Modelling Guide

Stormbloc® Optimum Infiltration System within Innovyze® - MicroDrainage®

This document outlines the method for sizing and checking the size of a Stormbloc® Optimum Infiltration System using the Innovyze® MicroDrainage® program, whilst following BRE Digest 365 guidelines.

Design Criteria

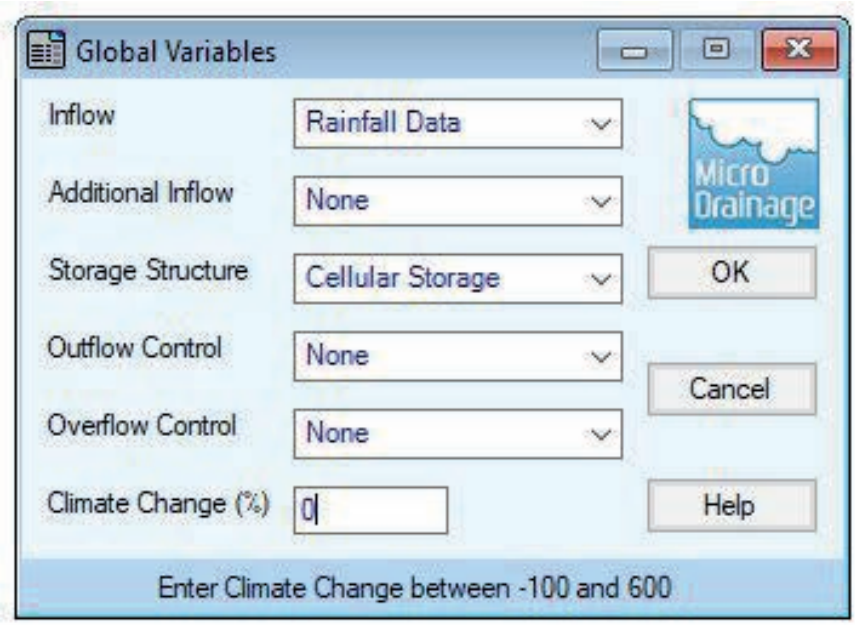
For this example we have used the following variables:

Return Period	10 years
Impermeable Area	0.5 Ha
M5-60	20
Infiltration Coefficient	0.35 m/hr
Ratio R	0.4

We have assumed that there is no outfall from the site and that all of the surface water runoff must soakaway.

1. Global Variables

Model the units as cellular storage with no outflow control. An overflow can be selected if necessary, though for this example we will not be using one.



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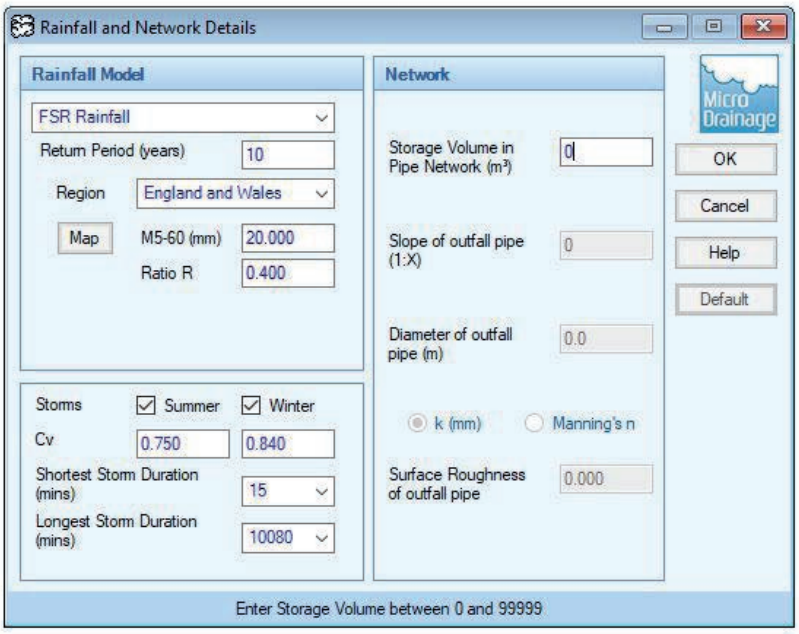
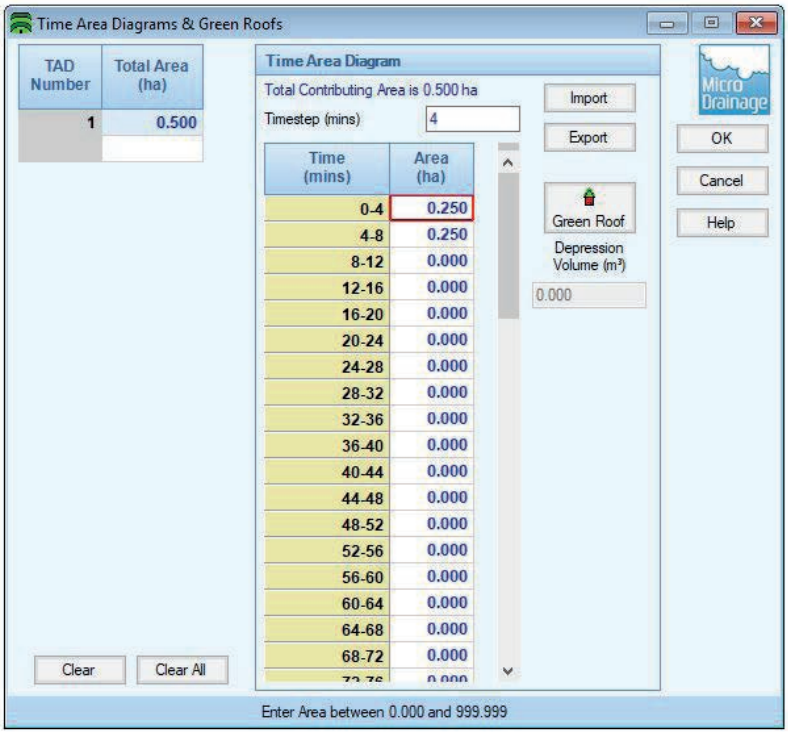
2. Rainfall and Network Details

Enter a 10 year return period and other rainfall details as normal:



3. Time / Area Diagram

Enter the time area details as normal. In this instance the catchment area is relatively small with evenly shaped characteristics, we have therefore assumed that the time/area diagram is linear in form.



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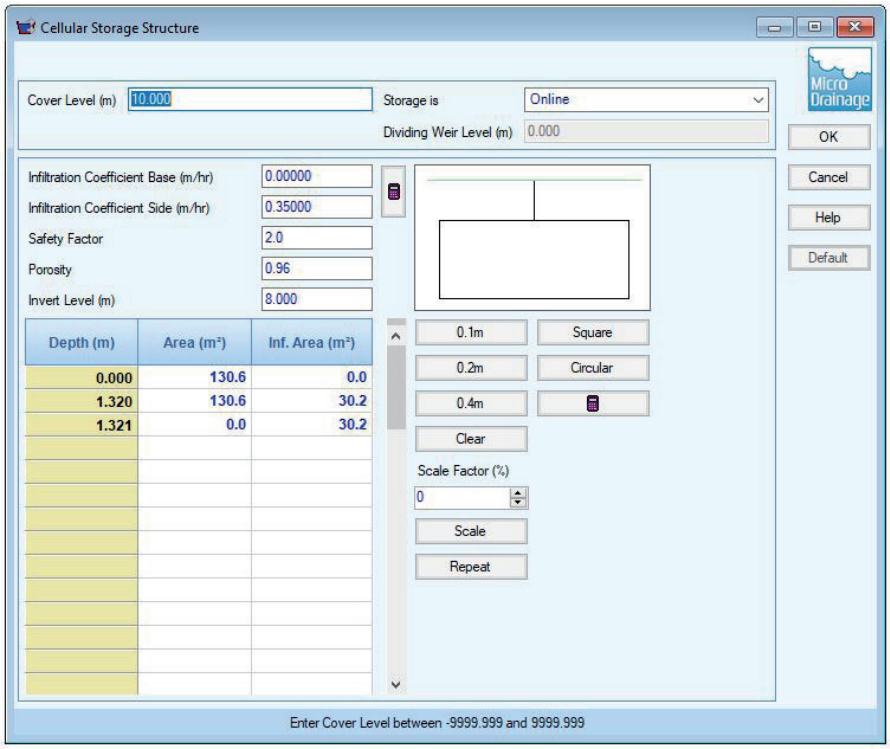
4. Cellular Storage Details

Enter the dimensions of the Stormbloc® Optimum Infiltration System here. For this instance the Stormbloc® Optimum Infiltration System we are looking at is 13.6 m (17 blocks) long, 9.6 m (12 blocks) wide and 1.32 (2 blocks) deep. We therefore input the data as a surface area, in this case 13.6 m x 9.6 m gives a surface area of 130.6 m². The pond/tank invert level should be input as the invert level of the bottom of the blocks. The cover level is the cover level above the infiltration system. For this example we have used relative levels of 8 for the invert level of the blocks and 10 for the cover level.

The infiltration coefficient should be input for the sides. This coefficient can be calculated from test pit results using the calculator tool shown next to the input boxes on the left hand side of this window. A suitable factor of safety should also be used. The void ratio of the Stormbloc® modules is 96% and so a value of 0.96 should be used in the porosity box.

Inflitration Coefficient Base = 0 m/hr. Base area is assumed to clog with fine particles and become ineffective in the long term (BRE Digest 365).

Infiltration Area = the internal surface area of the soakaway to 50% effective depth. Therefore half the surface area of the perimeter/sides of the tank.



The system can now be analysed by pressing the button: 

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5. Summary of Results

The Stormbloc® Optimum Infiltration System that we have modelled has dimensions of 13.6 m x 9.6 m x 1.32 m deep. At a void ratio of 96% this will provide a storage capacity of 165.4 m³.

The summary below indicates a storage volume of 160.0 m³ for the critical, winter storm of 1440 minutes. The summary also indicates that the half-drain down time for this system will be 1259 minutes, ie. within the 24 hours required for soakaway designs.

The proposed Stormbloc® Optimum Infiltration System will therefore have sufficient capacity for this site.

If the volume of the infiltration system is not sufficient, or the half drain down time is greater than 24 hours, then adjustments can be made to the size of the infiltration system by editing the cellular storage details.

Summary of Results for 10 year Return Period

Half Drain Time : 1259 minutes.

Storm Selector

1440 min Winter

Storm Event	Rain (mm/hr)	Time to Vol Peak (mins)	Max Water Level (m)	Max Depth (m)	Flooded Volume (m³)	Max Filtration (l/s)	Σ Max Outflow (l/s)	Maximum Volume (m³)	Status
30 min Summer	38.718	38	8.573	0.573	0.0	0.6	0.6	71.9	O K
60 min Summer	24.003	68	8.705	0.705	0.0	0.8	0.8	88.4	O K
120 min Summer	14.508	126	8.839	0.839	0.0	0.9	0.9	105.2	O K
180 min Summer	10.722	186	8.916	0.916	0.0	1.0	1.0	114.8	O K
240 min Summer	8.627	246	8.967	0.967	0.0	1.1	1.1	121.3	O K
360 min Summer	6.339	364	9.033	1.033	0.0	1.1	1.1	129.6	O K
480 min Summer	5.090	482	9.072	1.072	0.0	1.2	1.2	134.5	O K
600 min Summer	4.291	602	9.096	1.096	0.0	1.2	1.2	137.4	O K
720 min Summer	3.732	720	9.109	1.109	0.0	1.2	1.2	139.0	O K
960 min Summer	2.993	824	9.123	1.123	0.0	1.2	1.2	140.9	O K
1440 min Summer	2.191	1068	9.141	1.141	0.0	1.3	1.3	143.0	O K
2160 min Summer	1.603	1472	9.146	1.146	0.0	1.3	1.3	143.6	O K
2880 min Summer	1.283	1876	9.135	1.135	0.0	1.3	1.3	142.3	O K
4320 min Summer	0.938	2688	9.095	1.095	0.0	1.2	1.2	137.3	O K
5760 min Summer	0.751	3512	9.047	1.047	0.0	1.2	1.2	131.3	O K
7200 min Summer	0.631	4320	8.999	0.999	0.0	1.1	1.1	125.2	O K
8640 min Summer	0.548	5096	8.954	0.954	0.0	1.1	1.1	119.6	O K
10080 min Summer	0.486	5848	8.912	0.912	0.0	1.0	1.0	114.3	O K
15 min Winter	59.937	23	8.499	0.499	0.0	0.6	0.6	62.6	O K
30 min Winter	38.718	37	8.642	0.642	0.0	0.7	0.7	80.5	O K
60 min Winter	24.003	66	8.790	0.790	0.0	0.9	0.9	99.1	O K
120 min Winter	14.508	124	8.941	0.941	0.0	1.0	1.0	117.9	O K
180 min Winter	10.722	182	9.027	1.027	0.0	1.1	1.1	128.8	O K
240 min Winter	8.627	240	9.085	1.085	0.0	1.2	1.2	136.1	O K
360 min Winter	6.339	356	9.161	1.161	0.0	1.3	1.3	145.5	O K
480 min Winter	5.090	470	9.206	1.206	0.0	1.3	1.3	151.2	O K
600 min Winter	4.291	582	9.234	1.234	0.0	1.4	1.4	154.8	O K
720 min Winter	3.732	692	9.252	1.252	0.0	1.4	1.4	156.9	O K
960 min Winter	2.993	896	9.266	1.266	0.0	1.4	1.4	158.7	O K
1440 min Winter	2.191	1112	9.276	1.276	0.0	1.4	1.4	160.0	O K
2160 min Winter	1.603	1564	9.266	1.266	0.0	1.4	1.4	158.8	O K
2880 min Winter	1.283	2020	9.238	1.238	0.0	1.4	1.4	155.2	O K
4320 min Winter	0.938	2896	9.163	1.163	0.0	1.3	1.3	145.8	O K
5760 min Winter	0.751	3744	9.087	1.087	0.0	1.2	1.2	136.3	O K
7200 min Winter	0.631	4536	9.017	1.017	0.0	1.1	1.1	127.5	O K
8640 min Winter	0.548	5360	8.954	0.954	0.0	1.1	1.1	119.6	O K
10080 min Winter	0.486	6144	8.898	0.898	0.0	1.0	1.0	112.5	O K

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