August 12, 2003

5. Using WinSLAMM

Introduction

This section is a detailed discussion of the calculation procedures developed for the original DOS based version of SLAMM and now found in the Windows version, WinSLAMM. Over the past few years, the program was completely re-written in Visual Basic, version 5, to be completely Windows-based. The current version is numbered 8. Version 6 added Monte Carlo components to the model, developed with funding from Region 5 of EPA. Version 7 was a hybrid version, using many of the older DOS calculation modules, but with the initial windows user interface modules. It also included numerous additional changes. This version 8 is the first complete Windows-based version (including the basic data input, calculation, and output modules found in the DOS version) and closely resembles version 7 in content and capabilities, with a few additional changes. We are planning a new version 9 soon to incorporate many new features from our recent stormwater research conducted over the past several years. The main changes made to the program since the original user guide and algorithm documentation was prepared include the following:

• Practically all of the variable names given in this section and the use of goto statements have been changed to reflect current programming practice. The HELP files in the model provide accurate guidance for the model in its present form. Most of the "parameter" file maintenance programs are now available in the Windows version. WinSLAMM can now easily evaluate large rain files - analyses containing more than 4 decades of data and many thousands of individual rain events have been successfully conducted.

• Monte Carlo stochastic components have been added to the pollutant calculations to provide better representations of the random nature of stormwater pollutants.

• The batch processor program, originally developed for the DOS program, was modified for use with the Windows-based program. It now works with users interfacing WinSLAMM with GIS programs.

• Selected processes have been corrected or changed to reflect bug fixes or process modifications. These changes include adding additional controls and flexibility for the analyses of detention ponds, more accurate descriptions of catchbasins in an area, and modifying the pollutant listing.

• An interface program for the use of WinSLAMM as a replacement for the RUNOFF block in SWMM was developed as the main activity of the EPA-sponsored activity reported in this report.

WinSLAMM (the **Win**dows version of the **S**ource **L**oading **A**nd **M**anagement **M**odel) is an urban rainfall runoff water quality model. It calculates runoff volumes and urban pollutant loadings from individual rain events. It also allows the user to reduce pollutant loadings from a source area such as a roof or street area by using control measures such as detention ponds or infiltration devices.

The model is in many ways a very large pollutant mass and flow accounting program. Runoff volumes are calculated by multiplying the rain depth by varying runoff coefficients. The resulting source area runoff volumes are then multiplied by particulate residue concentrations to get particulate residue loadings for each source area for the rain. The runoff coefficient is a function of rain depth, land use (*eg*, a residential land use), and source area. The particulate residue concentrations are a function of runoff depth, land use and source area. Other particulate pollutants are then related to the particulate residue values, while filterable pollutants are related to the runoff volumes.

Much of the program is devoted to identifying the appropriate runoff and particulate residue concentration values for a given rain depth, land use, and source area. The process is complicated by the large number of source areas within each land use and by the large number of variable combinations needed for a specific source area.

Hardware Requirements and Recommendations

WinSLAMM has been successfully run on personal computers under Windows 95, Windows 98, Windows NT, Windows 2000, or Windows XP, although it has been a while since we were able to test it on the earlier Windows versions (95 and 98). It can even be operated under Apple DOS X using a current form of Virtual PC, although there is a speed penalty. The following computer features are required:

• Memory Requirements:
The model uses many dynamic, or variable-size, arrays. If a computer runs out of memory, either reduce the number of WinSLAMM source areas and rainfall events, or close other programs that are running on your computer. This is a relatively rare problem with current PCs. A typical Pentium computer can analyze a typical situation in a few seconds to a few minutes, even for a complete set of many rain years. The addition of detention ponds or a long list of pollutants in an analysis will significantly increase the computer computational time.

• Disk Storage:
The model creates and erases many temporary files while running. It requires only a few mb of storage on the hard drive, depending on the size of the rain files, etc.

• Printer:
The output may be sent to a printer or saved as a file. However, output can be many columns wide, and so users may need a printer operating in landscaped mode with a small sized font to print the output. The output can also be quite extensive, so we recommend that all output be saved to a file where it can be formatted as needed.

Description of the Files Associated WinSLAMM

WinSLAMM.EXE

This Windows version SLAMM (WinSLAMM) combines the DOS Input, Calculation, and Output modules of the DOS version of SLAMM. The program generates a site description file needed to run WinSLAMM, which has the extension .DAT (referred to as data.DAT). Besides the basic site development data requested, alternative runoff controls are also described using this program. The program must be installed using the appropriated installation files. Place the CD in the drive (we no longer routinely supply diskette versions of WinSLAMM due to the large number of disks needed and the long time needed to prepare and use them; contact us if you need them) and run setup from the run command or use the “install new software” option in the control panel, then follow the on-screen directions.

The files needed to run WinSLAMM include:

- A mandatory rain.RAN file to describe the rain series.
- A mandatory runoff.RSV file containing the runoff coefficients for each surface type to generate surface runoff volume quantities.
- A mandatory particulate.PSC file describing the particulate residue (suspended solids) concentrations for each source area (except for roads) and land use, for several rain categories.
- A mandatory delivery.PRR file to account for deposition of particulate pollutants in the storm drainage system, before the outfall, or before outfall controls. The DELIVERY.PRR file is calibrated for swales, curb and gutters, undeveloped roadsides, or combinations of drainage conditions.
- An optional pollutant.PPD file to describe the particulate pollutant strengths related to particulate residue and to describe the filterable pollutant concentrations for each source area for each land use. This file is not needed if only runoff volume and particulate residue calculations are desired. This file also contains the coefficient of variation (COV) values for each pollutant for Monte Carlo simulation in WinSLAMM.
- An optional size.CPZ files for wet detention pond analyses to describe the runoff particulate size distributions. If no wet detention ponds are included in a WinSLAMM model, these files are not needed.

MPARAXX.EXE

MPARAXX is the utility program that produces, edits, and displays the above files needed by WinSLAMM. This is a DOS-based program and can be executed from the DOS prompt in the DOS shell within Windows. The example parameter files included on the disk can be printed to a file using MPARAXX.EXE and then read using any ASCII text editor.

Creating or Editing a WinSLAMM Data File

Introduction

The information necessary to perform a WinSLAMM model run is stored in a WinSLAMM data file and its associated parameter files. This information includes a description of land uses and source areas, the time period and corresponding rainfall events, the pollutant control devices applied to the site, and the pollutants to be analyzed. This section discusses how to create or edit a WinSLAMM data file that stores this information. The HELP files with version 8 of WinSLAMM offer additional direction for the current version of WinSLAMM. See section 1 for detailed “hello world” examples.

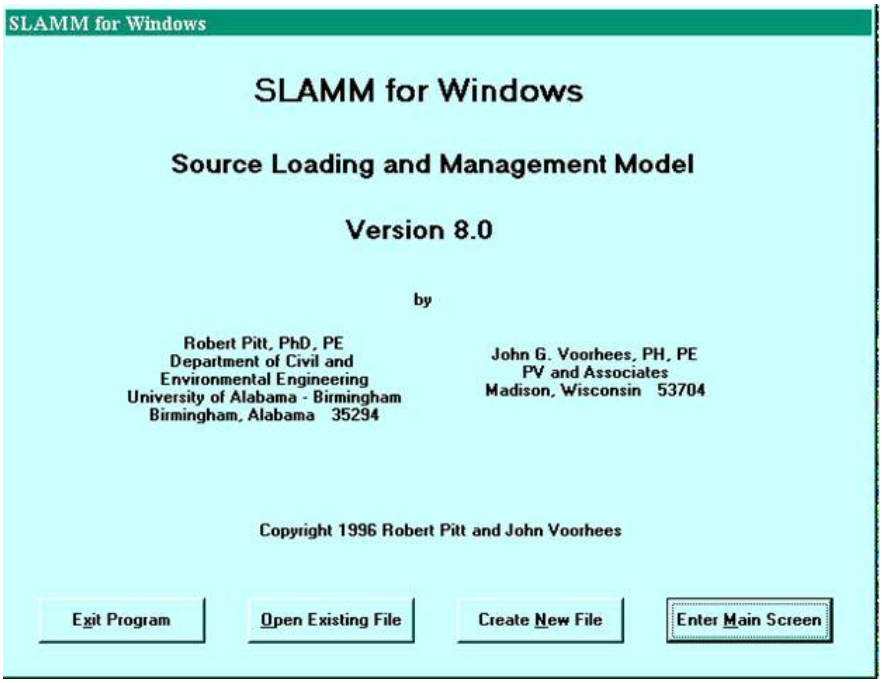
Table 5-1, lists the series of steps necessary to create a SLAMM data file.

Table 5-1. Steps For Creating A New SLAMM Data File

1. Start the Program
2. Enter Site, Drainage, and File Information
3. Enter Data
    A. Land use area and source controls information
    B. Catchbasin and drainage control information
    C. Outfall control information
4. Enter Pollutant Analysis Selection Information
5. Save the Data File

Starting the Program

To run the program, double-click the WinSLAMM program icon or double-click WinSLAMM.EXE in Win95/98/NT Explorer. Select “Open Existing File” to open a file that has previously been created, select “Create New File” to create a new .DAT file using the new file data entry sequence editor, or select “Enter Main Screen” to enter the data editor. Press “Exit” to exit the program. The opening screen for WinSLAMM is shown below.

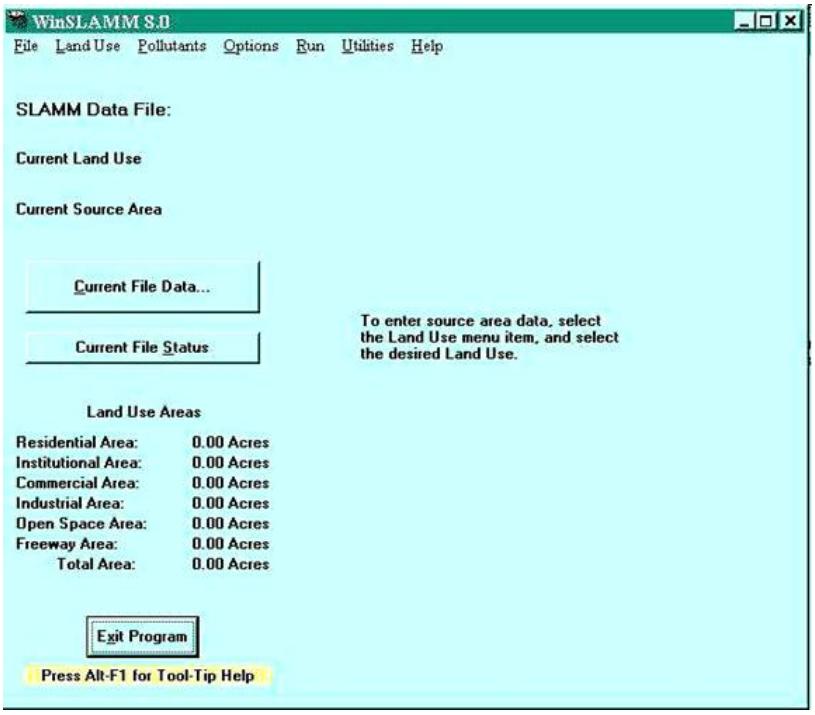


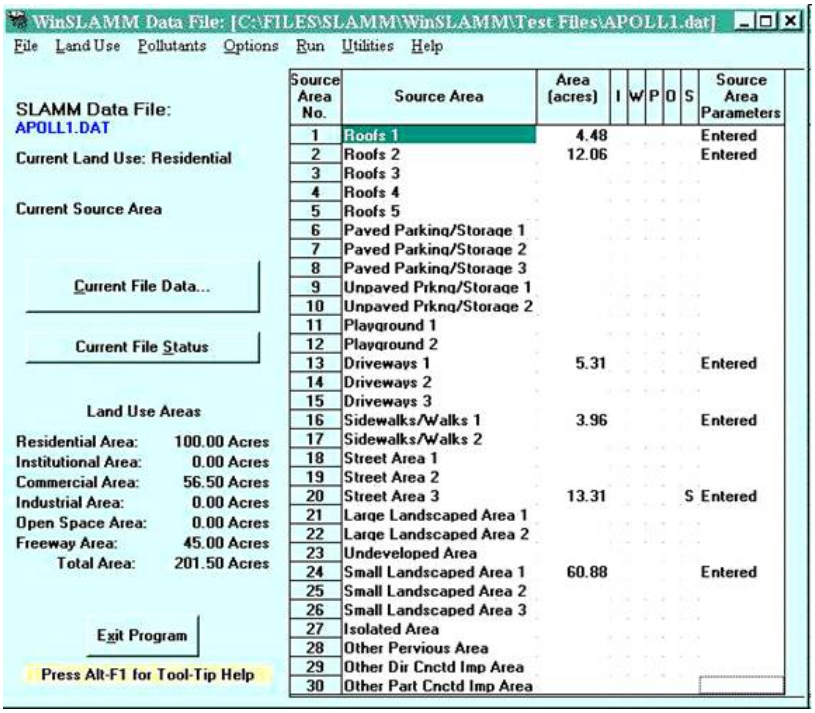
Main Data Entry Form

The main data entry form, which is illustrated below, allows you to enter the data needed to create a SLAMM data file. The main data entry form includes the following items:

- Menu items on the Main Menu bar
- A series of labels that identify the data file name, the current land use and source area, and the areas that have been entered for each land use
- A Current File Data button, described in more detail below
- A Current File Status button that determines if the minimum data needs of a WinSLAMM model run are met
- An Exit Program button
- A grid that lists the source areas for each land use and indicates whether source area parameters and control devices have been entered for each source area. Selecting a land use from the Land Use menu item accesses the grid for that land use.

The main menu is shown below, including a view of the land use screen:





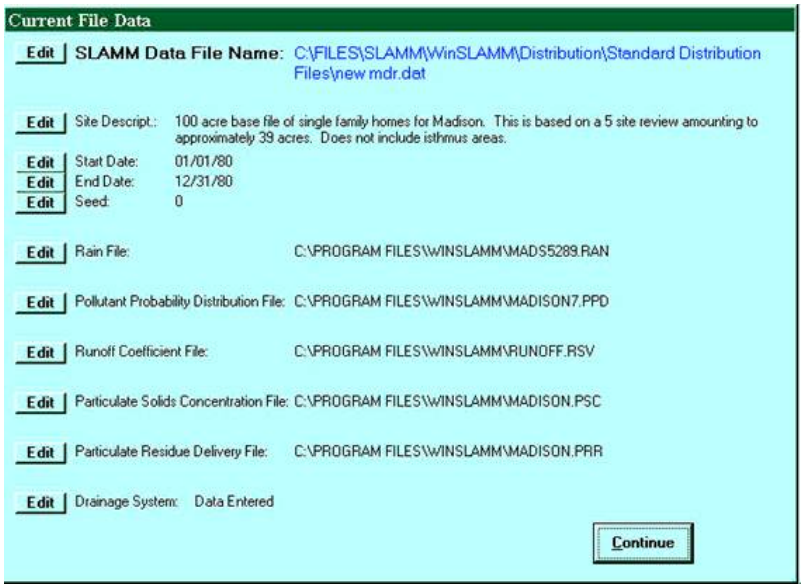
Current File Data Button

The Current File Data button allows the user to enter data critical to the operation of the model. This includes parameter file names and locations, Monte Carlo seed information, model run start and finish dates, and drainage information. A list of the items in the form is described below, followed by an illustration of the form.

1. SLAMM Data File Name. File names should subscribe to all the Windows file naming conventions. Do not use any extensions; the program will add them.
2. Site description for the file. The description may be up to 230 characters long.
3. Starting date of the study period. This date must be after 1952 and should correspond to the dates of the rain events in the rain file used in this SLAMM file. The format of the dates must be "MM/DD/YY" or "MM.DD.YY."
4. Ending date of the study period. This date must be after the starting date, and have the same format as the starting date.

5. Seed. The seed is used for Monte Carlo simulations of pollutant strength. The seed must be an integer greater than zero. Enter zero (0) for a randomly generated seed based upon the clock time a model run begins. A negative seed value will force the model to use zeros for any COV values in the pollutant probability distribution file. This has the effect of turning off the Monte Carlo pollutant loading simulation, so the model instead calculates pollutant loadings based upon the average pollutant value.
6. Rain file name. Enter the name of the rain file used in the model run. Do not include the extension.
7. Pollutant probability distribution file name. Enter the name of the pollutant probability distribution file you want to use for the model run. Do not include the extension.
8. Runoff coefficient file name. Enter the name of the runoff coefficient file used in the model run. Do not include the extension.
9. Particulate solids concentration file name. Enter the name of the particulate solids concentration file used in the model run. Do not include the extension.
10. Particulate residue delivery file name. Enter the name of the particulate residue delivery file used in the model run. Do not include the extension.
11. Drainage system data. Enter the fraction of the total area controlled by each drainage system type. The sum of the fractions of each of the drainage types must equal 1. The five drainage types are listed below:

    1. Grass Swales. Enter additional information to characterize grass swales after entering the drainage type area fractions. This information is described in the outfall control section.
    2. Undeveloped roadside. This category is used to represent haphazard drainage along a road.
    3. Curb and Gutters, “valleys,” or sealed swales in poor condition (or very flat). This category may also be used if runoff is channeled along the edge of streets without curb and gutter.
    4. Curb and Gutters, “valleys,” or sealed swales in fair condition.
    5. Curb and Gutters, `“valleys,” or sealed swales in good condition (or very steep).



The printing options are included under the drop-down tab “file-output options”. Table 5-2 lists the main options available. There are also several one-line per event options that summarize long SLAMM runs well, especially when exporting the data into spreadsheet programs for further analyses, or when using the SLAMM-SWMM interface program.

Table 5-2. Printing Options

1. Print source areas by land use & outfall for each rain - complete printout.
2. Print source area totals and outfall summaries.
3. Print outfall data only for each rain.
4. Default option - Print outfall summaries only.

Data Entry

This section reviews the steps necessary to enter WinSLAMM land use and drainage system information into a file. The first sub-section reviews the land use area information, the second sub-section reviews the catchbasin and drainage control information, and the final sub-section reviews the outfall control information.

Land Use and Source Area Information

Characterize the six land uses by defining source areas. Enter source areas for each land use by selecting, from the main menu, “File/{Land Use}”. A data entry spreadsheet, shown below, for the land use will appear on the “Main Data Entry” form. This spreadsheet lists all the available source areas for the land use, the area of the source area, the available controls, and the source area parameters. To enter an area, double-click on the area column box in the row of the desired land use. You will be prompted to enter the area of the source area as well as the required source area parameter information. To enter a control for the source area, double-click on the desired control box in the row of the selected source area. Land use areas 1 to 5 each have 30 source areas, while land use 6 (Freeways) has 10 source areas, as shown below.

Table 5-3 is a list of the mian source areas WinSLAMM uses. In most cases, more than source area in each category is available for each land use. If a control option has been activated, the code letter for that control option will appear in the column. For example, in the data grid above, street sweeping has been activated, as indicated by the three S's in the S column. The control options available for each source area are illustrated in Figure 5-1. The information needed for each control option and the procedure to enter this information in a WinSLAMM data file is listed at the end of this section.

Table 5-3. SLAMM Source Areas

Roofs	Sidewalks/Walks	Other Impervious Areas
Paved Parking/Storage	Streets/Alleys	Freeway Lanes/Shoulders
Unpaved Parking/Storage	Undeveloped Areas	Large Turf Areas
Playgrounds	Small Landscaped Areas	Large Landscaped Areas
Driveways	Other Pervious Areas	

Each source area listed in Table 5-3 has specific data requirements that depend upon the characteristics of the source area and upon the source area's land use. These requirements are listed in Table 5-4 and 5-5, which are coding forms that list the land use and control practice information requirements. These sheets should be filled out before the data file is created.

Streets and alleys in land uses 1 through 5 require somewhat different characteristic information than freeway (Land Use 6), paved lane, and shoulder areas. To enter a user defined street dirt accumulation equation for a street area in land uses 1 through 5, the equation must be in the form of a quadratic equation, $Ax^2 + Bx + C$, where A is greater than 0, B is greater than 0, and C is less than or equal to 0.

Isolated areas, or disconnected areas, are areas within a land use that do not contribute runoff to the land use outfall. Isolated areas could be constructed, e.g. swimming pools, or natural land features such as kettle ponds. Source controls are not applicable to isolated areas.

The source areas in the Freeway land use include Paved Land and Shoulder Areas, Large Turf Areas, an Undeveloped Area, an Other Pervious Area, an Other Directly Connected Impervious Area, and an Other Partially Connected Impervious Area. A paved lane and shoulder area requires somewhat different source area data requirements than street and alley source.

Catchbasin and Drainage Control Information
Enter catchbasin and drainage control information by selecting, from the main menu, "Land Use/Catchbasin" or "Drainage Control". The available options for catchbasins or drainage control are listed in Figure 5-1. The data requirements for each of these options is shown on Table 5-4 and are listed in a later section.

Outfall Control Information
Enter outfall control information by selecting , from the main menu, "Land Use/Outfall". The available options for outfall controls are listed in Figure 5-1. The data requirements for each of these options is shown on Table 5-5 and are listed in the following section.

Source Area Control Device Information
This section describes the information necessary to apply a pollutant control device to a source area or outfall. Figure 5-1 lists the control devices applicable to a specific source area, the entire drainage area, or to the outfall. The control device options for each source area are also listed on the source area screen in the program under the column heading "Control Options Available." To select a control option for a source area, follow the steps listed below upon entering a source area menu:

1. Enter the source area number.

2. Enter the area, in acres, of the source area.

3. Enter the source area characteristics. The model will request all parameters necessary for each source area, as described in Tables 5-4 and 5-5.

4. Enter the source area option letter to use a control device to reduce the runoff volume or pollutant loading coming from a source area. The letter for each control option is listed on Figure 5-1 and at the bottom of each source area menu in the program.

Figure 5-1. Source area, drainage system, and outfall control options available in SLAMM. (1)

	Infiltration device	Wet detention pond	Grass drainage swale	Street cleaning	Catchbasin cleaning	Porous pavement	Other
Roof	X	X					X
Paved parking/storage	X	X				X	X
Unpaved parking/storage	X	X					X
Playgrounds	X	X				X	X
Driveways						X	X
Sidewalks/walks						X	X
Streets/alleys				X			X
Undeveloped areas	X	X					X
Small landscaped areas	X						X
Other pervious areas	X	X					X
Other impervious areas	X	X				X	X
Freeway lanes/shoulders	X	X					X
Large turf areas	X	X					X
Large landscaped areas	X	X					X
Drainage system			X		X		X
Outfall	X	X					X

(1) Development characteristics affecting runoff, such as roof and pavement draining to grass instead of being directly connected to the drainage system, are included in the individual source area descriptions.

A description of the data necessary for each control device option is listed below.

Infiltration Devices

Water percolation rate (in/hr).
Area served by device (acres).
Surface area of the device (square feet).
Width to Depth ratio of the device. If the device is a spreading area, press ENTER.

Street Cleaning

The street cleaning control option can be applied to streets and alleys in land uses 1 through 5. No more than ten street cleaning schedule changes are allowed for each street or alley source area. Below is a description of the information requirements necessary to implement street cleaning.

Street cleaning starting date (date format: MM/DD/YY).
Street cleaning ending date (date format: MM/DD/YY).
Street cleaning schedule. The cleaning frequency options range from none to daily.
Street cleaning productivity. Select the default productivity by entering the parking density and the parking control status. The parking density options are:

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

The parking control status indicates whether parking options such as limited parking hours or alternate side-of-the-street parking have been regulated by the municipality. If they have, answer “YES” to indicate that parking controls are imposed.

Street sweeper productivity can also be described by entering the equation coefficients for the linear street cleaning equation, $Y = mx + b$, where is Y is the residual street dirt loading after street cleaning and x is the before street cleaning load (in lbs/curb-mile). Enter values for:

m (slope, less than 1)
b (intercept, greater than or equal to 1)

Porous Pavement

Infiltration rate of pavement, base, or soil, whichever is the least (in/hr).
Porous pavement area (acres).

Wet Detention Ponds

The wet detention pond algorithm in SLAMM is developed from the program DETPOND, a detention pond water quality analysis program developed by Pitt and Voorhees (1992). It uses the modified Puls hydraulic routing method and the surface overflow rate method for particulate sedimentation. The pond must have at least 3 feet of standing water below the lowest invert for these removal equations to be valid. Evaluate the pollutant removal capabilities of a wet detention pond either in specific source areas or at the outfall. The wet detention pond data requirements for SLAMM include:

The particle size distribution in the pond influent.

The initial stage elevation of the pond.
The pond stage - area relationship.
The pond outlet characteristics.

The input module creates a separate detention pond data file if one or more detention ponds are selected as a control device. The detention pond data file name is the same as the name of the SLAMM data file in the Site and File Information menu, but with the file extension ".PND." If the detention pond data file name is changed, the SLAMM data file name must also be changed to match it.

The model requires a particle size distribution file to evaluate the pollutant removal abilities of detention ponds. To create a particle size distribution file, use the SLAMM Parameter module discussed later. The model also requires the initial stage elevation of the pond and the pond stage - area relationship. The units for these values are in feet and, for the pond area, acres. The area of the pond at the datum (lowest) elevation must be zero. Enter at least five reasonably spaced stage increments. The increments can either be enter variably spaced, or at constant intervals.

SLAMM has the ability to characterize each detention pond with as many as ten different outlets. The pond outlet options are described below.

Rectangular Weir Characteristics:
1. Weir length (ft).
2. Height from bottom of weir opening (invert) to top of weir.
3. Height from datum (low elevation of pond) to bottom of weir opening (invert) (ft).

V-Notch Weir Characteristics
A) Weir angle:
1. 22.5 degrees.
2. 30 degrees.
3. 45 degrees.
4. 60 degrees.
5. 90 degrees.
6. 120 degrees.

B) Height from bottom of weir opening (invert) to top of weir.
C) Height from datum to bottom of weir opening (invert) (ft).

Orifice Characteristics:
1. Orifice diameter (ft).
2. Invert elevation above datum (ft).

Seepage Basin Characteristics:
1. Infiltration rate (inches/hr).
2. Width of device (ft).
3. Length of device (ft).
4. Invert elevation of seepage basin inlet above datum (ft).

Natural Seepage Infiltration Rates:
These stage elevations must correspond to the stage elevations entered for the pond stage - area elevations. The seepage rates are expressed in inches per hour. Enter 0 inches per hour for entry 0, stage 0.

Monthly Evaporation Rate
Enter the average pond surface evaporation rate, in inches per day, for each month of the year.

Other Outlet Characteristics:
This option allows you to describe a stage - discharge relationship that is independent of any other outlet discharge characteristics. The stage elevations must correspond to the pond stage - area elevations. Enter outflow values from zero stage level (datum), and enter 0 discharge at the 0 stage. I

Catchbasin Cleaning
Total sump volume (cubic feet) in the drainage area.
Area served by catchbasins control (acres).
Percentage of the sump volume which is full at the beginning of the study period (0 to 100).
Number of times the catchbasin is cleaned during the study period (cleaning up to 5 times is allowed).
Date for each time the catchbasin is cleaned. The dates must be consecutive, within the study time period, and in the format "MM/DD/YY."

Other Flow or Pollutant Reduction Control
Pollutant concentration reduction (fraction).
Water volume (flow) reduction (fraction).
Area served by other control (acres).

Grass Swales
Swale infiltration rate (in/hr). This is typically about one-half of the infiltration rate as measured using a double-ring infiltrometer.
Swale density (ft/acre).
Wetted swale width (ft).
Enter the area served by swales (acres).

Table 5-4a. Blank Coding Forms for SLAMM Source Areas

Table 5-4b. Blank Coding Forms for SLAMM Source Areas

Table 5-5a. Blank Coding Forms for SLAMM Control Practices

Table 5-5b. Blank Coding Forms for SLAMM Control Practices

Table 5-5c. Blank Coding Forms for SLAMM Control Practices

Table 5-5d. Blank Coding Forms for SLAMM Control Practices

Pollutant Analysis Selection Information
Select “Pollutants” in the “Main Menu” to analyze pollutants in a WinSLAMM model run. It is necessary to enter the name of the pollutant probability distribution file before selecting the pollutants, as the model must examine this file to show which pollutants are available. To enter the name of the pollutant probability distribution file, select the “Current File Data” button.

The pollutant selection box lists all of the available pollutants in the pollutant probability distribution file. To select a pollutant for analysis, click on its check box. To remove a checked box, simple click on it again. An example of the “Pollutant Selection” box is shown below, indicating that suspended solids (particulate solids) and particulate forms of copper are to be evaluated. Suspended solids are always evaluated and cannot be removed from the analysis.

Saving the Data File
To save a data file, from the main menu, select “File/Save”. You will be prompted for a file name if you haven’t already entered one. You may change the name of the file by selecting “File/Save As/Current Version”. An example data.DAT file is also included on the distribution disk. This “new mdr.dat” file is a medium density residential land use file.

Creating WinSLAMM Output
To Run a WinSLAMM data.dat model, select the “Windows Calculation Module” menu item to create model output based upon the input data currently loaded in the WinSLAMM interface. You will be asked whether you want to save the input file. If you select “yes”, the standard Windows “Save” dialog box will appear; enter the desired path and file name and press “OK”. The program will then run and create the output in the format selected in the “File / Output Format Options” submenu. A typical calculation tabulation of the output is listed below. The “Print Option” in the file drop down menu item allows the user to select which of the outputs to print. The user must also elect to print the output to either a file, in Comma Separated Value (or .CSV) format, or directly to a printer. The printing options listing is also shown below.

Parameter Module Description

Introduction

The parameter module contains five subprograms that create the parameter files needed to run WinSLAMM. A brief discussion of the subprograms is listed below, and is followed by a detailed description of each subprogram.

1. Rain Data: Creates files listing rainfall depths, durations, and interevent time periods from actual or stochastically generated rainfall data.

2. Runoff Coefficient Data: Creates files containing the data needed to calculate runoff from specific urban source areas.

3. Particle Size Data: Creates files describing the particle size distribution of sediment in urban runoff entering detention ponds.

4. Particulate Solids Concentration Data: Creates files containing the particulate solids concentration data needed by WinSLAMM to predict particulate solids loadings in urban source areas and land uses.

5. Particulate Residue Reduction Data: Creates files that determine the particulate residue loading remaining in curb and gutter delivery systems after a storm event.

6. Pollutant Probability Distribution Data: Creates files describing pollutant (*e.g.* lead, zinc, etc.) concentrations from WinSLAMM source areas and land uses.

Rain Input Subprogram

Both WinSLAMM and WinDETPOND need rain depths, rain durations, and interevent time periods to calculate runoff volume and pollutant loadings. The rain input parameter subprogram records this rain information in a format the models can use. This information can be recorded from rainfall records or generated stochastically from rainfall statistics. Both forms of this data are discussed below.

There are eleven options in the rain input Module menu. They are listed in Table 5-6.

Table 5-6. Rain Input Module Menu

1. Create a Rain File
2. Review or edit a rain file
3. Print a rain file
4. Save a rain file with duration calculations
5. View rain file input instruction
6. Create a generated rain file
7. Calculate the Depth-Duration Rank Correlation
8. Create a Rainfile from Standard Format Data
9. Create a Rainfile from Standard Format Data with Duration and Rainfall Erosive Capacity Data
10. Create a Rainfile from Data Base Formatted Data
11. Leave Rain input Program

Select options 1, 2, or 3 to create, edit, and print a rain file containing rainfall data from recorded rainfall records. The only rain information needed by WinSLAMM is the starting and ending times of each rain and the total rain depth (in inches) of each rain. A rain file therefore consists of rainfall starting and ending dates and times, and rainfall depths. Hourly rainfall data is available from National Oceanic and Atmospheric Administration records. However, the rainfall data must be in the format described below. It will be necessary to examine the hourly rain data and determine the beginning and ending times of each rain event. It is conventional to select 6 hours of no rain as the separating time between adjacent rains for most urban areas.

Rainfall date and time.
The dates must be in the form MM/DD/YY or MM.DD.YY. A date entered as 1/4/88 is unacceptable; it must be entered as 01/04/88. Time must be in the form HH:MM or HH.MM. A time entered as 6:30 is unacceptable; it must be entered as 06:30. Time is entered in 24 hour increments, so afternoon or evening times must be entered as, for example, 18:15, not 06:15. The data entry process in this subprogram is designed to speed data input, and is described below. The process applies to both creating a new rain file and editing an existing file. When editing a file, if an entry is correct, press ENTER; and the existing value will remain unchanged. An analysis cannot currently contain rains from 1999 to 2000. If all the rains selected for analysis are before 2000, or all are after 2000, then there is no problem.

Entering Date and Time Information (Shortcut method):

Before entering rainfall data, enter the number of distinct rainfall events.
Before entering rainfall data, enter the last two digits of the year of the first rainfall. For example, type “89” for 1989.
Enter the beginning date of the rainfall by entering two digits for the month and two digits for the day. Do not separate the two sets of digits with another character or a space.
Enter the beginning time of the rainfall by entering two digits for the hour. If the rainfall started on the hour, press ENTER. If not, also enter two digits for the minutes. Do not separate the two sets of digits with another character or a space.
Enter the ending date of the rainfall, if the date is different from the starting date, by entering two digits for the month and two digits for the day. If the ending date is the same as the starting date, press ENTER. Do not separate the two sets of digits with another character or a space. If the ending year is different that the starting year, enter the month, the day, and the new year in the following format: MMDDYY.
Enter the ending time of the rainfall by entering two digits for the hour. If the rainfall started on the hour, press ENTER. If not, also enter two digits for the minutes.

Entering Rainfall Depth information:
The rain depth must be entered in units of hundredths of inches. For example, if the rainfall depth was 0.09 inches, enter “9.” If the rainfall depth was 1.25 inches, enter “125.” Rain files created with this module will have the extension “.RAN.”

Select option 4 to export rain depths, durations, and times between rains to a file in a comma separated value data format. This option has been provided so that these values can be exported to a spreadsheet to calculate mean rain depths, mean durations, and mean interevent periods that may be used to generate rain events statistically. The format of this export file is listed later. It has the extension “.RES.”

Option 5 is a help screen. It lists the data input and editing shortcuts available for entering the rain data. The help screen is listed in Table 5-7.

Table 5-7. Rainfall Input and Edit Help Screen

1. In the create rain file option, to avoid entering the year each time you enter a date, type before entering any data the last two digits of the year (*e.g.*, 89 for 1989) as a beginning rain data. Press ENTER and then enter all dates with just the month and the date.
2. Do not use “/” (slash) marks when entering dates. Use “0506” or “050689” for 05/06/89.
3. If the times have no minutes, do not add “:00” when entering a time. Enter the two hour digits only.
4. If the ending date is the same as the beginning date, press ENTER.
5. In the create rain file option, enter integers for rain depths. The program will change them to hundredths of an inch.
6. When editing a rain file, if a part of a data line is correct, press ENTER. The current value will be retained.

Select option 6 to create a stochastically generated rain file. This set of subroutines creates rain depths, rain durations, and interevent periods by assuming that the distribution of these parameters closely matches an exponential probability distribution. This assumption is reasonably valid for the small and medium sized rain events (Voorhees 1989) that cause most of the urban nonpoint source pollution problems (Pitt 1987). The rainfall duration can be modeled using either the exponential probability distribution or the gamma probability distribution. The output from this option can be entered into SLAMM or DETPOND as a rain file. To create a stochastically generated rain file, enter the information listed in Table 5-8.

Table 5-8. Information Needed to Create a Stochastically Generated Rain File

1. Generator data file name.
2. Mean rain depth (inches).
3. Minimum recorded rain depth (inches). This is zero unless there is a lower limit (arbitrary or established by data limitations) in the rainfall data.
4. Mean rain duration (hours). Also enter the duration variance to model the duration using the gamma distribution.
5. Mean time between rains (hours).
6. Minimum time between rains (hours; must be an integer). For example, if an interevent period is defined as being greater than three hours, enter 3.
7. Number of events to be generated.
8. Seed. This value initializes the random number generator. Select "0" to use a random seed taken from the computer's internal clock.
9. Enter the rank correlation coefficient for the rainfall depths and rainfall durations in the data. The rank correlation is found by ranking the depths and durations of the data and calculating the correlation of the ranks. Option 7 in this module will calculate this.
10. Rain file start date. The date must be in the form “MM/DD/YY.”
11. Number of years of rainfall data. This value is altered by changing the mean time between rains, mean rain duration, or the number of events to be generated.

Option 7 is a two variable Spearman Rank Correlation program. It will calculate both the correlation coefficient (r) and the Spearman rank correlation coefficient for two variables. The data must be in one of three formats that are described later. The output from this option includes the file rain depth, duration, and interevent period averages and maximum values. The output is sent to a file with the extension “COR.”

Option 8 is a subroutine that converts hourly rain data into a WinSLAMM rainfall file. The standard format with hourly data is in a comma separated value ASCII file. Each row in the file represents one day of rainfall data. The first value in each row is the date, in the form MM/DD/YY. The next twenty-four values in each row, each separated by a comma, represent hourly rainfall data. Zero rainfall values are acceptable. The user must also enter the minimum number of hours between rains (typically 6 hours) and the minimum rainfall depth to define a rainfall event (typically 0.01 inch). We use the hourly NOAA data as supplied by EarthInfo of Golden, CO, on their CD-ROMs. They supply hourly data all U.S. rain gages on 4 CD-ROMs which can be purchased individually. The CD-ROMs are updated yearly and include all previous data (usually as far back as 1948). The EarthInfo software is used to select the state and the city (specific rain gage). The hourly summary option and the export option is selected. Lotus WK1 file formats are selected for exporting. The file is then opened in Excel and cleaned up. The initial data columns are removed, leaving the date column as the first column. Then the “flag” columns are deleted, along with the “25^{th}” hourly column (the daily rain total) and top header rows. The file is then saved in ASCII format (ASCII MSDOS option in Excel 2000). This file is then indicated in the SLAMM parameter file module to create the SLAMM rain file using this option 8. A representative selection of US rain gage files are included on the distribution disk (and described in a following table).

Option 9 evaluates the erosion potential of different rains through an energy equation that evaluates the erosive power of each rainfall event. This option was included in the parameter module to evaluate the usefulness of the energy algorithm and to evaluate the relative erosion capability of each rain using external procedures (such as Excel); WinSLAMM currently does not use the information.

Option 10 is another subroutine that converts hourly rain data into a WinSLAMM rainfall file. The database file format is also a comma separated value file with three columns. The first column is the date in the form MM/DD/YY. The second column is the time, in hours, in the form 0100 for 1:00 AM, 1300 for 1:00 PM, and so on. The subroutine ignores any 2500 values that are often used to summarize the daily rainfall totals. The third column is the rainfall for the hour. The user must also enter the minimum number of hours between rains and the minimum rainfall depth to define a rainfall event.

The following examples show how various types of rain files are created.

Description of Selected Rainfiles Included With The Program

The following are descriptions of some of the rain files included with the distribution of WinSLAMM. As an example, the BHAM76.RAN file contains all of the rains from 1976, as recorded at the Birmingham, AL, airport. The BHAM76.RAN file was selected to represent a typical Birmingham rain year. Similarly, the RAIN81.RAN file contains all of the 1981 rains observed at the Milwaukee Nationwide Urban Runoff Project (NURP) sampling locations. These files were used for the verification of the runoff volume and pollutant discharges using the observed NURP data. There are some relatively large rain files included that represent 30 to 50 years of rainfall observations. These files were produced from NOAA records (as recorded on EarthInfo CD-ROMs). Some of these files have rains as early as 1948, although the earliest rains that SLAMM can evaluate start on Jan 1, 1953. When selecting the rain file within SLAMM, the start and end dates of the evaluation period are automatically set to include all of the rains in the rain file. However, if earlier rains before 1953 are included in the rain file, a warning message is shown and the starting rain date for the evaluation is automatically moved to the earliest rain in 1953.

WinSLAMM is a fair weather program, as it currently does not include snowmelt (or baseflows). For areas with very cold winters (having extended periods of snowpacks each winter), the model should only be run for the rain season. For other areas, long-term continuous simulations are possible using the complete rain files covering several decades. The following is a listing of the rain files included with the download program, including brief descriptions of the rain series included in each file (you notice there are no 2000 year dates, that is another story).

File name	City	State/Province	Years	Approx. Rain Depth (in.)	Very Cold Winters?	Very Hot Summers?
Alby4895	Albany	New York	1948-1995	36	yes	no
Atl8792	Atlanta	Georgia	1987-1992	49	No	yes
Aust5292	Austin	Texas	1952-1992	32	No	yes
Bham4895	Birmingham	Alabama	1948-1995	55	No	yes
Bham76	Birmingham	Alabama	1976	55	No	yes
Bhamflod	Birmingham (series of extreme IDF rains)	Alabama	special	na	na	na
Bhamsrce	Birmingham (series for source evaluations)	Alabama	special	na	na	na
Boz8893	Bozeman	Montana	1988-1993	12	Yes	no
Buf8792	Buffalo	New York	1987-1992	36	Yes	no
CV80	Castro Valley (NURP data)	California	1980	15	no	no
Dal8893	Dallas	Texas	1988-1993	29	No	yes
Denv4895	Denver	Colorado	1948-1995	15	Yes	no
Dlt1975	Duluth	Minnesota	1975 (a typical year)	30	Yes	no
Gb1969	Green Bay	Wisconsin	1969 (a typical year)	28	Yes	No
Gb1982	Green Bay	Wisconsin	1982 (a typical year)	28	Yes	no
Lax4895	Los Angeles	California	1948-1995	13	No	no
LH80	Lake Hills (Bellevue) (NURP Data)	Washington	1980	35	No	No
LH81	Lake Hills (Bellevue) (NURP Data)	Washington	1981	35	No	No
LH82	Lake Hills (Bellevue) (NURP Data)	Washington	1982	35	No	No
LR7276	Little Rock	Arkansas	1972-1976	49	No	yes
Mads4895	Madison	Wisconsin	1948-1995	31	Yes	no
Miam5292	Miami	Florida	1952-1992	60	No	yes
Milwflod	Milwaukee (series of extreme IDF rains)	Wisconsin	special	na	na	na
Milw81	Milwaukee (NURP data)	Wisconsin	1981	31	Yes	no
Milw83	Milwaukee (NURP data)	Wisconsin	1983	31	Yes	no
Milw88	Milwaukee (monitoring period data)	Wisconsin	1988	31	Yes	no
Milw5288	Milwaukee	Wisconsin	1952-1988	31	Yes	no
Minn5289	Minneapolis	Minnesota	1952-1989	25	Yes	no
Mke1969	Milwaukee	Wisconsin	1969 (a typical year)	31	Yes	No
Monroe94	Madison (Monroe St)	Wisconsin	1994	31	Yes	no
Mps1959	Minneapolis	Minnesota	1959 (a typical year)	25	yes	no
Msn1968	Madison	Wisconsin	1968	31	yes	no
Msn1981	Madison	Wisconsin	1981	31	yes	no
Msntest	Madison (a small test file)	Wisconsin	1981 (only 5 events)	31	yes	no
Newk5292	Newark	New Jersey	1952-1992	42	No	no
Newo5495	New Orleans	Louisiana	1954-1995	54	No	yes
Newtor83	Toronto (TAWMS data)	Ontario	1983	32	Yes	No
Phen8391	Phoenix	Arizona	1983-1991	7	No	yes
File name	**City**	**State/Province**	**Years**	**Approx. Rain Depth (in.)**	**Very Cold Winters?**	**Very Hot Summers?**
NYNY4895	New York	New York	1948-1995	44	no	no
Por8892	Portland	Maine	1988-1992	44	No	no
RC8893	Rapid City	South Dakota	1988-1993	16	Yes	no
RCMD4895	Richmond	Virginia	1948-1995	44	no	yes
Ren8893	Reno	Nevada	1988-1993	7	Yes	yes
Setl4895	Seattle	Washington	1948-1995	39	No	no
SFCA4895	San Francisco	California	1948-1995	19	No	no
SL8792	Salt Lake City	Utah	1987-1992	14	Yes	no

Stlo5292	St. Louis	Missouri	1952-1992	34	no	no

Appendix 5-C contains an example printout of the Bham76.ran rain file for the 1976 year in Birmingham, AL.

Runoff Coefficient Subprogram

Runoff volume generation in WinSLAMM is accomplished with an RSV file. The included runoff.RSV file, named RUNOFF.RSV has undergone extensive calibration and verification and should not be destroyed. The runoff coefficients were calculated using general impervious and pervious area models. These models were then calibrated based on extensive Toronto data and were then verified using additional independent Toronto data, along with numerous Milwaukee and Madison data for a wide variety of land development and rain conditions. However, WinSLAMM was designed to allow the use of alternative runoff models, as desired. Alternative runoff coefficients for each source area type can be calculated using other models and saved as a different runoff.RSV file name.

Runoff coefficients, when multiplied by rain depths, land use source areas, and a conversion factor, determine the runoff volumes needed by WinSLAMM. The runoff coefficient subprogram creates the runoff coefficient file used in WinSLAMM and WinDETPOND. All runoff coefficient files have the extension ".RSV." Coefficients are required for nine area types which are listed in Table 5-9. Each area type requires a value for the 17 different rainfall depths listed in Table 5-10. The runoff coefficients are further reduced when the runoff from the areas drain across soils instead of being directly connected to the storm drainage system. These reduction factors are expressed as drainage efficiency factors (DEF). Table 5-11 lists the drainage efficiency factors. Disconnected paved area runoff coefficients in low density areas are similar to the runoff coefficients for the landscaped areas. All coefficient values must be less than 1.0.

The RUNOFF.RSV file contains the verified runoff coefficients, based on the small storm hydrology model. A typical runoff coefficient file is plotted below.

These data fit the general infiltration rate model developed by Pitt (1987) as follows:

This figure plots cumulative variable runoff losses (F, inches or mm), ignoring the initial losses, versus cumulative rain (P, inches or mm), after runoff begins. The slope of this line is the instantaneous variable runoff loss (infiltration) occurring at a specific rain depth after runoff starts. A simple nonlinear model can be used to

describe this relationship which is similar to many other infiltration models. For a constant rain intensity (i), total rain depth since the start of runoff (P), equals intensity times the time since the start of runoff (t). The small storm hydrology nonlinear model for this variable runoff loss (F) is therefore:

$$F = bit + a(1 - e^{-git}) \quad \text{or} \quad F = bP + a(1 - e^{-gP})$$

Three basic model parameters were used to define the model behavior, in addition to initial runoff losses and rain depth: “a”, the intercept of the equilibrium loss line on the cumulative variable loss axis; “b”, the rate of the variable losses after equilibrium; and “g”, an exponential coefficient. If variable losses are zero at equilibrium, then “b” would be zero. Because this plot does not consider initial runoff losses, the variable loss line must pass through the origin. This model reduces to the SCS model when the “b” value is zero and “a” is S’, and when Ia is 0.16 (80% of 0.2) of “a”. This general model also reduces to the Horton equation when cumulative rain depth since the start of the event is used instead of just time since the start of rain. Observed runoff data from both small- and large-scale tests were fitted to this equation to determine the values for a, b, and g for observed i and t (or P), and F values. In addition, outfall runoff observations from many different heterogeneous land uses were used to verify the calibrated model (Pitt 1987). Below is a table showing the relationship between this model and the SCS and Horton parameters:

Table 5-9. Runoff Coefficient Area Types

1. Connected flat roofs
2. Connected pitched roofs
3. Directly connected impervious areas
4. Directly connected unpaved areas
5. Pervious area - sandy (A/B) soils
6. Pervious area - clayey (C/D) soils
7. Smooth textured streets
8. Intermediate textured streets
9. Rough textured streets

Table 5-10. Rain Depths Needed for Each Area Type

in:	0.04	0.08	0.12	0.20	0.39	0.59	0.79	0.98	1.2
mm:	1	2	3	5	10	15	20	25	30
in:	1.6	2.0	2.4	2.8	3.2	3.5	3.9	4.9	
mm:	40	50	60	70	80	90	100	125	

Table 5-11. Drainage Efficiency Factors

1. w/o alleys, medium to high density land use
2. w/ alleys, medium to high density land use
3. strip commercial and shopping center land use

Appendix 5-D contains an example printout of the Runoff.rsv runoff coefficient file.

Critical Particle Size Subprogram

The particle size distribution option prepares files containing the runoff particle size distribution for wet detention pond analyses. This information describes the size distribution of urban runoff particulates that enter a detention pond. These files have the extension “.CPZ.” The particle size range is from 0 to 2000 microns.

To create a particle size file, enter the percentage of the particles in the runoff that are greater than the corresponding particle size for each particle size. The program will scroll from a particle size of 1 micron to a particle size of 2000 microns. The program will beep if a percentage value greater than the previous value is entered. Correct the error with the file-editor option.

Table 5-12 lists the particle sizes needed for a distribution. By definition, 100% of the particles are greater than 0 micrometers (μm) in size, and 0% of the particles are greater than 2000 μm. Data for each size can be easily determined from a standard particle size distribution plot developed from laboratory settling column tests or particle size analyses.

Table 5-12. Critical Particle Sizes for Detention Pond Analysis (Mm)

0	6	12	30	100	1000

1	7	13	35	150	2000
2	8	14	40	200	
3	9	15	50	300	
4	10	20	60	500	
5	11	25	80	800	

The following example illustrates the creation of a particle size file:

Description of Selected Critical Particle Size Files Included With The Program
The example size.CPZ files for wet detention analysis included in the disk were constructed using extensive urban runoff particle size data. However, these different size.CPZ files result in a wide range of potential wet detention pond performance (suspended solids percentage reduction) measurements. The particle size distributions for various source areas where wet detention ponds may be used can be expected to also vary widely. These size.CPZ files should therefore be used with caution, but they are expected to generally bracket particle size distributions in stormwater.

- LOW.CPZ is a particle size distribution corresponding to an urban runoff flow containing low concentrations of particulate residue (such as for roof runoff).
- MEDIUM.CPZ is a particle size distribution file for runoff containing "medium" particulate residue concentrations (such as for outfall locations).
- HIGH.CPZ is a particle size distribution file for runoff containing high concentrations of particulate residue (such as for construction sites).
- NURP.CPZ is an average of the available outfall particle size distribution data for all of the NURP projects.
- MIDWEST.CPZ summarizes the upper Midwest and Toronto outfall particle size data.

Below is a plot of the data in each of these files.

Also included on the distribution disk is an additional particle size file representing typical street dirt sizes (stretdrt.cpz). This file should not be used in stormwater treatment evaluations, but can be used to illustrate the misleading results when users incorrectly assume that the earlier reported street dirt particle distribution is the same as the particle size distribution in the runoff. Appendix 5-H includes an example file showing the medium.cpz distribution.

Particulate Solids Concentration Module

Particulate solids concentration values, when multiplied by source area runoff volumes and a conversion factor, calculate particulate solids loadings (lbs) in WinSLAMM. The particulate solids concentration subprogram creates the particulate solids concentration file used in WinSLAMM. All particulate solids concentration files have the extension ".PSC." Concentrations are required for thirteen area types in six land uses in WinSLAMM. These are listed in Table 5-13. Street areas are not included because WinSLAMM calculates street source area washoff directly. Each area type requires a value for the 14 different rain depths listed in Table 5-14.

Table 5-13. SLAMM Land Uses And Source Areas Listed In The Particulate Solids Concentration Subprogram

Land Uses:	Residential	Institutional
	Commercial	Industrial
	Open Spaces	Freeways
Source Areas:		
	Roofs	Undeveloped Areas
	Paved Parking/Storage	Small Landscaped Areas
	Unpaved Parking/Storage	Large Turf Areas
	Playgrounds	Other Pervious Areas
	Driveways	Other Impervious Areas
	Sidewalks/Walks	Freeway Lanes/Shoulders
	Large Landscaped Areas	

Table 5-14. Rain Depths Listed In The Particulate Solids Concentration Subprogram

in:	0.04	0.08	0.12	0.20	0.39	0.59	0.79	0.98	1.2
mm:	1	2	3	5	10	15	20	25	30
in:	1.6	2.0	2.4	2.8	3.2				
mm:	40	50	60	70	80				

The distribution disk contains a particulate residue (suspended solids) description file, BHAM.PSC. This file contains the summary of the calibrated and verified runoff particle solids concentration conditions found during Madison, Toronto, Birmingham and Milwaukee urban runoff research. Appendix 5-F lists the Bham.psc file.

Particulate Residue Reduction Subprogram

SLAMM uses the particulate residue reduction subprogram to create parameter files that describe the fraction of total particulates that remains in the drainage system (curbs and gutters, grass swales, and storm drainage) after rain events end due to deposition. The reduction of particulate residue at the outfall due to the delivery system is a function of the type of drainage system and rainfall depth. SLAMM calculates this deposition effect for three different drainage systems, based on the condition of the curb and gutter. The three drainage delivery systems are:

1. Grass swales
2. Undeveloped roadside
3. Curb and gutters, "valleys," or sealed swales

The three condition options for curbs and gutters are:

1. Poor condition (or very flat)

2. Fair condition
3. Good condition (or very steep)

To create a particulate residue delivery reduction parameter file, enter the particulate residue reduction fraction for each of the drainage delivery types and, for curb and gutter system, conditions, described above. Enter a fractional value for each rainfall depth listed in Table 5-14. To edit a file, select a delivery system type, and condition option for curb and gutter systems, and the rain number. Enter the new fractional value at the prompt after entering the rain number. Particulate residue reduction parameter files have the extension ".PRR." Appendix 5-E contains a printout of an example Delivery.prr file.

Pollutant Probability Distribution Subprogram

Data from a pollutant value file determine, when multiplied by either a source area runoff volume or source area particulate loading, the pollutant loading from a source area. This subprogram creates files that describe pollutant concentrations or loadings that are from source areas and land uses used in SLAMM. This data is generally based upon pollutant loading and concentration source area and land use data collected from the study area or region. For example, particulate phosphate source data, in units of milligrams of phosphate per kilogram of suspended solids loading in the runoff, must be entered for each source area and land use of concern. The land uses and source areas are described in Table 5-15.

To enter pollutant data in a new file, select the pollutant of concern from the "Pollutant Concentration Relative Values" menu. Then enter the geometric mean relative concentration value and the coefficient of variation of the selected pollutant for each source area and land use. To edit an existing pollutant parameter file, the user may either edit pollutant values for an entire source area, edit only a specified land use-source area pollutant value, or enter a multiplier factor for the mean pollutant value and coefficient of variation value of each of the source areas in a land use.

Table 5-15. SLAMM Land Uses and Source Areas Listed in the Pollutant Probability Distribution Subprogram

Land Uses:		
Residential	Institutional	Commercial
Industrial	Open Spaces	Freeways
Source Areas:		
Roofs	Undeveloped Areas	
Paved Parking/Storage	Small Landscaped Areas	
Unpaved Parking/Storage	Other Pervious Areas	
Playgrounds	Other Impervious Areas	
Driveways	Freeway Lanes/Shoulders	
Sidewalks/Walks	Large Turf Areas	
Street Areas	Large Landscaped Areas	

The MADISON7.PPD file contains the filterable residue (dissolved solids) concentrations for each source area and for several pollutants. This file also contains COV values needed for the Monte Carlo evaluations. Table 5-16 shows the complete listing of pollutants available in SLAMM. In addition, the user may define up to six other pollutants in both particulate and filterable forms.

Table 5-16. Pollutants Available in SLAMM

Particulate Forms	Filterable Forms
Particulate Solids (kg/kg) [1]	Filterable Solids (mg/L)
Phosphorus (mg/kg)	Phosphate (mg/L)
	Nitrates (mg/L)
	Ammonia (mg/L)
Total Kjeldahl Nitrogen (mg/kg)	Total Kjeldahl Nitrogen (mg/L)
Chemical Oxygen Demand (mg/kg)	Chemical Oxygen Demand (mg/L)
Chromium (micrograms/kg)	Chromium (micrograms/L)
Copper (micrograms/kg)	Copper (micrograms/L)
Lead (micrograms/kg)	Lead (micrograms/L)
Zinc (micrograms/kg)	Zinc (micrograms/L)
	Fecal Coliform Bacteria (#/100 ml) [2]
Other pollutant #1	Other pollutant #1
Other pollutant #2	Other pollutant #2
Other pollutant #3	Other pollutant #3
Other pollutant #4	Other pollutant #4
Other pollutant #5	Other pollutant #5
Other pollutant #6	Other pollutant #6

[1] The particulate solids (suspended solids) data is obtained in the Particulate Solids Concentration subprogram described below.

[2] Fecal Coliform are retained on 0.45 micrometer filters, but generally behave like filterable pollutants in most urban runoff control practices.

Table 5-17. Units Available for Other Pollutants

Particulate Pollutant Units	Filterable Pollutant Units
1. nanograms/kg	1. nanograms/L (ng/L)
2. micrograms/kg	2. micrograms/L (μg/L)
3. milligrams /kg	3. milligrams /L (mg/L)
	4. #/100 ml (# ==> bacteria count)

To enter pollutants that are not listed in Table 5-16, select pollutants 11 -16 (Other particulate pollutants) or pollutants 27 - 32 (Other filterable pollutants). Enter the name of the pollutant and the units of the pollutant. Table 5-17 lists the available units. Apply the same procedures used to enter pollutants listed in Table 5-16 when entering "Other Pollutant" values. Table 5-18 is a blank coding form to organize the pollutant values.

Table 5-18. Blank Coding Form for Pollutant Probability Concentration File

Appendix 5-G contains the printout of the Bham.ppd file, showing the source area concentrations and variabilities used.

Example Input and Output Files

Printouts of the following example WinSLAMM files described below are presented in this section or in Appendices 5-C through 5-G:

• NEWRES.DAT . This is an example input file summarizing the characteristics of the area to be simulated. This file shows the areas for each source area, along with the associated "parameter" files also used. The rain simulation period examined, plus the source area and outfall controls are also shown.

• BHAM76.RAN (see Appendix 5-C). This is the 1976 rain file for Birmingham, AL. It contains 112 rains, although the example output file only includes a simulation for January. This file shows the beginning and end dates and times of the individual rains, plus the rainfall depth, the rainfall duration, the average rainfall intensity, and the interevent duration between the end of the indicated event and the following event.

• RUNOFF.RSV (see Appendix 5-D). This is the general runoff coefficient description file. The file is set up as a table of varying volumetric runoff coefficients for different rains and source areas.

• DELIVERY.PRR (see Appendix 5-E). This is the suspended solids "delivery" file reflecting the SS fractions that are trapped in the surface drainage system (swales and curbs) and in the sewerage. These values are quite large for small rains where sufficient energy is available to dislodge particulates from paved surfaces, but is insufficient to transport the solids to the outfall.

• BHAM.PSC (see Appendix 5-F). This is the suspended solids concentration file showing changes in SS concentrations for different rains and source areas (except for streets and freeway lanes which area calculated internally by WINSLAMM).

• BHAM.POL (see Appendix 5-G). This is the pollutant relative concentration file that describes the sheetflow concentrations of pollutants (other than suspended solids). Both particulate fractions (usually in mg/kg of SS) and filtered concentrations (usually in mg/L) are given for each source area and land use.

• NEWRES.OUT . This file is an example WINSLAMM output file for the above NEWRES.DAT input file and the associated parameter files. Summary tables are shown for runoff volume and suspended solids.

```
Data file name:  E:\slamm803\Newres.dat                      SLAMM Version V8.0
    Rain file name:  E:\SLAMM803\BHAM76.RAN                      Particulate Solids Concentration file name:  E:\SLAMM803\BHAM.PSC
    Runoff Coefficient file name:  E:\SLAMM803\RUNOFF.RSV        Particulate Residue Delivery file name:  E:\SLAMM803\DELIVERY.PRR
    Pollutant Relative Concentration file name:  E:\SLAMM803\POLL.PPD
                                                                 Seed for random number generator:   5
    Study period starting date:  01/02/76                        Study period ending date:  01/31/76
    Date:  03-08-1999                                            Time:  20:30:40
    Fraction of each type of Drainage System serving study area:
      1. Grass Swales 0
      2. Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3. Poor condition (or very flat) 0
           4. Fair condition 1
           5. Good condition (or very steep) 0
    Site information:  MEDIUM DENSITY RESIDENTIAL 1961-1980, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

	|<===== Areas for each Source (acres) =====>|				
Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas
Roofs 1	2.60	0.00	0.00	0.00	0.00
Roofs 2	6.05	0.00	0.00	0.00	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00
Playground 2	0.00	0.00	0.00	0.00	0.00
Driveways 1	1.19	0.00	0.00	0.00	0.00
Driveways 2	1.18	0.00	0.00	0.00	0.00
Driveways 3	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00
Street Area 1	6.58	0.00	0.00	0.00	0.00
Street Area 2	0.65	0.00	0.00	0.00	0.00
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	4.59	0.00	0.00	0.00	0.00
Small Landscaped Area 1	50.94	0.00	0.00	0.00	0.00
Small Landscaped Area 2	26.22	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	0.00	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	100.00	0.00	0.00	0.00	0.00

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.00
Pavd Lane & Shldr Area 2	0.00
Pavd Lane & Shldr Area 3	0.00
Pavd Lane & Shldr Area 4	0.00
Pavd Lane & Shldr Area 5	0.00
Large Turf Areas	0.00
Undeveloped Areas	0.00
Other Pervious Areas	0.00
Other Directly Conctd Imp	0.00
Other Partially Conctd Imp	0.00
Total	0.00

Total of All Source Areas	100.00
Total of All Source Areas less All Isolated Areas	100.00

Source Area Control Practice Information

Land Use: Residential

Roofs 1 Source area number: 1
- The roof is pitched
- The Source Area is directly connected or draining to a directly conntected area

Roofs 2 Source area number: 2
- The roof is pitched
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Clayey
- The building density is medium or high
- Alleys are not present

Driveways 1 Source area number: 13
- The Source Area is directly connected or draining to a directly conntected area

Driveways 2 Source area number: 14
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Clayey
- The building density is medium or high
- Alleys are not present

Street Area 1 Source area number: 18
1. Street Texture: intermediate
2. Total study area street length (curb-miles): 2.73
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
   Default value used

Street Area 2 Source area number: 19
1. Street Texture: rough
2. Total study area street length (curb-miles): 0.27
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
   Default value used

Undeveloped Area Source area number: 23

```
       The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 1    Source area number:  24
       The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 2    Source area number:  25
       The SCS Hydrologic Soil Type is Clayey

Pollutants to be Analyzed and Printed:
       Pollutant Name               Pollutant Type
       --------------               --------------
        Solids                      Particulate
        Chemical Oxygen Demand
```

Typical Land Use Descriptions

A significant investment of time should be spent to understand local development characteristics. These are the most important elements that affect stormwater quality and quantity. The following sections describe some typical land uses, plus provide some data used during SLAMM evaluations. Several examples are included in this section, with most of the information provided from the Little Shades Creek watershed, Birmingham, AL area, study. In this study, about 135 neighborhoods were surveyed to determine the critical development characteristics representing 18 major land use areas (schools, shopping centers, under development, apartments, multi-family, high-density residential, medium-density residential built prior to 1960, medium-density residential built from 1960 to 1980, medium-density residential built since 1980, low density residential, freeways, golf courses, cemeteries, parks, office parks, vacant or open space, churches, and light industrial areas). These surveys were used to develop the Birmingham area SLAMM files included on the distribution disk, and described in the attached appendix. Other example information included in this section is from the Toronto area, where an earlier, but similar, survey was conducted. The examples shown for Toronto are the excellent, but inexpensive, aerial photographs that were available. Several examples of single land use neighborhoods are presented in these aerials. In all cases, the needed aerials are obtained from the best sources. Local planning agencies (such as in the Milwaukee, WI area) typically have the needed photos, but may not be as good as we had to work with in Toronto. Also included are some information from Los Angeles County, CA, where a very large scale land use survey was recently conducted in a short period of time.

General Land Use Descriptions

The following are general land use descriptions used by the WI DNR, based on Southeast Wisconsin Regional Planning Commission (SEWRPC) data, and are indicative of typical planning agency definitions. In all cases, a stormwater/watershed study should use the locally available land use data and definitions. However, it may be necessary to slightly modify them. In this example, SEWRPC had all street areas in separate categories, so those areas were "added" back into the basic land use descriptions. In addition, local planning agencies typically do not separate the medium density residential areas into sub-categories, which may be necessary to represent different development trends that has occurred with time.

• Residential Land Uses

High Density Residential without Alleys (HRNA): Urban single family housing at a density of greater than 6 units/acre. Includes house, driveway, yards, sidewalks, and streets.

High Density Residential with Alleys (HRWA): Same as HRNA1, except alleys exist behind the houses.

Medium Density without Alleys (MRNA): Same as HRNA except the density is between 2 - 6 units/acre.

Medium Density with Alleys (MRWA): Same as HRWA, except alleys exists behind the houses.

Low Density (LR): Same as HRNA except the density is 0.7 to 2 units/acre.

Duplexes (DUPLX): Housing having two separate units in a single building.

Multiple Family (MF): Housing for three or more families, from 1 - 3 stories in height. Units may be adjoined up-and-down, side-by-side; or front-and-rear. Includes building, yard, parking lot, and driveways.
High Rise (HIR): Same MF except buildings are

High Rise Apartments (APTS): Multiple family units 4 or more stories in height.

Trailer Parks (MOBR): A mobile home or trailer park, includes all vehicle homes, the yard, driveway, and office area.

Suburban (SUBR): Same as HRNA except the density is between 0.2 and 0.6 units/acre.

• Commercial Land Uses

Strip Commercial (CST): Those buildings for which the primary function involves the sale of goods or services. This category includes some institutional lands found in commercial strips, such as post offices, court houses, and fire and police stations. This category does not include buildings used for the manufacture of goods or warehouses. This land use includes the buildings, parking lots, and streets. This land use does not include nursery, tree farms, or lumber yards.

Shopping Centers (SC): Commercial areas where the related parking lot is at least 2.5 times the area of the building roof area. The buildings in this land use are usually surrounded by the parking area. This land use includes the buildings, parking lot, and the streets.

Office Parks (OP): Land use where non-retail business takes place. The buildings are usually multi storied buildings surrounded by larger areas of lawn and other landscaping. This land use includes the buildings, lawn, and road areas. Types of establishments that may be in this category includes: insurance offices, government buildings, and company headquarters.

Downtown Central Business District (CBD): Highly impervious downtown areas of commercial and institutional land use.

• Industrial Land Uses

Manufacturing Industrial (HI): Those buildings and premises which are devoted to the manufacture of products, with many of the operations conducted outside, such as power plants, steel mills, and cement plants.

Medium Industrial (MI): This category includes businesses such as lumber yards, auto salvage yards, junk yards, grain elevators, agricultural coops, oil tank farms, coal and salt storage areas, slaughter houses, and areas for bulk storage of fertilizers.

Non-Manufacturing (LI): Those buildings which are used for the storage and/or distribution of goods awaiting further processing or sale to retailers. This category mostly includes warehouses, and wholesalers where all operations are conducted indoors, but with truck loading and transfer operations conducted outside.

• Institutional Land Uses

Hospitals (HOSP): Medical facilities that provide patient overnight care. Includes nursing homes, state, county, or private facilities. Includes the buildings, grounds, parking lots, and drives.

Education (SCH): Includes any public or private primary, secondary, or college educational institutional grounds. Includes buildings, playgrounds, athletic fields, roads, parking lots, and lawn areas.

Miscellaneous Institutional (MISC): Churches and large areas of institutional property not part of CST and CDT.

• Open Space Land Uses

Cemeteries (CEM): Includes cemetery grounds, roads, and buildings located on the grounds.

Parks (PARK): Outdoor recreational areas including municipal playgrounds, botanical gardens, arboretums, golf courses, and natural areas.

Undeveloped (OSUD): Lands that are private or publicly owned with no structures and have a complete vegetative cover. This includes vacant lots, transformer stations, radio and TV transmission areas, water towers, and railroad rights-of-way.

• Freeway Land Uses

Freeways (FREE): Limited access highways and the interchange areas, including any vegetated rights-of-ways.

Land Development Characteristics

Appendix 5-A contains detailed SLAMM *.DAT file descriptions for 17 land use sub-categories that were developed for the Little Shades Creek study area in the Birmingham, AL, area. This Little Shades Creek watershed study was part of a cooperative study conducted by the University of Alabama at Birmingham and the

Jefferson County office of the U.S. Soil Conservation Service (now the U.S. Natural Resources Conservation Service). Other participants included the Jefferson County Office of Planning and Community Development, the U.S. Army Corps of Engineers, and various other city and county governments. The objective of the watershed study was to determine the sources of urban runoff and associated pollutants and to examine alternative controls in a rapidly developing area.

The Little Shades Creek watershed is about eight square miles in area and is about 70 percent developed, mostly with single family residential units. However, many different types of land development are represented in this area, from shopping centers to industrial areas. Current problems are mainly associated with frequent flooding during relatively small rains. This study, however, was a demonstration of how runoff water quality improvements can also be obtained in conjunction with drainage and flooding control. Local runoff quality data collected during EPA sponsored runoff projects (Pitt, *et al*. 1995) was used in conjunction with detailed development information collected during this watershed study, to calibrate SLAMM.

Site Surveys

Table 5-19 is the "Area Description" field sheet that was used to quantify the important characteristics of the study area. This sheet is a composite of earlier similar sheets and includes those characteristics thought to be of most importance in the study area. The following briefly explains the important elements of this sheet. Field training of the people responsible for collecting the information was carried out to assure data consistency.

• Location. The block number range and the street name were noted. A subarea name could also be used to describe the drainage area. Descriptions were made for homogeneous block segments in the study area. Specific blocks to be surveyed were randomly selected and located on the aerial photographs before the survey began. Each site had at least two photographs taken (color prints and slides): one was a general scene and the other was a close-up (showing about 25 by 40 centimeters of pavement). Additional photographs were usually taken to record unusual conditions. These photographs are very important to confirm the descriptions recorded on the sheets and to verify the consistency of information for the many areas. The photographs are also very important when additional site information is needed, but not recorded on the sheets.

• Land-use. The land-use type that best describes the block was circled. If more than one land-use was present the estimated distribution was shown. The approximate income level for residential areas was also circled. The specific types of industrial activities (warehouses, metal plating, bottling, electronics, gas station, etc.) for industrial and commercial areas was also written in. Also, the approximate age of development was circled.

• Roof drainage. The discharge location of the roof drains were shown by writing in. The approximate distribution was also noted if more than one discharge location was evident. The "underground" location may be to storm sewers, sanitary sewers, or dry wells. Some areas have the roof drains apparently directed underground but are actually discharged to the roadside gutter or drainage ditch. If they lead to the gutter, then the "to gutter" category was circled. Additionally, if the flow path length is less than about five feet over pervious ground, it is functionally directly connected to impervious areas, requiring circling the "to impervious" category. The roof types and building heights were also indicated (again, the approximate distributions were noted if more than one type were present). It was necessary to take an inventory of all visible roof drains in the study block by keeping tallies of each type of drain connection. The percentage distributions per connection type was put on the sheet. If other categories of characteristics varied in the study block (paved or unpaved driveway categories is another common variation), then these were also tallied.

• Sediment sources. Sediment sources near the drainage (street, drainageway or gutter), such as construction sites, unpaved driveways, unpaved parking areas or storage lots, or eroding vacant land, were described and photographed.

• Street and Pavement. Traffic and parking characteristics were estimated. Pavement condition and texture are quite different. Condition implies the state of repair, specifically relating to cracks and holes in the pavement. Texture implies roughness. A rough street may be in excellent condition: many new street overlays result in very rough streets. Some very worn streets may also be quite smooth, but with many cracks. A close-up photograph of the street surface is needed to make final determinations of street texture. An overview photograph of the street was also taken to make the final determination of the street condition. The gutter/street interface condition is an indication of how well the street pavement and the gutter material join. Many new street overly jobs are sloppy, resulting in a several centimeter ridge along the gutter/street interface. If the interface is in poor condition or uneven, an extra photograph was taken showing the interface close-up. The litter perception was also circled. Another photograph was taken of heavily littered areas.

Table 5-19. LITTLE SHADES CREEK CORRIDOR TEST AREA DESCRIPTIONS

```
Location:                                  Site number:
Date:                  Time:
Photo numbers:          Roll number:
Land-use and industrial activity:
   Residential:   low     medium     high density single family
                  multiple family
                  trailer parks
                  high rise apartments
       Income level: low   medium   high
       Age of development:   <196O    1960-1980   >1980
   Institutional:  school   hospital   other (type):
   Commercial:  strip    shop. center    downtown    hotel   offices
   Industrial: light   medium   heavy (manufacturing) describe:
   Open space:  undeveloped   park   golf   cemetery
   Other: freeway   utility ROW   railroad ROW   other:
Maintenance of building:   excellent   moderate   poor
Heights of buildings:   1   2   3   4+  stories
Roof drains:   % underground   % gutter   % impervious   % pervious
Roof types:   flat   composition shingle   wood shingle   other:
Sediment source nearby?  No   Yes (describe):
Treated wood near street? No  telephone   poles   fence   other:
Landscaping near road:
       quantity:  None   some   much
       type:  deciduous   evergreen   lawn
       maintenance:   excessive    adequate   poor
       leafs on street:   none    some    much
Topography:
       street slope:   flat (<2%)   medium (2-5%)   steep (>5%)
       land slope:   flat (<2%)   medium (2-5%)   steep (>5%)
Traffic speed:  <25mph   25-40mph   >40mph
```

```
Traffic density:  Light   moderate   heavy
Parking density:  none   light   moderate   heavy
Width of street:  number of parking lanes:
                  number of driving lanes:
Condition of street:  good   fair   poor
Texture of street:   smooth   intermediate   rough
Pavement material:   asphalt   concrete   unpaved
Driveways:   paved   unpaved
       condition:   good   fair   poor
       texture:   smooth   intermediate   rough
Gutter material:  grass swale   lined ditch   concrete   asphalt
      condition:   good   fair   poor
      street/gutter interface:   smooth   fair   uneven
Litter loadings near street:   clean   fair   dirty
Parking/storage areas (describe):
      condition of pavement:   good   fair   poor
      texture of pavement:   smooth   intermediate   rough   unpaved
Other paved areas (such as alleys and playgrounds),describe:
      condition:   good   fair   poor
      texture:   smooth   intermediate   rough
Notes:
```

The following illustrations are from the early analyses of the Little Shades Creek watershed (Rocky Ridge Corridor) and show the data collection steps describing the land uses, plus the initial source area contribution analyses and unit area yield data.

Figure 5-2. Map of Little Shades Creek watershed study area.

Table 5-20. Basic Land Uses in Each Sub-Watershed Area

Table 5-21. Land Use and Neighborhoods Surveyed and Corresponding Site Numbers

Figure 5-3. Example Site Photograph (Site 70, a new low density residential area).

Figure 5-4. Photograph of street texture at site 70 (intermediate texture).

Table 5-22. Site 70 Survey Form

Table 5- 23a. Site 70 Example Aerial Photograph Area Measurements

Table 5-23b. Site 70 Example Aerial Photograph Area Measurements (cont)

Table 5-24. Example Site Data Summary

Table 5-25. Summary of Site Development Characteristics

	Residential Land Uses							Commercial			Institut-ional	Industrial	Open Space				Free-ways
	Low Den.	Med. Den. Pre 1960	Med. Den. 1961 - 80	Med. Den. Since 1980	High Den.	Multi-family	Apart-ments	Strip devel.	Shop. center	Office Parks	Schools	Light (ware-housing)	Golf course	Cem-etery	Parks	Undev	
Directly Connected Impervious Areas																	
Roofs	1.17	3.26	2.6	5.35	5	10.9	4.25	23.4	21	17.58	6.02	23.8		1			
Parking/ storage								40.9	29.62	27.06	5.98	32.9		2.3	15.7		
Play-grounds															8.15		
Drive-ways		1.3	1.19	1.29	3	0.62	0.75	1.9	0.37	0.82	0.25	2.3		7.7	0.42		
Walks								4.3				0.7					
Streets	4.94	4.42	7.23	6.8	7	7.4	9.66	20.1	16.04	14.73	4.02	10.9	1.23	1.4	15.7	8	29.41
Other																	2.39
Subtotal	**6.11**	**8.98**	**11.02**	**13.44**	**15**	**18.92**	**14.66**	**90.6**	**67.03**	**60.17**	**16.27**	**70.6**	**1.23**	**12.4**	**39.97**	**8**	**31.8**
Impervious areas Draining to Pervious Areas																	
Roofs	3.13	4.9	6.05	3.68	9	6.5	14.94		0.75	0.32	4.5	1.6	0.26	0.1			
Parking/ storage						1.23	6.53						0.67				
Play-grounds						0.16	0.82				15.11		0.07		40.13		
Drive-ways	1.57	1.3	1.18	1.28		0.62	0.75		0.37	0.82		0.3	1.17				
Walks												0.7		0.1			
Other																	0.66
Subtotal	**4.7**	**6.2**	**7.23**	**4.96**	**9**	**8.51**	**23.04**	**0**	**1.12**	**1.14**	**19.61**	**2.6**	**2.19**	**0.2**	**40.13**	**0**	**0.66**
Pervious Areas																	
Parking/ storage						10		1.5				6.3					
Large lands-caped	39.49						51.69				40.83	3.5	96.58	86.3			33.94
Small lands-caped	46.16	84.82	77.16	79.8	72	58.2		5.8	31.85	38.67	23.18	9.9		0.6	4.94		
Undevel	3.54		4.59	1.8	4	3	3.18	0.2			0.11	4.3		0.5	14.96	92	33.6
Other						1.28	7.72	1.9				2.8					
Subtotal	**89.19**	**84.82**	**81.75**	**81.6**	**76**	**72.57**	**62.3**	**9.4**	**31.85**	**38.67**	**64.12**	**26.8**	**96.58**	**87.4**	**19.9**	**92**	**67.54**

Grand Total:	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Figure 5-5. Source area measurement variations (Milwaukee data).

Area Measurements from Aerial Photographs

As noted above, an important aspect of the site surveys is the use of aerial photographs to measure the individual elements of each land use. Figure 5-6 is an example of a detailed aerial photograph used during the Humber River watershed study in Toronto, Ontario (Pitt and McLean 1986 and Pitt 1987). There photos were from original 9 in. by 9 in. negatives shot at 1 to 10,000 scale, and were enlarged 3.3 x to 30 in. by 30 in. prints having a 1 to 3,000 scale. This figure is less than $1/10^{th}$ of the full print and the scale is represented by the map label (78-4351) which is about 530 ft long (0.1 mile). The above test area description sheet was filled out during each neighborhood surveyed. The corresponding aerial photographs were then examined for each neighborhood and the individual elements (roofs, parking areas, street areas, sidewalks, landscaping, etc.) were measured. These data were then summarized and used in the SLAMM files to describe each land use area. The following figures (various scales) are examples of aerial photographs of several different land use areas examined in the Toronto area.

Figure 5-6. General Aerial Photograph used to Measure Land Elements (Pitt and McLean 1986).

Figure 5-7. Medium Density Residential Area

Figure 5-8. Older Medium Density Residential Area

Figure 5-9. High Density Residential Area

Figure 5-10. High Rise Residential Area

Figure 5-11. School

Figure 5-12. Strip Commercial Area

Figure 5-13. Light Industrial Area (Warehousing)

Figure 5-14. Scrap Yard/Storage Area

Figure 5-15. Freeway

Figure 5-16. Cemetery

Example Land Use Evaluations for Los Angeles County, California
A marginal benefit analysis was conducted by WWC and Psomas (1996) to identify land use monitoring sites to best represent the wide range of land uses in Los Angeles County. Table 5-26 lists the general land use categories for Los Angeles County, showing the percentage of each in the area covered by the NPDES stormwater discharge permit, plus the percentage of the total area estimated total suspended solids (TSS) and copper loadings. Detailed site surveys were conducted for the 12 most important land uses shown on this table (excluding vacant land), using methods developed by Pitt (1987). These 12 land uses comprised about 75% of the area of all land uses, excluding the vacant land. Seven to eight homogeneous areas representing each of these land use areas were surveyed during a five week period in the summer of 1996. Site survey information collected included detailed descriptions of the land use and age of the area, the nature and character of the buildings, the routing of on-site drainage (roof drainage and paved area drainage), the condition of the streets and other impervious areas, gutter types, the nature of the landscaping adjacent to the road, the presence of treated wood near the streets, and landscaping practices, as noted in the previous site survey form. In addition, measurements from maps and aerial photographs were made to determine the areas of each element of the development (roofs, streets, sidewalks, gutters, driveways, parking/storage areas, paved playgrounds, other paved areas, landscaped areas, and other pervious areas).

The individual land use categories are also ranked on Table 5-26 according to their total area contributions of these attributes. The estimated contributions for each land use category were based on measured site characteristics (especially imperviousness) of the most important land uses, plus the best estimates of runoff characteristics for these land uses. Analyses using other expected critical pollutants (especially bacteria) would have been informative, but preliminary data were not available. Similar analyses using runoff volume, COD and P were also conducted, with very similar results: the same land uses were always included in the group of the most important land uses. From marginal benefit analyses, a total of seven most important land uses were identified: high density single family residential, vacant land, light industrial, transportation, retail and commercial, multi-family residential, and educational facilities. Multi-family residential and educational facilities were added to the five land use areas previously selected for monitoring. It must be noted that heavy industrial land use data is being collected by the industrial component of the NPDES program and construction sites were not deemed an appropriate source to be included in this program by the county.

Table 5-26. Land Uses in Los Angeles County, and Estimated Pollutant Discharge Rankings

Land Use Category	% of area	Rank based on area	% of TSS load	Rank based on TSS load	% of copper load	Rank based on copper load
Vacant land	56.0	1	19.5	2	13.3	3
High density single family residential	18.6	2	22.9	1	32.5	1
Light industry	3.2	3	14.8	3	17.1	2
Multi-family residential	2.8	4	4.9	6	6.9	4
Retail and commercial	2.5	5	9.5	4	4.6	6
Transportation	1.7	6	5.6	5	6.5	5
Low density SFR	1.6	7	1.6	11	2.2	8
Educational facilities	1.6	8	3.6	7	1.7	11
Receiving waters	1.4	9	0.0	34	0.0	34
Open space/recreation	1.2	10	1.6	13	0.54	19
Mixed residential	1.1	11	1.5	14	2.1	10
Utility facilities	1.1	12	1.2	15	0.69	16
Natural resources extraction	0.73	13	2.1	8	2.4	7
Institutions	0.66	14	1.6	12	0.76	14
Urban vacant	0.64	15	0.26	24	0.14	26
Golf courses	0.64	16	0.46	21	0.16	25
Rural residential	0.62	17	0.29	23	0.40	22
Floodways and structures	0.62	18	0.85	17	0.29	23
Heavy industry	0.51	19	1.9	9	2.2	9
General office use	0.49	20	1.8	10	0.86	12
Agriculture	0.45	21	0.21	25	0.11	29

Under construction	0.41	22	0.56	19	0.65	17
Other commercial	0.33	23	1.2	16	0.58	18
Nurseries and vineyards	0.33	24	0.10	29	0.27	24
Mobile homes and trailer parks	0.25	25	0.50	20	0.71	15
Mixed transportation and utility	0.14	26	0.66	18	0.77	13
Animal husbandry	0.11	27	0.09	30	0.09	31
Military installations	0.10	28	0.12	27	0.13	27
Maintenance yards	0.08	29	0.38	22	0.44	21
Mixed commercial and industrial	0.04	30	0.07	31	0.09	30
Harbor facilities	0.04	31	0.12	26	0.52	20
Marina facilities	0.03	32	0.03	33	0.07	32
Mixed urban	0.03	33	0.05	32	0.06	33
Communication facilities	0.02	34	0.11	28	0.13	28

Further analyses were conducted to select smaller watershed areas for monitoring critical sources (WCC 1997). A list of industrial categories (by SIC codes), along with their ranking by their pollution potential and the number of the facilities is shown in Table 5-27. The pollution potential rank was determined based on the number of sources in the area, the relative size of the paved areas at each source, the likelihood of specific toxic pollutants and the exposure potential of the on-site sources. From this analysis, the following critical sources were selected for potential monitoring:

- wholesale trade (including scrap yards and auto dismantlers)
- automotive repair/parking (intend to stress repair facilities over parking areas in the monitoring program)
- fabricated metal products (including electroplating)
- motor freight (including trucking)
- chemical manufacturing

These source categories were found to be poorly represented in past stormwater studies with very little characterization data already available. Therefore, all of these categories were selected for further monitoring.

Table 5-27. Ranking of Candidate Critical Sources in Los Angeles County

Industrial Category	SIC Code	Number of facilities in Los Angeles County study area	Ranking based on pollution potential
Wholesale trade (scrap, auto dismantling)	50	587	1
Automotive repair/parking	75	6,067	2
Fabricated metal products	34	3,283	3
Motor freight	42	872	4
Chemical manufacturing	28	1,069	5
Automotive dealers/gas stations	55	2,744	6
Primary metals products	33	703	7
Electric/gas/sanitary	49	2,001	8
Air transportation	45	431	9
Rubbers/miscellaneous plastics	30	1,034	10
Local/suburban transit	41	336	11
Railroad transportation	40	319	12
Oil and gas extraction	13	327	13
Lumber/wood products	24	905	14
Machinery manufacturing	35	4,223	15
Transportation equipment	37	1,838	16
Stone, clay, glass, concrete	32	733	17
Leather/leather products	31	163	18
Miscellaneous manufacturing	39	1,144	19
Food and kindred products	20	1,249	20
Petroleum refining	29	231	21
Mining of nonmetallic minerals	14	39	22
Printing and publishing	27	2,432	23
Electric/electronic	36	1,636	24
Paper and allied products	26	451	25
Furniture and fixtures	25	1,368	26
Personal services (laundries)	72	2,515	27
Instruments	38	1,029	28
Textile mills products	22	440	29
Apparel	23	1,900	30

Little Shades Creek (Rocky Ridge Corridor) Preliminary SLAMM Analyses

The following table and figures present the preliminary unit area loading calculations, and the relative source area evaluations, for the land uses studied in the Little Shades Creek watershed.

Table 5-28. Unit Area Loadings for Little Shades Creek Watershed Land Uses

WinSLAMM Calibration Procedures

The calibration and verification procedures of WinSLAMM are similar to the procedures needed to calibrate and verify any stormwater quality model. Local data should be collected, including stormwater outfall quality and quantity data and watershed information. Numerous individual rainfall-runoff events need to be sampled (using flow-weighted composite sampling). The best scenario is to collect all calibration information from one watershed and then verify the model using independent observations from another watershed. Another common approach is to collect calibration information for a series of events from one watershed, and then verify the calibrated model using additional data from other storms from the same watershed.

WinSLAMM has typically been calibrated and verified using a combination of approaches. The initial effort for the full implementation of WinSLAMM (as reported by Pitt 1987) used data from three years of monitoring of eight watersheds in Milwaukee and data from one year of monitoring two additional watersheds in Toronto. These data represented a broad range of land uses (residential, commercial, and industrial uses), a wide range of hydraulic complexity (from having mostly connected impervious areas to having much landscaped areas and grass drainages), and widely varying rain conditions (from 0.01 to over 3 inches). The data was supplemented with source area data collected elsewhere (as referenced later) and with small-scale washoff tests conducted in Toronto. These data (from

several hundred independent rainfall-runoff events) enabled the basic processes contained within WinSLAMM to be rigorously tested and allowed for a comprehensive set of initial calibration conditions to be developed. With additional site-specific data, these calibration conditions should be modified to consider specific situations not contained in the initial data set. This has been especially important for organic toxicants and for source areas not well represented in the initial data set.

This section describes a general approach to calibrate WinSLAMM and describes the data sources for the additional parameter files used in WinSLAMM. The order for calibrating WinSLAMM is:

1) Runoff quantity
2) Annual suspended solids loading (and event mean concentration)
3) Event suspended solids loadings and concentrations
4) Annual total pollutant loadings (and event mean concentrations)
5) Partitioning of pollutants between particulate and filterable phases
6) Variations in pollutant concentrations

It is very important that the user start with runoff quantity and be completely satisfied with the calibration of each step before proceeding to the next step. Much wasted effort will occur if one skips around in the order of the calibration.

Runoff Coefficients

The mandatory *.RSV file contains volumetric runoff coefficients (the ratio of runoff quantity to rain quantity: Rv) for each surface type for various rain depths. The runoff coefficients were calculated using general impervious and pervious area models. These models were then calibrated based on extensive Toronto data and were then verified using additional independent Toronto data, along with numerous Milwaukee data for a wide variety of land development and rain conditions. However, WinSLAMM was designed to allow the use of alternative runoff models, as desired. Alternative runoff coefficients for each source area type can be calculated using other models and saved under other runoff volume file names.

The *.RSV file must be calibrated before any of the other parameter files are examined. After this file is modified, as needed, the suspended solids files must be calibrated. Finally, the file describing the other pollutants is examined and modified last.

Initial Data Sources

The RUNOFF.RSV file contains the verified runoff coefficients, based on the small storm hydrology model described in:

R. Pitt. *Small Storm Urban Flow and Particulate Washoff Contributions to Outfall Discharges*. Ph.D. Dissertation, Civil and Environmental Engineering Department, University of Wisconsin, Madison, WI, November 1987.

This file was developed using data from eight study sites in Milwaukee (having generally clayey soils) and two study sites in Toronto (having generally sandy soils). The published data are contained in the following reports:

Bannerman, R., K. Baun, M. Bohn, P.E. Hughes, and D.A. Graczyk. *Evaluation of Urban Nonpoint Source Pollution Management in Milwaukee County, Wisconsin*, Vol. I. Grant No. P005432-01-5, PB 84-114164. US Environmental Protection Agency, Water Planning Division, November 1983.

R. Pitt and J. McLean. *Humber River Pilot Watershed Project*. Ontario Ministry of the Environment, Toronto, Canada, December 1984.

Calibration Steps

The runoff file should be modified based on correctly collected rainfall and runoff data. It is very important that adequate QA/QC procedures be used to insure the accuracy and suitability of the data. Common problems are associated with unrepresentative rainfall data (too few rain gauges and not correctly located in the watershed), incorrect rain gauge calibrations, poor flow monitoring conditions (surcharged flows, relying on Manning's equation for V and Q, poor conditions at the monitoring location), etc. The use of a calibrated flume or simultaneous use of velocity and depth sensors is preferred, for example. Other common errors are associated with inaccurate descriptions of the watershed (incorrect area, amount of impervious areas, understanding of drainage efficiency, soil characteristics, etc.).

Few people appreciate the inherent errors associated with measuring rainfall and runoff. Most monitoring programs are probably no more than ± 25% accurate for each event. It is very demanding to obtain rainfall and runoff data that is only 10% in error. This is most evident when highly paved areas (such as shopping centers or strip commercial areas) are monitored and the volumetric runoff coefficients are examined. For these areas, it is not uncommon for many of the events to have Rv values greater than 1.0 (implying more runoff than rainfall). Similar errors occur with other sites, but are not as obvious.

The first calibration steps are therefore associated with observing the watershed and rainfall - runoff data, followed by changing the RUNOFF.RSV file, as necessary:

1. Confirm that the watershed areas and development characteristics are correctly described. Urban drainage areas generally follow the topographic divide, but it is not unusual for storm drainage to cross-over surface topographic divides for a block, or more. If the area is very large (hundreds to thousands of acres), these deviations will tend to cancel out, with minimal detrimental effect. However, for calibration and verification studies, the drainage area should be as precisely defined as possible, especially for small drainage areas (tens to hundreds of acres). Therefore, confirm all storm drainage locations and storm drain inlets affecting the outfall monitoring location. For each inlet, identify the precise watershed divide, if at all possible. This includes examining all buildings located close to the divide and determining where the actual divide is located, including splitting roofs or paved areas, as necessary.

Another important aspect is correctly identifying the development characteristics for the watershed area. The most important attribute that affects runoff quantity (and quality) is the drainage efficiency of the area. This includes understanding where the paved areas drain. Are they directly connected to the storm drainage system, or do they drain across substantial distances of unpaved areas before reaching the drainage system? Each type of paved area (roofs, parking/storage areas, play grounds, driveways, sidewalks, etc.) needs to be divided to "directly-connected" and "disconnected" portions, usually through site investigations. Streets are assumed to be directly connected, as they are adjacent to the drainage system. Be careful of roof drains that are to lawns, but only provide a few feet of overland flow before paved areas. These are effectively directly connected areas. Similar problems arise with relatively large paved or roof areas that drain to relatively small unpaved areas (especially in multi-family residential, commercial and industrial areas). Other factors affecting drainage efficiency is the presence of grass swales, or other types of stormwater management devices (dry or wet ponds, porous pavements, infiltration areas, etc.) that may occur in the area. These need to be carefully described and considered in the calibration and verification process.

2. Calculate the Rv for each event and observe the pattern. Plot rainfall depth vs. runoff depth and plot Rv vs. rainfall depth. The Rv values should be small for small rains and steadily increase as the rains increase. The Rv differences will not be great for mostly directly connected impervious areas (either paved or roofed areas), but the trend should be quite dramatic for areas having substantial unpaved areas, if a wide range of rains were monitored. The Rv values should look reasonable for moderate rains (0.25 to 0.5 inch rains): about 0.3 for medium density residential areas, about 0.8+ for commercial areas, etc. If the Rv values all appear to be too small or too large, suspect an error in the drainage area, or an error in the rainfall or flow monitoring calibrations. If several individual events look strange and the others appear to follow a reasonable trend, then investigate specific circumstances for the odd events. Unusual rain intensities, snow/icing problems, debris at flow monitoring station, etc. are all transient problems that may periodically occur. If the unusual conditions cannot be explained, then a decision will have to be made concerning eliminating the data, or keeping it in the data set.

3. Hopefully, data from several watersheds are available for the calibration and verification process. If so, start with data from the simplest area (mostly directly connected paved areas and roofs, with little unpaved areas). This area probably represents commercial roofs and parking/storage areas alone. Therefore, these areas will be calibrated first, before moving on to more complex areas. The most complex areas, such as typical residential areas having large expanses of landscaped areas and most of the roofs being disconnected from the drainage areas, should be examined last.

4. Carefully prepare the WinSLAMM input file describing the watershed area and a rain file for the specific rains that occurred during the monitoring period. If rains occurred during the monitoring period that were not monitored, they must also be included in the rain file. It would be a good idea to include rains for about a month preceding the first monitored event because WinSLAMM is a quasi-continuous model and some preceding time is needed to reach equilibrium conditions before the first monitored event. It will also be helpful to prepare another special rain file to be used in determining the relative sources of runoff (and pollutants). This rain file (could be named SOURCE.RAN) should include about 12 rains spaced about two weeks apart, containing the following rain depths (sorted from small to large rains) and durations (modify durations based on typical durations for these rain depths for the area of interest):

0.01 inches	3 hours
0.05	7
0.10	8
0.25	10
0.50	12
0.75	14
1.0	14
1.5	14
2.0	14
2.5	14
3.0	14
4.0	14

5. Run the created watershed file for the two rain files, without any additional pollutants selected, using the available RUNOFF.RSV file and using the outfall total (at least) output option for the actual rains and the source area, by rains, output option for the source rain file. Compare the predicted runoff depths (in inches) with the measured runoff depths (in inches) for the monitored events by creating a scatter plot of observed vs. predicted runoff values. Calculate the percentage runoff depth errors: 100 x (observed-predicted)/observed, and plot these against the observed rain depths. The desired pattern for the observed vs. predicted runoff depth plot is a 45 degree line, with little deviation. The desired pattern for the residual error plot is an even, narrow band over the range of observed rain depths, centered on the zero residual error horizontal line. Also calculate the sum of the observed and predicted runoff depths for all monitored events. The percentage difference in the sum of depths should be small.

If you are satisfied with these analyses, then no changes are to be made to the RUNOFF.RSV file. However, some improvement is usually possible. The overall sum runoff error indicated the general severity of the problem, but other information needs to be used to identify which source areas for which rains need to have their Rv values modified.

The model run using the SOURCE.RAN file is important in directing where the changes should be made. This run contains the percentage contribution of runoff for each rain, for each source area. This shows where WinSLAMM is generating the runoff for the different rain depths. It is doubtful if the monitored events cover the wide range of rains contained in this special rain file. Therefore, only look at the range of predicted data covering the actual monitored rains.

If a constant percentage bias occurs (unlikely) over the range of events monitored, then modify the Rv values in the RUNOFF.RSV file for the contributing source areas for the range of rains monitored. However, the residual error plot probably shows a bias, with some portions of the rain distribution having greater problems than others. It is therefore possible to divide the residual error plot into different rain depth ranges, corresponding to different amounts of correction needed. Each rain depth range also has different source contributions. Therefore, Rv corrections can be made to each source area for different rain ranges. It is probably best to start with the smallest rains where the directly connected impervious areas have the greatest influence, then go to the largest rains where runoff from the soil dominates. It is possible to create a simple series of simultaneous equations to solve for the changes to be concurrently made, but manual changes are typically adequate. After the changes are made, it is necessary to plot the new Rv values for each source area against rain depth and to smooth the resulting relationships to remove any discontinuities. After these smoothing changes are made, then re-run the program using the new *.RSV file and review the results. It may be necessary to repeat this process a few times to become satisfied that no further improvements are possible or necessary.

6. The above process is difficult if only one watershed is available for study and if the watershed area has much disconnected paved/roof areas. The preferred approach would be to start by evaluating an area having all directly connected impervious areas and making the basic changes in the Rv values for each source area and rain, as needed. Another area (preferably similar in character) having disconnected impervious areas would then be used to verify (or change) the coefficients in the RUNOFF.RSV that reduces the Rv values if the impervious areas are disconnected. The ten different watersheds used in preparing the initial RUNOFF.RSV file allowed this more rigorous approach.

Assuming the RUNOFF.RSV file Rv values are acceptable, the disconnection coefficients can be adjusted in a similar manner using the above described residual analysis: the runoff residual errors are plotted against rain depth and changes are made to the disconnection coefficients to minimize the total and individual errors.

Particulate Solids Concentrations

The mandatory *.PSC file describes the particulate residue (suspended solids) concentrations for each source area (except for roads and freeway lanes, which are included in the build-up and washoff algorithms of WinSLAMM) and land use, for several rain categories. The PART.PSC file was developed and verified using source area data mostly from Toronto, Milwaukee and Birmingham during specific field tests.

SLAMM uses another file (*.PRR) to calibrate the source predictions to outfall observations because the *.PSC file contains suspended solids data for only some of the source areas, while the streets and highway lanes are directly predicted. The mandatory delivery.PRR file accounts for the deposition of particulate pollutants

in the storm drainage system, before the outfall, or before outfall controls. The DELIVERY.PRR file was originally calibrated for swales, curb and gutters, undeveloped roadsides, or combinations of drainage conditions.

Initial Data Sources
The following list shows the major published sources of the particulate residue (suspended solids) data used in developing the original PART.PSC and DELIVERY.PRR files:

Bannerman, R., K. Baun, M. Bohn, P.E. Hughes, and D.A. Graczyk. *Evaluation of Urban Nonpoint Source Pollution Management in Milwaukee County, Wisconsin*, Vol. I. Grant No. P005432-01-5, PB 84-114164. US Environmental Protection Agency, Water Planning Division, November 1983. SS and pollutants from streets, commercial roofs and parking areas - Milwaukee

R. Pitt and G. Shawley. *Demonstration of Nonpoint Pollution Management on Castro Valley Creek*. Environmental Protection Agency, Water Planning Division, Washington, D.C., June 1981. SS and pollutants from many source areas - Castro Valley, CA

R. Pitt. *Urban Bacteria Sources and Control in the Lower Rideau River Watershed*, Ottawa, Ontario. Ontario Ministry of the Environment, May 1982. SS and some pollutants from some source areas- Ottawa

Pitt, R. and M. Bozeman. *Sources of Urban Runoff Pollution and Its Effects on an Urban Creek*. EPA-600/S2-82-090, U.S. Environmental Protection Agency, Cincinnati, Ohio, December 1982. SS and pollutants from many source areas - San Jose, CA

R. Pitt and J. McLean. *Humber River Pilot Watershed Project*. Ontario Ministry of the Environment, Toronto, Canada, December 1984. SS and pollutants from many source areas - Toronto

Shelley, P.E. and D.R. Gaboury. “Estimation of Pollution from Highway Runoff - Initial Results,” *Conference on Urban Runoff Quality - Impact and Quality Enhancement Technology*, Henniker, New Hampshire, Edited by B. Urbonas and L.A. Roesner, Proceedings published by the American Society of Civil Engineering, New York, June 1986. SS and pollutants from highways - nationwide

Calibration Steps
The suspended solids files can only be examined and modified after the runoff file is acceptable. The *.PSC file contains suspended solids concentrations (in mg/L) for each source area and land use for different rains, except for the street areas that use explicit accumulation and washoff algorithms based on land use, street texture, and rain conditions. Highway paved lane and shoulder areas also have explicit algorithms that calculate accumulation and washoff of suspended solids based on traffic volume and rains. Both of these areas have a great deal of research information available, allowing these direct calculations. Unfortunately, other source areas have little research data available to allow direct predictions of suspended solids runoff concentrations. This file is therefore used to account for the “first-flush” effects observed at specific source areas. Concentrations of suspended solids at the very beginning of rains at some paved areas (especially paved parking areas) are much greater than later in the same rain. This variation is highly dependent on rain energy and SLAMM uses a similar relationship to describe suspended solids variations for different rain depths. These data are based on observed conditions at the source areas. Runoff from some source areas (especially roofs and landscaped areas) typically do not indicate major concentration changes for different rains.

The first calibration steps are associated with QA/QC checks and observing trends in predicted vs. observed outfall suspended solids concentrations, and then making needed changes:

1. This step is used if local source area data for suspended solids is available. If this data is not available, then start with the PART.PSC file and step 2.

The first step is to look at the data and see if it seems reasonable. The collected source area suspended solids concentrations need to be divided into separate categories for each source area and land use. These categories should be tested to determine if the categories are significantly different from each other. The easiest way to visualize these relationships is by using grouped boxed plots, sorted by median concentrations. If the boxes are offset by at least the 25% and 75% values, then they are generally significantly different at the 95% confidence level. What is likely, however, is that the groups show a gradual trend, with extreme groups different from each other and the other central groups showing generally overlapping distributions. The extreme groups may be roof runoff (for the low concentrations) and landscaped area runoff (for the high concentrations). The other groups (parking areas, streets, walks, etc.) area probably have more closely related suspended solids concentrations.

A two-way ANOVA test can be conducted to determine if there is any significant difference between the source area categories or between the land use categories. The test also determines if the combination of source area and land use combined affects the categories. ANOVA doesn’t specifically identify which sets of data are different from any other. A multiple comparison procedure (such as the Bonferroni *t*-test) can be used to identify significant differences between all cells in the 2-way matrix if the ANOVA finds that a significance difference exists. Both of these tests are parametric tests and require that the data be normally distributed. It may therefore be necessary to perform a log-transformation on the raw suspended solids data. These tests will identify differences in sample groupings, but similarities (to combine data) are probably more important to know. The grouped box plots, again, will be most helpful, in addition to possibly conducting a cluster analysis to identify natural groupings of the data.

Combine the data into fewer groupings (such as all paved parking areas for commercial and industrial areas, another group for all roofs, regardless of land use, and another for all landscaped area runoff). The data in each of these new groups should be plotted as suspended solids concentrations vs. rain depth. The resulting suspended solids concentrations for each rain depth should be included in the construction of a new *.PSC file, duplicating values for all land uses and source areas that were combined based on the statistical tests. If all land uses and source areas are not included in the local monitoring data, then data (unmodified) from elsewhere (including the existing PART.PSC file) can be used with caution.

2. Run the watershed description SLAMM file prepared previously, using the DELIVERY.PRR file, the calibrated *.RSV file and the two rain files (one containing the monitored events and the other being the source.RAN file) without any additional pollutants selected. Select the output option giving results for each rain, by source area. Compare the predicted to the observed suspended solids concentrations for the monitored events by creating a scatter plot of observed vs. predicted runoff values. Calculate the percentage suspended solids concentration errors: 100 x (observed-predicted)/observed, and plot these against the observed suspended solids concentrations and against rain depth for the monitored events. The residual patterns desired are as described above for the runoff calibration. Also calculate the sum of the observed and predicted suspended solids loadings (in lbs) for all monitored events. The percentage difference in the sum of loadings should be small and will indicate the general magnitude of the changes needed. It is likely that the largest discrepancies in suspended solids concentrations will be associated with small rain depths (SLAMM will probably over-estimate the concentrations), while the differences for the larger rains will be smaller.

The calibration of WinSLAMM for the suspended solids concentrations and loadings will mostly be accomplished by modifying the DELIVERY.PRR file. This file accounts for the reduction of suspended solids concentrations for small rains because of deposition of these solids along the drainage path, from the source area

(where the *.PSC associated concentrations were measured) to the outfall. Grass swales, undeveloped roadsides, and flat curbs and gutters have relatively slow runoff velocities and lower carrying capacities of sediment than flows in steeper areas and smoother gutters. The differences are most pronounced for the smaller rains than for larger rains where the velocities are all much greater, corresponding to much greater sediment carrying capacities.

Since the *.PRR file adjusts the delivery of the suspended solids for the whole watershed combined (for the drainage system type) the SOURCE.RAN file results won't be helpful in making changes to this files. However, if changes need to be made to the *.PSC file, the results from the model run using this rain file will be very helpful. This run contains the percentage contribution of suspended solids for each rain, for each source area. This shows where SLAMM is generating the suspended solids for the different rain depths. Again, only look at the range of predicted data covering the actual monitored rains.

If a constant percentage bias occurs (unlikely) over the range of events monitored, then modify all of the delivery fractions by the same amount. However, the residual error plot probably shows a bias, with some portions of the rain distribution having greater problems than others. As with the runoff calibration, it is possible to divide the residual error plot into different rain depth ranges, corresponding to different amounts of correction needed for suspended solids loads. Each rain depth range also has different source contributions. Therefore, the delivery corrections can be made to each source area for different rain ranges. After the changes are made, it is necessary to plot the new delivery values for each rain depth and to smooth the resulting relationships to remove any discontinuities. After these smoothing changes are made, re-run the program using the new *.PRR file and review the results. It may be necessary to repeat this process a few times to become satisfied that no further improvements are possible.

Pollutant Concentrations

The optional pollutant.PPD file describes the particulate pollutant strengths related to particulate residue and describes the filterable pollutant concentrations for each source area for each land use. This file is not needed if only runoff volume and particulate residue calculations are desired. This file also contains the COV values for each pollutant for Monte Carlo simulation in SLAMM. The POLL.PPD file was developed and verified using source area data from Toronto, Milwaukee and Birmingham during specific field tests. The following list shows the major published sources of the pollutant characteristic data used in developing this file:

Bannerman, R., K. Baun, M. Bohn, P.E. Hughes, and D.A. Graczyk. *Evaluation of Urban Nonpoint Source Pollution Management in Milwaukee County, Wisconsin*, Vol. I. Grant No. P005432-01-5, PB 84-114164. US Environmental Protection Agency, Water Planning Division, November 1983. SS and pollutants from streets, commercial roofs and parking areas - Milwaukee

Pitt, R. and G. Amy. *Toxic Materials Analysis of Street Surface Contaminants*. EPA-R2-73-283, U.S. Environmental Protection Agency, Washington, D.C., August 1973. SS quality from street dirt - nationwide

Pitt, R. *Demonstration of Nonpoint Pollution Abatement Through Improved Street Cleaning Practices*. EPA-600/2-79-161, U.S. Environmental Protection Agency, Cincinnati, Ohio, August 1979. SS and pollutants from streets - San Jose, CA

R. Pitt and G. Shawley. *Demonstration of Nonpoint Pollution Management on Castro Valley Creek*. Environmental Protection Agency, Water Planning Division, Washington, D.C., June 1981. SS and pollutants from many source areas - Castro Valley, CA

R. Pitt. *Urban Bacteria Sources and Control in the Lower Rideau River Watershed*, Ottawa, Ontario. Ontario Ministry of the Environment, May 1982. SS and some pollutants from some source areas- Ottawa

Pitt, R. and R. Sutherland. *Washoe County Urban Stormwater Management Program; Volume 2, Street Particulate Data Collection and Analyses*. Washoe Council of Governments, Reno, Nevada, August 1982. SS and pollutants from streets - Reno, NV

Pitt, R. and M. Bozeman. *Sources of Urban Runoff Pollution and Its Effects on an Urban Creek*. EPA-600/S2-82-090, U.S. Environmental Protection Agency, Cincinnati, Ohio, December 1982. SS and pollutants from many source areas - San Jose, CA

Pitt, R. *Characterization, Sources, and Control of Urban Runoff by Street and Sewerage Cleaning*. Contract No. R-80597012, U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, Ohio, 1984. SS and pollutants from streets - Bellevue, WA

R. Pitt and J. McLean. *Humber River Pilot Watershed Project*. Ontario Ministry of the Environment, Toronto, Canada, December 1984. SS and pollutants from many source areas - Toronto

Sartor, J.D. and G.B. Boyd. *Water Pollution Aspects of Street Surface Contaminants*. EPA-R2-72-081, U.S. Environmental Protection Agency, November 1972. SS and pollutants from streets - nationwide

Shaheen, D.G. *Contributions of Urban Roadway Usage to Water Pollution*. 600/2-75-004, U.S. Environmental Protection Agency, April 1975. SS and pollutants from streets - Washington, D.C.

Shelley, P.E. and D.R. Gaboury. "Estimation of Pollution from Highway Runoff - Initial Results," *Conference on Urban Runoff Quality - Impact and Quality Enhancement Technology*, Henniker, New Hampshire, Edited by B. Urbonas and L.A. Roesner, Proceedings published by the American Society of Civil Engineering, New York, June 1986. SS and pollutants from highways - nationwide

Terstriep, M.L., G.M. Bender, and D.C. Noel. *Final Report - NURP Project, Champaign, Illinois: Evaluation of the Effectiveness of Municipal Street Sweeping in the Control of Urban Storm Runoff Pollution*. State Water Survey Division, Illinois Dept. of Energy and Natural Resources, Champaign-Urbana, Illinois, December 1982. SS and pollutants from streets - Champaign, IL

Appendix 5-A: Shades Creek Land Use Descriptions

Residential Areas

Low Density (LDRCB.DAT and LDRSB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\LDRCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM
FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM
FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:27:25
    Fraction of each type of Drainage System serving study area:
```

```
      1.  Grass Swales 0
      2.  Undeveloped roadside 1
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 0
           5.  Good condition (or very steep) 0
    Site information:  LOW DENISTY RESIDENTIAL, UNDEVELOPED ROADSIDES, CLAYEY SOILS, BASELINE CONTROLS (NONE)
                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                         Areas         Freeway Source Area                  Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                  1.17      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                  3.13      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1  0.00      0.00      0.00      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2  0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3  0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1  0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2  0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1             0.00      0.00      0.00      0.00      0.00                                                 --------
Playground 2             0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1              1.57      0.00      0.00      0.00      0.00
Driveways 2              0.00      0.00      0.00      0.00      0.00
Driveways 3              0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1        0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2        0.00      0.00      0.00      0.00      0.00
Street Area 1            4.94      0.00      0.00      0.00      0.00
Street Area 2            0.00      0.00      0.00      0.00      0.00
Street Area 3            0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1 39.49      0.00      0.00      0.00      0.00
Large Landscaped Area 2  0.00      0.00      0.00      0.00      0.00
Undeveloped Area         3.54      0.00      0.00      0.00      0.00
Small Landscaped Area 1 46.16      0.00      0.00      0.00      0.00
Small Landscaped Area 2  0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3  0.00      0.00      0.00      0.00      0.00
Isolated Area            0.00      0.00      0.00      0.00      0.00
Other Pervious Area      0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area 0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area 0.00     0.00      0.00      0.00      0.00
                        --------  --------  --------  --------  --------
Total                   100.00    0.00      0.00      0.00      0.00
Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========
                  Source Area Control Practice Information
Land Use:  Residential
   Roofs 1    Source area number:  1
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is low
   Driveways 1    Source area number:  13
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is low
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  2.6
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Large Landscaped Area 1    Source area number:  21
         The SCS Hydrologic Soil Type is Clayey
   Undeveloped Area    Source area number:  23
         The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 1    Source area number:  24
```

The SCS Hydrologic Soil Type is Clayey

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Data file name: C:\Program Files\WinSLAMM\LDRSB.DAT
Rain file name: C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN
Runoff Coefficient file name: C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
Pollutant Relative Concentration file name: C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
Study period starting date: 01/01/53
Date: 07-23-2000
SLAMM Version V8.1
Particulate Solids Concentration file name: C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
Particulate Residue Delivery file name: C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
Seed for random number generator: 42
Study period ending date: 12/31/89
Time: 19:27:38

Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 1
5. Good condition (or very steep) 0

Site information: Low Density resid., curbs and gutters, baseline controls (none)

Source Area	Residential Areas	Institutional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	1.17	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	3.13	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	1.57	0.00	0.00	0.00	0.00		
Driveways 2	0.00	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	4.94	0.00	0.00	0.00	0.00		
Street Area 2	0.00	0.00	0.00	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	39.49	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	3.54	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	46.16	0.00	0.00	0.00	0.00		
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	100.00	0.00	0.00	0.00	0.00		

Total of All Source Areas	100.00
Total of All Source Areas less All Isolated Areas	100.00

Source Area Control Practice Information

Land Use: Residential
Roofs 1 Source area number: 1
The roof is pitched
The Source Area is directly connected or draining to a directly conntected area

```
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  13
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  2.6
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Large Landscaped Area 1    Source area number:  21
         The SCS Hydrologic Soil Type is Sandy
   Undeveloped Area    Source area number:  23
         The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 1    Source area number:  24
         The SCS Hydrologic Soil Type is Sandy

Pollutants to be Analyzed and Printed:
         Pollutant Name                Pollutant Type
         --------------                --------------
          Solids                       Particulate
```

Medium Density, pre 1960 (MR6CB.DAT and MR6SB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\MR6CB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:29:32
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  MEDIUM DENSITY RESIDENTIAL PRE 1960, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)

                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                          Areas         Freeway Source Area                  Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                   3.26      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                   4.90      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1   0.00      0.00      0.00      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2   0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3   0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1   0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2   0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1              0.00      0.00      0.00      0.00      0.00                                                 --------
Playground 2              0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1               1.30      0.00      0.00      0.00      0.00
Driveways 2               1.30      0.00      0.00      0.00      0.00
Driveways 3               0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1         0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2         0.00      0.00      0.00      0.00      0.00
Street Area 1             4.42      0.00      0.00      0.00      0.00
Street Area 2             0.00      0.00      0.00      0.00      0.00
Street Area 3             0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1   0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 2   0.00      0.00      0.00      0.00      0.00
Undeveloped Area          0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 1   84.81     0.00      0.00      0.00      0.00
Small Landscaped Area 2   0.00      0.00      0.00      0.00      0.00
```

```
Small Landscaped Area 3    0.00      0.00      0.00      0.00      0.00
Isolated Area              0.00      0.00      0.00      0.00      0.00
Other Pervious Area        0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area   0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area  0.00      0.00      0.00      0.00      0.00
                         --------  --------  --------  --------  --------
Total                    100.00    0.00      0.00      0.00      0.00

Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========
                 Source Area Control Practice Information
Land Use:  Residential
   Roofs 1    Source area number:  1
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is medium or high
         Alleys are not present
   Driveways 1    Source area number:  13
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  14
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is medium or high
         Alleys are not present
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  2.118
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Small Landscaped Area 1    Source area number:  24
         The SCS Hydrologic Soil Type is Clayey

      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:

         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate

    Data file name:  C:\Program Files\WinSLAMM\MR6SB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:29:53
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  MEDIUM DENSITY RESIDENTIAL PRE 1960, CURB AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)

                           |<===== Areas for each Source (acres) =====>|
                           Resi-   Institu- Commercial Industrial  Open
                          dential   tional     Areas      Areas   Spaces
Source Area                Areas    Areas                          Areas         Freeway Source Area                  Area (acres)
```

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                    3.26      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                    4.90      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1    0.00      0.00      0.00      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2    0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3    0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1    0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2    0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1               0.00      0.00      0.00      0.00      0.00                                                 --------
Playground 2               0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1                1.30      0.00      0.00      0.00      0.00
Driveways 2                1.30      0.00      0.00      0.00      0.00
Driveways 3                0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1          0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2          0.00      0.00      0.00      0.00      0.00
Street Area 1              4.42      0.00      0.00      0.00      0.00
Street Area 2              0.00      0.00      0.00      0.00      0.00
Street Area 3              0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1    0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Undeveloped Area           0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 1   84.81      0.00      0.00      0.00      0.00
Small Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3    0.00      0.00      0.00      0.00      0.00
Isolated Area              0.00      0.00      0.00      0.00      0.00
Other Pervious Area        0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area   0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area  0.00      0.00      0.00      0.00      0.00
                         --------  --------  --------  --------  --------
Total                    100.00    0.00      0.00      0.00      0.00

Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========
                  Source Area Control Practice Information
Land Use:  Residential
   Roofs 1    Source area number:  1
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  13
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  14
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  2.118
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Small Landscaped Area 1    Source area number:  24
         The SCS Hydrologic Soil Type is Sandy
      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:
         Pollutant Name               Pollutant Type
          Solids                      Particulate
```

Medium Density, 1961 – 1980 (MR68CB.DAT and MR68SB.DAT)

```
    Data file name:  C:\Program Files\WinSLAMM\MR68CB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN        Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                   Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                   Seed for random number generator:   42
    Study period starting date:  01/01/53                          Study period ending date:  12/31/89
    Date:  07-23-2000                                              Time:  19:28:54
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  MEDIUM DENSITY RESIDENTIAL 1961-1980, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	2.60	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	6.05	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	1.19	0.00	0.00	0.00	0.00		
Driveways 2	1.18	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	6.58	0.00	0.00	0.00	0.00		
Street Area 2	0.65	0.00	0.00	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	4.59	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	50.94	0.00	0.00	0.00	0.00		
Small Landscaped Area 2	26.22	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	100.00	0.00	0.00	0.00	0.00		

```
Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========

                  Source Area Control Practice Information
Land Use:  Residential
   Roofs 1    Source area number:  1
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
```

```
      The SCS Hydrologic Soil Type is Clayey
      The building density is medium or high
      Alleys are not present
Driveways 1    Source area number:  13
      The Source Area is directly connected or draining to a directly conntected area
Driveways 2    Source area number:  14
      The Source Area is draining to a pervious area (partially connected impervious area)
      The SCS Hydrologic Soil Type is Clayey
      The building density is medium or high
      Alleys are not present
Street Area 1    Source area number:  18
        1.  Street Texture:  intermediate
        2.  Total study area street length (curb-miles):  2.73
        3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
        4.  Street Dirt Accumulation:
              Default value used
Street Area 2    Source area number:  19
        1.  Street Texture:  rough
        2.  Total study area street length (curb-miles):  0.27
        3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
        4.  Street Dirt Accumulation:
              Default value used
Undeveloped Area    Source area number:  23
      The SCS Hydrologic Soil Type is Clayey
Small Landscaped Area 1    Source area number:  24
      The SCS Hydrologic Soil Type is Clayey
Small Landscaped Area 2    Source area number:  25
      The SCS Hydrologic Soil Type is Clayey


   Control Practice 1 :  Catchbasin Cleaning Controls
    1.  Total sump volume (cubic feet)=  1
    2.  Area served by catchbasins (acres)=  100
    3.  Percent of sump volume full at beginning of study period=  60 %
    4.  Average sump depth (feet)=  0
    5.  Number of times catchbasins cleaned each year=  0


Pollutants to be Analyzed and Printed:

        Pollutant Name               Pollutant Type
        --------------               --------------
         Solids                      Particulate

  Data file name:  C:\Program Files\WinSLAMM\MR68SB.DAT         SLAMM Version V8.1
  Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
  Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                               Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
  Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                               Seed for random number generator:   42
  Study period starting date:  01/01/53                        Study period ending date:  12/31/89
  Date:  07-23-2000                                            Time:  19:29:17
  Fraction of each type of Drainage System serving study area:
    1.  Grass Swales 0
    2.  Undeveloped roadside 0
        Curb and Gutters, `valleys', or sealed swales in:
         3.  Poor condition (or very flat) 0
         4.  Fair condition 1
         5.  Good condition (or very steep) 0
  Site information:  MEDIUM DENSITY RESIDENTIAL 1961-1980, CURBS AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)
                        |<===== Areas for each Source (acres) =====>|
                         Resi-   Institu- Commercial Industrial  Open
                        dential   tional     Areas      Areas   Spaces
Source Area              Areas    Areas                          Areas         Freeway Source Area                   Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                  2.60      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                  6.05      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1  0.00      0.00      0.00      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2  0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
```

Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	1.19	0.00	0.00	0.00	0.00		
Driveways 2	1.18	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	6.58	0.00	0.00	0.00	0.00		
Street Area 2	0.65	0.00	0.00	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	4.59	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	50.94	0.00	0.00	0.00	0.00		
Small Landscaped Area 2	26.22	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	100.00	0.00	0.00	0.00	0.00		

Total of All Source Areas 100.00

Total of All Source Areas
less All Isolated Areas 100.00

Source Area Control Practice Information

Land Use: Residential

Roofs 1 Source area number: 1
The roof is pitched
The Source Area is directly connected or draining to a directly conntected area

Roofs 2 Source area number: 2
The roof is pitched
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy

Driveways 1 Source area number: 13
The Source Area is directly connected or draining to a directly conntected area

Driveways 2 Source area number: 14
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy

Street Area 1 Source area number: 18
1. Street Texture: intermediate
2. Total study area street length (curb-miles): 2.73
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Street Area 2 Source area number: 19
1. Street Texture: rough
2. Total study area street length (curb-miles): 0.27
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Undeveloped Area Source area number: 23
The SCS Hydrologic Soil Type is Sandy

Small Landscaped Area 1 Source area number: 24
The SCS Hydrologic Soil Type is Sandy

Small Landscaped Area 2 Source area number: 25
The SCS Hydrologic Soil Type is Sandy

Control Practice 1 : Catchbasin Cleaning Controls
1. Total sump volume (cubic feet)= 1
2. Area served by catchbasins (acres)= 100
3. Percent of sump volume full at beginning of study period= 60 %
4. Average sump depth (feet)= 0
5. Number of times catchbasins cleaned each year= 0

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Medium Density, since 1980 (MR8CB.DAT and MR8SB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\MR8CB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:30:12
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  MEDIUM DENSITY RESIDENTIAL SINCE 1980, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

Source Area	Areas for each Source (acres): Residential	Institutional	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	5.35	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	3.68	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		---
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	1.29	0.00	0.00	0.00	0.00		
Driveways 2	1.28	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	6.80	0.00	0.00	0.00	0.00		
Street Area 2	0.00	0.00	0.00	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	1.80	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	56.50	0.00	0.00	0.00	0.00		
Small Landscaped Area 2	23.30	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	100.00	0.00	0.00	0.00	0.00		

```
Total of All Source Areas              100.00
                                       ------

Total of All Source Areas
     less All Isolated Areas           100.00
                                       ======

                 Source Area Control Practice Information
Land Use:  Residential
   Roofs 1    Source area number:  1
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
```

```
         The building density is medium or high
         Alleys are not present
   Driveways 1    Source area number:  13
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  14
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is medium or high
         Alleys are not present
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  3.17
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Undeveloped Area    Source area number:  23
         The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 1    Source area number:  24
         The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 2    Source area number:  25
         The SCS Hydrologic Soil Type is Clayey
      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:
         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate

    Data file name:  C:\Program Files\WinSLAMM\MR8SB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:30:29
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  MEDIUM DENSITY RESIDENTIAL SINCE 1980, CURB AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)

                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                         Areas         Freeway Source Area                  Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                  5.35      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                  3.68      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1  0.00      0.00      0.00      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2  0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3  0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1  0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2  0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1             0.00      0.00      0.00      0.00      0.00                                                 --------
Playground 2             0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1              1.29      0.00      0.00      0.00      0.00
Driveways 2              1.28      0.00      0.00      0.00      0.00
Driveways 3              0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1        0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2        0.00      0.00      0.00      0.00      0.00
Street Area 1            6.80      0.00      0.00      0.00      0.00
```

```
Street Area 2              0.00      0.00      0.00      0.00      0.00
Street Area 3              0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1    0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Undeveloped Area           1.80      0.00      0.00      0.00      0.00
Small Landscaped Area 1    56.50     0.00      0.00      0.00      0.00
Small Landscaped Area 2    23.30     0.00      0.00      0.00      0.00
Small Landscaped Area 3    0.00      0.00      0.00      0.00      0.00
Isolated Area              0.00      0.00      0.00      0.00      0.00
Other Pervious Area        0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area   0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area  0.00      0.00      0.00      0.00      0.00
                         --------  --------  --------  --------  --------
Total                    100.00    0.00      0.00      0.00      0.00


Total of All Source Areas               100.00
                                        ---------
Total of All Source Areas
     less All Isolated Areas            100.00
                                        =========

                  Source Area Control Practice Information
Land Use:  Residential
   Roofs 1    Source area number:  1
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  13
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  14
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  3.17
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Undeveloped Area    Source area number:  23
         The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 1    Source area number:  24
         The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 2    Source area number:  25
         The SCS Hydrologic Soil Type is Sandy

      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:
         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate
```

High Density (HDRCB.DAT and HDRSB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\HDRCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:26:57
    Fraction of each type of Drainage System serving study area:
```

```
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  HIGH DENSITY RESIDENTIAL, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)

                          |<===== Areas for each Source (acres) =====>|
                           Resi-   Institu- Commercial Industrial  Open
                          dential   tional     Areas      Areas   Spaces
Source Area                Areas    Areas                         Areas         Freeway Source Area                  Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                   5.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                   9.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1   0.00      0.00      0.00      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2   0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3   0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1   0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2   0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1              0.00      0.00      0.00      0.00      0.00                                                 --------
Playground 2              0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1               3.00      0.00      0.00      0.00      0.00
Driveways 2               0.00      0.00      0.00      0.00      0.00
Driveways 3               0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1         0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2         0.00      0.00      0.00      0.00      0.00
Street Area 1             6.00      0.00      0.00      0.00      0.00
Street Area 2             1.00      0.00      0.00      0.00      0.00
Street Area 3             0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1   0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 2   0.00      0.00      0.00      0.00      0.00
Undeveloped Area          4.00      0.00      0.00      0.00      0.00
Small Landscaped Area 1   40.00     0.00      0.00      0.00      0.00
Small Landscaped Area 2   32.00     0.00      0.00      0.00      0.00
Small Landscaped Area 3   0.00      0.00      0.00      0.00      0.00
Isolated Area             0.00      0.00      0.00      0.00      0.00
Other Pervious Area       0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area  0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area 0.00      0.00      0.00      0.00      0.00
                         --------  --------  --------  --------  --------
Total                    100.00    0.00      0.00      0.00      0.00

Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========
                  Source Area Control Practice Information
Land Use:  Residential
   Roofs 1    Source area number:  1
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is medium or high
         Alleys are not present
   Driveways 1    Source area number:  13
         The Source Area is directly connected or draining to a directly conntected area
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  3.1
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Street Area 2    Source area number:  19
            1.  Street Texture:  rough
            2.  Total study area street length (curb-miles):  2.7
```

```
           3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
           4.  Street Dirt Accumulation:
                 Default value used
   Undeveloped Area    Source area number:  23
         The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 1    Source area number:  24
         The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 2    Source area number:  25
         The SCS Hydrologic Soil Type is Clayey
      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0
Pollutants to be Analyzed and Printed:
         Pollutant Name                Pollutant Type
         --------------                --------------
          Solids                       Particulate

    Data file name:  C:\Program Files\WinSLAMM\HDRSB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:27:12
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  HIGH DENSITY RESIDENTIAL, CURB AND GUTTERS, SANDY, BASELINE CONTROLS (NONE)
```

	|<===== Areas for each Source (acres) =====>|						
	Resi- dential	Institu- tional	Commercial Areas	Industrial Areas	Open Spaces		
Source Area	Areas	Areas			Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	5.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	9.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	3.00	0.00	0.00	0.00	0.00		
Driveways 2	0.00	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	6.00	0.00	0.00	0.00	0.00		
Street Area 2	1.00	0.00	0.00	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	4.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	40.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 2	32.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	100.00	0.00	0.00	0.00	0.00		

```
Total of All Source Areas               100.00
                                        ---------
Total of All Source Areas
     less All Isolated Areas            100.00
                                        =========
                  Source Area Control Practice Information
Land Use:  Residential
   Roofs 1    Source area number:  1
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  13
         The Source Area is directly connected or draining to a directly conntected area
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  3.1
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Street Area 2    Source area number:  19
            1.  Street Texture:  rough
            2.  Total study area street length (curb-miles):  2.7
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Undeveloped Area    Source area number:  23
         The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 1    Source area number:  24
         The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 2    Source area number:  25
         The SCS Hydrologic Soil Type is Sandy

      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:
         Pollutant Name                 Pollutant Type
         --------------                 --------------
          Solids                        Particulate
```

Multi-Family (Duplexes) (MFRCB.DAT and MFRSB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\MFRCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:28:22
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 1
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 0
           5.  Good condition (or very steep) 0
    Site information:  MULTI-FAMILY RESIDENTIAL, UNDEVELOPED ROADSIDE, CLAYEY SOILS, BASELINE CONTROLS (NONE)

                           |<===== Areas for each Source (acres) =====>|
                           Resi-   Institu- Commercial Industrial  Open
                          dential   tional     Areas      Areas   Spaces
Source Area                Areas    Areas                          Areas         Freeway Source Area                  Area (acres)
```

123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	10.90	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	6.50	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	1.23	0.00	0.00	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	10.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.16	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.62	0.00	0.00	0.00	0.00		
Driveways 2	0.62	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	6.36	0.00	0.00	0.00	0.00		
Street Area 2	0.67	0.00	0.00	0.00	0.00		
Street Area 3	0.37	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	3.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	28.20	0.00	0.00	0.00	0.00		
Small Landscaped Area 2	30.09	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	1.28	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
	--------	--------	--------	--------	--------		
Total	100.00	0.00	0.00	0.00	0.00		

Total of All Source Areas	100.00

Total of All Source Areas less All Isolated Areas	100.00
	=========

Source Area Control Practice Information

Land Use: Residential

Roofs 1 Source area number: 1
- The roof is pitched
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Clayey
- The building density is medium or high
- Alleys are not present

Roofs 2 Source area number: 2
- The roof is pitched
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Clayey
- The building density is medium or high
- Alleys are not present

Paved Parking/Storage 1 Source area number: 6
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Clayey
- The building density is medium or high
- Alleys are not present

Unpaved Prkng/Storage 1 Source area number: 9
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Clayey
- The building density is medium or high
- Alleys are not present

Playground 1 Source area number: 11
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Clayey
- The building density is medium or high
- Alleys are not present

Driveways 1 Source area number: 13
- The Source Area is directly connected or draining to a directly conntected area

Driveways 2 Source area number: 14
- The Source Area is draining to a pervious area (partially connected impervious area)

```
      The SCS Hydrologic Soil Type is Clayey
      The building density is medium or high
      Alleys are not present
   Street Area 1    Source area number:  18
         1.  Street Texture:  intermediate
         2.  Total study area street length (curb-miles):  2.85
         3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
         4.  Street Dirt Accumulation:
               Default value used
   Street Area 2    Source area number:  19
         1.  Street Texture:  smooth
         2.  Total study area street length (curb-miles):  2.85
         3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
         4.  Street Dirt Accumulation:
               Default value used
   Street Area 3    Source area number:  20
         1.  Street Texture:  rough
         2.  Total study area street length (curb-miles):  2.85
         3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
         4.  Street Dirt Accumulation:
               Default value used
   Undeveloped Area    Source area number:  23
      The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 1    Source area number:  24
      The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 2    Source area number:  25
      The SCS Hydrologic Soil Type is Clayey
   Other Pervious Area    Source area number:  28
      The SCS Hydrologic Soil Type is Clayey




Pollutants to be Analyzed and Printed:

         Pollutant Name                Pollutant Type
         --------------                --------------
          Solids                       Particulate

    Data file name:  C:\Program Files\WinSLAMM\MFRSB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:28:37
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 1
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 0
           5.  Good condition (or very steep) 0
    Site information:  MULTI-FAMILY RESIDENTIAL, UNDEVELOPED ROADSIDE, SANDY SOILS, BASELINE CONTROLS (NONE)

                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                         Areas         Freeway Source Area                  Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                  10.90     0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                  6.50      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1  1.23      0.00      0.00      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2  0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3  0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1  10.00     0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2  0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1             0.16      0.00      0.00      0.00      0.00                                                  --------
```

Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.62	0.00	0.00	0.00	0.00		
Driveways 2	0.62	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	6.36	0.00	0.00	0.00	0.00		
Street Area 2	0.67	0.00	0.00	0.00	0.00		
Street Area 3	0.37	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	3.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	28.20	0.00	0.00	0.00	0.00		
Small Landscaped Area 2	30.09	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	1.28	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	100.00	0.00	0.00	0.00	0.00		

Total of All Source Areas	100.00
Total of All Source Areas less All Isolated Areas	100.00

Source Area Control Practice Information

Land Use: Residential

Roofs 1 Source area number: 1
- The roof is pitched
- The Source Area is directly connected or draining to a directly conntected area
- The SCS Hydrologic Soil Type is Sandy

Roofs 2 Source area number: 2
- The roof is pitched
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Sandy

Paved Parking/Storage 1 Source area number: 6
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Sandy

Unpaved Prkng/Storage 1 Source area number: 9
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Sandy

Playground 1 Source area number: 11
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Sandy

Driveways 1 Source area number: 13
- The Source Area is directly connected or draining to a directly conntected area

Driveways 2 Source area number: 14
- The Source Area is draining to a pervious area (partially connected impervious area)
- The SCS Hydrologic Soil Type is Sandy

Street Area 1 Source area number: 18
1. Street Texture: intermediate
2. Total study area street length (curb-miles): 2.85
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
   Default value used

Street Area 2 Source area number: 19
1. Street Texture: smooth
2. Total study area street length (curb-miles): 2.85
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
   Default value used

Street Area 3 Source area number: 20
1. Street Texture: rough
2. Total study area street length (curb-miles): 2.85
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
   Default value used

Undeveloped Area Source area number: 23
- The SCS Hydrologic Soil Type is Sandy

Small Landscaped Area 1 Source area number: 24

```
      The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 2    Source area number:  25
      The SCS Hydrologic Soil Type is Sandy
   Other Pervious Area    Source area number:  28
      The SCS Hydrologic Soil Type is Sandy



Pollutants to be Analyzed and Printed:

        Pollutant Name               Pollutant Type
        --------------               --------------
         Solids                      Particulate
```

Apartments (APTCB.DAT and APTSB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\APTCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:15:28
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  APARTMENTS, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)

                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                          Areas         Freeway Source Area                  Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                  14.94     0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                  4.25      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1  6.53      0.00      0.00      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2  0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3  0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1  0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2  0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1             0.82      0.00      0.00      0.00      0.00                                                 --------
Playground 2             0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1              0.75      0.00      0.00      0.00      0.00
Driveways 2              0.75      0.00      0.00      0.00      0.00
Driveways 3              0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1        0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2        0.00      0.00      0.00      0.00      0.00
Street Area 1            9.66      0.00      0.00      0.00      0.00
Street Area 2            0.00      0.00      0.00      0.00      0.00
Street Area 3            0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1  28.73     0.00      0.00      0.00      0.00
Large Landscaped Area 2  22.96     0.00      0.00      0.00      0.00
Undeveloped Area         3.18      0.00      0.00      0.00      0.00
Small Landscaped Area 1  0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 2  0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3  0.00      0.00      0.00      0.00      0.00
Isolated Area            0.00      0.00      0.00      0.00      0.00
Other Pervious Area      7.43      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area 0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area 0.00     0.00      0.00      0.00      0.00
```

```
                      --------  --------  --------  --------  --------
Total                 100.00    0.00      0.00      0.00      0.00


Total of All Source Areas             100.00
                                      ---------
Total of All Source Areas
     less All Isolated Areas          100.00
                                      =========

                  Source Area Control Practice Information
Land Use:  Residential
   Roofs 1    Source area number:  1
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is medium or high
         Alleys are not present
   Roofs 2    Source area number:  2
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Paved Parking/Storage 1    Source area number:  6
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is medium or high
         Alleys are not present
   Playground 1    Source area number:  11
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is medium or high
         Alleys are not present
   Driveways 1    Source area number:  13
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  14
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
         The building density is medium or high
         Alleys are not present
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  3.48
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Large Landscaped Area 1    Source area number:  21
         The SCS Hydrologic Soil Type is Clayey
   Large Landscaped Area 2    Source area number:  22
         The SCS Hydrologic Soil Type is Clayey
   Undeveloped Area    Source area number:  23
         The SCS Hydrologic Soil Type is Clayey
   Other Pervious Area    Source area number:  28
         The SCS Hydrologic Soil Type is Clayey


      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0


Pollutants to be Analyzed and Printed:

         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate

    Data file name:  C:\Program Files\WinSLAMM\APTSB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
```

Seed for random number generator: 42
Study period starting date: 01/01/53 Study period ending date: 12/31/89
Date: 07-23-2000 Time: 19:15:46
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 1
5. Good condition (or very steep) 0
Site information: APARTMENTS, CURBS AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)

Source Area	Areas for each Source (acres): Residential	Institutional	Commercial	Industrial	Open Spaces	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	14.94	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	4.25	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	6.53	0.00	0.00	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.82	0.00	0.00	0.00	0.00		---
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.75	0.00	0.00	0.00	0.00		
Driveways 2	0.75	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	9.66	0.00	0.00	0.00	0.00		
Street Area 2	0.00	0.00	0.00	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	28.73	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	22.96	0.00	0.00	0.00	0.00		
Undeveloped Area	3.18	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	7.43	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	100.00	0.00	0.00	0.00	0.00		

Total of All Source Areas 100.00

Total of All Source Areas
less All Isolated Areas 100.00
=========

Source Area Control Practice Information
Land Use: Residential
Roofs 1 Source area number: 1
The roof is pitched
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy
Roofs 2 Source area number: 2
The roof is pitched
The Source Area is directly connected or draining to a directly conntected area
Paved Parking/Storage 1 Source area number: 6
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy
Playground 1 Source area number: 11
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy
Driveways 1 Source area number: 13
The Source Area is directly connected or draining to a directly conntected area
Driveways 2 Source area number: 14

```
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Street Area 1    Source area number:  18
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  3.48
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Large Landscaped Area 1    Source area number:  21
         The SCS Hydrologic Soil Type is Sandy
   Large Landscaped Area 2    Source area number:  22
         The SCS Hydrologic Soil Type is Sandy
   Undeveloped Area    Source area number:  23
         The SCS Hydrologic Soil Type is Sandy
   Other Pervious Area    Source area number:  28
         The SCS Hydrologic Soil Type is Sandy
      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0
Pollutants to be Analyzed and Printed:
         Pollutant Name                Pollutant Type
         --------------                --------------
          Solids                       Particulate
```

Commercial Areas

Strip Development (STRCB.DAT and STRSB.DAT)

```
    Data file name:  C:\Program Files\WinSLAMM\STRCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:32:30
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  STRIP COMMERCIAL, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

	|<===== Areas for each Source (acres) =====>|						
Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	0.00	0.00	20.60	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	0.00	0.00	2.80	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	40.90	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	1.50	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.00	0.00	1.90	0.00	0.00		
Driveways 2	0.00	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	4.30	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	0.00	0.00	8.90	0.00	0.00		

Street Area 2	0.00	0.00	11.20	0.00	0.00
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	0.00	0.00	0.20	0.00	0.00
Small Landscaped Area 1	0.00	0.00	5.80	0.00	0.00
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	1.90	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	100.00	0.00	0.00

Total of All Source Areas	100.00
Total of All Source Areas less All Isolated Areas	100.00

Source Area Control Practice Information

Land Use: Commercial

Roofs 1 Source area number: 61
The roof is flat
The Source Area is directly connected or draining to a directly conntected area

Roofs 2 Source area number: 62
The roof is pitched
The Source Area is directly connected or draining to a directly conntected area

Paved Parking/Storage 1 Source area number: 66
The Source Area is directly connected or draining to a directly conntected area

Unpaved Prkng/Storage 1 Source area number: 69
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Clayey

Driveways 1 Source area number: 73
The Source Area is directly connected or draining to a directly conntected area

Sidewalks/Walks 1 Source area number: 76
The Source Area is directly connected or draining to a directly conntected area

Street Area 1 Source area number: 78
1. Street Texture: intermediate
2. Total study area street length (curb-miles): 3.5
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Street Area 2 Source area number: 79
1. Street Texture: smooth
2. Total study area street length (curb-miles): 4.3
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Undeveloped Area Source area number: 83
The SCS Hydrologic Soil Type is Clayey

Small Landscaped Area 1 Source area number: 84
The SCS Hydrologic Soil Type is Clayey

Other Pervious Area Source area number: 88
The SCS Hydrologic Soil Type is Clayey

Control Practice 1 : Catchbasin Cleaning Controls
1. Total sump volume (cubic feet)= 1
2. Area served by catchbasins (acres)= 100
3. Percent of sump volume full at beginning of study period= 60 %
4. Average sump depth (feet)= 0
5. Number of times catchbasins cleaned each year= 0

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

```
    Data file name:  C:\Program Files\WinSLAMM\STRSB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:32:44
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
       3.  Poor condition (or very flat) 0
       4.  Fair condition 1
       5.  Good condition (or very steep) 0
    Site information:  STRIP COMMERCIAL, CURB AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)

                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                         Areas         Freeway Source Area                  Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                   0.00      0.00      20.60      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                   0.00      0.00      2.80       0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                   0.00      0.00      0.00       0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                   0.00      0.00      0.00       0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                   0.00      0.00      0.00       0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1   0.00      0.00      40.90      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2   0.00      0.00      0.00       0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3   0.00      0.00      0.00       0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1   0.00      0.00      1.50       0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2   0.00      0.00      0.00       0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1              0.00      0.00      0.00       0.00      0.00                                                  --------
Playground 2              0.00      0.00      0.00       0.00      0.00          Total                                  0.00
Driveways 1               0.00      0.00      1.90       0.00      0.00
Driveways 2               0.00      0.00      0.00       0.00      0.00
Driveways 3               0.00      0.00      0.00       0.00      0.00
Sidewalks/Walks 1         0.00      0.00      4.30       0.00      0.00
Sidewalks/Walks 2         0.00      0.00      0.00       0.00      0.00
Street Area 1             0.00      0.00      8.90       0.00      0.00
Street Area 2             0.00      0.00      11.20      0.00      0.00
Street Area 3             0.00      0.00      0.00       0.00      0.00
Large Landscaped Area 1   0.00      0.00      0.00       0.00      0.00
Large Landscaped Area 2   0.00      0.00      0.00       0.00      0.00
Undeveloped Area          0.00      0.00      0.20       0.00      0.00
Small Landscaped Area 1   0.00      0.00      5.80       0.00      0.00
Small Landscaped Area 2   0.00      0.00      0.00       0.00      0.00
Small Landscaped Area 3   0.00      0.00      0.00       0.00      0.00
Isolated Area             0.00      0.00      0.00       0.00      0.00
Other Pervious Area       0.00      0.00      1.90       0.00      0.00
Other Dir Cnctd Imp Area  0.00      0.00      0.00       0.00      0.00
Other Part Cnctd Imp Area 0.00      0.00      0.00       0.00      0.00
                         --------  --------  --------   --------  --------
Total                     0.00      0.00      100.00     0.00      0.00

Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========
                  Source Area Control Practice Information
Land Use:  Commercial
   Roofs 1    Source area number:  61
         The roof is flat
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  62
         The roof is pitched
         The Source Area is directly connected or draining to a directly conntected area
   Paved Parking/Storage 1    Source area number:  66
         The Source Area is directly connected or draining to a directly conntected area
   Unpaved Prkng/Storage 1    Source area number:  69
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  73
```

```
      The Source Area is directly connected or draining to a directly conntected area
   Sidewalks/Walks 1    Source area number:  76
      The Source Area is directly connected or draining to a directly conntected area
   Street Area 1    Source area number:  78
         1.  Street Texture:  intermediate
         2.  Total study area street length (curb-miles):  3.5
         3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
         4.  Street Dirt Accumulation:
               Default value used
   Street Area 2    Source area number:  79
         1.  Street Texture:  smooth
         2.  Total study area street length (curb-miles):  4.3
         3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
         4.  Street Dirt Accumulation:
               Default value used
   Undeveloped Area    Source area number:  83
      The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 1    Source area number:  84
      The SCS Hydrologic Soil Type is Sandy
   Other Pervious Area    Source area number:  88
      The SCS Hydrologic Soil Type is Sandy
     Control Practice 1 :  Catchbasin Cleaning Controls
      1.  Total sump volume (cubic feet)=  1
      2.  Area served by catchbasins (acres)=  100
      3.  Percent of sump volume full at beginning of study period=  60 %
      4.  Average sump depth (feet)=  0
      5.  Number of times catchbasins cleaned each year=  0
Pollutants to be Analyzed and Printed:
      Pollutant Name               Pollutant Type
      --------------               --------------
       Solids                      Particulate
```

Shopping Centers (SHPCB.DAT and SHPSB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\SHPCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:31:47
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  SHOPPING CENTER, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                         Areas         Freeway Source Area                  Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                  0.00      0.00      21.00     0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                  0.00      0.00      0.75      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1  0.00      0.00      29.62     0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2  0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3  0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1  0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2  0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1             0.00      0.00      0.00      0.00      0.00                                                 --------
Playground 2             0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1              0.00      0.00      0.37      0.00      0.00
Driveways 2              0.00      0.00      0.37      0.00      0.00
Driveways 3              0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1        0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2        0.00      0.00      0.00      0.00      0.00
Street Area 1            0.00      0.00      1.76      0.00      0.00
```

```
Street Area 2              0.00      0.00      14.28     0.00      0.00
Street Area 3              0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1    0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Undeveloped Area           0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 1    0.00      0.00      31.85     0.00      0.00
Small Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3    0.00      0.00      0.00      0.00      0.00
Isolated Area              0.00      0.00      0.00      0.00      0.00
Other Pervious Area        0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area   0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area  0.00      0.00      0.00      0.00      0.00
                         --------  --------  --------  --------  --------
Total                    0.00      0.00      100.00    0.00      0.00
Total of All Source Areas               100.00
Total of All Source Areas
     less All Isolated Areas            100.00
                                        =========
                  Source Area Control Practice Information
Land Use:  Commercial
   Roofs 1    Source area number:  61
         The roof is flat
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  62
         The roof is flat
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
   Paved Parking/Storage 1    Source area number:  66
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 1    Source area number:  73
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  74
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
   Street Area 1    Source area number:  78
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  0.7
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Street Area 2    Source area number:  79
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  5.5
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Small Landscaped Area 1    Source area number:  84
         The SCS Hydrologic Soil Type is Clayey
      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:
         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate

    Data file name:  C:\Program Files\WinSLAMM\SHPSB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:32:12
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
```

```
          5.  Good condition (or very steep) 0
    Site information:  SHOPPING CENTER, CURB AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)
                            |<===== Areas for each Source (acres) =====>|
                            Resi-   Institu- Commercial Industrial  Open
                           dential   tional     Areas      Areas   Spaces
Source Area                 Areas    Areas                          Areas         Freeway Source Area                  Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                    0.00      0.00      21.00     0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                    0.00      0.00      0.75      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1    0.00      0.00      29.62     0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2    0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3    0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1    0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2    0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1               0.00      0.00      0.00      0.00      0.00                                                 --------
Playground 2               0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1                0.00      0.00      0.37      0.00      0.00
Driveways 2                0.00      0.00      0.37      0.00      0.00
Driveways 3                0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1          0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2          0.00      0.00      0.00      0.00      0.00
Street Area 1              0.00      0.00      1.76      0.00      0.00
Street Area 2              0.00      0.00      14.28     0.00      0.00
Street Area 3              0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1    0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Undeveloped Area           0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 1    0.00      0.00      31.85     0.00      0.00
Small Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3    0.00      0.00      0.00      0.00      0.00
Isolated Area              0.00      0.00      0.00      0.00      0.00
Other Pervious Area        0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area   0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area  0.00      0.00      0.00      0.00      0.00
                          --------  --------  --------  --------  --------
Total                     0.00      0.00      100.00    0.00      0.00

Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========
                  Source Area Control Practice Information
Land Use:  Commercial
   Roofs 1    Source area number:  61
         The roof is flat
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  62
         The roof is flat
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Paved Parking/Storage 1    Source area number:  66
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 1    Source area number:  73
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  74
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Street Area 1    Source area number:  78
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  0.7
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Street Area 2    Source area number:  79
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  5.5
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Small Landscaped Area 1    Source area number:  84
```

```
        The SCS Hydrologic Soil Type is Sandy

      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:
         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate
```

Office Parks (OFFCB.DAT and OFFSB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\OFFCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:30:50
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  OFFICE PARK, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	0.00	0.00	17.58	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	0.00	0.00	0.32	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	27.06	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.00	0.00	0.82	0.00	0.00		
Driveways 2	0.00	0.00	0.82	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	0.00	0.00	8.54	0.00	0.00		
Street Area 2	0.00	0.00	6.19	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	0.00	0.00	23.93	0.00	0.00		
Small Landscaped Area 2	0.00	0.00	14.74	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	0.00	0.00	100.00	0.00	0.00		
Total of All Source Areas			100.00				

```
                                    ---------
Total of All Source Areas
     less All Isolated Areas        100.00
                                    =========
                  Source Area Control Practice Information
Land Use:  Commercial
   Roofs 1    Source area number:  61
         The roof is flat
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  62
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
   Paved Parking/Storage 1    Source area number:  66
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 1    Source area number:  73
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  74
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
   Street Area 1    Source area number:  78
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  3.29
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Street Area 2    Source area number:  79
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  2.38
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Small Landscaped Area 1    Source area number:  84
         The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 2    Source area number:  85
         The SCS Hydrologic Soil Type is Clayey
      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0
Pollutants to be Analyzed and Printed:
         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate

    Data file name:  C:\Program Files\WinSLAMM\OFFSB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:31:03
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  OFFICE PARK, CURB AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)
                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                         Areas         Freeway Source Area                  Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                   0.00      0.00      17.58     0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                   0.00      0.00      0.32      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1   0.00      0.00      27.06     0.00      0.00          Large Turf Areas                       0.00
```

Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.00	0.00	0.82	0.00	0.00		
Driveways 2	0.00	0.00	0.82	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	0.00	0.00	8.54	0.00	0.00		
Street Area 2	0.00	0.00	6.19	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 1	0.00	0.00	23.93	0.00	0.00		
Small Landscaped Area 2	0.00	0.00	14.74	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	0.00	0.00	100.00	0.00	0.00		

Total of All Source Areas 100.00

Total of All Source Areas less All Isolated Areas 100.00

Source Area Control Practice Information

Land Use: Commercial

Roofs 1 Source area number: 61
The roof is flat
The Source Area is directly connected or draining to a directly conntected area

Roofs 2 Source area number: 62
The roof is flat
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy

Paved Parking/Storage 1 Source area number: 66
The Source Area is directly connected or draining to a directly conntected area

Driveways 1 Source area number: 73
The Source Area is directly connected or draining to a directly conntected area

Driveways 2 Source area number: 74
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy

Street Area 1 Source area number: 78
1. Street Texture: intermediate
2. Total study area street length (curb-miles): 3.29
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Street Area 2 Source area number: 79
1. Street Texture: intermediate
2. Total study area street length (curb-miles): 2.38
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Small Landscaped Area 1 Source area number: 84
The SCS Hydrologic Soil Type is Sandy

Small Landscaped Area 2 Source area number: 85
The SCS Hydrologic Soil Type is Clayey

Control Practice 1 : Catchbasin Cleaning Controls
1. Total sump volume (cubic feet)= 1
2. Area served by catchbasins (acres)= 100
3. Percent of sump volume full at beginning of study period= 60 %
4. Average sump depth (feet)= 0
5. Number of times catchbasins cleaned each year= 0

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Institutional Areas

Schools (SCHCB.DAT and SCHSB.DAT)

```
  Data file name:  C:\Program Files\WinSLAMM\SCHCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:31:17
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
       3.  Poor condition (or very flat) 0
       4.  Fair condition 1
       5.  Good condition (or very steep) 0
    Site information:  SCHOOLS, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

	|<===== Areas for each Source (acres) =====>|						
Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	0.00	0.13	0.00	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	0.00	4.37	0.00	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	6.02	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	5.98	0.00	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	15.11	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.00	0.25	0.00	0.00	0.00		
Driveways 2	0.00	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	0.00	0.32	0.00	0.00	0.00		
Street Area 2	0.00	3.70	0.00	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	40.83	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	0.00	0.11	0.00	0.00	0.00		
Small Landscaped Area 1	0.00	23.18	0.00	0.00	0.00		
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	0.00	100.00	0.00	0.00	0.00		

```
Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========

                  Source Area Control Practice Information
Land Use:  Institutional
   Roofs 1    Source area number:  31
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
```

```
      The building density is low
   Roofs 2    Source area number:  32
      The roof is flat
      The Source Area is draining to a pervious area (partially connected impervious area)
      The SCS Hydrologic Soil Type is Clayey
      The building density is low
   Roofs 3    Source area number:  33
      The roof is flat
      The Source Area is directly connected or draining to a directly conntected area
   Paved Parking/Storage 1    Source area number:  36
      The Source Area is directly connected or draining to a directly conntected area
   Playground 1    Source area number:  41
      The Source Area is draining to a pervious area (partially connected impervious area)
      The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  43
      The Source Area is directly connected or draining to a directly conntected area
   Street Area 1    Source area number:  48
        1.  Street Texture:  smooth
        2.  Total study area street length (curb-miles):  0.127
        3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
        4.  Street Dirt Accumulation:
            Default value used
   Street Area 2    Source area number:  49
        1.  Street Texture:  intermediate
        2.  Total study area street length (curb-miles):  1.46
        3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
        4.  Street Dirt Accumulation:
            Default value used
   Large Landscaped Area 1    Source area number:  51
      The SCS Hydrologic Soil Type is Clayey
   Undeveloped Area    Source area number:  53
      The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 1    Source area number:  54
      The SCS Hydrologic Soil Type is Clayey


     Control Practice 1 :  Catchbasin Cleaning Controls
      1.  Total sump volume (cubic feet)=  1
      2.  Area served by catchbasins (acres)=  100
      3.  Percent of sump volume full at beginning of study period=  60 %
      4.  Average sump depth (feet)=  0
      5.  Number of times catchbasins cleaned each year=  0


Pollutants to be Analyzed and Printed:

        Pollutant Name               Pollutant Type
        --------------               --------------
         Solids                      Particulate

   Data file name:  C:\Program Files\WinSLAMM\SCHSB.DAT          SLAMM Version V8.1
   Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
   Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                 Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
   Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                 Seed for random number generator:   42
   Study period starting date:  01/01/53                         Study period ending date:  12/31/89
   Date:  07-23-2000                                             Time:  19:31:32
   Fraction of each type of Drainage System serving study area:
     1.  Grass Swales 0
     2.  Undeveloped roadside 0
         Curb and Gutters, `valleys', or sealed swales in:
          3.  Poor condition (or very flat) 0
          4.  Fair condition 1
          5.  Good condition (or very steep) 0
   Site information:  SCHOOLS, CURB AND GUTTER, SANDY SOILS, BASELINE CONTROLS (NONE)

                         |<===== Areas for each Source (acres) =====>|
                         Resi-   Institu- Commercial Industrial  Open
                        dential   tional     Areas      Areas   Spaces
Source Area              Areas    Areas                         Areas         Freeway Source Area                  Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
```

Roofs 1	0.00	0.13	0.00	0.00	0.00
Roofs 2	0.00	4.37	0.00	0.00	0.00
Roofs 3	0.00	6.02	0.00	0.00	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 1	0.00	5.98	0.00	0.00	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00
Playground 1	0.00	15.11	0.00	0.00	0.00
Playground 2	0.00	0.00	0.00	0.00	0.00
Driveways 1	0.00	0.25	0.00	0.00	0.00
Driveways 2	0.00	0.00	0.00	0.00	0.00
Driveways 3	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00
Street Area 1	0.00	0.32	0.00	0.00	0.00
Street Area 2	0.00	3.70	0.00	0.00	0.00
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	40.83	0.00	0.00	0.00
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	0.00	0.11	0.00	0.00	0.00
Small Landscaped Area 1	0.00	23.18	0.00	0.00	0.00
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	0.00	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	100.00	0.00	0.00	0.00

Pavd Lane & Shldr Area 1	0.00
Pavd Lane & Shldr Area 2	0.00
Pavd Lane & Shldr Area 3	0.00
Pavd Lane & Shldr Area 4	0.00
Pavd Lane & Shldr Area 5	0.00
Large Turf Areas	0.00
Undeveloped Areas	0.00
Other Pervious Areas	0.00
Other Directly Conctd Imp	0.00
Other Partially Conctd Imp	0.00
Total	0.00

Total of All Source Areas	100.00
Total of All Source Areas less All Isolated Areas	100.00

Source Area Control Practice Information

Land Use: Institutional

Roofs 1 Source area number: 31
The roof is pitched
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy

Roofs 2 Source area number: 32
The roof is flat
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy

Roofs 3 Source area number: 33
The roof is flat
The Source Area is directly connected or draining to a directly conntected area

Paved Parking/Storage 1 Source area number: 36
The Source Area is directly connected or draining to a directly conntected area

Playground 1 Source area number: 41
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy

Driveways 1 Source area number: 43
The Source Area is directly connected or draining to a directly conntected area

Street Area 1 Source area number: 48
1. Street Texture: smooth
2. Total study area street length (curb-miles): 0.127
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Street Area 2 Source area number: 49
1. Street Texture: intermediate
2. Total study area street length (curb-miles): 1.46
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Large Landscaped Area 1 Source area number: 51
The SCS Hydrologic Soil Type is Sandy

```
   Undeveloped Area    Source area number:  53
         The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 1    Source area number:  54
         The SCS Hydrologic Soil Type is Sandy


      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0


Pollutants to be Analyzed and Printed:

         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate
```

Industrial Areas

Light Industry (Warehousing) (LIDCB.DAT and LIDSB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\LIDCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:27:55
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  LIGHT INDUSTRIAL AREA, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	0.00	0.00	0.00	23.80	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	0.00	0.00	0.00	1.60	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	32.90	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	6.30	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		---
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.00	0.00	0.00	2.30	0.00		
Driveways 2	0.00	0.00	0.00	0.30	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.70	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.70	0.00		
Street Area 1	0.00	0.00	0.00	9.00	0.00		
Street Area 2	0.00	0.00	0.00	1.90	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	3.50	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	0.00	0.00	0.00	4.30	0.00		
Small Landscaped Area 1	0.00	0.00	0.00	9.90	0.00		

Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	0.00	2.80	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	100.00	0.00

Total of All Source Areas 100.00

Total of All Source Areas
less All Isolated Areas 100.00

Source Area Control Practice Information

Land Use: Industrial

Roofs 1 Source area number: 91
The roof is flat
The Source Area is directly connected or draining to a directly conntected area

Roofs 2 Source area number: 92
The roof is flat
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Clayey
The building density is medium or high
Alleys are not present

Paved Parking/Storage 1 Source area number: 96
The Source Area is directly connected or draining to a directly conntected area

Unpaved Prkng/Storage 1 Source area number: 99
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Clayey
The building density is medium or high
Alleys are not present

Driveways 1 Source area number: 103
The Source Area is directly connected or draining to a directly conntected area

Driveways 2 Source area number: 104
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Clayey
The building density is medium or high
Alleys are not present

Sidewalks/Walks 1 Source area number: 106
The Source Area is directly connected or draining to a directly conntected area

Sidewalks/Walks 2 Source area number: 107
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Clayey
The building density is medium or high
Alleys are not present

Street Area 1 Source area number: 108
1. Street Texture: intermediate
2. Total study area street length (curb-miles): 4.3
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Street Area 2 Source area number: 109
1. Street Texture: smooth
2. Total study area street length (curb-miles): 0.75
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Large Landscaped Area 1 Source area number: 111
The SCS Hydrologic Soil Type is Clayey

Undeveloped Area Source area number: 113
The SCS Hydrologic Soil Type is Clayey

Small Landscaped Area 1 Source area number: 114
The SCS Hydrologic Soil Type is Clayey

Other Pervious Area Source area number: 118
The SCS Hydrologic Soil Type is Clayey

Control Practice 1 : Catchbasin Cleaning Controls
1. Total sump volume (cubic feet)= 1
2. Area served by catchbasins (acres)= 100
3. Percent of sump volume full at beginning of study period= 60 %

4. Average sump depth (feet)= 0
5. Number of times catchbasins cleaned each year= 0

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Data file name: C:\Program Files\WinSLAMM\LIDSB.DAT
SLAMM Version V8.1
Rain file name: C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN
Particulate Solids Concentration file name: C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
Runoff Coefficient file name: C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
Particulate Residue Delivery file name: C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
Pollutant Relative Concentration file name: C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
Seed for random number generator: 42
Study period starting date: 01/01/53
Study period ending date: 12/31/89
Date: 07-23-2000
Time: 19:28:08
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 1
5. Good condition (or very steep) 0
Site information: LIGHT INDUSTRIAL AREA, CURB AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)

	|<===== Areas for each Source (acres) =====>|						
Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	0.00	0.00	0.00	23.80	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	0.00	0.00	0.00	1.60	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	32.90	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	6.30	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.00	0.00	0.00	2.30	0.00		
Driveways 2	0.00	0.00	0.00	0.30	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.70	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.70	0.00		
Street Area 1	0.00	0.00	0.00	9.00	0.00		
Street Area 2	0.00	0.00	0.00	1.90	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	3.50	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	0.00	0.00	0.00	4.30	0.00		
Small Landscaped Area 1	0.00	0.00	0.00	9.90	0.00		
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	2.80	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	0.00	0.00	0.00	100.00	0.00		

Total of All Source Areas	100.00
Total of All Source Areas less All Isolated Areas	100.00

```
                  Source Area Control Practice Information
Land Use:  Industrial
   Roofs 1    Source area number:  91
         The roof is flat
         The Source Area is directly connected or draining to a directly conntected area
   Roofs 2    Source area number:  92
         The roof is flat
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Paved Parking/Storage 1    Source area number:  96
         The Source Area is directly connected or draining to a directly conntected area
   Unpaved Prkng/Storage 1    Source area number:  99
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  103
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  104
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Sidewalks/Walks 1    Source area number:  106
         The Source Area is directly connected or draining to a directly conntected area
   Sidewalks/Walks 2    Source area number:  107
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Street Area 1    Source area number:  108
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  4.3
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Street Area 2    Source area number:  109
            1.  Street Texture:  smooth
            2.  Total study area street length (curb-miles):  0.75
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Large Landscaped Area 1    Source area number:  111
         The SCS Hydrologic Soil Type is Sandy
   Undeveloped Area    Source area number:  113
         The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 1    Source area number:  114
         The SCS Hydrologic Soil Type is Sandy
   Other Pervious Area    Source area number:  118
         The SCS Hydrologic Soil Type is Sandy


      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0


Pollutants to be Analyzed and Printed:

         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate
```

Open Space

Golf Courses (GLFCB.DAT and GLFSB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\GLFCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:26:24
    Fraction of each type of Drainage System serving study area:
```

```
      1.  Grass Swales 1
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 0
           5.  Good condition (or very steep) 0
    Site information:  GOLF COURSE, SWALE DRAINAGE, CLAYEY SOILS, BASELILNE CONTROLS (SWALES)
                         |<===== Areas for each Source (acres) =====>|
                         Resi-   Institu- Commercial Industrial  Open
                        dential   tional     Areas      Areas   Spaces
Source Area              Areas    Areas                         Areas         Freeway Source Area                  Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                 0.00      0.00      0.00      0.00      0.28          Pavd Lane & Shldr Area 1               0.00
Roofs 2                 0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                 0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                 0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                 0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1 0.00      0.00      0.00      0.00      0.67          Large Turf Areas                       0.00
Paved Parking/Storage 2 0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3 0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1 0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2 0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1            0.00      0.00      0.00      0.00      0.07                                                 --------
Playground 2            0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1             0.00      0.00      0.00      0.00      1.17
Driveways 2             0.00      0.00      0.00      0.00      0.00
Driveways 3             0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1       0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2       0.00      0.00      0.00      0.00      0.00
Street Area 1           0.00      0.00      0.00      0.00      1.23
Street Area 2           0.00      0.00      0.00      0.00      0.00
Street Area 3           0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1 0.00      0.00      0.00      0.00     96.58
Large Landscaped Area 2 0.00      0.00      0.00      0.00      0.00
Undeveloped Area        0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 1 0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 2 0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3 0.00      0.00      0.00      0.00      0.00
Isolated Area           0.00      0.00      0.00      0.00      0.00
Other Pervious Area     0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area 0.00     0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area 0.00    0.00      0.00      0.00      0.00
                        --------  --------  --------  --------  --------
Total                   0.00      0.00      0.00      0.00      100.00

Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========
                  Source Area Control Practice Information
Land Use:  Open Space
   Roofs 1    Source area number:  121
         The roof is pitched
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
   Paved Parking/Storage 1    Source area number:  126
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
   Playground 1    Source area number:  131
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
   Driveways 1    Source area number:  133
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
   Street Area 1    Source area number:  138
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  0.65
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Large Landscaped Area 1    Source area number:  141
         The SCS Hydrologic Soil Type is Clayey
      Control Practice 1 :  Grass Swale
```

```
        1.  Swale infiltration rate (inches per hour)=  0.1
        2.  Wetted swale width (feet)=  3
        3.  Swale density (feet per acre)=  17.16
        4.  Area served by swales (acres)=  100
Pollutants to be Analyzed and Printed:
        Pollutant Name                Pollutant Type
         Solids                       Particulate

    Data file name:  C:\Program Files\WinSLAMM\GLFSB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:26:41
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 1
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 0
           5.  Good condition (or very steep) 0
    Site information:  GOLF COURSE, SWALE DRAINAGE, SANDY SOILS, BASELINE CONTROLS (SWALES)

                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                         Areas         Freeway Source Area                  Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                  0.00      0.00      0.00      0.00      0.28          Pavd Lane & Shldr Area 1               0.00
Roofs 2                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                  0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1  0.00      0.00      0.00      0.00      0.67          Large Turf Areas                       0.00
Paved Parking/Storage 2  0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3  0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1  0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2  0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1             0.00      0.00      0.00      0.00      0.07                                                 --------
Playground 2             0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1              0.00      0.00      0.00      0.00      1.17
Driveways 2              0.00      0.00      0.00      0.00      0.00
Driveways 3              0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1        0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2        0.00      0.00      0.00      0.00      0.00
Street Area 1            0.00      0.00      0.00      0.00      1.23
Street Area 2            0.00      0.00      0.00      0.00      0.00
Street Area 3            0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1  0.00      0.00      0.00      0.00     96.58
Large Landscaped Area 2  0.00      0.00      0.00      0.00      0.00
Undeveloped Area         0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 1  0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 2  0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3  0.00      0.00      0.00      0.00      0.00
Isolated Area            0.00      0.00      0.00      0.00      0.00
Other Pervious Area      0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area 0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area 0.00     0.00      0.00      0.00      0.00
                        --------  --------  --------  --------  --------
Total                   0.00      0.00      0.00      0.00     100.00


Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========

                  Source Area Control Practice Information
Land Use:  Open Space
   Roofs 1    Source area number:  121
```

```
      The roof is pitched
      The Source Area is draining to a pervious area (partially connected impervious area)
      The SCS Hydrologic Soil Type is Sandy
 Paved Parking/Storage 1    Source area number:  126
      The Source Area is draining to a pervious area (partially connected impervious area)
      The SCS Hydrologic Soil Type is Sandy
 Playground 1    Source area number:  131
      The Source Area is draining to a pervious area (partially connected impervious area)
      The SCS Hydrologic Soil Type is Sandy
 Driveways 1    Source area number:  133
      The Source Area is draining to a pervious area (partially connected impervious area)
      The SCS Hydrologic Soil Type is Sandy
 Street Area 1    Source area number:  138
        1.  Street Texture:  intermediate
        2.  Total study area street length (curb-miles):  0.65
        3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
        4.  Street Dirt Accumulation:
              Default value used
 Large Landscaped Area 1    Source area number:  141
      The SCS Hydrologic Soil Type is Sandy


   Control Practice 1 :  Grass Swale
      1.  Swale infiltration rate (inches per hour)=  2.5
      2.  Wetted swale width (feet)=  3
      3.  Swale density (feet per acre)=  17.16
      4.  Area served by swales (acres)=  100


Pollutants to be Analyzed and Printed:

      Pollutant Name               Pollutant Type
      --------------               --------------
       Solids                      Particulate
```

Cemeteries (CEMCB.DAT and CEMSB.DAT)

```
  Data file name:  C:\Program Files\WinSLAMM\CEMCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:15:59
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  CEMETERY, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
Roofs 1	0.00	0.00	0.00	0.00	1.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	0.00	0.00	0.00	0.00	0.10	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	2.30	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.00	0.00	0.00	0.00	7.70		

Driveways 2	0.00	0.00	0.00	0.00	0.00
Driveways 3	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.10
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00
Street Area 1	0.00	0.00	0.00	0.00	0.70
Street Area 2	0.00	0.00	0.00	0.00	0.70
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	0.00	0.00	0.00	86.30
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	0.00	0.00	0.00	0.00	0.50
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.60
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated Area	0.00	0.00	0.00	0.00	0.30
Other Pervious Area	0.00	0.00	0.00	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	100.30

Total of All Source Areas 100.30

Total of All Source Areas less All Isolated Areas 100.00

Source Area Control Practice Information

Land Use: Open Space

Roofs 1 Source area number: 121
The roof is flat
The Source Area is directly connected or draining to a directly conntected area

Roofs 2 Source area number: 122
The roof is pitched
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Clayey

Paved Parking/Storage 1 Source area number: 126
The Source Area is directly connected or draining to a directly conntected area

Driveways 1 Source area number: 133
The Source Area is directly connected or draining to a directly conntected area

Sidewalks/Walks 1 Source area number: 136
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Clayey

Street Area 1 Source area number: 138
1. Street Texture: smooth
2. Total study area street length (curb-miles): 0.38
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Street Area 2 Source area number: 139
1. Street Texture: intermediate
2. Total study area street length (curb-miles): 0.38
3. Initial Street Dirt Loading (lbs/curb-mi): default value
4. Street Dirt Accumulation:
Default value used

Large Landscaped Area 1 Source area number: 141
The SCS Hydrologic Soil Type is Clayey

Undeveloped Area Source area number: 143
The SCS Hydrologic Soil Type is Clayey

Small Landscaped Area 1 Source area number: 144
The SCS Hydrologic Soil Type is Clayey

Control Practice 1 : Catchbasin Cleaning Controls
1. Total sump volume (cubic feet)= 1
2. Area served by catchbasins (acres)= 100
3. Percent of sump volume full at beginning of study period= 60 %
4. Average sump depth (feet)= 0
5. Number of times catchbasins cleaned each year= 0

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Data file name: C:\Program Files\WinSLAMM\CEMSB.DAT SLAMM Version V8.1
Rain file name: C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN Particulate Solids Concentration file name: C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
Runoff Coefficient file name: C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
Particulate Residue Delivery file name: C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
Pollutant Relative Concentration file name: C:\PROGRAM FILES\WINSLAMM\BHAM.PPD

Seed for random number generator: 42
Study period starting date: 01/01/53 Study period ending date: 12/31/89
Date: 07-23-2000 Time: 19:16:13
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 1
5. Good condition (or very steep) 0
Site information: CEMETERY, CURBS AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)

Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	0.00	0.00	0.00	0.00	1.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	0.00	0.00	0.00	0.00	0.10	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	2.30	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.00	0.00	0.00	0.00	7.70		
Driveways 2	0.00	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.10		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	0.00	0.00	0.00	0.00	0.70		
Street Area 2	0.00	0.00	0.00	0.00	0.70		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	86.30		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	0.00	0.00	0.00	0.00	0.50		
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.60		
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.30		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	0.00	0.00	0.00	0.00	100.30		

Total of All Source Areas 100.30
Total of All Source Areas less All Isolated Areas 100.00

Source Area Control Practice Information
Land Use: Open Space
Roofs 1 Source area number: 121
The roof is flat
The Source Area is directly connected or draining to a directly conntected area
Roofs 2 Source area number: 122
The roof is pitched
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy
Paved Parking/Storage 1 Source area number: 126
The Source Area is directly connected or draining to a directly conntected area
Driveways 1 Source area number: 133
The Source Area is directly connected or draining to a directly conntected area
Sidewalks/Walks 1 Source area number: 136
The Source Area is draining to a pervious area (partially connected impervious area)
The SCS Hydrologic Soil Type is Sandy
Street Area 1 Source area number: 138
1. Street Texture: smooth

```
           2.  Total study area street length (curb-miles):  0.38
           3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
           4.  Street Dirt Accumulation:
                 Default value used
   Street Area 2    Source area number:  139
           1.  Street Texture:  intermediate
           2.  Total study area street length (curb-miles):  0.38
           3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
           4.  Street Dirt Accumulation:
                 Default value used
   Large Landscaped Area 1    Source area number:  141
         The SCS Hydrologic Soil Type is Sandy
   Undeveloped Area    Source area number:  143
         The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 1    Source area number:  144
         The SCS Hydrologic Soil Type is Sandy

      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0
Pollutants to be Analyzed and Printed:
         Pollutant Name                Pollutant Type
          Solids                       Particulate
```

Parks (PRKCB.DAT and PRKSB.DAT)

```
  Data file name:  C:\Program Files\WinSLAMM\PRKCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:35:59
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  PARKS, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
Roofs 1	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	15.70	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	8.15		--------
Playground 2	0.00	0.00	0.00	0.00	40.13	Total	0.00
Driveways 1	0.00	0.00	0.00	0.00	0.21		
Driveways 2	0.00	0.00	0.00	0.00	0.21		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	0.00	0.00	0.00	0.00	15.70		
Street Area 2	0.00	0.00	0.00	0.00	0.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		

```
Large Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Undeveloped Area           0.00      0.00      0.00      0.00      14.96
Small Landscaped Area 1    0.00      0.00      0.00      0.00      4.94
Small Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3    0.00      0.00      0.00      0.00      0.00
Isolated Area              0.00      0.00      0.00      0.00      0.00
Other Pervious Area        0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area   0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area  0.00      0.00      0.00      0.00      0.00
                         --------  --------  --------  --------  --------
Total                    0.00      0.00      0.00      0.00      100.00
Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========
                  Source Area Control Practice Information
Land Use:  Open Space
   Paved Parking/Storage 1    Source area number:  126
         The Source Area is directly connected or draining to a directly conntected area
   Playground 1    Source area number:  131
         The Source Area is directly connected or draining to a directly conntected area
   Playground 2    Source area number:  132
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Clayey
   Driveways 1    Source area number:  133
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  134
         The Source Area is directly connected or draining to a directly conntected area
   Street Area 1    Source area number:  138
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  11.913
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                Default value used
   Undeveloped Area    Source area number:  143
         The SCS Hydrologic Soil Type is Clayey
   Small Landscaped Area 1    Source area number:  144
         The SCS Hydrologic Soil Type is Clayey
      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0


Pollutants to be Analyzed and Printed:
         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate

    Data file name:  C:\Program Files\WinSLAMM\PRKSB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:36:14
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  PARKS, CURB AND GUTTERS, SANDY SOILS, BASELINE CONDITIONS (NONE)

                           |<===== Areas for each Source (acres) =====>|
                           Resi-   Institu- Commercial Industrial  Open
                          dential   tional     Areas      Areas   Spaces
Source Area                Areas    Areas                          Areas         Freeway Source Area                  Area (acres)
```

```
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                    0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1    0.00      0.00      0.00      0.00     15.70          Large Turf Areas                       0.00
Paved Parking/Storage 2    0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3    0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1    0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2    0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1               0.00      0.00      0.00      0.00      8.15                                                 --------
Playground 2               0.00      0.00      0.00      0.00     40.13          Total                                  0.00
Driveways 1                0.00      0.00      0.00      0.00      0.21
Driveways 2                0.00      0.00      0.00      0.00      0.21
Driveways 3                0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1          0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2          0.00      0.00      0.00      0.00      0.00
Street Area 1              0.00      0.00      0.00      0.00     15.70
Street Area 2              0.00      0.00      0.00      0.00      0.00
Street Area 3              0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1    0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Undeveloped Area           0.00      0.00      0.00      0.00     14.96
Small Landscaped Area 1    0.00      0.00      0.00      0.00      4.94
Small Landscaped Area 2    0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3    0.00      0.00      0.00      0.00      0.00
Isolated Area              0.00      0.00      0.00      0.00      0.00
Other Pervious Area        0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area   0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area  0.00      0.00      0.00      0.00      0.00
                         --------  --------  --------  --------  --------
Total                      0.00      0.00      0.00      0.00    100.00
Total of All Source Areas                100.00
     less All Isolated Areas             100.00
                                         =========
                  Source Area Control Practice Information
Land Use:  Open Space
   Paved Parking/Storage 1    Source area number:  126
         The Source Area is directly connected or draining to a directly conntected area
   Playground 1    Source area number:  131
         The Source Area is directly connected or draining to a directly conntected area
   Playground 2    Source area number:  132
         The Source Area is draining to a pervious area (partially connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  133
         The Source Area is directly connected or draining to a directly conntected area
   Driveways 2    Source area number:  134
         The Source Area is directly connected or draining to a directly conntected area
   Street Area 1    Source area number:  138
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  11.913
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Undeveloped Area    Source area number:  143
         The SCS Hydrologic Soil Type is Sandy
   Small Landscaped Area 1    Source area number:  144
         The SCS Hydrologic Soil Type is Sandy
      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:

         Pollutant Name               Pollutant Type
          Solids                      Particulate
```

Undeveloped (UNVCB.DAT and UNVSB.DAT)

```
    Data file name:  C:\Program Files\WinSLAMM\UDVCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:33:00
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  UNDEVELOPED LAND, CURBS AND GUTTERS, CLAYEY SOILS, BASELINE CONTROLS (NONE)
```

Source Area	Areas for each Source (acres): Residential Areas	Institutional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas	Freeway Source Area	Area (acres)
12345678901234567890123456789012345678901234567890123456789012345678901234567890							
Roofs 1	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 1	0.00
Roofs 2	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 2	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 3	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 4	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00	Pavd Lane & Shldr Area 5	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	0.00	Large Turf Areas	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00	Undeveloped Areas	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00	Other Pervious Areas	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00	Other Directly Conctd Imp	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00	Other Partially Conctd Imp	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00		--------
Playground 2	0.00	0.00	0.00	0.00	0.00	Total	0.00
Driveways 1	0.00	0.00	0.00	0.00	0.00		
Driveways 2	0.00	0.00	0.00	0.00	0.00		
Driveways 3	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00		
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00		
Street Area 1	0.00	0.00	0.00	0.00	7.00		
Street Area 2	0.00	0.00	0.00	0.00	1.00		
Street Area 3	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Undeveloped Area	0.00	0.00	0.00	0.00	92.00		
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00		
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00		
Isolated Area	0.00	0.00	0.00	0.00	0.00		
Other Pervious Area	0.00	0.00	0.00	0.00	0.00		
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00		
Total	0.00	0.00	0.00	0.00	100.00		

```
Total of All Source Areas              100.00
                                       ---------
Total of All Source Areas
     less All Isolated Areas           100.00
                                       =========

                  Source Area Control Practice Information
Land Use:  Open Space
   Street Area 1    Source area number:  138
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  2.7
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Street Area 2    Source area number:  139
```

```
           1.  Street Texture:  smooth
           2.  Total study area street length (curb-miles):  0.5
           3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
           4.  Street Dirt Accumulation:
                 Default value used
   Undeveloped Area    Source area number:  143
         The SCS Hydrologic Soil Type is Clayey

      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:

         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate

    Data file name:  C:\Program Files\WinSLAMM\UDVSB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:33:17
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 0
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 1
           5.  Good condition (or very steep) 0
    Site information:  UNDEVELOPED LAND, CURB AND GUTTERS, SANDY SOILS, BASELINE CONTROLS (NONE)

                          |<===== Areas for each Source (acres) =====>|
                           Resi-   Institu- Commercial Industrial  Open
                          dential   tional     Areas      Areas   Spaces
Source Area                Areas    Areas                         Areas         Freeway Source Area                   Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               0.00
Roofs 2                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               0.00
Roofs 3                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
Paved Parking/Storage 1   0.00      0.00      0.00      0.00      0.00          Large Turf Areas                       0.00
Paved Parking/Storage 2   0.00      0.00      0.00      0.00      0.00          Undeveloped Areas                      0.00
Paved Parking/Storage 3   0.00      0.00      0.00      0.00      0.00          Other Pervious Areas                   0.00
Unpaved Prkng/Storage 1   0.00      0.00      0.00      0.00      0.00          Other Directly Conctd Imp              0.00
Unpaved Prkng/Storage 2   0.00      0.00      0.00      0.00      0.00          Other Partially Conctd Imp             0.00
Playground 1              0.00      0.00      0.00      0.00      0.00                                                 --------
Playground 2              0.00      0.00      0.00      0.00      0.00          Total                                  0.00
Driveways 1               0.00      0.00      0.00      0.00      0.00
Driveways 2               0.00      0.00      0.00      0.00      0.00
Driveways 3               0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 1         0.00      0.00      0.00      0.00      0.00
Sidewalks/Walks 2         0.00      0.00      0.00      0.00      0.00
Street Area 1             0.00      0.00      0.00      0.00      7.00
Street Area 2             0.00      0.00      0.00      0.00      1.00
Street Area 3             0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 1   0.00      0.00      0.00      0.00      0.00
Large Landscaped Area 2   0.00      0.00      0.00      0.00      0.00
Undeveloped Area          0.00      0.00      0.00      0.00     92.00
Small Landscaped Area 1   0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 2   0.00      0.00      0.00      0.00      0.00
Small Landscaped Area 3   0.00      0.00      0.00      0.00      0.00
Isolated Area             0.00      0.00      0.00      0.00      0.00
Other Pervious Area       0.00      0.00      0.00      0.00      0.00
Other Dir Cnctd Imp Area  0.00      0.00      0.00      0.00      0.00
Other Part Cnctd Imp Area 0.00      0.00      0.00      0.00      0.00
```

```
                      --------  --------  --------  --------  --------
Total                 0.00      0.00      0.00      0.00      100.00


Total of All Source Areas             100.00
                                      ---------
Total of All Source Areas
     less All Isolated Areas          100.00
                                      =========

                  Source Area Control Practice Information
Land Use:  Open Space
   Street Area 1    Source area number:  138
            1.  Street Texture:  intermediate
            2.  Total study area street length (curb-miles):  2.7
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Street Area 2    Source area number:  139
            1.  Street Texture:  smooth
            2.  Total study area street length (curb-miles):  0.5
            3.  Initial Street Dirt Loading (lbs/curb-mi):  default value
            4.  Street Dirt Accumulation:
                  Default value used
   Undeveloped Area    Source area number:  143
         The SCS Hydrologic Soil Type is Sandy

      Control Practice 1 :  Catchbasin Cleaning Controls
       1.  Total sump volume (cubic feet)=  1
       2.  Area served by catchbasins (acres)=  100
       3.  Percent of sump volume full at beginning of study period=  60 %
       4.  Average sump depth (feet)=  0
       5.  Number of times catchbasins cleaned each year=  0

Pollutants to be Analyzed and Printed:

         Pollutant Name               Pollutant Type
         --------------               --------------
          Solids                      Particulate
```

Freeway Areas

Freeways (FRYCB.DAT and FRYSB.DAT)

```
Data file name:  C:\Program Files\WinSLAMM\FRYCB.DAT          SLAMM Version V8.1
    Rain file name:  C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN       Particulate Solids Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
    Runoff Coefficient file name:  C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
                                                                  Particulate Residue Delivery file name:  C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
    Pollutant Relative Concentration file name:  C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
                                                                  Seed for random number generator:   42
    Study period starting date:  01/01/53                         Study period ending date:  12/31/89
    Date:  07-23-2000                                             Time:  19:25:53
    Fraction of each type of Drainage System serving study area:
      1.  Grass Swales 0
      2.  Undeveloped roadside 1
          Curb and Gutters, `valleys', or sealed swales in:
           3.  Poor condition (or very flat) 0
           4.  Fair condition 0
           5.  Good condition (or very steep) 0
    Site information:  FREEWAYS, UNDEVELOPED ROADSIDE, CLAYEY SOILS, BASELINE CONTROLS (NONE)

                          |<===== Areas for each Source (acres) =====>|
                          Resi-   Institu- Commercial Industrial  Open
                         dential   tional     Areas      Areas   Spaces
Source Area               Areas    Areas                         Areas         Freeway Source Area                   Area (acres)

12345678901234567890123456789012345678901234567890123456789012345678901234567890
Roofs 1                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 1               11.76
Roofs 2                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 2               17.65
Roofs 3                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 3               0.00
Roofs 4                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 4               0.00
Roofs 5                   0.00      0.00      0.00      0.00      0.00          Pavd Lane & Shldr Area 5               0.00
```

Paved Parking/Storage 1	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00
Playground 2	0.00	0.00	0.00	0.00	0.00
Driveways 1	0.00	0.00	0.00	0.00	0.00
Driveways 2	0.00	0.00	0.00	0.00	0.00
Driveways 3	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00
Street Area 1	0.00	0.00	0.00	0.00	0.00
Street Area 2	0.00	0.00	0.00	0.00	0.00
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	0.00	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00

Large Turf Areas	33.94
Undeveloped Areas	33.60
Other Pervious Areas	0.00
Other Directly Conctd Imp	2.39
Other Partially Conctd Imp	0.66
Total	100.00

Total of All Source Areas	100.00
Total of All Source Areas less All Isolated Areas	100.00

Source Area Control Practice Information

Land Use: Freeways

Pavd Lane & Shldr Area 1 Source area number: 151
1. Pavement texture: smooth
2. Average daily traffic (# vehicles/day): 15000
3. Highway length (miles): 2.43
4. Initial street dirt loading (lbs/curb-mi): default value: 620.1882 lbs.

Pavd Lane & Shldr Area 2 Source area number: 152
1. Pavement texture: intermediate
2. Average daily traffic (# vehicles/day): 15000
3. Highway length (miles): 3.62
4. Initial street dirt loading (lbs/curb-mi): default value: 923.9018 lbs.

Large Turf Areas Source area number: 156
The SCS Hydrologic Soil Type is Clayey

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Data file name: C:\Program Files\WinSLAMM\FRYSB.DAT
SLAMM Version V8.1
Rain file name: C:\PROGRAM FILES\WINSLAMM\BHAM5289.RAN
Particulate Solids Concentration file name: C:\PROGRAM FILES\WINSLAMM\BHAM.PSC
Runoff Coefficient file name: C:\PROGRAM FILES\WINSLAMM\RUNOFF.RSV
Particulate Residue Delivery file name: C:\PROGRAM FILES\WINSLAMM\DELIVERY.PRR
Pollutant Relative Concentration file name: C:\PROGRAM FILES\WINSLAMM\BHAM.PPD
Seed for random number generator: 42
Study period starting date: 01/01/53
Study period ending date: 12/31/89
Date: 07-23-2000
Time: 19:26:07
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0
2. Undeveloped roadside 1
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 0

5. Good condition (or very steep) 0

Site information: FREEWAYS, UNDEVELOPED ROADSIDE, SANDY SOILS, BASELINE CONTROLS (NONE)

Source Area	Areas for each Source (acres): Residential Areas	Institutional Areas	Commercial Areas	Industrial Areas	Open Spaces Areas
Roofs 1	0.00	0.00	0.00	0.00	0.00
Roofs 2	0.00	0.00	0.00	0.00	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00
Playground 2	0.00	0.00	0.00	0.00	0.00
Driveways 1	0.00	0.00	0.00	0.00	0.00
Driveways 2	0.00	0.00	0.00	0.00	0.00
Driveways 3	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00
Street Area 1	0.00	0.00	0.00	0.00	0.00
Street Area 2	0.00	0.00	0.00	0.00	0.00
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	0.00	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	11.76
Pavd Lane & Shldr Area 2	17.65
Pavd Lane & Shldr Area 3	0.00
Pavd Lane & Shldr Area 4	0.00
Pavd Lane & Shldr Area 5	0.00
Large Turf Areas	33.94
Undeveloped Areas	33.60
Other Pervious Areas	0.00
Other Directly Conctd Imp	2.39
Other Partially Conctd Imp	0.66
Total	100.00

Total of All Source Areas	100.00
Total of All Source Areas less All Isolated Areas	100.00

Source Area Control Practice Information

Land Use: Freeways

Pavd Lane & Shldr Area 1 Source area number: 151

1. Pavement texture: smooth
2. Average daily traffic (# vehicles/day): 15000
3. Highway length (miles): 2.43
4. Initial street dirt loading (lbs/curb-mi): default value: 620.1882 lbs.

Pavd Lane & Shldr Area 2 Source area number: 152

1. Pavement texture: intermediate
2. Average daily traffic (# vehicles/day): 15000
3. Highway length (miles): 3.62
4. Initial street dirt loading (lbs/curb-mi): default value: 923.9018 lbs.

Large Turf Areas Source area number: 156

The SCS Hydrologic Soil Type is Sandy

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate

Appendix 5-B: WinSLAMM Algorithm Documentation

Introduction

This discussion describes how the program is structured. The following subsection discusses the input data requirements of the program. The last two subsections describe how the model calculates runoff and pollutant loadings, and the output formats available.

Data Entry

The graphical user interface allows you to create, edit, and print WinSLAMM data files. This subsection discusses the kinds of information needed to create a WinSLAMM data file. This includes information on both the different source area parameters, as well as a brief discussion of the control devices available in the model. Five main areas of data are needed to run WinSLAMM. They are the “Land Uses”, the “Catchbasin or Drainage Controls”, the “Outfall Controls”, the “Other Pollutant Analysis Selection”, and the “File Name Information”, and are described in the following discussion.

Table 5-29 lists the six land uses. Each one of these land uses, except Freeways, contains 14 source area types. Most of the source area types are listed more than once to account for different characteristics in a land use. The Freeways land use description has six source area types and a total of 10 available source areas. Table 5-30 lists the source areas and the number of each of the source areas available in each land use.

Table 5-29. SLAMM5 Land Uses

1. Residential Areas
2. Institutional Areas
3. Commercial Areas
4. Industrial Areas
5. Open Space Areas
6. Freeways

Table 5-30. Source Areas

Source Area	Number Available in Each Land Use
Roofs	5
Paved Parking/Storage	3
Unpaved Parking/Storage	2
Playgrounds	2
Driveways	3
Sidewalks	2
Street Areas/Alleys	3
Large Landscaped Areas	2
Undeveloped Areas	1
Small Landscaped Areas	3
Isolated Areas	1
Other Pervious Area	1
Other Directly Connected Impervious Area	1
Other Partially Connected Impervious Area	1
Paved Freeway and Shoulder Area (F)	5
Large Turf Area (F)	1

(F) indicates available in Freeway Land Use area only

There are two kinds of information required for each source area: the source area (in acres), and specific information about the characteristics, or parameters, of the source area. The various parameters are listed in Table 5-31. Each source area might need none, some, or all of this information. Figures 5-17 to 5-22 are flow charts that completely describe which parameters the model needs for each source area. The directly connected impervious areas are completely described by the name and no other information is required by the model for those source areas.

Table 5-31. “Other Information” Needed in a Source Area

1. Type of roof - pitched or flat
2. Source area connection to pavement drainage – directly connected, or unconnected/draining to a pervious area
3. Soil type - Sandy (A/B) or Clayey (C/D)
4. Building density - low or medium/high
5. Presence of alleys - yes or no
6. Pavement texture - smooth to very rough
7. Total street length - curb-miles
8. Street dirt accumulation equation coefficients (or let SLAMM5 determine based on land use)
9. Initial street dirt loading (or let SLAMM5 determine based on street texture and street cleaning frequency)
10. Average daily traffic - vehicles/day (freeway source area only)

“Catchbasin or Drainage Controls” are runoff and particulate residue loading control devices, and include infiltration devices, grass swales, and catchbasins. These devices modify the quantity of runoff and particulate residue after they are calculated for each source area and combined, but before they reach the outfall. “Outfall Controls” are runoff and suspended solids reduction devices. They are used to reduce runoff volumes and loadings at the outfall. These devices include wet detention ponds and infiltration devices. The “Other Pollutant Analysis” section allows the user to identify the other pollutants that are evaluated by WinSLAMM.

Figure 5-17. Source Area Information: Roofs

Figure 5-18. Source Area Information: Paved parking/storage; unpaved parking/storage; playgrounds; driveways; and sidewalks

Figure 5-19. Source Area Information: Streets and alleys

Figure 5-20. Source Area Information: Unpaved areas; other pervious areas; large landscaped areas; large turf areas; and undeveloped areas

Figure 5-21. Source Area Information: Other area: partially connected impervious areas

Figure 5-22. Source Area Information: Paved lane and shoulder areas (freeways)

Control Devices
There are seven different major categories of control devices available within SLAMM5 to reduce runoff volume and pollutant loadings. The following paragraphs describe each device. The algorithms for each device are described in detail later in this section. The control devices included in SLAMM5 are:

1. Wet Detention Ponds
2. Porous Pavement
3. Infiltration Devices
4. Other Devices (source areas)
5. Street Cleaning
6. Catchbasin Cleaning
7. Grass Swales
8. Other Devices (outfall)

Wet detention ponds. The wet detention ponds are the most complex control devices in the model. The design for each pond includes an outlet device description and a stage-area curve describing the incremental pond volume. The algorithm is based on the storage-indication reservoir routing subroutine in HE5-1 and in TR-20 and is summarized by McCuen (1982). The governing storage equation is:

Inflow - Outflow = Change in Storage/Change in Time

The inflow is calculated from a triangular hydrograph developed from the depth and duration of the runoff from each rain. The outflow is calculated from the outfall structure and the combined rating curve. The connection between the two is made through a storage indication curve.

The incremental upflow velocities are calculated from the incremental pond area and outflow values. These velocities are then used to find the quantity of particulates which settle in the pond. These values are based on the particle sizes entered in the critical particle size parameter file using the Parameter Module. If any detention pond should overflow (“fail”) during a rain event, the output will list the land use and source area where the overflow occurred.

Porous pavement. Porous Pavement flow volume reductions are based solely on the infiltration rate through the pavement times the duration of the event (compared to the rain intensity). The algorithm calculates the fraction of the total rain which is infiltrated into the ground by the pavement.

Infiltration devices. Infiltration device flow volume reductions are due to infiltration from both the bottom and sides of an infiltration device. The amount of infiltration is a function of the device area and the runoff volume and duration.

Other controls. The "Other" volume and loading reduction device only allows the user to enter a fixed fraction (from 0 to 1) as a runoff volume or particulate reduction value. This fraction is not a function of any other parameter except at the outfall, where the loading reduction may be entered as a function of rain depth.

Street cleaning. Street cleaning is part of the street loading subroutine. It is applied by setting street cleaning frequencies and durations in the input module for each street source area. The subroutine assumes that there are two possible street events which could occur over time: 1) street cleaning, and 2) washoff. Street dirt accumulates during the time between each street event. Then, when the time period between any two street events is up, the algorithm makes the appropriate street cleaning or street washoff event calculation.

Catchbasin cleaning. The catchbasin cleaning routine is used immediately before the outfall calculations and removes particulate loadings from the runoff. The user must enter the size of the basin as well as cleaning dates. The device will remove solids from the indicated source areas until it is full. At that point, no more solids are removed until the device is cleaned. The solids removal process then begins again.

Grass swales. Grass swales reduce runoff through infiltration. The reduction is a function of the dynamic percolation rate, the rain duration, the volume of runoff entering the swale, and the area of the swale .

Data File Format
WinSLAMM Version 8.0 creates either one or two input data files for use in the calculation module. It will always create a file with the extension .DAT. This file includes the source area, control device (except detention pond), and parameter file name information. If there are any detention ponds used as control devices, it also creates another input data file with the extension . SDP. Version 8.1 will combine the two files into one .DAT file.

Calculation/Output Module – Calculations

Calculation/Output Module Overview
The subprograms for WinSLAMM calculations calculate the runoff volumes and particulate loadings for all source areas and at the outfall and evaluate the effects of any control devices at the source areas and at the outfall.

Once all calculations are completed, WinSLAMM produces a number of temporary output variables. These variables contain the runoff volumes, particulate loadings, and other information generated by the model. They are used to calculate the loadings for other pollutants (besides suspended solids) and print or save the results of the calculations in the desired format.

The following flow charts describe the calculations module algorithms and equations. Figure 5-23 is the main flow chart for the calculations program of the main module. All the other flow charts in this section are connected to this main flow chart. Figure 5-24 illustrates the main calculation subroutines. This subroutine calculates runoff volumes and directs the program to the appropriate control device subroutines for infiltration, porous pavement, or "other" control methods (Figures 5-25 to 5- 27). It also routes the program to the paved lane and shoulder subroutine and to the street and alley loading subroutine. The street and alley loading subroutine can route program control to either the street cleaning subroutine or the washoff subroutine.

WinSLAMM calculates the effects of detention ponds after completing the main calculation subroutines. This process is developed as a control device in Figure 5-28. After adjusting the loading results for the detention pond particulate reductions, WinSLAMM determines the effects of grass swales (Figure 5-29) and catchbasins (Figure 5-30). It then calculates the effects of infiltration, detention ponds, and the "other" control device (which is, for the outfall, a function of rain depth) at the outfall.

The variables in each flow chart are defined in the variable list on the facing page. The flow charts are not intended to give a detailed description of the program structure. They should, however, help the user to understand how the calculation algorithms are structured in the code. Most of the variable subscripts have been eliminated to simplify the flow chart. Double lined boxes with a RETURN inside indicate the end of a subroutine. You should return to the box that sent you to the subroutine and continue from there.

Figure 5-23. MSCALC program module flow chart (referred to as Figure 5-1 in some flow charts).

Variable Definitions for Figure 5-23:

IVOLRED	Infiltration device volume reduction [fraction]
OVOLRED	Other control device volume reduction [fraction]
PNDASERV	Area served by detention pond [acres]
RUNVOLF	Source area runoff volume for a rain event [cu ft]
SOUTPUT5	Output program which prints the SLAMM5 calculation module results
TOTPCCNCRED	Total percentage reduction in concentration
TOTPCVRED	Total percentage volume reduction
TTLBSNA	Total basin area, the sum of source areas 1 to 160
TSCNCF	Particulate solid concentration [mg/L]
TSYLDF	Particulate solid yield [lbs]
WTSRED162	Weighted average total particulate solid reduction at outfall. Equivalent to WTSRED(a,s) for outfall from Figure 5-14

Continuation of Figure 5-23 (referred to as Figure 5-1 in some flow charts).

Variable Definitions for Figure 5-24:

IVOLRED	Infiltration device flow volume reduction [fraction]
OTSRED	Other control device particulate solids reduction [fraction]
OVOLRED	Other control device volume reduction [fraction]
PVOLRED	Porous pavement control device flow volume reduction [fraction]
RAIN	Rain depth [in]
RSUBV	Runoff coefficient for source area and rain depth
RUNVOLF	Source area runoff volume for a rain event [cu ft]
TOTPCCNCRED	Total percentage reduction in concentration
TOTPCVRED	Total percentage volume reduction
TSAREA	Total source area [acres]
TSCNCF	Particulate solid concentration [mg/L]

TSYLDF Particulate solid yield [lbs]

Figure 5-24. Calculations subroutine (referred to as Figure 5-2 in some flow charts).

Variable Definitions for Figure 5-25:

ADT Average daily traffic [vehicles/day]

AVAILTOTRES Total residue available for washoff

CURLOAD The street loading which occurs immediately after a rain event.

DUR Duration of rain event [days]

HIGHWYLEN Highway length [curb miles]

JSP The study period starting date in terms of the Julian calendar

JSTRTIME The starting time of a rain event in terms of the Julian calendar

K Proportionality constant used in loading calculations [l/mm]. Its a function of total street loading and rain intensity.

PLSAINITLOAD Paved lane and shoulder area initial load [lbs]

RAIN	Rain event depth [in].
RUNVOLF	Source area runoff volume for a rain event [cu ft]
TACCDUR	Street loading accumulation time: the time between the end of one rain and the beginning of the next.
TOTPCCNCRED	Total percentage reduction in concentration
TSCNCF	Source area particulate solids concentration [mg/L]
TSYLDF	Source area particulate solids yield [lbs].
UNAVAILAFTRAIN	Total loading unavailable for washoff after a rain
WASHOFF	Street dirt contained in runoff.

Figure-5-25 Paved lane and shoulder area flow chart (referred to as Figure 5-2.1 in some flow charts).

Variable Definitions for Figure 5-26:

CURLOAD	The street loading which occurs immediately after a rain event.
CURTIME	The time of the current rain event

INITLOAD	Initial street dirt loading value [lbs/curb mi].
JSCDATE	The time a street cleaning event occurs in terms of the Julian calendar.
JSP	The study period starting date in terms of the Julian calendar.
JSTRTIME	The starting time of a rain event in terms of the Julian calendar.
PREVTIME	Julian date of the event before the current event.
RAIN	Rain event depth [in] .
TYPEVENT	Marker to indicate type of event. 1: street cleaning; 2: rain event

Figure 5-26. Street and alley subroutine flow chart (referred to as Figure 5-2.2 in some flow charts).

Variable Definitions for Figure 5-26 (Continued):

AFTFVENTLOAD	Total loading after the event [lbs].
CURLOAD	The street loading which occurs immediately after a rain event.
CURTIME	The time of the current rain event.

INITLOAD	Initial street dirt loading value [lbs/curb mi].
PREVTIME	Julian date of the event before the current event.
RAIN	Rain event depth [in].
TACCDUR	Street loading accumulation time: the time between the end of one rain and the beginning of the next.
TYPEVENT	Marker to indicate type of event. 1: street cleaning: 2: rain event.

Continuation of Figure 5-26 (referred to as Figure 5-2.2 in some flow charts).

Variable Definitions for Figure 5-27:

BEFOREVENTLOAD	Street dirt loading [lbs/curb-mi - day] on the street immediately before the rain or street cleaning event.
BSTACC	First order coefficient in quadratic equation describing street dirt accumulation (y=ASTACC + BASTACC*x + CASTACC *x*x)
CSTACC	Second order coefficient in quadratic equation describing street dirt accumulation (y=ASTACC + BASTACC*x + CASTACC *x*x)
CURLOAD	The street loading which occurs immediately after a rain event.
MAXACCTIME	Maximum allowable time for street dirt loading accumulation. Equation is the derivative of the loading equation that calculated BEFORAINLOAD.
TACCDUR	Street loading accumulation time: the time between the end of one rain and the beginning of the next.

Figure 5-27. Street dirt loadings calculation subroutine (referred to as Figure 5-2.3 in some flow charts).

Variable Definitions for Figure 5-28:

AFTEVENTLOAD	Total loading on the street after the event [lbs].
AREA	The length of curb in a street (curb-mi/acre). If there are 2 miles of street per acre of land, then there are 4 curb-miles per acre. If the street is divided by an island, then there area 8 curb-miles per acre.
AVAILFACTOR	Availability factor which makes the initial adjustment on the street loading value immediately before the rain. It is calculated as a function of street texture, rain intensity, and street loading.
BEFOREVENTLOAD	Street dirt loading [lbs/(curb-mi)] on the street immediately before the rain or street cleaning event.
CORFACTOR	Correction factor to adjust street dirt washoff for short rains of relatively high duration. It is a function of street texture, rain depth, rain intensity, and street loading.
CURLOAD	The street loading which occurs immediately after a rain event.
DUR	Rain duration [days]
JSTRTIME	The starting time of a rain event in terms of the Julian calendar.
K	Proportionality constant used in loading calculations [l/mm]. Its a function of total street loading and rain intensity.
RAIN	Rain event depth [in].
RUNVOLF	Source area runoff volume for a rain event [cu ft]
TACCDUR	Street loading accumulation time: the time between the end of one rain and the beginning of the next.

TSCNCF	Source area particulate solids concentration [mg/L]
TSYLDF	Source area particulate solids yield [lbs].
UNAVAILAFTRAIN	Total loading unavailable for washoff after a rain
WASHOFF	Street dirt contained in runoff.

Figure 5-28. Washoff calculation subroutine (referred to as Figure 5-2.4 in some flow charts).

Variable Definitions for Figure 5-29:

AFTEVENTLOAD	Total loading after the event [lbs].
B	Y intercept term in first order equation describing street cleaning (y = m*x + B).
BEFOREVENTLOAD	Street dirt loading [lbs/(curb-mi)] on the street immediately before the rain or street cleaning event.
M	Slope term in first order equation describing street dirt cleaning (y = M *x + b).

Variable Definitions for Figure 5-30:

DUR	Rainfall duration [days]
IDAREA	Infiltration device area [sq ft]
IDASERV	Area served by infiltration device [acres]
IDPRATE	Infiltration device percolation rate [in/hr]
IDWTOD	Infiltration device width to depth ratio
IVOLRED	Water volume reduction from infiltration device
RAIN	Event rain depth [in]
RSUBV	Runoff coefficient for source area and rain depth
TSAREA	Total source area [acres]

Figure 5-29. Street cleaning flow chart (referred to as Figure 5-3 in some flow charts).

Figure 5-30. Infiltration device subroutine flow chart (referred to as Figure 5-4 in some flow charts).

Variable Definitions for Figure 5-31:

DUR	Rainfall duration [days]
PAVAREA	Porous pavement area [sq ft]
PAVPRATE	Porous pavement percolation rate [in/hr]
PVOLRED	Porous pavement volume reduction [fraction]
RAIN	Event rain depth [in]
TSAREA	Total source area [acres]

Variable Definitions for Figure 5-32:

AOTH	Percent flow reduction for “Other” control device.
BOTH	Proportion of the total area served by the “Other” control device.
CONASERV	Area served (acres) by the “Other” control device.
FLOWRED	Percent flow reduction for “Other” control device.
OTSRED	Particulate solids reduction percentage for that part of source area served by the “Other” control device.
OVOLRED	Volume reduction percentage for the source area.
POLRED	Particulate solids reduction percentage for the source area.
TSAREA	Total source area [acres]

Figure 5-31. Porous pavement subroutine flow chart (referred to as Figure 5-5 in some flow charts).

Figure 5-32. Other volume and solids reduction flow chart (referred to as Figure 5-6 in some flow charts).

Variable Definitions for Figure 5-33:

a	Rain number counter
FLUSHR	Flushing ratio: inflow volume/pond volume below invert
MAXQIN	Maximum event pond inflow [cfs]
MAXQOUT	Maximum event pond outflow [cfs]
NUMINCBTWNRAINS	Number of time steps for an interevent period
PRF	Peak reduction factor: 1 - (maximum pond outflow rate/maximum pond inflow rate)
PVBELINV	Pond volume below lowest invert [cu ft]
RAIN	Event rain depth [in]
RAINDUR	Event rain duration [hrs]
s	Source area number
SUMOUT	Total event outflow [cfs]
SUMVOLIN	Total event inflow volume [cu ft]
SUMWGHTDCONT	Sum of flow weighted percentage of particle sizes controlled
TIMINC	Time step increment [min]
WTSRED(a,s)	Weighted average total particulate solid reduction

Figure 5-33. Detention pond flow chart (referred to as Figure 5-7 in some flow charts).

Variable Definitions for Figure 5-34:

i	Stage increment counter
INVEL	Invert elevation of outlet [ft]
NETSTAGE	Net stage value [ft]
OUTFLOW	Outflow [cfs]
Outnumber	Outlet number counter
PONDAREA	Pond area for a time step [sq ft]
QOUTAR	Total pond outflow from all outlets for each defined stage elevation [cfs]
STAGE	pond stage level [ft]
STAGEAR	Model or user defined stage elevation [ft]
STORAGE	Total storage volume in pond for a time step [cu ft]
STORAGEAR	Total storage volume in pond at each stage level [cu ft]

WGHT	Weir height [ft]

Figure 5-34. Storage indication curve flow chart (referred to as Figure 5-7.1 in some flow charts).

Variable Definitions for Figure 5-35:

EVAP	Evaporation [in/day]
INFILRATE	Seepage field infiltration rate [in/hr]
NATSEEP	Natural seepage rate for a time step [in/hr]
NETSTAGE	Net stage value [ft]
ORDIA	Orifice diameter [ft]
OUTFLOW	Outflow [cfs]
OUTYPE	Outlet type
PNDAREA	Pond area for a time step [sq ft]
QOUTOTH	User defined hydrograph outflow rate [cfs]

RWLEN	Rectangular weir length [ft]
SEEPLEN	Seepage field length [ft]
SEEPWIDTH	Seepage field width [ft]

Figure 5-35. Outflow calculation flow chart (referred to as Figure 5-7.11 in some flow charts).

Variable Definitions for Figure 5-36:

a	Rain number counter
CURR	Current month
M	Month number (1 to 12)
NUMINC	Number of time step increments for an event
PEAKTIME	Time of peak inflow for an event
PNDASERV	Area served by detention pond [sq ft]
QAVE	Average event inflow rate [cfs]
QIN	Inflow for a time step [cfs]

QINAVE Average inflow rate between two time steps [cu ft]

QINAVEVOL Average inflow volume between two time steps [cu ft]

QOUTAR Total pond outflow from all outlets for each defined stage elevation [cfs]

QPEAK Peak inflow rate [cfs]

RAINDUR Event rain duration [hrs]

RUNDUR Event runoff duration (1.2 times rain duration)

RUNVOLF Source area runoff volume for a rain event [cu ft]

SMQOUT Previous time step storage volume minus previous time step outflow for current time step

SPQOUTAR Storage plus 1/2 outflow for each stage increment

STORAGE Total storage volume in pond for a time step [cu ft]

STORAGEAR Total storage volume in pond at each stage level [cu ft]

TIMINC Time step increment [min]

TOTQOUT Total outflow per time step [cfs]

TSAREA Total source area [acres]

TTLBSNA Total basin area [acres]

Figure 5-36. Main calculation loop flow chart (referred to as Figure 5-7.2 in some flow charts).

Variable Definitions for Figure 5-36 (Continued):

EVAPOUT	Outflow due to evaporation [cfs]
EVENTEVAP	Event evaporation
HYDQOUT	hydraulic outflow for a time step [cfs]
NSEEPOUT	Natural seepage for a time step [cfs]
PNDAREA	Pond area for a time step [sq ft]
PNDSTAGE	Pond stage for a time step [ft]
QINAVEVOL	Average inflow volume between two time steps [cu ft]
SMQOUT	Previous time step storage volume minus previous time step outflow for current time step
SPQOUT	Inflow volume for current time step plus SMQOUT for current time step
STORAGE	Total storage volume in pond for a time step [cu ft]
TOTQOUT	Total outflow per time step [cfs]

Continuation of Figure 5-36 (referred to as Figure 5-7.2 in some flow charts).

Variable Definitions for Figure 5-37:

a	Rain number counter
EVENTDUR	Event duration
INTEVENTDUR	Interevent duration time period [days]
JSTRTDT	Starting date and time for a model run (Julian calendar)
NUMINC	Number of time step increments for an event
NUMINCBTWNRAINS	Number of time steps for an interevent period
RUNDUR	Event runoff duration (1.2 times rain duration)
TIMINC	Time step increment [min]
TIMINCBTWNRAINS	Time step increment between rain events from stochastic rain file [days]

Figure 5-37. Time of next rain calculation flow chart (referred to as Figure 5-7.21 in some flow charts).

Variable Definitions for Figure 5-38:

i	Stage increment counter
PEAKTIME	Time of peak inflow for an event
PREVPEAKTIME	Peak inflow time used to calculate previous event inflow when a new event begins before runoff from the previous event has ended.
PREVQIN	Previous inflow value used as part of total inflow when a new event begins before runoff from the previous event has ended.
PREVQPEAK	Peak inflow value used to calculate previous event inflow when a new event begins before runoff from the previous event has ended.
QIN	Inflow for a time step [cfs]
QPEAK	Peak inflow rate [cfs]
RAINDUR	Event rain duration [hrs]
TIMINC	Time step increment [mind

Figure 5-38. Inflow hydrograph flow chart (referred to as Figure 5-7.22 in some flow charts).

Variable Definitions for Figure 5-39:

CRITPSIZ	Time step critical particle size [micrometers]
HYDQOUT	hydraulic outflow for a time step [cfs]
PCPCONT	Percent particle control for a time step
PNDAREA	Pond area for a time step [sq ft]
SUMWGHTDCONT	Sum of flow weighted percentage of particle sizes controlled
UPQVEL	Upflow velocity for a time step [ft/hr]
WGHTDCONT	Flow weighted percent of particle sizes controlled for a time step

Figure 5-39. Particle size calculation flow chart (referred to as Figure 5-7.23 in some flow charts)

Variable Definitions for Figure 40:

DUR	Event duration [days]
GDSVOLRED	Grass drainage swale volume reduction [fraction]
RUNVOLF	Source area runoff volume for a rain event [cu ft]
SWLASERV	Area served by grass swales [acres]
SWLDEN	Grass swale density
SWLPRATE	Grass swale percolation rate
SWLWIDTH	Grass swale width
TOTRUNVOLF	Total runoff volume from all source areas [cu ft]
TSCNCF	Source area particulate solids concentration [mg/L]
TSYLDF	Source area particulate solids yield [lbs]
TTLBSNA	Total basin area [acres]
TTLTSCNCF	Total solids concentration from entire basin [mg/L]

Figure 5-40. Grass swale subroutine flow chart (referred to as Figure 5-8 in some flow charts).

Variable Definitions for Figure 5-41:

CBASERV	Area served by catchbasin [acres]
DUR	Rain duration [days]
FLOW	Flow into catchbasin
PCSMPVF	Percent of sump volume full
RUNVOLF	Source area runoff volume for a rain event [cu ft]
SMPVAVAIL	Sump volume available for particulate solids [cu ft]
TBSNATSYLD	Total basin area particulate solids yield [lbs]
TSACCUM	Particulate solids accumulated in catchbasin [cu ft]
TSCNCREDCBPC	Percentage particulate solids reduction from catchbasin
TSUMPV	Total sump volume [cu ft]
TSYLDF	Source area particulate solids yield [lbs]
TTLBSNA	Total basin area [acres]

Figure 5-41. Catchbasin cleaning flow chart (referred to as Figure 5-9 in some flow charts).

Variable Definitions for Figure 5-41 (continued):

CBASERV	Area served by catchbasin [acres]
DUR	Rain duration [days]
FULL	Percent of catchbasin full
FLOW	Flow into catchbasin
IVOLRED	Infiltration device volume reduction [fraction]
MARK	Minimum sump volume available for solids storage (40 percent of total sump volume) [cu ft]
OVOLRED	Other control device volume reduction [fraction]
PCSMPVF	Percent of sump volume full
PCTSRED161	Percent particulate solids reduction due to drainage controls before catchbasins
PCVOLRED161	Percent flow volume reduction due to drainage controls before catchbasins
RUNVOLF	Source area runoff volume for a rain event [cu ft]

SMPVAVAIL	Sump volume available for particulate solids [cu ft] .
TBSNATSYLD	Total basin area particulate solids yield [lbs]
TSACCUM	Particulate solids accumulated in catchbasin [cu ft]
TSACCUMLBS	Particulate solids accumulated in catchbasin[lbs]
TSCNCF	Particulate solids concentration [mg/L]
TSCNCREDCBPC	Percentage particulate solids reduction from catchbasin
TSUMPV	Total sump volume [cu ft]
TSYLDF	Source area particulate solids yield [lbs].
TTLBSNA	Total basin area [acres]

Figure 5-41 continued (referred to as Figure 5-9 in some flow charts).

Variable Definitions for Figure 5-42:

AOTH	Percent flow reduction for “Other” control device.

BOTH	Proportion of the total area served by the “Other” control device.
CONASERV	Area served (acres) by the “Other” control device.
FLOWRED	Percent flow reduction for “Other” control device.
OTSRED	Particulate solids reduction percentage for that part of source area served by the “Other” control device.
OVOLRED	Volume reduction percentage for the source area.
POLRED	Particulate solids reduction percentage for the source area.
TSAREA	Total source area [acres]

Figure 5-42. Other volume and solids reduction flow chart (referred to as Figure 5-10 in some flow charts).

Calculation/Output Module - Output

The program uses flow volumes and particulate loadings to calculate the pollutant concentrations and loadings.

The variables in the flow chart are defined in the variable list on the facing page. The flow charts are not intended to give you a detailed description of the program structure. They should, however, help you understand how the calculations are structured in the code. To make the flow charts clearer, the variable subscripts have been eliminated.

Output from WinSLAMM is in both disk file and hard copy form.

There are four printing options. You select the desired option in the input module. The printing options are:

1. Print source areas by land use and outfall for each rain - complete printout. -

2. Print outfall data only for each rain.

3. Print summary totals of each source area category for all land uses and print outfall data for each rain.

4. Default option - print outfall summaries only.

Variable Definitions for Figure 5-43:

CONC	Concentration of a pollutant from a source area for a rain
FILTYLD	Filterable yield of a pollutant from a source area for a rain
MSCALC5	Calculation Module program which determined runoff volumes, particulate concentrations, and particulate yields for each source area for each rain
PARTYLD	Particulate yield of a pollutant from a source area for a rain
POLVAL	The concentration of a pollutant from a source area and land use. For particulate pollutants, the units are: mass of pollutant/kg particulate solids. For filterable pollutants, the units are: mass of pollutant/Liter of runoff.
PSYLDF	Particulate solids yield [lbs]. Determined for each source area for each rain in the "MSCALC5. EXE" program.
RUNOFF	Source area runoff volume for a rain event [cu ft]
s	Source area number
TTLBSNA	Total basin area [acres]

Figure 5-43. Output program main flow chart.

Variable Definitions for Figure 5-43 (continued):

CN	SCS Curve Number
GTFYLD	Total filterable yield of a pollutant from all source areas for a rain [lbs]
GTPYLD	Total particulate yield of a pollutant from all source areas for a rain [lbs]
PCTSRED161	Percent particulate solids reduction due to drainage controls for a rain
PCVOLRED161	Percent flow volume reduction due to drainage controls for a rain
Q	Runoff [in]
RAIN	Rain depth for an event [in]
RUNVOLF	Source area runoff volume for a rain event. (161)==> runoff volume from all source areas after drainage controls. (162)==> runoff volume from all source areas after outfall controls. [cu ft]
RUNPCRED161	Percent reduction of runoff due to drainage controls for a rain
RUNPCRED162	Percent reduction of runoff due to outfall controls for a rain
TOTRUNVOLF	Total runoff volume from all source areas for a rain
TOTRV	Ratio of runoff volume to rain volume for a rain event
TTCNC	Total concentration (particulate if yield is GTPYLD, filterable if yield is GTFYLD) from all the

source areas for a rain

TTCNC161 Total concentration (particulate if yield is GTPYLD, filterable if yield is GTFYLD) from all the source areas for a rain after drainage controls

TTCNC162 Total concentration (particulate if yield is GTPYLD, filterable if yield is GTFYLD) from all the source areas for a rain after drainage and outfall controls

TTLBSNA Total basin area t acres]

TTLOSS Total precipitation lost due to evaporation, infiltration, and other processes

TTLYLD Total yield (particulate if yield is GTPYLD, filterable if yield is GTFYLD) from all the source areas for a rain

TTLYLD161 Total yield (particulate if yield is GTPYLD, filterable if yield is GTFYLD) from all the source areas for a rain after drainage controls

TTLYLD162 Total yield (particulate if yield is GTPYLD, filterable if yield is GTFYLD) from all the source areas for a rain after drainage and outfall controls

YLDPCRED161 Percent reduction of yield due to drainage controls for a rain

YLDPCRED162 Percent reduction of yield due to outfall controls for a rain

Figure 5-43 (continued).

Appendix 5-C. Bham76.ran File Printout

Rain File name: bham76.RAN
Printout Date: 08-09-2000

Rain Number	Beginning Rain Date	Beginning Rain Time	Ending Rain Date	Ending Rain Time	Rainfall Depth (in)	Rainfall Duration (days)	Intensity (in/hr)	Interevent Duration (days)
1	01/02/76	22:00	01/03/76	07:00	0.46	0.3750	0.0511	3.7917
2	01/07/76	02:00	01/08/76	13:00	0.58	1.4583	0.0166	2.8333
3	01/11/76	09:00	01/11/76	21:00	0.25	0.5000	0.0208	1.1667
4	01/13/76	01:00	01/13/76	03:00	0.03	0.0833	0.0150	0.2500
5	01/13/76	09:00	01/13/76	21:00	0.39	0.5000	0.0325	2.8333
6	01/16/76	17:00	01/17/76	03:00	0.01	0.4167	0.0010	3.2083
7	01/20/76	08:00	01/20/76	14:00	0.05	0.2500	0.0083	3.7500
8	01/24/76	08:00	01/24/76	19:00	0.03	0.4583	0.0027	0.7083
9	01/25/76	12:00	01/26/76	22:00	2.33	1.4167	0.0685	5.4167
10	02/01/76	08:00	02/01/76	10:00	0.01	0.0833	0.0050	0.3333
11	02/01/76	18:00	02/01/76	20:00	0.01	0.0833	0.0050	3.5417
12	02/05/76	09:00	02/06/76	10:00	0.51	1.0417	0.0204	4.8750
13	02/11/76	07:00	02/11/76	18:00	0.01	0.4583	0.0009	6.0000
14	02/17/76	18:00	02/17/76	19:00	0.01	0.0417	0.0100	0.3750
15	02/18/76	04:00	02/18/76	12:00	0.67	0.3333	0.0837	3.0833
16	02/21/76	14:00	02/21/76	23:00	0.61	0.3750	0.0678	0.5000
17	02/22/76	11:00	02/22/76	14:00	0.01	0.1250	0.0033	12.0000
18	03/05/76	14:00	03/06/76	15:00	0.85	1.0417	0.0340	1.5417
19	03/08/76	04:00	03/08/76	08:00	0.01	0.1667	0.0025	0.4583
20	03/08/76	19:00	03/09/76	14:00	1.02	0.7917	0.0537	0.2500
21	03/09/76	20:00	03/09/76	23:00	0.01	0.1250	0.0033	2.2917
22	03/12/76	06:00	03/12/76	23:00	1.48	0.7083	0.0871	0.6250
23	03/13/76	14:00	03/13/76	15:00	0.01	0.0417	0.0100	0.5000
24	03/14/76	03:00	03/14/76	13:00	0.01	0.4167	0.0010	0.5000
25	03/15/76	01:00	03/16/76	12:00	3.64	1.4583	0.1040	3.7083
26	03/20/76	05:00	03/20/76	13:00	0.04	0.3333	0.0050	0.2500
27	03/20/76	19:00	03/21/76	05:00	1.14	0.4167	0.1140	3.5417
28	03/24/76	18:00	03/25/76	09:00	0.04	0.6250	0.0027	0.9167
29	03/26/76	07:00	03/27/76	06:00	1.54	0.9583	0.0670	2.4167
30	03/29/76	16:00	03/30/76	04:00	2.20	0.5000	0.1833	0.3333
31	03/30/76	12:00	03/31/76	15:00	2.08	1.1250	0.0770	3.8333
32	04/04/76	11:00	04/04/76	12:00	0.01	0.0417	0.0100	7.3333
33	04/11/76	20:00	04/11/76	25:00	0.21	0.2083	0.0420	1.9167
34	04/13/76	23:00	04/14/76	13:00	0.04	0.5833	0.0029	6.8333
35	04/21/76	09:00	04/21/76	11:00	0.01	0.0833	0.0050	3.1250
36	04/24/76	14:00	04/25/76	07:00	0.84	0.7083	0.0494	4.2500
37	04/29/76	13:00	05/01/76	05:00	1.03	1.6667	0.0258	5.4583
38	05/06/76	16:00	05/07/76	19:00	1.71	1.1250	0.0633	0.2500
39	05/08/76	01:00	05/08/76	12:00	0.30	0.4583	0.0273	2.0417
40	05/10/76	13:00	05/11/76	15:00	0.26	1.0833	0.0100	1.7917
41	05/13/76	10:00	05/14/76	24:00	3.84	1.5833	0.1011	0.4583
42	05/15/76	11:00	05/15/76	13:00	0.01	0.0833	0.0050	0.7917
43	05/16/76	08:00	05/16/76	11:00	0.07	0.1250	0.0233	1.6667
44	05/18/76	03:00	05/18/76	05:00	0.01	0.0833	0.0050	4.6250
45	05/22/76	20:00	05/24/76	02:00	2.31	1.2500	0.0770	2.5833
46	05/26/76	16:00	05/28/76	13:00	0.27	1.8750	0.0060	0.4583
47	05/28/76	24:00	05/29/76	07:00	0.05	0.2917	0.0071	3.1667
48	06/01/76	11:00	06/01/76	22:00	0.48	0.4583	0.0436	0.3333
49	06/02/76	06:00	06/02/76	14:00	0.01	0.3333	0.0012	2.3750
50	06/04/76	23:00	06/05/76	02:00	0.01	0.1250	0.0033	4.6667
51	06/09/76	18:00	06/09/76	20:00	0.01	0.0833	0.0050	6.7917
52	06/16/76	15:00	06/16/76	19:00	0.01	0.1667	0.0025	1.7083
53	06/18/76	12:00	06/18/76	19:00	0.03	0.2917	0.0043	0.3750
54	06/19/76	04:00	06/20/76	06:00	1.78	1.0833	0.0685	7.3333
55	06/27/76	14:00	06/27/76	15:00	0.01	0.0417	0.0100	2.6250
56	06/30/76	06:00	06/30/76	10:00	0.46	0.1667	0.1150	3.5417
57	07/03/76	23:00	07/04/76	24:00	1.17	1.0417	0.0468	8.6250
58	07/13/76	15:00	07/13/76	16:00	0.26	0.0417	0.2600	3.0000
Rain Number	Beginning Rain Date	Beginning Rain Time	Ending Rain Date	Ending Rain Time	Rainfall Depth (in)	Rainfall Duration (days)	Intensity (in/hr)	Interevent Duration (days)
59	07/16/76	16:00	07/17/76	08:00	0.03	0.6667	0.0019	0.3333
60	07/17/76	16:00	07/17/76	17:00	0.01	0.0417	0.0100	3.9167
61	07/21/76	15:00	07/21/76	17:00	0.09	0.0833	0.0450	1.9583
62	07/23/76	16:00	07/23/76	18:00	0.26	0.0833	0.1300	3.7083
63	07/27/76	11:00	07/27/76	24:00	1.01	0.5417	0.0777	0.4167
64	07/28/76	10:00	07/28/76	17:00	1.63	0.2917	0.2329	1.0000
65	07/29/76	17:00	07/29/76	20:00	0.17	0.1250	0.0567	0.4167
66	07/30/76	06:00	07/30/76	12:00	0.23	0.2500	0.0383	1.0000
67	07/31/76	12:00	07/31/76	14:00	0.07	0.0833	0.0350	5.9583
68	08/06/76	13:00	08/06/76	20:00	0.30	0.2917	0.0429	0.7500
69	08/07/76	14:00	08/07/76	16:00	0.54	0.0833	0.2700	8.0000
70	08/15/76	16:00	08/15/76	19:00	0.06	0.1250	0.0200	0.7917
71	08/16/76	14:00	08/16/76	17:00	0.93	0.1250	0.3100	7.9167
72	08/24/76	15:00	08/25/76	04:00	0.86	0.5417	0.0662	1.1667
73	08/26/76	08:00	08/26/76	14:00	0.01	0.2500	0.0017	0.6667
74	08/27/76	06:00	08/27/76	20:00	0.34	0.5833	0.0243	0.2500
75	08/28/76	02:00	08/28/76	15:00	0.28	0.5417	0.0215	2.8333
76	08/31/76	11:00	08/31/76	13:00	0.01	0.0833	0.0050	0.4167
77	08/31/76	23:00	09/01/76	20:00	1.41	0.8750	0.0671	1.3333
78	09/03/76	04:00	09/03/76	07:00	0.01	0.1250	0.0033	0.2500
79	09/03/76	13:00	09/03/76	24:00	0.25	0.4583	0.0227	0.2500
80	09/04/76	06:00	09/04/76	14:00	0.04	0.3333	0.0050	0.2917
81	09/04/76	21:00	09/05/76	18:00	0.44	0.8750	0.0210	0.9167
82	09/06/76	16:00	09/06/76	20:00	0.04	0.1667	0.0100	0.7083
83	09/07/76	13:00	09/07/76	17:00	0.11	0.1667	0.0275	1.8750
84	09/09/76	14:00	09/09/76	15:00	0.01	0.0417	0.0100	0.4167
85	09/10/76	01:00	09/10/76	03:00	0.01	0.0833	0.0050	6.8333
86	09/16/76	23:00	09/16/76	24:00	0.01	0.0417	0.0100	3.9583
87	09/20/76	23:00	09/21/76	06:00	0.06	0.2917	0.0086	4.8333
88	09/26/76	02:00	09/26/76	03:00	0.01	0.0417	0.0100	0.3333

89	09/26/76	11:00	09/26/76	15:00	0.12	0.1667	0.0300	0.6667
90	09/27/76	07:00	09/27/76	09:00	0.03	0.0833	0.0150	0.2500
91	09/27/76	15:00	09/27/76	18:00	0.01	0.1250	0.0033	1.1250
92	09/28/76	21:00	09/29/76	22:00	2.39	1.0417	0.0956	6.1250
93	10/06/76	01:00	10/07/76	05:00	0.05	1.1667	0.0018	0.7083
94	10/07/76	22:00	10/08/76	24:00	0.16	1.0833	0.0062	7.7500
95	10/16/76	18:00	10/17/76	03:00	0.05	0.3750	0.0056	2.9583
96	10/20/76	02:00	10/20/76	06:00	0.15	0.1667	0.0375	4.0000
97	10/24/76	06:00	10/24/76	17:00	0.01	0.4583	0.0009	0.2500
98	10/24/76	23:00	10/25/76	22:00	0.64	0.9583	0.0278	3.9167
99	10/29/76	20:00	10/30/76	16:00	0.54	0.8333	0.0270	11.8333
100	11/11/76	12:00	11/12/76	02:00	0.23	0.5833	0.0164	1.9583
101	11/14/76	01:00	11/15/76	05:00	0.96	1.1667	0.0343	4.3750
102	11/19/76	14:00	11/19/76	19:00	0.01	0.2083	0.0020	0.5833
103	11/20/76	09:00	11/20/76	19:00	0.22	0.4167	0.0220	5.4167
104	11/26/76	05:00	11/26/76	18:00	0.12	0.5417	0.0092	0.6667
105	11/27/76	10:00	11/27/76	15:00	0.02	0.2083	0.0040	0.4167
106	11/28/76	01:00	11/29/76	12:00	0.72	1.4583	0.0206	6.9583
107	12/06/76	11:00	12/07/76	15:00	0.57	1.1667	0.0204	2.5833
108	12/10/76	05:00	12/11/76	20:00	1.09	1.6250	0.0279	3.0417
109	12/14/76	21:00	12/15/76	05:00	0.25	0.3333	0.0312	4.5417
110	12/19/76	18:00	12/20/76	13:00	0.87	0.7917	0.0458	4.7917
111	12/25/76	08:00	12/25/76	24:00	1.35	0.6667	0.0844	4.5000
112	12/30/76	12:00	12/31/76	06:00	0.20	0.7500	0.0111	**

Appendix 5-D. Runoff.rsv File Printout

```
Runoff Coefficient file name:  RUNOFF.RSV
Runoff Coefficient file description:  CALIBRATED RUNOFF COEFFICIENT FILE
Date:  08-09-2000

    Area Types:
 1: Connected flat roofs
 2: Connected Pitched Roofs
 3: Directly connected impervious areas
 4: Directly connected unpaved areas
 5: Pervious areas - A/B soils
 6: Pervious areas - C/D soils
 7: Smooth textured streets
 8: Intermediate textured streets
 9: Rough textured streets

Drainage efficiency coefficients (fractions)
 10: C/D soils, w/o alleys, medium to high density land use
 11: C/D soils, w/ alleys, medium to high density land use
 12: C/D soils for strip commercial and shopping center land use

     |           Volumetric Runoff Coefficients for Rains (in & mm)
Area | in:   .01  .08  .12  .20  .39  .59  .79  .98  1.2  1.6  2.0  2.4  2.8  3.2  3.5  3.9  4.9
Type | mm:     1    2    3    5   10   15   20   25   30   40   50   60   70   80   90  100  125
 No  |Rain #:  1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17

 1 :        0.00 0.00 0.30 0.54 0.72 0.79 0.83 0.84 0.86 0.88 0.90 0.91 0.93 0.94 0.94 0.95 0.96
 2 :        0.25 0.63 0.75 0.85 0.93 0.95 0.96 0.97 0.98 0.98 0.99 0.99 0.99 0.99 0.99 0.99 0.99
 3 :        0.93 0.96 0.96 0.97 0.97 0.97 0.97 0.97 0.98 0.98 0.99 0.99 0.99 0.99 0.99 0.99 0.99
 4 :        0.00 0.00 0.00 0.00 0.47 0.64 0.72 0.77 0.81 0.86 0.89 0.91 0.92 0.93 0.94 0.94 0.95
 5 :        0.00 0.00 0.00 0.00 0.01 0.02 0.02 0.02 0.03 0.04 0.07 0.10 0.13 0.15 0.20 0.22 0.25
 6 :        0.00 0.00 0.00 0.10 0.15 0.19 0.20 0.21 0.22 0.23 0.26 0.29 0.32 0.33 0.36 0.39 0.45
 7 :        0.35 0.49 0.54 0.59 0.65 0.69 0.72 0.76 0.80 0.85 0.88 0.90 0.91 0.93 0.93 0.94 0.95
 8 :        0.26 0.43 0.49 0.55 0.60 0.64 0.67 0.67 0.73 0.80 0.84 0.86 0.88 0.90 0.91 0.92 0.93
 9 :        0.18 0.39 0.47 0.53 0.60 0.64 0.67 0.70 0.73 0.80 0.84 0.86 0.88 0.90 0.91 0.92 0.93

Drainage efficiency coefficients (fractions):
10 :        0.00 0.00 0.00 0.11 0.16 0.20 0.21 0.22 0.22 0.24 0.27 0.30 0.33 0.34 0.37 0.40 0.46
11 :        0.00 0.05 0.08 0.11 0.16 0.20 0.29 0.38 0.46 0.64 0.81 0.93 0.99 0.99 0.99 0.99 0.99
12 :        0.00 0.00 0.00 0.47 0.90 0.99 0.99 0.99 0.99 0.99 0.99 0.99 0.99 0.99 0.99 0.99 0.99
```

Appendix 5-E. Delivery.prr File Printout

```
Particulate Residue Reduction due to Delivery file name:  delivery.PRR
Size distribution file description:  example delivery
Date:  08-09-2000

             Particulate Residue Reduction due to Delivery (fraction) for Rains (in & mm)
             Rain (in) :.04  .08  .12  .20  .39  .59  .79  .98  1.2  1.6  2.0  2.4  2.8  3.2
             Rain (mm) :  1    2    3    5   10   15   20   25   30   40   50   60   70   80

       For 1.  Grass Swales:
                    0.99 0.98 0.97 0.94 0.85 0.74 0.61 0.44 0.25 0.07 0.02 0.00 0.00 0.00
       For 2.  Undeveloped roadside:
                    0.99 0.98 0.97 0.94 0.85 0.74 0.61 0.44 0.25 0.07 0.02 0.00 0.00 0.00
       For 3.  Curb and Gutters, `valleys', or sealed swales in poor condition (or very flat):
                    0.98 0.96 0.92 0.85 0.61 0.46 0.31 0.22 0.13 0.04 0.01 0.00 0.00 0.00
       For 3.  Curb and Gutters, `valleys', or sealed swales in fair condition:
                    0.98 0.95 0.90 0.80 0.48 0.32 0.16 0.11 0.07 0.02 0.00 0.00 0.00 0.00
       For 3.  Curb and Gutters, `valleys', or sealed swales in good condition (or very steep):
                    0.98 0.95 0.88 0.75 0.36 0.18 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00
```

Appendix 5-F. Bham.psc File Printout

```
Particulate Solids Concentration file name:  BHAM.PSC
Particulate Solids Concentration file description:  Particulate residue concentrations for source areas.
Date:  08-09-2000
```

Area Types:

A : Roofs
B : Paved Parking
C : Unpaved parking, driveways, and walkways
D : Paved playgrounds
E : Paved driveways
F : Paved sidewalks and walks
G : Large landscaped areas
H : Small landscaped areas
I : Undeveloped areas
J : Other pervious areas
K : Other directly connected impervious areas
L : Other partially connected impervious areas
M : Paved lane and shoulder areas

Row	Area Type	Particulate Solids (mg/l) for Rains (in & mm)													
		.04	.08	.12	.20	.39	.59	.79	.98	1.2	1.6	2.0	2.4	2.8	3.2
No		1	2	3	5	10	15	20	25	30	40	50	60	70	80
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Residential Areas															
1	A	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2	B	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
3	C	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
4	D	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
5	E	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
6	F	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
7	G	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
8	H	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
9	I	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
10	J	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
11	K	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
12	L	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
Institutional Areas															
13	A	5	5	5	5	5	5	5	5	5	5	5	5	5	5
14	B	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
15	C	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
16	D	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
17	E	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
18	F	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
19	G	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
20	H	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
21	I	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
22	J	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
23	K	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
24	L	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
Commercial Areas															
25	A	5	5	5	5	5	5	5	5	5	5	5	5	5	5
26	B	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
27	C	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
28	D	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
29	E	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
30	F	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
31	G	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
32	H	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
33	I	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
34	J	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
35	K	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
36	L	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
Industrial Areas															
37	A	5	5	5	5	5	5	5	5	5	5	5	5	5	5
38	B	300	200	150	100	100	100	100	100	100	100	100	100	100	100
39	C	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
40	D	300	200	150	100	100	100	100	100	100	100	100	100	100	100
41	E	300	200	150	100	100	100	100	100	100	100	100	100	100	100
42	F	300	200	150	100	100	100	100	100	100	100	100	100	100	100
43	G	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
44	H	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
45	I	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
46	J	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
47	K	300	200	150	100	100	100	100	100	100	100	100	100	100	100
48	L	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
Open Space Areas															
49	A	5	5	5	5	5	5	5	5	5	5	5	5	5	5
50	B	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
51	C	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
52	D	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
53	E	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
54	F	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
55	G	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
56	H	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
57	I	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
58	J	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
59	K	1030	550	370	210	80	60	60	60	60	60	60	60	60	60
60	L	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
Freeways															
61	M	5800	4200	3100	2000	1200	1100	1100	1100	1100	1100	1100	1100	1100	1100
62	G	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
63	I	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
64	J	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600
65	K	1030	550	370	210	100	100	100	100	100	100	100	100	100	100
66	L	5000	4000	3300	2200	1100	700	600	600	600	600	600	600	600	600

Appendix 5-G. Bham.ppd File Printout

```
Pollutant Probability Relative Concentration file name:  bham.PPD
File description:  Modified PPD File 05/22/00, Para Mod. Version 6.7
Date:  08-09-2000

Source: 1: Roofs                    7: Street Area            13: Other Dir Conctd Imperv Area
 Areas: 2: Paved Parking/Storage    8: Large Landscaped Area  14: Othr Partially Conctd Imperv Area
        3: Unpaved Parking/Storage  9: Undeveloped Area       15: Paved Lane & Shoulder Area
        4: Playground               10: Small Landscaped Area 16: Large Turf Areas
        5: Driveways                11: Isolated Area
        6: Sidewalks/Walks          12: Other Pervious Area
```

Source Area #	Residential Land Uses	Institutional Land Uses	Commercial Land Uses	Industrial Land Uses	Open Spcs Land Use	Freeway Land Use
Particulate Pollutant: Phosphorus (mg/kg)						
1-AVE :	5319.00	12033.00	12033.00	1600.00	1600.00	0.00
1-COV :	1.00	1.00	1.00	1.00	1.00	0.00
2-AVE :	1847.00	1847.00	1847.00	580.00	580.00	0.00
2-COV :	1.00	1.00	1.00	1.00	1.00	0.00
3-AVE :	1847.00	1847.00	1847.00	570.00	570.00	0.00
3-COV :	1.00	1.00	1.00	1.00	1.00	0.00
4-AVE :	7825.00	7825.00	7825.00	500.00	500.00	0.00
4-COV :	1.00	1.00	1.00	1.00	1.00	0.00
5-AVE :	3384.00	3384.00	3384.00	580.00	580.00	0.00
5-COV :	1.00	1.00	1.00	1.00	1.00	0.00
6-AVE :	3384.00	3384.00	3384.00	995.00	995.00	0.00
6-COV :	1.00	1.00	1.00	1.00	1.00	0.00
7-AVE :	809.00	809.00	809.00	650.00	650.00	0.00
7-COV :	1.00	1.00	1.00	1.00	1.00	0.00
8-AVE :	7825.00	7825.00	7825.00	2800.00	2800.00	2800.00
8-COV :	1.00	1.00	1.00	1.00	1.00	1.00
9-AVE :	5000.00	5000.00	5000.00	695.00	695.00	695.00
9-COV :	1.00	1.00	1.00	1.00	1.00	1.00
10-AVE :	7825.00	7825.00	7825.00	1250.00	1250.00	1250.00
10-COV :	1.00	1.00	1.00	1.00	1.00	1.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	7825.00	7825.00	7825.00	1600.00	1600.00	1600.00
12-COV :	1.00	1.00	1.00	1.00	1.00	1.00
13-AVE :	1847.00	1847.00	1847.00	500.00	500.00	500.00
13-COV :	1.00	1.00	1.00	1.00	1.00	1.00
14-AVE :	3304.00	3304.00	3304.00	500.00	500.00	500.00
14-COV :	1.00	1.00	1.00	1.00	1.00	1.00
15-AVE :	0.00	0.00	0.00	0.00	0.00	1000.00
15-COV :	0.00	0.00	0.00	0.00	0.00	1.00
16-AVE :	7825.00	7825.00	7825.00	2800.00	2800.00	2800.00
16-COV :	1.00	1.00	1.00	1.00	1.00	1.00
Particulate Pollutant: Total Kjeldahl Nitrogen (mg/kg)						
1-AVE :	3340.00	10000.00	10000.00	3340.00	3340.00	0.00
1-COV :	1.00	1.00	1.00	1.00	1.00	0.00
2-AVE :	911.00	6400.00	6400.00	911.00	911.00	0.00
2-COV :	1.00	1.00	1.00	1.00	1.00	0.00
3-AVE :	620.00	620.00	620.00	620.00	620.00	0.00
3-COV :	1.00	1.00	1.00	1.00	1.00	0.00
4-AVE :	600.00	600.00	600.00	600.00	600.00	0.00
4-COV :	1.00	1.00	1.00	1.00	1.00	0.00
5-AVE :	911.00	911.00	911.00	911.00	911.00	0.00
5-COV :	1.00	1.00	1.00	1.00	1.00	0.00

6-AVE :	2770.00	2770.00	2770.00	2770.00	2770.00	0.00
6-COV :	1.00	1.00	1.00	1.00	1.00	0.00
7-AVE :	630.00	630.00	1910.00	940.00	630.00	0.00
7-COV :	1.00	1.00	1.00	1.00	1.00	0.00
8-AVE :	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00
8-COV :	1.00	1.00	1.00	1.00	1.00	1.00
9-AVE :	1760.00	1760.00	1760.00	1760.00	1760.00	1760.00
9-COV :	1.00	1.00	1.00	1.00	1.00	1.00
10-AVE :	1760.00	1760.00	1760.00	1760.00	1760.00	1760.00
10-COV :	1.00	1.00	1.00	1.00	1.00	1.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00
12-COV :	1.00	1.00	1.00	1.00	1.00	1.00
13-AVE :	600.00	600.00	600.00	600.00	600.00	600.00
13-COV :	1.00	1.00	1.00	1.00	1.00	1.00
14-AVE :	600.00	600.00	600.00	600.00	600.00	600.00
14-COV :	1.00	1.00	1.00	1.00	1.00	1.00
15-AVE :	0.00	0.00	0.00	0.00	0.00	1100.00
15-COV :	0.00	0.00	0.00	0.00	0.00	1.00
16-AVE :	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00
16-COV :	1.00	1.00	1.00	1.00	1.00	1.00

Particulate Pollutant: Chemical Oxygen Demand (mg/kg)

1-AVE :	913000.00	1520000.00	1520000.00	913000.00	913000.00	0.00
1-COV :	1.00	1.00	1.00	1.00	1.00	0.00
2-AVE :	512000.00	512000.00	512000.00	540000.00	512000.00	0.00
2-COV :	1.00	1.00	1.00	1.00	1.00	0.00
3-AVE :	695000.00	695000.00	695000.00	733000.00	695000.00	0.00
3-COV :	1.00	1.00	1.00	1.00	1.00	0.00
4-AVE :	507000.00	507000.00	507000.00	535000.00	507000.00	0.00
4-COV :	1.00	1.00	1.00	1.00	1.00	0.00
5-AVE :	512000.00	512000.00	512000.00	535000.00	507000.00	0.00
5-COV :	1.00	1.00	1.00	1.00	1.00	0.00
6-AVE :	664000.00	659000.00	659000.00	701000.00	659000.00	0.00
6-COV :	1.00	1.00	1.00	1.00	1.00	0.00
7-AVE :	304000.00	304000.00	304000.00	428000.00	304000.00	0.00
7-COV :	1.00	1.00	1.00	1.00	1.00	0.00
8-AVE :	1115000.00	1115000.00	1115000.00	1180000.00	1115000.00	1115000.00
8-COV :	1.00	1.00	1.00	1.00	1.00	1.00
9-AVE :	276000.00	276000.00	276000.00	292000.00	276000.00	284000.00
9-COV :	1.00	1.00	1.00	1.00	1.00	1.00
10-AVE :	507000.00	507000.00	507000.00	535000.00	507000.00	507000.00
10-COV :	1.00	1.00	1.00	1.00	1.00	1.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	761000.00	761000.00	761000.00	803000.00	761000.00	782000.00
12-COV :	1.00	1.00	1.00	1.00	1.00	1.00
13-AVE :	304000.00	304000.00	304000.00	321000.00	304000.00	313000.00
13-COV :	1.00	1.00	1.00	1.00	1.00	1.00
14-AVE :	304000.00	304000.00	304000.00	321000.00	304000.00	313000.00
14-COV :	1.00	1.00	1.00	1.00	1.00	1.00
15-AVE :	0.00	0.00	0.00	0.00	0.00	464000.00
15-COV :	0.00	0.00	0.00	0.00	0.00	1.00

16-AVE :	1115000.00	1115000.00	1115000.00	1115000.00	1115000.00	1150000.00
16-COV :	1.00	1.00	1.00	1.00	1.00	1.00

Particulate Pollutant: Copper (mg/kg)

1-AVE :	106.00	121.00	121.00	324.00	106.00	0.00
1-COV :	1.38	1.49	1.49	1.26	1.49	0.00
2-AVE :	139.00	408.00	408.00	822.00	139.00	0.00
2-COV :	0.23	1.06	0.74	0.42	1.06	0.00
3-AVE :	151.00	151.00	151.00	461.00	151.00	0.00
3-COV :	0.86	0.86	0.86	1.12	0.86	0.00
4-AVE :	82.00	82.00	82.00	249.00	82.00	0.00
4-COV :	1.06	1.06	1.06	1.06	1.06	0.00
5-AVE :	139.00	139.00	139.00	423.00	139.00	0.00
5-COV :	1.06	1.06	1.06	1.06	1.06	0.00
6-AVE :	131.00	131.00	131.00	398.00	131.00	0.00
6-COV :	1.06	1.06	1.06	1.06	1.06	0.00
7-AVE :	375.00	375.00	143.00	423.00	375.00	0.00
7-COV :	1.06	0.69	1.06	1.16	1.06	0.00
8-AVE :	41.00	41.00	41.00	125.00	41.00	0.00
8-COV :	2.00	1.10	1.10	1.10	1.10	0.00
9-AVE :	73.00	73.00	73.00	224.00	73.00	150.00
9-COV :	1.10	1.10	1.10	1.10	1.10	1.10
10-AVE :	16.00	16.00	16.00	50.00	16.00	0.00
10-COV :	1.10	1.10	1.10	1.10	1.10	0.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	41.00	41.00	41.00	125.00	41.00	82.00
12-COV :	1.10	1.10	1.10	1.10	1.10	1.10
13-AVE :	82.00	82.00	82.00	249.00	82.00	165.00
13-COV :	1.06	1.06	2.02	0.88	1.06	1.06
14-AVE :	82.00	82.00	82.00	249.00	82.00	165.00
14-COV :	2.00	1.06	2.02	0.88	1.06	1.06
15-AVE :	0.00	0.00	0.00	0.00	0.00	1100.00
15-COV :	0.00	0.00	0.00	0.00	0.00	1.06
16-AVE :	0.00	0.00	0.00	0.00	0.00	150.00
16-COV :	0.00	0.00	0.00	0.00	0.00	1.10

Particulate Pollutant: Lead (mg/kg)

1-AVE :	3518.00	3518.00	26995.00	11778.00	3518.00	0.00
1-COV :	1.21	1.21	1.68	0.87	1.21	0.00
2-AVE :	7235.00	1289.00	1223.00	1157.00	7235.00	0.00
2-COV :	1.41	1.15	1.21	1.27	1.41	0.00
3-AVE :	94.00	94.00	94.00	1020.00	94.00	0.00
3-COV :	1.18	1.18	1.18	0.60	1.18	0.00
4-AVE :	1289.00	1289.00	1289.00	1289.00	1289.00	0.00
4-COV :	1.15	1.15	1.15	1.15	1.15	0.00
5-AVE :	1289.00	1289.00	1289.00	1289.00	1289.00	0.00
5-COV :	1.15	1.15	1.15	1.15	1.15	0.00
6-AVE :	1289.00	1289.00	1289.00	1289.00	1289.00	0.00
6-COV :	1.15	1.15	1.15	1.15	1.15	0.00
7-AVE :	1861.00	1861.00	3580.00	722.00	1861.00	0.00
7-COV :	1.41	1.41	1.41	0.81	1.41	0.00
8-AVE :	1358.00	1358.00	1358.00	1358.00	1358.00	1358.00
8-COV :	1.84	1.84	1.84	1.84	1.84	1.84
9-AVE :	1358.00	1358.00	1358.00	1358.00	1358.00	121.00

9-COV :	1.84	1.84	1.84	1.84	1.84	1.84
10-AVE :	1358.00	1358.00	1358.00	1358.00	1358.00	121.00
10-COV :	1.84	1.84	1.84	1.84	1.84	1.84
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	1358.00	1358.00	1358.00	1358.00	1358.00	134.00
12-COV :	1.84	1.84	1.84	1.84	1.84	1.84
13-AVE :	1289.00	1289.00	2911.00	1398.00	1289.00	447.00
13-COV :	1.15	1.15	0.79	0.63	1.15	1.15
14-AVE :	1289.00	1289.00	2911.00	1398.00	1289.00	447.00
14-COV :	1.15	1.15	0.79	0.63	1.15	1.15
15-AVE :	0.00	0.00	0.00	0.00	0.00	8630.00
15-COV :	0.00	0.00	0.00	0.00	0.00	1.41
16-AVE :	1358.00	1358.00	1358.00	1358.00	1358.00	240.00
16-COV :	1.84	1.84	1.84	1.84	1.84	1.84

Particulate Pollutant: Zinc (mg/kg)

1-AVE :	980.00	980.00	53333.00	4000.00	980.00	0.00
1-COV :	1.10	1.10	1.73	1.06	1.10	0.00
2-AVE :	944.00	1031.00	754.00	477.00	944.00	0.00
2-COV :	1.41	1.19	1.06	0.93	1.41	0.00
3-AVE :	85.00	85.00	85.00	308.00	85.00	0.00
3-COV :	1.41	1.41	1.41	1.00	1.41	0.00
4-AVE :	944.00	944.00	944.00	944.00	944.00	0.00
4-COV :	1.41	1.41	1.41	1.41	1.41	0.00
5-AVE :	944.00	944.00	944.00	944.00	944.00	0.00
5-COV :	1.41	1.41	1.41	1.41	1.41	0.00
6-AVE :	944.00	944.00	944.00	944.00	944.00	0.00
6-COV :	1.41	1.41	1.41	1.41	1.41	0.00
7-AVE :	384.00	447.00	876.00	1300.00	384.00	0.00
7-COV :	1.00	1.00	1.00	1.06	1.00	0.00
8-AVE :	1327.00	1327.00	1327.00	1327.00	1327.00	450.00
8-COV :	2.24	2.24	2.24	2.24	2.24	1.00
9-AVE :	1327.00	1327.00	1327.00	1327.00	1327.00	450.00
9-COV :	2.24	2.24	2.24	2.24	2.24	2.24
10-AVE :	1327.00	1327.00	1327.00	1327.00	1327.00	450.00
10-COV :	2.24	2.24	2.24	2.24	2.24	2.24
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	1327.00	1327.00	1327.00	1327.00	1327.00	340.00
12-COV :	2.24	2.24	2.24	2.24	2.24	2.24
13-AVE :	944.00	944.00	1691.00	385.00	944.00	510.00
13-COV :	1.41	1.41	1.73	1.03	1.41	2.24
14-AVE :	944.00	944.00	1691.00	385.00	944.00	510.00
14-COV :	1.41	1.41	1.73	1.03	1.41	2.24
15-AVE :	0.00	0.00	0.00	0.00	0.00	1730.00
15-COV :	0.00	0.00	0.00	0.00	0.00	1.00
16-AVE :	1327.00	1327.00	1327.00	1327.00	1327.00	450.00
16-COV :	2.24	2.24	2.24	2.24	2.24	2.24

Filterable Pollutant: Filterable Solids (mg/L)

1-AVE :	116.00	386.00	386.00	148.00	116.00	0.00
1-COV :	1.00	1.00	1.00	1.00	1.00	0.00
2-AVE :	223.00	223.00	223.00	157.00	223.00	0.00
2-COV :	1.00	1.00	1.00	1.00	1.00	0.00

3-AVE :	1240.00	1240.00	1240.00	585.00	1240.00	0.00
3-COV :	1.00	1.00	1.00	1.00	1.00	0.00
4-AVE :	223.00	223.00	223.00	105.00	223.00	0.00
4-COV :	1.00	1.00	1.00	1.00	1.00	0.00
5-AVE :	223.00	223.00	223.00	105.00	223.00	0.00
5-COV :	1.00	1.00	1.00	1.00	1.00	0.00
6-AVE :	318.00	318.00	318.00	150.00	318.00	0.00
6-COV :	1.00	1.00	1.00	1.00	1.00	0.00
7-AVE :	151.00	151.00	151.00	263.00	151.00	0.00
7-COV :	1.00	1.00	1.00	1.00	1.00	0.00
8-AVE :	861.00	861.00	861.00	406.00	861.00	861.00
8-COV :	1.00	1.00	1.00	1.00	1.00	1.00
9-AVE :	846.00	846.00	846.00	400.00	846.00	846.00
9-COV :	1.00	1.00	1.00	1.00	1.00	1.00
10-AVE :	861.00	861.00	861.00	406.00	861.00	861.00
10-COV :	1.00	1.00	1.00	1.00	1.00	1.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	861.00	861.00	861.00	406.00	861.00	638.00
12-COV :	1.00	1.00	1.00	1.00	1.00	1.00
13-AVE :	223.00	223.00	223.00	105.00	223.00	165.00
13-COV :	1.00	1.00	1.00	1.00	1.00	1.00
14-AVE :	223.00	223.00	223.00	105.00	223.00	165.00
14-COV :	1.00	1.00	1.00	1.00	1.00	1.00
15-AVE :	0.00	0.00	0.00	0.00	0.00	352.00
15-COV :	0.00	0.00	0.00	0.00	0.00	1.00
16-AVE :	861.00	861.00	861.00	861.00	861.00	638.00
16-COV :	1.00	1.00	1.00	1.00	1.00	1.00

Filterable Pollutant: Nitrates (mg/L)

1-AVE :	18.30	0.61	0.61	0.23	0.61	0.00
1-COV :	1.00	1.00	1.00	1.00	1.00	0.00
2-AVE :	0.61	0.61	0.61	26.10	0.61	0.00
2-COV :	1.00	1.00	1.00	1.00	1.00	0.00
3-AVE :	6.10	6.10	6.10	63.00	6.10	0.00
3-COV :	1.00	1.00	1.00	1.00	1.00	0.00
4-AVE :	0.61	0.61	0.61	0.61	0.61	0.00
4-COV :	1.00	1.00	1.00	1.00	1.00	0.00
5-AVE :	0.37	0.61	0.61	64.35	0.35	0.00
5-COV :	1.00	1.00	1.00	1.00	1.00	0.00
6-AVE :	0.61	0.61	0.61	16.20	0.61	0.00
6-COV :	1.00	1.00	1.00	1.00	1.00	0.00
7-AVE :	0.35	0.35	0.37	27.90	0.35	0.00
7-COV :	1.00	1.00	1.00	1.00	1.00	0.00
8-AVE :	1.28	1.28	1.28	9.45	1.28	1.28
8-COV :	1.00	1.00	1.00	1.00	1.00	1.00
9-AVE :	1.28	1.28	1.28	9.45	1.28	1.28
9-COV :	1.00	1.00	1.00	1.00	1.00	1.00
10-AVE :	1.28	1.28	1.28	9.45	1.28	1.28
10-COV :	1.00	1.00	1.00	1.00	1.00	1.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	1.28	1.28	1.28	9.45	1.28	5.46
12-COV :	1.00	1.00	1.00	1.00	1.00	1.00

13-AVE :	0.61	0.61	0.61	4.50	0.61	2.60
13-COV :	1.00	1.00	1.00	1.00	1.00	1.00
14-AVE :	0.61	0.61	0.61	4.50	0.61	2.60
14-COV :	1.00	1.00	1.00	1.00	1.00	1.00
15-AVE :	0.00	0.00	0.00	0.00	0.00	1.56
15-COV :	0.00	0.00	0.00	0.00	0.00	1.00
16-AVE :	1.28	1.28	1.28	9.45	1.28	5.46
16-COV :	1.00	1.00	1.00	1.00	1.00	1.00

Filterable Pollutant: Total Kjeldahl Nitrogen (mg/L)

1-AVE :	0.78	4.30	4.30	1.63	0.78	0.00
1-COV :	1.00	1.00	1.00	1.00	1.00	0.00
2-AVE :	1.42	1.40	1.40	0.29	1.40	0.00
2-COV :	1.00	1.00	1.00	1.00	1.00	0.00
3-AVE :	2.00	2.00	2.00	2.00	2.00	0.00
3-COV :	1.00	1.00	1.00	1.00	1.00	0.00
4-AVE :	1.40	1.40	1.40	1.40	1.40	0.00
4-COV :	1.00	1.00	1.00	1.00	1.00	0.00
5-AVE :	1.40	1.40	1.40	1.40	1.40	0.00
5-COV :	1.00	1.00	1.00	1.00	1.00	0.00
6-AVE :	3.30	3.30	3.30	3.30	3.30	0.00
6-COV :	1.00	1.00	1.00	1.00	1.00	0.00
7-AVE :	1.50	1.50	2.20	2.70	1.50	0.00
7-COV :	1.00	1.00	1.00	1.00	1.00	0.00
8-AVE :	1.60	1.60	1.60	1.60	1.60	1.60
8-COV :	1.00	1.00	1.00	1.00	1.00	1.00
9-AVE :	1.10	1.10	1.10	1.10	1.10	1.10
9-COV :	1.00	1.00	1.00	1.00	1.00	1.00
10-AVE :	1.60	1.60	1.60	1.60	1.60	1.60
10-COV :	1.00	1.00	1.00	1.00	1.00	1.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	1.60	1.60	1.60	1.60	1.60	1.60
12-COV :	1.00	1.00	1.00	1.00	1.00	1.00
13-AVE :	1.40	1.40	1.40	1.40	1.40	1.40
13-COV :	1.00	1.00	1.00	1.00	1.00	1.00
14-AVE :	1.40	1.40	1.40	1.40	1.40	1.40
14-COV :	1.00	1.00	1.00	1.00	1.00	1.00
15-AVE :	0.00	0.00	0.00	0.00	0.00	2.30
15-COV :	0.00	0.00	0.00	0.00	0.00	1.00
16-AVE :	1.60	1.60	1.60	1.60	1.60	1.60
16-COV :	1.00	1.00	1.00	1.00	1.00	1.00

Filterable Pollutant: Chemical Oxygen Demand (mg/L)

1-AVE :	23.00	84.00	84.00	38.00	23.00	0.00
1-COV :	1.00	1.00	1.00	1.00	1.00	0.00
2-AVE :	22.00	22.00	55.00	52.00	22.00	0.00
2-COV :	1.00	1.00	1.00	1.00	1.00	0.00
3-AVE :	107.00	107.00	107.00	113.00	107.00	0.00
3-COV :	1.00	1.00	1.00	1.00	1.00	0.00
4-AVE :	17.00	17.00	17.00	17.00	17.00	0.00
4-COV :	1.00	1.00	1.00	1.00	1.00	0.00
5-AVE :	22.00	22.00	22.00	22.00	22.00	0.00
5-COV :	1.00	1.00	1.00	1.00	1.00	0.00
6-AVE :	22.00	22.00	22.00	22.00	22.00	0.00

6-COV :	1.00	1.00	1.00	1.00	1.00	0.00
7-AVE :	40.00	40.00	101.00	191.00	40.00	0.00
7-COV :	1.00	1.00	1.00	1.00	1.00	0.00
8-AVE :	17.00	17.00	17.00	17.00	17.00	17.00
8-COV :	1.00	1.00	1.00	1.00	1.00	1.00
9-AVE :	20.00	20.00	20.00	20.00	20.00	20.00
9-COV :	1.00	1.00	1.00	1.00	1.00	1.00
10-AVE :	17.00	17.00	17.00	17.00	17.00	17.00
10-COV :	1.00	1.00	1.00	1.00	1.00	1.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	17.00	17.00	17.00	17.00	17.00	17.00
12-COV :	1.00	1.00	1.00	1.00	1.00	1.00
13-AVE :	22.00	22.00	22.00	22.00	22.00	22.00
13-COV :	1.00	1.00	1.00	1.00	1.00	1.00
14-AVE :	22.00	22.00	22.00	22.00	22.00	22.00
14-COV :	1.00	1.00	1.00	1.00	1.00	1.00
15-AVE :	0.00	0.00	0.00	0.00	0.00	78.00
15-COV :	0.00	0.00	0.00	0.00	0.00	1.00
16-AVE :	18.00	18.00	18.00	18.00	18.00	18.00
16-COV :	1.00	1.00	1.00	1.00	1.00	1.00

Filterable Pollutant: Fecal Coliform Bact. (#/100 ml)

1-AVE :	5030.00	80.00	80.00	5010.00	5030.00	0.00
1-COV :	1.00	1.00	1.00	1.00	1.00	0.00
2-AVE :	100000.00	100000.00	48000.00	9800.00	100000.00	0.00
2-COV :	1.00	1.00	1.00	1.00	1.00	0.00
3-AVE :	200000.00	200000.00	200000.00	200000.00	200000.00	0.00
3-COV :	1.00	1.00	1.00	1.00	1.00	0.00
4-AVE :	18000.00	18000.00	18000.00	18000.00	18000.00	0.00
4-COV :	1.00	1.00	1.00	1.00	1.00	0.00
5-AVE :	300000.00	300000.00	300000.00	300000.00	300000.00	0.00
5-COV :	1.00	1.00	1.00	1.00	1.00	0.00
6-AVE :	170000.00	170000.00	170000.00	170000.00	170000.00	0.00
6-COV :	1.00	1.00	1.00	1.00	1.00	0.00
7-AVE :	43000.00	43000.00	43000.00	170000.00	43000.00	0.00
7-COV :	1.00	1.00	1.00	1.00	1.00	0.00
8-AVE :	30000.00	30000.00	30000.00	30000.00	30000.00	30000.00
8-COV :	1.00	1.00	1.00	1.00	1.00	1.00
9-AVE :	30000.00	30000.00	30000.00	30000.00	30000.00	30000.00
9-COV :	1.00	1.00	1.00	1.00	1.00	1.00
10-AVE :	30000.00	30000.00	30000.00	30000.00	30000.00	30000.00
10-COV :	1.00	1.00	1.00	1.00	1.00	1.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	30000.00	30000.00	30000.00	30000.00	30000.00	30000.00
12-COV :	1.00	1.00	1.00	1.00	1.00	1.00
13-AVE :	18000.00	18000.00	18000.00	18000.00	18000.00	18000.00
13-COV :	1.00	1.00	1.00	1.00	1.00	1.00
14-AVE :	18000.00	18000.00	18000.00	18000.00	18000.00	18000.00
14-COV :	1.00	1.00	1.00	1.00	1.00	1.00
15-AVE :	0.00	0.00	0.00	0.00	0.00	43000.00
15-COV :	0.00	0.00	0.00	0.00	0.00	1.00
16-AVE :	30000.00	30000.00	30000.00	30000.00	30000.00	30000.00
16-COV :	1.00	1.00	1.00	1.00	1.00	1.00

Filterable Pollutant: Copper (microgram/L)

1-AVE :	2.82	0.85	0.85	1.60	0.85	0.00
1-COV :	1.18	0.72	0.72	0.94	0.72	0.00
2-AVE :	2.05	15.79	8.36	0.93	2.05	0.00
2-COV :	0.52	1.37	0.90	0.43	0.52	0.00
3-AVE :	2.28	2.28	2.28	154.00	2.28	0.00
3-COV :	0.20	0.20	0.20	1.64	0.20	0.00
4-AVE :	2.28	2.28	2.28	2.28	2.28	0.00
4-COV :	0.20	0.20	0.20	0.20	0.20	0.00
5-AVE :	2.28	2.28	2.28	2.28	2.28	0.00
5-COV :	0.20	0.20	0.20	0.20	0.20	0.00
6-AVE :	2.28	2.28	2.28	2.28	2.28	0.00
6-COV :	0.20	0.20	0.20	0.20	0.20	0.00
7-AVE :	1.34	1.34	1.34	4.23	1.34	0.00
7-COV :	0.39	0.39	0.39	1.16	0.39	0.00
8-AVE :	3.30	3.30	3.30	3.30	3.30	3.30
8-COV :	0.90	0.90	0.90	0.90	0.90	0.90
9-AVE :	3.30	3.30	3.30	3.30	3.30	3.30
9-COV :	0.90	0.90	0.90	0.90	0.90	0.90
10-AVE :	3.30	3.30	3.30	3.30	3.30	3.30
10-COV :	0.90	0.90	0.90	0.90	0.90	0.90
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	3.30	3.30	3.30	3.30	3.30	3.30
12-COV :	0.90	0.90	0.90	0.90	0.90	0.90
13-AVE :	2.28	2.28	7.00	5.94	2.28	2.28
13-COV :	0.20	0.20	1.45	1.29	0.20	0.20
14-AVE :	2.28	2.28	6.81	5.94	2.28	2.28
14-COV :	0.20	0.20	1.45	1.29	0.20	0.20
15-AVE :	0.00	0.00	0.00	0.00	0.00	1.34
15-COV :	0.00	0.00	0.00	0.00	0.00	0.39
16-AVE :	3.30	3.30	3.30	3.30	3.30	3.30
16-COV :	0.90	0.90	0.90	0.90	0.90	0.90

Filterable Pollutant: Lead (microgram/L)

1-AVE :	0.05	0.05	0.05	1.00	0.05	0.05
1-COV :	0.00	0.00	0.00	0.48	0.00	0.00
2-AVE :	1.00	1.48	1.57	1.66	1.00	0.00
2-COV :	0.71	1.13	0.60	0.07	0.71	0.00
3-AVE :	0.25	0.25	0.25	2.23	0.25	0.00
3-COV :	0.00	0.00	0.00	0.56	0.00	0.00
4-AVE :	1.00	1.00	1.00	1.00	1.00	0.00
4-COV :	0.71	0.71	0.71	0.71	0.71	0.00
5-AVE :	1.00	1.00	1.00	1.00	1.00	0.00
5-COV :	0.71	0.71	0.71	0.71	0.71	0.00
6-AVE :	1.00	1.00	1.00	1.00	1.00	0.00
6-COV :	0.71	0.71	0.71	0.71	0.71	0.00
7-AVE :	4.00	4.00	21.00	12.00	4.00	0.00
7-COV :	0.63	0.63	0.63	0.55	0.63	0.00
8-AVE :	0.73	0.73	0.73	0.73	0.73	2.00
8-COV :	0.70	0.70	0.70	0.70	0.70	0.70
9-AVE :	0.73	0.73	0.73	0.73	0.73	2.00
9-COV :	0.70	0.70	0.70	0.70	0.70	0.70

10-AVE :	0.73	1.00	0.73	0.73	0.73	2.00
10-COV :	0.70	0.70	0.70	0.70	0.70	0.70
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	0.70	0.73	0.73	0.73	0.73	2.00
12-COV :	0.70	0.70	0.70	0.70	0.70	0.70
13-AVE :	1.00	1.00	1.26	1.11	1.00	2.00
13-COV :	0.71	0.71	0.71	0.95	0.71	0.71
14-AVE :	1.00	1.00	1.26	1.11	1.00	2.00
14-COV :	0.71	0.71	1.00	0.95	0.71	0.71
15-AVE :	0.00	0.00	0.00	0.00	0.00	130.00
15-COV :	0.00	0.00	0.00	0.00	0.00	0.63
16-AVE :	0.73	0.73	0.73	0.73	0.73	2.00
16-COV :	0.70	0.70	0.70	0.70	0.70	0.70

Filterable Pollutant: Zinc (microgram/L)

1-AVE :	438.00	128.00	128.00	21.80	128.00	0.00
1-COV :	1.43	0.90	0.90	0.90	0.90	0.00
2-AVE :	55.50	144.00	92.00	39.20	55.50	0.00
2-COV :	0.83	1.38	1.40	1.42	0.83	0.00
3-AVE :	18.00	18.00	18.00	13.40	18.00	0.00
3-COV :	0.39	0.39	0.39	0.54	0.39	0.00
4-AVE :	55.50	55.50	55.50	55.50	55.50	0.00
4-COV :	0.83	0.83	0.83	0.83	0.83	0.00
5-AVE :	55.50	55.50	55.50	55.50	55.50	0.00
5-COV :	0.83	0.83	0.83	0.83	0.83	0.00
6-AVE :	55.50	55.50	55.50	55.50	55.50	0.00
6-COV :	0.83	0.83	0.83	0.83	0.83	0.00
7-AVE :	72.00	72.00	97.00	237.00	72.00	0.00
7-COV :	0.77	0.77	0.77	1.23	0.77	0.00
8-AVE :	165.00	165.00	165.00	165.00	165.00	19.00
8-COV :	1.71	1.71	1.71	1.71	1.71	1.71
9-AVE :	165.00	165.00	165.00	165.00	165.00	19.00
9-COV :	1.71	1.71	1.71	1.71	1.71	1.71
10-AVE :	165.00	165.00	165.00	165.00	165.00	19.00
10-COV :	1.71	1.71	1.71	1.71	1.71	1.71
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	165.00	165.00	165.00	165.00	165.00	2.00
12-COV :	1.71	1.71	1.71	1.71	1.71	1.71
13-AVE :	55.50	55.50	72.80	22.20	55.50	22.00
13-COV :	0.83	0.83	1.30	1.56	0.83	0.83
14-AVE :	55.50	55.50	72.80	22.20	55.50	22.00
14-COV :	0.83	0.83	1.30	1.56	0.83	0.83
15-AVE :	0.00	0.00	0.00	0.00	0.00	204.00
15-COV :	0.00	0.00	0.00	0.00	0.00	0.77
16-AVE :	165.00	165.00	165.00	165.00	165.00	2.00
16-COV :	1.71	1.71	1.71	1.71	1.71	1.71

Filterable Pollutant: Other 1 Ammonia (mg/L)

1-AVE :	0.50	1.10	1.10	0.40	0.50	0.00
1-COV :	1.00	1.00	1.00	1.00	1.00	0.00
2-AVE :	0.20	0.38	0.38	0.30	0.20	0.00
2-COV :	1.00	1.00	1.00	1.00	1.00	0.00
3-AVE :	0.05	0.05	0.05	0.05	0.05	0.00

3-COV :	1.00	1.00	1.00	1.00	1.00	0.00
4-AVE :	0.20	0.38	0.38	0.30	0.20	0.00
4-COV :	1.00	1.00	1.00	1.00	1.00	0.00
5-AVE :	0.05	0.05	0.05	0.05	0.05	0.00
5-COV :	1.00	1.00	1.00	1.00	1.00	0.00
6-AVE :	0.30	0.30	0.30	0.05	0.30	0.00
6-COV :	1.00	1.00	1.00	1.00	1.00	0.00
7-AVE :	0.42	0.05	0.05	0.05	0.42	0.00
7-COV :	1.00	1.00	1.00	1.00	1.00	0.00
8-AVE :	0.80	0.80	0.80	0.80	0.80	0.80
8-COV :	1.00	1.00	1.00	1.00	1.00	1.00
9-AVE :	0.05	0.05	0.05	0.05	0.05	0.05
9-COV :	1.00	1.00	1.00	1.00	1.00	1.00
10-AVE :	0.80	0.80	0.80	0.80	0.80	0.80
10-COV :	1.00	1.00	1.00	1.00	1.00	1.00
11-AVE :	0.00	0.00	0.00	0.00	0.00	0.00
11-COV :	0.00	0.00	0.00	0.00	0.00	0.00
12-AVE :	0.80	0.80	0.80	0.80	0.80	0.80
12-COV :	1.00	1.00	1.00	1.00	1.00	1.00
13-AVE :	0.20	0.38	0.38	0.30	0.20	0.30
13-COV :	1.00	1.00	1.00	1.00	1.00	1.00
14-AVE :	0.20	0.38	0.38	0.30	0.20	0.30
14-COV :	1.00	1.00	1.00	1.00	1.00	1.00
15-AVE :	0.42	0.05	0.05	0.05	0.42	0.05
15-COV :	1.00	1.00	1.00	1.00	1.00	1.00
16-AVE :	0.05	0.05	0.05	0.05	0.05	0.50
16-COV :	1.00	1.00	1.00	1.00	1.00	1.00

Appendix 5-H. Medium.cpz File Printout

Size distribution file name: MEDIUM.CPZ
Size distribution file description: PARTICLE SIZE DISTRIBUTION FOR URBAN RUNOFF HAVING MEDIUM TOTAL RESIDUE CONCENTRATIONS
Date: 03-08-1999

Entry Number	Critical Size (microns)	Percent > Critical Size
0	0	100.0
1	1	99.0
2	2	94.0
3	3	90.0
4	4	86.0
5	5	82.0
6	6	79.0
7	7	76.0
8	8	73.0
9	9	70.0
10	10	67.0
11	11	65.0
12	12	63.0
13	13	61.0
14	14	59.0
15	15	58.0
16	20	51.0
17	25	46.0
18	30	42.0
19	35	38.0
20	40	35.0
21	50	31.0
22	60	28.0
23	80	23.0
24	100	19.0
25	150	14.0

26	200	11.0
27	300	8.0
28	500	5.0
29	800	3.0
30	1000	2.0
31	2000	0.0