

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

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
EX MH			19.990	1200	564689.140	173975.300	2.449
SWMH 1			19.600	1200	564688.670	173979.750	2.009
TANK			18.900	50	564688.520	173985.660	1.250
SWMH 2	0.035	5.00	19.600	600	564685.503	173987.037	1.200
SWMH 3	0.035	5.00	19.600	600	564684.560	173977.930	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)
2.000	SWMH 2	TANK	3.316	0.600	18.400	17.700	0.700	4.7	100	5.02	50.0
1.001	TANK	SWMH 1	5.912	0.600	17.650	17.591	0.059	100.2	150	5.16	50.0
1.002	SWMH 1	EX MH	4.475	0.600	17.591	17.541	0.050	89.5	150	5.23	50.0
1.000	SWMH 3	TANK	8.685	0.600	18.400	17.700	0.700	12.4	100	5.07	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)
2.000	3.577	28.1	4.7	1.100	1.100	0.035	0.0	28	2.661
1.001	1.004	17.7	9.5	1.100	1.859	0.070	0.0	78	1.021
1.002	1.063	18.8	9.5	1.859	2.299	0.070	0.0	75	1.064
1.000	2.205	17.3	4.7	1.100	1.100	0.035	0.0	36	1.876

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)
2.000	3.316	4.7	100	Circular	19.600	18.400	1.100	18.900	17.700	1.100
1.001	5.912	100.2	150	Circular	18.900	17.650	1.100	19.600	17.591	1.859
1.002	4.475	89.5	150	Circular	19.600	17.591	1.859	19.990	17.541	2.299
1.000	8.685	12.4	100	Circular	19.600	18.400	1.100	18.900	17.700	1.100

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	SWMH 2	600	Manhole	Adoptable	TANK	50	Manhole	Adoptable
1.001	TANK	50	Manhole	Adoptable	SWMH 1	1200	Manhole	Adoptable
1.002	SWMH 1	1200	Manhole	Adoptable	EX MH	1200	Manhole	Adoptable
1.000	SWMH 3	600	Manhole	Adoptable	TANK	50	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
EX MH	564689.140	173975.300	19.990	2.449	1200	1 	1	1.002	17.541	150
SWMH 1	564688.670	173979.750	19.600	2.009	1200	1 	1	1.001	17.591	150
						0 	0	1.002	17.591	150
TANK	564688.520	173985.660	18.900	1.250	50	1 	1	2.000	17.700	100
						2 	2	1.000	17.700	100
						0 	0	1.001	17.650	150
SWMH 2	564685.503	173987.037	19.600	1.200	600	0 	0	2.000	18.400	100
SWMH 3	564684.560	173977.930	19.600	1.200	600	0 	0	1.000	18.400	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	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	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 %)
1	0	0	0
30	0	0	0
100	40	0	0

Node SWMH 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	17.591	Product Number	CTL-SHE-0102-5000-1250-5000
Design Depth (m)	1.250	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	17.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	52



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	15.0	0.0	1.200	15.0	0.0	1.201	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 98.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX MH	1	17.541	0.000	4.6	0.0000	0.0000	OK
15 minute winter	SWMH 1	14	17.784	0.193	4.9	0.2183	0.0000	SURCHARGED
15 minute winter	TANK	14	17.790	0.140	9.8	1.2835	0.0000	OK
15 minute winter	SWMH 2	9	18.430	0.030	4.9	0.0256	0.0000	OK
15 minute summer	SWMH 3	10	18.437	0.037	4.7	0.0319	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	SWMH 1	Hydro-Brake®	EX MH	4.7				4.6
15 minute winter	TANK	1.001	SWMH 1	4.9	0.621	0.276	0.1025	
15 minute winter	SWMH 2	2.000	TANK	4.9	2.493	0.174	0.0142	
15 minute summer	SWMH 3	1.000	TANK	4.7	1.787	0.274	0.0351	

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX MH	1	17.541	0.000	5.0	0.0000	0.0000	OK
30 minute winter	SWMH 1	26	18.156	0.565	6.0	0.6388	0.0000	SURCHARGED
30 minute winter	TANK	26	18.162	0.512	18.5	6.5968	0.0000	SURCHARGED
15 minute winter	SWMH 2	11	18.449	0.049	12.1	0.0423	0.0000	OK
15 minute winter	SWMH 3	11	18.466	0.066	12.1	0.0573	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)
30 minute winter	SWMH 1	Hydro-Brake®	EX MH	5.0				14.5
30 minute winter	TANK	1.001	SWMH 1	6.0	0.601	0.337	0.1041	
15 minute winter	SWMH 2	2.000	TANK	12.0	2.510	0.427	0.0193	
15 minute winter	SWMH 3	1.000	TANK	11.9	1.965	0.689	0.0578	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	EX MH	1	17.541	0.000	5.0	0.0000	0.0000	OK
60 minute winter	SWMH 1	50	18.825	1.234	6.1	1.3955	0.0000	SURCHARGED
60 minute winter	TANK	50	18.832	1.182	21.8	16.1384	0.0000	FLOOD RISK
60 minute winter	SWMH 2	49	18.841	0.441	11.4	0.3818	0.0000	SURCHARGED
15 minute winter	SWMH 3	12	19.316	0.916	22.0	0.7931	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	SWMH 1	Hydro-Brake®	EX MH	5.0				33.5
60 minute winter	TANK	1.001	SWMH 1	6.1	0.602	0.343	0.1041	
60 minute winter	SWMH 2	2.000	TANK	11.2	2.208	0.399	0.0259	
15 minute winter	SWMH 3	1.000	TANK	18.2	2.323	1.049	0.0680	