CALTRANS
BMP RETROFIT PILOT PROGRAM

DISTRICT 7, LOS ANGELES

SECOND YEAR 1999-2000 REPORT

APPENDED

BEST MANAGEMENT PRACTICES

OPERATIONS, MAINTENANCE & MONITORING

August 2000

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1.0 STORMWATER DATA

This summary report encapsulates the 1999/2000 water quality monitoring data through April, 2000 at a portion of the District 7 sites involved in the Caltrans Best Management Practices (BMP) Retrofit Pilot Program (refer to Table 1-1 and Figure 1-1).

This report addresses District 7 BMP locations that were monitored under the responsibility of Law Crandall. Brown & Caldwell also shared the BMP Pilot Program monitoring responsibility in District 7, and it is suggested that the corresponding synopsis authored by this consultant be reviewed to gain full perspective of the District 7 BMP effort.

1.1 Objective

A primary objective of the Caltrans BMP Pilot Program is to evaluate the performance of BMPs. A comprehensive water quality monitoring study has been designed to meet these objectives by evaluating the BMPs' performance in the removal of contaminants from stormwater runoff and by understanding the level of effort required to maintain the BMPs at optimal effectiveness. Data collected from the 1999/2000 wet season through April, 2000 is contained in this report and is used to initially evaluate the BMP's performance. Data includes:

- Rainfall data from storm events during the study period;
- Water quality and quantity of runoff into and discharged from the BMPs;
- Empirical observations of water quality, traffic, rainfall, and antecedent conditions; and
- Documentation records of inspection and maintenance activities performed.

In addition to the data collected above, characterization results of sediment removed from the Altadena Biofiltration Strip (73211a) spreader ditch and annual core soil and surface sediment sampling results from the Infiltration Basin (73101) have been included.

1.2 Hydrology

The sections that follow describe BMP and site hydrological characteristics as observed during storm monitoring events and maintenance inspections during 1999/2000.

1.2.1 Precipitation During the Wet Season

Over the entire Los Angeles Basin, excluding mountain locations, the average annual precipitation ranges from less than 12 inches at the immediate coast to more than 20 inches at the foothills. The normal seasonal rainfall measured at downtown Los Angeles is 14.77 inches. On average, 92% of the seasonal precipitation falls between November 1st and April 30th. This percentage is roughly the same for all stations, regardless of

elevation or distance from the ocean (National Weather Service, *The Climate of Los Angeles California*). Between October 1999 and April 2000, approximately 10.5 inches of precipitation fell on downtown Los Angeles. On average, the months of October through January were drier than usual, February was wetter than usual, and March and April were slightly wetter than usual.

Figures 1-2a through 1-2f illustrate daily precipitation totals for the 1999/2000 wet season at the BMP sites.

1.2.2 Precipitation During Monitored Events

Precipitation during each storm event was characterized by total rainfall, duration of rainfall, maximum intensity, days since last rainfall, and the magnitude of the event immediately preceding the monitored storm event (antecedent rainfall). Precipitation characteristics for each monitored event are summarized in Table 1-2. Maximum rainfall intensity (maximum hourly intensity calculated as twelve times the maximum rainfall recorded in any five minute period) for monitored events is summarized in Table 1-2. Rainfall variability from BMP sites during monitored events is graphically represented in Figures 1-3a through 1-3d. Cumulative rainfall is summarized graphically for each monitored event at each BMP site in Figures 1-4 through 1-17.

Each sampled storm event was preceded by at least 48 hours, meeting the minimum antecedent dry period.

1.2.3 Stormwater Runoff During Monitored Events

Monitoring was designed to isolate rainfall events and the runoff created by those events. Table 1-3 provides a summary of the runoff measured at each station in conjunction with each storm event. Figures 1-4 through 1-15 graphically summarize the influent and effluent flow during each monitored event at each BMP in response to rainfall. These figures also show when individual aliquots were collected as part of each composite sample.

In general, the drainage areas at each of the BMP sites are relatively small and impervious. This resulted in quick response times of inlet flow in relation to the advent of rain and fluctuations in rainfall intensity. At BMPs where runoff is captured and infiltrated (i.e., infiltration basin and infiltration trench), ponded water infiltrated in less than 72 hours.

Influent and effluent flow monitoring was conducted during each monitored storm event at the biofiltration strip and swale sites. With the exception of the Altadena Maintenance Station Biofiltration Strip (73211a), flow did not discharge through the biofilters until mid- to late-February. Until this time, most of the runoff infiltrated through the biofilters. After soils within the biofilters were saturated, which typically required approximately 1.25 inches of precipitation within a two-week period, and with continuous rainfall of moderate intensity, runoff was observed discharging through the biofilters.

The volume of runoff entering the I-605/SR-91 Swale (73222b) and the I-5/I-605 Swale (73224) was greater than the volume of runoff discharging from the swales. However, because freeway embankments may have been contributing runoff into the Cerritos Maintenance Station Swale (73223) and the I-605 at Carson Swale (73225) through their side slopes, there were two events where the volume of runoff entering the swales was less than the volume of runoff discharging the swales. Also, during three events, the volume of runoff entering the Altadena Maintenance Station Strip (73211a) was less than the volume of runoff discharging from the strip. This is attributed to some runoff bypassing the influent flume and sheet flowing directly into the strip during intense periods of rainfall. The size of the tributary area at the I-605/SR-91 Strip (73222a) control location is comparable to the size of the tributary area entering the strip, hence the volume of runoff entering the strip is similar to that passing through the control location.

At the DII sites, flow through the BMPs was continuously monitored throughout the wet season. The total flow volume passing through the DIIs was used to calculate pollutant removal efficiencies. DII pollutant removal efficiency results are presented in Section 1.4 of this report. The DIIs were removed during the first week of June 2000.

At the I-605/SR-91 Infiltration Basin (73101), rainfall and water level within the BMP were measured during each monitored storm event. Figure 1-16 graphically summarizes the infiltration rate during each monitored event at the BMP in response to rainfall. For each monitored event, ponded water within the infiltration basin infiltrated within 72 hours.

At the Altadena Maintenance Station Infiltration Trench (73211b), rainfall, influent flow rate, and water level within the BMP was measured during each monitored storm event. Figure 1-17 graphically summarizes the infiltration rate during each monitored event at the BMP in response to rainfall. For each monitored event, ponded water within the infiltration trench infiltrated within 72 hours.

1.2.4 Hydraulic Residence Time Evaluation

In accordance with the OMM Plan, hydraulic residence time measurements were conducted at each biofiltration swale once during a storm event during the 1999/2000 wet season. The intent of the hydraulic residence time evaluation was to confirm that the hydraulic residence time for the 1-year, 24-hour storm event was achieved by each biofiltration swale. After conducting the measurements and evaluating the data, inherent limitations with the current approach were encountered; these limitations include:

- Changing rainfall intensity caused fluctuating flow rates resulting in unsteady flow (i.e., flow depth changes over time);
- Infiltration of runoff within the swale resulted in non-uniform flow (i.e., flow depth changes over distance);

- Precipitation directly onto unvegetated areas of the swale caused turbidity, impacting absorbance measurements; depending on the flow rate through the swale, the degree of turbidity was not constant, impacting absorbance measurements;
- Measurements were not taken during steady, 1-year, 24-hour flow rates and therefore, there was difficulty confirming that the design residence time criteria had been achieved.

The following paragraphs describe results of the 1999/2000 hydraulic residence time evaluations.

Hydraulic residence time evaluations were conducted when there was sufficient flow through the swale. Flow monitoring equipment was calibrated and initiated. A solution of Formulabs yellow/green dye was then poured into the inlet flume. Observations were noted as the dye flowed through the swale. Samples were collected in two-minute intervals once the dye was visually observed discharging from the swale. A total of 30 discrete samples were collected in individual cups and analyzed onsite using a HACH Model DR/700 Colorimeter.

Hydraulic residence time was measured as the point in time in which 50% of the dye's mass passes through the swale. Plug flow was assumed.

On February 12, 2000, a hydraulic residence time test was performed at the Cerritos Maintenance Station. The vegetation height in the swale was measured to be approximately 10 inches. Dye was poured into the inlet flume and reached the beginning of the swale at 02:56. Visual observations suggested that the dye reached the end of the swale approximately 5 minutes later at 03:01. Based on field observations (i.e., perceptibility of dye in the effluent), the fact that the absorbance measurements appeared to be impacted by turbidity, and a review of the actual absorbance measurements, judgment was made to use only the first 14 measurements. A peak absorbance of 550 units was recorded at 03:08 at the effluent (12 minutes after the dye had reached the beginning of the swale). Based on the procedure described above, the calculated hydraulic residence time is 16 minutes. The designed hydraulic residence time for Cerritos Maintenance Station Swale is 4.6 minutes. However, varying flow rates throughout the evaluation compromised the accuracy of the calculated hydraulic residence time. Figure 1-18a graphically shows the events of the hydraulic residence time evaluation.

On February 21, 2000, a hydraulic residence time test was performed at the I-605 at Carson Swale. The vegetation height in the swale was measured to be approximately 10 inches. Dye was poured into the inlet flume and reached the beginning of the swale at 12:00. Visual observations suggested that the dye reached the end of the swale approximately 31 minutes later at 12:31. Based on field observations (i.e., perceptibility of dye in the effluent), the fact that the absorbance measurements appeared to be impacted by turbidity, and a review of the actual absorbance measurements, judgment

was made to use only the first 14 measurements. A peak absorbance of 550 units was recorded at 12:36 at the effluent (36 minutes after the dye had reached the beginning of the swale). Based on the procedure described above, the calculated hydraulic residence time is 46 minutes. The designed hydraulic residence time for I-605 at Carson Swale is 9 minutes. However, varying flow rates throughout the evaluation compromised the accuracy of the calculated hydraulic residence time. Figure 1-18b graphically shows the events of the hydraulic residence time evaluation.

On March 5, 2000, a hydraulic residence time test was performed at the I-5/I-605 Swale. The vegetation height in the swale was measured to be approximately 8 to 10 inches. Dye was poured into the inlet flume and reached the beginning of the swale at 09:27. Visual observations suggested that the dye reached the end of the swale approximately 8 minutes later at 09:35. Based on field observations (i.e., perceptibility of dye in the effluent), the fact that the absorbance measurements appeared to be impacted by turbidity, and a review of the actual absorbance measurements, judgment was made to use only the first 7 measurements. A peak absorbance of 315 units was recorded at 09:37 at the effluent (10 minutes after the dye had reached the beginning of the swale). Based on the procedure described above, the calculated hydraulic residence time is 11 minutes. The designed hydraulic residence time for the I-5/I-605 Swale is 7 minutes. However, varying flow rates throughout the evaluation compromised the accuracy of the calculated hydraulic residence time. Figure 1-18c graphically shows the events of the hydraulic residence time evaluation.

On March 5, 2000, a hydraulic residence time test was performed at the I-605/SR-91 Swale. The vegetation height in the swale was measured to be approximately 10 to 12 inches. Dye was poured into the inlet flume and reached the beginning of the swale at 09:26. Visual observations suggested that the dye reached the end of the swale approximately 56 minutes later at 10:22. Based on field observations (i.e., perceptibility of dye in the effluent), the fact that the absorbance measurements appeared to be impacted by turbidity, and a review of the actual absorbance measurements, judgment was made to use only the first 11 measurements. A peak absorbance of 429 units was recorded at 10:28 at the effluent (62 minutes after the dye had reached the beginning of the swale). Based on the procedure described above, the calculated hydraulic residence time is 66 minutes. The designed hydraulic residence time for the I-605/SR-91 Swale is 9 minutes. However, varying flow rates throughout the evaluation compromised the accuracy of the calculated hydraulic residence time. Figure 1-18d graphically shows the events of the hydraulic residence time evaluation.

1.3 Analytical Results

The following sections provide an assessment of the overall quality of the data set, a summary of water quality data for each monitored event and solid sampling results.

1.3.1 Assessment of Quality Assurance/Quality Control Results

1.3.1.1 INTRODUCTION

Prior to determining BMP performance, laboratory reports were assessed and the data validated for overall precision, accuracy, representativeness, and completeness to establish data quality and usability. As part of this process, field and laboratory quality control (QC) data were assessed for compliance with the procedures and methods outlined in the Quality Assurance Project Plan (QAPP) presented in Appendix III of the OMM Plan. QC samples were collected during the 1999/2000 wet season. Prior to each event a QC schedule was developed to determine the type of QC samples to be collected at each site in a manner to satisfy the requirements outlined in the Operation, Maintenance, and Monitoring (OMM) Plan - Quality Assurance Project Plan. Given the constraints associated with the collection of stormwater samples, the QC schedule was designed to be flexible in case sufficient sample was not obtained from the designated QC station. Table 1-4a summarizes the QC samples collected during each monitored storm event.

The data quality indicators used to evaluate the overall usability of the data for meeting the project Data Quality Objectives (DQOs) are described in the following paragraphs.

Precision

Precision measures the reproducibility of individual measurements under a given set of conditions. Precision was evaluated for each analyte based on field and laboratory duplicates. Field duplicate analyses were used to measure both field and laboratory precision, and to make an overall judgement as to whether the contaminants detected in the environmental samples are representative of conditions at the BMP location in which the field duplicate was collected. Laboratory duplicates were used to demonstrate method precision at the time of the analyses. Overall, precision was evaluated in terms related to the mean concentration (relative percent difference). The relative percent difference (RPD) between the pair of samples was calculated using the following formula:

$$\%\text{RPD} = \frac{S - D}{S + \frac{D}{2}} \; x100$$

Where:

S = first sample value, and
D = duplicate sample value

Results for RPD calculations for both field duplicates and laboratory splits are presented in Tables 1-4b and 1-4c, respectively and further discussed in the Data Validation Results section.

Accuracy

Accuracy measures the bias in a measurement system by the degree of agreement between a measured value and an accepted reference or true value. The accuracy of the analytical determinations was evaluated using laboratory QC analyses such as laboratory control samples (LCS), matrix spikes (MS/MSD), and surrogate spikes (where applicable). Accuracy results for the LCS analyses were used to monitor the overall performance of all steps in the analysis, including sample preparation. Matrix spike accuracy data was used to provide information about the effect of each sample matrix on the preparation and analyses methodology. Surrogate spike recovery results (where applicable) were used to establish if the analytical method was performed properly. Accuracy is expressed as the percent recovery of a known concentration added and the measured concentration as shown in the following formula:

$$\%\text{Recovery} = \frac{S - U}{Cs} \; x100$$

Where:

S = Measured concentration of spiked aliquot, and
U = Measured concentration of unspiked aliquot, and
Cs = Concentration of spike added

Accuracy results are typically reported by the laboratory and are presented along with the associated analytical results in Appendix A. All of the accuracy results were within the established acceptance criteria (DQOs).

Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Sample representativeness was assessed in terms of percent storm captured, number of aliquots, and ultimately the evaluation of all associated blanks. Sample integrity was also evaluated with respect to adherence to the required preservation, storage, and holding times. A discussion of samples not meeting percent storm capture and/or minimum number of aliquots goals are discussed below. Blank results and adherence to holding times are discussed in the Data Validation Results section.

The OMM Plan defines a representative composite sample as being composed of a minimum of 12 aliquots, and representing at least 75 percent storm capture. All samples during the 1999/2000 wet season met the 75 percent minimum storm capture goal. The percent storm capture for samples for the 1999/2000 season was generally greater than 90 percent. Overall, the average percent storm capture for samples collected through April 2000 was 96 percent. All but six samples were composed of at least twelve aliquots (refer to Table 1-4d).

Completeness

Completeness is a measurement of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Completeness was determined based on validation results and the number of valid data points (not rejected) relative to the total number of validated data. The overall completeness objective of 95 percent was met for all parameters. Percent completeness was calculated using the following formula:

$$\%\text{Completeness} = \frac{V}{T} \; x100$$

Where:

V = number of valid data points, and
T = total number of planned measurements

1.3.1.2 FIELD QA/QC

Blanks

Composite bottles and tubing were decontaminated in accordance with the procedures specified in the OMM Plan. All blanks were prepared in accordance with the project specifications as outlined in the OMM Plan - Quality Assurance Project Plan. Blank sample results were evaluated to determine whether contamination was introduced as a

result of sample equipment contribution (tubing blanks and composite bottle blanks) and analytical procedures (filter blanks and method blanks). Composite bottles (batches of 20) were not released for use unless blanks showed no contamination (i.e., blank results less than Reporting Limits). A review of this data showed that there were no contamination issues (i.e., all blank results were less than the Reporting Limits).

Field Duplicates

As shown in Table 1-4a, field duplicate samples were collected during four storm events for a total of four field duplicates composite samples and two field duplicates grab samples. These samples were submitted "blind" to the laboratory and analyzed for the full list of analytes associated with grab and composite samples. Precision data, as measured by the RPD, was calculated for all parameters reported above the reporting limit and are presented in Table 1-4b. As indicated in this table, RPD results are less than thirty five percent (<35%) in all samples except for:

- A Total Suspended Solids composite sample collected from the Las Flores Maintenance Station Fossil Filter™ on DII on January 25, 2000;
- A Fecal Coliform grab sample collected from the influent location of the Altadena Maintenance Station Biofiltration Strip on January 25, 2000;
- A Total Suspended Solids and Nitrate-N composite sample collected from the effluent location of the Cerritos Maintenance Station Biofiltration Strip on February 21, 2000;
- A Total Phosphorus composite sample collected from the Foothill Maintenance Station StreamGuard™ DII on February 27, 2000; and
- A Fecal Coliform grab sample collected from the influent location of the I-5/I-605 Biofiltration Swale on February 27, 2000.

RPD results for samples listed above are greater than 50 percent.

There are no review criteria for field duplicate analyses comparability. It is expected that the results may have more variability than laboratory replicates, which measures only laboratory performance. It is likely that the variance in the RPD observed in these samples is due to the heterogeneity of the samples.

1.3.1.3 LABORATORY QA/QC

To achieve the data quality needed to support project DQOs, all analyses for this investigation were performed using laboratory procedures in accordance with specified analytical protocols. To ensure comparability of the results and to maintain a high level of QC, a laboratory certified in the State of California under the Environmental Laboratory Accreditation Program (ELAP) performed the analyses.

The subsections below describe how each laboratory QC parameter was assessed for compliance with method-specific requirements. The results of this evaluation with respect to the data validation criteria are discussed in the Section 1.3.1.5.

Method Blanks

A method blank was included in every analytical batch of twenty samples or less to demonstrate that the laboratory materials and environment were not introducing contamination to the analysis. Sample concentrations associated with method blanks containing target analytes were evaluated with respect to blank concentrations during the data validation to determine the need for qualification.

Laboratory Control Samples (LCS)

One LCS was prepared with each analytical batch of 20 samples or less. The LCS consists of laboratory prepared blanks to which is added a known concentration of all of the target analytes. The LCS was carried through the entire sample preparation and analysis procedure with the sample unknowns. LCS recoveries were used to demonstrate that the method is operating within acceptable limits. LCS accuracy results were evaluated with respect to the acceptance criteria specified in the QAPP.

Laboratory Replicates

As shown in Table 1-4a, four composite samples and two grab samples were collected during storm events and were assigned for laboratory replicate analyses for the full list of analytes by the laboratory. These samples were split by the laboratory. Each aliquot of the sample was then analyzed and reported by the laboratory. Precision data as measured by the RPD was calculated for all parameters reported above the reporting limit and are presented in Table 1-4c. Precision data generated from laboratory splits were evaluated during the data validation with respect to the control limits specified in the QAPP. Laboratory duplicates with RPD limits outside the validation criteria and with both sample concentrations greater than 5x the RDL were flagged as estimated J for all samples analyzed within that batch.

Matrix Spike/Matrix Spike Duplicates (MS/MSD)

One set of matrix spike/matrix spike duplicate (MS/MSD) was prepared and analyzed for every analytical batch of 20 samples or less. As shown in Table 1-4a, MS/MSD analyses were performed on project samples collected during four storm events. In this process, three sample aliquots were measured out, and a known amount of the target analyte(s) was spiked into two of the aliquots at the same concentration. The three portions were then prepared and analyzed in the same manner. The analysis of the two spiked aliquots generated recovery data, which was used to measure the effects of interferences in the sample matrix and reflect the overall accuracy of the determination. Additionally, the calculated RPD between the two measurements were used to assess matrix-specific precision. The selection of spiking analytes was consistent with the published method.

Matrix spike accuracy and precision results were evaluated during the data validation with respect to the control limits specified in the QAPP.

Surrogates

Surrogate standards were added to all samples and QC samples tested by gas chromatography (GC). Surrogates are non-target compounds that are analytically similar to the analytes of interest. The surrogate compounds are spiked into the sample prior to the extraction or analysis. Surrogate recoveries were evaluated with respect to the acceptance criteria specified in the QAPP.

Holding Times

The holding time is the maximum amount of time that samples may be held before analysis and still be considered valid. Holding times for all samples were met during the 1999/2000 wet season.

Reporting Limits

Analytical methods and associated reporting limits (refer to Table 1-4e), specified in the OMM Plan, were adhered to.

1.3.1.4 DATA VALIDATION PROCESS

The following sections present the data validation effort performed to evaluate the usability of the sample data for meeting the project objectives.

Verification and Review

The verification and review process is based on overall accuracy, precision, and representativeness to establish data quality and usability. The approach used in the validation process involved the review of chain-of-custody forms; preparation, and use of checklists, which detail the required QC for each respective analytical method; verification and documentation of compliance with the applicable criteria; and, assignment of qualifiers to sample results associated with QC samples that do not meet the validation criteria.

The assessment below is intended to provide a synopsis of any significant problems identified during the data verification step that may lead to data qualification (i.e., assignment of qualifiers) during the later portion of the data validation process. The evaluation of whether or not qualification of the data is deemed necessary will follow basic guidelines from the United States Environmental Protection Agency (EPA) for evaluating inorganic and organic analysis (EPA February 1994a; EPA, 1994b).

Data Qualifiers

U	Indicates the compound or element was an analyte, but was not detected at or above the contract required detection limit (CRDL).
J	Indicates an estimated value.
R	Indicates that QC determined the data are not usable.
UJ	Indicates the compound or element was analyzed, but was not detected; the sample detection limit is an estimated value.

1.3.1.5 DATA VALIDATION RESULTS

Analytical results and associated data qualifiers are summarized in Tables 1-5a through 1-5d.

Stormwater Matrix

pH and Specific Conductance

pH and Specific Conductance analytical data were within acceptable QA/QC goals.

Hardness

Hardness analytical data was within acceptable QA/QC goals.

TSS

Total suspended solids analytical data was within acceptable QA/QC goals.

Nitrate-N

Nitrate-N analytical data was within acceptable QA/QC goals.

TKN

Total Kjeldahl Nitrogen (TKN) data was within acceptable QA/QC goals with the following exception:

- The RPD for a laboratory replicate sample collected at the influent location of the I-5/I-605 Biofiltration Swale on February 27, 2000 was 22 percent, slightly greater than the 20 percent goal. Consequently, a "J" qualifier has been applied to all TKN data for the February 27, 2000 storm event since they were all analyzed in the same batch.

It is likely that the variance in the RPD observed in this paired sample is due to the heterogeneity of the sample.

Total Phosphorous

Total phosphorus analytical data was within acceptable QA/QC goals.

Total/Dissolved Metals

Total and Dissolved Metals data were within acceptable QA/QC goals with the following exceptions:

- The RPD for a laboratory replicate of a dissolved copper sample collected at the influent location of the Altadena Biofiltration Strip on February 16, 2000 was 25 percent, slightly greater than the 20 percent goal. Consequently, a "J" qualifier has been applied to all dissolved copper data for the February 16, 2000 storm event since they were all analyzed in the same batch. It is likely that the variance in the RPD observed in this paired sample is due to the heterogeneity of the sample.

- The RPD for a laboratory replicate of a dissolved zinc sample collected at the influent location of the Altadena Biofiltration Strip on February 16, 2000 was 24 percent, slightly greater than the 20 percent goal. Consequently, a "J" qualifier has been applied to all dissolved zinc data for the February 16, 2000 storm event since they were all analyzed in the same batch. It is likely that the variance in the RPD observed in this paired sample is due to the heterogeneity of the sample.

TPH

Total Petroleum Hydrocarbon analytical data was within acceptable QA/QC goals.

Bacteria

Fecal Coliform data was within acceptable QA/QC goals with the following exceptions:

- The RPD for a laboratory replicate fecal coliform sample collected at the influent location of the Cerritos Maintenance Station Swale on February 21, 2000 was 59 percent. There are no review criteria for fecal coliform laboratory replicate analysis comparability. Therefore, the data has not been qualified. It is likely that the variance in the RPD observed in this paired sample is due to the heterogeneity of the sample.

- The RPD for a laboratory replicate fecal coliform sample collected at the control location of the I-605/SR-91 Biofiltration Strip on March 8, 2000 was 97 percent. There are no review criteria for fecal coliform laboratory replicate analysis comparability. Therefore, the data has not been qualified. It is likely that the

variance in the RPD observed in this paired sample is due to the heterogeneity of the sample.

Solid Matrices

Total Metals

Total Metals analytical data were within acceptable QA/QC goals.

TRPH

Total Recoverable Petroleum Hydrocarbon analytical data was within acceptable QA/QC goals with the following exceptions:

- The RPD for a matrix spike/matrix spike duplicate TRPH sample of StreamGuard™ absorbent material collected on June 1, 2000 from the DII sites was 51 percent, greater than the 30 percent goal. Consequently, a "J" qualifier has been applied to all TRPH data for StreamGuard absorbent material collected on June 1, 2000.

1.3.2 Water Quality Results

Analyses were conducted on stormwater samples by Pat-Chem Laboratories, a certified laboratory under the California Environmental Laboratory Accreditation Program (ELAP). The analyses were performed in accordance with methods and procedures outlined in the OMM Plan - Quality Assurance Project Plan and as specified by applicable EPA methods. The laboratory analyses performed on stormwater samples are listed in Table 1-4e. Analytical results are summarized in Table 1-5a.

1.3.3 Sediment Sampling Results

As part of the maintenance program, sediment is removed from the BMPs, tested, and properly disposed of. At the Altadena Maintenance Station Biofiltration Strip (73211a), material that had collected in the spreader ditch during the 1998/99 wet was removed and drummed on June 9, 1999. The material was composed of sediment, algae, and water. The material was black and silty in nature, with an organic decomposition odor. This material was tested and disposed.

On August 24, 1999 and periodically through December 7, 1999, material was removed from the spreader ditch (of the Altadena Maintenance Station Strip) and drummed. The material was composed of sediment, algae, and water. The material was black and silty in nature, with a decomposing organic odor. On December 7, 1999, the material was tested for disposal purpose and subsequently disposed.

Analytical results are summarized in Table 1-5b.

1.3.4 Soil Sampling Results

Core soil samples of the I-605/SR-91 Infiltration Basin (73101) were collected on June 20, 2000, following the end of the 1999/2000 wet season. Nine cores were collected from locations on an equilateral basin grid (superimposed over the basin). Each of the nine cores was collected using a hand-held, stainless steel soil probe. The probe was driven 1 meter [3.28 ft] below the ground surface and the core was recovered. Each core was then subdivided into three sections as follows:

Section 1 from the ground surface to 0.2 m [0.66 ft] below the ground surface.

Section 2 was from 0.3 m [0.98 ft] to 0.5 m [1.64 ft] below the ground surface.

Section 3 was from 0.6 m [1.97 ft] to 0.8 m [2.62 ft] below the ground surface.

Similar depth intervals of each core were combined to prepare three samples: one from the 0.0 m to 0.2m [0.66 ft] below ground surface interval, one from 0.3 m [0.98 ft] to 0.5 m [1.64 ft] below ground surface interval and one from the 0.6 m [1.97 ft] to 0.8 m [2.62 ft] below the ground surface. Samples were sent to Severn Trent Laboratories for total metals and TRPH analyses and also to LawCrandall's materials testing laboratory for grain size distribution testing.

Analytical results and grain size distribution test results are summarized in Table 1-5c. Results of the grain size distribution tests are also presented in Figures 1-19a through 1-19c.

1.3.5 Drain Inlet Insert Sampling Results

As part of the pollutant removal efficiency evaluation, DII media and the material within the DIIs was collected on June 1, 2000 and sent to Severn Trent Laboratories for analysis. The samples were analyzed for total metals and TRPH. Unused DII media had previously been analyzed to assess background concentrations of the DIIs. The following DII components and materials were tested:

StreamGuard™ DII	Fossil Filter™ DII
Geotextile fabric	Adsorbent material
Absorbent material	Debris/litter/sediment
Debris/litter/sediment	

Results of the analyses are summarized in Table 1-5d.

1.3.6 Vadose Zone Sampling

One pressure-vacuum lysimeter is installed in the I-605/SR-91 Infiltration Basin (73101) and one is installed in the Altadena Maintenance Station Infiltration Trench (73211b). On at least four occasions, vacuums were applied to both lysimeters in an attempt to obtain pore fluid samples. During one storm event at the Altadena Maintenance Station Infiltration Trench, a few drops of liquid were obtained from the infiltration trench one time but otherwise no fluids have been observed. Vacuums were applied to both lysimeters at different times during and after rain events and for varying lengths of times (5 minutes to 14 hours).

Based on review of the sampling procedures, site lithology, and performance of the lysimeters, the most likely causes preventing the lysimeters from collecting samples are that the silica flour encasing the lysimeter may have dried out and/or that water is not available to be collected. Per plaintiff request and Caltrans agreement, future attempts to collect vadose zone samples will be performed by applying vacuum to the lysimeters for a 24-hour period following a storm event if vacuums can be maintained.

1.4 Preliminary BMP Performance Evaluations

A preliminary evaluation of BMP performance was conducted to provide initial estimates of BMP efficiency (Tables 1-6a through 1-6c).

1.4.1 Biofiltration Strips and Swales

BMP efficiencies presented in Tables 1-6a and 1-6b were calculated based upon Event Mean Concentrations (EMCs) and load estimates measured at the influent and effluent monitoring sites for each biofiltration BMP. Average wet season efficiencies based on loads were also calculated and followed the Scoping Study methodology. For purposes of these preliminary calculations, the value of the reporting limit was used in cases where an analyte was reported as undetected. The following equations were used:

$$\text{Efficiency (\%)} = \frac{\text{EMC in} - \text{EMC out}}{\text{EMC in}} \times 100$$

and

$$\text{Efficiency (\%)} = \frac{\text{Load in} - \text{Load out}}{\text{Load in}} \times 100$$

Negative values indicate increases in concentration. Figures 1-20a through 1-20f are scatter plots graphically showing BMP pollutant removal efficiencies.

1.4.2 Drain Inlet Inserts

Preliminary BMP efficiencies were estimated for three StreamGuard™ DIIs and three Fossil Filter™ DIIs, which were installed at the Foothill, Las Flores, and Rosemead Maintenance Stations on 27 September 1999 and removed on 1 June 2000. Table 1-6c summarizes results and Worksheets 1 through 12 present the mass balance calculations.

To estimate the removal of contaminants by a DII, the procedure below was used. This procedure was taken from the *Criteria for Determination of Additional Drain Inlet Insert Monitoring Requirements and Use of 1998-1999 Monitoring Results.* For purposes of these preliminary calculations, the value of the reporting limit was used in cases where an analyte was reported as undetected.

1. For each of the five pollutants measured in the inlet media (total solids, total copper, total lead, total zinc, and TRPH), calculate percent efficiency representing the time interval since the last time the insert medium was changed, using the equation:

$$\text{Efficiency (\%)} = \frac{\text{Estimated Influent Pollutant Mass} - \text{Effluent Pollutant Mass}}{\text{Estimated Influent Pollutant Mass}} \times 100$$

2. Estimate the influent pollutant mass for the time interval according to:

Estimated Influent Pollutant Mass = Insert Medium Pollutant Mass + Total Effluent Pollutant Mass for the time interval

3. Calculate total effluent pollutant mass in two ways, and compute efficiency with each method for comparison:

   I. Storm-by-storm method:
      A. Estimate the effluent mass for each storm event in the time interval according to:

   Estimated Event Effluent Pollutant Mass = Effluent EMC x Event Runoff Volume

      B. For storm events that were successfully monitored, use the measured data.

      C. For any storm event during the time interval that met the deployment criteria but was not successfully monitored, estimate the EMC for that event as the mean of all EMCs measured for that case in all storm events during the time interval. How the mean EMC is determined depends on whether the data tend more to be normally or log-normally distributed. If the concentrations tend more to be normally distributed, use the arithmetic mean of the effluent EMCs. If they tend more to be log-normally

distributed, calculate the mean effluent EMC by log-transforming individual storm EMCs, averaging, and then transforming back.

D. Add the effluent pollutant masses from all storm events in the time interval.

II. Aggregated storm method:

A. Estimate the total effluent mass for all storm events in the time interval according to:

Estimated Total Effluent Pollutant Mass = Mean EMC x Total Runoff Volume

B. How the mean EMC is determined depends on whether the data tend more to be normally or log-normally distributed. If the concentrations tend more to be normally distributed, use the arithmetic mean of the effluent EMCs measured for that case in all storm events during the time interval. If they tend more to be log-normally distributed, calculate the mean effluent EMC by log-transforming individual storm EMCs, averaging, and then transforming back.

4. Compute mean efficiencies <u>for each pollutant and each wet season</u> by averaging results computed according to Steps 1-3 for all time intervals in that wet season.

1.4.3 Normality Test

Data sets were first tested for normality using the Shapiro-Wilk test. The Shapiro-Wilk (W) test is an effective method for evaluating whether the underlying distribution being tested is normally distributed. Data normality is a prerequisite to the computation of certain statistical tests (e.g., t-test). This test, which is a complex analysis of variance, was used to test a variable for departures from normality of the data. It requires a random sample of between 3 and 5,000 data points. Most authors agree that this is the most reliable quantification of non-normality for small to medium sized sample data set. In the Shapiro-Wilk Test, the following hypotheses are tested:

H_0 : The population has a normal distribution.
H_1 : The population does not have a normal distribution.

The null hypothesis (H_o) of the test is that the sample data set is taken from a normal distribution, thus a significance level of < 0.05 rejects this supposition of normality. Parametric methods with variables for which W is significant should not be used. Results of this test are not clear evidence of normality or non-normality, but just one piece of evidence that can be helpful. The Shapiro-Wilk test statistic, W, is calculated using the formula below.

$$W = \frac{1}{d}\left[\sum_{i=1}^{k} a_i (x_{[n-i+1]} - x_{[i]})\right]^2 \qquad d = \sum_{i=1}^{n} (x-\bar{x})^2$$

$$\text{if } n \text{ is even} \quad k = \frac{n}{2} \qquad\qquad \text{if } n \text{ is odd} \quad k = \frac{n-1}{2}$$

Where:

$\bar{x}$ = arithmetic mean
x_i = sample data
n = the number of sample data
a_i = the coefficient for the Shapiro-Wilk Test for normality (Gilbert, Table A6). Where the value of a_i is obtained knowing n.

The P value or critical level is the probability of rejecting the H_o when it is true. The null hypothesis is most often the hypothesis of "no difference". The term "significance level" (alpha) is used to refer to a pre-chosen probability and the term "P value" is used to indicate a probability that is calculated using the given data.

If the P value is less than the chosen significance level then you reject the null hypothesis (i.e., accept that your sample data gives reasonable evidence of a population difference for the observed parameters). It does NOT imply a "meaningful" or "important" difference.

The choice of significance level at which you reject the H_o is arbitrary. Traditionally the 5%, 1%, and 0.1% ($P < 0.05$, 0.01, and 0.001) regions are used. These numbers tend to give a false sense of security when in reality there are many factors that can contribute to the arbitrary nature of these levels. Ideally, random samples could be defined and the most appropriate test and one definitive conclusion could be made. However, because this cannot be done, optimization of research is done to minimize sources of uncertainty. A significance level or P-value of 0.05 (95% confidence interval) was used when performing the Shapiro-Wilk test.

Table 1-7 summarizes normality test results. Note that 1998-1999 data was not checked for normality because in all cases, fewer than three samples were collected and represented discharge from the DIIs.

1.4.4 1998-1999 Drain Inlet Insert Acceptance Criterion

The criterion for accepting and using the 1998-1999 results involved comparison of the calculated efficiencies for the various contaminants measured then and in 1999 2000. This criterion was applied after gaps between the DIIs and drain inlets were filled and the monitoring vaults bermed. If the 1998-1999 estimated efficiencies were generally lower

than the 1999-2000 values by a set margin (criterion for rejection of 1998-1999 results), then the 1998-1999 was rejected.

Before application of the subsequent criteria, at least eight successfully monitored rainfall events over two wet seasons (1998-1999 and 1999-2000) was required for each case. A "case" is a combination of a site (Foothill, Las Flores, or Rosemead Maintenance Station) and a DII (Stream Guard™ or Fossil Filter™). For Fossil Filter™ DII cases, only those events successfully monitored after installation of stainless steel filters counted toward the eight events. Therefore, the minimum numbers of events in 1999-2000 were:

	Fossil Filter	Stream Guard
Foothill Maintenance Station	5	4
Las Flores Maintenance Station	6	3
Rosemead Maintenance Station	5	5

1. In each wet season each case was required to have a median percent storm capture ≥60% and no more than one case could have median percent storm capture <70.

2. In each wet season the median percent storm capture of ≥80% was required for all cases, and the mean percent storm capture of ≥75%was required for all cases.

3. The monitoring events from 1998-1999 (after installation of stainless steel filters for Fossil Filter™ cases) could count toward the minimum eight events for each case, and their results could be used to express treatment efficiencies, if the mean percent efficiencies for 1998-1999 were not more than 20% lower than the 1999-2000 mean percent efficiencies (computed as 0.2 x 1999-2000 % efficiency) for at least four of the five pollutants measured.

For any case failing to meet this criterion, a minimum of eight storm events could be monitored in 1999-2000; if the minimum was not reached in 1999-2000, monitoring will continue in the 2000-2001 wet season until the minimum number is reached. The 1998-1999 results will not be used to express treatment efficiencies for cases failing to meet the criterion.

Table 1-8 summarizes the comparison of the 1998-1999 results with the 1999-2000 results and defines whether the 1998-1999 results may be used to express treatment efficiencies.

Table 1-1: District 7 Sites

Site ID.	BMP Location	BMP Type
73101	I-605/SR-91	Infiltration Basin
73211a	Altadena Maintenance Station	Biofiltration Strip
73211b	Altadena Maintenance Station	Infiltration Trench
73216	Foothill Maintenance Station - North	StreamGuard™ Drain Inlet Insert
73216	Foothill Maintenance Station - South	Fossil Filter™ Drain Inlet Insert
73217	Las Flores Maintenance Station - North	StreamGuard™ Drain Inlet Insert
73217	Las Flores Maintenance Station - South	Fossil Filter™ Drain Inlet Insert
73218	Rosemead Maintenance Station - North	Fossil Filter™ Drain Inlet Insert
73218	Rosemead Maintenance Station - South	StreamGuard™ Drain Inlet Insert
73222a	I-605/SR-91	Biofiltration Strip
73222b	I-605/SR-91	Biofiltration Swale
73223	Cerritos Maintenance Station	Biofiltration Swale
73224	I-5/I-605	Biofiltration Swale
73225	I-605 at Carson	Biofiltration Swale

Table 1-2: Rainfall Statistics for Each Monitored Event

Site/Event	Start Rain Date	Start Rain Time	End Rain Date	End Rain Time	Duration Rain (hours: minutes)	Total Rain (inches)	Max Intensity (inches/hour)	Antecedent Rain (days)	Antecedent Rain (inches)
Event 1									
Altadena MS Strip/IT	1/25/00	2:15	1/25/00	20:42	18:27:00	0.65	0.24	24.4	0.20
Foothill MS Dils	1/25/00	3:19	1/25/00	13:56	10:37:00	0.60	0.24	24.5	0.28
Las Flores MS Dils	1/25/00	0:37	1/25/00	19:25	18:48:00	0.86	0.24	78.0	0.48
Rosemead MS Dils	1/25/00	2:16	1/25/00	20:45	18:29:00	0.72	0.36	24.6	0.32
Event 2									
Foothill MS Dils	1/30/00	19:21	1/31/00	1:26	6:05:00	0.31	0.24	5.3	0.60
Las Flores MS Dils	1/30/00	14:06	1/31/00	0:48	10:42:00	0.42	0.24	4.9	0.85
Rosemead MS Dils	1/30/00	16:32	1/30/00	23:31	6:59:00	0.21	0.12	4.8	0.72
Event 3									
Las Flores MS Dils	2/10/00	4:29	2/10/00	18:37	14:08:00	0.45	0.36	10.2	0.42
Event 4									
Altadena MS Strip/IT	2/16/00	4:08	2/16/00	20:19	16:11:00	0.92	0.36	2.6	0.17
Foothill MS Dils	2/16/00	4:08	2/16/00	20:19	16:11:00	0.92	0.36	2.6	0.17
Event 5									
Altadena MS Strip/IT	2/20/00	6:16	2/21/00	19:59	37:43:00	3.11	0.96	3.4	0.92
Foothill MS Dils	2/20/00	6:31	2/21/00	15:58	33:27:00	3.05	0.96	3.4	0.92
Las Flores MS Dils	2/20/00	6:01	2/21/00	12:38	30:37:00	2.38	3.24	3.5	0.45
Rosemead MS Dils	2/20/00	6:07	2/21/00	14:16	32:09:00	2.64	1.44	3.4	0.90
I-605/SR-91 Strip	2/20/00	5:49	2/21/00	17:19	35:30:00	2.14	0.96	3.3	0.62
I-605/SR-91 Swale	2/20/00	5:49	2/21/00	17:19	35:30:00	2.14	0.96	3.3	0.62
Cerritos Swale	2/20/00	5:49	2/21/00	17:19	35:30:00	2.14	0.96	3.3	0.62
I-5/I-605 Swale	2/20/00	5:57	2/21/00	16:35	34:38:00	2.29	1.32	3.5	0.58
I-605 at Carson Swale	2/20/00	5:49	2/21/00	17:19	35:30:00	2.14	0.96	3.3	0.62
Event 6									
Altadena MS Strip/IT	2/27/00	12:02	2/27/00	17:34	5:32:00	0.77	0.72	3.8	1.84
Foothill MS Dils	2/27/00	12:23	2/27/00	17:43	5:20:00	0.48	0.60	3.8	1.59
Las Flores MS Dils	2/27/00	9:28	2/27/00	15:41	6:13:00	0.50	0.36	3.9	1.62
Rosemead MS Dils	2/27/00	12:13	2/27/00	17:20	5:07:00	0.46	0.60	3.9	1.69
Cerritos Swale	2/27/00	13:04	2/27/00	14:08	1:04:00	0.16	0.36	4.0	0.98
I-605/I-5 Swale	2/27/00	12:41	2/27/00	14:21	1:40:00	0.21	0.24	3.6	1.09
Event 7									
Altadena MS Strip/IT	3/8/00	0:36	3/8/00	9:28	8:52:00	0.55	0.36	2.5	2.18
Foothill MS Dils	3/8/00	2:17	3/8/00	11:23	9:06:00	0.79	0.48	2.6	1.77
I-605/SR-91 Swale	3/8/00	2:12	3/8/00	10:58	8:46:00	0.83	0.48	2.7	0.92
I-605/SR-91 Strip	3/8/00	2:12	3/8/00	10:58	8:46:00	0.83	0.48	2.7	0.92
Cerritos Swale	3/8/00	2:12	3/8/00	10:58	8:46:00	0.83	0.48	2.7	0.92
I-5/I-605 Swale	3/8/00	3:06	3/8/00	10:33	7:27:00	0.93	0.72	2.7	1.19
I-605 at Carson Swale	3/8/00	2:12	3/8/00	10:58	8:46:00	0.83	0.48	2.7	0.92
Event 8									
Altadena MS Strip/IT	4/17/00	10:17	4/17/00	17:41	7:24:00	2.01	0.60	40.1	0.55
Foothill MS Dils	4/17/00	10:40	4/18/00	10:56	24:16:00	2.90	1.44	40.0	0.79
Las Flores MS Dils	4/17/00	8:05	4/18/00	7:36	23:31:00	2.63	3.48	40.0	0.99
Rosemead MS Dils	4/17/00	10:32	4/18/00	4:14	17:42:00	2.10	1.56	40.1	0.81
I-605/SR-91 Strip	4/17/00	10:33	4/18/00	3:59	17:26:00	1.58	1.44	40.0	0.83
I-605/SR-91 Swale	4/17/00	10:33	4/18/00	3:59	17:26:00	1.58	1.44	40.0	0.83
Cerritos Swale	4/17/00	10:33	4/18/00	3:59	17:26:00	1.58	1.44	40.0	0.83
I-5/I-605 Swale	4/17/00	10:26	4/18/00	9:21	22:55:00	2.52	2.64	40.0	0.93
I-605 at Carson Swale	4/17/00	10:33	4/18/00	3:59	17:26:00	1.58	1.44	40.0	0.83

Table 1-3: Flow Data for Each Monitored Event[1]

Site/Event	Start Flow Date	Start Flow Time	End Flow Date	End Flow Time	Duration Flow (hours: minutes)	Total Flow (cubic feet)	Vol. To Samp (cf)	No. of Sample Aliquots Collected	Peak Flow (cfs)	% Capture	Peak Capture
Event 1											
Altadena Strip Inf	1/25/00	0:54	1/25/00	10:41	9:47:00	2584	159	7	0.234	86	Y
Altadena Strip Eff	1/25/00	3:30	1/25/00	9:45	6:15:00	1819	48	18	0.203	95	Y
Foothill FF Dll	1/25/00	4:01	1/25/00	21:30	17:29:00	1034	151	3	0.086	88	Y
Foothill SG Dll	1/25/00	2:05	1/25/00	14:39	12:34:00	262	28	14	0.021	100	Y
Las Flores FF Dll	1/25/00	0:36	1/25/00	19:59	19:23:00	926	41	11	0.067	97	Y
Rosemead FF Dll	1/25/00	2:10	1/25/00	21:44	19:34:00	456	24	9	0.041	94	Y
Rosemead SG Dll	1/25/00	2:06	1/25/00	23:07	21:01:00	2332	115	16	0.340	100	Y
Event 2											
Foothill FF Dll	1/30/00	19:34	1/30/00	23:54	4:20:00	351	20	9	0.057	98	Y
Foothill SG Dll	1/30/00	19:24	1/31/00	5:33	10:09:00	379	2	70	0.053	89	Y
Las Flores SG Dll	1/30/00	18:23	1/31/00	0:09	5:46:00	47	2	12	0.010	100	Y
Rosemead FF Dll	1/30/00	16:40	1/31/00	0:45	8:05:00	94	3	15	0.020	95	Y
Rosemead SG Dll	1/30/00	14:22	1/31/00	1:44	11:22:00	651	15	20	0.070	92	Y
Event 3											
Las Flores FF Dll	2/10/00	4:31	2/10/00	22:28	17:57:00	858	6	55	0.294	77	Y
Las Flores SG Dll	2/10/00	4:32	2/10/00	18:49	14:17:00	48	1	23	0.040	96	Y
Event 4											
Altadena Strip Inf	2/16/00	3:26	2/16/00	21:41	18:15:00	5337	40	104	0.628	78	Y
Altadena Strip Eff	2/16/00	3:17	2/16/00	21:05	17:48:00	6086	22	126	0.631	91	Y
Foothill FF Dll	2/16/00	4:29	2/16/00	21:39	17:10:00	1634	37	44	0.120	100	Y
Foothill SG Dll	2/16/00	4:50	2/16/00	20:38	15:48:00	268	4	138	0.027	100	Y
Event 5											
Altadena Strip Inf	2/20/00	6:20	2/21/00	21:34	39:14:00	12658	239	42	0.466	79	Y
Altadena Strip Eff	2/20/00	6:42	2/21/00	21:50	39:08:00	12104	239	44	0.782	90	Y
Foothill FF Dll	2/20/00	6:38	2/21/00	22:40	40:02:00	5722	303	18	0.665	95	Y
Foothill SG Dll	2/20/00	7:05	2/21/00	17:55	34:50:00	1512	49	32	0.082	81	Y
Las Flores FF Dll	2/20/00	5:59	2/21/00	13:35	31:36:00	3034	83	36	2.045	98	Y
Las Flores SG Dll	2/20/00	5:55	2/21/00	13:07	31:12:00	567	22	23	0.354	89	Y
Rosemead FF Dll	2/20/00	6:13	2/21/00	19:13	37:00:00	2664	48	46	0.266	81	Y
Rosemead SG Dll	2/20/00	6:13	2/21/00	21:29	39:16:00	3379	115	28	0.256	95	Y
Cerritos Swale Inf	2/20/00	6:02	2/21/00	18:12	36:10:00	4092	55	64	0.402	87	Y
Cerritos Swale Eff	2/20/00	12:03	2/21/00	19:40	31:37:00	3094	27	90	0.141	92	Y
I-5/I-605 Swale Inf	2/20/00	10:00	2/21/00	17:38	31:38:00	4095	62	65	0.705	98	Y
I-5/I-605 Swale Eff	2/20/00	6:46	2/21/00	17:32	34:46:00	2279	31	62	0.578	87	Y

[1] Only sites where flow was measured and composite samples were collected are included in this table.

Table 1-3: Flow Data for Each Monitored Event (continued)[1]

Site/Event	Start Flow Date	Start Flow Time	End Flow Date	End Flow Time	Duration Flow (hours: minutes)	Total Flow (cubic feet)	Vol. To Samp (cf)	No. of Sample Aliquots Collected	Peak Flow (cfs)	% Capture	Peak Capture
Event 6											
Altadena Strip Inf	2/27/00	10:42	2/27/00	15:41	4:59:00	2169	38	51	0.442	100	Y
Altadena Strip Eff	2/27/00	12:12	2/27/00	15:28	3:16:00	2249	48	32	0.652	100	Y
Foothill FF Dil	2/27/00	12:27	2/27/00	18:25	5:58:00	683	8	96	0.256	100	Y
Foothill SG Dil	2/27/00	11:50	2/28/00	12:20	24:30:00	984	12	81	0.056	99	Y
Las Flores FF Dil	2/27/00	9:46	2/27/00	16:20	6:34:00	512	14	33	0.106	90	Y
Las Flores SG Dil	2/27/00	10:30	2/27/00	15:45	5:15:00	90	3	13	0.025	100	Y
Rosemead FF Dil	2/27/00	12:13	2/27/00	17:39	5:26:00	300	8	38	0.112	100	Y
Rosemead SG Dil	2/27/00	12:18	2/27/00	18:33	6:15:00	1692	40	37	0.530	87	Y
Cerritos Swale Inf	2/27/00	13:25	2/27/00	14:54	1:29:00	152	16	9	0.077	95	Y
Cerritos Swale Eff	2/27/00	13:49	2/27/00	15:40	1:51:00	200	11	18	0.059	99	Y
I-5/I-605 Swale Inf	2/27/00	12:58	2/27/00	15:03	2:05:00	257	6	43	0.104	100	Y
I-5/I-605 Swale Eff	2/27/00	14:00	2/27/00	14:44	0:44:00	42	3	16	0.052	100	Y
Event 7											
Altadena Strip Inf	3/8/00	0:52	3/8/00	12:39	11:47:00	2203	95	24	0.235	100	Y
Altadena Strip Eff	3/8/00	2:22	3/8/00	12:53	10:31:00	1976	95	20	0.228	96	Y
Foothill FF Dil	3/8/00	2:47	3/8/00	14:36	11:49:00	1608	17	75	0.185	100	Y
Foothill SG Dil	3/8/00	2:46	3/8/00	12:00	9:14:00	463	12	65	0.038	99	Y
I-605/SR-91 Strip Control	3/8/00	2:55	3/8/00	12:06	9:11:00	576	6	89	0.094	93	Y
I-605/SR-91 Strip Eff	3/8/00	3:26	3/8/00	13:01	9:35:00	219	2	46	0.059	87	Y
I-605/SR-91 Swale Inf	3/8/00	2:45	3/8/00	12:06	9:21:00	452	3	150	0.083	100	Y
I-605/SR-91 Swale Eff	3/8/00	8:59	3/8/00	10:30	1:31:00	69	2	32	0.047	93	Y
Cerritos Swale Inf	3/8/00	2:59	3/8/00	11:39	8:40:00	2022	16	126	0.376	100	Y
Cerritos Swale Eff	3/8/00	2:18	3/8/00	12:23	10:05:00	2643	14	146	0.477	100	Y
I-5/I-605 Swale Inf	3/8/00	3:14	3/8/00	12:23	9:09:00	1373	8	141	0.295	100	Y
I-5/I-605 Swale Eff	3/8/00	3:43	3/8/00	11:31	7:48:00	988	3	142	0.263	100	Y
I-605 at Carson Inf	3/8/00	2:58	3/8/00	11:31	8:33:00	413	9	45	0.068	98	Y
I-605 at Carson Eff	3/8/00	4:09	3/8/00	12:49	8:40:00	456	4	97	0.075	85	Y

[1] Only sites where flow was measured and composite samples were collected are included in this table.

Table 1-3: Flow Data for Each Monitored Event (concluded)[1]

Site/Event	Start Flow Date	Start Flow Time	End Flow Date	End Flow Time	Duration Flow (hours: minutes)	Total Flow (cubic feet)	Vol. To Samp (cf)	No. of Sample Aliquots Collected	Peak Flow (cfs)	% Capture	Peak Capture
Event 8											
Altadena Strip Inf	4/17/00	10:20	4/17/00	18:19	7:59:00	6131	160	38	0.4	99	Y
Altadena Strip Eff	4/17/00	10:16	4/17/00	19:03	8:47:00	8220	111	73	0.8	99	Y
Foothill FF Dll	4/17/00	10:44	4/18/00	9:57	23:13:00	5315	23	231	1.1	100	Y
Foothill SG Dll	4/17/00	10:43	4/17/00	18:02	7:19:00	344	20	33	0.1	99	Y
Las Flores FF Dll	4/17/00	9:09	4/18/00	9:00	23:51:00	4800	28	165	1.7	96	Y
Las Flores SG Dll	4/17/00	9:11	4/18/00	2:44	17:33:00	485	7	69	0.2	100	Y
Rosemead FF Dll	4/17/00	10:38	4/18/00	4:40	18:02:00	1593	24	66	0.4	99	Y
Rosemead SG Dll	4/17/00	10:35	4/18/00	4:40	18:05:00	7226	114	76	1.0	82	Y
I-605/SR-91 Strip Control	4/17/00	11:25	4/18/00	4:56	17:31:00	958	11	85	0.3	98	Y
I-605/SR-91 Strip Eff	4/17/00	13:03	4/18/00	4:35	15:32:00	134	3	12	0.1	90	Y
I-605/SR-91 Swale Inf	4/17/00	10:57	4/18/00	9:34	22:37:00	674	5	129	0.2	96	Y
I-605/SR-91 Swale Eff	4/17/00	10:46	4/18/00	3:23	16:37:00	300	3	26	0.2	89	Y
Cerritos Swale Inf	4/17/00	12:00	4/18/00	5:24	17:24:00	3122	40	72	0.8	92	Y
Cerritos Swale Eff	4/17/00	10:36	4/18/00	4:37	18:01:00	562	27	21	0.5	100	Y
I-5/I-605 Swale Inf	4/17/00	13:30	4/18/00	7:33	18:03:00	3118	14	151	1.1	98	Y
I-5/I-605 Swale Eff	4/17/00	12:14	4/18/00	9:50	21:36:00	2605	6	168	1.1	100	Y
I-605 at Carson Inf	4/17/00	12:23	4/18/00	4:33	16:10:00	967	17	54	0.2	95	Y
I-605 at Carson Eff	4/17/00	13:22	4/18/00	11:13	21:51:00	797	7	110	0.1	97	Y

[1] Only sites where flow was measured and composite samples were collected are included in this table.

Table 1-4a Summary of QA/QC Samples

Site	1/25/2000	2/16/2000	2/20-21/00	2/27/00	3/8/00
Altadena Maintenance Station Biofiltration Strip - Influent	Field Duplicate (grab)	Laboratory Replicate (composite)			
Altadena Maintenance Station Biofiltration Strip - Effluent		MS/MSD (composite)			
Foothill Maintenance Station StreamGuard™ DII		Field Duplicate (composite)		Field Duplicate (composite)	
Foothill Maintenance Station Fossil Filter™ DII				Laboratory Replicate (composite)	MS/MSD (composite)
Las Flores Maintenance Station Fossil Filter™ DII	Field Duplicate (composite)		Laboratory Replicate (composite)/ MS/MSD (composite)		
I-605/SR-91 Biofiltration Strip - Influent					Laboratory Replicate (grab)/ MS/MSD (grab)
Cerritos Maintenance Station Biofiltration Swale - Influent			Laboratory Replicate (grab)		
Cerritos Maintenance Station Biofiltration Swale - Effluent			Field Duplicate (composite)		
I-5/I-605 Biofiltration Swale – Influent			MS/MSD (grab)	Laboratory Replicate (composite)/ MS/MSD (composite)/ Field Duplicate (grab)	
I-5/I-605 Biofiltration Swale - Effluent				MS/MSD (grab)	
I-605 at Carson Biofiltration Swale - Effluent					Laboratory Replicate (composite)
Sample from Analytical Batch	MS/MSD (grab)/ MS/MSD (composite)				

Table 1-4b Field Duplicate RPD Results

1/25/00 Las Flores Maintenance Station - Fossil Filter DII (Composite Samples)

	Original	Duplicate	RPD
pH	6.8	7.1	4%
Conductivity	18	17	6%
Hardness	20	19	5%
TSS	13	46	112%
Nitrate as N	1.37	1.43	4%
TKN	2.5	2.5	0%
Total Phosphorus	<0.002	<0.002	0%
Total Cu	1.7	1.8	6%
Total Pb	<1	<1	0%
Total Zn	10.8	11.8	9%
Dissolved Cu	1.2	1.4	15%
Dissolved Pb	1	1	0%
Dissolved Zn	9.1	11.5	23%
TPH-Diesel	<250	<250	0%
TPH-Heavy Oil	<200	<200	0%
TPH-Gasoline	<50	<50	0%

1/25/00 Altadena Maintenance Station – Influent (Grab Samples)

	Original	Duplicate	RPD
TPH-Diesel	<250	<250	0%
TPH-Heavy Oil	310	365	16%
TPH-Gasoline	<50	<50	0%
Fecal Coliform	80	30	91%

2/16/00 Foothill Maintenance Station – StreamGuard DII (Composite Samples)

	Original	Duplicate	RPD
pH	6.9	6.9	0%
Conductivity	19	19	0%
Hardness	12	12	0%
TSS	13	10	26%
Nitrate as N	0.4	0.41	2%
TKN	1.59	1.97	21%
Total Phosphorus	<0.002	0.06	187%
Total Cu	4.4	4.3	2%
Total Pb	1.7	1.6	6%
Total Zn	50	53	6%
Dissolved Cu	4.3	4	7%
Dissolved Pb	1.5	1.6	6%
Dissolved Zn	48	48	0%
TPH-Diesel	<250	<250	0%
TPH-Heavy Oil	<200	<200	0%
TPH-Gasoline	<50	<50	0%

Table 1-4b Field Duplicate RPD Results (continued)

2/21/00 Cerritos Maintenance Station Swale - Effluent (Composite Samples)

	Original	Duplicate	RPD
pH	7.4	7.5	1%
Conductivity	127	144	13%
Hardness	50	46	8%
TSS	62	30	70%
Nitrate as N	0.31	0.13	82%
TKN	1.56	1.42	9%
Total Phosphorus	0.18	0.13	32%
Total Cu	3.3	3.3	0%
Total Pb	5.7	5.9	3%
Total Zn	17.2	21.3	21%
Dissolved Cu	4.1	2.9	34%
Dissolved Pb	4.9	5	2%
Dissolved Zn	17.6	15.8	11%

2/27/00 Foothill Maintenance Station – StreamGuard DII (Composite Samples)

	Original	Duplicate	RPD
pH	7	6.9	1%
Conductivity	36	37	3%
Hardness	11	11	0%
TSS	5	6	18%
Nitrate as N	0.4	0.41	2%
TKN	2.15	1.97	9%
Total Phosphorus	0.05	0.1	67%
Total Cu	4.2	4.9	15%
Total Pb	<1	1.2	18%
Total Zn	50	64	25%
Dissolved Cu	4.3	4.1	5%
Dissolved Pb	<1	<1	0%
Dissolved Zn	49	50	2%
TPH-Diesel	<250	<250	0%
TPH-Heavy Oil	<200	<200	0%
TPH-Gasoline	<50	<50	0%

2/27/00 I-5/I-605 – Influent (Grab Samples)

	Original	Duplicate	RPD
TPH-Diesel	<250	<250	0%
TPH-Heavy Oil	319	308	4%
TPH-Gasoline	<50	<50	0%
Fecal Coliform	30	240	156%

Table 1-4c Laboratory Replicate RPD Results

2/16/00 Altadena Maintenance Station – Influent (Composite Samples)

	Field	Duplicate	RPD
pH	7	7	0%
Conductivity	21	23	9%
Hardness	15	15	0%
TSS	117	122	4%
Nitrate as N	0.23	0.2	14%
TKN	1.45	1.48	2%
Total Phosphorus	0.032	0.03	6%
Total Cu	11.4	11.5	1%
Total Pb	18.9	17.2	9%
Total Zn	124	107	15%
Dissolved Cu	9.4	7.3	25%
Dissolved Pb	14.1	11.5	20%
Dissolved Zn	116	91	24%

2/21/00 Las Flores Maintenance Station - Fossil Filter DII (Composite Samples)

	Original	Duplicate	RPD
pH	7.3	7.3	0%
Conductivity	36	36.5	1%
Hardness	22	20	10%
TSS	38	40	5%
Nitrate as N	0.35	0.35	0%
TKN	1.08	1.03	5%
Total Phosphorus	0.06	0.06	0%
Total Cu	1.3	1.2	8%
Total Pb	1.3	1.9	38%
Total Zn	14	12.9	8%
Dissolved Cu	1.3	1.3	0%
Dissolved Pb	1.1	1.1	0%
Dissolved Zn	8.4	8	5%
TPH-Diesel	<250	<250	0%
TPH-Heavy Oil	<200	<200	0%
TPH-Gasoline	<50	<50	0%

2/21/00 Cerritos Maintenance Station Swale – Influent (Grab Samples)

	Original	Duplicate	RPD
TPH-Diesel	<250	<250	0%
TPH-Heavy Oil	<200	<200	0%
TPH-Gasoline	<50	<50	0%
Fecal Coliform	24000	13000	59%

Table 1-4c Laboratory Replicate RPD Results (continued)

2/27/00 I-5/I-605 – Influent
(Composite Samples)

	Original	Duplicate	RPD
pH	6.5	6.5	0%
Conductivity	75	75	0%
Hardness	23	23	0%
TSS	21	21	0%
Nitrate as N	0.63	0.6	5%
TKN	2.32	2.89	22%
Total Phosphorus	0.08	0.08	0%
Total Cu	18.8	17	10%
Total Pb	21.7	18.4	16%
Total Zn	90	81	11%
Dissolved Cu	12.2	12.6	3%
Dissolved Pb	5.7	5.3	7%
Dissolved Zn	61	61	0%

2/27/00 Foothill Maintenance Station- Fossil Filter DII
(Composite Samples)

	Original	Duplicate	RPD
TPH-Diesel	<250	<250	0%
TPH-Heavy Oil	<200	<200	0%
TPH-Gasoline	<50	<50	0%

3/8/00 I-605 at Carson – Effluent
(Composite Samples)

	Original	Duplicate	RPD
pH	7.6	7.5	1%
Conductivity	111	107	4%
Hardness	49	49	0%
TSS	5	11	75%
Nitrate as N	0.69	0.73	6%
TKN	2.6	2.83	8%
Total Phosphorus	0.35	0.39	11%
Total Cu	9.4	9.8	4%
Total Pb	38	38	0%
Total Zn	29.3	29.3	0%
Dissolved Cu	8.5	8.1	5%
Dissolved Pb	24	25	4%
Dissolved Zn	23.7	25.2	6%

3/8/00 I-605/SR-91 Strip – Control
(Grab Samples)

	Original	Duplicate	RPD
TPH-Diesel	<250	<250	0%
TPH-Heavy Oil	311	280	10%
TPH-Gasoline	<50	<50	0%
Fecal Coliform	800	2300	97%

Table 1-4d Samples Comprised of Less Than Twelve Aliquots

Location	Date	No. of Aliquots	% Storm Capture	Comments	Figure Reference
Altadena Maintenance Station Biofiltration Strip – Influent	1/25/2000	7	86	Sample is from first monitored event of the season. Sample aliquots are well distributed across the hydrograph. Recommend accepting sample without qualification.	1-4a
Foothill Maintenance Station – Fossil Filter™ DII	1/25/2000	3	88	Sample is from first monitored event of the season. Sample results will be used as part of a mass-balance approach in calculating pollutant removal efficiency. Recommend accepting sample without qualification.	1-13a
Las Flores Maintenance Station – Fossil Filter™ DII	1/25/2000	11	97	Sample is from first monitored event of the season. Number of sample aliquots just below minimum required. Sample aliquots are well distributed across the hydrograph. Recommend accepting sample without qualification.	1-14a
Rosemead Maintenance Station – Fossil Filter™ DII	1/25/2000	9	94	Sample is from first monitored event of the season. Number of sample aliquots near minimum required. Sample aliquots are well distributed across the hydrograph. Recommend accepting sample without qualification.	1-15a
Foothill Maintenance Station – Fossil Filter™ DII	1/30/2000	9	98	Number of sample aliquots near minimum required. Sample aliquots are well distributed across the hydrograph. Recommend accepting sample without qualification.	1-13b
Cerritos Maintenance Station Biofiltration Swale – Influent	2/27/2000	9	95	Number of sample aliquots near minimum required. Sample aliquots are well distributed across the hydrograph. Paired sample met minimum % storm capture and minimum number of aliquots. Recommend accepting sample without qualification.	1-7b

Table 1-4e Analytical Methods and Reporting Limits

Analyte	Sample Type	Analytical Method	Reporting Limits
Stormwater Matrix			
Conventionals			
pH	Composite	EPA 150.1	0.1 pH
Specific Conductance	Composite	EPA 120.1	1.0
Hardness	Composite	EPA 130.2	2 mg/L
TSS	Composite	EPA 160.2	1 mg/L
Nutrients			
Nitrate-N	Composite	EPA 300	0.01 mg/L
TKN	Composite	EPA 351.3	0.1 mg/L
Total Phosphorus	Composite	EPA 365.1	0.002 mg/L
Total/Dissolved Metal			
Copper	Composite	EPA 200.8	1 ug/L
Lead	Composite	EPA 200.8	1 ug/L
Zinc	Composite	EPA 200.8	1 ug/L
Organics			
TPH-diesel	Grab/Composite[1]	EPA 8015M	250 ug/L
TPH-oil	Grab/Composite[1]	EPA 8015M	200 ug/L
TPH-gasoline	Grab/Composite[1]	EPA 8015M	50 ug/L
Bacteria			
Fecal Coliform	Grab	SM 9221	2 MPN/100
Sediment, Soil and Solid[2] Matrices			
Organics			
Total Recoverable Petroleum Hydrocarbons (TRPH)	Composite	EPA 418.1(IR)/ 1664HEM	10 mg/kg
Total Metals			
Copper	Composite	EPA 6020	2.5 mg/kg
Lead	Composite	EPA 6020	0.3 mg/kg
Zinc	Composite	EPA 6020	2.0 mg/kg
Grain Size Distribution[3] (Method of Tests for Sieve Analysis of Fine and Coarse Aggregates)	Composite	Caltrans Test 202	---

Table 1-4e Analytical Methods and Reporting Limits (concluded)

Analyte	Sample Type	Analytical Method	Reporting Limits
Sediment Matrix (Disposal)			
Organics			
Total Recoverable Petroleum Hydrocarbons (TRPH)	Composite	EPA 418.1	10 mg/kg
Volatile Organic Compounds	Composite	EPA 8260B	SW-846[7] requirements
Total Metals			
California Code of Regulations (CCR), Title 22 Metals[4]	Composite	EPA 6020/ 7471	SW-846[7] requirements
California Code of Regulations (CCR), Title 22 Waste Extraction Test (WET) Metals[5]	Composite	STLC Extraction	SW-846[7] requirements
Toxicity Characteristic Leaching Procedure (TCLP) Metals[6]	Composite	TCLP 1311	SW-846[7] requirements

1 Composite samples of effluent from DIIs were analyzed for TPH (diesel, oil, and gasoline).

2 Solid matrices for DIIs include StreamGuard™ fabric and absorbent, and Fossil Filter™ adsorbent

3 Grain size distribution test is for Infiltration Basin soil and sediment only.

4 California Code of Regulations (CCR), Title 22 Metals (Sb, As, Ba, Be, Cd, Cr (total), Co, Cu, Hg, Pb, Mo, Ni, Se, Ag, Tl, V, and Zn). Initial waste characterization results may lead to a shorter list of metals for subsequent sediment disposal.

5 Any sample for total metals that are below the Total Threshold Limit Concentration [TTLC] but exceed the ten times Soluble Threshold Limit Concentration (STLC) will be further analyzed using the WET procedure. WET extracts will be analyzed only for metals which exceed the ten times STLC criteria. Sediments associated with total metal results that exceed TTLC values are automatically considered hazardous and therefore do not need to undergo the WET procedure.

6 If any of the WET-soluble concentrations are equal to or greater than the TCLP regulatory thresholds, then analysis of the waste by TCLP may be required.

7 "Test Methods for Evaluating Solid Waste, Physical /Chemical Methods". SW-846, Update III. (SW-846).

Table 1-5a: BMP Retrofit Pilot Study, Stormwater Laboratory Data – District 7

Sample Date	BMP Location	BMP Type	Site ID	Sampling Location	% Storm Capture	pH	Specific Conductance (umhos/cm)	Hardness (mg/L)	TSS (mg/L)	Total (ug/L) Cu	Total (ug/L) Pb	Total (ug/L) Zn	Dissolved (ug/L) Cu	Dissolved (ug/L) Pb	Dissolved (ug/L) Zn	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	Total P (mg/L)	Fecal Coliform MPN/100mL	TPH - Diesel (ug/L)	TPH - Gasoline (ug/L)	TPH - Oil (ug/L)
Storm Water Matrix																						
January 25, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Influen	86	6.7	10	15	50	1.3	2.0	13.1	1U	1U	5.1	0.27	1.8	0.002U	80	250U	50U	310
January 25, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Effluent	95	6.7	20	20	17	1U	1U	4.2	1U	1U	3.2	0.41	2.2	0.51	140	250U	50U	200U
January 25, 2000	Foothill Maintenance Station	Drain Inlet Insert - Fossil Filter	073216	Effluent	88	6.5	12	18	24	1.5	1U	14.8	1.1	1U	13.8	1.2	0.9	0.002U	---	250U	50U	200U
January 25, 2000	Foothill Maintenance Station	Drain Inlet Insert - StreamGuard	073216	Effluent	100	7.2	9	10	13	1.7	1U	13.5	1.4	1U	10.5	0.41	1.8	0.002U	---	250U	50U	200U
January 25, 2000	Las Flores Maintenance Station	Drain Inlet Insert - Fossil Filter	073217	Effluent	97	6.8	18	20	13	1.7	1U	10.8	1.2	1U	9.1	1.37	2.5	0.002U	---	250U	50U	200U
January 25, 2000	Rosemead Maintenance Station	Drain Inlet Insert - StreamGuard	073218	Effluent	100	7.3	11	18	44	3.0	2.4	27.6	1.3	1U	18.7	0.68	18.2	0.002U	---	250U	50U	200U
January 25, 2000	Rosemead Maintenance Station	Drain Inlet Insert - Fossil Filter	073218	Effluent	94	7.1	17	26	39	2.4	2.3	34.2	1.9	1U	26.7	1.02	1.4	0.002U	---	250U	50U	200U
January 31, 2000	Foothill Maintenance Station	Drain Inlet Insert - Fossil Filter	073216	Effluent	98	6.5	50	22	8	1.5	1U	13.4	1.3	1U	11.7	0.70	2.4	0.128	---	250U	50U	200U
January 31, 2000	Foothill Maintenance Station	Drain Inlet Insert - StreamGuard	073216	Effluent	89	6.8	40	18	6	1.3	1U	18.2	1.3	1U	12.3	0.67	3.7	0.096	---	250U	50U	200U
January 31, 2000	Las Flores Maintenance Station	Drain Inlet Insert - StreamGuard	073217	Effluent	100	7.5	270	70	11	1.6	1U	11.4	1.4	1U	9.7	6.3	1.3	0.138	---	250U	50U	200U
January 30, 2000	Rosemead Maintenance Station	Drain Inlet Insert - Fossil Filter	073218	Effluent	95	7.1	91	36	19	1.8	1U	19.8	1.5	1U	18.0	1.52	2.1	0.075	---	250U	50U	200U
January 31, 2000	Rosemead Maintenance Station	Drain Inlet Insert - StreamGuard	073218	Effluent	92	6.3	115	35	18	3.7	1U	24.6	3.3	1U	23.7	1.99	4.7	0.198	---	250U	50U	200U
February 10, 2000	Las Flores Maintenance Station	Drain Inlet Insert - Fossil Filter	073217	Effluent	77	7.2	99	27	128	22.2	16.4	107	21.1	13.9	98	1.13	3.25	0.07	---	250U	50U	200U
February 10, 2000	Las Flores Maintenance Station	Drain Inlet Insert - StreamGuard	073217	Effluent	96	7.9	199	54	92	33.4	12.3	453	15.2	8.3	247	0.44	3.38	0.07	---	250U	50U	200U
February 16, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Influent	78	7.0	21	15	117	11.4	18.9	124	9.4J	14.1	116J	0.23	1.45	0.032	---	---	---	---
February 16, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Effluent	91	7.4	47	21	24	3.1	2.9	16.9	2.7J	2.7	15.8J	0.35	1.22	0.31	---	---	---	---
February 16, 2000	Foothill Maintenance Station	Drain Inlet Inser - Fossil Filter	073216	Effluent	100	7.2	32	12	32	7.7	9.4	69	7.3J	8.2	67J	0.41	1.73	0.002U	---	250U	50U	200U
February 16, 2000	Foothill Maintenance Station	Drain Inlet Inser - StreamGuard	073216	Effluent	100	6.9	19	12	13	4.4	1.7	50	4.3J	1.5	48J	0.40	1.59	0.002U	---	250U	50U	200U
February 21, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Influent	79	7.5	22	15	79	1.1	1.3	13	1U	1U	9.1	0.22	1.43	0.05	---	---	---	---
February 21, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Effluent	90	7.6	24	16	15	1U	1U	9.1	1U	1U	5.6	0.12	0.9	0.18	---	---	---	---
February 20, 2000	I-605/SR-91	Biofiltration Strip	073222a	Control	---	---	---	---	---	---	---	---	---	---	---	---	---	---	500	250U	50U	200U
February 20, 2000	I-605/SR-91	Biofiltration Strip	073222a	Effluent	---	---	---	---	---	---	---	---	---	---	---	---	---	---	170	250U	50U	200U
February 20, 2000	I-605/SR-91	Biofiltration Swale	073222b	Influent	---	---	---	---	---	---	---	---	---	---	---	---	---	---	240	250U	50U	200U
February 20, 2000	I-605/SR-91	Biofiltration Swale	073222b	Effluent	---	---	---	---	---	---	---	---	---	---	---	---	---	---	500	250U	50U	200U
February 21, 2000	Cerritos Maintenance Station	Biofiltration Swale	073223	Influent	87	7.5	4	41	71	5.1	8.9	34.3	4.1	7.1	30.1	0.45	1.80	0.07	24000	250U	50U	200U
February 21, 2000	Cerritos Maintenance Station	Biofiltration Swale	073223	Effluent	92	7.4	127	50	62	3.3	5.7	17.2	4.1	4.9	17.6	0.31	1.56	0.18	>160000	250U	50U	200U
February 22, 2000	I-5/I-605	Biofiltration Swale	073224	Influent	98	7.2	65	21	94	4.6	8.3	50.9	3.1	6.4	26.6	0.27	1.28	0.07	140	250U	50U	200U
February 21, 2000	I-5/I-605	Biofiltration Swale	073224	Effluent	87	7.5	50	23	10	1.5	2.0	6.2	1.3	1.7	6.2	0.68	1.05	0.17	50	250U	50U	200U
February 20, 2000	I-605 @ Carson	Biofiltration Swale	073225	Influent	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5000	250U	50U	200U
February 20, 2000	I-605 @ Carson	Biofiltration Swale	073225	Effluent	---	---	---	---	---	---	---	---	---	---	---	---	---	---	500	250U	50U	200U
February 21, 2000	Foothill Maintenance Station	Drain Inlet Insert - Fossil Filter	073216	Effluent	95	7.3	19	13	22	1.2	2.0	9.4	1.2	2.0	9.4	0.18	1.09	0.07	---	250U	50U	200U
February 21, 2000	Foothill Maintenance Station	Drain Inlet Insert - StreamGuard	073216	Effluent	81	7.5	23	23	20	1.2	1U	13	1.0	1U	13	0.03	1.08	0.06	---	250U	50U	200U
February 21, 2000	Las Flores Maintenance Station	Drain Inlet Insert - Fossil Filter	073217	Effluent	98	7.3	36	22	38	1.3	1.3	14.0	1.3	1.1	8.4	0.35	1.08	0.06	---	250U	50U	200U
February 21, 2000	Las Flores Maintenance Station	Drain Inlet Insert - StreamGuard	073217	Effluent	89	7.8	181	62	167	11.1	1.7	18.7	10.3	1.3	16.6	1.63	0.81	0.08	---	250U	50U	200U
February 21, 2000	Rosemead Maintenance Station	Drain Inlet Insert - StreamGuard	073218	Effluent	95	7.7	393	136	28	4.8	1.9	13.0	4.7	1.5	12.5	0.44	1.06	0.10	---	250U	50U	200U
February 21, 2000	Rosemead Maintenance Station	Drain Inlet Insert - Fossil Filter	073218	Effluent	81	7.4	41	17	8	2.8	1.2	19.5	2.6	1U	18.2	0.60	1.78	0.10	---	250U	50U	200U

"---" - Not Analyzed

Table 1-5a: BMP Retrofit Pilot Study, Stormwater Laboratory Data - District 7 (concluded)

Sample Date	BMP Location	BMP Type	Site ID	Sampling Location	% Storm Capture	pH	Specific Conductance (umhos/cm)	Hardness (mg/L)	TSS (mg/L)	Total (ug/L) Cu	Total (ug/L) Pb	Total (ug/L) Zn	Dissolved (ug/L) Cu	Dissolved (ug/L) Pb	Dissolved (ug/L) Zn	Nitrate-Nitrogen (mg/L)	TKN (mg/L)	Total P (mg/L)	Fecal Coliform (MPN/100mL)	TPH - Diesel (ug/L)	TPH - Gasoline (ug/L)	TPH - Oil (ug/L)
Storm Water Matrix																						
February 27, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Influent	100	6.5	32	11	45	13.7	18.5	102	4.6	1.3	28	0.73	2.64J	0.08	800	250U	50U	222
February 27, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Effluent	100	6.6	28	10	16	3.0	3.4	20.2	1.7	1.0	12	0.56	1.69J	0.21	300	250U	50U	200U
February 27, 2000	Cerritos Maintenance Station	Biofiltration Swale	073223	Influent	95	7.2	29	80	29	24.3	15.4	96	7.8	4.8	58	0.73	2.64J	0.12	5000	250U	50U	457
February 27, 2000	Cerritos Maintenance Station	Biofiltration Swale	073223	Effluent	99	7.3	98	79	62	20.5	15.0	61	5.6	3.8	35	0.77	2.13J	0.27	1600	250U	50U	320
February 27, 2000	I-5/I-605	Biofiltration Swale	073224	Influent	100	6.5	75	23	21	18.8	21.7	90	2.2	5.7	61	0.63	2.32J	0.08	30	250U	50U	319
February 27, 2000	I-5/I-605	Biofiltration Swale	073224	Effluent	100	6.8	78	24	14	10.4	9.6	28.1	9.3	5.1	23.3	0.88	1.95J	0.27	220	250U	50U	292
February 28, 2000	Foothill Maintenance Station	Drain Inlet Insert - Fossil Filter	073216	Effluent	100	6.9	36	11	20	5.8	4.7	60	4.1	1U	42	0.53	2.08J	0.07	---	250U	50U	200U
February 28, 2000	Foothill Maintenance Station	Drain Inlet Insert - StreamGuard	073216	Effluent	99	7.0	36	11	5	4.2	1U	50	4.3	1U	49	0.40	2.15J	0.05	---	250U	50U	200U
February 27, 2000	Las Flores Maintenance Station	Drain Inlet Insert - Fossil Filter	073217	Effluent	90	6.5	49	14	13	6.1	2.3	31	5.1	1U	20.8	0.31	3.23J	0.08	---	250U	50U	200U
February 27, 2000	Las Flores Maintenance Station	Drain Inlet Insert - StreamGuard	073217	Effluent	100	6.5	50	14	24	12.8	2.5	32	4.6	1U	17.3	0.33	1.71J	0.10	---	250U	50U	200U
February 27, 2000	Rosemead Maintenance Station	Drain Inlet Insert - StreamGuard	073218	Effluent	87	6.5	33	9	27	11.6	12.2	106	5.5	1.3	58	0.58	1.95J	0.06	---	250U	50U	200U
February 27, 2000	Rosemead Maintenance Station	Drain Inlet Insert - Fossil Filter	073218	Effluent	100	6.8	49	17	13	10.4	6.5	218	7.1	2.9	115	0.70	1.86J	0.13	---	250U	50U	200U
March 8, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Influent	100	7.1	41	20	52	7.2	12.0	57	2.6	1.2	29	0.34	1.83	0.04	---	---	---	---
March 8, 2000	Altadena Maintenance Station	Biofiltration Strip	073211a	Effluent	96	7.4	33	15	28	2.5	2.0	14.8	2.1	1U	13.8	0.02	1.66	0.18	---	---	---	---
March 8, 2000	I-605/SR-91	Biofiltration Strip	073222a	Control	93	7.5	71	48	54	24.8	81	96	11.2	20.7	45	0.41	1.78	0.12	800	250U	50U	311
March 8, 2000	I-605/SR-91	Biofiltration Strip	073222a	Effluent	87	7.6	161	64	1U	8.1	4.6	19.5	8.4	2.6	12.8	0.30	1.03	2.73	140	250U	50U	200U
March 8, 2000	I-605/SR-91	Biofiltration Swale	073222b	Influent	100	7.5	80	41	38	19.4	40.1	121	10.8	15.9	72.8	0.29	1.85	0.28	5000	250U	50U	488
March 8, 2000	I-605/SR-91	Biofiltration Swale	073222b	Effluent	93	7.9	279	54	26	13.8	9.9	31.2	11.5	4.9	20.5	0.39	2.65	2.68	900	250U	50U	355
March 8, 2000	Cerritos Maintenance Station	Biofiltration Swale	073223	Influent	100	7.6	86	32	103	35.6	100	275	11.1	19.0	52.3	0.39	1.79	0.11	---	---	---	---
March 8, 2000	Cerritos Maintenance Station	Biofiltration Swale	073223	Effluent	100	7.6	10[illegible]	41	56	19.5	49.8	84.6	11.7	20.3	48.6	0.47	4.76	0.15	---	---	---	---
March 8, 2000	I-5/I-605	Biofiltration Swale	073224	Influent	100	7.4	82	26	54	25.2	74.2	371	13.4	26.2	69	0.51	1.81	0.09	---	---	---	---
March 8, 2000	I-5/I-605	Biofiltration Swale	073224	Effluent	100	7.4	68	26	18	14.[illegible]	33.1	48.5	9.5	18.1	33.2	0.47	1.85	0.20	---	---	---	---
March 8, 2000	I-605 @ Carson	Biofiltration Swale	073225	Influent	98	7.6	85	39	67	27.8	175	110	9.4	18.1	24.1	0.45	3.23	0.13	11000	250U	50U	890
March 8, 2000	I-605 @ Carson	Biofiltration Swale	073225	Effluent	85	7.6	11[illegible]	49	5	9.4	38	29.3	8.5	24	23.7	0.69	2.60	0.35	8000	250U	50U	355
March 8, 2000	Foothill Maintenance Station	Drain Inlet Insert - Fossil Filter	073218	Effluent	100	7.6	24	25	31	6.7	12.0	74	3.1	2.6	41	0.23	1.48	0.07	---	250U	50U	210
March 8, 2000	Foothill Maintenance Station	Drain Inlet Insert - StreamGuard	073216	Effluent	99	6.8	34	21	10	4.3	2	66	3.6	1U	59	0.37	2.6	0.04	---	250U	50U	200U
April 18, 2000	Altadena Maintenance Station	Biofiltration Strip	073211	Influent	99	6.7	19	8	57	9.5	9.7	74	4.8	1.3	43.1	0.20	0.11	0.08	---	---	---	---
April 18, 2000	Altadena Maintenance Station	Biofiltration Strip	073211	Effluent	99	6.9	28	10	11	5.4	3.5	37.3	4.8	1.2	29.2	0.23	0.11	0.22	---	---	---	---
April 18, 2000	I-605/SR-91	Biofiltration Strip	073222a	Influent	98	7.5	81	29	61	36.3	79	226	20.4	14.8	75	0.62	2.49	0.21	300	250U	50U	2083
April 18, 2000	I-605/SR-91	Biofiltration Strip	073222a	Effluent	90	6.9	179	40	19	17	8.7	61.7	14.7	2.4	50.7	1.15	4.23	0.79	9000	250U	50U	1222
April 18, 2000	I-605/SR-91	Biofiltration Swale	073222b	Influent	96	7.5	85	30	45	30.7	40.2	322	19	12.2	141	0.82	0.13	0.2	---	---	---	---
April 18, 2000	I-605/SR-91	Biofiltration Swale	073222b	Effluent	89	7.4	193	30	37	20.3	15.5	68.9	16	4.8	45.4	0.83	0.13	1.03	---	---	---	---
April 18, 2000	Cerritos Maintenance Station	Biofiltration Swale	073223	Influent	92	7.5	104	41	117	58.4	133	478	22.4	20	105	0.62	0.11	0.17	---	---	---	---
April 18, 2000	Cerritos Maintenance Station	Biofiltration Swale	073223	Effluent	100	7.7	84	30	50	27.4	47.6	104	17.4	15.5	50.3	0.58	0.08	0.34	---	---	---	---
April 18, 2000	I-5/I-605	Biofiltration Swale	073224	Influent	98	7.4	75	25	27	26.3	48.4	243	17.1	13.9	109	0.48	0.12	0.11	---	---	---	---
April 18, 2000	I-5/I-605	Biofiltration Swale	073224	Effluent	100	7.1	59	19	19	19.5	31.3	80.9	15	10.3	55.6	0.47	0.13	0.29	---	---	---	---
April 18, 2000	I-605 @ Carson	Biofiltration Swale	073225	Influent	95	7.4	88	35	67	31.2	173	152	18.9	46.1	69.5	0.67	2.41	0.15	8000	250U	50J	6663
April 18, 2000	I-605 @ Carson	Biofiltration Swale	073225	Effluent	97	7	120	39	31	23	74.6	75.1	17.2	16.8	427	0.91	2.76	0.53	2400	250U	50J	7838
April 18, 2000	Foothill Maintenance Station	Drain Inlet Insert - Fossil Filter	073216	Effluent	100	6.8	26	8	27	8.[illegible]	10	62.8	4.7	1.6	57.1	0.34	1.6	0.08	---	250U	50J	200U
April 18, 2000	Foothill Maintenance Station	Drain Inlet Insert - StreamGuard	073216	Effluent	99	6.8	17	4	13	5.8	2.8	63.5	4.9	1U	54.5	0.22	1.38	0.05	---	250U	50J	200U
April 18, 2000	Las Flores Maintenance Station	Drain Inlet Insert - Fossil Filter	073217	Effluent	96	6.6	151	53	30	17.4	3.5	107	14.2	1.3	103	0.66	2.29	0.08	---	250U	50J	1118
April 18, 2000	Las Flores Maintenance Station	Drain Inlet Insert - StreamGuard	073217	Effluent	100	6.4	68	21	36	9.7	3.7	34.5	7.1	1	27.9	0.60	1.56	0.15	---	250U	50J	200U
April 18, 2000	Rosemead Maintenance Station	Drain Inlet Insert - StreamGuard	073218	Effluent	82	6.9	73	27	45	19.3	12.5	328	16.5	3.7	319	2.22	2.1	0.14	---	250U	50J	200U
April 18, 2000	Rosemead Maintenance Station	Drain Inlet Insert - Fossil Filter	073218	Effluent	99	7.3	53	20	38	29.7	16.8	436	21.5	5	356	0.86	1.9	0.1	---	250U	50J	200U

"---" - Not Analyzed

U Indicates the compound or element was an analyte, but was not detected at or above the Reporting Limit

Table 1-5b: BMP Retrofit Pilot Study, Sediment Sampling Laboratory Data - District 7

Sample Date	BMP Location	Site ID	BMP Type	Total (mg/kg)																
				Ag	As	Ba	Be	Cd	Cu	Co	Cr	Pb	Zn	Mo	Ni	Sb	Se	Tl	V	Hg
Solids Matrix (Sediment)																				
June 8, 1999	Biofiltration Strip Spreader Ditch - Drum 1	073211A	Biofiltration Strip	0.066	1.8	69.3	0.11	0.38	59.5	3.4	12.6	114[a]	134	1.3	12.9	0.60	0.12	0.048	16.1	0.037
December 12, 1999	Biofiltration Strip Spreader Ditch - Drum 1	073211A	Biofiltration Strip	0.1	2.1	94.0	0.14	1.1	34.5	4.8	12.9	102[c]	294	2.1	9.5	1.50	0.20U	0.10U	16.0	0.04U
December 12, 1999	Biofiltration Strip Spreader Ditch - Drum 2	073211A	Biofiltration Strip	0.14	2.9	109.0	0.17	1.2	49.4	5.6	16.4	144[c]	337	2.3	13.1	1.70	0.20U	0.10U	21.3	0.05

Sample Date	BMP Location	Site ID	BMP Type	STLC		VOCs (ug/kg)[b]			
				Pb (mg/L)	TRPH (mg/kg)	Acetone	Methylene Chloride	Toluene	2-Butanone (MEK)
Solids Matrix (Sediment)									
June 8, 1999	Biofiltration Strip Spreader Ditch - Drum 1	073211A	Biofiltration Strip	6.1	2350	79	15	140	15
December 12, 1999	Biofiltration Strip Spreader Ditch - Drum 1	073211A	Biofiltration Strip	---	1490	---	---	3900	---
December 12, 1999	Biofiltration Strip Spreader Ditch - Drum 2	073211A	Biofiltration Strip	---	1460	---	---	3300	---

"---" - Not Analyzed

[a] 10X STLC < Concentration < TTLC, thus requiring WET procedure.

[b] Parameters with results > Reporting Limit

[c] Because results were similar from sample collected on June 3, 1999, WET procedure was not required.

Table 1-5c: BMP Retrofit Pilot Study, Soil Sampling Laboratory Data - District 7

					Total (mg/kg)					Grain Size Distribution (% Passing)					
Sample Date	BMP Location	Site ID	BMP Type	Sampling Location	Cu	Pb	Zn	TRPH (mg/kg)	Mass (grams)	No. 4	No. 10	No. 20	No. 40	No. 100	No. 200
Solids Matrix (Soil)															
June 20, 2000	I-605/SR-91 Interchange	073101	Infiltration Basin	I-605/SR-91 Baseline Soil; 0.0-0.2 meter depth	22.8	39.4	54.4	10U	986.5	100	99.4	98.3	95.1	74.1	53.3
June 20, 2000	I-605/SR-91 Interchange	073101	Infiltration Basin	I-605/SR-91 Baseline Soil; 0.3-0.5 meter depth	16.1	3.4	35.8	10U	1082	100	100	99.4	94.7	58	28.7
June 20, 2000	I-605/SR-91 Interchange	073101	Infiltration Basin	I-605/SR-91 Baseline Soil; 0.6-0.8 meter depth	16.1	3.5	36.6	10U	940	100	100	99.3	94.5	54.5	25

Table 1-5d: BMP Retrofit Pilot Study, Drain Inlet Insert Solid Matrix Sampling Laboratory Data - District 7

Sample Date	Location	Site ID	BMP Type	Sampling Location	Total (mg/kg) Cu	Pb	Zn	TRPH (mg/kg)
Solids Matrix (StreamGuard Fabric)								
June 1, 2000	Foothill Maintenance Station	073216	Drain Inlet Insert - StreamGuard	Used - StreamGuard Fabric	74.5	150	917	3020
June 1, 2000	Las Flores Maintenance Station	073217	Drain Inlet Insert - StreamGuard	Used - StreamGuard Fabric	34.3	38.3	210	2180
June 1, 2000	Rosemead Maintenance Station	073218	Drain Inlet Insert - StreamGuard	Used - StreamGuard Fabric	42.5	95.4	934	2300
Solids Matrix (StreamGuard Absorbent)								
June 1, 2000	Foothill Maintenance Station	073216	Drain Inlet Insert - StreamGuard	Used - StreamGuard Absorbent	16.9	29.5	105	33700J
June 1, 2000	Las Flores Maintenance Station	073217	Drain Inlet Insert - StreamGuard	Used - StreamGuard Absorbent	10.9	8.2	46.7	28100J
June 1, 2000	Rosemead Maintenance Station	073218	Drain Inlet Insert - StreamGuard	Used - StreamGuard Absorbent	15.5	25.9	121	26400J
Solids Matrix (StreamGuard Sediment)								
June 1, 2000	Foothill Maintenance Station	073216	Drain Inlet Insert - StreamGuard	Used - StreamGuard Sediment	29.9	52.9	301	2870
June 1, 2000	Las Flores Maintenance Station	073217	Drain Inlet Insert - StreamGuard	Used - StreamGuard Sediment	24.5	9.9	98.7	8860
June 1, 2000	Rosemead Maintenance Station	073218	Drain Inlet Insert - StreamGuard	Used - StreamGuard Sediment	51	127	574	2320
Solids Matrix (Fossil Filter Adsorbent)								
June 1, 2000	Foothill Maintenance Station	073216	Drain Inlet Insert - Fossil Filter	Used - Fossil Filter Adsorbent	35.3	119	338	5180
June 1, 2000	Las Flores Maintenance Station	073217	Drain Inlet Insert - Fossil Filter	Used - Fossil Filter Adsorbent	18.9	21.7	120	3270
June 1, 2000	Rosemead Maintenance Station	073218	Drain Inlet Insert - Fossil Filter	Used - Fossil Filter Adsorbent	61.5	135	705	1460
Solids Matrix (Fossil Filter Sediment)								
June 1, 2000	Foothill Maintenance Station	073216	Drain Inlet Insert - Fossil Filter	Used - Fossil Filter Sediment	57	104	356	4550
June 1, 2000	Las Flores Maintenance Station	073217	Drain Inlet Insert - Fossil Filter	Used - Fossil Filter Sediment	22.2	7	69	333U
June 1, 2000	Rosemead Maintenance Station	073218	Drain Inlet Insert - Fossil Filter	Used - Fossil Filter Sediment	43.7	70.2	856	2950

Table 1-6a: BMP Pollutant Removal Efficiencies (Biofiltration Strips)

Altadena MS Strip — 25 January, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	50	17	66	76
Total Cu (ug/L)	3	1U	>23	>46
Total Pb (ug/L)	2	1U	>50	>65
Total Zn (ug/L)	13.1	4.2	68	77
Dissolved Cu (ug/L)	1U	1U	na	na
Dissolved Pb (ug/L)	1U	1U	na	na
Dissolved Zn (ug/L)	5.1	3.2	37	56
Nitrate-Nitrogen (mg/L)	0.27	0.41	-52	-7
TKN (mg/L)	1.8	2.2	-22	14
Total P (mg/L)	0.302U	0.51	-25400	-17851
Storm Volume (cubic feet)	2584	1819		

Altadena MS Strip — 16 February, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	117	24	79	77
Total Cu (ug/L)	11.4	3.1	73	69
Total Pb (ug/L)	18.9	2.9	85	83
Total Zn (ug/L)	124	16.9	86	84
Dissolved Cu (ug/L)	9.4	2.7	71	67
Dissolved Pb (ug/L)	14.1	2.7	81	78
Dissolved Zn (ug/L)	116	15.8	86	84
Nitrate-Nitrogen (mg/L)	0.23	0.35	-52	-74
TKN (mg/L)	1.45	1.22	16	4
Total P (mg/L)	0.032	0.31	-859	-1005
Storm Volume (cubic feet)	5337	6086		

Altadena MS Strip — 21 February, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	79	15	81	82
Total Cu (ug/L)	1.1	1U	>9	>13
Total Pb (ug/L)	1.3	1U	>23	>26
Total Zn (ug/L)	13	9.1	30	33
Dissolved Cu (ug/L)	1U	1U	na	na
Dissolved Pb (ug/L)	1U	1U	na	na
Dissolved Zn (ug/L)	9.1	5.6	38	41
Nitrate-Nitrogen (mg/L)	0.22	0.12	45	48
TKN (mg/L)	1.43	0.9	37	40
Total P (mg/L)	0.05	0.18	-260	-244
Storm Volume (cubic feet)	12658	12104		

Altadena MS Strip — 27 February, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	45	16	64	63
Total Cu (ug/L)	13.7	3	78	77
Total Pb (ug/L)	18.5	3.4	82	81
Total Zn (ug/L)	102	20.2	80	79
Dissolved Cu (ug/L)	4.6	1.7	63	62
Dissolved Pb (ug/L)	1.3	1	23	20
Dissolved Zn (ug/L)	28	12	57	56
Nitrate-Nitrogen (mg/L)	0.73	0.56	23	20
TKN (mg/L)	2.64	1.69	36	34
Total P (mg/L)	0.08	0.21	-163	-172
Storm Volume (cubic feet)	2169	2249		

Altadena MS Strip — 8 March, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff in Load
TSS (mg/L)	52	28	46	52
Total Cu (ug/L)	7.2	2.5	65	69
Total Pb (ug/L)	12	2	83	85
Total Zn (ug/L)	57	14.8	74	77
Dissolved Cu (ug/L)	2.6	2.1	19	28
Dissolved Pb (ug/L)	1.2	1U	>16	>25
Dissolved Zn (ug/L)	29	13	55	60
Nitrate-Nitrogen (mg/L)	0.34	0.02	94	95
TKN (mg/L)	1.63	1.66	-2	9
Total P (mg/L)	0.04	0.18	-350	-304
Storm Volume (cubic feet)	2203	1976		

Altadena MS Strip — 18 April, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	57	11	11	74
Total Cu (ug/L)	9.5	5.4	43	24
Total Pb (ug/L)	9.7	3.5	64	52
Total Zn (ug/L)	74	37.3	50	32
Dissolved Cu (ug/L)	4.8	4.8	0	-34
Dissolved Pb (ug/L)	1.3	1.2	8	-24
Dissolved Zn (ug/L)	43.1	29.2	32	9
Nitrate-Nitrogen (mg/L)	0.20	0.23	-15	-54
TKN (mg/L)	0.11	0.11	0	-34
Total P (mg/L)	0.08	0.22	-175	-269
Storm Volume (cubic feet)	6131	8220		

Altadena MS Strip — *1999 - 2000 Wet Season Statistics*

Parameter	Minimum Load Removal (%)	Maximum Load Removal (%)	Average Season Removal (%)
TSS	52	82	67
T-Cu	13	77	65
T-Pb	26	85	79
T-Zn	32	84	71
D-Cu	-34	67	37
D-Pb	-24	78	47
D-Zn	9	84	62
N-N	-74	95	-41
TKN	-34	40	3
T-P	-17851	-172	-301

Influent (cf) 59663
Effluent (cf) 70776

I-605/SR-91 Strip — 8 March, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	54	1U	>98	>99
Total Cu (ug/L)	24.8	8.1	67	83
Total Pb (ug/L)	81	4.6	94	93
Total Zn (ug/L)	96	19.5	80	92
Dissolved Cu (ug/L)	11.2	6.4	43	73
Dissolved Pb (ug/L)	20.7	2.6	87	95
Dissolved Zn (ug/L)	45	12.8	72	80
Nitrate-Nitrogen (mg/L)	0.41	0.3	27	72
TKN (mg/L)	1.78	1.03	42	78
Total P (mg/L)	0.12	2.73	-2175	-755
Storm Volume (cubic feet)	576	219		

I-605/SR-91 Strip — 18 April, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	61	19	69	96
Total Cu (ug/L)	36.9	17	54	94
Total Pb (ug/L)	79	8.7	89	98
Total Zn (ug/L)	226	61.7	73	96
Dissolved Cu (ug/L)	20.4	14.7	28	90
Dissolved Pb (ug/L)	14.8	2.4	84	98
Dissolved Zn (ug/L)	79	50.7	36	91
Nitrate-Nitrogen (mg/L)	0.62	1.15	-85	74
TKN (mg/L)	2.49	4.23	-70	76
Total P (mg/L)	0.21	0.79	-276	47
Storm Volume (cubic feet)	958	134		

I-605/SR-91 Strip — *1999 - 2000 Wet Season Statistics*

Parameter	Minimum Load Removal (%)	Maximum Load Removal (%)	Average Season Removal (%)
TSS	96	99	93
T-Cu	88	94	95
T-Pb	98	98	99
T-Zn	92	96	97
D-Cu	78	90	92
D-Pb	95	98	98
D-Zn	89	91	93
N-N	72	74	81
TKN	76	78	83
T-P	-765	47	-37

Influent (cf) 14088
Effluent (cf) 1538

Note 1: Altadena MS influent and effluent monitored throughout wet season.
Note 2: I-605/SR-91 control and effluent non-monitored wet season flow volume estimated using Scoping Study procedure.
Note 3: Where EMC was non-detect then Reporting Limit was used.
Note 4: U Indicates the compound or element was an analyte, but was not detected at or above the Reporting Limit.

Table 1-6b: BMP Pollutant Removal Efficiencies (Biofiltration Swales)

I-605/SR-91 Swale — 8 March, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	38	26	32	90
Total Cu (ug/L)	19.4	13.8	29	89
Total Pb (ug/L)	40.1	9.9	75	96
Total Zn (ug/L)	121	31.2	74	96
Dissolved Cu (ug/L)	10.8	11.5	-6	84
Dissolved Pb (ug/L)	15.9	4.9	69	95
Dissolved Zn (ug/L)	72.9	20.5	72	96
Nitrate-Nitrogen (mg/L)	0.29	0.39	-34	79
TKN (mg/L)	1.85	2.65	-43	78
Total P (mg/L)	0.28	2.68	-857	-46
Storm Volume (cubic feet)	452	69		

I-605/SR-91 Swale — 18 April, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	45	37	18	63
Total Cu (ug/L)	30.7	20.3	34	71
Total Pb (ug/L)	40.2	15.5	61	83
Total Zn (ug/L)	322	68.9	79	90
Dissolved Cu (ug/L)	19	16	16	63
Dissolved Pb (ug/L)	12.2	4.8	61	82
Dissolved Zn (ug/L)	141	45.4	68	86
Nitrate-Nitrogen (mg/L)	0.82	0.83	-1	55
TKN (mg/L)	0.13	0.13	0	55
Total P (mg/L)	0.2	1.03	-415	-129
Storm Volume (cubic feet)	674	300		

I-605/SR-91 Swale — *1999 - 2000 Wet Season Statistics*

Parameter	Minimum Load Removal (%)	Maximum Load Removal (%)	Average Season Removal (%)
TSS	63	90	82
T-Cu	71	89	84
T-Pb	83	96	93
T-Zn	90	96	95
D-Cu	63	84	79
D-Pb	82	95	92
D-Zn	86	96	93
N-N	55	79	76
TKN	55	78	54
T-P	-129	-46	-97

Influent (cf) 6985
Effluent (cf) 1608

Cerritos MS Swale — 21 February, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	71	62	13	34
Total Cu (ug/L)	5.1	3.3	35	51
Total Pb (ug/L)	8.9	5.7	36	52
Total Zn (ug/L)	34.3	17.2	50	62
Dissolved Cu (ug/L)	4.1	4.1	0	24
Dissolved Pb (ug/L)	7.1	4.9	31	48
Dissolved Zn (ug/L)	30.1	17.6	42	56
Nitrate-Nitrogen (mg/L)	0.45	0.31	31	48
TKN (mg/L)	1.6	1.56	3	26
Total P (mg/L)	0.07	0.18	-157	-94
Storm Volume (cubic feet)	4092	3094		

Cerritos MS Swale — 27 February, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	29	62	-114	-181
Total Cu (ug/L)	24.3	20.5	16	-11
Total Pb (ug/L)	15.4	15	3	-28
Total Zn (ug/L)	96	61	36	16
Dissolved Cu (ug/L)	17.8	15.6	12	-15
Dissolved Pb (ug/L)	4.8	3.8	21	-4
Dissolved Zn (ug/L)	58	35	40	21
Nitrate-Nitrogen (mg/L)	0.73	0.77	-5	-39
TKN (mg/L)	2.64	3.13	-19	-56
Total P (mg/L)	0.12	0.27	-125	-196
Storm Volume (cubic feet)	152	200		

Cerritos MS Swale — 8 March, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff in Load
TSS (mg/L)	103	56	46	29
Total Cu (ug/L)	35.6	19.5	45	28
Total Pb (ug/L)	100	49.8	50	35
Total Zn (ug/L)	275	84.6	69	60
Dissolved Cu (ug/L)	11.1	11.7	-5	-38
Dissolved Pb (ug/L)	19	20.3	-7	-40
Dissolved Zn (ug/L)	52.3	48.6	7	-21
Nitrate-Nitrogen (mg/L)	0.39	0.47	-21	-58
TKN (mg/L)	1.79	4.76	-166	-248
Total P (mg/L)	0.11	0.15	-36	-78
Storm Volume (cubic feet)	2022	2643		

Cerritos MS Swale — 18 April, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	117	50	57	92
Total Cu (ug/L)	58.4	27.4	53	92
Total Pb (ug/L)	133	47.6	64	94
Total Zn (ug/L)	478	104	78	96
Dissolved Cu (ug/L)	22.4	17.4	22	86
Dissolved Pb (ug/L)	20	15.5	23	86
Dissolved Zn (ug/L)	105	50.3	52	91
Nitrate-Nitrogen (mg/L)	0.62	0.58	6	83
TKN (mg/L)	0.11	0.08	27	87
Total P (mg/L)	0.17	0.34	-100	64
Storm Volume (cubic feet)	3122	562		

Cerritos MS Swale — *1999 - 2000 Wet Season Statistics*

Parameter	Minimum Load Removal (%)	Maximum Load Removal (%)	Average Season Removal (%)
TSS	-181	92	51
T-Cu	-11	92	59
T-Pb	-28	94	71
T-Zn	16	96	81
D-Cu	-38	86	37
D-Pb	-40	86	35
D-Zn	-21	91	55
N-N	-58	83	29
TKN	-248	87	-69
T-P	-196	64	-45

Influent (cf) 19923
Effluent (cf) 14488

I-5/I-605 — 21 February, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	94	10	89	94
Total Cu (ug/L)	4.6	1.5	67	82
Total Pb (ug/L)	8.3	2	76	87
Total Zn (ug/L)	50.9	6.2	88	93
Dissolved Cu (ug/L)	3.1	1.3	58	77
Dissolved Pb (ug/L)	6.4	1.7	73	85
Dissolved Zn (ug/L)	26.6	6.2	77	87
Nitrate-Nitrogen (mg/L)	0.27	0.68	-152	-40
TKN (mg/L)	1.28	1.05	18	54
Total P (mg/L)	0.07	0.17	-143	-35
Storm Volume (cubic feet)	4095	2279		

I-5/I-605 — 27 February, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	21	14	33	89
Total Cu (ug/L)	18.8	10.4	45	91
Total Pb (ug/L)	21.7	9.6	56	93
Total Zn (ug/L)	90	28.1	69	95
Dissolved Cu (ug/L)	12.2	9.3	24	88
Dissolved Pb (ug/L)	5.7	5.1	11	85
Dissolved Zn (ug/L)	61	23.3	62	94
Nitrate-Nitrogen (mg/L)	0.63	0.68	-8	82
TKN (mg/L)	2.32	1.95	16	86
Total P (mg/L)	0.08	0.27	-238	45
Storm Volume (cubic feet)	257	42		

I-5/I-605 — 8 March, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	54	18	67	76
Total Cu (ug/L)	25.2	14.1	44	60
Total Pb (ug/L)	74.2	33.1	55	68
Total Zn (ug/L)	371	48.5	87	91
Dissolved Cu (ug/L)	13.4	9.5	29	49
Dissolved Pb (ug/L)	26.2	18.1	31	50
Dissolved Zn (ug/L)	69	33.2	52	65
Nitrate-Nitrogen (mg/L)	0.51	0.47	8	34
TKN (mg/L)	1.81	1.85	-2	26
Total P (mg/L)	0.09	0.2	-122	-60
Storm Volume (cubic feet)	1373	988		

I-5/I-605 — 18 April, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	27	19	30	41
Total Cu (ug/L)	26.6	19.6	26	38
Total Pb (ug/L)	48.4	31.3	35	46
Total Zn (ug/L)	243	80.9	67	72
Dissolved Cu (ug/L)	17.1	15	12	27
Dissolved Pb (ug/L)	13.9	10.3	26	38
Dissolved Zn (ug/L)	109	55.6	49	57
Nitrate-Nitrogen (mg/L)	0.48	0.47	2	18
TKN (mg/L)	0.12	0.13	-8	9
Total P (mg/L)	0.11	0.29	-164	-120
Storm Volume (cubic feet)	3118	2605		

I-5/I-605 — *1999 - 2000 Wet Season Statistics*

Parameter	Minimum Load Removal (%)	Maximum Load Removal (%)	Average Season Removal (%)
TSS	41	94	87
T-Cu	38	91	70
T-Pb	46	93	74
T-Zn	72	95	90
D-Cu	27	88	62
D-Pb	38	85	68
D-Zn	57	94	79
N-N	-40	82	49
TKN	9	86	65
T-P	-120	45	-12

Influent (cf) 22225
Effluent (cf) 9368

I-605 at Carson — 8 March, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	67	5	93	92
Total Cu (ug/L)	27.8	9.4	66	63
Total Pb (ug/L)	175	38	78	76
Total Zn (ug/L)	110	29.3	73	71
Dissolved Cu (ug/L)	9.4	8.5	10	6
Dissolved Pb (ug/L)	18.1	24	-33	-46
Dissolved Zn (ug/L)	24.4	23.7	3	-7
Nitrate-Nitrogen (mg/L)	0.45	0.69	-53	-69
TKN (mg/L)	3.23	2.6	20	11
Total P (mg/L)	0.13	0.35	-169	-197
Storm Volume (cubic feet)	413	456		

I-605 at Carson — 18 April, 2000

	EMCs Influent	EMCs Effluent	Efficiency (%)	% Diff. in Load
TSS (mg/L)	67	31	54	62
Total Cu (ug/L)	31.2	23	26	39
Total Pb (ug/L)	173	74.6	57	64
Total Zn (ug/L)	152	75.1	51	59
Dissolved Cu (ug/L)	18.9	17.2	9	25
Dissolved Pb (ug/L)	46.1	16.8	64	70
Dissolved Zn (ug/L)	69.5	42.7	39	49
Nitrate-Nitrogen (mg/L)	0.67	0.91	-36	-12
TKN (mg/L)	2.41	2.76	-15	6
Total P (mg/L)	0.13	0.33	-253	-191
Storm Volume (cubic feet)	967	797		

I-605 at Carson — *1999 - 2000 Wet Season Statistics*

Parameter	Minimum Load Removal (%)	Maximum Load Removal (%)	Average Season Removal (%)
TSS	62	92	89
T-Cu	39	63	85
T-Pb	64	76	92
T-Zn	59	71	89
D-Cu	0	25	77
D-Pb	-46	70	86
D-Zn	-7	49	84
N-N	-69	-12	65
TKN	6	11	77
T-P	-197	-191	21

Influent (cf) 22025
Effluent (cf) 5459

Note 1: Cerritos MS influent and I-5/I-605 effluent monitored throughout wet season.
Note 2: I-605/SR-91 influent and effluent, Cerritos MS effluent, I-5/I-605 influent, and I-605 at Carson influent and effluent non-monitored wet season flow volumes estimated using Scoping Study procedure.
Note 3: Where EMC was non-detect then Reporting Limit was used.
Note 4: U Indicates the compound or element was an analyte, but was not detected at or above the Reporting Limit.

Table 1-6c: BMP Pollutant Removal Efficiencies (Drain Inlet Inserts)

Foothill MS StreamGuard DII
1999 - 2000 Wet Season Statistics

Parameter	% Diff. In Load Storm-by-Storm Method	% Diff. in Load Aggregate Method
Sediment	62	63
T-Cu	23	22
T-Pb	55	55
T-Zn	22	23
Hydrocarbons	21	21

Effluent (cf) 8462

Las Flores MS StreamGuard DII
1999 - 2000 Wet Season Statistics

Parameter	% Diff. In Load Storm-by-Storm Method	% Diff. in Load Aggregate Method
Sediment	52	57
T-Cu	17	16
T-Pb	31	32
T-Zn	21	21
Hydrocarbons	66	66

Effluent (cf) 2831

Rosemead MS StreamGuard DII
1999 - 2000 Wet Season Statistics

Parameter	% Diff. In Load Storm-by-Storm Method	% Diff. in Load Aggregate Method
Sediment	4	4
T-Cu	1	7
T-Pb	5	3
T-Zn	2	3
Hydrocarbons	3	1

Effluent (cf) 39422

Foothill MS Fossil Filter DII
1999 - 2000 Wet Season Statistics

Parameter	% Diff. In Load Storm-by-Storm Method	% Diff. in Load Aggregate Method
Sediment	25	27
T-Cu	9	11
T-Pb	19	24
T-Zn	8	10
Hydrocarbons	10	10

Effluent (cf) 27257

Las Flores MS Fossil Filter DII
1999 - 2000 Wet Season Statistics

Parameter	% Diff. In Load Storm-by-Storm Method	% Diff. in Load Aggregate Method
Sediment	38	41
T-Cu	6	8
T-Pb	10	11
T-Zn	4	6
Hydrocarbons	6	7

Effluent (cf) 20609

Rosemead MS Fossil Filter DII
1999 - 2000 Wet Season Statistics

Parameter	% Diff. In Load Storm-by-Storm Method	% Diff. in Load Aggregate Method
Sediment	76	76
T-Cu	29	40
T-Pb	56	66
T-Zn	33	46
Hydrocarbons	26	26

Effluent (cf) 9805

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.
Note 2: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debis removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.
Note 3 :Flow measured continuously while DII was installed.
Note 4: Where EMC was non-detect then Reporting Limit was used.

Table 1-7: Normality Test Summary

Data		Shapiro-Wilk			
		W Statistic	P value	Evidence of Normality	Transform Data (Y/N)
StreamGuard™ DII - TSS	Foothill MS	0.919881	0.4685	No evidence of non-normality	N
	Las Flores MS	0.870645	0.2690	No evidence of non-normality	N
	Rosemead MS	0.885162	0.3334	No evidence of non-normality	N
StreamGuard™ DII - Total Cu	Foothill MS	0.860444	0.1528	No evidence of non-normality	N
	Las Flores MS	0.858136	0.2216	No evidence of non-normality	N
	Rosemead MS	0.840028	0.1650	No evidence of non-normality	N
StreamGuard™ DII - Total Pb	Foothill MS	0.778776	0.0251	Unlikely	Y
	Las Flores MS	0.749605	0.0295	Unlikely	Y
	Rosemead MS	0.757448	0.0348	Unlikely	Y
StreamGuard™ DII - Total Zn	Foothill MS	0.832884	0.0852	Test not quite signifiant but do not assume normality	Y
	Las Flores MS	0.599346	0.0006	Unlikely	Y
	Rosemead MS	0.74373	0.0260	Unlikely	Y
StreamGuard™ DII - TPH	Foothill MS	1	>0.9999	All data are ND	N
	Las Flores MS	1	>0.9999	All data are ND	N
	Rosemead MS	1	>0.9999	All data are ND	N
Fossil Filter™ DII - TSS	Foothill MS	0.911642	0.4074	No evidence of non-normality	Y; other Fossil Filter™ DII data tend to be non-normal
	Las Flores MS	0.738489	0.0232	Unlikely	Y
	Rosemead MS	0.864069	0.2432	No evidence of non-normality	Y; other Fossil Filter™ DII data tend to be non-normal
Fossil Filter™ DII - Total Cu	Foothill MS	0.817005	0.0601	Test not quite signifiant but do not assume normality	Y
	Las Flores MS	0.861016	0.2319	No evidence of non-normality	Y; other Fossil Filter™ DII data tend to be non-normal
	Rosemead MS	0.744039	0.0262	Unlikely	Y
Fossil Filter™ DII - Total Pb	Foothill MS	0.863626	0.1631	No evidence of non-normality	Y; other Fossil Filter™ DII data tend to be non-normal
	Las Flores MS	0.685327	0.0067	Unlikely	Y
	Rosemead MS	0.781192	0.0564	Test not quite signifiant but do not assume normality	Y
Fossil Filter™ DII Total Zn	Foothill MS	0.825137	0.0719	Test not quite signifiant but do not assume normality	Y
	Las Flores MS	0.776256	0.0513	Test not quite signifiant but do not assume normality	Y
	Rosemead MS	0.788299	0.0648	Test not quite signifiant but do not assume normality	Y
Fossil Filter™ DII - TPH	Foothill MS	0.452971	<0.0001	Unlikely	Y
	Las Flores MS	0.552182	0.0001	Unlikely	Y
	Rosemead MS	1	>0.9999	All data are ND	Y

Table 1-8: Acceptance Criterion Results

DII Location and Type	Period of Use	Median % Storm Capture	No. of Required Storms	No. of Storms Monitored	Efficiency (%)					Accept/Reject 1998-1999 Data
					Solids	Copper	Lead	Zinc	Hydrocarbons	
Foothill MS StreamGuard DII	December 1998 - January 29, 1999	56			15	2	7	0	7	Reject: At least two 1998-1999 pollutant efficiencies were less than 20% of 1999-2000 efficiencies
	March 24, 1999 - April 8, 1999	58			5	1	4	1	8	
	April 8, 1999 - April 12, 1999	61			35	2	5	2	7	
	1998-1999 Summary	**60**			**18**	**2**	**5**	**3**	**7**	
	1999-2000 Summary [1]	**99**	**4**	**7**	**63**	**22**	**55**	**23**	**21**	
	80% of 1999-2000 Efficiency				**50.4**	**17.6**	**44**	**18.4**	**16.8**	
	1999-2000 Summary Without Litter Removal[1]				**3**	**9**	**32**	**11**	**13**	
	1998-1999 Mean % Efficiency More Than 20% Lower Than 1999-2000 Mean % Efficiency				**YES**	**YES**	**YES**	**YES**	**YES**	
Las Flores MS StreamGuard DII	December 1998 - March 24, 1999	75			27	4	6	5	7	Reject: At least two 1998-1999 pollutant efficiencies were less than 20% of 1999-2000 efficiencies
	March 24, 1999 - June 11, 1999	74			35	4	11	11	34	
	1998-1999 Summary	**74**			**31**	**4**	**9**	**8**	**21**	
	1999-2000 Summary [1]	**100**	**3**	**5**	**57**	**16**	**32**	**21**	**66**	
	80% of 1999-2000 Efficiency				**45.6**	**12.8**	**25.6**	**16.8**	**52.8**	
	1999-2000 Summary Without Litter Removal[1]				**2**	**3**	**15**	**6**	**31**	
	1998-1999 Mean % Efficiency More Than 20% Lower Than 1999-2000 Mean % Efficiency				**YES**	**YES**	**YES**	**YES**	**YES**	
Rosemead MS StreamGuard DII	March 24, 1999 - June 8, 1999	99			4	2	2	1	5	Reject: At least two 1998-1999 pollutant efficiencies were less than 20% of 1999-2000 efficiencies
	1998-1999 Summary	**99**			**4**	**2**	**2**	**1**	**5**	
	1999-2000 Summary [1]	**92**	**5**	**5**	**4**	**1**	**7**	**3**	**3**	
	80% of 1999-2000 Efficiency				**3.2**	**0.8**	**5.6**	**2.4**	**2.4**	
	1999-2000 Summary Without Litter Removal[1]				**0**	**1**	**3**	**2**	**2**	
	1998-1999 Mean % Efficiency More Than 20% Lower Than 1999-2000 Mean % Efficiency				**NO**	**NO**	**YES**	**YES**	**NO**	
Foothill MS Fossil Filter DII	December 1998 - January 29, 1999	93			30	2	4	3	10	Reject: At least two 1998-1999 pollutant efficiencies were less than 20% of 1999-2000 efficiencies
	March 24, 1999 - April 8, 1999	88			19	1	2	1	37	
	April 8, 1999 - April 12, 1999	99			35	2	3	2	11	
	1998-1999 Summary	**95**			**28**	**2**	**3**	**2**	**19**	
	1999-2000 Summary [1]	**100**	**5**	**7**	**27**	**11**	**24**	**10**	**10**	
	80% of 1999-2000 Efficiency				**21.6**	**8.8**	**19.2**	**8**	**8**	
	1999-2000 Summary Without Litter Removal[1]				**19**	**7**	**19**	**7**	**7**	
	1998-1999 Mean % Efficiency More Than 20% Lower Than 1999-2000 Mean % Efficiency				**NO**	**YES**	**YES**	**YES**	**NO**	
Las Flores MS Fossil Filter DII	March 24, 1999 - June 11, 1999	90			64	26	32	23	59	Reject: Minimum number of storms not achieved
	1998-1999 Summary	**90**			**64**	**26**	**32**	**23**	**59**	
	1999-2000 Summary [1]	**96**	**6**	**5**	**41**	**8**	**11**	**6**	**7**	
	80% of 1999-2000 Efficiency				**32.8**	**6.4**	**8.8**	**4.8**	**5.6**	
	1999-2000 Summary Without Litter Removal[1]				**25**	**4**	**9**	**4**	**7**	
	1998-1999 Mean % Efficiency More Than 20% Lower Than 1999-2000 Mean % Efficiency				**NO**	**NO**	**NO**	**NO**	**NO**	
Rosemead MS Fossil Filter DII	December 1998 - January 29, 1999	62			31	15	17	12	7	Reject: At least two 1998-1999 pollutant efficiencies were less than 20% of 1999-2000 efficiencies
	March 24, 1999 - June 8, 1999	80			56	17	22	17	49	
	1998-1999 Summary	**80**			**44**	**16**	**20**	**15**	**28**	
	1999-2000 Summary [1]	**95**	**5**	**5**	**76**	**40**	**66**	**46**	**26**	
	80% of 1999-2000 Efficiency				**60.8**	**32**	**52.8**	**36.8**	**20.8**	
	1999-2000 Summary Without Litter Removal[1]				**39**	**19**	**46**	**17**	**5**	
	1998-1999 Mean % Efficiency More Than 20% Lower Than 1999-2000 Mean % Efficiency				**YES**	**YES**	**YES**	**YES**	**NO**	

[1] Based on Aggregate Method

Median % Storm Capture for All 1998-1999 Cases (Goal >= 80%)	**83**	**Mean % Storm Capture for All 1998-1999 Cases (Goal >= 75%)**	**77**
Median % Storm Capture for All 1999-2000 Cases (Goal >= 80%)	**98**	**Mean % Storm Capture for All 1999-2000 Cases (Goal >= 75%)**	**95**

Figure 1-1: Map of Study Area, Caltrans District 7 Los Angeles

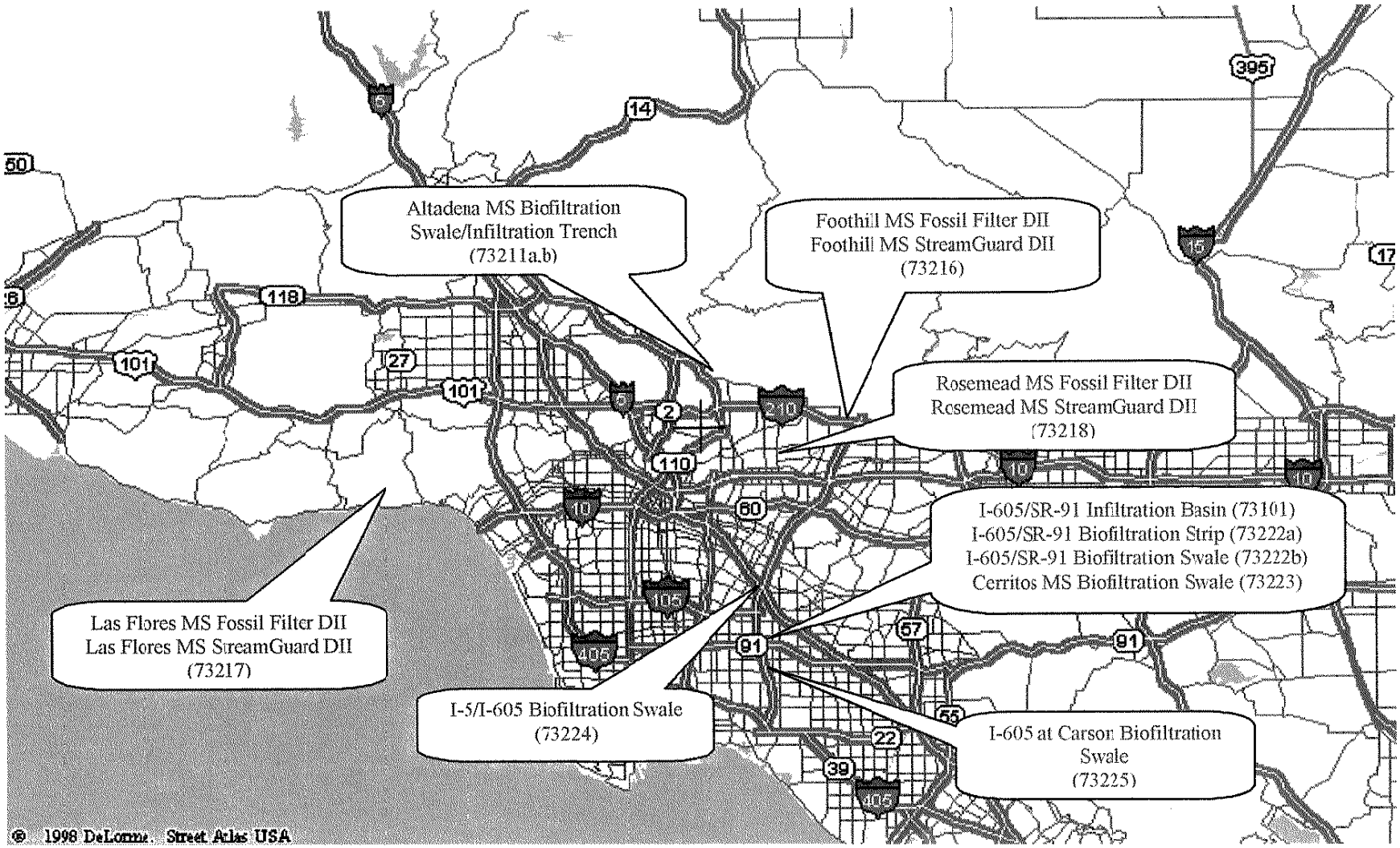
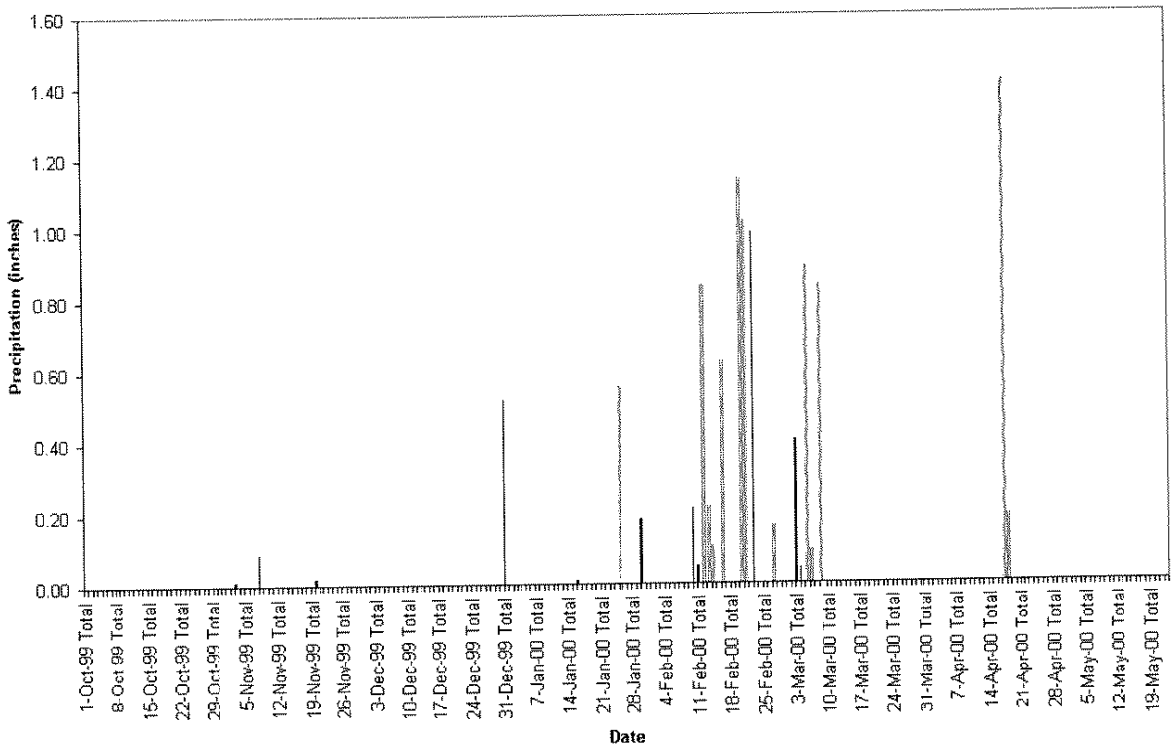


Figure 1-2a: Daily Precipitation Totals for Altadena Maintenance Station[1]

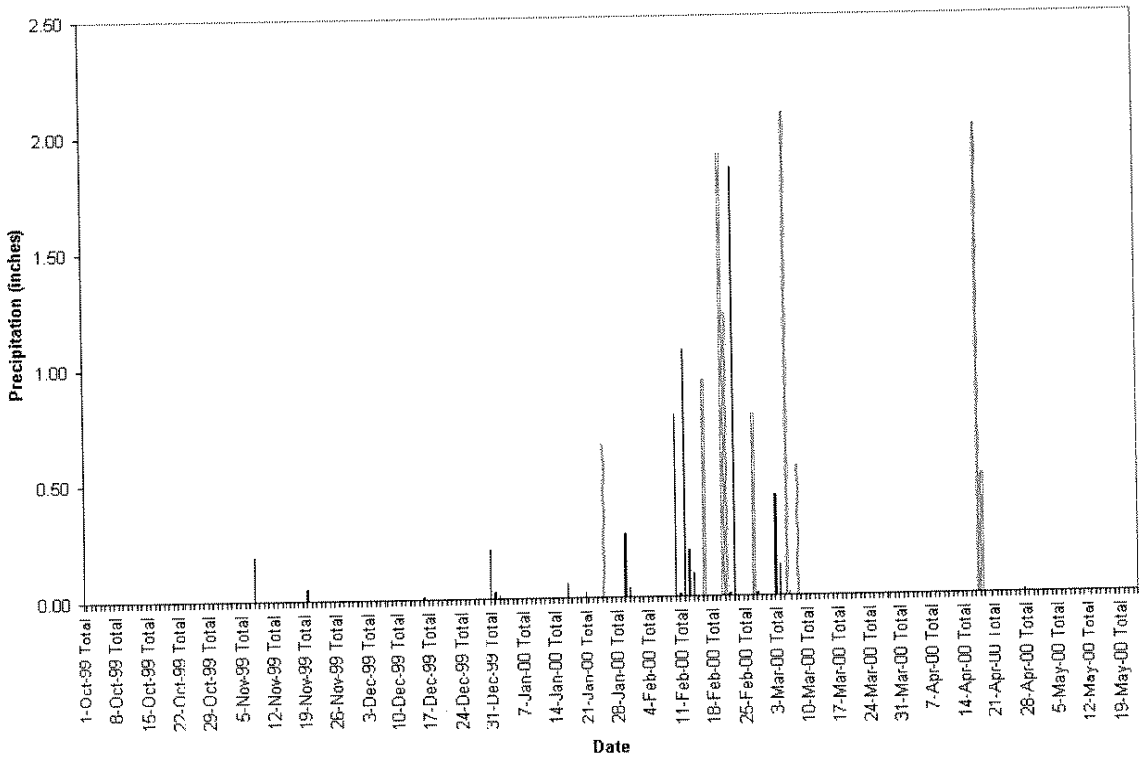


(1) Totals obtained from onsite rain gauge

Thick gray lines indicate events for which monitoring was conducted.

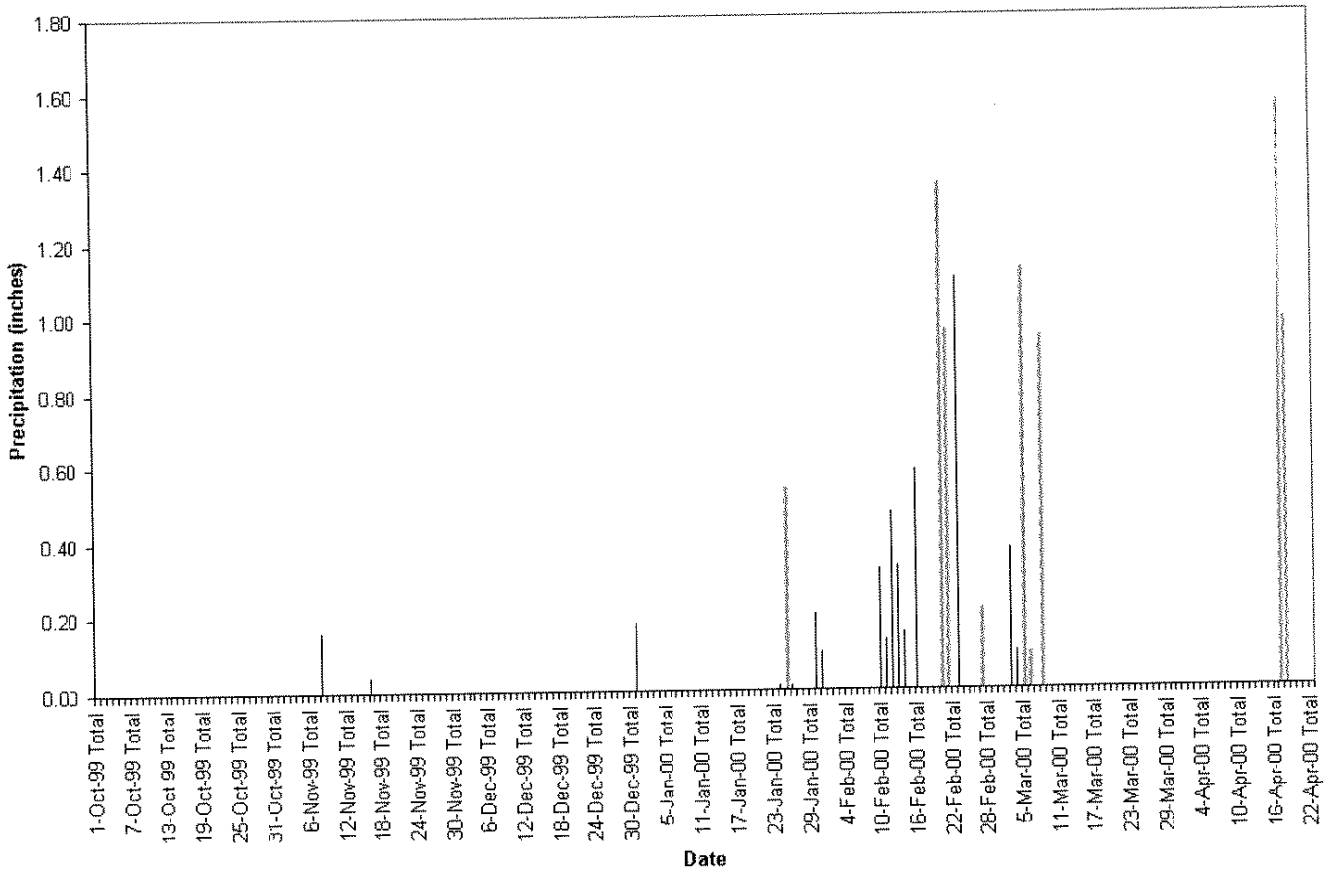
Thin black lines indicate events for which neither samples nor empirical observations were taken.

Figure 1-2b: Daily Precipitation Totals for I-605/SR-91, I-605 at Carson, and Cerritos Maintenance Station[1]



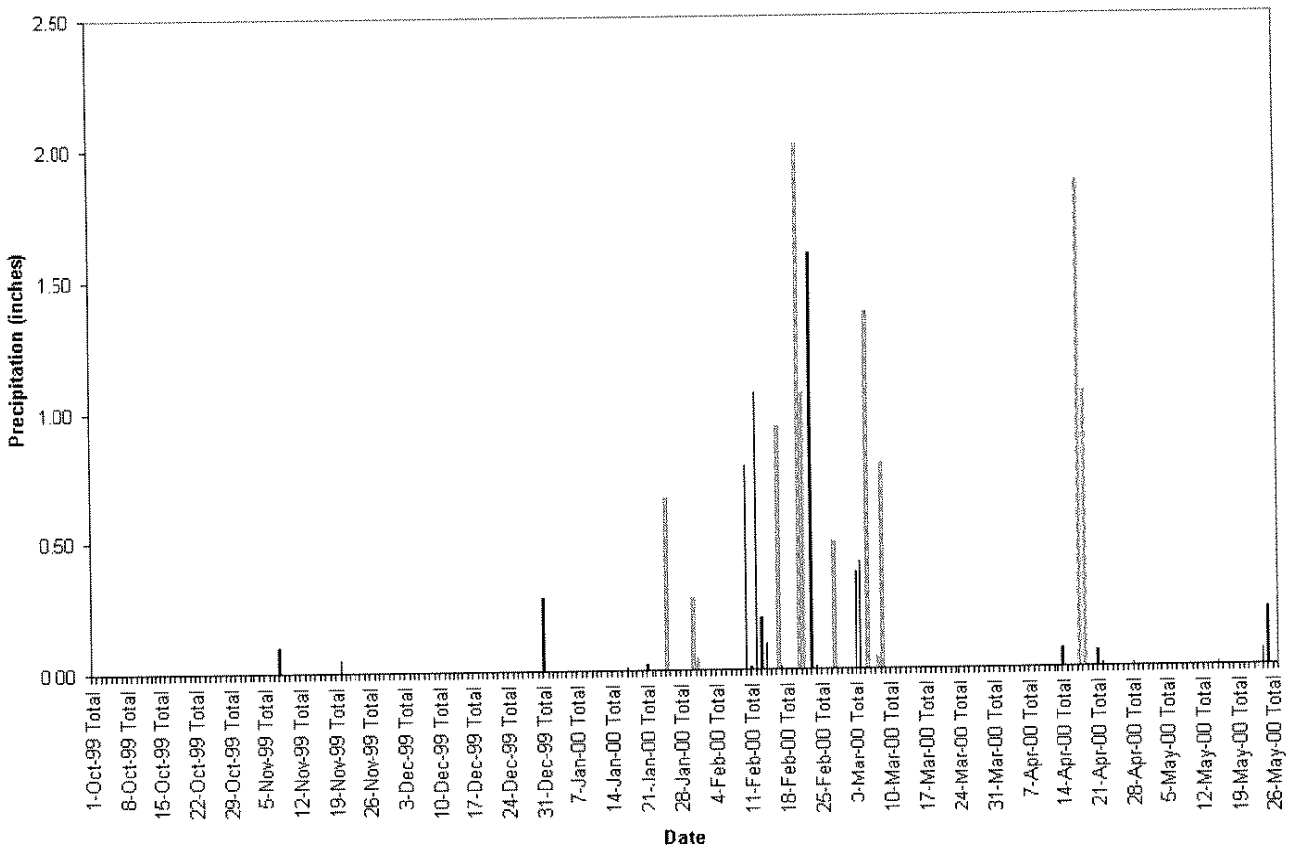
(1) Totals obtained from onsite rain gauge
Thick gray lines indicate events for which monitoring was conducted.
Thin black lines indicate events for which neither samples nor empirical observations were taken.

Figure 1-2c: Daily Precipitation Totals for I-5/I-605(1)



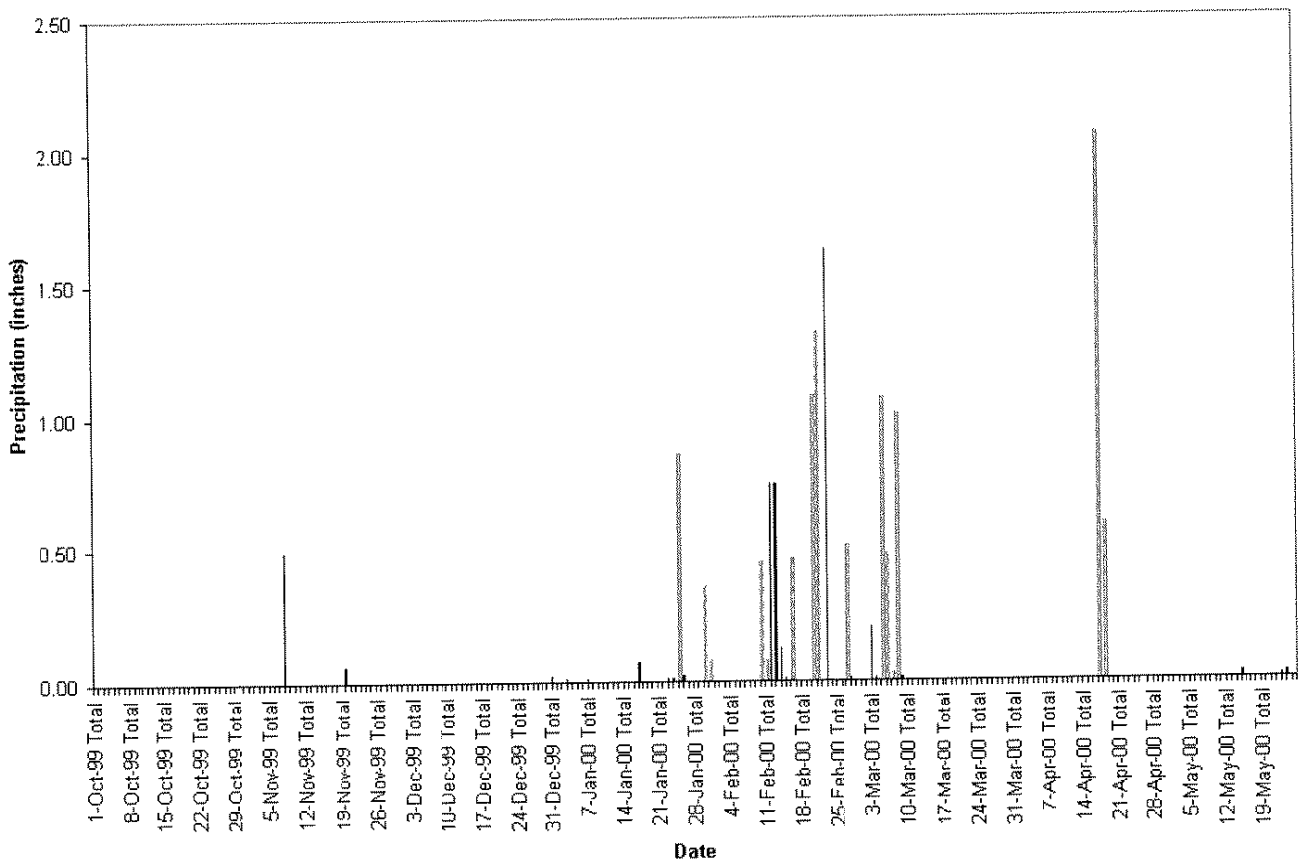
(1) Totals obtained from onsite rain gauge
Thick gray lines indicate events for which monitoring was conducted.
Thin black lines indicate events for which neither samples nor empirical observations were taken.

Figure 1-2d: Daily Precipitation Totals for Foothill Maintenance Station[1]



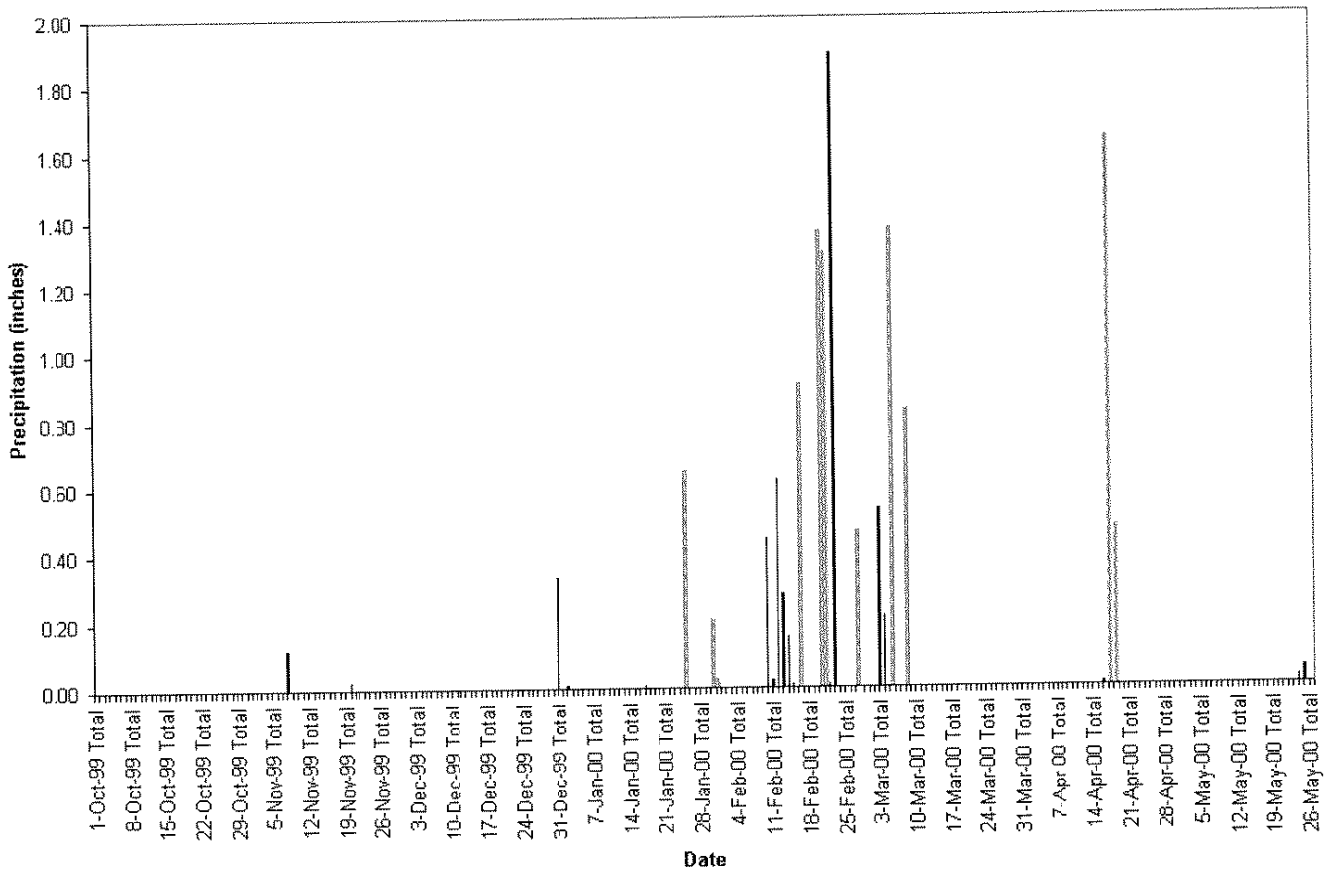
(1) Totals obtained from onsite rain gauge
Thick gray lines indicate events for which monitoring was conducted.
Thin black lines indicate events for which neither samples nor empirical observations were taken.

Figure 1-2e: Daily Precipitation Totals for Las Flores Maintenance Station[1]



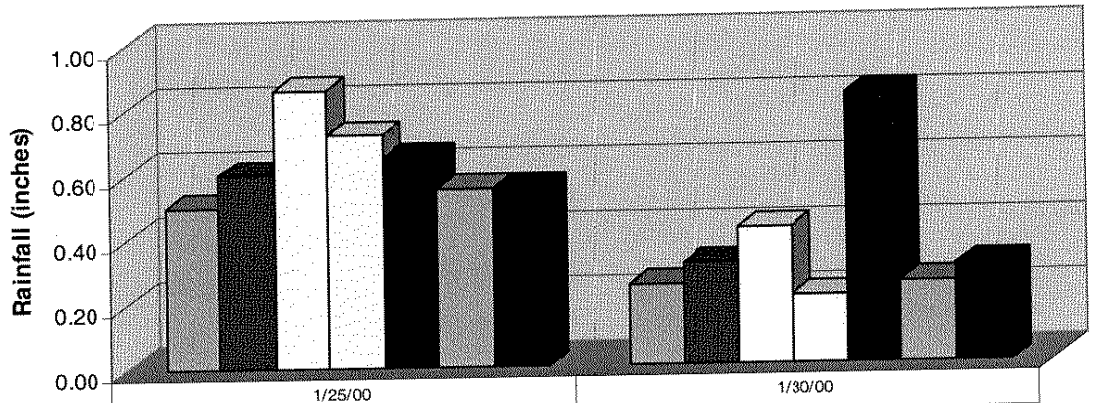
(1) Totals obtained from onsite rain gauge
Thick gray lines indicate events for which monitoring was conducted.
Thin black lines indicate events for which neither samples nor empirical observations were taken.

Figure 1-2f: Daily Precipitation Totals for Rosemead Maintenance Station(1)



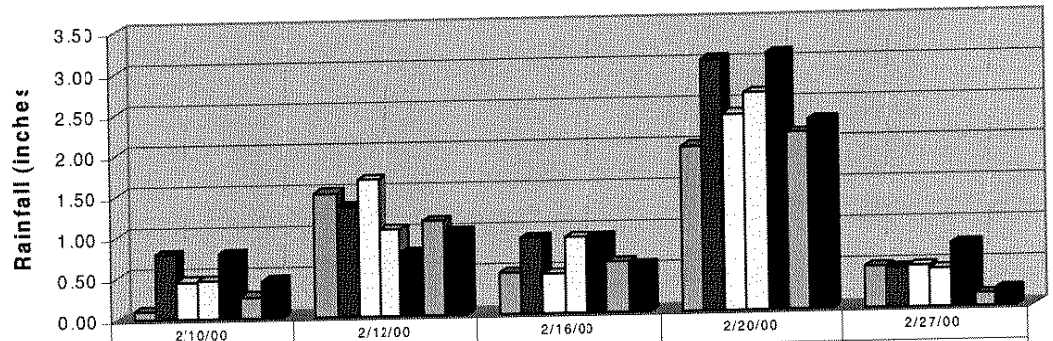
(1) Totals obtained from onsite rain gauge
Thick gray lines indicate events for which monitoring was conducted.
Thin black lines indicate events for which neither samples nor empirical observations were taken.

Figure 1-3a: Monitored Event Rainfall Totals - January 2000



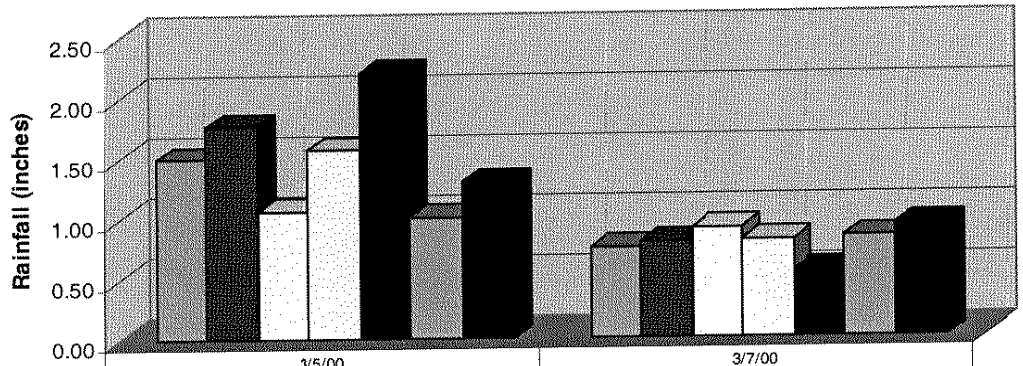
	1/25/00	1/30/00
Predicted Rainfall	0.50	0.25
Foothill Maintenance Station (DIIs)	0.60	0.31
Las Flores Maintenance Station (CIIs)	0.86	0.42
Rosemead Maintenance Station (DIIs)	0.72	0.21
Altadena Maintenance Station (Strp/IT)	0.65	0.83
Cerritos Maintenance Station (Swale), I-605/SR-91 (Swale, Strip, and IB), I-605 @ Carson (Swale)	0.55	0.25
I-5/I-605 (Swale)	0.55	0.30

Figure 1-3b: Monitored Event Rainfall Totals - February 2000



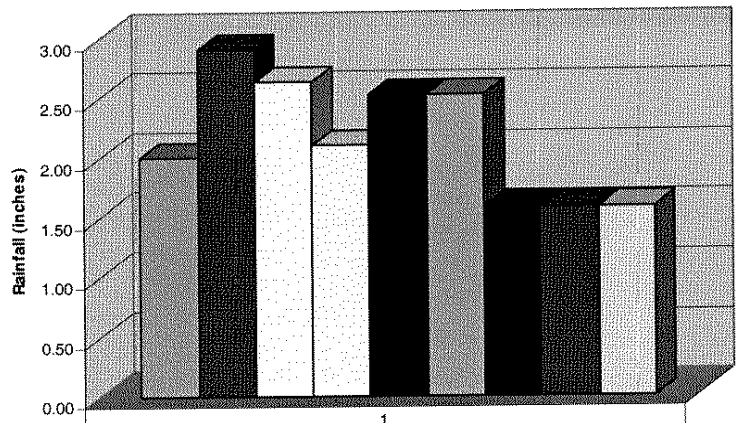
	2/10/00	2/12/00	2/16/00	2/20/00	2/27/00
Predicted Rainfall	0.10	1.50	0.50	2.00	0.50
Foothill Maintenance Station (DIIs)	0.79	1.34	0.92	3.05	0.48
Las Flores Maintenance Station (DIIs)	0.45	1.67	0.48	2.38	0.50
Rosemead Maintenance Station (DIIs)	0.46	1.05	0.92	2.64	0.46
Altadena Maintenance Station (Strip/IT)	0.79	0.76	0.92	3.11	0.77
Cerritos Maintenance Station (Swale), I-605/SR-91 (Swale, Strip, and IB), I-605 @ Carson (Swale)	0.26	1.14	0.62	2.14	0.16
I-5/I-605 (Swale)	0.45	1.01	0.58	2.29	0.21

Figure 1-3c: Monitored Event Rainfall Totals - March 2000



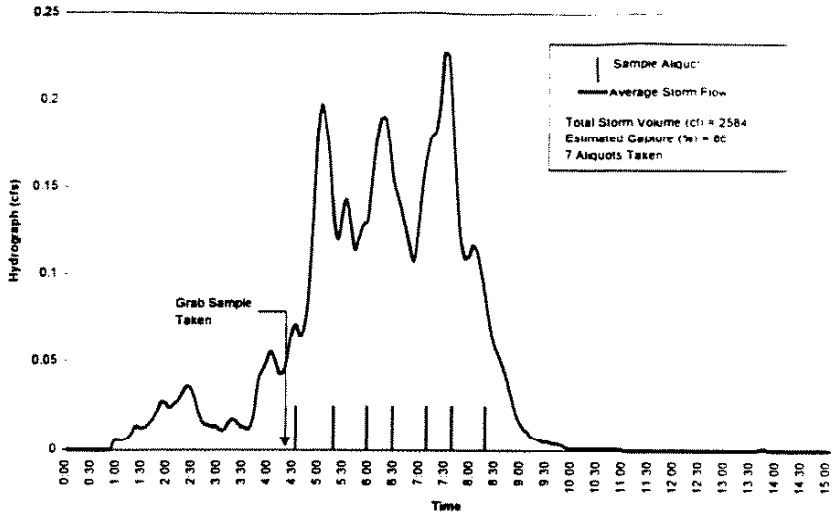
	3/5/00	3/7/00
Predicted Rainfall	1.50	0.75
Foothill Maintenance Station (DIIs)	1.77	0.79
Las Flores Maintenance Station (DIIs)	1.06	0.91
Rosemead Maintenance Station (DIIs)	1.57	0.81
Altadena Maintenance Station (Strip/IT)	2.21	0.55
Cerritos Maintenance Station (Swale), I-605/SR-91 (Swale, Strip, and IB), I-605 @ Carson (Swale)	1.01	0.83
I-5/I-605 (Swale)	1.30	0.93

Figure 1-3d: Monitored Event Rainfall Totals - April 2000

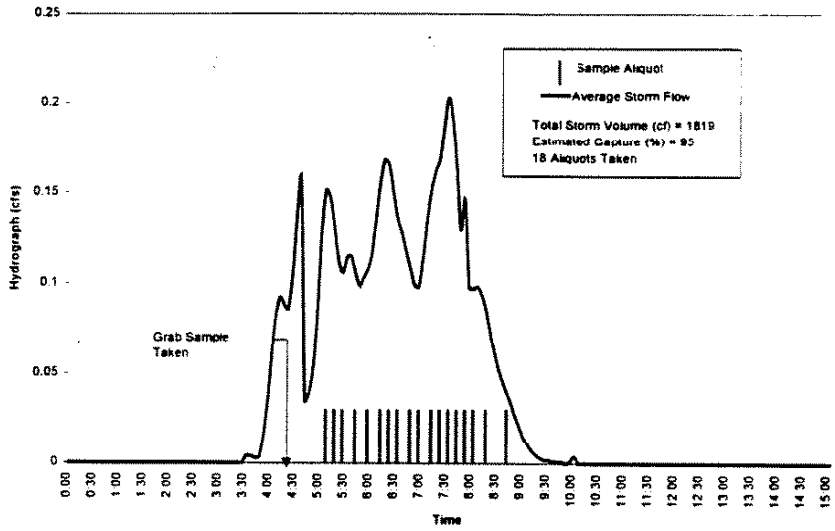


	1
Predicted Rainfall	2.00
Foothill Maintenance Station (Dils)	2.9
Las Flores Maintenance Station (Dils)	2.63
Rosemead Maintenance Station (Dils)	2.1
Altadena Maintenance Station (Strip/IT)	2.52
I-5/I-605 (Swale)	2.52
Carritos Maintenance Station (Swale), I-605/SR-91 (Swale, Strip, and IB), I-605 @ Carson (Swale)	1.58
I-605/SR-91 (Swale, Strip, and IB)	1.58
I-605 @ Carson (Swale)	1.58

Influent



Effluent



Cumulative Rainfall

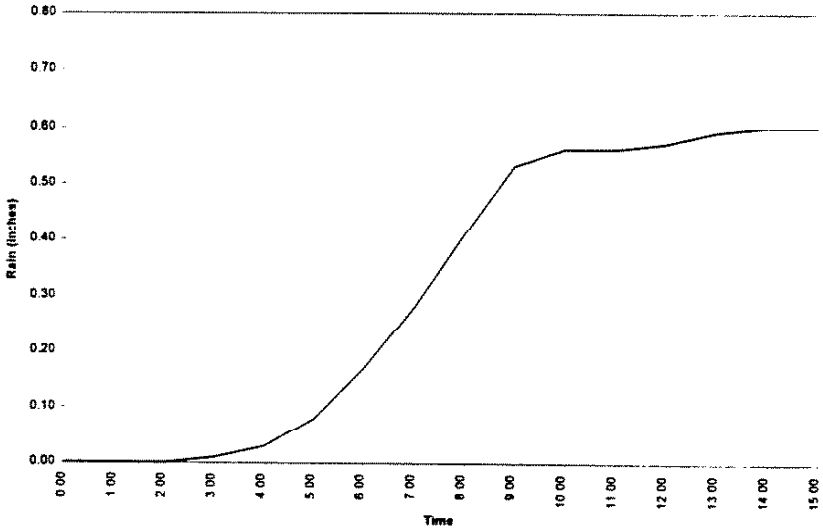
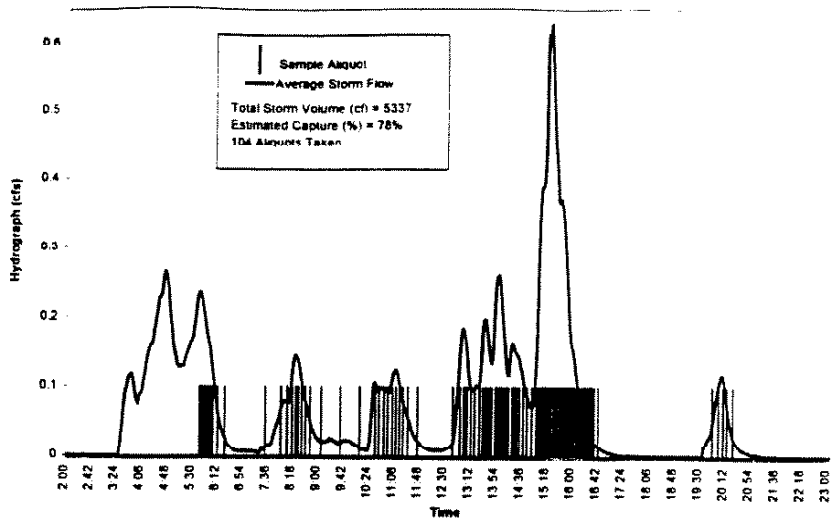
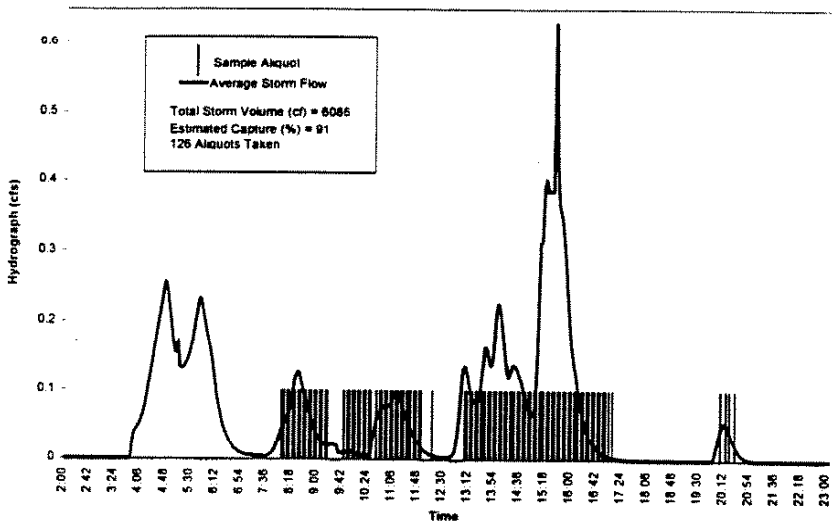


Figure 1-4a: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Altadena MS Biofiltration Strip for Event 1 on January 25, 2000

Influent



Effluent



Cumulative Rainfall

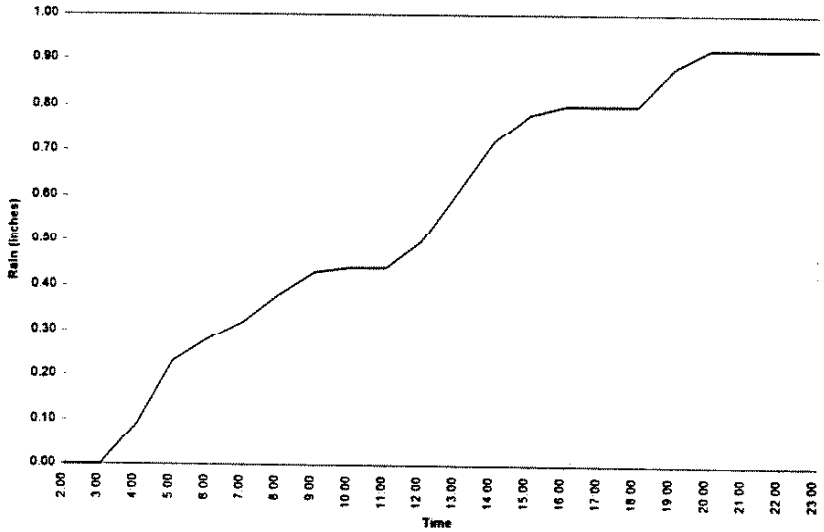
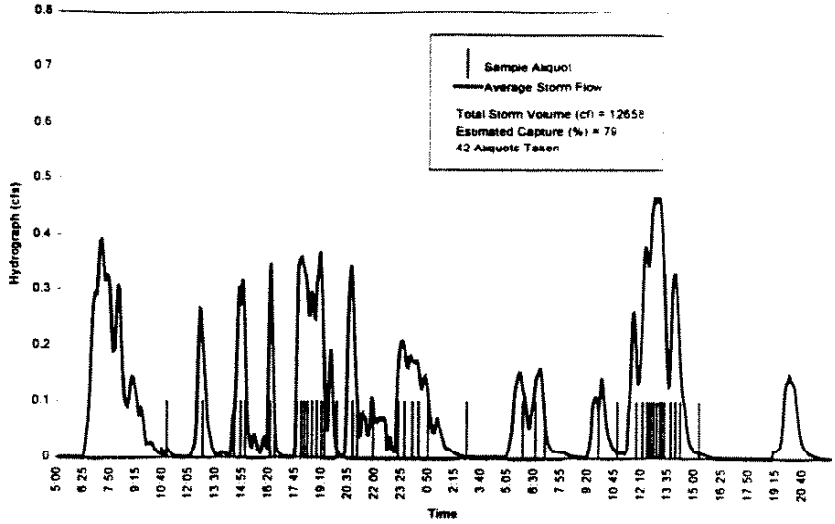
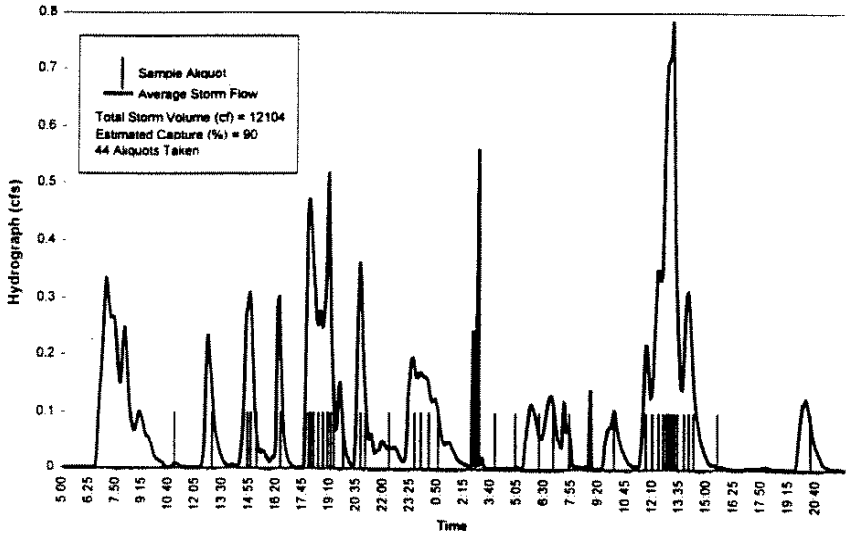


Figure 1-4b: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Altadena MS Biofiltration Strip for Event 4 on February 16, 2000

Influent



Effluent



Cumulative Rainfall

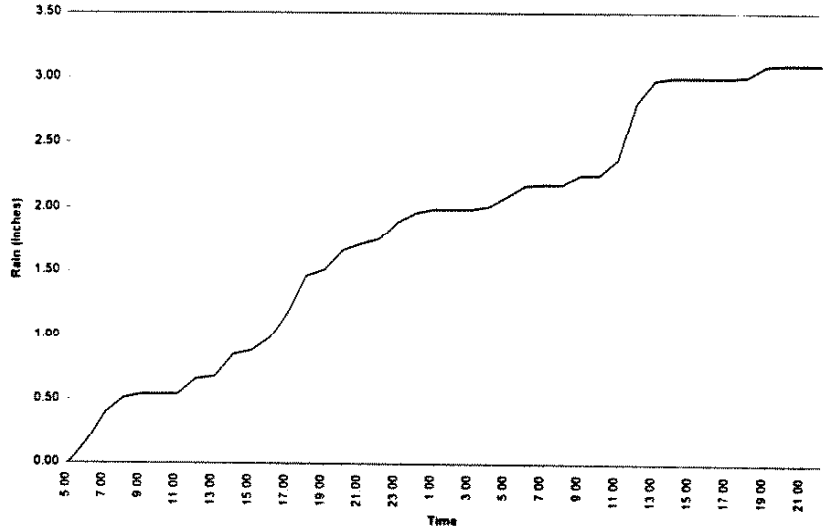
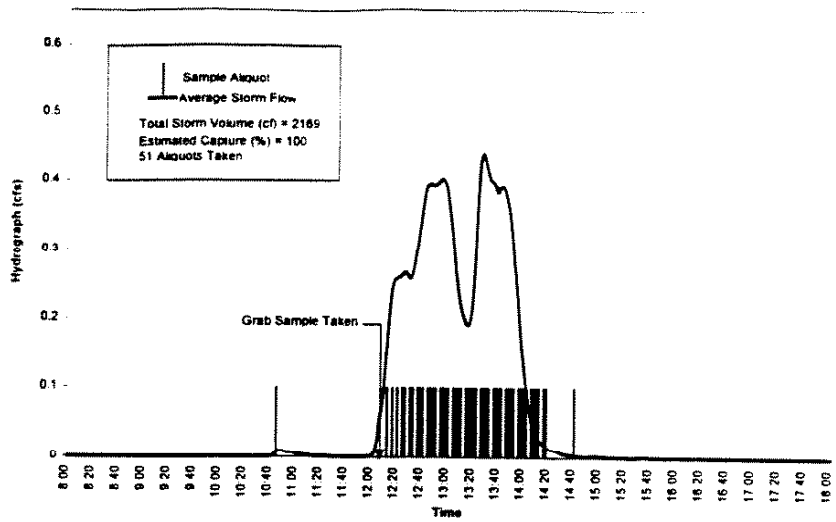
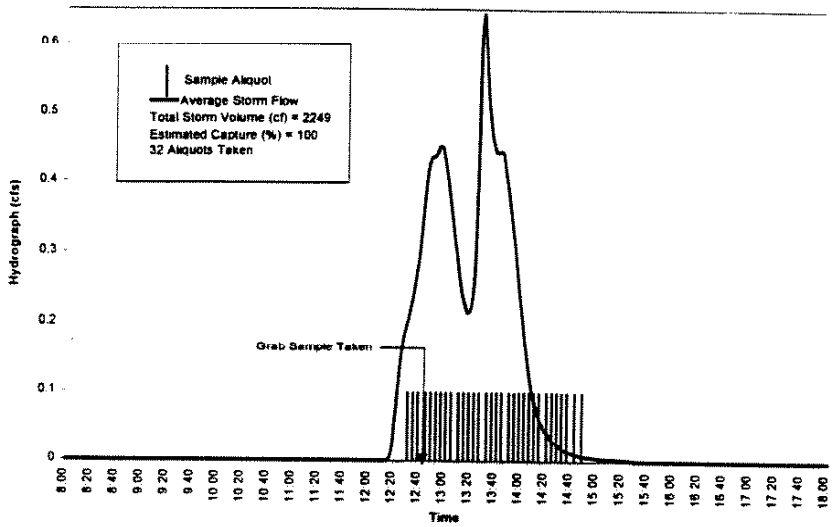


Figure 1-4c: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Altadena MS Biofiltration Strip for Event 5 on February 20-21, 2000.

Influent



Effluent



Cumulative Rainfall

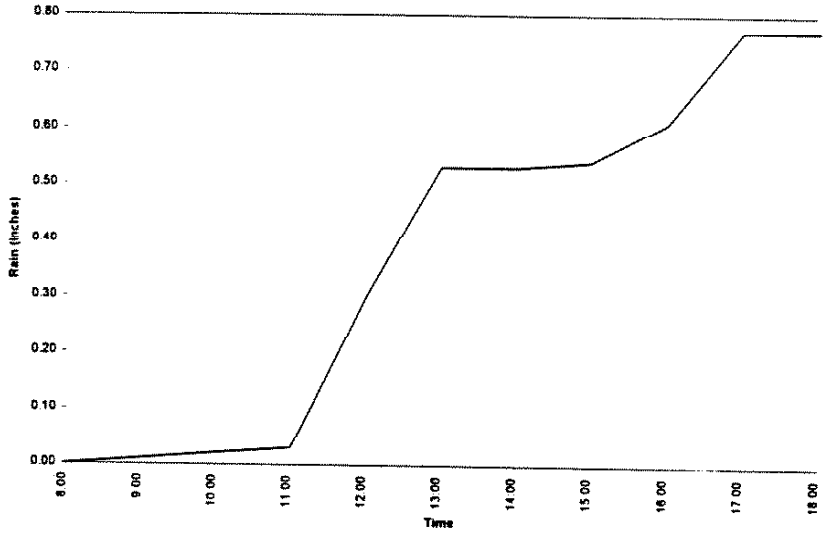
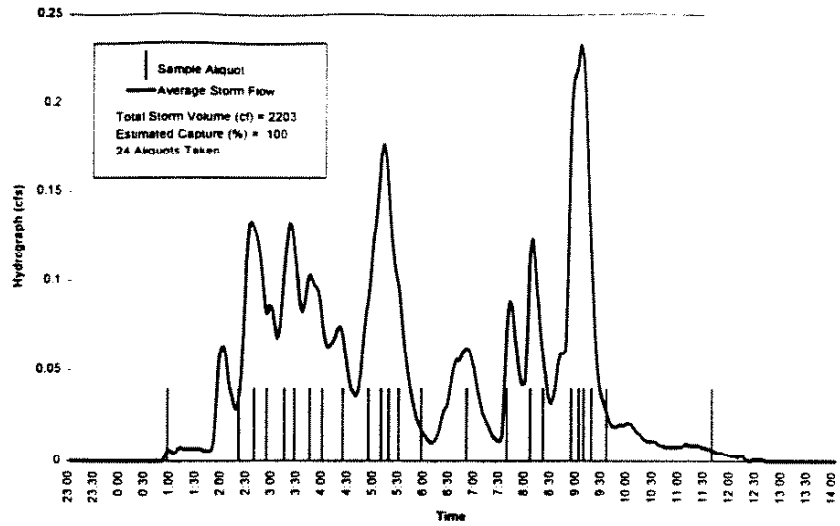
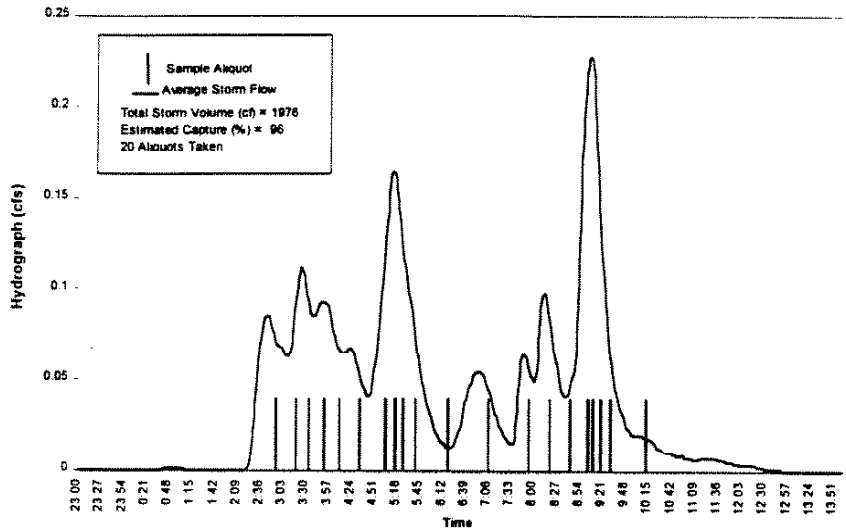


Figure 1-4d: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Altadena MS Biofiltration Strip for Event 6 on February 27, 2000

Influent



Effluent



Cumulative Rainfall

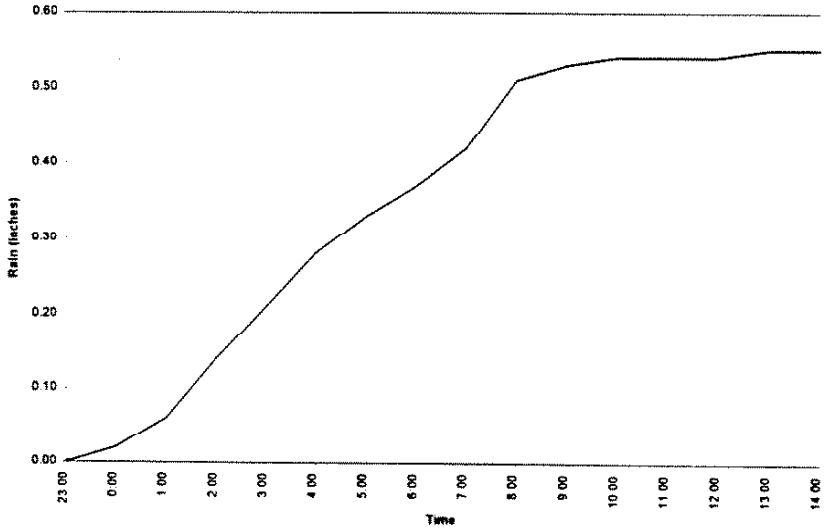
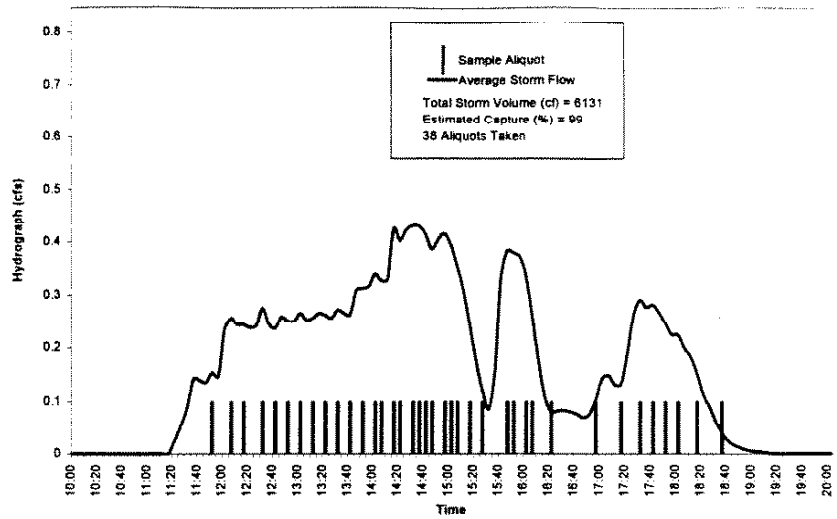
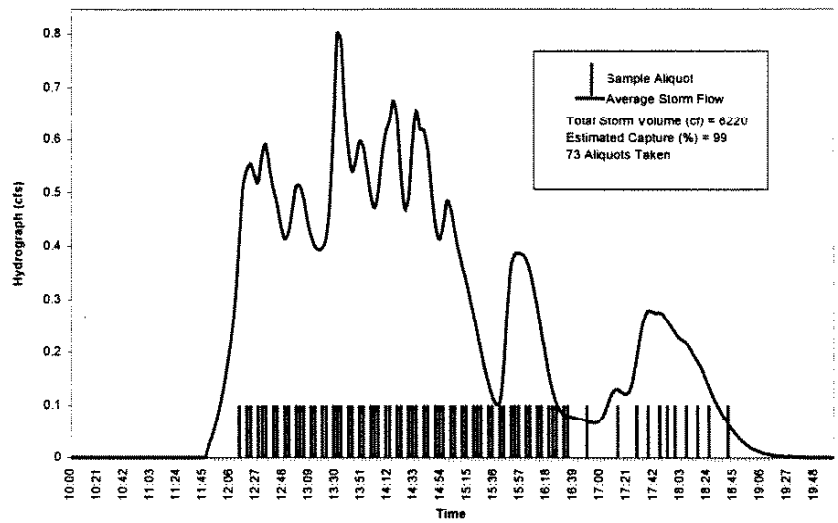


Figure 1-4e: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Altadena MS Biofiltration Strip for Event 7 on March 8, 2000

Influent



Effluent



Cumulative Rainfall

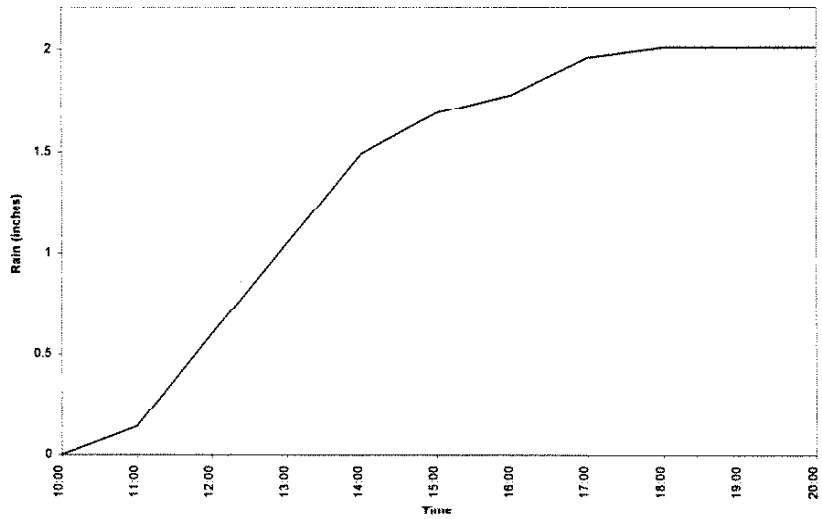
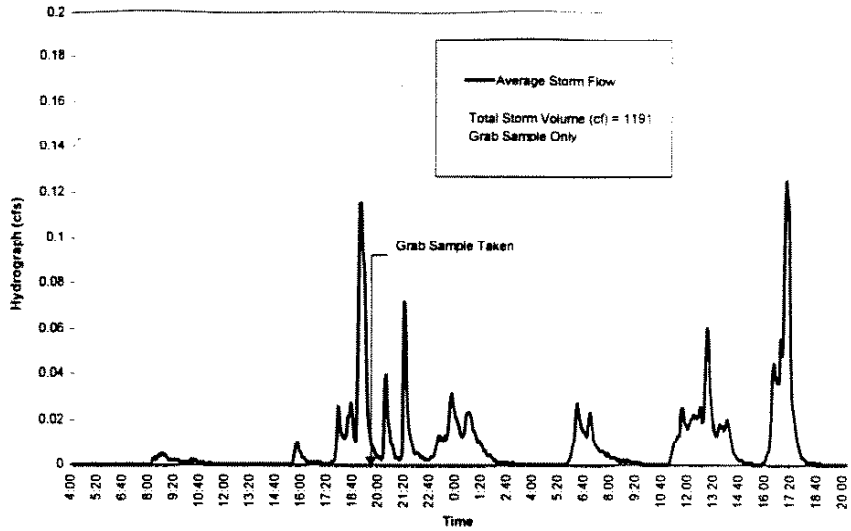
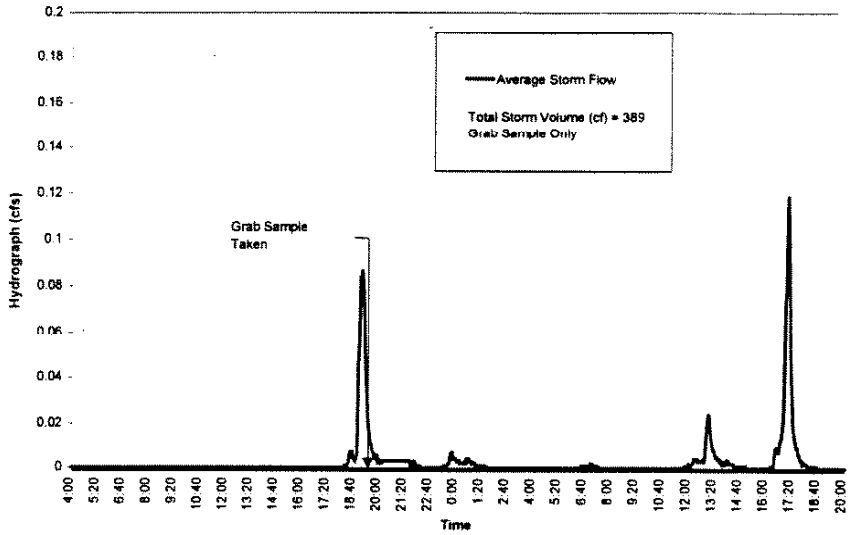


Figure 1-4f: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Altadena MS Biofiltration Strip for Event 8 on April 17-18, 2000

Control



Effluent



Cumulative Rainfall

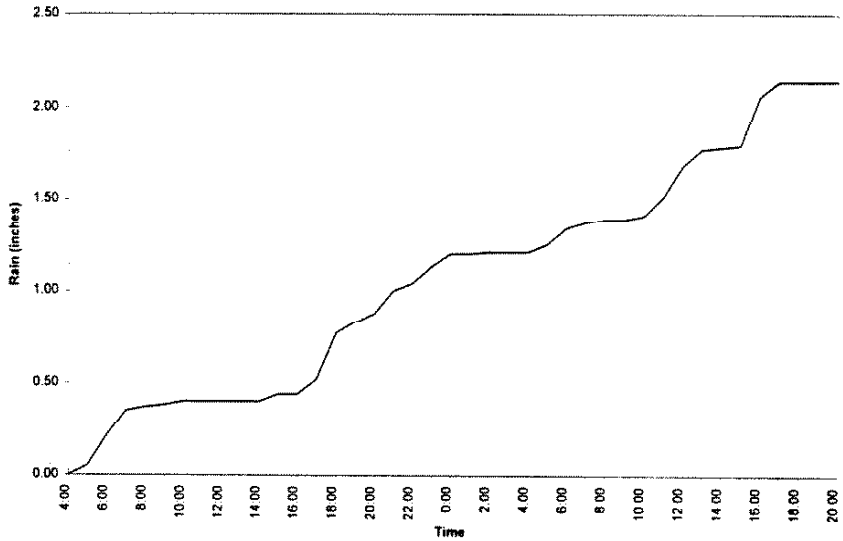
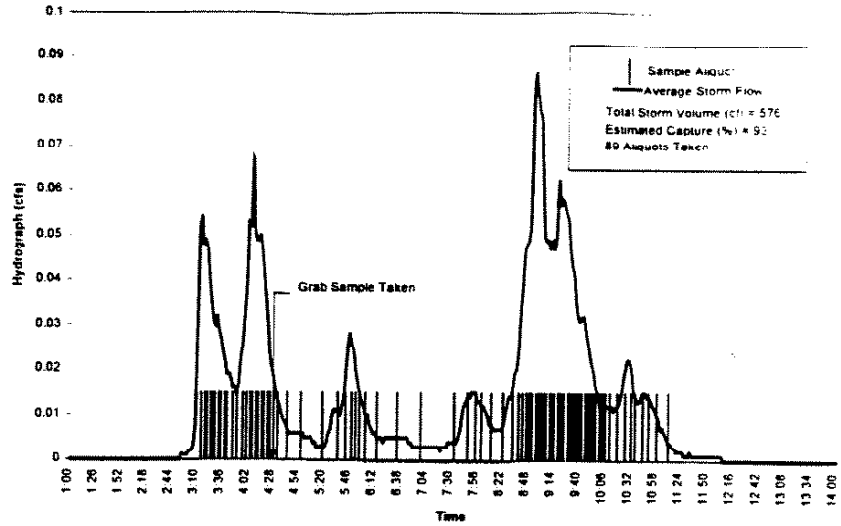
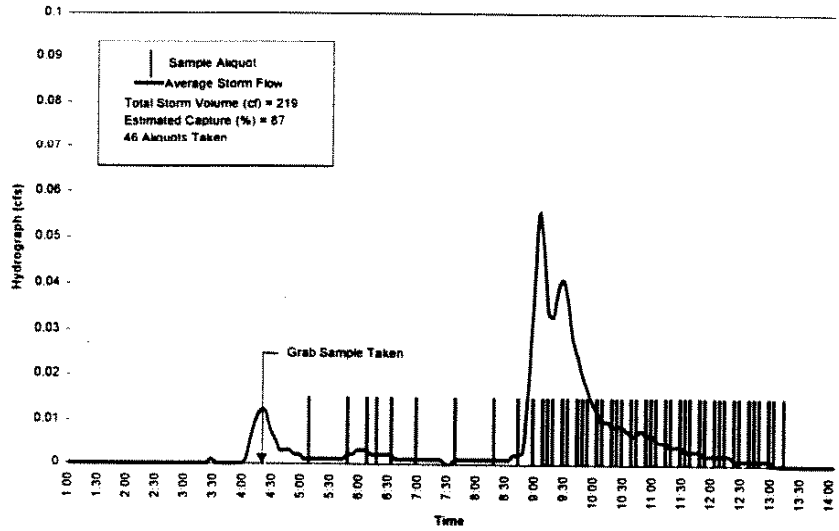


Figure 1-5a: Control and Effluent Hydrograph, and Cumulative Rainfall at the I-605/SR-91 Biofiltration Strip for Event 5 on February 20-21, 2000 (Grab Sample Only)

Control



Effluent



Cumulative Rainfall

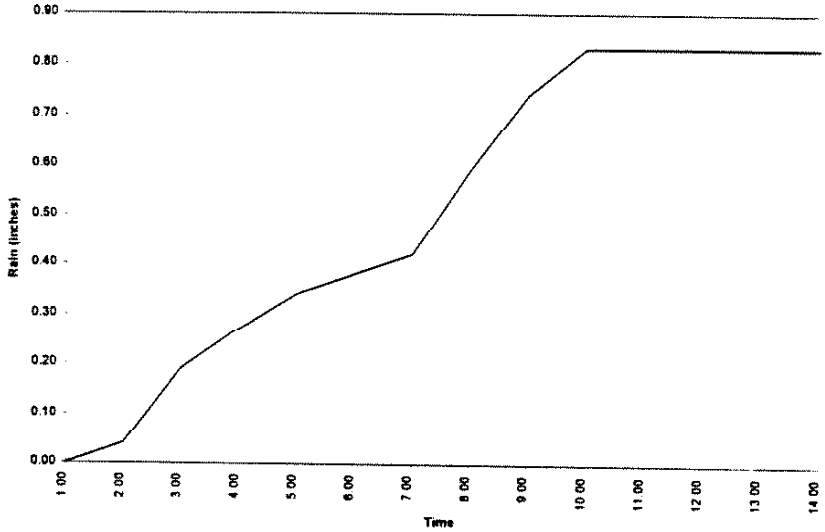
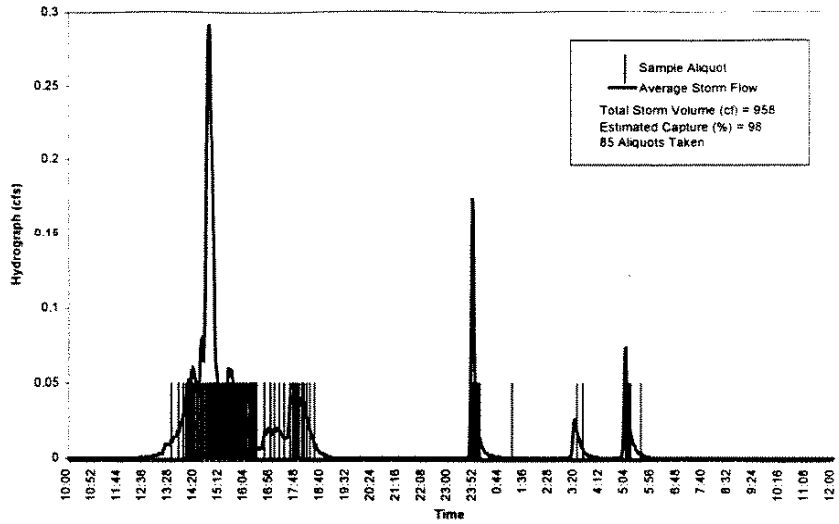
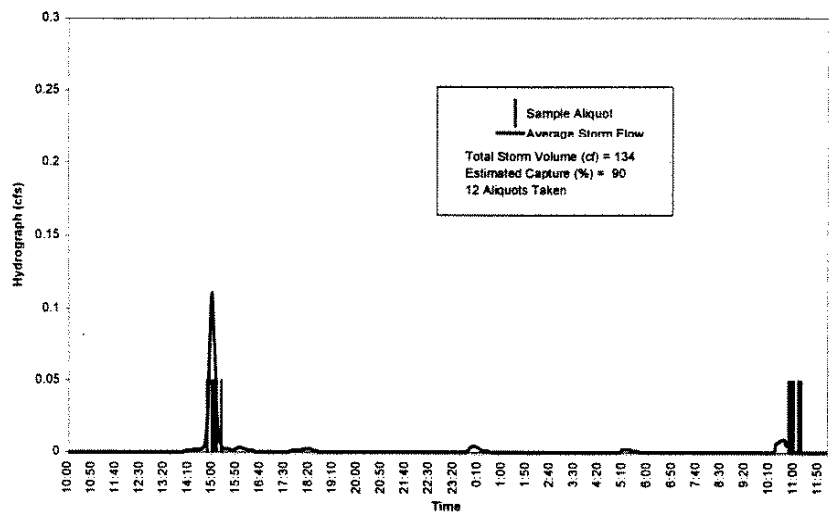


Figure 1-5b: Control and Effluent Hydrograph, and Cumulative Rainfall at the I-605/SR-91 Biofiltration Strip for Event 7 on March 8, 2000

Influent



Effluent



Cumulative Rainfall

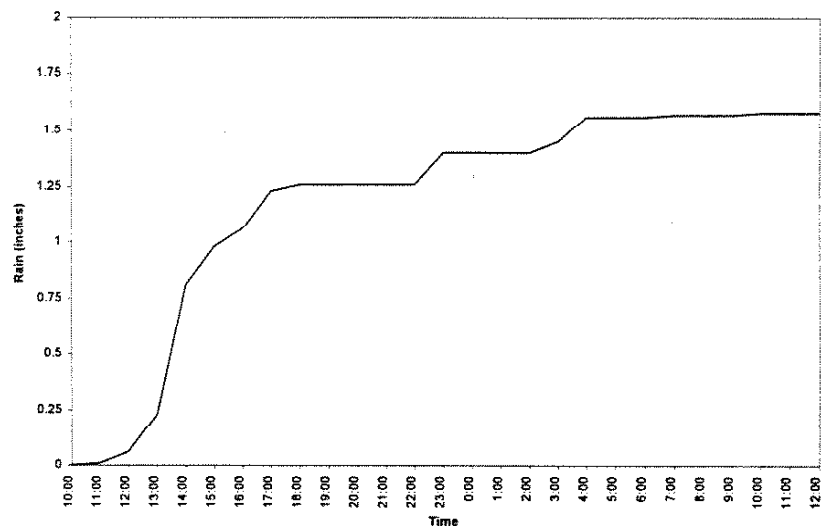
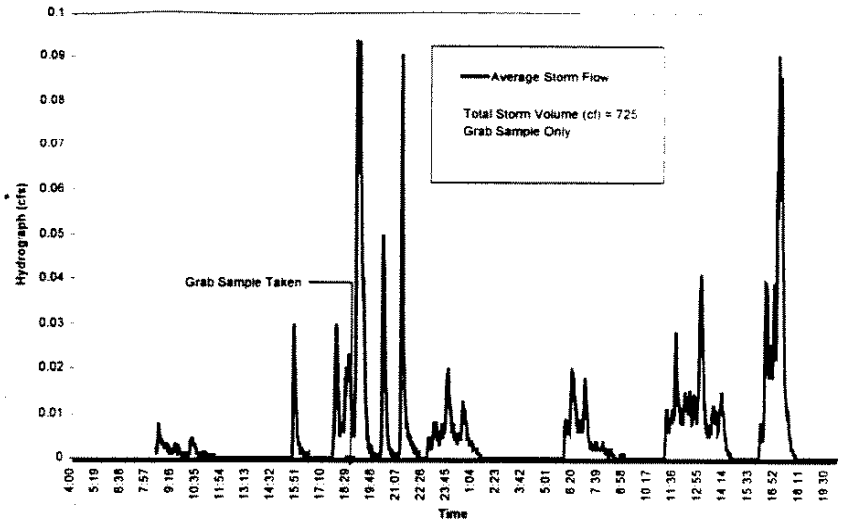
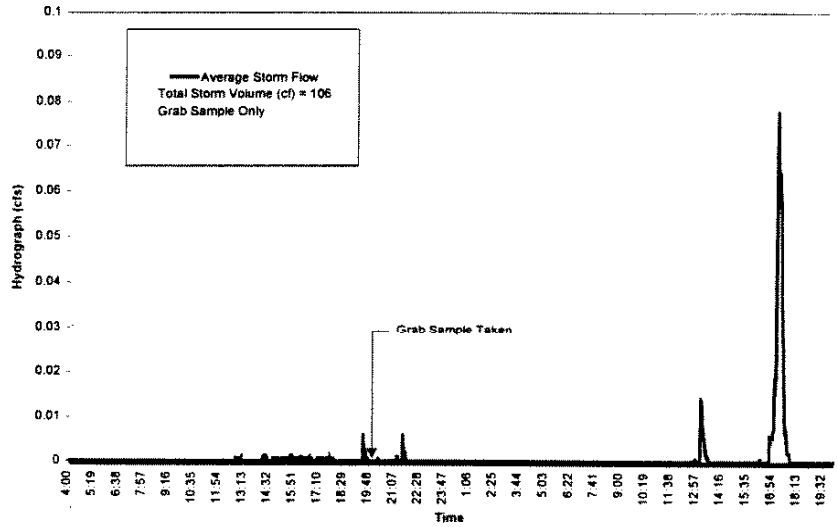


Figure 1-5c: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-605/SR-91 Biofiltration Strip for Event 8 on April 17-18, 2000

Influent



Effluent



Cumulative Rainfall

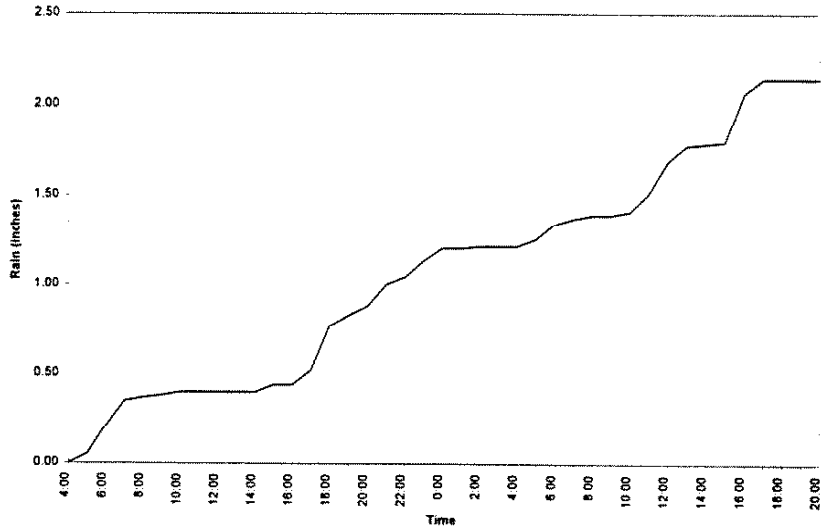
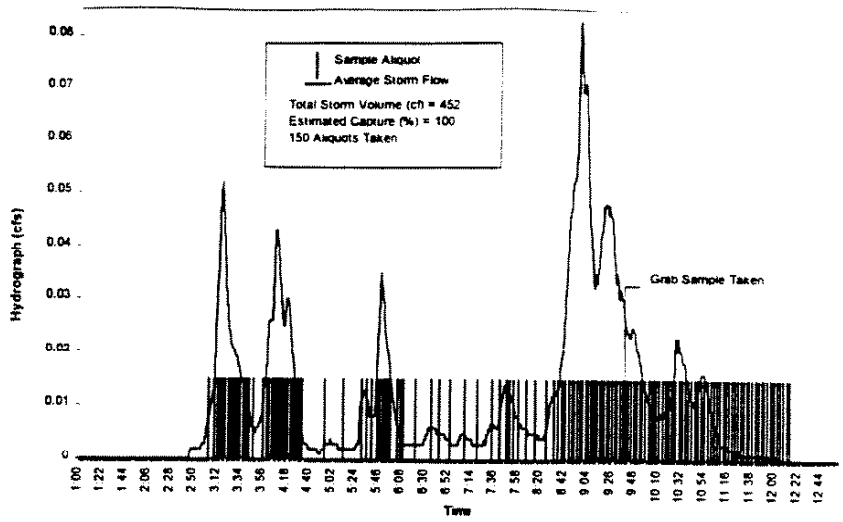
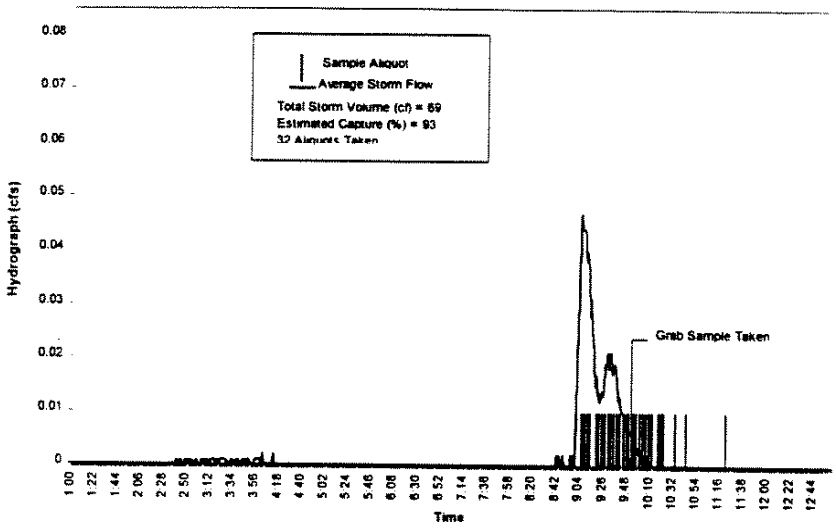


Figure 1-6a: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-605/SR-91 Swale for Event 5 on February 20-21, 2000 (Grab Sample Only)

Influent



Effluent



Cumulative Rainfall

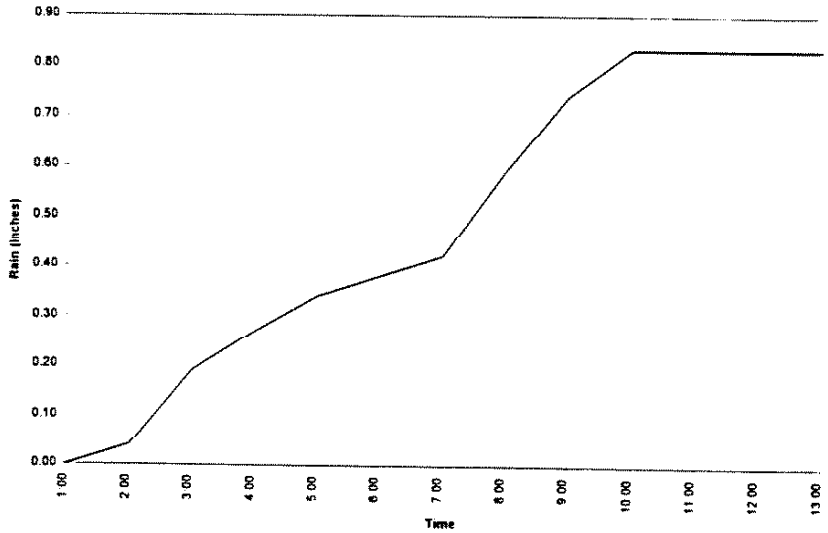
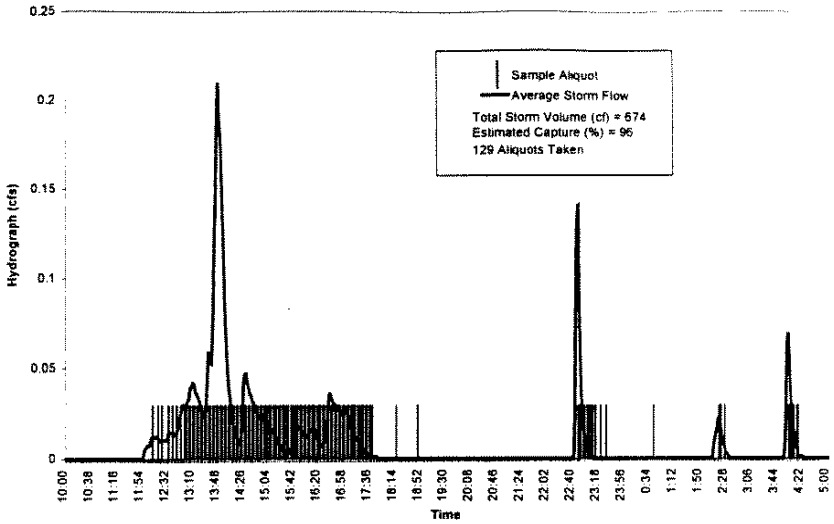
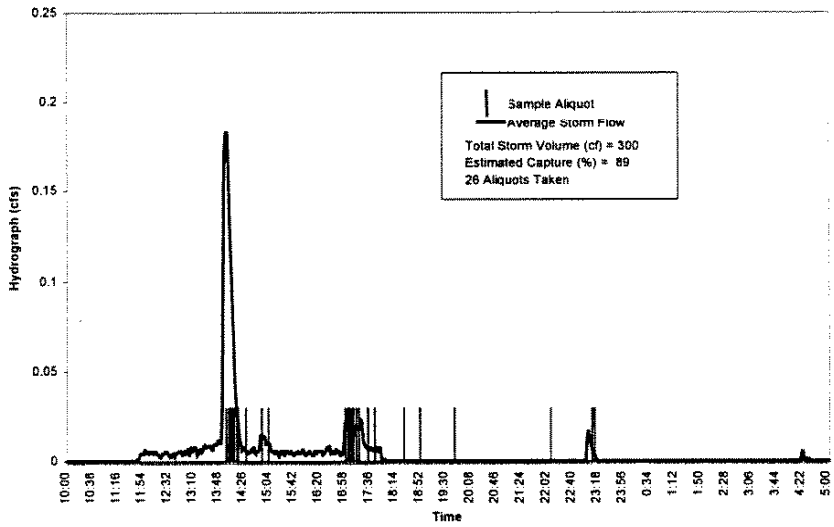


Figure 1-6b: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-605/SR-91 Swale for Event 7 on March 8, 2000

Influent



Effluent



Cumulative Rainfall

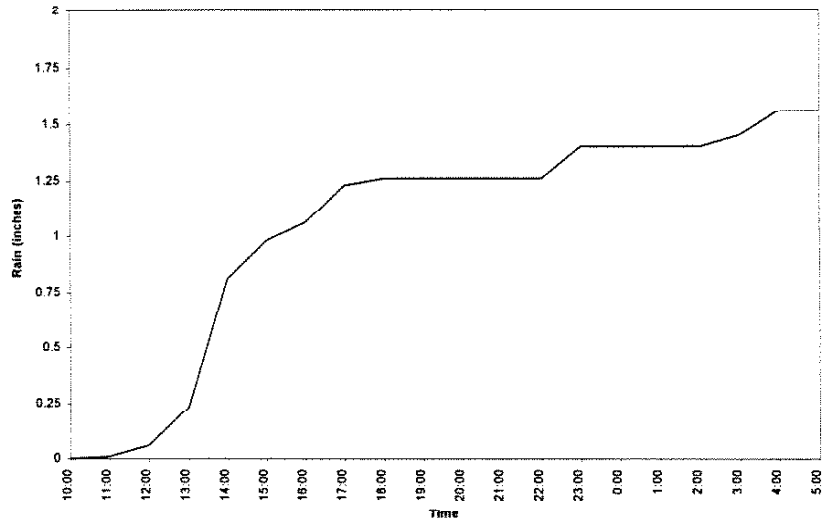
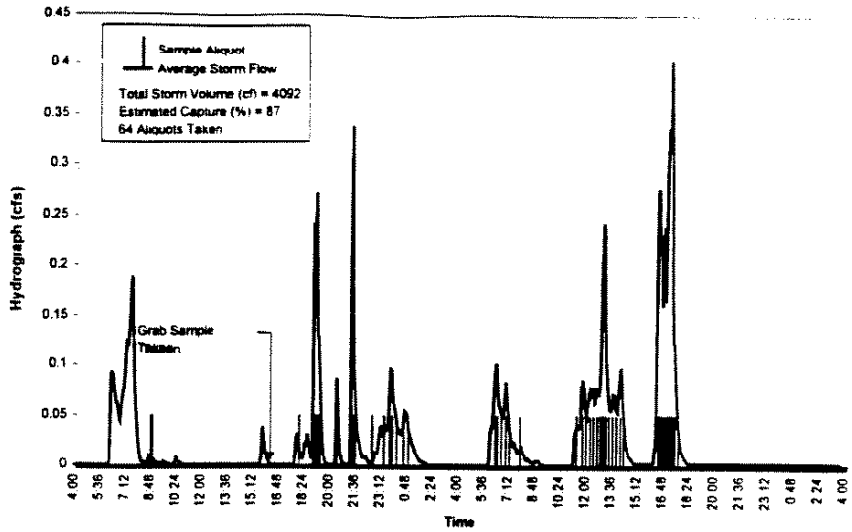
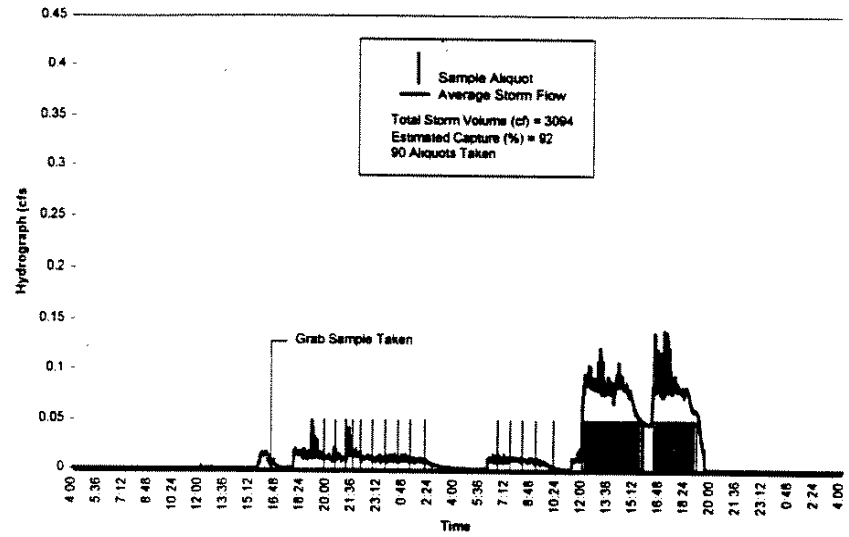


Figure 1-6c: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-605/SR-91 Swale for Event 8 on April 17-18, 2000

Influent



Effluent



Cumulative Rainfall

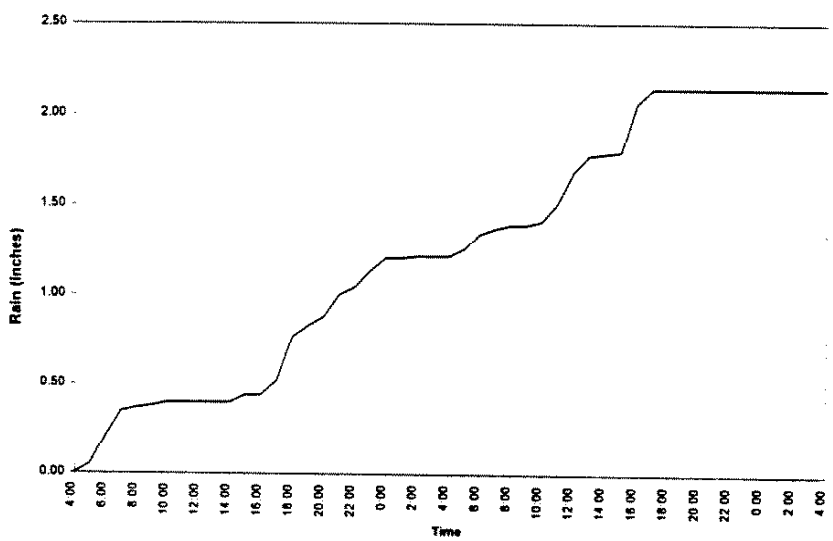
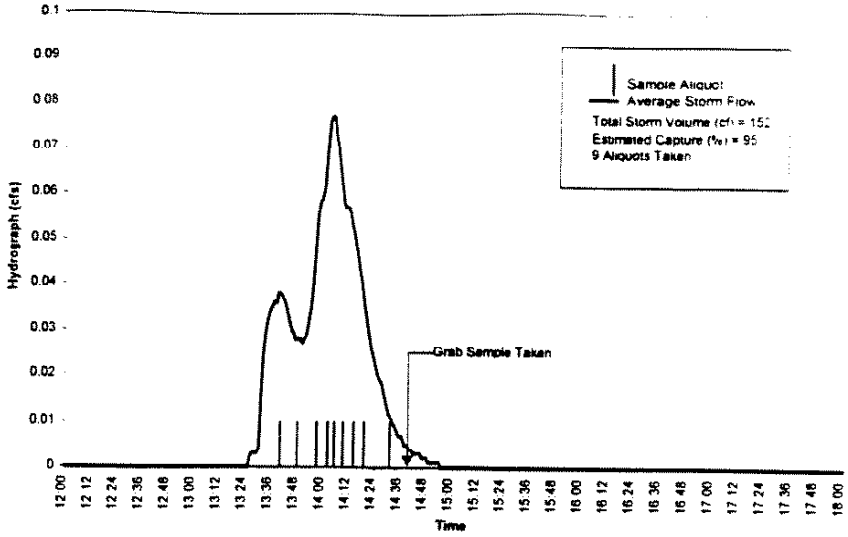
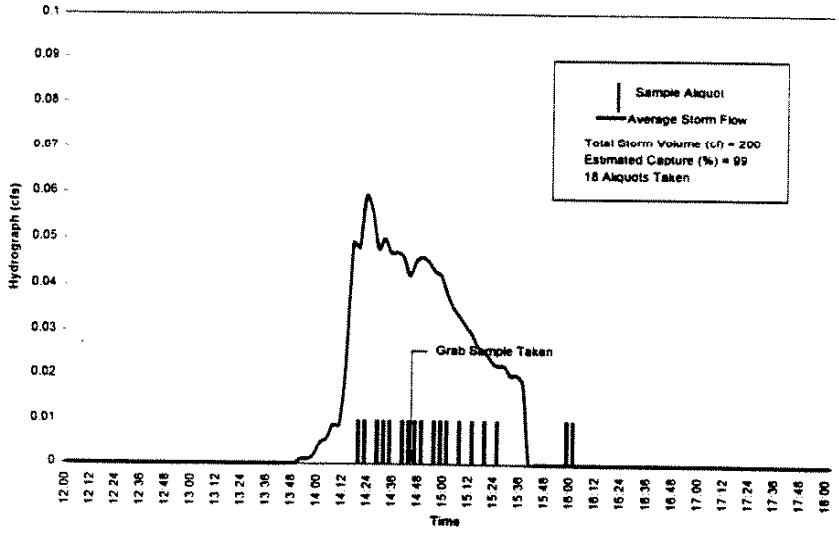


Figure 1-7a: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Cerritos MS Swale for Event 5 on February 20-21, 2000

Influent



Effluent



Cumulative Rainfall

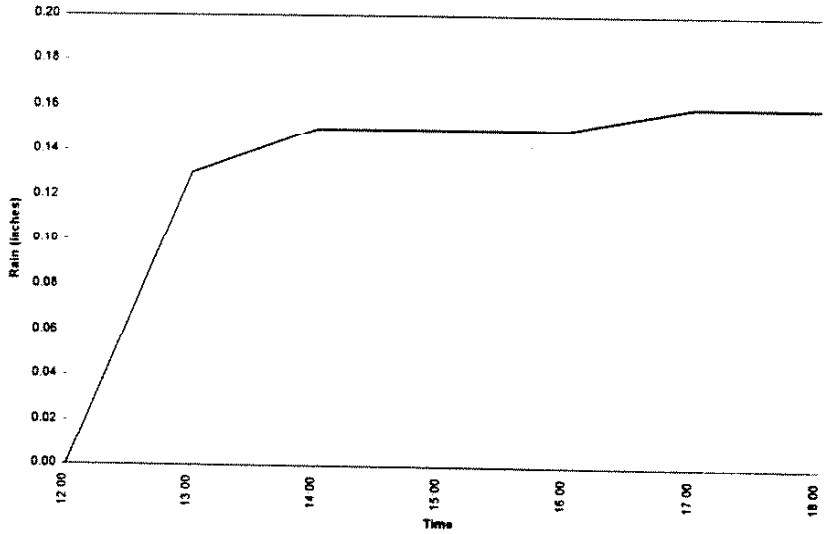
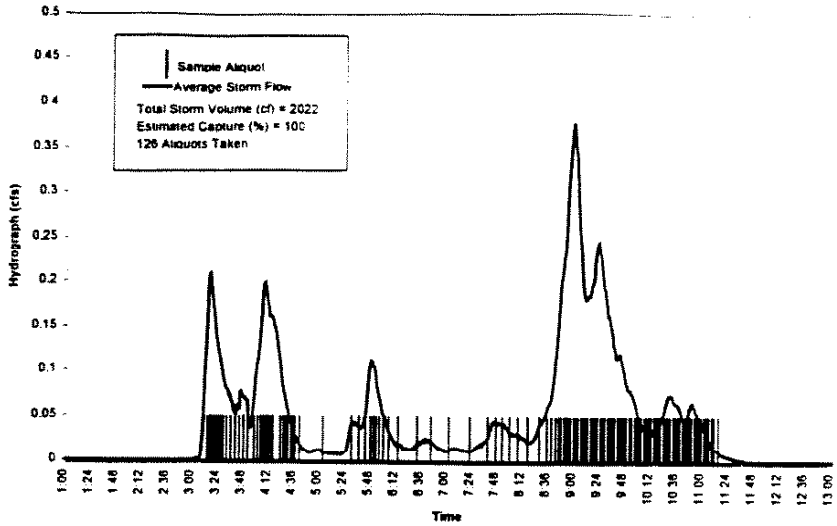
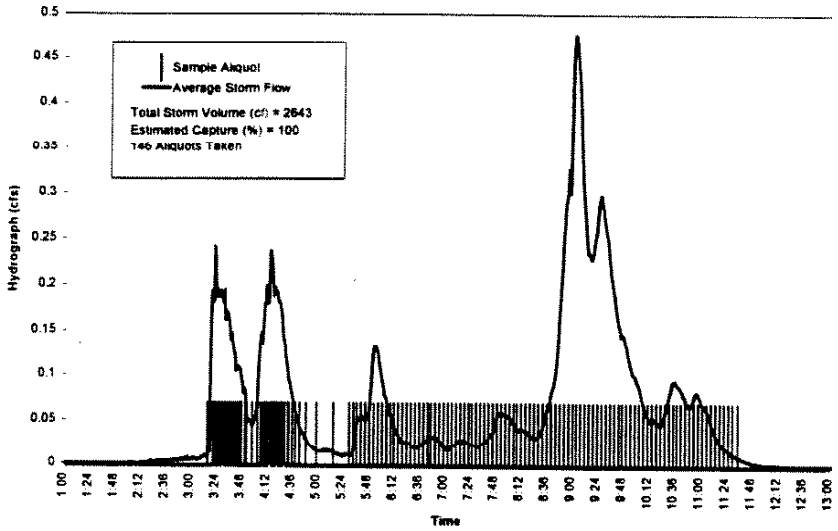


Figure 1-7b: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Cerritos MS Swale for Event 6 on February 27, 2000

Influent



Effluent



Cumulative Rainfall

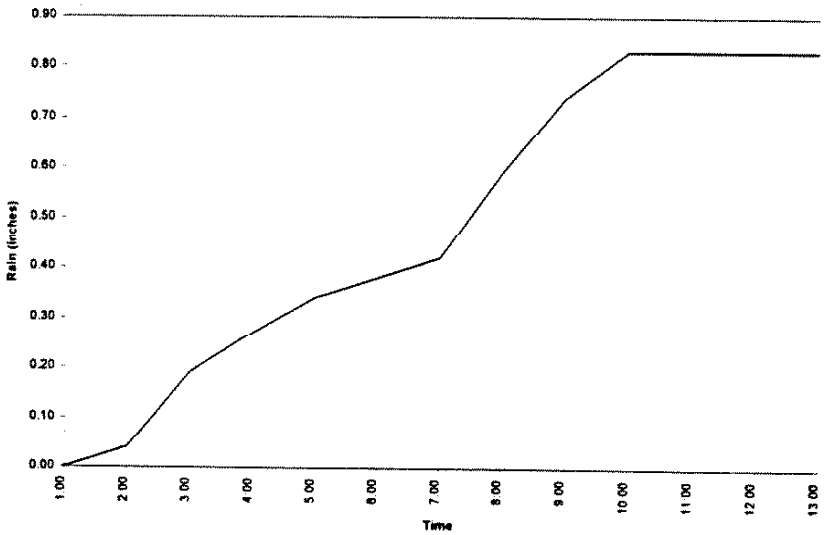
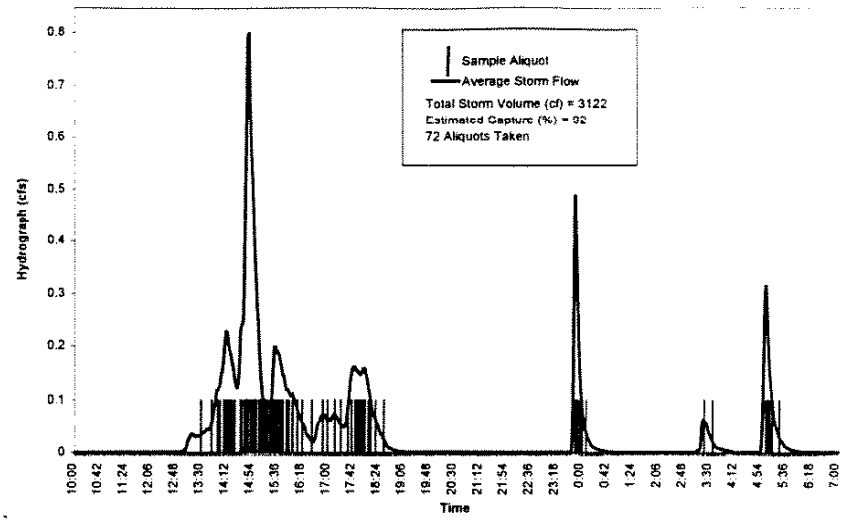
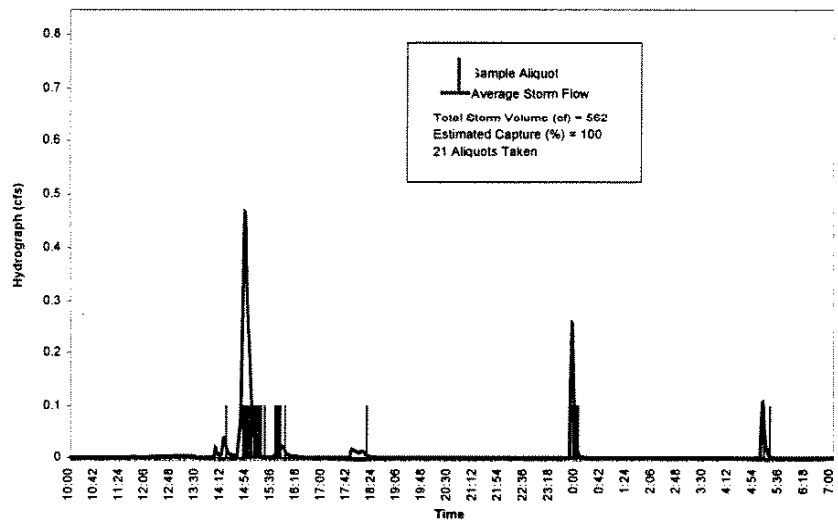


Figure 1-7c: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Cerritos MS Swale for Event 7 on March 8, 2000

Influent



Effluent



Cumulative Rainfall

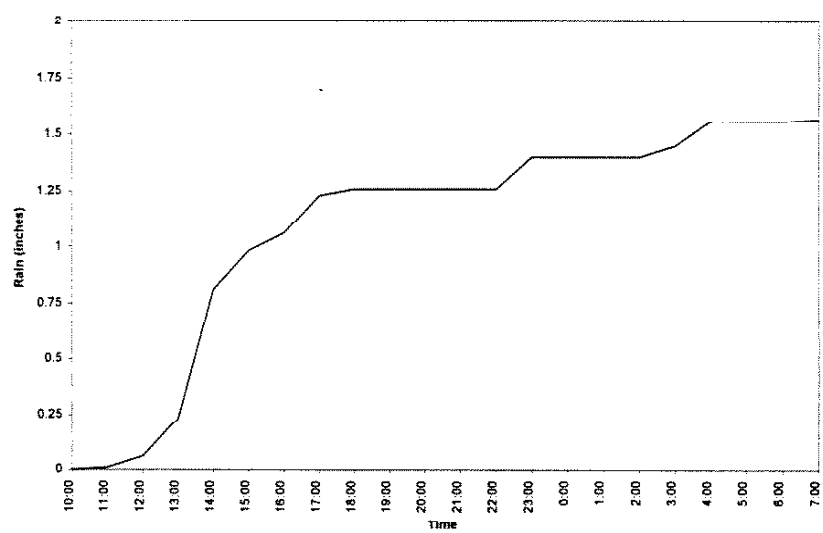
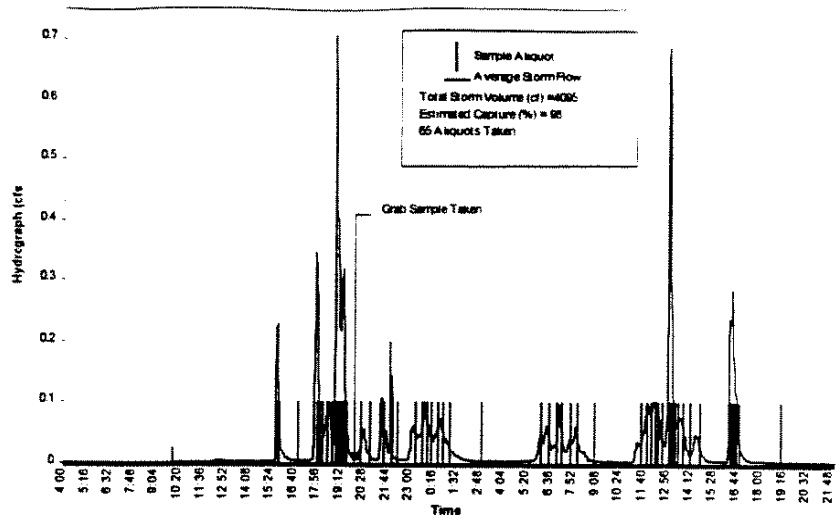
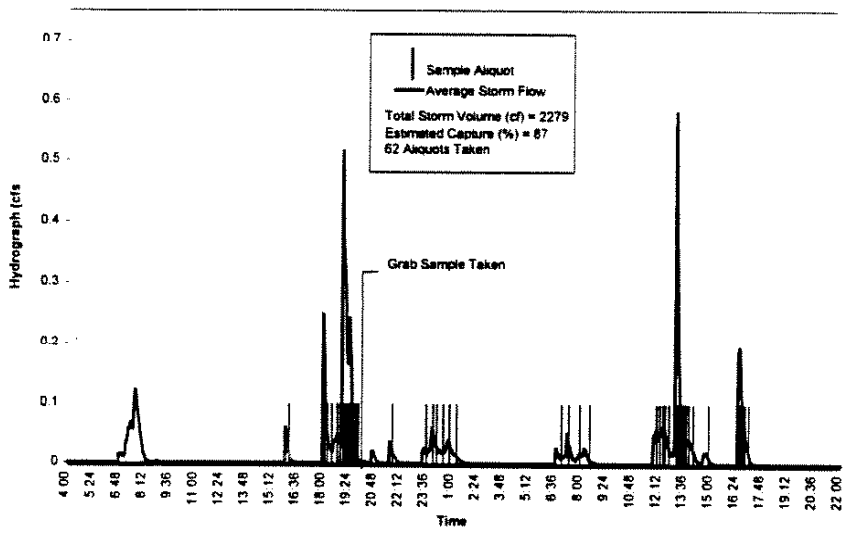


Figure 1-7d: Influent and Effluent Hydrograph, and Cumulative Rainfall at the Cerritos MS Swale for Event 8 on April 17-18, 2000

Influent



Effluent



Cumulative Rainfall

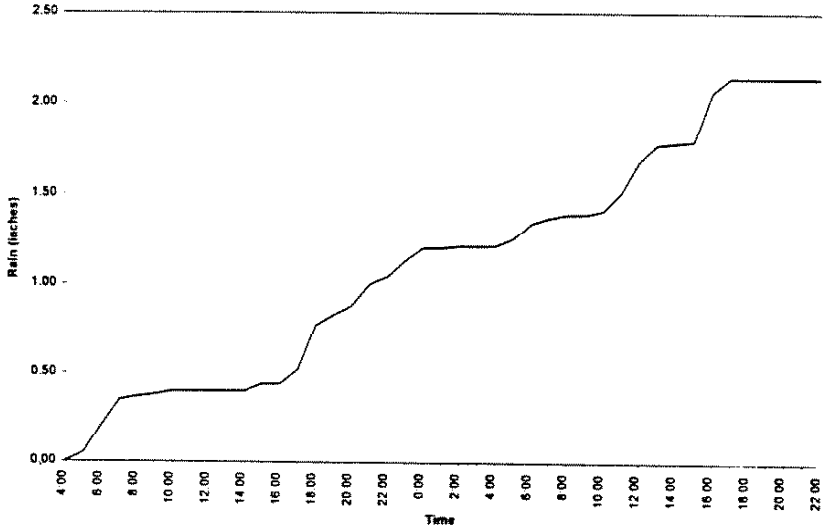
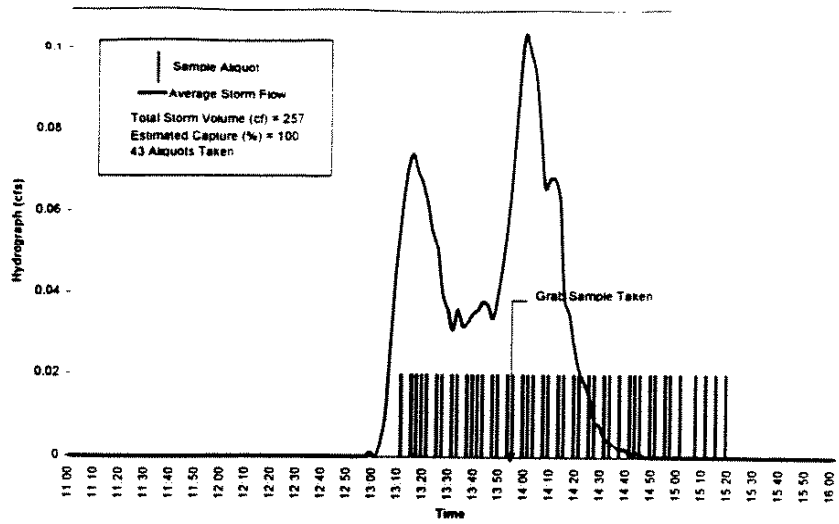
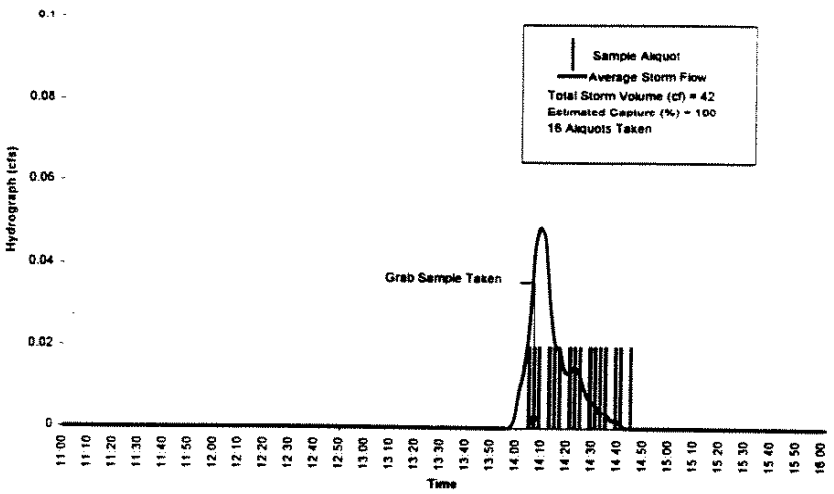


Figure 1-8a: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-5/I-605 Swale for Event 5 on February 20-21, 2000

Influent



Effluent



Cumulative Rainfall

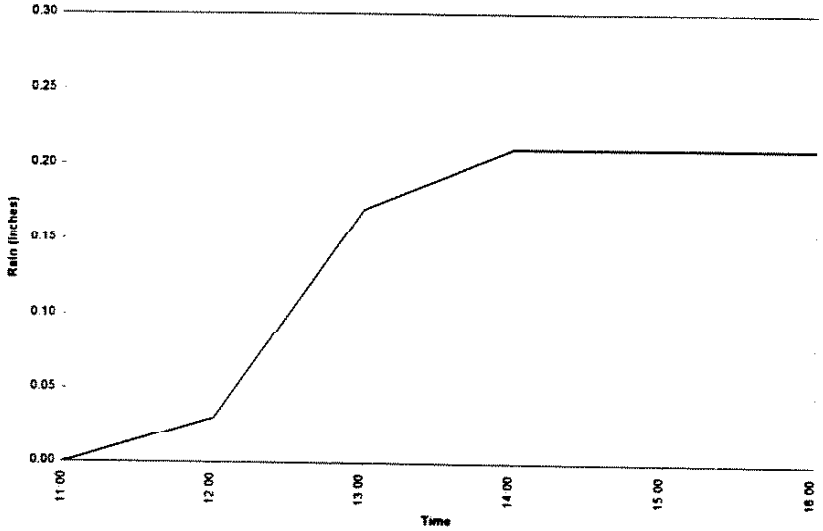
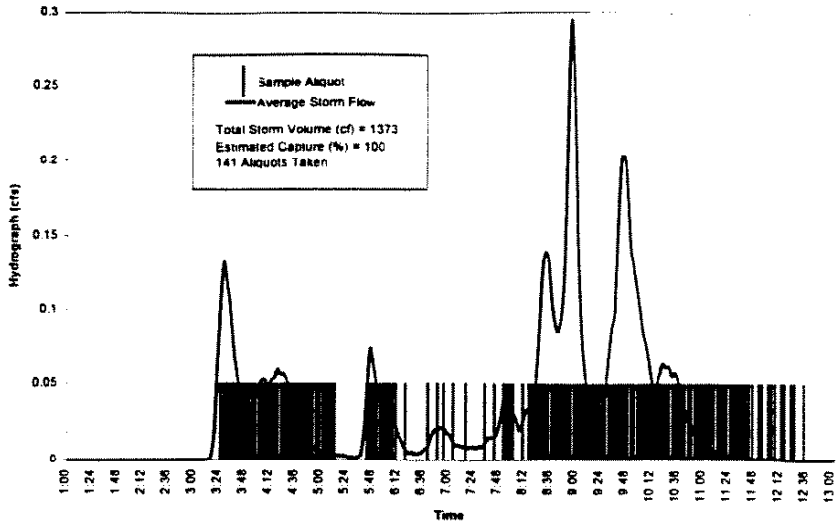
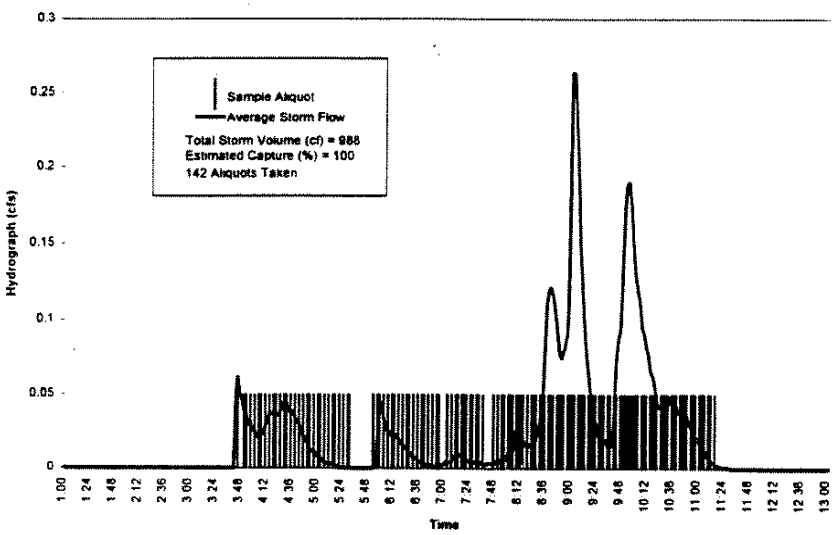


Figure 1-8b: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-5/I-605 Swale for Event 6 on February 27, 2000

Influent



Effluent



Cumulative Rainfall

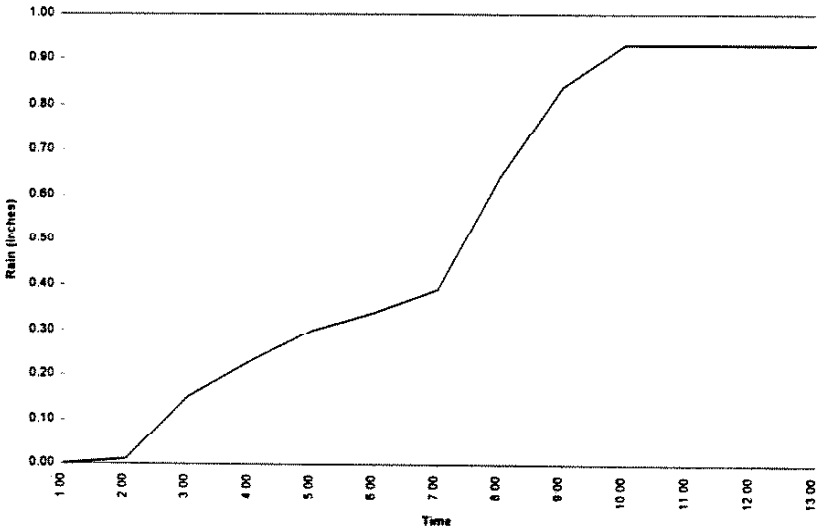
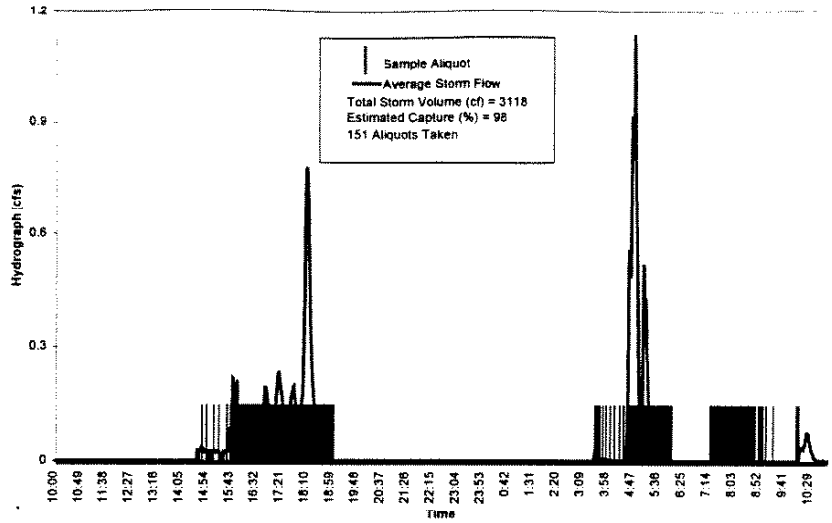
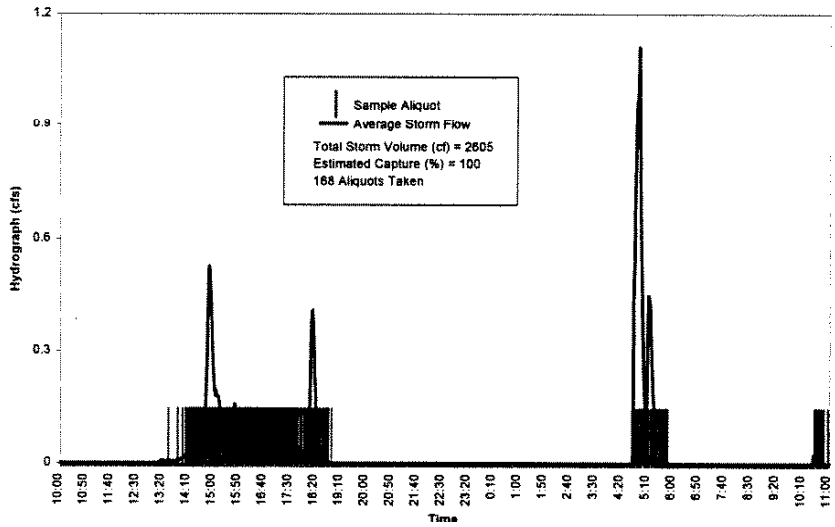


Figure 1-8c: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-5/I-605 Swale for Event 7 on March 8, 2000

Influent



Effluent



Cumulative Rainfall

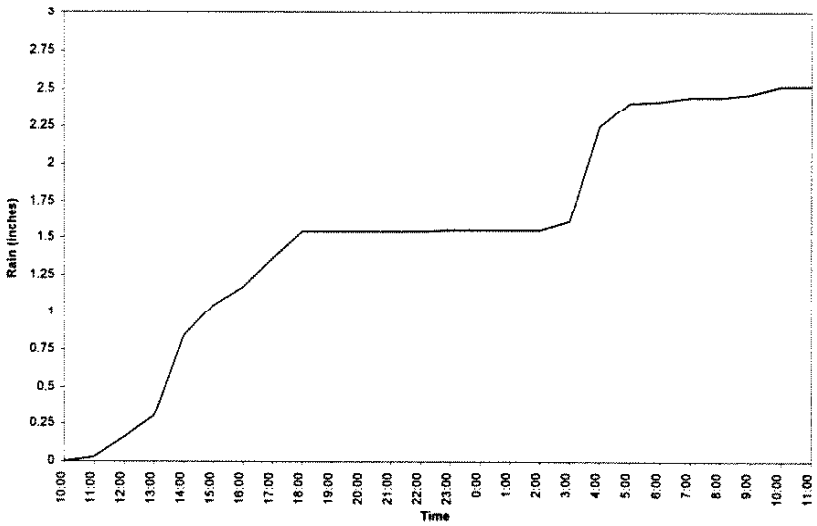
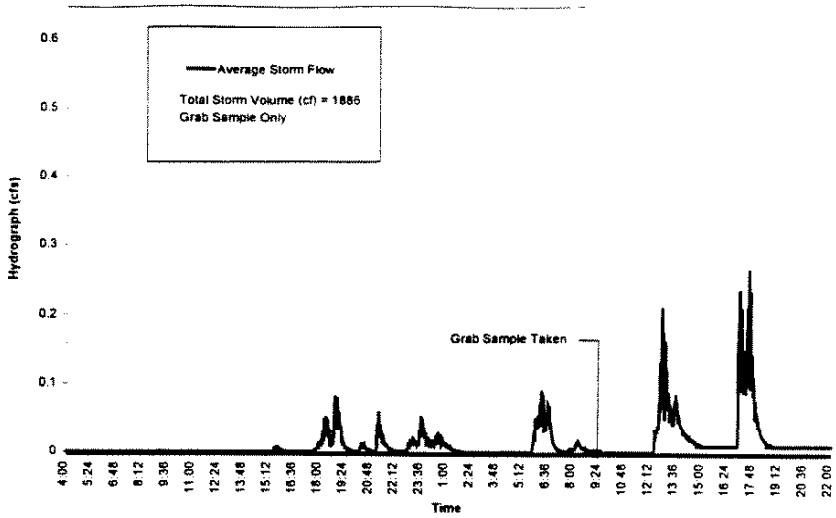
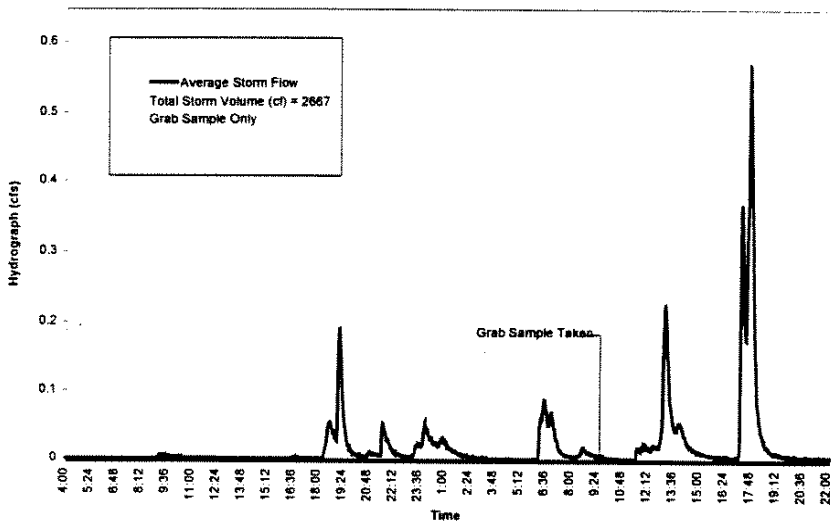


Figure 1-8d: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-5/I-605 Swale for Event 8 on April 17-18, 2000

Influent



Effluent



Cumulative Rainfall

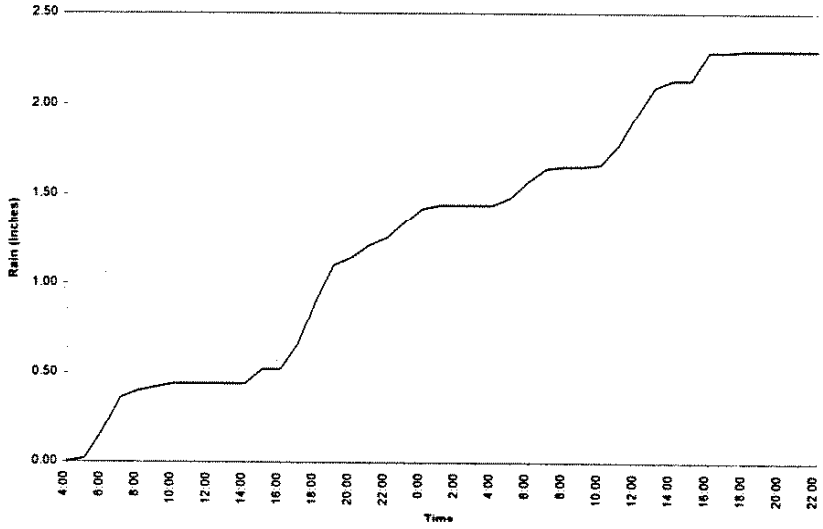
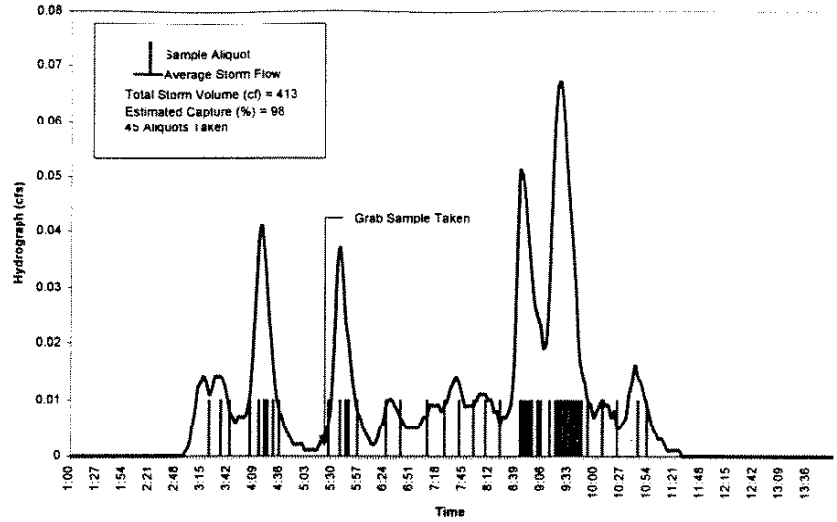
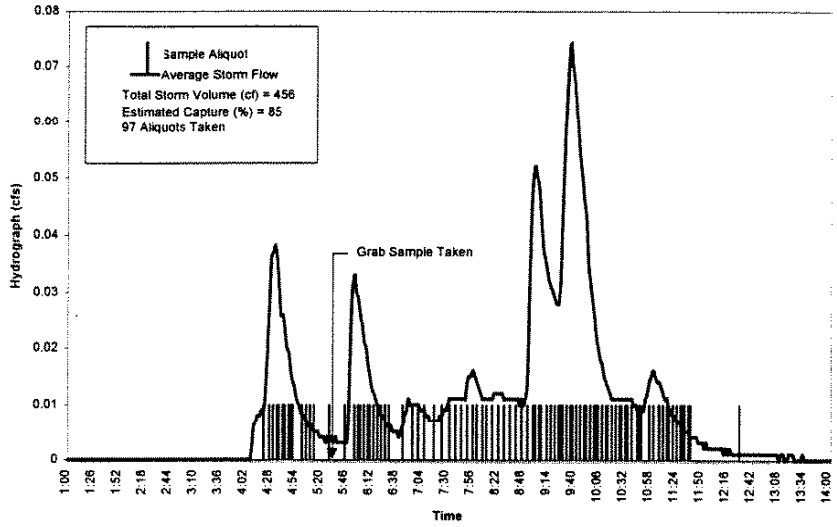


Figure 1-9a: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-605 @ Carson Swale for Event 5 on February 20-21, 2000 (Grab sample Only)

Influent



Effluent



Cumulative Rainfall

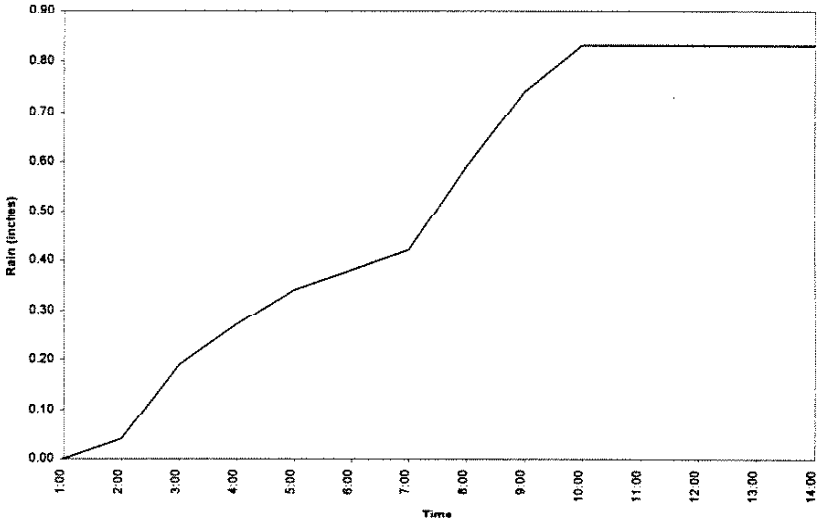
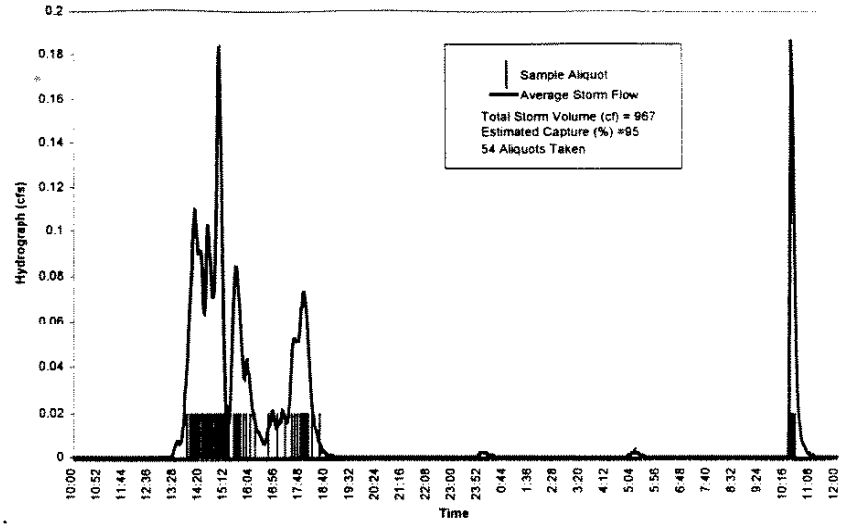
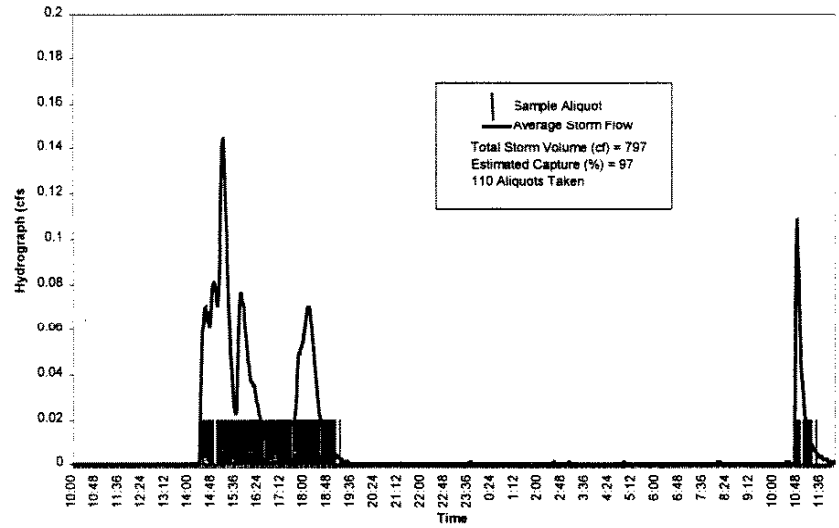


Figure 1-9b: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-605 @ Carson Swale for Event 7 on March 8, 2000

Influent



Effluent



Cumulative Rainfall

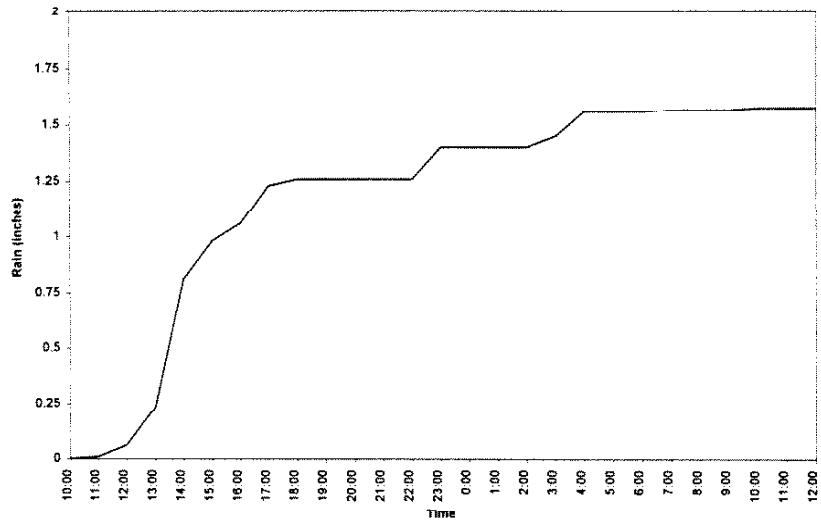
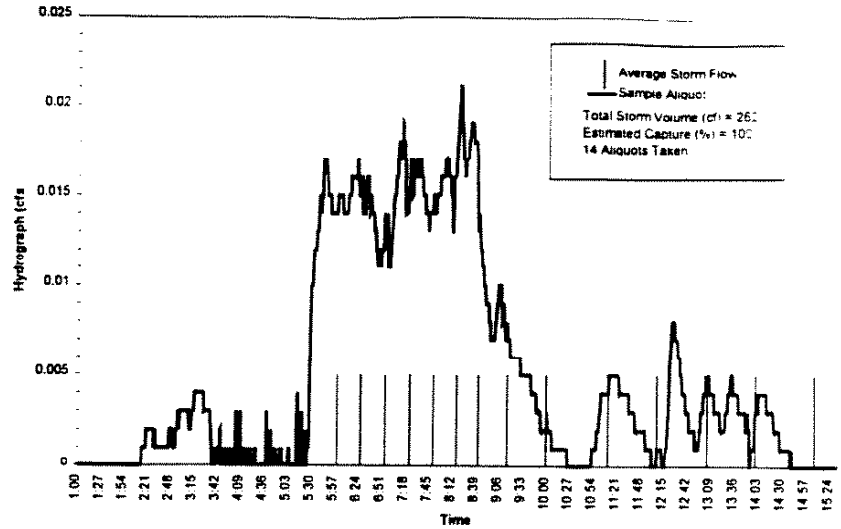
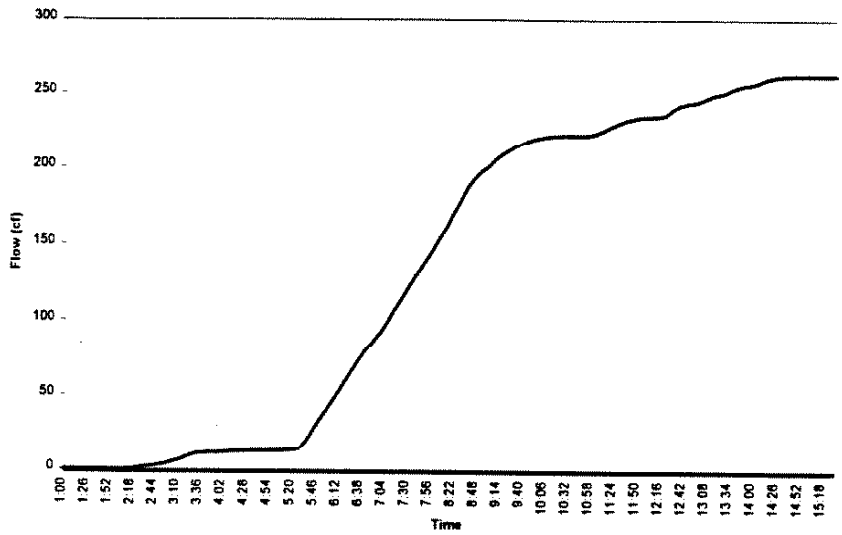


Figure 1-9c: Influent and Effluent Hydrograph, and Cumulative Rainfall at the I-605 @ Carson Swale for Event 8 on April 17-18, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

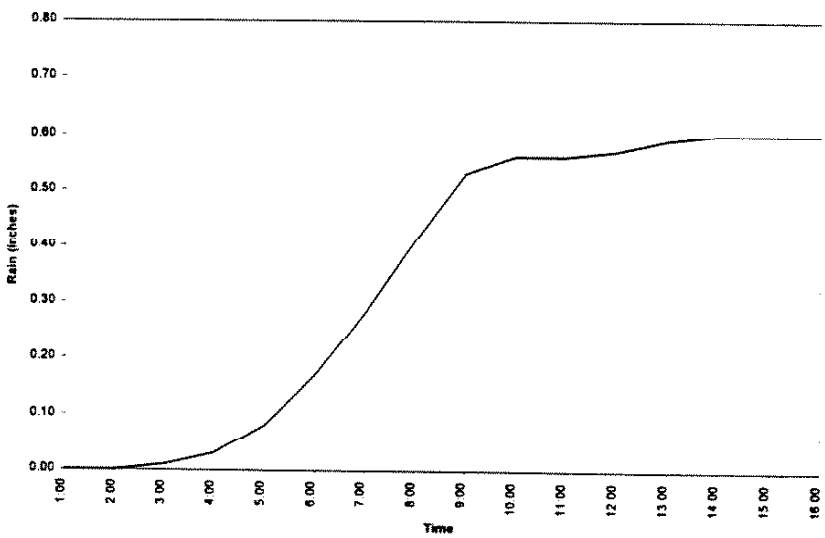
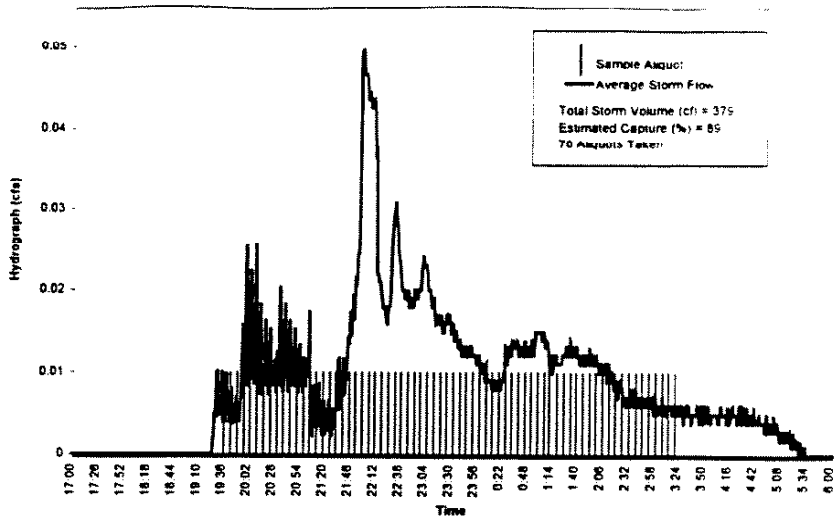
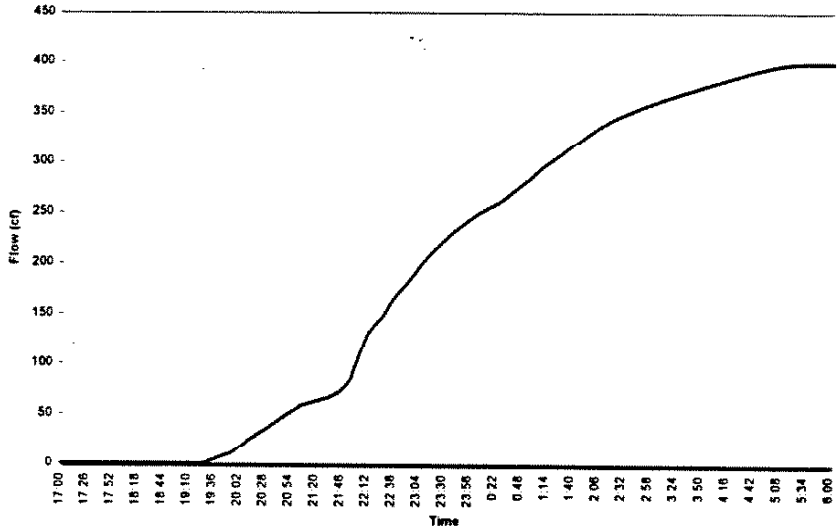


Figure 1-10a: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS StreamGuard DII for Event 1 on January 25, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

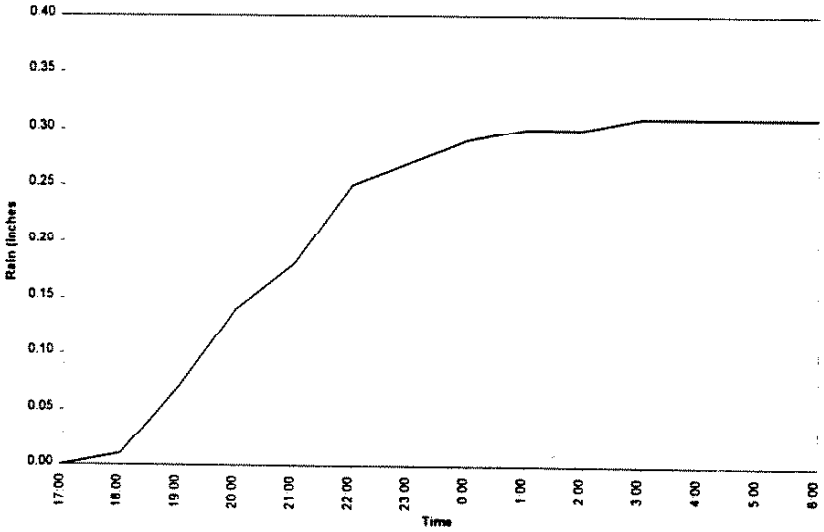
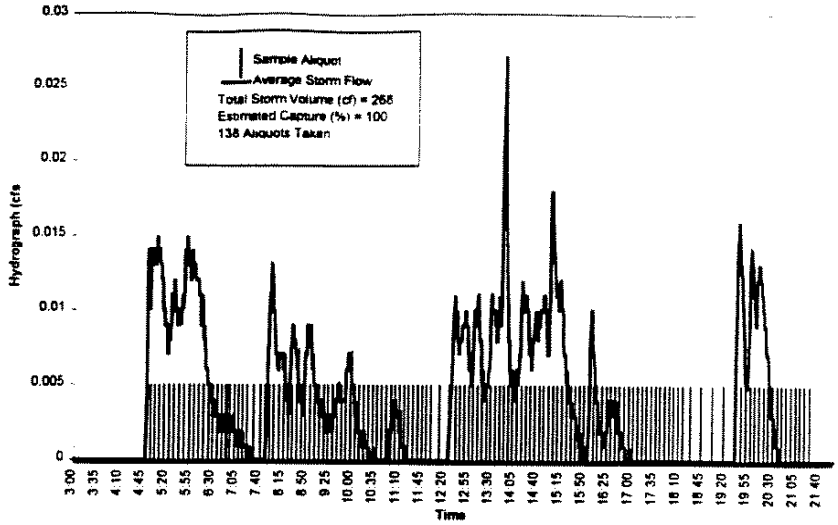
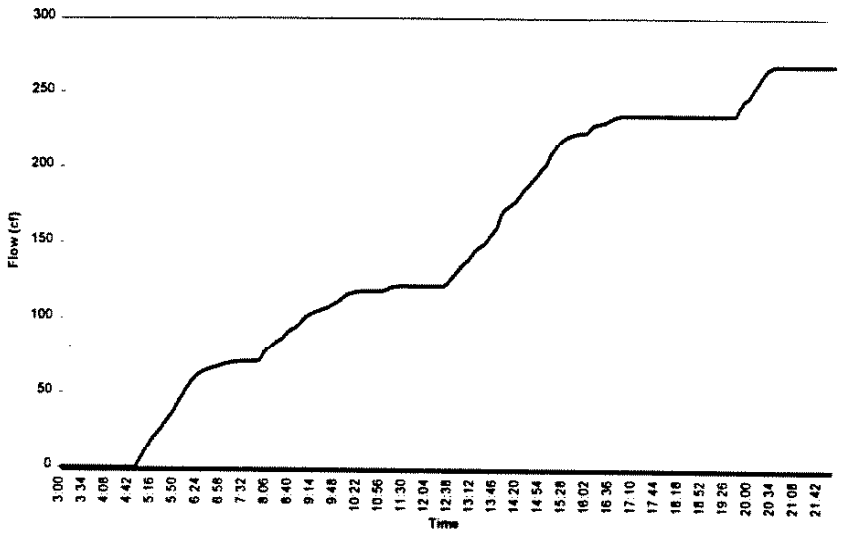


Figure 1-10b: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS StreamGuard DII for Event 2 on January 30, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

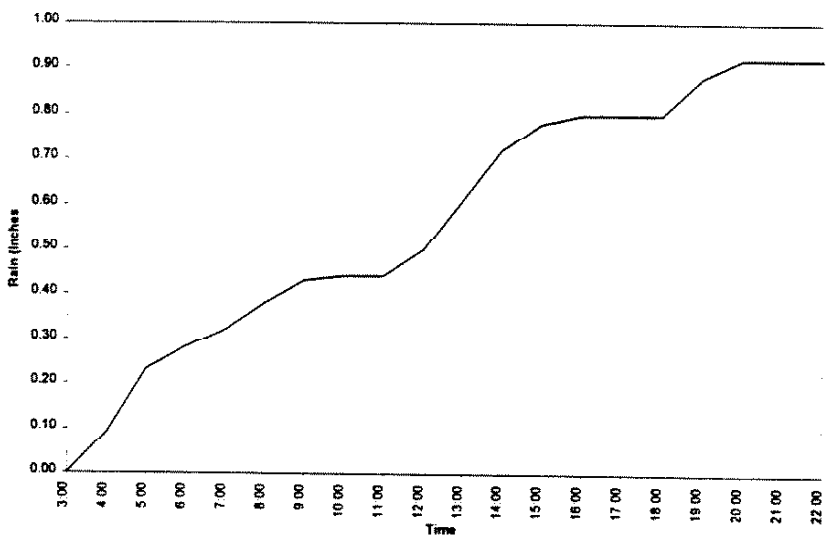
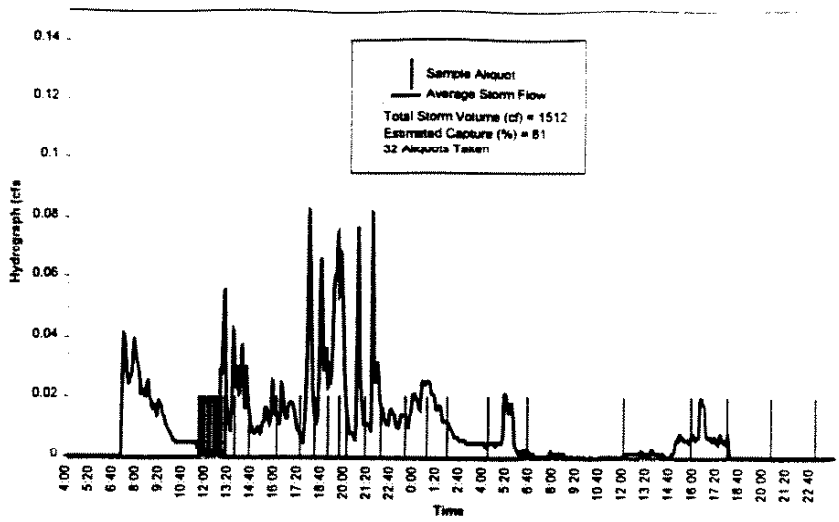
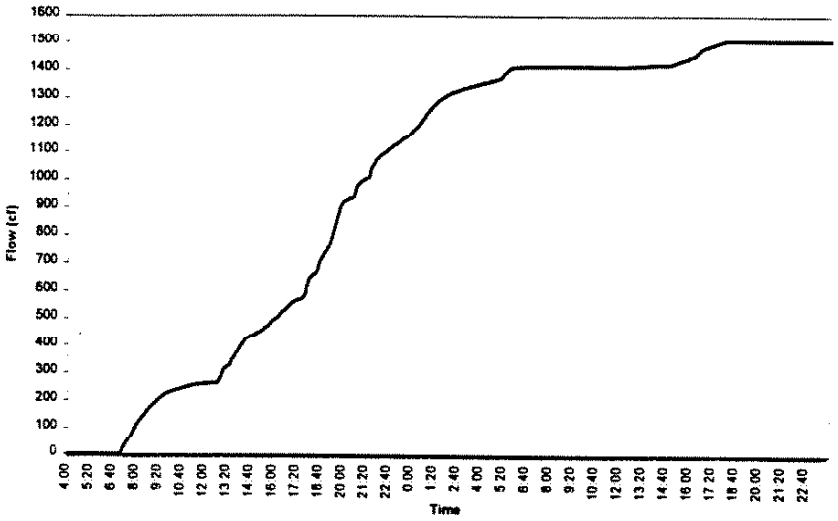


Figure 1-10c: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS StreamGuard DII for Event 4 on February 16, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

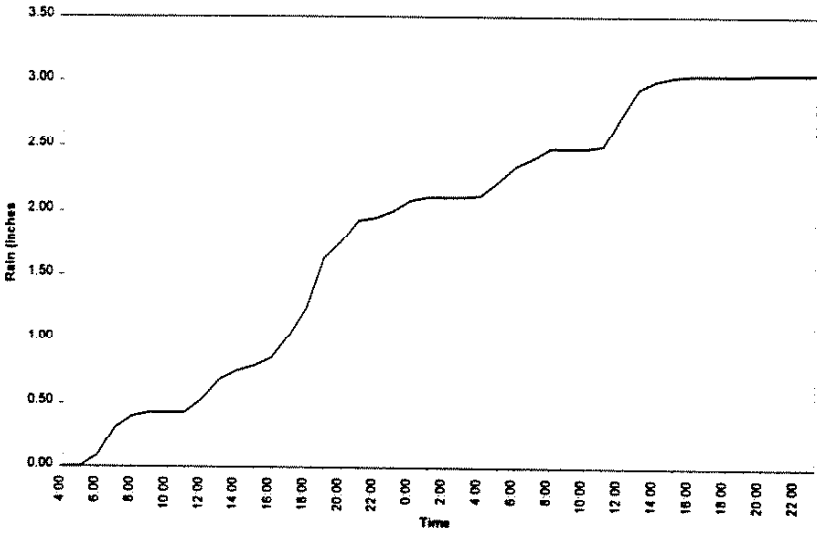
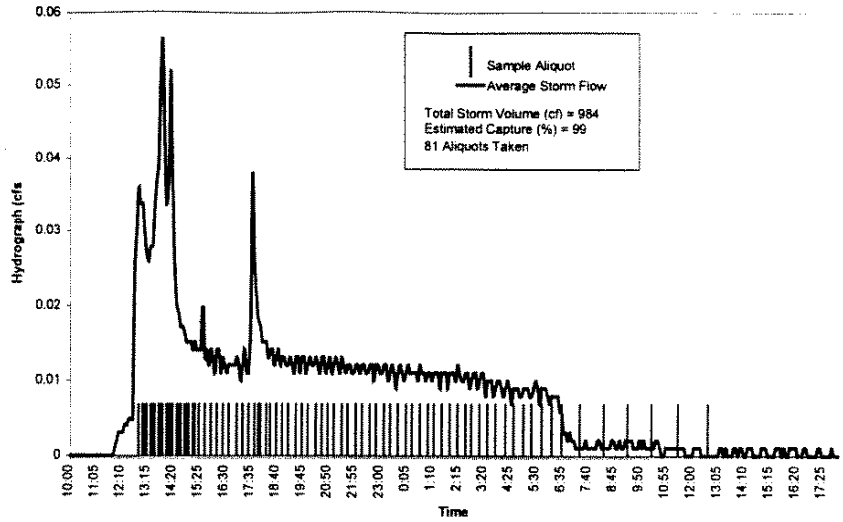
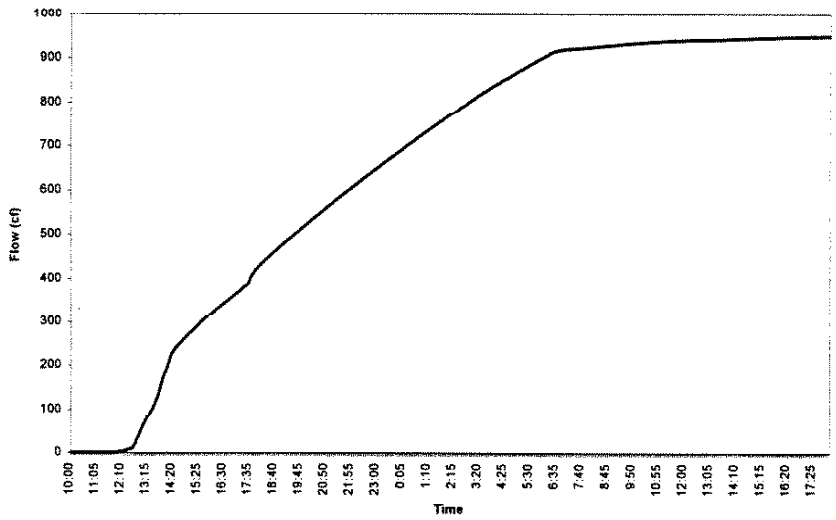


Figure 1-10d: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS StreamGuard DII for Event 5 on February 20-21, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

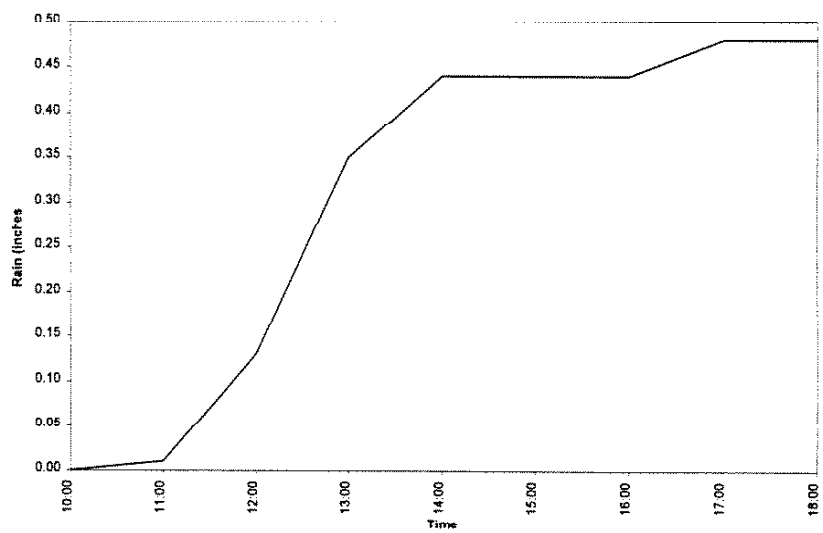
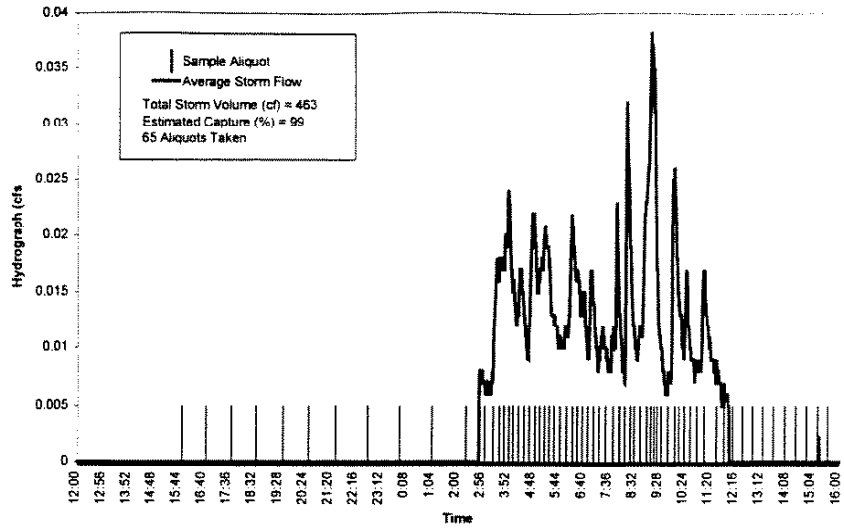
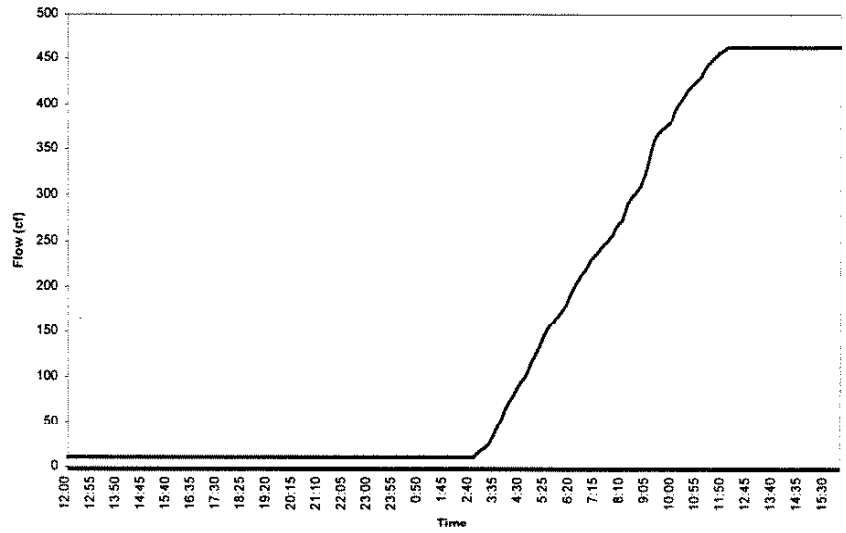


Figure 1-10e: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS StreamGuard DII for Event 6 on February 27, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

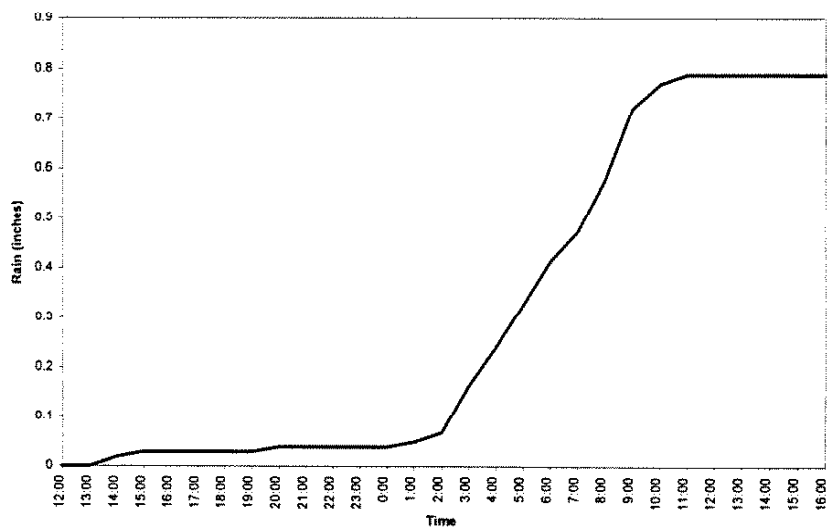
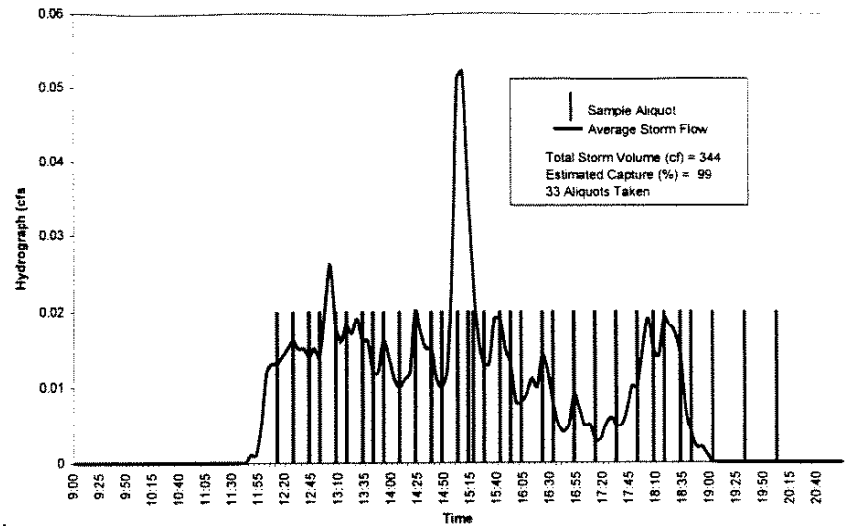
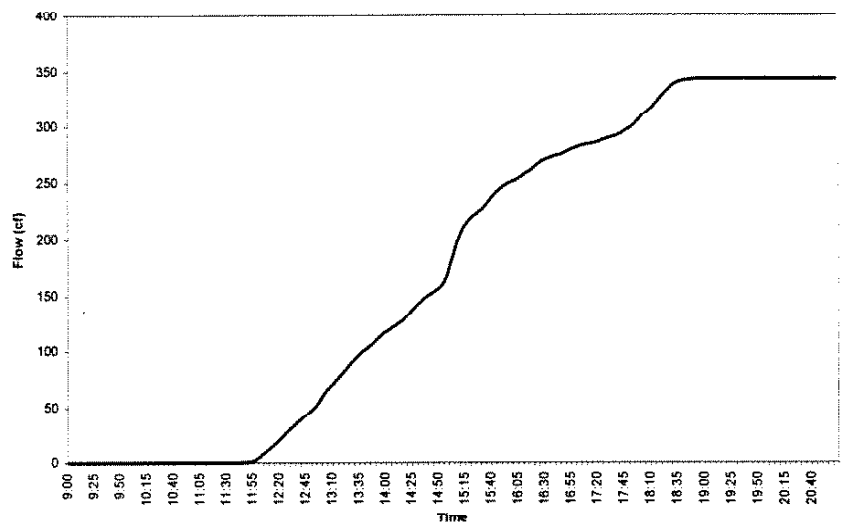


Figure 1-10f: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS StreamGuard DII for Event 7 on March 8, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

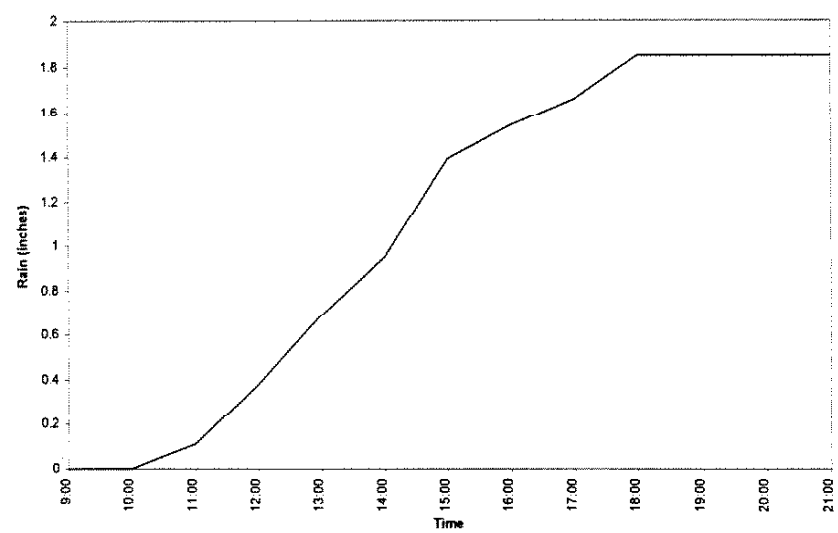
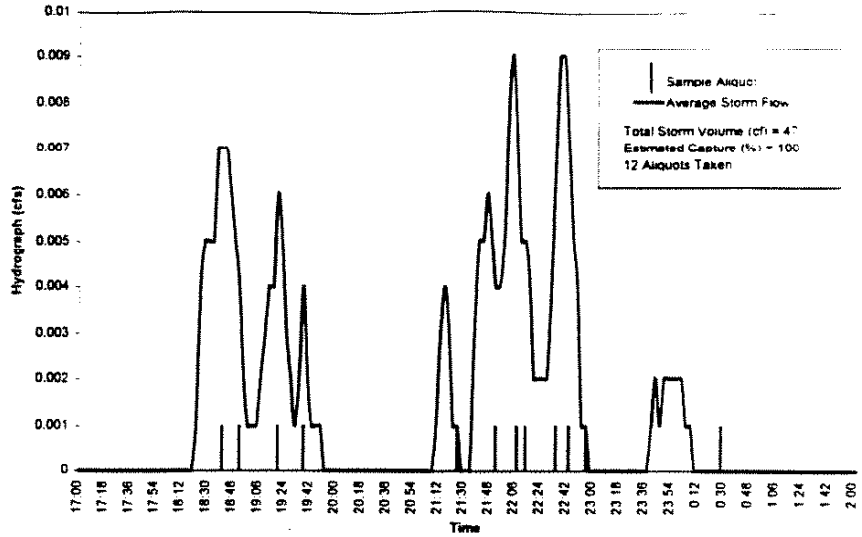
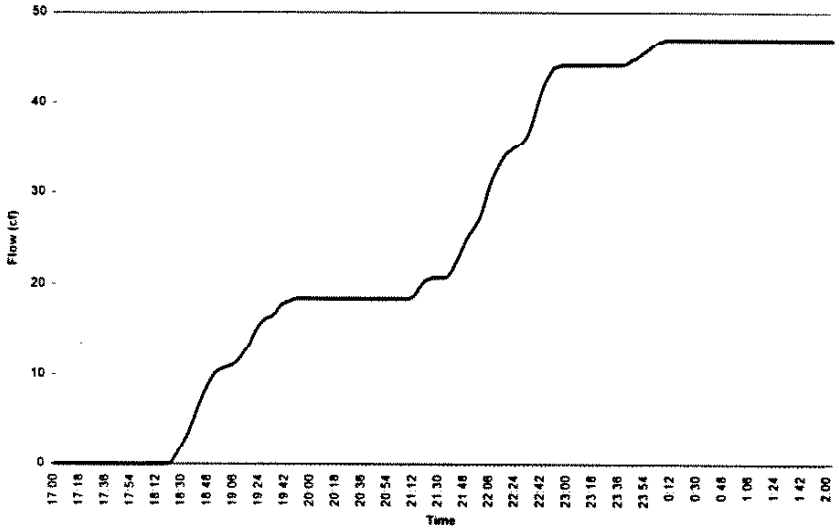


Figure 1-10g: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Foothill MS StreamGuard DII for Event 8 on April 17, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

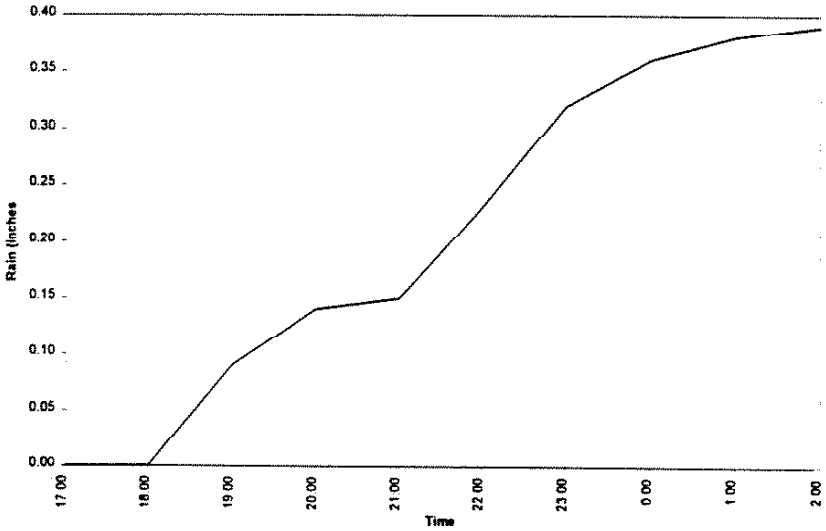
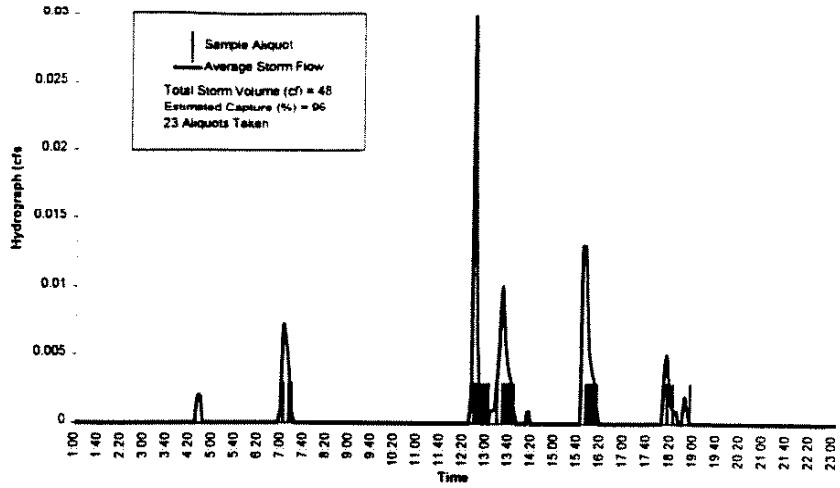
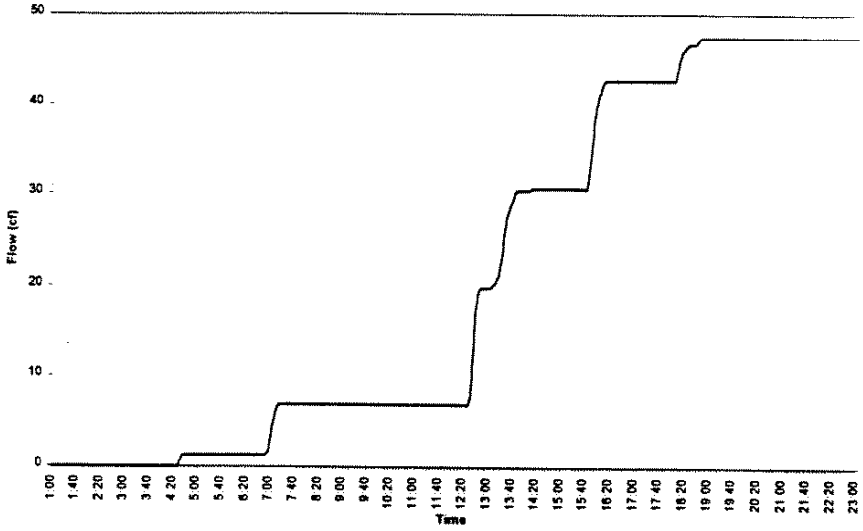


Figure 1-11a: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS StreamGuard DII for Event 2 on January 30, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

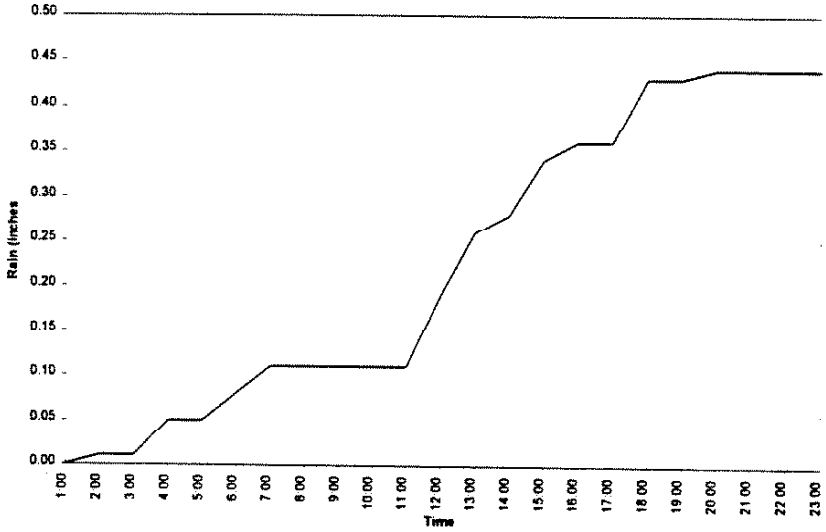
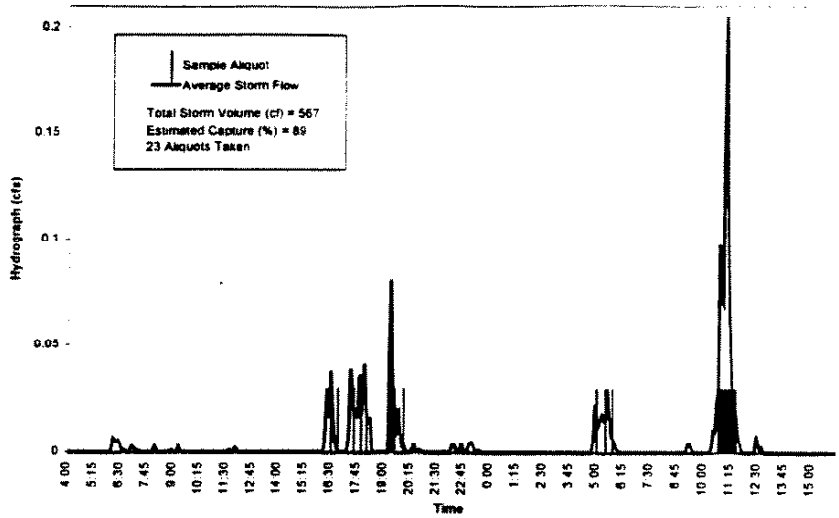
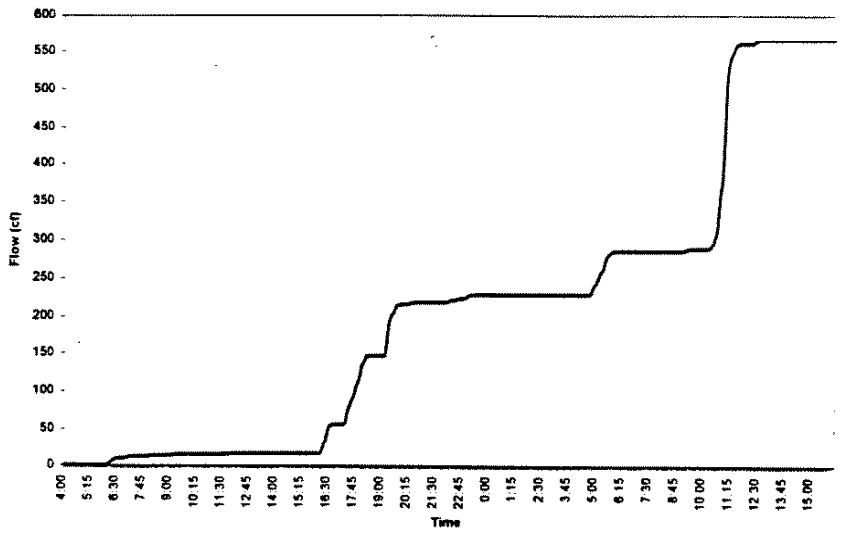


Figure 1-11b: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS StreamGuard DII for Event 3 on February 10, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

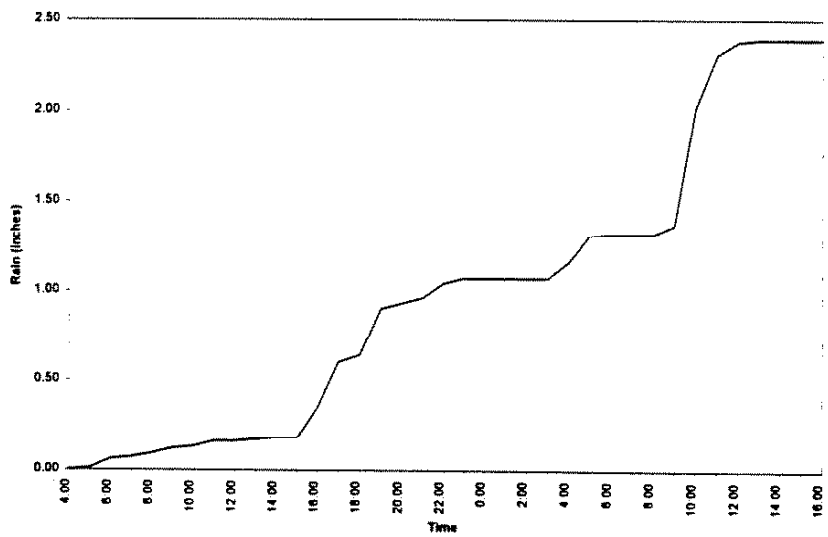
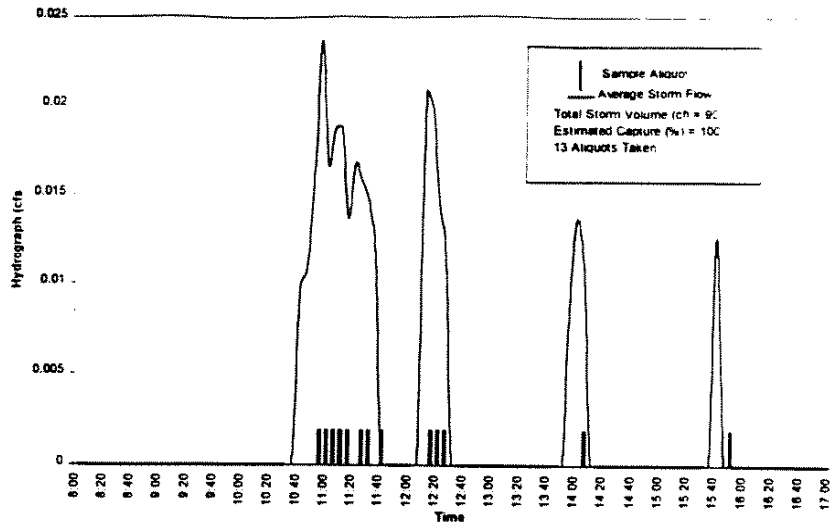
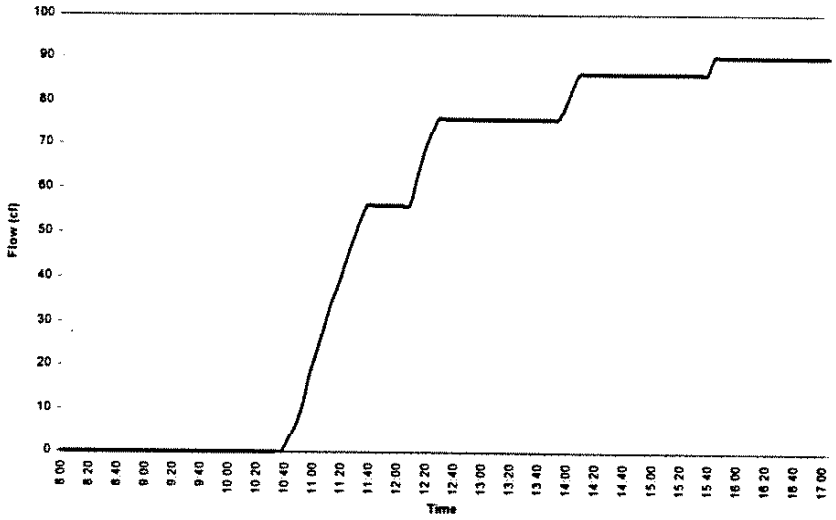


Figure 1-11c: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS StreamGuard DII for Event 5 on February 20-21, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

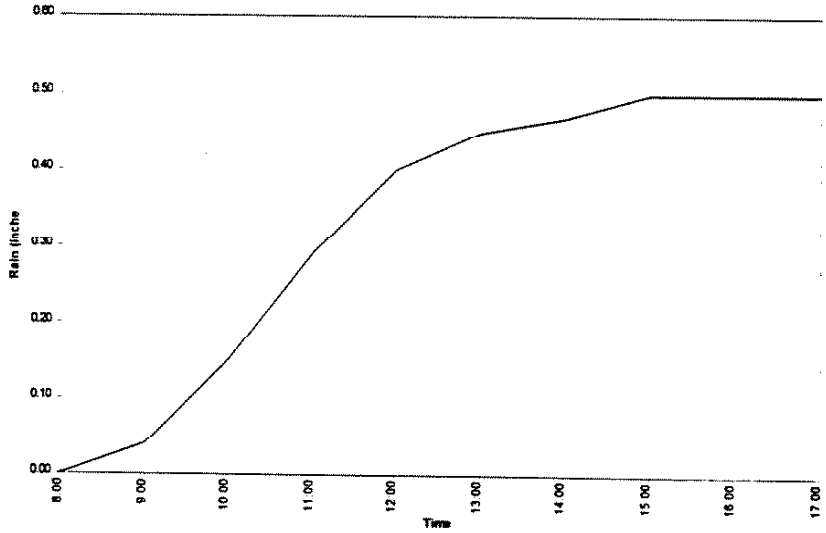
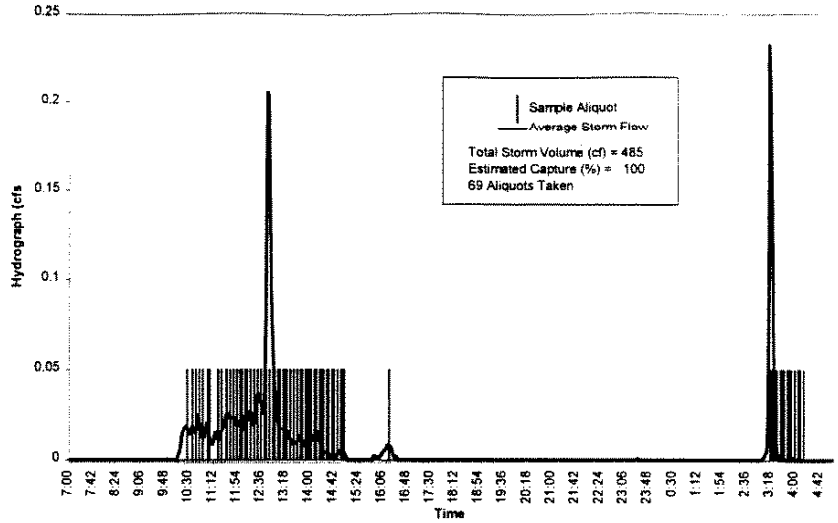
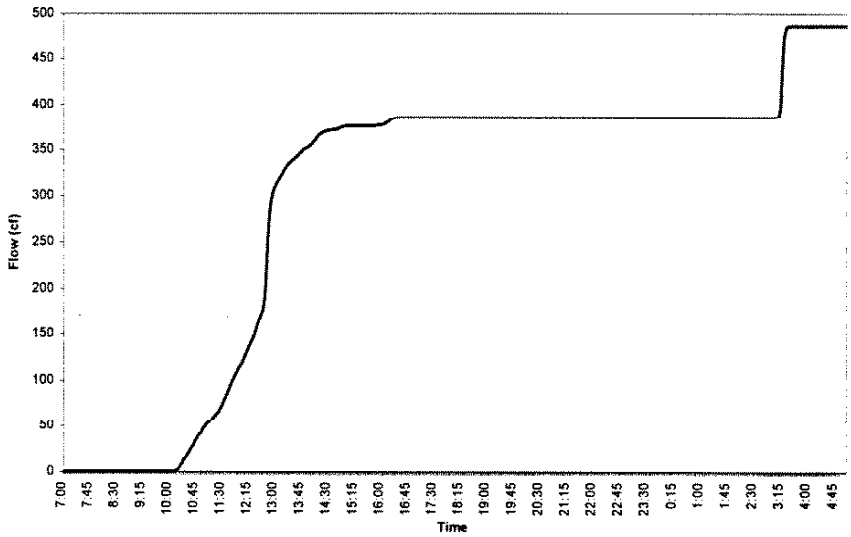


Figure 1-11d: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS StreamGuard DII for Event 6 on February 27, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

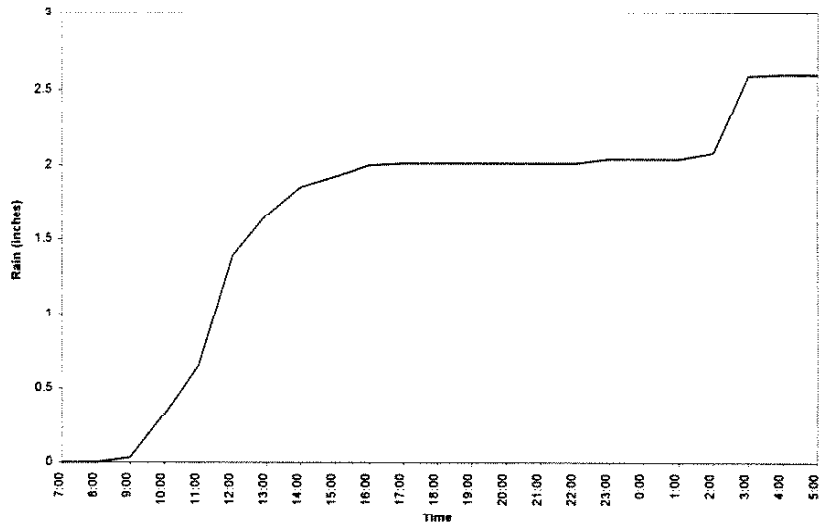
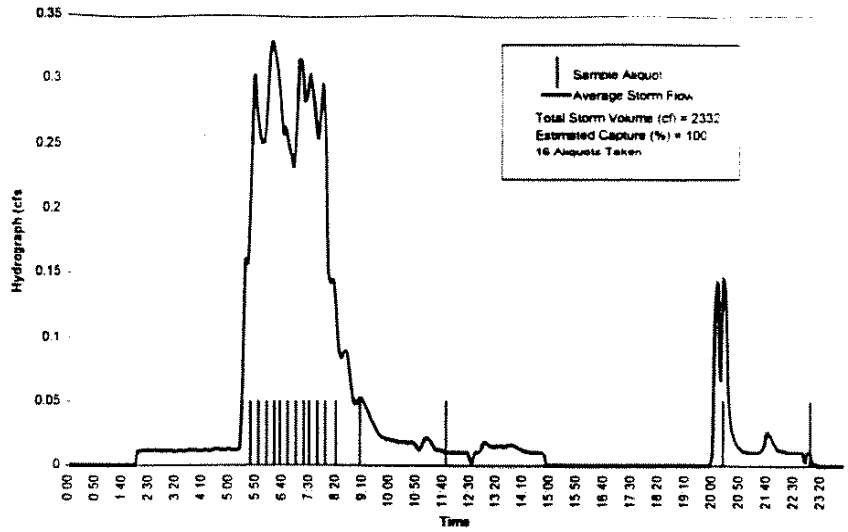
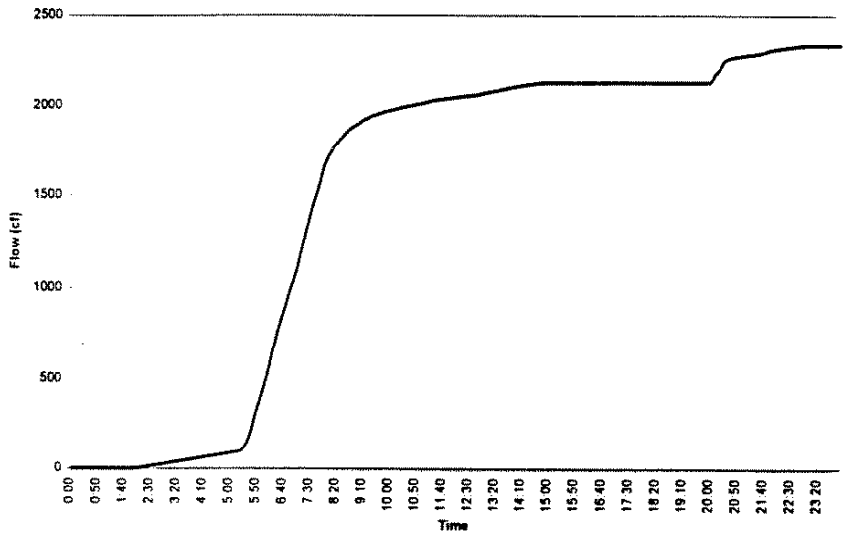


Figure 1-11e: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS StreamGuard DII for Event 8 on April 17-18, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

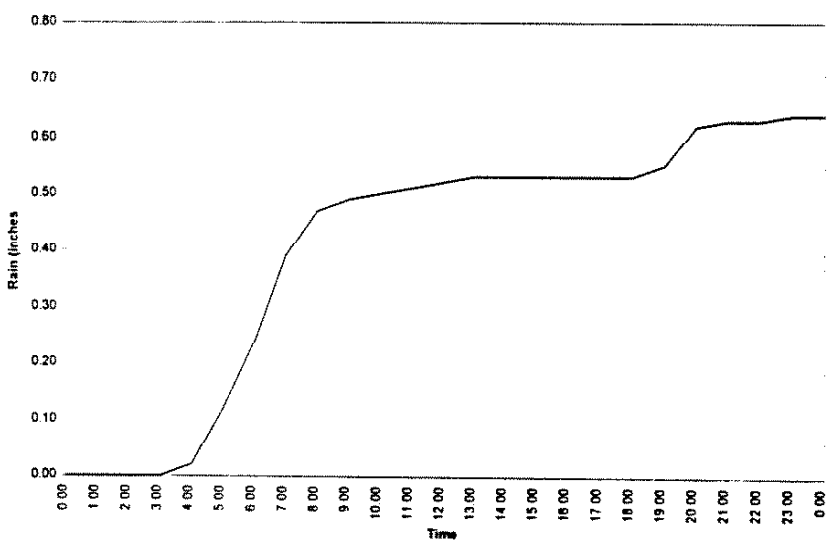
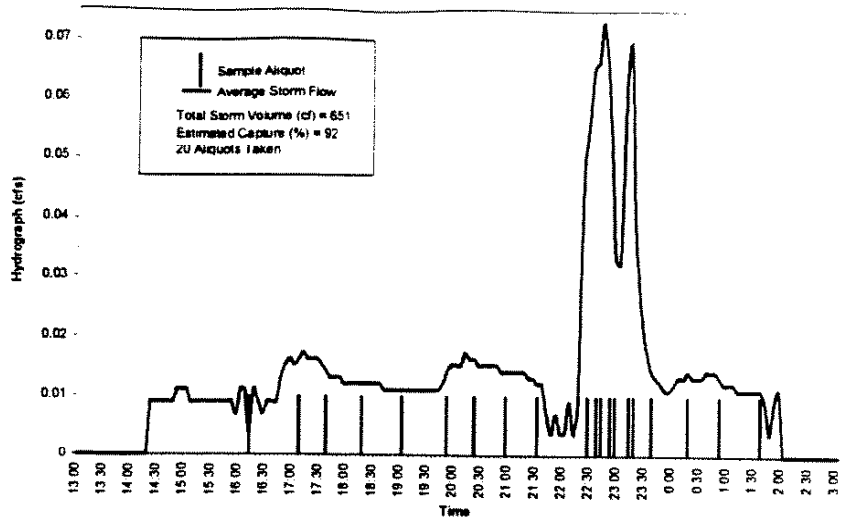
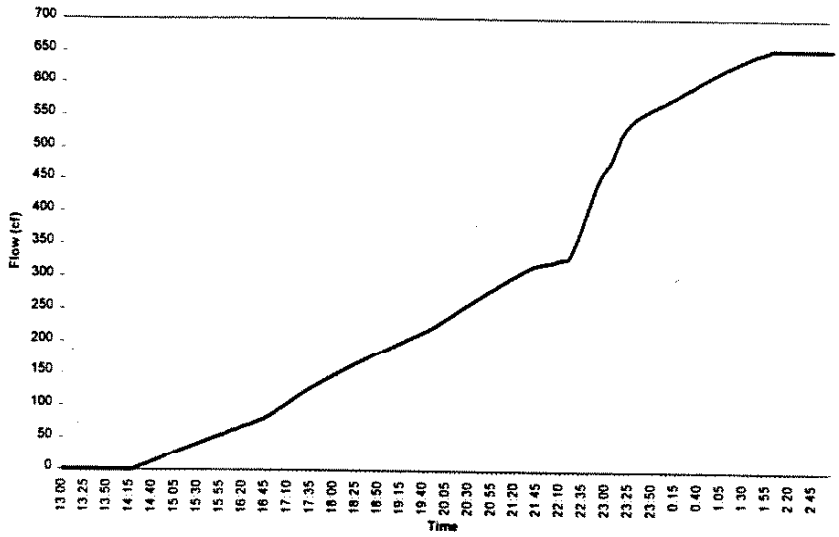


Figure 1-12a: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Rosemead MS StreamGuard DII for Event 1 on January 25, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

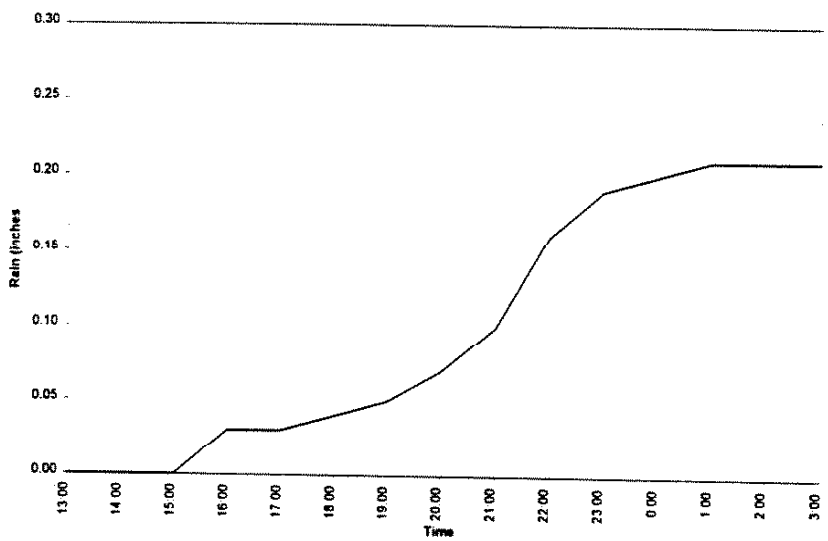
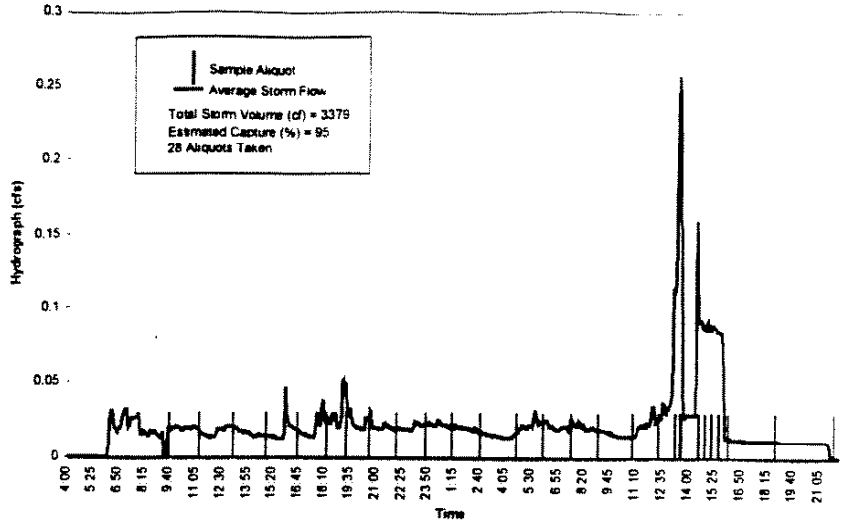
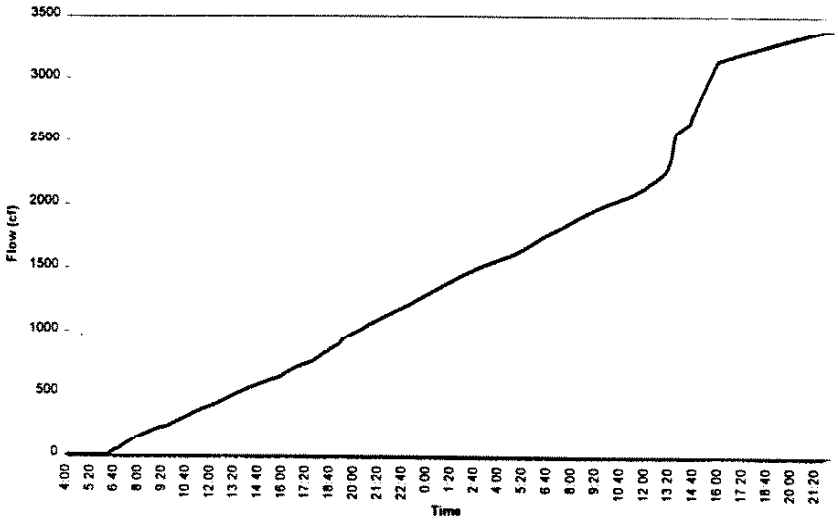


Figure 1-12b: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Rosemead MS StreamGuard DII for Event 2 on January 30, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

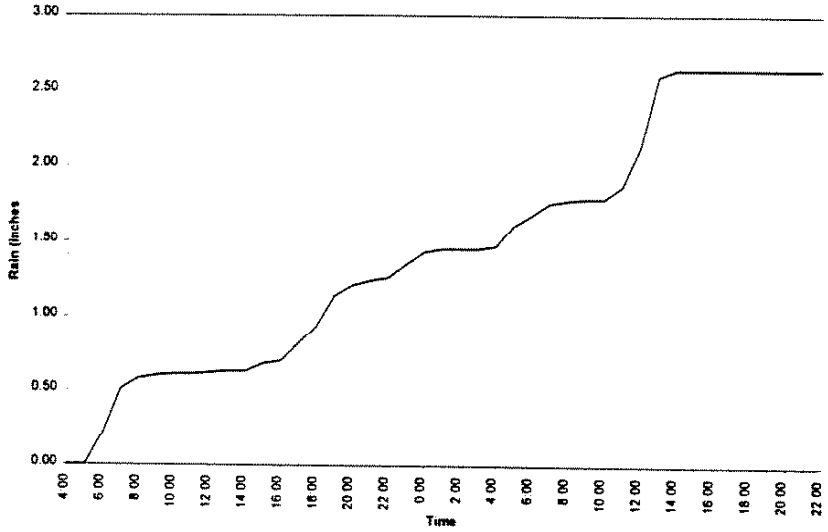
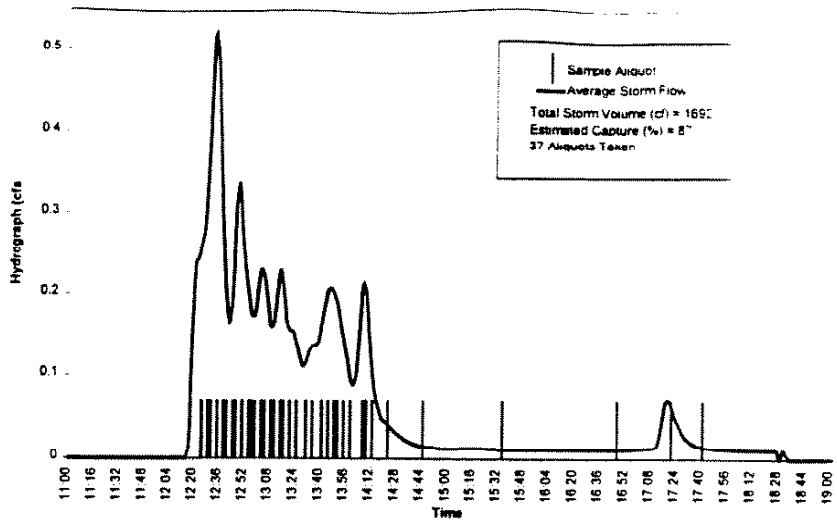
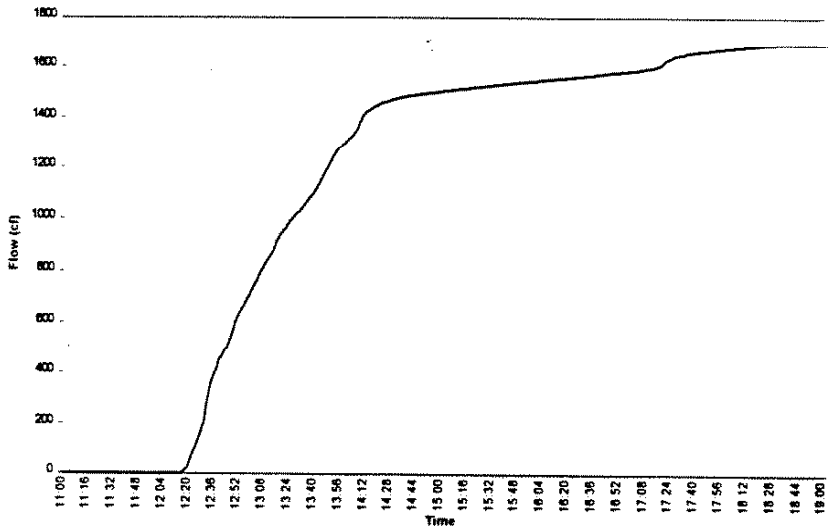


Figure 1-12c: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Rosemead MS StreamGuard DII for Event 5 on February 20-21, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

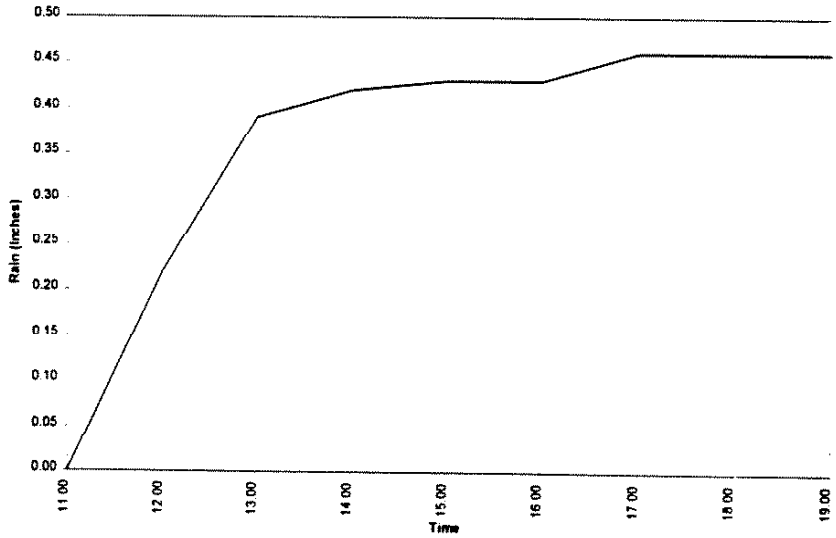
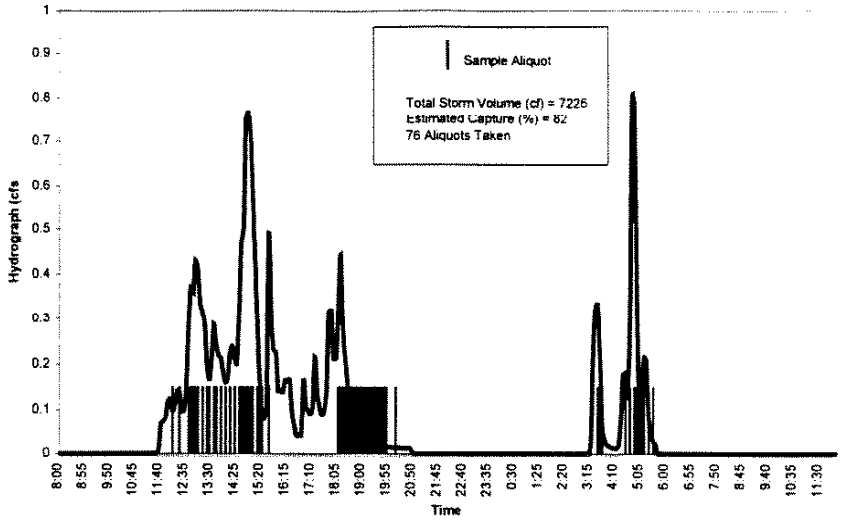
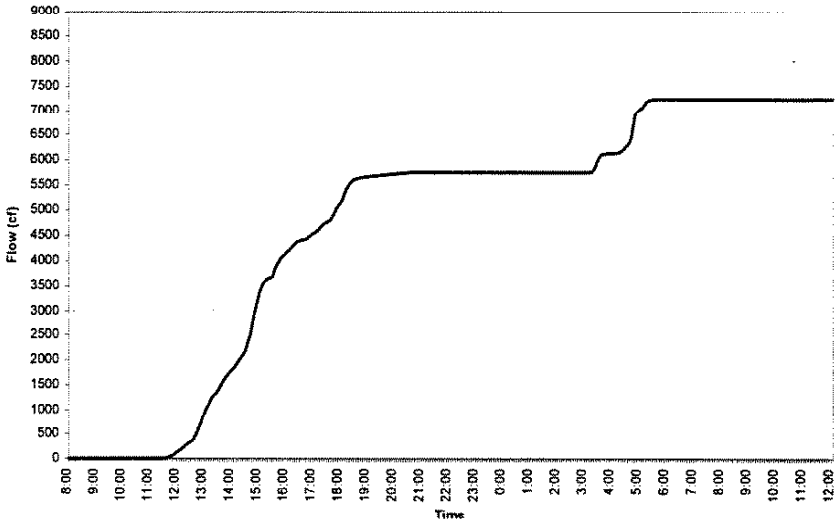


Figure 1-12d: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Rosemead MS StreamGuard DII for Event 6 on February 27, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

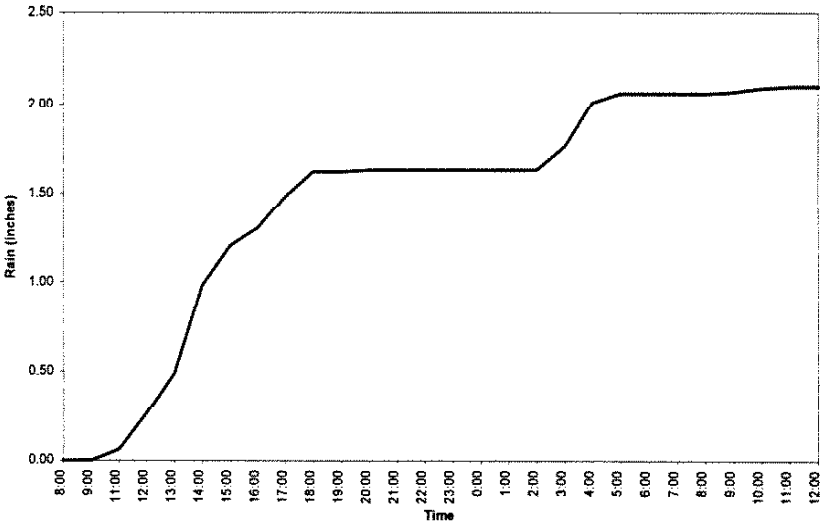
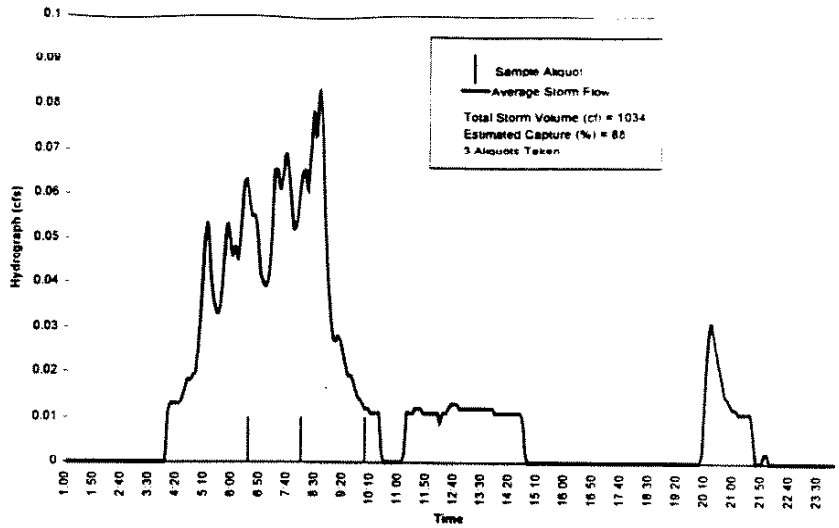
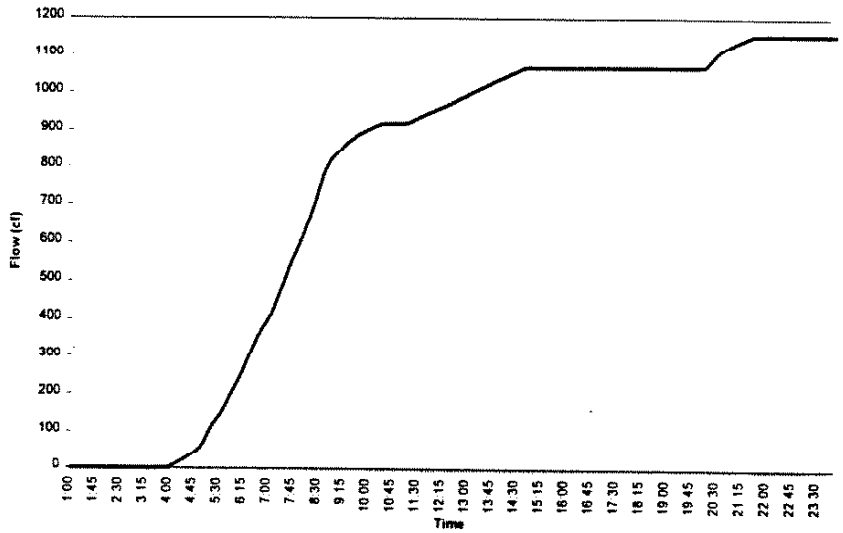


Figure 1-12e: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Rosemead MS StreamGuard DII for Event 8 on April 17-18, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

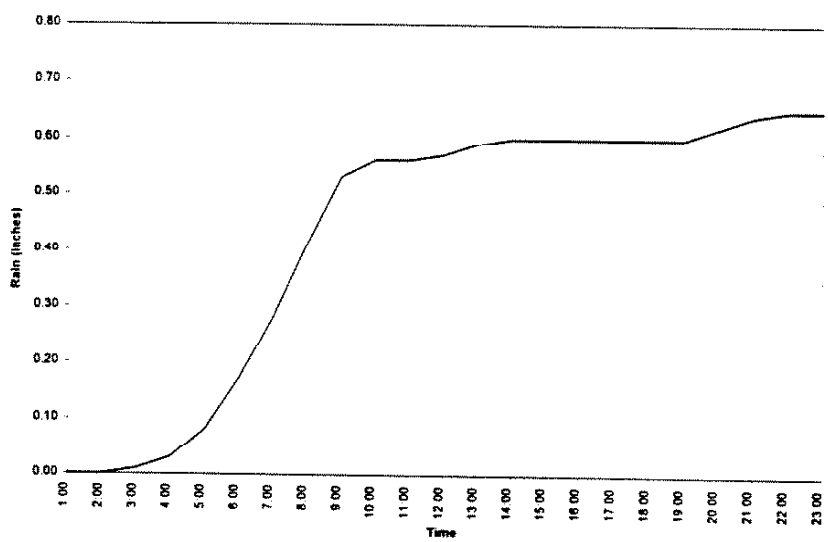
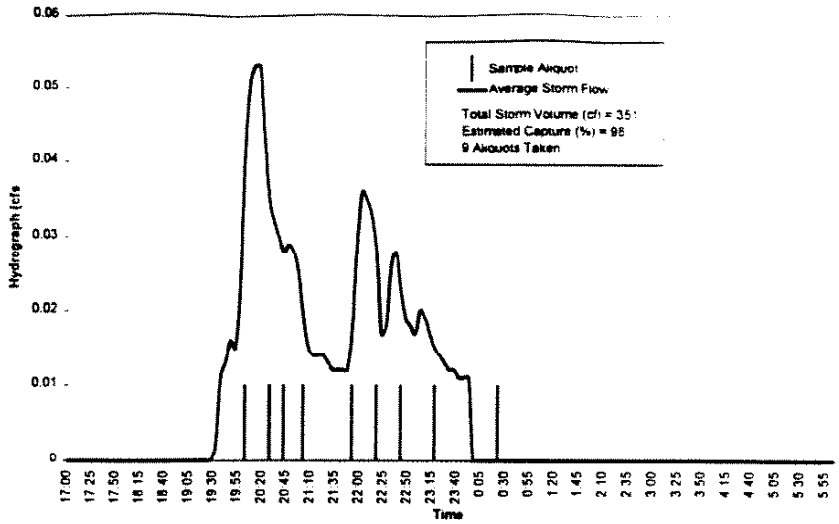
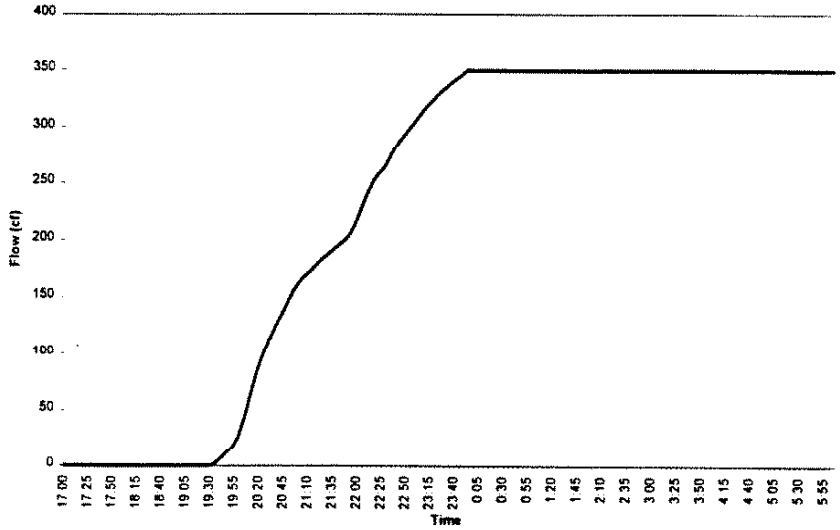


Figure 1-13a: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS Fossil Filter DII for Event 1 on January 25, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

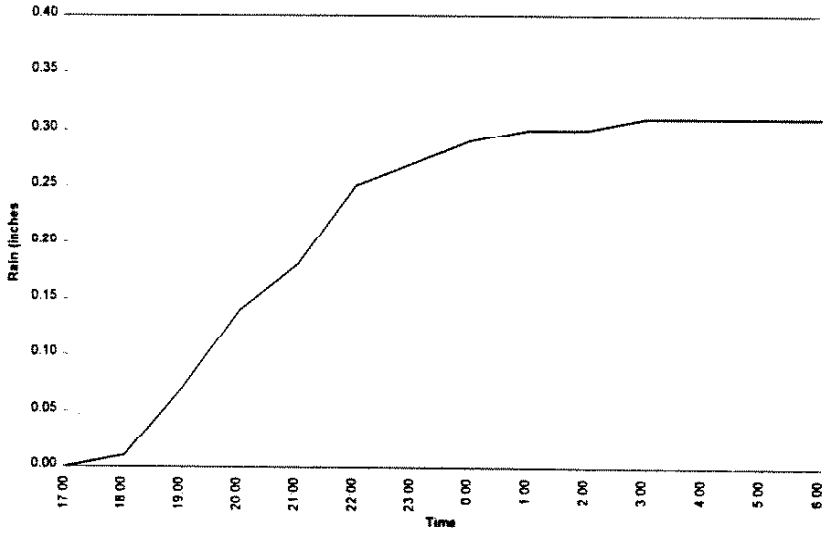
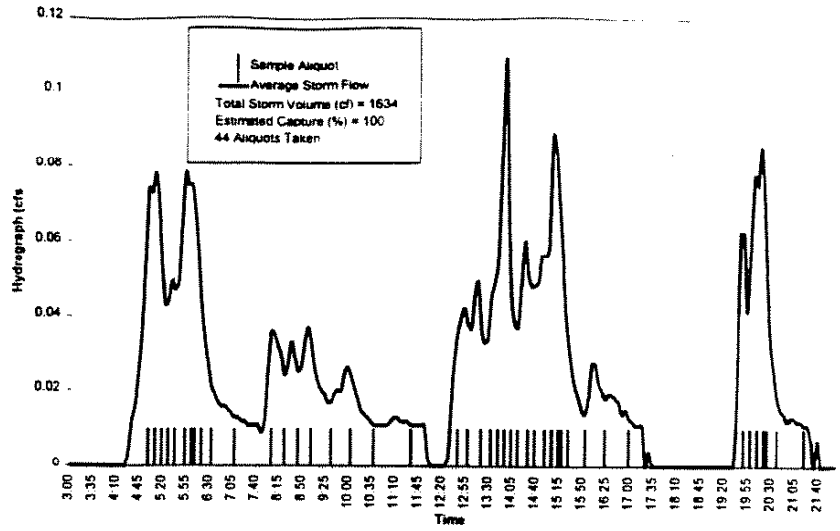
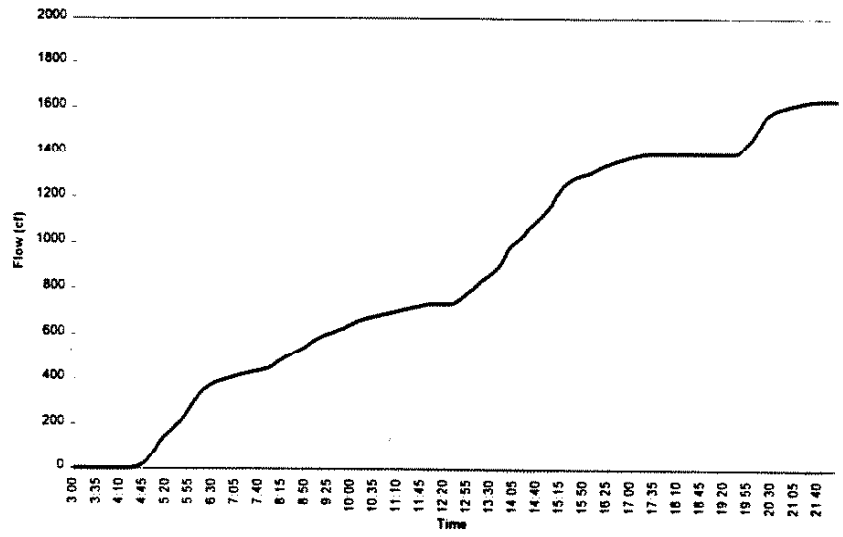


Figure 1-13b: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS Fossil Filter DII for Event 2 on January 30, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

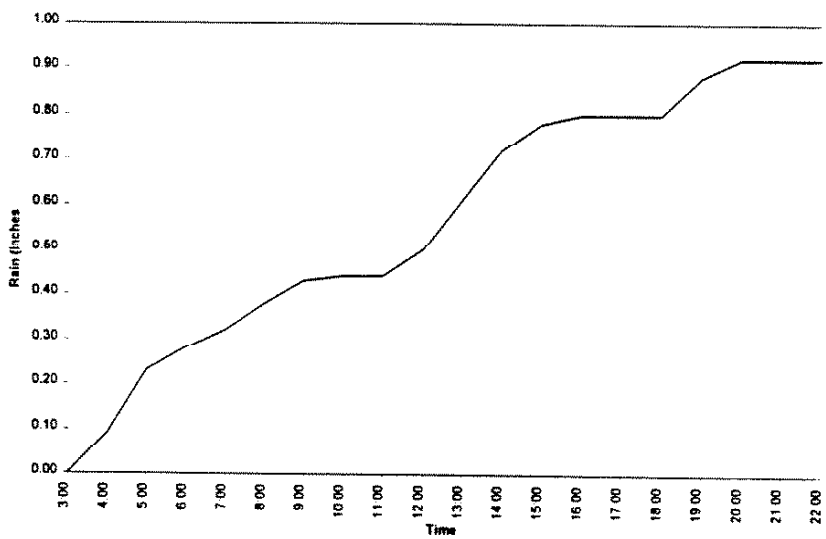
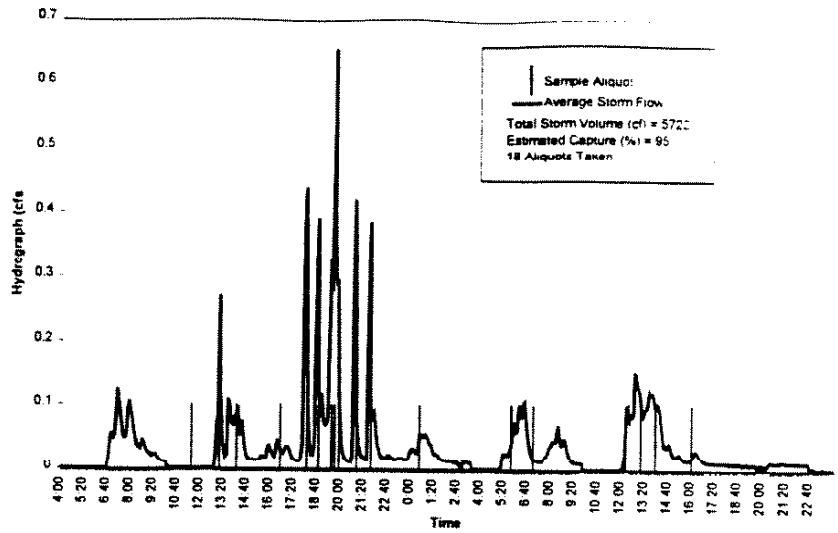
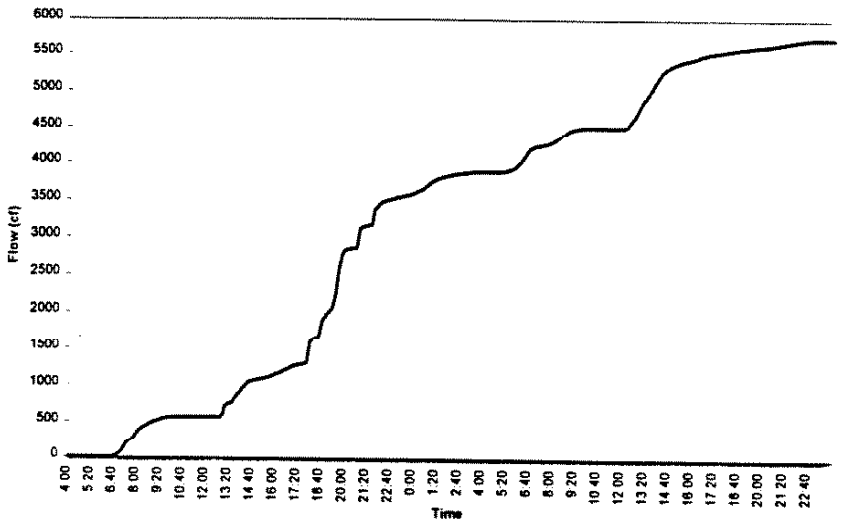


Figure 1-13c: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS Fossil Filter DII for Event 4 on February 16, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

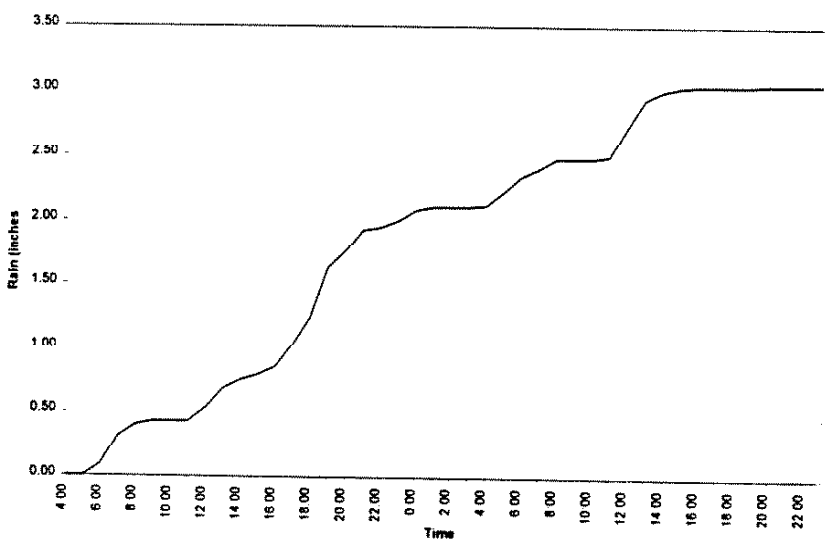
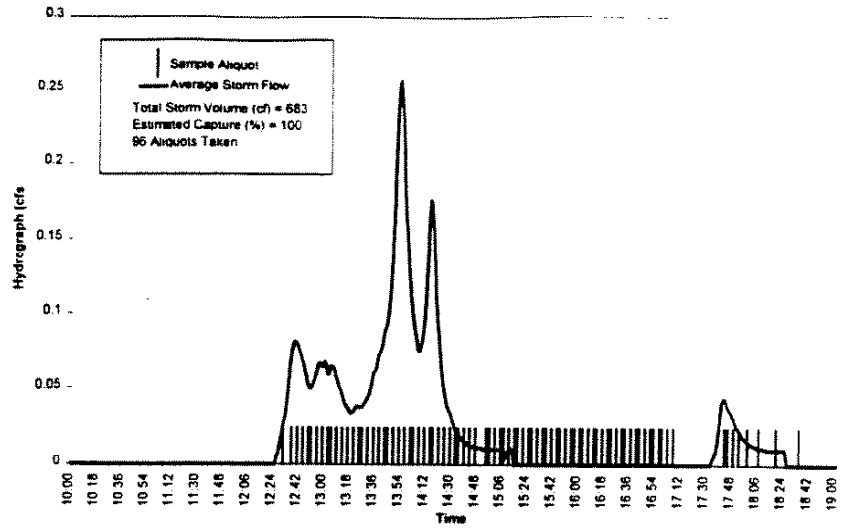
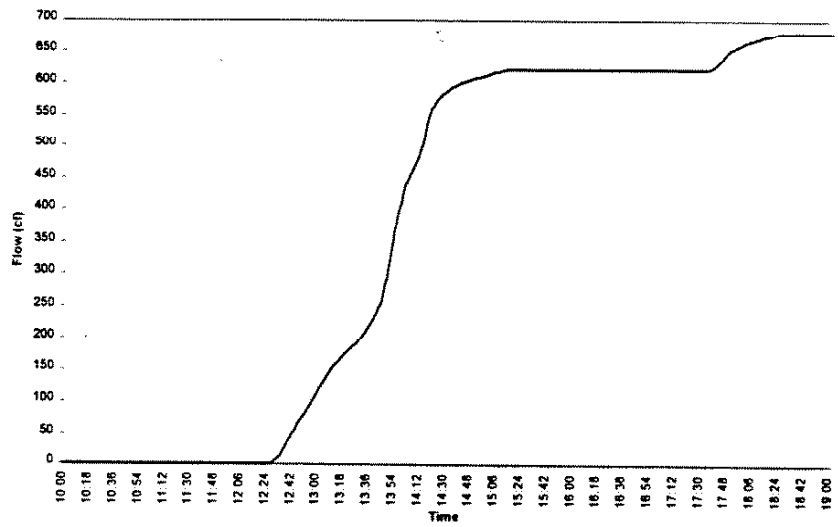


Figure 1-13d: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS Fossil Filter DII for Event 5 on February 20-21, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

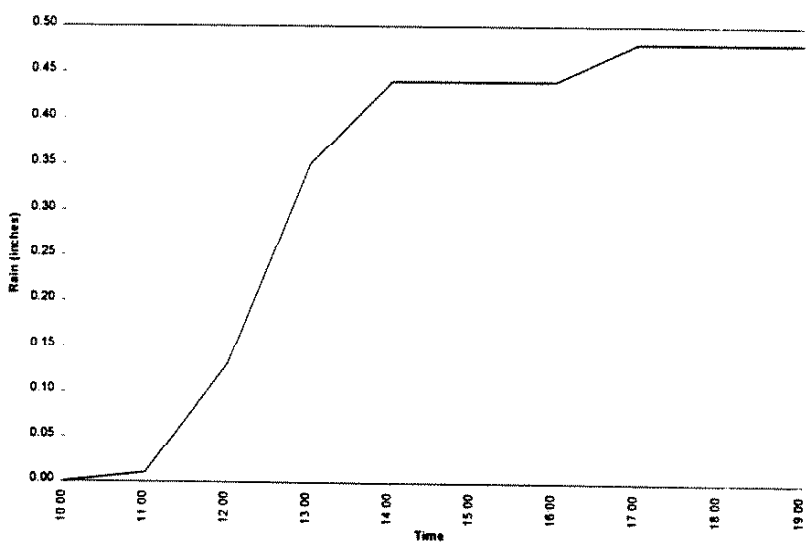
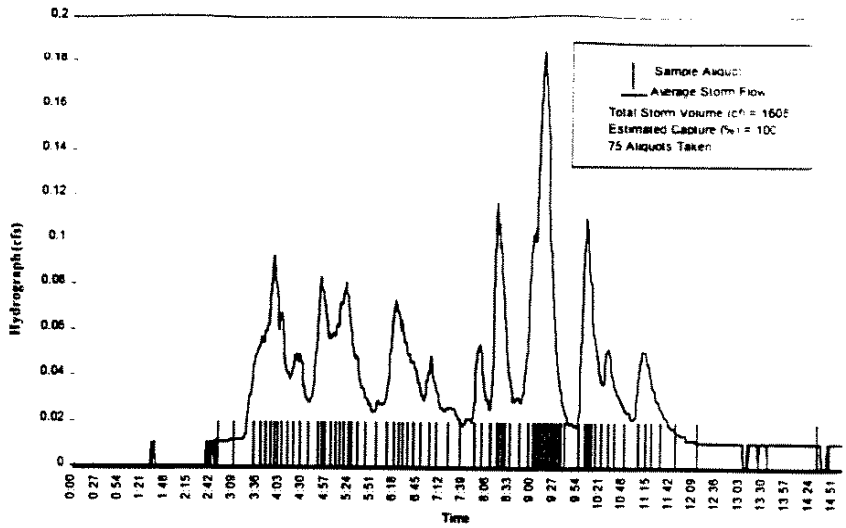
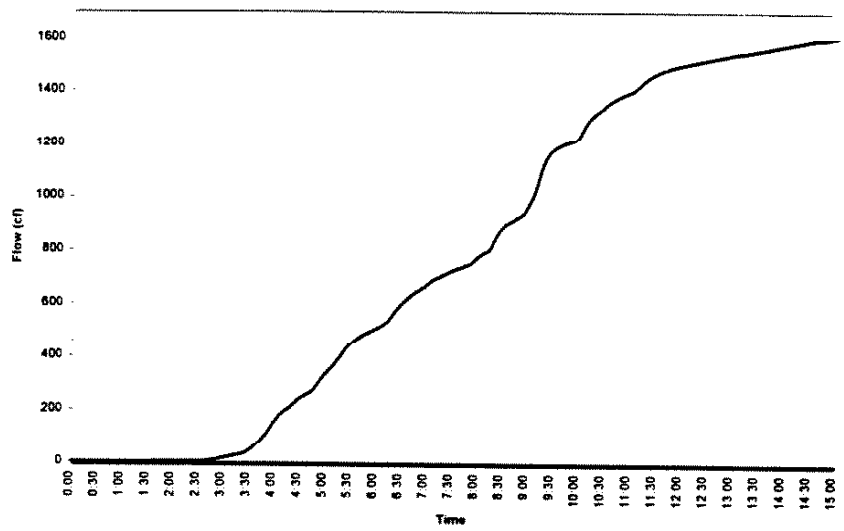


Figure 1-13e: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS Fossil Filter DII for Event 6 on February 27, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

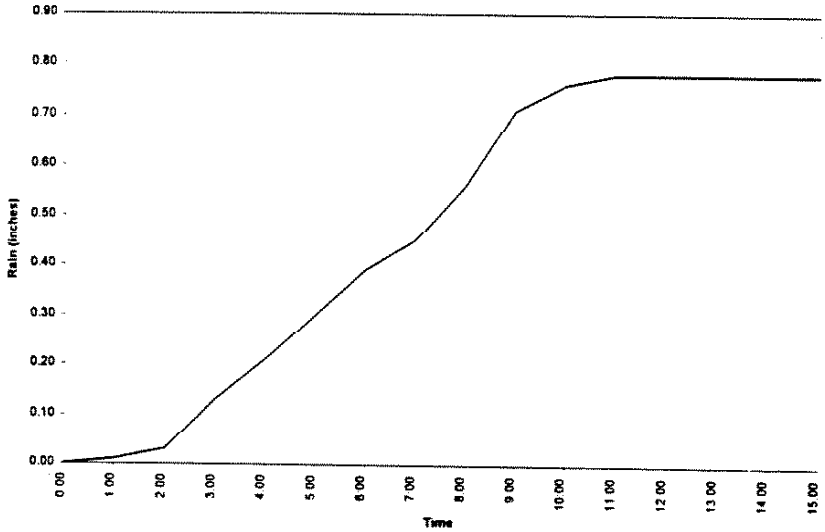
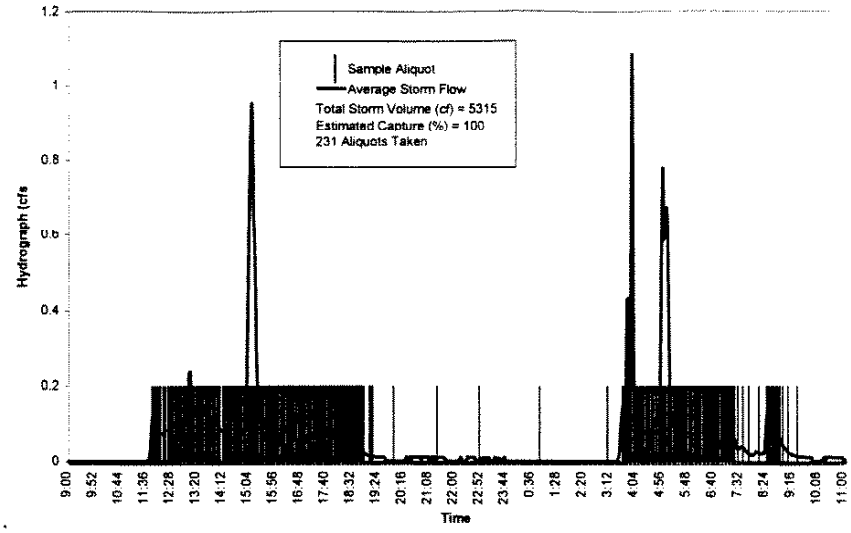
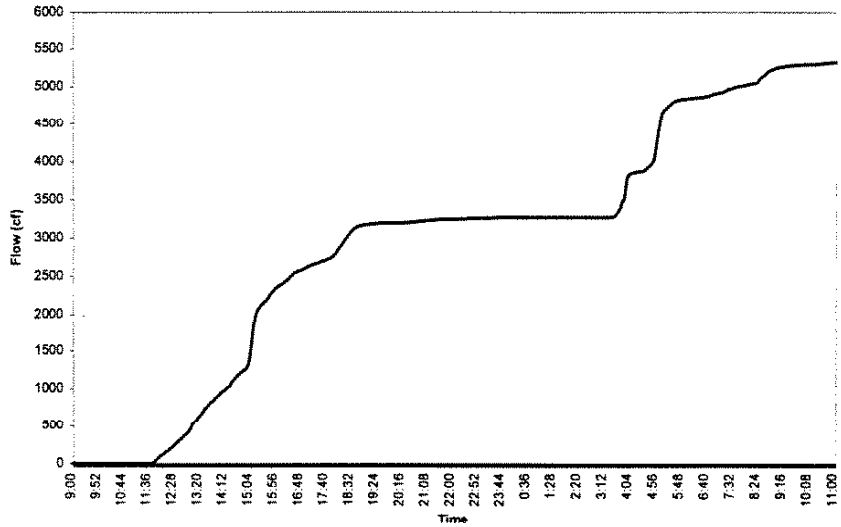


Figure 1-13f: Effluent Hydrograph, Cumulative Flow and Cumulative Rainfall at the Foothill MS Fossil Filter DII for Event 7 on March 8, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

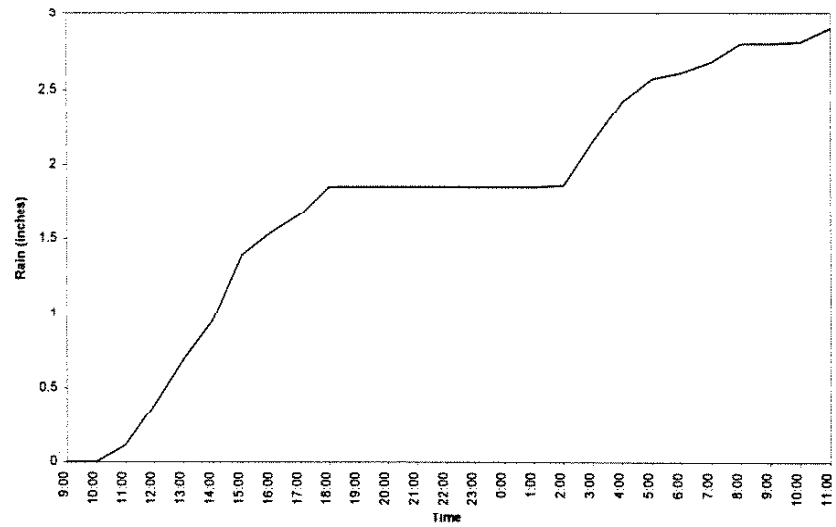
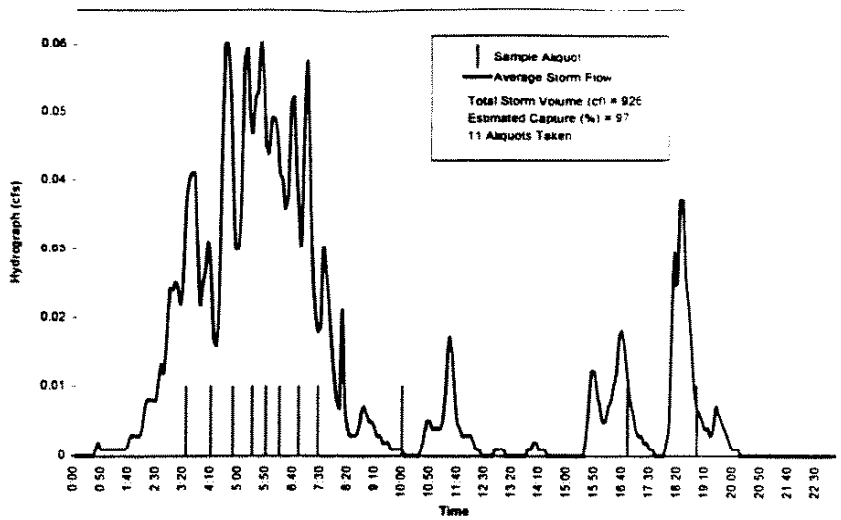
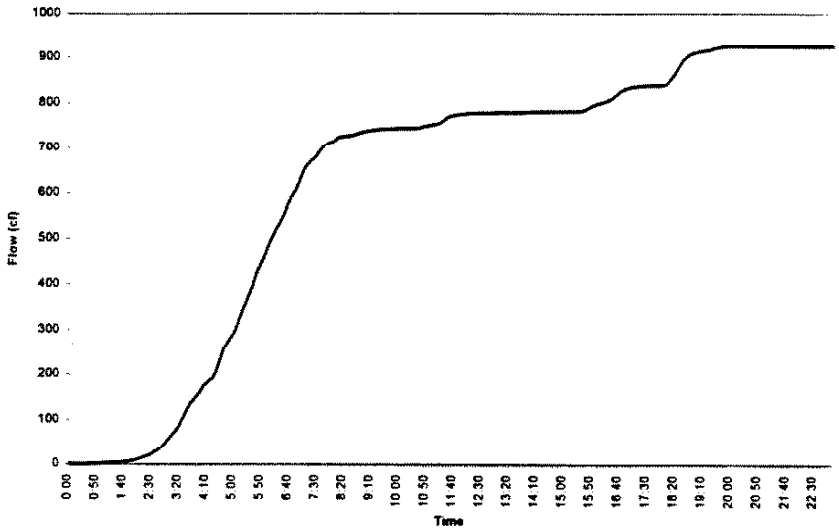


Figure 1-13g: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Foothill MS Fossil Filter DII for Event 8 on April 17-18, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

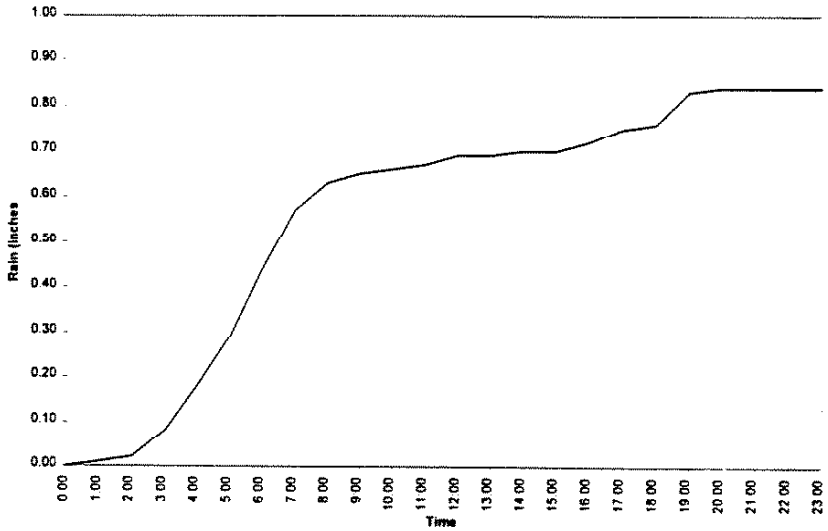
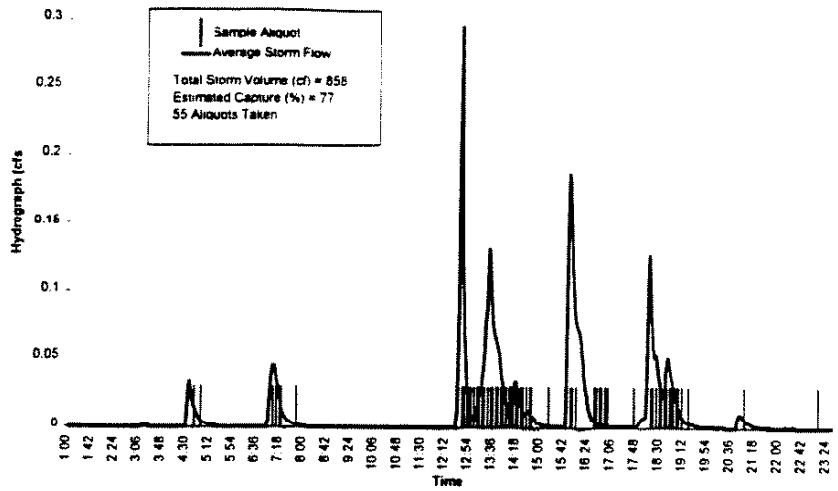
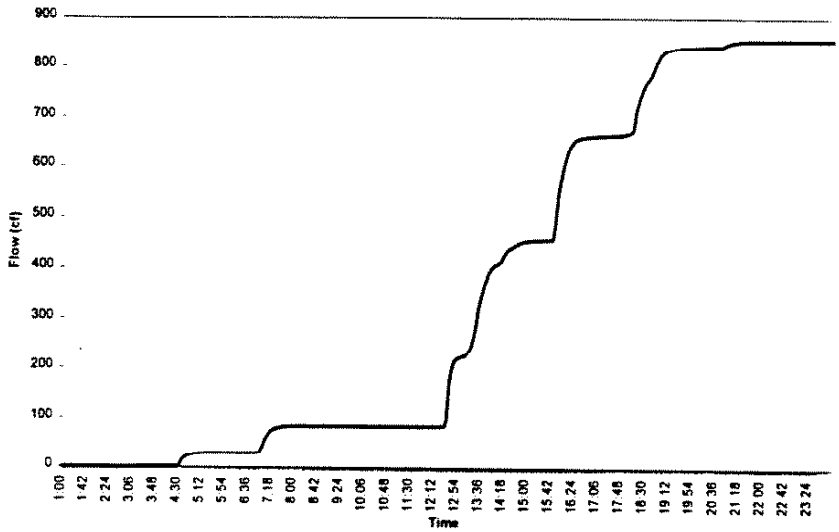


Figure 1-14a: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS Fossil Filter DII for Event 1 on January 25, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

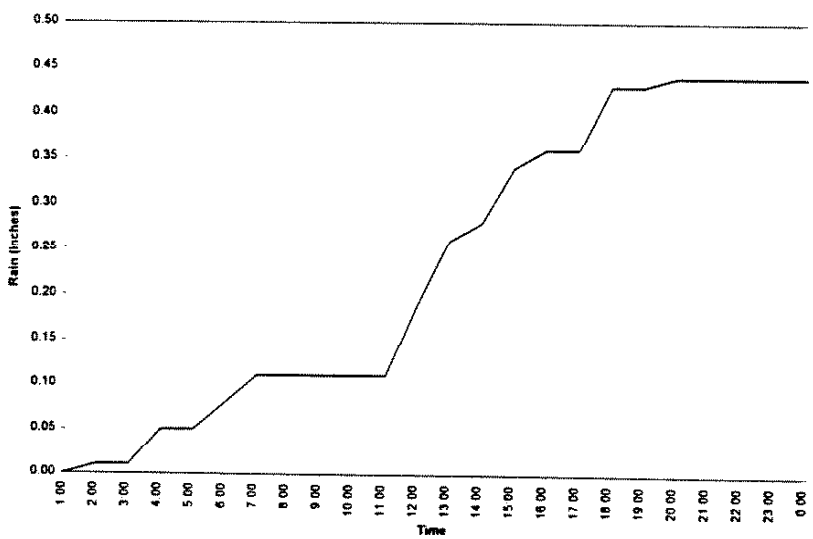
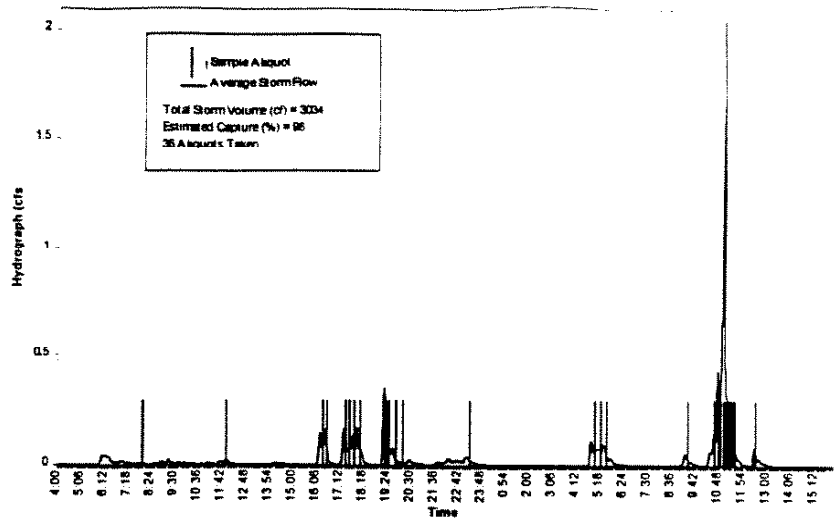
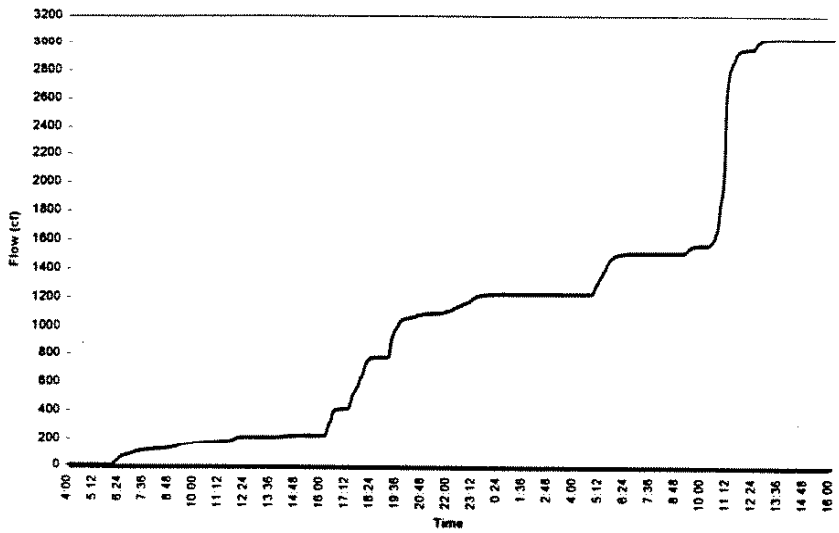


Figure 1-14b: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS Fossil Filter DII for Event 3 on February 10, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

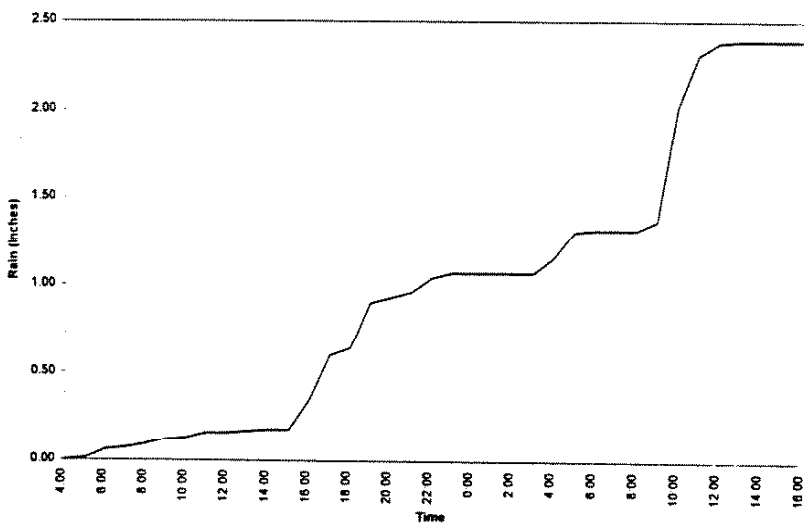
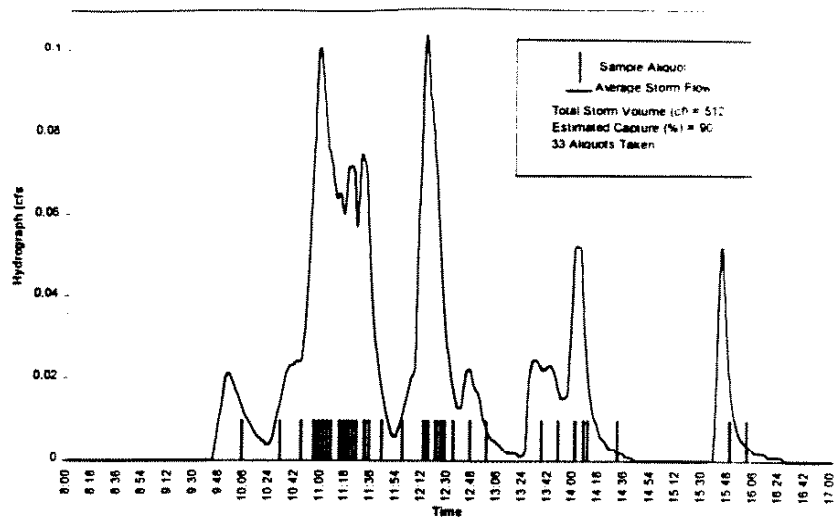
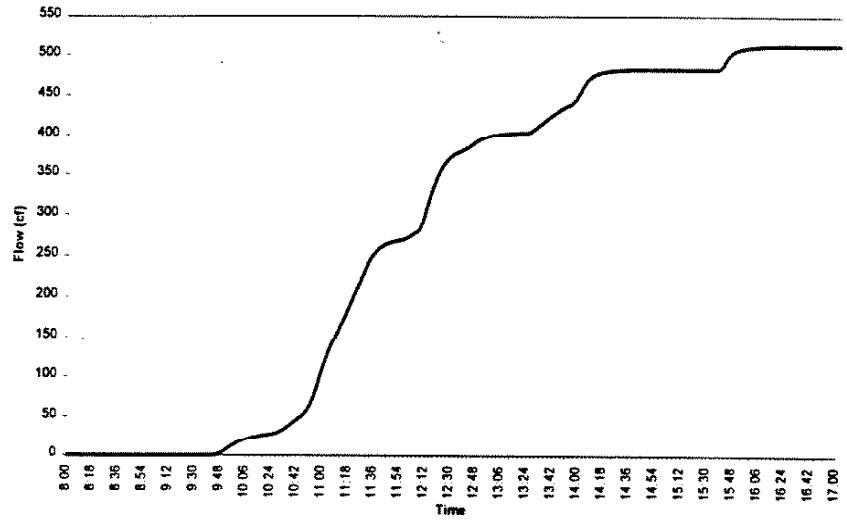


Figure 1-14c: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS Fossil Filter DII for Event 5 on February 20-21, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

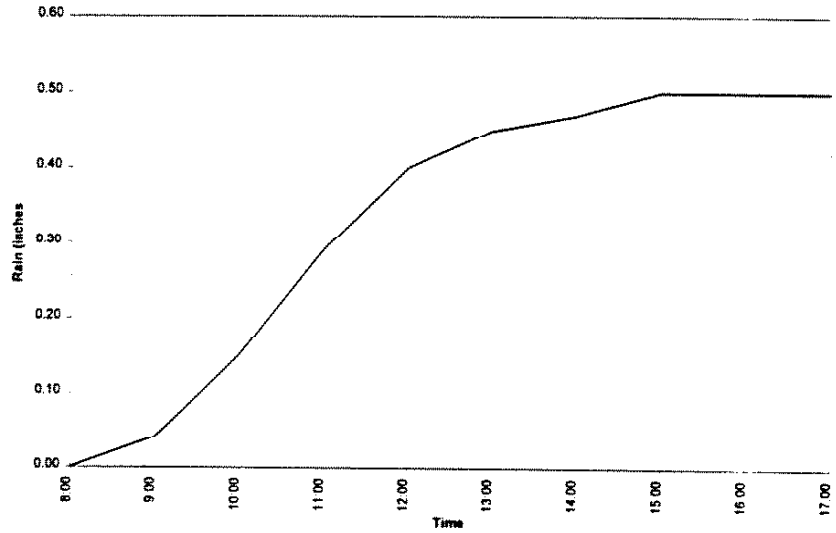
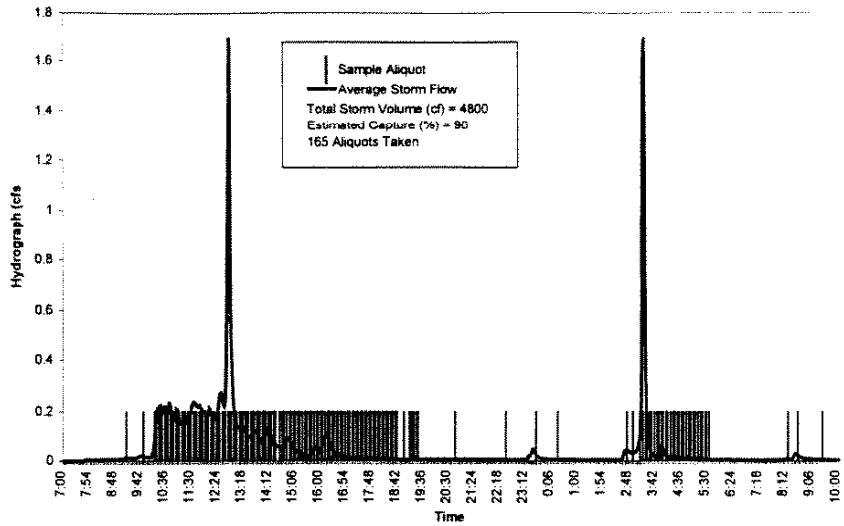
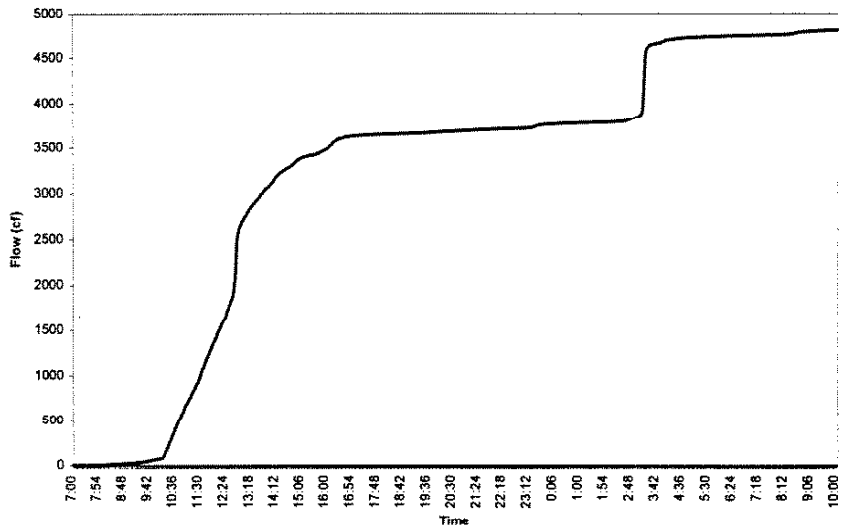


Figure 1-14d: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS Fossil Filter DII for Event 6 on February 27, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

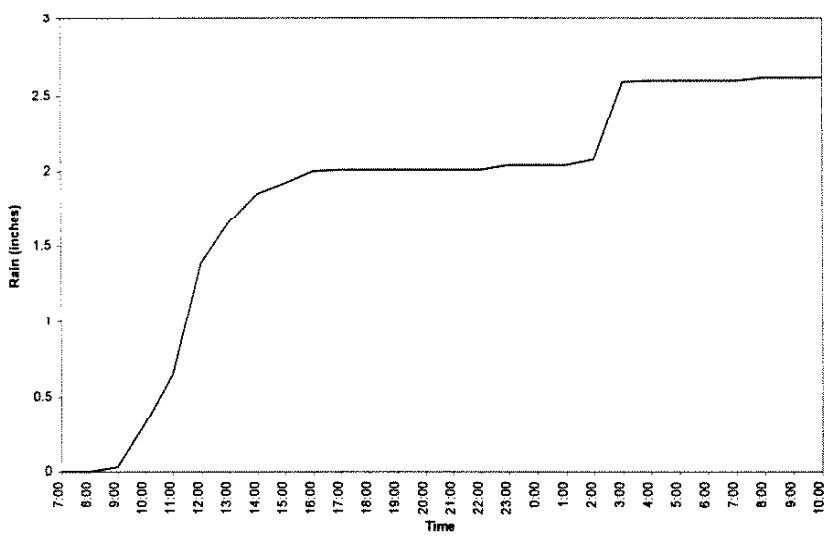
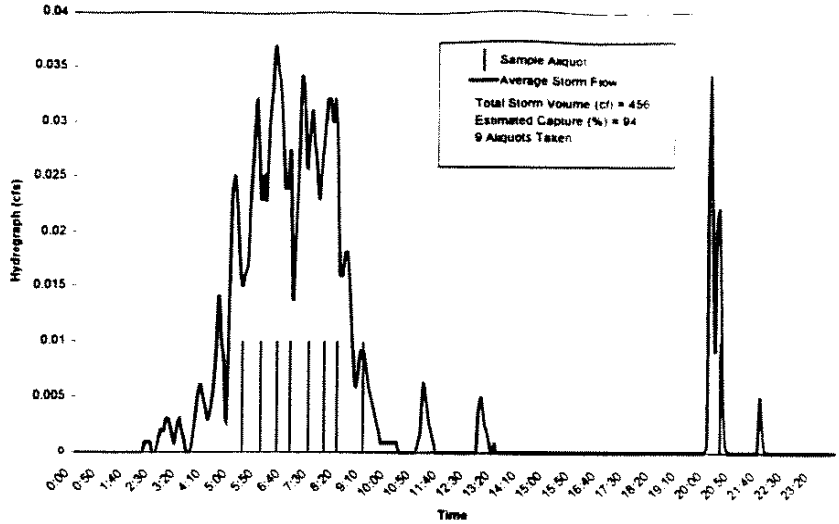
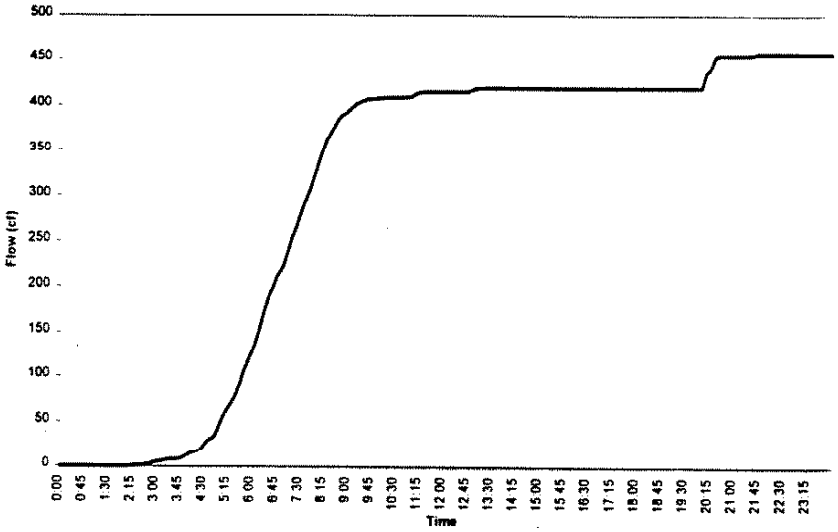


Figure 1-14e: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Las Flores MS Fossil Filter DII for Event 8 on April 17-18, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

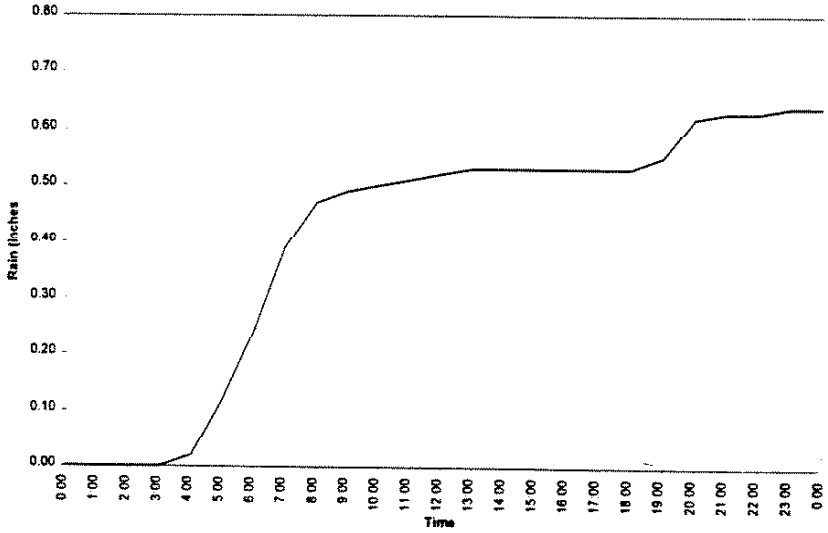
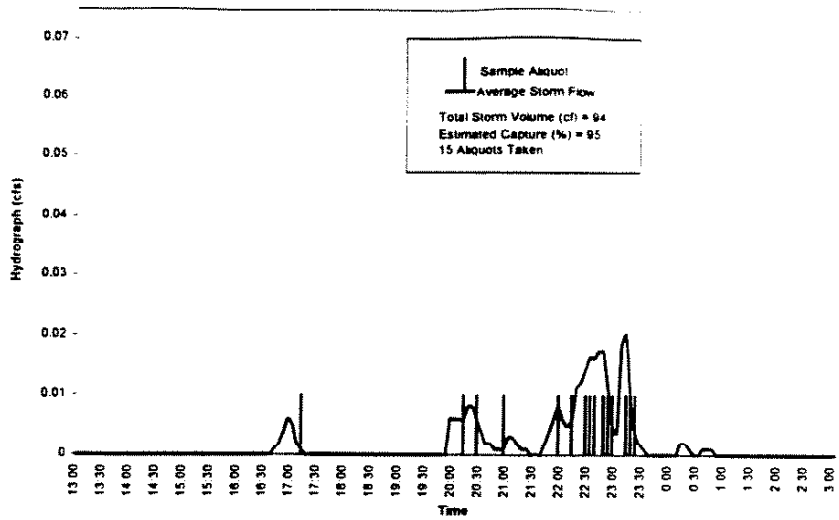
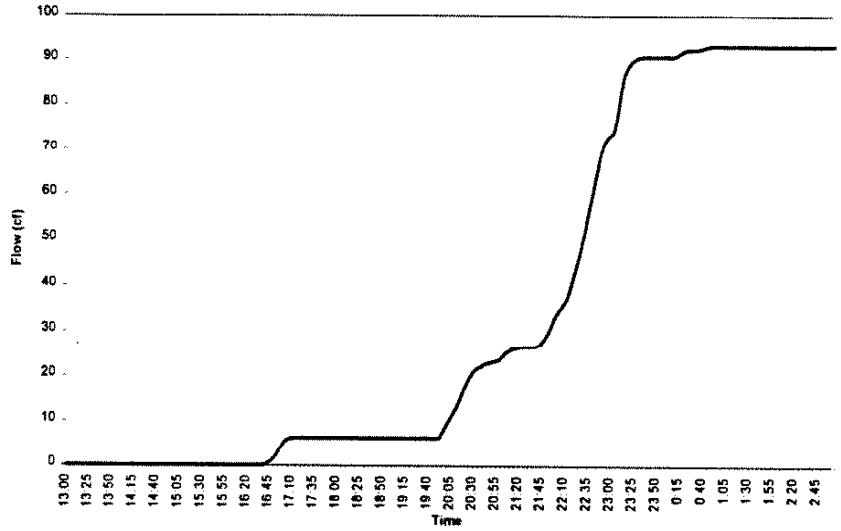


Figure 1-15a: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Rosemead MS Fossil Filter DII for Event 1 on January 25, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

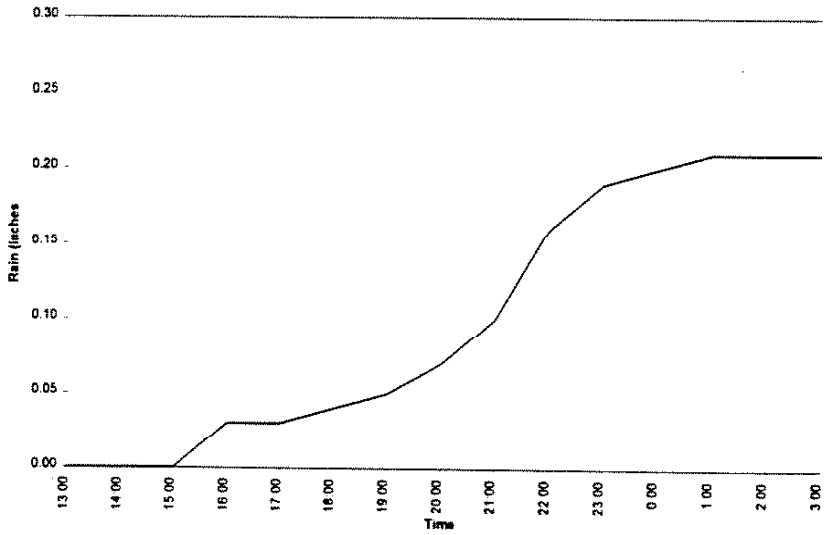
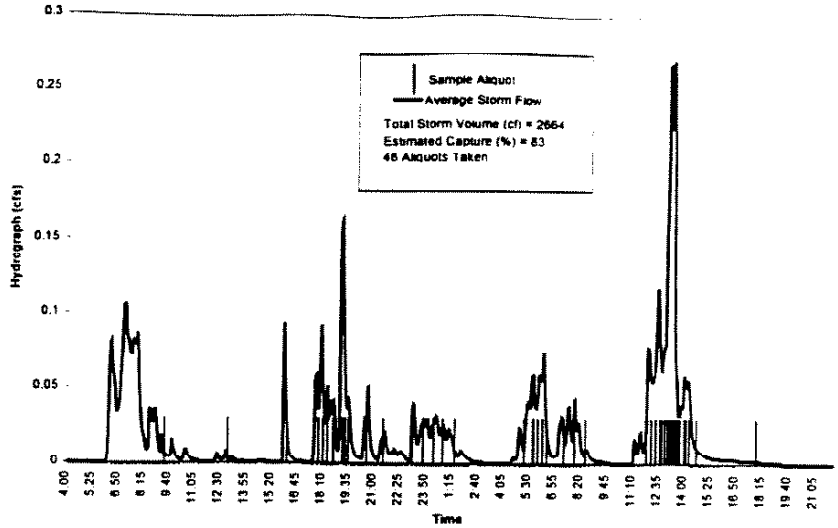
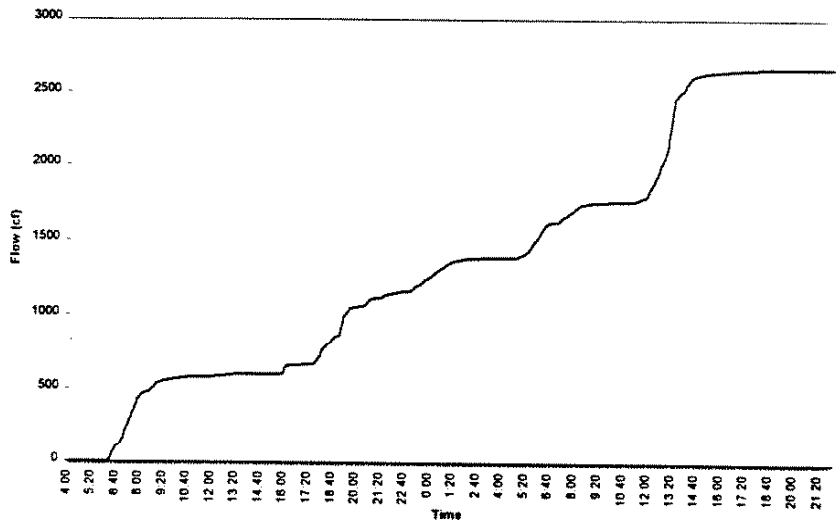


Figure 1-15b: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Rosemead MS Fossil Filter DII for Event 2 on January 30, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

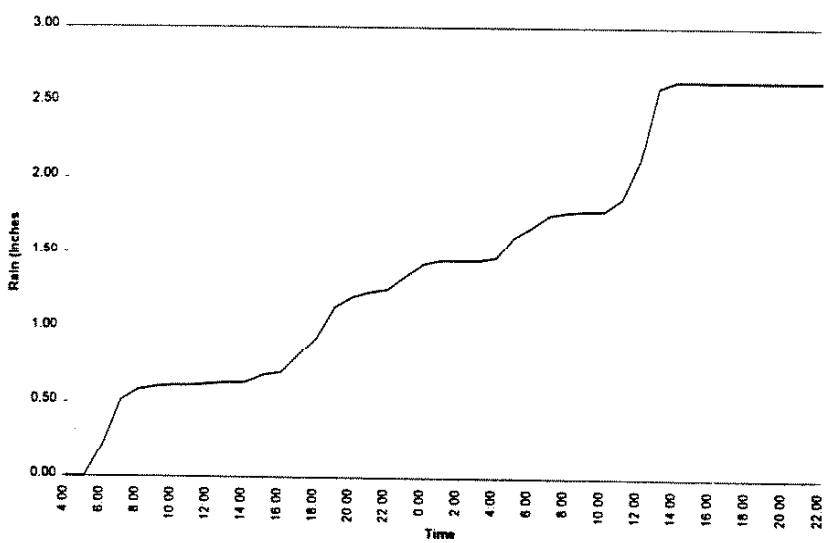
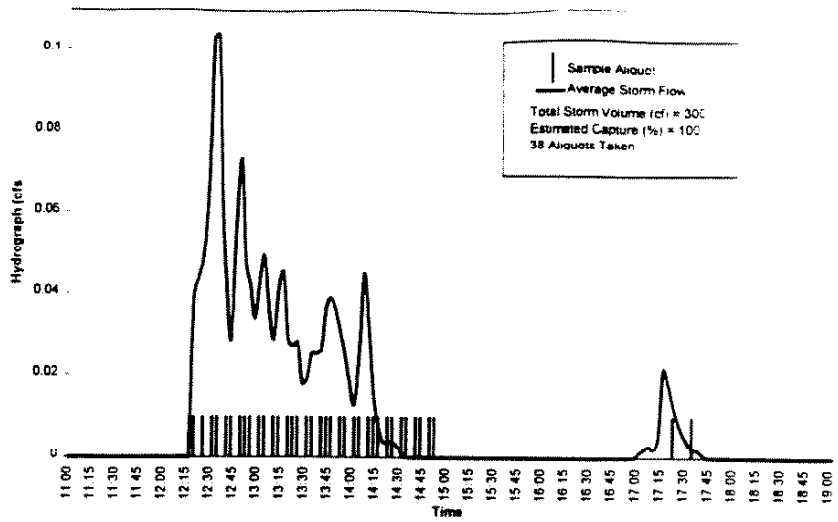
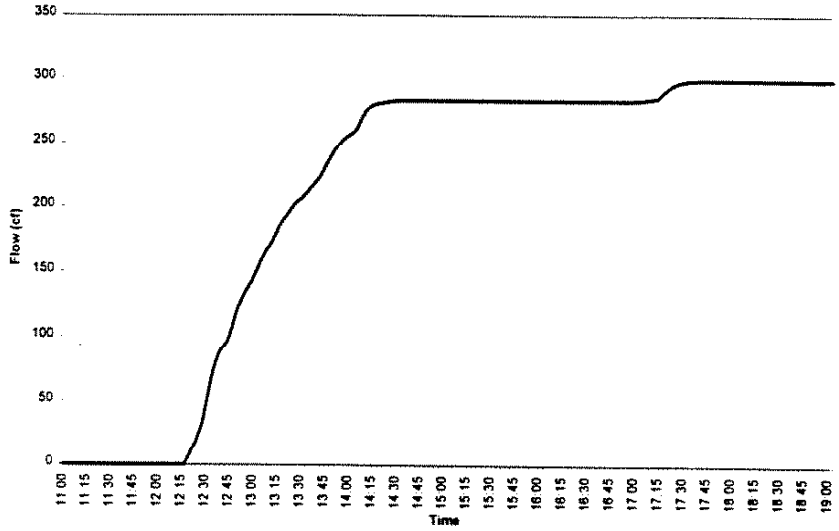


Figure 1-15c: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Rosemead MS Fossil Filter DII for Event 5 on February 20-21, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

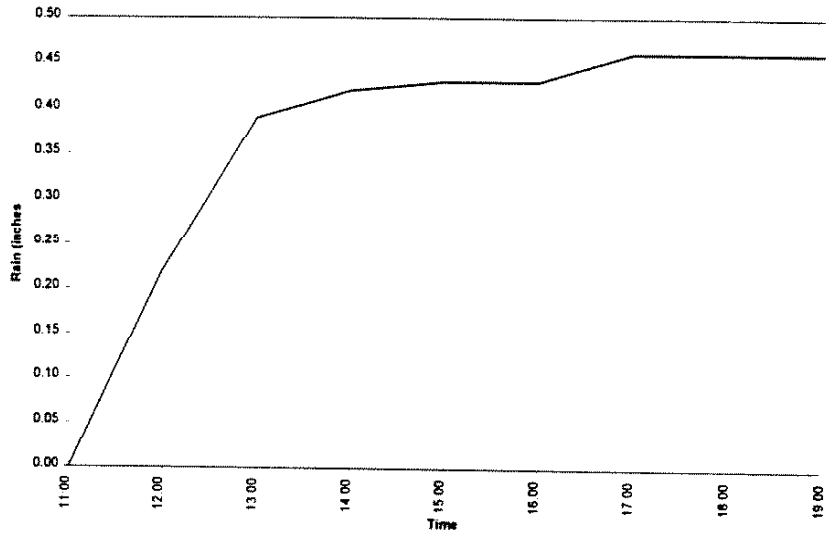
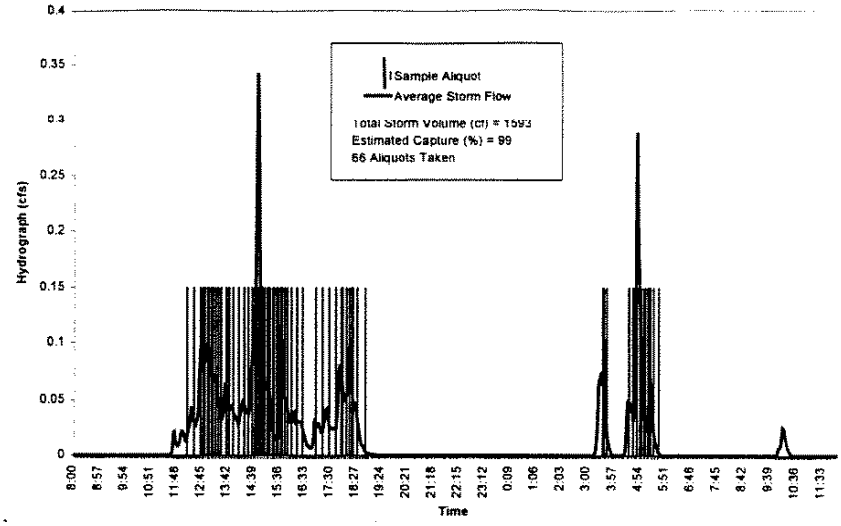
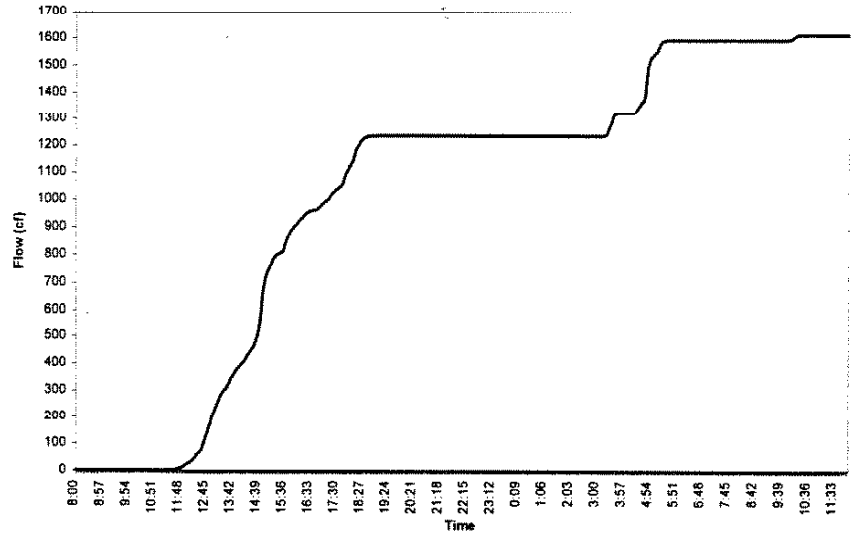


Figure 1-15d: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall at the Rosemead MS Fossil Filter DII for Event 6 on February 27, 2000

Effluent



Cumulative Flow



Cumulative Rainfall

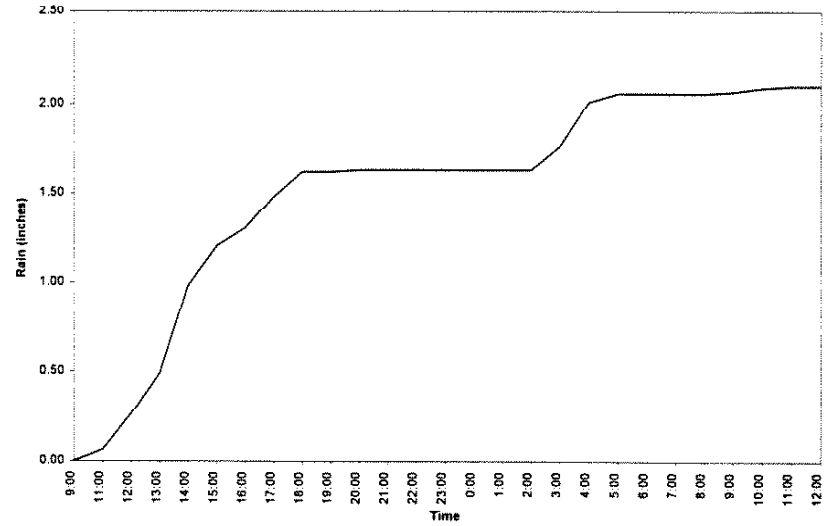
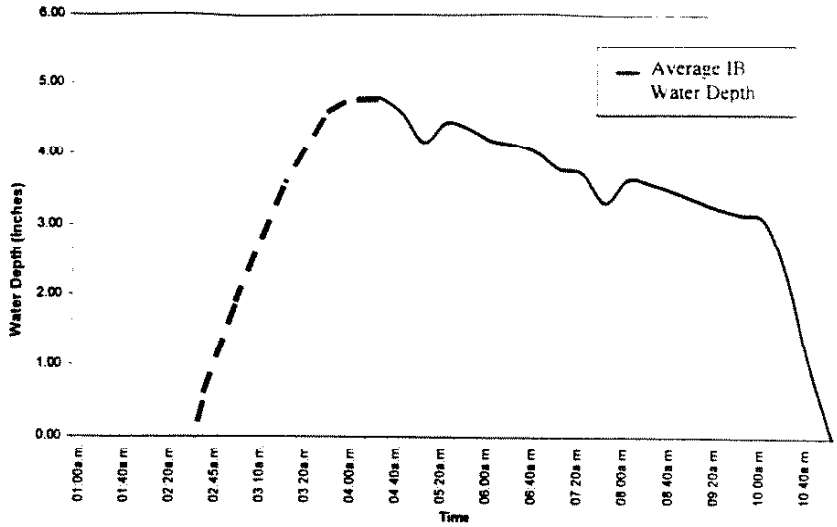


Figure 1-15e: Effluent Hydrograph, Cumulative Flow, and Cumulative Rainfall-at the Rosemead MS Fossil Filter DII for Event 8 on April 17-18, 2000

IB Water Depth



Cumulative Rainfall

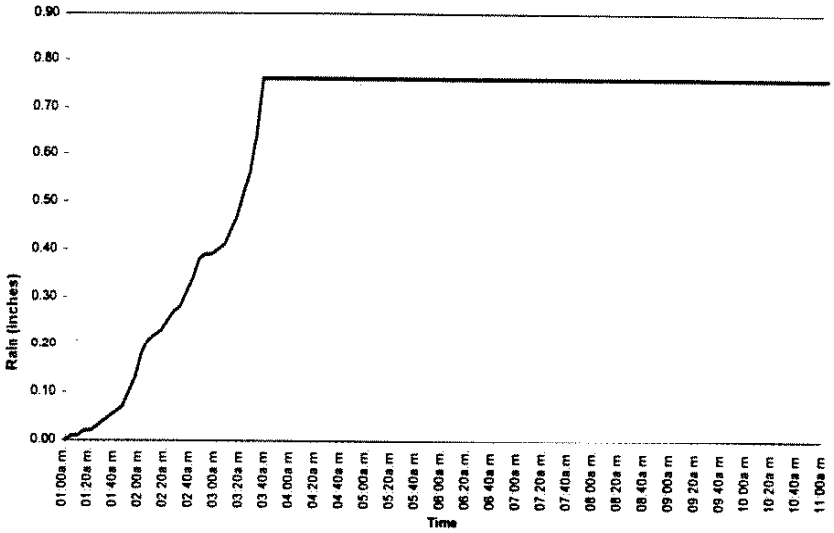
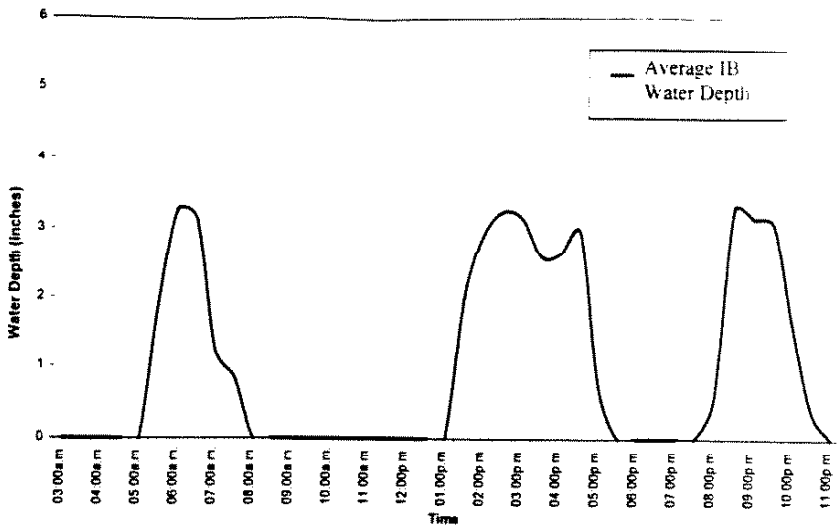


Figure 1-16a: Infiltration Basin Water Depth and Cumulative Rainfall at the I-605/SR-91 Infiltration Basin on February 12, 2000. Note: Data logger at IB turned on at 04:00 on 2/12/2000, dashed line represents estimated water depth in IB.

IB
Water
Depth



Cumulative
Rainfall

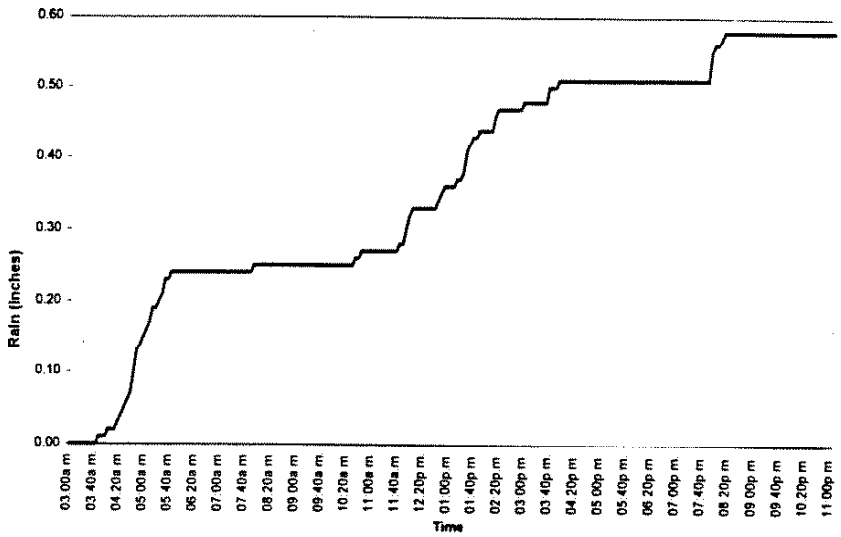
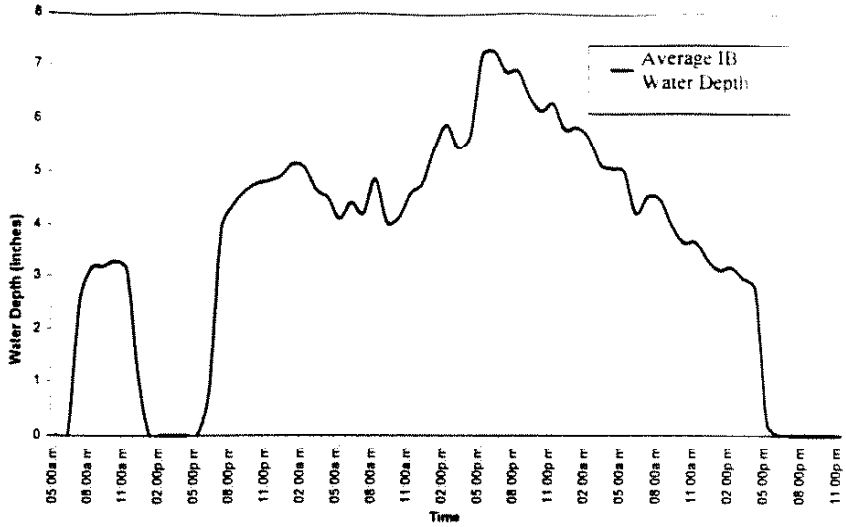


Figure 1-16b: Infiltration Basin Water Depth and Cumulative Rainfall at the I-605/SR-91 Infiltration Basin on February 16, 2000.

IB Water Depth



Cumulative Rainfall

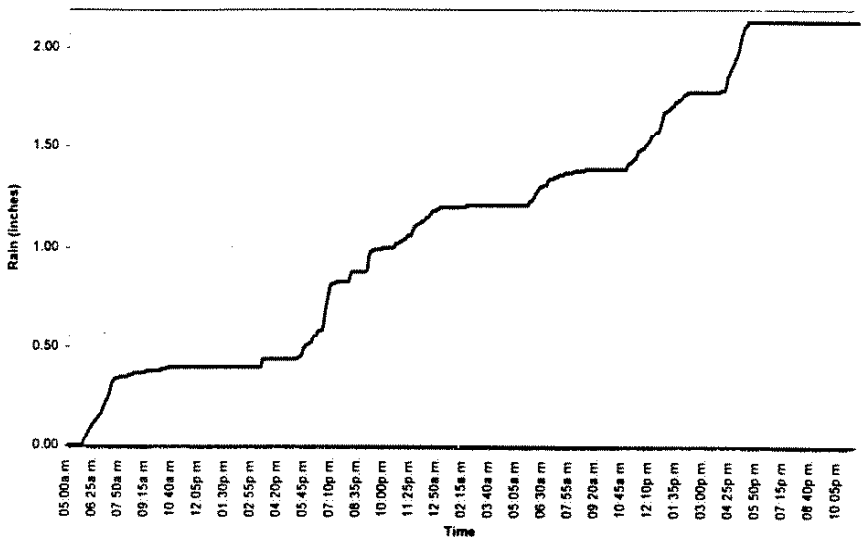
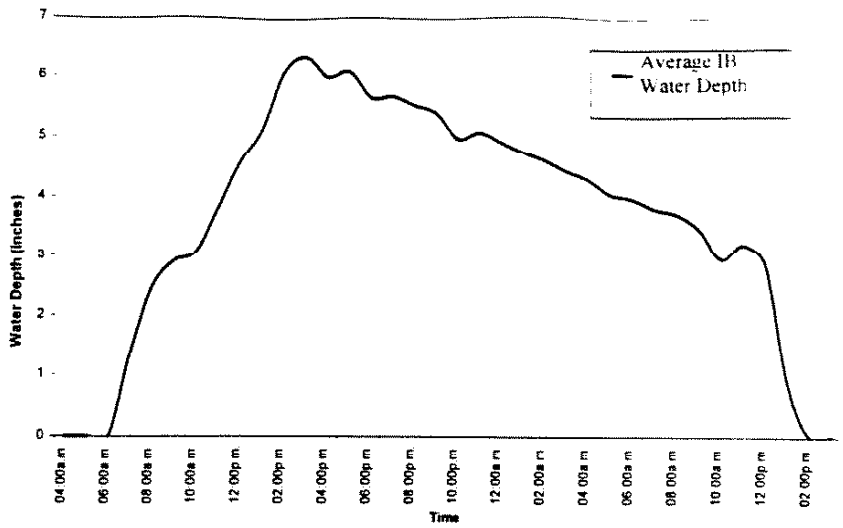


Figure 1-16c: Infiltration Basin Water Depth and Cumulative Rainfall at the I-605/SR-91 Infiltration Basin during February 20 to February 21, 2000

IB Water Depth



Cumulative Rainfall

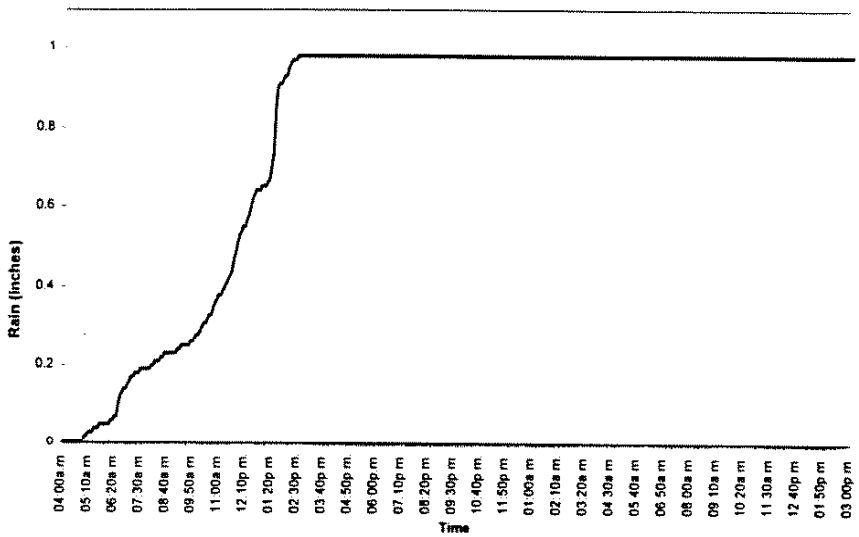
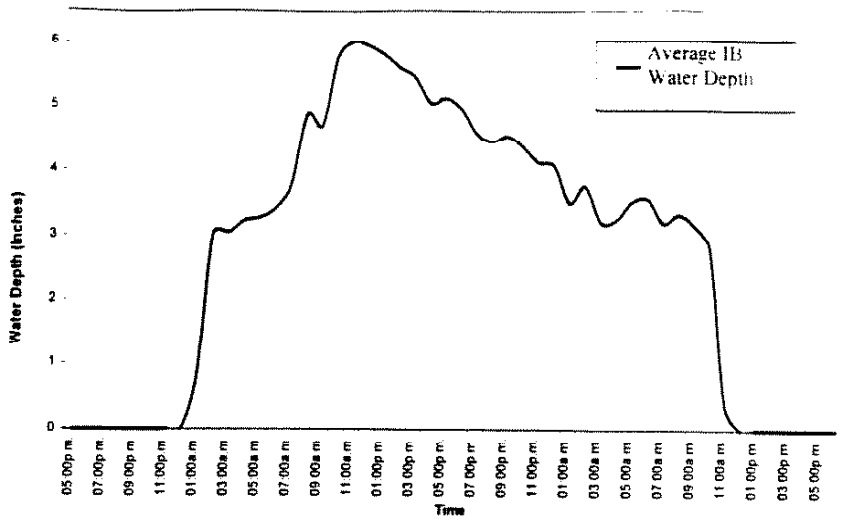


Figure 1-16d: Infiltration Basin Water Depth and Cumulative Rainfall at the I-605/SR-91 Infiltration Basin during February 23 to 24, 2000

IB Water Depth



Cumulative Rainfall

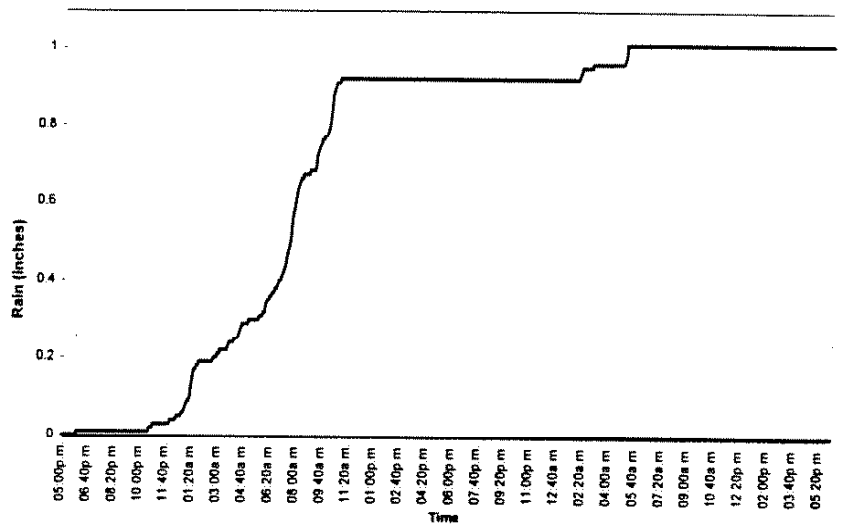
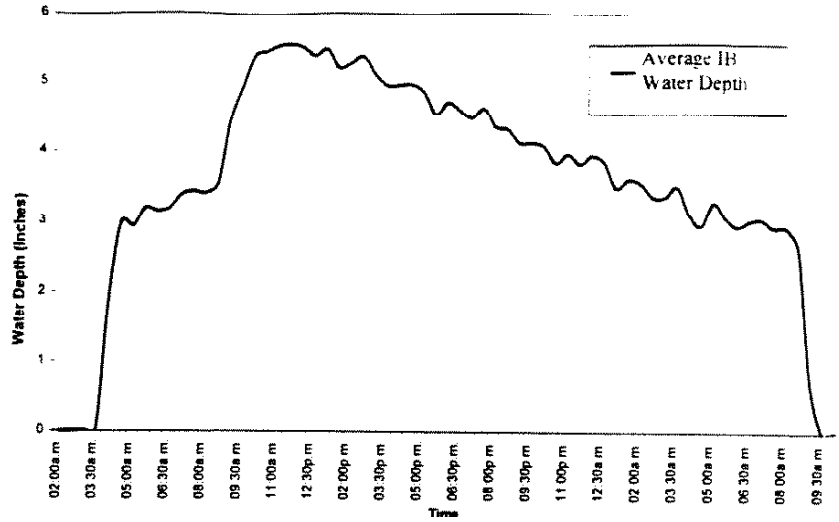


Figure 1-16e: Infiltration Basin Water Depth and Cumulative Rainfall at the I-605/SR-91 Infiltration Basin during March 5 to March 6, 2000

IB
Water
Depth



Cumulative
Rainfall

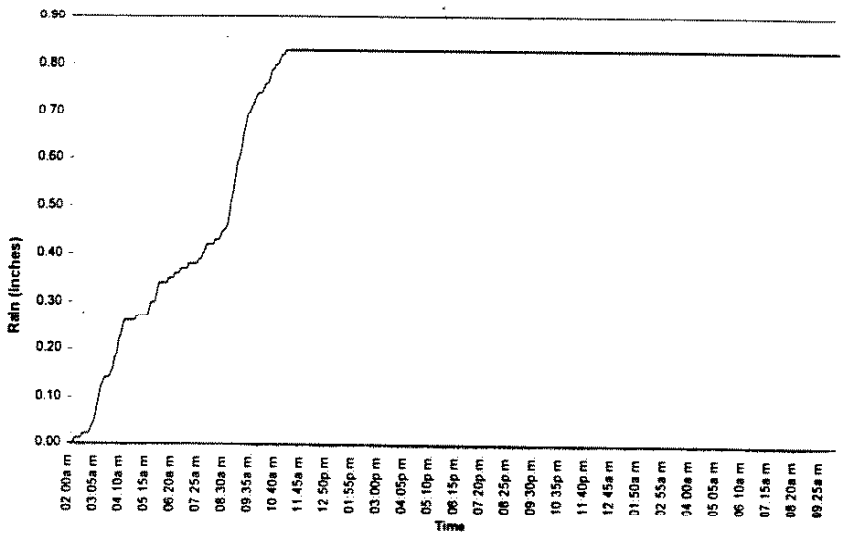
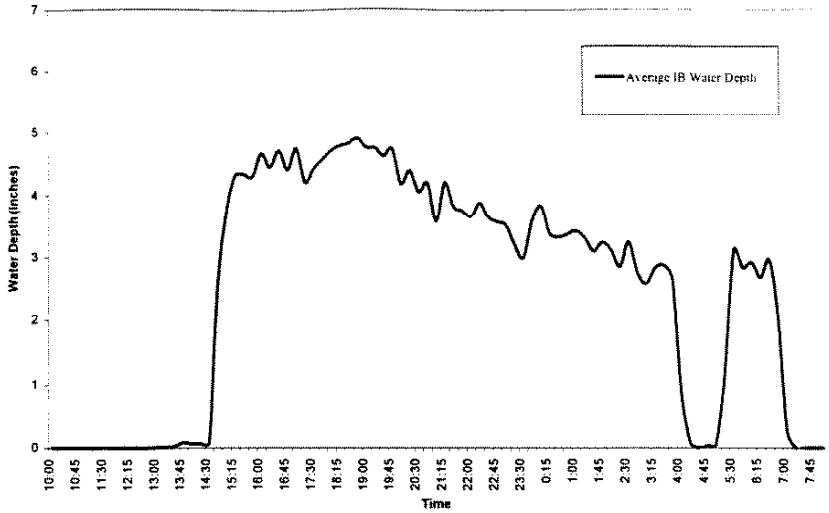


Figure 1-16f: Infiltration Basin Water Depth and Cumulative Rainfall at the I-605/SR-91 Infiltration Basin during March 8 to March 9, 2000

Basin Water Depth



Cumulative Rainfall

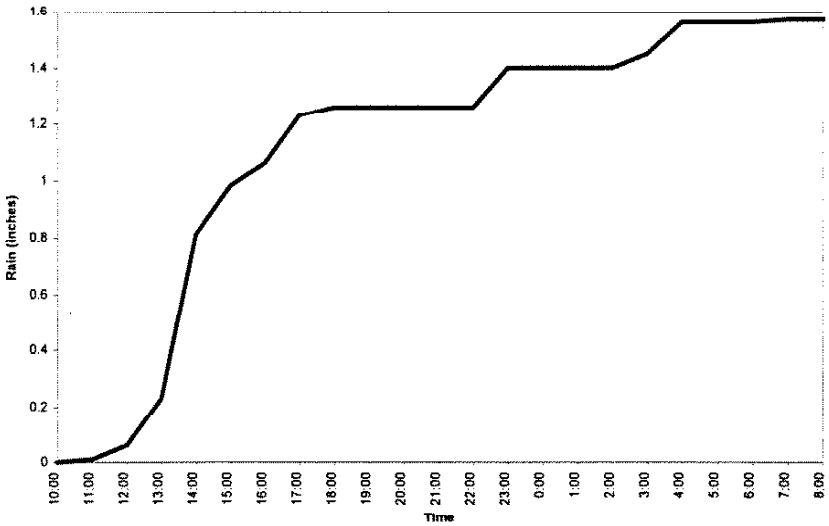
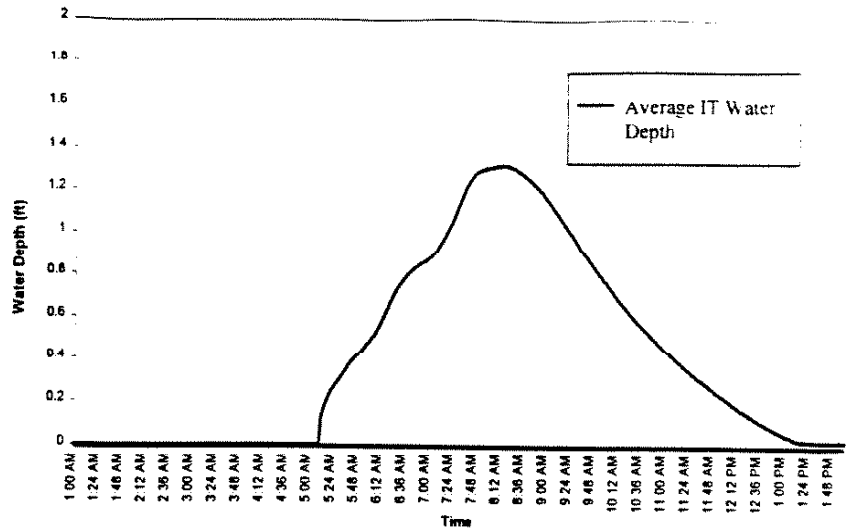
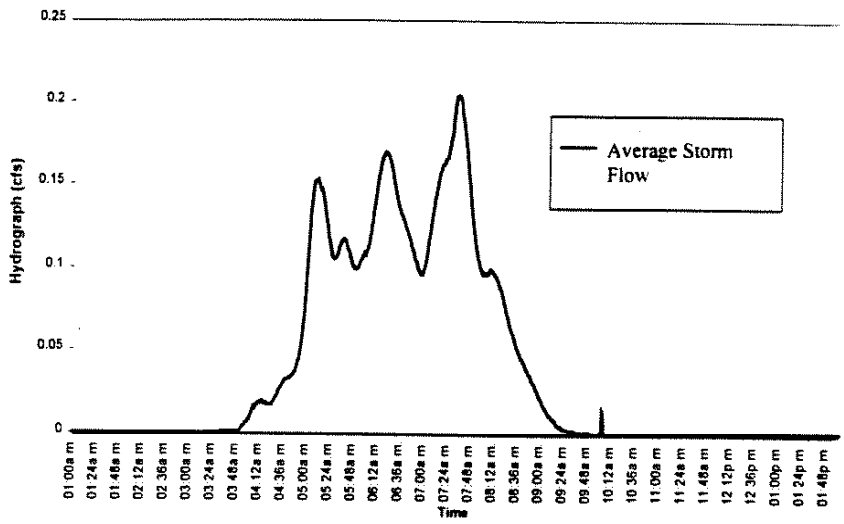


Figure 1-16g: Infiltration Basin Water Depth and Cumulative Rainfall at the I-605/SR-91 Infiltration Basin during April 17 to April 18, 2000.

Water Depth in IT



Influent



Cumulative Rainfall

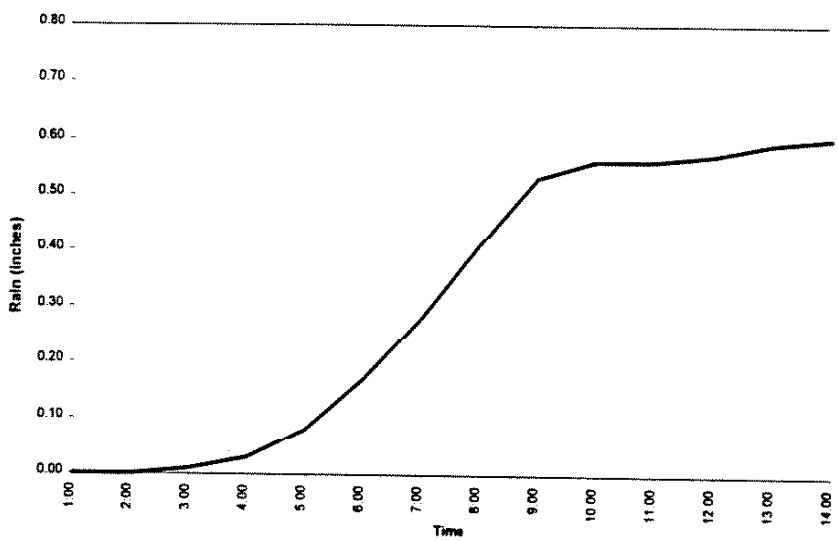
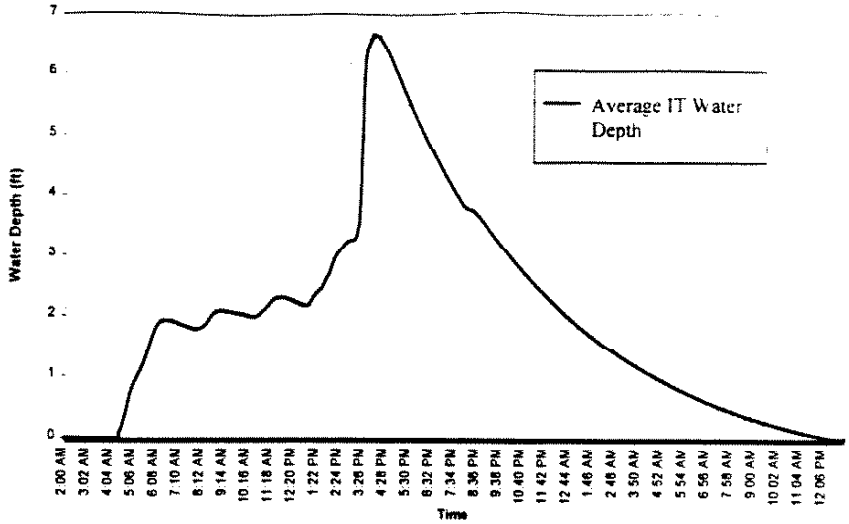
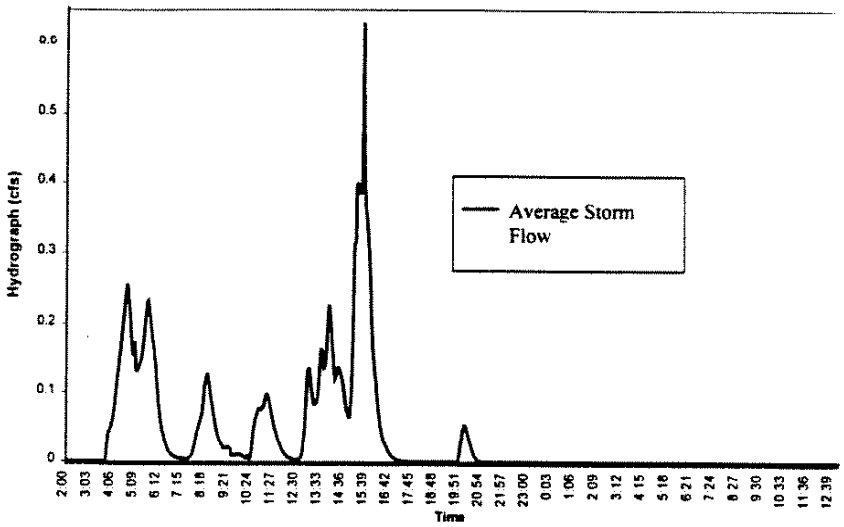


Figure 1-17a: Water Depth in IT, Influent Hydrograph, and Cumulative Rainfall at the Altadena MS on January 25, 2000

Water Depth in IT



Influent



Cumulative Rainfall

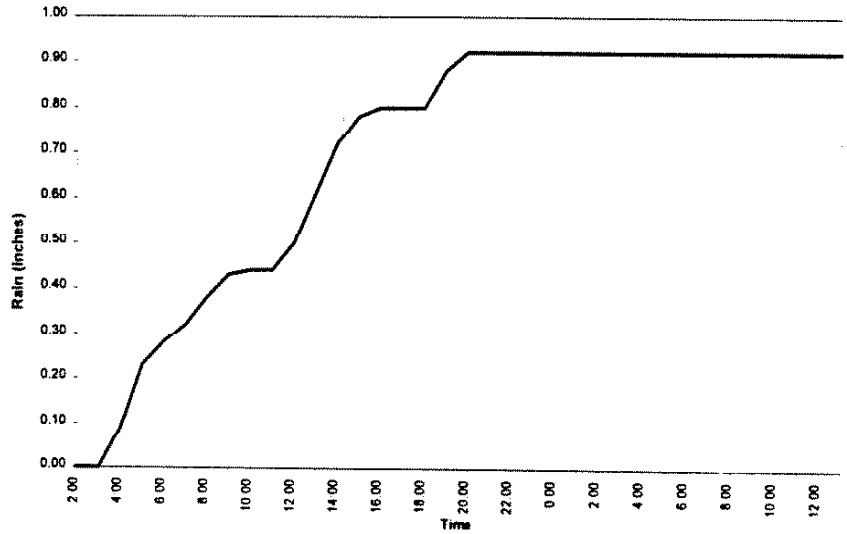
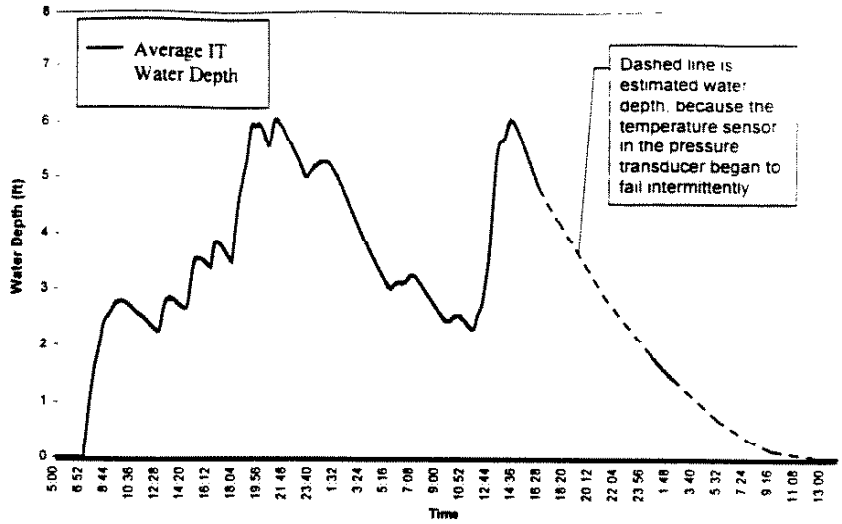
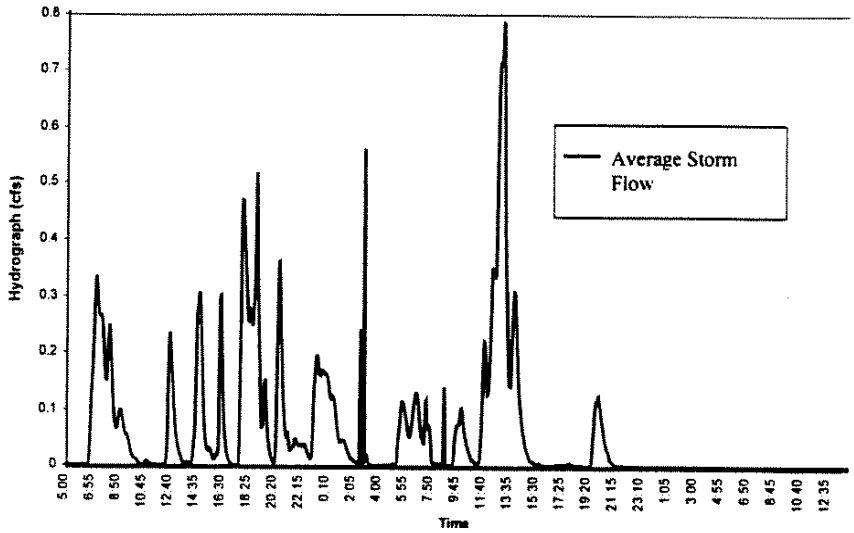


Figure 1-17b: Water Depth in IT, Influent Hydrograph, and Cumulative Rainfall at the Altadena MS during February 16 and February 17, 2000

Water Depth in IT



Influent



Cumulative Rainfall

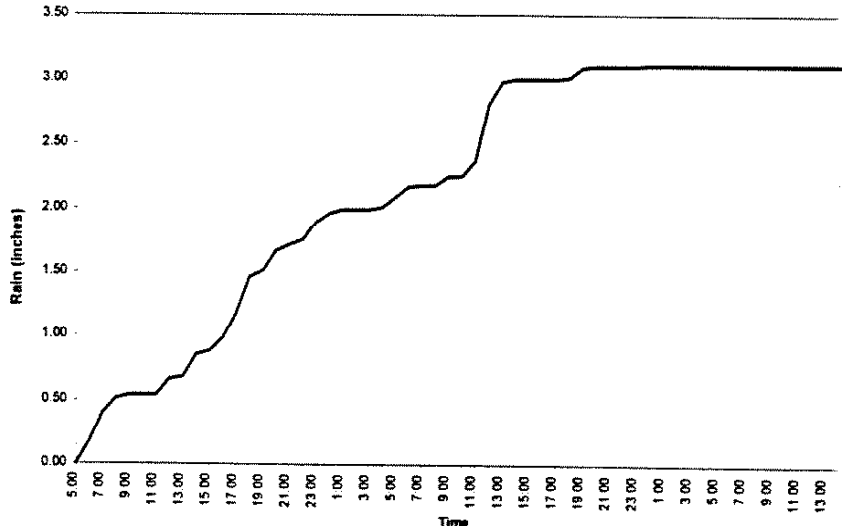
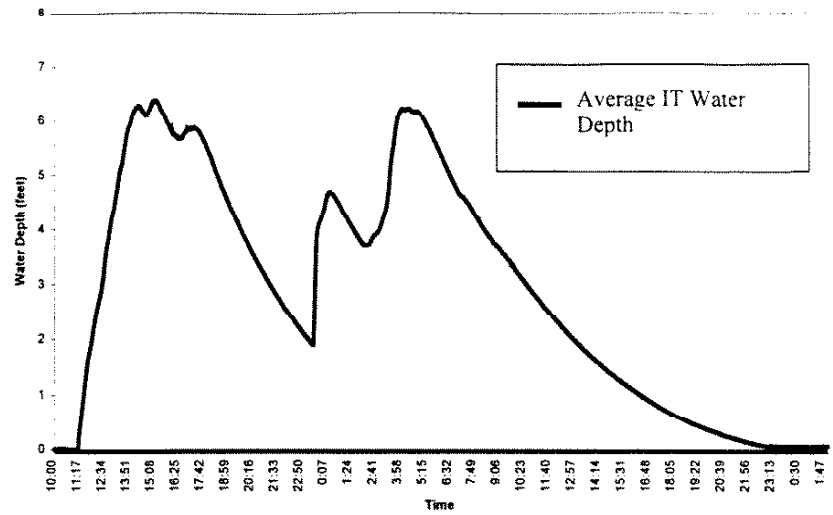
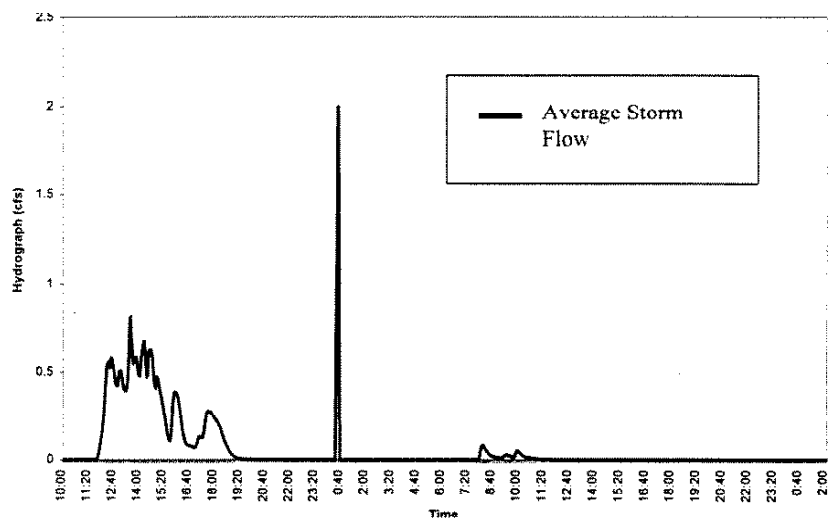


Figure 1-17c: Water Depth in IT, Influent Hydrograph, and Cumulative Rainfall at the Altadena MS during February 20 to February 22, 2000.

Water Depth in IT



Influent



Cumulative Rainfall

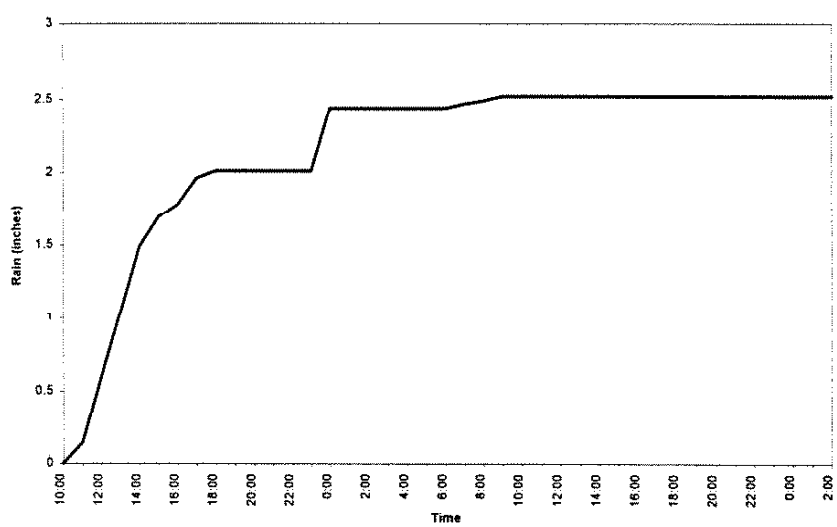
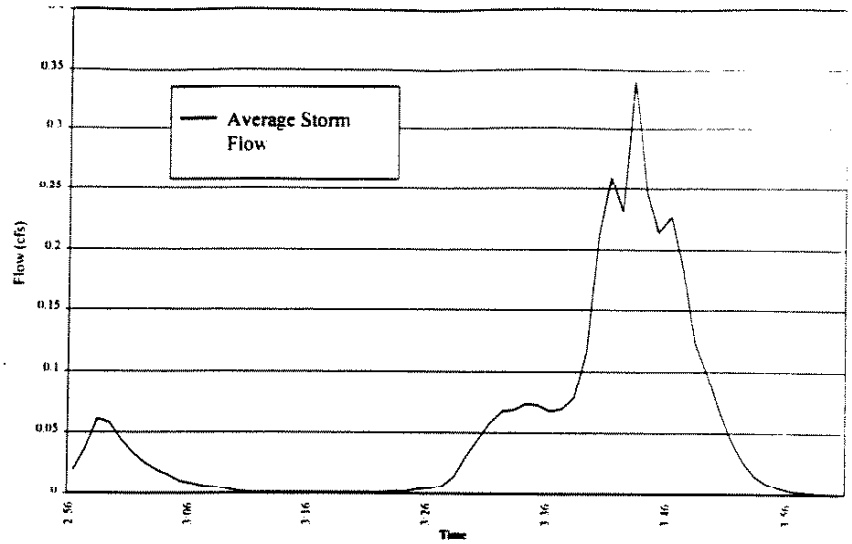
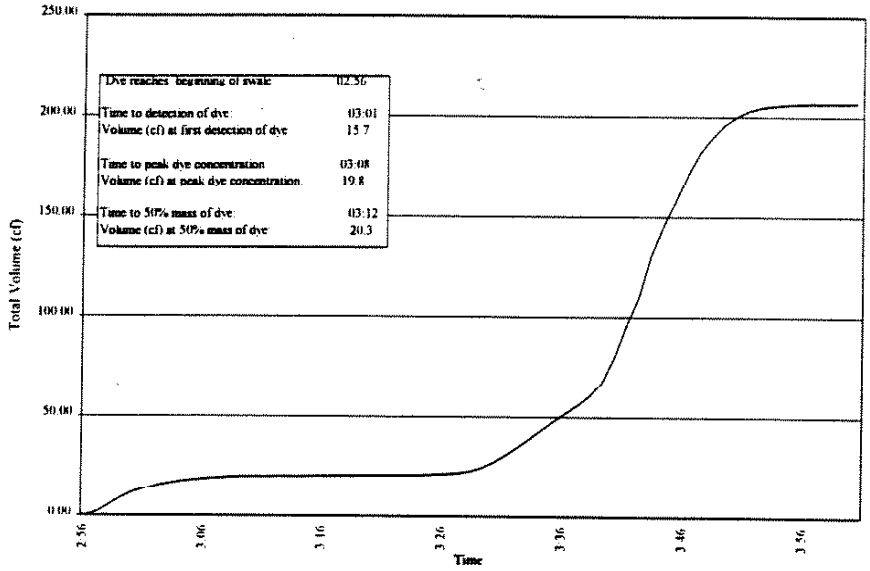


Figure 1-17d: Water Depth in IT, Influent Hydrograph, and Cumulative Rainfall at the Altadena MS for Event 8 on April 17-18, 2000.

Effluent Flow



Cumulative Flow



Absorbance

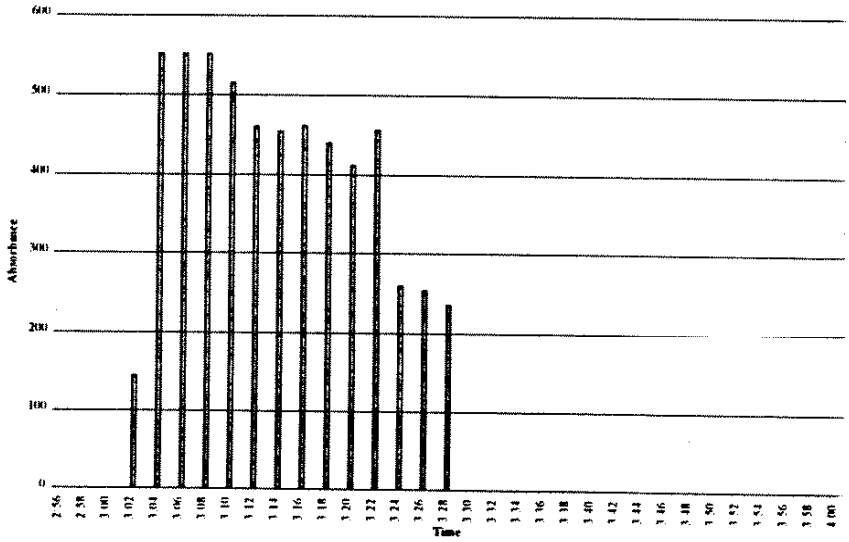
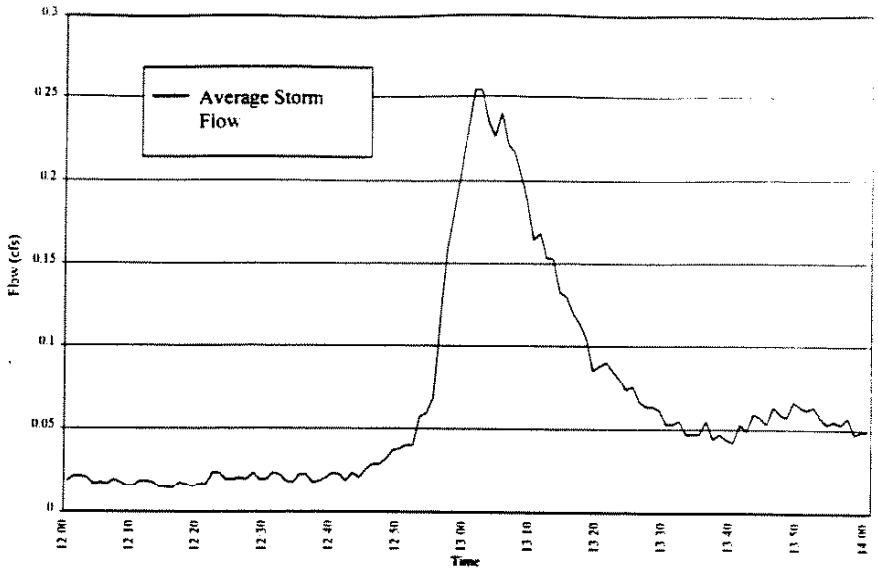
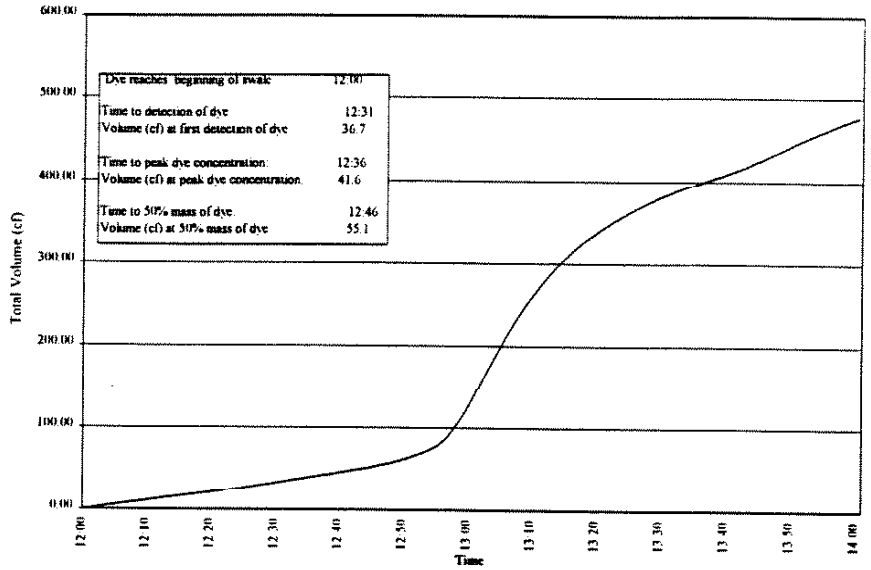


Figure 1-18a: Hydraulic Residence Time Characteristics (Effluent Flow, Cumulative Flow and Absorbance) at the Cerritos MS Swale on February 12, 2000

Effluent Flow



Cumulative Flow



Absorbance

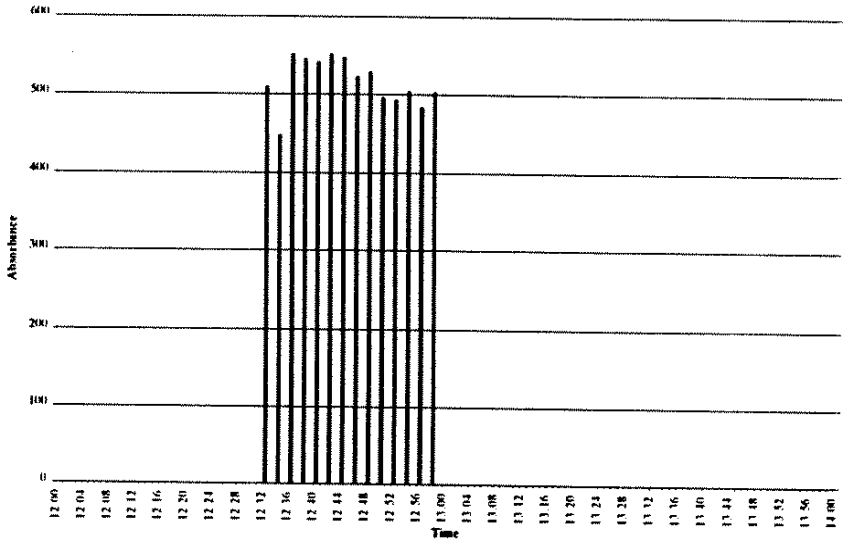
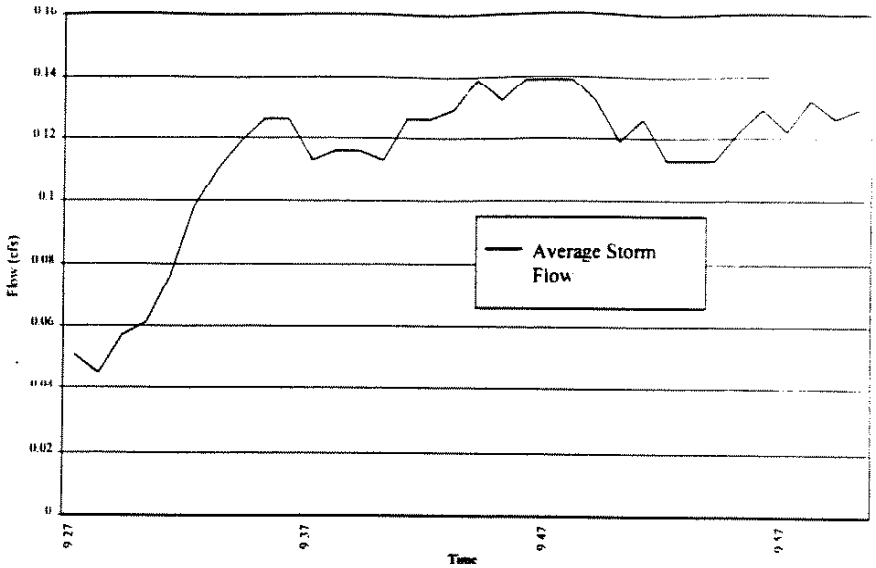
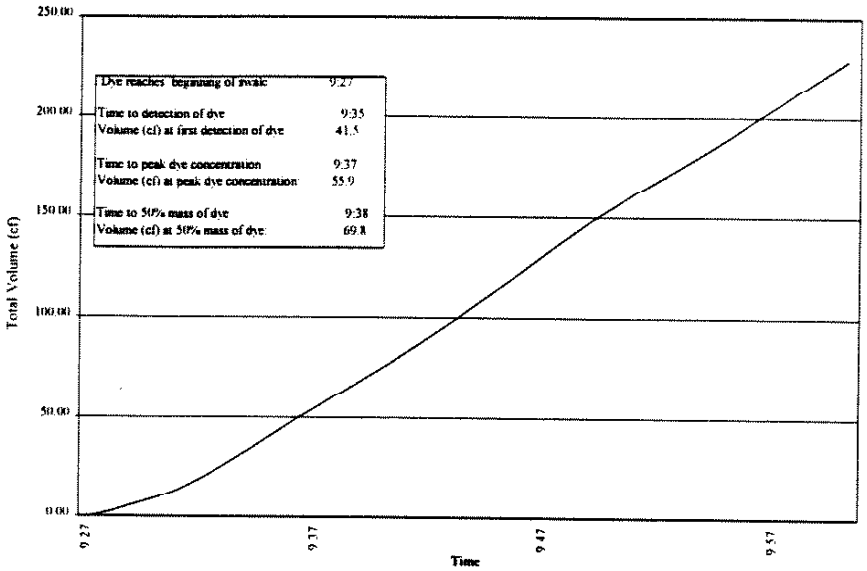


Figure 1-18b: Hydraulic Residence Time Characteristics (Effluent Flow, Cumulative Flow and Absorbance) at the I-605 @ Carson Swale on February 21, 2000

Effluent Flow



Cumulative Flow



Absorbance

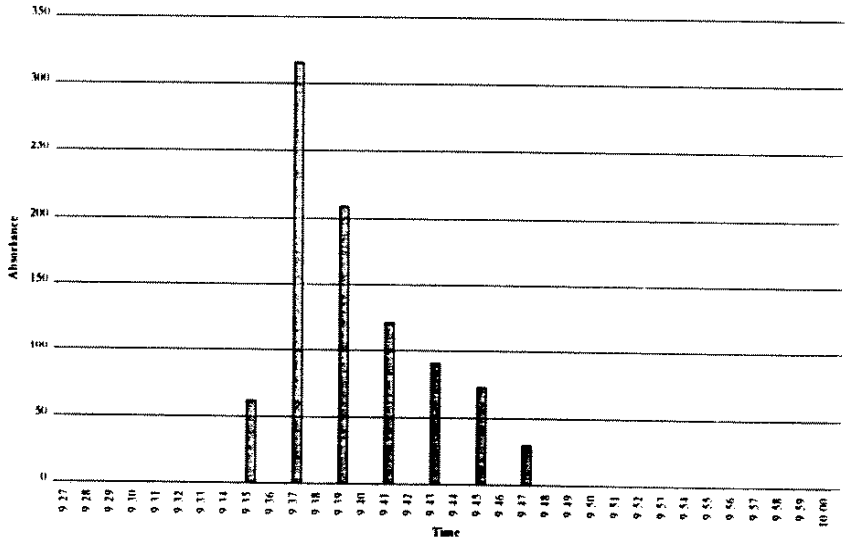
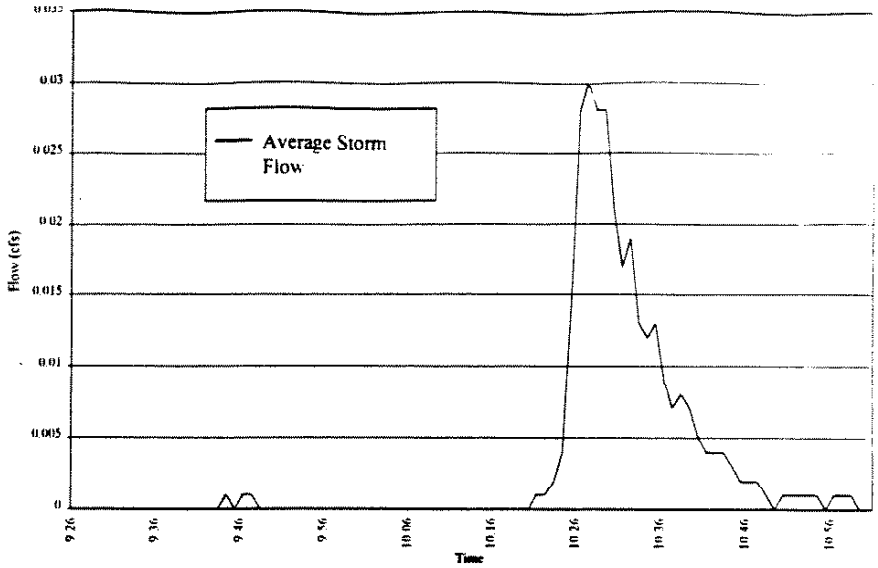
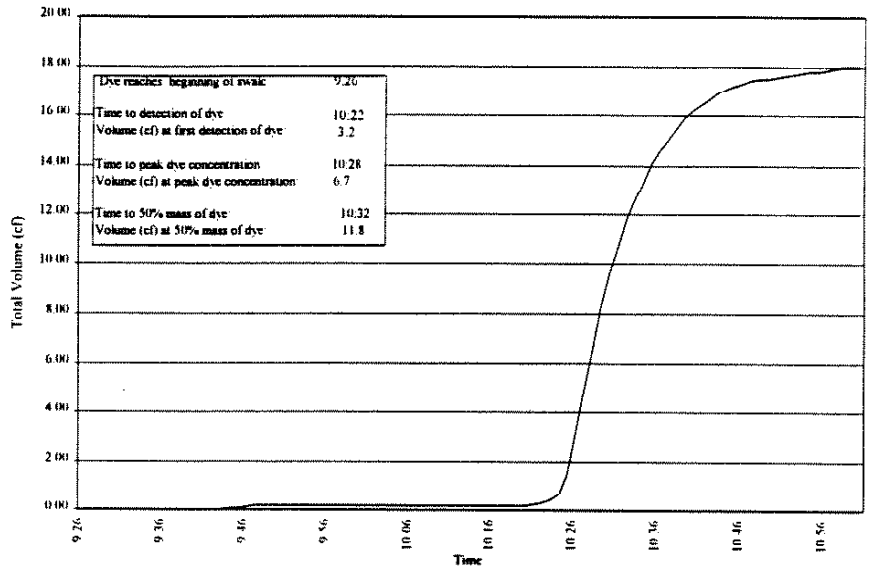


Figure 1-18c: Hydraulic Residence Time Characteristics (Effluent Flow, Cumulative Flow and Absorbance) at the I-5/I-605 Swale on March 5, 2000

Effluent Flow



Cumulative Flow



Absorbance

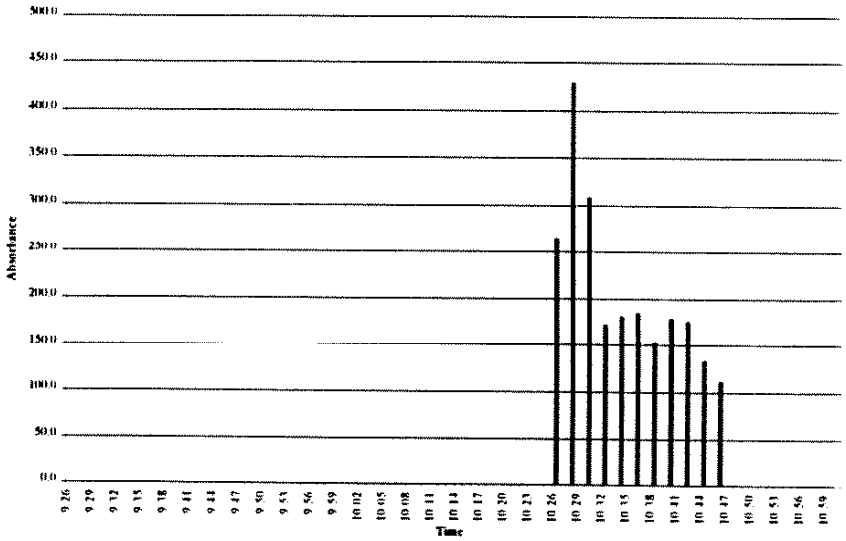
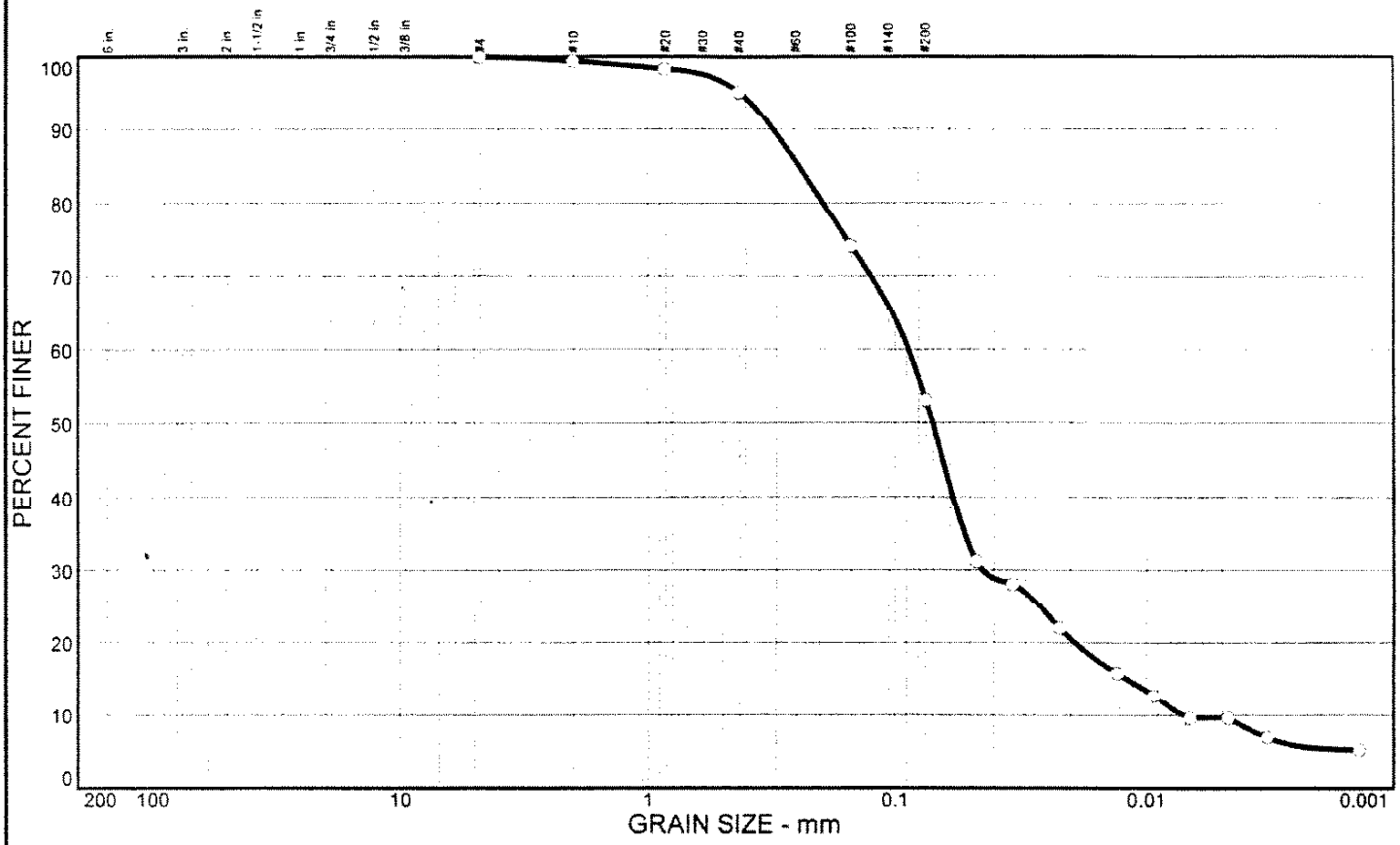


Figure 1-18d: Hydraulic Residence Time Characteristics (Effluent Flow, Cumulative Flow and Absorbance) at I-605/SR-91 Swale on March 5, 2000

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
		46.7	43.7	9.6	ML			

SIEVE inches size	PERCENT FINER		

	GRAIN SIZE		
D_{60}	0.0879		
D_{30}	0.0444		
D_{10}	0.0072		
	COEFFICIENTS		
C_c	3.13		
C_u	12.26		

SIEVE number size	PERCENT FINER		
#4	100.0		
#10	99.4		
#20	98.3		
#40	95.1		
#100	74.1		
#200	53.3		

SOIL DESCRIPTION

Sandy Silt

REMARKS:

sampled at 1330 on 6-20-00

Source:

Sample No.: 073101-layer1-17200 Elev./Depth: 0 -0.2 m

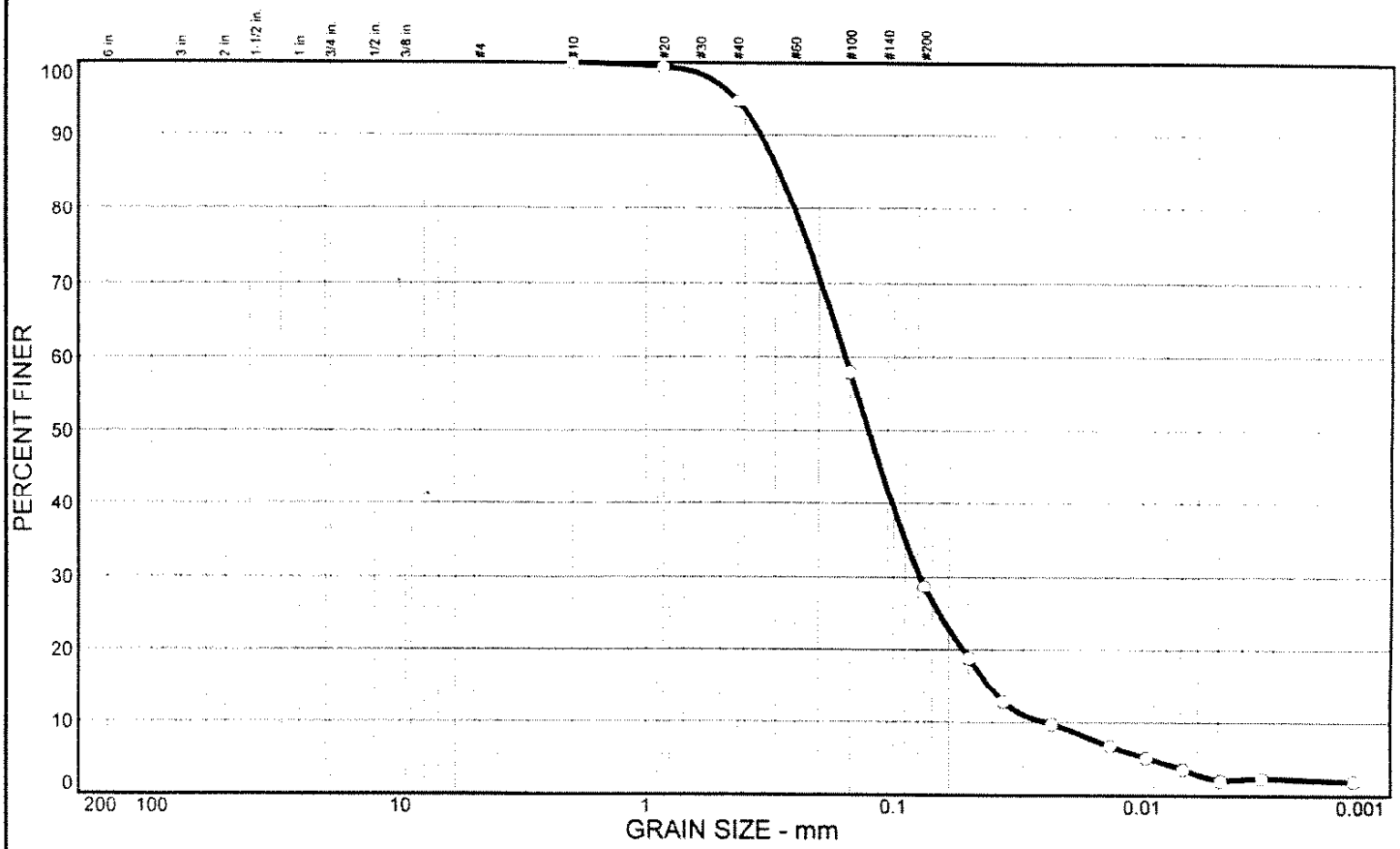
FIGURE 1-19a

Client: Caltrans

Project: Caltrans District 7 IB

Project No.: 70300-8-0212-02-901

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
		71.3	26.6	2.1	SM			

SIEVE inches size	PERCENT FINER		

	GRAIN SIZE		
D_{60}	0.157		
D_{30}	0.0781		
D_{10}	0.0247		
	COEFFICIENTS		
C_C	1.58		
C_U	6.35		

SIEVE number size	PERCENT FINER		
#10	100.0		
#20	99.4		
#40	94.7		
#100	58.0		
#200	28.7		

SOIL DESCRIPTION

Silty Sand

REMARKS:

sampled at 1500 on 6-20-00

Source:

Sample No.: 073101-layer2-17200 Elev./Depth: 0.3-0.5 m

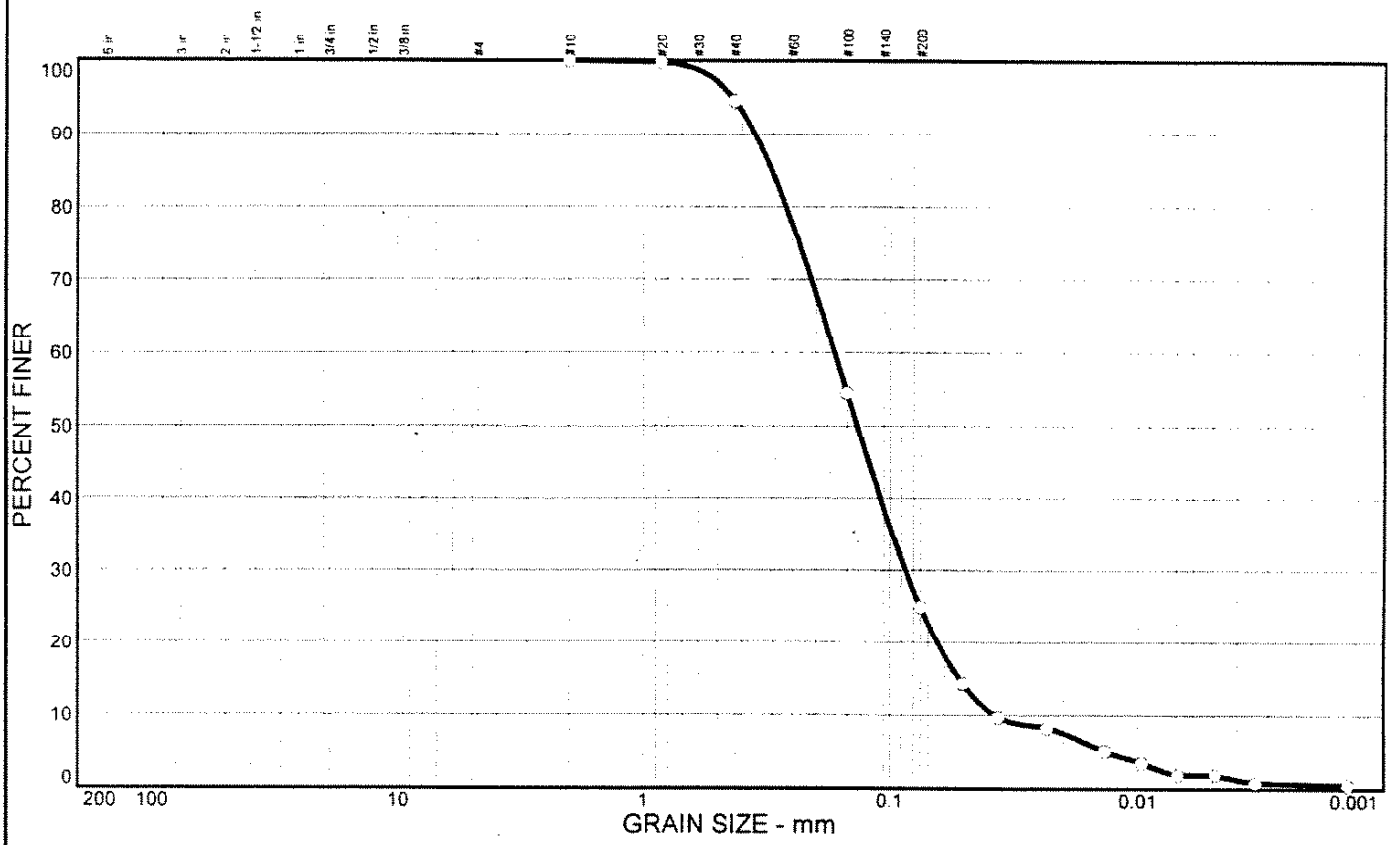
FIGURE 1-19b

Client: Caltrans

Project: Caltrans District 7 IB

Project No.: 70300-8-0212-02-901

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
		75.0	23.1	1.9	SM			

SIEVE inches size	PERCENT FINER
GRAIN SIZE	
D_{60}	0.169
D_{30}	0.0860
D_{10}	0.0377
COEFFICIENTS	
C_c	1.16
C_u	4.47

SIEVE number size	PERCENT FINER
#10	100.0
#20	99.8
#40	94.5
#100	54.5
#200	25.0

SOIL DESCRIPTION

Silty Sand

REMARKS:

sampled at 1505 on 6-20-00

Source:

Sample No.: 073101-layer3-17200

Elev./Depth: 0.6-0.8 m

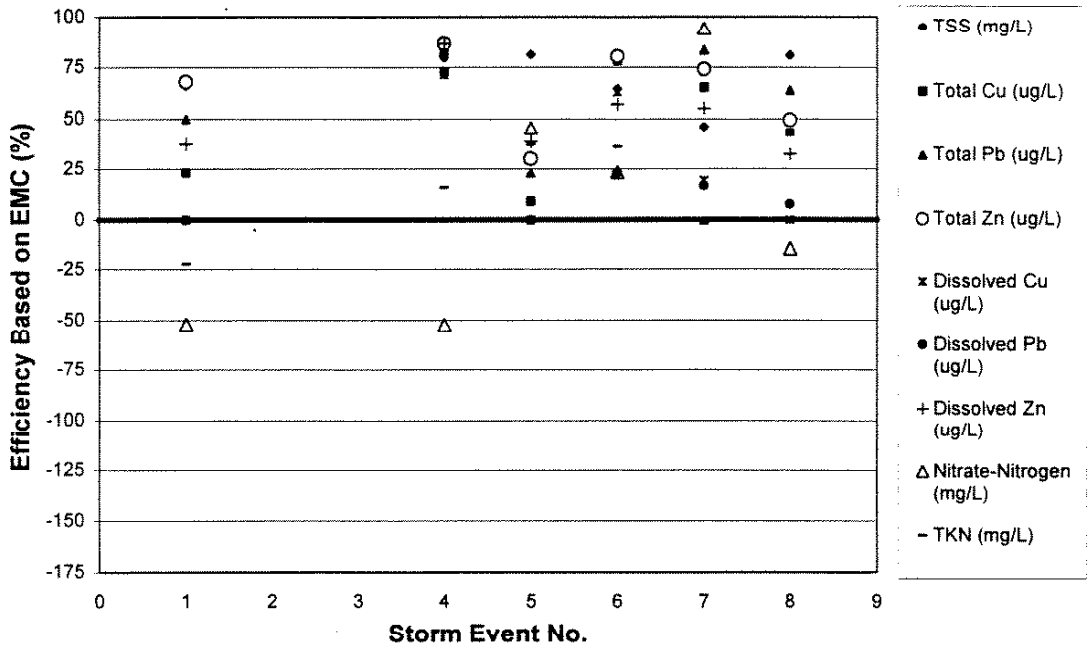
FIGURE 1-19c

Client: Caltrans

Project: Caltrans District 7 IB

Project No.: 70300-8-0212-02-901

Figure 1-20a: BMP Pollutant Removal Efficiency at the Altadena Maintenance Station Biofiltration Strip



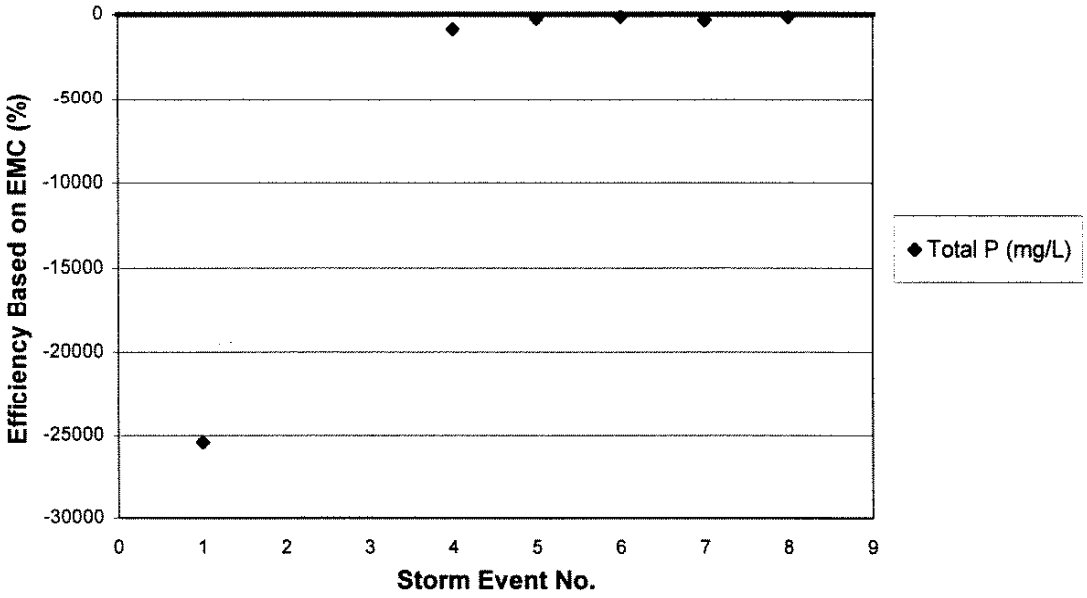
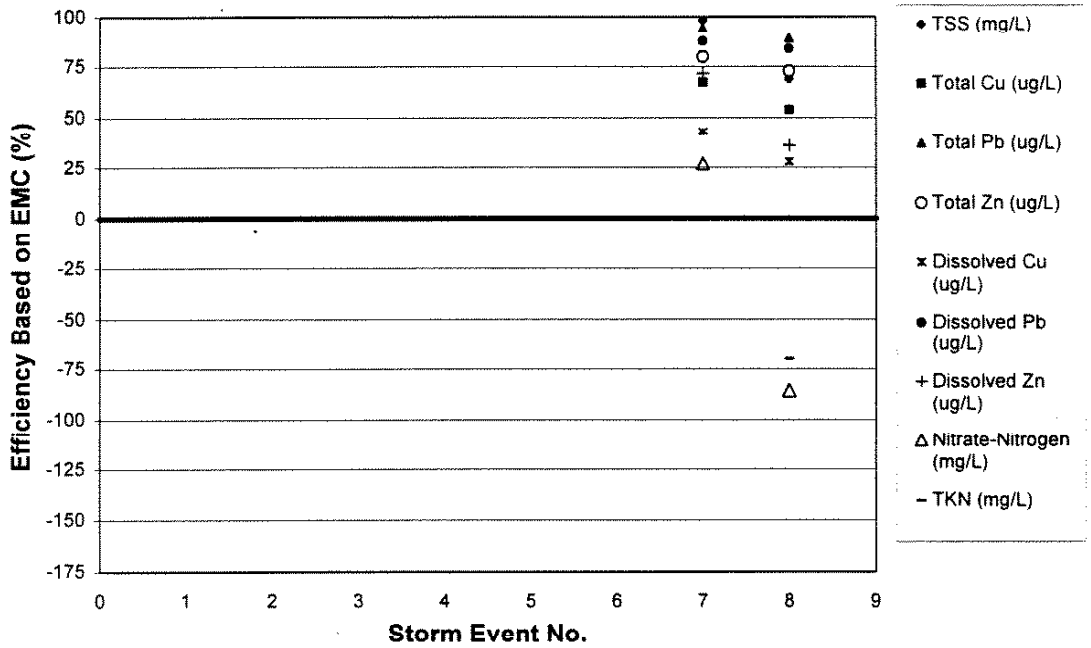


Figure 1-20b: BMP Pollutant Removal Efficiency at the I-605/SR-91 Biofiltration Strip



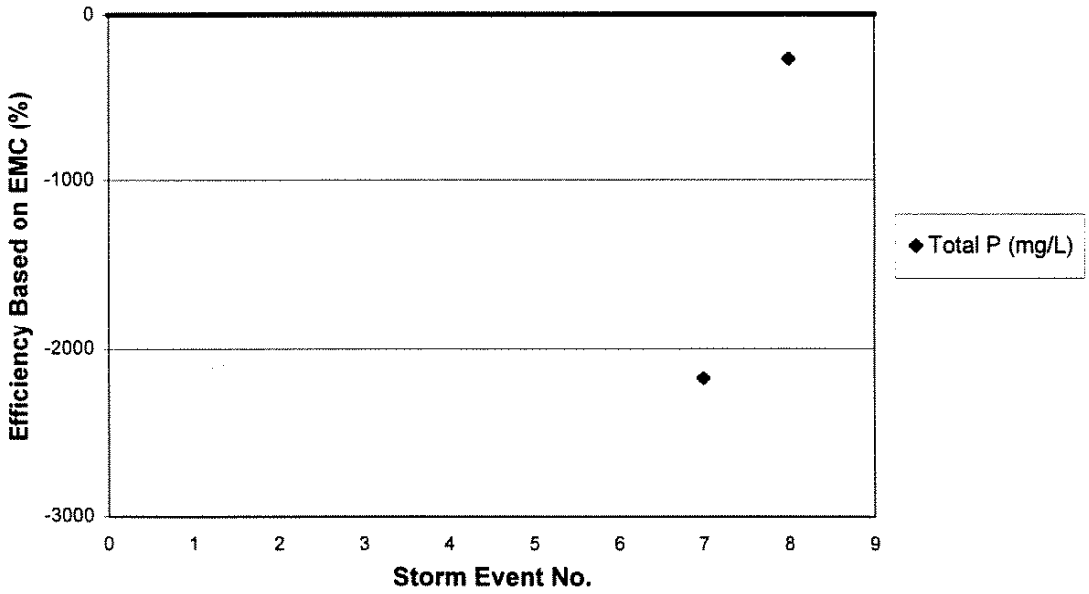


Figure 1-20c: BMP Pollutant Removal Efficiency at the I-605/SR-91 Biofiltration Swale

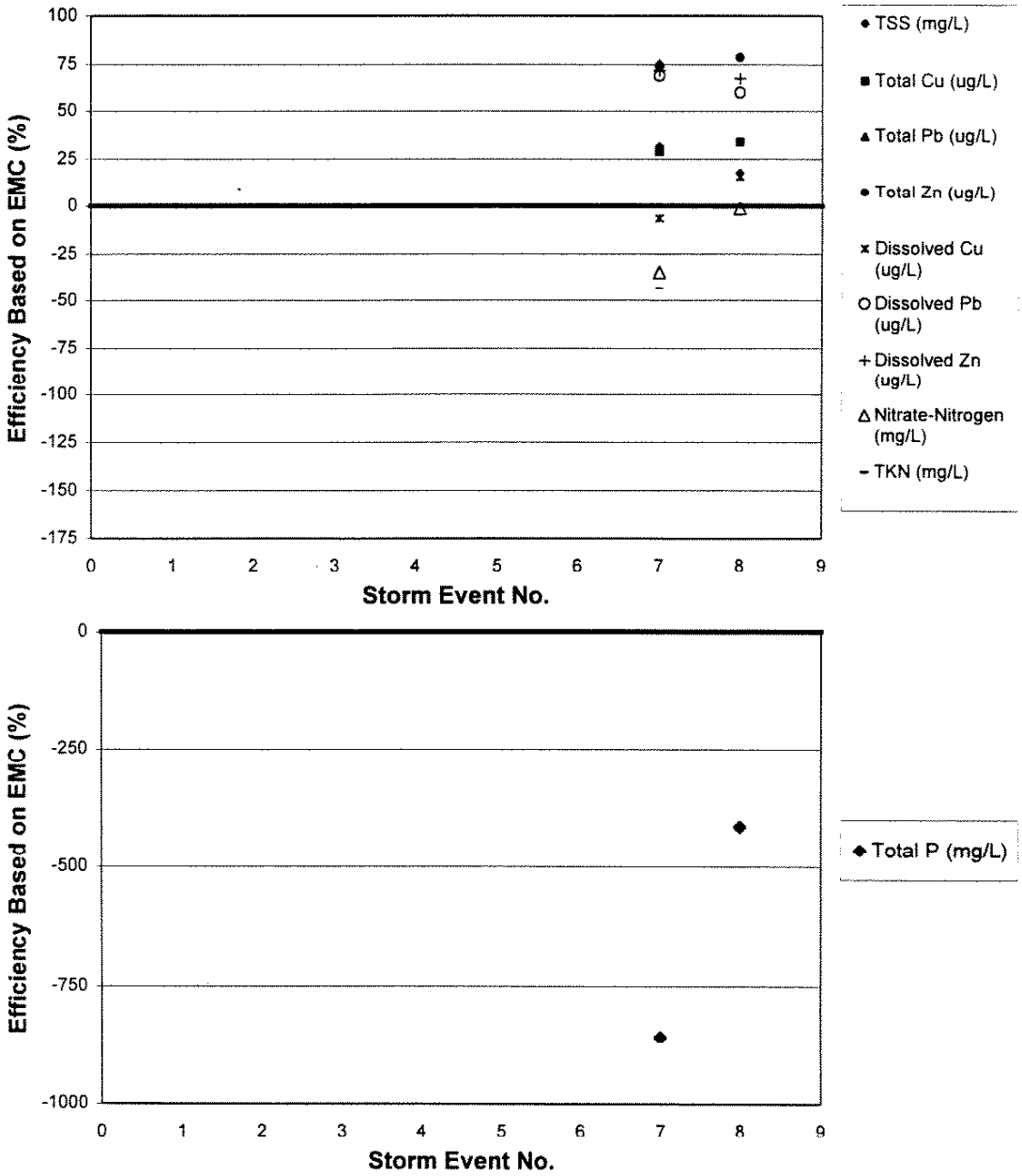
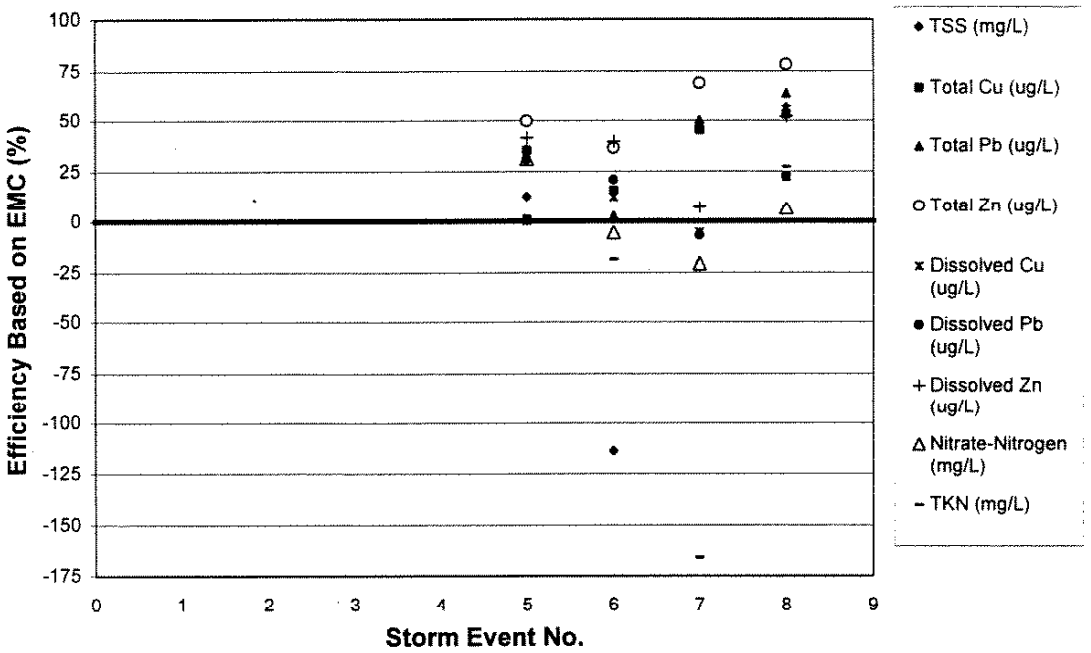


Figure 1-20d: BMP Pollutant Removal Efficiency at the Cerritos Maintenance Station Biofiltration Swale



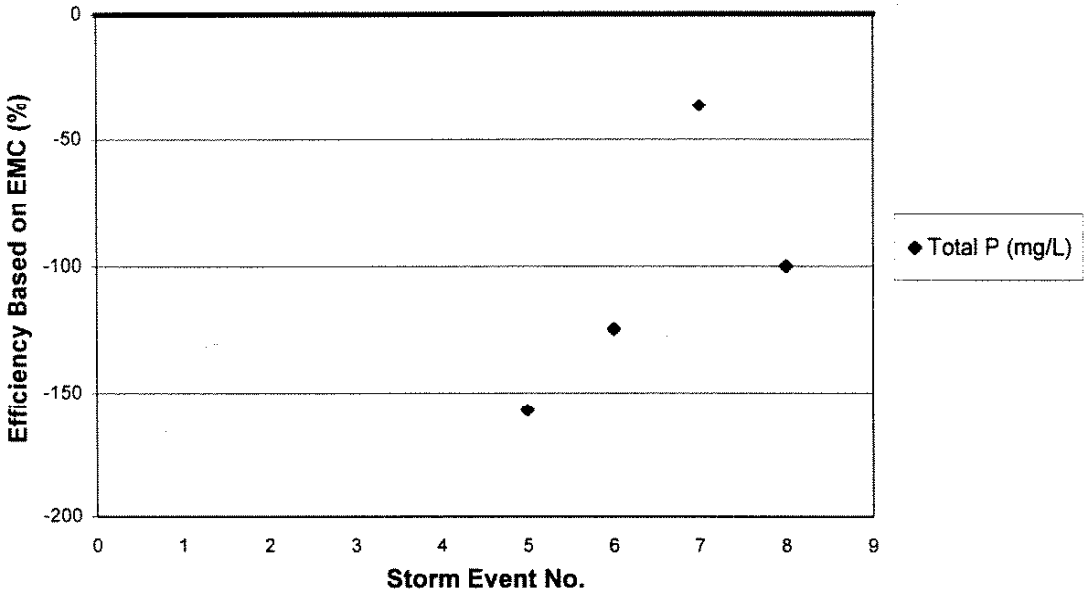
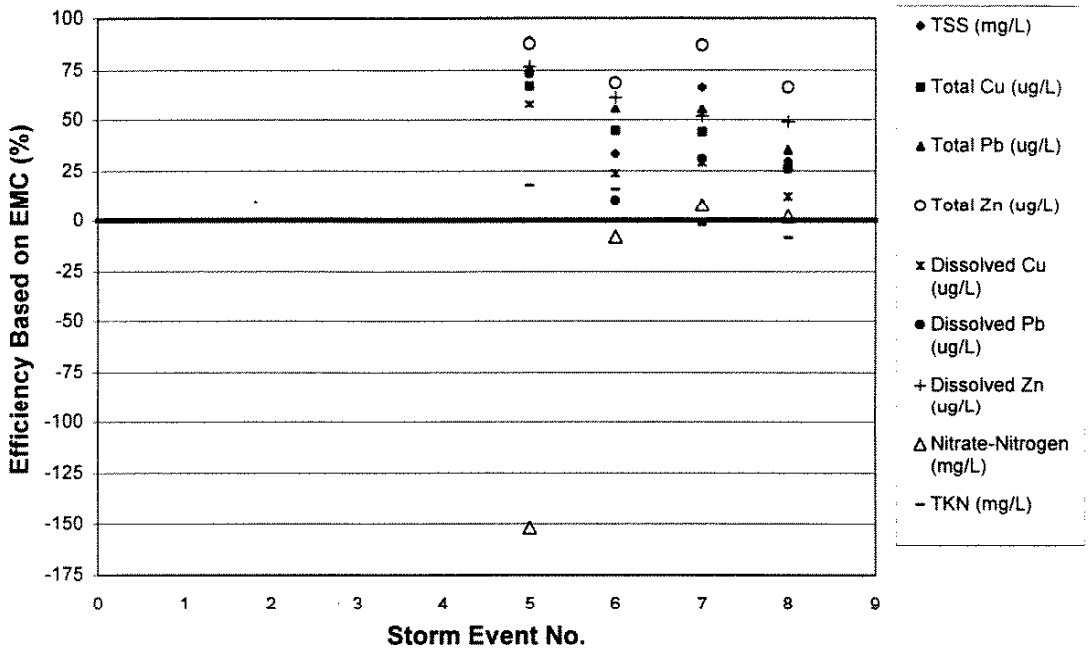


Figure 1-20e: BMP Pollutant Removal Efficiency at the I-5/I-605 Biofiltration Swale



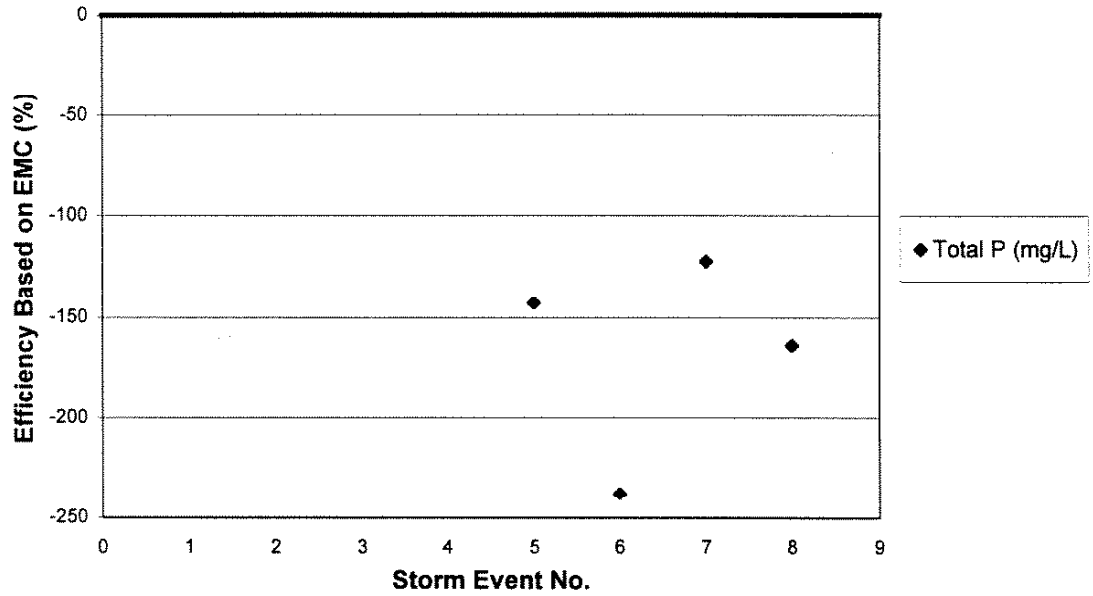
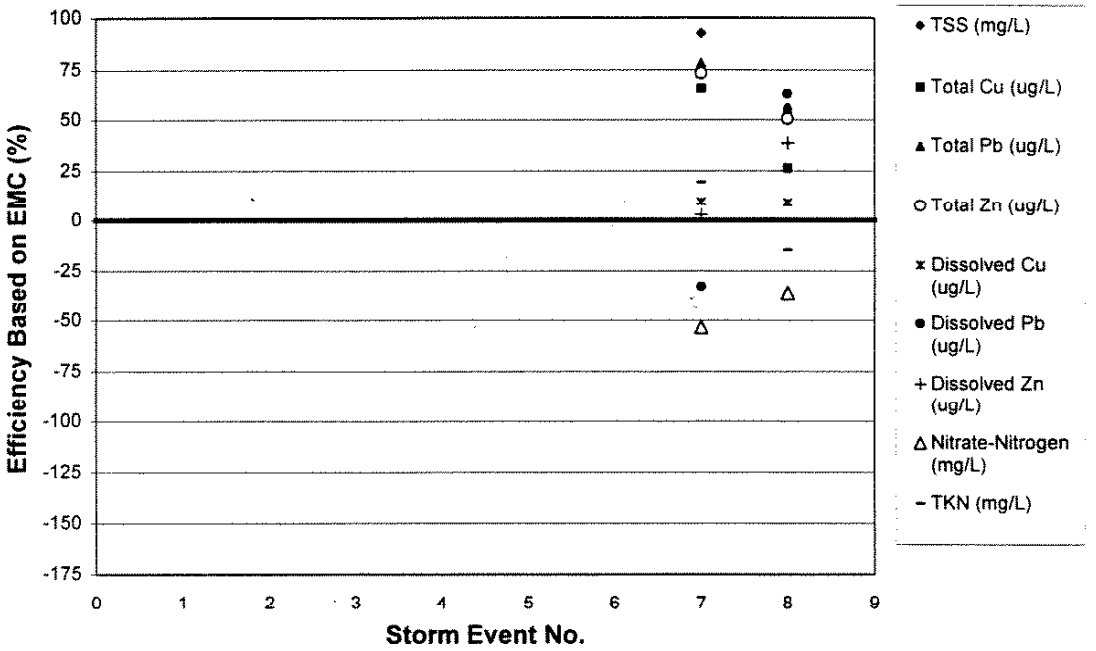
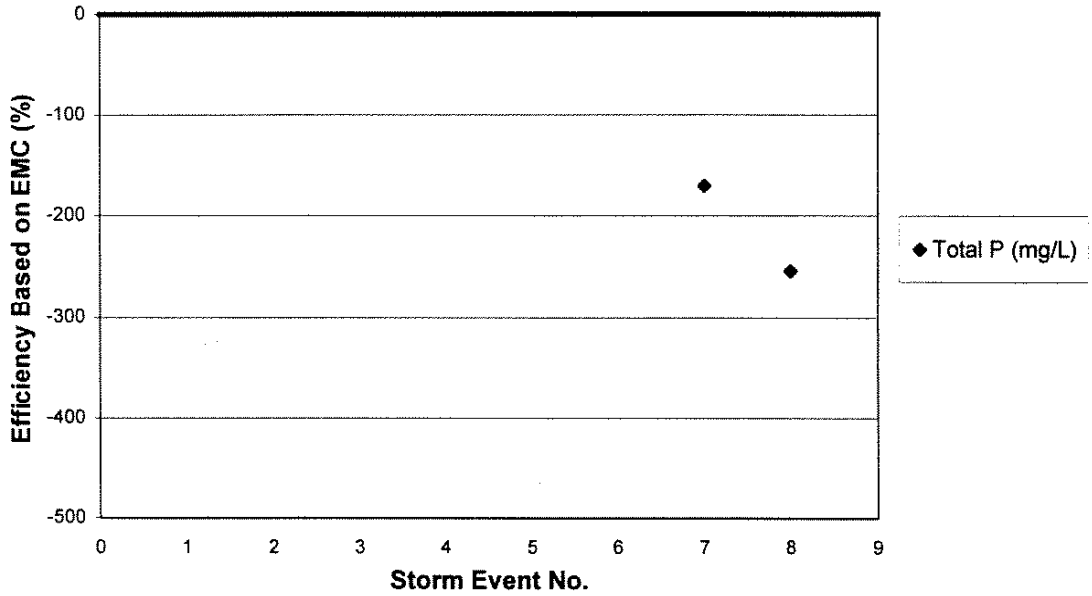


Figure 1-20f: BMP Pollutant Removal Efficiency at the I-605 at Carson Biofiltration Swale





Worksheet 1
Foothill Maintenance Station StreamGuard DII % Removal Efficiency Calculations (Storm-by-Storm Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used StreamGuard Geotextile Fabric	74.5	960	---	---	0.000157
Copper	Used StreamGuard Absorbent Material	18.9	504.5	---	---	0.000019
Copper	Used StreamGuard Debris/litter/sediment	29.9	4536	---	---	0.000298
Copper	*Used Media Subtotal*					*0.000474*
Copper	Unused StreamGuard Geotextile Fabric	0.22	943.9	---	---	0.000000
Copper	Unused StreamGuard Absorbent Material	0.24	443.15	---	---	0.000000
Copper	*Unused Media Subtotal*					*0.000001*
Copper	Effluent Water from 25 January 2000 storm event			1.7	262	0.000028
Copper	Effluent Water from 30 January 2000 storm event	---	---	1.3	379	0.000031
Copper	Effluent Water from 16 February 2000 storm event	---	---	4.4	268	0.000073
Copper	Effluent Water from 21 February 2000 storm event	---	---	1.2	1512	0.000113
Copper	Effluent Water from 27 February 2000 storm event	---	---	4.2	984	0.000257
Copper	Effluent Water from 8 March 2000 storm event	---	---	4.3	463	0.000124
Copper	Effluent Water from 17 April 2000 storm event	---	---	5.8	344	0.000124
Copper	Estimated effluent from unsampled storm events	---	---	3.3	4250	0.000866
Copper	*Effluent Subtotal*					*0.001517*
Copper	Estimated Influent Load					0.002091
Copper	Efficiency (%)					23%
Copper	Efficiency w/o Litter Removal (%)					10%

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used StreamGuard Geotextile Fabric	150	960	---	---	0.000317
Lead	Used StreamGuard Absorbent Material	29.5	504.5	---	---	0.000033
Lead	Used StreamGuard Debris/litter/sediment	52.9	4536	---	---	0.000526
Lead	*Used Media Subtotal*					*0.000877*
Lead	Unused StreamGuard Geotextile Fabric	0.1	943.9	---	---	0.000000
Lead	Unused StreamGuard Absorbent Material	0.1	443.15	---	---	0.000000
Lead	*Unused Media Subtotal*					*0.000000*
Lead	Effluent Water from 25 January 2000 storm event	---	---	1	262	0.000016
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	379	0.000024
Lead	Effluent Water from 10 February 2000 storm event	---	---	1.7	268	0.000028
Lead	Effluent Water from 21 February 2000 storm event	---	---	1	1512	0.000094
Lead	Effluent Water from 27 February 2000 storm event	---	---	1	984	0.000061
Lead	Effluent Water from 8 March 2000 storm event	---	---	2	463	0.000058
Lead	Effluent Water from 17 April 2000 storm event	---	---	2.8	344	0.000060
Lead	Estimated effluent from unsampled storm events	---	---	1.4	4250	0.000365
Lead	*Effluent Subtotal*					*0.000707*
Lead	Estimated Influent Load					0.001584
Lead	Efficiency (%)					55%
Lead	Efficiency w/o Litter Removal (%)					33%

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used StreamGuard Geotextile Fabric	917	960	---	---	0.001937
Zinc	Used StreamGuard Absorbent Material	105	504.5	---	---	0.000117
Zinc	Used StreamGuard Debris/litter/sediment	301	4536	---	---	0.003004
Zinc	*Used Media Subtotal*					*0.005057*
Zinc	Unused StreamGuard Geotextile Fabric	3.8	943.9	---	---	0.000008
Zinc	Unused StreamGuard Absorbent Material	0.6	443.15	---	---	0.000001
Zinc	*Unused Media Subtotal*					*0.000008*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	13.5	262	0.000220
Zinc	Effluent Water from 30 January 2000 storm event	---	---	18.2	379	0.000430
Zinc	Effluent Water from 16 February 2000 storm event	---	---	50	268	0.000835
Zinc	Effluent Water from 21 February 2000 storm event	---	---	13	1512	0.001225
Zinc	Effluent Water from 27 February 2000 storm event	---	---	50	984	0.003065
Zinc	Effluent Water from 8 March 2000 storm event	---	---	66	463	0.001904
Zinc	Effluent Water from 17 April 2000 storm event	---	---	63.5	344	0.001361
Zinc	Estimated effluent from unsampled storm events	---	---	*31.9*	4250	0.008441
Zinc	*Effluent Subtotal*					*0.017478*
Zinc	Estimated Influent Load					0.022528
Zinc	Efficiency (%)					22%
Zinc	Efficiency w/o Litter Removal (%)					10%

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used StreamGuard Geotextile Fabric	3020	960	---	---	0.006378
Petroleum Hydrocarbons	Used StreamGuard Absorbent Material	33706	504.5	---	---	0.037404
Petroleum Hydrocarbons	Used StreamGuard Debris/litter/sediment	2870	4536	---	---	0.028640
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.072422*
Petroleum Hydrocarbons	Unused StreamGuard Geotextile Fabric	684	943.9	---	---	0.001420
Petroleum Hydrocarbons	Unused StreamGuard Absorbent Material	1870	443.15	---	---	0.001824
Petroleum Hydrocarbons	*Unused Media Subtotal*					*0.003341*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	262	0.008161
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	379	0.011805
Petroleum Hydrocarbons	Effluent Water from 16 February 2000 storm event	---	---	500	268	0.008348
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	1512	0.047097
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	984	0.030650
Petroleum Hydrocarbons	Effluent Water from 8 March 2000 storm event	---	---	500	463	0.014422
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	500	344	0.010715
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	500	4250	0.132381
Petroleum Hydrocarbons	*Effluent Subtotal*					*0.263578*
Petroleum Hydrocarbons	Estimated Influent Load					0.332660
Petroleum Hydrocarbons	Efficiency (%)					21%
Petroleum Hydrocarbons	Efficiency w/o Litter Removal (%)					13%

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used StreamGuard Geotextile Fabric	---	960	---	---	2.116416
Sediment[1]	Used StreamGuard Absorbent Material	---	504.5	---	---	1.112221
Sediment	Used StreamGuard Debris/litter/sediment	---	4536	---	---	10.000066
Sediment	*Used Media Subtotal*					*13.228702*
Sediment	Unused StreamGuard Geotextile Fabric	---	943.9	---	---	2.080622
Sediment	Unused StreamGuard Absorbent Material	---	443.15	---	---	0.976968
Sediment	*Unused Media Subtotal*					*3.057590*
Sediment	Effluent Water from 25 January 2000 storm event	---	---	13	262	0.212183
Sediment	Effluent Water from 30 January 2000 storm event	---	---	6	379	0.141663
Sediment	Effluent Water from 16 February 2000 storm event	---	---	13	268	0.217043
Sediment	Effluent Water from 21 February 2000 storm event	---	---	20	1512	1.883860
Sediment	Effluent Water from 27 February 2000 storm event	---	---	5	984	0.306501
Sediment	Effluent Water from 8 March 2000 storm event	---	---	10	463	0.288435
Sediment	Effluent Water from 17 April 2000 storm event	---	---	13	344	0.278592
Sediment	Estimated effluent from unsampled storm events	---	---	11	4250	3.025852
Sediment	*Effluent Subtotal*					*6.354130*
Sediment	Estimated Influent Load					16.524942
Sediment	Efficiency (%)					62%
Sediment	Efficiency w/o Litter Removal (%)					3%

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debris removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 3: Where the individual storm EMCs showed evidence of normality, the unsampled effluent concentration was estimated by averaging individual storm EMCs.

Note 4: Where the individual storm EMCs showed evidence of non-normality, the unsampled effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 5: Flow measured continuously while DII was installed.

Note 6: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Othmer

Worksheet 2
Foothill Maintenance Station Fossil Filter DII % Removal Efficiency Calculations (Storm-by-Storm Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used Fossil Filter Adsorbent	35.3	5897	---	---	0.000458
Copper	Used Fossil Filter Debris/litter/sediment	57	2268	---	---	0.000284
Copper	*Used Media Subtotal*					*0.000742*
Copper	*Unused Fossil Filter Adsorbent*	*0.2*	*1900*	---	---	*0.000001*
Copper	Effluent Water from 25 January 2000 storm event	---	---	1.5	1034	0.000097
Copper	Effluent Water from 30 January 2000 storm event	---	---	1.5	351	0.000033
Copper	Effluent Water from 16 February 2000 storm event	---	---	7.7	1634	0.000784
Copper	Effluent Water from 21 February 2000 storm event	---	---	1.2	5722	0.000428
Copper	Effluent Water from 27 February 2000 storm event	---	---	5.8	683	0.000247
Copper	Effluent Water from 8 March 2000 storm event	---	---	6.7	1608	0.000671
Copper	Effluent Water from 17 April 2000 storm event	---	---	8.1	5315	0.002682
Copper	Estimated effluent from unsampled storm events	---	---	3.5	10910	0.002385
Copper	*Effluent Subtotal*					*0.007325*
Copper	Estimated Influent Load					0.008067
Copper	**Efficiency (%)**					**9%**
Copper	**Efficiency w/o Litter Removal (%)**					**8%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used Fossil Filter Adsorbent	119	5897	---	---	0.001544
Lead	Used Fossil Filter Debris/litter/sediment	104	2268	---	---	0.000519
Lead	*Used Media Subtotal*					*0.002063*
Lead	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Lead	Effluent Water from 25 January 2000 storm event	---	---	1	1034	0.000064
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	351	0.000022
Lead	Effluent Water from 16 February 2000 storm event	---	---	9.4	1634	0.000957
Lead	Effluent Water from 21 February 2000 storm event	---	---	2	5722	0.000713
Lead	Effluent Water from 27 February 2000 storm event	---	---	4.7	683	0.000200
Lead	Effluent Water from 8 March 2000 storm event	---	---	12	1608	0.001202
Lead	Effluent Water from 17 April 2000 storm event	---	---	10	5315	0.003311
Lead	Estimated effluent from unsampled storm events	---	---	*3.8*	10910	0.002555
Lead	*Effluent Subtotal*					*0.009924*
Lead	Estimated Influent Load					0.011082
Lead	**Efficiency (%)**					**19%**
Lead	**Efficiency w/o Litter Removal (%)**					**15%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used Fossil Filter Adsorbent	338	5897	---	---	0.004385
Zinc	Used Fossil Filter Debris/litter/sediment	356	2268	---	---	0.001776
Zinc	*Used Media Subtotal*					*0.006161*
Zinc	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	14.8	1034	0.000953
Zinc	Effluent Water from 30 January 2000 storm event	---	---	13.4	351	0.000293
Zinc	Effluent Water from 16 February 2000 storm event	---	---	69	1634	0.007024
Zinc	Effluent Water from 21 February 2000 storm event	---	---	9.4	5722	0.003351
Zinc	Effluent Water from 27 February 2000 storm event	---	---	60	683	0.002553
Zinc	Effluent Water from 8 March 2000 storm event	---	---	74	1608	0.007413
Zinc	Effluent Water from 17 April 2000 storm event	---	---	82.8	5315	0.027416
Zinc	Estimated effluent from unsampled storm events	---	---	*33.5*	10910	0.022764
Zinc	*Effluent Subtotal*					*0.071767*
Zinc	Estimated Influent Load					0.077923
Zinc	**Efficiency (%)**					**8%**
Zinc	**Efficiency w/o Litter Removal (%)**					**6%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used Fossil Filter Adsorbent	5180	5897	---	---	0.067202
Petroleum Hydrocarbons	Used Fossil Filter Debris/litter/sediment	4550	2268	---	---	0.022703
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.089905*
Petroleum Hydrocarbons	*Unused Fossil Filter Adsorbent*	*26.6*	*1900*	---	---	*0.000111*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	1034	0.032208
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	351	0.010933
Petroleum Hydrocarbons	Effluent Water from 16 February 2000 storm event	---	---	500	1634	0.050897
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	5722	0.178232
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	683	0.021274
Petroleum Hydrocarbons	Effluent Water from 8 March 2000 storm event	---	---	510	1608	0.051088
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	500	5315	0.165554
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	*501.4*	10910	0.340793
Petroleum Hydrocarbons	*Effluent Subtotal*					*0.850979*
Petroleum Hydrocarbons	Estimated Influent Load					0.940772
Petroleum Hydrocarbons	**Efficiency (%)**					**10%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**7%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used Fossil Filter Adsorbent	---	5897	---	---	13.000526
Sediment	Used Fossil Filter Debris/litter/sediment	---	2268	---	---	5.000033
Sediment	*Used Media Subtotal*					*18.000559*
Sediment	*Unused Fossil Filter Adsorbent*	---	*1900*	---	---	4.188740
Sediment	Effluent Water from 25 January 2000 storm event	---	---	24	1034	1.545961
Sediment	Effluent Water from 30 January 2000 storm event	---	---	8	351	0.174930
Sediment	Effluent Water from 16 February 2000 storm event	---	---	32	1634	3.257363
Sediment	Effluent Water from 21 February 2000 storm event	---	---	22	5722	7.842191
Sediment	Effluent Water from 27 February 2000 storm event	---	---	20	683	0.850976
Sediment	Effluent Water from 8 March 2000 storm event	---	---	31	1608	3.105379
Sediment	Effluent Water from 17 April 2000 storm event	---	---	27	5315	8.939925
Sediment	Estimated effluent from unsampled storm events	---	---	*21.7*	10910	14.745762
Sediment	*Effluent Subtotal*					*40.462508*
Sediment	Estimated Influent Load					54.274327
Sediment	**Efficiency (%)**					**25%**
Sediment	**Efficiency w/o Litter Removal (%)**					**18%**

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Each Fossil Filter DII used approximately 1900 grams of adsorbent material.

Note 3: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debris removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 4: Where the individual storm EMCs showed evidence of normality, the unsampled effluent concentration was estimated by averaging individual storm EMCs.

Note 5: Where the individual storm EMCs showed evidence of non-normality, the unsampled effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 6: Flow measured continuously while DII was installed.

Note 7: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Ottmer

Worksheet 3
Las Flores Maintenance Station StreamGuard DII % Removal Efficiency Calculations (Storm-by-Storm Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used StreamGuard Geotextile Fabric	34.3	890	---	---	0.000067
Copper	Used StreamGuard Absorbent Material	10.9	617	---	---	0.000015
Copper	Used StreamGuard Debris/litter/sediment	24.5	6804	---	---	0.000367
Copper	*Used Media Subtotal*					*0.000449*
Copper	Unused StreamGuard Geotextile Fabric	0.22	943.9	---	---	0.000000
Copper	Unused StreamGuard Absorbent Material	0.24	443.15	---	---	0.000000
Copper	*Unused Media Subtotal*					*0.000001*
Copper	Effluent Water from 30 January 2000 storm event	---	---	1.6	47	0.000005
Copper	Effluent Water from 10 February 2000 storm event	---	---	33.4	48	0.000100
Copper	Effluent Water from 21 February 2000 storm event	---	---	11.1	567	0.000392
Copper	Effluent Water from 27 February 2000 storm event	---	---	12.8	90	0.000072
Copper	Effluent Water from 17 April 2000 storm event	---	---	9.7	485	0.000293
Copper	Estimated effluent from unsampled storm events	---	---	13.7	1594	0.001362
Copper	*Effluent Subtotal*					*0.002224*
Copper	Estimated Influent Load					0.002672
Copper	**Efficiency (%)**					**17%**
Copper	**Efficiency w/o Litter Removal (%)**					**4%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used StreamGuard Geotextile Fabric	38.3	890	---	---	0.000075
Lead	Used StreamGuard Absorbent Material	8.2	617	---	---	0.000011
Lead	Used StreamGuard Debris/litter/sediment	9.9	6804	---	---	0.000148
Lead	*Used Media Subtotal*					*0.000234*
Lead	Unused StreamGuard Geotextile Fabric	0.1	943.9	---	---	0.000000
Lead	Unused StreamGuard Absorbent Material	0.1	443.15	---	---	0.000000
Lead	*Unused Media Subtotal*					*0.000000*
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	47	0.000003
Lead	Effluent Water from 10 February 2000 storm event	---	---	12.3	48	0.000037
Lead	Effluent Water from 21 February 2000 storm event	---	---	1.7	567	0.000060
Lead	Effluent Water from 27 February 2000 storm event	---	---	2.5	90	0.000014
Lead	Effluent Water from 17 April 2000 storm event	---	---	3.7	485	0.000112
Lead	Estimated effluent from unsampled storm events	---	---	2.9	1594	0.000285
Lead	*Effluent Subtotal*					*0.000510*
Lead	Estimated Influent Load					0.000744
Lead	**Efficiency (%)**					**31%**
Lead	**Efficiency w/o Litter Removal (%)**					**14%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used StreamGuard Geotextile Fabric	210	890	---	---	0.000411
Zinc	Used StreamGuard Absorbent Material	46.7	617	---	---	0.000063
Zinc	Used StreamGuard Debris/litter/sediment	98.7	6804	---	---	0.001477
Zinc	*Used Media Subtotal*					*0.001952*
Zinc	Unused StreamGuard Geotextile Fabric	3.8	943.9	---	---	0.000008
Zinc	Unused StreamGuard Absorbent Material	0.6	443.15	---	---	0.000001
Zinc	*Unused Media Subtotal*					*0.000008*
Zinc	Effluent Water from 30 January 2000 storm event	---	---	11.4	47	0.000033
Zinc	Effluent Water from 10 February 2000 storm event	---	---	453	48	0.001355
Zinc	Effluent Water from 21 February 2000 storm event	---	---	18.7	567	0.000661
Zinc	Effluent Water from 27 February 2000 storm event	---	---	32	90	0.000179
Zinc	Effluent Water from 17 April 2000 storm event	---	---	34.5	485	0.001042
Zinc	Estimated effluent from unsampled storm events	---	---	*40.3*	1594	0.004004
Zinc	*Effluent Subtotal*					*0.007275*
Zinc	Estimated Influent Load					0.009218
Zinc	**Efficiency (%)**					**21%**
Zinc	**Efficiency w/o Litter Removal (%)**					**6%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used StreamGuard Geotextile Fabric	2180	890	---	---	0.004268
Petroleum Hydrocarbons	Used StreamGuard Absorbent Material	28100	617	---	---	0.038143
Petroleum Hydrocarbons	Used StreamGuard Debris/litter/sediment	8660	6804	---	---	0.132624
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.175035*
Petroleum Hydrocarbons	Unused StreamGuard Geotextile Fabric	684	943.9	---	---	0.001420
Petroleum Hydrocarbons	Unused StreamGuard Absorbent Material	1970	443.15	---	---	0.001921
Petroleum Hydrocarbons	*Unused Media Subtotal*					*0.003341*
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	47	0.001464
Petroleum Hydrocarbons	Effluent Water from 10 February 2000 storm event	---	---	500	48	0.001495
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	567	0.017661
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	90	0.002803
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	500	485	0.015107
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	500	1594	0.049651
Petroleum Hydrocarbons	*Effluent Subtotal*					*0.088181*
Petroleum Hydrocarbons	Estimated Influent Load					0.259875
Petroleum Hydrocarbons	**Efficiency (%)**					**66%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**31%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1)]	Used StreamGuard Geotextile Fabric	---	890	---	---	1.962094
Sediment[1)]	Used StreamGuard Absorbent Material	---	617	---	---	1.360238
Sediment	Used StreamGuard Debris/litter/sediment	---	6804	---	---	15.000098
Sediment	*Used Media Subtotal*					*18.322431*
Sediment	Unused StreamGuard Geotextile Fabric	---	943.9	---	---	2.080922
Sediment	Unused StreamGuard Absorbent Material	---	443.15	---	---	0.976968
Sediment	*Unused Media Subtotal*					*3.057890*
Sediment	Effluent Water from 30 January 2000 storm event	---	---	11	47	0.032208
Sediment	Effluent Water from 10 February 2000 storm event	---	---	92	48	0.275103
Sediment	Effluent Water from 21 February 2000 storm event	---	---	167	567	5.898837
Sediment	Effluent Water from 27 February 2000 storm event	---	---	24	90	0.134561
Sediment	Effluent Water from 17 April 2000 storm event	---	---	36	485	1.087705
Sediment	Estimated effluent from unsampled storm events	---	---	66	1594	6.553889
Sediment	*Effluent Subtotal*					*13.982303*
Sediment	Estimated Influent Load					28.246844
Sediment	**Efficiency (%)**					**52%**
Sediment	**Efficiency w/o Litter Removal (%)**					**2%**

[1)] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debis removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 3: Where the individual storm EMCs showed evidence of normality, the unsampled effluent concentration was estimated by averaging individual storm EMCs.

Note 4: Where the individual storm EMCs showed evidence of non-normality, the unsampled effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 5: Flow measured continuously while DII was installed.

Note 6: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Othmer

Worksheet 4
Las Flores Maintenance Station Fossil Filter DII % Removal Efficiency Calculations (Storm-by-Storm Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used Fossil Filter Adsorbent	18.9	7711	---	---	0.000321
Copper	Used Fossil Filter Debris/litter/sediment	22.2	6350	---	---	0.000310
Copper	*Used Media Subtotal*					*0.000631*
Copper	*Unused Fossil Filter Adsorbent*	*0.2*	*1900*	---	---	*0.000001*
Copper	Effluent Water from 25 January 2000 storm event	---	---	1.7	926	0.000098
Copper	Effluent Water from 10 February 2000 storm event	---	---	22.2	858	0.001187
Copper	Effluent Water from 21 February 2000 storm event	---	---	1.3	3034	0.000246
Copper	Effluent Water from 27 February 2000 storm event	---	---	6.1	512	0.000195
Copper	Effluent Water from 17 April 2000 storm event	---	---	17.4	4800	0.005203
Copper	Estimated effluent from unsampled storm events	---	---	5.5	10479	0.003615
Copper	*Effluent Subtotal*					*0.010543*
Copper	Estimated Influent Load					0.011173
Copper	**Efficiency (%)**					**6%**
Copper	**Efficiency w/o Litter Removal (%)**					**3%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used Fossil Filter Adsorbent	21.7	7711	---	---	0.000368
Lead	Used Fossil Filter Debris/litter/sediment	7	6350	---	---	0.000098
Lead	*Used Media Subtotal*					*0.000466*
Lead	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Lead	Effluent Water from 25 January 2000 storm event	---	---	1	926	0.000058
Lead	Effluent Water from 10 February 2000 storm event	---	---	16.4	858	0.000877
Lead	Effluent Water from 21 February 2000 storm event	---	---	1.3	3034	0.000246
Lead	Effluent Water from 27 February 2000 storm event	---	---	2.3	512	0.000073
Lead	Effluent Water from 17 April 2000 storm event	---	---	3.5	4800	0.001047
Lead	Estimated effluent from unsampled storm events	---	---	*2.8*	10479	0.001827
Lead	*Effluent Subtotal*					*0.004127*
Lead	Estimated Influent Load					0.004588
Lead	**Efficiency (%)**					**10%**
Lead	**Efficiency w/o Litter Removal (%)**					**8%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used Fossil Filter Adsorbent	120	7711	---	---	0.002036
Zinc	Used Fossil Filter Debris/litter/sediment	69	6350	---	---	0.000964
Zinc	*Used Media Subtotal*					*0.003000*
Zinc	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	10.8	926	0.000623
Zinc	Effluent Water from 10 February 2000 storm event	---	---	107	858	0.005719
Zinc	Effluent Water from 21 February 2000 storm event	---	---	14	3034	0.002646
Zinc	Effluent Water from 27 February 2000 storm event	---	---	31	512	0.000989
Zinc	Effluent Water from 17 April 2000 storm event	---	---	107	4800	0.031996
Zinc	Estimated effluent from unsampled storm events	---	---	35.2	10479	0.022947
Zinc	*Effluent Subtotal*					*0.064920*
Zinc	Estimated Influent Load					0.067914
Zinc	**Efficiency (%)**					**4%**
Zinc	**Efficiency w/o Litter Removal (%)**					**3%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used Fossil Filter Adsorbent	3270	7711	---	---	0.055473
Petroleum Hydrocarbons	Used Fossil Filter Debris/litter/sediment	333	6350	---	---	0.004652
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.060125*
Petroleum Hydrocarbons	*Unused Fossil Filter Adsorbent*	*26.6*	*1900*	---	---	*0.000111*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	926	0.028843
Petroleum Hydrocarbons	Effluent Water from 10 February 2000 storm event	---	---	500	858	0.026725
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	3034	0.094504
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event			500	512	0.015948
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	1416	4800	0.423420
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	*615.7*	10479	0.401953
Petroleum Hydrocarbons	*Effluent Subtotal*					*0.991394*
Petroleum Hydrocarbons	Estimated Influent Load					1.051408
Petroleum Hydrocarbons	**Efficiency (%)**					**6%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**5%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used Fossil Filter Adsorbent	---	7711	---	---	16.999671
Sediment	Used Fossil Filter Debris/litter/sediment	---	6350	---	---	13.999210
Sediment	*Used Media Subtotal*					*30.998881*
Sediment	*Unused Fossil Filter Adsorbent*	---	*1900*	---	---	4.188740
Sediment	Effluent Water from 25 January 2000 storm event	---	---	13	926	0.749931
Sediment	Effluent Water from 10 February 2000 storm event	---	---	128	858	6.841701
Sediment	Effluent Water from 21 February 2000 storm event	---	---	38	3034	7.182341
Sediment	Effluent Water from 27 February 2000 storm event	---	---	13	512	0.414649
Sediment	Effluent Water from 17 April 2000 storm event	---	---	30	4800	8.970762
Sediment	Estimated effluent from unsampled storm events	---	---	*30*	10479	19.642058
Sediment	*Effluent Subtotal*					*43.801443*
Sediment	Estimated Influent Load					70.611583
Sediment	**Efficiency (%)**					**38%**
Sediment	**Efficiency w/o Litter Removal (%)**					**23%**

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Each Fossil Filter DII used approximately 1900 grams of adsorbent material.

Note 3: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debis removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 4: Where the individual storm EMCs showed evidence of normality, the unsampled effluent concentration was estimated by averaging individual storm EMCs.

Note 5: Where the individual storm EMCs showed evidence of non-normality, the unsampled effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 6: Flow measured continuously while DII was installed.

Note 7: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Othmer

Worksheet 5
Rosemead Maintenance Station StreamGuard DII % Removal Efficiency Calculations (Storm-by-Storm Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used StreamGuard Geotextile Fabric	42.5	1056	---	---	0.000099
Copper	Used StreamGuard Absorbent Material	15.5	437	---	---	0.000015
Copper	Used StreamGuard Debris/litter/sediment	51	1515	---	---	0.000170
Copper	*Used Media Subtotal*					*0.000284*
Copper	Unused StreamGuard Geotextile Fabric	0.22	943.9	---	---	0.000000
Copper	Unused StreamGuard Absorbent Material	0.24	443.15	---	---	0.000000
Copper	*Unused Media Subtotal*					*0.000000*
Copper	Effluent Water from 25 January 2000 storm event	---	---	3	2332	0.000436
Copper	Effluent Water from 30 January 2000 storm event	---	---	3.7	651	0.000150
Copper	Effluent Water from 21 February 2000 storm event	---	---	4.6	3379	0.001010
Copper	Effluent Water from 27 February 2000 storm event	---	---	11.6	1692	0.001223
Copper	Effluent Water from 17 April 2000 storm event	---	---	19.3	7226	0.008688
Copper	Estimated effluent from unsampled storm events	---	---	8.5	24142	0.012754
Copper	*Effluent Subtotal*					*0.024261*
Copper	Estimated Influent Load					0.024544
Copper	**Efficiency (%)**					**1%**
Copper	**Efficiency w/o Litter Removal (%)**					**0%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used StreamGuard Geotextile Fabric	95.4	1056	---	---	0.000222
Lead	Used StreamGuard Absorbent Material	25.9	437	---	---	0.000025
Lead	Used StreamGuard Debris/litter/sediment	127	1515	---	---	0.000423
Lead	*Used Media Subtotal*					*0.000670*
Lead	Unused StreamGuard Geotextile Fabric	0.1	943.9	---	---	0.000000
Lead	Unused StreamGuard Absorbent Material	0.1	443.15	---	---	0.000000
Lead	*Unused Media Subtotal*					*0.000000*
Lead	Effluent Water from 25 January 2000 storm event	---	---	2.4	2332	0.000349
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	651	0.000041
Lead	Effluent Water from 21 February 2000 storm event	---	---	1.9	3379	0.000400
Lead	Effluent Water from 27 February 2000 storm event	---	---	12.2	1692	0.001286
Lead	Effluent Water from 17 April 2000 storm event	---	---	12.5	7226	0.005627
Lead	Estimated effluent from unsampled storm events	---	---	3.7	24142	0.005568
Lead	*Effluent Subtotal*					*0.013270*
Lead	Estimated Influent Load					0.013939
Lead	**Efficiency (%)**					**5%**
Lead	**Efficiency w/o Litter Removal (%)**					**2%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used StreamGuard Geotextile Fabric	934	1056	---	---	0.002170
Zinc	Used StreamGuard Absorbent Material	121	437	---	---	0.000116
Zinc	Used StreamGuard Debris/litter/sediment	574	1515	---	---	0.001913
Zinc	*Used Media Subtotal*					*0.004199*
Zinc	Unused StreamGuard Geotextile Fabric	3.8	943.9	---	---	0.000008
Zinc	Unused StreamGuard Absorbent Material	0.6	443.15	---	---	0.000001
Zinc	*Unused Media Subtotal*					*0.000008*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	27.6	2332	0.004010
Zinc	Effluent Water from 30 January 2000 storm event	---	---	24.6	651	0.000998
Zinc	Effluent Water from 21 February 2000 storm event	---	---	13	3379	0.002737
Zinc	Effluent Water from 27 February 2000 storm event	---	---	106	1692	0.011173
Zinc	Effluent Water from 17 April 2000 storm event	---	---	328	7226	0.147652
Zinc	Estimated effluent from unsampled storm events	---	---	*49.8*	24142	0.074926
Zinc	*Effluent Subtotal*					*0.241495*
Zinc	Estimated Influent Load					0.245686
Zinc	**Efficiency (%)**					**2%**
Zinc	**Efficiency w/o Litter Removal (%)**					**1%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used StreamGuard Geotextile Fabric	2300	1056	---	---	0.005343
Petroleum Hydrocarbons	Used StreamGuard Absorbent Material	26400	437	---	---	0.025381
Petroleum Hydrocarbons	Used StreamGuard Debris/litter/sediment	2320	1515	---	---	0.007733
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.038457*
Petroleum Hydrocarbons	Unused StreamGuard Geotextile Fabric	684	943.9	---	---	0.001420
Petroleum Hydrocarbons	Unused StreamGuard Absorbent Material	1970	443.15	---	---	0.001921
Petroleum Hydrocarbons	*Unused Media Subtotal*					*0.003341*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	2332	0.072638
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	651	0.020278
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	3379	0.105251
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	1692	0.052703
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	500	7226	0.225079
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events			500	24142	0.751987
Petroleum Hydrocarbons	*Effluent Subtotal*					*1.227935*
Petroleum Hydrocarbons	Estimated Influent Load					1.263051
Petroleum Hydrocarbons	**Efficiency (%)**					**3%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**2%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used StreamGuard Geotextile Fabric	---	1056	---	---	2.328058
Sediment[1]	Used StreamGuard Absorbent Material	---	437	---	---	0.963410
Sediment	Used StreamGuard Debris/litter/sediment	---	1515	---	---	3.339969
Sediment	*Used Media Subtotal*					*6.631437*
Sediment	Unused StreamGuard Geotextile Fabric	---	943.9	---	---	2.080922
Sediment	Unused StreamGuard Absorbent Material	---	443.15	---	---	0.976968
Sediment	*Unused Media Subtotal*					*3.057890*
Sediment	Effluent Water from 25 January 2000 storm event	---	---	44	2332	6.392166
Sediment	Effluent Water from 30 January 2000 storm event	---	---	18	651	0.729996
Sediment	Effluent Water from 21 February 2000 storm event	---	---	28	3379	5.894040
Sediment	Effluent Water from 27 February 2000 storm event	---	---	27	1692	2.845974
Sediment	Effluent Water from 17 April 2000 storm event	---	---	45	7226	20.257102
Sediment	Estimated effluent from unsampled storm events	---	---	32	24142	48.726732
Sediment	*Effluent Subtotal*					*84.848011*
Sediment	Estimated Influent Load					88.421557
Sediment	**Efficiency (%)**					**4%**
Sediment	**Efficiency w/o Litter Removal (%)**					**0%**

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debris removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 3: Where the individual storm EMCs showed evidence of normality, the unsampled effluent concentration was estimated by averaging individual storm EMCs.

Note 4: Where the individual storm EMCs showed evidence of non-normality, the unsampled effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 5: Flow measured continuously while DII was installed.

Note 6: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Othmer

Worksheet 6
Rosemead Maintenance Station Fossil Filter DII % Removal Efficiency Calculations (Storm-by-Storm Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used Fossil Filter Adsorbent	61.5	5443	---	---	0.000736
Copper	Used Fossil Filter Debris/litter/sediment	43.7	14061	---	---	0.001352
Copper	*Used Media Subtotal*					*0.002088*
Copper	*Unused Fossil Filter Adsorbent*	*0.2*	*1900*	---	---	*0.000001*
Copper	Effluent Water from 25 January 2000 storm event	---	---	2.4	456	0.000068
Copper	Effluent Water from 30 January 2000 storm event	---	---	1.8	94	0.000011
Copper	Effluent Water from 21 February 2000 storm event	---	---	2.8	2664	0.000465
Copper	Effluent Water from 27 February 2000 storm event	---	---	10.4	300	0.000194
Copper	Effluent Water from 17 April 2000 storm event	---	---	29.7	1593	0.002947
Copper	Estimated effluent from unsampled storm events	---	---	5.2	4698	0.001517
Copper	*Effluent Subtotal*					*0.005202*
Copper	Estimated Influent Load					0.007289
Copper	**Efficiency (%)**					**29%**
Copper	**Efficiency w/o Litter Removal (%)**					**12%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used Fossil Filter Adsorbent	135	5443	---	---	0.001617
Lead	Used Fossil Filter Debris/litter/sediment	70.2	14061	---	---	0.002172
Lead	*Used Media Subtotal*					*0.003788*
Lead	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Lead	Effluent Water from 25 January 2000 storm event	---	---	2.3	456	0.000065
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	94	0.000006
Lead	Effluent Water from 21 February 2000 storm event	---	---	1.2	2664	0.000199
Lead	Effluent Water from 27 February 2000 storm event	---	---	6.5	300	0.000121
Lead	Effluent Water from 17 April 2000 storm event	---	---	16.8	1593	0.001667
Lead	Estimated effluent from unsampled storm events	---	---	3.1	4698	0.000917
Lead	*Effluent Subtotal*					*0.002976*
Lead	Estimated Influent Load					0.006759
Lead	**Efficiency (%)**					**56%**
Lead	**Efficiency w/o Litter Removal (%)**					**35%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used Fossil Filter Adsorbent	705	5443	---	---	0.008442
Zinc	Used Fossil Filter Debris/litter/sediment	856	14061	---	---	0.026480
Zinc	*Used Media Subtotal*					*0.034922*
Zinc	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	34.2	456	0.000972
Zinc	Effluent Water from 30 January 2000 storm event	---	---	19.8	94	0.000116
Zinc	Effluent Water from 21 February 2000 storm event	---	---	19.5	2664	0.003236
Zinc	Effluent Water from 27 February 2000 storm event	---	---	218	300	0.004074
Zinc	Effluent Water from 17 April 2000 storm event	---	---	436	1593	0.043268
Zinc	Estimated effluent from unsampled storm events	---	---	*66.0*	4698	0.019325
Zinc	*Effluent Subtotal*					*0.070991*
Zinc	Estimated Influent Load					0.105908
Zinc	**Efficiency (%)**					**33%**
Zinc	**Efficiency w/o Litter Removal (%)**					**11%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used Fossil Filter Adsorbent	1480	5443	---	---	0.017483
Petroleum Hydrocarbons	Used Fossil Filter Debris/litter/sediment	2950	14061	---	---	0.091256
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.108739*
Petroleum Hydrocarbons	*Unused Fossil Filter Adsorbent*	*26.6*	*1900*	---	---	*0.000111*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	456	0.014204
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	94	0.002928
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	2664	0.082980
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	300	0.009345
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	500	1593	0.049620
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	*500*	4698	0.146336
Petroleum Hydrocarbons	*Effluent Subtotal*					*0.305411*
Petroleum Hydrocarbons	Estimated Influent Load					0.414038
Petroleum Hydrocarbons	**Efficiency (%)**					**26%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**5%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used Fossil Filter Adsorbent	---	5443	---	---	11.999638
Sediment	Used Fossil Filter Debris/litter/sediment	---	14061	---	---	30.998881
Sediment	*Used Media Subtotal*					*42.998518*
Sediment	*Unused Fossil Filter Adsorbent*	---	*1900*	---	---	4.188740
Sediment	Effluent Water from 25 January 2000 storm event	---	---	39	456	1.107889
Sediment	Effluent Water from 30 January 2000 storm event	---	---	19	94	0.111262
Sediment	Effluent Water from 21 February 2000 storm event	---	---	8	2664	1.327673
Sediment	Effluent Water from 27 February 2000 storm event	---	---	13	300	0.242956
Sediment	Effluent Water from 17 April 2000 storm event	---	---	38	1593	3.771084
Sediment	Estimated effluent from unsampled storm events	---	---	*20*	4698	5.750517
Sediment	*Effluent Subtotal*					*12.311384*
Sediment	Estimated Influent Load					51.121162
Sediment	**Efficiency (%)**					**76%**
Sediment	**Efficiency w/o Litter Removal (%)**					**39%**

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Each Fossil Filter DII used approximately 1900 grams of adsorbent material.

Note 3: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debis removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 4: Where the individual storm EMCs showed evidence of normality, the unsampled effluent concentration was estimated by averaging individual storm EMCs.

Note 5: Where the individual storm EMCs showed evidence of non-normality, the unsampled effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 6: Flow measured continuously while DII was installed.

Note 7: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Othmer

Worksheet 7
Foothill Maintenance Station StreamGuard DII % Removal Efficiency Calculations (Aggregate Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used StreamGuard Geotextile Fabric	74.5	960	---	---	0.000157
Copper	Used StreamGuard Absorbent Material	16.9	504.5	---	---	0.000019
Copper	Used StreamGuard Debris/litter/sediment	29.9	4536	---	---	0.000298
Copper	*Used Media Subtotal*					*0.000474*
Copper	Unused StreamGuard Geotextile Fabric	0.22	943.9	---	---	0.000000
Copper	Unused StreamGuard Absorbent Material	0.24	443.15	---	---	0.000000
Copper	*Unused Media Subtotal*					*0.000001*
Copper	Effluent Water from 25 January 2000 storm event	---	---	1.7	262	
Copper	Effluent Water from 30 January 2000 storm event	---	---	1.3	379	
Copper	Effluent Water from 16 February 2000 storm event	---	---	4.4	268	
Copper	Effluent Water from 21 February 2000 storm event	---	---	1.2	1512	
Copper	Effluent Water from 27 February 2000 storm event	---	---	4.2	984	
Copper	Effluent Water from 8 March 2000 storm event	---	---	4.3	463	
Copper	Effluent Water from 17 April 2000 storm event	---	---	5.8	344	
Copper	Estimated flow volume from unsampled storm events	---	---	---	4250	
Copper	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			3.3	8462	0.001726
Copper	Estimated Influent Load					0.002198
Copper	Efficiency (%)					22%
Copper	Efficiency w/o Litter Removal (%)					9%

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used StreamGuard Geotextile Fabric	150	960	---	---	0.000317
Lead	Used StreamGuard Absorbent Material	29.5	504.5	---	---	0.000033
Lead	Used StreamGuard Debris/litter/sediment	52.9	4536	---	---	0.000528
Lead	*Used Media Subtotal*					*0.000877*
Lead	Unused StreamGuard Geotextile Fabric	0.1	943.9	---	---	0.000000
Lead	Unused StreamGuard Absorbent Material	0.1	443.15	---	---	0.000000
Lead	*Unused Media Subtotal*					*0.000000*
Lead	Effluent Water from 25 January 2000 storm event	---	---	1	262	
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	379	
Lead	Effluent Water from 10 February 2000 storm event	---	---	1.7	268	
Lead	Effluent Water from 21 February 2000 storm event	---	---	1	1512	
Lead	Effluent Water from 27 February 2000 storm event	---	---	1	984	
Lead	Effluent Water from 8 March 2000 storm event	---	---	2	463	
Lead	Effluent Water from 17 April 2000 storm event	---	---	2.8	344	
Lead	Estimated effluent from unsampled storm events	---	---	---	4250	
Lead	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*1.4*	8462	0.000727
Lead	Estimated Influent Load					0.001604
Lead	Efficiency (%)					55%
Lead	Efficiency w/o Litter Removal (%)					32%

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used StreamGuard Geotextile Fabric	917	960	---	---	0.001937
Zinc	Used StreamGuard Absorbent Material	105	504.5	---	---	0.000117
Zinc	Used StreamGuard Debris/litter/sediment	301	4536	---	---	0.003004
Zinc	*Used Media Subtotal*					*0.005057*
Zinc	Unused StreamGuard Geotextile Fabric	3.8	943.9	---	---	0.000006
Zinc	Unused StreamGuard Absorbent Material	0.6	443.15	---	---	0.000001
Zinc	*Unused Media Subtotal*					*0.000008*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	13.5	262	
Zinc	Effluent Water from 30 January 2000 storm event	---	---	16.2	379	
Zinc	Effluent Water from 16 February 2000 storm event	---	---	50	268	
Zinc	Effluent Water from 21 February 2000 storm event	---	---	13	1512	
Zinc	Effluent Water from 27 February 2000 storm event	---	---	50	984	
Zinc	Effluent Water from 8 March 2000 storm event	---	---	66	463	
Zinc	Effluent Water from 17 April 2000 storm event	---	---	63.5	344	
Zinc	Estimated effluent from unsampled storm events	---	---	---	4250	
Zinc	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*31.9*	8462	0.016806
Zinc	Estimated Influent Load					0.021854
Zinc	Efficiency (%)					23%
Zinc	Efficiency w/o Litter Removal (%)					11%

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used StreamGuard Geotextile Fabric	3020	960	---	---	0.006378
Petroleum Hydrocarbons	Used StreamGuard Absorbent Material	33700	504.5	---	---	0.037404
Petroleum Hydrocarbons	Used StreamGuard Debris/litter/sediment	2870	4536	---	---	0.028640
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.072422*
Petroleum Hydrocarbons	Unused StreamGuard Geotextile Fabric	684	943.9	---	---	0.001420
Petroleum Hydrocarbons	Unused StreamGuard Absorbent Material	1070	443.15			0.001021
Petroleum Hydrocarbons	*Unused Media Subtotal*					*0.003341*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	262	
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	379	
Petroleum Hydrocarbons	Effluent Water from 16 February 2000 storm event	---	---	500	268	
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	1512	
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	984	
Petroleum Hydrocarbons	Effluent Water from 8 March 2000 storm event	---	---	500	463	
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	300	344	
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	---	4250	
Petroleum Hydrocarbons	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			500.0	8462	0.263578
Petroleum Hydrocarbons	Estimated Influent Load					0.332660
Petroleum Hydrocarbons	Efficiency (%)					21%
Petroleum Hydrocarbons	Efficiency w/o Litter Removal (%)					13%

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used StreamGuard Geotextile Fabric	---	960	---	---	2.116416
Sediment[1]	Used StreamGuard Absorbent Material	---	504.5	---	---	1.112221
Sediment	Used StreamGuard Debris/litter/sediment	---	4536	---	---	10.000066
Sediment	*Used Media Subtotal*					*13.228702*
Sediment	Unused StreamGuard Geotextile Fabric		943.9			2.080023
Sediment	Unused StreamGuard Absorbent Material	---	443.15	---	---	0.976868
Sediment	*Unused Media Subtotal*					*3.057890*
Sediment	Effluent Water from 25 January 2000 storm event	---	---	13	262	
Sediment	Effluent Water from 30 January 2000 storm event	---	---	6	379	
Sediment	Effluent Water from 16 February 2000 storm event	---	---	13	268	
Sediment	Effluent Water from 21 February 2000 storm event	---	---	20	1512	
Sediment	Effluent Water from 27 February 2000 storm event	---	---	5	984	
Sediment	Effluent Water from 8 March 2000 storm event	---	---	10	463	
Sediment	Effluent Water from 17 April 2000 storm event	---	---	13	344	
Sediment	Estimated effluent from unsampled storm events	---	---	---	4250	
Sediment	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			11.4	8462	6.024650
Sediment	Estimated Influent Load					16.195462
Sediment	Efficiency (%)					63%
Sediment	Efficiency w/o Litter Removal (%)					3%

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debris removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 3: Where the individual storm EMCs showed evidence of normality, the mean EMC effluent concentration was estimated by averaging individual storm EMCs.

Note 4: Where the individual storm EMCs showed evidence of non-normality, the mean EMC effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 5: Flow measured continuously while DII was installed.

Note 6: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Ohmer

Worksheet 8
Foothill Maintenance Station Fossil Filter DII % Removal Efficiency Calculations (Aggregate Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used Fossil Filter Adsorbent	35.3	5897	---	---	0.000458
Copper	Used Fossil Filter Debris/litter/sediment	57	2268	---	---	0.000284
Copper	*Used Media Subtotal*					*0.000742*
Copper	*Unused Fossil Filter Adsorbent*	*0.2*	*1900*	---	---	*0.000001*
Copper	Effluent Water from 25 January 2000 storm event	---	---	1.5	1034	
Copper	Effluent Water from 30 January 2000 storm event	---	---	1.5	351	
Copper	Effluent Water from 16 February 2000 storm event	---	---	7.7	1634	
Copper	Effluent Water from 21 February 2000 storm event	---	---	1.2	5722	
Copper	Effluent Water from 27 February 2000 storm event	---	---	5.8	683	
Copper	Effluent Water from 8 March 2000 storm event	---	---	6.7	1608	
Copper	Effluent Water from 17 April 2000 storm event	---	---	8.1	5315	
Copper	Estimated effluent from unsampled storm events	---	---	---	10910	
Copper	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*3.5*	27257	0.005958
Copper	Estimated Influent Load					0.006699
Copper	**Efficiency (%)**					**11%**
Copper	**Efficiency w/o Litter Removal (%)**					**7%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used Fossil Filter Adsorbent	119	5897	---	---	0.001544
Lead	Used Fossil Filter Debris/litter/sediment	104	2268	---	---	0.000519
Lead	*Used Media Subtotal*					*0.002063*
Lead	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Lead	Effluent Water from 25 January 2000 storm event	---	---	1	1034	
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	351	
Lead	Effluent Water from 16 February 2000 storm event	---	---	9.4	1634	
Lead	Effluent Water from 21 February 2000 storm event	---	---	2	5722	
Lead	Effluent Water from 27 February 2000 storm event	---	---	4.7	683	
Lead	Effluent Water from 8 March 2000 storm event	---	---	12	1608	
Lead	Effluent Water from 17 April 2000 storm event	---	---	10	5315	
Lead	Estimated effluent from unsampled storm events	---	---	---	10910	
Lead	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*3.8*	27257	0.006383
Lead	Estimated Influent Load					0.008440
Lead	**Efficiency (%)**					**24%**
Lead	**Efficiency w/o Litter Removal (%)**					**19%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used Fossil Filter Adsorbent	338	5897	---	---	0.004385
Zinc	Used Fossil Filter Debris/litter/sediment	356	2268	---	---	0.001776
Zinc	*Used Media Subtotal*					*0.006161*
Zinc	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	14.8	1034	
Zinc	Effluent Water from 30 January 2000 storm event	---	---	13.4	351	
Zinc	Effluent Water from 16 February 2000 storm event	---	---	69	1634	
Zinc	Effluent Water from 21 February 2000 storm event	---	---	9.4	5722	
Zinc	Effluent Water from 27 February 2000 storm event	---	---	60	683	
Zinc	Effluent Water from 8 March 2000 storm event	---	---	74	1608	
Zinc	Effluent Water from 17 April 2000 storm event	---	---	82.8	5315	
Zinc	Estimated effluent from unsampled storm events	---	---	---	10910	
Zinc	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*33.5*	27257	0.056874
Zinc	Estimated Influent Load					0.063030
Zinc	**Efficiency (%)**					**10%**
Zinc	**Efficiency w/o Litter Removal (%)**					**7%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used Fossil Filter Adsorbent	5180	5897	---	---	0.067202
Petroleum Hydrocarbons	Used Fossil Filter Debris/litter/sediment	4550	2268	---	---	0.022703
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.089905*
Petroleum Hydrocarbons	*Unused Fossil Filter Adsorbent*	*28.8*	*1900*	---	---	*0.000111*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	1034	
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	351	
Petroleum Hydrocarbons	Effluent Water from 16 February 2000 storm event	---	---	500	1634	
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	5722	
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	683	
Petroleum Hydrocarbons	Effluent Water from 8 March 2000 storm event	---	---	510	1608	
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	500	5315	
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	---	10910	
Petroleum Hydrocarbons	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*501.4*	27257	0.851419
Petroleum Hydrocarbons	Estimated Influent Load					0.941213
Petroleum Hydrocarbons	**Efficiency (%)**					**10%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**7%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used Fossil Filter Adsorbent	---	5897	---	---	13.000526
Sediment	Used Fossil Filter Debris/litter/sediment	---	2268	---	---	5.000033
Sediment	*Used Media Subtotal*					*18.000559*
Sediment	*Unused Fossil Filter Adsorbent*	---	*1900*	---	---	4.188740
Sediment	Effluent Water from 25 January 2000 storm event	---	---	24	1034	
Sediment	Effluent Water from 30 January 2000 storm event	---	---	8	351	
Sediment	Effluent Water from 16 February 2000 storm event	---	---	32	1634	
Sediment	Effluent Water from 21 February 2000 storm event	---	---	22	5722	
Sediment	Effluent Water from 27 February 2000 storm event	---	---	20	683	
Sediment	Effluent Water from 8 March 2000 storm event	---	---	31	1608	
Sediment	Effluent Water from 17 April 2000 storm event	---	---	27	5315	
Sediment	Estimated effluent from unsampled storm events	---	---	---	10910	
Sediment	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*21.7*	27257	36.840077
Sediment	Estimated Influent Load					50.651896
Sediment	**Efficiency (%)**					**27%**
Sediment	**Efficiency w/o Litter Removal (%)**					**19%**

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Each Fossil Filter DII used approximately 1900 grams of adsorbent material.

Note 3: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debis removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 4: Where the individual storm EMCs showed evidence of normality, the mean EMC effluent concentration was estimated by averaging individual storm EMCs.

Note 5: Where the individual storm EMCs showed evidence of non-normality, the mean EMC effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 6: Flow measured continuously while DII was installed.

Note 7: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Othmer

Worksheet 9
Las Flores Maintenance Station StreamGuard DII % Removal Efficiency Calculations (Aggregate Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used StreamGuard Geotextile Fabric	34.3	890	---	---	0.000067
Copper	Used StreamGuard Absorbent Material	10.9	617	---	---	0.000015
Copper	Used StreamGuard Debris/litter/sediment	24.5	6804	---	---	0.000367
Copper	*Used Media Subtotal*					*0.000449*
Copper	Unused StreamGuard Geotextile Fabric	0.22	943.9	---	---	0.000000
Copper	Unused StreamGuard Absorbent Material	0.24	443.15	---	---	0.000000
Copper	*Unused Media Subtotal*					*0.000000*
Copper	Effluent Water from 30 January 2000 storm event	---	---	1.6	47	
Copper	Effluent Water from 10 February 2000 storm event	---	---	33.4	48	
Copper	Effluent Water from 21 February 2000 storm event	---	---	11.1	567	
Copper	Effluent Water from 27 February 2000 storm event	---	---	12.8	90	
Copper	Effluent Water from 17 April 2000 storm event	---	---	9.7	485	
Copper	Estimated effluent from unsampled storm events	---	---	---	1594	
Copper	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			13.7	2831	0.002420
Copper	Estimated Influent Load					0.002868
Copper	**Efficiency (%)**					**16%**
Copper	**Efficiency w/o Litter Removal (%)**					**3%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used StreamGuard Geotextile Fabric	38.3	890	---	---	0.000075
Lead	Used StreamGuard Absorbent Material	8.2	617	---	---	0.000011
Lead	Used StreamGuard Debris/litter/sediment	9.9	6804	---	---	0.000148
Lead	*Used Media Subtotal*					*0.000234*
Lead	Unused StreamGuard Geotextile Fabric	0.1	943.9	---	---	0.000000
Lead	Unused StreamGuard Absorbent Material	0.1	443.15	---	---	0.000000
Lead	*Unused Media Subtotal*					*0.000000*
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	47	
Lead	Effluent Water from 10 February 2000 storm event	---	---	12.3	48	
Lead	Effluent Water from 21 February 2000 storm event	---	---	1.7	567	
Lead	Effluent Water from 27 February 2000 storm event	---	---	2.5	90	
Lead	Effluent Water from 17 April 2000 storm event	---	---	3.7	485	
Lead	Estimated effluent from unsampled storm events	---	---	---	1594	
Lead	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			2.6	2831	0.000506
Lead	Estimated Influent Load					0.000739
Lead	**Efficiency (%)**					**32%**
Lead	**Efficiency w/o Litter Removal (%)**					**15%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used StreamGuard Geotextile Fabric	210	890	---	---	0.000411
Zinc	Used StreamGuard Absorbent Material	46.7	617	---	---	0.000063
Zinc	Used StreamGuard Debris/litter/sediment	96.7	6804	---	---	0.001477
Zinc	*Used Media Subtotal*					*0.001952*
Zinc	Unused StreamGuard Geotextile Fabric	3.8	943.9	---	---	0.000008
Zinc	Unused StreamGuard Absorbent Material	0.6	443.15	---	---	0.000001
Zinc	*Unused Media Subtotal*					*0.000008*
Zinc	Effluent Water from 30 January 2000 storm event	---	---	11.4	47	
Zinc	Effluent Water from 10 February 2000 storm event	---	---	453	48	
Zinc	Effluent Water from 21 February 2000 storm event	---	---	18.7	567	
Zinc	Effluent Water from 27 February 2000 storm event	---	---	32	90	
Zinc	Effluent Water from 17 April 2000 storm event	---	---	34.5	485	
Zinc	Estimated effluent from unsampled storm events	---	---	---	1594	
Zinc	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*40.3*	2831	0.007112
Zinc	Estimated Influent Load					0.009055
Zinc	**Efficiency (%)**					**21%**
Zinc	**Efficiency w/o Litter Removal (%)**					**6%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used StreamGuard Geotextile Fabric	2180	890	---	---	0.004268
Petroleum Hydrocarbons	Used StreamGuard Absorbent Material	28100	617	---	---	0.038143
Petroleum Hydrocarbons	Used StreamGuard Debris/litter/sediment	8860	6804	---	---	0.132624
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.175035*
Petroleum Hydrocarbons	Unused StreamGuard Geotextile Fabric	684	943.9	---	---	0.001420
Petroleum Hydrocarbons	Unused StreamGuard Absorbent Material	1070	443.15	---	---	0.001921
Petroleum Hydrocarbons	*Unused Media Subtotal*					*0.003341*
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	47	
Petroleum Hydrocarbons	Effluent Water from 10 February 2000 storm event	---	---	500	48	
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	567	
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	90	
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	500	485	
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	---	1594	
Petroleum Hydrocarbons	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			500.0	2831	0.088181
Petroleum Hydrocarbons	Estimated Influent Load					0.259875
Petroleum Hydrocarbons	**Efficiency (%)**					**66%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**31%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used StreamGuard Geotextile Fabric	---	890	---	---	1.962094
Sediment[1]	Used StreamGuard Absorbent Material	---	617	---	---	1.360238
Sediment	Used StreamGuard Debris/litter/sediment	---	6804	---	---	15.000098
Sediment	*Used Media Subtotal*					*18.322431*
Sediment	Unused StreamGuard Geotextile Fabric	---	943.9	---	---	2.080922
Sediment	Unused StreamGuard Absorbent Material	---	443.15	---	---	0.976968
Sediment	*Unused Media Subtotal*					*3.057890*
Sediment	Effluent Water from 30 January 2000 storm event	---	---	11	47	
Sediment	Effluent Water from 10 February 2000 storm event	---	---	92	48	
Sediment	Effluent Water from 21 February 2000 storm event	---	---	167	567	
Sediment	Effluent Water from 27 February 2000 storm event	---	---	24	90	
Sediment	Effluent Water from 17 April 2000 storm event	---	---	36	485	
Sediment	Estimated effluent from unsampled storm events	---	---	---	1594	
Sediment	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			66.0	2831	11.639938
Sediment	Estimated Influent Load					26.904478
Sediment	**Efficiency (%)**					**57%**
Sediment	**Efficiency w/o Litter Removal (%)**					**2%**

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1:	Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.
Note 2:	Efficiencies include sediment/debris entrapped by the DII. Extensive maintenence was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debis removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.
Note 3:	Where the individual storm EMCs showed evidence of normality, the mean EMC effluent concentration was estimated by averaging individual storm EMCs.
Note 4:	Where the individual storm EMCs showed evidence of non-normality, the mean EMC effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.
Note 5:	Flow measured continuously while DII was installed.
Note 6:	Reporting Limit was used where results were "<" Reporting Limit.
Calculated by:	Byron Berger
Checked by:	Ed Othmer

Worksheet 10
Las Flores Maintenance Station Fossil Filter DII % Removal Efficiency Calculations (Aggregate Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used Fossil Filter Adsorbent	18.9	7711	---	---	0.000321
Copper	Used Fossil Filter Debris/litter/sediment	22.2	6350	---	---	0.000310
Copper	*Used Media Subtotal*					*0.000631*
Copper	*Unused Fossil Filter Adsorbent*	*0.2*	*1900*	---	---	*0.000001*
Copper	Effluent Water from 25 January 2000 storm event	---	---	1.7	926	
Copper	Effluent Water from 10 February 2000 storm event	---	---	22.2	858	
Copper	Effluent Water from 21 February 2000 storm event	---	---	1.3	3034	
Copper	Effluent Water from 27 February 2000 storm event	---	---	6.1	512	
Copper	Effluent Water from 17 April 2000 storm event	---	---	17.4	4800	
Copper	Estimated effluent from unsampled storm events	---	---	---	10479	
Copper	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*5.5*	20609	0.007110
Copper	Estimated Influent Load					0.007740
Copper	**Efficiency (%)**					**8%**
Copper	**Efficiency w/o Litter Removal (%)**					**4%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used Fossil Filter Adsorbent	21.7	7711	---	---	0.000368
Lead	Used Fossil Filter Debris/litter/sediment	7	6350	---	---	0.000098
Lead	*Used Media Subtotal*					*0.000466*
Lead	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Lead	Effluent Water from 25 January 2000 storm event	---	---	1	926	
Lead	Effluent Water from 10 February 2000 storm event	---	---	16.4	858	
Lead	Effluent Water from 21 February 2000 storm event	---	---	1.3	3034	
Lead	Effluent Water from 27 February 2000 storm event	---	---	2.3	512	
Lead	Effluent Water from 17 April 2000 storm event	---	---	3.5	4800	
Lead	Estimated effluent from unsampled storm events	---	---	---	10479	
Lead	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*2.8*	20609	0.003593
Lead	Estimated Influent Load					0.004064
Lead	**Efficiency (%)**					**11%**
Lead	**Efficiency w/o Litter Removal (%)**					**9%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used Fossil Filter Adsorbent	120	7711	---	---	0.002036
Zinc	Used Fossil Filter Debris/litter/sediment	69	6350	---	---	0.000964
Zinc	*Used Media Subtotal*					*0.003000*
Zinc	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	10.8	926	
Zinc	Effluent Water from 10 February 2000 storm event	---	---	107	858	
Zinc	Effluent Water from 21 February 2000 storm event	---	---	14	3034	
Zinc	Effluent Water from 27 February 2000 storm event	---	---	31	512	
Zinc	Effluent Water from 17 April 2000 storm event	---	---	107	4800	
Zinc	Estimated effluent from unsampled storm events	---	---	---	10479	
Zinc	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*35.2*	20609	0.045129
Zinc	Estimated Influent Load					0.048124
Zinc	**Efficiency (%)**					**6%**
Zinc	**Efficiency w/o Litter Removal (%)**					**4%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used Fossil Filter Adsorbent	3270	7711	---	---	0.055473
Petroleum Hydrocarbons	Used Fossil Filter Debris/litter/sediment	333	6350	---	---	0.004652
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.060125*
Petroleum Hydrocarbons	*Unused Fossil Filter Adsorbent*	*26.6*	*1900*	---	---	*0.000111*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	926	
Petroleum Hydrocarbons	Effluent Water from 10 February 2000 storm event	---	---	500	858	
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	3034	
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	512	
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	1416	4800	
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	---	10479	
Petroleum Hydrocarbons	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*615.7*	20609	0.790519
Petroleum Hydrocarbons	Estimated Influent Load					0.850533
Petroleum Hydrocarbons	**Efficiency (%)**					**7%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**7%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used Fossil Filter Adsorbent	---	7711	---	---	16.999671
Sediment	Used Fossil Filter Debris/litter/sediment		6350			13.999210
Sediment	*Used Media Subtotal*					*30.998881*
Sediment	*Unused Fossil Filter Adsorbent*	---	*1900*	---	---	4.188740
Sediment	Effluent Water from 25 January 2000 storm event	---	---	13	926	
Sediment	Effluent Water from 10 February 2000 storm event	---	---	128	858	
Sediment	Effluent Water from 21 February 2000 storm event	---	---	38	3034	
Sediment	Effluent Water from 27 February 2000 storm event	---	---	13	512	
Sediment	Effluent Water from 17 April 2000 storm event	---	---	30	4800	
Sediment	Estimated effluent from unsampled storm events	---	---	---	10479	
Sediment	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*30.1*	20609	38.629944
Sediment	Estimated Influent Load					65.440085
Sediment	**Efficiency (%)**					**41%**
Sediment	**Efficiency w/o Litter Removal (%)**					**25%**

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Each Fossil Filter DII used approximately 1900 grams of adsorbent material.

Note 3: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debis removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 4: Where the individual storm EMCs showed evidence of normality, the mean EMC effluent concentration was estimated by averaging individual storm EMCs.

Note 5: Where the individual storm EMCs showed evidence of non-normality, the mean EMC effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 6: Flow measured continuously while DII was installed.

Note 7: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Othmer

Worksheet 11
Rosemead Maintenance Station StreamGuard DII % Removal Efficiency Calculations (Aggregate Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used StreamGuard Geotextile Fabric	42.5	1056	---	---	0.000099
Copper	Used StreamGuard Absorbent Material	15.5	437	---	---	0.000015
Copper	Used StreamGuard Debris/litter/sediment	51	1515	---	---	0.000170
Copper	*Used Media Subtotal*					*0.000284*
Copper	Unused StreamGuard Geotextile Fabric	0.22	943.9	---	---	0.000000
Copper	Unused StreamGuard Absorbent Material	0.24	443.15	---	---	0.000000
Copper	*Unused Media Subtotal*					*0.000001*
Copper	Effluent Water from 25 January 2000 storm event	---	---	3	2332	
Copper	Effluent Water from 30 January 2000 storm event	---	---	3.7	651	
Copper	Effluent Water from 21 February 2000 storm event	---	---	4.6	3379	
Copper	Effluent Water from 27 February 2000 storm event	---	---	11.6	1692	
Copper	Effluent Water from 17 April 2000 storm event	---	---	19.3	7226	
Copper	Estimated effluent from unsampled storm events	---	---	---	24142	
Copper	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			8.5	39422	0.020826
Copper	Estimated Influent Load					0.021109
Copper	**Efficiency (%)**					**1%**
Copper	**Efficiency w/o Litter Removal (%)**					**1%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used StreamGuard Geotextile Fabric	95.4	1056	---	---	0.000222
Lead	Used StreamGuard Absorbent Material	25.9	437	---	---	0.000025
Lead	Used StreamGuard Debris/litter/sediment	127	1515	---	---	0.000423
Lead	*Used Media Subtotal*					*0.000670*
Lead	Unused StreamGuard Geotextile Fabric	0.1	943.9	---	---	0.000000
Lead	Unused StreamGuard Absorbent Material	0.1	443.15	---	---	0.000000
Lead	*Unused Media Subtotal*					*0.000000*
Lead	Effluent Water from 25 January 2000 storm event	---	---	2.4	2332	
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	651	
Lead	Effluent Water from 21 February 2000 storm event	---	---	1.9	3379	
Lead	Effluent Water from 27 February 2000 storm event	---	---	12.2	1692	
Lead	Effluent Water from 17 April 2000 storm event	---	---	12.5	7226	
Lead	Estimated effluent from unsampled storm events	---	---	---	24142	
Lead	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			2.7	39422	0.006092
Lead	Estimated Influent Load					0.009761
Lead	**Efficiency (%)**					**7%**
Lead	**Efficiency w/o Litter Removal (%)**					**3%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used StreamGuard Geotextile Fabric	934	1056	---	---	0.002170
Zinc	Used StreamGuard Absorbent Material	121	437	---	---	0.000116
Zinc	Used StreamGuard Debris/litter/sediment	574	1515	---	---	0.001913
Zinc	*Used Media Subtotal*					*0.004199*
Zinc	Unused StreamGuard Geotextile Fabric	3.8	943.9	---	---	0.000008
Zinc	Unused StreamGuard Absorbent Material	0.6	443.15	---	---	0.000001
Zinc	*Unused Media Subtotal*					*0.000008*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	27.6	2332	
Zinc	Effluent Water from 30 January 2000 storm event	---	---	24.6	651	
Zinc	Effluent Water from 21 February 2000 storm event	---	---	13	3379	
Zinc	Effluent Water from 27 February 2000 storm event	---	---	106	1692	
Zinc	Effluent Water from 17 April 2000 storm event	---	---	326	7226	
Zinc	Estimated effluent from unsampled storm events	---	---	---	24142	
Zinc	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			49.8	39422	0.122349
Zinc	Estimated Influent Load					0.126539
Zinc	**Efficiency (%)**					**3%**
Zinc	**Efficiency w/o Litter Removal (%)**					**2%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used StreamGuard Geotextile Fabric	2300	1056	---	---	0.005343
Petroleum Hydrocarbons	Used StreamGuard Absorbent Material	26400	437	---	---	0.025361
Petroleum Hydrocarbons	Used StreamGuard Debris/litter/sediment	2320	1515	---	---	0.007733
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.038457*
Petroleum Hydrocarbons	Unused StreamGuard Geotextile Fabric	684	943.9	---	---	0.001420
Petroleum Hydrocarbons	Unused StreamGuard Absorbent Material	1070	443.15			0.001021
Petroleum Hydrocarbons	*Unused Media Subtotal*					*0.002441*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	2332	
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	651	
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	3379	
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	1692	
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	500	7226	
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	---	24142	
Petroleum Hydrocarbons	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			500.0	39422	1.227935
Petroleum Hydrocarbons	Estimated Influent Load					1.263051
Petroleum Hydrocarbons	**Efficiency (%)**					**3%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**2%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used StreamGuard Geotextile Fabric	---	1056	---	---	2.328058
Sediment[1]	Used StreamGuard Absorbent Material	---	437	---	---	0.963410
Sediment	Used StreamGuard Debris/litter/sediment	---	1515	---	---	3.339969
Sediment	*Used Media Subtotal*					*6.631437*
Sediment	Unused StreamGuard Geotextile Fabric	---	943.9	---	---	2.080922
Sediment	Unused StreamGuard Absorbent Material	---	443.15	---	---	0.976968
Sediment	*Unused Media Subtotal*					*3.057890*
Sediment	Effluent Water from 25 January 2000 storm event	---	---	44	2332	
Sediment	Effluent Water from 30 January 2000 storm event	---	---	18	651	
Sediment	Effluent Water from 21 February 2000 storm event	---	---	28	3379	
Sediment	Effluent Water from 27 February 2000 storm event	---	---	27	1692	
Sediment	Effluent Water from 17 April 2000 storm event	---	---	45	7226	
Sediment	Estimated effluent from unsampled storm events	---	---	---	24142	
Sediment	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			32.4	39422	79.570213
Sediment	Estimated Influent Load					83.143759
Sediment	**Efficiency (%)**					**4%**
Sediment	**Efficiency w/o Litter Removal (%)**					**0%**

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debis removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 3: Where the individual storm EMCs showed evidence of normality, the mean EMC effluent concentration was estimated by averaging individual storm EMCs.

Note 4: Where the individual storm EMCs showed evidence of non normality, the mean EMC effluent concentration was estimated by log transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 5: Flow measured continuously while DII was installed.

Note 6: Reporting Limit was used where results were "<" Reporting Limit.

Calculated by: Byron Berger

Checked by: Ed Ohmer

Worksheet 12
Rosemead Maintenance Station Fossil Filter DII % Removal Efficiency Calculations (Aggregate Method)

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Copper	Used Fossil Filter Adsorbent	61.5	5443	---	---	0.000736
Copper	Used Fossil Filter Debris/litter/sediment	43.7	14061	---	---	0.001352
Copper	*Used Media Subtotal*					*0.002088*
Copper	*Unused Fossil Filter Adsorbent*	*0.2*	*1900*	---	---	*0.000001*
Copper	Effluent Water from 25 January 2000 storm event	---	---	2.4	456	
Copper	Effluent Water from 30 January 2000 storm event	---	---	1.8	94	
Copper	Effluent Water from 21 February 2000 storm event	---	---	2.8	2664	
Copper	Effluent Water from 27 February 2000 storm event	---	---	10.4	300	
Copper	Effluent Water from 17 April 2000 storm event	---	---	29.7	1593	
Copper	Estimated effluent from unsampled storm events	---	---	---	4698	
Copper	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*5.2*	9805	0.003165
Copper	Estimated Influent Load					0.005253
Copper	**Efficiency (%)**					**40%**
Copper	**Efficiency w/o Litter Removal (%)**					**19%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Lead	Used Fossil Filter Adsorbent	135	5443	---	---	0.001617
Lead	Used Fossil Filter Debris/litter/sediment	70.2	14061	---	---	0.002172
Lead	*Used Media Subtotal*					*0.003788*
Lead	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Lead	Effluent Water from 25 January 2000 storm event	---	---	2.3	456	
Lead	Effluent Water from 30 January 2000 storm event	---	---	1	94	
Lead	Effluent Water from 21 February 2000 storm event	---	---	1.2	2664	
Lead	Effluent Water from 27 February 2000 storm event	---	---	6.5	300	
Lead	Effluent Water from 17 April 2000 storm event	---	---	16.8	1593	
Lead	Estimated effluent from unsampled storm events	---	---	---	4698	
Lead	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*3.1*	9805	0.001913
Lead	Estimated Influent Load					0.005696
Lead	**Efficiency (%)**					**66%**
Lead	**Efficiency w/o Litter Removal (%)**					**46%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Zinc	Used Fossil Filter Adsorbent	705	5443	---	---	0.008442
Zinc	Used Fossil Filter Debris/litter/sediment	856	14061	---	---	0.026480
Zinc	*Used Media Subtotal*					*0.034922*
Zinc	*Unused Fossil Filter Adsorbent*	*1.2*	*1900*	---	---	*0.000005*
Zinc	Effluent Water from 25 January 2000 storm event	---	---	34.2	456	
Zinc	Effluent Water from 30 January 2000 storm event	---	---	19.8	94	
Zinc	Effluent Water from 21 February 2000 storm event	---	---	19.5	2664	
Zinc	Effluent Water from 27 February 2000 storm event	---	---	218	300	
Zinc	Effluent Water from 17 April 2000 storm event	---	---	436	1593	
Zinc	Estimated effluent from unsampled storm events	---	---	---	4698	
Zinc	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*66.0*	9805	0.040332
Zinc	Estimated Influent Load					0.075249
Zinc	**Efficiency (%)**					**46%**
Zinc	**Efficiency w/o Litter Removal (%)**					**17%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (ug/L)	Runoff Volume (ft^3)	Load (lbs)
Petroleum Hydrocarbons	Used Fossil Filter Adsorbent	1460	5443	---	---	0.017483
Petroleum Hydrocarbons	Used Fossil Filter Debris/litter/sediment	2950	14061	---	---	0.091256
Petroleum Hydrocarbons	*Used Media Subtotal*					*0.108739*
Petroleum Hydrocarbons	*Unused Fossil Filter Adsorbent*	*26.6*	*1900*	---	---	*0.000111*
Petroleum Hydrocarbons	Effluent Water from 25 January 2000 storm event	---	---	500	456	
Petroleum Hydrocarbons	Effluent Water from 30 January 2000 storm event	---	---	500	94	
Petroleum Hydrocarbons	Effluent Water from 21 February 2000 storm event	---	---	500	2664	
Petroleum Hydrocarbons	Effluent Water from 27 February 2000 storm event	---	---	500	300	
Petroleum Hydrocarbons	Effluent Water from 17 April 2000 storm event	---	---	500	1593	
Petroleum Hydrocarbons	Estimated effluent from unsampled storm events	---	---	---	4698	
Petroleum Hydrocarbons	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*500.0*	9805	0.305411
Petroleum Hydrocarbons	Estimated Influent Load					0.414038
Petroleum Hydrocarbons	**Efficiency (%)**					**26%**
Petroleum Hydrocarbons	**Efficiency w/o Litter Removal (%)**					**5%**

Analyte	Media	Concentration (mg/kg)	Mass (grams)	Event Mean Concentration (mg/L)	Runoff Volume (ft^3)	Load (lbs)
Sediment[1]	Used Fossil Filter Adsorbent	---	5443	---	---	11.999638
Sediment[1]	Used Fossil Filter Debris/litter/sediment	---	14061	---	---	30.998881
Sediment	*Used Media Subtotal*					*42.998518*
Sediment	*Unused Fossil Filter Adsorbent*	---	*1900*	---	---	4.188740
Sediment	Effluent Water from 25 January 2000 storm event	---	---	39	456	
Sediment	Effluent Water from 30 January 2000 storm event	---	---	19	94	
Sediment	Effluent Water from 21 February 2000 storm event	---	---	8	2664	
Sediment	Effluent Water from 27 February 2000 storm event	---	---	13	300	
Sediment	Effluent Water from 17 April 2000 storm event	---	---	38	1593	
Sediment	Estimated effluent from unsampled storm events	---	---	---	4698	
Sediment	*Effluent Subtotal (Mean EMC x Total Runoff Volume)*			*19.6*	9805	12.001664
Sediment	Estimated Influent Load					50.811443
Sediment	**Efficiency (%)**					**76%**
Sediment	**Efficiency w/o Litter Removal (%)**					**39%**

[1] Mass of unused DII element subtracted from mass of used DII element.

Note 1: Dissolved solids fraction and gross solids fraction of effluent not accounted for in mass balance.

Note 2: Each Fossil Filter DII used approximately 1900 grams of adsorbent material.

Note 3: Efficiencies include sediment/debris entrapped by the DII. Extensive maintenance was conducted before, during, and after storm events to clear sediment and debris from the DII. Sediment and debis removed from the DII was temporarily stored onsite and then analyzed at the same time as DII.

Note 4: Where the individual storm EMCs showed evidence of normality, the mean EMC effluent concentration was estimated by averaging individual storm EMCs.

Note 5: Where the individual storm EMCs showed evidence of non-normality, the mean EMC effluent concentration was estimated by log-transforming individual storm EMCs, averaging, and then transforming back. These EMCs are italicized.

Note 6: Flow measured continuously while DII was installed.

Note 7: Reporting Limit was used where results were "<" Reporting Limit

Calculated by: Byron Berger

Checked by: Ed Othmer

2.0 BMP OPERATIONS

Performance assessments of BMP operations were determined using empirical observations (Form H of the OMM Volume II *Field Guidance Notebooks*). Empirical observations were taken at variable times during monitored events. Field crews assessed BMP operations at the beginning, middle and end of a storm event. Traffic, weather and sufficient light sometimes limited these observations.

Observations generally provided information on the following:

- Present meteorological characteristics;
- Rainfall (start times and intensity indication);
- Hydrologic and hydraulic characteristics (flowing and/or standing water, channelization);
- Water level;
- Inlet conditions (problems affecting performance);
- Evidence of debris (organic or trash), scouring, resuspension or erosion ;
- Description of amount and location of sediment accumulation;
- Water quality appearance (visual, olfactory);
- Vegetation condition;
- Outlet conditions (problems affecting performance); and
- Structural condition of facility.

Other site-specific observations were taken according to the checklists present in Form H.

2.1 BMPs Evaluated

Tables 2-1a through 2-1e summarize empirical observations of BMP performance. An overall review of each BMP is provided following each table. More detail on BMP operations is available at the following web site: http://www.rbf.com/caltrans/.

2.1.1 Biofiltration Strips

Table 2-1a: Comparison of Biofiltration Strip Operational Performance

Site	No. of Observed Events	Hydrologic/ Hydraulic Characteristics	Inlet Conditions	Water Quality	Solids Deposition/ Resuspension	Erosion	Vegetation	Outlet	Comments
Altadena Maintenance Station (73211a)	6	Functioned as designed	During peak flow rates, runoff flowed from facility directly into spreader ditch bypassing flume.	Less suspended solids were observed in the effluent compared to influent.	Sediment was deposited in the spreader ditch. Numerous earthworms were flushed into the collector ditch.	No notable observations	Vegetation required irrigation to establish (i.e., meet the 90% coverage requirement)	Functioned as designed	Spreader ditch bypass plug to infiltration trench was enlarged to facilitate dewatering following storm events Spreader ditch required dewatering after each rain event

Table 2-1a: Comparison of Biofiltration Strip Operational Performance (concluded)

Site	No. of Observed Events	Hydrologic/ Hydraulic Characteristics	Inlet Conditions	Water Quality	Solids Deposition/ Resuspension	Erosion	Vegetation	Outlet	Comments
I-605/SR-91 (73222a)	7	Functioned as designed No outlet flow during 3 of 7 observed events because of infiltration	Functioned as designed	Less suspended solids were observed in the effluent compared to influent	Trash and debris accumulated at the asphalt/vegetation interface	No notable observations	Vegetation required irrigation to establish (i.e., meet the 90% coverage requirement) Gophers caused a few small bare patches Two transplanted areas had less vegetation cover/density than main portion of strip Hydroseeded areas outside of strip germinated and covered bare areas	Functioned as designed	Majority of runoff entering the strip infiltrated

Overall Review of Biofiltration Strips

In July 1999, the biofiltration strips were relinquished from RBF to Law Crandall for operation and maintenance. To provide adequate coverage at the I-605 at Carson Swale, RBF removed salt grass (10 percent of the strip's area) from two areas of the I-605/SR-91 Strip. Various strategies were used to re-establish vegetation in the donor areas (refer to Section 3.1.1). Law Crandall continued irrigation efforts in a weaning manner to establish the biofilters in meeting the 90 percent coverage requirement. Irrigation continued at the Altadena Maintenance Station Strip and I 605/SR 91 Strip through December 1999 and January 2000, respectively. During various periods, vegetation color changed from green to yellow and then to brown in some cases but density was always maintained. Subsequently, the vegetation consultant (Margot Griswold) reviewed the sites and determined that the soil within the strips was drying out because of the weaning process and because of relatively high temperatures, resulting in the change in vegetation color. She also determined that the vegetation was still alive because it had green tips. Consequently, the watering schedule was increased for approximately one month and then reduced.

Altadena Maintenance Station Biofiltration Strip

One of the necessary design features of the Altadena Maintenance Station Strip is a spreader ditch, which collects and uniformly distributes water across the strip. Originally, any water that was captured in the collector ditch was allowed to remain (i.e., the spreader ditch was not dewatered). However, mosquitoes breeding became prevalent. During the 7th Quarterly Status Meeting, it was decided that a new maintenance threshold be developed to dewater the spreader ditch. Subsequently, as part of the operational characteristics of the strip, the spreader ditch is dewatered following each rain event (refer to Photograph 2-1 at the end of this section).

During each monitored event, flow was uniformly distributed across the strip. No channelization or ponding was observed. At the beginning of the wet season, there was more infiltration than at the end; this is attributed to soil moisture and rainfall/runoff intensity.

I-605/SR-91 Biofiltration Strip

At the I-605/SR-91 Strip, gophers persistently burrowed through the strip. Consequently, gopher inspection and abatement efforts were undertaken (refer to Section 3.1.1). To minimize channelization and/or ponding, the gopher burrows were filled and compacted.

Errant drivers running off the I-605/SR-91 connector also proved to be a problem. On at least three occasions, vehicles ran off the road (accidentally) and drove across the strip.

Following each accident, inspections were made of the strip. Other than the salt grass being compacted by the tires, no other damage to the strip was observed.

During each monitored event, flow was uniformly distributed across the strip. Throughout the wet season, most of the runoff infiltrated before reaching the strip's outlet. When flow was perceptible across the strip, no channelization or ponding was observed. Also of note is that trash and debris tended to collect at the asphalt/biofilter interface (refer to Photograph 2-2 at the end of this section).

2.1.2 Biofiltration Swales

Table 2-1b: Comparison of Biofiltration Swale Operational Performance

Site	No. of Observed Events	Hydrologic/ Hydraulic Characteristics	Inlet Conditions	Water Quality	Solids Deposition/ Resuspension	Erosion	Vegetation	Outlet	Comments
I-605/SR-91 (73222b)	7	Functioned as designed; no outlet flow from first two events due to infiltration	Functioned as designed	Less suspended solids were observed in the effluent compared to influent	Trash and debris accumulated in the energy dissipater and at the concrete spreader/biofilter interface	Soil at the headwall of inlet pipe eroded and accumulated into the energy dissipater	Vegetation required irrigation to establish (i.e., meet the 90% coverage requirement) Gophers caused a few small bare patches Hydroseeded areas germinated and covered bare areas	Growth of vegetation in channel downstream of swale constricted flow causing backflow towards swale outlet	Energy dissipater and concrete spreader were grouted to eliminate ponding water conditions Runoff infiltrated through gopher holes

Table 2-1b: Comparison of Biofiltration Swale Operational Performance (continued)

Site	No. of Observed Events	Hydrologic/ Hydraulic Characteristics	Inlet Conditions	Water Quality	Solids Deposition/ Resuspension	Erosion	Vegetation	Outlet	Comments
Cerritos Maintenance Station (73223)	7	Flow bypassed through gopher holes during most events Runoff from freeway embankment discharged into swale through swale's side	Runoff during December 31, 1999 event caused erosion at the concrete spreader/biofilter interface	More suspended solids observed in effluent during some events because of bare areas caused by gophers	Trash and debris accumulated in the energy dissipater and in the first 3rd of the swale Most sediment was removed by energy dissipater	Erosion within the swale and along the north side slope caused by gophers Eroded areas were further aggravated during storm events when runoff bypassed through gopher holes	Vegetation required irrigation to establish (i.e., meet the 90% coverage requirement) Minimum % coverage not maintained throughout wet season because of gopher problem Hydroseeded areas germinated and covered bare areas	Gopher holes at biofilter/ concrete collector channel caused flow bypass	Energy dissipater and concrete spreader were grouted to eliminate ponding water conditions Structural integrity of the swale was compromised because of gopher problem

Table 2-1b: Comparison of Biofiltration Swale Operational Performance (concluded)

Site	No. of Observed Events	Hydrologic/ Hydraulic Characteristics	Inlet Conditions	Water Quality	Solids Deposition/ Resuspension	Erosion	Vegetation	Outlet	Comments
I-5/I-605 (73224)	6	No outlet flow from first two events due to infiltration Flow bypassed through gopher hole near effluent end during last event	Functioned as designed	Less suspended solids were observed in the effluent compared to influent	Trash and debris accumulated in the energy dissipater and at the concrete spreader/biofilter interface	None	Vegetation required irrigation to establish (i.e., meet the 90% coverage requirement) A few small bare spots in swale caused by gophers Hydroseeded areas germinated and covered bare areas	Gopher hole near effluent end caused flow bypass during last event	Energy dissipater and concrete spreader were grouted to eliminate ponding water conditions Runoff infiltrated through gopher holes
I-605 at Carson (73225)	5	Functioned as designed; outlet flow from first few events was much less than inflow due to infiltration Runoff from freeway embankment discharged into swale over the sideslopes of the swale	Functioned as designed	Less suspended solids were observed in the effluent compared to influent Oil and grease sheen observed in effluent during 3 of 5 events	Trash and debris accumulated in the energy dissipater and at the concrete spreader/biofilter interface	None	Vegetation required irrigation to establish (i.e., meet the 90% coverage requirement) Hydroseeded areas germinated and covered bare areas	Functioned as designed	Energy dissipater and concrete spreader were grouted to eliminate ponding water conditions

Overall Review of Biofiltration Swales

In July 1999, the biofiltration swales were relinquished from RBF to Law Crandall for operation and maintenance. To provide adequate coverage at the I-605 at Carson Swale, RBF removed salt grass (10 percent of the strip's area) from two areas of the I-605/SR-91 Strip (refer to Section 3.1.2). Law Crandall continued irrigation efforts in a weaning manner to establish the biofilters in meeting the 90 percent coverage requirement. Irrigation continued at the swale through December 1999. During various periods, vegetation color changed from green to yellow and then to brown in some cases but density was always maintained. Subsequently, the vegetation consultant (Margot Griswold) reviewed the sites and determined that the soil within the swales was drying out because of the weaning process and because of relatively high temperatures, resulting in the change in vegetation color. She also determined that the vegetation was still alive because it had green tips. Consequently, the watering schedule was increased for approximately one month and then reduced.

During the first week of December, the swale side slopes were scarified and hydroseeded (refer to Section 3.1.2). For the most part, the hydroseeded areas germinated and were fully vegetated by February.

I-605/SR-91 Biofiltration Swale

At the I-605/SR-91 Swale, gophers persistently burrowed through the swale. Consequently, gopher inspection and abatement efforts were undertaken (refer to Section 3.1.2). To minimize channelization and/or ponding, the gopher burrows were filled and compacted.

During each monitored event, flow was uniformly distributed across the swale. Throughout the wet season, most of the runoff infiltrated before reaching the swale's outlet. When flow was perceptible across the swale, no channelization or ponding was observed. During the February 20, 2000 event, vegetation in the downstream channel had grown enough to restrict flow, causing flow to backflow towards the swale. A team of technicians promptly enlarged the downstream channel and cut-back the vegetation so the flow was not restricted. Also of note is that trash and debris tended to collect in the energy dissipater and at the concrete spreader/biofilter interface (refer to Photograph 2-3 at the end of this section).

Cerritos Maintenance Station Biofiltration Swale

At the Cerritos Maintenance Station Swale, gophers persistently burrowed through the swale. Damaged caused by the gophers was so extensive that the swale's structural integrity was compromised. During storm events, the gopher problem became worse because runoff infiltrated through previously filled in gopher holes causing extensive

erosion (refer to Photograph 2-4 at the end of this section). In addition to the swale's structural problems, vegetation cover fell below the 90 percent criteria because of the gopher problem. Unlike other swales in the BMP Pilot Study, the Cerritos Maintenance Station Swale was constructed in fill material to establish an appropriate flow line. Instead of the swale's side slopes being at lower elevation than the surrounding topography (as at the other swales), one of the swale's side slopes is constructed completely of fill material. Refer to Section 3.1.2 for a description of mitigation strategies undertaken.

During each monitored event, flow was uniformly distributed across the swale. In addition to the swale receiving runoff from the inlet, runoff from the freeway embankment discharged into the swale over one of the swale's side slopes. When flow was perceptible across the swale, no channelization or ponding was observed. Also of note is that trash and debris tended to collect in the energy dissipater and in the first third of the swale (refer to Photograph 2-5 at the end of this section), with most of the sediment settling out in the energy dissipater.

I-5/I-605 Biofiltration Swale

At the I-5/I-605 Swale, gophers persistently burrowed through the swale. Consequently, gopher inspection and abatement efforts were undertaken (refer to Section 3.1.2). To minimize channelization and/or ponding, the gopher burrows were filled and compacted. A gopher hole near the effluent end of the swale caused flow bypass during the last storm event on April 17, 2000.

During each monitored event, flow was uniformly distributed across the swale. Throughout the first portion of the wet season, most of the runoff infiltrated before reaching the swale's outlet. When flow was perceptible across the swale, no channelization or ponding was observed. Also of note is that trash and debris tended to collect in the energy dissipater and at the concrete spreader/biofilter interface (refer to Photograph 2-6 at the end of this section).

I-605 at Carson Biofiltration Swale

During each monitored event, flow was uniformly distributed across the swale. In addition to the swale receiving runoff from the inlet, runoff from the freeway embankment discharged into the swale through its side. Throughout the first portion of the wet season, most of the runoff infiltrated before reaching the swale's outlet. When flow was perceptible across the swale, no channelization or ponding was observed. Also of note is that trash and debris tended to collect in the energy dissipater and at the concrete spreader/biofilter interface (refer to Photograph 2-7 at the end of this section).

2.1.3 Drain Inlet Inserts

Table 2-1c: Comparison of StreamGuard™ DII Operational Performance

Site	No. of Observed Events	Hydrologic/Hydraulic Characteristics	Inlet Conditions	Water Quality	Solids Deposition/ Resuspension	Outlet	Comments
Foothill Maintenance Station (73216N)	10	Bypass through the DII's bypass cut-outs was observed during 2 of 10 events Ponded water was observed in DII after storm events	No gaps observed between inlet and insert	Oil sheen in effluent observed during 3 of 10 events	Organic materials and sediment collected in DII during 4 of 10 events	Functioned as designed	Bypass occurred when water filled the cone and exited through the overflow cut-outs.
Las Flores Maintenance Station (73217N)	10	Bypass through the DII's bypass cut-outs was observed during 4 of 10 events Ponded water was observed in DII after storm events	Gaps between the inlet and DII were observed and DII refitted three times DII fell into drain inlet during event because of the weight of standing water and sediment	Oil sheen in effluent observed during 5 of 10 events	Organic materials, trash and debris, and/or and sediment collected in DII during 5 of 10 events	Functioned as designed	Bypass due to either (a) water filled the cone and exited the overflow cut-outs or (b) insert slipped (due to weight of standing water/sediment) downward into the inlet and created a gap between the inlet and the insert. A small hole was observed in the fabric during the last storm, but no bypass occurred.
Rosemead Maintenance Station (73218S)	10	Bypass through the DII's bypass cut-outs was observed during 3 of 10 events Flooding was observed during three events because of the DII's hydraulic capacity being exceeded Ponded water was observed in DII after storm events	A corner of DII slipped into drain inlet and was refitted twice	Oil sheen in effluent observed during 3 of 10 events	Organic materials, trash and debris, and/or and sediment collected in DII during 6 of 10 events	Functioned as designed	Bypass occurred when water filled the cone and exited through the overflow cut-outs. Three times these openings were not large enough to accommodate incoming runoff; onsite flooding resulted.

Overall Review of StreamGuard™ Inserts

During the 1998-1999 storm season no bypass was observed at any StreamGuard™ DIIs. However, due to concern that there could be flow bypass between the insert fabric-inlet interface, wood was inserted into the area between the insert and inlet edge to form a tight seal at the Foothill and Rosemead Maintenance Stations. Prior to the 1999-2000 storm season, wood was inserted into the area between the insert and inlet edge at Las Flores Maintenance Station. Additionally, to address the concern of runoff directly entering the monitoring vaults, a rubber berm was installed around each vault.

Unlike the 1998-1999 season, during the 1999-2000 season flow bypass was observed at StreamGuard™ DIIs at all three sites. There are two reasons for this:

1. Hydraulic capacity—runoff filled the cone and flowed through the overflow cut-outs. The cone of the StreamGuard™ DIIs is 24 inches in depth. When standing water in the cone reaches a depth of approximately 22 inches, bypass can occur through the two overflow cut-outs on the sides.

2. The weight of the standing water in the cone caused the insert to slip downward into the inlet, thereby causing a gap in the inlet-insert interface and subsequent bypass.

The first reason for bypass is interesting because it was not observed during the previous storm season. However, research into the manufacturing process of the filter fabric indicated that fabric pore size can vary from roll to roll of the fabric. Even though the manufacturing process is the same for each roll of fabric, variation in pore size is normal and is not subject to control. It is possible that the inserts used this year were constructed with a fabric having a smaller pore size, thereby potentially reducing flow rate through the filter fabric and consequently causing standing water in the insert.

Generally, standing water in the cones resulted in flow bypass only. However, on three occasions at Rosemead Maintenance Station flooding was observed (refer to Photograph 2-8 at the end of this section).

The second reason for bypass could be related to the first reason. More standing water in the cones meant more weight in the cones, thereby possibly causing the inserts to slip downward into the inlet. Slippage of the insert was observed at Las Flores Maintenance Station and Rosemead Maintenance Station, and bypass through the gap was observed once at Las Flores.

In February, when ponding water was first observed in the DIIs, Foss Environmental (StreamGuard™ DII manufacturer) was consulted. Foss Environmental subsequently

provided the following correspondence on May 23, 2000 detailing operation and maintenance tips for the DII used in this study:

StreamGuard Catch Basin Insert (Oil & Sediment) Operation & Maintenance Tips

The StreamGuard Oil & Sediment Insert is a temporary, water permeable, non-woven fabric bag which intercepts oily and dirty water in the catch basin capturing some portion of the oil and heavier sediment material (heavy silt, sand, and rock) which might otherwise build up in the catch basin sump or drain pipe.

The insert in not an oil or particulate filter although when first installed, water will penetrate through the fabric quite readily. The nominal Apparent Opening Size of the pores in the insert fabric is US Sieve 100 or approximately 150 microns (ASTM D-4751) which means that large silt/fine sand particles and larger can be retained in the fabric during the short period of time it behaves like a filter.

It should be noted that oil sheen and persistent turbidity in surface water runoff is caused by small oil, silt and clay particles which range in size from 0.001 to 10 microns in size; most of which can not be retained in the insert fabric during the short period it acts as a filter. At present, there is no known way to achieve long-duration filtration of particles in this size range using a static filtration process and the StreamGuard insert manufacturer does not claim or imply the insert's ability to filter particles smaller than about 100 microns in size during the short period of time it behaves like a filter. Oil sheen may be absorbed by the oilophilic, non-woven polypropylene insert fabric but smaller oil sheen particles will also tend to penetrate the fabric during the short period of time it behaves like a filter.

After several hours in a catch basin during a rain event, the insert fabric will begin to become blocked or clogged with oil and sediment and the water level will rise to the two underflow cutouts located near the top of the unit, discharging water outside into the catch basin. ***The insert is designed to do this and this does not indicate a need to maintenance the unit.*** From this point on the insert will operate full of water allowing heavier sediment particles to settle out in the bag and oil to rise to the surface where it is absorbed in the oil- absorbent media. When the insert has collected approximately 6 inches of sediment or the oil-absorbent media becomes saturated, it should be replaced. It is not recommended that the oil/sediment unit be reused as oil which has been absorbed in the unit may leach back out into stormwater.

Despite the flow bypass and flooding that occurred, the thresholds required for replacement of the unit (more than 6" of sediment in the cone or loss of structural integrity) were not reached. The units were removed at the end of the storm season for analysis.

Table 2-1d: Comparison of Fossil Filter™ DII Operational Performance

Site	No. of Observed Events	Hydrologic/Hydraulic Characteristics	Inlet Conditions	Water Quality	Solids Deposition/ Resuspension	Outlet	Comments
Foothill Maintenance Station (73216S)	10	Bypass was observed during 6 of 10 events	Gap observed between inlet and insert during April 17 storm	Oil sheen in effluent observed during 3 of 10 events	Organic material, trash and debris, and or sediment collected in DII during 7 of 10 events	Functioned as designed	Bypass generally due to flow rates exceeding hydraulic capacity of the insert. During the April 17 storm, the stainless steel flange holding the FF cartridges bent upward due to the weight of water and bypass occurred.
Las Flores Maintenance Station (73217S)	10	Bypass was observed during 1 of 10 events	No gaps observed between inlet and insert	Oil sheen in effluent observed during 6 of 10 events	Organic materials, trash and debris, and/or sediment collected in DII during 7 of 10 events	Functioned as designed	Bypass due to sediment deposition on filter cartridges, which inhibited flow through the filter cartridges
Rosemead Maintenance Station (73218N)	10	Bypass was observed during 4 of 10 events	No gaps observed between inlet and insert	Oil sheen in effluent observed during 1 of 10 events	Organic materials, trash and debris, and/or sediment collected in DII during 6 of 10 events	Functioned as designed	Bypass due to (a) deposition of organic material, trash and debris, or sediment on top of the filter cartridges, which inhibited flow through the filter cartridges or (b) exceedance of hydraulic capacity.

Overall Review of Fossil Filter™ Inserts

During the 1998-1999 storm season, three reasons for flow bypass in Fossil Filter™ DIIs were observed:

1. Structural fit (poor fit resulting in gaps between the inlet and insert);
2. Hydraulic capacity; and
3. Blockage and clogging of cartridges.

Prior to the 1999-2000 storm season, steps were taken to eliminate or minimize flow bypass around the peripheral of the Fossil Filter™ DII. To eliminate the first reason for flow bypass, the interface between the DII and the inlet was sealed at the beginning of the wet season, immediately after installation of the new units. Additionally, to promote flow into the DII at Rosemead Maintenance Station, a section of rubber was attached along interface of the curb inlet and the insert. Finally, to address the concern of runoff directly entering the monitoring vaults, a rubber berm was installed around each vault.

Hydraulic capacity of the units is an inherent limiting factor in the performance of the DIIs. The Fossil Filter™ DIIs are designed to not impede flows (due to flood control considerations). During higher discharge rates, runoff has sufficient velocity and/or volume to pass over the lip of the cartridges and go directly into the storm drain system. No alterations in the design of the units were undertaken to eliminate this factor.

The third factor that caused flow bypass was blockage and clogging of the DII. Blockage occurred from the accumulation of trash, debris, and/or sediment on top of the filter cartridge screens. This accumulation blocked the filter cartridge screens so that stormwater runoff could not pass through the screens. The resultant standing water pooled and eventually achieved a depth where it spilled over the cartridge lip into the storm drain. Clogging occurred when sediment passed through the cartridge screens and settled in the pore spaces between the adsorbent granules. This appeared to cause a slowing in the infiltration of water through the adsorbent. Water pooled and reached a depth where it spilled over the cartridge lip into the storm drain.

Therefore, for the 1999-2000 wet season, it was decided to increase the maintenance of the units to lessen the impact of blockage and clogging. Trash/debris and/or sediment were removed from the units once prior to a storm event and once during a storm event. The removed trash/debris and sediment removed from the DII was placed in an on-site storage container designed to emulate ambient conditions at the top of the cartridges.

The result of the additional structural work and increased maintenance during the 1999/2000 wet season was that no flow bypass due to interface gaps was observed until the last storm on April 17, 2000, at Foothill Maintenance Station. Hence, flow bypass was observed due to the following reasons:

1. Hydraulic capacity. This was observed at both Foothill Maintenance Station and Rosemead Maintenance Station. Based on several observations of hydraulic capacity exceedance at the Foothill Maintenance Station, bypass at the Foothill Maintenance Station Fossil Filter™ DII generally was observed to occur when a flow rate of 0.07 cfs (31 gpm) was reached. Refer to Photograph 2-9 at the end of this section.

2. Blockage and clogging of cartridges. Despite removing trash/debris/sediment prior to a storm event and once during a storm event, bypass continued to be observed. Typically, after the trash/debris/sediment removal occurred, more trash/debris/sediment would be deposited during the course of the storm, again leading to more bypass. Refer to Photograph 2-10 at the end of this section.

3. During the last storm at Foothill Maintenance Station, the stainless steel flange holding the cartridges bent upward due to the weight of water, and bypass occurred underneath the cartridges.

Despite the flow bypass and flooding that occurred, the thresholds required for replacement of the unit (adsorbent granules dark gray or darker, or structural integrity problems) were not reached. The units were removed at the end of the storm season for analysis.

2.1.4 Infiltration Basin

Table 2-1e: Comparison of Infiltration Basin Operational Performance

Site	No. of Observed Events	Hydrologic/ Hydraulic Characteristics	Inlet Conditions	Water Quality	Solids Deposition/ Resuspension	Erosion	Vegetation	Outlet	Comments
I-605/SR-91 Infiltration Basin (73101)	8	Influent bypass was observed 5 times. Maximum time to infiltrate was 34 hours. Maximum depth in basin was 7.4 inches.	Functioned as designed	No notable observations	Some sediment deposition near inlets. No noticeable deposition in other areas.	Minor erosion noted on north side slope beneath asphalt swales on access road	Hydroseeded areas germinated and covered bare areas Vegetation coverage met threshold requirement after being established in February 2000.	Functioned as designed	Overflow structure grouted with concrete to eliminate standing water condition Overflow weir plat height increased to maximum height to minimize flow bypass

Overall Review of the I-605/SR-91Infiltration Basin

During the first rain events of the 1999/2000 wet season (approximately 1.5 inches of precipitation), runoff immediately infiltrated into the areas surrounding the inlets and prior to any runoff ponding within the infiltration basin. After approximately 1.5 inches of rainfall, ponding water would accumulate in the infiltration basin for each storm with precipitation greater than 0.16 inches.

Stormwater discharge effectively infiltrated into the IB, with a maximum infiltration time of approximately 34 hours. During larger storms, as designed, some flow bypassed the infiltration basin by flowing over the overflow weir in the junction box (refer to Photograph 2-11 at the end of this section).

Observations of note include localized sediment deposition around the inlets and minor erosion on the north side slope beneath the swales in the asphalt access road (refer to Photograph 2-12 at the end of this section).

2.1.5 *Infiltration Trench*

Table 2-1f: Comparison of Infiltration Trench Operational Performance

Site	No. of Observed Events	Hydrologic/Hydraulic Characteristics	Inlet Conditions	Water Quality	Solids Deposition/ Resuspension	Overflow	Comments
Altadena Maintenance Station (73211b)	6	Functioned as designed; bypass of IT was observed during 3 of 6 events because of the IT's capacity being exceeded.	Functioned as designed	No notable observations	No notable observations	No notable observations	None

Overall Review of the Altadena Maintenance Station Infiltration Trench

Stormwater discharge effectively infiltrated into the Infiltration Trench (IT), never taking more than approximately 36 hours for complete infiltration. During larger storms, as designed, the IT filled and discharged through the overflow pipe. Refer to Photograph 2-12 at the end of this section.

SITE PHOTOGRAPHS

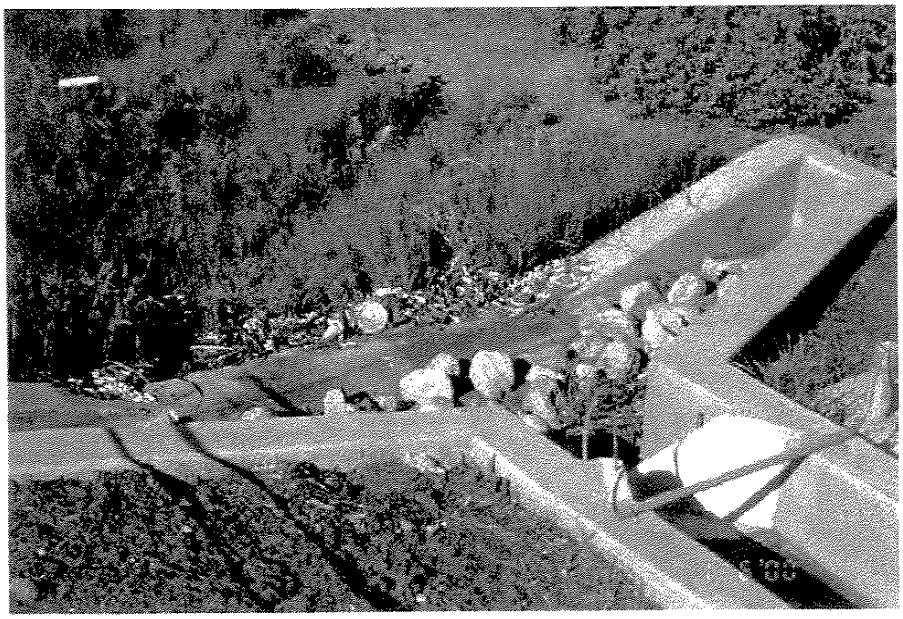
Photograph 2-1

Altadena Maintenance Station Biofiltration Strip (73211). As part of the operational characteristics of the strip, the spreader ditch is dewatered following each rain event.

Photograph 2-2

I-605/SR-91 Biofiltration Strip (73222a). Trash and debris at the asphalt/biofilter interface.

SITE PHOTOGRAPHS (continued)



Photograph 2-3

I-605/SR-91 Biofiltration Swale (73222b). Trash and debris in the concrete spreader/biofilter interface.

Photograph 2-4

Cerritos Maintenance Station Biofiltration Swale (73223). Runoff has infiltrated through previously filled-in gopher holes causing extensive erosion.

SITE PHOTOGRAPHS (continued)

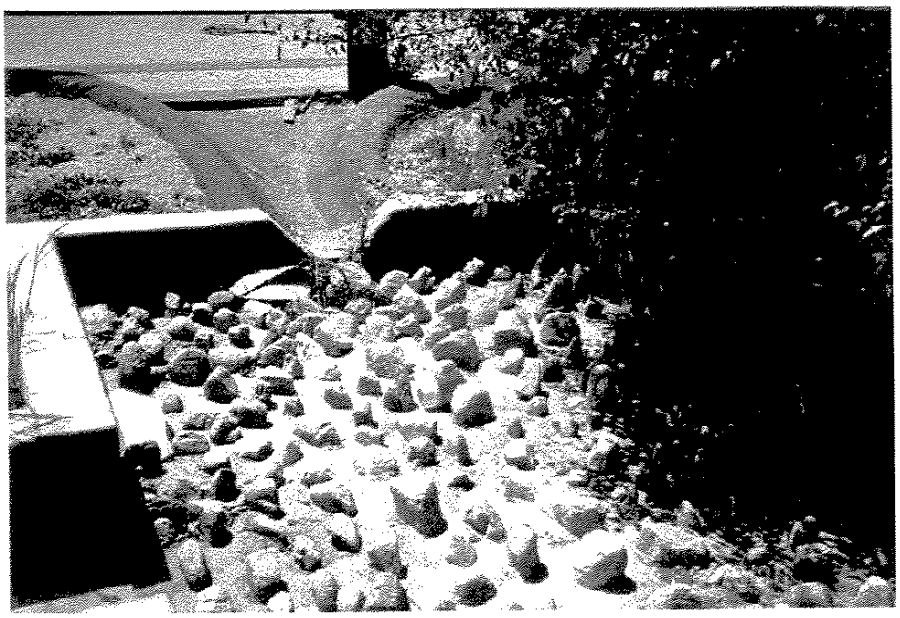
Photograph 2-5

Cerritos Maintenance Station Biofiltration Swale (73223). Trash and debris collected in the concrete spreader/biofilter interface and in the first third of the swale.

Photograph 2-6

I-5/I-605 Biofiltration Swale (73224). Trash and debris collected in the concrete spreader/biofilter interface.

SITE PHOTOGRAPHS (continued)



Photograph 2-7

I-605/Carson Biofiltration Swale (73225). Trash and debris collected in the energy dissipater.

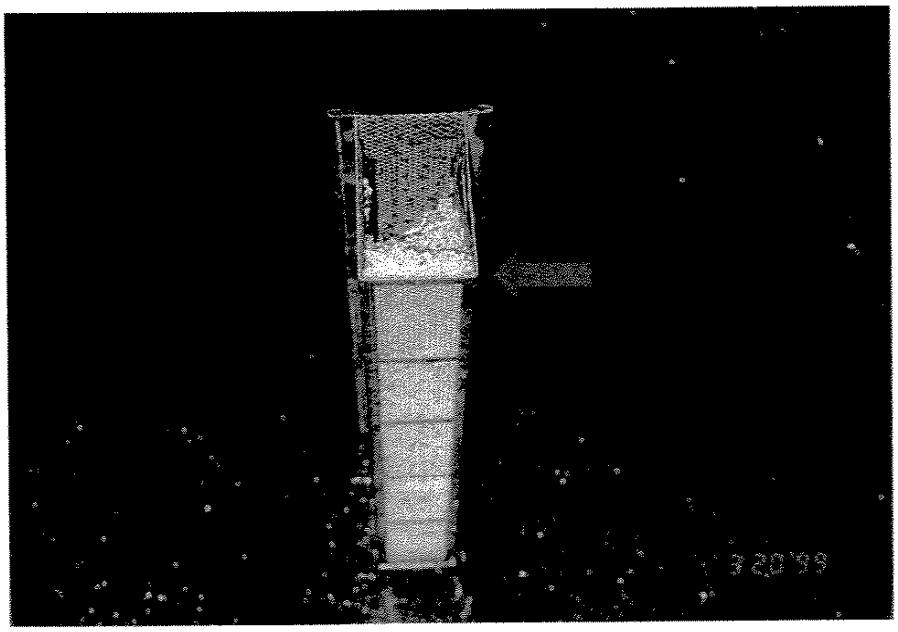
Photograph 2-8

Rosemead Maintenance Station South StreamGuard™ Drain Inlet Insert (73218). Localized flooding has occurred.

SITE PHOTOGRAPHS (continued)

Photograph 2-9

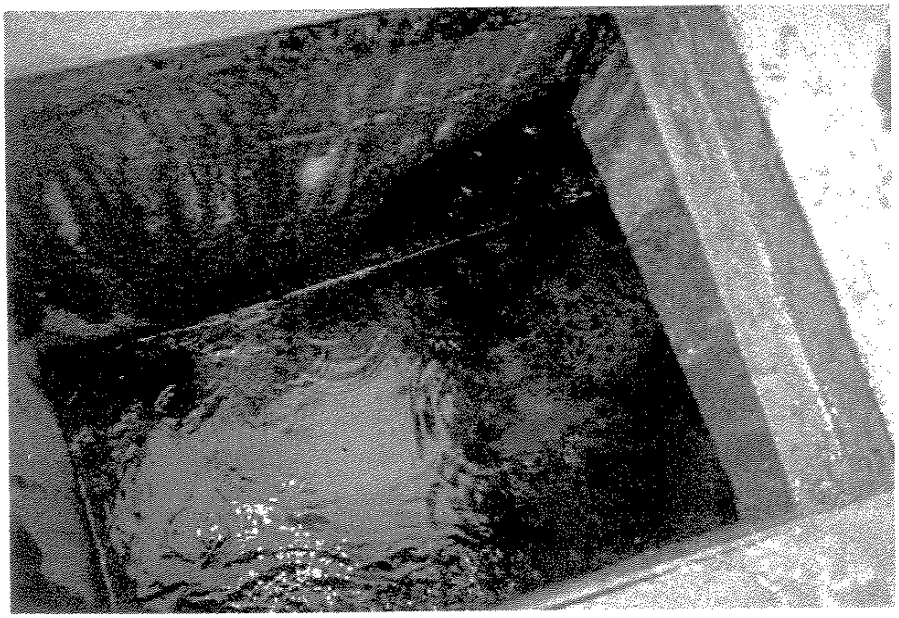
Storm water runoff bypassing Fossil Filter™ DII cartridges into overflow area at Foothill Maintenance Station (73216). This typically occurred when the flow rate exceeded 0.07 cfs.



Photograph 2-10

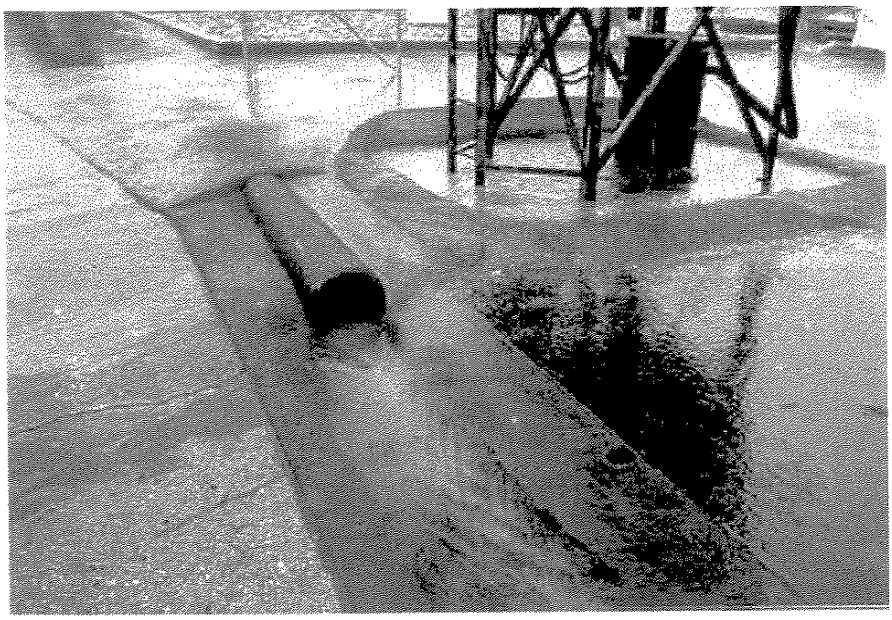
Las Flores Maintenance Station (73217). Layer of fine sediment in Fossil Filter™ DII adsorbent granules, impeding flow through filter cartridges and causing subsequent flow bypass.

SITE PHOTOGRAPHS (continued)



Photograph 2-11

I-605/SR-91 Infiltration Basin (73101) junction box. Flow bypassed the infiltration basin by flowing over the overflow weir.



Photograph 2-12

Altadena Maintenance Station Infiltration Trench (73211). Infiltration Trench filled and discharged through the overflow pipe.

3.0 BMP AND SITE MAINTENANCE

The primary objective of BMP maintenance is to ensure that each site is properly maintained to achieve optimum performance. Preventive and corrective maintenance measures were undertaken in accordance with the OMM Plan and the Maintenance Indicator Document (MID). These measures included:

- Removal of standing water;
- Sediment erosion control and removal;
- Structural integrity;
- Landscape management;
- Graffiti removal;
- Trash and debris removal; and
- General facility maintenance.

Regularly scheduled maintenance inspections were conducted monthly, with weekly surveys being performed during extended periods of wet weather. Maintenance visits were also conducted after each large storm event (greater that 0.5 inches). During the visits, maintenance observations and needs were documented on the "BMP Site Inspection Checklist" (Form C of the OMM Plan Volume II Field Guidance Notebooks). Based on this documentation, any immediate maintenance needs were arranged and documented on the "BMP Site Maintenance Form" (Form E of the OMM Plan Volume II Field Guidance Notebooks).

3.1 Summary of Inspection and Maintenance Activities

The following sections describe maintenance activities performed at each BMP site between June 1999 and June 2000. A comparison of maintenance requirements (frequencies and average times to perform) is graphically shown in Figures 3-1a through 3-4b. More detail on BMP maintenance is available at the following web site: http://www.rbf.com/caltrans/. Please note, however, that the maintenance times provided in the database are times required for each maintenance activity to be conducted, and do not distinguish whether one or more persons had performed the task (i.e., sometimes one person does a task while other times more than one person is involved). The average maintenance times illustrated in the figures have been adjusted to account for this.

3.1.1 Biofiltration Strips

Overall Review of Maintenance Activities at the Biofiltration Strips

Maintenance activities at the Biofiltration Strips consisted of unscheduled and routine maintenance. Unscheduled maintenance at both Biofiltration Strips consisted of the following:

1. Irrigating the salt grass for establishment. In July 1999, the strips were relinquished from RBF to Law Crandall for operation and maintenance. Law Crandall continued irrigation efforts in a weaning manner to establish the strips in meeting the 90 percent coverage requirement. The strips were brought up to the 90 percent coverage requirement by October 1, 1999 and irrigation continued through December 1999 at the Altadena Maintenance Station and January 2000 at the I-605/SR-91. During various periods, vegetation color changed from green to yellow and then to brown in some cases but density was always maintained. Subsequently, the vegetation consultant (Margot Griswold) reviewed each site and determined that the soil was drying out because of the weaning process and because of relatively warm temperatures, resulting in the change in vegetation color. She also determined that the vegetation was still alive because it had green tips. Consequently, the watering schedule was increased for approximately one month and then reduced.

2. Fertilization of salt grass in June 1999 by RBF.

Routine inspections were conducted on a monthly basis and weekly during extended periods of wet weather. In accordance with the MID and OMM Plan, routine maintenance activities at both the Altadena Maintenance Station and I-605/SR-91 Biofiltration Strips consisted of the following:

1. Cutting the salt grass twice to a nominal height of 6 inches and removing the cuttings. When cutting the salt grass, it first needs to be "fluffed up" so that it could be cut to the appropriate height. After the salt grass was cut, the cuttings were removed with a soft rake and disposed.

2. Manually removing weeds from the strips.

3. Removing trash and debris from the strips.

Overall Review of Maintenance Activities at the Altadena Maintenance Station Biofiltration Strip (73211a)

Site-specific maintenance activities at the Altadena Maintenance Station Biofiltration Strip consisted of the following:

1. Dewatering the strip's spreader ditch following each storm event to eliminate ponding water conditions, which could promote mosquito breeding. Originally, any water that was captured in the collector ditch was allowed to remain (i.e., the spreader ditch was not dewatered). However, mosquitoes breeding became prevalent. During the 7th Quarterly Status Meeting, it was decided that a new maintenance threshold be developed to dewater the spreader ditch. Subsequently, as part of the operational characteristics of the strip, the spreader ditch is dewatered following each rain event. At the end of the wet season, the bypass plug from the spreader ditch to the Infiltration Trench was opened to allow runoff from summer storm events to drain directly into the Infiltration Trench.

2. Removing sediment from the spreader ditch prior to the wet season and when the spreader ditch was dewatered.

Figure 3-1a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-1b summarizes the average amount of time spent performing each activity.

Overall Review of Maintenance Activities at the I-605/SR-91 Biofiltration Strip (73222a)

Site-specific maintenance activities at the I-605/SR-91 Biofiltration Strip consisted of the following:

1. Transplanting salt grass in two bare areas (448 sf and 60 sf). To promote adequate coverage at the I-605 at Carson Swale, RBF removed salt grass (10 percent of the strip's area) from two locations within the I-605/SR-91 Strip. Various strategies were used to re-establish vegetation in the donor areas including 1) applying seed, 2) transplanting salt grass plugs, and 3) transplanting salt grass flats. The first two methods were unsuccessful at re-establishing the salt grass despite intensive watering. The third method, transplanting salt grass flats, had limited success (i.e., vegetation growth and coverage was sparse). Establishment was limited because the transplanted salt grass was only irrigated once after being transplanted, in accordance with the MID.

2. Scarifying and hydroseeding bare areas outside of the strip but within its maintenance boundary for erosion control.

3. Cutting surrounding erosion control vegetation, which was located within the BMP's maintenance boundary. After the erosion control vegetation was cut, the cuttings were removed and disposed.

4. Gopher inspection and abatement.

Figure 3-1a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-1b summarizes the average amount of time spent performing each activity.

Figure 3-1a: Frequency of Maintenance Activities at the Biofiltration Strips

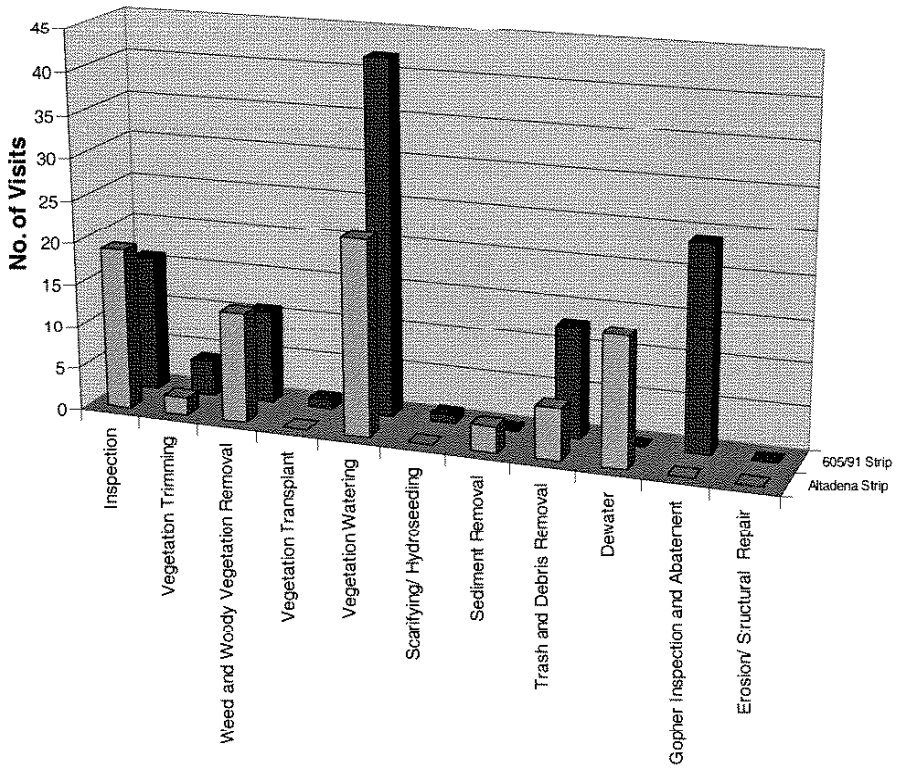
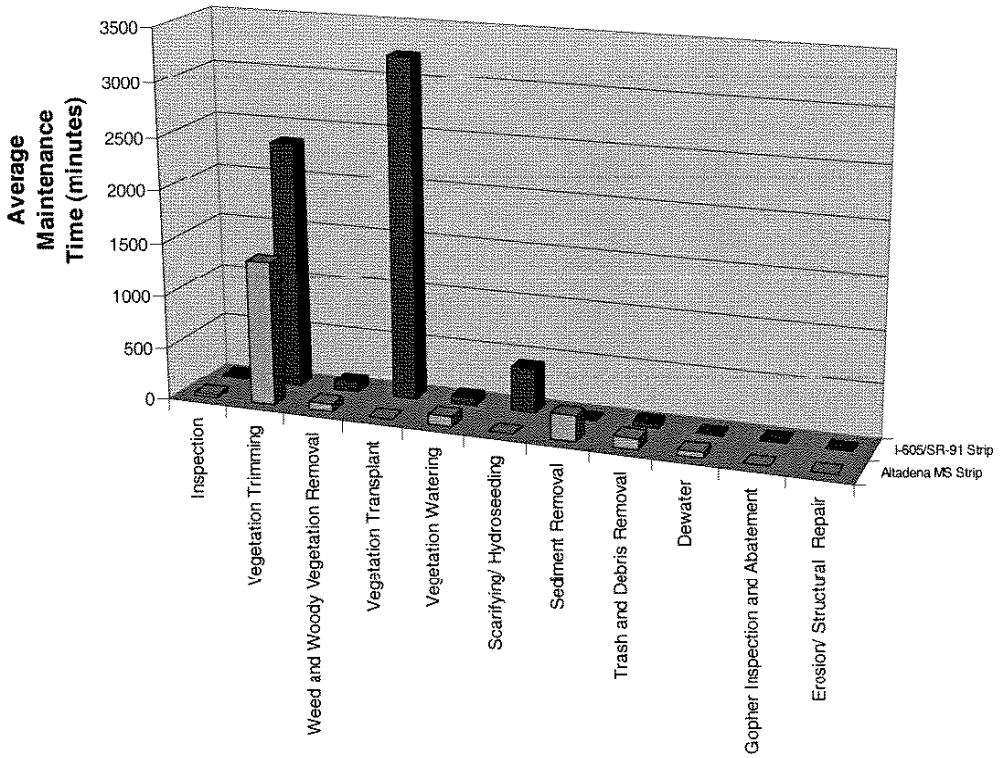


Figure 3-1b: Average Maintenance Times at the Biofiltration Strips



3.1.2 Biofiltration Swales

Overall Review of Maintenance Activities at the Biofiltration Swales

Maintenance activities at the Biofiltration Swales consisted of unscheduled and routine maintenance. Unscheduled maintenance at each Biofiltration Swale consisted of the following:

1. Irrigating the salt grass for establishment. In July 1999, the swales were relinquished from RBF to Law Crandall for operation and maintenance. Law Crandall continued irrigation efforts in a weaning manner to establish the swales in meeting the 90 percent coverage requirement. The swales were brought up to the 90 percent coverage requirement by October 1, 1999 and irrigation continued through December 1999. During various periods, vegetation color changed from green to yellow and then to brown in some cases but density was always maintained. Subsequently, the vegetation consultant (Margot Griswold) reviewed each site and determined that the soil was drying out because of the weaning process and because of relatively warm temperatures, resulting in the change in vegetation color. She also determined that the vegetation was still alive because it had green tips. Consequently, the watering schedule was increased for approximately one month and then reduced.

2. Fertilization of salt grass in June 1999 by RBF.

Routine inspections were conducted on a monthly basis and weekly during extended periods of wet weather. In accordance with the MID and OMM Plan, routine maintenance activities at each Biofiltration Swale consisted of the following:

1. Scarifying and hydroseeding the swale's side slopes and bare areas outside of the swale but within its maintenance boundary for erosion control.

2. Cutting the salt grass twice to a nominal height of 6 inches and removing the cuttings. When cutting the salt grass, it first needs to be "fluffed up" so that it could be cut to the appropriate height. After the salt grass was cut, the cuttings were removed with a soft rake and disposed.

3. Manually removing weeds from the swale.

4. Removing trash and debris from the swale.

Overall Review of Maintenance Activities at the I-605/SR-91 Biofiltration Swale (73222b)

Site-specific maintenance activities at the I-605/SR-91 Biofiltration Swale consisted of unscheduled and routine maintenance.

Unscheduled maintenance at the swale consisted of the following:

1. Removing eroded soil from the energy dissipater. On two occasions, minor erosion occurred at the headwall of the inlet pipe. Soil had eroded from the freeway embankment and deposited in the energy dissipater. Subsequently, the soil was removed from the energy dissipater.

2. Clearing the natural channel downstream of the swale to prevent backwater conditions in the swale. During the February 20, 2000 event, a team of technicians cleared vegetation in the downstream channel and removed high spots to allow free flowing condition from the swale.

Routine maintenance activities at the swale included:

1. Transplanting salt grass in a few small bare areas. Establishment was limited because the transplanted salt grass was only irrigated once after being transplanted, in accordance with the MID.

2. Cutting surrounding erosion control vegetation, which was located within the BMP's maintenance boundary. After the erosion control vegetation was cut, the cuttings were removed and disposed.

3. Gopher inspection and abatement.

Figure 3-2a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-2b summarizes the average amount of time spent performing each activity.

Overall Review of Maintenance Activities at the Cerritos Maintenance Station Biofiltration Swale (73223)

Site-specific maintenance activities at the I-605/SR-91 Biofiltration Swale consisted of unscheduled and routine maintenance.

Unscheduled maintenance at the swale consisted of the following:

1. Repaired structural damage caused by gophers. Despite regularly scheduled inspection and abatement, gophers continued to burrow through the swale, causing structural damage. Initially, burrows were backfilled and compacted with onsite soil. However, as

flow progressed through the swale during storm events, it infiltrated through previously filled-in gopher holes causing the runoff to flow into the subsurface gopher hole laterals. Flow eventually eroded areas of the side slope where gopher holes had been previously filled in and where new gopher holes had been burrowed during the storm event. This resulted in structural damage to the swale and flow bypass. A second strategy of filling gopher hole laterals with clay material was attempted. Similar to the first strategy, flow migrated around the clay-filled gopher holes and eroded areas of the side slope. Again, this resulted in structural damage to the swale and flow bypass. A third strategy of removing and rebuilding entire sections of the swale's side slope was undertaken. This strategy worked temporarily until the gophers migrated back to the repaired section. Another problem caused by the gophers was the reduction in vegetation cover below the MID requirement of 90 percent. In accordance with the MID, the bare areas will be transplanted with salt grass in the fall. Other strategies to minimize/prevent damage caused by gophers will be discussed during the summer of 2000.

Routine maintenance activities at the swale included:

1. Cutting surrounding erosion control vegetation, which was located within the BMP's maintenance boundary. After the erosion control vegetation was cut, the cuttings were removed and disposed.
2. Gopher inspection and abatement.

Figure 3-2a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-2b summarizes the average amount of time spent performing each activity.

Overall Review of Maintenance Activities at the I-5/I-605 Biofiltration Swale (73224)

Site-specific maintenance activities at the I-5/I-605 Biofiltration Swale consisted of routine maintenance.

Routine maintenance at the swale consisted of the following:

1. Cutting surrounding erosion control vegetation, which was located within the BMP's maintenance boundary. After the erosion control vegetation was cut, the cuttings were removed and disposed.

2. Gopher inspection and abatement.

Figure 3-2a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-2b summarizes the average amount of time spent performing each activity.

Overall Review of Maintenance Activities at the I-605 at Carson Biofiltration Swale (73225)

Site-specific maintenance activities at the I-605 at Carson Biofiltration Swale consisted of routine maintenance.

Routine maintenance activities at the swale included:

1. To promote adequate coverage at the I-605 at Carson Swale, RBF used various strategies establish vegetation including 1) transplanting salt grass from donor areas of the I-605/SR-91 Strip and 2) transplanting salt grass plugs.

2. Cutting surrounding erosion control vegetation, which was located within the BMP's maintenance boundary. After the erosion control vegetation was cut, the cuttings were removed and disposed.

3. Removing leaves from the swale, which fell from a nearby tree. The leaves had compacted the swale's vegetation.

Figure 3-2a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-2b summarizes the average amount of time spent performing each activity.

Figure 3-2a: Frequency of Maintenance Activities at the Biofiltration Swales

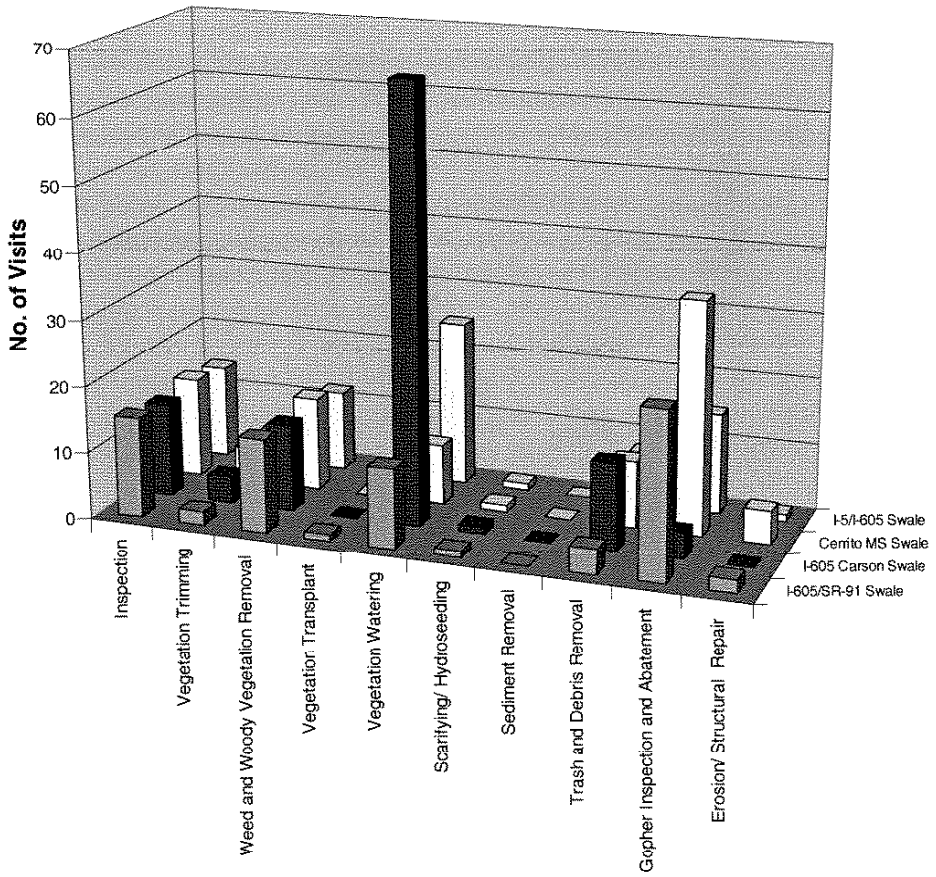
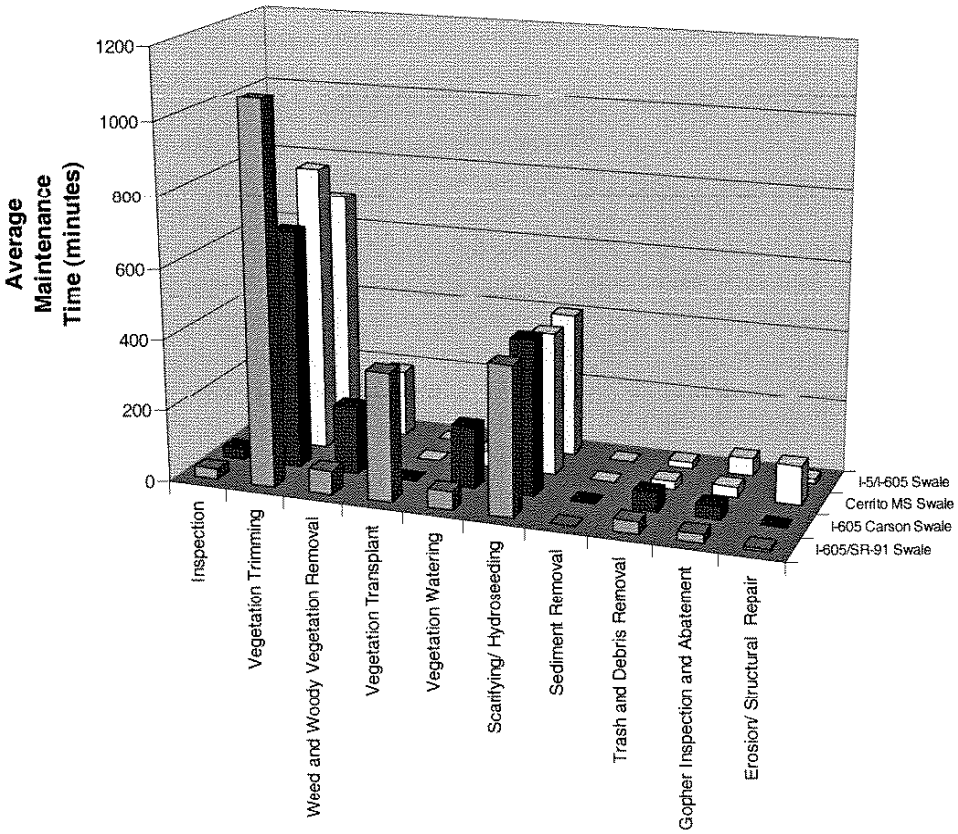


Figure 3-2b: Average Maintenance Times at the Biofiltration Swales



3.1.3 Drain Inlet Inserts

Overall Review of Maintenance Activities at the Foothill Maintenance Station StreamGuard™ DII (73216N)

Maintenance activities at the Foothill Maintenance Station StreamGuard™ DII consisted of one-time maintenance activities and routine maintenance activities.

One-time maintenance activities conducted at the site include the following:

1. Prior to the 1999-2000 wet season, the DII was installed and the interface gap between the DII fabric and the drain inlet was eliminated using wood shims to compress the DII fabric against the drain inlet walls.

2. Rubber berms were placed around the monitoring vaults to address the concern that untreated flow could enter the vaults.

Routine inspections were conducted at the site prior to and during each storm event. Organic material, mostly leaves, was removed from the DII once during the fall. Removed material was placed in an on-site storage container designed to emulate DII conditions. The thresholds for replacement of the DII provided in the MID were not reached. The DII was removed during the first week of June 2000 and subsequently analyzed.

Figure 3-3a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-3b summarizes the average amount of time spent performing each activity.

Overall Review of Maintenance Activities at the Las Flores Maintenance Station StreamGuard™ DII (73217N)

Maintenance activities at the Las Flores Maintenance Station StreamGuard™ DII consisted of one-time maintenance activities, unscheduled maintenance activities, and routine maintenance activities.

One-time maintenance activities conducted at the site include the following:

1. Prior to the 1999-2000 wet season, the DII was installed and the interface gap between the DII fabric and the drain inlet was eliminated using wood shims to compress the DII fabric against the drain inlet walls.

2. Rubber berms were placed around the monitoring vaults to address the concern that untreated flow could enter the vaults.

Unscheduled maintenance activities were conducted three times. The first time, standing water in the cone cause the DII to slip down and fall into the bottom of the drain inlet. Material was removed from the DII and the DII was subsequently reinstalled to its original position and the inlet-DII interface was tightened using additional wood shims. Removed material was placed in an on-site storage container designed to emulate DII conditions. The second and third time, standing water in the cone caused the DII to slip in one location along the inlet edge. The DII was returned to its original position and tightened using additional shims.

Routine inspections were conducted at the site prior to and during each storm event, but no maintenance was required because the DII did not meet the preventive maintenance thresholds in the Maintenance Indicator Document (MID). The thresholds for replacement of the DII provided in the MID were not reached. The DII was removed during the first week in June 2000 and subsequently analyzed.

Figure 3-3a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-3b summarizes the average amount o time spent performing each activity.

Overall Review of Maintenance Activities at the Rosemead Maintenance Station StreamGuard™ DII (73218S)

Maintenance activities at the Rosemead Maintenance Station StreamGuard™ DII consisted of one-time maintenance activities, unscheduled maintenance activities, and routine maintenance activities.

One-time maintenance activities conducted at the site include the following:

1. Prior to the 1999-2000 wet season, the DII was installed and the interface gap between the DII fabric and the drain inlet was eliminated using wood shims to compress the DII fabric against the drain inlet walls.

2. Rubber berms were placed around the monitoring vaults to address the concern that untreated flow could enter the vaults.

Two unscheduled maintenance activities were performed at the site. Standing water in the cone caused the DII to slip in one location along the inlet edge. The DII was reinstalled to its original position and tightened using available shim stock.

Routine inspections were conducted at the site prior to and during each storm event. Organic material, mostly leaves, was removed from the DII once during the fall. Removed material was placed in an on-site storage container designed to emulate DII conditions. The thresholds for replacement of the DII provided in the MID were not reached. The DII was removed during the first week in June 2000 and subsequently analyzed.

Figure 3-3a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-3b summarizes the average amount of time spent performing each activity.

Overall Review of Maintenance Activities at the Foothill Maintenance Station Fossil Filter™ DII (73216S)

Maintenance activities at the Foothill Maintenance Station Fossil Filter™ DII consisted of one-time maintenance activities, non-routine, and routine maintenance activities.

One-time maintenance activities conducted at the site include the following:

1. The interface between the DII and the inlet was checked for gaps prior to the beginning of the 1999-2000 wet season and throughout the wet season; no gaps were found.

2. Rubber berms were placed around the monitoring vaults to address the concern that untreated flow could enter the vaults.

Non-routine maintenance was conducted following the April 17 storm, when the stainless steel flange holding the cartridges bent upward due to the weight of water, and bypass occurred underneath the cartridges. Maintenance consisted of removing the DII, bending the flange back into its original position, and then reinstalling the DII.

Routine inspections were conducted at the site prior to and during each storm event. Generally, small amounts of trash, debris, and sediment were removed from the DII both before and once during a storm event. Removed trash, debris, and sediment were placed in an on-site storage container designed to emulate DII conditions.

The thresholds for replacement of the DII provided in the MID were not reached. The adsorbent granules were removed during the first week in June 2000. Subsequently, the adsorbent granules from the cartridges and trash, debris, and sediment collected during the 1999-2000 wet season were sent to the laboratory for analysis.

Figure 3-3a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-3b summarizes the average amount of time spent performing each activity.

Overall Review of Maintenance Activities at the Las Flores Maintenance Station Fossil Filter™ DII (73217S)

Maintenance activities at the Las Flores Maintenance Station Fossil Filter™ DII consisted of one-time maintenance activities and routine maintenance activities.

One-time maintenance activities conducted at the site include the following:

1. The interface gap between the DII and the inlet was sealed with spray foam prior to the beginning of the 1999-2000 wet season. The interface was also checked for gaps throughout the wet season; no gaps were found.

2. Rubber berms were placed around the monitoring vaults to address the concern that untreated flow could enter the vaults.

Routine inspections were conducted at the site prior to and during each storm event. Generally, small amounts of organic debris and sediment were removed from the DII both before and once during a storm event. Removed organic debris and sediment were placed in an on-site storage container designed to emulate DII conditions.

The thresholds for replacement of the DII provided in the MID were not reached. The adsorbent granules were removed during the first week in June 2000. Subsequently, the adsorbent granules from the cartridges and trash, debris, and sediment collected during the 1999-2000 wet season were sent to the laboratory for analysis.

Figure 3-3a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-3b summarizes the average amount of time spent performing each activity.

Overall Review of Maintenance Activities at the Rosemead Maintenance Station Fossil Filter™ DII (73218N)

Maintenance activities at the Rosemead Maintenance Station Fossil Filter™ DII consisted of one-time maintenance activities and routine maintenance activities.

One-time maintenance activities conducted at the site include the following:

1. The interface between the DII and the inlet was sealed with spray foam prior to the beginning of the 1999-2000 wet season. The interface was also checked for gaps throughout the wet season; no gaps were found.

2. A section of rubber was placed along the curb inlet-DII interface to promote flow into the DII.

3. Rubber berms were placed around the monitoring vaults to address the concern that untreated flow could enter the vaults.

Routine inspections were conducted at the site prior to and during each storm event. Generally, small amounts of organic debris, trash, and sediment were removed from the DII both before and

once during a storm event. Removed organic debris, trash, and sediment were placed in an on-site storage container designed to emulate the ambient conditions at the top of the screen in the cartridges.

The thresholds for replacement of the DII provided in the MID were not reached. The adsorbent granules were removed during the first week in June 2000. Subsequently, the adsorbent granules from the cartridges and organic debris, trash, and sediment collected during the 1999-2000 wet season were sent to the laboratory for analysis.

Figure 3-3a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-3b summarizes the average amount of time spent performing each activity.

Figure 3-3a: Frequency of Maintenance Activities at the DII Sites

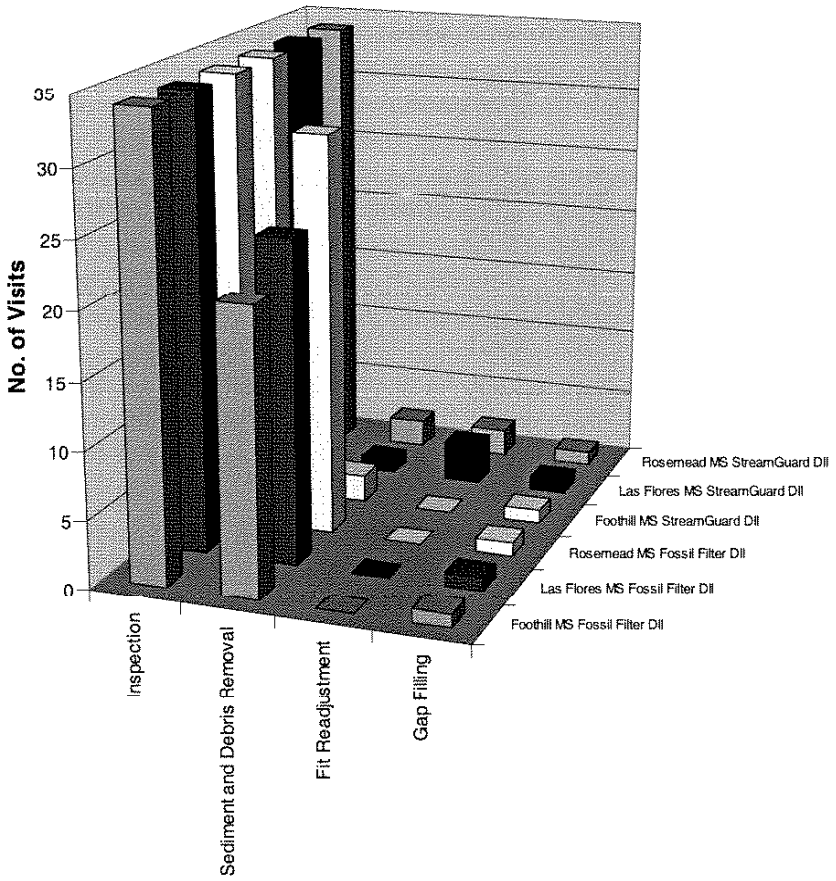
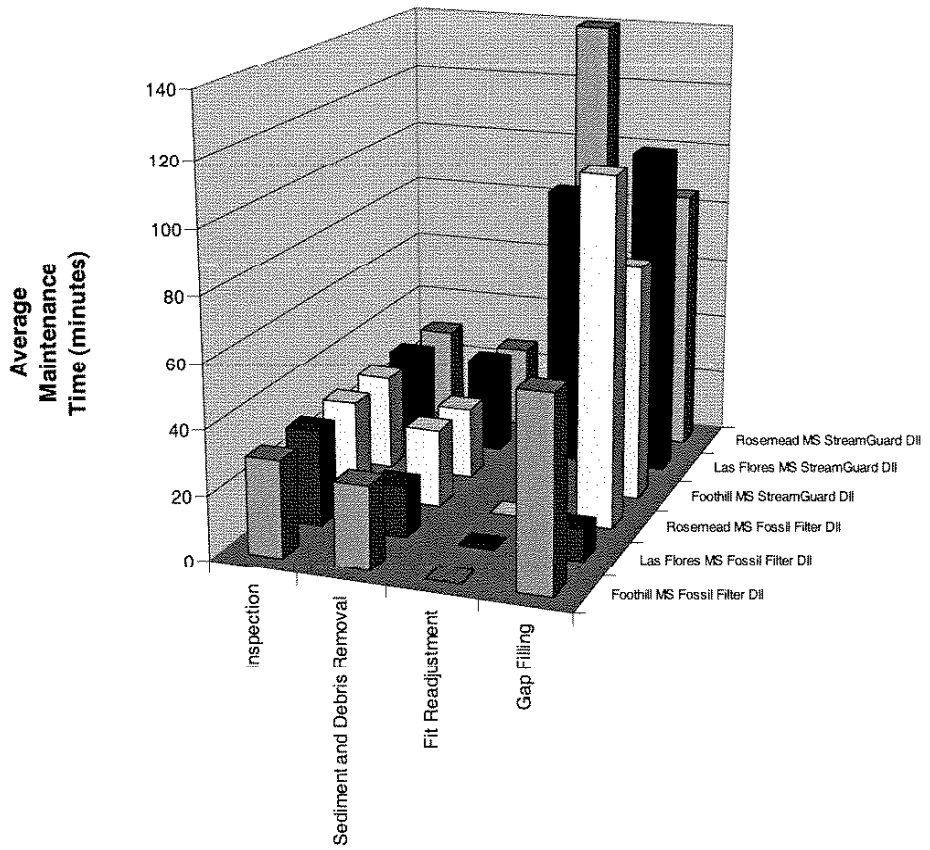


Figure 3-3b: Average Maintenance Times at the DII Sites



3.1.4 Infiltration Basin

Overall Review of Maintenance Activities at the I-605/SR-91 Infiltration Basin (73101)

Maintenance activities at the I-605/SR-91 Infiltration Basin (IB) consisted of one-time maintenance activities, unscheduled maintenance activities, and routine maintenance activities.

There was one one-time maintenance activity at the IB. In December of 1999, the bottom and side slopes of the IB was scarified and hydroseeded. By February 2000, the hydroseed sprouted and covered most of the IB.

The following unscheduled maintenance activities were performed at the site:

1. Removing ponded water from the overflow structure, prior to it being grouted with concrete.

2. Modifications were made to enhance flow into the IB. These consisted of (a) creating a shallow sump (approximately 3/4 inches in depth) in the bottom of the overflow structure and (b) increasing the height of a stainless steel weir plate in front of the overflow pipe.

3. Several times, minor erosion was observed at the downstream end of a shallow asphalt swale on the perimeter road. The erosion was repaired, and to prevent reoccurrence of problem, sandbags were placed at the end of the swale where it discharged into the edge of the IB.

Routine inspections were conducted per the OMM Plan and MID. Routine maintenance included removal of trash and debris, removal of woody vegetation, cutting the vegetation to a height of approximately six inches and removing and disposing of the cuttings, and compaction of ground squirrel holes and gopher burrows.

Figure 3-4a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-4b summarizes the average amount of time spent performing each activity.

3.1.5 Infiltration Trench

Overall Review of Maintenance Activities at the Altadena Maintenance Station Infiltration Trench (73211b)

Very little maintenance activity was conducted at the Altadena Maintenance Station Infiltration Trench. Routine inspections, required by the OMM Plan and MID, were conducted. Routine maintenance activities included the removal of small amounts of trash and debris.

Figure 3-5a summarizes the frequency of maintenance activities (i.e., number of times maintenance was conducted at the BMP) and Figure 3-5b summarizes the average amount of time spent performing each activity.

Figure 3-4a: Frequency of Maintenance Activities at the Infiltration Basin and Infiltration Trench

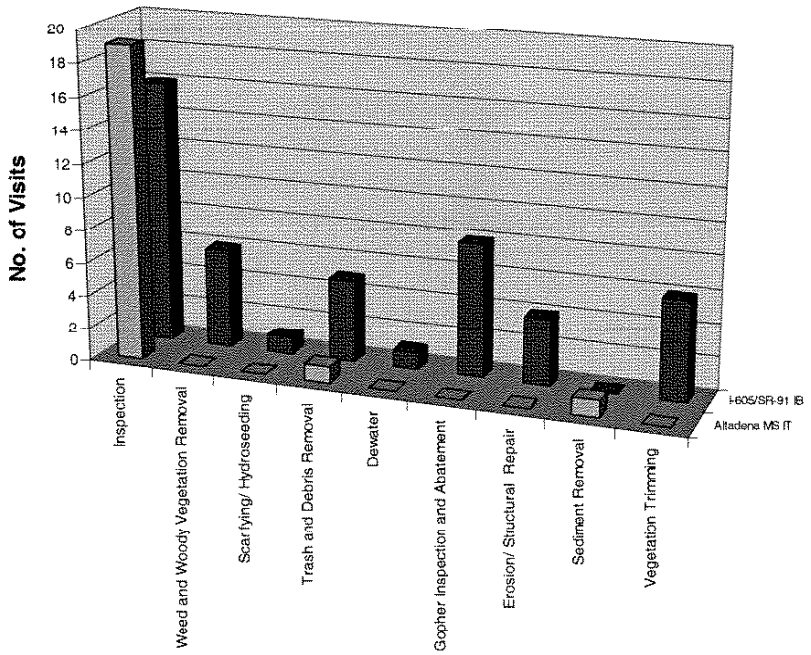
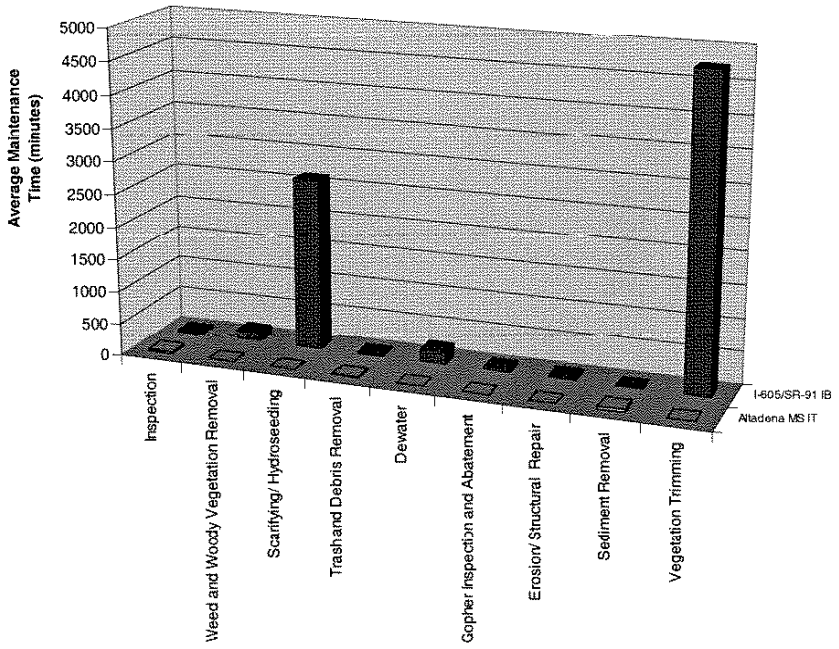


Figure 3-4b: Average Maintenance Times at the Infiltration Basin and Infiltration Trench



4.0 COST SUMMARY

A cost summary for maintenance of the BMPs during the 1999/2000 year is provided in the following spreadsheets. These cost summaries provided maintenance hours with generic rates.

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: I-605/SR-91 Interchange	SITE NO. 73101	BMP TYPE: Infiltration Basin	CONSULTANT: Montgomery Watson/LAW Crandall

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	3.0	7.8	12.0	2.5	5.3	4.7	10.3	8.5	4.8	14.9	8.9	9.6	14.4	106.6	$120	$ 12,786
	Encroachment Permits														0.0	$87	$ -
	Travel	2.6	1.7	7.8	5.1	6.0	0.8	5.0	5.1	5.0	10.0	5.5	4.8	10.8	70.1	$87	$ 6,094
	Unscheduled events						4.0								4.0	$87	$ 348
	Monthly Subtotal (hours)	5.6	9.5	19.8	7.6	11.3	9.5	15.3	13.6	9.8	24.9	4.4	14.4	25.1	180.6		
	Monthly Subtotal ($)	$586	$1,084	$2,114	$744	$1,152	$977	$1,671	$1,466	$1,005	$2,656	$1,547	$1,566	$2,660	$19,228		
																Task Subtotal =	$19,228
	Operation																
	Wet season inspections					1.0	0.5	1.0	1.3	1.3	1.5	1.5	0.5		8.5	$55	$ 468
	Dry season inspections	0.5	1.0	0.5	1.0									0.5	3.5	$55	$ 193
	Unscheduled inspections/field calls								1.5						1.5	$60	$ 90
	Monthly Subtotal (hours)	0.50	1.00	0.50	1.00	1.00	0.50	1.00	2.75	1.25	1.50	1.50	0.50	0.50	13.5		
	Monthly Subtotal ($)	$28	$55	$28	$55	$55	$28	$55	$159	$69	$83	$83	$28	$28	$750		
																Task Subtotal =	$750
	Maintenance																
	Scheduled maintenance	1.4		17.0	1.0	4.0		31.0	2.3	1.3	3.8	2.3	3.3	79.3	146.5	$55	$ 8,055
	Unscheduled maintenance			7.3											7.3	$55	$ 399
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Vegetation Consultant					0.9									0.9	$75	$ 65
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	1.40	0.00	24.25	1.00	4.87	0.00	31.00	2.25	1.25	3.75	2.30	3.25	79.25	151.6		
	Monthly Subtotal ($)	$77	$0	$1,334	$55	$285	$0	$1,705	$124	$69	$206	$127	$179	$4,359	$8,519		
																Task Subtotal =	$8,519
	Vector Control																
	Contract & General administration	1.0	1.9	1.0	0.25				0.1	0.1	0.1	0.1	0.1	0.3	4.9	$120	$ 588
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	6.2	8.2	3.2	2.2	1.8	2.6	2.1	2.2	2.0		1.8	2.1	3.0	37.3	$46	$ 1,734
	Monthly Subtotal (hours)	7.20	10.10	4.20	2.45	1.76	2.60	2.10	2.30	2.10	0.10	1.90	2.15	3.26	42.22		
	Monthly Subtotal ($)	$408	$609	$269	$132	$82	$121	$98	$114	$105	$12	$96	$107	$170	$2,322		
																Task Subtotal =	$2,322
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump			2.0											2.0	$5	$ 10
	Weed Wacker													39.3	39.3	$5	$ 196
	20" Push Lawnmower													0.5	0.5	$9	$ 5
	Self Powered Weed Mower													1.5	1.5	$20	$ 30
	Mounted Weed Eater													11.8	11.8	$7	$ 88
	Generator													11.8	11.8	$6	$ 71
	Trailer													2.8	2.8	$13	$ 36
	Monthly Subtotal (hours)	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	67.50	69.50		
	Monthly Subtotal ($)	$0	$0	$10	$0	$0	$0	$0	$0	$0	$0	$0	$0	$426	$436		
																Equipment Subtotal =	$436
Dollars ($)	***Direct Costs***																Total $
	VCD supplies (direct costs less labor)																$
	Reproduction	$ 8	$ 9	$ 13	$ 5		$ 2	$ 1	$ 1	$ 2	$ 4	$ 2	$ 2	$ 2			$ 49.99
	Postage/FedEx	$ 8	$ 9	$ 13	$ 5		$ 3	$ 1	$ 1	$ 3	$ 4	$ 2	$ 2	$ 2			$ 51.59
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4	$ 8				$ 47.31
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2	$ 2				$ 26.41
	Incidentals	$ 8	$ 9	$ 13	$ 5		$ 10	$ 1	$ 1	$ 8	$ 18	$ 17	$ 18	$ 2			$ 108.42
	Vehicle Rental/Lease	$ 50	$ 74	$ 148	$ 10	$ 11	$ 5	$ 27	$ 80	$ 85	$ 6	$ 96	$ 97	$ 225			$ 914.00
	Airfare																$ -
	Field Supp./Expendables	$ 10	$ 1	$ 37	$ 1	$ 24	$ 3	$ 3		$ 4	$ 116		$ 8	$ 108			$ 316.00
	Equipment Rental																$ -
	Sediment Analyses																$ -
	Sediment Disposal																$ -
	Weed Wacker	$ 15															$ 15.00
	Vegetation Disposal			$ 34													$ 34.00
	Scarifying/Hydroseeding								$ 7,618								$ 7,618.23
	Storage Container			$ 4													$ 4.25
	Monthly Subtotal	$ 99	$ 102	$ 270	$ 25	$ 50	$ 23	$ 58	$ 7,701	$ 102	$ 158	$ 123	$ 136	$ 339			$ 9,185
	MONTHLY TOTAL	$1,138	$1,850	$4,024	$1,011	$1,524	$1,149	$3,587	$9,564	$1,343	$3,115	$1,974	$2,016	$7,981	**1999/2000 TOTAL =**		**$40,439**

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: Altadena Maintenance Station	SITE NO. 73211a	BMP TYPE: Infiltration Trench	CONSULTANT: Montgomery Watson - Chaudhary

Labor (hours)

TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Administration																
General program support/Follow-up	2.0	3.0	6.3	2.5	6.3	1.9	6.7	6.0	2.0	13.7	10.3	8.8	8.8	78.2	$120	$ 9,378
Encroachment Permits														0.0	$87	$ -
Travel	2.1	1.0	4.0	2.6	1.7	0.8	2.8	0.9	4.3	9.1	2.3	2.9	1.8	36.1	$87	$ 3,136
Unscheduled events														0.0	$87	$ -
Monthly Subtotal (hours)	4.1	4.0	10.3	5.1	8.0	2.7	9.5	6.9	6.3	22.8	12.6	11.7	10.6	114.2		
Monthly Subtotal ($)	$423	$447	$1,098	$522	$898	$293	$1,043	$789	$614	$2,433	$1,436	$1,304	$1,213	$12,514		
														Task Subtotal =		$12,514
Operation																
Wet season inspections					2.0	0.5	1.0	1.3	1.3	2.5	0.5	0.8		9.8	$55	$ 536
Dry season inspections	0.8	1.0	0.5	0.5									0.5	3.3	$55	$ 182
Unscheduled inspections/field calls														0.0	$60	$ -
Monthly Subtotal (hours)	0.80	1.00	0.50	0.50	2.00	0.50	1.00	1.25	1.25	2.50	0.50	0.75	0.50	13.1		
Monthly Subtotal ($)	$44	$55	$28	$28	$110	$28	$55	$69	$69	$138	$28	$41	$28	$718		
														Task Subtotal =		$718
Maintenance																
Scheduled maintenance	1.5									0.5		0.3		2.3	$55	$ 124
Unscheduled maintenance														0.0	$55	$ -
Vandalism														0.0	$55	$ -
Acts of God														0.0	$55	$ -
Landscape Maintenance Contractor														0.0	$0	$ -
Sediment Removal Contractor														0.0	$0	$ -
Vegetation Consultant														0.0	$75	$ -
Other Contractor														0.0	$0	$ -
Other Contractor														0.0	$0	$ -
Monthly Subtotal (hours)	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.25	0.00	2.3		
Monthly Subtotal ($)	$83	$0	$0	$0	$0	$0	$0	$0	$0	$28	$0	$14	$0	$124		
														Task Subtotal =		$124
Vector Control																
Contract & General administration	0.3	0.6	0.5					0.1	0.1	0.1	0.1	0.1	0.3	2.1	$120	$ 246
Vector prevention maint. (consultant)														0.0	$65	$ -
Response to VCD calls (consultant)														0.0	$55	$ -
VCD efforts (contracted)	6.2	8.2	2.0	1.2	0.9	1.4	1.6	1.3	1.0	1.2	1.0	1.1	1.7	28.7	$46	$ 1,333
Monthly Subtotal (hours)	6.50	8.75	2.50	1.20	0.90	1.40	1.60	1.36	1.05	1.30	1.10	1.17	1.91	30.74		
Monthly Subtotal ($)	$324	$447	$153	$66	$42	$63	$74	$71	$56	$68	$58	$58	$107	$1,579		
														Task Subtotal =		$1,579

Non-Recurring Equipment (hours)

Equipment																
Trash Pump														0.0	$5	$ -
Piece of Equipment 2														0.0	$0	$ -
Piece of Equipment 3														0.0	$0	$ -
Piece of Equipment 4														0.0	$0	$ -
Piece of Equipment 5														0.0	$0	$ -
Piece of Equipment 6														0.0	$0	$ -
Monthly Subtotal (hours)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Monthly Subtotal ($)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
														Equipment Subtotal =		$0

Dollars ($)

Direct Costs																Total $
VCD supplies (direct costs less labor)																$ -
Reproduction	$ 4	$ 4	$ 7	$ 2		$ 1		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 24.7
Postage/FedEx	$ 4	$ 4	$ 7	$ 2		$ 2		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 26.3
Lodging			$ 5				$ 15			$ 7	$ 4	$ 8				$ 38.2
Per Diem			$ 3				$ 10			$ 3	$ 2	$ 2				$ 19.4
Incidentals	$ 4	$ 4	$ 7	$ 2		$ 6		$ 1	$ 6	$ 16	$ 16	$ 17	$ 1			$ 80.6
Vehicle Rental/Lease	$ 25	$ 37	$ 22	$ 10	$ 11	$ 5	$ 15	$ 13	$ 73	$ 6	$ 55	$ 58	$ 34			$ 364.3
Airfare																$ -
Field Supp./Expendables		$ 1	$ 1	$ 1	$ 9	$ 3	$ 3		$ 4	$ 9		$ 8				$ 38.2
Equipment Rental					$ 6											$ 6.4
Sediment Analyses																$ -
Sediment Disposal																$ -
Weed Wacker																$ -
Vegetation Disposal																$ -
Storage Container			$ 4													$ 4.2
Monthly Subtotal	$ 37	$ 50	$ 55	$ 17	$ 26	$ 17	$ 44	$ 16	$ 85	$ 44	$ 79	$ 95	$ 38			$ 60

MONTHLY TOTAL	$910	$999	$1,333	$622	$1,076	$401	$1,216	$944	$824	$2,711	$1,601	$1,512	$1,385	1999/2000 TOTAL	$15,537

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: Altadena Maintenance Station	SITE NO. 73211b	BMP TYPE: Biofiltration Strip	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	4.0	4.8	10.0	1.3	3.0	4.2	3.5	8.2	4.5	15.0	9.6	10.8	13.3	100.3	$120	$ 11,994
	Encroachment Permits														0.0	$87	$ -
	Travel	2.1	1.0	9.1	12.1	8.4	2.9	4.3	5.1	4.3	9.1	5.5	2.9	3.6	70.3	$87	$ 6,113
	Unscheduled events														0.0	$87	$ -
	Monthly Subtotal (hours)	6.1	5.8	19.1	15.3	11.4	7.1	13.7	13.3	8.8	24.0	15.1	13.7	16.9	170.2		
	Monthly Subtotal ($)	$663	$657	$1,992	$1,438	$1,091	$750	$1,504	$1,430	$914	$2,565	$1,631	$1,544	$1,908	$18,107		
															Task Subtotal =		$18,107
	Operation																
	Wet season inspections					1.0	0.5	1.5	1.3	1.3	4.0	1.0	1.0		11.5	$55	$ 633
	Dry season inspections	1.2	1.0	0.5	1.0									1.3	5.0	$55	$ 272
	Unscheduled inspections/field calls	1.0													1.0	$60	$ 60
	Monthly Subtotal (hours)	2.20	1.00	0.50	1.00	1.00	0.50	1.50	1.25	1.25	4.00	1.00	1.00	1.25	17.5		
	Monthly Subtotal ($)	$126	$55	$28	$55	$55	$28	$83	$69	$69	$220	$55	$55	$69	$965		
															Task Subtotal =		$965
	Maintenance																
	Scheduled maintenance	7.2	1.0	7.8	0.5	6.0	12.0	15.8	4.5	3.3	8.0	10.1	2.5	16.5	95.1	$55	$ 5,228
	Unscheduled maintenance			6.0	11.5	10.5	3.0	2.8							33.8	$55	$ 1,856
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Vegetation Consultant					0.9	0.9	3.0	1.2						5.9	$75	$ 445
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	7.20	1.00	13.75	12.00	17.37	15.90	21.50	5.66	3.25	8.00	10.10	2.50	16.50	134.7		
	Monthly Subtotal ($)	$396	$55	$756	$660	$973	$863	$1,243	$335	$179	$440	$556	$138	$908	$7,529		
															Task Subtotal =		$7,529
	Vector Control																
	Contract & General administation	0.8	1.1	0.5	0.5		0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.3	4.0	$120	$ 474
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	6.2	8.2	2.0	1.2	0.9	1.4	1.6	1.3	1.0	1.2	1.0	1.1	1.7	28.7	$46	$ 1,333
	Monthly Subtotal (hours)	7.00	9.25	2.50	1.70	0.90	1.70	1.70	1.36	1.05	1.30	1.10	1.17	1.91	32.64		
	Monthly Subtotal ($)	$384	$507	$153	$116	$42	$101	$86	$71	$56	$68	$58	$58	$107	$1,807		
															Task Subtotal =		$1,807
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump			6.0											6.0	$5	$ 30
	Weed Wacker						3.0							7.0	10.0	$5	$ 50
	20" Push Lawnmower													0.3	0.3	$9	$ 2
	Self Powered Weed Mower													0.3	0.3	$20	$ 5
	Mounted Weed Eater													2.0	2.0	$7	$ 15
	Generator													2.0	2.0	$6	$ 12
	Trailer													0.5	0.5	$13	$ 7
	Monthly Subtotal (hours)	0.00	0.00	6.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	21.00		
	Monthly Subtotal ($)	$0	$0	$30	$0	$0	$15	$0	$0	$0	$0	$0	$0	$76	$121		
															Equipment Subtotal =		$121
Dollars ($)	***Direct Costs***																Total$
	VCD supplies (direct costs less labor)																$ -
	Reproduction	$ 4	$ 4	$ 11	$ 3		$ 1	$ 1	$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 31.41
	Postage/FedEx	$ 4	$ 4	$ 11	$ 3		$ 2	$ 1	$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 33.01
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4	$ 8				$ 46.88
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2	$ 2				$ 25.91
	Incidentals	$ 4	$ 4	$ 11	$ 3		$ 6	$ 1	$ 1	$ 6	$ 16	$ 16	$ 17	$ 1			$ 37.38
	Vehicle Rental/Lease	$ 25	$ 37	$ 40	$ 10	$ 11	$ 19	$ 40	$ 87	$ 73	$ 6	$ 82	$ 58	$ 73			$ 560.92
	Airfare																$ -
	Field Supp./Expendables		$ 1	$ 3	$ 8	$ 24	$ 3	$ 3		$ 4	$ 5		$ 8	$ 24			$ 86.80
	Equipment Rental																$ -
	Sediment Analyses	$ 560							$ 850								$ 1,410.00
	Sediment Disposal							$ 300									$ 300.00
	Weed Wacker	$ 15															$ 15.00
	Vegetation Disposal																$ -
	Storage Container			$ 4													$ 4.25
	Monthly Subtotal	$ 612	$ 50	$ 89	$ 28	$ 50	$ 32	$ 371	$ 940	$ 85	$ 44	$ 106	$ 95	$ 101			$ 2,602
	MONTHLY TOTAL	$2,181	$1,324	$3,047	$2,297	$2,210	$1,878	$3,287	$2,844	$1,303	$3,356	$2,405	$1,889	$3,168	**1999/2000 TOTAL =**		**$31,129**

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT 7	LOCATION: Foothill Maintenance Station	SITE NO. 73H6a	BMP TYPE: Drain Inlet Insert (StreamGuard)	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hr)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	2.1	4.4	6.0	4.0	6.8	2.9	7.2	5.7	4.8	14.7	11.4	10.1	2.6	82.1	$120	$ 10,728
	Encroachment Permits														0.0	$87	$ -
	Travel	4.1	1.6	3.3	3.6	0.6	0.8	1.5	1.7	5.0	6.4	2.8	1.0	3.6	35.3	$87	$ 3,115
	Unscheduled events														0.0	$87	$ -
	Monthly Subtotal (hours)	6.2	6.0	9.3	7.6	7.4	3.7	8.7	7.4	9.8	21.1	14.2	11.0	13.1	125.2		
	Monthly Subtotal ($)	$603	$661	$1,003	$789	$862	$413	$995	$833	$1,005	$2,321	$1,612	$1,289	$1,458	$13,843		
															Task Subtotal =		$13,843
	Operation																
	Wet season inspections					1.0	0.5	1.5	1.5	2.5	4.5	0.5	0.3		12.3	$55	$ 674
	Dry season inspections	0.5	0.5	0.5	1.5									1.0	4.0	$55	$ 220
	Unscheduled inspections/field calls														0.0	$60	$ -
	Monthly Subtotal (hours)	0.50	0.50	0.50	1.50	1.00	0.50	1.50	1.50	2.50	4.50	0.50	0.25	1.00	16.3		
	Monthly Subtotal ($)	$28	$28	$28	$83	$55	$28	$83	$83	$138	$248	$28	$14	$55	$894		
															Task Subtotal =		$894
	Maintenance																
	Scheduled maintenance	1.0	0.5		0.8	2.0				0.5				1.0	5.8	$55	$ 316
	Unscheduled maintenance														0.0	$55	$ -
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	1.00	0.50	0.00	0.75	2.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00	1.00	5.8		
	Monthly Subtotal ($)	$55	$28	$0	$41	$110	$0	$0	$0	$28	$0	$0	$0	$55	$315		
															Task Subtotal =		$316
	Vector Control																
	Contract & General administration	0.4	0.6	0.5					0.1	0.1	0.1	0.1	0.1	0.3	2.2	$120	$ 258
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	1.0	1.1	1.0	1.2	0.7	0.8	0.8	0.8	0.8	1.3	1.0	0.8		11.5	$46	$ 533
	Monthly Subtotal (hours)	1.35	1.70	1.50	1.20	0.71	0.80	0.84	0.94	0.94	1.40	1.10	0.89	0.25	13.62		
	Monthly Subtotal ($)	$88	$123	$106	$56	$33	$37	$39	$51	$51	$72	$58	$45	$30	$791		
															Task Subtotal =		$791
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump														0.0	$5	$ -
	Piece of Equipment 2														0.0	$0	$ -
	Piece of Equipment 3														0.0	$0	$ -
	Piece of Equipment 4														0.0	$0	$ -
	Piece of Equipment 5														0.0	$0	$ -
	Piece of Equipment 6														0.0	$0	$ -
	Monthly Subtotal (hours)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Monthly Subtotal ($)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
															Equipment Subtotal =		$0
Dollars ($)	***Direct Costs***															Total $	
	VCD supplies (direct costs less labor)															$ -	
	Reproduction	$ 4	$ 4	$ 6	$ 2		$ 1		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1		$ 24.21	
	Postage/FedEx	$ 4	$ 4	$ 6	$ 2		$ 2		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1		$ 25.81	
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4				$ 19.25	
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2				$ 23.61	
	Incidentals	$ 4	$ 4	$ 6	$ 2		$ 5		$ 1	$ 6	$ 10	$ 16	$ 17	$ 1		$ 79.18	
	Vehicle Rental/Lease	$ 25	$ 37	$ 18	$ 10	$ 11	$ 6	$ 9	$ 27	$ 87	$ 6	$ 56	$ 21	$ 68		$ 381.23	
	Airfare															$ -	
	Field Supp./Expendables		$ 1	$ 1	$ 1	$ 24	$ 3	$ 3		$ 4	$ 4		$ 8			$ 49.37	
	Equipment Rental															$ -	
	Sediment Analysis															$ -	
	Sediment Disposal	$ 5														$ 5.00	
	Weed Wacker															$ -	
	Vegetation Disposal															$ -	
	Stream Guard Drain Inlet Insert ($93 each)	$ 93			$ 93											$ 186.00	
	Storage Container			$ 4												$ 4.25	
	Monthly Subtotal	$ 135	$ 50	$ 50	$ 110	$ 50	$ 17	$ 38	$ 30	$ 100	$ 35	$ 80	$ 47	$ 72		$ 818	
	MONTHLY TOTAL	$909	$882	$1,187	$1,078	$1,110	$495	$1,154	$996	$1,321	$2,680	$1,778	$1,395	$1,670		**1999/2000 TOTAL =**	**$16,661**

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: Foothill Maintenance Station	SITE NO. 732166	BMP TYPE: Drain inlet Insert (Fossil Filter)	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	2.1	4.4	6.0	4.0	7.3	2.8	7.5	5.2	4.8	14.7	11.4	10.6	9.6	90.1	$120	$ 10,806
	Encroachment Permits														0.0	$87	$ -
	Travel	4.1	1.6	3.3	3.6	0.6	0.8	1.5	1.7	5.0	6.4	3.9	2.9	3.6	38.8	$87	$ 3,376
	Unscheduled events														0.0	$87	$ -
	Monthly Subtotal (hours)	6.2	5.0	9.3	7.6	7.9	3.6	9.0	6.9	9.8	21.1	15.3	13.4	13.1	128.9		
	Monthly Subtotal ($)	$603	$661	$1,003	$789	$922	$401	$1,025	$773	$1,005	$2,321	$1,707	$1,514	$1,458	$14,182		
															Task Subtotal =		$14,182
	Operation																
	Wet season inspections					1.0	0.5	1.5	1.5	2.0	1.5	1.0	0.3		12.3	$55	$ 674
	Dry season inspections	0.5	0.5	0.5	1.5									0.5	3.5	$55	$ 193
	Unscheduled inspections/field calls														0.0	$60	$ -
	Monthly Subtotal (hours)	0.50	0.50	0.50	1.50	1.00	0.50	1.50	1.50	2.00	4.50	1.00	0.25	0.50	15.8		
	Monthly Subtotal ($)	$28	$28	$28	$83	$55	$28	$83	$83	$110	$248	$55	$14	$28	$866		
															Task Subtotal =		$866
	Maintenance																
	Scheduled maintenance	1.3	0.3		1.3	2.5			1.5	3.5	4.3	1.0	1.0	2.0	18.6	$55	$ 1,023
	Unscheduled maintenance	0.2													0.2	$55	$ 11
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	1.50	0.25	0.00	1.25	2.50	0.00	0.00	1.50	3.50	4.30	1.00	1.00	2.00	18.8		
	Monthly Subtotal ($)	$83	$14	$0	$69	$138	$0	$0	$83	$193	$237	$55	$55	$110	$1,034		
															Task Subtotal =		$1,034
	Vector Control																
	Contract & General administration	0.4	0.6	0.5					0.1	0.1	0.1	0.1	0.1	0.3	2.2	$120	$ 258
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	1.0	1.1	1.0	1.2	0.7	0.8	0.8	0.8	0.8	1.3	1.0	0.8		11.5	$46	$ 533
	Monthly Subtotal (hours)	1.35	1.70	1.50	1.20	0.71	0.80	0.84	0.94	0.94	1.40	1.10	0.89	0.25	13.62		
	Monthly Subtotal ($)	$88	$123	$106	$56	$33	$37	$39	$51	$51	$72	$58	$45	$30	$791		
															Task Subtotal =		$791
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump														0.0	$5	$ -
	Piece of Equipment 2														0.0	$0	$ -
	Piece of Equipment 3														0.0	$0	$ -
	Piece of Equipment 4														0.0	$0	$ -
	Piece of Equipment 5														0.0	$0	$ -
	Piece of Equipment 6														0.0	$0	$ -
	Monthly Subtotal (hours)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Monthly Subtotal ($)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
															Equipment Subtotal =		$0
Dollars ($)	***Direct Costs***																Total $
	VCD supplies (direct costs less abov)																$ -
	Reproduction	$ 4	$ 4	$ 6	$ 2		$ 1		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 24.21
	Postage/FedEx	$ 4	$ 4	$ 6	$ 2		$ 2		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 25.81
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4					$ 39.25
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2					$ 23.61
	Incidentals	$ 4	$ 4	$ 6	$ 2		$ 5		$ 1	$ 6	$ 16	$ 16	$ 17	$ 1			$ 79.18
	Vehicle Rental/Lease	$ 25	$ 37	$ 18	$ 10	$ 11	$ 6	$ 9	$ 27	$ 87	$ 6	$ 70	$ 60	$ 68			$ 434.22
	Airfare																$ -
	Field Supp./Expencables		$ 1	$ 1	$ 1	$ 24	$ 3	$ 3		$ 4	$ 4		$ 8				$ 49.37
	Equipment Rental																$ -
	Sediment Analyses																$ -
	Sediment Disposal	$ 5															$ 5.00
	Weed Wacker																$ -
	Vegetation Disposal																$ -
	Fossil Filter Adsorbent Material ($15/tsp)	$ 15			$ 15												$ 30.00
	Storage Container			$ 4													$ 4.25
	Monthly Subtotal	$ 57	$ 50	$ 50	$ 32	$ 50	$ 17	$ 38	$ 30	$ 100	$ 39	$ 94	$ 86	$ 72			$ 715
	MONTHLY TOTAL	$858	$876	$1,187	$1,028	$1,198	$481	$1,184	$1,018	$1,458	$2,916	$1,970	$1,714	$1,698	**1999/2000 TOTAL =**		**$17,568**

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: Las Flores Maintenance Station	SITE NO. 73217a	BMP TYPE: Drain Inlet Insert (StreamGuard)	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	2.1	3.9	4.0	4.5	10.0	2.9	6.7	5.5	4.8	14.7	11.4	10.1	9.6	89.9	$120	$ 10,788
	Encroachment Permits														0.0	$87	$ -
	Travel	2.1	1.6	2.5	2.1	2.2	0.8	1.5	1.7	6.4	6.4	2.8	1.0	3.6	34.6	$87	$ 3,006
	Unscheduled events														0.0	$87	$ -
	Monthly Subtotal (hours)	4.2	5.5	6.5	6.6	12.2	3.7	8.2	7.2	11.2	21.1	14.2	11.0	13.1	124.5		
	Monthly Subtotal ($)	$429	$601	$698	$718	$1,391	$413	$935	$803	$1,127	$2,321	$1,612	$1,289	$1,498	$13,794		
															Task Subtotal =		$13,794
	Operation																
	Wet season inspections					1.0	0.5	1.0	2.0	2.5	2.5	0.5	0.3		10.3	$55	$ 564
	Dry season inspections	0.5	0.5	0.5	1.5									0.5	3.5	$55	$ 193
	Unscheduled inspections/field calls		1.0	0.8											1.8	$60	$ 105
	Monthly Subtotal (hours)	0.50	1.50	1.25	1.50	1.00	0.50	1.00	2.00	2.50	2.50	0.50	0.25	0.50	15.5		
	Monthly Subtotal ($)	$28	$88	$73	$83	$55	$28	$55	$110	$138	$138	$28	$14	$28	$861		
															Task Subtotal =		$861
	Maintenance																
	Scheduled maintenance	1.0			0.8	2.0				0.5	1.5			1.5	7.3	$55	$ 399
	Unscheduled maintenance	0.2			2.0										2.2	$55	$ 121
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	1.20	0.00	0.00	2.75	2.00	0.00	0.00	0.00	0.50	1.50	0.00	0.00	1.50	9.5		
	Monthly Subtotal ($)	$66	$0	$0	$151	$110	$0	$0	$0	$28	$83	$0	$0	$82	$520		
															Task Subtotal =		$520
	Vector Control																
	Contract & General administration	0.4	0.6	0.5	1.3			3.0	0.1	0.1	0.1	0.1	0.1	0.3	6.4	$120	$ 768
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)								4.0	5.0	4.0	4.0	4.0	4.0	25.0	$66	$ 1,638
	Monthly Subtotal (hours)	0.35	0.60	0.50	1.25	0.00	0.00	3.00	4.10	5.10	4.10	4.10	4.05	4.25	31.40		
	Monthly Subtotal ($)	$42	$72	$60	$150	$0	$0	$360	$274	$340	$274	$274	$268	$292	$2,406		
															Task Subtotal =		$2,406
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump														0.0	$5	$ -
	Piece of Equipment 2														0.0	$0	$ -
	Piece of Equipment 3														0.0	$0	$ -
	Piece of Equipment 4														0.0	$0	$ -
	Piece of Equipment 5														0.0	$0	$ -
	Piece of Equipment 6														0.0	$0	$ -
	Monthly Subtotal (hours)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Monthly Subtotal ($)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
															Equipment Subtotal =		$0

	Direct Costs														Total $
Dollars ($)	VCD supplies (direct costs less labor)														$ -
	Reproduction	$ 4	$ 4	$ 1	$ 5		$ 1	$ 8	$ 1	$ 1	$ 2	$ 1	$ 1	$ 1	$ 30.11
	Postage/FedEx	$ 4	$ 4	$ 1	$ 5		$ 2	$ 8	$ 1	$ 1	$ 2	$ 1	$ 1	$ 1	$ 31.71
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4			$ 39.25
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2			$ 23.61
	Incidentals	$ 4	$ 4	$ 1	$ 5		$ 5	$ 8	$ 1	$ 6	$ 16	$ 16	$ 17	$ 1	$ 85.08
	Vehicle Rental/Lease	$ 25	$ 37	$ 14	$ 10	$ 11	$ 5	$ 41	$ 35	$ 120	$ 16	$ 65	$ 32	$ 18	$ 489.34
	Airfare														$ -
	Field Supp./Expendables		$ 1	$ 1	$ 1	$ 24	$ 3	$ 3		$ 4	$ 4		$ 8		$ 49.37
	Equipment Rental														$ -
	Sediment Analyses														$ -
	Sediment Disposal	$ 5													$ 5.00
	Weed Wacker														$ -
	Vegetation Disposal														$ -
	Stream Guard Grain Inlet Insert ($93 each)	$ 93			$ 93										$ 186.00
	Storage Container			$ 4											$ 4.25
	Monthly Subtotal	$ 135	$ 50	$ 31	$ 119	$ 50	$ 16	$ 93	$ 38	$ 133	$ 50	$ 85	$ 58	$ 42	$ 944

MONTHLY TOTAL	$699	$811	$861	$1,221	$1,606	$457	$1,443	$1,225	$1,764	$2,864	$2,002	$1,629	$1,948	**1999/2000 TOTAL**	$18,525

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: Las Flores Maintenance Station	SITE NO. 73217b	BMP TYPE: Drain Inlet Insert (Fossil Filter)	CONSULTANT: Montgomery Watson - Chaudhary

Labor (hours)

TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Administration																
General program support/Follow-up	2.1	4.4	4.0	4.0	7.3	2.9	7.0	4.7	4.8	14.7	11.4	10.1	9.6	86.7	$120	$ 10,398
Encroachment Permits														0.0	$87	$ -
Travel	2.1	1.6	2.5	2.1	2.2	0.8	1.5	1.7	6.4	6.4	3.9	1.0	3.6	35.7	$87	$ 3,102
Unscheduled events														0.0	$87	$ -
Monthly Subtotal (hours)	4.2	6.0	6.5	6.1	9.5	3.7	8.5	6.4	11.2	21.1	15.3	11.0	13.1	122.3		
Monthly Subtotal ($)	$429	$661	$698	$658	$1,061	$413	$965	$713	$1,127	$2,321	$1,707	$1,289	$1,458	$13,500		
														Task Subtotal =		$13,500
Operation																
Wet season inspections					1.0	0.5	1.0	2.0	2.5	2.5	1.0	0.3		10.8	$55	$ 591
Dry season inspections	0.5	0.5	0.5	1.5									0.5	3.5	$55	$ 193
Unscheduled inspections/field calls		1.0	0.8											1.8	$60	$ 105
Monthly Subtotal (hours)	0.50	1.50	1.25	1.50	1.00	0.50	1.00	2.00	2.50	2.50	1.00	0.25	0.50	16.0		
Monthly Subtotal ($)	$28	$88	$73	$83	$55	$28	$55	$110	$138	$138	$55	$14	$28	$889		
														Task Subtotal =		$889
Maintenance																
Scheduled maintenance	2.3	0.3		1.3	2.0		0.5	1.8	4.3	3.0	1.0	0.3	2.0	18.6	$55	$ 1,020
Unscheduled maintenance	0.2			1.5										1.7	$55	$ 94
Vandalism														0.0	$55	$ -
Acts of God														0.0	$55	$ -
Landscape Maintenance Contractor														0.0	$0	$ -
Sediment Removal Contractor														0.0	$0	$ -
Other Contractor														0.0	$0	$ -
Other Contractor														0.0	$0	$ -
Other Contractor														0.0	$0	$ -
Monthly Subtotal (hours)	2.50	0.25	0.00	2.75	2.00	0.00	0.50	1.75	4.25	3.00	1.00	0.25	2.00	20.3		
Monthly Subtotal ($)	$138	$14	$0	$151	$110	$0	$28	$96	$234	$165	$55	$14	$110	$1,114		
														Task Subtotal =		$1,114
Vector Control																
Contract & General administration	0.4	0.6	0.5	1.3			3.0	0.1	0.1	0.1	0.1	0.1	0.3	6.4	$120	$ 768
Vector prevention maint. (consultant)														0.0	$65	$ -
Response to VCD calls (consultant)														0.0	$55	$ -
VCD efforts (contracted)								4.0	5.0	4.0	4.0	4.0	4.0	25.0	$66	$ 1,638
Monthly Subtotal (hours)	0.35	0.60	0.50	1.25	0.00	0.00	3.00	4.10	5.10	4.10	4.10	4.05	4.25	31.40		
Monthly Subtotal ($)	$42	$72	$60	$150	$0	$0	$360	$274	$340	$274	$274	$268	$292	$2,406		
														Task Subtotal =		$2,406

Non-Recurring Equipment (hours)

Equipment																
Trash Pump														0.0	$5	$ -
Piece of Equipment 2														0.0	$0	$ -
Piece of Equipment 3														0.0	$0	$ -
Piece of Equipment 4														0.0	$0	$ -
Piece of Equipment 5														0.0	$0	$ -
Piece of Equipment 6														0.0	$0	$ -
Monthly Subtotal (hours)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Monthly Subtotal ($)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
														Equipment Subtotal =		$0

Dollars ($)

																	Total$
Direct Costs																	
VCD supplies (direct costs less labor)																	$ -
Reproduction	$ 4	$ 4	$ 1	$ 5			$ 8	$ 1	$ 1	$ 2	$ 1	$ 1	$ 1				$ 29.11
Postage/FedEx	$ 4	$ 4	$ 1	$ 5		$ 2	$ 8	$ 1	$ 1	$ 2	$ 1	$ 1	$ 1				$ 21.71
Lodging			$ 5		$ 9		$ 15			$ 7	$ 4						$ 39.25
Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2						$ 23.61
Incidentals	$ 4	$ 4	$ 1	$ 5		$ 5	$ 8	$ 1	$ 6	$ 16	$ 16	$ 17	$ 1				$ 65.08
Vehicle Rental/Lease	$ 25	$ 37	$ 14	$ 10	$ 11	$ 5	$ 41	$ 35	$ 120	$ 16	$ 79	$ 32	$ 78				$ 503.34
Airfare																	$ -
Field Supp./Expendables		$ 1	$ 1	$ 1	$ 24	$ 3	$ 3		$ 4	$ 4		$ 8					$ 49.37
Equipment Rental																	$ -
Sediment Analyses																	$ -
Sediment Disposal	$ 5																$ 5.00
Weed Wacker																	$ -
Vegetation Disposal																	$ -
Fossil Filter Adsorbent Material (8x15/repl)	$ 15			$ 15													$ 30.00
Storage Container			$ 4														$ 4.25
Monthly Subtotal	$ 57	$ 50	$ 31	$ 41	$ 50	$ 15	$ 93	$ 38	$ 133	$ 50	$ 103	$ 58	$ 82				$ 801

MONTHLY TOTAL	$693	$884	$861	$1,083	$1,276	$456	$1,500	$1,231	$1,970	$2,947	$2,194	$1,643	$1,970	**1999/2000 TOTAL =** $18,709

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: Rosemead Maintenance Station	SITE NO. 73218a	BMP TYPE: Drain Inlet Insert (StreamGuard)	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	2.1	3.4	6.0	5.0	6.0	2.0	7.5	5.2	4.5	14.7	11.4	10.1	9.6	88.2	$120	$ 10,578
	Encroachment Permits														0.0	$87	$ -
	Travel	4.1	1.6	2.8	1.8	1.1	0.8	1.5	1.7	5.0	6.4	3.9	1.0	3.6	35.2	$87	$ 3,058
	Unscheduled events														0.0	$87	$ -
	Monthly Subtotal (hours)	6.2	5.0	8.8	6.8	7.1	3.7	9.0	6.9	9.5	21.1	15.3	11.0	13.1	123.3		
	Monthly Subtotal ($)	$603	$541	$959	$757	$816	$413	$1,025	$773	$975	$2,321	$1,707	$1,289	$1,458	$13,636		
															Task Subtotal =		$13,636
	Operation																
	Wet season inspections					1.0	0.5	1.0	1.8	2.0	4.0	0.5	0.3		11.0	$55	$ 605
	Dry season inspections	0.3	0.5	0.5	1.0									0.5	2.8	$55	$ 154
	Unscheduled inspections/field calls														0.0	$60	$ -
	Monthly Subtotal (hours)	0.30	0.50	0.50	1.00	1.00	0.50	1.00	1.75	2.00	4.00	0.50	0.25	0.50	13.8		
	Monthly Subtotal ($)	$17	$28	$28	$55	$55	$28	$55	$96	$110	$220	$28	$14	$28	$759		
															Task Subtotal =		$759
	Maintenance																
	Scheduled maintenance	0.5			0.8	1.0					1.5			1.5	5.3	$55	$ 289
	Unscheduled maintenance	0.2													0.2	$55	$ 11
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	0.70	0.00	0.00	0.75	1.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	1.50	5.5		
	Monthly Subtotal ($)	$39	$0	$0	$41	$55	$0	$0	$0	$0	$83	$0	$0	$83	$300		
															Task Subtotal =		$300
	Vector Control																
	Contract & General administration	0.7	0.4	0.5					0.1	0.1	0.1	0.1	0.1	0.3	2.3	$120	$ 270
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	1.4	1	1	1.2	1.0	0.9	1.0	1.2	1.1	1.4	1.2	0.9		13.4	$46	$ 621
	Monthly Subtotal (hours)	2.05	1.40	1.50	1.20	0.96	0.90	1.04	1.31	1.23	1.50	1.30	0.97	0.25	15.61		
	Monthly Subtotal ($)	$143	$94	$106	$56	$45	$42	$48	$68	$64	$77	$68	$49	$30	$891		
															Task Subtotal =		$891
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump														0.0	$5	$ -
	Piece of Equipment 2														0.0	$0	$ -
	Piece of Equipment 3														0.0	$0	$ -
	Piece of Equipment 4														0.0	$0	$ -
	Piece of Equipment 5														0.0	$0	$ -
	Piece of Equipment 6														0.0	$0	$ -
	Monthly Subtotal (hours)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Monthly Subtotal ($)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
															Equipment Subtotal =		$0
Dollars ($)	***Direct Costs***																Total $
	VCD supplies (direct costs less labor)						$ 1										$ 1.38
	Reproduction	$ 4	$ 4	$ 6	$ 2		$ 1		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 24.21
	Postage/FedEx	$ 4	$ 4	$ 6	$ 2		$ 2		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 25.81
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4					$ 39.25
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2					$ 23.61
	Incidentals	$ 4	$ 4	$ 6	$ 2		$ 5		$ 1	$ 6	$ 16	$ 16	$ 17	$ 1			$ 79.18
	Vehicle Rental/Lease	$ 25	$ 37	$ 14	$ 10	$ 11	$ 9	$ 12	$ 27	$ 90	$ 6	$ 73	$ 24	$ 68			$ 406.23
	Airfare																$ -
	Field Supp./Expendables		$ 1	$ 1	$ 1	$ 24	$ 3	$ 3		$ 4	$ 4		$ 8				$ 49.37
	Equipment Rental																$ -
	Sediment Analyses																$ -
	Sediment Disposal	$ 5															$ 5.00
	Weed Wacker																$ -
	Vegetation Disposal																$ -
	Stream Guard Drain Inlet Insert ($93 each)	$ 93			$ 93												$ 186.00
	Storage Container			$ 4													$ 4.25
	Monthly Subtotal	$ 135	$ 50	$ 46	$ 110	$ 50	$ 22	$ 41	$ 30	$ 102	$ 39	$ 97	$ 50	$ 72			$ 844
	MONTHLY TOTAL	$936	$713	$1,139	$1,019	$1,020	$505	$1,168	$967	$1,252	$2,140	$1,900	$1,401	$1,670	**1999/2000 TOTAL =**		**$16,430**

BMP Recoft Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: Rosemead Maintenance Station	SITE NO. 73218b	BMP TYPE: Drain Inlet Insert (Fossil Filter)	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	2.1	4.4	6.0	4.0	6.5	2.9	6.7	4.7	4.5	14.7	11.4	10.1	9.6	87.4	$120	$ 10,488
	Encroachment Permits														0.0	$87	$ -
	Travel	4.1	1.6	2.8	1.8	1.1	0.8	1.5	2.6	5.0	6.4	3.9	1.0	3.6	36.0	$87	$ 3,133
	Unscheduled events														0.0	$87	$ -
	Monthly Subtotal (hours)	6.2	6.0	8.8	5.8	7.6	3.7	8.2	7.3	9.5	21.1	15.3	11.0	13.1	122.4		
	Monthly Subtotal ($)	$603	$661	$959	$637	$876	$413	$935	$788	$975	$2,321	$1,707	$1,289	$1,458	$13,621		
															Task Subtotal =		$13,621
	Operation																
	Wet season inspections					1.0	0.5	1.0	1.8	2.0	4.0	1.0	0.3		11.5	$55	$ 633
	Dry season inspections	0.5	0.5	0.5	0.8									0.5	2.8	$55	$ 151
	Unscheduled inspections/field calls														0.0	$60	$ -
	Monthly Subtotal (hours)	0.50	0.50	0.50	0.75	1.00	0.50	1.00	1.75	2.00	4.00	1.00	0.25	0.50	14.3		
	Monthly Subtotal ($)	$28	$28	$28	$4.	$55	$28	$55	$96	$110	$220	$55	$14	$28	$784		
															Task Subtotal =		$784
	Maintenance																
	Scheduled maintenance	1.7	0.5	0.5	1.1	2.0		1.0	1.8	3.8	3.0	1.0	0.3	1.5	18.2	$55	$ 1,001
	Unscheduled maintenance	0.2			2.0										2.2	$55	$ 121
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	1.90	0.50	0.50	3.25	2.00	0.00	1.00	1.75	3.75	3.00	1.00	0.25	1.50	20.4		
	Monthly Subtotal ($)	$105	$28	$28	$179	$110	$0	$55	$96	$206	$165	$55	$14	$83	$1,122		
															Task Subtotal =		$1,122
	Vector Control																
	Contract & General administration	0.4	0.6	0.5					0.1	0.1	0.1	0.1	0.1	0.3	2.2	$120	$ 258
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	1.4	1.0	1.0	1.2	1.0	0.9	1.0	1.2	1.1	1.4	1.2	0.9		13.4	$46	$ 621
	Monthly Subtotal (hours)	1.75	1.60	1.50	1.23	0.96	0.90	1.04	1.31	1.23	1.50	1.30	0.97	0.25	15.51		
	Monthly Subtotal ($)	$107	$118	$106	$56	$45	$42	$48	$68	$64	$77	$68	$49	$30	$879		
															Task Subtotal =		$879
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump														0.0	$5	$ -
	Piece of Equipment 2														0.0	$0	$ -
	Piece of Equipment 3														0.0	$0	$ -
	Piece of Equipment 4														0.0	$0	$ -
	Piece of Equipment 5														0.0	$0	$ -
	Piece of Equipment 6														0.0	$0	$ -
	Monthly Subtotal (hours)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Monthly Subtotal ($)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0		
															Equipment Subtotal =		$0
Dollars ($)	***Direct Costs***																Total $
	VCD supplies (direct costs less labor)	$ 3					$ 1										$ 4.14
	Reproduction	$ 4	$ 4	$ 6	$ 2		$ 1		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 24.21
	Postage/FedEx	$ 4	$ 4	$ 6	$ 2		$ 2		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1			$ 25.81
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4					$ 39.25
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2					$ 23.61
	Incidentals	$ 4	$ 4	$ 6	$ 2		$ 5		$ 1	$ 6	$ 16	$ 16	$ 17	$ 1			$ 79.18
	Vehicle Rental/Lease	$ 25	$ 37	$ 14	$ 10	$ 11	$ 5	$ 12	$ 40	$ 90	$ 6	$ 73	$ 24	$ 68			$ 419.48
	Airfare																$ -
	Field Supp./Expendables		$ 1	$ 1	$ 78	$ 24	$ 3	$ 3		$ 4	$ 4		$ 8				$ 126.26
	Equipment Rental																$ -
	Sediment Analyses																$ -
	Sediment Disposal	$ 5															$ 5.00
	Weed Wacker																$ -
	Vegetation Disposal																$ -
	Fossil Filter Adsorbent Material ($15/repl)	$ 15			$ 15												$ 30.00
	Storage Container			$ 4													$ 4.25
	Monthly Subtotal	$ 60	$ 50	$ 46	$ 109	$ 50	$ 22	$ 41	$ 43	$ 102	$ 39	$ 97	$ 50	$ 72			$ 781
	MONTHLY TOTAL	$901	$885	$1,167	$1,021	$1,135	$505	$1,133	$1,091	$1,458	$2,822	$1,982	$1,415	$1,670	**1999/2000 TOTAL =**		**$17,186**

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: I-605/SR-91 Interchange	SITE NO. 73222a	BMP TYPE: Biofiltration Strip	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate		TOTAL $
Labor (hours)	***Administration***																	
	General program support/Follow-up	3.9	6.7	9.5	4.5	3.0	3.0	8.7	8.5	4.8	15.4	9.6	10.3	16.1	104.8	$120	1	12,570
	Encroachment Permit														0.4	$87	1	-
	Travel	6.6	3.7	16.3	4.4	8.7	5.3	6.0	6.8	5.0	9.0	11.2	4.8	7.2	95.4	$87	1	8,296
	Unscheduled events		2.0	3.3	1.0										6.3	$87	1	544
	Monthly Subtotal (hours)	10.5	12.4	29.1	9.9	11.7	9.7	14.7	15.3	9.8	24.4	20.8	15.1	23.2	206.4			
	Monthly Subtotal ($)	$1,938	$1,296	$2,841	$1,005	$1,117	$973	$1,566	$1,609	$1,005	$2,631	$2,126	$1,550	$2,551	$21,410			
															Task Subtotal =			$21,410
	Operation																	
	Wet season inspections					1.0	0.5	1.5	0.8	0.8	1.5	1.3	0.5		7.8	$55	1	429
	Dry season inspections	0.5	1.0	0.5	1.0									0.8	3.8	$55	1	206
	Unscheduled inspections/field calls								1.5						1.5	$60	1	90
	Monthly Subtotal (hours)	0.50	1.00	0.50	1.00	1.00	0.50	1.50	2.25	0.75	1.50	1.30	0.50	0.75	13.1			
	Monthly Subtotal ($)	$28	$55	$28	$55	$55	$28	$83	$131	$41	$83	$72	$28	$41	$725			
															Task Subtotal =			$725
	Maintenance																	
	Scheduled maintenance	4.3	1.0	2.5	3.0	16.0	71.5	12.5	5.0	2.5	3.3	7.0	2.8	49.5	182.8	$55	1	10,054
	Unscheduled maintenance			14.8	16.5	10.8	3.1	4.0	1.3						50.5	$55	1	2,778
	Vandalism														0.0	$55	1	-
	Acts of God														0.0	$55	1	-
	Landscape Maintenance Contractor														0.0	$0	1	-
	Sediment Removal Contractor														0.0	$0	1	-
	Vegetation Consultant					0.9	0.9	3.0	1.2						5.5	$75	1	445
	Other Contractor														0.0	$0	1	-
	Other Contractor														0.0	$0	1	-
	Monthly Subtotal (hours)	4.30	1.00	17.25	20.50	27.62	75.45	19.50	7.41	2.50	3.25	7.00	2.75	49.50	239.2			
	Monthly Subtotal ($)	$237	$55	$949	$1,183	$1,537	$4,179	$1,133	$431	$138	$179	$385	$151	$2,723	$13,276			
															Task Subtotal =			$13,276
	Vector Control																	
	Contract & General administration		0.9	0.5	4.3				0.1	0.1	0.1	0.1	0.1	0.3	2.3	$120	1	276
	Vector prevention maint. (consultant)														0.0	$65	1	-
	Response to VCD calls (consultant)														0.0	$55	1	-
	VCD efforts (contracted)	6.2	8.2	1.3	1.2	1.0	1.4	1.1	1.2	1.0	1.1	0.9	1.1	1.6	27.5	$46	1	1,280
	Monthly Subtotal (hours)	6.20	9.05	1.80	1.45	0.99	1.40	1.10	1.29	1.12	1.20	1.00	1.17	1.88	29.85			
	Monthly Subtotal ($)	$288	$483	$120	$86	$46	$74	$51	$67	$59	$63	$54	$58	$106	$1,556			
															Task Subtotal =			$1,556
Non-Recurring Equipment (hours)	***Equipment***																	
	Trash Pump														0.0	$5	1	-
	Weed Wacker	1.7					10.0							23.8	35.5	$5	1	177
	Generator							2.5						7.3	9.8	$6	1	59
	Shop Vac							2.5							2.5	$5	1	13
	Mounted Weed Eater													7.3	7.3	$7	1	54
	20" Push Lawnmower													0.3	0.3	$9	1	2
	Self Powered Weed Mower													0.8	0.8	$20	1	15
	Trailer													1.8	1.8	$13	1	23
	Monthly Subtotal (hours)	1.70	0.00	0.00	0.00	0.00	10.00	5.00	0.00	0.00	0.00	0.00	0.00	41.00	57.70			
	Monthly Subtotal ($)	$9	$0	$0	$0	$0	$50	$28	$0	$0	$0	$0	$0	$257	$343			
															Equipment Subtotal =			$343
Dollars ($)	***Direct Costs***																	Total $
	VCD supplies (direct costs less labor)																	$ -
	Reproduction	$ 8	$ 9	$ 15	$ 5		$ 1		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1				$ 44.66
	Postage/FedEx	$ 8	$ 9	$ 15	$ 5		$ 2		$ 1	$ 1	$ 2	$ 1	$ 1	$ 1				$ 46.26
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4	$ 8					$ 45.88
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2	$ 2					$ 25.91
	Incidentals	$ 8	$ 9	$ 15	$ 5		$ 6		$ 1	$ 6	$ 15	$ 16	$ 17	$ 1				$ 100.63
	Vehicle Rental/Lease	$ 50	$ 74	$ 69	$ 10	$ 11	$ 59	$ 51	$ 113	$ 85	$ 6	$ 178	$ 97	$ 148				$ 931.48
	Airfare																	$ -
	Field Supp./Expendables	$ 10	$ 1	$ 29	$ 1	$ 56	$ 3	$ 3		$ 4	$ 9		$ 8	$ 60				$ 183.57
	Equipment Rental																	$ -
	Sediment Analyses																	$ -
	Sediment Disposal																	$ -
	Weed Wacker	$ 15																$ 15.00
	Vegetation Disposal																	$ -
	Scarifying/Hydroseeding								$ 3,339									$ 3,338.50
	Storage Container			$ 4														$ 4.25
	Monthly Subtotal	$ 99	$ 102	$ 156	$ 25	$ 81	$ 51	$ 80	$ 3,455	$ 98	$ 44	$ 202	$ 134	$ 212				$ 4,737
	MONTHLY TOTAL	$1,697	$1,990	$4,093	$2,353	$2,836	$5,354	$2,939	$5,593	$1,341	$3,001	$2,839	$2,021	$5,889	**1999/2000 TOTAL =**			**$42,047**

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: I-605/SR-91 Interchange	SITE NO. 75222b	BMP TYPE: Biofiltration Swale	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	3.9	5.1	8.0	3.3	3.0	5.2	9.5	8.0	5.3	15.4	9.5	9.8	15.3	102.9	$120	$ 12,342
	Encroachment Permits														0.0	$87	$ -
	Travel	6.6	3.7	7.4	4.4	8.7	4.4	5.5	7.7	7.9	9.0	11.2	5.7	5.3	88.4	$87	$ 7,693
	Unscheduled events		1.5	1.0	1.0										3.5	$87	$ 305
	Monthly Subtotal (hours)	10.5	12.0	16.4	8.6	11.7	9.6	15.0	15.7	13.2	24.4	20.8	15.5	21.6	194.8		
	Monthly Subtotal ($)	$1,042	$1,268	$1,686	$855	$1,117	$1,001	$1,613	$1,624	$1,317	$2,633	$2,126	$1,673	$2,383	$20,339		
															Task Subtotal =		$20,319
	Operation																
	Wet season inspections					1.0	0.5	1.5	0.8	0.8	1.5	1.9	0.5		8.4	$55	$ 462
	Dry season inspections	0.5	1.0	0.5	1.0									1.0	4.0	$55	$ 220
	Unscheduled inspections/field calls								1.5						1.5	$60	$ 90
	Monthly Subtotal (hours)	0.50	1.00	0.50	1.00	1.00	0.50	1.50	2.25	0.75	1.50	1.90	0.50	1.00	13.9		
	Monthly Subtotal ($)	$28	$55	$28	$55	$55	$28	$83	$131	$41	$83	$105	$28	$55	$772		
															Task Subtotal =		$772
	Maintenance																
	Scheduled maintenance	5.6	1.0	2.0	3.8	10.0	23.8	8.8	4.3	12.3	12.0	7.6	3.5	28.8	123.2	$55	$ 6,776
	Unscheduled maintenance			6.3	5.0	4.5	3.8	1.0							20.5	$55	$ 1,128
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Vegetation Consultant					0.9	0.9	3.0	1.2						5.9	$75	$ 445
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	5.60	1.00	8.25	8.75	15.37	28.40	12.75	5.41	12.25	12.00	7.60	3.50	23.75	149.6		
	Monthly Subtotal ($)	$308	$55	$454	$481	$863	$1,580	$761	$321	$674	$660	$418	$193	$1,581	$8,348		
															Task Subtotal =		$8,348
	Vector Control																
	Contract & General administration	1.0	1.5	1.0	0.3				0.1	0.1	0.1	0.1	0.1	1.3	4.9	$120	$ 582
	Vector prevention maint. (consultant)														0.0	$55	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	6.2	8.2	1.3	1.2	1.0	1.6	1.1	1.2	1.0		0.9	1.1	1.6	26.5	$46	$ 1,229
	Monthly Subtotal (hours)	7.20	10.10	2.30	1.45	0.99	1.60	1.10	1.29	1.12	0.10	1.00	1.17	1.88	31.30		
	Monthly Subtotal ($)	$408	$609	$180	$86	$46	$74	$51	$67	$59	$12	$54	$58	$106	$1,811		
															Task Subtotal =		$1,811
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump	1.3													1.3	$5	$ 7
	Weed Wacker					0.6	3.0							13.5	17.1	$5	$ 85
	Generator							1.0						4.0	5.0	$6	$ 30
	Shop Vac							1.0							1.0	$5	$ 5
	Mounted Weed Eater													4.0	4.0	$7	$ 30
	20" Push Lawnmower													0.3	0.3	$9	$ 2
	Self Powered Weed Mower													0.5	0.5	$20	$ 10
	Trailer													1.0	1.0	$13	$ 13
	Monthly Subtotal (hours)	1.30	0.00	0.00	0.00	0.58	3.00	2.00	0.00	0.00	0.00	0.00	0.00	23.25	30.13		
	Monthly Subtotal ($)	$7	$0	$0	$0	$3	$15	$11	$0	$0	$0	$0	$0	$147	$182		
															Equipment Subtotal =		$182

	Direct Costs															Total $
Dollars ($)	VCD supplies (direct costs less labor)															$ -
	Reproduction	$ 8	$ 9	$ 13	$ 5		$ 1		$ 1	$ 2	$ 2	1 1	$ 1	$ 1		$ 43.31
	Postage/FedEx	$ 8	$ 9	$ 13	$ 5		$ 2		$ 1	$ 2	$ 2	1 1	$ 1	$ 1		$ 44.91
	Lodging			$ 5		$ 9		$ 15			$ 7	1 4	$ 8			$ 46.88
	Per Diem			$ 3		$ 6		$ 10			$ 3	1 2	$ 2			$ 25.91
	Incidentals	$ 8	$ 9	$ 13	$ 5		$ 6		$ 1	$ 8	$ 16	1 16	$ 17	$ 1		$ 99.28
	Vehicle Rental/Lease	$ 50	$ 74	$ 33	$ 10	$ 11	$ 29	$ 48	$ 127	$ 134	$ 6	1 178	$ 117	$ 124		$ 939.15
	Airfare															$ -
	Field Supp./Expendables	$ 10	$ 1	$ 3	$ 1	$ 56	$ 3	$ 3		$ 4	$ 4		$ 8	$ 24		$ 116.95
	Equipment Rental															$ -
	Sediment Analyses															$ -
	Sediment Disposal															$ -
	Weed Wacker	$ 15														$ 15.00
	Vegetation Disposal															$ -
	Scarifying/Hydroseeding								$ 1,659							$ 1,659.25
	Storage Container			$ 4												$ 4.25
	Monthly Subtotal	$ 99	$ 102	$ 85	$ 25	$ 81	$ 41	$ 76	$ 1,799	$ 150	$ 39	1 202	$ 153	$ 152		$ 3,905

MONTHLY TOTAL	$1,891	$2,089	$2,433	$1,502	$2,165	$2,739	$2,594	$3,942	$2,242	$3,427	$2,905	$2,104	$4,424	**1999/2000 TOTAL =** $34,458

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: Cerritos Maintenance Station	SITE NO. 73223	BMP TYPE: Biofiltration Swale	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jan	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	3.0	5.8	8.0	3.0	2.8	5.0	8.8	8.8	6.7	15.4	9.9	11.8	33.0	122.8	$120	$ 14,736
	Encroachment Permits														0.0	$87	$ -
	Travel	2.7	3.8	8.3	4.4	8.7	2.2	5.0	6.0	11.4	10.1	11.2	4.8	6.3	84.6	$87	$ 7,361
	Unscheduled events		3.0	2.0	1.0										6.0	$87	$ 522
	Monthly Subtotal (hours)	5.7	13.6	18.3	8.4	11.5	7.2	13.8	14.7	18.1	25.5	21.1	16.5	39.3	213.4		
	Monthly Subtotal ($)	$591	$1,403	$1,852	$825	$1,087	$785	$1,491	$1,571	$1,796	$2,724	$2,162	$1,824	$4,507	$22,619		
															Task Subtotal =		$22,619
	Operation																
	Wet season inspections					1.0	0.5	1.5	2.0	2.0	2.0	1.9	0.5		11.4	$55	$ 627
	Dry season inspections	0.5	1.0	0.5	1.0									1.0	4.0	$55	$ 220
	Unscheduled inspections/field calls			1.5					1.0						2.5	$60	$ 150
	Monthly Subtotal (hours)	0.50	1.00	2.00	1.00	1.00	0.50	1.50	3.00	2.00	2.00	1.90	0.50	1.00	17.9		
	Monthly Subtotal ($)	$28	$55	$118	$55	$55	$28	$83	$170	$110	$110	$105	$28	$55	$997		
															Task Subtotal =		$997
	Maintenance																
	Scheduled maintenance	2.0	0.8	1.3	0.8	7.0	1.0	8.5	4.5	28.3	16.0	5.8	2.8	25.8	104.3	$55	$ 5,737
	Unscheduled maintenance			6.3	9.5	2.5	2.0	1.0							21.3	$55	$ 1,169
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Vegetation Consultant					0.9	0.5	3.0	1.2						5.9	$75	$ 445
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	2.00	0.75	7.50	10.25	10.37	3.90	12.50	5.66	28.25	16.00	5.80	2.75	25.75	131.5		
	Monthly Subtotal ($)	$110	$41	$413	$564	$588	$233	$748	$335	$1,554	$880	$319	$151	$1,416	$7,350		
															Task Subtotal =		$7,350
	Vector Control																
	Contract & General administration	1.0	1.9	1.0	0.3				0.1	0.1	0.1	0.1	0.1	0.3	4.9	$120	$ 588
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	6.2	8.2	2.9	2.3	1.8	2.6	2.1	2.3	1.9	2.2	1.8	2.1	2.9	39.3	$46	$ 1,824
	Monthly Subtotal (hours)	7.20	10.10	3.90	2.55	1.78	2.60	2.10	2.35	2.01	2.30	1.90	2.19	3.19	44.17		
	Monthly Subtotal ($)	$408	$609	$255	$137	$83	$121	$98	$117	$101	$114	$96	$109	$167	$2,412		
															Task Subtotal =		$2,412
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump	0.8													0.8	$5	$ 4
	Weed Wacker					1.2								12.0	13.2	$5	$ 66
	Generator								0.8					3.5	4.3	$6	$ 26
	Shop Vac								0.8						0.8	$5	$ 4
	Wacker										8.0				8.0	$28	$ 222
	Mounted Weed Eater													3.5	3.5	$7	$ 26
	20" Push Lawnmower													0.3	0.3	$9	$ 2
	Self Powered Weed Mower													0.5	0.5	$20	$ 10
	Trailer													1.0	1.0	$13	$ 13
	Monthly Subtotal (hours)	0.80	0.00	0.00	0.00	1.16	0.00	0.00	1.50	0.00	8.00	0.00	0.00	20.75	32.21		
	Monthly Subtotal ($)	$4	$0	$0	$0	$6	$0	$0	$8	$0	$222	$0	$0	$133	$373		
															Equipment Subtotal =		$373
Dollars ($)	***Direct Costs***																Total $
	VCD supplies (direct costs less labor)																$ -
	Reproduction	$ 8	$ 9	$ 13	$ 5		$ 2	$ 1	$ 1	$ 3	$ 4	$ 2	$ 7	$ 32			$ 86.25
	Postage/FedEx	$ 8	$ 9	$ 13	$ 5		$ 3	$ 1	$ 1	$ 3	$ 4	$ 2	$ 7	$ 32			$ 87.85
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4	$ 8				$ 46.88
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2	$ 2				$ 25.91
	Incidentals	$ 8	$ 9	$ 13	$ 5		$ 10	$ 1	$ 1	$ 8	$ 18	$ 17	$ 24	$ 32			$ 145.25
	Vehicle Rental/Lease	$ 50	$ 74	$ 36	$ 10	$ 11	$ 14	$ 44	$ 100	$ 195	$ 6	$ 178	$ 97	$ 124			$ 939.5
	Airfare																$ -
	Field Supp./Expendables	$ 10	$ 1	$ 3	$ 15	$ 45	$ 3	$ 3		$ 4	$ 9		$ 8	$ 24			$ 124.2
	Equipment Rental																$ -
	Sediment Analyses																$ -
	Sediment Disposal																$ -
	Weed Wacker	$ 15															$ 15.00
	Vegetation Disposal																$ -
	Scarifying/Hydroseeding								$ 1,701								$ 1,700.57
	Storage Container			$ 4													$ 4.25
	Monthly Subtotal	$ 99	$ 102	$ 89	$ 38	$ 71	$ 33	$ 75	$ 1,804	$ 213	$ 50	$ 205	$ 154	$ 244			$ 3,176

MONTHLY TOTAL	$1,239	$2,210	$2,725	$1,519	$1,889	$1,119	$2,494	$4,004	$3,773	$4,100	$2,887	$2,265	$5,522	**1999/2000 TOTAL =**	**$36,927**

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: I-5/I-605	SITE NO. 73224	BMP TYPE: Biofiltration Swale	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jan	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	5.2	5.8	8.0	3.8	2.8	5.2	9.8	7.8	5.0	15.4	9.9	10.6	14.9	104.0	$120	$ 12,480
	Encroachment Permits														0.0	$87	$ -
	Travel	8.2	3.7	9.2	7.4	10.0	2.9	5.0	5.1	6.4	10.1	9.0	6.7	4.5	89.0	$87	$ 7,743
	Unscheduled events		1.0	5.0	1.0										7.0	$87	$ 609
	Monthly Subtotal (hours)	13.4	10.5	22.2	12.1	13.7	8.1	14.8	12.9	11.4	25.5	18.9	17.3	19.3	200.0		
	Monthly Subtotal ($)	$1,337	$1,105	$2,195	$1,176	$1,278	$876	$1,611	$1,376	$1,157	$2,724	$1,971	$1,851	$2,173	$20,832		
															Task Subtotal =		$20,832
	Operation																
	Wet season inspections					1.0	0.5	1.5	0.8	0.8	1.8	1.9	1.0		9.2	$55	$ 503
	Dry season inspections		1.0	0.5	1.0									1.0	3.5	$55	$ 193
	Unscheduled inspections/Field calls	1.3							1.0						2.3	$60	$ 138
	Monthly Subtotal (hours)	1.30	1.00	0.50	1.00	1.00	0.50	1.50	1.75	0.75	1.75	1.90	1.00	1.00	15.0		
	Monthly Subtotal ($)	$78	$55	$28	$55	$55	$28	$83	$101	$41	$96	$105	$55	$55	$834		
															Task Subtotal =		$834
	Maintenance																
	Scheduled maintenance		1.0	4.3	16.0	5.0	13.0	8.5	5.0	7.5	6.0	5.3	6.8	18.3	90.6	$55	$ 4,980
	Unscheduled maintenance	7.0		6.3	35	1.0	1.0	1.0							19.8	$55	$ 1,086
	Vandalism						1.0								1.0	$55	$ 55
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Vegetation Consultant					0.9	0.9	3.0	1.2						5.9	$75	$ 445
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	7.00	1.00	10.50	13.50	6.87	15.94	12.50	6.16	7.50	6.00	5.30	6.75	18.25	117.2		
	Monthly Subtotal ($)	$385	$55	$578	$743	$395	$892	$748	$362	$413	$330	$292	$371	$1,004	$6,566		
															Task Subtotal =		$6,566
	Vector Control																
	Contract & General administration	1.0	1.9	1.0	0.3		0.3		0.1	0.1	0.1	0.1	0.1	0.3	5.2	$120	$ 624
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	6.2	8.2	3.9	3.4	2.2	2.7	2.3	2.3	1.9	2.2	1.8	2.1	3.0	42.2	$46	$ 1,960
	Monthly Subtotal (hours)	7.20	10.10	4.90	3.65	2.24	3.00	2.30	2.44	1.98	2.30	1.90	2.15	3.24	47.40		
	Monthly Subtotal ($)	$408	$609	$301	$118	$104	$161	$107	$121	$99	$114	$96	$107	$169	$2,584		
															Task Subtotal =		$2,514
Non-Recurring Equipment (hours)	***Equipment***																
	Trash Pump														0.0	$5	$ -
	Weed Wacker	3.5		2.0	2.0	0.5	4.0							8.5	20.5	$5	$ 103
	Generator							0.4						2.5	2.9	$6	$ 17
	Shop Vac							0.4							0.4	$5	$ 2
	Mounted Weed Eater													2.5	2.5	$7	$ 19
	20" Push Lawnmower													0.3	0.3	$9	$ 2
	Self Powered Weed Mower													0.3	0.3	$20	$ 5
	Trailer													0.5	0.5	$13	$ 7
	Monthly Subtotal (hours)	3.50	0.00	2.00	2.00	0.50	4.00	0.80	0.00	0.00	0.00	0.00	0.00	14.50	27.30		
	Monthly Subtotal ($)	$18	$0	$10	$10	$3	$20	$4	$0	$0	$0	$0	$0	$90	$154		
															Equipment Subtotal =		$154

	Direct Costs	1999 Jan	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	Total $
Dollars ($)	VCD supplies (direct costs less labor)														$ -
	Reproduction	$ 8	$ 9	$ 13	$ 5		$ 2	$ 1	$ 1	$ 1	$ 4	$ 2	$ 2	1 2	$ 49.41
	Postage/FedEx	$ 8	$ 9	$ 13	$ 5		$ 3	$ 1	$ 1	$ 2	$ 4	$ 2	$ 2	1 2	$ 51.04
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4	$ 8		$ 46.88
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2	$ 2		$ 25.9
	Incidentals	$ 8	$ 9	$ 13	$ 5		$ 16	$ 1	$ 1	$ 7	$ 18	$ 17	$ 18	1 2	$ 108.44
	Vehicle Rental/Lease	$ 50	$ 74	$ 40	$ 10	$ 11	$ 11	$ 44	$ 87	$ 110	$ 6	$ 150	$ 136	1 90	$ 826.33
	Airfare														$ -
	Field Supp./Expenfables	$ 30	$ 1	$ 3	$ 1	$ 24	$ 3	$ 3		$ 4	$ 9		$ 8	1 24	$ 199.78
	Equipment Rental														$ -
	Sediment Analyses														$ -
	Sediment Disposal														$ -
	Weed Wacker	$ 15													$ 15.00
	Vegetation Disposal														$ -
	Scarifying/Hydroseeding								$ 2,882						$ 2,882.4
	Storage Container			$ 4											$ 4.25
	Monthly Subtotal	$ 119	$ 102	$ 93	$ 25	$ 50	$ 38	$ 75	$ 2,972	$ 124	$ 50	$ 177	$ 175	1 120	$ 4,120
	MONTHLY TOTAL	$2,345	$1,926	$3,204	$2,137	$1,885	$2,015	$2,627	$4,933	$1,834	$3,314	$2,640	$2,560	$3,610	**1999/2000 TOTAL =** $35,090

BMP Retrofit Pilot Program
Maintenance Operation
Cost Accounting Summary, 1999-2000

DISTRICT: 7	LOCATION: I-605/Carson & Del Amo Avenue	SITE NO. 73255	BMP TYPE: Biofiltration Swale	CONSULTANT: Montgomery Watson - Chaudhary

	TASK	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Jun	(hrs)	Rate	TOTAL $
Labor (hours)	***Administration***																
	General program support/Follow-up	3.0	5.8	8.0	4.8	3.3	7.0	9.3	7.3	4.5	15.4	9.0	9.9	4.1	102.1	$120	$ 12,246
	Encroachment Permits														0.0	$87	$ -
	Travel	2.7	3.8	15.4	32.4	37.0	5.1	5.5	6.8	6.4	8.6	5.5	3.8	6.3	139.2	$87	$ 12,109
	Unscheduled events		1.0	8.3	1.0										10.3	$87	$ 892
	Monthly Subtotal (hours)	5.7	10.6	31.6	38.1	40.3	12.1	14.8	14.1	10.9	24.0	15.4	13.7	20.4	251.5		
	Monthly Subtotal ($)	$591	$1,114	$3,013	$3,471	$3,609	$1,278	$1,595	$1,465	$1,097	$2,597	$1,667	$1,513	$2,239	$25,247		
															Task Subtotal =		$25,247
	Operation																
	Wet season inspections					1.0	0.5	1.5	0.8	1.3	1.5	1.9	0.5		8.9	$55	$ 490
	Dry season inspections	0.5	1.0	0.5	1.0									1.0	4.0	$55	$ 220
	Unscheduled inspections/field calls								1.0						1.0	$60	$ 60
	Monthly Subtotal (hours)	0.50	1.00	0.50	1.00	1.00	0.50	1.50	1.75	1.25	1.50	1.90	0.50	1.00	13.9		
	Monthly Subtotal ($)	$28	$55	$28	$55	$55	$28	$83	$101	$69	$83	$105	$28	$55	$770		
															Task Subtotal =		$770
	Maintenance																
	Scheduled maintenance	1.5	1.0	0.5	5.0	11.0		14.5	6.3	6.8	3.5	3.5	2.0	18.5	74.0	$55	$ 4,070
	Unscheduled maintenance			38.3	46.0	33.8	10.0	6.0							134.0	$55	$ 7,370
	Vandalism														0.0	$55	$ -
	Acts of God														0.0	$55	$ -
	Landscape Maintenance Contractor														0.0	$0	$ -
	Sediment Removal Contractor														0.0	$0	$ -
	Vegetation Consultant					0.9	0.9	3.0	1.2						5.9	$75	$ 445
	Other Contractor														0.0	$0	$ -
	Other Contractor														0.0	$0	$ -
	Monthly Subtotal (hours)	1.50	1.00	38.75	51.00	45.62	10.90	23.50	7.41	6.75	3.50	3.50	2.00	18.50	213.9		
	Monthly Subtotal ($)	$83	$55	$2,131	$2,805	$2,527	$618	$1,353	$431	$371	$193	$193	$110	$1,018	$11,885		
															Task Subtotal =		$11,885
	Vector Control																
	Contract & General administration	1.0	1.3	1.0	0.3				0.1	0.1	0.1	0.1	0.1	0.3	4.3	$120	$ 516
	Vector prevention maint. (consultant)														0.0	$65	$ -
	Response to VCD calls (consultant)														0.0	$55	$ -
	VCD efforts (contracted)	6.2	8.2	2.8	2.3	1.9	2.6	2.1	2.3	1.8	2.2	1.9	2.2	3.2	39.6	$46	$ 1,841
	Monthly Subtotal (hours)	7.20	9.50	3.80	2.55	1.93	2.60	2.10	2.41	1.88	2.30	2.00	2.25	3.41	43.93		
	Monthly Subtotal ($)	$408	$537	$250	$137	$90	$121	$98	$119	$95	$114	$100	$112	$177	$2,357		
															Task Subtotal =		$2,357
Non-Recurring Equipment (hours)	***Equipment***																
	Water Tank with Pump			38.3	46.0	33.8	10.0	6.0							134.1	$5	$ 670
	Weed Wacker					2.0								8.5	10.5	$5	$ 53
	20" Push Lawnmover													0.3	0.3	$9	$ 2
	Self Powered WeedMower													0.3	0.3	$20	$ 5
	Mounted Weed Eater													2.5	2.5	$7	$ 19
	Generator													2.5	2.5	$6	$ 15
	Trailer													0.5	0.5	$13	$ 7
	Monthly Subtotal (hours)	0.00	0.00	38.25	46.00	35.80	10.00	6.00	0.00	0.00	0.00	0.00	0.00	14.50	150.55		
	Monthly Subtotal ($)	$0	$0	$191	$230	$179	$50	$30	$0	$0	$0	$0	$0	$90	$770		
															Equipment Subtotal =		$770
Dollars ($)	***Direct Costs***																Total $
	VCD supplies (direct costs less labor)																$ -
	Reproduction	$ 8	$ 9	$ 13	$ 5		$ 2	$ 1	$ 1	$ 1	$ 4	$ 2	$ 2	$ 2			$ 45.39
	Postage/FedEx	$ 8	$ 9	$ 13	$ 5		$ 3	$ 1	$ 1	$ 2	$ 4	$ 2	$ 2	$ 2			$ 50.99
	Lodging			$ 5		$ 9		$ 15			$ 7	$ 4	$ 8				$ 46.88
	Per Diem			$ 3		$ 6		$ 10			$ 3	$ 2	$ 2				$ 25.91
	Incidentals	$ 8	$ 9	$ 13	$ 5		$ 10	$ 1	$ 1	$ 7	$ 18	$ 17	$ 18	$ 2			$ 108.36
	Vehicle Rental/Lease	$ 50	$ 74	$ 65	$ 10	$ 11	$ 24	$ 48	$ 113	$ 110	$ 6	$ 96	$ 78	$ 124			$ 809.38
	Airface																$ -
	Field Supp./Expendables	$ 10	$ 1	$ 3	$ 1	$ 24	$ 3	$ 3		$ 4	$ 9		$ 8	$ 24			$ 86.70
	Equipment Rental																$ -
	Sediment Analyses																$ -
	Sediment Disposal																$ -
	Weed Wacker	$ 15															$ 15.00
	Vegetation Disposal																$ -
	Stacifying/Hydroseeding								$ 2,374								$ 2,374.45
	Storage Container			$ 4													$ 4.25
	Monthly Subtotal	$ 99	$ 102	$ 118	$ 25	$ 50	$ 42	$ 79	$ 2,491	$ 124	$ 50	$ 123	$ 117	$ 154			$ 3,573
	MONTHLY TOTAL	$1,208	$1,862	$5,731	$6,723	$6,509	$2,136	$3,236	$4,607	$1,756	$3,035	$2,187	$1,879	$3,733		1999/2000 TOTAL =	$44,601