

Doc. Ref.	26726-CALC-0101
Sheet	1 of 14
Engineer	Z. Jordan
Date	30 May 25
Revision	-

DESIGN CALCULATIONS FRONT SHEET

SCHEME	Barrow Hill Quarry, Mill Lane, Earl Shilton
CLIENT	AT Contracting and Plant Hire Ltd
ASPECTS OF SCHEME TO BE DESIGNED	Greenfield Calculations Surface water attenuation design and simulation results for the 1%AEP40CC event for the development site.
CODES OF PRACTICE, DESIGN SPECIFICATIONS & BRITISH STANDARDS	- Design and analysis of urban storm drainage. Wallingford Procedure Vol.1 - Sustainable Drainage Systems- Non-Statutory technical standards for Sustainable drainage systems- 2015 - The SuDS Manual – CIRIA C753
NOTES	Existing runoff conditions have been calculated using the FEH Statistical method within UK SuDS to calculate the Greenfield discharge rate for the impermeable area of 0.572ha, the QBAR Greenfield rate has been calculated as 2.0l/s. As this is a low rate that could cause blockages within the system, and in accordance with Leicestershire Guidance, the discharge rate has been increased to 5.0l/s. Design calculations were carried out within Flow Causeway.

INDEX

Pages	Calculations	Checked by	Date
2 - 14	Surface water sewer detailed design details for the 50%AEP, 3.3%AEP35CC and 1%40AEPCC event.	RC	30.05.2025

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	4.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.025	4.00	87.630	1200	448711.668	297208.697	1.554
S2	0.016	4.00	87.940	1200	448686.881	297201.713	2.122
S3	0.020	4.00	87.990	1200	448675.005	297193.916	2.314
S4	0.037	4.00	87.800	1200	448670.504	297181.018	2.336
S5	0.020	4.00	87.650	1200	448670.841	297169.395	2.302
S6	0.023	4.00	87.460	1200	448679.408	297160.454	2.471
S7	0.024	4.00	87.130	1200	448698.716	297159.378	2.330
S8 HW	0.022	4.00	86.240	1200	448702.625	297167.193	1.476
S9 Basin	0.020	4.00	86.240	1200	448708.289	297166.771	1.500
S10 HydroBrake			86.240	1200	448715.273	297162.789	1.600
S11	0.010	4.00	85.870	1200	448738.493	297154.744	2.718
S12	0.012	4.00	82.800	1200	448766.560	297152.849	1.523
S13	0.069	4.00	81.300	1200	448788.083	297152.639	1.608
S14	0.023	4.00	81.000	1200	448800.907	297131.855	1.667
S15	0.024	4.00	81.100	1200	448813.294	297120.043	1.847
S16	0.004	4.00	81.180	1200	448827.138	297118.058	1.985
S17	0.042	4.00	80.770	1200	448856.546	297145.571	1.539
S18	0.020	4.00	80.590	1200	448849.011	297131.219	1.427
S19	0.006	4.00	80.640	1200	448842.431	297124.874	1.590
S20	0.023	4.00	80.800	1200	448851.578	297119.329	1.786
S21	0.025	4.00	80.800	1200	448860.950	297116.499	1.819
S22	0.006	4.00	80.570	1200	448870.048	297105.808	1.636
S23 HW			80.320	1200	448877.131	297110.962	1.490
S24 Basin	0.101	4.00	80.320	1200	448881.269	297111.613	1.500
S25 HydroBrake			80.320	1200	448887.090	297107.058	1.518
S26			80.380	1200	448896.764	297098.523	1.654
S27			80.440	1200	448913.019	297090.739	1.820
S28			80.400	1200	448910.150	297080.596	1.842
S29			79.800	1200	448868.152	297052.123	1.777
S30			79.000	1200	448861.930	297001.770	1.275
S31			78.000	1200	448878.216	296898.390	0.891
S32 Outfall			77.500	1200	448865.495	296884.985	0.500

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	S1	S2	25.752	0.600	86.076	85.818	0.258	100.0	225	4.33	50.0
1.001	S2	S3	14.207	0.600	85.818	85.676	0.142	100.0	225	4.51	50.0
1.002	S3	S4	13.661	0.600	85.676	85.464	0.212	64.4	225	4.65	50.0
1.003	S4	S5	11.628	0.600	85.464	85.348	0.116	100.0	225	4.80	50.0
1.004	S5	S6	12.383	0.600	85.348	84.989	0.359	34.5	225	4.89	50.0
1.005	S6	S7	19.338	0.600	84.989	84.875	0.114	169.6	225	5.21	50.0
1.006	S7	S8 HW	8.738	0.600	84.800	84.764	0.036	240.0	300	5.36	50.0
1.007	S8 HW	S9 Basin	5.680	0.600	84.764	84.740	0.024	240.0	300	5.45	50.0
1.008	S9 Basin	S10 HydroBrake	8.039	0.600	84.740	84.640	0.100	80.4	300	5.53	50.0
1.009	S10 HydroBrake	S11	24.574	0.600	84.640	83.152	1.488	16.5	150	5.69	50.0
1.010	S11	S12	28.131	0.600	83.152	81.277	1.875	15.0	150	5.87	50.0
1.011	S12	S13	21.524	0.600	81.277	79.842	1.435	15.0	150	6.01	50.0
1.012	S13	S14	24.422	0.600	79.692	79.333	0.359	68.0	300	6.22	50.0
1.013	S14	S15	17.116	0.600	79.333	79.253	0.080	214.0	300	6.49	50.0
1.014	S15	S16	13.986	0.600	79.253	79.195	0.058	240.0	300	6.72	50.0
1.015	S16	S19	16.743	0.600	79.195	79.125	0.070	240.0	300	6.99	50.0
2.000	S17	S18	16.210	0.600	79.231	79.163	0.068	240.0	300	4.27	50.0
2.001	S18	S19	9.141	0.600	79.163	79.125	0.038	240.0	300	4.42	50.0
1.016	S19	S20	10.696	0.600	79.050	79.014	0.036	300.0	375	7.16	50.0
1.017	S20	S21	9.790	0.600	79.014	78.981	0.033	300.0	375	7.32	50.0
1.018	S21	S22	14.038	0.600	78.981	78.934	0.047	300.0	375	7.55	50.0
1.019	S22	S23 HW	8.760	0.600	78.934	78.905	0.029	300.0	375	7.69	50.0
1.020	S23 HW	S24 Basin	4.189	0.600	78.830	78.820	0.010	400.0	450	7.76	50.0
1.021	S24 Basin	S25 HydroBrake	7.391	0.600	78.820	78.802	0.018	400.0	450	7.88	50.0
1.022	S25 HydroBrake	S26	12.901	0.600	78.802	78.726	0.076	170.0	225	8.09	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)
1.000	1.307	52.0	4.5	1.329	1.897	0.025	0.0
1.001	1.307	52.0	7.4	1.897	2.089	0.041	0.0
1.002	1.632	64.9	11.0	2.089	2.111	0.061	0.0
1.003	1.307	52.0	17.7	2.111	2.077	0.098	0.0
1.004	2.235	88.9	21.3	2.077	2.246	0.118	0.0
1.005	1.001	39.8	25.5	2.246	2.030	0.141	0.0
1.006	1.010	71.4	29.8	2.030	1.176	0.165	0.0
1.007	1.010	71.4	33.8	1.176	1.200	0.187	0.0
1.008	1.755	124.0	37.4	1.200	1.300	0.207	0.0
1.009	2.491	44.0	37.4	1.450	2.568	0.207	0.0
1.010	2.614	46.2	39.2	2.568	1.373	0.217	0.0
1.011	2.614	46.2	41.4	1.373	1.308	0.229	0.0
1.012	1.909	134.9	53.8	1.308	1.367	0.298	0.0
1.013	1.071	75.7	58.0	1.367	1.547	0.321	0.0
1.014	1.010	71.4	62.3	1.547	1.685	0.345	0.0
1.015	1.010	71.4	63.1	1.685	1.215	0.349	0.0
2.000	1.010	71.4	7.6	1.239	1.127	0.042	0.0
2.001	1.010	71.4	11.2	1.127	1.215	0.062	0.0
1.016	1.041	114.9	75.4	1.215	1.411	0.417	0.0
1.017	1.041	114.9	79.5	1.411	1.444	0.440	0.0
1.018	1.041	114.9	84.0	1.444	1.261	0.465	0.0
1.019	1.041	114.9	85.1	1.261	1.040	0.471	0.0
1.020	1.010	160.7	85.1	1.040	1.050	0.471	0.0
1.021	1.010	160.7	103.4	1.050	1.068	0.572	0.0
1.022	1.000	39.7	103.4	1.293	1.429	0.572	0.0

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)
1.023	S26	S27	18.023	0.600	78.726	78.620	0.106	170.0	225	8.39	50.0
1.024	S27	S28	10.541	0.600	78.620	78.558	0.062	170.0	225	8.57	50.0
1.025	S28	S29	50.740	0.600	78.558	78.023	0.535	94.8	225	9.20	50.0
1.026	S29	S30	50.736	0.600	78.023	77.725	0.298	170.0	225	10.05	50.0
1.027	S30	S31	104.655	0.600	77.725	77.109	0.616	170.0	225	11.79	50.0
1.028	S31	S32 Outfall	18.480	0.600	77.109	77.000	0.109	170.0	225	12.10	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)
1.023	1.000	39.7	103.4	1.429	1.595	0.572	0.0
1.024	1.000	39.7	103.4	1.595	1.617	0.572	0.0
1.025	1.343	53.4	103.4	1.617	1.552	0.572	0.0
1.026	1.000	39.7	103.4	1.552	1.050	0.572	0.0
1.027	1.000	39.7	103.4	1.050	0.666	0.572	0.0
1.028	1.000	39.7	103.4	0.666	0.275	0.572	0.0

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	25.752	100.0	225	Circular	87.630	86.076	1.329	87.940	85.818	1.897
1.001	14.207	100.0	225	Circular	87.940	85.818	1.897	87.990	85.676	2.089
1.002	13.661	64.4	225	Circular	87.990	85.676	2.089	87.800	85.464	2.111
1.003	11.628	100.0	225	Circular	87.800	85.464	2.111	87.650	85.348	2.077
1.004	12.383	34.5	225	Circular	87.650	85.348	2.077	87.460	84.989	2.246
1.005	19.338	169.6	225	Circular	87.460	84.989	2.246	87.130	84.875	2.030
1.006	8.738	240.0	300	Circular	87.130	84.800	2.030	86.240	84.764	1.176
1.007	5.680	240.0	300	Circular	86.240	84.764	1.176	86.240	84.740	1.200
1.008	8.039	80.4	300	Circular	86.240	84.740	1.200	86.240	84.640	1.300
1.009	24.574	16.5	150	Circular	86.240	84.640	1.450	85.870	83.152	2.568
1.010	28.131	15.0	150	Circular	85.870	83.152	2.568	82.800	81.277	1.373
1.011	21.524	15.0	150	Circular	82.800	81.277	1.373	81.300	79.842	1.308
1.012	24.422	68.0	300	Circular	81.300	79.692	1.308	81.000	79.333	1.367
1.013	17.116	214.0	300	Circular	81.000	79.333	1.367	81.100	79.253	1.547
1.014	13.986	240.0	300	Circular	81.100	79.253	1.547	81.180	79.195	1.685
1.015	16.743	240.0	300	Circular	81.180	79.195	1.685	80.640	79.125	1.215

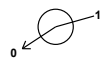
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
1.003	S4	1200	Manhole	Adoptable	S5	1200	Manhole	Adoptable
1.004	S5	1200	Manhole	Adoptable	S6	1200	Manhole	Adoptable
1.005	S6	1200	Manhole	Adoptable	S7	1200	Manhole	Adoptable
1.006	S7	1200	Manhole	Adoptable	S8 HW	1200	Manhole	Adoptable
1.007	S8 HW	1200	Manhole	Adoptable	S9 Basin	1200	Manhole	Adoptable
1.008	S9 Basin	1200	Manhole	Adoptable	S10 HydroBrake	1200	Manhole	Adoptable
1.009	S10 HydroBrake	1200	Manhole	Adoptable	S11	1200	Manhole	Adoptable
1.010	S11	1200	Manhole	Adoptable	S12	1200	Manhole	Adoptable
1.011	S12	1200	Manhole	Adoptable	S13	1200	Manhole	Adoptable
1.012	S13	1200	Manhole	Adoptable	S14	1200	Manhole	Adoptable
1.013	S14	1200	Manhole	Adoptable	S15	1200	Manhole	Adoptable
1.014	S15	1200	Manhole	Adoptable	S16	1200	Manhole	Adoptable
1.015	S16	1200	Manhole	Adoptable	S19	1200	Manhole	Adoptable

**Pipeline Schedule**

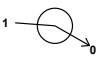
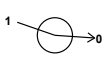
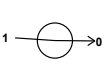
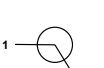
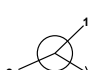
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
2.000	16.210	240.0	300	Circular	80.770	79.231	1.239	80.590	79.163	1.127
2.001	9.141	240.0	300	Circular	80.590	79.163	1.127	80.640	79.125	1.215
1.016	10.696	300.0	375	Circular	80.640	79.050	1.215	80.800	79.014	1.411
1.017	9.790	300.0	375	Circular	80.800	79.014	1.411	80.800	78.981	1.444
1.018	14.038	300.0	375	Circular	80.800	78.981	1.444	80.570	78.934	1.261
1.019	8.760	300.0	375	Circular	80.570	78.934	1.261	80.320	78.905	1.040
1.020	4.189	400.0	450	Circular	80.320	78.830	1.040	80.320	78.820	1.050
1.021	7.391	400.0	450	Circular	80.320	78.820	1.050	80.320	78.802	1.068
1.022	12.901	170.0	225	Circular	80.320	78.802	1.293	80.380	78.726	1.429
1.023	18.023	170.0	225	Circular	80.380	78.726	1.429	80.440	78.620	1.595
1.024	10.541	170.0	225	Circular	80.440	78.620	1.595	80.400	78.558	1.617
1.025	50.740	94.8	225	Circular	80.400	78.558	1.617	79.800	78.023	1.552
1.026	50.736	170.0	225	Circular	79.800	78.023	1.552	79.000	77.725	1.050
1.027	104.655	170.0	225	Circular	79.000	77.725	1.050	78.000	77.109	0.666
1.028	18.480	170.0	225	Circular	78.000	77.109	0.666	77.500	77.000	0.275

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	S17	1200	Manhole	Adoptable	S18	1200	Manhole	Adoptable
2.001	S18	1200	Manhole	Adoptable	S19	1200	Manhole	Adoptable
1.016	S19	1200	Manhole	Adoptable	S20	1200	Manhole	Adoptable
1.017	S20	1200	Manhole	Adoptable	S21	1200	Manhole	Adoptable
1.018	S21	1200	Manhole	Adoptable	S22	1200	Manhole	Adoptable
1.019	S22	1200	Manhole	Adoptable	S23 HW	1200	Manhole	Adoptable
1.020	S23 HW	1200	Manhole	Adoptable	S24 Basin	1200	Manhole	Adoptable
1.021	S24 Basin	1200	Manhole	Adoptable	S25 HydroBrake	1200	Manhole	Adoptable
1.022	S25 HydroBrake	1200	Manhole	Adoptable	S26	1200	Manhole	Adoptable
1.023	S26	1200	Manhole	Adoptable	S27	1200	Manhole	Adoptable
1.024	S27	1200	Manhole	Adoptable	S28	1200	Manhole	Adoptable
1.025	S28	1200	Manhole	Adoptable	S29	1200	Manhole	Adoptable
1.026	S29	1200	Manhole	Adoptable	S30	1200	Manhole	Adoptable
1.027	S30	1200	Manhole	Adoptable	S31	1200	Manhole	Adoptable
1.028	S31	1200	Manhole	Adoptable	S32 Outfall	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	448711.668	297208.697	87.630	1.554	1200				
						0	1.000	86.076	225
S2	448686.881	297201.713	87.940	2.122	1200				
						0	1.001	85.818	225
S3	448675.005	297193.916	87.990	2.314	1200				
						0	1.002	85.676	225
S4	448670.504	297181.018	87.800	2.336	1200				
						0	1.003	85.464	225
S5	448670.841	297169.395	87.650	2.302	1200				
						0	1.004	85.348	225

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S6	448679.408	297160.454	87.460	2.471	1200		1 1.004	84.989	225
							0 1.005	84.989	225
S7	448698.716	297159.378	87.130	2.330	1200		1 1.005	84.875	225
							0 1.006	84.800	300
S8 HW	448702.625	297167.193	86.240	1.476	1200		1 1.006	84.764	300
							0 1.007	84.764	300
S9 Basin	448708.289	297166.771	86.240	1.500	1200		1 1.007	84.740	300
							0 1.008	84.740	300
S10 HydroBrake	448715.273	297162.789	86.240	1.600	1200		1 1.008	84.640	300
							0 1.009	84.640	150
S11	448738.493	297154.744	85.870	2.718	1200		1 1.009	83.152	150
							0 1.010	83.152	150
S12	448766.560	297152.849	82.800	1.523	1200		1 1.010	81.277	150
							0 1.011	81.277	150
S13	448788.083	297152.639	81.300	1.608	1200		1 1.011	79.842	150
							0 1.012	79.692	300
S14	448800.907	297131.855	81.000	1.667	1200		1 1.012	79.333	300
							0 1.013	79.333	300
S15	448813.294	297120.043	81.100	1.847	1200		1 1.013	79.253	300
							0 1.014	79.253	300
S16	448827.138	297118.058	81.180	1.985	1200		1 1.014	79.195	300
							0 1.015	79.195	300
S17	448856.546	297145.571	80.770	1.539	1200		0 2.000	79.231	300
S18	448849.011	297131.219	80.590	1.427	1200		1 2.000	79.163	300
							0 2.001	79.163	300
S19	448842.431	297124.874	80.640	1.590	1200		1 2.001	79.125	300
							2 1.015	79.125	300
							0 1.016	79.050	375
S20	448851.578	297119.329	80.800	1.786	1200		1 1.016	79.014	375
							0 1.017	79.014	375

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S21	448860.950	297116.499	80.800	1.819	1200		1 1.017	78.981	375
						0	1.018	78.981	375
S22	448870.048	297105.808	80.570	1.636	1200		1 1.018	78.934	375
						0	1.019	78.934	375
S23 HW	448877.131	297110.962	80.320	1.490	1200		1 1.019	78.905	375
						0	1.020	78.830	450
S24 Basin	448881.269	297111.613	80.320	1.500	1200		1 1.020	78.820	450
						0	1.021	78.820	450
S25 HydroBrake	448887.090	297107.058	80.320	1.518	1200		1 1.021	78.802	450
						0	1.022	78.802	225
S26	448896.764	297098.523	80.380	1.654	1200		1 1.022	78.726	225
						0	1.023	78.726	225
S27	448913.019	297090.739	80.440	1.820	1200		1 1.023	78.620	225
						0	1.024	78.620	225
S28	448910.150	297080.596	80.400	1.842	1200		1 1.024	78.558	225
						0	1.025	78.558	225
S29	448868.152	297052.123	79.800	1.777	1200		1 1.025	78.023	225
						0	1.026	78.023	225
S30	448861.930	297001.770	79.000	1.275	1200		1 1.026	77.725	225
						0	1.027	77.725	225
S31	448878.216	296898.390	78.000	0.891	1200		1 1.027	77.109	225
						0	1.028	77.109	225
S32 Outfall	448865.495	296884.985	77.500	0.500	1200		1 1.028	77.000	225

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	1.8
Summer CV	1.000	Drain Down Time (mins)	240	30 year (l/s)	3.9
Winter CV	1.000	Additional Storage (m³/ha)	0.0	100 year (l/s)	5.1
Analysis Speed	Normal	Check Discharge Rate(s)	✓	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.87%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	86.123	0.047	5.1	0.0535	0.0000	OK
15 minute summer	S2	10	85.881	0.063	8.3	0.0708	0.0000	OK
15 minute summer	S3	10	85.743	0.067	12.4	0.0758	0.0000	OK
15 minute summer	S4	10	85.568	0.104	19.8	0.1172	0.0000	OK
15 minute summer	S5	10	85.427	0.079	23.8	0.0895	0.0000	OK
15 minute summer	S6	10	85.137	0.148	28.5	0.1674	0.0000	OK
120 minute summer	S7	84	85.037	0.237	14.7	0.2683	0.0000	OK
120 minute summer	S8 HW	84	85.037	0.273	16.5	0.3090	0.0000	OK
120 minute summer	S9 Basin	84	85.037	0.297	23.3	15.0054	0.0000	OK
120 minute summer	S10 HydroBrake	84	85.037	0.397	16.7	0.4491	0.0000	SURCHARGED
15 minute summer	S11	10	83.188	0.036	5.9	0.0409	0.0000	OK
15 minute summer	S12	10	81.321	0.044	8.2	0.0493	0.0000	OK
15 minute summer	S13	10	79.773	0.081	22.1	0.0921	0.0000	OK
15 minute summer	S14	10	79.466	0.133	26.8	0.1506	0.0000	OK
15 minute summer	S15	10	79.405	0.152	31.5	0.1722	0.0000	OK
15 minute summer	S16	11	79.343	0.148	31.9	0.1673	0.0000	OK
15 minute summer	S17	9	79.300	0.069	8.5	0.0782	0.0000	OK
15 minute summer	S18	10	79.258	0.095	12.6	0.1076	0.0000	OK
15 minute summer	S19	11	79.244	0.194	44.3	0.2199	0.0000	OK
15 minute summer	S20	11	79.216	0.202	48.3	0.2280	0.0000	OK
360 minute winter	S21	312	79.210	0.229	11.5	0.2589	0.0000	OK
360 minute winter	S22	312	79.210	0.276	11.6	0.3119	0.0000	OK
360 minute winter	S23 HW	312	79.210	0.380	11.4	0.4294	0.0000	OK
360 minute winter	S24 Basin	312	79.210	0.390	14.2	67.1160	0.0000	OK
360 minute winter	S25 HydroBrake	312	79.210	0.408	5.1	0.4610	0.0000	SURCHARGED
240 minute summer	S26	284	78.781	0.055	5.0	0.0622	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	S1	1.000	S2	5.1	0.681	0.098	0.1938	
15 minute summer	S2	1.001	S3	8.3	0.875	0.159	0.1342	
15 minute summer	S3	1.002	S4	12.3	0.893	0.190	0.1895	
15 minute summer	S4	1.003	S5	19.7	1.305	0.380	0.1762	
15 minute summer	S5	1.004	S6	23.8	1.184	0.267	0.2486	
15 minute summer	S6	1.005	S7	27.8	1.055	0.698	0.5120	
120 minute summer	S7	1.006	S8 HW	14.5	0.575	0.203	0.5553	
120 minute summer	S8 HW	1.007	S9 Basin	15.7	0.724	0.219	0.3910	
120 minute summer	S9 Basin	1.008	S10 HydroBrake	16.7	0.516	0.135	0.5657	
120 minute summer	S10 HydroBrake	Hydro-Brake®	S11	4.0				
15 minute summer	S11	1.010	S12	5.8	1.580	0.127	0.1056	
15 minute summer	S12	1.011	S13	8.1	1.942	0.176	0.0899	
15 minute summer	S13	1.012	S14	22.1	0.988	0.164	0.5571	
15 minute summer	S14	1.013	S15	26.6	0.806	0.352	0.5655	
15 minute summer	S15	1.014	S16	31.1	0.884	0.435	0.4918	
15 minute summer	S16	1.015	S19	31.7	0.964	0.444	0.5509	
15 minute summer	S17	2.000	S18	8.5	0.560	0.119	0.2547	
15 minute summer	S18	2.001	S19	12.3	0.669	0.173	0.2045	
15 minute summer	S19	1.016	S20	44.4	0.757	0.386	0.6311	
15 minute summer	S20	1.017	S21	48.7	0.810	0.424	0.5887	
360 minute winter	S21	1.018	S22	11.4	0.594	0.099	1.1041	
360 minute winter	S22	1.019	S23 HW	11.4	0.635	0.099	0.8006	
360 minute winter	S23 HW	1.020	S24 Basin	11.2	0.602	0.070	0.6043	
360 minute winter	S24 Basin	1.021	S25 HydroBrake	5.1	0.171	0.032	1.0968	
360 minute winter	S25 HydroBrake	Hydro-Brake®	S26	5.0				
240 minute summer	S26	1.023	S27	5.0	0.659	0.126	0.1367	

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.87%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	S27	228	78.676	0.056	5.0	0.0632	0.0000	OK
180 minute summer	S28	136	78.604	0.046	5.0	0.0523	0.0000	OK
240 minute summer	S29	288	78.077	0.054	5.0	0.0613	0.0000	OK
240 minute winter	S30	292	77.779	0.054	5.0	0.0605	0.0000	OK
180 minute winter	S31	144	77.164	0.055	5.0	0.0623	0.0000	OK
180 minute summer	S32 Outfall	144	77.053	0.053	5.0	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)
180 minute summer	S27	1.024	S28	5.0	0.740	0.126	0.0713	
180 minute summer	S28	1.025	S29	5.0	0.759	0.094	0.3348	
240 minute summer	S29	1.026	S30	5.0	0.687	0.126	0.3691	
240 minute winter	S30	1.027	S31	5.0	0.679	0.126	0.7704	
180 minute winter	S31	1.028	S32 Outfall	5.0	0.680	0.126	0.1359	104.5

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	86.220	0.144	16.5	0.1627	0.0000	OK
15 minute summer	S2	11	86.204	0.386	27.1	0.4371	0.0000	SURCHARGED
15 minute summer	S3	11	86.186	0.510	38.8	0.5766	0.0000	SURCHARGED
15 minute summer	S4	11	86.139	0.675	49.1	0.7630	0.0000	SURCHARGED
15 minute summer	S5	11	86.007	0.659	57.9	0.7449	0.0000	SURCHARGED
15 minute summer	S6	11	85.794	0.805	70.3	0.9108	0.0000	SURCHARGED
180 minute winter	S7	172	85.673	0.873	21.9	0.9872	0.0000	SURCHARGED
180 minute winter	S8 HW	172	85.673	0.909	24.6	1.0277	0.0000	SURCHARGED
180 minute winter	S9 Basin	172	85.673	0.933	27.0	75.8075	0.0000	SURCHARGED
180 minute winter	S10 HydroBrake	172	85.672	1.032	12.0	1.1677	0.0000	SURCHARGED
15 minute summer	S11	10	83.201	0.049	10.6	0.0553	0.0000	OK
15 minute summer	S12	10	81.344	0.067	18.5	0.0761	0.0000	OK
15 minute summer	S13	11	80.051	0.359	64.7	0.4060	0.0000	SURCHARGED
15 minute summer	S14	11	79.971	0.638	77.6	0.7217	0.0000	SURCHARGED
15 minute summer	S15	11	79.876	0.623	82.9	0.7048	0.0000	SURCHARGED
720 minute winter	S16	720	79.799	0.604	10.0	0.6833	0.0000	SURCHARGED
720 minute winter	S17	735	79.800	0.569	1.9	0.6432	0.0000	SURCHARGED
960 minute winter	S18	915	79.798	0.635	2.1	0.7187	0.0000	SURCHARGED
960 minute winter	S19	915	79.798	0.748	10.6	0.8459	0.0000	SURCHARGED
720 minute winter	S20	720	79.800	0.786	13.2	0.8888	0.0000	SURCHARGED
960 minute winter	S21	915	79.799	0.818	11.6	0.9250	0.0000	SURCHARGED
720 minute winter	S22	720	79.797	0.863	14.2	0.9761	0.0000	SURCHARGED
720 minute winter	S23 HW	720	79.797	0.967	14.1	1.0939	0.0000	SURCHARGED
720 minute winter	S24 Basin	720	79.797	0.977	18.4	214.1443	0.0000	SURCHARGED
720 minute winter	S25 HydroBrake	720	79.797	0.995	5.1	1.1251	0.0000	SURCHARGED
15 minute summer	S26	12	78.781	0.055	5.0	0.0622	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	S1	1.000	S2	16.5	0.887	0.318	0.8570	
15 minute summer	S2	1.001	S3	25.6	1.005	0.493	0.5650	
15 minute summer	S3	1.002	S4	31.8	1.015	0.491	0.5433	
15 minute summer	S4	1.003	S5	46.8	1.433	0.900	0.4625	
15 minute summer	S5	1.004	S6	57.7	1.452	0.650	0.4925	
15 minute summer	S6	1.005	S7	70.0	1.759	1.758	0.7691	
180 minute winter	S7	1.006	S8 HW	21.6	0.503	0.302	0.6153	
180 minute winter	S8 HW	1.007	S9 Basin	24.3	0.822	0.340	0.4000	
180 minute winter	S9 Basin	1.008	S10 HydroBrake	12.0	0.491	0.097	0.5661	
180 minute winter	S10 HydroBrake	Hydro-Brake®	S11	4.0				
15 minute summer	S11	1.010	S12	10.6	1.681	0.229	0.1776	
15 minute summer	S12	1.011	S13	19.1	2.387	0.414	0.2635	
15 minute summer	S13	1.012	S14	62.4	1.159	0.463	1.7198	
15 minute summer	S14	1.013	S15	69.8	0.992	0.922	1.2053	
15 minute summer	S15	1.014	S16	83.8	1.189	1.173	0.9849	
720 minute winter	S16	1.015	S19	9.7	0.686	0.136	1.1790	
720 minute winter	S17	2.000	S18	1.8	0.361	0.025	1.1415	
960 minute winter	S18	2.001	S19	1.9	0.427	0.027	0.6437	
960 minute winter	S19	1.016	S20	10.6	0.544	0.092	1.1797	
720 minute winter	S20	1.017	S21	12.6	0.567	0.110	1.0798	
960 minute winter	S21	1.018	S22	11.6	0.545	0.101	1.5484	
720 minute winter	S22	1.019	S23 HW	14.1	0.570	0.122	0.9662	
720 minute winter	S23 HW	1.020	S24 Basin	14.1	0.632	0.088	0.6637	
720 minute winter	S24 Basin	1.021	S25 HydroBrake	5.1	0.170	0.032	1.1711	
720 minute winter	S25 HydroBrake	Hydro-Brake®	S26	5.0				
15 minute summer	S26	1.023	S27	5.0	0.659	0.126	0.1366	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	S27	200	78.676	0.056	5.0	0.0632	0.0000	OK
15 minute winter	S28	10	78.604	0.046	5.0	0.0523	0.0000	OK
15 minute summer	S29	13	78.078	0.055	5.0	0.0627	0.0000	OK
15 minute winter	S30	15	77.780	0.055	5.1	0.0620	0.0000	OK
15 minute winter	S31	19	77.164	0.055	5.1	0.0623	0.0000	OK
15 minute winter	S32 Outfall	19	77.053	0.053	5.0	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)
480 minute winter	S27	1.024	S28	5.0	0.740	0.126	0.0713	
15 minute winter	S28	1.025	S29	5.0	0.965	0.093	0.3404	
15 minute summer	S29	1.026	S30	5.1	0.826	0.128	0.3757	
15 minute winter	S30	1.027	S31	5.1	0.773	0.128	0.7721	
15 minute winter	S31	1.028	S32 Outfall	5.0	0.680	0.126	0.1360	71.7

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	86.867	0.791	21.5	0.8945	0.0000	SURCHARGED
15 minute summer	S2	11	86.841	1.023	33.6	1.1568	0.0000	SURCHARGED
15 minute summer	S3	11	86.801	1.125	40.5	1.2718	0.0000	SURCHARGED
15 minute summer	S4	11	86.715	1.251	63.0	1.4147	0.0000	SURCHARGED
15 minute summer	S5	11	86.504	1.156	72.7	1.3077	0.0000	SURCHARGED
15 minute summer	S6	11	86.184	1.195	86.8	1.3521	0.0000	SURCHARGED
180 minute winter	S7	176	85.893	1.093	27.2	1.2361	0.0000	SURCHARGED
180 minute winter	S8 HW	172	85.893	1.129	30.7	1.2768	0.0000	SURCHARGED
180 minute winter	S9 Basin	176	85.892	1.152	33.9	105.8949	0.0000	SURCHARGED
180 minute winter	S10 HydroBrake	176	85.892	1.252	13.1	1.4159	0.0000	SURCHARGED
15 minute summer	S11	10	83.205	0.053	12.6	0.0605	0.0000	OK
15 minute summer	S12	10	81.355	0.078	22.8	0.0884	0.0000	OK
15 minute summer	S13	11	80.641	0.949	81.8	1.0739	0.0000	SURCHARGED
15 minute summer	S14	11	80.510	1.177	92.8	1.3315	0.0000	SURCHARGED
15 minute summer	S15	11	80.354	1.101	108.4	1.2454	0.0000	SURCHARGED
15 minute summer	S16	11	80.159	0.964	110.4	1.0900	0.0000	SURCHARGED
480 minute winter	S17	472	80.011	0.780	3.3	0.8825	0.0000	SURCHARGED
480 minute winter	S18	480	80.010	0.847	4.8	0.9584	0.0000	SURCHARGED
720 minute winter	S19	720	80.011	0.961	14.7	1.0866	0.0000	SURCHARGED
480 minute winter	S20	488	80.010	0.996	20.5	1.1267	0.0000	SURCHARGED
480 minute winter	S21	472	80.010	1.029	22.4	1.1637	0.0000	SURCHARGED
480 minute winter	S22	480	80.010	1.076	22.7	1.2175	0.0000	SURCHARGED
480 minute winter	S23 HW	472	80.010	1.180	22.9	1.3348	0.0000	SURCHARGED
480 minute winter	S24 Basin	480	80.010	1.190	30.2	281.0803	0.0000	SURCHARGED
480 minute winter	S25 HydroBrake	480	80.011	1.209	5.5	1.3670	0.0000	SURCHARGED
15 minute winter	S26	11	78.781	0.055	5.0	0.0622	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	S1	1.000	S2	19.8	0.896	0.381	1.0242	
15 minute summer	S2	1.001	S3	25.4	1.088	0.489	0.5650	
15 minute summer	S3	1.002	S4	37.9	0.988	0.584	0.5433	
15 minute summer	S4	1.003	S5	58.5	1.470	1.125	0.4625	
15 minute summer	S5	1.004	S6	70.4	1.771	0.793	0.4925	
15 minute summer	S6	1.005	S7	85.0	2.139	2.137	0.7691	
180 minute winter	S7	1.006	S8 HW	26.9	0.528	0.376	0.6153	
180 minute winter	S8 HW	1.007	S9 Basin	30.4	0.859	0.425	0.4000	
180 minute winter	S9 Basin	1.008	S10 HydroBrake	13.1	0.344	0.106	0.5661	
180 minute winter	S10 HydroBrake	Hydro-Brake®	S11	4.0				
15 minute summer	S11	1.010	S12	12.5	1.750	0.272	0.2096	
15 minute summer	S12	1.011	S13	22.5	2.379	0.487	0.2893	
15 minute summer	S13	1.012	S14	73.0	1.169	0.541	1.7198	
15 minute summer	S14	1.013	S15	89.7	1.274	1.185	1.2053	
15 minute summer	S15	1.014	S16	107.7	1.529	1.507	0.9849	
15 minute summer	S16	1.015	S19	111.0	1.577	1.555	1.1790	
480 minute winter	S17	2.000	S18	3.2	0.398	0.045	1.1415	
480 minute winter	S18	2.001	S19	4.7	0.491	0.066	0.6437	
720 minute winter	S19	1.016	S20	14.4	0.550	0.125	1.1797	
480 minute winter	S20	1.017	S21	20.4	0.573	0.178	1.0798	
480 minute winter	S21	1.018	S22	22.2	0.552	0.193	1.5484	
480 minute winter	S22	1.019	S23 HW	22.9	0.592	0.200	0.9662	
480 minute winter	S23 HW	1.020	S24 Basin	22.4	0.748	0.139	0.6637	
480 minute winter	S24 Basin	1.021	S25 HydroBrake	5.5	0.184	0.034	1.1711	
480 minute winter	S25 HydroBrake	Hydro-Brake®	S26	5.0				
15 minute winter	S26	1.023	S27	5.0	0.665	0.126	0.1366	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	S27	136	78.676	0.056	5.0	0.0632	0.0000	OK
15 minute winter	S28	10	78.604	0.046	5.0	0.0523	0.0000	OK
15 minute winter	S29	12	78.079	0.056	5.0	0.0630	0.0000	OK
15 minute winter	S30	15	77.780	0.055	5.1	0.0620	0.0000	OK
600 minute summer	S31	255	77.164	0.055	5.0	0.0623	0.0000	OK
600 minute summer	S32 Outfall	255	77.053	0.053	5.0	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)
360 minute winter	S27	1.024	S28	5.0	0.740	0.126	0.0713	
15 minute winter	S28	1.025	S29	5.0	0.934	0.093	0.3421	
15 minute winter	S29	1.026	S30	5.1	0.829	0.129	0.3748	
15 minute winter	S30	1.027	S31	5.1	0.773	0.127	0.7652	
600 minute summer	S31	1.028	S32 Outfall	5.0	0.680	0.126	0.1359	220.0