


Chartway Group Ltd

Thanet Way, Whitstable, Kent, CT5 3DG

December 2019















Appendix B

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15 Meridian Way Meridian Business Park Norwich Norfolk NR7 0TA	Thanet Way RM1	
Date 24/09/2020 16:38 File 2020.09.22 - SURFACE WA...	Designed by AR Checked by JR	
Micro Drainage Network 2019.1		

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 3

- Indicates pipe length does not match coordinates
« - 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
1.000	30.609	0.475	64.4	0.059	5.00	0.0	0.600		o	225	Pipe/Conduit	
2.000	18.115	0.925	19.6	0.128	5.00	0.0	0.600		o	225	Pipe/Conduit	
1.001	11.496	0.270	42.6	0.023	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.002	15.511	0.355	43.7	0.036	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.003	46.705	1.450	32.2	0.157	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.004	23.580	2.084	11.3	0.057	0.00	0.0	0.600		o	375	Pipe/Conduit	
3.000	27.541	0.069	399.1	0.217	5.00	0.0	0.600		o	600	Pipe/Conduit	
1.005	26.456	0.066	400.8	0.079	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.006	38.670	0.105	368.3	0.062	0.00	0.0	0.600		o	600	Pipe/Conduit	
4.000	40.104	3.535	11.3	0.075	5.00	0.0	0.600		o	225	Pipe/Conduit	
4.001	37.509	1.630	23.0	0.129	0.00	0.0	0.600		o	300	Pipe/Conduit	
4.002	36.859	1.483	24.9	0.170	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)
1.000	50.00	5.31	33.190	0.059	0.0	0.0	0.0	1.63	64.9	8.0
2.000	50.00	5.10	33.640	0.128	0.0	0.0	0.0	2.97	118.1	17.3
1.001	50.00	5.39	32.640	0.210	0.0	0.0	0.0	2.42	170.8	28.4
1.002	50.00	5.50	32.370	0.246	0.0	0.0	0.0	2.39	168.6	33.3
1.003	50.00	5.74	31.940	0.403	0.0	0.0	0.0	3.20	353.7	54.6
1.004	50.00	5.82	30.490	0.460	0.0	0.0	0.0	5.41	597.7	62.3
3.000	50.00	5.38	28.250	0.217	0.0	0.0	0.0	1.21	342.9	29.4
1.005	50.00	6.18	28.181	0.756	0.0	0.0	0.0	1.21	342.1	102.4
1.006	50.00	6.69	28.115	0.818	0.0	0.0	0.0	1.26	357.1	110.8
4.000	50.00	5.17	36.900	0.075	0.0	0.0	0.0	3.91	155.3	10.2
4.001	50.00	5.36	33.290	0.204	0.0	0.0	0.0	3.29	232.7	27.6
4.002	50.00	5.53	31.585	0.374	0.0	0.0	0.0	3.65	402.8	50.6

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Micro Drainage		Network 2019.1



STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 3

















PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.007	26.315	0.065	404.8	0.119	0.00	0.0	0.600		o	600	Pipe/Conduit	🔒
1.008	19.090	0.055	347.1	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	🔒
1.009	22.846	1.850	12.3	0.069	0.00	0.0	0.600		o	600	Pipe/Conduit	🔒
5.000	26.256	0.164	160.0	0.083	5.00	0.0	0.600		o	225	Pipe/Conduit	🔒
5.001	25.895	0.577	44.9	0.055	0.00	0.0	0.600		o	225	Pipe/Conduit	🔒
1.010	17.669	1.540	11.5	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	🔒
1.011	20.735	0.650	31.9	0.072	0.00	0.0	0.600		o	225	Pipe/Conduit	🔒
1.012	34.953	1.175	29.7	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	🔒
1.013	58.395	3.700	15.8	0.135	0.00	0.0	0.600		o	225	Pipe/Conduit	🔒
6.000	59.252	2.290	25.9	0.218	5.00	0.0	0.600		o	300	Pipe/Conduit	🔒
6.001	49.373	4.000	12.3	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	🔒
6.002	24.487	0.162	151.2	0.039	0.00	0.0	0.600		o	375	Pipe/Conduit	🔒
6.003	5.448	0.014	403.6	0.013	0.00	0.0	0.600		o	450	Pipe/Conduit	🔒
7.000	15.025	0.369	40.8	0.037	5.00	0.0	0.600		o	150	Pipe/Conduit	🔒
6.004	23.748	0.059	399.2	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	🔒
6.005	19.741	1.200	16.5	0.081	0.00	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)
1.007	50.00	7.05	28.010	1.311	0.0	0.0	0.0	1.20	340.4	177.5
1.008	50.00	7.30	27.945	1.311	0.0	0.0	0.0	1.30	367.9	177.5
1.009	50.00	7.35	27.890	1.380	0.0	0.0	0.0	6.95	1966.3	186.9
5.000	50.00	5.42	27.156	0.083	0.0	0.0	0.0	1.03	41.0	11.2
5.001	50.00	5.64	26.992	0.138	0.0	0.0	0.0	1.96	77.8	18.7
1.010	50.00	7.39	26.040	1.518	0.0	0.0	0.0	7.22	2040.1	205.6
1.011	50.00	7.54	24.500	1.590	0.0	0.0	0.0	2.32	92.4	215.3
1.012	50.00	7.79	23.850	1.590	0.0	0.0	0.0	2.41	95.7	215.3
1.013	50.00	8.08	22.675	1.725	0.0	0.0	0.0	3.31	131.6	233.6
6.000	50.00	5.32	26.550	0.218	0.0	0.0	0.0	3.10	219.4	29.5
6.001	50.00	5.50	24.260	0.218	0.0	0.0	0.0	4.50	318.0	29.5
6.002	50.00	5.78	20.260	0.257	0.0	0.0	0.0	1.47	162.5	34.8
6.003	50.00	5.87	20.023	0.270	0.0	0.0	0.0	1.01	160.0	36.6
7.000	50.00	5.16	20.678	0.037	0.0	0.0	0.0	1.58	27.9	5.0
6.004	50.00	6.26	20.010	0.307	0.0	0.0	0.0	1.01	160.9	41.6
6.005	50.00	6.33	19.950	0.388	0.0	0.0	0.0	5.03	800.2	52.5


STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 3

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
1.014	17.530	0.088	200.3	0.083	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.015	20.236	0.101	201.4	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.016	44.918	0.225	199.6	0.058	0.00	0.0	0.600		o	600	Pipe/Conduit	
8.000	25.349	0.670	37.8	0.087	5.00	0.0	0.600		o	300	Pipe/Conduit	
8.001	42.700	0.990	43.1	0.140	0.00	0.0	0.600		o	300	Pipe/Conduit	
8.002	38.538	3.589	10.7	0.169	0.00	0.0	0.600		o	300	Pipe/Conduit	
8.003	17.486	1.599	10.9	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.017	7.604	0.025	304.2	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.018	21.117	0.182	116.0	0.000	0.00	0.0	0.600		o	1000	Pipe/Conduit	
1.019	13.633	0.088	154.9	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.020	52.163	0.315	165.6	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.021	35.102	0.210	167.2	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
9.000	8.435	0.080	105.4	0.035	5.00	0.0	0.600		o	150	Pipe/Conduit	
9.001	6.000#	0.090	66.7	0.000	0.00	0.0		0.045 3 \=/	o	150	1:3 Swale	
9.002	3.622	0.280	12.9	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
9.003	5.854	0.268	21.8	0.000	0.00	0.0	0.600		o	150	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)
1.014	50.00	8.25	18.600	2.196	0.0	0.0	0.0	1.72	485.4	297.4
1.015	50.00	8.45	18.513	2.196	0.0	0.0	0.0	1.71	484.2	297.4
1.016	50.00	8.88	18.412	2.254	0.0	0.0	0.0	1.72	486.3	305.2
8.000	50.00	5.16	25.410	0.087	0.0	0.0	0.0	2.56	181.2	11.8
8.001	50.00	5.46	24.740	0.227	0.0	0.0	0.0	2.40	169.7	30.7
8.002	50.00	5.59	23.750	0.396	0.0	0.0	0.0	4.82	341.0	53.6
8.003	50.00	5.66	20.161	0.396	0.0	0.0	0.0	4.78	337.9	53.6
1.017	50.00	8.97	18.187	2.650	0.0	0.0	0.0	1.39	393.3	358.8
1.018	50.00	9.09	18.162	2.650	0.0	0.0	0.0	3.10	2437.7	358.8
1.019	50.00	9.20	17.980	2.650	0.0	0.0	0.0	1.95	552.5	358.8
1.020	50.00	10.06	17.892	2.650	0.0	0.0	0.0	1.01	40.3	358.8
1.021	50.00	10.64	17.577	2.650	0.0	0.0	0.0	1.01	40.1	358.8
9.000	50.00	5.14	18.160	0.035	0.0	0.0	0.0	0.98	17.3	4.7
9.001	50.00	5.34	18.080	0.035	0.0	0.0	0.0	0.51	46.2	4.7
9.002	50.00	5.36	17.990	0.035	0.0	0.0	0.0	2.82	49.8	4.7
9.003	50.00	5.41	17.710	0.035	0.0	0.0	0.0	2.16	38.2	4.7

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Date 24/09/2020 16:38 File 2020.09.22 - SURFACE WA...	Designed by AR Checked by JR	
Micro Drainage	Network 2019.1	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 3

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.022	5.872	0.035	167.8	0.000	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)
1.022	50.00	10.74	17.367	2.685	0.0	0.0	0.0	1.01	40.0«	363.6

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Date 24/09/2020 16:38 File 2020.09.22 - SURFACE WA...		Designed by AR Checked by JR
Micro Drainage		Network 2019.1



Manhole Schedules for Surface Network 3

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)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Back (m)
ASW1	34.825	1.635	Open Manhole	1200	1.000	33.190	225				
ASW2	35.230	1.590	Open Manhole	1200	2.000	33.640	225				
ASW3	34.193	1.553	Open Manhole	1200	1.001	32.640	300	1.000	32.715	225	
								2.000	32.715	225	
ASW4	33.951	1.581	Open Manhole	1200	1.002	32.370	300	1.001	32.370	300	
ASW5	33.535	1.595	Open Manhole	1350	1.003	31.940	375	1.002	32.015	300	
ASW6	32.085	1.595	Open Manhole	1350	1.004	30.490	375	1.003	30.490	375	
ASW7	30.714	2.464	Open Manhole	1350	3.000	28.250	600				
ASW8	31.388	3.207	Open Manhole	1500	1.005	28.181	600	1.004	28.406	375	
								3.000	28.181	600	
ASW9	32.023	3.908	Open Manhole	1500	1.006	28.115	600	1.005	28.115	600	
ASW10	38.141	1.241	Open Manhole	1200	4.000	36.900	225				
ASW11	34.838	1.548	Open Manhole	1200	4.001	33.290	300	4.000	33.365	225	
ASW12	33.198	1.613	Open Manhole	1200	4.002	31.585	375	4.001	31.660	300	
ASW13	31.845	3.835	Open Manhole	1500	1.007	28.010	600	1.006	28.010	600	
								4.002	30.102	375	
ASW14	30.923	2.978	Open Manhole	1500	1.008	27.945	600	1.007	27.945	600	
ASW15	30.173	2.283	Open Manhole	1500	1.009	27.890	600	1.008	27.890	600	
ASW18A	28.563	1.407	Open Manhole	1200	5.000	27.156	225				
ASW18B	28.793	1.801	Open Manhole	1200	5.001	26.992	225	5.000	26.992	225	
ASW16	29.135	3.095	Open Manhole	1500	1.010	26.040	600	1.009	26.040	600	
								5.001	26.415	225	
ASW17 HYDRO	28.360	3.860	Open Manhole	1500	1.011	24.500	225	1.010	24.500	600	
ASW19	27.331	3.481	Open Manhole	1350	1.012	23.850	225	1.011	23.850	225	
ASW20	25.503	2.828	Open Manhole	1200	1.013	22.675	225	1.012	22.675	225	
ASW22	28.072	1.522	Open Manhole	1200	6.000	26.550	300				
ASW23	25.545	1.285	Open Manhole	900 x 750	6.001	24.260	300	6.000	24.260	300	
ASW24	21.800	1.540	Open Manhole	1200	6.002	20.260	375	6.001	20.260	300	
ASW25	22.690	2.667	Open Manhole	1350	6.003	20.023	450	6.002	20.098	375	
ASW26	21.565	0.887	Open Manhole	1200	7.000	20.678	150				
ASW27	22.417	2.408	Open Manhole	1350	6.004	20.010	450	6.003	20.010	450	
								7.000	20.310	150	
ASW28	21.796	1.846	Open Manhole	1240 x 900	6.005	19.950	450	6.004	19.950	450	
ASW29	20.809	2.209	Open Manhole	1500	1.014	18.600	600	1.013	18.975	225	
								6.005	18.750	450	
ASW30	20.550	2.038	Open Manhole	1240 x 1050	1.015	18.513	600	1.014	18.513	600	
ASW31	20.300	1.888	Open Manhole	1240 x 1050	1.016	18.412	600	1.015	18.412	600	
ASW32	27.437	2.027	Open Manhole	1200	8.000	25.410	300				


















Manhole Schedules for Surface Network 3

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)	Back (mm)
ASW33	26.698	1.958	Open Manhole	1200	8.001	24.740	300	8.000	24.740	300	
ASW34	26.093	2.343	Open Manhole	1200	8.002	23.750	300	8.001	23.750	300	
ASW35	22.555	2.394	Open Manhole	1200	8.003	20.161	300	8.002	20.161	300	
ASW36	20.300	2.113	Open Manhole	1500	1.017	18.187	600	1.016	18.187	600	
								8.003	18.562	300	
ASW37	20.300	2.138	Open Manhole	1240 x 975	1.018	18.162	1000	1.017	18.162	600	
ASW38	20.300	2.320	Open Manhole	1500	1.019	17.980	600	1.018	17.980	1000	
ASW39 HYDRO	20.300	2.408	Open Manhole	1200	1.020	17.892	225	1.019	17.892	600	
ASW40	19.802	2.225	Open Manhole	1200	1.021	17.577	225	1.020	17.577	225	
ASW42	19.050	0.890	Open Manhole	900 x 675	9.000	18.160	150				
ASW43	19.100	1.020	Open Manhole	1200	9.001	18.080	150	9.000	18.080	150	
ASW44	19.134	1.144	Open Manhole	900 x 675	9.002	17.990	150	9.001	17.990	150	
ASW45	18.968	1.258	Open Manhole	1200	9.003	17.710	150	9.002	17.710	150	
ASW46	19.189	1.822	Open Manhole	1200	1.022	17.367	225	1.021	17.367	225	
								9.003	17.442	150	
ASW45 HW6	18.730	1.398	Open Manhole	0		OUTFALL		1.022	17.332	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
ASW1	611299.323	164988.489	611299.323	164988.489	Required	
ASW2	611334.567	164987.433	611334.567	164987.433	Required	
ASW3	611326.045	165003.418	611326.045	165003.418	Required	
ASW4	611334.916	165010.730	611334.916	165010.730	Required	
ASW5	611341.038	165024.982	611341.038	165024.982	Required	
ASW6	611336.843	165071.498	611336.843	165071.498	Required	
ASW7	611302.959	165079.993	611302.959	165079.993	Required	

Manhole Schedules for Surface Network 3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
ASW8	611327.221	165093.026	611327.221	165093.026	Required	
ASW9	611351.026	165104.568	611351.026	165104.568	Required	
ASW10	611400.670	164995.653	611400.670	164995.653	Required	
ASW11	611395.655	165035.442	611395.655	165035.442	Required	
ASW12	611392.598	165072.826	611392.598	165072.826	Required	
ASW13	611389.375	165109.544	611389.375	165109.544	Required	
ASW14	611397.442	165134.592	611397.442	165134.592	Required	
ASW15	611385.823	165149.738	611385.823	165149.738	Required	
ASW18A	611323.268	165154.532	611323.268	165154.532	Required	
ASW18B	611348.497	165161.801	611348.497	165161.801	Required	
ASW16	611373.397	165168.910	611373.397	165168.910	Required	
ASW17 HYDRO	611368.690	165185.940	611368.690	165185.940	Required	
ASW19	611364.213	165206.186	611364.213	165206.186	Required	
ASW20	611330.158	165214.056	611330.158	165214.056	Required	
ASW22	611300.998	165145.418	611300.998	165145.418	Required	

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Thanet Way RM1



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Micro Drainage


Network 2019.1

Manhole Schedules for Surface Network 3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
ASW23	611247.481	165119.987	611247.481	165119.987	Required	
ASW24	611225.366	165164.130	611225.366	165164.130	Required	
ASW25	611247.175	165175.264	611247.175	165175.264	Required	
ASW26	611240.168	165193.140	611240.168	165193.140	Required	
ASW27	611248.402	165180.573	611248.402	165180.573	Required	
ASW28	611269.858	165190.754	611269.858	165190.754	Required	
ASW29	611271.879	165210.392	611271.879	165210.392	Required	
ASW30	611270.778	165227.887	611270.778	165227.887	Required	
ASW31	611283.405	165243.700	611283.405	165243.700	Required	
ASW32	611412.038	165292.325	611412.038	165292.325	Required	
ASW33	611401.062	165269.476	611401.062	165269.476	Required	
ASW34	611377.155	165234.096	611377.155	165234.096	Required	
ASW35	611344.718	165254.904	611344.718	165254.904	Required	
ASW36	611327.322	165253.133	611327.322	165253.133	Required	
ASW37	611325.731	165260.569	611325.731	165260.569	Required	

Manhole Schedules for Surface Network 3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
ASW38	611304.706	165258.596	611304.706	165258.596	Required	
ASW39 HYDRO	611291.544	165255.045	611291.544	165255.045	Required	
ASW40	611257.327	165215.673	611257.327	165215.673	Required	
ASW42	611242.674	165215.010	611242.674	165215.010	Required	
ASW43	611234.247	165214.638	611234.247	165214.638	Required	
ASW44	611231.780	165209.855	611231.780	165209.855	Required	
ASW45	611228.617	165208.092	611228.617	165208.092	Required	
ASW46	611224.092	165204.378	611224.092	165204.378	Required	
ASW45 HW6	611220.492	165209.017			No Entry	

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PIPELINE SCHEDULES for Surface Network 3

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	ASW1	34.825	33.190	1.410	Open Manhole	1200
2.000	o	225	ASW2	35.230	33.640	1.365	Open Manhole	1200
1.001	o	300	ASW3	34.193	32.640	1.253	Open Manhole	1200
1.002	o	300	ASW4	33.951	32.370	1.281	Open Manhole	1200
1.003	o	375	ASW5	33.535	31.940	1.220	Open Manhole	1350
1.004	o	375	ASW6	32.085	30.490	1.220	Open Manhole	1350
3.000	o	600	ASW7	30.714	28.250	1.864	Open Manhole	1350
1.005	o	600	ASW8	31.388	28.181	2.607	Open Manhole	1500
1.006	o	600	ASW9	32.023	28.115	3.308	Open Manhole	1500
4.000	o	225	ASW10	38.141	36.900	1.016	Open Manhole	1200
4.001	o	300	ASW11	34.838	33.290	1.248	Open Manhole	1200
4.002	o	375	ASW12	33.198	31.585	1.238	Open Manhole	1200
1.007	o	600	ASW13	31.845	28.010	3.235	Open Manhole	1500

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)
1.000	30.609	64.4	ASW3	34.193	32.715	1.253	Open Manhole	1200
2.000	18.115	19.6	ASW3	34.193	32.715	1.253	Open Manhole	1200
1.001	11.496	42.6	ASW4	33.951	32.370	1.281	Open Manhole	1200
1.002	15.511	43.7	ASW5	33.535	32.015	1.220	Open Manhole	1350
1.003	46.705	32.2	ASW6	32.085	30.490	1.220	Open Manhole	1350
1.004	23.580	11.3	ASW8	31.388	28.406	2.607	Open Manhole	1500
3.000	27.541	399.1	ASW8	31.388	28.181	2.607	Open Manhole	1500
1.005	26.456	400.8	ASW9	32.023	28.115	3.308	Open Manhole	1500
1.006	38.670	368.3	ASW13	31.845	28.010	3.235	Open Manhole	1500
4.000	40.104	11.3	ASW11	34.838	33.365	1.248	Open Manhole	1200
4.001	37.509	23.0	ASW12	33.198	31.660	1.238	Open Manhole	1200
4.002	36.859	24.9	ASW13	31.845	30.102	1.368	Open Manhole	1500
1.007	26.315	404.8	ASW14	30.923	27.945	2.378	Open Manhole	1500

PIPELINE SCHEDULES for Surface Network 3

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)
1.008	o	600	ASW14	30.923	27.945	2.378	Open Manhole	1500
1.009	o	600	ASW15	30.173	27.890	1.683	Open Manhole	1500
5.000	o	225	ASW18A	28.563	27.156	1.182	Open Manhole	1200
5.001	o	225	ASW18B	28.793	26.992	1.576	Open Manhole	1200
1.010	o	600	ASW16	29.135	26.040	2.495	Open Manhole	1500
1.011	o	225	ASW17 HYDRO	28.360	24.500	3.635	Open Manhole	1500
1.012	o	225	ASW19	27.331	23.850	3.256	Open Manhole	1350
1.013	o	225	ASW20	25.503	22.675	2.603	Open Manhole	1200
6.000	o	300	ASW22	28.072	26.550	1.222	Open Manhole	1200
6.001	o	300	ASW23	25.545	24.260	0.985	Open Manhole	900 x 750
6.002	o	375	ASW24	21.800	20.260	1.165	Open Manhole	1200
6.003	o	450	ASW25	22.690	20.023	2.217	Open Manhole	1350
7.000	o	150	ASW26	21.565	20.678	0.737	Open Manhole	1200
6.004	o	450	ASW27	22.417	20.010	1.958	Open Manhole	1350
6.005	o	450	ASW28	21.796	19.950	1.396	Open Manhole	1240 x 900

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)
1.008	19.090	347.1	ASW15	30.173	27.890	1.683	Open Manhole	1500
1.009	22.846	12.3	ASW16	29.135	26.040	2.495	Open Manhole	1500
5.000	26.256	160.0	ASW18B	28.793	26.992	1.576	Open Manhole	1200
5.001	25.895	44.9	ASW16	29.135	26.415	2.495	Open Manhole	1500
1.010	17.669	11.5	ASW17 HYDRO	28.360	24.500	3.260	Open Manhole	1500
1.011	20.735	31.9	ASW19	27.331	23.850	3.256	Open Manhole	1350
1.012	34.953	29.7	ASW20	25.503	22.675	2.603	Open Manhole	1200
1.013	58.395	15.8	ASW29	20.809	18.975	1.609	Open Manhole	1500
6.000	59.252	25.9	ASW23	25.545	24.260	0.985	Open Manhole	900 x 750
6.001	49.373	12.3	ASW24	21.800	20.260	1.240	Open Manhole	1200
6.002	24.487	151.2	ASW25	22.690	20.098	2.217	Open Manhole	1350
6.003	5.448	403.6	ASW27	22.417	20.010	1.958	Open Manhole	1350
7.000	15.025	40.8	ASW27	22.417	20.310	1.958	Open Manhole	1350
6.004	23.748	399.2	ASW28	21.796	19.950	1.396	Open Manhole	1240 x 900
6.005	19.741	16.5	ASW29	20.809	18.750	1.609	Open Manhole	1500


PIPELINE SCHEDULES for Surface Network 3

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)
1.014	o	600	ASW29	20.809	18.600	1.609	Open Manhole	1500
1.015	o	600	ASW30	20.550	18.513	1.438	Open Manhole	1240 x 1050
1.016	o	600	ASW31	20.300	18.412	1.288	Open Manhole	1240 x 1050
8.000	o	300	ASW32	27.437	25.410	1.727	Open Manhole	1200
8.001	o	300	ASW33	26.698	24.740	1.658	Open Manhole	1200
8.002	o	300	ASW34	26.093	23.750	2.043	Open Manhole	1200
8.003	o	300	ASW35	22.555	20.161	2.094	Open Manhole	1200
1.017	o	600	ASW36	20.300	18.187	1.513	Open Manhole	1500
1.018	o	1000	ASW37	20.300	18.162	1.138	Open Manhole	1240 x 975
1.019	o	600	ASW38	20.300	17.980	1.720	Open Manhole	1500
1.020	o	225	ASW39 HYDRO	20.300	17.892	2.183	Open Manhole	1200
1.021	o	225	ASW40	19.802	17.577	2.000	Open Manhole	1200
9.000	o	150	ASW42	19.050	18.160	0.740	Open Manhole	900 x 675
9.001	3 \=/	150	ASW43	19.100	18.080	0.870	Open Manhole	1200
9.002	o	150	ASW44	19.134	17.990	0.994	Open Manhole	900 x 675
9.003	o	150	ASW45	18.968	17.710	1.108	Open Manhole	1200
1.022	o	225	ASW46	19.189	17.367	1.597	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)
1.014	17.530	200.3	ASW30	20.550	18.513	1.438	Open Manhole	1240 x 1050
1.015	20.236	201.4	ASW31	20.300	18.412	1.288	Open Manhole	1240 x 1050
1.016	44.918	199.6	ASW36	20.300	18.187	1.513	Open Manhole	1500
8.000	25.349	37.8	ASW33	26.698	24.740	1.658	Open Manhole	1200
8.001	42.700	43.1	ASW34	26.093	23.750	2.043	Open Manhole	1200
8.002	38.538	10.7	ASW35	22.555	20.161	2.094	Open Manhole	1200
8.003	17.486	10.9	ASW36	20.300	18.562	1.438	Open Manhole	1500
1.017	7.604	304.2	ASW37	20.300	18.162	1.538	Open Manhole	1240 x 975
1.018	21.117	116.0	ASW38	20.300	17.980	1.320	Open Manhole	1500
1.019	13.633	154.9	ASW39 HYDRO	20.300	17.892	1.808	Open Manhole	1200
1.020	52.163	165.6	ASW40	19.802	17.577	2.000	Open Manhole	1200
1.021	35.102	167.2	ASW46	19.189	17.367	1.597	Open Manhole	1200
9.000	8.435	105.4	ASW43	19.100	18.080	0.870	Open Manhole	1200
9.001	6.000#	66.7	ASW44	19.134	17.990	0.994	Open Manhole	900 x 675
9.002	3.622	12.9	ASW45	18.968	17.710	1.108	Open Manhole	1200
9.003	5.854	21.8	ASW46	19.189	17.442	1.597	Open Manhole	1200
1.022	5.872	167.8	ASW45 HW6	18.730	17.332	1.173	Open Manhole	0

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Free Flowing Outfall Details for Surface Network 3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.022	ASW45 HW6	18.730	17.332	0.000	0	0
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Simulation Criteria for Surface Network 3

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 Storage Structures	5
Number of Online Controls	3	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)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	26.500	Storm Duration (mins)	30
Ratio R	0.400		

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Online Controls for Surface Network 3

Hydro-Brake® Optimum Manhole: ASW17 HYDRO, DS/PN: 1.011, Volume (m³): 11.4

Unit Reference	MD-SHE-0139-1270-2600-1270
Design Head (m)	2.600
Design Flow (l/s)	12.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	139
Invert Level (m)	24.500
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.600	12.7
Flush-Flo™	0.603	11.4
Kick-Flo®	1.243	9.0
Mean Flow over Head Range	-	10.4

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	5.0	1.200	9.4	3.000	13.6	7.000	20.4
0.200	9.4	1.400	9.5	3.500	14.6	7.500	21.1
0.300	10.5	1.600	10.1	4.000	15.6	8.000	21.7
0.400	11.0	1.800	10.7	4.500	16.5	8.500	22.4
0.500	11.3	2.000	11.2	5.000	17.3	9.000	23.0
0.600	11.4	2.200	11.7	5.500	18.1	9.500	23.6
0.800	11.2	2.400	12.2	6.000	18.9		
1.000	10.7	2.600	12.7	6.500	19.7		

Hydro-Brake® Optimum Manhole: ASW39 HYDRO, DS/PN: 1.020, Volume (m³): 6.2

Unit Reference	MD-SHE-0157-1410-1900-1410
Design Head (m)	1.900
Design Flow (l/s)	14.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	157
Invert Level (m)	17.892
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

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Hydro-Brake® Optimum Manhole: ASW39 HYDRO, DS/PN: 1.020, Volume (m³): 6.2


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.900	14.1
Flush-Flo™	0.559	14.1
Kick-Flo®	1.169	11.2
Mean Flow over Head Range	-	12.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.6	1.200	11.3	3.000	17.5	7.000	26.3
0.200	11.9	1.400	12.2	3.500	18.8	7.500	27.1
0.300	13.2	1.600	13.0	4.000	20.1	8.000	28.0
0.400	13.8	1.800	13.7	4.500	21.2	8.500	28.8
0.500	14.1	2.000	14.4	5.000	22.3	9.000	29.6
0.600	14.1	2.200	15.1	5.500	23.4	9.500	30.4
0.800	13.8	2.400	15.7	6.000	24.4		
1.000	12.9	2.600	16.3	6.500	25.3		

Orifice Manhole: ASW45, DS/PN: 9.003, Volume (m³): 1.5

Diameter (m) 0.030 Discharge Coefficient 0.600 Invert Level (m) 17.710

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Storage Structures for Surface Network 3

Cellular Storage Manhole: ASW7, DS/PN: 3.000

Invert Level (m) 28.350 Safety Factor 3.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	34.0	0.0	0.801	0.0	0.0
0.800	34.0	0.0			

Cellular Storage Manhole: ASW13, DS/PN: 1.007

Invert Level (m) 28.510 Safety Factor 5.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	20.0	0.0	1.201	0.0	0.0
1.200	20.0	0.0			

Cellular Storage Manhole: ASW17 HYDRO, DS/PN: 1.011

Invert Level (m) 24.600 Safety Factor 5.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	530.0	0.0	2.401	0.0	0.0
2.400	530.0	0.0			


Cellular Storage Manhole: ASW29, DS/PN: 1.014

Invert Level (m) 18.600 Safety Factor 5.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	70.0	0.0	0.801	0.0	0.0
0.800	70.0	0.0			


Tank or Pond Manhole: ASW39 HYDRO, DS/PN: 1.020

Invert Level (m) 18.000

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Tank or Pond Manhole: ASW39 HYDRO, DS/PN: 1.020

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	189.8	0.700	329.6	1.300	579.6	2.000	809.2
0.100	207.3	0.800	353.6	1.500	642.3	2.100	844.2
0.200	225.4	0.900	377.6	1.600	674.0	2.200	879.8
0.300	244.3	1.000	402.3	1.700	706.3	2.299	915.6
0.500	286.1	1.100	521.0	1.800	740.8	2.300	915.9
0.600	307.5	1.200	550.0	1.900	774.7		

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 3

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 Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 5
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 26.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0
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) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	ASW1	15 Winter	1	+0%	100/15 Summer			
2.000	ASW2	15 Winter	1	+0%	100/15 Summer			
1.001	ASW3	15 Winter	1	+0%	100/15 Summer			
1.002	ASW4	15 Winter	1	+0%	100/15 Summer			
1.003	ASW5	15 Winter	1	+0%	100/15 Winter			
1.004	ASW6	15 Winter	1	+0%	100/15 Summer			
3.000	ASW7	15 Winter	1	+0%	30/15 Summer			
1.005	ASW8	15 Winter	1	+0%	30/15 Summer			
1.006	ASW9	15 Winter	1	+0%	30/15 Summer			
4.000	ASW10	15 Winter	1	+0%				
4.001	ASW11	15 Winter	1	+0%				
4.002	ASW12	15 Winter	1	+0%				
1.007	ASW13	15 Winter	1	+0%	30/15 Summer			
1.008	ASW14	15 Winter	1	+0%	30/15 Summer			
1.009	ASW15	15 Winter	1	+0%				
5.000	ASW18A	15 Winter	1	+0%	100/15 Summer			
5.001	ASW18B	15 Winter	1	+0%	100/15 Summer			
1.010	ASW16	15 Winter	1	+0%	100/60 Winter			
1.011	ASW17 HYDRO	240 Winter	1	+0%	1/15 Summer			

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Micro Drainage	Network 2019.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 3


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	ASW1	33.255	-0.160	0.000	0.18	10.9	OK	
2.000	ASW2	33.713	-0.152	0.000	0.23	24.0	OK	
1.001	ASW3	32.752	-0.188	0.000	0.29	38.2	OK	
1.002	ASW4	32.486	-0.184	0.000	0.31	44.3	OK	
1.003	ASW5	32.058	-0.257	0.000	0.21	69.3	OK	
1.004	ASW6	30.588	-0.277	0.000	0.15	78.4	OK	
3.000	ASW7	28.511	-0.339	0.000	0.10	27.1	OK	
1.005	ASW8	28.490	-0.291	0.000	0.41	111.0	OK	
1.006	ASW9	28.439	-0.276	0.000	0.38	116.2	OK	
4.000	ASW10	36.947	-0.178	0.000	0.10	14.1	OK	
4.001	ASW11	33.371	-0.219	0.000	0.16	34.5	OK	
4.002	ASW12	31.689	-0.271	0.000	0.17	61.3	OK	
1.007	ASW13	28.380	-0.230	0.000	0.67	181.1	OK	
1.008	ASW14	28.301	-0.244	0.000	0.65	179.3	OK	
1.009	ASW15	28.038	-0.452	0.000	0.14	187.6	OK	
5.000	ASW18A	27.257	-0.124	0.000	0.40	15.3	OK	
5.001	ASW18B	27.082	-0.135	0.000	0.34	24.1	OK	
1.010	ASW16	26.203	-0.437	0.000	0.16	204.4	OK	
1.011	ASW17 HYDRO	25.058	0.333	0.000	0.13	11.1	SURCHARGED	

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Micro Drainage		Network 2019.1

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 3


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.012	ASW19	960 Winter	1	+0%				
1.013	ASW20	15 Winter	1	+0%	100/15 Summer			
6.000	ASW22	15 Winter	1	+0%				
6.001	ASW23	15 Winter	1	+0%				
6.002	ASW24	15 Winter	1	+0%	100/15 Summer			
6.003	ASW25	15 Winter	1	+0%	100/15 Summer			
7.000	ASW26	15 Winter	1	+0%	100/15 Summer			
6.004	ASW27	15 Winter	1	+0%	100/15 Summer			
6.005	ASW28	15 Winter	1	+0%	100/15 Winter			
1.014	ASW29	15 Winter	1	+0%	30/120 Winter			
1.015	ASW30	15 Winter	1	+0%	30/120 Winter			
1.016	ASW31	480 Winter	1	+0%	30/120 Summer			
8.000	ASW32	15 Winter	1	+0%	100/15 Winter			
8.001	ASW33	15 Winter	1	+0%	100/15 Summer			
8.002	ASW34	15 Winter	1	+0%	100/15 Summer			
8.003	ASW35	15 Winter	1	+0%	100/15 Summer			
1.017	ASW36	480 Winter	1	+0%	30/15 Summer			
1.018	ASW37	480 Winter	1	+0%	30/240 Winter			
1.019	ASW38	480 Winter	1	+0%	1/120 Winter			
1.020	ASW39 HYDRO	480 Winter	1	+0%	1/15 Summer			
1.021	ASW40	1440 Summer	1	+0%				
9.000	ASW42	30 Winter	1	+0%	1/30 Winter			
9.001	ASW43	30 Winter	1	+0%				
9.002	ASW44	30 Winter	1	+0%	1/15 Summer			
9.003	ASW45	30 Winter	1	+0%	1/15 Summer			
1.022	ASW46	60 Winter	1	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.012	ASW19	23.902	-0.173	0.000	0.12	11.1	OK	
1.013	ASW20	22.748	-0.152	0.000	0.23	29.1	OK	
6.000	ASW22	26.640	-0.210	0.000	0.19	40.4	OK	
6.001	ASW23	24.334	-0.226	0.000	0.13	40.3	OK	
6.002	ASW24	20.410	-0.225	0.000	0.33	46.9	OK	
6.003	ASW25	20.229	-0.244	0.000	0.43	48.8	OK	
7.000	ASW26	20.731	-0.097	0.000	0.27	6.9	OK	
6.004	ASW27	20.211	-0.249	0.000	0.41	54.6	OK	
6.005	ASW28	20.049	-0.351	0.000	0.11	66.7	OK	
1.014	ASW29	18.820	-0.380	0.000	0.29	100.6	OK	
1.015	ASW30	18.732	-0.380	0.000	0.29	99.9	OK	
1.016	ASW31	18.675	-0.337	0.000	0.06	26.3	OK	
8.000	ASW32	25.474	-0.236	0.000	0.10	16.4	OK	
8.001	ASW33	24.841	-0.199	0.000	0.24	38.2	OK	
8.002	ASW34	23.843	-0.207	0.000	0.21	65.0	OK	
8.003	ASW35	20.258	-0.203	0.000	0.23	65.4	OK	

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Micro Drainage	Network 2019.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 3

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.017	ASW36	18.669	-0.118	0.000	0.15	34.4	OK	
1.018	ASW37	18.663	-0.499	0.000	0.03	34.0	OK	
1.019	ASW38	18.661	0.081	0.000	0.09	32.5	SURCHARGED	
1.020	ASW39 HYDRO	18.659	0.542	0.000	0.36	14.1	SURCHARGED	
1.021	ASW40	17.672	-0.130	0.000	0.37	14.1	OK	
9.000	ASW42	18.315	0.005	0.000	0.32	4.8	SURCHARGED	
9.001	ASW43	18.310	-0.790	0.000	0.00	4.2	OK	
9.002	ASW44	18.310	0.170	0.000	0.07	2.5	SURCHARGED	
9.003	ASW45	18.308	0.448	0.000	0.05	1.4	SURCHARGED	
1.022	ASW46	17.482	-0.110	0.000	0.52	15.5	OK	

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Micro Drainage	Network 2019.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 3

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 Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 5
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 26.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0
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) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	ASW1	15 Winter	30	+0%	100/15 Summer			
2.000	ASW2	15 Winter	30	+0%	100/15 Summer			
1.001	ASW3	15 Winter	30	+0%	100/15 Summer			
1.002	ASW4	15 Winter	30	+0%	100/15 Summer			
1.003	ASW5	15 Winter	30	+0%	100/15 Winter			
1.004	ASW6	15 Winter	30	+0%	100/15 Summer			
3.000	ASW7	15 Winter	30	+0%	30/15 Summer			
1.005	ASW8	15 Winter	30	+0%	30/15 Summer			
1.006	ASW9	15 Winter	30	+0%	30/15 Summer			
4.000	ASW10	15 Winter	30	+0%				
4.001	ASW11	15 Winter	30	+0%				
4.002	ASW12	15 Winter	30	+0%				
1.007	ASW13	15 Winter	30	+0%	30/15 Summer			
1.008	ASW14	15 Winter	30	+0%	30/15 Summer			
1.009	ASW15	15 Winter	30	+0%				
5.000	ASW18A	15 Winter	30	+0%	100/15 Summer			
5.001	ASW18B	15 Winter	30	+0%	100/15 Summer			
1.010	ASW16	15 Winter	30	+0%	100/60 Winter			
1.011	ASW17 HYDRO	360 Winter	30	+0%	1/15 Summer			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 3


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	ASW1	33.296	-0.119	0.000	0.44		26.8	OK	
2.000	ASW2	33.761	-0.104	0.000	0.56		58.8	OK	
1.001	ASW3	32.836	-0.104	0.000	0.74		95.9	OK	
1.002	ASW4	32.578	-0.092	0.000	0.79		112.5	OK	
1.003	ASW5	32.148	-0.167	0.000	0.58		188.5	OK	
1.004	ASW6	30.661	-0.204	0.000	0.42		214.9	OK	
3.000	ASW7	29.046	0.196	0.000	0.27		74.5	SURCHARGED	
1.005	ASW8	29.034	0.253	0.000	0.97		264.8	SURCHARGED	
1.006	ASW9	28.968	0.253	0.000	0.92		278.5	SURCHARGED	
4.000	ASW10	36.974	-0.151	0.000	0.23		34.5	OK	
4.001	ASW11	33.432	-0.158	0.000	0.45		97.6	OK	
4.002	ASW12	31.773	-0.187	0.000	0.50		180.9	OK	
1.007	ASW13	28.875	0.265	0.000	1.67		453.7	SURCHARGED	
1.008	ASW14	28.663	0.118	0.000	1.63		448.5	SURCHARGED	
1.009	ASW15	28.134	-0.356	0.000	0.34		466.3	OK	
5.000	ASW18A	27.349	-0.032	0.000	0.99		37.5	OK	
5.001	ASW18B	27.158	-0.059	0.000	0.88		63.0	OK	
1.010	ASW16	26.311	-0.329	0.000	0.42		518.0	OK	
1.011	ASW17 HYDRO	25.852	1.127	0.000	0.13		11.1	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 3


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.012	ASW19	1440 Winter	30	+0%				
1.013	ASW20	15 Winter	30	+0%	100/15 Summer			
6.000	ASW22	15 Winter	30	+0%				
6.001	ASW23	15 Winter	30	+0%				
6.002	ASW24	15 Winter	30	+0%	100/15 Summer			
6.003	ASW25	15 Winter	30	+0%	100/15 Summer			
7.000	ASW26	15 Winter	30	+0%	100/15 Summer			
6.004	ASW27	15 Winter	30	+0%	100/15 Summer			
6.005	ASW28	15 Winter	30	+0%	100/15 Winter			
1.014	ASW29	1440 Winter	30	+0%	30/120 Winter			
1.015	ASW30	1440 Winter	30	+0%	30/120 Winter			
1.016	ASW31	1440 Winter	30	+0%	30/120 Summer			
8.000	ASW32	15 Winter	30	+0%	100/15 Winter			
8.001	ASW33	15 Winter	30	+0%	100/15 Summer			
8.002	ASW34	15 Winter	30	+0%	100/15 Summer			
8.003	ASW35	15 Winter	30	+0%	100/15 Summer			
1.017	ASW36	1440 Winter	30	+0%	30/15 Summer			
1.018	ASW37	1440 Winter	30	+0%	30/240 Winter			
1.019	ASW38	1440 Winter	30	+0%	1/120 Winter			
1.020	ASW39 HYDRO	1440 Winter	30	+0%	1/15 Summer			
1.021	ASW40	1440 Summer	30	+0%				
9.000	ASW42	60 Winter	30	+0%	1/30 Winter			
9.001	ASW43	60 Winter	30	+0%				
9.002	ASW44	60 Winter	30	+0%	1/15 Summer			
9.003	ASW45	60 Winter	30	+0%	1/15 Summer			
1.022	ASW46	30 Winter	30	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.012	ASW19	23.902	-0.173	0.000	0.12	11.1	OK	
1.013	ASW20	22.801	-0.099	0.000	0.60	75.9	OK	
6.000	ASW22	26.698	-0.152	0.000	0.47	99.0	OK	
6.001	ASW23	24.380	-0.180	0.000	0.33	98.5	OK	
6.002	ASW24	20.576	-0.059	0.000	0.82	114.8	OK	
6.003	ASW25	20.473	0.000	0.000	1.01	114.5	OK	
7.000	ASW26	20.768	-0.060	0.000	0.66	16.9	OK	
6.004	ASW27	20.363	-0.097	0.000	0.97	129.7	OK	
6.005	ASW28	20.109	-0.291	0.000	0.26	163.4	OK	
1.014	ASW29	19.290	0.090	0.000	0.06	22.4	SURCHARGED	
1.015	ASW30	19.288	0.176	0.000	0.06	22.4	SURCHARGED	
1.016	ASW31	19.286	0.274	0.000	0.06	23.5	SURCHARGED	
8.000	ASW32	25.511	-0.199	0.000	0.25	40.0	OK	
8.001	ASW33	24.924	-0.116	0.000	0.68	108.0	OK	
8.002	ASW34	23.919	-0.131	0.000	0.60	190.6	OK	
8.003	ASW35	20.340	-0.121	0.000	0.66	189.9	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 3

PN	US/MH Name	Water		Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status		
1.017	ASW36	19.283	0.496	0.000	0.14	31.1			SURCHARGED	
1.018	ASW37	19.282	0.120	0.000	0.02	31.1			SURCHARGED	
1.019	ASW38	19.281	0.701	0.000	0.09	31.1			SURCHARGED	
1.020	ASW39 HYDRO	19.279	1.162	0.000	0.36	14.1			SURCHARGED	
1.021	ASW40	17.672	-0.130	0.000	0.37	14.1			OK	
9.000	ASW42	18.630	0.320	0.000	0.49	7.4			FLOOD RISK	
9.001	ASW43	18.624	-0.476	0.000	0.00	7.0			OK	
9.002	ASW44	18.624	0.484	0.000	0.06	2.1			SURCHARGED	
9.003	ASW45	18.621	0.761	0.000	0.06	1.8			FLOOD RISK	
1.022	ASW46	17.483	-0.109	0.000	0.53	15.7			OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 5
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 26.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0
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) 1, 30, 100
Climate Change (%) 0, 0, 40

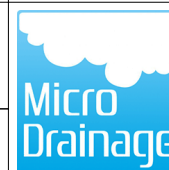
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	ASW1	15 Winter	100	+40%	100/15	Summer		
2.000	ASW2	15 Winter	100	+40%	100/15	Summer		
1.001	ASW3	15 Winter	100	+40%	100/15	Summer		
1.002	ASW4	15 Winter	100	+40%	100/15	Summer		
1.003	ASW5	15 Winter	100	+40%	100/15	Winter		
1.004	ASW6	15 Winter	100	+40%	100/15	Summer		
3.000	ASW7	15 Winter	100	+40%	30/15	Summer		
1.005	ASW8	15 Winter	100	+40%	30/15	Summer		
1.006	ASW9	15 Winter	100	+40%	30/15	Summer		
4.000	ASW10	15 Winter	100	+40%				
4.001	ASW11	15 Winter	100	+40%				
4.002	ASW12	15 Winter	100	+40%				
1.007	ASW13	15 Winter	100	+40%	30/15	Summer		
1.008	ASW14	15 Winter	100	+40%	30/15	Summer		
1.009	ASW15	480 Winter	100	+40%				
5.000	ASW18A	480 Winter	100	+40%	100/15	Summer		
5.001	ASW18B	480 Winter	100	+40%	100/15	Summer		
1.010	ASW16	480 Winter	100	+40%	100/60	Winter		
1.011	ASW17 HYDRO	480 Winter	100	+40%	1/15	Summer		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	ASW1	33.671	0.256	0.000	0.75	45.5	SURCHARGED	
2.000	ASW2	34.230	0.365	0.000	0.95	100.1	SURCHARGED	
1.001	ASW3	33.417	0.477	0.000	1.23	159.9	SURCHARGED	
1.002	ASW4	33.026	0.356	0.000	1.31	185.2	SURCHARGED	
1.003	ASW5	32.450	0.135	0.000	0.96	312.3	SURCHARGED	
1.004	ASW6	31.404	0.539	0.000	0.65	334.0	SURCHARGED	
3.000	ASW7	30.711	1.861	0.000	0.57	156.5	FLOOD RISK	
1.005	ASW8	30.671	1.890	0.000	1.90	516.9	SURCHARGED	
1.006	ASW9	30.403	1.688	0.000	1.83	554.1	SURCHARGED	
4.000	ASW10	37.003	-0.122	0.000	0.43	63.3	OK	
4.001	ASW11	33.501	-0.089	0.000	0.83	179.0	OK	
4.002	ASW12	31.867	-0.093	0.000	0.91	331.7	OK	
1.007	ASW13	30.062	1.452	0.000	3.23	875.9	SURCHARGED	
1.008	ASW14	29.241	0.696	0.000	3.19	874.7	SURCHARGED	
1.009	ASW15	28.360	-0.130	0.000	0.09	119.4	OK	
5.000	ASW18A	28.362	0.981	0.000	0.19	7.2	FLOOD RISK	
5.001	ASW18B	28.360	1.143	0.000	0.17	12.0	FLOOD RISK	
1.010	ASW16	28.357	1.717	0.000	0.11	131.3	SURCHARGED	
1.011	ASW17 HYDRO	28.354	3.629	0.000	0.18	15.3	FLOOD RISK	


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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3


PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.012	ASW19	480 Winter	100	+40%				
1.013	ASW20	15 Winter	100	+40%	100/15 Summer			
6.000	ASW22	15 Winter	100	+40%				
6.001	ASW23	15 Winter	100	+40%				
6.002	ASW24	15 Winter	100	+40%	100/15 Summer			
6.003	ASW25	15 Winter	100	+40%	100/15 Summer			
7.000	ASW26	15 Winter	100	+40%	100/15 Summer			
6.004	ASW27	15 Winter	100	+40%	100/15 Summer			
6.005	ASW28	15 Winter	100	+40%	100/15 Winter			
1.014	ASW29	15 Winter	100	+40%	30/120 Winter			
1.015	ASW30	15 Winter	100	+40%	30/120 Winter			
1.016	ASW31	960 Winter	100	+40%	30/120 Summer			
8.000	ASW32	15 Winter	100	+40%	100/15 Winter			
8.001	ASW33	15 Winter	100	+40%	100/15 Summer			
8.002	ASW34	15 Winter	100	+40%	100/15 Summer			
8.003	ASW35	15 Winter	100	+40%	100/15 Summer			
1.017	ASW36	960 Winter	100	+40%	30/15 Summer			
1.018	ASW37	960 Winter	100	+40%	30/240 Winter			
1.019	ASW38	960 Winter	100	+40%	1/120 Winter			
1.020	ASW39 HYDRO	960 Winter	100	+40%	1/15 Summer			
1.021	ASW40	960 Winter	100	+40%				
9.000	ASW42	60 Winter	100	+40%	1/30 Winter			
9.001	ASW43	60 Winter	100	+40%				
9.002	ASW44	60 Winter	100	+40%	1/15 Summer			
9.003	ASW45	60 Winter	100	+40%	1/15 Summer			
1.022	ASW46	360 Winter	100	+40%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.012	ASW19	23.912	-0.163	0.000	0.17		15.3	OK	
1.013	ASW20	23.135	0.235	0.000	0.97		123.1	SURCHARGED	
6.000	ASW22	26.771	-0.079	0.000	0.87		181.6	OK	
6.001	ASW23	24.431	-0.129	0.000	0.60		180.6	OK	
6.002	ASW24	21.139	0.504	0.000	1.53		213.8	SURCHARGED	
6.003	ASW25	20.901	0.428	0.000	1.97		224.0	SURCHARGED	
7.000	ASW26	21.067	0.239	0.000	1.11		28.7	SURCHARGED	
6.004	ASW27	20.800	0.341	0.000	1.84		246.2	SURCHARGED	
6.005	ASW28	20.660	0.260	0.000	0.45		279.5	SURCHARGED	
1.014	ASW29	20.292	1.092	0.000	1.28		443.8	SURCHARGED	
1.015	ASW30	20.123	1.011	0.000	1.27		439.9	FLOOD RISK	
1.016	ASW31	20.005	0.993	0.000	0.10		42.6	FLOOD RISK	
8.000	ASW32	25.761	0.051	0.000	0.44		70.8	SURCHARGED	
8.001	ASW33	25.554	0.514	0.000	1.11		176.4	SURCHARGED	
8.002	ASW34	24.333	0.283	0.000	0.98		308.2	SURCHARGED	
8.003	ASW35	21.264	0.803	0.000	1.05		303.8	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

















PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.017	ASW36	20.001	1.214	0.000	0.28	62.2	FLOOD RISK	
1.018	ASW37	19.999	0.837	0.000	0.05	62.2	FLOOD RISK	
1.019	ASW38	19.999	1.419	0.000	0.18	62.3	FLOOD RISK	
1.020	ASW39 HYDRO	19.996	1.879	0.000	0.38	14.8	FLOOD RISK	
1.021	ASW40	17.674	-0.128	0.000	0.39	14.8	OK	
9.000	ASW42	18.975	0.665	0.000	0.92	14.0	FLOOD RISK	
9.001	ASW43	18.967	-0.133	0.000	0.00	13.3	FLOOD RISK	
9.002	ASW44	18.967	0.827	0.000	0.08	2.5	FLOOD RISK	
9.003	ASW45	18.964	1.104	0.000	0.07	2.1	FLOOD RISK	
1.022	ASW46	17.484	-0.108	0.000	0.53	15.9	OK	

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STORM SEWER DESIGN by the Modified Rational Method


Network Design Table for Surface Network 5

« - 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
1.000	45.368	1.900	23.9	0.095	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	32.807	1.275	25.7	0.045	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	26.190	1.120	23.4	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	28.216	0.985	28.6	0.063	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	15.510	0.330	47.0	0.080	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	22.822	0.535	42.7	0.094	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.005	25.592	0.800	32.0	0.061	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.006	27.974	0.060	466.2	0.019	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.007	20.311	0.044	461.6	0.076	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	18.222	0.039	467.2	0.022	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.009	15.256	0.033	462.3	0.045	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.010	9.050	0.019	476.3	0.070	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.011	35.597	0.077	462.3	0.063	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.012	19.644	0.042	467.7	0.114	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.013	18.802	0.045	417.8	0.096	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	13.703	0.740	18.5	0.020	5.00	0.0	0.600	o	150	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)
1.000	50.00	5.28	34.540	0.095	0.0	0.0	0.0	2.69	106.9	12.9
1.001	50.00	5.49	32.640	0.140	0.0	0.0	0.0	2.59	103.0	19.0
1.002	50.00	5.63	31.290	0.199	0.0	0.0	0.0	3.27	230.8	26.9
2.000	50.00	5.25	31.305	0.063	0.0	0.0	0.0	1.89	33.4	8.5
1.003	50.00	5.71	30.020	0.342	0.0	0.0	0.0	2.97	472.6	46.3
1.004	50.00	5.83	29.690	0.436	0.0	0.0	0.0	3.12	496.2	59.0
1.005	50.00	5.93	29.005	0.497	0.0	0.0	0.0	4.32	1220.3	67.3
1.006	50.00	6.35	28.204	0.516	0.0	0.0	0.0	1.12	317.0	69.9
1.007	50.00	6.65	28.144	0.592	0.0	0.0	0.0	1.13	318.6	80.2
1.008	50.00	6.92	28.100	0.614	0.0	0.0	0.0	1.12	316.7	83.1
1.009	50.00	7.15	28.061	0.659	0.0	0.0	0.0	1.13	318.4	89.2
1.010	50.00	7.28	28.028	0.729	0.0	0.0	0.0	1.11	313.6	98.7
1.011	50.00	7.81	28.009	0.792	0.0	0.0	0.0	1.13	318.4	107.2
1.012	50.00	8.10	27.932	0.906	0.0	0.0	0.0	1.12	316.5	122.7
1.013	50.00	8.37	27.890	1.002	0.0	0.0	0.0	1.19	335.1	135.7
3.000	50.00	5.10	31.260	0.020	0.0	0.0	0.0	2.35	41.6	2.7

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 5

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
3.001	10.587	0.700	15.1	0.100	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.002	31.458	1.600	19.7	0.042	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.014	45.807	1.246	36.8	0.105	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.015	14.069	0.042	335.0	0.074	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	40.216	0.113	355.9	0.098	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.017	26.624	0.059	451.2	0.084	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.018	30.390	0.325	93.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.019	33.214	3.321	10.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.020	11.310	1.131	10.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	12.315	0.590	20.9	0.032	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	8.689	0.360	24.1	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	16.186	0.995	16.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.003	41.105	2.750	14.9	0.044	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	41.913	0.170	246.9	0.104	5.00	0.0	0.600	o	450	Pipe/Conduit	
5.001	24.046	0.060	400.0	0.064	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.004	8.360	0.021	398.1	0.111	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.005	27.153	0.068	400.0	0.077	0.00	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)
3.001	50.00	5.15	30.520	0.120	0.0	0.0	0.0	3.38	134.5	16.2
3.002	50.00	5.33	29.820	0.162	0.0	0.0	0.0	2.96	117.9	21.9
1.014	50.00	8.56	27.845	1.269	0.0	0.0	0.0	4.03	1138.1	171.8
1.015	50.00	8.73	26.599	1.343	0.0	0.0	0.0	1.32	374.6	181.9
1.016	50.00	9.26	26.557	1.441	0.0	0.0	0.0	1.29	363.3	195.1
1.017	50.00	9.64	26.444	1.525	0.0	0.0	0.0	1.14	322.3	206.5
1.018	50.00	9.85	26.385	1.525	0.0	0.0	0.0	2.52	712.2	206.5
1.019	50.00	9.92	26.060	1.525	0.0	0.0	0.0	7.73	2185.5	206.5
1.020	50.00	9.94	22.739	1.525	0.0	0.0	0.0	7.73	2185.5	206.5
4.000	50.00	5.09	34.790	0.032	0.0	0.0	0.0	2.21	39.1	4.3
4.001	50.00	5.16	34.200	0.032	0.0	0.0	0.0	2.06	36.4	4.3
4.002	50.00	5.27	33.840	0.032	0.0	0.0	0.0	2.51	44.4	4.3
4.003	50.00	5.47	32.770	0.076	0.0	0.0	0.0	3.40	135.3	10.3
5.000	50.00	5.54	29.960	0.104	0.0	0.0	0.0	1.29	205.1	14.1
5.001	50.00	5.94	29.790	0.168	0.0	0.0	0.0	1.01	160.7	22.7
4.004	50.00	6.08	29.730	0.355	0.0	0.0	0.0	1.01	161.1	48.1
4.005	50.00	6.52	29.709	0.432	0.0	0.0	0.0	1.01	160.7	58.5

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 5

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
4.006	16.777	0.042	400.0	0.032	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
6.000	35.234	0.465	75.8	0.118	5.00	0.0	0.600	o	450	Pipe/Conduit		🔴
4.007	7.946	0.020	400.0	0.048	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
4.008	19.497	0.049	400.0	0.057	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
4.009	32.527	0.081	400.0	0.252	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
4.010	21.473	0.054	400.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
4.011	56.841	0.161	353.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
4.012	23.950	0.411	58.3	0.045	0.00	0.0	0.600	o	600	Pipe/Conduit		🔴
7.000	18.792	0.665	28.3	0.035	5.00	0.0	0.600	o	150	Pipe/Conduit		🔴
7.001	26.643	1.350	19.7	0.042	0.00	0.0	0.600	o	225	Pipe/Conduit		🔴
7.002	23.122	1.041	22.2	0.050	0.00	0.0	0.600	o	225	Pipe/Conduit		🔴
7.003	20.136	0.534	37.7	0.052	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
7.004	15.242	0.090	169.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
7.005	42.103	0.105	401.0	0.028	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
7.006	21.209	0.053	400.2	0.072	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
7.007	25.087	0.063	398.2	0.053	0.00	0.0	0.600	o	450	Pipe/Conduit		🔴
7.008	26.075	0.065	401.1	0.000	0.00	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)
4.006	50.00	6.80	29.641	0.464	0.0	0.0	0.0	1.01	160.7	62.8
6.000	50.00	5.25	30.129	0.118	0.0	0.0	0.0	2.34	371.7	16.0
4.007	50.00	6.93	29.599	0.630	0.0	0.0	0.0	1.01	160.7	85.3
4.008	50.00	7.25	29.579	0.687	0.0	0.0	0.0	1.01	160.7	93.0
4.009	50.00	7.79	29.531	0.939	0.0	0.0	0.0	1.01	160.7	127.2
4.010	50.00	8.14	29.449	0.939	0.0	0.0	0.0	1.01	160.7	127.2
4.011	50.00	9.02	29.396	0.939	0.0	0.0	0.0	1.08	171.2	127.2
4.012	50.00	9.15	29.085	0.984	0.0	0.0	0.0	3.19	903.2	133.2
7.000	50.00	5.16	33.090	0.035	0.0	0.0	0.0	1.90	33.6	4.7
7.001	50.00	5.31	32.350	0.077	0.0	0.0	0.0	2.96	117.7	10.4
7.002	50.00	5.45	31.000	0.127	0.0	0.0	0.0	2.79	110.9	17.2
7.003	50.00	5.55	29.734	0.179	0.0	0.0	0.0	3.32	527.9	24.2
7.004	50.00	5.72	29.200	0.179	0.0	0.0	0.0	1.56	248.0	24.2
7.005	50.00	6.41	29.110	0.207	0.0	0.0	0.0	1.01	160.5	28.0
7.006	50.00	6.76	29.005	0.279	0.0	0.0	0.0	1.01	160.7	37.8
7.007	50.00	7.18	28.952	0.332	0.0	0.0	0.0	1.01	161.1	45.0
7.008	50.00	7.61	28.889	0.332	0.0	0.0	0.0	1.01	160.5	45.0

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 5

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
4.013	30.270	0.076	398.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit		
4.014	22.404	0.112	200.0	0.023	0.00	0.0	0.600	o	600	Pipe/Conduit		
4.015	16.728	0.084	199.1	0.066	0.00	0.0	0.600	o	600	Pipe/Conduit		
4.016	39.249	1.742	22.5	0.089	0.00	0.0	0.600	o	600	Pipe/Conduit		
4.017	31.461	3.146	10.0	0.075	0.00	0.0	0.600	o	600	Pipe/Conduit		
4.018	20.739	2.074	10.0	0.128	0.00	0.0	0.600	o	600	Pipe/Conduit		
1.021	18.316	1.831	10.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit		
1.022	62.153	0.091	683.0	0.000	0.00	0.0	0.600	o	1000	Pipe/Conduit		
1.023	25.722	3.680	7.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		

Network Results Table

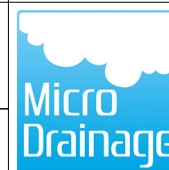
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.013	50.00	9.56	28.674	1.316	0.0	0.0	0.0	1.21	343.3	178.2
4.014	50.00	9.78	28.598	1.339	0.0	0.0	0.0	1.72	485.8	181.3
4.015	50.00	9.94	28.486	1.405	0.0	0.0	0.0	1.72	486.9	190.3
4.016	50.00	10.07	28.402	1.494	0.0	0.0	0.0	5.15	1454.7	202.3
4.017	50.00	10.14	26.660	1.569	0.0	0.0	0.0	7.73	2185.5	212.5
4.018	50.00	10.18	23.514	1.697	0.0	0.0	0.0	7.73	2185.5	229.8
1.021	50.00	10.22	20.181	3.222	0.0	0.0	0.0	7.73	2185.1	436.3
1.022	50.00	11.04	18.350	3.222	0.0	0.0	0.0	1.27	998.9	436.3
1.023	50.00	11.11	16.700	3.222	0.0	0.0	0.0	5.98	422.9«	436.3

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Manhole Schedules for Surface Network 5

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out		Pipes In			Backdrop (mm)
						Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
SW1	36.083	1.543	Open Manhole	1200	1.000	34.540	225				
SW2	34.205	1.565	Open Manhole	1200	1.001	32.640	225	1.000	32.640	225	
SW3	32.821	1.531	Open Manhole	1200	1.002	31.290	300	1.001	31.365	225	
SW4	33.112	1.807	Open Manhole	1200	2.000	31.305	150				
SW5	31.772	1.752	Open Manhole	1240 x 900	1.003	30.020	450	1.002	30.170	300	
								2.000	30.320	150	
SW6	31.417	1.727	Open Manhole	1240 x 900	1.004	29.690	450	1.003	29.690	450	
SW7	30.963	1.958	Open Manhole	1240 x 975	1.005	29.005	600	1.004	29.155	450	
SW8	30.469	2.265	Open Manhole	1240 x 975	1.006	28.204	600	1.005	28.205	600	1
SW9	30.228	2.084	Open Manhole	1240 x 975	1.007	28.144	600	1.006	28.144	600	
SW10	30.076	1.976	Open Manhole	1240 x 975	1.008	28.100	600	1.007	28.100	600	
SW11	29.927	1.866	Open Manhole	1240 x 975	1.009	28.061	600	1.008	28.061	600	
SW12	30.114	2.086	Open Manhole	1500	1.010	28.028	600	1.009	28.028	600	
SW13	30.322	2.313	Open Manhole	1500	1.011	28.009	600	1.010	28.009	600	
SW14	31.079	3.147	Open Manhole	1500	1.012	27.932	600	1.011	27.932	600	
SW15	31.488	3.598	Open Manhole	1500	1.013	27.890	600	1.012	27.890	600	
SW16	32.995	1.735	Open Manhole	1200	3.000	31.260	150				
SW17	32.696	2.176	Open Manhole	1200	3.001	30.520	225	3.000	30.520	150	
SW18	32.470	2.650	Open Manhole	1200	3.002	29.820	225	3.001	29.820	225	
SW19	31.824	3.979	Open Manhole	1500	1.014	27.845	600	1.013	27.845	600	
								3.002	28.220	225	
SW20	29.131	2.532	Open Manhole	1500	1.015	26.599	600	1.014	26.599	600	
SW21	29.461	2.904	Open Manhole	1500	1.016	26.557	600	1.015	26.557	600	
SW22	30.346	3.902	Open Manhole	1500	1.017	26.444	600	1.016	26.444	600	
SW23	28.750	2.365	Open Manhole	1500	1.018	26.385	600	1.017	26.385	600	
SW24	28.448	2.388	Open Manhole	1500	1.019	26.060	600	1.018	26.060	600	
SW25	25.500	2.761	Open Manhole	1500	1.020	22.739	600	1.019	22.739	600	
SW27	36.435	1.645	Open Manhole	1200	4.000	34.790	150				
SW28	35.736	1.536	Open Manhole	1200	4.001	34.200	150	4.000	34.200	150	
SW29	35.211	1.371	Open Manhole	1200	4.002	33.840	150	4.001	33.840	150	
SW30	34.310	1.540	Open Manhole	1200	4.003	32.770	225	4.002	32.845	150	
SW31	32.021	2.061	Open Manhole	1350	5.000	29.960	450				
SW32	32.686	2.896	Open Manhole	1350	5.001	29.790	450	5.000	29.790	450	
SW33	32.774	3.044	Open Manhole	1350	4.004	29.730	450	4.003	30.020	225	65
								5.001	29.730	450	
SW34	32.527	2.818	Open Manhole	1350	4.005	29.709	450	4.004	29.709	450	
SW35	32.486	2.845	Open Manhole	1350	4.006	29.641	450	4.005	29.641	450	
SW36	33.405	3.276	Open Manhole	1350	6.000	30.129	450				


















Manhole Schedules for Surface Network 5
















MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out		Pipes In			Backdrop (mm)	
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)		Diameter (mm)
SW37	32.675	3.075	Open Manhole	1350	4.007	29.599	450	4.006	29.599	450	65
								6.000	29.664	450	
SW39	32.623	3.044	Open Manhole	1350	4.008	29.579	450	4.007	29.579	450	
SW40	32.566	3.036	Open Manhole	1350	4.009	29.531	450	4.008	29.531	450	
SW41	32.682	3.233	Open Manhole	1350	4.010	29.449	450	4.009	29.449	450	
SW42	32.500	3.104	Open Manhole	1350	4.011	29.396	450	4.010	29.396	450	
SW43	33.293	4.208	Open Manhole	1500	4.012	29.085	600	4.011	29.235	450	
SW44	34.928	1.838	Open Manhole	1200	7.000	33.090	150				
SW45	34.372	2.022	Open Manhole	1200	7.001	32.350	225	7.000	32.425	150	
SW46	33.086	2.086	Open Manhole	1200	7.002	31.000	225	7.001	31.000	225	
SW47	31.948	2.214	Open Manhole	1350	7.003	29.734	450	7.002	29.959	225	
SW48	31.065	1.865	Open Manhole	1240 x 900	7.004	29.200	450	7.003	29.200	450	
SW49	30.892	1.782	Open Manhole	1240 x 900	7.005	29.110	450	7.004	29.110	450	
SW50	31.317	2.312	Open Manhole	1350	7.006	29.005	450	7.005	29.005	450	
SW51	31.500	2.548	Open Manhole	1350	7.007	28.952	450	7.006	28.952	450	
SW52	33.200	4.311	Open Manhole	1350	7.008	28.889	450	7.007	28.889	450	
SW53	34.300	5.626	Open Manhole	1500	4.013	28.674	600	4.012	28.674	600	
								7.008	28.824	450	
SW54	32.956	4.358	Open Manhole	1500	4.014	28.598	600	4.013	28.598	600	
SW55	32.224	3.738	Open Manhole	1500	4.015	28.486	600	4.014	28.486	600	
SW56	31.487	3.085	Open Manhole	1500	4.016	28.402	600	4.015	28.402	600	
SW57	28.467	1.807	Open Manhole	1500	4.017	26.660	600	4.016	26.660	600	
SW58	25.250	1.736	Open Manhole	1240 x 1050	4.018	23.514	600	4.017	23.514	600	
SW60	25.000	4.819	Open Manhole	1500	1.021	20.181	600	1.020	21.608	600	1427
								4.018	21.440	600	1259
SW61	19.800	1.450	Open Manhole	900 x 1050	1.022	18.350	1000	1.021	18.350	600	
SW64	19.800	3.100	Open Manhole	900 x 1050	1.023	16.700	300	1.022	18.259	1000	2259
SW65	14.000	0.980	Open Manhole	900 x 750		OUTFALL		1.023	13.020	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW1	611552.295	165125.549	611552.295	165125.549	Required	
SW2	611516.932	165097.128	611516.932	165097.128	Required	

Manhole Schedules for Surface Network 5

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW3	611485.397	165088.084	611485.397	165088.084	Required	
SW4	611460.376	165072.786	611460.376	165072.786	Required	
SW5	611462.566	165100.916	611462.566	165100.916	Required	
SW6	611458.530	165115.892	611458.530	165115.892	Required	
SW7	611449.484	165136.845	611449.484	165136.845	Required	
SW8	611434.531	165157.614	611434.531	165157.614	Required	
SW9	611451.751	165179.659	611451.751	165179.659	Required	
SW10	611459.477	165198.443	611459.477	165198.443	Required	
SW11	611456.014	165216.333	611456.014	165216.333	Required	
SW12	611448.838	165229.796	611448.838	165229.796	Required	
SW13	611448.561	165238.842	611448.561	165238.842	Required	
SW14	611462.222	165271.713	611462.222	165271.713	Required	
SW15	611472.614	165288.383	611472.614	165288.383	Required	
SW16	611491.725	165357.841	611491.725	165357.841	Required	
SW17	611494.250	165344.373	611494.250	165344.373	Required	

Manhole Schedules for Surface Network 5

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW18	611491.922	165334.045	611491.922	165334.045	Required	
SW19	611476.089	165306.861	611476.089	165306.861	Required	
SW20	611434.941	165326.989	611434.941	165326.989	Required	
SW21	611433.131	165340.941	611433.131	165340.941	Required	
SW22	611450.490	165377.218	611450.490	165377.218	Required	
SW23	611427.277	165390.256	611427.277	165390.256	Required	
SW24	611440.421	165417.657	611440.421	165417.657	Required	
SW25	611412.837	165436.158	611412.837	165436.158	Required	
SW27	611590.919	165169.789	611590.919	165169.789	Required	
SW28	611586.207	165181.167	611586.207	165181.167	Required	
SW29	611580.878	165188.030	611580.878	165188.030	Required	
SW30	611565.887	165194.136	611565.887	165194.136	Required	
SW31	611493.336	165142.260	611493.336	165142.260	Required	
SW32	611525.277	165169.399	611525.277	165169.399	Required	
SW33	611524.788	165193.440	611524.788	165193.440	Required	

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Micro Drainage

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Manhole Schedules for Surface Network 5

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW34	611522.308	165201.423	611522.308	165201.423	Required	
SW35	611524.515	165228.487	611524.515	165228.487	Required	
SW36	611558.842	165245.531	611558.842	165245.531	Required	
SW37	611523.609	165245.240	611523.609	165245.240	Required	
SW39	611518.677	165251.470	611518.677	165251.470	Required	
SW40	611520.559	165270.877	611520.559	165270.877	Required	
SW41	611538.308	165298.134	611538.308	165298.134	Required	
SW42	611554.052	165312.736	611554.052	165312.736	Required	
SW43	611517.766	165356.488	611517.766	165356.488	Required	
SW44	611601.738	165219.534	611601.738	165219.534	Required	
SW45	611603.945	165238.196	611603.945	165238.196	Required	
SW46	611604.008	165264.839	611604.008	165264.839	Required	
SW47	611610.628	165286.993	611610.628	165286.993	Required	
SW48	611616.976	165306.102	611616.976	165306.102	Required	
SW49	611611.402	165320.288	611611.402	165320.288	Required	

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Manhole Schedules for Surface Network 5

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW50	611575.834	165342.817	611575.834	165342.817	Required	
SW51	611561.288	165358.253	611561.288	165358.253	Required	
SW52	611540.309	165372.009	611540.309	165372.009	Required	
SW53	611515.601	165380.340	611515.601	165380.340	Required	
SW54	611485.450	165383.018	611485.450	165383.018	Required	
SW55	611485.242	165405.422	611485.242	165405.422	Required	
SW56	611478.285	165420.634	611478.285	165420.634	Required	
SW57	611450.996	165448.845	611450.996	165448.845	Required	
SW58	611423.700	165464.488	611423.700	165464.488	Required	
SW60	611411.906	165447.429	611411.906	165447.429	Required	
SW61	611394.163	165451.977	611394.163	165451.977	Required	
SW64	611397.172	165514.057	611397.172	165514.057	Required	
SW65	611377.350	165530.448			No Entry	


PIPELINE SCHEDULES for Surface Network 5

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)
1.000	o	225	SW1	36.083	34.540	1.318	Open Manhole	1200
1.001	o	225	SW2	34.205	32.640	1.340	Open Manhole	1200
1.002	o	300	SW3	32.821	31.290	1.231	Open Manhole	1200
2.000	o	150	SW4	33.112	31.305	1.657	Open Manhole	1200
1.003	o	450	SW5	31.772	30.020	1.302	Open Manhole	1240 x 900
1.004	o	450	SW6	31.417	29.690	1.277	Open Manhole	1240 x 900
1.005	o	600	SW7	30.963	29.005	1.358	Open Manhole	1240 x 975
1.006	o	600	SW8	30.469	28.204	1.665	Open Manhole	1240 x 975
1.007	o	600	SW9	30.228	28.144	1.484	Open Manhole	1240 x 975
1.008	o	600	SW10	30.076	28.100	1.376	Open Manhole	1240 x 975
1.009	o	600	SW11	29.927	28.061	1.266	Open Manhole	1240 x 975
1.010	o	600	SW12	30.114	28.028	1.486	Open Manhole	1500
1.011	o	600	SW13	30.322	28.009	1.713	Open Manhole	1500
1.012	o	600	SW14	31.079	27.932	2.547	Open Manhole	1500
1.013	o	600	SW15	31.488	27.890	2.998	Open Manhole	1500
3.000	o	150	SW16	32.995	31.260	1.585	Open Manhole	1200
3.001	o	225	SW17	32.696	30.520	1.951	Open Manhole	1200
3.002	o	225	SW18	32.470	29.820	2.425	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)
1.000	45.368	23.9	SW2	34.205	32.640	1.340	Open Manhole	1200
1.001	32.807	25.7	SW3	32.821	31.365	1.231	Open Manhole	1200
1.002	26.190	23.4	SW5	31.772	30.170	1.302	Open Manhole	1240 x 900
2.000	28.216	28.6	SW5	31.772	30.320	1.302	Open Manhole	1240 x 900
1.003	15.510	47.0	SW6	31.417	29.690	1.277	Open Manhole	1240 x 900
1.004	22.822	42.7	SW7	30.963	29.155	1.358	Open Manhole	1240 x 975
1.005	25.592	32.0	SW8	30.469	28.205	1.664	Open Manhole	1240 x 975
1.006	27.974	466.2	SW9	30.228	28.144	1.484	Open Manhole	1240 x 975
1.007	20.311	461.6	SW10	30.076	28.100	1.376	Open Manhole	1240 x 975
1.008	18.222	467.2	SW11	29.927	28.061	1.266	Open Manhole	1240 x 975
1.009	15.256	462.3	SW12	30.114	28.028	1.486	Open Manhole	1500
1.010	9.050	476.3	SW13	30.322	28.009	1.713	Open Manhole	1500
1.011	35.597	462.3	SW14	31.079	27.932	2.547	Open Manhole	1500
1.012	19.644	467.7	SW15	31.488	27.890	2.998	Open Manhole	1500
1.013	18.802	417.8	SW19	31.824	27.845	3.379	Open Manhole	1500
3.000	13.703	18.5	SW17	32.696	30.520	2.026	Open Manhole	1200
3.001	10.587	15.1	SW18	32.470	29.820	2.425	Open Manhole	1200
3.002	31.458	19.7	SW19	31.824	28.220	3.379	Open Manhole	1500

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PIPELINE SCHEDULES for Surface Network 5

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)
1.014	o	600	SW19	31.824	27.845	3.379	Open Manhole	1500
1.015	o	600	SW20	29.131	26.599	1.932	Open Manhole	1500
1.016	o	600	SW21	29.461	26.557	2.304	Open Manhole	1500
1.017	o	600	SW22	30.346	26.444	3.302	Open Manhole	1500
1.018	o	600	SW23	28.750	26.385	1.765	Open Manhole	1500
1.019	o	600	SW24	28.448	26.060	1.788	Open Manhole	1500
1.020	o	600	SW25	25.500	22.739	2.161	Open Manhole	1500
4.000	o	150	SW27	36.435	34.790	1.495	Open Manhole	1200
4.001	o	150	SW28	35.736	34.200	1.386	Open Manhole	1200
4.002	o	150	SW29	35.211	33.840	1.221	Open Manhole	1200
4.003	o	225	SW30	34.310	32.770	1.315	Open Manhole	1200
5.000	o	450	SW31	32.021	29.960	1.611	Open Manhole	1350
5.001	o	450	SW32	32.686	29.790	2.446	Open Manhole	1350
4.004	o	450	SW33	32.774	29.730	2.594	Open Manhole	1350
4.005	o	450	SW34	32.527	29.709	2.368	Open Manhole	1350
4.006	o	450	SW35	32.486	29.641	2.395	Open Manhole	1350

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)
1.014	45.807	36.8	SW20	29.131	26.599	1.932	Open Manhole	1500
1.015	14.069	335.0	SW21	29.461	26.557	2.304	Open Manhole	1500
1.016	40.216	355.9	SW22	30.346	26.444	3.302	Open Manhole	1500
1.017	26.624	451.2	SW23	28.750	26.385	1.765	Open Manhole	1500
1.018	30.390	93.5	SW24	28.448	26.060	1.788	Open Manhole	1500
1.019	33.214	10.0	SW25	25.500	22.739	2.161	Open Manhole	1500
1.020	11.310	10.0	SW60	25.000	21.608	2.792	Open Manhole	1500
4.000	12.315	20.9	SW28	35.736	34.200	1.386	Open Manhole	1200
4.001	8.689	24.1	SW29	35.211	33.840	1.221	Open Manhole	1200
4.002	16.186	16.3	SW30	34.310	32.845	1.315	Open Manhole	1200
4.003	41.105	14.9	SW33	32.774	30.020	2.529	Open Manhole	1350
5.000	41.913	246.9	SW32	32.686	29.790	2.446	Open Manhole	1350
5.001	24.046	400.0	SW33	32.774	29.730	2.594	Open Manhole	1350
4.004	8.360	398.1	SW34	32.527	29.709	2.368	Open Manhole	1350
4.005	27.153	400.0	SW35	32.486	29.641	2.395	Open Manhole	1350
4.006	16.777	400.0	SW37	32.675	29.599	2.625	Open Manhole	1350

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PIPELINE SCHEDULES for Surface Network 5

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)
6.000	o	450	SW36	33.405	30.129	2.826	Open Manhole	1350
4.007	o	450	SW37	32.675	29.599	2.625	Open Manhole	1350
4.008	o	450	SW39	32.623	29.579	2.594	Open Manhole	1350
4.009	o	450	SW40	32.566	29.531	2.586	Open Manhole	1350
4.010	o	450	SW41	32.682	29.449	2.783	Open Manhole	1350
4.011	o	450	SW42	32.500	29.396	2.654	Open Manhole	1350
4.012	o	600	SW43	33.293	29.085	3.608	Open Manhole	1500
7.000	o	150	SW44	34.928	33.090	1.688	Open Manhole	1200
7.001	o	225	SW45	34.372	32.350	1.797	Open Manhole	1200
7.002	o	225	SW46	33.086	31.000	1.861	Open Manhole	1200
7.003	o	450	SW47	31.948	29.734	1.764	Open Manhole	1350
7.004	o	450	SW48	31.065	29.200	1.415	Open Manhole	1240 x 900
7.005	o	450	SW49	30.892	29.110	1.332	Open Manhole	1240 x 900
7.006	o	450	SW50	31.317	29.005	1.862	Open Manhole	1350
7.007	o	450	SW51	31.500	28.952	2.098	Open Manhole	1350
7.008	o	450	SW52	33.200	28.889	3.861	Open Manhole	1350
4.013	o	600	SW53	34.300	28.674	5.026	Open Manhole	1500
4.014	o	600	SW54	32.956	28.598	3.758	Open Manhole	1500

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)
6.000	35.234	75.8	SW37	32.675	29.664	2.560	Open Manhole	1350
4.007	7.946	400.0	SW39	32.623	29.579	2.594	Open Manhole	1350
4.008	19.497	400.0	SW40	32.566	29.531	2.586	Open Manhole	1350
4.009	32.527	400.0	SW41	32.682	29.449	2.783	Open Manhole	1350
4.010	21.473	400.0	SW42	32.500	29.396	2.654	Open Manhole	1350
4.011	56.841	353.0	SW43	33.293	29.235	3.608	Open Manhole	1500
4.012	23.950	58.3	SW53	34.300	28.674	5.026	Open Manhole	1500
7.000	18.792	28.3	SW45	34.372	32.425	1.797	Open Manhole	1200
7.001	26.643	19.7	SW46	33.086	31.000	1.861	Open Manhole	1200
7.002	23.122	22.2	SW47	31.948	29.959	1.764	Open Manhole	1350
7.003	20.136	37.7	SW48	31.065	29.200	1.415	Open Manhole	1240 x 900
7.004	15.242	169.4	SW49	30.892	29.110	1.332	Open Manhole	1240 x 900
7.005	42.103	401.0	SW50	31.317	29.005	1.862	Open Manhole	1350
7.006	21.209	400.2	SW51	31.500	28.952	2.098	Open Manhole	1350
7.007	25.087	398.2	SW52	33.200	28.889	3.861	Open Manhole	1350
7.008	26.075	401.1	SW53	34.300	28.824	5.026	Open Manhole	1500
4.013	30.270	398.3	SW54	32.956	28.598	3.758	Open Manhole	1500
4.014	22.404	200.0	SW55	32.224	28.486	3.138	Open Manhole	1500

PIPELINE SCHEDULES for Surface Network 5

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)
4.015	o	600	SW55	32.224	28.486	3.138	Open Manhole	1500
4.016	o	600	SW56	31.487	28.402	2.485	Open Manhole	1500
4.017	o	600	SW57	28.467	26.660	1.207	Open Manhole	1500
4.018	o	600	SW58	25.250	23.514	1.136	Open Manhole	1240 x 1050
1.021	o	600	SW60	25.000	20.181	4.219	Open Manhole	1500
1.022	o	1000	SW61	19.800	18.350	0.450	Open Manhole	900 x 1050
1.023	o	300	SW64	19.800	16.700	2.800	Open Manhole	900 x 1050

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)
4.015	16.728	199.1	SW56	31.487	28.402	2.485	Open Manhole	1500
4.016	39.249	22.5	SW57	28.467	26.660	1.207	Open Manhole	1500
4.017	31.461	10.0	SW58	25.250	23.514	1.136	Open Manhole	1240 x 1050
4.018	20.739	10.0	SW60	25.000	21.440	2.960	Open Manhole	1500
1.021	18.316	10.0	SW61	19.800	18.350	0.850	Open Manhole	900 x 1050
1.022	62.153	683.0	SW64	19.800	18.259	0.541	Open Manhole	900 x 1050
1.023	25.722	7.0	SW65	14.000	13.020	0.680	Open Manhole	900 x 750


Free Flowing Outfall Details for Surface Network 5

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.023	SW65	14.000	13.020	0.000	900	750

Simulation Criteria for Surface Network 5


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 Storage Structures	4
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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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)	26.500	Storm Duration (mins)	30
Ratio R	0.400		

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Online Controls for Surface Network 5


Hydro-Brake® Optimum Manhole: SW64, DS/PN: 1.023, Volume (m³): 51.0

Unit Reference	MD-SHE-0181-2200-2750-2200
Design Head (m)	2.750
Design Flow (l/s)	22.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	181
Invert Level (m)	16.700
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.750	22.0
Flush-Flo™	0.797	21.7
Kick-Flo®	1.625	17.1
Mean Flow over Head Range	-	19.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.4	1.200	20.9	3.000	22.9	7.000	34.4
0.200	16.3	1.400	19.7	3.500	24.7	7.500	35.6
0.300	18.7	1.600	17.5	4.000	26.3	8.000	36.7
0.400	20.1	1.800	18.0	4.500	27.8	8.500	37.8
0.500	20.9	2.000	18.9	5.000	29.3	9.000	38.9
0.600	21.4	2.200	19.8	5.500	30.7	9.500	39.9
0.800	21.7	2.400	20.6	6.000	32.0		
1.000	21.5	2.600	21.4	6.500	33.2		

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Storage Structures for Surface Network 5

Cellular Storage Manhole: SW9, DS/PN: 1.007

Invert Level (m) 28.219 Safety Factor 5.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	30.0	0.0	1.201	0.0	0.0
1.200	30.0	0.0			

Cellular Storage Manhole: SW20, DS/PN: 1.015

Invert Level (m) 26.674 Safety Factor 5.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	35.0	0.0	1.201	0.0	0.0
1.200	35.0	0.0			

Cellular Storage Manhole: SW32, DS/PN: 5.001

Invert Level (m) 29.790 Safety Factor 3.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	60.0	0.0	1.601	0.0	0.0
1.600	60.0	0.0			

Tank or Pond Manhole: SW64, DS/PN: 1.023

Invert Level (m) 17.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	606.0	0.600	949.1	1.300	1569.8	1.900	2009.5
0.100	660.5	0.700	1010.1	1.400	1640.5	2.000	2086.4
0.200	716.0	0.800	1072.3	1.500	1712.2	2.100	2164.4
0.300	772.6	0.900	1135.5	1.600	1784.9	2.200	2243.4
0.400	830.4	1.100	1431.7	1.700	1858.7	2.299	2322.7
0.500	889.2	1.200	1500.2	1.800	1933.6		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 5

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	4
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0


Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		26.500 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
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, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW1	15 Winter	1	+0%				
1.001	SW2	15 Winter	1	+0%	100/15 Summer			
1.002	SW3	15 Winter	1	+0%				
2.000	SW4	15 Winter	1	+0%	100/15 Summer			
1.003	SW5	15 Winter	1	+0%	100/15 Winter			
1.004	SW6	15 Winter	1	+0%	100/15 Winter			
1.005	SW7	15 Winter	1	+0%	100/15 Summer			
1.006	SW8	15 Winter	1	+0%	30/15 Winter			
1.007	SW9	15 Winter	1	+0%	30/15 Summer			
1.008	SW10	15 Winter	1	+0%	30/15 Summer			
1.009	SW11	15 Winter	1	+0%	30/15 Summer	100/15 Winter		
1.010	SW12	15 Winter	1	+0%	30/15 Summer			
1.011	SW13	15 Winter	1	+0%	30/15 Winter			
1.012	SW14	15 Winter	1	+0%	30/15 Winter			
1.013	SW15	15 Winter	1	+0%	100/15 Summer			
3.000	SW16	15 Winter	1	+0%				
3.001	SW17	15 Winter	1	+0%	100/15 Summer			
3.002	SW18	15 Winter	1	+0%	100/15 Summer			
1.014	SW19	30 Winter	1	+0%	100/15 Summer			

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 5


PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)			
1.000	SW1	34.603	-0.162	0.000	0.17			17.7	OK	
1.001	SW2	32.718	-0.147	0.000	0.26			24.7	OK	
1.002	SW3	31.372	-0.218	0.000	0.17			34.2	OK	
2.000	SW4	31.368	-0.087	0.000	0.37			11.8	OK	
1.003	SW5	30.150	-0.320	0.000	0.18			58.5	OK	
1.004	SW6	29.819	-0.321	0.000	0.18			73.7	OK	
1.005	SW7	29.128	-0.477	0.000	0.09			83.4	OK	
1.006	SW8	28.483	-0.321	0.000	0.33			83.8	OK	
1.007	SW9	28.447	-0.297	0.000	0.36			80.5	OK	
1.008	SW10	28.417	-0.283	0.000	0.39			80.6	OK	
1.009	SW11	28.387	-0.274	0.000	0.46			84.2	OK	1
1.010	SW12	28.355	-0.273	0.000	0.57			91.2	OK	
1.011	SW13	28.303	-0.306	0.000	0.36			96.1	OK	
1.012	SW14	28.237	-0.295	0.000	0.48			104.1	OK	
1.013	SW15	28.180	-0.310	0.000	0.47			111.0	OK	
3.000	SW16	31.292	-0.118	0.000	0.10			3.8	OK	
3.001	SW17	30.583	-0.162	0.000	0.17			19.7	OK	
3.002	SW18	29.895	-0.150	0.000	0.24			26.2	OK	
1.014	SW19	27.992	-0.453	0.000	0.14			134.6	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 5

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.015	SW20	30	Winter	1	+0%	30/15	Summer		26.925
1.016	SW21	30	Winter	1	+0%	30/15	Summer		26.877
1.017	SW22	30	Winter	1	+0%	30/15	Summer		26.781
1.018	SW23	30	Winter	1	+0%	100/15	Summer		26.597
1.019	SW24	30	Winter	1	+0%				26.178
1.020	SW25	30	Winter	1	+0%				22.890
4.000	SW27	15	Winter	1	+0%				34.831
4.001	SW28	15	Winter	1	+0%				34.244
4.002	SW29	15	Winter	1	+0%				33.878
4.003	SW30	15	Winter	1	+0%				32.818
5.000	SW31	15	Winter	1	+0%	30/15	Summer		30.058
5.001	SW32	30	Winter	1	+0%	30/15	Summer		29.967
4.004	SW33	30	Winter	1	+0%	30/15	Summer		29.957
4.005	SW34	30	Winter	1	+0%	30/15	Summer		29.941
4.006	SW35	15	Winter	1	+0%	30/15	Summer		29.908
6.000	SW36	15	Winter	1	+0%	30/15	Winter		30.206
4.007	SW37	15	Winter	1	+0%	30/15	Summer		29.889
4.008	SW39	15	Winter	1	+0%	30/15	Summer		29.867
4.009	SW40	15	Winter	1	+0%	30/15	Summer		29.831
4.010	SW41	15	Winter	1	+0%	30/15	Summer		29.747
4.011	SW42	15	Winter	1	+0%	30/15	Summer		29.658
4.012	SW43	15	Winter	1	+0%	100/15	Summer		29.247
7.000	SW44	15	Winter	1	+0%				33.137
7.001	SW45	15	Winter	1	+0%				32.402
7.002	SW46	15	Winter	1	+0%	100/15	Summer		31.070
7.003	SW47	15	Winter	1	+0%	100/15	Summer		29.814
7.004	SW48	15	Winter	1	+0%	100/15	Summer		29.327
7.005	SW49	15	Winter	1	+0%	100/15	Summer		29.267
7.006	SW50	15	Winter	1	+0%	30/15	Winter		29.195
7.007	SW51	15	Winter	1	+0%	100/15	Summer		29.144
7.008	SW52	15	Winter	1	+0%	100/15	Summer		29.073
4.013	SW53	15	Winter	1	+0%	30/15	Winter		28.987
4.014	SW54	15	Winter	1	+0%	100/15	Summer		28.875
4.015	SW55	15	Winter	1	+0%	100/15	Summer		28.767
4.016	SW56	15	Winter	1	+0%				28.546
4.017	SW57	15	Winter	1	+0%				26.783
4.018	SW58	15	Winter	1	+0%				23.652
1.021	SW60	30	Winter	1	+0%	100/15	Summer		20.379
1.022	SW61	30	Winter	1	+0%	100/15	Summer		18.783
1.023	SW64	120	Winter	1	+0%	1/15	Summer		18.072

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.015	SW20	-0.274	0.000	0.57		140.9	OK	
1.016	SW21	-0.280	0.000	0.48		148.4	OK	


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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 5

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
1.017	SW22	-0.263	0.000	0.60		155.0	OK	
1.018	SW23	-0.388	0.000	0.27		154.7	OK	
1.019	SW24	-0.482	0.000	0.09		154.7	OK	
1.020	SW25	-0.448	0.000	0.15		154.9	OK	
4.000	SW27	-0.109	0.000	0.17		6.0	OK	
4.001	SW28	-0.106	0.000	0.19		5.9	OK	
4.002	SW29	-0.112	0.000	0.15		6.0	OK	
4.003	SW30	-0.177	0.000	0.10		13.0	OK	
5.000	SW31	-0.352	0.000	0.10		19.1	OK	
5.001	SW32	-0.273	0.000	0.14		18.7	OK	
4.004	SW33	-0.223	0.000	0.38		35.1	OK	
4.005	SW34	-0.218	0.000	0.32		43.3	OK	
4.006	SW35	-0.183	0.000	0.41		46.9	OK	
6.000	SW36	-0.373	0.000	0.07		22.0	OK	
4.007	SW37	-0.160	0.000	0.68		62.2	OK	
4.008	SW39	-0.162	0.000	0.54		69.4	OK	
4.009	SW40	-0.149	0.000	0.73		102.0	OK	
4.010	SW41	-0.152	0.000	0.77		101.1	OK	
4.011	SW42	-0.188	0.000	0.64		101.1	OK	
4.012	SW43	-0.438	0.000	0.16		105.1	OK	
7.000	SW44	-0.103	0.000	0.21		6.6	OK	
7.001	SW45	-0.173	0.000	0.12		13.2	OK	
7.002	SW46	-0.155	0.000	0.21		21.1	OK	
7.003	SW47	-0.370	0.000	0.07		29.4	OK	
7.004	SW48	-0.323	0.000	0.18		29.6	OK	
7.005	SW49	-0.293	0.000	0.23		32.7	OK	
7.006	SW50	-0.260	0.000	0.32		41.4	OK	
7.007	SW51	-0.258	0.000	0.35		47.9	OK	
7.008	SW52	-0.266	0.000	0.35		47.3	OK	
4.013	SW53	-0.287	0.000	0.53		149.3	OK	
4.014	SW54	-0.323	0.000	0.44		151.3	OK	
4.015	SW55	-0.319	0.000	0.45		155.3	OK	
4.016	SW56	-0.456	0.000	0.13		160.6	OK	
4.017	SW57	-0.477	0.000	0.09		165.1	OK	
4.018	SW58	-0.461	0.000	0.12		173.1	OK	
1.021	SW60	-0.402	0.000	0.24		323.6	OK	
1.022	SW61	-0.567	0.000	0.39		323.7	OK	
1.023	SW64	1.072	0.000	0.06		21.7	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 5

PN	US/MH Name	Water		Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)				
1.000	SW1	34.643	-0.122	0.000	0.42			43.3	OK	
1.001	SW2	32.777	-0.088	0.000	0.67			64.9	OK	
1.002	SW3	31.433	-0.157	0.000	0.45			93.4	OK	
2.000	SW4	31.418	-0.037	0.000	0.91			28.9	OK	
1.003	SW5	30.247	-0.223	0.000	0.50			160.7	OK	
1.004	SW6	29.918	-0.222	0.000	0.50			205.7	OK	
1.005	SW7	29.215	-0.390	0.000	0.26			234.1	OK	
1.006	SW8	28.820	0.016	0.000	0.90			228.8	SURCHARGED	
1.007	SW9	28.784	0.040	0.000	1.01			229.2	SURCHARGED	
1.008	SW10	28.747	0.047	0.000	1.09			225.6	SURCHARGED	
1.009	SW11	28.705	0.044	0.000	1.28			234.6	SURCHARGED	1
1.010	SW12	28.662	0.034	0.000	1.57			251.3	SURCHARGED	
1.011	SW13	28.628	0.019	0.000	0.97			258.3	SURCHARGED	
1.012	SW14	28.550	0.018	0.000	1.27			277.0	SURCHARGED	
1.013	SW15	28.490	0.000	0.000	1.24			293.4	OK	
3.000	SW16	31.310	-0.100	0.000	0.24			9.2	OK	
3.001	SW17	30.635	-0.110	0.000	0.52			58.3	OK	
3.002	SW18	29.962	-0.083	0.000	0.71			78.9	OK	
1.014	SW19	28.091	-0.354	0.000	0.35			340.6	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 5

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.015	SW20	15 Winter	30	+0%	30/15 Summer				27.333
1.016	SW21	15 Winter	30	+0%	30/15 Summer				27.252
1.017	SW22	15 Winter	30	+0%	30/15 Summer				27.097
1.018	SW23	15 Winter	30	+0%	100/15 Summer				26.739
1.019	SW24	15 Winter	30	+0%					26.244
1.020	SW25	15 Winter	30	+0%					22.983
4.000	SW27	15 Winter	30	+0%					34.857
4.001	SW28	15 Winter	30	+0%					34.272
4.002	SW29	15 Winter	30	+0%					33.902
4.003	SW30	15 Winter	30	+0%					32.852
5.000	SW31	15 Winter	30	+0%	30/15 Summer				30.563
5.001	SW32	15 Winter	30	+0%	30/15 Summer				30.462
4.004	SW33	15 Winter	30	+0%	30/15 Summer				30.451
4.005	SW34	15 Winter	30	+0%	30/15 Summer				30.442
4.006	SW35	15 Winter	30	+0%	30/15 Summer				30.438
6.000	SW36	15 Winter	30	+0%	30/15 Winter				30.615
4.007	SW37	15 Winter	30	+0%	30/15 Summer				30.430
4.008	SW39	15 Winter	30	+0%	30/15 Summer				30.413
4.009	SW40	15 Winter	30	+0%	30/15 Summer				30.372
4.010	SW41	15 Winter	30	+0%	30/15 Summer				30.170
4.011	SW42	15 Winter	30	+0%	30/15 Summer				30.006
4.012	SW43	15 Winter	30	+0%	100/15 Summer				29.344
7.000	SW44	15 Winter	30	+0%					33.166
7.001	SW45	15 Winter	30	+0%					32.440
7.002	SW46	15 Winter	30	+0%	100/15 Summer				31.127
7.003	SW47	15 Winter	30	+0%	100/15 Summer				29.874
7.004	SW48	30 Winter	30	+0%	100/15 Summer				29.586
7.005	SW49	30 Winter	30	+0%	100/15 Summer				29.538
7.006	SW50	15 Winter	30	+0%	30/15 Winter				29.461
7.007	SW51	15 Summer	30	+0%	100/15 Summer				29.402
7.008	SW52	15 Winter	30	+0%	100/15 Summer				29.339
4.013	SW53	15 Winter	30	+0%	30/15 Winter				29.276
4.014	SW54	15 Winter	30	+0%	100/15 Summer				29.058
4.015	SW55	15 Winter	30	+0%	100/15 Summer				28.953
4.016	SW56	15 Winter	30	+0%					28.617
4.017	SW57	15 Winter	30	+0%					26.842
4.018	SW58	15 Winter	30	+0%					23.721
1.021	SW60	15 Winter	30	+0%	100/15 Summer				20.500
1.022	SW61	15 Winter	30	+0%	100/15 Summer				19.092
1.023	SW64	360 Winter	30	+0%	1/15 Summer				18.742


PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.015	SW20	0.134	0.000	1.41	346.6	SURCHARGED	
1.016	SW21	0.095	0.000	1.16	360.6	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Surface Network 5

PN	US/MH Name	Surcharged Flooded		Pipe		Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)		
1.017	SW22	0.053	0.000	1.45		373.4	SURCHARGED
1.018	SW23	-0.246	0.000	0.65		373.4	OK
1.019	SW24	-0.416	0.000	0.21		373.1	OK
1.020	SW25	-0.355	0.000	0.35		372.8	OK
4.000	SW27	-0.083	0.000	0.41		14.7	OK
4.001	SW28	-0.078	0.000	0.46		14.5	OK
4.002	SW29	-0.088	0.000	0.35		14.6	OK
4.003	SW30	-0.143	0.000	0.28		35.8	OK
5.000	SW31	0.153	0.000	0.23		42.0	SURCHARGED
5.001	SW32	0.222	0.000	0.33		44.7	SURCHARGED
4.004	SW33	0.271	0.000	0.87		80.5	SURCHARGED
4.005	SW34	0.283	0.000	0.68		92.3	SURCHARGED
4.006	SW35	0.347	0.000	0.82		94.7	SURCHARGED
6.000	SW36	0.035	0.000	0.16		52.5	SURCHARGED
4.007	SW37	0.381	0.000	1.43		131.4	SURCHARGED
4.008	SW39	0.383	0.000	1.10		140.5	SURCHARGED
4.009	SW40	0.392	0.000	1.66		232.0	SURCHARGED
4.010	SW41	0.271	0.000	1.71		225.5	SURCHARGED
4.011	SW42	0.160	0.000	1.36		213.3	SURCHARGED
4.012	SW43	-0.341	0.000	0.35		224.7	OK
7.000	SW44	-0.074	0.000	0.51		16.1	OK
7.001	SW45	-0.135	0.000	0.34		36.6	OK
7.002	SW46	-0.098	0.000	0.60		61.0	OK
7.003	SW47	-0.310	0.000	0.21		86.4	OK
7.004	SW48	-0.064	0.000	0.38		64.1	OK
7.005	SW49	-0.022	0.000	0.50		71.7	OK
7.006	SW50	0.006	0.000	0.88		115.2	SURCHARGED
7.007	SW51	0.000	0.000	0.92		124.2	OK
7.008	SW52	0.000	0.000	0.82		110.9	OK
4.013	SW53	0.002	0.000	1.15		322.2	SURCHARGED
4.014	SW54	-0.140	0.000	0.93		322.6	OK
4.015	SW55	-0.133	0.000	0.96		333.0	OK
4.016	SW56	-0.385	0.000	0.28		344.3	OK
4.017	SW57	-0.418	0.000	0.20		353.1	OK
4.018	SW58	-0.393	0.000	0.26		369.6	OK
1.021	SW60	-0.281	0.000	0.55		740.3	OK
1.022	SW61	-0.258	0.000	0.89		739.9	OK
1.023	SW64	1.742	0.000	0.06		21.7	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

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 Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 4
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 26.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status ON
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, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW1	15 Winter	100	+40%				
1.001	SW2	15 Winter	100	+40%	100/15	Summer		
1.002	SW3	15 Winter	100	+40%				
2.000	SW4	15 Winter	100	+40%	100/15	Summer		
1.003	SW5	15 Winter	100	+40%	100/15	Winter		
1.004	SW6	15 Winter	100	+40%	100/15	Winter		
1.005	SW7	15 Winter	100	+40%	100/15	Summer		
1.006	SW8	15 Winter	100	+40%	30/15	Winter		
1.007	SW9	15 Winter	100	+40%	30/15	Summer		
1.008	SW10	15 Winter	100	+40%	30/15	Summer		
1.009	SW11	15 Winter	100	+40%	30/15	Summer	100/15	Winter
1.010	SW12	15 Winter	100	+40%	30/15	Summer		
1.011	SW13	15 Winter	100	+40%	30/15	Winter		
1.012	SW14	15 Winter	100	+40%	30/15	Winter		
1.013	SW15	15 Winter	100	+40%	100/15	Summer		
3.000	SW16	15 Winter	100	+40%				
3.001	SW17	15 Winter	100	+40%	100/15	Summer		
3.002	SW18	15 Winter	100	+40%	100/15	Summer		
1.014	SW19	15 Winter	100	+40%	100/15	Summer		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1	34.692	-0.073	0.000	0.78	79.4	OK	
1.001	SW2	33.340	0.475	0.000	1.17	113.4	SURCHARGED	
1.002	SW3	31.494	-0.096	0.000	0.77	159.9	OK	
2.000	SW4	32.552	1.097	0.000	1.41	45.2	SURCHARGED	
1.003	SW5	30.870	0.400	0.000	0.84	271.0	SURCHARGED	
1.004	SW6	30.703	0.563	0.000	0.86	352.7	SURCHARGED	
1.005	SW7	30.464	0.859	0.000	0.43	381.3	SURCHARGED	
1.006	SW8	30.152	1.348	0.000	1.40	356.5	FLOOD RISK	
1.007	SW9	30.083	1.339	0.000	1.48	334.0	FLOOD RISK	
1.008	SW10	30.006	1.306	0.000	1.59	328.7	FLOOD RISK	
1.009	SW11	29.927	1.266	0.150	1.89	346.3	FLOOD	1
1.010	SW12	29.844	1.216	0.000	2.34	374.5	FLOOD RISK	
1.011	SW13	29.706	1.097	0.000	1.50	399.9	SURCHARGED	
1.012	SW14	29.539	1.007	0.000	2.03	441.2	SURCHARGED	
1.013	SW15	29.356	0.866	0.000	2.03	479.3	SURCHARGED	
3.000	SW16	31.338	-0.072	0.000	0.44	16.8	OK	
3.001	SW17	31.226	0.481	0.000	0.85	96.3	SURCHARGED	
3.002	SW18	30.740	0.695	0.000	1.17	128.7	SURCHARGED	
1.014	SW19	29.140	0.695	0.000	0.65	637.8	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.015	SW20	15 Winter	100	+40%	30/15 Summer				28.651
1.016	SW21	15 Winter	100	+40%	30/15 Summer				28.227
1.017	SW22	15 Winter	100	+40%	30/15 Summer				27.655
1.018	SW23	15 Winter	100	+40%	100/15 Summer				27.143
1.019	SW24	15 Winter	100	+40%					26.322
1.020	SW25	15 Winter	100	+40%					23.099
4.000	SW27	15 Winter	100	+40%					34.889
4.001	SW28	15 Winter	100	+40%					34.307
4.002	SW29	15 Winter	100	+40%					33.930
4.003	SW30	15 Winter	100	+40%					32.886
5.000	SW31	30 Winter	100	+40%	30/15 Summer				31.949
5.001	SW32	15 Winter	100	+40%	30/15 Summer				31.895
4.004	SW33	15 Winter	100	+40%	30/15 Summer				31.868
4.005	SW34	15 Winter	100	+40%	30/15 Summer				31.834
4.006	SW35	15 Winter	100	+40%	30/15 Summer				31.738
6.000	SW36	15 Winter	100	+40%	30/15 Winter				31.830
4.007	SW37	15 Winter	100	+40%	30/15 Summer				31.664
4.008	SW39	15 Winter	100	+40%	30/15 Summer				31.503
4.009	SW40	15 Winter	100	+40%	30/15 Summer				31.367
4.010	SW41	15 Winter	100	+40%	30/15 Summer				30.979
4.011	SW42	15 Winter	100	+40%	30/15 Summer				30.686
4.012	SW43	15 Winter	100	+40%	100/15 Summer				30.077
7.000	SW44	15 Winter	100	+40%					33.205
7.001	SW45	15 Winter	100	+40%					32.479
7.002	SW46	15 Winter	100	+40%	100/15 Summer				31.412
7.003	SW47	15 Winter	100	+40%	100/15 Summer				30.568
7.004	SW48	15 Winter	100	+40%	100/15 Summer				30.360
7.005	SW49	15 Winter	100	+40%	100/15 Summer				30.281
7.006	SW50	15 Winter	100	+40%	30/15 Winter				30.208
7.007	SW51	15 Winter	100	+40%	100/15 Summer				30.121
7.008	SW52	15 Winter	100	+40%	100/15 Summer				29.987
4.013	SW53	15 Winter	100	+40%	30/15 Winter				29.858
4.014	SW54	15 Winter	100	+40%	100/15 Summer				29.584
4.015	SW55	15 Winter	100	+40%	100/15 Summer				29.293
4.016	SW56	15 Winter	100	+40%					28.697
4.017	SW57	15 Winter	100	+40%					26.906
4.018	SW58	15 Winter	100	+40%					23.801
1.021	SW60	15 Winter	100	+40%	100/15 Summer				21.331
1.022	SW61	480 Winter	100	+40%	100/15 Summer				19.466
1.023	SW64	480 Winter	100	+40%	1/15 Summer				19.464

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.015	SW20	1.452	0.000	2.71		664.9	SURCHARGED	
1.016	SW21	1.070	0.000	2.22		688.2	SURCHARGED	
















100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 5

PN	US/MH Name	Depth (m)	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Pipe	Status	Level Exceeded
			Volume (m³)	Flow (l/s)		Flow (l/s)		
1.017	SW22	0.611	0.000	2.76	708.8	SURCHARGED		
1.018	SW23	0.158	0.000	1.25	711.4	SURCHARGED		
1.019	SW24	-0.338	0.000	0.39	713.5	OK		
1.020	SW25	-0.239	0.000	0.67	714.1	OK		
4.000	SW27	-0.051	0.000	0.76	27.0	OK		
4.001	SW28	-0.043	0.000	0.84	26.6	OK		
4.002	SW29	-0.060	0.000	0.65	26.7	OK		
4.003	SW30	-0.109	0.000	0.51	65.8	OK		
5.000	SW31	1.539	0.000	0.32	57.9	FLOOD RISK		
5.001	SW32	1.655	0.000	0.58	77.6	SURCHARGED		
4.004	SW33	1.688	0.000	1.55	144.3	SURCHARGED		
4.005	SW34	1.675	0.000	1.15	156.8	SURCHARGED		
4.006	SW35	1.647	0.000	1.43	165.1	SURCHARGED		
6.000	SW36	1.251	0.000	0.29	94.7	SURCHARGED		
4.007	SW37	1.614	0.000	2.46	225.4	SURCHARGED		
4.008	SW39	1.474	0.000	1.85	236.9	SURCHARGED		
4.009	SW40	1.387	0.000	2.47	344.4	SURCHARGED		
4.010	SW41	1.080	0.000	2.60	341.9	SURCHARGED		
4.011	SW42	0.840	0.000	2.07	325.4	SURCHARGED		
4.012	SW43	0.392	0.000	0.52	334.8	SURCHARGED		
7.000	SW44	-0.035	0.000	0.94	29.5	OK		
7.001	SW45	-0.096	0.000	0.62	67.1	OK		
7.002	SW46	0.187	0.000	1.06	107.8	SURCHARGED		
7.003	SW47	0.384	0.000	0.36	146.9	SURCHARGED		
7.004	SW48	0.710	0.000	0.74	125.2	SURCHARGED		
7.005	SW49	0.721	0.000	0.98	141.0	SURCHARGED		
7.006	SW50	0.753	0.000	1.46	191.0	SURCHARGED		
7.007	SW51	0.719	0.000	1.66	224.5	SURCHARGED		
7.008	SW52	0.648	0.000	1.58	214.2	SURCHARGED		
4.013	SW53	0.584	0.000	1.90	532.4	SURCHARGED		
4.014	SW54	0.386	0.000	1.54	534.0	SURCHARGED		
4.015	SW55	0.207	0.000	1.60	555.7	SURCHARGED		
4.016	SW56	-0.305	0.000	0.47	584.5	OK		
4.017	SW57	-0.354	0.000	0.34	608.4	OK		
4.018	SW58	-0.313	0.000	0.45	647.0	OK		
1.021	SW60	0.550	0.000	1.01	1364.3	SURCHARGED		
1.022	SW61	0.116	0.000	0.33	276.9	FLOOD RISK		
1.023	SW64	2.464	0.000	0.06	22.0	FLOOD RISK		

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

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
1.000	44.219	1.025	43.1	0.139	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	48.744	1.470	33.2	0.075	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	58.448	1.450	40.3	0.140	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	84.712	1.735	48.8	0.107	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	15.130	0.275	55.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	105.127	2.330	45.1	0.139	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	468.151	8.140	57.5	0.421	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.007	41.380	3.795	10.9	0.089	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.008	24.402	2.430	10.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	16.446	0.690	23.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	17.712	0.670	26.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.011	23.055	0.880	26.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.012	33.556	1.450	23.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.013	41.024	1.840	22.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.014	82.069	4.650	17.6	0.000	0.00	0.0	0.600	o	600	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)
1.000	50.00	5.48	52.770	0.139	0.0	0.0	0.0	1.54	27.2	18.8
1.001	50.00	5.84	51.670	0.214	0.0	0.0	0.0	2.28	90.6	29.0
1.002	50.00	6.31	50.200	0.354	0.0	0.0	0.0	2.07	82.2	47.9
1.003	50.00	7.06	48.750	0.461	0.0	0.0	0.0	1.88	74.6	62.4
1.004	50.00	7.18	46.940	0.461	0.0	0.0	0.0	2.12	150.1	62.4
1.005	50.00	7.83	46.590	0.600	0.0	0.0	0.0	2.70	298.6	81.2
1.006	50.00	11.09	44.570	1.021	0.0	0.0	0.0	2.39	264.3	138.3
1.007	50.00	11.21	36.430	1.110	0.0	0.0	0.0	5.51	608.9	150.3
1.008	50.00	11.27	32.560	1.110	0.0	0.0	0.0	6.44	1024.9	150.3
1.009	50.00	11.34	30.130	1.110	0.0	0.0	0.0	4.18	664.5	150.3
1.010	50.00	11.41	29.440	1.110	0.0	0.0	0.0	3.97	630.8	150.3
1.011	50.00	11.51	28.770	1.110	0.0	0.0	0.0	3.98	633.7	150.3
1.012	50.00	11.64	27.890	1.110	0.0	0.0	0.0	4.24	674.4	150.3
1.013	50.00	11.80	26.440	1.110	0.0	0.0	0.0	4.32	687.1	150.3
1.014	50.00	12.04	24.600	1.110	0.0	0.0	0.0	5.81	1644.1	150.3


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Manhole Schedules for Surface Network 1


MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out		Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	
EX 1	54.240	1.470	Open Manhole	1200	1.000	52.770	150			
EX 2	53.110	1.440	Open Manhole	1200	1.001	51.670	225	1.000	51.745	150
EX 3	51.730	1.530	Open Manhole	1200	1.002	50.200	225	1.001	50.200	225
EX 4	50.230	1.480	Open Manhole	1200	1.003	48.750	225	1.002	48.750	225
EX 5	48.440	1.500	Open Manhole	1200	1.004	46.940	300	1.003	47.015	225
EX 6	48.000	1.410	Open Manhole	1200	1.005	46.590	375	1.004	46.665	300
EX 7	45.730	1.470	Open Manhole	1200	1.006	44.570	375	1.005	44.260	375
EX 8	38.660	2.230	Open Manhole	1200	1.007	36.430	375	1.006	36.430	375
HD1	34.251	1.691	Open Manhole	1200	1.008	32.560	450	1.007	32.635	375
HD2	32.658	2.528	Open Manhole	1200	1.009	30.130	450	1.008	30.130	450
HD3	31.878	2.438	Open Manhole	1200	1.010	29.440	450	1.009	29.440	450
HD4	31.406	2.636	Open Manhole	1200	1.011	28.770	450	1.010	28.770	450
HD5	30.950	3.060	Open Manhole	1200	1.012	27.890	450	1.011	27.890	450
HD6	30.500	4.060	Open Manhole	1200	1.013	26.440	450	1.012	26.440	450
EX-HD9	28.300	3.700	Open Manhole	1200	1.014	24.600	600	1.013	24.600	450
S15	22.480	2.530	Open Manhole	1200		OUTFALL		1.014	19.950	600

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
EX 1	610848.118	164548.710	610848.118	164548.710	Required	
EX 2	610891.360	164557.956	610891.360	164557.956	Required	
EX 3	610936.226	164577.009	610936.226	164577.009	Required	
EX 4	610984.629	164609.770	610984.629	164609.770	Required	
EX 5	611049.344	164664.434	611049.344	164664.434	Required	
EX 6	611063.568	164659.278	611063.568	164659.278	Required	
EX 7	611143.571	164727.477	611143.571	164727.477	Required	

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Manhole Schedules for Surface Network 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
EX 8	611499.802	165031.229	611499.802	165031.229	Required	
HD1	611478.325	165066.599	611478.325	165066.599	Required	
HD2	611459.906	165082.606	611459.906	165082.606	Required	
HD3	611460.535	165099.039	611460.535	165099.039	Required	
HD4	611456.833	165116.361	611456.833	165116.361	Required	
HD5	611447.360	165137.380	611447.360	165137.380	Required	
HD6	611426.452	165163.626	611426.452	165163.626	Required	
EX-HD9	611406.800	165199.637	611406.800	165199.637	Required	
S15	611348.516	165257.416			No Entry	

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PIPELINE SCHEDULES for Surface Network 1

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)
1.000	o	150	EX 1	54.240	52.770	1.320	Open Manhole	1200
1.001	o	225	EX 2	53.110	51.670	1.215	Open Manhole	1200
1.002	o	225	EX 3	51.730	50.200	1.305	Open Manhole	1200
1.003	o	225	EX 4	50.230	48.750	1.255	Open Manhole	1200
1.004	o	300	EX 5	48.440	46.940	1.200	Open Manhole	1200
1.005	o	375	EX 6	48.000	46.590	1.035	Open Manhole	1200
1.006	o	375	EX 7	45.730	44.570	0.785	Open Manhole	1200
1.007	o	375	EX 8	38.660	36.430	1.855	Open Manhole	1200
1.008	o	450	HD1	34.251	32.560	1.241	Open Manhole	1200
1.009	o	450	HD2	32.658	30.130	2.078	Open Manhole	1200
1.010	o	450	HD3	31.878	29.440	1.988	Open Manhole	1200
1.011	o	450	HD4	31.406	28.770	2.186	Open Manhole	1200
1.012	o	450	HD5	30.950	27.890	2.610	Open Manhole	1200
1.013	o	450	HD6	30.500	26.440	3.610	Open Manhole	1200
1.014	o	600	EX-HD9	28.300	24.600	3.100	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)
1.000	44.219	43.1	EX 2	53.110	51.745	1.215	Open Manhole	1200
1.001	48.744	33.2	EX 3	51.730	50.200	1.305	Open Manhole	1200
1.002	58.448	40.3	EX 4	50.230	48.750	1.255	Open Manhole	1200
1.003	84.712	48.8	EX 5	48.440	47.015	1.200	Open Manhole	1200
1.004	15.130	55.0	EX 6	48.000	46.665	1.035	Open Manhole	1200
1.005	105.127	45.1	EX 7	45.730	44.260	1.095	Open Manhole	1200
1.006	468.151	57.5	EX 8	38.660	36.430	1.855	Open Manhole	1200
1.007	41.380	10.9	HD1	34.251	32.635	1.241	Open Manhole	1200
1.008	24.402	10.0	HD2	32.658	30.130	2.078	Open Manhole	1200
1.009	16.446	23.8	HD3	31.878	29.440	1.988	Open Manhole	1200
1.010	17.712	26.4	HD4	31.406	28.770	2.186	Open Manhole	1200
1.011	23.055	26.2	HD5	30.950	27.890	2.610	Open Manhole	1200
1.012	33.556	23.1	HD6	30.500	26.440	3.610	Open Manhole	1200
1.013	41.024	22.3	EX-HD9	28.300	24.600	3.250	Open Manhole	1200
1.014	82.069	17.6	S15	22.480	19.950	1.930	Open Manhole	1200

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
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1.014	S15	22.480	19.950	0.000	1200	0
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Simulation Criteria for Surface Network 1

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 Storage Structures	0
Number of Online Controls	0	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)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	26.500	Storm Duration (mins)	30
Ratio R	0.400		

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

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 Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 26.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	EX 1	15 Winter	1	+0%	30/15 Summer	30/15 Summer		
1.001	EX 2	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
1.002	EX 3	15 Winter	1	+0%	30/15 Summer	30/15 Summer		
1.003	EX 4	15 Winter	1	+0%	1/15 Winter	30/15 Summer		
1.004	EX 5	15 Winter	1	+0%				
1.005	EX 6	15 Winter	1	+0%	100/15 Summer			
1.006	EX 7	15 Winter	1	+0%	30/15 Summer	30/15 Summer		
1.007	EX 8	15 Winter	1	+0%				
1.008	HD1	15 Winter	1	+0%				
1.009	HD2	15 Winter	1	+0%				
1.010	HD3	15 Winter	1	+0%				
1.011	HD4	15 Winter	1	+0%				
1.012	HD5	15 Winter	1	+0%				
1.013	HD6	15 Winter	1	+0%				
1.014	EX-HD9	15 Winter	1	+0%				

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

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)		
1.000	EX 1	52.891	-0.029	0.000	0.97	25.7	OK	11
1.001	EX 2	51.774	-0.121	0.000	0.43	37.6	OK	2
1.002	EX 3	50.347	-0.078	0.000	0.74	58.8	OK	12
1.003	EX 4	48.975	0.000	0.000	0.99	72.3	SURCHARGED	12
1.004	EX 5	47.104	-0.136	0.000	0.58	72.6	OK	
1.005	EX 6	46.736	-0.229	0.000	0.32	90.8	OK	
1.006	EX 7	44.776	-0.169	0.000	0.48	124.9	OK	8
1.007	EX 8	36.555	-0.250	0.000	0.24	133.2	OK	
1.008	HD1	32.679	-0.331	0.000	0.16	133.5	OK	
1.009	HD2	30.294	-0.286	0.000	0.29	133.7	OK	
1.010	HD3	29.605	-0.285	0.000	0.29	133.8	OK	
1.011	HD4	28.923	-0.297	0.000	0.26	133.8	OK	
1.012	HD5	28.035	-0.305	0.000	0.23	133.5	OK	
1.013	HD6	26.582	-0.308	0.000	0.22	133.1	OK	
1.014	EX-HD9	24.720	-0.480	0.000	0.09	133.4	OK	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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


Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)		26.500 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	450.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status			ON


Profile(s)		Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440	
Return Period(s) (years)		1, 30, 100
Climate Change (%)		0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	EX 1	15 Winter	30	+0%	30/15 Summer	30/15 Summer		
1.001	EX 2	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
1.002	EX 3	15 Winter	30	+0%	30/15 Summer	30/15 Summer		
1.003	EX 4	15 Winter	30	+0%	1/15 Winter	30/15 Summer		
1.004	EX 5	15 Winter	30	+0%				
1.005	EX 6	15 Winter	30	+0%	100/15 Summer			
1.006	EX 7	15 Winter	30	+0%	30/15 Summer	30/15 Summer		
1.007	EX 8	30 Winter	30	+0%				
1.008	HD1	30 Winter	30	+0%				
1.009	HD2	30 Winter	30	+0%				
1.010	HD3	30 Winter	30	+0%				
1.011	HD4	30 Winter	30	+0%				
1.012	HD5	30 Winter	30	+0%				
1.013	HD6	30 Winter	30	+0%				
1.014	EX-HD9	30 Winter	30	+0%				

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

PN	US/MH Name	Water	Surcharged	Flooded	Pipe		Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)		
1.000	EX 1	54.243	1.323	3.091	1.43	37.6	FLOOD	11
1.001	EX 2	52.520	0.625	0.000	0.72	62.2	SURCHARGED	2
1.002	EX 3	51.736	1.311	6.257	1.02	80.6	FLOOD	12
1.003	EX 4	50.235	1.260	5.404	1.32	95.8	FLOOD	12
1.004	EX 5	47.136	-0.104	0.000	0.76	95.8	OK	
1.005	EX 6	46.792	-0.173	0.000	0.54	156.0	OK	
1.006	EX 7	45.734	0.789	3.977	0.97	254.5	FLOOD	8
1.007	EX 8	36.615	-0.190	0.000	0.48	268.9	OK	
1.008	HD1	32.733	-0.277	0.000	0.31	269.1	OK	
1.009	HD2	30.375	-0.205	0.000	0.57	269.1	OK	
1.010	HD3	29.687	-0.203	0.000	0.58	269.1	OK	
1.011	HD4	28.998	-0.222	0.000	0.51	269.0	OK	
1.012	HD5	28.103	-0.237	0.000	0.46	268.8	OK	
1.013	HD6	26.648	-0.242	0.000	0.44	268.7	OK	
1.014	EX-HD9	24.770	-0.430	0.000	0.18	268.9	OK	

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

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 Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000


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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 26.500 Cv (Winter) 0.840
Margin for Flood Risk Warning (mm) 450.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	EX 1	15 Winter	100	+40%	30/15 Summer	30/15 Summer		
1.001	EX 2	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
1.002	EX 3	30 Winter	100	+40%	30/15 Summer	30/15 Summer		
1.003	EX 4	30 Winter	100	+40%	1/15 Winter	30/15 Summer		
1.004	EX 5	15 Winter	100	+40%				
1.005	EX 6	15 Winter	100	+40%	100/15 Summer			
1.006	EX 7	15 Winter	100	+40%	30/15 Summer	30/15 Summer		
1.007	EX 8	30 Winter	100	+40%				
1.008	HD1	30 Winter	100	+40%				
1.009	HD2	30 Winter	100	+40%				
1.010	HD3	30 Winter	100	+40%				
1.011	HD4	30 Winter	100	+40%				
1.012	HD5	30 Winter	100	+40%				
1.013	HD6	30 Winter	100	+40%				
1.014	EX-HD9	30 Winter	100	+40%				

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Micro Drainage	Network 2019.1	

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	EX 1	54.265	1.345	24.569	1.47	38.7	FLOOD	11
1.001	EX 2	53.111	1.216	1.023	0.96	83.5	FLOOD	2
1.002	EX 3	51.766	1.341	35.908	1.02	80.9	FLOOD	12
1.003	EX 4	50.254	1.279	24.325	1.32	96.1	FLOOD	12
1.004	EX 5	47.204	-0.036	0.000	0.77	97.2	OK	
1.005	EX 6	47.053	0.088	0.000	0.73	209.9	SURCHARGED	
1.006	EX 7	45.804	0.859	74.000	1.05	273.9	FLOOD	8
1.007	EX 8	36.633	-0.172	0.000	0.57	313.7	OK	
1.008	HD1	32.749	-0.261	0.000	0.37	313.8	OK	
1.009	HD2	30.401	-0.179	0.000	0.67	313.8	OK	
1.010	HD3	29.713	-0.177	0.000	0.68	313.7	OK	
1.011	HD4	29.020	-0.200	0.000	0.60	313.5	OK	
1.012	HD5	28.124	-0.216	0.000	0.53	313.5	OK	
1.013	HD6	26.668	-0.222	0.000	0.51	313.7	OK	
1.014	EX-HD9	24.785	-0.415	0.000	0.21	313.7	OK	