



WinSLAMM v 9.4 User's Guide

Control Devices



Start-Up Hints

Press F1 on any screen within the program to see the corresponding Help File Topic

Throughout this User's Guide, the text in red walks you through the program

The User may need to press Enter in various input screens to activate the next data input

Control Devices Summary

☁ Biofiltration

☁ Catch Basins

☁ Grass Swales

☁ Hydrodynamic Devices

☁ Other Control Device

☁ Porous Pavement

☁ Street Cleaning

☁ Wet Detention

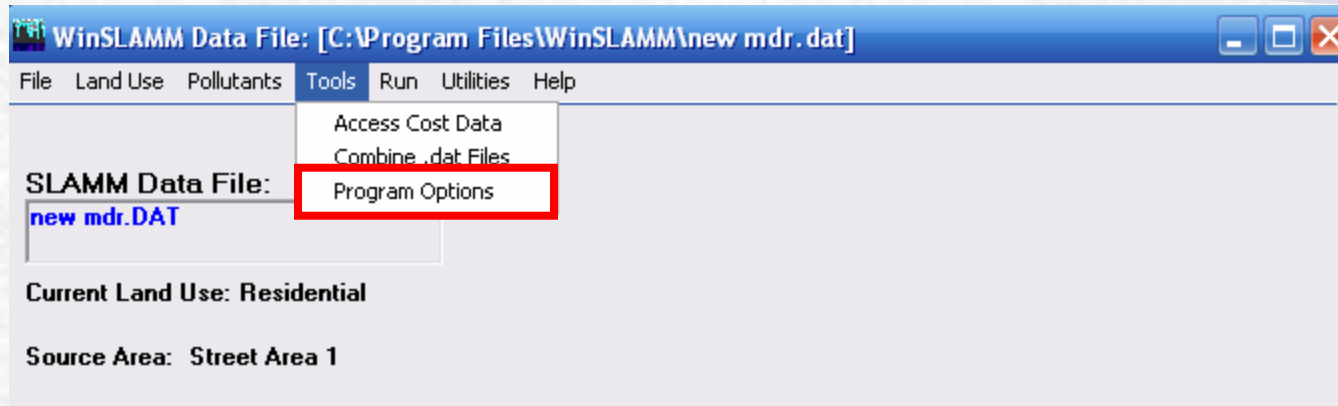
Control Devices

After the Basic Parameter Files and Source Area data is entered, Control Devices can be added to analyze affect their effect on pollution generation.

There are two ‘classes’ of control devices –

- 1. Source Area Specific Control Devices (Source Area(s))**
- 2. System Control Devices (Land Use(s), Drainage System, or Outfall)**

Detailed Output Options



The screenshot shows the WinSLAMM Data File window. The title bar reads "WinSLAMM Data File: [C:\Program Files\WinSLAMM\new mdr.dat]". The menu bar includes File, Land Use, Pollutants, Tools, Run, Utilities, and Help. The Tools menu is open, showing options: Access Cost Data, Combine .dat Files, and Program Options. The Program Options option is highlighted with a red rectangle. Below the menu, the SLAMM Data File is listed as "new mdr.DAT". The Current Land Use is "Residential" and the Source Area is "Street Area 1".

Each control practice has detailed output data. The data is only generated if selected by the user. **To select the detailed output data, go to Tools>Program Options.**

Land Use Areas	
Residential Area:	100.00 Acres
Institutional Area:	0.00 Acres
Commercial Area:	0.00 Acres
Industrial Area:	0.00 Acres
Other Urban Area:	0.00 Acres
Freeway Area:	0.00 Acres
Total Area:	100.00 Acres

Exit Program

Press F1 for Help

Detailed Output Options

Program Options

Detailed Output File Options

Biofilters

- ☐ Detailed Biofilter Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☒ Water Balance

Catchbasins

- ☐ Performance by Event Output
- ☐ Performance By Step Output
- ☐ Stage-Inflow Data
- ☐ Stage-Outflow

Flow Duration Curve Data

- ☐ Detailed Data
- ☐ Plotting Calculations

Freeway Data

- ☐ Freeway Washoff Detail
- ☐ Critical Particle Size Calculation Detailed Output File

Grass Swales

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

Hydrodynamic Devices

- ☐ Detailed Output
- ☐ Performance By Event
- ☐ Stage-Inflow
- ☐ Stage-Outflow

Porous Pavement

- ☐ Detailed Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☐ Surface Seepage Rate
- ☐ Water Balance

Street Cleaning

- ☐ Street Dirt Plot
- ☐ Street Dirt Removal
- ☐ Washoff or Street Cleaning Detail

Wet Detention Ponds

- ☐ Detailed Output
- ☐ Outfall Discharge Hydrograph
- ☐ Pond Stage-Area-Volume Data
- ☐ Stage-Outflow
- ☐ Stone Weeper Detailed Output
- ☐ Water Balance Summary of All Ponds

Default Model Options

☐ Uncheck All Detailed Output File Options

☐ Check All Detailed Output File Options

File Update Options

Cancel Changes

Save .INI File

Based on the control device being modeled, select the desired output by checking the box next to the file name.

Then select 'Save .INI File'.

A Comma-Separated Value file (*.csv file) will be created in the file the *.dat file is saved in after the file is run.

Program Options

Detailed Output File Options

- ☐ Suppress Control Practice Review Warning Messages
- ☐ Suppress 'No Street Cleaning with Catchbasin Cleaning' Warning Message
- ☐ Turn 'Save File Upon Exit' Message Off
- ☐ Turn 'Save Outfall Runoff and Particulate Loading for WinDETPOND Analysis' Output Option On
- ☐ Suppress the Wet Detention Pond Overflow Warning Message

Default Peak Flow to Average Flow Ratio

Standard Particle Size Distribution File

Default Model Options

Default Monthly Temperature	
January	0
February	0
March	0
April	0
May	0
June	0
July	0
August	0
September	0
October	0
November	0
December	0

File Update Options

Cancel Changes

Save .INI File

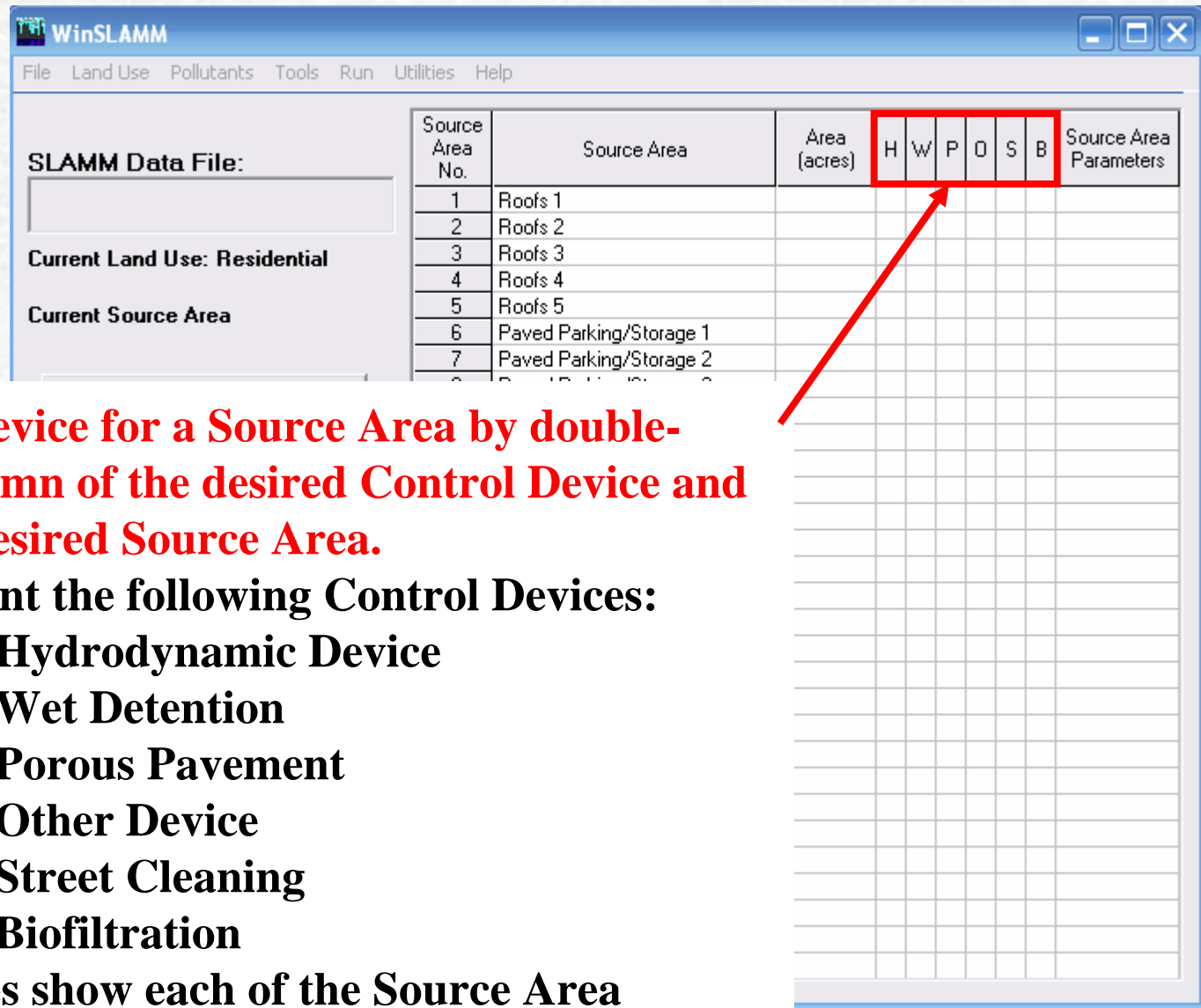
In version, 9.4.0, a Default Model Options form was added. This form can be used to suppress selected warning messages, select a particle size distribution that will be used for all control practices and set the default monthly temperature values.



Control Devices – Source Area Specific



Source Area Specific Control Device



WinSLAMM

File Land Use Pollutants Tools Run Utilities Help

SLAMM Data File:

Current Land Use: Residential

Current Source Area

Source Area No.	Source Area	Area (acres)	H	W	P	O	S	B	Source Area Parameters
1	Roofs 1								
2	Roofs 2								
3	Roofs 3								
4	Roofs 4								
5	Roofs 5								
6	Paved Parking/Storage 1								
7	Paved Parking/Storage 2								
8	Paved Parking/Storage 3								
9	Paved Parking/Storage 4								
10	Paved Parking/Storage 5								
11	Paved Parking/Storage 6								
12	Paved Parking/Storage 7								
13	Paved Parking/Storage 8								
14	Paved Parking/Storage 9								
15	Paved Parking/Storage 10								
16	Paved Parking/Storage 11								
17	Paved Parking/Storage 12								
18	Paved Parking/Storage 13								
19	Paved Parking/Storage 14								
20	Paved Parking/Storage 15								
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37	Paved Parking/Storage 32								
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92	Paved Parking/Storage 87								
93	Paved Parking/Storage 88								
94	Paved Parking/Storage 89								
95	Paved Parking/Storage 90								
96	Paved Parking/Storage 91								
97	Paved Parking/Storage 92								
98	Paved Parking/Storage 93								
99	Paved Parking/Storage 94								
100	Paved Parking/Storage 95								

Select a Control Device for a Source Area by double-clicking in the column of the desired Control Device and in the row of the desired Source Area.

The letters represent the following Control Devices:

- H – Hydrodynamic Device**
- W – Wet Detention**
- P – Porous Pavement**
- O – Other Device**
- S – Street Cleaning**
- B – Biofiltration**

The following slides show each of the Source Area Specific Control Devices



Control Devices – Hydrodynamic Device



Hydrodynamic Device

Land Use: Residential

Source Area: Roofs 1

Device Number 1

Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices

Total Source Area (ac)	2.06
Area Served by Device (ac)	2.06
Number of Devices	0
Device Density (units/ac)	0.000

Select

Critical Particle Size file name:

☐ Model Hydrodynamic Device with Lamella Plates or Settling Tubes

Fraction of device area with plates or tubes	
Average tube diameter or distance between plates (ft)	
Number of plates or tubes a vertical line will intersect	

For Device Cleaning, Select Either

Device Cleaning Dates

Device Cleaning No.	Device Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

OR

Device Cleaning Frequency

☐ Monthly
☐ Three Times per Year
☐ Semi-Annually
☐ Annually
☐ Every Two Years
☐ Every Three Years
☐ Every Four Years
☐ Every Five Years
☐ Never

Single Chamber Device Characteristics

1 - Average Sump Depth below Device Outlet Invert (ft)	0.00
Depth of Sediment in Device at Beginning of Study Period (ft)	0.00
2 - Typical Typical Ou	
3 - Typical Typical De	
4 - Device Street Lev	

Or Use Proprietary Hydrodynamic Control Device Information

☐

Inflow Hydrograph Peak to Average Flow Ratio

3.8

Discharge Flow

2

2 - Typical Outlet Pipe Diameter (ft)

Typical Outlet Pipe Manning's n

5 - Minimum Below Out

Maximum F

6 - Diametr to In-Line S

7 - Inflow C

8 - Length Acting as s

9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)

N/A

Delete Control

Cancel

Continue

The Hydrodynamic Device allows the user to enter data for a 'generic' single chambered hydrodynamic device or select a proprietary device model.

Proprietary device data is currently not available for the model. It will become available as manufacturers test their devices and provide the peer- or regulatory agency-reviewed data to us to incorporate into the model.

Hydrodynamic Device

Hydrodynamic Device

Land Use: Residential
Source Area: Roofs 1
Device Number 1

Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices

Total Source Area (ac)	2.06
Area Served by Device (ac)	2.06
Number of Devices	1
Device Density (units/ac)	0.485

Select Critical Particle Size file name:
C:\Program Files\WinSLAMM\NURP.CPZ

Model Hydrodynamic

For Device Cleaning, Select Either

☐ Discrete Particles

Fraction area w tubes
Average or dist plates
Number tubes & interse

First enter data regarding the drainage area to the device and the device density.

Then choose the appropriate critical particle size distribution file.

Note: For analyses in Wisconsin, select the NURP critical particle size file.

Single Chamber Device Characteristics

1 - Average Sump Depth below Device Outlet Invert (ft)	0.00
Depth of Sediment in Device at Beginning of Study Period (ft)	0.00
2 - Typical Outlet Pipe Diameter (ft)	0.00
Typical Outlet Pipe Manning's n	0.000
3 - Typical Outlet Pipe Slope (ft/ft)	0.0000
Typical Device Sump Surface Area (sf)	0.0
4 - Device Depth from Sump Bottom to Street Level (ft)	0.00
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	1.0
Maximum Flow to In-Line Sump (cfs)	0.0
6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)	N/A - Click to Activate
7 - Inflow Orifice Invert Elevation (ft)	N/A
8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir	N/A
9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)	N/A

The diagram illustrates a cross-section of a single chamber device. It shows an inlet pipe on the left, a central chamber, and an outlet pipe on the right. Key features include a bypass flow path at the top, an overflow weir, and a discharge flow path. Dimensions 1 through 5 are marked: 1 is the device depth from sump bottom to street level; 2 is the typical outlet pipe diameter; 3 is the typical outlet pipe slope; 4 is the device depth from sump bottom to street level; 5 is the minimum allowable scour depth below the outlet invert. Other labels include 'N/A' for various parameters and 'Device Flow' for the main path.

Or Use Proprietary Hydrodynamic Control Device Information

Manufacturer - Model

1 - Average Sump Depth below Device Outlet Invert (ft)	
Depth of Sediment in Device at Beginning of Study Period (ft)	
2 - Typical Outlet Pipe Diameter (ft)	
Typical Outlet Pipe Manning's n	
3 - Typical Outlet Pipe Slope (ft/ft)	
Inflow Hydrograph Peak to Average Flow Ratio	
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	
Device Sump Surface Area (sf)	

Delete Control

Cancel

Continue

Hydrodynamic Device

Land Use: Residential

Source Area: Roofs 1

Device Number 1

Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices

Total Source Area (ac)	2.06
Area Served by Device (ac)	2.06
Number of Devices	1
Device Density (units/ac)	0.485

Select

Critical Particle Size file name:

C:\Program Files\WinSLAMM\NURP.CPZ

☐ Model Hydrodynamic Device with Lamella Plates or Settling Tubes

For Device Cleaning, Select Either

Device Cleaning Dates

☐ Device Cleaning Frequency

Fraction of device area with plates or tubes

Average tube diameter or distance between plates (ft)

Number of plates or tubes a vertical line will intersect

Single Chamber Device Characteristics

1 - Average Sump Depth below Device Outlet Invert (ft)	5.00
Depth of Sediment in Device at Beginning of Study Period (ft)	0.00
2 - Typical Outlet Pipe Diameter (ft)	1.00
Typical Outlet Pipe Manning's n	0.012
3 - Typical Outlet Pipe Slope (ft/ft)	0.0100
Typical Device Sump Surface Area (sf)	28.0
4 - Device Depth from Sump Bottom to Street Level (ft)	8.00
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	1.0
Maximum Flow to In-Line Sump (cfs)	0.0
6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)	N/A - Click to Activate
7 - Inflow Orifice Invert Elevation (ft)	N/A
8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir	N/A
9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)	N/A

N/A

Bypass Flow

Device Flow

N/A

N/A

N/A

N/A

N/A

Delete Control

Cancel

Continue

If using a single chambered hydrodynamic device, enter the data describing the device in the form to the left of the schematic.

As data is entered in the form, it will appear in the schematic.

Values 1 through 5 describe the geometry of the device.

The remainder of the table describes when flow will bypass.

Either enter a maximum flow, or enter the geometry of the bypass system.

Hydrodynamic Device

Land Use: Residential

Source Area: Roofs 1

Device Number 1

Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices

Total Source Area (ac)	2.06
Area Served by Device (ac)	2.06
Number of Devices	1
Device Density (units/ac)	0.485

Select

Critical Particle Size file name:

C:\Program Files\WinSLAMM\NURP.CPZ

☐ Model Hydrodynamic Device with Lamella Plates or Settling Tubes

Fraction of device area with plates or tubes	
Average tube diameter or distance between plates (ft)	
Number of plates or tubes a vertical line will intersect	

For Device Cleaning, Select Either

Device Cleaning Dates

Device Cleaning No.	Device Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

☐ Device Cleaning Frequency

☐ Monthly
 ☐ Three Times per Year
 ☐ Semi-Annually
 ☐ Annually
 ☐ Every Two Years
 ☐ Every Three Years
 ☐ Every Four Years
 ☐ Every Five Years
 ☐ Never

OR

Single Chamber Device Characteristics

1 - Average Sump Depth below Device Outlet Invert (ft)	5.00
Depth of Sediment in Device at Beginning of Study Period (ft)	0.00
2 - Typical Outlet Pipe Diameter (ft)	1.00
Typical Outlet Pipe Manning's n	0.012
3 - Typical Outlet Pipe Slope (ft/ft)	0.0100
Typical Device Sump Surface Area (sf)	28.0
4 - Device Depth from Sump Bottom to Street Level (ft)	8.00
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	1.0
Maximum Flow to In-Line Sump (cfs)	N/A - Click to Activate
6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)	0.75
7 - Inflow Orifice Invert Elevation (ft)	6.00
8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir	5.00
9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)	7.00

The diagram illustrates a cross-section of a hydrodynamic device. It shows a main chamber with a sump at the bottom. An inflow orifice (6) is located at an elevation of 6.00 ft (7). An overflow structure (8) with a length of 5.00 ft is positioned at an elevation of 7.00 ft (9) above the sump base. A bypass flow path is shown above the overflow structure, leading to a device flow path. The sump depth is 5.00 ft (1). The device depth from the sump bottom to the street level is 8.00 ft (4). The typical outlet pipe diameter is 1.00 ft (2) with a Manning's n of 0.012. The typical outlet pipe slope is 0.0100 ft/ft (3). The typical device sump surface area is 28.0 sf. The maximum flow to the in-line sump is N/A (5). The diameter of the orifice that controls flow to the in-line sump is 0.75 ft (6). The inflow orifice invert elevation is 6.00 ft (7). The length of the overflow structure acting as a sharp-crested weir is 5.00 ft (8). The elevation of the overflow structure to the bypass in-line sump is 7.00 ft (9).

Or Use Proprietary Hydrodynamic Control Device Information

Manufacturer - Model

1 - Average Sump Depth below Device Outlet Invert (ft)

The remainder of the table describes when flow will bypass.

Either enter a maximum flow, or enter the geometry of the bypass system.

Delete Control

Cancel

Continue

Hydrodynamic Device

Hydrodynamic Device

Land Use: Residential
Source Area: Roofs 1
Device Number 1

For Device Cleaning, Select Either
Device Cleaning

Device Cleaning Frequency

☐ Monthly
☐ Three Times per Year
☐ Semi-Annually
☐ Annually
☐ Every Two Years
☐ Every Three Years
☐ Every Four Years
☐ Every Five Years
☐ Never

Or Use Proprietary
Hydrodynamic Control
Device Information

Manufacturer - Model
Acme - Model 1A

1 - Average Sump Depth below Device Outlet Invert (ft)	5.00
Depth of Sediment in Device at Beginning of Study Period (ft)	0.00
2 - Typical Outlet Pipe Diameter (ft)	N/A
Typical Outlet Pipe Manning's n	N/A
3 - Typical Outlet Pipe Slope (ft/ft)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Maximum Allowable Depth of Sediment Accumulation Below Outlet Invert (ft)	4.5
Device Sump Surface Area (sf)	20.0

Delete Control

Cancel

Continue

3 - Typical Outlet Pipe Slope (ft/ft)

Typical Device Sump Surface Area (sf)

4 - Device Depth from Sump Bottom to Street Level (ft)

Inflow Hydrograph Peak to Average Flow Ratio

5 - Max. Allowable Depth of Sediment Accumulation Below Outlet Invert (ft)

Maximum Flow to In-Line Sump (cfs)

6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)

7 - Inflow Orifice Invert Elevation (ft)

8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir

9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)

Device Row

Discharge Row

N/A

N/A

N/A

N/A

1. 5.00'

5. 4.50'

Proprietary Device data is not yet available.

Once it is, the user may check the box next to “Or Use Proprietary Hydrodynamic Control Device Information”. You may then select the device from the drop down menu. As you enter data in the form, it will appear in the schematic.

Note: Less data is required for a proprietary hydrodynamic device with research data available to the model, so “N/A” will appear in the schematic for data that is not required.

Hydrodynamic Device

Land Use: Residential

Source Area: Roofs 1

Device Number 1

Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices

Total Source Area (ac)	2.06
Area Served by Device (ac)	2.06
Number of Devices	1
Device Density (units/ac)	0.485

Select

Critical Particle Size file name:

C:\Program Files\WinSLAMM\NURP.CPZ

☐ Model Hydrodynamic Device with Lamella Plates or Settling Tubes

Fraction of device area with plates or tubes	
Average tube diameter or distance between plates (ft)	
Number of plates or tubes a vertical line will intersect	

For Device Cleaning, Select Either

Device Cleaning Dates

Device Cleaning No.	Device Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

OR

☒ Device Cleaning Frequency

☐ Monthly
 ☐ Three Times per Year
 ☐ Semi-Annually
 ☒ Annually
 ☐ Every Two Years
 ☐ Every Three Years
 ☐ Every Four Years
 ☐ Every Five Years
 ☐ Never

Single Chamber Dev

1 - Average Sump Depth below Outlet Invert (ft)	
Depth of Sediment in Device Beginning of Study Period (ft)	
2 - Typical Outlet Pipe Diameter (ft)	
Typical Outlet Pipe Manning's n	
3 - Typical Outlet Pipe Slope (ft/ft)	
Typical Device Sump Surface Area (sf)	
4 - Device Depth from Sump Street Level (ft)	
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	1.0
Maximum Flow to In-Line Sump (cfs)	N/A - Click to Activate
6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)	0.75
7 - Inflow Orifice Invert Elevation (ft)	6.00
8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir	5.00
9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)	7.00

2 - Typical Outlet Pipe Diameter (ft)	
Typical Outlet Pipe Manning's n	
3 - Typical Outlet Pipe Slope (ft/ft)	
Inflow Hydrograph Peak to Average Flow Ratio	
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	
Device Sump Surface Area (sf)	

Delete Control

Cancel

Continue

Finally, enter the cleaning frequency.

If using specific dates, enter the dates in the box on the left.

If using a frequency, check the box next to “Device Cleaning Frequency” and then select the frequency from the options on the right.

A schematic is available in the Help File to illustrate each data value.

Hydrodynamic Device

Several detailed output files are available for the Hydrodynamic Device through the Program Options form.

Access the form through the Main Menu of the program. Select the desired file(s).

Then select "Save .INI File".

*.csv file(s) will be created in the same directory that your .DAT file is stored in for the detailed output options selected.

For example, this *.csv output file illustrates the Hydrodynamic Device Performance By Event. The file was opened in Microsoft Excel.

The image shows the 'Program Options' dialog box with the 'Hydrodynamic Devices' section highlighted by a red box and a red arrow. The 'Hydrodynamic Devices' section includes the following options:

- ☒ Detailed Output
- ☒ Performance By Event
- ☒ Stage-Inflow
- ☒ Stage-Outflow

Other sections in the dialog box include:

- Grass Swales**
 - ☐ Hydraulics and Concentration by Event
 - ☐ Hydraulics Detailed Output
 - ☐ Incremental Performance Output
 - ☐ Irreducible Concentration Detailed Output
 - ☐ Particulate Reduction Output
- Street Cleaning**
 - ☐ Street Dirt Plot
 - ☐ Street Dirt Removal
 - ☐ Washoff or Street Cleaning Detail
- Wet Detention Ponds**
 - ☐ Detailed Output
 - ☐ Outfall Discharge Hydrograph
 - ☐ Pond Stage-Area-Volume Data
 - ☐ Stage-Outflow
 - ☐ Stone Weeper Detailed Output
 - ☐ Water Balance Summary of All Ponds
- Porous Pavement**
 - ☐ Detailed Output

Below the dialog box, a Microsoft Excel spreadsheet is shown, displaying the output data. The spreadsheet has columns for Rain Depth (in), Runoff Volume per HD (cf), Maximum Inflow from Basin (cfs), Time Increment (min), Maximum Inflow through HD (cfs), Volume In (cf), Hydraulic Volume Out (cf), Total Volume Out of HD (cf), Bypass Volume (cf), and Cumulative Volume Out of HD (cf). The data is organized by event, with the first event showing a peak runoff volume of 20.74545 cf and a cumulative volume out of 21.1159 cf.

	C	D	E	F	G	H	I	J	K	L
	Rain Depth (in)	Runoff Volume per HD (cf)	Maximum Inflow from Basin (cfs)	Time Increment (min)	Maximum Inflow through HD (cfs)	Volume In (cf)	Hydraulic Volume Out (cf)	Total Volume Out of HD (cf)	Bypass Volume (cf)	Cumulative Volume Out of HD (cf)
1										
2	0.03	20.74545	6.08E-03	6	6.08E-03	21.1159	0	0	0	21.1159
3	0.06	97.81833	1.07E-02	15	1.07E-02	96.38525	0	0	0	117.5011
4	0.01	2.30505	2.03E-03	2	2.03E-03	2.346212	0	0	0	119.8474
5	0.01	2.30505	2.03E-03	2	2.03E-03	2.346212	0	0	0	122.1936
6	0.11	289.6043	4.25E-02	12	4.25E-02	294.7758	0	0	0	416.9694
7	0.05	63.9969	9.38E-03	12	9.38E-03	65.1397	0	0	0	482.1091
8	0.06	97.81833	1.72E-02	10	1.72E-02	99.56506	0	0	0	581.6741
9	0.01	2.30505	2.03E-03	2	2.03E-03	2.346212	0	0	0	584.0203
10	0.01	2.30505	2.03E-03	2	2.03E-03	2.346212	0	0	0	586.3665
11	0.38	1275.161	5.61E-02	15	5.61E-02	1287.116	0	0	0	1873.483
12	1.58	5621.45	0.2602523	15	0.2602523	5613.082	0	0	0	7486.564



Control Devices – Wet Detention



Wet Detention Control Device

Wet Detention Control Device

Land Use: Residential
Source Area: Roofs 1
Total Area: 6 acres
Pond Number 2

Select Particle Size Distribution File

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0			
1			
2			
3			
4			
5			
6			
7			

Add Outlet

Outlet Options—
☐ 1. Sharp Crested Weir
☐ 2. V - Notch Weir
☐ 3. Orifice
☐ 4. Seepage Basin
☐ 5. Natural Seepage
☐ 6. Evaporation
☐ 7. Other Outflow

Initial Stage
Peak to Average

The Wet Detention Pond form was updated in version 9.3.0 to include the Stage-Area data in the main form and a copy and paste function.

Enter fraction (greater than 0) that you want to modify all pond areas by and then select 'Modify Pond Areas' button

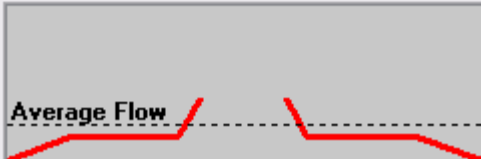
Modify Pond Areas

16			
17			
18			
19			
20			

Recalculate Cumulative Volume

Save this Pond as a WinDETPOND File

Flow



Average Flow

Time (1.2 * Rainfall Duration)

Copy Pond Data

Paste Pond Data

Cancel

Delete Pond

Continue

Wet Detention Control Device

Wet Detention Control Device

Land Use: Residential
Source Area: Roofs 1
Total Area: 6 acres
Pond Number 2

Select Particle Size Distribution File

Initial Stage Elevation (ft):
Peak to Average Flow Ratio:

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

Flow

Average Flow

Time (1.2 * Rainfall Duration)

Particle Size Distribution File Name

Look in: WinSLAMM

- Control Demo Files
- DEC06
- Documentation
- Files before v92
- Help Files
- Huntsville Files
- Rain Files
- Standard Land Use Files
- v 9.0.1
- v 9.1.2
- v 9.2
- v 9.2 Update Release
- v 9.2.1
- v 9.2.2
- v 9.2.3
- v 9.2.4
- v 9.2.5
- v 9.2.5 beta
- v 9.3.0
- v 9.3.0 beta
- v 10.0
- HIGH.CPZ
- LOW.CPZ
- MEDIUM.CPZ
- MIDWEST.CPZ
- MONROE.CPZ
- NURP.CPZ
- STRETDRT.CPZ

File name: NURP.CPZ

Files of type: Particle Size Distribution Files (*.CPZ)

Open Cancel

Copy Pond Data Paste Pond Data Cancel Delete Pond Continue

Select the Particle Size Distribution for the runoff entering the Wet Detention Pond

Wet Detention Control Device

Wet Detention Control Device

Outfall Control

Total Area: 100 acres

Pond Number 1

Select Particle Size Distribution File

C:\Program Files\WinSLAMM\NURP.CPZ

Initial Stage Elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Enter fraction (greater than 0) that you want to modify all pond areas by and then select 'Modify Pond Areas' button

Modify Pond Areas

Flow

Time (1.2 * Rainfall Duration)

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Add Outlet

Outlet Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. V - Notch Weir
- ☐ 3. Orifice
- ☐ 4. Cippoletti Basin

Selected Outlets (Max. 5) Double Click to Edit or Delete

Recalculate Cumulative Volume

Copy Pond Data

Paste Pond Data

Save this Pond as a WinDETPOND File

Cancel Delete Pond Continue

Enter the Initial Stage Elevation of the Wet Detention Pond.

The Peak to Average Flow Ratio default value is 3.8 based on monitoring many urban areas. Use a value of 2 for a triangular hydrograph.

Wet Detention Control Device

Wet Detention Control Device

Outfall Control

Total Area: 100 acres

Pond Number 1

Select Particle Size Distribution File

C:\Program Files\WinSLAMM\NURP.CPZ

Initial Stage Elevation (ft): 5

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000	0.000
1	0.10	0.500	0.025
2	3.00	0.750	1.838
3	5.00	1.000	3.588
4	7.00	1.250	5.838
5	8.00	1.350	7.138
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Add Outlet

Outlet Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. V - Notch Weir
- ☐ 3. Orifice
- ☐ 4. Seepage Basin
- ☐ 5. Natural Seepage
- ☐ 6. Evaporation
- ☐ 7. Other Outflow
- ☐ 8. Water Withdrawal
- ☐ 9. Broad Crested Weir
- ☐ 10. Vertical Stand Pipe
- ☐ 11. Stone Weeper

Edit Existing Outlet

Selected Outlets (Max. 5) Double Click to Edit or Delete

Recalculate Cumulative Volume

Save this Pond as a WinDETPOND File

Copy Pond Data

Paste Pond Data

Cancel

Delete Pond

Continue

Enter the Stage Area Data for the basin. At least five stage increments must be entered. The area of the basin at the datum must be zero.

The 'Cumulative Volume' is calculated for informational purposes only. The program divides the pond volume into much finer slices when routing runoff through the pond.

Wet Detention Control Device

Wet Detention Control Device

Outfall Control

Total Area: 100 acres

Pond Number 1

Select Particle Size Distribution File

C:\Program Files\WinSLAMM\NURP.CPZ

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000	0.000
1	0.10	0.500	0.025
2	3.00	0.750	1.838
3	5.00	1.000	3.588
4	7.00	1.250	5.838
5	8.00	1.350	7.138
6			
7			

Add Outlet

Outlet Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. V - Notch Weir
- ☐ 3. Orifice
- ☐ 4. Seepage Basin
- ☐ 5. Natural Seepage
- ☐ 6. Evaporation
- ☐ 7. Other Outflow
- ☐ 8. Water Withdrawal
- ☐ 9. Broad Crested Weir
- ☐ 10. Vertical Stand Pipe
- ☐ 11. Stone Weeper

Edit Existing Outlet

Selected Outlets (Max. 5) Double Click to Edit or Delete

Flow

Time (1.2 * Rainfall Duration)

Modify Pond Areas

18

19

20

Recalculate Cumulative Volume

Copy Pond Data

Paste Pond Data

Cancel

Delete Pond

Continue

Save this Pond as a WinDETPOND File

Diagram of what you want to modify all pond areas by and then select 'Modify Pond Areas' button

The pond geometry can be saved so that it can be directly read into **WinDETPOND**. Check the “Wet Detention Control Device” Help File Topic for more information.

Wet Detention Control Device

To add the outlet structure for the pond, select “Add Outlet”. Then select the outlet structure from the 11 options. Outlets must be defined from the top of the permanent pool to the top of the defined pond. A maximum of five outlets can be defined.

Broad Crested Weir

Outfall

Pond Number 1 Outlet Number 1

1. Weir Crest Length (ft) 10

2. Weir Crest Width (ft) 10

3. Discharge Coefficient (English Units) 0

☒ Default Discharge Coefficients

4. Height of Weir Opening (ft) 3

5. Height from Datum to Bottom of Weir Opening (ft) 5

Cancel Continue Delate

Initial Stage Elevation (ft): 5

Ratio: 3.8

Modify Pond Areas

Rainfall Duration)

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000	0.000
1	0.10	0.500	0.025
2	3.00	0.750	1.838
3	5.00	1.000	3.588
4	7.00	1.250	5.838
5	8.00	1.350	7.138
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Add Outlet

Outlet Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. V - Notch Weir
- ☐ 3. Orifice
- ☐ 4. Seepage Basin
- ☐ 5. Natural Seepage
- ☐ 6. Evaporation
- ☐ 7. Other Outflow
- ☐ 8. Water Withdrawal
- ☐ 9. Broad Crested Weir
- ☐ 10. Vertical Stand Pipe
- ☐ 11. Stone Weeper

Edit Existing Outlet

Selected Outlets (Max. 5) Double Click to Edit or Delete

Recalculate Cumulative Volume

Save this Pond as a WinDETPOND File

Copy Pond Data

Paste Pond Data

Cancel **Delete Pond** **Continue**

Wet Detention Control Device

To change an outlet, select “Edit Existing Outlet”, then double click on the outlet in the box below.

Wet Detention Control Device

Outfall Control

Total Area: 100 acres

Pond Number 1

Select Particle Size Distribution File

C:\Program Files\WinSLAMM\NURP.CPZ

Initial Stage Elevation (ft): 5

Peak to Average Flow Ratio: 3.8

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000	0.000
1	0.10	0.500	0.025
2	3.00	0.750	1.838
3	5.00	1.000	3.588
4	7.00	1.250	5.838
5	8.00	1.350	7.138
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Initial fraction (greater than 0.5) that you want to retain in all pond areas by selecting 'Modify Pond Areas' button

Modify Pond Areas

Recalculate Cumulative Volume

Copy Pond Data

Paste Pond Data

Cancel

Delete Pond

Continue

Add Outlet

Outlet Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. V - Notch Weir
- ☐ 3. Orifice
- ☐ 4. Seepage Basin
- ☐ 5. Natural Seepage
- ☐ 6. Evaporation
- ☐ 7. Other Outflow
- ☐ 8. Water Withdrawal
- ☐ 9. Broad Crested Weir
- ☐ 10. Vertical Stand Pipe
- ☐ 11. Stone Weeper

Edit Existing Outlet

Selected Outlets (Max. 5) Double Click to Edit or Delete

1 - Broad Crested Weir

Average Flow

Time (1.2 * Rainfall Duration)

Wet Detention Control Device

Wet Detention Control Device

Outfall Control

Total Area: 100 acres

Pond Number 1

Select Particle Size Distribution File

C:\Program Files\WinSLAMM\NURP.CPZ

Initial Stage Elevation (ft): 5

Peak to Average Flow Ratio: 3.8

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000	0.000
1	0.10	0.500	0.025
2	3.00	0.750	1.838
3	5.00	1.000	3.588
4	7.00	1.250	5.838
5	8.00	1.350	7.138
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Outlet Options:

- ☐ 1. Sharp Crested Weir
- ☐ 2. V - Notch Weir
- ☐ 3. Orifice
- ☐ 4. Seepage Basin
- ☐ 5. Natural Seepage
- ☐ 6. Evaporation
- ☐ 7. Other Outflow
- ☐ 8. Water Withdrawl
- ☐ 9. Broad Crested Weir
- ☐ 10. Vertical Stand Pipe
- ☐ 11. Stone Weeper

Edit Existing Outlet

Selected Outlets (Max. 5) Double Click to Edit or Delete

1 - Broad Crested Weir

Save this Pond as a WinDETPOND File

Cancel Delete Pond Continue

Recalculate Cumulative Volume

Copy Pond Data

Paste Pond Data

Average Flow

Time (1.2 * Rainfall Duration)

fraction (greater than 0.5) that you want to all pond areas by then select 'Modify Pond Areas' button

Modify Pond Areas

Data can be copied from one *.dat file and pasted into another one.



Control Devices – Porous Pavement



Porous Pavement Control Device

Porous Pavement Control Device

Land Use: Residential

Source Area: Driveways 1

Total Area: 5.14 Porous Pavement Number 1

Porous pavement area (acres):

Inflow Hydrograph Peak to Average Flow Ratio

Pavement Geometry and Properties

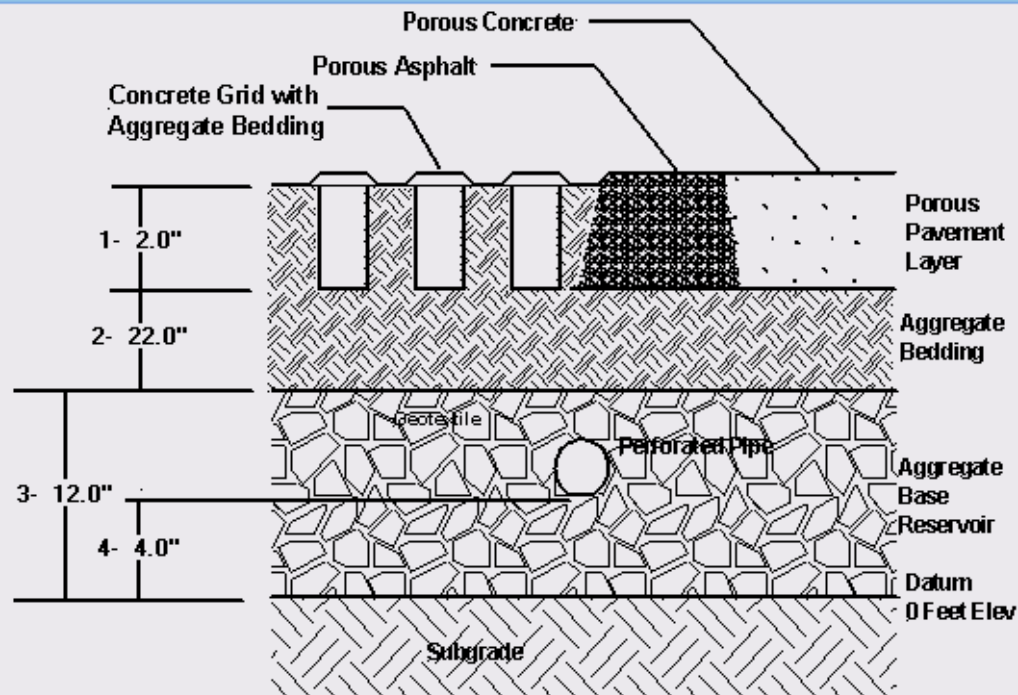
1 - Pavement Thickness (in)	2.0
Pavement Void Ratio (0-1)	0.20
2 - Aggregate Bedding Thickness (in)	22.0
Aggregate Bedding Void Ratio (0-1)	0.25
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Void Ratio (0-1)	0.80

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	8.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	4.0
Number of Perforated Pipe Underdrains	2
Subgrade Seepage Rate (in/hr) - select below or enter	0.05
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	1.60

Select Subgrade Seepage Rate

- ☐ Sand - 8 in/hr
☐ Loamy sand - 2.5 in/hr
☐ Sandy loam - 1.0 in/hr
☐ Loam - 0.5 in/hr
☐ Silt loam - 0.3 in/hr
☐ Sandy silt loam - 0.2 in/hr
☐ Clay loam - 0.1 in/hr
☐ Silty clay loam - 0.05 in/hr
☐ Sandy clay - 0.05 in/hr
☐ Silty clay - 0.04 in/hr
☐ Clay - 0.02 in/hr



Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	0.05
Percent of Infiltration Rate After 3 Years (0-100)	75.0
Percent of Infiltration Rate After 5 Years (0-100)	65.0
Percent of Original Infiltration Rate Upon Cleaning (0-100)	85.0
Time Period Until Complete Clogging Occurs (yrs)	6.0

Restorative Cleaning Frequency

- ☐ Never Cleaned
☐ Three Times per Year
☐ Semi-Annually
☐ Annually
☐ Every Two Years
☐ Every Three Years
☐ Every Four Years
☐ Every Five Years
☒ Every Seven Years
☐ Every Ten Years

[Continue](#)

[Cancel](#)

[Delete Control](#)

Porous Pavement Control Device

Porous Pavement Control Device

Land Use: Residential

Source Area: Driveways 1

Total Area: 5.14 Porous Pavement Number 1

Porous pavement area (acres):

Inflow Hydrograph Peak to Average Flow Ratio

Pavement Geometry and Properties

1 - Pavement Thickness (in)	2.0
Pavement Void Ratio (0-1)	0.20
2 - Aggregate Bedding Thickness (in)	22.0
Aggregate Bedding Void Ratio (0-1)	0.25
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Void Ratio (0-1)	0.80

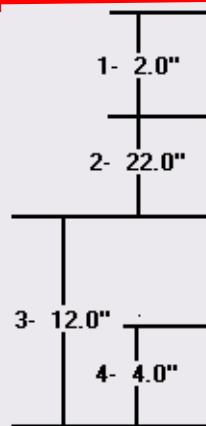
Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	8.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	4.0
Number of Perforated Pipe Underdrains	2
Subgrade Seepage Rate (in/hr) - select below or enter	0.05
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	1.60

Select Subgrade Seepage Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr

Concrete
Aggregate



Surfa
Inf

Initial Infiltration Rate	
Percent of Infiltration	
Percent of Infiltration rate After 3 Years (0-100)	60.0
Percent of Original Infiltration Rate Upon Cleaning (0-100)	85.0
Time Period Until Complete Clogging Occurs (yrs)	6.0

Enter the area of the Porous Pavement.

The area of porous pavement must be equal to the source area. If there is pavement that is not porous, then you must create two source areas - one with the porous pavement and one without.

Note: the Porous Pavement Control Device only treats the runoff that falls directly on it. It does not treat any run-on from other areas in the subbasin.

- ☐ Every Three Years
- ☐ Every Four Years
- ☐ Every Five Years
- ☒ Every Seven Years
- ☐ Every Ten Years

Continue

Cancel

Delete Control

Porous Pavement Control Device

Porous Pavement Control Device

Land Use: Residential

Source Area: Driveways 1

Total Area: 5.14 Porous Pavement Number 1

Porous pavement area (acres):

Inflow Hydrograph Peak to Average Flow Ratio

Pavement Geometry and Properties

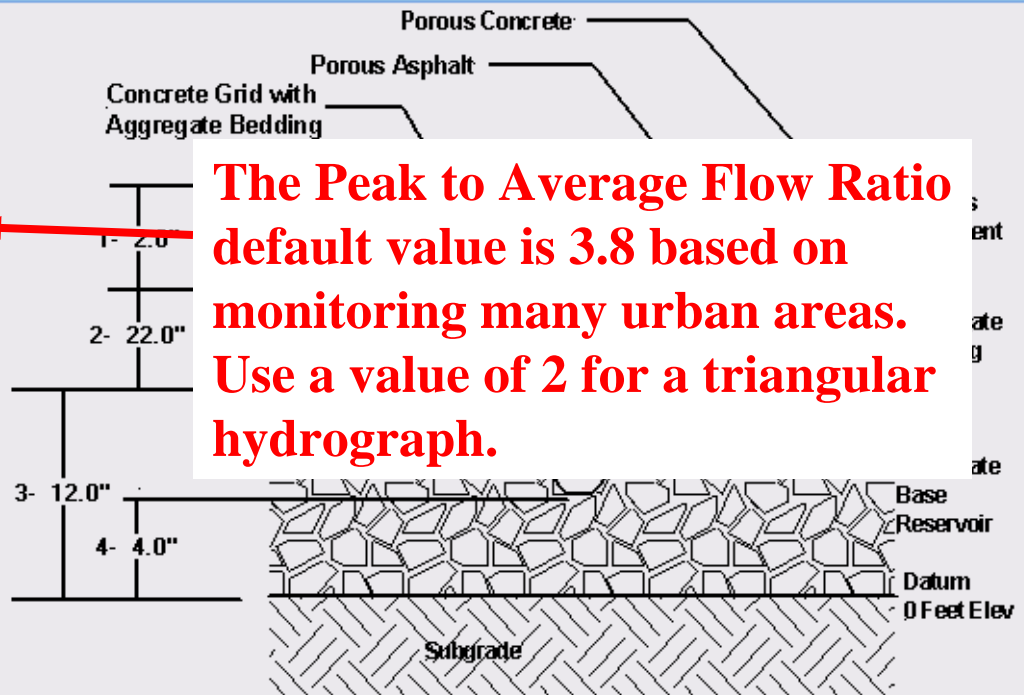
1 - Pavement Thickness (in)	2.0
Pavement Void Ratio (0-1)	0.20
2 - Aggregate Bedding Thickness (in)	22.0
Aggregate Bedding Void Ratio (0-1)	0.25
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Void Ratio (0-1)	0.80

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	8.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	4.0
Number of Perforated Pipe Underdrains	2
Subgrade Seepage Rate (in/hr) - select below or enter	0.05
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	1.60

Select Subgrade Seepage Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr



The Peak to Average Flow Ratio default value is 3.8 based on monitoring many urban areas. Use a value of 2 for a triangular hydrograph.

Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	0.05
Percent of Infiltration Rate After 3 Years (0-100)	75.0
Percent of Infiltration Rate After 5 Years (0-100)	65.0
Percent of Original Infiltration Rate Upon Cleaning (0-100)	85.0
Time Period Until Complete Clogging Occurs (yrs)	6.0

Restorative Cleaning Frequency

- ☐ Never Cleaned
- ☐ Three Times per Year
- ☐ Semi-Annually
- ☐ Annually
- ☐ Every Two Years
- ☐ Every Three Years
- ☐ Every Four Years
- ☐ Every Five Years
- ☒ Every Seven Years
- ☐ Every Ten Years

Continue

Cancel

Delete Control

Porous Pavement Control Device

Porous Pavement Control Device

Land Use: Residential

Source Area: Driveways 1

Total Area: 5.14 Porous Pavement Number 1

Porous pavement area (acres):

Inflow Hydrograph Peak to Average Flow Ratio

Pavement Geometry and Properties

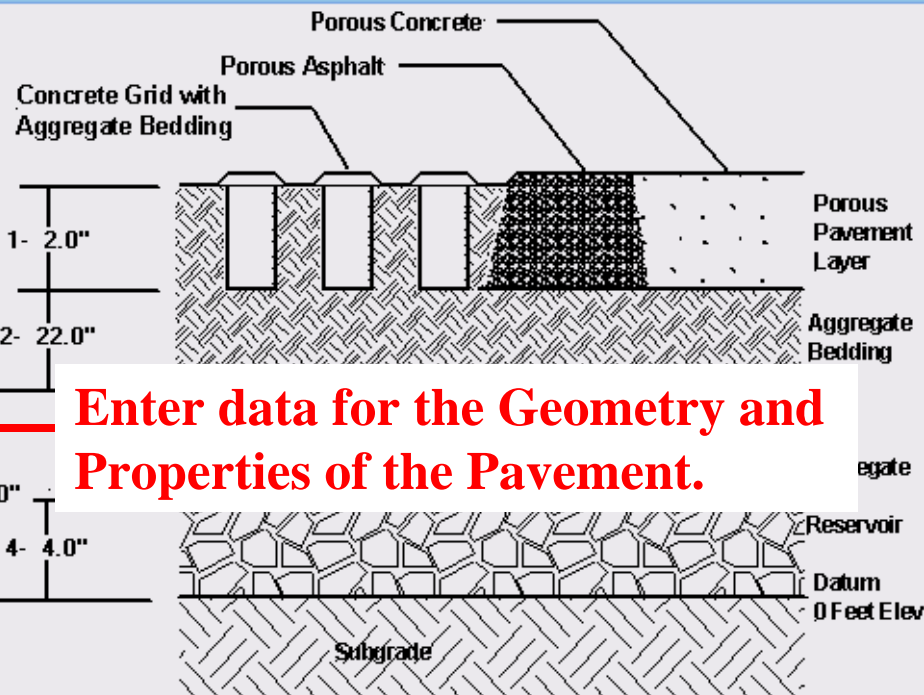
1 - Pavement Thickness (in)	2.0
Pavement Void Ratio (0-1)	0.20
2 - Aggregate Bedding Thickness (in)	22.0
Aggregate Bedding Void Ratio (0-1)	0.25
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Void Ratio (0-1)	0.80

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	8.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	4.0
Number of Perforated Pipe Underdrains	2
Subgrade Seepage Rate (in/hr) - select below or enter	0.05
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	1.60

Select Subgrade Seepage Rate

- ☐ Sand - 8 in/hr
☐ Loamy sand - 2.5 in/hr
☐ Sandy loam - 1.0 in/hr
☐ Loam - 0.5 in/hr
☐ Silt loam - 0.3 in/hr
☐ Sandy silt loam - 0.2 in/hr
☐ Clay loam - 0.1 in/hr
☐ Silty clay loam - 0.05 in/hr
☐ Sandy clay - 0.05 in/hr
☐ Silty clay - 0.04 in/hr
☐ Clay - 0.02 in/hr



Enter data for the Geometry and Properties of the Pavement.

Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	0.05
Percent of Infiltration Rate After 3 Years (0-100)	75.0
Percent of Infiltration Rate After 5 Years (0-100)	65.0
Percent of Original Infiltration Rate Upon Cleaning (0-100)	85.0
Time Period Until Complete Clogging Occurs (yrs)	6.0

Restorative Cleaning Frequency

- ☐ Never Cleaned
☐ Three Times per Year
☐ Semi-Annually
☐ Annually
☐ Every Two Years
☐ Every Three Years
☐ Every Four Years
☐ Every Five Years
☒ Every Seven Years
☐ Every Ten Years

Continue

Cancel

Delete Control

Porous Pavement Control Device

Porous Pavement Control Device

Land Use: Residential

Source Area: Driveways 1

Total Area: 5.14 Porous Pavement Number 1

Porous pavement area (acres):

Inflow Hydrograph Peak to Average Flow Ratio

Pavement Geometry and Properties

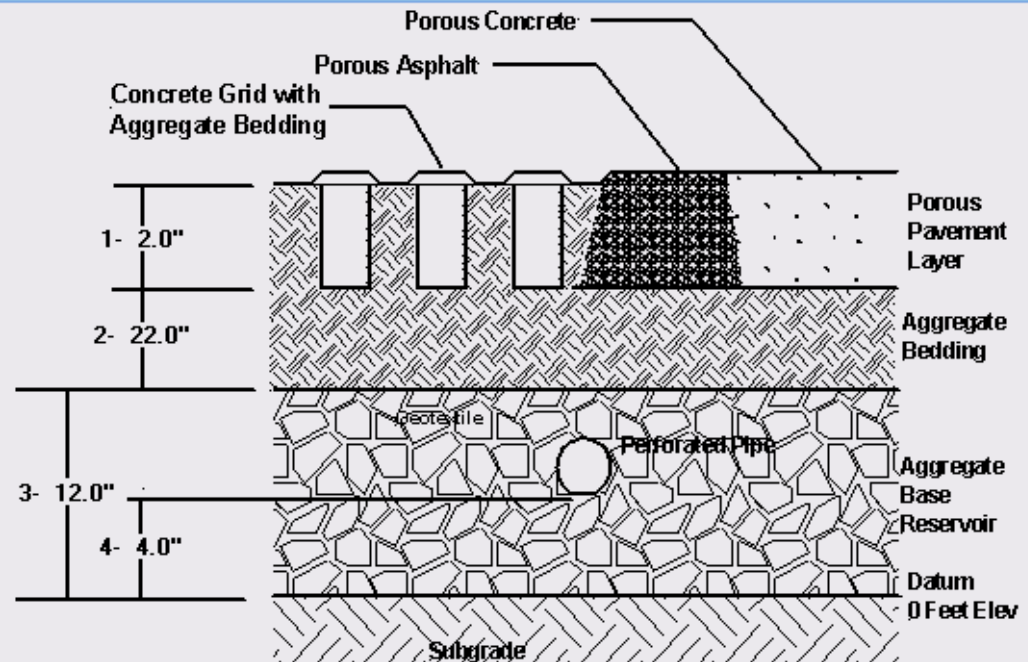
1 - Pavement Thickness (in)	2.0
Pavement Void Ratio (0-1)	0.20
2 - Aggregate Bedding Thickness (in)	22.0
Aggregate Bedding Void Ratio (0-1)	0.25
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Void Ratio (0-1)	0.80

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	8.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	4.0
Number of Perforated Pipe Underdrains	2
Subgrade Seepage Rate (in/hr) - select below or enter	0.05
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	1.60

Select Subgrade Seepage Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr



Enter data for the Outlet.

Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	0.05
Percent of Infiltration Rate After 3 Years (0-100)	75.0
Percent of Infiltration Rate After 5 Years (0-100)	65.0
Percent of Original Infiltration Rate Upon Cleaning (0-100)	85.0
Time Period Until Complete Clogging Occurs (yrs)	6.0

Cleaning Frequency

- ☐ Never Cleaned
- ☐ Three Times per Year
- ☐ Semi-Annually
- ☐ Annually
- ☐ Every Two Years
- ☐ Every Three Years
- ☐ Every Four Years
- ☐ Every Five Years
- ☒ Every Seven Years
- ☐ Every Ten Years

Continue

Cancel

Delte Control

Porous Pavement Control Device

Porous Pavement Control Device

Land Use: Residential

Source Area: Driveways 1

Total Area: 5.14 Porous Pavement Number 1

Porous pavement area (acres):

Inflow Hydrograph Peak to Average Flow Ratio

Pavement Geometry and Properties

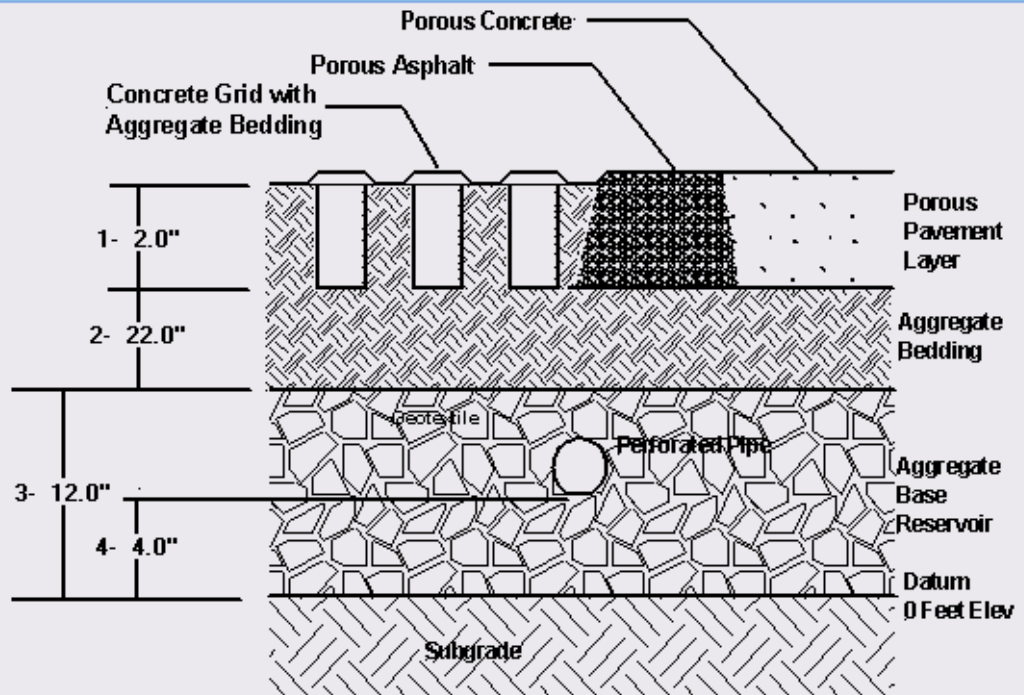
1 - Pavement Thickness (in)	2.0
Pavement Void Ratio (0-1)	0.20
2 - Aggregate Bedding Thickness (in)	22.0
Aggregate Bedding Void Ratio (0-1)	0.25
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Void Ratio (0-1)	0.80

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	8.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	4.0
Number of Perforated Pipe Underdrains	2
Subgrade Seepage Rate (in/hr) - select below or enter	0.05
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	1.60

Select Subgrade Seepage Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr



Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	0.05
Percent of Infiltration Rate After 3 Years (0-100)	75.0
Percent of Infiltration Rate After 5 Years (0-100)	
Percent of Infiltration Rate After 10 Years (0-100)	
Time Period U	

Restorative Cleaning Frequency

- ☐ Never Cleaned
- ☐ Three Times per Year
- ☐ Semi-Annually
- ☐ Annually
- ☐ Every Two Years

Values are filled in in the schematic above as values are entered.

Continue

Cancel

Delete Control

Porous Pavement Control Device

Porous Pavement Control Device

Land Use: Residential

Source Area: Driveways 1

Total Area: 5.14 Porous Pavement Number 1

Porous pavement area (acres):

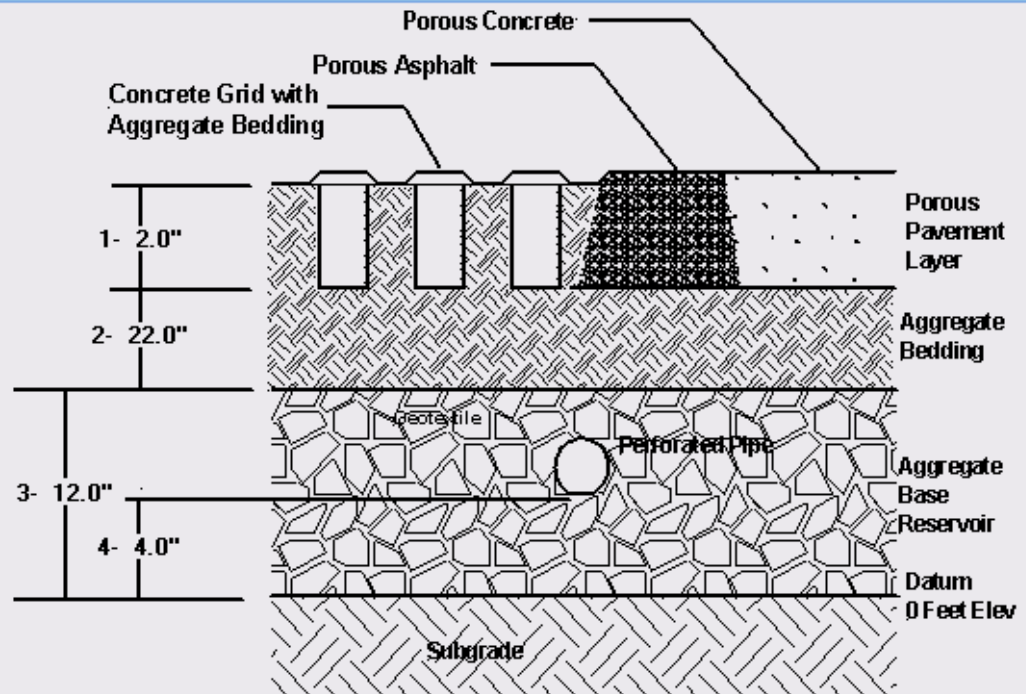
Inflow Hydrograph Peak to Average Flow Ratio

Select the Seepage Rate of the Subgrade from the list of default values or enter the value if known.

4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	4.0
Number of Perforated Pipe Underdrains	2
Subgrade Seepage Rate (in/hr) - select below or enter	0.05
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	1.60

Select Subgrade Seepage Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr



Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	0.05
Percent of Infiltration Rate After 3 Years (0-100)	75.0
Percent of Infiltration Rate After 5 Years (0-100)	65.0
Percent of Original Infiltration Rate Upon Cleaning (0-100)	85.0
Time Period Until Complete Clogging Occurs (yrs)	6.0

Restorative Cleaning Frequency

- ☐ Never Cleaned
- ☐ Three Times per Year
- ☐ Semi-Annually
- ☐ Annually
- ☐ Every Two Years
- ☐ Every Three Years
- ☐ Every Four Years
- ☐ Every Five Years
- ☒ Every Seven Years
- ☐ Every Ten Years

[Continue](#)

[Cancel](#)

[Delete Control](#)

Porous Pavement Control Device

Porous Pavement Control Device

Land Use: Residential

Source Area: Driveways 1

Total Area: 5.14 Porous Pavement Number 1

Porous pavement area (acres):

Inflow Hydrograph Peak to Average Flow Ratio

Pavement Geometry and Properties

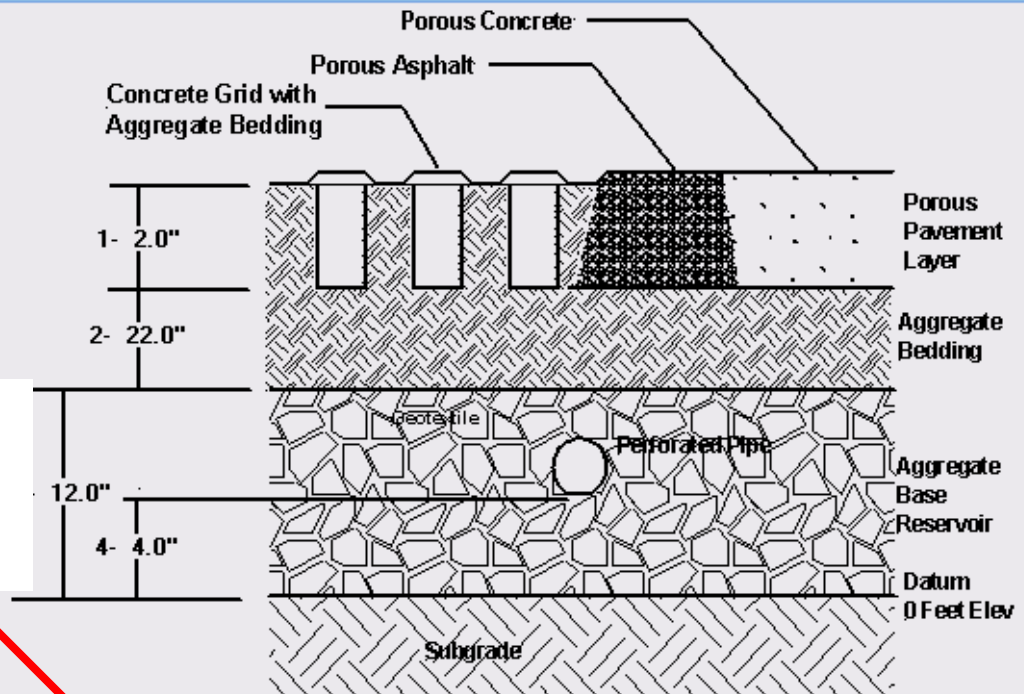
1 - Pavement Thickness (in)	2.0
Pavement Void Ratio (0-1)	0.20

**Enter the remaining data
for the Surface
Pavement Layer.**

1 - Surface Layer Subgrade Infiltration Rate (inches)	8.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	4.0
Number of Perforated Pipe Underdrains	2
Subgrade Seepage Rate (in/hr) - select below or enter	0.05
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	1.60

Select Subgrade Seepage Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr



Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	0.05
Percent of Infiltration Rate After 3 Years (0-100)	75.0
Percent of Infiltration Rate After 5 Years (0-100)	65.0
Percent of Original Infiltration Rate Upon Cleaning (0-100)	85.0
Time Period Until Complete Clogging Occurs (yrs)	6.0

Restorative Cleaning Frequency

- ☐ Never Cleaned
- ☐ Three Times per Year
- ☐ Semi-Annually
- ☐ Annually
- ☐ Every Two Years
- ☐ Every Three Years
- ☐ Every Four Years
- ☐ Every Five Years
- ☒ Every Seven Years
- ☐ Every Ten Years

Continue

Cancel

Dele^te Control

Porous Pavement Control Device

Porous Pavement Control Device

Land Use: Residential

Source Area: Driveways 1

Total Area: 5.14 Porous Pavement Number 1

Porous pavement area (acres):

Inflow Hydrograph Peak to Average Flow Ratio

Pavement Geometry and Properties

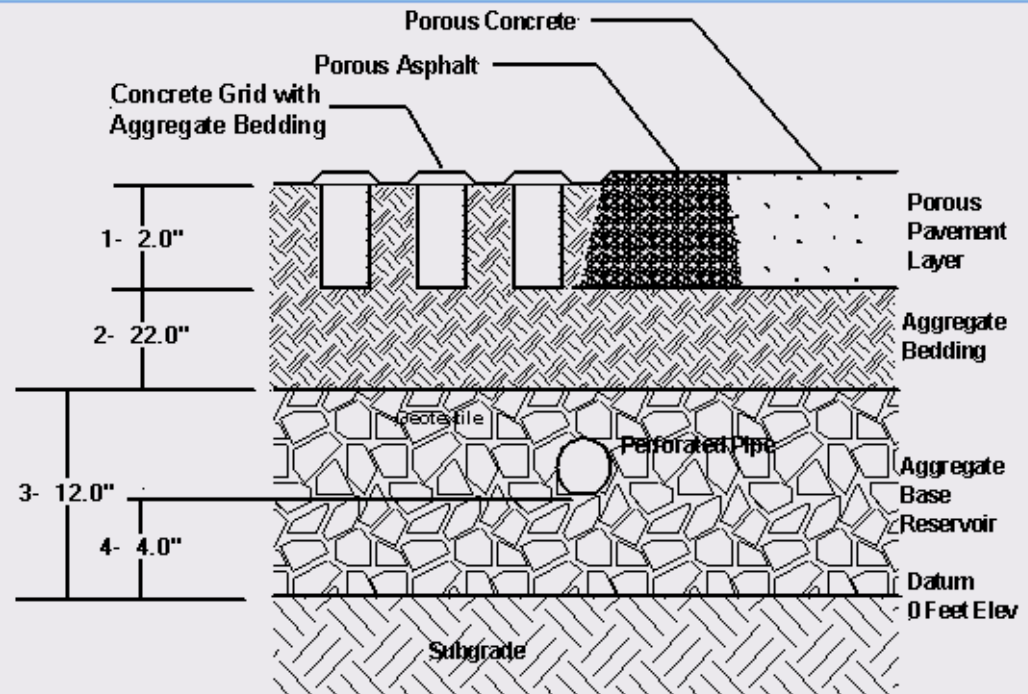
1 - Pavement Thickness (in)	2.0
Pavement Void Ratio (0-1)	0.20
2 - Aggregate Bedding Thickness (in)	22.0
Aggregate Bedding Void Ratio (0-1)	0.25
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Void Ratio (0-1)	0.80

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	8.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	4.0
Number of Perforated Pipe Underdrains	2
Subgrade Seepage Rate (in/hr) - select below or enter	0.05
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	1.60

Select Subgrade Seepage Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr



Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	0.05
Percent of Infiltration Rate After 3 Years (0-100)	75.0
Percent of Infiltration Rate After 5 Years (0-100)	65.0
Percent of Original Infiltration Rate Upon Cleaning (0-100)	85.0
Time Period Until Complete Clogging Occurs (yrs)	6.0

Restorative Cleaning Frequency

- ☐ Never Cleaned
- ☐ Three Times per Year
- ☐ Semi-Annually
- ☐ Annually
- ☐ Every Two Years
- ☐ Every Three Years
- ☐ Every Four Years
- ☐ Every Five Years
- ☒ Every Seven Years
- ☐ Every Ten Years

Finally, enter the Restorative Cleaning Frequency.



Control Devices - Other



Other Control Device

Other Control Device

Land Use: Residential

Source Area: Roofs 1

1. Pollutant concentration reduction (fraction): 0.00

2. Water volume (flow) reduction (fraction): 0.00

3. Area served by Other Control (acres): 2.06

Total Area: 2.06 acres

Continue Clear Delete Control

Enter the Percent Reduction in Pollutant Concentration and Runoff, and the Area served by the Control Practice. The percent reduction will be applied uniformly to the Source Area's Pollutant Load and Runoff Volume generated.

Note: The Other Control Device should only be used if monitored data is available and applicable.



Control Devices – Street Cleaning



Street Cleaning Control Device

Street Cleaning Control Device

Land Use: Residential

Total Area: 1 acres

Source Area: Street Area 2

Select ☒ Street Cleaning Dates OR ☐ Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

- ☐ 7 Passes per Week
- ☐ 5 Passes per Week
- ☐ 4 Passes per Week
- ☐ 3 Passes per Week
- ☐ 2 Passes per Week
- ☐ One Pass per Week
- ☐ One Pass Every Two Weeks
- ☐ One Pass Every Four Weeks
- ☐ One Pass Every Eight Weeks
- ☐ One Pass Every Twelve Weeks
- ☐ Two Passes per Year (Spring and Fall)
- ☐ One Pass Each Spring

Model Run Start Date: 01/01/85

Model Run End Date: 12/31/85

Copy Cleaning Data

Final cleaning period
ending date (MM/DD/YY):

Paste Cleaning Data

Continue

Clear

Cancel Edits

Delete Control

Type of Street Cleaner

- ☒ Mechanical Broom Cleaner
- ☐ Vacuum Assisted Cleaner

Street Cleaner Productivity

- ☐ 1. Coefficients based on street texture, parking density and parking controls
- ☐ 2. Other (specify equation coefficients)

Equation coefficient M
(slope, $M < 1$)

Equation coefficient B
(intercept, $B > 1$)

Parking Densities

- ☐ 1. None
- ☐ 2. Light
- ☐ 3. Medium
- ☐ 4. Extensive (short term)
- ☐ 5. Extensive (long term)

Are Parking Controls Imposed?

- ☐ Yes
- ☐ No

Street Cleaning Control Device

Enter the Street Cleaning Start Date, Frequency, and Street Cleaning End Date if known.

Street Cleaning Control Device

Land Use: Residential Total /
Source Area: Street Area 2

Select ☐ Street Cleaning Dates OR ☒ Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		▼
2		▼
3		▼
4		▼
5		▼
6		▼
7		▼
8		▼
9		▼
10		▼

Model Run Start Date: 01/01/85 Model Run End Date: 12/31.

Final cleaning period ending date (MM/DD/YY):

Street Cleaner

☐ Vacuum Assisted Cleaner

Street Cleaner Productivity

☐ 1. Coefficients based on street texture, parking density and parking controls

☐ 2. Other (specify equation coefficients)

Equation coefficient M (slope, $M < 1$)

Equation coefficient B (intercept, $B > 1$)

Parking Densities

☐ 1. None

☐ 2. Light

☐ 3. Heavy

Are Parking Controls Imposed?

☐ Yes ☐ No

Or, Enter the Street Cleaning Frequency.

Street Cleaning Control Device

Street Cleaning Control Device

Land Use: Residential

Total Area: 1 acres

Source Area: Street Area 2

Enter the Type of Street Cleaner

Select

☐ Street Cleaning Dates

☐ Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		▼
2		▼
3		▼
4		▼
5		▼
6		▼
7		▼
8		▼
9		▼
10		▼

- ☐ 7 Passes per Week
- ☐ 5 Passes per Week
- ☐ 4 Passes per Week
- ☐ 3 Passes per Week
- ☐ 2 Passes per Week
- ☒ One Pass per Week
- ☐ One Pass Every Two Weeks
- ☐ One Pass Every Four Weeks
- ☐ One Pass Every Eight Weeks
- ☐ One Pass Every Twelve Weeks
- ☐ Two Passes per Year (Spring and Fall)
- ☐ One Pass Each Spring

Model Run Start Date: 01/01/85

Model Run End Date: 12/31/85

Copy Cleaning Data

Final cleaning period
ending date (MM/DD/YY):

Paste Cleaning Data

Continue

Clear

Cancel Edits

Delete Control

Type of Street Cleaner

- ☒ Mechanical Broom Cleaner
- ☐ Vacuum Assisted Cleaner

Street Cleaner Productivity

☒ 1. Coefficients based on street texture, parking density and parking controls

☐ 2. Other (specify equation coefficients)

Equation coefficient M
(slope, $M < 1$)

Equation coefficient B
(intercept, $B > 1$)

Parking Densities

- ☐ 1. None
- ☐ 2. Light
- ☐ 3. Medium
- ☐ 4. Extensive (short term)
- ☐ 5. Extensive (long term)

Are Parking Controls Imposed?

☐ Yes

☐ No

Street Cleaning Control Device

Street Cleaning Control Device

Land Use: Residential
Source Area: Street Area 2

Total Area: 1 acres

Select ☐ Street Cleaning Dates OR ☒ Street Cleaning Frequency

**Enter the Street Cleaner Productivity coefficients if known,
Or use the defaults based on research data.**

4		▼
5		▼
6		▼
7		▼
8		▼
9		▼
10		▼

- ☐ One Pass Every Two Weeks
- ☐ One Pass Every Four Weeks
- ☐ One Pass Every Eight Weeks
- ☐ One Pass Every Twelve Weeks
- ☐ Two Passes per Year (Spring and Fall)
- ☐ One Pass Each Spring

Model Run Start Date: 01/01/85

Model Run End Date: 12/31/85

Copy Cleaning Data

Final cleaning period
ending date (MM/DD/YY):

Paste Cleaning Data

Continue

Clear

Cancel Edits

Delete Control

Type of Street Cleaner

- ☒ Mechanical Broom Cleaner
- ☐ Vacuum Assisted Cleaner

Street Cleaner Productivity

- ☒ 1. Coefficients based on street texture, parking density and parking controls
- ☐ 2. Other (specify equation coefficients)

Equation coefficient M
(slope, $M < 1$)

Equation coefficient B
(intercept, $B > 1$)

Parking Densities

- ☐ 1. None
- ☐ 2. Light
- ☐ 3. Medium
- ☐ 4. Extensive (short term)
- ☐ 5. Extensive (long term)

Are Parking Controls Imposed?

- ☐ Yes
- ☐ No

Street Cleaning Control Device

Street Cleaning Control Device

Land Use: Residential Total Area: 1 acres
Source Area: Street Area 2

Select ☐ Street Cleaning Dates OR ☒ Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		▼
2		▼
3		▼
4		▼
5		▼
6		▼
7		▼
8		▼
9		▼
10		▼

Model Run Start Date: ()
Final cleaning period ending date (MM/DD/YY): ()

**Finally, Enter the Parking Density
And if Parking Controls are Imposed.**

Type of Street Cleaner

- ☒ Mechanical Broom Cleaner
- ☐ Vacuum Assisted Cleaner

Street Cleaner Productivity

- ☒ 1. Coefficients based on street texture, parking density and parking controls
- ☐ 2. Other (specify equation coefficients)

Equation coefficient M (slope, $M < 1$)
Equation coefficient B (intercept, $B > 1$)

Parking Densities

- ☐ 1. None
- ☒ 2. Light
- ☐ 3. Medium
- ☐ 4. Extensive (short term)
- ☐ 5. Extensive (long term)

Are Parking Controls Imposed?

- ☐ Yes
- ☒ No

Street Cleaning Control Device

Street Cleaning Control Device

Land Use: Residential Total Area: 1 acres
Source Area: Street Area 2

Select ☐ Street Cleaning Dates OR ☒ Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

☐ 7 Passes per Week
☐ 5 Passes per Week
☐ 4 Passes per Week
☐ 3 Passes per Week
☐ 2 Passes per Week

Type of Street Cleaner
☒ Mechanical Broom Cleaner
☐ Vacuum Assisted Cleaner

Street Cleaner Productivity
☒ 1. Coefficients based on street texture, parking density and parking controls
☐ 2. Other (specify equation coefficients)

M 0.55
B 310

☐ and Fall)
☐ One Pass Each Spring

Model Run Start Date: 01/01/85 Model Run End Date: 12/31/85

Final cleaning period ending date (MM/DD/YY):

Copy Cleaning Data
Paste Cleaning Data

☐ 1. None
☒ 2. Light
☐ 3. Medium
☐ 4. Extensive (short term)
☐ 5. Extensive (long term)

Are Parking Controls Imposed?
☐ Yes ☒ No

Continue C~~l~~ear C~~a~~ncel Edits Delete Control



Control Devices – Biofiltration



Biofiltration Control Device

Biofiltration Control Device

Land Use: Residential
Source Area: Roofs 1

Total Area: 5 acres
Biofilter Number 1

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- ☐ Rooftop 1 ☐ Playground 1 ☐ Large Landscaped Area 1
☐ Rooftop 2 ☐ Playground 2

Device Properties

Top Area (sf)	
Bottom Area (sf)	
Total Depth (ft)	
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	1.00
Infil. Rate Fraction-Sides (0-1)	1.00
Rock Filled Depth (ft)	
Rock Fill Void Ratio (0-1)	
Engineered Soil Type	
Engineered Soil Infiltration Rate (in/hr)	
Engineered Soil Depth (ft)	
Engineered Soil Void Ratio (0-1)	
Percent solids reduction due to Engineered Soil (0-100)	
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Land Use	1

Add Outlet/

Outlet/Disch

- ☐ 1. Sharp Cre
☐ 2. Broad Cre
☐ 3. Vertical Stand Pipe
☐ 4. Evaporation
☐ 5. Rain Barrel/Cistern
☐ 6. Underdrain Outlet

Edit Existing Outlet

Selected Outlets

Change Geometry

Enter data regarding the Biofiltration Device(s) physical characteristics.

The values will appear in the diagram below.

Biofilter Geometry Schematic

Copy Biofilter Data

Paste Biofilter Data

Select Native Soil Infiltration Rate

- ☐ Sand - 8 in/hr ☐ Clay loam - 0.1 in/hr
☐ Loamy sand - 2.5 in/hr ☐ Silty clay loam - 0.05 in/hr
☐ Sandy loam - 1.0 in/hr ☐ Sandy clay - 0.05 in/hr
☐ Loam - 0.5 in/hr ☐ Silty clay - 0.04 in/hr
☐ Silt loam - 0.3 in/hr ☐ Clay - 0.02 in/hr
☐ Sandy silt loam - 0.2 in/hr ☐ Rain Barrel/Cistern - 0.00 in/hr

Route Through Wet Detention Pond First

Use Random Number Generation to Account for Infiltration Rate Uncertainty

Select Particle Size File

Refresh Schematic

Delete

Cancel

Continue

Biofiltration Control Device

Biofiltration Control Device

Land Use: Residential
Source Area: Roofs 1

Total Area: 5 acres
Biofilter Number 1

Device Properties

Top Area (sf)	
Bottom Area (sf)	
Total Depth (ft)	
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	1.00
Infil. Rate Fraction-Sides (0-1)	1.00
Rock Filled Depth (ft)	
Rock Fill Void Ratio (0-1)	
Engineered Soil Type	
Engineered Soil Infiltration Rate (in/hr)	
Engineered Soil Depth (ft)	
Engineered Soil Void Ratio (0-1)	
Percent solids reduction due to Engineered Soil (0-100)	
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Land Use	1

Add Outlet/ Discharge

Outlet/Discharge Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. Broad Crested Weir
- ☐ 3. Vertical Stand Pipe
- ☐ 4. Evaporation
- ☐ 5. Rain Barrel/Cistern
- ☐ 6. Underdrain Outlet

Edit Existing Outlet

Selected Outlets

Change Geometry

Copy Biofilter Data

Paste Biofilter Data

Select Native Soil Infiltration Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr
- ☐ Rain Barrel/Cistern - 0.00 in/hr

Route Through
Wet Detention
Pond First

Use Random
Number
Generation to
Account for
Infiltration Rate
Uncertainty

Select Particle
Size File

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- ☐ Rooftop 1
- ☐ Rooftop 2
- ☐ Rooftop 3
- ☐ Rooftop 4
- ☐ Rooftop 5
- ☐ Paved Parking/Storage 1
- ☐ Paved Parking/Storage 2
- ☐ Paved Parking/Storage 3
- ☐ Unpaved Prkng/Storage 1
- ☐ Unpaved Prkng/Storage 2
- ☐ Playground 1
- ☐ Playground 2
- ☐ Driveways 1
- ☐ Driveways 2
- ☐ Driveways 3
- ☐ Sidewalks/Walks 1
- ☐ Sidewalks/Walks 2
- ☐ Street Area 1
- ☐ Street Area 2
- ☐ Street Area 3
- ☐ Large Landscaped Area 1
- ☐ Undeveloped Area
- ☐ Small Landscaped Area 1
- ☐ Small Landscaped Area 2
- ☐ Small Landscaped Area 3
- ☐ Other Pervious Area
- ☐ Other Dir Cnctd Imp Area
- ☐ Other Part Cnctd Imp Area
- ☐ Paved Land and Shoulder 1
- ☐ Paved Land and Shoulder 2
- ☐ Paved Land and Shoulder 3
- ☐ Paved Land and Shoulder 4
- ☐ Paved Land and Shoulder 5
- ☐ Large Turf Areas
- ☐ Undeveloped Areas
- ☐ Other Pervious Areas
- ☐ Other Directly Cnctd Imp
- ☐ Other Partially Cnctd Imp

Biofilter Geometry Schematic

If unknown, select the Native Soil Seepage Rate from the list of default values

Biofiltration Control Device

Biofiltration Control Device

Land Use: Residential
Source Area: Roofs 1

Total Area: 5 acres
Biofilter Number 1

Device Properties

Top Area (sf)	
Bottom Area (sf)	
Total Depth (ft)	
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	1.00
Infil. Rate Fraction-Sides (0-1)	1.00
Rock Filled Depth (ft)	
Rock Fill Void Ratio (0-1)	
Engineered Soil Type	
Engineered Soil Infiltration Rate (in/hr)	
Engineered Soil Depth (ft)	
Engineered Soil Void Ratio (0-1)	
Percent solids reduction due to Engineered Soil (0-100)	
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Land Use	1

Add Outlet/ Discharge

Outlet/Discharge Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. Broad Crested Weir
- ☐ 3. Vertical Stand Pipe
- ☐ 4. Evaporation
- ☐ 5. Rain Barrel/Cistern
- ☐ 6. Underdrain

Edit Existing

Selected Outlets

Change Geometry

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- | | | |
|--|--|--|
| <input type="checkbox"/> Rooftop 1 | <input type="checkbox"/> Playground 1 | <input type="checkbox"/> Large Landscaped Area 1 |
| <input type="checkbox"/> Rooftop 2 | <input type="checkbox"/> Playground 2 | |
| <input type="checkbox"/> Rooftop 3 | <input type="checkbox"/> Driveways 1 | <input type="checkbox"/> Undeveloped Area |
| <input type="checkbox"/> Rooftop 4 | <input type="checkbox"/> Driveways 2 | <input type="checkbox"/> Small Landscaped Area 1 |
| <input type="checkbox"/> Rooftop 5 | <input type="checkbox"/> Driveways 3 | <input type="checkbox"/> Small Landscaped Area 2 |
| <input type="checkbox"/> Paved Parking/Storage 1 | <input type="checkbox"/> Sidewalks/Walks 1 | <input type="checkbox"/> Small Landscaped Area 3 |
| <input type="checkbox"/> Paved Parking/Storage 2 | <input type="checkbox"/> Sidewalks/Walks 2 | <input type="checkbox"/> Other Pervious Area |
| <input type="checkbox"/> Paved Parking/Storage 3 | <input type="checkbox"/> Street Area 1 | <input type="checkbox"/> Other Dir Cnctd Imp Area |
| <input type="checkbox"/> Unpaved Prkng/Storage 1 | <input type="checkbox"/> Street Area 2 | <input type="checkbox"/> Other Part Cnctd Imp Area |
| <input type="checkbox"/> Unpaved Prkng/Storage 2 | <input type="checkbox"/> Street Area 3 | |

If applicable, check the box to account for the uncertainty in the system.

Route Through
Wet Detention
Pond First

☐ Use Random
Number
Generation to
Account for
Infiltration Rate
Uncertainty

Biofilter Geometry Schematic

Refresh Schematic

Delete

Cancel

Continue

Select Particle
Size File

Select Native Soil Infiltration Rate

- | | |
|---|--|
| <input type="radio"/> Sand - 8 in/hr | <input type="radio"/> Clay loam - 0.1 in/hr |
| <input type="radio"/> Loamy sand - 2.5 in/hr | <input type="radio"/> Silty clay loam - 0.05 in/hr |
| <input type="radio"/> Sandy loam - 1.0 in/hr | <input type="radio"/> Sandy clay - 0.05 in/hr |
| <input type="radio"/> Loam - 0.5 in/hr | <input type="radio"/> Silty clay - 0.04 in/hr |
| <input type="radio"/> Silt loam - 0.3 in/hr | <input type="radio"/> Clay - 0.02 in/hr |
| <input type="radio"/> Sandy silt loam - 0.2 in/hr | <input type="radio"/> Rain Barrel/Cistern - 0.00 in/hr |

Biofiltration Control Device

Land Use: Residential
Source Area: Roofs 1

Total Area: 5 acres
Biofilter Number 1

Device Properties

Top Area (sf)	
Bottom Area (sf)	
Total Depth (ft)	
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	
Infil. Rate Fraction-Sides (0-1)	
Rock Filled Depth (ft)	
Rock Fill Void Ratio (0-1)	
Engineered Soil Type	
Engineered Soil Infiltration Rate (in/hr)	
Engineered Soil Depth (ft)	
Engineered Soil Void Ratio (0-1)	
Percent solids reduction due to Engineered Soil (0-100)	
Inflow Hydrograph Peak to Average Flow Ratio	
Number of Devices in Source Area or Land Use	1

Add Outlet/ Discharge

Outlet/Discharge Options

- ☐ 1. Sharp Crested Weir
☐ 2. Broad Crested Weir

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- | | | |
|--|--|--|
| <input type="checkbox"/> Rooftop 1 | <input type="checkbox"/> Playground 1 | <input type="checkbox"/> Large Landscaped Area 1 |
| <input type="checkbox"/> Rooftop 2 | <input type="checkbox"/> Playground 2 | <input type="checkbox"/> Undeveloped Area |
| <input type="checkbox"/> Rooftop 3 | <input type="checkbox"/> Driveways 1 | <input type="checkbox"/> Small Landscaped Area 1 |
| <input type="checkbox"/> Rooftop 4 | <input type="checkbox"/> Driveways 2 | <input type="checkbox"/> Small Landscaped Area 2 |
| <input type="checkbox"/> Rooftop 5 | <input type="checkbox"/> Driveways 3 | <input type="checkbox"/> Small Landscaped Area 3 |
| <input type="checkbox"/> Paved Parking/Storage 1 | <input type="checkbox"/> Sidewalks/Walks 1 | <input type="checkbox"/> Other Pervious Area |
| <input type="checkbox"/> Paved Parking/Storage 2 | <input type="checkbox"/> Sidewalks/Walks 2 | <input type="checkbox"/> Other Dir Cnctd Imp Area |
| | Area 1 | <input type="checkbox"/> Other Part Cnctd Imp Area |
| | Area 2 | |
| | Area 3 | |
| er 1 | <input type="checkbox"/> Large Turf Areas | |
| er 2 | <input type="checkbox"/> Undeveloped Areas | |
| er 3 | <input type="checkbox"/> Other Pervious Areas | |
| er 4 | <input type="checkbox"/> Other Directly Cnctd Imp | |
| er 5 | <input type="checkbox"/> Other Partially Cnctd Imp | |

In version 9.4.0, the model will route the hydrograph and particle size distribution from a wet detention pond to a biofilter. This routing can only be done at the Outfall in version 9.4.0.

Change Geometry

Geometry Schematic

Copy Biofilter Data

Paste Biofilter Data

Select Native Soil Infiltration Rate

- | | |
|---|--|
| <input type="radio"/> Sand - 8 in/hr | <input type="radio"/> Clay loam - 0.1 in/hr |
| <input type="radio"/> Loamy sand - 2.5 in/hr | <input type="radio"/> Silty clay loam - 0.05 in/hr |
| <input type="radio"/> Sandy loam - 1.0 in/hr | <input type="radio"/> Sandy clay - 0.05 in/hr |
| <input type="radio"/> Loam - 0.5 in/hr | <input type="radio"/> Silty clay - 0.04 in/hr |
| <input type="radio"/> Silt loam - 0.3 in/hr | <input type="radio"/> Clay - 0.02 in/hr |
| <input type="radio"/> Sandy silt loam - 0.2 in/hr | <input type="radio"/> Rain Barrel/Cistern - 0.00 in/hr |

Route Through Wet Detention Pond First

☐ Use Random Number Generation to Account for Infiltration Rate Uncertainty

Select "Route Through Wet Detention Pond First" and enter the data for the Wet Detention Pond.

Select Particle Size File

Refresh Schematic

Delete

Cancel

Continue

Biofiltration Control Device

Biofiltration Control Device

Land Use: Outfall

Biofilter Number 1

Device Properties

Top Area (sf)	500
Bottom Area (sf)	400
Total Depth (ft)	5.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.02
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	1.00
Infil. Rate Fraction-Sides (0-1)	1.00
Rock Filled Depth (ft)	1.00
Rock Fill Void Ratio (0-1)	0.30
Engineered Soil Type	Fine Filter Sand ▼
Engineered Soil Infiltration Rate (in/hr)	1.00
Engineered Soil Depth (ft)	3
Engineered Soil Void Ratio (0-1)	0.30
Percent solids reduction due to Engineered Soil (0-100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area	

Add Outlet/ Discharge

Outlet/Discharge Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. Broad Crested Weir
- ☐ 3. Vertical Stand Pipe
- ☐ 4. Evaporation
- ☐ 5. Rain Barrel/Cistern
- ☐ 6. Underdrain Outlet

Edit Existing Outlet

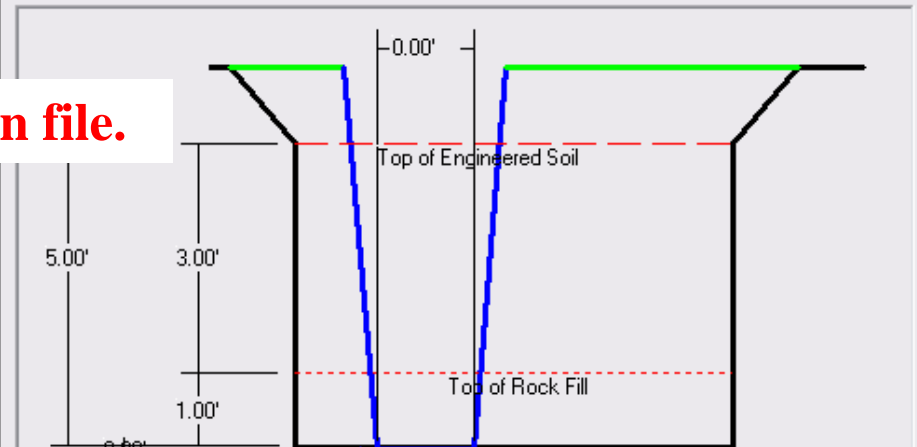
Selected Outlets

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- | | | |
|--|--|--|
| <input type="checkbox"/> Rooftop 1 | <input type="checkbox"/> Playground 1 | <input type="checkbox"/> Large Landscaped Area 1 |
| <input type="checkbox"/> Rooftop 2 | <input type="checkbox"/> Playground 2 | |
| <input type="checkbox"/> Rooftop 3 | <input type="checkbox"/> Driveways 1 | <input type="checkbox"/> Undeveloped Area |
| <input type="checkbox"/> Rooftop 4 | <input type="checkbox"/> Driveways 2 | <input type="checkbox"/> Small Landscaped Area 1 |
| <input type="checkbox"/> Rooftop 5 | <input type="checkbox"/> Driveways 3 | <input type="checkbox"/> Small Landscaped Area 2 |
| <input type="checkbox"/> Paved Parking/Storage 1 | <input type="checkbox"/> Sidewalks/Walks 1 | <input type="checkbox"/> Small Landscaped Area 3 |
| <input type="checkbox"/> Paved Parking/Storage 2 | <input type="checkbox"/> Sidewalks/Walks 2 | <input type="checkbox"/> Other Pervious Area |
| <input type="checkbox"/> Paved Parking/Storage 3 | <input type="checkbox"/> Street Area 1 | <input type="checkbox"/> Other Dir Cnctd Imp Area |
| <input type="checkbox"/> Unpaved Prkng/Storage 1 | <input type="checkbox"/> Street Area 2 | <input type="checkbox"/> Other Part Cnctd Imp Area |
| <input type="checkbox"/> Unpaved Prkng/Storage 2 | <input type="checkbox"/> Street Area 3 | |
| <input type="checkbox"/> Paved Land and Shoulder 1 | | <input type="checkbox"/> Large Turf Areas |
| <input type="checkbox"/> Paved Land and Shoulder 2 | | <input type="checkbox"/> Undeveloped Areas |
| <input type="checkbox"/> Paved Land and Shoulder 3 | | <input type="checkbox"/> Other Pervious Areas |
| <input type="checkbox"/> Paved Land and Shoulder 4 | | <input type="checkbox"/> Other Directly Cnctd Imp |
| <input type="checkbox"/> Paved Land and Shoulder 5 | | <input type="checkbox"/> Other Partially Cnctd Imp |

Fraction of Runoff from Outfall Routed to Outfall Biofilters (0 - 1)

Biofilter Geometry Schematic



Refresh Schematic

Delete

Cancel

Continue

Enter the particle size distribution file.

Select Native Soil Infiltration Rate

- | | |
|---|--|
| <input type="radio"/> Sand - 8 in/hr | <input type="radio"/> Clay loam - 0.1 in/hr |
| <input type="radio"/> Loamy sand - 2.5 in/hr | <input type="radio"/> Silty clay loam - 0.05 in/hr |
| <input type="radio"/> Sandy loam - 1.0 in/hr | <input type="radio"/> Sandy clay - 0.05 in/hr |
| <input type="radio"/> Loam - 0.5 in/hr | <input type="radio"/> Silty clay - 0.0 in/hr |
| <input type="radio"/> Silt loam - 0.3 in/hr | <input type="radio"/> Clay - 0.02 in/hr |
| <input type="radio"/> Sandy silt loam - 0.2 in/hr | <input type="radio"/> Rain Barrel/Cistern - 0.00 in/hr |

Route Through Wet Detention Pond First

Use Random Number
☐ Generation to Account for Infiltration Rate Uncertainty

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

Biofiltration Control Device

Biofiltration Control Device

Land Use: Outfall

Biofilter Number 1

Device Properties

Top Area (sf)	500
Bottom Area (sf)	400
Total Depth (ft)	5.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.02
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	1.00
Infil. Rate Fraction-Sides (0-1)	1.00
Rock Filled Depth (ft)	1.00
Rock Fill Void Ratio (0-1)	0.30
Engineered Soil Type	Fine Filter Sand
Engineered Soil Infiltration Rate (in/hr)	1.00
Engineered Soil Depth (ft)	3
Engineered Soil Void Ratio (0-1)	0.30
Percent solids reduction due to Engineered Soil (0-100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80

Add Outlet/ Discharge

Outlet/Discharge Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. Broad Crested Weir
- ☐ 3. Vertical Stand Pipe
- ☐ 4. Evaporation
- ☐ 5. Rain Barrel/Cistern
- ☐ 6. Underdrain Outlet

Edit Existing Outlet

Selected Outlets

- 1 - Underdrain Outlet
- 2 - Broad Crested Weir

Data describing the outlet structures will also be reflected in the schematic.

- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr
- ☐ Rain Barrel/Cistern - 0.00 in/hr

Use Random Number Generation to Account for Infiltration Rate Uncertainty

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

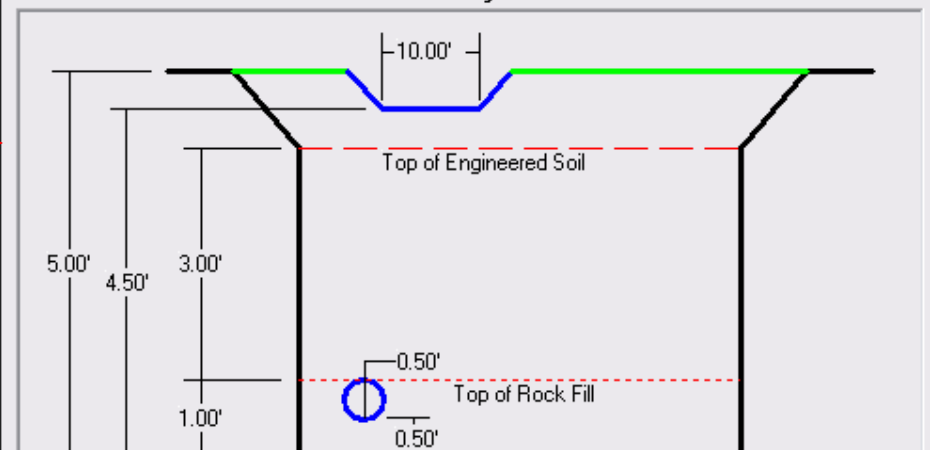
Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- ☐ Rooftop 1
- ☐ Playground 1
- ☐ Large Landscaped Area 1
- ☐ Paved Parking/Storage 1
- ☐ Sidewalks/Walks 1
- ☐ Small Landscaped Area 1
- ☐ Paved Parking/Storage 2
- ☐ Sidewalks/Walks 2
- ☐ Other Pervious Area
- ☐ Paved Parking/Storage 3
- ☐ Street Area 1
- ☐ Other Dir Cnctd Imp Area
- ☐ Unpaved Prkng/Storage 1
- ☐ Street Area 2
- ☐ Other Part Cnctd Imp Area
- ☐ Unpaved Prkng/Storage 2
- ☐ Street Area 3
- ☐ Paved Land and Shoulder 1
- ☐ Large Turf Areas
- ☐ Paved Land and Shoulder 2
- ☐ Undeveloped Areas
- ☐ Paved Land and Shoulder 3
- ☐ Other Pervious Areas
- ☐ Paved Land and Shoulder 4
- ☐ Other Directly Cnctd Imp
- ☐ Paved Land and Shoulder 5
- ☐ Other Partially Cnctd Imp

Enter the outlet structure information.

1 Fraction of Runoff from Outfall Routed to Outfall Biofilters (0 - 1)

Biofilter Geometry Schematic



Refresh Schematic

Delete

Cancel

Continue

Biofiltration Control Device

Biofiltration Control Device

Land Use: Outfall

Biofilter Number 1

Device Properties

Top Area (sf)	500
Bottom Area (sf)	400
Total Depth (ft)	5.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.02
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	1.00
Infil. Rate Fraction-Sides (0-1)	1.00
Rock Filled Depth (ft)	1.00
Rock Fill Void Ratio (0-1)	0.30
Engineered Soil Type	Fine Filter Sand
Engineered Soil Infiltration Rate (in/hr)	1.00
Engineered Soil Depth (ft)	3
Engineered Soil Void Ratio (0-1)	0.30
Percent solids reduction due to Engineered Soil (0-100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Land Use	5

Add Outlet/ Discharge

Outlet/Discharge Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. Broad Crested Weir
- ☐ 3. Vertical Stand Pipe
- ☐ 4. Evaporation
- ☐ 5. Rain Barrel/Cistern
- ☐ 6. Underdrain Outlet

Edit Existing Outlet

Selected Outlets

- 1 - Underdrain Outlet
- 2 - Broad Crested Weir

Change Geometry

Copy Biofilter Data

Paste Biofilter Data

Select Native Soil Infiltration Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr
- ☐ Rain Barrel/Cistern - 0.00 in/hr

Route Through Wet Detention Pond First

Use Random Number Generation to Account for Infiltration Rate Uncertainty

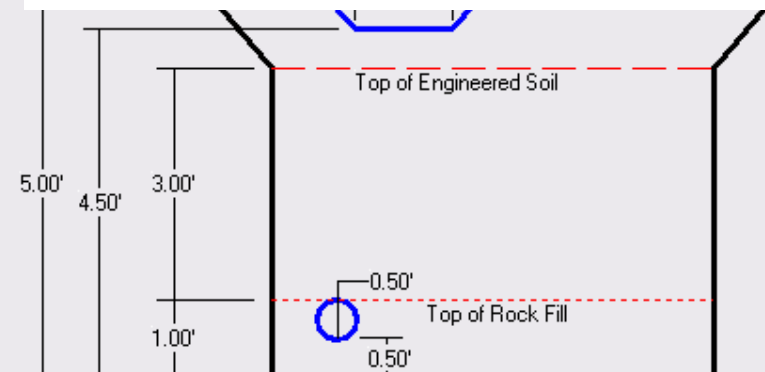
Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- ☐ Rooftop 1
- ☐ Rooftop 2
- ☐ Rooftop 3
- ☐ Rooftop 4
- ☐ Rooftop 5
- ☐ Paved Parking/Storage 1
- ☐ Paved Parking/Storage 2
- ☐ Paved Parking/Storage 3
- ☐ Unpaved Prkng/Storage 1
- ☐ Unpaved Prkng/Storage 2
- ☐ Playground 1
- ☐ Playground 2
- ☐ Driveways 1
- ☐ Driveways 2
- ☐ Driveways 3
- ☐ Sidewalks/Walks 1
- ☐ Sidewalks/Walks 2
- ☐ Street Area 1
- ☐ Street Area 2
- ☐ Street Area 3
- ☐ Large Landscaped Area 1
- ☐ Undeveloped Area
- ☐ Small Landscaped Area 1
- ☐ Small Landscaped Area 2
- ☐ Small Landscaped Area 3
- ☐ Other Pervious Area
- ☐ Other Dir Cnctd Imp Area
- ☐ Other Part Cnctd Imp Area

Each outlet is listed in the 'Selected Outlets' box. To edit an outlet, select 'Edit Existing Outlets' and then double click on the outlet to edit an outlet structure



Refresh Schematic

Delete

Cancel

Continue

Biofiltration Control Device

Biofiltration Control Device

Land Use: Outfall

Biofilter Number 1

Device Properties

Top Area (sf)	500
Bottom Area (sf)	400
Total Depth (ft)	5.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.02
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	1.00
Infil. Rate Fraction-Sides (0-1)	1.00
Rock Filled Depth (ft)	1.00
Rock Fill Void Ratio (0-1)	0.30
Engineered Soil Type	Fine Filter Sand
Engineered Soil Infiltration Rate (in/hr)	1.00
Engineered Soil Depth (ft)	3
Engineered Soil Void Ratio (0-1)	0.30
Percent solids reduction due to Engineered Soil (0-100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Land Use	5

Add Outlet/ Discharge

Outlet/Discharge Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. Broad Crested Weir
- ☐ 3. Vertical Stand Pipe
- ☐ 4. Evaporation
- ☐ 5. Rain Barrel/Cistern
- ☐ 6. Underdrain Outlet

Edit Existing Outlet

Selected Outlets

- 1 - Underdrain Outlet
- 2 - Broad Crested Weir

Change Geometry

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- ☐ Rooftop 1
- ☐ Rooftop 2
- ☐ Rooftop 3
- ☐ Rooftop 4
- ☐ Rooftop 5
- ☐ Paved Parking/Storage 1
- ☐ Paved Parking/Storage 2
- ☐ Paved Parking/Storage 3
- ☐ Unpaved Prkng/Storage 1
- ☐ Unpaved Prkng/Storage 2
- ☐ Playground 1
- ☐ Playground 2
- ☐ Driveways 1
- ☐ Driveways 2
- ☐ Driveways 3
- ☐ Sidewalks/Walks 1
- ☐ Sidewalks/Walks 2
- ☐ Street Area 1
- ☐ Street Area 2
- ☐ Street Area 3
- ☐ Large Landscaped Area 1
- ☐ Undeveloped Area
- ☐ Small Landscaped Area 1
- ☐ Small Landscaped Area 2
- ☐ Small Landscaped Area 3
- ☐ Other Pervious Area
- ☐ Other Dir Cnctd Imp Area
- ☐ Other Part Cnctd Imp Area
- ☐ Paved Land and Shoulder 1
- ☐ Paved Land and Shoulder 2
- ☐ Paved Land and Shoulder 3
- ☐ Paved Land and Shoulder 4
- ☐ Paved Land and Shoulder 5
- ☐ Large Turf Areas
- ☐ Undeveloped Areas
- ☐ Other Pervious Areas
- ☐ Other Directly Cnctd Imp
- ☐ Other Partially Cnctd Imp

1 Fraction of Runoff from Outfall Routd to Outfall Biofilters (0 - 1)

Biofilter Geometry Schematic

Select Native Soil Infiltration Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.02 in/hr
- ☐ Silty clay - 0.01 in/hr
- ☐ Clay - 0.02 in/hr
- ☐ Rain Barrel/Cistern

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

Refresh Schematic

Delete

Cancel

Continue

If the Biofiltration Device is entered at the Land Use or Outfall system level, the above area will have Source Areas highlighted that can be selected if they are draining to the Biofiltration Device.

Biofiltration Control Device

Biofiltration Control Device

Land Use: Outfall

Biofilter Number 1

Device Properties

Top Area (sf)	500
Bottom Area (sf)	400
Total Depth (ft)	5.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.02
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	1.00
Infil. Rate Fraction-Sides (0-1)	1.00
Rock Filled Depth (ft)	1.00
Rock Fill Void Ratio (0-1)	0.30
Engineered Soil Type	Fine Filter Sand
Engineered Soil Infiltration Rate (in/hr)	1.00
Engineered Soil Depth (ft)	3
Engineered Soil Void Ratio (0-1)	0.30
Percent solids reduction due to Engineered Soil (0-100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Land Use	5

Add Outlet/ Discharge

Outlet/Discharge Options

- ☐ 1. Sharp Crested Weir
- ☐ 2. Broad Crested Weir
- ☐ 3. Vertical Stand Pipe
- ☐ 4. Evaporation
- ☐ 5. Rain Barrel/Cistern
- ☐ 6. Underdrain Outlet

Edit Existing Outlet

Selected Outlets

- 1 - Underdrain Outlet
- 2 - Broad Crested Weir

Change Geometry

Copy Biofilter Data

Paste Biofilter Data

Route Through
Wet Detention
Pond First

Select Native Soil Infiltration Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Silty clay - 0.02 in/hr
- ☐ Clay - 0.01 in/hr
- ☐ Very clayey - 0.005 in/hr

Select Particle
Size File

C:\Program Files\WinSLAMM\NURP.CPZ

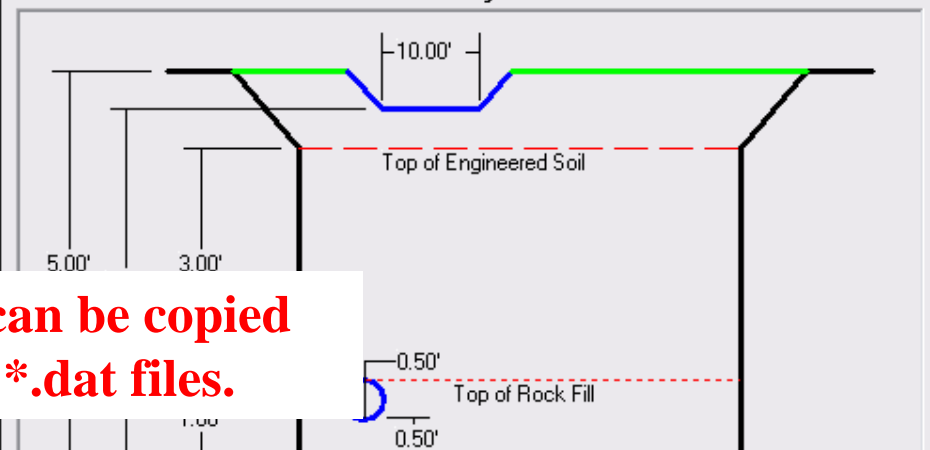
Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- ☐ Rooftop 1
- ☐ Rooftop 2
- ☐ Rooftop 3
- ☐ Rooftop 4
- ☐ Rooftop 5
- ☐ Paved Parking/Storage 1
- ☐ Paved Parking/Storage 2
- ☐ Paved Parking/Storage 3
- ☐ Unpaved Prkng/Storage 1
- ☐ Unpaved Prkng/Storage 2
- ☐ Playground 1
- ☐ Playground 2
- ☐ Driveways 1
- ☐ Driveways 2
- ☐ Driveways 3
- ☐ Sidewalks/Walks 1
- ☐ Sidewalks/Walks 2
- ☐ Street Area 1
- ☐ Street Area 2
- ☐ Street Area 3
- ☐ Large Landscaped Area 1
- ☐ Undeveloped Area
- ☐ Small Landscaped Area 1
- ☐ Small Landscaped Area 2
- ☐ Small Landscaped Area 3
- ☐ Other Pervious Area
- ☐ Other Dir Cnctd Imp Area
- ☐ Other Part Cnctd Imp Area
- ☐ Paved Land and Shoulder 1
- ☐ Paved Land and Shoulder 2
- ☐ Paved Land and Shoulder 3
- ☐ Paved Land and Shoulder 4
- ☐ Paved Land and Shoulder 5
- ☐ Large Turf Areas
- ☐ Undeveloped Areas
- ☐ Other Pervious Areas
- ☐ Other Directly Cnctd Imp
- ☐ Other Partially Cnctd Imp

1

Fraction of Runoff from Outfall Routed to Outfall Biofilters (0 - 1)

Biofilter Geometry Schematic



Refresh Schematic

Delete

Cancel

Continue

Data for a biofilter can be copied
and pasted between *.dat files.

Biofiltration Control Device

Biofiltration Control Device

Land Use: Outfall

Biofilter Number 1

Device Properties

Top Area (sf)	500
Bottom Area (sf)	400
Total Depth (ft)	5.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.02

Add Outlet/ Discharge

Outlet/Discharge Options

- ☐ 1. Sharp Crested Weir
☐ 2. Broad Crested Weir

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- | | | |
|--|--|--|
| <input type="checkbox"/> Rooftop 1 | <input type="checkbox"/> Playground 1 | <input type="checkbox"/> Large Landscaped Area 1 |
| <input type="checkbox"/> Rooftop 2 | <input type="checkbox"/> Playground 2 | <input type="checkbox"/> Undeveloped Area |
| <input type="checkbox"/> Rooftop 3 | <input type="checkbox"/> Driveways 1 | <input type="checkbox"/> Small Landscaped Area 1 |
| <input type="checkbox"/> Rooftop 4 | <input type="checkbox"/> Driveways 2 | <input type="checkbox"/> Small Landscaped Area 2 |
| <input type="checkbox"/> Rooftop 5 | <input type="checkbox"/> Driveways 3 | <input type="checkbox"/> Small Landscaped Area 3 |
| <input type="checkbox"/> Paved Parking/Storage 1 | <input type="checkbox"/> Sidewalks/Walks 1 | <input type="checkbox"/> Other Pervious Area |
| <input type="checkbox"/> Paved Parking/Storage 2 | <input type="checkbox"/> Sidewalks/Walks 2 | <input type="checkbox"/> Other Dir Cnctd Imp Area |
| <input type="checkbox"/> Paved Parking/Storage 3 | <input type="checkbox"/> Street Area 1 | <input type="checkbox"/> Other Part Cnctd Imp Area |

Native Soil Infiltration Rate

Infil. Rate Fraction-Bottom

Infil. Rate Fraction-Sides

Rock Filled Depth (ft)

Rock Fill Void Ratio (0-1)

Engineered Soil Type

Engineered Soil Infiltration Rate (in/hr)

Engineered Soil Depth (ft)

Engineered Soil Void Ratio (0-1)

Percent solids reduction due to Engineered Soil (0-100)

Inflow Hydrograph Peak to Average Flow Ratio

Number of Devices in Source Area or Land Use

Detailed output from the Biofiltration Control Device can be generated by selecting the option in the Program Options screen. Information on how to generate this data is found later in this User's Guide.

2 - Broad Crested Weir

Change Geometry

Copy Biofilter Data

Paste Biofilter Data

Select Native Soil Infiltration Rate

- | | |
|---|--|
| <input type="radio"/> Sand - 8 in/hr | <input type="radio"/> Clay loam - 0.1 in/hr |
| <input type="radio"/> Loamy sand - 2.5 in/hr | <input type="radio"/> Silty clay loam - 0.05 in/hr |
| <input type="radio"/> Sandy loam - 1.0 in/hr | <input type="radio"/> Sandy clay - 0.05 in/hr |
| <input type="radio"/> Loam - 0.5 in/hr | <input type="radio"/> Silty clay - 0.04 in/hr |
| <input type="radio"/> Silt loam - 0.3 in/hr | <input type="radio"/> Clay - 0.02 in/hr |
| <input type="radio"/> Sandy silt loam - 0.2 in/hr | <input type="radio"/> Rain Barrel/Cistern - 0.00 in/hr |

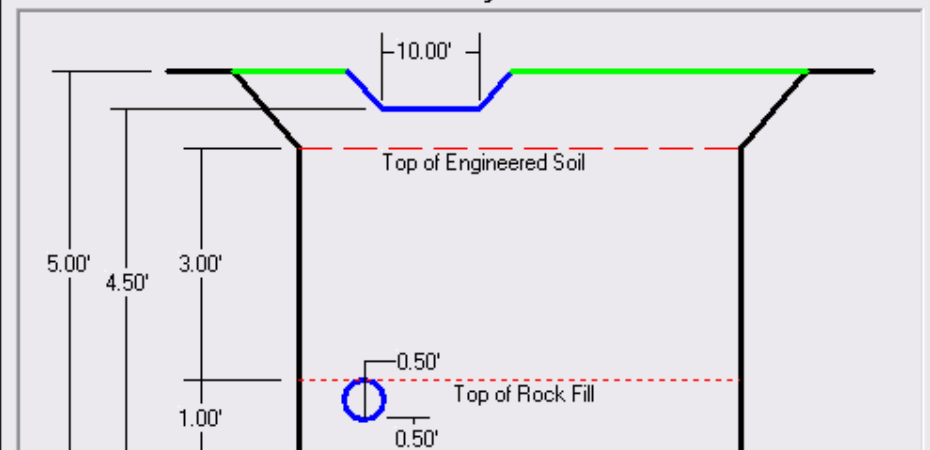
Route Through Wet Detention Pond First

Use Random Number Generation to Account for Infiltration Rate Uncertainty

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

Biofilter Geometry Schematic



Refresh Schematic

Delete

Cancel

Continue

Biofiltration Control Device

Biofiltration Control Device

Land Use: Residential

Source Area: Paved Parking/Storage 1

Total Area: 5 acres

Biofilter Number 1

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

☐ Rooftop 1

☐ Playground 1

☐ Large Landscaped Area 1

☐ Rooftop 2

☐ Playground 2

Device Properties

Summary Statistics

	Rain Depth (in)	Rain Duration (hrs)		Maximum BioF Stage (ft)	Minimum BioF Stage (ft)	Event Peak Flow (cfs)	Surface Ponding Duration (hrs)	Total Ponding Duration (hrs)	Event Inflow Volume (ac-ft)	Event Hydraulic Outflow (ac-ft)
Number of Events	112	112	-	112	112	112	112	112	112	1
Total	27.87	28.71	-	-	-	-	0.7	887.401	5.295	2.7
Equivalent Annual Total	28.25	29.1	-	-	-	-	0.709	899.413	5.366	2.8
Minimum	0.01	0.04	0	0.003	0	0.003	0	0.8	0	
Maximum	2.34	1.08	0	3.599	0	2.429	0.7	29.3	0.49	0.4
Average of All Events	0.2	0.2		0.4	0	0.2	0	7	0	
Median	0.1	0.2		0.1	0	0	0	6	0	
Std. Deviation	0.3	0.2		0.5	0	0.3	0	6	0	
COV	1	0.9		1	7	1	10	0.8	1	
First Rain Date: 01/02/69										
Last Rain Date: 12/28/69										
Total Time Period (yrs): 0.9866439										

- ☐ Sand - 8 in/hr
☐ Loamy sand - 2.5 in/hr
☐ Sandy loam - 1.0 in/hr
☐ Loam - 0.5 in/hr
☐ Silt loam - 0.3 in/hr
☐ Sandy silt loam - 0.2 in/hr
☐ Clay loam - 0.1 in/hr
☐ Silty clay loam - 0.05 in/hr
☐ Sandy clay - 0.05 in/hr
☐ Silty clay - 0.04 in/hr
☐ Clay - 0.02 in/hr
☐ Rain Barrel/Cistern - 0.00

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CF

This shows an example of the Biofilter Water Balance detailed output that can be generated for a Biofiltration Control Device.

Notice data on the Surface Ponding Duration and the Total Ponding Duration.

Biofiltration Control Device

Biofiltration Control Device

Land Use: Residential

Source Area: Paved Parking/Storage 1

Total Area: 5 acres

Biofilter Number 1

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

☐ Rooftop 1
☐ Rooftop 2

☐ Playground 1
☐ Playground 2

☐ Large Landscaped Area 1

Device Properties

Summary Statistics

	Rain Depth (in)	Rain Duration (hrs)		Maximum BioF Stage (ft)	Minimum BioF Stage (ft)	Event Peak Flow (cfs)	Surface Ponding Duration (hrs)	Total Ponding Duration (hrs)	Event Inflow Volume (ac-ft)	Event Hydraulic Outflow (ac-ft)
Number of Events	112	112	-	112	112	112	112	112	112	1
Total	27.87	28.71	-	-	-	-	0.7	887.401	5.295	2.7
Equivalent Annual Total	28.25	29.1	-	-	-	-	0.709	899.413	5.366	2.8
Minimum	0.01	0.04	0	0.003	0	0.003	0	0.8	0	
Maximum	2.34	1.08	0	3.599	0	2.429	0.7	29.3	0.49	0.4
Average of All Events	0.2	0.2		0.4	0	0.2	0	7	0	
Median	0.1	0.2		0.1	0	0	0	6	0	
Std. Deviation	0.3	0.2		0.5	0	0.3	0	6	0	
COV	1	0.9		1	7	1	10	0.8	1	

First Rain C

Last Rain D

Total Time I

This is the maximum amount of time the biofilter surface was flooded during the analyzed period.

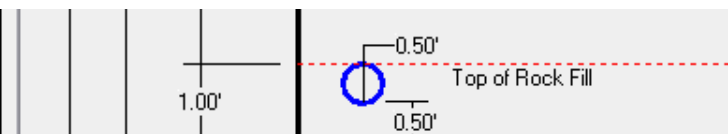
- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr
- ☐ Rain Barrel/Cistern - 0.00 in/hr

This is the maximum amount of time there was water in the biofilter during the analyzed period.

Select Particle Size File

C:\Program Files\WinSLAMM\NURP.CPZ

Uncertainty



Refresh Schematic

Delete

Cancel

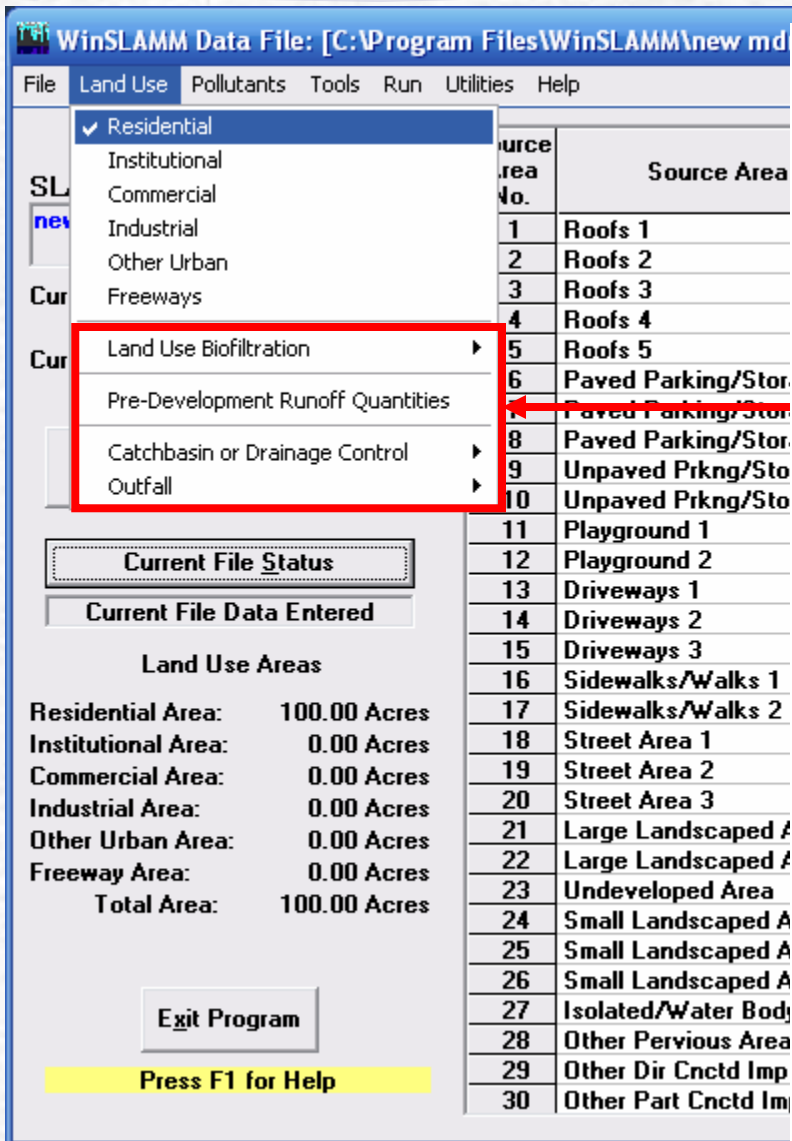
Continue



Control Devices – System



System Control Devices



Additional Control Devices are available through the Land Use menu. These Control Devices will treat a system. A system may be all the runoff generated from a

1. Land Use
2. Drainage System (can include multiple land uses); or
3. An entire watershed (Outfall – can include multiple land uses and drainage systems)

These Control Devices include:

- Land Use Biofiltration
- Catchbasins
- Grass Swales
- Wet Detention
- Other Device

The following screens show the System Control Devices



Control Devices – Land Use Biofiltration



Land Use Biofiltration

Biofiltration Control Device

Land Use: Outfall

Biofilter Number 1

Device Properties

Top Area (sf)	500
Bottom Area (sf)	400
Total Depth (ft)	5.00
Typical Width (ft) (Cost est. only)	10.00

Add Outlet/ Discharge

Outlet/Discharge Options

☐ 1. Sharp Crested Weir

Native Soil Infiltration R

Native Soil Infiltration R

Infil. Rate Fraction-Bott

Infil. Rate Fraction-Side

Rock Filled Depth (ft)

Rock Fill Void Ratio (0-

Engineered Soil Type

Engineered Soil Infiltrati

(in/hr)

Engineered Soil Depth

Engineered Soil Void R

Percent solids reduction

Engineered Soil (0-100

Inflow Hydrograph Peal

Average Flow Ratio

Number of Devices in S

Area or Land Use

Change Geometry

Copy Biofilter Data

Paste Biofilter Data

Select Native Soil Infiltration Rate

- ☐ Sand - 8 in/hr
- ☐ Loamy sand - 2.5 in/hr
- ☐ Sandy loam - 1.0 in/hr
- ☐ Loam - 0.5 in/hr
- ☐ Silt loam - 0.3 in/hr
- ☐ Sandy silt loam - 0.2 in/hr
- ☐ Clay loam - 0.1 in/hr
- ☐ Silty clay loam - 0.05 in/hr
- ☐ Sandy clay - 0.05 in/hr
- ☐ Silty clay - 0.04 in/hr
- ☐ Clay - 0.02 in/hr
- ☐ Rain Barrel/Cistern - 0.00 in/hr

Route Through
Wet Detention
Pond First

Use Random
Number
Generation to
Account for
Infiltration Rate
Uncertainty

Select Particle
Size File

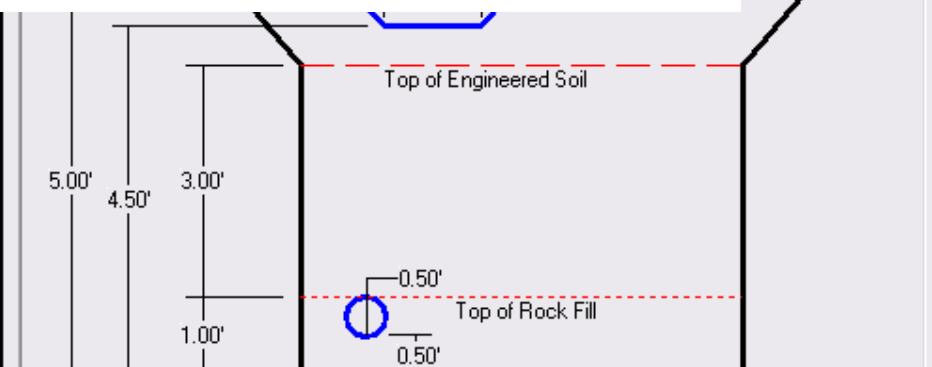
C:\Program Files\WinSLAMM\NURP.CPZ

Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device(s)

- ☐ Rooftop 1
- ☐ Rooftop 2
- ☐ Rooftop 3
- ☐ Rooftop 4
- ☐ Rooftop 5
- ☐ Paved Parking/Storage 1
- ☐ Paved Parking/Storage 2
- ☐ Playground 1
- ☐ Playground 2
- ☐ Driveways 1
- ☐ Driveways 2
- ☐ Driveways 3
- ☐ Sidewalks/Walks 1
- ☐ Sidewalks/Walks 2
- ☐ Large Landscaped Area 1
- ☐ Undeveloped Area
- ☐ Small Landscaped Area 1
- ☐ Small Landscaped Area 2
- ☐ Small Landscaped Area 3
- ☐ Other Landscaped Area

This Biofiltration Control Device is calculated at the Land Use system level. The data is the similar to the Biofiltration Control Device at the Source Area level, except for selection of the Source Areas contributing to the Biofiltration Control Device.

Information on entering data into a Biofiltration Control Device can be found earlier in this User's Guide.



Refresh Schematic

Delete

Cancel

Continue



Control Devices – Catchbasins



Catchbasin Control Device

Catchbasin Control Device

Total Basin Area: 100.00 acres

1. Area served by catchbasins (acres): 100.00

☒ 2a. Catchbasin density (cb/ac): 1.0

☐ 2b. Number of Catchbasins: 100

3. Average sump depth below catchbasin outlet invert (ft): 2.00

4. Depth of sediment in catchbasin sump at beginning of study period (ft): 0.00

5. Typical outlet pipe diameter (ft): 1.00

6. Typical outlet pipe Manning's n: 0.013

Typical
Catchbasin
Densities

- ☐ Low density residential (0.25 inlets/acre)
☐ Medium density residential (0.5 inlets/acre)
☐ High density residential (1 inlet/acre)
☐ Strip commercial (1.2 inlets/acre)

- ☐ Shopping center (1.2 inlets/acre)
☐ Industry (0.8 inlets/acre)
☐ Freeways (1 inlet/acre)

Catchbasin
Cleaning Dates

Catchbasin Cleaning No.	Catchbasin Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

Select

OR

☒ Catchbasin Cleaning Frequency

- ☐ Monthly
☐ Three Times per Year
☐ Semi-Annually
☒ Annually
☐ Every Two Years
☐ Every Three Years
☐ Every Four Years
☐ Every Five Years

Inflow Bypass and Lamella
Plate Data

Continue

Clear

Cancel

Delete Control

Enter either the Catchbasin Density (catchbasins per acre) or the total number of Catchbasins in the drainage system or watershed you are modeling.

Catchbasin Control Device

Catchbasin Control Device

Total Basin Area: 100.00 acres

1. Area served by catchbasins (acres):

☒ 2a. Catchbasin density (cb/ac):

☐ 2b. Number of Catchbasins:

3. Average sump depth below catchbasin outlet invert (ft):

4. Depth of sediment in catchbasin sump at beginning of study period (ft):

5. Typical outlet pipe diameter (ft):

6. Typical outlet pipe Manning's n:

7. Typical outlet pipe slope (ft/ft):

8. Typical catchbasin sump surface area (sf):

9. Catchbasin Depth from Sump Bottom to street level (ft):

10. Inflow Hydrograph Peak to Average Flow Ratio:

11. Leakage rate through sump bottom (in/hr):

12. Critical Particle Size file name:

C:\Program Files\WinSLAMM\NURP.CPZ

Typical
Catchbasin
Densities

- ☐ Low density residential (0.25 inlets/acre)
- ☐ Medium density residential (0.5 inlets/acre)
- ☐ High density residential (1 inlet/acre)
- ☐ Strip commercial (1.2 inlets/acre)

- ☐ Shopping center (1.2 inlets/acre)
- ☐ Industry (0.8 inlets/acre)
- ☐ Freeways (1 inlet/acre)

Catchbasin
Cleaning Dates

☒ Catchbasin Cleaning Frequency

☐ Monthly

es per Year
ally

Years
ee Years
r Years

☐ Every Five Years

Catchbasin
Cleaning No.

Catchbasin

1

2

3

4

5

You can select a typical
catchbasin density or enter
your own value

Catchbasin Control Device

Catchbasin Control Device

Total Basin Area: 100.00 acres

1. Area served by catchbasins (acres): 100.00

☒ 2a. Catchbasin density (cb/ac): 1.0

☐ 2b. Number of Catchbasins: 100

3. Average sump depth below catchbasin outlet invert (ft): 2.00

4. Depth of sediment in catchbasin sump at beginning of study period (ft): 0.00

5. Typical outlet pipe diameter (ft): 1.00

6. Typical outlet pipe Manning's n: 0.013

Typical
Catchbasin
Densities

- ☐ Low density residential (0.25 inlets/acre)
☐ Medium density residential (0.5 inlets/acre)
☐ High density residential (1 inlet/acre)
☐ Strip commercial (1.2 inlets/acre)

- ☐ Shopping center (1.2 inlets/acre)
☐ Industry (0.8 inlets/acre)
☐ Freeways (1 inlet/acre)

Catchbasin
Cleaning Dates

Catchbasin Cleaning No.	Catchbasin Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

Select

OR

☒ Catchbasin Cleaning Frequency

- ☐ Monthly
☐ Three Times per Year
☐ Semi-Annually
☒ Annually
☐ Every Two Years
☐ Every Three Years
☐ Every Four Years
☐ Every Five Years

Inflow Bypass and Lamella
Plate Data

Continue

Clear

Cancel

Delete Control

Enter a leakage rate only if
the sump bottom is not
sealed. This rate will not
change over time.

10. Inflow Hydrograph Peak to Average
Flow Ratio 3.8

11. Leakage rate through sump
bottom (in/hr) 0.00

12. Select Critical Particle Size file name:

C:\Program Files\WinSLAMM\NURP.CPZ

Catchbasin Control Device

Catchbasin Control Device

Total Basin Area: 100.00 acres

1. Area served by catchbasins (acres): 100.00

☒ 2a. Catchbasin density (cb/ac): 1.0

☐ 2b. Number of Catchbasins: 100

3. Average sump depth below

7. Typical outlet pipe slope (ft/ft): 0.020

8. Typical catchbasin sump surface area (sf): 6.0

9. Catchbasin Depth from Sump Bottom to street level (ft): 5.0

10. Inflow Hydrograph Peak to Average Flow Ratio: 3.8

11. Leakage rate through sump bottom (in/hr): 0.00

12. Critical Particle Size file name:

C:\Program Files\WinSLAMM\NURP.CPZ

You can enter specific catchbasin cleaning dates or select a catchbasin cleaning frequency

Typical Catchbasin Densities

☐ Medium density residential (0.5 inlets/acre)

☐ High density residential (1 inlet/acre)

☐ Strip commercial (1.2 inlets/acre)

☐ Shopping center (1.2 inlets/acre)

☐ Industry (0.8 inlets/acre)

☐ Freeways (1 inlet/acre)

Catchbasin Cleaning Dates

Select

☒ Catchbasin Cleaning Frequency

Catchbasin Cleaning No.	Catchbasin Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

OR

- ☐ Monthly
- ☐ Three Times per Year
- ☐ Semi-Annually
- ☒ Annually
- ☐ Every Two Years
- ☐ Every Three Years
- ☐ Every Four Years
- ☐ Every Five Years

Inflow Bypass and Lamella Plate Data

Catchbasin Control Device

Catchbasin Control Device

Total Basin Area: 100.00 acres

1. Area served by catchbasins (acres):

100.00

☒ 2a. Catchbasin density (cb/ac):

1.0

☐ 2b. Number of Catchbasins:

100

7. Typical outlet pipe slope (ft/ft):

0.020

8. Typical catchbasin sump surface area (sfl):

6.0

9. Catchbasin Depth from Sump Bottom to street level (ft):

5.0

10. Inflow Hydrograph Peak to Average

3.8

In version 9.4.0, the ability to model Lamella Plates was added to the Catchbasin and Hydrodynamic Control Devices.

Typical
Catchbasin

- ☐ Low density residential (0.25 inlets/acre)
☐ Medium density residential (0.5 inlets/acre)

- ☐ Shopping center (1.2 inlets/acre)
☐ Industry (0.8 inlets/acre)
☐ Freeways (1 inlet/acre)

If modeling a catch basin with an overflow structure, a hydrodynamic device at the drainage level system, or a system with Lamella Plates, select the “Inflow Bypass and Lamella Plate Data” button.

☒ Catchbasin Cleaning Frequency

- ☐ Monthly
☐ Three Times per Year
☐ Semi-Annually
☒ Annually
☐ Every Two Years
☐ Every Three Years
☐ Every Four Years
☐ Every Five Years

Inflow Bypass and Lamella
Plate Data

Continue

Clear

Cancel

Delete Control

Enter the Maximum Flow to the In-Line Sump if known.
Or enter the characteristics of the diversion and the program will calculate the maximum flow.

The data required for this control device when using the bypass is the same data required for the hydrodynamic device.

Catchbasin Flow Bypass Data

☒ **Maximum Flow to In-Line Sump**

9999.00 Maximum Flow to In-Line Sump (cfs)

☐ **Flow Inlet Diversion Elevation**

Diameter of Orifice that Controls Flow to In-Line Sump (ft)

Inflow Orifice Invert Elevation (ft)

Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir

Elevation of Overflow Structure to Bypass Inline Sump (ft above sump base)

☐ **Lamella Plates or Tube Settlers**

Fraction of device area with plates or tubes

Average tube diameter or distance between plates (ft):

Number of plates or tubes that a vertical line will intercept

Clear and Exit Continue

Enter the data for the Lamella Plates if relevant.



Control Devices – Grass Swales



Grass Swales

The screenshot shows the WinSLAMM Data File window with the title bar "WinSLAMM Data File: [C:\Program Files\WinSLAMM\new mdr.dat]". The "Land Use" menu is open, showing options: Residential (checked), Institutional, Commercial, Industrial, Other Urban, Freeways, Land Use Biofiltration, Pre-Development Runoff Quantities, Catchbasin or Drainage Control (highlighted), and Outfall. A sub-menu for "Catchbasin or Drainage Control" is also open, showing: Biofiltration, Infiltration..., Catchbasin..., Upflow Filter, Drainage Control... (highlighted with a red box), and Other Control... The background data table is partially visible.

Source Area No.	Source Area	Area (acres)	I	W	P	O	S	B	Source Area Parameters
1	Roofs 1	2.06			P			B	Entered
2	Roofs 2	12.23							Entered
3	Roofs 3								
4	Roofs 4								
5	Roofs 5								
6	Paved Parking/Storage 1								
7	Paved Parking/Storage 2								
	Storage 3								
	Storage 1								
	Storage 2								
		5.14			P				Entered
		1.01							Entered

Pollution is reduced by both volume reduction and filtering of particulate solids from the grass.

Grass Swales are often referred to as “Drainage Control” throughout the program.

Total Area: 100.00 Acres		24	Small Landscaped Area 1	63.09							Entered
		25	Small Landscaped Area 2								
		26	Small Landscaped Area 3								
		27	Isolated/Water Body Area								
		28	Other Pervious Area								
		29	Other Dir Cnctd Imp Area								
		30	Other Part Cnctd Imp Area								

Grass Swales

Grass Swales

Grass Swale Data	Combined Land Uses	Residential Land Use	Institutional Land Use	Commercial Land Use	Industrial Land Use	Other Urban Land Use	Freeway Land Use
Total Area in Land Use (ac)		100.00					
Area Served by Swales (ac)		0.00					
Swale Density (ft/ac)		0.00					
Total Swale Length (ft)		0					
Average Swale Length to Outlet (ft)		0					
Typical Bottom Width (ft)		0.0					
Typical Swale Side Slope (___ ft H : 1 ft V)		0.0					
Typical Longitudinal Slope (ft/ft, V/H)		0.000					
Swale Retardance Factor							
Typical Grass Height (in)		0.0					
Swale Dynamic Infiltration Rate (in/hr)		0.000					
Typical Swale Depth (ft) for Cost Analysis (Optional)		0.0					

☐ Use Total Swale Length Instead of Swale Density for Infiltration Calculations
 ☐ Use One Swale System For All Land Uses

Total area served by swales (acres): 0.00
 Total area (acres): 100.00

High density residential - 370 ft/ac

Strip commercial - 410 ft/ac

Freeways (shoulder only) - 400 ft/ac

Freeways (center and shoulder) - 540 ft/ac

Delete

Cancel

Continue

Grass swale data can be entered for each land use in the *.dat file.

Where grass swales are present, enter the data for the grass. The data describing the grass swales in each land use can be unique.

If grass swales are not present in a land use, do not enter any grass swale data for that land use.

Grass Swales

Grass Swales

Grass Swale Data	Combined Land Uses	Residential Land Use	Institutional Land Use	Commercial Land Use	Industrial Land Use	Other Urban Land Use	Freeway Land Use
Total Area in Land Use (ac)	100.00						
Area Served by Swales (ac)	100.00						
Swale Density (ft/ac)	0						
Total Swale Length (ft)	0						
Average Swale Length to Outlet (ft)	3131						
Typical Bottom Width (ft)	0.0						
Typical Swale Side Slope (__ ft H : 1 ft V)	0.0						
Typical Longitudinal Slope (ft/ft, V/H)	0.000						
Swale Retardance Factor							
Typical Grass Height (in)	0.00						
Swale Dynamic Infiltration Rate (in/hr)	0.00						
Typical Swale Depth (ft) for Cost Analysis (Optional)	0.00						

☐ Use Total Swale Length Instead of Swale Density for Infiltration Calculations

☒ **Use One Swale System For All Land Uses**

Total area served by swales (acres): 100.00
Total area (acres): 100.00

Select Critical

If the grass swale is the same for all land uses, check the box and enter the data in the “Combined Land Uses” column.

Institutional LU

Apply the Residential Land Use Particle Size File to All Active Land Uses

Select Swale Density by Land Use

☐ Low density residential - 240 ft/ac
☐ Medium density residential - 350 ft/ac
☐ High density residential - 375 ft/ac
☐ Strip commercial - 410 ft/ac

☐ Shopping center - 90 ft/ac
☐ Industrial - 260 ft/ac
☐ Freeways (shoulder only) - 480 ft/ac
☐ Freeways (center and shoulder) - 540 ft/ac

☐ Loam - 0.25 in/hr
☐ Silt loam - 0.15 in/hr
☐ Sandy clay loam - 0.1 in/hr
☐ Clay loam - 0.05 in/hr
☐ Silty clay loam - 0.025 in/hr
☐ Sandy clay - 0.025 in/hr
☐ Silty clay - 0.02 in/hr
☐ Clay - 0.01 in/hr

Delete Cancel Continue

Grass Swales

Grass Swales

Grass Swale Data	Combined Land Uses	Residential Land Use	Institutional Land Use	Commercial Land Use	Industrial Land Use	Other Urban Land Use	Freeway Land Use
Total Area in Land Use (ac)		100.00					
Area Served by Swales (ac)		100.00					
Swale Density (ft/ac)		350					
Total Swale Length (ft)		35000					
Average Swale Length to Outlet (ft)		3131					
Typical Bottom Width (ft)		3					
Typical Swale Side Slope (ft H : 1 ft V)		4					
Typical Longitudinal Slope (ft/ft, V/H)		.005					
Swale Retardance Factor		D					
Typical Grass Height (in)		4					
Swale Dynamic Infiltration Rate (in/hr)		0.15					
Typical Swale Depth (ft) for Cost Analysis (Optional)		2					

☐ Use Total Swale Length In Density for Infiltration Calculations

Select Critical Particle Size File

Combined Land Uses

Residential LU

Institutional LU

Particulate Size File

C:\Program Files\Grass Swales\Particle Size Files\Residential LU Particle Size File.dat

Apply the Residential Land Use Particle Size File to All Active Land Uses

Select Swale Density by Land Use

☐ Low density residential - 240 ft/ac
 ☐ Shopping center - 90 ft/ac

☐ Medium density residential - 350 ft/ac
 ☐ Industrial - 260 ft/ac

☐ High density residential - 375 ft/ac
 ☐ Freeways (shoulder only) - 480 ft/ac

☐ Strip commercial - 410 ft/ac
 ☐ Freeways (center and shoulder) - 540 ft/ac

Area served by swales (acres): 100.00

Total area (acres): 100.00

Infiltration rate by soil type

☐ Loamy sand - 1.25 in/hr
 ☐ Sandy loam - 0.5 in/hr
 ☐ Loam - 0.25 in/hr
 ☐ Silt loam - 0.15 in/hr
 ☐ Sandy clay loam - 0.1 in/hr
 ☐ Clay loam - 0.05 in/hr
 ☐ Silty clay loam - 0.025 in/hr
 ☐ Sandy clay - 0.025 in/hr
 ☐ Silty clay - 0.02 in/hr
 ☐ Clay - 0.01 in/hr

Delete

Cancel

Continue

Descriptions of the various characteristics describing the Grass Swales are available in the Help File (Press the F1 key).

Grass Swales

Grass Swales

To select the Critical Particle Size File, select the cell next to the land use, and then select the “Select Critical Particle Size File” button.

If the Critical Particle Size File is the same for all land uses, after entering the file, select the “Apply the Residential Land Use Particle Size File to All Active Land Uses” button.

Swale Retardance Factor		D						
Typical Grass Height (in)		4						
Swale Dynamic Infiltration Rate (in/hr)		0.15						
Typical Swale Depth (ft) for Cost Analysis (Optional)		2						

☐ Use Total Swale Length Instead of Swale Density for Infiltration Calculations ☐ Use One Swale System For All Land Uses

Total area served by swales (acres): 100.00
Total area (acres): 100.00

Select Critical Particle Size File

Combined Land Uses	
Residential LU	C:\Program Files\WinSLAMM\NURP.CPZ
Institutional LU	
Commercial LU	

Apply the Residential Land Use Particle Size File to All Active Land Uses

Select Swale Density by Land Use

<input type="radio"/> Low density residential - 240 ft/ac	<input type="radio"/> Shopping center - 90 ft/ac
<input type="radio"/> Medium density residential - 350 ft/ac	<input type="radio"/> Industrial - 260 ft/ac
<input type="radio"/> High density residential - 375 ft/ac	<input type="radio"/> Freeways (shoulder only) - 480 ft/ac
<input type="radio"/> Strip commercial - 410 ft/ac	<input type="radio"/> Freeways (center and shoulder) - 540 ft/ac

Select infiltration rate by soil type

- ☐ Sand - 4 in/hr
- ☐ Loamy sand - 1.25 in/hr
- ☐ Sandy loam - 0.5 in/hr
- ☐ Loam - 0.25 in/hr
- ☐ Silt loam - 0.15 in/hr
- ☐ Sandy clay loam - 0.1 in/hr
- ☐ Clay loam - 0.05 in/hr
- ☐ Silty clay loam - 0.025 in/hr
- ☐ Sandy clay - 0.025 in/hr
- ☐ Silty clay - 0.02 in/hr
- ☐ Clay - 0.01 in/hr

Delete Cancel Continue

Grass Swales

Grass Swales

Grass Swale Data	Combined Land Uses	Residential Land Use	Institutional Land Use	Commercial Land Use	Industrial Land Use	Other Urban Land Use	Freeway Land Use
Total Area in Land Use (ac)		100.00					
Area Served by Swales (ac)		100.00					
Swale Density (ft/ac)		350					
Total Swale Length (ft)		35000					
Average Swale Length to Outlet (ft)		3131					
Typical Bottom Width (ft)							
Typical Swale Side Slope ()							
Typical Longitudinal Slope (ft/)							
Swale Retardance Factor							
Typical Grass Height (in)							
Swale Dynamic Infiltration Rate							
Typical Swale Depth (ft) for Cc							

☐ Use Total Swale Length Instead of Swale Density for Infiltration Calculations

☐ Use One Swale System For All Land Uses

Select Critical Particle Size File

Particle Size Distribution File Data Grid

Combined Land Uses	
Residential LU	C:\Program Files\WinSLAMM\NURP.CPZ
Institutional LU	

Apply the Residential Land Use Particle Size File to All Active Land Uses

Select Swale Density by Land Use

☐ Low density residential - 240 ft/ac

☐ Shopping center - 90 ft/ac

☐ Medium density residential - 350 ft/ac

☐ Industrial - 260 ft/ac

☐ High density residential - 375 ft/ac

☐ Freeways (shoulder only) - 480 ft/ac

☐ Strip commercial - 410 ft/ac

☐ Freeways (center and shoulder) - 540 ft/ac

Select infiltration rate by soil type

☐ Sand - 4 in/hr

☐ Loamy sand - 1.25 in/hr

☐ Sandy loam - 0.5 in/hr

☐ Loam - 0.25 in/hr

☐ Silt loam - 0.15 in/hr

☐ Sandy clay loam - 0.1 in/hr

☐ Clay loam - 0.05 in/hr

☐ Silty clay loam - 0.025 in/hr

☐ Sandy clay - 0.025 in/hr

☐ Silty clay - 0.02 in/hr

☐ Clay - 0.01 in/hr

Total area served by swales (acres): 100.00

Total area (acres): 100.00

Delete

Cancel

Continue

Grass Swales

Program Options

Detailed Output File Options

Biofilters

- ☐ Detailed Biofilter Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☐ Water Balance
- ☐ Evapotranspiration Detail

Catchbasins

- ☐ Performance by Event Output

Grass Swales

- ☐ Hydraulics and Concentration by Event
- ☒ **Hydraulics Detailed Output**
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

Hydrodynamic Devices

- ☐ Detailed Output
- ☐ Performance by Event
- ☐ Stage-Inflow

Default Model Options

Street Cleaning

- ☐ Street Dirt Plot
- ☐ Street Dirt Removal
- ☐ Washoff or Street Cleaning Detail

Wet Detention Ponds

- ☐ Detailed Output
- ☐ Outfall Discharge Hydrograph
- ☐ Pond Stage-Area-Volume Data
- ☐ Stage-Outflow
- ☐ Stone Weeper Detailed Output
- ☐ Water Balance Summary of All Ponds

☐ Uncheck All Detailed Output File Options


☐ Check All Detailed Output File Options

File Update Options


Cancel Changes

Save .INI File

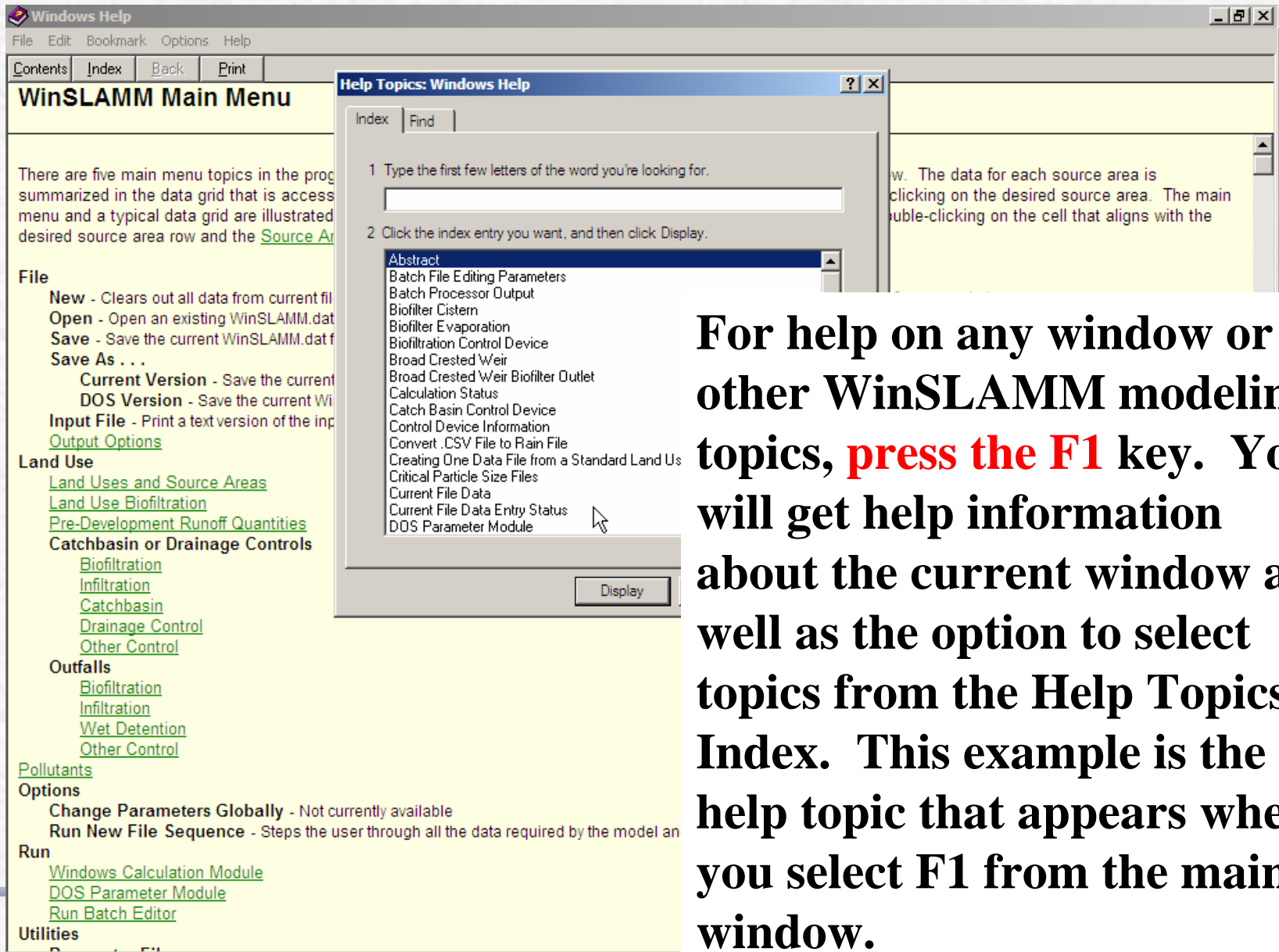
View detailed output data for the grass swales through the Detailed Output Options form. A *.csv file will be created in the same directory as the data file is stored, after the data file is run.



For Additional
Information See . . .



The Context-Sensitive Help in the Program



For help on any window or on other WinSLAMM modeling topics, **press the F1 key. You will get help information about the current window as well as the option to select topics from the Help Topics Index. This example is the help topic that appears when you select F1 from the main window.**

Model Documentation Included on the CD

- WinSLAMM Introduction and Basics
- Integration of Water Quality and Design Objectives
- Sources of Stormwater Pollutants
- Stormwater Quality Controls in WinSLAMM
- Using SLAMM
- Biofiltration Example
- Detention Pond Design
- National Stormwater Quality Database (NSQD, version 1.1)