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30 Geoffrey Road Norwich NR1 3BG	Magpie Close, Long Sutton Phase 1 Surface Water Network lin2yr, lin30yr, lin100yr+40%cc	
Date 27/07/2023	Designed by NR	
File 2023.07.27 - SURFACE WATER	Checked by Barter Hill Patnership	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 3

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 543450 324450 TF 43450 24450
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
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

Network Design Table for Surface Network 3

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
1.000	45.397	0.185	245.4	0.198	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	51.845	0.211	246.0	0.205	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	37.004	0.151	245.1	0.079	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	18.718	0.047	398.3	0.203	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.003	11.579	0.029	399.3	0.033	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.004	37.907	0.095	399.0	0.136	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	12.758	0.080	159.5	0.069	5.00	0.0	0.600	o	450	Pipe/Conduit	
1.005	12.368	0.031	399.0	0.054	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	24.623	0.061	403.7	0.031	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.76	2.583	0.198	0.0	0.0	0.0	1.00	70.6	26.8
1.001	50.00	6.62	2.398	0.403	0.0	0.0	0.0	1.00	70.5	54.6
2.000	50.00	5.62	2.338	0.079	0.0	0.0	0.0	1.00	70.7	10.7
1.002	50.00	6.93	2.037	0.685	0.0	0.0	0.0	1.01	161.0	92.8
1.003	50.00	7.12	1.990	0.718	0.0	0.0	0.0	1.01	160.8	97.2
1.004	50.00	7.75	1.961	0.854	0.0	0.0	0.0	1.01	160.9	115.6
3.000	50.00	5.13	1.946	0.069	0.0	0.0	0.0	1.61	255.6	9.3
1.005	50.00	7.95	1.866	0.977	0.0	0.0	0.0	1.01	160.9	132.3
1.006	50.00	8.36	1.835	1.008	0.0	0.0	0.0	1.01	159.9	136.5

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Norwich	Phase 1 Surface Water Network	
NR1 3BG	1in2yr,1in30yr,1in100yr+40%cc	
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Network Design Table for Surface Network 3

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
4.000	32.481	0.082	396.1	0.158	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	24.290	0.061	398.2	0.131	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	31.877	0.106	300.7	0.069	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	8.038	0.843	9.5	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	10.337	0.026	397.6	0.166	0.00	0.0	0.600	o	600	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)
4.000	50.00	5.69	2.006	0.158	0.0	0.0	0.0	0.78	55.4	21.4
1.007	50.00	8.69	1.624	1.297	0.0	0.0	0.0	1.21	343.3	175.6
1.008	50.00	9.07	1.563	1.366	0.0	0.0	0.0	1.40	395.6	185.0
5.000	50.00	5.03	2.600	0.000	0.0	0.0	0.0	5.12	362.0	0.0
1.009	50.00	9.21	1.457	1.532	0.0	0.0	0.0	1.22	343.6	207.5

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Manhole Schedules for Surface Network 3

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	3.745	1.162	Open Manhole	1350	1.000	2.583	300				
S2	3.627	1.229	Open Manhole	1350	1.001	2.398	300	1.000	2.398	300	
S3	3.597	1.259	Open Manhole	1350	2.000	2.338	300				
S4	3.422	1.385	Open Manhole	1350	1.002	2.037	450	1.001	2.187	300	
								2.000	2.187	300	
S5	3.550	1.560	Open Manhole	1350	1.003	1.990	450	1.002	1.990	450	
S6	3.397	1.436	Open Manhole	1350	1.004	1.961	450	1.003	1.961	450	
S7	3.414	1.468	Open Manhole	1350	3.000	1.946	450				
S8	3.405	1.539	Open Manhole	1350	1.005	1.866	450	1.004	1.866	450	
								3.000	1.866	450	
S9	3.522	1.687	Open Manhole	1350	1.006	1.835	450	1.005	1.835	450	
S10	3.376	1.370	Open Manhole	1350	4.000	2.006	300				
S11	3.335	1.711	Open Manhole	1350	1.007	1.624	600	1.006	1.774	450	
								4.000	1.924	300	
S12	3.369	1.806	Open Manhole	1350	1.008	1.563	600	1.007	1.563	600	
HW1	3.650	1.050	Open Manhole	1350	5.000	2.600	300				
S13.HBRAKE1	3.650	2.193	Open Manhole	1350	1.009	1.457	600	1.008	1.457	600	
								5.000	1.757	300	
OUTFALL 1 HW2	2.500	1.069	Open Manhole	1350		OUTFALL		1.009	1.431	600	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	-8853.766	1378.663	-8853.766	1378.663	Required	
S2	-8831.924	1418.460	-8831.924	1418.460	Required	
S3	-8894.903	1412.343	-8894.903	1412.343	Required	
S4	-8876.716	1444.568	-8876.716	1444.568	Required	
S5	-8893.230	1453.381	-8893.230	1453.381	Required	
S6	-8904.771	1452.448	-8904.771	1452.448	Required	
S7	-8938.501	1429.773	-8938.501	1429.773	Required	
S8	-8941.274	1442.226	-8941.274	1442.226	Required	

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Manhole Schedules for Surface Network 3

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S9	-8953.593	1443.322	-8953.593	1443.322	Required	
S10	-8958.781	1483.295	-8958.781	1483.295	Required	
S11	-8975.142	1455.235	-8975.142	1455.235	Required	
S12	-8996.484	1466.834	-8996.484	1466.834	Required	
HW1	-9015.581	1485.990	-9015.581	1485.990	Required	
S13.HBRAKE1	-9023.362	1483.973	-9023.362	1483.973	Required	
OUTFALL 1 HW2	-9032.495	1488.815			No Entry	

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PIPELINE SCHEDULES for Surface Network 3

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	S1	3.745	2.583	0.862	Open Manhole	1350
1.001	o	300	S2	3.627	2.398	0.929	Open Manhole	1350
2.000	o	300	S3	3.597	2.338	0.959	Open Manhole	1350
1.002	o	450	S4	3.422	2.037	0.935	Open Manhole	1350
1.003	o	450	S5	3.550	1.990	1.110	Open Manhole	1350
1.004	o	450	S6	3.397	1.961	0.986	Open Manhole	1350
3.000	o	450	S7	3.414	1.946	1.018	Open Manhole	1350
1.005	o	450	S8	3.405	1.866	1.089	Open Manhole	1350
1.006	o	450	S9	3.522	1.835	1.237	Open Manhole	1350
4.000	o	300	S10	3.376	2.006	1.070	Open Manhole	1350
1.007	o	600	S11	3.335	1.624	1.111	Open Manhole	1350
1.008	o	600	S12	3.369	1.563	1.206	Open Manhole	1350
5.000	o	300	HW1	3.650	2.600	0.750	Open Manhole	1350
1.009	o	600	S13.HBRAKE1	3.650	1.457	1.593	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	45.397	245.4	S2	3.627	2.398	0.929	Open Manhole	1350
1.001	51.845	246.0	S4	3.422	2.187	0.935	Open Manhole	1350
2.000	37.004	245.1	S4	3.422	2.187	0.935	Open Manhole	1350
1.002	18.718	398.3	S5	3.550	1.990	1.110	Open Manhole	1350
1.003	11.579	399.3	S6	3.397	1.961	0.986	Open Manhole	1350
1.004	37.907	399.0	S8	3.405	1.866	1.089	Open Manhole	1350
3.000	12.758	159.5	S8	3.405	1.866	1.089	Open Manhole	1350
1.005	12.368	399.0	S9	3.522	1.835	1.237	Open Manhole	1350
1.006	24.623	403.7	S11	3.335	1.774	1.111	Open Manhole	1350
4.000	32.481	396.1	S11	3.335	1.924	1.111	Open Manhole	1350
1.007	24.290	398.2	S12	3.369	1.563	1.206	Open Manhole	1350
1.008	31.877	300.7	S13.HBRAKE1	3.650	1.457	1.593	Open Manhole	1350
5.000	8.038	9.5	S13.HBRAKE1	3.650	1.757	1.593	Open Manhole	1350
1.009	10.337	397.6	OUTFALL 1 HW2	2.500	1.431	0.469	Open Manhole	1350

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Free Flowing Outfall Details for Surface Network 3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.009	OUTFALL 1 HW2	2.500	1.431	0.000	1350	0
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Simulation Criteria for Surface Network 3

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 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 Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	12	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location GB 543450 324450 TF 43450 24450		Cv (Winter)	0.840
Data Type	Catchment	Storm Duration (mins)	30

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Online Controls for Surface Network 3

Hydro-Brake® Optimum Manhole: S13.HBRAKE1, DS/PN: 1.009, Volume (m³): 12.2

Unit Reference	MD-SHE-0058-2000-1876-2000
Design Head (m)	1.876
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	58
Invert Level (m)	1.457
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points			Control Points		
	Head (m)	Flow (l/s)		Head (m)	Flow (l/s)
Design Point (Calculated)	1.876	2.0	Kick-Flo®	0.514	1.1
Flush-Flo™	0.254	1.4	Mean Flow over Head Range	-	1.5

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	1.2	0.800	1.4	2.000	2.1	4.000	2.8	7.000	3.7
0.200	1.4	1.000	1.5	2.200	2.1	4.500	3.0	7.500	3.8
0.300	1.4	1.200	1.6	2.400	2.2	5.000	3.1	8.000	3.9
0.400	1.3	1.400	1.7	2.600	2.3	5.500	3.3	8.500	4.0
0.500	1.2	1.600	1.9	3.000	2.5	6.000	3.4	9.000	4.1
0.600	1.2	1.800	2.0	3.500	2.7	6.500	3.5	9.500	4.2

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Storage Structures for Surface Network 3

Porous Car Park Manhole: S1, DS/PN: 1.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	15.0
Membrane Percolation (mm/hr)	1000	Length (m)	26.5
Max Percolation (l/s)	110.4	Slope (1:X)	100.0
Safety Factor	5.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	2.865	Cap Volume Depth (m)	0.750

Porous Car Park Manhole: S3, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	11.0
Membrane Percolation (mm/hr)	1000	Length (m)	19.5
Max Percolation (l/s)	59.6	Slope (1:X)	100.0
Safety Factor	3.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	2.717	Cap Volume Depth (m)	0.750

Complex Manhole: S4, DS/PN: 1.002

Trench Soakaway

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.0
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	43.0
Safety Factor	2.0	Slope (1:X)	100.0
Porosity	0.30	Cap Volume Depth (m)	0.900
Invert Level (m)	2.122	Cap Infiltration Depth (m)	0.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	7.5
Membrane Percolation (mm/hr)	1000	Length (m)	14.0
Max Percolation (l/s)	29.2	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	2.528	Cap Volume Depth (m)	0.900

Tank or Pond

Invert Level (m) 3.007

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	39.5	0.400	130.5

Cellular Storage Manhole: S5, DS/PN: 1.003

Invert Level (m)	1.990	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	330.0	330.0	0.400	330.0	359.1	0.401	0.0	359.1

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Porous Car Park Manhole: S6, DS/PN: 1.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	23.5
Max Percolation (l/s)	39.2	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	2.067	Cap Volume Depth (m)	1.200

Cellular Storage Manhole: S7, DS/PN: 3.000

Invert Level (m)	1.946	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	430.0	330.0	0.800	430.0	388.1	0.801	0.0	388.2

Complex Manhole: S8, DS/PN: 1.005

Cellular Storage

Invert Level (m)	1.866	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	330.0	660.0	0.400	330.0	701.1	0.401	0.0	701.2

Tank or Pond

Invert Level (m) 2.805

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	266.8	0.201	381.8	0.401	508.6	0.600	646.3
0.101	322.8	0.301	443.7	0.501	576.3		

Tank or Pond Manhole: S9, DS/PN: 1.006

Invert Level (m) 3.122

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	23.4	0.201	47.6	0.400	75.4
0.101	35.1	0.304	61.1	0.401	75.5

Complex Manhole: S10, DS/PN: 4.000

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	14.5
Membrane Percolation (mm/hr)	1000	Length (m)	21.5
Max Percolation (l/s)	86.6	Slope (1:X)	100.0
Safety Factor	3.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	2.006	Cap Volume Depth (m)	0.350

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Cellular Storage

Invert Level (m) 1.116 Safety Factor 3.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	200.0	200.0	0.800	200.0	245.3	0.801	0.0	245.3

Complex Manhole: S11, DS/PN: 1.007

Cellular Storage

Invert Level (m) 1.774 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	56.0	56.0	1.200	56.0	91.9	1.201	0.0	91.9

Cellular Storage

Invert Level (m) 1.774 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	71.0	71.0	1.200	71.0	111.4	1.201	0.0	111.5

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.0
Membrane Percolation (mm/hr) 1000 Length (m) 23.5
Max Percolation (l/s) 26.1 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 3.035 Cap Volume Depth (m) 0.300

Complex Manhole: S12, DS/PN: 1.008

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.00000 Trench Width (m) 1.0
Infiltration Coefficient Side (m/hr) 0.00000 Trench Length (m) 32.0
Safety Factor 2.0 Slope (1:X) 100.0
Porosity 0.30 Cap Volume Depth (m) 0.000
Invert Level (m) 1.713 Cap Infiltration Depth (m) 0.000

Cellular Storage

Invert Level (m) 1.713 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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Cellular Storage

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	112.0	112.0	1.200	112.0	162.8	1.201	0.0	162.8

Tank or Pond

Invert Level (m) 2.963

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	60.0	0.400	207.0

Complex Manhole: S13.HBRAKE1, DS/PN: 1.009

Cellular Storage

Invert Level (m) 1.633 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	293.0	293.0	0.800	293.0	347.8	0.801	0.0	347.8

Cellular Storage

Invert Level (m) 1.633 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	166.0	166.0	1.200	166.0	227.8	1.201	0.0	227.9

Tank or Pond

Invert Level (m) 2.600

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	40.6	0.201	70.3	0.401	106.2	0.701	148.1	0.901	196.1
0.101	54.7	0.301	87.5	0.501	126.4	0.801	171.4		

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 8.0
Membrane Percolation (mm/hr) 1000 Length (m) 33.0
Max Percolation (l/s) 73.3 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 2.770 Cap Volume Depth (m) 0.600

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 1 Number of Storage Structures 12 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 0.750
 Site Location GB 543450 324450 TF 43450 24450 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

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	S1	15 Winter	2	+0%	30/15 Summer				2.732	-0.151
1.001	S2	15 Winter	2	+0%	30/15 Summer				2.615	-0.083
2.000	S3	15 Winter	2	+0%	100/15 Summer				2.428	-0.210
1.002	S4	15 Winter	2	+0%	30/15 Summer				2.324	-0.163
1.003	S5	120 Winter	2	+0%	100/15 Winter				2.154	-0.286
1.004	S6	120 Summer	2	+0%	100/15 Winter				2.111	-0.300
3.000	S7	1440 Winter	2	+0%	100/120 Summer				2.043	-0.353
1.005	S8	1440 Winter	2	+0%	30/960 Winter				2.043	-0.273
1.006	S9	1440 Winter	2	+0%	30/360 Winter				2.043	-0.242
4.000	S10	15 Winter	2	+0%	30/480 Winter				2.131	-0.175
1.007	S11	960 Winter	2	+0%	30/240 Winter				2.043	-0.181
1.008	S12	960 Winter	2	+0%	30/120 Winter				2.042	-0.121
5.000	HW1	15 Summer	2	+0%	100/240 Winter				2.600	-0.300
1.009	S13.HBRAKE1	960 Winter	2	+0%	30/60 Summer				2.042	-0.015

PN	US/MH Name	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	0.000	0.47	6	31.2	OK	
1.001	S2	0.000	0.84		55.7	OK	
2.000	S3	0.000	0.19	6	12.6	OK	
1.002	S4	0.000	0.72	5	90.3	OK	
1.003	S5	0.000	0.29	64	28.8	OK	
1.004	S6	0.000	0.24	28	33.6	OK	
3.000	S7	0.000	0.00	1152	0.5	OK	
1.005	S8	0.000	0.07		7.7	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Flooded		Half Drain	Pipe	Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
1.006	S9	0.000	0.06		7.9	OK	
4.000	S10	0.000	0.36		18.2	OK	
1.007	S11	0.000	0.04		11.6	OK	
1.008	S12	0.000	0.03		9.6	OK	
5.000	HW1	0.000	0.00		0.0	OK	
1.009	S13.HBRAKE1	0.000	0.01		1.4	OK	

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30 Geoffrey Road Norwich NR1 3BG	Magpie Close, Long Sutton Phase 1 Surface Water Network lin2yr, lin30yr, lin100yr+40%cc	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 1 Number of Storage Structures 12 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 0.750
 Site Location GB 543450 324450 TF 43450 24450 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

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	S1	15 Winter	30	+0%	30/15 Summer				3.106	0.223
1.001	S2	15 Winter	30	+0%	30/15 Summer				3.049	0.351
2.000	S3	15 Winter	30	+0%	100/15 Summer				2.601	-0.037
1.002	S4	15 Winter	30	+0%	30/15 Summer				2.557	0.070
1.003	S5	1440 Winter	30	+0%	100/15 Winter				2.363	-0.077
1.004	S6	1440 Winter	30	+0%	100/15 Winter				2.364	-0.047
3.000	S7	1440 Winter	30	+0%	100/120 Summer				2.363	-0.033
1.005	S8	1440 Winter	30	+0%	30/960 Winter				2.363	0.047
1.006	S9	1440 Winter	30	+0%	30/360 Winter				2.363	0.078
4.000	S10	1440 Winter	30	+0%	30/480 Winter				2.363	0.057
1.007	S11	1440 Winter	30	+0%	30/240 Winter				2.363	0.139
1.008	S12	1440 Winter	30	+0%	30/120 Winter				2.363	0.200
5.000	HW1	15 Summer	30	+0%	100/240 Winter				2.600	-0.300
1.009	S13.HBRAKE1	1440 Winter	30	+0%	30/60 Summer				2.363	0.306

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	0.000	1.04		5 68.6	SURCHARGED	
1.001	S2	0.000	1.50		99.6	SURCHARGED	
2.000	S3	0.000	0.49		7 31.7	OK	
1.002	S4	0.000	1.66		9 207.1	SURCHARGED	
1.003	S5	0.000	0.12		11.9	OK	
1.004	S6	0.000	0.10		14.5	OK	
3.000	S7	0.000	0.01		1.3	OK	
1.005	S8	0.000	0.10		9.8	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Flooded		Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)				
1.006	S9	0.000	0.08		10.2	SURCHARGED	
4.000	S10	0.000	0.05		2.8	SURCHARGED	
1.007	S11	0.000	0.04		11.5	SURCHARGED	
1.008	S12	0.000	0.03		9.5	SURCHARGED	
5.000	HW1	0.000	0.00		0.0	OK	
1.009	S13.HBRAKE1	0.000	0.01		1.4	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

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 1 Number of Storage Structures 12 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Catchment
 FEH Rainfall Version 2013 Cv (Summer) 0.750
 Site Location GB 543450 324450 TF 43450 24450 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

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	S1	15 Winter	100	+40%	30/15 Summer				3.455	0.572
1.001	S2	15 Winter	100	+40%	30/15 Summer				3.427	0.729
2.000	S3	1440 Winter	100	+40%	100/15 Summer				3.329	0.691
1.002	S4	1440 Winter	100	+40%	30/15 Summer				3.329	0.842
1.003	S5	1440 Winter	100	+40%	100/15 Winter				3.329	0.889
1.004	S6	1440 Winter	100	+40%	100/15 Winter				3.328	0.917
3.000	S7	1440 Winter	100	+40%	100/120 Summer				3.327	0.931
1.005	S8	1440 Winter	100	+40%	30/960 Winter				3.327	1.011
1.006	S9	1440 Winter	100	+40%	30/360 Winter				3.327	1.042
4.000	S10	1440 Winter	100	+40%	30/480 Winter				3.326	1.020
1.007	S11	1440 Winter	100	+40%	30/240 Winter				3.327	1.103
1.008	S12	1440 Winter	100	+40%	30/120 Winter				3.327	1.164
5.000	HW1	1440 Winter	100	+40%	100/240 Winter				3.327	0.427
1.009	S13.HBRAKE1	1440 Winter	100	+40%	30/60 Summer				3.327	1.270

PN	US/MH Name	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	0.000	1.41		9 93.2	FLOOD RISK	
1.001	S2	0.000	1.79		118.9	FLOOD RISK	
2.000	S3	0.000	0.05		3.1	FLOOD RISK	
1.002	S4	0.000	0.21		25.7	FLOOD RISK	
1.003	S5	0.000	0.26		26.6	FLOOD RISK	
1.004	S6	0.000	0.21		29.9	FLOOD RISK	
3.000	S7	0.000	0.01		2.0	FLOOD RISK	
1.005	S8	0.000	0.13		12.8	FLOOD RISK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 3

PN	US/MH Name	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.006	S9	0.000	0.10		14.0	FLOOD RISK	
4.000	S10	0.000	0.11		5.6	FLOOD RISK	
1.007	S11	0.000	0.06		16.5	FLOOD RISK	
1.008	S12	0.000	0.04		13.7	FLOOD RISK	
5.000	HW1	0.000	0.00		0.0	FLOOD RISK	
1.009	S13.HBRAKE1	0.000	0.01		2.0	FLOOD RISK	