

11 Broomhead Road  
Wombell  
Barnsley S73 0SA



Date 25/03/2024 16:25  
File attenuation calc.SRCX

Designed by shaun  
Checked by

CADS Source Control 2020.1.3

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

Half Drain Time : 26 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E (l/s)	Max Outflow Volume (m <sup>3</sup> )	Status
15 min Summer	8.619	0.619	0.0	8.4	8.4	17.7	O K
30 min Summer	8.778	0.778	0.0	8.4	8.4	22.2	O K
60 min Summer	8.825	0.825	0.0	8.4	8.4	23.3	O K
120 min Summer	8.755	0.755	0.0	8.4	8.4	21.5	O K
180 min Summer	8.652	0.652	0.0	8.4	8.4	18.6	O K
240 min Summer	8.520	0.520	0.0	8.4	8.4	14.8	O K
360 min Summer	8.327	0.327	0.0	8.4	8.4	9.3	O K
480 min Summer	8.215	0.215	0.0	8.3	8.3	6.1	O K
600 min Summer	8.158	0.158	0.0	7.9	7.9	4.5	O K
720 min Summer	8.137	0.137	0.0	7.2	7.2	3.9	O K
960 min Summer	8.115	0.115	0.0	5.9	5.9	3.3	O K
1440 min Summer	8.093	0.093	0.0	4.4	4.4	2.6	O K
2160 min Summer	8.077	0.077	0.0	3.2	3.2	2.2	O K
2880 min Summer	8.067	0.067	0.0	2.6	2.6	1.9	O K
4320 min Summer	8.056	0.056	0.0	1.9	1.9	1.6	O K
5760 min Summer	8.050	0.050	0.0	1.5	1.5	1.4	O K
7200 min Summer	8.045	0.045	0.0	1.3	1.3	1.3	O K
8640 min Summer	8.042	0.042	0.0	1.1	1.1	1.2	O K
10080 min Summer	8.039	0.039	0.0	1.0	1.0	1.1	O K
15 min Winter	8.616	0.616	0.0	8.4	8.4	17.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	125.006	0.0	25.0	21
30 min Summer	83.918	0.0	33.6	32
60 min Summer	53.779	0.0	43.0	50
120 min Summer	33.289	0.0	53.2	84
180 min Summer	24.779	0.0	59.5	118
240 min Summer	19.956	0.0	63.8	148
360 min Summer	14.657	0.0	70.3	206
480 min Summer	11.773	0.0	75.3	260
600 min Summer	9.924	0.0	79.4	314
720 min Summer	8.626	0.0	82.8	372
960 min Summer	6.909	0.0	88.4	492
1440 min Summer	5.043	0.0	96.8	734
2160 min Summer	3.673	0.0	105.8	1100
2880 min Summer	2.930	0.0	112.5	1444
4320 min Summer	2.126	0.0	122.5	2164
5760 min Summer	1.692	0.0	129.9	2912
7200 min Summer	1.416	0.0	135.9	3664
8640 min Summer	1.225	0.0	141.1	4360
10080 min Summer	1.084	0.0	145.7	4984
15 min Winter	125.006	0.0	25.0	22

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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 (l/s)	Max Outflow Volume (m³)	Status
30 min Winter	8.773	0.773	0.0	8.4	8.4	22.0	O K
60 min Winter	8.798	0.798	0.0	8.3	8.3	22.8	O K
120 min Winter	8.673	0.673	0.0	8.4	8.4	19.2	O K
180 min Winter	8.473	0.473	0.0	8.4	8.4	13.5	O K
240 min Winter	8.313	0.313	0.0	8.4	8.4	8.9	O K
360 min Winter	8.154	0.154	0.0	7.9	7.9	4.4	O K
480 min Winter	8.125	0.125	0.0	6.5	6.5	3.5	O K
600 min Winter	8.109	0.109	0.0	5.5	5.5	3.1	O K
720 min Winter	8.099	0.099	0.0	4.8	4.8	2.8	O K
960 min Winter	8.086	0.086	0.0	3.9	3.9	2.4	O K
1440 min Winter	8.071	0.071	0.0	2.8	2.8	2.0	O K
2160 min Winter	8.060	0.060	0.0	2.1	2.1	1.7	O K
2880 min Winter	8.053	0.053	0.0	1.7	1.7	1.5	O K
4320 min Winter	8.044	0.044	0.0	1.2	1.2	1.3	O K
5760 min Winter	8.039	0.039	0.0	1.0	1.0	1.1	O K
7200 min Winter	8.036	0.036	0.0	0.8	0.8	1.0	O K
8640 min Winter	8.033	0.033	0.0	0.7	0.7	0.9	O K
10080 min Winter	8.031	0.031	0.0	0.6	0.6	0.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	83.918	0.0	33.6	32
60 min Winter	53.779	0.0	43.0	52
120 min Winter	33.289	0.0	53.2	90
180 min Winter	24.779	0.0	59.5	120
240 min Winter	19.956	0.0	63.8	148
360 min Winter	14.657	0.0	70.3	196
480 min Winter	11.773	0.0	75.3	254
600 min Winter	9.924	0.0	79.4	312
720 min Winter	8.626	0.0	82.8	372
960 min Winter	6.909	0.0	88.4	494
1440 min Winter	5.043	0.0	96.8	734
2160 min Winter	3.673	0.0	105.8	1100
2880 min Winter	2.930	0.0	112.5	1436
4320 min Winter	2.126	0.0	122.5	2176
5760 min Winter	1.692	0.0	129.9	2864
7200 min Winter	1.416	0.0	135.9	3552
8640 min Winter	1.225	0.0	141.1	4360
10080 min Winter	1.084	0.0	145.7	5048

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.353	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.080

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:
0	4 0.027	4	8 0.027	8	12 0.027

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.000  
 Infiltration Coefficient Base (m/hr) 0.00000  
 Infiltration Coefficient Side (m/hr) 0.00000  
 Safety Factor 1.0  
 Porosity 0.95

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	30.0	30.0	0.900	0.0	50.8
0.800	30.0	50.8			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0136-8400-0900-8400  
 Design Head (m) 0.900  
 Design Flow (l/s) 8.4  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Application Surface  
 Sump Available Yes  
 Diameter (mm) 136  
 Invert Level (m) 8.000  
 Minimum Outlet Pipe Diameter (mm) 150  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	8.4
Flush-Flo™	0.275	8.4
Kick-Flo®	0.610	7.0
Mean Flow over Head Range	-	7.2

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	4.9	1.200	9.6	3.000	14.8	7.000	22.3
0.200	8.2	1.400	10.3	3.500	16.0	7.500	23.0
0.300	8.3	1.600	11.0	4.000	17.0	8.000	23.7
0.400	8.2	1.800	11.6	4.500	18.0	8.500	24.4
0.500	7.9	2.000	12.2	5.000	18.9	9.000	25.1
0.600	7.2	2.200	12.8	5.500	19.8	9.500	25.7
0.800	7.9	2.400	13.3	6.000	20.7		
1.000	8.8	2.600	13.9	6.500	21.5		