

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	5.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	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)	1.500
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	0.076	5.00	127.397	1500	442001.592	305681.788	1.725
S102	0.194	5.00	128.129	1500	441994.009	305708.892	2.698
S103	0.131	5.00	126.991	1500	442082.510	305789.717	1.531
S104	0.022	5.00	127.198	1500	442087.099	305773.290	1.839
S105	0.011	5.00	127.121	1500	442084.136	305754.628	1.949
S106	0.095	5.00	126.923	1500	442079.507	305739.231	1.817
S107	0.062	5.00	126.905	1500	442068.124	305732.852	1.928
S108	0.000		126.600		442074.311	305721.806	1.900
S109	0.090	5.00	126.600		442091.957	305705.799	1.900
S110	0.000		126.850	3000	442097.529	305701.231	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	28.145	0.600	125.672	125.506	0.166	169.5	225	5.00	50.0
1.001	S102	S107	77.892	0.600	125.431	125.052	0.379	205.5	300	5.00	50.0
2.000	S103	S104	17.056	0.600	125.460	125.359	0.101	168.9	225	5.00	50.0
2.001	S104	S105	18.896	0.600	125.359	125.247	0.112	168.7	225	5.00	50.0
2.002	S105	S106	16.078	0.600	125.172	125.106	0.066	243.6	300	5.00	50.0
2.003	S106	S107	13.049	0.600	125.106	125.052	0.054	241.6	300	5.00	50.0
1.002	S107	S108	12.661	0.600	124.977	124.925	0.052	243.5	375	5.00	50.0
1.004	S109	S110	7.205	0.600	124.700	124.675	0.025	288.2	375	5.00	50.0
1.005	S110	S1604	11.639	0.600	124.675	124.620	0.055	211.6	300	5.00	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	1.001	39.8	14.4	1.500	2.398	0.076	0.0	94	0.923
1.001	1.093	77.2	51.2	2.398	1.553	0.270	0.0	179	1.166
2.000	1.003	39.9	24.9	1.306	1.614	0.131	0.0	129	1.056
2.001	1.004	39.9	29.0	1.614	1.649	0.153	0.0	143	1.092
2.002	1.003	70.9	31.1	1.649	1.517	0.164	0.0	139	0.971
2.003	1.007	71.2	49.1	1.517	1.553	0.259	0.0	184	1.084
1.002	1.156	127.7	112.1	1.553	1.300	0.591	0.0	274	1.298
1.004	1.062	117.3	17.1	1.525	1.800	0.090	0.0	96	0.765
1.005	1.077	76.1	17.1	1.875	0.804	0.090	0.0	96	0.874

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)	0.0
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	✓	Invert Level (m)	124.675	Design Flow (l/s)	5.7
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	4.760	0.800	4.430	1.200	5.420	1.600	6.260	2.000	7.000
0.100	2.780	0.500	4.410	0.900	4.700	1.300	5.650	1.700	6.460	2.100	7.180
0.200	4.670	0.600	4.240	1.000	4.950	1.400	5.860	1.800	6.640	2.200	7.340
0.300	5.060	0.700	4.140	1.100	5.190	1.500	6.060	1.900	6.830		

Node S109 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	21.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	124.700	Main Channel Slope (1:X)	100000.0
Safety Factor	2.0	Time to half empty (mins)	0	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)
0.000	275.5	0.0	1.000	489.4	0.0	1.500	617.6	0.0
0.500	375.4	0.0	1.300	564.6	0.0	1.900	730.2	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	✓	Maximum Length (m)	100.000
Node Losses	✓	Coordinates	✓
Link Size	✓	Accuracy (m)	1.000
Minimum Diameter (mm)	150	Crossings	✓
Link Length	✓	Cover Depth	✓

Approval Settings

Minimum Cover Depth (m)		Maximum Proportional Velocity (m/s)	3.000
Maximum Cover Depth (m)	3.000	Surcharged Depth	✓
Backdrops	✓	Return Period (years)	
Minimum Backdrop Height (m)		Maximum Surcharged Depth (m)	0.100
Maximum Backdrop Height (m)	1.500	Flooding	✓
Full Bore Velocity	✓	Return Period (years)	30
Minimum Full Bore Velocity (m/s)		Time to Half Empty	x
Maximum Full Bore Velocity (m/s)	3.000	Discharge Rates	✓
Proportional Velocity	✓	Discharge Volume	✓
Return Period (years)		100 year 360 minute (m ³)	
Minimum Proportional Velocity (m/s)	0.750		

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S101	33	125.734	0.062	6.5	0.1102	0.0000	OK
60 minute summer	S102	34	125.542	0.111	23.0	0.1968	0.0000	OK
60 minute summer	S103	33	125.545	0.085	11.2	0.1503	0.0000	OK
60 minute summer	S104	33	125.451	0.092	13.1	0.1627	0.0000	OK
60 minute summer	S105	33	125.266	0.094	13.9	0.1654	0.0000	OK
60 minute summer	S106	33	125.227	0.121	22.0	0.2141	0.0000	OK
60 minute summer	S107	34	125.144	0.167	49.3	0.2944	0.0000	OK
360 minute winter	S108	264	124.934	0.233	13.0	0.0000	0.0000	OK
360 minute winter	S109	264	124.933	0.233	9.8	0.0000	0.0000	OK
360 minute winter	S110	264	124.933	0.258	5.0	1.8252	0.0000	OK
60 minute summer	S1604	1	124.620	0.000	4.6	0.0000	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)
60 minute summer	S101	1.000	S102	6.5	0.735	0.162	0.2476	
60 minute summer	S102	1.001	S107	22.5	0.956	0.291	1.8314	
60 minute summer	S103	2.000	S104	11.2	0.774	0.281	0.2474	
60 minute summer	S104	2.001	S105	13.0	0.882	0.327	0.2796	
60 minute summer	S105	2.002	S106	13.9	0.615	0.196	0.3648	
60 minute summer	S106	2.003	S107	21.8	0.861	0.306	0.3305	
60 minute summer	S107	1.002	S108	49.4	1.078	0.387	0.5809	
360 minute winter	S108	Flow through pond	S109	7.8	0.013	0.002	69.7826	
360 minute winter	S109	1.004	S110	5.0	0.316	0.042	0.5510	
360 minute winter	S110	Head/Flow	S1604	4.9				128.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S101	33	125.775	0.103	16.5	0.1814	0.0000	OK
60 minute summer	S102	33	125.627	0.196	58.5	0.3458	0.0000	OK
60 minute summer	S103	33	125.615	0.154	28.4	0.2729	0.0000	OK
60 minute summer	S104	33	125.527	0.168	33.2	0.2971	0.0000	OK
60 minute summer	S105	34	125.360	0.188	35.5	0.3313	0.0000	OK
60 minute summer	S106	33	125.336	0.230	55.7	0.4056	0.0000	OK
360 minute winter	S107	344	125.283	0.306	28.5	0.5400	0.0000	OK
360 minute winter	S108	344	125.283	0.583	28.4	0.0000	0.0000	OK
360 minute winter	S109	344	125.283	0.583	19.1	0.0000	0.0000	SURCHARGED
360 minute winter	S110	344	125.283	0.608	5.6	4.2945	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	5.1	0.0000	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)
60 minute summer	S101	1.000	S102	16.5	0.853	0.415	0.5532	
60 minute summer	S102	1.001	S107	58.6	1.129	0.759	4.0430	
60 minute summer	S103	2.000	S104	28.4	0.937	0.712	0.5192	
60 minute summer	S104	2.001	S105	33.1	1.094	0.829	0.5711	
60 minute summer	S105	2.002	S106	35.2	0.676	0.496	0.8374	
60 minute summer	S106	2.003	S107	55.2	0.981	0.776	0.7391	
360 minute winter	S107	1.002	S108	28.4	0.929	0.223	1.2953	
360 minute winter	S108	Flow through pond	S109	14.8	0.018	0.004	194.6476	
360 minute winter	S109	1.004	S110	5.6	0.363	0.048	0.7947	
360 minute winter	S110	Head/Flow	S1604	5.0				279.0

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S101	33	125.791	0.119	22.2	0.2099	0.0000	OK
60 minute summer	S102	33	125.686	0.255	78.9	0.4497	0.0000	OK
60 minute summer	S103	34	125.741	0.281	38.3	0.4958	0.0000	SURCHARGED
60 minute summer	S104	34	125.631	0.272	43.5	0.4811	0.0000	SURCHARGED
480 minute winter	S105	464	125.501	0.329	8.7	0.5811	0.0000	SURCHARGED
480 minute winter	S106	464	125.501	0.395	13.7	0.6977	0.0000	SURCHARGED
480 minute winter	S107	464	125.501	0.524	31.1	0.9256	0.0000	SURCHARGED
480 minute winter	S108	464	125.501	0.801	29.8	0.0000	0.0000	OK
480 minute winter	S109	464	125.501	0.801	19.8	0.0000	0.0000	SURCHARGED
480 minute winter	S110	464	125.501	0.826	5.6	5.8372	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	5.1	0.0000	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)
60 minute summer	S101	1.000	S102	22.2	0.852	0.558	0.7772	
60 minute summer	S102	1.001	S107	77.4	1.159	1.002	5.2201	
60 minute summer	S103	2.000	S104	37.1	0.969	0.929	0.6783	
60 minute summer	S104	2.001	S105	42.7	1.140	1.071	0.7513	
480 minute winter	S105	2.002	S106	8.7	0.550	0.123	1.1322	
480 minute winter	S106	2.003	S107	13.6	0.752	0.191	0.9189	
480 minute winter	S107	1.002	S108	29.8	0.916	0.233	1.3965	
480 minute winter	S108	Flow through pond	S109	15.1	0.016	0.004	286.2018	
480 minute winter	S109	1.004	S110	5.6	0.350	0.047	0.7947	
480 minute winter	S110	Head/Flow	S1604	5.1				406.9

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S101	34	126.621	0.949	33.6	1.6775	0.0000	SURCHARGED
60 minute summer	S102	34	126.485	1.054	116.5	1.8632	0.0000	SURCHARGED
60 minute summer	S103	34	126.451	0.991	57.9	1.7516	0.0000	SURCHARGED
60 minute summer	S104	34	126.201	0.842	64.9	1.4879	0.0000	SURCHARGED
60 minute summer	S105	34	125.829	0.657	69.1	1.1605	0.0000	SURCHARGED
600 minute winter	S106	585	125.797	0.691	15.6	1.2210	0.0000	SURCHARGED
600 minute winter	S107	585	125.797	0.820	35.8	1.4489	0.0000	SURCHARGED
600 minute winter	S108	585	125.797	1.097	35.2	0.0000	0.0000	OK
600 minute winter	S109	585	125.797	1.097	22.7	0.0000	0.0000	SURCHARGED
600 minute winter	S110	585	125.797	1.122	5.5	7.9302	0.0000	SURCHARGED
60 minute summer	S1604	1	124.620	0.000	5.1	0.0000	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)
60 minute summer	S101	1.000	S102	33.4	0.853	0.838	1.1194	
60 minute summer	S102	1.001	S107	115.3	1.637	1.492	5.4851	
60 minute summer	S103	2.000	S104	55.2	1.389	1.385	0.6783	
60 minute summer	S104	2.001	S105	64.5	1.622	1.616	0.7515	
60 minute summer	S105	2.002	S106	69.4	0.986	0.979	1.1322	
600 minute winter	S106	2.003	S107	15.4	0.740	0.216	0.9189	
600 minute winter	S107	1.002	S108	35.2	0.883	0.275	1.3965	
600 minute winter	S108	Flow through pond	S109	17.2	0.018	0.005	427.6409	
600 minute winter	S109	1.004	S110	5.5	0.342	0.047	0.7947	
600 minute winter	S110	Head/Flow	S1604	5.2				546.5