STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
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 SW

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.086	4-8	0.525	8-12	0.120

Total Area Contributing (ha) = 0.731

Total Pipe Volume (m³) = 113.238

Network Design Table for SW

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	32.756	0.100	327.0	0.074	5.00	0.0	0.600		o	375	Pipe/Conduit	
1.001	66.047	0.202	327.0	0.199	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.002	10.537	0.033	319.3	0.062	0.00	0.0	0.600		o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.55	3.110	0.074	0.0	0.0	0.0	1.00	110.1	10.0
1.001	50.00	6.65	3.010	0.273	0.0	0.0	0.0	1.00	110.1	37.0
1.002	50.00	6.83	2.808	0.335	0.0	0.0	0.0	1.01	111.4	45.4

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Network Design Table for SW

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	16.292	0.150	108.6	0.041	0.00	0.0	0.600		o	375	Pipe/Conduit	
2.000	39.480	0.079	499.7	0.211	5.00	0.0		0.045	2 _/	500	1:2 Ditch	
2.001	14.625	0.046	317.9	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
2.002	45.398	0.150	302.7	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
3.000	14.692	0.088	167.0	0.110	5.00	0.0	0.600		o	225	Pipe/Conduit	
3.001	8.310	0.052	159.8	0.034	0.00	0.0	0.600		o	225	Pipe/Conduit	
3.002	10.849	0.150	72.3	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.004	3.200	0.010	320.0	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.005	12.748	0.085	150.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
1.006	25.624	0.051	502.4	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	6.98	2.775	0.376	0.0	0.0	0.0	1.74	192.0	50.9
2.000	50.00	7.08	2.900	0.211	0.0	0.0	0.0	0.32	104.3	28.6
2.001	50.00	7.32	2.821	0.211	0.0	0.0	0.0	1.01	111.6	28.6
2.002	50.00	8.05	2.775	0.211	0.0	0.0	0.0	1.04	114.4	28.6
3.000	50.00	5.24	2.915	0.110	0.0	0.0	0.0	1.01	40.1	14.9
3.001	50.00	5.38	2.827	0.144	0.0	0.0	0.0	1.03	41.0	19.5
3.002	50.00	5.49	2.775	0.144	0.0	0.0	0.0	1.54	61.2	19.5
1.004	50.00	8.10	2.625	0.731	0.0	0.0	0.0	1.13	179.9	99.0
1.005	50.00	8.36	2.615	0.731	0.0	0.0	0.0	0.82	14.5«	99.0
1.006	46.75	10.38	2.380	0.731	0.0	0.0	0.0	0.21	30.1«	99.0

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Manhole Schedules for SW

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	4.600	1.490	Open Manhole	1350	1.000	3.110	375				
2	4.450	1.440	Open Manhole	1800	1.001	3.010	375	1.000	3.010	375	
3	4.185	1.377	Open Manhole	1350	1.002	2.808	375	1.001	2.808	375	
HW1	3.625	0.850	Open Manhole	500	1.003	2.775	375	1.002	2.775	375	
HW2	3.625	0.725	Junction		2.000	2.900	500				
HW3	3.625	0.804	Open Manhole	500	2.001	2.821	375	2.000	2.821	500	
HW4	3.625	0.850	Open Manhole	1350	2.002	2.775	375	2.001	2.775	375	
4	4.205	1.290	Open Manhole	1500	3.000	2.915	225				
5	4.050	1.223	Open Manhole	1350	3.001	2.827	225	3.000	2.827	225	
HW5	3.625	0.850	Open Manhole	1200	3.002	2.775	225	3.001	2.775	225	
HW6	3.625	1.000	Open Manhole	1350	1.004	2.625	450	1.003	2.625	375	
								2.002	2.625	375	
								3.002	2.625	225	
6 (FC)	3.915	1.300	Open Manhole	1800	1.005	2.615	150	1.004	2.615	450	
HW7	2.975	0.595	Open Manhole	500	1.006	2.380	500	1.005	2.530	150	150
Ditch	2.840	0.511	Open Manhole	0		OUTFALL		1.006	2.329	500	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	524553.640	326628.948	524553.640	326628.948	Required	
2	524541.856	326598.385	524541.856	326598.385	Required	
3	524510.103	326540.472	524510.103	326540.472	Required	
HW1	524501.150	326534.916	524501.150	326534.916	Required	
HW2	524481.203	326606.293			No Entry	

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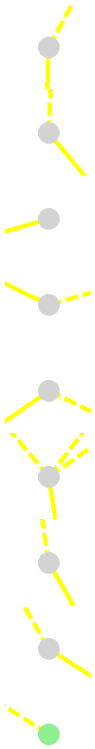
Manhole Schedules for SW

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
HW3	524462.686	326571.424	524462.686	326571.424	Required	
HW4	524462.149	326556.809	524462.149	326556.809	Required	
4	524521.743	326528.604	524521.743	326528.604	Required	
5	524507.621	326524.551	524507.621	326524.551	Required	
HW5	524500.149	326528.188	524500.149	326528.188	Required	
HW6	524491.257	326521.972	524491.257	326521.972	Required	
6 (FC)	524491.742	326518.809	524491.742	326518.809	Required	
HW7	524498.142	326507.783	524498.142	326507.783	Required	
Ditch	524519.696	326493.927			No Entry	



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PIPELINE SCHEDULES for SW

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	375	1	4.600	3.110	1.115	Open Manhole	1350
1.001	o	375	2	4.450	3.010	1.065	Open Manhole	1800
1.002	o	375	3	4.185	2.808	1.002	Open Manhole	1350
1.003	o	375	HW1	3.625	2.775	0.475	Open Manhole	500
2.000	2 _/	500	HW2	3.625	2.900	0.425	Junction	
2.001	o	375	HW3	3.625	2.821	0.429	Open Manhole	500
2.002	o	375	HW4	3.625	2.775	0.475	Open Manhole	1350
3.000	o	225	4	4.205	2.915	1.065	Open Manhole	1500
3.001	o	225	5	4.050	2.827	0.998	Open Manhole	1350
3.002	o	225	HW5	3.625	2.775	0.625	Open Manhole	1200
1.004	o	450	HW6	3.625	2.625	0.550	Open Manhole	1350
1.005	o	150	6 (FC)	3.915	2.615	1.150	Open Manhole	1800
1.006	3 \=/	500	HW7	2.975	2.380	0.445	Open Manhole	500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	32.756	327.0	2	4.450	3.010	1.065	Open Manhole	1800
1.001	66.047	327.0	3	4.185	2.808	1.002	Open Manhole	1350
1.002	10.537	319.3	HW1	3.625	2.775	0.475	Open Manhole	500
1.003	16.292	108.6	HW6	3.625	2.625	0.625	Open Manhole	1350
2.000	39.480	499.7	HW3	3.625	2.821	0.504	Open Manhole	500
2.001	14.625	317.9	HW4	3.625	2.775	0.475	Open Manhole	1350
2.002	45.398	302.7	HW6	3.625	2.625	0.625	Open Manhole	1350
3.000	14.692	167.0	5	4.050	2.827	0.998	Open Manhole	1350
3.001	8.310	159.8	HW5	3.625	2.775	0.625	Open Manhole	1200
3.002	10.849	72.3	HW6	3.625	2.625	0.775	Open Manhole	1350
1.004	3.200	320.0	6 (FC)	3.915	2.615	0.850	Open Manhole	1800
1.005	12.748	150.0	HW7	2.975	2.530	0.295	Open Manhole	500
1.006	25.624	502.4	Ditch	2.840	2.329	0.361	Open Manhole	0

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Area Summary for SW

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.074	0.074	0.074
1.001	-	-	100	0.199	0.199	0.199
1.002	-	-	100	0.062	0.062	0.062
1.003	-	-	100	0.041	0.041	0.041
2.000	-	-	100	0.211	0.211	0.211
2.001	-	-	100	0.000	0.000	0.000
2.002	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.110	0.110	0.110
3.001	-	-	100	0.034	0.034	0.034
3.002	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.731	0.731	0.731

Simulation Criteria for SW

Volumetric Runoff Coeff	0.750	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)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.400		

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Online Controls for SW

Hydro-Brake® Optimum Manhole: 6 (FC), DS/PN: 1.005, Volume (m³): 3.6

Unit Reference	MD-SHE-0073-2000-0600-2000
Design Head (m)	0.600
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	73
Invert Level (m)	2.615
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	2.0	Kick-Flo®	0.397	1.7
Flush-Flo™	0.177	2.0	Mean Flow over Head Range	-	1.7

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	1.9	1.200	2.7	3.000	4.2	7.000	6.3
0.200	2.0	1.400	2.9	3.500	4.5	7.500	6.5
0.300	1.9	1.600	3.1	4.000	4.8	8.000	6.7
0.400	1.7	1.800	3.3	4.500	5.1	8.500	6.9
0.500	1.8	2.000	3.5	5.000	5.3	9.000	7.1
0.600	2.0	2.200	3.6	5.500	5.6	9.500	7.3
0.800	2.3	2.400	3.8	6.000	5.8		
1.000	2.5	2.600	3.9	6.500	6.0		

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Storage Structures for SW

Tank or Pond Manhole: HW6, DS/PN: 1.004

Invert Level (m) 2.625

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	915.0	1.000	1320.0

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

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 2, 30, 100
Climate Change (%) 0, 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)
1.000	1	15 Winter	1	+0%	100/15 Summer				3.199
1.001	2	15 Winter	1	+0%	100/15 Summer				3.150
1.002	3	15 Winter	1	+0%	30/15 Winter				2.982
1.003	HW1	15 Winter	1	+0%	100/15 Summer				2.905
2.000	HW2	15 Winter	1	+0%					3.060
2.001	HW3	15 Winter	1	+0%					2.957
2.002	HW4	15 Winter	1	+0%					2.897
3.000	4	15 Winter	1	+0%	30/15 Summer				3.016
3.001	5	15 Winter	1	+0%	30/15 Summer				2.949
3.002	HW5	15 Winter	1	+0%	100/15 Summer				2.867
1.004	HW6	960 Winter	1	+0%	100/360 Winter				2.738
1.005	6 (FC)	960 Winter	1	+0%	2/480 Winter				2.741
1.006	HW7	960 Winter	1	+0%					2.424

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.286	0.000	0.10		9.5	OK	
1.001	2	-0.235	0.000	0.29		29.8	OK	
1.002	3	-0.200	0.000	0.44		35.4	OK	
1.003	HW1	-0.245	0.000	0.26		39.2	OK	
2.000	HW2	-0.565	0.000	0.04		26.6	OK	
2.001	HW3	-0.239	0.000	0.28		24.3	OK	
2.002	HW4	-0.253	0.000	0.23		24.3	OK	
3.000	4	-0.124	0.000	0.41		14.3	OK	
3.001	5	-0.103	0.000	0.57		18.2	OK	
3.002	HW5	-0.133	0.000	0.35		18.2	OK	
1.004	HW6	-0.337	0.000	0.02		2.2	OK	
1.005	6 (FC)	-0.024	0.000	0.15		2.0	OK	
1.006	HW7	-0.551	0.000	0.00		2.0	OK	

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

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 2, 30, 100
Climate Change (%) 0, 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)
1.000	1	15 Winter	2	+0%	100/15 Summer				3.215
1.001	2	15 Winter	2	+0%	100/15 Summer				3.172
1.002	3	15 Winter	2	+0%	30/15 Winter				3.012
1.003	HW1	15 Winter	2	+0%	100/15 Summer				2.925
2.000	HW2	15 Winter	2	+0%					3.081
2.001	HW3	15 Winter	2	+0%					2.978
2.002	HW4	15 Winter	2	+0%					2.915
3.000	4	15 Winter	2	+0%	30/15 Summer				3.033
3.001	5	15 Winter	2	+0%	30/15 Summer				2.972
3.002	HW5	15 Winter	2	+0%	100/15 Summer				2.881
1.004	HW6	960 Winter	2	+0%	100/360 Winter				2.765
1.005	6 (FC)	960 Winter	2	+0%	2/480 Winter				2.769
1.006	HW7	720 Winter	2	+0%					2.425

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.270	0.000	0.13		12.3	OK	
1.001	2	-0.213	0.000	0.37		38.6	OK	
1.002	3	-0.171	0.000	0.57		45.8	OK	
1.003	HW1	-0.225	0.000	0.33		50.8	OK	
2.000	HW2	-0.544	0.000	0.05		34.4	OK	
2.001	HW3	-0.218	0.000	0.36		31.4	OK	
2.002	HW4	-0.235	0.000	0.30		31.2	OK	
3.000	4	-0.107	0.000	0.52		18.5	OK	
3.001	5	-0.080	0.000	0.73		23.6	OK	
3.002	HW5	-0.119	0.000	0.46		23.6	OK	
1.004	HW6	-0.310	0.000	0.02		2.3	OK	
1.005	6 (FC)	0.004	0.000	0.15		2.0	SURCHARGED	
1.006	HW7	-0.550	0.000	0.00		2.0	OK	

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

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 2, 30, 100
Climate Change (%) 0, 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)
1.000	1	15 Winter	30	+0%	100/15 Summer				3.313
1.001	2	15 Winter	30	+0%	100/15 Summer				3.288
1.002	3	15 Winter	30	+0%	30/15 Winter				3.187
1.003	HW1	15 Winter	30	+0%	100/15 Summer				2.998
2.000	HW2	15 Winter	30	+0%					3.150
2.001	HW3	15 Winter	30	+0%					3.049
2.002	HW4	15 Winter	30	+0%					2.976
3.000	4	15 Winter	30	+0%	30/15 Summer				3.193
3.001	5	15 Winter	30	+0%	30/15 Summer				3.102
3.002	HW5	15 Winter	30	+0%	100/15 Summer				2.942
1.004	HW6	960 Winter	30	+0%	100/360 Winter				2.900
1.005	6 (FC)	960 Winter	30	+0%	2/480 Winter				2.909
1.006	HW7	960 Summer	30	+0%					2.425

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.172	0.000	0.24		23.1	OK	
1.001	2	-0.097	0.000	0.79		81.4	OK	
1.002	3	0.004	0.000	1.10		88.8	SURCHARGED	
1.003	HW1	-0.152	0.000	0.63		95.8	OK	
2.000	HW2	-0.475	0.000	0.09		65.4	OK	
2.001	HW3	-0.147	0.000	0.68		58.7	OK	
2.002	HW4	-0.174	0.000	0.55		57.5	OK	
3.000	4	0.053	0.000	1.00		35.1	SURCHARGED	
3.001	5	0.050	0.000	1.44		46.1	SURCHARGED	
3.002	HW5	-0.058	0.000	0.90		46.4	OK	
1.004	HW6	-0.175	0.000	0.02		2.4	OK	
1.005	6 (FC)	0.144	0.000	0.15		2.0	SURCHARGED	
1.006	HW7	-0.550	0.000	0.00		2.0	OK	

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

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.400
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 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, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 2, 30, 100
Climate Change (%) 0, 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)
1.000	1	15 Winter	100	+40%	100/15 Summer				3.912
1.001	2	15 Winter	100	+40%	100/15 Summer				3.847
1.002	3	15 Winter	100	+40%	30/15 Winter				3.440
1.003	HW1	15 Winter	100	+40%	100/15 Summer				3.238
2.000	HW2	15 Winter	100	+40%					3.246
2.001	HW3	15 Winter	100	+40%					3.187
2.002	HW4	1440 Winter	100	+40%					3.142
3.000	4	15 Winter	100	+40%	30/15 Summer				3.755
3.001	5	15 Winter	100	+40%	30/15 Summer				3.494
3.002	HW5	15 Winter	100	+40%	100/15 Summer				3.183
1.004	HW6	1440 Winter	100	+40%	100/360 Winter				3.141
1.005	6 (FC)	1440 Winter	100	+40%	2/480 Winter				3.154
1.006	HW7	720 Winter	100	+40%					2.425

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.427	0.000	0.41		40.5	SURCHARGED	
1.001	2	0.462	0.000	1.35		139.8	SURCHARGED	
1.002	3	0.257	0.000	2.12		170.5	SURCHARGED	
1.003	HW1	0.088	0.000	1.26		190.9	SURCHARGED	
2.000	HW2	-0.379	0.000	0.16		118.4	OK	
2.001	HW3	-0.009	0.000	1.00		86.4	OK	
2.002	HW4	-0.008	0.000	0.05		5.6	OK	
3.000	4	0.615	0.000	1.70		59.9	SURCHARGED	
3.001	5	0.442	0.000	2.41		77.4	SURCHARGED	
3.002	HW5	0.183	0.000	1.50		77.2	SURCHARGED	
1.004	HW6	0.066	0.000	0.02		2.5	SURCHARGED	
1.005	6 (FC)	0.389	0.000	0.15		2.0	SURCHARGED	
1.006	HW7	-0.550	0.000	0.00		2.0	OK	

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