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	0.351	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	8-12	0.438	16-20	0.020	24-28	0.001	32-36	0.005
4-8	0.165	12-16	0.232	20-24	0.032	28-32	0.007		

Total Area Contributing (ha) = 0.902

Total Pipe Volume (m³) = 105.514

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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S3.000	69.135	0.310	223.0	0.024	5.00	0.0	0.600		o	450	Pipe/Conduit	
S4.000	64.011	0.320	200.0	0.035	5.00	0.0	0.600		o	450	Pipe/Conduit	
S3.001	43.555	0.300	145.2	0.297	0.00	0.0	0.600		o	600	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)
S3.000	50.00	5.85	31.685	0.024	0.0	0.0	0.0	1.36	215.9	3.2
S4.000	50.00	5.74	31.590	0.035	0.0	0.0	0.0	1.43	228.1	4.7
S3.001	50.00	6.21	31.225	0.356	0.0	0.0	0.0	2.02	570.9	48.2

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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
S3.002	33.571	0.220	152.6	0.056	0.00	0.0		0.075	o	600	Pipe/Conduit	
S3.003	30.014	0.210	142.9	0.120	0.00	0.0		0.075	o	600	Pipe/Conduit	
S5.000	19.400	0.055	352.7	0.008	5.00	0.0		0.075	→|o|→		Filter Drain	
S5.001	42.894	0.110	389.9	0.006	0.00	0.0		0.075	→|o|→		Filter Drain	
S5.002	41.378	0.105	394.1	0.027	0.00	0.0		0.075	→|o|→		Filter Drain	
S5.003	13.354	0.070	190.8	0.023	0.00	0.0		0.075	→|o|→		Filter Drain	
S5.004	8.671	0.045	192.7	0.005	0.00	0.0		0.075	→|o|→		Filter Drain	
S6.000	17.820	0.090	198.0	0.010	5.00	0.0		0.075	→|o|→		Filter Drain	
S6.001	16.476	0.085	193.8	0.012	0.00	0.0		0.075	→|o|→		Filter Drain	
S6.002	26.520	0.125	212.2	0.006	0.00	0.0		0.075	→|o|→		Filter Drain	
S6.003	26.387	0.140	188.5	0.014	0.00	0.0		0.075	→|o|→		Filter Drain	
S5.005	45.806	0.215	213.1	0.020	0.00	0.0		0.075	o	525	Pipe/Conduit	
S3.004	24.176	0.150	161.2	0.169	0.00	0.0		0.075	o	525	Pipe/Conduit	
S3.005	29.345	0.160	183.4	0.070	0.00	0.0		0.075	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)
S3.002	50.00	8.04	30.925	0.412	0.0	0.0	0.0	0.30	86.2	55.7
S3.003	50.00	9.63	30.705	0.532	0.0	0.0	0.0	0.31	89.0	72.0
S5.000	50.00	8.18	31.440	0.008	0.0	0.0	0.0	0.10	16.5	1.1
S5.001	50.00	15.80	31.385	0.014	0.0	0.0	0.0	0.09	13.1	1.8
S5.002	50.00	23.74	31.165	0.040	0.0	0.0	0.0	0.09	8.9	5.4
S5.003	50.00	25.49	30.955	0.063	0.0	0.0	0.0	0.13	14.0	8.5
S5.004	50.00	26.38	30.885	0.068	0.0	0.0	0.0	0.16	40.9	9.3
S6.000	50.00	6.98	31.150	0.010	0.0	0.0	0.0	0.15	31.2	1.3
S6.001	50.00	8.73	31.060	0.022	0.0	0.0	0.0	0.16	35.7	3.0
S6.002	50.00	11.59	30.975	0.028	0.0	0.0	0.0	0.15	38.4	3.8
S6.003	50.00	14.17	30.850	0.042	0.0	0.0	0.0	0.17	47.2	5.7
S5.005	50.00	29.61	30.710	0.130	0.0	0.0	0.0	0.24	51.1	17.7
S3.004	50.00	30.00	30.495	0.831	0.0	0.0	0.0	0.27	58.7«	112.6
S3.005	50.00	30.00	30.345	0.902	0.0	0.0	0.0	0.11	1.9«	122.1

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
3.000	User	-	100	0.024	0.024	0.024
4.000	User	-	100	0.035	0.035	0.035
3.001	User	-	100	0.297	0.297	0.297
3.002	User	-	100	0.056	0.056	0.056
3.003	User	-	100	0.120	0.120	0.120
5.000	User	-	100	0.008	0.008	0.008
5.001	User	-	100	0.006	0.006	0.006
5.002	User	-	100	0.010	0.010	0.010
	User	-	100	0.016	0.016	0.027
5.003	User	-	100	0.009	0.009	0.009
	User	-	100	0.014	0.014	0.023
5.004	User	-	100	0.005	0.005	0.005
6.000	User	-	100	0.010	0.010	0.010
6.001	User	-	100	0.012	0.012	0.012
6.002	User	-	100	0.006	0.006	0.006
6.003	User	-	100	0.014	0.014	0.014
5.005	User	-	100	0.015	0.015	0.015
	User	-	100	0.005	0.005	0.020
3.004	User	-	100	0.169	0.169	0.169
3.005	User	-	100	0.070	0.070	0.070
				Total	Total	Total
				0.902	0.902	0.902

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)
S3.005	SW.EX	32.034	30.185	0.000	1500	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	10
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)	100	M5-60 (mm)	18.000

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Synthetic Rainfall Details

Ratio R	0.351	Cv (Winter)	0.840
Profile Type	Summer	Storm Duration (mins)	30
Cv (Summer)	0.750		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S6, DS/PN: S3.005, Volume (m³): 7.8

Unit Reference	MD-SHE-0088-4200-1600-4200
Design Head (m)	1.600
Design Flow (l/s)	4.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	88
Invert Level (m)	30.345
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.600	4.2
Flush-Flo™	0.385	3.8
Kick-Flo®	0.786	3.0
Mean Flow over Head Range	-	3.5

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	2.7	1.200	3.7	3.000	5.6	7.000	8.4
0.200	3.5	1.400	3.9	3.500	6.0	7.500	8.7
0.300	3.7	1.600	4.2	4.000	6.4	8.000	8.9
0.400	3.8	1.800	4.4	4.500	6.8	8.500	9.2
0.500	3.7	2.000	4.7	5.000	7.1	9.000	9.4
0.600	3.6	2.200	4.9	5.500	7.5	9.500	9.7
0.800	3.0	2.400	5.1	6.000	7.8		
1.000	3.4	2.600	5.3	6.500	8.1		

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Storage Structures for Storm

Filter Drain Pipe: S5.000

Manning's N	0.075	Trench Length (m)	19.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	352.7
Invert Level (m)	31.440	Cap Volume Depth (m)	1.000
Trench Width (m)	0.5	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: S5.001

Manning's N	0.075	Trench Length (m)	42.9
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	389.9
Invert Level (m)	31.385	Cap Volume Depth (m)	0.850
Trench Width (m)	0.5	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: S5.002

Manning's N	0.075	Trench Length (m)	41.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	394.1
Invert Level (m)	31.165	Cap Volume Depth (m)	0.600
Trench Width (m)	0.5	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: S5.003

Manning's N	0.075	Trench Length (m)	13.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	190.8
Invert Level (m)	30.955	Cap Volume Depth (m)	0.650
Trench Width (m)	0.5	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: S5.004

Manning's N	0.075	Trench Length (m)	8.7
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	192.7
Invert Level (m)	30.885	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

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Filter Drain Pipe: S6.000

Manning's N	0.075	Trench Length (m)	17.8
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	198.0
Invert Level (m)	31.150	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: S6.001

Manning's N	0.075	Trench Length (m)	16.5
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	193.8
Invert Level (m)	31.060	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: S6.002

Manning's N	0.075	Trench Length (m)	26.5
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	212.2
Invert Level (m)	30.975	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Filter Drain Pipe: S6.003

Manning's N	0.075	Trench Length (m)	26.4
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	188.5
Invert Level (m)	30.850	Cap Volume Depth (m)	0.000
Trench Width (m)	1.0	Cap Infiltration Depth (m)	0.000

Cellular Storage Manhole: S5, DS/PN: S3.004

Invert Level (m)	30.495	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)
0.000	500.0	0.0	0.500	500.0	0.0
0.100	500.0	0.0	0.600	500.0	0.0
0.200	500.0	0.0	0.700	500.0	0.0
0.300	500.0	0.0	0.800	500.0	0.0
0.400	500.0	0.0	0.900	500.0	0.0

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Cellular Storage Manhole: S5, DS/PN: S3.004

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
1.000	500.0	0.0	1.800	0.0	0.0
1.100	500.0	0.0	1.900	0.0	0.0
1.200	0.0	0.0	2.000	0.0	0.0
1.300	0.0	0.0	2.100	0.0	0.0
1.400	0.0	0.0	2.200	0.0	0.0
1.500	0.0	0.0	2.300	0.0	0.0
1.600	0.0	0.0	2.400	0.0	0.0
1.700	0.0	0.0	2.500	0.0	0.0

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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 10
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 0.350
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

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

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, 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
S3.000	SCHANNEL	15 Winter	1	+0%			
S4.000	S2	15 Winter	1	+0%	100/15 Winter		
S3.001	SMH1	15 Winter	1	+0%	100/15 Summer		
S3.002	S3	15 Winter	1	+0%	100/15 Summer		
S3.003	S4	15 Winter	1	+0%	30/15 Winter		
S5.000	SFD1	15 Winter	1	+0%			
S5.001	SFD2	30 Winter	1	+0%			
S5.002	SFD3	15 Winter	1	+0%			
S5.003	SFD4	60 Winter	1	+0%	100/960 Winter		
S5.004	SFD9	60 Winter	1	+0%			
S6.000	SFD5	15 Winter	1	+0%			
S6.001	SFD6	15 Winter	1	+0%			
S6.002	SFD7	30 Winter	1	+0%			
S6.003	SFD8	30 Winter	1	+0%			
S5.005	S13	60 Winter	1	+0%	100/120 Winter		
S3.004	S5	480 Winter	1	+0%	30/360 Winter		
S3.005	S6	480 Winter	1	+0%	1/15 Summer	100/600 Winter	

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S3.000	SCHANNEL		31.715	-0.420	0.000	0.01			2.8
S4.000	S2		31.632	-0.408	0.000	0.02			4.0
S3.001	SMH1		31.333	-0.492	0.000	0.07			36.4
S3.002	S3		31.210	-0.315	0.000	0.45			38.7
S3.003	S4		31.014	-0.291	0.000	0.52			46.3
S5.000	SFD1		31.506	-0.934	0.000	0.04		8	0.7
S5.001	SFD2		31.455	-0.780	0.000	0.05		15	0.7
S5.002	SFD3		31.300	-0.465	0.000	0.21		20	1.9
S5.003	SFD4		31.057	-0.548	0.000	0.17		36	2.4
S5.004	SFD9		30.965	-0.715	0.000	0.06		32	2.6
S6.000	SFD5		31.200	-0.603	0.000	0.03		6	1.0
S6.001	SFD6		31.125	-0.652	0.000	0.05		8	1.8
S6.002	SFD7		31.044	-0.717	0.000	0.05		13	1.9
S6.003	SFD8		30.920	-0.812	0.000	0.04		14	2.1
S5.005	S13		30.821	-0.414	0.000	0.10			5.0
S3.004	S5		30.703	-0.317	0.000	0.06		328	3.7
S3.005	S6		30.698	0.203	0.000	1.94			3.8

PN	US/MH Name	Status	Level Exceeded
S3.000	SCHANNEL	OK	
S4.000	S2	OK	
S3.001	SMH1	OK	
S3.002	S3	OK	
S3.003	S4	OK	
S5.000	SFD1	OK	
S5.001	SFD2	OK	
S5.002	SFD3	OK	
S5.003	SFD4	OK	
S5.004	SFD9	OK	
S6.000	SFD5	OK	
S6.001	SFD6	OK	
S6.002	SFD7	OK	
S6.003	SFD8	OK	
S5.005	S13	OK	
S3.004	S5	OK	
S3.005	S6	SURCHARGED	1

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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 10
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 0.350
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

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

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, 30, 100
Climate Change (%) 0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S3.000	SCHANNEL	15 Winter	30	+0%			
S4.000	S2	15 Winter	30	+0%	100/15 Winter		
S3.001	SMH1	15 Winter	30	+0%	100/15 Summer		
S3.002	S3	15 Winter	30	+0%	100/15 Summer		
S3.003	S4	15 Winter	30	+0%	30/15 Winter		
S5.000	SFD1	15 Winter	30	+0%			
S5.001	SFD2	30 Winter	30	+0%			
S5.002	SFD3	15 Winter	30	+0%			
S5.003	SFD4	15 Winter	30	+0%	100/960 Winter		
S5.004	SFD9	720 Winter	30	+0%			
S6.000	SFD5	15 Winter	30	+0%			
S6.001	SFD6	15 Winter	30	+0%			
S6.002	SFD7	30 Winter	30	+0%			
S6.003	SFD8	720 Winter	30	+0%			
S5.005	S13	720 Winter	30	+0%	100/120 Winter		
S3.004	S5	720 Winter	30	+0%	30/360 Winter		
S3.005	S6	1440 Winter	30	+0%	1/15 Summer	100/600 Winter	

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S3.000	SCHANNEL		31.739	-0.396	0.000	0.03			6.7
S4.000	S2		31.653	-0.387	0.000	0.05			9.9
S3.001	SMH1		31.548	-0.277	0.000	0.19			92.1
S3.002	S3		31.491	-0.034	0.000	0.96			82.3
S3.003	S4		31.328	0.023	0.000	1.09			96.8
S5.000	SFD1		31.560	-0.880	0.000	0.11		9	1.7
S5.001	SFD2		31.516	-0.719	0.000	0.14		15	1.9
S5.002	SFD3		31.473	-0.292	0.000	0.48		20	4.3
S5.003	SFD4		31.186	-0.419	0.000	0.40		20	5.6
S5.004	SFD9		31.057	-0.623	0.000	0.04		264	1.8
S6.000	SFD5		31.235	-0.568	0.000	0.08		7	2.6
S6.001	SFD6		31.180	-0.597	0.000	0.13		8	4.5
S6.002	SFD7		31.102	-0.659	0.000	0.13		12	4.8
S6.003	SFD8		31.056	-0.676	0.000	0.02		276	1.1
S5.005	S13		31.056	-0.179	0.000	0.07			3.3
S3.004	S5		31.056	0.036	0.000	0.07			3.9
S3.005	S6		31.354	0.859	0.000	1.94			3.8

PN	US/MH Name	Status	Level Exceeded
S3.000	SCHANNEL	OK	
S4.000	S2	OK	
S3.001	SMH1	OK	
S3.002	S3	OK	
S3.003	S4	SURCHARGED	
S5.000	SFD1	OK	
S5.001	SFD2	OK	
S5.002	SFD3	OK	
S5.003	SFD4	OK	
S5.004	SFD9	OK	
S6.000	SFD5	OK	
S6.001	SFD6	OK	
S6.002	SFD7	OK	
S6.003	SFD8	OK	
S5.005	S13	OK	
S3.004	S5	SURCHARGED	
S3.005	S6	SURCHARGED	1

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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 10
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 0.350
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

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

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, 30, 100
Climate Change (%) 0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S3.000	SCHANNEL	15 Winter	100	+40%			
S4.000	S2	15 Winter	100	+40%	100/15 Winter		
S3.001	SMH1	15 Winter	100	+40%	100/15 Summer		
S3.002	S3	15 Winter	100	+40%	100/15 Summer		
S3.003	S4	15 Winter	100	+40%	30/15 Winter		
S5.000	SFD1	15 Winter	100	+40%			
S5.001	SFD2	30 Winter	100	+40%			
S5.002	SFD3	15 Winter	100	+40%			
S5.003	SFD4	960 Winter	100	+40%	100/960 Winter		
S5.004	SFD9	960 Winter	100	+40%			
S6.000	SFD5	960 Winter	100	+40%			
S6.001	SFD6	960 Winter	100	+40%			
S6.002	SFD7	960 Winter	100	+40%			
S6.003	SFD8	960 Winter	100	+40%			
S5.005	S13	960 Winter	100	+40%	100/120 Winter		
S3.004	S5	960 Winter	100	+40%	30/360 Winter		
S3.005	S6	1440 Summer	100	+40%	1/15 Summer	100/600 Winter	

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S3.000	SCHANNEL		32.098	-0.037	0.000	0.05			10.4
S4.000	S2		32.085	0.045	0.000	0.07			14.5
S3.001	SMH1		32.078	0.253	0.000	0.23			113.4
S3.002	S3		31.986	0.461	0.000	1.25			107.1
S3.003	S4		31.611	0.306	0.000	1.57			138.9
S5.000	SFD1		31.646	-0.794	0.000	0.17		10	2.8
S5.001	SFD2		31.626	-0.609	0.000	0.28		16	3.7
S5.002	SFD3		31.676	-0.089	0.000	0.77		17	6.9
S5.003	SFD4		31.608	0.003	0.000	0.16		880	2.2
S5.004	SFD9		31.606	-0.074	0.000	0.06			2.2
S6.000	SFD5		31.607	-0.196	0.000	0.01		688	0.4
S6.001	SFD6		31.607	-0.170	0.000	0.02		832	0.8
S6.002	SFD7		31.606	-0.155	0.000	0.02		960	0.9
S6.003	SFD8		31.606	-0.126	0.000	0.02			1.1
S5.005	S13		31.606	0.371	0.000	0.07			3.6
S3.004	S5		31.606	0.586	0.000	0.06			3.7
S3.005	S6		31.996	1.501	0.265	1.93			3.8

PN	US/MH Name	Status	Level Exceeded
S3.000	SCHANNEL	FLOOD RISK	
S4.000	S2	SURCHARGED	
S3.001	SMH1	SURCHARGED	
S3.002	S3	SURCHARGED	
S3.003	S4	SURCHARGED	
S5.000	SFD1	OK	
S5.001	SFD2	OK	
S5.002	SFD3	OK	
S5.003	SFD4	FLOOD RISK	
S5.004	SFD9	FLOOD RISK	
S6.000	SFD5	FLOOD RISK	
S6.001	SFD6	FLOOD RISK	
S6.002	SFD7	FLOOD RISK	
S6.003	SFD8	FLOOD RISK	
S5.005	S13	FLOOD RISK	
S3.004	S5	SURCHARGED	
S3.005	S6	FLOOD	1

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