

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	100.0
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)	9.000
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S101	0.091	5.00	127.418	1500	442001.416	305682.959	1.800
S102	0.178	5.00	128.137	1500	441993.979	305709.277	2.755
S103	0.165	5.00	127.192	1500	442082.026	305789.572	1.725
S104	0.011	5.00	127.322	1500	442086.707	305774.997	2.021
S105	0.022	5.00	126.957	1500	442080.734	305741.376	1.932
S106	0.133	5.00	126.895	1500	442076.873	305736.863	1.895
S107	0.114	5.00	126.892	1800	442071.464	305734.382	1.917
S107A	0.000		127.015	1200	442073.077	305729.370	2.062
S108	0.000		126.600		442075.189	305722.805	1.897
S109	0.200	5.00	126.600		442093.437	305704.240	1.900
S110	0.000		126.850	3000	442095.547	305699.583	2.175
S1604	0.000		125.724	1500	442106.529	305693.851	1.104

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	S101	S102	27.349	0.600	125.618	125.457	0.161	169.9	300	5.38	53.0
1.001	S102	S107	81.451	0.600	125.382	124.975	0.407	200.1	375	6.44	48.7
2.000	S103	S104	15.308	0.600	125.467	125.376	0.091	168.2	225	5.25	53.5
2.001	S104	S105	34.147	0.600	125.301	125.100	0.201	169.9	300	5.73	51.5
2.002	S105	S106	5.939	0.600	125.025	125.000	0.025	237.6	375	5.81	51.1
2.003	S106	S107	5.951	0.600	125.000	124.975	0.025	238.0	375	5.90	50.8
1.002	S107	S107A	5.265	0.600	124.975	124.953	0.022	239.3	375	6.52	48.4
1.003	S107A	S108	6.897	0.600	124.953	124.925	0.028	246.3	375	6.62	48.1
1.005	S109	S110	5.113	0.600	124.700	124.675	0.025	204.5	375	5.07	54.4
1.006	S110	S1604	12.388	0.600	124.675	124.620	0.055	225.2	300	5.27	53.5

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	1.203	85.0	13.1	1.500	2.380	0.091	0.0	79	0.876
1.001	1.277	141.0	35.5	2.380	1.542	0.269	0.0	128	1.070
2.000	1.005	40.0	23.9	1.500	1.721	0.165	0.0	125	1.048
2.001	1.203	85.0	24.6	1.721	1.557	0.176	0.0	110	1.044
2.002	1.171	129.3	27.4	1.557	1.520	0.198	0.0	117	0.936
2.003	1.170	129.2	45.6	1.520	1.542	0.331	0.0	153	1.071
1.002	1.167	128.8	93.7	1.542	1.687	0.714	0.0	238	1.268
1.003	1.150	127.0	93.0	1.687	1.300	0.714	0.0	239	1.252
1.005	1.263	139.5	29.5	1.525	1.800	0.200	0.0	117	1.010
1.006	1.043	73.7	29.0	1.875	0.804	0.200	0.0	130	0.982

Simulation Settings

Rainfall Methodology	FEH-99	E (1km)	0.309	Drain Down Time (mins)	1440
Rainfall Events	Singular	F (1km)	2.376	Additional Storage (m³/ha)	20.0
C (1km)	-0.029	Summer CV	0.750	Starting Level (m)	
D1 (1km)	0.362	Winter CV	0.840	Check Discharge Rate(s)	x
D2 (1km)	0.326	Analysis Speed	Detailed	Check Discharge Volume	x
D3 (1km)	0.287	Skip Steady State	x		

Storm Durations

60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
30	35	0	0
100	40	0	0

Node S110 Online Head/Flow Control

Flap Valve	x	Invert Level (m)	124.675	Design Flow (l/s)	8.7
Replaces Downstream Link	✓	Design Depth (m)	1.325		

Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.001	0.000	0.400	4.758	0.800	4.428	1.200	5.418	1.600	6.257	2.000	6.997
0.100	2.779	0.500	4.408	0.900	4.698	1.300	5.648	1.700	6.457	2.100	7.177
0.200	4.668	0.600	4.238	1.000	4.948	1.400	5.857	1.800	6.637	2.200	7.337
0.300	5.058	0.700	4.138	1.100	5.188	1.500	6.057	1.900	6.827		

Node S109 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	26.032
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	124.700	Main Channel Slope (1:X)	10000.0
Safety Factor	2.0	Time to half empty (mins)	300	Main Channel n	0.030

Inlets

S108

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	317.5	0.0	0.500	426.7	0.0	1.000	550.5	0.0	1.500	688.3	0.0
0.100	337.8	0.0	0.600	450.3	0.0	1.100	576.9	0.0	1.600	717.6	0.0
0.200	359.2	0.0	0.700	474.5	0.0	1.200	603.9	0.0	1.700	747.4	0.0
0.300	381.1	0.0	0.800	499.3	0.0	1.300	631.5	0.0	1.800	777.8	0.0
0.400	403.6	0.0	0.900	524.6	0.0	1.400	659.6	0.0	1.900	808.8	0.0

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Approval Settings

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

Results for 2 year 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
60 minute summer	S101	33	125.680	0.062	7.8	0.1727	0.0000	OK
60 minute summer	S102	33	125.482	0.100	23.0	0.3063	0.0000	OK
60 minute summer	S103	33	125.564	0.097	14.1	0.3563	0.0000	OK
60 minute summer	S104	33	125.388	0.087	15.0	0.1627	0.0000	OK
60 minute summer	S105	34	125.192	0.167	16.9	0.3328	0.0000	OK
60 minute summer	S106	34	125.189	0.189	27.3	0.6000	0.0000	OK
60 minute summer	S107	34	125.183	0.208	58.9	0.7765	0.0000	OK
60 minute summer	S107A	34	125.140	0.187	58.6	0.2114	0.0000	OK
480 minute winter	S108	352	125.000	0.297	13.1	0.0000	0.0000	OK
480 minute winter	S109	352	125.000	0.300	10.9	0.6317	0.0000	OK
480 minute winter	S110	352	125.000	0.325	5.2	2.2979	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	4.8	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S101	1.000	S102	7.8	0.750	0.091	0.2829	
60 minute summer	S102	1.001	S107	22.6	0.544	0.160	3.5089	
60 minute summer	S103	2.000	S104	14.1	0.896	0.352	0.2407	
60 minute summer	S104	2.001	S105	15.0	0.885	0.176	0.5934	
60 minute summer	S105	2.002	S106	16.5	0.343	0.128	0.3061	
60 minute summer	S106	2.003	S107	27.2	0.469	0.211	0.3524	
60 minute summer	S107	1.002	S107A	58.6	0.996	0.455	0.3095	
60 minute summer	S107A	1.003	S108	58.5	1.110	0.461	0.3635	
60 minute summer	S108	Flow through pond	S109	24.7	0.022	0.003	68.6796	
60 minute winter	S109	1.005	S110	6.5	0.492	0.047	0.3844	
180 minute winter	S110	Head/Flow	S1604	5.1				135.6

Results for 30 year 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
60 minute summer	S101	33	125.719	0.101	19.7	0.2810	0.0000	OK
60 minute summer	S102	33	125.547	0.165	58.3	0.5036	0.0000	OK
60 minute summer	S103	33	125.647	0.180	35.7	0.6639	0.0000	OK
60 minute summer	S104	33	125.440	0.139	38.0	0.2601	0.0000	OK
480 minute winter	S105	464	125.418	0.393	7.7	0.7831	0.0000	SURCHARGED
480 minute winter	S106	464	125.418	0.418	12.8	1.3240	0.0000	SURCHARGED
480 minute winter	S107	464	125.418	0.443	27.4	1.6524	0.0000	SURCHARGED
480 minute winter	S107A	464	125.418	0.464	26.7	0.5253	0.0000	SURCHARGED
480 minute winter	S108	464	125.417	0.714	26.5	0.0000	0.0000	OK
480 minute winter	S109	464	125.418	0.717	19.8	1.5103	0.0000	SURCHARGED
480 minute winter	S110	464	125.417	0.742	5.5	5.2483	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	5.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S101	1.000	S102	19.7	0.970	0.231	0.5550	
60 minute summer	S102	1.001	S107	58.0	0.670	0.411	6.3867	
60 minute summer	S103	2.000	S104	35.7	1.112	0.892	0.4898	
60 minute summer	S104	2.001	S105	38.0	0.886	0.446	1.7373	
60 minute summer	S105	2.002	S106	42.4	0.385	0.328	0.6543	
60 minute summer	S106	2.003	S107	70.1	0.635	0.542	0.6564	
60 minute summer	S107	1.002	S107A	151.3	1.383	1.174	0.5619	
60 minute summer	S107A	1.003	S108	151.5	1.558	1.193	0.6678	
60 minute summer	S108	Flow through pond	S109	58.1	0.032	0.006	184.5362	
60 minute summer	S109	1.005	S110	9.9	0.557	0.071	0.5639	
120 minute winter	S110	Head/Flow	S1604	5.1				280.4

Results for 30 year +35% 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
60 minute summer	S101	33	125.738	0.120	26.6	0.3323	0.0000	OK
720 minute winter	S102	690	125.662	0.280	10.4	0.8567	0.0000	OK
60 minute summer	S103	34	125.789	0.322	48.3	1.1854	0.0000	SURCHARGED
720 minute winter	S104	690	125.662	0.361	6.8	0.6774	0.0000	SURCHARGED
720 minute winter	S105	690	125.662	0.637	7.7	1.2709	0.0000	SURCHARGED
720 minute winter	S106	690	125.662	0.662	12.4	2.0994	0.0000	SURCHARGED
720 minute winter	S107	690	125.662	0.687	26.9	2.5654	0.0000	SURCHARGED
720 minute winter	S107A	690	125.662	0.709	25.8	0.8019	0.0000	SURCHARGED
720 minute winter	S108	690	125.662	0.959	25.6	0.0000	0.0000	OK
720 minute winter	S109	690	125.662	0.962	19.1	2.0249	0.0000	SURCHARGED
720 minute winter	S110	690	125.662	0.987	5.4	6.9764	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	5.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S101	1.000	S102	26.6	1.018	0.313	0.7764	
60 minute summer	S102	1.001	S107	75.9	0.796	0.538	7.1186	
60 minute summer	S103	2.000	S104	46.6	1.193	1.165	0.6088	
60 minute summer	S104	2.001	S105	49.2	0.882	0.579	2.4046	
60 minute summer	S105	2.002	S106	55.3	0.502	0.428	0.6551	
60 minute summer	S106	2.003	S107	92.3	0.837	0.714	0.6564	
60 minute summer	S107	1.002	S107A	196.9	1.785	1.528	0.5807	
60 minute summer	S107A	1.003	S108	196.9	1.794	1.550	0.7607	
60 minute summer	S108	Flow through pond	S109	78.9	0.036	0.008	250.7219	
60 minute summer	S109	1.005	S110	11.1	0.600	0.080	0.5639	
480 minute summer	S110	Head/Flow	S1604	5.1				475.7

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
60 minute summer	S101	34	126.168	0.550	40.2	1.5284	0.0000	SURCHARGED
60 minute summer	S102	34	126.125	0.743	115.7	2.2723	0.0000	SURCHARGED
60 minute summer	S103	34	126.444	0.977	72.9	3.5937	0.0000	SURCHARGED
60 minute summer	S104	34	126.100	0.799	72.0	1.4985	0.0000	SURCHARGED
720 minute winter	S105	705	126.001	0.976	10.1	1.9480	0.0000	SURCHARGED
720 minute winter	S106	705	126.001	1.001	17.0	3.1756	0.0000	SURCHARGED
720 minute winter	S107	705	126.001	1.026	36.4	3.8327	0.0000	SURCHARGED
720 minute winter	S107A	705	126.001	1.048	35.6	1.1857	0.0000	SURCHARGED
720 minute winter	S108	705	126.001	1.298	35.6	0.0000	0.0000	OK
720 minute winter	S109	705	126.001	1.301	25.7	2.7394	0.0000	SURCHARGED
720 minute winter	S110	705	126.001	1.326	5.7	9.3756	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	5.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S101	1.000	S102	38.3	1.026	0.451	1.9259	
60 minute summer	S102	1.001	S107	113.1	1.026	0.802	8.9838	
60 minute summer	S103	2.000	S104	67.4	1.695	1.687	0.6088	
60 minute summer	S104	2.001	S105	72.6	1.031	0.854	2.4046	
60 minute summer	S105	2.002	S106	82.6	0.749	0.638	0.6551	
60 minute summer	S106	2.003	S107	135.6	1.229	1.049	0.6564	
60 minute summer	S107	1.002	S107A	296.2	2.685	2.299	0.5807	
60 minute summer	S107A	1.003	S108	296.1	2.685	2.332	0.7607	
60 minute summer	S108	Flow through pond	S109	113.6	0.041	0.012	380.5128	
60 minute summer	S109	1.005	S110	11.5	0.651	0.082	0.5639	
720 minute winter	S110	Head/Flow	S1604	5.7				609.3