

**Design Settings**

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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	0.400	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

**Nodes**

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
S1	0.170	4.00	130.875	1500	1.875
S2	0.187	4.00	130.725	1500	2.498
S3	0.165	4.00	130.675	1500	2.541
S4			131.000	1500	3.120
S5			129.500	1500	1.789
S6			128.900	1500	1.600
S7			128.900	1500	1.625
Ex			127.800	1350	0.560

**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	55.800	0.600	129.000	128.302	0.698	80.0	375	4.46	50.0
1.001	S2	S3	9.300	0.600	128.227	128.134	0.093	100.0	450	4.54	50.0
1.002	S3	S4	25.400	0.600	128.134	127.880	0.254	100.0	450	4.74	50.0
1.003	S4	S5	25.300	0.600	127.880	127.711	0.169	150.0	450	5.00	50.0
1.004	S5	S6	17.100	0.600	127.711	127.597	0.114	150.0	450	5.17	50.0
1.005	S6	S7	5.000	0.600	127.300	127.275	0.025	200.0	450	5.23	50.0
1.006	S7	Ex	5.000	0.600	127.275	127.240	0.035	142.9	450	5.28	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	2.027	223.9	30.7	1.500	2.048	0.170	0.0	93	1.439
1.001	2.033	323.3	64.5	2.048	2.091	0.357	0.0	136	1.602
1.002	2.033	323.3	94.3	2.091	2.670	0.522	0.0	166	1.772
1.003	1.657	263.6	94.3	2.670	1.339	0.522	0.0	186	1.526
1.004	1.657	263.6	94.3	1.339	0.853	0.522	0.0	186	1.526
1.005	1.434	228.0	94.3	1.150	1.175	0.522	0.0	202	1.369
1.006	1.699	270.2	94.3	1.175	0.110	0.522	0.0	183	1.554

**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	55.800	80.0	375	Circular	130.875	129.000	1.500	130.725	128.302	2.048
1.001	9.300	100.0	450	Circular	130.725	128.227	2.048	130.675	128.134	2.091
1.002	25.400	100.0	450	Circular	130.675	128.134	2.091	131.000	127.880	2.670
1.003	25.300	150.0	450	Circular	131.000	127.880	2.670	129.500	127.711	1.339
1.004	17.100	150.0	450	Circular	129.500	127.711	1.339	128.900	127.597	0.853
1.005	5.000	200.0	450	Circular	128.900	127.300	1.150	128.900	127.275	1.175
1.006	5.000	142.9	450	Circular	128.900	127.275	1.175	127.800	127.240	0.110

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1500	Manhole	Adoptable	S2	1500	Manhole	Adoptable
1.001	S2	1500	Manhole	Adoptable	S3	1500	Manhole	Adoptable
1.002	S3	1500	Manhole	Adoptable	S4	1500	Manhole	Adoptable
1.003	S4	1500	Manhole	Adoptable	S5	1500	Manhole	Adoptable
1.004	S5	1500	Manhole	Adoptable	S6	1500	Manhole	Adoptable
1.005	S6	1500	Manhole	Adoptable	S7	1500	Manhole	Adoptable
1.006	S7	1500	Manhole	Adoptable	Ex	1350	Manhole	Adoptable

**Manhole Schedule**

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	130.875	1.875	1500				
				0	1.000	129.000	375
S2	130.725	2.498	1500				
				0	1.001	128.227	450
S3	130.675	2.541	1500				
				1	1.001	128.134	450
				0	1.002	128.134	450
S4	131.000	3.120	1500				
				1	1.002	127.880	450
				0	1.003	127.880	450
S5	129.500	1.789	1500				
				1	1.003	127.711	450
				0	1.004	127.711	450
S6	128.900	1.600	1500				
				1	1.004	127.597	450
				0	1.005	127.300	450
S7	128.900	1.625	1500				
				1	1.005	127.275	450
				0	1.006	127.275	450

**Manhole Schedule**

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Ex	127.800	0.560	1350	1	1.006	127.240	450



**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)	240
Ratio-R	0.400	Additional Storage (m³/ha)	0.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	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
30	40	0	0
100	50	0	0

**Node S7 Online Hydro-Brake® Control**

Flap Valve	x	Objective (HE)	Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	127.275	Product Number	CTL-SHE-0123-6600-0800-6600
Design Depth (m)	0.800	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	6.6	Min Node Diameter (mm)	1200

**Node S7 Depth/Area Storage Structure**

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	126.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	280.0	0.0	0.800	280.0	0.0

**Results for 1 year Critical Storm Duration. Lowest mass balance: 99.55%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	S1	10	129.099	0.099	33.8	0.1757	0.0000	OK
15 minute summer	S2	10	128.401	0.174	71.1	0.3076	0.0000	OK
15 minute summer	S3	10	128.323	0.189	103.8	0.3345	0.0000	OK
15 minute summer	S4	10	128.092	0.212	103.7	0.3753	0.0000	OK
15 minute summer	S5	10	127.923	0.212	102.8	0.3749	0.0000	OK
15 minute summer	S6	11	127.539	0.239	102.2	0.4228	0.0000	OK
240 minute summer	S7	160	127.496	0.221	26.7	59.0986	0.0000	OK
15 minute summer	Ex	1	127.240	0.000	6.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	S1	1.000	S2	33.9	1.457	0.152	1.2993	
15 minute summer	S2	1.001	S3	71.0	1.185	0.220	0.5573	
15 minute summer	S3	1.002	S4	103.7	1.515	0.321	1.7380	
15 minute summer	S4	1.003	S5	102.8	1.398	0.390	1.8603	
15 minute summer	S5	1.004	S6	102.2	1.491	0.388	1.1718	
15 minute summer	S6	1.005	S7	102.9	1.310	0.451	0.3927	
240 minute summer	S7	Hydro-Brake®	Ex	6.6				93.6

**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.55%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	S1	11	129.244	0.244	116.1	0.4318	0.0000	OK
15 minute summer	S2	10	129.126	0.899	240.2	1.5890	0.0000	SURCHARGED
15 minute summer	S3	10	129.035	0.900	330.4	1.5911	0.0000	SURCHARGED
15 minute summer	S4	10	128.656	0.776	327.4	1.3717	0.0000	SURCHARGED
15 minute summer	S5	10	128.283	0.572	325.2	1.0113	0.0000	SURCHARGED
240 minute winter	S6	232	128.161	0.861	56.0	1.5217	0.0000	SURCHARGED
240 minute winter	S7	232	128.161	0.886	55.3	237.1877	0.0000	SURCHARGED
15 minute summer	Ex	1	127.240	0.000	6.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	S1	1.000	S2	112.6	1.417	0.503	5.1988	
15 minute summer	S2	1.001	S3	224.3	1.416	0.694	1.4735	
15 minute summer	S3	1.002	S4	327.4	2.067	1.013	4.0245	
15 minute summer	S4	1.003	S5	325.2	2.053	1.234	4.0086	
15 minute summer	S5	1.004	S6	324.0	2.050	1.229	2.6119	
240 minute winter	S6	1.005	S7	55.3	0.697	0.243	0.7922	
240 minute winter	S7	Hydro-Brake®	Ex	6.9				164.1

**Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.55%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	S1	10	130.661	1.661	161.3	2.9355	0.0000	FLOOD RISK
15 minute summer	S2	10	130.276	2.049	325.9	3.6203	0.0000	SURCHARGED
15 minute summer	S3	10	130.081	1.947	472.1	3.4399	0.0000	SURCHARGED
15 minute summer	S4	10	129.321	1.441	463.0	2.5470	0.0000	SURCHARGED
15 minute summer	S5	11	128.583	0.872	456.9	1.5407	0.0000	SURCHARGED
240 minute winter	S6	232	128.555	1.255	75.9	2.2178	0.0000	SURCHARGED
240 minute winter	S7	232	128.556	1.280	74.7	342.7376	0.0000	SURCHARGED
15 minute summer	Ex	1	127.240	0.000	6.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	S1	1.000	S2	148.9	1.436	0.665	6.1546	
15 minute summer	S2	1.001	S3	315.9	1.994	0.977	1.4735	
15 minute summer	S3	1.002	S4	463.0	2.923	1.432	4.0245	
15 minute summer	S4	1.003	S5	456.9	2.884	1.733	4.0086	
15 minute summer	S5	1.004	S6	460.1	2.904	1.746	2.6962	
240 minute winter	S6	1.005	S7	74.7	0.762	0.327	0.7922	
240 minute winter	S7	Hydro-Brake®	Ex	8.2				195.1