

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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)
1	0.056	5.00	212.220	450	446944.955	311543.748	1.145
2	0.056	5.00	211.950	1200	446928.821	311510.061	1.250
3	0.056	5.00	211.950	1200	446934.501	311507.352	1.300
4	0.056	5.00	217.450	1200	446910.465	311456.207	7.700
5	0.056	5.00	215.167	1200	446940.157	311442.252	6.117
6	0.056	5.00	212.230	1200	446984.705	311537.031	2.730
7	0.056	5.00	212.100	1500	446969.291	311503.903	3.450
8	0.837	5.00	213.119	1200	446961.053	311406.794	1.575
9	0.000		211.450		446970.884	311403.019	0.825
10	0.000		210.800		446986.868	311428.196	0.825
11	0.000		210.750		446997.468	311445.037	0.825
12	0.000	5.00	210.800		447026.785	311482.330	1.400
13	0.766	5.00	210.700		447007.269	311457.989	1.375
14	0.000		211.652	1200	446997.400	311464.638	2.377
15	0.000		211.500	1500	446995.165	311490.302	3.275
16	0.000		210.376	1800	447024.919	311517.813	2.301
17			209.850	1200	447043.764	311509.162	1.850

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	1	2	37.351	0.600	211.075	210.700	0.375	99.6	225	5.48	50.0
1.001	2	3	6.293	0.600	210.700	210.650	0.050	125.9	225	5.57	50.0
1.002	3	4	56.511	0.600	210.650	209.825	0.825	68.5	225	6.16	49.7
1.003	4	5	32.808	0.600	209.750	209.200	0.550	59.7	300	6.43	48.7
1.004	5	7	68.188	0.600	209.050	208.650	0.400	170.5	450	7.16	46.2
2.000	6	7	36.538	0.600	209.500	208.650	0.850	43.0	450	5.20	50.0
1.005	7	15	29.231	0.600	208.650	208.525	0.125	233.8	450	7.53	45.0
3.000	8	9	10.531	0.600	211.544	211.150	0.394	26.7	300	5.06	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	1.310	52.1	7.6	0.920	1.025	0.056	0.0	58	0.938
1.001	1.164	46.3	15.2	1.025	1.075	0.112	0.0	88	1.044
1.002	1.582	62.9	22.6	1.075	7.400	0.168	0.0	94	1.459
1.003	2.039	144.1	29.6	7.400	5.667	0.224	0.0	92	1.614
1.004	1.554	247.1	35.1	5.667	3.000	0.280	0.0	114	1.113
2.000	3.107	494.2	7.6	2.280	3.000	0.056	0.0	38	1.162
1.005	1.325	210.7	47.9	3.000	2.525	0.392	0.0	145	1.082
3.000	3.053	215.8	113.4	1.275	0.000	0.837	0.0	154	3.088

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)
3.001	9	10	29.822	0.035	210.625	209.975	0.650	45.9	739	5.26	50.0
3.002	10	11	19.899	0.035	209.975	209.925	0.050	398.0	500	5.67	50.0
3.003	11	13	16.242	0.035	209.925	209.325	0.600	27.1	500	5.75	50.0
4.000	12	13	31.199	0.035	209.400	209.325	0.075	416.0	500	5.65	50.0
3.004	13	14	11.900	0.035	209.325	209.275	0.050	238.0	750	6.08	50.0
3.005	14	15	25.761	0.035	209.275	208.225	1.050	24.5	750	6.31	49.2
1.006	15	16	40.524	0.600	208.225	208.075	0.150	270.2	750	7.93	43.9
1.007	16	17	20.736	0.600	208.075	208.000	0.075	276.5	300	8.29	10.0

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)
3.001	2.459	6520.5	113.4	0.000	0.000	0.837	0.0	122	0.843
3.002	0.815	2000.2	113.4	0.000	0.000	0.837	0.0	238	0.394
3.003	3.125	7669.5	113.4	0.000	0.550	0.837	0.0	124	1.053
4.000	0.797	1956.5	0.0	0.575	0.550	0.000	0.0	0	0.000
3.004	0.607	268.0	217.2	0.625	1.627	1.603	0.0	512	0.676
3.005	1.890	834.8	213.7	1.627	2.525	1.603	0.0	259	1.581
1.006	1.697	749.9	237.2	2.525	1.551	1.995	0.0	289	1.515
1.007	0.940	66.5	54.1	2.001	1.550	1.995	0.0	206	1.044

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	37.351	99.6	225	Circular_Default Sewer Type	212.220	211.075	0.920	211.950	210.700	1.025
1.001	6.293	125.9	225	Circular_Default Sewer Type	211.950	210.700	1.025	211.950	210.650	1.075
1.002	56.511	68.5	225	Circular_Default Sewer Type	211.950	210.650	1.075	217.450	209.825	7.400
1.003	32.808	59.7	300	Circular_Default Sewer Type	217.450	209.750	7.400	215.167	209.200	5.667
1.004	68.188	170.5	450	Circular_Default Sewer Type	215.167	209.050	5.667	212.100	208.650	3.000
2.000	36.538	43.0	450	Circular_Default Sewer Type	212.230	209.500	2.280	212.100	208.650	3.000
1.005	29.231	233.8	450	Circular_Default Sewer Type	212.100	208.650	3.000	211.500	208.525	2.525
3.000	10.531	26.7	300	Circular_Default Sewer Type	213.119	211.544	1.275	211.450	211.150	0.000
3.001	29.822	45.9	739	Swale	211.450	210.625	0.000	210.800	209.975	0.000
3.002	19.899	398.0	500	Swale	210.800	209.975	0.000	210.750	209.925	0.000
3.003	16.242	27.1	500	Swale	210.750	209.925	0.000	210.700	209.325	0.550
4.000	31.199	416.0	500	Swale	210.800	209.400	0.575	210.700	209.325	0.550
3.004	11.900	238.0	750	Circular_Default Sewer Type	210.700	209.325	0.625	211.652	209.275	1.627

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	Adoptable	2	1200	Manhole	Adoptable
1.001	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.002	3	1200	Manhole	Adoptable	4	1200	Manhole	Adoptable
1.003	4	1200	Manhole	Adoptable	5	1200	Manhole	Adoptable
1.004	5	1200	Manhole	Adoptable	7	1500	Manhole	Adoptable
2.000	6	1200	Manhole	Adoptable	7	1500	Manhole	Adoptable
1.005	7	1500	Manhole	Adoptable	15	1500	Manhole	Adoptable
3.000	8	1200	Manhole	Adoptable	9		Junction	
3.001	9		Junction		10		Junction	
3.002	10		Junction		11		Junction	
3.003	11		Junction		13		Junction	
4.000	12		Junction		13		Junction	
3.004	13		Junction		14	1200	Manhole	Adoptable

Pipeline Schedule

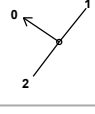
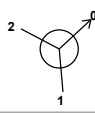
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.005	25.761	24.5	750	Circular_Default Sewer Type	211.652	209.275	1.627	211.500	208.225	2.525
1.006	40.524	270.2	750	Circular_Default Sewer Type	211.500	208.225	2.525	210.376	208.075	1.551
1.007	20.736	276.5	300	Circular_Default Sewer Type	210.376	208.075	2.001	209.850	208.000	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.005	14	1200	Manhole	Adoptable	15	1500	Manhole	Adoptable
1.006	15	1500	Manhole	Adoptable	16	1800	Manhole	Adoptable
1.007	16	1800	Manhole	Adoptable	17	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
1	446944.955	311543.748	212.220	1.145	450		0	1.000	211.075	225
2	446928.821	311510.061	211.950	1.250	1200		1	1.000	210.700	225
							0	1.001	210.700	225
3	446934.501	311507.352	211.950	1.300	1200		1	1.001	210.650	225
							0	1.002	210.650	225
4	446910.465	311456.207	217.450	7.700	1200		1	1.002	209.825	225
							0	1.003	209.750	300
5	446940.157	311442.252	215.167	6.117	1200		1	1.003	209.200	300
							0	1.004	209.050	450
6	446984.705	311537.031	212.230	2.730	1200		0	2.000	209.500	450
7	446969.291	311503.903	212.100	3.450	1500		1	2.000	208.650	450
							2	1.004	208.650	450
							0	1.005	208.650	450
8	446961.053	311406.794	213.119	1.575	1200		0	3.000	211.544	300
9	446970.884	311403.019	211.450	0.825			1	3.000	211.150	300
							0	3.001	210.625	739
10	446986.868	311428.196	210.800	0.825			1	3.001	209.975	739
							0	3.002	209.975	500

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
11	446997.468	311445.037	210.750	0.825		1	3.002	209.925	500	
						0	3.003	209.925	500	
12	447026.785	311482.330	210.800	1.400		0	4.000	209.400	500	
13	447007.269	311457.989	210.700	1.375		1	4.000	209.325	500	
						2	3.003	209.325	500	
						0	3.004	209.325	750	
14	446997.400	311464.638	211.652	2.377	1200		1	3.004	209.275	750
							0	3.005	209.275	750
15	446995.165	311490.302	211.500	3.275	1500		1	3.005	208.225	750
							2	1.005	208.525	450
							0	1.006	208.225	750
16	447024.919	311517.813	210.376	2.301	1800		1	1.006	208.075	750
							0	1.007	208.075	300
17	447043.764	311509.162	209.850	1.850	1200		1	1.007	208.000	300

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	✓
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Check Discharge Rate(s)	✓
Summer CV	0.750	Check Discharge Volume	✓
Winter CV	0.840	100 year 360 minute (m³)	
Analysis Speed	Detailed		

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 %)
1	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Pre-development Discharge Rate

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

Pre-development Discharge Volume

Site Makeup	Greenfield	SPR	0.10	Storm Duration (mins)	360
Greenfield Method	FSR/FEH	CWI		Betterment (%)	0
Positively Drained Area (ha)		Return Period (years)	100	PR	
Soil Index	1	Climate Change (%)	0	Runoff Volume (m³)	

Node 8 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	211.544	Product Number	CTL-SHE-0084-4200-2000-4200
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	4.2	Min Node Diameter (mm)	1200

Node 16 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	208.075	Product Number	CTL-SHE-0118-8700-2300-8700
Design Depth (m)	2.300	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	8.7	Min Node Diameter (mm)	1200

Node 8 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	211.544
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	700.0	0.0	1.000	700.0	0.0	1.001	0.0	0.0

Node 15 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	209.450
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	690.0	0.0	1.000	690.0	0.0	1.001	0.0	0.0