Discharge of Condition 3 & 5
(Details of Foul & Surface Water Drainage)
Planning Consent CA/20/01289

for

Plot C1 & C2 Stone Way
Lakesview International Business Park
Hersden, Canterbury
Kent, CT3 4GP

on behalf of

Luckhurst Scaffolding Ltd

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Appendix A Tridax Drawings
T-2020-050-10-revB – Drainage Plan
T-2020-050-11-revB – Drainage Details Sheet 1
T-2020-050-12-revA – Drainage Details Sheet 2
T-2020-050-13-revA – Drainage Details Sheet 3
T-2020-050-14-revA – Drainage Details Sheet 4
T-2020-050-15-revB – Drainage Details Sheet 5

Appendix B Surface Water Design Calculations
MicroDrainage Network Details & Simulation Results

Appendix C Separator Installation & Maintenance Literature

1.0 INTRODUCTION
Background

1.1 Tridax Ltd have been commissioned by Luckhurst Scaffolding Ltd and requested to prepare details for the foul & surface water drainage required for the discharge of condition 3 & 5 of the planning consent CA/20/01289 to Canterbury Council.

(3) Development shall not begin in any phase until a detailed sustainable surface water drainage scheme for the site has been submitted to (and approved in writing by) the local planning authority. The detailed drainage scheme shall be based upon the Drainage Impact and Flood Risk Assessment Issue 2.0 prepared by Tridax dated 12 May 2020 and Proposed Drainage Plan T-2020-050-03 Rev 00 dated 29 April 2020 and shall demonstrate that the surface water generated by this development (for all rainfall durations and intensities up to and including the climate change adjusted critical 100 year storm) can be accommodated and disposed of without increase to flood risk on or off-site. The drainage scheme shall also demonstrate (with reference to published guidance):

- that silt and pollutants resulting from the site use can be adequately managed to ensure there is no pollution risk to receiving waters.
- appropriate operational, maintenance and access requirements for each drainage feature or SuDS component are adequately considered, including any proposed arrangements for future adoption by any public body or statutory undertaker.

(5) No development shall begin (other than demolition) until details of the proposed means of foul water sewerage disposal have been submitted to, and approved in writing by the Local Planning Authority.

The development shall be carried out in accordance with the approved details.

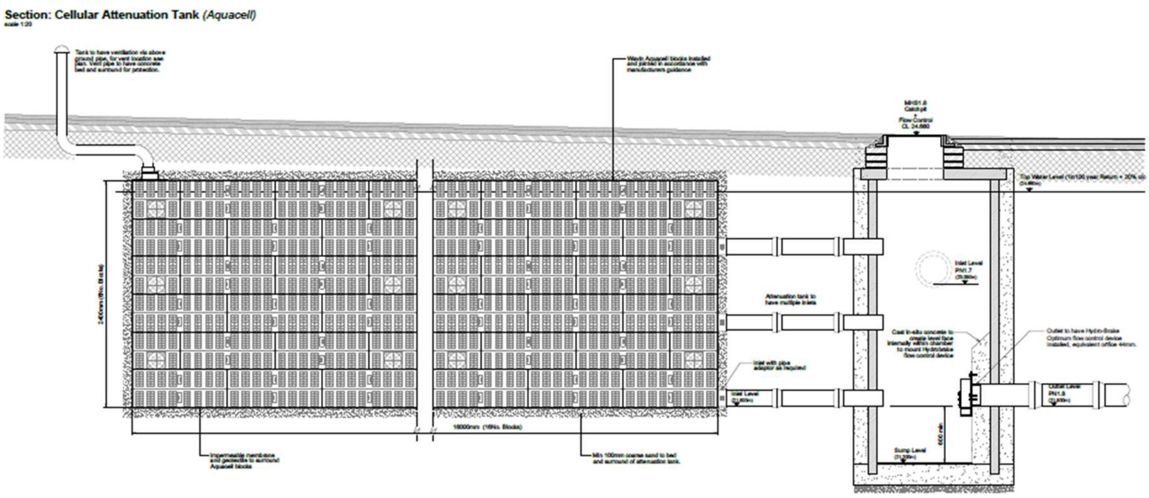
REASON: To ensure adequate drainage provision and to prevent pollution, in accordance with policies CC11, CC12, CC13 and QL12 of the Canterbury District Local Plan 2017, the National Planning Policy Framework.

Frame 1 ~ Extract of Planning Conditions

2.0 SURFACE WATER DRAINAGE

Proposed Discharge

2.1 Enclosed within Appendix A are the drainage design and construction details drawings indicating a positive drainage system to drain the impermeable area (3,545m²) and restrict the outfall to the equivalent run-off rate of 1.4l/s (0.35ha x 4.0l/s/ha). Below ground attenuation for 296m³ of storage is provided in the form of a 'Wavin Aquacell' attenuation tank measuring 8.0m x 16.0m x 2.4m deep. The discharge will be controlled with a 'Hydrobrake Optimum' vortex flow control device of 44mmØ as shown on the construction drawings and the extract as frame 2 below.



Frame 2 ~ SUDS Solution

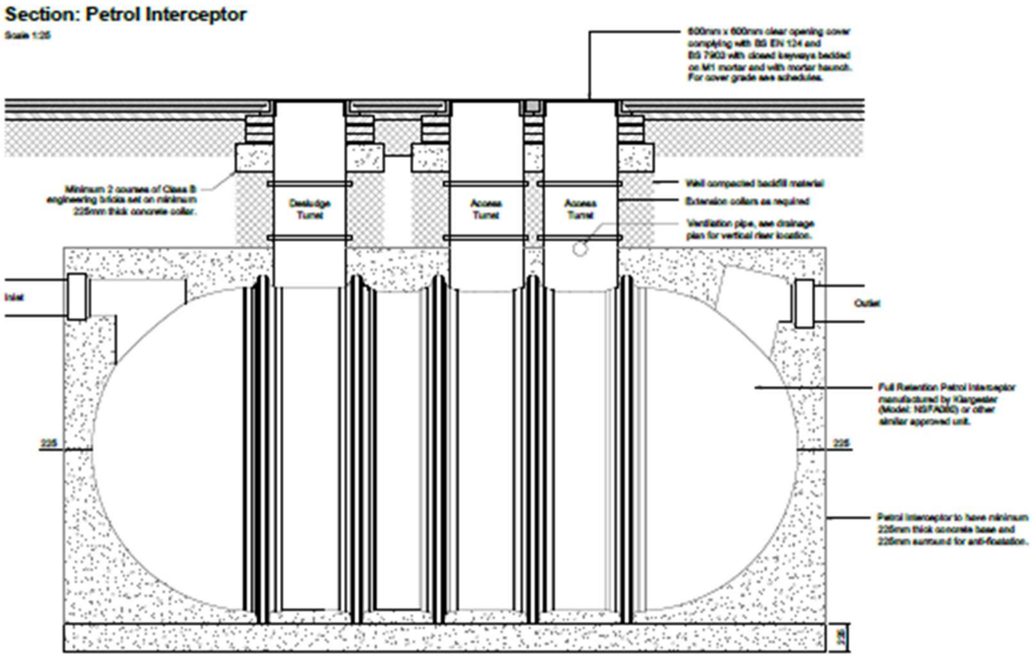
2.2 Included within Appendix B are the MicroDrainage Network Details & Simulation results to demonstrate that the system will be adequate to cater for a 1in100 year return period with a 20% allowance for future climate change.

2.3 The drainage calculations provided comply with the new Kent County Council SUDS guidance and used the FEH Rainfall data for the site.

2.4 A 40% sensitivity test is not required for commercial developments

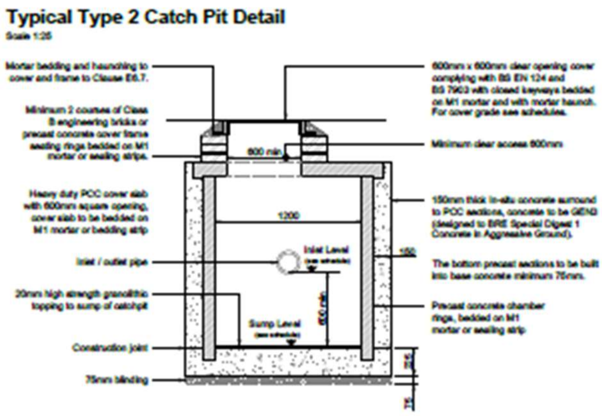
Pollution Protection

2.5 As the surface water ultimately discharges to the River Stour via the outfall from the attenuation pond to the east of the site, a full retention interceptor is to be installed on the site prior to the connection to the existing private surface water sewer.



Frame 3 ~ Pollution Prevention

2.6 All surface water manholes within the access road and parking areas are to be constructed as catch pits with a 600mm sump to allow for the collection of silts and sediment



Frame 4 ~ Silt collection measures

Consents

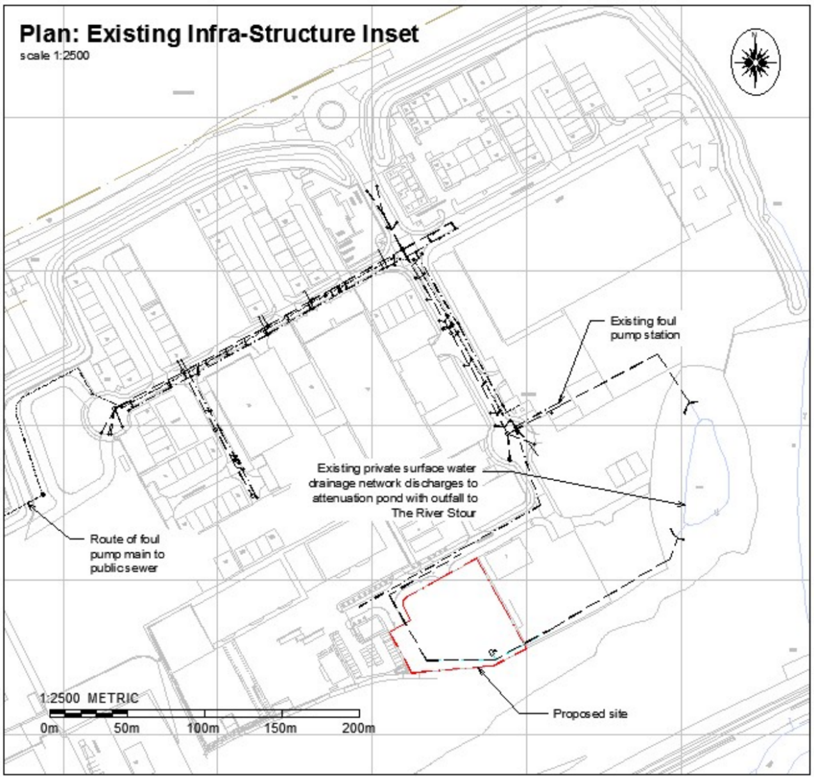
2.7 No formal consents are required other than the discharge of the planning condition and compliance with the Building Regulations.

2.8 The surface water system as indicated on the design drawings is a private Sustainable Urban Drainage System (SUDS) and the owner of the development (Luckhurst Scaffolding Ltd) will be responsible for the inspection and maintenance for the system. Refer to the Operation & Maintenance statement in Section 4.0

3.0 FOUL WATER DRAINAGE

Proposed Discharge

3.1 Enclosed within Appendix A are the drainage design and construction details drawings indicating a new connection to the private foul water sewer utilising the existing spur in Stone Way. The foul water discharge from the Business Park discharges to a private foul water pumping as shown in frame 5 below. The pump station has been designed for accommodate the site discharge with no change to the current pumped discharge to the Public Foul Water Sewer.



Frame 5 – Strategy Plan Inset

Consents

3.2 No formal consents are required other than the discharge of the planning condition and compliance with the Building Regulations.

4.0 OPERATION & MAINTENANCE STATEMENT

4.1 The surface water system as indicated on the design drawings is a private Sustainable Urban Drainage System (SUDS) and the owner of the development (Luckhurst Scaffolding Ltd) will be responsible for the inspection and maintenance for the system.

4.2 The SUDS solution for the scheme involves an attenuated discharge to the private surface water sewer with an oil separator upstream of the sewer connection.

4.3 The supplier of the oil separators recommends that the separators are inspected at least every six months and a log be maintained detailing the depth of oil found, volumes of any oil/silt removed, or cleaning work carried out. The alarm probes should be removed and cleaned whenever waste material is removed from the separator. Refer to the attached installation and operating manual provided by the oil separator supplier included within Appendix C.

4.4 Six monthly Inspection to include;

- Lift all manhole covers and check general condition
- Check that the vortex flow control device within manhole MHS1.8 is free from obstruction and that the sump is clear of any silt
- Check and clear the oil separator and remove any silts and oils as necessary (see appendix C)
- Dip the 6No catchpits (MHS5.3, 5.4, 5.5, 5.6, 1.4, & 1.5) that have a 600mm sump below the standing water and clear as necessary with a gully sucker and dispose by a licensed carrier.

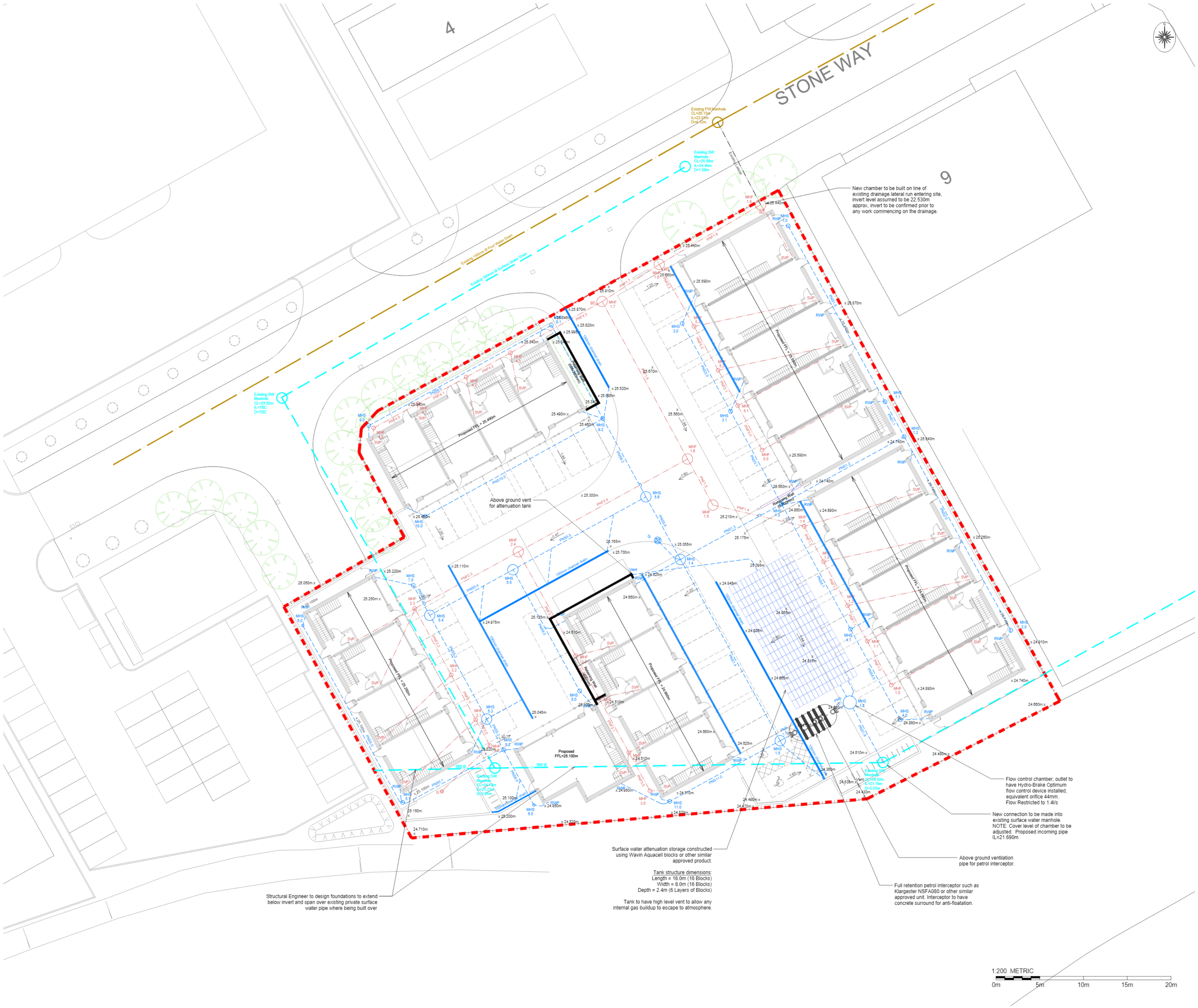
4.5 Five year Inspection / Five Year Anniversary

- Lift the by-pass flap to the vortex flow control device to allow rodding and jetting of the whole surface water network. Carry out a rapid 'Flush' through of the system (works during a dry period) all pipe work to ensure no blockages and free flow of water to the outfall and to check overall integrity

- Empty all catchpits with a gully sucker and dispose off site by a licensed carrier.

APPENDIX A

Tridax Drawings
T-2020-050-10-revB – Drainage Plan
T-2020-050-11-revB – Drainage Details Sheet 1
T-2020-050-12-revA – Drainage Details Sheet 2
T-2020-050-13-revA – Drainage Details Sheet 3
T-2020-050-14-revA – Drainage Details Sheet 4
T-2020-050-15-revB – Drainage Details Sheet 5



DRAWING LEGEND

- Site boundary line

EXISTING SEWERS

- Public foul water sewer
- MH Public foul water manhole
- Private surface water sewer
- MH Private surface water manhole

EXISTING PRIVATE DRAINAGE

- Private foul water drain

PROPOSED PRIVATE DRAINAGE

- Private foul water drainage
- MH Private foul water manhole
- SVP Soil vent pipe
- G Foul water gully
- Private surface water drainage
- MH Private surface water manhole
- RWP Rainwater pipe
- G Surface water gully
- Private surface water channel drains

DRAINAGE NOTES

- The location of any existing drains and sewers are to be accurately located and reported prior to any work commencing on site.
- All materials, workmanship and construction to be in accordance with the requirements of 'Sewers for Adoption - 7th Edition' and published addendum and corrigendum.
- Channel drains shown are only to collect surface water run-off from hard paved areas and door thresholds and are not intended to collect groundwater or run-off from gardens and landscaped areas.
- All abandoned pipework to be completely removed or grout filled unless stated otherwise.

NOTES

- The Contractor should check all dimensions on site.
- It is the Contractors responsibility to ensure compliance with building regulations and current codes of practice.
- Drawings cannot take into account any drains or underground works not locatable by visual survey of the site.
- Commencement of any building works prior to full building regulation approval is entirely at the clients risk.

Rev	Description	Date
B	Updated to suit revised finished levels	17/11/2020
A	First issue to client	21/10/2020

PROJECT: Proposed commercial development on land off Stone Way, Lakesview Business Park, Hersden.

CLIENT: D. Luckhurst % Taylor Roberts Ltd

tridax

Suite 2, The Powder House, Menzies Road, White Cliffs Business Park, Whitfield, Dover, Kent, CT16 2HQ. Tel: 01304 820777

DRAWING: Proposed Drainage Plan

Scale	Date	Size
1:200	28/09/2020	A1

STATUS: PLANNING

Dwg No: T-2020-050-010 Rev: B

FOUL WATER MANHOLE SCHEDULE

Manhole Ref.	Cover Level (m)	Invert Level (m)	Backdrop Invert Lvl (m)	Manhole Depth (m)	Manhole Type	Manhole Ø (mm)	Cover/Frame Grade	Remarks
MHF1.0	24.790	23.890	-	0.900	PPIC	450	C250	-
MHF1.1	24.790	23.795	-	0.995	PPIC	450	C250	-
MHF1.2	24.900	23.720	-	1.180	PPIC	450	C250	-
MHF1.3	24.900	23.625	-	1.275	PPIC	450	C250	-
MHF1.4	24.900	23.550	-	1.350	PPIC	450	C250	-
MHF1.5	25.255	23.370	-	1.885	Type 2	1200	D400	-
MHF1.6	25.390	23.015	-	2.375	Type 2	1200	D400	-
MHF1.7	25.880	22.885	24.245	2.995	Type 2	1200	D400	-
MHF1.8	25.560	22.755	24.430	2.805	Type 2	1200	D400	-
MHF1.9	25.440	22.530 (TBC)	-	2.910	Type 1B	1200	D400	Built on line of existing sewer lateral, Invert to be confirmed prior to any work commencing on the foul drainage network.
MHF2.0	25.185	24.285	-	0.900	PPIC	450	C250	-
MHF2.1	25.185	24.230	-	0.955	PPIC	450	C250	-
MHF2.2	25.185	24.130	-	1.055	PPIC	450	C250	-
MHF2.3	25.185	23.985	-	1.200	PPIC	450	C250	-
MHF2.4	25.290	23.385	-	1.905	Type 2	1200	D400	-
MHF3.0	24.510	23.910	-	0.600	PPIC	450	B125	-
MHF3.1	24.510	23.825	-	0.685	PPIC	450	B125	-
MHF3.2	24.510	23.705	-	0.805	PPIC	450	B125	-
MHF3.3	24.510	23.610	-	0.900	PPIC	450	B125	-
MHF4.0	25.340	24.740	-	0.600	PPIC	450	B125	-
MHF4.1	25.340	24.645	-	0.695	PPIC	450	B125	-
MHF4.2	25.340	24.540	-	0.800	PPIC	450	B125	-
MHF4.3	25.340	24.445	-	0.895	PPIC	450	B125	-
MHF5.0	25.490	24.815	-	0.675	PPIC	450	C250	-
MHF5.1	25.490	24.740	-	0.750	PPIC	450	C250	-
MHF5.2	25.600	24.660	-	0.940	PPIC	450	C250	-
MHF5.3	25.600	24.565	-	1.035	PPIC	450	C250	-

FOUL WATER PIPE SCHEDULE

Pipe Ref.	Pipe Length (m)	Pipe Ø (mm)	Pipe Material	Gradient (1 in ?)	Bedding	Remarks
PNF1.0	5.71	100	UPVC	60	Class Z	-
PNF1.1	4.65	100	UPVC	60	Class Z	-
PNF1.2	5.72	100	UPVC	60	Class Z	-
PNF1.3	4.61	100	UPVC	60	Class Z	-
PNF1.4	10.70	100	UPVC	60	Class S	-
PNF1.5	6.01	100	UPVC	16.9	Class S	-
PNF1.6	20.49	150	UPVC	60	Class S	-
PNF1.7	7.79	150	UPVC	60	Class S	-
PNF1.8	13.44	150	UPVC	60	Class S	-
PNF2.0	3.38	100	UPVC	60	Class Z	-
PNF2.1	5.84	100	UPVC	60	Class Z	-
PNF2.2	8.66	100	UPVC	60	Class Z	-
PNF2.3	13.50	100	UPVC	22.5	Class S	-
PNF2.4	22.05	100	UPVC	60	Class S	-
PNF3.0	5.00	100	UPVC	60	Class S	-
PNF3.1	7.11	100	UPVC	60	Class S	-
PNF3.2	5.52	100	UPVC	60	Class S	-
PNF3.3	13.57	100	UPVC	60	Class S	-
PNF4.0	5.76	100	UPVC	60	Class S	-
PNF4.1	6.32	100	UPVC	60	Class S	-
PNF4.2	5.76	100	UPVC	60	Class S	-
PNF4.3	12.00	100	UPVC	60	Class S	-
PNF5.0	5.79	100	UPVC	60	Class Z	-
PNF5.1	4.61	100	UPVC	60	Class Z	-
PNF5.2	5.71	100	UPVC	60	Class Z	-
PNF5.3	8.14	100	UPVC	60	Class Z	-

SURFACE WATER MANHOLE SCHEDULE

Manhole Ref.	Cover Level (m)	Invert Level (m)	Backdrop Invert Lvl (m)	Manhole Depth (m)	Manhole Type	Manhole Ø (mm)	Cover/Frame Grade	Remarks
MHS1.0	25.440	24.840	-	0.600	PPIC	450	B125	-
MHS1.1	25.440	24.610	-	0.830	PPIC	450	B125	-
MHS1.2	25.540	24.515	-	1.025	PPIC	450	B125	-
MHS1.3	24.960	23.825	-	1.135	PPIC	450	B125	-
MHS1.4	25.600	IN=23.540 OUT=23.390 SL=22.790	-	IN=2.060 OUT=2.210 SL=2.810	Type 2 Catchpit	1200	D400	600mm deep sump PNS1.3 IN=24.085m
MHS1.5	24.510	IN=23.150 OUT=23.150 SL=22.550	-	IN=1.360 OUT=1.360 SL=1.960	Type 2 Catchpit	1200	D400	600mm deep sump PNS11.0 IN=23.900m
Petrol Interceptor	24.585 Average (Varies)	IN=23.140 OUT=23.090	-	IN=1.370 OUT=1.570	Proprietary Unit	L=5.744m Ø=2.820m	D400	Petrol interceptor such as Klargester NSFA080 or other similar approved unit installed in accordance with manufacturers guidance.
MHS1.6	Not Used							
MHS1.7	Not Used							
MHS1.8	24.660	IN=23.090 OUT=21.800 SL=21.200	-	IN=1.570 OUT=2.860 SL=3.460	Type 2 Catchpit + Flow Control	1200	D400	600mm deep sump Outlet to have Hydro-Brake Optimum flow control device installed, equivalent orifice 44mmØ
MHS2.0	25.740	25.140	-	0.600	PPIC	450	B125	-
MHS3.0	25.660	25.060	-	0.600	PPIC	450	C250	-
MHS3.1	25.390	24.790	-	0.600	PPIC	450	C250	-
MHS4.0	24.760	24.160	-	0.600	PPIC	450	C250	-
MHS4.1	24.990	24.040	-	0.950	PPIC	450	C250	-
MHS5.0	25.100	24.500	-	0.600	PPIC	450	B125	-
MHS5.1	25.100	24.265	-	0.835	PPIC	450	B125	-
MHS5.2	25.100	24.080	-	1.020	PPIC	450	C250	-
MHS5.3	25.100	IN=24.040 OUT=23.965 SL=23.365	-	IN=1.060 OUT=1.135 SL=1.35	Type 2 Catchpit	1200	D400	600mm deep sump
MHS5.4	25.160	IN=23.830 OUT=23.830 SL=23.230	-	IN=1.330 OUT=1.330 SL=1.930	Type 2 Catchpit	1200	D400	600mm deep sump PNS7.0 IN=24.860m
MHS5.5	25.680	IN=23.720 OUT=23.720 SL=23.120	-	IN=1.960 OUT=1.960 SL=2.560	Type 2 Catchpit	1200	D400	600mm deep sump
MHS5.6	25.290	IN=23.545 OUT=23.545 SL=22.945	-	IN=1.745 OUT=1.745 SL=2.345	Type 2 Catchpit	1200	D400	600mm deep sump
MHS6.0	24.950	24.350	-	0.600	PPIC	450	B125	-
MHS7.0	25.800	24.900	-	0.900	PPIC	450	C250	-
MHS8.0	25.100	24.500	-	0.600	PPIC	450	C250	-
MHS9.0	25.340	24.740	-	0.600	PPIC	450	B125	-
MHS9.1	26.130	24.500	-	1.630	PPIC	450	B125	-
MHS9.2	25.850	24.380	-	1.470	PPIC	450	C250	-
MHS10.0	25.360	24.760	-	0.600	PPIC	450	C250	-
MHS11.0	24.510	23.910	-	0.600	PPIC	450	B125	-

SURFACE WATER ATTENUATION TANK SCHEDULE - CELLULAR BLOCKS

Tank Ref.	Cover / Ground Level (m)	Inlet Level(s) (m)	Inlet Depth(s) (m)	Remarks
Tank A	Varies 24.715 (Lowest Corner)	21.800	2.915	Tank constructed using Wavin Aquacell blocks or similar approved product (Individual block dimensions: L=1.0m x W=0.5m x D=0.4m) Tank Structure Dimensions Length = 16.0m (16 Blocks) Width = 8.0m (16 Blocks) Depth = 2.4m (6 Layers of Blocks) Tank to have high level vent to allow any internal gas build-up to escape to atmosphere, vent located to be determined on site.

SURFACE WATER PIPE SCHEDULE

Pipe Ref.	Pipe Length (m)	Pipe Ø (mm)	Pipe Material	Gradient (1 in ?)	Bedding	Remarks
PNS1.0	22.96	100	UPVC	99.8	Class S	-
PNS1.1	4.55	100	UPVC	101.1	Class S	-
PNS1.2	16.00	150	UPVC	23.2	Class S	-
PNS1.3	13.18	150	UPVC	46.2	Class Z	-
PNS1.4	23.66	300	UPVC	78.6	Class S	-
PNS1.5	1.23	300	UPVC	123	Class S	-
PNS1.6	Not Used					
PNS1.7	Not Used					
PNS1.8	7.84	225	UPVC	71.3	Class S	-
PNS2.0	25.30	100	UPVC	44	Class S	-
PNS3.0	11.47	100	UPVC	42.5	Class Z	-
PNS3.1	12.09	100	UPVC	12.5	Class Z	-
PNS4.0	11.82	100	UPVC	98.5	Class Z	-
PNS4.1	16.35	100	UPVC	99.1	Class Z	-
PNS5.0	23.36	100	UPVC	99.4	Class S	-
PNS5.1	13.11	100	UPVC	97.1	Class S	-
PNS5.2	4.03	150	UPVC	100.8	Class Z	-
PNS5.3	13.53	225	UPVC	100.2	Class Z	-
PNS5.4	10.84	225	UPVC	98.6	Class Z	-
PNS5.5	17.34	225	UPVC	99.1	Class S	-
PNS5.6	8.18	225	UPVC	102.2	Class S	-
PNS6.0	7.18	150	UPVC	32.6	Class S	-
PNS7.0	3.92	100	UPVC	12.9	Class Z	-
PNS8.0	15.82	100	UPVC	24.2	Class Z	-
PNS9.0	23.83	100	UPVC	99.3	Class S	-
PNS9.1	12.19	100	UPVC	101.7	Class S	-
PNS9.2	10.20	100	UPVC	14.4	Class Z	-
PNS10.0	23.19	100	UPVC	61.1	Class Z	-
PNS11.0	14.40	100	UPVC	25.7	Class S	-

DRAINAGE NOTES

- The location of any existing drains and sewers are to be accurately located and reported prior to any work commencing on site.
- All materials, workmanship and construction to be in accordance with the requirements of 'Sewers for Adoption - 7th Edition' and published addendum and corrigendum.
- Channel drains shown are only to collect surface water run-off from hard paved areas and door thresholds and are not intended to collect groundwater or run-off from gardens and landscaped areas.
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A	First issue to client	21/10/2020
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CLIENT: **D. Luckhurst % Taylor Roberts Ltd**

tridax
Suite 2, The Powder House, Menzies Road, White Cliffs Business Park, Whitfield, Dover, Kent, CT16 2HQ Tel: 01304 820777

DRAWING: Proposed Drainage Details
Sheet 1

SCALES: As Noted | DATE: 21/10/2020 | SIZE: A1

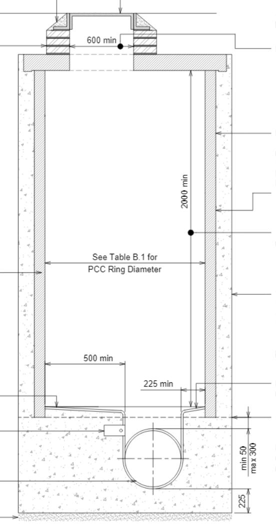
STATUS: **PLANNING**

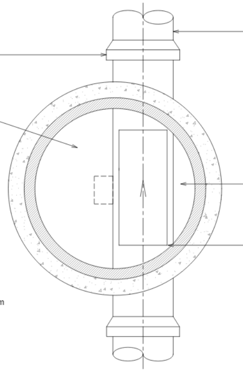
Dwg No. **T-2020-050-011** | REV. B

Typical Type 1B Chamber Detail

scale 1:25

- Depth from cover level to soffit of pipe 3.0m to 6.0m





NOTE: Outgoing pipes should be fitted with guard bars, safety chains, or other safety devices in accordance with the undertakers safety policy

NOTE: Opening to be located centrally over 900mm shaft and offset approximately 200mm for 1200mm diameter shaft with ladder.

Table B.1 - Clause B3.2.12 - Manhole Diameters

Nominal internal diameter of largest pipe in manhole (mm)	Minimum nominal internal dimension of manhole (mm)
Less than 375	1200
375 - 450	1350
500 - 700	1500
750 - 900	1800
Greater than 900	Pipe diameter + 900

Clause E6.7 - Setting Manhole Covers and Frames

1. Manhole frames shall be set to level, bedded and haunched externally over the base and sides of the frame in mortar, in accordance with the manufacturers instructions. The frame shall be seated on at least two courses of Class B engineering bricks, on precast masonry units or on precast concrete cover frame seating rings to regulate the distance between the top of the cover and the top rung of the ladder (to be no greater than 675mm). A mortar fillet shall be provided where the corners to an opening in a slab are chamfered and the brickwork is not flush with the edges of the opening.
2. Frames for manhole covers shall be bedded in a polyester resin based mortar in all situations where covers are sited in NRSWA Road Categories I,II or III (i.e. all except residential cul-de-sacs).

Clause E2.29 - Precast Concrete Manholes

1. Precast concrete manhole units shall comply with the relevant provisions of BS EN 1917 and BS 5911-3. Units which bed into bases shall be manufactured so that imposed vertical loads are transmitted directly via the full wall thickness of the unit. The profiles of joints between units and the underside of slabs, shall be capable of withstanding applied loadings from such slabs and spigot-ended sections shall only be used where the soffit of the slab is recessed to receive them.
2. Precast concrete chamber sections for valves and meters shall be interlocking and comply with BS EN 1917 and BS 5911-3.

Clause E2.32 - Manhole Covers and Frames

1. Manhole covers and frames shall comply with the relevant provisions of BS EN 124, BS 7903 and Highways Agency Guidance Document HA 104/09. They shall be of a non rocking design which does not rely on the use of cushion inserts.
2. Manhole covers on foul-only sewers shall be of low leakage types in order to prevent excessive surface water ingress.
3. As a minimum, Class D400 covers shall be used in carriageways of roads (including pedestrian streets), hard shoulders and parking areas used by all types of road vehicles.
4. Minimum frame depths for NRSWA road categories I to IV shall be as table E.6.
5. Class B125 covers shall be used in footways, pedestrian areas and comparable locations.
6. In situations where traffic loading is anticipated to be heavier than would occur on a typical residential estate distributor road (i.e. braking or turning near a junction). higher specification E600 covers shall be used.
7. All Manholes shall be the non ventilating type and shall have closed keyways.

Table E.6 Minimum Frame Depths

NRSWA Road Category	Road Description	Minimum Frame Depth (mm)
I	Trunk road and dual carriageways	150
II	All other A roads	150
III	Bus services	150
IV	All other roads except residential cul-de-sacs	150
-	Residential cul-de-sacs	100

Clause E2.37 - Ladders

1. Ladders in manholes and similar structures shall comply with the requirements of BS EN 14396, with width of rung 380mm and two stringers, but shall not be made from aluminium.
2. Mild steel ladders for vertical fixing shall be fabricated from steel conforming to BS EN 10025-2. After fabrication, low carbon steel ladders shall be hot dip galvanized in accordance with BS EN 1461.
3. Stainless steel ladders for vertical fixing shall be fabricated from Grade X5CrNiMo 17-12-2 steel conforming to BS EN 10088-3.
4. GRP ladders shall be manufactured from pultruded sections conforming to BS EN 13706-2 and BS EN 13706-3. The surface shall be smooth with fibres embedded and sealed against penetration from dirt and water. The Barcol hardness of the sections shall be at least 35 when tested in accordance with BS 2782-10.

Clause E6.6 - Pipes and Joints Adjacent to Structures

1. Where rigid pipes are used, a flexible joint (rocker pipe) shall be provided as close as is feasible to the outside face of any structure into which a pipe is built, within 150mm for pipe diameters less than 300mm. The design of the joints shall be compatible with any subsequent movement.
2. The recommended length of the next pipe (rocker pipe) away from the structure shall be as shown in Table E.12.

Table E.12 Rocker Pipes

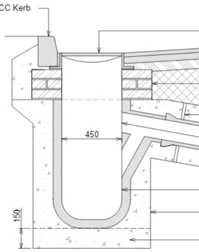
Nominal Diameter (mm)	Effective length of Rocker Pipe (mm)
150 to 600	600
600 to 750	1000
Over 750	1250

Text taken from Figure B.14

1. Stub pipes into structures shall be of rigid material.
2. No incoming branch is to be less than 90° from the outgoing direction of flow, all pipes entering the bottom of the manhole are to have level soffits.

Typical Highway Gully Detail

scale 1:20

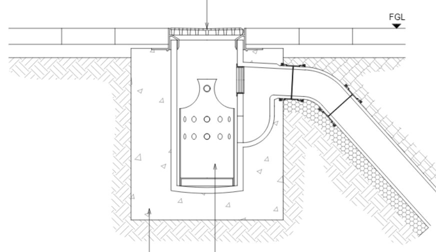


NOTE: Concrete protection to pipe where depth to soffit is less than 1.2m

Yard Gully Connection Detail

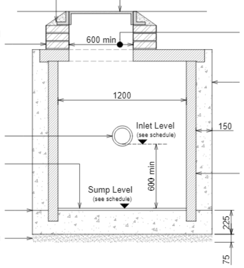
scale 1:10

NOTE:
The depth of the gully can be increased by up to 300mm by fitting a 225mm coupling and a 300mm high raising piece between the frame and the gully body.



Typical Type 2 Catch Pit Detail

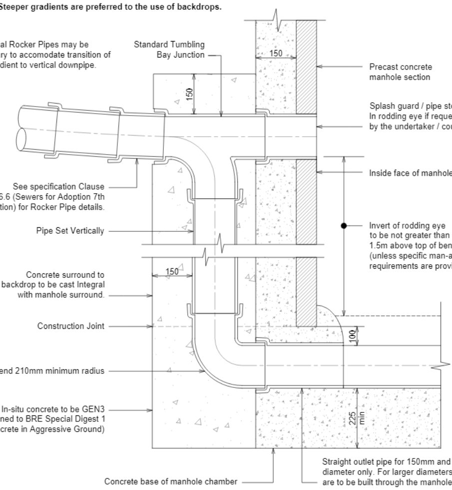
Scale 1:25



Typical External Vertical Backdrop Detail

scale 1:10

NOTE: Steeper gradients are preferred to the use of backdrops.



DRAINAGE NOTES

- The location of any existing drains and sewers are to be accurately located and reported prior to any work commencing on site.
- All materials, workmanship and construction to be in accordance with the requirements of 'Sewers for Adoption - 7th Edition' and published addendum and corrigendum.
- Channel drains shown are only to collect surface water run-off from hard paved areas and door thresholds and are not intended to collect groundwater or run-off from gardens and landscaped areas.
- All abandoned pipework to be completely removed or grout filled unless stated otherwise.

NOTES

- The Contractor should check all dimensions on site.
- It is the Contractors responsibility to ensure compliance with building regulations and current codes of practice.
- Drawings cannot take into account any drains or underground works not locatable by visual survey of the site.
- Commencement of any building works prior to full building regulation approval is entirely at the clients risk.

Rev	Description	Date
A	First issue to client	21/10/2020

PROJECT
Proposed commercial development on land off Stone Way, Lakesview Business Park, Hersden.

CLIENT
D. Luckhurst % Taylor Roberts Ltd

tridax
Suite 2, The Powder House, Menzies Road, White Cliffs Business Park, Whitfield, Dover, Kent, CT16 2HQ. Tel: 01304 820777

DRAWING
Proposed Drainage Details
Sheet 2

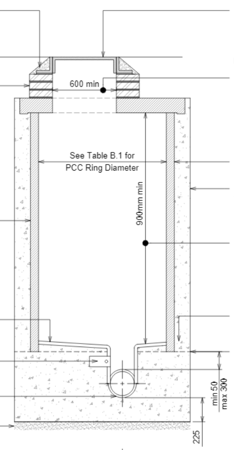
SCALE	DATE	SIZE
As Noted	21/10/2020	A1

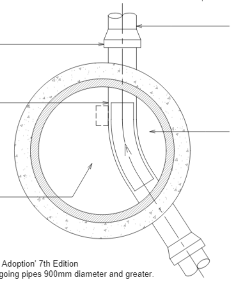
STATUS	DWG No	REV
PLANNING	T-2020-050-012	A

Typical Type 2 Chamber Detail

scale 1:25

- **Maximum depth from cover level to soffit of pipe 3.0m**





NOTES:
1. Clause numbering refers to 'Sewers for Adoption' 7th Edition
2. Safety chains shall be provided on out-going pipes 900mm diameter and greater.

Table B.1 - Clause B3.2.12 - Manhole Diameters

Nominal internal diameter of largest pipe in manhole (mm)	Minimum nominal internal dimension of manhole (mm)
Less than 375	1200
375 - 450	1350
500 - 700	1500
750 - 900	1800
Greater than 900	Pipe diameter + 900

Clause E6.6 - Pipes and Joints Adjacent to Structures
1. Where rigid pipes are used, a flexible joint (rocker pipe) shall be provided as close as is feasible to the outside face of any structure into which a pipe is built, within 150mm for pipe diameters less than 300mm. The design of the joints shall be compatible with any subsequent movement.
2. The recommended length of the next pipe (rocker pipe) away from the structure shall be as shown in Table E.12.

Clause E6.7 - Setting Manhole Covers and Frames
1. Manhole frames shall be set to level, bedded and haunched externally over the base and sides of the frame in mortar, in accordance with the manufacturers instructions. The frame shall be seated on at least two courses of Class B engineering bricks, on precast masonry units or on precast concrete cover frame seating rings to regulate the distance between the top of the cover and the top rung of the ladder (to be no greater than 675mm). A mortar fillet shall be provided where the corners to an opening in a slab are chamfered and the brickwork is not flush with the edges of the opening.
2. Frames for manhole covers shall be bedded in a polyester resin based mortar in all situations where covers are sited in NRSWA Road Categories I,II or III (i.e. all except residential cul-de-sacs).

Table E.12 Rocker Pipes

Nominal Diameter (mm)	Effective length of Rocker Pipe (mm)
150 to 600	600
600 to 750	1000
Over 750	1250

Clause E2.29 - Precast Concrete Manholes
1. Precast concrete manhole units shall comply with the relevant provisions of BS EN 1917 and BS 5911-3. Units which bed into bases shall be manufactured so that imposed vertical loads are transmitted directly via the full wall thickness of the unit. The profiles of joints between units and the underside of slabs, shall be capable of withstanding applied loadings from such slabs and spigot-ended sections shall only be used where the soffit of the slab is recessed to receive them.
2. Precast concrete chamber sections for valves and meters shall be interlocking and comply with BS EN 1917 and BS 5911-3.

Clause E2.32 - Manhole Covers and Frames
1. Manhole covers and frames shall comply with the relevant provisions of BS EN 124, BS 7903 and Highways Agency Guidance Document HA 104/09. They shall be of a non rocking design which does not rely on the use of cushion inserts.
2. Manhole covers on foul-only sewers shall be of low leakage types in order to prevent excessive surface water ingress.
3. As a minimum, Class D400 covers shall be used in carriageways of roads (including pedestrian streets), hard shoulders and parking areas used by all types of road vehicles.
4. Minimum frame depths for NRSWA road categories I to IV shall be as table E.6.
5. Class B125 covers shall be used in footways, pedestrian areas and comparable locations.
6. In situations where traffic loading is anticipated to be heavier than would occur on a typical residential estate distributor road (i.e. braking or turning near a junction). higher specification E600 covers shall be used.
7. All Manholes shall be the non ventilating type and shall have closed keyways.

Table E.6 Minimum Frame Depths

NRSWA Road Category	Road Description	Minimum Frame Depth (mm)
I	Trunk road and dual carriageways	150
II	All other A roads	150
III	Bus services	150
IV	All other roads except residential cul-de-sacs	150
-	Residential cul-de-sacs	100

Clause E2.32 - Manhole Covers and Frames
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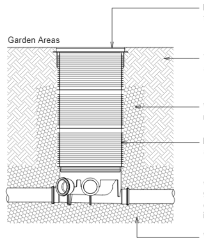
5. Class B125 covers shall be used in footways, pedestrian areas and comparable locations.
6. In situations where traffic loading is anticipated to be heavier than would occur on a typical residential estate distributor road (i.e. braking or turning near a junction). higher specification E600 covers shall be used.
7. All Manholes shall be the non ventilating type and shall have closed keyways.

Text taken from Figure B.14
1. Stub pipes into structures shall be of rigid material.
2. No incoming branch is to be less than 90° from the outgoing direction of flow, all pipes entering the bottom of the manhole are to have level soffits.

Polypropylene Inspection Chamber (PPIC)

Use on private drainage works only

scale 1:20



NOTE:
Maximum diameter of main channel 150/160mm
Maximum pipe diameter of inlets 100/110mm

Unused inlets are to be sealed and made watertight.

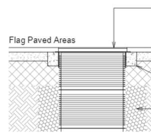
Backfill to be well compacted around shaft of chamber.

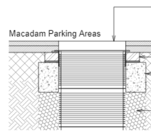
No incoming branch is to be less than 90° from the outgoing direction of flow, all pipes entering the bottom of the manhole are to have level soffits.

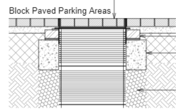
Alternate Access Cover Details (PPIC)

Use on private drainage works only

scale 1:20

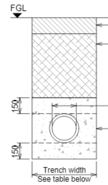






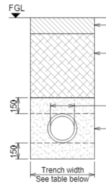
Pipe Bedding - Class Z

Areas subject to vehicle loadings.
Less than 1.2m cover to pipe.



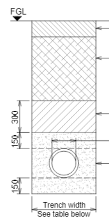
Pipe Bedding - Class S

Areas not subject to vehicle loadings.
Use in private gardens, landscaped areas etc.



Pipe Bedding - Class S

Areas subject to vehicle loadings.
Greater than 1.2m cover to pipe.



PIPE BEDDING MATERIAL - CLASS S

Pipe Ø (mm)	Suitable Materials: (Aggregate to BS 882)
100	10mm nominal single sized aggregate
150	10 to 14mm nominal single sized aggregate
225 to 525	10 to 14mm or 20mm nominal single sized aggregate
Over 525	10, 14 ,20 or 40mm nominal single sized crushed rock

TRENCH WIDTH

Pipe Ø (mm)	Trench Width (mm)
100	450
150	450
225	600
300	600
375	750
450	750
525	900
600	900
750	1200
900	1350
1050	1500

Pipe surround material shall where required, be placed and compacted over the full width of the trench in layers not exceeding 150mm before compaction, to a finished thickness of 300mm above the crown of the pipe.

Where excavations have been supported and the supports are removed they shall be withdrawn progressively as backfilling proceeds in a manner that minimises the danger of collapse, all voids formed behind the supports are to be carefully filled and compacted.

Pipe jointing surfaces and components shall be kept clean and free from extraneous matter until the joints have been made or assembled, care should be taken to ensure that there is no ingress of grout or other material into the joint after the joint has been made.

Pipes should be cut in accordance with the manufacturers recommendations to provide a clean square profile without splitting or fracturing the pipe wall and to ensure minimal damage to any protective coatings, where necessary, the cut ends of pipes shall be formed to the tapers and chamfers suitable for the type of joint to be used.

DRAINAGE NOTES

- The location of any existing drains and sewers are to be accurately located and reported prior to any work commencing on site.
- All materials, workmanship and construction to be in accordance with the requirements of 'Sewers for Adoption - 7th Edition' and published addendum and corrigendum.
- Channel drains shown are only to collect surface water run-off from hard paved areas and door thresholds and are not intended to collect groundwater or run-off from gardens and landscaped areas.
- All abandoned pipework to be completely removed or grout filled unless stated otherwise.

NOTES

- The Contractor should check all dimensions on site.
- It is the Contractors responsibility to ensure compliance with building regulations and current codes of practice.
- Drawings cannot take into account any drains or underground works not locatable by visual survey of the site.
- Commencement of any building works prior to full building regulation approval is entirely at the clients risk.

Rev	Description	Date
A	First issue to client	21/10/2020

PROJECT: Proposed commercial development on land off Stone Way, Lakesview Business Park, Hersden.

CLIENT: D. Luckhurst % Taylor Roberts Ltd

tridax

Suite 2, The Powder House, Menzies Road, White Cliffs Business Park, Whitfield, Dover, Kent, CT16 2HQ. Tel: 01304 820777

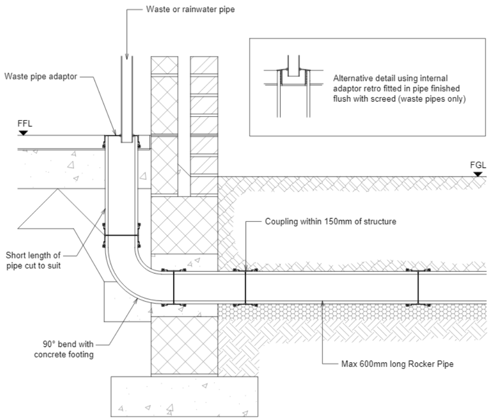
DRAWING: Proposed Drainage Details Sheet 3

SCALE: As Noted | DATE: 21/10/2020 | SIZE: A1

STATUS: PLANNING | DWG No: T-2020-050-013 | REV: A

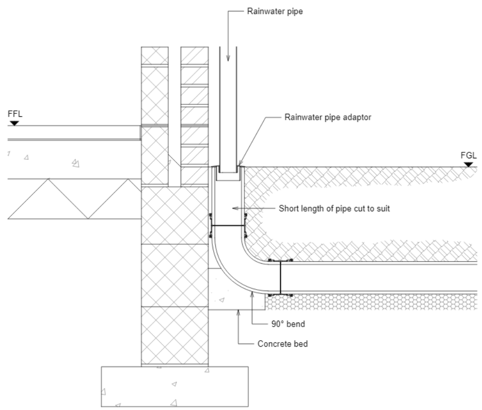
Typical Internal Waste Pipe Connection Detail

scale 1:10



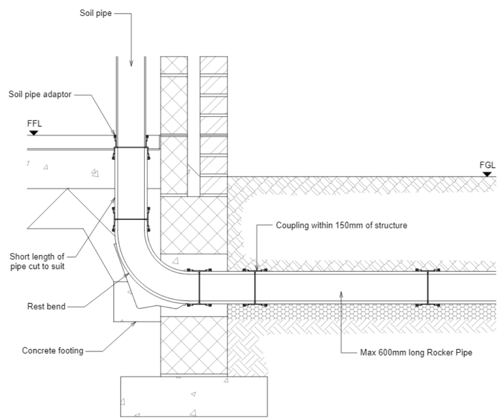
Typical External Rainwater Pipe Connection Detail

scale 1:10



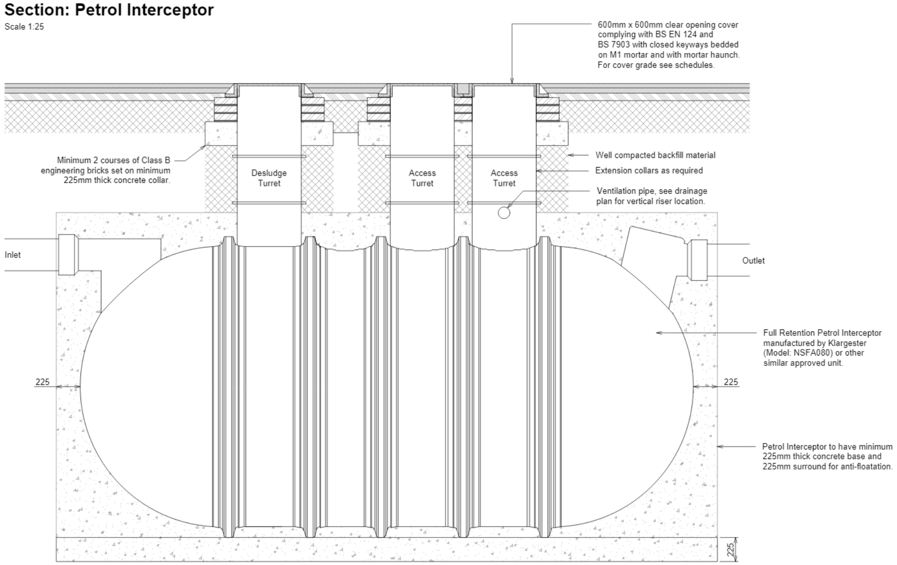
Typical Soil Vent Pipe / Stub Stack Connection Detail

scale 1:10



Section: Petrol Interceptor

Scale 1:25



Floatation Check for Petrol Interceptor
NOTE: Groundwater level taken as ground level

Mass of displaced water:
(assuming 225mm concrete bed and surround)
Excavation Length = 6.20m
Excavation Width = 3.27m
Excavation Depth = 4.48m

6.20m x 3.27m x 4.48m = 90.827m³ x 1000kg/m³ = 90827kg

Mass of material above concrete surround:
Length = 6.20m
Width = 3.27m
Depth = 1.20m

6.20m x 3.270m x 1.20m = 24.328m³ x 1800kg/m³ = 43790kg

Mass of concrete surround:
Length = 6.20m
Width = 3.27m
Depth = 3.27m

6.20m x 3.27m x 3.27m = 66.295m³ - Volume of tank (35.880m³) = 30.415m³
30.415m³ x 2400kg/m³ = 72996kg

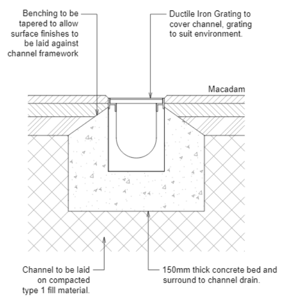
Mass of earth/finishes + concrete surround = 43790kg + 72996kg = 116786kg

Mass of earth/finishes + concrete surround is approx 128% greater than displaced water, therefore OK. (Mass of tank ignored).

Therefore Interceptor requires min 225mm concrete base with min 225mm of concrete surround.

Typical Channel Drain Detal

scale 1:10



Channel drain notes:
1) A trash box is to be located at every channel outlet.

2) In macadam surfaced areas, benching to be tapered to allow base course and wearing course to be in close contact with egde of channel grating. Wearing course to be 3-6mm above the grating after rolling. In heavy duty traffic areas benching should be carried up to protect the edge of the channel.

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- Channel drains shown are only to collect surface water run-off from hard paved areas and door thresholds and are not intended to collect groundwater or run-off from gardens and landscaped areas.
- All abandoned pipework to be completely removed or grout filled unless stated otherwise.

NOTES

- The Contractor should check all dimensions on site.
- It is the Contractors responsibility to ensure compliance with building regulations and current codes of practice.
- Drawings cannot take into account any drains or underground works not locatable by visual survey of the site.
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Rev	Description	Date
A	First issue to client	21/10/2020

PROJECT: Proposed commercial development on land off Stone Way, Lakesview Business Park, Hersden.

CLIENT: **D. Luckhurst % Taylor Roberts Ltd**

tridax
Suite 2, The Powder House, Menzies Road, White Cliffs Business Park, Whitfield, Dover, Kent, CT16 2HQ Tel: 01304 820777

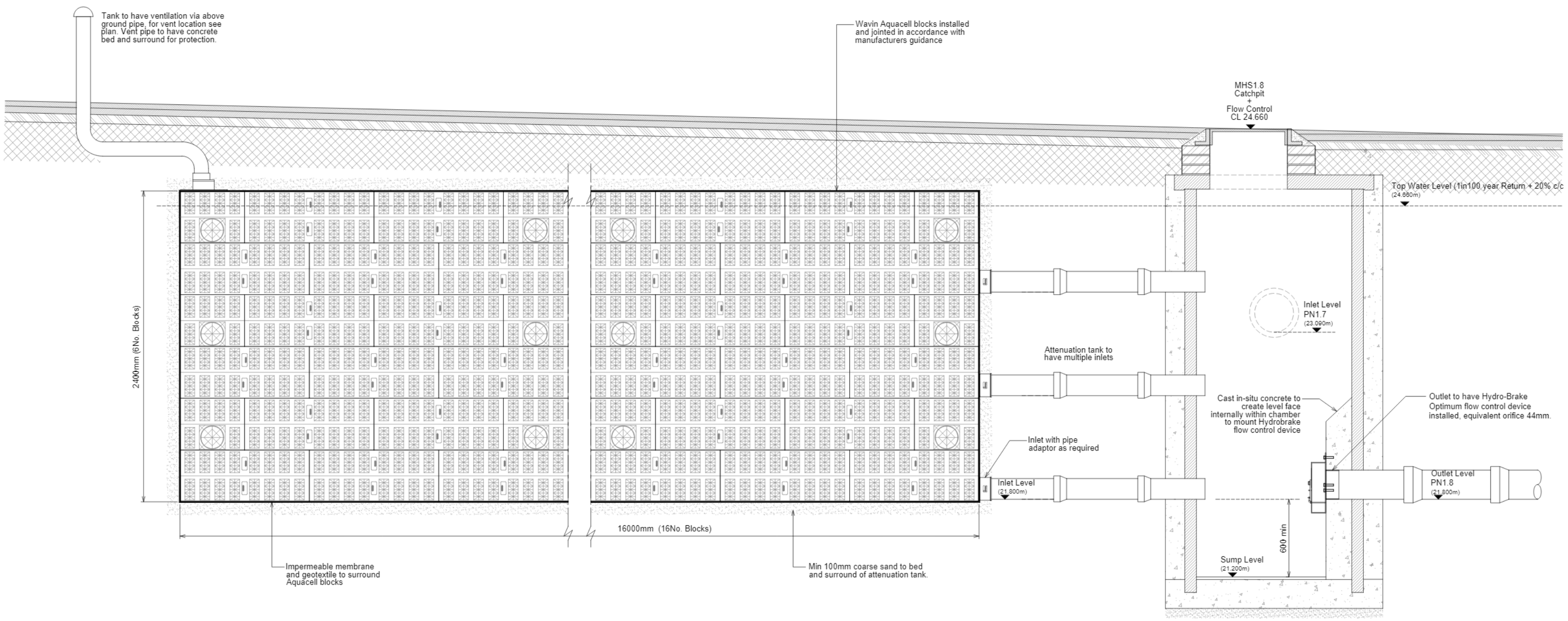
DRAWING: Proposed Drainage Details Sheet 4

SCALES	DATE	SIZE
As Noted	21/10/2020	A1

STATUS: **PLANNING**

Dwg No.: **T-2020-050-014** REV.: A

Section: Cellular Attenuation Tank *(Aquacell)*
scale 1:20



Aquacell Installation Notes: (Contractor to consult manufacturers literature for full details)

1. Excavate the trench to the required depth ensuring that the plan area is slightly greater than that of the AquaCell units.
2. Lay 100mm bed of coarse sand, level and compact.
3. Lay the geotextile over the base and up the sides of the trench.
4. Lay the impermeable membrane on top of the geotextile over the base and up the sides of the trench.
5. Lay the AquaCell units parallel with each other. In multiple layer applications, wherever possible, continuous vertical joints should be avoided. AquaCell units can be laid in a 'brick bonded' formation (i.e. to overlap the joints below). For single layer applications use AquaCell Clips and for multi layers use AquaCell Clips and AquaCell Shear Connectors (vertical rods).
6. Wrap the Impermeable membrane around the AquaCell structure and seal in accordance with the manufacturers recommendations.
7. If side connections into the AquaCell units are required, (other than the preformed socket), use the appropriate Flange Adaptor. Fix the flange adaptor to the unit using self-tapping screws. Drill a hole through the Flange Adaptor and connect the pipework.
6. In order to prevent silt from entering the tank, clogging the inlet pipework and reducing the tank capacity, it is recommended that a silt trap / catchpit is installed upstream of the tank inlet.
7. Wrap and overlap the geotextile to cover the entire AquaCell structure protecting the impermeable membrane.
8. Lay 100mm of coarse sand between the trench walls and the AquaCell structure and compact being careful not to damage the blocks or either of the membranes.
9. Lay 100mm bed of coarse sand over the geotextile and compact.
10. Backfill tank with suitable clean material, free of organic matter and debris.

DRAINAGE NOTES

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Rev	Description	Date
B	Updated to suit revised finished levels	17/11/2020
A	First issue to client	21/10/2020

PROJECT: Proposed commercial development on land off Stone Way, Lakesview Business Park, Hersden.

CLIENT: **D. Luckhurst % Taylor Roberts Ltd**

tridax
Suite 2, The Powder House, Menzies Road, White Cliffs Business Park, Whitfield, Dover, Kent, CT16 2HQ. Tel: 01304 820777

DRAWING: Proposed Drainage Details Sheet 5

SCALE: As Noted | DATE: 21/10/2020 | SIZE: A1

STATUS: PLANNING

DWG No: T-2020-050-015 | REV: B

APPENDIX B

Surface Water Design Calculations
MicroDrainage Network Details & Simulation Results

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	22.960	0.230	99.8	0.009	5.00	0.0	0.600	o	100	Pipe/Conduit
1.001	4.550	0.045	101.1	0.009	0.00	0.0	0.600	o	100	Pipe/Conduit
2.000	25.300	0.575	44.0	0.018	5.00	0.0	0.600	o	100	Pipe/Conduit
1.002	16.000	0.690	23.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
3.000	11.480	0.270	42.5	0.003	5.00	0.0	0.600	o	100	Pipe/Conduit
3.001	12.100	0.965	12.5	0.003	0.00	0.0	0.600	o	100	Pipe/Conduit
4.000	11.820	0.120	98.5	0.003	5.00	0.0	0.600	o	100	Pipe/Conduit
4.001	16.350	0.165	99.1	0.003	0.00	0.0	0.600	o	100	Pipe/Conduit
1.003	13.180	0.285	46.2	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit
5.000	23.360	0.235	99.4	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit
5.001	13.110	0.135	97.1	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit
6.000	7.180	0.220	32.6	0.005	5.00	0.0	0.600	o	150	Pipe/Conduit
5.002	4.030	0.040	100.8	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit
5.003	13.530	0.135	100.2	0.052	0.00	0.0	0.600	o	225	Pipe/Conduit
7.000	3.920	0.305	12.9	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	24.840	0.009	0.0	0.77	6.0
1.001	24.610	0.018	0.0	0.76	6.0
2.000	25.140	0.018	0.0	1.17	9.2
1.002	24.515	0.036	0.0	2.10	37.1
3.000	25.060	0.003	0.0	1.19	9.3
3.001	24.790	0.006	0.0	2.19	17.2
4.000	24.160	0.003	0.0	0.77	6.1
4.001	24.040	0.006	0.0	0.77	6.1
1.003	23.825	0.054	0.0	1.48	26.2
5.000	24.500	0.005	0.0	0.77	6.1
5.001	24.265	0.010	0.0	0.78	6.1
6.000	24.350	0.005	0.0	1.77	31.2
5.002	24.080	0.017	0.0	1.00	17.7
5.003	23.965	0.069	0.0	1.31	51.9
7.000	24.260	0.005	0.0	2.17	17.0

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
5.004	10.850	0.110	98.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
8.000	15.820	0.655	24.2	0.010	5.00	0.0	0.600	o	100	Pipe/Conduit
5.005	17.340	0.175	99.1	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit
9.000	23.830	0.240	99.3	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit
9.001	12.200	0.120	101.7	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit
10.000	23.200	0.380	61.1	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit
9.002	10.210	0.710	14.4	0.030	0.00	0.0	0.600	o	100	Pipe/Conduit
5.006	8.180	0.080	102.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
1.004	23.670	0.240	98.6	0.042	0.00	0.0	0.600	o	300	Pipe/Conduit
11.000	14.400	0.560	25.7	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit
1.005	1.230	0.010	123.0	0.071	0.00	0.0	0.600	o	300	Pipe/Conduit
1.006	6.200	0.000	0.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit
1.007	1.650	0.000	0.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit
1.008	7.840	0.110	71.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
5.004	23.830	0.074	0.0	1.32	52.3
8.000	24.500	0.010	0.0	1.58	12.4
5.005	23.720	0.099	0.0	1.31	52.2
9.000	24.740	0.005	0.0	0.77	6.1
9.001	24.500	0.010	0.0	0.76	6.0
10.000	24.760	0.005	0.0	0.99	7.8
9.002	24.380	0.045	0.0	2.05	16.1
5.006	23.545	0.144	0.0	1.29	51.4
1.004	23.390	0.240	0.0	1.58	111.9
11.000	23.910	0.005	0.0	1.53	12.0
1.005	23.150	0.316	0.0	1.42	100.1
1.006	23.140	0.316	0.0	0.00	0.0
1.007	23.090	0.316	0.0	0.00	0.0
1.008	21.800	0.316	0.0	1.55	61.7

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
MHS1.0	25.440	0.600	Open Manhole	600	1.000	24.840	100				
MHS1.1	25.440	0.830	Open Manhole	600	1.001	24.610	100	1.000	24.610	100	
MHS2.0	25.740	0.600	Open Manhole	600	2.000	25.140	100				
MHS1.2	25.540	1.025	Open Manhole	600	1.002	24.515	150	1.001	24.565	100	
								2.000	24.565	100	
MHS3.0	25.660	0.600	Open Manhole	600	3.000	25.060	100				
MHS3.1	25.390	0.600	Open Manhole	600	3.001	24.790	100	3.000	24.790	100	
MHS4.0	24.760	0.600	Open Manhole	600	4.000	24.160	100				
MHS4.1	24.990	0.950	Open Manhole	600	4.001	24.040	100	4.000	24.040	100	
MHS1.3	24.960	1.135	Open Manhole	600	1.003	23.825	150	1.002	23.825	150	
								3.001	23.825	100	
								4.001	23.875	100	
MHS5.0	25.100	0.600	Open Manhole	600	5.000	24.500	100				
MHS5.1	25.100	0.835	Open Manhole	600	5.001	24.265	100	5.000	24.265	100	
MHS6.0	24.950	0.600	Open Manhole	600	6.000	24.350	150				
MHS5.2	25.100	1.020	Open Manhole	600	5.002	24.080	150	5.001	24.130	100	
								6.000	24.130	150	50
MHS5.3	25.100	1.135	Open Manhole	600	5.003	23.965	225	5.002	24.040	150	
MHS7.0	25.160	0.900	Open Manhole	600	7.000	24.260	100				
MHS5.4	25.160	1.330	Open Manhole	1200	5.004	23.830	225	5.003	23.830	225	
								7.000	23.955	100	
MHS8.0	25.100	0.600	Open Manhole	600	8.000	24.500	100				
MHS5.5	25.680	1.960	Open Manhole	1200	5.005	23.720	225	5.004	23.720	225	
								8.000	23.845	100	
MHS9.0	25.340	0.600	Open Manhole	600	9.000	24.740	100				
MHS9.1	26.130	1.630	Open Manhole	600	9.001	24.500	100	9.000	24.500	100	
MHS10.0	25.360	0.600	Open Manhole	600	10.000	24.760	100				
MHS9.2	25.850	1.470	Open Manhole	600	9.002	24.380	100	9.001	24.380	100	
								10.000	24.380	100	
MHS5.6	25.290	1.745	Open Manhole	1200	5.006	23.545	225	5.005	23.545	225	
								9.002	23.670	100	
MHS1.4	25.600	2.210	Open Manhole	1200	1.004	23.390	300	1.003	23.540	150	
								5.006	23.465	225	
MHS11.0	24.510	0.600	Open Manhole	600	11.000	23.910	100				
MHS1.5	24.510	1.360	Open Manhole	1200	1.005	23.150	300	1.004	23.150	300	
								11.000	23.350	100	
Interceptor In	24.510	1.370	Open Manhole	1200	1.006	23.140	300	1.005	23.140	300	
Interceptor Out	24.660	1.570	Open Manhole	1200	1.007	23.090	300	1.006	23.140	300	50
MHS1.8	24.660	2.860	Open Manhole	1200	1.008	21.800	225	1.007	23.090	300	1365
EXMH	24.520	2.830	Open Manhole	1500		OUTFALL		1.008	21.690	225	

Manhole Schedules for Storm

No coordinates have been specified, layout information cannot be produced.

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	100	MHS1.0	25.440	24.840	0.500	Open Manhole	600
1.001	o	100	MHS1.1	25.440	24.610	0.730	Open Manhole	600
2.000	o	100	MHS2.0	25.740	25.140	0.500	Open Manhole	600
1.002	o	150	MHS1.2	25.540	24.515	0.875	Open Manhole	600
3.000	o	100	MHS3.0	25.660	25.060	0.500	Open Manhole	600
3.001	o	100	MHS3.1	25.390	24.790	0.500	Open Manhole	600
4.000	o	100	MHS4.0	24.760	24.160	0.500	Open Manhole	600
4.001	o	100	MHS4.1	24.990	24.040	0.850	Open Manhole	600
1.003	o	150	MHS1.3	24.960	23.825	0.985	Open Manhole	600
5.000	o	100	MHS5.0	25.100	24.500	0.500	Open Manhole	600
5.001	o	100	MHS5.1	25.100	24.265	0.735	Open Manhole	600
6.000	o	150	MHS6.0	24.950	24.350	0.450	Open Manhole	600
5.002	o	150	MHS5.2	25.100	24.080	0.870	Open Manhole	600
5.003	o	225	MHS5.3	25.100	23.965	0.910	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	22.960	99.8	MHS1.1	25.440	24.610	0.730	Open Manhole	600
1.001	4.550	101.1	MHS1.2	25.540	24.565	0.875	Open Manhole	600
2.000	25.300	44.0	MHS1.2	25.540	24.565	0.875	Open Manhole	600
1.002	16.000	23.2	MHS1.3	24.960	23.825	0.985	Open Manhole	600
3.000	11.480	42.5	MHS3.1	25.390	24.790	0.500	Open Manhole	600
3.001	12.100	12.5	MHS1.3	24.960	23.825	1.035	Open Manhole	600
4.000	11.820	98.5	MHS4.1	24.990	24.040	0.850	Open Manhole	600
4.001	16.350	99.1	MHS1.3	24.960	23.875	0.985	Open Manhole	600
1.003	13.180	46.2	MHS1.4	25.600	23.540	1.910	Open Manhole	1200
5.000	23.360	99.4	MHS5.1	25.100	24.265	0.735	Open Manhole	600
5.001	13.110	97.1	MHS5.2	25.100	24.130	0.870	Open Manhole	600
6.000	7.180	32.6	MHS5.2	25.100	24.130	0.820	Open Manhole	600
5.002	4.030	100.8	MHS5.3	25.100	24.040	0.910	Open Manhole	600
5.003	13.530	100.2	MHS5.4	25.160	23.830	1.105	Open Manhole	1200

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
7.000	o	100	MHS7.0	25.160	24.260	0.800	Open Manhole	600
5.004	o	225	MHS5.4	25.160	23.830	1.105	Open Manhole	1200
8.000	o	100	MHS8.0	25.100	24.500	0.500	Open Manhole	600
5.005	o	225	MHS5.5	25.680	23.720	1.735	Open Manhole	1200
9.000	o	100	MHS9.0	25.340	24.740	0.500	Open Manhole	600
9.001	o	100	MHS9.1	26.130	24.500	1.530	Open Manhole	600
10.000	o	100	MHS10.0	25.360	24.760	0.500	Open Manhole	600
9.002	o	100	MHS9.2	25.850	24.380	1.370	Open Manhole	600
5.006	o	225	MHS5.6	25.290	23.545	1.520	Open Manhole	1200
1.004	o	300	MHS1.4	25.600	23.390	1.910	Open Manhole	1200
11.000	o	100	MHS11.0	24.510	23.910	0.500	Open Manhole	600
1.005	o	300	MHS1.5	24.510	23.150	1.060	Open Manhole	1200
1.006	o	300	Interceptor In	24.510	23.140	1.070	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
7.000	3.920	12.9	MHS5.4	25.160	23.955	1.105	Open Manhole	1200
5.004	10.850	98.6	MHS5.5	25.680	23.720	1.735	Open Manhole	1200
8.000	15.820	24.2	MHS5.5	25.680	23.845	1.735	Open Manhole	1200
5.005	17.340	99.1	MHS5.6	25.290	23.545	1.520	Open Manhole	1200
9.000	23.830	99.3	MHS9.1	26.130	24.500	1.530	Open Manhole	600
9.001	12.200	101.7	MHS9.2	25.850	24.380	1.370	Open Manhole	600
10.000	23.200	61.1	MHS9.2	25.850	24.380	1.370	Open Manhole	600
9.002	10.210	14.4	MHS5.6	25.290	23.670	1.520	Open Manhole	1200
5.006	8.180	102.2	MHS1.4	25.600	23.465	1.910	Open Manhole	1200
1.004	23.670	98.6	MHS1.5	24.510	23.150	1.060	Open Manhole	1200
11.000	14.400	25.7	MHS1.5	24.510	23.350	1.060	Open Manhole	1200
1.005	1.230	123.0	Interceptor In	24.510	23.140	1.070	Open Manhole	1200
1.006	6.200	0.0	Interceptor Out	24.660	23.140	1.220	Open Manhole	1200

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.007	o	300	Interceptor Out	24.660	23.090	1.270	Open Manhole	1200
1.008	o	225	MHS1.8	24.660	21.800	2.635	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.007	1.650	0.0	MHS1.8	24.660	23.090	1.270	Open Manhole	1200
1.008	7.840	71.3	EXMH	24.520	21.690	2.605	Open Manhole	1500

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008	EXMH	24.520	21.690	21.190	1500	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	30	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 621354 162082 TR 21354 62082	Cv (Winter)	0.840
Data Type	Point	Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Optimum Manhole: MHS1.8, DS/PN: 1.008, Volume (m^3): 3.3

Unit Reference	MD-SFP-0044-1400-2400-1400
Design Head (m)	2.400
Design Flow (l/s)	1.4
Flush-Flo™	Calculated
Objective	Future Proof
Application	Surface
Sump Available	Yes
Diameter (mm)	44
Invert Level (m)	21.800
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.400	1.4	Kick-Flo®	0.394	0.6
Flush-Flo™	0.185	0.8	Mean Flow over Head Range	-	1.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.7	0.800	0.9	2.000	1.3	4.000	1.8	7.000	2.3
0.200	0.8	1.000	0.9	2.200	1.3	4.500	1.9	7.500	2.4
0.300	0.7	1.200	1.0	2.400	1.4	5.000	2.0	8.000	2.4
0.400	0.6	1.400	1.1	2.600	1.5	5.500	2.0	8.500	2.5
0.500	0.7	1.600	1.2	3.000	1.5	6.000	2.1	9.000	2.6
0.600	0.8	1.800	1.2	3.500	1.7	6.500	2.2	9.500	2.6

Storage Structures for Storm

Cellular Storage Manhole: MHS1.8, DS/PN: 1.008

Invert Level (m) 21.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	128.0	0.0	2.400	128.0	0.0	2.401	0.0	0.0

Volume Summary (Static)

Length Calculations based on True Length

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	MHS1.0	0.170	0.176	0.000	0.345
1.001	MHS1.1	0.235	0.031	0.000	0.266
2.000	MHS2.0	0.170	0.194	0.000	0.364
1.002	MHS1.2	0.290	0.272	0.000	0.562
3.000	MHS3.0	0.170	0.085	0.000	0.255
3.001	MHS3.1	0.170	0.090	0.000	0.260
4.000	MHS4.0	0.170	0.088	0.000	0.258
4.001	MHS4.1	0.269	0.124	0.000	0.392
1.003	MHS1.3	0.321	0.217	0.000	0.538
5.000	MHS5.0	0.170	0.179	0.000	0.348
5.001	MHS5.1	0.236	0.098	0.000	0.334
6.000	MHS6.0	0.170	0.116	0.000	0.286
5.002	MHS5.2	0.288	0.061	0.000	0.349
5.003	MHS5.3	0.321	0.502	0.000	0.823
7.000	MHS7.0	0.254	0.024	0.000	0.278
5.004	MHS5.4	1.504	0.384	0.000	1.888
8.000	MHS8.0	0.170	0.117	0.000	0.287
5.005	MHS5.5	2.217	0.642	0.000	2.858
9.000	MHS9.0	0.170	0.182	0.000	0.352
9.001	MHS9.1	0.461	0.091	0.000	0.552
10.000	MHS10.0	0.170	0.177	0.000	0.347
9.002	MHS9.2	0.416	0.073	0.000	0.489
5.006	MHS5.6	1.974	0.278	0.000	2.251
1.004	MHS1.4	2.499	1.588	0.000	4.088
11.000	MHS11.0	0.170	0.106	0.000	0.276
1.005	MHS1.5	1.538	0.002	0.000	1.540
1.006	Interceptor In	1.549	0.353	0.000	1.903
1.007	Interceptor Out	1.776	0.032	0.000	1.807
1.008	MHS1.8	3.235	0.258	291.881	295.373
Total		21.248	6.541	291.881	319.670

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Data Type	Point
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 621354 162082 TR 21354 62082	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 20

PN	Event	US/CL (m)	Water Level (m)	Flooded Volume (m³)	Flow / Cap.	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	30 minute 2 year Summer I+0%	25.440	24.870	0.000	0.20	0.743	1.2	OK
1.001	30 minute 2 year Summer I+0%	25.440	24.655	0.000	0.42	1.485	2.2	OK
2.000	30 minute 2 year Summer I+0%	25.740	25.175	0.000	0.26	1.489	2.4	OK
1.002	30 minute 2 year Summer I+0%	25.540	24.551	0.000	0.13	2.970	4.5	OK
3.000	30 minute 2 year Summer I+0%	25.660	25.074	0.000	0.04	0.247	0.4	OK
3.001	30 minute 2 year Summer I+0%	25.390	24.804	0.000	0.05	0.495	0.7	OK
4.000	30 minute 2 year Summer I+0%	24.760	24.177	0.000	0.07	0.247	0.4	OK
4.001	30 minute 2 year Summer I+0%	24.990	24.064	0.000	0.13	0.496	0.7	OK
1.003	30 minute 2 year Summer I+0%	24.960	23.879	0.000	0.28	4.453	6.7	OK
5.000	30 minute 2 year Summer I+0%	25.100	24.522	0.000	0.11	0.413	0.6	OK
5.001	30 minute 2 year Summer I+0%	25.100	24.296	0.000	0.21	0.827	1.2	OK
6.000	30 minute 2 year Summer I+0%	24.950	24.366	0.000	0.02	0.412	0.7	OK
5.002	30 minute 2 year Summer I+0%	25.100	24.121	0.000	0.17	1.403	2.1	OK
5.003	30 minute 2 year Summer I+0%	25.100	24.029	0.000	0.18	5.693	8.0	OK
7.000	30 minute 2 year Summer I+0%	25.160	24.274	0.000	0.05	0.412	0.7	OK
5.004	30 minute 2 year Summer I+0%	25.160	23.898	0.000	0.19	6.102	8.6	OK
8.000	30 minute 2 year Summer I+0%	25.100	24.522	0.000	0.11	0.825	1.3	OK
5.005	30 minute 2 year Summer I+0%	25.680	23.796	0.000	0.25	8.164	11.5	OK
9.000	30 minute 2 year Summer I+0%	25.340	24.762	0.000	0.11	0.413	0.6	OK
9.001	30 minute 2 year Summer I+0%	26.130	24.531	0.000	0.22	0.825	1.2	OK
10.000	30 minute 2 year Summer I+0%	25.360	24.780	0.000	0.09	0.412	0.7	OK
9.002	30 minute 2 year Summer I+0%	25.850	24.421	0.000	0.35	3.712	5.3	OK
5.006	30 minute 2 year Summer I+0%	25.290	23.647	0.000	0.42	11.872	16.8	OK
1.004	30 minute 2 year Summer I+0%	25.600	23.499	0.000	0.28	19.788	28.2	OK
11.000	30 minute 2 year Summer I+0%	24.510	23.925	0.000	0.06	0.412	0.7	OK
1.005	30 minute 2 year Summer I+0%	24.510	23.359	0.000	0.64	26.072	36.3	OK

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Event	US/CL (m)	Water Level (m)	Flooded Volume (m³)	Flow / Cap.	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.006	30 minute 2 year Summer I+0%	24.510	23.351	0.000	0.84	26.070	36.2	OK
1.007	30 minute 2 year Summer I+0%	24.660	23.268	0.000	0.65	26.075	36.2	OK
1.008	600 minute 2 year Winter I+0%	24.660	22.311	0.000	0.02	44.618	0.8	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 621354 162082 TR 21354 62082 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 20

PN	Event	US/CL (m)	Water Level (m)	Flooded Volume (m³)	Flow / Cap.	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	30 minute 30 year Summer I+0%	25.440	24.888	0.000	0.46	1.699	2.7	OK
1.001	30 minute 30 year Summer I+0%	25.440	24.710	0.000	1.02	3.398	5.3	SURCHARGED
2.000	30 minute 30 year Summer I+0%	25.740	25.196	0.000	0.61	3.400	5.4	OK
1.002	30 minute 30 year Summer I+0%	25.540	24.573	0.000	0.31	6.797	10.7	OK
3.000	30 minute 30 year Summer I+0%	25.660	25.081	0.000	0.10	0.566	0.9	OK
3.001	30 minute 30 year Summer I+0%	25.390	24.812	0.000	0.11	1.133	1.8	OK
4.000	30 minute 30 year Summer I+0%	24.760	24.186	0.000	0.16	0.566	0.9	OK
4.001	30 minute 30 year Summer I+0%	24.990	24.079	0.000	0.32	1.133	1.8	OK
1.003	30 minute 30 year Summer I+0%	24.960	23.967	0.000	0.65	10.195	15.5	OK
5.000	30 minute 30 year Summer I+0%	25.100	24.534	0.000	0.25	0.944	1.5	OK
5.001	30 minute 30 year Summer I+0%	25.100	24.317	0.000	0.52	1.889	3.0	OK
6.000	30 minute 30 year Summer I+0%	24.950	24.373	0.000	0.06	0.944	1.5	OK
5.002	30 minute 30 year Summer I+0%	25.100	24.147	0.000	0.41	3.210	5.1	OK
5.003	30 minute 30 year Summer I+0%	25.100	24.101	0.000	0.47	13.027	21.4	OK
7.000	30 minute 30 year Summer I+0%	25.160	24.281	0.000	0.10	0.944	1.5	OK
5.004	30 minute 30 year Summer I+0%	25.160	24.070	0.000	0.47	13.967	20.6	SURCHARGED
8.000	30 minute 30 year Summer I+0%	25.100	24.534	0.000	0.25	1.888	3.0	OK
5.005	30 minute 30 year Summer I+0%	25.680	24.024	0.000	0.58	18.686	27.0	SURCHARGED
9.000	30 minute 30 year Summer I+0%	25.340	24.774	0.000	0.25	0.944	1.5	OK
9.001	30 minute 30 year Summer I+0%	26.130	24.553	0.000	0.54	1.888	3.0	OK
10.000	30 minute 30 year Summer I+0%	25.360	24.790	0.000	0.20	0.944	1.5	OK
9.002	30 minute 30 year Summer I+0%	25.850	24.489	0.000	0.90	8.495	13.6	SURCHARGED
5.006	30 minute 30 year Summer I+0%	25.290	23.950	0.000	0.95	27.178	37.9	SURCHARGED
1.004	30 minute 30 year Summer I+0%	25.600	23.851	0.000	0.64	45.299	63.7	SURCHARGED
11.000	30 minute 30 year Summer I+0%	24.510	23.934	0.000	0.13	0.944	1.5	OK
1.005	30 minute 30 year Summer I+0%	24.510	23.712	0.000	1.46	59.659	83.0	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Event	US/CL (m)	Water Level (m)	Flooded Volume (m³)	Flow / Cap.	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.006	30 minute 30 year Summer I+0%	24.510	23.598	0.000	1.91	59.658	83.0	SURCHARGED
1.007	30 minute 30 year Summer I+0%	24.660	23.485	0.000	1.50	59.663	82.9	SURCHARGED
1.008	1440 minute 30 year Winter I+0%	24.660	23.015	0.000	0.02	143.924	1.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
FEH Rainfall Version 2013 Cv (Summer) 0.750
Site Location GB 621354 162082 TR 21354 62082 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 20

PN	Event	US/CL (m)	Water Level (m)	Flooded Volume (m³)	Flow / Cap.	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.000	30 minute 100 year Summer I+20%	25.440	24.903	0.000	0.71	2.647	4.2	OK
1.001	30 minute 100 year Summer I+20%	25.440	24.780	0.000	1.63	5.294	8.4	SURCHARGED
2.000	30 minute 100 year Summer I+20%	25.740	25.217	0.000	0.94	5.297	8.4	OK
1.002	30 minute 100 year Summer I+20%	25.540	24.602	0.000	0.49	10.589	16.7	OK
3.000	30 minute 100 year Summer I+20%	25.660	25.087	0.000	0.16	0.883	1.4	OK
3.001	30 minute 100 year Summer I+20%	25.390	24.818	0.000	0.18	1.765	2.8	OK
4.000	30 minute 100 year Summer I+20%	24.760	24.505	0.000	0.33	0.882	1.9	FLOOD RISK
4.001	30 minute 100 year Summer I+20%	24.990	24.495	0.000	0.67	1.767	3.9	SURCHARGED
1.003	30 minute 100 year Summer I+20%	24.960	24.469	0.000	0.94	15.882	22.5	SURCHARGED
5.000	30 minute 100 year Summer I+20%	25.100	24.700	0.000	0.37	1.470	2.2	SURCHARGED
5.001	30 minute 100 year Summer I+20%	25.100	24.678	0.000	0.83	2.941	4.8	SURCHARGED
6.000	30 minute 100 year Summer I+20%	24.950	24.639	0.000	0.09	1.471	2.3	SURCHARGED
5.002	30 minute 100 year Summer I+20%	25.100	24.633	0.000	0.72	4.999	9.0	SURCHARGED
5.003	30 minute 100 year Summer I+20%	25.100	24.623	0.000	0.58	20.293	25.9	SURCHARGED
7.000	30 minute 100 year Summer I+20%	25.160	24.554	0.000	0.15	1.471	2.1	SURCHARGED
5.004	30 minute 100 year Summer I+20%	25.160	24.546	0.000	0.59	21.758	26.2	SURCHARGED
8.000	30 minute 100 year Summer I+20%	25.100	24.543	0.000	0.39	2.942	4.7	OK
5.005	30 minute 100 year Summer I+20%	25.680	24.459	0.000	0.76	29.107	35.4	SURCHARGED
9.000	30 minute 100 year Summer I+20%	25.340	25.174	0.000	0.42	1.470	2.4	FLOOD RISK
9.001	30 minute 100 year Summer I+20%	26.130	25.155	0.000	0.93	2.941	5.3	SURCHARGED
10.000	30 minute 100 year Summer I+20%	25.360	25.136	0.000	0.33	1.470	2.5	FLOOD RISK
9.002	30 minute 100 year Summer I+20%	25.850	25.117	0.000	1.03	13.234	15.4	SURCHARGED
5.006	30 minute 100 year Summer I+20%	25.290	24.347	0.000	1.31	42.336	52.4	SURCHARGED
1.004	30 minute 100 year Summer I+20%	25.600	24.217	0.000	0.89	70.561	88.1	SURCHARGED
11.000	1440 minute 100 year Winter I+20%	24.510	24.061	0.000	0.02	5.876	0.2	SURCHARGED
1.005	1440 minute 100 year Winter I+20%	24.510	24.061	0.000	0.19	371.086	10.9	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	Event	US/CL (m)	Water Level (m)	Flooded Volume (m³)	Flow / Cap.	Discharge Vol (m³)	Pipe Flow (l/s)	Status
1.006	1440 minute 100 year Winter I+20%	24.510	24.061	0.000	0.25	370.918	10.9	SURCHARGED
1.007	1440 minute 100 year Winter I+20%	24.660	24.060	0.000	0.20	370.656	10.9	SURCHARGED
1.008	1440 minute 100 year Winter I+20%	24.660	24.060	0.000	0.03	191.895	1.4	SURCHARGED

APPENDIX C

Separator Installation & Maintenance Literature

Kingspan Environmental Service Contact Numbers:

GB: 0844 846 0500

NI: 028 3025 4077

IRL: 048 3025 4077

Enclosed Documents

DS0848P	**NSFA010 – NSFA015 Class 1 & 2 Full Retention Separators**

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 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 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.

CE

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

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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 efficency	Passed

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Appendices

Separator Maintenance Log

1.0 Introduction

These Guidelines represent Best Practice for the installation of the above Kingspan 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 Kingspan 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 Kingspan 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. Kingspan accept no responsibility for the selection of lifting equipment.

2.7. Whenever Kingspan 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. Kingspan 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 Kingspan 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 they're 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. There is no suitable facility to effectively sample the waste water from inside the unit. 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. (If required)

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	REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS
	C25 /30	REINFORCED (EG. FOR HIGH WATER TABLE)
	C16 /20	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 225mm 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 then unit, then lower the unit onto the haunch using suitable webbing slings and lifting equipment.

5.4. Locate the float valve in the coalescer unit. 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 **Kingspan 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 flexseal 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

Kingspan 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 Kingspan supply an extension shaft to meet a deeper invert requirement, a coalescer extension 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)
NSFA010	100 litres	55mm
NSFA015	150 litres	45mm

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 Class 1 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 Class 2 units do not include replaceable media

7.4 Both Class I and class 2 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 thorough the unit. The unit **MUST** be emptied after the closure device has operated. The coalescer media should be inspected and changed if fouled.

7.5 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.**

7.6 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 Kingspan Technical Sales Department for suitable alternative equipment.

8.0 Maintenance

Separated light liquid **must** be removed from 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 where fitted, 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, if fitted, 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. If an alarm is fitted, it 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.
NSFA010	11 kg	21 kg	≈ 30 Kg	402672
NSFA015	11 kg	21 kg	≈ 30 Kg	402672

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. Core tube from standard invert units may generally be lifted by hand, but should you suspect that the coalescer media be silted, additional lifting equipment should be employed.

8.20. Removing the coalescer assembly.

8.21. A hand hold cutout is provided in the top of the coalescer tube. When the unit is installed the coalescer tube is bolted to the neck. Deeper invert units are provided with a coalescer tube extension of the appropriate length. The coalescer tube must be bolted in place during use.

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. Bolt core tube into place, 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

Kingspan Environmental

Site address/location ....
....

Separator location ....
....

Type of separator ....

Nominal Flow ....

Total capacity ....

Inspection/ Maintenance Date	Comments	Waste Volumes Removed (if appropriate)