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)	2	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	19.300	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.348	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	10	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.600		

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	63.568	1.087	58.5	0.117	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	22.780	0.389	58.6	0.060	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.002	24.765	0.423	58.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	53.305	0.911	58.5	0.041	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	43.357	0.741	58.5	0.040	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.005	16.187	0.277	58.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	86.089	1.472	58.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.007	11.421	0.195	58.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	16.500	0.757	21.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	18.986	0.078	243.4	0.030	5.00	0.0	0.600	o	300	Pipe/Conduit	
S2.001	21.530	0.088	244.7	0.020	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.002	12.589	0.052	242.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.003	37.709	0.154	244.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.004	40.499	0.165	245.4	0.035	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.005	16.422	0.067	245.1	0.009	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	37.878	0.694	54.6	0.050	5.00	0.0	0.600	o	300	Pipe/Conduit	
S3.001	11.023	0.045	245.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.002	20.416	0.083	246.0	0.041	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.003	25.487	0.104	245.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.004	10.499	0.043	244.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.005	12.913	0.053	243.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.006	19.998	0.082	243.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.007	17.545	0.076	230.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.008	24.545	0.100	245.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.009	9.668	1.157	8.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.006	6.425	0.026	247.1	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)
S1.000	50.00	5.51	29.869	0.117	0.0	0.0	1.6	2.06	145.6	17.4
S1.001	50.00	5.70	28.782	0.177	0.0	0.0	2.4	2.06	145.5	26.4
S1.002	50.00	5.90	28.393	0.177	0.0	0.0	2.4	2.06	145.5	26.4
S1.003	50.00	6.33	27.970	0.218	0.0	0.0	3.0	2.06	145.6	32.5
S1.004	50.00	6.68	27.059	0.258	0.0	0.0	3.5	2.06	145.6	38.4
S1.005	50.00	6.81	26.318	0.258	0.0	0.0	3.5	2.06	145.7	38.4
S1.006	50.00	7.51	26.041	0.258	0.0	0.0	3.5	2.06	145.6	38.4
S1.007	50.00	7.60	24.569	0.258	0.0	0.0	3.5	2.06	145.5	38.4
S1.008	50.00	7.68	24.374	0.258	0.0	0.0	3.5	3.38	239.1	38.4
S2.000	50.00	5.32	23.322	0.030	0.0	0.0	0.4	1.00	70.9	4.5
S2.001	50.00	5.67	23.244	0.050	0.0	0.0	0.7	1.00	70.7	7.4
S2.002	50.00	5.88	23.156	0.050	0.0	0.0	0.7	1.01	71.1	7.4
S2.003	50.00	6.51	23.104	0.050	0.0	0.0	0.7	1.00	70.7	7.4
S2.004	50.00	7.19	22.950	0.085	0.0	0.0	1.2	1.00	70.6	12.7
S2.005	50.00	7.46	22.785	0.094	0.0	0.0	1.3	1.00	70.7	14.0
S3.000	50.00	5.30	25.155	0.050	0.0	0.0	0.7	2.13	150.8	7.4
S3.001	50.00	5.48	24.461	0.050	0.0	0.0	0.7	1.00	70.7	7.4
S3.002	50.00	5.82	24.416	0.091	0.0	0.0	1.2	1.00	70.5	13.6
S3.003	50.00	6.25	24.333	0.091	0.0	0.0	1.2	1.00	70.7	13.6
S3.004	50.00	6.42	24.229	0.091	0.0	0.0	1.2	1.00	70.8	13.6
S3.005	50.00	6.63	24.186	0.091	0.0	0.0	1.2	1.00	70.9	13.6
S3.006	50.00	6.97	24.133	0.091	0.0	0.0	1.2	1.00	70.9	13.6
S3.007	50.00	7.25	24.051	0.091	0.0	0.0	1.2	1.03	72.8	13.6
S3.008	50.00	7.66	23.975	0.091	0.0	0.0	1.2	1.00	70.6	13.6
S3.009	50.00	7.69	23.875	0.091	0.0	0.0	1.2	5.47	386.7	13.6
S2.006	50.00	7.80	22.718	0.185	0.0	0.0	2.5	1.00	70.4	27.6

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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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.007	30.960	0.126	245.7	0.034	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.008	21.713	0.089	244.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.009	31.085	0.126	246.7	0.039	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.010	15.735	0.064	245.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.011	17.280	0.071	243.4	0.037	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.012	19.280	0.078	247.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.013	9.481	0.038	249.5	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.009	21.634	0.087	248.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.010	15.917	0.065	244.9	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.011	19.348	0.079	244.9	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.012	48.776	0.198	246.3	0.046	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.013	7.684	0.031	247.9	0.020	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.014	21.644	0.088	246.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.015	17.006	0.069	246.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S4.000	17.548	0.320	54.8	0.056	5.00	0.0	0.600	o	300	Pipe/Conduit	
S1.016	11.585	0.047	246.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.017	14.801	0.060	246.7	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.018	12.558	0.051	246.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.019	16.604	0.067	247.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.020	18.356	0.075	244.7	0.015	0.00	0.0	0.600	o	300	Pipe/Conduit	
S5.000	19.609	0.735	26.7	0.016	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.001	8.980	0.090	99.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.002	29.138	0.172	169.4	0.037	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.003	14.499	0.102	142.1	0.068	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.021	27.790	0.087	319.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.000	15.517	0.627	24.7	0.061	5.00	0.0	0.600	o	300	Pipe/Conduit	
S6.001	15.647	0.064	244.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.002	5.455	0.023	237.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.003	21.798	0.089	244.9	0.009	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.004	17.453	0.072	242.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.005	15.369	0.081	189.7	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.006	32.517	0.131	248.2	0.014	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.007	21.759	0.088	247.3	0.021	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)
S2.007	50.00	8.31	22.692	0.219	0.0	0.0	3.0	1.00	70.6	32.6
S2.008	49.25	8.68	22.566	0.219	0.0	0.0	3.0	1.00	70.8	32.6
S2.009	47.83	9.20	22.477	0.258	0.0	0.0	3.3	1.00	70.4	36.8
S2.010	47.16	9.46	22.351	0.258	0.0	0.0	3.3	1.00	70.6	36.8
S2.011	46.44	9.75	22.287	0.295	0.0	0.0	3.7	1.00	70.9	40.8
S2.012	45.67	10.07	22.216	0.295	0.0	0.0	3.7	1.00	70.4	40.8
S2.013	45.30	10.23	22.138	0.313	0.0	0.0	3.8	0.99	70.0	42.2
S1.009	44.48	10.59	22.100	0.571	0.0	0.0	6.9	0.99	70.2«	75.7
S1.010	43.91	10.86	22.013	0.571	0.0	0.0	6.9	1.00	70.7«	75.7
S1.011	43.24	11.18	21.948	0.589	0.0	0.0	6.9	1.00	70.7«	75.9
S1.012	41.67	11.99	21.869	0.635	0.0	0.0	7.2	1.00	70.5«	78.8
S1.013	41.44	12.12	21.670	0.655	0.0	0.0	7.4	0.99	70.3«	80.9
S1.014	40.79	12.48	21.637	0.655	0.0	0.0	7.4	1.00	70.5«	80.9
S1.015	40.30	12.77	21.549	0.655	0.0	0.0	7.4	1.00	70.5«	80.9
S4.000	50.00	5.14	21.800	0.056	0.0	0.0	0.8	2.13	150.4	8.3
S1.016	39.97	12.96	21.480	0.711	0.0	0.0	7.7	1.00	70.5«	84.7
S1.017	39.57	13.21	21.433	0.736	0.0	0.0	7.9	1.00	70.4«	86.8
S1.018	39.23	13.42	21.373	0.736	0.0	0.0	7.9	1.00	70.5«	86.8
S1.019	38.79	13.70	21.322	0.736	0.0	0.0	7.9	0.99	70.3«	86.8
S1.020	38.32	14.00	21.255	0.751	0.0	0.0	7.9	1.00	70.7«	86.8
S5.000	50.00	5.13	22.328	0.016	0.0	0.0	0.2	2.54	101.1	2.4
S5.001	50.00	5.24	21.593	0.016	0.0	0.0	0.2	1.31	52.0	2.4
S5.002	50.00	5.73	21.503	0.053	0.0	0.0	0.7	1.00	39.8	7.9
S5.003	50.00	5.95	21.331	0.121	0.0	0.0	1.6	1.09	43.5	18.0
S1.021	37.54	14.53	21.154	0.872	0.0	0.0	8.9	0.87	61.8«	97.5
S6.000	50.00	5.08	22.654	0.061	0.0	0.0	0.8	3.17	224.3	9.1
S6.001	50.00	5.34	22.027	0.061	0.0	0.0	0.8	1.00	70.8	9.1
S6.002	50.00	5.43	21.954	0.061	0.0	0.0	0.8	1.02	71.9	9.1
S6.003	50.00	5.79	21.931	0.070	0.0	0.0	0.9	1.00	70.7	10.4
S6.004	50.00	6.08	21.842	0.070	0.0	0.0	0.9	1.01	71.1	10.4
S6.005	50.00	6.31	21.777	0.100	0.0	0.0	1.4	1.14	80.4	14.9
S6.006	50.00	6.85	21.696	0.114	0.0	0.0	1.5	0.99	70.2	17.0
S6.007	50.00	7.22	21.565	0.135	0.0	0.0	1.8	1.00	70.4	20.1

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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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.008	14.639	0.060	244.0	0.015	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.009	16.912	0.069	245.1	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.010	23.588	0.096	245.7	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.011	27.300	0.111	245.9	0.027	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.012	22.313	0.091	245.2	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.022	1.989	0.022	90.4	0.075	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)
S6.008	50.00	7.46	21.477	0.150	0.0	0.0	2.0	1.00	70.8	22.3
S6.009	50.00	7.74	21.417	0.150	0.0	0.0	2.0	1.00	70.7	22.3
S6.010	50.00	8.14	21.348	0.168	0.0	0.0	2.3	1.00	70.6	25.0
S6.011	49.48	8.59	21.252	0.195	0.0	0.0	2.6	1.00	70.5	28.7
S6.012	48.45	8.97	21.141	0.195	0.0	0.0	2.6	1.00	70.7	28.7
S1.022	37.51	14.55	21.050	1.142	0.0	0.0	11.6	1.65	116.9«	127.6

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	31.639	1.770	Open Manhole	1200	S1.000	29.869	300				
S2	30.562	1.780	Open Manhole	1200	S1.001	28.782	300	S1.000	28.782	300	
S3	30.041	1.648	Open Manhole	1200	S1.002	28.393	300	S1.001	28.393	300	
S4	29.557	1.587	Open Manhole	1200	S1.003	27.970	300	S1.002	27.970	300	
S5	28.855	1.796	Open Manhole	1200	S1.004	27.059	300	S1.003	27.059	300	
S6	28.061	1.743	Open Manhole	1200	S1.005	26.318	300	S1.004	26.318	300	
S7	28.340	2.299	Open Manhole	1200	S1.006	26.041	300	S1.005	26.041	300	
S8	27.381	2.812	Open Manhole	1200	S1.007	24.569	300	S1.006	24.569	300	
S9	27.298	2.924	Open Manhole	1200	S1.008	24.374	300	S1.007	24.374	300	
S22	24.457	1.135	Open Manhole	1200	S2.000	23.322	300				
S23	24.402	1.158	Open Manhole	1200	S2.001	23.244	300	S2.000	23.244	300	
S24	24.709	1.553	Open Manhole	1200	S2.002	23.156	300	S2.001	23.156	300	
S25	24.925	1.821	Open Manhole	1200	S2.003	23.104	300	S2.002	23.104	300	
S26	25.952	3.002	Open Manhole	1200	S2.004	22.950	300	S2.003	22.950	300	
S27	26.318	3.533	Open Manhole	1200	S2.005	22.785	300	S2.004	22.785	300	
S36	26.664	1.509	Open Manhole	1200	S3.000	25.155	300				
S37	26.261	1.800	Open Manhole	1200	S3.001	24.461	300	S3.000	24.461	300	
S38	26.235	1.819	Open Manhole	1200	S3.002	24.416	300	S3.001	24.416	300	
S39	26.305	1.972	Open Manhole	1200	S3.003	24.333	300	S3.002	24.333	300	
S40	26.911	2.682	Open Manhole	1200	S3.004	24.229	300	S3.003	24.229	300	
S41	27.076	2.890	Open Manhole	1200	S3.005	24.186	300	S3.004	24.186	300	
S42	27.073	2.940	Open Manhole	1200	S3.006	24.133	300	S3.005	24.133	300	
S43	26.933	2.882	Open Manhole	1200	S3.007	24.051	300	S3.006	24.051	300	
S44	26.807	2.832	Open Manhole	1200	S3.008	23.975	300	S3.007	23.975	300	
S45	26.620	2.745	Open Manhole	1200	S3.009	23.875	300	S3.008	23.875	300	
S28	26.632	3.914	Open Manhole	1200	S2.006	22.718	300	S2.005	22.718	300	
								S3.009	22.718	300	
S29	26.627	3.935	Open Manhole	1200	S2.007	22.692	300	S2.006	22.692	300	
S30	26.716	4.150	Open Manhole	1200	S2.008	22.566	300	S2.007	22.566	300	
S31	26.813	4.336	Open Manhole	1200	S2.009	22.477	300	S2.008	22.477	300	
S32	26.953	4.602	Open Manhole	1200	S2.010	22.351	300	S2.009	22.351	300	
S33	27.003	4.716	Open Manhole	1200	S2.011	22.287	300	S2.010	22.287	300	
S34	27.094	4.878	Open Manhole	1200	S2.012	22.216	300	S2.011	22.216	300	
S35	27.175	5.037	Open Manhole	1200	S2.013	22.138	300	S2.012	22.138	300	
S10	27.132	5.032	Open Manhole	1200	S1.009	22.100	300	S1.008	23.617	300	1517
								S2.013	22.100	300	
S11	26.729	4.716	Open Manhole	1200	S1.010	22.013	300	S1.009	22.013	300	
S12	26.426	4.478	Open Manhole	1200	S1.011	21.948	300	S1.010	21.948	300	
S13	26.122	4.253	Open Manhole	1200	S1.012	21.869	300	S1.011	21.869	300	
S14	24.751	3.081	Open Manhole	1200	S1.013	21.670	300	S1.012	21.671	300	1
S15	24.504	2.867	Open Manhole	1200	S1.014	21.637	300	S1.013	21.639	300	2
S16	23.848	2.299	Open Manhole	1200	S1.015	21.549	300	S1.014	21.549	300	
S46	23.600	1.800	Open Manhole	1200	S4.000	21.800	300				
S17	23.492	2.012	Open Manhole	1200	S1.016	21.480	300	S1.015	21.480	300	
								S4.000	21.480	300	
S18	23.271	1.838	Open Manhole	1200	S1.017	21.433	300	S1.016	21.433	300	
S19	22.828	1.455	Open Manhole	1200	S1.018	21.373	300	S1.017	21.373	300	
S20	22.416	1.094	Open Manhole	1200	S1.019	21.322	300	S1.018	21.322	300	
S21	22.383	1.128	Open Manhole	1200	S1.020	21.255	300	S1.019	21.255	300	
S47	23.753	1.425	Open Manhole	1200	S5.000	22.328	225				
S48	23.400	1.807	Open Manhole	1200	S5.001	21.593	225	S5.000	21.593	225	
S49	23.203	1.700	Open Manhole	1200	S5.002	21.503	225	S5.001	21.503	225	
S50	22.312	0.981	Open Manhole	1200	S5.003	21.331	225	S5.002	21.331	225	
S22	22.017	0.863	Open Manhole	1200	S1.021	21.154	300	S1.020	21.180	300	26
								S5.003	21.229	225	
S51	24.447	1.793	Open Manhole	1200	S6.000	22.654	300				
S52	23.684	1.657	Open Manhole	1200	S6.001	22.027	300	S6.000	22.027	300	
S53	23.512	1.558	Open Manhole	1200	S6.002	21.954	300	S6.001	21.963	300	9
S54	23.435	1.504	Open Manhole	1200	S6.003	21.931	300	S6.002	21.931	300	
S55	23.206	1.364	Open Manhole	1200	S6.004	21.842	300	S6.003	21.842	300	
S56	22.992	1.222	Open Manhole	1200	S6.005	21.777	300	S6.004	21.770	300	
S57	23.728	2.032	Open Manhole	1200	S6.006	21.696	300	S6.005	21.696	300	
S58	22.650	1.085	Open Manhole	1200	S6.007	21.565	300	S6.006	21.565	300	
S59	22.771	1.294	Open Manhole	1200	S6.008	21.477	300	S6.007	21.477	300	

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S60	23.000	1.583	Open Manhole	1200	S6.009	21.417	300	S6.008	21.417	300	
S61	22.248	0.900	Open Manhole	1200	S6.010	21.348	300	S6.009	21.348	300	
S62	22.152	0.900	Open Manhole	1200	S6.011	21.252	300	S6.010	21.252	300	
S63	22.066	0.925	Open Manhole	1200	S6.012	21.141	300	S6.011	21.141	300	
S22	22.000	0.950	Open Manhole	1200	S1.022	21.050	300	S1.021	21.067	300	17
								S6.012	21.050	300	
S	22.000	0.972	Open Manhole	0		OUTFALL		S1.022	21.028	300	

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)
S1.022	S	22.000	21.028	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	10.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	1	Number of Time/Area Diagrams	0
Number of Online Controls	2	Number of Storage Structures	3	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	19.300	Cv (Summer)	0.750
Return Period (years)	100	Ratio R	0.348	Cv (Winter)	0.840
Region	England and Wales	Profile Type	Winter	Storm Duration (mins)	30

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Online Controls for Storm

Orifice Manhole: S23, DS/PN: S2.001, Volume (m³): 2.6

Diameter (m) 0.225 Discharge Coefficient 0.600 Invert Level (m) 23.244

Depth/Flow Relationship Manhole: S22, DS/PN: S1.022, Volume (m³): 4.4

Invert Level (m) 21.050

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)	Depth (m)	Flow (l/s)
0.100	0.0000	0.300	0.0000	0.500	0.0000	0.700	0.0000	0.900	0.0000	1.100	0.0000
0.200	0.0000	0.400	0.0000	0.600	0.0000	0.800	0.0000	1.000	0.0000	1.200	0.0000

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Offline Controls for Storm

Orifice Manhole: S20, DS/PN: S1.019, Loop to PN: None

Diameter (m) 0.225 Discharge Coefficient 0.600 Invert Level (m) 21.322

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Storage Structures for Storm

Tank or Pond Manhole: S23, DS/PN: S2.001

Invert Level (m) 23.257

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	43.5	0.400	43.5	0.401	0.0

Tank or Pond Manhole: S20, DS/PN: S1.019

Invert Level (m) 21.322

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	8.0	0.400	8.0	0.401	0.0

Infiltration Basin Manhole: S22, DS/PN: S1.022

Invert Level (m) 20.900 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Base (m/hr) 0.10700 Safety Factor 2.0

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	749.0	0.600	1217.0

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 1 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.300 Cv (Summer) 0.750
Region England and Wales Ratio R 0.348 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status ON Inertia Status OFF
Analysis Timestep Fine DVD 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) 100
Climate Change (%) 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S1.000	S1	15 Winter	100	+40%					30.025	-0.144	0.000	0.52		71.6
S1.001	S2	15 Winter	100	+40%					29.001	-0.081	0.000	0.85		109.6
S1.002	S3	15 Winter	100	+40%					28.609	-0.084	0.000	0.84		109.7
S1.003	S4	15 Winter	100	+40%	100/15 Summer				28.331	0.061	0.000	0.93		127.6
S1.004	S5	15 Winter	100	+40%	100/15 Summer				27.554	0.195	0.000	1.06		144.6
S1.005	S6	15 Winter	100	+40%	100/15 Summer				26.756	0.138	0.000	1.15		141.7
S1.006	S7	15 Winter	100	+40%	100/15 Summer				26.436	0.095	0.000	0.97		136.4
S1.007	S8	30 Winter	100	+40%	100/15 Summer				25.398	0.529	0.000	1.08		119.4
S1.008	S9	30 Winter	100	+40%	100/15 Summer				25.225	0.551	0.000	0.54		109.9
S2.000	S22	30 Winter	100	+40%	100/15 Summer				24.456	0.834	0.000	0.24		14.4
S2.001	S23	30 Winter	100	+40%	100/15 Summer	100/15 Winter			24.454	0.910	13.438	0.71		43.9
S2.002	S24	30 Winter	100	+40%	100/15 Summer				24.565	1.109	0.000	0.77		44.7
S2.003	S25	30 Winter	100	+40%	100/15 Summer				24.620	1.216	0.000	0.68		44.5
S2.004	S26	30 Winter	100	+40%	100/15 Summer				24.708	1.458	0.000	0.70		45.8
S2.005	S27	30 Winter	100	+40%	100/15 Summer				24.771	1.686	0.000	0.77		46.3
S3.000	S36	15 Winter	100	+40%					25.251	-0.204	0.000	0.22		30.9
S3.001	S37	30 Winter	100	+40%	100/30 Winter				24.933	0.172	0.000	0.45		25.1
S3.002	S38	30 Winter	100	+40%	100/15 Winter				24.926	0.210	0.000	0.74		45.6
S3.003	S39	30 Winter	100	+40%	100/15 Winter				24.908	0.275	0.000	0.71		45.0
S3.004	S40	30 Winter	100	+40%	100/15 Winter				24.889	0.360	0.000	0.76		42.5
S3.005	S41	30 Winter	100	+40%	100/15 Summer				24.877	0.391	0.000	0.71		41.2
S3.006	S42	30 Winter	100	+40%	100/15 Summer				24.864	0.431	0.000	0.62		38.6
S3.007	S43	30 Winter	100	+40%	100/15 Summer				24.846	0.495	0.000	0.65		40.5
S3.008	S44	30 Winter	100	+40%	100/15 Summer				24.832	0.557	0.000	0.66		41.6
S3.009	S45	30 Winter	100	+40%	100/15 Summer				24.817	0.642	0.000	0.18		49.2
S2.006	S28	30 Winter	100	+40%	100/15 Summer				24.810	1.792	0.000	1.48		73.8
S2.007	S29	30 Winter	100	+40%	100/15 Summer				24.823	1.831	0.000	1.15		73.8
S2.008	S30	30 Winter	100	+40%	100/15 Summer				24.836	1.970	0.000	1.19		74.0
S2.009	S31	30 Winter	100	+40%	100/15 Summer				24.861	2.084	0.000	1.15		73.8
S2.010	S32	30 Winter	100	+40%	100/15 Summer				24.898	2.247	0.000	1.24		74.1
S2.011	S33	30 Winter	100	+40%	100/15 Summer				24.928	2.341	0.000	1.22		74.1
S2.012	S34	30 Winter	100	+40%	100/15 Summer				24.940	2.424	0.000	1.22		74.6
S2.013	S35	30 Winter	100	+40%	100/15 Summer				24.953	2.515	0.000	1.38		74.9
S1.009	S10	30 Winter	100	+40%	100/15 Summer				24.955	2.555	0.000	1.72		105.9
S1.010	S11	30 Winter	100	+40%	100/15 Summer				24.705	2.392	0.000	1.75		104.4
S1.011	S12	30 Winter	100	+40%	100/15 Summer				24.510	2.262	0.000	1.76		107.9
S1.012	S13	30 Winter	100	+40%	100/15 Summer				24.268	2.099	0.000	1.76		116.8
S1.013	S14	30 Winter	100	+40%	100/15 Summer				23.646	1.676	0.000	2.33		120.9
S1.014	S15	30 Winter	100	+40%	100/15 Summer				23.411	1.474	0.000	1.95		121.2
S1.015	S16	30 Winter	100	+40%	100/15 Summer				23.077	1.228	0.000	2.03		121.9
S4.000	S46	30 Winter	100	+40%	100/15 Summer				22.824	0.724	0.000	0.17		22.3
S1.016	S17	30 Winter	100	+40%	100/15 Summer				22.809	1.029	0.000	2.37		134.0
S1.017	S18	30 Winter	100	+40%	100/15 Summer				22.523	0.790	0.000	2.36		139.3
S1.018	S19	30 Winter	100	+40%	100/15 Summer				22.187	0.514	0.000	2.43		139.5
S1.019	S20	30 Winter	100	+40%	100/15 Summer		100/15 Summer	38	21.879	0.257	0.000	1.21	70.4	72.3
S1.020	S21	30 Winter	100	+40%	100/15 Summer				21.798	0.243	0.000	1.22		74.7
S5.000	S47	15 Winter	100	+40%					22.378	-0.175	0.000	0.11		10.0
S5.001	S48	15 Winter	100	+40%	100/15 Summer				22.024	0.206	0.000	0.26		10.9
S5.002	S49	15 Winter	100	+40%	100/15 Summer				22.014	0.286	0.000	0.79		29.3
S5.003	S50	15 Winter	100	+40%	100/15 Summer				21.906	0.350	0.000	1.76		67.3
S1.021	S22	30 Winter	100	+40%	100/15 Summer				21.704	0.250	0.000	2.00		111.8
S6.000	S51	15 Winter	100	+40%					22.746	-0.208	0.000	0.20		38.2
S6.001	S52	15 Winter	100	+40%					22.299	-0.028	0.000	0.63		37.5
S6.002	S53	15 Winter	100	+40%					22.254	0.000	0.000	0.78		37.9
S6.003	S54	15 Winter	100	+40%	100/15 Winter				22.239	0.008	0.000	0.68		42.6
S6.004	S55	15 Winter	100	+40%	100/15 Winter				22.186	0.044	0.000	0.63		38.3
S6.005	S56	15 Winter	100	+40%	100/15 Winter				22.132	0.055	0.000	0.76		51.1
S6.006	S57	15 Winter	100	+40%	100/15 Winter				22.042	0.046	0.000	0.87		55.7
S6.007	S58	15 Winter	100	+40%	100/15 Summer				21.954	0.089	0.000	0.93		57.6
S6.008	S59	15 Winter	100	+40%	100/15 Summer				21.872	0.095	0.000	1.06		62.5

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

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	OK	
S1.001	S2	OK	
S1.002	S3	OK	
S1.003	S4	SURCHARGED	
S1.004	S5	SURCHARGED	
S1.005	S6	SURCHARGED	
S1.006	S7	SURCHARGED	
S1.007	S8	SURCHARGED	
S1.008	S9	SURCHARGED	
S2.000	S22	FLOOD RISK	
S2.001	S23	FLOOD	5
S2.002	S24	FLOOD RISK	
S2.003	S25	SURCHARGED	
S2.004	S26	SURCHARGED	
S2.005	S27	SURCHARGED	
S3.000	S36	OK	
S3.001	S37	SURCHARGED	
S3.002	S38	SURCHARGED	
S3.003	S39	SURCHARGED	
S3.004	S40	SURCHARGED	
S3.005	S41	SURCHARGED	
S3.006	S42	SURCHARGED	
S3.007	S43	SURCHARGED	
S3.008	S44	SURCHARGED	
S3.009	S45	SURCHARGED	
S2.006	S28	SURCHARGED	
S2.007	S29	SURCHARGED	
S2.008	S30	SURCHARGED	
S2.009	S31	SURCHARGED	
S2.010	S32	SURCHARGED	
S2.011	S33	SURCHARGED	
S2.012	S34	SURCHARGED	
S2.013	S35	SURCHARGED	
S1.009	S10	SURCHARGED	
S1.010	S11	SURCHARGED	
S1.011	S12	SURCHARGED	
S1.012	S13	SURCHARGED	
S1.013	S14	SURCHARGED	
S1.014	S15	SURCHARGED	
S1.015	S16	SURCHARGED	
S4.000	S46	SURCHARGED	
S1.016	S17	SURCHARGED	
S1.017	S18	SURCHARGED	
S1.018	S19	SURCHARGED	
S1.019	S20	SURCHARGED	
S1.020	S21	SURCHARGED	
S5.000	S47	OK	
S5.001	S48	SURCHARGED	
S5.002	S49	SURCHARGED	
S5.003	S50	SURCHARGED	
S1.021	S22	SURCHARGED	
S6.000	S51	OK	
S6.001	S52	OK	
S6.002	S53	OK	
S6.003	S54	SURCHARGED	
S6.004	S55	SURCHARGED	
S6.005	S56	SURCHARGED	
S6.006	S57	SURCHARGED	
S6.007	S58	SURCHARGED	
S6.008	S59	SURCHARGED	

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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) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S6.009	S60	15 Winter	100	+40%	100/15 Summer				21.797	0.080	0.000	1.00		60.4
S6.010	S61	15 Winter	100	+40%	100/15 Summer				21.718	0.070	0.000	1.05		65.6
S6.011	S62	15 Winter	100	+40%	100/15 Summer				21.609	0.057	0.000	1.16		73.5
S6.012	S63	15 Winter	100	+40%	100/15 Summer				21.461	0.020	0.000	1.17		73.1
S1.022	S22	360 Winter	100	+40%	100/120 Winter				21.388	0.038	0.000	0.00		0.0

PN	US/MH Name	Status	Level Exceeded
S6.009	S60	SURCHARGED	
S6.010	S61	SURCHARGED	
S6.011	S62	SURCHARGED	
S6.012	S63	SURCHARGED	
S1.022	S22	SURCHARGED	

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