

Aire House
 12 Victoria Avenue
 Harrogate, HG1 1ED



Date 12/10/2021 11:02
 File Source Rev A.SRCX

Designed by TomA
 Checked by

Innovyze Source Control 2020.1

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

Half Drain Time : 36 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	42.003	0.803	0.0	3.5	3.5	9.2	O K
30 min Summer	42.189	0.989	0.0	3.5	3.5	11.3	O K
60 min Summer	42.226	1.026	0.0	3.5	3.5	11.7	O K
120 min Summer	42.143	0.943	0.0	3.5	3.5	10.8	O K
180 min Summer	42.025	0.825	0.0	3.5	3.5	9.4	O K
240 min Summer	41.870	0.670	0.0	3.5	3.5	7.6	O K
360 min Summer	41.629	0.429	0.0	3.5	3.5	4.9	O K
480 min Summer	41.483	0.283	0.0	3.5	3.5	3.2	O K
600 min Summer	41.398	0.198	0.0	3.3	3.3	2.3	O K
720 min Summer	41.347	0.147	0.0	3.1	3.1	1.7	O K
960 min Summer	41.302	0.102	0.0	2.7	2.7	1.2	O K
1440 min Summer	41.276	0.076	0.0	2.0	2.0	0.9	O K
2160 min Summer	41.260	0.060	0.0	1.4	1.4	0.7	O K
2880 min Summer	41.252	0.052	0.0	1.1	1.1	0.6	O K
4320 min Summer	41.243	0.043	0.0	0.8	0.8	0.5	O K
5760 min Summer	41.238	0.038	0.0	0.7	0.7	0.4	O K
7200 min Summer	41.234	0.034	0.0	0.5	0.5	0.4	O K
8640 min Summer	41.231	0.031	0.0	0.5	0.5	0.4	O K
10080 min Summer	41.229	0.029	0.0	0.4	0.4	0.3	O K
15 min Winter	42.123	0.923	0.0	3.5	3.5	10.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.414	0.0	12.4	22
30 min Summer	79.406	0.0	16.4	33
60 min Summer	49.937	0.0	20.6	52
120 min Summer	30.371	0.0	25.1	86
180 min Summer	22.412	0.0	27.7	120
240 min Summer	17.961	0.0	29.6	152
360 min Summer	13.061	0.0	32.3	208
480 min Summer	10.425	0.0	34.4	264
600 min Summer	8.747	0.0	36.1	322
720 min Summer	7.574	0.0	37.5	378
960 min Summer	6.031	0.0	39.8	492
1440 min Summer	4.368	0.0	43.2	734
2160 min Summer	3.158	0.0	46.9	1080
2880 min Summer	2.506	0.0	49.6	1440
4320 min Summer	1.806	0.0	53.6	2160
5760 min Summer	1.431	0.0	56.6	2928
7200 min Summer	1.193	0.0	59.1	3600
8640 min Summer	1.028	0.0	61.1	4320
10080 min Summer	0.907	0.0	62.8	5112
15 min Winter	120.414	0.0	13.9	22

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Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E (l/s)	Max Outflow Volume (m³)	Status
30 min Winter	42.338	1.138	0.0	3.5	3.5	13.0	O K
60 min Winter	42.386	1.186	0.0	3.5	3.5	13.5	O K
120 min Winter	42.252	1.052	0.0	3.5	3.5	12.0	O K
180 min Winter	42.066	0.866	0.0	3.5	3.5	9.9	O K
240 min Winter	41.820	0.620	0.0	3.5	3.5	7.1	O K
360 min Winter	41.501	0.301	0.0	3.5	3.5	3.4	O K
480 min Winter	41.365	0.165	0.0	3.2	3.2	1.9	O K
600 min Winter	41.309	0.109	0.0	2.8	2.8	1.2	O K
720 min Winter	41.293	0.093	0.0	2.4	2.4	1.1	O K
960 min Winter	41.275	0.075	0.0	2.0	2.0	0.9	O K
1440 min Winter	41.260	0.060	0.0	1.4	1.4	0.7	O K
2160 min Winter	41.249	0.049	0.0	1.0	1.0	0.6	O K
2880 min Winter	41.243	0.043	0.0	0.8	0.8	0.5	O K
4320 min Winter	41.236	0.036	0.0	0.6	0.6	0.4	O K
5760 min Winter	41.231	0.031	0.0	0.5	0.5	0.4	O K
7200 min Winter	41.229	0.029	0.0	0.4	0.4	0.3	O K
8640 min Winter	41.226	0.026	0.0	0.3	0.3	0.3	O K
10080 min Winter	41.225	0.025	0.0	0.3	0.3	0.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	79.406	0.0	18.3	33
60 min Winter	49.937	0.0	23.1	54
120 min Winter	30.371	0.0	28.1	92
180 min Winter	22.412	0.0	31.1	130
240 min Winter	17.961	0.0	33.2	160
360 min Winter	13.061	0.0	36.2	212
480 min Winter	10.425	0.0	38.5	264
600 min Winter	8.747	0.0	40.4	314
720 min Winter	7.574	0.0	42.0	374
960 min Winter	6.031	0.0	44.6	492
1440 min Winter	4.368	0.0	48.4	738
2160 min Winter	3.158	0.0	52.5	1088
2880 min Winter	2.506	0.0	55.6	1452
4320 min Winter	1.806	0.0	60.1	2172
5760 min Winter	1.431	0.0	63.4	2936
7200 min Winter	1.193	0.0	66.1	3664
8640 min Winter	1.028	0.0	68.4	4264
10080 min Winter	0.907	0.0	70.4	5016

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Model Details

Storage is Online Cover Level (m) 43.000

Cellular Storage Structure

Invert Level (m) 41.200 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	12.0	12.0	1.300	0.0	31.2
1.200	12.0	31.2			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0086-3500-1200-3500
 Design Head (m) 1.200
 Design Flow (l/s) 3.5
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 86
 Invert Level (m) 41.200
 Minimum Outlet Pipe Diameter (mm) 100
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	3.5
Flush-Flo™	0.367	3.5
Kick-Flo®	0.746	2.8
Mean Flow over Head Range	-	3.1

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	2.6	1.200	3.5	3.000	5.4	7.000	8.0
0.200	3.3	1.400	3.8	3.500	5.8	7.500	8.3
0.300	3.5	1.600	4.0	4.000	6.1	8.000	8.5
0.400	3.5	1.800	4.2	4.500	6.5	8.500	8.8
0.500	3.4	2.000	4.4	5.000	6.8	9.000	9.0
0.600	3.3	2.200	4.6	5.500	7.1	9.500	9.2
0.800	2.9	2.400	4.8	6.000	7.4		
1.000	3.2	2.600	5.0	6.500	7.7		