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11 Tungsten Building George Street Fishersgate BN41 1RA	Manor Nursery Angmering West Sussex	
Date 28/06/2019 File Planning Network File.MDX	Designed by S Burgess Checked by SRD	
Innovyze Network 2017.1.2		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for NETWORK 8.SWS

Pipe Sizes NETWORK 9 Manhole Sizes NETWORK 9

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.600	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.500
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.000
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

Network Design Table for NETWORK 8.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
1.000	11.177	0.109	103.0	0.004	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	7.008	0.068	102.9	0.003	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	3.176	0.031	103.1	0.001	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.003	10.630	0.103	103.0	0.011	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.004	8.337	0.081	102.9	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.005	6.323	0.061	103.0	0.010	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.006	7.986	0.078	102.9	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	16.247	0.158	103.0	0.010	5.00	0.0	0.600	o	100	Pipe/Conduit	
2.001	6.765	0.066	103.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.007	2.046	0.020	102.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.25	15.000	0.004	0.0	0.0	0.0	0.76	5.9	0.5
1.001	50.00	5.40	14.892	0.007	0.0	0.0	0.0	0.76	6.0	0.9
1.002	50.00	5.47	14.823	0.008	0.0	0.0	0.0	0.76	5.9	1.1
1.003	50.00	5.70	14.793	0.019	0.0	0.0	0.0	0.76	5.9	2.6
1.004	50.00	5.89	14.689	0.019	0.0	0.0	0.0	0.76	6.0	2.6
1.005	50.00	6.03	14.608	0.029	0.0	0.0	0.0	0.76	5.9	3.9
1.006	50.00	6.20	14.547	0.029	0.0	0.0	0.0	0.76	6.0	3.9
2.000	50.00	5.36	15.250	0.010	0.0	0.0	0.0	0.76	5.9	1.4
2.001	50.00	5.51	15.092	0.010	0.0	0.0	0.0	0.76	5.9	1.4
1.007	50.00	6.25	14.469	0.039	0.0	0.0	0.0	0.76	6.0	5.3

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<u>Network Design Table for NETWORK 8.SWS</u> <table><tr><th>PN</th><th>Length (m)</th><th>Fall (m)</th><th>Slope (1:X)</th><th>I.Area (ha)</th><th>T.E. (mins)</th><th>Base Flow (l/s)</th><th>k (mm)</th><th>HYD SECT</th><th>DIA (mm)</th><th>Section Type</th><th>Auto Design</th></tr><tr><td>3.000</td><td>6.240</td><td>0.061</td><td>103.0</td><td>0.002</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>100</td><td>Pipe/Conduit</td><td></td></tr><tr><td>3.001</td><td>6.697</td><td>0.065</td><td>103.0</td><td>0.002</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>100</td><td>Pipe/Conduit</td><td></td></tr><tr><td>3.002</td><td>12.469</td><td>0.121</td><td>103.0</td><td>0.003</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>100</td><td>Pipe/Conduit</td><td></td></tr><tr><td>4.000</td><td>14.378</td><td>0.397</td><td>36.2</td><td>0.012</td><td>5.00</td><td>0.0</td><td>0.600</td><td>o</td><td>100</td><td>Pipe/Conduit</td><td></td></tr><tr><td>3.003</td><td>5.372</td><td>0.052</td><td>102.9</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>100</td><td>Pipe/Conduit</td><td></td></tr><tr><td>3.004</td><td>7.702</td><td>0.502</td><td>15.3</td><td>0.003</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>100</td><td>Pipe/Conduit</td><td></td></tr><tr><td>1.008</td><td>1.720</td><td>0.010</td><td>175.5</td><td>0.000</td><td>0.00</td><td>0.0</td><td>0.600</td><td>o</td><td>150</td><td>Pipe/Conduit</td><td></td></tr></table> <u>Network Results Table</u> <table><tr><th>PN</th><th>Rain (mm/hr)</th><th>T.C. (mins)</th><th>US/IL (m)</th><th>Σ I.Area (ha)</th><th>Σ Base Flow (l/s)</th><th>Foul (l/s)</th><th>Add Flow (l/s)</th><th>Vel (m/s)</th><th>Cap (l/s)</th><th>Flow (l/s)</th></tr><tr><td>3.000</td><td>50.00</td><td>5.14</td><td>15.250</td><td>0.002</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.76</td><td>5.9</td><td>0.3</td></tr><tr><td>3.001</td><td>50.00</td><td>5.28</td><td>15.189</td><td>0.004</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.76</td><td>5.9</td><td>0.5</td></tr><tr><td>3.002</td><td>50.00</td><td>5.56</td><td>15.124</td><td>0.007</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.76</td><td>5.9</td><td>0.9</td></tr><tr><td>4.000</td><td>50.00</td><td>5.19</td><td>15.400</td><td>0.012</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.29</td><td>10.1</td><td>1.6</td></tr><tr><td>3.003</td><td>50.00</td><td>5.68</td><td>15.003</td><td>0.019</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.76</td><td>6.0</td><td>2.6</td></tr><tr><td>3.004</td><td>50.00</td><td>5.74</td><td>14.951</td><td>0.022</td><td>0.0</td><td>0.0</td><td>0.0</td><td>1.98</td><td>15.6</td><td>3.0</td></tr><tr><td>1.008</td><td>50.00</td><td>6.29</td><td>14.399</td><td>0.061</td><td>0.0</td><td>0.0</td><td>0.0</td><td>0.76</td><td>13.4</td><td>8.3</td></tr></table>													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	3.000	6.240	0.061	103.0	0.002	5.00	0.0	0.600	o	100	Pipe/Conduit		3.001	6.697	0.065	103.0	0.002	0.00	0.0	0.600	o	100	Pipe/Conduit		3.002	12.469	0.121	103.0	0.003	0.00	0.0	0.600	o	100	Pipe/Conduit		4.000	14.378	0.397	36.2	0.012	5.00	0.0	0.600	o	100	Pipe/Conduit		3.003	5.372	0.052	102.9	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit		3.004	7.702	0.502	15.3	0.003	0.00	0.0	0.600	o	100	Pipe/Conduit		1.008	1.720	0.010	175.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit		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)	3.000	50.00	5.14	15.250	0.002	0.0	0.0	0.0	0.76	5.9	0.3	3.001	50.00	5.28	15.189	0.004	0.0	0.0	0.0	0.76	5.9	0.5	3.002	50.00	5.56	15.124	0.007	0.0	0.0	0.0	0.76	5.9	0.9	4.000	50.00	5.19	15.400	0.012	0.0	0.0	0.0	1.29	10.1	1.6	3.003	50.00	5.68	15.003	0.019	0.0	0.0	0.0	0.76	6.0	2.6	3.004	50.00	5.74	14.951	0.022	0.0	0.0	0.0	1.98	15.6	3.0	1.008	50.00	6.29	14.399	0.061	0.0	0.0	0.0	0.76	13.4	8.3
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PIPELINE SCHEDULES for NETWORK 8.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)
1.000	o	100	1	15.600	15.000	0.500	Open Manhole	1200
1.001	o	100	2	15.700	14.892	0.708	Open Manhole	1200
1.002	o	100	3	15.700	14.823	0.777	Open Manhole	1200
1.003	o	100	4	15.700	14.793	0.807	Open Manhole	1200
1.004	o	100	5	15.700	14.689	0.911	Open Manhole	1200
1.005	o	100	6	15.850	14.608	1.142	Open Manhole	1200
1.006	o	100	7	15.850	14.547	1.203	Open Manhole	1200
2.000	o	100	11	15.850	15.250	0.500	Open Manhole	1200
2.001	o	100	12	15.850	15.092	0.658	Open Manhole	1200
1.007	o	100	8	15.925	14.469	1.356	Open Manhole	1200
3.000	o	100	13	15.850	15.250	0.500	Open Manhole	1200
3.001	o	100	14	15.850	15.189	0.561	Open Manhole	1200
3.002	o	100	15	15.850	15.124	0.626	Open Manhole	1200
4.000	o	100	18	16.000	15.400	0.500	Open Manhole	1200
3.003	o	100	16	15.850	15.003	0.747	Open Manhole	1200
3.004	o	100	17	15.850	14.951	0.799	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)
1.000	11.177	103.0	2	15.700	14.892	0.708	Open Manhole	1200
1.001	7.008	102.9	3	15.700	14.823	0.777	Open Manhole	1200
1.002	3.176	103.1	4	15.700	14.793	0.807	Open Manhole	1200
1.003	10.630	103.0	5	15.700	14.689	0.911	Open Manhole	1200
1.004	8.337	102.9	6	15.850	14.608	1.142	Open Manhole	1200
1.005	6.323	103.0	7	15.850	14.547	1.203	Open Manhole	1200
1.006	7.986	102.9	8	15.925	14.469	1.356	Open Manhole	1200
2.000	16.247	103.0	12	15.850	15.092	0.658	Open Manhole	1200
2.001	6.765	103.0	8	15.925	15.027	0.799	Open Manhole	1200
1.007	2.046	102.8	9	15.925	14.450	1.376	Open Manhole	1200
3.000	6.240	103.0	14	15.850	15.189	0.561	Open Manhole	1200
3.001	6.697	103.0	15	15.850	15.124	0.626	Open Manhole	1200
3.002	12.469	103.0	16	15.850	15.003	0.747	Open Manhole	1200
4.000	14.378	36.2	16	15.850	15.003	0.747	Open Manhole	1200
3.003	5.372	102.9	17	15.850	14.951	0.799	Open Manhole	1200
3.004	7.702	15.3	9	15.925	14.449	1.376	Open Manhole	1200

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PIPELINE SCHEDULES for NETWORK 8.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)
1.008	o	150	9	15.925	14.399	1.376	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)
1.008	1.720	175.5	10	15.925	14.389	1.386	Open Manhole	0

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Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 8.SWS

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 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 0
 Number of Online Controls 0 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) 19.500 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
 Analysis Timestep Fine Inertia Status OFF
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 100
 Climate Change (%) 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	100	+40%	100/15 Summer				15.252
1.001	2	15 Winter	100	+40%	100/15 Summer				15.242
1.002	3	15 Winter	100	+40%	100/15 Summer				15.230
1.003	4	15 Winter	100	+40%	100/15 Summer				15.223
1.004	5	15 Winter	100	+40%	100/15 Summer				15.151
1.005	6	15 Winter	100	+40%	100/15 Summer				15.101
1.006	7	15 Winter	100	+40%	100/15 Summer				14.986
2.000	11	15 Winter	100	+40%					15.335
2.001	12	15 Winter	100	+40%					15.188
1.007	8	15 Winter	100	+40%	100/15 Summer				14.855
3.000	13	15 Winter	100	+40%					15.285
3.001	14	15 Winter	100	+40%					15.276
3.002	15	15 Winter	100	+40%	100/15 Summer				15.263
4.000	18	15 Winter	100	+40%					15.464
3.003	16	15 Winter	100	+40%	100/15 Summer				15.223
3.004	17	15 Winter	100	+40%					15.019
1.008	9	15 Winter	100	+40%	100/15 Summer				14.663

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<u>Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 8.SWS</u>								
PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)			Flow (l/s)		
1.000	1	0.152	0.000	0.33		1.8	SURCHARGED	
1.001	2	0.251	0.000	0.46		2.5	SURCHARGED	
1.002	3	0.306	0.000	0.70		3.4	SURCHARGED	
1.003	4	0.330	0.000	0.94		5.2	SURCHARGED	
1.004	5	0.362	0.000	1.02		5.6	SURCHARGED	
1.005	6	0.392	0.000	1.42		7.6	SURCHARGED	
1.006	7	0.339	0.000	1.46		8.0	SURCHARGED	
2.000	11	-0.015	0.000	0.98		5.6	OK	
2.001	12	-0.004	0.000	1.00		5.4	OK	
1.007	8	0.286	0.000	3.11		12.3	SURCHARGED	
3.000	13	-0.065	0.000	0.21		1.1	OK	
3.001	14	-0.014	0.000	0.39		2.1	OK	
3.002	15	0.039	0.000	0.62		3.5	SURCHARGED	
4.000	18	-0.036	0.000	0.72		6.9	OK	
3.003	16	0.120	0.000	1.82		9.6	SURCHARGED	
3.004	17	-0.033	0.000	0.78		11.1	OK	
1.008	9	0.114	0.000	2.08		22.6	SURCHARGED	
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