

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)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.900
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.70
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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	51.850	0.346	149.9	0.182	4.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	18.713	0.125	150.0	0.262	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.002	37.389	0.249	150.0	0.139	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.000	27.734	0.185	150.0	0.183	4.00	0.0	0.600	o	450	Pipe/Conduit	
S2.001	16.489	0.110	150.0	0.021	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.003	29.486	0.197	150.0	0.029	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.004	85.930	0.158	543.9	0.172	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.005	10.784	0.025	431.4	0.102	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.006	40.931	0.084	487.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.007	40.728	0.327	124.4	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S3.000	18.510	0.093	199.0	0.091	4.00	0.0	0.600	o	300	Pipe/Conduit	
S3.001	25.698	0.128	200.8	0.371	0.00	0.0	0.600	o	525	Pipe/Conduit	
S1.008	90.845	0.214	424.5	0.000	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)
S1.000	50.00	4.67	81.800	0.182	0.0	0.0	0.0	1.28	90.6	24.7
S1.001	50.00	4.86	81.304	0.445	0.0	0.0	0.0	1.66	263.6	60.2
S1.002	50.00	5.24	81.179	0.584	0.0	0.0	0.0	1.66	263.6	79.0
S2.000	50.00	4.28	81.500	0.183	0.0	0.0	0.0	1.66	263.6	24.8
S2.001	50.00	4.44	81.315	0.204	0.0	0.0	0.0	1.66	263.6	27.7
S1.003	50.00	5.53	80.930	0.817	0.0	0.0	0.0	1.66	263.6	110.6
S1.004	50.00	7.19	80.733	0.989	0.0	0.0	0.0	0.86	137.5	133.9
S1.005	50.00	7.38	80.575	1.092	0.0	0.0	0.0	0.97	154.7	147.8
S1.006	50.00	8.05	80.475	1.092	0.0	0.0	0.0	1.01	218.2	147.8
S1.007	50.00	8.39	80.391	1.092	0.0	0.0	0.0	2.01	434.5	147.8
S3.000	50.00	4.28	81.400	0.091	0.0	0.0	0.0	1.11	78.5	12.4
S3.001	50.00	4.55	81.082	0.463	0.0	0.0	0.0	1.58	341.4	62.7
S1.008	50.00	9.79	80.064	1.554	0.0	0.0	0.0	1.08	234.0	210.5

















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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.009	18.244	0.212	86.1	0.074	0.00	0.0	0.600	o	525	Pipe/Conduit	
S4.000	17.546	0.088	199.4	0.094	4.00	0.0	0.600	o	300	Pipe/Conduit	
S4.001	29.597	0.148	200.0	0.334	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.010	40.263	0.071	567.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.011	43.225	0.086	502.6	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.012	11.877	0.021	565.6	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S1.013	88.680	0.222	399.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S5.000	43.138	0.069	625.2	0.108	4.00	0.0	0.600	o	500	Pipe/Conduit	
S6.000	11.170	0.094	118.8	0.000	4.00	0.0	0.600	o	450	Pipe/Conduit	
S5.001	17.050	0.067	254.5	0.286	0.00	0.0	0.600	o	500	Pipe/Conduit	
S5.002	56.548	0.268	211.0	0.347	0.00	0.0	0.600	o	500	Pipe/Conduit	
S5.003	119.208	0.478	249.4	0.190	0.00	0.0	0.600	o	500	Pipe/Conduit	
S7.000	41.099	0.113	363.7	0.131	4.00	0.0	0.600	o	750	Pipe/Conduit	
S8.000	13.815	0.152	90.9	0.171	4.00	0.0	0.600	o	350	Pipe/Conduit	
S8.001	53.708	0.134	400.8	0.230	0.00	0.0	0.600	o	350	Pipe/Conduit	
S1.014	28.594	0.191	150.0	0.524	0.00	0.0	0.600	o	750	Pipe/Conduit	
S1.015	76.982	0.192	400.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
S9.000	15.276	0.034	449.3	0.000	4.00	0.0	0.600	o	375	Pipe/Conduit	
S9.001	57.051	0.905	63.0	0.650	0.00	0.0	0.600	o	375	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	50.00	9.92	79.850	1.629	0.0	0.0	0.0	2.42	522.9	220.6
S4.000	50.00	4.26	81.400	0.094	0.0	0.0	0.0	1.11	78.4	12.8
S4.001	50.00	4.61	81.162	0.428	0.0	0.0	0.0	1.43	228.1	58.0
S1.010	50.00	10.58	79.563	2.057	0.0	0.0	0.0	1.02	287.1	278.5
S1.011	50.00	11.25	79.492	2.057	0.0	0.0	0.0	1.08	305.2	278.5
S1.012	50.00	11.44	79.406	2.057	0.0	0.0	0.0	1.02	287.5	278.5
S1.013	50.00	12.66	79.385	2.057	0.0	0.0	0.0	1.21	342.7	278.5
S5.000	50.00	4.83	80.771	0.108	0.0	0.0	0.0	0.86	169.1	14.7
S6.000	50.00	4.10	81.500	0.000	0.0	0.0	0.0	1.86	296.5	0.0
S5.001	50.00	5.04	80.702	0.395	0.0	0.0	0.0	1.36	266.5	53.4
S5.002	50.00	5.68	80.635	0.742	0.0	0.0	0.0	1.49	292.9	100.4
S5.003	50.00	7.12	80.317	0.932	0.0	0.0	0.0	1.37	269.2	126.2
S7.000	50.00	4.47	80.300	0.131	0.0	0.0	0.0	1.46	645.7	17.7
S8.000	50.00	4.13	80.600	0.171	0.0	0.0	0.0	1.82	175.1	23.2
S8.001	50.00	5.17	80.448	0.402	0.0	0.0	0.0	0.86	82.8	54.4
S1.014	50.00	12.87	79.013	4.045	0.0	0.0	0.0	2.28	1008.5	547.8
S1.015	50.00	13.79	78.822	4.045	0.0	0.0	0.0	1.39	615.4	547.8
S9.000	50.00	4.30	81.149	0.000	0.0	0.0	0.0	0.85	93.7	0.0
S9.001	50.00	4.72	81.115	0.650	0.0	0.0	0.0	2.29	252.4	88.0




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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S10.000	12.952	0.022	588.7	0.000	4.00	0.0	0.600	o	100	Pipe/Conduit	
S10.001	9.455	0.232	40.8	0.322	0.00	0.0	0.600	o	225	Pipe/Conduit	
S9.002	16.772	0.496	33.8	0.123	0.00	0.0	0.600	o	375	Pipe/Conduit	
S11.000	11.319	0.039	290.2	0.000	4.00	0.0	0.600	o	100	Pipe/Conduit	
S11.001	15.510	0.039	397.7	0.435	0.00	0.0	0.600	o	450	Pipe/Conduit	
S9.003	50.328	0.149	337.8	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
S12.000	27.093	0.119	227.7	0.000	4.00	0.0	0.600	o	100	Pipe/Conduit	
S12.001	25.584	0.078	328.0	0.155	0.00	0.0	0.600	o	350	Pipe/Conduit	
S9.004	55.057	0.110	500.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S13.000	18.331	0.167	109.8	0.000	4.00	0.0	0.600	o	100	Pipe/Conduit	
S13.001	15.785	0.029	544.3	0.556	0.00	0.0	0.600	o	375	Pipe/Conduit	
S9.005	44.176	0.457	96.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S14.000	19.864	0.265	75.0	0.000	4.00	0.0	0.600	o	100	Pipe/Conduit	
S14.001	18.644	0.162	115.1	0.507	0.00	0.0	0.600	o	300	Pipe/Conduit	
S9.006	18.723	0.056	334.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
S15.000	59.093	0.405	145.9	0.000	4.00	0.0	0.600	o	675	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)
S10.000	50.00	4.70	80.739	0.000	0.0	0.0	0.0	0.31	2.4	0.0
S10.001	50.00	4.77	80.592	0.322	0.0	0.0	0.0	2.06	81.7	43.7
S9.002	50.00	4.86	80.210	1.095	0.0	0.0	0.0	3.13	345.2	148.3
S11.000	50.00	4.42	80.067	0.000	0.0	0.0	0.0	0.45	3.5	0.0
S11.001	50.00	4.68	79.678	0.435	0.0	0.0	0.0	1.01	161.2	58.8
S9.003	50.00	5.55	79.564	1.530	0.0	0.0	0.0	1.21	262.6	207.1
S12.000	50.00	4.89	80.112	0.000	0.0	0.0	0.0	0.51	4.0	0.0
S12.001	50.00	5.34	79.743	0.155	0.0	0.0	0.0	0.95	91.6	20.9
S9.004	50.00	6.40	79.340	1.684	0.0	0.0	0.0	1.08	305.8	228.1
S13.000	50.00	4.42	80.239	0.000	0.0	0.0	0.0	0.73	5.8	0.0
S13.001	50.00	4.76	79.797	0.556	0.0	0.0	0.0	0.77	85.0	75.2
S9.005	50.00	6.70	79.230	2.240	0.0	0.0	0.0	2.48	700.4	303.3
S14.000	50.00	4.37	79.700	0.000	0.0	0.0	0.0	0.89	7.0	0.0
S14.001	50.00	4.58	79.235	0.507	0.0	0.0	0.0	1.46	103.5	68.7
S9.006	50.00	6.93	78.773	2.747	0.0	0.0	0.0	1.33	375.0	372.0
S15.000	50.00	4.45	79.000	0.000	0.0	0.0	0.0	2.17	775.7	0.0

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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.016	91.803	0.141	651.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.017	24.873	0.050	497.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.018	93.931	0.188	499.6	0.000	0.00	0.0	0.600	o	300	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)
S1.016	50.00	16.30	78.595	6.792	0.0	0.0	0.0	0.61	43.0«	919.8
S1.017	50.00	16.90	78.454	6.792	0.0	0.0	0.0	0.70	49.4«	919.8
S1.018	50.00	19.14	78.450	6.792	0.0	0.0	0.0	0.70	49.2«	919.8

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	82.700	0.900	Open Manhole	1200	S1.000	81.800	300				
S2	82.700	1.396	Open Manhole	1350	S1.001	81.304	450	S1.000	81.454	300	
S3	82.700	1.521	Open Manhole	1350	S1.002	81.179	450	S1.001	81.179	450	
S4	82.700	1.200	Open Manhole	1350	S2.000	81.500	450				
S5	82.700	1.385	Open Manhole	1350	S2.001	81.315	450	S2.000	81.315	450	
S6	82.700	1.770	Open Manhole	1350	S1.003	80.930	450	S1.002	80.930	450	
								S2.001	81.205	450	275
S7	83.000	2.267	Open Manhole	1350	S1.004	80.733	450	S1.003	80.733	450	
S8	83.000	2.425	Open Manhole	1350	S1.005	80.575	450	S1.004	80.575	450	
S9	82.700	2.225	Open Manhole	1500	S1.006	80.475	525	S1.005	80.550	450	
S10	82.700	2.309	Open Manhole	1500	S1.007	80.391	525	S1.006	80.391	525	
S11	82.600	1.200	Open Manhole	1200	S3.000	81.400	300				
S12	82.600	1.518	Open Manhole	1500	S3.001	81.082	525	S3.000	81.307	300	
S13	82.700	2.636	Open Manhole	1500	S1.008	80.064	525	S1.007	80.064	525	
								S3.001	80.954	525	890
S14	82.600	2.750	Open Manhole	1500	S1.009	79.850	525	S1.008	79.850	525	
S15	82.600	1.200	Open Manhole	1200	S4.000	81.400	300				
S16	82.600	1.438	Open Manhole	1350	S4.001	81.162	450	S4.000	81.312	300	
S17	82.250	2.687	Open Manhole	1500	S1.010	79.563	600	S1.009	79.638	525	
								S4.001	81.014	450	1301
S18	81.550	2.058	Open Manhole	1500	S1.011	79.492	600	S1.010	79.492	600	
S19	81.700	2.294	Open Manhole	1500	S1.012	79.406	600	S1.011	79.406	600	
S20	81.600	2.215	Open Manhole	1500	S1.013	79.385	600	S1.012	79.385	600	
S21	82.700	1.929	Open Manhole	1500	S5.000	80.771	500				
S22	82.700	1.200	Open Manhole	1350	S6.000	81.500	450				
S23	82.700	1.998	Open Manhole	1500	S5.001	80.702	500	S5.000	80.702	500	
								S6.000	81.406	450	654
S24	82.700	2.065	Open Manhole	1500	S5.002	80.635	500	S5.001	80.635	500	
S25	82.300	1.983	Open Manhole	1500	S5.003	80.317	500	S5.002	80.367	500	50
S26	82.700	2.400	Open Manhole	1800	S7.000	80.300	750				
S27	82.700	2.100	Open Manhole	1200	S8.000	80.600	350				
S28	82.700	2.252	Open Manhole	1200	S8.001	80.448	350	S8.000	80.448	350	
S29	82.100	3.087	Open Manhole	1800	S1.014	79.013	750	S1.013	79.163	600	
								S5.003	79.839	500	576
								S7.000	80.187	750	1174
								S8.001	80.314	350	901
S30	82.000	3.178	Open Manhole	1800	S1.015	78.822	750	S1.014	78.822	750	
S31	83.000	1.851	Open Manhole	1350	S9.000	81.149	375				
S31a	83.000	1.885	Open Manhole	1350	S9.001	81.115	375	S9.000	81.115	375	
S32	82.500	1.761	Open Manhole	1200	S10.000	80.739	100				
S32a	82.500	1.908	Open Manhole	1200	S10.001	80.592	225	S10.000	80.717	100	
S33	82.500	2.290	Open Manhole	1350	S9.002	80.210	375	S9.001	80.210	375	
								S10.001	80.360	225	
S34	81.500	1.433	Open Manhole	1200	S11.000	80.067	100				
S34a	81.500	1.822	Open Manhole	1350	S11.001	79.678	450	S11.000	80.028	100	
S35	81.500	1.936	Open Manhole	1500	S9.003	79.564	525	S9.002	79.714	375	

40 Compton Street
 London
 EC1V 0BD



Date 15/01/2020 16:15
 File SURFACE WATER V02.MDX

Designed by Michael.Smith
 Checked by

Innovyze

Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S36	81.500	1.388	Open Manhole	1200	S12.000	80.112	100	S11.001	79.639	450	
S36a	81.500	1.757	Open Manhole	1200	S12.001	79.743	350	S12.000	79.993	100	
S37	81.500	2.160	Open Manhole	1500	S9.004	79.340	600	S9.003	79.415	525	
								S12.001	79.665	350	75
S38	81.500	1.261	Open Manhole	1200	S13.000	80.239	100				
S39	81.500	1.703	Open Manhole	1350	S13.001	79.797	375	S13.000	80.072	100	
S40	81.500	2.270	Open Manhole	1500	S9.005	79.230	600	S9.004	79.230	600	
								S13.001	79.768	375	313
S41	81.500	1.800	Open Manhole	1200	S14.000	79.700	100				
S41a	81.500	2.265	Open Manhole	1200	S14.001	79.235	300	S14.000	79.435	100	
S42	81.500	2.727	Open Manhole	1500	S9.006	78.773	600	S9.005	78.773	600	
								S14.001	79.073	300	
S43	81.500	2.500	Open Manhole	1500	S15.000	79.000	675				
S44	81.500	2.905	Open Manhole	1800	S1.016	78.595	300	S1.015	78.630	750	485
								S9.006	78.717	600	422
								S15.000	78.595	675	
S45	80.789	2.335	Open Manhole	1200	S1.017	78.454	300	S1.016	78.454	300	
S46	80.984	2.580	Open Manhole	1200	S1.018	78.450	300	S1.017	78.404	300	
S	80.000	1.738	Open Manhole	300		OUTFALL		S1.018	78.262	300	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.182	0.182	0.182
1.001	User	-	100	0.230	0.230	0.230
	User	-	100	0.032	0.032	0.262
1.002	User	-	100	0.119	0.119	0.119
	User	-	100	0.020	0.020	0.139
2.000	User	-	100	0.183	0.183	0.183
2.001	User	-	100	0.021	0.021	0.021
1.003	User	-	100	0.029	0.029	0.029
1.004	User	-	100	0.111	0.111	0.111
	User	-	100	0.062	0.062	0.172
1.005	User	-	100	0.102	0.102	0.102
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
3.000	User	-	100	0.091	0.091	0.091
3.001	User	-	100	0.038	0.038	0.038
	User	-	100	0.213	0.213	0.251
	User	-	100	0.008	0.008	0.259
	User	-	100	0.041	0.041	0.299
	User	-	100	0.072	0.072	0.371
1.008	-	-	100	0.000	0.000	0.000
1.009	User	-	100	0.074	0.074	0.074
4.000	User	-	100	0.094	0.094	0.094
4.001	User	-	100	0.238	0.238	0.238
	User	-	100	0.048	0.048	0.286
	User	-	100	0.048	0.048	0.334
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	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
5.000	User	-	100	0.108	0.108	0.108
6.000	-	-	100	0.000	0.000	0.000
5.001	User	-	100	0.286	0.286	0.286
5.002	User	-	100	0.324	0.324	0.324
	User	-	100	0.023	0.023	0.347
5.003	User	-	100	0.152	0.152	0.152
	User	-	100	0.038	0.038	0.190
7.000	User	-	100	0.131	0.131	0.131
8.000	User	-	100	0.171	0.171	0.171
8.001	User	-	100	0.230	0.230	0.230
1.014	User	-	100	0.157	0.157	0.157
	User	-	100	0.367	0.367	0.524
1.015	-	-	100	0.000	0.000	0.000
9.000	-	-	100	0.000	0.000	0.000
9.001	User	-	100	0.650	0.650	0.650
10.000	-	-	100	0.000	0.000	0.000
10.001	User	-	100	0.322	0.322	0.322
9.002	User	-	100	0.123	0.123	0.123
11.000	-	-	100	0.000	0.000	0.000
11.001	User	-	100	0.376	0.376	0.376
	User	-	100	0.059	0.059	0.435
9.003	-	-	100	0.000	0.000	0.000
12.000	-	-	100	0.000	0.000	0.000
12.001	User	-	100	0.155	0.155	0.155
9.004	-	-	100	0.000	0.000	0.000
13.000	-	-	100	0.000	0.000	0.000
13.001	User	-	100	0.556	0.556	0.556
9.005	-	-	100	0.000	0.000	0.000
14.000	-	-	100	0.000	0.000	0.000
14.001	User	-	100	0.507	0.507	0.507
9.006	-	-	100	0.000	0.000	0.000
15.000	-	-	100	0.000	0.000	0.000
1.016	-	-	100	0.000	0.000	0.000

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.017	-	-	100	0.000	0.000	0.000
1.018	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				6.792	6.792	6.792

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.018	S	80.000	78.262	78.550	300	0

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	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)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 10 Number of Storage Structures 11 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.413		

Online Controls for Storm

Orifice Manhole: S12, DS/PN: S3.001, Volume (m³): 3.9

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 81.082

Orifice Manhole: S16, DS/PN: S4.001, Volume (m³): 3.2

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 81.162

Orifice Manhole: S23, DS/PN: S5.001, Volume (m³): 13.3

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 80.702

Orifice Manhole: S31a, DS/PN: S9.001, Volume (m³): 4.2

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 81.115

Orifice Manhole: S32a, DS/PN: S10.001, Volume (m³): 2.3

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 80.717

Orifice Manhole: S34a, DS/PN: S11.001, Volume (m³): 2.7

Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 79.928

Orifice Manhole: S36a, DS/PN: S12.001, Volume (m³): 2.2

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 79.992

Orifice Manhole: S39, DS/PN: S13.001, Volume (m³): 2.6

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 79.997

Orifice Manhole: S41a, DS/PN: S14.001, Volume (m³): 2.7

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 79.435

Hydro-Brake® Optimum Manhole: S44, DS/PN: S1.016, Volume (m³): 66.0

Unit Reference	MD-SHE-0215-3130-2800-3130
Design Head (m)	2.800
Design Flow (l/s)	31.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	215
Invert Level (m)	78.595
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.800	31.3	Kick-Flo®	1.678	24.5
Flush-Flo™	0.801	31.3	Mean Flow over Head Range	-	27.3

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

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Hydro-Brake® Optimum Manhole: S44, DS/PN: S1.016, Volume (m³): 66.0

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.3	0.800	31.3	2.000	26.6	4.000	37.1	7.000	48.6
0.200	21.0	1.000	31.0	2.200	27.9	4.500	39.3	7.500	50.3
0.300	26.8	1.200	30.2	2.400	29.0	5.000	41.3	8.000	51.9
0.400	28.8	1.400	28.7	2.600	30.2	5.500	43.3	8.500	53.4
0.500	30.1	1.600	26.1	3.000	32.3	6.000	45.1	9.000	54.9
0.600	30.8	1.800	25.3	3.500	34.8	6.500	46.9	9.500	56.4

40 Compton Street
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 EC1V 0BD



Date 15/01/2020 16:15
 File SURFACE WATER V02.MDX

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Storage Structures for Storm

Tank or Pond Manhole: S2, DS/PN: S1.001

Invert Level (m) 81.304

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	1.000	100.0	1.001	0.0

Tank or Pond Manhole: S12, DS/PN: S3.001

Invert Level (m) 82.100

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	183.0	0.500	1184.0

Tank or Pond Manhole: S16, DS/PN: S4.001

Invert Level (m) 82.100

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	183.0	0.500	1184.0

Porous Car Park Manhole: S23, DS/PN: S5.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	30.0
Membrane Percolation (mm/hr)	1000	Length (m)	30.0
Max Percolation (l/s)	250.0	Slope (1:X)	400.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.95	Evaporation (mm/day)	3
Invert Level (m)	82.400	Membrane Depth (mm)	0

Porous Car Park Manhole: S31a, DS/PN: S9.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	70.0
Membrane Percolation (mm/hr)	1000	Length (m)	70.0
Max Percolation (l/s)	1361.1	Slope (1:X)	400.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	82.600	Membrane Depth (mm)	0

Porous Car Park Manhole: S32a, DS/PN: S10.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	54.0
Membrane Percolation (mm/hr)	1000	Length (m)	54.0
Max Percolation (l/s)	810.0	Slope (1:X)	400.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	82.100	Membrane Depth (mm)	0

Porous Car Park Manhole: S34a, DS/PN: S11.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	50.0
Membrane Percolation (mm/hr)	1000	Length (m)	40.0
Max Percolation (l/s)	555.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	81.100	Membrane Depth (mm)	0

40 Compton Street
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Date 15/01/2020 16:15
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Network 2017.1.2

Porous Car Park Manhole: S36a, DS/PN: S12.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	30.0
Membrane Percolation (mm/hr)	1000	Length (m)	21.0
Max Percolation (l/s)	175.0	Slope (1:X)	400.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	81.100	Membrane Depth (mm)	0

Porous Car Park Manhole: S39, DS/PN: S13.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	65.0
Membrane Percolation (mm/hr)	1000	Length (m)	64.0
Max Percolation (l/s)	1155.6	Slope (1:X)	300.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	81.100	Membrane Depth (mm)	0

Porous Car Park Manhole: S41a, DS/PN: S14.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	55.0
Membrane Percolation (mm/hr)	1000	Length (m)	55.0
Max Percolation (l/s)	840.3	Slope (1:X)	300.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.95	Evaporation (mm/day)	3
Invert Level (m)	81.100	Membrane Depth (mm)	0

Tank or Pond Manhole: S44, DS/PN: S1.016

Invert Level (m) 79.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	2000.0	1.000	2000.0	1.001	0.0

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 10 Number of Storage Structures 11 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Site Location GB 455172 221569 Cv (Summer) 0.750
 FEH Rainfall Version 2013 Data Type Point 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, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 20, 20, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded
									Level (m)	Depth (m)	Volume (m³)
S1.000	S1	15 Winter	2	+20%	100/15 Summer				81.939	-0.161	0.000
S1.001	S2	15 Winter	2	+20%	30/15 Summer				81.470	-0.284	0.000
S1.002	S3	15 Winter	2	+20%	30/15 Summer				81.357	-0.272	0.000
S2.000	S4	15 Winter	2	+20%	100/15 Summer				81.624	-0.326	0.000
S2.001	S5	15 Winter	2	+20%	30/15 Winter				81.458	-0.307	0.000
S1.003	S6	15 Winter	2	+20%	30/15 Summer				81.197	-0.183	0.000
S1.004	S7	15 Winter	2	+20%	30/15 Summer				81.142	-0.042	0.000
S1.005	S8	30 Winter	2	+20%	2/30 Winter				81.026	0.000	0.000
S1.006	S9	15 Winter	2	+20%	30/15 Winter				80.794	-0.207	0.000
S1.007	S10	15 Winter	2	+20%	100/15 Winter				80.591	-0.326	0.000
S3.000	S11	240 Winter	2	+20%	2/15 Summer				82.293	0.593	0.000
S3.001	S12	240 Winter	2	+20%	2/15 Summer				82.292	0.685	0.000
S1.008	S13	15 Winter	2	+20%	100/15 Summer				80.341	-0.248	0.000
S1.009	S14	15 Winter	2	+20%	100/15 Winter				80.054	-0.321	0.000
S4.000	S15	240 Winter	2	+20%	2/15 Summer				82.281	0.581	0.000
S4.001	S16	240 Winter	2	+20%	2/15 Summer				82.281	0.669	0.000
S1.010	S17	30 Winter	2	+20%	100/15 Summer				79.915	-0.248	0.000
S1.011	S18	30 Winter	2	+20%	100/15 Summer				79.856	-0.236	0.000
S1.012	S19	30 Winter	2	+20%	100/15 Summer				79.809	-0.197	0.000
S1.013	S20	30 Winter	2	+20%	100/15 Summer				79.627	-0.358	0.000
S5.000	S21	240 Winter	2	+20%	2/15 Summer				82.474	1.203	0.000
S6.000	S22	240 Winter	2	+20%	2/15 Summer				82.474	0.524	0.000
S5.001	S23	240 Winter	2	+20%	2/15 Summer				82.474	1.272	0.000
S5.002	S24	15 Winter	2	+20%	100/15 Summer				80.794	-0.341	0.000
S5.003	S25	15 Winter	2	+20%	100/15 Summer				80.519	-0.298	0.000
S7.000	S26	15 Winter	2	+20%	100/360 Winter				80.408	-0.642	0.000
S8.000	S27	15 Winter	2	+20%	30/15 Summer				80.743	-0.207	0.000
S8.001	S28	15 Winter	2	+20%	30/15 Summer				80.717	-0.081	0.000
S1.014	S29	480 Winter	2	+20%	30/240 Winter				79.442	-0.321	0.000
S1.015	S30	480 Winter	2	+20%	30/15 Winter				79.429	-0.144	0.000
S9.000	S31	360 Winter	2	+20%	2/15 Summer				82.739	1.215	0.000
S9.001	S31a	360 Winter	2	+20%	2/15 Summer				82.739	1.249	0.000
S10.000	S32	240 Winter	2	+20%	2/15 Summer				82.189	1.350	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (1/s)	Pipe Flow (1/s)	Status	Level Exceeded
S1.000	S1	0.44		37.6	OK	
S1.001	S2	0.29		58.3	OK	
S1.002	S3	0.33		75.7	OK	
S2.000	S4	0.17		37.9	OK	
S2.001	S5	0.22		41.0	OK	
S1.003	S6	0.47		105.4	OK	
S1.004	S7	0.87		112.6	OK	
S1.005	S8	1.24		114.0	SURCHARGED	
S1.006	S9	0.62		117.8	OK	
S1.007	S10	0.31		116.2	OK	
S3.000	S11	0.06		3.8	SURCHARGED	
S3.001	S12	0.01		3.6	SURCHARGED	
S1.008	S13	0.51		112.3	OK	
S1.009	S14	0.32		113.7	OK	
S4.000	S15	0.06		4.0	SURCHARGED	
S4.001	S16	0.02		3.5	SURCHARGED	
S1.010	S17	0.47		114.7	OK	
S1.011	S18	0.42		110.0	OK	
S1.012	S19	0.79		109.1	OK	
S1.013	S20	0.34		107.6	OK	
S5.000	S21	0.03		4.6	FLOOD RISK	
S6.000	S22	0.00		0.6	FLOOD RISK	
S5.001	S23	0.02		4.4	FLOOD RISK	
S5.002	S24	0.22		57.7	OK	
S5.003	S25	0.34		87.5	OK	
S7.000	S26	0.05		27.1	OK	
S8.000	S27	0.26		35.2	OK	
S8.001	S28	0.93		72.2	OK	
S1.014	S29	0.12		81.2	OK	
S1.015	S30	0.15		80.3	OK	
S9.000	S31	0.01		0.5	FLOOD RISK	
S9.001	S31a	0.02		4.2	FLOOD RISK	
S10.000	S32	0.29		0.7	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
									(m)	(m)	(m ³)
S10.001	S32a	240	Winter	2	+20%	2/15	Summer		82.189	1.372	0.000
S9.002	S33	30	Winter	2	+20%	100/240	Winter		80.283	-0.302	0.000
S11.000	S34	120	Winter	2	+20%	2/15	Summer		81.150	0.983	0.000
S11.001	S34a	120	Winter	2	+20%	2/15	Summer		81.150	1.022	0.000
S9.003	S35	30	Winter	2	+20%	100/240	Winter		79.689	-0.400	0.000
S12.000	S36	120	Winter	2	+20%	2/15	Summer		81.167	0.955	0.000
S12.001	S36a	120	Winter	2	+20%	2/15	Summer		81.167	1.074	0.000
S9.004	S37	30	Winter	2	+20%	100/240	Summer		79.480	-0.460	0.000
S13.000	S38	360	Winter	2	+20%	2/15	Summer		81.255	0.916	0.000
S13.001	S39	360	Winter	2	+20%	2/15	Summer		81.255	1.083	0.000
S9.005	S40	480	Winter	2	+20%	30/960	Winter		79.388	-0.442	0.000
S14.000	S41	240	Winter	2	+20%	2/15	Summer		81.185	1.385	0.000
S14.001	S41a	240	Winter	2	+20%	2/15	Summer		81.185	1.650	0.000
S9.006	S42	480	Winter	2	+20%	2/240	Winter		79.385	0.012	0.000
S15.000	S43	480	Winter	2	+20%	30/240	Winter		79.382	-0.293	0.000
S1.016	S44	480	Winter	2	+20%	2/15	Summer		79.382	0.487	0.000
S1.017	S45	480	Winter	2	+20%				78.668	-0.086	0.000
S1.018	S46	480	Winter	2	+20%				78.626	-0.124	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe	Level Exceeded
				Flow (l/s)	
S10.001	S32a	0.06		4.0	SURCHARGED
S9.002	S33	0.08		22.6	OK
S11.000	S34	0.35		1.2	SURCHARGED
S11.001	S34a	0.07		8.2	SURCHARGED
S9.003	S35	0.13		30.1	OK
S12.000	S36	0.22		0.9	SURCHARGED
S12.001	S36a	0.04		3.6	SURCHARGED
S9.004	S37	0.12		33.1	OK
S13.000	S38	0.07		0.4	FLOOD RISK
S13.001	S39	0.07		3.7	FLOOD RISK
S9.005	S40	0.04		26.4	OK
S14.000	S41	0.09		0.6	SURCHARGED
S14.001	S41a	0.05		4.4	SURCHARGED
S9.006	S42	0.11		29.9	SURCHARGED
S15.000	S43	0.00		0.0	OK
S1.016	S44	0.74		30.9	SURCHARGED
S1.017	S45	0.70		30.9	OK
S1.018	S46	0.65		30.9	OK

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 10 Number of Storage Structures 11 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Site Location GB 455172 221569 Cv (Summer) 0.750
 FEH Rainfall Version 2013 Data Type Point 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, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 20, 20, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	15 Winter	30	+20%	100/15 Summer				82.074	-0.026	0.000
S1.001	S2	15 Winter	30	+20%	30/15 Summer				81.883	0.129	0.000
S1.002	S3	15 Winter	30	+20%	30/15 Summer				81.807	0.177	0.000
S2.000	S4	15 Winter	30	+20%	100/15 Summer				81.848	-0.102	0.000
S2.001	S5	15 Winter	30	+20%	30/15 Winter				81.776	0.011	0.000
S1.003	S6	15 Summer	30	+20%	30/15 Summer				81.673	0.293	0.000
S1.004	S7	15 Summer	30	+20%	30/15 Summer				81.533	0.350	0.000
S1.005	S8	15 Winter	30	+20%	2/30 Winter				81.163	0.137	0.000
S1.006	S9	15 Winter	30	+20%	30/15 Winter				81.004	0.004	0.000
S1.007	S10	15 Winter	30	+20%	100/15 Winter				80.673	-0.243	0.000
S3.000	S11	240 Winter	30	+20%	2/15 Summer				82.457	0.757	0.000
S3.001	S12	240 Winter	30	+20%	2/15 Summer				82.457	0.850	0.000
S1.008	S13	15 Winter	30	+20%	100/15 Summer				80.479	-0.110	0.000
S1.009	S14	30 Winter	30	+20%	100/15 Winter				80.236	-0.139	0.000
S4.000	S15	240 Winter	30	+20%	2/15 Summer				82.440	0.740	0.000
S4.001	S16	240 Winter	30	+20%	2/15 Summer				82.440	0.828	0.000
S1.010	S17	60 Summer	30	+20%	100/15 Summer				80.163	0.000	0.000
S1.011	S18	30 Summer	30	+20%	100/15 Summer				80.092	0.000	0.000
S1.012	S19	30 Winter	30	+20%	100/15 Summer				80.006	0.000	0.000
S1.013	S20	960 Winter	30	+20%	100/15 Summer				79.851	-0.134	0.000
S5.000	S21	240 Winter	30	+20%	2/15 Summer				82.573	1.302	0.000
S6.000	S22	240 Winter	30	+20%	2/15 Summer				82.573	0.623	0.000
S5.001	S23	240 Winter	30	+20%	2/15 Summer				82.573	1.371	0.000
S5.002	S24	15 Winter	30	+20%	100/15 Summer				80.927	-0.208	0.000
S5.003	S25	15 Winter	30	+20%	100/15 Summer				80.713	-0.104	0.000
S7.000	S26	15 Winter	30	+20%	100/360 Winter				80.471	-0.579	0.000
S8.000	S27	15 Winter	30	+20%	30/15 Summer				81.565	0.615	0.000
S8.001	S28	15 Winter	30	+20%	30/15 Summer				81.435	0.637	0.000
S1.014	S29	960 Winter	30	+20%	30/240 Winter				79.836	0.073	0.000
S1.015	S30	960 Winter	30	+20%	30/15 Winter				79.834	0.261	0.000
S9.000	S31	360 Winter	30	+20%	2/15 Summer				82.845	1.321	0.000
S9.001	S31a	360 Winter	30	+20%	2/15 Summer				82.845	1.355	0.000
S10.000	S32	240 Winter	30	+20%	2/15 Summer				82.272	1.433	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (1/s)	Pipe Flow (1/s)	Status	Level Exceeded
S1.000	S1	0.97		83.3	OK	
S1.001	S2	0.48		96.0	SURCHARGED	
S1.002	S3	0.46		106.0	SURCHARGED	
S2.000	S4	0.37		82.4	OK	
S2.001	S5	0.42		78.9	SURCHARGED	
S1.003	S6	0.68		153.8	SURCHARGED	
S1.004	S7	1.38		179.5	SURCHARGED	
S1.005	S8	2.39		219.2	SURCHARGED	
S1.006	S9	1.13		214.3	SURCHARGED	
S1.007	S10	0.56		212.5	OK	
S3.000	S11	0.11		7.6	FLOOD RISK	
S3.001	S12	0.01		3.9	FLOOD RISK	
S1.008	S13	0.94		206.4	OK	
S1.009	S14	0.64		226.9	OK	
S4.000	S15	0.12		7.9	FLOOD RISK	
S4.001	S16	0.02		3.7	FLOOD RISK	
S1.010	S17	0.83		202.5	OK	
S1.011	S18	0.75		196.3	OK	
S1.012	S19	1.57		218.2	OK	
S1.013	S20	0.12		38.7	OK	
S5.000	S21	0.06		9.2	FLOOD RISK	
S6.000	S22	0.00		0.0	FLOOD RISK	
S5.001	S23	0.02		4.5	FLOOD RISK	
S5.002	S24	0.62		164.2	OK	
S5.003	S25	0.97		250.0	OK	
S7.000	S26	0.12		62.8	OK	
S8.000	S27	0.58		77.5	SURCHARGED	
S8.001	S28	2.37		183.1	SURCHARGED	
S1.014	S29	0.12		82.4	SURCHARGED	
S1.015	S30	0.15		81.3	SURCHARGED	
S9.000	S31	0.00		0.0	FLOOD RISK	
S9.001	S31a	0.02		4.4	FLOOD RISK	
S10.000	S32	0.00		0.0	FLOOD RISK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
									(m)	(m)	(m ³)
S10.001	S32a	240	Winter	30	+20%	2/15	Summer		82.272	1.455	0.000
S9.002	S33	15	Winter	30	+20%	100/240	Winter		80.335	-0.250	0.000
S11.000	S34	120	Winter	30	+20%	2/15	Summer		81.284	1.117	0.000
S11.001	S34a	120	Winter	30	+20%	2/15	Summer		81.284	1.156	0.000
S9.003	S35	480	Winter	30	+20%	100/240	Winter		79.926	-0.163	0.000
S12.000	S36	120	Winter	30	+20%	2/15	Summer		81.308	1.096	0.000
S12.001	S36a	120	Winter	30	+20%	2/15	Summer		81.308	1.215	0.000
S9.004	S37	480	Winter	30	+20%	100/240	Summer		79.903	-0.037	0.000
S13.000	S38	360	Winter	30	+20%	2/15	Summer		81.365	1.026	0.000
S13.001	S39	360	Winter	30	+20%	2/15	Summer		81.365	1.193	0.000
S9.005	S40	960	Winter	30	+20%	30/960	Winter		79.837	0.007	0.000
S14.000	S41	240	Winter	30	+20%	2/15	Summer		81.247	1.447	0.000
S14.001	S41a	240	Winter	30	+20%	2/15	Summer		81.247	1.712	0.000
S9.006	S42	960	Winter	30	+20%	2/240	Winter		79.834	0.461	0.000
S15.000	S43	960	Winter	30	+20%	30/240	Winter		79.831	0.156	0.000
S1.016	S44	960	Winter	30	+20%	2/15	Summer		79.831	0.936	0.000
S1.017	S45	480	Summer	30	+20%				78.670	-0.084	0.000
S1.018	S46	480	Summer	30	+20%				78.627	-0.123	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe	Level Exceeded
				Flow (l/s)	
S10.001	S32a	0.06		4.1	FLOOD RISK
S9.002	S33	0.24		67.0	OK
S11.000	S34	0.00		0.0	FLOOD RISK
S11.001	S34a	0.08		8.7	FLOOD RISK
S9.003	S35	0.10		22.6	OK
S12.000	S36	0.01		0.0	FLOOD RISK
S12.001	S36a	0.05		3.8	FLOOD RISK
S9.004	S37	0.10		26.2	OK
S13.000	S38	0.00		0.0	FLOOD RISK
S13.001	S39	0.07		3.9	FLOOD RISK
S9.005	S40	0.04		27.0	SURCHARGED
S14.000	S41	0.00		0.0	FLOOD RISK
S14.001	S41a	0.05		4.5	FLOOD RISK
S9.006	S42	0.11		31.4	SURCHARGED
S15.000	S43	0.00		0.0	SURCHARGED
S1.016	S44	0.75		31.2	SURCHARGED
S1.017	S45	0.71		31.2	OK
S1.018	S46	0.66		31.2	OK

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 10 Number of Storage Structures 11 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Site Location GB 455172 221569 Cv (Summer) 0.750
 FEH Rainfall Version 2013 Data Type Point 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, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 20, 20, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	15 Winter	100	+40%	100/15 Summer				82.683	0.583	0.000
S1.001	S2	30 Winter	100	+40%	30/15 Summer				82.480	0.726	0.000
S1.002	S3	15 Winter	100	+40%	30/15 Summer				82.376	0.747	0.000
S2.000	S4	30 Winter	100	+40%	100/15 Summer				82.425	0.475	0.000
S2.001	S5	30 Winter	100	+40%	30/15 Winter				82.299	0.534	0.000
S1.003	S6	15 Winter	100	+40%	30/15 Summer				82.237	0.857	0.000
S1.004	S7	30 Winter	100	+40%	30/15 Summer				82.053	0.869	0.000
S1.005	S8	960 Winter	100	+40%	2/30 Winter				81.525	0.499	0.000
S1.006	S9	960 Winter	100	+40%	30/15 Winter				81.523	0.522	0.000
S1.007	S10	960 Winter	100	+40%	100/15 Winter				81.520	0.604	0.000
S3.000	S11	360 Winter	100	+40%	2/15 Summer				82.571	0.871	0.000
S3.001	S12	360 Winter	100	+40%	2/15 Summer				82.570	0.963	0.000
S1.008	S13	960 Winter	100	+40%	100/15 Summer				81.518	0.929	0.000
S1.009	S14	960 Winter	100	+40%	100/15 Winter				81.513	1.138	0.000
S4.000	S15	360 Winter	100	+40%	2/15 Summer				82.550	0.850	0.000
S4.001	S16	360 Winter	100	+40%	2/15 Summer				82.549	0.937	0.000
S1.010	S17	960 Winter	100	+40%	100/15 Summer				81.510	1.347	0.000
S1.011	S18	960 Winter	100	+40%	100/15 Summer				81.507	1.415	0.000
S1.012	S19	960 Winter	100	+40%	100/15 Summer				81.503	1.497	0.000
S1.013	S20	960 Winter	100	+40%	100/15 Summer				81.501	1.516	0.000
S5.000	S21	240 Winter	100	+40%	2/15 Summer				82.677	1.406	0.000
S6.000	S22	240 Winter	100	+40%	2/15 Summer				82.677	0.727	0.000
S5.001	S23	240 Winter	100	+40%	2/15 Summer				82.677	1.475	0.000
S5.002	S24	960 Winter	100	+40%	100/15 Summer				81.503	0.368	0.000
S5.003	S25	960 Winter	100	+40%	100/15 Summer				81.501	0.684	0.000
S7.000	S26	960 Winter	100	+40%	100/360 Winter				81.497	0.447	0.000
S8.000	S27	15 Winter	100	+40%	30/15 Summer				82.428	1.478	0.000
S8.001	S28	15 Winter	100	+40%	30/15 Summer				82.302	1.504	0.000
S1.014	S29	960 Winter	100	+40%	30/240 Winter				81.497	1.734	0.000
S1.015	S30	960 Winter	100	+40%	30/15 Winter				81.493	1.921	0.000
S9.000	S31	480 Winter	100	+40%	2/15 Summer				82.952	1.428	0.000
S9.001	S31a	480 Winter	100	+40%	2/15 Summer				82.952	1.462	0.000
S10.000	S32	240 Winter	100	+40%	2/15 Summer				82.352	1.513	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (1/s)	Pipe Flow (1/s)	Status	Level Exceeded
S1.000	S1	1.27		109.1	FLOOD RISK	
S1.001	S2	0.68		134.8	FLOOD RISK	
S1.002	S3	0.74		171.1	SURCHARGED	
S2.000	S4	0.38		85.1	FLOOD RISK	
S2.001	S5	0.50		93.7	SURCHARGED	
S1.003	S6	1.03		231.8	SURCHARGED	
S1.004	S7	1.98		256.5	SURCHARGED	
S1.005	S8	0.48		43.7	SURCHARGED	
S1.006	S9	0.23		43.7	SURCHARGED	
S1.007	S10	0.12		43.7	SURCHARGED	
S3.000	S11	0.12		8.2	FLOOD RISK	
S3.001	S12	0.01		4.0	FLOOD RISK	
S1.008	S13	0.22		47.5	SURCHARGED	
S1.009	S14	0.14		50.4	SURCHARGED	
S4.000	S15	0.13		8.5	FLOOD RISK	
S4.001	S16	0.02		3.9	FLOOD RISK	
S1.010	S17	0.22		53.7	SURCHARGED	
S1.011	S18	0.20		53.8	FLOOD RISK	
S1.012	S19	0.39		53.9	FLOOD RISK	
S1.013	S20	0.17		53.6	FLOOD RISK	
S5.000	S21	0.09		13.6	FLOOD RISK	
S6.000	S22	0.00		0.0	FLOOD RISK	
S5.001	S23	0.02		4.7	FLOOD RISK	
S5.002	S24	0.07		17.9	SURCHARGED	
S5.003	S25	0.10		25.5	SURCHARGED	
S7.000	S26	0.01		5.2	SURCHARGED	
S8.000	S27	0.85		113.2	FLOOD RISK	
S8.001	S28	3.43		265.4	SURCHARGED	
S1.014	S29	0.18		121.0	SURCHARGED	
S1.015	S30	0.22		120.9	SURCHARGED	
S9.000	S31	0.00		0.0	FLOOD RISK	
S9.001	S31a	0.02		4.5	FLOOD RISK	
S10.000	S32	0.00		0.0	FLOOD RISK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
									(m)	(m)	(m ³)
S10.001	S32a	240	Winter	100	+40%	2/15	Summer		82.352	1.535	0.000
S9.002	S33	960	Winter	100	+40%	100/240	Winter		81.497	0.912	0.000
S11.000	S34	120	Winter	100	+40%	2/15	Summer		81.422	1.255	0.000
S11.001	S34a	120	Winter	100	+40%	2/15	Summer		81.422	1.294	0.000
S9.003	S35	960	Winter	100	+40%	100/240	Winter		81.493	1.404	0.000
S12.000	S36	120	Winter	100	+40%	2/15	Summer		81.457	1.245	0.000
S12.001	S36a	120	Winter	100	+40%	2/15	Summer		81.457	1.364	0.000
S9.004	S37	960	Winter	100	+40%	100/240	Summer		81.491	1.551	0.000
S13.000	S38	960	Winter	100	+40%	2/15	Summer		81.487	1.148	0.000
S13.001	S39	960	Winter	100	+40%	2/15	Summer		81.487	1.315	0.000
S9.005	S40	960	Winter	100	+40%	30/960	Winter		81.490	1.660	0.000
S14.000	S41	960	Winter	100	+40%	2/15	Summer		81.303	1.503	0.000
S14.001	S41a	960	Winter	100	+40%	2/15	Summer		81.303	1.768	0.000
S9.006	S42	960	Winter	100	+40%	2/240	Winter		81.489	2.116	0.000
S15.000	S43	960	Winter	100	+40%	30/240	Winter		81.488	1.813	0.000
S1.016	S44	960	Winter	100	+40%	2/15	Summer		81.488	2.593	0.000
S1.017	S45	960	Winter	100	+40%				78.670	-0.084	0.000
S1.018	S46	960	Winter	100	+40%				78.627	-0.123	0.000

PN	US/MH Name	Flow / Cap.	Overflow (1/s)	Pipe	Level Exceeded
				Flow (1/s)	
S10.001	S32a	0.06		4.2	FLOOD RISK
S9.002	S33	0.05		13.3	SURCHARGED
S11.000	S34	0.00		0.0	FLOOD RISK
S11.001	S34a	0.08		8.8	FLOOD RISK
S9.003	S35	0.09		21.6	FLOOD RISK
S12.000	S36	0.01		0.0	FLOOD RISK
S12.001	S36a	0.05		4.0	FLOOD RISK
S9.004	S37	0.09		24.6	FLOOD RISK
S13.000	S38	0.00		0.0	FLOOD RISK
S13.001	S39	0.07		3.9	FLOOD RISK
S9.005	S40	0.05		28.0	FLOOD RISK
S14.000	S41	0.00		0.0	FLOOD RISK
S14.001	S41a	0.05		4.4	FLOOD RISK
S9.006	S42	0.12		32.2	FLOOD RISK
S15.000	S43	0.00		0.2	FLOOD RISK
S1.016	S44	0.75		31.3	FLOOD RISK
S1.017	S45	0.71		31.3	OK
S1.018	S46	0.66		31.3	OK