

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	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	0.840	Include Intermediate Ground	✓
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)
CD US	0.073	5.00	97.000	100	381229.202	404289.618	0.639
CD DS			97.000	100	381244.902	404260.243	1.010
03	0.064	5.00	94.000	1200	381280.187	404227.811	0.875
04	0.068	5.00	95.632	1200	381257.762	404267.683	2.812
05			95.874	1200	381253.968	404274.814	3.086
01	0.084	5.00	94.000	1200	381292.070	404234.769	0.875
02	0.033	5.00	95.799	1200	381266.309	404281.358	3.029
06	0.045	5.00	95.800	450	381261.554	404278.767	3.055
Oil Sep In			95.739		381262.358	404277.333	3.005
Oil Sep Out			95.739		381263.254	404275.462	3.105
Tank In			95.583		381264.252	404273.417	3.866
Tank Out			94.452		381279.426	404243.754	2.735
07			94.398	1200	381280.170	404242.461	2.617
08			93.948	1200	381288.621	404226.457	2.288
09			93.901	1200	381276.134	404219.102	2.338
IC01	0.020	5.00	93.806	450	381308.000	404213.878	1.106
IC02			93.788	450	381289.862	404206.932	1.282
10			93.731	1350	381282.301	404208.003	2.253
CW01			93.660	1500	381284.093	404204.259	2.224

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	CD US	CD DS	33.307	0.600	96.361	95.990	0.371	89.8	240	5.39	50.0
1.001	CD DS	04	14.857	0.600	95.990	95.247	0.743	20.0	225	5.47	50.0
2.000	03	04	45.810	0.600	93.125	92.820	0.305	150.0	300	5.60	50.0
1.002	04	05	8.077	0.600	92.820	92.788	0.032	250.0	300	5.73	50.0
1.003	05	06	8.554	0.600	92.788	92.745	0.043	200.0	300	5.86	50.0
3.000	01	02	53.237	0.600	93.125	92.770	0.355	150.0	300	5.69	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	1.439	65.1	11.1	0.399	0.770	0.073	0.0	67	1.082
1.001	2.939	116.8	11.1	0.785	0.160	0.073	0.0	47	1.878
2.000	1.281	90.6	9.7	0.575	2.512	0.064	0.0	66	0.844
1.002	0.990	70.0	31.2	2.512	2.786	0.205	0.0	140	0.962
1.003	1.108	78.3	31.2	2.786	2.755	0.205	0.0	132	1.047
3.000	1.281	90.6	12.8	0.575	2.729	0.084	0.0	76	0.914

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	02	06	5.415	0.600	92.770	92.745	0.025	213.0	300	5.78	50.0
1.004	06	Oil Sep In	1.644	0.600	92.745	92.734	0.011	150.0	300	5.88	50.0
1.005	Oil Sep In	Oil Sep Out	2.072	0.600	92.734	92.634	0.100	20.7	300	5.89	50.0
1.006	Oil Sep Out	Tank In	2.470	0.600	92.634	92.618	0.016	150.0	300	5.92	50.0
1.007	Tank In	Tank Out	33.319	0.600	91.717	91.717	0.000	0.0	6000	6.48	50.0
1.008	Tank Out	07	1.577	0.600	91.792	91.781	0.011	150.0	150	6.50	50.0
1.009	07	08	18.098	0.600	91.781	91.660	0.121	150.0	150	6.87	50.0
1.010	08	09	14.492	0.600	91.660	91.563	0.097	150.0	150	7.17	50.0
1.011	09	10	12.697	0.600	91.563	91.478	0.085	150.0	150	7.42	50.0
4.000	IC01	IC02	19.423	0.600	92.700	92.506	0.194	100.0	150	5.32	50.0
4.001	IC02	10	7.636	0.600	92.506	92.336	0.170	45.0	150	5.41	50.0
1.012	10	CW01	4.151	0.600	91.478	91.436	0.042	100.0	150	7.49	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)
3.001	1.073	75.9	17.8	2.729	2.755	0.117	0.0	98	0.879
1.004	1.281	90.6	55.8	2.755	2.705	0.368	0.0	171	1.346
1.005	3.469	245.2	55.8	2.705	2.805	0.368	0.0	97	2.829
1.006	1.281	90.6	55.8	2.805	2.665	0.368	0.0	171	1.346
1.007	1.000	7200.0	55.8	2.666	1.535	0.368	0.0	0	∞
1.008	1.188	213.9	55.8	1.460	1.417	0.368	0.0	331	1.124
1.009	0.818	14.5	55.8	2.467	2.138	0.368	0.0	150	0.833
1.010	0.818	14.5	55.8	2.138	2.188	0.368	0.0	150	0.833
1.011	0.818	14.5	55.8	2.188	2.103	0.368	0.0	150	0.833
4.000	1.005	17.8	3.0	0.956	1.132	0.020	0.0	42	0.751
4.001	1.504	26.6	3.0	1.132	1.245	0.020	0.0	34	1.004
1.012	1.005	17.8	58.8	2.103	2.074	0.388	0.0	150	1.023

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	33.307	89.8	240	Circular	97.000	96.361	0.399	97.000	95.990	0.770
1.001	14.857	20.0	225	Circular	97.000	95.990	0.785	95.632	95.247	0.160
2.000	45.810	150.0	300	Circular	94.000	93.125	0.575	95.632	92.820	2.512
1.002	8.077	250.0	300	Circular	95.632	92.820	2.512	95.874	92.788	2.786
1.003	8.554	200.0	300	Circular	95.874	92.788	2.786	95.800	92.745	2.755
3.000	53.237	150.0	300	Circular	94.000	93.125	0.575	95.799	92.770	2.729
3.001	5.415	213.0	300	Circular	95.799	92.770	2.729	95.800	92.745	2.755

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	CD US	100	Manhole	Adoptable	CD DS	100	Manhole	Adoptable
1.001	CD DS	100	Manhole	Adoptable	04	1200	Manhole	Adoptable
2.000	03	1200	Manhole	Adoptable	04	1200	Manhole	Adoptable
1.002	04	1200	Manhole	Adoptable	05	1200	Manhole	Adoptable
1.003	05	1200	Manhole	Adoptable	06	450	Manhole	Adoptable
3.000	01	1200	Manhole	Adoptable	02	1200	Manhole	Adoptable
3.001	02	1200	Manhole	Adoptable	06	450	Manhole	Adoptable

Pipeline Schedule

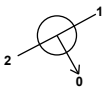
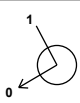
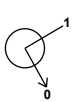
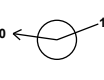
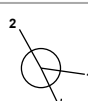
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.004	1.644	150.0	300	Circular	95.800	92.745	2.755	95.739	92.734	2.705
1.005	2.072	20.7	300	Circular	95.739	92.734	2.705	95.739	92.634	2.805
1.006	2.470	150.0	300	Circular	95.739	92.634	2.805	95.583	92.618	2.665
1.007	33.319	0.0	6000	Plastic Tank	95.583	91.717	2.666	94.452	91.717	1.535
1.008	1.577	150.0	150	Plastic Tank	94.452	91.792	1.460	94.398	91.781	1.417
1.009	18.098	150.0	150	Circular	94.398	91.781	2.467	93.948	91.660	2.138
1.010	14.492	150.0	150	Circular	93.948	91.660	2.138	93.901	91.563	2.188
1.011	12.697	150.0	150	Circular	93.901	91.563	2.188	93.731	91.478	2.103
4.000	19.423	100.0	150	Circular	93.806	92.700	0.956	93.788	92.506	1.132
4.001	7.636	45.0	150	Circular	93.788	92.506	1.132	93.731	92.336	1.245
1.012	4.151	100.0	150	Circular	93.731	91.478	2.103	93.660	91.436	2.074

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.004	06	450	Manhole	Adoptable	Oil Sep In		Junction	
1.005	Oil Sep In		Junction		Oil Sep Out		Junction	
1.006	Oil Sep Out		Junction		Tank In		Junction	
1.007	Tank In		Junction		Tank Out		Junction	
1.008	Tank Out		Junction		07	1200	Manhole	Adoptable
1.009	07	1200	Manhole	Adoptable	08	1200	Manhole	Adoptable
1.010	08	1200	Manhole	Adoptable	09	1200	Manhole	Adoptable
1.011	09	1200	Manhole	Adoptable	10	1350	Manhole	Adoptable
4.000	IC01	450	Manhole	Adoptable	IC02	450	Manhole	Adoptable
4.001	IC02	450	Manhole	Adoptable	10	1350	Manhole	Adoptable
1.012	10	1350	Manhole	Adoptable	CW01	1500	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
CD US	381229.202	404289.618	97.000	0.639	100				
						0	1.000	96.361	240
CD DS	381244.902	404260.243	97.000	1.010	100		1	1.000	95.990
						0	1.001	95.990	225
03	381280.187	404227.811	94.000	0.875	1200				
						0	2.000	93.125	300
04	381257.762	404267.683	95.632	2.812	1200		1	2.000	92.820
						2	1.001	95.247	225
						0	1.002	92.820	300
05	381253.968	404274.814	95.874	3.086	1200		1	1.002	92.788
						0	1.003	92.788	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
01	381292.070	404234.769	94.000	0.875	1200				
						0	3.000	93.125	300
02	381266.309	404281.358	95.799	3.029	1200		1	3.000	92.770
						0	3.001	92.770	300
06	381261.554	404278.767	95.800	3.055	450		1	3.001	92.745
						2	1.003	92.745	300
						0	1.004	92.745	300
Oil Sep In	381262.358	404277.333	95.739	3.005			1	1.004	92.734
						0	1.005	92.734	300
Oil Sep Out	381263.254	404275.462	95.739	3.105			1	1.005	92.634
						0	1.006	92.634	300
Tank In	381264.252	404273.417	95.583	3.866			1	1.006	92.618
						0	1.007	91.717	6000
Tank Out	381279.426	404243.754	94.452	2.735			1	1.007	91.717
						0	1.008	91.792	150
07	381280.170	404242.461	94.398	2.617	1200		1	1.008	91.781
						0	1.009	91.781	150
08	381288.621	404226.457	93.948	2.288	1200		1	1.009	91.660
						0	1.010	91.660	150
09	381276.134	404219.102	93.901	2.338	1200		1	1.010	91.563
						0	1.011	91.563	150
IC01	381308.000	404213.878	93.806	1.106	450				
						0	4.000	92.700	150
IC02	381289.862	404206.932	93.788	1.282	450		1	4.000	92.506
						0	4.001	92.506	150
10	381282.301	404208.003	93.731	2.253	1350		1	4.001	92.336
						2	1.011	91.478	150
						0	1.012	91.478	150



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
CW01	381284.093	404204.259	93.660	2.224	1500	1	1	1.012	91.436	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	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 %)
50	45	0	0
100	45	0	0

Node 10 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	91.478	Product Number	CTL-SHE-0073-3000-1715-3000
Design Depth (m)	1.715	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.0	Min Node Diameter (mm)	1200

Results for 50 year +45% CC Critical Storm Duration. Lowest mass balance: 98.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	CD US	10	96.516	0.155	43.7	0.3571	0.0000	OK
15 minute summer	CD DS	10	96.092	0.102	43.2	0.0008	0.0000	OK
15 minute summer	03	11	93.616	0.491	38.0	1.2716	0.0000	SURCHARGED
15 minute summer	04	11	93.556	0.736	116.9	1.1907	0.0000	SURCHARGED
15 minute summer	05	11	93.394	0.606	116.4	0.6852	0.0000	SURCHARGED
15 minute summer	01	12	93.326	0.201	50.4	0.6161	0.0000	OK
15 minute summer	02	11	93.260	0.490	66.9	0.6595	0.0000	SURCHARGED
15 minute summer	06	11	93.227	0.482	200.4	0.2196	0.0000	SURCHARGED
15 minute summer	Oil Sep In	11	93.068	0.334	200.3	0.0000	0.0000	SURCHARGED
15 minute summer	Oil Sep Out	11	92.997	0.363	200.2	0.0000	0.0000	SURCHARGED
480 minute winter	Tank In	472	92.786	1.069	23.0	0.0000	0.0000	OK
480 minute winter	Tank Out	464	92.786	1.069	12.2	0.0000	0.0000	OK
480 minute winter	07	464	92.786	1.005	3.9	1.1372	0.0000	SURCHARGED
480 minute winter	08	464	92.782	1.122	3.8	1.2688	0.0000	SURCHARGED
480 minute winter	09	464	92.778	1.215	3.0	1.3743	0.0000	SURCHARGED
15 minute summer	IC01	10	92.795	0.095	11.9	0.0493	0.0000	OK
480 minute winter	IC02	472	92.775	0.269	1.3	0.0427	0.0000	SURCHARGED
480 minute winter	10	464	92.775	1.297	2.9	1.8558	0.0000	SURCHARGED
15 minute summer	CW01	1	91.436	0.000	2.4	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 summer	CD US	1.000	CD DS	43.2	1.759	0.664	0.8170	
15 minute summer	CD DS	1.001	04	42.9	2.593	0.367	0.2458	
15 minute summer	03	2.000	04	35.7	0.507	0.394	3.2259	
15 minute summer	04	1.002	05	116.4	1.652	1.663	0.5688	
15 minute summer	05	1.003	06	116.1	1.648	1.482	0.6024	
15 minute summer	01	3.000	02	47.5	0.774	0.525	3.2120	
15 minute summer	02	3.001	06	62.8	0.892	0.828	0.3813	
15 minute summer	06	1.004	Oil Sep In	200.3	2.845	2.212	0.1158	
15 minute summer	Oil Sep In	1.005	Oil Sep Out	200.2	2.844	0.817	0.1459	
15 minute summer	Oil Sep Out	1.006	Tank In	200.2	2.843	2.210	0.1722	
480 minute winter	Tank In	1.007	Tank Out	12.2	0.036	0.002	213.7773	
480 minute winter	Tank Out	1.008	07	3.9	0.505	0.018	0.2373	
480 minute winter	07	1.009	08	3.8	0.643	0.264	0.3186	
480 minute winter	08	1.010	09	3.0	0.546	0.205	0.2551	
480 minute winter	09	1.011	10	2.6	0.252	0.179	0.2235	
15 minute summer	IC01	4.000	IC02	11.8	1.136	0.664	0.2014	
480 minute winter	IC02	4.001	10	1.3	0.769	0.049	0.1344	
480 minute winter	10	Hydro-Brake®	CW01	2.6				92.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	CD US	10	96.533	0.172	50.6	0.3958	0.0000	OK
15 minute summer	CD DS	10	96.101	0.111	50.0	0.0009	0.0000	OK
15 minute summer	03	11	93.839	0.714	44.0	1.8469	0.0000	FLOOD RISK
15 minute summer	04	11	93.769	0.949	134.4	1.5350	0.0000	SURCHARGED
15 minute summer	05	11	93.558	0.770	133.1	0.8707	0.0000	SURCHARGED
15 minute summer	01	11	93.544	0.419	58.3	1.2829	0.0000	SURCHARGED
15 minute summer	02	11	93.394	0.624	73.4	0.8403	0.0000	SURCHARGED
15 minute summer	06	11	93.342	0.597	233.9	0.2723	0.0000	SURCHARGED
600 minute winter	Oil Sep In	585	93.237	0.503	42.3	0.0000	0.0000	SURCHARGED
600 minute winter	Oil Sep Out	585	93.237	0.603	22.5	0.0000	0.0000	SURCHARGED
600 minute winter	Tank In	585	93.237	1.520	27.2	0.0000	0.0000	SURCHARGED
600 minute winter	Tank Out	585	93.235	1.518	16.3	0.0000	0.0000	SURCHARGED
600 minute winter	07	585	93.236	1.455	4.1	1.6458	0.0000	SURCHARGED
600 minute winter	08	585	93.230	1.570	3.3	1.7760	0.0000	SURCHARGED
600 minute winter	09	585	93.225	1.662	3.0	1.8802	0.0000	SURCHARGED
600 minute winter	IC01	585	93.221	0.521	1.2	0.2710	0.0000	SURCHARGED
600 minute winter	IC02	585	93.221	0.715	1.2	0.1137	0.0000	SURCHARGED
600 minute winter	10	585	93.221	1.743	3.0	2.4943	0.0000	SURCHARGED
15 minute summer	CW01	1	91.436	0.000	2.4	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 summer	CD US	1.000	CD DS	50.0	1.805	0.768	0.9174	
15 minute summer	CD DS	1.001	04	49.6	2.683	0.424	0.2749	
15 minute summer	03	2.000	04	41.7	0.595	0.460	3.2259	
15 minute summer	04	1.002	05	133.1	1.890	1.903	0.5688	
15 minute summer	05	1.003	06	132.0	1.875	1.686	0.6024	
15 minute summer	01	3.000	02	52.1	0.798	0.575	3.7489	
15 minute summer	02	3.001	06	71.9	1.022	0.948	0.3813	
15 minute summer	06	1.004	Oil Sep In	233.0	3.309	2.572	0.1158	
600 minute winter	Oil Sep In	1.005	Oil Sep Out	-23.2	1.440	-0.095	0.1459	
600 minute winter	Oil Sep Out	1.006	Tank In	27.2	1.072	0.300	0.1739	
600 minute winter	Tank In	1.007	Tank Out	16.3	0.033	0.002	240.0075	
600 minute winter	Tank Out	1.008	07	4.1	0.474	0.019	0.2849	
600 minute winter	07	1.009	08	3.3	0.596	0.226	0.3186	
600 minute winter	08	1.010	09	3.0	0.531	0.208	0.2551	
600 minute winter	09	1.011	10	2.9	0.258	0.203	0.2235	
600 minute winter	IC01	4.000	IC02	1.2	0.636	0.068	0.3419	
600 minute winter	IC02	4.001	10	1.2	0.751	0.045	0.1344	
600 minute winter	10	Hydro-Brake®	CW01	3.0				114.6