

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	2.00	Enforce best practice design rules	✓

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

Circular Link Type

Template	Freeform Carrier	Auto Increment (mm)	75
Shape	Circular	Follow Ground	x
Barrels	1		

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Basin inlet	0.146	2.00	5.0	130.000	1	431517.256	306137.752	2.400	127.600
Basin outlet				130.000	1	431525.731	306126.809	2.500	127.500
Flow Control				130.000	1200	431526.827	306122.392	2.523	127.477

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Basin inlet	Basin outlet	13.841	0.600	127.600	127.531	0.069	200.0	225	2.25	50.0
1.001	Basin outlet	Flow Control	4.551	0.600	127.500	127.477	0.023	200.0	225	2.33	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.921	36.6	24.8	2.175	2.244	0.146	5.0	136	0.987
1.001	0.921	36.6	24.8	2.275	2.298	0.146	5.0	136	0.987

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	13.841	200.0	225	Circular	130.000	127.600	2.175	130.000	127.531	2.244
1.001	4.551	200.0	225	Circular	130.000	127.500	2.275	130.000	127.477	2.298

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Basin inlet	1	Manhole	Adoptable	Basin outlet	1	Manhole	Adoptable
1.001	Basin outlet	1	Manhole	Adoptable	Flow Control	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
Basin inlet	431517.256	306137.752	130.000	2.400	1		0	1.000	127.600	225
Basin outlet	431525.731	306126.809	130.000	2.500	1		1	1.000	127.531	225
							0	1.001	127.500	225
Flow Control	431526.827	306122.392	130.000	2.523	1200		1	1.001	127.477	225

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	20	0	0
100	40	0	0

Node Flow Control Online ACO Q-Brake Control

Flap Valve	x	Design Depth (m)	2.094	Min Node Diameter (mm)	1050
Replaces Downstream Link	x	Design Flow (l/s)	5.0	Orifice Diameter (m)	0.090
Invert Level (m)	127.477	Min Outlet Diameter (m)	0.095		

Node Basin outlet Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	127.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	17.0	17.0	2.000	296.0	306.1

Approval Settings

Node Size	✓	Maximum Full Bore Velocity (m/s)	3.000
Node Losses	✓	Proportional Velocity	✓
Link Size	✓	Return Period (years)	
Minimum Diameter (mm)	150	Minimum Proportional Velocity (m/s)	0.750
Link Length	✓	Maximum Proportional Velocity (m/s)	3.000
Maximum Length (m)	100.000	Surcharged Depth	✓
Coordinates	✓	Return Period (years)	
Accuracy (m)	1.000	Maximum Surcharged Depth (m)	0.100
Crossings	✓	Flooding	✓
Cover Depth	✓	Return Period (years)	30
Minimum Cover Depth (m)		Time to Half Empty	x
Maximum Cover Depth (m)	3.000	Discharge Rates	✓
Backdrops	✓	Discharge Volume	✓
Minimum Backdrop Height (m)		100 year 360 minute (m ³)	
Maximum Backdrop Height (m)	1.500	First Flush	✓
Full Bore Velocity	✓	Return Period (years)	30
Minimum Full Bore Velocity (m/s)		First Flush Depth (mm)	5

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	109.521	30.991	1 year 1440 minute winter	3.326	1.326
1 year 15 minute winter	76.857	30.991	2 year 15 minute summer	141.566	40.058
1 year 30 minute summer	71.439	20.215	2 year 15 minute winter	99.345	40.058
1 year 30 minute winter	50.133	20.215	2 year 30 minute summer	91.753	25.963
1 year 60 minute summer	48.435	12.800	2 year 30 minute winter	64.388	25.963
1 year 60 minute winter	32.179	12.800	2 year 60 minute summer	61.301	16.200
1 year 120 minute summer	30.053	7.942	2 year 60 minute winter	40.727	16.200
1 year 120 minute winter	19.966	7.942	2 year 120 minute summer	37.449	9.897
1 year 180 minute summer	23.233	5.979	2 year 120 minute winter	24.880	9.897
1 year 180 minute winter	15.102	5.979	2 year 180 minute summer	28.672	7.378
1 year 240 minute summer	18.475	4.882	2 year 180 minute winter	18.637	7.378
1 year 240 minute winter	12.274	4.882	2 year 240 minute summer	22.636	5.982
1 year 360 minute summer	14.169	3.646	2 year 240 minute winter	15.039	5.982
1 year 360 minute winter	9.210	3.646	2 year 360 minute summer	17.235	4.435
1 year 480 minute summer	11.185	2.956	2 year 360 minute winter	11.203	4.435
1 year 480 minute winter	7.431	2.956	2 year 480 minute summer	13.550	3.581
1 year 600 minute summer	9.182	2.511	2 year 480 minute winter	9.003	3.581
1 year 600 minute winter	6.274	2.511	2 year 600 minute summer	11.088	3.033
1 year 720 minute summer	8.203	2.199	2 year 600 minute winter	7.576	3.033
1 year 720 minute winter	5.513	2.199	2 year 720 minute summer	9.878	2.647
1 year 960 minute summer	6.768	1.782	2 year 720 minute winter	6.639	2.647
1 year 960 minute winter	4.483	1.782	2 year 960 minute summer	8.113	2.136
1 year 1440 minute summer	4.949	1.326	2 year 960 minute winter	5.374	2.136

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 1440 minute summer	5.891	1.579	30 year +20% CC 1440 minute winter	8.194	3.268
2 year 1440 minute winter	3.959	1.579	100 year +40% CC 15 minute summer	488.233	138.153
30 year +20% CC 15 minute summer	322.448	91.242	100 year +40% CC 15 minute winter	342.620	138.153
30 year +20% CC 15 minute winter	226.279	91.242	100 year +40% CC 30 minute summer	320.551	90.705
30 year +20% CC 30 minute summer	209.915	59.399	100 year +40% CC 30 minute winter	224.948	90.705
30 year +20% CC 30 minute winter	147.308	59.399	100 year +40% CC 60 minute summer	214.603	56.713
30 year +20% CC 60 minute summer	139.907	36.973	100 year +40% CC 60 minute winter	142.577	56.713
30 year +20% CC 60 minute winter	92.951	36.973	100 year +40% CC 120 minute summer	129.587	34.246
30 year +20% CC 120 minute summer	84.526	22.338	100 year +40% CC 120 minute winter	86.094	34.246
30 year +20% CC 120 minute winter	56.157	22.338	100 year +40% CC 180 minute summer	97.729	25.149
30 year +20% CC 180 minute summer	63.957	16.458	100 year +40% CC 180 minute winter	63.526	25.149
30 year +20% CC 180 minute winter	41.574	16.458	100 year +40% CC 240 minute summer	75.977	20.078
30 year +20% CC 240 minute summer	49.925	13.194	100 year +40% CC 240 minute winter	50.477	20.078
30 year +20% CC 240 minute winter	33.169	13.194	100 year +40% CC 360 minute summer	56.677	14.585
30 year +20% CC 360 minute summer	37.466	9.641	100 year +40% CC 360 minute winter	36.841	14.585
30 year +20% CC 360 minute winter	24.354	9.641	100 year +40% CC 480 minute summer	43.979	11.622
30 year +20% CC 480 minute summer	29.189	7.714	100 year +40% CC 480 minute winter	29.219	11.622
30 year +20% CC 480 minute winter	19.392	7.714	100 year +40% CC 600 minute summer	35.604	9.738
30 year +20% CC 600 minute summer	23.707	6.484	100 year +40% CC 600 minute winter	24.327	9.738
30 year +20% CC 600 minute winter	16.198	6.484	100 year +40% CC 720 minute summer	31.433	8.424
30 year +20% CC 720 minute summer	20.987	5.625	100 year +40% CC 720 minute winter	21.125	8.424
30 year +20% CC 720 minute winter	14.105	5.625	100 year +40% CC 960 minute summer	25.432	6.697
30 year +20% CC 960 minute summer	17.058	4.492	100 year +40% CC 960 minute winter	16.847	6.697
30 year +20% CC 960 minute winter	11.300	4.492	100 year +40% CC 1440 minute summer	18.055	4.839
30 year +20% CC 1440 minute summer	12.193	3.268	100 year +40% CC 1440 minute winter	12.134	4.839

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Basin inlet	1680	128.756	1.156	6.1	1.4070	0.0000	SURCHARGED
1440 minute winter	Basin outlet	1680	128.754	1.254	6.1	131.0754	0.0000	SURCHARGED
1440 minute winter	Flow Control	1680	128.754	1.277	5.0	1.4441	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute winter	Basin inlet	1.000	Basin outlet	6.1	0.395	0.166	0.5505	
1440 minute winter	Basin outlet	1.001	Flow Control	5.0	0.131	0.137	0.1810	
1440 minute winter	Flow Control	ACO Q-Brake		5.0				406.8

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Basin inlet	1680	128.788	1.188	6.3	1.4462	0.0000	SURCHARGED
1440 minute winter	Basin outlet	1680	128.787	1.287	6.3	137.3234	0.0000	SURCHARGED
1440 minute winter	Flow Control	1680	128.786	1.309	5.0	1.4805	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute winter	Basin inlet	1.000	Basin outlet	6.3	0.395	0.171	0.5505	
1440 minute winter	Basin outlet	1.001	Flow Control	5.0	0.131	0.137	0.1810	
1440 minute winter	Flow Control	ACO Q-Brake		5.0				406.6

Results for 30 year +20% CC Critical Storm Duration. Lowest mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Basin inlet	1680	128.990	1.390	7.8	1.6919	0.0000	SURCHARGED
1440 minute winter	Basin outlet	1680	128.989	1.488	7.8	179.8426	0.0000	SURCHARGED
1440 minute winter	Flow Control	1680	128.988	1.511	5.0	1.7088	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute winter	Basin inlet	1.000	Basin outlet	7.8	0.395	0.212	0.5505	
1440 minute winter	Basin outlet	1.001	Flow Control	5.0	0.131	0.137	0.1810	
1440 minute winter	Flow Control	ACO Q-Brake		5.0				414.3

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.88%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Basin inlet	1680	129.144	1.544	9.1	1.8786	0.0000	SURCHARGED
1440 minute winter	Basin outlet	1680	129.142	1.642	9.1	215.9429	0.0000	SURCHARGED
1440 minute winter	Flow Control	1680	129.141	1.664	5.0	1.8822	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute winter	Basin inlet	1.000	Basin outlet	9.1	0.395	0.248	0.5505	
1440 minute winter	Basin outlet	1.001	Flow Control	5.0	0.131	0.137	0.1810	
1440 minute winter	Flow Control	ACO Q-Brake		5.0				423.1