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)	20.000	Minimum Backdrop Height (m)	1.000
Ratio-R	0.300	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)
S3	0.045	5.00	201.138	1200	424314.661	412843.690	2.168
Tank	0.042	5.00	198.587	1200	424434.425	412809.121	3.404
S10	0.107	5.00	200.612	1200	424364.473	412819.135	1.712
S9			198.300	1200	424434.488	412803.185	3.717
S8			198.904	2100	424433.216	412806.558	3.796
S7	0.099	5.00	199.333	1500	424409.829	412817.657	2.342
S6	0.034	5.00	199.825	1200	424382.605	412831.073	2.253
S5	0.069	5.00	200.011	1500	424368.044	412834.222	2.191
S4	0.147	5.00	200.792	1500	424320.778	412855.933	2.322
S2	0.032	5.00	201.680	1200	424303.115	412823.530	1.880
S1	0.053	5.00	202.376	1200	424270.360	412836.028	1.445

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	S1	S2	35.058	0.600	200.931	199.875	1.056	33.2	150	5.33	50.0
1.001	S2	S3	23.232	0.600	199.800	198.970	0.830	28.0	225	5.49	50.0
1.002	S3	S4	13.686	0.600	198.970	198.545	0.425	32.2	225	5.59	50.0
1.003	S4	S5	52.014	0.600	198.470	197.820	0.650	80.0	300	6.08	50.0
2.000	S10	S5	15.504	0.600	198.900	198.650	0.250	62.0	225	5.16	50.0
1.004	S5	S6	14.898	0.600	197.820	197.572	0.248	60.1	300	6.20	50.0
1.005	S6	S7	30.350	0.600	197.572	197.066	0.506	60.0	300	6.45	50.0
1.006	S7	S8	25.887	0.600	196.991	196.560	0.431	60.1	375	6.64	50.0
3.000	Tank	S8	4.900	0.600	195.183	195.158	0.025	196.0	600	5.05	50.0
1.007	S8	S9	53.000	0.600	195.108	194.583	0.525	101.0	150	7.52	0.0

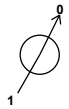
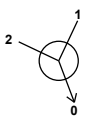
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.753	31.0	7.2	1.295	1.655	0.053	0.0	49	1.429
1.001	2.482	98.7	11.5	1.655	1.943	0.085	0.0	51	1.670
1.002	2.313	92.0	17.6	1.943	2.022	0.130	0.0	66	1.793
1.003	1.759	124.3	37.5	2.022	1.891	0.277	0.0	113	1.547
2.000	1.663	66.1	14.5	1.487	1.136	0.107	0.0	72	1.342
1.004	2.032	143.6	61.4	1.891	1.953	0.453	0.0	137	1.955
1.005	2.033	143.7	66.0	1.953	1.967	0.487	0.0	143	1.992
1.006	2.341	258.6	79.4	1.967	1.969	0.586	0.0	142	2.071
3.000	1.736	490.7	5.7	2.804	3.146	0.042	0.0	45	0.600
1.007	1.000	17.7	0.0	3.646	3.567	0.628	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	35.058	33.2	150	Circular	202.376	200.931	1.295	201.680	199.875	1.655
1.001	23.232	28.0	225	Circular	201.680	199.800	1.655	201.138	198.970	1.943
1.002	13.686	32.2	225	Circular	201.138	198.970	1.943	200.792	198.545	2.022
1.003	52.014	80.0	300	Circular	200.792	198.470	2.022	200.011	197.820	1.891
2.000	15.504	62.0	225	Circular	200.612	198.900	1.487	200.011	198.650	1.136
1.004	14.898	60.1	300	Circular	200.011	197.820	1.891	199.825	197.572	1.953
1.005	30.350	60.0	300	Circular	199.825	197.572	1.953	199.333	197.066	1.967
1.006	25.887	60.1	375	Circular	199.333	196.991	1.967	198.904	196.560	1.969
3.000	4.900	196.0	600	Circular	198.587	195.183	2.804	198.904	195.158	3.146
1.007	53.000	101.0	150	Circular	198.904	195.108	3.646	198.300	194.583	3.567

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1500	Manhole	Adoptable
1.003	S4	1500	Manhole	Adoptable	S5	1500	Manhole	Adoptable
2.000	S10	1200	Manhole	Adoptable	S5	1500	Manhole	Adoptable
1.004	S5	1500	Manhole	Adoptable	S6	1200	Manhole	Adoptable
1.005	S6	1200	Manhole	Adoptable	S7	1500	Manhole	Adoptable
1.006	S7	1500	Manhole	Adoptable	S8	2100	Manhole	Adoptable
3.000	Tank	1200	Manhole	Adoptable	S8	2100	Manhole	Adoptable
1.007	S8	2100	Manhole	Adoptable	S9	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
S3	424314.661	412843.690	201.138	2.168	1200		1	1.001	198.970	225
							0	1.002	198.970	225
Tank	424434.425	412809.121	198.587	3.404	1200		0	3.000	195.183	600
S10	424364.473	412819.135	200.612	1.712	1200		0	2.000	198.900	225
S9	424434.488	412803.185	198.300	3.717	1200		1	1.007	194.583	150
S8	424433.216	412806.558	198.904	3.796	2100		1	3.000	195.158	600
							2	1.006	196.560	375
							0	1.007	195.108	150
S7	424409.829	412817.657	199.333	2.342	1500		1	1.005	197.066	300
							0	1.006	196.991	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S6	424382.605	412831.073	199.825	2.253	1200	1	1.004	197.572	300
						0	1.005	197.572	300
S5	424368.044	412834.222	200.011	2.191	1500	1	2.000	198.650	225
						2	1.003	197.820	300
						0	1.004	197.820	300
S4	424320.778	412855.933	200.792	2.322	1500	1	1.002	198.545	225
						0	1.003	198.470	300
S2	424303.115	412823.530	201.680	1.880	1200	1	1.000	199.875	150
						0	1.001	199.800	225
S1	424270.360	412836.028	202.376	1.445	1200	0	1.000	200.931	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	1440
Ratio-R	0.300	Additional Storage (m³/ha)	0.0
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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
20	0	0	0
100	30	0	0

Node S8 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	194.925	Product Number	CTL-SHE-0075-3500-2100-3500
Design Depth (m)	2.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.5	Min Node Diameter (mm)	1200

Node Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	195.233
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	1305

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	174.3	0.0	2.400	174.3	0.0	2.401	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 97.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S3	10	199.037	0.067	16.4	0.0761	0.0000	OK
480 minute winter	Tank	400	195.704	0.521	10.0	82.6914	0.0000	OK
15 minute winter	S10	10	198.972	0.072	13.7	0.0819	0.0000	OK
30 minute winter	S9	34	194.622	0.039	2.6	0.0000	0.0000	OK
480 minute winter	S8	400	195.704	0.596	12.0	2.0647	0.0000	SURCHARGED
15 minute winter	S7	11	197.135	0.144	72.8	0.2550	0.0000	OK
15 minute winter	S6	11	197.715	0.143	60.5	0.1620	0.0000	OK
15 minute winter	S5	11	197.963	0.143	56.6	0.2519	0.0000	OK
15 minute winter	S4	10	198.577	0.107	35.0	0.1886	0.0000	OK
15 minute winter	S2	10	199.850	0.050	10.7	0.0563	0.0000	OK
15 minute winter	S1	10	200.979	0.048	6.8	0.0542	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)
15 minute winter	S3	1.002	S4	16.2	1.693	0.176	0.1310	
480 minute winter	Tank	3.000	S8	-9.1	0.272	-0.019	1.2954	
15 minute winter	S10	2.000	S5	13.5	1.274	0.205	0.1647	
480 minute winter	S8	1.007	S9	2.6	0.715	0.146	0.1914	148.3
15 minute winter	S7	1.006	S8	73.0	1.960	0.282	0.9648	
15 minute winter	S6	1.005	S7	60.9	1.907	0.424	0.9700	
15 minute winter	S5	1.004	S6	56.4	1.703	0.392	0.4930	
15 minute winter	S4	1.003	S5	34.3	1.245	0.276	1.4400	
15 minute winter	S2	1.001	S3	10.6	1.301	0.108	0.1910	
15 minute winter	S1	1.000	S2	6.6	1.384	0.214	0.1680	

Results for 2 year Critical Storm Duration. Lowest mass balance: 97.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S3	10	199.048	0.078	21.3	0.0878	0.0000	OK
600 minute winter	Tank	570	195.874	0.691	10.6	112.5978	0.0000	SURCHARGED
15 minute winter	S10	10	198.983	0.083	17.7	0.0944	0.0000	OK
30 minute summer	S9	81	194.622	0.039	2.6	0.0000	0.0000	OK
600 minute winter	S8	570	195.874	0.766	12.5	2.6557	0.0000	SURCHARGED
15 minute winter	S7	11	197.159	0.168	94.4	0.2969	0.0000	OK
15 minute winter	S6	11	197.740	0.168	78.3	0.1905	0.0000	OK
15 minute winter	S5	11	197.989	0.169	73.5	0.2978	0.0000	OK
15 minute winter	S4	10	198.593	0.123	45.4	0.2173	0.0000	OK
15 minute winter	S2	10	199.857	0.057	13.9	0.0641	0.0000	OK
15 minute winter	S1	10	200.986	0.055	8.8	0.0624	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)
15 minute winter	S3	1.002	S4	21.0	1.810	0.228	0.1589	
600 minute winter	Tank	3.000	S8	-9.7	0.144	-0.020	1.3802	
15 minute winter	S10	2.000	S5	17.5	1.362	0.265	0.1992	
600 minute winter	S8	1.007	S9	2.6	0.715	0.146	0.1914	191.3
15 minute winter	S7	1.006	S8	94.7	2.090	0.366	1.1738	
15 minute winter	S6	1.005	S7	78.9	2.024	0.549	1.1835	
15 minute winter	S5	1.004	S6	73.0	1.792	0.508	0.6067	
15 minute winter	S4	1.003	S5	44.6	1.317	0.359	1.7624	
15 minute winter	S2	1.001	S3	13.8	1.391	0.140	0.2317	
15 minute winter	S1	1.000	S2	8.6	1.487	0.278	0.2030	

Results for 20 year Critical Storm Duration. Lowest mass balance: 97.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S3	10	199.077	0.107	37.0	0.1215	0.0000	OK
720 minute winter	Tank	690	196.454	1.271	18.9	214.3511	0.0000	SURCHARGED
15 minute winter	S10	10	199.016	0.116	30.8	0.1310	0.0000	OK
720 minute winter	S9	690	194.623	0.040	2.8	0.0000	0.0000	OK
720 minute winter	S8	690	196.454	1.346	17.6	4.6650	0.0000	SURCHARGED
15 minute winter	S7	11	197.230	0.239	163.4	0.4222	0.0000	OK
15 minute winter	S6	11	197.835	0.263	136.0	0.2972	0.0000	OK
15 minute winter	S5	11	198.091	0.271	128.2	0.4789	0.0000	OK
15 minute winter	S4	10	198.642	0.172	78.8	0.3042	0.0000	OK
15 minute winter	S2	10	199.875	0.075	24.2	0.0852	0.0000	OK
15 minute winter	S1	10	201.007	0.076	15.3	0.0856	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)
15 minute winter	S3	1.002	S4	36.6	2.074	0.398	0.2415	
720 minute winter	Tank	3.000	S8	-17.6	0.072	-0.036	1.3802	
15 minute winter	S10	2.000	S5	30.5	1.560	0.461	0.3028	
720 minute winter	S8	1.007	S9	2.8	0.733	0.159	0.2036	315.2
15 minute winter	S7	1.006	S8	163.6	2.359	0.633	1.7942	
15 minute winter	S6	1.005	S7	136.6	2.222	0.950	1.8708	
15 minute winter	S5	1.004	S6	126.8	1.931	0.883	0.9862	
15 minute winter	S4	1.003	S5	77.9	1.418	0.626	2.8010	
15 minute winter	S2	1.001	S3	24.1	1.592	0.244	0.3523	
15 minute winter	S1	1.000	S2	15.0	1.715	0.484	0.3067	

Results for 100 year +30% CC Critical Storm Duration. Lowest mass balance: 97.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S3	12	200.330	1.360	62.5	1.5379	0.0000	SURCHARGED
960 minute winter	Tank	765	197.665	2.482	22.5	421.3010	0.0000	SURCHARGED
15 minute winter	S10	12	199.597	0.697	56.5	0.7885	0.0000	SURCHARGED
720 minute winter	S9	660	194.630	0.047	3.8	0.0000	0.0000	OK
720 minute winter	S8	660	197.642	2.534	31.2	8.7804	0.0000	SURCHARGED
720 minute winter	S7	660	197.639	0.648	31.2	1.1442	0.0000	SURCHARGED
15 minute winter	S6	12	198.771	1.199	209.2	1.3564	0.0000	SURCHARGED
15 minute winter	S5	12	199.438	1.618	198.9	2.8597	0.0000	SURCHARGED
15 minute winter	S4	12	200.117	1.647	123.1	2.9110	0.0000	SURCHARGED
15 minute winter	S2	12	200.470	0.670	44.3	0.7579	0.0000	SURCHARGED
15 minute winter	S1	11	201.048	0.116	28.0	0.1317	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)
15 minute winter	S3	1.002	S4	65.1	2.025	0.708	0.5443	
960 minute winter	Tank	3.000	S8	-20.7	-0.078	-0.042	1.3802	
15 minute winter	S10	2.000	S5	51.5	1.729	0.779	0.6166	
720 minute winter	S8	1.007	S9	3.8	0.797	0.214	0.2520	398.7
720 minute winter	S7	1.006	S8	31.2	1.567	0.121	2.8553	
15 minute winter	S6	1.005	S7	209.1	2.970	1.455	2.1372	
15 minute winter	S5	1.004	S6	194.1	2.756	1.351	1.0491	
15 minute winter	S4	1.003	S5	117.4	1.668	0.945	3.6628	
15 minute winter	S2	1.001	S3	40.1	1.710	0.407	0.9240	
15 minute winter	S1	1.000	S2	27.4	1.933	0.884	0.5658	