



Clarke Nicholls Marcel		Page 0
Glen House 22-24 Glenthorne Road Hammersmith W6 ONG	150 Holborn Residential Roof	
Date 07/09/2016 13:50 File 1 in 100 + 30 year res...	Designed by Alan Yan Checked by Mark Stanton	
Micro Drainage		Source Control 2015.1

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 79 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	0.038	0.038	0.0	0.4	0.4	3.0	O K
30 min Summer	0.046	0.046	0.0	0.6	0.6	3.7	O K
60 min Summer	0.051	0.051	0.0	0.7	0.7	4.1	O K
120 min Summer	0.053	0.053	0.0	0.7	0.7	4.3	O K
180 min Summer	0.053	0.053	0.0	0.7	0.7	4.3	O K
240 min Summer	0.051	0.051	0.0	0.7	0.7	4.2	O K
360 min Summer	0.048	0.048	0.0	0.6	0.6	3.9	O K
480 min Summer	0.045	0.045	0.0	0.6	0.6	3.7	O K
600 min Summer	0.043	0.043	0.0	0.5	0.5	3.5	O K
720 min Summer	0.041	0.041	0.0	0.5	0.5	3.3	O K
960 min Summer	0.037	0.037	0.0	0.4	0.4	3.0	O K
1440 min Summer	0.033	0.033	0.0	0.4	0.4	2.6	O K
2160 min Summer	0.028	0.028	0.0	0.3	0.3	2.3	O K
2880 min Summer	0.025	0.025	0.0	0.2	0.2	2.0	O K
4320 min Summer	0.021	0.021	0.0	0.2	0.2	1.7	O K
5760 min Summer	0.019	0.019	0.0	0.1	0.1	1.5	O K
7200 min Summer	0.017	0.017	0.0	0.1	0.1	1.4	O K
8640 min Summer	0.016	0.016	0.0	0.1	0.1	1.3	O K
10080 min Summer	0.015	0.015	0.0	0.1	0.1	1.2	O K
15 min Winter	0.042	0.042	0.0	0.5	0.5	3.4	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	135.934	0.0	3.1	23
30 min Summer	87.857	0.0	4.1	35
60 min Summer	54.012	0.0	5.2	54
120 min Summer	32.082	0.0	6.2	88
180 min Summer	23.356	0.0	6.7	120
240 min Summer	18.546	0.0	7.1	154
360 min Summer	13.362	0.0	7.7	220
480 min Summer	10.589	0.0	8.2	284
600 min Summer	8.835	0.0	8.5	344
720 min Summer	7.617	0.0	8.8	408
960 min Summer	6.024	0.0	9.3	530
1440 min Summer	4.321	0.0	10.0	772
2160 min Summer	3.096	0.0	10.8	1136
2880 min Summer	2.441	0.0	11.3	1504
4320 min Summer	1.745	0.0	12.1	2248
5760 min Summer	1.374	0.0	12.8	2944
7200 min Summer	1.141	0.0	13.3	3680
8640 min Summer	0.980	0.0	13.7	4408
10080 min Summer	0.861	0.0	14.0	5144
15 min Winter	135.934	0.0	3.5	23

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	0.051	0.051	0.0	0.7	0.7	4.2	O K
60 min Winter	0.057	0.057	0.0	0.8	0.8	4.6	O K
120 min Winter	0.058	0.058	0.0	0.8	0.8	4.7	O K
180 min Winter	0.056	0.056	0.0	0.7	0.7	4.6	O K
240 min Winter	0.054	0.054	0.0	0.7	0.7	4.4	O K
360 min Winter	0.049	0.049	0.0	0.6	0.6	4.0	O K
480 min Winter	0.045	0.045	0.0	0.6	0.6	3.6	O K
600 min Winter	0.042	0.042	0.0	0.5	0.5	3.4	O K
720 min Winter	0.039	0.039	0.0	0.5	0.5	3.2	O K
960 min Winter	0.035	0.035	0.0	0.4	0.4	2.8	O K
1440 min Winter	0.030	0.030	0.0	0.3	0.3	2.4	O K
2160 min Winter	0.025	0.025	0.0	0.2	0.2	2.0	O K
2880 min Winter	0.022	0.022	0.0	0.2	0.2	1.8	O K
4320 min Winter	0.019	0.019	0.0	0.1	0.1	1.5	O K
5760 min Winter	0.016	0.016	0.0	0.1	0.1	1.3	O K
7200 min Winter	0.015	0.015	0.0	0.1	0.1	1.2	O K
8640 min Winter	0.014	0.014	0.0	0.1	0.1	1.1	O K
10080 min Winter	0.013	0.013	0.0	0.1	0.1	1.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	87.857	0.0	4.6	35
60 min Winter	54.012	0.0	5.8	58
120 min Winter	32.082	0.0	6.9	92
180 min Winter	23.356	0.0	7.6	130
240 min Winter	18.546	0.0	8.0	164
360 min Winter	13.362	0.0	8.7	232
480 min Winter	10.589	0.0	9.1	296
600 min Winter	8.835	0.0	9.5	358
720 min Winter	7.617	0.0	9.9	420
960 min Winter	6.024	0.0	10.4	548
1440 min Winter	4.321	0.0	11.2	790
2160 min Winter	3.096	0.0	12.1	1148
2880 min Winter	2.441	0.0	12.7	1508
4320 min Winter	1.745	0.0	13.6	2208
5760 min Winter	1.374	0.0	14.4	3048
7200 min Winter	1.141	0.0	14.9	3760
8640 min Winter	0.980	0.0	15.3	4424
10080 min Winter	0.861	0.0	15.7	5256

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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)	20.500	Shortest Storm (mins)	15
Ratio R	0.437	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.013

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:
0	4	4	8	8	12
	0.004		0.004		0.004

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Model Details

Storage is Online Cover Level (m) 0.085

Cellular Storage Structure

Invert Level (m) 0.000 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 <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	85.0	0.0	0.085	85.0	0.0

Hydro-Brake Optimum® Outflow Control

Unit Reference MD-SHE-0055-1000-0400-1000  
 Design Head (m) 0.400  
 Design Flow (l/s) 1.0  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Diameter (mm) 55  
 Invert Level (m) 0.000  
 Minimum Outlet Pipe Diameter (mm) 75  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.400	1.0
Flush-Flo™	0.116	1.0
Kick-Flo®	0.271	0.8
Mean Flow over Head Range	-	0.8

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)
0.100	1.0	1.200	1.6	3.000	2.5	7.000	3.7
0.200	0.9	1.400	1.7	3.500	2.6	7.500	3.8
0.300	0.9	1.600	1.8	4.000	2.8	8.000	4.0
0.400	1.0	1.800	1.9	4.500	3.0	8.500	4.1
0.500	1.1	2.000	2.0	5.000	3.1	9.000	4.2
0.600	1.2	2.200	2.1	5.500	3.3	9.500	4.3
0.800	1.3	2.400	2.2	6.000	3.4		
1.000	1.5	2.600	2.3	6.500	3.6		