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)	100	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.340	Minimum Backdrop Height (m)	2.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	2.000
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

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.006	4-8	0.063	8-12	0.023

Total Area Contributing (ha) = 0.092

Total Pipe Volume (m³) = 25.323

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	10.437	0.062	168.0	0.003	5.00	0.0		0.075	→|_|→		Infiltration Trench	
S1.001	5.712	0.045	126.9	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
S2.000	10.371	0.062	168.0	0.012	5.00	0.0		0.075	→|_|→		Infiltration Trench	
S3.000	4.861	0.029	168.0	0.004	5.00	0.0		0.075	→|_|→		Infiltration Trench	
S1.002	13.049	0.075	174.0	0.005	0.00	0.0		0.075	→|_|→		Infiltration Trench	
S1.003	12.461	0.075	166.2	0.011	0.00	0.0		0.075	→|_|→		Infiltration Trench	
S4.000	20.783	0.124	167.6	0.023	5.00	0.0		0.075	→|_|→		Infiltration Trench	

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	6.10	74.692	0.003	0.0	0.0	0.0	0.16	34.3	0.5
S1.001	50.00	6.18	74.630	0.003	0.0	0.0	0.0	1.16	46.1	0.5
S2.000	50.00	6.09	74.647	0.012	0.0	0.0	0.0	0.16	35.9	1.6
S3.000	50.00	5.51	74.614	0.004	0.0	0.0	0.0	0.16	37.0	0.5
S1.002	50.00	7.56	74.585	0.024	0.0	0.0	0.0	0.16	37.4	3.3
S1.003	50.00	8.83	74.510	0.035	0.0	0.0	0.0	0.16	40.9	4.7
S4.000	50.00	7.14	74.559	0.023	0.0	0.0	0.0	0.16	39.0	3.2

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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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.004	21.699	0.045	482.2	0.011	0.00	0.0	0.600		o	225	Pipe/Conduit	
S5.000	21.132	0.126	167.7	0.023	5.00	0.0		0.075	→|_|→		Infiltration Trench	
S1.005	6.352	0.180	35.3	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.006	22.148	0.360	61.5	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.007	4.937	0.550	9.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.008	39.917	0.480	83.2	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.009	40.467	0.350	115.6	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)
S1.004	50.00	9.44	74.435	0.069	0.0	0.0	0.0	0.59	23.4	9.4
S5.000	50.00	7.17	74.516	0.023	0.0	0.0	0.0	0.16	40.5	3.1
S1.005	50.00	5.06	74.390	0.000	5.0	0.0	0.0	1.70	30.0	5.0
S1.006	50.00	5.35	74.210	0.000	5.0	0.0	0.0	1.28	22.7	5.0
S1.007	50.00	5.37	73.850	0.000	5.0	0.0	0.0	3.38	59.8	5.0
S1.008	50.00	5.98	73.300	0.000	5.0	0.0	0.0	1.10	19.5	5.0
S1.009	50.00	6.70	72.820	0.000	5.0	0.0	0.0	0.93	16.5	5.0

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SRE	75.900	1.208	Open Manhole	300	S1.000	74.692					
SWMH6	75.900	1.270	Open Manhole	600	S1.001	74.630	225	S1.000	74.630		
SRE	75.900	1.253	Open Manhole	300	S2.000	74.647					
SRE	75.900	1.286	Open Manhole	300	S3.000	74.614					
SWMH5	75.900	1.315	Open Manhole	600	S1.002	74.585		S1.001	74.585	225	
								S2.000	74.585		
								S3.000	74.585		
SWMH4	75.900	1.390	Open Manhole	600	S1.003	74.510		S1.002	74.510		
SRE	75.900	1.341	Open Manhole	300	S4.000	74.559					
SWMH3	75.950	1.515	Open Manhole	600	S1.004	74.435	225	S1.003	74.435		
								S4.000	74.435		
SRE	75.900	1.384	Open Manhole	300	S5.000	74.516					
SWMH2	75.950	1.560	Open Manhole	1200	S1.005	74.390	150	S1.004	74.390	225	
								S5.000	74.390		
SWMH1	75.950	1.740	Open Manhole	1200	S1.006	74.210	150	S1.005	74.210	150	
SWMH7	75.900	2.050	Open Manhole	600	S1.007	73.850	150	S1.006	73.850	150	
SCWMH1	75.900	2.600	Open Manhole	1200	S1.008	73.300	150	S1.007	73.300	150	
SCWHM2	75.900	3.080	Open Manhole	1200	S1.009	72.820	150	S1.008	72.820	150	
S6500	75.210	2.740	Open Manhole	1200		OUTFALL		S1.009	72.470	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SRE	388649.359	397465.739	388649.359	397465.739	Required	
SWMH6	388652.473	397455.777	388652.473	397455.777	Required	
SRE	388642.687	397463.111	388642.687	397463.111	Required	
SRE	388642.485	397452.327	388642.485	397452.327	Required	
SWMH5	388647.135	397453.742	388647.135	397453.742	Required	
SWMH4	388649.966	397441.004	388649.966	397441.004	Required	
SRE	388618.356	397430.759	388618.356	397430.759	Required	
SWMH3	388637.969	397437.634	388637.969	397437.634	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SRE	388610.866	397451.181	388610.866	397451.181	Required	
SWMH2	388630.825	397458.123	388630.825	397458.123	Required	
SWMH1	388628.735	397464.122	388628.735	397464.122	Required	
SWMH7	388607.842	397456.775	388607.842	397456.775	Required	
SCWMH1	388603.056	397455.562	388603.056	397455.562	Required	
SCWHM2	388589.485	397493.101	388589.485	397493.101	Required	
S6500	388601.352	397531.789			No Entry	

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.003	0.003	0.003
1.001	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.012	0.012	0.012
3.000	User	-	100	0.004	0.004	0.004
1.002	User	-	100	0.005	0.005	0.005
1.003	User	-	100	0.009	0.009	0.009
	User	-	100	0.001	0.001	0.011
4.000	User	-	100	0.023	0.023	0.023
1.004	User	-	100	0.011	0.011	0.011
5.000	User	-	100	0.023	0.023	0.023
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.092	0.092	0.092

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)
S1.009	S6500	75.210	72.470	72.470	1200	0

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SWMH2, DS/PN: S1.005, Volume (m³): 7.7

Unit Reference	MD-SHE-0111-5000-0600-5000
Design Head (m)	0.600
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	111
Invert Level (m)	74.390
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	5.0	Kick-Flo®	0.428	4.3
Flush-Flo™	0.193	5.0	Mean Flow over Head Range	-	4.2

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)	Depth (m)	Flow (l/s)
0.100	3.9	0.800	5.7	2.000	8.8	4.000	12.2	7.000	15.9
0.200	5.0	1.000	6.3	2.200	9.2	4.500	12.9	7.500	16.5
0.300	4.9	1.200	6.9	2.400	9.6	5.000	13.6	8.000	17.0
0.400	4.5	1.400	7.4	2.600	9.9	5.500	14.2	8.500	17.6
0.500	4.6	1.600	7.9	3.000	10.6	6.000	14.8	9.000	18.1
0.600	5.0	1.800	8.4	3.500	11.4	6.500	15.3	9.500	18.6

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Storage Structures for Storm

Infiltration Trench Pipe: S1.000

Manning's N	0.075	Trench Width (m)	0.6
Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	10.4
Infiltration Coefficient Side (m/hr)	0.00000	Slope (1:X)	168.0
Safety Factor	2.0	Cap Volume Depth (m)	0.000
Porosity	0.30	Cap Infiltration Depth (m)	0.000
Invert Level (m)	74.692		

Infiltration Trench Pipe: S2.000

Manning's N	0.075	Trench Width (m)	0.6
Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	10.4
Infiltration Coefficient Side (m/hr)	0.00000	Slope (1:X)	168.0
Safety Factor	2.0	Cap Volume Depth (m)	0.000
Porosity	0.30	Cap Infiltration Depth (m)	0.000
Invert Level (m)	74.647		

Infiltration Trench Pipe: S3.000

Manning's N	0.075	Trench Width (m)	0.6
Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	4.9
Infiltration Coefficient Side (m/hr)	0.00000	Slope (1:X)	168.0
Safety Factor	2.0	Cap Volume Depth (m)	0.000
Porosity	0.30	Cap Infiltration Depth (m)	0.000
Invert Level (m)	74.614		

Infiltration Trench Pipe: S1.002

Manning's N	0.075	Trench Width (m)	0.6
Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	13.0
Infiltration Coefficient Side (m/hr)	0.00000	Slope (1:X)	174.0
Safety Factor	2.0	Cap Volume Depth (m)	0.000
Porosity	0.30	Cap Infiltration Depth (m)	0.000
Invert Level (m)	74.585		

Infiltration Trench Pipe: S1.003

Manning's N	0.075	Trench Width (m)	0.6
Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	12.5
Infiltration Coefficient Side (m/hr)	0.00000	Slope (1:X)	166.2
Safety Factor	2.0	Cap Volume Depth (m)	0.000
Porosity	0.30	Cap Infiltration Depth (m)	0.000
Invert Level (m)	74.510		

Infiltration Trench Pipe: S4.000

Manning's N	0.075	Trench Width (m)	0.6
Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	20.8
Infiltration Coefficient Side (m/hr)	0.00000	Slope (1:X)	167.6
Safety Factor	2.0	Cap Volume Depth (m)	0.000
Porosity	0.30	Cap Infiltration Depth (m)	0.000
Invert Level (m)	74.559		

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Infiltration Trench Pipe: S5.000

Manning's N	0.075	Trench Width (m)	0.6
Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	21.1
Infiltration Coefficient Side (m/hr)	0.00000	Slope (1:X)	167.7
Safety Factor	2.0	Cap Volume Depth (m)	0.000
Porosity	0.30	Cap Infiltration Depth (m)	0.000
Invert Level (m)	74.516		

Cellular Storage Manhole: SWMH2, DS/PN: S1.005

Invert Level (m)	74.390	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	30.0	85.0	0.600	30.0	107.1	0.601	0.0	107.1

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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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.300 Cv (Summer) 0.750
Region England and Wales Ratio R 0.323 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, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	SRE	15 Winter	1	+0%					74.735	-1.165	0.000
S1.001	SWMH6	15 Winter	1	+0%	100/15 Summer				74.709	-0.146	0.000
S2.000	SRE	15 Winter	1	+0%					74.746	-1.154	0.000
S3.000	SRE	15 Winter	1	+0%					74.709	-1.191	0.000
S1.002	SWMH5	15 Winter	1	+0%					74.708	-1.191	0.000
S1.003	SWMH4	15 Winter	1	+0%					74.650	-1.249	0.000
S4.000	SRE	15 Winter	1	+0%					74.714	-1.186	0.000
S1.004	SWMH3	30 Winter	1	+0%	30/30 Winter				74.513	-0.147	0.000
S5.000	SRE	15 Winter	1	+0%					74.669	-1.231	0.000
S1.005	SWMH2	60 Winter	1	+0%	30/15 Summer				74.491	-0.048	0.000
S1.006	SWMH1	60 Winter	1	+0%					74.253	-0.107	0.000
S1.007	SWMH7	60 Winter	1	+0%					73.879	-0.121	0.000
S1.008	SCWMH1	60 Winter	1	+0%					73.346	-0.104	0.000
S1.009	SCWHM2	60 Winter	1	+0%					72.870	-0.100	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE	0.01		6	0.3	OK	
S1.001	SWMH6	0.01			0.4	OK	
S2.000	SRE	0.04		7	1.4	OK	
S3.000	SRE	0.01		7	0.4	OK	
S1.002	SWMH5	0.05		8	1.9	OK	
S1.003	SWMH4	0.06		9	2.4	OK	
S4.000	SRE	0.07		6	2.6	OK	
S1.004	SWMH3	0.24			5.0	OK	
S5.000	SRE	0.06		6	2.5	OK	
S1.005	SWMH2	0.16		28	3.9	OK	
S1.006	SWMH1	0.18			3.9	OK	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.007	SWMH7	0.08			3.9	OK	
S1.008	SCWMH1	0.21			3.9	OK	
S1.009	SCWHM2	0.24			3.9	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	18.300
Region	England and Wales	Ratio R	0.323
Cv (Summer)	0.750		
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, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	SRE	15 Winter	30	+0%					74.822	-1.078	0.000
S1.001	SWMH6	15 Winter	30	+0%	100/15 Summer				74.819	-0.036	0.000
S2.000	SRE	15 Winter	30	+0%					74.835	-1.065	0.000
S3.000	SRE	15 Winter	30	+0%					74.819	-1.081	0.000
S1.002	SWMH5	15 Winter	30	+0%					74.818	-1.081	0.000
S1.003	SWMH4	30 Winter	30	+0%					74.772	-1.128	0.000
S4.000	SRE	15 Winter	30	+0%					74.855	-1.045	0.000
S1.004	SWMH3	60 Winter	30	+0%	30/30 Winter				74.682	0.022	0.000
S5.000	SRE	15 Winter	30	+0%					74.808	-1.092	0.000
S1.005	SWMH2	60 Winter	30	+0%	30/15 Summer				74.673	0.133	0.000
S1.006	SWMH1	180 Winter	30	+0%					74.259	-0.101	0.000
S1.007	SWMH7	240 Summer	30	+0%					73.882	-0.117	0.000
S1.008	SCWMH1	240 Summer	30	+0%					73.352	-0.098	0.000
S1.009	SCWHM2	240 Summer	30	+0%					72.877	-0.093	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE	0.02		7	0.7	OK	
S1.001	SWMH6	0.03			0.9	OK	
S2.000	SRE	0.09		8	3.1	OK	
S3.000	SRE	0.03		9	1.0	OK	
S1.002	SWMH5	0.13		9	4.7	OK	
S1.003	SWMH4	0.14		16	5.7	OK	
S4.000	SRE	0.16		7	6.2	OK	
S1.004	SWMH3	0.44			9.2	SURCHARGED	
S5.000	SRE	0.15		7	6.1	OK	
S1.005	SWMH2	0.20		36	5.0	SURCHARGED	
S1.006	SWMH1	0.23			5.0	OK	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.007	SWMH7	0.11			5.0	OK	
S1.008	SCWMH1	0.26			5.0	OK	
S1.009	SCWHM2	0.31			5.0	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 8 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.300 Cv (Summer) 0.750
Region England and Wales Ratio R 0.323 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, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	SRE	60 Winter	100	+40%					75.000	-0.900	0.000
S1.001	SWMH6	60 Winter	100	+40%	100/15 Summer				75.000	0.145	0.000
S2.000	SRE	60 Winter	100	+40%					75.000	-0.900	0.000
S3.000	SRE	60 Winter	100	+40%					75.000	-0.900	0.000
S1.002	SWMH5	60 Winter	100	+40%					74.999	-0.900	0.000
S1.003	SWMH4	60 Winter	100	+40%					74.998	-0.902	0.000
S4.000	SRE	15 Winter	100	+40%					75.027	-0.873	0.000
S1.004	SWMH3	60 Winter	100	+40%	30/30 Winter				74.995	0.335	0.000
S5.000	SRE	60 Winter	100	+40%					74.990	-0.910	0.000
S1.005	SWMH2	60 Winter	100	+40%	30/15 Summer				74.987	0.447	0.000
S1.006	SWMH1	60 Winter	100	+40%					74.259	-0.101	0.000
S1.007	SWMH7	60 Winter	100	+40%					73.882	-0.117	0.000
S1.008	SCWMH1	60 Winter	100	+40%					73.352	-0.098	0.000
S1.009	SCWHM2	60 Winter	100	+40%					72.877	-0.093	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SRE	0.03		36	0.9	OK	
S1.001	SWMH6	0.03			0.8	SURCHARGED	
S2.000	SRE	0.09		40	3.3	OK	
S3.000	SRE	0.03		42	1.1	OK	
S1.002	SWMH5	0.16		48	6.1	OK	
S1.003	SWMH4	0.20		50	8.3	OK	
S4.000	SRE	0.28		17	11.0	OK	
S1.004	SWMH3	0.77			16.0	SURCHARGED	
S5.000	SRE	0.16		52	6.3	OK	
S1.005	SWMH2	0.20		62	5.0	SURCHARGED	
S1.006	SWMH1	0.23			5.0	OK	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.007	SWMH7	0.11			5.0	OK	
S1.008	SCWMH1	0.26			5.0	OK	
S1.009	SCWHM2	0.31			5.0	OK	

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