

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)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	x
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S01	0.014	5.00	149.383	450	399690.142	342683.452	0.628
S02	0.068	5.00	149.390	600	399700.089	342662.736	0.749
S03	0.064	5.00	149.352	1200	399688.692	342654.530	0.781
S03a			149.616	1200	399694.965	342642.599	1.087
S04	0.000	5.00	149.603	1200	399701.254	342646.254	1.110
S05	0.060	5.00	149.400	1200	399674.266	342650.481	0.640
Storage	0.000	5.00	149.430	1200	399693.437	342645.360	0.897
Outfall			149.250	1200	399704.091	342646.153	0.770
PI			149.325	1200	399689.399	342652.783	0.763

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	S01	S02	22.980	0.600	148.755	148.641	0.114	201.6	100	5.71	44.0
1.001	S02	S03	14.044	0.600	148.641	148.571	0.070	200.6	150	6.04	42.8
1.002	S03	PI	1.885	0.600	148.571	148.562	0.009	209.4	225	6.08	42.7
1.003	PI	Storage	8.450	0.600	148.562	148.533	0.029	291.4	225	6.26	42.1
1.004	Storage	S03a	3.156	0.600	148.533	148.529	0.004	789.0	225	6.38	42.0
1.005	S03a	S04	7.274	0.600	148.529	148.493	0.036	202.1	225	6.51	41.7
1.006	S04	Outfall	2.839	0.600	148.493	148.480	0.013	218.4	225	6.56	41.6
2.000	S05	S03	14.983	0.600	148.760	148.571	0.189	79.3	225	5.17	45.7

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)
1.000	0.538	4.2	1.7	0.528	0.649	0.014	0.0	43	0.504
1.001	0.706	12.5	9.5	0.599	0.631	0.082	0.0	98	0.776
1.002	0.899	35.8	23.8	0.556	0.538	0.206	0.0	135	0.962
1.003	0.761	30.2	23.5	0.538	0.672	0.206	0.0	149	0.838
1.004	0.458	18.2	23.5	0.672	0.862	0.206	0.0	225	0.466
1.005	0.916	36.4	23.3	0.862	0.885	0.206	0.0	131	0.969
1.006	0.881	35.0	23.2	0.885	0.545	0.206	0.0	134	0.940
2.000	1.470	58.4	7.4	0.415	0.556	0.060	0.0	54	1.016

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	22.980	201.6	100	Circular	149.383	148.755	0.528	149.390	148.641	0.649
1.001	14.044	200.6	150	Circular	149.390	148.641	0.599	149.352	148.571	0.631
1.002	1.885	209.4	225	Circular	149.352	148.571	0.556	149.325	148.562	0.538
1.003	8.450	291.4	225	Circular	149.325	148.562	0.538	149.430	148.533	0.672
1.004	3.156	789.0	225	Circular	149.430	148.533	0.672	149.616	148.529	0.862
1.005	7.274	202.1	225	Circular	149.616	148.529	0.862	149.603	148.493	0.885
1.006	2.839	218.4	225	Circular	149.603	148.493	0.885	149.250	148.480	0.545
2.000	14.983	79.3	225	Circular	149.400	148.760	0.415	149.352	148.571	0.556

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S01	450	Manhole	Adoptable	S02	600	Manhole	Adoptable
1.001	S02	600	Manhole	Adoptable	S03	1200	Manhole	Adoptable
1.002	S03	1200	Manhole	Adoptable	PI	1200	Manhole	Adoptable
1.003	PI	1200	Manhole	Adoptable	Storage	1200	Manhole	Adoptable
1.004	Storage	1200	Manhole	Adoptable	S03a	1200	Manhole	Adoptable
1.005	S03a	1200	Manhole	Adoptable	S04	1200	Manhole	Adoptable
1.006	S04	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable
2.000	S05	1200	Manhole	Adoptable	S03	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	17.000	Additional Storage (m³/ha)	20.0
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
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
30	0	0	0
100	40	0	0

Node S04 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	148.493	Product Number	CTL-SHE-0110-5200-0840-5200
Design Depth (m)	0.840	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.2	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	148.533
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	88

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	70.0	0.0	0.375	70.0	0.0	0.376	0.0	0.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S01	12	149.219	0.464	4.1	0.2806	0.0000	FLOOD RISK
15 minute winter	S02	11	149.135	0.494	22.4	1.0364	0.0000	FLOOD RISK
60 minute winter	S03	58	148.941	0.370	29.9	1.0236	0.0000	SURCHARGED
60 minute winter	S03a	58	148.939	0.410	6.2	0.4638	0.0000	SURCHARGED
60 minute winter	S04	58	148.937	0.444	5.6	0.5023	0.0000	SURCHARGED
60 minute winter	S05	58	148.941	0.181	9.0	0.5446	0.0000	OK
60 minute winter	Storage	58	148.939	0.406	28.4	26.7439	0.0000	SURCHARGED
15 minute summer	Outfall	1	148.480	0.000	5.2	0.0000	0.0000	OK
60 minute winter	PI	58	148.941	0.379	28.9	0.4290	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	S01	1.000	S02	3.7	0.477	0.883	0.1798	24.0
15 minute winter	S02	1.001	S03	20.6	1.171	1.652	0.2472	
15 minute winter	S03	1.002	PI	50.9	1.279	1.423	0.0750	
15 minute summer	S03a	1.005	S04	6.7	0.569	0.184	0.2893	
15 minute summer	S04	Hydro-Brake®	Outfall	5.2				
15 minute winter	S05	2.000	S03	15.8	0.510	0.270	0.5136	
15 minute summer	Storage	1.004	S03a	8.7	0.570	0.477	0.1255	
15 minute winter	PI	1.003	Storage	50.3	1.762	1.664	0.3361	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.53%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	S01	17	149.383	0.628	6.5	0.3799	2.7429	FLOOD
30 minute winter	S02	17	149.390	0.749	28.8	1.5714	3.3327	FLOOD
30 minute winter	S03	20	149.352	0.781	68.9	2.1634	1.7588	FLOOD
30 minute winter	S03a	20	149.353	0.824	9.4	0.9318	0.0000	FLOOD RISK
30 minute winter	S04	20	149.362	0.869	6.5	0.9826	0.0000	FLOOD RISK
30 minute winter	S05	20	149.400	0.640	24.5	1.9238	0.1816	FLOOD
30 minute winter	Storage	20	149.348	0.815	65.3	27.2062	0.0000	FLOOD RISK
15 minute summer	Outfall	1	148.480	0.000	5.2	0.0000	0.0000	OK
120 minute winter	PI	64	149.325	0.763	29.5	0.8630	30.2777	FLOOD
Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S01	1.000	S02	3.8	0.486	0.899	0.1798	44.1
15 minute summer	S02	1.001	S03	24.7	1.402	1.979	0.2472	
15 minute winter	S03	1.002	PI	78.0	1.962	2.182	0.0750	
30 minute summer	S03a	1.005	S04	23.7	0.596	0.650	0.2893	
30 minute winter	S04	Hydro-Brake®	Outfall	5.3				
15 minute winter	S05	2.000	S03	28.4	0.714	0.486	0.5959	
30 minute summer	Storage	1.004	S03a	32.1	0.807	1.763	0.1255	
15 minute winter	PI	1.003	Storage	76.8	1.934	2.541	0.3361	