

The Old Chapel
Station Road, Hugglescote
Leicestershire LE67 2GB

Bicester
Parcel H
SWS NET 4

Date 01/08/2018
File 23431 parcel H4 rev a.MDX

Designed by as
Checked by



XP Solutions

Network 2015.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 4

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	1
Site Location GB 457850 220300 SP 57850 20300	
C (1km)	-0.023
D1 (1km)	0.309
D2 (1km)	0.343
D3 (1km)	0.255
E (1km)	0.288
F (1km)	2.462
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Surface Network 4

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.471	4-8	0.344

Total Area Contributing (ha) = 0.815

Total Pipe Volume (m³) = 25.166

Network Design Table for Surface Network 4

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	2.108	0.014	150.6	0.063	5.00	0.0	0.600	o	225	
1.001	11.433	0.076	150.4	0.063	0.00	0.0	0.600	o	225	
1.002	19.930	0.198	100.7	0.000	0.00	0.0	0.600	o	225	
1.003	23.246	0.284	81.9	0.023	0.00	0.0	0.600	o	300	

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	5.03	77.700	0.063	0.0	0.0	0.0	1.06	42.3	8.5
1.001	50.00	5.21	77.686	0.126	0.0	0.0	0.0	1.06	42.3	17.1
1.002	50.00	5.47	77.610	0.126	0.0	0.0	0.0	1.30	51.8	17.1
1.003	50.00	5.69	77.337	0.149	0.0	0.0	0.0	1.74	122.9	20.2

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Network Design Table for Surface Network 4

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
2.000	11.013	0.551	20.0	0.051	5.00	0.0	0.600	o	150	
2.001	4.483	0.216	20.7	0.000	0.00	0.0	0.600	o	150	
1.004	47.948	0.213	225.0	0.044	0.00	0.0	0.600	o	300	
3.000	1.679	0.017	100.0	0.104	5.00	0.0	0.600	o	150	
3.001	5.021	0.050	100.4	0.000	0.00	0.0	0.600	o	150	
3.002	5.771	0.580	9.9	0.000	0.00	0.0	0.600	o	150	
1.005	11.151	0.055	202.7	0.000	0.00	0.0	0.600	o	300	
4.000	24.906	1.610	15.5	0.093	5.00	0.0	0.600	o	300	
1.006	39.320	0.250	157.4	0.049	0.00	0.0	0.600	o	300	
5.000	2.209	0.025	88.4	0.098	5.00	0.0	0.600	o	150	
5.001	17.480	0.448	39.0	0.000	0.00	0.0	0.600	o	150	
6.000	10.933	0.223	49.0	0.010	5.00	0.0	0.600	o	300	
5.002	17.523	0.274	64.0	0.000	0.00	0.0	0.600	o	300	
7.000	8.178	0.155	52.8	0.061	5.00	0.0	0.600	o	150	
7.001	8.369	0.152	55.0	0.000	0.00	0.0	0.600	o	150	
7.002	5.237	0.560	9.4	0.000	0.00	0.0	0.600	o	150	

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)
2.000	50.00	5.08	77.970	0.051	0.0	0.0	0.0	2.26	40.0	6.9
2.001	50.00	5.11	77.419	0.051	0.0	0.0	0.0	2.22	39.3	6.9
1.004	50.00	6.46	77.053	0.244	0.0	0.0	0.0	1.04	73.8	33.0
3.000	50.00	5.03	78.400	0.104	0.0	0.0	0.0	1.00	17.8	14.1
3.001	50.00	5.11	78.383	0.104	0.0	0.0	0.0	1.00	17.7	14.1
3.002	50.00	5.14	77.570	0.104	0.0	0.0	0.0	3.21	56.8	14.1
1.005	50.00	6.62	76.840	0.348	0.0	0.0	0.0	1.10	77.8	47.1
4.000	50.00	5.10	78.395	0.093	0.0	0.0	0.0	4.02	284.0	12.6
1.006	50.00	7.15	76.785	0.490	0.0	0.0	0.0	1.25	88.4	66.4
5.000	50.00	5.03	78.300	0.098	0.0	0.0	0.0	1.07	18.9	13.3
5.001	50.00	5.21	78.275	0.098	0.0	0.0	0.0	1.62	28.6	13.3
6.000	50.00	5.08	77.900	0.010	0.0	0.0	0.0	2.25	159.1	1.4
5.002	50.00	5.36	77.677	0.108	0.0	0.0	0.0	1.97	139.2	14.6
7.000	50.00	5.10	78.420	0.061	0.0	0.0	0.0	1.39	24.5	8.3
7.001	50.00	5.20	78.265	0.061	0.0	0.0	0.0	1.36	24.0	8.3
7.002	50.00	5.23	78.113	0.061	0.0	0.0	0.0	3.31	58.6	8.3

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Network Design Table for Surface Network 4

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
5.003	40.791	0.868	47.0	0.036	0.00	0.0	0.600	o	300	
8.000	11.987	0.150	80.0	0.089	5.00	0.0	0.600	o	150	
8.001	8.210	0.103	79.7	0.000	0.00	0.0	0.600	o	150	
8.002	6.027	0.620	9.7	0.000	0.00	0.0	0.600	o	150	
1.007	7.442	0.074	100.6	0.000	0.00	0.0	0.600	o	450	
1.008	7.580	0.053	143.0	0.031	0.00	0.0	0.600	o	450	
1.009	28.293	0.290	97.6	0.000	0.00	0.0	0.600	o	450	

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)
5.003	50.00	5.66	77.403	0.205	0.0	0.0	0.0	2.30	162.5	27.8
8.000	50.00	5.18	78.500	0.089	0.0	0.0	0.0	1.12	19.9	12.1
8.001	50.00	5.30	78.350	0.089	0.0	0.0	0.0	1.13	19.9	12.1
8.002	50.00	5.33	77.380	0.089	0.0	0.0	0.0	3.25	57.4	12.1
1.007	50.00	7.21	76.460	0.784	0.0	0.0	0.0	2.03	322.4	106.2
1.008	50.00	7.28	76.386	0.815	0.0	0.0	0.0	1.70	270.1	110.4
1.009	49.29	7.51	76.350	0.815	0.0	0.0	0.0	2.06	327.4	110.4

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Area Summary for Surface Network 4

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.063	0.063	0.063
1.001	-	-	100	0.063	0.063	0.063
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.023	0.023	0.023
2.000	-	-	100	0.051	0.051	0.051
2.001	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.044	0.044	0.044
3.000	-	-	100	0.104	0.104	0.104
3.001	-	-	100	0.000	0.000	0.000
3.002	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.093	0.093	0.093
1.006	-	-	100	0.049	0.049	0.049
5.000	-	-	100	0.098	0.098	0.098
5.001	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.010	0.010	0.010
5.002	-	-	100	0.000	0.000	0.000
7.000	-	-	100	0.061	0.061	0.061
7.001	-	-	100	0.000	0.000	0.000
7.002	-	-	100	0.000	0.000	0.000
5.003	-	-	100	0.036	0.036	0.036
8.000	-	-	100	0.089	0.089	0.089
8.001	-	-	100	0.000	0.000	0.000
8.002	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.031	0.031	0.031
1.009	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.815	0.815	0.815

Free Flowing Outfall Details for Surface Network 4

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	S96Exist	80.504	76.060	76.060	1500	0

Simulation Criteria for Surface Network 4

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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 4 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH D1 (1km)	0.309
Return Period (years)	1 D2 (1km)	0.343
Site Location GB 457850 220300 SP 57850 20300	D3 (1km)	0.255
C (1km)	-0.023 E (1km)	0.288

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Synthetic Rainfall Details

F (1km) 2.462 Cv (Summer) 0.750
Summer Storms Yes Cv (Winter) 0.840
Winter Storms Yes Storm Duration (mins) 30

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Online Controls for Surface Network 4

Garastor Manhole: S415, DS/PN: 5.001, Volume (m³): 0.3

Invert Level (m) 78.275 Model 400mm Overflow

Garastor Manhole: S419, DS/PN: 7.001, Volume (m³): 0.4

Invert Level (m) 78.265 Model 400mm Overflow

Garastor Manhole: S424, DS/PN: 8.002, Volume (m³): 0.5

Invert Level (m) 77.380 Model 400mm Overflow

Complex Manhole: S426HB, DS/PN: 1.008, Volume (m³): 29.0

Hydro-Brake Optimum®

Unit Reference MD-SHE-0087-5500-3000-5500
 Design Head (m) 3.000
 Design Flow (l/s) 5.5
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Diameter (mm) 87
 Invert Level (m) 76.386
 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)	3.000	5.5	Kick-Flo®	0.780	2.9
Flush-Flo™	0.380	3.7	Mean Flow over Head Range	-	4.1

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	2.7	0.800	3.0	2.000	4.6	4.000	6.3	7.000	8.2
0.200	3.4	1.000	3.3	2.200	4.8	4.500	6.7	7.500	8.5
0.300	3.7	1.200	3.6	2.400	5.0	5.000	7.0	8.000	8.7
0.400	3.7	1.400	3.9	2.600	5.1	5.500	7.3	8.500	9.0
0.500	3.6	1.600	4.1	3.000	5.5	6.000	7.6	9.000	9.2
0.600	3.5	1.800	4.3	3.500	5.9	6.500	7.9	9.500	9.5

Weir

Discharge Coef 0.544 Width (m) 0.150 Invert Level (m) 79.016

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Storage Structures for Surface Network 4

Tank or Pond Manhole: S411, DS/PN: 1.005

Invert Level (m) 77.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	349.0	1.200	0.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	349.0	1.400	0.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	349.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	349.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	349.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	0.0	2.200	0.0	3.400	0.0	4.600	0.0		

Tank or Pond Manhole: S414, DS/PN: 5.000

Invert Level (m) 78.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	63.0	1.200	0.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	63.0	1.400	0.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	63.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	63.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	63.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	0.0	2.200	0.0	3.400	0.0	4.600	0.0		

Tank or Pond Manhole: S418, DS/PN: 7.000

Invert Level (m) 78.420

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	84.0	1.200	0.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	84.0	1.400	0.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	84.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	84.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	84.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	0.0	2.200	0.0	3.400	0.0	4.600	0.0		

Tank or Pond Manhole: S422, DS/PN: 8.000

Invert Level (m) 78.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	100.0	1.200	0.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	100.0	1.400	0.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	100.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	100.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	100.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	0.0	2.200	0.0	3.400	0.0	4.600	0.0		

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 Coefficient 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 4 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.255
Site Location GB 457850 220300 SP 57850 20300 E (1km) 0.288
C (1km) -0.023 F (1km) 2.462
D1 (1km) 0.309 Cv (Summer) 0.750
D2 (1km) 0.343 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 10, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth
	Name	Storm							(m)	(m)
1.000	S401	15 Winter	10	+0%	30/15 Summer	100/15 Summer		77.897	-0.028	
1.001	S402	15 Winter	10	+0%	30/15 Summer	100/15 Summer		77.890	-0.021	
1.002	S403	15 Winter	10	+0%	30/15 Summer			77.758	-0.077	
1.003	S404	15 Winter	10	+0%	100/15 Summer			77.467	-0.170	
2.000	S405	15 Winter	10	+0%	100/15 Summer			78.036	-0.084	
2.001	S406	15 Winter	10	+0%	30/15 Summer			77.494	-0.075	
1.004	S407	480 Winter	10	+0%	10/240 Winter			77.385	0.032	
3.000	S408	15 Winter	10	+0%	10/15 Summer	100/15 Summer		78.897	0.347	
3.001	S409	15 Winter	10	+0%	10/15 Summer			78.685	0.151	
3.002	S410	15 Winter	10	+0%	100/15 Summer			77.654	-0.066	
1.005	S411	480 Winter	10	+0%	10/15 Summer			77.384	0.244	
4.000	S412	15 Winter	10	+0%	100/120 Winter			78.460	-0.235	
1.006	S413	480 Winter	10	+0%	10/15 Summer			77.384	0.299	
5.000	S414	240 Winter	10	+0%	10/15 Summer			78.555	0.105	
5.001	S415	240 Winter	10	+0%	10/15 Summer			78.701	0.276	
6.000	S416	15 Winter	10	+0%	100/60 Winter			77.931	-0.269	
5.002	S417	15 Winter	10	+0%	100/60 Winter			77.711	-0.266	
7.000	S418	60 Winter	10	+0%	30/60 Winter			78.524	-0.046	
7.001	S419	60 Winter	10	+0%	10/15 Summer			78.521	0.106	
7.002	S420	60 Winter	10	+0%	100/120 Summer			78.128	-0.135	
5.003	S421	15 Winter	10	+0%	100/15 Summer			77.466	-0.237	
8.000	S422	15 Winter	10	+0%	100/15 Summer			78.579	-0.071	
8.001	S423	15 Winter	10	+0%	100/15 Summer			78.431	-0.069	
8.002	S424	15 Winter	10	+0%	10/15 Summer			77.947	0.417	
1.007	S425	480 Winter	10	+0%	10/15 Summer			77.382	0.472	
1.008	S426HB	480 Winter	10	+0%	10/15 Summer			77.381	0.545	

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Bicester
Parcel H
SWS NET 4



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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for
Surface Network 4

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.000	S401	0.000	0.62	17.7	OK	2	
1.001	S402	0.000	1.00	35.9	OK	2	
1.002	S403	0.000	0.76	35.8	OK		
1.003	S404	0.000	0.39	42.4	OK		
2.000	S405	0.000	0.40	14.4	OK		
2.001	S406	0.000	0.49	14.3	OK		
1.004	S407	0.000	0.10	6.8	SURCHARGED		
3.000	S408	0.000	2.62	28.5	SURCHARGED	4	
3.001	S409	0.000	2.03	28.5	SURCHARGED		
3.002	S410	0.000	0.60	28.4	OK		
1.005	S411	0.000	0.09	5.5	SURCHARGED		
4.000	S412	0.000	0.10	26.3	OK		
1.006	S413	0.000	0.06	5.0	SURCHARGED		
5.000	S414	0.000	0.22	2.4	SURCHARGED		
5.001	S415	0.000	0.06	1.5	SURCHARGED		
6.000	S416	0.000	0.02	2.8	OK		
5.002	S417	0.000	0.03	3.5	OK		
7.000	S418	0.000	0.05	1.2	OK		
7.001	S419	0.000	0.05	1.0	SURCHARGED		
7.002	S420	0.000	0.02	1.0	OK		
5.003	S421	0.000	0.10	14.9	OK		
8.000	S422	0.000	0.55	9.8	OK		
8.001	S423	0.000	0.57	9.8	OK		
8.002	S424	0.000	0.21	9.9	SURCHARGED		
1.007	S425	0.000	0.03	4.7	SURCHARGED		
1.008	S426HB	0.000	0.02	3.7	SURCHARGED		

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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)
1.009	S427	1440 Winter	10	+0%					76.378	-0.422	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Level Exceeded	Status
1.009	S427	0.01		3.7		OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 Coefficient 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 4 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.255
 Site Location GB 457850 220300 SP 57850 20300 E (1km) 0.288
 C (1km) -0.023 F (1km) 2.462
 D1 (1km) 0.309 Cv (Summer) 0.750
 D2 (1km) 0.343 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 10, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	S401	15 Winter	30	+0%	30/15 Summer	100/15 Summer			78.043	0.118
1.001	S402	15 Winter	30	+0%	30/15 Summer	100/15 Summer			78.027	0.116
1.002	S403	15 Winter	30	+0%	30/15 Summer				77.865	0.030
1.003	S404	15 Winter	30	+0%	100/15 Summer				77.593	-0.044
2.000	S405	15 Winter	30	+0%	100/15 Summer				78.052	-0.068
2.001	S406	15 Winter	30	+0%	30/15 Summer				77.611	0.042
1.004	S407	480 Winter	30	+0%	10/240 Winter				77.573	0.220
3.000	S408	15 Winter	30	+0%	10/15 Summer	100/15 Summer			79.298	0.748
3.001	S409	15 Winter	30	+0%	10/15 Summer				78.887	0.354
3.002	S410	15 Winter	30	+0%	100/15 Summer				77.677	-0.043
1.005	S411	480 Winter	30	+0%	10/15 Summer				77.572	0.432
4.000	S412	15 Winter	30	+0%	100/120 Winter				78.472	-0.223
1.006	S413	480 Winter	30	+0%	10/15 Summer				77.571	0.487
5.000	S414	120 Winter	30	+0%	10/15 Summer				78.643	0.193
5.001	S415	480 Winter	30	+0%	10/15 Summer				78.789	0.364
6.000	S416	15 Winter	30	+0%	100/60 Winter				77.936	-0.264
5.002	S417	15 Winter	30	+0%	100/60 Winter				77.716	-0.261
7.000	S418	60 Winter	30	+0%	30/60 Winter				78.572	0.002
7.001	S419	120 Winter	30	+0%	10/15 Summer				78.576	0.161
7.002	S420	120 Winter	30	+0%	100/120 Summer				78.129	-0.134
5.003	S421	480 Winter	30	+0%	100/15 Summer				77.573	-0.130
8.000	S422	15 Winter	30	+0%	100/15 Summer				78.608	-0.042
8.001	S423	15 Winter	30	+0%	100/15 Summer				78.461	-0.039
8.002	S424	15 Winter	30	+0%	10/15 Summer				78.223	0.693
1.007	S425	480 Winter	30	+0%	10/15 Summer				77.570	0.660
1.008	S426HB	480 Winter	30	+0%	10/15 Summer				77.569	0.733

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for
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PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.000	S401	0.000	0.88	25.3	SURCHARGED		2
1.001	S402	0.000	1.42	51.1	SURCHARGED		2
1.002	S403	0.000	1.09	51.0	SURCHARGED		
1.003	S404	0.000	0.53	57.5	OK		
2.000	S405	0.000	0.58	20.7	OK		
2.001	S406	0.000	0.69	20.0	SURCHARGED		
1.004	S407	0.000	0.13	8.7	SURCHARGED		
3.000	S408	0.000	3.69	40.0	SURCHARGED		4
3.001	S409	0.000	2.85	39.9	SURCHARGED		
3.002	S410	0.000	0.84	39.7	OK		
1.005	S411	0.000	0.09	5.7	SURCHARGED		
4.000	S412	0.000	0.15	37.7	OK		
1.006	S413	0.000	0.05	4.0	SURCHARGED		
5.000	S414	0.000	0.26	2.8	SURCHARGED		
5.001	S415	0.000	0.09	2.5	SURCHARGED		
6.000	S416	0.000	0.03	4.0	OK		
5.002	S417	0.000	0.04	4.8	OK		
7.000	S418	0.000	0.06	1.2	SURCHARGED		
7.001	S419	0.000	0.05	1.1	SURCHARGED		
7.002	S420	0.000	0.02	1.1	OK		
5.003	S421	0.000	0.03	4.2	OK		
8.000	S422	0.000	0.86	15.6	OK		
8.001	S423	0.000	0.89	15.5	OK		
8.002	S424	0.000	0.32	15.5	SURCHARGED		
1.007	S425	0.000	0.03	4.3	SURCHARGED		
1.008	S426HB	0.000	0.02	3.7	SURCHARGED		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
1.009	S427	960 Summer	30	+0%					76.378	-0.422	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Level Exceeded	Status
1.009	S427	0.01		3.7		OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 4

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 Coefficient 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 4 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.255
 Site Location GB 457850 220300 SP 57850 20300 E (1km) 0.288
 C (1km) -0.023 F (1km) 2.462
 D1 (1km) 0.309 Cv (Summer) 0.750
 D2 (1km) 0.343 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 10, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	S401	15 Winter	100	+40%	30/15 Summer	100/15 Summer			79.203	1.278
1.001	S402	15 Winter	100	+40%	30/15 Summer	100/15 Summer			79.152	1.241
1.002	S403	480 Winter	100	+40%	30/15 Summer				79.029	1.194
1.003	S404	480 Winter	100	+40%	100/15 Summer				79.026	1.389
2.000	S405	15 Winter	100	+40%	100/15 Summer				79.396	1.276
2.001	S406	480 Winter	100	+40%	30/15 Summer				79.025	1.456
1.004	S407	480 Winter	100	+40%	10/240 Winter				79.025	1.672
3.000	S408	15 Winter	100	+40%	10/15 Summer	100/15 Summer			80.006	1.456
3.001	S409	15 Winter	100	+40%	10/15 Summer				79.241	0.708
3.002	S410	480 Winter	100	+40%	100/15 Summer				79.024	1.304
1.005	S411	480 Winter	100	+40%	10/15 Summer				79.022	1.882
4.000	S412	480 Winter	100	+40%	100/120 Winter				79.020	0.325
1.006	S413	480 Winter	100	+40%	10/15 Summer				79.019	1.934
5.000	S414	480 Winter	100	+40%	10/15 Summer				79.015	0.565
5.001	S415	1440 Summer	100	+40%	10/15 Summer				79.224	0.799
6.000	S416	480 Winter	100	+40%	100/60 Winter				79.015	0.815
5.002	S417	480 Winter	100	+40%	100/60 Winter				79.015	1.038
7.000	S418	480 Winter	100	+40%	30/60 Winter				79.010	0.440
7.001	S419	480 Winter	100	+40%	10/15 Summer				79.010	0.595
7.002	S420	480 Winter	100	+40%	100/120 Summer				79.012	0.749
5.003	S421	480 Winter	100	+40%	100/15 Summer				79.014	1.311
8.000	S422	480 Winter	100	+40%	100/15 Summer				79.010	0.360
8.001	S423	480 Winter	100	+40%	100/15 Summer				79.009	0.509
8.002	S424	480 Winter	100	+40%	10/15 Summer				79.011	1.481
1.007	S425	480 Winter	100	+40%	10/15 Summer				79.014	2.104
1.008	S426HB	480 Winter	100	+40%	10/15 Summer				79.013	2.177

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PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.000	S401	3.107	1.87	53.7		FLOOD	2
1.001	S402	1.747	2.20	79.0		FLOOD	2
1.002	S403	0.000	0.19	8.8		FLOOD RISK	
1.003	S404	0.000	0.09	9.7		SURCHARGED	
2.000	S405	0.000	1.08	38.9		FLOOD RISK	
2.001	S406	0.000	0.12	3.5		SURCHARGED	
1.004	S407	0.000	0.23	16.0		SURCHARGED	
3.000	S408	6.321	5.05	54.8		FLOOD	4
3.001	S409	0.000	3.91	54.8		SURCHARGED	
3.002	S410	0.000	0.15	7.2		SURCHARGED	
1.005	S411	0.000	0.21	12.8		SURCHARGED	
4.000	S412	0.000	0.03	6.5		SURCHARGED	
1.006	S413	0.000	0.22	18.1		SURCHARGED	
5.000	S414	0.000	0.54	5.9		SURCHARGED	
5.001	S415	0.000	0.19	5.0		SURCHARGED	
6.000	S416	0.000	0.01	0.7		SURCHARGED	
5.002	S417	0.000	0.05	6.1		SURCHARGED	
7.000	S418	0.000	0.08	1.8		SURCHARGED	
7.001	S419	0.000	0.09	1.8		SURCHARGED	
7.002	S420	0.000	0.04	1.7		SURCHARGED	
5.003	S421	0.000	0.06	9.4		SURCHARGED	
8.000	S422	0.000	0.34	6.1		SURCHARGED	
8.001	S423	0.000	0.35	6.1		SURCHARGED	
8.002	S424	0.000	0.13	6.1		SURCHARGED	
1.007	S425	0.000	0.07	11.8		SURCHARGED	
1.008	S426HB	0.000	0.03	5.2		SURCHARGED	

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PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
1.009	S427	480 Winter	100	+40%					76.389	-0.411	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Level Exceeded Status
1.009	S427	0.02		5.2	OK