

Banners Gate Ltd		Page 0
10-11 Birmingham Street Halesowen West Midlands B63 3HN	17071 - Barnham Phase 2	
Date 21/05/2019 08:10 File Network 1	Designed by TB Checked by JB	
Micro Drainage		Network 2017.1.2

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 17071 - 17.05.19 2.SWS

Pipe Sizes 17071 - 17.05.19 Manhole Sizes 17071 - 17.05.19

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	100	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for 17071 - 17.05.19 2.SWS

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.015	4-8	0.977	8-12	1.413	12-16	0.380	16-20	0.003

Total Area Contributing (ha) = 2.787

Total Pipe Volume (m³) = 136.368

Network Design Table for 17071 - 17.05.19 2.SWS

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	31.669	0.132	239.9	0.189	6.00	0.0	0.600	o	300	Pipe/Conduit	
S1.001	42.244	0.106	398.5	0.231	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.002	17.368	0.043	403.9	0.129	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.003	13.409	0.034	394.4	0.062	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.004	15.534	0.039	398.3	0.020	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	55.63	6.52	9.654	0.189	0.0	0.0	0.0	1.01	71.4	28.5
S1.001	53.10	7.22	9.372	0.420	0.0	0.0	0.0	1.01	161.0	60.4
S1.002	52.14	7.51	9.266	0.549	0.0	0.0	0.0	1.01	159.9	77.5
S1.003	51.43	7.73	9.223	0.611	0.0	0.0	0.0	1.02	161.8	85.1
S1.004	50.63	7.98	9.189	0.631	0.0	0.0	0.0	1.01	161.0	86.5

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Micro Drainage					Network 2017.1.2							
Network Design Table for 17071 - 17.05.19 2.SWS												
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
S1.005	23.359	0.050	467.2	0.058	0.00	0.0	0.600	o	450	Pipe/Conduit		
S2.000	25.283	0.175	144.5	0.125	6.00	0.0	0.600	o	225	Pipe/Conduit		
S2.001	23.038	0.150	153.6	0.030	0.00	0.0	0.600	o	300	Pipe/Conduit		
S1.006	16.067	0.072	223.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
S1.007	11.343	0.048	236.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
S1.008	16.371	0.069	237.3	0.069	0.00	0.0	0.600	o	300	Pipe/Conduit		
S1.009	10.814	0.045	240.3	0.096	0.00	0.0	0.600	o	300	Pipe/Conduit		
S1.010	16.173	0.068	237.8	0.035	0.00	0.0	0.600	o	300	Pipe/Conduit		
S1.011	16.186	0.068	238.0	0.061	0.00	0.0	0.600	o	300	Pipe/Conduit		
S1.012	22.372	0.094	238.0	0.080	0.00	0.0	0.600	o	300	Pipe/Conduit		
S1.013	28.912	0.121	238.9	0.047	0.00	0.0	0.600	o	300	Pipe/Conduit		
S1.014	29.403	0.124	237.1	0.106	0.00	0.0	0.600	o	300	Pipe/Conduit		
S3.000	88.241	0.371	237.8	0.197	6.00	0.0	0.600	o	300	Pipe/Conduit		
S4.000	12.888	0.055	234.3	0.103	6.00	0.0	0.600	o	300	Pipe/Conduit		
S3.001	18.409	0.046	400.2	0.115	0.00	0.0	0.600	o	450	Pipe/Conduit		
S3.002	62.655	0.157	399.1	0.036	0.00	0.0	0.600	o	450	Pipe/Conduit		
Network Results Table												
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)		
S1.005	49.39	8.40	9.150	0.689	0.0	0.0	0.0	0.93	148.5	92.2		
S2.000	56.15	6.39	9.550	0.125	0.0	0.0	0.0	1.09	43.2	19.0		
S2.001	54.99	6.69	9.300	0.155	0.0	0.0	0.0	1.27	89.5	23.1		
S1.006	48.82	8.60	9.100	0.844	0.0	0.0	0.0	1.36	215.8	111.6		
S1.007	48.31	8.78	9.028	0.844	0.0	0.0	0.0	1.02	72.0«	111.6		
S1.008	47.59	9.05	8.980	0.913	0.0	0.0	0.0	1.02	71.8«	117.7		
S1.009	47.12	9.23	8.911	1.009	0.0	0.0	0.0	1.01	71.4«	128.8		
S1.010	46.44	9.49	8.866	1.044	0.0	0.0	0.0	1.02	71.8«	131.3		
S1.011	45.79	9.76	8.798	1.105	0.0	0.0	0.0	1.01	71.7«	137.0		
S1.012	44.92	10.13	8.730	1.185	0.0	0.0	0.0	1.01	71.7«	144.2		
S1.013	43.86	10.60	8.636	1.232	0.0	0.0	0.0	1.01	71.6«	146.3		
S1.014	42.84	11.08	8.515	1.338	0.0	0.0	0.0	1.02	71.9«	155.2		
S3.000	52.32	7.45	9.528	0.197	0.0	0.0	0.0	1.02	71.8	27.9		
S4.000	56.86	6.21	9.212	0.103	0.0	0.0	0.0	1.02	72.3	15.9		
S3.001	51.34	7.75	9.007	0.415	0.0	0.0	0.0	1.01	160.6	57.7		
S3.002	48.30	8.78	8.961	0.451	0.0	0.0	0.0	1.01	160.9	59.0		
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Micro Drainage					Network 2017.1.2							
Network Design Table for 17071 - 17.05.19 2.SWS												
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
S5.000	23.569	0.099	238.1	0.151	6.00	0.0	0.600	o	300	Pipe/Conduit		
S3.003	26.874	0.067	401.1	0.058	0.00	0.0	0.600	o	450	Pipe/Conduit		
S3.004	47.680	0.119	400.7	0.099	0.00	0.0	0.600	o	450	Pipe/Conduit		
S3.005	24.832	0.065	382.0	0.024	0.00	0.0	0.600	o	450	Pipe/Conduit		
S3.006	8.777	0.025	351.1	0.098	0.00	0.0	0.600	o	450	Pipe/Conduit		
S3.007	23.521	0.059	398.7	0.021	0.00	0.0	0.600	o	525	Pipe/Conduit		
S3.008	23.302	0.057	408.8	0.258	0.00	0.0	0.600	o	525	Pipe/Conduit		
S3.009	21.658	0.054	401.1	0.016	0.00	0.0	0.600	o	525	Pipe/Conduit		
S3.010	17.625	0.038	463.8	0.014	0.00	0.0	0.600	o	600	Pipe/Conduit		
S3.011	31.595	0.079	399.9	0.138	0.00	0.0	0.600	o	600	Pipe/Conduit		
S1.015	29.714	0.063	471.7	0.062	0.00	0.0	0.600	o	600	Pipe/Conduit		
S1.016	11.218	0.031	361.9	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit		
S1.017	9.055	0.027	335.4	0.059	0.00	0.0	0.600	o	600	Pipe/Conduit		
S1.018	36.779	0.000	0.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit		
S1.019	9.597	0.000	0.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit		
S1.020	7.242	0.070	103.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit		
Network Results Table												
PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)		
S5.000	56.15	6.39	9.053	0.151	0.0	0.0	0.0	1.01	71.7	23.0		
S3.003	47.12	9.23	8.804	0.660	0.0	0.0	0.0	1.01	160.5	84.2		
S3.004	45.18	10.02	8.737	0.759	0.0	0.0	0.0	1.01	160.5	92.9		
S3.005	44.27	10.42	8.618	0.783	0.0	0.0	0.0	1.03	164.5	93.9		
S3.006	43.97	10.55	8.553	0.881	0.0	0.0	0.0	1.08	171.6	104.9		
S3.007	43.21	10.90	8.453	0.902	0.0	0.0	0.0	1.12	241.5	105.6		
S3.008	42.50	11.26	8.394	1.160	0.0	0.0	0.0	1.10	238.5	133.5		
S3.009	41.87	11.58	8.337	1.176	0.0	0.0	0.0	1.11	240.8	133.5		
S3.010	41.37	11.84	8.208	1.190	0.0	0.0	0.0	1.12	317.8	133.5		
S3.011	40.59	12.28	8.170	1.328	0.0	0.0	0.0	1.21	342.5	146.0		
S1.015	39.82	12.72	8.091	2.728	0.0	0.0	0.0	1.11	315.2	294.2		
S1.016	39.57	12.87	8.028	2.728	0.0	0.0	0.0	1.27	360.3	294.2		
S1.017	39.38	12.98	7.997	2.787	0.0	0.0	0.0	1.32	374.4	297.3		
S1.018	35.83	15.40	7.970	2.787	0.0	0.0	0.0	0.25	90.7«	297.3		
S1.019	35.03	16.03	7.970	2.787	0.0	0.0	0.0	0.25	90.7«	297.3		
S1.020	34.97	16.08	7.970	2.787	0.0	0.0	0.0	2.39	676.9	297.3		
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Date 21/05/2019 08:10 File Network 1				Designed by TB Checked by JB							
Micro Drainage				Network 2017.1.2							
Manhole Schedules for 17071 - 17.05.19 2.SWS											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S2	11.205	1.551	Open Manhole	1200	S1.000	9.654	300				
S4	11.354	1.982	Open Manhole	1500	S1.001	9.372	450	S1.000	9.522	300	
S6	10.935	1.669	Open Manhole	1500	S1.002	9.266	450	S1.001	9.266	450	
S8	11.008	1.785	Open Manhole	1500	S1.003	9.223	450	S1.002	9.223	450	
S10	11.139	1.950	Open Manhole	1500	S1.004	9.189	450	S1.003	9.189	450	
SOF1	10.600	1.450	Open Manhole	1500	S1.005	9.150	450	S1.004	9.150	450	
S12	10.876	1.326	Open Manhole	1200	S2.000	9.550	225				
S14	11.111	1.811	Open Manhole	1200	S2.001	9.300	300	S2.000	9.375	225	
SPOND1	10.600	1.500	Open Manhole	1500	S1.006	9.100	450	S1.005	9.100	450	
								S2.001	9.150	300	
S16	11.200	2.172	Open Manhole	2100	S1.007	9.028	300	S1.006	9.028	450	
S18	11.000	2.020	Open Manhole	1200	S1.008	8.980	300	S1.007	8.980	300	
S20	10.704	1.793	Open Manhole	1200	S1.009	8.911	300	S1.008	8.911	300	
S22	10.605	1.739	Open Manhole	1200	S1.010	8.866	300	S1.009	8.866	300	
S24	10.442	1.644	Open Manhole	1200	S1.011	8.798	300	S1.010	8.798	300	
S26	10.270	1.540	Open Manhole	1200	S1.012	8.730	300	S1.011	8.730	300	
S28	10.078	1.442	Open Manhole	1200	S1.013	8.636	300	S1.012	8.636	300	
S30	10.278	1.763	Open Manhole	1200	S1.014	8.515	300	S1.013	8.515	300	
S32	10.910	1.382	Open Manhole	1200	S3.000	9.528	300				
S34	10.620	1.408	Open Manhole	1200	S4.000	9.212	300				
S36	10.519	1.512	Open Manhole	1500	S3.001	9.007	450	S3.000	9.157	300	
								S4.000	9.157	300	
S38	10.400	1.439	Open Manhole	1500	S3.002	8.961	450	S3.001	8.961	450	
S40	10.620	1.567	Open Manhole	1200	S5.000	9.053	300				
S42	11.052	2.248	Open Manhole	1500	S3.003	8.804	450	S3.002	8.804	450	
								S5.000	8.954	300	
SJPM24	10.811	2.074	Open Manhole	1500	S3.004	8.737	450	S3.003	8.737	450	
SJPM25	10.305	1.687	Open Manhole	1500	S3.005	8.618	450	S3.004	8.618	450	
SJPM26	10.405	1.852	Open Manhole	1500	S3.006	8.553	450	S3.005	8.553	450	
SJPM27	10.267	1.814	Open Manhole	1500	S3.007	8.453	525	S3.006	8.528	450	
SJPM28	10.034	1.640	Open Manhole	1500	S3.008	8.394	525	S3.007	8.394	525	
SJPM28A	10.348	2.011	Open Manhole	1500	S3.009	8.337	525	S3.008	8.337	525	
SJPM29	10.249	2.041	Open Manhole	1500	S3.010	8.208	600	S3.009	8.283	525	
SJPM29A	10.015	1.845	Open Manhole	1500	S3.011	8.170	600	S3.010	8.170	600	
SJPM30	10.104	2.013	Open Manhole	1500	S1.015	8.091	600	S1.014	8.391	300	
								S3.011	8.091	600	
SJPM31	9.600	1.572	Open Manhole	1500	S1.016	8.028	600	S1.015	8.028	600	
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Micro Drainage	Network 2017.1.2
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Manhole Schedules for 17071 - 17.05.19 2.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SJPM32	9.500	1.503	Open Manhole	1500	S1.017	7.997	600	S1.016	7.997	600	
SJPMOF	9.300	1.330	Open Manhole	1500	S1.018	7.970	675	S1.017	7.970	600	
SJPMPOND	9.300	1.330	Open Manhole	1500	S1.019	7.970	675	S1.018	7.970	675	
SJPMCC	9.300	1.330	Open Manhole	1500	S1.020	7.970	600	S1.019	7.970	675	
S47	8.500	0.600	Open Manhole	0		OUTFALL		S1.020	7.900	600	

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PIPELINE SCHEDULES for 17071 - 17.05.19 2.SWS								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	300	S2	11.205	9.654	1.251	Open Manhole	1200
S1.001	o	450	S4	11.354	9.372	1.532	Open Manhole	1500
S1.002	o	450	S6	10.935	9.266	1.219	Open Manhole	1500
S1.003	o	450	S8	11.008	9.223	1.335	Open Manhole	1500
S1.004	o	450	S10	11.139	9.189	1.500	Open Manhole	1500
S1.005	o	450	SOF1	10.600	9.150	1.000	Open Manhole	1500
S2.000	o	225	S12	10.876	9.550	1.101	Open Manhole	1200
S2.001	o	300	S14	11.111	9.300	1.511	Open Manhole	1200
S1.006	o	450	SPOND1	10.600	9.100	1.050	Open Manhole	1500
S1.007	o	300	S16	11.200	9.028	1.872	Open Manhole	2100
S1.008	o	300	S18	11.000	8.980	1.720	Open Manhole	1200
S1.009	o	300	S20	10.704	8.911	1.493	Open Manhole	1200
S1.010	o	300	S22	10.605	8.866	1.439	Open Manhole	1200
S1.011	o	300	S24	10.442	8.798	1.344	Open Manhole	1200
S1.012	o	300	S26	10.270	8.730	1.240	Open Manhole	1200
S1.013	o	300	S28	10.078	8.636	1.142	Open Manhole	1200
S1.014	o	300	S30	10.278	8.515	1.463	Open Manhole	1200
Downstream Manhole								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	31.669	239.9	S4	11.354	9.522	1.532	Open Manhole	1500
S1.001	42.244	398.5	S6	10.935	9.266	1.219	Open Manhole	1500
S1.002	17.368	403.9	S8	11.008	9.223	1.335	Open Manhole	1500
S1.003	13.409	394.4	S10	11.139	9.189	1.500	Open Manhole	1500
S1.004	15.534	398.3	SOF1	10.600	9.150	1.000	Open Manhole	1500
S1.005	23.359	467.2	SPOND1	10.600	9.100	1.050	Open Manhole	1500
S2.000	25.283	144.5	S14	11.111	9.375	1.511	Open Manhole	1200
S2.001	23.038	153.6	SPOND1	10.600	9.150	1.150	Open Manhole	1500
S1.006	16.067	223.2	S16	11.200	9.028	1.722	Open Manhole	2100
S1.007	11.343	236.3	S18	11.000	8.980	1.720	Open Manhole	1200
S1.008	16.371	237.3	S20	10.704	8.911	1.493	Open Manhole	1200
S1.009	10.814	240.3	S22	10.605	8.866	1.439	Open Manhole	1200
S1.010	16.173	237.8	S24	10.442	8.798	1.344	Open Manhole	1200
S1.011	16.186	238.0	S26	10.270	8.730	1.240	Open Manhole	1200
S1.012	22.372	238.0	S28	10.078	8.636	1.142	Open Manhole	1200
S1.013	28.912	238.9	S30	10.278	8.515	1.463	Open Manhole	1200
S1.014	29.403	237.1	SJPM30	10.104	8.391	1.413	Open Manhole	1500
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PIPELINE SCHEDULES for 17071 - 17.05.19 2.SWS								
Upstream Manhole								
PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S3.000	o	300	S32	10.910	9.528	1.082	Open Manhole	1200
S4.000	o	300	S34	10.620	9.212	1.108	Open Manhole	1200
S3.001	o	450	S36	10.519	9.007	1.062	Open Manhole	1500
S3.002	o	450	S38	10.400	8.961	0.989	Open Manhole	1500
S5.000	o	300	S40	10.620	9.053	1.267	Open Manhole	1200
S3.003	o	450	S42	11.052	8.804	1.798	Open Manhole	1500
S3.004	o	450	SJPM24	10.811	8.737	1.624	Open Manhole	1500
S3.005	o	450	SJPM25	10.305	8.618	1.237	Open Manhole	1500
S3.006	o	450	SJPM26	10.405	8.553	1.402	Open Manhole	1500
S3.007	o	525	SJPM27	10.267	8.453	1.289	Open Manhole	1500
S3.008	o	525	SJPM28	10.034	8.394	1.115	Open Manhole	1500
S3.009	o	525	SJPM28A	10.348	8.337	1.486	Open Manhole	1500
S3.010	o	600	SJPM29	10.249	8.208	1.441	Open Manhole	1500
S3.011	o	600	SJPM29A	10.015	8.170	1.245	Open Manhole	1500
S1.015	o	600	SJPM30	10.104	8.091	1.413	Open Manhole	1500
Downstream Manhole								
PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S3.000	88.241	237.8	S36	10.519	9.157	1.062	Open Manhole	1500
S4.000	12.888	234.3	S36	10.519	9.157	1.062	Open Manhole	1500
S3.001	18.409	400.2	S38	10.400	8.961	0.989	Open Manhole	1500
S3.002	62.655	399.1	S42	11.052	8.804	1.798	Open Manhole	1500
S5.000	23.569	238.1	S42	11.052	8.954	1.798	Open Manhole	1500
S3.003	26.874	401.1	SJPM24	10.811	8.737	1.624	Open Manhole	1500
S3.004	47.680	400.7	SJPM25	10.305	8.618	1.237	Open Manhole	1500
S3.005	24.832	382.0	SJPM26	10.405	8.553	1.402	Open Manhole	1500
S3.006	8.777	351.1	SJPM27	10.267	8.528	1.289	Open Manhole	1500
S3.007	23.521	398.7	SJPM28	10.034	8.394	1.115	Open Manhole	1500
S3.008	23.302	408.8	SJPM28A	10.348	8.337	1.486	Open Manhole	1500
S3.009	21.658	401.1	SJPM29	10.249	8.283	1.441	Open Manhole	1500
S3.010	17.625	463.8	SJPM29A	10.015	8.170	1.245	Open Manhole	1500
S3.011	31.595	399.9	SJPM30	10.104	8.091	1.413	Open Manhole	1500
S1.015	29.714	471.7	SJPM31	9.600	8.028	0.972	Open Manhole	1500
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10-11 Birmingham Street Halesowen West Midlands B63 3HN				17071 - Barnham Phase 2																																																																																																															
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PIPELINE SCHEDULES for 17071 - 17.05.19 2.SWS <u>Upstream Manhole</u> <table><thead><tr><th>PN</th><th>Hyd Sect</th><th>Diam (mm)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr></thead><tbody><tr><td>S1.016</td><td>o</td><td>600</td><td>SJPM31</td><td>9.600</td><td>8.028</td><td>0.972</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.017</td><td>o</td><td>600</td><td>SJPM32</td><td>9.500</td><td>7.997</td><td>0.903</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.018</td><td>o</td><td>675</td><td>SJPMOF</td><td>9.300</td><td>7.970</td><td>0.655</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.019</td><td>o</td><td>675</td><td>SJPMPOND</td><td>9.300</td><td>7.970</td><td>0.655</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.020</td><td>o</td><td>600</td><td>SJPMCC</td><td>9.300</td><td>7.970</td><td>0.730</td><td>Open Manhole</td><td>1500</td></tr></tbody></table> <u>Downstream Manhole</u> <table><thead><tr><th>PN</th><th>Length (m)</th><th>Slope (1:X)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr></thead><tbody><tr><td>S1.016</td><td>11.218</td><td>361.9</td><td>SJPM32</td><td>9.500</td><td>7.997</td><td>0.903</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.017</td><td>9.055</td><td>335.4</td><td>SJPMOF</td><td>9.300</td><td>7.970</td><td>0.730</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.018</td><td>36.779</td><td>0.0</td><td>SJPMPOND</td><td>9.300</td><td>7.970</td><td>0.655</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.019</td><td>9.597</td><td>0.0</td><td>SJPMCC</td><td>9.300</td><td>7.970</td><td>0.655</td><td>Open Manhole</td><td>1500</td></tr><tr><td>S1.020</td><td>7.242</td><td>103.5</td><td>S47</td><td>8.500</td><td>7.900</td><td>0.000</td><td>Open Manhole</td><td>0</td></tr></tbody></table>								PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	S1.016	o	600	SJPM31	9.600	8.028	0.972	Open Manhole	1500	S1.017	o	600	SJPM32	9.500	7.997	0.903	Open Manhole	1500	S1.018	o	675	SJPMOF	9.300	7.970	0.655	Open Manhole	1500	S1.019	o	675	SJPMPOND	9.300	7.970	0.655	Open Manhole	1500	S1.020	o	600	SJPMCC	9.300	7.970	0.730	Open Manhole	1500	PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	S1.016	11.218	361.9	SJPM32	9.500	7.997	0.903	Open Manhole	1500	S1.017	9.055	335.4	SJPMOF	9.300	7.970	0.730	Open Manhole	1500	S1.018	36.779	0.0	SJPMPOND	9.300	7.970	0.655	Open Manhole	1500	S1.019	9.597	0.0	SJPMCC	9.300	7.970	0.655	Open Manhole	1500	S1.020	7.242	103.5	S47	8.500	7.900	0.000	Open Manhole	0
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Area Summary for 17071 - 17.05.19 2.SWS <table><thead><tr><th>Pipe Number</th><th>PIMP Type</th><th>PIMP Name</th><th>PIMP (%)</th><th>Gross Area (ha)</th><th>Imp. Area (ha)</th><th>Pipe Total (ha)</th></tr></thead><tbody><tr><td>1.000</td><td>-</td><td>-</td><td>100</td><td>0.189</td><td>0.189</td><td>0.189</td></tr><tr><td>1.001</td><td>-</td><td>-</td><td>100</td><td>0.231</td><td>0.231</td><td>0.231</td></tr><tr><td>1.002</td><td>-</td><td>-</td><td>100</td><td>0.129</td><td>0.129</td><td>0.129</td></tr><tr><td>1.003</td><td>-</td><td>-</td><td>100</td><td>0.062</td><td>0.062</td><td>0.062</td></tr><tr><td>1.004</td><td>-</td><td>-</td><td>100</td><td>0.020</td><td>0.020</td><td>0.020</td></tr><tr><td>1.005</td><td>-</td><td>-</td><td>100</td><td>0.058</td><td>0.058</td><td>0.058</td></tr><tr><td>2.000</td><td>-</td><td>-</td><td>100</td><td>0.125</td><td>0.125</td><td>0.125</td></tr><tr><td>2.001</td><td>-</td><td>-</td><td>100</td><td>0.030</td><td>0.030</td><td>0.030</td></tr><tr><td>1.006</td><td>-</td><td>-</td><td>100</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>1.007</td><td>-</td><td>-</td><td>100</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>1.008</td><td>-</td><td>-</td><td>100</td><td>0.069</td><td>0.069</td><td>0.069</td></tr><tr><td>1.009</td><td>-</td><td>-</td><td>100</td><td>0.096</td><td>0.096</td><td>0.096</td></tr><tr><td>1.010</td><td>-</td><td>-</td><td>100</td><td>0.035</td><td>0.035</td><td>0.035</td></tr><tr><td>1.011</td><td>-</td><td>-</td><td>100</td><td>0.061</td><td>0.061</td><td>0.061</td></tr><tr><td>1.012</td><td>-</td><td>-</td><td>100</td><td>0.080</td><td>0.080</td><td>0.080</td></tr><tr><td>1.013</td><td>-</td><td>-</td><td>100</td><td>0.047</td><td>0.047</td><td>0.047</td></tr><tr><td>1.014</td><td>-</td><td>-</td><td>100</td><td>0.106</td><td>0.106</td><td>0.106</td></tr><tr><td>3.000</td><td>-</td><td>-</td><td>100</td><td>0.197</td><td>0.197</td><td>0.197</td></tr><tr><td>4.000</td><td>-</td><td>-</td><td>100</td><td>0.103</td><td>0.103</td><td>0.103</td></tr><tr><td>3.001</td><td>-</td><td>-</td><td>100</td><td>0.115</td><td>0.115</td><td>0.115</td></tr><tr><td>3.002</td><td>-</td><td>-</td><td>100</td><td>0.036</td><td>0.036</td><td>0.036</td></tr><tr><td>5.000</td><td>-</td><td>-</td><td>100</td><td>0.151</td><td>0.151</td><td>0.151</td></tr><tr><td>3.003</td><td>-</td><td>-</td><td>100</td><td>0.058</td><td>0.058</td><td>0.058</td></tr><tr><td>3.004</td><td>-</td><td>-</td><td>100</td><td>0.099</td><td>0.099</td><td>0.099</td></tr><tr><td>3.005</td><td>-</td><td>-</td><td>100</td><td>0.024</td><td>0.024</td><td>0.024</td></tr><tr><td>3.006</td><td>-</td><td>-</td><td>100</td><td>0.098</td><td>0.098</td><td>0.098</td></tr><tr><td>3.007</td><td>-</td><td>-</td><td>100</td><td>0.021</td><td>0.021</td><td>0.021</td></tr><tr><td>3.008</td><td>-</td><td>-</td><td>100</td><td>0.258</td><td>0.258</td><td>0.258</td></tr><tr><td>3.009</td><td>-</td><td>-</td><td>100</td><td>0.016</td><td>0.016</td><td>0.016</td></tr><tr><td>3.010</td><td>-</td><td>-</td><td>100</td><td>0.014</td><td>0.014</td><td>0.014</td></tr><tr><td>3.011</td><td>-</td><td>-</td><td>100</td><td>0.138</td><td>0.138</td><td>0.138</td></tr><tr><td>1.015</td><td>-</td><td>-</td><td>100</td><td>0.062</td><td>0.062</td><td>0.062</td></tr><tr><td>1.016</td><td>-</td><td>-</td><td>100</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>1.017</td><td>-</td><td>-</td><td>100</td><td>0.059</td><td>0.059</td><td>0.059</td></tr><tr><td>1.018</td><td>-</td><td>-</td><td>100</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>1.019</td><td>-</td><td>-</td><td>100</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td>1.020</td><td>-</td><td>-</td><td>100</td><td>0.000</td><td>0.000</td><td>0.000</td></tr><tr><td colspan="4"></td><td>Total</td><td>Total</td><td>Total</td></tr><tr><td colspan="4"></td><td>2.787</td><td>2.787</td><td>2.787</td></tr></tbody></table> Free Flowing Outfall Details for 17071 - 17.05.19 2.SWS <table><thead><tr><th>Outfall Pipe Number</th><th>Outfall Name</th><th>C. Level (m)</th><th>I. Level (m)</th><th>Min I. Level (m)</th><th>D,L (mm)</th><th>W (mm)</th></tr></thead><tbody><tr><td>S1.020</td><td>S47</td><td>8.500</td><td>7.900</td><td>7.710</td><td>0</td><td>0</td></tr></tbody></table>							Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)	1.000	-	-	100	0.189	0.189	0.189	1.001	-	-	100	0.231	0.231	0.231	1.002	-	-	100	0.129	0.129	0.129	1.003	-	-	100	0.062	0.062	0.062	1.004	-	-	100	0.020	0.020	0.020	1.005	-	-	100	0.058	0.058	0.058	2.000	-	-	100	0.125	0.125	0.125	2.001	-	-	100	0.030	0.030	0.030	1.006	-	-	100	0.000	0.000	0.000	1.007	-	-	100	0.000	0.000	0.000	1.008	-	-	100	0.069	0.069	0.069	1.009	-	-	100	0.096	0.096	0.096	1.010	-	-	100	0.035	0.035	0.035	1.011	-	-	100	0.061	0.061	0.061	1.012	-	-	100	0.080	0.080	0.080	1.013	-	-	100	0.047	0.047	0.047	1.014	-	-	100	0.106	0.106	0.106	3.000	-	-	100	0.197	0.197	0.197	4.000	-	-	100	0.103	0.103	0.103	3.001	-	-	100	0.115	0.115	0.115	3.002	-	-	100	0.036	0.036	0.036	5.000	-	-	100	0.151	0.151	0.151	3.003	-	-	100	0.058	0.058	0.058	3.004	-	-	100	0.099	0.099	0.099	3.005	-	-	100	0.024	0.024	0.024	3.006	-	-	100	0.098	0.098	0.098	3.007	-	-	100	0.021	0.021	0.021	3.008	-	-	100	0.258	0.258	0.258	3.009	-	-	100	0.016	0.016	0.016	3.010	-	-	100	0.014	0.014	0.014	3.011	-	-	100	0.138	0.138	0.138	1.015	-	-	100	0.062	0.062	0.062	1.016	-	-	100	0.000	0.000	0.000	1.017	-	-	100	0.059	0.059	0.059	1.018	-	-	100	0.000	0.000	0.000	1.019	-	-	100	0.000	0.000	0.000	1.020	-	-	100	0.000	0.000	0.000					Total	Total	Total					2.787	2.787	2.787	Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)	S1.020	S47	8.500	7.900	7.710	0	0
Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)																																																																																																																																																																																																																																																																																																						
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1.001	-	-	100	0.231	0.231	0.231																																																																																																																																																																																																																																																																																																						
1.002	-	-	100	0.129	0.129	0.129																																																																																																																																																																																																																																																																																																						
1.003	-	-	100	0.062	0.062	0.062																																																																																																																																																																																																																																																																																																						
1.004	-	-	100	0.020	0.020	0.020																																																																																																																																																																																																																																																																																																						
1.005	-	-	100	0.058	0.058	0.058																																																																																																																																																																																																																																																																																																						
2.000	-	-	100	0.125	0.125	0.125																																																																																																																																																																																																																																																																																																						
2.001	-	-	100	0.030	0.030	0.030																																																																																																																																																																																																																																																																																																						
1.006	-	-	100	0.000	0.000	0.000																																																																																																																																																																																																																																																																																																						
1.007	-	-	100	0.000	0.000	0.000																																																																																																																																																																																																																																																																																																						
1.008	-	-	100	0.069	0.069	0.069																																																																																																																																																																																																																																																																																																						
1.009	-	-	100	0.096	0.096	0.096																																																																																																																																																																																																																																																																																																						
1.010	-	-	100	0.035	0.035	0.035																																																																																																																																																																																																																																																																																																						
1.011	-	-	100	0.061	0.061	0.061																																																																																																																																																																																																																																																																																																						
1.012	-	-	100	0.080	0.080	0.080																																																																																																																																																																																																																																																																																																						
1.013	-	-	100	0.047	0.047	0.047																																																																																																																																																																																																																																																																																																						
1.014	-	-	100	0.106	0.106	0.106																																																																																																																																																																																																																																																																																																						
3.000	-	-	100	0.197	0.197	0.197																																																																																																																																																																																																																																																																																																						
4.000	-	-	100	0.103	0.103	0.103																																																																																																																																																																																																																																																																																																						
3.001	-	-	100	0.115	0.115	0.115																																																																																																																																																																																																																																																																																																						
3.002	-	-	100	0.036	0.036	0.036																																																																																																																																																																																																																																																																																																						
5.000	-	-	100	0.151	0.151	0.151																																																																																																																																																																																																																																																																																																						
3.003	-	-	100	0.058	0.058	0.058																																																																																																																																																																																																																																																																																																						
3.004	-	-	100	0.099	0.099	0.099																																																																																																																																																																																																																																																																																																						
3.005	-	-	100	0.024	0.024	0.024																																																																																																																																																																																																																																																																																																						
3.006	-	-	100	0.098	0.098	0.098																																																																																																																																																																																																																																																																																																						
3.007	-	-	100	0.021	0.021	0.021																																																																																																																																																																																																																																																																																																						
3.008	-	-	100	0.258	0.258	0.258																																																																																																																																																																																																																																																																																																						
3.009	-	-	100	0.016	0.016	0.016																																																																																																																																																																																																																																																																																																						
3.010	-	-	100	0.014	0.014	0.014																																																																																																																																																																																																																																																																																																						
3.011	-	-	100	0.138	0.138	0.138																																																																																																																																																																																																																																																																																																						
1.015	-	-	100	0.062	0.062	0.062																																																																																																																																																																																																																																																																																																						
1.016	-	-	100	0.000	0.000	0.000																																																																																																																																																																																																																																																																																																						
1.017	-	-	100	0.059	0.059	0.059																																																																																																																																																																																																																																																																																																						
1.018	-	-	100	0.000	0.000	0.000																																																																																																																																																																																																																																																																																																						
1.019	-	-	100	0.000	0.000	0.000																																																																																																																																																																																																																																																																																																						
1.020	-	-	100	0.000	0.000	0.000																																																																																																																																																																																																																																																																																																						
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				2.787	2.787	2.787																																																																																																																																																																																																																																																																																																						
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)																																																																																																																																																																																																																																																																																																						
S1.020	S47	8.500	7.900	7.710	0	0																																																																																																																																																																																																																																																																																																						
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10-11 Birmingham Street Halesowen West Midlands B63 3HN	17071 - Barnham Phase 2																					
Date 21/05/2019 08:10	Designed by TB																					
File Network 1	Checked by JB																					
Micro Drainage		Network 2017.1.2																				
<u>Simulation Criteria for 17071 - 17.05.19 2.SWS</u> Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 4.000 Hot Start (mins) 0 Inlet Coefficient 0.800 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1 Number of Input Hydrographs 0 Number of Storage Structures 2 Number of Online Controls 2 Number of Time/Area Diagrams 0 Number of Offline Controls 0 Number of Real Time Controls 0 <u>Synthetic Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Profile Type</td> <td>Summer</td> </tr> <tr> <td>Return Period (years)</td> <td>2</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>19.000</td> <td>Storm Duration (mins)</td> <td>30</td> </tr> <tr> <td>Ratio R</td> <td>0.350</td> <td></td> <td></td> </tr> </table>			Rainfall Model	FSR	Profile Type	Summer	Return Period (years)	2	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	19.000	Storm Duration (mins)	30	Ratio R	0.350		
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Online Controls for 17071 - 17.05.19 2.SWS

Hydro-Brake® Optimum Manhole: S16, DS/PN: S1.007, Volume (m³): 9.8

Unit Reference	MD-SHE-0144-1000-1100-1000
Design Head (m)	1.100
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	144
Invert Level (m)	9.028
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.100	10.0	Kick-Flo®	0.728	8.2
Flush-Flo™	0.332	10.0	Mean Flow over Head Range	-	8.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	1.200	10.4	3.000	16.1	7.000	24.1
0.200	9.6	1.400	11.2	3.500	17.3	7.500	24.9
0.300	10.0	1.600	11.9	4.000	18.4	8.000	25.7
0.400	9.9	1.800	12.6	4.500	19.5	8.500	26.5
0.500	9.7	2.000	13.3	5.000	20.5	9.000	27.2
0.600	9.4	2.200	13.9	5.500	21.5	9.500	28.0
0.800	8.6	2.400	14.5	6.000	22.4		
1.000	9.6	2.600	15.0	6.500	23.3		

Hydro-Brake® Optimum Manhole: SJPMCC, DS/PN: S1.020, Volume (m³): 5.2

Unit Reference	MD-SHE-0206-2170-1000-2170
Design Head (m)	1.000
Design Flow (l/s)	21.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	206
Invert Level (m)	7.970
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

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Storage Structures for 17071 - 17.05.19 2.SWS

Tank or Pond Manhole: SPOND1, DS/PN: S1.006

Invert Level (m) 9.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	191.0	0.700	393.0	1.400	661.0	2.100	0.0
0.100	215.0	0.800	426.0	1.500	690.0	2.200	0.0
0.200	242.0	0.900	463.0	1.600	0.0	2.300	0.0
0.300	270.0	1.000	500.0	1.700	0.0	2.400	0.0
0.400	298.0	1.100	538.0	1.800	0.0	2.500	0.0
0.500	328.0	1.200	578.0	1.900	0.0		
0.600	360.0	1.300	619.0	2.000	0.0		

Tank or Pond Manhole: SJPMPOUND, DS/PN: S1.019

Invert Level (m) 7.970

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	475.0	0.575	850.0	1.130	1200.0
0.475	700.0	1.000	1050.0		

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10-11 Birmingham Street Halesowen West Midlands B63 3HN	17071 - Barnham Phase 2																																																																																																																																																																			
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<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 17071 - 17.05.19 2.SWS</u>									
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S2	9.774	-0.180	0.000	0.33		21.8	OK	
S1.001	S4	9.564	-0.258	0.000	0.31		44.1	OK	
S1.002	S6	9.505	-0.211	0.000	0.45		53.1	OK	
S1.003	S8	9.468	-0.205	0.000	0.55		57.6	OK	
S1.004	S10	9.427	-0.212	0.000	0.54		58.7	OK	
S1.005	SOF1	9.378	-0.222	0.000	0.51		62.4	OK	
S2.000	S12	9.644	-0.131	0.000	0.36		14.5	OK	
S2.001	S14	9.396	-0.204	0.000	0.22		17.5	OK	
S1.006	SPOND1	9.360	-0.190	0.000	0.06		10.6	OK	
S1.007	S16	9.357	0.029	0.000	0.17		9.9	SURCHARGED	
S1.008	S18	9.076	-0.204	0.000	0.21		13.0	OK	
S1.009	S20	9.032	-0.179	0.000	0.34		19.4	OK	
S1.010	S22	8.992	-0.174	0.000	0.37		22.3	OK	
S1.011	S24	8.941	-0.157	0.000	0.45		27.2	OK	
S1.012	S26	8.889	-0.141	0.000	0.55		34.6	OK	1
S1.013	S28	8.804	-0.132	0.000	0.60		38.7	OK	2
S1.014	S30	8.706	-0.109	0.000	0.72		47.2	OK	
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 17071 - 17.05.19 2.SWS									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	
S3.000	S32	15 Winter	1	+0%	100/15 Summer				
S4.000	S34	15 Winter	1	+0%	100/15 Summer				
S3.001	S36	15 Winter	1	+0%	100/15 Summer				
S3.002	S38	15 Winter	1	+0%	100/15 Summer	100/30 Winter			
S5.000	S40	15 Winter	1	+0%	30/15 Winter				
S3.003	S42	15 Winter	1	+0%	30/15 Winter				
S3.004	SJPM24	15 Winter	1	+0%	30/15 Winter				
S3.005	SJPM25	15 Winter	1	+0%	30/15 Summer				
S3.006	SJPM26	15 Winter	1	+0%	30/15 Summer				
S3.007	SJPM27	30 Winter	1	+0%	30/15 Summer				
S3.008	SJPM28	30 Winter	1	+0%	30/15 Summer				
S3.009	SJPM28A	30 Winter	1	+0%	30/15 Summer				
S3.010	SJPM29	30 Winter	1	+0%	30/15 Winter				
S3.011	SJPM29A	30 Winter	1	+0%	30/15 Winter				
S1.015	SJPM30	30 Winter	1	+0%	30/15 Summer				
S1.016	SJPM31	30 Winter	1	+0%	30/15 Summer				
S1.017	SJPM32	30 Winter	1	+0%	30/15 Summer				
S1.018	SJPMOF	30 Winter	1	+0%	30/15 Winter				
S1.019	SJPMPOD	360 Winter	1	+0%	30/120 Winter				
S1.020	SJPMCC	360 Winter	1	+0%	30/120 Summer				
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S3.000	S32	9.647	-0.181	0.000	0.32		22.1	OK	
S4.000	S34	9.303	-0.209	0.000	0.20		12.0	OK	
S3.001	S36	9.197	-0.260	0.000	0.37		45.1	OK	
S3.002	S38	9.137	-0.274	0.000	0.31		46.3	OK	1
S5.000	S40	9.160	-0.193	0.000	0.28		17.5	OK	
S3.003	S42	9.032	-0.222	0.000	0.46		63.2	OK	
S3.004	SJPM24	8.960	-0.227	0.000	0.47		67.8	OK	
S3.005	SJPM25	8.874	-0.194	0.000	0.49		67.0	OK	
S3.006	SJPM26	8.822	-0.181	0.000	0.67		71.1	OK	
S3.007	SJPM27	8.699	-0.279	0.000	0.36		69.5	OK	
S3.008	SJPM28	8.649	-0.270	0.000	0.43		82.2	OK	
S3.009	SJPM28A	8.586	-0.276	0.000	0.43		82.3	OK	
S3.010	SJPM29	8.523	-0.285	0.000	0.41		82.5	OK	
S3.011	SJPM29A	8.490	-0.280	0.000	0.31		87.5	OK	
S1.015	SJPM30	8.457	-0.234	0.000	0.50		129.0	OK	
S1.016	SJPM31	8.405	-0.223	0.000	0.60		127.9	OK	
S1.017	SJPM32	8.378	-0.219	0.000	0.60		130.0	OK	
S1.018	SJPMOF	8.358	-0.287	0.000	0.62		129.5	OK	
S1.019	SJPMPOD	8.337	-0.308	0.000	0.11		22.9	OK	
S1.020	SJPMCC	8.333	-0.237	0.000	0.06		21.5	OK	
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10-11 Birmingham Street Halesowen West Midlands B63 3HN	17071 - Barnham Phase 2																																																																																																																																																																			
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<u>Simulation Criteria</u> Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 4.000 Hot Start Level (mm) 0 Inlet Coefficient 0.800 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000 Foul Sewage per hectare (l/s) 0.000 Number of Input Hydrographs 0 Number of Storage Structures 2 Number of Online Controls 2 Number of Time/Area Diagrams 0 Number of Offline Controls 0 Number of Real Time Controls 0 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Ratio R 0.350 Region England and Wales Cv (Summer) 0.750 M5-60 (mm) 19.000 Cv (Winter) 0.840 Margin for Flood Risk Warning (mm) 450.0 Analysis Timestep 2.5 Second Increment (Extended) DTS Status OFF DVD Status ON Inertia Status ON Profile(s) Summer and Winter Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 Return Period(s) (years) 1, 5, 30, 100 Climate Change (%) 0, 0, 0, 30																																																																																																																																																																				
<table border="1"> <thead> <tr> <th>PN</th> <th>US/MH Name</th> <th>Storm</th> <th>Return Period</th> <th>Climate Change</th> <th>First (X) Surge</th> <th>First (Y) Flood</th> <th>First (Z) Overflow</th> <th>Overflow Act.</th> </tr> </thead> <tbody> <tr><td>S1.000</td><td>S2</td><td>15 Winter</td><td>5</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.001</td><td>S4</td><td>15 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.002</td><td>S6</td><td>15 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.003</td><td>S8</td><td>15 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.004</td><td>S10</td><td>120 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.005</td><td>SOF1</td><td>120 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S2.000</td><td>S12</td><td>15 Winter</td><td>5</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S2.001</td><td>S14</td><td>120 Winter</td><td>5</td><td>+0%</td><td>30/60 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.006</td><td>SPOND1</td><td>120 Winter</td><td>5</td><td>+0%</td><td>30/30 Winter</td><td></td><td></td><td></td></tr> <tr><td>S1.007</td><td>S16</td><td>120 Winter</td><td>5</td><td>+0%</td><td>1/60 Winter</td><td></td><td></td><td></td></tr> <tr><td>S1.008</td><td>S18</td><td>30 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.009</td><td>S20</td><td>15 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.010</td><td>S22</td><td>15 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.011</td><td>S24</td><td>15 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td></tr> <tr><td>S1.012</td><td>S26</td><td>15 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td>100/15 Winter</td><td></td><td></td></tr> <tr><td>S1.013</td><td>S28</td><td>15 Winter</td><td>5</td><td>+0%</td><td>30/15 Summer</td><td>100/15 Winter</td><td></td><td></td></tr> <tr><td>S1.014</td><td>S30</td><td>15 Winter</td><td>5</td><td>+0%</td><td>5/15 Winter</td><td></td><td></td><td></td></tr> </tbody> </table>			PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	S1.000	S2	15 Winter	5	+0%	100/15 Summer				S1.001	S4	15 Winter	5	+0%	30/15 Summer				S1.002	S6	15 Winter	5	+0%	30/15 Summer				S1.003	S8	15 Winter	5	+0%	30/15 Summer				S1.004	S10	120 Winter	5	+0%	30/15 Summer				S1.005	SOF1	120 Winter	5	+0%	30/15 Summer				S2.000	S12	15 Winter	5	+0%	100/15 Summer				S2.001	S14	120 Winter	5	+0%	30/60 Summer				S1.006	SPOND1	120 Winter	5	+0%	30/30 Winter				S1.007	S16	120 Winter	5	+0%	1/60 Winter				S1.008	S18	30 Winter	5	+0%	30/15 Summer				S1.009	S20	15 Winter	5	+0%	30/15 Summer				S1.010	S22	15 Winter	5	+0%	30/15 Summer				S1.011	S24	15 Winter	5	+0%	30/15 Summer				S1.012	S26	15 Winter	5	+0%	30/15 Summer	100/15 Winter			S1.013	S28	15 Winter	5	+0%	30/15 Summer	100/15 Winter			S1.014	S30	15 Winter	5	+0%	5/15 Winter			
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.																																																																																																																																																												
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S2.000	S12	15 Winter	5	+0%	100/15 Summer																																																																																																																																																															
S2.001	S14	120 Winter	5	+0%	30/60 Summer																																																																																																																																																															
S1.006	SPOND1	120 Winter	5	+0%	30/30 Winter																																																																																																																																																															
S1.007	S16	120 Winter	5	+0%	1/60 Winter																																																																																																																																																															
S1.008	S18	30 Winter	5	+0%	30/15 Summer																																																																																																																																																															
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S1.012	S26	15 Winter	5	+0%	30/15 Summer	100/15 Winter																																																																																																																																																														
S1.013	S28	15 Winter	5	+0%	30/15 Summer	100/15 Winter																																																																																																																																																														
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<u>5 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for 17071 - 17.05.19 2.SWS</u>									
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S2	9.815	-0.139	0.000	0.56		36.2	OK	
S1.001	S4	9.649	-0.173	0.000	0.50		72.2	OK	
S1.002	S6	9.601	-0.115	0.000	0.75		87.7	OK	
S1.003	S8	9.564	-0.109	0.000	0.91		95.6	OK	
S1.004	S10	9.533	-0.106	0.000	0.38		41.8	OK	
S1.005	SOF1	9.521	-0.079	0.000	0.36		44.7	OK	
S2.000	S12	9.677	-0.098	0.000	0.61		24.2	OK	
S2.001	S14	9.509	-0.091	0.000	0.14		10.8	OK	
S1.006	SPOND1	9.507	-0.043	0.000	0.07		11.4	OK	
S1.007	S16	9.494	0.166	0.000	0.17		10.0	SURCHARGED	
S1.008	S18	9.108	-0.172	0.000	0.29		17.5	OK	
S1.009	S20	9.081	-0.130	0.000	0.52		29.3	OK	
S1.010	S22	9.058	-0.108	0.000	0.57		34.6	OK	
S1.011	S24	9.026	-0.072	0.000	0.71		43.0	OK	
S1.012	S26	8.986	-0.044	0.000	0.85		53.7	OK	1
S1.013	S28	8.924	-0.012	0.000	0.89		57.9	OK	2
S1.014	S30	8.828	0.013	0.000	1.10		71.5	SURCHARGED	
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Micro Drainage				Network 2017.1.2					
5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 17071 - 17.05.19 2.SWS									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	
S3.000	S32	15 Winter	5	+0%	100/15 Summer				
S4.000	S34	15 Winter	5	+0%	100/15 Summer				
S3.001	S36	15 Winter	5	+0%	100/15 Summer				
S3.002	S38	15 Winter	5	+0%	100/15 Summer	100/30 Winter			
S5.000	S40	15 Winter	5	+0%	30/15 Winter				
S3.003	S42	15 Winter	5	+0%	30/15 Winter				
S3.004	SJPM24	15 Winter	5	+0%	30/15 Winter				
S3.005	SJPM25	15 Winter	5	+0%	30/15 Summer				
S3.006	SJPM26	15 Winter	5	+0%	30/15 Summer				
S3.007	SJPM27	30 Winter	5	+0%	30/15 Summer				
S3.008	SJPM28	30 Winter	5	+0%	30/15 Summer				
S3.009	SJPM28A	30 Winter	5	+0%	30/15 Summer				
S3.010	SJPM29	360 Winter	5	+0%	30/15 Winter				
S3.011	SJPM29A	360 Winter	5	+0%	30/15 Winter				
S1.015	SJPM30	360 Winter	5	+0%	30/15 Summer				
S1.016	SJPM31	360 Winter	5	+0%	30/15 Summer				
S1.017	SJPM32	360 Winter	5	+0%	30/15 Summer				
S1.018	SJPMOF	360 Winter	5	+0%	30/15 Winter				
S1.019	SJPMPOND	360 Winter	5	+0%	30/120 Winter				
S1.020	SJPMCC	360 Winter	5	+0%	30/120 Summer				
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S3.000	S32	9.687	-0.141	0.000	0.52		35.9	OK	
S4.000	S34	9.332	-0.180	0.000	0.34		20.1	OK	
S3.001	S36	9.260	-0.197	0.000	0.60		73.5	OK	
S3.002	S38	9.202	-0.209	0.000	0.50		75.1	OK	1
S5.000	S40	9.196	-0.157	0.000	0.46		29.2	OK	
S3.003	S42	9.120	-0.134	0.000	0.74		101.1	OK	
S3.004	SJPM24	9.064	-0.123	0.000	0.75		108.6	OK	
S3.005	SJPM25	9.009	-0.059	0.000	0.74		101.8	OK	
S3.006	SJPM26	8.951	-0.052	0.000	1.00		106.7	OK	
S3.007	SJPM27	8.824	-0.154	0.000	0.56		107.9	OK	
S3.008	SJPM28	8.789	-0.130	0.000	0.68		129.7	OK	
S3.009	SJPM28A	8.750	-0.112	0.000	0.67		127.3	OK	
S3.010	SJPM29	8.726	-0.082	0.000	0.19		37.6	OK	
S3.011	SJPM29A	8.717	-0.053	0.000	0.15		41.3	OK	
S1.015	SJPM30	8.691	0.000	0.000	0.27		68.2	OK	
S1.016	SJPM31	8.628	0.000	0.000	0.31		67.2	OK	
S1.017	SJPM32	8.572	-0.025	0.000	0.32		68.6	OK	
S1.018	SJPMOF	8.538	-0.107	0.000	0.33		68.2	OK	
S1.019	SJPMPOND	8.502	-0.143	0.000	0.12		24.8	OK	
S1.020	SJPMCC	8.496	-0.074	0.000	0.06		21.6	OK	
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 17071 - 17.05.19 2.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 4.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 2
 Number of Online Controls 2 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.350
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 5, 30, 100
 Climate Change (%) 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S2	15 Winter	30	+0%	100/15 Summer			
S1.001	S4	15 Winter	30	+0%	30/15 Summer			
S1.002	S6	15 Winter	30	+0%	30/15 Summer			
S1.003	S8	180 Winter	30	+0%	30/15 Summer			
S1.004	S10	180 Winter	30	+0%	30/15 Summer			
S1.005	SOF1	180 Winter	30	+0%	30/15 Summer			
S2.000	S12	180 Winter	30	+0%	100/15 Summer			
S2.001	S14	180 Winter	30	+0%	30/60 Summer			
S1.006	SPOND1	180 Winter	30	+0%	30/30 Winter			
S1.007	S16	180 Winter	30	+0%	1/60 Winter			
S1.008	S18	15 Winter	30	+0%	30/15 Summer			
S1.009	S20	15 Winter	30	+0%	30/15 Summer			
S1.010	S22	15 Winter	30	+0%	30/15 Summer			
S1.011	S24	15 Winter	30	+0%	30/15 Summer			
S1.012	S26	15 Winter	30	+0%	30/15 Summer	100/15 Winter		
S1.013	S28	15 Winter	30	+0%	30/15 Summer	100/15 Winter		
S1.014	S30	30 Winter	30	+0%	5/15 Winter			

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Micro Drainage				Network 2017.1.2					
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 17071 - 17.05.19 2.SWS</u>									
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S2	9.918	-0.036	0.000	0.77		50.1	OK	
S1.001	S4	9.843	0.021	0.000	0.75		107.9	SURCHARGED	
S1.002	S6	9.797	0.081	0.000	1.15		134.1	SURCHARGED	
S1.003	S8	9.728	0.055	0.000	0.40		41.8	SURCHARGED	
S1.004	S10	9.726	0.087	0.000	0.39		43.0	SURCHARGED	
S1.005	SOF1	9.723	0.123	0.000	0.38		46.8	SURCHARGED	
S2.000	S12	9.725	-0.050	0.000	0.25		9.9	OK	
S2.001	S14	9.721	0.121	0.000	0.15		11.8	SURCHARGED	
S1.006	SPOND1	9.720	0.170	0.000	0.07		11.8	SURCHARGED	
S1.007	S16	9.721	0.393	0.000	0.17		10.0	SURCHARGED	
S1.008	S18	9.543	0.263	0.000	0.25		15.0	SURCHARGED	
S1.009	S20	9.536	0.325	0.000	0.62		35.1	SURCHARGED	
S1.010	S22	9.464	0.298	0.000	0.62		37.7	SURCHARGED	
S1.011	S24	9.385	0.287	0.000	0.83		50.5	SURCHARGED	
S1.012	S26	9.307	0.277	0.000	1.10		69.6	SURCHARGED	1
S1.013	S28	9.190	0.254	0.000	1.23		79.6	SURCHARGED	2
S1.014	S30	9.023	0.208	0.000	1.40		91.5	SURCHARGED	
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Micro Drainage				Network 2017.1.2					
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 17071 - 17.05.19 2.SWS</u>									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	
S3.000	S32	15 Winter	30	+0%	100/15 Summer				
S4.000	S34	30 Winter	30	+0%	100/15 Summer				
S3.001	S36	30 Winter	30	+0%	100/15 Summer				
S3.002	S38	30 Winter	30	+0%	100/15 Summer	100/30 Winter			
S5.000	S40	30 Winter	30	+0%	30/15 Winter				
S3.003	S42	30 Winter	30	+0%	30/15 Winter				
S3.004	SJPM24	15 Winter	30	+0%	30/15 Winter				
S3.005	SJPM25	30 Winter	30	+0%	30/15 Summer				
S3.006	SJPM26	30 Winter	30	+0%	30/15 Summer				
S3.007	SJPM27	30 Winter	30	+0%	30/15 Summer				
S3.008	SJPM28	30 Winter	30	+0%	30/15 Summer				
S3.009	SJPM28A	30 Winter	30	+0%	30/15 Summer				
S3.010	SJPM29	30 Winter	30	+0%	30/15 Winter				
S3.011	SJPM29A	30 Winter	30	+0%	30/15 Winter				
S1.015	SJPM30	30 Winter	30	+0%	30/15 Summer				
S1.016	SJPM31	480 Winter	30	+0%	30/15 Summer				
S1.017	SJPM32	480 Winter	30	+0%	30/15 Summer				
S1.018	SJPMOF	480 Winter	30	+0%	30/15 Winter				
S1.019	SJPMPOND	480 Winter	30	+0%	30/120 Winter				
S1.020	SJPMCC	480 Winter	30	+0%	30/120 Summer				
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S3.000	S32	9.734	-0.094	0.000	0.76		52.4	OK	
S4.000	S34	9.490	-0.022	0.000	0.41		24.4	OK	
S3.001	S36	9.457	0.000	0.000	0.74		90.5	OK	
S3.002	S38	9.396	-0.015	0.000	0.61		90.9	OK	1
S5.000	S40	9.377	0.024	0.000	0.55		35.2	SURCHARGED	
S3.003	S42	9.317	0.063	0.000	0.86		117.4	SURCHARGED	
S3.004	SJPM24	9.229	0.042	0.000	0.96		139.5	SURCHARGED	
S3.005	SJPM25	9.132	0.064	0.000	0.93		128.2	SURCHARGED	
S3.006	SJPM26	9.080	0.077	0.000	1.33		141.9	SURCHARGED	
S3.007	SJPM27	9.039	0.061	0.000	0.73		142.6	SURCHARGED	
S3.008	SJPM28	9.000	0.081	0.000	0.92		176.5	SURCHARGED	
S3.009	SJPM28A	8.950	0.088	0.000	0.93		176.5	SURCHARGED	
S3.010	SJPM29	8.901	0.093	0.000	0.88		178.5	SURCHARGED	
S3.011	SJPM29A	8.868	0.098	0.000	0.69		193.5	SURCHARGED	
S1.015	SJPM30	8.824	0.133	0.000	1.08		277.5	SURCHARGED	
S1.016	SJPM31	8.773	0.145	0.000	0.33		70.9	SURCHARGED	
S1.017	SJPM32	8.770	0.173	0.000	0.34		72.4	SURCHARGED	
S1.018	SJPMOF	8.767	0.122	0.000	0.35		72.0	SURCHARGED	
S1.019	SJPMPOND	8.764	0.119	0.000	0.13		25.1	SURCHARGED	
S1.020	SJPMCC	8.774	0.204	0.000	0.06		21.6	SURCHARGED	
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