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)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	100	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	60	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

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
S1.000	30.013	0.073	411.1	0.070	5.00	0.0	0.600	o	450	Pipe/Conduit	
S1.001	37.727	0.092	410.1	0.104	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.002	42.027	0.102	412.0	0.122	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.003	17.694	0.043	411.5	0.017	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.004	66.022	0.161	410.1	0.193	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.005	13.220	0.039	339.0	0.025	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.006	10.870	0.050	217.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.000	16.400	0.100	164.0	0.051	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	13.400	0.100	134.0	0.029	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.001	31.003	0.076	407.9	0.090	0.00	0.0	0.600	o	450	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	64.05	5.50	2.010	0.070	0.0	0.0	0.0	1.00	158.5	12.1
S1.001	60.99	6.13	1.937	0.174	0.0	0.0	0.0	1.00	158.7	28.7
S1.002	57.95	6.84	1.845	0.296	0.0	0.0	0.0	1.00	158.3	46.5
S1.003	56.78	7.13	1.743	0.313	0.0	0.0	0.0	1.00	158.4	48.2
S1.004	52.84	8.24	1.700	0.506	0.0	0.0	0.0	1.00	158.7	72.4
S1.005	52.19	8.44	1.539	0.532	0.0	0.0	0.0	1.10	174.7	75.2
S1.006	51.77	8.57	1.500	0.532	0.0	0.0	0.0	1.37	218.7	75.2
S2.000	65.27	5.27	2.170	0.051	0.0	0.0	0.0	1.02	40.5	9.0
S3.000	65.65	5.20	2.170	0.029	0.0	0.0	0.0	1.13	44.8	5.2
S2.001	62.63	5.78	1.845	0.170	0.0	0.0	0.0	1.00	159.1	28.8

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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
S2.002	33.329	0.081	411.5	0.063	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.003	14.835	0.040	370.9	0.067	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.004	64.193	0.157	408.9	0.130	0.00	0.0	0.600	o	450	Pipe/Conduit	
S4.000	16.606	0.041	405.0	0.094	5.00	0.0	0.600	o	450	Pipe/Conduit	
S2.005	7.307	0.022	332.1	0.012	0.00	0.0	0.600	o	450	Pipe/Conduit	
S2.006	7.442	0.019	391.7	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.007	7.098	0.025	283.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.008	7.493	0.025	299.7	0.000	0.00	0.0	0.600	o	450	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)
S2.002	60.05	6.34	1.769	0.233	0.0	0.0	0.0	1.00	158.4	37.9
S2.003	59.03	6.58	1.688	0.300	0.0	0.0	0.0	1.05	167.0	48.0
S2.004	54.85	7.65	1.648	0.430	0.0	0.0	0.0	1.00	158.9	63.9
S4.000	65.23	5.28	1.532	0.094	0.0	0.0	0.0	1.00	159.7	16.6
S2.005	54.46	7.76	1.491	0.536	0.0	0.0	0.0	1.11	176.5	79.1
S2.006	54.04	7.88	1.469	0.536	0.0	0.0	0.0	1.02	162.4	79.1
S1.007	51.47	8.67	1.450	1.068	0.0	0.0	0.0	1.20	191.1	148.8
S1.008	51.14	8.77	1.425	1.068	0.0	0.0	0.0	1.17	185.9	148.8

Surcharged 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	3.100	1.400	0.000	0	0

Datum (m) 1.400 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
60	1.250	420	1.250	780	1.250	1140	1.250	1500	1.250	1860	1.250
120	1.250	480	1.250	840	1.250	1200	1.250	1560	1.250	1920	1.250
180	1.250	540	1.250	900	1.250	1260	1.250	1620	1.250	1980	1.250
240	1.250	600	1.250	960	1.250	1320	1.250	1680	1.250	2040	1.250
300	1.250	660	1.250	1020	1.250	1380	1.250	1740	1.250	2100	1.250
360	1.250	720	1.250	1080	1.250	1440	1.250	1800	1.250	2160	1.250

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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2220	1.250	5220	1.250	8220	1.250	11220	1.250	14220	1.250	17220	1.250
2280	1.250	5280	1.250	8280	1.250	11280	1.250	14280	1.250	17280	1.250
2340	1.250	5340	1.250	8340	1.250	11340	1.250	14340	1.250	17340	1.250
2400	1.250	5400	1.250	8400	1.250	11400	1.250	14400	1.250	17400	1.250
2460	1.250	5460	1.250	8460	1.250	11460	1.250	14460	1.250	17460	1.250
2520	1.250	5520	1.250	8520	1.250	11520	1.250	14520	1.250	17520	1.250
2580	1.250	5580	1.250	8580	1.250	11580	1.250	14580	1.250	17580	1.250
2640	1.250	5640	1.250	8640	1.250	11640	1.250	14640	1.250	17640	1.250
2700	1.250	5700	1.250	8700	1.250	11700	1.250	14700	1.250	17700	1.250
2760	1.250	5760	1.250	8760	1.250	11760	1.250	14760	1.250	17760	1.250
2820	1.250	5820	1.250	8820	1.250	11820	1.250	14820	1.250	17820	1.250
2880	1.250	5880	1.250	8880	1.250	11880	1.250	14880	1.250	17880	1.250
2940	1.250	5940	1.250	8940	1.250	11940	1.250	14940	1.250	17940	1.250
3000	1.250	6000	1.250	9000	1.250	12000	1.250	15000	1.250	18000	1.250
3060	1.250	6060	1.250	9060	1.250	12060	1.250	15060	1.250	18060	1.250
3120	1.250	6120	1.250	9120	1.250	12120	1.250	15120	1.250	18120	1.250
3180	1.250	6180	1.250	9180	1.250	12180	1.250	15180	1.250	18180	1.250
3240	1.250	6240	1.250	9240	1.250	12240	1.250	15240	1.250	18240	1.250
3300	1.250	6300	1.250	9300	1.250	12300	1.250	15300	1.250	18300	1.250
3360	1.250	6360	1.250	9360	1.250	12360	1.250	15360	1.250	18360	1.250
3420	1.250	6420	1.250	9420	1.250	12420	1.250	15420	1.250	18420	1.250
3480	1.250	6480	1.250	9480	1.250	12480	1.250	15480	1.250	18480	1.250
3540	1.250	6540	1.250	9540	1.250	12540	1.250	15540	1.250	18540	1.250
3600	1.250	6600	1.250	9600	1.250	12600	1.250	15600	1.250	18600	1.250
3660	1.250	6660	1.250	9660	1.250	12660	1.250	15660	1.250	18660	1.250
3720	1.250	6720	1.250	9720	1.250	12720	1.250	15720	1.250	18720	1.250
3780	1.250	6780	1.250	9780	1.250	12780	1.250	15780	1.250	18780	1.250
3840	1.250	6840	1.250	9840	1.250	12840	1.250	15840	1.250	18840	1.250
3900	1.250	6900	1.250	9900	1.250	12900	1.250	15900	1.250	18900	1.250
3960	1.250	6960	1.250	9960	1.250	12960	1.250	15960	1.250	18960	1.250
4020	1.250	7020	1.250	10020	1.250	13020	1.250	16020	1.250	19020	1.250
4080	1.250	7080	1.250	10080	1.250	13080	1.250	16080	1.250	19080	1.250
4140	1.250	7140	1.250	10140	1.250	13140	1.250	16140	1.250	19140	1.250
4200	1.250	7200	1.250	10200	1.250	13200	1.250	16200	1.250	19200	1.250
4260	1.250	7260	1.250	10260	1.250	13260	1.250	16260	1.250	19260	1.250
4320	1.250	7320	1.250	10320	1.250	13320	1.250	16320	1.250	19320	1.250
4380	1.250	7380	1.250	10380	1.250	13380	1.250	16380	1.250	19380	1.250
4440	1.250	7440	1.250	10440	1.250	13440	1.250	16440	1.250	19440	1.250
4500	1.250	7500	1.250	10500	1.250	13500	1.250	16500	1.250	19500	1.250
4560	1.250	7560	1.250	10560	1.250	13560	1.250	16560	1.250	19560	1.250
4620	1.250	7620	1.250	10620	1.250	13620	1.250	16620	1.250	19620	1.250
4680	1.250	7680	1.250	10680	1.250	13680	1.250	16680	1.250	19680	1.250
4740	1.250	7740	1.250	10740	1.250	13740	1.250	16740	1.250	19740	1.250
4800	1.250	7800	1.250	10800	1.250	13800	1.250	16800	1.250	19800	1.250
4860	1.250	7860	1.250	10860	1.250	13860	1.250	16860	1.250	19860	1.250
4920	1.250	7920	1.250	10920	1.250	13920	1.250	16920	1.250	19920	1.250
4980	1.250	7980	1.250	10980	1.250	13980	1.250	16980	1.250	19980	1.250
5040	1.250	8040	1.250	11040	1.250	14040	1.250	17040	1.250	20040	1.250
5100	1.250	8100	1.250	11100	1.250	14100	1.250	17100	1.250	20100	1.250
5160	1.250	8160	1.250	11160	1.250	14160	1.250	17160	1.250	20160	1.250

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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	0.000
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	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 Storm

Hydro-Brake® Optimum Manhole: S15, DS/PN: S1.008, Volume (m³): 3.5

Unit Reference	MD-SHE-0226-3000-1775-3000
Design Head (m)	1.775
Design Flow (l/s)	30.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	226
Invert Level (m)	1.425
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.775	30.0
Flush-Flo™	0.528	30.0
Kick-Flo®	1.154	24.4
Mean Flow over Head Range	-	25.9

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	7.6	1.200	24.9	3.000	38.6	7.000	58.1
0.200	22.5	1.400	26.8	3.500	41.6	7.500	60.1
0.300	28.4	1.600	28.5	4.000	44.3	8.000	62.0
0.400	29.6	1.800	30.2	4.500	46.9	8.500	63.9
0.500	29.9	2.000	31.8	5.000	49.4	9.000	65.7
0.600	29.9	2.200	33.2	5.500	51.7	9.500	67.4
0.800	29.1	2.400	34.7	6.000	53.9		
1.000	27.5	2.600	36.0	6.500	56.1		

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Storage Structures for Storm

Tank or Pond Manhole: SPond OF, DS/PN: S1.007

Invert Level (m) 1.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	220.5	0.700	440.6	1.400	695.8	2.100	0.0
0.100	249.7	0.800	475.1	1.500	734.6	2.200	0.0
0.200	279.6	0.900	510.3	1.600	774.0	2.300	0.0
0.300	310.3	1.000	546.3	1.700	813.9	2.400	0.0
0.400	341.7	1.100	582.8	1.701	0.0	2.500	0.0
0.500	373.9	1.200	619.9	1.900	0.0		
0.600	406.9	1.300	657.6	2.000	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	0.000
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	FEH
FEH Rainfall Version	1999
Site Location	GB 523100 322750 TF 23100 22750
C (1km)	-0.022
D1 (1km)	0.292
D2 (1km)	0.299
D3 (1km)	0.226
E (1km)	0.314
F (1km)	2.492
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	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
S1.000	S1	10080 Winter	1	+0%	1/10080 Winter		
S1.001	S2	10080 Winter	1	+0%	1/7200 Winter		
S1.002	S3	10080 Winter	1	+0%	1/4320 Winter		
S1.003	S4	10080 Winter	1	+0%	1/2160 Winter		
S1.004	S5	10080 Winter	1	+0%	1/1440 Winter		
S1.005	S6	10080 Winter	1	+0%	1/480 Winter		
S1.006	SPond Inlet 1	10080 Winter	1	+0%	1/360 Winter		
S2.000	S7	10080 Winter	1	+0%	1/7200 Winter		
S3.000	S8	10080 Winter	1	+0%	1/7200 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)
S1.000	S1		2.481	0.021	0.000	0.00			0.1
S1.001	S2		2.481	0.094	0.000	0.00			0.3
S1.002	S3		2.481	0.186	0.000	0.00			0.5
S1.003	S4		2.481	0.288	0.000	0.00			0.5
S1.004	S5		2.481	0.331	0.000	0.00			0.7
S1.005	S6		2.481	0.492	0.000	0.01			0.8
S1.006	SPond Inlet 1		2.481	0.531	0.000	0.00			0.7
S2.000	S7		2.481	0.086	0.000	0.00			0.1
S3.000	S8		2.481	0.086	0.000	0.00			0.1

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	SURCHARGED	
S1.001	S2	SURCHARGED	
S1.002	S3	SURCHARGED	
S1.003	S4	SURCHARGED	
S1.004	S5	SURCHARGED	
S1.005	S6	SURCHARGED	
S1.006	SPond Inlet 1	SURCHARGED	
S2.000	S7	SURCHARGED	
S3.000	S8	SURCHARGED	

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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
S2.001	S9	10080 Winter	1	+0%	1/4320 Winter		
S2.002	S10	10080 Winter	1	+0%	1/2160 Winter		
S2.003	S11	10080 Winter	1	+0%	1/1440 Winter		
S2.004	S12	10080 Winter	1	+0%	1/1440 Summer		
S4.000	S13	10080 Winter	1	+0%	1/480 Winter		
S2.005	S14	10080 Winter	1	+0%	1/360 Winter		
S2.006	SPond Inlet 2	10080 Winter	1	+0%	1/240 Winter		
S1.007	SPond OF	10080 Winter	1	+0%	1/180 Winter		
S1.008	S15	10080 Winter	1	+0%	1/120 Winter		

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)
S2.001	S9		2.481	0.186	0.000	0.00			0.3
S2.002	S10		2.481	0.262	0.000	0.00			0.4
S2.003	S11		2.481	0.343	0.000	0.00			0.5
S2.004	S12		2.481	0.383	0.000	0.00			0.7
S4.000	S13		2.481	0.499	0.000	0.00			0.2
S2.005	S14		2.481	0.540	0.000	0.01			0.9
S2.006	SPond Inlet 2		2.481	0.562	0.000	0.01			0.9
S1.007	SPond OF		2.481	0.581	0.000	0.04			5.0
S1.008	S15		2.644	0.769	0.000	0.00			0.0

PN	US/MH Name	Status	Level Exceeded
S2.001	S9	SURCHARGED	
S2.002	S10	SURCHARGED	
S2.003	S11	SURCHARGED	
S2.004	S12	SURCHARGED	
S4.000	S13	SURCHARGED	
S2.005	S14	SURCHARGED	
S2.006	SPond Inlet 2	SURCHARGED	
S1.007	SPond OF	SURCHARGED	
S1.008	S15	SURCHARGED	

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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	0.000
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	FEH
FEH Rainfall Version	1999
Site Location	GB 523100 322750 TF 23100 22750
C (1km)	-0.022
D1 (1km)	0.292
D2 (1km)	0.299
D3 (1km)	0.226
E (1km)	0.314
F (1km)	2.492
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	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
S1.000	S1	2880 Winter	30	+0%	1/10080 Winter		
S1.001	S2	2880 Winter	30	+0%	1/7200 Winter		
S1.002	S3	2880 Winter	30	+0%	1/4320 Winter		
S1.003	S4	2880 Winter	30	+0%	1/2160 Winter		
S1.004	S5	2880 Winter	30	+0%	1/1440 Winter		
S1.005	S6	2880 Winter	30	+0%	1/480 Winter		
S1.006	SPond Inlet 1	2880 Winter	30	+0%	1/360 Winter		
S2.000	S7	2880 Winter	30	+0%	1/7200 Winter		
S3.000	S8	2880 Winter	30	+0%	1/7200 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)
S1.000	S1		2.688	0.228	0.000	0.00			0.7
S1.001	S2		2.688	0.301	0.000	0.01			1.6
S1.002	S3		2.688	0.393	0.000	0.02			2.7
S1.003	S4		2.688	0.495	0.000	0.02			2.9
S1.004	S5		2.688	0.538	0.000	0.03			4.8
S1.005	S6		2.688	0.699	0.000	0.04			5.0
S1.006	SPond Inlet 1		2.687	0.737	0.000	0.03			5.0
S2.000	S7		2.688	0.293	0.000	0.01			0.5
S3.000	S8		2.688	0.293	0.000	0.01			0.3

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	SURCHARGED	
S1.001	S2	SURCHARGED	
S1.002	S3	SURCHARGED	
S1.003	S4	SURCHARGED	
S1.004	S5	SURCHARGED	
S1.005	S6	SURCHARGED	
S1.006	SPond Inlet 1	SURCHARGED	
S2.000	S7	SURCHARGED	
S3.000	S8	SURCHARGED	

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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
S2.001	S9	2880 Winter	30	+0%	1/4320 Winter		
S2.002	S10	2880 Winter	30	+0%	1/2160 Winter		
S2.003	S11	2880 Winter	30	+0%	1/1440 Winter		
S2.004	S12	2880 Winter	30	+0%	1/1440 Summer		
S4.000	S13	2880 Winter	30	+0%	1/480 Winter		
S2.005	S14	2880 Winter	30	+0%	1/360 Winter		
S2.006	SPond Inlet 2	2880 Winter	30	+0%	1/240 Winter		
S1.007	SPond OF	2880 Winter	30	+0%	1/180 Winter		
S1.008	S15	2880 Winter	30	+0%	1/120 Winter		

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)
S2.001	S9		2.688	0.393	0.000	0.01			1.6
S2.002	S10		2.688	0.469	0.000	0.02			2.2
S2.003	S11		2.688	0.550	0.000	0.02			2.9
S2.004	S12		2.688	0.590	0.000	0.03			4.1
S4.000	S13		2.688	0.706	0.000	0.01			0.9
S2.005	S14		2.688	0.747	0.000	0.05			5.1
S2.006	SPond Inlet 2		2.687	0.768	0.000	0.05			5.1
S1.007	SPond OF		2.687	0.787	0.000	0.08			9.2
S1.008	S15		2.788	0.913	0.000	0.03			3.9

PN	US/MH Name	Status	Level Exceeded
S2.001	S9	SURCHARGED	
S2.002	S10	SURCHARGED	
S2.003	S11	SURCHARGED	
S2.004	S12	SURCHARGED	
S4.000	S13	SURCHARGED	
S2.005	S14	SURCHARGED	
S2.006	SPond Inlet 2	SURCHARGED	
S1.007	SPond OF	SURCHARGED	
S1.008	S15	SURCHARGED	

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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	0.000
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	FEH
FEH Rainfall Version	1999
Site Location	GB 523100 322750 TF 23100 22750
C (1km)	-0.022
D1 (1km)	0.292
D2 (1km)	0.299
D3 (1km)	0.226
E (1km)	0.314
F (1km)	2.492
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	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
S1.000	S1	60 Summer	100	+40%	1/10080 Winter		
S1.001	S2	60 Summer	100	+40%	1/7200 Winter		
S1.002	S3	600 Winter	100	+40%	1/4320 Winter		
S1.003	S4	600 Winter	100	+40%	1/2160 Winter		
S1.004	S5	600 Winter	100	+40%	1/1440 Winter		
S1.005	S6	600 Winter	100	+40%	1/480 Winter		
S1.006	SPond Inlet 1	600 Winter	100	+40%	1/360 Winter		
S2.000	S7	600 Winter	100	+40%	1/7200 Winter		
S3.000	S8	600 Winter	100	+40%	1/7200 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)
S1.000	S1		3.005	0.545	0.000	0.23			31.0
S1.001	S2		2.992	0.605	0.000	0.54			76.3
S1.002	S3		2.961	0.666	0.000	0.13			18.9
S1.003	S4		2.958	0.765	0.000	0.17			19.8
S1.004	S5		2.955	0.805	0.000	0.22			32.3
S1.005	S6		2.947	0.958	0.000	0.28			33.7
S1.006	SPond Inlet 1		2.944	0.994	0.000	0.22			33.6
S2.000	S7		2.961	0.566	0.000	0.09			3.2
S3.000	S8		2.959	0.564	0.000	0.05			1.8

PN	US/MH Name	Status	Level Exceeded
S1.000	S1	FLOOD RISK	
S1.001	S2	FLOOD RISK	
S1.002	S3	FLOOD RISK	
S1.003	S4	FLOOD RISK	
S1.004	S5	FLOOD RISK	
S1.005	S6	FLOOD RISK	
S1.006	SPond Inlet 1	FLOOD RISK	
S2.000	S7	FLOOD RISK	
S3.000	S8	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.
S2.001	S9	600 Winter	100	+40%	1/4320 Winter			
S2.002	S10	600 Winter	100	+40%	1/2160 Winter			
S2.003	S11	600 Winter	100	+40%	1/1440 Winter			
S2.004	S12	600 Winter	100	+40%	1/1440 Summer			
S4.000	S13	600 Winter	100	+40%	1/480 Winter			
S2.005	S14	600 Winter	100	+40%	1/360 Winter			
S2.006	SPond Inlet 2	600 Winter	100	+40%	1/240 Winter			
S1.007	SPond OF	600 Winter	100	+40%	1/180 Winter			
S1.008	S15	360 Winter	100	+40%	1/120 Winter			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
S2.001	S9	2.958	0.663	0.000	0.08			10.7
S2.002	S10	2.956	0.737	0.000	0.11			14.6
S2.003	S11	2.954	0.816	0.000	0.16			18.9
S2.004	S12	2.951	0.853	0.000	0.18			27.2
S4.000	S13	2.946	0.964	0.000	0.05			6.0
S2.005	S14	2.945	1.004	0.000	0.32			33.8
S2.006	SPond Inlet 2	2.943	1.024	0.000	0.35			33.6
S1.007	SPond OF	2.940	1.040	0.000	0.24			29.5
S1.008	S15	3.091	1.216	0.000	0.20			23.5

PN	US/MH Name	Status	Level Exceeded
S2.001	S9	FLOOD RISK	
S2.002	S10	FLOOD RISK	
S2.003	S11	FLOOD RISK	
S2.004	S12	FLOOD RISK	
S4.000	S13	FLOOD RISK	
S2.005	S14	FLOOD RISK	
S2.006	SPond Inlet 2	FLOOD RISK	
S1.007	SPond OF	FLOOD RISK	
S1.008	S15	FLOOD RISK	

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