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3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP		C85850 Bartons Road, Havant Phase 2 Surface Water Calcs
Date 07/11/2018 15:45 File PHASE 2 SW DETAIL DESIG...		Designed by KM Checked by KT
Micro Drainage		Network 2018.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	19.500	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	150	Maximum Backdrop Height (m)	1.500
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)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - 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	3.570	0.050	71.4	0.182	5.00	0.0	0.600		o	225	Pipe/Conduit	
S1.001	53.308	0.300	177.7	0.000	0.00	0.0		0.040	\/	-2	Pipe/Conduit	
S1.002	10.089	0.057	178.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S2.000	26.254	0.332	79.1	0.126	5.00	0.0	0.600		o	150	Pipe/Conduit	
S1.003	6.723	0.043	156.3	0.019	0.00	0.0	0.600		o	225	Pipe/Conduit	
S1.004	66.996	0.800	83.7	0.051	0.00	0.0		0.040	\/	-3	Pipe/Conduit	
S1.005	8.185	2.360	3.5	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S3.000	10.375	0.040	259.4	0.000	5.00	0.0	0.600		o	450	Pipe/Conduit	

Network Results Table

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)
S1.000	49.75	5.04	24.400	0.182	0.0	0.0	0.0	1.55	61.6	24.5
S1.001	46.44	5.91	24.250	0.182	0.0	0.0	0.0	1.02	2262.6	24.5
S1.002	45.85	6.08	23.950	0.182	0.0	0.0	0.0	0.98	38.8	24.5
S2.000	48.36	5.39	24.300	0.126	0.0	0.0	0.0	1.13	20.0	16.5
S1.003	45.48	6.19	23.893	0.327	0.0	0.0	0.0	1.04	41.5	40.3
S1.004	43.35	6.86	23.850	0.378	0.0	0.0	0.0	1.65	5315.9	44.4
S1.005	43.28	6.89	23.050	0.378	0.0	0.0	0.0	5.45	96.3	44.4
S3.000	49.34	5.14	20.600	0.000	0.0	0.0	0.0	1.26	200.0	0.0

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Network Design Table for Storm

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
S4.000	15.377	0.675	22.8	0.236	5.00	0.0	0.600		o	225	Pipe/Conduit	
S4.001	25.056	2.425	10.3	0.060	0.00	0.0	0.600		o	225	Pipe/Conduit	
S5.000	8.193	0.040	204.8	0.000	5.00	0.0	0.600		o	225	Pipe/Conduit	
S4.002	14.084	0.359	39.2	0.131	0.00	0.0	0.600		o	225	Pipe/Conduit	
S1.006	14.245	0.178	80.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.007	50.530	0.537	94.1	0.140	0.00	0.0	0.600		o	225	Pipe/Conduit	
S1.008	9.491	0.779	12.2	0.141	0.00	0.0	0.600		o	225	Pipe/Conduit	
S6.000	16.302	2.379	6.9	0.067	5.00	0.0	0.600		o	150	Pipe/Conduit	
S6.001	35.700	0.071	502.8	0.041	0.00	0.0	0.600		oo	-5	Pipe/Conduit	
S6.002	3.751	0.013	288.5	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
S7.000	3.757	0.033	113.8	0.000	5.00	0.0	0.600		o	300	Pipe/Conduit	
S7.001	6.677	0.050	133.5	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S6.003	3.588	0.012	299.0	0.077	0.00	0.0	0.600		o	450	Pipe/Conduit	
S6.004	16.000	0.032	500.0	0.013	0.00	0.0	0.600		oo	-5	Pipe/Conduit	
S6.005	6.645	0.022	302.0	0.014	0.00	0.0	0.600		o	525	Pipe/Conduit	

Network Results Table

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)
S4.000	49.52	5.09	24.225	0.236	0.0	0.0	0.0	2.75	109.5	31.7
S4.001	49.11	5.20	23.550	0.296	0.0	0.0	0.0	4.09	162.8	39.4
S5.000	49.29	5.15	20.939	0.000	0.0	0.0	0.0	0.91	36.2	0.0
S4.002	48.67	5.31	20.899	0.427	0.0	0.0	0.0	2.09	83.3	56.3
S1.006	42.66	7.10	20.540	0.805	0.0	0.0	0.0	1.12	19.9«	93.0
S1.007	40.95	7.72	20.287	0.945	0.0	0.0	0.0	1.35	53.6«	104.8
S1.008	40.84	7.77	19.750	1.086	0.0	0.0	0.0	3.77	149.9	120.1
S6.000	49.61	5.07	22.550	0.067	0.0	0.0	0.0	3.87	68.5	9.0
S6.001	48.37	5.38	18.821	0.108	0.0	0.0	0.0	1.91	6736.5	14.1
S6.002	48.17	5.43	18.750	0.108	0.0	0.0	0.0	1.19	189.5	14.1
S7.000	49.73	5.04	18.970	0.000	0.0	0.0	0.0	1.47	104.1	0.0
S7.001	49.39	5.12	18.937	0.000	0.0	0.0	0.0	1.36	96.1	0.0
S6.003	47.98	5.49	18.737	0.185	0.0	0.0	0.0	1.17	186.2	24.0
S6.004	47.46	5.63	18.725	0.198	0.0	0.0	0.0	1.91	6755.5	25.4
S6.005	47.14	5.71	18.693	0.212	0.0	0.0	0.0	1.28	277.9	27.1

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Network Design Table for Storm

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
S1.009	11.476	0.358	32.1	0.010	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.010	16.441	0.033	498.2	0.005	0.00	0.0	0.600		o	900	Pipe/Conduit	
S8.000	3.602	0.035	102.9	0.000	5.00	0.0	0.600		o	300	Pipe/Conduit	
S8.001	5.067	0.034	149.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S1.011	42.036	0.084	500.4	0.084	0.00	0.0	0.600		o	900	Pipe/Conduit	
S9.000	18.034	0.225	80.2	0.019	5.00	0.0	0.600		o	150	Pipe/Conduit	
S9.001	26.430	0.475	55.6	0.033	0.00	0.0	0.600		o	150	Pipe/Conduit	
S9.002	24.684	0.850	29.0	0.014	0.00	0.0	0.600		o	150	Pipe/Conduit	
S9.003	26.160	0.550	47.6	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S9.004	11.528	0.300	38.4	0.060	0.00	0.0	0.600		o	150	Pipe/Conduit	
S9.005	21.024	0.625	33.6	0.012	0.00	0.0	0.600		o	150	Pipe/Conduit	
S10.000	47.513	1.125	42.2	0.058	5.00	0.0	0.600		o	150	Pipe/Conduit	
S9.006	8.864	0.350	25.3	0.048	0.00	0.0	0.600		o	225	Pipe/Conduit	
S9.007	16.637	1.563	10.6	0.019	0.00	0.0	0.600		o	225	Pipe/Conduit	
S9.008	72.496	0.315	230.1	0.122	0.00	0.0	0.600		o	900	Pipe/Conduit	

Network Results Table

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)
S1.009	40.56	7.87	18.671	1.308	0.0	0.0	0.0	1.78	31.5	143.7
S1.010	40.07	8.07	17.563	1.313	0.0	0.0	0.0	1.40	888.7	143.7
S8.000	49.74	5.04	17.600	0.000	0.0	0.0	0.0	1.55	109.5	0.0
S8.001	49.47	5.10	17.565	0.000	0.0	0.0	0.0	1.29	90.9	0.0
S1.011	38.86	8.57	17.531	1.397	0.0	0.0	0.0	1.39	886.7	147.0
S9.000	48.82	5.27	23.450	0.019	0.0	0.0	0.0	1.12	19.9	2.5
S9.001	47.57	5.59	23.225	0.052	0.0	0.0	0.0	1.35	23.9	6.7
S9.002	46.78	5.81	22.750	0.066	0.0	0.0	0.0	1.88	33.1	8.4
S9.003	45.74	6.11	21.900	0.066	0.0	0.0	0.0	1.46	25.8	8.4
S9.004	45.34	6.23	21.350	0.126	0.0	0.0	0.0	1.63	28.8	15.5
S9.005	44.69	6.43	21.050	0.138	0.0	0.0	0.0	1.74	30.8	16.7
S10.000	47.89	5.51	21.550	0.058	0.0	0.0	0.0	1.55	27.4	7.5
S9.006	44.51	6.49	20.350	0.244	0.0	0.0	0.0	2.61	103.8	29.4
S9.007	44.29	6.56	20.000	0.263	0.0	0.0	0.0	4.03	160.4	31.5
S9.008	42.53	7.14	17.762	0.385	0.0	0.0	0.0	2.06	1311.3	44.3

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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
S1.012	48.330	0.097	498.2	0.115	0.00	0.0	0.600		o	900	Pipe/Conduit	
S1.013	206.853	1.400	147.8	0.095	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

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)
S1.012	37.58	9.15	17.447	1.897	0.0	0.0	0.0	1.40	888.6	193.1
S1.013	32.09	12.36	17.350	1.992	0.0	0.0	0.0	1.07	42.7«	193.1

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m²)
-2	\ /	642	750	18.0		1.610	2.213
-3	\ /	1980	750	18.0		1.882	3.216
-5	oo	3000	1500			1.500	3.534

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backd (mm)
S201	25.099	0.699	Open Manhole	1200	S1.000	24.400	225				
SSwale 1a	25.000	0.750	Junction		S1.001	24.250	-2	S1.000	24.350	225	
SSwale 1b	25.150	1.200	Junction		S1.002	23.950	225	S1.001	23.950	-2	
S202	25.713	1.413	Open Manhole	1200	S2.000	24.300	150				
S203	25.043	1.150	Open Manhole	1200	S1.003	23.893	225	S1.002	23.893	225	
								S2.000	23.968	150	
SSwale 2a	25.150	1.300	Junction		S1.004	23.850	-3	S1.003	23.850	225	
SSwale 2b	23.723	0.673	Junction		S1.005	23.050	150	S1.004	23.050	-3	
STank 1	23.200	2.600	Open Manhole	1500	S3.000	20.600	450				
S204	25.723	1.498	Open Manhole	1200	S4.000	24.225	225				
S205	25.000	1.450	Open Manhole	1200	S4.001	23.550	225	S4.000	23.550	225	
STank 2	24.058	3.119	Open Manhole	1200	S5.000	20.939	225				
S206	23.990	3.091	Open Manhole	1200	S4.002	20.899	225	S4.001	21.125	225	
								S5.000	20.899	225	
S207 FC2	23.489	2.949	Open Manhole	3000	S1.006	20.540	150	S1.005	20.690	150	
								S3.000	20.560	450	
								S4.002	20.540	225	
S208	22.988	2.701	Open Manhole	1200	S1.007	20.287	225	S1.006	20.362	150	
S209	21.225	1.475	Open Manhole	1200	S1.008	19.750	225	S1.007	19.750	225	
S210	23.951	1.401	Open Manhole	1200	S6.000	22.550	150				
SBC4a	22.924	4.103	Open Manhole	1200	S6.001	18.821	-5	S6.000	20.171	150	
SBC4b	21.822	3.072	Open Manhole	1200	S6.002	18.750	450	S6.001	18.750	-5	
STank 3	21.900	2.930	Open Manhole	1200	S7.000	18.970	300				
S211	21.750	2.813	Open Manhole	1200	S7.001	18.937	300	S7.000	18.937	300	
S212	21.719	2.982	Open Manhole	1500	S6.003	18.737	450	S6.002	18.737	450	
								S7.001	18.887	300	
SBC5a	21.628	2.903	Open Manhole	1200	S6.004	18.725	-5	S6.003	18.725	450	
SBC5b	21.207	2.514	Open Manhole	3000	S6.005	18.693	525	S6.004	18.693	-5	
S213 FC3	21.154	2.483	Open Manhole	3000	S1.009	18.671	150	S1.008	18.971	225	
								S6.005	18.671	525	
S214	20.585	3.022	Open Manhole	1800	S1.010	17.563	900	S1.009	18.313	150	
STank 4	20.150	2.550	Open Manhole	1200	S8.000	17.600	300				
S215	20.150	2.585	Open Manhole	1200	S8.001	17.565	300	S8.000	17.565	300	
S216	20.116	2.586	Open Manhole	1800	S1.011	17.531	900	S1.010	17.530	900	
								S8.001	17.531	300	
S217	24.843	1.393	Open Manhole	1200	S9.000	23.450	150				
S218	24.946	1.721	Open Manhole	1200	S9.001	23.225	150	S9.000	23.225	150	
S219	24.142	1.392	Open Manhole	1200	S9.002	22.750	150	S9.001	22.750	150	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (mm)
S220	23.285	1.385	Open Manhole	1200	S9.003	21.900	150	S9.002	21.900	150	
S221	22.726	1.376	Open Manhole	1200	S9.004	21.350	150	S9.003	21.350	150	
S222	22.439	1.389	Open Manhole	1200	S9.005	21.050	150	S9.004	21.050	150	
S223	22.958	1.408	Open Manhole	1200	S10.000	21.550	150				
S224	21.774	1.424	Open Manhole	1200	S9.006	20.350	225	S9.005	20.425	150	
								S10.000	20.425	150	
S225	21.500	1.500	Open Manhole	1200	S9.007	20.000	225	S9.006	20.000	225	
S226	20.610	2.848	Open Manhole	1800	S9.008	17.762	900	S9.007	18.437	225	
S227	19.468	2.021	Open Manhole	2100	S1.012	17.447	900	S1.011	17.447	900	
								S9.008	17.447	900	
S228 FC4	19.450	2.100	Open Manhole	2400	S1.013	17.350	225	S1.012	17.350	900	
S	21.000	5.050	Open Manhole	0		OUTFALL		S1.013	15.950	225	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S201	25.099	24.400	0.474	Open Manhole	1200
S1.001	\/	-2	SSwale 1a	25.000	24.250	0.000	Junction	
S1.002	o	225	SSwale 1b	25.150	23.950	0.975	Junction	
S2.000	o	150	S202	25.713	24.300	1.263	Open Manhole	1200
S1.003	o	225	S203	25.043	23.893	0.925	Open Manhole	1200
S1.004	\/	-3	SSwale 2a	25.150	23.850	0.550	Junction	
S1.005	o	150	SSwale 2b	23.723	23.050	0.523	Junction	
S3.000	o	450	STank 1	23.200	20.600	2.150	Open Manhole	1500
S4.000	o	225	S204	25.723	24.225	1.273	Open Manhole	1200
S4.001	o	225	S205	25.000	23.550	1.225	Open Manhole	1200
S5.000	o	225	STank 2	24.058	20.939	2.894	Open Manhole	1200
S4.002	o	225	S206	23.990	20.899	2.866	Open Manhole	1200
S1.006	o	150	S207 FC2	23.489	20.540	2.799	Open Manhole	3000
S1.007	o	225	S208	22.988	20.287	2.476	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	3.570	71.4	SSwale 1a	25.000	24.350	0.425	Junction	
S1.001	53.308	177.7	SSwale 1b	25.150	23.950	0.450	Junction	
S1.002	10.089	178.0	S203	25.043	23.893	0.925	Open Manhole	1200
S2.000	26.254	79.1	S203	25.043	23.968	0.925	Open Manhole	1200
S1.003	6.723	156.3	SSwale 2a	25.150	23.850	1.075	Junction	
S1.004	66.996	83.7	SSwale 2b	23.723	23.050	-0.077	Junction	
S1.005	8.185	3.5	S207 FC2	23.489	20.690	2.649	Open Manhole	3000
S3.000	10.375	259.4	S207 FC2	23.489	20.560	2.479	Open Manhole	3000
S4.000	15.377	22.8	S205	25.000	23.550	1.225	Open Manhole	1200
S4.001	25.056	10.3	S206	23.990	21.125	2.640	Open Manhole	1200
S5.000	8.193	204.8	S206	23.990	20.899	2.866	Open Manhole	1200
S4.002	14.084	39.2	S207 FC2	23.489	20.540	2.724	Open Manhole	3000
S1.006	14.245	80.0	S208	22.988	20.362	2.476	Open Manhole	1200
S1.007	50.530	94.1	S209	21.225	19.750	1.250	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.008	o	225	S209	21.225	19.750	1.250	Open Manhole	1200
S6.000	o	150	S210	23.951	22.550	1.251	Open Manhole	1200
S6.001	oo	-5	SBC4a	22.924	18.821	2.603	Open Manhole	1200
S6.002	o	450	SBC4b	21.822	18.750	2.622	Open Manhole	1200
S7.000	o	300	STank 3	21.900	18.970	2.630	Open Manhole	1200
S7.001	o	300	S211	21.750	18.937	2.513	Open Manhole	1200
S6.003	o	450	S212	21.719	18.737	2.532	Open Manhole	1500
S6.004	oo	-5	SBC5a	21.628	18.725	1.403	Open Manhole	1200
S6.005	o	525	SBC5b	21.207	18.693	1.989	Open Manhole	3000
S1.009	o	150	S213 FC3	21.154	18.671	2.333	Open Manhole	3000
S1.010	o	900	S214	20.585	17.563	2.122	Open Manhole	1800
S8.000	o	300	STank 4	20.150	17.600	2.250	Open Manhole	1200
S8.001	o	300	S215	20.150	17.565	2.285	Open Manhole	1200
S1.011	o	900	S216	20.116	17.531	1.685	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.008	9.491	12.2	S213 FC3	21.154	18.971	1.958	Open Manhole	3000
S6.000	16.302	6.9	SBC4a	22.924	20.171	2.603	Open Manhole	1200
S6.001	35.700	502.8	SBC4b	21.822	18.750	1.572	Open Manhole	1200
S6.002	3.751	288.5	S212	21.719	18.737	2.532	Open Manhole	1500
S7.000	3.757	113.8	S211	21.750	18.937	2.513	Open Manhole	1200
S7.001	6.677	133.5	S212	21.719	18.887	2.532	Open Manhole	1500
S6.003	3.588	299.0	SBC5a	21.628	18.725	2.453	Open Manhole	1200
S6.004	16.000	500.0	SBC5b	21.207	18.693	1.014	Open Manhole	3000
S6.005	6.645	302.0	S213 FC3	21.154	18.671	1.958	Open Manhole	3000
S1.009	11.476	32.1	S214	20.585	18.313	2.122	Open Manhole	1800
S1.010	16.441	498.2	S216	20.116	17.530	1.686	Open Manhole	1800
S8.000	3.602	102.9	S215	20.150	17.565	2.285	Open Manhole	1200
S8.001	5.067	149.0	S216	20.116	17.531	2.285	Open Manhole	1800
S1.011	42.036	500.4	S227	19.468	17.447	1.121	Open Manhole	2100

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S9.000	o	150	S217	24.843	23.450	1.243	Open Manhole	1200
S9.001	o	150	S218	24.946	23.225	1.571	Open Manhole	1200
S9.002	o	150	S219	24.142	22.750	1.242	Open Manhole	1200
S9.003	o	150	S220	23.285	21.900	1.235	Open Manhole	1200
S9.004	o	150	S221	22.726	21.350	1.226	Open Manhole	1200
S9.005	o	150	S222	22.439	21.050	1.239	Open Manhole	1200
S10.000	o	150	S223	22.958	21.550	1.258	Open Manhole	1200
S9.006	o	225	S224	21.774	20.350	1.199	Open Manhole	1200
S9.007	o	225	S225	21.500	20.000	1.275	Open Manhole	1200
S9.008	o	900	S226	20.610	17.762	1.948	Open Manhole	1800
S1.012	o	900	S227	19.468	17.447	1.121	Open Manhole	2100
S1.013	o	225	S228 FC4	19.450	17.350	1.875	Open Manhole	2400

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S9.000	18.034	80.2	S218	24.946	23.225	1.571	Open Manhole	1200
S9.001	26.430	55.6	S219	24.142	22.750	1.242	Open Manhole	1200
S9.002	24.684	29.0	S220	23.285	21.900	1.235	Open Manhole	1200
S9.003	26.160	47.6	S221	22.726	21.350	1.226	Open Manhole	1200
S9.004	11.528	38.4	S222	22.439	21.050	1.239	Open Manhole	1200
S9.005	21.024	33.6	S224	21.774	20.425	1.199	Open Manhole	1200
S10.000	47.513	42.2	S224	21.774	20.425	1.199	Open Manhole	1200
S9.006	8.864	25.3	S225	21.500	20.000	1.275	Open Manhole	1200
S9.007	16.637	10.6	S226	20.610	18.437	1.948	Open Manhole	1800
S9.008	72.496	230.1	S227	19.468	17.447	1.121	Open Manhole	2100
S1.012	48.330	498.2	S228 FC4	19.450	17.350	1.200	Open Manhole	2400
S1.013	206.853	147.8	S	21.000	15.950	4.825	Open Manhole	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
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)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.500	Storm Duration (mins)	30
Ratio R	0.350		

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Online Controls for Storm

Orifice Manhole: SSswale 1b, DS/PN: S1.002, Volume (m³): 118.0

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 23.950

Orifice Manhole: SSswale 2b, DS/PN: S1.005, Volume (m³): 215.5

Diameter (m) 0.150 Discharge Coefficient 0.600 Invert Level (m) 23.050

Hydro-Brake® Optimum Manhole: S207 FC2, DS/PN: S1.006, Volume (m³): 22.7

Unit Reference	MD-SHE-0092-5000-2000-5000
Design Head (m)	2.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	92
Invert Level (m)	20.540
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	5.0
Flush-Flo™	0.398	4.1
Kick-Flo®	0.816	3.3
Mean Flow over Head Range	-	3.9

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	2.9	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.8	1.400	4.2	3.500	6.5	7.500	9.3
0.300	4.1	1.600	4.5	4.000	6.9	8.000	9.6
0.400	4.1	1.800	4.8	4.500	7.3	8.500	9.9
0.500	4.1	2.000	5.0	5.000	7.7	9.000	10.2
0.600	4.0	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.4	2.400	5.4	6.000	8.4		
1.000	3.6	2.600	5.6	6.500	8.7		

Hydro-Brake® Optimum Manhole: S213 FC3, DS/PN: S1.009, Volume (m³): 18.6

Unit Reference	MD-SHE-0134-9700-1650-9700
Design Head (m)	1.650
Design Flow (l/s)	9.7

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Hydro-Brake® Optimum Manhole: S213 FC3, DS/PN: S1.009, Volume (m³): 18.6

Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	134
Invert Level (m)	18.671
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.650	9.7
Flush-Flo™	0.483	9.7
Kick-Flo®	1.009	7.7
Mean Flow over Head Range	-	8.5

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	4.8	1.200	8.4	3.000	12.9	7.000	19.3
0.200	8.5	1.400	9.0	3.500	13.8	7.500	19.9
0.300	9.3	1.600	9.6	4.000	14.8	8.000	20.6
0.400	9.6	1.800	10.1	4.500	15.6	8.500	21.2
0.500	9.7	2.000	10.6	5.000	16.4	9.000	21.8
0.600	9.6	2.200	11.1	5.500	17.2	9.500	22.3
0.800	9.1	2.400	11.6	6.000	17.9		
1.000	7.8	2.600	12.0	6.500	18.6		

Hydro-Brake® Optimum Manhole: S228 FC4, DS/PN: S1.013, Volume (m³): 38.8

Unit Reference	MD-SHE-0187-1940-1650-1940
Design Head (m)	1.650
Design Flow (l/s)	19.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	187
Invert Level (m)	17.350
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.650	19.4
Flush-Flo™	0.488	19.4
Kick-Flo®	1.053	15.7
Mean Flow over Head Range	-	16.8

The hydrological calculations have been based on the Head/Discharge relationship for the

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Hydro-Brake® Optimum Manhole: S228 FC4, DS/PN: S1.013, Volume (m³): 38.8

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	6.5	1.200	16.7	3.000	25.8	7.000	38.8
0.200	17.1	1.400	17.9	3.500	27.8	7.500	40.1
0.300	18.6	1.600	19.1	4.000	29.6	8.000	41.4
0.400	19.2	1.800	20.2	4.500	31.4	8.500	42.6
0.500	19.4	2.000	21.3	5.000	33.0	9.000	43.8
0.600	19.2	2.200	22.3	5.500	34.5	9.500	45.0
0.800	18.5	2.400	23.2	6.000	36.0		
1.000	16.6	2.600	24.1	6.500	37.4		

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Storage Structures for Storm

Cellular Storage Manhole: STank 1, DS/PN: S3.000

Invert Level (m) 20.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.96
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	185.6	225.0	2.050	185.6	361.0
2.000	185.6	361.0	2.051	0.0	361.0

Cellular Storage Manhole: STank 2, DS/PN: S5.000

Invert Level (m) 20.939 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.96
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	69.0	0.0	1.550	69.0	0.0
1.000	69.0	0.0	1.551	0.0	0.0

Cellular Storage Manhole: STank 3, DS/PN: S7.000

Invert Level (m) 18.970 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.96
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	42.2	57.5	1.301	0.0	134.0
1.300	42.2	134.0			

Cellular Storage Manhole: STank 4, DS/PN: S8.000

Invert Level (m) 17.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.96
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	123.7	0.0	1.551	0.0	0.0
1.550	123.7	0.0			

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S1.000	S201		0.160	0.9	23.2	OK
S1.001	SSwale 1a		0.078	0.3	22.7	OK
S1.002	SSwale 1b		10.474	0.7	4.5	SURCHARGED*
S2.000	S202		0.116	1.2	15.9	OK
S1.003	S203		0.321	0.8	19.3	OK
S1.004	SSwale 2a		0.035	0.5	24.3	OK
S1.005	SSwale 2b		4.708	4.1	17.2	SURCHARGED*
S3.000	STank 1		74.184	0.1	3.7	OK
S4.000	S204		0.093	2.2	30.3	OK
S4.001	S205		0.091	3.2	36.6	OK
S5.000	STank 2		3.632	0.4	0.9	OK
S4.002	S206		0.536	1.8	44.3	SURCHARGED
S1.006	S207 FC2		5.087	0.9	4.1	SURCHARGED
S1.007	S208		0.104	1.2	19.2	OK
S1.008	S209		0.136	2.7	34.3	OK
S6.000	S210		0.036	2.6	8.6	OK
S6.001	SBC4a		0.361	0.1	7.2	OK
S6.002	SBC4b		14.415	0.2	2.9	OK
S7.000	STank 3		6.809	0.4	1.6	OK

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

PN	US/MH Name	Event	Water Surcharged Flooded				
			US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.
S7.001	S211	120 minute 1 year Winter I+0%	21.750	19.134	-0.103	0.000	0.03
S6.003	S212	60 minute 1 year Winter I+0%	21.719	19.145	-0.042	0.000	0.03
S6.004	SBC5a	60 minute 1 year Winter I+0%	21.628	19.146	-1.079	0.000	0.00
S6.005	SBC5b	60 minute 1 year Winter I+0%	21.207	19.146	-0.072	0.000	0.03
S1.009	S213 FC3	60 minute 1 year Winter I+0%	21.154	19.146	0.325	0.000	0.34
S1.010	S214	60 minute 1 year Winter I+0%	20.585	17.832	-0.631	0.000	0.02
S8.000	STank 4	120 minute 1 year Winter I+0%	20.150	17.740	-0.160	0.000	0.07
S8.001	S215	60 minute 1 year Winter I+0%	20.150	17.778	-0.087	0.000	0.08
S1.011	S216	60 minute 1 year Winter I+0%	20.116	17.831	-0.600	0.000	0.02
S9.000	S217	15 minute 1 year Winter I+0%	24.843	23.486	-0.114	0.000	0.13
S9.001	S218	15 minute 1 year Winter I+0%	24.946	23.278	-0.097	0.000	0.26
S9.002	S219	15 minute 1 year Winter I+0%	24.142	22.800	-0.100	0.000	0.24
S9.003	S220	15 minute 1 year Winter I+0%	23.285	21.956	-0.094	0.000	0.30
S9.004	S221	15 minute 1 year Winter I+0%	22.726	21.428	-0.072	0.000	0.53
S9.005	S222	15 minute 1 year Winter I+0%	22.439	21.127	-0.073	0.000	0.52
S10.000	S223	15 minute 1 year Winter I+0%	22.958	21.604	-0.096	0.000	0.28
S9.006	S224	15 minute 1 year Winter I+0%	21.774	20.440	-0.135	0.000	0.33
S9.007	S225	15 minute 1 year Winter I+0%	21.500	20.070	-0.155	0.000	0.21
S9.008	S226	30 minute 1 year Winter I+0%	20.610	17.877	-0.785	0.000	0.03
S1.012	S227	60 minute 1 year Winter I+0%	19.468	17.831	-0.516	0.000	0.04
S1.013	S228 FC4	60 minute 1 year Winter I+0%	19.450	17.829	0.254	0.000	0.46

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Maximum Pipe Velocity Flow		Status
				(m/s)	(l/s)	
S7.001	S211		0.316	0.3	1.6	OK
S6.003	S212		1.333	0.4	4.0	OK
S6.004	SBC5a		0.778	0.0	4.0	OK
S6.005	SBC5b		10.614	0.0	5.2	OK
S1.009	S213 FC3		4.014	1.6	9.6	SURCHARGED
S1.010	S214		0.671	0.3	9.8	OK
S8.000	STank 4		16.747	0.4	4.4	OK
S8.001	S215		0.340	0.2	4.8	OK
S1.011	S216		2.623	0.3	14.7	OK
S9.000	S217		0.035	0.8	2.4	OK
S9.001	S218		0.073	1.1	6.0	OK
S9.002	S219		0.064	1.5	7.5	OK
S9.003	S220		0.066	1.2	7.5	OK
S9.004	S221		0.101	1.5	13.9	OK
S9.005	S222		0.095	1.7	15.2	OK
S10.000	S223		0.056	1.3	7.4	OK
S9.006	S224		0.097	1.9	27.7	OK
S9.007	S225		0.083	2.9	29.7	OK
S9.008	S226		0.280	0.9	36.0	OK
S1.012	S227		17.483	0.4	26.1	OK
S1.013	S228 FC4		14.126	1.0	19.4	SURCHARGED

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3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	C85850 Bartons Road, Havant Phase 2 Surface Water Calcs	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

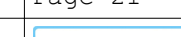
PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S1.000	S201		0.372	1.4	56.7	SURCHARGED
S1.001	SSwale 1a		0.195	0.3	30.6	OK
S1.002	SSwale 1b		30.416	0.7	6.7	SURCHARGED*
S2.000	S202		1.213	2.0	35.8	SURCHARGED
S1.003	S203		0.816	1.1	44.3	SURCHARGED
S1.004	SSwale 2a		0.095	0.5	56.7	OK
S1.005	SSwale 2b		17.384	4.6	26.0	FLOOD RISK*
S3.000	STank 1		194.939	0.0	2.6	SURCHARGED
S4.000	S204		0.164	2.7	74.3	OK
S4.001	S205		0.172	4.0	93.8	OK
S5.000	STank 2		50.372	0.0	1.0	SURCHARGED
S4.002	S206		1.337	1.4	13.1	SURCHARGED
S1.006	S207 FC2		9.862	0.9	4.1	SURCHARGED
S1.007	S208		0.244	1.5	50.3	OK
S1.008	S209		0.353	3.4	97.4	OK
S6.000	S210		0.062	3.3	21.1	OK
S6.001	SBC4a		0.851	0.0	6.9	OK
S6.002	SBC4b		54.151	0.2	2.6	SURCHARGED
S7.000	STank 3		25.307	0.0	1.3	SURCHARGED

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
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PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S7.001	S211	240 minute 30 year Winter I+0%	21.750	19.578	0.341	0.000	0.02
S6.003	S212	240 minute 30 year Winter I+0%	21.719	19.578	0.391	0.000	0.03
S6.004	SBC5a	240 minute 30 year Winter I+0%	21.628	19.578	-0.647	0.000	0.00
S6.005	SBC5b	240 minute 30 year Winter I+0%	21.207	19.578	0.360	0.000	0.03
S1.009	S213 FC3	240 minute 30 year Winter I+0%	21.154	19.577	0.756	0.000	0.34
S1.010	S214	120 minute 30 year Winter I+0%	20.585	18.127	-0.336	0.000	0.02
S8.000	STank 4	120 minute 30 year Winter I+0%	20.150	18.126	0.226	0.000	0.08
S8.001	S215	120 minute 30 year Winter I+0%	20.150	18.126	0.261	0.000	0.08
S1.011	S216	120 minute 30 year Winter I+0%	20.116	18.127	-0.304	0.000	0.02
S9.000	S217	15 minute 30 year Winter I+0%	24.843	23.509	-0.091	0.000	0.32
S9.001	S218	15 minute 30 year Winter I+0%	24.946	23.323	-0.052	0.000	0.74
S9.002	S219	15 minute 30 year Winter I+0%	24.142	22.842	-0.058	0.000	0.68
S9.003	S220	15 minute 30 year Winter I+0%	23.285	22.295	0.245	0.000	0.75
S9.004	S221	15 minute 30 year Winter I+0%	22.726	22.002	0.502	0.000	1.26
S9.005	S222	15 minute 30 year Winter I+0%	22.439	21.507	0.307	0.000	1.22
S10.000	S223	15 minute 30 year Winter I+0%	22.958	21.642	-0.058	0.000	0.67
S9.006	S224	15 minute 30 year Winter I+0%	21.774	20.506	-0.069	0.000	0.80
S9.007	S225	15 minute 30 year Winter I+0%	21.500	20.115	-0.110	0.000	0.51
S9.008	S226	120 minute 30 year Winter I+0%	20.610	18.126	-0.536	0.000	0.04
S1.012	S227	120 minute 30 year Winter I+0%	19.468	18.126	-0.221	0.000	0.03
S1.013	S228 FC4	120 minute 30 year Winter I+0%	19.450	18.125	0.550	0.000	0.46

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S7.001	S211		0.900	0.0	1.4	SURCHARGED
S6.003	S212		2.236	0.3	4.1	SURCHARGED
S6.004	SBC5a		1.315	0.0	4.2	OK
S6.005	SBC5b		29.960	0.0	5.4	SURCHARGED
S1.009	S213 FC3		7.346	1.6	9.6	SURCHARGED
S1.010	S214		1.423	0.3	9.4	OK
S8.000	STank 4		63.008	0.1	4.6	SURCHARGED
S8.001	S215		0.799	0.1	4.7	SURCHARGED
S1.011	S216		7.090	0.3	13.8	OK
S9.000	S217		0.061	0.9	5.9	OK
S9.001	S218		0.143	1.4	16.8	OK
S9.002	S219		0.124	1.9	21.4	OK
S9.003	S220		0.594	1.5	18.5	SURCHARGED
S9.004	S221		1.159	1.9	32.8	SURCHARGED
S9.005	S222		0.692	2.0	35.5	SURCHARGED
S10.000	S223		0.098	1.6	17.9	OK
S9.006	S224		0.204	2.3	66.6	OK
S9.007	S225		0.147	3.6	72.4	OK
S9.008	S226		0.915	0.8	41.0	OK
S1.012	S227		46.373	0.4	23.0	OK
S1.013	S228 FC4		27.106	1.0	19.4	SURCHARGED

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

Simulation Criteria

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

								Water	Surcharged	Flooded		
US/MH								US/CL	Level	Depth	Volume	Flow /
PN	Name	Event						(m)	(m)	(m)	(m³)	Cap.
S1.000	S201	15 minute	100 year	Winter	I+30%	25.099	25.043		0.418	0.000	3.01	
S1.001	SSwale 1a	120 minute	100 year	Winter	I+30%	25.000	24.595		-0.405	0.000	0.01	
S1.002	SSwale 1b	120 minute	100 year	Winter	I+30%	25.150	24.594		0.419	0.000	0.25	
S2.000	S202	15 minute	100 year	Winter	I+30%	25.713	25.718		1.268	4.977	2.15	
S1.003	S203	15 minute	100 year	Winter	I+30%	25.043	24.214		0.096	0.000	1.81	
S1.004	SSwale 2a	15 minute	100 year	Winter	I+30%	25.150	23.929		-0.671	0.000	0.02	
S1.005	SSwale 2b	30 minute	100 year	Winter	I+30%	23.723	23.575		0.375	0.000	0.33	
S3.000	STank 1	480 minute	100 year	Winter	I+30%	23.200	22.558		1.508	0.000	0.03	
S4.000	S204	15 minute	100 year	Winter	I+30%	25.723	25.159		0.709	0.000	1.22	
S4.001	S205	15 minute	100 year	Winter	I+30%	25.000	24.154		0.379	0.000	0.96	
S5.000	STank 2	960 minute	100 year	Winter	I+30%	24.058	22.562		1.398	0.000	0.04	
S4.002	S206	960 minute	100 year	Winter	I+30%	23.990	22.562		1.438	0.000	0.13	
S1.006	S207 FC2	480 minute	100 year	Winter	I+30%	23.489	22.558		1.868	0.000	0.27	
S1.007	S208	15 minute	100 year	Winter	I+30%	22.988	21.487		0.975	0.000	1.37	
S1.008	S209	15 minute	100 year	Winter	I+30%	21.225	20.485		0.510	0.000	1.12	
S6.000	S210	15 minute	100 year	Winter	I+30%	23.951	22.631		-0.069	0.000	0.56	
S6.001	SBC4a	360 minute	100 year	Winter	I+30%	22.924	20.291		-0.030	0.000	0.00	
S6.002	SBC4b	360 minute	100 year	Winter	I+30%	21.822	20.291		1.091	0.000	0.02	
S7.000	STank 3	360 minute	100 year	Winter	I+30%	21.900	20.291		1.021	0.000	0.02	

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3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	C85850 Bartons Road, Havant Phase 2 Surface Water Calcs	
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S1.000	S201		0.721	2.4	94.7	FLOOD RISK
S1.001	SSwale 1a		0.446	0.3	33.1	OK
S1.002	SSwale 1b		58.899	0.8	8.3	SURCHARGED*
S2.000	S202		6.558	2.3	40.9	FLOOD
S1.003	S203		0.956	1.4	54.0	SURCHARGED
S1.004	SSwale 2a		0.129	0.5	80.2	OK
S1.005	SSwale 2b		35.799	4.9	31.5	FLOOD RISK*
S3.000	STank 1		352.345	0.0	4.6	SURCHARGED
S4.000	S204		1.051	3.0	117.8	SURCHARGED
S4.001	S205		1.084	4.2	144.7	SURCHARGED
S5.000	STank 2		104.525	0.0	1.3	SURCHARGED
S4.002	S206		2.671	1.2	9.6	SURCHARGED
S1.006	S207 FC2		16.090	0.9	5.0	SURCHARGED
S1.007	S208		1.567	1.8	70.3	SURCHARGED
S1.008	S209		2.775	3.5	138.8	SURCHARGED
S6.000	S210		0.086	3.7	35.5	OK
S6.001	SBC4a		1.664	0.0	8.6	OK
S6.002	SBC4b		116.971	0.2	2.5	SURCHARGED
S7.000	STank 3		54.168	0.0	1.4	SURCHARGED

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3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	C85850 Bartons Road, Havant Phase 2 Surface Water Calcs	
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Micro Drainage	Network 2018.1	

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S7.001	S211	360 minute 100 year Winter I+30%	21.750	20.291	1.054	0.000	0.02
S6.003	S212	360 minute 100 year Winter I+30%	21.719	20.291	1.104	0.000	0.03
S6.004	SBC5a	360 minute 100 year Winter I+30%	21.628	20.291	0.066	0.000	0.00
S6.005	SBC5b	360 minute 100 year Winter I+30%	21.207	20.291	1.073	0.000	0.03
S1.009	S213 FC3	360 minute 100 year Winter I+30%	21.154	20.291	1.470	0.000	0.34
S1.010	S214	240 minute 100 year Winter I+30%	20.585	19.005	0.542	0.000	0.03
S8.000	STank 4	240 minute 100 year Winter I+30%	20.150	18.991	1.091	0.000	0.89
S8.001	S215	240 minute 100 year Winter I+30%	20.150	18.991	1.126	0.000	0.87
S1.011	S216	240 minute 100 year Winter I+30%	20.116	19.004	0.573	0.000	0.07
S9.000	S217	15 minute 100 year Winter I+30%	24.843	23.931	0.331	0.000	0.48
S9.001	S218	15 minute 100 year Winter I+30%	24.946	23.897	0.522	0.000	0.98
S9.002	S219	15 minute 100 year Winter I+30%	24.142	23.596	0.696	0.000	0.79
S9.003	S220	15 minute 100 year Winter I+30%	23.285	23.165	1.115	0.000	1.04
S9.004	S221	15 minute 100 year Winter I+30%	22.726	22.727	1.227	0.979	1.58
S9.005	S222	15 minute 100 year Winter I+30%	22.439	22.091	0.891	0.000	1.51
S10.000	S223	15 minute 100 year Winter I+30%	22.958	21.966	0.266	0.000	1.06
S9.006	S224	15 minute 100 year Winter I+30%	21.774	20.681	0.106	0.000	1.14
S9.007	S225	15 minute 100 year Winter I+30%	21.500	20.145	-0.080	0.000	0.74
S9.008	S226	240 minute 100 year Winter I+30%	20.610	19.010	0.348	0.000	0.04
S1.012	S227	240 minute 100 year Winter I+30%	19.468	19.010	0.663	0.000	0.04
S1.013	S228 FC4	240 minute 100 year Winter I+30%	19.450	19.010	1.435	0.000	0.46

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
S7.001	S211		1.707	0.0	1.4	SURCHARGED
S6.003	S212		3.496	0.3	3.6	SURCHARGED
S6.004	SBC5a		2.122	0.0	3.5	SURCHARGED
S6.005	SBC5b		59.021	0.0	4.3	SURCHARGED
S1.009	S213 FC3		12.498	1.6	9.6	SURCHARGED
S1.010	S214		3.816	0.3	15.2	SURCHARGED
S8.000	STank 4		166.715	0.8	54.4	SURCHARGED
S8.001	S215		1.777	0.8	52.6	SURCHARGED
S1.011	S216		13.304	0.3	45.7	SURCHARGED
S9.000	S217		0.539	1.0	9.0	SURCHARGED
S9.001	S218		1.052	1.5	22.3	SURCHARGED
S9.002	S219		1.397	1.9	24.8	SURCHARGED
S9.003	S220		1.840	1.5	25.7	FLOOD RISK
S9.004	S221		2.971	2.3	41.1	FLOOD
S9.005	S222		1.354	2.5	43.8	SURCHARGED
S10.000	S223		0.465	1.7	28.4	SURCHARGED
S9.006	S224		0.596	2.4	95.4	SURCHARGED
S9.007	S225		0.199	3.9	104.8	OK
S9.008	S226		3.337	0.7	42.0	SURCHARGED
S1.012	S227		75.776	0.4	31.2	SURCHARGED
S1.013	S228 FC4		36.801	1.0	19.4	SURCHARGED