

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.335	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)
SW01A	0.054	5.00	169.200	600	400501.773	383844.000	0.862
SW01	0.000	5.00	169.650	1800	400500.698	383833.109	2.550
SW02A	0.042	5.00	170.000	600	400513.310	383825.964	1.000
SW02B	0.023	5.00	170.100	600	400502.474	383820.090	1.100
SW02	0.034	5.00	170.000	1800	400508.529	383821.973	2.920
SW03	0.049	5.00	170.750	1800	400516.429	383794.094	3.710
SW04A	0.090	5.00	169.750	600	400560.662	383764.674	1.450
SW04	0.023	5.00	169.870	1200	400555.457	383757.295	2.020
SW05	0.041	5.00	169.950	1800	400554.563	383747.831	2.990
SW06B	0.026	5.00	169.100	600	400609.142	383723.049	1.205
SW06A	0.079	5.00	169.150	600	400599.851	383730.442	1.255
SW06	0.044	5.00	169.120	1800	400599.065	383722.234	2.205
SW07A	0.027	5.00	169.145	600	400593.300	383714.107	1.195
SW07	0.000	5.00	169.500	2100	400590.188	383719.446	3.200
CW1			170.980	1500	400582.952	383710.102	1.360
EX5701			170.990	1200	400585.268	383704.647	3.935

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)
P1.000A	SW01A	SW01	5.034	0.600	168.338	167.850	0.488	10.3	150	5.03	50.0
1.000	SW01	SW02	13.665	0.600	167.100	167.080	0.020	683.3	900	5.22	50.0
P1.001A	SW02A	SW02	9.453	0.600	169.000	167.830	1.170	8.1	150	5.04	50.0
P1.001B	SW02B	SW02	6.518	0.600	169.000	167.830	1.170	5.6	150	5.03	50.0
1.001	SW02	SW03	28.953	0.600	167.080	167.040	0.040	723.8	900	5.64	50.0
1.002	SW03	SW05	58.395	0.600	167.040	166.960	0.080	729.9	900	6.48	50.0
P2.000A	SW04A	SW04	10.093	0.600	168.300	167.925	0.375	26.9	150	5.09	50.0
2.000	SW04	SW05	8.040	0.600	167.850	167.735	0.115	69.9	225	5.17	50.0
1.003	SW05	SW07	42.972	0.600	166.960	166.900	0.060	716.2	900	7.10	50.0
P3.000B	SW06B	SW06	10.033	0.600	167.895	167.650	0.245	41.0	150	5.11	50.0
P3.000A	SW06A	SW06	8.239	0.600	167.895	167.650	0.245	33.6	150	5.08	50.0
3.000	SW06	SW07	10.340	0.600	166.915	166.900	0.015	689.3	900	5.25	50.0
P1.003A	SW07A	SW07	6.180	0.600	167.950	167.650	0.300	20.6	150	5.05	50.0
1.004	SW07	CW1	11.818	0.600	167.051	169.620	-2.569	-4.6	90	7.29	50.0
1.006	CW1	EX5701	5.926	0.600	169.620	167.055	2.565	2.3	150	7.31	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)
P1.000A	3.155	55.7	10.2	0.712	1.650	0.054	0.0	44	2.420
1.000	1.191	757.5	10.2	1.650	2.020	0.054	0.0	72	0.432
P1.001A	3.566	63.0	8.0	0.850	2.020	0.042	0.0	36	2.457
P1.001B	4.298	75.9	4.4	0.950	2.020	0.023	0.0	24	2.343
1.001	1.157	735.8	29.0	2.020	2.810	0.153	0.0	120	0.576
1.002	1.152	732.7	38.3	2.810	2.090	0.202	0.0	138	0.623
P2.000A	1.948	34.4	17.1	1.300	1.795	0.090	0.0	75	1.945
2.000	1.566	62.3	21.4	1.795	1.990	0.113	0.0	91	1.425
1.003	1.163	739.7	67.5	2.090	1.700	0.356	0.0	181	0.738
P3.000B	1.577	27.9	4.9	1.055	1.320	0.026	0.0	42	1.190
P3.000A	1.741	30.8	15.0	1.105	1.320	0.079	0.0	74	1.733
3.000	1.185	754.2	28.3	1.305	1.700	0.149	0.0	117	0.583
P1.003A	2.229	39.4	5.1	1.045	1.700	0.027	0.0	37	1.548
1.004	1.000	6.4	100.9	2.359	1.270	0.532	0.0	90	0.000
1.006	6.681	118.1	100.9	1.210	3.785	0.532	0.0	107	7.482

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)
P1.000A	5.034	10.3	150	Proposed - Private	169.200	168.338	0.712	169.650	167.850	1.650
1.000	13.665	683.3	900	Proposed - Private	169.650	167.100	1.650	170.000	167.080	2.020
P1.001A	9.453	8.1	150	Proposed - Private	170.000	169.000	0.850	170.000	167.830	2.020
P1.001B	6.518	5.6	150	Proposed - Private	170.100	169.000	0.950	170.000	167.830	2.020
1.001	28.953	723.8	900	Proposed - Private	170.000	167.080	2.020	170.750	167.040	2.810
1.002	58.395	729.9	900	Proposed - Private	170.750	167.040	2.810	169.950	166.960	2.090
P2.000A	10.093	26.9	150	Proposed - Private	169.750	168.300	1.300	169.870	167.925	1.795
2.000	8.040	69.9	225	Proposed - Private	169.870	167.850	1.795	169.950	167.735	1.990
1.003	42.972	716.2	900	Proposed - Private	169.950	166.960	2.090	169.500	166.900	1.700
P3.000B	10.033	41.0	150	Proposed - Private	169.100	167.895	1.055	169.120	167.650	1.320
P3.000A	8.239	33.6	150	Proposed - Private	169.150	167.895	1.105	169.120	167.650	1.320
3.000	10.340	689.3	900	Proposed - Private	169.120	166.915	1.305	169.500	166.900	1.700
P1.003A	6.180	20.6	150	Proposed - Private	169.145	167.950	1.045	169.500	167.650	1.700
1.004	11.818	-4.6	90	Proposed - Private	169.500	167.051	2.359	170.980	169.620	1.270
1.006	5.926	2.3	150	Proposed - Private	170.980	169.620	1.210	170.990	167.055	3.785

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
P1.000A	SW01A	600	Manhole	Plastic Inspection Chamber	SW01	1800	Manhole	Concrete Manhole Chamber
1.000	SW01	1800	Manhole	Concrete Manhole Chamber	SW02	1800	Manhole	Concrete Manhole Chamber
P1.001A	SW02A	600	Manhole	Plastic Inspection Chamber	SW02	1800	Manhole	Concrete Manhole Chamber
P1.001B	SW02B	600	Manhole	Plastic Inspection Chamber	SW02	1800	Manhole	Concrete Manhole Chamber
1.001	SW02	1800	Manhole	Concrete Manhole Chamber	SW03	1800	Manhole	Concrete Manhole Chamber
1.002	SW03	1800	Manhole	Concrete Manhole Chamber	SW05	1800	Manhole	Concrete Manhole Chamber
P2.000A	SW04A	600	Manhole	Concrete Manhole Chamber	SW04	1200	Manhole	Concrete Manhole Chamber
2.000	SW04	1200	Manhole	Concrete Manhole Chamber	SW05	1800	Manhole	Concrete Manhole Chamber
1.003	SW05	1800	Manhole	Concrete Manhole Chamber	SW07	2100	Manhole	Concrete Manhole Chamber
P3.000B	SW06B	600	Manhole	Plastic Inspection Chamber	SW06	1800	Manhole	Concrete Manhole Chamber
P3.000A	SW06A	600	Manhole	Plastic Inspection Chamber	SW06	1800	Manhole	Concrete Manhole Chamber
3.000	SW06	1800	Manhole	Concrete Manhole Chamber	SW07	2100	Manhole	Concrete Manhole Chamber
P1.003A	SW07A	600	Manhole	Plastic Inspection Chamber	SW07	2100	Manhole	Concrete Manhole Chamber
1.004	SW07	2100	Manhole	Concrete Manhole Chamber	CW1	1500	Manhole	Concrete Manhole Chamber
1.006	CW1	1500	Manhole	Concrete Manhole Chamber	EX5701	1200	Manhole	Concrete Manhole Chamber

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW01A	400501.773	383844.000	169.200	0.862	600				
						0	P1.000A	168.338	150
SW01	400500.698	383833.109	169.650	2.550	1800				
						1	P1.000A	167.850	150
						0	1.000	167.100	900
SW02A	400513.310	383825.964	170.000	1.000	600				
						0	P1.001A	169.000	150
SW02B	400502.474	383820.090	170.100	1.100	600				
						0	P1.001B	169.000	150
SW02	400508.529	383821.973	170.000	2.920	1800				
						1	P1.001B	167.830	150
						2	P1.001A	167.830	150
						3	1.000	167.080	900
						0	1.001	167.080	900
SW03	400516.429	383794.094	170.750	3.710	1800				
						1	1.001	167.040	900
						0	1.002	167.040	900
SW04A	400560.662	383764.674	169.750	1.450	600				
						0	P2.000A	168.300	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW04	400555.457	383757.295	169.870	2.020	1200		1 P2.000A	167.925	150
							0 2.000	167.850	225
SW05	400554.563	383747.831	169.950	2.990	1800		1 2.000	167.735	225
							2 1.002	166.960	900
							0 1.003	166.960	900
SW06B	400609.142	383723.049	169.100	1.205	600				
							0 P3.000B	167.895	150
SW06A	400599.851	383730.442	169.150	1.255	600				
							0 P3.000A	167.895	150
SW06	400599.065	383722.234	169.120	2.205	1800		1 P3.000A	167.650	150
							2 P3.000B	167.650	150
							0 3.000	166.915	900
SW07A	400593.300	383714.107	169.145	1.195	600				
							0 P1.003A	167.950	150
SW07	400590.188	383719.446	169.500	3.200	2100		1 P1.003A	167.650	150
							2 3.000	166.900	900
							3 1.003	166.900	900
							0 1.004	167.051	90
CW1	400582.952	383710.102	170.980	1.360	1500		1 1.004	169.620	90
							0 1.006	169.620	150
EX5701	400585.268	383704.647	170.990	3.935	1200		1 1.006	167.055	150

Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Additional Storage (m³/ha)	20.0
Rainfall Events	Singular	Winter CV	0.840	Starting Level (m)	
FSR Region	England and Wales	Analysis Speed	Normal	Check Discharge Rate(s)	x
M5-60 (mm)	18.000	Skip Steady State	x	Check Discharge Volume	x
Ratio-R	0.335	Drain Down Time (mins)	240		

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 %)
2	0	0	0	100	40	0	0
30	0	0	0				

Node SW07 Online Pump Control

Flap Valve	x	Design Depth (m)	2.094	Switch off depth (m)	0.349
Replaces Downstream Link	✓	Design Flow (l/s)	6.5		
Invert Level (m)	167.051	Switch on depth (m)	0.700		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.350	5.850	2.094	6.500

Node SW03 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.0	Invert Level (m)	168.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	312

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	225.0	0.0	0.800	225.0	0.0	0.801	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.35%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW01A	10	168.380	0.042	8.3	0.0649	0.0000	OK
960 minute winter	SW01	555	167.754	0.654	0.7	1.6637	0.0000	OK
15 minute winter	SW02A	10	169.034	0.034	6.5	0.0378	0.0000	OK
15 minute winter	SW02B	10	169.023	0.023	3.5	0.0159	0.0000	OK
720 minute winter	SW02	435	167.753	0.673	2.6	1.8707	0.0000	OK
720 minute winter	SW03	435	167.753	0.713	5.6	2.0017	0.0000	OK
15 minute winter	SW04A	10	168.371	0.071	13.9	0.1083	0.0000	OK
15 minute winter	SW04	10	167.939	0.089	17.3	0.1204	0.0000	OK
600 minute winter	SW05	375	167.752	0.792	5.7	2.2331	0.0000	OK
15 minute winter	SW06B	10	167.935	0.040	4.0	0.0284	0.0000	OK
15 minute winter	SW06A	10	167.966	0.071	12.2	0.1097	0.0000	OK
600 minute winter	SW06	375	167.754	0.839	2.7	2.4703	0.0000	OK
15 minute winter	SW07A	10	167.985	0.035	4.2	0.0256	0.0000	OK
600 minute winter	SW07	375	167.754	0.854	6.8	2.9582	0.0000	SURCHARGED
600 minute winter	CW1	375	169.644	0.024	6.0	0.0424	0.0000	OK
600 minute winter	EX5701	375	167.078	0.022	6.0	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	SW01A	P1.000A	SW01	8.2	2.142	0.148	0.0194	
960 minute winter	SW01	1.000	SW02	1.4	0.092	0.002	6.8483	
15 minute winter	SW02A	P1.001A	SW02	6.5	2.247	0.102	0.0272	
15 minute winter	SW02B	P1.001B	SW02	3.5	2.142	0.046	0.0106	
720 minute winter	SW02	1.001	SW03	5.1	0.150	0.007	15.1632	
720 minute winter	SW03	1.002	SW05	6.1	0.140	0.008	32.9528	
15 minute winter	SW04A	P2.000A	SW04	13.8	1.758	0.400	0.0791	
15 minute winter	SW04	2.000	SW05	17.1	1.261	0.275	0.1092	
600 minute winter	SW05	1.003	SW07	5.3	0.065	0.007	26.0614	
15 minute winter	SW06B	P3.000B	SW06	4.0	1.091	0.142	0.0364	
15 minute winter	SW06A	P3.000A	SW06	12.1	1.552	0.393	0.0642	
600 minute winter	SW06	3.000	SW07	2.3	0.069	0.003	6.3967	
15 minute winter	SW07A	P1.003A	SW07	4.2	1.399	0.106	0.0184	
600 minute winter	SW07	Pump	CW1	6.0				
600 minute winter	CW1	1.006	EX5701	6.0	3.457	0.051	0.0103	90.7

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.35%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW01A	10	168.399	0.061	15.7	0.0937	0.0000	OK
600 minute winter	SW01	420	168.193	1.093	16.5	2.7807	0.0000	SURCHARGED
15 minute winter	SW02A	10	169.047	0.047	12.2	0.0529	0.0000	OK
15 minute winter	SW02B	10	169.032	0.032	6.7	0.0221	0.0000	OK
480 minute winter	SW02	376	168.172	1.092	19.0	3.0339	0.0000	SURCHARGED
480 minute winter	SW03	352	168.169	1.129	12.7	39.3034	0.0000	SURCHARGED
15 minute winter	SW04A	10	168.410	0.110	26.2	0.1673	0.0000	OK
480 minute winter	SW04	344	168.172	0.322	4.3	0.4375	0.0000	SURCHARGED
480 minute winter	SW05	352	168.171	1.211	8.8	3.4131	0.0000	SURCHARGED
480 minute winter	SW06B	344	168.173	0.278	1.0	0.1986	0.0000	SURCHARGED
480 minute winter	SW06A	344	168.174	0.279	2.9	0.4307	0.0000	SURCHARGED
480 minute winter	SW06	352	168.176	1.261	6.1	3.7133	0.0000	SURCHARGED
480 minute winter	SW07A	352	168.172	0.222	1.0	0.1629	0.0000	SURCHARGED
480 minute winter	SW07	344	168.171	1.271	12.2	4.4033	0.0000	SURCHARGED
60 minute summer	CW1	56	170.962	1.342	6.0	2.3716	0.0000	FLOOD RISK
15 minute summer	EX5701	1	170.935	3.880	0.0	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	SW01A	P1.000A	SW01	15.6	2.505	0.280	0.0314	
600 minute winter	SW01	1.000	SW02	16.5	0.103	0.022	8.6605	
15 minute winter	SW02A	P1.001A	SW02	12.1	2.665	0.193	0.0431	
15 minute winter	SW02B	P1.001B	SW02	6.7	2.570	0.088	0.0169	
480 minute winter	SW02	1.001	SW03	7.0	0.191	0.010	18.3497	
480 minute winter	SW03	1.002	SW05	8.6	0.158	0.012	37.0092	
15 minute winter	SW04A	P2.000A	SW04	25.9	2.001	0.754	0.1307	
480 minute winter	SW04	2.000	SW05	4.3	0.865	0.069	0.3198	
480 minute winter	SW05	1.003	SW07	8.4	0.131	0.011	27.2345	
480 minute winter	SW06B	P3.000B	SW06	1.0	0.714	0.036	0.1766	
480 minute winter	SW06A	P3.000A	SW06	2.9	1.060	0.094	0.1450	
480 minute winter	SW06	3.000	SW07	9.0	0.163	0.012	6.5532	
480 minute winter	SW07A	P1.003A	SW07	1.0	0.905	0.025	0.1088	
480 minute winter	SW07	Pump	CW1	6.1				
60 minute summer	CW1	1.006	EX5701	6.1	0.344	0.051	0.1043	58.3

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.35%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	SW01A	570	168.803	0.465	2.7	0.7143	0.0000	SURCHARGED
480 minute winter	SW01	416	168.808	1.708	11.0	4.3461	0.0000	SURCHARGED
15 minute winter	SW02A	10	169.066	0.066	22.1	0.0742	0.0000	OK
15 minute winter	SW02B	10	169.043	0.043	12.1	0.0303	0.0000	OK
480 minute winter	SW02	440	168.800	1.720	13.5	4.7783	0.0000	SURCHARGED
480 minute winter	SW03	408	168.790	1.750	28.1	173.9143	0.0000	SURCHARGED
15 minute winter	SW04A	11	168.910	0.610	47.4	0.9289	0.0000	SURCHARGED
480 minute winter	SW04	456	168.792	0.942	7.7	1.2799	0.0000	SURCHARGED
480 minute winter	SW05	448	168.794	1.834	14.8	5.1704	0.0000	SURCHARGED
480 minute winter	SW06B	448	168.798	0.903	1.8	0.6448	0.0000	SURCHARGED
480 minute winter	SW06A	448	168.796	0.901	5.3	1.3892	0.0000	SURCHARGED
480 minute winter	SW06	448	168.804	1.889	9.8	5.5600	0.0000	SURCHARGED
480 minute winter	SW07A	448	168.798	0.848	1.8	0.6230	0.0000	SURCHARGED
480 minute winter	SW07	392	168.791	1.891	11.1	6.5497	0.0000	SURCHARGED
600 minute winter	CW1	240	170.960	1.340	6.4	2.3680	0.0000	FLOOD RISK
15 minute summer	EX5701	1	170.935	3.880	6.0	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)
720 minute winter	SW01A	P1.000A	SW01	2.9	1.411	0.052	0.0886	
480 minute winter	SW01	1.000	SW02	11.8	0.119	0.016	8.6605	
15 minute winter	SW02A	P1.001A	SW02	22.0	3.096	0.349	0.0960	
15 minute winter	SW02B	P1.001B	SW02	12.1	3.010	0.159	0.0624	
480 minute winter	SW02	1.001	SW03	11.0	0.228	0.015	18.3497	
480 minute winter	SW03	1.002	SW05	-14.4	0.196	-0.020	37.0092	
15 minute winter	SW04A	P2.000A	SW04	45.2	2.568	1.313	0.1777	
480 minute winter	SW04	2.000	SW05	7.5	0.903	0.120	0.3198	
480 minute winter	SW05	1.003	SW07	7.2	0.127	0.010	27.2345	
480 minute winter	SW06B	P3.000B	SW06	1.7	0.738	0.060	0.1766	
480 minute winter	SW06A	P3.000A	SW06	5.1	1.081	0.166	0.1450	
480 minute winter	SW06	3.000	SW07	9.4	0.141	0.012	6.5532	
480 minute winter	SW07A	P1.003A	SW07	1.7	0.934	0.043	0.1088	
480 minute winter	SW07	Pump	CW1	6.4				
600 minute winter	CW1	1.006	EX5701	6.4	0.362	0.054	0.1043	227.2