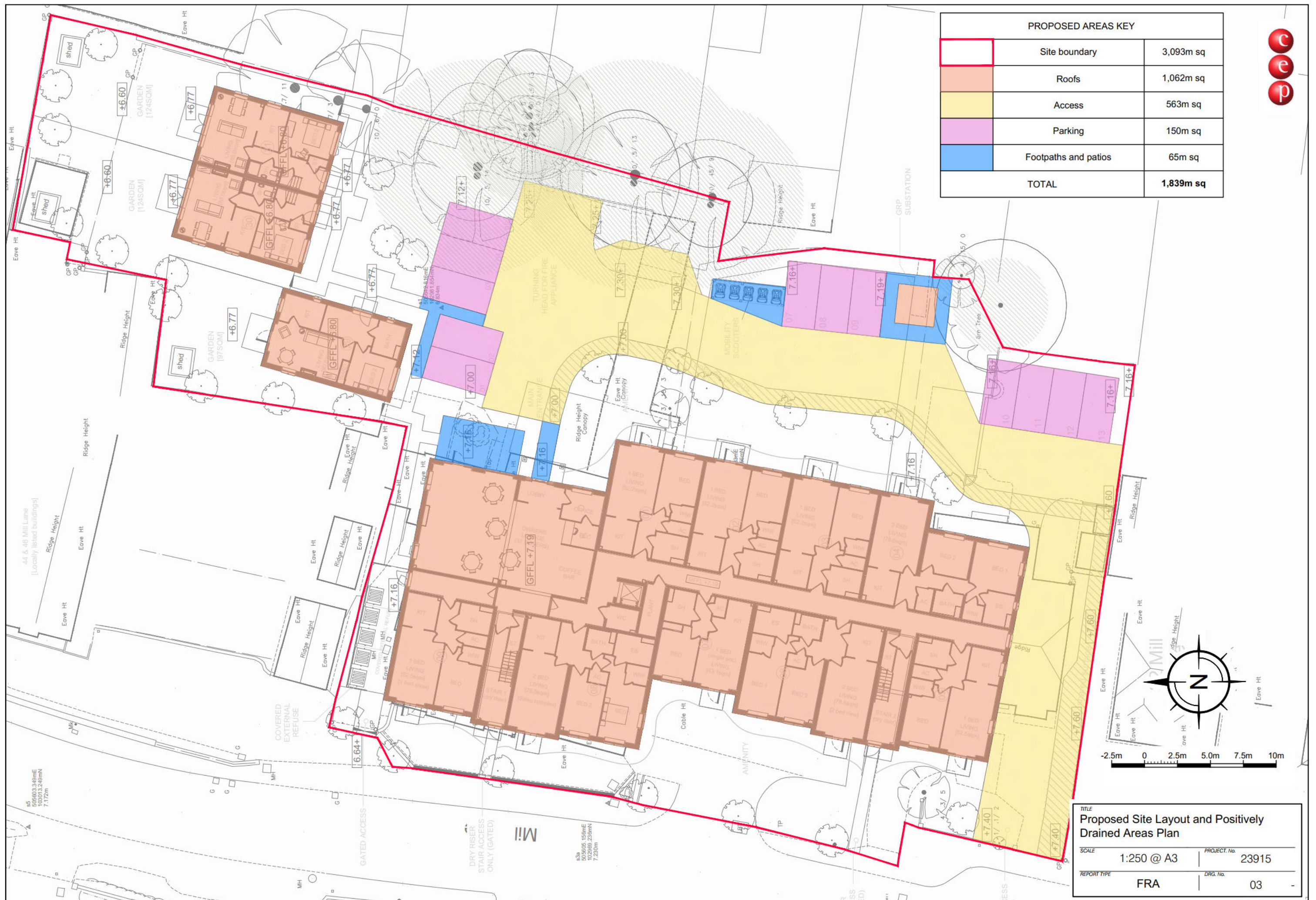
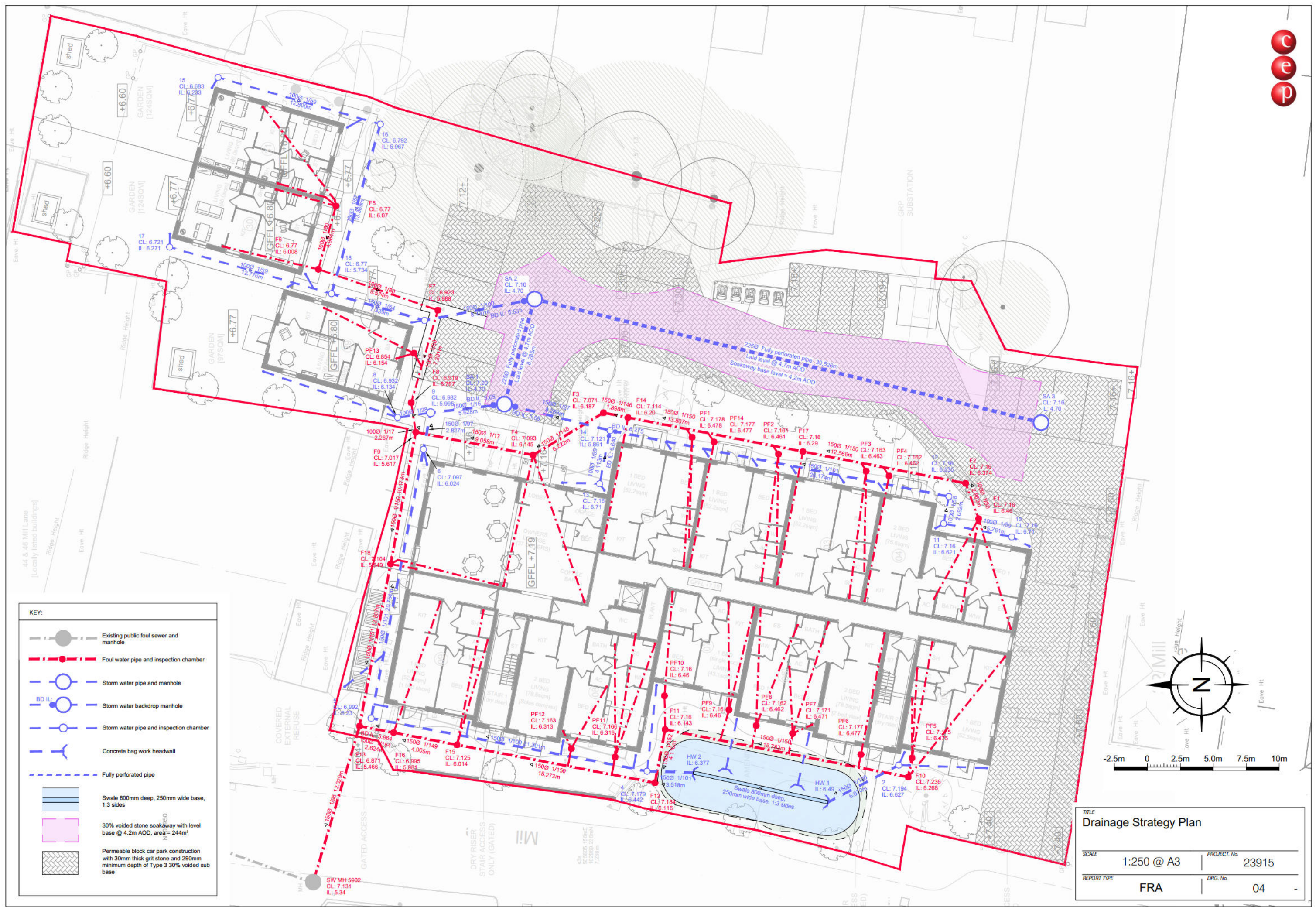


Appendix 6

**Proposed Site Layout
and Positively Drained Areas Plan**



Appendix 7
Drainage Strategy Plan
and Calculations



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.350
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	150.0		

Surface Link Type

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

Available Diameters (mm)

100 | 150

Swale Link Type

Template	Swale	Preferred Cover (m)	0.001	Base Inf Coefficient (m/hr)	0.00000
Width (mm)	200	Follow Ground	✓	Side Inf Coefficient (m/hr)	0.00000
Side Slope (1:X)	2.5	Velocity	Manning	Safety Factor	2.0
Auto Increment (mm)	1	ks (mm) / n	0.035		

Available Diameters (mm)

800

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.014	5.00	7.195		505607.409	102940.498	0.500	6.695
2			7.194	450	505608.279	102947.300	0.567	6.627
HW 1			7.290		505605.455	102952.673	0.800	6.490
HW 2			7.177		505607.713	102962.869	0.800	6.377
3	0.013	5.00	7.160	450	505613.641	102965.265	0.450	6.710
4	0.011	5.00	7.179	450	505607.814	102966.386	0.737	6.442
5	0.011	5.00	6.992	450	505611.829	102987.305	0.762	6.230
6	0.007	5.00	7.097	450	505632.210	102983.334	1.073	6.024
7	0.003	5.00	6.768		505637.653	102995.813	0.450	6.318
8	0.003	5.00	6.932	450	505634.629	102985.297	0.798	6.134
9			6.982	450	505634.985	102982.793	0.987	5.995
10	0.007	5.00	7.160	450	505625.573	102938.736	0.450	6.710
11			7.160	450	505626.579	102943.900	0.539	6.621
12	0.011	5.00	7.160	450	505628.632	102943.499	0.625	6.535
13	0.007	5.00	7.160	450	505629.599	102969.979	0.450	6.710
14	0.014	5.00	7.121	450	505633.636	102969.190	1.260	5.861
15	0.003	5.00	6.683	450	505660.395	102998.907	0.450	6.233
16	0.003	5.00	6.792	450	505656.852	102986.607	0.825	5.967
17	0.006	5.00	6.721	450	505647.539	103002.586	0.450	6.271
18	0.003	5.00	6.770	450	505644.006	102990.308	1.036	5.734
19			6.880	450	505641.977	102983.255	1.260	5.620
SA 1	0.079	5.00	7.000	1200	505635.635	102977.203	2.300	4.700
SA 2			7.100	1200	505643.598	102974.914	2.400	4.700

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
SA 3			7.160	1200	505634.236	102936.513	2.460	4.700

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	6.857	0.600	6.695	6.627	0.068	100.8	150	5.11	57.1
1.001	2	HW 1	6.070	0.600	6.627	6.566	0.061	99.5	150	5.21	56.7
Swale	HW 1	HW 2	10.443	0.035	6.490	6.377	0.113	92.4	800	5.32	56.3
1.003	HW 2	4	3.518	0.600	6.477	6.442	0.035	100.5	150	5.38	56.1
2.000	3	4	5.934	0.600	6.710	6.492	0.218	27.2	100	5.07	57.3
1.004	4	5	21.301	0.600	6.442	6.230	0.212	100.5	150	5.74	54.6
1.005	5	6	20.764	0.600	6.230	6.024	0.206	100.8	150	6.08	53.2
1.006	6	9	2.827	0.600	6.024	5.995	0.029	97.5	150	6.13	53.1
3.000	7	8	10.942	0.600	6.318	6.134	0.184	59.5	100	5.18	56.9
3.001	8	9	2.529	0.600	6.134	6.045	0.089	28.4	100	5.21	56.7
1.007	9	SA 1	5.628	0.600	5.995	5.650	0.345	16.3	150	6.17	52.9
4.000	10	11	5.261	0.600	6.710	6.621	0.089	59.1	100	5.09	57.2
4.001	11	12	2.092	0.600	6.621	6.585	0.036	58.1	100	5.12	57.1
4.002	12	14	26.174	0.600	6.535	6.275	0.260	100.7	150	5.56	55.3
5.000	13	14	4.113	0.600	6.710	6.640	0.070	58.8	100	5.07	57.3
4.003	14	SA 1	8.259	0.600	5.861	5.550	0.311	26.6	150	5.63	55.1
6.000	15	16	12.800	0.600	6.233	6.017	0.216	59.3	100	5.21	56.7
6.001	16	18	13.369	0.600	5.967	5.734	0.233	57.4	150	5.38	56.1
7.000	17	18	12.776	0.600	6.271	6.056	0.215	59.4	100	5.21	56.7
6.002	18	19	7.339	0.600	5.734	5.620	0.114	64.4	150	5.48	55.7
6.003	19	SA 2	8.497	0.600	5.620	5.535	0.085	100.0	150	5.62	55.1

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	1.000	17.7	2.9	0.350	0.417	0.014	0.0	41	0.736
1.001	1.007	17.8	2.9	0.417	0.574	0.014	0.0	41	0.741
Swale	1.588	2794.1	2.8	0.000	0.000	0.014	0.0	36	0.266
1.003	1.002	17.7	2.8	0.550	0.587	0.014	0.0	41	0.738
2.000	1.485	11.7	2.7	0.350	0.587	0.013	0.0	32	1.202
1.004	1.002	17.7	7.5	0.587	0.612	0.038	0.0	68	0.962
1.005	1.001	17.7	9.4	0.612	0.923	0.049	0.0	78	1.018
1.006	1.018	18.0	10.7	0.923	0.837	0.056	0.0	83	1.062
3.000	1.000	7.9	0.6	0.350	0.698	0.003	0.0	19	0.595
3.001	1.453	11.4	1.2	0.698	0.837	0.006	0.0	22	0.949
1.007	2.506	44.3	11.9	0.837	1.200	0.062	0.0	53	2.131
4.000	1.003	7.9	1.4	0.350	0.439	0.007	0.0	29	0.768
4.001	1.012	8.0	1.4	0.439	0.475	0.007	0.0	29	0.763
4.002	1.001	17.7	3.6	0.475	0.696	0.018	0.0	46	0.788
5.000	1.006	7.9	1.5	0.350	0.381	0.007	0.0	29	0.770
4.003	1.961	34.7	7.8	1.110	1.300	0.039	0.0	48	1.589
6.000	1.002	7.9	0.6	0.350	0.675	0.003	0.0	19	0.596
6.001	1.330	23.5	1.2	0.675	0.886	0.006	0.0	23	0.700
7.000	1.001	7.9	1.2	0.350	0.614	0.006	0.0	27	0.730
6.002	1.255	22.2	3.0	0.886	1.110	0.015	0.0	37	0.878
6.003	1.005	17.8	3.0	1.110	1.415	0.015	0.0	41	0.746

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)
Perforated Pipe 1	SA 1	SA 2	8.285	0.600	4.700	4.700	0.000	0.0	225	6.30	52.4
Perforated Pipe 2	SA 2	SA 3	39.526	0.600	4.700	4.700	0.000	0.0	225	6.96	49.9

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)
Perforated Pipe 1	1.000	39.8	34.1	2.075	2.175	0.180	0.0	225	0.000
Perforated Pipe 2	1.000	39.8	35.2	2.175	2.235	0.195	0.0	225	0.000

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	10080	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m ³ /ha)	0.0		

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
2	0	0	0
2	45	0	0
10	0	0	0
10	45	0	0
30	0	0	0
30	45	0	0
100	0	0	0
100	45	0	0

Node SA 3 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.700	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.001		

Node SA 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.01944	Safety Factor	2.0	Invert Level (m)	4.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	2580

Depth	Area	Inf Area	Depth	Area	Inf Area	Depth	Area	Inf Area
(m)	(m ²)	(m ²)	(m)	(m ²)	(m ²)	(m)	(m ²)	(m ²)
0.000	244.0	244.0	2.400	244.0	376.9	2.401	0.0	376.9

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.727	0.032	1.7	0.0000	0.0000	OK
15 minute summer	2	10	6.659	0.032	1.7	0.0050	0.0000	OK
15 minute summer	HW 1	11	6.517	0.027	1.7	0.0000	0.0000	OK
15 minute summer	HW 2	12	6.507	0.130	1.7	0.0000	0.0000	OK
15 minute summer	3	10	6.736	0.026	1.6	0.0041	0.0000	OK
15 minute summer	4	11	6.490	0.048	4.0	0.0077	0.0000	OK
15 minute summer	5	12	6.286	0.056	5.2	0.0089	0.0000	OK
15 minute summer	6	12	6.089	0.065	5.9	0.0103	0.0000	OK
15 minute summer	7	10	6.333	0.015	0.4	0.0000	0.0000	OK
15 minute summer	8	10	6.152	0.018	0.8	0.0029	0.0000	OK
15 minute summer	9	12	6.037	0.042	6.6	0.0067	0.0000	OK
15 minute summer	10	10	6.733	0.023	0.9	0.0037	0.0000	OK
15 minute summer	11	10	6.645	0.024	0.9	0.0038	0.0000	OK
15 minute summer	12	11	6.571	0.036	2.1	0.0057	0.0000	OK
15 minute summer	13	10	6.734	0.024	0.9	0.0037	0.0000	OK
15 minute summer	14	10	5.900	0.039	4.7	0.0062	0.0000	OK
15 minute summer	15	10	6.248	0.015	0.4	0.0024	0.0000	OK
15 minute summer	16	10	5.985	0.018	0.8	0.0029	0.0000	OK
15 minute summer	17	11	6.291	0.020	0.7	0.0033	0.0000	OK
15 minute summer	18	10	5.763	0.029	1.8	0.0047	0.0000	OK
15 minute summer	19	11	5.653	0.033	1.8	0.0052	0.0000	OK
15 minute summer	SA 1	11	4.865	0.165	19.9	0.1866	0.0000	OK
360 minute winter	SA 2	296	4.567	-0.133	4.8	26.8615	0.0000	OK
15 minute summer	SA 3	1	4.700	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	1.7	
15 minute summer	2	1.001	1.7	
15 minute summer	HW 1	Swale	1.7	
15 minute summer	HW 2	1.003	1.5	
15 minute summer	3	2.000	1.6	
15 minute summer	4	1.004	4.0	
15 minute summer	5	1.005	5.2	
15 minute summer	6	1.006	6.0	
15 minute summer	7	3.000	0.4	
15 minute summer	8	3.001	0.7	
15 minute summer	9	1.007	6.6	
15 minute summer	10	4.000	0.9	
15 minute summer	11	4.001	0.8	
15 minute summer	12	4.002	2.2	
15 minute summer	13	5.000	0.9	
15 minute summer	14	4.003	4.6	
15 minute summer	15	6.000	0.4	
15 minute summer	16	6.001	0.7	
15 minute summer	17	7.000	0.7	
15 minute summer	18	6.002	1.8	
15 minute summer	19	6.003	1.8	
15 minute summer	SA 1	Perforated Pipe 1	19.9	
360 minute winter	SA 2	Perforated Pipe 2	0.0	
360 minute winter	SA 2	Infiltration	0.7	
15 minute summer	SA 3	Orifice	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.735	0.040	2.6	0.0000	0.0000	OK
15 minute summer	2	10	6.667	0.040	2.6	0.0063	0.0000	OK
15 minute summer	HW 1	11	6.525	0.035	2.6	0.0000	0.0000	OK
15 minute summer	HW 2	12	6.515	0.138	2.6	0.0000	0.0000	OK
15 minute summer	3	10	6.743	0.033	2.5	0.0052	0.0000	OK
15 minute summer	4	11	6.507	0.065	6.8	0.0104	0.0000	OK
15 minute summer	5	11	6.307	0.077	8.8	0.0122	0.0000	OK
15 minute summer	6	11	6.112	0.088	10.2	0.0139	0.0000	OK
15 minute summer	7	10	6.336	0.018	0.6	0.0000	0.0000	OK
15 minute summer	8	10	6.157	0.023	1.2	0.0036	0.0000	OK
15 minute summer	9	11	6.052	0.057	11.2	0.0090	0.0000	OK
15 minute summer	10	10	6.738	0.028	1.3	0.0045	0.0000	OK
15 minute summer	11	11	6.651	0.030	1.3	0.0048	0.0000	OK
15 minute summer	12	11	6.580	0.045	3.4	0.0071	0.0000	OK
15 minute summer	13	11	6.739	0.029	1.3	0.0046	0.0000	OK
15 minute summer	14	10	5.910	0.049	7.2	0.0078	0.0000	OK
15 minute summer	15	10	6.251	0.018	0.6	0.0029	0.0000	OK
15 minute summer	16	10	5.989	0.022	1.2	0.0036	0.0000	OK
15 minute summer	17	11	6.297	0.026	1.1	0.0041	0.0000	OK
15 minute summer	18	10	5.771	0.037	2.8	0.0059	0.0000	OK
15 minute summer	19	11	5.662	0.042	2.8	0.0066	0.0000	OK
15 minute summer	SA 1	11	4.924	0.224	32.6	0.2537	0.0000	OK
360 minute winter	SA 2	344	4.726	0.026	5.9	38.5560	0.0000	OK
360 minute winter	SA 3	344	4.726	0.026	0.0	0.0298	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	2.6	
15 minute summer	2	1.001	2.6	
15 minute summer	HW 1	Swale	2.6	
15 minute summer	HW 2	1.003	2.5	
15 minute summer	3	2.000	2.5	
15 minute summer	4	1.004	6.8	
15 minute summer	5	1.005	8.9	
15 minute summer	6	1.006	10.1	
15 minute summer	7	3.000	0.6	
15 minute summer	8	3.001	1.1	
15 minute summer	9	1.007	11.2	
15 minute summer	10	4.000	1.3	
15 minute summer	11	4.001	1.3	
15 minute summer	12	4.002	3.3	
15 minute summer	13	5.000	1.3	
15 minute summer	14	4.003	7.2	
15 minute summer	15	6.000	0.6	
15 minute summer	16	6.001	1.1	
15 minute summer	17	7.000	1.1	
15 minute summer	18	6.002	2.8	
15 minute summer	19	6.003	2.8	
15 minute summer	SA 1	Perforated Pipe 1	32.7	
360 minute winter	SA 2	Perforated Pipe 2	0.0	
360 minute winter	SA 2	Infiltration	0.7	
360 minute winter	SA 3	Orifice	0.0	0.0

Results for 2 year +45% CC Critical Storm Duration. Lowest mass balance: 99.91%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.744	0.049	3.8	0.0000	0.0000	OK
15 minute summer	2	10	6.675	0.048	3.8	0.0077	0.0000	OK
15 minute summer	HW 1	11	6.532	0.042	3.8	0.0000	0.0000	OK
15 minute summer	HW 2	11	6.528	0.151	3.8	0.0000	0.0000	OK
15 minute summer	3	10	6.751	0.041	3.6	0.0064	0.0000	OK
15 minute summer	4	11	6.525	0.083	10.0	0.0132	0.0000	OK
15 minute summer	5	11	6.330	0.100	12.9	0.0158	0.0000	OK
15 minute summer	6	11	6.135	0.111	14.7	0.0176	0.0000	OK
15 minute summer	7	11	6.340	0.022	0.8	0.0000	0.0000	OK
15 minute summer	8	11	6.162	0.028	1.6	0.0044	0.0000	OK
15 minute summer	9	11	6.066	0.071	16.3	0.0113	0.0000	OK
15 minute summer	10	10	6.745	0.035	1.9	0.0055	0.0000	OK
15 minute summer	11	10	6.658	0.037	1.9	0.0058	0.0000	OK
15 minute summer	12	11	6.589	0.054	4.9	0.0086	0.0000	OK
15 minute summer	13	10	6.746	0.036	1.9	0.0057	0.0000	OK
15 minute summer	14	10	5.922	0.061	10.4	0.0096	0.0000	OK
15 minute summer	15	11	6.255	0.022	0.8	0.0035	0.0000	OK
15 minute summer	16	11	5.994	0.027	1.6	0.0042	0.0000	OK
15 minute summer	17	11	6.302	0.031	1.6	0.0050	0.0000	OK
15 minute summer	18	11	5.779	0.045	4.0	0.0071	0.0000	OK
15 minute summer	19	11	5.671	0.051	4.0	0.0081	0.0000	OK
720 minute winter	SA 1	675	5.034	0.334	4.9	0.3776	0.0000	SURCHARGED
720 minute winter	SA 2	675	5.034	0.334	5.4	61.4152	0.0000	SURCHARGED
720 minute winter	SA 3	675	5.034	0.334	0.3	0.3777	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	3.8	
15 minute summer	2	1.001	3.8	
15 minute summer	HW 1	Swale	3.8	
15 minute summer	HW 2	1.003	3.7	
15 minute summer	3	2.000	3.6	
15 minute summer	4	1.004	10.0	
15 minute summer	5	1.005	12.9	
15 minute summer	6	1.006	14.7	
15 minute summer	7	3.000	0.8	
15 minute summer	8	3.001	1.6	
15 minute summer	9	1.007	16.3	
15 minute summer	10	4.000	1.9	
15 minute summer	11	4.001	1.9	
15 minute summer	12	4.002	4.8	
15 minute summer	13	5.000	1.9	
15 minute summer	14	4.003	10.4	
15 minute summer	15	6.000	0.8	
15 minute summer	16	6.001	1.6	
15 minute summer	17	7.000	1.6	
15 minute summer	18	6.002	4.0	
15 minute summer	19	6.003	4.0	
720 minute winter	SA 1	Perforated Pipe 1	4.9	
720 minute winter	SA 2	Perforated Pipe 2	0.3	
720 minute winter	SA 2	Infiltration	0.7	
720 minute winter	SA 3	Orifice	0.0	0.1

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.753	0.058	5.2	0.0000	0.0000	OK
15 minute summer	2	10	6.684	0.057	5.2	0.0091	0.0000	OK
15 minute summer	HW 1	11	6.546	0.056	5.1	0.0000	0.0000	OK
15 minute summer	HW 2	11	6.543	0.166	5.0	0.0000	0.0000	OK
15 minute summer	3	10	6.758	0.048	4.8	0.0076	0.0000	OK
15 minute summer	4	11	6.542	0.100	13.5	0.0158	0.0000	OK
15 minute summer	5	11	6.362	0.132	17.5	0.0210	0.0000	OK
15 minute summer	6	11	6.163	0.139	19.9	0.0222	0.0000	OK
15 minute summer	7	11	6.343	0.025	1.1	0.0000	0.0000	OK
15 minute summer	8	10	6.166	0.032	2.2	0.0052	0.0000	OK
15 minute summer	9	11	6.082	0.087	22.1	0.0138	0.0000	OK
15 minute summer	10	10	6.752	0.042	2.6	0.0066	0.0000	OK
15 minute summer	11	10	6.665	0.044	2.6	0.0070	0.0000	OK
15 minute summer	12	10	6.600	0.065	6.7	0.0103	0.0000	OK
15 minute summer	13	10	6.753	0.043	2.6	0.0068	0.0000	OK
15 minute summer	14	10	5.934	0.073	14.3	0.0117	0.0000	OK
15 minute summer	15	11	6.259	0.026	1.1	0.0041	0.0000	OK
15 minute summer	16	11	5.998	0.031	2.2	0.0049	0.0000	OK
15 minute summer	17	10	6.308	0.037	2.2	0.0059	0.0000	OK
15 minute summer	18	10	5.788	0.054	5.5	0.0085	0.0000	OK
15 minute summer	19	11	5.680	0.060	5.5	0.0096	0.0000	OK
480 minute winter	SA 1	472	5.152	0.452	7.2	0.5111	0.0000	SURCHARGED
480 minute winter	SA 2	472	5.152	0.452	7.7	70.1894	0.0000	SURCHARGED
480 minute winter	SA 3	472	5.152	0.452	0.9	0.5112	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	5.2	
15 minute summer	2	1.001	5.1	
15 minute summer	HW 1	Swale	5.0	
15 minute summer	HW 2	1.003	5.1	
15 minute summer	3	2.000	4.8	
15 minute summer	4	1.004	13.6	
15 minute summer	5	1.005	17.4	
15 minute summer	6	1.006	19.9	
15 minute summer	7	3.000	1.1	
15 minute summer	8	3.001	2.2	
15 minute summer	9	1.007	22.1	
15 minute summer	10	4.000	2.6	
15 minute summer	11	4.001	2.6	
15 minute summer	12	4.002	6.5	
15 minute summer	13	5.000	2.6	
15 minute summer	14	4.003	14.3	
15 minute summer	15	6.000	1.1	
15 minute summer	16	6.001	2.2	
15 minute summer	17	7.000	2.2	
15 minute summer	18	6.002	5.5	
15 minute summer	19	6.003	5.5	
480 minute winter	SA 1	Perforated Pipe 1	7.2	
480 minute winter	SA 2	Perforated Pipe 2	0.9	
480 minute winter	SA 2	Infiltration	0.7	
480 minute winter	SA 3	Orifice	0.0	0.1

Results for 10 year +45% CC Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.767	0.072	7.6	0.0000	0.0000	OK
15 minute summer	2	10	6.698	0.071	7.6	0.0113	0.0000	OK
15 minute summer	HW 1	12	6.646	0.156	7.5	0.0000	0.0000	OK
15 minute summer	HW 2	12	6.646	0.269	6.3	0.0000	0.0000	SURCHARGED
15 minute summer	3	11	6.769	0.059	7.0	0.0094	0.0000	OK
15 minute summer	4	12	6.642	0.200	16.7	0.0318	0.0000	SURCHARGED
15 minute summer	5	12	6.478	0.248	20.8	0.0395	0.0000	SURCHARGED
15 minute summer	6	11	6.195	0.171	22.5	0.0272	0.0000	SURCHARGED
15 minute summer	7	10	6.348	0.030	1.6	0.0000	0.0000	OK
15 minute summer	8	10	6.174	0.040	3.2	0.0063	0.0000	OK
15 minute summer	9	11	6.091	0.096	25.5	0.0153	0.0000	OK
15 minute summer	10	10	6.763	0.053	3.8	0.0084	0.0000	OK
15 minute summer	11	10	6.677	0.056	3.8	0.0089	0.0000	OK
15 minute summer	12	10	6.616	0.081	9.6	0.0128	0.0000	OK
15 minute summer	13	10	6.764	0.054	3.8	0.0085	0.0000	OK
15 minute summer	14	10	5.955	0.094	20.8	0.0149	0.0000	OK
15 minute summer	15	10	6.264	0.031	1.6	0.0049	0.0000	OK
15 minute summer	16	10	6.004	0.037	3.2	0.0059	0.0000	OK
15 minute summer	17	10	6.317	0.046	3.2	0.0073	0.0000	OK
15 minute summer	18	10	5.801	0.067	7.9	0.0106	0.0000	OK
15 minute summer	19	10	5.695	0.075	7.9	0.0119	0.0000	OK
720 minute winter	SA 1	705	5.674	0.974	7.6	1.1020	0.0000	SURCHARGED
720 minute winter	SA 2	705	5.674	0.974	8.1	109.0257	0.0000	SURCHARGED
720 minute winter	SA 3	705	5.674	0.974	0.8	1.1021	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	7.6	
15 minute summer	2	1.001	7.5	
15 minute summer	HW 1	Swale	6.3	
15 minute summer	HW 2	1.003	11.0	
15 minute summer	3	2.000	7.0	
15 minute summer	4	1.004	15.7	
15 minute summer	5	1.005	19.1	
15 minute summer	6	1.006	22.5	
15 minute summer	7	3.000	1.6	
15 minute summer	8	3.001	3.2	
15 minute summer	9	1.007	25.5	
15 minute summer	10	4.000	3.8	
15 minute summer	11	4.001	3.7	
15 minute summer	12	4.002	9.5	
15 minute summer	13	5.000	3.8	
15 minute summer	14	4.003	20.8	
15 minute summer	15	6.000	1.6	
15 minute summer	16	6.001	3.2	
15 minute summer	17	7.000	3.2	
15 minute summer	18	6.002	7.9	
15 minute summer	19	6.003	7.8	
720 minute winter	SA 1	Perforated Pipe 1	7.5	
720 minute winter	SA 2	Perforated Pipe 2	0.8	
720 minute winter	SA 2	Infiltration	0.7	
720 minute winter	SA 3	Orifice	0.0	0.2

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.762	0.067	6.8	0.0000	0.0000	OK
15 minute summer	2	10	6.694	0.067	6.8	0.0106	0.0000	OK
15 minute summer	HW 1	12	6.610	0.120	6.7	0.0000	0.0000	OK
15 minute summer	HW 2	12	6.610	0.233	5.9	0.0000	0.0000	OK
15 minute summer	3	10	6.765	0.055	6.3	0.0087	0.0000	OK
15 minute summer	4	12	6.606	0.164	15.0	0.0261	0.0000	SURCHARGED
15 minute summer	5	10	6.457	0.227	19.4	0.0361	0.0000	SURCHARGED
15 minute summer	6	10	6.188	0.164	21.9	0.0261	0.0000	SURCHARGED
15 minute summer	7	10	6.347	0.029	1.5	0.0000	0.0000	OK
15 minute summer	8	10	6.172	0.038	3.0	0.0061	0.0000	OK
15 minute summer	9	10	6.089	0.094	24.8	0.0149	0.0000	OK
15 minute summer	10	10	6.759	0.049	3.4	0.0078	0.0000	OK
15 minute summer	11	10	6.673	0.052	3.4	0.0083	0.0000	OK
15 minute summer	12	10	6.611	0.076	8.8	0.0121	0.0000	OK
15 minute summer	13	10	6.760	0.050	3.4	0.0080	0.0000	OK
15 minute summer	14	10	5.948	0.087	18.8	0.0139	0.0000	OK
15 minute summer	15	10	6.263	0.030	1.5	0.0048	0.0000	OK
15 minute summer	16	10	6.003	0.036	3.0	0.0057	0.0000	OK
15 minute summer	17	10	6.314	0.043	2.9	0.0069	0.0000	OK
15 minute summer	18	10	5.798	0.064	7.3	0.0101	0.0000	OK
15 minute summer	19	10	5.691	0.071	7.3	0.0113	0.0000	OK
600 minute winter	SA 1	585	5.460	0.760	7.6	0.8594	0.0000	SURCHARGED
600 minute winter	SA 2	585	5.460	0.760	8.1	93.0807	0.0000	SURCHARGED
600 minute winter	SA 3	585	5.460	0.760	0.4	0.8594	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	6.8	
15 minute summer	2	1.001	6.7	
15 minute summer	HW 1	Swale	5.9	
15 minute summer	HW 2	1.003	8.8	
15 minute summer	3	2.000	6.3	
15 minute summer	4	1.004	15.0	
15 minute summer	5	1.005	18.5	
15 minute summer	6	1.006	21.8	
15 minute summer	7	3.000	1.5	
15 minute summer	8	3.001	3.0	
15 minute summer	9	1.007	24.7	
15 minute summer	10	4.000	3.4	
15 minute summer	11	4.001	3.4	
15 minute summer	12	4.002	8.6	
15 minute summer	13	5.000	3.4	
15 minute summer	14	4.003	18.7	
15 minute summer	15	6.000	1.5	
15 minute summer	16	6.001	3.0	
15 minute summer	17	7.000	2.9	
15 minute summer	18	6.002	7.3	
15 minute summer	19	6.003	7.2	
600 minute winter	SA 1	Perforated Pipe 1	7.5	
600 minute winter	SA 2	Perforated Pipe 2	0.4	
600 minute winter	SA 2	Infiltration	0.7	
600 minute winter	SA 3	Orifice	0.0	0.1

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.780	0.085	9.9	0.0000	0.0000	OK
15 minute summer	2	13	6.748	0.121	9.8	0.0193	0.0000	OK
15 minute summer	HW 1	13	6.745	0.255	9.5	0.0000	0.0000	OK
15 minute summer	HW 2	13	6.745	0.368	9.1	0.0000	0.0000	SURCHARGED
15 minute summer	3	12	6.854	0.144	9.2	0.0229	0.0000	SURCHARGED
15 minute summer	4	13	6.737	0.295	16.6	0.0470	0.0000	SURCHARGED
15 minute summer	5	12	6.561	0.331	20.8	0.0526	0.0000	SURCHARGED
15 minute summer	6	11	6.225	0.201	25.2	0.0320	0.0000	SURCHARGED
15 minute summer	7	10	6.353	0.035	2.1	0.0000	0.0000	OK
15 minute summer	8	10	6.182	0.048	4.2	0.0076	0.0000	OK
720 minute winter	9	705	6.128	0.133	3.4	0.0211	0.0000	OK
15 minute summer	10	10	6.773	0.063	4.9	0.0100	0.0000	OK
15 minute summer	11	10	6.687	0.066	4.9	0.0105	0.0000	OK
15 minute summer	12	10	6.631	0.096	12.6	0.0153	0.0000	OK
15 minute summer	13	10	6.774	0.064	4.9	0.0101	0.0000	OK
720 minute winter	14	705	6.128	0.267	2.1	0.0424	0.0000	SURCHARGED
15 minute summer	15	10	6.269	0.036	2.1	0.0057	0.0000	OK
720 minute winter	16	705	6.128	0.161	0.4	0.0255	0.0000	SURCHARGED
15 minute summer	17	10	6.325	0.054	4.2	0.0086	0.0000	OK
720 minute winter	18	705	6.128	0.394	0.9	0.0626	0.0000	SURCHARGED
720 minute winter	19	705	6.128	0.508	0.9	0.0807	0.0000	SURCHARGED
720 minute winter	SA 1	705	6.128	1.428	9.7	1.6146	0.0000	SURCHARGED
720 minute winter	SA 2	705	6.128	1.428	10.5	142.7093	0.0000	SURCHARGED
720 minute winter	SA 3	705	6.128	1.428	0.5	1.6146	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	9.8	
15 minute summer	2	1.001	9.5	
15 minute summer	HW 1	Swale	7.4	
15 minute summer	HW 2	1.003	14.1	
15 minute summer	3	2.000	8.8	
15 minute summer	4	1.004	17.3	
15 minute summer	5	1.005	20.7	
15 minute summer	6	1.006	25.1	
15 minute summer	7	3.000	2.1	
15 minute summer	8	3.001	4.2	
720 minute winter	9	1.007	3.4	
15 minute summer	10	4.000	4.9	
15 minute summer	11	4.001	4.8	
15 minute summer	12	4.002	12.4	
15 minute summer	13	5.000	4.9	
720 minute winter	14	4.003	2.1	
15 minute summer	15	6.000	2.1	
720 minute winter	16	6.001	0.4	
15 minute summer	17	7.000	4.2	
720 minute winter	18	6.002	0.9	
720 minute winter	19	6.003	0.9	
720 minute winter	SA 1	Perforated Pipe 1	9.6	
720 minute winter	SA 2	Perforated Pipe 2	0.5	
720 minute winter	SA 2	Infiltration	0.7	
720 minute winter	SA 3	Orifice	0.0	0.3

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.772	0.077	8.6	0.0000	0.0000	OK
15 minute summer	2	11	6.706	0.079	8.6	0.0126	0.0000	OK
15 minute summer	HW 1	13	6.693	0.203	8.5	0.0000	0.0000	OK
15 minute summer	HW 2	13	6.693	0.316	6.7	0.0000	0.0000	SURCHARGED
15 minute summer	3	11	6.783	0.073	8.0	0.0115	0.0000	OK
15 minute summer	4	12	6.688	0.246	15.5	0.0390	0.0000	SURCHARGED
15 minute summer	5	12	6.518	0.288	20.0	0.0457	0.0000	SURCHARGED
15 minute summer	6	11	6.209	0.185	23.8	0.0295	0.0000	SURCHARGED
15 minute summer	7	11	6.351	0.033	1.8	0.0000	0.0000	OK
15 minute summer	8	10	6.177	0.043	3.6	0.0069	0.0000	OK
15 minute summer	9	11	6.096	0.101	27.3	0.0161	0.0000	OK
15 minute summer	10	10	6.767	0.057	4.3	0.0091	0.0000	OK
15 minute summer	11	10	6.682	0.061	4.3	0.0096	0.0000	OK
15 minute summer	12	10	6.623	0.088	11.0	0.0140	0.0000	OK
15 minute summer	13	10	6.768	0.058	4.3	0.0092	0.0000	OK
15 minute summer	14	10	5.964	0.103	23.7	0.0164	0.0000	OK
15 minute summer	15	11	6.266	0.033	1.8	0.0053	0.0000	OK
15 minute summer	16	11	6.007	0.040	3.6	0.0063	0.0000	OK
15 minute summer	17	10	6.321	0.050	3.7	0.0079	0.0000	OK
600 minute winter	18	600	5.832	0.098	0.9	0.0156	0.0000	OK
600 minute winter	19	600	5.832	0.212	0.9	0.0338	0.0000	SURCHARGED
600 minute winter	SA 1	600	5.832	1.132	9.7	1.2808	0.0000	SURCHARGED
600 minute winter	SA 2	600	5.832	1.132	10.5	120.7764	0.0000	SURCHARGED
600 minute winter	SA 3	600	5.832	1.132	1.1	1.2807	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	8.6	
15 minute summer	2	1.001	8.5	
15 minute summer	HW 1	Swale	6.7	
15 minute summer	HW 2	1.003	12.0	
15 minute summer	3	2.000	7.8	
15 minute summer	4	1.004	16.1	
15 minute summer	5	1.005	19.9	
15 minute summer	6	1.006	23.7	
15 minute summer	7	3.000	1.8	
15 minute summer	8	3.001	3.6	
15 minute summer	9	1.007	27.3	
15 minute summer	10	4.000	4.3	
15 minute summer	11	4.001	4.2	
15 minute summer	12	4.002	10.8	
15 minute summer	13	5.000	4.3	
15 minute summer	14	4.003	23.6	
15 minute summer	15	6.000	1.8	
15 minute summer	16	6.001	3.6	
15 minute summer	17	7.000	3.7	
600 minute winter	18	6.002	0.9	
600 minute winter	19	6.003	0.9	
600 minute winter	SA 1	Perforated Pipe 1	9.6	
600 minute winter	SA 2	Perforated Pipe 2	1.1	
600 minute winter	SA 2	Infiltration	0.7	
600 minute winter	SA 3	Orifice	0.0	0.2

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	12	6.859	0.164	12.5	0.0000	0.0000	SURCHARGED
15 minute summer	2	13	6.842	0.215	12.4	0.0342	0.0000	SURCHARGED
15 minute summer	HW 1	13	6.834	0.344	11.7	0.0000	0.0000	OK
15 minute summer	HW 2	13	6.834	0.457	11.9	0.0000	0.0000	SURCHARGED
15 minute summer	3	12	7.013	0.303	11.6	0.0482	0.0000	FLOOD RISK
15 minute summer	4	13	6.829	0.387	19.8	0.0615	0.0000	SURCHARGED
2160 minute winter	5	2040	6.683	0.453	1.3	0.0720	0.0000	SURCHARGED
2160 minute winter	6	2040	6.682	0.658	1.5	0.1047	0.0000	SURCHARGED
2160 minute winter	7	2040	6.682	0.364	0.1	0.0000	0.0000	FLOOD RISK
2160 minute winter	8	2040	6.683	0.549	0.2	0.0873	0.0000	FLOOD RISK
2160 minute winter	9	2040	6.682	0.687	1.7	0.1093	0.0000	FLOOD RISK
15 minute summer	10	10	6.786	0.076	6.2	0.0121	0.0000	OK
15 minute summer	11	10	6.700	0.079	6.2	0.0126	0.0000	OK
2160 minute winter	12	2040	6.682	0.147	0.5	0.0234	0.0000	OK
15 minute summer	13	10	6.786	0.076	6.2	0.0121	0.0000	OK
2160 minute winter	14	2040	6.682	0.821	1.1	0.1305	0.0000	SURCHARGED
2160 minute winter	15	2040	6.682	0.449	0.1	0.0714	0.0000	FLOOD RISK
2160 minute winter	16	2040	6.682	0.715	0.2	0.1137	0.0000	FLOOD RISK
2160 minute winter	17	2040	6.682	0.411	0.2	0.0653	0.0000	FLOOD RISK
2160 minute winter	18	2040	6.682	0.948	0.5	0.1507	0.0000	FLOOD RISK
2160 minute winter	19	2040	6.682	1.062	0.5	0.1688	0.0000	FLOOD RISK
2160 minute winter	SA 1	2040	6.682	1.982	4.9	2.2422	0.0000	SURCHARGED
2160 minute winter	SA 2	2040	6.682	1.982	5.3	177.9593	0.0000	SURCHARGED
2160 minute winter	SA 3	2040	6.682	1.982	0.2	2.2417	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	12.4	
15 minute summer	2	1.001	11.7	
15 minute summer	HW 1	Swale	8.3	
15 minute summer	HW 2	1.003	15.5	
15 minute summer	3	2.000	10.3	
15 minute summer	4	1.004	18.0	
2160 minute winter	5	1.005	1.3	
2160 minute winter	6	1.006	1.5	
2160 minute winter	7	3.000	-0.1	
2160 minute winter	8	3.001	0.2	
2160 minute winter	9	1.007	1.7	
15 minute summer	10	4.000	6.2	
15 minute summer	11	4.001	6.1	
2160 minute winter	12	4.002	0.5	
15 minute summer	13	5.000	6.2	
2160 minute winter	14	4.003	1.1	
2160 minute winter	15	6.000	0.1	
2160 minute winter	16	6.001	0.2	
2160 minute winter	17	7.000	0.2	
2160 minute winter	18	6.002	0.5	
2160 minute winter	19	6.003	0.5	
2160 minute winter	SA 1	Perforated Pipe 1	4.8	
2160 minute winter	SA 2	Perforated Pipe 2	0.2	
2160 minute winter	SA 2	Infiltration	0.7	
2160 minute winter	SA 3	Orifice	0.0	0.7

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.350
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	150.0		

Surface Link Type

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

Available Diameters (mm)

100 | 150

Swale Link Type

Template	Swale	Preferred Cover (m)	0.001	Base Inf Coefficient (m/hr)	0.00000
Width (mm)	200	Follow Ground	✓	Side Inf Coefficient (m/hr)	0.00000
Side Slope (1:X)	2.5	Velocity	Manning	Safety Factor	2.0
Auto Increment (mm)	1	ks (mm) / n	0.035		

Available Diameters (mm)

800

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.014	5.00	7.195		505607.409	102940.498	0.500	6.695
2			7.194	450	505608.279	102947.300	0.567	6.627
HW 1			7.290		505605.455	102952.673	0.800	6.490
HW 2			7.177		505607.713	102962.869	0.800	6.377
3	0.013	5.00	7.160	450	505613.641	102965.265	0.450	6.710
4	0.011	5.00	7.179	450	505607.814	102966.386	0.737	6.442
5	0.011	5.00	6.992	450	505611.829	102987.305	0.762	6.230
6	0.007	5.00	7.097	450	505632.210	102983.334	1.073	6.024
7	0.003	5.00	6.768		505637.653	102995.813	0.450	6.318
8	0.003	5.00	6.932	450	505634.629	102985.297	0.798	6.134
9			6.982	450	505634.985	102982.793	0.987	5.995
10	0.007	5.00	7.160	450	505625.573	102938.736	0.450	6.710
11			7.160	450	505626.579	102943.900	0.539	6.621
12	0.011	5.00	7.160	450	505628.632	102943.499	0.625	6.535
13	0.007	5.00	7.160	450	505629.599	102969.979	0.450	6.710
14	0.014	5.00	7.121	450	505633.636	102969.190	1.260	5.861
15	0.003	5.00	6.683	450	505660.395	102998.907	0.450	6.233
16	0.003	5.00	6.792	450	505656.852	102986.607	0.825	5.967
17	0.006	5.00	6.721	450	505647.539	103002.586	0.450	6.271
18	0.003	5.00	6.770	450	505644.006	102990.308	0.936	5.834
19			6.880	450	505641.977	102983.255	1.119	5.761
SA 1	0.079	5.00	7.000	1200	505635.635	102977.203	2.300	4.700
SA 2			7.100	1200	505643.598	102974.914	2.400	4.700

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
SA 3			7.160	1200	505634.236	102936.513	2.460	4.700

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	6.857	0.600	6.695	6.627	0.068	100.8	150	5.11	57.1
1.001	2	HW 1	6.070	0.600	6.627	6.566	0.061	99.5	150	5.21	56.7
Swale	HW 1	HW 2	10.443	0.035	6.490	6.377	0.113	92.4	800	5.32	56.3
1.003	HW 2	4	3.518	0.600	6.477	6.442	0.035	100.5	150	5.38	56.1
2.000	3	4	5.934	0.600	6.710	6.492	0.218	27.2	100	5.07	57.3
1.004	4	5	21.301	0.600	6.442	6.230	0.212	100.5	150	5.74	54.6
1.005	5	6	20.764	0.600	6.230	6.024	0.206	100.8	150	6.08	53.2
1.006	6	9	2.827	0.600	6.024	5.995	0.029	97.5	150	6.13	53.1
3.000	7	8	10.942	0.600	6.318	6.134	0.184	59.5	100	5.18	56.9
3.001	8	9	2.529	0.600	6.134	6.045	0.089	28.4	100	5.21	56.7
1.007	9	SA 1	5.628	0.600	5.995	5.650	0.345	16.3	150	6.17	52.9
4.000	10	11	5.261	0.600	6.710	6.621	0.089	59.1	100	5.09	57.2
4.001	11	12	2.092	0.600	6.621	6.585	0.036	58.1	100	5.12	57.1
4.002	12	14	26.174	0.600	6.535	6.275	0.260	100.7	150	5.56	55.3
5.000	13	14	4.113	0.600	6.710	6.640	0.070	58.8	100	5.07	57.3
4.003	14	SA 1	8.259	0.600	5.861	5.550	0.311	26.6	150	5.63	55.1
6.000	15	16	12.800	0.600	6.233	6.017	0.216	59.3	100	5.21	56.7
6.001	16	18	13.369	0.600	5.967	5.834	0.133	100.5	150	5.44	55.8
7.000	17	18	12.776	0.600	6.271	5.884	0.387	33.0	100	5.16	57.0
6.002	18	19	7.339	0.600	5.834	5.761	0.073	100.5	150	5.56	55.3
6.003	19	SA 2	8.497	0.600	5.761	5.676	0.085	100.0	150	5.70	54.8

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	1.000	17.7	2.9	0.350	0.417	0.014	0.0	41	0.736
1.001	1.007	17.8	2.9	0.417	0.574	0.014	0.0	41	0.741
Swale	1.588	2794.1	2.8	0.000	0.000	0.014	0.0	36	0.266
1.003	1.002	17.7	2.8	0.550	0.587	0.014	0.0	41	0.738
2.000	1.485	11.7	2.7	0.350	0.587	0.013	0.0	32	1.202
1.004	1.002	17.7	7.5	0.587	0.612	0.038	0.0	68	0.962
1.005	1.001	17.7	9.4	0.612	0.923	0.049	0.0	78	1.018
1.006	1.018	18.0	10.7	0.923	0.837	0.056	0.0	83	1.062
3.000	1.000	7.9	0.6	0.350	0.698	0.003	0.0	19	0.595
3.001	1.453	11.4	1.2	0.698	0.837	0.006	0.0	22	0.949
1.007	2.506	44.3	11.9	0.837	1.200	0.062	0.0	53	2.131
4.000	1.003	7.9	1.4	0.350	0.439	0.007	0.0	29	0.768
4.001	1.012	8.0	1.4	0.439	0.475	0.007	0.0	29	0.763
4.002	1.001	17.7	3.6	0.475	0.696	0.018	0.0	46	0.788
5.000	1.006	7.9	1.5	0.350	0.381	0.007	0.0	29	0.770
4.003	1.961	34.7	7.8	1.110	1.300	0.039	0.0	48	1.589
6.000	1.002	7.9	0.6	0.350	0.675	0.003	0.0	19	0.596
6.001	1.002	17.7	1.2	0.675	0.786	0.006	0.0	27	0.574
7.000	1.347	10.6	1.2	0.350	0.786	0.006	0.0	23	0.898
6.002	1.002	17.7	3.0	0.786	0.969	0.015	0.0	42	0.749
6.003	1.005	17.8	3.0	0.969	1.274	0.015	0.0	41	0.746

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)
Perforated Pipe 1	SA 1	SA 2	8.285	0.600	4.700	4.700	0.000	0.0	225	6.30	52.4
Perforated Pipe 2	SA 2	SA 3	39.526	0.600	4.700	4.700	0.000	0.0	225	6.96	49.9

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)
Perforated Pipe 1	1.000	39.8	34.1	2.075	2.175	0.180	0.0	225	0.000
Perforated Pipe 2	1.000	39.8	35.2	2.175	2.235	0.195	0.0	225	0.000

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	10080	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m ³ /ha)	0.0		

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 %)
30	0	0	0

Node SA 3 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.700	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.001		

Node SA 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.01944	Safety Factor	2.0	Invert Level (m)	4.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	1260

Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	244.0	244.0

Depth (m)	Area (m ²)	Inf Area (m ²)
2.400	244.0	376.9

Depth (m)	Area (m ²)	Inf Area (m ²)
2.401	0.0	376.9

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.762	0.067	6.8	0.0000	0.0000	OK
15 minute summer	2	10	6.694	0.067	6.8	0.0106	0.0000	OK
15 minute summer	HW 1	12	6.610	0.120	6.7	0.0000	0.0000	OK
15 minute summer	HW 2	12	6.610	0.233	5.9	0.0000	0.0000	OK
15 minute summer	3	10	6.765	0.055	6.3	0.0087	0.0000	OK
15 minute summer	4	12	6.606	0.164	15.0	0.0261	0.0000	SURCHARGED
15 minute summer	5	10	6.457	0.227	19.4	0.0361	0.0000	SURCHARGED
15 minute summer	6	10	6.188	0.164	21.9	0.0261	0.0000	SURCHARGED
15 minute summer	7	10	6.347	0.029	1.5	0.0000	0.0000	OK
15 minute summer	8	10	6.172	0.038	3.0	0.0061	0.0000	OK
15 minute summer	9	10	6.089	0.094	24.8	0.0149	0.0000	OK
15 minute summer	10	10	6.759	0.049	3.4	0.0078	0.0000	OK
15 minute summer	11	10	6.673	0.052	3.4	0.0083	0.0000	OK
15 minute summer	12	10	6.611	0.076	8.8	0.0121	0.0000	OK
15 minute summer	13	10	6.760	0.050	3.4	0.0080	0.0000	OK
15 minute summer	14	10	5.948	0.087	18.8	0.0139	0.0000	OK
15 minute summer	15	10	6.263	0.030	1.5	0.0048	0.0000	OK
15 minute summer	16	10	6.008	0.041	3.0	0.0066	0.0000	OK
15 minute summer	17	10	6.308	0.037	2.9	0.0058	0.0000	OK
15 minute summer	18	10	5.907	0.073	7.3	0.0116	0.0000	OK
15 minute summer	19	10	5.832	0.071	7.3	0.0113	0.0000	OK
600 minute winter	SA 1	585	5.460	0.760	7.6	0.8594	0.0000	SURCHARGED
600 minute winter	SA 2	585	5.460	0.760	8.1	93.0807	0.0000	SURCHARGED
600 minute winter	SA 3	585	5.460	0.760	0.5	0.8595	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	1.000	6.8	
15 minute summer	2	1.001	6.7	
15 minute summer	HW 1	Swale	5.9	
15 minute summer	HW 2	1.003	8.8	
15 minute summer	3	2.000	6.3	
15 minute summer	4	1.004	15.0	
15 minute summer	5	1.005	18.5	
15 minute summer	6	1.006	21.8	
15 minute summer	7	3.000	1.5	
15 minute summer	8	3.001	3.0	
15 minute summer	9	1.007	24.7	
15 minute summer	10	4.000	3.4	
15 minute summer	11	4.001	3.4	
15 minute summer	12	4.002	8.6	
15 minute summer	13	5.000	3.4	
15 minute summer	14	4.003	18.7	
15 minute summer	15	6.000	1.5	
15 minute summer	16	6.001	2.9	
15 minute summer	17	7.000	2.9	
15 minute summer	18	6.002	7.3	
15 minute summer	19	6.003	7.2	
600 minute winter	SA 1	Perforated Pipe 1	7.5	
600 minute winter	SA 2	Perforated Pipe 2	0.5	
600 minute winter	SA 2	Infiltration	0.7	
600 minute winter	SA 3	Orifice	0.0	0.1

Appendix 8

**Interim Drainage Management
and Maintenance Plan**

Interim Drainage Management and Maintenance Plan



The Civil Engineering Practice
11 Tungsten Building
George Street
Fishersgate
Sussex
BN41 1RA

Project	Windmill Inn, Mill Lane, Rustington
Project Number	23915

By Steve Doughty

Date 26 March 2026

1 Introduction

- 1.1 This Interim Drainage Management and Maintenance Plan has been prepared as the initial draft of the document that will become the Drainage Maintenance and Management Manual.
- 1.2 The Drainage Management and Maintenance Manual will be completed as part of the Operation and Maintenance Manual to be provided by the Principal Contractor on completion of construction.
- 1.3 The Drainage Management and Maintenance Manual will be handed over to a Management Company appointed by the Developer on project completion.
- 1.4 The Drainage Management and Maintenance Manual will remain a live document and will be used to guide and record the management and maintenance of the surface water and foul drainage systems.
- 1.5 In the event that the Management Company becomes unable to discharge its duties within two years of first appointment the Developer will endeavour to appoint an alternative.

2 During Construction

- 2.1 Once appointed the Contractor will prepare a site specific method statement for the control of silt and other pollutants during construction. CIRIA Report C532, Control of water pollution from construction sites, provides further guidance on this.
- 2.2 The Contractor will maintain the proposed drainage system during construction and until the handing over of the site.



3 Surface Water Drainage System

- 3.1 The surface water drainage system has been designed as a Sustainable Urban Drainage System (SuDS)
- 3.2 The system has been designed to collect surface water from the roofs and discharge it to ground via a base draining soakaway.
- 3.3 Driveways and parking areas have been designed as permeable paving with infiltration to ground via the base draining soakaway.
- 3.4 The system will provide water quality improvement to ensure that at the point of discharge the surface water has received suitable pollution mitigation.

4 Foul Water Drainage System

- 4.1 Foul water will be discharged to the public foul sewer beneath Mill Lane via conventional pipework laid at self cleansing velocity and will require minimal maintenance.

5 Schedule of Maintenance

- 5.1 Management of shared drainage facilities will be passed on to a Management Company.
- 5.2 There are three categories of maintenance activities:

- **Regular maintenance**

Basic tasks undertaken on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.

- **Occasional maintenance**

Tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).

- **Remedial maintenance**

Intermittent tasks that may be required to rectify faults associated with the system. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.

- 5.3 The following maintenance schedule details the typical tasks to be undertaken at different intervals.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Manage vegetation and remove nuisance plants - aesthetics	As required
	Litter and debris removal - catchpits and swale	Monthly or as required
	Maintain / mow dry swale to ensure vegetation height remains at between 100mm and 150mm	3 Monthly or as required

Maintenance Schedule	Required Action	Frequency
	Cleaning of gutters and any filters on downpipes	3 Monthly
Occasional Maintenance	Remove sediment and debris from silt trap chambers, channel drains and inlet chambers	6 monthly
	Visual inspection of permeable paving for defects and settlement	Annually
	Sweeping / brushing of permeable paving	Every 2 years
	Surface and foul water pipework - jetting / rodding	Every 2 years or as required
Remedial Maintenance	Remove debris / blockages to silt traps / channel drains / headwalls	As required
	Repairs to access chambers / manhole covers	As required
	Replace any broken permeable blocks / surface, remedial works to any depressions or rutting	As required
	Inspect inlet, outlet from downpipes, channel drains, swale, headwalls and gullies for blockages, standing water and clear	As required
	Reconstruct storage structures if performance deteriorates or failure occurs	As required
	Where there is a build-up of silt in swale or at inlets of 50mm or more above the design level remove silt and spread on site. Undertake when ground is damp in autumn or early spring and transplant turf / overseed to original design levels	As required
Monitoring	Inspect silt traps and note the rate sediment has accumulated	Monthly in the first year and then annually
	Inspect storage structures to ensure they are fully emptying	Annually

Indicative Schedule of Maintenance for the Proposed Drainage System

Component	Inspection Frequency					
	1 Month	3 Months	6 Months	1 Year	After leaf fall in Autumn	2 Years
Gullies, Channel Drains and Gutters			✓		✓	
Catchpits	✓				✓	
Surface and Foul Water Pipework						✓
Permeable Paving				✓		
Swale		✓				
Storage Facilities				✓		
Existing Watercourse	✓					

Inspection Frequency Summary

6 Maintenance Procedures

6.1 It is recommended that the Management Company employ a suitably qualified company to undertake the maintenance works for all onsite drainage.

6.2 The following procedures provide a guide to the two most common maintenance items, jetting and silt removal, to be undertaken on site:

6.3 Jetting

6.3.1 Equipment Required:

- High-pressure water jetting equipment.
- Personal protective equipment (PPE) for operators.

6.3.2 Typical Procedure:

- Perform a pre-jetting inspection to assess the level of sedimentation.
- Insert the jetting hose into the pipe, starting from the upstream end.
- Gradually move the jetting hose downstream, ensuring the entire pipe or structure length is cleaned.
- Monitor the process to avoid any damage to the drainage infrastructure.
- Collect dislodged silt and debris at the downstream end using a vacuum or manual removal.

6.4 Silt Removal and Disposal

6.4.1 Equipment Required:

- Vacuum truck or manual removal tools.
- Containers for temporary storage of silt and debris.

6.4.2 Typical Procedure:

- Collect the dislodged silt and debris from the downstream end of pipe or structure.
- Transfer the collected material to the containers.
- Dispose of the collected silt and debris following local regulations and environmental guidelines.

7 Financing

7.1 The regular and corrective maintenance of all shared elements of the drainage system will be managed and funded through the Management Company on behalf of the Site Operator.

8 Health and Safety

8.1 Designers Residual Risks

- 8.1.1 There are no significant residual risks associated with the construction of the proposed surface or foul water drainage network or permeable paving system beyond common site risks that would reasonably be anticipated by a competent Civil Engineering Contractor.

8.2 Construction Phase

- 8.2.1 The Principal Contractor will undertake a construction phase Health and Safety Plan for the site.
- 8.2.2 Prior to handover the Principal Contractor will undertake a review of maintenance activities required and prepare suitable Health and Safety documentation as part of the site hand over documents.

9 Design Life

- 9.1 The design life of the development is likely to exceed the design life of the components within the SuDS network. During the routine drainage inspections it may be determined that some components have reached the end of their functional life cycle.
- 9.2 Where possible repairs should be the first option considered however if repairs are unviable it will be necessary for the Management Company to arrange for the replacement of the faulty component.

10 Emergency Plan

10.1 Potential flood and maintenance indicators:

- Manholes or inspections chambers overflowing
- Gullies overflowing or ponding
- Channel drains overflowing or ponding
- Other visual indicators of the drainage system not performing as it should

10.2 Should any of the items above occur then immediate action as outlined below should be undertaken:

- Inspect for blockages in the problem area
- Should the problem not be identified via an initial inspection:
 - For unadopted onsite drainage the Management Company should appoint a suitable drainage engineer to inspect and survey the system and jet any blockages

- Where it is suspected that there is a problem with the downstream drainage network the Owner or relevant statutory undertaker of that system should be alerted

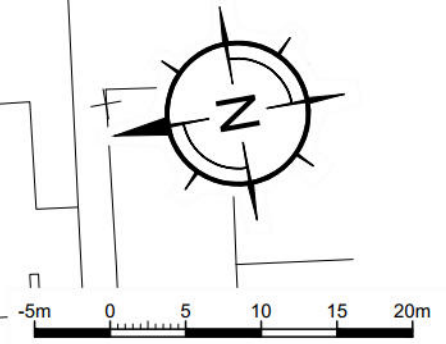
10.3 Emergency Contact Details

10.3.1 Management Company	TBC
---------------------------	-----

10.3.2 Maintenance Team	TBC
-------------------------	-----

Appendix 9

Surface Water Exceedance Route Plan



Key

- Exceedence Route
- Proposed Levels (By Others)

TITLE Surface Water Exceedence Route Plan	
SCALE 1:500 @ A3	PROJECT No. 23915
REPORT TYPE FRA	DRG. No. 05

Drainage Survey (c) Crown Copyright 2024. All rights reserved. Licence number 10002432