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4, Ironstone Way Brixworth Northampton, NN3 9UD	25910 - Kestrel Way, Luton SW 1 in 30 Year FSR	
Date 13/12/2023 File Network 1.MDX	Designed by TL Checked by TL	
Innovyze	Network 2016.1	

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	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	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

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Online Controls for Storm


Hydro-Brake Optimum® Manhole: SFCC1, DS/PN: S1.009, Volume (m³): 9.4

Unit Reference	MD-SHE-0086-3600-1250-3600
Design Head (m)	1.250
Design Flow (l/s)	3.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	86
Invert Level (m)	121.250
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.250	3.6
Flush-Flo™	0.378	3.6
Kick-Flo®	0.770	2.9
Mean Flow over Head Range	-	3.2

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	2.6	1.200	3.5	3.000	5.4	7.000	8.1
0.200	3.4	1.400	3.8	3.500	5.8	7.500	8.3
0.300	3.6	1.600	4.0	4.000	6.2	8.000	8.6
0.400	3.6	1.800	4.3	4.500	6.5	8.500	8.8
0.500	3.5	2.000	4.5	5.000	6.9	9.000	9.1
0.600	3.4	2.200	4.7	5.500	7.2	9.500	9.3
0.800	2.9	2.400	4.9	6.000	7.5		
1.000	3.2	2.600	5.1	6.500	7.8		

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Storage Structures for Storm

Porous Car Park Manhole: S5, DS/PN: S1.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	27.8
Max Percolation (l/s)	37.1	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.595	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: S6, DS/PN: S2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	26.7	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.595	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: S8, DS/PN: S1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	22.5
Max Percolation (l/s)	30.0	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.045	Cap Volume Depth (m)	0.225

Tank or Pond Manhole: SHW2, DS/PN: S1.007

Invert Level (m) 121.800


Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	35.4	0.800	147.5	0.801	0.0

Porous Car Park Manhole: S11, DS/PN: S3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	27.5
Max Percolation (l/s)	36.7	Slope (1:X)	60.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.695	Cap Volume Depth (m)	0.225

Porous Car Park Manhole: S12, DS/PN: S3.001

Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0
Membrane Percolation (mm/hr)	1000	Porosity	0.30
Max Percolation (l/s)	30.0	Invert Level (m)	123.195

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Porous Car Park Manhole: S12, DS/PN: S3.001

Width (m) 4.8 Depression Storage (mm) 5
Length (m) 22.5 Evaporation (mm/day) 3
Slope (1:X) 60.0 Cap Volume Depth (m) 0.225

Tank or Pond Manhole: S13, DS/PN: S1.008

Invert Level (m) 121.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	65.0	1.200	65.0

Filter Drain Manhole: S16, DS/PN: S4.002

Infiltration Coefficient Base (m/hr) 0.00000 Pipe Diameter (m) 0.300
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) 150.0
Invert Level (m) 123.340 Cap Volume Depth (m) 1.260
Trench Width (m) 0.6 Cap Infiltration Depth (m) 0.000
Trench Length (m) 18.0


Porous Car Park Manhole: S22, DS/PN: S5.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
Membrane Percolation (mm/hr) 1000 Length (m) 16.8
Max Percolation (l/s) 22.4 Slope (1:X) 60.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 122.595 Cap Volume Depth (m) 0.225

Tank or Pond Manhole: S23, DS/PN: S4.008

Invert Level (m) 121.265

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	384.0	1.200	384.0	1.201	0.0

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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 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 0.408
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840

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


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 30
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	30	+0%	30/15 Summer				123.946
S1.001	S2	15 Winter	30	+0%	30/15 Summer				123.809
S1.002	S3	15 Winter	30	+0%					123.446
S1.003	S4	15 Winter	30	+0%					123.180
S1.004	S5	15 Winter	30	+0%					122.841
S2.000	S6	15 Winter	30	+0%					123.007
S2.001	S7	15 Winter	30	+0%	30/15 Summer				122.645
S1.005	S8	15 Winter	30	+0%	30/15 Summer				122.499
S1.006	SHW1	15 Winter	30	+0%	30/15 Summer				122.301
S1.007	SHW2	15 Winter	30	+0%					121.956
S3.000	S11	15 Winter	30	+0%					123.082
S3.001	S12	15 Winter	30	+0%					122.568
S1.008	S13	480 Winter	30	+0%					121.800
S4.000	S14	15 Winter	30	+0%	30/15 Summer				123.983
S4.001	S15	15 Winter	30	+0%	30/15 Winter				123.716
S4.002	S16	15 Winter	30	+0%	30/15 Winter				123.654
S4.003	S17	15 Winter	30	+0%	30/15 Winter				123.561
S4.004	S18	15 Winter	30	+0%					123.409
S4.005	S19	15 Winter	30	+0%					123.262

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

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)			
S1.000	S1	0.096	0.000	1.04		39.8	SURCHARGED	
S1.001	S2	0.084	0.000	1.20		47.8	SURCHARGED	
S1.002	S3	-0.089	0.000	0.82		68.6	OK	
S1.003	S4	-0.145	0.000	0.52		73.3	OK	
S1.004	S5	-0.159	0.000	0.44		82.4	OK	
S2.000	S6	-0.043	0.000	0.83		19.3	OK	
S2.001	S7	0.095	0.000	1.20		18.8	SURCHARGED	
S1.005	S8	0.049	0.000	0.98		109.7	SURCHARGED	
S1.006	SHW1	0.051	0.000	1.19		110.3	SURCHARGED	
S1.007	SHW2	-0.444	0.000	0.15		108.1	OK	
S3.000	S11	-0.068	0.000	0.57		19.9	OK	
S3.001	S12	-0.082	0.000	0.42		19.7	OK	
S1.008	S13	-0.100	0.000	0.05		13.1	OK	
S4.000	S14	0.133	0.000	1.31		51.7	SURCHARGED	
S4.001	S15	0.056	0.000	0.97		50.7	SURCHARGED	
S4.002	S16	0.014	0.000	0.72		56.1	SURCHARGED	
S4.003	S17	0.041	0.000	1.00		53.4	SURCHARGED	
S4.004	S18	-0.096	0.000	0.79		63.8	OK	
S4.005	S19	-0.083	0.000	0.87		63.6	OK	

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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.	Water Level (m)
S4.006	S20	15	Winter	30	+0%				123.130
S4.007	S21	15	Winter	30	+0%				122.767
S5.000	S22	15	Winter	30	+0%				121.994
S4.008	S23	480	Winter	30	+0%				121.800
S1.009	SFCC1	360	Winter	30	+0%	30/15	Summer		121.798

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status	
S4.006	S20	-0.130	0.000	0.60		83.6	OK	
S4.007	S21	-0.183	0.000	0.32		83.4	OK	
S5.000	S22	-0.056	0.000	0.71		14.8	OK	
S4.008	S23	-0.065	0.000	0.01		3.1	OK	
S1.009	SFCC1	0.398	0.000	0.25		3.6	SURCHARGED	