

BDW TRADING LTD (REDROW MIDLANDS DIVISION)

BURBAGE FIELD FARM

BULLFURLONG LANE

BURBAGE

LE10 2HS

SURFACE WATER HYDRAULIC MODELLING

SEPTEMBER 2025

Ref: 25080-TDC-XX-XX-CA-Z-0001-P01

Document Control Sheet

Project: Burbage Fields Farm, Bullfurlong Lane, Burbage

Client: BDW Trading Ltd (Redrow Midlands Division)

Project Ref: 25-080

Report Title: Surface Water Hydraulic Modelling

Doc Ref: 25080_TDC_XX_XX_CA_Z_0001

Date: September 2025

Revision	Date	Reason for Issue	Prepared	Reviewed	Approved
P01	29.09.2025	First Issue	JD	DS	DM

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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)	0.300
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	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	0.044	5.00	113.230	1350	444478.419	291754.627	1.425
S2L	0.038	5.00	112.700	1200	444466.203	291741.844	1.350
S2	0.016	5.00	112.445	1350	444472.552	291739.811	1.500
S3	0.038	5.00	112.030	1350	444471.366	291724.564	1.500
S4L	0.043	5.00	111.300	1200	444451.198	291695.137	1.350
S4	0.042	5.00	111.105	1350	444449.554	291698.452	1.500
S5L	0.085	5.00	110.200	1200	444413.651	291675.762	1.425
S5	0.056	5.00	110.130	1350	444418.452	291670.640	1.575
S6L	0.045	5.00	108.885	1200	444386.103	291630.802	1.350
S6	0.041	5.00	108.710	1350	444381.993	291634.464	1.575
S7L	0.085	5.00	108.420	1200	444365.851	291628.450	1.425
S7	0.000	5.00	108.235	1350	444363.674	291610.868	1.575
S8L	0.046	5.00	107.740	1200	444346.148	291613.378	1.350
S8	0.038	5.00	107.790	1350	444354.284	291607.769	1.715
HW1	0.000		106.286	250	444357.352	291595.926	1.499
S9L	0.030	5.00	110.050	1200	444441.084	291663.879	1.350
S9	0.041	5.00	109.905	1350	444437.060	291659.865	1.500
S10LA	0.128	5.00	109.640	1200	444459.072	291644.519	1.425
S10LB	0.059	5.00	109.670	1200	444448.741	291638.557	1.350
S10	0.027	5.00	109.495	1350	444455.891	291640.983	1.500
S11L	0.079	5.00	109.650	1200	444491.437	291624.214	1.350
S11	0.033	5.00	109.075	1350	444476.721	291613.637	1.575
S12L	0.088	5.00	108.000	1200	444431.322	291585.700	1.350
S12	0.000	5.00	108.000	1350	444432.333	291581.347	1.605
S13	0.000		107.500	1350	444416.332	291574.005	1.575
S14L	0.154	5.00	107.200	1200	444396.803	291580.914	1.440
S14	0.000	5.00	107.150	1350	444393.792	291576.152	1.878
HW2	0.000		106.286	250	444392.230	291573.611	1.499
HW3	0.168	5.00	106.286	250	444370.615	291565.689	1.500
S15	0.000	5.00	106.286	2700	444364.822	291560.491	1.519
HW4	0.000		105.750	250	444342.103	291540.109	1.155

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	15.935	0.600	111.805	111.020	0.785	20.3	225	5.09	50.0
2.000	S2L	S2	6.667	0.600	111.350	111.095	0.255	26.1	150	5.06	50.0
1.001	S2	S3	15.293	0.600	110.945	110.530	0.415	36.9	300	5.19	50.0
1.002	S3	S4	34.024	0.600	110.530	109.605	0.925	36.8	300	5.41	50.0
3.000	S4L	S4	3.700	0.600	109.950	109.755	0.195	19.0	150	5.03	50.0
1.003	S4	S5	41.723	0.600	109.605	108.630	0.975	42.8	300	5.70	50.0
4.000	S5L	S5	7.020	0.600	108.775	108.705	0.070	100.3	225	5.09	50.0
1.004	S5	S6	51.361	0.600	108.555	107.135	1.420	36.2	375	5.98	50.0
5.000	S6L	S6	5.505	0.600	107.535	107.498	0.037	150.0	150	5.11	50.0
1.005	S6	S7	29.872	0.600	107.135	106.660	0.475	62.9	375	6.20	49.9
6.000	S7L	S7	17.716	0.600	106.995	106.810	0.185	95.8	225	5.22	50.0
1.006	S7	S8	9.888	0.600	106.660	106.075	0.585	16.9	375	6.23	49.7
7.000	S8L	S8	9.882	0.600	106.390	106.324	0.066	150.0	150	5.20	50.0
1.007	S8	HW1	12.234	0.600	106.075	105.086	0.989	12.4	375	6.27	49.6
1.008	HW1	HW3	33.018	0.600	104.787	104.786	0.001	33017.9	825	9.85	39.2
8.000	S9L	S9	5.684	0.600	108.700	108.555	0.145	39.2	150	5.06	50.0
8.001	S9	S10	26.667	0.600	108.405	107.995	0.410	65.0	300	5.29	50.0
9.000	S10LA	S10	4.756	0.600	108.215	108.070	0.145	32.8	225	5.03	50.0
10.000	S10LB	S10	7.550	0.600	108.320	108.145	0.175	43.1	150	5.08	50.0
8.002	S10	S11	34.376	0.600	107.995	107.575	0.420	81.8	300	5.62	50.0
11.000	S11L	S11	18.123	0.600	108.300	107.725	0.575	31.5	150	5.17	50.0
8.003	S11	S12	54.890	0.600	107.500	106.395	1.105	49.7	375	5.97	50.0
12.000	S12L	S12	4.469	0.600	106.650	106.620	0.030	150.0	150	5.09	50.0
8.004	S12	S13	17.605	0.600	106.395	105.925	0.470	37.5	375	6.07	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	2.917	116.0	6.0	1.200	1.200	0.044	0.0	35	1.555
2.000	1.977	34.9	5.1	1.200	1.200	0.038	0.0	39	1.423
1.001	2.598	183.6	13.3	1.200	1.200	0.098	0.0	54	1.530
1.002	2.600	183.8	18.4	1.200	1.200	0.136	0.0	64	1.681
3.000	2.323	41.0	5.8	1.200	1.200	0.043	0.0	38	1.643
1.003	2.410	170.3	30.0	1.200	1.200	0.221	0.0	85	1.828
4.000	1.305	51.9	11.5	1.200	1.200	0.085	0.0	72	1.053
1.004	3.021	333.6	49.1	1.200	1.200	0.362	0.0	96	2.182
5.000	0.818	14.5	6.1	1.200	1.062	0.045	0.0	68	0.782
1.005	2.288	252.7	60.6	1.200	1.200	0.448	0.0	124	1.890
6.000	1.336	53.1	11.5	1.200	1.200	0.085	0.0	71	1.071
1.006	4.425	488.7	71.8	1.200	1.340	0.533	0.0	96	3.199
7.000	0.818	14.5	6.2	1.200	1.316	0.046	0.0	69	0.788
1.007	5.175	571.5	82.9	1.340	0.825	0.617	0.0	96	3.726
1.008	0.154	82.3	65.6	0.674	0.675	0.617	0.0	558	0.170
8.000	1.612	28.5	4.1	1.200	1.200	0.030	0.0	38	1.149
8.001	1.952	138.0	9.6	1.200	1.200	0.071	0.0	53	1.134
9.000	2.292	91.1	17.3	1.200	1.200	0.128	0.0	66	1.776
10.000	1.536	27.1	8.0	1.200	1.200	0.059	0.0	56	1.341
8.002	1.739	122.9	38.6	1.200	1.200	0.285	0.0	115	1.545
11.000	1.799	31.8	10.7	1.200	1.200	0.079	0.0	60	1.627
8.003	2.576	284.5	53.8	1.200	1.230	0.397	0.0	109	1.994
12.000	0.818	14.5	11.9	1.200	1.230	0.088	0.0	104	0.912
8.004	2.968	327.8	65.7	1.230	1.200	0.485	0.0	113	2.338

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)
8.005	S13	S14	22.642	0.600	105.925	105.309	0.616	36.8	375	6.20	49.9
13.000	S14L	S14	5.634	0.600	105.760	105.497	0.263	21.4	225	5.03	50.0
8.006	S14	HW2	2.983	0.600	105.272	105.087	0.185	16.1	450	6.21	49.8
8.007	HW2	HW3	23.021	0.600	104.787	104.786	0.001	23021.0	450	9.28	0.0
1.009	HW3	S15	7.783	0.600	104.786	104.767	0.019	409.6	450	9.98	0.0
1.010	S15	HW4	30.522	0.600	104.767	104.595	0.172	177.5	300	10.41	0.0

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)
8.005	2.996	330.9	65.6	1.200	1.466	0.485	0.0	112	2.353
13.000	2.839	112.9	20.9	1.215	1.428	0.154	0.0	65	2.185
8.006	5.082	808.2	86.3	1.428	0.749	0.639	0.0	98	3.359
8.007	0.125	19.9	0.0	1.049	1.050	0.639	0.0	0	0.000
1.009	0.998	158.7	0.0	1.050	1.069	1.424	0.0	0	0.000
1.010	1.177	83.2	0.0	1.219	0.855	1.424	0.0	0	0.000

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	15.935	20.3	225	Circular	113.230	111.805	1.200	112.445	111.020	1.200
2.000	6.667	26.1	150	Circular	112.700	111.350	1.200	112.445	111.095	1.200
1.001	15.293	36.9	300	Circular	112.445	110.945	1.200	112.030	110.530	1.200
1.002	34.024	36.8	300	Circular	112.030	110.530	1.200	111.105	109.605	1.200
3.000	3.700	19.0	150	Circular	111.300	109.950	1.200	111.105	109.755	1.200
1.003	41.723	42.8	300	Circular	111.105	109.605	1.200	110.130	108.630	1.200
4.000	7.020	100.3	225	Circular	110.200	108.775	1.200	110.130	108.705	1.200
1.004	51.361	36.2	375	Circular	110.130	108.555	1.200	108.710	107.135	1.200
5.000	5.505	150.0	150	Circular	108.885	107.535	1.200	108.710	107.498	1.062
1.005	29.872	62.9	375	Circular	108.710	107.135	1.200	108.235	106.660	1.200
6.000	17.716	95.8	225	Circular	108.420	106.995	1.200	108.235	106.810	1.200
1.006	9.888	16.9	375	Circular	108.235	106.660	1.200	107.790	106.075	1.340
7.000	9.882	150.0	150	Circular	107.740	106.390	1.200	107.790	106.324	1.316
1.007	12.234	12.4	375	Circular	107.790	106.075	1.340	106.286	105.086	0.825

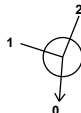
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1350	Manhole	Adoptable	S2	1350	Manhole	Adoptable
2.000	S2L	1200	Manhole	Adoptable	S2	1350	Manhole	Adoptable
1.001	S2	1350	Manhole	Adoptable	S3	1350	Manhole	Adoptable
1.002	S3	1350	Manhole	Adoptable	S4	1350	Manhole	Adoptable
3.000	S4L	1200	Manhole	Adoptable	S4	1350	Manhole	Adoptable
1.003	S4	1350	Manhole	Adoptable	S5	1350	Manhole	Adoptable
4.000	S5L	1200	Manhole	Adoptable	S5	1350	Manhole	Adoptable
1.004	S5	1350	Manhole	Adoptable	S6	1350	Manhole	Adoptable
5.000	S6L	1200	Manhole	Adoptable	S6	1350	Manhole	Adoptable
1.005	S6	1350	Manhole	Adoptable	S7	1350	Manhole	Adoptable
6.000	S7L	1200	Manhole	Adoptable	S7	1350	Manhole	Adoptable
1.006	S7	1350	Manhole	Adoptable	S8	1350	Manhole	Adoptable
7.000	S8L	1200	Manhole	Adoptable	S8	1350	Manhole	Adoptable
1.007	S8	1350	Manhole	Adoptable	HW1	250	Manhole	Adoptable

Pipeline Schedule

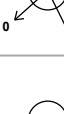
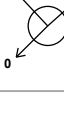
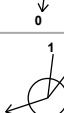
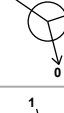
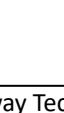
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.008	33.018	33017.9	825	Circular	106.286	104.787	0.674	106.286	104.786	0.675
8.000	5.684	39.2	150	Circular	110.050	108.700	1.200	109.905	108.555	1.200
8.001	26.667	65.0	300	Circular	109.905	108.405	1.200	109.495	107.995	1.200
9.000	4.756	32.8	225	Circular	109.640	108.215	1.200	109.495	108.070	1.200
10.000	7.550	43.1	150	Circular	109.670	108.320	1.200	109.495	108.145	1.200
8.002	34.376	81.8	300	Circular	109.495	107.995	1.200	109.075	107.575	1.200
11.000	18.123	31.5	150	Circular	109.650	108.300	1.200	109.075	107.725	1.200
8.003	54.890	49.7	375	Circular	109.075	107.500	1.200	108.000	106.395	1.230
12.000	4.469	150.0	150	Circular	108.000	106.650	1.200	108.000	106.620	1.230
8.004	17.605	37.5	375	Circular	108.000	106.395	1.230	107.500	105.925	1.200
8.005	22.642	36.8	375	Circular	107.500	105.925	1.200	107.150	105.309	1.466
13.000	5.634	21.4	225	Circular	107.200	105.760	1.215	107.150	105.497	1.428
8.006	2.983	16.1	450	Circular	107.150	105.272	1.428	106.286	105.087	0.749
8.007	23.021	23021.0	450	Circular	106.286	104.787	1.049	106.286	104.786	1.050
1.009	7.783	409.6	450	Circular	106.286	104.786	1.050	106.286	104.767	1.069
1.010	30.522	177.5	300	Circular	106.286	104.767	1.219	105.750	104.595	0.855

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.008	HW1	250	Manhole	Adoptable	HW3	250	Manhole	Adoptable
8.000	S9L	1200	Manhole	Adoptable	S9	1350	Manhole	Adoptable
8.001	S9	1350	Manhole	Adoptable	S10	1350	Manhole	Adoptable
9.000	S10LA	1200	Manhole	Adoptable	S10	1350	Manhole	Adoptable
10.000	S10LB	1200	Manhole	Adoptable	S10	1350	Manhole	Adoptable
8.002	S10	1350	Manhole	Adoptable	S11	1350	Manhole	Adoptable
11.000	S11L	1200	Manhole	Adoptable	S11	1350	Manhole	Adoptable
8.003	S11	1350	Manhole	Adoptable	S12	1350	Manhole	Adoptable
12.000	S12L	1200	Manhole	Adoptable	S12	1350	Manhole	Adoptable
8.004	S12	1350	Manhole	Adoptable	S13	1350	Manhole	Adoptable
8.005	S13	1350	Manhole	Adoptable	S14	1350	Manhole	Adoptable
13.000	S14L	1200	Manhole	Adoptable	S14	1350	Manhole	Adoptable
8.006	S14	1350	Manhole	Adoptable	HW2	250	Manhole	Adoptable
8.007	HW2	250	Manhole	Adoptable	HW3	250	Manhole	Adoptable
1.009	HW3	250	Manhole	Adoptable	S15	2700	Manhole	Adoptable
1.010	S15	2700	Manhole	Adoptable	HW4	250	Manhole	Adoptable

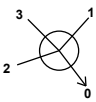
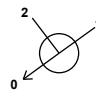
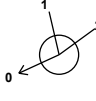
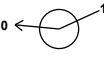
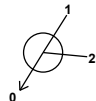
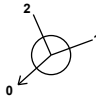
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	444478.419	291754.627	113.230	1.425	1350	 0	1.000	111.805	225
S2L	444466.203	291741.844	112.700	1.350	1200	 0	2.000	111.350	150
S2	444472.552	291739.811	112.445	1.500	1350	 1 2 0	2.000	111.095	150
							1.000	111.020	225
							1.001	110.945	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S3	444471.366	291724.564	112.030	1.500	1350		1	1.001	110.530	300
							0	1.002	110.530	300
S4L	444451.198	291695.137	111.300	1.350	1200		0	3.000	109.950	150
S4	444449.554	291698.452	111.105	1.500	1350		1	3.000	109.755	150
							2	1.002	109.605	300
						0	1.003	109.605	300	
S5L	444413.651	291675.762	110.200	1.425	1200		0	4.000	108.775	225
S5	444418.452	291670.640	110.130	1.575	1350		1	4.000	108.705	225
							2	1.003	108.630	300
						0	1.004	108.555	375	
S6L	444386.103	291630.802	108.885	1.350	1200		0	5.000	107.535	150
S6	444381.993	291634.464	108.710	1.575	1350		1	5.000	107.498	150
							2	1.004	107.135	375
						0	1.005	107.135	375	
S7L	444365.851	291628.450	108.420	1.425	1200		0	6.000	106.995	225
S7	444363.674	291610.868	108.235	1.575	1350		1	6.000	106.810	225
							2	1.005	106.660	375
						0	1.006	106.660	375	
S8L	444346.148	291613.378	107.740	1.350	1200		0	7.000	106.390	150
S8	444354.284	291607.769	107.790	1.715	1350		1	7.000	106.324	150
							2	1.006	106.075	375
						0	1.007	106.075	375	
HW1	444357.352	291595.926	106.286	1.499	250		1	1.007	105.086	375
							0	1.008	104.787	825
S9L	444441.084	291663.879	110.050	1.350	1200		0	8.000	108.700	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S9	444437.060	291659.865	109.905	1.500	1350		1 8.000	108.555	150
						0	8.001	108.405	300
S10LA	444459.072	291644.519	109.640	1.425	1200		0 9.000	108.215	225
S10LB	444448.741	291638.557	109.670	1.350	1200		0 10.000	108.320	150
S10	444455.891	291640.983	109.495	1.500	1350		1 9.000	108.070	225
						2	10.000	108.145	150
						3	8.001	107.995	300
						0	8.002	107.995	300
S11L	444491.437	291624.214	109.650	1.350	1200		0 11.000	108.300	150
S11	444476.721	291613.637	109.075	1.575	1350		1 11.000	107.725	150
						2	8.002	107.575	300
						0	8.003	107.500	375
S12L	444431.322	291585.700	108.000	1.350	1200		0 12.000	106.650	150
S12	444432.333	291581.347	108.000	1.605	1350		1 12.000	106.620	150
						2	8.003	106.395	375
						0	8.004	106.395	375
S13	444416.332	291574.005	107.500	1.575	1350		1 8.004	105.925	375
						0	8.005	105.925	375
S14L	444396.803	291580.914	107.200	1.440	1200		0 13.000	105.760	225
S14	444393.792	291576.152	107.150	1.878	1350		1 13.000	105.497	225
						2	8.005	105.309	375
						0	8.006	105.272	450
HW2	444392.230	291573.611	106.286	1.499	250		1 8.006	105.087	450
						0	8.007	104.787	450
HW3	444370.615	291565.689	106.286	1.500	250		1 8.007	104.786	450
						2	1.008	104.786	825
						0	1.009	104.786	450

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S15	444364.822	291560.491	106.286	1.519	2700	1	1.009	104.767	450
						0	1.010	104.767	300
HW4	444342.103	291540.109	105.750	1.155	250	1	1.010	104.595	300

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Rainfall Events	Singular	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		
Analysis Speed	Detailed	Starting Level (m)			

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
100	40	0	0

Node S15 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	104.767	Product Number	CTL-SHE-0107-5100-1000-5100
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.1	Min Node Diameter (mm)	1200

Node HW3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	104.786
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	913.0	913.0	1.500	1676.0	1699.1

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Rainfall Events	Singular	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		
Analysis Speed	Detailed	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
100	40	0	0

Node HW4 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		
Applies to All storms					

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	1.405	255	1.405	510	1.405	765	1.405	1020	1.405	1275	1.405
15	1.405	270	1.405	525	1.405	780	1.405	1035	1.405	1290	1.405
30	1.405	285	1.405	540	1.405	795	1.405	1050	1.405	1305	1.405
45	1.405	300	1.405	555	1.405	810	1.405	1065	1.405	1320	1.405
60	1.405	315	1.405	570	1.405	825	1.405	1080	1.405	1335	1.405
75	1.405	330	1.405	585	1.405	840	1.405	1095	1.405	1350	1.405
90	1.405	345	1.405	600	1.405	855	1.405	1110	1.405	1365	1.405
105	1.405	360	1.405	615	1.405	870	1.405	1125	1.405	1380	1.405
120	1.405	375	1.405	630	1.405	885	1.405	1140	1.405	1395	1.405
135	1.405	390	1.405	645	1.405	900	1.405	1155	1.405	1410	1.405
150	1.405	405	1.405	660	1.405	915	1.405	1170	1.405	1425	1.405
165	1.405	420	1.405	675	1.405	930	1.405	1185	1.405	1440	1.405
180	1.405	435	1.405	690	1.405	945	1.405	1200	1.405		
195	1.405	450	1.405	705	1.405	960	1.405	1215	1.405		
210	1.405	465	1.405	720	1.405	975	1.405	1230	1.405		
225	1.405	480	1.405	735	1.405	990	1.405	1245	1.405		
240	1.405	495	1.405	750	1.405	1005	1.405	1260	1.405		

Node S15 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	104.767	Product Number	CTL-SHE-0107-5100-1000-5100
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.1	Min Node Diameter (mm)	1200

Node HW3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	104.786
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	913.0	913.0	1.500	1676.0	1699.1

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.77%

Node Event	US	Peak	Level	Depth	Inflow	Node	Flood	Status
	Node	(mins)	(m)	(m)	(l/s)	Vol (m³)	(m³)	
15 minute winter	S1	10	111.837	0.032	4.9	0.0457	0.0000	OK
15 minute winter	S2L	10	111.387	0.037	4.3	0.0422	0.0000	OK
15 minute winter	S2	10	110.995	0.050	10.9	0.0709	0.0000	OK
15 minute winter	S3	10	110.587	0.057	15.1	0.0820	0.0000	OK
15 minute winter	S4L	10	109.988	0.038	4.8	0.0427	0.0000	OK
15 minute winter	S4	11	109.682	0.077	24.3	0.1106	0.0000	OK
15 minute winter	S5L	10	108.845	0.070	9.5	0.0793	0.0000	OK
15 minute winter	S5	11	108.641	0.086	39.1	0.1229	0.0000	OK
15 minute winter	S6L	10	107.600	0.065	5.0	0.0734	0.0000	OK
15 minute winter	S6	11	107.253	0.118	48.3	0.1690	0.0000	OK
15 minute winter	S7L	10	107.061	0.066	9.5	0.0749	0.0000	OK
15 minute winter	S7	11	106.755	0.095	57.8	0.1355	0.0000	OK
15 minute winter	S8L	10	106.454	0.064	5.1	0.0724	0.0000	OK
15 minute winter	S8	11	106.169	0.094	66.7	0.1342	0.0000	OK
1440 minute winter	HW1	1650	105.160	0.373	4.9	0.0183	0.0000	OK
15 minute winter	S9L	10	108.737	0.037	3.4	0.0417	0.0000	OK
15 minute winter	S9	10	108.453	0.048	8.0	0.0690	0.0000	OK
15 minute winter	S10LA	10	108.283	0.068	14.3	0.0767	0.0000	OK
15 minute winter	S10LB	10	108.374	0.054	6.6	0.0606	0.0000	OK
15 minute winter	S10	11	108.100	0.105	31.6	0.1509	0.0000	OK
15 minute winter	S11L	10	108.355	0.055	8.8	0.0627	0.0000	OK
15 minute winter	S11	11	107.598	0.098	42.9	0.1405	0.0000	OK
15 minute winter	S12L	10	106.751	0.101	9.9	0.1141	0.0000	OK
15 minute winter	S12	11	106.503	0.108	52.8	0.1542	0.0000	OK
15 minute winter	S13	11	106.032	0.107	53.1	0.1525	0.0000	OK

Link Event	US	Link	DS	Outflow	Velocity	Flow/Cap	Link	Discharge
(Upstream Depth)	Node		Node	(l/s)	(m/s)		Vol (m³)	Vol (m³)
15 minute winter	S1	1.000	S2	4.8	1.430	0.042	0.0539	
15 minute winter	S2L	2.000	S2	4.3	1.294	0.122	0.0219	
15 minute winter	S2	1.001	S3	10.8	1.277	0.059	0.1297	
15 minute winter	S3	1.002	S4	14.8	1.273	0.081	0.4022	
15 minute winter	S4L	3.000	S4	4.8	1.461	0.116	0.0121	
15 minute winter	S4	1.003	S5	24.1	1.704	0.141	0.5893	
15 minute winter	S5L	4.000	S5	9.4	0.945	0.181	0.0699	
15 minute winter	S5	1.004	S6	39.3	1.622	0.118	1.2502	
15 minute winter	S6L	5.000	S6	4.9	0.711	0.341	0.0382	
15 minute winter	S6	1.005	S7	48.6	1.894	0.192	0.7691	
15 minute winter	S7L	6.000	S7	9.3	0.989	0.176	0.1674	
15 minute winter	S7	1.006	S8	57.8	2.672	0.118	0.2141	
15 minute winter	S8L	7.000	S8	5.0	0.723	0.346	0.0683	
15 minute winter	S8	1.007	HW1	66.8	3.309	0.117	0.2472	
1440 minute winter	HW1	1.008	HW3	4.8	0.197	0.058	7.7497	
15 minute winter	S9L	8.000	S9	3.4	1.042	0.118	0.0183	
15 minute winter	S9	8.001	S10	7.8	0.552	0.057	0.3912	
15 minute winter	S10LA	9.000	S10	14.2	1.537	0.156	0.0440	
15 minute winter	S10LB	10.000	S10	6.5	1.210	0.240	0.0407	
15 minute winter	S10	8.002	S11	31.0	1.439	0.252	0.7411	
15 minute winter	S11L	11.000	S11	8.7	1.503	0.273	0.1047	
15 minute winter	S11	8.003	S12	43.3	1.767	0.152	1.3465	
15 minute winter	S12L	12.000	S12	9.8	0.828	0.675	0.0527	
15 minute winter	S12	8.004	S13	53.1	2.049	0.162	0.4566	
15 minute winter	S13	8.005	S14	53.1	2.151	0.161	0.5594	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.77%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S14L	10	105.826	0.066	17.2	0.0746	0.0000	OK
15 minute winter	S14	11	105.389	0.117	69.4	0.1677	0.0000	OK
15 minute winter	HW2	9	105.251	0.464	69.4	0.0227	0.0000	SURCHARGED
1440 minute winter	HW3	1590	105.160	0.374	11.0	377.5153	0.0000	OK
1440 minute winter	S15	1530	105.160	0.393	0.1	2.2529	0.0000	SURCHARGED
15 minute winter	HW4	1	106.000	1.405	0.0	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)
15 minute winter	S14L	13.000	S14	17.1	1.906	0.152	0.0506	
15 minute winter	S14	8.006	HW2	69.4	2.560	0.086	0.1188	
15 minute winter	HW2	8.007	HW3	76.4	1.722	3.847	1.8405	
1440 minute winter	HW3	1.009	S15	0.1	0.111	0.001	1.1205	
1440 minute winter	S15	1.010	HW4	0.0	0.000	0.000	2.1493	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US	Peak	Level	Depth	Inflow	Node	Flood	Status
	Node	(mins)	(m)	(m)	(l/s)	Vol (m³)	(m³)	
15 minute winter	S1	10	111.844	0.039	7.3	0.0558	0.0000	OK
15 minute winter	S2L	10	111.396	0.046	6.3	0.0519	0.0000	OK
15 minute winter	S2	10	111.006	0.061	16.1	0.0866	0.0000	OK
15 minute winter	S3	10	110.600	0.070	22.3	0.0996	0.0000	OK
15 minute winter	S4L	10	109.997	0.047	7.1	0.0532	0.0000	OK
15 minute winter	S4	11	109.700	0.095	36.0	0.1359	0.0000	OK
15 minute winter	S5L	10	108.862	0.087	14.1	0.0989	0.0000	OK
15 minute winter	S5	11	108.660	0.105	58.0	0.1496	0.0000	OK
15 minute winter	S6L	10	107.618	0.083	7.5	0.0935	0.0000	OK
15 minute winter	S6	11	107.281	0.146	71.5	0.2094	0.0000	OK
15 minute winter	S7L	10	107.077	0.082	14.1	0.0928	0.0000	OK
15 minute winter	S7	11	106.778	0.118	85.7	0.1693	0.0000	OK
15 minute winter	S8L	10	106.471	0.081	7.6	0.0921	0.0000	OK
15 minute winter	S8	11	106.192	0.117	99.1	0.1678	0.0000	OK
1440 minute winter	HW1	1530	105.249	0.462	6.1	0.0226	0.0000	OK
15 minute winter	S9L	10	108.746	0.045	5.0	0.0515	0.0000	OK
15 minute winter	S9	10	108.463	0.058	11.7	0.0835	0.0000	OK
15 minute winter	S10LA	10	108.300	0.085	21.2	0.0966	0.0000	OK
15 minute winter	S10LB	10	108.387	0.067	9.8	0.0763	0.0000	OK
15 minute winter	S10	10	108.127	0.132	46.9	0.1889	0.0000	OK
15 minute winter	S11L	10	108.370	0.070	13.1	0.0787	0.0000	OK
15 minute winter	S11	11	107.621	0.120	63.9	0.1724	0.0000	OK
15 minute winter	S12L	10	106.787	0.137	14.6	0.1546	0.0000	OK
15 minute winter	S12	11	106.529	0.134	78.1	0.1922	0.0000	OK
15 minute winter	S13	11	106.058	0.133	78.8	0.1899	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 winter	S1	1.000	S2	7.2	1.605	0.062	0.0717	
15 minute winter	S2L	2.000	S2	6.2	1.432	0.179	0.0291	
15 minute winter	S2	1.001	S3	16.0	1.422	0.087	0.1720	
15 minute winter	S3	1.002	S4	22.0	1.412	0.120	0.5334	
15 minute winter	S4L	3.000	S4	7.1	1.611	0.172	0.0162	
15 minute winter	S4	1.003	S5	35.6	1.898	0.209	0.7823	
15 minute winter	S5L	4.000	S5	13.9	1.045	0.269	0.0937	
15 minute winter	S5	1.004	S6	58.0	1.803	0.174	1.6652	
15 minute winter	S6L	5.000	S6	7.4	0.785	0.511	0.0518	
15 minute winter	S6	1.005	S7	72.2	2.080	0.286	1.0389	
15 minute winter	S7L	6.000	S7	13.8	1.097	0.261	0.2236	
15 minute winter	S7	1.006	S8	85.9	2.904	0.176	0.2925	
15 minute winter	S8L	7.000	S8	7.5	0.798	0.517	0.0925	
15 minute winter	S8	1.007	HW1	99.3	3.651	0.174	0.3331	
1440 minute winter	HW1	1.008	HW3	5.9	0.203	0.072	10.1522	
15 minute winter	S9L	8.000	S9	4.9	1.154	0.174	0.0244	
15 minute winter	S9	8.001	S10	11.6	0.605	0.084	0.5260	
15 minute winter	S10LA	9.000	S10	21.1	1.688	0.231	0.0595	
15 minute winter	S10LB	10.000	S10	9.7	1.335	0.357	0.0549	
15 minute winter	S10	8.002	S11	46.0	1.593	0.374	0.9922	
15 minute winter	S11L	11.000	S11	12.9	1.664	0.407	0.1408	
15 minute winter	S11	8.003	S12	64.2	1.948	0.226	1.8096	
15 minute winter	S12L	12.000	S12	14.4	0.923	0.995	0.0690	
15 minute winter	S12	8.004	S13	78.8	2.243	0.240	0.6187	
15 minute winter	S13	8.005	S14	79.0	2.383	0.239	0.7511	

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S14L	10	105.843	0.083	25.5	0.0939	0.0000	OK
15 minute winter	S14	11	105.422	0.150	103.2	0.2143	0.0000	OK
15 minute winter	HW2	8	105.316	0.528	103.2	0.0259	0.0000	SURCHARGED
1440 minute winter	HW3	1620	105.249	0.463	14.0	477.2802	0.0000	SURCHARGED
1440 minute winter	S15	1590	105.249	0.482	0.1	2.7602	0.0000	SURCHARGED
15 minute winter	HW4	1	106.000	1.405	0.0	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)
15 minute winter	S14L	13.000	S14	25.4	2.093	0.225	0.0683	
15 minute winter	S14	8.006	HW2	103.2	2.771	0.128	0.1706	
15 minute winter	HW2	8.007	HW3	109.6	1.964	5.519	1.8393	
1440 minute winter	HW3	1.009	S15	0.1	0.123	0.001	1.2332	
1440 minute winter	S15	1.010	HW4	0.0	0.000	0.000	2.1493	0.0

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	111.867	0.062	17.7	0.0882	0.0000	OK
15 minute winter	S2L	10	111.427	0.077	15.3	0.0875	0.0000	OK
15 minute winter	S2	10	111.043	0.098	39.1	0.1406	0.0000	OK
15 minute winter	S3	10	110.640	0.110	54.2	0.1576	0.0000	OK
15 minute winter	S4L	10	110.031	0.081	17.3	0.0918	0.0000	OK
15 minute winter	S4	10	109.763	0.158	87.8	0.2259	0.0000	OK
15 minute winter	S5L	10	108.926	0.151	34.2	0.1713	0.0000	OK
15 minute winter	S5	11	108.723	0.168	142.2	0.2400	0.0000	OK
15 minute winter	S6L	10	107.710	0.175	18.1	0.1984	0.0000	SURCHARGED
15 minute winter	S6	11	107.388	0.253	175.3	0.3623	0.0000	OK
15 minute winter	S7L	10	107.136	0.140	34.2	0.1589	0.0000	OK
15 minute winter	S7	11	106.867	0.207	208.6	0.2957	0.0000	OK
15 minute winter	S8L	10	106.580	0.190	18.5	0.2151	0.0000	SURCHARGED
15 minute winter	S8	11	106.279	0.204	241.5	0.2921	0.0000	OK
1440 minute winter	HW1	1590	105.562	0.775	11.3	0.0380	0.0000	OK
15 minute winter	S9L	10	108.776	0.076	12.1	0.0864	0.0000	OK
15 minute winter	S9	10	108.496	0.091	28.5	0.1306	0.0000	OK
15 minute winter	S10LA	10	108.373	0.158	51.5	0.1787	0.0000	OK
15 minute winter	S10LB	10	108.447	0.127	23.7	0.1434	0.0000	OK
15 minute winter	S10	10	108.238	0.243	113.8	0.3476	0.0000	OK
15 minute winter	S11L	10	108.436	0.136	31.8	0.1539	0.0000	OK
15 minute winter	S11	10	107.700	0.200	154.8	0.2856	0.0000	OK
15 minute winter	S12L	10	107.044	0.394	35.4	0.4453	0.0000	SURCHARGED
15 minute winter	S12	11	106.630	0.235	189.8	0.3367	0.0000	OK
15 minute winter	S13	11	106.152	0.227	191.2	0.3244	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 winter	S1	1.000	S2	17.5	2.056	0.151	0.1360	
15 minute winter	S2L	2.000	S2	15.2	1.778	0.435	0.0570	
15 minute winter	S2	1.001	S3	38.9	1.792	0.212	0.3325	
15 minute winter	S3	1.002	S4	53.7	1.766	0.292	1.0378	
15 minute winter	S4L	3.000	S4	17.2	1.972	0.419	0.0323	
15 minute winter	S4	1.003	S5	86.5	2.382	0.508	1.5153	
15 minute winter	S5L	4.000	S5	33.9	1.292	0.653	0.1841	
15 minute winter	S5	1.004	S6	141.0	2.228	0.423	3.2577	
15 minute winter	S6L	5.000	S6	17.8	1.026	1.233	0.0910	
15 minute winter	S6	1.005	S7	175.9	2.484	0.696	2.1117	
15 minute winter	S7L	6.000	S7	33.7	1.360	0.635	0.4392	
15 minute winter	S7	1.006	S8	209.3	3.390	0.428	0.6106	
15 minute winter	S8L	7.000	S8	18.1	1.038	1.249	0.1638	
15 minute winter	S8	1.007	HW1	242.1	4.441	0.424	0.6672	
1440 minute winter	HW1	1.008	HW3	11.0	0.219	0.133	17.1670	
15 minute winter	S9L	8.000	S9	12.0	1.433	0.421	0.0476	
15 minute winter	S9	8.001	S10	28.2	0.712	0.205	1.0563	
15 minute winter	S10LA	9.000	S10	51.2	1.850	0.562	0.1464	
15 minute winter	S10LB	10.000	S10	23.4	1.589	0.863	0.1108	
15 minute winter	S10	8.002	S11	111.5	1.913	0.907	2.0013	
15 minute winter	S11L	11.000	S11	31.3	1.941	0.984	0.3116	
15 minute winter	S11	8.003	S12	155.9	2.355	0.548	3.6322	
15 minute winter	S12L	12.000	S12	34.7	1.973	2.403	0.0779	
15 minute winter	S12	8.004	S13	191.2	2.685	0.583	1.2535	
15 minute winter	S13	8.005	S14	191.7	2.744	0.579	1.5851	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.72%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S14L	10	105.908	0.148	61.9	0.1677	0.0000	OK
1440 minute winter	S14	1560	105.562	0.290	23.0	0.4144	0.0000	OK
1440 minute winter	HW2	1560	105.562	0.775	25.7	0.0380	0.0000	SURCHARGED
1440 minute winter	HW3	1680	105.562	0.776	45.1	861.0648	0.0000	SURCHARGED
1440 minute winter	S15	1620	105.562	0.795	0.2	4.5496	0.0000	SURCHARGED
15 minute winter	HW4	1	106.000	1.405	0.0	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)
15 minute winter	S14L	13.000	S14	61.6	2.522	0.546	0.1374	
1440 minute winter	S14	8.006	HW2	25.7	1.656	0.032	0.3971	
1440 minute winter	HW2	8.007	HW3	32.9	0.442	1.656	3.6475	
1440 minute winter	HW3	1.009	S15	0.2	0.130	0.001	1.2332	
1440 minute winter	S15	1.010	HW4	0.0	0.000	0.000	2.1493	0.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S14L	11	106.243	0.483	108.6	0.5465	0.0000	SURCHARGED
1440 minute winter	S14	1470	106.012	0.740	20.3	1.0588	0.0000	SURCHARGED
1440 minute winter	HW2	1470	106.012	1.225	35.4	0.0600	0.0000	FLOOD RISK
1440 minute winter	HW3	1470	106.012	1.226	45.2	1501.5890	0.0000	FLOOD RISK
1440 minute winter	S15	1470	106.012	1.245	0.2	7.1285	0.0000	FLOOD RISK
15 minute winter	HW4	1	106.000	1.405	0.0	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)
15 minute winter	S14L	13.000	S14	107.7	2.708	0.954	0.2241	
1440 minute winter	S14	8.006	HW2	35.4	1.715	0.044	0.4726	
1440 minute winter	HW2	8.007	HW3	20.8	0.544	1.047	3.6475	
1440 minute winter	HW3	1.009	S15	0.2	0.150	0.002	1.2332	
1440 minute winter	S15	1.010	HW4	0.1	0.001	0.001	2.1493	1.4

