

Betts Associates Ltd				Page 1																																																																																																																																																																																																																			
Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY		Old Foundry Wrexham SG Estates																																																																																																																																																																																																																					
Date 11.11.14 File SA04.srcx		Designed by SR Checked by RA																																																																																																																																																																																																																					
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Summary of Results for 100 year Return Period (+30%) Half Drain Time : 39 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>106.721</td><td>1.143</td><td>1.5</td><td>4.5</td><td>0 K</td></tr><tr><td>30 min Summer</td><td>107.046</td><td>1.468</td><td>1.7</td><td>5.8</td><td>0 K</td></tr><tr><td>60 min Summer</td><td>107.248</td><td>1.670</td><td>1.9</td><td>6.6</td><td>0 K</td></tr><tr><td>120 min Summer</td><td>107.299</td><td>1.721</td><td>1.9</td><td>6.8</td><td>0 K</td></tr><tr><td>180 min Summer</td><td>107.227</td><td>1.649</td><td>1.9</td><td>6.5</td><td>0 K</td></tr><tr><td>240 min Summer</td><td>107.131</td><td>1.553</td><td>1.8</td><td>6.2</td><td>0 K</td></tr><tr><td>360 min Summer</td><td>106.953</td><td>1.375</td><td>1.7</td><td>5.5</td><td>0 K</td></tr><tr><td>480 min Summer</td><td>106.801</td><td>1.223</td><td>1.5</td><td>4.9</td><td>0 K</td></tr><tr><td>600 min Summer</td><td>106.671</td><td>1.093</td><td>1.4</td><td>4.3</td><td>0 K</td></tr><tr><td>720 min Summer</td><td>106.559</td><td>0.981</td><td>1.3</td><td>3.9</td><td>0 K</td></tr><tr><td>960 min Summer</td><td>106.376</td><td>0.798</td><td>1.2</td><td>3.2</td><td>0 K</td></tr><tr><td>1440 min Summer</td><td>106.119</td><td>0.541</td><td>1.0</td><td>2.1</td><td>0 K</td></tr><tr><td>2160 min Summer</td><td>105.882</td><td>0.304</td><td>0.8</td><td>1.2</td><td>0 K</td></tr><tr><td>2880 min Summer</td><td>105.735</td><td>0.157</td><td>0.7</td><td>0.6</td><td>0 K</td></tr><tr><td>4320 min Summer</td><td>105.624</td><td>0.046</td><td>0.5</td><td>0.2</td><td>0 K</td></tr><tr><td>5760 min Summer</td><td>105.615</td><td>0.037</td><td>0.4</td><td>0.1</td><td>0 K</td></tr><tr><td>7200 min Summer</td><td>105.609</td><td>0.031</td><td>0.4</td><td>0.1</td><td>0 K</td></tr><tr><td>8640 min Summer</td><td>105.605</td><td>0.027</td><td>0.3</td><td>0.1</td><td>0 K</td></tr><tr><td>10080 min Summer</td><td>105.602</td><td>0.024</td><td>0.3</td><td>0.1</td><td>0 K</td></tr><tr><td>15 min Winter</td><td>106.872</td><td>1.294</td><td>1.6</td><td>5.1</td><td>0 K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>102.843</td><td>0.0</td><td>22</td></tr><tr><td>30 min Summer</td><td>71.174</td><td>0.0</td><td>32</td></tr><tr><td>60 min Summer</td><td>47.182</td><td>0.0</td><td>50</td></tr><tr><td>120 min Summer</td><td>30.215</td><td>0.0</td><td>84</td></tr><tr><td>180 min Summer</td><td>22.902</td><td>0.0</td><td>118</td></tr><tr><td>240 min Summer</td><td>18.651</td><td>0.0</td><td>152</td></tr><tr><td>360 min Summer</td><td>13.921</td><td>0.0</td><td>216</td></tr><tr><td>480 min Summer</td><td>11.303</td><td>0.0</td><td>280</td></tr><tr><td>600 min Summer</td><td>9.607</td><td>0.0</td><td>342</td></tr><tr><td>720 min Summer</td><td>8.406</td><td>0.0</td><td>404</td></tr><tr><td>960 min Summer</td><td>6.800</td><td>0.0</td><td>528</td></tr><tr><td>1440 min Summer</td><td>5.032</td><td>0.0</td><td>770</td></tr><tr><td>2160 min Summer</td><td>3.713</td><td>0.0</td><td>1128</td></tr><tr><td>2880 min Summer</td><td>2.987</td><td>0.0</td><td>1480</td></tr><tr><td>4320 min Summer</td><td>2.194</td><td>0.0</td><td>2200</td></tr><tr><td>5760 min Summer</td><td>1.763</td><td>0.0</td><td>2920</td></tr><tr><td>7200 min Summer</td><td>1.489</td><td>0.0</td><td>3600</td></tr><tr><td>8640 min Summer</td><td>1.298</td><td>0.0</td><td>4368</td></tr><tr><td>10080 min Summer</td><td>1.155</td><td>0.0</td><td>4992</td></tr><tr><td>15 min Winter</td><td>102.843</td><td>0.0</td><td>22</td></tr></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	106.721	1.143	1.5	4.5	0 K	30 min Summer	107.046	1.468	1.7	5.8	0 K	60 min Summer	107.248	1.670	1.9	6.6	0 K	120 min Summer	107.299	1.721	1.9	6.8	0 K	180 min Summer	107.227	1.649	1.9	6.5	0 K	240 min Summer	107.131	1.553	1.8	6.2	0 K	360 min Summer	106.953	1.375	1.7	5.5	0 K	480 min Summer	106.801	1.223	1.5	4.9	0 K	600 min Summer	106.671	1.093	1.4	4.3	0 K	720 min Summer	106.559	0.981	1.3	3.9	0 K	960 min Summer	106.376	0.798	1.2	3.2	0 K	1440 min Summer	106.119	0.541	1.0	2.1	0 K	2160 min Summer	105.882	0.304	0.8	1.2	0 K	2880 min Summer	105.735	0.157	0.7	0.6	0 K	4320 min Summer	105.624	0.046	0.5	0.2	0 K	5760 min Summer	105.615	0.037	0.4	0.1	0 K	7200 min Summer	105.609	0.031	0.4	0.1	0 K	8640 min Summer	105.605	0.027	0.3	0.1	0 K	10080 min Summer	105.602	0.024	0.3	0.1	0 K	15 min Winter	106.872	1.294	1.6	5.1	0 K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	102.843	0.0	22	30 min Summer	71.174	0.0	32	60 min Summer	47.182	0.0	50	120 min Summer	30.215	0.0	84	180 min Summer	22.902	0.0	118	240 min Summer	18.651	0.0	152	360 min Summer	13.921	0.0	216	480 min Summer	11.303	0.0	280	600 min Summer	9.607	0.0	342	720 min Summer	8.406	0.0	404	960 min Summer	6.800	0.0	528	1440 min Summer	5.032	0.0	770	2160 min Summer	3.713	0.0	1128	2880 min Summer	2.987	0.0	1480	4320 min Summer	2.194	0.0	2200	5760 min Summer	1.763	0.0	2920	7200 min Summer	1.489	0.0	3600	8640 min Summer	1.298	0.0	4368	10080 min Summer	1.155	0.0	4992	15 min Winter	102.843	0.0	22
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Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY		Old Foundry Wrexham SG Estates				
Date 11.11.14 File SA04.srcx		Designed by SR Checked by RA				
Micro Drainage		Source Control 2014.1.1				
Summary of Results for 100 year Return Period (+30%)						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
30 min Winter	107.244	1.666	1.9	6.6	0 K	
60 min Winter	107.468	1.890	2.1	7.5	0 K	
120 min Winter	107.482	1.904	2.1	7.6	0 K	
180 min Winter	107.352	1.774	2.0	7.0	0 K	
240 min Winter	107.197	1.619	1.9	6.4	0 K	
360 min Winter	106.935	1.357	1.6	5.4	0 K	
480 min Winter	106.727	1.149	1.5	4.6	0 K	
600 min Winter	106.557	0.979	1.3	3.9	0 K	
720 min Winter	106.417	0.839	1.2	3.3	0 K	
960 min Winter	106.202	0.624	1.1	2.5	0 K	
1440 min Winter	105.923	0.345	0.8	1.4	0 K	
2160 min Winter	105.689	0.111	0.6	0.4	0 K	
2880 min Winter	105.623	0.045	0.5	0.2	0 K	
4320 min Winter	105.611	0.033	0.4	0.1	0 K	
5760 min Winter	105.605	0.027	0.3	0.1	0 K	
7200 min Winter	105.601	0.023	0.3	0.1	0 K	
8640 min Winter	105.598	0.020	0.2	0.1	0 K	
10080 min Winter	105.596	0.018	0.2	0.1	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
30 min Winter	71.174	0.0	33			
60 min Winter	47.182	0.0	52			
120 min Winter	30.215	0.0	90			
180 min Winter	22.902	0.0	126			
240 min Winter	18.651	0.0	160			
360 min Winter	13.921	0.0	228			
480 min Winter	11.303	0.0	292			
600 min Winter	9.607	0.0	356			
720 min Winter	8.406	0.0	418			
960 min Winter	6.800	0.0	542			
1440 min Winter	5.032	0.0	786			
2160 min Winter	3.713	0.0	1136			
2880 min Winter	2.987	0.0	1464			
4320 min Winter	2.194	0.0	2176			
5760 min Winter	1.763	0.0	2952			
7200 min Winter	1.489	0.0	3648			
8640 min Winter	1.298	0.0	4296			
10080 min Winter	1.155	0.0	4968			
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Micro Drainage		Source Control 2014.1.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Shortest Storm (mins)	15
Ratio R	0.296	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.030

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.010	4 8	0.010	8 12	0.010

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Micro Drainage Source Control 2014.1.1																						
<u>Model Details</u> Storage is Online Cover Level (m) 108.200 <u>Lined Soakaway Structure</u> <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.54000</td> <td>Ring Diameter (m)</td> <td>1.80</td> </tr> <tr> <td>Infiltration Coefficient Side (m/hr)</td> <td>0.54000</td> <td>Pit Multiplier</td> <td>1.5</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Number Required</td> <td>1</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Cap Volume Depth (m)</td> <td>0.000</td> </tr> <tr> <td>Invert Level (m)</td> <td>105.578</td> <td>Cap Infiltration Depth (m)</td> <td>0.000</td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.54000	Ring Diameter (m)	1.80	Infiltration Coefficient Side (m/hr)	0.54000	Pit Multiplier	1.5	Safety Factor	2.0	Number Required	1	Porosity	0.30	Cap Volume Depth (m)	0.000	Invert Level (m)	105.578	Cap Infiltration Depth (m)	0.000
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