

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
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)	21.000	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)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
S2	0.062	5.00	54.601	394936.747	178816.667	1.491
S4	0.030	5.00	54.744	394935.011	178829.804	1.690
S6	0.005	5.00	54.885	394942.014	178843.115	1.900
S8	0.058	5.00	54.893	394952.014	178845.092	1.953
SW-IC5	0.021	5.00	54.700	395018.236	178742.679	1.300
SW-IC6	0.000		54.500	395011.342	178741.767	1.237
S10	0.030	5.00	54.531	395006.009	178747.664	1.500
S12	0.110	5.00	54.448	395001.196	178779.544	1.625
S14	0.039	5.00	54.533	395000.895	178793.855	1.783
S16	0.108	5.00	54.431	395010.052	178812.972	1.846
SW-IC1	0.015	5.00	54.000	395113.793	178818.581	0.900
SW-IC2	0.023	5.00	53.950	395111.475	178833.066	1.100
SW-IC3	0.010	5.00	54.000	395101.006	178866.592	0.900
SW-IC4	0.025	5.00	54.200	395103.035	178860.205	1.250
S18	0.047	5.00	53.950	395107.073	178849.014	1.504
S20	0.139	5.00	54.796	395027.683	178878.304	1.575
S22	0.097	5.00	54.281	395039.390	178839.784	1.576
S24	0.114	5.00	54.191	395050.836	178829.330	2.017
S26	0.053	5.00	54.564	395033.959	178799.861	2.544
S28	0.105	5.00	53.904	395082.605	178772.569	2.004
S30	0.089	5.00	53.466	395092.778	178743.854	1.159
S32	0.019	5.00	53.828	395087.198	178764.243	1.948
HW1			53.208	395099.736	178770.259	1.358
HW2			53.208	395125.277	178779.264	1.508
S34	0.084	5.00	53.686	395105.553	178785.771	1.406
S36 (HB)	0.017	5.00	53.871	395129.804	178788.026	2.227
S38			53.914	395114.313	178847.155	2.404
S40			53.878	395106.261	178876.164	2.435
S42			53.726	395077.094	178976.796	2.513
HW3			52.500	395045.886	179082.495	1.529

Links

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S2	S4	13.251	53.110	53.054	0.056	236.6	300	5.22	50.0
1.001	S4	S6	15.041	53.054	52.985	0.069	218.0	300	5.45	50.0
1.002	S6	S8	10.194	52.985	52.940	0.045	226.5	300	5.62	50.0
1.003	S8	S16	66.333	52.940	52.660	0.280	236.9	300	6.70	50.0
Private 2.0	SW-IC5	SW-IC6	6.954	53.400	53.313	0.087	80.0	100	5.13	50.0
Lateral 2	SW-IC6	S10	7.951	53.263	53.181	0.082	97.0	150	5.26	50.0
2.000	S10	S12	32.241	53.031	52.898	0.133	242.4	300	5.80	50.0
2.001	S12	S14	14.314	52.823	52.750	0.073	196.1	375	5.98	50.0
2.002	S14	S16	21.197	52.750	52.585	0.165	128.5	375	6.21	50.0
1.004	S16	S26	27.266	52.585	52.170	0.415	65.7	375	6.91	50.0
Private 4.0	SW-IC1	SW-IC2	14.669	53.100	52.900	0.200	73.3	100	5.27	50.0
Lateral 4	SW-IC2	S18	16.544	52.850	52.671	0.179	92.4	150	5.54	50.0
Private 5.0	SW-IC3	SW-IC4	6.702	53.100	53.000	0.100	67.0	100	5.12	50.0
Lateral 5	SW-IC4	S18	11.897	52.950	52.671	0.279	42.6	150	5.25	50.0
3.000	S18	S24	59.582	52.446	52.249	0.197	302.4	375	6.49	50.0
4.000	S20	S22	40.260	53.221	52.705	0.516	78.0	375	5.33	50.0
4.001	S22	S24	15.502	52.705	52.249	0.456	34.0	375	5.41	50.0
3.001	S24	S26	33.960	52.174	52.095	0.079	429.9	450	7.07	50.0
1.005	S26	S28	55.779	52.020	51.900	0.120	464.8	525	7.98	50.0
1.006	S28	S32	9.509	51.900	51.880	0.020	475.4	525	8.13	50.0
5.000	S30	S32	21.139	52.307	52.180	0.127	166.4	225	5.35	50.0
1.007	S32	HW1	13.907	51.880	51.850	0.030	463.6	525	8.36	50.0
1.008	HW1	HW2	27.082	51.850	51.700	0.150	180.5	750	8.57	50.0
1.009	HW2	S36 (HB)	9.862	51.700	51.644	0.056	176.1	525	8.67	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	1.018	71.9	8.4	1.191	1.390	0.062	0.0	69	0.686
1.001	1.061	75.0	12.5	1.390	1.600	0.092	0.0	82	0.791
1.002	1.040	73.5	13.1	1.600	1.653	0.097	0.0	85	0.791
1.003	1.017	71.9	21.0	1.653	1.471	0.155	0.0	111	0.887
Private 2.0	0.861	6.8	2.8	1.200	1.087	0.021	0.0	45	0.821
Lateral 2	1.020	18.0	2.8	1.087	1.200	0.021	0.0	40	0.745
2.000	1.005	71.1	6.9	1.200	1.250	0.051	0.0	63	0.644
2.001	1.290	142.5	21.8	1.250	1.408	0.161	0.0	99	0.942
2.002	1.597	176.4	27.1	1.408	1.471	0.200	0.0	99	1.166
1.004	2.238	247.2	62.7	1.471	2.019	0.463	0.0	129	1.882
Private 4.0	0.900	7.1	2.0	0.800	0.950	0.015	0.0	37	0.782
Lateral 4	1.046	18.5	5.1	0.950	1.129	0.038	0.0	54	0.898
Private 5.0	0.942	7.4	1.4	0.800	1.100	0.010	0.0	29	0.720
Lateral 5	1.546	27.3	4.7	1.100	1.129	0.035	0.0	42	1.167
3.000	1.036	114.5	16.3	1.129	1.567	0.120	0.0	95	0.740
4.000	2.053	226.7	18.8	1.200	1.201	0.139	0.0	72	1.258
4.001	3.116	344.2	32.0	1.201	1.567	0.236	0.0	77	1.979
3.001	0.974	154.9	63.7	1.567	2.019	0.470	0.0	201	0.928
1.005	1.032	223.4	133.6	2.019	1.479	0.986	0.0	293	1.076
1.006	1.020	220.9	147.9	1.479	1.423	1.091	0.0	315	1.090
5.000	1.010	40.2	12.1	0.934	1.423	0.089	0.0	84	0.884
1.007	1.033	223.7	162.5	1.423	0.833	1.199	0.0	333	1.123
1.008	2.079	918.6	162.5	0.608	0.758	1.199	0.0	211	1.586
1.009	1.684	364.6	162.5	0.983	1.702	1.199	0.0	245	1.638

Links

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
6.000	S34	S36 (HB)	24.356	52.280	51.944	0.336	72.5	225	5.26	50.0
1.010	S36 (HB)	S38	61.125	51.644	51.510	0.134	456.2	525	9.65	50.0
1.011	S38	S40	30.106	51.510	51.443	0.067	449.3	525	10.13	50.0
1.012	S40	S42	104.774	51.443	51.213	0.230	455.5	525	11.80	48.3
1.013	S42	HW3	110.210	51.213	50.971	0.242	455.4	525	13.56	44.7

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)
6.000	1.538	61.1	11.4	1.181	1.702	0.084	0.0	65	1.182
1.010	1.042	225.6	176.2	1.702	1.879	1.300	0.0	350	1.147
1.011	1.050	227.3	176.2	1.879	1.910	1.300	0.0	348	1.154
1.012	1.043	225.7	170.3	1.910	1.988	1.300	0.0	342	1.141
1.013	1.043	225.7	157.4	1.988	1.004	1.300	0.0	324	1.124

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	10000
M5-60 (mm)	21.000	Additional Storage (m³/ha)	0.0
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
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node HW3 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	1.569	1440	1.569

Node S36 (HB) Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	51.644	Product Number	CTL-SHE-0107-5900-1500-5900
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.9	Min Node Diameter (mm)	1200

Node HW2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr) 0.00000

Safety Factor 2.0

Invert Level (m) 51.700

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)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	525.8	0.0	0.500	634.6	0.0	1.000	753.0	0.0	1.500	880.5	0.0
0.100	546.5	0.0	0.600	657.6	0.0	1.100	777.8	0.0	1.508	882.6	0.0
0.200	568.0	0.0	0.700	680.9	0.0	1.200	802.9	0.0			
0.300	589.8	0.0	0.800	704.6	0.0	1.300	828.4	0.0			
0.400	612.1	0.0	0.900	728.6	0.0	1.400	854.3	0.0			

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 95.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S2	11	54.601	1.491	42.9	2.1336	3.6516	FLOOD
15 minute winter	S4	11	54.604	1.550	56.3	2.2174	0.0000	FLOOD RISK
15 minute winter	S6	11	54.594	1.609	47.9	1.8202	0.0000	FLOOD RISK
15 minute winter	S8	11	54.587	1.647	74.2	1.8630	0.0000	SURCHARGED
15 minute winter	SW-IC5	12	54.700	1.300	14.4	1.8603	0.1224	FLOOD
15 minute winter	SW-IC6	11	54.500	1.237	21.2	1.7701	0.3608	FLOOD
15 minute winter	S10	11	54.498	1.467	29.3	2.0998	0.0000	FLOOD RISK
15 minute winter	S12	11	54.448	1.625	89.8	2.3254	0.7826	FLOOD
15 minute winter	S14	11	54.415	1.665	114.2	1.8826	0.0000	FLOOD RISK
15 minute winter	S16	11	54.332	1.747	243.7	2.5004	0.0000	FLOOD RISK
15 minute winter	SW-IC1	11	54.000	0.900	11.4	1.2879	0.8317	FLOOD
15 minute winter	SW-IC2	10	53.950	1.100	18.1	1.5741	2.6478	FLOOD
15 minute winter	SW-IC3	11	54.000	0.900	12.9	1.2879	1.0691	FLOOD
15 minute summer	SW-IC4	11	54.030	1.080	18.0	1.5452	0.0000	FLOOD RISK
15 minute winter	S18	10	53.950	1.504	66.8	2.6576	6.0959	FLOOD
15 minute winter	S20	11	54.226	1.005	95.5	1.4386	0.0000	SURCHARGED
15 minute winter	S22	11	54.123	1.418	155.9	2.0287	0.0000	FLOOD RISK
15 minute summer	S24	11	53.977	1.803	234.5	2.5800	0.0000	FLOOD RISK
15 minute winter	S26	11	53.791	1.771	488.6	2.5344	0.0000	SURCHARGED
1440 minute winter	S28	1380	53.120	1.219	32.3	2.1548	0.0000	SURCHARGED
15 minute winter	S30	11	53.128	0.821	61.1	1.1744	0.0000	SURCHARGED
1440 minute winter	S32	1380	53.119	1.239	35.4	2.1890	0.0000	SURCHARGED
1440 minute winter	HW1	1380	53.120	1.270	35.2	1.8168	0.0000	FLOOD RISK
1440 minute winter	HW2	1380	53.119	1.419	36.6	975.7851	0.0000	FLOOD RISK
1440 minute winter	S34	1380	53.119	0.839	2.6	1.2006	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S2	1.000	S4	37.0	0.711	0.514	0.9331	
15 minute winter	S4	1.001	S6	46.5	0.865	0.621	1.0592	
15 minute winter	S6	1.002	S8	56.2	0.798	0.764	0.7179	
15 minute winter	S8	1.003	S16	80.4	1.141	1.118	4.6711	
15 minute winter	SW-IC5	Private 2.0	SW-IC6	13.3	1.705	1.973	0.0544	
15 minute winter	SW-IC6	Lateral 2	S10	22.8	1.293	1.262	0.1400	
15 minute winter	S10	2.000	S12	39.2	0.782	0.551	2.2704	
15 minute winter	S12	2.001	S14	93.3	1.035	0.655	1.5788	
15 minute winter	S14	2.002	S16	116.5	1.073	0.661	2.3380	
15 minute winter	S16	1.004	S26	246.4	2.234	0.997	3.0074	
15 minute winter	SW-IC1	Private 4.0	SW-IC2	8.9	1.139	1.261	0.1148	
15 minute winter	SW-IC2	Lateral 4	S18	19.7	1.169	1.067	0.2913	
15 minute winter	SW-IC3	Private 5.0	SW-IC4	9.3	1.190	1.259	0.0524	
15 minute summer	SW-IC4	Lateral 5	S18	22.0	1.358	0.807	0.2094	
15 minute winter	S18	3.000	S24	64.0	0.592	0.559	6.5717	
15 minute winter	S20	4.000	S22	93.2	1.565	0.411	4.4406	
15 minute winter	S22	4.001	S24	158.6	1.714	0.461	1.7098	
15 minute summer	S24	3.001	S26	233.6	1.475	1.508	5.3807	
15 minute winter	S26	1.005	S28	490.3	2.270	2.194	12.0501	
1440 minute winter	S28	1.006	S32	32.2	0.502	0.146	2.0543	
15 minute winter	S30	5.000	S32	58.3	1.467	1.452	0.8407	
1440 minute winter	S32	1.007	HW1	35.2	0.702	0.157	3.0044	
1440 minute winter	HW1	1.008	HW2	35.4	0.886	0.039	11.9193	
1440 minute winter	HW2	1.009	S36 (HB)	5.9	0.089	0.016	2.1305	
1440 minute winter	S34	6.000	S36 (HB)	2.5	0.575	0.041	0.9687	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 95.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	S36 (HB)	1380	53.119	1.475	6.1	10.4265	0.0000	SURCHARGED
240 minute summer	S38	232	52.560	1.050	6.0	1.8562	0.0000	SURCHARGED
240 minute summer	S40	232	52.559	1.116	6.6	1.9713	0.0000	SURCHARGED
240 minute summer	S42	232	52.549	1.336	7.3	2.3606	0.0000	SURCHARGED
15 minute summer	HW3	1	52.540	1.569	0.0	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)
1440 minute winter	S36 (HB)	1.010	S38	5.9	0.380	0.026	13.2050	
240 minute summer	S38	1.011	S40	6.6	0.442	0.029	6.5039	
240 minute summer	S40	1.012	S42	7.3	0.416	0.032	22.6346	
240 minute summer	S42	1.013	HW3	7.6	0.035	0.034	23.8090	187.1