Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 259 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	115.934	0.184	0.0	1.0	1.0	14.4	O K
30 min Summer	115.988	0.238	0.0	1.0	1.0	18.7	O K
60 min Summer	116.038	0.288	0.0	1.0	1.0	22.6	O K
120 min Summer	116.074	0.324	0.0	1.0	1.0	25.4	O K
180 min Summer	116.084	0.334	0.0	1.0	1.0	26.2	O K
240 min Summer	116.081	0.331	0.0	1.0	1.0	26.0	O K
360 min Summer	116.069	0.319	0.0	1.0	1.0	25.0	O K
480 min Summer	116.057	0.307	0.0	1.0	1.0	24.0	O K
600 min Summer	116.043	0.293	0.0	1.0	1.0	23.0	O K
720 min Summer	116.029	0.279	0.0	1.0	1.0	21.9	O K
960 min Summer	116.002	0.252	0.0	1.0	1.0	19.7	O K
1440 min Summer	115.953	0.203	0.0	1.0	1.0	15.9	O K
2160 min Summer	115.896	0.146	0.0	1.0	1.0	11.4	O K
2880 min Summer	115.858	0.108	0.0	1.0	1.0	8.5	O K
4320 min Summer	115.822	0.072	0.0	0.9	0.9	5.6	O K
5760 min Summer	115.808	0.058	0.0	0.7	0.7	4.5	O K
7200 min Summer	115.800	0.050	0.0	0.6	0.6	3.9	O K
8640 min Summer	115.794	0.044	0.0	0.5	0.5	3.5	O K
10080 min Summer	115.791	0.041	0.0	0.5	0.5	3.2	O K
15 min Winter	115.957	0.207	0.0	1.0	1.0	16.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	134.489	0.0	15.2	25
30 min Summer	88.306	0.0	20.0	39
60 min Summer	55.250	0.0	25.2	68
120 min Summer	33.412	0.0	30.5	124
180 min Summer	24.571	0.0	33.6	182
240 min Summer	19.643	0.0	35.8	228
360 min Summer	14.257	0.0	39.0	282
480 min Summer	11.362	0.0	41.5	344
600 min Summer	9.520	0.0	43.4	412
720 min Summer	8.236	0.0	45.1	478
960 min Summer	6.548	0.0	47.8	610
1440 min Summer	4.732	0.0	51.8	868
2160 min Summer	3.414	0.0	56.2	1224
2880 min Summer	2.706	0.0	59.3	1564
4320 min Summer	1.947	0.0	64.0	2248
5760 min Summer	1.540	0.0	67.6	2944
7200 min Summer	1.283	0.0	70.4	3672
8640 min Summer	1.105	0.0	72.7	4408
10080 min Summer	0.973	0.0	74.7	5136
15 min Winter	134.489	0.0	17.0	25

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Summary of Results for 100 year Return Period (+40%)

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	116.019	0.269	0.0	1.0	1.0	21.1	O K
60 min Winter	116.076	0.326	0.0	1.0	1.0	25.6	O K
120 min Winter	116.122	0.372	0.0	1.0	1.0	29.2	O K
180 min Winter	116.136	0.386	0.0	1.0	1.0	30.3	O K
240 min Winter	116.137	0.387	0.0	1.0	1.0	30.3	O K
360 min Winter	116.122	0.372	0.0	1.0	1.0	29.2	O K
480 min Winter	116.103	0.353	0.0	1.0	1.0	27.7	O K
600 min Winter	116.083	0.333	0.0	1.0	1.0	26.1	O K
720 min Winter	116.061	0.311	0.0	1.0	1.0	24.4	O K
960 min Winter	116.019	0.269	0.0	1.0	1.0	21.1	O K
1440 min Winter	115.944	0.194	0.0	1.0	1.0	15.2	O K
2160 min Winter	115.867	0.117	0.0	1.0	1.0	9.1	O K
2880 min Winter	115.827	0.077	0.0	0.9	0.9	6.1	O K
4320 min Winter	115.805	0.055	0.0	0.7	0.7	4.3	O K
5760 min Winter	115.795	0.045	0.0	0.5	0.5	3.5	O K
7200 min Winter	115.789	0.039	0.0	0.5	0.5	3.1	O K
8640 min Winter	115.786	0.036	0.0	0.4	0.4	2.8	O K
10080 min Winter	115.783	0.033	0.0	0.4	0.4	2.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	88.306	0.0	22.4	39
60 min Winter	55.250	0.0	28.2	66
120 min Winter	33.412	0.0	34.1	124
180 min Winter	24.571	0.0	37.7	180
240 min Winter	19.643	0.0	40.1	236
360 min Winter	14.257	0.0	43.7	338
480 min Winter	11.362	0.0	46.5	380
600 min Winter	9.520	0.0	48.7	452
720 min Winter	8.236	0.0	50.5	524
960 min Winter	6.548	0.0	53.5	664
1440 min Winter	4.732	0.0	58.0	922
2160 min Winter	3.414	0.0	62.9	1260
2880 min Winter	2.706	0.0	66.5	1560
4320 min Winter	1.947	0.0	71.7	2252
5760 min Winter	1.540	0.0	75.7	2944
7200 min Winter	1.283	0.0	78.8	3680
8640 min Winter	1.105	0.0	81.4	4368
10080 min Winter	0.973	0.0	83.7	5136

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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)	19.500	Shortest Storm (mins)	15
Ratio R	0.401	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.061

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.020	4	8	0.021	8	12	0.020

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Model Details

Storage is Online Cover Level (m) 116.600

Cellular Storage Structure

Invert Level (m) 115.750 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	82.5	82.5	0.401	0.0	97.1
0.400	82.5	97.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0053-1000-0550-1000
Design Head (m)	0.550
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	53
Invert Level (m)	115.750
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.550	1.0
Flush-Flo™	0.166	1.0
Kick-Flo®	0.358	0.8
Mean Flow over Head Range	-	0.9

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	1.4	3.000	2.2	7.000	3.2
0.200	1.0	1.400	1.5	3.500	2.3	7.500	3.3
0.300	0.9	1.600	1.6	4.000	2.5	8.000	3.4
0.400	0.9	1.800	1.7	4.500	2.6	8.500	3.5
0.500	1.0	2.000	1.8	5.000	2.7	9.000	3.6
0.600	1.0	2.200	1.9	5.500	2.8	9.500	3.7
0.800	1.2	2.400	1.9	6.000	3.0		
1.000	1.3	2.600	2.0	6.500	3.1		

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