Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	32.400	0.540	60.0	0.023	4.00	0.600	o	150	Pipe/Conduit
1.001	21.000	0.210	100.0	0.023	0.00	0.600	o	150	Pipe/Conduit
2.000	19.000	0.300	63.3	0.023	4.00	0.600	o	150	Pipe/Conduit
2.001	41.100	0.450	91.3	0.021	0.00	0.600	o	150	Pipe/Conduit
1.002	5.000	0.050	100.0	0.000	0.00	0.600	o	225	Pipe/Conduit
1.003	24.400	0.350	69.7	0.000	0.00	0.600	o	225	Pipe/Conduit
3.000	10.000	0.250	40.0	0.059	4.00	0.600	o	150	Pipe/Conduit
1.004	6.400	0.064	100.0	0.000	0.00	0.600	o	225	Pipe/Conduit
1.005	5.000	0.050	100.0	0.000	0.00	0.600	o	225	Pipe/Conduit
1.006	18.320	0.183	100.1	0.000	0.00	0.600	o	150	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
1.000	S8	31.900	31.450	0.300	31.900	30.910	0.840		475
1.001	S7	31.900	30.910	0.840	31.900	30.700	1.050		475
2.000	S10	31.900	31.450	0.300	31.900	31.150	0.600		475
2.001	S9	31.900	31.150	0.600	31.900	30.700	1.050		475
1.002	S6	31.900	30.625	1.050	31.900	30.575	1.100		600
1.003	S5	31.900	30.575	1.100	31.850	30.225	1.400		600
3.000	S11	31.900	30.600	1.150	31.850	30.350	1.350		475
1.004	S4	31.850	30.225	1.400	31.350	30.161	0.964		1050
1.005	S3	31.350	30.040	1.085	31.150	29.990	0.935		0
1.006	S2	31.150	29.990	1.010	30.900	29.807	0.943	Hydro-Brake®	1500

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)
1.006	S1	30.900	29.807	29.900	2700	0

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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	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	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)	19.500	Storm Duration (mins)	30
Ratio R	0.384		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S2, DS/PN: 1.006, Volume (m³): 2.2

Unit Reference	MD-SHE-0100-5000-1350-5000
Design Head (m)	1.350
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	29.990
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.350	5.0
Flush-Flo™	0.400	5.0
Kick-Flo®	0.829	4.0
Mean Flow over Head Range	-	4.4

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	3.3	1.200	4.7	3.000	7.3	7.000	10.9
0.200	4.6	1.400	5.1	3.500	7.8	7.500	11.2
0.300	4.9	1.600	5.4	4.000	8.3	8.000	11.6
0.400	5.0	1.800	5.7	4.500	8.8	8.500	11.9
0.500	5.0	2.000	6.0	5.000	9.2	9.000	12.2
0.600	4.8	2.200	6.3	5.500	9.7	9.500	12.6
0.800	4.2	2.400	6.5	6.000	10.1		
1.000	4.4	2.600	6.8	6.500	10.5		

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Storage Structures for Storm

Cellular Storage Manhole: S3, DS/PN: 1.005

Invert Level (m) 30.040 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	150.0	0.0	0.410	0.0	0.0
0.400	150.0	0.0			

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2 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 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 Ratio R 0.384
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.500 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 45

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	S8	15 Winter	2	+0%	100/15 Summer				31.494
1.001	S7	15 Winter	2	+0%	100/15 Summer				30.981
2.000	S10	15 Summer	2	+0%	100/15 Summer				31.496
2.001	S9	15 Winter	2	+0%	100/15 Summer				31.217
1.002	S6	15 Winter	2	+0%	100/15 Summer				30.734
1.003	S5	15 Winter	2	+0%	100/15 Summer				30.652
3.000	S11	15 Winter	2	+0%	100/15 Summer				30.669
1.004	S4	15 Winter	2	+0%	30/15 Summer				30.366
1.005	S3	60 Winter	2	+0%	100/15 Summer				30.126
1.006	S2	60 Winter	2	+0%	30/15 Summer				30.126

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S8	-0.106	0.000	0.19			4.2	OK	
1.001	S7	-0.079	0.000	0.45			7.5	OK	
2.000	S10	-0.104	0.000	0.20			4.3	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.001	S9	-0.083	0.000	0.40			7.2	OK	
1.002	S6	-0.116	0.000	0.47			14.8	OK	
1.003	S5	-0.148	0.000	0.26			14.8	OK	
3.000	S11	-0.081	0.000	0.44			10.9	OK	
1.004	S4	-0.084	0.000	0.70			24.9	OK	
1.005	S3	-0.139	0.000	0.14		43	4.3	OK*	
1.006	S2	-0.014	0.000	0.25			4.1	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 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 Ratio R 0.384
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.500 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 45

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	S8	15 Winter	30	+0%	100/15 Summer				31.513
1.001	S7	15 Winter	30	+0%	100/15 Summer				31.027
2.000	S10	15 Winter	30	+0%	100/15 Summer				31.514
2.001	S9	15 Summer	30	+0%	100/15 Summer				31.257
1.002	S6	15 Winter	30	+0%	100/15 Summer				30.804
1.003	S5	15 Winter	30	+0%	100/15 Summer				30.693
3.000	S11	15 Winter	30	+0%	100/15 Summer				30.704
1.004	S4	15 Winter	30	+0%	30/15 Summer				30.509
1.005	S3	60 Winter	30	+0%	100/15 Summer				30.224
1.006	S2	120 Winter	30	+0%	30/15 Summer				30.232

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S8	-0.087	0.000	0.36			8.0	OK	
1.001	S7	-0.033	0.000	0.95			15.9	OK	
2.000	S10	-0.086	0.000	0.39			8.1	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.001	S9	-0.043	0.000	0.82			14.8	OK	
1.002	S6	-0.046	0.000	0.98			30.7	OK	
1.003	S5	-0.107	0.000	0.54			31.0	OK	
3.000	S11	-0.046	0.000	0.83			20.7	OK	
1.004	S4	0.059	0.000	1.42			50.8	SURCHARGED	
1.005	S3	-0.041	0.000	0.17		59	5.2	OK*	
1.006	S2	0.092	0.000	0.29			4.7	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 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 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 Ratio R 0.384
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.500 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 45

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	S8	15 Winter	100	+45%	100/15 Summer				31.682
1.001	S7	15 Winter	100	+45%	100/15 Summer				31.514
2.000	S10	15 Winter	100	+45%	100/15 Summer				31.885
2.001	S9	15 Winter	100	+45%	100/15 Summer				31.791
1.002	S6	15 Winter	100	+45%	100/15 Summer				31.057
1.003	S5	15 Winter	100	+45%	100/15 Summer				30.943
3.000	S11	15 Winter	100	+45%	100/15 Summer				31.260
1.004	S4	120 Winter	100	+45%	30/15 Summer				30.755
1.005	S3	120 Winter	100	+45%	100/15 Summer				30.450
1.006	S2	120 Winter	100	+45%	30/15 Summer				30.748

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S8	0.082	0.000	0.62			13.8	FLOOD RISK	
1.001	S7	0.454	0.000	1.51			25.2	SURCHARGED	
2.000	S10	0.285	0.000	0.58			12.1	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	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.001	S9	0.491	0.000	1.26			22.8	FLOOD RISK	
1.002	S6	0.207	0.000	1.52			47.9	SURCHARGED	
1.003	S5	0.143	0.000	0.84			48.3	SURCHARGED	
3.000	S11	0.510	0.000	1.47			36.8	SURCHARGED	
1.004	S4	0.305	0.000	0.85			30.4	SURCHARGED	
1.005	S3	0.185	0.000	0.19		114	5.9	SURCHARGED*	
1.006	S2	0.608	0.000	0.30			5.0	SURCHARGED	

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