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12 Berry Holm Close Sheffield S35 1AB	Highgrange developments Old development 30% additional flow	
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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for NETWORK1 FULL SYSTEM 11-8-21.SWS

- Indicates pipe length does not match coordinates
« - 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
1.000	50.464	0.710	71.1	0.079	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	6.496	0.043	151.1	0.100	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	23.049	0.981	23.5	0.035	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	25.308	0.169	149.8	0.043	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	21.850	0.137	159.5	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	5.455	0.022	248.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	31.521	0.130	242.5	0.051	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	31.196	0.156	200.0	0.205	5.00	0.0	0.600	o	300	Pipe/Conduit	
3.001	47.206	0.236	200.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.002	49.747	0.249	199.8	0.101	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.003	60.714	0.304	199.7	0.254	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.004	13.307	0.067	198.6	0.101	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.005	30.824	0.103	299.3	0.068	0.00	0.0	0.600	o	1800	Pipe/Conduit	
4.000	16.420	0.210	78.2	0.123	5.00	0.0	0.600	o	225	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)
1.000	34.08	5.54	84.110	0.079	0.0	0.0	2.2	1.55	61.8	9.5
1.001	33.84	5.64	83.400	0.179	0.0	0.0	4.9	1.06	42.2	21.3
2.000	34.94	5.18	83.100	0.035	0.0	0.0	1.0	2.09	36.9	4.3
2.001	33.99	5.58	82.044	0.078	0.0	0.0	2.2	1.07	42.4	9.3
1.002	33.17	5.94	81.800	0.316	0.0	0.0	8.5	1.24	87.8	36.9
1.003	32.97	6.03	81.663	0.316	0.0	0.0	8.5	0.99	70.3	36.9
1.004	31.87	6.55	81.641	0.367	0.0	0.0	9.5	1.01	71.1	41.2
3.000	34.25	5.47	83.177	0.205	0.0	0.0	5.7	1.11	78.3	24.7
3.001	32.64	6.18	83.021	0.205	0.0	0.0	5.7	1.11	78.3	24.7
3.002	31.13	6.93	82.785	0.306	0.0	0.0	7.7	1.11	78.4	33.5
3.003	29.72	7.72	82.536	0.560	0.0	0.0	13.5	1.28	141.2	58.6
3.004	29.43	7.89	82.232	0.661	0.0	0.0	15.8	1.28	141.6	68.5
3.005	29.13	8.08	80.740	0.729	0.0	0.0	17.3	2.77	7039.1	74.8
4.000	34.94	5.18	82.950	0.123	0.0	0.0	3.5	1.48	58.9	15.1

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for NETWORK1 FULL SYSTEM 11-8-21.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
4.001	15.640	0.497	31.5	0.054	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.006	86.800	0.289	300.3	0.189	0.00	0.0	0.600	o	1800	Pipe/Conduit	
1.005	63.642#	0.334	190.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (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)
4.001	34.67	5.30	82.740	0.177	0.0	0.0	5.0	2.34	93.1	21.6
3.006	28.31	8.60	80.637	1.095	0.0	0.0	25.2	2.76	7026.4	109.2
1.005	27.00	9.54	80.348	1.462	0.0	0.0	32.1	1.14	80.3«	139.0

Simulation Criteria for NETWORK1 FULL SYSTEM 11-8-21.SWS

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	30.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
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 0
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	16.000	Storm Duration (mins)	15
Ratio R	0.261		

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Online Controls for NETWORK1 FULL SYSTEM 11-8-21.SWS

Depth/Flow Relationship Manhole: 5, DS/PN: 1.005, Volume (m³): 247.6

Invert Level (m) 80.348

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	20.7600	1.800	32.0200	3.400	43.4600	5.000	51.8600
0.400	24.1300	2.000	33.1600	3.600	44.6600	5.200	51.8600
0.600	21.7600	2.200	35.2500	3.800	45.8600	5.400	51.8600
0.800	21.7700	2.400	36.7500	4.000	47.0600	5.600	51.8600
1.000	24.2000	2.600	38.2000	4.200	48.2600	5.800	51.8600
1.200	26.3000	2.800	39.5500	4.400	49.4600	6.000	51.8600
1.400	28.4000	3.000	40.9200	4.600	50.6600		
1.600	30.2000	3.200	42.2000	4.800	51.8600		

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Summary of Results for 15 minute 100 year Winter (NETWORK1 FULL SYSTEM
11-8-21.SWS)

Margin for Flood Risk Warning (mm) 200.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status OFF

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	84.225	-0.110	0.000	0.50	29.8	OK
1.001	2	83.824	0.199	0.000	2.30	68.7	SURCHARGED
2.000	7	83.165	-0.085	0.000	0.39	13.5	OK
2.001	8	82.882	0.613	0.000	0.67	26.3	SURCHARGED
1.002	3	82.793	0.693	0.000	1.45	111.8	SURCHARGED
1.003	4	82.505	0.542	0.000	2.33	111.1	SURCHARGED
1.004	42	82.307	0.366	0.000	1.96	127.1	SURCHARGED
3.000	9	84.000	0.523	0.000	0.96	68.5	SURCHARGED
3.001	6	83.852	0.531	0.000	0.93	68.3	SURCHARGED
3.002	12	83.666	0.581	0.000	1.25	92.1	SURCHARGED
3.003	13	83.278	0.367	0.000	1.22	161.8	SURCHARGED
3.004	14	82.774	0.167	0.000	1.80	192.6	SURCHARGED
3.005	15	81.862	-0.678	0.000	0.05	197.3	OK
4.000	18	83.119	-0.056	0.000	0.91	47.5	OK
4.001	17	82.901	-0.064	0.000	0.84	69.2	OK
3.006	20	81.850	-0.587	0.000	0.04	235.0	OK
1.005	5	81.825	1.177	0.000	0.38	29.1	SURCHARGED

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Summary of Results for 30 minute 100 year Winter (NETWORK1 FULL SYSTEM
11-8-21.SWS)

Margin for Flood Risk Warning (mm) 200.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status OFF

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	84.214	-0.121	0.000	0.44	25.8	OK
1.001	2	83.746	0.121	0.000	1.97	58.8	SURCHARGED
2.000	7	83.159	-0.091	0.000	0.33	11.5	OK
2.001	8	82.654	0.385	0.000	0.61	24.0	SURCHARGED
1.002	3	82.575	0.475	0.000	1.28	99.0	SURCHARGED
1.003	4	82.353	0.390	0.000	2.07	98.7	SURCHARGED
1.004	42	82.320	0.379	0.000	1.75	113.2	SURCHARGED
3.000	9	83.768	0.291	0.000	0.88	63.0	SURCHARGED
3.001	6	83.654	0.333	0.000	0.82	60.0	SURCHARGED
3.002	12	83.500	0.415	0.000	1.16	85.5	SURCHARGED
3.003	13	83.161	0.250	0.000	1.15	152.4	SURCHARGED
3.004	14	82.736	0.129	0.000	1.68	180.3	SURCHARGED
3.005	15	82.444	-0.096	0.000	0.04	185.5	OK
4.000	18	83.099	-0.076	0.000	0.77	40.4	OK
4.001	17	82.881	-0.084	0.000	0.71	58.3	OK
3.006	20	82.400	-0.037	0.000	0.04	196.7	OK
1.005	5	82.315	1.667	0.000	0.43	33.0	SURCHARGED

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Summary of Results for 60 minute 100 year Winter (NETWORK1 FULL SYSTEM
11-8-21.SWS)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status OFF

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Status
1.000	1	84.196	-0.139	0.000	0.31	18.5	OK
1.001	2	83.755	0.130	0.000	1.40	42.0	SURCHARGED
2.000	7	83.759	0.509	0.000	0.24	8.2	SURCHARGED
2.001	8	83.754	1.485	0.000	0.46	17.9	SURCHARGED
1.002	3	83.750	1.650	0.000	0.95	73.3	SURCHARGED
1.003	4	83.740	1.777	0.000	1.53	73.2	SURCHARGED
1.004	42	83.737	1.796	0.000	1.30	84.3	SURCHARGED
3.000	9	83.849	0.372	0.000	0.67	48.0	SURCHARGED
3.001	6	83.840	0.519	0.000	0.63	46.6	SURCHARGED
3.002	12	83.829	0.744	0.000	0.92	68.2	SURCHARGED
3.003	13	83.813	0.902	0.000	0.92	122.4	SURCHARGED
3.004	14	83.795	1.188	0.000	1.34	144.1	SURCHARGED
3.005	15	83.725	1.185	0.000	0.04	147.8	SURCHARGED
4.000	18	83.743	0.568	0.000	0.55	29.0	SURCHARGED
4.001	17	83.735	0.770	0.000	0.51	41.7	SURCHARGED
3.006	20	83.725	1.288	0.000	0.03	153.9	SURCHARGED
1.005	5	83.725	3.077	0.000	0.57	43.3	SURCHARGED

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Summary of Results for 120 minute 100 year Winter (NETWORK1 FULL SYSTEM
11-8-21.SWS)

Margin for Flood Risk Warning (mm) 200.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status OFF

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	84.605	0.270	0.000	0.21	12.5	SURCHARGED
1.001	2	84.594	0.969	0.000	0.95	28.4	SURCHARGED
2.000	7	84.589	1.339	0.000	0.16	5.6	SURCHARGED
2.001	8	84.592	2.323	0.000	0.31	12.1	SURCHARGED
1.002	3	84.583	2.483	0.000	0.63	48.6	SURCHARGED
1.003	4	84.566	2.603	0.000	0.99	47.2	SURCHARGED
1.004	42	84.560	2.619	0.000	0.84	54.7	SURCHARGED
3.000	9	84.772	1.295	0.000	0.46	32.5	SURCHARGED
3.001	6	84.758	1.437	0.000	0.44	32.3	SURCHARGED
3.002	12	84.742	1.657	0.000	0.65	48.1	SURCHARGED
3.003	13	84.718	1.807	0.000	0.67	88.0	FLOOD RISK
3.004	14	84.628	2.021	0.000	0.97	103.6	SURCHARGED
3.005	15	84.537	1.997	0.000	0.03	106.7	SURCHARGED
4.000	18	84.561	1.386	0.000	0.37	19.5	SURCHARGED
4.001	17	84.549	1.584	0.000	0.34	28.1	FLOOD RISK
3.006	20	84.537	2.100	11.389	0.02	108.9	FLOOD
1.005	5	84.548	3.900	0.000	0.63	48.0	SURCHARGED

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Summary of Results for 240 minute 100 year Winter (NETWORK1 FULL SYSTEM
11-8-21.SWS)

Margin for Flood Risk Warning (mm) 200.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status OFF

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	84.610	0.275	0.000	0.14	8.1	SURCHARGED
1.001	2	84.594	0.969	0.000	0.62	18.4	SURCHARGED
2.000	7	84.599	1.349	0.000	0.10	3.6	SURCHARGED
2.001	8	84.592	2.323	0.000	0.20	7.9	SURCHARGED
1.002	3	84.582	2.482	0.000	0.40	31.2	SURCHARGED
1.003	4	84.569	2.606	0.000	0.64	30.7	SURCHARGED
1.004	42	84.566	2.625	0.000	0.55	35.4	SURCHARGED
3.000	9	84.783	1.306	0.000	0.29	21.1	SURCHARGED
3.001	6	84.769	1.448	0.000	0.29	21.0	SURCHARGED
3.002	12	84.752	1.667	0.000	0.42	31.4	SURCHARGED
3.003	13	84.727	1.816	0.000	0.43	57.4	FLOOD RISK
3.004	14	84.638	2.031	0.000	0.63	67.7	SURCHARGED
3.005	15	84.548	2.008	0.000	0.02	69.6	SURCHARGED
4.000	18	84.568	1.393	0.000	0.24	12.6	SURCHARGED
4.001	17	84.559	1.594	0.000	0.22	18.2	FLOOD RISK
3.006	20	84.548	2.111	21.982	0.01	74.5	FLOOD
1.005	5	84.554	3.906	0.000	0.63	48.1	SURCHARGED

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Summary of Results for 360 minute 100 year Winter (NETWORK1 FULL SYSTEM
11-8-21.SWS)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status OFF

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status
1.000	1	84.492	0.157	0.000	0.10	6.1	SURCHARGED
1.001	2	84.484	0.859	0.000	0.46	13.9	SURCHARGED
2.000	7	84.490	1.240	0.000	0.08	2.7	SURCHARGED
2.001	8	84.484	2.215	0.000	0.15	6.0	SURCHARGED
1.002	3	84.479	2.379	0.000	0.31	23.7	SURCHARGED
1.003	4	84.468	2.505	0.000	0.49	23.4	SURCHARGED
1.004	42	84.463	2.522	0.000	0.42	27.0	SURCHARGED
3.000	9	84.551	1.074	0.000	0.22	15.9	SURCHARGED
3.001	6	84.541	1.220	0.000	0.22	15.9	SURCHARGED
3.002	12	84.531	1.446	0.000	0.32	23.7	SURCHARGED
3.003	13	84.515	1.604	0.000	0.33	43.4	SURCHARGED
3.004	14	84.496	1.889	0.000	0.48	51.3	SURCHARGED
3.005	15	84.449	1.909	0.000	0.01	53.0	SURCHARGED
4.000	18	84.468	1.293	0.000	0.18	9.5	SURCHARGED
4.001	17	84.460	1.495	0.000	0.17	13.7	FLOOD RISK
3.006	20	84.449	2.012	0.000	0.01	58.8	FLOOD RISK
1.005	5	84.449	3.801	0.000	0.62	47.7	SURCHARGED

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Summary of Results for 480 minute 100 year Winter (NETWORK1 FULL SYSTEM
11-8-21.SWS)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status OFF

		Water	Surcharged	Flooded		Pipe	
PN	US/MH Name	Level (m)	Depth (m)	Volume (m ³)	Flow / Overflow Cap. (1/s)	Flow (1/s)	Status
1.000	1	84.154	-0.181	0.000	0.08	5.0	OK
1.001	2	84.029	0.404	0.000	0.38	11.4	SURCHARGED
2.000	7	84.035	0.785	0.000	0.06	2.2	SURCHARGED
2.001	8	84.029	1.760	0.000	0.13	4.9	SURCHARGED
1.002	3	84.024	1.924	0.000	0.25	19.6	SURCHARGED
1.003	4	84.013	2.050	0.000	0.40	19.3	SURCHARGED
1.004	42	84.009	2.068	0.000	0.34	22.3	SURCHARGED
3.000	9	84.053	0.576	0.000	0.18	13.0	SURCHARGED
3.001	6	84.045	0.724	0.000	0.18	13.0	SURCHARGED
3.002	12	84.036	0.951	0.000	0.26	19.4	SURCHARGED
3.003	13	84.022	1.111	0.000	0.27	35.6	SURCHARGED
3.004	14	84.005	1.398	0.000	0.39	42.0	SURCHARGED
3.005	15	83.995	1.455	0.000	0.01	43.8	SURCHARGED
4.000	18	84.013	0.838	0.000	0.15	7.8	SURCHARGED
4.001	17	84.005	1.040	0.000	0.14	11.2	SURCHARGED
3.006	20	83.995	1.558	0.000	0.01	49.7	SURCHARGED
1.005	5	83.995	3.347	0.000	0.59	44.9	SURCHARGED