

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)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

D AND CG Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
299	1200	599	1500	1199	2100
449	1350	899	1800	1800	2700

>1800 Link+900 mm

SW CIRCULAR Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

225	375	525	750	900	1200	1500
300	450	600	825	1050	1350	1800

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
50	0.135	5.00	45.966	2700	386062.047	397067.350	2.685
51	0.099	5.00	46.511	2400	386077.024	397090.643	3.069
52	0.078	5.00	46.333	2700	386079.268	397068.873	3.096
54	0.157	5.00	46.306	2700	386140.409	397075.875	3.225
HB5	0.079	5.00	46.077	2700	386142.576	397058.256	3.041
105			45.973	1200	386146.558	397053.237	2.976

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	50	52	17.288	0.600	43.281	43.237	0.044	392.9	1200	5.15	50.0
2.000	51	52	21.885	0.600	43.442	43.387	0.055	397.9	1050	5.21	50.0
1.001	52	54	61.541	0.600	43.237	43.081	0.156	394.5	1200	5.76	50.0
1.002	54	HB5	17.752	0.600	43.081	43.036	0.045	394.5	1200	5.92	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)
1.000	1.881	2127.3	18.3	1.485	1.896	0.135	0.0	76	0.601
2.000	1.721	1490.3	13.4	2.019	1.896	0.099	0.0	69	0.558
1.001	1.877	2122.9	42.3	1.896	2.025	0.312	0.0	115	0.771
1.002	1.877	2122.9	63.6	2.025	1.841	0.469	0.0	139	0.868

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)
1.003	HB5	105	6.407	0.600	43.036	42.997	0.039	165.0	225	6.02	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)
1.003	1.015	40.4	74.3	2.816	2.751	0.548	0.0	225	1.034

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	17.288	392.9	1200	SW CIRCULAR	45.966	43.281	1.485	46.333	43.237	1.896
2.000	21.885	397.9	1050	SW CIRCULAR	46.511	43.442	2.019	46.333	43.387	1.896
1.001	61.541	394.5	1200	SW CIRCULAR	46.333	43.237	1.896	46.306	43.081	2.025
1.002	17.752	394.5	1200	SW CIRCULAR	46.306	43.081	2.025	46.077	43.036	1.841
1.003	6.407	165.0	225	SW CIRCULAR	46.077	43.036	2.816	45.973	42.997	2.751

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	50	2700	Manhole	D AND CG	52	2700	Manhole	D AND CG
2.000	51	2400	Manhole	D AND CG	52	2700	Manhole	D AND CG
1.001	52	2700	Manhole	D AND CG	54	2700	Manhole	D AND CG
1.002	54	2700	Manhole	D AND CG	HB5	2700	Manhole	D AND CG
1.003	HB5	2700	Manhole	D AND CG	105	1200	Manhole	D AND CG

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	17.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	2 year (l/s)	15.0
Summer CV	0.750	30 year (l/s)	15.0
Winter CV	0.840	100 year (l/s)	15.0
Analysis Speed	Detailed	Check Discharge Volume	x
Skip Steady State	✓		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Region	1
Greenfield Method	IH124	Growth Factor 1 year	0.85
Positively Drained Area (ha)		Growth Factor 30 year	1.95
SAAR (mm)		Growth Factor 100 year	2.48
Soil Index	1	Betterment (%)	0
SPR	0.10	QBar	

Pre-development Discharge Rate

Q 1 year (l/s)	Q 100 year (l/s)
Q 30 year (l/s)	

Node HB5 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	43.036	Product Number	CTL-SHE-0156-1500-2300-1500
Design Depth (m)	2.300	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	15.0	Min Node Diameter (mm)	1800

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	119.760	33.888	30 year 360 minute summer	26.939	6.932
2 year 15 minute winter	84.042	33.888	30 year 360 minute winter	17.511	6.932
2 year 30 minute summer	77.518	21.935	30 year 480 minute summer	20.981	5.545
2 year 30 minute winter	54.399	21.935	30 year 480 minute winter	13.940	5.545
2 year 60 minute summer	51.720	13.668	30 year 600 minute summer	17.039	4.661
2 year 60 minute winter	34.361	13.668	30 year 600 minute winter	11.642	4.661
2 year 120 minute summer	31.549	8.338	30 year 720 minute summer	15.093	4.045
2 year 120 minute winter	20.961	8.338	30 year 720 minute winter	10.143	4.045
2 year 180 minute summer	24.133	6.210	30 year 960 minute summer	12.278	3.233
2 year 180 minute winter	15.687	6.210	30 year 960 minute winter	8.133	3.233
2 year 240 minute summer	19.039	5.032	30 year 1440 minute summer	8.788	2.355
2 year 240 minute winter	12.649	5.032	30 year 1440 minute winter	5.906	2.355
2 year 360 minute summer	14.516	3.735	100 year +45% CC 15 minute summer	423.061	119.712
2 year 360 minute winter	9.436	3.735	100 year +45% CC 15 minute winter	296.885	119.712
2 year 480 minute summer	11.436	3.022	100 year +45% CC 30 minute summer	278.374	78.770
2 year 480 minute winter	7.598	3.022	100 year +45% CC 30 minute winter	195.350	78.770
2 year 600 minute summer	9.363	2.561	100 year +45% CC 60 minute summer	187.417	49.529
2 year 600 minute winter	6.398	2.561	100 year +45% CC 60 minute winter	124.515	49.529
2 year 720 minute summer	8.339	2.235	100 year +45% CC 120 minute summer	114.312	30.209
2 year 720 minute winter	5.605	2.235	100 year +45% CC 120 minute winter	75.946	30.209
2 year 960 minute summer	6.846	1.803	100 year +45% CC 180 minute summer	86.951	22.375
2 year 960 minute winter	4.535	1.803	100 year +45% CC 180 minute winter	56.520	22.375
2 year 1440 minute summer	4.967	1.331	100 year +45% CC 240 minute summer	68.114	18.001
2 year 1440 minute winter	3.338	1.331	100 year +45% CC 240 minute winter	45.253	18.001
30 year 15 minute summer	226.195	64.005	100 year +45% CC 360 minute summer	51.133	13.158
30 year 15 minute winter	158.733	64.005	100 year +45% CC 360 minute winter	33.238	13.158
30 year 30 minute summer	147.452	41.724	100 year +45% CC 480 minute summer	39.658	10.480
30 year 30 minute winter	103.475	41.724	100 year +45% CC 480 minute winter	26.348	10.480
30 year 60 minute summer	98.615	26.061	100 year +45% CC 600 minute summer	32.099	8.780
30 year 60 minute winter	65.517	26.061	100 year +45% CC 600 minute winter	21.932	8.780
30 year 120 minute summer	59.946	15.842	100 year +45% CC 720 minute summer	28.365	7.602
30 year 120 minute winter	39.827	15.842	100 year +45% CC 720 minute winter	19.063	7.602
30 year 180 minute summer	45.598	11.734	100 year +45% CC 960 minute summer	22.984	6.052
30 year 180 minute winter	29.640	11.734	100 year +45% CC 960 minute winter	15.225	6.052
30 year 240 minute summer	35.759	9.450	100 year +45% CC 1440 minute summer	16.353	4.383
30 year 240 minute winter	23.758	9.450	100 year +45% CC 1440 minute winter	10.990	4.383

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.16%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	50	30	43.489	0.208	15.9	1.3979	0.0000	OK
15 minute winter	51	10	43.516	0.074	15.3	0.3845	0.0000	OK
30 minute winter	52	26	43.489	0.252	35.8	1.5714	0.0000	OK
30 minute winter	54	28	43.486	0.405	46.6	2.7158	0.0000	OK
30 minute winter	HB5	28	43.488	0.452	24.8	2.8199	0.0000	SURCHARGED
15 minute summer	105	1	42.997	0.000	14.3	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)
30 minute winter	50	1.000	52	15.5	0.423	0.007	2.6041	
15 minute winter	51	2.000	52	14.9	0.632	0.010	0.5191	
30 minute winter	52	1.001	54	29.3	0.397	0.014	15.1495	
30 minute winter	54	1.002	HB5	16.9	0.267	0.008	6.4112	
30 minute winter	HB5	Hydro-Brake®	105	14.5				50.5

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.16%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	50	58	43.766	0.485	20.1	3.2622	0.0000	OK
60 minute winter	51	50	43.768	0.326	14.8	1.6834	0.0000	OK
60 minute winter	52	50	43.766	0.529	42.3	3.2923	0.0000	OK
60 minute winter	54	52	43.768	0.687	42.8	4.6011	0.0000	OK
60 minute winter	HB5	52	43.768	0.732	24.1	4.5730	0.0000	SURCHARGED
15 minute summer	105	1	42.997	0.000	14.9	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)
60 minute winter	50	1.000	52	19.0	0.388	0.009	7.8152	
60 minute winter	51	2.000	52	14.2	0.578	0.010	5.5559	
60 minute winter	52	1.001	54	21.9	0.407	0.010	35.0818	
60 minute winter	54	1.002	HB5	17.0	0.267	0.008	12.3143	
60 minute winter	HB5	Hydro-Brake®	105	15.0				120.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.16%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	50	114	45.172	1.891	23.7	12.7297	0.0000	SURCHARGED
120 minute winter	51	114	45.172	1.730	17.4	8.9447	0.0000	SURCHARGED
120 minute winter	52	114	45.172	1.935	39.8	12.0530	0.0000	SURCHARGED
120 minute winter	54	116	45.172	2.091	35.7	14.0096	0.0000	SURCHARGED
120 minute winter	HB5	116	45.172	2.136	23.2	13.3415	0.0000	SURCHARGED
15 minute summer	105	1	42.997	0.000	15.0	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)
120 minute winter	50	1.000	52	15.3	0.313	0.007	19.4785	
120 minute winter	51	2.000	52	11.4	0.515	0.008	18.8788	
120 minute winter	52	1.001	54	12.1	0.394	0.006	69.3388	
120 minute winter	54	1.002	HB5	14.9	0.260	0.007	20.0013	
120 minute winter	HB5	Hydro-Brake®	105	15.0				277.7