STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Water - Network A - MD

- 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)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	7.102	0.047	151.1	0.004	4.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	19.430	0.130	149.5	0.047	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	10.458	0.105	99.6	0.002	4.00	0.0	0.600	o	100	Pipe/Conduit	
S1.002	47.031	0.157	299.6	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	36.308	0.242	150.0	0.028	4.00	0.0	0.600	o	150	Pipe/Conduit	
S4.000	6.192	0.155	39.9	0.016	4.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	30.074	0.200	150.4	0.034	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	12.810	0.043	297.9	0.009	0.00	0.0	0.600	o	375	Pipe/Conduit	
S5.000	14.191	0.177	80.2	0.021	4.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	17.091	0.114	149.9	0.048	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)
S1.000	50.00	4.15	78.515	0.004	0.0	0.0	0.0	0.82	14.4	0.6
S1.001	50.00	4.54	78.468	0.051	0.0	0.0	0.0	0.82	14.5	7.0
S2.000	50.00	4.23	78.493	0.002	0.0	0.0	0.0	0.77	6.1	0.3
S1.002	50.00	5.41	78.188	0.112	0.0	0.0	0.0	0.90	63.8	15.2
S3.000	50.00	4.74	78.359	0.028	0.0	0.0	0.0	0.82	14.5	3.8
S4.000	50.00	4.06	78.272	0.016	0.0	0.0	0.0	1.60	28.2	2.1
S3.001	50.00	5.35	78.117	0.078	0.0	0.0	0.0	0.82	14.4	10.6
S1.003	50.00	5.61	77.692	0.200	0.0	0.0	0.0	1.04	115.4	27.0
S5.000	50.00	4.21	78.165	0.021	0.0	0.0	0.0	1.12	19.9	2.9
S5.001	50.00	4.56	77.988	0.069	0.0	0.0	0.0	0.82	14.5	9.4

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Water - Network A - MD

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.004	33.903	0.113	300.0	0.058	0.00	0.0	0.600	o	375	Pipe/Conduit	
S6.000	31.280	0.187	167.3	0.074	4.00	0.0	0.600	o	225	Pipe/Conduit	
S7.000	14.320	0.095	150.7	0.019	4.00	0.0	0.600	o	150	Pipe/Conduit	
S7.001	23.791	0.298	79.8	0.050	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	25.611	0.086	297.8	0.036	0.00	0.0	0.600	o	375	Pipe/Conduit	
S8.000	9.054	0.091	99.5	0.033	4.00	0.0	0.600	o	150	Pipe/Conduit	
S1.006	24.024	0.080	300.3	0.068	0.00	0.0	0.600	o	375	Pipe/Conduit	
S9.000	31.492	0.210	150.0	0.038	4.00	0.0	0.600	o	150	Pipe/Conduit	
S9.001	28.272	0.189	149.6	0.036	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.007	23.425	0.078	300.3	0.016	0.00	0.0	0.600	o	375	Pipe/Conduit	
S10.000	10.281	0.103	99.8	0.013	4.00	0.0	0.600	o	150	Pipe/Conduit	
S1.008	28.688	0.096	298.8	0.021	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.004	50.00	6.16	77.649	0.326	0.0	0.0	0.0	1.04	115.0	44.2
S6.000	50.00	4.52	77.873	0.074	0.0	0.0	0.0	1.01	40.1	10.0
S7.000	50.00	4.29	78.154	0.019	0.0	0.0	0.0	0.82	14.4	2.5
S7.001	50.00	4.64	78.059	0.069	0.0	0.0	0.0	1.13	19.9	9.3
S1.005	50.00	6.56	77.536	0.505	0.0	0.0	0.0	1.04	115.4	68.4
S8.000	50.00	4.15	77.766	0.033	0.0	0.0	0.0	1.01	17.8	4.4
S1.006	50.00	6.95	77.450	0.605	0.0	0.0	0.0	1.04	114.9	81.9
S9.000	50.00	4.64	77.994	0.038	0.0	0.0	0.0	0.82	14.5	5.2
S9.001	50.00	5.22	77.784	0.074	0.0	0.0	0.0	0.82	14.5	10.0
S1.007	50.00	7.32	77.370	0.695	0.0	0.0	0.0	1.04	114.9	94.1
S10.000	50.00	4.17	77.653	0.013	0.0	0.0	0.0	1.01	17.8	1.7
S1.008	50.00	7.78	77.292	0.729	0.0	0.0	0.0	1.04	115.2	98.7

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Water - Network A - MD

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
S11.000	21.736	0.145	149.9	0.013	4.00	0.0	0.600	o	150	Pipe/Conduit	
S11.001	19.863	0.207	96.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.009	11.989	0.040	299.7	0.013	0.00	0.0	0.600	o	375	Pipe/Conduit	
S12.000	21.897	0.219	100.0	0.040	4.00	0.0	0.600	o	150	Pipe/Conduit	
S12.001	28.531	0.285	100.1	0.079	0.00	0.0	0.600	o	225	Pipe/Conduit	
S12.002	46.139	0.308	149.8	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
S13.000	33.246	0.416	79.9	0.024	4.00	0.0	0.600	o	150	Pipe/Conduit	
S13.001	17.702	0.708	25.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S12.003	8.820#	0.059	149.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.010	13.656	0.007	1950.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.011	3.600	0.024	150.0	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)
S11.000	50.00	4.44	77.773	0.013	0.0	0.0	0.0	0.82	14.5	1.7
S11.001	50.00	4.77	77.628	0.013	0.0	0.0	0.0	1.03	18.1	1.7
S1.009	50.00	7.97	77.196	0.755	0.0	0.0	0.0	1.04	115.0	102.2
S12.000	50.00	4.36	78.121	0.040	0.0	0.0	0.0	1.00	17.8	5.4
S12.001	50.00	4.73	77.827	0.119	0.0	0.0	0.0	1.31	52.0	16.1
S12.002	50.00	5.33	77.467	0.144	0.0	0.0	0.0	1.28	90.6	19.5
S13.000	50.00	4.49	78.435	0.024	0.0	0.0	0.0	1.13	19.9	3.2
S13.001	50.00	4.64	78.019	0.024	0.0	0.0	0.0	2.02	35.7	3.2
S12.003	50.00	5.44	77.159	0.168	0.0	0.0	0.0	1.28	90.7	22.7
S1.010	50.00	9.01	77.100	0.923	0.0	0.0	0.0	0.22	3.9«	125.0
S1.011	50.00	9.09	77.084	0.923	0.0	0.0	0.0	0.82	14.5«	125.0

Online Controls for Surface Water - Network A - MD

Complex Manhole: S16.0, DS/PN: S1.011, Volume (m³): 1.5

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0059-1400-0774-1400
Design Head (m)	0.774
Design Flow (l/s)	1.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	77.084
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.774	1.4
Flush-Flo™	0.241	1.4
Kick-Flo®	0.493	1.1
Mean Flow over Head Range	-	1.2

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	1.2	1.200	1.7	3.000	2.6	7.000	3.8
0.200	1.4	1.400	1.8	3.500	2.8	7.500	4.0
0.300	1.4	1.600	1.9	4.000	3.0	8.000	4.1
0.400	1.3	1.800	2.1	4.500	3.1	8.500	4.2
0.500	1.2	2.000	2.2	5.000	3.3	9.000	4.3
0.600	1.2	2.200	2.2	5.500	3.4	9.500	4.5
0.800	1.4	2.400	2.3	6.000	3.6		
1.000	1.6	2.600	2.4	6.500	3.7		

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0065-1300-0150-1300
Design Head (m)	0.150
Design Flow (l/s)	1.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	65
Invert Level (m)	77.858

Hydro-Brake® Optimum

Minimum Outlet Pipe Diameter (mm) 100
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.150	1.3
Flush-Flo™	0.086	1.3
Kick-Flo®	0.130	1.2
Mean Flow over Head Range	-	0.9

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.3	1.200	3.3	3.000	5.2	7.000	8.0
0.200	1.5	1.400	3.6	3.500	5.6	7.500	8.3
0.300	1.8	1.600	3.8	4.000	6.0	8.000	8.6
0.400	2.0	1.800	4.0	4.500	6.4	8.500	8.8
0.500	2.2	2.000	4.3	5.000	6.8	9.000	9.1
0.600	2.4	2.200	4.5	5.500	7.1	9.500	9.3
0.800	2.8	2.400	4.7	6.000	7.4		
1.000	3.1	2.600	4.9	6.500	7.7		

Weir

Discharge Coef 0.544 Width (m) 1.800 Invert Level (m) 155.262

Storage Structures for Surface Water - Network A - MD

Tank or Pond Manhole: SHW (POND), DS/PN: S1.010

Invert Level (m) 77.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	401.0	1.000	1196.6	1.150	1854.5
0.900	747.0	1.100	1673.3		

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of 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 0.401
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	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	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, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1.0	15 Winter	1	+0%	30/15 Summer			
S1.001	S1.1	15 Winter	1	+0%	30/15 Summer			
S2.000	S2.0	15 Winter	1	+0%	100/15 Summer			
S1.002	S1.2	15 Winter	1	+0%	100/15 Summer			
S3.000	S3.0	15 Winter	1	+0%	30/15 Summer			
S4.000	S4.0	15 Summer	1	+0%	30/15 Summer	100/15 Winter		
S3.001	S3.1	15 Winter	1	+0%	30/15 Summer			
S1.003	S1.3	15 Winter	1	+0%	30/15 Summer			
S5.000	S5.0	15 Summer	1	+0%	30/15 Summer			
S5.001	S5.1	15 Winter	1	+0%	30/15 Summer			
S1.004	S1.4	15 Winter	1	+0%	30/15 Summer			
S6.000	S6.0	15 Winter	1	+0%	30/15 Summer			
S7.000	S7.0	15 Winter	1	+0%	30/15 Summer			
S7.001	S7.1	15 Winter	1	+0%	30/15 Summer	100/15 Winter		
S1.005	S1.5	15 Winter	1	+0%	30/15 Summer			
S8.000	S8.0	15 Summer	1	+0%	30/15 Summer			
S1.006	S1.6	15 Winter	1	+0%	30/15 Summer			
S9.000	S9.0	15 Winter	1	+0%	30/15 Summer			
S9.001	S9.1	15 Winter	1	+0%	30/15 Summer	100/15 Winter		

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

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
S1.000	S1.0	78.545	-0.120	0.000	0.05		0.6	OK	
S1.001	S1.1	78.539	-0.079	0.000	0.45		6.1	OK	
S2.000	S2.0	78.509	-0.084	0.000	0.06		0.3	OK	
S1.002	S1.2	78.283	-0.205	0.000	0.22		13.2	OK	
S3.000	S3.0	78.415	-0.094	0.000	0.29		4.0	OK	
S4.000	S4.0	78.303	-0.119	0.000	0.10		2.3	OK	2
S3.001	S3.1	78.215	-0.052	0.000	0.75		10.3	OK	
S1.003	S1.3	77.844	-0.223	0.000	0.27		24.4	OK	
S5.000	S5.0	78.207	-0.108	0.000	0.18		3.2	OK	
S5.001	S5.1	78.077	-0.061	0.000	0.65		8.8	OK	
S1.004	S1.4	77.816	-0.208	0.000	0.37		38.4	OK	
S6.000	S6.0	77.956	-0.142	0.000	0.29		11.0	OK	
S7.000	S7.0	78.200	-0.104	0.000	0.21		2.7	OK	
S7.001	S7.1	78.131	-0.078	0.000	0.46		8.7	OK	1
S1.005	S1.5	77.751	-0.160	0.000	0.57		57.2	OK	
S8.000	S8.0	77.823	-0.093	0.000	0.31		4.9	OK	
S1.006	S1.6	77.686	-0.139	0.000	0.67		66.2	OK	
S9.000	S9.0	78.061	-0.083	0.000	0.39		5.4	OK	
S9.001	S9.1	77.877	-0.057	0.000	0.70		9.6	OK	1

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.007	S1.7	15 Winter	1	+0%	30/15 Summer			
S10.000	S10.0	15 Summer	1	+0%	30/15 Summer			
S1.008	S1.8	15 Winter	1	+0%	30/15 Summer			
S11.000	S11.0	15 Winter	1	+0%	100/960 Winter			
S11.001	S11.1	15 Winter	1	+0%	30/960 Winter			
S1.009	S1.9	15 Winter	1	+0%	30/15 Summer			
S12.000	S12.0	15 Winter	1	+0%	100/15 Summer			
S12.001	S12.1	15 Winter	1	+0%	100/15 Summer			
S12.002	S12.2	15 Winter	1	+0%	30/960 Winter			
S13.000	S13.0	15 Winter	1	+0%				
S13.001	S13.1	15 Winter	1	+0%				
S12.003	S12.3	960 Winter	1	+0%	30/30 Winter			
S1.010	SHW (POND)	960 Winter	1	+0%	1/30 Summer			
S1.011	S16.0	960 Winter	1	+0%	1/30 Summer			

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
S1.007	S1.7	77.618	-0.127	0.000	0.76		75.2	OK	
S10.000	S10.0	77.687	-0.116	0.000	0.12		1.9	OK	
S1.008	S1.8	77.542	-0.125	0.000	0.75		76.5	OK	
S11.000	S11.0	77.810	-0.113	0.000	0.14		1.9	OK	
S11.001	S11.1	77.661	-0.117	0.000	0.11		1.9	OK	
S1.009	S1.9	77.471	-0.100	0.000	0.88		77.8	OK	
S12.000	S12.0	78.183	-0.088	0.000	0.35		6.0	OK	
S12.001	S12.1	77.914	-0.138	0.000	0.32		15.3	OK	
S12.002	S12.2	77.561	-0.206	0.000	0.21		17.9	OK	
S13.000	S13.0	78.479	-0.106	0.000	0.18		3.5	OK	
S13.001	S13.1	78.052	-0.117	0.000	0.10		3.5	OK	
S12.003	S12.3	77.439	-0.020	0.000	0.03		1.7	OK	
S1.010	SHW (POND)	77.439	0.189	0.000	0.30		1.5	SURCHARGED	
S1.011	S16.0	77.443	0.209	0.000	0.13		1.4	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of 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 0.401
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	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	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, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1.0	15 Winter	30	+0%	30/15 Summer			
S1.001	S1.1	15 Winter	30	+0%	30/15 Summer			
S2.000	S2.0	15 Summer	30	+0%	100/15 Summer			
S1.002	S1.2	15 Winter	30	+0%	100/15 Summer			
S3.000	S3.0	15 Winter	30	+0%	30/15 Summer			
S4.000	S4.0	15 Winter	30	+0%	30/15 Summer	100/15 Winter		
S3.001	S3.1	15 Winter	30	+0%	30/15 Summer			
S1.003	S1.3	15 Winter	30	+0%	30/15 Summer			
S5.000	S5.0	15 Winter	30	+0%	30/15 Summer			
S5.001	S5.1	15 Winter	30	+0%	30/15 Summer			
S1.004	S1.4	15 Winter	30	+0%	30/15 Summer			
S6.000	S6.0	15 Winter	30	+0%	30/15 Summer			
S7.000	S7.0	15 Winter	30	+0%	30/15 Summer			
S7.001	S7.1	15 Winter	30	+0%	30/15 Summer	100/15 Winter		
S1.005	S1.5	15 Winter	30	+0%	30/15 Summer			
S8.000	S8.0	15 Winter	30	+0%	30/15 Summer			
S1.006	S1.6	15 Winter	30	+0%	30/15 Summer			
S9.000	S9.0	15 Winter	30	+0%	30/15 Summer			
S9.001	S9.1	15 Winter	30	+0%	30/15 Summer	100/15 Winter		

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

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
S1.000	S1.0	78.674	0.009	0.000	0.16		1.9	FLOOD RISK	
S1.001	S1.1	78.672	0.054	0.000	1.20		16.3	FLOOD RISK	
S2.000	S2.0	78.519	-0.074	0.000	0.15		0.9	OK	
S1.002	S1.2	78.449	-0.039	0.000	0.61		36.5	OK	
S3.000	S3.0	78.646	0.137	0.000	0.59		8.3	FLOOD RISK	
S4.000	S4.0	78.619	0.197	0.000	0.18		4.3	FLOOD RISK	2
S3.001	S3.1	78.612	0.345	0.000	1.26		17.4	FLOOD RISK	
S1.003	S1.3	78.396	0.329	0.000	0.49		44.3	SURCHARGED	
S5.000	S5.0	78.486	0.171	0.000	0.33		6.0	FLOOD RISK	
S5.001	S5.1	78.468	0.330	0.000	1.45		19.6	SURCHARGED	
S1.004	S1.4	78.331	0.307	0.000	0.64		66.3	SURCHARGED	
S6.000	S6.0	78.286	0.188	0.000	0.64		23.9	SURCHARGED	
S7.000	S7.0	78.428	0.124	0.000	0.41		5.5	FLOOD RISK	
S7.001	S7.1	78.413	0.204	0.000	1.00		18.9	FLOOD RISK	1
S1.005	S1.5	78.240	0.329	0.000	1.01		101.3	SURCHARGED	
S8.000	S8.0	78.182	0.266	0.000	0.68		10.7	SURCHARGED	
S1.006	S1.6	78.150	0.325	0.000	1.23		121.8	SURCHARGED	
S9.000	S9.0	78.345	0.201	0.000	0.75		10.4	FLOOD RISK	
S9.001	S9.1	78.274	0.340	0.000	1.21		16.7	FLOOD RISK	1

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.007	S1.7	15 Winter	30	+0%	30/15 Summer			
S10.000	S10.0	15 Winter	30	+0%	30/15 Summer			
S1.008	S1.8	15 Winter	30	+0%	30/15 Summer			
S11.000	S11.0	15 Winter	30	+0%	100/960 Winter			
S11.001	S11.1	1440 Winter	30	+0%	30/960 Winter			
S1.009	S1.9	1440 Winter	30	+0%	30/15 Summer			
S12.000	S12.0	15 Winter	30	+0%	100/15 Summer			
S12.001	S12.1	15 Winter	30	+0%	100/15 Summer			
S12.002	S12.2	1440 Winter	30	+0%	30/960 Winter			
S13.000	S13.0	15 Winter	30	+0%				
S13.001	S13.1	15 Winter	30	+0%				
S12.003	S12.3	1440 Winter	30	+0%	30/30 Winter			
S1.010	SHW (POND)	1440 Winter	30	+0%	1/30 Summer			
S1.011	S16.0	1440 Winter	30	+0%	1/30 Summer			

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
S1.007	S1.7	78.030	0.285	0.000	1.43		140.8	SURCHARGED	
S10.000	S10.0	77.884	0.081	0.000	0.28		4.4	SURCHARGED	
S1.008	S1.8	77.873	0.206	0.000	1.45		146.6	SURCHARGED	
S11.000	S11.0	77.833	-0.090	0.000	0.34		4.6	OK	
S11.001	S11.1	77.819	0.041	0.000	0.01		0.2	FLOOD RISK	
S1.009	S1.9	77.819	0.248	0.000	0.13		11.8	SURCHARGED	
S12.000	S12.0	78.229	-0.042	0.000	0.87		14.5	OK	
S12.001	S12.1	77.994	-0.058	0.000	0.88		42.7	OK	
S12.002	S12.2	77.818	0.051	0.000	0.03		2.3	SURCHARGED	
S13.000	S13.0	78.506	-0.079	0.000	0.45		8.7	OK	
S13.001	S13.1	78.071	-0.098	0.000	0.26		8.6	OK	
S12.003	S12.3	77.818	0.359	0.000	0.04		2.5	FLOOD RISK	
S1.010	SHW (POND)	77.818	0.568	0.000	0.30		1.5	SURCHARGED	
S1.011	S16.0	77.822	0.588	0.000	0.13		1.4	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of 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 0.401
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	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	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, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1.0	15 Winter	100	+0%	30/15 Summer			
S1.001	S1.1	15 Winter	100	+0%	30/15 Summer			
S2.000	S2.0	15 Winter	100	+0%	100/15 Summer			
S1.002	S1.2	15 Winter	100	+0%	100/15 Summer			
S3.000	S3.0	15 Winter	100	+0%	30/15 Summer			
S4.000	S4.0	15 Winter	100	+0%	30/15 Summer	100/15 Winter		
S3.001	S3.1	15 Winter	100	+0%	30/15 Summer			
S1.003	S1.3	15 Winter	100	+0%	30/15 Summer			
S5.000	S5.0	15 Winter	100	+0%	30/15 Summer			
S5.001	S5.1	15 Winter	100	+0%	30/15 Summer			
S1.004	S1.4	15 Winter	100	+0%	30/15 Summer			
S6.000	S6.0	15 Winter	100	+0%	30/15 Summer			
S7.000	S7.0	15 Winter	100	+0%	30/15 Summer			
S7.001	S7.1	15 Winter	100	+0%	30/15 Summer	100/15 Winter		
S1.005	S1.5	15 Winter	100	+0%	30/15 Summer			
S8.000	S8.0	15 Winter	100	+0%	30/15 Summer			
S1.006	S1.6	15 Winter	100	+0%	30/15 Summer			
S9.000	S9.0	15 Winter	100	+0%	30/15 Summer			
S9.001	S9.1	15 Winter	100	+0%	30/15 Summer	100/15 Winter		

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

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
S1.000	S1.0	78.849	0.184	0.000	0.21		2.6	FLOOD RISK	
S1.001	S1.1	78.838	0.220	0.000	1.38		18.7	FLOOD RISK	
S2.000	S2.0	78.724	0.131	0.000	0.34		1.9	SURCHARGED	
S1.002	S1.2	78.712	0.224	0.000	0.69		41.1	FLOOD RISK	
S3.000	S3.0	78.820	0.311	0.000	0.61		8.5	FLOOD RISK	
S4.000	S4.0	78.685	0.263	1.490	0.66		15.5	FLOOD	2
S3.001	S3.1	78.745	0.478	0.000	1.28		17.7	FLOOD RISK	
S1.003	S1.3	78.632	0.565	0.000	0.54		48.1	FLOOD RISK	
S5.000	S5.0	78.751	0.436	0.000	0.56		10.3	FLOOD RISK	
S5.001	S5.1	78.776	0.638	0.000	1.56		21.0	FLOOD RISK	
S1.004	S1.4	78.601	0.577	0.000	0.77		79.0	FLOOD RISK	
S6.000	S6.0	78.588	0.490	0.000	0.70		26.4	FLOOD RISK	
S7.000	S7.0	78.570	0.266	0.000	0.52		6.9	FLOOD RISK	
S7.001	S7.1	78.540	0.331	2.528	1.08		20.5	FLOOD	1
S1.005	S1.5	78.514	0.603	0.000	1.19		118.8	FLOOD RISK	
S8.000	S8.0	78.425	0.509	0.000	0.74		11.7	FLOOD RISK	
S1.006	S1.6	78.394	0.569	0.000	1.49		147.0	FLOOD RISK	
S9.000	S9.0	78.466	0.322	0.000	0.81		11.3	FLOOD RISK	
S9.001	S9.1	78.327	0.393	0.317	1.39		19.3	FLOOD	1

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.007	S1.7	15 Winter	100	+0%	30/15 Summer			
S10.000	S10.0	15 Winter	100	+0%	30/15 Summer			
S1.008	S1.8	15 Winter	100	+0%	30/15 Summer			
S11.000	S11.0	1440 Winter	100	+0%	100/960 Winter			
S11.001	S11.1	1440 Winter	100	+0%	30/960 Winter			
S1.009	S1.9	1440 Winter	100	+0%	30/15 Summer			
S12.000	S12.0	15 Winter	100	+0%	100/15 Summer			
S12.001	S12.1	15 Winter	100	+0%	100/15 Summer			
S12.002	S12.2	1440 Winter	100	+0%	30/960 Winter			
S13.000	S13.0	15 Winter	100	+0%				
S13.001	S13.1	15 Winter	100	+0%				
S12.003	S12.3	1440 Winter	100	+0%	30/30 Winter			
S1.010	SHW (POND)	1440 Winter	100	+0%	1/30 Summer			
S1.011	S16.0	1440 Winter	100	+0%	1/30 Summer			

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
S1.007	S1.7	78.216	0.471	0.000	1.64		161.9	SURCHARGED	
S10.000	S10.0	78.014	0.211	0.000	0.31		4.9	FLOOD RISK	
S1.008	S1.8	78.001	0.334	0.000	1.69		170.9	SURCHARGED	
S11.000	S11.0	77.951	0.028	0.000	0.02		0.3	FLOOD RISK	
S11.001	S11.1	77.951	0.173	0.000	0.02		0.3	FLOOD RISK	
S1.009	S1.9	77.951	0.380	0.000	0.17		15.1	FLOOD RISK	
S12.000	S12.0	78.333	0.062	0.000	1.03		17.3	SURCHARGED	
S12.001	S12.1	78.099	0.047	0.000	1.08		52.2	SURCHARGED	
S12.002	S12.2	77.950	0.183	0.000	0.03		2.9	SURCHARGED	
S13.000	S13.0	78.518	-0.067	0.000	0.59		11.3	OK	
S13.001	S13.1	78.079	-0.090	0.000	0.34		11.2	OK	
S12.003	S12.3	77.950	0.491	0.000	0.05		3.2	FLOOD RISK	
S1.010	SHW (POND)	77.950	0.700	0.000	0.56		2.8	SURCHARGED	
S1.011	S16.0	77.939	0.705	0.000	0.25		2.8	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of 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 0.401
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	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	ON

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1.0	15 Winter	100	+40%	100/15 Summer			
S1.001	S1.1	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S2.000	S2.0	15 Winter	100	+40%	100/15 Summer			
S1.002	S1.2	15 Winter	100	+40%	100/15 Summer			
S3.000	S3.0	15 Winter	100	+40%	100/15 Summer			
S4.000	S4.0	30 Winter	100	+40%	100/15 Summer	100/15 Summer		
S3.001	S3.1	15 Winter	100	+40%	100/15 Summer			
S1.003	S1.3	15 Summer	100	+40%	100/15 Summer	100/15 Summer		
S5.000	S5.0	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S5.001	S5.1	15 Winter	100	+40%	100/15 Summer			
S1.004	S1.4	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S6.000	S6.0	15 Winter	100	+40%	100/15 Summer			
S7.000	S7.0	15 Winter	100	+40%	100/15 Summer			
S7.001	S7.1	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S1.005	S1.5	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S8.000	S8.0	15 Winter	100	+40%	100/15 Summer			
S1.006	S1.6	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S9.000	S9.0	15 Winter	100	+40%	100/15 Summer	100/15 Summer		
S9.001	S9.1	30 Winter	100	+40%	100/15 Summer	100/15 Summer		

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

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
S1.000	S1.0	78.853	0.188	0.000	0.29		3.6	FLOOD RISK	
S1.001	S1.1	78.849	0.231	6.018	1.67		22.7	FLOOD	4
S2.000	S2.0	78.873	0.280	0.000	0.54		3.1	SURCHARGED	
S1.002	S1.2	78.897	0.409	0.000	0.68		40.7	FLOOD RISK	
S3.000	S3.0	78.826	0.317	0.000	0.77		10.7	FLOOD RISK	
S4.000	S4.0	78.693	0.271	8.960	0.79		18.8	FLOOD	6
S3.001	S3.1	78.772	0.505	0.000	1.47		20.3	FLOOD RISK	
S1.003	S1.3	78.772	0.705	0.007	0.61		54.3	FLOOD	
S5.000	S5.0	78.760	0.445	5.525	1.19		21.7	FLOOD	5
S5.001	S5.1	78.898	0.760	0.000	1.66		22.4	FLOOD RISK	
S1.004	S1.4	78.728	0.704	0.064	0.94		96.2	FLOOD	2
S6.000	S6.0	78.766	0.668	0.000	0.88		33.0	FLOOD RISK	
S7.000	S7.0	78.614	0.310	0.000	0.87		11.5	FLOOD RISK	
S7.001	S7.1	78.550	0.341	13.063	1.34		25.3	FLOOD	6
S1.005	S1.5	78.621	0.710	5.149	1.28		128.1	FLOOD	4
S8.000	S8.0	78.617	0.701	0.000	1.12		17.5	FLOOD RISK	
S1.006	S1.6	78.539	0.714	0.300	1.60		158.5	FLOOD	2
S9.000	S9.0	78.474	0.330	2.297	0.82		11.4	FLOOD	3
S9.001	S9.1	78.335	0.401	8.240	1.53		21.1	FLOOD	6

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S1.007	S1.7	15 Winter	100	+40%	100/15 Summer		
S10.000	S10.0	15 Winter	100	+40%	100/15 Summer		
S1.008	S1.8	360 Winter	100	+40%	100/15 Summer		
S11.000	S11.0	1440 Winter	100	+40%	100/120 Winter		
S11.001	S11.1	1440 Winter	100	+40%	100/15 Summer	100/240 Winter	
S1.009	S1.9	1440 Winter	100	+40%	100/15 Summer		
S12.000	S12.0	15 Winter	100	+40%	100/15 Summer		
S12.001	S12.1	15 Winter	100	+40%	100/15 Summer		
S12.002	S12.2	1440 Winter	100	+40%	100/15 Summer		
S13.000	S13.0	15 Winter	100	+40%			
S13.001	S13.1	1440 Winter	100	+40%			
S12.003	S12.3	1440 Winter	100	+40%	100/15 Summer		
S1.010	SHW (POND)	1440 Winter	100	+40%	100/15 Summer		
S1.011	S16.0	1440 Winter	100	+40%	100/15 Summer		

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.007	S1.7		78.350	0.605	0.000	1.72		169.3	FLOOD RISK
S10.000	S10.0		78.143	0.340	0.000	0.45		7.2	FLOOD RISK
S1.008	S1.8		78.136	0.469	0.000	0.57		57.6	FLOOD RISK
S11.000	S11.0		78.096	0.173	0.000	0.03		0.4	FLOOD RISK
S11.001	S11.1		78.096	0.318	80.935	0.09		1.5	FLOOD
S1.009	S1.9		78.101	0.530	0.000	0.24		20.8	FLOOD RISK
S12.000	S12.0		78.724	0.453	0.000	1.33		22.4	FLOOD RISK
S12.001	S12.1		78.358	0.306	0.000	1.40		67.5	SURCHARGED
S12.002	S12.2		78.101	0.334	0.000	0.05		4.0	SURCHARGED
S13.000	S13.0		78.540	-0.045	0.000	0.82		15.8	OK
S13.001	S13.1		78.100	-0.069	0.000	0.02		0.7	OK
S12.003	S12.3		78.100	0.641	0.000	0.08		4.6	FLOOD RISK
S1.010	SHW (POND)		78.099	0.849	0.000	0.66		3.2	FLOOD RISK
S1.011	S16.0		78.106	0.872	0.000	0.29		3.1	FLOOD RISK

PN	US/MH Name	Level Exceeded
S1.007	S1.7	
S10.000	S10.0	
S1.008	S1.8	
S11.000	S11.0	
S11.001	S11.1	9
S1.009	S1.9	
S12.000	S12.0	
S12.001	S12.1	

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

PN	US/MH Name	Level Exceeded
S12.002	S12.2	
S13.000	S13.0	
S13.001	S13.1	
S12.003	S12.3	
S1.010	SHW (POND)	
S1.011	S16.0	