Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 326 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	30.158	0.475	0.0	2.6	2.6	49.3	O K
30 min Summer	30.263	0.580	0.0	2.6	2.6	62.6	O K
60 min Summer	30.353	0.670	0.0	2.6	2.6	74.0	O K
120 min Summer	30.413	0.730	0.0	2.6	2.6	81.6	O K
180 min Summer	30.422	0.739	0.0	2.6	2.6	82.8	O K
240 min Summer	30.412	0.729	0.0	2.6	2.6	81.5	O K
360 min Summer	30.379	0.696	0.0	2.6	2.6	77.3	O K
480 min Summer	30.349	0.666	0.0	2.6	2.6	73.5	O K
600 min Summer	30.322	0.639	0.0	2.6	2.6	70.0	O K
720 min Summer	30.296	0.613	0.0	2.6	2.6	66.7	O K
960 min Summer	30.242	0.559	0.0	2.6	2.6	59.9	O K
1440 min Summer	30.139	0.456	0.0	2.6	2.6	46.9	O K
2160 min Summer	30.020	0.337	0.0	2.6	2.6	31.7	O K
2880 min Summer	29.934	0.251	0.0	2.6	2.6	20.8	O K
4320 min Summer	29.842	0.159	0.0	2.5	2.5	9.1	O K
5760 min Summer	29.784	0.101	0.0	2.2	2.2	5.4	O K
7200 min Summer	29.765	0.082	0.0	1.9	1.9	4.4	O K
8640 min Summer	29.754	0.071	0.0	1.6	1.6	3.8	O K
10080 min Summer	29.747	0.064	0.0	1.4	1.4	3.4	O K
15 min Winter	30.207	0.524	0.0	2.6	2.6	55.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	152.427	0.0	51.4	22
30 min Summer	98.505	0.0	66.4	37
60 min Summer	60.544	0.0	81.7	66
120 min Summer	35.949	0.0	97.0	126
180 min Summer	26.163	0.0	105.9	186
240 min Summer	20.769	0.0	112.1	244
360 min Summer	14.966	0.0	121.2	310
480 min Summer	11.860	0.0	128.0	374
600 min Summer	9.896	0.0	133.5	438
720 min Summer	8.531	0.0	138.2	506
960 min Summer	6.746	0.0	145.7	640
1440 min Summer	4.839	0.0	156.7	896
2160 min Summer	3.467	0.0	168.5	1260
2880 min Summer	2.734	0.0	177.1	1592
4320 min Summer	1.954	0.0	189.8	2252
5760 min Summer	1.538	0.0	199.3	2936
7200 min Summer	1.277	0.0	206.9	3672
8640 min Summer	1.097	0.0	213.2	4400
10080 min Summer	0.964	0.0	218.6	5064
15 min Winter	152.427	0.0	57.5	22

Summary of Results for 100 year Return Period (+45%)

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	30.326	0.643	0.0	2.6	2.6	70.6	O K
60 min Winter	30.430	0.747	0.0	2.6	2.6	83.8	O K
120 min Winter	30.506	0.823	0.0	2.6	2.6	93.1	O K
180 min Winter	30.528	0.845	0.0	2.6	2.6	95.3	O K
240 min Winter	30.521	0.838	0.0	2.6	2.6	94.6	O K
360 min Winter	30.482	0.799	0.0	2.6	2.6	90.4	O K
480 min Winter	30.443	0.760	0.0	2.6	2.6	85.4	O K
600 min Winter	30.408	0.725	0.0	2.6	2.6	81.0	O K
720 min Winter	30.373	0.690	0.0	2.6	2.6	76.5	O K
960 min Winter	30.302	0.619	0.0	2.6	2.6	67.5	O K
1440 min Winter	30.142	0.459	0.0	2.6	2.6	47.2	O K
2160 min Winter	29.968	0.285	0.0	2.6	2.6	25.1	O K
2880 min Winter	29.865	0.182	0.0	2.5	2.5	12.0	O K
4320 min Winter	29.775	0.092	0.0	2.1	2.1	4.9	O K
5760 min Winter	29.755	0.072	0.0	1.6	1.6	3.8	O K
7200 min Winter	29.745	0.062	0.0	1.4	1.4	3.3	O K
8640 min Winter	29.739	0.056	0.0	1.2	1.2	3.0	O K
10080 min Winter	29.735	0.052	0.0	1.0	1.0	2.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	98.505	0.0	74.4	37
60 min Winter	60.544	0.0	91.5	66
120 min Winter	35.949	0.0	108.7	124
180 min Winter	26.163	0.0	118.6	180
240 min Winter	20.769	0.0	125.6	236
360 min Winter	14.966	0.0	135.7	342
480 min Winter	11.860	0.0	143.4	390
600 min Winter	9.896	0.0	149.6	466
720 min Winter	8.531	0.0	154.7	544
960 min Winter	6.746	0.0	163.1	698
1440 min Winter	4.839	0.0	175.5	958
2160 min Winter	3.467	0.0	188.7	1304
2880 min Winter	2.734	0.0	198.4	1620
4320 min Winter	1.954	0.0	212.6	2208
5760 min Winter	1.538	0.0	223.2	2888
7200 min Winter	1.277	0.0	231.7	3640
8640 min Winter	1.097	0.0	238.8	4352
10080 min Winter	0.964	0.0	244.9	5128

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)	20.600	Shortest Storm (mins)	15
Ratio R	0.437	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.180

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.000	4	8	0.180

Model Details

Storage is Online Cover Level (m) 31.350

Complex Structure

Cellular Storage

Invert Level (m) 29.683 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	56.0	56.0	0.900	0.0	80.0
0.800	56.0	80.0			

Cellular Storage

Invert Level (m) 29.833 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	77.6	77.6	0.900	0.0	105.9
0.800	77.6	105.9			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0078-2600-0900-2600
Design Head (m)	0.900
Design Flow (l/s)	2.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	78
Invert Level (m)	29.683
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	2.6
Flush-Flo™	0.271	2.6
Kick-Flo®	0.569	2.1
Mean Flow over Head Range	-	2.3

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

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)
0.100	2.2	1.200	3.0	3.000	4.5	7.000	6.8
0.200	2.6	1.400	3.2	3.500	4.9	7.500	7.0
0.300	2.6	1.600	3.4	4.000	5.2	8.000	7.2
0.400	2.5	1.800	3.6	4.500	5.5	8.500	7.4
0.500	2.4	2.000	3.8	5.000	5.8	9.000	7.6
0.600	2.2	2.200	3.9	5.500	6.0	9.500	7.8
0.800	2.5	2.400	4.1	6.000	6.3		
1.000	2.7	2.600	4.2	6.500	6.5		