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)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.600
CV	0.750	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)
S1a	0.014	4.00	99.950	450	0.700
S1b	0.008	4.00	99.850	450	0.720
S1c	0.007	4.00	99.170	225	0.700
S1d	0.009	4.00	98.800	450	0.750
S1e			98.600	450	0.835
S1f	0.000	4.00	97.850	1200	0.850
S2			97.800	600	0.970
S3			97.700	1200	1.200
Headwall			94.700		1.200

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	S1a	S1b	7.100	0.600	99.250	99.130	0.120	59.2	100	4.12	50.0
1.001	S1b	S1d	14.850	0.600	99.130	98.100	1.030	14.4	100	4.24	50.0
2.000	S1c	S1d	15.950	0.600	98.470	98.100	0.370	43.1	100	4.23	50.0
1.002	S1d	S1e	16.950	0.600	98.050	97.765	0.285	59.5	150	4.46	50.0
1.003	S1e	S1f	20.620	0.600	97.765	97.000	0.765	27.0	150	4.63	50.0
1.004	S1f	S2	16.770	0.600	97.000	96.830	0.170	98.6	150	4.91	50.0
1.005	S2	S3	13.000	0.600	96.830	96.500	0.330	39.4	150	5.04	50.0
1.006	S3	Headwall	240.000	0.600	96.500	93.500	3.000	80.0	150	8.60	46.2

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	1.003	7.9	1.9	0.600	0.620	0.014	0.0	33	0.822
1.001	2.045	16.1	3.0	0.620	0.600	0.022	0.0	29	1.567
2.000	1.177	9.2	0.9	0.600	0.600	0.007	0.0	21	0.752
1.002	1.306	23.1	5.1	0.600	0.685	0.038	0.0	48	1.057
1.003	1.947	34.4	5.1	0.685	0.700	0.038	0.0	39	1.401
1.004	1.012	17.9	5.1	0.700	0.820	0.038	0.0	55	0.874
1.005	1.608	28.4	5.1	0.820	1.050	0.038	0.0	43	1.223
1.006	1.125	19.9	4.8	1.050	1.050	0.038	0.0	50	0.927

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	7.100	59.2	100	Circular	99.950	99.250	0.600	99.850	99.130	0.620
1.001	14.850	14.4	100	Circular	99.850	99.130	0.620	98.800	98.100	0.600
2.000	15.950	43.1	100	Circular	99.170	98.470	0.600	98.800	98.100	0.600
1.002	16.950	59.5	150	Circular	98.800	98.050	0.600	98.600	97.765	0.685
1.003	20.620	27.0	150	Circular	98.600	97.765	0.685	97.850	97.000	0.700
1.004	16.770	98.6	150	Circular	97.850	97.000	0.700	97.800	96.830	0.820
1.005	13.000	39.4	150	Circular	97.800	96.830	0.820	97.700	96.500	1.050
1.006	240.000	80.0	150	Circular	97.700	96.500	1.050	94.700	93.500	1.050

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1a	450	Manhole	Private	S1b	450	Manhole	Private
1.001	S1b	450	Manhole	Private	S1d	450	Manhole	Private
2.000	S1c	225	Manhole	Private	S1d	450	Manhole	Private
1.002	S1d	450	Manhole	Private	S1e	450	Manhole	Private
1.003	S1e	450	Manhole	Private	S1f	1200	Manhole	Private
1.004	S1f	1200	Manhole	Private	S2	600	Manhole	Private
1.005	S2	600	Manhole	Private	S3	1200	Manhole	Private
1.006	S3	1200	Manhole	Private	Headwall		Junction	

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1a	99.950	0.700	450	0	1.000	99.250	100
S1b	99.850	0.720	450	1	1.000	99.130	100
				0	1.001	99.130	100
S1c	99.170	0.700	225	0	2.000	98.470	100
S1d	98.800	0.750	450	1	2.000	98.100	100
				2	1.001	98.100	100
				0	1.002	98.050	150
S1e	98.600	0.835	450	1	1.002	97.765	150
				0	1.003	97.765	150
S1f	97.850	0.850	1200	1	1.003	97.000	150
				0	1.004	97.000	150
S2	97.800	0.970	600	1	1.004	96.830	150
				0	1.005	96.830	150

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S3	97.700	1.200	1200	1	1.005	96.500	150
				0	1.006	96.500	150
Headwall	94.700	1.200		1	1.006	93.500	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
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 %)
30	0	0	0
100	40	0	0

Node S1f Online Head/Flow Control

Flap Valve x | Replaces Downstream Link ✓ | Invert Level (m) 97.000

Head (m)	Flow (l/s)
0.600	16.000

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 15 minute summer	226.195	64.005	30 year 480 minute summer	20.981	5.545
30 year 15 minute winter	158.733	64.005	30 year 480 minute winter	13.940	5.545
30 year 30 minute summer	147.452	41.724	30 year 600 minute summer	17.039	4.661
30 year 30 minute winter	103.475	41.724	30 year 600 minute winter	11.642	4.661
30 year 60 minute summer	98.615	26.061	30 year 720 minute summer	15.093	4.045
30 year 60 minute winter	65.517	26.061	30 year 720 minute winter	10.143	4.045
30 year 120 minute summer	59.946	15.842	30 year 960 minute summer	12.278	3.233
30 year 120 minute winter	39.827	15.842	30 year 960 minute winter	8.133	3.233
30 year 180 minute summer	45.598	11.734	30 year 1440 minute summer	8.788	2.355
30 year 180 minute winter	29.640	11.734	30 year 1440 minute winter	5.906	2.355
30 year 240 minute summer	35.759	9.450	100 year +40% CC 15 minute summer	408.473	115.584
30 year 240 minute winter	23.758	9.450	100 year +40% CC 15 minute winter	286.647	115.584
30 year 360 minute summer	26.939	6.932	100 year +40% CC 30 minute summer	268.775	76.054
30 year 360 minute winter	17.511	6.932	100 year +40% CC 30 minute winter	188.614	76.054

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 60 minute summer	180.954	47.821	100 year +40% CC 480 minute summer	38.291	10.119
100 year +40% CC 60 minute winter	120.222	47.821	100 year +40% CC 480 minute winter	25.439	10.119
100 year +40% CC 120 minute summer	110.370	29.168	100 year +40% CC 600 minute summer	30.992	8.477
100 year +40% CC 120 minute winter	73.327	29.168	100 year +40% CC 600 minute winter	21.176	8.477
100 year +40% CC 180 minute summer	83.953	21.604	100 year +40% CC 720 minute summer	27.387	7.340
100 year +40% CC 180 minute winter	54.572	21.604	100 year +40% CC 720 minute winter	18.406	7.340
100 year +40% CC 240 minute summer	65.765	17.380	100 year +40% CC 960 minute summer	22.191	5.844
100 year +40% CC 240 minute winter	43.693	17.380	100 year +40% CC 960 minute winter	14.700	5.844
100 year +40% CC 360 minute summer	49.370	12.705	100 year +40% CC 1440 minute summer	15.789	4.232
100 year +40% CC 360 minute winter	32.092	12.705	100 year +40% CC 1440 minute winter	10.611	4.232

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1a	10	99.307	0.057	4.3	0.0318	0.0000	OK
15 minute winter	S1b	10	99.177	0.047	6.8	0.0179	0.0000	OK
15 minute winter	S1c	10	98.504	0.034	2.2	0.0081	0.0000	OK
15 minute winter	S1d	10	98.132	0.082	11.8	0.0328	0.0000	OK
15 minute winter	S1e	10	97.826	0.061	11.8	0.0096	0.0000	OK
15 minute winter	S1f	11	97.411	0.411	11.8	0.4647	0.0000	SURCHARGED
15 minute winter	S2	11	96.898	0.068	11.0	0.0192	0.0000	OK
15 minute winter	S3	13	96.574	0.074	11.0	0.0835	0.0000	OK
15 minute winter	Headwall	13	93.574	0.074	9.7	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)
15 minute winter	S1a	1.000	S1b	4.3	1.046	0.546	0.0292	
15 minute winter	S1b	1.001	S1d	6.8	1.917	0.423	0.0527	
15 minute winter	S1c	2.000	S1d	2.2	0.953	0.237	0.0368	
15 minute winter	S1d	1.002	S1e	11.8	1.429	0.511	0.1401	
15 minute winter	S1e	1.003	S1f	11.8	1.026	0.342	0.2501	
15 minute winter	S1f	Head/Flow	S2	11.0				
15 minute winter	S2	1.005	S3	11.0	1.463	0.386	0.1033	
15 minute winter	S3	1.006	Headwall	9.7	1.126	0.489	2.0718	5.1

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1a	10	99.343	0.093	7.8	0.0521	0.0000	OK
15 minute winter	S1b	10	99.197	0.067	12.2	0.0256	0.0000	OK
15 minute winter	S1c	10	98.515	0.045	3.9	0.0109	0.0000	OK
15 minute summer	S1d	10	98.173	0.123	21.1	0.0491	0.0000	OK
15 minute winter	S1e	12	98.013	0.248	21.1	0.0395	0.0000	SURCHARGED
15 minute winter	S1f	12	97.806	0.806	19.0	0.9121	0.0000	FLOOD RISK
15 minute summer	S2	10	96.917	0.087	16.0	0.0246	0.0000	OK
15 minute winter	S3	14	96.601	0.101	16.1	0.1143	0.0000	OK
15 minute winter	Headwall	14	93.601	0.101	15.8	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)
15 minute winter	S1a	1.000	S1b	7.8	1.164	0.987	0.0469	
15 minute winter	S1b	1.001	S1d	12.2	2.100	0.758	0.0869	
15 minute winter	S1c	2.000	S1d	3.9	0.938	0.422	0.0761	
15 minute summer	S1d	1.002	S1e	21.1	1.513	0.914	0.2682	
15 minute winter	S1e	1.003	S1f	19.0	1.165	0.552	0.3630	
15 minute winter	S1f	Head/Flow	S2	16.0				
15 minute summer	S2	1.005	S3	16.1	1.610	0.567	0.1467	
15 minute winter	S3	1.006	Headwall	15.8	1.255	0.795	3.0238	9.3