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4 Market Square	Levenshulme Road	
Old Amersham	Surface Water	
Buckinghamshire, HP7 0DQ	Network Calculations	
Date 09/09/2024	Designed by MDS	
File SW Network Calculations ...	Checked by MDS	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	30
FEH Rainfall Version	2013
Site Location GB 388687 395445 SJ 88687 95445	
Data Type	Point
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	40
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
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	0.236	4-8	0.064

Total Area Contributing (ha) = 0.300

Total Pipe Volume (m³) = 17.308

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
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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)
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Manhole Schedules for Storm											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	66.350	0.750	Open Manhole	150	1.000	65.600	150				
S2	66.350	0.870	Open Manhole	460	1.001	65.480	150	1.000	65.480	150	
S3	66.350	0.750	Open Manhole	150	2.000	65.600	150				
S4	66.350	1.010	Open Manhole	460	1.002	65.340	150	1.001	65.340	150	
								2.000	65.340	150	
S5	66.700	0.750	Open Manhole	150	3.000	65.950	150				
S6	66.700	1.560	Open Manhole	460	1.003	65.140	150	1.002	65.140	150	
								3.000	65.140	150	
S7	66.625	1.355	Open Manhole	150	4.000	65.270	150				
S8	66.550	0.750	Open Manhole	460	5.000	65.800	150				
S9	66.550	0.875	Open Manhole	460	5.001	65.675	150	5.000	65.675	150	
S10	66.550	1.595	Open Manhole	1500	1.004	64.955	150	1.003	64.955	150	
								4.000	64.955	150	
								5.001	64.955	150	
S11	66.250	1.390	Open Manhole	1500	6.000	64.860	375				
S12	66.550	1.900	Open Manhole	1500	1.005	64.650	375	1.004	64.875	150	
								6.000	64.650	375	
S13	66.350	0.750	Open Manhole	460	7.000	65.600	150				
S14	66.350	0.945	Open Manhole	460	7.001	65.405	150	7.000	65.405	150	
S15	66.850	2.025	Open Manhole	460	7.002	64.825	150	7.001	64.825	150	
JCT	66.550	2.020	Junction		1.006	64.530	375	1.005	64.530	375	
								7.002	64.755	150	
S16	66.750	2.335	Open Manhole	1500	1.007	64.415	375	1.006	64.415	375	
S17	66.350	0.750	Open Manhole	460	8.000	65.600	150				
S18	66.350	1.000	Open Manhole	460	8.001	65.350	150	8.000	65.350	150	
S19	66.250	1.655	Open Manhole	1500	8.002	64.595	375	8.001	64.820	150	
S20	66.300	1.820	Open Manhole	1500	8.003	64.480	375	8.002	64.480	375	
S21	66.350	1.450	Open Manhole	460	9.000	64.900	150				
S22	66.350	1.700	Open Manhole	460	9.001	64.650	150	9.000	64.650	150	
S23	66.400	2.015	Open Manhole	1500	8.004	64.385	375	8.003	64.385	375	
								9.001	64.610	150	
S24	66.750	2.470	Open Manhole	1500	1.008	64.280	375	1.007	64.280	375	
								8.004	64.280	375	
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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)
8.004	o	375	S23	66.400	64.385	1.640	Open Manhole	1500
1.008	o	375	S24	66.750	64.280	2.095	Open Manhole	1500
1.009	o	150	S25/FC	66.200	64.260	1.790	Open Manhole	1500

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)
8.004	16.050	152.9	S24	66.750	64.280	2.095	Open Manhole	1500
1.008	3.000	150.0	S25/FC	66.200	64.260	1.565	Open Manhole	1500
1.009	8.750	21.3	S26	65.560	63.850	1.750	Open Manhole	1500

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)
1.009	S26	65.750	63.850	0.000	1500	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	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)	4320
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 FEH

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Synthetic Rainfall Details Return Period (years) FEH Rainfall Version Site Location Data Type Summer Storms Winter Storms Cv (Summer) Cv (Winter) Storm Duration (mins) 2 2013 GB 388687 395445 SJ 88687 95445 Point No Yes 0.750 0.950 15		
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Online Controls for Storm Hydro-Brake® Optimum Manhole: S25/FC, DS/PN: 1.009, Volume (m³): 3.6 Unit Reference MD-SHE-0103-5000-1200-5000 Design Head (m)1.200 Design Flow (l/s)5.0 Flush-Flo™Calculated ObjectiveMinimise upstream storage ApplicationSurface Sump AvailableYes Diameter (mm)103 Invert Level (m)64.260 Minimum Outlet Pipe Diameter (mm)150 Suggested Manhole Diameter (mm)1200 <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>1.200</td><td>5.0</td><td>Kick-Flo®</td><td>0.745</td><td>4.0</td></tr><tr><td>Flush-Flo™</td><td>0.354</td><td>5.0</td><td>Mean Flow over Head Range</td><td>-</td><td>4.4</td></tr></table> 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 <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>3.4</td><td>1.200</td><td>5.0</td><td>3.000</td><td>7.7</td><td>7.000</td><td>11.5</td></tr><tr><td>0.200</td><td>4.7</td><td>1.400</td><td>5.4</td><td>3.500</td><td>8.3</td><td>7.500</td><td>11.8</td></tr><tr><td>0.300</td><td>5.0</td><td>1.600</td><td>5.7</td><td>4.000</td><td>8.8</td><td>8.000</td><td>12.2</td></tr><tr><td>0.400</td><td>5.0</td><td>1.800</td><td>6.0</td><td>4.500</td><td>9.3</td><td>8.500</td><td>12.6</td></tr><tr><td>0.500</td><td>4.9</td><td>2.000</td><td>6.3</td><td>5.000</td><td>9.8</td><td>9.000</td><td>12.9</td></tr><tr><td>0.600</td><td>4.7</td><td>2.200</td><td>6.6</td><td>5.500</td><td>10.2</td><td>9.500</td><td>13.3</td></tr><tr><td>0.800</td><td>4.1</td><td>2.400</td><td>6.9</td><td>6.000</td><td>10.7</td><td></td><td></td></tr><tr><td>1.000</td><td>4.6</td><td>2.600</td><td>7.2</td><td>6.500</td><td>11.1</td><td></td><td></td></tr></table> <tr><td colspan="3">©1982-2020 Innovyze</td></tr>			Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.200	5.0	Kick-Flo®	0.745	4.0	Flush-Flo™	0.354	5.0	Mean Flow over Head Range	-	4.4	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	3.4	1.200	5.0	3.000	7.7	7.000	11.5	0.200	4.7	1.400	5.4	3.500	8.3	7.500	11.8	0.300	5.0	1.600	5.7	4.000	8.8	8.000	12.2	0.400	5.0	1.800	6.0	4.500	9.3	8.500	12.6	0.500	4.9	2.000	6.3	5.000	9.8	9.000	12.9	0.600	4.7	2.200	6.6	5.500	10.2	9.500	13.3	0.800	4.1	2.400	6.9	6.000	10.7			1.000	4.6	2.600	7.2	6.500	11.1			©1982-2020 Innovyze		
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Storage Structures for Storm Cellular Storage Manhole: S25/FC, DS/PN: 1.009 Invert Level (m) 64.270 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>170.0</td><td>0.0</td><td>1.300</td><td>0.0</td><td>0.0</td></tr><tr><td>0.100</td><td>170.0</td><td>0.0</td><td>1.400</td><td>0.0</td><td>0.0</td></tr><tr><td>0.200</td><td>170.0</td><td>0.0</td><td>1.500</td><td>0.0</td><td>0.0</td></tr><tr><td>0.300</td><td>170.0</td><td>0.0</td><td>1.600</td><td>0.0</td><td>0.0</td></tr><tr><td>0.400</td><td>170.0</td><td>0.0</td><td>1.700</td><td>0.0</td><td>0.0</td></tr><tr><td>0.500</td><td>170.0</td><td>0.0</td><td>1.800</td><td>0.0</td><td>0.0</td></tr><tr><td>0.600</td><td>170.0</td><td>0.0</td><td>1.900</td><td>0.0</td><td>0.0</td></tr><tr><td>0.700</td><td>170.0</td><td>0.0</td><td>2.000</td><td>0.0</td><td>0.0</td></tr><tr><td>0.800</td><td>170.0</td><td>0.0</td><td>2.100</td><td>0.0</td><td>0.0</td></tr><tr><td>0.900</td><td>170.0</td><td>0.0</td><td>2.200</td><td>0.0</td><td>0.0</td></tr><tr><td>1.000</td><td>170.0</td><td>0.0</td><td>2.300</td><td>0.0</td><td>0.0</td></tr><tr><td>1.100</td><td>170.0</td><td>0.0</td><td>2.400</td><td>0.0</td><td>0.0</td></tr><tr><td>1.200</td><td>0.0</td><td>0.0</td><td>2.500</td><td>0.0</td><td>0.0</td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	170.0	0.0	1.300	0.0	0.0	0.100	170.0	0.0	1.400	0.0	0.0	0.200	170.0	0.0	1.500	0.0	0.0	0.300	170.0	0.0	1.600	0.0	0.0	0.400	170.0	0.0	1.700	0.0	0.0	0.500	170.0	0.0	1.800	0.0	0.0	0.600	170.0	0.0	1.900	0.0	0.0	0.700	170.0	0.0	2.000	0.0	0.0	0.800	170.0	0.0	2.100	0.0	0.0	0.900	170.0	0.0	2.200	0.0	0.0	1.000	170.0	0.0	2.300	0.0	0.0	1.100	170.0	0.0	2.400	0.0	0.0	1.200	0.0	0.0	2.500	0.0	0.0
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<u>Volume Summary (Static)</u>					
Length Calculations based on Centre-Centre					
Pipe	USMH	Manhole	Pipe	Storage	Total
Number	Name	Volume (m³)	Volume (m³)	Structure Volume (m³)	Volume (m³)
1.000	S1	0.013	0.166	0.000	0.179
1.001	S2	0.145	0.194	0.000	0.339
2.000	S3	0.013	0.166	0.000	0.179
1.002	S4	0.168	0.286	0.000	0.454
3.000	S5	0.013	0.168	0.000	0.181
1.003	S6	0.259	0.262	0.000	0.521
4.000	S7	0.024	0.168	0.000	0.192
5.000	S8	0.125	0.168	0.000	0.293
5.001	S9	0.145	0.261	0.000	0.406
1.004	S10	2.819	0.110	0.000	2.929
6.000	S11	2.456	3.485	0.000	5.941
1.005	S12	3.358	2.010	0.000	5.368
7.000	S13	0.125	0.277	0.000	0.402
7.001	S14	0.157	0.316	0.000	0.473
7.002	S15	0.337	0.098	0.000	0.435
1.006	JCT	0.000	1.872	0.000	1.872
1.007	S16	4.126	0.503	0.000	4.629
8.000	S17	0.125	0.350	0.000	0.475
8.001	S18	0.166	0.260	0.000	0.426
8.002	S19	2.925	1.933	0.000	4.857
8.003	S20	3.216	1.585	0.000	4.801
9.000	S21	0.241	0.352	0.000	0.593
9.001	S22	0.283	0.060	0.000	0.343
8.004	S23	3.561	1.773	0.000	5.333
1.008	S24	4.365	0.331	0.000	4.696
1.009	S25/FC	3.428	0.155	183.033	186.616
Total		32.592	17.308	183.033	232.933
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<u>Volume Summary (Static)</u> Length Calculations based on True Length <table><thead><tr><th>Pipe Number</th><th>USMH Name</th><th>Manhole Volume (m³)</th><th>Pipe Volume (m³)</th><th>Storage Structure Volume (m³)</th><th>Total Volume (m³)</th></tr></thead><tbody><tr><td>1.000</td><td>S1</td><td>0.013</td><td>0.161</td><td>0.000</td><td>0.174</td></tr><tr><td>1.001</td><td>S2</td><td>0.145</td><td>0.186</td><td>0.000</td><td>0.331</td></tr><tr><td>2.000</td><td>S3</td><td>0.013</td><td>0.161</td><td>0.000</td><td>0.174</td></tr><tr><td>1.002</td><td>S4</td><td>0.168</td><td>0.278</td><td>0.000</td><td>0.446</td></tr><tr><td>3.000</td><td>S5</td><td>0.013</td><td>0.162</td><td>0.000</td><td>0.176</td></tr><tr><td>1.003</td><td>S6</td><td>0.259</td><td>0.244</td><td>0.000</td><td>0.503</td></tr><tr><td>4.000</td><td>S7</td><td>0.024</td><td>0.153</td><td>0.000</td><td>0.177</td></tr><tr><td>5.000</td><td>S8</td><td>0.125</td><td>0.160</td><td>0.000</td><td>0.284</td></tr><tr><td>5.001</td><td>S9</td><td>0.145</td><td>0.243</td><td>0.000</td><td>0.389</td></tr><tr><td>1.004</td><td>S10</td><td>2.819</td><td>0.084</td><td>0.000</td><td>2.903</td></tr><tr><td>6.000</td><td>S11</td><td>2.456</td><td>3.319</td><td>0.000</td><td>5.775</td></tr><tr><td>1.005</td><td>S12</td><td>3.358</td><td>1.927</td><td>0.000</td><td>5.285</td></tr><tr><td>7.000</td><td>S13</td><td>0.125</td><td>0.269</td><td>0.000</td><td>0.394</td></tr><tr><td>7.001</td><td>S14</td><td>0.157</td><td>0.308</td><td>0.000</td><td>0.465</td></tr><tr><td>7.002</td><td>S15</td><td>0.337</td><td>0.094</td><td>0.000</td><td>0.431</td></tr><tr><td>1.006</td><td>JCT</td><td>0.000</td><td>1.789</td><td>0.000</td><td>1.789</td></tr><tr><td>1.007</td><td>S16</td><td>4.126</td><td>0.337</td><td>0.000</td><td>4.463</td></tr><tr><td>8.000</td><td>S17</td><td>0.125</td><td>0.342</td><td>0.000</td><td>0.466</td></tr><tr><td>8.001</td><td>S18</td><td>0.166</td><td>0.242</td><td>0.000</td><td>0.409</td></tr><tr><td>8.002</td><td>S19</td><td>2.925</td><td>1.767</td><td>0.000</td><td>4.692</td></tr><tr><td>8.003</td><td>S20</td><td>3.216</td><td>1.419</td><td>0.000</td><td>4.635</td></tr><tr><td>9.000</td><td>S21</td><td>0.241</td><td>0.344</td><td>0.000</td><td>0.585</td></tr><tr><td>9.001</td><td>S22</td><td>0.283</td><td>0.043</td><td>0.000</td><td>0.325</td></tr><tr><td>8.004</td><td>S23</td><td>3.561</td><td>1.607</td><td>0.000</td><td>5.168</td></tr><tr><td>1.008</td><td>S24</td><td>4.365</td><td>0.166</td><td>0.000</td><td>4.531</td></tr><tr><td>1.009</td><td>S25/FC</td><td>3.428</td><td>0.128</td><td>183.033</td><td>186.590</td></tr><tr><td colspan="2">Total</td><td>32.592</td><td>15.934</td><td>183.033</td><td>231.559</td></tr></tbody></table>						Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)	1.000	S1	0.013	0.161	0.000	0.174	1.001	S2	0.145	0.186	0.000	0.331	2.000	S3	0.013	0.161	0.000	0.174	1.002	S4	0.168	0.278	0.000	0.446	3.000	S5	0.013	0.162	0.000	0.176	1.003	S6	0.259	0.244	0.000	0.503	4.000	S7	0.024	0.153	0.000	0.177	5.000	S8	0.125	0.160	0.000	0.284	5.001	S9	0.145	0.243	0.000	0.389	1.004	S10	2.819	0.084	0.000	2.903	6.000	S11	2.456	3.319	0.000	5.775	1.005	S12	3.358	1.927	0.000	5.285	7.000	S13	0.125	0.269	0.000	0.394	7.001	S14	0.157	0.308	0.000	0.465	7.002	S15	0.337	0.094	0.000	0.431	1.006	JCT	0.000	1.789	0.000	1.789	1.007	S16	4.126	0.337	0.000	4.463	8.000	S17	0.125	0.342	0.000	0.466	8.001	S18	0.166	0.242	0.000	0.409	8.002	S19	2.925	1.767	0.000	4.692	8.003	S20	3.216	1.419	0.000	4.635	9.000	S21	0.241	0.344	0.000	0.585	9.001	S22	0.283	0.043	0.000	0.325	8.004	S23	3.561	1.607	0.000	5.168	1.008	S24	4.365	0.166	0.000	4.531	1.009	S25/FC	3.428	0.128	183.033	186.590	Total		32.592	15.934	183.033	231.559
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4 Market Square Old Amersham Buckinghamshire, HP7 0DQ	Levenshulme Road Surface Water Network Calculations	
Date 09/09/2024	Designed by MDS	
File SW Network Calcualtions ...	Checked by MDS	
Innovyze	Network 2020.1.3	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	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)	4320
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	FEH
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	30

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Date 09/09/2024	Designed by MDS	
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Buckinghamshire, HP7 0DQ	Network Calculations	
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File SW Network Calcualtions ...	Checked by MDS	
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	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)	4320
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	4

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	FEH
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	120

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Date 09/09/2024	Designed by MDS																					
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Date 09/09/2024	Designed by MDS	
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Innovyze	Network 2020.1.3	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	40.000
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)	4320
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	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	30

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	40.000
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)	4320
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	2

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
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Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	60

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Date 09/09/2024	Designed by MDS	
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Innovyze	Network 2020.1.3	

Summary of Results for 60 minute 30 year Winter (Storm)

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

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PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m ³)		Time (mins)	Flow (l/s)	
1.000	S1	65.633	-0.117	0.000	0.11		2.0	OK
1.001	S2	65.518	-0.112	0.000	0.14		2.6	OK
2.000	S3	65.627	-0.123	0.000	0.08		2.0	OK
1.002	S4	65.391	-0.099	0.000	0.25		4.5	OK
3.000	S5	65.970	-0.130	0.000	0.04		2.0	OK
1.003	S6	65.207	-0.083	0.000	0.40		7.4	OK
4.000	S7	65.300	-0.120	0.000	0.09		2.6	OK
5.000	S8	65.833	-0.117	0.000	0.11		2.0	OK
5.001	S9	65.703	-0.122	0.000	0.08		2.9	OK
1.004	S10	65.065	-0.040	0.000	0.88		14.8	OK
6.000	S11	64.928	-0.307	0.000	0.07		10.8	OK
1.005	S12	64.881	-0.144	0.000	0.24		31.6	OK
7.000	S13	65.637	-0.113	0.000	0.14		2.6	OK
7.001	S14	65.447	-0.108	0.000	0.17		5.2	OK
7.002	S15	64.883	-0.092	0.000	0.31		5.1	OK
1.006	JCT	64.879	-0.026	0.000	0.32		42.0	OK*
1.007	S16	64.877	0.087	0.000	0.29		41.7	SURCHARGED
8.000	S17	65.645	-0.105	0.000	0.20		3.7	OK
8.001	S18	65.400	-0.100	0.000	0.24		7.4	OK
8.002	S19	64.880	-0.090	0.000	0.12		16.1	OK
8.003	S20	64.879	0.024	0.000	0.14		17.2	SURCHARGED
9.000	S21	64.950	-0.100	0.000	0.24		4.5	OK
9.001	S22	64.879	0.079	0.000	0.75		9.4	SURCHARGED
8.004	S23	64.878	0.118	0.000	0.26		33.6	SURCHARGED
1.008	S24	64.877	0.222	0.000	0.93		77.0	SURCHARGED
1.009	S25/FC	64.876	0.466	0.000	0.14	230	4.8	SURCHARGED

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Innovyze	Network 2020.1.3	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	40.000
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)	4320
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	4

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	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	120

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4 Market Square Old Amersham Buckinghamshire, HP7 0DQ	Levenshulme Road Surface Water Network Calculations	
Date 09/09/2024	Designed by MDS	
File SW Network Calcualtions ...	Checked by MDS	
Innovyze	Network 2020.1.3	
<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.950 Additional Flow - % of Total Flow 40.000 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) 4320 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 4 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 FEH Return Period (years) 30 FEH Rainfall Version 2013 Site Location GB 388687 395445 SJ 88687 95445 Data Type Point Summer Storms No Winter Storms Yes Cv (Summer) 0.750 Cv (Winter) 0.950 Storm Duration (mins) 240		
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Innovyze	Network 2020.1.3	
<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.950 Additional Flow - % of Total Flow 40.000 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) 4320 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 6 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 FEH Return Period (years) 30 FEH Rainfall Version 2013 Site Location GB 388687 395445 SJ 88687 95445 Data Type Point Summer Storms No Winter Storms Yes Cv (Summer) 0.750 Cv (Winter) 0.950 Storm Duration (mins) 360		
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	40.000
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)	4320
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	12

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	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	720

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<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.950 Additional Flow - % of Total Flow 40.000 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) 4320 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 24 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 FEH Return Period (years) 30 FEH Rainfall Version 2013 Site Location GB 388687 395445 SJ 88687 95445 Data Type Point Summer Storms No Winter Storms Yes Cv (Summer) 0.750 Cv (Winter) 0.950 Storm Duration (mins) 1440		
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Micro
Drainage

Summary of Results for 1440 minute 30 year Winter (Storm)

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

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m³)		Time (mins)	Flow (l/s)	
1.000	S1	65.608	-0.142	0.000	0.01		0.2	OK
1.001	S2	65.490	-0.140	0.000	0.01		0.3	OK
2.000	S3	65.605	-0.145	0.000	0.01		0.2	OK
1.002	S4	65.356	-0.134	0.000	0.02		0.5	OK
3.000	S5	65.953	-0.147	0.000	0.00		0.2	OK
1.003	S6	65.159	-0.131	0.000	0.04		0.7	OK
4.000	S7	65.276	-0.144	0.000	0.01		0.3	OK
5.000	S8	65.808	-0.142	0.000	0.01		0.2	OK
5.001	S9	65.681	-0.144	0.000	0.01		0.3	OK
1.004	S10	64.985	-0.120	0.000	0.09		1.5	OK
6.000	S11	64.873	-0.362	0.000	0.01		1.1	OK
1.005	S12	64.699	-0.326	0.000	0.02		3.1	OK
7.000	S13	65.610	-0.140	0.000	0.01		0.3	OK
7.001	S14	65.417	-0.138	0.000	0.02		0.5	OK
7.002	S15	64.842	-0.133	0.000	0.03		0.5	OK
1.006	JCT	64.693	-0.212	0.000	0.03		4.2	OK*
1.007	S16	64.692	-0.098	0.000	0.03		4.3	OK
8.000	S17	65.614	-0.136	0.000	0.02		0.4	OK
8.001	S18	65.366	-0.134	0.000	0.02		0.7	OK
8.002	S19	64.693	-0.277	0.000	0.01		1.6	OK
8.003	S20	64.693	-0.162	0.000	0.01		1.8	OK
9.000	S21	64.916	-0.134	0.000	0.02		0.5	OK
9.001	S22	64.693	-0.107	0.000	0.07		0.9	OK
8.004	S23	64.692	-0.068	0.000	0.03		3.5	OK
1.008	S24	64.691	0.036	0.000	0.10		8.0	SURCHARGED
1.009	S25/FC	64.691	0.281	0.000	0.14	336	4.8	SURCHARGED

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4 Market Square Old Amersham Buckinghamshire, HP7 0DQ	Levenshulme Road Surface Water Network Calculations	
Date 09/09/2024	Designed by MDS	
File SW Network Calcualtions ...	Checked by MDS	
Innovyze	Network 2020.1.3	
<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.950 Additional Flow - % of Total Flow 45.000 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) 4320 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 <u>Synthetic Rainfall Details</u> Rainfall Model FEH Return Period (years) 100 FEH Rainfall Version 2013 Site Location GB 388687 395445 SJ 88687 95445 Data Type Point Summer Storms No Winter Storms Yes Cv (Summer) 0.750 Cv (Winter) 0.950 Storm Duration (mins) 15		
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	45.000
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)	4320
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	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	30

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	45.000
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)	4320
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	2

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	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	60

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	45.000
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)	4320
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	4

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	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	120

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Simulation Criteria for Storm

Volumetric Runoff Coeff 0.950	Additional Flow - % of Total Flow 45.000	
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) 4320	
Foul Sewage per hectare (l/s) 0.000	Output Interval (mins) 4	

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	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	240

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.950	Additional Flow - % of Total Flow	45.000
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)	4320
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	6

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	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 388687 395445 SJ 88687 95445
Data Type	Point
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.950
Storm Duration (mins)	360

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Summary of Results for 360 minute 100 year Winter (Storm)

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

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Half Drain	Pipe	Status
		Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)	
1.000	S1	65.620	-0.130	0.000	0.04			0.8	OK
1.001	S2	65.503	-0.127	0.000	0.06			1.0	OK
2.000	S3	65.617	-0.133	0.000	0.03			0.8	OK
1.002	S4	65.371	-0.119	0.000	0.10			1.8	OK
3.000	S5	65.962	-0.138	0.000	0.02			0.8	OK
1.003	S6	65.365	0.075	0.000	0.16			2.9	SURCHARGED
4.000	S7	65.363	-0.057	0.000	0.03			1.0	OK
5.000	S8	65.820	-0.130	0.000	0.04			0.8	OK
5.001	S9	65.692	-0.133	0.000	0.03			1.1	OK
1.004	S10	65.363	0.258	0.000	0.34			5.8	SURCHARGED
6.000	S11	65.361	0.126	0.000	0.03			4.2	SURCHARGED
1.005	S12	65.361	0.336	0.000	0.08			11.1	SURCHARGED
7.000	S13	65.623	-0.127	0.000	0.05			1.0	OK
7.001	S14	65.430	-0.125	0.000	0.07			2.0	OK
7.002	S15	65.361	0.386	0.000	0.12			2.0	SURCHARGED
1.006	JCT	64.905	0.000	0.000	0.11			14.4	SURCHARGED*
1.007	S16	65.359	0.569	0.000	0.10			14.5	SURCHARGED
8.000	S17	65.628	-0.122	0.000	0.08			1.5	OK
8.001	S18	65.381	-0.119	0.000	0.09			2.9	OK
8.002	S19	65.360	0.390	0.000	0.04			5.9	SURCHARGED
8.003	S20	65.360	0.505	0.000	0.05			6.3	SURCHARGED
9.000	S21	65.361	0.311	0.000	0.10			1.8	SURCHARGED
9.001	S22	65.360	0.560	0.000	0.28			3.4	SURCHARGED
8.004	S23	65.359	0.599	0.000	0.10			12.7	SURCHARGED
1.008	S24	65.358	0.703	0.000	0.34			28.3	SURCHARGED
1.009	S25/FC	65.357	0.947	0.000	0.14		414	4.8	SURCHARGED

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Storage Structures for Storm

Cellular Storage Manhole: S25/FC, DS/PN: 1.009

Invert Level (m) 64.270 Safety Factor 2.0

Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95

Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	170.0	0.0	1.300	0.0	0.0
0.100	170.0	0.0	1.400	0.0	0.0
0.200	170.0	0.0	1.500	0.0	0.0
0.300	170.0	0.0	1.600	0.0	0.0
0.400	170.0	0.0	1.700	0.0	0.0
0.500	170.0	0.0	1.800	0.0	0.0
0.600	170.0	0.0	1.900	0.0	0.0
0.700	170.0	0.0	2.000	0.0	0.0
0.800	170.0	0.0	2.100	0.0	0.0
0.900	170.0	0.0	2.200	0.0	0.0
1.000	170.0	0.0	2.300	0.0	0.0
1.100	170.0	0.0	2.400	0.0	0.0
1.200	0.0	0.0	2.500	0.0	0.0

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<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.950 Additional Flow - % of Total Flow 45.000 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) 4320 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 24 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 FEH Return Period (years) 100 FEH Rainfall Version 2013 Site Location GB 388687 395445 SJ 88687 95445 Data Type Point Summer Storms No Winter Storms Yes Cv (Summer) 0.750 Cv (Winter) 0.950 Storm Duration (mins) 1440		
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