

Appendix (E)

Proposed Surface Water Strategy



- NOTES**
1. All dimensions are in metres unless stated otherwise.
 2. Do not scale from this drawing. Only written dimensions are to be used.
 3. Site layout based on Kenn Scaddan Associates Ltd site plan issued to RCP in DWG format on 29.10.2019.
 4. Topographic Survey as per Siltline Level Survey, drawing number 657PG01 dated July 2012.
 5. Additional topographic Survey as per ADA Solutions Ltd Topographical Survey, drawing number 0614-HP2-T1 dated June 2014.
 6. Ditch survey based on Siltline Ditch Level Survey drawing number 657PG05 dated 30.01.19.
 7. The current surface water drainage proposals only show primary SW drainage runs. An allowance must be made for secondary drainage which is all subject to design development

KEY

- Red Line Boundary as per Outline Application
- Permeable Paving
- Proposed Surface Water Network
- Proposed outfall headwall

SCALE BAR 1:500 at A1
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Rev	Date	Details	By	Chkd	Appd
G	13.11.19	Update to latest site layout	PJ	TRS	TRS
F	07.11.19	Drainage main updated to suit latest site layout	PJ	TRS	TRS
E	17.07.19	Update to latest site layout	TRS	TRS	TRS
D	11.07.19	Update to latest site layout	TRS	TRS	TRS
C	10.07.19	Update to latest site layout	TRS	TRS	TRS
B	03.07.19	Update to latest site layout	TRS	TRS	TRS
A	02.07.19	Update to latest site layout	TRS	TRS	TRS

Client:-
DREW SMITH LIMITED

Site:-
SUMMER LANE PAGHAM

Drawing Title:-
DRAINAGE STRATEGY LAYOUT

Date: February 2019
Drawn: KK
Checked: SRV
Approved: TRS

Scales: 1:500 at A1

Drawing No. **DSM/E4761/001G**

FOR INFORMATION ONLY

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- NOTES**
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 6. Ditch survey based on Sitaline Ditch Level Survey drawing number 657PG05 dated 30.01.19
 7. The current surface water drainage proposals only show primary SW drainage runs. An allowance must be made for secondary drainage which is all subject to design development

KEY

Red Line Boundary as per Outline Application

Impermeable Area take off
Western Part of the Site = 0.967 ha
Easter Part of the Site = 0.690 ha
All Site = 1.657 ha

SCALE BAR 1:500 at A1
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A		13.11.19	Update to latest site layout	PJ	TRS	TRS
Rev.	Date	Details		By	Chkd	Appd

Client:-
DREW SMITH LIMITED

Site:- SUMMER LANE PAGHAM	Drawing Title:- IMPERMEABLE AREA LAYOUT
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Date:	November 2019	Scales:	1:500 at A1
Drawn:	PJ	Checked:	TRS
		Approved:	TRS

Drawing No. **DSM/E4761/009A**

FOR INFORMATION ONLY



RCP
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Appendix (F)
Micro Drainage Calculations

Rogers Cory Ptn Ltd		Page 0
The Old School Old School Road Hook RG27 9NJ	Summer Lane Pagham	
Date 07/11/2019 10:07 File SW1-with Crayfern site.MDX	Designed by Terry Seymour Checked by Terry Seymour	
Micro Drainage	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW-1.SWS

Pipe Sizes SW-1 Manhole Sizes SW-1

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	10
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for SW-1.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.198	8-12	1.181	12-16	0.794	16-20	0.054

Total Area Contributing (ha) = 2.226

Total Pipe Volume (m³) = 1508.218

Network Design Table for SW-1.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	30.938	0.178	173.8	0.133	5.00	0.0	0.600		o	300	Pipe/Conduit	
S2.000	18.777	0.380	49.4	0.070	5.00	0.0	0.600		o	225	Pipe/Conduit	
S1.001	35.919	0.147	244.3	0.053	0.00	0.0	0.600		o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.43	4.412	0.133	0.0	0.0	1.8	1.19	84.1	19.8
S2.000	50.00	5.17	4.614	0.070	0.0	0.0	0.9	1.87	74.2	10.4
S1.001	50.00	5.95	4.309	0.256	0.0	0.0	3.5	1.15	127.5	38.1

Rogers Cory Ptn Ltd											Page 1	
The Old School Old School Road Hook RG27 9NJ						Summer Lane Pagham						
Date 07/11/2019 10:07						Designed by Terry Seymour						
File SW1-with Crayfern site.MDX						Checked by Terry Seymour						
Micro Drainage						Network 2017.1.2						
<u>Network Design Table for SW-1.SWS</u>												
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.002	19.564	0.080	244.6	0.104	0.00	0.0	0.600		o	375	Pipe/Conduit	
S3.000	24.951	0.143	174.5	0.075	5.00	0.0	0.600		o	225	Pipe/Conduit	
S4.000	24.529	0.148	165.7	0.057	5.00	0.0	0.600		o	225	Pipe/Conduit	
S1.003	30.561	0.113	270.5	0.085	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.004	14.757	0.030	491.9	0.058	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.005	9.883	0.022	449.2	0.007	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.006	14.051	0.046	305.5	0.007	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.007	21.099	0.039	534.1	0.041	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.008	12.902	0.039	330.8	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.009	12.638	0.032	394.9	0.072	0.00	0.0	0.600		o	450	Pipe/Conduit	
S1.010	6.866	0.017	403.9	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S5.000	10.000	0.040	250.0	0.260	5.00	0.0	0.600		o	300	Pipe/Conduit	
S5.001	2.500	0.010	250.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S5.002	2.500	0.010	250.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S1.011	43.627	0.087	501.5	0.000	0.00	0.0	0.600	1 _ /		525	1:1 Ditch	
S6.000	10.000	0.040	250.0	0.150	5.00	0.0	0.600	1 _ /		300	1:1 Ditch	
<u>Network Results Table</u>												
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)		
S1.002	50.00	6.23	4.162	0.360	0.0	0.0	4.9	1.15	127.5	53.6		
S3.000	50.00	5.42	4.445	0.075	0.0	0.0	1.0	0.99	39.2	11.2		
S4.000	50.00	5.40	4.306	0.057	0.0	0.0	0.8	1.01	40.3	8.5		
S1.003	50.00	6.65	3.932	0.577	0.0	0.0	7.8	1.23	195.8	85.9		
S1.004	50.00	6.92	3.744	0.635	0.0	0.0	8.6	0.91	144.7	94.6		
S1.005	50.00	7.09	3.714	0.642	0.0	0.0	8.7	0.95	151.5	95.6		
S1.006	50.00	7.29	3.692	0.649	0.0	0.0	8.8	1.16	184.2	96.7		
S1.007	50.00	7.70	3.846	0.690	0.0	0.0	9.3	0.87	138.8	102.8		
S1.008	50.00	7.89	3.607	0.690	0.0	0.0	9.3	1.11	176.9	102.8		
S1.009	50.00	8.10	3.567	0.762	0.0	0.0	10.3	1.02	161.7	113.5		
S1.010	49.93	8.21	3.535	0.762	0.0	0.0	10.3	1.01	159.9	113.5		
S5.000	50.00	5.17	4.000	0.260	0.0	0.0	3.5	0.99	70.0	38.7		
S5.001	50.00	5.21	3.960	0.260	0.0	0.0	3.5	0.99	70.0	38.7		
S5.002	50.00	5.25	3.950	0.260	0.0	0.0	3.5	0.99	70.0	38.7		
S1.011	48.61	8.67	3.443	1.022	0.0	0.0	13.5	1.57	867.7	148.0		
S6.000	50.00	5.11	4.000	0.150	0.0	0.0	2.0	1.58	284.1	22.3		
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The Old School Old School Road Hook RG27 9NJ						Summer Lane Pagham						
Date 07/11/2019 10:07 File SW1-with Crayfern site.MDX						Designed by Terry Seymour Checked by Terry Seymour						
Micro Drainage						Network 2017.1.2						
<u>Network Design Table for SW-1.SWS</u>												
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.001	2.500	0.010	250.0	0.000	0.00	0.0	0.600		1 _ /	300	1:1 Ditch	🔧
S6.002	2.500	0.010	250.0	0.000	0.00	0.0	0.600		1 _ /	300	1:1 Ditch	🔧
S1.012	5.353	0.011	486.6	0.000	0.00	0.0	0.600		1 _ /	525	1:1 Ditch	🔧
S1.013	17.096	0.034	502.8	0.000	0.00	0.0	0.600		1 _ /	525	1:1 Ditch	🔧
S1.014	13.810	0.028	493.2	0.000	0.00	0.0		0.045	o	525	Pipe/Conduit	🔧
S1.015	6.683	0.013	514.1	0.000	0.00	0.0		0.045	1 _ /	525	1:1 Ditch	🔧
S1.016	4.615	0.009	512.8	0.117	0.00	0.0	0.600		o	525	Pipe/Conduit	🔧
S1.017	27.468	0.055	499.4	0.000	0.00	0.0	0.600		1 _ /	525	1:1 Ditch	🔧
S1.018	70.410	0.141	499.4	0.087	0.00	0.0	0.600		1 _ /	525	1:1 Ditch	🔧
S7.000	37.874	0.223	169.8	0.060	5.00	0.0	0.600		o	225	Pipe/Conduit	🔧
S7.001	13.335	0.078	171.0	0.034	0.00	0.0	0.600		o	225	Pipe/Conduit	🔧
S7.002	15.006	0.088	170.5	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	🔧
S7.003	47.205	0.193	244.6	0.087	0.00	0.0	0.600		o	300	Pipe/Conduit	🔧
S8.000	46.917	0.456	102.9	0.130	5.00	0.0	0.600		o	300	Pipe/Conduit	🔧
S7.004	37.876	0.117	323.7	0.108	0.00	0.0	0.600		o	375	Pipe/Conduit	🔧
S7.005	18.226	0.045	405.0	0.175	0.00	0.0	0.600		o	450	Pipe/Conduit	🔧
S7.006	10.518	0.027	389.6	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	🔧
<u>Network Results Table</u>												
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Foul Flow (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)		
S6.001	50.00	5.13	3.960	0.150		0.0	0.0	2.0	1.58	284.1	22.3	
S6.002	50.00	5.16	3.950	0.150		0.0	0.0	2.0	1.58	284.1	22.3	
S1.012	48.45	8.73	3.356	1.172		0.0	0.0	15.4	1.60	881.0	169.2	
S1.013	47.96	8.91	3.345	1.172		0.0	0.0	15.4	1.57	866.6	169.2	
S1.014	45.69	9.80	3.311	1.172		0.0	0.0	15.4	0.26	58.9	169.2	
S1.015	45.06	10.07	3.283	1.172		0.0	0.0	15.4	0.41	228.1	169.2	
S1.016	44.87	10.15	3.270	1.289		0.0	0.0	15.7	0.98	212.6	172.3	
S1.017	44.22	10.44	3.261	1.289		0.0	0.0	15.7	1.58	869.5	172.3	
S1.018	42.64	11.18	3.206	1.376		0.0	0.0	15.9	1.58	869.6	174.8	
S7.000	50.00	5.63	4.167	0.060		0.0	0.0	0.8	1.00	39.8	8.9	
S7.001	50.00	5.85	3.944	0.094		0.0	0.0	1.3	1.00	39.6	14.0	
S7.002	50.00	6.10	3.866	0.094		0.0	0.0	1.3	1.00	39.7	14.0	
S7.003	50.00	6.89	3.703	0.181		0.0	0.0	2.5	1.00	70.7	27.0	
S8.000	50.00	5.50	4.000	0.130		0.0	0.0	1.8	1.55	109.6	19.4	
S7.004	50.00	7.52	3.435	0.419		0.0	0.0	5.7	1.00	110.6	62.4	
S7.005	50.00	7.82	3.243	0.594		0.0	0.0	8.0	1.00	159.7	88.5	
S7.006	50.00	7.99	3.198	0.594		0.0	0.0	8.0	1.02	162.9	88.5	
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The Old School Old School Road Hook RG27 9NJ					Summer Lane Pagham						
Date 07/11/2019 10:07					Designed by Terry Seymour						
File SW1-with Crayfern site.MDX					Checked by Terry Seymour						
Micro Drainage					Network 2017.1.2						
<u>Network Design Table for SW-1.SWS</u>											
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S9.000	13.486	0.079	170.7	0.019	5.00	0.0	0.600		o	225	Pipe/Conduit
S9.001	18.636	0.110	169.4	0.061	0.00	0.0	0.600		o	225	Pipe/Conduit
S9.002	13.429	0.143	93.9	0.026	0.00	0.0	0.600		o	225	Pipe/Conduit
S7.007	15.587	0.031	502.8	0.000	0.00	0.0	0.600		1 _ /	525	1:1 Ditch
S7.008	13.290	0.027	492.2	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit
S7.009	5.199	0.013	399.9	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit
S7.010	6.968	0.017	409.9	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit
S1.019	38.980	0.078	499.7	0.000	0.00	0.0	0.600		1 _ /	525	1:1 Ditch
S1.020	48.609	0.111	437.9	0.000	0.00	0.0	0.600		1 _ /	525	1:1 Ditch
S10.000	15.057	0.089	169.2	0.038	5.00	0.0	0.600		o	225	Pipe/Conduit
S10.001	12.781	0.093	137.4	0.033	0.00	0.0	0.600		o	225	Pipe/Conduit
S1.021	14.254	0.036	396.0	0.000	0.00	0.0	0.600		1 _ /	525	1:1 Ditch
S11.000	19.401	0.048	404.2	0.079	5.00	0.0		0.045	o	450	Pipe/Conduit
S1.022	2.098	0.029	72.4	0.000	0.00	0.0		0.045	1 _ /	525	1:1 Ditch
S1.023	27.502	0.006	4583.7	0.000	0.00	0.0		0.045	o	600	Pipe/Conduit
<u>Network Results Table</u>											
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	
S9.000	50.00	5.23	3.728	0.019	0.0	0.0	0.3	1.00	39.7	2.8	
S9.001	50.00	5.54	3.643	0.080	0.0	0.0	1.1	1.00	39.8	11.9	
S9.002	50.00	5.70	3.539	0.106	0.0	0.0	1.4	1.35	53.7	15.8	
S7.007	50.00	8.16	3.096	0.700	0.0	0.0	9.5	1.57	866.6	104.3	
S7.008	49.44	8.38	3.065	0.700	0.0	0.0	9.5	1.00	217.1	104.3	
S7.009	49.21	8.46	3.038	0.700	0.0	0.0	9.5	1.11	241.1	104.3	
S7.010	48.91	8.56	3.025	0.700	0.0	0.0	9.5	1.10	238.1	104.3	
S1.019	41.84	11.59	3.065	2.076	0.0	0.0	23.5	1.58	869.2	258.8	
S1.020	40.95	12.07	2.987	2.076	0.0	0.0	23.5	1.69	929.0	258.8	
S10.000	50.00	5.25	3.318	0.038	0.0	0.0	0.5	1.00	39.9	5.7	
S10.001	50.00	5.44	3.229	0.071	0.0	0.0	1.0	1.11	44.3	10.6	
S1.021	40.71	12.21	2.876	2.147	0.0	0.0	23.7	1.77	977.4	260.4	
S11.000	50.00	6.26	3.467	0.079	0.0	0.0	1.1	0.25	41.0	11.8	
S1.022	40.65	12.24	2.840	2.226	0.0	0.0	24.5	1.10	607.9	269.6	
S1.023	33.66	17.19	2.803	2.226	0.0	0.0	24.5	0.69	25.2	269.6	
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The Old School Old School Road Hook RG27 9NJ			Summer Lane Pagham			
Date 07/11/2019 10:07 File SW1-with Crayfern site.MDX			Designed by Terry Seymour Checked by Terry Seymour			
Micro Drainage			Network 2017.1.2			
<u>Area Summary for SW-1.SWS</u>						
Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.133	0.133	0.133
2.000	-	-	100	0.070	0.070	0.070
1.001	-	-	100	0.053	0.053	0.053
1.002	-	-	100	0.104	0.104	0.104
3.000	-	-	100	0.075	0.075	0.075
4.000	-	-	100	0.057	0.057	0.057
1.003	-	-	100	0.085	0.085	0.085
1.004	-	-	100	0.058	0.058	0.058
1.005	-	-	100	0.007	0.007	0.007
1.006	-	-	100	0.007	0.007	0.007
1.007	-	-	100	0.041	0.041	0.041
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.072	0.072	0.072
1.010	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.260	0.260	0.260
5.001	-	-	100	0.000	0.000	0.000
5.002	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.150	0.150	0.150
6.001	-	-	100	0.000	0.000	0.000
6.002	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.117	0.117	0.117
1.017	-	-	100	0.000	0.000	0.000
1.018	-	-	100	0.087	0.087	0.087
7.000	-	-	100	0.060	0.060	0.060
7.001	-	-	100	0.034	0.034	0.034
7.002	-	-	100	0.000	0.000	0.000
7.003	-	-	100	0.087	0.087	0.087
8.000	-	-	100	0.130	0.130	0.130
7.004	-	-	100	0.108	0.108	0.108
7.005	-	-	100	0.175	0.175	0.175
7.006	-	-	100	0.000	0.000	0.000
9.000	-	-	100	0.019	0.019	0.019
9.001	-	-	100	0.061	0.061	0.061
9.002	-	-	100	0.026	0.026	0.026
7.007	-	-	100	0.000	0.000	0.000
7.008	-	-	100	0.000	0.000	0.000
7.009	-	-	100	0.000	0.000	0.000
7.010	-	-	100	0.000	0.000	0.000
1.019	-	-	100	0.000	0.000	0.000
1.020	-	-	100	0.000	0.000	0.000
10.000	-	-	100	0.038	0.038	0.038
10.001	-	-	100	0.033	0.033	0.033
1.021	-	-	100	0.000	0.000	0.000
11.000	-	-	100	0.079	0.079	0.079
1.022	-	-	100	0.000	0.000	0.000
1.023	-	-	100	0.000	0.000	0.000
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Area Summary for SW-1.SWS

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
				Total	Total	Total
				2.226	2.226	2.226

Simulation Criteria for SW-1.SWS

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	10.000
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	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	480
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	4

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	240
Ratio R	0.350		

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Online Controls for SW-1.SWS

Hydro-Brake® Optimum Manhole: SCF-02, DS/PN: S5.001, Volume (m³): 2.0

Unit Reference MD-SHE-0132-8000-1000-8000
Design Head (m) 1.000
Design Flow (l/s) 8.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 132
Invert Level (m) 3.960
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	8.0
Flush-Flo™	0.302	8.0
Kick-Flo®	0.664	6.6
Mean Flow over Head Range	-	6.9

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	1.200	8.7	3.000	13.4	7.000	20.1
0.200	7.8	1.400	9.4	3.500	14.5	7.500	20.8
0.300	8.0	1.600	10.0	4.000	15.4	8.000	21.5
0.400	7.9	1.800	10.5	4.500	16.3	8.500	22.1
0.500	7.7	2.000	11.1	5.000	17.1	9.000	22.7
0.600	7.2	2.200	11.6	5.500	17.9	9.500	23.3
0.800	7.2	2.400	12.1	6.000	18.7		
1.000	8.0	2.600	12.6	6.500	19.4		

Non Return Valve Manhole: S17, DS/PN: S5.002, Volume (m³): 1.5

Hydro-Brake® Optimum Manhole: SCF-04, DS/PN: S6.001, Volume (m³): 18.0

Unit Reference MD-SHE-0101-4600-1000-4600
Design Head (m) 1.000
Design Flow (l/s) 4.6
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 101
Invert Level (m) 3.960

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Hydro-Brake® Optimum Manhole: SCF-04, DS/PN: S6.001, Volume (m³): 18.0

Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	4.6
Flush-Flo™	0.293	4.6
Kick-Flo®	0.633	3.7
Mean Flow over Head Range	-	4.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.4	1.200	5.0	3.000	7.7	7.000	11.5
0.200	4.5	1.400	5.4	3.500	8.3	7.500	11.9
0.300	4.6	1.600	5.7	4.000	8.8	8.000	12.2
0.400	4.5	1.800	6.0	4.500	9.3	8.500	12.6
0.500	4.4	2.000	6.3	5.000	9.8	9.000	12.9
0.600	4.0	2.200	6.6	5.500	10.2	9.500	13.3
0.800	4.1	2.400	6.9	6.000	10.7		
1.000	4.6	2.600	7.2	6.500	11.1		

Non Return Valve Manhole: S21, DS/PN: S6.002, Volume (m³): 4.8

Hydro-Brake® Optimum Manhole: SW-10, DS/PN: S1.016, Volume (m³): 27.7

Unit Reference MD-SHE-0288-5000-1500-5000
Design Head (m) 1.500
Design Flow (l/s) 50.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 288
Invert Level (m) 3.270
Minimum Outlet Pipe Diameter (mm) 375
Suggested Manhole Diameter (mm) 2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	49.9
Flush-Flo™	0.505	49.8
Kick-Flo®	1.067	42.4
Mean Flow over Head Range	-	42.1

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

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Hydro-Brake® Optimum Manhole: SW-10, DS/PN: S1.016, Volume (m³): 27.7

invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.9	1.200	44.9	3.000	69.8	7.000	105.4
0.200	29.7	1.400	48.3	3.500	75.2	7.500	109.0
0.300	47.6	1.600	51.5	4.000	80.3	8.000	112.5
0.400	49.4	1.800	54.5	4.500	85.0	8.500	115.9
0.500	49.8	2.000	57.4	5.000	89.5	9.000	119.2
0.600	49.6	2.200	60.1	5.500	93.7	9.500	122.4
0.800	48.2	2.400	62.7	6.000	97.8		
1.000	44.8	2.600	65.1	6.500	101.7		

Hydro-Brake® Optimum Manhole: SW-2, DS/PN: S1.023, Volume (m³): 8.0

Unit Reference MD-SHE-0124-7900-1450-7900
 Design Head (m) 1.450
 Design Flow (l/s) 7.9
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 124
 Invert Level (m) 2.803
 Minimum Outlet Pipe Diameter (mm) 150
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.450	7.9
Flush-Flo™	0.425	7.9
Kick-Flo®	0.896	6.3
Mean Flow over Head Range	-	6.9

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.4	1.200	7.2	3.000	11.1	7.000	16.7
0.200	7.2	1.400	7.8	3.500	12.0	7.500	17.2
0.300	7.7	1.600	8.3	4.000	12.7	8.000	17.8
0.400	7.9	1.800	8.7	4.500	13.5	8.500	18.3
0.500	7.9	2.000	9.2	5.000	14.2	9.000	18.8
0.600	7.7	2.200	9.6	5.500	14.8	9.500	19.3
0.800	7.1	2.400	10.0	6.000	15.5		
1.000	6.6	2.600	10.4	6.500	16.1		

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<u>Offline Controls for SW-1.SWS</u> <u>Weir Manhole: SW-10, DS/PN: S1.016, Loop to PN: S1.017</u> Discharge Coef 0.544 Width (m) 1.500 Invert Level (m) 4.500		
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Storage Structures for SW-1.SWS

Porous Car Park Manhole: SW-25, DS/PN: S1.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.5
Membrane Percolation (mm/hr)	1000	Length (m)	51.0
Max Percolation (l/s)	77.9	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.412	Cap Volume Depth (m)	0.600

Porous Car Park Manhole: SW-18, DS/PN: S1.007

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	27.8	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	4.333	Cap Volume Depth (m)	0.450

Tank or Pond Manhole: SCF-01, DS/PN: S5.000

Invert Level (m) 4.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	168.0	0.400	168.0

Tank or Pond Manhole: SCF-03, DS/PN: S6.000

Invert Level (m) 4.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	294.0	0.400	294.0	0.401	0.0

Tank or Pond Manhole: SW-12, DS/PN: S1.014

Invert Level (m) 4.200

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	153.3	1.000	353.2

Tank or Pond Manhole: SW-31, DS/PN: S7.008

Invert Level (m) 4.200

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	130.1	0.700	311.4

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW-1.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia 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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SW-25	15 Winter	1	+0%	100/15 Summer			
S2.000	SW-26	15 Winter	1	+0%	100/15 Summer			
S1.001	SW-24	15 Winter	1	+0%	100/15 Summer			
S1.002	SW-23	15 Winter	1	+0%	30/15 Winter			
S3.000	SW-27	15 Winter	1	+0%	100/15 Summer			
S4.000	SW-28	15 Winter	1	+0%	30/15 Winter			
S1.003	SW-22	2880 Winter	1	+0%	30/15 Summer			
S1.004	SW-21	2880 Winter	1	+0%	1/600 Winter			
S1.005	SW-20	2880 Winter	1	+0%	1/480 Winter			
S1.006	SW-19	2880 Winter	1	+0%	1/480 Winter			
S1.007	SW-18	2880 Winter	1	+0%	1/360 Winter			
S1.008	SW-17a	2880 Winter	1	+0%	1/180 Winter			
S1.009	SW-17	2880 Winter	1	+0%	1/180 Winter			
S1.010	SW-16	2880 Winter	1	+0%	1/120 Winter			
S5.000	SCF-01	4320 Winter	1	+0%	30/60 Summer			
S5.001	SCF-02	4320 Winter	1	+0%	1/2160 Winter			
S5.002	S17	2880 Winter	1	+0%	1/1440 Winter			

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW-1.SWS

		Water	Surcharged	Flooded			Pipe		
	US/MH	Level	Depth	Volume	Flow /	Overflow	Flow		Level
PN	Name	(m)	(m)	(m³)	Cap.	(l/s)	(l/s)	Status	Exceeded
S1.000	SW-25	4.509	-0.203	0.000	0.22		17.0		OK
S2.000	SW-26	4.671	-0.168	0.000	0.15		9.7		OK
S1.001	SW-24	4.444	-0.240	0.000	0.28		31.8		OK
S1.002	SW-23	4.326	-0.211	0.000	0.39		41.9		OK
S3.000	SW-27	4.528	-0.142	0.000	0.29		10.3		OK
S4.000	SW-28	4.371	-0.154	0.000	0.21		7.8		OK
S1.003	SW-22	4.287	-0.095	0.000	0.02		3.3		OK
S1.004	SW-21	4.287	0.093	0.000	0.04		3.6	SURCHARGED	
S1.005	SW-20	4.286	0.122	0.000	0.04		3.7	SURCHARGED	
S1.006	SW-19	4.285	0.143	0.000	0.03		3.7	SURCHARGED	
S1.007	SW-18	4.285	0.189	0.000	0.04		3.9	SURCHARGED	
S1.008	SW-17a	4.284	0.227	0.000	0.03		3.8	SURCHARGED	
S1.009	SW-17	4.283	0.266	0.000	0.04		4.2	SURCHARGED	
S1.010	SW-16	4.283	0.298	0.000	0.04		4.1	SURCHARGED	
S5.000	SCF-01	4.294	-0.006	0.000	0.01		0.8		OK
S5.001	SCF-02	4.294	0.034	0.000	0.02		0.8	SURCHARGED	
S5.002	S17	4.282	0.032	0.000	0.02		1.1	SURCHARGED	

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<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for SW-1.SWS</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow		
S1.011	SW-15	2880 Winter	1	+0%					
S6.000	SCF-03	10080 Winter	1	+0%					
S6.001	SCF-04	10080 Winter	1	+0%					
S6.002	S21	10080 Winter	1	+0%					
S1.012	SW-14	2880 Winter	1	+0%					
S1.013	SW-13	2880 Winter	1	+0%					
S1.014	SW-12	2880 Winter	1	+0%	1/30 Winter				
S1.015	SW-11	2880 Winter	1	+0%					
S1.016	SW-10	2880 Winter	1	+0%	1/30 Summer		30/360 Winter		
S1.017	SW-9	2880 Winter	1	+0%		100/1440 Winter			
S1.018	SW-8	2880 Winter	1	+0%					
S7.000	SW-39	2880 Winter	1	+0%	30/360 Winter	100/15 Winter			
S7.001	SW-38	2880 Winter	1	+0%	1/600 Winter				
S7.002	SW-37	2880 Winter	1	+0%	1/360 Winter				
S7.003	SW-36	2880 Winter	1	+0%	1/180 Winter				
S8.000	S26	2880 Winter	1	+0%	30/180 Winter				
S7.004	SW-35	2880 Winter	1	+0%	1/60 Winter				
S7.005	SW-34	2880 Winter	1	+0%	1/30 Winter				
S7.006	SW-33	2880 Winter	1	+0%	1/30 Summer				
S9.000	SW-42	2880 Winter	1	+0%	1/120 Winter				
S9.001	SW-41	2880 Winter	1	+0%	1/120 Summer				
S9.002	SW-40	2880 Winter	1	+0%	1/60 Summer				
S7.007	SW-32	2880 Winter	1	+0%					
S7.008	SW-31	2880 Winter	1	+0%	1/15 Summer				
S7.009	SW-30	2880 Winter	1	+0%	1/15 Summer				
S7.010	SW-29	2880 Winter	1	+0%	1/15 Summer				
S1.019	SW-7	2880 Winter	1	+0%					
S1.020	SW-6	2880 Winter	1	+0%					
S10.000	SW-44	2880 Winter	1	+0%	1/15 Summer				
S10.001	SW-43	2880 Winter	1	+0%	1/15 Summer				
S1.021	SW-5	2880 Winter	1	+0%					
S11.000	SW-45	2880 Winter	1	+0%	1/120 Winter				
S1.022	SW-4	2880 Winter	1	+0%					
S1.023	SW-2	2880 Winter	1	+0%	1/15 Summer				
PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.011	SW-15		4.282	-0.918	0.000	0.00		4.4	OK
S6.000	SCF-03		4.187	-1.013	0.000	0.00		1.8	OK
S6.001	SCF-04		4.192	-1.008	0.000	0.00		1.7	OK
S6.002	S21		4.188	-1.012	0.000	0.00		1.7	OK
S1.012	SW-14		4.282	-0.918	0.000	0.00		3.5	OK
S1.013	SW-13		4.282	-0.918	0.000	0.00		3.3	OK
S1.014	SW-12		4.282	0.446	0.000	0.07		2.8	SURCHARGED
S1.015	SW-11		4.281	-0.919	0.000	0.00		2.8	OK
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
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PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.016	SW-10	50	4.281	0.486	0.000	0.02	0.0	3.2	SURCHARGED
S1.017	SW-9		4.249	-0.851	0.000	0.00		3.2	OK
S1.018	SW-8		4.249	-0.851	0.000	0.00		3.3	OK
S7.000	SW-39		4.252	-0.140	0.000	0.01		0.3	OK
S7.001	SW-38		4.252	0.083	0.000	0.01		0.5	SURCHARGED
S7.002	SW-37		4.252	0.161	0.000	0.01		0.5	SURCHARGED
S7.003	SW-36		4.251	0.248	0.000	0.01		0.9	SURCHARGED
S8.000	S26		4.251	-0.049	0.000	0.01		0.7	OK
S7.004	SW-35		4.251	0.441	0.000	0.02		2.1	SURCHARGED
S7.005	SW-34		4.250	0.557	0.000	0.03		3.0	SURCHARGED
S7.006	SW-33		4.250	0.602	0.000	0.03		3.0	SURCHARGED
S9.000	SW-42		4.250	0.297	0.000	0.00		0.1	SURCHARGED
S9.001	SW-41		4.250	0.376	0.000	0.01		0.4	SURCHARGED
S9.002	SW-40		4.250	0.486	0.000	0.01		0.6	SURCHARGED
S7.007	SW-32		4.249	-0.951	0.000	0.00		3.5	OK
S7.008	SW-31		4.249	0.659	0.000	0.03		3.3	SURCHARGED
S7.009	SW-30		4.249	0.686	0.000	0.02		3.3	SURCHARGED
S7.010	SW-29		4.249	0.699	0.000	0.02		3.3	SURCHARGED
S1.019	SW-7		4.248	-0.852	0.000	0.00		5.6	OK
S1.020	SW-6		4.248	-0.852	0.000	0.00		5.4	OK
S10.000	SW-44		4.248	0.705	0.000	0.01		0.2	SURCHARGED
S10.001	SW-43		4.248	0.794	0.000	0.01		0.4	SURCHARGED
S1.021	SW-5		4.248	-0.852	0.000	0.00		6.2	OK
S11.000	SW-45		4.247	0.330	0.000	0.02		0.7	SURCHARGED
S1.022	SW-4		4.250	-0.850	0.000	0.00		11.9	OK
S1.023	SW-2		4.256	0.853	0.000	0.13		5.2	SURCHARGED

PN	US/MH Name	Level Exceeded
S1.011	SW-15	
S6.000	SCF-03	
S6.001	SCF-04	
S6.002	S21	
S1.012	SW-14	
S1.013	SW-13	
S1.014	SW-12	
S1.015	SW-11	
S1.016	SW-10	
S1.017	SW-9	
S1.018	SW-8	
S7.000	SW-39	1
S7.001	SW-38	
S7.002	SW-37	
S7.003	SW-36	
S8.000	S26	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
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Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia 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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SW-25	15 Winter	30	+0%	100/15 Summer			
S2.000	SW-26	15 Winter	30	+0%	100/15 Summer			
S1.001	SW-24	15 Winter	30	+0%	100/15 Summer			
S1.002	SW-23	60 Winter	30	+0%	30/15 Winter			
S3.000	SW-27	15 Winter	30	+0%	100/15 Summer			
S4.000	SW-28	2160 Winter	30	+0%	30/15 Winter			
S1.003	SW-22	2160 Winter	30	+0%	30/15 Summer			
S1.004	SW-21	2160 Winter	30	+0%	1/600 Winter			
S1.005	SW-20	2160 Winter	30	+0%	1/480 Winter			
S1.006	SW-19	2160 Winter	30	+0%	1/480 Winter			
S1.007	SW-18	2160 Winter	30	+0%	1/360 Winter			
S1.008	SW-17a	2160 Winter	30	+0%	1/180 Winter			
S1.009	SW-17	2160 Winter	30	+0%	1/180 Winter			
S1.010	SW-16	2160 Winter	30	+0%	1/120 Winter			
S5.000	SCF-01	2160 Winter	30	+0%	30/60 Summer			
S5.001	SCF-02	2160 Winter	30	+0%	1/2160 Winter			
S5.002	S17	2160 Winter	30	+0%	1/1440 Winter			

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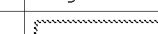
PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)				
S1.000	SW-25	4.674	-0.038	0.000	0.46		35.3			OK	
S2.000	SW-26	4.707	-0.132	0.000	0.36		23.8			OK	
S1.001	SW-24	4.652	-0.032	0.000	0.63		72.4			OK	
S1.002	SW-23	4.597	0.060	0.000	0.56		60.1		SURCHARGED		
S3.000	SW-27	4.586	-0.084	0.000	0.69		25.1			OK	
S4.000	SW-28	4.580	0.055	0.000	0.02		0.8		SURCHARGED		
S1.003	SW-22	4.580	0.198	0.000	0.05		7.8		SURCHARGED		
S1.004	SW-21	4.579	0.385	0.000	0.10		8.5		SURCHARGED		
S1.005	SW-20	4.578	0.414	0.000	0.10		8.6		SURCHARGED		
S1.006	SW-19	4.577	0.435	0.000	0.06		8.7		SURCHARGED		
S1.007	SW-18	4.576	0.480	0.000	0.09		8.7		SURCHARGED		
S1.008	SW-17a	4.575	0.519	0.000	0.07		8.6		SURCHARGED		
S1.009	SW-17	4.574	0.557	0.000	0.09		9.6		SURCHARGED		
S1.010	SW-16	4.573	0.588	0.000	0.09		9.5		SURCHARGED		
S5.000	SCF-01	4.599	0.299	0.000	0.03		1.6		SURCHARGED		
S5.001	SCF-02	4.600	0.340	0.000	0.03		1.6		SURCHARGED		
S5.002	S17	4.573	0.323	0.000	0.03		1.6		SURCHARGED		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW-1.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S1.011	SW-15	2160 Winter	30	+0%			
S6.000	SCF-03	7200 Winter	30	+0%			
S6.001	SCF-04	7200 Winter	30	+0%			
S6.002	S21	7200 Winter	30	+0%			
S1.012	SW-14	2160 Winter	30	+0%			
S1.013	SW-13	2160 Winter	30	+0%			
S1.014	SW-12	2160 Winter	30	+0%	1/30 Winter		
S1.015	SW-11	2160 Winter	30	+0%			
S1.016	SW-10	2160 Winter	30	+0%	1/30 Summer		30/360 Winter
S1.017	SW-9	2160 Winter	30	+0%		100/1440 Winter	
S1.018	SW-8	2160 Winter	30	+0%			
S7.000	SW-39	2160 Winter	30	+0%	30/360 Winter	100/15 Winter	
S7.001	SW-38	2160 Winter	30	+0%	1/600 Winter		
S7.002	SW-37	2160 Winter	30	+0%	1/360 Winter		
S7.003	SW-36	2160 Winter	30	+0%	1/180 Winter		
S8.000	S26	2160 Winter	30	+0%	30/180 Winter		
S7.004	SW-35	2160 Winter	30	+0%	1/60 Winter		
S7.005	SW-34	2160 Winter	30	+0%	1/30 Winter		
S7.006	SW-33	2160 Winter	30	+0%	1/30 Summer		
S9.000	SW-42	2160 Winter	30	+0%	1/120 Winter		
S9.001	SW-41	2160 Winter	30	+0%	1/120 Summer		
S9.002	SW-40	2160 Winter	30	+0%	1/60 Summer		
S7.007	SW-32	2160 Winter	30	+0%			
S7.008	SW-31	2160 Winter	30	+0%	1/15 Summer		
S7.009	SW-30	2160 Winter	30	+0%	1/15 Summer		
S7.010	SW-29	2160 Winter	30	+0%	1/15 Summer		
S1.019	SW-7	2160 Winter	30	+0%			
S1.020	SW-6	2160 Winter	30	+0%			
S10.000	SW-44	2160 Winter	30	+0%	1/15 Summer		
S10.001	SW-43	2160 Winter	30	+0%	1/15 Summer		
S1.021	SW-5	2160 Winter	30	+0%			
S11.000	SW-45	2160 Winter	30	+0%	1/120 Winter		
S1.022	SW-4	2160 Winter	30	+0%			
S1.023	SW-2	2160 Winter	30	+0%	1/15 Summer		

PN	US/MH Name	Overflow Act.	Water Surcharged Flooded			Pipe		Status
			Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	
S1.011	SW-15		4.573	-0.627	0.000	0.00	9.5	OK
S6.000	SCF-03		4.346	-0.854	0.000	0.00	2.4	OK
S6.001	SCF-04		4.353	-0.847	0.000	0.00	1.5	OK
S6.002	S21		4.344	-0.856	0.000	0.00	1.6	OK
S1.012	SW-14		4.573	-0.627	0.000	0.00	7.8	OK
S1.013	SW-13		4.573	-0.627	0.000	0.00	7.8	OK
S1.014	SW-12		4.572	0.736	0.000	0.17	7.3	SURCHARGED
S1.015	SW-11		4.570	-0.630	0.000	0.00	7.3	OK

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PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Cap.	Overflow Flow (l/s)	Pipe Flow (l/s)	Status
S1.016	SW-10	50	4.570	0.775	0.000	0.03	5.5	5.4	SURCHARGED
S1.017	SW-9		4.555	-0.545	0.000	0.00		8.3	OK
S1.018	SW-8		4.554	-0.546	0.000	0.00		8.3	OK
S7.000	SW-39		4.560	0.168	0.000	0.02		0.8	SURCHARGED
S7.001	SW-38		4.560	0.391	0.000	0.04		1.2	SURCHARGED
S7.002	SW-37		4.559	0.468	0.000	0.03		1.2	SURCHARGED
S7.003	SW-36		4.559	0.556	0.000	0.04		2.4	SURCHARGED
S8.000	S26		4.558	0.258	0.000	0.02		1.7	SURCHARGED
S7.004	SW-35		4.558	0.748	0.000	0.06		5.5	SURCHARGED
S7.005	SW-34		4.556	0.863	0.000	0.07		7.9	SURCHARGED
S7.006	SW-33		4.556	0.908	0.000	0.08		7.8	SURCHARGED
S9.000	SW-42		4.556	0.603	0.000	0.01		0.2	SURCHARGED
S9.001	SW-41		4.556	0.682	0.000	0.03		1.0	SURCHARGED
S9.002	SW-40		4.556	0.792	0.000	0.03		1.4	SURCHARGED
S7.007	SW-32		4.555	-0.645	0.000	0.00		9.2	OK
S7.008	SW-31		4.555	0.965	0.000	0.06		6.7	SURCHARGED
S7.009	SW-30		4.555	0.992	0.000	0.04		6.7	SURCHARGED
S7.010	SW-29		4.554	1.004	0.000	0.05		6.7	SURCHARGED
S1.019	SW-7		4.554	-0.546	0.000	0.00		10.1	OK
S1.020	SW-6		4.553	-0.547	0.000	0.00		9.2	OK
S10.000	SW-44		4.552	1.009	0.000	0.01		0.5	SURCHARGED
S10.001	SW-43		4.552	1.098	0.000	0.03		1.0	SURCHARGED
S1.021	SW-5		4.552	-0.548	0.000	0.00		10.9	OK
S11.000	SW-45		4.552	0.635	0.000	0.03		1.2	SURCHARGED
S1.022	SW-4		4.555	-0.545	0.000	0.00		13.4	OK
S1.023	SW-2		4.559	1.156	0.000	0.19		7.9	SURCHARGED

PN	US/MH Name	Level Exceeded
S1.011	SW-15	
S6.000	SCF-03	
S6.001	SCF-04	
S6.002	S21	
S1.012	SW-14	
S1.013	SW-13	
S1.014	SW-12	
S1.015	SW-11	
S1.016	SW-10	
S1.017	SW-9	
S1.018	SW-8	
S7.000	SW-39	1
S7.001	SW-38	
S7.002	SW-37	
S7.003	SW-36	
S8.000	S26	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW-1.SWS

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia 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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	SW-25	30 Winter	100	+40%	100/15 Summer			
S2.000	SW-26	15 Winter	100	+40%	100/15 Summer			
S1.001	SW-24	30 Winter	100	+40%	100/15 Summer			
S1.002	SW-23	15 Winter	100	+40%	30/15 Winter			
S3.000	SW-27	15 Winter	100	+40%	100/15 Summer			
S4.000	SW-28	15 Winter	100	+40%	30/15 Winter			
S1.003	SW-22	2160 Winter	100	+40%	30/15 Summer			
S1.004	SW-21	2160 Winter	100	+40%	1/600 Winter			
S1.005	SW-20	2160 Winter	100	+40%	1/480 Winter			
S1.006	SW-19	2160 Winter	100	+40%	1/480 Winter			
S1.007	SW-18	2160 Winter	100	+40%	1/360 Winter			
S1.008	SW-17a	2160 Winter	100	+40%	1/180 Winter			
S1.009	SW-17	2160 Winter	100	+40%	1/180 Winter			
S1.010	SW-16	2160 Winter	100	+40%	1/120 Winter			
S5.000	SCF-01	2160 Winter	100	+40%	30/60 Summer			
S5.001	SCF-02	2160 Winter	100	+40%	1/2160 Winter			
S5.002	S17	2160 Winter	100	+40%	1/1440 Winter			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW-1.SWS

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)				
S1.000	SW-25	5.169	0.457	0.000	0.44		33.5			SURCHARGED	
S2.000	SW-26	5.268	0.429	0.000	0.58		38.5			FLOOD RISK	
S1.001	SW-24	5.146	0.462	0.000	0.61		69.6			SURCHARGED	
S1.002	SW-23	5.146	0.609	0.000	0.95		101.4			SURCHARGED	
S3.000	SW-27	5.256	0.586	0.000	1.14		41.4			FLOOD RISK	
S4.000	SW-28	5.170	0.645	0.000	0.84		31.2			FLOOD RISK	
S1.003	SW-22	5.118	0.736	0.000	0.08		13.2			SURCHARGED	
S1.004	SW-21	5.117	0.923	0.000	0.17		14.4			FLOOD RISK	
S1.005	SW-20	5.116	0.952	0.000	0.17		14.6			FLOOD RISK	
S1.006	SW-19	5.116	0.974	0.000	0.11		14.7			FLOOD RISK	
S1.007	SW-18	5.115	1.019	0.000	0.15		14.7			FLOOD RISK	
S1.008	SW-17a	5.114	1.057	0.000	0.12		14.6			FLOOD RISK	
S1.009	SW-17	5.113	1.096	0.000	0.16		16.3			FLOOD RISK	
S1.010	SW-16	5.112	1.127	0.000	0.16		16.2			SURCHARGED	
S5.000	SCF-01	5.134	0.834	0.000	0.04		2.1			FLOOD RISK	
S5.001	SCF-02	5.134	0.874	0.000	0.04		2.0			FLOOD RISK	
S5.002	S17	5.112	0.862	0.000	0.04		2.0			FLOOD RISK	

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Micro Drainage				Network 2017.1.2					
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW-1.SWS</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow		
S1.011	SW-15	2160 Winter	100	+40%					
S6.000	SCF-03	2160 Winter	100	+40%					
S6.001	SCF-04	2160 Winter	100	+40%					
S6.002	S21	2160 Winter	100	+40%					
S1.012	SW-14	2160 Winter	100	+40%					
S1.013	SW-13	2160 Winter	100	+40%					
S1.014	SW-12	2160 Winter	100	+40%	1/30 Winter				
S1.015	SW-11	2160 Winter	100	+40%					
S1.016	SW-10	2160 Winter	100	+40%	1/30 Summer		30/360 Winter		
S1.017	SW-9	2160 Winter	100	+40%		100/1440 Winter			
S1.018	SW-8	2160 Winter	100	+40%					
S7.000	SW-39	15 Winter	100	+40%	30/360 Winter	100/15 Winter			
S7.001	SW-38	15 Winter	100	+40%	1/600 Winter				
S7.002	SW-37	15 Winter	100	+40%	1/360 Winter				
S7.003	SW-36	2160 Winter	100	+40%	1/180 Winter				
S8.000	S26	2160 Winter	100	+40%	30/180 Winter				
S7.004	SW-35	2160 Winter	100	+40%	1/60 Winter				
S7.005	SW-34	2160 Winter	100	+40%	1/30 Winter				
S7.006	SW-33	2160 Winter	100	+40%	1/30 Summer				
S9.000	SW-42	2160 Winter	100	+40%	1/120 Winter				
S9.001	SW-41	2160 Winter	100	+40%	1/120 Summer				
S9.002	SW-40	2160 Winter	100	+40%	1/60 Summer				
S7.007	SW-32	2160 Winter	100	+40%					
S7.008	SW-31	2160 Winter	100	+40%	1/15 Summer				
S7.009	SW-30	2160 Winter	100	+40%	1/15 Summer				
S7.010	SW-29	2160 Winter	100	+40%	1/15 Summer				
S1.019	SW-7	2160 Winter	100	+40%					
S1.020	SW-6	2160 Winter	100	+40%					
S10.000	SW-44	2160 Winter	100	+40%	1/15 Summer				
S10.001	SW-43	2160 Winter	100	+40%	1/15 Summer				
S1.021	SW-5	2160 Winter	100	+40%					
S11.000	SW-45	2160 Winter	100	+40%	1/120 Winter				
S1.022	SW-4	2160 Winter	100	+40%					
S1.023	SW-2	2160 Winter	100	+40%	1/15 Summer				
PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Cap. (l/s)	Overflow Flow (l/s)	Pipe Flow (l/s)	Status
S1.011	SW-15		5.111	-0.089	0.000	0.00		17.5	FLOOD RISK
S6.000	SCF-03		5.140	-0.060	0.000	0.00		2.3	FLOOD RISK*
S6.001	SCF-04		5.140	-0.060	0.000	0.00		0.9	FLOOD RISK*
S6.002	S21		5.109	-0.091	0.000	0.00		0.9	FLOOD RISK*
S1.012	SW-14		5.109	-0.091	0.000	0.00		14.5	FLOOD RISK
S1.013	SW-13		5.109	-0.091	0.000	0.00		14.4	FLOOD RISK
S1.014	SW-12		5.108	1.272	0.000	0.28		11.9	FLOOD RISK
S1.015	SW-11		5.105	-0.095	0.000	0.00		11.9	FLOOD RISK
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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW-1.SWS</u>									
PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.016	SW-10	50	5.104	1.309	0.000	0.04	10.8	6.4	FLOOD RISK
S1.017	SW-9		5.100	0.000	0.000	0.00		14.3	FLOOD
S1.018	SW-8		5.100	0.000	0.000	0.00		13.8	FLOOD RISK
S7.000	SW-39		5.202	0.810	1.534	0.86		32.3	FLOOD
S7.001	SW-38		5.184	1.015	0.000	1.25		42.9	FLOOD RISK
S7.002	SW-37		5.104	1.018	0.000	1.28		44.8	FLOOD RISK
S7.003	SW-36		5.093	1.090	0.000	0.06		4.1	FLOOD RISK
S8.000	S26		5.093	0.793	0.000	0.03		3.0	FLOOD RISK
S7.004	SW-35		5.093	1.283	0.000	0.10		9.7	FLOOD RISK
S7.005	SW-34		5.092	1.399	0.000	0.11		13.8	FLOOD RISK
S7.006	SW-33		5.091	1.443	0.000	0.14		13.8	FLOOD RISK
S9.000	SW-42		5.092	1.139	0.000	0.01		0.4	FLOOD RISK
S9.001	SW-41		5.092	1.218	0.000	0.05		1.8	FLOOD RISK
S9.002	SW-40		5.091	1.327	0.000	0.05		2.4	FLOOD RISK
S7.007	SW-32		5.091	-0.109	0.000	0.00		16.1	FLOOD RISK
S7.008	SW-31		5.091	1.501	0.000	0.08		9.5	FLOOD RISK
S7.009	SW-30		5.090	1.527	0.000	0.06		9.4	FLOOD RISK
S7.010	SW-29		5.090	1.540	0.000	0.07		9.4	FLOOD RISK
S1.019	SW-7		5.090	-0.010	0.000	0.00		14.8	FLOOD RISK
S1.020	SW-6		5.074	-0.026	0.000	0.00		11.3	FLOOD RISK
S10.000	SW-44		5.060	1.517	0.000	0.03		0.9	FLOOD RISK
S10.001	SW-43		5.060	1.606	0.000	0.04		1.6	FLOOD RISK
S1.021	SW-5		5.060	-0.040	0.000	0.00		10.8	FLOOD RISK
S11.000	SW-45		5.054	1.137	0.000	0.05		1.9	FLOOD RISK
S1.022	SW-4		5.054	-0.046	0.000	0.00		13.7	FLOOD RISK
S1.023	SW-2		5.053	1.650	0.000	0.19		7.9	FLOOD RISK
US/MH Level PN Name Exceeded									
S1.011 SW-15									
S6.000 SCF-03									
S6.001 SCF-04									
S6.002 S21									
S1.012 SW-14									
S1.013 SW-13									
S1.014 SW-12									
S1.015 SW-11									
S1.016 SW-10									
S1.017 SW-9									
S1.018 SW-8									
S7.000 SW-39 1									
S7.001 SW-38									
S7.002 SW-37									
S7.003 SW-36									
S8.000 S26									
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	<table><tr><td></td><td>US/MH</td><td>Level</td></tr><tr><td>PN</td><td>Name</td><td>Exceeded</td></tr><tr><td>S7.004</td><td>SW-35</td><td></td></tr><tr><td>S7.005</td><td>SW-34</td><td></td></tr><tr><td>S7.006</td><td>SW-33</td><td></td></tr><tr><td>S9.000</td><td>SW-42</td><td></td></tr><tr><td>S9.001</td><td>SW-41</td><td></td></tr><tr><td>S9.002</td><td>SW-40</td><td></td></tr><tr><td>S7.007</td><td>SW-32</td><td></td></tr><tr><td>S7.008</td><td>SW-31</td><td></td></tr><tr><td>S7.009</td><td>SW-30</td><td></td></tr><tr><td>S7.010</td><td>SW-29</td><td></td></tr><tr><td>S1.019</td><td>SW-7</td><td></td></tr><tr><td>S1.020</td><td>SW-6</td><td></td></tr><tr><td>S10.000</td><td>SW-44</td><td></td></tr><tr><td>S10.001</td><td>SW-43</td><td></td></tr><tr><td>S1.021</td><td>SW-5</td><td></td></tr><tr><td>S11.000</td><td>SW-45</td><td></td></tr><tr><td>S1.022</td><td>SW-4</td><td></td></tr><tr><td>S1.023</td><td>SW-2</td><td></td></tr></table>		US/MH	Level	PN	Name	Exceeded	S7.004	SW-35		S7.005	SW-34		S7.006	SW-33		S9.000	SW-42		S9.001	SW-41		S9.002	SW-40		S7.007	SW-32		S7.008	SW-31		S7.009	SW-30		S7.010	SW-29		S1.019	SW-7		S1.020	SW-6		S10.000	SW-44		S10.001	SW-43		S1.021	SW-5		S11.000	SW-45		S1.022	SW-4		S1.023	SW-2		
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<u>User Report S:\Clients\DREW SMITH\4761 - Summer Lane, Pagham\02 - ENGINEERS</u> <u>\01 - RCP DESIGN\03 - MICRODRAINAGE\M360 discharge volume.SPDX for SW-1.SWS</u>					
PN	Discharge Volume (m³)	PN	Discharge Volume (m³)	PN	Discharge Volume (m³)
S1.000	92.282	S1.011	602.119	S7.005	451.504
S2.000	56.485	S6.000	9.984	S7.006	446.532
S1.001	187.819	S6.001	7.787	S9.000	13.937
S1.002	266.704	S6.002	6.907	S9.001	60.754
S3.000	60.111	S1.012	509.228	S9.002	79.344
S4.000	45.226	S1.013	497.851	S7.007	521.498
S1.003	435.041	S1.014	331.961	S7.008	353.768
S1.004	475.203	S1.015	327.063	S7.009	348.653
S1.005	477.096	S1.016	164.723	S7.010	344.694
S1.006	479.725	S1.017	401.531	S1.019	520.648
S1.007	494.613	S1.018	397.389	S1.020	389.904
S1.008	489.753	S7.000	47.290	S10.000	28.557
S1.009	543.608	S7.001	72.009	S10.001	52.488
S1.010	539.993	S7.002	70.475	S1.021	260.271
S5.000	67.735	S7.003	138.098	S11.000	60.626
S5.001	66.132	S8.000	102.922	S1.022	264.752
S5.002	65.068	S7.004	318.560	S1.023	258.737
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Appendix (G)

SuDS Maintenance Strategy

Land North of Summer Lane

Pagham, West Sussex

OWNERS MANUAL

Relating to Surface Water Drainage Maintenance

The site has been designed in accordance with Sustainable Drainage Systems (SuDS) techniques.

An extract from the SuDS Manual (CIRIA C753) states “Sedimentation is one of the primary removal mechanisms in SUDS. Most pollution in runoff is attached to sediment particles and therefore removal of sediment results in a significant reduction in pollutant loads..”.

In order to remove sedimentation the surface water drainage design utilises deep seal trapped gullies throughout, catchpit manholes upstream of the surface water granular filter drains and bio-retention areas in attenuation ponds.

CONTENTS

- 1) Explanation of the Surface Water Drainage System
- 2) Operating and Maintenance Responsibility
- 3) Maintenance Schedule for catchpits, control chambers, flow control devices and gullies
- 4) Maintenance of permeable paving and distribution tanks
- 5) Maintenance Schedule for attenuation basins, bioretention areas and swales
- 6) Maintenance Schedule for filter trenches and porous pipework
- 7) Maintenance Schedule for solid wall pipes
- 8) Reasons for Maintenance

1) Explanation of the Surface Water Drainage System

The Principle of SUDs has been adopted for the whole of the site, calculations have been carried out using MicroDrainage with a storm return period of 100 years and an allowance of 40% for climate change and 10% allowance for urban creep.

Generally roof water drains direct to the domestic drainage system within each curtilage and from there will be directed to the below ground surface water network

Hardstanding areas and access roads or drives, drain to trapped gullies. Parking bays constructed of permeable paving will drain to ground, but will also contain an overflow provision which connects to the new below ground surface water network. All of these systems outfall to the surface water drainage system within the site.

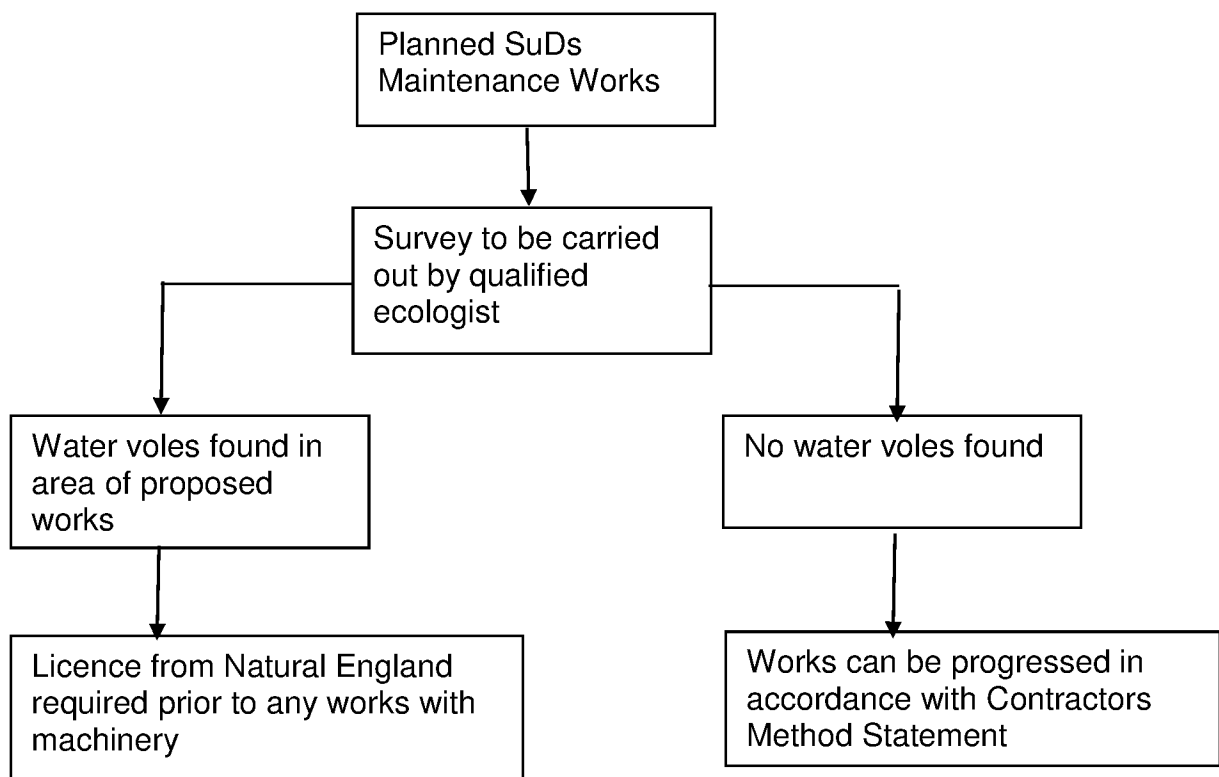
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2) Operating and Maintenance Responsibility

Drew Smith Homes are responsible for maintaining the surface water drainage systems on this site during the construction period. A management company nominated by Drew Smith Homes which during the construction period will have DSM as the sole directors. Upon handover and occupation a Maintenance Company will be handed over to residents who will take over as Directors.

The Management Company will appoint a managing agent who will ensure that the SuDS are maintained as set out in this document. The maintenance and operation will be funded through contributions from the residents to the maintenance company.

As part of the maintenance responsibility of the SuDS and drainage system, it is important that all future maintenance works consider the presence of water voles and other ecological sensitive receptors. As such prior to any intrusive maintenance works (which includes the use of heavy machinery where soils/ground is disturbed) to the new swales, ditches and basins an ecological survey should be carried out to determine the proposed method statements and if any licences are required ahead of the works. A simple flow chart has been provided below to describe the approach which needs to be considered:



3) Maintenance Schedule for catchpits, control chambers, flow control devices and gullies

Flow Control Maintenance

Normally, little maintenance is required as there are no moving parts within the Flow Control. The Flow Control is fitted with pivoting by-pass door, which allows the manhole to be drained down should blockage occur. It is recommended that the unit be inspected at six monthly intervals with hose down if required. All flow controls are typically manufactured from grade 304 Stainless Steel which has an estimated life span in excess of the design life of drainage systems.

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Remove sediment and oil deposits from all trapped gullies.	Annually, or as required.
	Remove sediment from structures upstream of the cellular storage tanks.	Annually, or as required.
Remedial actions	Repair/rehabilitation of inlets, outlets, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually and after large storms

4) Maintenance Schedule for Permeable Paving and Distribution Tanks

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing & vacuuming	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weed.	As required.
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required.
	Remedial work to any depression's, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure.	As required (if infiltration performance is reduced as a result of significant clogging).
Monitoring	Initial Inspection	Monthly for 3 months after installation.
	Inspect for evidence of poor operation and/or weed growth.	3-monthly, 48h after large storms.
	If required take remedial action.	
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.

5) Maintenance Schedule for Attenuation basins , bio-retention areas and swales

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal.	Monthly
	Grass cutting – for spillways and access routes.	Monthly (during growing season), or as required.
	Grass cutting – meadow grass in and around basin. Ensure that the meadow grass is not cut lower than 10cm. No vehicle should track within 3-5m of the toe of the bank	50% of the area annually during late autumn period (eg 1 side/bank of the system each year or 50% in area terms spread out amongst the system). Adjust as required should any survey show Water voles are present.
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
	Tidy all dead growth before start of growing season.	Annually.
	Remove sediment from inlets, outlet and forebay.	Annually (or as required).
Occasional maintenance	Check for poor vegetation growth due to lack of sunlight or leaf dropping litter and cut back adjacent vegetation where possible/	Annually
	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required	Annually, or if bare soil is exposed over 10% or more of the basin/swale treatment area
	Prune and trim trees and remove cuttings.	2 years (or as required). Ensure this is undertaken outside of bird nesting season.

Remedial actions	Repair of erosion or other damage by re-turfing or reseeded.	As required
	Re-level uneven surfaces and reinstate design levels.	As required.
	Repair/rehabilitation of inlets, outlets and overflows.	As required.
	Remove and dispose of oils or petrol residues using safe standard practices	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly/ after large storms.
	Inspect banksides, structures, pipework etc. for evidence of physical damage.	Monthly/ after large storms.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.
	Check flow control device and other mechanical devices.	Half yearly.

6) Maintenance Schedule for Filter trenches and porous pipework

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal from trench surface, access chambers and pre-treatment devices.	Monthly (or as required).
	Removal and washing of exposed stones on the trench surface.	Annual (bi-annual the first year) or when silt is evident on the surface.
	Trimming of any roots that may be causing blockages.	Annual (semi-annual the first year).
	Remove weeds on the trench surface.	Monthly (at start, then as required).
Occasional maintenance	Removal of sediment from pre-treatment devices.	Six monthly
	Remove tree roots or trees that grow close to the trench.	As required.
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace filter media.	Five yearly.
Remedial actions	Clear perforated pipework of blockages.	As required.
	Rehabilitate infiltration or filtration surfaces.	As required.
	Replace geotextiles and clean and replace filter media, if clogging occurs.	As required.
	Inspect inlets, outlets and inspection points for blockages, clogging, standing water and structural damage.	As required.
Monitoring	Inspect pre-treatment systems, inlets, trench surfaces and perforated pipework for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

7) Maintenance Schedule for Grilles

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal.	Monthly (or as required).
Occasional maintenance	Check moving parts and locks. Oil and ensure free moving. Replace when necessary.	As required.
Remedial actions	Remove build-up of sediment.	As required.
Monitoring	Inspect for blockages, and clear if required.	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

8) Maintenance Schedule for solid wall pipes

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Inspect chambers and manholes for evidence of pipes operating correctly and take remedial action if necessary, to include jetting of pipework.	Monthly for 3 months, then annually

9) Reasons for Maintenance

Surface water contains variable amounts of sediment which settles out at certain locations and could cause blockages if left. Road gullies also trap oil and prevent it entering the surface water sewer system.