NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
4601	42.17	36.55
581C	n/a	n/a
581G	n/a	n/a
5808	n/a	n/a
5801	42.26	40.55
5802	41.44	36.26
6806	42.4	41.63
681C	n/a	n/a
681B	n/a	n/a
681A	n/a	n/a
6701	48.39	46.1
6703	48.47	47.42
4605	41.83	40.34
5608	n/a	n/a
5605	46.65	45.95
5607	46.75	46.15
561A	n/a	n/a
5602	42.36	41.34
4604	42.08	40.56
471C	n/a	n/a
471B	n/a	n/a
4810	n/a	n/a
4812	n/a	n/a
481A	n/a	n/a
4807	n/a	n/a
4811	n/a	n/a
5703	n/a	n/a
571A	n/a	n/a
571B	n/a	n/a
581B	n/a	n/a
5701	43.1	36.9
5702	42.98	41.96
581D	n/a	n/a
581A	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Ancillary
- Drop Pipe
- Control Valve
- Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

- Inlet
- Outfall
- Undefined End

Other Symbols

Symbols used on maps which do not fall under other general categories.

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

- Casement

Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement.

If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0800 009 4540** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Print | Close Report

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	andrew wallace
Site name:	Fairfield
Site location:	Uxbridge

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.55188° N
Longitude:	0.47872° W
Reference:	3510935528
Date:	Jun 14 2022 12:37

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 0.069

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics	Default	Edited
SAAR (mm):	636	636
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

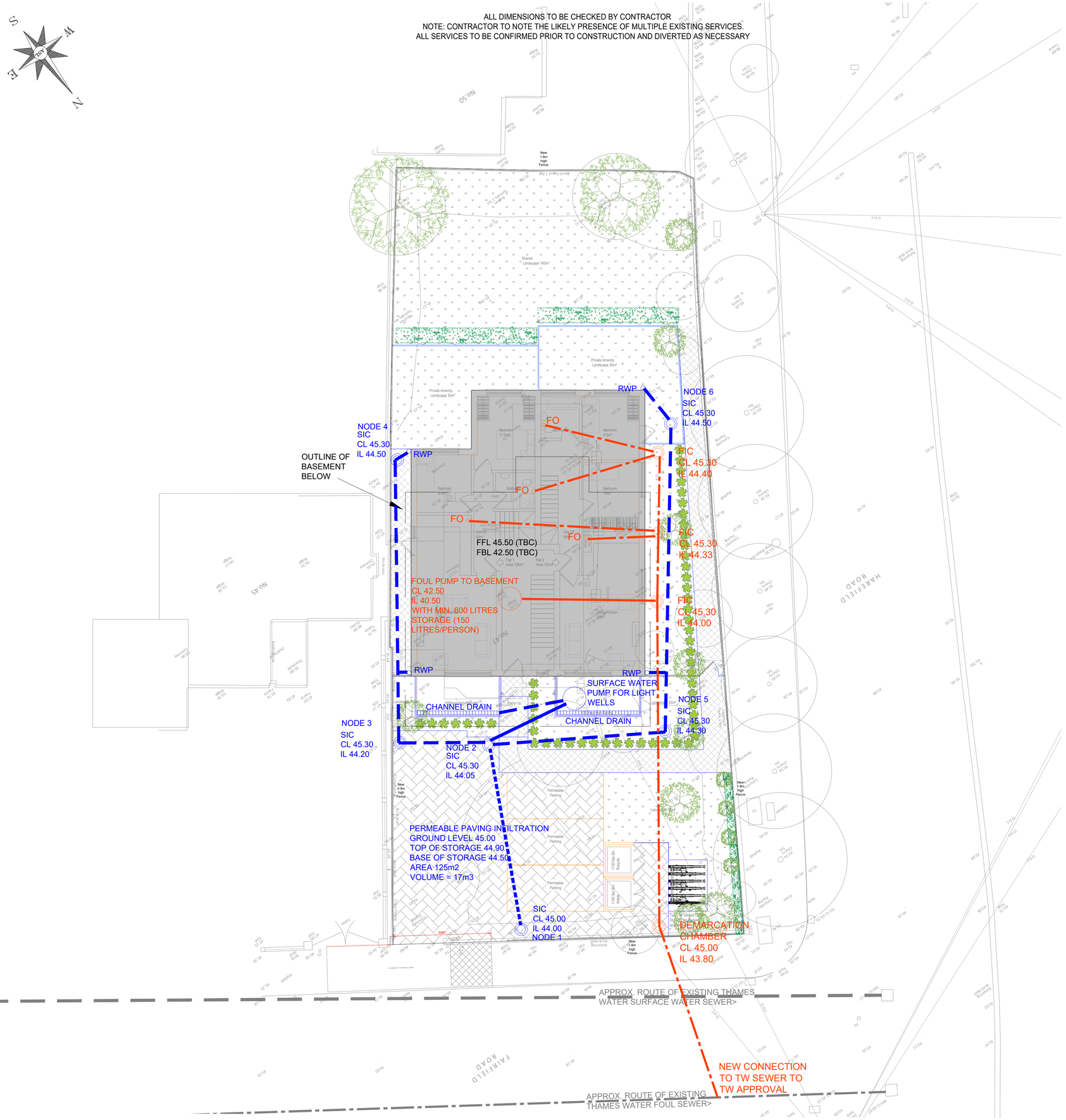
Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	0.11	0.11
1 in 1 year (l/s):	0.1	0.1
1 in 30 years (l/s):	0.26	0.26
1 in 100 year (l/s):	0.36	0.36
1 in 200 years (l/s):	0.42	0.42

ALL DIMENSIONS TO BE CHECKED BY CONTRACTOR
NOTE: CONTRACTOR TO NOTE THE LIKELY PRESENCE OF MULTIPLE EXISTING SERVICES.
ALL SERVICES TO BE CONFIRMED PRIOR TO CONSTRUCTION AND DIVERTED AS NECESSARY



DRAINAGE CONCEPT LEGEND

Ø100@1:100>	Stormwater Pipe - Diameter and fall
Ø100@1:100>	Perforated Pipe
Ø80>	Rising Main
FWIC Ø450	Polypropylene Inspection Chamber (PPIC)
Ø150@1:100>	Foul Pipe - Diameter and fall
Ø80>	Rising Main
FWIC Ø450	Polypropylene Inspection Chamber (PPIC)
FO	Sewer Vent Pipe/Sub Stack/Outlet
18.30+	Proposed Level
FFL 80.90	Finished floor level
Ø150@1:100>	Ex. Foul Pipe - Diameter and fall
Ø100@1:100>	Ex. SW Pipe - Diameter and fall
	Permeable Paving

Job No. **P4308JJ2590** Rev.

DRAINAGE NOTES

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5. ALL EXISTING SERVICES ARE TO BE LOCATED PRIOR TO THE COMMENCEMENT OF ANY WORKS. THE CONTRACTOR MUST NOTIFY THE ENGINEER IMMEDIATELY OF ANY CONFLICT WITH THE PROPOSED WORKS.
6. THE GENERAL SPECIFICATION OF MATERIALS AND WORKMANSHIPS FOR THE CONSTRUCTION OF THE ACCESS ROAD, FOOTPATHS AND OTHER AREAS OF HARDSTANDING SHALL BE THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOLUME 1. SPECIFICATION OF HIGHWAY WORKS (SHW) PUBLISHED BY THE STATIONARY OFFICE.
7. ALL RWP AND FO SHOWN ARE INDICATIVE ONLY AND SUBJECT TO APPROVAL AND SETTING OUT BY THE ARCHITECT.
8. NODE NUMBERS REFER TO DRAINAGE MODEL
9. UNLESS NOTED OTHERWISE, PIPES TO BE:
   FOUL PIPES UNDER BUILDING Ø100@1:40,
   FOUL PIPES EXTERNAL Ø100@1:80,
   SURFACE WATER PIPES Ø150@1:100

Notes.

Key dimensions to be checked by engineer before major structural works commence on site.

1. This survey has been computed and drawn about O S National Grid.
2. All levels are in metres and relate to O S National Datum by GPS instruments.
3. This survey was measured for a scale of 1:100, any subsequent enlargements should be verified on site.

Amendments

Rev	Date		By	Chkd

JOMAS
ENGINEERING
ENVIRONMENTAL
Jomas Associates Ltd.
Unit 24 Sarum Complex,
Salisbury Road,
Uxbridge, UB8 2RZ

Client
Khakaria Properties Limited

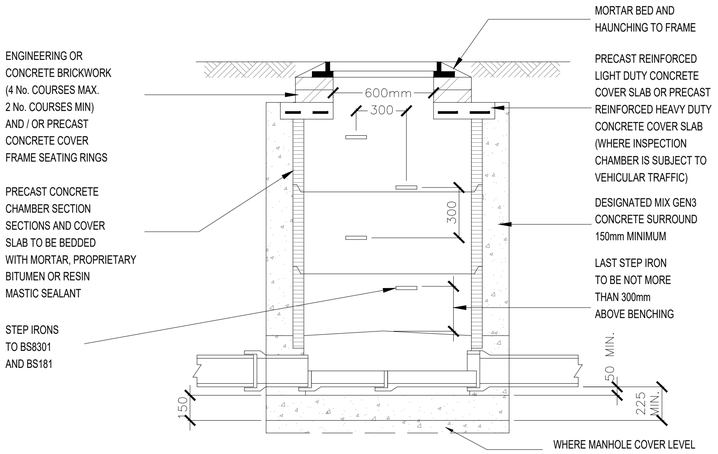
Project
47 Fairfield Road, Uxbridge
UB8 1AZ

Drawing
Proposed Drainage Plan

Dwg no	Checked	Surveyor
C01	AW	NA
Date 17.06.22	Scale 1:100 @ A1	
Job No. P4308JJ2590		Rev. -

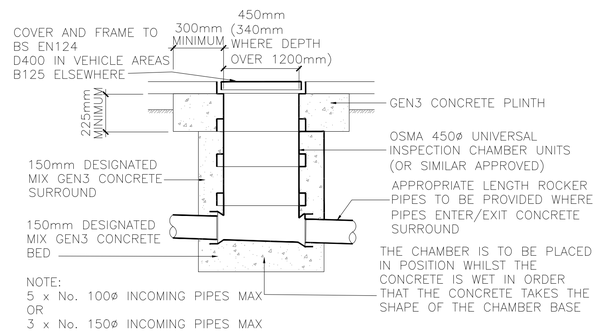
Grid	Contours	Level Datum

ALL DIMENSIONS TO BE CHECKED BY CONTRACTOR



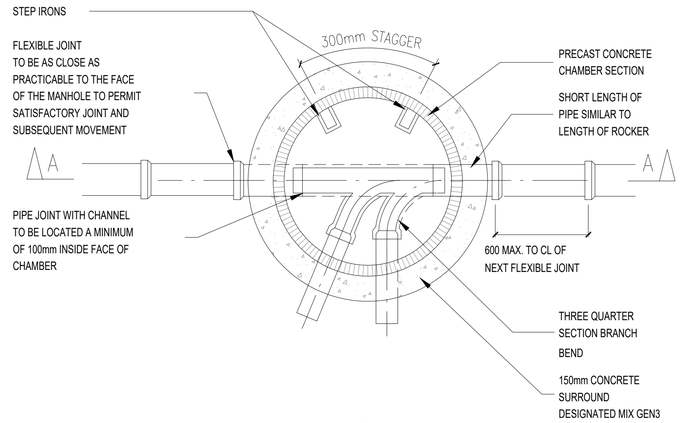
ALL MANHOLE BASE SLABS TO HAVE ONE LAYER A393 MESH CENTRALLY PLACED

SECTION A-A



EXTERNAL POLYPROPYLENE INSPECTION CHAMBER (PPIC)

MAXIMUM DEPTH TO INVERT OF CHAMBER TO BE 1200mm (3000mm FOR REDUCED ACCESS)
CUT TO INTERMEDIATE SIZES
SCALE 1:20



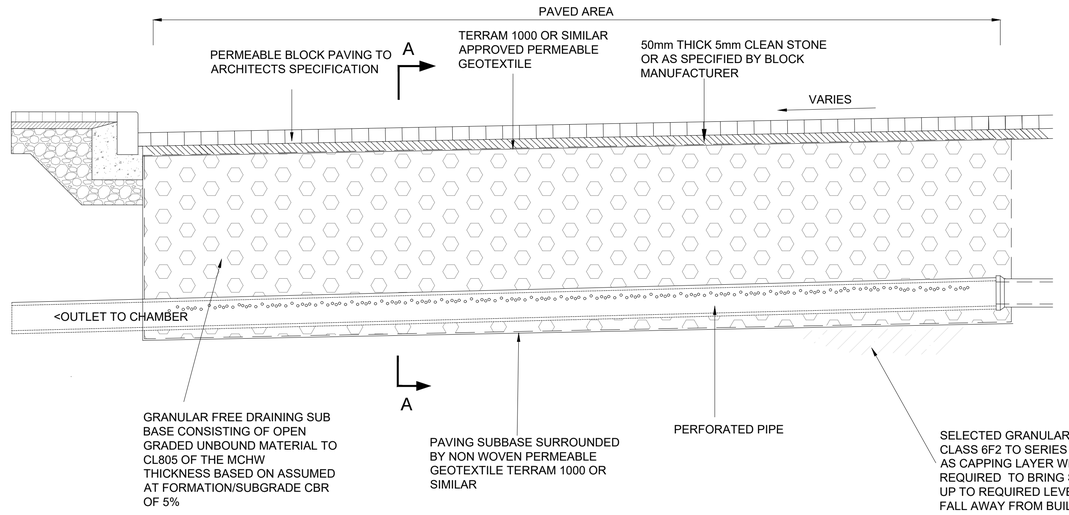
PLAN

PIPE DIAMETER	ROCKER PIPE * LENGTH
150mm-450mm	500mm-750mm
475mm-750mm	750mm-1000mm
OVER 750mm	1200mm

* OR LINTEL AND COMPRESSIBLE SEALANT IN ACCORDANCE WITH CLAUSE 689 OF THE SPECIFICATION.

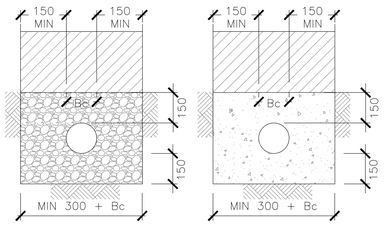
NOTES:
CHAMBERS WITH OUTGOING PIPES GREATER THAN 500mm DIAMETER SHALL BE FITTED WITH GUARD BARS, SAFETY CHAINS OR OTHER SAFETY DEVICES. TOE HOLES TO BE PROVIDED IN BENCHING OF SEWERS GREATER THAN 450mm DIAMETER FOR ACCESS TO INVERT. WHERE INTERNAL HEIGHT EXCEEDS 1800mm MANHOLE MAY BE PROVIDED WITH REDUCING COVER AND SHAFT. SHAFT DIAMETER TO BE 600mm DIAMETER OR 900mm DIAMETER IF LONGER THAN 900mm.

PRECAST CONCRETE MANHOLE TYPE B (PCC) IN EXTERNAL AREAS DETAIL



PERMEABLE PAVING DETAIL

SCALE 1:20



GENERAL PIPE BEDDING DETAIL

PIPE BEDDING DETAIL FOR ALL PIPES THAT PASS BELOW OR NEAR FOUNDATIONS, PIPES WITH LESS THAN 600mm COVER IN ALL EXTERNAL AREAS AND PIPES WITH LESS THAN 1200mm COVER BELOW ROADS AND DRIVEWAYS

SELECTED FILL: FREE FROM STONES LARGER THAN 40mm, LUMPS OF CLAY OVER 100mm, TIMBER, FROZEN MATERIAL, VEGETABLE MATTER.

GRANULAR MATERIAL: TO CONFORM TO BS EN 1610 ANNEX B TABLE B.15 AND SHOULD BE SINGLE SIZE MATERIAL OR GRADED MATERIAL FROM 5mm UP TO A MAXIMUM SIZE OF 10mm FOR 100mm PIPES, 14mm FOR 150mm PIPES, 20mm FOR PIPES FROM 150mm UP TO 600mm DIAMETER AND 40mm FOR PIPES MORE THAN 600mm DIAMETER.

GEN1 CONCRETE IN ACCORDANCE WITH BS 8500-1:2002.

NOTE:
PIPES LESS THAN 1200mm BELOW ROADS AND LESS THAN 600mm BELOW OTHER EXTERNAL AREAS SHALL HAVE A 150mm GEN1 CONCRETE SURROUND. OTHER THAN PIPES CAST WITHIN PILECAPS ALL PIPES BELOW SUSPENDED SLAB SHALL HAVE GRANULAR SURROUND AS SHOWN.

PIPE BEDDING DETAIL
SCALE 1:10

Job No.	P4308JJ2590	Rev.

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5. FOR GRAVITY SEWERS, ALL DRAINAGE AND FITTINGS ARE TO BE FLEXIBLY JOINTED UPVC TO BS EN 1401-1 OR CLAYWARE TO BS EN295 OR CONCRETE TO BS5911 PART 100
6. CHAMBER WALLS 225 THICK TO BE CONSTRUCTED IN CLASS B ENGINEERING BRICKS TO SHW SERIES 2400 IN DESIGNATION (i) MORTAR OR IN-SITU STRENGTH CLASS C16/20 CONCRETE TO CLAUSE 2602
7. CHAMBER WALLS AND COVER SLAB TO BE CONSTRUCTED IN PRECAST CONCRETE TO BS EN 1917 AND BS 5911-3.
8. CONCRETE MIXES INDICATED ON THIS DRAWING ARE DESIGNATED MIXES IN ACCORDANCE WITH BS8500-1:2006. ALL CONCRETE TO BE SULPHATE RESISTANT
9. BACKFILL TO ALL TRENCHES UNDER CARRIAGEWAYS TO BE TYPE 1 SUB-BASE MATERIAL, ELSEWHERE BACKFILL TO BE IN ACCORDANCE WITH THE SPECIFICATION, FREE DRAINING READILY COMPACTIBLE MATERIAL, FREE FROM RUBBISH AND ORGANIC MATTER, FROZEN SOIL CLAY LUMPS AND LARGE STONES. TO BE COMPACTED IN LAYERS NOT EXCEEDING 150mm THICK.
10. A FLEXIBLE JOINT SHALL BE PROVIDED AS CLOSE AS IS FEASIBLE TO OUTSIDE FACE OF ANY STRUCTURE INTO WHICH A PIPE IS BUILT, IN ACCORDANCE WITH THE DETAIL.
11. THE GENERAL SPECIFICATION OF MATERIALS AND WORKMANSHIPS FOR THE CONSTRUCTION OF THE ACCESS ROAD FOOTPATHS AND OTHER AREAS OF HARDSTANDING SHALL BE THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS, VOLUME 1. SPECIFICATION OF HIGHWAY WORKS (SHW) PUBLISHED BY THE STATIONARY OFFICE.
12. ALL PIPES TO BE LAID SOFFIT TO SOFFIT UNLESS NOTED OTHERWISE.
13. MANHOLE COVERS AND FRAMES SHALL COMPLY WITH BS EN124 AND SHALL BE OF A NON-ROCKING DESIGN WHICH DOES NOT RELY ON THE USE OF CUSHION INSERTS. CLASS D COVERS SHALL BE USED IN CARRIAGEWAYS, HARD SHOULDERS AND PARKING AREAS USED BY ALL TYPE OF ROAD VEHICLES. CLASS C SHALL BE USED IN FOOTWAYS, PEDESTRIAN AREAS AND ALL COMPARABLE LOCATIONS.

Notes.

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Amendments

Rev	Date		By	Chkd

JOMAS
ENGINEERING
ENVIRONMENTAL
Jomas Associates Ltd.
Unit 24 Sarum Complex,
Salisbury Road,
Uxbridge, UB8 2RZ

Client
Khakaria Properties Limited

Project
47 Fairfield Road, Uxbridge UB8 1AZ

Drawing
Proposed Drainage Details

Dwg no	Checked	Surveyor
C02	AW	NA
Date 17.06.22	Scale	AS SHOWN
Job No. P4308JJ2590		Rev. -
Grid	Contours	Level Datum

Job No. **P4308JJ2590** Rev.

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   FOUL PIPES UNDER BUILDING ø100@1:40,
   FOUL PIPES EXTERNAL ø100@1:80,
   SURFACE WATER PIPES ø150@1:100

STORMWATER CONCEPT LEGEND

18.30x	Proposed Level
FFL 80.90	Finished floor level
	Overland flow
	Escape Route

Notes.

Key dimensions to be checked by engineer before major structural works commence on site.

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Rev	Date		By	Chkd

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Jomas Associates Ltd.
Unit 24 Sarum Complex,
Salisbury Road,
Uxbridge, UB8 2RZ

Client
Khakaria Properties Limited

Project
47 Fairfield Road, Uxbridge
UB8 1AZ

Drawing
Proposed Overland Flow and Flood Compensation

Dwg no	Checked	Surveyor
C03	AW	ICELABZ
Date 17.06.22	Scale 1:200 @ A1	
Job No. **P4308JJ2590**		Rev. -
Grid	Contours	Level Datum

Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	10	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.020	2.00	45.000	450	50.000	50.000	1.000
2	0.005	2.00	45.300	450	50.000	60.000	1.250
3	0.005	2.00	45.300	450	45.000	60.000	1.100
4	0.005	2.00	45.300	450	45.000	75.000	0.800
5	0.005	2.00	45.300	450	55.000	60.000	1.000
6	0.005	2.00	45.300	450	55.000	75.000	0.800
overflow			45.000	1200	50.000	45.000	0.200

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.002	2	1	10.000	0.600	44.050	44.000	0.050	200.0	150	2.49	50.0
1.001	3	2	5.000	0.600	44.200	44.050	0.150	33.3	150	2.22	50.0
1.000	4	3	15.000	0.600	44.500	44.200	0.300	50.0	150	2.18	50.0
2.001	5	2	5.000	0.600	44.300	44.050	0.250	20.0	150	2.25	50.0
2.000	6	5	15.000	0.600	44.500	44.300	0.200	75.0	150	2.22	50.0
1.003	1	overflow	5.000	0.600	44.900	44.800	0.100	50.0	100	2.56	50.0

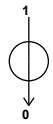
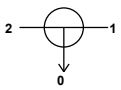
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.002	0.707	12.5	3.4	1.100	0.850	0.025	0.0	54	0.603
1.001	1.749	30.9	1.4	0.950	1.100	0.010	0.0	21	0.877
1.000	1.426	25.2	0.7	0.650	0.950	0.005	0.0	17	0.609
2.001	2.262	40.0	1.4	0.850	1.100	0.010	0.0	19	1.055
2.000	1.162	20.5	0.7	0.650	0.850	0.005	0.0	18	0.528
1.003	1.092	8.6	6.1	0.000	0.100	0.045	0.0	62	1.184

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.002	10.000	200.0	150	Circular	45.300	44.050	1.100	45.000	44.000	0.850
1.001	5.000	33.3	150	Circular	45.300	44.200	0.950	45.300	44.050	1.100
1.000	15.000	50.0	150	Circular	45.300	44.500	0.650	45.300	44.200	0.950
2.001	5.000	20.0	150	Circular	45.300	44.300	0.850	45.300	44.050	1.100
2.000	15.000	75.0	150	Circular	45.300	44.500	0.650	45.300	44.300	0.850
1.003	5.000	50.0	100	Circular	45.000	44.900	0.000	45.000	44.800	0.100

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.002	2	450	Manhole	Adoptable	1	450	Manhole	Adoptable
1.001	3	450	Manhole	Adoptable	2	450	Manhole	Adoptable
1.000	4	450	Manhole	Adoptable	3	450	Manhole	Adoptable
2.001	5	450	Manhole	Adoptable	2	450	Manhole	Adoptable
2.000	6	450	Manhole	Adoptable	5	450	Manhole	Adoptable
1.003	1	450	Manhole	Adoptable	overflow	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	50.000	50.000	45.000	1.000	450		1 0	1.002 1.003	44.000 44.900	150 100
2	50.000	60.000	45.300	1.250	450		1 2 0	2.001 1.001 1.002	44.050 44.050 44.050	150 150 150
3	45.000	60.000	45.300	1.100	450		1 0	1.000 1.001	44.200 44.200	150 150
4	45.000	75.000	45.300	0.800	450		0	1.000	44.500	150
5	55.000	60.000	45.300	1.000	450		1 0	2.000 2.001	44.300 44.300	150 150
6	55.000	75.000	45.300	0.800	450		0	2.000	44.500	150
overflow	50.000	45.000	45.000	0.200	1200		1	1.003	44.800	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	5.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
10	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.20000	Safety Factor	1.5	Invert Level (m)	44.500
Side Inf Coefficient (m/hr)	0.20000	Porosity	0.30	Time to half empty (mins)	30

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	125.0	125.0	0.400	125.0	125.0	0.401	1.0	125.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 41.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	38	44.520	0.520	3.4	0.9190	0.0000	OK
60 minute winter	2	40	44.521	0.471	2.0	0.0843	0.0000	SURCHARGED
60 minute winter	3	40	44.521	0.321	1.0	0.0584	0.0000	SURCHARGED
60 minute winter	4	40	44.521	0.021	0.4	0.0040	0.0000	OK
60 minute winter	5	40	44.521	0.221	1.1	0.0407	0.0000	SURCHARGED
15 minute summer	6	9	44.521	0.021	0.9	0.0041	0.0000	OK
15 minute summer	overflow	1	44.800	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	1	1.003	overflow	0.0	0.000	0.000	0.0000	0.0
60 minute winter	1	Infiltration		1.9				
60 minute winter	2	1.002	1	1.9	0.110	0.156	0.1760	
60 minute winter	3	1.001	2	0.8	0.276	0.025	0.0880	
60 minute winter	4	1.000	3	0.4	0.287	0.016	0.1435	
60 minute winter	5	2.001	2	0.8	0.317	0.020	0.0880	
15 minute summer	6	2.000	5	0.9	0.549	0.044	0.1389	

Results for 10 year Critical Storm Duration. Lowest mass balance: 41.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	21	44.553	0.553	9.2	2.1336	0.0000	OK
30 minute winter	2	20	44.555	0.505	5.1	0.0905	0.0000	SURCHARGED
30 minute winter	3	20	44.556	0.356	2.4	0.0647	0.0000	SURCHARGED
30 minute winter	4	20	44.556	0.056	1.1	0.0106	0.0000	OK
30 minute winter	5	20	44.556	0.256	2.7	0.0470	0.0000	SURCHARGED
30 minute winter	6	20	44.556	0.056	1.1	0.0106	0.0000	OK
15 minute summer	overflow	1	44.800	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1	1.003	overflow	0.0	0.000	0.000	0.0000	0.0
30 minute winter	1	Infiltration		4.6				
30 minute winter	2	1.002	1	4.9	0.279	0.394	0.1760	
30 minute winter	3	1.001	2	2.3	0.321	0.074	0.0880	
30 minute winter	4	1.000	3	1.3	0.386	0.050	0.1770	
30 minute winter	5	2.001	2	1.7	0.365	0.043	0.0880	
30 minute winter	6	2.000	5	1.1	0.434	0.056	0.1766	

Results for 30 year Critical Storm Duration. Lowest mass balance: 41.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	22	44.582	0.582	11.1	3.2332	0.0000	OK
30 minute winter	2	21	44.585	0.535	5.8	0.0957	0.0000	SURCHARGED
30 minute winter	3	21	44.585	0.385	2.5	0.0701	0.0000	SURCHARGED
30 minute winter	4	21	44.585	0.085	1.4	0.0161	0.0000	OK
30 minute winter	5	21	44.585	0.285	2.7	0.0524	0.0000	SURCHARGED
30 minute winter	6	21	44.585	0.085	1.4	0.0161	0.0000	OK
15 minute summer	overflow	1	44.800	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1	1.003	overflow	0.0	0.000	0.000	0.0000	0.0
30 minute winter	1	Infiltration		4.6				
30 minute winter	2	1.002	1	5.6	0.317	0.446	0.1760	
30 minute winter	3	1.001	2	2.2	0.324	0.071	0.0880	
30 minute winter	4	1.000	3	1.1	0.405	0.042	0.2090	
30 minute winter	5	2.001	2	2.2	0.369	0.054	0.0880	
30 minute winter	6	2.000	5	1.1	0.434	0.051	0.2091	

Results for 100 year Critical Storm Duration. Lowest mass balance: 41.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	23	44.628	0.628	14.6	4.9978	0.0000	OK
30 minute winter	2	22	44.631	0.581	7.5	0.1041	0.0000	SURCHARGED
30 minute winter	3	22	44.632	0.432	3.2	0.0786	0.0000	SURCHARGED
30 minute winter	4	22	44.632	0.132	1.9	0.0250	0.0000	OK
30 minute winter	5	22	44.632	0.332	3.1	0.0610	0.0000	SURCHARGED
30 minute winter	6	22	44.632	0.132	1.9	0.0250	0.0000	OK
15 minute summer	overflow	1	44.800	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1	1.003	overflow	0.0	0.000	0.000	0.0000	0.0
30 minute winter	1	Infiltration		4.6				
30 minute winter	2	1.002	1	7.3	0.413	0.582	0.1760	
30 minute winter	3	1.001	2	2.8	0.349	0.092	0.0880	
30 minute winter	4	1.000	3	1.3	0.405	0.053	0.2549	
30 minute winter	5	2.001	2	2.9	0.376	0.071	0.0880	
30 minute winter	6	2.000	5	1.3	0.450	0.065	0.2549	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 41.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	44	44.726	0.726	13.6	8.6692	0.0000	OK
60 minute winter	2	43	44.728	0.678	7.2	0.1214	0.0000	SURCHARGED
60 minute winter	3	43	44.729	0.529	3.0	0.0962	0.0000	SURCHARGED
60 minute winter	4	43	44.729	0.229	1.7	0.0435	0.0000	SURCHARGED
60 minute winter	5	43	44.729	0.429	3.0	0.0789	0.0000	SURCHARGED
60 minute winter	6	43	44.729	0.229	1.7	0.0435	0.0000	SURCHARGED
15 minute summer	overflow	1	44.800	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	1	1.003	overflow	0.0	0.000	0.000	0.0000	0.0
60 minute winter	1	Infiltration		4.6				
60 minute winter	2	1.002	1	7.0	0.400	0.564	0.1760	
60 minute winter	3	1.001	2	2.8	0.321	0.091	0.0880	
60 minute winter	4	1.000	3	1.4	0.405	0.056	0.2641	
60 minute winter	5	2.001	2	2.8	0.365	0.070	0.0880	
60 minute winter	6	2.000	5	1.4	0.415	0.068	0.2641	

Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	10	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.020	2.00	45.000	1200	50.000	50.000	1.000
2	0.005	2.00	45.300	450	50.000	60.000	1.250
3	0.005	2.00	45.300	450	45.000	60.000	1.100
4	0.005	2.00	45.300	450	45.000	75.000	0.800
5	0.005	2.00	45.300	450	55.000	60.000	1.000
6	0.005	2.00	45.300	450	55.000	75.000	0.800
overflow			45.000	1200	50.000	45.000	1.100

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.002	2	1	10.000	0.600	44.050	44.000	0.050	200.0	150	2.49	50.0
1.001	3	2	5.000	0.600	44.200	44.050	0.150	33.3	150	2.22	50.0
1.000	4	3	15.000	0.600	44.500	44.200	0.300	50.0	150	2.18	50.0
2.001	5	2	5.000	0.600	44.300	44.050	0.250	20.0	150	2.25	50.0
2.000	6	5	15.000	0.600	44.500	44.300	0.200	75.0	150	2.22	50.0
1.003	1	overflow	5.000	0.600	44.000	43.900	0.100	50.0	100	2.56	50.0

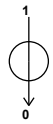
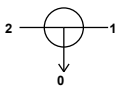
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.002	0.707	12.5	3.4	1.100	0.850	0.025	0.0	54	0.603
1.001	1.749	30.9	1.4	0.950	1.100	0.010	0.0	21	0.877
1.000	1.426	25.2	0.7	0.650	0.950	0.005	0.0	17	0.609
2.001	2.262	40.0	1.4	0.850	1.100	0.010	0.0	19	1.055
2.000	1.162	20.5	0.7	0.650	0.850	0.005	0.0	18	0.528
1.003	1.092	8.6	6.1	0.900	1.000	0.045	0.0	62	1.184

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.002	10.000	200.0	150	Circular	45.300	44.050	1.100	45.000	44.000	0.850
1.001	5.000	33.3	150	Circular	45.300	44.200	0.950	45.300	44.050	1.100
1.000	15.000	50.0	150	Circular	45.300	44.500	0.650	45.300	44.200	0.950
2.001	5.000	20.0	150	Circular	45.300	44.300	0.850	45.300	44.050	1.100
2.000	15.000	75.0	150	Circular	45.300	44.500	0.650	45.300	44.300	0.850
1.003	5.000	50.0	100	Circular	45.000	44.000	0.900	45.000	43.900	1.000

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.002	2	450	Manhole	Adoptable	1	1200	Manhole	Adoptable
1.001	3	450	Manhole	Adoptable	2	450	Manhole	Adoptable
1.000	4	450	Manhole	Adoptable	3	450	Manhole	Adoptable
2.001	5	450	Manhole	Adoptable	2	450	Manhole	Adoptable
2.000	6	450	Manhole	Adoptable	5	450	Manhole	Adoptable
1.003	1	1200	Manhole	Adoptable	overflow	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	50.000	50.000	45.000	1.000	1200		1 0	1.002 1.003	44.000 44.000	150 100
2	50.000	60.000	45.300	1.250	450		1 2 0	2.001 1.001 1.002	44.050 44.050 44.050	150 150 150
3	45.000	60.000	45.300	1.100	450		1 0	1.000 1.001	44.200 44.200	150 150
4	45.000	75.000	45.300	0.800	450		0	1.000	44.500	150
5	55.000	60.000	45.300	1.000	450		1 0	2.000 2.001	44.300 44.300	150 150
6	55.000	75.000	45.300	0.800	450		0	2.000	44.500	150
overflow	50.000	45.000	45.000	1.100	1200		1	1.003	43.900	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	5.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
10	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	44.000	Product Number	CTL-SHE-0067-2000-1000-2000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.20000	Safety Factor	1.5	Invert Level (m)	44.500
Side Inf Coefficient (m/hr)	0.20000	Porosity	0.30	Time to half empty (mins)	14

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	125.0	125.0	0.400	125.0	125.0	0.401	1.0	125.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 96.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	13	44.381	0.381	4.3	0.4684	0.0000	SURCHARGED
15 minute winter	2	13	44.383	0.333	3.8	0.0597	0.0000	SURCHARGED
15 minute winter	3	13	44.385	0.185	1.6	0.0337	0.0000	SURCHARGED
15 minute summer	4	9	44.519	0.019	0.9	0.0037	0.0000	OK
15 minute winter	5	13	44.383	0.083	2.5	0.0153	0.0000	OK
15 minute summer	6	9	44.522	0.022	0.9	0.0041	0.0000	OK
15 minute summer	overflow	1	43.900	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	Hydro-Brake®	overflow	2.0				2.9
15 minute winter	1	Infiltration		0.0				
15 minute winter	2	1.002	1	1.7	0.207	0.136	0.1760	
15 minute winter	3	1.001	2	1.5	0.320	0.049	0.0880	
15 minute summer	4	1.000	3	0.9	0.547	0.036	0.1378	
15 minute winter	5	2.001	2	1.6	0.365	0.040	0.0690	
15 minute summer	6	2.000	5	0.9	0.575	0.044	0.0435	

Results for 10 year Critical Storm Duration. Lowest mass balance: 96.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	21	44.529	0.529	9.9	1.7680	0.0000	SURCHARGED
15 minute winter	2	10	44.533	0.483	6.9	0.0865	0.0000	SURCHARGED
15 minute winter	3	10	44.536	0.336	5.7	0.0611	0.0000	SURCHARGED
15 minute summer	4	10	44.542	0.042	1.8	0.0080	0.0000	OK
15 minute winter	5	10	44.535	0.235	6.5	0.0433	0.0000	SURCHARGED
15 minute summer	6	10	44.541	0.041	1.8	0.0078	0.0000	OK
15 minute summer	overflow	1	43.900	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1	Hydro-Brake®	overflow	2.0				5.6
30 minute winter	1	Infiltration		2.7				
15 minute winter	2	1.002	1	6.4	0.363	0.511	0.1760	
15 minute winter	3	1.001	2	-3.2	0.350	-0.104	0.0880	
15 minute summer	4	1.000	3	1.8	0.578	0.071	0.1624	
15 minute winter	5	2.001	2	-3.3	0.375	-0.083	0.0880	
15 minute summer	6	2.000	5	1.8	0.648	0.088	0.1612	

Results for 30 year Critical Storm Duration. Lowest mass balance: 96.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	21	44.550	0.550	12.1	2.5685	0.0000	SURCHARGED
30 minute winter	2	20	44.557	0.507	6.6	0.0907	0.0000	SURCHARGED
30 minute winter	3	20	44.557	0.357	3.3	0.0650	0.0000	SURCHARGED
15 minute winter	4	10	44.560	0.060	2.0	0.0115	0.0000	OK
30 minute winter	5	20	44.557	0.257	3.7	0.0473	0.0000	SURCHARGED
15 minute winter	6	10	44.561	0.061	2.0	0.0117	0.0000	OK
15 minute summer	overflow	1	43.900	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1	Hydro-Brake®	overflow	2.0				5.9
30 minute winter	1	Infiltration		4.6				
30 minute winter	2	1.002	1	6.4	0.366	0.516	0.1760	
30 minute winter	3	1.001	2	2.7	0.338	0.087	0.0880	
15 minute winter	4	1.000	3	2.3	0.505	0.092	0.1818	
30 minute winter	5	2.001	2	2.5	0.366	0.062	0.0880	
15 minute winter	6	2.000	5	2.5	0.580	0.121	0.1828	

Results for 100 year Critical Storm Duration. Lowest mass balance: 96.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	22	44.588	0.588	14.7	4.0423	0.0000	SURCHARGED
15 minute winter	2	11	44.597	0.547	10.2	0.0978	0.0000	SURCHARGED
15 minute winter	3	10	44.599	0.399	5.0	0.0727	0.0000	SURCHARGED
15 minute winter	4	10	44.602	0.102	2.8	0.0194	0.0000	OK
15 minute winter	5	10	44.599	0.299	5.2	0.0551	0.0000	SURCHARGED
15 minute winter	6	10	44.602	0.102	2.7	0.0194	0.0000	OK
15 minute summer	overflow	1	43.900	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1	Hydro-Brake®	overflow	2.0				6.4
30 minute winter	1	Infiltration		4.6				
15 minute winter	2	1.002	1	10.2	0.582	0.820	0.1760	
15 minute winter	3	1.001	2	3.8	0.393	0.123	0.0880	
15 minute winter	4	1.000	3	1.9	0.548	0.076	0.2279	
15 minute winter	5	2.001	2	3.8	0.447	0.095	0.0880	
15 minute winter	6	2.000	5	1.9	0.626	0.093	0.2278	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 96.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	24	44.674	0.674	20.5	7.3804	0.0000	SURCHARGED
15 minute winter	2	10	44.682	0.632	14.4	0.1132	0.0000	SURCHARGED
15 minute winter	3	10	44.690	0.490	6.1	0.0892	0.0000	SURCHARGED
15 minute winter	4	10	44.695	0.195	3.7	0.0370	0.0000	SURCHARGED
15 minute winter	5	10	44.690	0.390	7.6	0.0718	0.0000	SURCHARGED
15 minute winter	6	10	44.695	0.195	3.7	0.0370	0.0000	SURCHARGED
15 minute summer	overflow	1	43.900	0.000	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1	Hydro-Brake®	overflow	2.0				7.7
30 minute winter	1	Infiltration		4.6				
15 minute winter	2	1.002	1	13.8	0.782	1.102	0.1760	
15 minute winter	3	1.001	2	5.5	0.422	0.179	0.0880	
15 minute winter	4	1.000	3	2.8	0.538	0.113	0.2641	
15 minute winter	5	2.001	2	5.5	0.481	0.139	0.0880	
15 minute winter	6	2.000	5	2.8	0.600	0.138	0.2641	

Appendix D: SuDS Details and Maintenance Report

INSTALLATION GUIDANCE NOTES

Dutypoint Systems

T06, T10, T15 & T18 Series Polyethylene Underground Tanks

INSTALLATION INSTRUCTIONS

Check list before installation

IMPORTANT NOTE

Installation of this Pumping Station must be undertaken only by suitably qualified and experienced personnel. Use only the appropriately certificated tradesmen for each major task – e.g: Registered Plumbers and NICEIC registered Electricians.

Having selected the site for the Pumping Station, check with all available maps and plans to ensure there are no concealed obstructions, existing pipes, cables, trunking, etc. that cross or impinge on the site. A physical survey should also be carried out.

Ask your Local Authority if in doubt.

NOTE: Installing a Pumping Station usually requires formal approval from the appropriate department of your Local Authority. It is the responsibility of the Landowner (or Site Management) – not the Contractor or Pumping Station supplier - to ensure that this consent is obtained in writing prior to commencing installation.

Pre-survey of the site will also reveal any potential difficulties with flooding caused by the water table itself, run-off drainage from surrounding areas, ground saturation in storm conditions, or tidal conditions (if appropriate).

- Maximum groundwater depth of 2m from base of tank must not be exceeded. Only standard size tanks should be used where there is groundwater present.

Where it is necessary to install the Pumping Station in ground where there are potential flooding problems, care should be taken to ensure that the tank cannot be forced out of the ground by the upward pressure of any ground water in the excavation. It should be noted that tanks such as those used in packaged Pumping Stations will, when empty, float on as little as 50mm (2") of water, and the upward thrust of that tank fully immersed in water can be surprisingly high. For sites where the water table is above the bottom of the tank, the use of cement slurry as a bed will prevent the base of the tank from buckling. In any case, always ensure that:

- There is no damage to the tank. Inspect carefully for any damage from contact with sharp objects or by mishandling during transport to site or off-loading.
- The Pumping Station will be so positioned that the inlet pipeline connection is at least 700mm above the base of the tank.
- The tank is surrounded in concrete to the top.

Electrics

Ascertain from which outlet the power supply for the Pumping Station will be supplied. Ideally this should be a dedicated fused outlet, capable of isolation in emergencies and must be adequate to meet the rated load of the station – *see the detailed specification sheet which accompanies the pumping station.*

Installation Guidance Notes

The following installation check list should not be regarded as site-specific. It is not definitive, as each installation /site is unique in some way. Please therefore also refer to the detailed specification sheet which accompanies the Pumping Station and read it in conjunction with these guidance notes.

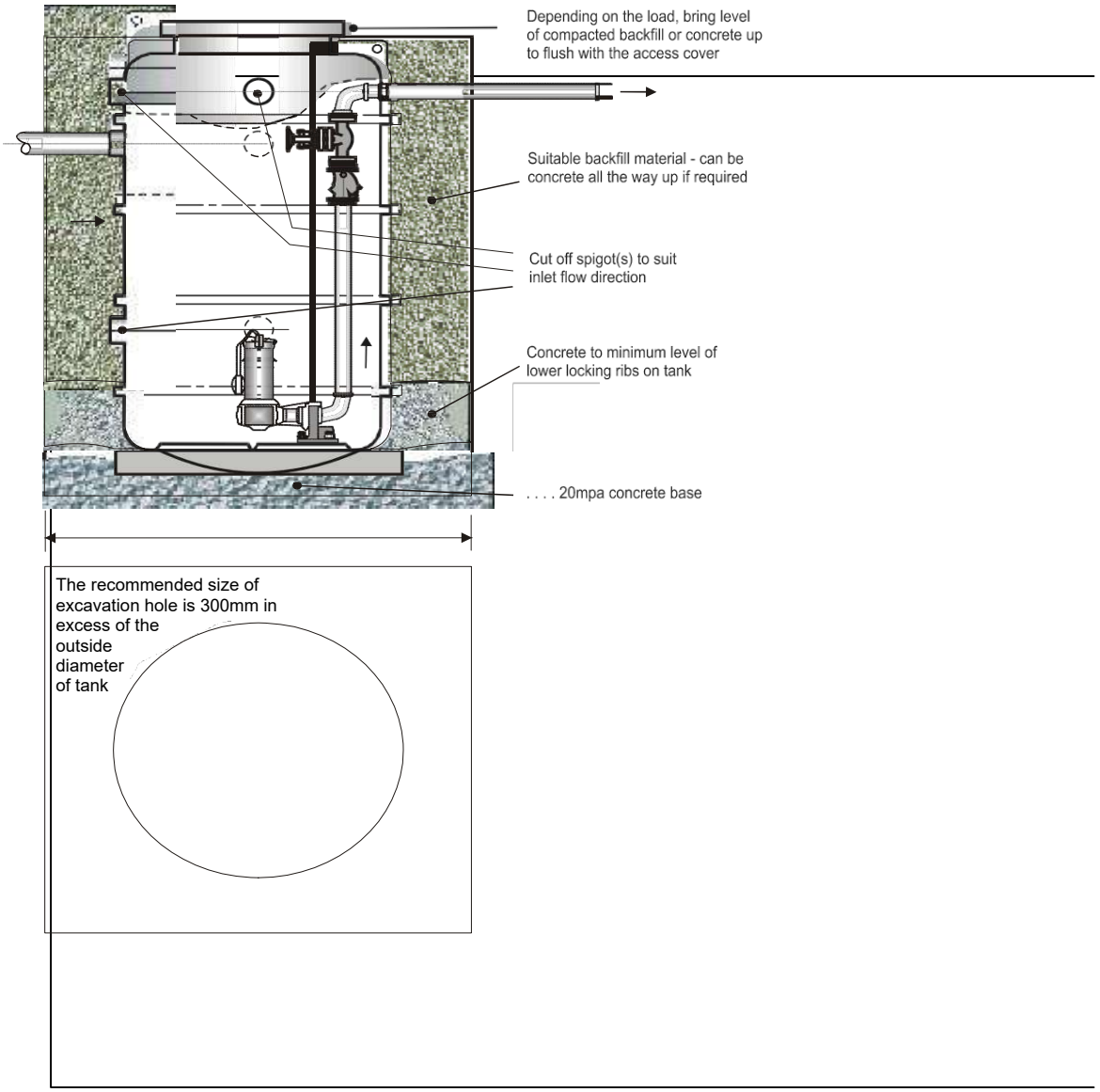


Fig 1: Typical installation sketch with backfill notes

1. Check the depth (invert) of the inlet pipe as this will determine the excavation depth –*see tank inlet specification.* In any case the minimum height from the bottom of the tank to the underside of the inlet pipe must be 600mm (24”).

2. The recommended size of the excavation hole should be 300mm (12”) more than that of the tank.

3. Lay a minimum of 100mm (4”) of 20mpa concrete in the bottom of the excavation hole if there is no potential water ingress or flooding problem.

4. Whilst the base cement or concrete is still slurry – and using suitable lifting equipment - lower the Pumping Station gently onto the base, ensuring that no stones or other sharp objects are allowed to fall in at the same time, or damage to the tank may result.

5. Once the tank is roughly in place, check for level and position, and adjust / prop as necessary before leaving it for the slurry to set, ensuring that the top of the excavation is covered with a tarpaulin or suitable PE sheeting to protect it from rain or wildlife.

6. Fill the tank with water up to and over the first rib - or in any case, at least 300 - 400mm (12 – 16") in depth.

7. Ensuring the tank is secure on its base – and will not move laterally – pour concrete up to at least the level of the first reinforcing rib on the tank – *see note to Step 8 below.*

8. Make all pipework connections for inlet and discharge pipework. Note that the Pump Chamber should be vented from one of the 110mm spigot pipe connections below the access cover. A 110mm cable duct is required between the pump chamber and the control panel location and should be connected to one of the 110mm spigot pipe connections just below the manhole cover. A draw cord should be installed and secured in the duct during installation. Check that the pipework connections to and from the tank are secure and leak free, and ensure that all unused connections are plugged and properly sealed.

   NOTE: Local regulations and site conditions will determine whether concrete should be used further up than the first rib, or simply a suitable backfill material (e.g. sand or pea-shingle which will compact easily). **It is recommended that no backfilling is undertaken until formal approval of the installation has been obtained from the Building Inspector.**

9. Finish around the tank top at ground level, ensuring the area is adequately protected from access by vehicles or wildlife (e.g. secure fencing) – *see specification sheet for details of cover (lid) used and its load rating.*

10. If the tank is sited in a driveway it must be surrounded in concrete, and a reinforced concrete slab (min. 200mm thick) must be used to spread the load away from the tank on to a firm surround.

Extra inlet installation.

Drill 140mm for 110mm diameter pipe with whole saw available from Dutypoint Ltd, and clean off burr.

Insert V-Tank wall seal into hole.

Once the wall seal is in place the pipe can be inserted into the seal. The seal can be sprayed with soapy water to ease pipe installation.

Note: Larger size wall seals are available.

Dutypoint Systems

Dutypoint Limited, Shepherd Road, Gloucester, GL2 5EL
T: +44(0)1452 300592 **E:** sales@dutypoint.com
www.dutypoint.com

July 2019

DELTA MEMBRANE SYSTEMS LTD
BASEMENT PUMP & DRAINAGE

DELTA MEMBRANES

01992 523 523 | info@deltamembranes.com | www.deltamembranes.com

CONTENTS

DELTA MEMBRANES

Delta Membrane Systems Limited is the leading Type C Cavity Drain Membrane Manufacturer in the United Kingdom. Our extensive range of waterproofing and damp proofing products are suitable for basement drainage and structural waterproofing (both for new build and existing structures) and in flood resilience projects.

Installing a Delta Membrane System offers complete protection to structures from ground water ingress and contaminates. Our products comply with British Standard BS 8102:2009 and are BBA Certified. Our dedicated Technical Team offer knowledge and experience in waterproofing design solutions and can provide on-site assistance and advice throughout a project.

BS 8102:2009 (Code of Practice for Protection of Below Ground Structures Against Water from the Ground) recommends that every Design Team should incorporate a Waterproofing Design Specialist.

Delta Membrane Systems Limited has a dedicated team of Waterproofing Design Specialists. Our trusted Technical Team offer knowledge and experience and are able to provide expertise in structural waterproofing. As a Waterproofing Specialist Manufacturer, we work with architects, surveyors, contractors and engineers alike to provide a design service which complies with BS 8102:2009 and offers the highest level of technical expertise and assurance.

SERVICES

Delta Membrane Systems Limited provides a full range of waterproofing solutions suitable for all new, retrofit and refurbishment construction. With over 125 years of manufacturing experience, Delta is an impeccable partner on every project. Our skills have been mastered through experience in the waterproofing industry. Delta's trusted Technical Team will offer assistance from concept to completion. Our hands on approach and knowledge is what sets us apart.

DESIGN SUPPORT

- Architecture knowledge
- Concept and waterproofing solutions
- Advice on design and best practice
- Custom solutions, as each project is unique in requirements
- Qualified CSSW staff (named on the Waterproofing Design Register)

SPECIFICATION SUPPORT

- Detailed drawings including CAD
- Watertight and locking down structure concepts
- Specifications
- BIM
- NBS Plus
- RIBA Product Selector

SITE SUPPORT

- Training and guidance offered at every step
- Technical Team attendance at site meetings
- Knowledge and experience
- Troubleshooting solutions

BASEMENT PROTECTION

One of the main design considerations when designing a Cavity Drain System is to consider managing the collection and discharge of ground and/or foul water.

The majority of projects will require a collection sump + pump to automatically manage the evacuation of water ingress. A sump + pump solution will require mains power to operate.

Peace of mind is offered with the MaxxFamily product range. The AlertMaxx2 is a high level water alarm and monitoring system which will predictively alert a homeowner when there is a potential fault or service required to the sump pump. Our extensive range of battery back-ups offer unrivalled technology and will keep the sump pump working in the event of power failure.

The number of pump systems required for each project will (in part) depend on the overall basement size, perimeter and also the method of drainage – Delta Channel, Modular or a combination of both.

External surface water from light-wells, courtyards and terraces may be drained into the ground water sump, providing the area of external surface water collection does not exceed 12m^2 to each sump – if the external area is greater, advice should be sought from the Delta Technical Team.

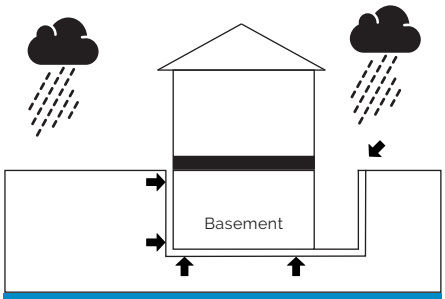
For each sump system, the recommendation is for two pumps in case of failure of the duty pump. In the event of failure of the duty pump, the secondary back up pump will take over, therefore significantly reducing the risk of potential flooding. In addition, a minimum industry standard would be to include a high level alarm such as the Delta AlertMaxx2 and power back up system such as Delta PowerMaxx in case of mains power failure. Again reducing the risk of potential flooding to the basement.

GROUND & SURFACE WATER

GROUND & SURFACE WATER

A range of pump stations designed to collect ground and/or surface water from the smallest domestic basement through to large commercial projects.

Our range of products have been designed specifically for the application and brings the technology of waterproofing and discharging water from properties under one responsibility, fully integrated and co-ordinated.



GROUND WATER

- Ground water collects or flows beneath the Earth's surface, filling the porous spaces in soil, sediment and rocks, originating from rain, melting snow and ice and is the source of water for aquifers, springs and wells.
- The basement structure should offer the primary resistance to passage of water.

PLEASE NOTE

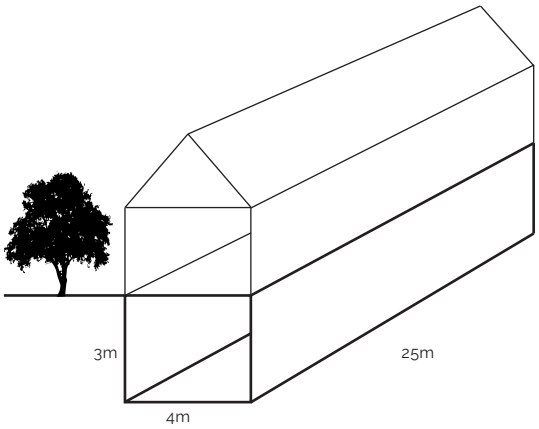
For any calculation, detailed reference should be made to the relevant British/European Standard.

CALCULATING FLOW RATES (GROUND WATER)

- It is virtually impossible to calculate water ingress through a structure, however, we need to make some assumptions and based on our experience we allow 0.001l/s/m2 of basement slab and walls and then allow a safety factor of 5. However, if the basement pumps are monitored by AlertMaxx2 & SideWinder we can build up a dataset for water ingress and make recommendations if and when necessary.

CALCULATING GROUND WATER INGRESS

- It is very difficult to obtain data for water ingress, we need to assume...
- For basements above the water table, assume 0.1l/s per 100m3 basement wall and floor area (or 0.001l/s/m2). Multiply by a factor of safety of 5.
- For basements below the water table assume 0.2l/s per 100m3 basement wall and floor area (or 0.002l/s/m2). Multiply by a factor of safety of 5.



Slab = 25m x 4m = 100m2

Wall 1 = 25m x 3m x 2no = 150m2

Wall 2 = 3m x 4m x 2no = 24m2

Total area = 274m2

Multiply total area by flow rate and factor of safety

=274m2 x 0.001l/s/m2 x 5 = 1.37l/s

CALCULATING FLOW RATES (SURFACE WATER)

- When selecting a pump station for collecting & discharging surface water we take into account a 5 minute storm event and the storage required for 24 hours, we always use a 500 year return period for basement applications and 24 hour storage as they are considered critical. *Battery backups can be used instead of physical storage.*

Example : 25m2 surface water application i.e. patio or small rear roof elevation

Flow rate: Area x l/s/m2 = 1.6l/s

5 minute storage: Area x l/s/m2 x 5 minutes

24 hour storage: Area x 0.11

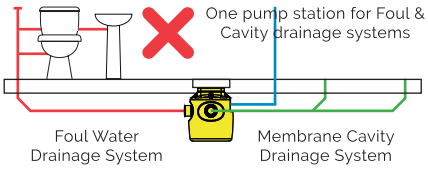
CALCULATING SURFACE WATER FLOW RATES & STORAGE

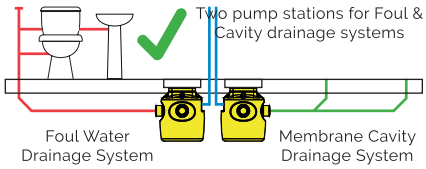
Design intensity for London based on BS EN 752 (2008)

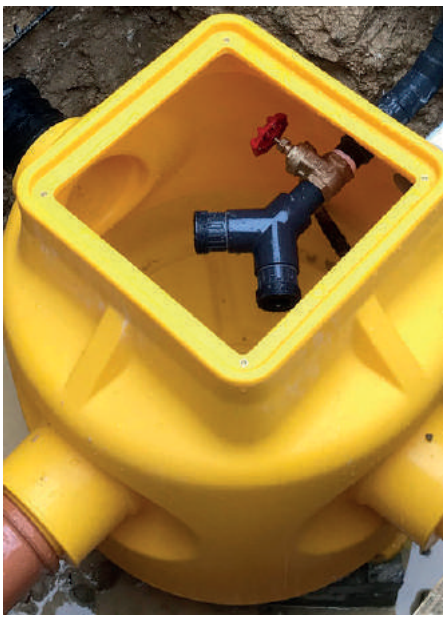
Return period	l/s/m2	mm/hour
1 year	0.016	57.6
5 years	0.024	86.4
50 years	0.040	144.0
500 years	0.064	230.4

WHY FOUL & GROUND WATER SHOULD NEVER BE MIXED

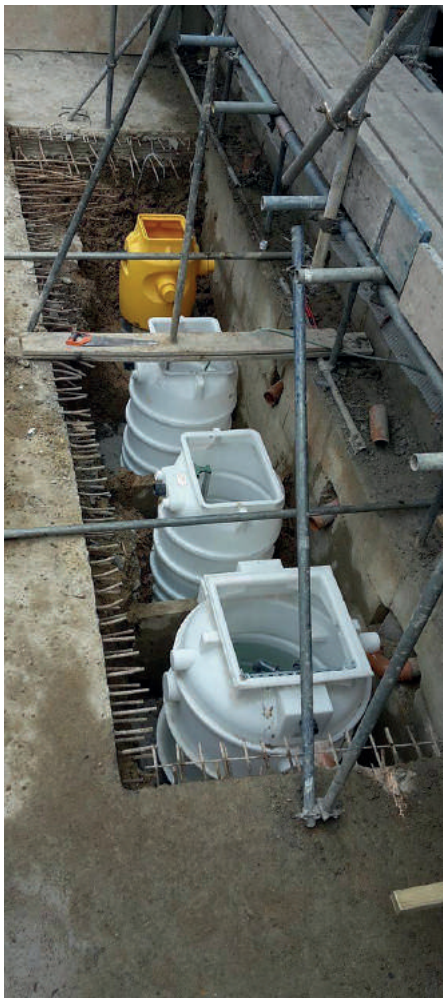
1. Foul gas will be able to migrate into the cavity spaces behind the membrane and will be able to escape into the building at the top edges of the membrane sheet, which must be left unsealed.
2. In the event of a pump station becoming inoperative, continual use of the sanitary appliances may result in the foul level rising above the normal operating level to the extent that effluent would back-fill the cavity drainage system and eventually escape into the cavities, resulting in contamination of floor construction.



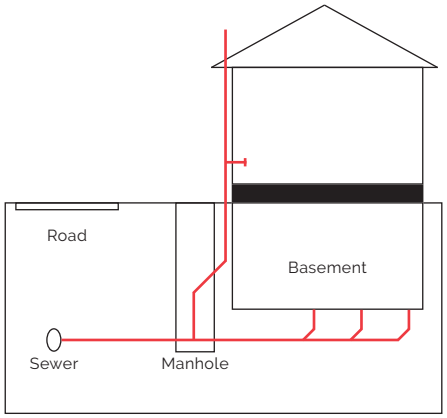




BASEMENT WITHOUT FLOOD PROTECTION

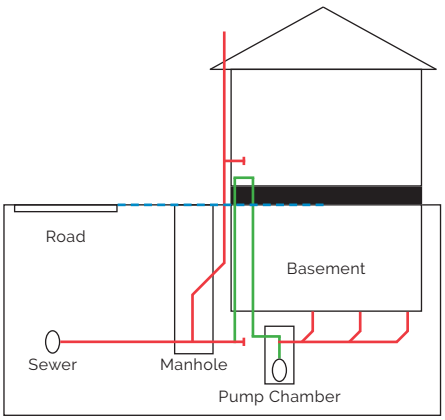


- If the sewer becomes surcharged and if the road surface floods, water will back-up in the house drain and flood the basement.
- If the sewer causes the surface of the road to flood, then the level of the flood water in the basement will reach the same level.



FLOOD PROTECTION MEASURES

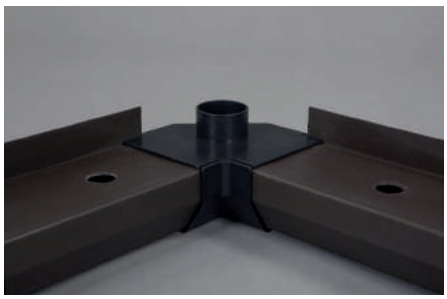
- A pump station with an anti-flooding loop in the discharge pipe is the best method in accordance with BS12056-4.
- If the sewer becomes surcharged and if the road surface floods, the basement will remain safe.
- Flood water cannot pass over the top of the anti-flooding loop.
- Benefits:
- Flood protection is not reliant on valves which may leak and won't prevent odours travelling back into the property.
- The pumped drainage system will remain operational during flooding.

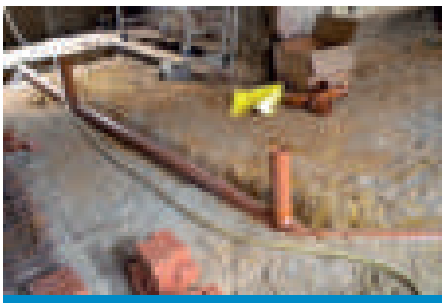


GROUND & SURFACE WATER - DRAINAGE

PERIMETER DRAINAGE CHANNEL

Channel typically laid level in a rebate in the structural slab. As the name suggests it is run around the perimeter of the basement, but can also be installed across the basement to improve drainage. The maximum distance from the end of channel to the sump is 25 linear meters, therefore one sump can be used for a 50m linear run where the sump is installed centrally.



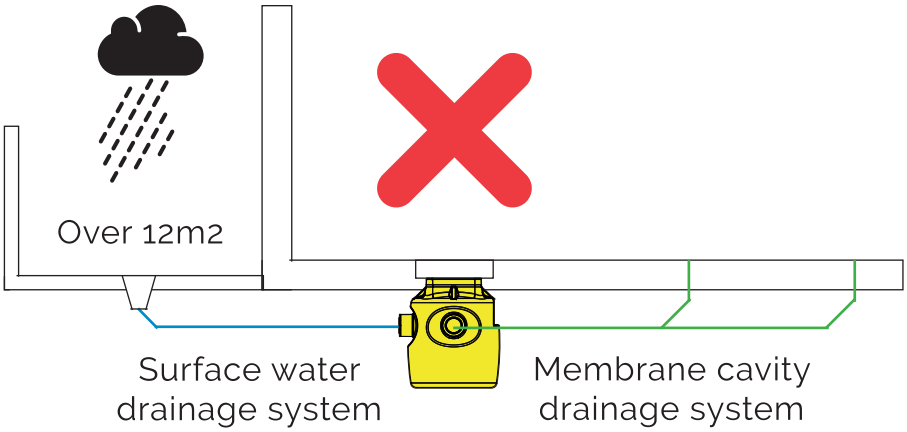


MODULAR DRAINAGE

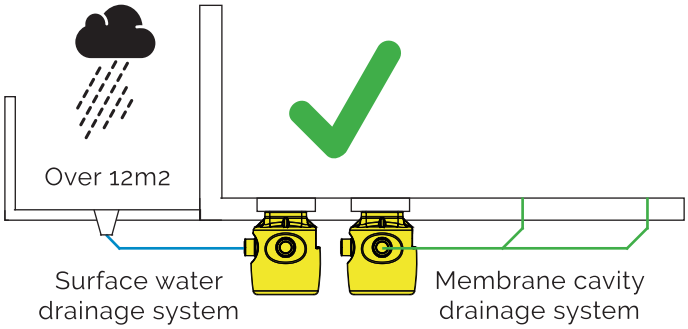
110mm drainage pipe laid below or in the slab to a fall of 1:100. One pump station can serve areas over 200m2. Typically one drainage point is required every 12m2 of basement slab area.

SURFACE WATER LIMITS FOR GROUND WATER SUMPS

- Where rainwater from a total surface area exceeding 12m2 is to be pumped it is recommended this water is drained to a dedicated pump station.



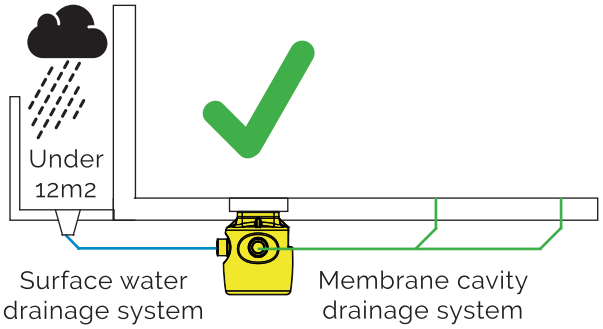
Pump station for a cavity system & external area MORE THAN 12m2



Pump stations for a cavity system & external area MORE THAN 12m2

CONSTANT RAINFALL

- Constant rate rainfall intensity for an event of 5 minutes duration with a probability of exceedance of 0,002 in 1 year (a return period of 500 years).
- We use this figure as basement design is considered to be critical.
- Figures and map available from BS EN 752:2008.



Pump station for a cavity system & external area NOT MORE THAN 12m2

DUAL V3

A packaged pump station designed to collect ground water via perimeter channel or 110mm pipes (129 detail) and/or clear opening to the top of the chamber. This chamber cannot collect grey water from showers and wash hand basins, or foul from a WC (See 'Delta Foul V3 Sump'). A typical application would be collecting ground water from a basement up to 150m² and surface water from a 12m² lightwell.

The Dual V3 pump station has been specifically designed for below ground applications. The chamber is manufactured from HDPE and able to withstand hydrostatic forces encountered in applications with high water tables.

The pump station is delivered as a complete package including, chamber, all internal pipework and two powerful V3 pumps. It is designed to be installed by contractors with competent building, plumbing and electrical skills.

PUMP STATION TECHNICAL DATA

DMS Code	DMS-164
Chamber Material	High Density Polyethylene
Volume Below Inlets	87L
Total Volume	217L
Fixed Inlets	3 x 110 / 160mm
Cable Duct Size	50mm
Discharge Connection	1.25" / 32mm BSP Class C
Discharge Pipework	1.25" / 32mm BSP Class C
Internal Pipework	1.25" / 32mm BSP Class C
Cable Duct Pipework	2" / 50mm White Waste Pipe

The Dual V3 is simple to install, the chamber sits on a concrete base, inlets in the form of perimeter channel or modular 110mm system are connected into the chamber, a 32mm discharge pipe connects to the gravity drain and a 50mm cable duct to bring electrics and control cabling from the chamber into a dry environment. The chamber is filled with water to prevent buoyancy and is surrounded with concrete. A simple rule of thumb is the top of the chamber should be level with the structural slab or no deeper than 500mm from the final finishes.

The installation is to be topped off with a double sealed cover supplied by the contractor to tie in with the general floor finish. Remember this product need to be accessed for service so care should be taken with its location.

For full installation instructions see 'Delta Dual V3 Installation Instructions' on our website.

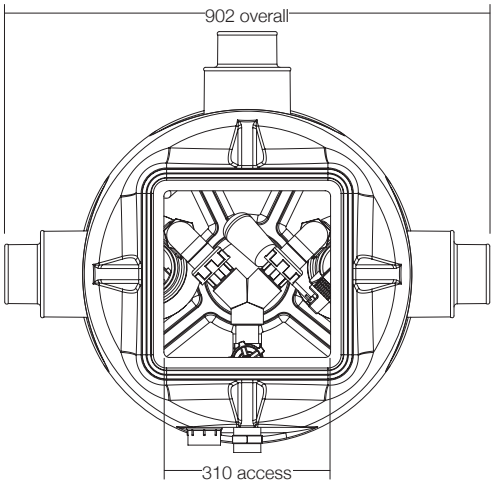
RECOMMENDATIONS

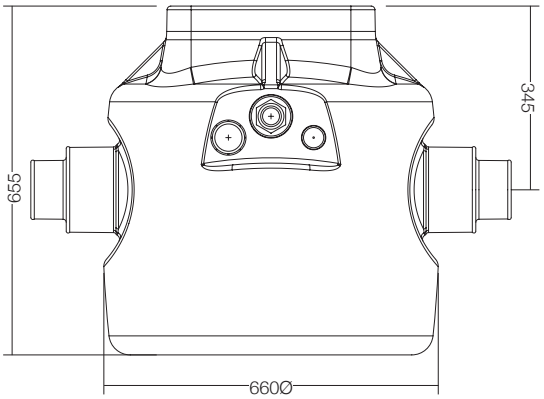
- AlertMaxx2 (DMS-298)
- PowerMaxx (DMS-280)

SPECIFICATION

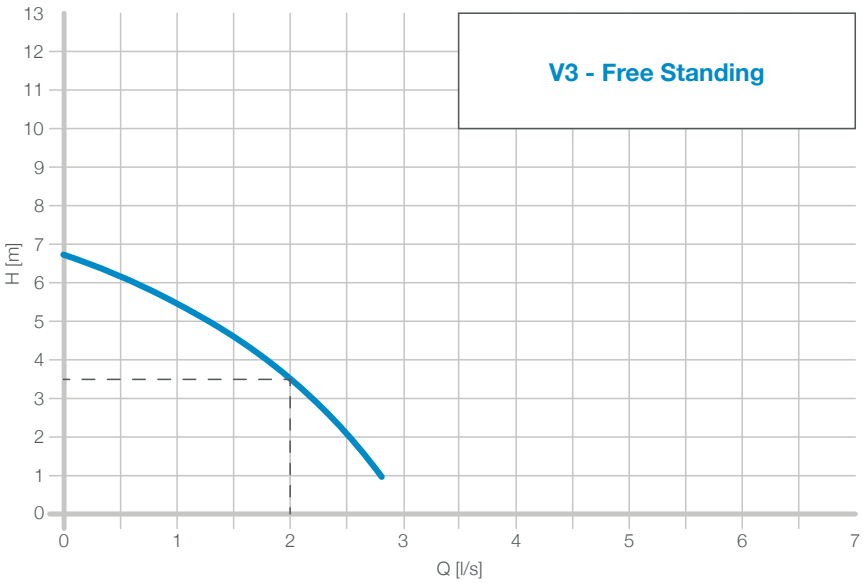
- NBS specification R18 (clause 310) Pumping Stations & Pressure Pipelines.

DUAL V3 - DMS-164





PUMP DATA	
Pump Model	V3
Voltage	230V
KW Rating P1 / P2	0.43 / 0.18kW
Full Load Current	1.9A
Fuse Spur Rating	13A Non-switched
Typical Duty	2.0l/s @ 3.5m
Power Phase	Single
Weight	5.64kg



DUAL V3.1

A packaged pump station designed to collect ground water via perimeter channel or 110mm pipes (129 detail) and/or clear opening to the top of the chamber. This chamber cannot collect grey water from showers and wash hand basins, or foul from a WC (See 'Delta Foul V3 Sump'). The Dual V3.1 is ideal for jobs where one or less inlet is required and space is limited. A typical application would be collecting ground water from a basement up to 150m² and surface water from a 12m² lightwell.

The Dual V3.1 pump station has been specifically designed for below ground applications. The chamber is manufactured from HDPE and able to withstand hydrostatic forces encountered in applications with high water tables.

The pump station is delivered as a complete package including, chamber, all internal pipework and two powerful V3 pumps. It is designed to be installed by contractors with competent building, plumbing and electrical skills.

RECOMMENDATIONS

- AlertMaxx2 (DMS-298)
- PowerMaxx (DMS-280)

SPECIFICATION

- NBS specification R18 (clause 310) Pumping Stations & Pressure Pipelines.

PUMP STATION TECHNICAL DATA

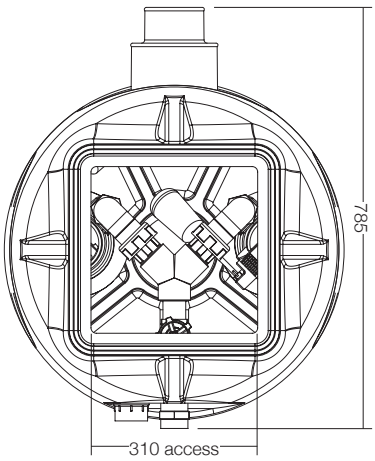
DMS Code	DMS-166
Chamber Material	High Density Polyethylene
Volume Below Inlets	87L
Total Volume	217L
Fixed Inlets	1 x 110 / 160mm
Cable Duct Size	50mm
Discharge Connection	1.25" / 32mm BSP Class C
Discharge Pipework	1.25" / 32mm BSP Class C
Internal Pipework	1.25" / 32mm BSP Class C
Cable Duct Pipework	2" / 50mm White Waste Pipe

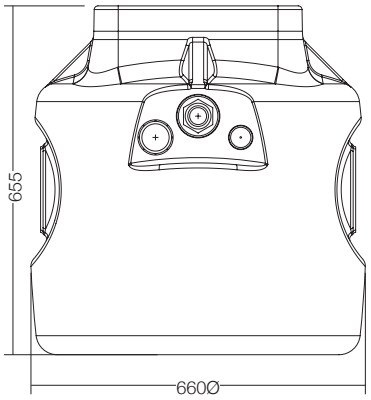
The Dual V3.1 is simple to install, the chamber sits on a concrete base, inlets in the form of perimeter channel or modular 110mm system are connected into the chamber, a 32mm discharge pipe connects to the gravity drain and a 50mm cable duct to bring electrics and control cabling from the chamber into a dry environment. The chamber is filled with water to prevent buoyancy and is surrounded with concrete. A simple rule of thumb is the top of the chamber should be level with the structural slab or no deeper than 500mm from the final finishes.

The installation is to be topped off with a double sealed cover supplied by the contractor to tie in with the general floor finish. Remember this product need to be accessed for service so care should be taken with its location.

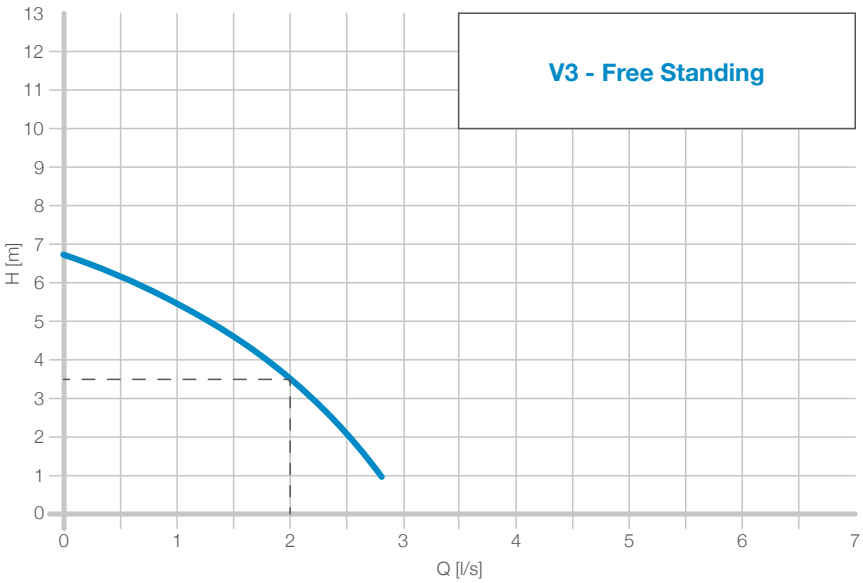
For full installation instructions see 'Delta Dual V3 Installation Instructions' on our website.

DUAL V3.1 - DMS-166





PUMP DATA	
Pump Model	V3
Voltage	230V
KW Rating P1 / P2	0.43 / 0.18kW
Full Load Current	1.9A
Fuse Spur Rating	13A Non-switched
Typical Duty	2.0l/s @ 3.5m
Power Phase	Single
Weight	5.64kg



DUAL V4

The Dual V4 is an upgrade to the standard Dual V3 where higher discharge heads are required. Typically, for double and triple depth basements or where long discharge runs are required resulting in higher than normal pipe work losses. The Dual V4 is suitable for basements that require a head height greater than the V3. The Dual V4 can pump 12m² of surface area in addition to ground water.

The Dual V4 has been specifically designed for below ground applications. The chamber is manufactured from HDPE and is able to withstand hydrostatic forces encountered in applications with high water tables.

The pump station is delivered as a complete package including chamber, all internal pipework and two powerful V4 pumps. It is designed to be installed by contractors with competent building, plumbing and electrical skills.

RECOMMENDATIONS

- AlertMaxx2 (DMS-298)
- Hi-PowerMaxx (DMS-364)

SPECIFICATION

- NBS specification R18 (clause 310) Pumping Stations & Pressure Pipelines.

PUMP STATION TECHNICAL DATA

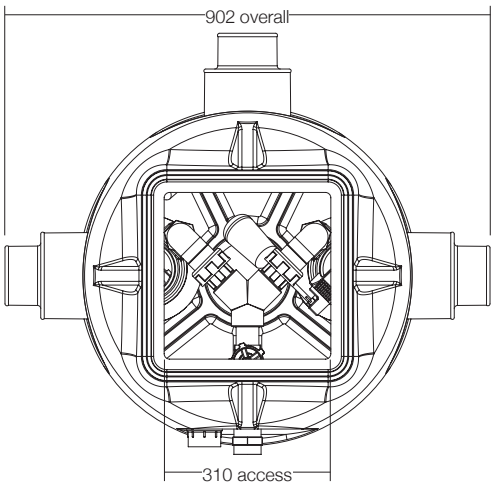
DMS Code	DMS-217
Chamber Material	High Density Polyethylene
Volume Below Inlets	137L
Total Volume	273L
Fixed Inlets	3 x 110 / 160mm
Cable Duct Size	50mm
Discharge Connection	2" / 50mm BSP Class C
Discharge Pipework	2" / 50mm BSP Class C
Internal Pipework	1.25" / 32mm BSP Class C
Cable Duct Pipework	2" / 50mm White Waste Pipe

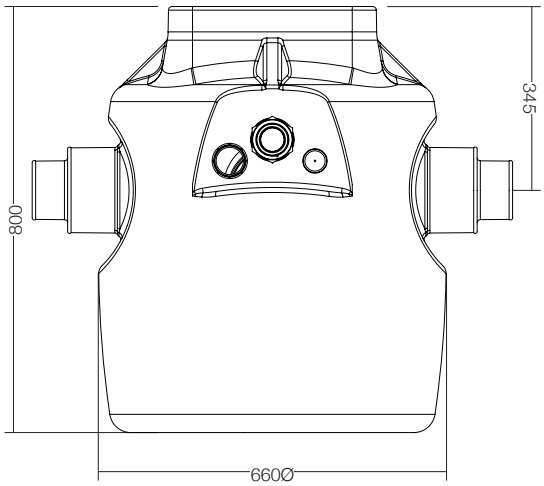
The Dual V4 is simple to install, the chamber sits on a concrete base, inlets in the form of perimeter channel or modular 110mm system are connected into the chamber, a 32mm discharge pipe connects to the gravity drain and a 50mm cable duct to bring electrics and control cabling from the chamber into a dry environment. The chamber is filled with water to prevent buoyancy and is surrounded with concrete. A simple rule of thumb is the top of the chamber should be level with the structural slab or no deeper than 500mm from the final finishes.

The installation is to be topped off with a double sealed cover supplied by the contractor to tie in with the general floor finish. Remember this product need to be accessed for service so care should be taken with its location.

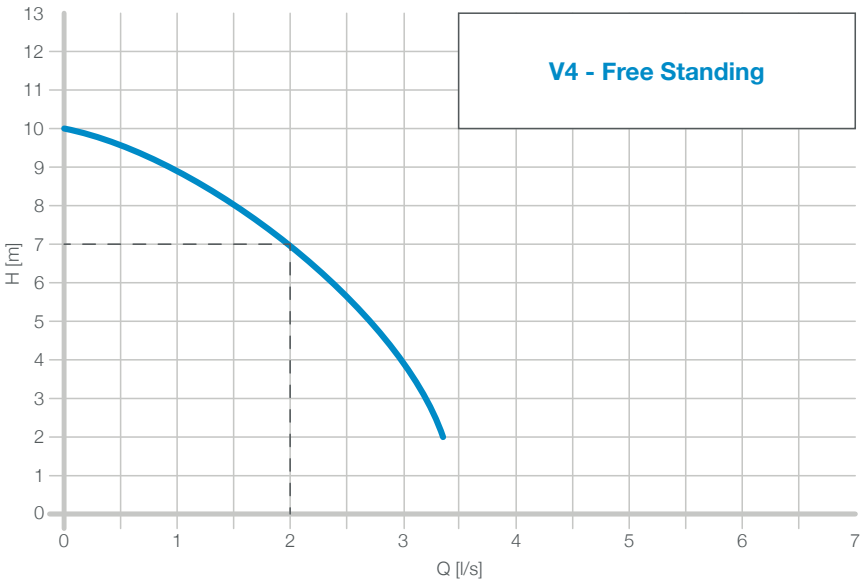
For full installation instructions, see 'Delta Dual V4/V6 Installation Instructions' on our website.

DUAL V4 - DMS-217





PUMP DATA	
Pump Model	V4
Voltage	230V
KW Rating P1 / P2	0.75 / 0.36kW
Full Load Current	4.0A
Fuse Spur Rating	13A Non-switched
Typical Duty	2.0l/s @ 7m
Power Phase	Single
Weight	6.7kg



DUAL V6

The Dual V6 is an upgrade to the standard Dual V3 where higher discharge heads are required. Typically, for double and triple depth basements or where long discharge runs are required resulting in higher than normal pipe work losses. The Dual V6 is suitable for basements that require a head height greater then the V4. The Dual V6 can pump 12m² of surface area in addition to ground water.

The Dual V6 has been specifically designed for below ground applications. The chamber is manufactured from HDPE and is able to withstand hydrostatic forces encountered in applications with high water tables.

The pump station is delivered as a complete package including chamber, all internal pipework and two powerful V6 pumps. It is designed to be installed by contractors with competent building, plumbing and electrical skills.

RECOMMENDATIONS

- AlertMaxx2 (DMS-298)
- Hi-PowerMaxx (DMS-364)

SPECIFICATION

- NBS specification R18 (clause 310) Pumping Stations & Pressure Pipelines.

PUMP STATION TECHNICAL DATA

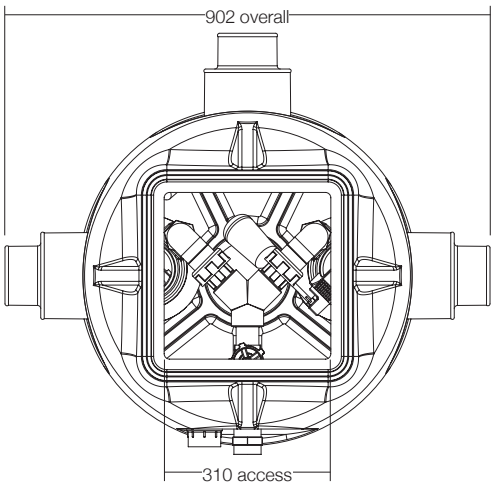
DMS Code	DMS-079
Chamber Material	High Density Polyethylene
Volume Below Inlets	137L
Total Volume	273L
Fixed Inlets	3 x 110 / 160mm
Cable Duct Size	50mm
Discharge Connection	2" / 50mm BSP Class C
Discharge Pipework	2" / 50mm BSP Class C
Internal Pipework	1.25" / 32mm BSP Class C
Cable Duct Pipework	2" / 50mm White Waste Pipe

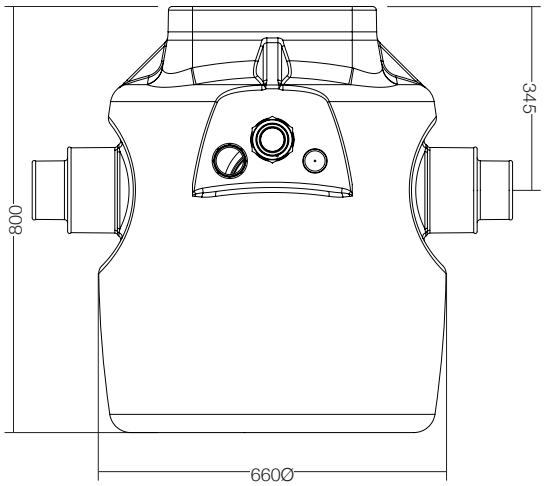
The Dual V6 is simple to install, the chamber sits on a concrete base, inlets in the form of perimeter channel or modular 110mm system are connected into the chamber, a 32mm pipe discharge connects to the gravity drain and a 50mm cable duct to bring electrics and control cabling from the chamber into a dry environment. The chamber is filled with water to prevent buoyancy and is surrounded with concrete. A simple rule of thumb is the top of the chamber should be level with the structural slab or no deeper than 500mm from the final finishes.

The installation is to be topped off with a double sealed cover supplied by the contractor to tie in with the general floor finish. Remember this product need to be accessed for service so care should be taken with its location.

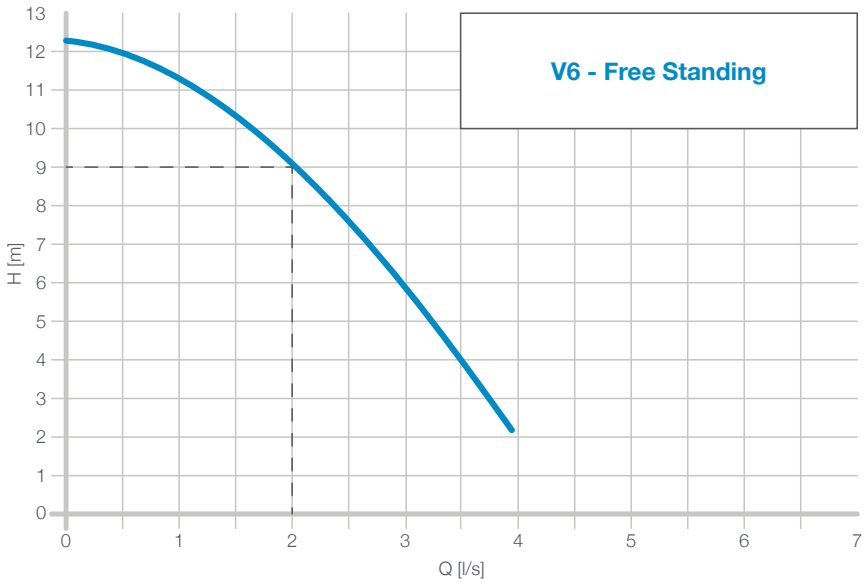
For full installation instructions, see 'Delta Dual V4/V6 Installation Instructions' on our website.

DUAL V4 / V6 - DMS-217 / 079





PUMP DATA	
Pump Model	V6
Voltage	230V
KW Rating P1 / P2	1.05 / 0.50kW
Full Load Current	4.9A
Fuse Spur Rating	13A Non-switched
Typical Duty	2.0l/s @ 9m
Power Phase	Single
Weight	6.9kg



800 SERIES GROUND & SURFACE WATER STATIONS

The 800 series ground & surface water pump stations are available in depths from 800mm – 2000mm. Applications include collecting ground water from a Type C cavity membrane system or surface water from roofs and patios subject to selection criteria.

This product is specifically designed for below ground applications where hydrostatic water pressure may be present. However, they should be surrounded with concrete to prevent movement. A manhole cover is not supplied as these are generally site specific and installed in the final finish. However, if required the chamber will accept a standard 450mm x 600mm cover and frame. A kit is provided so inlets can be easily drilled and sealed on site in the positions highlighted in blue, making this product very simple to install.

The 800 series pump chambers are compatible with a range of free standing and guide rail mounted pumps.

TYPICAL APPLICATION

- Ground Water
- Surface Water

PUMP STATION TECHNICAL DATA

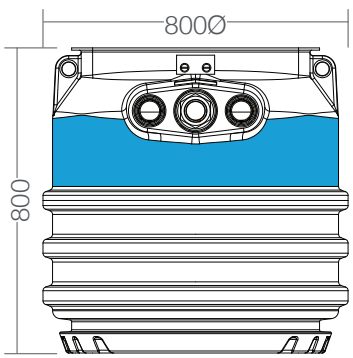
Chamber Model	800 Series
Chamber Material	High Density Polyethylene
Available Depths	800mm, 1000mm, 1300mm, 1500mm, 1800mm, 2000mm
Available Pumps	V3, V4, V6
Inlets	5 x 110mm grommets (supplied loose)
Cable Duct & Vent Size	50mm
Discharge Connection	BSP Class C
Cable Duct Pipework	2" / 50mm White Waste Pipe
Vent Pipework	2" / 50mm White Waste Pipe

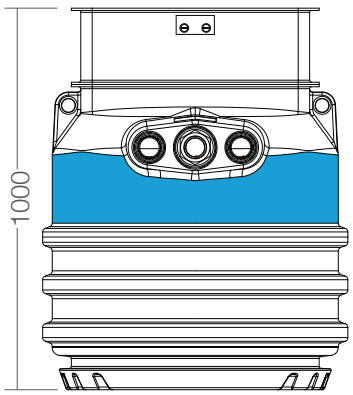
INLETS

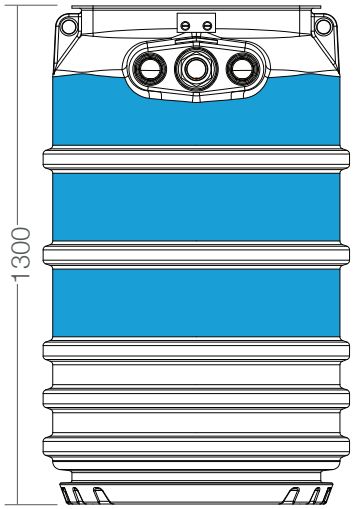
Inlets can be cut on site using the inlet kit provided with the chamber. The sections highlighted in blue on the drawings below show the areas suitable for drilling inlets.

SPECIFICATION

NBS specification R18 (clause 310) Pumping Stations & Pressure Pipelines.

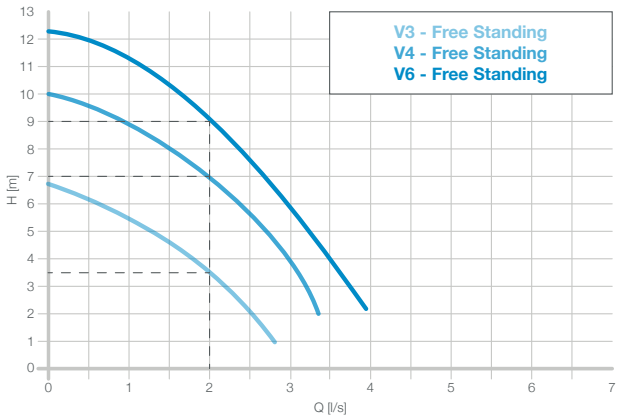


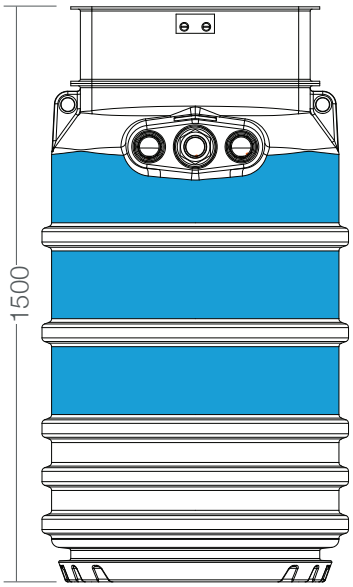


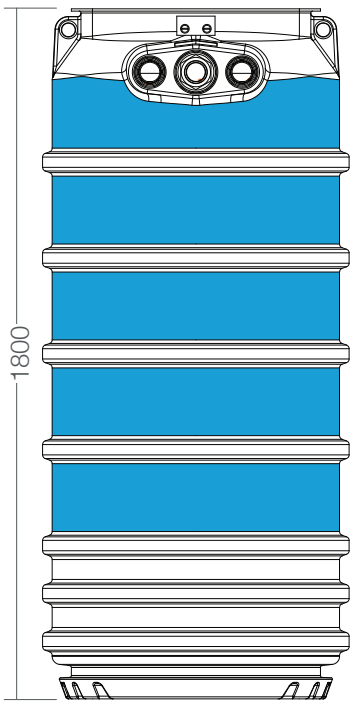


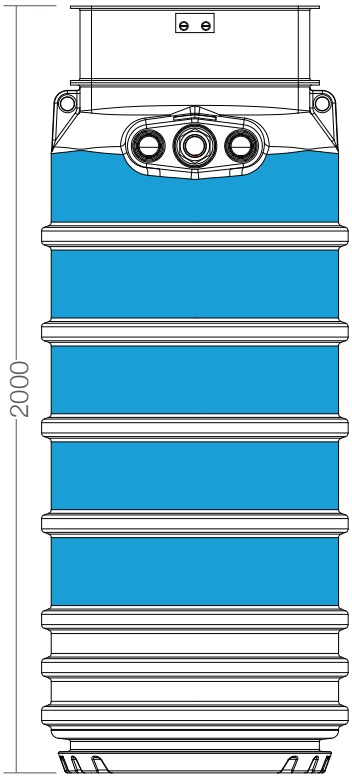
V3, V4, V6

50Hz - 1 ~ 230V Discharge 1.25" BSP Female					
Model	P1 kW	P2 kW	In A	Part No.	Weight Kg
V3	0.43	0.18	1.9	116	5.64
V4	0.75	0.36	4.0	216	7.17
V6	1.05	0.50	4.9	084	7.40









1000 SERIES GROUND & SURFACE WATER STATIONS

The 1000 series ground & surface water pump stations are available in depths from 1250mm - 3000mm. Applications include collecting ground water from a Type C cavity membrane system and larger surface water applications from roofs and patios subject to selection criteria.

This product is specifically designed for below ground applications where hydrostatic water pressure may be present. However, they should be surrounded with concrete to prevent movement. The chamber will accept a standard 750mm x 600mm cover and frame to suit floor build. A kit is provided so inlets can be easily drilled and sealed on site in the positions highlighted in blue, making this product very simple to install.

The 1000 series pump chambers are compatible with a range guide rail mounted pumps.

PUMP STATION TECHNICAL DATA

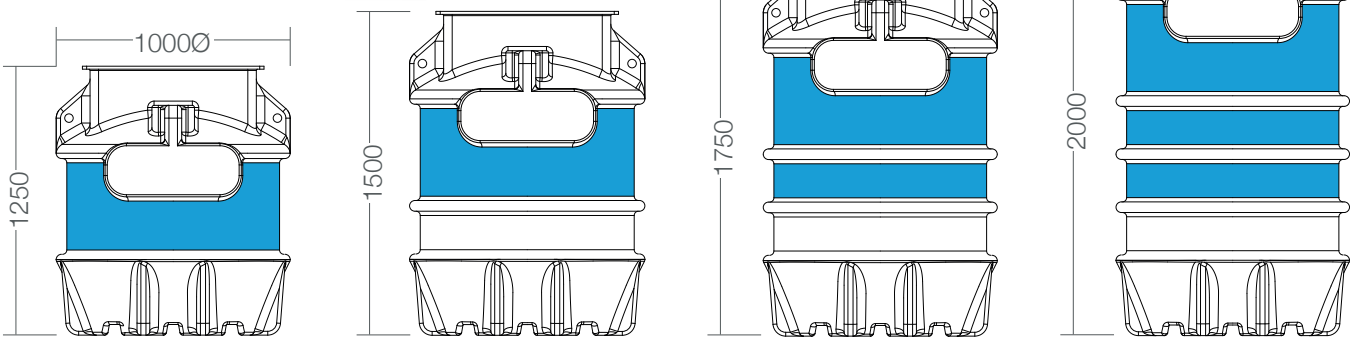
Chamber Model	1000 Series
Chamber Material	High Density Polyethylene
Available Depths	1250mm, 1500mm, 1750mm, 2000mm, 2250mm, 2500mm, 2750mm, 3000mm
Available Pumps	2500 Series, D10 Series
Inlets	5 x 110mm grommets (supplied loose)
Cable Duct & Vent Size	50mm
Discharge Connection	BSP Class C
Cable Duct Pipework	2" / 50mm White Waste Pipe
Vent Pipework	2" / 50mm White Waste Pipe

TYPICAL APPLICATION

- Ground Water
- Surface Water

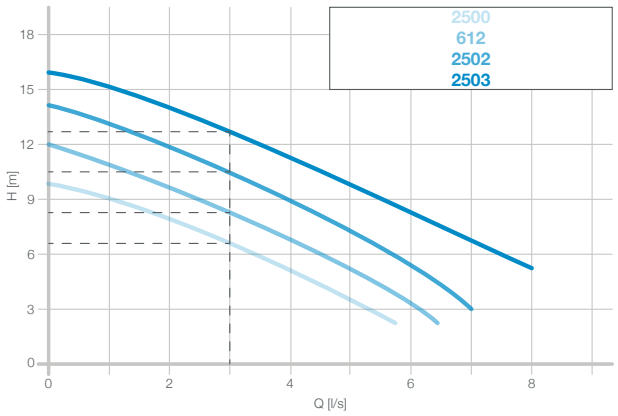
INLETS

Inlets can be cut on site using the inlet kit provided with the chamber. The sections highlighted in blue on the drawings below show the areas suitable for drilling inlets.



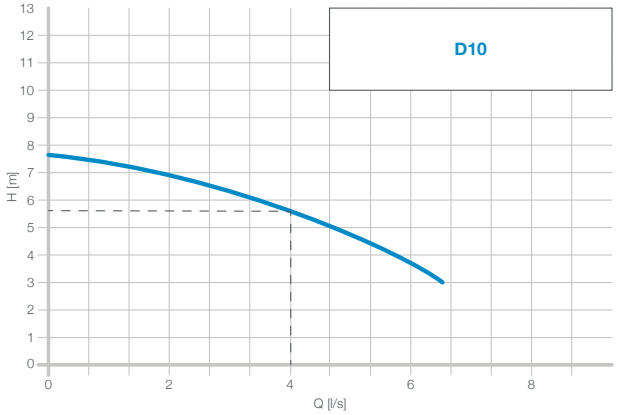
2500 SERIES

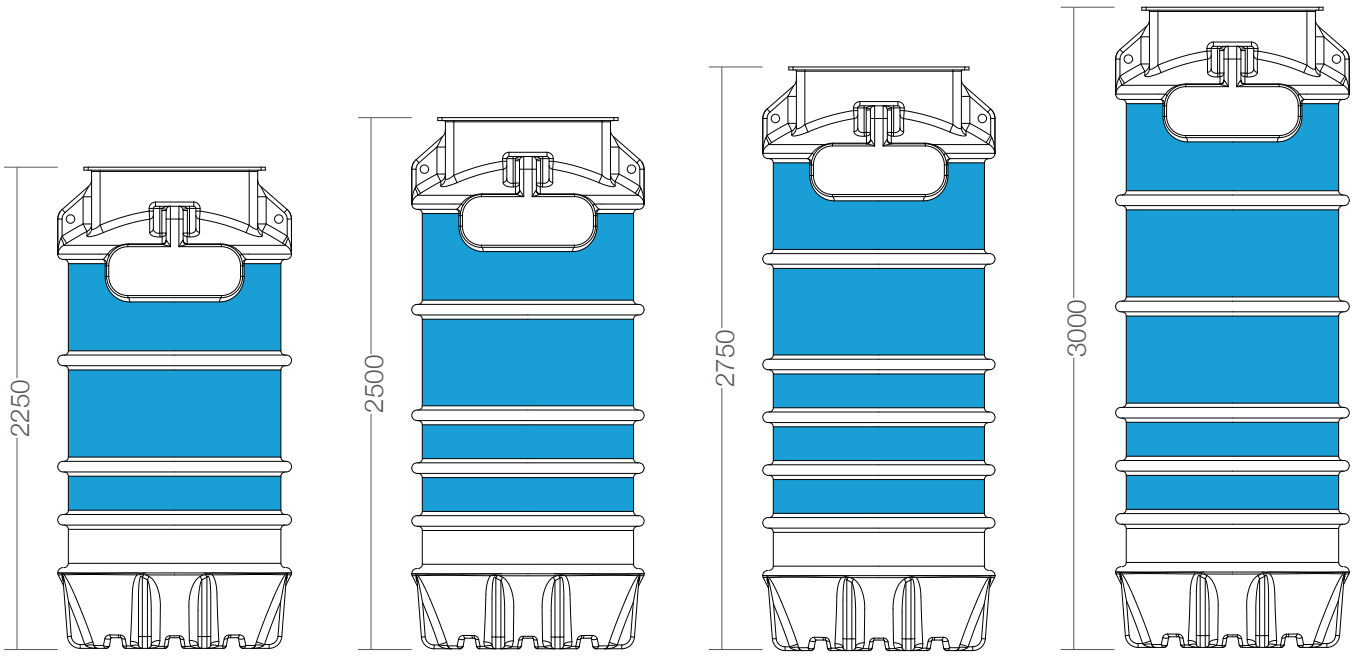
50Hz - 1 ~ 230V Discharge 2" BSP Female					
Model	P1 kW	P2 kW	In A	Part No.	Weight Kg
2500SA	1.00	0.55	5.0	Call	22
612SA	0.75	0.36	6.0	114	22
2502SA	1.05	0.50	8.2	PU-006	22
2503SA	1.90	1.10	8.2	PU-008	22
2500SM	1.00	0.55	5.0	Call	22
612SM	1.25	0.75	6.0	PU-005	22
2502SM	1.80	1.10	8.2	PU-007	22
2503SM	1.80	1.10	8.2	PU-009	22
50Hz - 3 ~ 400V Discharge 2" BSP Female					
2500TM	0.90	0.55	2.3	Call	22
612TM	1.10	0.75	2.8	Call	22
2502TM	1.50	1.10	3.0	Call	22
2503TM	2.05	1.50	3.5	Call	22



D10 SERIES

50Hz - 1 ~ 230V Discharge 2" BSP Female					
Model	P1 kW	P2 kW	In A	Part No.	Weight Kg
D10SA	1.14	0.75	5.84	120	13.4
D10SM	1.14	0.75	5.84	PU-101	13.4





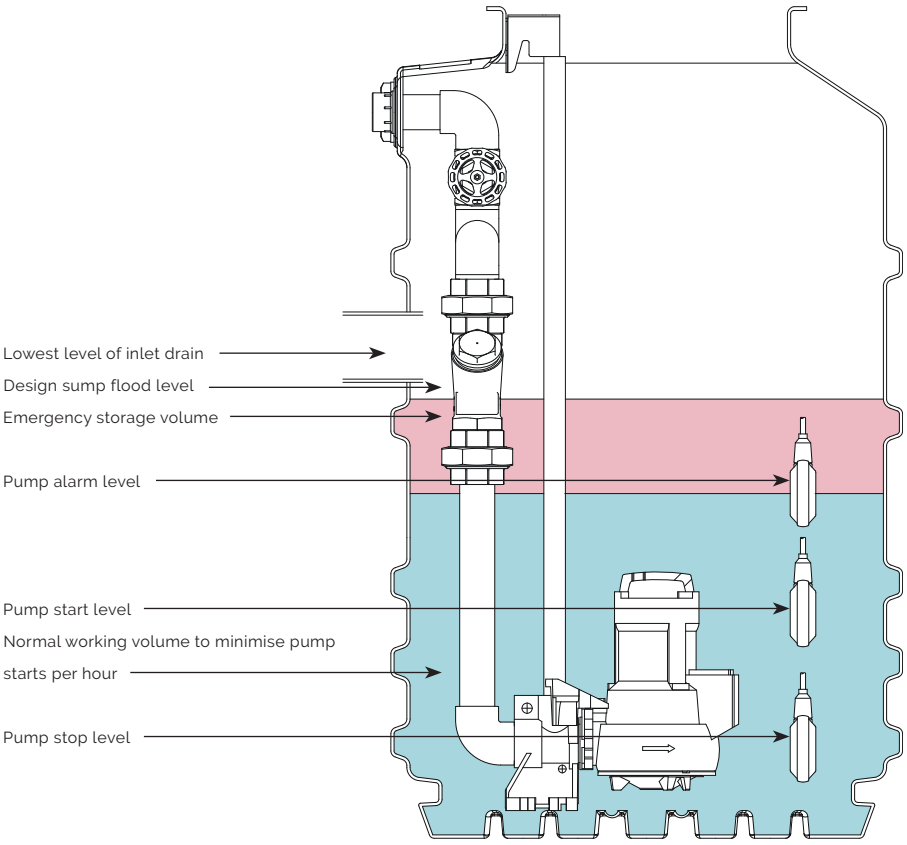
FOUL WATER PUMP STATIONS

FOUL WATER

A range of pump stations designed to collect foul water from a small utility room to large commercial projects, such as theatres, blocks of flats and major building upgrades where gravity discharge is not possible.

Our range of products have been designed specifically for these application and brings the technology of waterproofing and discharging water from properties under one responsibility, fully integrated and co-ordinated.

CALCULATING FOUL WATER STORAGE VOLUMES



NOTE

- The inlet drain should not be submerged otherwise there is a risk that the solid waste would cause a blockage.

EMERGENCY STORAGE

- Where foul water drainage from a building is to be pumped, the effluent receiving chamber should be sized to contain 24 hour inflow to allow for disruption in service. The minimum daily discharge of foul drainage should be taken as 150 litres per head per day for domestic use. For other types of building, the capacity of the receiving chamber should be based on the calculated daily demand of the water intake for the building. Where only a proportion of the foul sewage is to be pumped, then the capacity should be based pro-rata. In all pump systems the controls should be so arranged to optimise pump operation.

Example : 6 bedroom house to be 'pumped' = 2 people in the master bedroom, 1 in each of the remaining = 7 x 150L = 1050L
It is considered bad practice to pump facilities from ground level and above if they can be designed to be discharged by gravity.
It may not be necessary to allow for storage capacity on a pro-rata basis for basement application where alternative gravity facilities are available in accordance with BS6465.

FLOW RATES FROM DWELLINGS

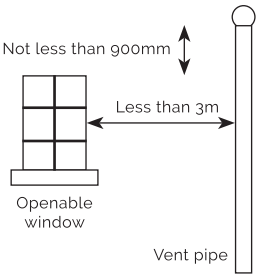
Number of dwellings	Flow rate (litres/sec)
1	2.5
5	3.5
10	4.1
15	4.6
20	5.1
25	5.4
30	5.8

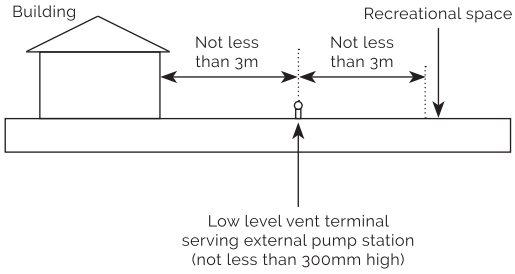
ASSESSING FOUL SUMP FLOW RATE

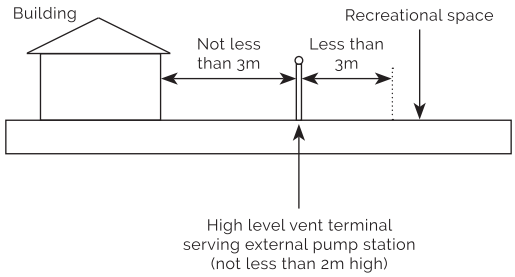
- The flow rate of a foul pump should equal or exceed the design inflow of the drainage system.
- For typical dwellings, where there is no information about the sanitary appliances, it is acceptable to use the information from the table opposite.
- For non-typical dwellings or where the sanitary appliances are known, the Delta Wastewater Design Flow Calculator can be used.
- For buildings other than dwellings, assistance from a Delta Consultant should be sought.

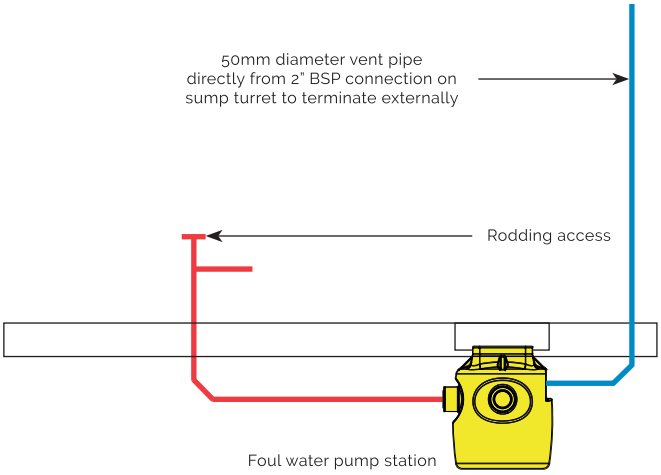
VENTILATION OF FOUL SUMPS

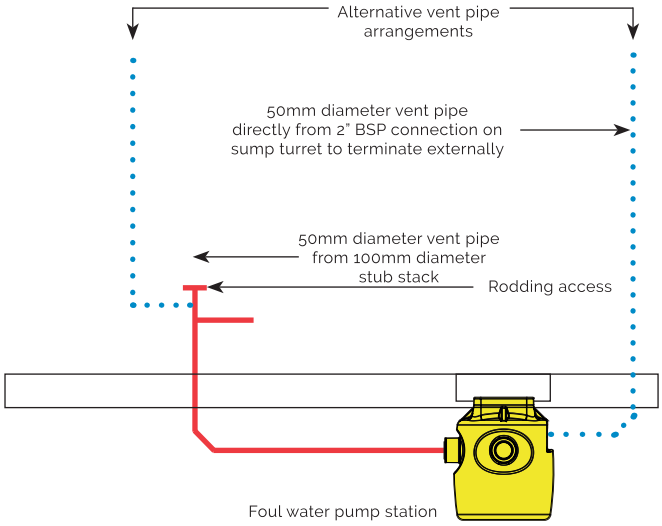
- The purpose of sump ventilation is to;
- a) allow foul gas to escape safely.
- b) prevent the pump from overheating.
- c) allow the sump to fill higher than normal in an emergency situation.
- The best situation is to provide a 50mm vent pipe connected directly to the sump at high level using the connection provided by the manufacturer.
- In some situations it is acceptable to ventilate the sump via the drainage system.
- The use of an air admittance valve is not acceptable.











FOUL V3

A packaged pump station designed to collect foul water from basements and ground floor extensions where other facilities in the property discharge via gravity. A typical application would be the collection and discharge of foul water from a basement fitted with a bathroom and a utility room. This pump station is not designed to collect ground water from a cavity membrane system (see Dual V3 Sump). For kitchen applications, we recommend fitting a grease trap prior to the pump station and do not recommend sinks fitted with macerator type waste disposal units are connected to pump stations.

The Foul V3 pump station has been specifically designed for below ground applications. The chamber is manufactured from virgin tank grade HDPE and is able to withstand hydrostatic forces encountered in applications with high water tables.

The pump station is delivered as a complete package with all internal pipework and a D10SA foul vortex pump. It is designed to be installed by contractors with competent building, plumbing and electrical skills.

RECOMMENDATIONS

- AlertMaxx2 (DMS-299)
- Hi-PowerMaxx-XL (DMS-236)

SPECIFICATION

- NBS specification R18 (clause 310) Pumping Stations & Pressure Pipelines.

PUMP STATION TECHNICAL DATA

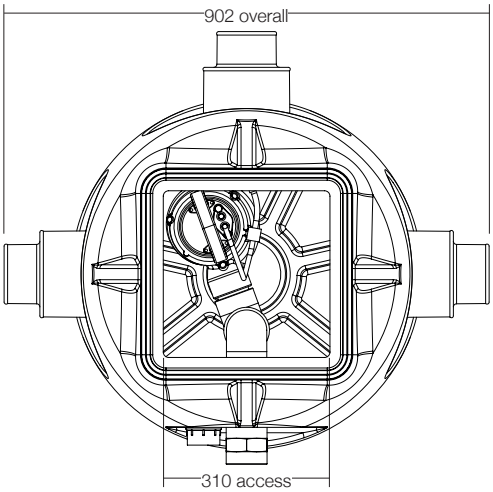
DMS Code	DMS-165-1
Chamber Material	High Density Polyethylene
Volume Below Inlets	137L
Total Volume	273L
Fixed Inlets	3 x 110 / 160mm
Cable Duct & Vent Size	50mm
Discharge Connection	2" / 50mm BSP Class C
Discharge Pipework	2" / 50mm BSP Class C
Internal Pipework	2" / 50mm BSP Class C
Cable Duct Pipework	2" / 50mm White Waste Pipe
Vent Pipework	2" / 50mm White Waste Pipe

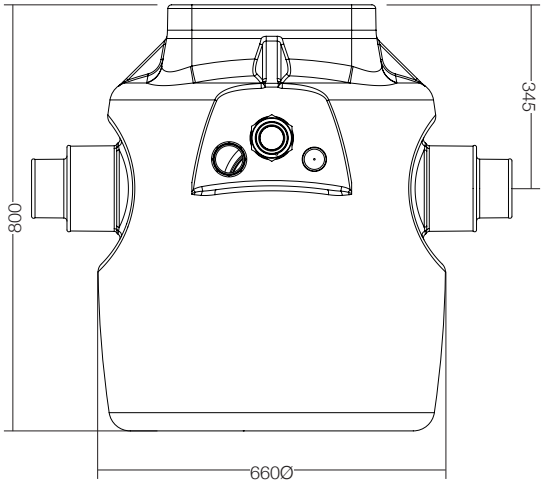
The Foul V3 is simple to install, the chamber is sited on a concrete base, inlets in the form of 110mm pipework are connected into the chamber, a 50mm discharge pipe connects to the gravity drain and a 50mm cable duct to bring electrics and control cabling from the chamber into a dry environment. The chamber is vented via a 50mm duct to the same standard as a traditional SVP. An air admittance or 'durgo' type valve should not be used. The chamber is filled with water to prevent buoyancy and is surrounded with concrete. A simple rule of thumb is the top of the chamber should be level with the structural slab or no deeper than 500mm from the final finishes.

The whole lot is topped off with a double sealed cover supplied by the contractor to tie in with the general floor finish. Remember this product need to be accessed for service so care should be taken with its location.

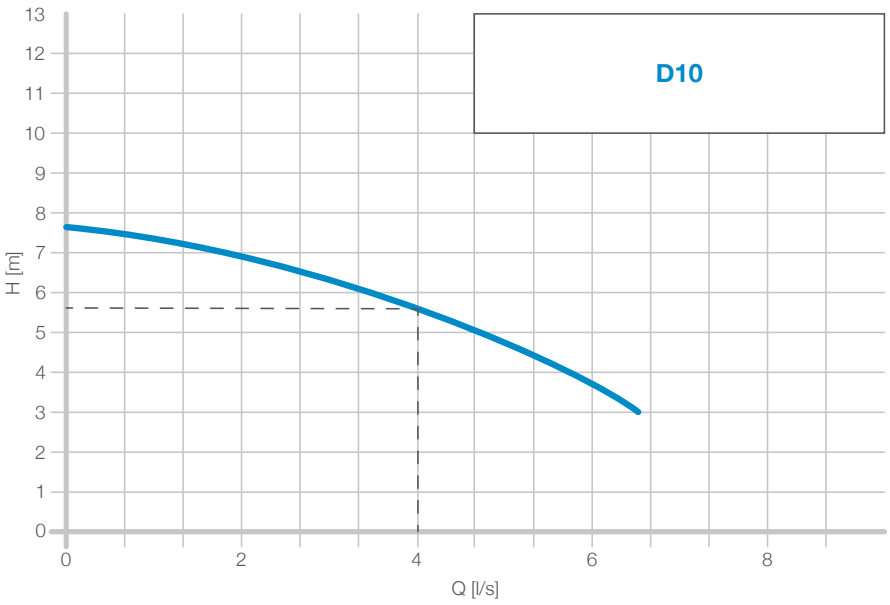
For full installation instructions see 'Delta Foul V3 Installation Instructions' on our website.

FOUL V3 - DMS-165-1





PUMP DATA	
Pump Model	D10SA
Voltage	230V
KW Rating P1 / P2	1.14 / 0.75kW
Full Load Current	5.84A
Fuse Spur Rating	13A Non-switched
Typical Duty	4.0l/s @ 6.5m
Power Phase	Single
Weight	13.4kg



800 SERIES FOUL WATER STATIONS

The 800 series foul water pump stations are available in depths from 800mm - 2000mm. Applications include collecting foul and grey water from WC's, wash hand basins, showers, sinks and dishwashers subject to selection criteria, typically for larger self contained basements or where inverts are low due to site conditions. When the 800 series is collecting grey water from a kitchen, we recommend fitting a grease trap prior to the chamber to optimize the reliability of the pump station.

This product is specifically designed for below ground applications where hydrostatic water pressure may be present. However, they should be surrounded with concrete to prevent movement. A manhole cover is not supplied as these are generally site specific and installed in the final finish. However, if required the chamber will accept a standard 450mm x 600mm cover and frame.

The 800 series pump chambers are compatible with a range of free standing and guide rail mounted pumps.

TYPICAL APPLICATION

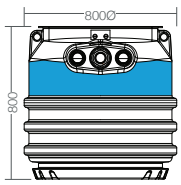
- Foul Water

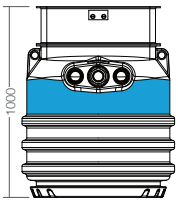
INLETS

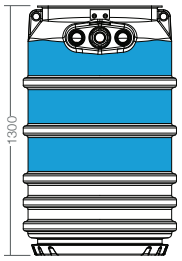
Inlets can be cut on site using the inlet kit provided with the chamber. The sections highlighted in blue on the drawings below show the areas suitable for drilling inlets.

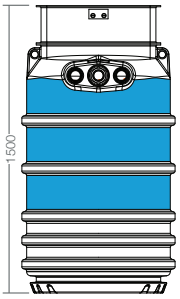
PUMP STATION TECHNICAL DATA

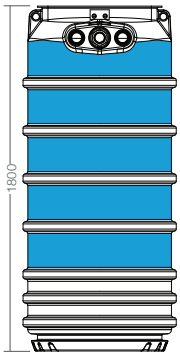
Chamber Model	800 Series
Chamber Material	High Density Polyethylene
Available Depths	800mm, 1000mm, 1300mm, 1500mm, 1800mm, 2000mm
Available Pumps	2500 Series, 2600 Series, D10 Series
Inlets	5 x 110mm grommets (supplied loose)
Cable Duct & Vent Size	50mm
Discharge Connection	BSP Class C
Cable Duct Pipework	2" / 50mm White Waste Pipe
Vent Pipework	2" / 50mm White Waste Pipe

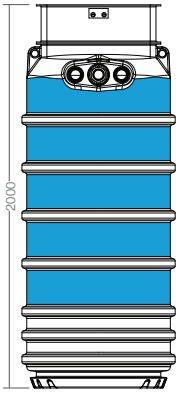






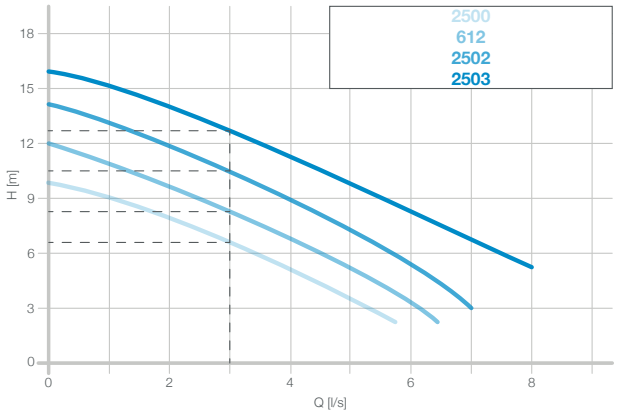






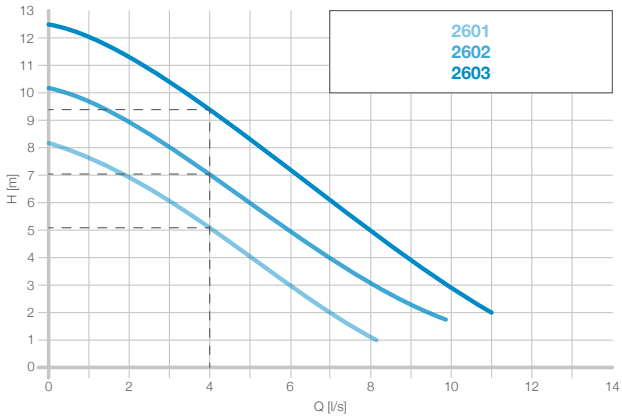
2500 SERIES

50Hz - 1 ~ 230V Discharge 2" BSP Female					
Model	P1 kW	P2 kW	In A	Part No.	Weight Kg
2500SA	1.00	0.55	5.0	Call	22
612SA	0.75	0.36	6.0	DMS-114	22
2502SA	1.05	0.50	8.2	PU-006	22
2503SA	1.90	1.10	8.2	PU-008	22
2500SM	1.00	0.55	5.0	Call	22
612SM	1.25	0.75	6.0	PU-005	22
2502SM	1.80	1.10	8.2	PU-007	22
2503SM	1.80	1.10	8.2	PU-009	22
50Hz - 3 ~ 400V Discharge 2" BSP Female					
2500TM	0.90	0.55	2.3	Call	22
612TM	1.10	0.75	2.8	Call	22
2502TM	1.50	1.10	3.0	Call	22
2503TM	2.05	1.50	3.5	Call	22



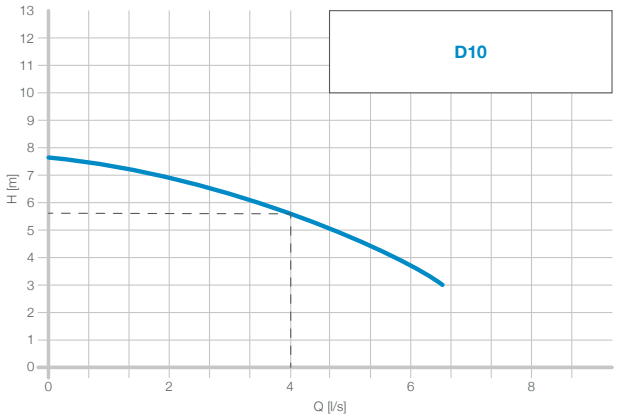
2600 SERIES

50Hz - 1 ~ 230V Discharge 2.50" BSP Female					
Model	P1 kW	P2 kW	In A	Part No.	Weight Kg
2601SA	1.25	0.75	6.0	PU-010	25
2602SA	1.80	1.10	8.2	PU-012	25
2603SA	1.80	1.10	8.2	PU-014	25
2601SM	1.25	0.75	6.0	PU-011	25
2602SM	1.80	1.10	8.2	PU-013	25
2603SM	1.80	1.10	8.2	PU-015	25
50Hz - 3 ~ 400V Discharge 2.50" BSP Female					
2601TM	1.10	0.75	2.8	Call	25
2602TM	1.50	1.10	3.0	Call	25
2603TM	2.05	1.50	3.5	Call	25



D10 SERIES

50Hz - 1 ~ 230V Discharge 2" BSP Female					
Model	P1 kW	P2 kW	In A	Part No.	Weight Kg
D10SA	1.14	0.75	5.84	DMS-120	13.4
D10SM	1.14	0.75	5.84	PU-101	13.4



1000 SERIES FOUL WATER STATIONS

The 1000 series foul water pump stations are available in depths from 1250mm - 3000mm. Applications include collecting foul and grey water from WC's, wash hand basins, showers, sinks and dishwashers subject to selection criteria, typically for larger basements or where inverts are low due to site conditions. When the 1000 series is collecting grey water from a kitchen, we recommend fitting a grease trap prior to the chamber to optimize the reliability of the pump station.

This product is specifically designed for below ground applications where hydrostatic water pressure may be present. However, they should be surrounded with concrete to prevent movement. A manhole cover is not supplied as these are generally site specific and installed in the final finish. However, if required the chamber will accept a standard 450mm x 600mm cover and frame.

The 1000 series pump chambers are compatible with a range of free standing and guide rail mounted pumps.

TYPICAL APPLICATION

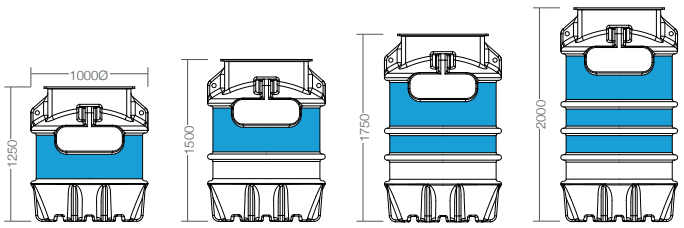
- Foul Water

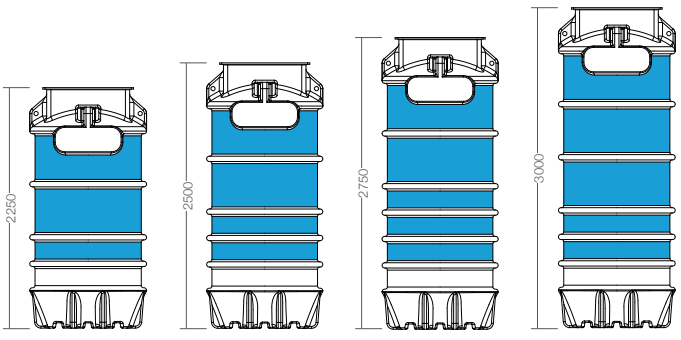
INLETS

Inlets can be cut on site using the inlet kit provided with the chamber. The sections highlighted in blue on the drawings below show the areas suitable for drilling inlets.

PUMP STATION TECHNICAL DATA

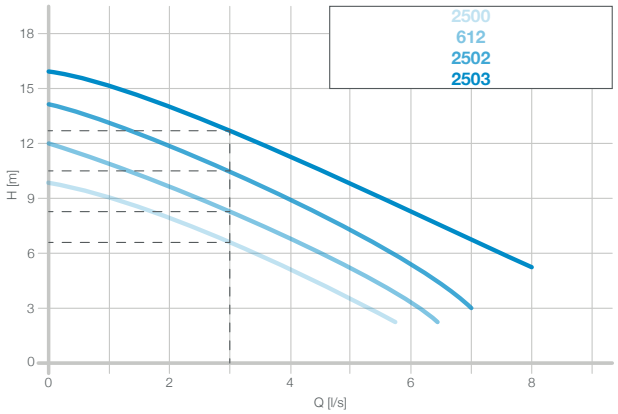
Chamber Model	1000 Series
Chamber Material	High Density Polyethylene
Available Depths	1250mm, 1500mm, 1750mm, 2000mm, 2250mm, 2500mm, 2750mm, 3000mm
Available Pumps	2500 Series, 2600 Series, D10 Series
Inlets	5 x 110mm grommets (supplied loose)
Cable Duct & Vent Size	50mm
Discharge Connection	BSP Class C
Cable Duct Pipework	2" / 50mm White Waste Pipe
Vent Pipework	2" / 50mm White Waste Pipe





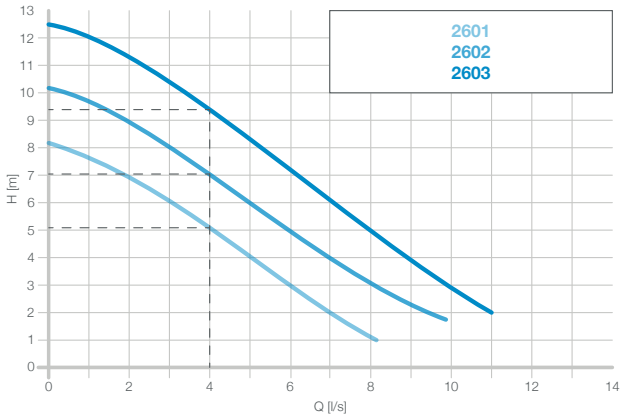
2500 SERIES

50Hz - 1 ~ 230V Discharge 2" BSP Female					
Model	P1 kW	P2 kW	In A	Part No.	Weight Kg
2500SA	1.00	0.55	5.0	Call	22
612SA	0.75	0.36	6.0	DMS-114	22
2502SA	1.05	0.50	8.2	PU-006	22
2503SA	1.90	1.10	8.2	PU-008	22
2500SM	1.00	0.55	5.0	Call	22
612SM	1.25	0.75	6.0	PU-005	22
2502SM	1.80	1.10	8.2	PU-007	22
2503SM	1.80	1.10	8.2	PU-009	22
50Hz - 3 ~ 400V Discharge 2" BSP Female					
2500TM	0.90	0.55	2.3	Call	22
612TM	1.10	0.75	2.8	Call	22
2502TM	1.50	1.10	3.0	Call	22
2503TM	2.05	1.50	3.5	Call	22



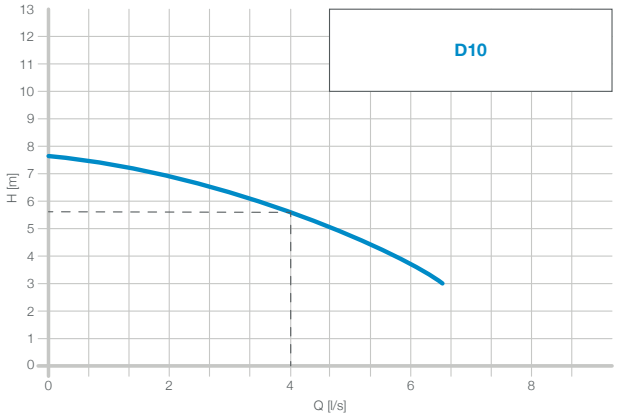
2600 SERIES

50Hz - 1 ~ 230V Discharge 2.50" BSP Female					
Model	P1 kW	P2 kW	In A	Part No.	Weight Kg
2601SA	1.25	0.75	6.0	PU-010	25
2602SA	1.80	1.10	8.2	PU-012	25
2603SA	1.80	1.10	8.2	PU-014	25
2601SM	1.25	0.75	6.0	PU-011	25
2602SM	1.80	1.10	8.2	PU-013	25
2603SM	1.80	1.10	8.2	PU-015	25
50Hz - 3 ~ 400V Discharge 2.50" BSP Female					
2601TM	1.10	0.75	2.8	Call	25
2602TM	1.50	1.10	3.0	Call	25
2603TM	2.05	1.50	3.5	Call	25



D10 SERIES

50Hz - 1 ~ 230V Discharge 2" BSP Female					
Model	P1 kW	P2 kW	In A	Part No.	Weight Kg
D10SA	1.14	0.75	5.84	DMS-120	13.4
D10SM	1.14	0.75	5.84	PU-101	13.4



ALERTMAXX2

The AlertMaxx2 is an intelligent high level alarm, designed to alert homeowners when the water level in their pump station becomes too high. AlertMaxx2 can be a stand alone high level alarm offering internal data logging, energy monitoring and a service reminder or it can be connected via Wi-Fi to the SideWinder Technology monitoring system (**www.sidewindertech.co.uk**). To enable the Wi-Fi, the AlertMaxx2 will have to be connected by one of the Certified SideWinder installers.

The AlertMaxx2 can be connected to a PowerMaxx or Hi-PowerMaxx. When connected, the AlertMaxx2 receives important data about the battery backups status and condition. The battery backup will also extend the operating time of the AlertMaxx2 during a power outage. All this data is transmitted via Wi-Fi (if connected) to the SideWinder operations centre where it is available 24/7 for intelligent analysis.

Offering a volt free contact, the AlertMaxx2 allows connection of external devices such as an alarm or beacon with a maximum load of 0.5A and voltage up to 30V. The VFR can also be connected to any BMS system if required for high level alarm only, sending a continuous signal.

KEY FEATURES

- 6V battery backup.
- Intelligent logging.
- 100db sounder.
- Digital display.
- Software controlled.
- Local energy monitoring.
- Wi-Fi enabled.
- Predictive capabilities.
- 24 month component guarantee.

TECHNICAL DATA

DMS Code (Ground Water / Foul Water)	DMS-298 / DMS-299
Size (without cable glands)	310mm x 170mm x 78mm
Weight (with battery installed)	1kg
Mains supply	200-250V AC (50Hz)
Internal battery	Pb 6V - 1.2Ah Lead Acid
Sounder	100db @ 30cm
Operating temperature	5-40˚C
Power (standby)	<2W
IP	IP2X
Approximate installation time	1 hour
Electrical Requirements (Ground)	2 Spurs
Electrical Requirements (Foul)	1 Spur
Warranty	2 years

SideWinder™ Tech

LOOKING AFTER PROPERTIES WITH OUR VIRTUAL ENGINEER...

INTELLIGENT LOGGING
Data from the property is uploaded and analysed by SideWinder Tech every 15 minutes.

FLEXIBILITY
Can be connected to almost any single or dual pump system, both existing & new.

ENERGY MONITORING
Provides local real time energy monitoring to show kWh usage per day.

WI-FI ENABLED
Simple connection to the properties Wi-Fi network made by an approved SideWinder Tech installer.

PREDICTIVE CAPABILITIES
Tells you before an event has happened! Predictive intelligence at it's best.

INTERNAL BATTERY BACKUP
Alarms remain operational even when there is a power outage or tripped electrical circuit.

100DB SOUNDER
As loud as a chainsaw, the alarm will easily be heard throughout the entire property.

MAXX BATTERY BACKUPS
Compatible with all Delta's range of battery backups. Battery status info uploaded to SideWinder Tech.

DIGITAL DISPLAY
Shows current status and simple to understand fault codes.

THE JOB OF THE VIRTUAL ENGINEER...

- Gives the property owner complete peace of mind.
- Detects over 70% of failures in advance, so an emergency becomes a scheduled visit.
- Detects pump blockages.
- Detects lime-scale build up.
- Creates triggers to investigate unusual events, i.e. longer or more frequent pump cycles.
- Understand more remotely than an engineer based at the property 24/7/365.

POWERMAXX

PowerMaxx is specifically designed for pump applications. It can run 2 x V3 (not simultaneously) ground water pumps without mains power for up to 10 days depending on the number of cycles/day and is virtually inaudible. 1 or 2 pumps are directly fed through the PowerMaxx. If a power failure occurs, the pump/s automatically take power from the PowerMaxx which will have been fully charged during mains operation.

The PowerMaxx will automatically recharge when mains power returns. Installation is simple, The PowerMaxx is free standing and can be installed in any dry ventilated area. As this unit is fitted in the power line, no additional electrical spurs are required. The PowerMaxx is part of the MaxxConnect family and can operate as a stand alone unit or can be used in conjunction with AlertMaxx2. It can also be used as a direct replacement for previous versions.

TECHNICAL DATA

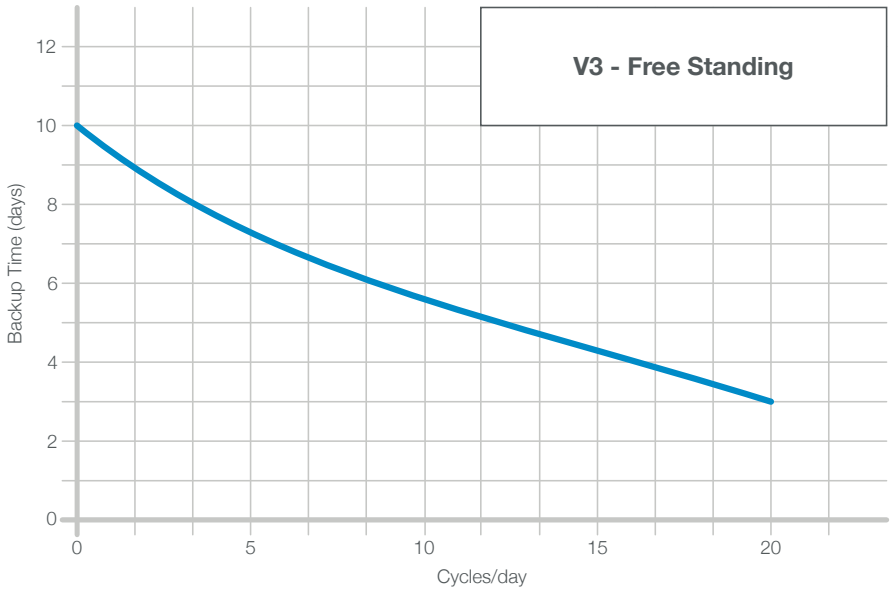
DMS Code	DMS-280
Size (without cable glands)	155mm x 425mm x 300mm
Weight (without battery installed)	6.5kg
Weight (with battery installed)	19.5kg
Mains supply	200-250V AC (50Hz)
Internal battery	24V - 1x22Ah Lead Acid
Power (standby)	<3W
Power (charging)	55W
Peak Power Handling	600W P1
Visual display	Red, Blue, Green LED
Operating temperature	5-35˚C
Approximate installation time	1 hour
Warranty	2 years

KEY FEATURES

- Designed for 2 x V3 ground water pumps.
- Powers a V3 for up to 10 days.
- Operates in standby mode during a power outage for at least 10 days.
- 24 month component guarantee.

TOP TIP

Want longer run and standby times? A PowerMaxx+ is available which has been designed to triple the available run and standby statistics of the PowerMaxx.



HI-POWERMAXX

Hi-PowerMaxx is specifically designed for pump applications. It provides battery backup for larger pumps such as the V4 &V6, sits in standby mode for up to 50 days and is virtually inaudible. If a power failure occurs, the pump/s automatically take power from the Hi-PowerMaxx which will have been fully charged during mains operation.

The Hi-PowerMaxx will automatically recharge when mains power returns. Installation is simple, the Hi-PowerMaxx is free standing and can be installed in any dry ventilated area. As this unit is fitted in series between the spur and the pump, no additional electrical spurs are required. The Hi-PowerMaxx is part of the MaxxConnect family and can operate as a stand alone unit or can be used in conjunction with the AlertMaxx2. It can also be used as a direct replacement for previous versions.

TECHNICAL DATA

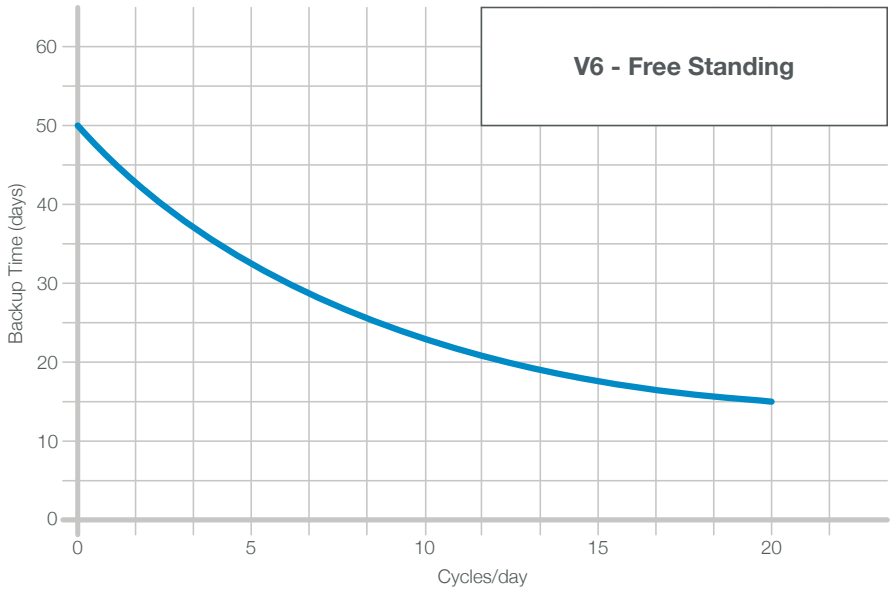
DMS Code	DMS-364
Size (without cable glands)	475mm x 425mm x 300mm
Weight (without battery installed)	15.5kg
Weight (with battery installed)	80.5kg
Mains supply	200-250V AC (50Hz)
Internal battery	24V - 5x22Ah Lead Acid Total = 110Ah
Power (standby)	<3W
Power (charging)	55W
Peak Power Handling	2000W P1
Visual display	Red, Blue, Green LED
Operating temperature	5-35˚C
Approximate installation time	1.5 hours
Warranty	2 years

KEY FEATURES

- Designed for 2 x V4/V6 ground water pumps.
- Operates in standby mode during a power outage for at least 50 days.
- 24 month component guarantee.

TOP TIP

The Hi-PowerMaxx can be used to backup manual pumps that run through a DUTY/STANDBY control panel (2000W max.). Please request a wiring diagram before attempting installation.



ANCILLARY PRODUCTS & MAINTENANCE

PIPE & FITTINGS

We can supply a range of pipe and pipe fittings from 1.25" up to 2.5". Our pipe and fittings are all high pressure PVC-U Class C with a pressure rating from 9 bar up to 15 bar depending on the type. We also stock high pressure solvent weld glue in 500ml pots.

VALVES

We can supply a range of brass and cast iron valves including, swing check non return valves, non return ball valves and brass gate valves. Our valves range in size from 1.25" through to 2.50".

PUMP & CHAMBER SPARES

We can supply a range of pump and sump spares. This includes float switches, replacement pump claws, cable harnesses, sounders & beacons and pipework assemblies. Please contact our technical team for more information.

MAINTENANCE

Sump pumps must be maintained. We recommend a qualified engineer examines and services equipment every year. Pumps running frequently due to higher water tables, water drainage, or weather conditions should be examined more frequently, we recommend every 6 months. Sump pumps, being mechanical devices, may fail if not maintained which could lead to a flooded basement and costly repairs.

Regular servicing of sump pumps will increase efficiency and extend the life of the pump. All Delta Membrane pump systems can be maintained by our pump partners, Packaged Pump Systems (PPS) or the installing contractor.

COMMISSIONING

All sump pumps require commissioning. Commissioning provides peace of mind, knowing that the system is installed correctly and in compliance with warranty conditions. When this is done by our pump partners Packaged Pump Systems (PPS), the warranty on the pumps is restarted from the date of commissioning.

DELTA MEMBRANES

PPS packagedpumpsystems

‘FREE LIME’ RISK

The British Standard for waterproofing BS 8102:2009 recognises the requirement of a Type C Waterproofing System or Cavity Drain Membrane System to be maintainable.

The use of inspection ports within a Basement Waterproofing Design is key for maintenance or the ability to carry out periodic inspection. When new concrete is introduced to structures, there is a risk of excess free lime leaching out during the curing process in the form of calcium hydroxide, this free lime, if untreated, can enter the Cavity Drainage System which can impede the flow of water and cause sump pump failure. We recommend during a Cavity Drain System installation that a silicification pre-treatment of concrete be used to reduce the risk of free lime build up. Attention should be observed to dry pack joints often formed between the existing foundation and new concrete underpin, these are classic areas for free lime to infiltrate the structure and should be ‘locked’ down

KOSTER POLYSIL-TG 500

An ‘anti lime’ coating product specially blended with Polymers and silicates which is applied by brush or spray application. Applying Koster Polysil-TG 500 will not only reduce the amount of free lime leaching into the Cavity Drainage System but will also improve the water resistance of the basement structure by absorption into the structure and locking in the free lime.

Head Office:
Delta House, Merlin Way, North Weald, Epping, Essex, CM16 6HR
01992 523 523 | info@deltamembranes.com | www.deltamembranes.com

DOC: BPD/2019V2

JOMAS ENGINEERING ENVIRONMENTAL

WE LISTEN, WE PLAN, WE DELIVER
Geotechnical Engineering and Environmental Services across the UK.

DRAINAGE MAINTENANCE PLAN

47 Fairfield Road, Uxbridge UB8 1AZ

JOMAS ASSOCIATES LTD
Unit 24 Sarum Complex, Salisbury Road, Uxbridge, UB8 2RZ
www.jomasassociates.com info@jomasassociates.com

Report Title: **DRAINAGE AND SUDS MAINTENANCE PLAN**

Report Status: **Final v1.0**

Job No: **P4308J2590**

Date: **17 June 2022**

Control: Previous Release

Version	Date	Issued By
V1.0	17/06/22	A Wallace

Prepared by: **JOMAS ASSOCIATES LTD** **For** Khakaria Properties Limited

Should you have any queries relating to this report, please contact

JOMAS ASSOCIATES LTD

www.jomasassociates.com

0843 289 2187

info@jomasassociates.com

1.0 GENERAL

1.1 Sustainable Drainage Systems (SuDS) are an environmentally friendly approach to managing rainfall. SuDS techniques use landscape features to deal with surface water with the aim to:

1.1.1 Control the flow, volume and frequency of water leaving a development.

1.1.2 Prevent pollution by intercepting silt and cleaning runoff from hard surfaces.

1.1.3 Provide attractive surroundings for the community.

1.2 The surface water drainage strategy for this development utilises permeable paving as the main SUDS feature. The following sections provides a brief description of these features and outlines the maintenance programme that should be adopted.

2.0 CLEANING OF THE DRAINAGE SYSTEM

2.1 Drainage systems should be inspected at regular intervals and where necessary, thoroughly cleaned out at the same time. Any defects discovered should be made good.

2.2 The following operations should be carried out during the periodic cleaning of a drainage system:-

Product Type	Period	Responsibility	Maintenance Methods
Silt Trap	As necessary and before wet season	Owner or Maintenance Company for communal areas	• Sediment and debris that accumulated during summer needs to be removed before the wet season. • Inspect and clean out routinely prior to inlet pipework to minimise debris reaching the tank. • Conduct inspections more frequently during the wet season for the area where sediment or trash accumulates more often. Clean and repair as needed.
Standard Manholes/ Inspection Chambers	As necessary	Owner or Maintenance Company for communal areas	• Remove and clean any soil and vegetation that covers the manhole cover to prevent blockage of the drainage system at the manhole.

Product Type	Period	Responsibility	Maintenance Methods
			• Renew/replace any damaged/missing bolts and damaged/missing manhole covers.
Drainage Pipes	Six monthly interval	Owner or Maintenance Company for communal areas	• Inspect underground drainage pipes to ensure that the distribution pipework arrangement is operational and free from blockages. If required, take remedial action.
Hydrobrake	Monthly for 3 months	Owner/ Maintenance Company	• Inspect and identify any areas that are not operating correctly. If required, take remedial action.
	Monthly	Owner/ Maintenance Company	• Debris removal from catchment surface (where may cause risks to performance).
	Annually	Owner/ Maintenance Company	• Remove sediment from pre-treatment structures.
	Annually and after large storms	Owner/ Maintenance Company	• Inspection/check all inlets and outlets to ensure that they are in good condition and operating as designed.
Permeable Paving	As required	Site Owner for private areas. Maintenance Company for communal areas	• Inspect the paving after any precipitation to ensure no displacement of any organic matter onto the surface of the pavement.
	Six monthly (Ideally, this activity to be carried out in spring and autumn seasons)	Site Owner for private areas. Maintenance Company for communal areas	• Agitate (e.g. brush, vacuum, etc.) the block paving to ensure no vegetation of any sort is allowed to grow and develop in the joints (where may affect performance).
	Winter season	Site Owner for private areas. Maintenance Company for communal areas	• De-icing may be used without causing significant detrimental effects towards the permeable pavement's performance. When used carefully, the use of these chlorides will not

Product Type	Period	Responsibility	Maintenance Methods
			result in an increase in the chloride levels in the local ground.

3.0 SKETCHES AND PLANS

3.1 The locations of the above features can be found by examining Drawing P4308J2590-C01

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JOMAS ASSOCIATES LTD

Unit 24 Sarum Complex

Salisbury Rd

Uxbridge

UB8 2RZ

CONTACT US

Website: www.jomasassociates.com

Tel: 0333 305 9054

Email: info@jomasassociates.com