

Tier Consult

Richmond House
Chester Bus. Park
CH4 9QZ

Date 22/03/2018 16:55
File 100 YEAR + 30% CC.SRCX

Micro Drainage

Former Caparo Wire
Villlage Bakery
Surface Water Attenuation

Designed by MikeHughes
Checked by

Source Control 2015.1

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

Half Drain Time : 16 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	99.127	0.127	0.0	2.0	2.0	2.4	O K
30 min Summer	99.161	0.161	0.0	2.0	2.0	3.1	O K
60 min Summer	99.173	0.173	0.0	2.0	2.0	3.3	O K
120 min Summer	99.153	0.153	0.0	2.0	2.0	2.9	O K
180 min Summer	99.124	0.124	0.0	2.0	2.0	2.4	O K
240 min Summer	99.102	0.102	0.0	2.0	2.0	1.9	O K
360 min Summer	99.080	0.080	0.0	1.8	1.8	1.5	O K
480 min Summer	99.068	0.068	0.0	1.5	1.5	1.3	O K
600 min Summer	99.061	0.061	0.0	1.3	1.3	1.2	O K
720 min Summer	99.056	0.056	0.0	1.2	1.2	1.1	O K
960 min Summer	99.049	0.049	0.0	1.0	1.0	0.9	O K
1440 min Summer	99.041	0.041	0.0	0.7	0.7	0.8	O K
2160 min Summer	99.035	0.035	0.0	0.5	0.5	0.7	O K
2880 min Summer	99.031	0.031	0.0	0.4	0.4	0.6	O K
4320 min Summer	99.026	0.026	0.0	0.3	0.3	0.5	O K
5760 min Summer	99.023	0.023	0.0	0.3	0.3	0.4	O K
7200 min Summer	99.021	0.021	0.0	0.2	0.2	0.4	O K
8640 min Summer	99.020	0.020	0.0	0.2	0.2	0.4	O K
10080 min Summer	99.018	0.018	0.0	0.2	0.2	0.3	O K
15 min Winter	99.146	0.146	0.0	2.0	2.0	2.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	106.494	0.0	3.8	20
30 min Summer	72.470	0.0	5.2	30
60 min Summer	47.182	0.0	6.7	46
120 min Summer	29.707	0.0	8.5	78
180 min Summer	22.334	0.0	9.5	108
240 min Summer	18.110	0.0	10.3	136
360 min Summer	13.388	0.0	11.4	194
480 min Summer	10.808	0.0	12.3	254
600 min Summer	9.146	0.0	13.0	314
720 min Summer	7.975	0.0	13.6	374
960 min Summer	6.417	0.0	14.6	494
1440 min Summer	4.715	0.0	16.1	736
2160 min Summer	3.456	0.0	17.7	1100
2880 min Summer	2.768	0.0	18.9	1468
4320 min Summer	2.021	0.0	20.7	2184
5760 min Summer	1.614	0.0	22.1	2888
7200 min Summer	1.356	0.0	23.2	3632
8640 min Summer	1.176	0.0	24.1	4296
10080 min Summer	1.044	0.0	25.0	4976
15 min Winter	106.494	0.0	4.2	21

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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)	18.000	Shortest Storm (mins)	15
Ratio R	0.327	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.019

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.006	4 8	0.006	8 12	0.006

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Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 99.000 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 ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	20.0	20.0	0.300	0.0	23.6
0.200	20.0	23.6			

Hydro-Brake Optimum® Outflow Control

Unit Reference MD-SFP-0074-2000-0200-2000
Design Head (m) 0.200
Design Flow (l/s) 2.0
Flush-Flo™ Calculated
Objective Future Proof
Diameter (mm) 74
Invert Level (m) 99.000
Minimum Outlet Pipe Diameter (mm) 100
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.200	2.0
Flush-Flo™	0.097	2.0
Kick-Flo®	0.163	1.8
Mean Flow over Head Range	-	1.4

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	2.0	1.200	4.5	3.000	7.0	7.000	10.7
0.200	2.0	1.400	4.8	3.500	7.5	7.500	11.1
0.300	2.4	1.600	5.1	4.000	8.1	8.000	11.4
0.400	2.7	1.800	5.4	4.500	8.5	8.500	11.8
0.500	3.0	2.000	5.7	5.000	9.0	9.000	12.1
0.600	3.3	2.200	5.9	5.500	9.5	9.500	12.4
0.800	3.7	2.400	6.2	6.000	9.9		
1.000	4.1	2.600	6.5	6.500	10.3		

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