STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	18.500	Add Flow / Climate Change (%)	0
Ratio R	0.338	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)	400

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	30.735	0.384	80.0	0.017	6.00	0.0	0.600	o	100	Pipe/Conduit	
S2.000	6.636	0.318	20.9	0.014	6.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	9.126	0.114	80.1	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	5.807	0.083	70.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	10.900	0.149	73.0	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	34.355	1.155	29.7	0.072	6.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	32.882	0.736	44.7	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)
S1.000	50.00	6.59	80.650	0.017	0.0	0.0	0.0	0.86	6.8	2.3
S2.000	50.00	6.05	80.534	0.014	0.0	0.0	0.0	2.21	39.1	1.9
S1.001	50.00	6.73	80.216	0.040	0.0	0.0	0.0	1.12	19.9	5.5
S1.002	50.00	6.81	80.102	0.040	0.0	0.0	0.0	1.20	21.3	5.5
S1.003	50.00	6.96	80.019	0.066	0.0	0.0	0.0	1.18	20.8	9.0
S3.000	50.00	6.24	80.950	0.072	0.0	0.0	0.0	2.41	95.7	9.8
S1.004	50.00	7.24	79.795	0.138	0.0	0.0	0.0	1.96	78.0	18.7

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.000	30.237	0.767	39.4	0.012	6.00	0.0	0.600	o	150	Pipe/Conduit	
S4.001	29.075	0.899	32.3	0.079	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	15.598	0.069	225.0	0.067	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.000	34.806	0.488	71.3	0.057	6.00	0.0	0.600	o	150	Pipe/Conduit	
S6.000	21.926	0.274	80.0	0.032	6.00	0.0	0.600	o	150	Pipe/Conduit	
S6.001	30.034	0.440	68.2	0.046	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.001	20.900	0.211	99.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S7.000	34.841	0.436	79.9	0.049	6.00	0.0	0.600	o	150	Pipe/Conduit	
S7.001	17.119	0.489	35.0	0.032	0.00	0.0	0.600	o	150	Pipe/Conduit	
S5.002	11.574	0.387	29.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.000	15.000	0.410	36.6	0.052	6.00	0.0	0.600	o	150	Pipe/Conduit	
S9.000	15.989	0.235	68.0	0.097	6.00	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)
S4.000	50.00	6.31	80.800	0.012	0.0	0.0	0.0	1.61	28.4	1.6
S4.001	50.00	6.52	79.958	0.091	0.0	0.0	0.0	2.31	91.8	12.3
S1.005	50.00	7.54	79.059	0.296	0.0	0.0	0.0	0.87	34.5«	40.0
S5.000	50.00	6.49	80.724	0.057	0.0	0.0	0.0	1.19	21.1	7.7
S6.000	50.00	6.32	80.950	0.032	0.0	0.0	0.0	1.12	19.9	4.3
S6.001	50.00	6.74	80.676	0.078	0.0	0.0	0.0	1.22	21.5	10.6
S5.001	50.00	7.00	80.161	0.135	0.0	0.0	0.0	1.31	52.2	18.3
S7.000	50.00	6.52	80.950	0.049	0.0	0.0	0.0	1.13	19.9	6.6
S7.001	50.00	6.68	80.514	0.081	0.0	0.0	0.0	1.71	30.2	10.9
S5.002	50.00	7.08	79.950	0.216	0.0	0.0	0.0	2.40	95.5	29.2
S8.000	50.00	6.15	80.000	0.052	0.0	0.0	0.0	1.67	29.5	7.1
S9.000	50.00	6.17	79.750	0.097	0.0	0.0	0.0	1.59	63.1	13.1

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S8.001	17.678	0.177	99.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.002	17.949	0.294	61.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.003	6.802	0.068	100.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	4.000	0.040	100.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.007	11.115	0.095	117.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.008	10.171	0.041	248.1	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)
S8.001	50.00	6.39	79.515	0.149	0.0	0.0	0.0	1.31	52.0	20.2
S8.002	50.00	6.57	79.338	0.149	0.0	0.0	0.0	1.68	66.7	20.2
S5.003	50.00	7.15	78.969	0.365	0.0	0.0	0.0	1.57	111.1	49.4
S1.006	50.00	6.04	78.915	0.000	40.0	0.0	0.0	1.57	111.1	40.0
S1.007	50.00	6.20	78.875	0.000	40.0	0.0	0.0	1.21	48.0	40.0
S1.008	50.00	6.40	78.780	0.000	40.0	0.0	0.0	0.83	32.8«	40.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	S	81.510	78.739	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
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)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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	Region	England and Wales
Return Period (years)	5	M5-60 (mm)	18.500

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Synthetic Rainfall Details

Ratio R	0.338	Cv (Winter)	0.840
Profile Type	Summer	Storm Duration (mins)	30
Cv (Summer)	0.750		

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Online Controls for Storm

Depth/Flow Relationship Manhole: S24, DS/PN: S1.007, Volume (m³): 3.1

Invert Level (m) 78.875

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.8500	0.700	21.1600	1.300	26.5400	1.900	32.0900
0.200	14.3000	0.800	21.1300	1.400	27.5400	2.000	32.9200
0.300	19.2000	0.900	22.0800	1.500	28.5100	2.100	33.7300
0.400	21.5100	1.000	23.2800	1.600	29.4400	2.200	34.5300
0.500	22.0100	1.100	24.4100	1.700	30.3500		
0.600	21.6300	1.200	25.5000	1.800	31.2300		

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of 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 0.340
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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.	Water Level (m)
S1.000	S1	15 Winter	1	+0%	100/15 Summer				80.687
S2.000	S2	15 Winter	1	+0%	100/15 Summer				80.555
S1.001	S3	15 Winter	1	+0%	100/15 Summer				80.267
S1.002	S4	15 Winter	1	+0%	100/15 Summer				80.153
S1.003	S5	15 Winter	1	+0%	30/15 Summer				80.083
S3.000	S6	15 Winter	1	+0%					80.995
S1.004	S7	15 Winter	1	+0%	30/15 Summer				79.864
S4.000	S8	15 Winter	1	+0%					80.821
S4.001	S9	15 Winter	1	+0%	100/15 Summer				80.008
S1.005	S10	15 Winter	1	+0%	1/15 Winter				79.296
S5.000	S11	15 Winter	1	+0%	100/15 Summer				80.782
S6.000	S12	15 Winter	1	+0%	100/15 Summer				80.994
S6.001	S13	15 Winter	1	+0%	30/15 Summer				80.742
S5.001	S14	15 Winter	1	+0%	100/15 Summer				80.246
S7.000	S15	15 Winter	1	+0%	100/15 Summer				81.004
S7.001	S16	15 Winter	1	+0%	100/15 Summer				80.571
S5.002	S17	15 Winter	1	+0%	100/15 Summer				80.032
S8.000	S18	15 Winter	1	+0%	100/15 Summer				80.047
S9.000	S19	15 Winter	1	+0%	100/15 Summer				79.817

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.063	0.000	0.29			1.9	OK	
S2.000	S2	-0.129	0.000	0.05			1.6	OK	
S1.001	S3	-0.099	0.000	0.25			4.4	OK	
S1.002	S4	-0.099	0.000	0.25			4.4	OK	
S1.003	S5	-0.086	0.000	0.37			6.9	OK	
S3.000	S6	-0.180	0.000	0.09			8.1	OK	
S1.004	S7	-0.156	0.000	0.20			14.9	OK	
S4.000	S8	-0.129	0.000	0.05			1.3	OK	
S4.001	S9	-0.175	0.000	0.11			9.4	OK	
S1.005	S10	0.012	0.000	0.95			28.8	SURCHARGED	
S5.000	S11	-0.092	0.000	0.31			6.4	OK	
S6.000	S12	-0.106	0.000	0.19			3.5	OK	
S6.001	S13	-0.084	0.000	0.40			8.2	OK	
S5.001	S14	-0.140	0.000	0.31			14.6	OK	
S7.000	S15	-0.096	0.000	0.28			5.4	OK	
S7.001	S16	-0.093	0.000	0.31			8.6	OK	
S5.002	S17	-0.143	0.000	0.28			23.1	OK	
S8.000	S18	-0.103	0.000	0.22			5.9	OK	
S9.000	S19	-0.158	0.000	0.20			10.9	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S8.001	S20	15 Winter	1	+0%	30/15 Summer				79.609
S8.002	S21	15 Winter	1	+0%	30/15 Summer				79.419
S5.003	S22	15 Winter	1	+0%	30/15 Summer				79.252
S1.006	S23	15 Winter	1	+0%	1/15 Winter				79.233
S1.007	S24	60 Winter	1	+0%	1/60 Winter				79.102
S1.008	S25	60 Winter	1	+0%					78.895

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S8.001	S20	-0.131	0.000	0.36			16.8	OK	
S8.002	S21	-0.144	0.000	0.28			16.8	OK	
S5.003	S22	-0.017	0.000	0.60			39.0	OK	
S1.006	S23	0.018	0.000	1.09			66.8	SURCHARGED	
S1.007	S24	0.002	0.000	0.35		40	14.3	SURCHARGED	
S1.008	S25	-0.110	0.000	0.52			14.3	OK	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of 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 0.340
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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.	Water Level (m)
S1.000	S1	15 Winter	30	+0%	100/15 Summer				80.712
S2.000	S2	15 Winter	30	+0%	100/15 Summer				80.568
S1.001	S3	15 Winter	30	+0%	100/15 Summer				80.304
S1.002	S4	15 Winter	30	+0%	100/15 Summer				80.247
S1.003	S5	15 Winter	30	+0%	30/15 Summer				80.220
S3.000	S6	15 Winter	30	+0%					81.021
S1.004	S7	15 Winter	30	+0%	30/15 Summer				80.126
S4.000	S8	15 Winter	30	+0%					80.834
S4.001	S9	15 Winter	30	+0%	100/15 Summer				80.047
S1.005	S10	15 Winter	30	+0%	1/15 Winter				79.977
S5.000	S11	15 Winter	30	+0%	100/15 Summer				80.824
S6.000	S12	15 Winter	30	+0%	100/15 Summer				81.021
S6.001	S13	15 Winter	30	+0%	30/15 Summer				80.848
S5.001	S14	15 Winter	30	+0%	100/15 Summer				80.311
S7.000	S15	15 Winter	30	+0%	100/15 Summer				81.042
S7.001	S16	15 Winter	30	+0%	100/15 Summer				80.618
S5.002	S17	15 Winter	30	+0%	100/15 Summer				80.092
S8.000	S18	15 Winter	30	+0%	100/15 Summer				80.078
S9.000	S19	15 Winter	30	+0%	100/15 Summer				79.972

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.038	0.000	0.70			4.6	OK	
S2.000	S2	-0.116	0.000	0.11			3.8	OK	
S1.001	S3	-0.062	0.000	0.63			11.1	OK	
S1.002	S4	-0.005	0.000	0.62			10.9	OK	
S1.003	S5	0.051	0.000	0.95			17.8	SURCHARGED	
S3.000	S6	-0.154	0.000	0.22			19.8	OK	
S1.004	S7	0.106	0.000	0.49			36.2	SURCHARGED	
S4.000	S8	-0.116	0.000	0.12			3.2	OK	
S4.001	S9	-0.136	0.000	0.33			28.2	OK	
S1.005	S10	0.693	0.000	2.38			72.4	SURCHARGED	
S5.000	S11	-0.050	0.000	0.77			15.5	OK	
S6.000	S12	-0.079	0.000	0.46			8.7	OK	
S6.001	S13	0.022	0.000	1.03			21.2	SURCHARGED	
S5.001	S14	-0.075	0.000	0.77			36.7	OK	
S7.000	S15	-0.058	0.000	0.69			13.2	OK	
S7.001	S16	-0.046	0.000	0.79			22.3	OK	
S5.002	S17	-0.083	0.000	0.72			58.4	OK	
S8.000	S18	-0.072	0.000	0.53			14.4	OK	
S9.000	S19	-0.003	0.000	0.47			26.0	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S8.001	S20	15 Winter	30	+0%	30/15 Summer				79.928
S8.002	S21	15 Winter	30	+0%	30/15 Summer				79.819
S5.003	S22	15 Winter	30	+0%	30/15 Summer				79.712
S1.006	S23	15 Winter	30	+0%	1/15 Winter				79.580
S1.007	S24	120 Winter	30	+0%	1/60 Winter				79.459
S1.008	S25	120 Winter	30	+0%					78.933

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S8.001	S20	0.188	0.000	0.77			35.7	SURCHARGED	
S8.002	S21	0.256	0.000	0.61			36.7	SURCHARGED	
S5.003	S22	0.443	0.000	1.40			91.2	SURCHARGED	
S1.006	S23	0.365	0.000	2.65			162.6	SURCHARGED	
S1.007	S24	0.359	0.000	0.54		72	21.9	SURCHARGED	
S1.008	S25	-0.072	0.000	0.80			21.9	OK	

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

Simulation Criteria

Areal Reduction Factor 1.000 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 0.340
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
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.	Water Level (m)
S1.000	S1	15 Winter	100	+30%	100/15 Summer				81.207
S2.000	S2	15 Winter	100	+30%	100/15 Summer				81.046
S1.001	S3	15 Winter	100	+30%	100/15 Summer				81.033
S1.002	S4	15 Winter	100	+30%	100/15 Summer				80.990
S1.003	S5	15 Winter	100	+30%	30/15 Summer				80.973
S3.000	S6	15 Winter	100	+30%					81.044
S1.004	S7	15 Winter	100	+30%	30/15 Summer				80.886
S4.000	S8	15 Winter	100	+30%					80.845
S4.001	S9	15 Winter	100	+30%	100/15 Summer				80.808
S1.005	S10	15 Winter	100	+30%	1/15 Winter				80.648
S5.000	S11	15 Winter	100	+30%	100/15 Summer				81.101
S6.000	S12	15 Winter	100	+30%	100/15 Summer				81.436
S6.001	S13	15 Winter	100	+30%	30/15 Summer				81.320
S5.001	S14	15 Winter	100	+30%	100/15 Summer				80.662
S7.000	S15	15 Winter	100	+30%	100/15 Summer				81.305
S7.001	S16	15 Winter	100	+30%	100/15 Summer				80.894
S5.002	S17	15 Winter	100	+30%	100/15 Summer				80.485
S8.000	S18	15 Winter	100	+30%	100/15 Summer				80.798
S9.000	S19	15 Winter	100	+30%	100/15 Summer				80.707

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.457	0.000	0.87			5.8	FLOOD RISK	
S2.000	S2	0.362	0.000	0.17			5.6	FLOOD RISK	
S1.001	S3	0.667	0.000	0.88			15.4	FLOOD RISK	
S1.002	S4	0.738	0.000	1.03			18.2	SURCHARGED	
S1.003	S5	0.804	0.000	1.22			22.9	SURCHARGED	
S3.000	S6	-0.131	0.000	0.37			33.3	OK	
S1.004	S7	0.866	0.000	0.60			44.3	SURCHARGED	
S4.000	S8	-0.105	0.000	0.20			5.4	OK	
S4.001	S9	0.625	0.000	0.43			36.8	SURCHARGED	
S1.005	S10	1.364	0.000	3.26			99.4	SURCHARGED	
S5.000	S11	0.227	0.000	1.06			21.5	FLOOD RISK	
S6.000	S12	0.336	0.000	0.67			12.6	FLOOD RISK	
S6.001	S13	0.494	0.000	1.36			28.0	FLOOD RISK	
S5.001	S14	0.276	0.000	0.93			44.2	SURCHARGED	
S7.000	S15	0.205	0.000	0.97			18.5	FLOOD RISK	
S7.001	S16	0.230	0.000	1.09			30.7	SURCHARGED	
S5.002	S17	0.310	0.000	0.85			68.7	SURCHARGED	
S8.000	S18	0.648	0.000	0.65			17.8	SURCHARGED	
S9.000	S19	0.732	0.000	0.64			35.5	FLOOD RISK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S8.001	S20	15 Winter	100	+30%	30/15 Summer				80.624
S8.002	S21	15 Winter	100	+30%	30/15 Summer				80.416
S5.003	S22	30 Winter	100	+30%	30/15 Summer				80.226
S1.006	S23	30 Winter	100	+30%	1/15 Winter				80.045
S1.007	S24	120 Winter	100	+30%	1/60 Winter				80.017
S1.008	S25	120 Winter	100	+30%					78.942

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S8.001	S20	0.884	0.000	1.10			51.1	SURCHARGED	
S8.002	S21	0.853	0.000	0.84			50.4	SURCHARGED	
S5.003	S22	0.957	0.000	1.66			108.2	SURCHARGED	
S1.006	S23	0.830	0.000	3.15			193.4	SURCHARGED	
S1.007	S24	0.917	0.000	0.59		112	23.8	SURCHARGED	
S1.008	S25	-0.063	0.000	0.87			23.8	OK	

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

Simulation Criteria

Areal Reduction Factor 1.000 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 0.340
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+40%	100/15 Summer				81.251
S2.000	S2	15 Winter	100	+40%	100/15 Summer				81.174
S1.001	S3	15 Winter	100	+40%	100/15 Summer				81.161
S1.002	S4	15 Winter	100	+40%	100/15 Summer				81.121
S1.003	S5	15 Winter	100	+40%	100/15 Summer				81.094
S3.000	S6	15 Winter	100	+40%					81.124
S1.004	S7	15 Winter	100	+40%	100/15 Summer				80.998
S4.000	S8	15 Winter	100	+40%	100/15 Winter				80.958
S4.001	S9	15 Winter	100	+40%	100/15 Summer				80.942
S1.005	S10	15 Winter	100	+40%	100/15 Summer				80.768
S5.000	S11	15 Winter	100	+40%	100/15 Summer				81.204
S6.000	S12	15 Winter	100	+40%	100/15 Summer				81.510
S6.001	S13	15 Winter	100	+40%	100/15 Summer				81.427
S5.001	S14	15 Winter	100	+40%	100/15 Summer				80.758
S7.000	S15	15 Winter	100	+40%	100/15 Summer				81.422
S7.001	S16	15 Winter	100	+40%	100/15 Summer				80.995
S5.002	S17	15 Winter	100	+40%	100/15 Summer				80.578
S8.000	S18	15 Winter	100	+40%	100/15 Summer				80.959
S9.000	S19	15 Winter	100	+40%	100/15 Summer				80.856

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.501	0.000	0.96			6.3	FLOOD RISK	
S2.000	S2	0.490	0.000	0.17			5.7	FLOOD RISK	
S1.001	S3	0.795	0.000	0.90			15.9	FLOOD RISK	
S1.002	S4	0.869	0.000	1.07			18.9	FLOOD RISK	
S1.003	S5	0.925	0.000	1.26			23.6	SURCHARGED	
S3.000	S6	-0.051	0.000	0.39			35.0	OK	
S1.004	S7	0.978	0.000	0.64			47.1	SURCHARGED	
S4.000	S8	0.008	0.000	0.26			7.0	FLOOD RISK	
S4.001	S9	0.759	0.000	0.45			38.7	SURCHARGED	
S1.005	S10	1.484	0.000	3.42			104.1	SURCHARGED	
S5.000	S11	0.330	0.000	1.07			21.7	FLOOD RISK	
S6.000	S12	0.410	0.000	0.75			14.0	FLOOD RISK	
S6.001	S13	0.601	0.000	1.39			28.8	FLOOD RISK	
S5.001	S14	0.372	0.000	0.92			43.9	SURCHARGED	
S7.000	S15	0.322	0.000	0.99			19.0	FLOOD RISK	
S7.001	S16	0.331	0.000	1.12			31.4	SURCHARGED	
S5.002	S17	0.403	0.000	0.86			69.6	SURCHARGED	
S8.000	S18	0.809	0.000	0.69			18.9	SURCHARGED	
S9.000	S19	0.881	0.000	0.68			37.8	FLOOD RISK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S8.001	S20	15 Winter	100	+40%	100/15 Summer				80.762
S8.002	S21	15 Winter	100	+40%	100/15 Summer				80.527
S5.003	S22	120 Winter	100	+40%	100/15 Summer				80.388
S1.006	S23	120 Winter	100	+40%	100/15 Summer				80.425
S1.007	S24	120 Winter	100	+40%	100/15 Summer				80.433
S1.008	S25	120 Winter	100	+40%					78.952

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S8.001	S20	1.022	0.000	1.17			54.4	SURCHARGED	
S8.002	S21	0.964	0.000	0.89			53.4	SURCHARGED	
S5.003	S22	1.119	0.000	0.97			63.3	SURCHARGED	
S1.006	S23	1.210	0.000	1.86			114.2	SURCHARGED	
S1.007	S24	1.333	0.000	0.64		120	25.9	SURCHARGED	
S1.008	S25	-0.053	0.000	0.95			26.0	OK	

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