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51a St.Paul's Street	124826	
Leeds	The Mount	
LS1 2TE	Cumbria	
Date 14/04/2021	Designed by AL	
File Ph4network -22-4-22.MDX	Checked by AC	
Innovyze	Network 2020.1	

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)	100	PIMP (%)	100
M5-60 (mm)	16.000	Add Flow / Climate Change (%)	0
Ratio R	0.260	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
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)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

- 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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.000	24.009	2.375	10.1	0.087	4.00	0.0	0.600		o	150	Pipe/Conduit	
S2.001	20.899	0.104	201.0	0.045	0.00	0.0	0.600		o	225	Pipe/Conduit	
S2.002	20.161	0.134	150.5	0.035	0.00	0.0	0.600		o	300	Pipe/Conduit	
S2.003	22.466	0.151	148.8	0.089	0.00	0.0	0.600		o	300	Pipe/Conduit	
S2.004	37.725	2.236	16.9	0.156	0.00	0.0	0.600		o	300	Pipe/Conduit	
S3.000	19.864	1.250	15.9	0.102	4.00	0.0	0.600		o	150	Pipe/Conduit	
S3.001	20.547	0.275	74.7	0.063	0.00	0.0	0.600		o	225	Pipe/Conduit	
S2.005	40.935	3.630	11.3	0.044	0.00	0.0	0.600		o	300	Pipe/Conduit	
S2.006	50.000	0.250	200.0	0.102	0.00	0.0	0.600		o	450	Pipe/Conduit	
S2.007	36.248	0.405	89.5	0.029	0.00	0.0	0.600		o	450	Pipe/Conduit	
S2.008	12.212	0.395	30.9	0.000	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)
S2.000	50.00	4.13	134.350	0.087	0.0	0.0	0.0	3.19	56.3	11.8
S2.001	50.00	4.50	131.900	0.132	0.0	0.0	0.0	0.92	36.5	17.9
S2.002	50.00	4.77	131.721	0.167	0.0	0.0	0.0	1.28	90.4	22.7
S2.003	50.00	5.06	131.587	0.256	0.0	0.0	0.0	1.29	91.0	34.7
S2.004	50.00	5.22	131.436	0.412	0.0	0.0	0.0	3.85	271.9	55.8
S3.000	50.00	4.13	131.400	0.102	0.0	0.0	0.0	2.54	44.9	13.8
S3.001	50.00	4.36	129.555	0.165	0.0	0.0	0.0	1.51	60.2	22.4
S2.005	50.00	5.37	129.200	0.621	0.0	0.0	0.0	4.71	332.8	84.1
S2.006	50.00	5.95	125.420	0.723	0.0	0.0	0.0	1.43	228.1	97.9
S2.007	50.00	6.23	125.170	0.752	0.0	0.0	0.0	2.15	341.9	101.9
S2.008	50.00	6.28	124.765	0.752	0.0	0.0	0.0	3.67	583.2	101.9

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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)	n	HYD SECT	DIA (mm)	Section	Type	Auto Design
S4.000	39.867	0.266	150.0	0.142	4.00	0.0	0.600		o	225	Pipe/Conduit		
S4.001	30.705	1.219	25.2	0.085	0.00	0.0	0.600		o	225	Pipe/Conduit		
S4.002	9.557	0.210	45.5	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit		
S2.009	7.157	0.260	27.5	0.000	0.00	0.0		0.045	2 _ /	500	1:2 Ditch		
S2.010	4.916	0.320	15.4	0.000	0.00	0.0		0.045	2 _ /	500	1:2 Ditch		
S5.000	18.688	0.062	301.4	0.008	4.00	0.0	0.600		o	225	Pipe/Conduit		
S5.001	17.124	0.057	300.4	0.007	0.00	0.0	0.600		o	225	Pipe/Conduit		
S5.002	16.009	0.058	276.0	0.008	0.00	0.0	0.600		o	225	Pipe/Conduit		
S5.003	9.500	0.026	365.4	0.007	0.00	0.0	0.600		o	225	Pipe/Conduit		
S5.004	56.263	1.014	55.5	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit		
S2.011	12.644	0.690	18.3	0.000	0.00	0.0		0.045	2 _ /	500	1:2 Ditch		
S2.012	9.482	0.530	17.9	0.000	0.00	0.0		0.045	3 \=/	500	1:3 Swale		
S2.013	5.800#	0.540	10.7	0.000	0.00	0.0		0.045	4 \=/	500	1:4 Swale		
S2.014	21.270	2.024	10.5	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit		
S2.015	47.219	0.315	149.9	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit		
S2.016	21.750	0.145	150.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit		
S2.017	53.850	0.359	150.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit		
S2.018	52.610	2.667	19.7	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit		
S2.019	65.358	5.950	11.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit		
S2.020	66.697	7.000	9.5	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit		
S2.021	61.704	15.000	4.1	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit		
S2.022	63.982	16.000	4.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit		
S2.023	58.612	9.000	6.5	0.000	0.00	0.0	0.600		o	150	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)
S4.000	50.00	4.62	126.290	0.142	0.0	0.0	0.0	1.07	42.4	19.3
S4.001	50.00	4.82	126.024	0.227	0.0	0.0	0.0	2.62	104.1	30.7
S4.002	50.00	4.90	124.805	0.227	0.0	0.0	0.0	1.94	77.3	30.7
S2.009	50.00	6.37	124.370	0.979	0.0	0.0	0.0	1.35	444.2	132.6
S2.010	50.00	6.42	124.110	0.979	0.0	0.0	0.0	1.80	594.7	132.6
S5.000	50.00	4.42	125.117	0.008	0.0	0.0	0.0	0.75	29.7	1.0
S5.001	50.00	4.80	125.055	0.015	0.0	0.0	0.0	0.75	29.8	2.0
S5.002	50.00	5.14	124.998	0.022	0.0	0.0	0.0	0.78	31.1	3.0
S5.003	50.00	5.37	124.940	0.030	0.0	0.0	0.0	0.68	27.0	4.0
S5.004	50.00	5.90	124.914	0.030	0.0	0.0	0.0	1.76	70.0	4.0
S2.011	50.00	6.55	123.790	1.009	0.0	0.0	0.0	1.65	544.5	136.6
S2.012	50.00	6.69	123.100	1.009	0.0	0.0	0.0	1.12	159.5	136.6
S2.013	50.00	6.76	122.570	1.009	0.0	0.0	0.0	1.41	232.9	136.6
S2.014	50.00	6.87	119.310	1.009	0.0	0.0	0.0	3.13	55.2«	136.6
S2.015	50.00	7.83	117.286	1.009	0.0	0.0	0.0	0.82	14.5«	136.6
S2.016	50.00	8.27	116.971	1.009	0.0	0.0	0.0	0.82	14.5«	136.6
S2.017	50.00	9.37	116.826	1.009	0.0	0.0	0.0	0.82	14.5«	136.6
S2.018	50.00	9.76	116.467	1.009	0.0	0.0	0.0	2.28	40.3«	136.6
S2.019	50.00	10.11	113.800	1.009	0.0	0.0	0.0	3.06	54.0«	136.6
S2.020	50.00	10.45	107.850	1.009	0.0	0.0	0.0	3.28	58.0«	136.6
S2.021	50.00	10.66	100.850	1.009	0.0	0.0	0.0	5.00	88.4«	136.6
S2.022	50.00	10.87	85.850	1.009	0.0	0.0	0.0	5.08	89.7«	136.6
S2.023	50.00	11.11	69.850	1.009	0.0	0.0	0.0	3.97	70.2«	136.6

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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)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.000	26.157	0.920	28.4	0.021	4.00	0.0	0.600		o	150	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)
S6.000	50.00	4.23	125.800	0.021	0.0	0.0	0.0	1.90	33.5	2.9

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)
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S2.023 SOutfall 62.000 60.850 0.000 150 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)
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S6.000 S104 126.100 124.880 0.000 1200 0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha	Storage 2.000
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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 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)	16.000	Storm Duration (mins)	30
Ratio R	0.260		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S113, DS/PN: S2.015, Volume (m³): 6.8

Unit Reference	MD-SHE-0089-7000-4600-7000
Design Head (m)	4.600
Design Flow (l/s)	7.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	89
Invert Level (m)	117.286
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	4.600	7.0	Kick-Flo®	0.796	3.1
Flush-Flo™	0.383	3.9	Mean Flow over Head Range	-	5.0

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)	Depth (m)	Flow (l/s)
0.100	2.8	0.800	3.1	2.000	4.7	4.000	6.5	7.000	8.5
0.200	3.6	1.000	3.4	2.200	4.9	4.500	6.9	7.500	8.8
0.300	3.9	1.200	3.7	2.400	5.2	5.000	7.3	8.000	9.1
0.400	3.9	1.400	4.0	2.600	5.3	5.500	7.6	8.500	9.4
0.500	3.9	1.600	4.3	3.000	5.7	6.000	7.9	9.000	9.6
0.600	3.7	1.800	4.5	3.500	6.1	6.500	8.2	9.500	9.9

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Storage Structures for Storm

Tank or Pond Manhole: S112, DS/PN: S2.014

Invert Level (m) 119.310

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	2.5	1.440	114.0	2.190	401.0	2.940	1059.0
0.190	5.0	1.690	191.0	2.440	550.0	3.190	1368.0
0.690	21.0	1.940	285.0	2.690	789.0	3.440	1660.0

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2 year Return Period 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 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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.000 Cv (Summer) 1.000
 Region England and Wales Ratio R 0.258 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100, 200
 Climate Change (%) 0, 0, 40, 40

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
	Name	Storm							(m)	(m)	(m ³)
S2.000	S1	15 Summer	2	+0%	100/15 Summer				134.405	-0.095	0.000
S2.001	S2	15 Summer	2	+0%	30/15 Summer				132.032	-0.093	0.000
S2.002	S3	15 Summer	2	+0%	100/15 Summer				131.840	-0.181	0.000
S2.003	S4	15 Summer	2	+0%	100/15 Summer				131.731	-0.156	0.000
S2.004	S5	15 Summer	2	+0%	200/15 Summer				131.533	-0.203	0.000
S3.000	S6	15 Summer	2	+0%	100/15 Summer				131.469	-0.081	0.000
S3.001	S7	15 Summer	2	+0%	100/15 Summer				129.666	-0.114	0.000
S2.005	S8	15 Summer	2	+0%	100/15 Summer				129.310	-0.190	0.000
S2.006	S9	15 Summer	2	+0%	30/15 Summer				125.644	-0.226	0.000
S2.007	S12	15 Summer	2	+0%	100/15 Summer				125.352	-0.268	0.000
S2.008	S13	15 Summer	2	+0%	200/15 Summer				124.930	-0.285	0.000
S4.000	S101	15 Summer	2	+0%	30/15 Summer				126.419	-0.096	0.000
S4.001	S102	15 Summer	2	+0%	100/15 Summer				126.119	-0.130	0.000
S4.002	S104	15 Summer	2	+0%	30/15 Summer				124.926	-0.104	0.000
S2.009	S107	15 Summer	2	+0%					124.536	-1.664	0.000
S2.010	S108	15 Summer	2	+0%					124.250	-1.120	0.000
S5.000	S30	15 Summer	2	+0%					125.149	-0.193	0.000
S5.001	S31	15 Summer	2	+0%					125.099	-0.181	0.000
S5.002	S32	15 Summer	2	+0%					125.049	-0.174	0.000
S5.003	S33	30 Summer	2	+0%					125.007	-0.158	0.000
S5.004	S34	30 Summer	2	+0%					124.949	-0.190	0.000
S2.011	S109	15 Summer	2	+0%					123.936	-1.064	0.000
S2.012	S110	15 Summer	2	+0%					123.239	-1.311	0.000
S2.013	S111	15 Summer	2	+0%					122.686	-1.264	0.000
S2.014	S112	720 Summer	2	+0%	2/15 Summer				121.234	1.774	0.000
S2.015	S113	720 Summer	2	+0%	2/15 Summer				121.202	3.766	0.000
S2.016	S114	720 Summer	2	+0%					117.044	-0.077	0.000
S2.017	S115	720 Summer	2	+0%					116.897	-0.079	0.000
S2.018	S116	720 Summer	2	+0%					116.508	-0.109	0.000
S2.019	S117	720 Summer	2	+0%					113.835	-0.115	0.000

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Pipe		Status	Level Exceeded
				Time (mins)	Flow (l/s)		
S2.000	S1	0.29			15.5	OK	
S2.001	S2	0.64			21.2	OK	
S2.002	S3	0.33			25.7	OK	
S2.003	S4	0.46			37.3	OK	
S2.004	S5	0.23			57.2	OK	
S3.000	S6	0.43			18.1	OK	
S3.001	S7	0.49			26.6	OK	
S2.005	S8	0.28			88.2	OK	
S2.006	S9	0.48			99.5	OK	
S2.007	S12	0.34			102.6	OK	
S2.008	S13	0.29			103.0	OK	
S4.000	S101	0.61			24.4	OK	
S4.001	S102	0.36			35.4	OK	
S4.002	S104	0.56			35.6	OK	
S2.009	S107	0.01			135.0	OK	
S2.010	S108	0.01			135.4	OK	
S5.000	S30	0.05			1.3	OK	
S5.001	S31	0.08			2.2	OK	
S5.002	S32	0.11			3.1	OK	
S5.003	S33	0.19			3.9	OK	
S5.004	S34	0.06			3.8	OK	
S2.011	S109	0.01			138.9	OK	
S2.012	S110	0.01			138.1	OK	
S2.013	S111	0.01			137.0	OK	
S2.014	S112	0.12			6.5	SURCHARGED	
S2.015	S113	0.46			6.5	SURCHARGED	
S2.016	S114	0.47			6.5	OK	
S2.017	S115	0.46			6.5	OK	
S2.018	S116	0.17			6.5	OK	
S2.019	S117	0.12			6.5	OK	

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

									Water	Surcharged	Flooded	
US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume	Flow /
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)	Cap.
S2.020	S118	720 Summer	2	+0%					107.884	-0.116	0.000	0.11
S2.021	S119	720 Summer	2	+0%					100.877	-0.123	0.000	0.07
S2.022	S120	720 Summer	2	+0%					85.877	-0.123	0.000	0.07
S2.023	S121	720 Summer	2	+0%					69.881	-0.119	0.000	0.09
S6.000	S103	15 Summer	2	+0%					125.834	-0.116	0.000	0.12

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LS1 2TE	Cumbria	
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30 year Return Period 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 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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.000 Cv (Summer) 1.000
 Region England and Wales Ratio R 0.258 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100, 200
 Climate Change (%) 0, 0, 40, 40

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
	Name	Storm							(m)	(m)	(m³)
S2.000	S1	15 Summer	30	+0%	100/15 Summer				134.428	-0.072	0.000
S2.001	S2	15 Summer	30	+0%	30/15 Summer				132.190	0.065	0.000
S2.002	S3	15 Summer	30	+0%	100/15 Summer				131.906	-0.115	0.000
S2.003	S4	15 Summer	30	+0%	100/15 Summer				131.840	-0.047	0.000
S2.004	S5	15 Summer	30	+0%	200/15 Summer				131.590	-0.146	0.000
S3.000	S6	15 Summer	30	+0%	100/15 Summer				131.502	-0.048	0.000
S3.001	S7	15 Summer	30	+0%	100/15 Summer				129.749	-0.031	0.000
S2.005	S8	15 Summer	30	+0%	100/15 Summer				129.376	-0.124	0.000
S2.006	S9	15 Summer	30	+0%	30/15 Summer				125.908	0.038	0.000
S2.007	S12	15 Summer	30	+0%	100/15 Summer				125.464	-0.156	0.000
S2.008	S13	15 Summer	30	+0%	200/15 Summer				125.029	-0.186	0.000
S4.000	S101	15 Summer	30	+0%	30/15 Summer				126.593	0.078	0.000
S4.001	S102	15 Summer	30	+0%	100/15 Summer				126.170	-0.079	0.000
S4.002	S104	15 Summer	30	+0%	30/15 Summer				125.073	0.043	0.000
S2.009	S107	15 Summer	30	+0%					124.605	-1.595	0.000
S2.010	S108	15 Summer	30	+0%					124.316	-1.054	0.000
S5.000	S30	15 Summer	30	+0%					125.164	-0.178	0.000
S5.001	S31	15 Summer	30	+0%					125.121	-0.159	0.000
S5.002	S32	15 Summer	30	+0%					125.080	-0.143	0.000
S5.003	S33	15 Summer	30	+0%					125.044	-0.121	0.000
S5.004	S34	15 Summer	30	+0%					124.968	-0.171	0.000
S2.011	S109	15 Summer	30	+0%					124.011	-0.989	0.000
S2.012	S110	15 Summer	30	+0%					123.294	-1.256	0.000
S2.013	S111	15 Summer	30	+0%					122.732	-1.218	0.000
S2.014	S112	480 Winter	30	+0%	2/15 Summer				121.732	2.272	0.000
S2.015	S113	480 Winter	30	+0%	2/15 Summer				121.697	4.261	0.000
S2.016	S114	480 Winter	30	+0%					117.046	-0.075	0.000
S2.017	S115	480 Winter	30	+0%					116.900	-0.076	0.000
S2.018	S116	480 Winter	30	+0%					116.509	-0.108	0.000
S2.019	S117	480 Winter	30	+0%					113.836	-0.114	0.000

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Half Drain Overflow (l/s)	Pipe Time (mins)	Flow (l/s)	Status	Level Exceeded
S2.000	S1	0.54			28.8	OK	
S2.001	S2	1.29			42.9	SURCHARGED	
S2.002	S3	0.67			53.2	OK	
S2.003	S4	1.00			80.1	OK	
S2.004	S5	0.50			125.6	OK	
S3.000	S6	0.80			33.8	OK	
S3.001	S7	1.00			54.6	OK	
S2.005	S8	0.62			192.4	OK	
S2.006	S9	1.07			221.1	SURCHARGED	
S2.007	S12	0.74			222.9	OK	
S2.008	S13	0.64			225.7	OK	
S4.000	S101	1.11			44.5	SURCHARGED	
S4.001	S102	0.72			70.0	OK	
S4.002	S104	1.11			70.8	SURCHARGED	
S2.009	S107	0.01			291.6	OK	
S2.010	S108	0.03			293.1	OK	
S5.000	S30	0.09			2.5	OK	
S5.001	S31	0.17			4.6	OK	
S5.002	S32	0.25			6.8	OK	
S5.003	S33	0.44			8.8	OK	
S5.004	S34	0.13			8.6	OK	
S2.011	S109	0.03			301.2	OK	
S2.012	S110	0.02			299.5	OK	
S2.013	S111	0.01			296.8	OK	
S2.014	S112	0.14			7.2	SURCHARGED	
S2.015	S113	0.49			6.9	SURCHARGED	
S2.016	S114	0.50			6.9	OK	
S2.017	S115	0.49			6.9	OK	
S2.018	S116	0.17			6.9	OK	
S2.019	S117	0.13			6.9	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

									Water	Surcharged	Flooded	
US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume	Flow /
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)	Cap.
S2.020	S118	480 Winter	30	+0%					107.884	-0.116	0.000	0.12
S2.021	S119	480 Winter	30	+0%					100.878	-0.122	0.000	0.08
S2.022	S120	480 Winter	30	+0%					85.878	-0.122	0.000	0.08
S2.023	S121	480 Winter	30	+0%					69.882	-0.118	0.000	0.10
S6.000	S103	15 Summer	30	+0%					125.848	-0.102	0.000	0.22
Half Drain Pipe												
US/MH			Overflow	Time	Flow	Level						
PN	Name		(l/s)	(mins)	(l/s)	Status	Exceeded					
S2.020	S118				6.9	OK						
S2.021	S119				6.9	OK						
S2.022	S120				6.9	OK						
S2.023	S121				6.9	OK						
S6.000	S103				7.1	OK						

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100 year Return Period 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 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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.000 Cv (Summer) 1.000
 Region England and Wales Ratio R 0.258 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100, 200
 Climate Change (%) 0, 0, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
									(m)	(m)	(m ³)
S2.000	S1	15 Summer	100	+40%	100/15 Summer				134.622	0.122	0.000
S2.001	S2	15 Summer	100	+40%	30/15 Summer				132.795	0.670	0.000
S2.002	S3	15 Summer	100	+40%	100/15 Summer				132.330	0.309	0.000
S2.003	S4	15 Summer	100	+40%	100/15 Summer				132.163	0.276	0.000
S2.004	S5	15 Summer	100	+40%	200/15 Summer				131.658	-0.078	0.000
S3.000	S6	15 Summer	100	+40%	100/15 Summer				132.161	0.611	0.000
S3.001	S7	15 Summer	100	+40%	100/15 Summer				130.500	0.720	0.000
S2.005	S8	15 Summer	100	+40%	100/15 Summer				129.948	0.448	0.000
S2.006	S9	15 Summer	100	+40%	30/15 Summer				126.459	0.589	0.000
S2.007	S12	30 Summer	100	+40%	100/15 Summer				125.747	0.127	0.000
S2.008	S13	15 Summer	100	+40%	200/15 Summer				125.124	-0.091	0.000
S4.000	S101	15 Summer	100	+40%	30/15 Summer				127.539	1.024	0.000
S4.001	S102	15 Summer	100	+40%	100/15 Summer				126.826	0.577	0.000
S4.002	S104	15 Summer	100	+40%	30/15 Summer				125.379	0.349	0.000
S2.009	S107	15 Summer	100	+40%					124.662	-1.538	0.000
S2.010	S108	15 Summer	100	+40%					124.372	-0.998	0.000
S5.000	S30	15 Summer	100	+40%					125.185	-0.157	0.000
S5.001	S31	15 Summer	100	+40%					125.151	-0.129	0.000
S5.002	S32	15 Summer	100	+40%					125.118	-0.105	0.000
S5.003	S33	15 Summer	100	+40%					125.089	-0.076	0.000
S5.004	S34	15 Summer	100	+40%					124.987	-0.152	0.000
S2.011	S109	15 Summer	100	+40%					124.065	-0.935	0.000
S2.012	S110	15 Summer	100	+40%					123.343	-1.207	0.000
S2.013	S111	30 Summer	100	+40%					122.767	-1.183	0.000
S2.014	S112	960 Winter	100	+40%	2/15 Summer				122.287	2.827	0.000
S2.015	S113	960 Winter	100	+40%	2/15 Summer				122.248	4.812	0.000
S2.016	S114	960 Winter	100	+40%					117.049	-0.072	0.000
S2.017	S115	960 Winter	100	+40%					116.902	-0.074	0.000
S2.018	S116	960 Winter	100	+40%					116.510	-0.107	0.000
S2.019	S117	960 Winter	100	+40%					113.837	-0.113	0.000

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Pipe		Status	Level Exceeded
				Time (mins)	Flow (l/s)		
S2.000	S1	0.89			47.4	SURCHARGED	
S2.001	S2	2.11			70.1	SURCHARGED	
S2.002	S3	1.12			88.0	SURCHARGED	
S2.003	S4	1.66			133.6	SURCHARGED	
S2.004	S5	0.85			214.1	OK	
S3.000	S6	1.19			50.1	SURCHARGED	
S3.001	S7	1.48			80.8	SURCHARGED	
S2.005	S8	0.98			303.0	SURCHARGED	
S2.006	S9	1.66			344.4	SURCHARGED	
S2.007	S12	1.16			350.1	SURCHARGED	
S2.008	S13	0.99			349.4	OK	
S4.000	S101	1.69			68.1	SURCHARGED	
S4.001	S102	1.07			104.6	SURCHARGED	
S4.002	S104	1.64			104.5	SURCHARGED	
S2.009	S107	0.02			450.4	OK	
S2.010	S108	0.05			452.2	OK	
S5.000	S30	0.16			4.4	OK	
S5.001	S31	0.31			8.1	OK	
S5.002	S32	0.44			12.0	OK	
S5.003	S33	0.77			15.5	OK	
S5.004	S34	0.23			15.3	OK	
S2.011	S109	0.04			467.3	OK	
S2.012	S110	0.02			467.4	OK	
S2.013	S111	0.02			465.4	OK	
S2.014	S112	0.14			7.3	SURCHARGED	
S2.015	S113	0.51			7.2	SURCHARGED	
S2.016	S114	0.53			7.2	OK	
S2.017	S115	0.51			7.2	OK	
S2.018	S116	0.18			7.2	OK	
S2.019	S117	0.14			7.2	OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

US/MH			Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume	Flow /
PN	Name	Storm							(m)	(m)	(m³)	Cap.
S2.020	S118	960 Winter	100	+40%					107.885	-0.115	0.000	0.13
S2.021	S119	960 Winter	100	+40%					100.879	-0.121	0.000	0.08
S2.022	S120	960 Winter	100	+40%					85.879	-0.121	0.000	0.08
S2.023	S121	960 Winter	100	+40%					69.882	-0.118	0.000	0.11
S6.000	S103	15 Summer	100	+40%					125.866	-0.084	0.000	0.40

			Half Drain		Pipe		
PN	US/MH Name	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded	
S2.020	S118			7.2	OK		
S2.021	S119			7.2	OK		
S2.022	S120			7.2	OK		
S2.023	S121			7.2	OK		
S6.000	S103			12.7	OK		

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200 year Return Period 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 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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.000 Cv (Summer) 1.000
 Region England and Wales Ratio R 0.258 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 2, 30, 100, 200
 Climate Change (%) 0, 0, 40, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
S2.000	S1	15 Summer	200	+40%	100/15 Summer				134.981	0.481	0.000
S2.001	S2	15 Summer	200	+40%	30/15 Summer				133.084	0.959	0.000
S2.002	S3	15 Summer	200	+40%	100/15 Summer				132.620	0.599	0.000
S2.003	S4	15 Summer	200	+40%	100/15 Summer				132.455	0.568	0.000
S2.004	S5	15 Summer	200	+40%	200/15 Summer				132.032	0.296	0.000
S3.000	S6	15 Summer	200	+40%	100/15 Summer				132.717	1.167	0.000
S3.001	S7	15 Summer	200	+40%	100/15 Summer				130.971	1.191	0.000
S2.005	S8	15 Summer	200	+40%	100/15 Summer				130.385	0.885	0.000
S2.006	S9	15 Summer	200	+40%	30/15 Summer				126.627	0.757	0.000
S2.007	S12	30 Summer	200	+40%	100/15 Summer				125.847	0.227	0.000
S2.008	S13	30 Summer	200	+40%	200/15 Summer				125.232	0.017	0.000
S4.000	S101	15 Summer	200	+40%	30/15 Summer				128.148	1.633	0.000
S4.001	S102	15 Summer	200	+40%	100/15 Summer				127.255	1.006	0.000
S4.002	S104	15 Summer	200	+40%	30/15 Summer				125.496	0.466	0.000
S2.009	S107	30 Summer	200	+40%					124.672	-1.528	0.000
S2.010	S108	30 Summer	200	+40%					124.379	-0.991	0.000
S5.000	S30	15 Summer	200	+40%					125.191	-0.151	0.000
S5.001	S31	15 Summer	200	+40%					125.161	-0.119	0.000
S5.002	S32	15 Summer	200	+40%					125.131	-0.092	0.000
S5.003	S33	15 Summer	200	+40%					125.104	-0.061	0.000
S5.004	S34	15 Summer	200	+40%					124.992	-0.147	0.000
S2.011	S109	30 Summer	200	+40%					124.074	-0.926	0.000
S2.012	S110	30 Summer	200	+40%					123.351	-1.199	0.000
S2.013	S111	30 Summer	200	+40%					122.773	-1.177	0.000
S2.014	S112	960 Winter	200	+40%	2/15 Summer				122.425	2.965	0.000
S2.015	S113	960 Winter	200	+40%	2/15 Summer				122.384	4.948	0.000
S2.016	S114	960 Winter	200	+40%					117.049	-0.072	0.000
S2.017	S115	960 Winter	200	+40%					116.903	-0.073	0.000
S2.018	S116	960 Winter	200	+40%					116.511	-0.106	0.000
S2.019	S117	960 Winter	200	+40%					113.837	-0.113	0.000

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200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Half Drain Overflow (l/s)	Pipe Time (mins)	Flow (l/s)	Status	Level Exceeded
S2.000	S1	0.91			48.5	SURCHARGED	
S2.001	S2	2.16			71.7	FLOOD RISK	
S2.002	S3	1.15			91.0	SURCHARGED	
S2.003	S4	1.75			140.8	SURCHARGED	
S2.004	S5	0.88			222.5	SURCHARGED	
S3.000	S6	1.21			51.0	FLOOD RISK	
S3.001	S7	1.49			81.2	SURCHARGED	
S2.005	S8	1.02			314.7	SURCHARGED	
S2.006	S9	1.75			362.0	SURCHARGED	
S2.007	S12	1.24			373.6	SURCHARGED	
S2.008	S13	1.04			369.5	SURCHARGED	
S4.000	S101	1.80			72.3	FLOOD RISK	
S4.001	S102	1.18			115.1	SURCHARGED	
S4.002	S104	1.80			115.2	SURCHARGED	
S2.009	S107	0.02			480.6	OK	
S2.010	S108	0.05			482.2	OK	
S5.000	S30	0.19			5.1	OK	
S5.001	S31	0.35			9.3	OK	
S5.002	S32	0.50			13.7	OK	
S5.003	S33	0.88			17.8	OK	
S5.004	S34	0.26			17.5	OK	
S2.011	S109	0.05			498.7	OK	
S2.012	S110	0.03			499.1	OK	
S2.013	S111	0.02			498.5	OK	
S2.014	S112	0.14			7.3	SURCHARGED	
S2.015	S113	0.52			7.3	SURCHARGED	
S2.016	S114	0.54			7.3	OK	
S2.017	S115	0.52			7.3	OK	
S2.018	S116	0.19			7.3	OK	
S2.019	S117	0.14			7.3	OK	

W A Fairhurst & Partners		Page 17
51a St.Paul's Street	124826	
Leeds	The Mount	
LS1 2TE	Cumbria	
Date 14/04/2021	Designed by AL	
File Ph4network -22-4-22.MDX	Checked by AC	
Innovyze	Network 2020.1	

200 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

									Water	Surcharged	Flooded		
US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth	Volume	Flow /	
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)	(m³)	Cap.	
S2.020	S118	960 Winter	200	+40%					107.886	-0.114	0.000	0.13	
S2.021	S119	960 Winter	200	+40%					100.879	-0.121	0.000	0.08	
S2.022	S120	960 Winter	200	+40%					85.879	-0.121	0.000	0.08	
S2.023	S121	960 Winter	200	+40%					69.883	-0.117	0.000	0.11	
S6.000	S103	15 Summer	200	+40%					125.871	-0.079	0.000	0.46	

			Half Drain			Pipe		
US/MH			Overflow	Time	Flow	Level		
PN	Name		(l/s)	(mins)	(l/s)	Status	Exceeded	
S2.020	S118				7.3	OK		
S2.021	S119				7.3	OK		
S2.022	S120				7.3	OK		
S2.023	S121				7.3	OK		
S6.000	S103				14.6	OK		