

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	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	0.450	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)	Depth (m)
3.01	0.005	5.00	15.092	450	0.742
3.06	0.012	5.00	15.093	50	0.793
3.07	0.001	5.00	15.118	450	0.988
3.02	0.001	5.00	14.970	450	1.050
RE3.1	0.006	5.00	15.184	450	0.934
3.08	0.006	5.00	15.142	450	0.742
NODE	0.007	5.00	15.070	300	0.925
3.09	0.000		15.134	450	1.174
3.09a	0.000		15.100	300	1.240
3.03	0.003	5.00	14.938	450	1.248
3.04	0.002	5.00	14.961	450	1.521
RE 3.2	0.002	5.00	15.050	450	1.150
3.05a	0.000		14.977	450	1.637
3.10	0.007	5.00	15.194	450	0.894
3.05	0.007	5.00	14.942	1200	1.777
CS3	0.000		14.871	300	1.806
DMH			14.858	300	1.803

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)
1.000	3.01	3.02	7.990	0.600	14.350	13.920	0.430	18.6	150	5.06
2.000	3.06	3.07	1.953	0.600	14.300	14.130	0.170	11.5	150	5.01
2.001	3.07	3.02	12.867	0.600	14.130	13.990	0.140	92.0	150	5.22
1.001	3.02	3.03	9.407	0.600	13.920	13.690	0.230	40.9	150	5.31
3.000	RE3.1	NODE	4.861	0.600	14.250	14.145	0.105	46.3	150	5.05
4.000	3.08	NODE	2.536	0.600	14.400	14.145	0.255	9.9	150	5.01
3.001	NODE	3.09	1.854	0.600	14.145	13.960	0.185	10.0	150	5.06
3.002	3.09	3.09a	5.523	0.600	13.960	13.860	0.100	55.2	150	5.13
3.003	3.09a	3.03	5.447	0.600	13.860	13.760	0.100	54.5	150	5.20
1.002	3.03	3.04	19.382	0.600	13.690	13.510	0.180	107.7	150	5.65
1.003	3.04	3.05a	3.251	0.600	13.440	13.340	0.100	32.5	150	5.68
5.000	RE 3.2	3.05a	4.946	0.600	13.900	13.410	0.490	10.1	150	5.03
1.004	3.05a	3.05	5.019	0.600	13.340	13.240	0.100	50.2	150	5.74
6.000	3.10	3.05	10.519	0.600	14.300	14.100	0.200	52.6	150	5.13
1.005	3.05	CS3	7.136	0.600	13.165	13.065	0.100	71.4	225	5.81
1.006	CS3	DMH	2.000	0.600	13.065	13.055	0.010	200.0	225	5.85

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	3.01	3.02	2.347	41.5	0.7	0.592	0.900	0.005	13	0.861
2.000	3.06	3.07	2.989	52.8	1.6	0.643	0.838	0.012	18	1.341
2.001	3.07	3.02	1.048	18.5	1.8	0.838	0.830	0.013	31	0.663
1.001	3.02	3.03	1.578	27.9	2.6	0.900	1.098	0.019	31	0.989
3.000	RE3.1	NODE	1.482	26.2	0.8	0.784	0.775	0.006	18	0.662
4.000	3.08	NODE	3.213	56.8	0.8	0.592	0.775	0.006	13	1.147
3.001	NODE	3.09	3.204	56.6	2.6	0.775	1.024	0.019	22	1.639
3.002	3.09	3.09a	1.356	24.0	2.6	1.024	1.090	0.019	33	0.887
3.003	3.09a	3.03	1.366	24.1	2.6	1.090	1.028	0.019	33	0.893
1.002	3.03	3.04	0.968	17.1	5.6	1.098	1.301	0.041	59	0.866
1.003	3.04	3.05a	1.771	31.3	5.8	1.371	1.487	0.043	44	1.358
5.000	RE 3.2	3.05a	3.189	56.4	0.3	1.000	1.417	0.002	7	0.785
1.004	3.05a	3.05	1.423	25.1	6.1	1.487	1.552	0.045	50	1.174
6.000	3.10	3.05	1.390	24.6	0.9	0.744	0.692	0.007	20	0.671
1.005	3.05	CS3	1.550	61.6	8.0	1.552	1.581	0.059	54	1.071
1.006	CS3	DMH	0.921	36.6	8.0	1.581	1.578	0.059	72	0.742

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)	
3.01	15.092	0.742	450	Manhole		0	1.000	14.350	150
3.06	15.093	0.793	50	Manhole		0	2.000	14.300	150
3.07	15.118	0.988	450	Manhole		1	2.000	14.130	150
						0	2.001	14.130	150
3.02	14.970	1.050	450	Manhole		1	2.001	13.990	150
						2	1.000	13.920	150
						0	1.001	13.920	150
RE3.1	15.184	0.934	450	Manhole		0	3.000	14.250	150
3.08	15.142	0.742	450	Manhole		0	4.000	14.400	150
NODE	15.070	0.925	300	Manhole		1	4.000	14.145	150
						2	3.000	14.145	150
						0	3.001	14.145	150
3.09	15.134	1.174	450	Manhole		1	3.001	13.960	150
						0	3.002	13.960	150
3.09a	15.100	1.240	300	Manhole		1	3.002	13.860	150
						0	3.003	13.860	150
3.03	14.938	1.248	450	Manhole		1	3.003	13.760	150
						2	1.001	13.690	150
						0	1.002	13.690	150
3.04	14.961	1.521	450	Manhole		1	1.002	13.510	150
						0	1.003	13.440	150
RE 3.2	15.050	1.150	450	Manhole		0	5.000	13.900	150
3.05a	14.977	1.637	450	Manhole		1	5.000	13.410	150
						2	1.003	13.340	150
						0	1.004	13.340	150
3.10	15.194	0.894	450	Manhole		0	6.000	14.300	150
3.05	14.942	1.777	1200	Manhole		1	6.000	14.100	150
						2	1.004	13.240	150
						0	1.005	13.165	225
CS3	14.871	1.806	300	Manhole		1	1.005	13.065	225
						0	1.006	13.065	225
DMH	14.858	1.803	300	Manhole		1	1.006	13.055	225

Simulation Settings

Rainfall Methodology	FSR	Winter CV	0.840	Check Discharge Rate(s)	✓
FSR Region	England and Wales	Analysis Speed	Normal	Check Discharge Volume	✓
M5-60 (mm)	20.000	Skip Steady State	✓	100 year 360 minute (m³)	
Ratio-R	0.450	Drain Down Time (mins)	240		
Summer CV	0.750	Additional Storage (m³/ha)	20.0		

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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	30	0	0	0
10	0	0	0	100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	SPR	0.10	Betterment (%)	0
Greenfield Method	IH124	Region	1	QBar	
Positively Drained Area (ha)		Growth Factor 1 year	0.85	Q 1 year (l/s)	
SAAR (mm)		Growth Factor 30 year	1.95	Q 30 year (l/s)	
Soil Index	1	Growth Factor 100 year	2.48	Q 100 year (l/s)	

Pre-development Discharge Volume

Site Makeup	Greenfield	SPR	0.10	Storm Duration (mins)	360
Greenfield Method	FSR/FEH	CWI		Betterment (%)	0
Positively Drained Area (ha)		Return Period (years)	100	PR	
Soil Index	1	Climate Change (%)	0	Runoff Volume (m³)	

Node DMH Offline Weir Control

Flap Valve	x	Invert Level (m)	13.055	Design Flow (l/s)		Discharge Coefficient	0.590
Loop to Node	CS3	Design Depth (m)	1.500	Width (m)	0.300		

Node CS3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	12.100
Side Inf Coefficient (m/hr)	1.29600	Porosity	0.95	Time to half empty (mins)	84

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	8.0	8.0	1.600	8.0	27.2	1.601	0.0	27.2

Results for 1 year Critical Storm Duration. Lowest mass balance: 76.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m³)	Status
15 minute winter	3.01	11	14.364	0.014	0.7	0.0000	OK
15 minute winter	3.06	10	14.319	0.019	1.8	0.0000	OK
15 minute winter	3.07	10	14.163	0.033	1.9	0.0000	OK
15 minute winter	3.02	11	13.951	0.031	2.6	0.0000	OK
15 minute winter	RE3.1	10	14.269	0.019	0.9	0.0000	OK
15 minute winter	3.08	10	14.413	0.013	0.9	0.0000	OK
15 minute winter	NODE	10	14.168	0.023	2.8	0.0000	OK
15 minute winter	3.09	10	13.996	0.036	2.7	0.0000	OK
15 minute winter	3.09a	11	13.896	0.036	2.7	0.0000	OK
15 minute winter	3.03	11	13.752	0.062	5.8	0.0000	OK
15 minute winter	3.04	11	13.490	0.050	6.1	0.0000	OK
15 minute winter	RE 3.2	11	13.908	0.008	0.3	0.0000	OK
15 minute winter	3.05a	11	13.396	0.056	6.4	0.0000	OK
15 minute winter	3.10	11	14.321	0.021	1.0	0.0000	OK
15 minute winter	3.05	11	13.225	0.060	8.3	0.0000	OK
60 minute winter	CS3	49	12.664	-0.401	4.2	0.0000	OK
15 minute summer	DMH	1	13.055	0.000	0.0	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)
15 minute winter	3.01	1.000	3.02	0.7	0.640	0.017	0.0138	
15 minute winter	3.06	2.000	3.07	1.8	0.887	0.034	0.0040	
15 minute winter	3.07	2.001	3.02	1.8	0.664	0.100	0.0358	
15 minute winter	3.02	1.001	3.03	2.7	0.580	0.095	0.0447	
15 minute winter	RE3.1	3.000	NODE	0.9	0.591	0.033	0.0072	
15 minute winter	3.08	4.000	NODE	0.9	0.741	0.016	0.0031	
15 minute winter	NODE	3.001	3.09	2.7	1.129	0.048	0.0046	
15 minute winter	3.09	3.002	3.09a	2.7	0.844	0.113	0.0178	
15 minute winter	3.09a	3.003	3.03	2.7	0.875	0.113	0.0170	
15 minute winter	3.03	1.002	3.04	5.8	0.861	0.338	0.1300	
15 minute winter	3.04	1.003	3.05a	6.1	1.087	0.194	0.0181	
15 minute winter	RE 3.2	5.000	3.05a	0.3	0.834	0.005	0.0018	
15 minute winter	3.05a	1.004	3.05	6.3	1.116	0.252	0.0285	
15 minute winter	3.10	6.000	3.05	1.0	0.676	0.041	0.0156	
15 minute winter	3.05	1.005	CS3	8.3	1.034	0.134	0.0571	
15 minute summer	CS3	1.006	DMH	0.0	0.000	0.000	0.0000	
60 minute winter	CS3	Infiltration		1.1				
15 minute summer	DMH	Weir	CS3	0.0				0.0

Results for 10 year Critical Storm Duration. Lowest mass balance: 76.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m³)	Status
15 minute winter	3.01	10	14.369	0.019	1.4	0.0000	OK
15 minute winter	3.06	10	14.326	0.026	3.4	0.0000	OK
15 minute winter	3.07	10	14.176	0.046	3.7	0.0000	OK
15 minute winter	3.02	10	13.964	0.044	5.3	0.0000	OK
15 minute winter	RE3.1	10	14.276	0.026	1.7	0.0000	OK
15 minute winter	3.08	10	14.418	0.018	1.7	0.0000	OK
15 minute winter	NODE	10	14.178	0.033	5.4	0.0000	OK
15 minute winter	3.09	10	14.012	0.052	5.3	0.0000	OK
15 minute winter	3.09a	10	13.911	0.051	5.3	0.0000	OK
15 minute winter	3.03	11	13.784	0.094	11.4	0.0000	OK
15 minute winter	3.04	11	13.517	0.077	11.9	0.0000	OK
15 minute winter	RE 3.2	10	13.911	0.011	0.6	0.0000	OK
15 minute winter	3.05a	11	13.425	0.085	12.5	0.0000	OK
15 minute winter	3.10	10	14.330	0.030	2.0	0.0000	OK
15 minute winter	3.05	11	13.252	0.087	16.3	0.0000	OK
60 minute winter	CS3	49	13.135	0.069	8.1	0.0000	OK
60 minute winter	DMH	49	13.134	0.079	0.4	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)
15 minute winter	3.01	1.000	3.02	1.4	0.655	0.033	0.0223	
15 minute winter	3.06	2.000	3.07	3.4	1.029	0.064	0.0065	
15 minute winter	3.07	2.001	3.02	3.6	0.799	0.195	0.0583	
15 minute winter	3.02	1.001	3.03	5.2	0.682	0.188	0.0748	
15 minute winter	RE3.1	3.000	NODE	1.7	0.680	0.064	0.0121	
15 minute winter	3.08	4.000	NODE	1.7	0.848	0.030	0.0052	
15 minute winter	NODE	3.001	3.09	5.3	1.302	0.094	0.0077	
15 minute winter	3.09	3.002	3.09a	5.3	0.989	0.221	0.0296	
15 minute winter	3.09a	3.003	3.03	5.3	1.039	0.218	0.0276	
15 minute winter	3.03	1.002	3.04	11.4	1.015	0.669	0.2184	
15 minute winter	3.04	1.003	3.05a	12.0	1.232	0.382	0.0315	
15 minute winter	RE 3.2	5.000	3.05a	0.6	0.963	0.011	0.0036	
15 minute winter	3.05a	1.004	3.05	12.5	1.310	0.497	0.0479	
15 minute winter	3.10	6.000	3.05	2.0	0.822	0.080	0.0252	
15 minute winter	3.05	1.005	CS3	16.3	1.232	0.265	0.0947	
60 minute winter	CS3	1.006	DMH	-0.5	0.065	-0.014	0.0230	
60 minute winter	CS3	Infiltration		2.2				
60 minute winter	DMH	Weir	CS3	0.3				0.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 76.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m³)	Status
15 minute winter	3.01	10	14.371	0.021	1.8	0.0000	OK
15 minute winter	3.06	10	14.330	0.030	4.3	0.0000	OK
15 minute winter	3.07	10	14.183	0.053	4.7	0.0000	OK
15 minute winter	3.02	10	13.970	0.050	6.8	0.0000	OK
15 minute winter	RE3.1	10	14.280	0.030	2.2	0.0000	OK
15 minute winter	3.08	10	14.420	0.020	2.2	0.0000	OK
15 minute winter	NODE	10	14.184	0.039	6.9	0.0000	OK
15 minute winter	3.09	10	14.019	0.059	6.8	0.0000	OK
15 minute winter	3.09a	10	13.919	0.059	6.7	0.0000	OK
15 minute winter	3.03	11	13.802	0.112	14.4	0.0000	OK
15 minute winter	3.04	11	13.532	0.092	15.2	0.0000	OK
15 minute summer	RE 3.2	10	13.912	0.012	0.7	0.0000	OK
15 minute winter	3.05a	11	13.441	0.101	15.9	0.0000	OK
15 minute winter	3.10	10	14.333	0.033	2.5	0.0000	OK
60 minute winter	3.05	49	13.350	0.185	10.4	0.0000	OK
60 minute winter	CS3	49	13.350	0.285	10.4	0.0000	SURCHARGED
60 minute winter	DMH	49	13.343	0.288	1.0	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)
15 minute winter	3.01	1.000	3.02	1.8	0.572	0.043	0.0266	
15 minute winter	3.06	2.000	3.07	4.3	1.089	0.081	0.0079	
15 minute winter	3.07	2.001	3.02	4.6	0.851	0.248	0.0694	
15 minute winter	3.02	1.001	3.03	6.7	0.708	0.240	0.0903	
15 minute winter	RE3.1	3.000	NODE	2.2	0.718	0.083	0.0147	
15 minute winter	3.08	4.000	NODE	2.2	0.900	0.038	0.0063	
15 minute winter	NODE	3.001	3.09	6.8	1.362	0.120	0.0093	
15 minute winter	3.09	3.002	3.09a	6.7	1.044	0.281	0.0357	
15 minute winter	3.09a	3.003	3.03	6.7	1.103	0.276	0.0329	
15 minute winter	3.03	1.002	3.04	14.5	1.060	0.847	0.2650	
15 minute winter	3.04	1.003	3.05a	15.2	1.277	0.486	0.0387	
15 minute summer	RE 3.2	5.000	3.05a	0.7	1.056	0.012	0.0070	
15 minute winter	3.05a	1.004	3.05	15.9	1.377	0.632	0.0579	
15 minute winter	3.10	6.000	3.05	2.5	0.877	0.101	0.0297	
15 minute winter	3.05	1.005	CS3	20.7	1.304	0.336	0.1133	
30 minute winter	CS3	1.006	DMH	2.1	0.238	0.057	0.0795	
60 minute winter	CS3	Infiltration		2.7				
120 minute summer	DMH	Weir	CS3	2.1				0.4

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 76.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m³)	Status
15 minute winter	3.01	10	14.379	0.029	3.3	0.0000	OK
15 minute winter	3.06	10	14.344	0.044	7.9	0.0000	OK
15 minute winter	3.07	10	14.205	0.075	8.6	0.0000	OK
60 minute winter	3.02	45	14.171	0.251	6.1	0.0000	SURCHARGED
15 minute winter	RE3.1	10	14.291	0.041	3.9	0.0000	OK
15 minute winter	3.08	10	14.427	0.027	3.9	0.0000	OK
15 minute winter	NODE	10	14.201	0.056	12.4	0.0000	OK
60 minute winter	3.09	45	14.184	0.224	6.1	0.0000	SURCHARGED
60 minute winter	3.09a	45	14.188	0.328	6.1	0.0000	SURCHARGED
60 minute winter	3.03	45	14.178	0.488	13.2	0.0000	SURCHARGED
120 minute winter	3.04	84	14.180	0.740	8.7	0.0000	SURCHARGED
120 minute winter	RE 3.2	84	14.198	0.298	2.5	0.0000	SURCHARGED
120 minute winter	3.05a	84	14.152	0.812	14.4	0.0000	SURCHARGED
15 minute winter	3.10	10	14.346	0.046	4.6	0.0000	OK
60 minute winter	3.05	44	14.246	1.081	74.0	0.0000	SURCHARGED
60 minute winter	CS3	44	14.764	1.699	285.7	16.2010	FLOOD
60 minute winter	DMH	46	14.682	1.627	567.3	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)
15 minute winter	3.01	1.000	3.02	3.3	0.757	0.079	0.0768	
15 minute winter	3.06	2.000	3.07	7.9	1.218	0.149	0.0127	
15 minute winter	3.07	2.001	3.02	8.4	0.991	0.454	0.1090	
15 minute winter	3.02	1.001	3.03	11.1	0.757	0.398	0.1638	
15 minute winter	RE3.1	3.000	NODE	3.9	0.784	0.148	0.0241	
15 minute winter	3.08	4.000	NODE	3.9	0.981	0.068	0.0103	
15 minute winter	NODE	3.001	3.09	12.3	1.479	0.217	0.0174	
15 minute winter	3.09	3.002	3.09a	12.4	1.144	0.519	0.0857	
15 minute winter	3.09a	3.003	3.03	11.3	1.164	0.468	0.0959	
15 minute winter	3.03	1.002	3.04	23.0	1.310	1.347	0.3412	
15 minute winter	3.04	1.003	3.05a	24.0	1.362	0.766	0.0572	
120 minute winter	RE 3.2	5.000	3.05a	6.8	0.909	0.120	0.0871	
15 minute winter	3.05a	1.004	3.05	25.0	1.435	0.992	0.0884	
15 minute winter	3.10	6.000	3.05	4.5	1.035	0.185	0.0461	
30 minute winter	3.05	1.005	CS3	-71.5	-1.799	-1.161	0.2838	
120 minute winter	CS3	1.006	DMH	179.9	4.525	4.915	0.0795	
30 minute summer	CS3	Infiltration		3.5				
120 minute winter	DMH	Weir	CS3	371.4				-63.0