

SURFACE WATER DRAINAGE STRATEGY
JUNE 2012
REV A

PROPOSED FOODSTORE

HAWTHORN ROAD, LITTLEHAMPTON

FOR

OPTIMISATION DEVELOPMENTS LTD

PROJECT No	LS1224
PROJECT TITLE	Proposed Foodstore, Hawthorn Road, Littlehampton
CLIENT	Optimisation Developments Ltd

DISCIPLINE	Civil
DOCUMENT TITLE	Surface Water Drainage Strategy
AUTHOR	D J Burniston

DATE	June 2012
CHECKED BY	R Fowler
AUTHORISED FOR ISSUE BY	D J Burniston
DOCUMENT NUMBER	LS1224/SWDS001
REVISION	A

A	RF	07/11/12	DJB	DJB	Proposed drainage updated
ISSUE	AUTHOR	DATE	CHECKED	APPROVED	ALTERATIONS



Existing Drainage

The site was occupied by 2 No. factory/warehouse buildings with an office development identified as the Enterprise Hub.

Drainage investigation works have been carried out on site, the results of which are recorded on BSCP drawing LS1224/D1 Rev P2 – Existing Drainage Layout. Refer Appendix.

Surface water runoff from the existing buildings and hardstandings discharge to a network of soakaways located within the hardstanding areas around the site.

The soakaways are a mixture of traditional circular perforated pre-cast concrete soakaways circa 2.5m deep and deep bore soakaways, which have a vertical perforated pipe that extends into the underlying strata.

A 225ø public foul sewer traverses the site from west to east, connecting into a 300ø public foul sewer in Lyminster Road. Refer Appendix Southern Water Public Sewer Record Plan.

2 No. pumping stations and a 3 stage interceptor have been located that originally conveyed trade effluent into the public foul sewer from the factory building.

Proposed Drainage

Drainage from the roofs of buildings and external paved areas around the buildings are required to comply with the 2002 edition of the Building Regulations 2000 Approved Document – Part H – Drainage and Waste Disposal.

The hierarchy for surface water disposal from a development within the Building Regulations is as below in descending order of preference.

- (1) Discharge to ground via adequate soakaway/infiltration system.
- (2) Discharge to watercourse.
- (3) Discharge to sewer/drain.

As the site currently discharges surface water to the ground, this is to be continued for the new development as the preferred option.

However, the site is located above a Major Aquifer High Groundwater Vulnerability Zone as defined by the Environment Agency. Whilst it is not within a Groundwater Source Protection Zone, consideration is required for the protection of the groundwater.



The following proposals are included on BSCP drawing LS1224/D2 Rev E – Proposed Drainage Layout.

- (1) Roofwater from the northern half of the main foodstore is directed toward the retained existing deep bore soakaways and traditional soakaways that originally drained the factory/warehouse buildings and hardstandings. Note those beneath the new building are now redundant.

The roofwater drainage system is a sealed system to prevent any pollutants entering the system.

An additional sealed cellular attenuation tank is provided to accommodate a 1 in 100 year return period storm with an additional 20% allowance for anticipated future climate change. This is identified on the drawing as Attenuation Tank No. 2 and is sized following completion of percolation testing on the existing deep bore soakaways.

Refer Appendix Sirius Soakaway Results and MicroDrainage Calculations.

The southern half of the main food store cannot be drained to the existing deep bore soakaways as testing of these showed that the permeability rate of the ground in this area is unsatisfactory. Instead, this section of roof water is discharged to a tank (Attenuation Tank No. 5) which is linked to the attenuation and drainage system used for the southern car park and service yard.

- (2) Discharge of surface water runoff from the car park, service yard, petrol filling station and access road is to 4 No. new cellular attenuation tanks (Attenuation Tank No's 1, 3, 4 and 6) that discharge to the public surface water sewers.

These provide attenuation volumes to accommodate up to a 1 in 100 year return period storm + 20% climate change.

Prior to discharge to the attenuation tanks, the surface water runoff passes through trapped gullies and Class 1 Bypass Separators. The runoff from the petrol filling station passes through a forecourt separator.

The manufacturer of the Separators will be from the Environment Agency approved Oil Separator Manufacturers List (August 2011) and fitted with coalescent filters and oil high level alarms.

The sizes and positions of these tanks are shown on the Proposed Drainage Layout.

- (3) Attenuation Tanks 5 and 6 collect surface water from the southern half of the main food store, southern car park and service yard which is then pumped at a rate of 2.5 litres per second to Tank 1, located in the northern car park.

Attenuation Tank 1 collects additional surface water from the northern car park and discharges by gravity to the Southern Water surface water culvert in Courtwick Lane at a maximum agreed rate of 5 litres per second.

A small amount of flooding occurs during the 1 in 100 year storm event, with 20% added for anticipated future climate change, which ponds in the north west corner of the car park to a depth of 60mm.

Refer Appendix MicroDrainage Calculations.

- (4) Attenuation Tanks 3 and 4 collect surface water from the eastern car park, access road and petrol filling station. It discharges by gravity to the Southern Water surface water culvert in Lyminster Road at a maximum agreed rate of 5 litres per second.

A small amount of flooding occurs during the 1 in 100 year storm event, with 20% added for anticipated future climate change, which ponds around the channel drain in the eastern car park to a depth of 50mm.

Refer Appendix MicroDrainage Calculations.

- (5) The office block identified as the Enterprise Hub is maintained on the current soakaway drainage system.
- (6) Any redundant soakaways are to be adequately backfilled and any deep bore soakaways are to have the vertical pipes securely sealed prior to backfilling.
- (7) The diversion of the foul sewer is agreed and subject to a Section 185 Agreement with Southern Water.

Foul water from the store and petrol filling station will be discharged to the foul sewer as agreed with Southern Water.

Future Maintenance

As a private drainage system, the maintenance responsibility of the private drainage system will rest with the superstore operator.

On completion of the project, 'As Built' Drainage Plans and a Drainage Maintenance Schedule are provided as part of the Operation and Maintenance Manual, to assist the operator to establish a drainage maintenance regime.



APPENDIX

BSCP Drawing LS1224/D1 Rev P2 – Existing Drainage Layout

Southern Water Public Sewer Record Plan

BSCP Drawing LS1224/D2 Rev E – Proposed Drainage Layout

Sirius Soakaway Results

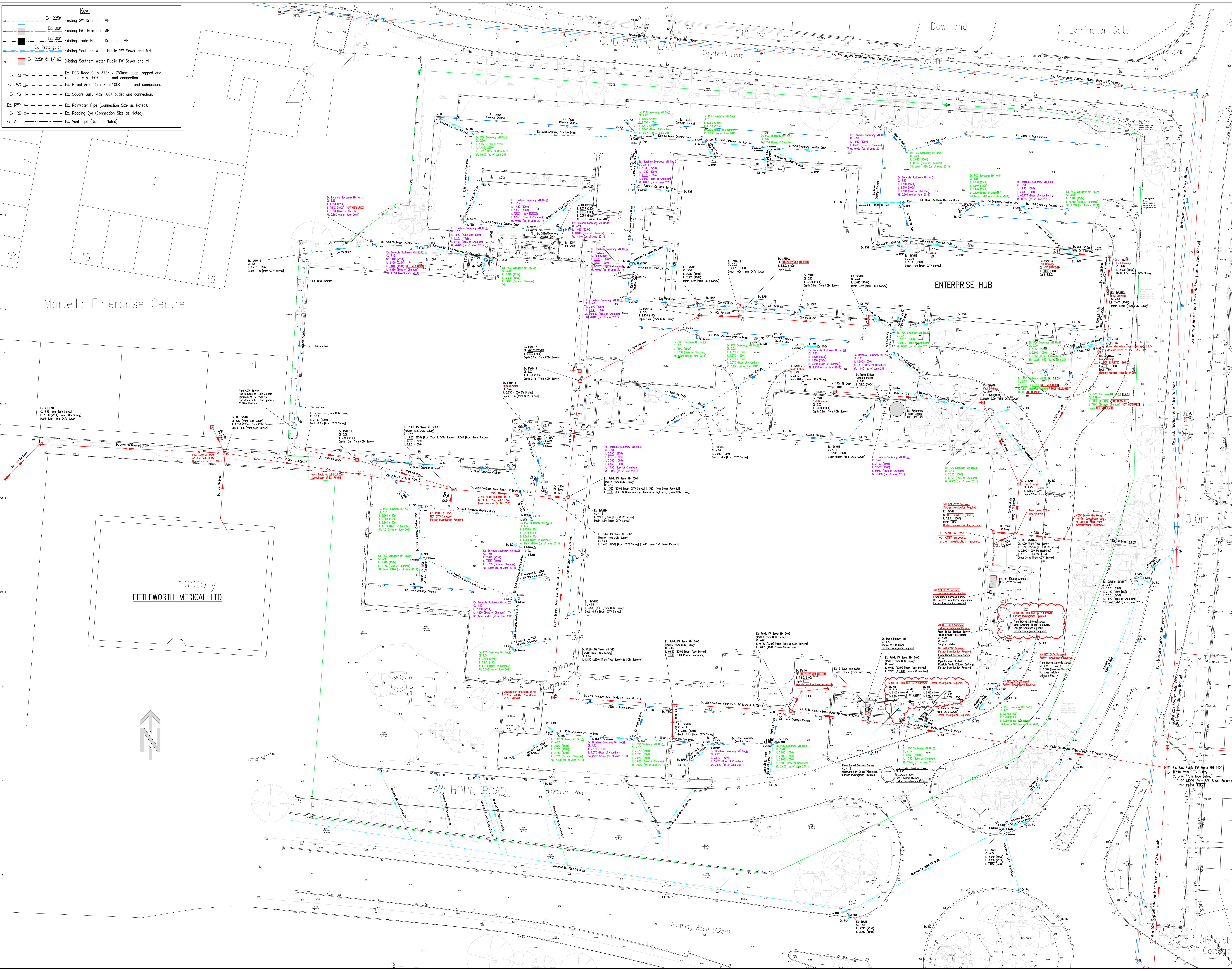
MicroDrainage Calculations

BSCP Drawing LS1224/DA2 Rev P1 – Impermeable Area Drainage Plan



Key

- Ex. 225# Existing SW Drain and MH
- Ex. 100# Existing FW Drain and MH
- Ex. 100# Existing Trade Effluent Drain and MH
- Ex. Rectangular Existing Southern Water Public SW Sewer and MH
- Ex. 225# @ 1/163 Existing Southern Water Public FW Sewer and MH
- Ex. POC Road Gully 375# x 750mm deep trapped and roadable with 150# outlet and connection.
- Ex. PAG Existing Area Gully with 100# outlet and connection.
- Ex. YG Existing Square Gully with 100# outlet and connection.
- Ex. RWP Existing Rainwater Pipe (Connection Size as Noted).
- Ex. RE Existing Rodding Eye (Connection Size as Noted).
- Ex. Vent Existing Vent pipe (Size as Noted).



DO NOT SCALE - IF IN DOUBT ASK

NOTES

(a) Drawing based upon Surveys carried out by Tower Survey Ltd. Survey No. R-M4277 2011-204 (No Revisions) Topographical Survey dated 12-01-11 and Survey No. R-M4277 101-104 (No Revisions) Buried Services Survey dated 29-06-11.

(b) Drawing based upon Southern Water Sewer Records (search dated 17-12-10).

(c) Drawing based upon CCTV Drainage Survey carried out by County Environmental Services Ltd. Survey No. Littlehampton - Lyminster Road (dated 03-05-12 and 04-05-12).

Rev	Date	Description	By	Chk	App
P2	19/06/12	Additional Information Added from Tower Surveys Buried Services Survey dated 29-06-11. Subsoy Type Identified and Subsoy Numbers.	JNS	DJB	DJB
P1	11/06/12	Preliminary for Tender.	JNS	DJB	DJB

Part of the **gha ivignn** group

BSC P LS16 T5R

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CLIENT: **Optimisation Developments Ltd**

PROJECT: **Proposed Food Superstore
Lyminster Road, Littlehampton**

TITLE: **Existing Drainage Layout**

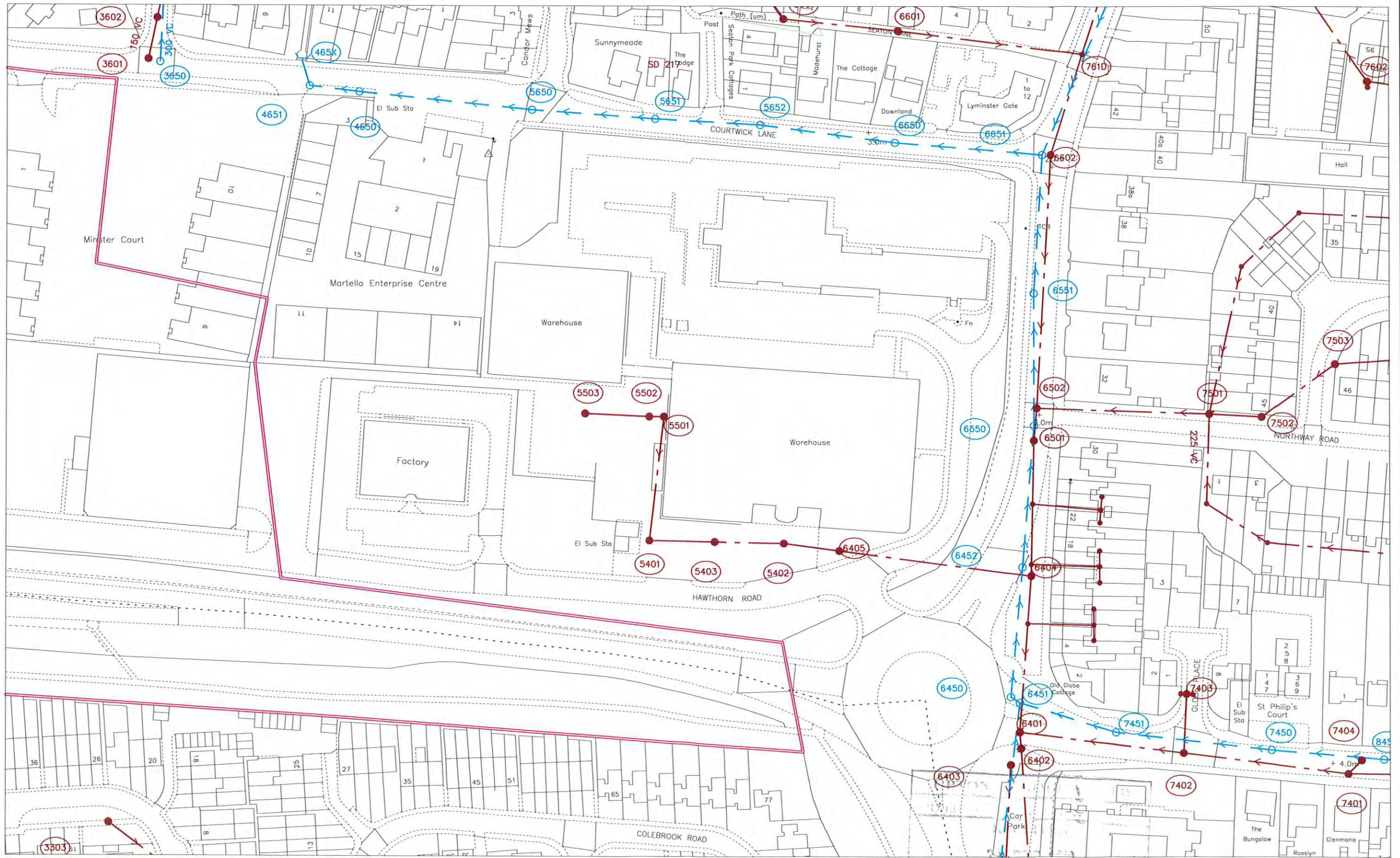
SCALE: 1:250

DRAWING NO: **LS 1224 / D1**

REVISION: **P2**

SEWER RECORDS PAGE 1 OF 2

103676



103388

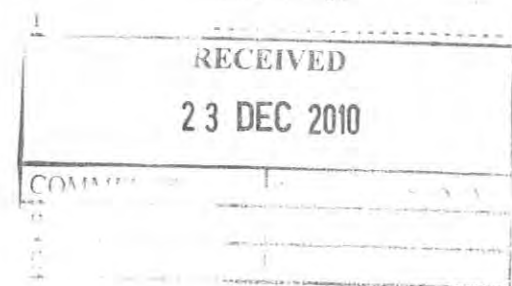
O.S. REF. TQ0203NE	Drawn by: JhunjhN Scale: 1:1250	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: BAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement	502805
Title: 111592_Wick Site Lyminster Roa	Date: 17/12/2010	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.	502805

COMMENTS
REPLY DATE
INITIALS



SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
3303X	4.82	3.92	150	VC	CIRC																		
3601X	2.75	0.94	150	VC	CIRC																		
3602X	2.68	0.67	150	VC	CIRC																		
3650X	2.77	1.56	300	VC	CIRC																		
4650X	2.9	1.21	OTHER	CO	RECT																		
5501X	4.1	1.32	225	VC	CIRC																		
5502X	4.11	1.44	225	VC	CIRC																		
5503X	3.86	1.64	225	VC	CIRC																		
5601X	2.21	1.51	225	VC	CIRC																		
5650X	3.18	1.21	OTHER	CO	RECT																		
5651X	3.06	1.21	OTHER	CO	RECT																		
5652X	3.1	1.21	OTHER	CO	RECT																		
6403X	3.9	2.41	375	VC	CIRC																		
6404X	3.76	0.19	300	VC	CIRC																		
640DX			300	VC	CIRC																		
641DX			300	VC	CIRC																		
6450X	3.86	1.36	OTHER	CO	RECT																		
6451X	3.84	1.37	OTHER	CO	RECT																		
6452X	3.78	1.36	OTHER	CO	RECT																		
6501X	3.38	0.39	300	VC	CIRC																		
6502X	3.26	0.46	300	VC	CIRC																		
650DX			300	VC	CIRC																		
6550X	3.3	1.31	OTHER	CO	RECT																		
6551X	2.97	1.26	OTHER	CO	CIRC																		
6601X	2.36	1.31	225	VC	CIRC																		
6602X	2.91	0.87	300	VC	CIRC																		
6650X	2.98	1.21	OTHER	CO	RECT																		
6651X	2.88	1.21	OTHER	CO	RECT																		
7401X		0.38	300	VC	CIRC																		
7402X	3.73	0.03	300	VC	CIRC																		
7403X	3.96	1.07	150	VC	CIRC																		
7450X	3.81	1.63	900	CP	CIRC																		
7451X	3.52	1.43	900	CP	CIRC																		
7501X	4.08	1.72	225	VC	CIRC																		
7502X	4.21	2.06	225	VC	CIRC																		
7503X	4.33	2.52	225	VC	CIRC																		
753DX			225	VC	CIRC																		
7602X	4.3	2.18	225	CP	CIRC																		
761DX			300	VC	CIRC																		
8454X	3.91	1.73	525	CP	CIRC																		



LINE STYLES / COLOURS	MATERIALS	LEGEND - SEWERS
Brown --- Foul	AK Alkathene	Manhole (SW)
Red --- Foul Syphon Sewer	BAZ Bonded Asbestos Cement	Manhole (F&C)
Red --- Foul Vacuum Main	BRC Brick (Common)	Lamp hole (SW)
Red --- Foul Rising Main	BRE Brick (Engineering)	Lamp hole (F&C)
Red --- Combined	CC Concrete Box Culvert	Pumping Station (SW)
Red --- Combined Syphon Sewer	CI Cast Iron	Pumping Station (F&C)
Red --- Combined Rising Main	CO Concrete (in-situ)	Side entry manhole (SW)
Red --- Lateral Drain	CP Concrete (Pre-Cast)	Side entry Manhole (F&C)
Orange --- Building Over Agreement Arse	CSB Concrete Segments (bottle)	Blind shaft (SW)
Dark Blue --- Treated Effluent	CSU Concrete Segments (unbottle)	Blind shaft (F&C)
Purple --- Sludge	DI Ductile Iron	Ejector station (SW)
Purple --- Sewer Catchment	GRD Glass Reinforced Concrete	Ejector station (F&C)
Purple --- Section 104 Arse	GRP Glass Reinforced Plastic	Widening door (SW)
Light Blue --- Surface Water	MAC Masonry in random Courses	Widening door (F&C)
Light Blue --- Surface Water Rising Main	PE Polyethylene	Flushing ch. Min (SW)
Yellow --- Private	PF Pitch Fibre	Flushing ch. Min (F&C)
Green --- Access Shaft	PP Polypropylene	Flushing ch. No-e (SW)
Green --- Decommissioned	PVC PolyVinyl Chloride	Flushing ch. No-e (F&C)
	RPM Reinforced Plastic Matrix	Demarcation Chamber
	SI Spun Iron	
	ST Steel	
	VC Vitified Clay	
	XXX Other	
	ZZZ Unknown	

Drawn by:	JhunjhN	
Title:	111592_Wick Site Lyminster Roa	
Date:	17/12/2010	

BOREHOLE SOAKAWAY TESTS BY SIRIUS - Summary

BOREHOLE SA12 2.8m DIAMETER 2.6m DEEP

INFILTRATION RATE	
TEST 1	6.25×10^{-6}
TEST 2	8.57×10^{-6}
TEST 3	1.19×10^{-5}

* LOWEST RESULT

BOREHOLE SA13 2.4m DIAMETER 2.33m DEEP

INFILTRATION RATE	
TEST 1	5.70×10^{-5}
TEST 2	5.28×10^{-5}
TEST 3	4.55×10^{-5} * LOWEST RESULT

BOREHOLE JA14 2.8m DIAMETER 2.35m DEEP

INFILTRATION RATE		
TEST 1	3.53×10^{-6}	* LOWEST RESULT
TEST 2	6.48×10^{-5}	
TEST 3	4.79×10^{-5}	

EQUIVALENT SAKAWAY (FOR MICRO DRAINAGE, 3 NO. SAKAWAYS)

AVERAGE DIAMETER 2.67 m

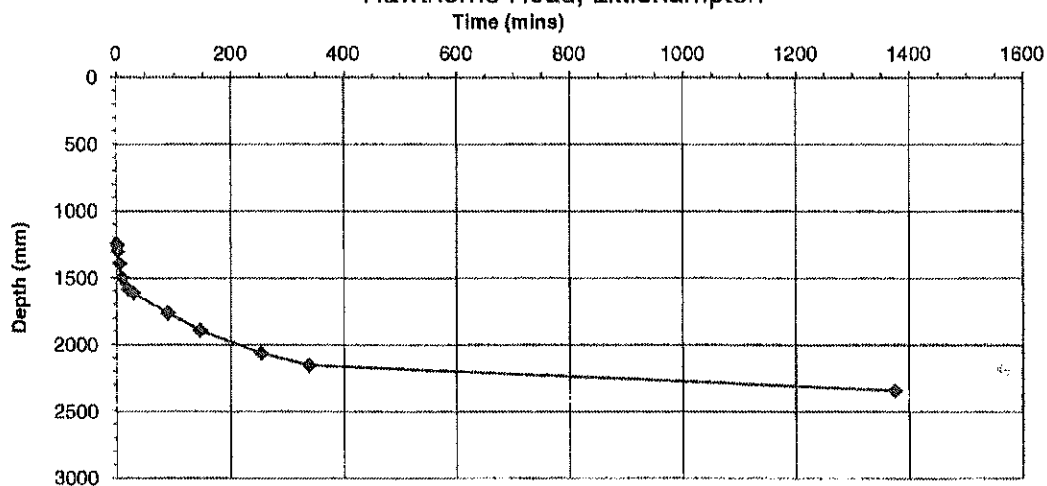
AVERAGE DEPTH 2.43m

AVERAGE INFILTRATION RATE $1.843 \times 10^{-5} \text{ m/s}$
 $\equiv 0.06634 \text{ m/hr}$

SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	BSC.P		
Site:	Hawthorne Road, Littlehampton		
Job No:		Test No:	SA12 - Test 1
Date:	11/09/2012	Time:	
CALCULATION OF SOIL INFILTRATION RATE			
Time (min)	Depth (mm)	Size of Soakaway	Depths of soakaway (m) = 2.60
0	1240		diameter (m) = 2.80
1	1260		
2	1300		
5	1390	Depth to water at start of test = 1240mm	
10	1500	Depth to base of Pit = 2600mm	
20	1580	75% level = 1580mm	
30	1610	50% level = 1920mm	
90	1760	25% level = 2260mm	
146	1890		
254	2060	Base area of pit (m²) = 6.158	
339	2150	Eff area of loss 75 - 25% (m²) = 12.158	
1375	2340	Volume outflow 75 - 25% (m³) = 4.187	
		From the graph:	
		tp 75 (min) = 20	
		tp 25 (min) = 938	
		Soil Infiltration rate, f, (m/s) =	6.25E-06 normal test
		Soil Infiltration rate, f, (m/s) =	pit with stone
		Input by: MB	Date: 09/10/2012
		Checked by:	Date:

Hawthorne Road, Littlehampton



BRE Digest 365, Figure 2, Page 5

BSC.P

Hawthorne Road, Littlehampton

Test No: SA12 - Test 1 2

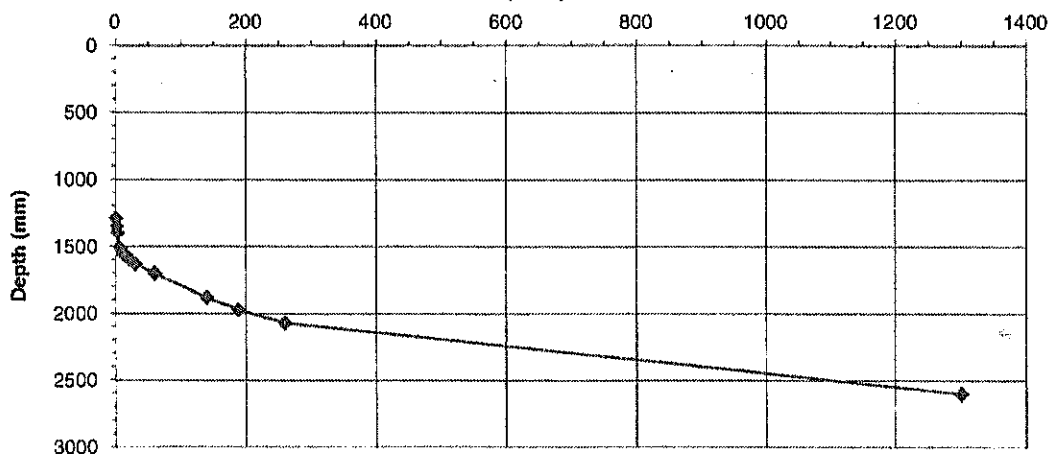
Time:

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)	Size of Soakaway	Depths of soakaway (m) =	2.60
0	1290		diameter (m) =	2.80
1	1350	Depth to water at start of test = 1290mm Depth to base of Pit = 2600mm 75% level = 1618mm 50% level = 1945mm 25% level = 2273mm		
2	1400			
6	1510			
10	1550			
20	1590			
30	1630	Base area of pit (m ²) = 6.158 Eff area of loss 75 - 25% (m ²) = 11.938 Volume outflow 75 - 25% (m ³) = 4.033		
60	1700			
140	1880			
188	1970			
260	2070	From the graph: tp 75 (min) = 24 tp 25 (min) = 659		
1301	2600			
		Soil Infiltration rate, f, (m/s) = Soil Infiltration rate, f, (m/s) = Input by: MB Checked by:	8.87E-06	normal test
				pit with stone
			Date:	09/10/2012
			Date:	

Hawthorne Road, Littlehampton

Time (mins)

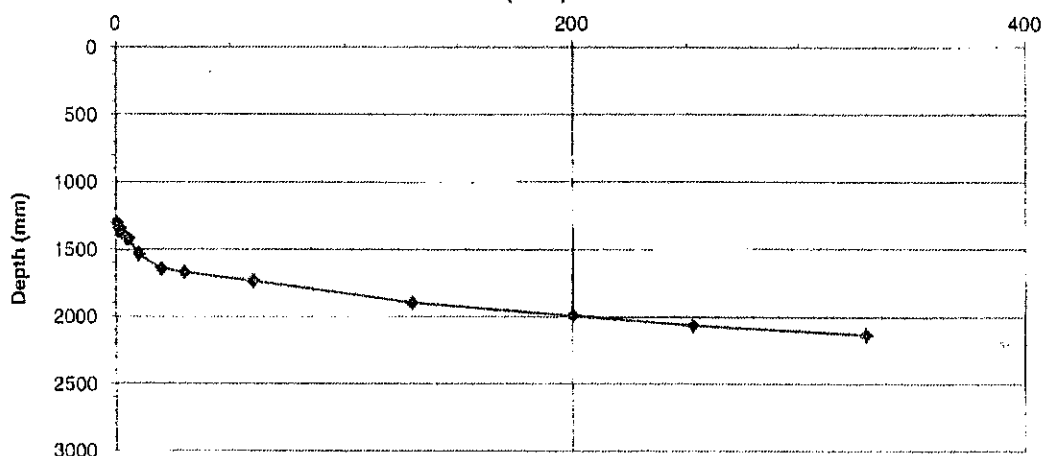


SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	BSC.P		
Site:	Hawthorne Road, Littlehampton		
Job No:		Test No:	SA12 - Test 3
Date:	12/09/2012	Time:	

CALCULATION OF SOIL INFILTRATION RATE			
Time (min)	Depth (mm)	Size of Soakaway	Depths of soakaway (m) = 2.60
0	1300		diameter (m) = 2.80
1	1340		
2	1370		
5	1420	Depth to water at start of test = 1300mm	
10	1530	Depth to base of Pit = 2600mm	
20	1640	75% level = 1625mm	
30	1665	50% level = 1950mm	
60	1730	25% level = 2275mm	
130	1890		
200	1990	Base area of pit (m ²) = 6.158	
253	2060	Eff area of loss 75 - 25% (m ²) = 11.893	
330	2130	Volume outflow 75 - 25% (m ³) = 4.002	
		From the graph:	
		tp 75 (min) = 18	
		tp 25 (min) = 489	
		Soil infiltration rate, f, (m/s) =	1.19E-05 normal test
		Soil infiltration rate, f, (m/s) =	pit with stone
		Input by: MB	Date: 09/10/2012
		Checked by:	Date:

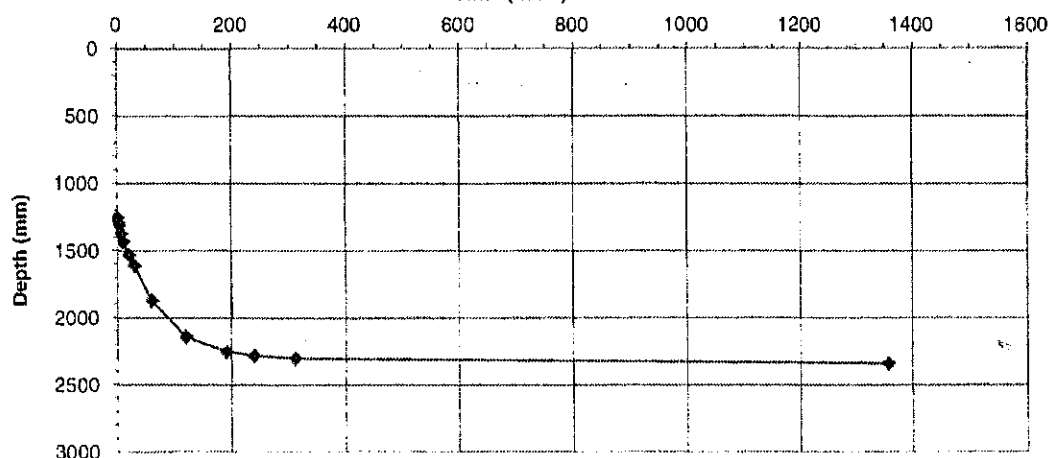
Hawthorne Road, Littlehampton
Time (mins)



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	BSC.P			
Site:	Hawthorne Road, Littlehampton			
Job No:		Test No:	SA13 - Test 1	
Date:	10/09/2012	Time:		
CALCULATION OF SOIL INFILTRATION RATE				
Time (min)	Depth (mm)	Size of Soakaway	Depths of soakaway (m)* =	2.33
0	1250		diameter (m) =	2.40
1	1290			
2	1310			
6	1370	Depth to water at start of test = 1250mm		
10	1430	Depth to base of Pit = 2330mm		
20	1530	75% level = 1520mm		
30	1610	50% level = 1790mm		
60	1870	25% level = 2060mm		
120	2140			
191	2250	Base area of pit (m ²) = 4.524		
240	2280	Eff area of loss 75 - 25% (m ²) = 8.608		
311	2300	Volume outflow 75 - 25% (m ³) = 2.443		
1358	2340			
		From the graph:		
		tp 75 (min) = 19		
		tp 25 (min) = 102		
		Soil Infiltration rate, f, (m/s) =	5.70E-05	normal test
		Soil Infiltration rate, f, (m/s) =		pit with stone
		Input by: MB	Date:	09/10/2012
		Checked by:	Date:	

Hawthorne Road, Littlehampton
Time (mins)



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991

BRE Digest 365, Figure 2, Page 5

Client:

BSC.P

Site:

Hawthorne Road, Littlehampton

Job No:

Test No:

SA13 - Test 2

Date:

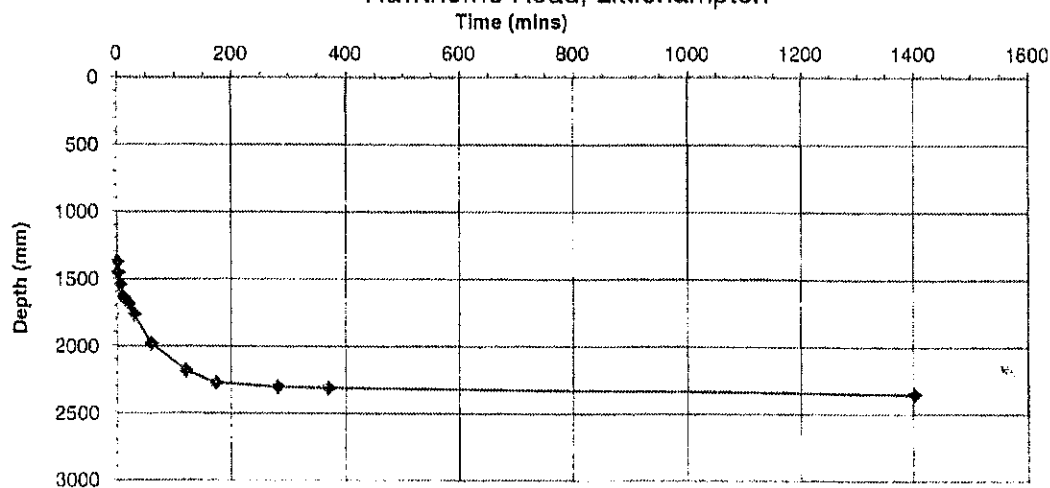
11/09/2012

Time:

CALCULATION OF SOIL INFILTRATION RATE

Time (min)	Depth (mm)	Size of Soakaway	Depths of soakaway (m)* =	
0	1370		2.33	
1	1450		diameter (m) =	2.40
5	1540			
10	1630			
20	1680		Depth to water at start of test =	1370mm
30	1760		Depth to base of Pit =	2330mm
60	1980		75% level =	1610mm
120	2180		50% level =	1850mm
173	2270		25% level =	2090mm
281	2300			
369	2310		Base area of pit (m ²) =	4.524
1402	2350		Eff area of loss 75 - 25% (m ²) =	8.155
			Volume outflow 75 - 25% (m ³) =	2.171
			From the graph:	
			tp 75 (min) =	9
			tp 25 (min) =	93
			Soil Infiltration rate, f, (m/s) =	5.28E-05 normal test
			Soil Infiltration rate, f, (m/s) =	pit with stone
			Input by:	MB
			Date:	09/10/2012
			Checked by:	
			Date:	

Hawthorne Road, Littlehampton

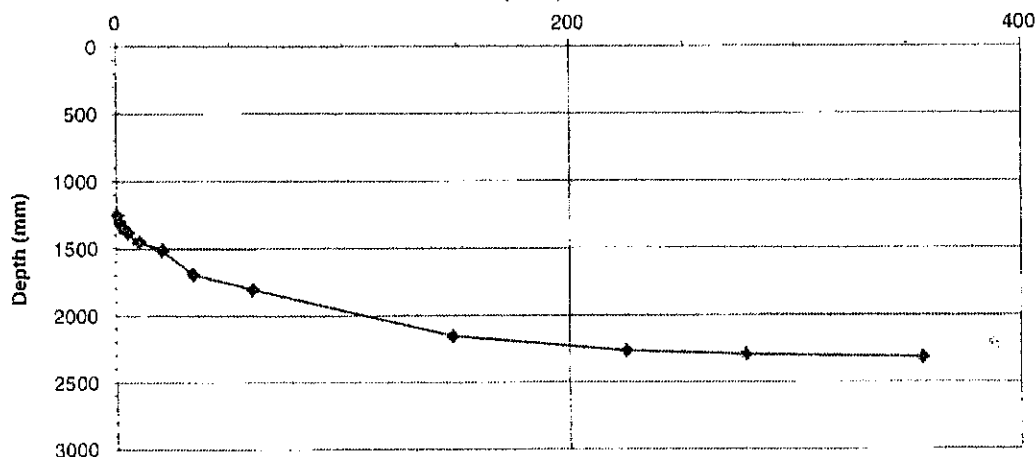


SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	BSC.P		
Site:	Hawthorne Road, Littlehampton		
Job No:		Test No:	SA13 - Test 3
Date:	12/09/2012	Time:	
CALCULATION OF SOIL INFILTRATION RATE			
Time (min)	Depth (mm)	Size of Soakaway	Depths of soakaway (m)* = 2.33
0	1250		diameter (m) = 2.40
1	1300		
2	1330		
5	1380	Depth to water at start of test = 1250mm	
10	1450	Depth to base of Pit = 2330mm	
20	1510	75% level = 1520mm	
34	1690	50% level = 1790mm	
60	1800	25% level = 2060mm	
148	2150		
225	2260	Base area of pit (m ²) = 4.524	
278	2290	Eff area of loss 75 - 25% (m ²) = 8.608	
357	2310	Volume outflow 75 - 25% (m ³) = 2.443	
		From the graph:	
		tp 75 (min) = 21	
		tp 25 (min) = 125	
		Soil infiltration rate, f, (m/s) =	4.55E-05 normal test
		Soil infiltration rate, f, (m/s) =	pit with stone
		Input by: MB	Date: 09/10/2012
		Checked by:	Date:

2.33 deep
2.4 d

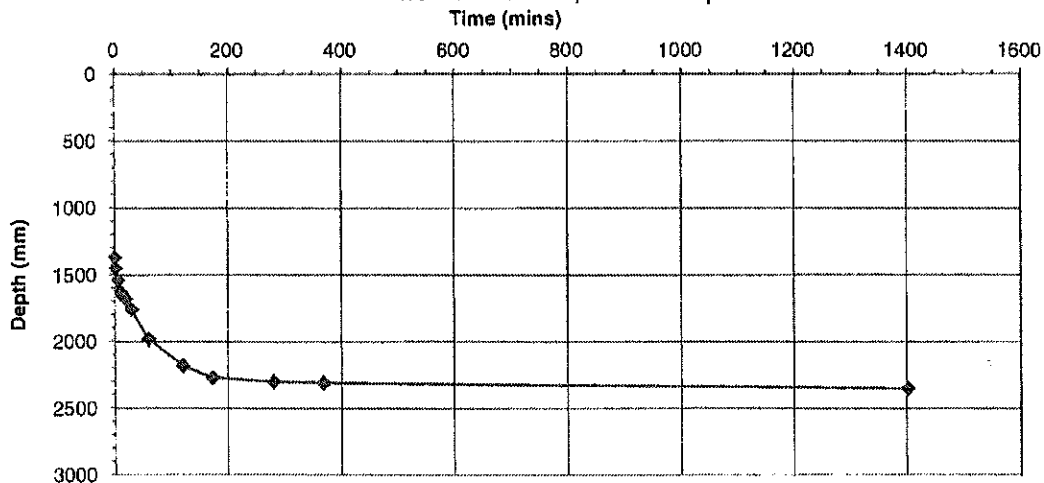
Hawthorne Road, Littlehampton
Time (mins)



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	BSC.P		
Site:	Hawthorne Road, Littlehampton		
Job No:		Test No:	SA14 - Test 2
Date:	11/09/2012	Time:	
CALCULATION OF SOIL INFILTRATION RATE			
Time (min)	Depth (mm)	Size of Soakaway	Depths of soakaway (m) = 2.35
0	1370		diameter (m) = 2.80
1	1450		
5	1540		
10	1630	Depth to water at start of test = 1370mm	
20	1680	Depth to base of Pit = 2350mm	
30	1760	75% level = 1615mm	
60	1980	50% level = 1860mm	
120	2180	25% level = 2105mm	
173	2270		
281	2300	Base area of pit (m²) = 6.158	
369	2310	Eff area of loss 75 - 25% (m²) = 10.482	
1402	2350	Volume outflow 75 - 25% (m³) = 3.017	
		From the graph:	
		tp 75 (min) = 9	
		tp 25 (min) = 83	
		Soil Infiltration rate, f_i (m/s) =	6.48E-05 normal test
		Soil Infiltration rate, f_i (m/s) =	plt with stone
		Input by: MB	Date: 09/10/2012
		Checked by:	Date:

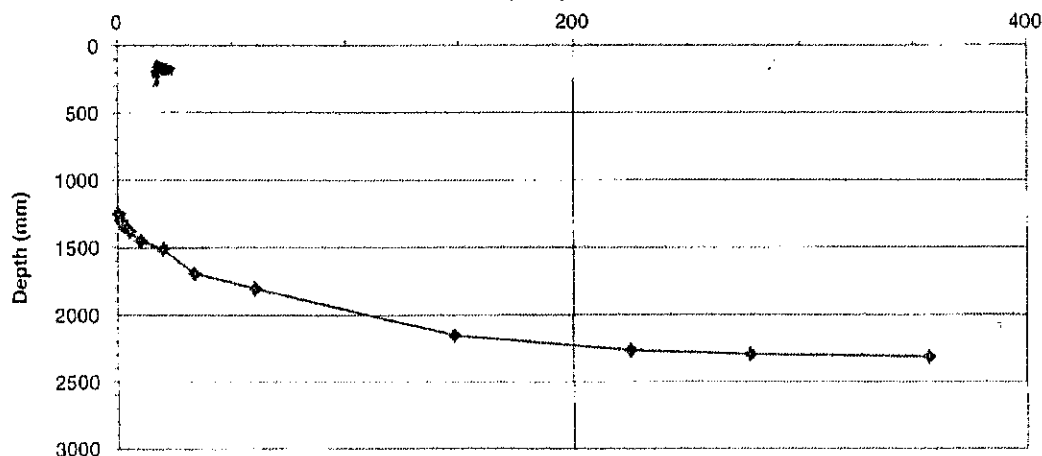
Hawthorne Road, Littlehampton



SOAKAWAY DESIGN IN ACCORDANCE WITH BRE DIGEST 365: 1991
BRE Digest 365, Figure 2, Page 5

Client:	BSC.P		
Site:	Hawthorne Road, Littlehampton		
Job No:		Test No:	SA14 - Test 3
Date:	12/09/2012	Time:	
CALCULATION OF SOIL INFILTRATION RATE			
Time (min)	Depth (mm)	Size of Soakaway	Depths of soakaway (m)* = 2.35
0	1250		diameter (m) = 2.80
1	1300		
2	1330		
5	1380	Depth to water at start of test = 1250mm	
10	1450	Depth to base of Pit = 2350mm	
20	1510	75% level = 1525mm	
34	1690	50% level = 1800mm	
60	1800	25% level = 2075mm	
148	2150		
225	2260	Base area of pit (m ²) = 6.158	
278	2290	Eff area of loss 75 - 25% (m ²) = 11.011	
357	2310	Volume outflow 75 - 25% (m ³) = 3.387	
		From the graph:	
		tp 75 (min) = 22	
		tp 25 (min) = 129	
		Soil infiltration rate, f, (m/s) =	4.79E-05 normal test
		Soil infiltration rate, f, (m/s) =	pit with stone
		Input by: MB	Date: 09/10/2012
		Checked by:	Date:

Hawthorne Road, Littlehampton
Time (mins)



BSCP		Page 1																																																																																																																																					
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Tank 2 borehole soakaway 1.84 x 10-5 m/s Average																																																																																																																																						
Date 07/11/2012 12:10 File Oct 12 Tank 2.mdx	Designed By roy.fowler Checked By																																																																																																																																						
Micro Drainage		Network W.12.5																																																																																																																																					
Existing Network Details for Storm * - Indicates pipe has been modified outside of System 1 <table><tr><th>PN</th><th>Length (m)</th><th>Fall (m)</th><th>Slope (1:X)</th><th>Area (ha)</th><th>T.E. (mins)</th><th>k (mm)</th><th>HYD SECT</th><th>DIA (mm)</th></tr><tr><td>1.000</td><td>21.900</td><td>0.220</td><td>99.5</td><td>0.125</td><td>4.00</td><td>0.600</td><td>o</td><td>375</td></tr><tr><td>1.001</td><td>19.700</td><td>0.200</td><td>98.5</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>375</td></tr><tr><td>2.000</td><td>24.300</td><td>0.260</td><td>93.5</td><td>0.115</td><td>4.00</td><td>0.600</td><td>o</td><td>375</td></tr><tr><td>1.002</td><td>6.000</td><td>0.050</td><td>120.0</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>450</td></tr><tr><td>1.003</td><td>6.000</td><td>0.050</td><td>120.0</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>300</td></tr><tr><td>* 1.004</td><td>6.000</td><td>-2.230</td><td>-2.7</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>225</td></tr></table> <table><tr><th>PN</th><th>US/MH Name</th><th>US/CL (m)</th><th>US/IL (m)</th><th>US C.Depth (m)</th><th>DS/CL (m)</th><th>DS/IL (m)</th><th>DS C.Depth (m)</th><th>Ctrl</th><th>US/MH (mm)</th></tr><tr><td>1.000</td><td></td><td>14.0</td><td>3.720</td><td>2.400</td><td>0.945</td><td>3.780</td><td>2.180</td><td>1.225</td><td>1350</td></tr><tr><td>1.001</td><td></td><td>14.1</td><td>3.780</td><td>2.180</td><td>1.225</td><td>4.020</td><td>1.980</td><td>1.665</td><td>1350</td></tr><tr><td>2.000</td><td></td><td>15.0</td><td>4.320</td><td>2.900</td><td>1.045</td><td>4.020</td><td>2.640</td><td>1.005</td><td>1350</td></tr><tr><td>1.002</td><td></td><td>14.2</td><td>4.020</td><td>1.100</td><td>2.470</td><td>3.740</td><td>1.050</td><td>2.240</td><td>1350</td></tr><tr><td>1.003</td><td></td><td>14.3</td><td>3.740</td><td>1.050</td><td>2.390</td><td>3.620</td><td>1.000</td><td>2.320</td><td>1350</td></tr><tr><td>* 1.004</td><td>BHSWay14</td><td>3.620</td><td>1.000</td><td>2.395</td><td>3.460</td><td>3.230</td><td>0.005</td><td></td><td>1200</td></tr></table>			PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	1.000	21.900	0.220	99.5	0.125	4.00	0.600	o	375	1.001	19.700	0.200	98.5	0.000	0.00	0.600	o	375	2.000	24.300	0.260	93.5	0.115	4.00	0.600	o	375	1.002	6.000	0.050	120.0	0.000	0.00	0.600	o	450	1.003	6.000	0.050	120.0	0.000	0.00	0.600	o	300	* 1.004	6.000	-2.230	-2.7	0.000	0.00	0.600	o	225	PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)	1.000		14.0	3.720	2.400	0.945	3.780	2.180	1.225	1350	1.001		14.1	3.780	2.180	1.225	4.020	1.980	1.665	1350	2.000		15.0	4.320	2.900	1.045	4.020	2.640	1.005	1350	1.002		14.2	4.020	1.100	2.470	3.740	1.050	2.240	1350	1.003		14.3	3.740	1.050	2.390	3.620	1.000	2.320	1350	* 1.004	BHSWay14	3.620	1.000	2.395	3.460	3.230	0.005		1200
PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)																																																																																																																															
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BSCP				Page 2						
Smeaton House Holt Park District Centre Leeds LS16 7SR		LS1224 Littlehampton Tank 2 borehole soakaway 1.84 x 10-5 m/s Average								
Date 07/11/2012 12:10 File Oct 12 Tank 2.mdx		Designed By roy.fowler Checked By								
Micro Drainage		Network W.12.5								
<u>Manhole Schedules for Storm</u>										
MH Name	MH CL (m)	MH Depth (m)	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
14.0	3.720	1.320	1350	1.000	2.400	375				
14.1	3.780	1.600	1350	1.001	2.180	375	1.000	2.180	375	
15.0	4.320	1.420	1350	2.000	2.900	375				
14.2	4.020	2.920	1350	1.002	1.100	450	1.001	1.980	375	805
							2.000	2.640	375	1465
14.3	3.740	2.690	1350	1.003	1.050	300	1.002	1.050	450	
BH\$Way14	3.620	2.620	1200	1.004	1.000	225	1.003	1.000	300	
BH\$Way13	3.460	0.230	2670		OUTFALL		1.004	3.230	225	
<u>Free Flowing Outfall Details for Storm</u>										
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)				
1.004	BH\$Way13	3.460	3.230	0.000	2670	0				
<u>Simulation Criteria for Storm</u>										
Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000							
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000							
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000							
Hot Start (mins)	0	Inlet Coefficient	0.800							
Hot Start Level (mm)	0	Run Time (mins)	60							
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1							
Number of Input Hydrographs	0	Number of Storage Structures	2							
Number of Online Controls	0	Number of Time/Area Diagrams	0							
Number of Offline Controls	0									
<u>Synthetic Rainfall Details</u>										
Rainfall Model	FSR	Profile Type	Summer							
Return Period (years)	2	Cv (Summer)	0.750							
Region	England and Wales	Cv (Winter)	0.840							
M5-60 (mm)	19.000	Storm Duration (mins)	30							
Ratio R	0.350									
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BSCP		Page 3
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Tank 2 borehole soakaway 1.84 x 10-5 m/s Average	
Date 07/11/2012 12:10 File Oct 12 Tank 2.mdx	Designed By roy.fowler Checked By	
Micro Drainage Network W.12.5		

Storage Structures for Storm

Tank or Pond Manhole: 14.3, DS/PN: 1.003

Invert Level (m) 1.050

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	72.0	0.700	72.0	1.400	72.0	2.100	0.0
0.100	72.0	0.800	72.0	1.500	72.0	2.200	0.0
0.200	72.0	0.900	72.0	1.600	72.0	2.300	0.0
0.300	72.0	1.000	72.0	1.700	72.0	2.400	0.0
0.400	72.0	1.100	72.0	1.800	72.0	2.500	0.0
0.500	72.0	1.200	72.0	1.900	72.0		
0.600	72.0	1.300	72.0	2.000	72.0		

Lined Soakaway Manhole: BHSWay14, DS/PN: 1.004

Infiltration Coefficient Base (m/hr)	0.06624	Ring Diameter (m)	2.67
Infiltration Coefficient Side (m/hr)	0.06624	Pit Multiplier	1.0
Safety Factor	2.0	Number Required	3
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	1.000	Cap Infiltration Depth (m)	2.430

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BSCP		Page 4						
Smeaton House	LS1224 Littlehampton							
Holt Park District Centre	Tank 2 borehole soakaway							
Leeds LS16 7SR	1.84 x 10-5 m/s Average							
Date 07/11/2012 12:10	Designed By roy.fowler							
File Oct 12 Tank 2.mdx	Checked By							
Micro Drainage	Network W.12.5							
2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for								
Storm								
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF								
Analysis Timestep Fine Inertia Status OFF								
DTS Status ON								
Profile(s) Summer and Winter								
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080								
Return Period(s) (years) 2, 30, 100								
Climate Change (%) 20, 20, 20								
PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	2	+20%	100/2160 Winter				
1.001	15 Summer	2	+20%	100/480 Winter				
2.000	15 Winter	2	+20%					
1.002	2880 Winter	2	+20%	2/180 Winter				
1.003	2880 Winter	2	+20%	2/60 Summer				
1.004	1440 Winter	2	+20%					
PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	14.0	2.498	-0.277	0.000	0.15	0.0	26.3	OK
1.001	14.1	2.279	-0.276	0.000	0.16	0.0	26.4	OK
2.000	15.0	2.991	-0.284	0.000	0.14	0.0	24.2	OK
1.002	14.2	1.891	0.341	0.000	0.01	0.0	1.7	SURCHARGED
1.003	14.3	1.891	0.541	0.000	0.04	0.0	2.5	SURCHARGED
1.004	BHSWay14	1.912	0.687	0.000	0.00	0.0	0.0	SURCHARGED
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BSCP				Page 5				
Smeaton House		LS1224 Littlehampton						
Holt Park District Centre		Tank 2 borehole soakaway						
Leeds LS16 7SR		1.84 x 10-5 m/s Average						
Date 07/11/2012 12:10		Designed By roy.fowler						
File Oct 12 Tank 2.mdx		Checked By						
Micro Drainage		Network W.12.5						
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>								
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF								
Analysis Timestep Fine Inertia Status OFF								
DTS Status ON								
Profile(s) Summer and Winter								
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080								
Return Period(s) (years) 2, 30, 100								
Climate Change (%) 20, 20, 20								
PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	100/2160 Winter				
1.001	1440 Winter	30	+20%	100/480 Winter				
2.000	15 Winter	30	+20%					
1.002	1440 Winter	30	+20%	2/180 Winter				
1.003	1440 Winter	30	+20%	2/60 Summer				
1.004	1440 Winter	30	+20%					
PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	14.0	2.538	-0.237	0.000	0.29	0.0	49.7	OK
1.001	14.1	2.466	-0.089	0.000	0.01	0.0	2.5	OK
2.000	15.0	3.028	-0.247	0.000	0.26	0.0	45.7	OK
1.002	14.2	2.466	0.916	0.000	0.03	0.0	4.8	SURCHARGED
1.003	14.3	2.466	1.116	0.000	0.02	0.0	1.3	SURCHARGED
1.004	BHSWay14	2.477	1.252	0.000	0.00	0.0	0.0	SURCHARGED
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BSCP		Page 6						
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Tank 2 borehole soakaway 1.84 x 10-5 m/s Average							
Date 07/11/2012 12:10 File Oct 12 Tank 2.mdx	Designed By roy.fowler Checked By							
Micro Drainage		Network W.12.5						
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>								
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON								
Profile(s) Summer and Winter Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080 Return Period(s) (years) 2, 30, 100 Climate Change (%) 20, 20, 20								
PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	2160 Winter	100	+20%	100/2160 Winter				
1.001	2160 Winter	100	+20%	100/480 Winter				
2.000	15 Winter	100	+20%					
1.002	2160 Winter	100	+20%	2/180 Winter				
1.003	2160 Winter	100	+20%	2/60 Summer				
1.004	2160 Winter	100	+20%					
PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	14.0	2.888	0.113	0.000	0.01	0.0	2.3	SURCHARGED
1.001	14.1	2.888	0.333	0.000	0.01	0.0	2.3	SURCHARGED
2.000	15.0	3.048	-0.227	0.000	0.33	0.0	59.1	OK
1.002	14.2	2.888	1.338	0.000	0.03	0.0	4.4	SURCHARGED
1.003	14.3	2.888	1.538	0.000	0.02	0.0	1.4	SURCHARGED
1.004	BHSWay14	2.890	1.665	0.000	0.00	0.0	0.0	SURCHARGED
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BSCP						Page 1			
Smeaton House Holt Park District Centre Leeds LS16 7SR			LS1224 Littlehampton Pumped from Tanks 5&6 to Tank 1. Discharge 5 l/s						
Date 07/11/2012 12:11 File Oct 12 Tank 5 to ...			Designed By roy.fowler Checked By						
Micro Drainage						Network W.12.5			
Existing Network Details for Storm									
* - Indicates pipe has been modified outside of System 1									
PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	
1.000	33.100	0.240	137.9	0.125	4.00	0.600	o	225	
1.001	6.600	0.035	188.6	0.000	0.00	0.600	o	300	
2.000	32.200	0.215	149.8	0.190	4.00	0.600	o	300	
2.001	9.700	0.065	149.2	0.000	0.00	0.600	o	300	
1.002	6.100	0.100	61.0	0.000	0.00	0.600	o	300	
3.000	10.600	0.065	163.1	0.116	4.00	0.600	o	225	
3.001	5.200	0.025	208.0	0.000	0.00	0.600	o	300	
4.000	15.700	0.105	149.5	0.013	4.00	0.600	o	150	
4.001	5.300	0.035	151.4	0.000	0.00	0.600	o	150	
4.002	32.000	0.215	148.8	0.013	4.00	0.600	o	150	
1.003	12.000	0.100	120.0	0.000	0.00	0.600	o	300	
1.004	180.000	-1.280	-140.6	0.000	0.00	0.600	o	80	
1.005	33.600	0.335	100.3	0.012	0.00	0.600	o	150	
1.006	24.800	0.100	248.0	0.198	0.00	0.600	o	300	
* 1.007	5.500	0.020	275.0	0.105	0.00	0.600	o	300	
* 1.008	22.000	0.060	366.7	0.000	0.00	0.600	o	300	
* 1.009	12.000	0.080	150.0	0.000	0.00	0.600	o	150	
PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
1.000	4.0A	4.280	3.050	1.005	4.300	2.810	1.265		1050
1.001	CP4.0	4.300	2.735	1.265	4.300	2.700	1.300		1050
2.000	CP11.1	4.310	2.380	1.630	4.200	2.165	1.735		1050
2.001	11.0	4.200	2.165	1.735	4.300	2.100	1.900		1050
1.002	2.0	4.300	2.100	1.900	3.850	2.000	1.550		1050
3.000	1.0	3.550	2.265	1.060	3.810	2.200	1.385		1050
3.001	CP1.1	3.810	2.125	1.385	3.850	2.100	1.450		1050
4.000	RE3.0A	3.700	2.505	1.045	3.250	2.400	0.700		150
4.001	3.0B	3.250	2.400	0.700	3.250	2.365	0.735		1050
4.002	3.0	3.250	2.365	0.735	3.850	2.150	1.550		1050
1.003	Tank1.2	3.850	2.000	1.550	4.150	1.900	1.950		1050
1.004	PS1.4	4.150	1.900	2.170	4.180	3.180	0.920	Pump	1200
1.005	S13.0	4.180	3.045	0.985	3.710	2.710	0.850		1050
1.006	12.1	3.710	2.560	0.850	3.260	2.460	0.500		1200
* 1.007	CP12.2	3.260	2.360	0.600	3.290	2.340	0.650		1200
* 1.008	Tank12.3	3.290	2.340	0.650	3.510	2.280	0.930		1200
* 1.009	Control12.4	3.510	2.280	1.080	2.950	2.200	0.600	Crown Vortex Valve®	1200
©1982-2010 Micro Drainage Ltd									

BSCP		Page 2
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Pumped from Tanks 5&6 to Tank 1. Discharge 5 l/s	
Date 07/11/2012 12:11 File Oct 12 Tank 5 to ...	Designed By roy.fowler Checked By	
Micro Drainage		Network W.12.5

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
4.0A	4.280	1.230	1050	1.000	3.050	225				
CP4.0	4.300	1.565	1050	1.001	2.735	300	1.000	2.810	225	
CP11.1	4.310	1.930	1050	2.000	2.380	300				
11.0	4.200	2.035	1050	2.001	2.165	300	2.000	2.165	300	
2.0	4.300	2.200	1050	1.002	2.100	300	1.001	2.700	300	600
							2.001	2.100	300	
1.0	3.550	1.285	1050	3.000	2.265	225				
CP1.1	3.810	1.685	1050	3.001	2.125	300	3.000	2.200	225	
RE3.0A	3.700	1.195	150	4.000	2.505	150				
3.0B	3.250	0.850	1050	4.001	2.400	150	4.000	2.400	150	
3.0	3.250	0.885	1050	4.002	2.365	150	4.001	2.365	150	
Tank1.2	3.850	1.850	1050	1.003	2.000	300	1.002	2.000	300	
							3.001	2.100	300	100
							4.002	2.150	150	
PS1.4	4.150	2.250	1200	1.004	1.900	80	1.003	1.900	300	
S13.0	4.180	1.135	1050	1.005	3.045	150	1.004	3.180	80	65
12.1	3.710	1.150	1200	1.006	2.560	300	1.005	2.710	150	
CP12.2	3.260	0.900	1200	1.007	2.360	300	1.006	2.460	300	100
Tank12.3	3.290	0.950	1200	1.008	2.340	300	1.007	2.340	300	
Control12.4	3.510	1.230	1200	1.009	2.280	150	1.008	2.280	300	
S12.5	2.950	0.750	1050		OUTFALL		1.009	2.200	150	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
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1.009	S12.5	2.950	2.200	0.000	1050	0
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.350		

BSCP		Page 3
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Pumped from Tanks 5&6 to Tank 1. Discharge 5 l/s	
Date 07/11/2012 12:11 File Oct 12 Tank 5 to ...	Designed By roy.fowler Checked By	
Micro Drainage	Network W.12.5	

Online Controls for Storm

Pump Manhole: PS1.4, DS/PN: 1.004, Volume (m³): 3.3

Invert Level (m) 1.900

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	2.5000	1.800	2.5000	3.400	2.5000	5.000	2.5000
0.400	2.5000	2.000	2.5000	3.600	2.5000	5.200	2.5000
0.600	2.5000	2.200	2.5000	3.800	2.5000	5.400	2.5000
0.800	2.5000	2.400	2.5000	4.000	2.5000	5.600	2.5000
1.000	2.5000	2.600	2.5000	4.200	2.5000	5.800	2.5000
1.200	2.5000	2.800	2.5000	4.400	2.5000	6.000	2.5000
1.400	2.5000	3.000	2.5000	4.600	2.5000		
1.600	2.5000	3.200	2.5000	4.800	2.5000		

Crown Vortex Valve® Manhole: Control12.4, DS/PN: 1.009, Volume (m³): 2.9

Design Head (m) 0.550 Diameter (mm) 107
Design Flow (l/s) 5.0 Invert Level (m) 2.280
Vortex Valve® Type R1 SW Only

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	1.200	7.4	3.000	11.7	7.000	17.9
0.200	3.5	1.400	8.0	3.500	12.7	7.500	18.5
0.300	3.7	1.600	8.6	4.000	13.5	8.000	19.2
0.400	4.3	1.800	9.1	4.500	14.4	8.500	19.7
0.500	4.8	2.000	9.6	5.000	15.1	9.000	20.3
0.600	5.2	2.200	10.0	5.500	15.9	9.500	20.9
0.800	6.1	2.400	10.5	6.000	16.6		
1.000	6.8	2.600	10.9	6.500	17.3		

BSCP		Page 4																																																																																																																																																																																				
Smeaton House	LS1224 Littlehampton																																																																																																																																																																																					
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Micro Drainage	Network W.12.5																																																																																																																																																																																					
Storage Structures for Storm Cellular Storage Manhole: CP11.1, DS/PN: 2.000 Invert Level (m)2.450Safety Factor2.0 Infiltration Coefficient Base (m/hr)0.00000Porosity0.95 Infiltration Coefficient Side (m/hr)0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>150.0</td><td>0.0</td><td>1.300</td><td>0.0</td><td>0.0</td></tr><tr><td>0.100</td><td>150.0</td><td>0.0</td><td>1.400</td><td>0.0</td><td>0.0</td></tr><tr><td>0.200</td><td>150.0</td><td>0.0</td><td>1.500</td><td>0.0</td><td>0.0</td></tr><tr><td>0.300</td><td>150.0</td><td>0.0</td><td>1.600</td><td>0.0</td><td>0.0</td></tr><tr><td>0.400</td><td>150.0</td><td>0.0</td><td>1.700</td><td>0.0</td><td>0.0</td></tr><tr><td>0.500</td><td>150.0</td><td>0.0</td><td>1.800</td><td>0.0</td><td>0.0</td></tr><tr><td>0.600</td><td>150.0</td><td>0.0</td><td>1.900</td><td>0.0</td><td>0.0</td></tr><tr><td>0.700</td><td>150.0</td><td>0.0</td><td>2.000</td><td>0.0</td><td>0.0</td></tr><tr><td>0.800</td><td>150.0</td><td>0.0</td><td>2.100</td><td>0.0</td><td>0.0</td></tr><tr><td>0.900</td><td>150.0</td><td>0.0</td><td>2.200</td><td>0.0</td><td>0.0</td></tr><tr><td>1.000</td><td>150.0</td><td>0.0</td><td>2.300</td><td>0.0</td><td>0.0</td></tr><tr><td>1.100</td><td>0.0</td><td>0.0</td><td>2.400</td><td>0.0</td><td>0.0</td></tr><tr><td>1.200</td><td>0.0</td><td>0.0</td><td>2.500</td><td>0.0</td><td>0.0</td></tr></tbody></table> Cellular Storage Manhole: PS1.4, DS/PN: 1.004 Invert Level (m)1.900Safety Factor2.0 Infiltration Coefficient Base (m/hr)0.00000Porosity0.95 Infiltration Coefficient Side (m/hr)0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>108.0</td><td>0.0</td><td>1.300</td><td>0.0</td><td>0.0</td></tr><tr><td>0.100</td><td>108.0</td><td>0.0</td><td>1.400</td><td>0.0</td><td>0.0</td></tr><tr><td>0.200</td><td>108.0</td><td>0.0</td><td>1.500</td><td>0.0</td><td>0.0</td></tr><tr><td>0.300</td><td>108.0</td><td>0.0</td><td>1.600</td><td>0.0</td><td>0.0</td></tr><tr><td>0.400</td><td>108.0</td><td>0.0</td><td>1.700</td><td>0.0</td><td>0.0</td></tr><tr><td>0.500</td><td>108.0</td><td>0.0</td><td>1.800</td><td>0.0</td><td>0.0</td></tr><tr><td>0.600</td><td>108.0</td><td>0.0</td><td>1.900</td><td>0.0</td><td>0.0</td></tr><tr><td>0.700</td><td>108.0</td><td>0.0</td><td>2.000</td><td>0.0</td><td>0.0</td></tr><tr><td>0.800</td><td>108.0</td><td>0.0</td><td>2.100</td><td>0.0</td><td>0.0</td></tr><tr><td>0.900</td><td>108.0</td><td>0.0</td><td>2.200</td><td>0.0</td><td>0.0</td></tr><tr><td>1.000</td><td>108.0</td><td>0.0</td><td>2.300</td><td>0.0</td><td>0.0</td></tr><tr><td>1.100</td><td>108.0</td><td>0.0</td><td>2.400</td><td>0.0</td><td>0.0</td></tr><tr><td>1.200</td><td>108.0</td><td>0.0</td><td>2.500</td><td>0.0</td><td>0.0</td></tr></tbody></table> Cellular Storage Manhole: Controll2.4, DS/PN: 1.009 Invert Level (m)2.280Safety Factor2.0 Infiltration Coefficient Base (m/hr)0.00000Porosity0.95 Infiltration Coefficient Side (m/hr)0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>394.0</td><td>0.0</td><td>0.100</td><td>394.0</td><td>0.0</td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	150.0	0.0	1.300	0.0	0.0	0.100	150.0	0.0	1.400	0.0	0.0	0.200	150.0	0.0	1.500	0.0	0.0	0.300	150.0	0.0	1.600	0.0	0.0	0.400	150.0	0.0	1.700	0.0	0.0	0.500	150.0	0.0	1.800	0.0	0.0	0.600	150.0	0.0	1.900	0.0	0.0	0.700	150.0	0.0	2.000	0.0	0.0	0.800	150.0	0.0	2.100	0.0	0.0	0.900	150.0	0.0	2.200	0.0	0.0	1.000	150.0	0.0	2.300	0.0	0.0	1.100	0.0	0.0	2.400	0.0	0.0	1.200	0.0	0.0	2.500	0.0	0.0	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	108.0	0.0	1.300	0.0	0.0	0.100	108.0	0.0	1.400	0.0	0.0	0.200	108.0	0.0	1.500	0.0	0.0	0.300	108.0	0.0	1.600	0.0	0.0	0.400	108.0	0.0	1.700	0.0	0.0	0.500	108.0	0.0	1.800	0.0	0.0	0.600	108.0	0.0	1.900	0.0	0.0	0.700	108.0	0.0	2.000	0.0	0.0	0.800	108.0	0.0	2.100	0.0	0.0	0.900	108.0	0.0	2.200	0.0	0.0	1.000	108.0	0.0	2.300	0.0	0.0	1.100	108.0	0.0	2.400	0.0	0.0	1.200	108.0	0.0	2.500	0.0	0.0	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	394.0	0.0	0.100	394.0	0.0
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BSCP		Page 5			
Smeaton House	LS1224 Littlehampton				
Holt Park District Centre	Pumped from Tanks 5&6 to				
Leeds LS16 7SR	Tank 1. Discharge 5 l/s				
Date 07/11/2012 12:11	Designed By roy.fowler				
File Oct 12 Tank 5 to ...	Checked By				
Micro Drainage	Network W.12.5				
Cellular Storage Manhole: Control12.4, DS/PN: 1.009					
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.200	394.0	0.0	1.400	0.0	0.0
0.300	394.0	0.0	1.500	0.0	0.0
0.400	394.0	0.0	1.600	0.0	0.0
0.500	394.0	0.0	1.700	0.0	0.0
0.600	0.0	0.0	1.800	0.0	0.0
0.700	0.0	0.0	1.900	0.0	0.0
0.800	0.0	0.0	2.000	0.0	0.0
0.900	0.0	0.0	2.100	0.0	0.0
1.000	0.0	0.0	2.200	0.0	0.0
1.100	0.0	0.0	2.300	0.0	0.0
1.200	0.0	0.0	2.400	0.0	0.0
1.300	0.0	0.0	2.500	0.0	0.0
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BSCP		Page 6
Smeaton House	LS1224 Littlehampton	
Holt Park District Centre	Pumped from Tanks 5&6 to	
Leeds LS16 7SR	Tank 1. Discharge 5 l/s	
Date 07/11/2012 12:11	Designed By roy.fowler	
File Oct 12 Tank 5 to ...	Checked By	
Micro Drainage	Network W.12.5	

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm	
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Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	20, 20, 20

PN	Storm	Return Period	Climate Change	First X SurchARGE	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	2	+20%	30/15 Summer				
1.001	15 Winter	2	+20%	100/180 Winter				
2.000	360 Winter	2	+20%	30/60 Winter				
2.001	360 Winter	2	+20%	2/120 Winter				
1.002	360 Winter	2	+20%	2/60 Winter				
3.000	360 Winter	2	+20%	2/120 Winter				
3.001	360 Winter	2	+20%	2/60 Winter				
4.000	15 Winter	2	+20%	30/60 Winter				
4.001	360 Winter	2	+20%	30/30 Summer				
4.002	360 Winter	2	+20%	2/240 Winter				
1.003	360 Winter	2	+20%	2/30 Summer				
1.004	360 Winter	2	+20%					
1.005	60 Summer	2	+20%	100/15 Summer				
1.006	15 Winter	2	+20%	30/15 Summer				
1.007	15 Winter	2	+20%	30/15 Summer	100/15 Winter			1
1.008	15 Winter	2	+20%	30/15 Summer	30/720 Winter			
1.009	1440 Winter	2	+20%	2/120 Winter				

PN	US/MH Name	Water	Surch'd Depth (m)	Flooded	Flow / Cap.	O'flow	Pipe	Status
		Level (m)		Volume (m³)		(1/s)	Flow (1/s)	
1.000	4.0A	3.180	-0.095	0.000	0.62	0.0	25.8	OK
1.001	CP4.0	2.877	-0.158	0.000	0.44	0.0	25.5	OK
2.000	CP11.1	2.529	-0.151	0.000	0.07	0.0	6.0	OK
2.001	11.0	2.527	0.062	0.000	0.08	0.0	5.4	SURCHARGED
1.002	2.0	2.527	0.127	0.000	0.11	0.0	9.1	SURCHARGED
3.000	1.0	2.527	0.037	0.000	0.10	0.0	3.5	SURCHARGED
3.001	CP1.1	2.526	0.101	0.000	0.06	0.0	3.3	SURCHARGED
4.000	RE3.0A	2.551	-0.104	0.000	0.20	0.0	2.7	OK
4.001	3.0B	2.527	-0.023	0.000	0.04	0.0	0.4	OK
4.002	3.0	2.527	0.012	0.000	0.06	0.0	0.8	SURCHARGED
1.003	Tank1.2	2.526	0.226	0.000	0.16	0.0	12.6	SURCHARGED
1.004	PS1.4	2.524	0.544	0.000	2.47	0.0	2.5	SURCHARGED
1.005	S13.0	3.093	-0.102	0.000	0.22	0.0	3.8	OK
1.006	12.1	2.722	-0.138	0.000	0.56	0.0	34.9	OK
1.007	CP12.2	2.660	0.000	0.000	1.08	0.0	49.2	OK
1.008	Tank12.3	2.574	-0.066	0.000	0.95	0.0	48.3	OK
1.009	Control12.4	2.536	0.106	0.000	0.27	0.0	3.6	SURCHARGED

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Smeaton House	LS1224 Littlehampton							
Holt Park District Centre	Pumped from Tanks 5&6 to							
Leeds LS16 7SR	Tank 1. Discharge 5 l/s							
Date 07/11/2012 12:11	Designed By roy.fowler							
File Oct 12 Tank 5 to ...	Checked By							
Micro Drainage	Network W.12.5							
30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)								
for Storm								
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF								
Analysis Timestep Fine Inertia Status OFF								
DTS Status ON								
Profile(s) Summer and Winter								
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080								
Return Period(s) (years) 2, 30, 100								
Climate Change (%) 20, 20, 20								
PN	Storm	Return Period	Climate Change	First X Surge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	30/15 Summer				
1.001	15 Winter	30	+20%	100/180 Winter				
2.000	480 Winter	30	+20%	30/60 Winter				
2.001	480 Winter	30	+20%	2/120 Winter				
1.002	480 Winter	30	+20%	2/60 Winter				
3.000	480 Winter	30	+20%	2/120 Winter				
3.001	480 Winter	30	+20%	2/60 Winter				
4.000	480 Winter	30	+20%	30/60 Winter				
4.001	480 Winter	30	+20%	30/30 Summer				
4.002	480 Winter	30	+20%	2/240 Winter				
1.003	480 Winter	30	+20%	2/30 Summer				
1.004	480 Winter	30	+20%					
1.005	15 Winter	30	+20%	100/15 Summer				
1.006	15 Winter	30	+20%	30/15 Summer				
1.007	15 Winter	30	+20%	30/15 Summer	100/15 Winter			1
1.008	15 Winter	30	+20%	30/15 Summer	30/720 Winter			
1.009	720 Winter	30	+20%	2/120 Winter				
PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	4.0A	3.359	0.084	0.000	1.14	0.0	47.4	SURCHARGED
1.001	CP4.0	2.944	-0.091	0.000	0.83	0.0	47.7	OK
2.000	CP11.1	2.901	0.221	0.000	0.08	0.0	6.6	SURCHARGED
2.001	11.0	2.899	0.434	0.000	0.09	0.0	5.8	SURCHARGED
1.002	2.0	2.899	0.499	0.000	0.13	0.0	10.2	SURCHARGED
3.000	1.0	2.899	0.409	0.000	0.15	0.0	5.1	SURCHARGED
3.001	CP1.1	2.898	0.473	0.000	0.10	0.0	5.1	SURCHARGED
4.000	RE3.0A	2.899	0.244	0.000	0.04	0.0	0.6	SURCHARGED
4.001	3.0B	2.899	0.349	0.000	0.04	0.0	0.5	SURCHARGED
4.002	3.0	2.899	0.384	0.000	0.07	0.0	1.0	SURCHARGED
1.003	Tank1.2	2.898	0.598	0.000	0.18	0.0	14.3	SURCHARGED
1.004	PS1.4	2.896	0.916	0.000	2.47	0.0	2.5	SURCHARGED
1.005	S13.0	3.194	-0.001	0.000	0.36	0.0	6.2	OK
1.006	12.1	3.160	0.300	0.000	1.15	0.0	72.3	SURCHARGED
1.007	CP12.2	3.022	0.362	0.000	2.38	0.0	108.0	FLOOD RISK
1.008	Tank12.3	2.836	0.196	0.000	2.09	0.0	106.1	SURCHARGED
1.009	Control12.4	2.695	0.265	0.000	0.33	0.0	4.4	SURCHARGED
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Smeaton House	LS1224 Littlehampton							
Holt Park District Centre	Pumped from Tanks 5&6 to							
Leeds LS16 7SR	Tank 1. Discharge 5 l/s							
Date 07/11/2012 12:11	Designed By roy.fowler							
File Oct 12 Tank 5 to ...	Checked By							
Micro Drainage	Network W.12.5							
100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)								
for Storm								
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF								
Analysis Timestep Fine Inertia Status OFF								
DTS Status ON								
Profile(s) Summer and Winter								
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,								
720, 960, 1440, 2160, 2880, 4320, 5760, 7200,								
8640, 10080								
Return Period(s) (years) 2, 30, 100								
Climate Change (%) 20, 20, 20								
PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+20%	30/15 Summer				
1.001	600 Winter	100	+20%	100/180 Winter				
2.000	600 Winter	100	+20%	30/60 Winter				
2.001	600 Winter	100	+20%	2/120 Winter				
1.002	600 Winter	100	+20%	2/60 Winter				
3.000	600 Winter	100	+20%	2/120 Winter				
3.001	600 Winter	100	+20%	2/60 Winter				
4.000	600 Winter	100	+20%	30/60 Winter				
4.001	600 Winter	100	+20%	30/30 Summer				
4.002	600 Winter	100	+20%	2/240 Winter				
1.003	600 Winter	100	+20%	2/30 Summer				
1.004	600 Winter	100	+20%					
1.005	15 Winter	100	+20%	100/15 Summer				
1.006	15 Winter	100	+20%	30/15 Summer				
1.007	15 Winter	100	+20%	30/15 Summer	100/15 Winter			1
1.008	15 Winter	100	+20%	30/15 Summer	30/720 Winter			
1.009	960 Winter	100	+20%	2/120 Winter				
PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	4.0A	3.571	0.296	0.000	1.46	0.0	60.8	SURCHARGED
1.001	CP4.0	3.166	0.131	0.000	0.11	0.0	6.3	SURCHARGED
2.000	CP11.1	3.167	0.487	0.000	0.07	0.0	5.9	SURCHARGED
2.001	11.0	3.166	0.701	0.000	0.08	0.0	5.1	SURCHARGED
1.002	2.0	3.165	0.765	0.000	0.11	0.0	8.7	SURCHARGED
3.000	1.0	3.166	0.676	0.000	0.16	0.0	5.6	SURCHARGED
3.001	CP1.1	3.165	0.740	0.000	0.11	0.0	5.5	SURCHARGED
4.000	RE3.0A	3.166	0.511	0.000	0.05	0.0	0.6	SURCHARGED
4.001	3.0B	3.166	0.616	0.000	0.05	0.0	0.6	FLOOD RISK
4.002	3.0	3.166	0.651	0.000	0.08	0.0	1.1	FLOOD RISK
1.003	Tank1.2	3.165	0.865	0.000	0.15	0.0	12.2	SURCHARGED
1.004	PS1.4	3.163	1.183	0.000	2.47	0.0	2.5	SURCHARGED
1.005	S13.0	3.539	0.344	0.000	0.48	0.0	8.2	SURCHARGED
1.006	12.1	3.498	0.638	0.000	1.48	0.0	92.9	FLOOD RISK
1.007	CP12.2	3.260	0.600	0.447	2.94	0.0	133.2	FLOOD
1.008	Tank12.3	2.978	0.338	0.000	2.62	0.0	133.0	SURCHARGED
1.009	Control12.4	2.791	0.361	0.000	0.37	0.0	4.8	SURCHARGED
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BSCP		Page 1																																																																																																																																																																																																																																				
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Tanks 3 and 4 combined 5 l/s discharge																																																																																																																																																																																																																																					
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Micro Drainage	Network W.12.5																																																																																																																																																																																																																																					
Existing Network Details for Storm * - Indicates pipe has been modified outside of System 1 <table><thead><tr><th>PN</th><th>Length (m)</th><th>Fall (m)</th><th>Slope (1:X)</th><th>Area (ha)</th><th>T.E. (mins)</th><th>k (mm)</th><th>HYD SECT</th><th>DIA (mm)</th></tr></thead><tbody><tr><td>1.000</td><td>21.200</td><td>0.130</td><td>163.1</td><td>0.168</td><td>4.00</td><td>0.600</td><td>o</td><td>225</td></tr><tr><td>1.001</td><td>17.400</td><td>0.070</td><td>248.6</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>300</td></tr><tr><td>1.002</td><td>45.000</td><td>0.200</td><td>225.0</td><td>0.010</td><td>0.00</td><td>0.600</td><td>o</td><td>300</td></tr><tr><td>2.000</td><td>20.400</td><td>0.340</td><td>60.0</td><td>0.008</td><td>4.00</td><td>0.600</td><td>o</td><td>150</td></tr><tr><td>3.000</td><td>21.500</td><td>0.215</td><td>100.0</td><td>0.048</td><td>4.00</td><td>0.600</td><td>o</td><td>150</td></tr><tr><td>2.001</td><td>9.900</td><td>0.130</td><td>76.2</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>150</td></tr><tr><td>4.000</td><td>14.400</td><td>0.180</td><td>80.0</td><td>0.059</td><td>4.00</td><td>0.600</td><td>o</td><td>150</td></tr><tr><td>4.001</td><td>8.500</td><td>0.085</td><td>100.0</td><td>0.049</td><td>0.00</td><td>0.600</td><td>o</td><td>225</td></tr><tr><td>2.002</td><td>28.300</td><td>0.170</td><td>166.5</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>225</td></tr><tr><td>1.003</td><td>9.600</td><td>0.035</td><td>274.3</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>300</td></tr><tr><td>5.000</td><td>45.000</td><td>0.200</td><td>225.0</td><td>0.007</td><td>4.00</td><td>0.600</td><td>o</td><td>300</td></tr></tbody></table> <table><thead><tr><th>PN</th><th>US/MH Name</th><th>US/CL (m)</th><th>US/IL (m)</th><th>US C.Depth (m)</th><th>DS/CL (m)</th><th>DS/IL (m)</th><th>DS C.Depth (m)</th><th>Ctrl</th><th>US/MH (mm)</th></tr></thead><tbody><tr><td>1.000</td><td>4.2</td><td>4.250</td><td>3.075</td><td>0.950</td><td>4.260</td><td>2.945</td><td>1.090</td><td></td><td>1200</td></tr><tr><td>1.001</td><td>CP4.3</td><td>4.260</td><td>2.870</td><td>1.090</td><td>4.260</td><td>2.800</td><td>1.160</td><td></td><td>1200</td></tr><tr><td>1.002</td><td>Tank4.4</td><td>4.260</td><td>2.700</td><td>1.260</td><td>3.540</td><td>2.500</td><td>0.740</td><td></td><td>1200</td></tr><tr><td>2.000</td><td>PPIC8.0</td><td>4.470</td><td>3.290</td><td>1.030</td><td>4.250</td><td>2.950</td><td>1.150</td><td></td><td>475</td></tr><tr><td>3.000</td><td>RE9.0</td><td>4.250</td><td>3.165</td><td>0.935</td><td>4.250</td><td>2.950</td><td>1.150</td><td></td><td>150</td></tr><tr><td>2.001</td><td>8.1</td><td>4.250</td><td>2.950</td><td>1.150</td><td>3.980</td><td>2.820</td><td>1.010</td><td></td><td>1050</td></tr><tr><td>4.000</td><td>10.2</td><td>4.080</td><td>3.135</td><td>0.795</td><td>3.900</td><td>2.955</td><td>0.795</td><td></td><td>1050</td></tr><tr><td>4.001</td><td>10.1</td><td>3.900</td><td>2.880</td><td>0.795</td><td>3.980</td><td>2.795</td><td>0.960</td><td></td><td>1200</td></tr><tr><td>2.002</td><td>10.0</td><td>3.980</td><td>2.745</td><td>1.010</td><td>3.540</td><td>2.575</td><td>0.740</td><td></td><td>1200</td></tr><tr><td>1.003</td><td>CP4.5</td><td>3.540</td><td>2.500</td><td>0.740</td><td>3.540</td><td>2.465</td><td>0.775</td><td></td><td>1200</td></tr><tr><td>5.000</td><td>Tank7.0</td><td>4.240</td><td>2.665</td><td>1.275</td><td>3.540</td><td>2.465</td><td>0.775</td><td></td><td>1200</td></tr></tbody></table>			PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	1.000	21.200	0.130	163.1	0.168	4.00	0.600	o	225	1.001	17.400	0.070	248.6	0.000	0.00	0.600	o	300	1.002	45.000	0.200	225.0	0.010	0.00	0.600	o	300	2.000	20.400	0.340	60.0	0.008	4.00	0.600	o	150	3.000	21.500	0.215	100.0	0.048	4.00	0.600	o	150	2.001	9.900	0.130	76.2	0.000	0.00	0.600	o	150	4.000	14.400	0.180	80.0	0.059	4.00	0.600	o	150	4.001	8.500	0.085	100.0	0.049	0.00	0.600	o	225	2.002	28.300	0.170	166.5	0.000	0.00	0.600	o	225	1.003	9.600	0.035	274.3	0.000	0.00	0.600	o	300	5.000	45.000	0.200	225.0	0.007	4.00	0.600	o	300	PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)	1.000	4.2	4.250	3.075	0.950	4.260	2.945	1.090		1200	1.001	CP4.3	4.260	2.870	1.090	4.260	2.800	1.160		1200	1.002	Tank4.4	4.260	2.700	1.260	3.540	2.500	0.740		1200	2.000	PPIC8.0	4.470	3.290	1.030	4.250	2.950	1.150		475	3.000	RE9.0	4.250	3.165	0.935	4.250	2.950	1.150		150	2.001	8.1	4.250	2.950	1.150	3.980	2.820	1.010		1050	4.000	10.2	4.080	3.135	0.795	3.900	2.955	0.795		1050	4.001	10.1	3.900	2.880	0.795	3.980	2.795	0.960		1200	2.002	10.0	3.980	2.745	1.010	3.540	2.575	0.740		1200	1.003	CP4.5	3.540	2.500	0.740	3.540	2.465	0.775		1200	5.000	Tank7.0	4.240	2.665	1.275	3.540	2.465	0.775		1200
PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)																																																																																																																																																																																																																														
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2.000	PPIC8.0	4.470	3.290	1.030	4.250	2.950	1.150		475																																																																																																																																																																																																																													
3.000	RE9.0	4.250	3.165	0.935	4.250	2.950	1.150		150																																																																																																																																																																																																																													
2.001	8.1	4.250	2.950	1.150	3.980	2.820	1.010		1050																																																																																																																																																																																																																													
4.000	10.2	4.080	3.135	0.795	3.900	2.955	0.795		1050																																																																																																																																																																																																																													
4.001	10.1	3.900	2.880	0.795	3.980	2.795	0.960		1200																																																																																																																																																																																																																													
2.002	10.0	3.980	2.745	1.010	3.540	2.575	0.740		1200																																																																																																																																																																																																																													
1.003	CP4.5	3.540	2.500	0.740	3.540	2.465	0.775		1200																																																																																																																																																																																																																													
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Existing Network Details for Storm <table><thead><tr><th>PN</th><th>Length (m)</th><th>Fall (m)</th><th>Slope (1:X)</th><th>Area (ha)</th><th>T.E. (mins)</th><th>k (mm)</th><th>HYD SECT</th><th>DIA (mm)</th></tr></thead><tbody><tr><td>1.004</td><td>9.600</td><td>0.035</td><td>274.3</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>300</td></tr><tr><td>6.000</td><td>25.600</td><td>0.260</td><td>98.5</td><td>0.028</td><td>4.00</td><td>0.600</td><td>o</td><td>150</td></tr><tr><td>6.001</td><td>22.500</td><td>0.135</td><td>166.7</td><td>0.018</td><td>0.00</td><td>0.600</td><td>o</td><td>225</td></tr><tr><td>6.002</td><td>7.100</td><td>0.045</td><td>157.8</td><td>0.019</td><td>0.00</td><td>0.600</td><td>o</td><td>225</td></tr><tr><td>6.003</td><td>15.500</td><td>0.095</td><td>163.2</td><td>0.061</td><td>0.00</td><td>0.600</td><td>o</td><td>225</td></tr><tr><td>7.000</td><td>9.300</td><td>0.100</td><td>93.0</td><td>0.042</td><td>4.00</td><td>0.600</td><td>o</td><td>150</td></tr><tr><td>7.001</td><td>8.000</td><td>0.180</td><td>44.4</td><td>0.042</td><td>0.00</td><td>0.600</td><td>o</td><td>225</td></tr><tr><td>6.004</td><td>9.100</td><td>0.040</td><td>227.5</td><td>0.197</td><td>0.00</td><td>0.600</td><td>o</td><td>300</td></tr><tr><td>* 1.005</td><td>12.000</td><td>0.080</td><td>150.0</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>150</td></tr><tr><td>1.006</td><td>12.700</td><td>0.085</td><td>149.4</td><td>0.000</td><td>0.00</td><td>0.600</td><td>o</td><td>150</td></tr></tbody></table> <table><thead><tr><th>PN</th><th>US/MH Name</th><th>US/CL (m)</th><th>US/IL (m)</th><th>US C.Depth (m)</th><th>DS/CL (m)</th><th>DS/IL (m)</th><th>DS C.Depth (m)</th><th>Ctrl</th><th>US/MH (mm)</th></tr></thead><tbody><tr><td>1.004</td><td>CP4.6</td><td>3.540</td><td>2.465</td><td>0.775</td><td>3.400</td><td>2.430</td><td>0.670</td><td></td><td>1200</td></tr><tr><td>6.000</td><td>5.0</td><td>4.385</td><td>3.445</td><td>0.790</td><td>4.200</td><td>3.185</td><td>0.865</td><td></td><td>1050</td></tr><tr><td>6.001</td><td>5.1</td><td>4.200</td><td>3.110</td><td>0.865</td><td>3.890</td><td>2.975</td><td>0.690</td><td></td><td>1200</td></tr><tr><td>6.002</td><td>5.2</td><td>3.890</td><td>2.975</td><td>0.690</td><td>3.570</td><td>2.930</td><td>0.415</td><td></td><td>1200</td></tr><tr><td>6.003</td><td>5.3</td><td>3.570</td><td>2.930</td><td>0.415</td><td>3.470</td><td>2.835</td><td>0.410</td><td></td><td>1200</td></tr><tr><td>7.000</td><td>6.0</td><td>3.560</td><td>3.000</td><td>0.410</td><td>3.560</td><td>2.900</td><td>0.510</td><td></td><td>1050</td></tr><tr><td>7.001</td><td>6.1</td><td>3.560</td><td>2.825</td><td>0.510</td><td>3.470</td><td>2.645</td><td>0.600</td><td></td><td>1200</td></tr><tr><td>6.004</td><td>CP5.4</td><td>3.470</td><td>2.570</td><td>0.600</td><td>3.400</td><td>2.530</td><td>0.570</td><td></td><td>1200</td></tr><tr><td>* 1.005</td><td>Control</td><td>4.7</td><td>3.400</td><td>2.430</td><td>0.820</td><td>3.480</td><td>2.350</td><td>0.980</td><td>Crown Vortex Valve®</td><td>1200</td></tr><tr><td>1.006</td><td>4.8</td><td>3.480</td><td>2.350</td><td>0.980</td><td>2.970</td><td>2.265</td><td>0.555</td><td></td><td></td><td>1050</td></tr></tbody></table>											PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	1.004	9.600	0.035	274.3	0.000	0.00	0.600	o	300	6.000	25.600	0.260	98.5	0.028	4.00	0.600	o	150	6.001	22.500	0.135	166.7	0.018	0.00	0.600	o	225	6.002	7.100	0.045	157.8	0.019	0.00	0.600	o	225	6.003	15.500	0.095	163.2	0.061	0.00	0.600	o	225	7.000	9.300	0.100	93.0	0.042	4.00	0.600	o	150	7.001	8.000	0.180	44.4	0.042	0.00	0.600	o	225	6.004	9.100	0.040	227.5	0.197	0.00	0.600	o	300	* 1.005	12.000	0.080	150.0	0.000	0.00	0.600	o	150	1.006	12.700	0.085	149.4	0.000	0.00	0.600	o	150	PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)	1.004	CP4.6	3.540	2.465	0.775	3.400	2.430	0.670		1200	6.000	5.0	4.385	3.445	0.790	4.200	3.185	0.865		1050	6.001	5.1	4.200	3.110	0.865	3.890	2.975	0.690		1200	6.002	5.2	3.890	2.975	0.690	3.570	2.930	0.415		1200	6.003	5.3	3.570	2.930	0.415	3.470	2.835	0.410		1200	7.000	6.0	3.560	3.000	0.410	3.560	2.900	0.510		1050	7.001	6.1	3.560	2.825	0.510	3.470	2.645	0.600		1200	6.004	CP5.4	3.470	2.570	0.600	3.400	2.530	0.570		1200	* 1.005	Control	4.7	3.400	2.430	0.820	3.480	2.350	0.980	Crown Vortex Valve®	1200	1.006	4.8	3.480	2.350	0.980	2.970	2.265	0.555			1050
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Micro Drainage		Network W.12.5

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
4.2	4.250	1.175	1200	1.000	3.075	225				
CP4.3	4.260	1.390	1200	1.001	2.870	300	1.000	2.945	225	
Tank4.4	4.260	1.560	1200	1.002	2.700	300	1.001	2.800	300	100
PPIC8.0	4.470	1.180	475	2.000	3.290	150				
RE9.0	4.250	1.085	150	3.000	3.165	150				
8.1	4.250	1.300	1050	2.001	2.950	150	2.000	2.950	150	
							3.000	2.950	150	
10.2	4.080	0.945	1050	4.000	3.135	150				
10.1	3.900	1.020	1200	4.001	2.880	225	4.000	2.955	150	
10.0	3.980	1.235	1200	2.002	2.745	225	2.001	2.820	150	
							4.001	2.795	225	50
CP4.5	3.540	1.040	1200	1.003	2.500	300	1.002	2.500	300	
							2.002	2.575	225	
Tank7.0	4.240	1.575	1200	5.000	2.665	300				
CP4.6	3.540	1.075	1200	1.004	2.465	300	1.003	2.465	300	
							5.000	2.465	300	
5.0	4.385	0.940	1050	6.000	3.445	150				
5.1	4.200	1.090	1200	6.001	3.110	225	6.000	3.185	150	
5.2	3.890	0.915	1200	6.002	2.975	225	6.001	2.975	225	
5.3	3.570	0.640	1200	6.003	2.930	225	6.002	2.930	225	
6.0	3.560	0.560	1050	7.000	3.000	150				
6.1	3.560	0.735	1200	7.001	2.825	225	7.000	2.900	150	
CP5.4	3.470	0.900	1200	6.004	2.570	300	6.003	2.835	225	190
							7.001	2.645	225	
Control4.7	3.400	0.970	1200	1.005	2.430	150	1.004	2.430	300	
							6.004	2.530	300	250
4.8	3.480	1.130	1050	1.006	2.350	150	1.005	2.350	150	
RectSew	2.970	0.705	1050		OUTFALL		1.006	2.265	150	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.006	RectSew	2.970	2.265	0.000	1050	0

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<u>Simulation Criteria for Storm</u> <table> <tr> <td>Volumetric Runoff Coeff</td> <td>0.750</td> <td>Foul Sewage per hectare (l/s)</td> <td>0.000</td> </tr> <tr> <td>PIMP (% impervious)</td> <td>100</td> <td>Additional Flow - % of Total Flow</td> <td>0.000</td> </tr> <tr> <td>Areal Reduction Factor</td> <td>1.000</td> <td>MADD Factor * 10m³/ha Storage</td> <td>2.000</td> </tr> <tr> <td>Hot Start (mins)</td> <td>0</td> <td>Inlet Coeffiecient</td> <td>0.800</td> </tr> <tr> <td>Hot Start Level (mm)</td> <td>0</td> <td>Run Time (mins)</td> <td>60</td> </tr> <tr> <td>Manhole Headloss Coeff (Global)</td> <td>0.500</td> <td>Output Interval (mins)</td> <td>1</td> </tr> <tr> <td colspan="2">Number of Input Hydrographs</td> <td>0</td> <td>Number of Storage Structures</td> </tr> <tr> <td colspan="2">Number of Online Controls</td> <td>1</td> <td>Number of Time/Area Diagrams</td> </tr> <tr> <td colspan="2">Number of Offline Controls</td> <td>0</td> <td></td> </tr> </table> <u>Synthetic Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Profile Type</td> <td>Summer</td> </tr> <tr> <td>Return Period (years)</td> <td>2</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>19.000</td> <td>Storm Duration (mins)</td> <td>30</td> </tr> <tr> <td>Ratio R</td> <td>0.350</td> <td></td> <td></td> </tr> </table>			Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000	PIMP (% impervious)	100	Additional Flow - % of Total Flow	0.000	Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000	Hot Start (mins)	0	Inlet Coeffiecient	0.800	Hot Start Level (mm)	0	Run Time (mins)	60	Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1	Number of Input Hydrographs		0	Number of Storage Structures	Number of Online Controls		1	Number of Time/Area Diagrams	Number of Offline Controls		0		Rainfall Model	FSR	Profile Type	Summer	Return Period (years)	2	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	19.000	Storm Duration (mins)	30	Ratio R	0.350		
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Online Controls for Storm

Crown Vortex Valve® Manhole: Control4.7, DS/PN: 1.005, Volume (m³): 2.2

Design Head (m) 0.650 Diameter (mm) 102
Design Flow (l/s) 5.0 Invert Level (m) 2.430
Vortex Valve® Type R1 SW Only

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	1.200	6.7	3.000	10.7	7.000	16.3
0.200	3.1	1.400	7.3	3.500	11.5	7.500	16.9
0.300	3.4	1.600	7.8	4.000	12.3	8.000	17.4
0.400	3.9	1.800	8.3	4.500	13.1	8.500	17.9
0.500	4.4	2.000	8.7	5.000	13.8	9.000	18.5
0.600	4.8	2.200	9.1	5.500	14.4	9.500	19.0
0.800	5.5	2.400	9.5	6.000	15.1		
1.000	6.2	2.600	9.9	6.500	15.7		

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Storage Structures for Storm

Cellular Storage Manhole: CP4.5, DS/PN: 1.003

Invert Level (m) 2.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	581.0	0.0	1.300	0.0	0.0
0.100	581.0	0.0	1.400	0.0	0.0
0.200	581.0	0.0	1.500	0.0	0.0
0.300	581.0	0.0	1.600	0.0	0.0
0.400	581.0	0.0	1.700	0.0	0.0
0.500	581.0	0.0	1.800	0.0	0.0
0.600	0.0	0.0	1.900	0.0	0.0
0.700	0.0	0.0	2.000	0.0	0.0
0.800	0.0	0.0	2.100	0.0	0.0
0.900	0.0	0.0	2.200	0.0	0.0
1.000	0.0	0.0	2.300	0.0	0.0
1.100	0.0	0.0	2.400	0.0	0.0
1.200	0.0	0.0	2.500	0.0	0.0

Cellular Storage Manhole: CP4.6, DS/PN: 1.004

Invert Level (m) 2.465 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	249.0	0.0	1.300	0.0	0.0
0.100	249.0	0.0	1.400	0.0	0.0
0.200	249.0	0.0	1.500	0.0	0.0
0.300	249.0	0.0	1.600	0.0	0.0
0.400	249.0	0.0	1.700	0.0	0.0
0.500	249.0	0.0	1.800	0.0	0.0
0.600	0.0	0.0	1.900	0.0	0.0
0.700	0.0	0.0	2.000	0.0	0.0
0.800	0.0	0.0	2.100	0.0	0.0
0.900	0.0	0.0	2.200	0.0	0.0
1.000	0.0	0.0	2.300	0.0	0.0
1.100	0.0	0.0	2.400	0.0	0.0
1.200	0.0	0.0	2.500	0.0	0.0

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

Margin for Flood Risk Warning (mm)

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

DVD Status

Inertia Status

300.0

OFF

OFF

OFF

Profile(s)

Duration(s) (mins)

Return Period(s) (years)

Climate Change (%)

Summer and Winter

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

2, 30, 100

20, 20, 20

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	2	+20%	30/15 Summer				
1.001	15 Winter	2	+20%	100/15 Summer				
1.002	15 Winter	2	+20%	100/15 Summer				
2.000	15 Winter	2	+20%	100/15 Summer				
3.000	15 Winter	2	+20%	30/15 Summer				
2.001	15 Winter	2	+20%	30/15 Summer				
4.000	15 Summer	2	+20%	30/15 Summer				
4.001	15 Winter	2	+20%	30/15 Summer				
2.002	15 Winter	2	+20%	30/15 Summer				
1.003	720 Winter	2	+20%	30/180 Winter				
5.000	15 Winter	2	+20%	100/360 Winter				
1.004	720 Winter	2	+20%	30/30 Winter				
6.000	15 Winter	2	+20%	100/15 Summer				
6.001	15 Winter	2	+20%	30/15 Summer				
6.002	15 Winter	2	+20%	30/15 Summer				
6.003	15 Winter	2	+20%	30/15 Summer	100/15 Summer			2
7.000	15 Summer	2	+20%	30/15 Summer	100/15 Summer			3
7.001	15 Winter	2	+20%	30/15 Summer				
6.004	15 Winter	2	+20%		100/15 Summer			2
1.005	15 Winter	2	+20%					
1.006	15 Winter	2	+20%					

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BSCP		Page 9						
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Tanks 3 and 4 combined 5 l/s discharge							
Date 07/11/2012 12:13 File Oct 12 Tanks 3 an...	Designed By roy.fowler Checked By							
Micro Drainage	Network W.12.5							
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>								
Margin for Flood Risk Warning (mm)		300.0						
Analysis Timestep 2.5 Second Increment (Extended)								
DTS Status		OFF						
DVD Status		OFF						
Inertia Status		OFF						
Profile(s)		Summer and Winter						
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080						
Return Period(s) (years)		2, 30, 100						
Climate Change (%)		20, 20, 20						
PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	+20%	30/15 Summer				
1.001	15 Winter	30	+20%	100/15 Summer				
1.002	15 Winter	30	+20%	100/15 Summer				
2.000	15 Winter	30	+20%	100/15 Summer				
3.000	15 Winter	30	+20%	30/15 Summer				
2.001	15 Winter	30	+20%	30/15 Summer				
4.000	15 Winter	30	+20%	30/15 Summer				
4.001	15 Winter	30	+20%	30/15 Summer				
2.002	15 Winter	30	+20%	30/15 Summer				
1.003	720 Winter	30	+20%	30/180 Winter				
5.000	720 Winter	30	+20%	100/360 Winter				
1.004	720 Winter	30	+20%	30/30 Winter				
6.000	15 Winter	30	+20%	100/15 Summer				
6.001	15 Winter	30	+20%	30/15 Summer				
6.002	15 Winter	30	+20%	30/15 Summer				
6.003	15 Winter	30	+20%	30/15 Summer	100/15 Summer			2
7.000	15 Winter	30	+20%	30/15 Summer	100/15 Summer			3
7.001	15 Winter	30	+20%	30/15 Summer				
6.004	15 Winter	30	+20%		100/15 Summer			2
1.005	15 Winter	30	+20%					
1.006	15 Winter	30	+20%					
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BSCP		Page 10
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Tanks 3 and 4 combined 5 l/s discharge	
Date 07/11/2012 12:13 File Oct 12 Tanks 3 an...	Designed By roy.fowler Checked By	
Micro Drainage	Network W.12.5	

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

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	4.2	3.564	0.264	0.000	1.71	0.0	63.2	SURCHARGED
1.001	CP4.3	3.170	0.000	0.000	1.00	0.0	60.2	OK
1.002	Tank4.4	2.925	-0.075	0.000	0.91	0.0	62.6	OK
2.000	PPIC8.0	3.328	-0.112	0.000	0.15	0.0	3.2	OK
3.000	RE9.0	3.493	0.178	0.000	1.03	0.0	17.3	SURCHARGED
2.001	8.1	3.295	0.195	0.000	1.04	0.0	18.8	SURCHARGED
4.000	10.2	3.443	0.158	0.000	1.13	0.0	20.6	SURCHARGED
4.001	10.1	3.222	0.117	0.000	0.89	0.0	36.7	SURCHARGED
2.002	10.0	3.156	0.186	0.000	1.46	0.0	54.6	SURCHARGED
1.003	CP4.5	2.870	0.070	0.000	0.05	0.0	2.8	SURCHARGED
5.000	Tank7.0	2.869	-0.096	0.000	0.00	0.0	0.2	OK
1.004	CP4.6	2.869	0.104	0.000	0.11	0.0	5.5	SURCHARGED
6.000	5.0	3.533	-0.062	0.000	0.65	0.0	11.0	OK
6.001	5.1	3.453	0.118	0.000	0.43	0.0	15.9	SURCHARGED
6.002	5.2	3.421	0.221	0.000	0.81	0.0	24.3	SURCHARGED
6.003	5.3	3.400	0.245	0.000	1.16	0.0	41.6	FLOOD RISK
7.000	6.0	3.387	0.237	0.000	0.87	0.0	14.2	FLOOD RISK
7.001	6.1	3.315	0.265	0.000	0.47	0.0	28.1	FLOOD RISK
6.004	CP5.4	3.280	0.410	0.000	2.33	0.0	131.4	FLOOD RISK
1.005	Control4.7	3.000	0.420	0.000	0.35	0.0	4.6	SURCHARGED
1.006	4.8	2.411	-0.089	0.000	0.35	0.0	4.6	OK

BSCP		Page 11						
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Tanks 3 and 4 combined 5 l/s discharge							
Date 07/11/2012 12:13 File Oct 12 Tanks 3 an...	Designed By roy.fowler Checked By							
Micro Drainage	Network W.12.5							
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>								
Margin for Flood Risk Warning (mm)		300.0						
Analysis Timestep		2.5 Second Increment (Extended)						
DTS Status		OFF						
DVD Status		OFF						
Inertia Status		OFF						
Profile(s)		Summer and Winter						
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080						
Return Period(s) (years)		2, 30, 100						
Climate Change (%)		20, 20, 20						
PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+20%	30/15 Summer				
1.001	15 Winter	100	+20%	100/15 Summer				
1.002	15 Winter	100	+20%	100/15 Summer				
2.000	15 Winter	100	+20%	100/15 Summer				
3.000	15 Winter	100	+20%	30/15 Summer				
2.001	15 Winter	100	+20%	30/15 Summer				
4.000	15 Winter	100	+20%	30/15 Summer				
4.001	15 Winter	100	+20%	30/15 Summer				
2.002	15 Winter	100	+20%	30/15 Summer				
1.003	720 Winter	100	+20%	30/180 Winter				
5.000	720 Winter	100	+20%	100/360 Winter				
1.004	720 Winter	100	+20%	30/30 Winter				
6.000	15 Winter	100	+20%	100/15 Summer				
6.001	15 Winter	100	+20%	30/15 Summer				
6.002	15 Winter	100	+20%	30/15 Summer				
6.003	15 Winter	100	+20%	30/15 Summer	100/15 Summer			2
7.000	15 Winter	100	+20%	30/15 Summer	100/15 Summer			3
7.001	15 Summer	100	+20%	30/15 Summer				
6.004	15 Winter	100	+20%		100/15 Summer			2
1.005	720 Winter	100	+20%					
1.006	15 Summer	100	+20%					
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BSCP		Page 12
Smeaton House Holt Park District Centre Leeds LS16 7SR	LS1224 Littlehampton Tanks 3 and 4 combined 5 l/s discharge	
Date 07/11/2012 12:13 File Oct 12 Tanks 3 an...	Designed By roy.fowler Checked By	
Micro Drainage	Network W.12.5	

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

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	4.2	3.836	0.536	0.000	2.15	0.0	79.6	SURCHARGED
1.001	CP4.3	3.206	0.036	0.000	1.32	0.0	79.1	SURCHARGED
1.002	Tank4.4	3.066	0.066	0.000	1.14	0.0	78.7	SURCHARGED
2.000	PPIC8.0	3.587	0.147	0.000	0.18	0.0	3.9	SURCHARGED
3.000	RE9.0	3.892	0.577	0.000	1.24	0.0	20.8	SURCHARGED
2.001	8.1	3.571	0.471	0.000	1.29	0.0	23.4	SURCHARGED
4.000	10.2	3.779	0.494	0.000	1.35	0.0	24.6	SURCHARGED
4.001	10.1	3.454	0.349	0.000	1.09	0.0	44.8	SURCHARGED
2.002	10.0	3.352	0.382	0.000	1.81	0.0	67.7	SURCHARGED
1.003	CP4.5	3.003	0.203	0.000	0.07	0.0	3.5	SURCHARGED
5.000	Tank7.0	3.001	0.036	0.000	0.00	0.0	0.3	SURCHARGED
1.004	CP4.6	3.001	0.236	0.000	0.16	0.0	8.4	SURCHARGED
6.000	5.0	3.782	0.187	0.000	0.72	0.0	12.3	SURCHARGED
6.001	5.1	3.649	0.314	0.000	0.52	0.0	19.0	SURCHARGED
6.002	5.2	3.605	0.405	0.000	0.95	0.0	28.3	FLOOD RISK
6.003	5.3	3.572	0.417	1.907	1.55	0.0	55.5	FLOOD
7.000	6.0	3.561	0.411	0.896	1.26	0.0	20.4	FLOOD
7.001	6.1	3.526	0.476	0.000	0.55	0.0	32.8	FLOOD RISK
6.004	CP5.4	3.470	0.600	0.530	2.73	0.0	153.8	FLOOD
1.005	Control4.7	3.210	0.630	0.000	0.36	0.0	4.7	FLOOD RISK
1.006	4.8	2.414	-0.086	0.000	0.38	0.0	5.0	OK

Key

1.000 Pipework and Areas from Tanks 5 & 6 pumped into Tank 1, gravity drained into sewer at 5 1/5

[1.000] Pipework and Areas into Tanks 3 and 4, gravity drained into sewer at 5 1/5

<1.000 Pipework and Areas into Tank 2 and discharged into Boreholes

Area of flooding

Roof Area

6. NO. SURFACE WATER ATTENUATION TANKS

All tanks supplied and installed by SDS Ltd.

Individual Tank Volumes accommodate up to 1 in 100 year return period storm + 20% allowance for climate change.

WH S1.4 (P.P.S.)
SW Pumping Station 1500W x 3m deep
Discharge Rate: 25 1/2 per pump
1 No. Duty Pump / 1 No. Standby Pump
CL 4.15
IL 1.00 (300W from tank)
IL 3.150 (30W OD MPEBO SDRI SW Rising Main)
IL 1.000 (Sump 30)
1500mm RC Concrete slab, Heavy Duty Access Cover.
Alarm (in to Warehouse Channel) Deck. Threshold
Borehole required for rising main. With control block

P1	06/11/12	Preliminary for comment.	RF	DJB	DJB
Rev	Date	Description	By	Chk	App

Part of the **gha ivigunn** group

BSC P

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Optimisation Developments Ltd

PROJECT
Proposed Food Superstore, Hawthorn Road
off Wick Roundabout, Littlehampton

TITLE
Impermeable Area Drainage Plan

SCALE 1:250	DRAWING SIZE A0
DRAWING No. LS 1224 / DA2	REV P1