

# **Stormwater Report**

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## **Milwaukie Riverfront Park**

**City of Milwaukie**

*Prepared For:*

**City of Milwaukie**

*Prepared By:*

**David Evans and Associates, Inc.**

**December 2009**

# Stormwater Report

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## Milwaukie Riverfront Park

**City of Milwaukie**

*Prepared for:*

**City of Milwaukie**

**JoAnn Herrigel, Community Services Director**

10722 SE Main Street

Milwaukie, OR 97222

*Prepared by:*

**David Evans and Associates, Inc.**

2100 SW River Parkway

Portland, Oregon 97201

DEA Project Number: MAEX0000-0019

**December 2009**

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## **1 INTRODUCTION**

The City of Milwaukie Riverfront Park Project is located between McLoughlin Blvd. and the Willamette River at the Kellogg Creek inflow. The City has long desired to improve pedestrian access to Riverfront recreational facilities and to reconnect the downtown business and retail areas to Riverfront. Improvements to the park include an amphitheater, restrooms, plaza, boat parking, car parking, pedestrian suspension bridge, boat ramp and dock, floating dock, pavilion with overlook, and multi-use paths.

The project is located in the City of Milwaukie and falls under the administration of the City of Milwaukie (COM) Public Works Design Standards for stormwater design. This report addresses the stormwater design of the park improvements in relation to COM stormwater regulations.

## **2 EXISTING SITE**

The existing park has two parking areas and a boat ramp. The majority of the existing impervious areas will be removed for the new layout of parking and sidewalks. The vehicular bridge crossing Kellogg Creek and connecting the north and south parking areas will remain and will be incorporated into the site improvements. The total pre-development site impervious area is approximately 103,960 square-feet (2.4 acres). An impervious area of 95,756 square-feet (2.2 acres) will be removed. An impervious area of 8,204 square-feet (0.2 acres) of sidewalk will remain. For the most part there is not an existing storm system. Stormwater from the impervious surfaces flows down the river bank to the Willamette River. However, there are two existing catch basins that collect part of the driveway stormwater runoff. These catch basins will be removed during construction since the driveway will be relocated.

## **3 PROPOSED IMPROVEMENTS**

The Riverfront Park project has multiple uses including large grassy areas, picnic facilities, plaza with restrooms, amphitheater, benches for viewing the river, natural vegetative areas with trails, a boat ramp and parking, and transient boat dock. The site has 20 long parking spaces for vehicles with trailers and 16 standard size parking spaces. The site improvements will add 122,821 square-feet (2.8 acres) of impervious area to the existing 8,204 square-feet (0.2 acres) that will remain. The total impervious area for the site post-development will be 131,025 square-feet (3.0 acres). The project will create a net increase of 27,065 square-feet (0.6 acres) of impervious area. For discussion of stormwater the site has been divided into three key areas. These areas are the north and south parking (intersected by Kellogg creek connected by an existing vehicle bridge and

the proposed pedestrian bridge) and the north pedestrian plaza. All storm water from vehicular impervious surfaces on the site will be collected and all storm water up to the 10-year event will be treated and infiltrated on the site. Overflow from larger storms, and runoff from some non-vehicular surfaces will be discharged at six pipe outfalls into the Willamette River.

Appendix A shows the existing site plan and the proposed site layout and storm design.

## 4 HYDROLOGIC PARAMETERS

Table 4.1 details the 24-hour rainfall amounts for the City of Milwaukie taken from Oregon’s isopluvial maps published by NOAA.

**Table 4.1: 24-Hour Rainfall Amounts for the City of Milwaukie**

| Recurrence Interval (years) | Total Rainfall (inches) |
|-----------------------------|-------------------------|
| 2                           | 2.7                     |
| 5                           | 3.1                     |
| 10                          | 3.4                     |
| 25                          | 3.9                     |
| 100                         | 4.6                     |
| WQ                          | 0.83                    |

The existing soil in the project area is Urban Land (Hydrologic Soil Group D). The pervious area curve number (CN) used is 84 (fair condition open space) and the impervious area CN used is 98. An estimated time of concentration of 15.0 minutes was used for existing conditions analysis. The post construction time of concentration was calculated as a 5 minute travel time to water quality and detention facilities plus the travel time through the water quality and detention facilities.

## 5 PROPOSED WATER QUALITY

COM stormwater regulations state that water quality facilities are required to meet the design standards of the current City of Portland, Stormwater Management Manual (SWMM). SWMM specifies that pollution reduction is required for all impervious areas created by development projects with the exception of roof areas. SWMM regulations require water quality facilities to treat stormwater runoff generated by 0.83 inches of rainfall over a 24-hour period when using the SBUH hydrograph-based analysis method.

## 5.1 SOUTH PARKING

Stormwater runoff in the south parking area (Basins C1, C2, C3 and C4) is treated and detained in four (4) separate facilities; one (1) vegetated swale/planter and three (3) infiltration planters. All facilities are designed to meet the water quality treatment requirements specified by the SWMM. The City of Portland, Bureau of Environmental Services (BES), Presumptive Approach Calculator was used to model water quality storm event capacity of all water quality facilities. For Basin Map see Appendix B.

The south parking area includes a plaza overlooking the Willamette River. This overlook is Basin C1 (3,796 square feet impervious). The storm water runoff from Basin C1 is collected by sheet flow into two (2) infiltration planters, Planter #1 and Planter #2. The two planters combine to provide 477 cubic feet (cf) of storage volume (344 cf above grade, and 103 cf in the voids of drain rock below grade). An area drain overflow will be placed 12-inches above the bottom of the planter. The 12 inches of dead storage provides water quality treatment and allows time for the storm water to infiltrate. The planters treat the water quality storm event flow of 0.016 cubic feet per second (cfs) and also fully infiltrate the 10-year storm water runoff of 0.077 cfs. The soils for the project site are classified as Urban Soils by the USDA Soil Conservation Service. Urban Soils are not provided with typical infiltration rates. Soils adjacent to our site that are classified have reported infiltration rates between 0.6 – 2.0 inches per hour. We have assumed an infiltration rate of 2.0 inches per hour.

Runoff from Basin C2 (16,320 square-foot impervious and 3,465 square feet pervious) is conveyed to a vegetated swale, “South Swale,” through concrete curb cuts. The swale is located along vehicle turn-around next to the river overlook. The swale is 188 feet long. It has a 0.5-foot bottom width and 3L:1V side slopes. Initially the swale is 1.5 feet deep, but increases to a depth of 3 feet at the outlet point. The South Swale conveys the storm water to Planter #3.

Planter #3 is along the same alignment as South Swale. The remainder of the C2 Basin surface area that does not discharge storm water to the swale is collected into Planter #3 through concrete curb cuts. Basin C2 generates a water quality runoff flow rate of 0.067 cfs. Planter #3 has 1,814 cf of storage volume (1,395 cf above grade, and 418 cf below grade). An area drain overflow is placed at an elevation of 12-inches above the bottom of the pond. The 12-inches of dead storage provide water quality and infiltration. The swale and Planter #3 combine to treat a water quality runoff flow rate of 0.067 cfs and also fully infiltrate the runoff from a 10-year event of 0.208 cfs.

Runoff from Basin C3 is conveyed to “Large Pond”. The pond is located at the center island between trailer parking and standard parking. Runoff from Basin C3 (10,212 square feet impervious and 3,222 square-foot pervious) is conveyed to Large Pond

through concrete curb cuts. The water quality storm event for Basin C3 generates a runoff of 0.042 cfs. Large Pond has a storage volume of 1,032 cf. The proposed outlet is a ditch inlet with inlet elevation 18 inches above the bottom of the pond. The 18-inch difference creates a dead storage for water quality and infiltration (2.0 inches per hour infiltration was used for modeling). The Large Pond also infiltrates the entire storm water runoff from a 10-year storm event, 0.208 cfs

Basin C4 includes the roadway area south of the bridge crossing Kellogg Creek. Runoff from Basin C4 (3,328 sf impervious) is conveyed to Planter #4. Similar to the other planters, there is an area drain placed 12 inches above the bottom of the planter to maximize treatment and infiltration. Planter #4 provides 553 cf of storage volume (425 cf above grade, and 128 cf below grade). The planter provides treatment for the water quality flow of 0.014 cfs and fully infiltrates the runoff from the 10-year event, 0.068 cfs.

For water quality and detention calculations see Appendix C.

## **5.2 NORTH PARKING**

Stormwater runoff in the north parking area (Basins N1, N2, and N3) is treated and detained in three (3) separate facilities; one (1) flat planter and two (2) sloped planters. All three planters are designed to SWMM's water quality requirements.

Basin N1 includes the lower level parking drive aisle and sidewalks. Storm water is conveyed into Planter #5 via trench drain located at the top of the boat ramp and by curb cuts along the drive aisle. Storm water runoff from Basins N1 (11,375 square-foot impervious) generates a water quality runoff flow of 0.047 cfs. Planter #5 is 7 feet wide by 151 feet long and is sloped at 1.5% to match the slope of the adjacent drive aisle. The planter has six (6) check dams spaced equally along the bottom of the planter to maximize the infiltration area. With 12-inches of dead storage and 12-inches of drain rock media below grade, there is approximately 1,205 cf of storage volume (907 cf above grade, and 298 cf below grade). The planter provides treatment for the water quality storm event (0.047 cfs) and fully infiltrates the 10-year storm event runoff (0.232 cfs) with no overflow. An overflow catch basin is providing 12 inches above the bottom of the planter for larger storm events.

Basin N2 (6,372 sf impervious) includes the paved drive aisle directly north of the Kellogg Creek Bridge. Storm water is conveyed to Planter #6 via trench drain. Planter #6 is on the opposite side of the lower drive aisle from Planter #5. And, it is just west of Planter #7. The planter is shaped like a sawtooth and is sloped, similar to Planter #5, at a 1.5-percent grade. Planter #6 also includes check dams to maximize infiltration. The

planter has an average bottom width of 7 feet. The planter has a vertical retaining wall on the east side and has 3L:1V side slopes on the west side. Planter #6 provides treatment for the water quality storm event (0.026 cfs) and fully infiltrates the 10-year storm event runoff (0.130 cfs) with no overflow. An overflow catch basin is provided 12 inches from the bottom of the planter to manage larger storm events.

Basin N3 (3,429 sf impervious, and 6,487 pervious) includes the upper level parking and drive aisle. The parking stall pavement surface is a pervious pavement material to allow for immediate surface infiltration. Storm water runoff from Basin N3 sheet flows across the parking stalls and through curb cuts to Planter #7. The planter zigzags along the front of the parking stall and is 3 feet wide. Planter #7 has 3 inches of dead storage and 12 inches of drain rock media below grade, providing 288 cf of storage volume (131 cf above grade, and 157 cf below grade). Planter #7 provides treatment for the water quality storm event (0.014 cfs) and fully infiltrates the 10-year storm event runoff (0.070 cfs) with no overflow. Overflow notches in the planter wall located 3 inches above the bottom of the planter allow for sufficient overflow for the larger storm events.

For water quality and detention calculations see Appendix C.

### **5.3 PEDESTRIAN PLAZA**

The Pedestrian Plaza area includes the restrooms, water features, planters, and amphitheater these areas have two (2) water quality features for stormwater treatment. A swale is proposed on the south side of the plaza and a filter strip is proposed on the far north side of the plaza. All the facilities meet SWMM's requirements for water quality. A large percentage of the plaza is graded to sheet flow stormwater runoff run into adjacent planters or grassy areas. These areas were not modeled for water quality purposes.

On the south side of the plaza there is a 100-foot long water quality swale with 12-inch high check dams located every 25 feet to allow for higher infiltration. The swale is sloped at approximately 4 percent and the bottom width is 9 feet. The side slopes are 2L:1V. The swale treats a water quality runoff event of 0.044 cfs from Basin P1 (10,660 square-feet of impervious). Basin P1 storm water is collected in area drains and is conveyed to the swale using a 12-inch pipe. The swale also infiltrates 99 percent of the 10-year storm event with a runoff flow rate of 0.07 cfs.

On the south side of the plaza there is an 80-foot long water quality swale with 12-inch high check dams located every 20 feet to allow for higher infiltration. The swale is sloped at approximately 3.4 percent and the bottom width is 4 feet. The side slopes are 2L:1V. The swale treats a water quality runoff event of 0.009 cfs from Basin P2



(2,145 square-feet of impervious). Basin P2 storm water is collected by area drains and is conveyed to the swale using a 12-inch pipe. The swale also infiltrates 100 percent of the 10-year storm event with a runoff flow rate of 0.044cfs.

Both swales treating storm water from the plaza areas eventually discharge to the Willamette River.

For water quality and detention calculations see Appendix C.

## 6 PROPOSED DETENTION

Since infiltration rates in this area are not high enough to infiltrate the 2-, 5-, 10-, and 25-year storm event, it is necessary to provide a detention system in order to meet the COM flow attenuation requirements: post-development flow for 2-, 5-, 10-, and 25-year storm events shall be detained to the pre-development discharge rate. The detention facilities for the project have been designed to meet the COM requirements.

Table 6.0 is a summary of the pre and post development runoff flow-rates for the 2-, 5-, 10-, and 25-year storm events.

**Table 6.0: Pre- and Post-Development Flow and Detention Requirements**

| Recurrence Interval (years) | Pre-Development Flow (cfs) | Post-Development Flow (cfs) | Flow Reduction (cfs) |
|-----------------------------|----------------------------|-----------------------------|----------------------|
| 2                           | 1.31                       | 0.96                        | 0.35                 |
| 5                           | 1.52                       | 1.17                        | 0.35                 |
| 10                          | 1.67                       | 1.38                        | 0.29                 |
| 25                          | 1.93                       | 1.59                        | 0.34                 |

### 6.1 SOUTH PARKING

Table 6.1.1 is a summary of the proposed South Parking area water quality and detention facilities. Inflow is the sum of flow from all basins (Basins C1, C2, C3 and C4). Modeled outflow is the post-development flow released from the four (4) separate facilities; one (1) vegetated swale/planter and three (3) infiltration planters.

**Table 6.1.1: South Parking Detention Summary**

| Recurrence Interval (years) | Inflow (cfs) | Modeled Outflow (cfs) | Flow Reduction (cfs) |
|-----------------------------|--------------|-----------------------|----------------------|
| 2                           | 0.52         | 0.48                  | 0.02                 |
| 5                           | 0.61         | 0.58                  | 0.03                 |
| 10                          | 0.68         | 0.68                  | 0.00                 |
| 25                          | 0.79         | 0.79                  | 0.00                 |

The total storm water detention storage volume for the South Parking treatment facilities is approximately 3,846 cubic feet.

For water quality and detention calculations see Appendix C.

## 6.2 NORTH PARKING

Table 6.2.1 is a summary of the proposed North Parking area water quality and detention facilities. Inflow is the sum of flow from all the basins (Basin N1, N2, and N3). Modeled outflow summation of the flow that is released from the three (3) facilities; one (1) flat planter and two (2) sloped planters.

**Table 6.2.1: North Parking Detention Summary**

| Recurrence Interval (years) | Inflow (cfs) | Modeled Outflow (cfs) | Flow Reduction (cfs) |
|-----------------------------|--------------|-----------------------|----------------------|
| 2                           | 0.42         | 0.30                  | 0.12                 |
| 5                           | 0.49         | 0.37                  | 0.12                 |
| 10                          | 0.55         | 0.43                  | 0.12                 |
| 25                          | 0.62         | 0.50                  | 0.12                 |

The total storm water detention storage volume for the North Parking treatment facilities is approximately 1,822 cubic feet.

For water quality and detention calculations see Appendix C.

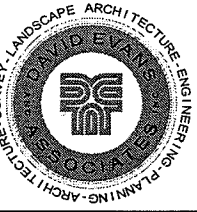
## 6.3 PEDESTRIAN PLAZA

The proposed Pedestrian Plaza area water quality swales provide treatment and some detention value; however, we did not include detention in our analysis. The detention value is in the form of check dams spaced 20 to 25 feet apart. The total storm water detention storage volume for the Pedestrian Plaza treatment facilities is approximately 814 cubic feet.

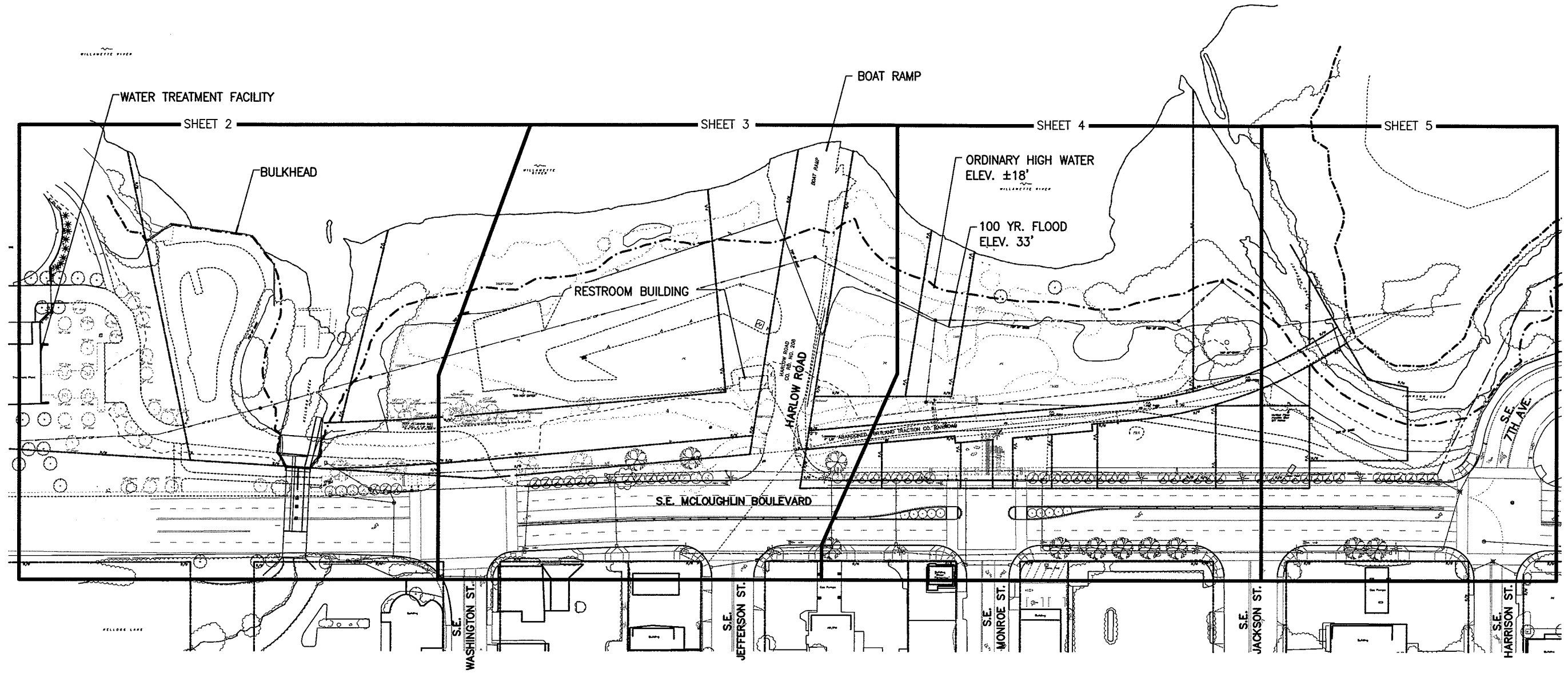
For water quality and detention calculations see Appendix C.

# **Appendix A**

## ***Existing Site Plan and Proposed Site Plan***



2100 SW River Parkway  
 Portland OR 97201  
 Phone: 503.223.6663  
 Fax: 503.223.2701



|                   |                          |           |               |
|-------------------|--------------------------|-----------|---------------|
| CITY OF MILWAUKIE | DEPARTMENT               | SIGNATURE | APPROVAL DATE |
|                   | CITY LANDSCAPE ARCHITECT |           |               |
|                   | COMMUNITY DEVELOPMENT    |           |               |
|                   | PUBLIC WORKS             |           |               |

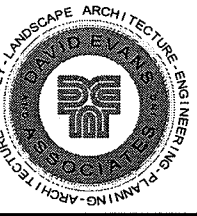
|             |   |
|-------------|---|
| PROJECT     | MILWAUKIE RIVERFRONT PARK<br>PARK IMPROVEMENT PROJECT<br>S.E. HARRISON STREET - KELLOGG CREEK |
| SHEET TITLE | EXISTING SITE CONDITIONS  |

| NO. | DATE | REVISION | BY |
|-----|------|----------|----|
|     |      |          |    |
|     |      |          |    |
|     |      |          |    |
|     |      |          |    |
|     |      |          |    |
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|        |            |
|--------|------------|
| SCALE: | 1" = 60'   |
| DATE:  | 01-05-2009 |
| DRN.   | BAR        |
| CK.    | RGWI       |

|         |             |
|---------|-------------|
| JOB NO. | MAEX0000018 |
| 1       |             |

Drawing File: F:\M\MAEX0000018\040000\018\040000\018.dwg Date/Time: Dec 11, 2009 11:48am User: sgh



2100 SW River Parkway  
Portland OR 97201  
Phone: 503.223.6663  
Fax: 503.223.2701

|                   |                          |                       |
|-------------------|--------------------------|-----------------------|
| CITY OF MILWAUKIE | APPROVAL DATE            |                       |
|                   | SIGNATURE                |                       |
| DEPARTMENT        | CITY LANDSCAPE ARCHITECT | COMMUNITY DEVELOPMENT |
|                   |                          | PUBLIC WORKS          |

PROJECT  
**MILWAUKIE RIVERFRONT PARK  
PARK IMPROVEMENT PROJECT**  
S.E. HARRISON STREET - KELLOGG CREEK

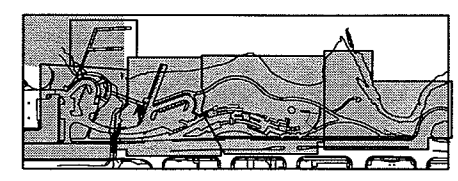
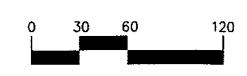
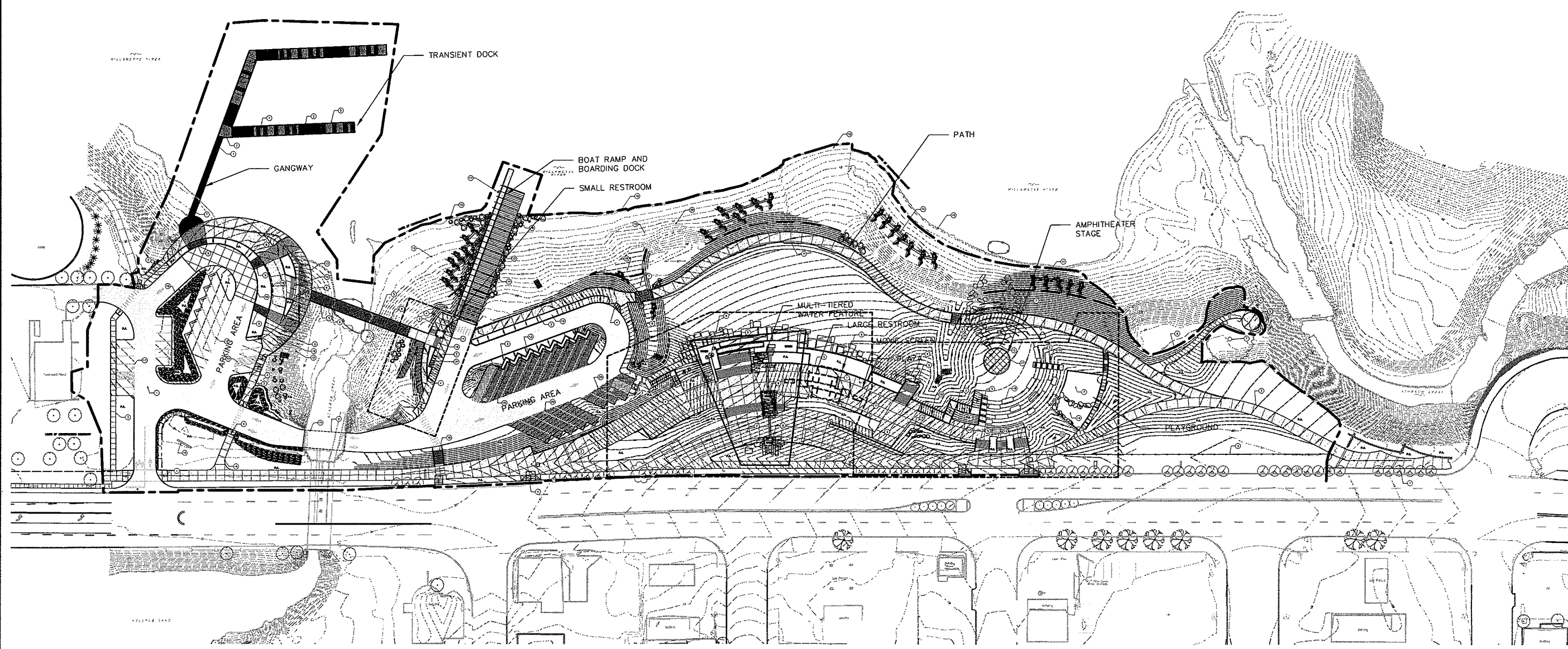
SHEET TITLE  
**LANDSCAPE SITE PLAN  
SHEET 0**

| NO. | DATE | REVISION | BY |
|-----|------|----------|----|
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**PRELIMINARY:**  
NOT FOR CONSTRUCTION

SCALE: AS SHOWN  
DATE: 12-01-08  
DRN. BAR  
CK. RGWI

**L200**  
JOB NO. MAEX00000018

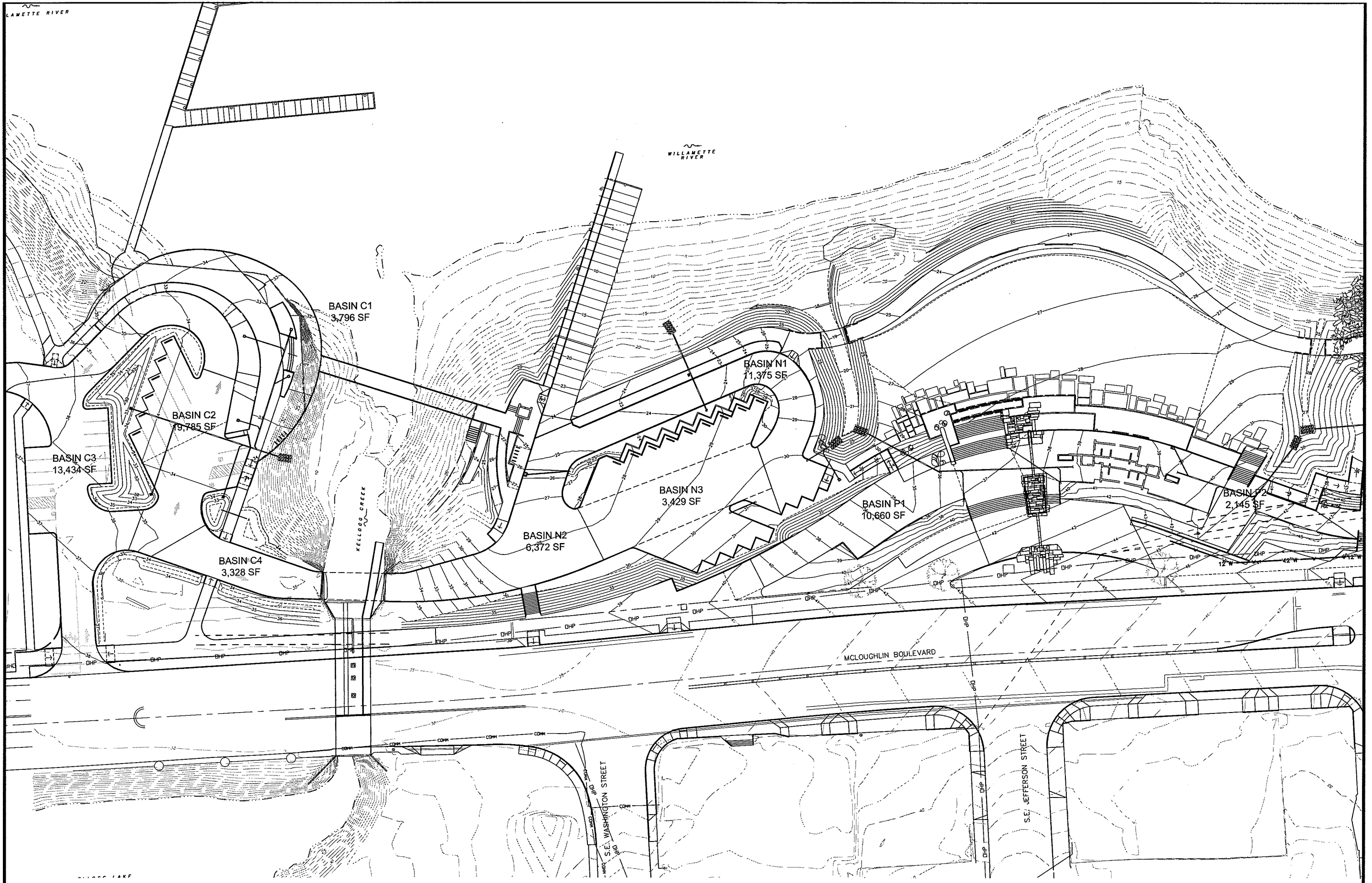


**KEY MAP**  
NOT TO SCALE

Drawing File: P:\M\MAEX00000018\0400CAD\DWG\Sheet\3\_LANDSCAPE\L200\_MAEX0018\_CONSTR.dwg Date/Time: Dec 11, 2009 - 11:56am User: adf

# **Appendix B**

## ***Basin Map***



2100 SW River Parkway  
 Portland OR 97201  
 Phone: 503.223.6663  
 Fax: 503.223.2701

| CITY OF MILWAUKIE        |           | APPROVAL DATE |  |
|--------------------------|-----------|---------------|--|
| DEPARTMENT               | SIGNATURE |               |  |
| CITY LANDSCAPE ARCHITECT |           |               |  |
| COMMUNITY DEVELOPMENT    |           |               |  |
| PUBLIC WORKS             |           |               |  |

PROJECT  
**MILWAUKIE RIVERFRONT PARK  
 PARK IMPROVEMENT PROJECT**  
 S.E. HARRISON STREET - KELLOGG CREEK

SHEET TITLE  
**APPENDIX-B  
 BASIN MAP**

| NO. | DATE | REVISION BY |
|-----|------|-------------|
|     |      |             |
|     |      |             |
|     |      |             |

|        |     |
|--------|-----|
| SCALE: | NTS |
| DATE:  |     |
| DRN:   | KRN |
| CK:    |     |

**B**

JOB NO. MAEX00000018

Underground Service Alert  
 Call: TOLL FREE  
 1-800-422-4133  
 TWO WORKING DAYS  
 BEFORE YOU DIG

Drawing File: P:\MILWAUKIE\00000018\040000\DWG\Storm\_Report\Appendix B-Basin\_Map2.dwg Date/Time: Dec 11, 2009 - 11:05am User: ash

## **Appendix C**

### ***Water Quality and Detention Analysis***





# Presumptive Approach Calculator ver. 1.1

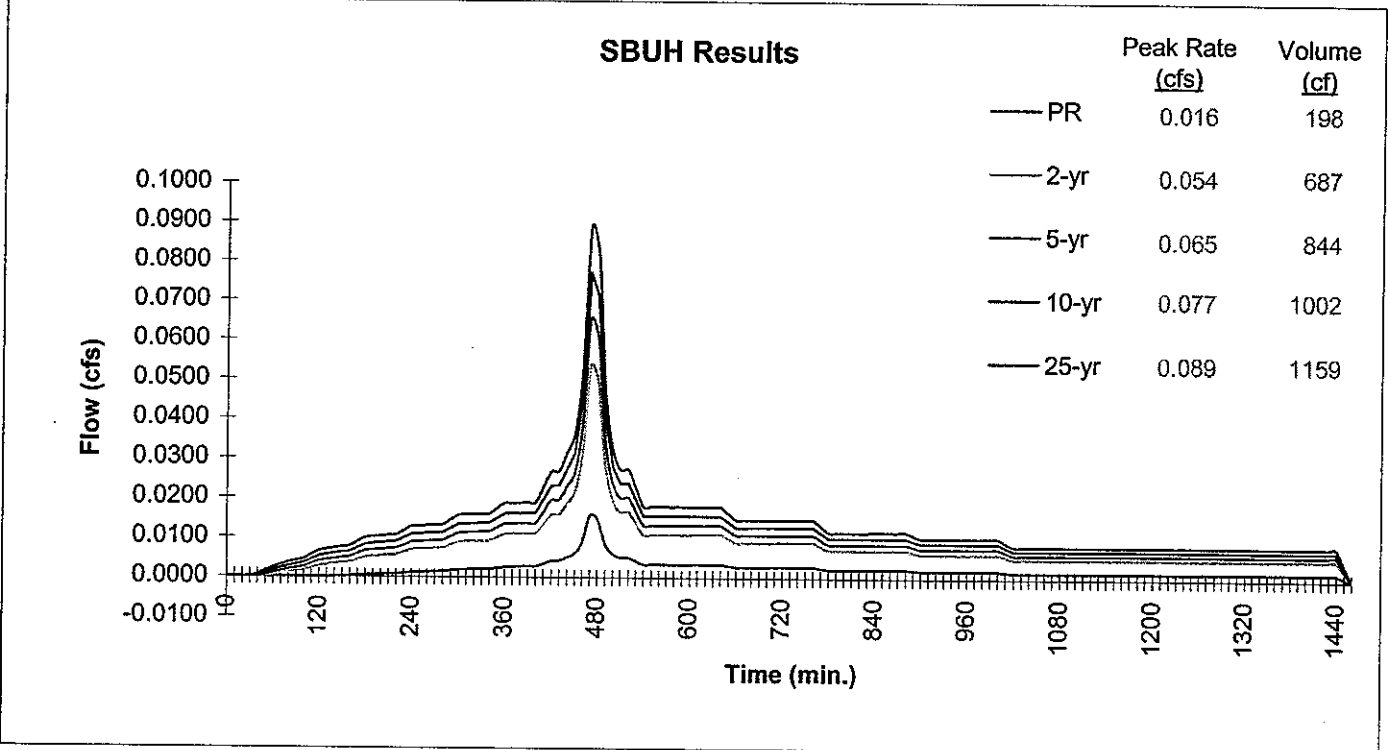
Catchment Data

Project Name: **Milwaukie Park - Overlook Catch**  
 Project Address: **-**  
**Milwaukie, OR**  
 Designer: **SDH**  
 Company: **David Evans and Associates, Inc.**

Catchment ID: **C1**  
 Date: **03/15/09**  
 Permit Number: **-**  
 Run Time: 5/13/2009 10:56:06 AM

| Drainage Catchment Information   |                       |
|--|-----------------------|
| Catchment ID   | C1                    |
| <b>Catchment Area</b>  |                       |
| Impervious Area  | 3,796 SF              |
| Impervious Area  | 0.09 ac               |
| Impervious Area Curve Number, $CN_{imp}$   | 98                    |
| Time of Concentration, $T_c$ , minutes   | 5 min.                |
| Site Soils & Infiltration Testing Data   |                       |
| Infiltration Testing Procedure:  | Open Pit Falling Head |
| Native Soil Field Tested Infiltration Rate ( $I_{test}$ ):                                   | 2 in/hr               |
| Bottom of Facility Meets Required Separation From High Groundwater Per BES SWMM Section 1.4: | Yes                   |
| Correction Factor Component  |                       |
| $CF_{test}$ (ranges from 1 to 3)   | 2                     |
| Design Infiltration Rates  |                       |
| $I_{dsgn}$ for Native ( $I_{test} / CF_{test}$ ):  | 1.00 in/hr            |
| $I_{dsgn}$ for Imported Growing Medium:  | 2.00 in/hr            |

**Execute SBUH Calculations**





**Presumptive Approach Calculator ver. 1.1**

Catchment ID: **C1**

Run Time: 5/13/2009 10:56:06 AM

Project Name: Milwaukie Park - Overlook Catch

Catchment ID: C1

Date: 3/15/2009

**Instructions:**

1. Identify which Stormwater Hierarchy Category the facility.
2. Select Facility Type.
3. Identify facility shape of surface facility to more accurately estimate surface volume, except for Swales and sloped planters that use the PAC Sloped Facility Worksheet to enter data.
4. Select type of facility configuration.
5. Complete data entry for all highlighted cells.

Catchment facility will meet Hierarchy Category: 1

**Goal Summary:**

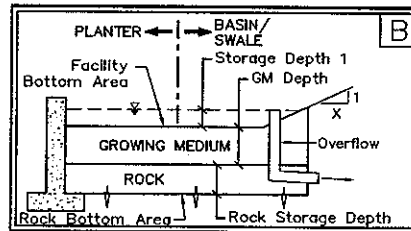
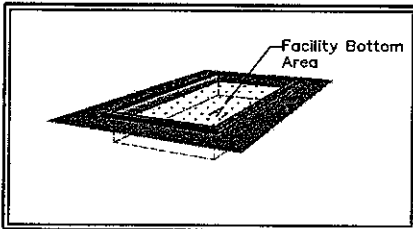
| Hierarchy Category | SWMM Requirement   | RESULTS box below needs to display... |                           | Facility configurations allowed |
|--------------------|--|---------------------------------------|---------------------------|---------------------------------|
|                    |  | Pollution Reduction as a              | 10-yr (aka disposal) as a |                                 |
| 1                  | On-site infiltration with a surface infiltration facility. | PASS                                  | PASS                      | A or B                          |

Facility Type = Planter (Flat)



Facility Shape: Rectangle/Square

Facility Configuration: B



**DATA FOR ABOVE GRADE STORAGE COMPONENT**

Facility Bottom Area = 344 sf  
 Bottom Width = 18.0 ft  
 Facility Side Slope = 0 to 1  
 Storage Depth 1 = 12 in  
 Growing Medium Depth = 18 in  
 Freeboard Depth = N/A in

**BELOW GRADE STORAGE**

Rock Storage Bottom Area = 344 sf  
 Rock Storage Depth = 12 in  
 Rock Void Ratio = 0.3

Calculation Guide  
 Max. Rock Stor.  
 Bottom Area  
 344 SF

Surface Capacity at Depth 1 = 344 cf  
 GM Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.016 cfs

Rock Storage Capacity = 103 cf  
 Native Design Infiltration Rate = 1.00 in/hr  
 Infiltration Capacity = 0.008 cfs

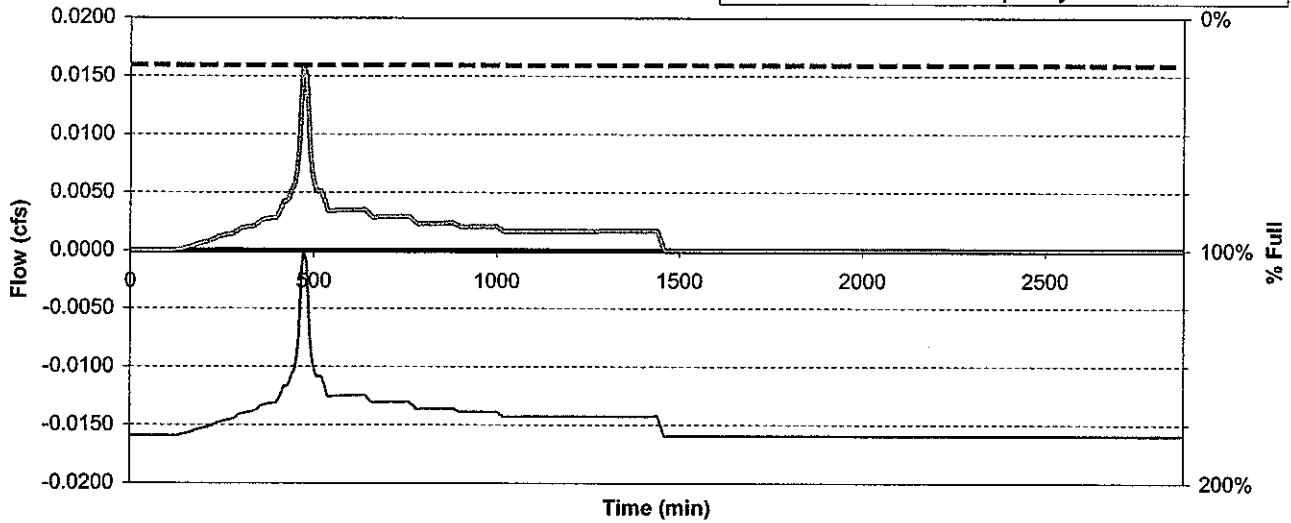
| RESULTS             |             | Overflow Volume |                            |
|---------------------|-------------|-----------------|----------------------------|
| Pollution Reduction | <b>PASS</b> | 0 CF            | <u>0%</u> Surf. Cap. Used  |
|                     |             |                 | <u>9%</u> Rock Cap. Used   |
| 10-yr               | <b>PASS</b> | 0 CF            | <u>81%</u> Surf. Cap. Used |
|                     |             |                 | <u>100%</u> Rock Cap. Used |

| FACILITY FACTS  |               |
|---|---------------|
| Total Facility Area Including Freeboard =             | <b>344 SF</b> |
| Sizing Ratio (Total Facility Area / Catchment Area) = | <b>0.091</b>  |

**Pollution Reduction Event  
Surface Facility Modeling**

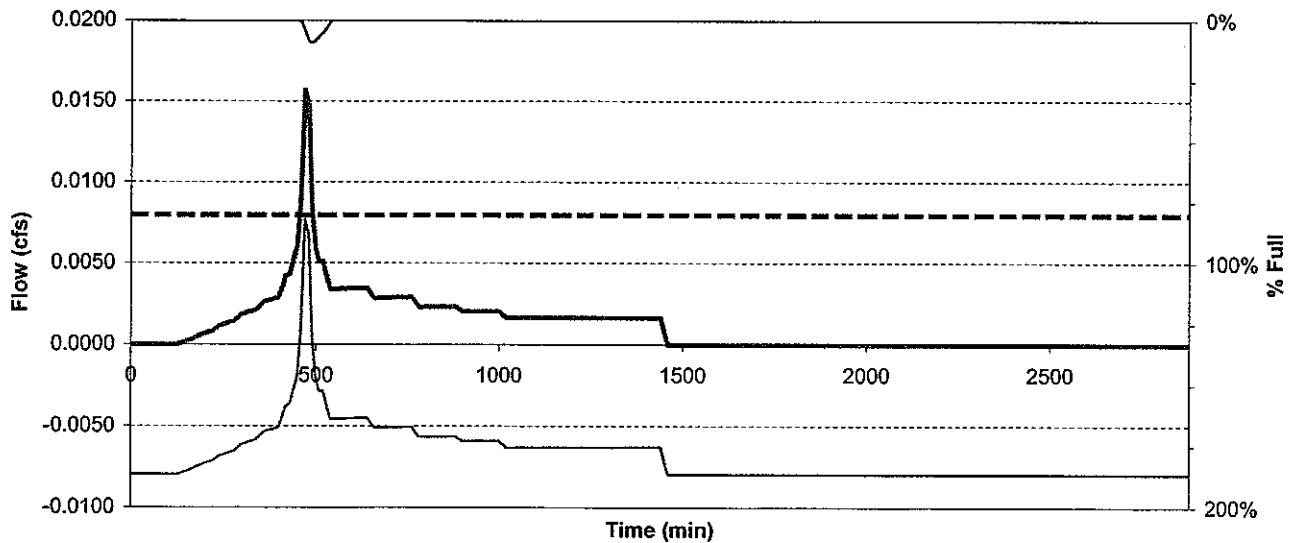
Project Name: Milwaukie Park - Overlook Catch  
 Run Time: 5/13/2009 10:56:06 AM  
 Catchment ID: C1  
 Hierarchy: 1  
 Facility Type: Planter (I)  
 Facility Configuration: B

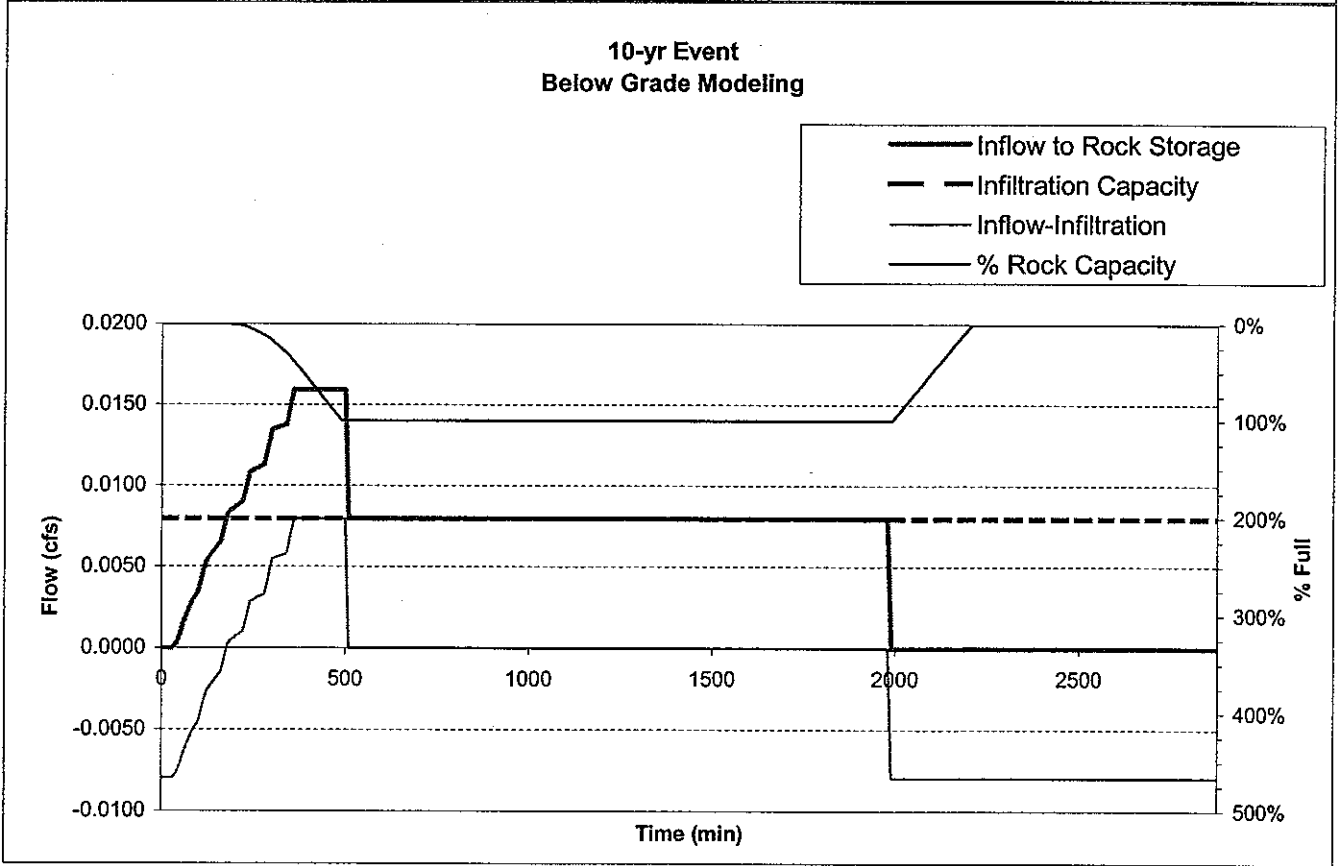
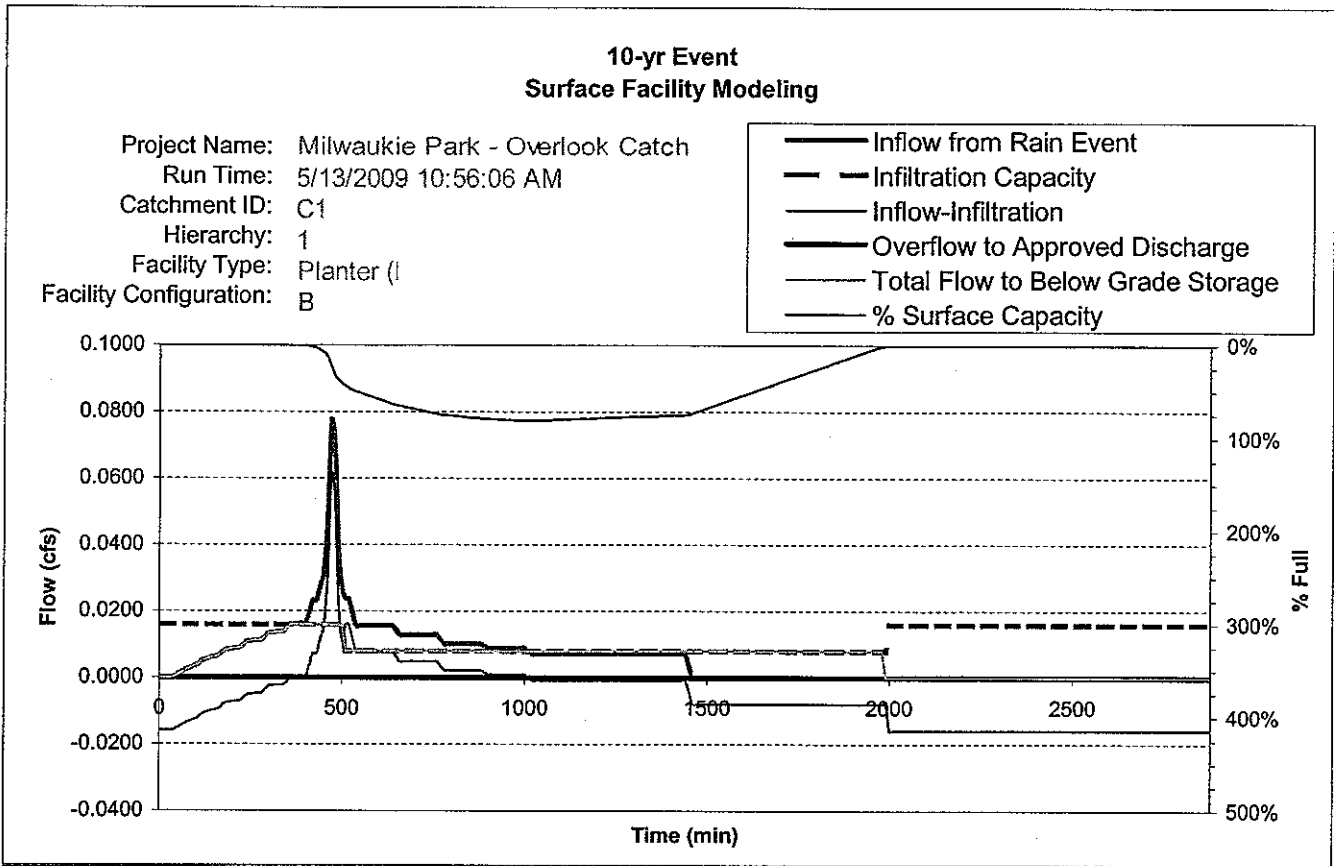
- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Percolation to Below Grade Storage
- % Surface Capacity



**Pollution Reduction Event  
Below Grade Modeling**

- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity







# Presumptive Approach Calculator ver. 1.1

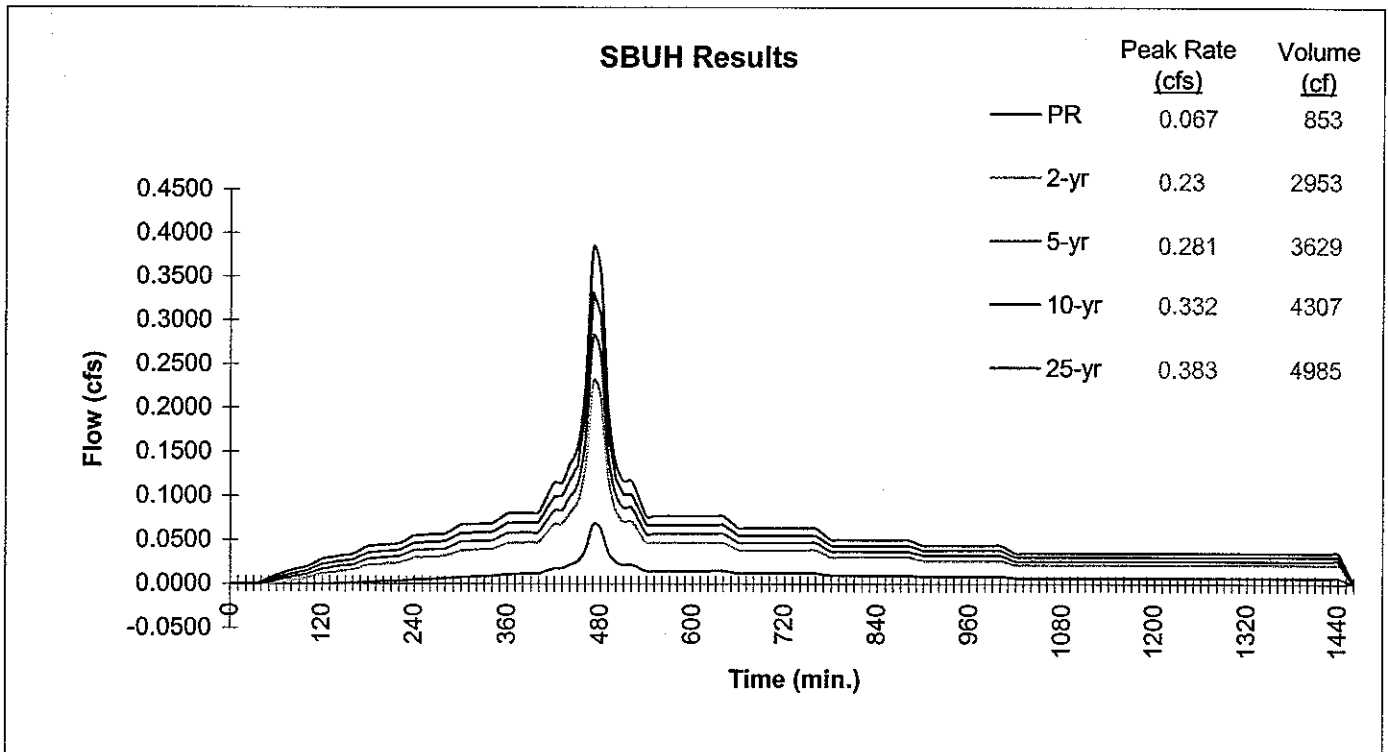
Catchment Data

Project Name: **Milwaukie Park - So. Parking1 Catch**  
 Project Address: **-**  
**Milwaukie, OR**  
 Designer: **SDH**  
 Company: **David Evans and Associates, Inc.**

Catchment ID: **C2**  
 Date: **03/15/09**  
 Permit Number: **-**  
 Run Time: 5/13/2009 11:09:52 AM

| Drainage Catchment Information   |                       |
|--|-----------------------|
| Catchment ID   | C2                    |
| <b>Catchment Area</b>  |                       |
| Impervious Area  | 16,320 SF             |
| Impervious Area  | 0.37 ac               |
| Impervious Area Curve Number, $CN_{imp}$   | 98                    |
| Time of Concentration, $T_c$ , minutes   | 5 min.                |
| Site Soils & Infiltration Testing Data   |                       |
| Infiltration Testing Procedure:  | Open Pit Falling Head |
| Native Soil Field Tested Infiltration Rate ( $I_{test}$ ):                                   | 2 in/hr               |
| Bottom of Facility Meets Required Separation From High Groundwater Per BES SWMM Section 1.4: | Yes                   |
| Correction Factor Component  |                       |
| $CF_{test}$ (ranges from 1 to 3)   | 2                     |
| Design Infiltration Rates  |                       |
| $I_{dsgn}$ for Native ( $I_{test} / CF_{test}$ ):  | 1.00 in/hr            |
| $I_{dsgn}$ for Imported Growing Medium:  | 2.00 in/hr            |

**Execute SBUH Calculations**





**Presumptive Approach Calculator ver. 1.1**

Catchment ID: **C2**

Run Time: 5/13/2009 11:09:52 AM

Project Name: Milwaukie Park - So. Parking1 Catch

Catchment ID: C2

Date: 3/15/2009

**Instructions:**

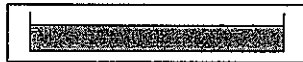
1. Identify which Stormwater Hierarchy Category the facility.
2. Select Facility Type.
3. Identify facility shape of surface facility to more accurately estimate surface volume, except for Swales and sloped planters that use the PAC Sloped Facility Worksheet to enter data.
4. Select type of facility configuration.
5. Complete data entry for all highlighted cells.

Catchment facility will meet Hierarchy Category: 1

**Goal Summary:**

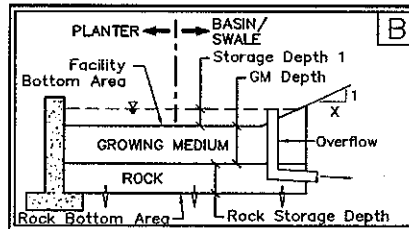
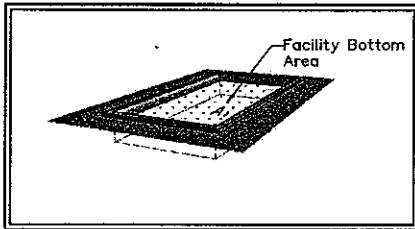
| Hierarchy Category | SWMM Requirement   | RESULTS box below needs to display... |                           | Facility configurations allowed |
|--------------------|--|---------------------------------------|---------------------------|---------------------------------|
|                    |  | Pollution Reduction as a              | 10-yr (aka disposal) as a |                                 |
| 1                  | On-site infiltration with a surface infiltration facility. | PASS                                  | PASS                      | A or B                          |

Facility Type = Planter (Flat)



Facility Shape: Rectangle/Square

Facility Configuration: B



|                             |
|-----------------------------|
| Calculation Guide           |
| Max. Rock Stor. Bottom Area |
| 1,395 SF                    |

**DATA FOR ABOVE GRADE STORAGE COMPONENT**

Facility Bottom Area = 1,395 sf  
 Bottom Width = 15.0 ft  
 Facility Side Slope = 0 to 1  
 Storage Depth 1 = 12 in  
 Growing Medium Depth = 18 in  
 Freeboard Depth = N/A in

Surface Capacity at Depth 1 = 1,395 cf  
 GM Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.065 cfs

**BELOW GRADE STORAGE**

Rock Storage Bottom Area = 1,395 sf  
 Rock Storage Depth = 12 in  
 Rock Void Ratio = 0.3

Rock Storage Capacity = 419 cf  
 Native Design Infiltration Rate = 1.00 in/hr  
 Infiltration Capacity = 0.032 cfs

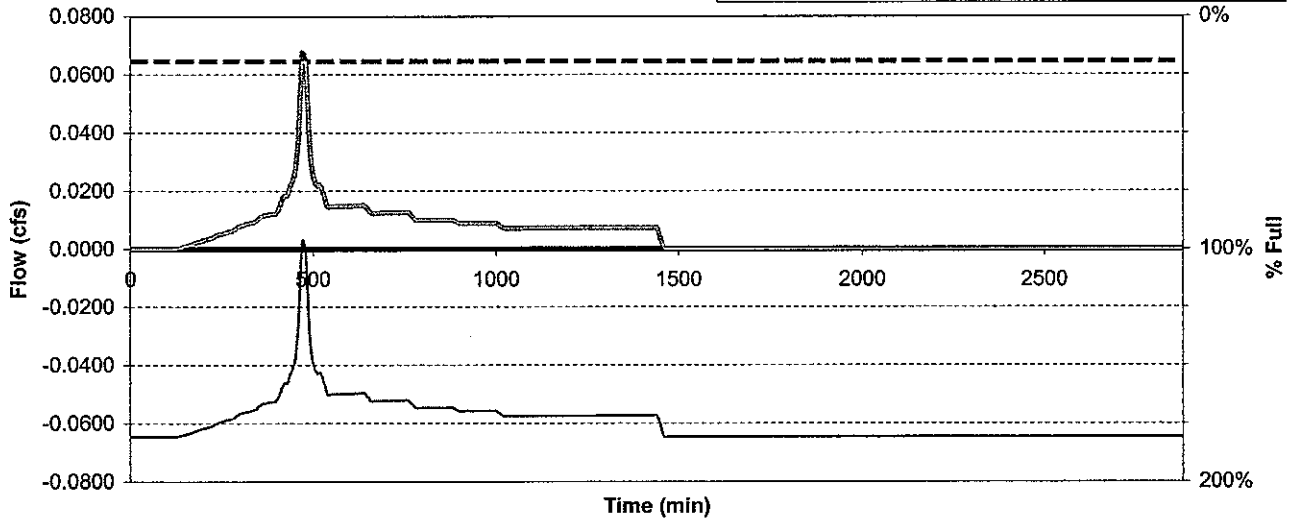
| RESULTS             |             | Overflow Volume |                     |
|---------------------|-------------|-----------------|---------------------|
| Pollution Reduction | <b>PASS</b> | 0 CF            | 0% Surf. Cap. Used  |
|                     |             |                 | 11% Rock Cap. Used  |
| 10-yr               | <b>PASS</b> | 0 CF            | 94% Surf. Cap. Used |
|                     |             |                 | 100% Rock Cap. Used |

| FACILITY FACTS  |          |
|---|----------|
| Total Facility Area Including Freeboard =             | 1,395 SF |
| Sizing Ratio (Total Facility Area / Catchment Area) = | 0.085    |

**Pollution Reduction Event  
Surface Facility Modeling**

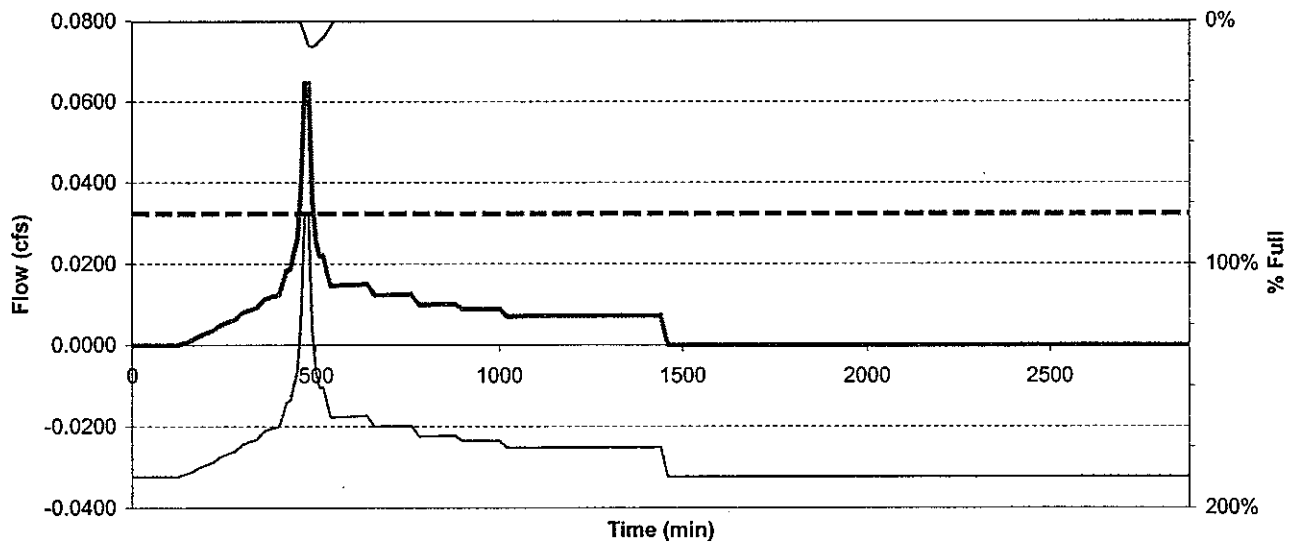
Project Name: Milwaukie Park - So. Parking1 Catc  
 Run Time: 5/13/2009 11:09:52 AM  
 Catchment ID: C2  
 Hierarchy: 1  
 Facility Type: Planter (I)  
 Facility Configuration: B

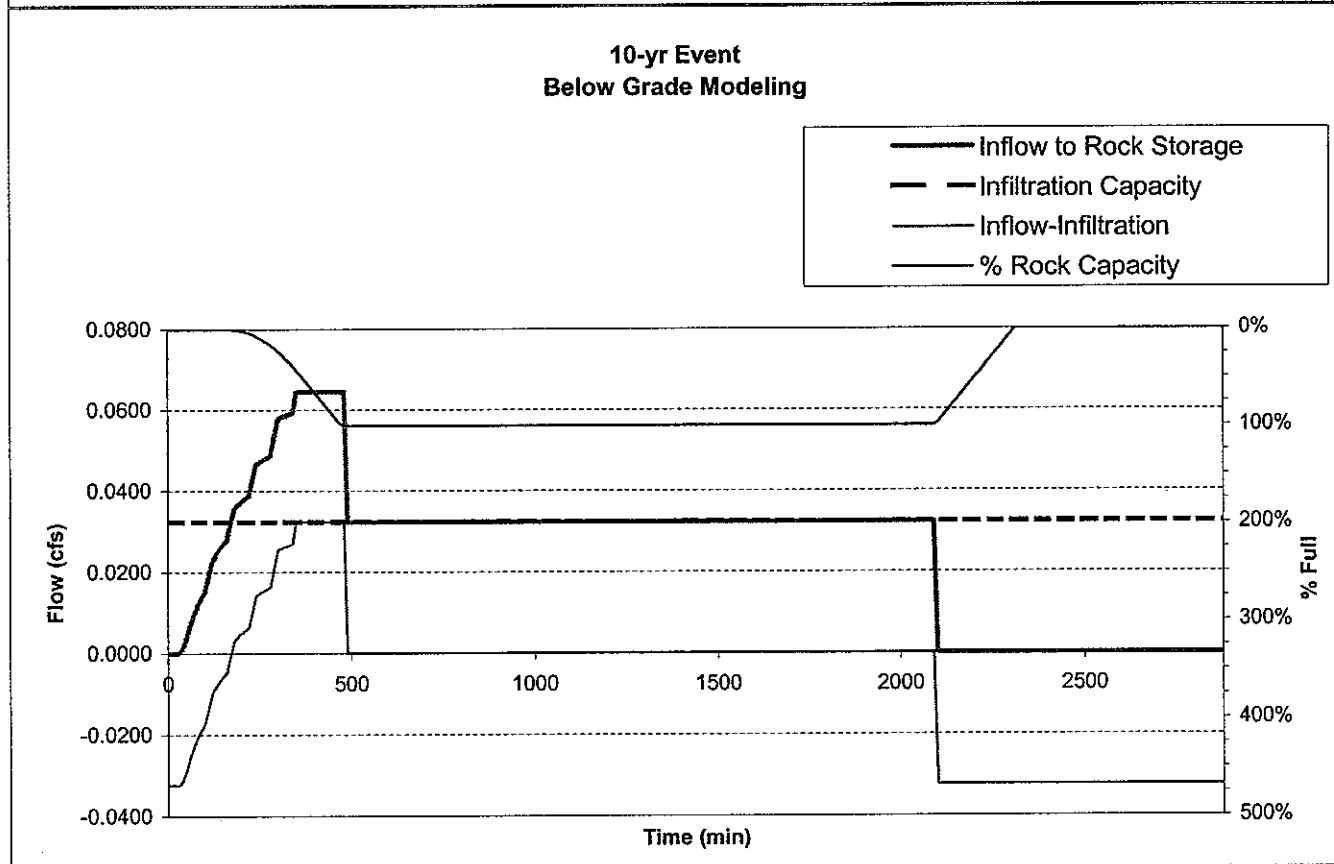
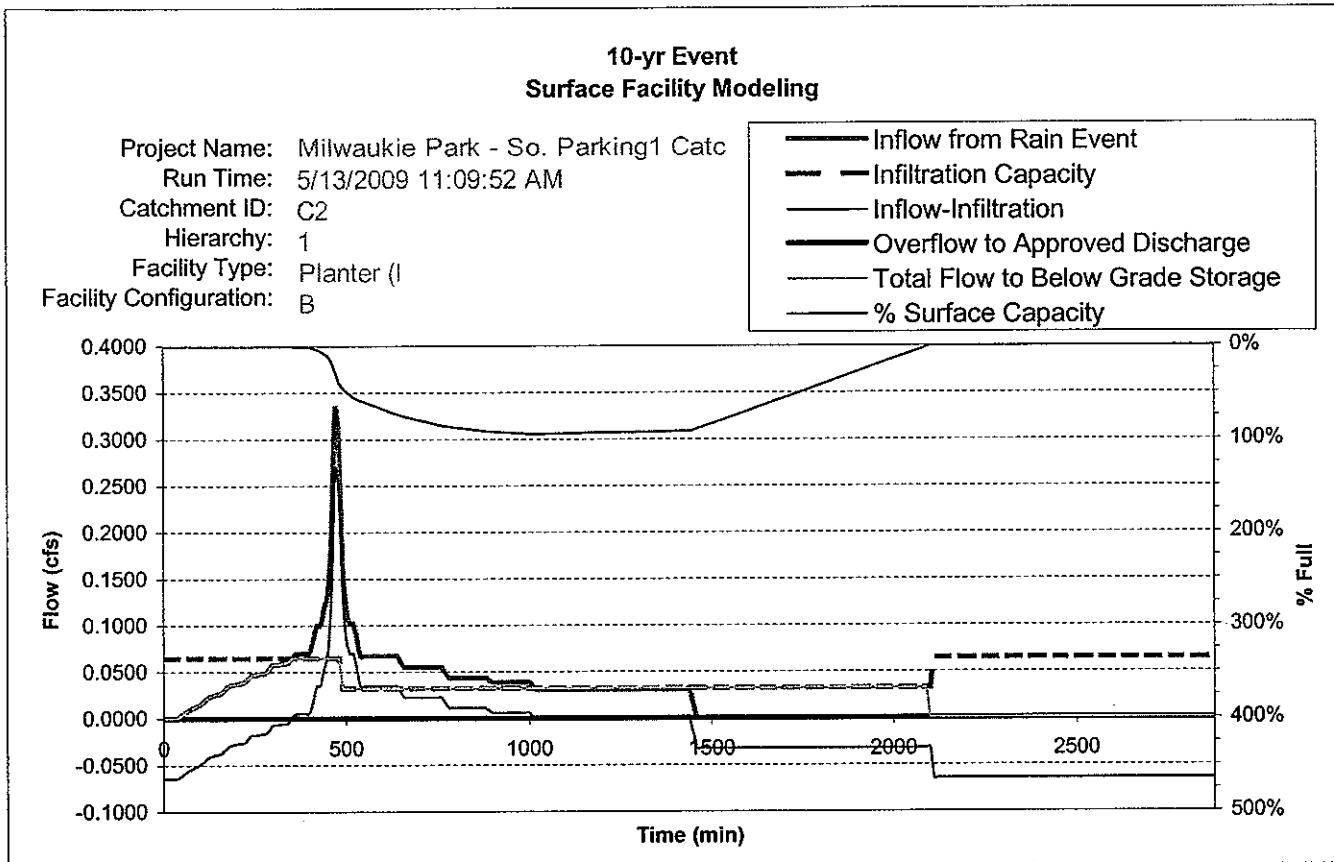
- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Percolation to Below Grade Storage
- % Surface Capacity



**Pollution Reduction Event  
Below Grade Modeling**

- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity









# Presumptive Approach Calculator ver. 1.1

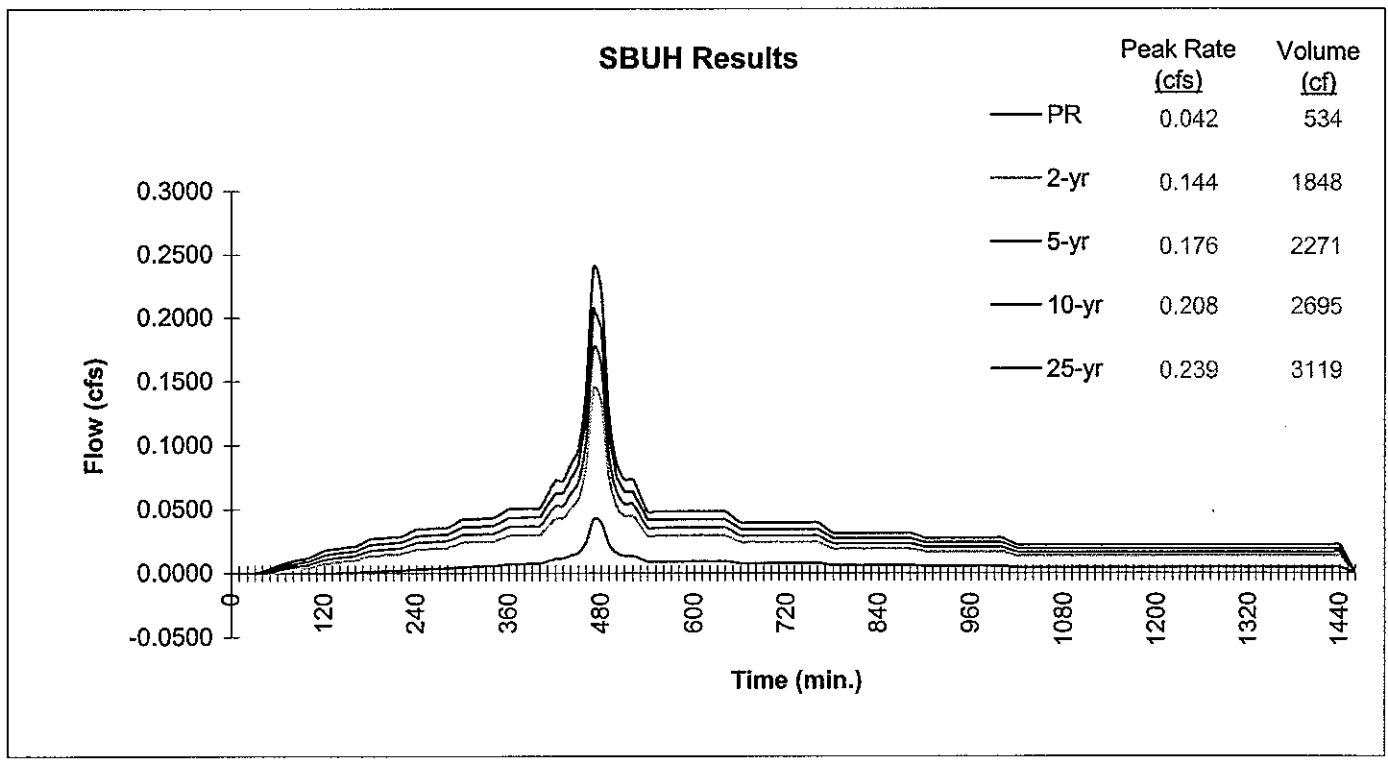
Catchment Data

Project Name: **Milwaukie Park - No. Parking2 Catch**  
 Project Address: \_\_\_\_\_  
**Milwaukie, OR**  
 Designer: **SDH**  
 Company: **David Evans and Associates, Inc.**

Catchment ID: **C3**  
 Date: **03/15/09**  
 Permit Number: \_\_\_\_\_  
 Run Time: 5/13/2009 12:54:02 PM

| Drainage Catchment Information   |                       |
|--|-----------------------|
| Catchment ID   | C3                    |
| <b>Catchment Area</b>  |                       |
| Impervious Area  | 10,212 SF             |
| Impervious Area  | 0.23 ac               |
| Impervious Area Curve Number, $CN_{imp}$   | 98                    |
| Time of Concentration, $T_c$ , minutes   | 5 min.                |
| Site Soils & Infiltration Testing Data   |                       |
| Infiltration Testing Procedure:  | Open Pit Falling Head |
| Native Soil Field Tested Infiltration Rate ( $I_{test}$ ):                                   | 2 in/hr               |
| Bottom of Facility Meets Required Separation From High Groundwater Per BES SWMM Section 1.4: | Yes                   |
| Correction Factor Component  |                       |
| $CF_{test}$ (ranges from 1 to 3)   | 2                     |
| Design Infiltration Rates  |                       |
| $I_{dsgn}$ for Native ( $I_{test} / CF_{test}$ ):  | 1.00 in/hr            |
| $I_{dsgn}$ for Imported Growing Medium:  | 2.00 in/hr            |

**Execute SBUH Calculations**





**Presumptive Approach Calculator ver. 1.1**

Catchment ID: **C3**

Run Time: 5/13/2009 12:54:02 PM

Project Name: Milwaukee Park - No. Parking2 Catch

Catchment ID: C3

Date: 3/15/2009

**Instructions:**

1. Identify which Stormwater Hierarchy Category the facility.
2. Select Facility Type.
3. Identify facility shape of surface facility to more accurately estimate surface volume, except for Swales and sloped planters that use the PAC Sloped Facility Worksheet to enter data.
4. Select type of facility configuration.
5. Complete data entry for all highlighted cells.

Catchment facility will meet Hierarchy Category: 1

**Goal Summary:**

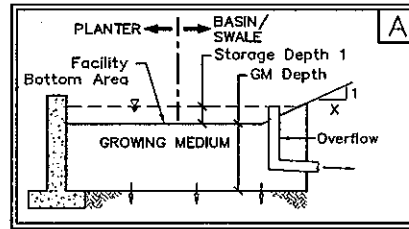
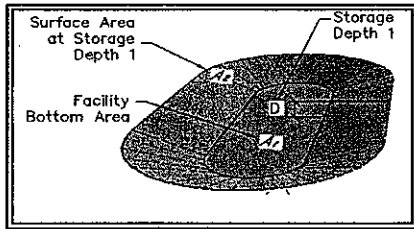
| Hierarchy Category | SWMM Requirement   | RESULTS box below needs to display... |                           | Facility configurations allowed |
|--------------------|--|---------------------------------------|---------------------------|---------------------------------|
|                    |  | Pollution Reduction as a              | 10-yr (aka disposal) as a |                                 |
| <b>1</b>           | On-site infiltration with a surface infiltration facility. | <b>PASS</b>                           | <b>PASS</b>               | <b>A or B</b>                   |

Facility Type = Basin



Facility Shape: User-Defined

Facility Configuration: A



| Calculation Guide |          |
|-------------------|----------|
| Max. Rock Stor.   |          |
| Bottom Area       | 1,245 SF |

**DATA FOR ABOVE GRADE STORAGE COMPONENT**

Facility Bottom Area = 131 sf  
 Surf. Area at Storage Depth 1 = 1245.0 sf

Storage Depth 1 = 18 in  
 Growing Medium Depth = 18 in  
 Freeboard Depth = N/A in

Surface Capacity at Depth 1 = 1,032 cf  
 Infiltration Area at 75% Depth1 = 966 SF  
 GM Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.045 cfs

**BELOW GRADE STORAGE**

Rock Storage Bottom Area = 966 sf  
 Rock Storage Depth = 0 in

Rock Storage Capacity = 0 cf

Native Design Infiltration Rate = 1.00 in/hr  
 Infiltration Capacity = 0.022 cfs

Native Infiltration Rate Used in P/

| RESULTS             |             | Overflow Volume |                            |
|---------------------|-------------|-----------------|----------------------------|
| Pollution Reduction | <b>PASS</b> | 0 CF            | <u>2%</u> Surf. Cap. Used  |
| 10-yr               | <b>PASS</b> | 0 CF            | <u>95%</u> Surf. Cap. Used |

Run PAC

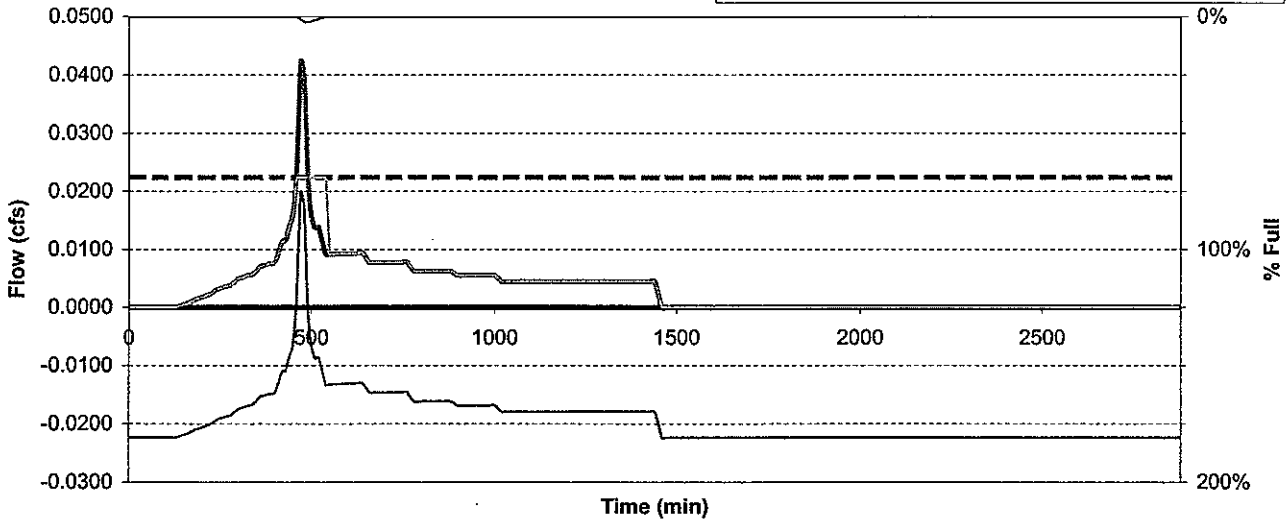
| FACILITY FACTS  |                 |
|---|-----------------|
| Total Facility Area Including Freeboard =             | <b>1,245 SF</b> |
| Sizing Ratio (Total Facility Area / Catchment Area) = | <b>0.122</b>    |

Current data has been exported:  
 No\_Parking22\_Export.xls 5/13/2009 12:55:36 PM

**Pollution Reduction Event  
Surface Facility Modeling**

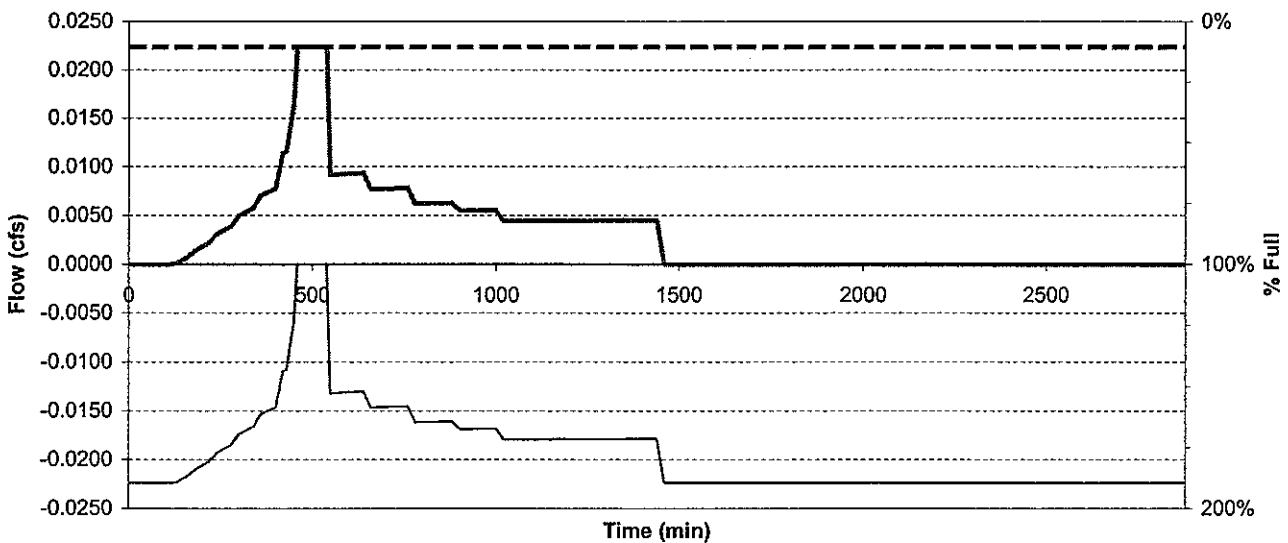
Project Name: Milwaukie Park - No. Parking2 Catc  
 Run Time: 5/13/2009 12:54:02 PM  
 Catchment ID: C3  
 Hierarchy: 1  
 Facility Type: Basin  
 Facility Configuration: A

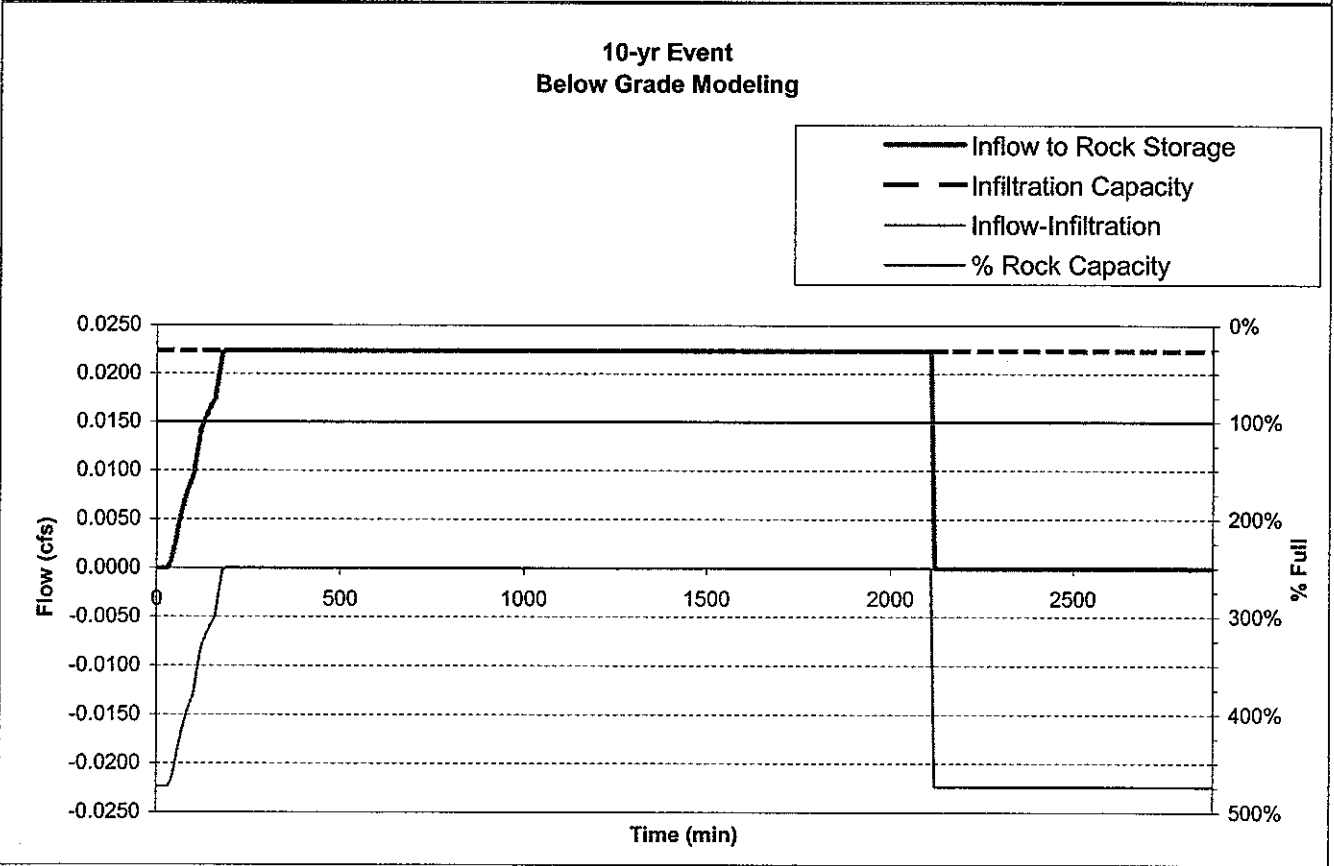
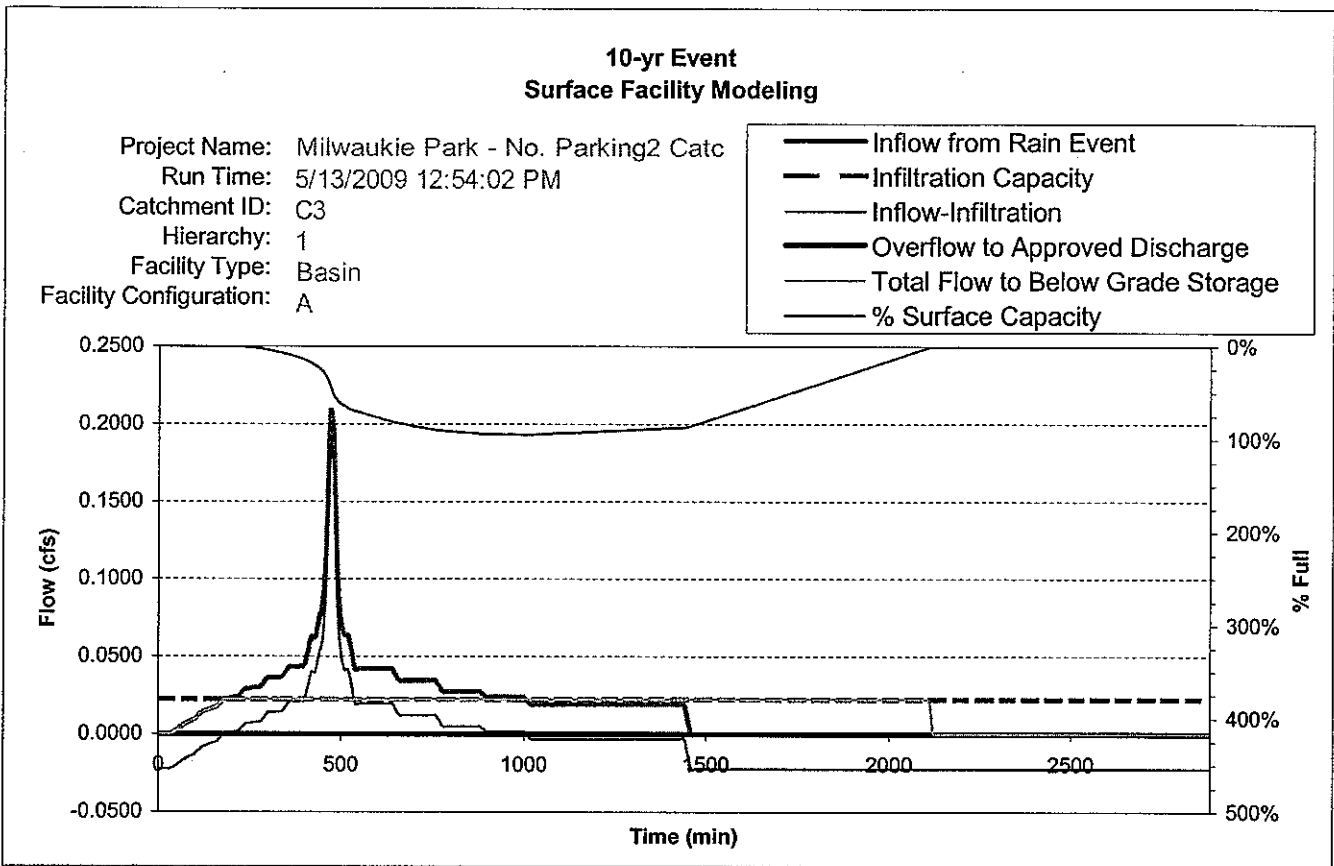
- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Percolation to Below Grade Storage
- % Surface Capacity



**Pollution Reduction Event  
Below Grade Modeling**

- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity







# Presumptive Approach Calculator ver. 1.1

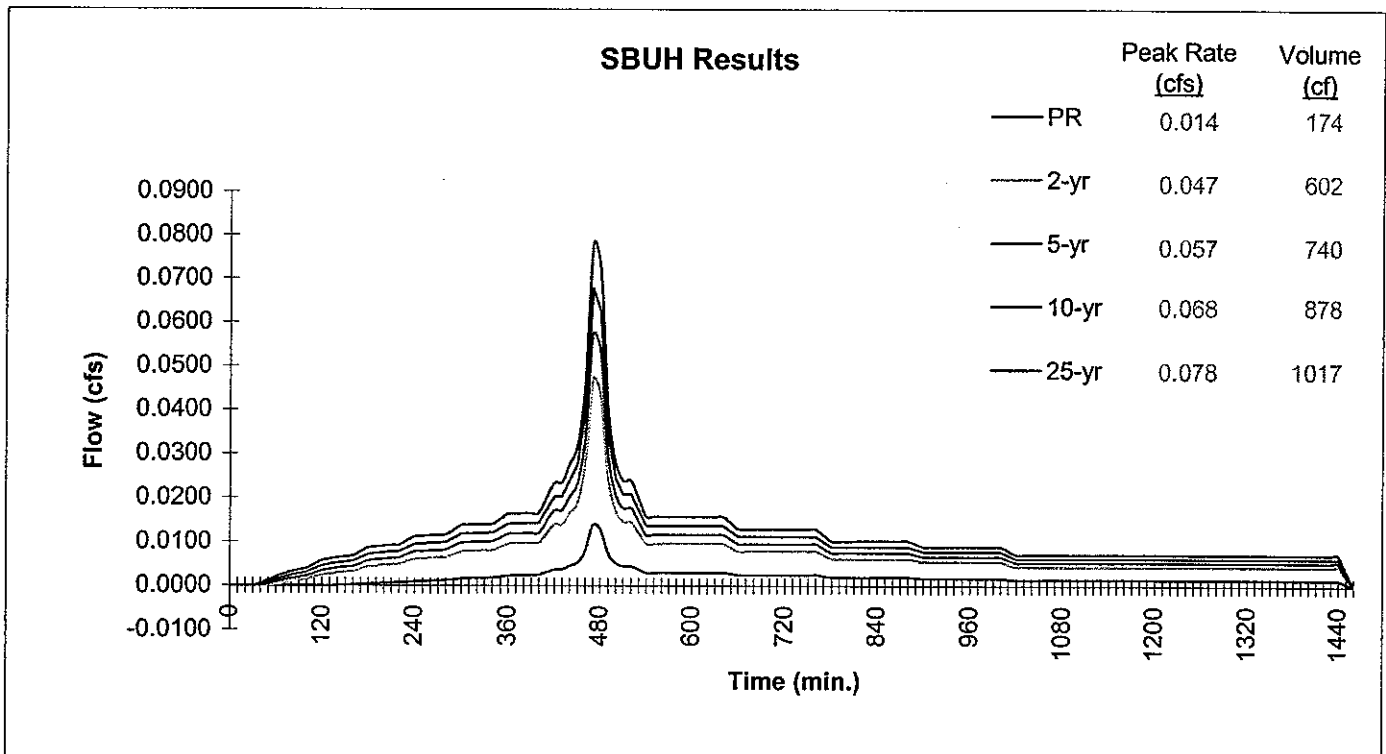
Catchment Data

Project Name: **Milwaukie Park - Access Catch**  
 Project Address: **-**  
**Milwaukie, OR**  
 Designer: **SDH**  
 Company: **David Evans and Associates, Inc.**

Catchment ID: **C4**  
 Date: **03/15/09**  
 Permit Number: **0**  
 Run Time: 5/13/2009 12:35:49 PM

| Drainage Catchment Information   |                       |
|--|-----------------------|
| Catchment ID   | C4                    |
| <b>Catchment Area</b>  |                       |
| Impervious Area  | 3,328 SF              |
| Impervious Area  | 0.08 ac               |
| Impervious Area Curve Number, $CN_{imp}$   | 98                    |
| Time of Concentration, $T_c$ , minutes   | 5 min.                |
| Site Soils & Infiltration Testing Data   |                       |
| Infiltration Testing Procedure:  | Open Pit Falling Head |
| Native Soil Field Tested Infiltration Rate ( $I_{test}$ ):                                   | 2 in/hr               |
| Bottom of Facility Meets Required Separation From High Groundwater Per BES SWMM Section 1.4: | Yes                   |
| Correction Factor Component  |                       |
| $CF_{test}$ (ranges from 1 to 3)   | 2                     |
| Design Infiltration Rates  |                       |
| $I_{dsgn}$ for Native ( $I_{test} / CF_{test}$ ):  | 1.00 in/hr            |
| $I_{dsgn}$ for Imported Growing Medium:  | 2.00 in/hr            |

**Execute SBUH Calculations**





**Presumptive Approach Calculator ver. 1.1**

Catchment ID: **C4**

Run Time: 5/13/2009 12:35:49 PM

Project Name: Milwaukee Park - Access Catch

Catchment ID: C4

Date: 3/15/2009

**Instructions:**

1. Identify which Stormwater Hierarchy Category the facility.
2. Select Facility Type.
3. Identify facility shape of surface facility to more accurately estimate surface volume, except for Swales and sloped planters that use the PAC Sloped Facility Worksheet to enter data.
4. Select type of facility configuration.
5. Complete data entry for all highlighted cells.

Catchment facility will meet Hierarchy Category: 1

**Goal Summary:**

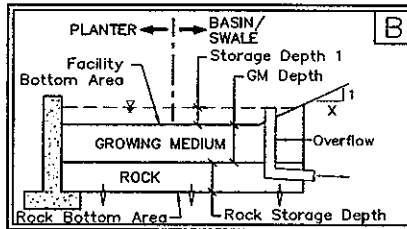
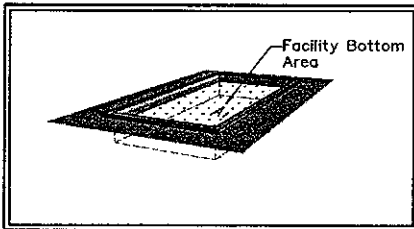
| Hierarchy Category | SWMM Requirement   | RESULTS box below needs to display... |                           | Facility configurations allowed |
|--------------------|--|---------------------------------------|---------------------------|---------------------------------|
|                    |  | Pollution Reduction as a              | 10-yr (aka disposal) as a |                                 |
| I                  | On-site infiltration with a surface infiltration facility. | PASS                                  | PASS                      | A or B                          |

Facility Type = Planter (Flat)



Facility Shape: Rectangle/Square

Facility Configuration: B



|                             |
|-----------------------------|
| Calculation Guide           |
| Max. Rock Stor. Bottom Area |
| 425 SF                      |

**DATA FOR ABOVE GRADE STORAGE COMPONENT**

Facility Bottom Area = 425 sf  
 Bottom Width = 10.0 ft  
 Facility Side Slope = 0 to 1  
 Storage Depth 1 = 12 in  
 Growing Medium Depth = 18 in  
 Freeboard Depth = N/A in

Surface Capacity at Depth 1 = 425 cf  
 GM Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.020 cfs

**BELOW GRADE STORAGE**

Rock Storage Bottom Area = 425 sf  
 Rock Storage Depth = 12 in  
 Rock Void Ratio = 0.3

Rock Storage Capacity = 128 cf  
 Native Design Infiltration Rate = 1.00 in/hr  
 Infiltration Capacity = 0.010 cfs

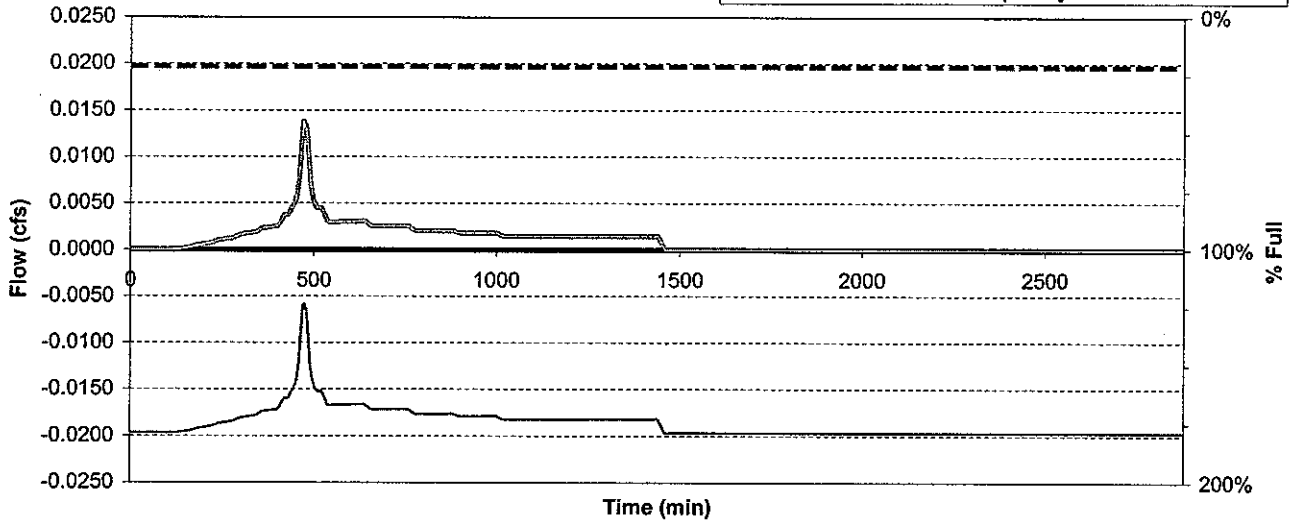
| RESULTS             |             | Overflow Volume |                            |
|---------------------|-------------|-----------------|----------------------------|
| Pollution Reduction | <b>PASS</b> | 0 CF            | <u>0%</u> Surf. Cap. Used  |
|                     |             |                 | <u>3%</u> Rock Cap. Used   |
| 10-yr               | <b>PASS</b> | 0 CF            | <u>22%</u> Surf. Cap. Used |
|                     |             |                 | <u>100%</u> Rock Cap. Used |

| FACILITY FACTS  |               |
|---|---------------|
| Total Facility Area Including Freeboard =             | <u>425 SF</u> |
| Sizing Ratio (Total Facility Area / Catchment Area) = | <u>0.128</u>  |

**Pollution Reduction Event  
Surface Facility Modeling**

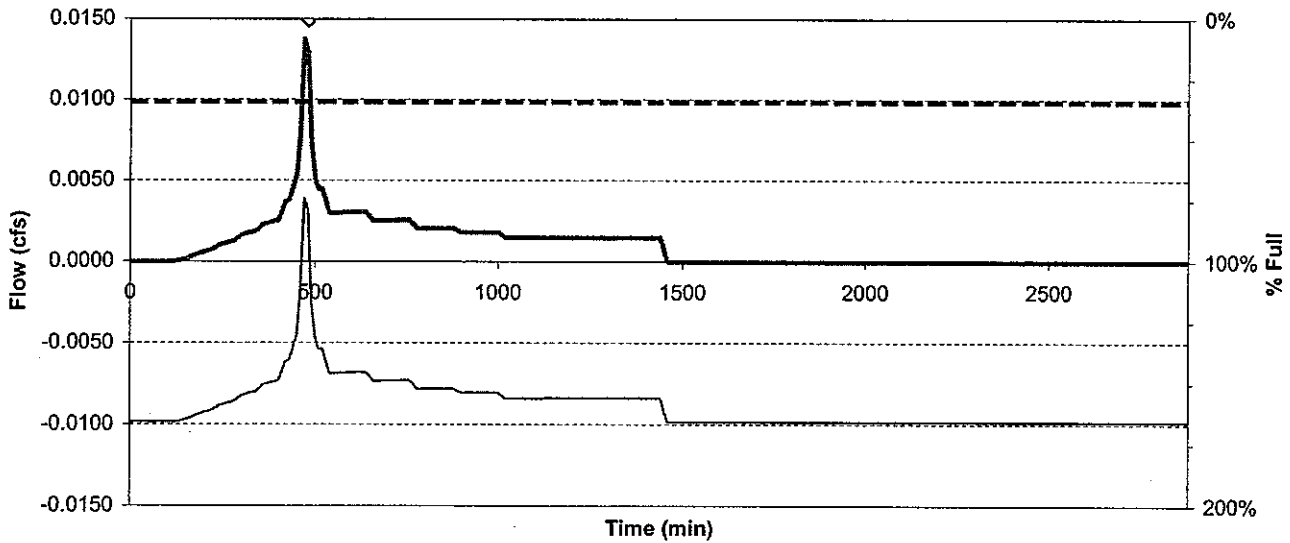
Project Name: Milwaukie Park - Access Catch  
 Run Time: 5/13/2009 12:35:49 PM  
 Catchment ID: C4  
 Hierarchy: 1  
 Facility Type: Planter (I)  
 Facility Configuration: B

- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Percolation to Below Grade Storage
- % Surface Capacity



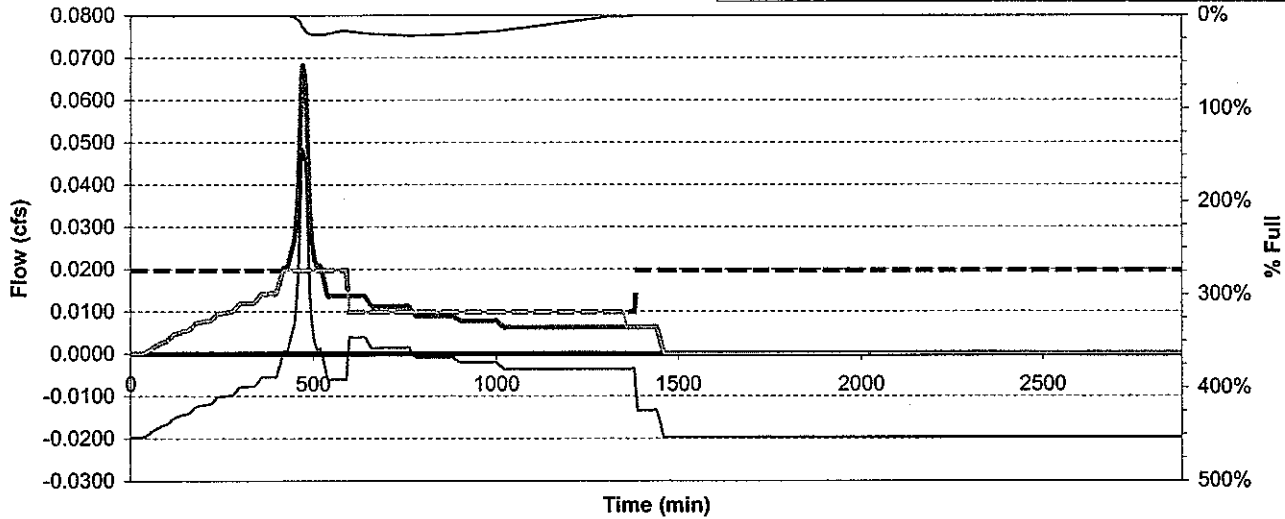
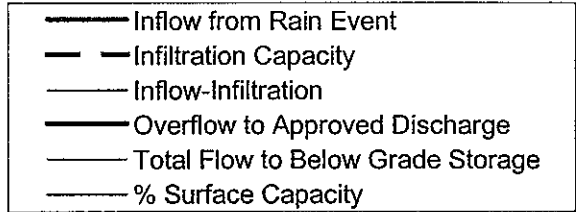
**Pollution Reduction Event  
Below Grade Modeling**

- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity

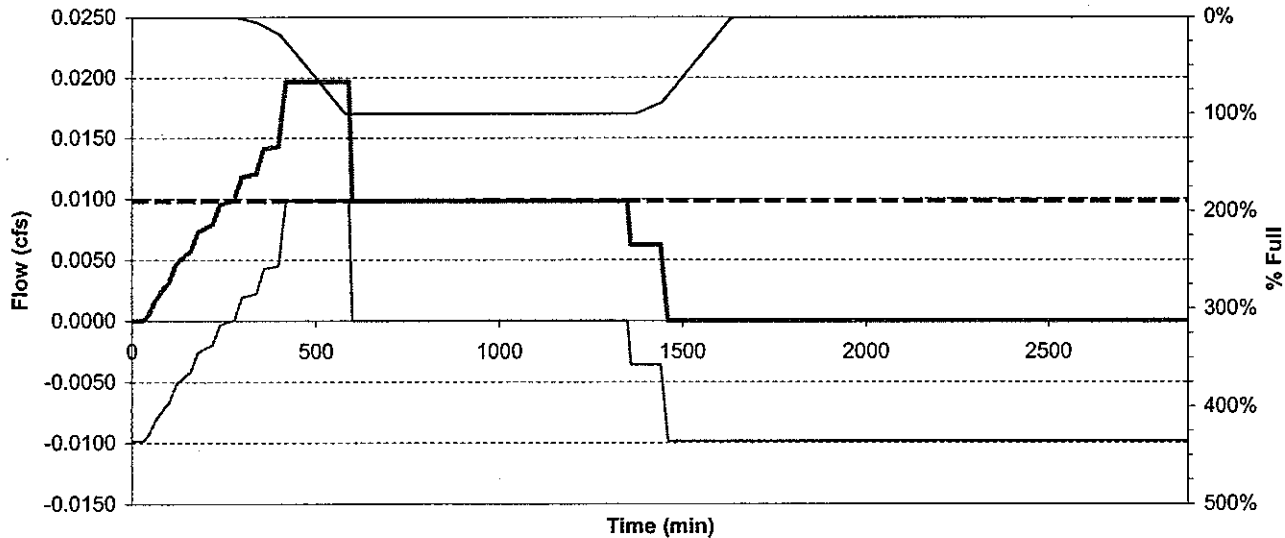
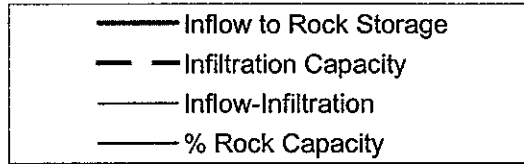


10-yr Event  
Surface Facility Modeling

Project Name: Milwaukie Park - Access Catch  
 Run Time: 5/13/2009 12:35:49 PM  
 Catchment ID: C4  
 Hierarchy: 1  
 Facility Type: Planter (I)  
 Facility Configuration: B



10-yr Event  
Below Grade Modeling







# Presumptive Approach Calculator ver. 1.1

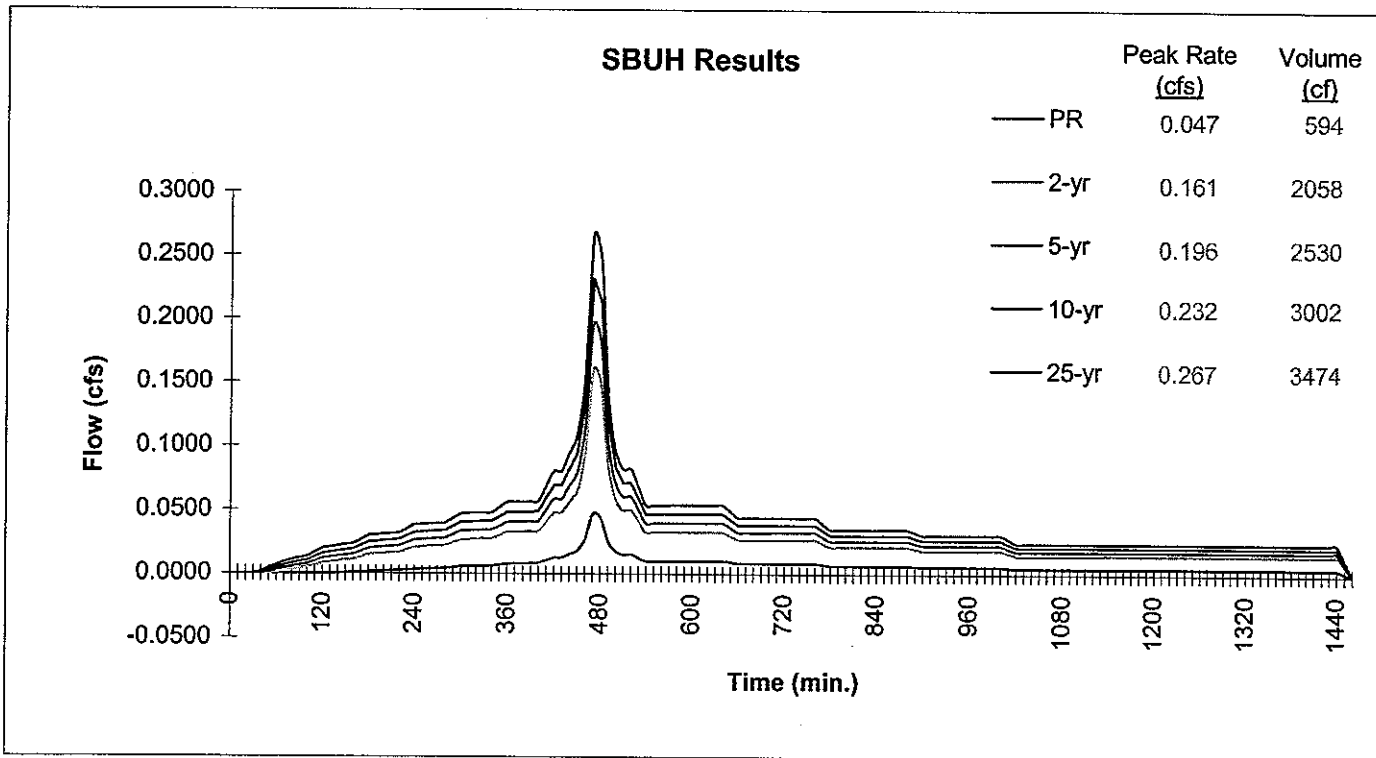
Catchment Data

Project Name: **Milwaukie Park - Lower No. Parking Ca**  
 Project Address: **Milwaukie, OR**  
 Designer: **SDH**  
 Company: **David Evans and Associates, Inc.**

Catchment ID: **N1**  
 Date: **03/15/09**  
 Permit Number: **0**  
 Run Time: 5/14/2009 11:42:05 AM

| Drainage Catchment Information   |                       |
|--|-----------------------|
| Catchment ID   | N1                    |
| <b>Catchment Area</b>  |                       |
| Impervious Area  | 11,375 SF             |
| Impervious Area  | 0.26 ac               |
| Impervious Area Curve Number, $CN_{imp}$   | 98                    |
| Time of Concentration, $T_c$ , minutes   | 5 min.                |
| Site Soils & Infiltration Testing Data   |                       |
| Infiltration Testing Procedure:  | Open Pit Falling Head |
| Native Soil Field Tested Infiltration Rate ( $I_{test}$ ):                                   | 2 in/hr               |
| Bottom of Facility Meets Required Separation From High Groundwater Per BES SWMM Section 1.4: | Yes                   |
| Correction Factor Component  |                       |
| $CF_{test}$ (ranges from 1 to 3)   | 2                     |
| Design Infiltration Rates  |                       |
| $I_{dsgn}$ for Native ( $I_{test} / CF_{test}$ ):  | 1.00 in/hr            |
| $I_{dsgn}$ for Imported Growing Medium:  | 2.00 in/hr            |

Execute SBUH Calculations





**Presumptive Approach Calculator ver. 1.1**

Catchment ID: **N1**

Run Time: 5/14/2009 11:42:05 AM

Project Name: **Milwaukee Park - Lower No. Parking Catch**

Catchment ID: **N1**

Date: **3/15/2009**

**Instructions:**

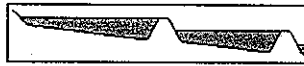
1. Identify which Stormwater Hierarchy Category the facility.
2. Select Facility Type.
3. Identify facility shape of surface facility to more accurately estimate surface volume, except for Swales and sloped planters that use the PAC Sloped Facility Worksheet to enter data.
4. Select type of facility configuration.
5. Complete data entry for all highlighted cells.

Catchment facility will meet Hierarchy Category: **1**

**Goal Summary:**

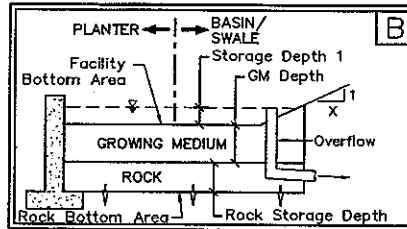
| Hierarchy Category | SWMM Requirement   | RESULTS box below needs to display... |                           | Facility configurations allowed |
|--------------------|--|---------------------------------------|---------------------------|---------------------------------|
|                    |  | Pollution Reduction as a              | 10-yr (aka disposal) as a |                                 |
| 1                  | On-site infiltration with a surface infiltration facility. | PASS                                  | PASS                      | A or B                          |

Facility Type = **Planter (Sloped)**



Facility Configuration: **B**

**Refer to Sloped Facility Worksheet and enter Variable Parameters**



Calculation Guide  
Max. Rock Stor.  
Bottom Area  
Per Swale Dims

**DATA FOR ABOVE GRADE STORAGE COMPONENT**

Infiltration Area = **1,057 sf**  
Surface Capacity Volume = **907.3 cf**

**BELOW GRADE STORAGE**

Rock Storage Bottom Area = **994 sf**  
Rock Storage Depth = **12 in**  
Rock Void Ratio = **0.3**

Growing Medium Depth = **18 in**  
Freeboard Depth = **N/A in**

Surface Capacity at Depth 1 = **907 cf**  
GM Design Infiltration Rate = **2.00 in/hr**  
Infiltration Capacity = **0.049 cfs**

Rock Storage Capacity = **298 cf**  
Native Design Infiltration Rate = **1.00 in/hr**  
Infiltration Capacity = **0.023 cfs**

| RESULTS             |             | Overflow Volume |                            |
|---------------------|-------------|-----------------|----------------------------|
| Pollution Reduction | <b>PASS</b> | 0 CF            | <b>0%</b> Surf. Cap. Used  |
|                     |             |                 | <b>10%</b> Rock Cap. Used  |
| 10-yr               | <b>PASS</b> | 0 CF            | <b>98%</b> Surf. Cap. Used |
|                     |             |                 | <b>100%</b> Rock Cap. Used |

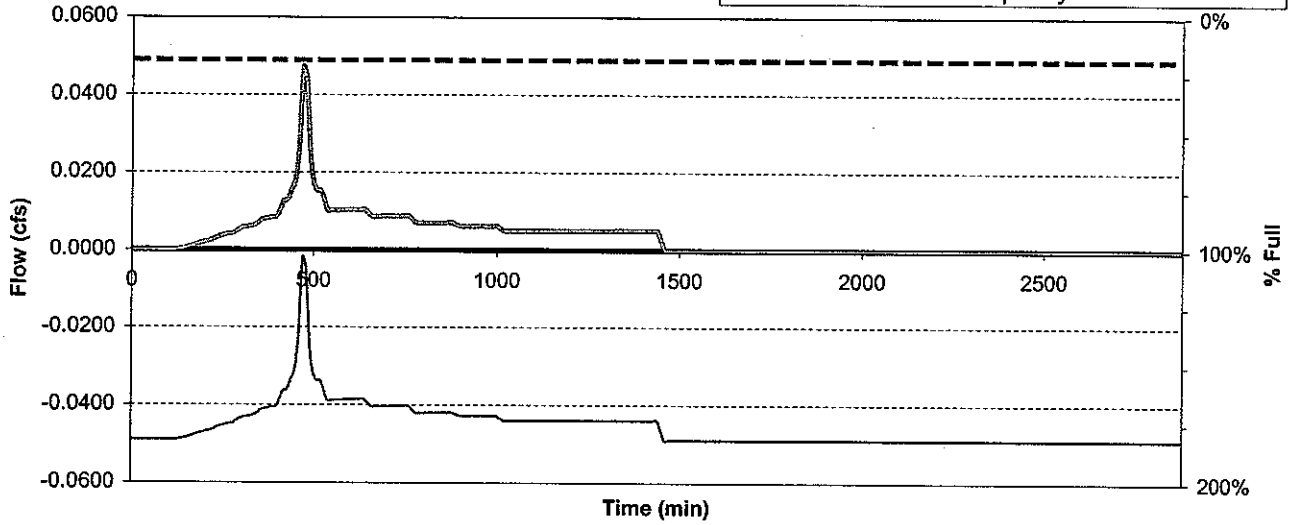
| FACILITY FACTS  |                 |
|---|-----------------|
| Total Facility Area Including Freeboard =             | <b>1,228 SF</b> |
| Sizing Ratio (Total Facility Area / Catchment Area) = | <b>0.108</b>    |

Current data has been exported:  
**Ramp\_Lower\_Park\_Export.xls** 5/14/2009 11:45:23 AM

**Pollution Reduction Event  
Surface Facility Modeling**

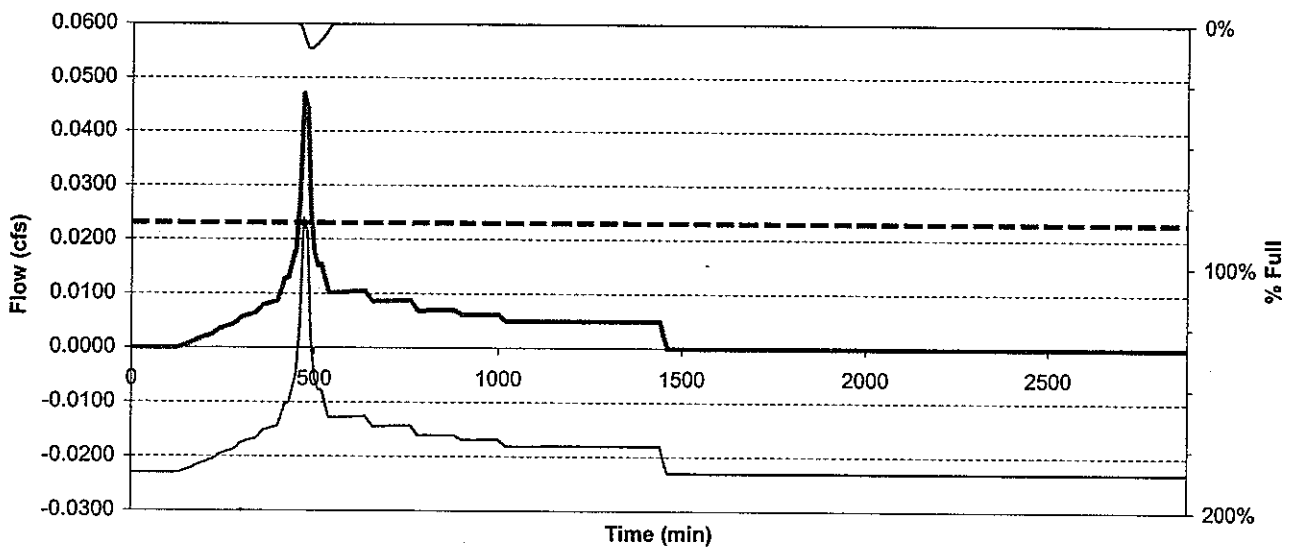
Project Name: Milwaukie Park - Access Catch  
 Run Time: 5/14/2009 11:42:05 AM  
 Catchment ID: N1  
 Hierarchy: 1  
 Facility Type: Planter (:  
 Facility Configuration: B

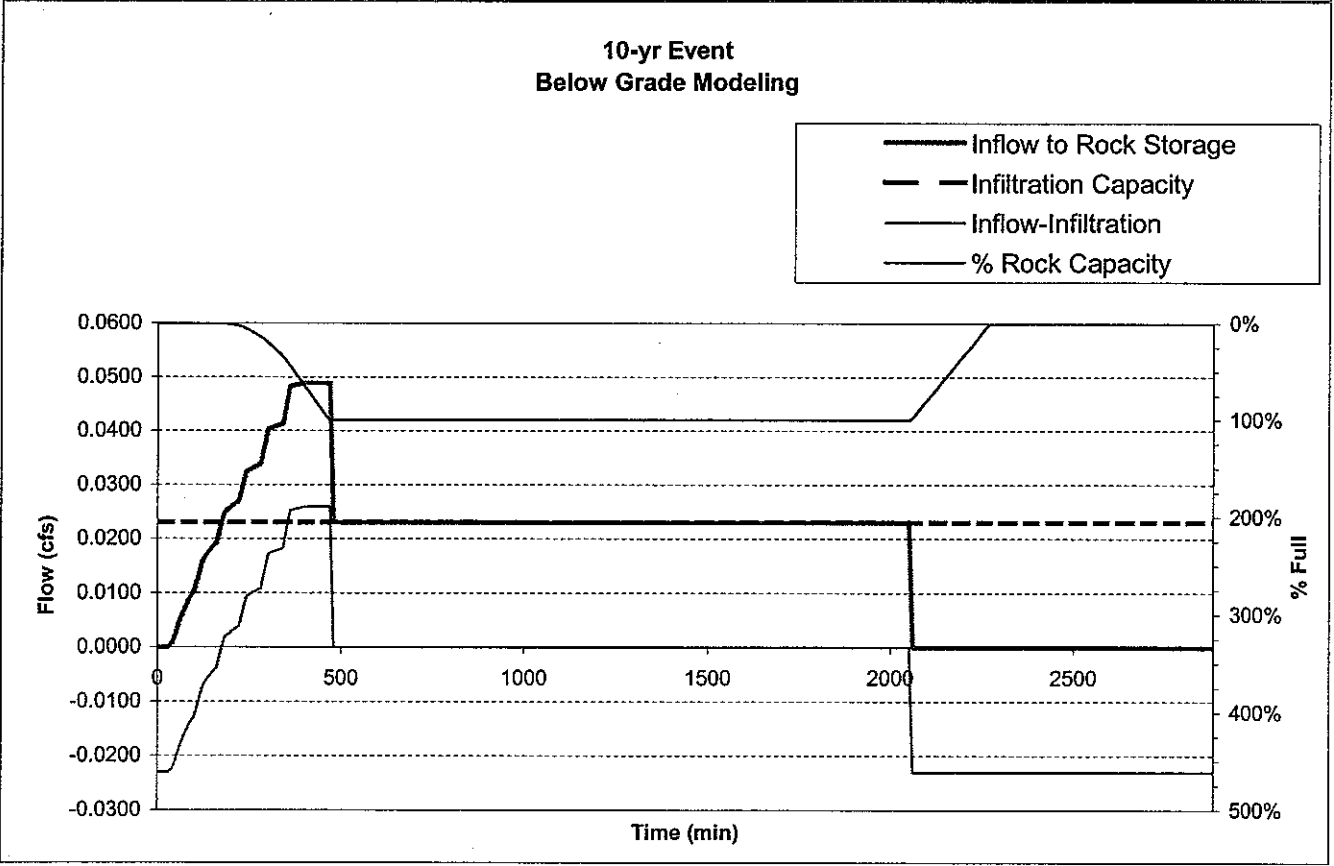
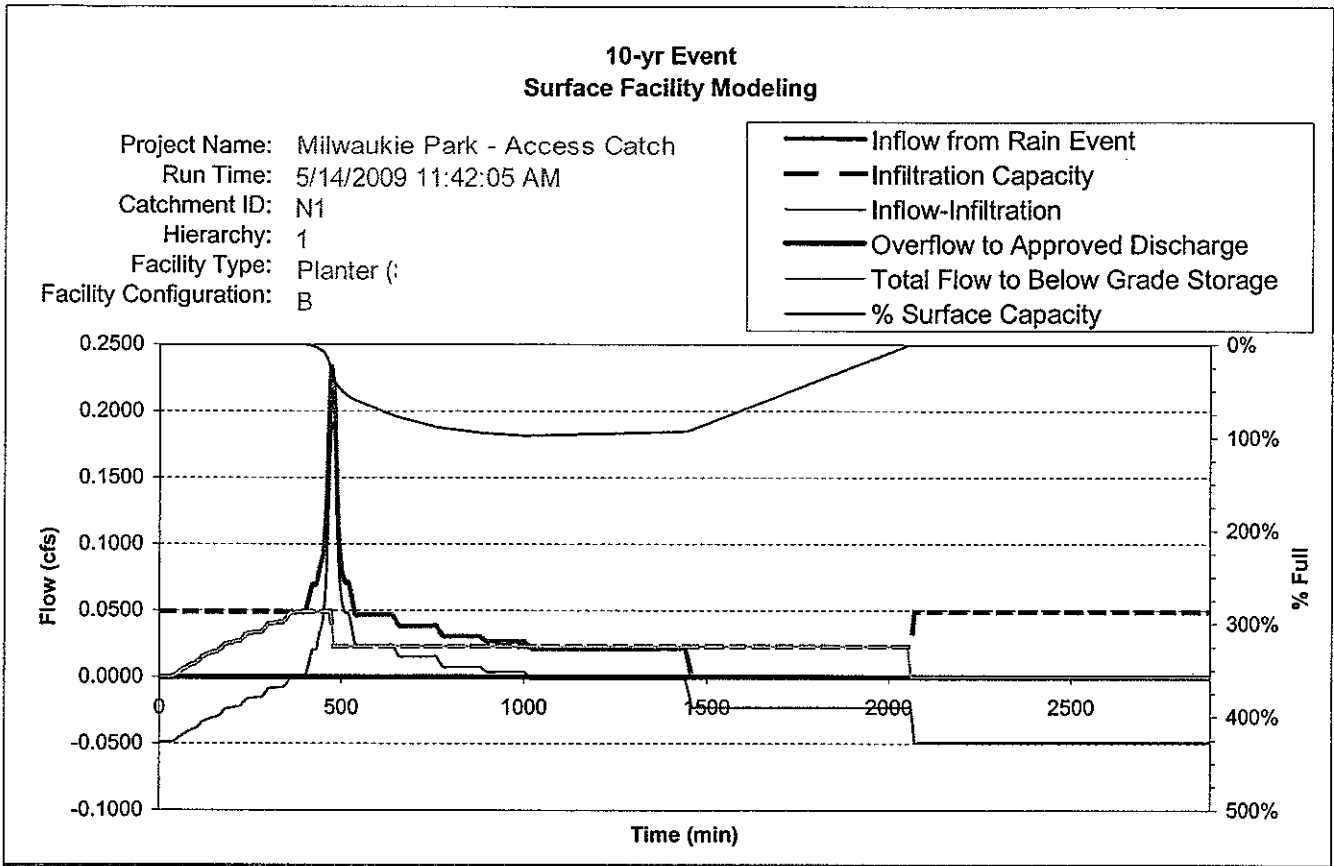
- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Percolation to Below Grade Storage
- % Surface Capacity



**Pollution Reduction Event  
Below Grade Modeling**

- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity





### Presumptive Approach Calculator Ver 1.1



**Instructions:**

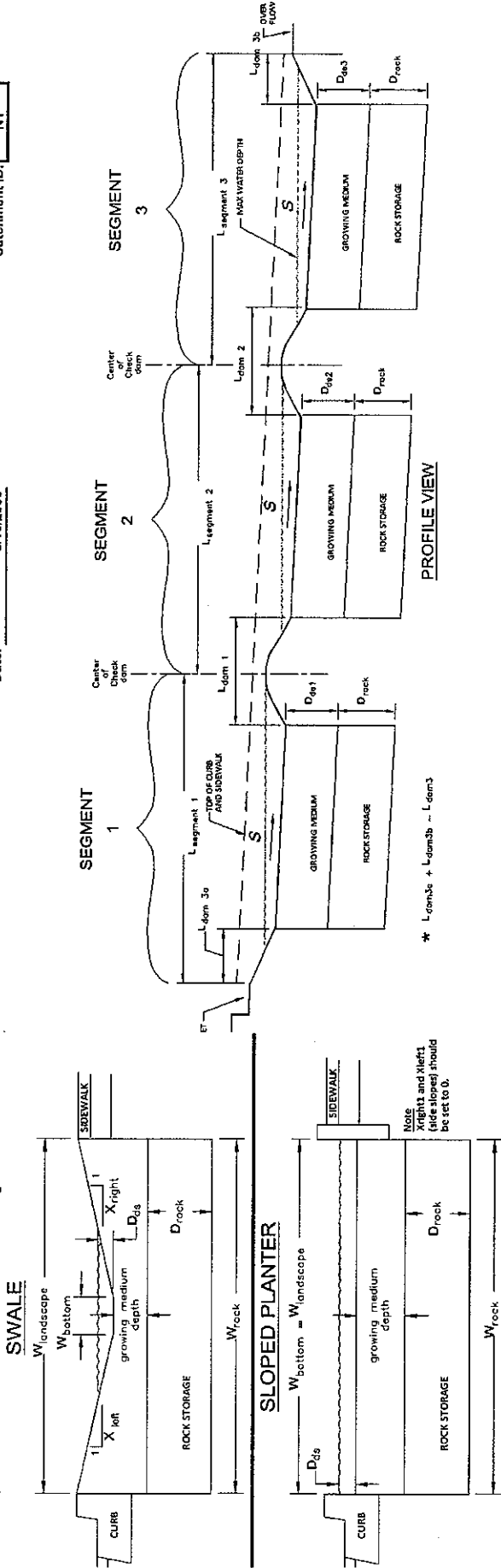
1. Refer to facility graphics and fill in all relevant facility parameters in the Data Entry table below. Data entry cells vary based on Facility Configuration selected on Facility Design Data tab.
2. Delete all facility parameters that may have been entered by the previous iteration that are no longer applicable.

Project Name: Milwaukee Park - Lower No. Parking Catch

Date: 3/15/2009

Run Time: 5/14/2009 11:42:05 AM

Catchment ID: N1



| Data Entry Parameters |      | Rock Storage Parameters                 |                                  |                                     |       |                   |                     |   |                       |                 |                      |                           |                 |                      |                        |                         |                   |                             |                   |                 |     |
|-----------------------|------|---|----------------------------------|-------------------------------------|-------|-------------------|---------------------|---|-----------------------|-----------------|----------------------|---------------------------|-----------------|----------------------|------------------------|-------------------------|-------------------|-----------------------------|-------------------|-----------------|-----|
| Variable Description  | Unit | Downstream Facility Segment Length (ft) | Downstream Check Dam Length (ft) | Longitudinal Facility Slope (ft/ft) | S     | Bottom Width (ft) | W <sub>bottom</sub> | Side Slope Right (Right and Left1 (side slopes) should be set to 0) | X <sub>right</sub> :1 | Side Slope Left | X <sub>left</sub> :1 | Downstream Depth (inches) | D <sub>ds</sub> | Landscape Width (ft) | W <sub>landscape</sub> | Rock Storage Width (ft) | W <sub>rock</sub> | Rock Storage Depth (inches) | D <sub>rock</sub> | Rock Void Ratio | V   |
| 1                     |      | 20                                      | 3                                | 0.015                               | 0.015 | 7                 | 7                   | 0   | 0                     | 0               | 0                    | 12                        | 12              | 7                    | 7                      | 7                       | 7                 | 12                          | 12                | 0.3             | 0.3 |
| 2                     |      | 20                                      | 2                                | 0.015                               | 0.015 | 7                 | 7                   | 0   | 0                     | 0               | 0                    | 12                        | 12              | 7                    | 7                      | 7                       | 7                 | 12                          | 12                |                 |     |
| 3                     |      | 20                                      | 2                                | 0.015                               | 0.015 | 7                 | 7                   | 0   | 0                     | 0               | 0                    | 12                        | 12              | 7                    | 7                      | 7                       | 7                 | 12                          | 12                |                 |     |
| 4                     |      | 20                                      | 2                                | 0.015                               | 0.015 | 7                 | 7                   | 0   | 0                     | 0               | 0                    | 12                        | 12              | 7                    | 7                      | 7                       | 7                 | 12                          | 12                |                 |     |
| 5                     |      | 20                                      | 2                                | 0.015                               | 0.015 | 7                 | 7                   | 0   | 0                     | 0               | 0                    | 12                        | 12              | 7                    | 7                      | 7                       | 7                 | 12                          | 12                |                 |     |
| 6                     |      | 20                                      | 2                                | 0.015                               | 0.015 | 7                 | 7                   | 0   | 0                     | 0               | 0                    | 12                        | 12              | 7                    | 7                      | 7                       | 7                 | 12                          | 12                |                 |     |
| 7                     |      | 20                                      | 2                                | 0.015                               | 0.015 | 7                 | 7                   | 0   | 0                     | 0               | 0                    | 12                        | 12              | 7                    | 7                      | 7                       | 7                 | 12                          | 12                |                 |     |
| 8                     |      | 20                                      | 3                                | 0.015                               | 0.015 | 7                 | 7                   | 0   | 0                     | 0               | 0                    | 12                        | 12              | 7                    | 7                      | 7                       | 7                 | 12                          | 12                |                 |     |
| 9                     |      | 20                                      |                                  |                                     |       |                   |                     |   |                       |                 |                      |                           |                 |                      |                        |                         |                   |                             |                   |                 |     |
| 10                    |      |   |                                  |                                     |       |                   |                     |   |                       |                 |                      |                           |                 |                      |                        |                         |                   |                             |                   |                 |     |

Worksheet Calculations



# Presumptive Approach Calculator ver. 1.1

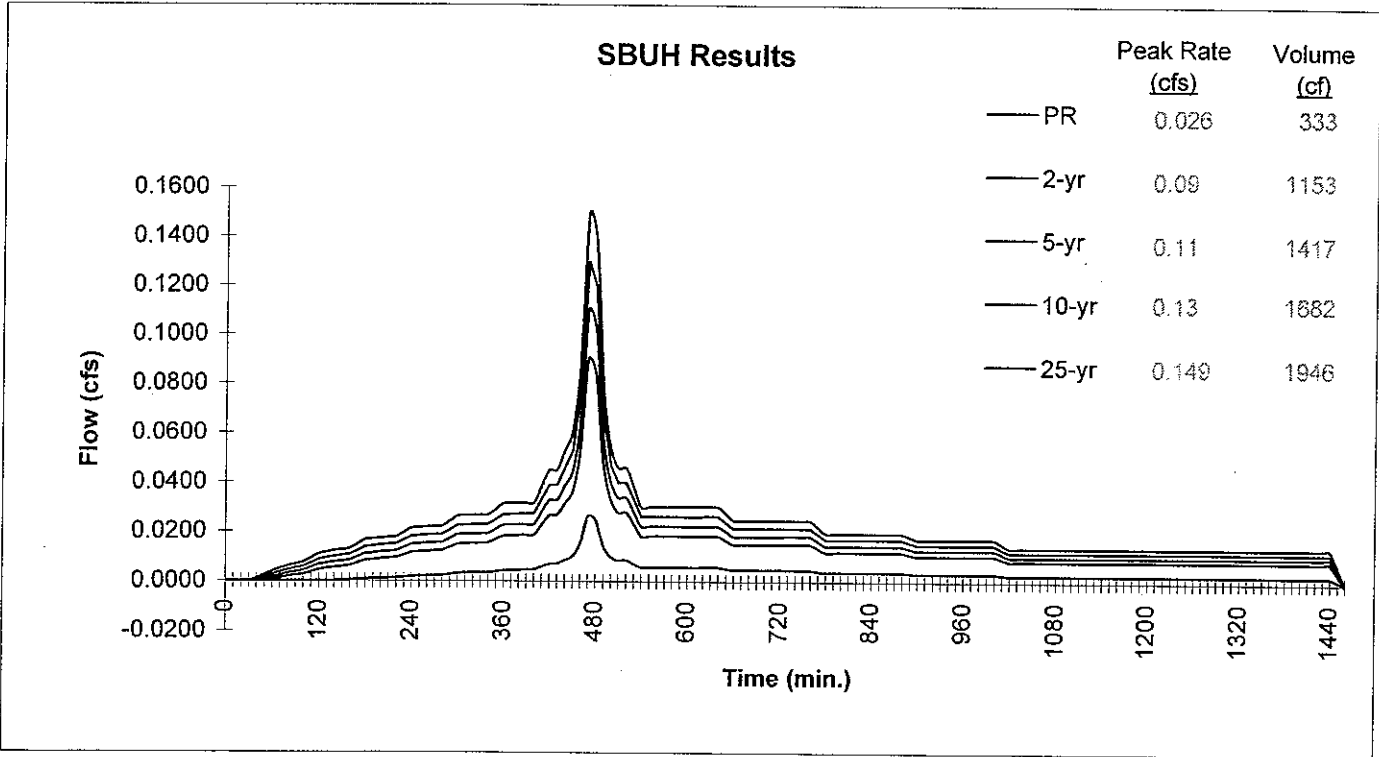
Catchment Data

Project Name: Milwaukie Park - Bridge to Parking Catchment  
 Project Address: -  
Milwaukie, OR  
 Designer: SDH  
 Company: David Evans and Associates, Inc.

Catchment ID: N2  
 Date: 03/15/09  
 Permit Number: 0  
 Run Time: 12/8/2009 12:20:16 PM

| Drainage Catchment Information   |                       |
|--|-----------------------|
| Catchment ID   | N2                    |
| <b>Catchment Area</b>  |                       |
| Impervious Area  | 6,372 SF              |
| Impervious Area  | 0.15 ac               |
| Impervious Area Curve Number, $CN_{imp}$   | 98                    |
| Time of Concentration, $T_c$ , minutes   | 5 min.                |
| Site Soils & Infiltration Testing Data   |                       |
| Infiltration Testing Procedure:  | Open Pit Falling Head |
| Native Soil Field Tested Infiltration Rate ( $I_{test}$ ):                                   | 4 in/hr               |
| Bottom of Facility Meets Required Separation From High Groundwater Per BES SWMM Section 1.4: | Yes                   |
| Correction Factor Component  |                       |
| $CF_{test}$ (ranges from 1 to 3)   | 2                     |
| Design Infiltration Rates  |                       |
| $I_{dsgn}$ for Native ( $I_{test} / CF_{test}$ ):  | 2.00 in/hr            |
| $I_{dsgn}$ for Imported Growing Medium:  | 2.00 in/hr            |

**Execute SBUH Calculations**





**Presumptive Approach Calculator ver. 1.1**

Catchment ID: **N2**

Run Time: 12/8/2009 12:20:16 PM

Project Name: Milwaukee Park - Bridge to Parking Catch

Catchment ID: N2

Date: 3/15/2009

**Instructions:**

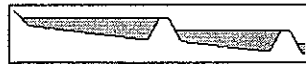
1. Identify which Stormwater Hierarchy Category the facility.
2. Select Facility Type.
3. Identify facility shape of surface facility to more accurately estimate surface volume, except for Swales and sloped planters that use the PAC Sloped Facility Worksheet to enter data.
4. Select type of facility configuration.
5. Complete data entry for all highlighted cells.

Catchment facility will meet Hierarchy Category: 1

**Goal Summary:**

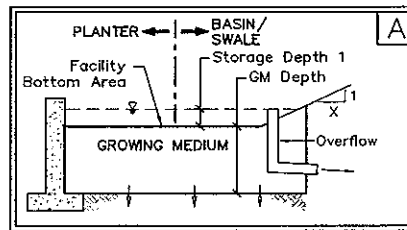
| Hierarchy Category | SWMM Requirement   | RESULTS box below needs to display... |                           | Facility configurations allowed |
|--------------------|--|---------------------------------------|---------------------------|---------------------------------|
|                    |  | Pollution Reduction as a              | 10-yr (aka disposal) as a |                                 |
| 1                  | On-site infiltration with a surface infiltration facility. | PASS                                  | PASS                      | A or B                          |

Facility Type = Planter (Sloped)



Facility Configuration: A

**Refer to Sloped Facility Worksheet and enter Variable Parameters**



**DATA FOR ABOVE GRADE STORAGE COMPONENT**

Infiltration Area = 481 sf  
 Surface Capacity Volume = 329.0 cf

**BELOW GRADE STORAGE**

Rock Storage Bottom Area = 481 sf  
 Rock Storage Depth = 0 in

Calculation Guide  
 Max. Rock Stor.  
 Bottom Area  
 Per Swale Dims

Growing Medium Depth = 18 in  
 Freeboard Depth = N/A in

Surface Capacity at Depth 1 = 329 cf  
 GM Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.022 cfs

Rock Storage Capacity = 0 cf  
 Native Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.022 cfs

GM Infiltration Rate Used in PAC

| RESULTS             |             | Overflow Volume |                             |
|---------------------|-------------|-----------------|-----------------------------|
| Pollution Reduction | <b>PASS</b> | 0 CF            | <u>1%</u> Surf. Cap. Used   |
| 10-yr               | <b>PASS</b> | 0 CF            | <u>100%</u> Surf. Cap. Used |

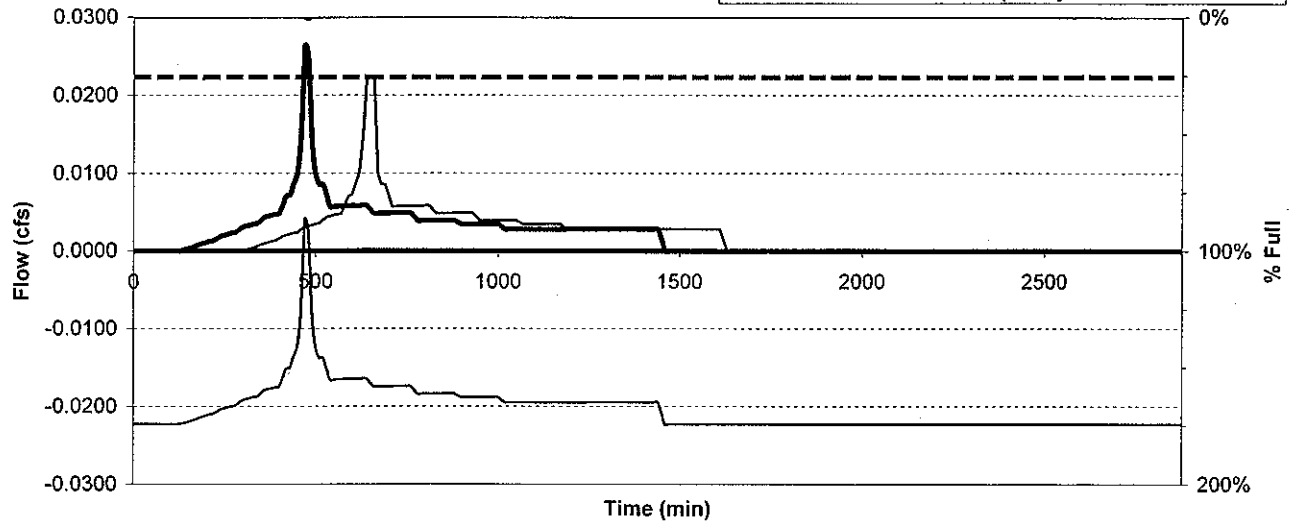
| FACILITY FACTS  |               |
|---|---------------|
| Total Facility Area Including Freeboard =             | <b>871 SF</b> |
| Sizing Ratio (Total Facility Area / Catchment Area) = | <b>0.137</b>  |

Current data has been exported:  
 Brid\_Parking2\_Export.xls 12/8/2009  
 12:21:33 PM

**Pollution Reduction Event  
Surface Facility Modeling**

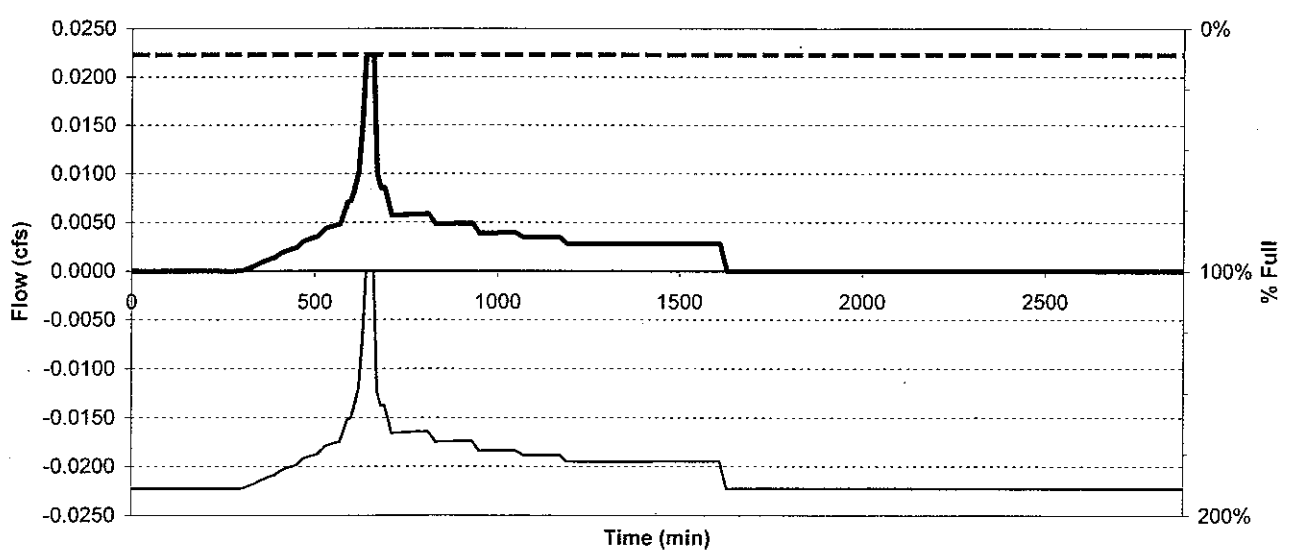
Project Name: Milwaukie Park - Bridge to Parking  
 Run Time: 12/8/2009 12:20:16 PM  
 Catchment ID: N2  
 Hierarchy: 1  
 Facility Type: Planter (:  
 Facility Configuration: A

- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Percolation to Below Grade Storage
- % Surface Capacity

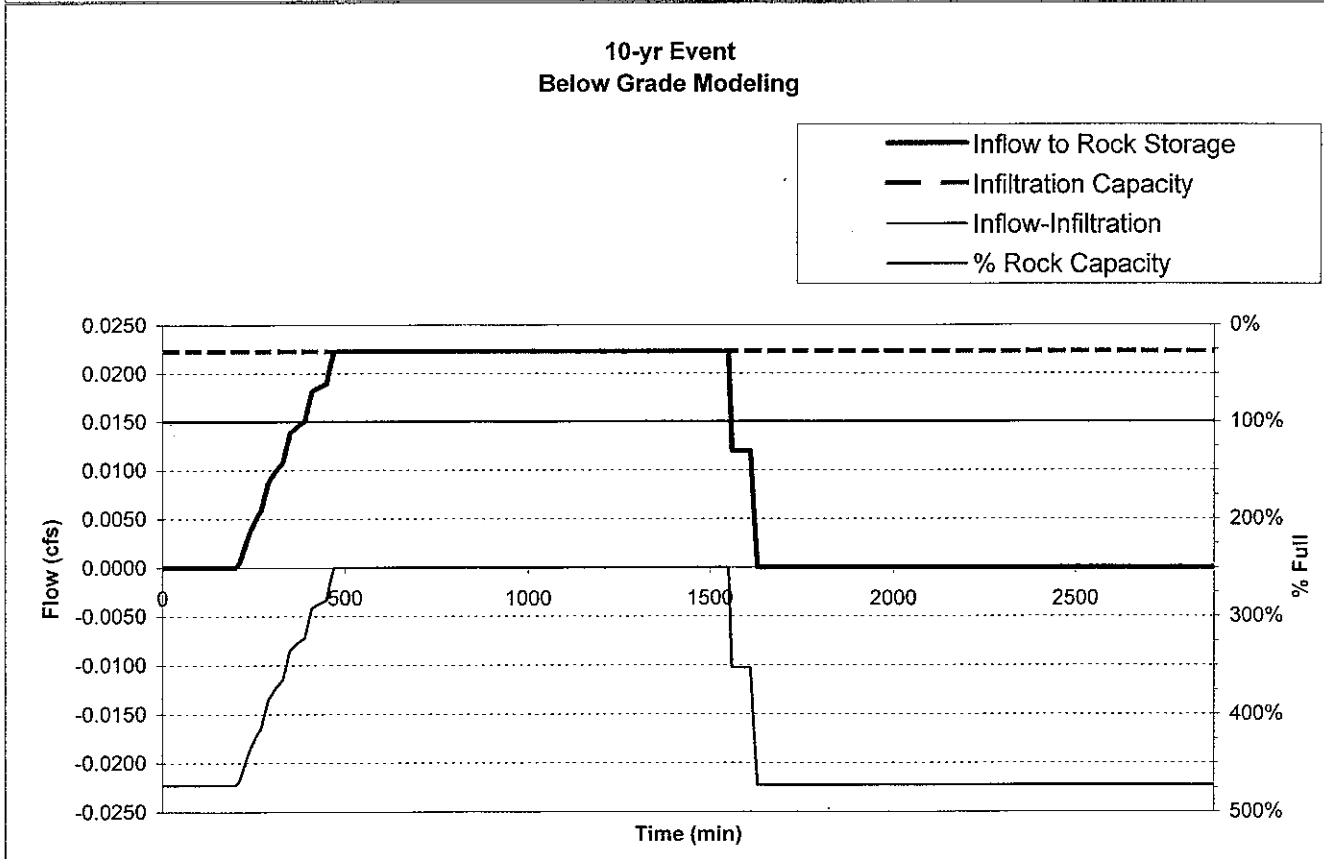
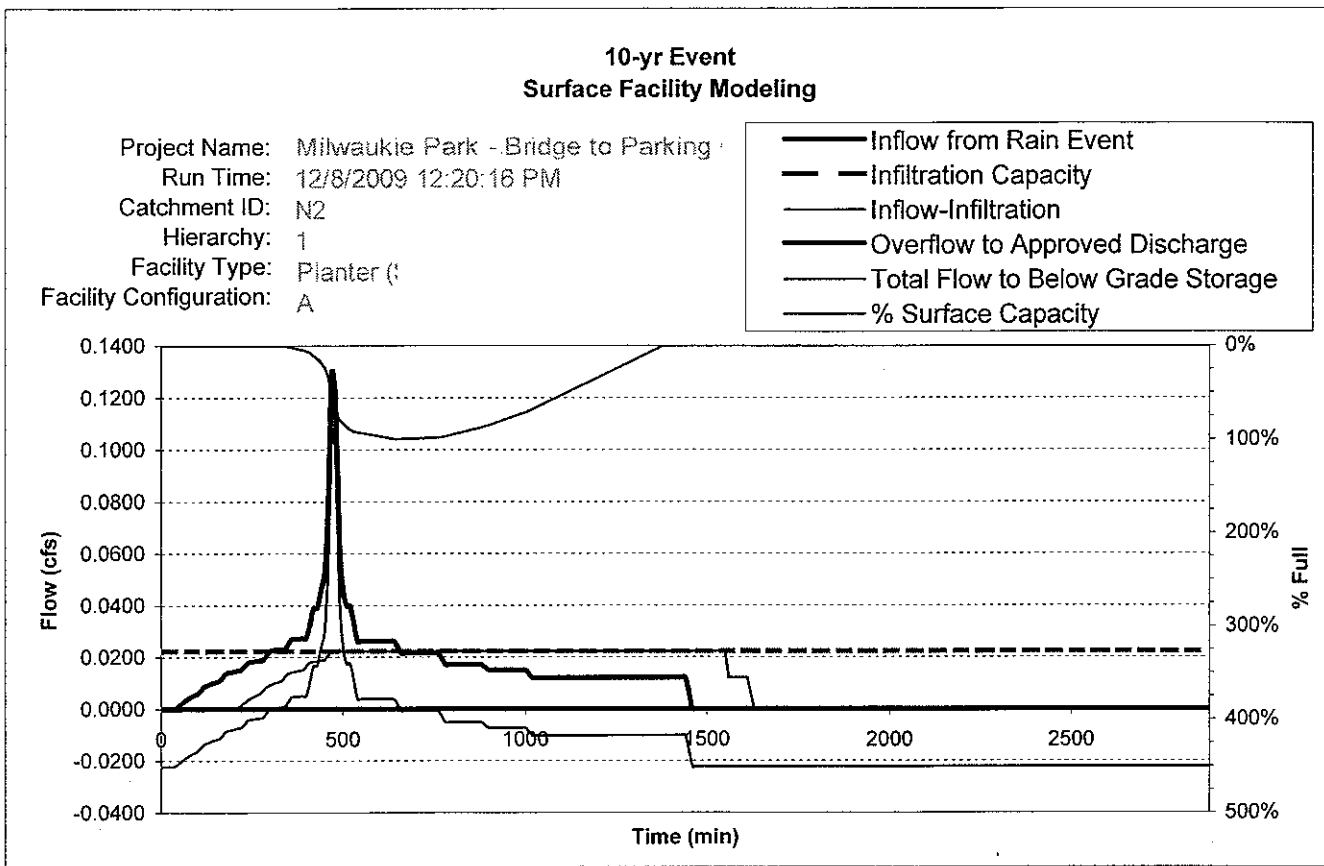


**Pollution Reduction Event  
Below Grade Modeling**

- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity







### Presumptive Approach Calculator Ver 1.1



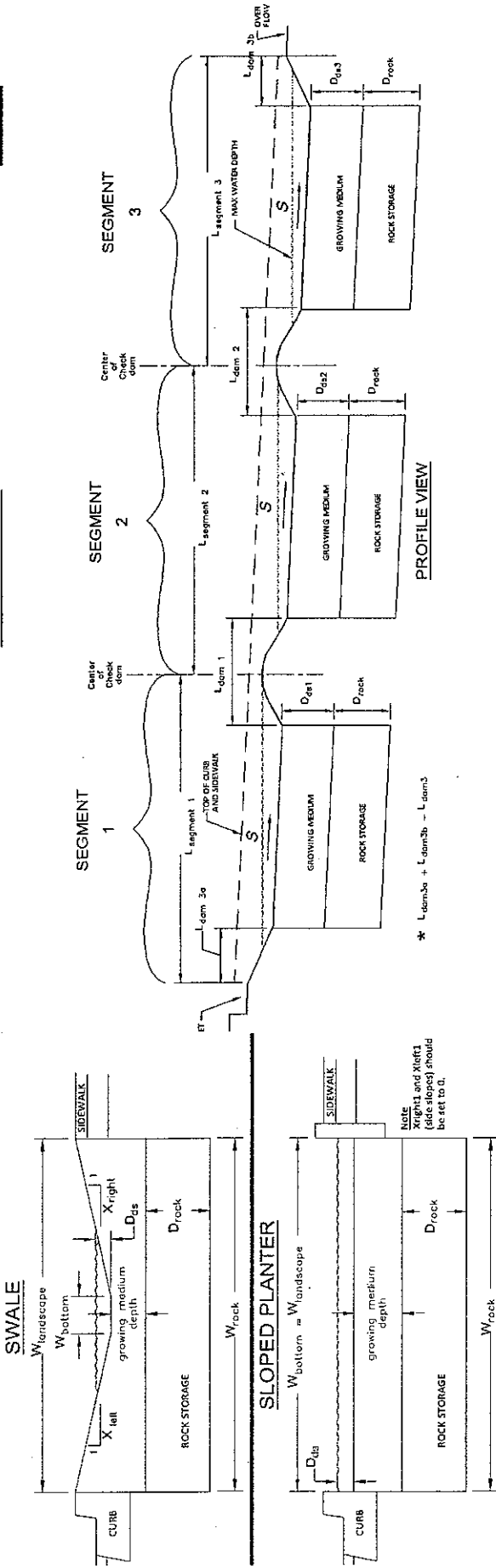
**Instructions:**

1. Refer to facility graphics and fill in all relevant facility parameters in the Data Entry table below. Data entry calls vary based on Facility Configuration selected on Facility Design Data tab.
2. Delete all facility parameters that may have been entered by the previous iteration that are no longer applicable.

Project Name: Milwaukee Park - Bridge to Parking Catch

Date: 3/15/2009

Run Time: 12/8/2009 12:20:10 P.M.  
 Catchment ID: N2



PROFILE VIEW

Error Messages

| Data Entry Parameters |      | Rock Storage Parameters |                                  |                                     |                     |                       |                      |                           |                        |                         |                             |                 |
|-----------------------|------|-------------------------|----------------------------------|-------------------------------------|---------------------|-----------------------|----------------------|---------------------------|------------------------|-------------------------|-----------------------------|-----------------|
| Variable Description  | Unit | Variable Symbol         | Downstream Check Dam Length (ft) | Longitudinal Facility Slope (ft/ft) | Bottom Width (ft)   | Side Slope Right      | Side Slope Left      | Downstream Depth (inches) | Landscape Width (ft)   | Rock Storage Width (ft) | Rock Storage Depth (inches) | Rock Void Ratio |
| 1                     | 32   | L <sub>segment</sub>    | 3                                | S                                   | W <sub>bottom</sub> | X <sub>right</sub> :1 | X <sub>left</sub> :1 | D <sub>ds</sub>           | W <sub>landscape</sub> | W <sub>rock</sub>       | D <sub>rock</sub>           | V               |
| 2                     | 14   | L <sub>dam</sub>        | 3                                | 0.015                               | 4.75                | 0                     | 3                    | 9                         | 7                      |                         |                             |                 |
| 3                     | 14   | L <sub>segment</sub>    | 5                                | 0.015                               | 4.75                | 0                     | 3                    | 9                         | 7                      |                         |                             |                 |
| 4                     | 14   | L <sub>segment</sub>    | 5                                | 0.015                               | 4.75                | 0                     | 3                    | 9                         | 7                      |                         |                             |                 |
| 5                     | 14   | L <sub>segment</sub>    | 5                                | 0.015                               | 4.75                | 0                     | 3                    | 9                         | 7                      |                         |                             |                 |
| 6                     | 14   | L <sub>segment</sub>    | 5                                | 0.015                               | 4.75                | 0                     | 3                    | 9                         | 7                      |                         |                             |                 |
| 7                     | 7    | L <sub>dam</sub>        | 5                                | 0.015                               | 4.75                | 0                     | 3                    | 9                         | 7                      |                         |                             |                 |
| 8                     |      |                         |                                  |                                     |                     |                       |                      |                           |                        |                         |                             |                 |
| 9                     |      |                         |                                  |                                     |                     |                       |                      |                           |                        |                         |                             |                 |
| 10                    |      |                         |                                  |                                     |                     |                       |                      |                           |                        |                         |                             |                 |

Worksheet Calculations



# Presumptive Approach Calculator ver. 1.1

Catchment Data

Project Name: **Milwaukie Park - Upper No. Parking Cal**  
 Project Address: **Milwaukie, OR**  
 Designer: **SDH**  
 Company: **David Evans and Associates, Inc.**

Catchment ID: **N3**

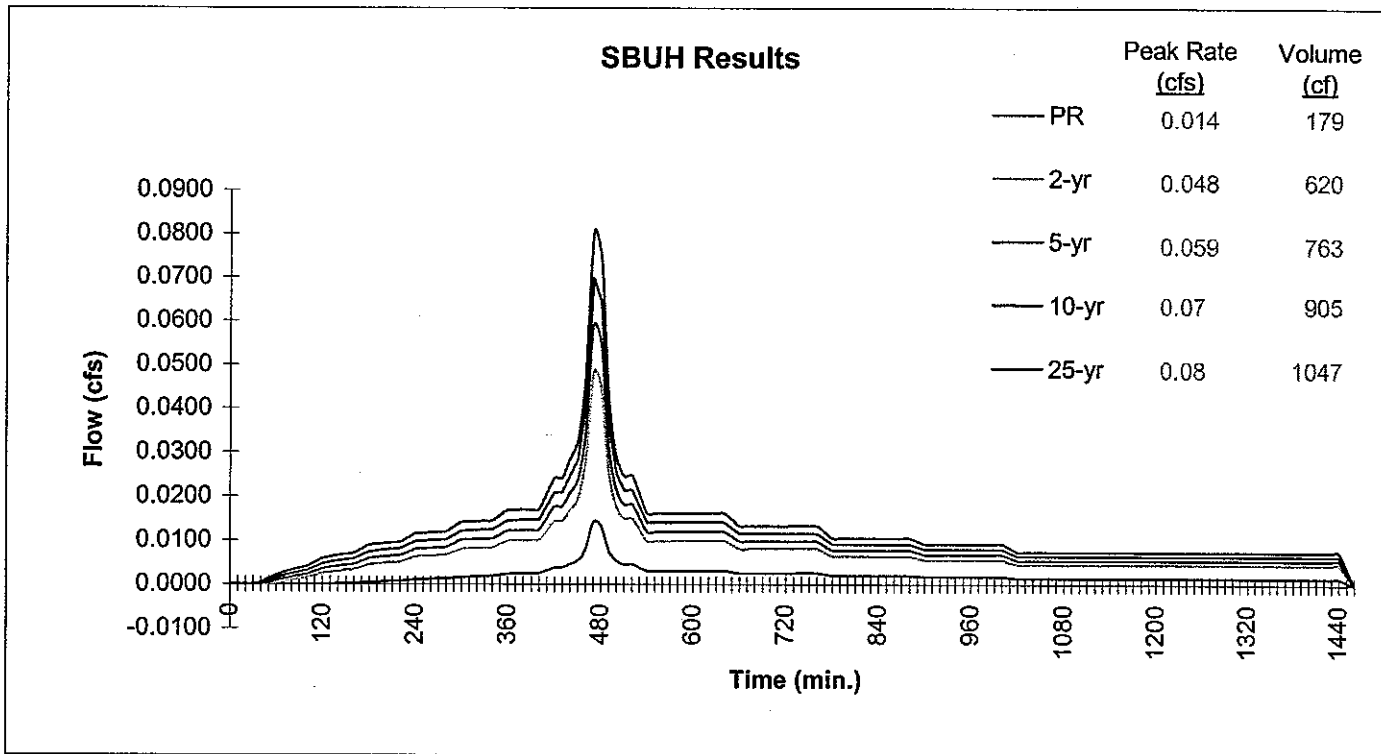
Date: **03/15/09**

Permit Number: **0**

Run Time: 5/14/2009 12:37:10 PM

| Drainage Catchment Information   |                       |
|--|-----------------------|
| Catchment ID   | N3                    |
| <b>Catchment Area</b>  |                       |
| Impervious Area  | 3,429 SF              |
| Impervious Area  | 0.08 ac               |
| Impervious Area Curve Number, CN <sub>imp</sub>  | 98                    |
| Time of Concentration, T <sub>c</sub> , minutes  | 5 min.                |
| Site Soils & Infiltration Testing Data   |                       |
| Infiltration Testing Procedure:  | Open Pit Falling Head |
| Native Soil Field Tested Infiltration Rate (I <sub>test</sub> ):                             | 2 in/hr               |
| Bottom of Facility Meets Required Separation From High Groundwater Per BES SWMM Section 1.4: | Yes                   |
| Correction Factor Component  |                       |
| CF <sub>test</sub> (ranges from 1 to 3)  | 2                     |
| Design Infiltration Rates  |                       |
| I <sub>dsgn</sub> for Native (I <sub>test</sub> / CF <sub>test</sub> ):                      | 1.00 in/hr            |
| I <sub>dsgn</sub> for Imported Growing Medium:   | 2.00 in/hr            |

**Execute SBUH Calculations**





**Presumptive Approach Calculator ver. 1.1**

Catchment ID: **N3**

Run Time: 5/14/2009 12:37:10 PM

Project Name: **Milwaukee Park - Upper No. Parking Catch** Catchment ID: **N3** Date: **3/15/2009**

**Instructions:**

1. Identify which Stormwater Hierarchy Category the facility.
2. Select Facility Type.
3. Identify facility shape of surface facility to more accurately estimate surface volume, except for Swales and sloped planters that use the PAC Sloped Facility Worksheet to enter data.
4. Select type of facility configuration.
5. Complete data entry for all highlighted cells.

Catchment facility will meet Hierarchy Category: **1**

**Goal Summary:**

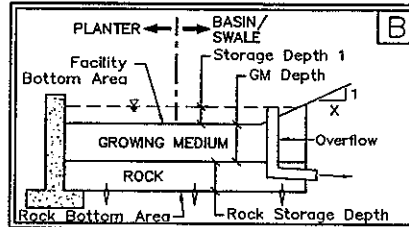
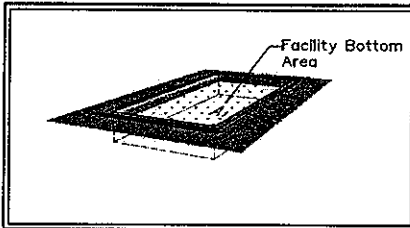
| Hierarchy Category | SWMM Requirement   | RESULTS box below needs to display... |                           | Facility configurations allowed |
|--------------------|--|---------------------------------------|---------------------------|---------------------------------|
|                    |  | Pollution Reduction as a              | 10-yr (aka disposal) as a |                                 |
| <b>1</b>           | On-site infiltration with a surface infiltration facility. | <b>PASS</b>                           | <b>PASS</b>               | <b>A or B</b>                   |

Facility Type = **Planter (Flat)**



Facility Shape: **Rectangle/Square**

Facility Configuration: **B**



**DATA FOR ABOVE GRADE STORAGE COMPONENT**

Facility Bottom Area = **522** sf  
 Bottom Width = **3.0** ft  
 Facility Side Slope = **0** to **1**  
 Storage Depth 1 = **3** in  
 Growing Medium Depth = **18** in  
 Freeboard Depth = **N/A** in

<Warning

**BELOW GRADE STORAGE**

Rock Storage Bottom Area = **522** sf  
 Rock Storage Depth = **12** in  
 Rock Void Ratio = **0.3**

|                   |
|-------------------|
| Calculation Guide |
| Max. Rock Stor.   |
| Bottom Area       |
| 522 SF            |

Surface Capacity at Depth 1 = **131** cf  
 GM Design Infiltration Rate = **2.00** in/hr  
 Infiltration Capacity = **0.024** cfs

Rock Storage Capacity = **157** cf  
 Native Design Infiltration Rate = **1.00** in/hr  
 Infiltration Capacity = **0.012** cfs

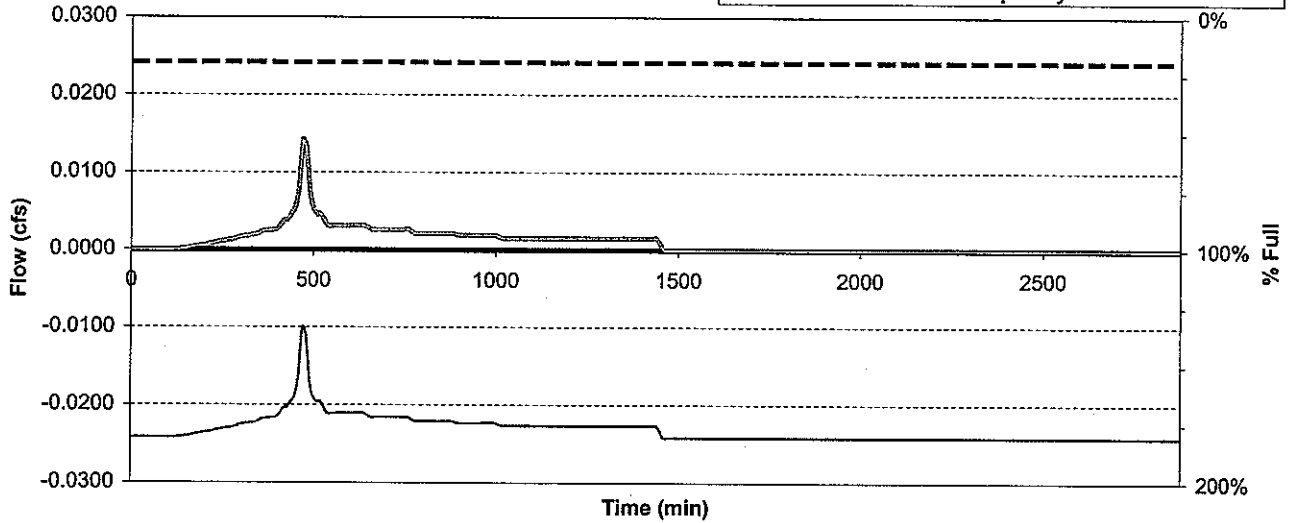
| RESULTS             |             | Overflow Volume |                            |
|---------------------|-------------|-----------------|----------------------------|
| Pollution Reduction | <b>PASS</b> | 0 CF            | <b>0%</b> Surf. Cap. Used  |
|                     |             |                 | <b>1%</b> Rock Cap. Used   |
| 10-yr               | <b>PASS</b> | 0 CF            | <b>55%</b> Surf. Cap. Used |
|                     |             |                 | <b>100%</b> Rock Cap. Used |

| FACILITY FACTS  |               |
|---|---------------|
| Total Facility Area Including Freeboard =             | <b>522 SF</b> |
| Sizing Ratio (Total Facility Area / Catchment Area) = | <b>0.152</b>  |

**Pollution Reduction Event  
Surface Facility Modeling**

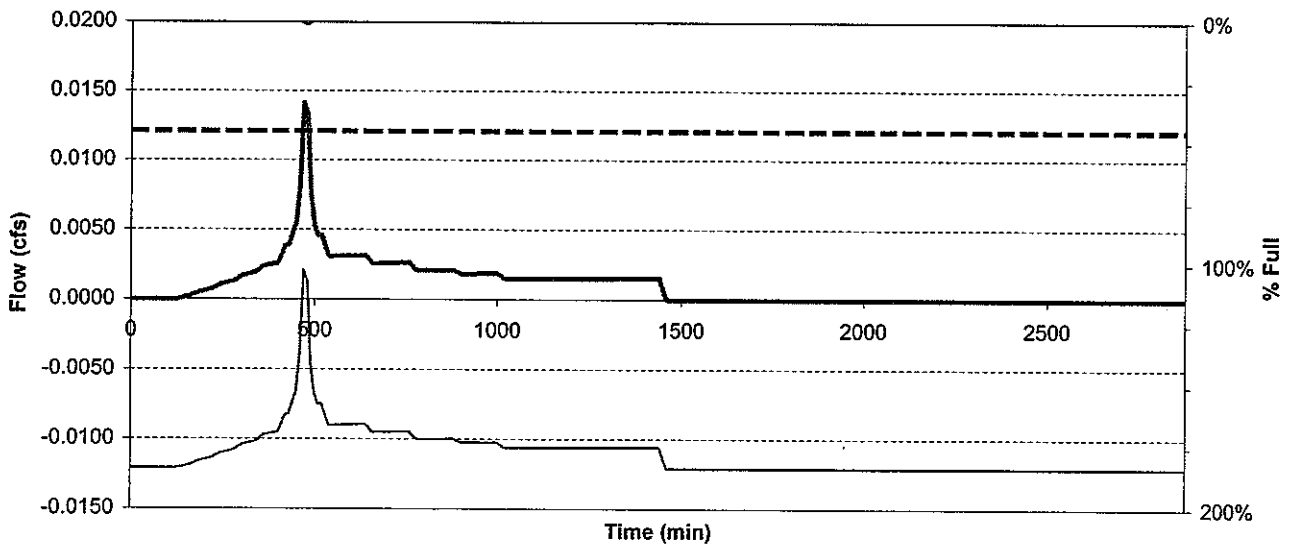
Project Name: Milwaukie Park - Upper No. Parking  
 Run Time: 5/14/2009 12:37:10 PM  
 Catchment ID: N3  
 Hierarchy: 1  
 Facility Type: Planter (I)  
 Facility Configuration: B

- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Percolation to Below Grade Storage
- % Surface Capacity



**Pollution Reduction Event  
Below Grade Modeling**

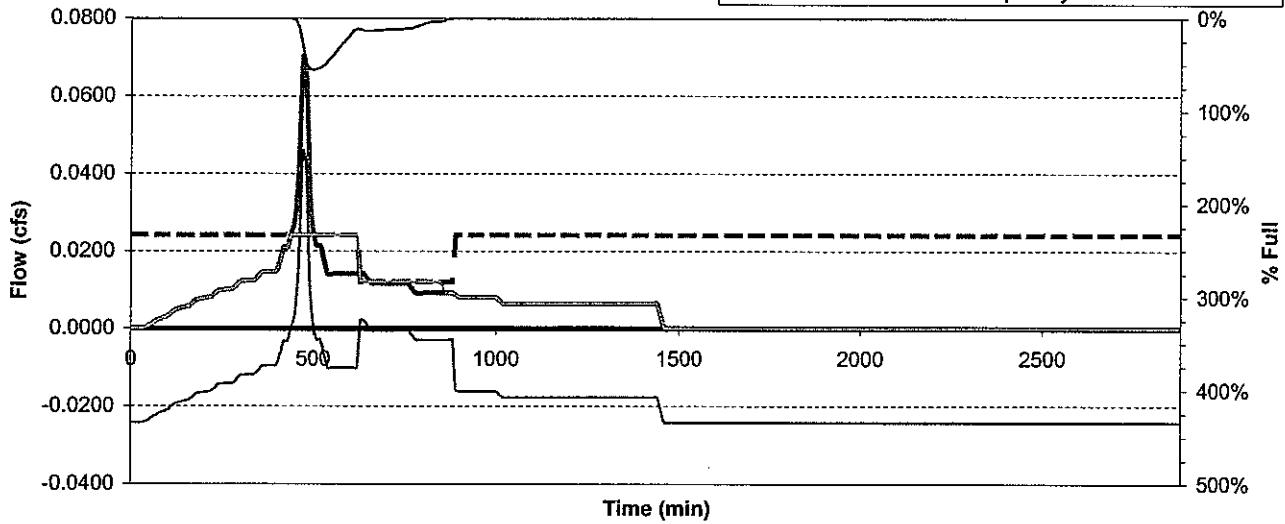
- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity



10-yr Event  
Surface Facility Modeling

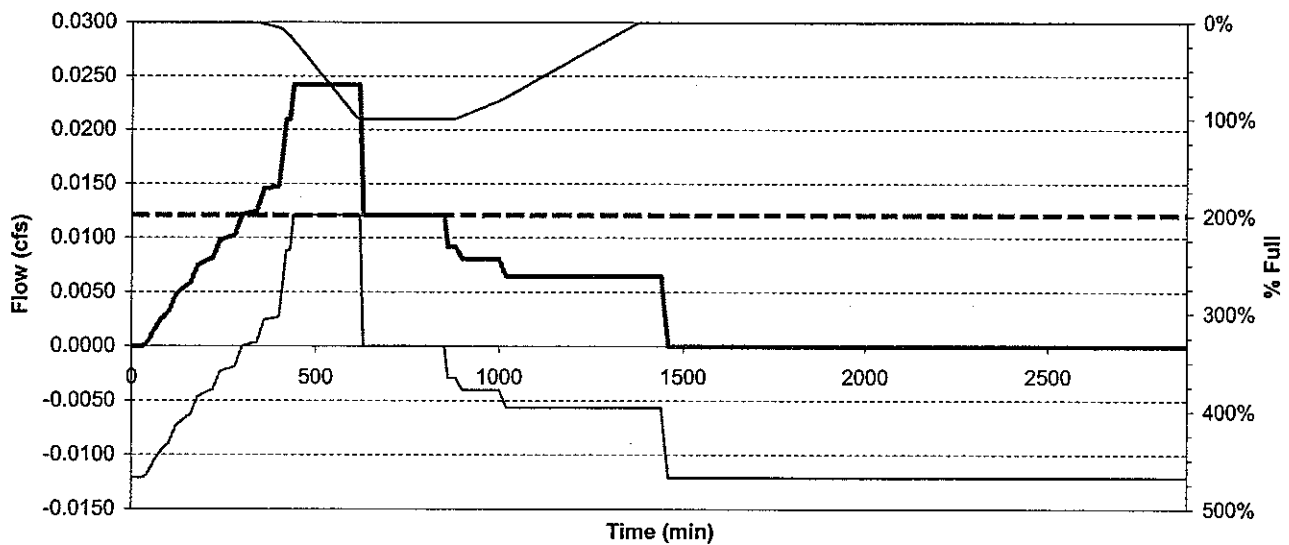
Project Name: Milwaukie Park - Upper No. Parking  
 Run Time: 5/14/2009 12:37:10 PM  
 Catchment ID: N3  
 Hierarchy: 1  
 Facility Type: Planter (l  
 Facility Configuration: B

- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Total Flow to Below Grade Storage
- % Surface Capacity



10-yr Event  
Below Grade Modeling

- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity





# Presumptive Approach Calculator ver. 1.1

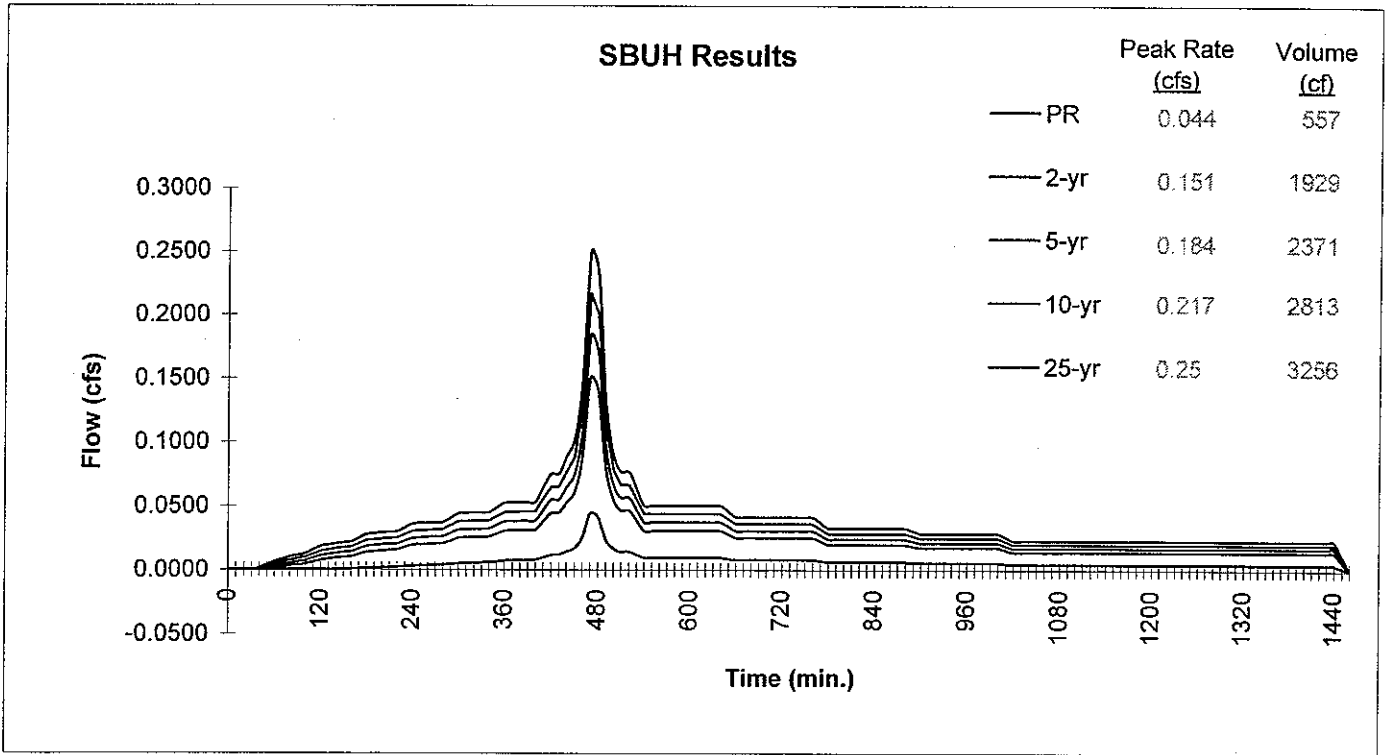
Catchment Data

Project Name: Milwaukie Park - Plaza 1  
 Project Address: -  
Milwaukie, OR  
 Designer: SDH  
 Company: David Evans and Associates, Inc.

Catchment ID: P1  
 Date: 12/10/09  
 Permit Number: 0  
 Run Time: 12/10/2009 3:05:27 PM

| Drainage Catchment Information   |                       |
|--|-----------------------|
| Catchment ID   | P1                    |
| <b>Catchment Area</b>  |                       |
| Impervious Area  | 10,660 SF             |
| Impervious Area  | 0.24 ac               |
| Impervious Area Curve Number, $CN_{imp}$   | 98                    |
| Time of Concentration, $T_c$ , minutes   | 5 min.                |
| Site Soils & Infiltration Testing Data   |                       |
| Infiltration Testing Procedure:  | Open Pit Falling Head |
| Native Soil Field Tested Infiltration Rate ( $I_{test}$ ):                                   | 4 in/hr               |
| Bottom of Facility Meets Required Separation From High Groundwater Per BES SWMM Section 1.4: | Yes                   |
| Correction Factor Component  |                       |
| $CF_{test}$ (ranges from 1 to 3)   | 2                     |
| Design Infiltration Rates  |                       |
| $I_{dsgn}$ for Native ( $I_{test} / CF_{test}$ ):  | 2.00 in/hr            |
| $I_{dsgn}$ for Imported Growing Medium:  | 2.00 in/hr            |

Execute SBUH Calculations





**Presumptive Approach Calculator ver. 1.1**

Catchment ID: **P1**

Run Time: 12/10/2009 3:05:27 PM

Project Name: Milwaukee Park - Plaza 1

Catchment ID: P1

Date: 12/10/2009

**Instructions:**

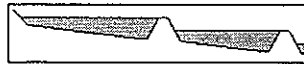
1. Identify which Stormwater Hierarchy Category the facility.
2. Select Facility Type.
3. Identify facility shape of surface facility to more accurately estimate surface volume, except for Swales and sloped planters that use the PAC Sloped Facility Worksheet to enter data.
4. Select type of facility configuration.
5. Complete data entry for all highlighted cells.

Catchment facility will meet Hierarchy Category: 1

**Goal Summary:**

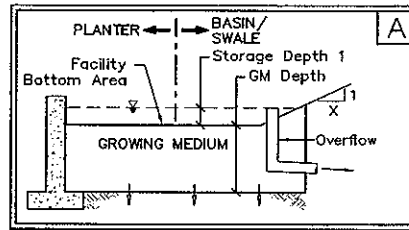
| Hierarchy Category | SWMM Requirement   | RESULTS box below needs to display... |                           | Facility configurations allowed |
|--------------------|--|---------------------------------------|---------------------------|---------------------------------|
|                    |  | Pollution Reduction as a              | 10-yr (aka disposal) as a |                                 |
| 1                  | On-site infiltration with a surface infiltration facility. | PASS                                  | PASS                      | A or B                          |

Facility Type = Swale



Facility Configuration: A

Refer to Sloped Facility Worksheet and enter Variable Parameters



|                   |
|-------------------|
| Calculation Guide |
| Max. Rock Stor.   |
| Bottom Area       |
| Per Swale Dims    |

**DATA FOR ABOVE GRADE STORAGE COMPONENT**

Infiltration Area = 788 sf  
 Surface Capacity Volume = 536.4 cf

**BELOW GRADE STORAGE**

Rock Storage Bottom Area = 788 sf  
 Rock Storage Depth = 0 in

Growing Medium Depth = 18 in  
 Freeboard Depth = N/A in

Surface Capacity at Depth 1 = 536 cf  
 GM Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.036 cfs

Rock Storage Capacity = 0 cf  
 Native Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.036 cfs

GM Infiltration Rate Used in PAC

| RESULTS             |             | Overflow Volume |                      |         |
|---------------------|-------------|-----------------|----------------------|---------|
| Pollution Reduction | <b>PASS</b> | 0 CF            | 1% Surf. Cap. Used   | Run PAC |
| 10-yr               | <b>FAIL</b> | 33 CF           | 100% Surf. Cap. Used |         |

Warning - Data Modified, Re-run Calculator.

| FACILITY FACTS  |                 |
|---|-----------------|
| Total Facility Area Including Freeboard =             | <b>1,508 SF</b> |
| Sizing Ratio (Total Facility Area / Catchment Area) = | <b>0.141</b>    |

|                                 |                       |
|---------------------------------|-----------------------|
| Current data has been exported: |                       |
| Plaza1_Export.xls               | 12/10/2009 3:15:51 PM |



### Presumptive Approach Calculator Ver 1.1



**Instructions:**

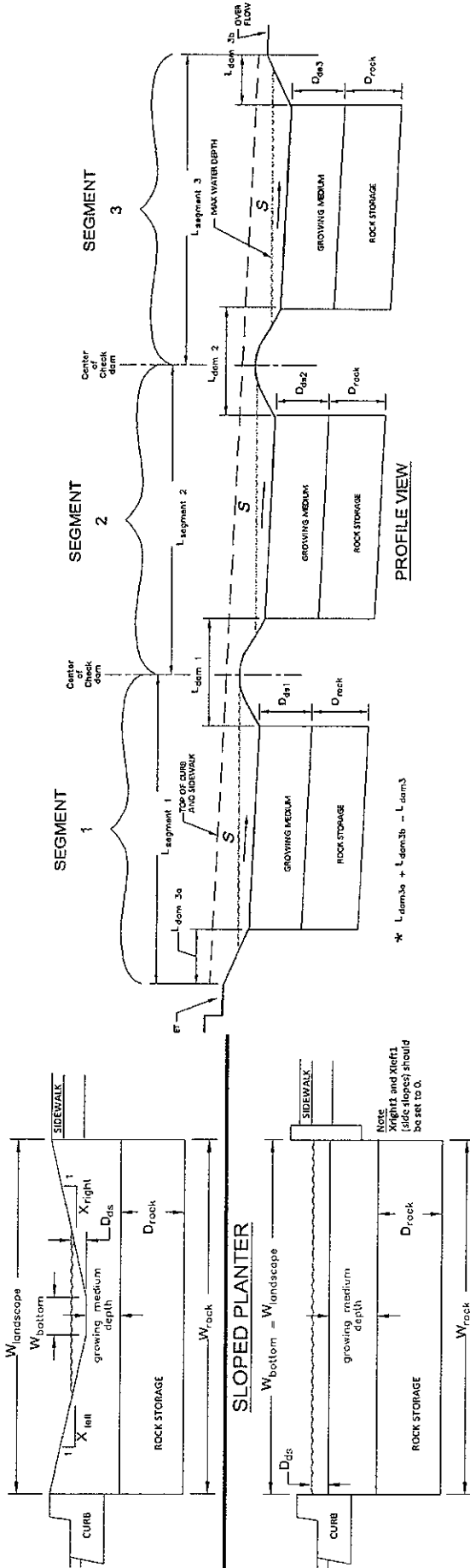
1. Refer to facility graphics and fill in all relevant facility parameters in the Data Entry table below. Data entry cells vary based on Facility Configuration selected on Facility Design Data tab.
2. Delete all facility parameters that may have been entered by the previous iteration that are no longer applicable.

Project Name: Milwaukee Park - Plaza 1

Date: 12/10/2009

Run Time: 12/10/2009 3:15:27 PM

Catchment ID: P1



**Data Entry Parameters**

| Variable Description | Unit | Variable Symbol | Facility Segment | Length of facility segment (ft) | Downstream Check Dam Length (ft) | Longitudinal Facility Slope (ft/ft) | Bottom Width (ft) | Side Slope Right      | Side Slope Left      | Downstream Depth (inches) | Landscape Width (ft)   | Rock Storage Width (ft) | Rock Storage Depth (inches) | Rock Void Ratio |
|----------------------|------|-----------------|------------------|---------------------------------|----------------------------------|-------------------------------------|-------------------|-----------------------|----------------------|---------------------------|------------------------|-------------------------|-----------------------------|-----------------|
|                      |      |                 | 1                | 25                              | 5                                | S                                   | 9                 | X <sub>right</sub> :1 | X <sub>left</sub> :1 | D <sub>ds</sub>           | W <sub>landscope</sub> | W <sub>rock</sub>       | D <sub>rock</sub>           | V               |
|                      |      |                 | 2                | 25                              | 5                                | 0.04                                | 9                 | 2                     | 2                    | 12                        | 14                     |                         |                             |                 |
|                      |      |                 | 3                | 25                              | 5                                | 0.04                                | 9                 | 2                     | 2                    | 12                        | 14                     |                         |                             |                 |
|                      |      |                 | 4                | 25                              | 5                                | 0.04                                | 9                 | 2                     | 2                    | 12                        | 14                     |                         |                             |                 |
|                      |      |                 | 5                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 6                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 7                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 8                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 9                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 10               |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |

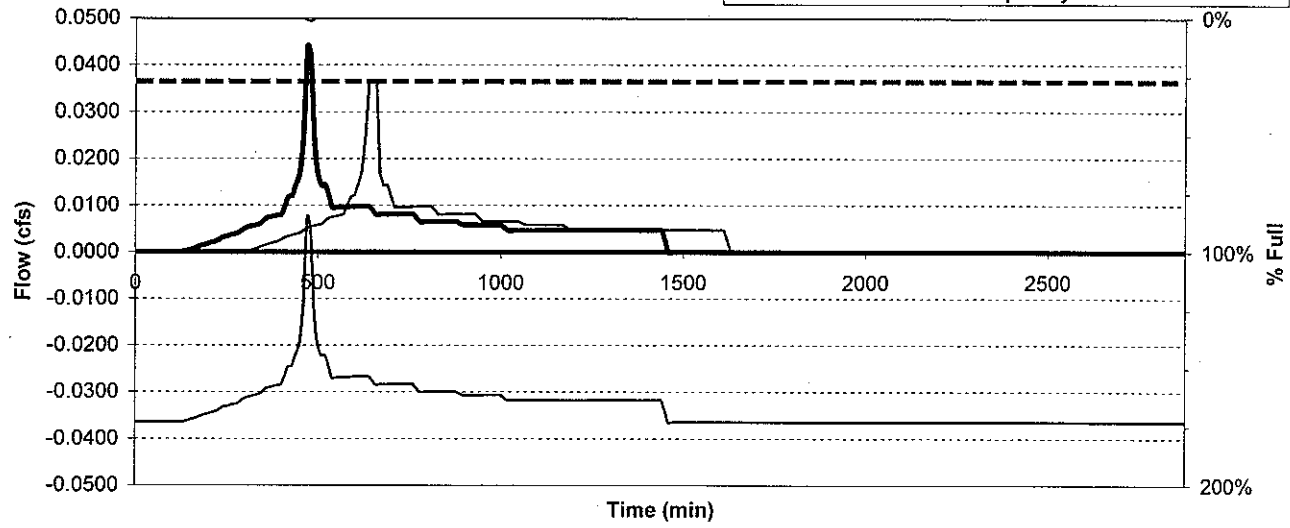
**Error Messages**

**Worksheet Calculations**

**Pollution Reduction Event  
Surface Facility Modeling**

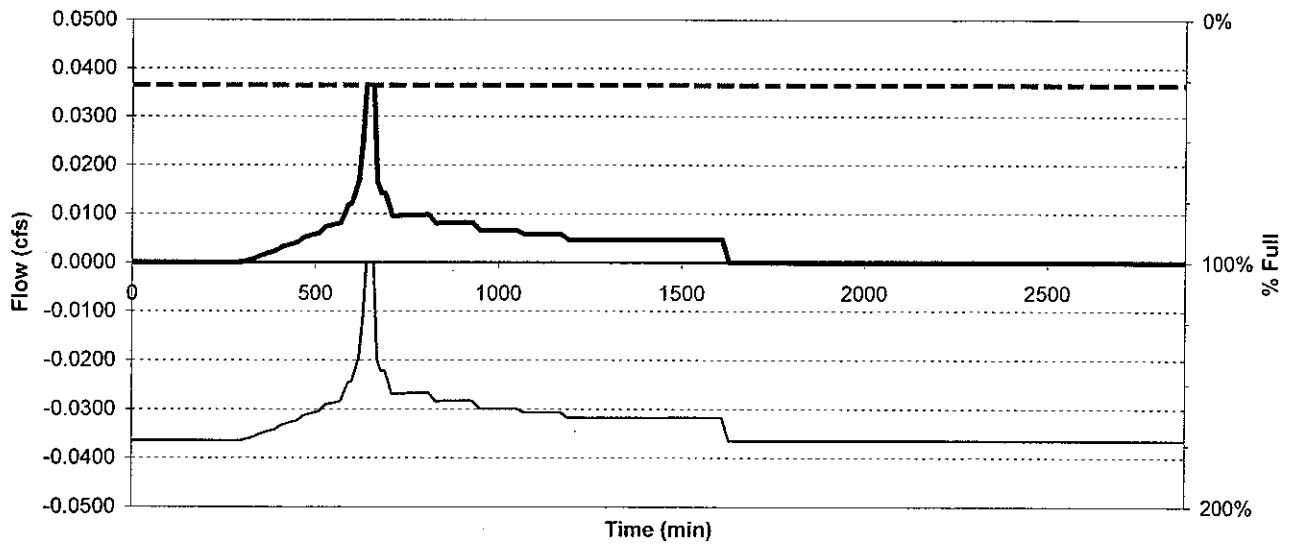
Project Name: Milwaukie Park - Bridge to Parking  
 Run Time: 12/10/2009 3:05:27 PM  
 Catchment ID: P1  
 Hierarchy: 1  
 Facility Type: Swale  
 Facility Configuration: A

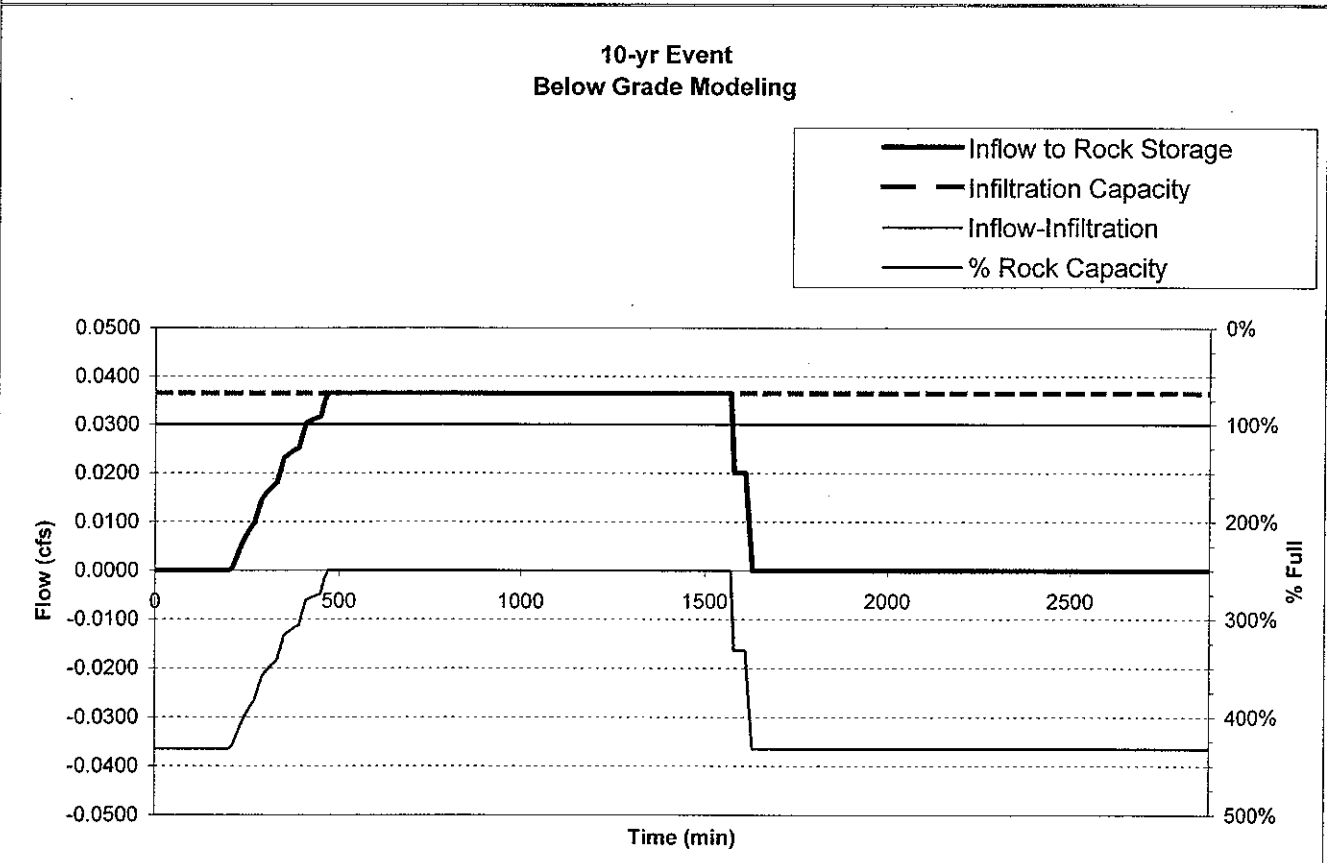
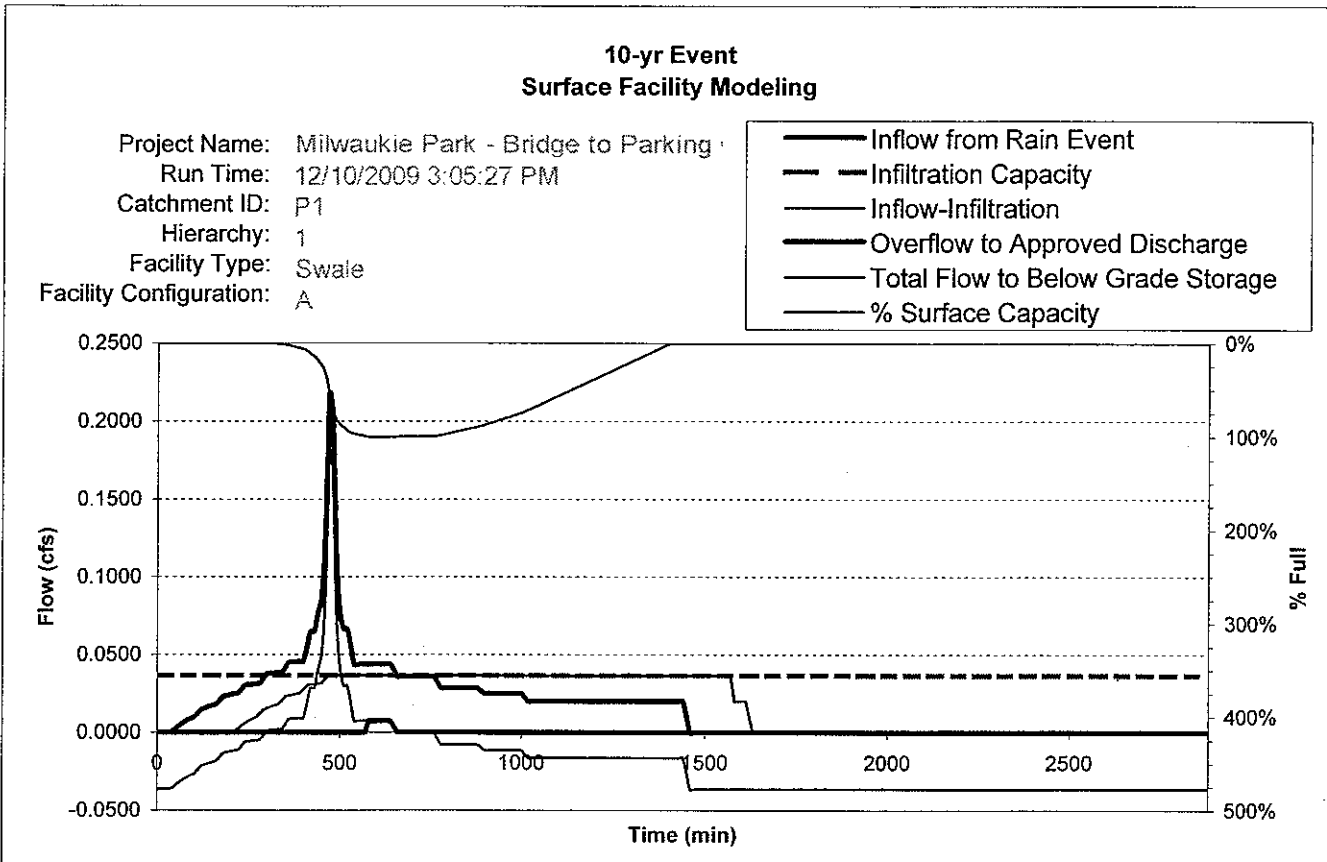
- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Percolation to Below Grade Storage
- % Surface Capacity



**Pollution Reduction Event  
Below Grade Modeling**

- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity







# Presumptive Approach Calculator ver. 1.1

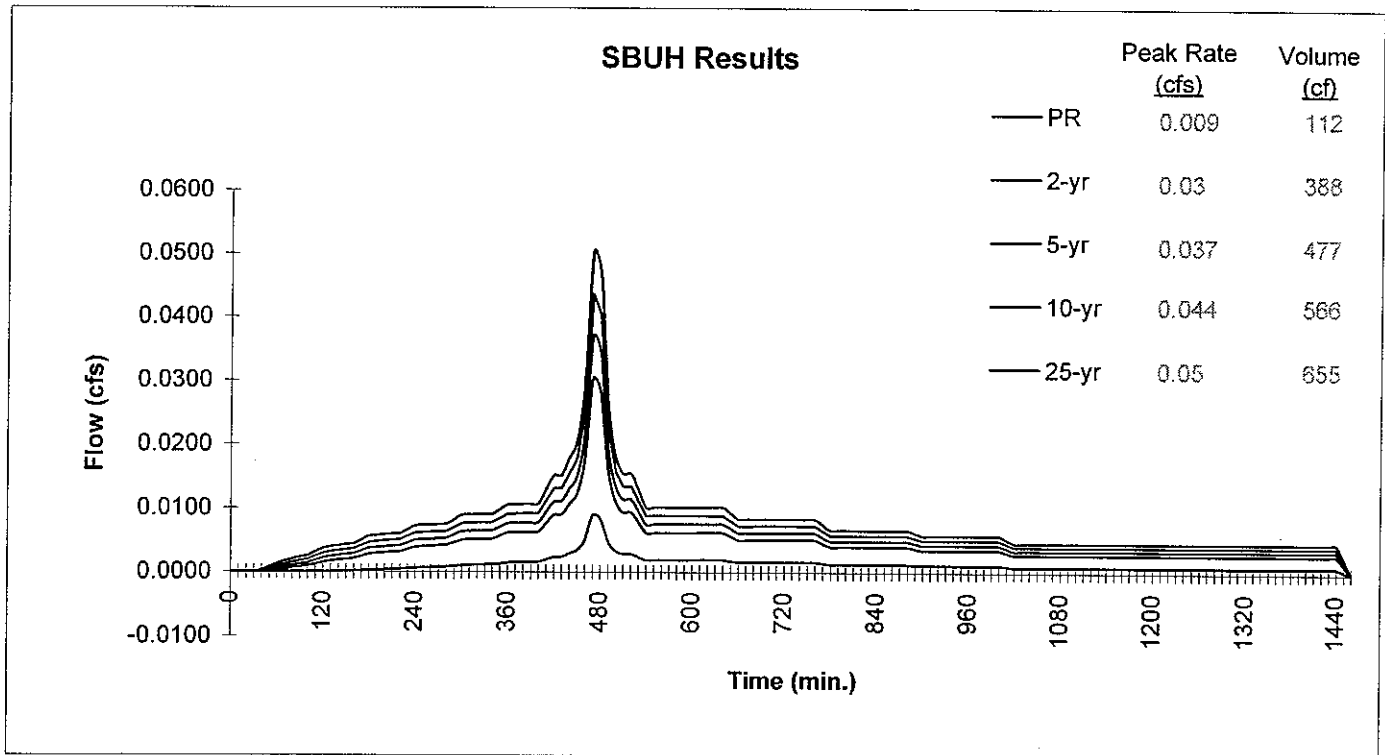
Catchment Data

Project Name: Milwaukie Park - Plaza 2  
 Project Address: -  
Milwaukie, OR  
 Designer: SDH  
 Company: David Evans and Associates, Inc.

Catchment ID: P2  
 Date: 12/10/09  
 Permit Number: 0  
 Run Time: 12/10/2009 3:21:47 PM

| Drainage Catchment Information   |                       |
|--|-----------------------|
| Catchment ID   | P2                    |
| <b>Catchment Area</b>  |                       |
| Impervious Area  | 2,145 SF              |
| Impervious Area  | 0.05 ac               |
| Impervious Area Curve Number, $CN_{imp}$   | 98                    |
| Time of Concentration, $T_c$ , minutes   | 5 min.                |
| Site Soils & Infiltration Testing Data   |                       |
| Infiltration Testing Procedure:  | Open Pit Falling Head |
| Native Soil Field Tested Infiltration Rate ( $I_{test}$ ):                                   | 4 in/hr               |
| Bottom of Facility Meets Required Separation From High Groundwater Per BES SWMM Section 1.4: | Yes                   |
| Correction Factor Component  |                       |
| $CF_{test}$ (ranges from 1 to 3)   | 2                     |
| Design Infiltration Rates  |                       |
| $I_{dsgn}$ for Native ( $I_{test} / CF_{test}$ ):  | 2.00 in/hr            |
| $I_{dsgn}$ for Imported Growing Medium:  | 2.00 in/hr            |

**Execute SBUH Calculations**





**Presumptive Approach Calculator ver. 1.1**

Catchment ID: **P2**

Run Time: 12/10/2009 3:21:47 PM

Project Name: Mitwaukie Park - Plaza 2

Catchment ID: P2

Date: 12/10/2009

**Instructions:**

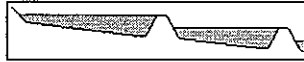
1. Identify which Stormwater Hierarchy Category the facility.
2. Select Facility Type.
3. Identify facility shape of surface facility to more accurately estimate surface volume, except for Swales and sloped planters that use the PAC Sloped Facility Worksheet to enter data.
4. Select type of facility configuration.
5. Complete data entry for all highlighted cells.

Catchment facility will meet Hierarchy Category: 1

**Goal Summary:**

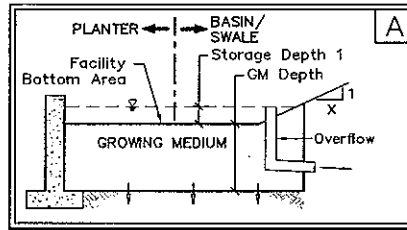
| Hierarchy Category | SWMM Requirement   | RESULTS box below needs to display... |                           | Facility configurations allowed |
|--------------------|--|---------------------------------------|---------------------------|---------------------------------|
|                    |  | Pollution Reduction as a              | 10-yr (aka disposal) as a |                                 |
| 1                  | On-site infiltration with a surface infiltration facility. | PASS                                  | PASS                      | A or B                          |

Facility Type = Swale



Facility Configuration: A

Refer to Sloped Facility Worksheet and enter Variable Parameters



|                   |
|-------------------|
| Calculation Guide |
| Max. Rock Stor.   |
| Bottom Area       |
| Per Swale Dims    |

**DATA FOR ABOVE GRADE STORAGE COMPONENT**

Infiltration Area = 407 sf  
 Surface Capacity Volume = 278.2 cf

**BELOW GRADE STORAGE**

Rock Storage Bottom Area = 407 sf  
 Rock Storage Depth = 0 in

Growing Medium Depth = 18 in  
 Freeboard Depth = N/A in

Surface Capacity at Depth 1 = 278 cf  
 GM Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.019 cfs

Rock Storage Capacity = 0 cf  
 Native Design Infiltration Rate = 2.00 in/hr  
 Infiltration Capacity = 0.019 cfs

GM Infiltration Rate Used in PAC

| RESULTS             |             | Overflow Volume |     |                 |
|---------------------|-------------|-----------------|-----|-----------------|
| Pollution Reduction | <b>PASS</b> | 0 CF            | 0%  | Surf. Cap. Used |
| 10-yr               | <b>PASS</b> | 0 CF            | 12% | Surf. Cap. Used |

Run PAC

| FACILITY FACTS  |               |
|---|---------------|
| Total Facility Area Including Freeboard =             | <b>748 SF</b> |
| Sizing Ratio (Total Facility Area / Catchment Area) = | <b>0.349</b>  |

Current data has been exported:  
 Plaza2\_Export.xls 12/10/2009 3:29:06 PM

### Presumptive Approach Calculator Ver 1.1



**Instructions:**

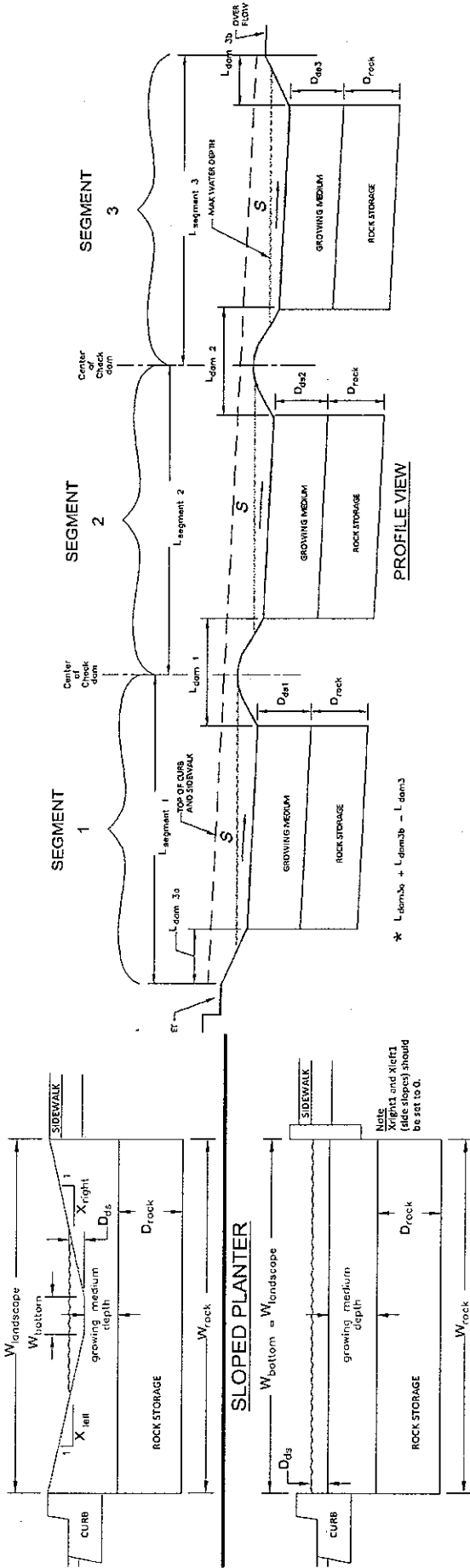
1. Refer to facility graphics and fill in all relevant facility parameters in the Data Entry table below. Data entry cells vary based on Facility Configuration selected on Facility Design Data tab.
2. Delete all facility parameters that may have been entered by the previous iteration that are no longer applicable.

Project Name: Milwaukee Park - Plaza 2

Date: 12/10/2009

Run Time: 12/10/2009 2:24:47 PM

Catchment ID: P2



**Data Entry Parameters**

| Variable Description | Unit | Variable Symbol | Facility Segment | Length of facility segment (ft) | Downstream Check Dam Length (ft) | Longitudinal Facility Slope (ft/ft) | Bottom Width (ft) | Side Slope Right      | Side Slope Left      | Downstream Depth (inches) | Landscape Width (ft)   | Rock Storage Width (ft) | Rock Storage Depth (inches) | Rock Void Ratio |
|----------------------|------|-----------------|------------------|---------------------------------|----------------------------------|-------------------------------------|-------------------|-----------------------|----------------------|---------------------------|------------------------|-------------------------|-----------------------------|-----------------|
|                      |      |                 | 1                | 20                              | 5                                | S                                   | 4                 | X <sub>right</sub> :1 | X <sub>left</sub> :1 | D <sub>ds</sub>           | W <sub>landscape</sub> | W <sub>rock</sub>       | D <sub>rock</sub>           | V               |
|                      |      |                 | 2                | 20                              | 5                                | 0.034                               | 4                 | 2                     | 2                    | 12                        | 8                      |                         |                             |                 |
|                      |      |                 | 3                | 20                              | 5                                | 0.034                               | 4                 | 2                     | 2                    | 12                        | 8                      |                         |                             |                 |
|                      |      |                 | 4                | 20                              | 5                                | 0.034                               | 4                 | 2                     | 2                    | 12                        | 8                      |                         |                             |                 |
|                      |      |                 | 5                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 6                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 7                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 8                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 9                |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |
|                      |      |                 | 10               |                                 |                                  |                                     |                   |                       |                      |                           |                        |                         |                             |                 |

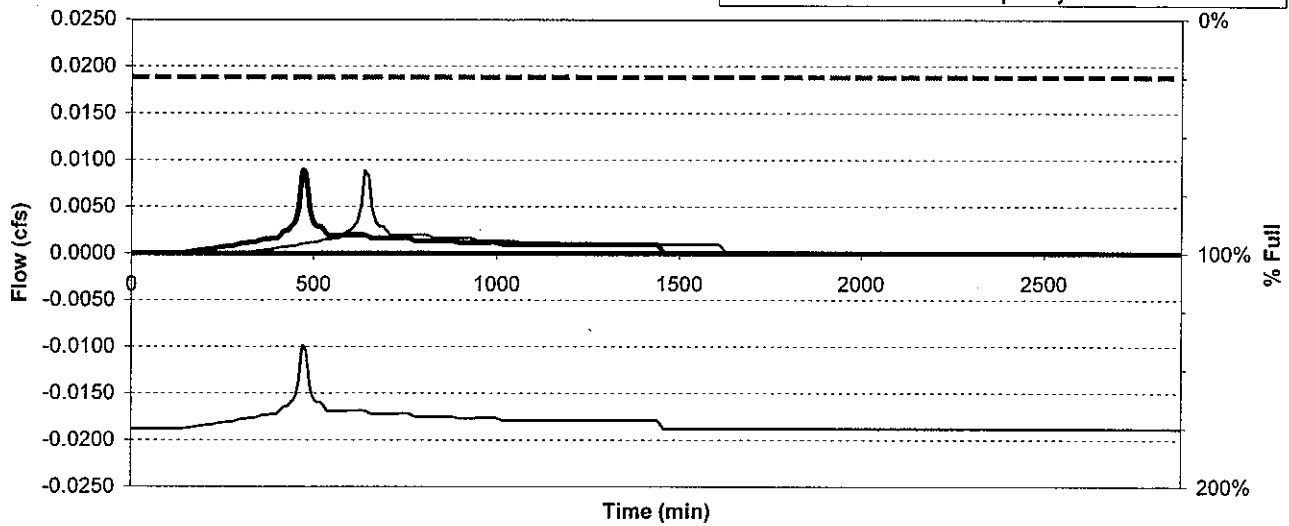
**Error Messages**

**Worksheet Calculations**

**Pollution Reduction Event  
Surface Facility Modeling**

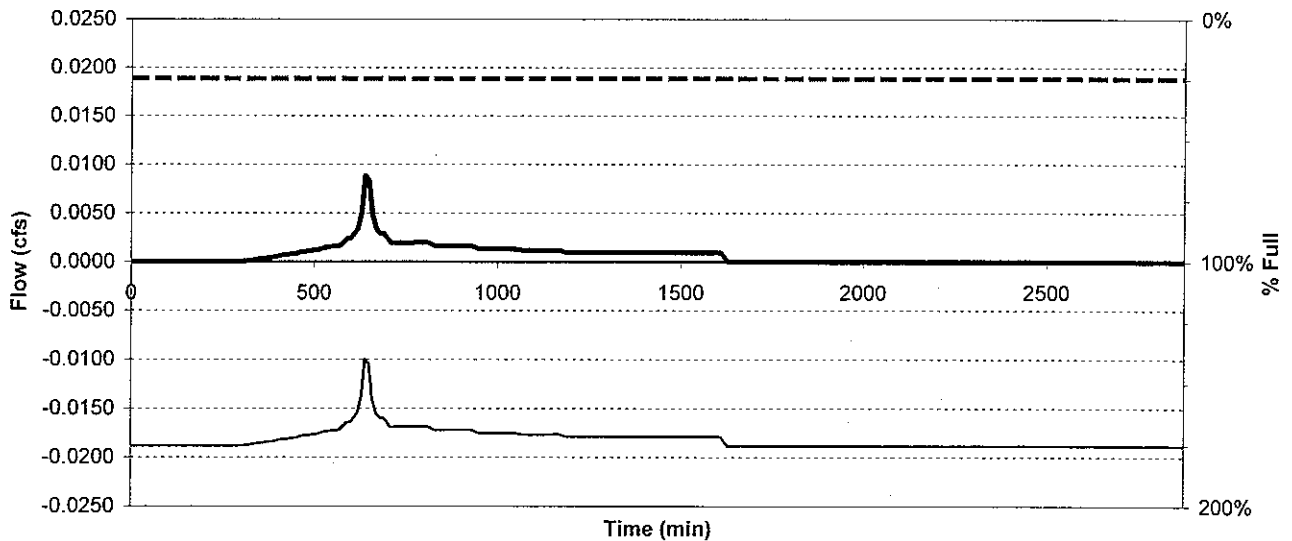
Project Name: Milwaukie Park - Plaza 2  
 Run Time: 12/10/2009 3:21:47 PM  
 Catchment ID: P2  
 Hierarchy: 1  
 Facility Type: Swale  
 Facility Configuration: A

- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Percolation to Below Grade Storage
- % Surface Capacity



**Pollution Reduction Event  
Below Grade Modeling**

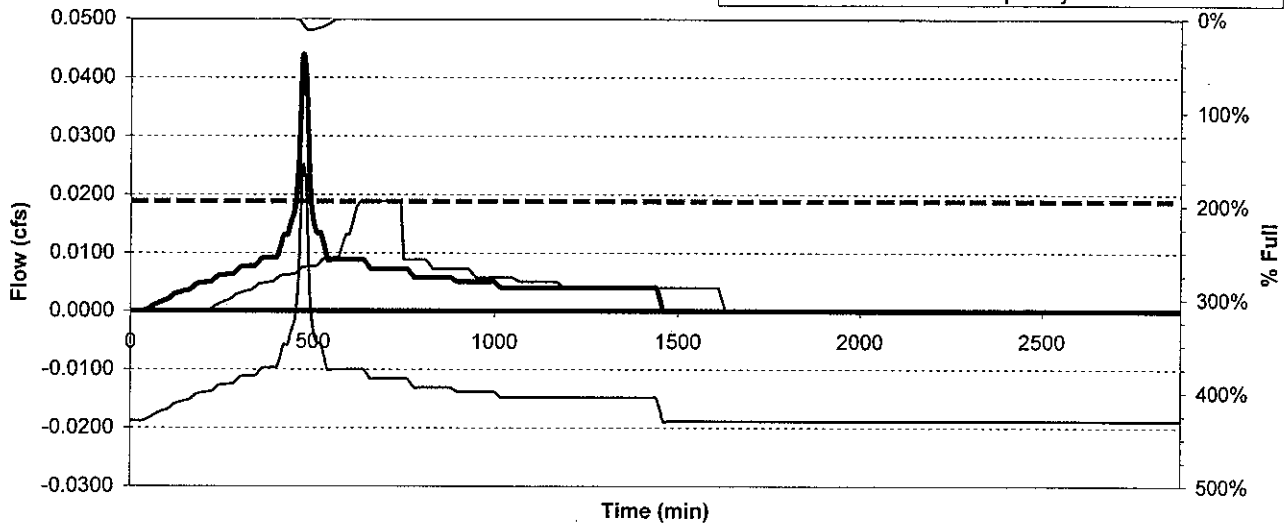
- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity



10-yr Event  
Surface Facility Modeling

Project Name: Milwaukie Park - Plaza 2  
 Run Time: 12/10/2009 3:21:47 PM  
 Catchment ID: P2  
 Hierarchy: 1  
 Facility Type: Swale  
 Facility Configuration: A

- Inflow from Rain Event
- Infiltration Capacity
- Inflow-Infiltration
- Overflow to Approved Discharge
- Total Flow to Below Grade Storage
- % Surface Capacity



10-yr Event  
Below Grade Modeling

- Inflow to Rock Storage
- Infiltration Capacity
- Inflow-Infiltration
- % Rock Capacity

