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3 Worsley Court Walkden Manchester M28 3NJ	Smithy Bridge Road Rochdale West Catchment RevB	
Date 12/10/2022 16:04 File 30329 SMITHY BRIDGE WEST...	Designed by RDE Checked by	
Micro Drainage 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)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.252	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	0	Maximum Backdrop Height (m)	0.000
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)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.436	4-8	0.765

Total Area Contributing (ha) = 2.201

Total Pipe Volume (m³) = 53.408

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)	Section Type	Auto Design
1.000	45.496	1.820	25.0	0.213	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	8.866	0.354	25.0	0.098	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	54.455	2.346	23.2	0.000	0.00	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	0.00	4.29	153.300	0.213	0.0	0.0	0.0	2.63	104.5	0.0
1.001	0.00	4.34	151.480	0.311	0.0	0.0	0.0	2.63	104.4	0.0
1.002	0.00	4.68	151.126	0.311	0.0	0.0	0.0	2.73	108.4	0.0

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2.000	41.581	0.520	80.0	0.146	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	24.836	1.552	16.0	0.120	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	30.330	1.896	16.0	0.034	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	42.969	2.686	16.0	0.039	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	35.893	2.243	16.0	0.148	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	25.924	0.432	60.0	0.143	4.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	46.074	2.880	16.0	0.113	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.002	11.412	0.713	16.0	0.050	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.003	52.690	3.293	16.0	0.103	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	25.451	1.697	15.0	0.140	4.00	0.0	0.600	o	225	Pipe/Conduit	
3.004	75.300	3.514	21.4	0.086	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.005	11.515	0.115	100.1	0.228	0.00	0.0	0.600	o	525	Pipe/Conduit	
5.000	17.466	0.873	20.0	0.059	4.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	20.003	1.539	13.0	0.079	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.002	52.504	4.039	13.0	0.074	0.00	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)	
2.000	0.00	4.47	149.300	0.146	0.0	0.0	0.0	1.46	58.2	0.0	
1.003	0.00	4.78	148.705	0.577	0.0	0.0	0.0	3.95	279.2	0.0	
1.004	0.00	4.91	147.153	0.611	0.0	0.0	0.0	3.95	279.2	0.0	
1.005	0.00	5.09	145.257	0.650	0.0	0.0	0.0	3.95	279.2	0.0	
1.006	0.00	5.24	141.300	0.798	0.0	0.0	0.0	3.95	279.2	0.0	
3.000	0.00	4.26	153.700	0.143	0.0	0.0	0.0	1.69	67.3	0.0	
3.001	0.00	4.49	153.268	0.256	0.0	0.0	0.0	3.29	130.7	0.0	
3.002	0.00	4.54	150.313	0.306	0.0	0.0	0.0	3.95	279.2	0.0	
3.003	0.00	4.76	148.000	0.409	0.0	0.0	0.0	3.95	279.2	0.0	
4.000	0.00	4.12	146.400	0.140	0.0	0.0	0.0	3.40	135.0	0.0	
3.004	0.00	5.08	143.000	0.635	0.0	0.0	0.0	3.93	434.0	0.0	
3.005	0.00	5.16	139.336	0.863	0.0	0.0	0.0	2.24	484.6	0.0	
5.000	0.00	4.13	148.450	0.059	0.0	0.0	0.0	2.26	40.0	0.0	
5.001	0.00	4.25	147.577	0.138	0.0	0.0	0.0	2.81	49.7	0.0	
5.002	0.00	4.49	145.963	0.212	0.0	0.0	0.0	3.65	145.1	0.0	
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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)
1.011	o	225	27	135.500	132.050	3.225	Open Manhole	1200
1.012	o	225	28	132.500	131.336	0.939	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)
1.011	17.317	24.3	28	132.500	131.336	0.939	Open Manhole	1200
1.012	22.414	59.6		131.200	130.960	0.015	Open Manhole	1200

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 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)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.252		

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<u>Online Controls for Storm</u>																																																																										
<u>Hydro-Brake® Optimum Manhole: 30, DS/PN: 1.008, Volume (m³): 8.3</u>																																																																										
Unit Reference MD-SHE-0140-1000-1400-1000																																																																										
Design Head (m) 1.400																																																																										
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Flush-Flo™ Calculated																																																																										
Objective Minimise upstream storage																																																																										
Application Surface																																																																										
Sump Available Yes																																																																										
Diameter (mm) 140																																																																										
Invert Level (m) 138.304																																																																										
Minimum Outlet Pipe Diameter (mm) 225																																																																										
Suggested Manhole Diameter (mm) 1200																																																																										
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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																																																																										
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		Water <table><thead><tr><th>PN</th><th>US/MH Name</th><th>Storm</th><th>Return Period</th><th>Climate Change</th><th>First (X) Surge</th><th>First (Y) Flood</th><th>First (Z) Overflow</th><th>Overflow Act.</th><th>Level (m)</th></tr></thead><tbody><tr><td>1.000</td><td>1</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>153.377</td></tr><tr><td>1.001</td><td>2</td><td>15 Winter</td><td>1</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td><td>151.582</td></tr><tr><td>1.002</td><td>3</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>151.216</td></tr><tr><td>2.000</td><td>4</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>149.387</td></tr><tr><td>1.003</td><td>4</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>148.808</td></tr><tr><td>1.004</td><td>5</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>147.258</td></tr><tr><td>1.005</td><td>100</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>145.364</td></tr><tr><td>1.006</td><td>101</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>141.419</td></tr><tr><td>3.000</td><td>7</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>153.781</td></tr><tr><td>3.001</td><td>8</td><td>15 Winter</td><td>1</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>153.340</td></tr><tr><td>3.002</td><td>9</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>150.392</td></tr><tr><td>3.003</td><td>10</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>148.081</td></tr><tr><td>4.000</td><td>11</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>146.455</td></tr><tr><td>3.004</td><td>11</td><td>15 Winter</td><td>1</td><td>+0%</td><td></td><td></td><td></td><td></td><td>143.102</td></tr></tbody></table>		PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	1.000	1	15 Winter	1	+0%	100/15 Summer				153.377	1.001	2	15 Winter	1	+0%	30/15 Summer				151.582	1.002	3	15 Winter	1	+0%	100/15 Summer				151.216	2.000	4	15 Winter	1	+0%	100/15 Summer				149.387	1.003	4	15 Winter	1	+0%	100/15 Summer				148.808	1.004	5	15 Winter	1	+0%	100/15 Summer				147.258	1.005	100	15 Winter	1	+0%	100/15 Summer				145.364	1.006	101	15 Winter	1	+0%	100/15 Summer				141.419	3.000	7	15 Winter	1	+0%	100/15 Summer				153.781	3.001	8	15 Winter	1	+0%	100/15 Summer				153.340	3.002	9	15 Winter	1	+0%					150.392	3.003	10	15 Winter	1	+0%					148.081	4.000	11	15 Winter	1	+0%					146.455	3.004	11	15 Winter	1	+0%					143.102
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Time (mins)	Pipe		Level Exceeded
		Depth (m)	Volume (m³)			Flow (l/s)	Status	
1.000	1	-0.148	0.000	0.26		25.8	OK	
1.001	2	-0.123	0.000	0.42		35.2	OK	
1.002	3	-0.135	0.000	0.33		34.7	OK	
2.000	4	-0.138	0.000	0.32		17.7	OK	
1.003	4	-0.197	0.000	0.25		63.5	OK	
1.004	5	-0.195	0.000	0.26		67.0	OK	
1.005	100	-0.193	0.000	0.27		71.1	OK	
1.006	101	-0.181	0.000	0.33		85.2	OK	
3.000	7	-0.144	0.000	0.28		17.3	OK	
3.001	8	-0.153	0.000	0.23		28.2	OK	
3.002	9	-0.221	0.000	0.16		32.8	OK	
3.003	10	-0.219	0.000	0.16		42.5	OK	
4.000	11	-0.170	0.000	0.14		17.0	OK	
3.004	11	-0.273	0.000	0.16		66.9	OK	

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Micro Drainage				Network 2020.1					
1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm									

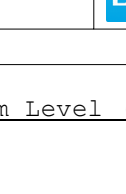
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3 Worsley Court Walkden Manchester M28 3NJ		Smithy Bridge Road Rochdale West Catchment RevB	
Date 12/10/2022 16:04 File 30329 SMITHY BRIDGE WEST...		Designed by RDE Checked by	
Micro Drainage		Network 2020.1	
<u>2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u> <u>Simulation Criteria</u> 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 <u>Synthetic Rainfall Details</u> Rainfall Model FSR Ratio R 0.252 Region England and Wales Cv (Summer) 0.750 M5-60 (mm) 19.000 Cv (Winter) 0.840 Margin for Flood Risk Warning (mm) 300.0 Analysis Timestep 2.5 Second Increment (Extended) DTS Status ON 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 Return Period(s) (years) 1, 2, 30, 100 Climate Change (%) 0, 0, 0, 45			
			Water
PN	US/MH Name	Storm	Return Period
			Climate Change
			First (X) First (Y) First (Z) Overflow
			Surcharge Flood Overflow Act.
			Water Level (m)
1.000	1 15 Winter	2	+0%
1.001	2 15 Winter	2	+0%
1.002	3 15 Winter	2	+0%
2.000	4 15 Winter	2	+0%
1.003	4 15 Winter	2	+0%
1.004	5 15 Winter	2	+0%
1.005	100 15 Winter	2	+0%
1.006	101 15 Winter	2	+0%
3.000	7 15 Winter	2	+0%
3.001	8 15 Winter	2	+0%
3.002	9 15 Winter	2	+0%
3.003	10 15 Winter	2	+0%
4.000	11 15 Winter	2	+0%
3.004	11 15 Winter	2	+0%

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Micro Drainage		Network 2020.1

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

PN	US/MH Name	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe		Level Exceeded
		Depth (m)	Volume (m³)			Flow (l/s)	Status	
1.000	1	-0.135	0.000	0.34		33.4	OK	
1.001	2	-0.106	0.000	0.54		45.6	OK	
1.002	3	-0.121	0.000	0.43		44.8	OK	
2.000	4	-0.124	0.000	0.41		22.7	OK	
1.003	4	-0.180	0.000	0.33		81.9	OK	
1.004	5	-0.178	0.000	0.34		86.8	OK	
1.005	100	-0.177	0.000	0.35		91.9	OK	
1.006	101	-0.163	0.000	0.43		110.2	OK	
3.000	7	-0.132	0.000	0.36		22.4	OK	
3.001	8	-0.142	0.000	0.29		36.5	OK	
3.002	9	-0.209	0.000	0.20		42.5	OK	
3.003	10	-0.207	0.000	0.21		55.0	OK	
4.000	11	-0.162	0.000	0.18		22.0	OK	
3.004	11	-0.257	0.000	0.21		86.5	OK	

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<table><tr><th colspan="2">US/MH</th><th rowspan="2">Storm</th><th rowspan="2">Return Period</th><th rowspan="2">Climate Change</th><th rowspan="2">First (X) Surcharge</th><th rowspan="2">First (Y) Flood</th><th rowspan="2">First (Z) Overflow</th><th rowspan="2">Overflow Act.</th><th rowspan="2">Water Level (m)</th></tr><tr><th>PN</th><th>Name</th></tr><tr><td>3.005</td><td>13</td><td>15 Winter</td><td>2</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td><td>139.582</td></tr><tr><td>5.000</td><td>14</td><td>15 Winter</td><td>2</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>148.501</td></tr><tr><td>5.001</td><td>17</td><td>15 Winter</td><td>2</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>147.644</td></tr><tr><td>5.002</td><td>18</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>146.032</td></tr><tr><td>5.003</td><td>19</td><td>15 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>141.937</td></tr><tr><td>6.000</td><td>16</td><td>15 Winter</td><td>2</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>141.296</td></tr><tr><td>5.004</td><td>100</td><td>15 Winter</td><td>2</td><td>+0%</td><td>100/15 Summer</td><td></td><td></td><td></td><td>140.697</td></tr><tr><td>3.006</td><td>100</td><td>15 Winter</td><td>2</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td><td>139.544</td></tr><tr><td>1.007</td><td>29</td><td>960 Winter</td><td>2</td><td>+0%</td><td>30/120 Winter</td><td></td><td></td><td></td><td>138.841</td></tr><tr><td>1.008</td><td>30</td><td>600 Winter</td><td>2</td><td>+0%</td><td>1/15 Summer</td><td></td><td></td><td></td><td>138.840</td></tr><tr><td>1.009</td><td>31</td><td>60 Summer</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>136.800</td></tr><tr><td>1.010</td><td>26</td><td>30 Summer</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>134.500</td></tr><tr><td>1.011</td><td>27</td><td>30 Summer</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>132.098</td></tr><tr><td>1.012</td><td>28</td><td>30 Winter</td><td>2</td><td>+0%</td><td></td><td></td><td></td><td></td><td>131.396</td></tr></table>											US/MH		Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	PN	Name	3.005	13	15 Winter	2	+0%	30/15 Summer				139.582	5.000	14	15 Winter	2	+0%	100/15 Summer				148.501	5.001	17	15 Winter	2	+0%	100/15 Summer				147.644	5.002	18	15 Winter	2	+0%					146.032	5.003	19	15 Winter	2	+0%					141.937	6.000	16	15 Winter	2	+0%	100/15 Summer				141.296	5.004	100	15 Winter	2	+0%	100/15 Summer				140.697	3.006	100	15 Winter	2	+0%	30/15 Summer				139.544	1.007	29	960 Winter	2	+0%	30/120 Winter				138.841	1.008	30	600 Winter	2	+0%	1/15 Summer				138.840	1.009	31	60 Summer	2	+0%					136.800	1.010	26	30 Summer	2	+0%					134.500	1.011	27	30 Summer	2	+0%					132.098	1.012	28	30 Winter	2	+0%					131.396
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<table><tr><th rowspan="2">PN</th><th rowspan="2">US/MH Name</th><th colspan="2">Surcharged Flooded</th><th rowspan="2">Flow / Cap.</th><th rowspan="2">Overflow (l/s)</th><th rowspan="2">Half Drain Time (mins)</th><th rowspan="2">Pipe Flow (l/s)</th><th rowspan="2">Status</th><th rowspan="2">Level Exceeded</th></tr><tr><th>Depth (m)</th><th>Volume (m³)</th></tr><tr><td>3.005</td><td>13</td><td>-0.279</td><td>0.000</td><td>0.44</td><td></td><td></td><td>115.4</td><td>OK</td><td></td></tr><tr><td>5.000</td><td>14</td><td>-0.099</td><td>0.000</td><td>0.25</td><td></td><td></td><td>9.3</td><td>OK</td><td></td></tr><tr><td>5.001</td><td>17</td><td>-0.083</td><td>0.000</td><td>0.41</td><td></td><td></td><td>19.1</td><td>OK</td><td></td></tr><tr><td>5.002</td><td>18</td><td>-0.156</td><td>0.000</td><td>0.20</td><td></td><td></td><td>28.3</td><td>OK</td><td></td></tr><tr><td>5.003</td><td>19</td><td>-0.212</td><td>0.000</td><td>0.19</td><td></td><td></td><td>42.9</td><td>OK</td><td></td></tr><tr><td>6.000</td><td>16</td><td>-0.134</td><td>0.000</td><td>0.35</td><td></td><td></td><td>20.3</td><td>OK</td><td></td></tr><tr><td>5.004</td><td>100</td><td>-0.243</td><td>0.000</td><td>0.26</td><td></td><td></td><td>72.6</td><td>OK</td><td></td></tr><tr><td>3.006</td><td>100</td><td>-0.202</td><td>0.000</td><td>0.69</td><td></td><td></td><td>189.0</td><td>OK</td><td></td></tr><tr><td>1.007</td><td>29</td><td>-0.109</td><td>0.000</td><td>0.06</td><td></td><td></td><td>14.7</td><td>OK</td><td></td></tr><tr><td>1.008</td><td>30</td><td>0.311</td><td>0.000</td><td>0.12</td><td></td><td></td><td>9.9</td><td>SURCHARGED</td><td></td></tr><tr><td>1.009</td><td>31</td><td>-0.175</td><td>0.000</td><td>0.11</td><td></td><td></td><td>9.9</td><td>OK</td><td></td></tr><tr><td>1.010</td><td>26</td><td>-0.175</td><td>0.000</td><td>0.11</td><td></td><td></td><td>9.9</td><td>OK</td><td></td></tr><tr><td>1.011</td><td>27</td><td>-0.177</td><td>0.000</td><td>0.10</td><td></td><td></td><td>9.9</td><td>OK</td><td></td></tr><tr><td>1.012</td><td>28</td><td>-0.165</td><td>0.000</td><td>0.16</td><td></td><td></td><td>9.9</td><td>OK</td><td></td></tr></table>											PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded	Depth (m)	Volume (m³)	3.005	13	-0.279	0.000	0.44			115.4	OK		5.000	14	-0.099	0.000	0.25			9.3	OK		5.001	17	-0.083	0.000	0.41			19.1	OK		5.002	18	-0.156	0.000	0.20			28.3	OK		5.003	19	-0.212	0.000	0.19			42.9	OK		6.000	16	-0.134	0.000	0.35			20.3	OK		5.004	100	-0.243	0.000	0.26			72.6	OK		3.006	100	-0.202	0.000	0.69			189.0	OK		1.007	29	-0.109	0.000	0.06			14.7	OK		1.008	30	0.311	0.000	0.12			9.9	SURCHARGED		1.009	31	-0.175	0.000	0.11			9.9	OK		1.010	26	-0.175	0.000	0.11			9.9	OK		1.011	27	-0.177	0.000	0.10			9.9	OK		1.012	28	-0.165	0.000	0.16			9.9	OK	
PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded																																																																																																																																																									
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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	Ratio R 0.252
Region England and Wales Cv (Summer)	0.750	
M5-60 (mm)	19.000 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

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

Return Period(s) (years) 1, 2, 30, 100

Climate Change (%) 0, 0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1 15 Winter		30	+0%	100/15 Summer				153.430
1.001	2 15 Winter		30	+0%	30/15 Summer				151.767
1.002	3 15 Winter		30	+0%	100/15 Summer				151.290
2.000	4 15 Winter		30	+0%	100/15 Summer				149.450
1.003	4 15 Winter		30	+0%	100/15 Summer				148.887
1.004	5 15 Winter		30	+0%	100/15 Summer				147.340
1.005	100 15 Winter		30	+0%	100/15 Summer				145.448
1.006	101 15 Winter		30	+0%	100/15 Summer				141.523
3.000	7 15 Winter		30	+0%	100/15 Summer				153.837
3.001	8 15 Summer		30	+0%	100/15 Summer				153.395
3.002	9 15 Summer		30	+0%					150.450
3.003	10 15 Winter		30	+0%					148.143
4.000	11 15 Winter		30	+0%					146.489
3.004	11 15 Winter		30	+0%					143.178

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

PN	US/MH Name	Surcharged		Flooded		Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Volume (m³)	Flow (l/s)					
1.000	1	-0.095	0.000	0.000	0.63			63.1	OK	
1.001	2	0.062	0.000	0.000	1.08			90.3	SURCHARGED	
1.002	3	-0.061	0.000	0.000	0.87			90.3	OK	
2.000	4	-0.075	0.000	0.000	0.77			42.8	OK	
1.003	4	-0.118	0.000	0.000	0.66			164.7	OK	
1.004	5	-0.113	0.000	0.000	0.68			173.8	OK	
1.005	100	-0.109	0.000	0.000	0.71			185.3	OK	
1.006	101	-0.077	0.000	0.000	0.87			224.8	OK	
3.000	7	-0.088	0.000	0.000	0.68			42.4	OK	
3.001	8	-0.098	0.000	0.000	0.61			75.8	OK	
3.002	9	-0.163	0.000	0.000	0.43			90.5	OK	
3.003	10	-0.157	0.000	0.000	0.46			120.8	OK	
4.000	11	-0.136	0.000	0.000	0.33			41.5	OK	
3.004	11	-0.197	0.000	0.000	0.45			185.6	OK	

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Micro Drainage		Network 2020.1	

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	Ratio R	0.252
Region England and Wales Cv (Summer)			0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status ON

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

Return Period(s) (years) 1, 2, 30, 100

Climate Change (%) 0, 0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	100	+45%	100/15 Summer				154.631
1.001	2	15 Winter	100	+45%	30/15 Summer				153.186
1.002	3	15 Winter	100	+45%	100/15 Summer				152.414
2.000	4	15 Winter	100	+45%	100/15 Summer				150.020
1.003	4	15 Winter	100	+45%	100/15 Summer				149.206
1.004	5	15 Winter	100	+45%	100/15 Summer				147.792
1.005	100	15 Winter	100	+45%	100/15 Summer				145.948
1.006	101	15 Winter	100	+45%	100/15 Summer				143.163
3.000	7	15 Winter	100	+45%	100/15 Summer				154.234
3.001	8	15 Winter	100	+45%	100/15 Summer				153.632
3.002	9	15 Winter	100	+45%					150.505
3.003	10	15 Winter	100	+45%					148.205
4.000	11	15 Winter	100	+45%					146.529
3.004	11	15 Winter	100	+45%					143.259

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Micro Drainage				Network 2020.1				
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>								
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Overflow Cap.	Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	1.106	0.000	0.90		89.7	SURCHARGED	
1.001	2	1.481	0.000	1.49		124.9	SURCHARGED	
1.002	3	1.063	0.000	1.18		123.4	SURCHARGED	
2.000	4	0.495	0.000	1.31		72.3	SURCHARGED	
1.003	4	0.201	0.000	0.96		239.1	SURCHARGED	
1.004	5	0.339	0.000	1.00		253.2	SURCHARGED	
1.005	100	0.391	0.000	1.04		270.4	SURCHARGED	
1.006	101	1.563	0.000	1.30		334.8	SURCHARGED	
3.000	7	0.309	0.000	1.17		72.7	SURCHARGED	
3.001	8	0.139	0.000	1.02		127.9	SURCHARGED	
3.002	9	-0.108	0.000	0.73		153.7	OK	
3.003	10	-0.095	0.000	0.80		210.3	OK	
4.000	11	-0.096	0.000	0.62		77.5	OK	
3.004	11	-0.116	0.000	0.81		333.4	OK	
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Micro Drainage		Network 2020.1	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
3.005	13	15 Winter	100	+45%	30/15 Summer				140.754
5.000	14	15 Winter	100	+45%	100/15 Summer				149.135
5.001	17	15 Winter	100	+45%	100/15 Summer				148.734
5.002	18	15 Winter	100	+45%					146.104
5.003	19	15 Winter	100	+45%					142.037
6.000	16	15 Winter	100	+45%	100/15 Summer				141.941
5.004	100	15 Winter	100	+45%	100/15 Summer				141.421
3.006	100	15 Winter	100	+45%	30/15 Summer				140.406
1.007	29	1440 Winter	100	+45%	30/120 Winter				139.685
1.008	30	1440 Winter	100	+45%	1/15 Summer				139.693
1.009	31	1440 Winter	100	+45%					136.800
1.010	26	1440 Winter	100	+45%					134.500
1.011	27	1440 Winter	100	+45%					132.098
1.012	28	1440 Winter	100	+45%					131.396

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
3.005	13	0.893	0.000	1.69			439.4	SURCHARGED	
5.000	14	0.535	0.000	0.70			26.2	SURCHARGED	
5.001	17	1.007	0.000	1.27			59.5	SURCHARGED	
5.002	18	-0.084	0.000	0.70			97.5	OK	
5.003	19	-0.112	0.000	0.70			162.7	OK	
6.000	16	0.511	0.000	1.03			60.4	SURCHARGED	
5.004	100	0.481	0.000	0.92			251.7	SURCHARGED	
3.006	100	0.660	0.000	2.53			692.5	SURCHARGED	
1.007	29	0.735	0.000	0.06			14.5	SURCHARGED	
1.008	30	1.164	0.000	0.12			9.9	SURCHARGED	
1.009	31	-0.175	0.000	0.11			9.9	OK	
1.010	26	-0.175	0.000	0.11			9.9	OK	
1.011	27	-0.177	0.000	0.10			9.9	OK	
1.012	28	-0.165	0.000	0.16			9.9	OK	

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