

Design Settings

Rainfall Methodology	FSR	CV	0.750	Minimum Backdrop Height (m)	1.000
Return Period (years)	100	Time of Entry (mins)	5.00	Preferred Cover Depth (m)	0.900
Additional Flow (%)	40	Maximum Time of Concentration (mins)	30.00	Include Intermediate Ground	✓
FSR Region	England and Wales	Maximum Rainfall (mm/hr)	50.0	Enforce best practice design rules	✓
M5-60 (mm)	17.000	Minimum Velocity (m/s)	1.00		
Ratio-R	0.300	Connection Type	Level Soffits		

1 STANDARD Link Type

Shape Circular | Barrels 1 | Auto Increment (mm) 75 | Follow Ground x

Available Diameters (mm)
100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.050	5.00	95.000	1350	299019.555	516129.502	1.350
2	0.081	5.00	94.740	1350	299034.574	516109.458	1.350
4	0.086	5.00	95.200	1350	299074.134	516094.455	1.956
5			94.550	1350	299060.360	516083.028	1.350
6	0.024	5.00	93.950	1500	299076.925	516063.255	1.350
7			94.100	1350	299082.375	516056.749	1.557
7_OUT			94.000	1350	299083.958	516040.542	1.566
3		5.00	95.130	1350	299061.593	516111.753	1.833

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	1	2	25.047	0.600	93.650	93.390	0.260	96.3	450	5.20	50.0
1.001	2	5	36.925	0.600	93.390	93.200	0.190	194.3	450	5.62	50.0
2.000	3	4	21.366	0.600	93.297	93.244	0.053	404.0	450	5.35	50.0
2.001	4	5	17.897	0.600	93.244	93.200	0.044	404.0	450	5.30	50.0
1.002	5	6	25.795	0.600	93.200	92.600	0.600	43.0	450	5.76	50.0
1.003	6	7	8.487	0.600	92.600	92.543	0.057	150.0	450	5.85	50.0
1.004	7	7_OUT	16.284	0.600	92.543	92.434	0.109	150.0	450	6.01	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	2.071	329.4	9.5	0.900	0.900	0.050	0.0	51	0.931
1.001	1.455	231.3	24.9	0.900	0.900	0.131	0.0	99	0.963
2.000	1.005	159.8	0.0	1.383	1.506	0.000	0.0	0	0.000
2.001	1.005	159.8	16.3	1.506	0.900	0.086	0.0	96	0.654
1.002	3.107	494.1	41.2	0.900	0.900	0.217	0.0	87	1.911
1.003	1.657	263.6	45.7	0.900	1.107	0.241	0.0	126	1.256
1.004	1.657	263.6	45.7	1.107	1.116	0.241	0.0	126	1.256

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	25.047	96.3	450	1 STANDARD	95.000	93.650	0.900	94.740	93.390	0.900
1.001	36.925	194.3	450	1 STANDARD	94.740	93.390	0.900	94.550	93.200	0.900
2.000	21.366	404.0	450	1 STANDARD	95.130	93.297	1.383	95.200	93.244	1.506

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1350	Manhole	1 STANDARD	2	1350	Manhole	1 STANDARD
1.001	2	1350	Manhole	1 STANDARD	5	1350	Manhole	1 STANDARD
2.000	3	1350	Manhole	1 STANDARD	4	1350	Manhole	1 STANDARD

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)
2.001	17.897	404.0	450	1 STANDARD	95.200	93.244	1.506	94.550	93.200	0.900
1.002	25.795	43.0	450	1 STANDARD	94.550	93.200	0.900	93.950	92.600	0.900
1.003	8.487	150.0	450	1 STANDARD	93.950	92.600	0.900	94.100	92.543	1.107
1.004	16.284	150.0	450	1 STANDARD	94.100	92.543	1.107	94.000	92.434	1.116

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.001	4	1350	Manhole	1 STANDARD	5	1350	Manhole	1 STANDARD
1.002	5	1350	Manhole	1 STANDARD	6	1500	Manhole	1 STANDARD
1.003	6	1500	Manhole	1 STANDARD	7	1350	Manhole	1 STANDARD
1.004	7	1350	Manhole	1 STANDARD	7_OUT	1350	Manhole	1 STANDARD

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	299019.555	516129.502	95.000	1.350	1350		0	1.000	93.650	450
2	299034.574	516109.458	94.740	1.350	1350		1	1.000	93.390	450
4	299074.134	516094.455	95.200	1.956	1350		1	2.000	93.244	450
							0	2.001	93.244	450
5	299060.360	516083.028	94.550	1.350	1350		1	2.001	93.200	450
6	299076.925	516063.255	93.950	1.350	1500		2	1.001	93.200	450
							0	1.002	93.200	450
							1	1.002	92.600	450
							0	1.003	92.600	450

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
7	299082.375	516056.749	94.100	1.557	1350	1  0	1	1.003	92.543	450
7_OUT	299083.958	516040.542	94.000	1.566	1350	1  1	1	1.004	92.434	450
3	299061.593	516111.753	95.130	1.833	1350	 0	0	2.000	93.297	450

Simulation Settings

Rainfall Methodology	FSR	Ratio-R	0.300	Analysis Speed	Normal	Additional Storage (m³/ha)	20.0
FSR Region	England and Wales	Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
M5-60 (mm)	17.000	Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

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

Node 6 Online Hydro-Brake® Control

Flap Valve	x	Design Flow (l/s)	4.5	Min Outlet Diameter (m)	0.150
Replaces Downstream Link	✓	Objective	(HE) Minimise upstream storage	Min Node Diameter (mm)	1200
Invert Level (m)	92.600	Sump Available	✓		
Design Depth (m)	1.350	Product Number	CTL-SHE-0095-4500-1350-4500		

Node 5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	93.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.97	Time to half empty (mins)	148

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	45.0	0.0	0.800	45.0	0.0	0.801	0.0	0.0

Node 4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	93.244
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.97	Time to half empty (mins)	280

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	85.5	0.0	0.500	85.5	0.0	0.501	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.16%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	93.689	0.039	5.4	0.0858	0.0000	OK
15 minute winter	2	10	93.471	0.081	14.1	0.2130	0.0000	OK
60 minute winter	4	40	93.288	0.044	5.3	3.7885	0.0000	OK
60 minute winter	5	48	93.283	0.083	11.9	3.7366	0.0000	OK
60 minute winter	6	49	93.297	0.697	11.5	1.4800	0.0000	SURCHARGED
60 minute winter	7	86	92.584	0.041	4.5	0.0593	0.0000	OK
15 minute winter	7_OUT	33	92.474	0.040	4.5	0.0000	0.0000	OK
15 minute summer	3	1	93.297	0.000	0.0	0.0000	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	1	1.000	2	5.3	0.421	0.016	0.3263	
15 minute winter	2	1.001	5	14.1	1.155	0.061	0.4951	
60 minute winter	4	2.001	5	3.3	0.382	0.021	0.2418	
15 minute winter	5	1.002	6	12.7	0.348	0.026	2.1514	
60 minute summer	6	Hydro-Brake®	7	4.5				
15 minute winter	7	1.004	7_OUT	4.5	0.632	0.017	0.1159	11.4
15 minute summer	3	2.000	4	0.0	0.000	0.000	0.0604	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.16%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	93.710	0.060	13.2	0.1312	0.0000	OK
15 minute winter	2	10	93.513	0.123	34.4	0.3229	0.0000	OK
120 minute winter	4	116	93.476	0.232	12.3	19.7810	0.0000	OK
120 minute winter	5	116	93.476	0.276	16.7	12.4521	0.0000	OK
120 minute winter	6	114	93.483	0.883	12.2	1.8742	0.0000	SURCHARGED
960 minute summer	7	465	92.584	0.041	4.5	0.0593	0.0000	OK
960 minute summer	7_OUT	465	92.474	0.040	4.5	0.0000	0.0000	OK
120 minute winter	3	116	93.476	0.179	0.6	0.2561	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	1	1.000	2	13.0	0.564	0.040	0.5958	
15 minute winter	2	1.001	5	34.2	1.355	0.148	1.3169	
30 minute summer	4	2.001	5	-13.6	0.404	-0.085	0.9868	
15 minute winter	5	1.002	6	28.0	0.375	0.057	2.7369	
15 minute summer	6	Hydro-Brake®	7	4.5				
960 minute summer	7	1.004	7_OUT	4.5	0.632	0.017	0.1159	111.7
30 minute winter	3	2.000	4	-1.8	-0.111	-0.011	0.9625	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.16%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	1	176	93.910	0.260	6.8	0.5654	0.0000	OK
180 minute winter	2	176	93.911	0.521	17.8	1.3695	0.0000	SURCHARGED
180 minute winter	4	176	93.911	0.667	17.0	43.0502	0.0000	SURCHARGED
180 minute winter	5	176	93.911	0.711	19.1	32.0470	0.0000	SURCHARGED
180 minute winter	6	176	93.911	1.311	9.3	2.7829	0.0000	FLOOD RISK
30 minute summer	7	265	92.584	0.041	4.5	0.0593	0.0000	OK
15 minute winter	7_OUT	209	92.474	0.040	4.5	0.0000	0.0000	OK
240 minute winter	3	220	93.912	0.615	2.9	0.8800	0.0000	SURCHARGED

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	1	1.000	2	23.5	0.677	0.071	0.8912	
15 minute winter	2	1.001	5	61.4	1.492	0.265	2.6713	
15 minute winter	4	2.001	5	-35.3	-0.510	-0.221	1.8489	
15 minute summer	5	1.002	6	37.1	0.366	0.075	3.3429	
30 minute summer	6	Hydro-Brake®	7	4.5				
15 minute winter	7	1.004	7_OUT	4.5	0.632	0.017	0.1159	51.3
15 minute winter	3	2.000	4	-4.8	-0.191	-0.030	1.7822	