



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	5.00
Return Period (years)	2	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)	19.000	Minimum Backdrop Height (m)	1.000
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)	Easting (m)	Northing (m)	Depth (m)
S1	0.058	5.00	83.994	1350	519135.775	226815.198	1.444
S2			83.920	1350	519143.189	226814.275	1.520
S3	0.032	5.00	83.828	1350	519149.613	226816.813	1.503
S4	0.053	5.00	83.486	1350	519161.178	226836.332	1.586
S5	0.035	5.00	83.214	1350	519169.324	226836.211	1.539
S15	0.106	5.00	82.993	1350	519182.205	226772.403	1.693
S16	0.018	5.00	82.286	1350	519199.340	226798.668	1.536
S6	0.069	5.00	81.960	1350	519208.683	226816.710	1.585
S7	0.094	5.00	81.460	1350	519223.744	226808.958	1.710
S8	0.156	5.00	80.629	1500	519248.147	226794.656	1.804
S9	0.053	5.00	80.277	1500	519261.450	226815.795	2.302
S10	0.099	5.00	80.133	1500	519280.764	226840.477	2.383
S11	0.090	5.00	80.475	1500	519299.913	226859.564	3.000
S12	0.087	5.00	80.723	1500	519326.847	226877.465	3.473
S13	0.031	5.00	80.096	1500	519344.608	226885.469	2.996
S17	0.076	5.00	78.428	1500	519379.658	226900.992	1.213
S14	0.012	5.00	79.004	1500	519365.746	226894.545	2.104
HW15			77.800	1	519370.702	226883.329	0.925
HW22	0.130	5.00	77.800	1	519369.713	226854.175	0.850
S18	0.019	5.00	78.170	1350	519410.711	226906.555	1.127
S19			77.800	1350	519405.433	226896.587	0.825
HW20			77.800	1	519401.798	226894.400	0.850
N21			77.800	1500	519378.800	226872.096	1.925
N23			77.800	1500	519509.259	226720.503	1.950
P1	0.143	5.00	83.300	1200	519178.481	226766.694	1.800

Links (Input)

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	S1	S2	7.471	0.600	82.550	82.475	0.075	99.6	225	5.00	50.0
1.001	S2	S3	6.907	0.600	82.400	82.325	0.075	92.1	300	5.00	50.0
1.002	S3	S4	22.687	0.600	82.325	81.900	0.425	53.4	300	5.00	50.0
1.003	S4	S5	8.147	0.600	81.900	81.675	0.225	36.2	300	5.00	50.0
1.004	S5	S6	43.925	0.600	81.675	80.450	1.225	35.9	300	5.00	50.0
2.000	P1	S15	6.816	0.600	81.500	81.375	0.125	54.5	225	5.00	50.0
2.001	S15	S16	31.360	0.600	81.300	80.750	0.550	57.0	300	5.00	50.0
2.002	S16	S6	20.318	0.600	80.750	80.450	0.300	67.7	300	5.00	50.0
1.005	S6	S7	16.938	0.600	80.375	79.825	0.550	30.8	375	5.00	50.0
1.006	S7	S8	28.286	0.600	79.750	78.900	0.850	33.3	450	5.00	50.0
1.007	S8	S9	24.977	0.600	78.825	77.975	0.850	29.4	525	5.00	50.0



Links (Input)

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)
1.008	S9	S10	31.340	0.600	77.975	77.750	0.225	139.3	525	5.00	50.0
1.009	S10	S11	27.037	0.600	77.750	77.550	0.200	135.2	525	5.00	50.0
1.010	S11	S12	32.341	0.600	77.475	77.250	0.225	143.7	600	5.00	50.0
1.011	S12	S13	19.481	0.600	77.250	77.100	0.150	129.9	600	5.00	50.0
1.012	S13	S14	23.004	0.600	77.100	76.900	0.200	115.0	600	5.00	50.0
3.000	S17	S14	15.333	0.600	77.215	77.200	0.015	1022.2	300	5.00	50.0
1.013	S14	HW15	12.262	0.600	76.900	76.875	0.025	490.5	600	5.00	50.0
1.014	HW15	N21	13.848	0.600	76.875	75.875	1.000	13.8	600	5.00	50.0
4.005	HW22	N21	20.093	0.600	76.950	76.825	0.125	160.7	300	5.00	50.0
5.000	S18	S19	11.279	0.600	77.043	76.975	0.068	165.9	225	5.00	50.0
5.001	S19	HW20	4.242	0.600	76.975	76.950	0.025	169.7	225	5.00	50.0
5.002	HW20	N21	32.038	0.600	76.950	76.800	0.150	213.6	225	5.00	50.0
1.015	N21	N23	200.000	0.600	75.875	75.850	0.025	8000.0	600	5.00	0.0

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s) x
Summer CV	1.000	Drain Down Time (mins)	780	Check Discharge Volume x
Winter CV	1.000	Additional Storage (m³/ha)	0.0	

Storm Durations

15	60	180	360	600	960	2880	10080
30	120	240	480	720	1440	5760	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
100	40	0	0
100	40	10	0

Node S15 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	81.300	Product Number	CTL-SHE-0106-5000-1000-5000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node N21 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	76.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

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	1178.6	0.0	0.300	1313.6	0.0	0.600	1454.6	0.0	0.900	1600.7	0.0
0.100	1222.4	0.0	0.400	1360.1	0.0	0.700	1502.7	0.0	1.000	1650.5	0.0
0.200	1267.7	0.0	0.500	1407.1	0.0	0.800	1551.4	0.0	1.001	0.0	0.0

Node N23 Link Surround Storage Structure

Base Inf Coefficient (m/hr)	0.06730	Porosity	0.30	Link	1.015
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	73.500	Surround Shape	(Trench)
Safety Factor	1.5	Time to half empty (mins)		Diameter (mm)	1400

Node P1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	81.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	308

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	200.0	0.0	0.400	200.0	0.0	0.800	200.0	0.0
0.200	200.0	0.0	0.600	200.0	0.0			



Results for 2 year Critical Storm Duration. Lowest mass balance: 99.01%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	82.621	0.071	9.9	0.1021	0.0000	OK
15 minute summer	S2	10	82.463	0.063	9.8	0.0907	0.0000	OK
15 minute summer	S3	10	82.388	0.063	15.2	0.0904	0.0000	OK
15 minute summer	S4	10	81.979	0.079	24.0	0.1127	0.0000	OK
15 minute summer	S5	11	81.757	0.082	29.9	0.1178	0.0000	OK
180 minute summer	S15	140	81.642	0.342	17.0	0.4889	0.0000	SURCHARGED
15 minute summer	S16	10	80.800	0.050	8.0	0.0720	0.0000	OK
15 minute summer	S6	11	80.474	0.099	48.8	0.1414	0.0000	OK
15 minute summer	S7	11	79.857	0.107	64.4	0.1527	0.0000	OK
15 minute summer	S8	11	78.935	0.110	90.1	0.1952	0.0000	OK
15 minute summer	S9	11	78.161	0.186	98.7	0.3286	0.0000	OK
15 minute summer	S10	11	77.952	0.202	115.5	0.3568	0.0000	OK
15 minute summer	S11	11	77.683	0.208	130.6	0.3670	0.0000	OK
15 minute summer	S12	11	77.473	0.223	144.7	0.3940	0.0000	OK
15 minute summer	S13	11	77.323	0.223	148.9	0.3948	0.0000	OK
15 minute summer	S17	10	77.330	0.115	12.9	0.2038	0.0000	OK
15 minute summer	S14	12	77.170	0.270	161.9	0.4777	0.0000	OK
15 minute summer	HW15	11	76.995	0.120	169.3	0.0000	0.0000	OK
15 minute summer	HW22	10	77.057	0.107	22.1	0.0000	0.0000	OK
15 minute summer	S18	10	77.087	0.044	3.2	0.0629	0.0000	OK
15 minute summer	S19	11	77.021	0.046	3.2	0.0658	0.0000	OK
15 minute summer	HW20	11	76.995	0.045	3.1	0.0000	0.0000	OK
30 minute summer	N21	22	76.299	0.424	163.9	0.7501	0.0000	OK
480 minute winter	N23	472	76.277	0.427	30.4	220.5020	0.0000	OK
180 minute summer	P1	120	81.603	0.103	11.4	20.7445	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S1	1.000	S2	9.8	0.961	0.188	0.0763
15 minute summer	S2	1.001	S3	9.8	0.904	0.084	0.0746
15 minute summer	S3	1.002	S4	15.0	1.186	0.099	0.2892
15 minute summer	S4	1.003	S5	23.9	1.579	0.129	0.1232
15 minute summer	S5	1.004	S6	29.7	1.928	0.160	0.6774
180 minute summer	S15	Hydro-Brake®	S16	5.0			
15 minute summer	S16	2.002	S6	7.9	1.042	0.059	0.1548
15 minute summer	S6	1.005	S7	49.0	2.220	0.135	0.3738
15 minute summer	S7	1.006	S8	64.6	2.330	0.115	0.7842
15 minute summer	S8	1.007	S9	90.1	1.806	0.100	1.2657
15 minute summer	S9	1.008	S10	99.5	1.375	0.243	2.2696
15 minute summer	S10	1.009	S11	116.0	1.605	0.278	1.9542
15 minute summer	S11	1.010	S12	130.6	1.437	0.228	2.9400
15 minute summer	S12	1.011	S13	143.9	1.508	0.238	1.8589
15 minute summer	S13	1.012	S14	147.3	1.356	0.230	2.5089
15 minute summer	S17	3.000	S14	12.6	0.616	0.368	0.3159
15 minute summer	S14	1.013	HW15	169.3	2.143	0.548	0.9955
15 minute summer	HW15	1.014	N21	163.7	2.180	0.088	1.6623
15 minute summer	HW22	4.005	N21	21.8	1.007	0.250	0.4356
15 minute summer	S18	5.000	S19	3.2	0.571	0.079	0.0630
15 minute summer	S19	5.001	HW20	3.1	0.575	0.079	0.0243
15 minute summer	HW20	5.002	N21	3.0	0.550	0.086	0.1782
30 minute summer	N21	1.015	N23	116.5	0.758	1.570	30.5740
480 minute winter	N23	Infiltration		3.5			
180 minute summer	P1	2.000	S15	16.2	0.845	0.229	0.1960



Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 94.12%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	82.744	0.194	47.2	0.2775	0.0000	OK
15 minute summer	S2	10	82.558	0.158	46.8	0.2262	0.0000	OK
15 minute summer	S3	10	82.477	0.152	72.3	0.2181	0.0000	OK
15 minute summer	S4	10	82.113	0.213	114.3	0.3055	0.0000	OK
15 minute summer	S5	10	81.882	0.207	142.1	0.2965	0.0000	OK
180 minute winter	S15	176	82.207	0.907	18.8	1.2976	0.0000	SURCHARGED
15 minute summer	S16	10	80.824	0.074	18.6	0.1065	0.0000	OK
15 minute summer	S6	10	80.617	0.242	214.3	0.3461	0.0000	OK
15 minute summer	S7	11	80.023	0.273	288.8	0.3910	0.0000	OK
15 minute summer	S8	11	79.618	0.793	415.7	1.4005	0.0000	SURCHARGED
15 minute summer	S9	11	79.367	1.392	433.6	2.4589	0.0000	SURCHARGED
15 minute summer	S10	11	79.017	1.267	504.7	2.2396	0.0000	SURCHARGED
15 minute summer	S11	11	78.588	1.113	569.6	1.9671	0.0000	SURCHARGED
15 minute summer	S12	11	78.261	1.011	632.7	1.7866	0.0000	SURCHARGED
15 minute summer	S13	11	77.967	0.867	654.2	1.5325	0.0000	SURCHARGED
15 minute summer	S17	11	77.676	0.461	61.5	0.8147	0.0000	SURCHARGED
15 minute summer	S14	11	77.621	0.721	718.9	1.2740	0.0000	SURCHARGED
960 minute winter	HW15	1035	77.390	0.515	47.9	0.0000	0.0000	OK
1440 minute winter	HW22	1410	77.390	0.440	4.0	0.0000	0.0000	SURCHARGED
1440 minute winter	S18	1410	77.390	0.347	0.6	0.4966	0.0000	SURCHARGED
1440 minute winter	S19	1410	77.390	0.415	0.6	0.5939	0.0000	SURCHARGED
1440 minute winter	HW20	1410	77.390	0.440	0.6	0.0000	0.0000	SURCHARGED
1440 minute winter	N21	1410	77.390	1.515	91.5	777.5477	0.0000	SURCHARGED
1440 minute winter	N23	1410	77.390	1.540	28.5	311.4652	0.0000	OK
180 minute winter	P1	176	82.207	0.707	39.5	142.2198	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S1	1.000	S2	46.8	1.380	0.898	0.2521
15 minute summer	S2	1.001	S3	46.6	1.270	0.402	0.2540
15 minute summer	S3	1.002	S4	71.8	1.600	0.471	1.0158
15 minute summer	S4	1.003	S5	113.6	2.153	0.613	0.4299
15 minute summer	S5	1.004	S6	141.2	2.831	0.758	2.1900
180 minute winter	S15	Hydro-Brake®	S16	5.0			
15 minute summer	S16	2.002	S6	18.5	1.093	0.137	0.5470
15 minute summer	S6	1.005	S7	213.5	3.132	0.590	1.1537
15 minute summer	S7	1.006	S8	289.9	3.250	0.516	3.6651
15 minute summer	S8	1.007	S9	392.4	2.197	0.438	5.3958
15 minute summer	S9	1.008	S10	429.1	1.986	1.046	6.7705
15 minute summer	S10	1.009	S11	500.4	2.316	1.201	5.8409
15 minute summer	S11	1.010	S12	565.7	2.008	0.986	9.1097
15 minute summer	S12	1.011	S13	630.3	2.238	1.044	5.4874
15 minute summer	S13	1.012	S14	652.8	2.318	1.017	6.4797
15 minute summer	S17	3.000	S14	60.1	0.911	1.758	1.0797
15 minute summer	S14	1.013	HW15	717.6	2.752	2.323	2.9672
960 minute winter	HW15	1.014	N21	75.6	0.730	0.041	3.7327
1440 minute winter	HW22	4.005	N21	4.0	0.615	0.046	1.4149
1440 minute winter	S18	5.000	S19	0.6	0.359	0.015	0.4486
1440 minute winter	S19	5.001	HW20	0.6	0.346	0.016	0.1687
1440 minute winter	HW20	5.002	N21	0.6	0.331	0.017	1.2742
1440 minute winter	N21	1.015	N23	28.5	0.425	0.384	56.3355
1440 minute winter	N23	Infiltration		3.5			
180 minute winter	P1	2.000	S15	17.0	0.830	0.241	0.2711



Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 95.24%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	82.774	0.224	51.9	0.3199	0.0000	OK
15 minute summer	S2	10	82.568	0.168	50.8	0.2398	0.0000	OK
15 minute summer	S3	10	82.487	0.162	78.9	0.2320	0.0000	OK
15 minute summer	S4	10	82.131	0.231	125.3	0.3306	0.0000	OK
15 minute summer	S5	10	81.898	0.223	155.8	0.3193	0.0000	OK
180 minute winter	S15	176	82.295	0.995	20.6	1.4234	0.0000	SURCHARGED
15 minute summer	S16	10	80.828	0.078	20.2	0.1109	0.0000	OK
15 minute summer	S6	11	80.665	0.290	234.8	0.4145	0.0000	OK
15 minute summer	S7	11	80.374	0.624	317.3	0.8924	0.0000	SURCHARGED
15 minute summer	S8	11	80.040	1.215	436.4	2.1478	0.0000	SURCHARGED
15 minute summer	S9	11	79.752	1.777	467.4	3.1397	0.0000	SURCHARGED
15 minute summer	S10	11	79.341	1.591	546.6	2.8112	0.0000	SURCHARGED
15 minute summer	S11	11	78.835	1.360	616.4	2.4034	0.0000	SURCHARGED
15 minute summer	S12	11	78.455	1.205	686.4	2.1287	0.0000	SURCHARGED
15 minute summer	S13	11	78.111	1.011	711.6	1.7858	0.0000	SURCHARGED
15 minute summer	S17	11	77.777	0.562	67.5	0.9929	0.0000	SURCHARGED
15 minute summer	S14	11	77.703	0.803	785.7	1.4187	0.0000	SURCHARGED
1440 minute winter	HW15	1440	77.477	0.602	58.3	0.0000	0.0000	SURCHARGED
1440 minute winter	HW22	1440	77.476	0.526	4.5	0.0000	0.0000	SURCHARGED
1440 minute winter	S18	1440	77.476	0.433	0.7	0.6203	0.0000	SURCHARGED
1440 minute winter	S19	1440	77.476	0.501	0.7	0.7174	0.0000	SURCHARGED
1440 minute winter	HW20	1440	77.476	0.526	0.6	0.0000	0.0000	SURCHARGED
1440 minute winter	N21	1440	77.476	1.601	51.7	904.6115	0.0000	SURCHARGED
1440 minute winter	N23	1440	77.476	1.626	22.3	318.8818	0.0000	OK
180 minute winter	P1	176	82.295	0.795	44.1	159.8883	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	S1	1.000	S2	50.8	1.378	0.976	0.2735
15 minute summer	S2	1.001	S3	50.9	1.293	0.439	0.2739
15 minute summer	S3	1.002	S4	78.4	1.613	0.515	1.1012
15 minute summer	S4	1.003	S5	124.4	2.175	0.672	0.4662
15 minute summer	S5	1.004	S6	155.0	2.856	0.833	2.4131
180 minute winter	S15	Hydro-Brake®	S16	5.0			
15 minute summer	S16	2.002	S6	20.1	1.087	0.149	0.6926
15 minute summer	S6	1.005	S7	233.5	3.104	0.645	1.7079
15 minute summer	S7	1.006	S8	303.0	3.269	0.539	4.4817
15 minute summer	S8	1.007	S9	422.1	2.208	0.471	5.3958
15 minute summer	S9	1.008	S10	466.8	2.161	1.138	6.7705
15 minute summer	S10	1.009	S11	542.9	2.513	1.303	5.8409
15 minute summer	S11	1.010	S12	612.6	2.175	1.068	9.1097
15 minute summer	S12	1.011	S13	685.3	2.433	1.135	5.4874
15 minute summer	S13	1.012	S14	711.3	2.525	1.108	6.4797
15 minute summer	S17	3.000	S14	64.5	0.927	1.887	1.0797
15 minute summer	S14	1.013	HW15	785.1	2.911	2.541	3.0709
1440 minute winter	HW15	1.014	N21	48.8	0.494	0.026	3.8995
1440 minute winter	HW22	4.005	N21	4.5	0.615	0.051	1.4149
1440 minute winter	S18	5.000	S19	0.7	0.359	0.017	0.4486
1440 minute winter	S19	5.001	HW20	0.6	0.346	0.015	0.1687
1440 minute winter	HW20	5.002	N21	0.6	0.332	0.017	1.2742
1440 minute winter	N21	1.015	N23	22.3	0.415	0.300	56.3355
1440 minute winter	N23	Infiltration		3.5			
180 minute winter	P1	2.000	S15	-16.2	0.844	-0.229	0.2711