STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW 01

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.423	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for SW 01

« - 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
9.000	22.590	0.550	41.1	1.130	4.00	0.0	0.600	o	450	Pipe/Conduit	
9.001	15.198	0.150	101.3	0.035	0.00	0.0	0.600	o	600	Pipe/Conduit	
10.000	20.329	1.070	19.0	0.025	4.00	0.0	0.600	o	150	Pipe/Conduit	
10.001	56.042	0.225	249.1	0.260	0.00	0.0	0.600	o	300	Pipe/Conduit	
10.002	54.933	0.170	323.1	0.150	0.00	0.0	0.600	o	375	Pipe/Conduit	
11.000	14.659	0.060	244.3	0.220	4.00	0.0	0.600	o	300	Pipe/Conduit	
12.000	13.821	0.560	24.7	0.520	4.00	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)
9.000	50.00	4.12	95.900	1.130	0.0	0.0	0.0	3.18	505.7	153.0
9.001	50.00	4.22	95.350	1.165	0.0	0.0	0.0	2.42	684.1	157.8
10.000	50.00	4.15	97.230	0.025	0.0	0.0	0.0	2.32	41.0	3.4
10.001	50.00	5.09	96.010	0.285	0.0	0.0	0.0	0.99	70.1	38.6
10.002	50.00	6.00	95.710	0.435	0.0	0.0	0.0	1.00	110.7	58.9
11.000	50.00	4.24	95.675	0.220	0.0	0.0	0.0	1.00	70.8	29.8
12.000	50.00	4.06	96.476	0.520	0.0	0.0	0.0	3.66	404.3	70.4

Network Design Table for SW 01

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
13.000	31.433	1.678	18.7	0.060	8.00	0.0	0.600	o	225	Pipe/Conduit	
14.000	14.840	0.083	178.8	0.000	4.00	0.0	0.600	o	225	Pipe/Conduit	
13.001	38.333	0.681	56.3	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
12.001	43.018	0.376	114.4	0.050	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.003	18.499	0.058	318.9	0.090	0.00	0.0	0.600	o	600	Pipe/Conduit	
10.004	11.474	0.058	197.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
9.002	41.847	0.001	41846.7	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
9.003	5.305	0.001	5304.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.004	23.396	0.080	292.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.005	20.601	0.211	97.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.006	15.899	0.078	203.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.007	9.981	0.050	199.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
13.000	46.44	8.17	98.425	0.060	0.0	0.0	0.0	3.04	120.8	7.5
14.000	50.00	4.25	96.840	0.000	0.0	0.0	0.0	0.97	38.8	0.0
13.001	45.59	8.48	96.672	0.110	0.0	0.0	0.0	2.10	148.4	13.6
12.001	44.58	8.85	95.841	0.680	0.0	0.0	0.0	1.90	302.2	82.1
10.003	44.00	9.08	95.315	1.425	0.0	0.0	0.0	1.36	384.0	169.8
10.004	43.72	9.19	95.257	1.425	0.0	0.0	0.0	1.73	488.5	169.8
9.002	34.54	14.04	95.200	2.590	0.0	0.0	0.0	0.14	91.5«	242.3
9.003	33.94	14.47	95.199	2.590	0.0	0.0	0.0	0.21	14.6«	242.3
9.004	33.36	14.90	95.198	2.590	0.0	0.0	0.0	0.91	64.6«	242.3
9.005	33.07	15.11	95.118	2.590	0.0	0.0	0.0	1.59	112.5«	242.3
9.006	32.76	15.35	94.907	2.590	0.0	0.0	0.0	1.10	77.6«	242.3
9.007	32.57	15.50	94.829	2.590	0.0	0.0	0.0	1.11	78.4«	242.3

Manhole Schedules for SW 01

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdr (mm)
S1.01A	99.000	3.100	Open Manhole	1500	9.000	95.900	450				
S1.01	96.633	1.283	Junction		9.001	95.350	600	9.000	95.350	450	
S1.02A	98.578	1.348	Open Manhole	1200	10.000	97.230	150				
S1.02	98.035	2.025	Open Manhole	1500	10.001	96.010	300	10.000	96.160	150	
S1.03	97.374	1.664	Open Manhole	1200	10.002	95.710	375	10.001	95.785	300	
S1.04	97.119	1.444	Junction		11.000	95.675	300				
S1.05	98.050	1.574	Open Manhole	1240 x 825	12.000	96.476	375				
S1.06	99.870	1.445	Open Manhole	1200	13.000	98.425	225				
S1.07	98.437	1.597	Junction		14.000	96.840	225				
S1.08	98.735	2.063	Open Manhole	1200	13.001	96.672	300	13.000	96.747	225	
								14.000	96.757	225	
S1.09	98.090	2.249	Open Manhole	1500	12.001	95.841	450	12.000	95.916	375	
								13.001	95.991	300	
S1.10	97.354	2.039	Open Manhole	1500	10.003	95.315	600	10.002	95.540	375	
								11.000	95.615	300	
								12.001	95.465	450	
S1.11	97.000	1.743	Junction		10.004	95.257	600	10.003	95.257	600	
S1.12	97.000	1.801	Junction		9.002	95.200	900	9.001	95.200	600	
								10.004	95.199	600	
S1.13	97.000	1.801	Junction		9.003	95.199	300	9.002	95.199	900	
S1.14 FC	96.953	1.755	Open Manhole	1500	9.004	95.198	300	9.003	95.198	300	
S1.15	96.686	1.568	Junction		9.005	95.118	300	9.004	95.118	300	
S1.16	96.270	1.363	Junction		9.006	94.907	300	9.005	94.907	300	
S1.17	96.270	1.441	Junction		9.007	94.829	300	9.006	94.829	300	
S1.02	96.200	1.421	Open Manhole	1200		OUTFALL		9.007	94.779	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1.01A	568102.938	246731.215	568102.938	246731.215	Required	
S1.01	568125.414	246733.489			No Entry	
S1.02	568230.437	246689.379	568230.437	246689.379	Required	

Manhole Schedules for SW 01

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1.03	568174.508	246685.813	568174.508	246685.813	Required	
S1.04	568184.433	246740.920			No Entry	
S1.05	568182.975	246783.342	568182.975	246783.342	Required	
S1.06	568178.368	246852.552	568178.368	246852.552	Required	
S1.07	568186.731	246820.981			No Entry	
S1.08	568171.913	246821.789	568171.913	246821.789	Required	
S1.09	568169.156	246783.555	568169.156	246783.555	Required	
S1.10	568169.778	246740.542	568169.778	246740.542	Required	
S1.11	568152.002	246735.423			No Entry	
S1.12	568140.535	246735.019			No Entry	
S1.13	568149.562	246694.157			No Entry	
S1.14 FC	568150.688	246688.973	568150.688	246688.973	Required	
S1.15	568155.906	246666.167			No Entry	
S1.16	568152.902	246645.786			No Entry	
S1.17	568152.676	246629.889			No Entry	

Manhole Schedules for SW 01

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1.02	568162.612	246628.934			No Entry	

PIPELINE SCHEDULES for SW 01

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)
9.000	o	450	S1.01A	99.000	95.900	2.650	Open Manhole	1500
9.001	o	600	S1.01	96.633	95.350	0.683	Junction	
10.000	o	150	S1.02A	98.578	97.230	1.198	Open Manhole	1200
10.001	o	300	S1.02	98.035	96.010	1.725	Open Manhole	1500
10.002	o	375	S1.03	97.374	95.710	1.289	Open Manhole	1200
11.000	o	300	S1.04	97.119	95.675	1.144	Junction	
12.000	o	375	S1.05	98.050	96.476	1.199	Open Manhole	1240 x 825
13.000	o	225	S1.06	99.870	98.425	1.220	Open Manhole	1200
14.000	o	225	S1.07	98.437	96.840	1.372	Junction	
13.001	o	300	S1.08	98.735	96.672	1.763	Open Manhole	1200
12.001	o	450	S1.09	98.090	95.841	1.799	Open Manhole	1500
10.003	o	600	S1.10	97.354	95.315	1.439	Open Manhole	1500
10.004	o	600	S1.11	97.000	95.257	1.143	Junction	

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)
9.000	22.590	41.1	S1.01	96.633	95.350	0.833	Junction	
9.001	15.198	101.3	S1.12	97.000	95.200	1.200	Junction	
10.000	20.329	19.0	S1.02	98.035	96.160	1.725	Open Manhole	1500
10.001	56.042	249.1	S1.03	97.374	95.785	1.289	Open Manhole	1200
10.002	54.933	323.1	S1.10	97.354	95.540	1.439	Open Manhole	1500
11.000	14.659	244.3	S1.10	97.354	95.615	1.439	Open Manhole	1500
12.000	13.821	24.7	S1.09	98.090	95.916	1.799	Open Manhole	1500
13.000	31.433	18.7	S1.08	98.735	96.747	1.763	Open Manhole	1200
14.000	14.840	178.8	S1.08	98.735	96.757	1.753	Open Manhole	1200
13.001	38.333	56.3	S1.09	98.090	95.991	1.799	Open Manhole	1500
12.001	43.018	114.4	S1.10	97.354	95.465	1.439	Open Manhole	1500
10.003	18.499	318.9	S1.11	97.000	95.257	1.143	Junction	
10.004	11.474	197.8	S1.12	97.000	95.199	1.201	Junction	

PIPELINE SCHEDULES for SW 01

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)
9.002	o	900	S1.12	97.000	95.200	0.900	Junction	
9.003	o	300	S1.13	97.000	95.199	1.501	Junction	
9.004	o	300	S1.14 FC	96.953	95.198	1.455	Open Manhole	1500
9.005	o	300	S1.15	96.686	95.118	1.268	Junction	
9.006	o	300	S1.16	96.270	94.907	1.063	Junction	
9.007	o	300	S1.17	96.270	94.829	1.141	Junction	

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)
9.002	41.847	41846.7	S1.13	97.000	95.199	0.901	Junction	
9.003	5.305	5304.7	S1.14 FC	96.953	95.198	1.455	Open Manhole	1500
9.004	23.396	292.5	S1.15	96.686	95.118	1.268	Junction	
9.005	20.601	97.6	S1.16	96.270	94.907	1.063	Junction	
9.006	15.899	203.8	S1.17	96.270	94.829	1.141	Junction	
9.007	9.981	199.6	S1.O2	96.200	94.779	1.121	Open Manhole	1200

Area Summary for SW 01

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
9.000	-	-	100	1.130	1.130	1.130
9.001	-	-	100	0.035	0.035	0.035
10.000	-	-	100	0.025	0.025	0.025
10.001	-	-	100	0.260	0.260	0.260
10.002	-	-	100	0.150	0.150	0.150
11.000	-	-	100	0.220	0.220	0.220
12.000	-	-	100	0.520	0.520	0.520
13.000	-	-	100	0.060	0.060	0.060
14.000	-	-	100	0.000	0.000	0.000
13.001	-	-	100	0.050	0.050	0.050
12.001	-	-	100	0.050	0.050	0.050
10.003	-	-	100	0.090	0.090	0.090
10.004	-	-	100	0.000	0.000	0.000
9.002	-	-	100	0.000	0.000	0.000
9.003	-	-	100	0.000	0.000	0.000
9.004	-	-	100	0.000	0.000	0.000
9.005	-	-	100	0.000	0.000	0.000
9.006	-	-	100	0.000	0.000	0.000
9.007	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				2.590	2.590	2.590

Simulation Criteria for SW 01

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	1.000
Hot Start (mins)	0	Inlet Coeffiecient	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)	10080
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	2

Number of Input Hydrographs	0	Number of Storage Structures	1
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	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	15
Ratio R	0.430		

Online Controls for SW 01

Complex Manhole: S1.13, DS/PN: 9.003, Volume (m³): 26.6

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0114-5000-0400-5000
Design Head (m)	0.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	114
Invert Level (m)	95.199
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.400	5.0
Flush-Flo™	0.169	5.0
Kick-Flo®	0.312	4.5
Mean Flow over Head Range	-	4.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.0	1.200	8.3	3.000	12.9	7.000	19.5
0.200	5.0	1.400	9.0	3.500	13.9	7.500	20.2
0.300	4.6	1.600	9.6	4.000	14.8	8.000	20.9
0.400	5.0	1.800	10.1	4.500	15.6	8.500	21.5
0.500	5.5	2.000	10.6	5.000	16.4	9.000	22.1
0.600	6.0	2.200	11.1	5.500	17.3	9.500	22.7
0.800	6.9	2.400	11.6	6.000	18.0		
1.000	7.7	2.600	12.0	6.500	18.8		

Orifice

Diameter (m) 0.225 Discharge Coefficient 0.600 Invert Level (m) 96.129

Storage Structures for SW 01

Tank or Pond Manhole: S1.13, DS/PN: 9.003

Invert Level (m) 95.199

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	938.0	0.551	1358.0	1.700	1885.0
0.550	1132.0	1.500	1786.0		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 01

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	1
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	0.430
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	OFF

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
9.000	S1.01A	15 Winter	1	+0%	30/15 Summer			
9.001	S1.01	15 Winter	1	+0%				
10.000	S1.02A	15 Winter	1	+0%	30/15 Winter			
10.001	S1.02	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
10.002	S1.03	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
11.000	S1.04	15 Winter	1	+0%				
12.000	S1.05	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
13.000	S1.06	15 Winter	1	+0%				
14.000	S1.07	60 Winter	1	+0%				
13.001	S1.08	15 Winter	1	+0%	100/15 Summer			
12.001	S1.09	15 Winter	1	+0%	30/15 Summer			
10.003	S1.10	15 Winter	1	+0%	30/15 Summer			
10.004	S1.11	15 Winter	1	+0%				
9.002	S1.12	15 Winter	1	+0%				
9.003	S1.13	960 Winter	1	+0%	1/120 Winter			
9.004	S1.14 FC	30 Winter	1	+0%				
9.005	S1.15	30 Winter	1	+0%				
9.006	S1.16	30 Winter	1	+0%				
9.007	S1.17	1440 Winter	1	+0%				

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 01

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
9.000	S1.01A	96.107	-0.243	0.000	0.44		181.6	OK	
9.001	S1.01	95.734	-0.216	0.000	0.47		182.6	OK*	
10.000	S1.02A	97.262	-0.118	0.000	0.10		4.0	OK	
10.001	S1.02	96.171	-0.139	0.000	0.54		35.9	OK	4
10.002	S1.03	95.904	-0.181	0.000	0.51		52.6	OK	4
11.000	S1.04	95.838	-0.137	0.000	0.58		35.3	OK*	
12.000	S1.05	96.612	-0.239	0.000	0.29		83.6	OK	3
13.000	S1.06	98.461	-0.189	0.000	0.06		7.1	OK	
14.000	S1.07	96.840	-0.225	0.000	0.00		0.0	OK*	
13.001	S1.08	96.734	-0.238	0.000	0.10		13.3	OK	
12.001	S1.09	96.033	-0.258	0.000	0.38		101.5	OK	
10.003	S1.10	95.772	-0.143	0.000	0.66		188.7	OK	
10.004	S1.11	95.736	-0.121	0.000	0.56		193.2	OK*	
9.002	S1.12	95.707	-0.393	0.000	0.60		343.6	OK*	
9.003	S1.13	95.617	0.118	0.000	0.08		5.0	SURCHARGED*	
9.004	S1.14 FC	95.257	-0.241	0.000	0.09		5.0	OK	
9.005	S1.15	95.158	-0.260	0.000	0.04		5.0	OK*	
9.006	S1.16	94.959	-0.248	0.000	0.07		5.0	OK*	
9.007	S1.17	94.886	-0.243	0.000	0.08		5.0	OK*	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 01

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	1
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	0.430
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	OFF

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
9.000	S1.01A	15 Winter	30	+0%	30/15 Summer			
9.001	S1.01	120 Winter	30	+0%				
10.000	S1.02A	15 Winter	30	+0%	30/15 Winter			
10.001	S1.02	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
10.002	S1.03	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
11.000	S1.04	30 Winter	30	+0%				
12.000	S1.05	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
13.000	S1.06	15 Winter	30	+0%				
14.000	S1.07	15 Winter	30	+0%				
13.001	S1.08	15 Winter	30	+0%	100/15 Summer			
12.001	S1.09	15 Winter	30	+0%	30/15 Summer			
10.003	S1.10	15 Winter	30	+0%	30/15 Summer			
10.004	S1.11	60 Winter	30	+0%				
9.002	S1.12	30 Winter	30	+0%				
9.003	S1.13	960 Winter	30	+0%	1/120 Winter			
9.004	S1.14 FC	960 Winter	30	+0%				
9.005	S1.15	960 Winter	30	+0%				
9.006	S1.16	960 Winter	30	+0%				
9.007	S1.17	960 Winter	30	+0%				

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 01

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
9.000	S1.01A	96.969	0.619	0.000	1.04		433.6	SURCHARGED	
9.001	S1.01	95.950	0.000	0.000	0.34		130.6	SURCHARGED*	
10.000	S1.02A	97.383	0.003	0.000	0.25		9.6	SURCHARGED	
10.001	S1.02	97.337	1.027	0.000	1.38		91.8	SURCHARGED	4
10.002	S1.03	96.882	0.797	0.000	1.30		134.5	SURCHARGED	4
11.000	S1.04	95.975	0.000	0.000	0.96		58.9	SURCHARGED*	
12.000	S1.05	97.070	0.219	0.000	0.64		186.6	SURCHARGED	3
13.000	S1.06	98.484	-0.166	0.000	0.15		17.5	OK	
14.000	S1.07	96.848	-0.217	0.000	0.00		0.1	OK*	
13.001	S1.08	96.861	-0.111	0.000	0.26		35.5	OK	
12.001	S1.09	96.815	0.524	0.000	0.83		225.3	SURCHARGED	
10.003	S1.10	96.558	0.643	0.000	1.60		453.8	SURCHARGED	
10.004	S1.11	95.857	0.000	0.000	0.77		266.1	SURCHARGED*	
9.002	S1.12	96.100	0.000	0.000	1.18		675.8	SURCHARGED*	
9.003	S1.13	96.038	0.539	0.000	0.11		6.8	SURCHARGED*	
9.004	S1.14 FC	95.266	-0.232	0.000	0.12		6.8	OK	
9.005	S1.15	95.165	-0.253	0.000	0.06		6.8	OK*	
9.006	S1.16	94.969	-0.238	0.000	0.10		6.8	OK*	
9.007	S1.17	94.895	-0.234	0.000	0.11		6.8	OK*	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 01

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	1
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	0.430
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	21.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	OFF

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
9.000	S1.01A	15 Winter	100	+30%	30/15 Summer			
9.001	S1.01	60 Winter	100	+30%				
10.000	S1.02A	15 Summer	100	+30%	30/15 Winter			
10.001	S1.02	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
10.002	S1.03	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
11.000	S1.04	60 Winter	100	+30%				
12.000	S1.05	15 Winter	100	+30%	30/15 Summer	100/15 Summer		
13.000	S1.06	15 Winter	100	+30%				
14.000	S1.07	30 Winter	100	+30%				
13.001	S1.08	15 Winter	100	+30%	100/15 Summer			
12.001	S1.09	15 Winter	100	+30%	30/15 Summer			
10.003	S1.10	15 Winter	100	+30%	30/15 Summer			
10.004	S1.11	60 Winter	100	+30%				
9.002	S1.12	60 Winter	100	+30%				
9.003	S1.13	960 Winter	100	+30%	1/120 Winter			
9.004	S1.14 FC	960 Winter	100	+30%				
9.005	S1.15	960 Winter	100	+30%				
9.006	S1.16	960 Winter	100	+30%				
9.007	S1.17	960 Winter	100	+30%				

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW 01

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
9.000	S1.01A	98.751	2.401	0.000	1.73		721.6	FLOOD RISK	
9.001	S1.01	95.950	0.000	0.000	0.96		371.2	SURCHARGED*	
10.000	S1.02A	98.242	0.862	0.000	0.40		15.5	SURCHARGED	
10.001	S1.02	98.046	1.736	10.648	1.71		113.4	FLOOD	4
10.002	S1.03	97.390	1.305	15.831	2.11		217.8	FLOOD	4
11.000	S1.04	95.975	0.000	0.000	1.12		68.6	SURCHARGED*	
12.000	S1.05	98.062	1.211	12.110	0.89		262.1	FLOOD	3
13.000	S1.06	98.503	-0.147	0.000	0.26		29.6	OK	
14.000	S1.07	97.065	0.000	0.000	0.12		4.6	SURCHARGED*	
13.001	S1.08	97.920	0.948	0.000	0.43		58.4	SURCHARGED	
12.001	S1.09	97.734	1.443	0.000	1.20		323.9	SURCHARGED	
10.003	S1.10	97.227	1.312	0.000	2.19		623.3	FLOOD RISK	
10.004	S1.11	95.857	0.000	0.000	1.25		434.8	SURCHARGED*	
9.002	S1.12	96.100	0.000	0.000	1.39		796.1	SURCHARGED*	
9.003	S1.13	96.405	0.906	0.000	0.37		22.6	SURCHARGED*	
9.004	S1.14 FC	95.328	-0.170	0.000	0.39		22.6	OK	
9.005	S1.15	95.209	-0.209	0.000	0.20		22.6	OK*	
9.006	S1.16	95.024	-0.183	0.000	0.32		22.6	OK*	
9.007	S1.17	94.954	-0.175	0.000	0.37		22.6	OK*	