

Summary of Results for 2 year Return Period

Half Drain Time : 969 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max $\Sigma$ Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	208.916	0.316	0.0	0.4	0.4	16.2	O K
30 min Summer	209.023	0.423	0.0	0.4	0.4	21.7	O K
60 min Summer	209.143	0.543	0.0	0.4	0.4	27.8	O K
120 min Summer	209.274	0.674	0.0	0.5	0.5	34.6	O K
180 min Summer	209.354	0.754	0.0	0.5	0.5	38.7	O K
240 min Summer	209.410	0.810	0.0	0.5	0.5	41.6	O K
360 min Summer	209.481	0.881	0.0	0.5	0.5	45.2	O K
480 min Summer	209.523	0.923	0.0	0.5	0.5	47.3	O K
600 min Summer	209.548	0.948	0.0	0.5	0.5	48.6	O K
720 min Summer	209.563	0.963	0.0	0.5	0.5	49.4	O K
960 min Summer	209.582	0.982	0.0	0.6	0.6	50.4	O K
1440 min Summer	209.597	0.997	0.0	0.6	0.6	51.2	O K
2160 min Summer	209.596	0.996	0.0	0.6	0.6	51.1	O K
2880 min Summer	209.583	0.983	0.0	0.6	0.6	50.4	O K
4320 min Summer	209.545	0.945	0.0	0.5	0.5	48.5	O K
5760 min Summer	209.494	0.894	0.0	0.5	0.5	45.9	O K
7200 min Summer	209.441	0.841	0.0	0.5	0.5	43.1	O K
8640 min Summer	209.388	0.788	0.0	0.5	0.5	40.4	O K
10080 min Summer	209.338	0.738	0.0	0.5	0.5	37.9	O K
15 min Winter	208.955	0.355	0.0	0.4	0.4	18.2	O K
30 min Winter	209.075	0.475	0.0	0.4	0.4	24.4	O K
60 min Winter	209.211	0.611	0.0	0.5	0.5	31.3	O K
120 min Winter	209.362	0.762	0.0	0.5	0.5	39.1	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	34.946	0.0	16.7	26
30 min Summer	23.557	0.0	22.5	41
60 min Summer	15.352	0.0	29.3	70
120 min Summer	9.823	0.0	37.5	128
180 min Summer	7.532	0.0	43.2	188
240 min Summer	6.232	0.0	47.6	246
360 min Summer	4.745	0.0	54.4	364
480 min Summer	3.909	0.0	59.8	482
600 min Summer	3.363	0.0	64.3	600
720 min Summer	2.974	0.0	68.2	690
960 min Summer	2.450	0.0	73.5	806
1440 min Summer	1.863	0.0	74.5	1066
2160 min Summer	1.417	0.0	97.5	1476
2880 min Summer	1.167	0.0	107.1	1904
4320 min Summer	0.888	0.0	122.2	2728
5760 min Summer	0.730	0.0	134.0	3536
7200 min Summer	0.627	0.0	143.9	4336
8640 min Summer	0.554	0.0	152.5	5120
10080 min Summer	0.499	0.0	160.2	5952
15 min Winter	34.946	0.0	18.7	26
30 min Winter	23.557	0.0	25.2	40
60 min Winter	15.352	0.0	32.9	70
120 min Winter	9.823	0.0	42.0	126

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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
180 min Winter	209.455	0.855	0.0	0.5	0.5	43.9	O K
240 min Winter	209.522	0.922	0.0	0.5	0.5	47.3	O K
360 min Winter	209.608	1.008	0.0	0.6	0.6	51.7	O K
480 min Winter	209.662	1.062	0.0	0.6	0.6	54.5	O K
600 min Winter	209.698	1.098	0.0	0.6	0.6	56.3	O K
720 min Winter	209.721	1.121	0.0	0.6	0.6	57.5	O K
960 min Winter	209.745	1.145	0.0	0.6	0.6	58.7	O K
1440 min Winter	209.761	1.161	0.0	0.6	0.6	59.6	O K
2160 min Winter	209.749	1.149	0.0	0.6	0.6	59.0	O K
2880 min Winter	209.719	1.119	0.0	0.6	0.6	57.4	O K
4320 min Winter	209.640	1.040	0.0	0.6	0.6	53.4	O K
5760 min Winter	209.552	0.952	0.0	0.5	0.5	48.8	O K
7200 min Winter	209.466	0.866	0.0	0.5	0.5	44.4	O K
8640 min Winter	209.385	0.785	0.0	0.5	0.5	40.3	O K
10080 min Winter	209.310	0.710	0.0	0.5	0.5	36.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
180 min Winter	7.532	0.0	48.4	184
240 min Winter	6.232	0.0	53.4	242
360 min Winter	4.745	0.0	61.0	358
480 min Winter	3.909	0.0	67.0	472
600 min Winter	3.363	0.0	72.0	582
720 min Winter	2.974	0.0	75.4	692
960 min Winter	2.450	0.0	77.1	900
1440 min Winter	1.863	0.0	79.3	1124
2160 min Winter	1.417	0.0	109.2	1596
2880 min Winter	1.167	0.0	119.9	2052
4320 min Winter	0.888	0.0	136.9	2944
5760 min Winter	0.730	0.0	150.1	3808
7200 min Winter	0.627	0.0	161.2	4624
8640 min Winter	0.554	0.0	170.8	5448
10080 min Winter	0.499	0.0	179.5	6256

Fosse House  
 Roman Wharf  
 Lincoln LN1 1SR

Torsion Care, Thomas Street  
 Lindley, Huddersfield  
 10-6102



Date 05/01/2024  
 File Temporary Attenuation Tank....

Designed by DM  
 Checked by

Innovyze

Source Control 2020.1.3


Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.310	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.255

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:
0	4	4	8	8	12
	0.085		0.085		0.085

Ward Cole Consulting Engineers		Page 4
Fosse House	Torsion Care, Thomas Street	
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Innovyze	Source Control 2020.1.3	

Model Details

Storage is Online Cover Level (m) 210.200

Cellular Storage Structure

Invert Level (m) 208.600 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 <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	54.0	54.0	1.300	0.0	90.0
1.200	54.0	90.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0034-6000-1230-6000  
 Design Head (m) 1.230  
 Design Flow (l/s) 0.6  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Application Surface  
 Sump Available Yes  
 Diameter (mm) 34  
 Invert Level (m) 208.570  
 Minimum Outlet Pipe Diameter (mm) 75  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.230	0.6	Kick-Flo®	0.302	0.3
Flush-Flo™	0.150	0.4	Mean Flow over Head Range	-	0.4

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	0.4	1.200	0.6	3.000	0.9	7.000	1.3
0.200	0.4	1.400	0.6	3.500	1.0	7.500	1.4
0.300	0.3	1.600	0.7	4.000	1.0	8.000	1.4
0.400	0.4	1.800	0.7	4.500	1.1	8.500	1.4
0.500	0.4	2.000	0.7	5.000	1.1	9.000	1.5
0.600	0.4	2.200	0.8	5.500	1.2	9.500	1.5
0.800	0.5	2.400	0.8	6.000	1.2		
1.000	0.5	2.600	0.8	6.500	1.3		