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

Half Drain Time : 38 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	72.033	0.883	0.0	5.0	5.0	14.3	O K
30 min Summer	72.148	0.998	0.0	5.0	5.0	16.1	O K
60 min Summer	72.130	0.980	0.0	5.0	5.0	15.8	O K
120 min Summer	72.007	0.857	0.0	5.0	5.0	13.8	O K
180 min Summer	71.853	0.703	0.0	5.0	5.0	11.3	O K
240 min Summer	71.681	0.531	0.0	5.0	5.0	8.6	O K
360 min Summer	71.450	0.300	0.0	5.0	5.0	4.9	O K
480 min Summer	71.316	0.166	0.0	4.8	4.8	2.7	O K
600 min Summer	71.240	0.090	0.0	4.5	4.5	1.5	O K
720 min Summer	71.197	0.047	0.0	4.2	4.2	0.8	O K
960 min Summer	71.165	0.015	0.0	3.5	3.5	0.2	O K
1440 min Summer	71.150	0.000	0.0	2.6	2.6	0.0	O K
2160 min Summer	71.150	0.000	0.0	1.8	1.8	0.0	O K
2880 min Summer	71.150	0.000	0.0	1.5	1.5	0.0	O K
4320 min Summer	71.150	0.000	0.0	1.0	1.0	0.0	O K
5760 min Summer	71.150	0.000	0.0	0.8	0.8	0.0	O K
7200 min Summer	71.150	0.000	0.0	0.7	0.7	0.0	O K
8640 min Summer	71.150	0.000	0.0	0.6	0.6	0.0	O K
10080 min Summer	71.150	0.000	0.0	0.5	0.5	0.0	O K
15 min Winter	72.167	1.017	0.0	5.0	5.0	16.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	139.226	0.0	18.5	17
30 min Summer	90.034	0.0	24.0	30
60 min Summer	55.351	0.0	29.6	46
120 min Summer	32.852	0.0	35.1	82
180 min Summer	23.893	0.0	38.1	116
240 min Summer	18.953	0.0	40.5	146
360 min Summer	13.678	0.0	43.7	202
480 min Summer	10.842	0.0	46.2	258
600 min Summer	9.048	0.0	48.2	314
720 min Summer	7.802	0.0	49.8	370
960 min Summer	6.171	0.0	52.6	490
1440 min Summer	4.428	0.0	56.6	0
2160 min Summer	3.173	0.0	60.8	0
2880 min Summer	2.502	0.0	64.0	0
4320 min Summer	1.789	0.0	68.6	0
5760 min Summer	1.409	0.0	72.0	0
7200 min Summer	1.170	0.0	74.7	0
8640 min Summer	1.005	0.0	77.0	0
10080 min Summer	0.883	0.0	79.0	0
15 min Winter	139.226	0.0	20.8	17

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	72.318	1.168	0.0	5.0	5.0	18.9	O K
60 min Winter	72.295	1.145	0.0	5.0	5.0	18.5	O K
120 min Winter	72.111	0.961	0.0	5.0	5.0	15.5	O K
180 min Winter	71.883	0.733	0.0	5.0	5.0	11.8	O K
240 min Winter	71.616	0.466	0.0	5.0	5.0	7.5	O K
360 min Winter	71.326	0.176	0.0	4.9	4.9	2.8	O K
480 min Winter	71.209	0.059	0.0	4.3	4.3	1.0	O K
600 min Winter	71.173	0.023	0.0	3.8	3.8	0.4	O K
720 min Winter	71.157	0.007	0.0	3.3	3.3	0.1	O K
960 min Winter	71.150	0.000	0.0	2.6	2.6	0.0	O K
1440 min Winter	71.150	0.000	0.0	1.9	1.9	0.0	O K
2160 min Winter	71.150	0.000	0.0	1.3	1.3	0.0	O K
2880 min Winter	71.150	0.000	0.0	1.0	1.0	0.0	O K
4320 min Winter	71.150	0.000	0.0	0.7	0.7	0.0	O K
5760 min Winter	71.150	0.000	0.0	0.6	0.6	0.0	O K
7200 min Winter	71.150	0.000	0.0	0.5	0.5	0.0	O K
8640 min Winter	71.150	0.000	0.0	0.4	0.4	0.0	O K
10080 min Winter	71.150	0.000	0.0	0.4	0.4	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	90.034	0.0	26.8	30
60 min Winter	55.351	0.0	33.1	48
120 min Winter	32.852	0.0	39.3	88
180 min Winter	23.893	0.0	42.7	126
240 min Winter	18.953	0.0	45.1	152
360 min Winter	13.678	0.0	49.0	206
480 min Winter	10.842	0.0	51.7	258
600 min Winter	9.048	0.0	54.0	308
720 min Winter	7.802	0.0	55.8	368
960 min Winter	6.171	0.0	58.9	0
1440 min Winter	4.428	0.0	63.4	0
2160 min Winter	3.173	0.0	68.1	0
2880 min Winter	2.502	0.0	71.6	0
4320 min Winter	1.789	0.0	76.8	0
5760 min Winter	1.409	0.0	80.6	0
7200 min Winter	1.170	0.0	83.7	0
8640 min Winter	1.005	0.0	86.3	0
10080 min Winter	0.883	0.0	88.5	0

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)	21.000	Shortest Storm (mins)	15
Ratio R	0.434	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.071

Time (mins) From:	To:	Area (ha)
0	4	0.071

Model Details

Storage is Online Cover Level (m) 73.630

Cellular Storage Structure

Invert Level (m) 71.150 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	17.0	17.0	1.300	17.0	38.4
0.100	17.0	18.6	1.400	17.0	40.1
0.200	17.0	20.3	1.500	17.0	41.7
0.300	17.0	21.9	1.600	17.0	43.4
0.400	17.0	23.6	1.700	17.0	45.0
0.500	17.0	25.2	1.800	17.0	46.7
0.600	17.0	26.9	1.900	17.0	48.3
0.700	17.0	28.5	2.000	17.0	50.0
0.800	17.0	30.2	2.100	17.0	51.6
0.900	17.0	31.8	2.200	17.0	53.3
1.000	17.0	33.5	2.300	17.0	54.9
1.100	17.0	35.1	2.400	17.0	56.6
1.200	17.0	36.8	2.500	17.0	58.2

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0101-5000-1300-5000
Design Head (m)	1.300
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	101
Invert Level (m)	71.060
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	5.0	Kick-Flo®	0.797	4.0
Flush-Flo™	0.382	5.0	Mean Flow over Head Range	-	4.4

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	3.3	0.400	5.0	0.800	4.0	1.400	5.2
0.200	4.6	0.500	4.9	1.000	4.4	1.600	5.5
0.300	4.9	0.600	4.8	1.200	4.8	1.800	5.8

Hydro-Brake Optimum® Outflow Control

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
2.000	6.1	3.500	7.9	6.000	10.2	8.500	12.1
2.200	6.4	4.000	8.4	6.500	10.6	9.000	12.4
2.400	6.6	4.500	8.9	7.000	11.0	9.500	12.7
2.600	6.9	5.000	9.4	7.500	11.4		
3.000	7.4	5.500	9.8	8.000	11.7		