

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	250.0
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)	0.500
Ratio-R	0.300	Preferred Cover Depth (m)	0.900
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	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)
S1	0.009	4.00	348.000	450	-2104.011	-874.135	0.750
S4	0.009	4.00	348.000	450	-2087.093	-897.364	1.277
S2	0.009	4.00	348.000	450	-2082.028	-880.897	1.050
S3	0.009	4.00	348.000	450	-2108.923	-890.601	1.050
S5			347.000	450	-2074.699	-903.352	1.050
S6			342.500	600	-2052.503	-915.281	2.310
S8			338.000	450	-2016.353	-938.565	1.050
HW			336.000	150	-1999.855	-965.769	1.050
Tank			342.000		-2048.735	-917.742	1.555
S7 - Flow Control			342.000	1200	-2044.050	-920.623	1.910

Pipeline Schedule

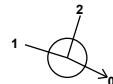
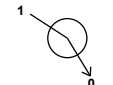
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	22.999	76.7	150	Circular	348.000	347.250	0.600	348.000	346.950	0.900
1.001	17.228	100.0	150	Circular	348.000	346.950	0.900	348.000	346.778	1.072
2.000	22.854	100.7	150	Circular	348.000	346.950	0.900	348.000	346.723	1.127
1.002	13.765	17.8	150	Circular	348.000	346.723	1.127	347.000	345.950	0.900
1.003	25.198	5.6	150	Circular	347.000	345.950	0.900	342.500	341.450	0.900
1.004	4.500	100.0	150	Circular	342.500	340.490	1.860	342.000	340.445	1.405
1.006	33.001	9.6	100	Circular	342.000	340.390	1.510	338.000	336.950	0.950
1.007	31.816	15.9	100	Circular	338.000	336.950	0.950	336.000	334.950	0.950
1.005	5.500	100.0	150	Circular	342.000	340.445	1.405	342.000	340.390	1.460

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	450	Manhole	Plastic Inspection Chamber	S2	450	Manhole	Plastic Inspection Chamber
1.001	S2	450	Manhole	Plastic Inspection Chamber	S4	450	Manhole	Plastic Inspection Chamber
2.000	S3	450	Manhole	Plastic Inspection Chamber	S4	450	Manhole	Plastic Inspection Chamber
1.002	S4	450	Manhole	Plastic Inspection Chamber	S5	450	Manhole	Plastic Inspection Chamber
1.003	S5	450	Manhole	Plastic Inspection Chamber	S6	600	Manhole	Plastic Inspection Chamber
1.004	S6	600	Manhole	Plastic Inspection Chamber	Tank		Junction	
1.006	S7 - Flow Control	1200	Manhole	Plastic Inspection Chamber	S8	450	Manhole	Plastic Inspection Chamber
1.007	S8	450	Manhole	Plastic Inspection Chamber	HW	150	Manhole	Headwall
1.005	Tank		Junction		S7 - Flow Control	1200	Manhole	Plastic Inspection Chamber

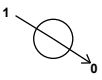
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	-2104.011	-874.135	348.000	0.750	450		0	1.000	347.250	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S4	-2087.093	-897.364	348.000	1.277	450		1	2.000	346.723	150
							2	1.001	346.778	150
							0	1.002	346.723	150
S2	-2082.028	-880.897	348.000	1.050	450		1	1.000	346.950	150
							0	1.001	346.950	150
S3	-2108.923	-890.601	348.000	1.050	450		0	2.000	346.950	150
S5	-2074.699	-903.352	347.000	1.050	450		1	1.002	345.950	150
							0	1.003	345.950	150
S6	-2052.503	-915.281	342.500	2.310	600		1	1.003	341.450	150
							0	1.004	340.490	150
S8	-2016.353	-938.565	338.000	1.050	450		1	1.006	336.950	100
							0	1.007	336.950	100
HW	-1999.855	-965.769	336.000	1.050	150		1	1.007	334.950	100
Tank	-2048.735	-917.742	342.000	1.555			1	1.004	340.445	150
							0	1.005	340.445	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S7 - Flow Control	-2044.050	-920.623	342.000	1.910	1200		1	1.005	340.390	150
							0	1.006	340.390	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal	2 year (l/s)	0.4
FSR Region	England and Wales	Skip Steady State	x	30 year (l/s)	0.8
M5-60 (mm)	20.000	Drain Down Time (mins)	240	100 year (l/s)	1.0
Ratio-R	0.300	Additional Storage (m³/ha)	20.0	Check Discharge Volume	✓
Summer CV	1.000	Check Discharge Rate(s)	✓	100 year 360 minute (m³)	14
Winter CV	1.000	1 year (l/s)	0.4		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

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	35	0	0
2	0	0	0	100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	SPR	0.53	Growth Factor 100 year	2.08	Q 30 year (l/s)	0.8
Greenfield Method	IH124	Region	10	Betterment (%)	0	Q 100 year (l/s)	1.0
Positively Drained Area (ha)	0.035	Growth Factor 1 year	0.87	QBar	0.5		
SAAR (mm)	1345	Growth Factor 2 year	0.93	Q 1 year (l/s)	0.4		
Soil Index	5	Growth Factor 30 year	1.70	Q 2 year (l/s)	0.4		

Pre-development Discharge Volume

Site Makeup	Greenfield	Soil Index	5	Return Period (years)	100	Betterment (%)	0
Greenfield Method	FSR/FEH	SPR	0.53	Climate Change (%)	0	PR	0.581
Positively Drained Area (ha)	0.035	CWI	125.863	Storm Duration (mins)	360	Runoff Volume (m³)	14

Node S7 - Flow Control Online Orifice Control

Flap Valve	x	Invert Level (m)	340.390	Design Flow (l/s)	2.0	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Depth (m)	0.800	Diameter (m)	0.033		

Node Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	340.445
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	112

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	21.0	0.0	0.800	21.0	0.0	0.801	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Approval Settings

Node Size	✓	Minimum Cover Depth (m)	0.900	Minimum Proportional Velocity (m/s)	0.750
Node Losses	✓	Maximum Cover Depth (m)	3.000	Maximum Proportional Velocity (m/s)	3.000
Link Size	✓	Backdrops	✓	Surcharged Depth	✓
Minimum Diameter (mm)	150	Minimum Backdrop Height (m)	0.500	Return Period (years)	2
Link Length	✓	Maximum Backdrop Height (m)	1.500	Maximum Surcharged Depth (m)	0.100
Maximum Length (m)	100.000	Full Bore Velocity	✓	Flooding	✓
Coordinates	✓	Minimum Full Bore Velocity (m/s)	1.000	Return Period (years)	30
Accuracy (m)	1.000	Maximum Full Bore Velocity (m/s)	3.000	Time to Half Empty	x
Crossings	✓	Proportional Velocity	✓	Discharge Rates	✓
Cover Depth	✓	Return Period (years)	2	1 year (l/s)	0.3

Approval Settings

30 year (l/s)	0.6	Discharge Volume	✓
100 year (l/s)	0.7	100 year 360 minute (m ³)	10

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	347.278	0.028	1.6	0.0113	0.0000	OK
15 minute summer	S4	10	346.765	0.042	6.3	0.0127	0.0000	OK
15 minute summer	S2	10	346.993	0.043	3.2	0.0143	0.0000	OK
15 minute summer	S3	10	346.980	0.030	1.6	0.0100	0.0000	OK
15 minute summer	S5	10	345.979	0.029	6.2	0.0047	0.0000	OK
180 minute summer	S6	112	340.565	0.075	2.4	0.0213	0.0000	OK
180 minute summer	S8	112	336.967	0.017	0.9	0.0027	0.0000	OK
180 minute summer	HW	112	334.967	0.017	0.9	0.0000	0.0000	OK
180 minute summer	Tank	112	340.566	0.121	3.7	2.5309	0.0000	OK
180 minute summer	S7 - Flow Control	112	340.565	0.175	2.7	0.1983	0.0000	SURCHARGED

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 summer	S1	1.000	S2	1.6	0.500	0.079	0.0752	
15 minute summer	S4	1.002	S5	6.2	1.933	0.147	0.0447	
15 minute summer	S2	1.001	S4	3.1	0.745	0.174	0.0714	
15 minute summer	S3	2.000	S4	1.6	0.485	0.090	0.0756	
15 minute summer	S5	1.003	S6	6.1	2.563	0.081	0.0603	
180 minute summer	S6	1.004	Tank	2.4	0.719	0.135	0.0540	
180 minute summer	S8	1.007	HW	0.9	1.062	0.059	0.0271	7.8
180 minute summer	Tank	1.005	S7 - Flow Control	2.7	0.271	0.153	0.0901	
180 minute summer	S7 - Flow Control	1.006	S8	0.9	1.159	0.046	0.0258	

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	347.283	0.033	2.1	0.0130	0.0000	OK
15 minute summer	S4	10	346.772	0.049	8.3	0.0147	0.0000	OK
15 minute summer	S2	10	347.000	0.050	4.2	0.0166	0.0000	OK
15 minute summer	S3	10	346.985	0.035	2.1	0.0115	0.0000	OK
15 minute summer	S5	10	345.984	0.034	8.2	0.0054	0.0000	OK
180 minute summer	S6	116	340.609	0.119	3.1	0.0337	0.0000	OK
180 minute summer	S8	116	336.968	0.018	1.0	0.0028	0.0000	OK
180 minute summer	HW	116	334.968	0.018	1.0	0.0000	0.0000	OK
180 minute summer	Tank	116	340.609	0.164	3.9	3.4438	0.0000	SURCHARGED
180 minute summer	S7 - Flow Control	116	340.609	0.219	3.0	0.2474	0.0000	SURCHARGED

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 summer	S1	1.000	S2	2.1	0.538	0.103	0.0920	
15 minute summer	S4	1.002	S5	8.2	2.080	0.194	0.0548	
15 minute summer	S2	1.001	S4	4.1	0.804	0.230	0.0876	
15 minute summer	S3	2.000	S4	2.1	0.523	0.118	0.0924	
15 minute summer	S5	1.003	S6	8.1	2.780	0.107	0.0736	
180 minute summer	S6	1.004	Tank	3.0	0.719	0.167	0.0733	
180 minute summer	S8	1.007	HW	1.0	1.101	0.067	0.0296	9.3
180 minute summer	Tank	1.005	S7 - Flow Control	3.0	0.271	0.170	0.0968	
180 minute summer	S7 - Flow Control	1.006	S8	1.0	1.199	0.052	0.0281	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	347.303	0.053	5.4	0.0210	0.0000	OK
15 minute summer	S4	10	346.809	0.086	21.5	0.0257	0.0000	OK
15 minute summer	S2	10	347.038	0.088	10.8	0.0291	0.0000	OK
15 minute summer	S3	10	347.007	0.057	5.4	0.0187	0.0000	OK
15 minute summer	S5	10	346.006	0.056	21.4	0.0089	0.0000	OK
180 minute summer	S6	124	340.957	0.467	7.4	0.1320	0.0000	SURCHARGED
180 minute summer	S8	124	336.973	0.023	1.7	0.0036	0.0000	OK
180 minute summer	HW	124	334.973	0.022	1.7	0.0000	0.0000	OK
180 minute summer	Tank	124	340.956	0.511	7.2	10.7319	0.0000	SURCHARGED
180 minute summer	S7 - Flow Control	124	340.955	0.565	1.7	0.6395	0.0000	SURCHARGED

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 summer	S1	1.000	S2	5.4	0.676	0.266	0.1874	
15 minute summer	S4	1.002	S5	21.4	2.621	0.505	0.1126	
15 minute summer	S2	1.001	S4	10.7	1.024	0.602	0.1798	
15 minute summer	S3	2.000	S4	5.4	0.663	0.305	0.1881	
15 minute summer	S5	1.003	S6	21.3	3.631	0.281	0.1479	
180 minute summer	S6	1.004	Tank	7.2	0.962	0.403	0.0792	
180 minute summer	S8	1.007	HW	1.7	1.273	0.110	0.0420	21.8
180 minute summer	Tank	1.005	S7 - Flow Control	1.7	0.335	0.097	0.0968	
180 minute summer	S7 - Flow Control	1.006	S8	1.7	1.388	0.085	0.0400	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	347.312	0.062	7.2	0.0246	0.0000	OK
15 minute summer	S4	10	346.828	0.105	28.6	0.0314	0.0000	OK
15 minute summer	S2	10	347.059	0.108	14.4	0.0358	0.0000	OK
15 minute summer	S3	10	347.016	0.066	7.2	0.0219	0.0000	OK
15 minute summer	S5	10	346.016	0.066	28.6	0.0105	0.0000	OK
180 minute summer	S6	124	341.182	0.692	10.2	0.1958	0.0000	SURCHARGED
180 minute summer	S8	124	336.975	0.025	2.0	0.0039	0.0000	OK
180 minute summer	HW	124	334.975	0.024	2.0	0.0000	0.0000	OK
180 minute summer	Tank	124	341.181	0.736	9.8	15.4533	0.0000	SURCHARGED
180 minute summer	S7 - Flow Control	124	341.180	0.790	2.6	0.8934	0.0000	SURCHARGED

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 summer	S1	1.000	S2	7.2	0.716	0.354	0.2351	
15 minute summer	S4	1.002	S5	28.6	2.764	0.674	0.1415	
15 minute summer	S2	1.001	S4	14.3	1.083	0.803	0.2266	
15 minute summer	S3	2.000	S4	7.2	0.704	0.407	0.2358	
15 minute summer	S5	1.003	S6	28.5	3.913	0.376	0.1833	
180 minute summer	S6	1.004	Tank	9.8	0.962	0.551	0.0792	
180 minute summer	S8	1.007	HW	2.0	1.336	0.130	0.0474	28.8
180 minute summer	Tank	1.005	S7 - Flow Control	2.6	0.335	0.144	0.0968	
180 minute summer	S7 - Flow Control	1.006	S8	2.0	1.458	0.101	0.0452	