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St Nicholas House St Nicholas Road Sutton SM1 1EL		
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Micro Drainage Network 2020.1.3		

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SAT3	39.500	4.100	Open Manhole	1200	S7.000	35.400	225				
S3hb	39.425	4.325	Open Manhole	1350	S7.001	35.100	450	S9.000	35.100	225	
S4	39.350	4.360	Open Manhole	1350	S7.002	34.990	450	S9.001	34.990	450	
S5	38.850	4.060	Open Manhole	1350	S7.003	34.790	450	S9.002	34.790	450	
S6	37.000	2.510	Open Manhole	1350	S7.004	34.490	450	S9.003	34.490	450	
SAT4	36.250	2.150	Open Manhole	1200	S10.000	34.100	225				
S7hb	36.000	2.600	Open Manhole	1350	S7.005	33.400	225	S9.004	33.400	450	
								S10.000	33.400	225	
S8	34.500	2.380	Open Manhole	1200	S7.006	32.120	225	S9.005	32.120	225	
S9	33.000	2.412	Open Manhole	1200	S7.007	30.588	225	S9.006	30.588	225	
S10	30.000	3.495	Open Manhole	1200	S7.008	26.525	225	S9.007	26.505	225	
S	24.000	1.186	Open Manhole	0		OUTFALL		S9.008	22.815	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SAT3	470617.904	109466.361	470617.904	109466.361	Required	
S3hb	470622.833	109458.376	470622.833	109458.376	Required	
S4	470637.477	109459.589	470637.477	109459.589	Required	
S5	470640.116	109429.266	470640.116	109429.266	Required	
S6	470630.382	109384.913	470630.382	109384.913	Required	
SAT4	470570.346	109384.849	470570.346	109384.849	Required	
S7hb	470572.158	109379.754	470572.158	109379.754	Required	
S8	470552.536	109372.749	470552.536	109372.749	Required	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	470532.915	109365.744	470532.915	109365.744	Required	
S10	470475.522	109357.562	470475.522	109357.562	Required	
S	470431.432	109351.355			No Entry	

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)
S9.008	S	24.000	22.815	23.500	0	0

Simulation Criteria for Storm

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 Storage Structures	2
Number of Online Controls	2	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)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.100	Storm Duration (mins)	30
Ratio R	0.350		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S3hb, DS/PN: S7.001, Volume (m³): 6.5

Unit Reference	MD-SHE-0069-2000-0900-2000
Design Head (m)	0.900
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	69
Invert Level (m)	35.100
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	2.0
Flush-Flo™	0.278	2.0
Kick-Flo®	0.568	1.6
Mean Flow over Head Range	-	1.8

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	1.7	1.200	2.3	3.000	3.5	7.000	5.2
0.200	2.0	1.400	2.4	3.500	3.7	7.500	5.3
0.300	2.0	1.600	2.6	4.000	4.0	8.000	5.5
0.400	1.9	1.800	2.7	4.500	4.2	8.500	5.7
0.500	1.8	2.000	2.9	5.000	4.4	9.000	5.8
0.600	1.7	2.200	3.0	5.500	4.6	9.500	6.0
0.800	1.9	2.400	3.1	6.000	4.8		
1.000	2.1	2.600	3.2	6.500	5.0		

Hydro-Brake® Optimum Manhole: S7hb, DS/PN: S7.005, Volume (m³): 13.0

Unit Reference	MD-SHE-0069-2000-0900-2000
Design Head (m)	0.900
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	69
Invert Level (m)	33.400
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

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Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																			
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Micro Drainage Network 2020.1.3																										
Storage Structures for Storm Tank or Pond Manhole: SAT3, DS/PN: S9.000 Invert Level (m) 35.400 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>422.0</td><td>0.800</td><td>422.0</td><td>0.801</td><td>0.0</td></tr></tbody></table> Tank or Pond Manhole: SAT4, DS/PN: S10.000 Invert Level (m) 34.100 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>549.0</td><td>0.400</td><td>549.0</td><td>0.401</td><td>0.0</td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	422.0	0.800	422.0	0.801	0.0	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	549.0	0.400	549.0	0.401	0.0
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)																					
0.000	422.0	0.800	422.0	0.801	0.0																					
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0.000	549.0	0.400	549.0	0.401	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 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 Storage Structures 2

Number of Online Controls 2

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)

19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

DVD Status OFF

Analysis Timestep

Fine Inertia Status OFF

DTS Status

ON

Profile(s)

Summer and Winter

Duration(s) (mins)

15, 30, 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) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S9.000	SAT3	180 Winter	1	+0%	100/120 Winter			
S9.001	S3hb	360 Winter	1	+0%	30/60 Winter			
S9.002	S4	720 Summer	1	+0%				
S9.003	S5	240 Summer	1	+0%				
S9.004	S6	480 Winter	1	+0%				
S10.000	SAT4	480 Winter	1	+0%	100/120 Winter			
S9.005	S7hb	600 Winter	1	+0%	1/15 Summer			
S9.006	S8	360 Summer	1	+0%				
S9.007	S9	2880 Winter	1	+0%				
S9.008	S10	15 Summer	1	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S9.000	SAT3	35.438	-0.187	0.000	0.04	3.1	OK
S9.001	S3hb	35.455	-0.095	0.000	0.01	2.0	OK
S9.002	S4	35.009	-0.431	0.000	0.01	2.0	OK

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

		Water	Surcharged	Flooded				Half Drain	Pipe	
	US/MH	Level	Depth	Volume	Flow /	Overflow	Time	Flow		
PN	Name	(m)	(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)	Status	
S9.003	S5	34.808	-0.432	0.000	0.01			2.0	OK	
S9.004	S6	34.500	-0.440	0.000	0.00			2.0	OK	
S10.000	SAT4	34.170	-0.155	0.000	0.02			2.9	OK	
S9.005	S7hb	34.178	0.553	0.000	0.02			2.0	SURCHARGED	
S9.006	S8	32.136	-0.209	0.000	0.02			2.0	OK	
S9.007	S9	30.604	-0.209	0.000	0.01			2.0	OK	
S9.008	S10	26.540	-0.210	0.000	0.01			2.0	OK	

PN	US/MH		Level Exceeded
	Name		
S9.000	SAT3		
S9.001	S3hb		
S9.002	S4		
S9.003	S5		
S9.004	S6		
S10.000	SAT4		
S9.005	S7hb		
S9.006	S8		
S9.007	S9		
S9.008	S10		

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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 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 Storage Structures 2

Number of Online Controls 2

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) 19.000

Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

DVD Status OFF

Analysis Timestep Fine

Inertia Status OFF

DTS Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 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) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
S9.000	SAT3	2880 Summer	100	+40%	100/120 Winter			
S9.001	S3hb	2160 Winter	100	+40%	30/60 Winter			
S9.002	S4	2880 Winter	100	+40%				
S9.003	S5	1440 Winter	100	+40%				
S9.004	S6	2880 Winter	100	+40%				
S10.000	SAT4	2880 Winter	100	+40%	100/120 Winter			
S9.005	S7hb	2880 Winter	100	+40%	1/15 Summer			
S9.006	S8	2880 Winter	100	+40%				
S9.007	S9	2880 Winter	100	+40%				
S9.008	S10	2880 Winter	100	+40%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Half Drain Flow / Cap. (l/s)	Pipe Time (mins)	Pipe Flow (l/s)	Status
S9.000	SAT3	36.259	0.634	0.000	0.06		4.8	SURCHARGED
S9.001	S3hb	37.791	2.241	0.000	0.01		2.3	SURCHARGED
S9.002	S4	35.016	-0.424	0.000	0.01		2.2	OK

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

PN	US/MH Name	Water		Surcharged		Flooded		Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)		
S9.003	S5	34.810	-0.430	0.000	0.01			2.1		OK
S9.004	S6	34.702	-0.238	0.000	0.01			3.4		OK
S10.000	SAT4	34.710	0.385	0.000	0.01			1.6		SURCHARGED
S9.005	S7hb	34.788	1.163	0.000	0.02			2.4		SURCHARGED
S9.006	S8	32.140	-0.205	0.000	0.02			2.4		OK
S9.007	S9	30.607	-0.206	0.000	0.02			2.4		OK
S9.008	S10	26.543	-0.207	0.000	0.02			2.4		OK

PN	US/MH		Level Exceeded
	Name		
S9.000	SAT3		
S9.001	S3hb		
S9.002	S4		
S9.003	S5		
S9.004	S6		
S10.000	SAT4		
S9.005	S7hb		
S9.006	S8		
S9.007	S9		
S9.008	S10		