORAGE TANK
DETAILS USING ECO-CELLS
MODULE

Scale	Drawn	Checked
N.T.S.	MI	AY
Date	Drawing No.	Revision
16/08/2022	ECST - 2.3	R0

ESS ECO-CELL MODULES DATA SHEET

Eco-cell Module Dimensions* (mm)	Module Configuration	Units per m ³	Module Volume (m ³)	Storage Volume (m ³)
685 (L) x 410 (W) x 450 (D)	Single	8.00	0.127	0.120
685 (L) x 410 (W) x 900 (D)	Double	4.00	0.254	0.241
685 (L) x 410 (W) x 1310 (D)	Triple	2.72	0.367	0.349

* Bespoke modules with different configuration available



Single Module

Product Data	Heavy Duty Module
Average Weight (kg)	9
Vertical Compressive Strength* (kN/m ²)	400
Lateral Compressive Strength* (kN/m ²)	200
Long Term Creep Strength** (kN/m ²)	140
Void Ratio (%)	95
Surface Void Ratio (%)	Greater than 90
Minimum Backfill Cover# (mm)	450
Maximum Backfill Cover (mm)	4500
Material	Polypropylene
Chemical resistance	Good
Bacterial Resistance	Good
UV Resistance	Good

* Modules tested using UKAS calibrated test machine, range 0 – 60 Tons, UDL, loading rate 0.2 kN/m²

** Modules tested for long term creep testing for 90 days and new on-going test.

Any cover less than 450 mm OR for trafficked areas – contact Alderburgh design department

Note: All Alderburgh products are manufactured to the highest quality, being subjected to rigid quality control. However the company cannot control conditions of application and use of its products, thus any warranty, written or implied, is given in good faith for materials only. Alderburgh Ltd will not accept any responsibility for damage or injury arising from storage handling, misapplication or misuse of its products. All transactions are subject to our standard condition of sales, copies of which are available on request. Product design and specification are subject to change without further notice

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Appendix D - Non return Valves

DOUBLE HINGE FLAP VALVE

FIGURE 5000



Metal seat double hinge flap valve with circular aperture to prevent reverse flow in outfall applications. Typically utilised in river, surface/ storm water and treatment works.

FEATURES

- Unique lightweight ductile iron design
- Double hinge for optimal sealing
- Durable fusion bonded epoxy coated
- Anti-tamper stainless steel hinge pins
- Bush hinge links
- Corrosion resistant construction
- Lifting eye as standard
- Drilled to suit flange & wall mounting



TECHNICAL SPECIFICATION

RANGE	DN80 to DN600
FLANGES AND DRILLINGS	BS EN 1092-2 1987 Table 9 (PN16)
MAXIMUM WORKING PRESSURE	6.0 metres static on-seat head
COATING	Blue fusion bonded epoxy

MATERIAL AND DIMENSIONAL SPECIFICATION

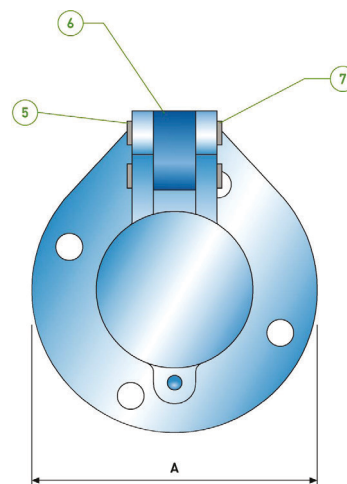
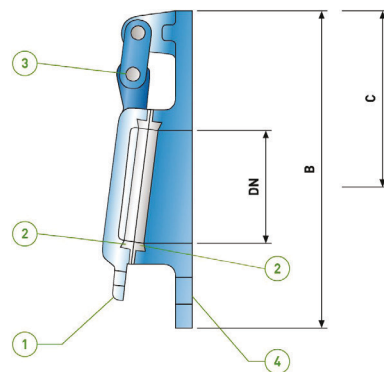
ITEM	ITEM NAME	MATERIAL	SPECIFICATION
1	Door	Ductile Iron	BS EN 1563 Gr 500/7
2	Door Seat	Copper Alloy	BS EN 1982
3	Frame Bush	Polytetrafluorethylene	-
4	Frame	Ductile Iron	BS EN 1563 Gr 500/7
5	Hinge Pin	Stainless Steel	BS EN 1982
6	Hinge	Ductile Iron	BS EN 1563 Gr 500/7
7	Star Lock	Stainless Steel	BS EN 1982
8*	Hinge Bush	Polytetrafluorethylene	-

* Hinge Bush not shown

DN	A	B	C	PCD	HOLES (No. - Ø)	WEIGHT (Kg)
80	200	225	125	160	4 - 17	5
100	220	245	135	180	4 - 18	6
150	285	315	172	240	4 - 22	11
200	332	368	202	295	4 - 22	16
225* (9")	368	404	220	324	4 - 18	20
250	400	438	238	355	4 - 26	23
300	454	495	268	410	4 - 26	32
350	550	588	313	470	4 - 26	34
375* (15")	550	588	313	495	4 - 25	34
400	580	612	322	525	4 - 30	49
450	585	635	360	585	4 - 31	56
500	600	692	392	650	4 - 34	68
600	730	815	450	770	3 - 37	93

Dimensions in mm. Weights are approximate.

*Drilled BS10 Table D. DN = Nominal Valve Size. Larger sizes are available on request.



Appendix E - Flow Control Devices

CROWN WATER

FLOW CONTROL QUOTATION REF. 4090922

Product Information and FAQ's

DESIGN

Individual Design.

All of our Vortex Flow Control Units are individually designed to meet the client's optimum performance criteria.

Will our Vortex Flow Control's Block?

The relatively large cross sectional areas and high internal velocities greatly reduce the risk of blockage.

How Long Will They Last?

Crown Water Vortex Flow Control Units have no moving parts to wear or fail. Made from stainless steel plate they will resist scour, degradation and chemical attack. A Vortex Flow Control should outlast the sewer in which it is installed.

MANUFACTURE

Crown Water Vortex Flow Control Units are manufactured to a high standard

- 304 Grade Stainless Steel as standard. Other material optional.
- Plate thickness 3mm as standard Thicker where required
- Pulse arc Tungsten Inert Gas Welding. All seams continuous for maximum strength.
- Emergency Bypass Door fitted as standard to allow drain down and rodding access.
- Externally regulated ISO 9001:2008 Quality Assurance System

INSTALLATION

All of our Vortex Flow Controls are purpose built to suit the specific site and to fit easily into the drainage infrastructure. Units can be specially designed for retrofitting or for installation in difficult spaces

MAINTENANCE

Vortex Flow Control units themselves require no routine maintenance. Inspection chambers require inspection & maintenance in line with current practice.

WHAT DESIGN INFORMATION DO WE NEED?

We require the following basic information to specify a Vortex Flow Control for you.

- 1) The design Flow - *Maximum Discharge*
- 2) The design Head - *Invert to Top Water Level*

From this information we will size and design the Vortex Flow Control to meet the design criteria and to suit the proposed infrastructure.

SPECIFICATION

Includes: -

- 1) Data Sheet showing the Head/Discharge Characteristic, both graphically and numerically.
- 2) Installation Guide showing the outline dimensions of the specified Vortex Flow Control and the method of fixing.

Note: Surface Water Only

Crown Water Ltd

Index House

Ascot SL5 7ET

Tel 01344 886996 Fax 01344 886646

sales@crownwater.com

Company Registration Number 9514593

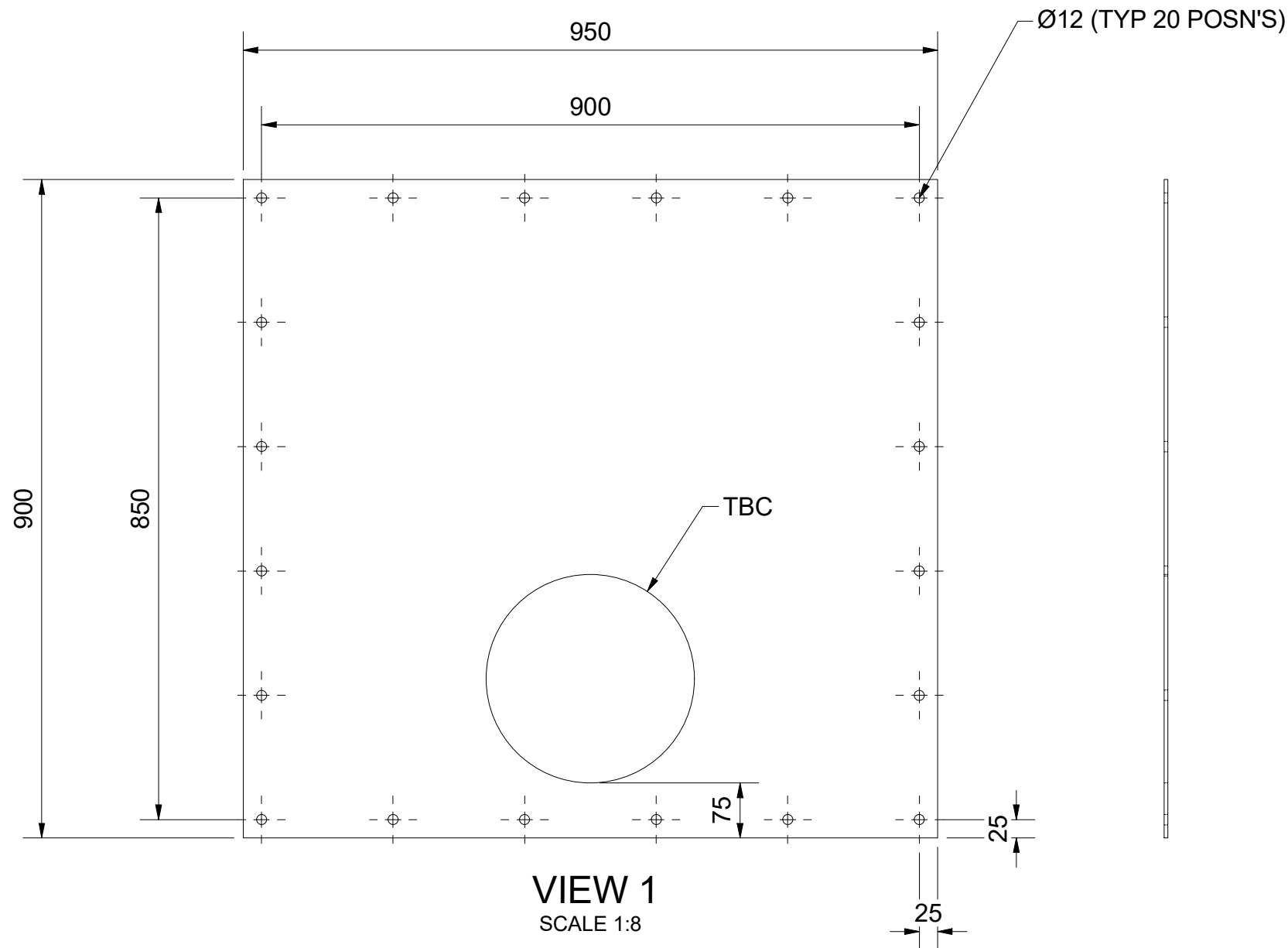
www.crownwater.com



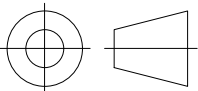
**ISO
9001 : 2015
REGISTERED**

Cert No. 14126867

Copyright Crown Water Ltd 2017



PROJECTION



- COMMENTS:
1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT GENERAL ARRANGEMENT & DETAIL DRAWINGS.
 2. ALL COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE PRODUCTION SPECIFICATION HRD-FM 09/15.
 3. ALL COMPONENTS SHALL BE MANUFACTURED FROM STAINLESS STEEL GRADE 304 UNLESS SHOWN OTHERWISE.

REVISION HISTORY			
REV	BY	DESCRIPTION	DATE
A	SK	FIRST RELEASE	15/02/2017

DATE: 15/02/2017 SCALE: 1:8

DRAWN BY: SK CHECKED BY: MB APPROVED BY: WCJ

Title
ORIFICE PLATE
TO SUIT 750 OUTLET

Fabrication Drawing

Hydro
International

Shearwater House
Victoria Road
Clevedon, UK
BS21 7RD
Tel: +44 (0)1275 878371
Fax: +44 (0)1275 874979
hydro-int.com

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DO NOT SCALE DRAWING

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS.

TOLERANCES ARE:
± 1 MM UNLESS SHOWN OTHERWISE

ANGLES: ± .5°

WEIGHT: N/A MATERIAL: Stainless Steel

NEXT ASSEMBLY:
-D1 285 O Orifice Plate 750 Outlet

DRAWING NO.:
-D1 285 Orifice Plate 750 Outlet

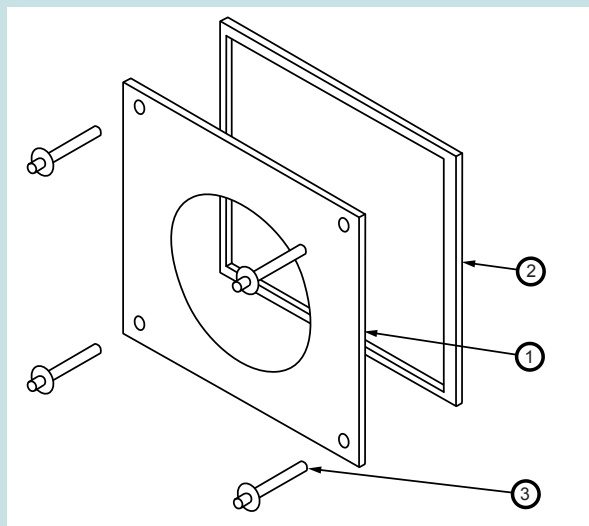
SHEET SIZE: A3 SHEET: 1 OF 1 Rev: A

Hydro-Brake® Orifice

Precision Cut Orifice Plate Flow Control

The Hydro-Brake® Orifice flow control is designed and manufactured in accordance with the applicable sections of BS EN ISO 5167-2:2003 to deliver precise, repeatable flow control.

Ideally suited to sites where there are minimal on-site storage / attenuation constraints, generous discharge consents or the need for a low-cost, low-complexity flow control solution.



Precision Engineered Orifice Plates

1. Precision cut stainless steel orifice plate (to applicable sections of BS EN ISO 5167-2:2003).
2. Neoprene gasket.
3. Fixing bolts.

The Hydro-Brake® Orifice is manufactured under strict Quality Assurance procedures to the stringent methods and tolerances set out in the international standard BS EN ISO 5167-2:2003.

Each Hydro-Brake® Orifice is manufactured to suit the precise hydraulic requirements of the individual application.

Figure 1 - The Hydro-Brake® Orifice flow control is designed and manufactured to deliver precise, repeatable flow control.

Benefits

- Manufactured from high grade stainless steel.
- Configurations available to suit a wide variety of installations.
- Simple installation.
- Self-activating.
- No moving parts or external power requirements.
- Low-cost, low-complexity flow control.

Custom Configured

At Hydro International, we pride ourselves on providing solutions that meet your requirements, rather than providing a standard solution and asking you to compromise on your project needs. The Hydro-Brake® Orifice is available in a wide variety of configurations to suit numerous applications – a selection of these are shown below. If you don't see a configuration that meets your requirements, contact our dedicated professional engineers, who would be happy to work with you to provide the best possible solution.

The Hydro-Brake® Orifice can also be supplied pre-fitted within in manhole to allow for simple plug-and-play installation on site.



Integrated mesh guards



Curved mount pipe insert



Slide mounted



Push-fit spigot



Pivot mounted



Pipe end cap

Precision Cut Orifice Plate Flow Control

Expert Design Support Services

Hydro International's professional engineers work with you to provide expert technical and aftersales support to ensure your projects meet exacting design requirements and deliver the very best hydraulic controls for your site.

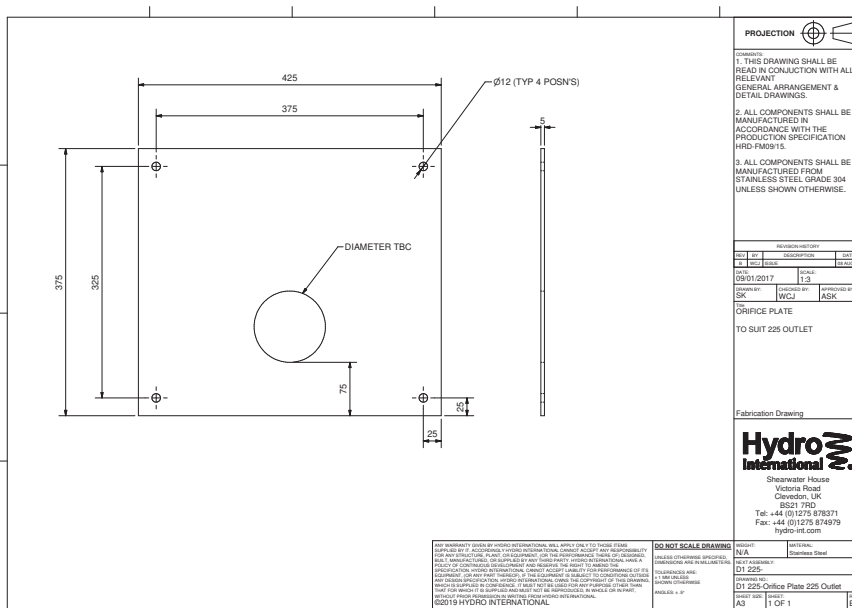
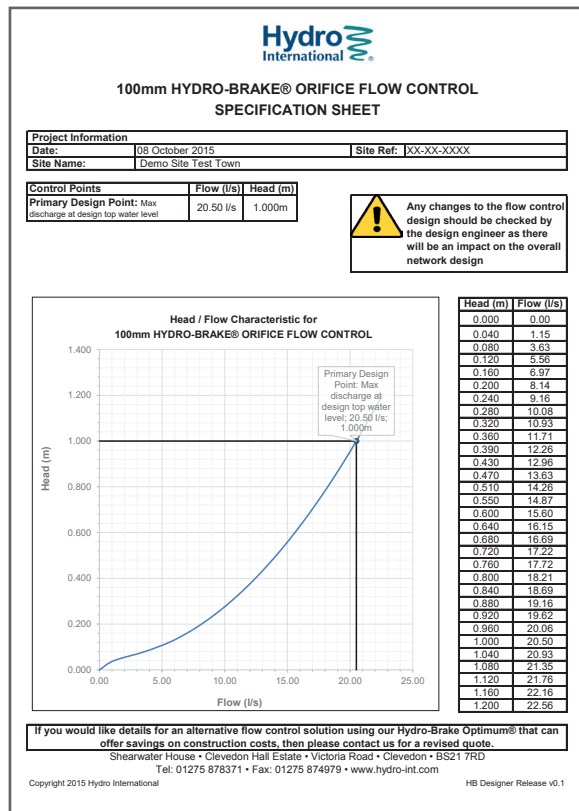
With over 35 years' experience of flow control knowledge and experience, Hydro International's design support team is available to advise on any aspect of water flow management, including detailed modelling of orifice plates and composite outlet structures

Resilience by Design

Hydro-Brake® Orifice plates can be supplied with integrated protection against the risk of blockages. Alternatively, the Hydro-Brake® Orifice can be mounted on moveable or removable structures to allow for manual intervention to drain the control chamber from surface level and clear any blockages that do occur. Our engineers will be happy to advise on the most appropriate protection or intervention structure(s) for your application.

Technical Details and Further Information

Hydro International will supply detailed hydraulic data and dimensioned installation drawings for each unit. Example details are shown below.



The Hydro-Brake® Flow Control Series

As a brand leader for vortex flow controls for more than 30 years, Hydro International continues to set the standard in flow control management technologies.

At Hydro International, we pride ourselves on our engineering excellence and in developing a range of flow control solutions, we have invested in significant research and development to validate their performance.

Hydro-Brake® Orifice



The low-cost option for unconstrained sites (shown with optional screen).

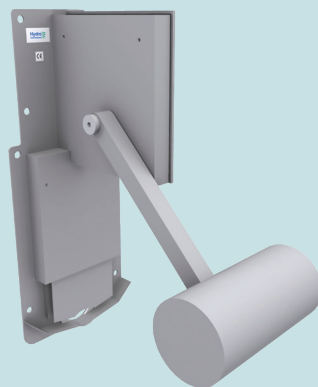
Hydro-Brake® Optimum



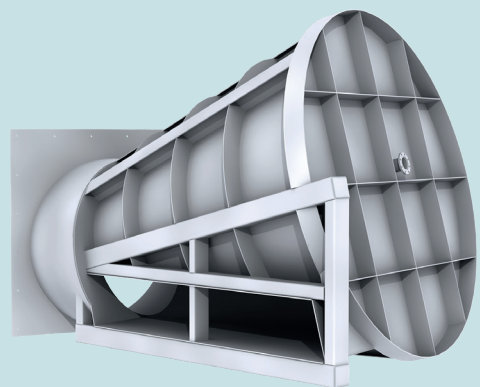
The vortex flow control with no equivalent, delivering Nature's Perfect Cuve with no moving parts and independently verified by the BBA and WRc.

Hydro-Brake® Agile

Precision engineered flow control for highly constrained applications.



Hydro-Brake® Flood Alleviation



The vortex controlled solution to watercourse flooding.

ORIFICE PLATE® FLOW CONTROL

MAINTENANCE AND SAFETY DATA SHEET

MAINTENANCE

Normally, little maintenance is required as there are no moving parts within the Orifice Plate® Flow Control. Experience has shown that if blockages occur they do so at the intake, and the cause on such occasions has been due to a lack of attention to engineering detail such as approach velocities being too low, inadequate benching, or the use of units below the minimum recommended size.

Following installation of the Orifice Plate® Flow Control it is vitally important that any extraneous material i.e. Building materials are removed from the unit and the chamber. After the system is made live, and assuming that the chamber design is satisfactory, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. If problems are experienced please do not hesitate to contact the company so that an investigation may be made.

Orifice Plates® Flow Controls are typically manufactured from grade 304 Stainless Steel which has an estimated life span in excess of the design life of drainage systems.

COSHH

Orifice Plates® Flow Controls are manufactured from Stainless Steel, which is not regarded as hazardous to health and exhibits no chemical hazard when used under normal circumstances for the stated applications.

MANUAL HANDLING

The handling of Orifice Plates® Flow Controls should be in accordance with current legislation and regulations:

- The Health and Safety at Work Act 1972.
- The Management of Health and Safety at Work Regulations 1992.
- The Manual Handling Operations Regulations 1992.

All published and printed by the Health and Safety Executive.

Appendix F - Penstocks



VIRTUALLY MAINTENANCE FREE

6MwC PRESSURE RATING AS STANDARD

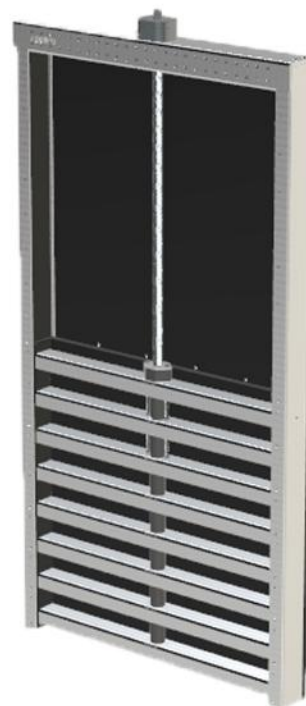
QUICK INSTALLATION

The AQUIKO Penstock has been designed and manufactured in the UK using the most cutting-edge techniques. Our penstocks are made from HDPE and stainless steel 316 and have a design life of 50 years*.

Due to the penstocks unique compact design, the narrow frame ensures it fits in even the tightest spaces. This compact design is also a cut above the average penstock in strength being rated for a 6MwC pressure as standard. With no metal on metal moving parts there is virtually no chance of an AQUIKO penstock seizing, meaning the AQUIKO penstocks require practically no maintenance. With no need for casting in or grouting, you can save over 12 hours in installation time, compared with stainless or cast-iron alternatives.

The Environmental Choice

AQUIKO penstocks have been designed to have minimum impact on the environment. HDPE is used rather than full stainless steel, greatly reducing the CO2 footprint of our penstocks when compared to cast iron or full stainless alternatives. The HDPE material also reduces the weight of the penstock saving CO2 in lifting equipment, as often smaller cranes can be used. AQUIKO have designed the penstock to be weld free. Welding not only requires significant energy, but stainless-steel welds must be passivated. Passivating stainless steel welds requires extremely acidic compounds which are damaging to the environment. AQUIKO has designed away the use of these damaging chemicals.



Manufactured in the UK

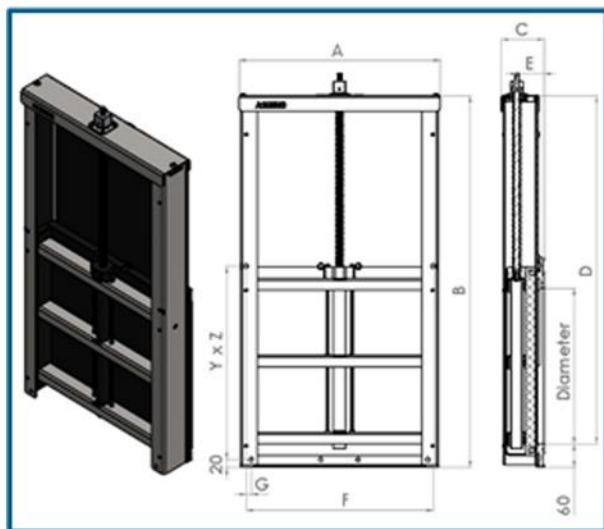
01777 819734

info@aquiko.co.uk

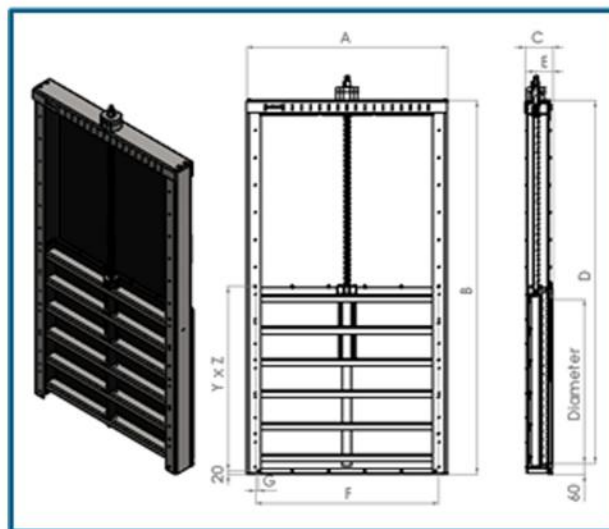
www.aquiko.co.uk



Trading as Aquatic Control Engineering Ltd



APS-100mm up to 600mm



APS-700mm up to 1500mm

Diameter	A	B	C	D	E	F	G	Y	Z	Turns	Torque (Nm.)			Weight (KG.)
											Up	Down	Max.	
100	238	355	115	295	73	200	14	1	197	33	1	1	30	9
125	263	405	115	345	73	225	14	1	222	39	2	1	30	11
150	288	455	115	395	73	250	14	1	247	45	2	2	30	12
200	338	555	115	495	73	300	14	1	297	57	3	3	30	15
250	388	655	115	595	73	350	14	1	347	70	4	4	30	19
300	438	755	115	695	73	400	14	1	397	82	6	5	30	22
400	538	955	115	895	73	500	14	1	497	107	9	8	30	29
500	638	1156	118	1096	74	600	15	2	299	133	13	12	30	43
600	738	1356	118	1296	74	700	15	2	349	158	18	17	30	52
700	840	1641	143	1581	87	802	15	3	255	121	37	34	105	91
800	962	1843	146.25	1783	88	904	16	4	224	138	48	44	105	130
900	1110	2051	151	1991	93	1012	16	5	200	155	60	54	105	168
1000	1212	2301	179	2241	106	1114	17	5	222	147	87	76	210	266
1100	1312	2501	179	2441	106	1214	17	6	202	162	105	91	210	305
1200	1412	2701	179	2641	106	1314	17	7	187	176	124	108	210	646
1250	1462	2801	179	2741	106	1364	17	7	194	183	134	117	210	361
1300	1512	2901	179	2841	106	1414	17	8	176	190	145	126	210	390
1400	1612	3101	179	3041	106	1514	17	8	189	204	167	146	210	423
1500	1712	3301	179	3241	106	1614	17	8	201	219	191	167	210	471

Penstock: APS-100 up to 1500mm
Materials: SS316, HDPE, EPDM & POM
Pressure: 6MwC (Front & Back)

