Existing Network Details 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)
S1.000	24.799	0.155	160.0	0.087	5.00	0.0	0.600	o	225
S1.001	30.142	0.132	228.4	0.005	0.00	0.0	0.600	o	225
S1.002	43.627	0.194	224.9	0.020	0.00	0.0	0.600	o	225
S1.003	31.705	0.141	224.9	0.073	0.00	0.0	0.600	o	225
S1.004	21.417	0.095	225.0	0.000	0.00	0.0	0.600	o	225
S1.005	21.636	0.070	309.1	0.027	0.00	0.0	0.600	o	225
S1.006	15.596	0.000	0.0	0.070	0.00	0.0	0.600	o	225
S1.007	4.043	0.000	0.0	0.000	0.00	0.0	0.600	o	225
S1.008	5.115	0.000	0.0	0.000	0.00	0.0	0.600	o	225
S2.000	12.574	0.122	103.1	0.000	5.00	0.0	0.600	o	225
S2.001	19.508	0.094	207.4	0.032	0.00	0.0	0.600	o	225
S2.002	10.685	0.077	138.9	0.009	0.00	0.0	0.600	o	225
S2.003	25.760	0.172	150.0	0.017	0.00	0.0	0.600	o	225
S2.004	16.604	0.344	48.3	0.018	0.00	0.0	0.600	o	225
S3.000	25.377	0.113	224.6	0.018	5.00	0.0	0.600	o	225
S3.001	36.871	0.165	223.5	0.046	0.00	0.0	0.600	o	225
S2.005	20.421	0.100	204.2	0.000	0.00	0.0	0.600	o	225
S2.006	4.794	0.000	0.0	0.000	0.00	0.0	0.600	o	225
S2.007	7.140	0.000	0.0	0.037	0.00	0.0	0.600	o	225

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S1.000	7.387	0.087	0.0	1.03	41.0
S1.001	7.232	0.092	0.0	0.86	34.2
S1.002	7.100	0.112	0.0	0.87	34.5
S1.003	6.906	0.185	0.0	0.87	34.5
S1.004	6.765	0.185	0.0	0.87	34.5
S1.005	6.670	0.212	0.0	0.74	29.4
S1.006	6.600	0.282	0.0	0.00	0.0
S1.007	6.600	0.282	0.0	0.00	0.0
S1.008	8.500	0.282	0.0	0.00	0.0
S2.000	7.509	0.000	0.0	1.29	51.2
S2.001	7.387	0.032	0.0	0.90	36.0
S2.002	7.293	0.041	0.0	1.11	44.0
S2.003	7.216	0.058	0.0	1.07	42.3
S2.004	7.044	0.076	0.0	1.89	75.0
S3.000	6.978	0.018	0.0	0.87	34.5
S3.001	6.865	0.064	0.0	0.87	34.6
S2.005	6.700	0.140	0.0	0.91	36.2
S2.006	6.600	0.140	0.0	0.00	0.0
S2.007	7.400	0.177	0.0	0.00	0.0

2 St Peter's Court
Middleborough
Colchester CO1 1WD

Date 28/07/2017 16:54 | Designed by sean-c
File Storm 20-07-17.MDX | 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)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Back (m
S4	9.041	1.654	Open Manhole	1200	S1.000	7.387	225				
S5	9.376	2.144	Open Manhole	1200	S1.001	7.232	225	S1.000	7.232	225	
S8	9.422	2.322	Open Manhole	1200	S1.002	7.100	225	S1.001	7.100	225	
S11	9.000	2.094	Open Manhole	1200	S1.003	6.906	225	S1.002	6.906	225	
S12	9.091	2.326	Open Manhole	1200	S1.004	6.765	225	S1.003	6.765	225	
S13	9.100	2.430	Open Manhole	1200	S1.005	6.670	225	S1.004	6.670	225	
S15	9.100	2.500	Open Manhole	1200	S1.006	6.600	225	S1.005	6.600	225	
SAquacell 2	9.100	2.500	Open Manhole	1200	S1.007	6.600	225	S1.006	6.600	225	
Sdummy	9.100	2.500	Open Manhole	1200	S1.008	8.500	225	S1.007	6.600	225	
SOutfall 2	9.100	0.600	Open Manhole	0		OUTFALL		S1.008	8.500	225	
S17	9.234	1.725	Open Manhole	1200	S2.000	7.509	225				
S18	9.040	1.653	Open Manhole	1200	S2.001	7.387	225	S2.000	7.387	225	
S19	8.920	1.627	Open Manhole	1200	S2.002	7.293	225	S2.001	7.293	225	
S21	8.823	1.607	Open Manhole	1200	S2.003	7.216	225	S2.002	7.216	225	
S22	8.587	1.543	Open Manhole	1200	S2.004	7.044	225	S2.003	7.044	225	
S23	8.123	1.145	Open Manhole	1200	S3.000	6.978	225				
S24	8.250	1.385	Open Manhole	1200	S3.001	6.865	225	S3.000	6.865	225	
S25	8.418	1.718	Open Manhole	1200	S2.005	6.700	225	S2.004	6.700	225	
								S3.001	6.700	225	
SAquacell 1	8.400	1.800	Open Manhole	1200	S2.006	6.600	225	S2.005	6.600	225	
S27	8.400	1.800	Open Manhole	1200	S2.007	7.400	225	S2.006	6.600	225	
SOutfall 1	8.400	1.000	Open Manhole	0		OUTFALL		S2.007	7.400	225	

PIPELINE SCHEDULES for Storm

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	225	S4	9.041	7.387	1.429	Open Manhole	1200
S1.001	o	225	S5	9.376	7.232	1.919	Open Manhole	1200
S1.002	o	225	S8	9.422	7.100	2.097	Open Manhole	1200
S1.003	o	225	S11	9.000	6.906	1.869	Open Manhole	1200
S1.004	o	225	S12	9.091	6.765	2.101	Open Manhole	1200
S1.005	o	225	S13	9.100	6.670	2.205	Open Manhole	1200
S1.006	o	225	S15	9.100	6.600	2.275	Open Manhole	1200
S1.007	o	225	SAquacell 2	9.100	6.600	2.275	Open Manhole	1200
S1.008	o	225	Sdummy	9.100	8.500	0.375	Open Manhole	1200
S2.000	o	225	S17	9.234	7.509	1.500	Open Manhole	1200
S2.001	o	225	S18	9.040	7.387	1.428	Open Manhole	1200
S2.002	o	225	S19	8.920	7.293	1.402	Open Manhole	1200
S2.003	o	225	S21	8.823	7.216	1.382	Open Manhole	1200
S2.004	o	225	S22	8.587	7.044	1.318	Open Manhole	1200
S3.000	o	225	S23	8.123	6.978	0.920	Open Manhole	1200
S3.001	o	225	S24	8.250	6.865	1.160	Open Manhole	1200
S2.005	o	225	S25	8.418	6.700	1.493	Open Manhole	1200
S2.006	o	225	SAquacell 1	8.400	6.600	1.575	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	24.799	160.0	S5	9.376	7.232	1.919	Open Manhole	1200
S1.001	30.142	228.4	S8	9.422	7.100	2.097	Open Manhole	1200
S1.002	43.627	224.9	S11	9.000	6.906	1.869	Open Manhole	1200
S1.003	31.705	224.9	S12	9.091	6.765	2.101	Open Manhole	1200
S1.004	21.417	225.0	S13	9.100	6.670	2.205	Open Manhole	1200
S1.005	21.636	309.1	S15	9.100	6.600	2.275	Open Manhole	1200
S1.006	15.596	0.0	SAquacell 2	9.100	6.600	2.275	Open Manhole	1200
S1.007	4.043	0.0	Sdummy	9.100	6.600	2.275	Open Manhole	1200
S1.008	5.115	0.0	SOutfall 2	9.100	8.500	0.375	Open Manhole	0
S2.000	12.574	103.1	S18	9.040	7.387	1.428	Open Manhole	1200
S2.001	19.508	207.4	S19	8.920	7.293	1.402	Open Manhole	1200
S2.002	10.685	138.9	S21	8.823	7.216	1.382	Open Manhole	1200
S2.003	25.760	150.0	S22	8.587	7.044	1.318	Open Manhole	1200
S2.004	16.604	48.3	S25	8.418	6.700	1.493	Open Manhole	1200
S3.000	25.377	224.6	S24	8.250	6.865	1.160	Open Manhole	1200
S3.001	36.871	223.5	S25	8.418	6.700	1.493	Open Manhole	1200
S2.005	20.421	204.2	SAquacell 1	8.400	6.600	1.575	Open Manhole	1200
S2.006	4.794	0.0	S27	8.400	6.600	1.575	Open Manhole	1200

PIPELINE SCHEDULES for Storm

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)
S2.007	o	225	S27	8.400	7.400	0.775	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)
S2.007	7.140	0.0	SOutfall 1	8.400	7.400	0.775	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.087	0.087	0.087
1.001	-	-	100	0.005	0.005	0.005
1.002	-	-	100	0.020	0.020	0.020
1.003	-	-	100	0.073	0.073	0.073
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.027	0.027	0.027
1.006	-	-	100	0.070	0.070	0.070
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.000	0.000	0.000
2.001	-	-	100	0.032	0.032	0.032
2.002	-	-	100	0.009	0.009	0.009
2.003	-	-	100	0.017	0.017	0.017
2.004	-	-	100	0.018	0.018	0.018
3.000	-	-	100	0.018	0.018	0.018
3.001	-	-	100	0.046	0.046	0.046
2.005	-	-	100	0.000	0.000	0.000
2.006	-	-	100	0.000	0.000	0.000
2.007	-	-	100	0.037	0.037	0.037
				Total	Total	Total
				0.459	0.459	0.459

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)
S1.008	SOutfall 2	9.100	8.500	8.500	0	0

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)
S2.007	SOutfall 1	8.400	7.400	7.400	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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	3
Number of Online Controls	3	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	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.409		

Online Controls for Storm

Orifice Manhole: Sdummy, DS/PN: S1.008, Volume (m³): 0.8

Diameter (m) 0.006 Discharge Coefficient 0.600 Invert Level (m) 8.500

Non Return Valve Manhole: S24, DS/PN: S3.001, Volume (m³): 2.5

Orifice Manhole: S27, DS/PN: S2.007, Volume (m³): 1.3

Diameter (m) 0.006 Discharge Coefficient 0.600 Invert Level (m) 7.400

Storage Structures for Storm

Porous Car Park Manhole: S4, DS/PN: S1.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	28.5
Max Percolation (l/s)	79.2	Slope (1:X)	225.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	7.387	Cap Volume Depth (m)	0.540

Cellular Storage Manhole: SAquacell 2, DS/PN: S1.007

Invert Level (m)	6.600	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.19300	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.19300		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	110.0	0.0	2.600	0.0	50.4
0.200	110.0	8.4	2.800	0.0	50.4
0.400	110.0	16.8	3.000	0.0	50.4
0.600	110.0	25.2	3.200	0.0	50.4
0.800	110.0	33.6	3.400	0.0	50.4
1.000	110.0	42.0	3.600	0.0	50.4
1.200	110.0	50.4	3.800	0.0	50.4
1.400	0.0	50.4	4.000	0.0	50.4
1.600	0.0	50.4	4.200	0.0	50.4
1.800	0.0	50.4	4.400	0.0	50.4
2.000	0.0	50.4	4.600	0.0	50.4
2.200	0.0	50.4	4.800	0.0	50.4
2.400	0.0	50.4	5.000	0.0	50.4

Cellular Storage Manhole: SAquacell 1, DS/PN: S2.006

Invert Level (m)	6.600	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.19300	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.19300		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	200.0	0.0	2.400	0.0	86.4
0.200	200.0	14.4	2.600	0.0	86.4
0.400	200.0	28.8	2.800	0.0	86.4
0.600	200.0	43.2	3.000	0.0	86.4
0.800	200.0	57.6	3.200	0.0	86.4
1.000	200.0	72.0	3.400	0.0	86.4
1.200	200.0	86.4	3.600	0.0	86.4
1.400	0.0	86.4	3.800	0.0	86.4
1.600	0.0	86.4	4.000	0.0	86.4
1.800	0.0	86.4	4.200	0.0	86.4
2.000	0.0	86.4	4.400	0.0	86.4
2.200	0.0	86.4	4.600	0.0	86.4

Cellular Storage Manhole: SAquacell 1, DS/PN: S2.006

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
4.800	0.0	86.4	5.000	0.0	86.4

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	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	3
Number of Online Controls	3	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 0.409
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S4	720 Winter	100	+30%	100/15 Summer			
S1.001	S5	720 Winter	100	+30%	30/15 Winter			
S1.002	S8	15 Winter	100	+30%	30/15 Summer			
S1.003	S11	15 Winter	100	+30%	30/15 Summer			
S1.004	S12	720 Winter	100	+30%	1/480 Winter			
S1.005	S13	720 Winter	100	+30%	1/120 Winter			
S1.006	S15	720 Winter	100	+30%	1/15 Summer			
S1.007	SAquacell 2	720 Winter	100	+30%	1/60 Winter			
S1.008	Sdummy	720 Winter	100	+30%				
S2.000	S17	15 Winter	100	+30%				
S2.001	S18	15 Winter	100	+30%				
S2.002	S19	15 Winter	100	+30%				
S2.003	S21	15 Winter	100	+30%				
S2.004	S22	15 Winter	100	+30%	100/15 Summer			
S3.000	S23	15 Winter	100	+30%	100/15 Summer			
S3.001	S24	15 Winter	100	+30%	100/15 Summer			
S2.005	S25	15 Winter	100	+30%	30/15 Summer			
S2.006	SAquacell 1	720 Winter	100	+30%	30/60 Winter			
S2.007	S27	720 Winter	100	+30%				

Summary of Critical Results by Maximum Level (Rank 1) for Storm

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	S4	7.872	0.260	0.000	0.10		3.7	SURCHARGED	
S1.001	S5	7.871	0.414	0.000	0.11		3.6	SURCHARGED	
S1.002	S8	7.881	0.556	0.000	0.80		26.4	SURCHARGED	
S1.003	S11	7.933	0.802	0.000	1.19		38.6	SURCHARGED	
S1.004	S12	7.866	0.876	0.000	0.21		6.7	SURCHARGED	
S1.005	S13	7.864	0.969	0.000	0.29		7.7	SURCHARGED	
S1.006	S15	7.862	1.037	0.000	1.00		10.7	SURCHARGED	
S1.007	SAquacell 2	7.860	1.035	0.000	0.18		4.4	SURCHARGED	
S1.008	Sdummy	7.872	-0.853	0.000	0.00		0.0	OK	
S2.000	S17	7.510	-0.224	0.000	0.00		0.0	OK	
S2.001	S18	7.514	-0.098	0.000	0.61		19.8	OK	
S2.002	S19	7.459	-0.059	0.000	0.67		24.8	OK	
S2.003	S21	7.431	-0.010	0.000	0.85		33.4	OK	
S2.004	S22	7.338	0.069	0.000	0.55		36.7	SURCHARGED	
S3.000	S23	7.410	0.207	0.000	0.29		9.3	SURCHARGED	
S3.001	S24	7.389	0.299	0.000	0.93		30.4	SURCHARGED	
S2.005	S25	7.233	0.308	0.000	2.04		67.0	SURCHARGED	
S2.006	SAquacell 1	7.161	0.336	0.000	0.00		0.0	SURCHARGED	
S2.007	S27	7.161	-0.464	0.000	0.00		0.0	OK	