

GTA Civils Ltd		Page 1
66a Church Walk	COURTWICK LANE	
Burgess Hill	SWALE NETWORK	
West Sussex RH15 9AS	(with Cottage Site)	
Date 02.03.17	Designed by DMS	
File 4485_Swale Network.mdx	Checked by	
Micro Drainage	Network 2015.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Foul Sewage (l/s/ha)	0.000	Min Design Depth for Optimisation (m)	1.200
M5-60 (mm)	19.000	Volumetric Runoff Coeff.	0.750	Min Vel for Auto Design only (m/s)	1.00
Ratio R	0.350	Add Flow / Climate Change (%)	0	Min Slope for Optimisation (1:X)	500
Maximum Rainfall (mm/hr)	100	Minimum Backdrop Height (m)	0.200		
Maximum Time of Concentration (mins)	30	Maximum Backdrop Height (m)	1.500		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.354	4-8	0.982	8-12	0.358	12-16	0.014

Total Area Contributing (ha) = 1.707

Total Pipe Volume (m³) = 110.679

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S4.000	34.080	0.200	170.4	0.047	5.00	0.0	0.600	o	225	⚙️
S4.001	20.610	0.121	170.3	0.022	0.00	0.0	0.600	o	225	⚙️
S4.002	24.670	0.145	170.1	0.031	0.00	0.0	0.600	o	225	⚙️
S4.003	15.270	0.090	169.7	0.011	0.00	0.0	0.600	o	225	⚙️
S4.004	11.850	0.070	169.3	0.000	0.00	0.0	0.600	o	225	⚙️
S4.005	24.270	0.389	62.4	0.039	0.00	0.0	0.600	o	225	⚙️
S4.006	23.070	0.217	106.3	0.015	0.00	0.0	0.600	o	225	⚙️
S5.000	14.020	0.242	57.9	0.021	5.00	0.0	0.600	o	150	⚙️
S4.007	46.000	0.352	130.7	0.068	0.00	0.0	0.600	o	300	⚙️
S4.008	17.860	0.136	131.3	0.027	0.00	0.0	0.600	o	300	⚙️
S4.009	35.150	0.207	169.8	0.030	0.00	0.0	0.600	o	300	⚙️
S4.010	9.300	0.038	244.7	0.023	0.00	0.0	0.600	o	300	⚙️
S4.011	64.420	0.263	244.9	0.060	0.00	0.0	0.600	o	300	⚙️
S4.012	34.370	0.108	318.2	0.040	0.00	0.0	0.600	o	375	⚙️
S4.013	15.430	0.049	314.9	0.042	0.00	0.0	0.600	o	375	⚙️
S6.000	25.060	1.725	14.5	0.053	5.00	0.0	0.600	o	150	⚙️
S4.014	76.030	0.190	400.2	0.112	0.00	0.0	0.600	o	450	⚙️
S4.015	51.680	0.155	333.4	0.067	0.00	0.0	0.600	o	450	⚙️
S7.000	26.420	0.260	101.6	0.065	5.00	0.0	0.600	o	225	⚙️

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4.000	46.47	5.57	6.645	0.047	0.0	0.0	0.0	1.00	39.7	5.9
S4.001	45.26	5.91	6.445	0.069	0.0	0.0	0.0	1.00	39.7	8.5
S4.002	43.90	6.32	6.324	0.100	0.0	0.0	0.0	1.00	39.7	11.9
S4.003	43.11	6.58	6.179	0.111	0.0	0.0	0.0	1.00	39.8	13.0
S4.004	42.52	6.78	6.089	0.111	0.0	0.0	0.0	1.00	39.8	13.0
S4.005	41.82	7.02	6.019	0.150	0.0	0.0	0.0	1.66	65.9	17.0
S4.006	40.98	7.32	5.630	0.165	0.0	0.0	0.0	1.27	50.4	18.3
S5.000	47.95	5.18	5.730	0.021	0.0	0.0	0.0	1.32	23.4	2.7
S4.007	39.53	7.88	5.338	0.254	0.0	0.0	0.0	1.37	97.1	27.2
S4.008	39.00	8.10	4.986	0.281	0.0	0.0	0.0	1.37	96.9	29.7
S4.009	37.87	8.58	4.850	0.311	0.0	0.0	0.0	1.20	85.1	31.9
S4.010	37.52	8.74	4.643	0.334	0.0	0.0	0.0	1.00	70.7	33.9
S4.011	35.32	9.81	4.605	0.394	0.0	0.0	0.0	1.00	70.7	37.7
S4.012	34.28	10.38	4.267	0.434	0.0	0.0	0.0	1.01	111.6	40.3
S4.013	33.83	10.63	4.159	0.476	0.0	0.0	0.0	1.02	112.2	43.6
S6.000	48.03	5.16	6.060	0.053	0.0	0.0	0.0	2.66	47.0	6.9
S4.014	31.89	11.89	4.035	0.641	0.0	0.0	0.0	1.01	160.7	55.4
S4.015	30.83	12.67	3.845	0.708	0.0	0.0	0.0	1.11	176.2	59.1
S7.000	47.32	5.34	6.900	0.065	0.0	0.0	0.0	1.30	51.6	8.3

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File 4485_Swale Network.mdx	Checked by	
Micro Drainage	Network 2015.1	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S7.001	56.510	0.385	146.8	0.035	0.00	0.0	0.600	o	225	100
S7.002	27.470	0.191	143.8	0.000	0.00	0.0	0.600	o	225	100
S7.003	21.440	0.113	189.7	0.020	0.00	0.0	0.600	o	300	100
S7.004	23.350	0.123	189.8	0.081	0.00	0.0	0.600	o	300	100
S7.005	53.750	1.171	45.9	0.095	0.00	0.0	0.600	o	300	100
S8.000	21.990	0.220	100.0	0.025	5.00	0.0	0.600	o	150	100
S9.000	14.360	1.329	10.8	0.060	5.00	0.0	0.600	o	150	100
S8.001	37.860	0.223	169.8	0.020	0.00	0.0	0.600	o	225	100
S10.000	35.220	0.587	60.0	0.047	5.00	0.0	0.600	o	150	100
S8.002	56.060	0.419	133.8	0.053	0.00	0.0	0.600	o	300	100
S11.000	37.430	2.246	16.7	0.031	5.00	0.0	0.600	o	150	100
S8.003	63.190	0.258	244.9	0.113	0.00	0.0	0.600	o	300	100
S8.004	26.320	0.108	243.7	0.032	0.00	0.0	0.600	o	300	100
S8.005	25.830	0.106	243.7	0.025	0.00	0.0	0.600	o	300	100
S7.006	44.850	0.231	194.2	0.043	0.00	0.0	0.600	o	450	100
S7.007	39.910	0.205	194.7	0.049	0.00	0.0	0.600	o	450	100
S7.008	39.550	0.204	193.9	0.091	0.00	0.0	0.600	o	450	100
S7.009	19.040	0.102	186.7	0.000	0.00	0.0	0.600	o	450	100
S4.016	23.850	0.127	187.8	0.020	0.00	0.0	0.600	o	525	100
S4.017	25.490	0.135	188.8	0.030	0.00	0.0	0.600	o	525	100
S4.018	16.320	0.094	173.6	0.015	0.00	0.0	0.600	o	525	100
S12.000	17.240	0.416	41.4	0.049	5.00	0.0	0.600	o	150	100
S4.019	7.540	0.019	396.8	0.000	0.00	0.0	0.600	o	525	100

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL Σ (m)	I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S7.001	44.26	6.21	6.640	0.100	0.0	0.0	0.0	1.08	42.8	12.0
S7.002	42.94	6.63	6.255	0.100	0.0	0.0	0.0	1.09	43.3	12.0
S7.003	42.02	6.95	5.989	0.120	0.0	0.0	0.0	1.14	80.4	13.7
S7.004	41.06	7.29	5.876	0.201	0.0	0.0	0.0	1.14	80.4	22.4
S7.005	40.05	7.68	5.753	0.296	0.0	0.0	0.0	2.33	164.5	32.1
S8.000	47.23	5.36	6.066	0.025	0.0	0.0	0.0	1.01	17.8	3.2
S9.000	48.34	5.08	7.175	0.060	0.0	0.0	0.0	3.08	54.5	7.9
S8.001	44.98	6.00	5.771	0.105	0.0	0.0	0.0	1.00	39.8	12.8
S10.000	46.90	5.45	6.230	0.047	0.0	0.0	0.0	1.30	23.0	6.0
S8.002	42.79	6.68	5.473	0.205	0.0	0.0	0.0	1.36	96.0	23.8
S11.000	47.66	5.25	7.480	0.031	0.0	0.0	0.0	2.48	43.8	4.0
S8.003	39.89	7.74	5.054	0.349	0.0	0.0	0.0	1.00	70.7	37.7
S8.004	38.82	8.17	4.796	0.381	0.0	0.0	0.0	1.00	70.9	40.1
S8.005	37.82	8.60	4.688	0.406	0.0	0.0	0.0	1.00	70.9	41.6
S7.006	36.71	9.12	4.432	0.745	0.0	0.0	0.0	1.46	231.5	74.1
S7.007	35.78	9.57	4.201	0.794	0.0	0.0	0.0	1.45	231.2	76.9
S7.008	34.92	10.03	3.996	0.885	0.0	0.0	0.0	1.46	231.7	83.7
S7.009	34.53	10.24	3.792	0.885	0.0	0.0	0.0	1.48	236.1	83.7
S4.016	30.52	12.91	3.615	1.613	0.0	0.0	0.0	1.63	353.1	133.3
S4.017	30.19	13.17	3.488	1.643	0.0	0.0	0.0	1.63	352.1	134.3
S4.018	29.99	13.33	3.353	1.658	0.0	0.0	0.0	1.70	367.4	134.7
S12.000	47.92	5.18	4.050	0.049	0.0	0.0	0.0	1.57	27.7	6.4
S4.019	29.86	13.44	3.259	1.707	0.0	0.0	0.0	1.12	242.1	138.0

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66a Church Walk Burgess Hill West Sussex RH15 9AS				COURTWICK LANE SWALE NETWORK (with Cottage Site)							
Date 02.03.17 File 4485_Swale Network.mdx				Designed by DMS Checked by							
Micro Drainage				Network 2015.1							
Manhole Schedules for Storm											
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)
S17	8.070	1.425	Open Manhole	1200	S4.000	6.645	225				
S18	8.450	2.005	Open Manhole	1200	S4.001	6.445	225	S4.000	6.445	225	
S19	8.060	1.736	Open Manhole	1200	S4.002	6.324	225	S4.001	6.324	225	
S20	7.820	1.641	Open Manhole	1200	S4.003	6.179	225	S4.002	6.179	225	
S21	7.850	1.761	Open Manhole	1200	S4.004	6.089	225	S4.003	6.089	225	
S22	7.700	1.681	Open Manhole	1200	S4.005	6.019	225	S4.004	6.019	225	
S23	7.380	1.750	Open Manhole	1200	S4.006	5.630	225	S4.005	5.630	225	
S24	7.380	1.650	Open Manhole	1200	S5.000	5.730	150				
S25	7.220	1.882	Open Manhole	1200	S4.007	5.338	300	S4.006	5.413	225	
								S5.000	5.488	150	
S26	6.625	1.639	Open Manhole	1050	S4.008	4.986	300	S4.007	4.986	300	
S27	6.350	1.500	Open Manhole	1200	S4.009	4.850	300	S4.008	4.850	300	
S28	6.435	1.792	Open Manhole	1200	S4.010	4.643	300	S4.009	4.643	300	
S29	6.575	1.970	Open Manhole	1200	S4.011	4.605	300	S4.010	4.605	300	
S30	7.435	3.168	Open Manhole	1350	S4.012	4.267	375	S4.011	4.342	300	
S31	6.355	2.776	Open Manhole	1350	S4.013	4.159	375	S4.012	4.159	375	
S32	7.410	1.350	Open Manhole	1200	S6.000	6.060	150				
S33	7.220	3.185	Open Manhole	1350	S4.014	4.035	450	S4.013	4.110	375	
								S6.000	4.335	150	
S34	6.565	2.520	Open Manhole	1350	S4.015	3.845	450	S4.014	3.845	450	
S35	8.310	1.410	Open Manhole	1050	S7.000	6.900	225				
S36	8.050	1.410	Open Manhole	1200	S7.001	6.640	225	S7.000	6.640	225	
S37	8.870	2.615	Open Manhole	1200	S7.002	6.255	225	S7.001	6.255	225	
S38	8.540	2.551	Open Manhole	1200	S7.003	5.989	300	S7.002	6.064	225	
S39	8.260	2.384	Open Manhole	1200	S7.004	5.876	300	S7.003	5.876	300	
S40	8.820	2.267	Open Manhole	1200	S7.005	5.753	300	S7.004	5.753	300	
S41	8.830	1.964	Open Manhole	1200	S8.000	6.066	150				
S42	8.575	1.400	Open Manhole	1200	S9.000	7.175	150				
S43	8.775	3.004	Open Manhole	1200	S8.001	5.771	225	S8.000	5.846	150	
								S9.000	5.846	150	
S44	7.610	1.400	Open Manhole	1200	S10.000	6.210	150				
S45	8.235	2.762	Open Manhole	1200	S8.002	5.473	300	S8.001	5.548	225	
								S10.000	5.623	150	
S46A	8.850	1.400	Open Manhole	1200	S11.000	7.450	150				
S46	8.345	3.291	Open Manhole	1200	S8.003	5.054	300	S8.002	5.054	300	
								S11.000	5.204	150	
S47	7.565	2.769	Open Manhole	1200	S8.004	4.796	300	S8.003	4.796	300	
S48	7.610	2.922	Open Manhole	1200	S8.005	4.688	300	S8.004	4.688	300	
S49	7.335	2.903	Open Manhole	1350	S7.006	4.432	450	S7.005	4.582	300	
								S8.005	4.582	300	
S50	6.640	2.439	Open Manhole	1350	S7.007	4.201	450	S7.006	4.201	450	
S51	6.125	2.129	Open Manhole	1350	S7.008	3.996	450	S7.007	3.996	450	
S52	5.845	2.053	Open Manhole	1350	S7.009	3.792	450	S7.008	3.792	450	
S53	6.165	2.490	Open Manhole	1500	S4.016	3.615	525	S4.015	3.690	450	
								S7.009	3.690	450	
S54	5.940	2.452	Open Manhole	1500	S4.017	3.488	525	S4.016	3.488	525	
S55	5.490	2.137	Open Manhole	1500	S4.018	3.353	525	S4.017	3.353	525	
S56	5.490	1.350	Open Manhole	1050	S12.000	4.050	150				
S57	5.340	2.081	Open Manhole	1500	S4.019	3.259	525	S4.018	3.259	525	
								S12.000	3.634	150	
S	5.300	2.060	Open Manhole	0		OUTFALL		S4.019	3.240	525	
Free Flowing Outfall Details for Storm											
Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)					
S4.019	S	5.300	3.240	0.000	0	0					
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66a Church Walk	COURTWICK LANE	
Burgess Hill	SWALE NETWORK	
West Sussex RH15 9AS	(with Cottage Site)	
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File 4485_Swale Network.mdx	Checked by	
Micro Drainage	Network 2015.1	
Simulation Criteria for Storm Volumetric Runoff Coeff 0.840 Manhole Headloss Coeff (Global) 0.500 Inlet Coefficient 0.800 Areal Reduction Factor 1.000 Foul Sewage per hectare (l/s) 0.000 Flow per Person per Day (l/per/day) 0.000 Hot Start (mins) 0 Additional Flow - % of Total Flow 30.000 Run Time (mins) 60 Hot Start Level (mm) 0 MADD Factor * 10m³/ha Storage 2.000 Output Interval (mins) 1 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0 Synthetic Rainfall Details Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750 Return Period (years) 100 Ratio R 0.350 Cv (Winter) 0.840 Region England and Wales Profile Type Winter Storm Duration (mins) 30		
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Burgess Hill	SWALE NETWORK	
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Micro Drainage	Network 2015.1	

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 150.0 DTS Status ON Inertia Status OFF
Analysis Timestep Fine DVD Status ON

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status
		Level (m)	Depth (m)	Volume (m³)			Flow (l/s)	
S4.000	S17	7.028	0.158	0.000	0.52		19.5	SURCHARGED
S4.001	S18	6.997	0.327	0.000	0.70		25.3	SURCHARGED
S4.002	S19	6.962	0.413	0.000	0.95		34.9	SURCHARGED
S4.003	S20	6.889	0.485	0.000	1.04		36.4	SURCHARGED
S4.004	S21	6.810	0.496	0.000	1.00		34.0	SURCHARGED
S4.005	S22	6.733	0.489	0.000	0.78		47.0	SURCHARGED
S4.006	S23	6.603	0.754	0.000	1.02		46.9	SURCHARGED
S5.000	S24	6.497	0.617	0.000	0.38		8.1	SURCHARGED
S4.007	S25	6.477	0.839	0.000	0.80		72.7	SURCHARGED
S4.008	S26	6.335	1.049	0.000	0.90		74.9	SURCHARGED
S4.009	S27	6.225	1.075	0.000	1.01		79.4	FLOOD RISK
S4.010	S28	6.054	1.111	0.000	1.52		83.0	SURCHARGED
S4.011	S29	5.959	1.054	0.000	1.44		97.3	SURCHARGED
S4.012	S30	5.874	0.832	0.000	1.03		103.3	SURCHARGED
S4.013	S31	5.360	0.826	0.000	1.26		112.2	SURCHARGED
S6.000	S32	6.135	-0.075	0.000	0.50		22.1	OK
S4.014	S33	5.278	0.791	0.000	1.02		153.8	SURCHARGED
S4.015	S34	5.083	0.794	0.000	1.05		168.0	SURCHARGED
S7.000	S35	7.022	-0.103	0.000	0.57		27.1	OK
S7.001	S36	6.832	-0.033	0.000	0.99		40.9	OK
S7.002	S37	6.448	-0.032	0.000	1.00		40.2	OK
S7.003	S38	6.320	0.031	0.000	0.67		47.1	SURCHARGED
S7.004	S39	6.223	0.053	0.000	1.07		76.2	SURCHARGED
S7.005	S40	6.134	0.081	0.000	0.72		111.2	SURCHARGED
S8.000	S41	7.186	0.970	0.000	0.56		9.4	SURCHARGED
S9.000	S42	7.304	-0.021	0.000	0.50		25.1	OK
S8.001	S43	7.151	1.155	0.000	0.92		34.6	SURCHARGED
S10.000	S44	7.213	0.853	0.000	0.79		17.4	SURCHARGED
S8.002	S45	7.026	1.253	0.000	0.62		56.2	SURCHARGED
S11.000	S46A	7.507	-0.093	0.000	0.31		13.0	OK
S8.003	S46	6.879	1.525	0.000	1.51		102.1	SURCHARGED
S8.004	S47	6.396	1.360	0.000	1.67		106.3	SURCHARGED
S8.005	S48	6.111	1.125	0.000	1.74		119.4	SURCHARGED
S7.006	S49	5.797	0.915	0.000	0.99		206.7	SURCHARGED
S7.007	S50	5.581	0.930	0.000	1.05		210.4	SURCHARGED
S7.008	S51	5.360	0.914	0.000	1.15		237.3	SURCHARGED
S7.009	S52	5.095	0.853	0.000	1.31		236.2	SURCHARGED
S4.016	S53	4.921	0.781	0.000	1.49		407.1	SURCHARGED
S4.017	S54	4.638	0.625	0.000	1.47		413.0	SURCHARGED
S4.018	S55	4.347	0.469	0.000	1.67		416.1	SURCHARGED
S12.000	S56	4.183	-0.017	0.000	0.79		20.3	OK
S4.019	S57	4.051	0.267	0.000	3.18		427.7	SURCHARGED