



**Design Settings**

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	75.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.341	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	2.00	Enforce best practice design rules	x

**Nodes**

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
1	0.069	2.00	114.550	450	1.000
2	0.031	2.00	114.400	2400	3.950
6	0.060	2.00	114.600	450	1.600
3	0.000		114.350		3.912
7	0.040	2.00	112.750	450	0.700
8	0.018	2.00	112.550	450	1.000
4	0.000		112.400	2700	2.050
5	0.000		112.350	1200	2.030

**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	19.610	0.600	113.550	112.493	1.057	18.6	150	2.14	75.0
1.001	2	3	3.600	0.600	110.450	110.438	0.012	300.0	1350	2.17	75.0
2.000	6	3	23.900	0.600	113.000	111.638	1.362	17.5	150	2.16	75.0
1.002	3	4	26.450	0.600	110.438	110.350	0.088	300.0	1350	2.36	75.0
3.000	7	4	7.050	0.600	112.050	111.550	0.500	14.1	150	2.04	75.0
4.000	8	4	7.800	0.600	111.550	111.420	0.130	60.0	150	2.10	75.0
1.003	4	5	5.000	0.600	110.350	110.320	0.030	166.7	225	2.44	75.0

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	2.349	41.5	14.0	0.850	1.757	0.069	0.0	60	2.125
1.001	2.316	3315.4	20.3	2.600	2.562	0.100	0.0	73	0.674
2.000	2.416	42.7	12.2	1.450	2.562	0.060	0.0	55	2.088
1.002	2.316	3315.4	32.5	2.562	0.700	0.160	0.0	91	0.772
3.000	2.697	47.7	8.1	0.550	0.700	0.040	0.0	42	2.022
4.000	1.301	23.0	3.7	0.850	0.830	0.018	0.0	40	0.951
1.003	1.010	40.1	44.3	1.825	1.805	0.218	0.0	225	1.028



**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	19.610	18.6	150	Circular_Default Sewer Type	114.550	113.550	0.850	114.400	112.493	1.757
1.001	3.600	300.0	1350	Circular_Default Sewer Type	114.400	110.450	2.600	114.350	110.438	2.562
2.000	23.900	17.5	150	Circular_Default Sewer Type	114.600	113.000	1.450	114.350	111.638	2.562
1.002	26.450	300.0	1350	Circular_Default Sewer Type	114.350	110.438	2.562	112.400	110.350	0.700
3.000	7.050	14.1	150	Circular_Default Sewer Type	112.750	112.050	0.550	112.400	111.550	0.700
4.000	7.800	60.0	150	Circular_Default Sewer Type	112.550	111.550	0.850	112.400	111.420	0.830
1.003	5.000	166.7	225	Circular_Default Sewer Type	112.400	110.350	1.825	112.350	110.320	1.805

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	Adoptable	2	2400	Manhole	Adoptable
1.001	2	2400	Manhole	Adoptable	3		Junction	
2.000	6	450	Manhole	Adoptable	3		Junction	
1.002	3		Junction		4	2700	Manhole	Adoptable
3.000	7	450	Manhole	Adoptable	4	2700	Manhole	Adoptable
4.000	8	450	Manhole	Adoptable	4	2700	Manhole	Adoptable
1.003	4	2700	Manhole	Adoptable	5	1200	Manhole	Adoptable

**Manhole Schedule**

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	114.550	1.000	450	○	0	1.000	113.550 150
2	114.400	3.950	2400		1	1.000	112.493 150
6	114.600	1.600	450	○	0	1.001	110.450 1350
					0	2.000	113.000 150
3	114.350	3.912		○	1	2.000	111.638 150
					2	1.001	110.438 1350
					0	1.002	110.438 1350
7	112.750	0.700	450	○	0	3.000	112.050 150
8	112.550	1.000	450		0	4.000	111.550 150
4	112.400	2.050	2700	○	1	4.000	111.420 150
					2	3.000	111.550 150
					3	1.002	110.350 1350
					0	1.003	110.350 225



**Manhole Schedule**

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
5	112.350	2.030	1200	1	1.003	110.320	225



**Simulation Settings**

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	19.000	Additional Storage (m <sup>3</sup> /ha)	20.0
Ratio-R	0.341	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

**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 %)
2	0	0	0
30	0	0	0
100	0	0	0
100	45	0	0

**Node 4 Online Hydro-Brake® Control**

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	110.350	Product Number	CTL-SHE-0155-1260-1450-1260
Design Depth (m)	1.450	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	12.6	Min Node Diameter (mm)	1500



**Results for 2 year Critical Storm Duration. Lowest mass balance: 93.22%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	1	9	113.615	0.065	15.1	0.1000	0.0000	OK
30 minute winter	2	22	110.707	0.257	13.8	1.2043	0.0000	OK
15 minute summer	6	9	113.058	0.058	13.1	0.0526	0.0000	OK
30 minute winter	3	22	110.707	0.269	19.1	0.0000	0.0000	OK
15 minute summer	7	9	112.096	0.046	8.7	0.0603	0.0000	OK
15 minute summer	8	9	111.594	0.044	3.9	0.0228	0.0000	OK
30 minute winter	4	22	110.709	0.359	20.7	2.0578	0.0000	SURCHARGED
30 minute winter	5	22	110.404	0.084	12.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	1	1.000	2	15.1	2.116	0.364	0.1399	
30 minute winter	2	1.001	3	11.0	0.350	0.003	0.7037	
15 minute summer	6	2.000	3	13.1	2.111	0.307	0.1483	
30 minute winter	3	1.002	4	13.7	0.373	0.004	6.6912	
15 minute summer	7	3.000	4	8.7	1.967	0.183	0.0312	
15 minute summer	8	4.000	4	3.9	0.941	0.170	0.0324	
30 minute winter	4	1.003	5	12.1	0.836	0.301	0.0723	21.9



**Results for 30 year Critical Storm Duration. Lowest mass balance: 93.22%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	1	9	113.647	0.097	28.5	0.1494	0.0000	OK
30 minute winter	2	24	111.021	0.571	26.3	2.6736	0.0000	OK
15 minute summer	6	9	113.084	0.084	24.8	0.0763	0.0000	OK
30 minute winter	3	24	111.021	0.583	37.1	0.0000	0.0000	OK
15 minute summer	7	9	112.117	0.067	16.5	0.0873	0.0000	OK
15 minute summer	8	9	111.613	0.063	7.4	0.0326	0.0000	OK
30 minute winter	4	26	111.020	0.670	38.4	3.8390	0.0000	SURCHARGED
15 minute summer	5	11	110.406	0.086	12.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	1	1.000	2	28.5	2.448	0.687	0.2283	
30 minute winter	2	1.001	3	21.4	0.349	0.006	2.0942	
15 minute summer	6	2.000	3	24.8	2.479	0.581	0.2391	
30 minute winter	3	1.002	4	23.0	0.400	0.007	17.0737	
15 minute summer	7	3.000	4	16.5	2.304	0.346	0.0505	
15 minute summer	8	4.000	4	7.4	1.109	0.322	0.0520	
30 minute winter	4	1.003	5	12.5	0.845	0.312	0.0743	41.7



**Results for 100 year Critical Storm Duration. Lowest mass balance: 93.22%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	1	9	113.670	0.120	36.8	0.1847	0.0000	OK
60 minute winter	2	47	111.277	0.827	22.5	3.8691	0.0000	OK
15 minute summer	6	9	113.100	0.100	32.0	0.0906	0.0000	OK
60 minute winter	3	47	111.277	0.839	31.8	0.0000	0.0000	OK
15 minute summer	7	9	112.129	0.079	21.4	0.1027	0.0000	OK
15 minute summer	8	9	111.624	0.073	9.6	0.0381	0.0000	OK
60 minute winter	4	48	111.277	0.927	33.1	5.3078	0.0000	SURCHARGED
15 minute winter	5	9	110.406	0.086	12.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	1	1.000	2	36.8	2.540	0.886	0.2837	
60 minute winter	2	1.001	3	18.4	0.328	0.006	3.3237	
15 minute summer	6	2.000	3	32.0	2.617	0.750	0.2923	
60 minute winter	3	1.002	4	20.2	0.387	0.006	26.1040	
15 minute summer	7	3.000	4	21.4	2.443	0.449	0.0618	
15 minute summer	8	4.000	4	9.6	1.181	0.418	0.0634	
60 minute winter	4	1.003	5	12.5	0.845	0.312	0.0743	70.3



**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 93.22%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	1	9	114.172	0.622	53.3	0.9577	0.0000	SURCHARGED
60 minute winter	2	44	111.879	1.429	887.3	6.6881	0.0000	SURCHARGED
15 minute summer	6	9	113.333	0.333	46.4	0.3027	0.0000	SURCHARGED
120 minute winter	3	86	111.937	1.499	216.2	0.0000	0.0000	SURCHARGED
15 minute summer	7	9	112.152	0.102	31.0	0.1334	0.0000	OK
120 minute winter	8	84	111.887	0.337	3.7	0.1749	0.0000	SURCHARGED
120 minute winter	4	84	111.891	1.541	30.5	8.8250	0.0000	SURCHARGED
120 minute winter	5	86	110.406	0.086	12.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	1	1.000	2	46.2	2.622	1.112	0.3433	
60 minute winter	2	1.001	3	-778.8	-0.546	-0.235	5.1336	
15 minute summer	6	2.000	3	43.5	2.813	1.018	0.4207	
120 minute winter	3	1.002	4	25.3	0.306	0.008	37.7175	
15 minute summer	7	3.000	4	31.0	2.626	0.651	0.0831	
120 minute winter	8	4.000	4	3.7	0.927	0.161	0.1373	
120 minute winter	4	1.003	5	12.6	0.845	0.313	0.0744	122.7