Port of Seattle
Lora Lake Apartments Site

Remedial Investigation/ Feasibility Study

Volume II

Appendix E
Final Stormwater Interim Action Data Report

FINAL

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Data Report

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List of Abbreviations/Acronyms

Acronym/ Abbreviation	Definition
ANOVA	Analysis of variance
APS	Applied Professional Services
COC	Contaminant of concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
1,2-DCA	1,2-Dichloroethane
1,2-DCE	trans-1,2-Dichloroethene
HPAH	High molecular-weight polycyclic aromatic hydrocarbon
LCS/LCSD	Laboratory control sample/laboratory control sample duplicate
LL	Lora Lake
LPAH	Low molecular-weight polycyclic aromatic hydrocarbon
mL	Milliliter
MTCA	Model Toxics Control Act
PAH	Polycyclic aromatic hydrocarbon
PCE	Tetrachloroethene
PCP	Pentachlorophenol
Port	Port of Seattle
RI/FS	Remedial Investigation/Feasibility Study
STE	Storm event
SWIA	Stormwater Interim Action
TCE	Trichloroethene
TEF	Toxic equivalency factor
TEQ	Toxic equivalency quotient
TOC	Total organic carbon
TPH	Total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound
WAC	Washington Administrative Code
WSDOE	Washington State Department of Ecology

1.0 Introduction

1.1 SITE BACKGROUND

This document presents the results of the Stormwater Interim Action (SWIA) conducted at the Lora Lake Apartments Parcel (LL Apartments Parcel) of the Lora Lake Apartments MTCA Site, located at 15001 Des Moines Memorial Drive in Burien, Washington (Figure 1.1). The LL Apartments Parcel is located near the northwest corner of Seattle-Tacoma International Airport (STIA) and is the location of a former apartment building complex that was developed in 1987, under previous ownership, for use as residential housing. The LL Apartments Parcel also has an industrial use history that includes a barrel washing facility and an auto wrecking yard.

Environmental investigations conducted by the Port of Seattle (Port) in 2007 and 2008 identified impacted soil and groundwater at the LL Apartments Parcel. Investigations to date indicate that the contaminants of concern (COCs) include carcinogenic polycyclic aromatic hydrocarbons (cPAHs), total petroleum hydrocarbons (TPH—gasoline range, diesel range, and heavy oil range), dioxins, pentachlorophenol (PCP), tetrachloroethene (PCE), trichloroethene (TCE), 1,2-dichloroethane (1,2-DCA), and arsenic.

The Port entered into a Model Toxics Control Act (MTCA) Agreed Order (AO) in July 2009 with the Washington State Department of Ecology (WSDOE) to conduct a Remedial Investigation and Feasibility Study (RI/FS) for the Lora Lake Apartments Site, in order to define appropriate methods to remediate the identified contamination (WSDOE 2009). In response to concerns expressed by the Public in 2009, WSDOE requested that the Port conduct a stormwater interim action pursuant to Washington Administrative Code (WAC) 173-340-430(1)(a). Under the stormwater interim action, the Port investigated the chemical nature of the following media:

- Stormwater and stormwater solids entering and leaving the LL Apartments Parcel
- Catch-basin sediment collected from locations within the LL Apartments Parcel

The following introductory sections provide a physical description of the LL Apartments Parcel stormwater drainage system, define the objectives of the stormwater interim action, describe the interim action scope of work implemented to meet the objectives, and discuss the process for reporting interim action results.

1.2 LORA LAKE APARTMENTS PARCEL STORMWATER DRAINAGE SYSTEM

An overview of the LL Apartments Parcel stormwater drainage system, and upgradient and downgradient drainage networks is provided in Figure 1.2. The LL Apartments Parcel stormwater drainage system is owned and maintained by the Port; however, it receives flow from a larger upgradient stormwater drainage network that is owned and

maintained by the City of Burien. A review of City of Burien stormwater drainage network plans discovered that the LL Apartments Parcel stormwater drainage system receives stormwater from an upgradient area that is approximately 83 acres (as shown on Figure 1.2) before on-site stormwater drainage is introduced to the system. The LL Apartments Parcel contributes stormwater drainage to the system from an approximate 8-acre area, and the combined LL Apartments Parcel and City of Burien stormwater drainage then exits the LL Apartments Parcel in two locations near Des Moines Memorial Drive. Additional City of Burien stormwater drainage is introduced to the system downgradient of the LL Apartments Parcel via catch basins located along Des Moines Memorial Drive (Figure 1.2). Stormwater discharge is then routed to the southeast where it is discharged through an outfall structure into Lora Lake. Although not confirmed to date, it is possible that additional inputs to the drainage system downgradient of the LL Apartments Parcel but upgradient of the Lora Lake outfall may also come from Highway 518 stormwater run-off and the drainage network from City of SeaTac stormwater drainage lines. Investigation of these potential stormwater sources will be completed during the Lora Lake Apartments Site Remedial Investigation/Feasibility study (RI/FS) process.

There are two distinct storm drainage sub-systems at the LL Apartments Parcel, as shown on Figure 1.3. A large main line crosses the parcel from west (upstream) to east (downstream) and conveys water through 24-inch (or greater) diameter pipes. This sub-system is referred to as the “Main Line” and also conveys stormwater drainage collected from the upgradient City of Burien drainage network. A second, smaller sub-system drains the northeast portion of the LL Apartments Parcel and conveys water through 12-inch (or smaller) diameter pipes. This system is referred to as the “Secondary Line”; drainage that travels through this sub-system is representative of the northeastern portion of the of LL Apartments Parcel drainage only (i.e., no upgradient off-site contributions are comingled with this sub-system).

The Main Line, owned by the City of Burien, enters the LL Apartments Parcel from the west, along 8th Avenue South, at the paired catch basin location CB4505/CB-31A, also known as the Main Line Inlet Catch Basin (Figure 1.3). Drainage from the LL Apartments Parcel enters catch basins that are connected to the Main Line at various points along its alignment throughout the LL Apartments Parcel. The Main Line then exits the eastern side of the LL Apartments Parcel, approximately 100 feet south of the main driveway (South 149th Place) along Des Moines Memorial Drive at catch basin location CB4857, also known as the Main Line Outlet Catch Basin (Figure 1.3). At this point the Main Line flow, including the City of Burien stormwater, and the Secondary Line flow with LL Apartments Parcel stormwater only, comingle with roadway runoff from Des Moines Memorial Drive. The Main Line continues eastward, crossing beneath Des Moines Memorial Drive and eventually discharging through an outfall into Lora Lake.

Several stormwater detention tanks are present within the northwest and southeast portions of the LL Apartments Parcel, providing on-site stormwater flow control and detention (Figure 1.3). The detention tanks consist of 54-inch diameter by approximate

100-foot long corrugated metal pipes welded together and sealed with steel end caps. The detention tanks control stormwater flows into the Main Line within the LL Apartments Parcel. In addition to the detention tanks, there are several other vault structures that are outfitted to provide oil and water separation and debris and stormwater flow control.

The Secondary Line collects stormwater drainage from catch basin inputs similar to the Main Line, as well as a small (approximately 20-foot by 20-foot) detention pond, which appears to have functioned as a landscape feature when the apartment building complex was in operation. The collection area for the Secondary Line is bounded by the area between former Building T in the west, former Buildings X and Y in the east, former Buildings U and V in the north and the main site driveway (South 149th Place) to the south (Figure 1.3). Stormwater flow enters the Secondary Line at the westernmost point, just east of the former Building T location, and exits in the northeast quadrant of the LL Apartments Parcel at catch basin location CB-1, also referred to as the Secondary Line Outlet Catch Basin. Flow from CB-1 is then conveyed slightly further east to catch basins located within Des Moines Memorial Drive; at this location, the flow becomes comingled with runoff from Des Moines Memorial Drive.

Flows from the Secondary Line are routed south along Des Moines Memorial Drive, through various catch basin structures before joining the stormwater discharge coming from the LL Apartments Parcel and City of Burien Main Line at the Main Line Outlet Catch Basin (Figure 1.3). As described above, from this point, flows pass beneath Des Moines Memorial Drive to another vault to the northeast before discharging through an outfall into Lora Lake.

1.3 STORMWATER INTERIM ACTION OBJECTIVES AND SCOPE OF WORK

1.3.1 Stormwater Interim Action Objectives

The goal of the SWIA is to determine what impact, if any, the LL Apartments Parcel has on the chemical quality of stormwater that leaves the site and discharges to Lora Lake. Specifically, the Port and WSDOE developed the following objectives as SWIA requirements:

- Collect and chemically analyze stormwater, stormwater solids, and catch basin sediment samples at locations to compare the COC concentrations in media entering and leaving the LL Apartments Parcel.
- Complete sampling and analysis activities to identify locations where COCs may enter the LL Apartments Parcel storm drain system, including the potential for contaminated groundwater and/or soil to seep into the LL Apartments Parcel stormwater drainage system.
- Perform sampling activities in accordance with WSDOE guidance for stormwater sampling at industrial facilities and analyze collected samples for site COCs.

1.3.2 Stormwater Interim Action Scope of Work

The interim action technical scope of work addresses the primary concern expressed about site stormwater: What, if any, site contamination is conveyed from the LL Apartments Parcel by stormwater drainage? To address that concern, the following interim action scope of work was developed for implementation in the order described below:

1. Conduct 10 rounds of stormwater sampling, 2 prior to catch basin cleaning (Scope Item 2) and 8 following catch basin cleaning (Scope Item 7).
2. Collect stormwater samples during two sampling events prior to catch basin cleaning, at specific catch basin locations where stormwater enters and leaves the LL Apartments Parcel. Analyze stormwater samples for site COCs.
3. Collect catch basin sediment samples to assess the chemical quality of sediment introduced from or influenced by on-property sources, and potentially transported from the LL Apartments Parcel.
4. Remove remaining catch basin sediment from the storm drainage system using vactor methods.
5. Conduct a TV-type line inspection of the entire LL Apartments Parcel stormwater drainage system to determine the potential for contaminated groundwater and/or soil to enter the storm drain system and be discharged to Lora Lake.
6. Collect one round of stormwater solids samples using in-line solids “sediment traps” to assess the chemical quality of solids introduced from or influenced by on-property sources, and potentially transported from the LL Apartments Parcel. Perform chemical analysis on collected stormwater solids samples as sufficient solids accumulate between the date of installation and completion of the stormwater interim action.
7. Following catch basin cleaning, collect stormwater samples for an additional eight sampling events from specific catch basin locations where stormwater enters and leaves the LL Apartments Parcel. Analyze stormwater samples for site COCs.

The procedures and methods implemented during completion of this proposed LL Apartments Parcel SWIA scope of work are presented in the SWIA Work Plan completed by Floyd|Snider and Taylor Associates, Inc. (Floyd|Snider and Taylor Associates, Inc. 2009). This work was originally planned to be included in the Lora Lake Apartments RI/FS Work Plan and implemented during the wet season of 2010 to 2011. However, in response to concerns expressed by the Public, the Port agreed to WSDOE’s request to conduct the stormwater investigation as an early interim action. Interim action work was conducted between December 2009 and April 2010, with the continued collection of the in-line solids sediment trap samples, as the solids volume collected from January 2010 through April 2010 was insufficient for chemical analysis. In-line solids sediment samples continued to be collected through the 2010 to 2011 wet

season in order to obtain sufficient sample volume to perform the required chemical analyses. A detailed description of the work completed as part of this interim action is provided in Section 3.0.

1.4 LORA LAKE APARTMENTS PARCEL STORMWATER INTERIM ACTION REPORTING

As described in the SWIA Work Plan, interim action progress reports were developed to provide WSDOE with the results of sampling activities during the evaluation process. Progress reports were used in part to inform decisions regarding the total number of sampling events to be conducted. Following completion of the first two stormwater monitoring events, SWIA Progress Report 1 was developed and submitted to WSDOE on March 19, 2010 (Floyd|Snider 2010a). A second progress report, also submitted to WSDOE on March 19, 2010 (the two events were collected only 17 days apart), summarizes results of the catch basin sediment sampling activities conducted at the LL Apartments Parcel prior to conveyance system cleaning (Floyd|Snider 2010b). Details regarding the methods and procedures used during the sampling events are included in the interim progress reports (provided in Appendix A).

A third progress report was proposed in the SWIA Work Plan. The objective of this third progress report was to determine whether the full schedule of 10 monitoring events was necessary. Based on the late occurrence of measurable storms during the monitoring period, the Port elected to monitor all 10 storm events outlined in the SWIA work plan, and to report all monitoring event results in one final report. WSDOE approved removing the third progress report from the SWIA deliverables schedule via email on March 15, 2010.

This Final Stormwater Interim Action Data Report presents the results of all field work, data collection, and data analyses tasks described in Section 1.3.2 above, with the exception of in-line solids sample collection activities, which are still being conducted at the LL Apartments Parcel.

1.5 REPORT ORGANIZATION

This Final Stormwater Interim Action Report is organized into the following sections:

- **2.0 Stormwater Interim Action Sample Location Selection and Rationale:** This section presents the rationale used to select specific locations for collecting stormwater, stormwater solids, and catch basin sediment samples as part of the LL Apartments Parcel SWIA.
- **3.0 Summary of Field Inspection and Data Collection Activities:** This section describes details of the field inspection and data collection activities including initial stormwater sample collection, catch basin sediment sampling, catch basin sediment removal and disposal, TV in-line inspection, in-line

solids sediment trap installation and collection activities, and post-system cleaning stormwater sample collection.

- **4.0 Work Plan Deviations:** This section discusses reasons for deviations in field activities from those proposed in the Work Plan (Floyd|Snider and Taylor Associates, Inc. 2009) as well as actions implemented to address the deviations and achieve the objectives of the SWIA.
- **5.0 Data Quality Review:** This section describes the process for collecting and evaluating quality control samples and procedures implemented for data validation of LL Apartments Parcel SWIA data.
- **6.0 Summary of Analytical Results:** This section presents a summary of the data results from analytical testing completed on stormwater and catch basin sediment samples, as well as stormwater in-line solids samples, collected as part of the LL Apartments Parcel SWIA.
- **7.0 Stormwater Statistical Analyses:** This section presents a summary of the statistical evaluation completed for the stormwater analytical data. The purpose of the statistical analysis is to evaluate and compare the chemical quality of stormwater as it enters and leaves the LL Apartments Parcel.
- **8.0 Conclusions:** This section provides a summary of the conclusions that have been developed following an evaluation of analytical data and completion of the statistical analysis described in Section 7.0. The summary of conclusions also describes how the objectives of the SWIA were achieved.
- **9.0 References:** This section provides a list of materials cited in this report.

2.0 Monitoring and Sample Location Selection and Rationale

The following sections describe the locations selected for storm flow monitoring and stormwater sampling, stormwater solids sampling, and catch basin sediment sampling along with the rationale for selecting these locations. Figure 2.1 presents the sampling and monitoring locations on the LL Apartments Parcel. Storm flow and stormwater sample locations were selected using the same rationale presented in the SWIA Work Plan (Floyd|Snider and Taylor Associates, Inc. 2009).

2.1 STORM FLOW MONITORING AND STORMWATER SAMPLE LOCATIONS

Storm flow monitoring and stormwater sample collection activities were completed at three locations to characterize the inlet and outlet flows at the LL Apartments Parcel. These locations are designated as the Main Line Inlet Catch Basin (CB4505/CB-31A), Main Line Outlet Catch Basin (CB4857), and Secondary Line Outlet Catch Basin (CB-1), as shown on Figure 2.1.

The Main Line Inlet Catch Basin was selected for storm flow monitoring and sample collection because it represents the inlet of all upgradient piped stormwater conveyance entering the LL Apartments Parcel. The Main Line Inlet location allows sampling access to all incoming flows from the City of Burien (as it enters the LL Apartments Parcel Main Line system) before these flows are impacted by surface drainage from LL Apartments Parcel run-off and/or on-site stormwater. Storm flow monitoring and stormwater sampling activities were conducted on the outlet, downstream side (east side), of the catch basin structure representing the Main Line Inlet location.

The Main Line Outlet Catch Basin was selected for storm flow monitoring and sample collection because it represents the outlet of the Main Line drainage from the LL Apartments Parcel. Off-property flows comingle with LL Apartments Parcel runoff within the Main Line Outlet Catch Basin; therefore stormwater flow was monitored and stormwater samples were collected from the LL Apartments Parcel inlet pipe, just before stormwater enters the Main Line Outlet Catch Basin. Stormwater flow monitoring and sampling activities completed at this location allowed for collection of data that were representative of stormwater drainage passing through the potentially impacted soil and groundwater areas of the LL Apartments Parcel, before the drainage comingles with inputs from stormwater sources outside of the property (primarily road runoff from Des Moines Memorial Drive).

The Secondary Line Outlet Catch Basin (CB-1) was selected for storm flow monitoring and sample collection because it represents the outlet of all Secondary Line drainage from the LL Apartments Parcel. Storm flow monitoring and stormwater sample collection activities were completed at the inlet pipe to the Secondary Line Outlet Catch Basin (CB-1) in order to avoid potential effects from limited local surface drainage associated with a small grass area located adjacent to the catch basin structure.

In addition to storm flow monitoring at the locations described above, groundwater levels were also measured (using an electronic water level indicator) at several existing monitoring well locations during each monitored storm event to assess shallow aquifer/water table levels and fluctuations over time. Monitoring Wells MW-1 (central portion of site), MW-3 (southern portion of site), MW-4 (southeastern portion of site), MW-6 (northeastern portion of site), and MW-2 (northwestern portion of the site) were used for these assessments. Monitoring Well MW-5 was also used for Storm Events 4 through 10 in place of MW-1 as a light non-aqueous phase liquid was observed on the water level meter at MW-1 during completion of water level measurements during Storm Event 3.

2.2 IN-LINE SOLIDS SAMPLE LOCATIONS

In-line sediment traps, designed to collect stormwater solid samples, were installed at the following four catch basin locations: Main Line Inlet (CB4505/CB-31A), Main Line Outlet (CB4857), Secondary Line Outlet (CB-1), and Main Line Interior (CB5945 [Ex. CB-B]). These sites were selected to coincide with the storm flow monitoring and stormwater sampling stations to the maximum extent possible.

Stormwater solids samples were collected at the Main Line Inlet and Main Line Outlet, as these locations represent the inlet and outlet points for stormwater solids travelling through the Main Line of the LL Apartments Parcel drainage system. The in-line sediment traps were installed following Storm Event 2 at the same locations where stormwater samples were collected for the first two monitored storm events. Initially, it was uncertain whether an in-line sediment trap could be installed at the Main Line Outlet location due to the potential that samples would include roadway runoff from Des Moines Memorial Drive comingled with the stormwater of interest. However, following inspection of the catch basin system at the Main Line Outlet location, Taylor Associates, Inc. was able to install an in-line sediment trap in a custom configuration that ensured the in-line solids sediment sample would be representative of LL Apartments Parcel and upgradient City of Burien stormwater discharges only.

The Secondary Line Outlet, Catch Basin CB4555 (CS/CB-2), was selected as the catch basin location to sample stormwater solids discharging from the Secondary Line drainage system. This location was selected for stormwater solids sampling rather than CB-1 (the corresponding stormwater sampling location) because it is a flow-control structure within the Secondary Line drainage system and was observed to contain a greater amount of solids material during the initial catch basin inspection. Additionally, an in-line sediment trap could not be installed at Catch Basin CB-1 in a position where the sample would not be affected by local off-site drainage.

The Main Line Interior (CB5945 [Ex. CB-B]) location is the furthest downstream catch basin in the Main Line drainage system. Before Taylor Associates determined that appropriate stormwater solids could be obtained at the Main Line Outlet location, they installed a sediment trap at the Main Line Interior (CB5945 [Ex. CB-B]) location as an alternative/backup sampling station. Samples collected at the Main Line Interior

(CB5945 [Ex. CB-B]) location were used to compare in-line solids quality data at the Main Line Outlet location.

2.3 CATCH BASIN SEDIMENT SAMPLE LOCATIONS

Catch basin sediment samples were collected at five locations to characterize COCs within the drainage systems beneath the LL Apartments Parcel (Figure 2.1). The following locations were selected for collection of catch basin sediment samples:

- **The Main Line Inlet Catch Basin.** This catch basin is the inlet to the Main Line drainage system entering the LL Apartments Parcel and provides an assessment of catch basin sediment prior to any potential contribution of contaminants from within the LL Apartments Parcel.
- **The Main Line Outlet Catch Basin.** This catch basin is the combined outlet to the Main Line drainage system and the Secondary Line drainage system discharging from the LL Apartments Parcel and provides an assessment of the total combined site discharges. This catch basin also receives contributions from road runoff associated with Des Moines Memorial Drive. Therefore, an effort was made to collect sediments from just inside the catch basin inlet pipe to reflect only the Main Line and LL Apartments Parcel Secondary Line discharges.
- **Main Line Interior Catch Basin CS/CB-19.** This catch basin is a junction receiving flow from all catch basins and associated detention tanks located in the western portion of the LL Apartments Parcel.
- **Main Line Interior Catch Basin CB-12.** This catch basin is a junction receiving flow from all catch basins and the associated detention tank located in the central portion of the LL Apartments Parcel.
- **The Secondary Line Outlet Catch Basin (CB4555 [CS/CB-2]).** This catch basin is the outlet discharge point for stormwater and sediment discharging from the LL Apartments Parcel secondary line drainage network.

3.0 Summary of Field Inspection, Monitoring, and Data Collection Activities

This section describes the following field inspection and monitoring and data collection activities conducted as part of the SWIA:

- Storm Event Targeting, Qualification, and Event Completion
- Stormwater Sample Collection
- Pipe and Catch Basin Sediment Sample Collection
- Stormwater Drainage System Cleaning
- Stormwater Drainage System In-line TV Inspection
- In-line Solids Sediment Sample Collection

Activities reported in the SWIA Progress Reports 1 and 2 are also included in the discussion below for completeness. Except where noted, field activities were conducted according to the methods detailed in the SWIA Work Plan. Deviations from the work plan are discussed in detail in Section 4.0.

In general, LL Apartments Parcel SWIA activities were completed in the order they are discussed in this section. Two monitored storm events were sampled prior to completion of catch basin sediment sampling, stormwater drainage system cleaning, stormwater drainage system in-line TV inspection, and installation of the in-line solids sediment equipment. The remaining eight monitored storm events were then sampled following completion of these other activities.

3.1 STORM EVENT TARGETING, QUALIFICATION, AND EVENT COMPLETION

This section presents storm targeting and sampling design details. The actions listed below comply with WSDOE's guidance for stormwater sampling at industrial facilities (WSDOE 2002).

3.1.1 Storm Events

Stormwater conditions were monitored at the LL Apartments Parcel in 10 distinct storm events during the wet weather period between December 2009 and April 2010. Monitoring activities were completed over a range of representative storm sizes, rainfall intensities, and groundwater/soil water conditions at the LL Apartments Parcel. Groundwater table fluctuations were also measured during monitored storms to characterize the potential subsurface contaminant transport through inflow and/or infiltration into the stormwater drainage system.

3.1.2 Target Storm Event Qualification and Completion

The SWIA targeted storm events for sampling that were forecast to produce at least 0.1 inch of precipitation in a 24-hour period with a 70 percent or greater probability of occurrence 24 hours prior to the anticipated event start, as described in the SWIA Work Plan (Floyd|Snider and Taylor Associates, Inc. 2009). Targeted storms also met the requirement of being preceded by 12 hours of dry weather and 24 hours with less than 0.1 inch of precipitation. The rain gauge on the Port Airport Office Building roof was designated as the "project gauge" and was used to target storm events and in storm qualification.

Stormwater sample collection of grab and composite samples was conducted as described in Section 3.2.2. In order for the monitored storm event to qualify as acceptable, grab samples were required to be collected while storm runoff was occurring and composite samples were required to represent at least 75 percent of the storm hydrograph volume during the first 24 hours of the event[1]. Hydrographs for each monitored storm event are included in the associated Storm Event Reports included in Appendix B.

Monitored storm events were considered complete when there was no precipitation for 6 to 12 hours following a qualified storm event, or after a maximum period of 24 hours following the start of sample collection activities if precipitation was still occurring.

3.2 STORMWATER SAMPLE COLLECTION

Stormwater samples were collected from 3 locations at the LL Apartments Parcel during 10 monitored storm events between December 2009 and April 2010. The following sections describe the methods for stormwater sample collection and summarize the LL Apartments Parcel SWIA monitored storm events. Stormwater analytical results are discussed in Section 6.0.

3.2.1 Sample Collection Locations

During each of the 10 monitored storm events summarized below, stormwater samples were collected from the Main Line Inlet, Main Line Outlet, and Secondary Line Outlet (CB-1) catch basin locations, as discussed in Section 2.0, to characterize the quality of stormwater flowing through the Main Line and Secondary Line drainage networks (Figure 2.1).

Following sample collection, stormwater samples were transported to the laboratory for analytical testing. The results of the analytical testing are discussed in Section 6.0.

[1] Phase I Municipal Stormwater Permit, Section S8.

3.2.2 Sample Collection Methods

Two methods, grab sampling and flow-proportionate composite sampling, were used to collect stormwater samples from each of the sampling locations described above. Composite sampling is a preferred method to obtain representative stormwater samples because the samples are made up of a number of smaller subsamples that are collected at intervals over the course of a monitored storm event (WSDOE 2002). The majority of COCs in the LL Apartments Parcel SWIA were analyzed from the flow-proportional composite samples. However, volatile organic compounds and total petroleum hydrocarbons were analyzed from grab samples to avoid loss of volatile components, and adherence of petroleum constituents to sampling containers, which can occur if composite sampling methods are used.

3.2.2.1 Grab Sample Collection

A single grab sample was collected from each stormwater sampling location during each of the 10 monitored storm events. Grab samples were collected at each location using dedicated Teflon-lined tubing attached to a peristaltic pump in accordance with the SWIA Work Plan. Grab samples were collected as early as possible during the monitored storm events once runoff was noted and while storm flow was occurring at each sampling location.

3.2.2.2 Composite Sample Collection

A single flow-weighted composite sample was collected from each stormwater sampling location per monitored storm event. Flow-weighted composite samples were created by combining a set of discrete samples collected with an autosampler in accordance with the SWIA Work Plan. Samples were manually flow-weighted following the storm based on a review of the storm hydrograph and timing of discrete sample collection. One dedicated autosampler was used at each location to collect the composite samples. Each autosampler was programmed to collect samples via time-paced programming. The duration between aliquot collections varied between the monitored storm events due to the forecast length of the storms, as described in more detail in the Storm Event Reports included in Appendix B. Following sample collection during each monitored storm event, the hydrographs from each monitoring location were examined to determine which specific bottles would be included in the composite samples submitted for chemical analysis. Hydrographs and descriptions of the compositing process for each stormwater event are also presented in the Storm Event Reports included in Appendix B.

3.2.3 Sample Handling

Stormwater samples from each monitored storm event were collected, processed as necessary, and then stored in coolers with ice, under the direct supervision of project personnel. The samples were then transported to the project laboratory (Analytical

Resources, Inc.) under chain-of-custody procedures in accordance with the requirements of the SWIA Work Plan.

3.2.4 Storm Event Summaries

The following sections provide summaries for the 10 monitored storm events completed as part of the LL Apartments Parcel SWIA. Monitored storm events were targeted and qualified based on the criteria described in Sections 3.1.1 through 3.1.3. The storms that were monitored and sampled for this study varied in duration, size, and intensity, providing stormwater quality data for a range of precipitation conditions representative of local wet weather storms. The duration of the monitored storm events ranged from short, approximately 4-hours, to long, approximately 52 hours. In addition to variations in storm duration, the magnitude (amount of rainfall) of the monitored storm events ranged from 0.08 inches to 1.49 inches. The average rainfall intensity for the 10 monitored storm events ranged from 0.01 inches per hour to 0.10 inches per hour.

In general, the storms that were sampled as part of this study met the qualifying criteria outlined in the SWIA Work Plan, and all resulting data were determined to be of useable quality. One exception was that of Storm Event 3 (STE 3), which did not meet the requirement of covering 75 percent of the storm hydrograph during composite stormwater sample collection at the Secondary Line Outlet (CB-1) sample location due to a communication error in the auto-sampling equipment. The stormwater samples collected at the Main Line Inlet and Main Line Outlet locations did meet the storm hydrograph sampling requirements and approximately 65 percent of the hydrograph was sampled at the Secondary Line Outlet (CB-1) location. STE 3 was determined to be acceptable and a more detailed explanation of this monitored storm event is provided in Section 3.2.4.3.

Sufficient sample volume was collected during each storm to enable laboratory analysis for the complete list of COCs specified in the SWIA Work Plan. Limited sample collection volume during select events did restrict the ability to complete quality control sample analyses; however, alternate methods for data evaluation and qualification were available, and all data were determined appropriate for use. Data quality and validation procedures are presented in Section 5.0.

The following sections provide summary information for each storm sampled as part of the SWIA including: rainfall magnitude, duration and intensity, and length of the antecedent dry period. Details on flow-weight compositing are also provided. Discussion of the analytical results is included in Section 6.0. Appendix B contains the complete Storm Event Reports that present the event details, field sampling forms, and storm hydrographs.

3.2.4.1 Storm Event 1

Storm Event 1 (STE 1) was monitored on December 14, 2009. Characteristics of STE 1 include the following:

- Storm duration: 8 hours 10 minutes
- Maximum rainfall intensity: 0.13 inches/hour
- Average rainfall intensity: 0.06 inches/hour
- Antecedent dry period: 4 days
- Percent hydrograph sampled: 88 percent to 99 percent at the three sample locations
- Total rainfall: 0.48 inches

In STE 1, the stormwater sample collected from Main Line Inlet location was composited from 7 sample bottles that contained 35 discrete samples based on hydrograph review and totaled 5,761 milliliters (mL). The stormwater sample collected from the Main Line Outlet location was composited from 8 sample bottles that contained 40 discrete samples based on hydrograph review and totaled 4,826 mL. The stormwater sample collected from the Secondary Line Outlet (CB-1) location was composited from 3 sample bottles that contained 17 discrete samples, as the remainder of the sample bottles were empty, and totaled 4,601 mL.

3.2.4.2 Storm Event 2

Storm Event 2 (STE 2) was monitored on December 31, 2009. Characteristics of STE 2 include the following:

- Storm duration: 7 hours, 25 minutes
- Maximum 1-hour rainfall intensity: 0.10 inches/hour
- Average 1-hour rainfall intensity: 0.02 inches/hour
- Antecedent dry period: 1.5 days
- Percent hydrograph sampled: 100 percent at the three sample locations
- Total rainfall for storm period: 0.25 inches

In STE 2, the stormwater sample collected from the Main Line Inlet location was composited from 7 sample bottles that contained 35 discrete samples based on hydrograph review and totaled 6,278 mL. The stormwater sample collected from the Main Line Outlet location was composited from 8 sample bottles that contained 40 discrete samples based on hydrograph review and totaled 7,437 mL. The stormwater sample collected from the Secondary Line Outlet (CB-1) location was composited from 6 sample bottles that contained 33 discrete samples based on hydrograph review and totaled 5,412 mL.

3.2.4.3 Storm Event 3

Storm Event 3 (STE 3) was monitored on February 23, 2010 following completion of catch basin sediment sample collection, cleanout of the stormwater drainage system,

completion of the in-line TV inspection, and installation of the in-line solids sediment sampling equipment. Characteristics of STE 3 include the following:

- Storm duration: 27 hours, 10 minutes
- Maximum 1-hour rainfall intensity: 0.11 inches/hour
- Average 1-hour rainfall intensity: 0.02 inches/hour
- Antecedent dry period: 7.25 days
- Percent hydrograph sampled: 65 percent to 100 percent at the three sample locations
- Total rainfall for storm period: 0.52 inches

In STE 3, the stormwater sample collected from the Main Line Inlet location was composited from 12 sample bottles that contained 60 discrete samples based on hydrograph review and totaled 4,830 mL. A duplicate sample was also collected from the Main Line Inlet Location during this event. The stormwater sample collected from the Main Line Outlet location was composited from 7 sample bottles that contained 35 discrete samples based on hydrograph review and totaled 5,561 mL. The stormwater sample collected from the Secondary Line Outlet (CB-1) location was composited from 8 sample bottles that contained 40 discrete samples based on hydrograph review and totaled 9,050 mL.

During sample collection at the Secondary Line Outlet (CB-1) location, a communication error occurred between the master and subordinate autosampler. This error prevented bottles 8–12 from receiving corresponding time-paced discrete samples. This communication error is discussed in more detail in the Storm Event Report for STE 3, included as part of Appendix B. The 75 percent flow hydrograph coverage requirement for this sample was not obtained due to the communication error; however the collected sample was determined to represent an acceptable majority of the monitored storm event, and was therefore analyzed. Additional information regarding the rationale for acceptance of this sample is provided in the report for STE 3 included in Appendix B. The data collected were determined to be of useable quality and the communication error was corrected prior to sampling the next monitored storm event.

3.2.4.4 Storm Event 4

Storm Event 4 (STE 4) was monitored on February 26, 2010. Characteristics of STE 4 include the following:

- Storm duration: 27 hours, 20 minutes
- Maximum 1-hour rainfall intensity: 0.09 inches/hour
- Average 1-hour rainfall intensity: 0.02 inches/hour
- Antecedent dry period: 0.5 days

- Percent hydrograph sampled: 94 percent to 99 percent at the three sample locations
- Total rainfall for storm period: 0.47 inches

In STE 4, the stormwater sample collected from the Main Line Inlet location was composited from 10 sample bottles that contained 50 discrete samples based on hydrograph review and totaled 8,721 mL. The stormwater sample collected from the Main Line Outlet location was composited from 10 sample bottles that contained 46 discrete samples based on hydrograph review and totaled 4,698 mL. The stormwater sample collected from the Secondary Line Outlet (CB-1) location was composited from 10 sample bottles that contained 50 discrete samples based on hydrograph review and totaled 4,558 mL. A duplicate sample was also collected from the Secondary Line Outlet (CB-1) location during this monitored storm event.

3.2.4.5 Storm Event 5

Storm Event 5 (STE 5) was monitored on March 10-11, 2010. Prior to STE 5, the sampler at the Secondary Line Outlet (CB-1) location was replaced with a 12-bottle capacity unit to increase the sampling capabilities. This new sampling device is equivalent to the samplers in place at the other two sample locations.

The weather between STE 4 and STE 5 was a relatively dry period during the first 9 days of March 2010, which was punctuated by brief and intermittent periods of low volume rainfall. Due to the unusually low frequency of monitored storm events for the season, the next runoff-producing rainfall event was targeted for sample collection. The event occurring on March 10, 2010 was a short duration storm that produced a low volume of runoff, but was a qualifying event. The storm occurred between 12:00AM and 4:00AM. Composite samples were collected, but no grab samples were collected due to the timing of the storm.

Another rain event occurred on March 11, 2010, 24 hours after the March 10, 2010 rain event. This was a larger event producing 1.05 inches of rain. The autosamplers could not be reset in time to collect composite samples from this second rain event; however, grab samples were collected from this event. Grab and composite samples from these two storms were qualified for use, according to the SWIA Work Plan, which allows for unpaired collection of grab and composite samples. The attributes of interest for the March 10, 2010 composite sampling event and the March 11, 2010 grab sampling event are presented below.

March 10, 2010 composite sample STE 5 characteristics:

- Storm duration: 3 hours, 55 minutes
- Maximum 1-hour rainfall intensity: 0.03 inches/hour
- Average 1-hour rainfall intensity: 0.02 inches/hour
- Antecedent dry period: 1.5 day

- Percent hydrograph sampled: 96 percent to 100 percent at the three sample locations
- Total rainfall for storm period: 0.08 inches

March 11, 2010 grab sample STE 5 characteristics:

- Storm duration: 28 hours, 15 minutes
- Maximum 1-hour rainfall intensity: 0.25 inches/hour
- Average 1-hour rainfall intensity: 0.09 inches/hour
- Antecedent dry period: 1 day
- Percent hydrograph sampled: Not applicable for grab sample collection
- Total rainfall for storm period: 1.04 inches

In the March 10, 2010 STE 5 composite sample collection effort, the stormwater sample collected from the Main Line Inlet location was composited from 6 sample bottles that contained 30 discrete samples based on hydrograph review and totaled 8,867 mL. The stormwater sample collected from the Main Line Outlet location was composited from 5 sample bottles that contained 25 discrete samples based on hydrograph review and totaled 4,538 mL. A duplicate sample was also collected from the Main Line Outlet location during this monitored storm event. The stormwater sample collected from the Secondary Line Outlet (CB-1) location was composited from 10 sample bottles that contained 25 discrete samples based on hydrograph review and totaled 4,654 mL.

3.2.4.6 Storm Event 6

After sampling a non-qualifying event on March 16, 2010, Storm Event 6 (STE 6) was monitored on March 25, 2010. Characteristics of STE 6 include the following:

- Storm duration: 22 hours, 20 minutes
- Maximum 1-hour rainfall intensity: 0.12 inches/hour
- Average 1-hour rainfall intensity: 0.03 inches/hour
- Antecedent dry period: 3.5 days
- Percent hydrograph sampled: 95 percent to 100 percent for the three sample locations
- Total rainfall for storm period: 0.64 inches

In STE 6, the stormwater sample collected from the Main Line Inlet location was composited from 7 sample bottles that contained 35 discrete samples based on hydrograph review and totaled 8,562 mL. The stormwater sample collected from the Main Line Outlet location was composited from 7 sample bottles that contained 35 discrete samples based on hydrograph review and totaled 4,659 mL. A duplicate sample was also collected from the Main Line Outlet location during this monitored

storm event. The stormwater sample collected from the Secondary Line Outlet (CB-1) location was composited from 7 sample bottles that contained 35 discrete samples based on hydrograph review and totaled 4,672 mL.

3.2.4.7 Storm Event 7

Storm Event 7 (STE 7) was monitored on March 28, 2010. Characteristics of STE 7 include the following:

- Storm duration: 51 hours, 55 minutes
- Maximum 1-hour rainfall intensity: 0.16 inches/hour
- Average 1-hour rainfall intensity: 0.03 inches/hour
- Antecedent dry period: 2 days
- Percent hydrograph sampled: 93 percent to 99 percent for the three sample locations
- Total rainfall for storm period: 1.49 inches

In STE 7, the stormwater sample collected at the Main Line Inlet location was composited from 6 sample bottles that contained 30 discrete samples based on hydrograph review and totaled 4,602 mL. A duplicate sample was also collected from the Main Line Inlet location during this monitored storm event. The stormwater sample collected from the Main Line Outlet location was composited from 6 sample bottles that contained 30 discrete samples based on hydrograph review and totaled 4,660 mL. The stormwater sample collected at the Secondary Line Outlet (CB-1) location was composited from 6 sample bottles that contained 30 discrete samples based on hydrograph review and totaled 8,768 mL.

Based on updated forecast information during STE 7 the autosamplers were reprogrammed to collect discrete samples every 42 minutes rather than every 24 minutes, allowing for extended collection over a storm duration of up to approximately 38 hours, rather than 24 hours. Details pertaining to the programming and operation of the samplers are included in the Storm Event Report for STE 7 in Appendix B.

3.2.4.8 Storm Event 8

Storm Event 8 (STE 8) was monitored on April 1, 2010. Characteristics of STE 8 include the following:

- Storm duration: 33 hours, 45 minutes
- Maximum 1-hour rainfall intensity: 0.09 inches/hour
- Average 1-hour rainfall intensity: 0.02 inches/hour
- Antecedent dry period: 1.8 days

- Percent hydrograph sampled: 92 percent to 99 percent for the three sample locations
- Total rainfall for storm period: 0.67 inches

In STE 8, the stormwater sample collected at the Main Line Inlet location was composited from 4 sample bottles that contained 20 discrete samples based on hydrograph review and totaled 5,049 mL. The stormwater sample collected at the Main Line Outlet location was composited from 12 sample bottles that contained 60 discrete samples based on hydrograph review and totaled 8,936 mL. The stormwater sample collected at the Secondary Line Outlet (CB-1) location was composited from 5 sample bottles that contained 25 discrete samples based on hydrograph review and totaled 4,159 mL. A duplicate sample was also collected from the Secondary Line Outlet (CB-1) location for this monitored storm event.

Initial light rainfall in the later afternoon of April 1, 2010 caused a runoff response at the Main Line Inlet and Secondary Line Outlet (CB-1) locations, which enabled the autosamplers to begin sample collection. Due to the small amount and light intensity of this initial rainfall and the specific hydraulic conditions at the monitoring station, the sampler at the Main Line Outlet location was not triggered until later in the monitored storm event (approximately 8 hours after the initial 0.04 inches of rainfall). Based on updated forecast information and optimal compositing requirements, the sample collection rates at the Main Line Inlet and Secondary Line Outlet (CB-1) locations were adjusted to 42-minutes, after the samplers triggered, thus allowing for a total collection time of up to 23 hours at these stations. The sample collection rate at the Main Line Outlet location was not adjusted due to its delayed start. Composite samples collected at the Main Line Inlet and Secondary Line Exit locations included the beginning and the middle of the monitored storm event. The composite sample collected at the Main Line Outlet location included the middle and later portion of the storm. All qualification and validation criteria for each of the sampling stations were met, consistent with the SWIA Work Plan.

3.2.4.9 Storm Event 9

Storm Event (STE 9) was monitored on April 7, 2010. Characteristics of STE 9 include the following:

- Storm duration: 12 hours, 10 minutes
- Maximum 1-hour rainfall intensity: 0.05 inches/hour
- Average 1-hour rainfall intensity: 0.01 inches/hour
- Antecedent dry period: 1.5 days
- Percent hydrograph sampled: 90 percent to 99 percent at the three sample locations
- Total rainfall for storm period: 0.16 inches

In STE 9, the stormwater sample collected at the Main Line Inlet location was composited from 4 sample bottles that contained 20 discrete samples based on hydrograph review and totaled 4,545 mL. A duplicate sample was also collected from the Main Line Inlet location during this monitored storm event. The stormwater sample collected from the Main Line Outlet location was composited from 4 sample bottles that contained 20 discrete samples based on hydrograph review and totaled 4,550 mL. The stormwater sample collected from the Secondary Line Outlet (CB-1) location was composited from 4 sample bottles that contained 20 discrete samples based on hydrograph review and totaled 8,523 mL.

3.2.4.10 Storm Event 10

Storm Event 10 (STE 10) was monitored on April 21, 2010. Characteristics of STE 10 include the following:

- Storm duration: 9 hours, 35 minutes
- Maximum 1-hour rainfall intensity: 0.20 inches/hour
- Average 1-hour rainfall intensity: 0.10 inches/hour
- Antecedent dry period: 3 days
- Percent hydrograph sampled: 99 percent to 100 percent for the three sample locations
- Total rainfall for storm period: 0.97 inches

In STE 10, the stormwater sample collected at the Main Line Inlet location was composited from 12 sample bottles that contained 60 discrete samples based on hydrograph review and totaled 4,971 mL. The stormwater sample collected at the Main Line Outlet location was composited from 12 sample bottles that contained 60 discrete samples based on hydrograph review and totaled 5,176 ml. A duplicate sample was also collected from the Main Line Outlet location during this monitored storm event. The stormwater sample collected at the Secondary Line Outlet (CB-1) location was composited from 11 sample bottles that contained 55 discrete samples based on hydrograph review and totaled 8,857 mL.

3.2.5 Groundwater Elevation Measurements

Groundwater level measurements were collected from existing monitoring wells located across the LL Apartments Parcel during each monitored storm event to assess the upper-most water table elevation and document fluctuations of groundwater elevations during the stormwater sampling period. Groundwater elevation measurements are presented in each Storm Event Report in Appendix B and are summarized in Table 3.1. Additional discussion regarding modifications to the monitoring locations selected for groundwater level measurements is included in Section 4.0.

3.3 CATCH BASIN SEDIMENT SAMPLE COLLECTION

Catch basin sediment samples were collected in December 2009 and January 2010 The objective for collecting and analyzing sediment samples is to characterize the chemical quality of sediment that settles within the LL Apartments Parcel stormwater catch basins. Samples were collected from the following five catch basin locations discussed in Section 2.0 and shown on Figure 2.1:

- Main Line Inlet
- Main Line Interior (CS/CB-19)
- Main Line Interior (CB-12)
- Main Line Outlet
- Secondary Line Outlet (CB4555 [CS/CB-2])

After a limited in-line TV inspection was performed on a section of Main Line stormwater pipe that discharges to the Main Line Outlet Catch Basin, a catch basin sediment sample was collected to characterize the chemical quality of sediment in this section of the stormwater pipe (just before it discharges to the Main Line Outlet Catch Basin and becomes comingled with roadway runoff from Des Moines Memorial Drive). The following sections discuss the rationale for performing the limited TV inspection and collecting the catch basin sediment sample at this location.

3.3.1 TV Inspection of Pipe Segment Upgradient of the Main Line Outlet Catch Basin

A TV in-line inspection was initially conducted on the segment of the LL Apartments Parcel storm drainage system along the eastern portion of the property between the Main Line Interior Catch Basin (CB5945) and the Main Line Outlet Catch Basin (CB4857) (Figure 3.1). This section of stormwater drainage pipe runs through the area of the site containing elevated dioxin concentrations in soil. The purpose of this initial investigation was to determine if cracks or breaks in this section of stormwater drainage pipe were present (i.e., whether contaminated soil could enter the storm drain system and migrate downgradient).

The TV in-line inspection of the pipe segment from the Main Line Interior Catch Basin (CB5945) and the Main Line Outlet Catch Basin was performed on December 10, 2009 by Pipe Experts, LLC (Pipe Experts), of Tumwater, Washington. The TV in-line inspection was recorded and narrated by the operator who described distance markings and visual observations of base flow, pipe joints, mineral deposits, and infiltration. The TV in-line inspection video and inspection forms produced by Pipe Experts are presented in Appendix C.

This segment of stormwater drainage pipe consists of a 24-inch diameter corrugated metal pipe. The inspection was conducted on a dry day (without rain) during the wet

season. A small base flow was observed in the line. A total of 120 feet of pipe was TV inspected. The pipe is in good quality condition and no significant cracks, breaks, or other discontinuities were observed during the inspection. However, soil and roots were observed at the storm system pipe joints (Appendix C).

Results of this inspection were used to make the decision to install an in-line solids sediment sampling device in both the Main Line Interior Catch Basin (CB5945) and Main Line Outlet Catch Basin (CB4857) in order to evaluate if dioxin-impacted soil was entering this section of the stormwater drainage pipe and discharging to the Main Line Outlet Catch Basin as discussed in Section 2.2.

3.3.2 Catch Basin Sediment Sample Collection

Catch basin sediment sampling was completed in general accordance with the field schedule outlined in the SWIA Work Plan. Catch basin sediment samples were collected from the five locations identified above on December 10, 2009 and January 7 and January 11, 2010. One catch basin sediment sample was collected at the Main Line Outlet on December 10, 2010, taking advantage of the access provided during the TV in-line inspection described above. Details of this catch basin sediment sampling event are provided in Section 3.3.2.1 below and details regarding the catch basin sediment sampling activities in general are included in SWIA Progress Reports 1 and 2 (Appendix A; Floyd|Snider 2010a, 2010b).

3.3.2.1 Sample Collection Activity—December 10, 2009

During the limited TV in-line inspection event described above, accumulated sediment was observed in the section of stormwater drainage pipe between the Main Line Interior (CB5945) catch basin and the Main Line Outlet (CB4857) catch basin, within a few feet before the outlet of the pipe connection to the Main Line Outlet catch basin (Figure 3.1). Because of the potential for soil infiltration at the pipe joints, a pipe sediment sample was collected from this section of the stormwater drainage pipe and submitted for chemical analysis, as described in Section 6. This sediment sample was collected from approximately 1 to 5 feet inside the pipe inlet upgradient from the Main Line Outlet Catch Basin. The results of the chemical analyses performed on this sample are discussed in the SWIA Progress Report 1 (Appendix A) and in Section 6.0.

3.3.2.2 Sample Collection Activity—January 7 and January 11, 2010

Catch basin sediment samples were collected by Taylor Associates field personnel in accordance with the procedures described in the SWIA Work Plan. All sediment sampling was performed by trained field personnel following the Puget Sound Estuary Program (PSEP) Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound (PSEP 1986).

Catch basin sediment samples were collected using stainless steel dip cups and a polyurethane Nasco swing sampler arm (dip cup holder) attached to a fiberglass

extension pole. Sediment at each catch basin was accessed from the surface via the vault lid of the catch basin. Using the dip cup attached to the extension pole, sediment was scooped from the top 3 to 4 inches of accumulated sediment at multiple locations (a minimum of four) within each catch basin. Hence, the samples are representative of the more recently deposited sediment in the catch basin.

Individual sediment grabs were placed into a decontaminated stainless steel bowl for homogenization. Particles greater than 2 centimeters in size were removed from the sample and discarded. To minimize volatile loss, sediment samples designated for volatiles analyses were collected from each catch basin (bowl) prior to homogenization, using an Ez-Draw apparatus.[2] The sample submitted for volatile analysis consisted of sediment subsets collected from various positions within the bowl. After the volatile analysis samples were obtained, the remaining sediment was completely homogenized and placed into pre-cleaned sample containers provided by the analytical laboratory.

All samples were handled and managed in accordance with the SWIA Work Plan. Following sample collection, the labeled sediment sample containers were placed into coolers and iced. All samples were recorded on Chain-of-Custody Forms and were in direct control of field personnel at all times. All samples were delivered to the analytical laboratory, Analytical Resources, Inc. in Tukwila, Washington.

All stainless steel sampling equipment was decontaminated in accordance with the SWIA Work Plan by the analytical laboratory. The Nasco swing arm and the first 6 feet of the extension pole were also decontaminated following the same SWIA Work Plan standard operating procedure prior to sample collection and between sampling locations by field personnel.

Deviations from the work plan during sediment sampling are discussed in Section 4.0. A discussion of analytical test results for the catch basin sediment samples is presented in Section 6.0.

3.3.2.2 Field Observations

The following observations were recorded by field personnel on sample collection field forms as part of the field effort on January 7 and 11, 2010. The field forms documenting the catch basin sediment sample collection effort are included in Appendix D.

The thickness of sediment observed in each catch basin was approximately 1.0 to 1.5 feet. Stagnant water was also present in the Secondary Line Outlet Catch Basin (CB4555 [CS/CB-2]) and the two Main Line Interior Catch Basins (CS/CB-19 and CB-12), with total water depths from the bottom of the catch basins ranging from 1.5 to 2.5 feet. Flowing water was observed at the Main Line Inlet Catch Basin at an approximate depth of 2.5 to 3.0 feet.

[2] The EZ-Draw apparatus is a specialized device designed to minimize volatile loss during sampling.

The sediments collected from Secondary Line Outlet Catch Basin (CB4555 [CS/CB-2]) and the two Main Line Interior Catch Basins (CS/CB-19 and CB-12) were black and organic-rich with an earthy or pungent odor. A petroleum odor was noted at the Main Line Interior Catch Basins (CS/CB-19 and CB-12), but not at the Secondary Line Outlet Catch Basin (CB4555 [CS/CB-2]). Sediments collected from Main Line Inlet Catch Basin consisted of black and gray silt and sand with a pungent, slight petroleum odor. A visible, but non-iridescent, sheen was observed in sediments at each catch basin location.

3.4 STORMWATER DRAINAGE SYSTEM CLEANING

Between January 4, 2010 and February 11, 2010, accumulated sediments were removed from the stormwater catch basins and storm drain conveyance pipes using vactor methods (high velocity vacuum truck). The vactored sediment was placed temporarily in an on-site 20,000-gallon storage tank until the material was removed for off-site disposal on February 11, 2010. The sediment material removed from the catch basins was designated as non-hazardous solid waste in accordance with 40 CFR 261, WAC 173-303-070, and WAC 173-303-100. The sediment was disposed of at the LRI Municipal Solid Waste Landfill in Pierce County. The LRI Landfill is a lined, municipal solid waste handling facility fully permitted to accept non-hazardous industrial wastes under 40 CFR Part 258 and Subtitle D designated material. Additional details regarding analysis and disposal of vactored sediment from the LL Apartments Parcel stormwater drainage system is presented in the Waste Designation Memorandum, in Appendix E.

3.5 STORMWATER DRAINAGE SYSTEM IN-LINE TV INSPECTION

3.5.1 TV In-line Inspection

A system-wide TV in-line inspection was conducted on the entire LL Apartments Parcel storm drainage system between January 20, 2010 and February 8, 2010 by Applied Professional Services (APS) of North Bend, Washington. The purpose of the inspection was to determine the integrity and physical condition of the storm drainage system piping and identify corrosion, cracks, or holes in the pipes. The TV in-line inspection was video-recorded and includes narration by the operator, who described distance markings and real-time visual observations. The inspection recordings were reviewed by the Port to verify the operator's observations and to further evaluate pipe conditions. The visual observations documented by the operator and by the Port include the condition of pipe joints, presence of pipe deposits, and interior pipe wall conditions.

The system-wide LL Apartments Parcel storm drainage system inspection was conducted on 35 of the 36 storm drainage system pipe segments within the LL Apartments Parcel (Figure 3.1). The short segment connecting control structure RCB-7 to Catch Basin CB 22 was not inspected due to access limitations and/or blockage in the conveyance structure. The system pipe segments consist of 12-, 24-, 36- and 54-inch corrugated Armco metal pipe, and one concrete pipe segment (the

segment connecting Catch Basin CB-29 to Catch Basin CB-28). The majority of pipe segments were 12-inch diameter steel pipes. A total of 2,577 lineal feet of pipe was inspected. All inspections were performed on days without precipitation.

Six pipe segments were blocked by debris during the TV in-line inspection. These segments are noted in Table 3.2. Following the system cleaning activities described in Section 3.4, these previously blocked pipe segments were re-evaluated, and video was obtained.

3.5.2 Stormwater Conveyance System Integrity

Table 3.2 presents the results of the TV in-line video inspection, identifying each segment of storm drainage pipe that was inspected with a classification of its condition and comments made by the inspector. The inspected pipe segments and the pipe condition classification codes are also shown in Figure 3.1. Nearly half of the LL Apartments Parcel pipe segments were in good condition with no pipe integrity cracks observed during the inspection. An additional 11 segments contained visible corrosion, but no cracks or holes. Isolated areas of degradation were observed in some of the remaining pipe segments, in the form of cracks or holes, and soil and roots were observed to have entered the storm system at select pipe joints. The TV in-line inspection video and inspection forms produced by APS are presented in Appendix C.

3.6 IN-LINE SOLIDS SAMPLE COLLECTION

In-line stormwater sediment traps were placed in three locations at the LL Apartments Parcel in February 2010 to collect samples representative of solids that are currently conveyed in stormwater through the stormwater conveyance system. The SWIA Work Plan called for placement of these sediment traps at the Main Line Inlet Catch Basin, the Main Line Interior Catch Basin (CB5945), and the Secondary Line Outlet Catch Basin (CB4555 [CS/CB-2]). Following discussions with WSDOE and completion of the limited TV in-line inspection effort (Section 3.3.1), a fourth in-line solids sample collection location was installed. This fourth location was placed within the upgradient pipe segment entering the Main Line Outlet Catch Basin as an attempt to collect a sample of in-line solids exiting the Main Line drainage system as far downgradient as possible, and prior to influence from other off-site sources.

The collection locations of the in-line solids samples were selected to coincide with the storm flow monitoring, stormwater sampling, and catch basin sediment sampling locations to the maximum extent possible. The specific rationale for these locations is presented in Section 2.0. The details of in-line solids sampling are provided below and the general details regarding the sampling activities are included in Stormwater Solids Sampling Event Report (Appendix F).

In-line solids sediment traps were installed after the stormwater drainage system cleanout activities. The sediment traps were inspected after the tenth storm monitoring

event in April 2010 to determine if a sufficient volume of in-line sediment had accumulated since February 2010 to perform chemical analyses. Results of the inspection indicated that there was insufficient volume of material for chemical analysis; additional accumulation time would be necessary to obtain the required sample volume. Therefore, WSDOE approved the Port's request to leave the in-line sediment traps deployed into the 2010 to 2011 wet season. During this additional accumulation period, four inspection events (6/4/10, 6/25/10, 9/3/10, and 11/12/10) were conducted to assess collection bottle capacity and the general condition of each sediment trap, and to perform minor maintenance (e.g., tightening bolts on retainer ring, removing any debris over bottle opening, etc.). After determining that a sufficient volume had accumulated, all stormwater in-line solids were then collected for sample analysis during a single-day event on December 12, 2010.

3.6.1 Sample Collection Methodology, Inspections, and Trap Retrieval

The sampling equipment included stainless-steel sediment trap bottle cradles, stainless-steel brackets, mounting hardware, and glass and Teflon® collection bottles. Sediment traps were strategically mounted at each of the four sampling locations to maximize stormwater solids collection during periods of stormwater runoff and also to try and exclude collecting solids during periods of base flow. Base flow was excluded to provide characterization of only those sediments being mobilized and associated with stormwater flows or storm events. Segregating storm and non-storm elements within piping systems is common because Phase I permits typically require separate characterization of storm and base flow portions of stormwater. The sediment traps were initially installed in early February 2010 after the Port had conducted the final stage of the drainage system cleaning event and the drainage systems were flushed by several rain events. Sediment traps were installed on catch basin vault walls (CB-31A, CB5945, and CB-2) or in the centerline of pipes (CB4857). At vault locations, sediment traps were positioned such that the collection container was set approximately 0.25 inches above the outlet elevation and not directly adjacent to the vault's inlet pipe. The traps passively collect stormwater in-line solids by allowing storm flows to pass over the top of the collection container; thus providing a space where settleable materials can accumulate in a lower energy environment (the collection container). Once set, the sediment traps were left in place to collect solids from each passing storm event.

3.6.1.1 Inspection Activity—April 26, 2010

An in-line solids inspection performed on April 26, 2010 showed that two of the four sample jars (CB-31A and CB5945) were approximately 20 percent full and that the other two jars (CB4857 and CB-2) had very little or no sediment. In order to have sufficient sediment volume for all chemical analyses, at least 75 percent of the sediment trap sample volume is needed. Based on these initial inspection results it was determined that the traps should be left in place until spring 2011. In addition, Taylor Associates, Inc. developed options for reconfiguring or relocating the two traps that were not collecting sediment.

3.6.1.2 Inspection Activity—June 4, 2010

Based on the initial inspection results, field personnel from Taylor Associates, Inc. installed additional traps on June 4, 2010 to aid with sediment accumulation. Four additional containers were placed into the pipe at CB4857. Two of the containers were 16-ounce glass jars that were anchored to the existing sediment trap and two were small rectangular-shaped glass containers anchored to their own base plate. All of the banding material and clamps were stainless steel and the opening on the four additional containers had the same 1¾-inch diameter as the original Teflon trap. The original sediment trap at location CB4857 was also checked and the accumulated sediment volume was only slightly greater than the previous April inspection. It was decided that over the course of the remainder of the summer and fall that the sediment traps would periodically be inspected for percent volume and maintenance purposes.

3.6.1.3 Inspection Activity—June 25, 2010

On June 25, 2010 field personnel inspected the traps set at location CB4857. The sediment traps at this location were approximately 5 percent to 15 percent full. Due to the slow sediment accumulation rate, the next sediment trap and volume inspection was scheduled for the fall.

3.6.1.4 Inspection Activity—September 3, 2010

On September 3, 2010, field personnel inspected all sediment traps installed on the site. During this fall inspection event sediment thickness was measured in all four of the sediment trap locations as well as at two additional catch basins where sediment traps were not installed but catch basin bottom sediment had previously been collected (CB-19 and CB-12). The sediment traps had accumulated approximately 0 to 20 percent of the sediment trap volume, with the exception of location CB4505, which had accumulated 50 percent of the trap volume. The re-accumulated sediment in the non-sediment trap catch basins (CB-19 and CB-12) was negligible.

3.6.1.5 Inspection Activity—November 12, 2010

A final inspection event took place on November 12, 2010 to assess the percent volume in each of the sediment traps. There was a notable increase in all of the bottles from the last inspection. The results of this inspection are presented below:

- CB-31A had accumulated 100 percent of the potential sediment trap volume.
- The main, larger bottle at CB4857 accumulated only 20 percent; however, the four smaller bottles had accumulated 95 percent to 100 percent of the volume.
- CB5945 had accumulated 50 percent of the potential sediment trap volume. It was determined that the accumulated sediment would be sufficient for the majority of the targeted chemical analyses.

- CB-2 had accumulated 10 percent of the potential sediment trap volume—the same accumulation volume as documented during the previous September inspection event. It was determined that this catch basin was unlikely to collect any additional volume.

Based on the results of this inspection event, it was determined that the sediment traps were ready for retrieval and analysis of all accumulated sediment per the SWIA Work Plan.

3.6.1.6 Stormwater Solids Material Retrieval—December 12, 2010

After the last inspection event in November 2010, the sediment traps had accumulated the necessary volume for analysis (CB-31A and CB4857), or accumulated enough volume for the majority of the targeted chemical analyses (CB5945), or showed no capacity for additional accumulation based on the previous 6 months. Therefore, the stormwater in-line solids (sediment) material that had been collected in all of the installed sediment traps was retrieved during a single-day event on December 12, 2010. Each sediment trap container was sealed in place with its original matching lid that had been stored in zip-lock baggies at the Port Storm Lab. No sample fractionation was conducted in the field and no additional quality control samples were collected due to the limited sediment volumes available for chemical analysis.

4.0 Work Plan Deviations

The following sections describe the rationale for several modifications to monitoring and sampling activities described in the LL Apartments SWIA Work Plan (Floyd|Snider and Taylor Associates, Inc. 2009), and the adaptive management or corrective actions that were implemented to maintain data quality and meet the SWIA objectives.

4.1 CATCH BASIN SEDIMENT SAMPLING

The SWIA Work Plan required collecting catch basin sediment samples as part of a single-day field event. The required catch basin sample locations were sampled on January 7, 2010; however, insufficient sample volume was available to be collected at that time for the field duplicate or matrix spike/matrix spike duplicate samples.

This deviation was addressed by performing additional catch basin sediment collection activities at the Main Line Inlet Catch Basin on January 11, 2010 to satisfy the work plan requirements for field quality control samples. The January 11, 2010 sediment sample from the Main Line Inlet Catch Basin was then used for both primary analysis and analysis of quality control samples.

This deviation does not adversely impact the quality of data collected, as the catch basin sediment sample collected dates were completed within 4 days of one another.

4.2 IN-LINE STORMWATER SOLIDS SAMPLING

The SWIA Work Plan required that in-line sediment traps be installed after the stormwater drainage system cleanout activities were performed and then removed at the completion of the SWIA data collection efforts (i.e., after the STE 10 stormwater sample collection).

4.2.1 In-line Sediment Trap Monitoring and Set-up Modifications

Consistent with the SWIA Work Plan, the in-line sediment traps were placed at the locations described above (Section 3.6) in February 2010. The condition of the traps and the volume of accumulated sediment were inspected on April 26, 2010. Field personnel observed that approximately 20 percent of the sample volume required for chemical analyses had accumulated in the sample containers located at the Main Line Inlet and Main Line Interior (CB5945) sample locations, and little to no sediment had accumulated at the Secondary Line Outlet (CB4555 [CS/CB-2]) and Main Line Outlet sample locations.

On June 4, 2010 following inspection of the sediment traps, modifications were made to the set-up at the Main Line Outlet sample location in an attempt to collect a greater volume of in-line sediments. Additional sediment trap containers were placed and shorter containers were used so that sediment could be collected during lower flows. No

modifications could be made to the sampling apparatus at the Secondary Line Outlet (CB4555 [CS/CB-2]) location, as the current placement is the optimal position; the small volume of collected sediment is representative of the volume of solids moving through the stormwater drainage in this location.

Sediment trap inspections were performed on June 25, 2010 and September 3, 2010; however, a significant volume of in-line solids had not yet accumulated in the traps. Another inspection was completed on November 12, 2010 when it was decided that the traps could be removed because there was enough sediment volume for all or the majority of the chemical analyses, or the traps showed no increase in accumulation over the additional collection period and were not likely to collect additional sediment. The traps were removed in a single-day event on December 12, 2010.

The in-line solids sample collection schedule deviation from the work plan did not adversely impact the quality of data from samples collected at the in-line solids locations because the samples were representative of stormwater solids conveyed through the drainage system at the Main Line Inlet location, solids conveyed through the Main Line drainage system at the Main Line Interior Catch Basin (CB5945), and solids discharging from the LL Apartments Parcel at the Main Line Outlet and Secondary Line Outlet (CB4555 [CS/CB-2]) locations. All efforts were made to ensure that adequate volumes of in-line solids were collected for chemical analysis and to achieve the SWIA Work Plan objectives.

4.3 GROUNDWATER ELEVATION MONITORING LOCATIONS

While collecting water level measurements associated with STE 3, a light non-aqueous phase liquid was observed in Monitoring Well MW-1 (less than 0.01-foot in thickness). Groundwater level measurements were discontinued at this location and groundwater elevation gauging during all subsequent monitored storm events (STE 4 through STE 10) was conducted from either Monitoring Well MW-5 or MW-2. An absorbent sock was placed in MW-1 to absorb any light non-aqueous phase liquid that enters the well, and is being monitored periodically by the Port.

This deviation from the work plan does not adversely impact the quality of groundwater elevation data that was collected during monitoring activities for the 10 monitored storm events.

4.4 STORMWATER SAMPLE ANALYTICAL TESTING

Samples collected for analysis of dioxins were provided to the analytical laboratory, where lab staff then split the sample into multiple containers for the various chemical analyses. Typically, samples are split using a Teflon splitter for dioxin samples, due to the potential for dioxin to absorb to conventional polypropylene splitters, and associated risk of sample cross contamination. A deviation from the SWIA Work Plan occurred

during sample processing for stormwater samples collected as part of STE 3 when stormwater samples were incorrectly split using a polypropylene splitter.

In order to address this deviation, an equipment blank sample (laboratory-certified clean water) was run through the polypropylene splitter immediately following processing of the STE 3 stormwater samples. This equipment blank was then analyzed for dioxins on a rush turnaround time. The equipment blank analytical results were non-detect for all dioxin congeners, indicating that no cross contamination had occurred. Following receipt of the non-detect equipment blank, the STE 3 stormwater samples were analyzed, and the data were determined to be appropriate for use. Results of the equipment blank sample are included in Appendix G.

This deviation from the SWIA Work Plan occurred during STE 3 sample processing and does not adversely impact the quality of the dioxins data obtained in stormwater for this event, as demonstrated by the additional quality control sample analysis performed to address this deviation.

5.0 Data Quality Review

Stormwater and sediment analytical data were provided to EcoChem of Seattle, Washington for data validation. A Level III Data Quality Review (Summary Validation) was performed on all the analytical data except dioxins. For dioxins, a Level IV, Tier III Data Quality Review (Full Validation) was performed. The analytical data were validated in accordance with the following:

- U. S. Environmental Protection Agency (USEPA) CLP National Functional Guidelines for Inorganic Data Review (2004)
- USEPA CLP National Functional Guidelines for Organic Data Review (1999 and 2008)
- USEPA CLP Region 10 SOP for Validation of Dioxins and Furans (1996)

All data, as reported, are acceptable for use. A summary report presenting the results of the data validation and quality review is included in Appendix H.

5.1 QUALITY CONTROL SAMPLE COLLECTION

During the first two stormwater sampling events, field duplicate samples and matrix spike/matrix spike duplicate samples were not collected. These quality control samples were collected from all subsequent stormwater monitoring events. For these first two monitored storm events, laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference values.

5.2 DATA QUALIFICATION

The analytical laboratories followed the specified analytical methods, submitted all required deliverables, followed adequate corrective action processes if needed, and any anomalies were discussed in the laboratory report case narratives. The qualifiers that were added to analytical data include the following:

- **J qualifier.** A J qualifier indicates that the analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.
- **JN qualifier.** A JN qualifier indicates that the analyte was tentatively identified, and the associated numerical value is an estimated approximate concentration of the analyte in the sample. This qualifier has been added to results of benzo(b)fluoranthene and benzo(k)fluoranthene, which elute close to each other, and (especially with SIM analysis) cannot be differentiated by the laboratory equipment used for sample analysis. For these compounds, unless there are two peaks observed by the analysis, the laboratory reports both compounds with the same concentration—the averaged sum of the

observed peaks, divided in half. The reported concentrations are estimated with tentative identification, as it is possible that one compound may be underestimated and the other overestimated. This does not impact the data quality, interpretation of the data, or the cPAH toxic equivalency quantity calculation, as both benzo(b)fluoranthene and benzo(k)fluoranthene have the same toxicity equivalency factor.

Data validation reports for all analytical data collected are included in Appendix H. The data validation reports discuss in detail the rationale for the data qualifiers added to analytical data either by the laboratory, or by the validator during review. All data, as qualified, were determined acceptable for use.

6.0 Summary of Analytical Results

The following section summarizes the analytical results of catch basin sediment samples, stormwater samples, and in-line solids samples collected at the LL Apartments Parcel as part of the SWIA. Statistical evaluation of the analytical results is included in Section 7.0. Table 6.1 presents the analytical data from the catch basin sediment sampling events. Table 6.2 presents the stormwater analytical data for Storm Events 1 through 10. Table 6.3 presents the analytical data from the in-line solids sampling event.

The calculation of cPAH total toxic equivalency quotient (TEQ) concentrations was performed using the California Environmental Protection Agency 2005 toxicity equivalency factors (TEFs) as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007). A TEF value was assigned to each cPAH, which are high molecular-weight polycyclic aromatic hydrocarbon (HPAH) compounds, relative to the carcinogenicity of benzo(a)pyrene. TEQ values were determined using two approaches to handling non-detected compounds: (1) use of one-half of the method reporting limit for non-detected compounds and (2) use of zero values for non-detected compounds. The TEQ values that were derived utilizing one-half of the reporting limit are discussed below.

The TEF and TEQ method was also used to evaluate dioxins, consistent with the method used for PAHs and as described in the SWIA Work Plan. The dioxin congener TEFs used to calculate TEQ values were the World Health Organization 2005 TEFs (van den Berg et al. 2006) as presented in Table 708-1 of WAC 173-340-900. Consistent with the approach for cPAH TEQ values, dioxin TEQ values were determined using the two approaches for addressing non-detected congeners. TEQ values derived utilizing one-half of the reporting limit are discussed below.

6.1 CATCH BASIN SEDIMENT SAMPLING ANALYTICAL RESULTS

Catch basin sediment samples were analyzed for the following parameters, as specified in the SWIA Work Plan:

- Total solids by USEPA Method 2540
- Total organic carbon (TOC) by Method Plumb 1981
- Arsenic and lead by USEPA Method 6010
- TPH (diesel and oil range) by NWTPH-Dx
- Polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270
- PCP by USEPA Method 8041
- Volatile organic compounds (VOCs): PCE, TCE, and 1,2-DCA by USEPA Method 8260C
- Dioxin/furans by USEPA Method 1613

For completeness and although not required in the SWIA Work Plan, the PCE and TCE breakdown products cis-1,2-dichloroethene and trans-1,2-dichloroethene (1,2-DCE) were also analyzed for using USEPA Method 8260C.

Adequate sediment sample volumes were collected from each sampling location such that analyses were performed for all parameters except for the sample collected from the Main Line Outlet (CB4857) on December 10, 2009, which was not analyzed for VOCs due to limited sediment volume.

Analytical results for all catch basin sediment samples are summarized below and presented in Table 6.1. Analytical laboratory reports, including Chain-of-Custody Forms, are presented in Appendix I.

In the following sections the catch basin sediment sampling results are summarized by analyte group. The results for each analyte group are presented for the sediment samples collected from the Main Line Inlet Catch Basin (CB-31A and field duplicate), the Main Line Interior Catch Basins (CS/CB-19 and CB-12), the Main Line Outlet Catch Basin (CB4857), and the Secondary Line Outlet Catch Basin (CB4555 [CS/CB-2]).

6.1.1 Conventionals

6.1.1.1 Total Solids

The highest total solids content was measured at both the Main Line Inlet to the LL Apartments Parcel (83.2 percent) and the Main Line Outlet from the parcel (85.1 percent). The lowest total solids percentages of 23.5 percent and 20.6 percent were measured in sediments collected from the two Main Line Interior Catch Basins (CS/CB-19 and CB-12).

6.1.1.2 Total Organic Carbon

The highest TOC contents, 40.7 percent and 44.6 percent, were measured in sediment collected from the two Main Line Interior Catch Basins (CS/CB-19 and CB-12). The lowest TOC percentage of 1.29 percent was measured in sediments collected from the Main Line Outlet, followed by TOC percentages of 3.38 percent and 3.36 percent measured in the Main Line Inlet to the LL Apartments Parcel. A TOC percentage of 28.3 percent was measured in the Secondary Line Outlet Catch Basin (CB4555 [CS/CB-2]).

6.1.2 Arsenic and Lead

Arsenic was not detected in sediment collected from the five sampled catch basins.

Lead was detected in each of the five catch basin sediment sampling locations. The highest lead concentration, 322 mg/kg, was measured in sediments collected from the Secondary Line Outlet (CB4555 [CS/CB-2]). Lead concentrations measured in

sediments collected from catch basins within the Main Line Interior (CS/CB-19 and CB-12) ranged from 243 mg/kg up to 270 mg/kg.

The lowest concentration of lead was measured in sediments collected from the Main Line Inlet to the LL Apartments Parcel (31 mg/kg). A lead concentration of 42 mg/kg was measured in sediment collected from the Main Line Outlet.

6.1.3 Volatile Organic Compounds

The following VOCs were not detected in samples collected during the sediment sampling event: PCE, TCE, breakdown products cis-1,2-dichloroethene and 1,2-DCE, and 1,2-DCA.

6.1.4 Semivolatile Organic Compounds

6.1.4.1 Polycyclic Aromatic Hydrocarbons

6.1.4.1.1 Low Molecular-weight Polycyclic Aromatic Hydrocarbons

In sediments collected from the five catch basin locations, the majority of low molecular-weight polycyclic aromatic hydrocarbons (LPAHs) were not detected, with one or two LPAH analytes detected in each sample. Phenanthrene was the one LPAH detected in all sediment samples.

The highest detected LPAH concentration was phenanthrene at 1,000 µg/kg in sediments collected from Catch Basin CS/CB-19. This catch basin is located directly downgradient of the Main Line Inlet. Further downgradient in the other Main Line Interior Catch Basin (CB-12), a phenanthrene concentration of 460 µg/kg was detected. 2-Methylnaphthalene was also detected in catch basin sediment from Catch Basin CS/CB-19 at a concentration of 550 µg/kg.

Phenanthrene was the only LPAH detected in sediment samples collected from the Main and Secondary Line Outlet (CB4555 [CS/CB-2]) Catch Basins. Phenanthrene was detected at a concentration of 340 µg/kg at the Secondary Line Outlet (CB4555 [CS/CB-2]). The lowest phenanthrene concentration, 36 µg/kg, was measured at the Main Line Outlet.

The concentration of phenanthrene measured in sediment from the Main Line Inlet was 180 µg/kg. Low level concentrations of anthracene (34 µg/kg), acenaphthene (13 µg/kg), and fluorene (16 µg/kg) were also detected in the sediment sample from the Main Line Inlet. No other LPAHs were detected in the sediment samples from the Main Line Inlet Catch Basin.

6.1.4.1.2 High Molecular-weight Polycyclic Aromatic Hydrocarbons

HPAHs were detected in all catch basin samples. The highest HPAH concentrations were detected in sediments collected from a Main Line Interior Catch Basin (CS/CB-19).

HPAHs measured in sediments collected from the Main Line Interior Catch Basin (CS/CB 19) range from non-detect for benzo(g,h,i)perylene and dibenzo(a,h)anthracene to a concentration of 3,200 µg/kg for pyrene. HPAH concentrations ranging from non-detect for dibenzo(a,h)anthracene to a concentration of 1,700 µg/kg for pyrene were also detected in sediments collected from the Main Line Interior Catch Basin (CB-12).

The lowest HPAH concentrations were measured in sediments sampled from the Main Line Outlet; these concentrations ranged from non-detect for dibenzo(a,h)anthracene to 73 µg/kg for fluoranthene.

HPAH concentrations measured in sediments sampled from the Main Line Inlet Catch Basin ranged from non-detect for dibenzo(a,h)anthracene to 340 µg/kg for fluoranthene. HPAH concentrations for sediments collected from the Secondary Line Outlet (CB4555 [CS/CB-2]) ranged from non-detect for dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene to a concentration of 1,500 µg/kg for pyrene.

6.1.4.1.3 Carcinogenic Polycyclic Aromatic Hydrocarbon Toxic Equivalency Quotient Values

The highest cPAH TEQ concentration (calculated using one-half of the method reporting limit) was 1,510 µg/kg, measured for sediments collected from the Main Line Interior Catch Basin (CS/CB-19). cPAH TEQ values decrease downgradient to concentrations of 570 µg/kg and 421 µg/kg for sediments sampled from the Main Line Interior Catch Basin (CB-12), and the Secondary Line Outlet (CB4555 [CS/CB-2]), respectively. The lowest cPAH TEQ concentration was measured for sediments sampled the furthest downgradient at the Main Line Outlet (59 µg/kg).

At the Main Line Inlet, the cPAH TEQ concentration was 153 µg/kg and 63 µg/kg for the field duplicate.

6.1.4.2 Pentachlorophenol

PCP was detected at two of the five catch basin locations: the Main Line Inlet to the LL Apartments Parcel and the Main Line Outlet from the parcel.

The highest PCP concentration was measured in the field duplicate collected at the Main Line Inlet. The PCP concentration for the parent sample collected at the Main Line Inlet was 25 µg/kg, and the duplicate sample was 84 µg/kg. PCP was measured at a concentration of 71 µg/kg in sediments collected from the Main Line Outlet. PCP was not detected in sediments collected from the Main Line Interior catch basins or the Secondary Line Outlet Catch Basin (CB4555 [CS/CB-2]).

6.1.5 Dioxins

The results as discussed below are for the dioxin TEQ values derived using one-half of the method reporting limit. Dioxin congeners were detected in each sample collected at the five catch basin sediment sampling locations. The highest dioxin TEQ

concentrations were measured in the two Main Line Interior Catch Basins (CS/CB-19 and CB-12). The highest dioxin TEQ concentration measured in sediments collected from the Main Line Interior Catch Basin (CB-12) was 143.1 pg/g. The lowest dioxin TEQ concentration (13.4 pg/g) was measured in sediments collected at the Main Line Outlet.

The TEQ concentration measured for sediments collected from the Main Line Interior Catch Basin (CS/CB-19) was 89.5 pg/g and 36 pg/g at the Main Line Inlet. The TEQ concentration measured for sediments collected downgradient at the Secondary Line Outlet (CB4555 [CS/CB-2]) was 44.9 pg/g.

6.1.6 Petroleum Hydrocarbons

Diesel and heavy oil range TPH were detected in each sample collected at the five catch basin sediment sampling locations.

6.1.6.1 Diesel Range Hydrocarbons

The highest diesel range TPH concentrations were measured in sediments collected from the two Main Line Interior Catch Basins (CS/CB-19 and CB-12), ranging from a maximum of 4,200 mg/kg at CB-19 to 1,300 mg/kg at CB-12. The next highest diesel TPH concentration was measured in sediments collected from the Secondary Line Outlet (CB4555 [CS/CB-2]) at a concentration 1,200 mg/kg.

The lowest detected concentrations of diesel range TPH were measured at the Main Line Outlet Catch Basin (19 mg/kg) and at the Main Line Inlet Catch Basin (54 mg/kg for the parent sample and 31 mg/kg for the duplicate sample).

6.1.6.2 Heavy Oil Range Hydrocarbons

Consistent with the diesel range TPH concentrations, the heavy oil range TPH concentrations were highest for sediments collected from the two Main Line Interior Catch Basins (CS/CB-19 and CB-12). Heavy oil range TPH concentrations ranged from 6,600 mg/kg at CB-12 to 18,000 mg/kg at CB-19. The next highest diesel TPH concentration was measured in sediments collected from the Secondary Line Outlet (CB4555 [CS/CB-2]) at a concentration of 6,100 mg/kg.

The lowest detected concentrations of heavy oil range TPH were at the stormwater Main Line Outlet (160 mg/kg) and at the Main Line Inlet (270 mg/kg for the parent sample and 200 mg/kg for the duplicate sample).

6.2 STORMWATER SAMPLING ANALYTICAL RESULTS

Stormwater samples collected during the 10 monitoring events were analyzed for the following parameters, as specified in the SWIA Work Plan:

- PAHs by USEPA Method 8270D-SIM-Low Level

- PCP by USEPA Method 8041
- TPH (diesel and oil range) by NWTPH-Dx
- Arsenic (total and dissolved) by USEPA Method 200.8
- Dioxin/furans by USEPA Method 1613
- PCE, TCE, and 1,2-DCA by USEPA Method 8260C-SIM
- Total suspended solids (TSS) by USEPA Method 2540

In addition, the pH of all stormwater composite samples was measured at the Port's Stormwater Laboratory prior to the delivery of samples to the analytical laboratory.

For completeness and although not required in the SWIA Work Plan, the PCE TCE, and breakdown products cis-1,2-dichloroethene and 1,2-DCE, were also analyzed using USEPA Method 8260C.

Adequate stormwater sample volumes were collected from each sampling location such that analyses were performed for all parameters.

Analytical results for all monitored storm event analytical samples are summarized below and presented in Table 6.2. Analytical laboratory reports, including Chain-of-Custody forms, are presented in Appendix I.

In the following sections, the stormwater sampling results are summarized by analyte group. The results for each analyte group are presented for the stormwater samples collected from the Main Line Inlet Catch Basin, the Main Line Outlet Catch Basin, and the Secondary Line Outlet Catch Basin (CB-1).

6.2.1 Conventionals

6.2.1.1 Total Suspended Solids

The highest TSS concentration was detected at the Main Line Inlet location at a concentration of 59 mg/L. The highest detection occurred during Storm Event 2. STE 2 was a 7-hour 25-minute storm event, with 0.25 inches of total rainfall. The second highest TSS measurement of 51.9 mg/L was also measured at the Main Line Inlet during STE 7, which was a 51-hour 55-minute storm with an associated 1.49 total inches of rainfall. The lowest TSS detection of 3.4 mg/L was measured at the Secondary Line Outlet (CB-1) during STE 9. STE 9 was a 12-hour storm with a total measured rainfall of 0.16 inches.

6.2.1.2 pH

Measurements of pH during the 10 monitored storm events ranged from 6.22 at the Main Line Inlet during STE 10, to 7.09 measured at the Main Line Outlet during STE 9.

Measurements of pH for all monitored storm events at the Secondary Line Outlet (CB-1) ranged from 6.25 to 6.82.

6.2.2 Arsenic (Total and Dissolved)

Total and dissolved arsenic were detected in each of the samples collected at three stormwater sampling locations for the 10 monitored storm events.

The highest dissolved arsenic concentration was measured in the sample collected at the Secondary Line Outlet (CB-1) during STE 3, at a concentration of 1 µg/L. The highest detected total arsenic concentration of 1.3 µg/L was also measured at the Secondary Line Outlet (CB-1) during STE 3. STE 3 was a 27-hour duration storm event with a total of 0.52 inches of rainfall.

The lowest dissolved arsenic concentration of 0.2 µg/L was observed during STE 8 at the Secondary Line Outlet (CB-1). The lowest detected total arsenic concentration of 0.3 µg/L was also measured at the Secondary Line Outlet (CB-1) during STE 8. STE 8 was a longer duration (33 hours, 45 minutes) storm event, with a total rainfall of 0.67 inches.

Dissolved arsenic concentrations for the 10 monitored storm events at the Main Line Inlet and Main Line Outlet ranged from 0.3 µg/L to 0.6 µg/L. Total arsenic concentrations at the Main Line Inlet and the Main Line Outlet ranged from 0.5 µg/L to 1.2 µg/L over the 10 storm monitoring events.

6.2.3 Volatile Organic Compounds

The following VOCs were not detected in samples collected during the 10 monitored storm events from the three monitoring locations: PCE, TCE, breakdown products cis-1,2-dichloroethene and 1,2-DCE, and 1,2-DCA.

6.2.4 Semivolatile Organic Compounds

6.2.4.1 Polycyclic Aromatic Hydrocarbons

6.2.4.1.1 Low Molecular-weight Polycyclic Aromatic Hydrocarbons

LPAHs were detected in each of the samples collected at the three sampling locations during the 10 monitored storm events.

Two individual LPAHs (acenaphthalene and anthracene) were not detected in any sample collected at the three sampling locations during the monitoring program.

The highest total LPAH concentration observed, 0.2 µg/L, was measured at the Main Line Inlet during STE 1. STE 1 was an 8-hour, 10-minute storm event, with a total rainfall of 0.48 inches. LPAHs were not detected at the Secondary Line Outlet (CB-1)

during four monitored storm events (STEs 6, 7, 9, and 10). These storm events ranged in duration from 9 hours, 35 minutes to 51 hours, 55 minutes, with total rainfall ranging from 0.16 inches to 1.49 inches.

Total LPAH concentrations at the Main Line Outlet ranged from 0.01 µg/L to 0.17 µg/L (Table 6.2).

6.2.4.1.2 High Molecular-weight Polycyclic Aromatic Hydrocarbons

HPAHs were detected in all stormwater samples collected from two of the three sample locations. HPAHs were not detected in samples collected from the Secondary Line Outlet Catch Basin (CB-1).

The highest total HPAH concentration of 0.75 µg/L was measured in stormwater at the Main Line Inlet during STE 2. STE 2 was a 24-hour duration storm event with an associated total rainfall of 0.34 inches.

Total HPAH concentrations measured at the Main Line Outlet ranged from 0.04 µg/L to 0.54 µg/L.

6.1.4.1.3 Carcinogenic Polycyclic Aromatic Hydrocarbon Toxic Equivalency Quotient Values

The results discussed below present the cPAH TEQ values calculated using one-half of the method reporting limit for non-detects. The highest cPAH TEQ concentration of 0.071 µg/L was measured from the Main Line Inlet during STE 2. TEQ concentrations measured at the Main Line Outlet ranged from non-detect to 0.046 µg/L. CPAHs were not detected at the Secondary Line Outlet (CB-1) during the 10 monitored storm events.

6.2.4.2 Pentachlorophenol

PCP was detected in samples collected at two of the three sampling locations. PCP was not detected in samples collected from the Secondary Line Outlet (CB-1) location.

The highest detected PCP concentration was 1.5 µg/L in a sample collected at the Main Line Inlet during STE 5. STE 5 was a 3-hour 55-minute storm event with an associated rainfall of 0.08 inches.

PCP concentrations in samples collected from the Main Line Outlet ranged from non-detect to 1.3 µg/L, measured during STE 7. STE 7 was a 51-hour 55-minute storm with an associated 1.49 total inches of rainfall.

6.2.5 Dioxins

Dioxins were detected in all stormwater samples collected from the three monitoring locations. The TEQ values that were calculated utilizing one-half of the method reporting limit are discussed below.

The highest dioxin TEQ concentration measured for stormwater was 37.2 pg/g, and was collected from the Main Line Inlet during STE 7. STE 7 was a 51-hour 55-minute storm with an associated 1.49 total inches of rainfall.

The lowest dioxin TEQ concentration was measured at the Secondary Line Outlet (CB-1) at 1.3 pg/g, during STE 6 which was a 22-hour 20-minute storm with an associated 0.64 total inches of rainfall.

The TEQ concentrations measured in stormwater collected from the Main Line Inlet ranged from 7.4 pg/g to 37.2 pg/g, while samples collected from the Main Line Outlet ranged from 4.2 pg/g to 29.82. The TEQ concentrations measured for stormwater collected from the Secondary Line Outlet (CB-1) ranged from 1.3 pg/g to 4.6 pg/g.

6.2.6 Petroleum Hydrocarbons

Diesel and heavy oil range TPH were detected in two of the three stormwater sampling locations during the 10 monitored storm events. Diesel and heavy oil range TPH were not detected in samples collected at the Secondary Line Outlet (CB-1).

6.2.6.1 Diesel Range Hydrocarbons

The highest detected concentration of diesel range TPH was 1.6 mg/L, measured at the Main Line Inlet during STE 1.

Diesel range TPH was detected at the Main Line Inlet during five monitored storm events, with concentrations ranging from 0.3 mg/L to 1.6 mg/L.

Diesel range TPH was detected during two monitoring events at the Main Line Outlet (STE 1, STE 3), with concentrations of 0.43 mg/L and 0.29 mg/L respectively.

Diesel range TPH was not detected in samples collected from the Secondary Line Outlet (CB-1).

6.2.6.2 Heavy Oil Range Hydrocarbons

The highest detected concentration of heavy oil range TPH was 7.5 mg/L measured at the Main Line Inlet during STE 1.

Heavy oil range TPH was detected in all but one sample collected at the Main Line Inlet, with concentrations ranging from 0.5 mg/L to 7.5 mg/L. Heavy oil range TPH was detected in 5 of the 10 sampling events at the Main Line Outlet, with concentrations ranging from 0.57 mg/L to 2.4 mg/L.

Heavy oil range TPH was not detected in samples collected from the Secondary Line Outlet (CB-1).

6.3 STORMWATER IN-LINE SOLIDS SAMPLING ANALYTICAL RESULTS

Stormwater in-line solids samples were analyzed for the following parameters, as specified in the SWIA Work Plan:

- Total solids by USEPA Method 2540
- Total organic carbon (TOC) by Method Plumb 1981
- Arsenic and lead by USEPA Method 6010
- TPH (diesel and oil range) by NWTPH-Dx
- Polycyclic aromatic hydrocarbons (PAHs) by USEPA Method 8270
- PCP by USEPA Method 8041
- Dioxin/furans by USEPA Method 1613

From all in-line solids sample locations except one, sufficient volumes were collected to enable all planned analyses. Due to limited in-line solids sample volume collected from the Secondary Line Outlet (CB-2), sediment from that location was not analyzed for TOC, arsenic, lead, TPH, or PCP, consistent with the prioritization established in the SWIA Work Plan.

Analytical results for all in-line solids sediment samples are summarized below and presented in Table 6.3. Analytical laboratory reports are presented in Appendix I.

In the following sections the in-line solids sampling results are summarized by analyte group. The results for each analyte group are presented for the in-line solids samples collected from the sediment traps installed in the Main Line Inlet Catch Basin (CB-31A), the Main Line Interior Catch Basin (CB5945), the Main Line Outlet Catch Basin (CB4857), and the Secondary Line Outlet Catch Basin (CB4555 [CB-2]).

6.3.1 Conventionals

6.3.1.1 Total Solids

The highest total solids content of 70.2 percent was measured at the sediment trap in the Main Line Outlet to the LL Apartments Parcel (CB4857). The lowest total solids percentage of 21.4 percent was measured in in-line solids collected from the trap at the Secondary Line Outlet (CB-2). The Main Line Inlet sediment trap (CB-31A) and the Main Line Interior trap (CB5945) had total solids percentages of 65.7 percent and 51.8 percent, respectively.

6.3.1.2 Total Organic Carbon

The highest percentages of TOC, 9.97 percent and 9.42 percent, were measured in in-line solids collected from the Main Line Interior trap (CB5945) and the Main Line Inlet trap (CB-31A), respectively. The lowest TOC percentage of 5.28 percent was measured

from the in-line solids collected from the trap in the Main Line Outlet (CB4857). Due to insufficient collection volume, TOC was not analyzed for in the in-line solids collected by the sediment trap at the Secondary Line Outlet (CB-2).

6.3.2 Arsenic and Lead

Arsenic was not detected in solids collected from the three sediment traps that were analyzed for metals. As stated above, due to insufficient sediment sample volume, metals were not analyzed in the sample collected in the trap at the Secondary Line Outlet (CB-2).

Lead was detected in each of the three in-line solids sampling locations that were analyzed for metals. The highest lead concentration, 208 mg/kg, was measured in in-line solids collected from the Main Line Interior trap (CB5945). The lowest concentration of lead was measured in in-line solids collected via the trap at the Main Line Inlet to the LL Apartments Parcel (64 mg/kg; CB-31A). A lead concentration of 130 mg/kg was measured in in-line solids collected from the trap at the Main Line Outlet (CB4857).

6.3.3 Semivolatile Organic Compounds

6.3.3.1 Polycyclic Aromatic Hydrocarbons

6.3.3.1.1 Low Molecular-weight Polycyclic Aromatic Hydrocarbons

For the in-line solids collected from the four sediment trap locations, phenanthrene was the only detected LPAH.

Phenanthrene was detected in three of the four in-line solids sediment samples. The highest detected phenanthrene concentration was 690 µg/kg in in-line solids collected from the trap located in the Main Line Interior (CB5945). The next highest phenanthrene concentration was 390 µg/kg, detected in the in-line solids collected from the Main Line Inlet trap. The lowest detectable concentration was found in the in-line solids collected from the trap at the Main Line Outlet (230 µg/kg).

No LPAHs were detected in the in-line solids from the Secondary Line Outlet trap.

6.3.3.1.2 High Molecular-weight Polycyclic Aromatic Hydrocarbons

HPAHs were detected in all four of the in-line solids sediment trap samples. Total HPAH concentrations ranged from 2010 µg/kg in in-line solids collected from the Main Line Interior trap (CB5945) to 6570 µg/kg in in-line solids collected from the Secondary Line Outlet trap (CB-2). The total HPAH concentration detected in in-line solids collected from the trap at the Main Line Outlet (CB4857) was 2550 µg/kg and 3290 µg/kg from in-line solids collected at the Main Line Inlet sediment trap (CB-31A).

The HPAHs that were detected in all four in-line solids samples were total benzoflouranthenes, chrysene, fluoranthene, and pyrene. Concentrations of total

benzoflouranthenes ranged from 600 µg/kg at the Secondary Line Inlet trap (CB-2) to 1,400 µg/kg at the Main Line Interior trap (CB5945). Concentrations of chrysene ranged from 330 µg/kg at the Main Line Outlet trap (CB4857) to 820 µg/kg at the Main Line Interior trap (CB5945). Concentrations of fluoranthene ranged from 570 µg/kg at both the Secondary Line Outlet trap (CB-2) and the Main Line Outlet trap (CB4857) to 1,700 µg/kg at the Main Line Interior trap (CB5945). Lastly, concentrations of pyrene ranged from 400 µg/kg at the Secondary Line Outlet trap (CB-2) to 1,100 µg/kg at the Main Line Interior trap (CB5945).

6.3.3.1.3 Carcinogenic Polycyclic Aromatic Hydrocarbon Toxic Equivalency Quotient Values

The highest cPAH TEQ concentration (calculated using one-half of the method reporting limit) was 801 µg/kg, measured in in-line solids collected from the Main Line Interior trap (CB5945). The lowest TEQ concentration was 328 µg/kg for in-line solids that were collected via the trap at the Main Line Outlet (CB4857). TEQ concentrations at the Secondary Line Outlet trap (CB-2) and the Main Line Inlet trap (CB-31A) were 474 µg/kg and 400 µg/kg, respectively.

6.3.3.2 Pentachlorophenol

The in-line solids collected from the trap at the Secondary Line Outlet (CB-2) were not analyzed for PCP due to insufficient sample collection volume. Although PCP was analyzed for and detected in each of the other three in-line solids sediment trap samples.

The highest PCP concentration was measured from the in-line solids collected in the trap at the Main Line Outlet (CB4857). The concentration at this location was 79 µg/kg. The lowest concentrations of PCP were found in in-line solids collected in the Main Line Interior (CB5945) and Main Line Inlet (CB-31A) traps. The concentrations at these locations were 55 µg/kg and 50 µg/kg, respectively.

6.3.4 Dioxins

The results discussed below are dioxin TEQ values that were derived using one-half of the method reporting limit. Dioxin congeners were detected in each sample collected at the four in-line solids sampling locations. The highest dioxin TEQ concentration was measured in the Main Line Interior trap (CB5945). The TEQ value at this location was 181 pg/g. The lowest dioxin TEQ concentration of 44 pg/g was measured in in-line solids collected at the Secondary Line Outlet trap (CB-2).

The TEQ concentration measured for in-line solids collected from the Main Line Inlet trap (CB-31A) was 107 pg/g and the TEQ concentration measured for in-line solids collected at the Main Line Outlet trap (CB4857) was 63 pg/g.

6.3.5 Petroleum Hydrocarbons

Diesel and heavy oil range TPH were detected in samples from three of the four in-line solids sediment traps. The fourth trap, located at the Secondary Line Outlet (CB-2), was not analyzed for TPH due to insufficient sample collection volume.

6.3.5.1 Diesel Range Hydrocarbons

The highest diesel range TPH concentration was measured in in-line solids collected from the Main Line Interior trap (CB5945) at a concentration of 590 mg/kg. The next highest diesel TPH concentration was measured in in-line solids collected from the Main Line Inlet trap (CB-31A) at a concentration 290 mg/kg. The lowest detected concentration of diesel range TPH was measured at the Main Line Outlet trap (CB4857) at a concentration of 200 mg/kg.

6.3.5.2 Heavy Oil Range Hydrocarbons

Consistent with the diesel range TPH concentrations, the highest heavy oil range TPH concentration was measured in in-line solids collected from the Main Line Interior trap (CB5945) at a concentration of 2,000 mg/kg. The concentration of heavy oil range TPH was 1,200 mg/kg in samples taken from both the Main Line Inlet trap (CB-31A) and the Main Line Outlet trap (CB4857).

7.0 Stormwater Statistical Evaluation

This section summarizes the results of a statistical evaluation of stormwater sample data collected as part of LL Apartments Parcel SWIA. The purpose of this statistical analysis is to compare the quality of the stormwater entering the LL Apartments Parcel to the quality of the stormwater leaving the parcel. The analysis also identifies statistically significant changes in analyte concentrations.

In accordance with the SWIA Work Plan, the statistical evaluation of stormwater monitoring data presented in this section consists of the following:

- **Site-wide Statistical Summary:** Assess the overall range and statistical characteristics of the LL Apartments Parcel stormwater quality and upgradient stormwater quality at multiple monitoring locations (i.e., catch basins) for each analyte of concern using probability plots.
- **Intra-catch Basin Data Comparison:** Characterize each individual data set for each analyte monitored at each catch basin location by defining data distributions and identifying outliers.
- **Site-wide Variability:** Evaluate the degree of variation in the stormwater quality as detected at individual monitoring locations using box plots and analysis of variance (ANOVA) or, where appropriate, other comparable comparison of means tests.

7.1 STATISTICAL METHODS

Statistical analysis and calculation of summary statistics were performed using the USEPA-recommended software program ProUCL Version 4.00.04. Additional required statistical methods (comparison of means and graphical box plots) that are not available with ProUCL were conducted using the Minitab Version 15 software program. The handling of non-detect data differs between the ProUCL and Minitab statistical programs due to the difference in statistical methods and software abilities. In all ProUCL analyses, non-detects were labeled as such and no substitution method was used. For all Minitab analyses non-detects were entered as one-half the reporting limit and were not identified as non-detects.

The calculation of means for data sets that include multiple non-detect results often requires the use of a more sophisticated mean calculation to account for the non-detect detection limits, rather than assigning the non-detect results a value of zero or one-half the reporting limit. Therefore, means were calculated as either arithmetic means or Kaplan-Meier means, as appropriate for the data. Arithmetic means were used for data sets without non-detects and data sets in which a single detection limit was used to define non-detect data. The Kaplan-Meier method was used for data sets with non-detect data defined by multiple detection limits, a condition for which the method was specifically designed (Helsel 2005, Singh and Singh 2007, Singh et al. 2007). The Kaplan-Meier method uses a cumulative distribution function, assigning a ranking

(percentage) to each detected value based on the number of detects and non-detects greater than and less than that value, and results in a distribution curve that is based on the detected values, but influenced by the multiple detection limits. For example, there were several stormwater samples with detected concentrations of benzo(a)anthracene and several non-detect results at various detection limits. Therefore, the Kaplan-Meier method was used to calculate the mean concentration in order to account for the non-detect results as well as the detected concentrations.

Testing statistically significant variations in the data set was performed using comparison of means in one-way ANOVA or Kruskal-Wallis nonparametric comparison of means tests. Prior to running the comparison of means tests, assumptions of normality were assessed. Where data met the assumption, comparison of means were tested using ANOVA; where the assumption was not met (i.e., the data distribution was not normal), the comparison of means was tested using the Kruskal-Wallis nonparametric method. The 95 percent upper confidence limit (UCL) was calculated in ProUCL, which determines the best statistical method for calculating the UCL based on the distribution of the data set, sample size, and number of non-detects. Potential outlier data points should be evaluated when assessing the use of UCLs.

7.2 SITE-WIDE STATISTICAL SUMMARY

The site-wide statistical analysis reviewed pooled data (each analyte from each data collection location, for each sampling event). This analysis provides an overview of stormwater quality for the analytes of concern and allows the overall consistency of the data and stormwater quality to be assessed by examining the statistical frequency distribution of the data.

Summary statistics for each individual catch basin location sampled during interim action stormwater monitoring are presented in Table 7.1. The summary statistics include maximum and minimum concentrations, the data set means and standard deviations, the type of data distribution, 95 percent UCL and also outlier concentrations. The 95 percent UCL is the concentration at which 95 percent of samples may be expected to contain the true mean. An outlier concentration is a value that appears to numerically deviate significantly from the other values measured in the data set for each catch basin location and/or analyte group. All data, including statistical outliers, were included in the interpretation and statistical analyses of the data, and the entire data set, including statistical outliers, is stored in the project database and also submitted to WSDOE's environmental information management (EIM) database. Summary statistics for data from the stormwater Main Line Inlet Catch Basin (CB-31A) are presented in Table 7.2. Summary statistics for combined data for the stormwater Main Line Outlet Catch Basin (CB4857) and the Secondary Line Outlet Catch Basin (CB-1) are presented in Table 7.3. A comparison of these two tables shows the differences in quality between the stormwater data entering the LL Apartments Parcel and that leaving the parcel.

Statistical values for all data sets were calculated for both approaches to calculating cPAH and dioxin TEQ values, using one-half the reporting limit for non-detects and setting non-detects to zero. The results of the statistical evaluations using these approaches are presented in Tables 7.1, 7.2, and 7.3. The following sections discuss the statistical analyses of cPAH and dioxin results using one-half the reporting limit for non-detects, as it is the more conservative approach[3].

Results of the site-wide statistical analysis are summarized in the following sections. Overall, the statistical analysis of site-wide variability, including comparison of means tests for stormwater samples from the Main Line Inlet compared to the Main Line Outlet, show that there are no statistically significant changes in analyte concentrations (i.e., stormwater quality is not degraded) as stormwater is conveyed across the LL Apartments Parcel.

7.3 INTRA-CATCH BASIN DATA COMPARISON

The statistical characteristics and presence of significant trends in the data for each analyte at each individual catch basin location were determined on an intra-catch basin basis by assessing the probability distribution and plotting time series graphs for each analyte. Mean analyte concentrations before and after the stormwater drainage system cleaning effort were also compared using either the ANOVA or Kruskal-Wallis comparison of means test to determine whether the system cleaning had a measurable effect on the stormwater quality at the LL Apartments Parcel.

The data for each analyte at each catch basin sample location were assessed for distribution (normal, lognormal, gamma, and no discernible distribution pattern) using the Shapiro-Wilk test statistic in ProUCL and the appropriate statistical method was used for that data set. Historically, typically large environmental data sets are observed to have a log-normal distribution; however, with smaller data sets the data distribution is often difficult to discern.

The summary statistics for the individual catch basins are presented in Table 7.1. The statistical summary of each analyte in each catch basin is presented for only those analytes that were detected during a minimum of one monitoring event. Analytes that were not detected throughout the stormwater interim action monitoring events, such as some SVOCs, and all VOCs, are not included in the table.

[3] In addition to calculating statistical values setting non-detects to one-half the reporting limits, statistical values were also calculated setting non-detects to zero values in order to provide valid additional information about data distributions and data comparisons and to identify any uncertainty or potential meaningful differences in the two approaches. However, following completion of the statistical analysis, data sets collected as part of the SWIA effort resulted in consistent statistical values with both approaches to handling non-detects and provided sufficient statistical certainty such that, although calculated, the non-detect “zero” value calculations are not used in the evaluations provided in this report.

7.3.1 Main Line Inlet Catch Basin (CB-31A)

Analyte concentrations measured in stormwater collected from the Main Line Inlet are shown as time series graphs (concentrations vs. storm event), in Figure 7.1. In discerning trends in the stormwater monitoring data for this location, the COCs fall into two distinct groupings. One group of analytes (cPAH TEQ, and both diesel range and heavy oil range TPH) achieves maximum concentrations at the beginning of the study, remain elevated through STE 3 (the event following the vactor cleaning), then, for STE 4, decrease to concentrations near the reporting limits and remain relatively low for the remainder of interim action monitoring.

The second group of analytes (dioxin TEQ, total and dissolved arsenic, PCP, and TSS) shows no consistent pattern in concentration over time through the duration of stormwater monitoring. However, these analytes were observed at lower concentrations in samples collected from STE 5, which is also when the lowest TSS concentration was measured. For this group of analytes the comparison of means test for each individual analyte in stormwater indicates no statistically significant difference in analyte concentrations before and after the stormwater drainage system cleaning effort (Table 7.4). By contrast, the comparison of means test does indicate a difference in the cPAH TEQ, and TPH concentrations in stormwater at the Main Line Inlet Catch Basin before and after the stormwater drainage system cleaning (Table 7.4).

7.3.2 Main Line Outlet Catch Basin (CB4857)

Time series graphs of analyte concentrations measured in stormwater collected from the Main Line Outlet are shown in Figure 7.2. Similar to trends observed for the Main Line Inlet stormwater data, the analytes fall into two distinct groupings. cPAH TEQ values and heavy oil range TPH show maximum concentrations during STE 1 through STE 3, and then sharply decrease to low concentrations in STE 4. cPAH TEQ and TPH concentrations remain at lower concentrations than that observed in STE 1 through STE 3 for subsequent monitored storm events. Dioxin TEQ values, arsenic (total and dissolved), PCP, TSS, and diesel range TPH show no temporal trends in concentration for the duration of monitoring.

Comparison of means tests provides similar results. cPAH TEQ values and heavy oil range TPH concentrations measured in stormwater at this location are statistically significantly different before and after the stormwater drainage system cleaning effort (Table 7.5). Lower cPAH TEQ and heavy oil range TPH concentrations are observed after completion the drainage system cleaning. Dioxin TEQ, total and dissolved arsenic, PCP, TSS, and diesel range TPH are not statistically significantly different before and after the vactor cleaning at this location (Table 7.5).

7.3.3 Secondary Line Outlet Catch Basin (CB-1)

Analyte concentrations measured in stormwater collected from the Secondary Line Outlet (CB-1) are shown as time series graphs in Figure 7.3. cPAHs, TPH (both the diesel and heavy oil ranges), and PCP were not detected in stormwater sampled from the Secondary Line Outlet (CB-1) throughout the duration of the monitored events and are therefore not presented in the time series graphs in Figure 7.3. Dioxin TEQ, arsenic (total and dissolved) and TSS data for this location generally exhibit low concentrations (relative to main line locations), low overall variability, and no discernable trends over time. A comparison of means test (either ANOVA or Kruskal-Wallis) for the four analytes detected in stormwater at the Secondary Line Outlet (CB-1) location indicates no statistically significant difference in stormwater composition before and after the stormwater drainage system cleaning effort (Table 7.6).

7.4 SITE-WIDE VARIABILITY

An examination of the variability of stormwater analyte concentrations as stormwater travels across the LL Apartments Parcel allows for quantification of whether on-property contamination may be impacting stormwater that is ultimately discharged to Lora Lake. Site-wide variability in stormwater analyte concentrations was assessed by comparing box plots of the data from each catch basin sampling location for each analyte of concern. Additionally, the composition of stormwater entering the LL Apartments Parcel at the Main Line Inlet Catch Basin is compared to the composition of stormwater exiting the parcel at the Main Line and Secondary Line Outlet (CB-1) Catch Basins, using a comparison of means evaluation. No box plots or additional statistical analyses were conducted for VOCs, which had no detections during the storm event monitoring. Variability across the LL Apartments Parcel for each analyte group is discussed in the subsections below, 7.4.1 through 7.4.5.

7.4.1 Total Suspended Solids

The box plot and time series graph for TSS are presented in Figure 7.4. Stormwater collected from the Main Line Inlet contained higher TSS concentrations than stormwater collected from the LL Apartments Parcel Main Line and Secondary Line Outlet (CB-1) catch basins throughout the storm event monitoring. The lowest TSS concentrations were measured in stormwater collected from the Secondary Line Outlet (CB-1); the Secondary Line Outlet TSS data were less variable throughout the 10 monitored storm events than TSS data observed at the Main Line Outlet.

7.4.2 Arsenic

7.4.2.1 Total Arsenic

Box plots and time series graphs for both total and dissolved arsenic are shown in Figure 7.5. The maximum total arsenic concentration (1.3 µg/L) was measured in

stormwater sampled from the Secondary Line Outlet (CB-1). Considering the overall distribution of the data, stormwater collected from the Main Line Inlet displays higher concentrations of total arsenic relative to stormwater collected from both the Main Line and Secondary Line Outlet (CB-1) catch basins, as shown in the box plots. The total arsenic concentrations detected in the Secondary Line Outlet (CB-1) show the greatest variability. There does not appear to be a distinct correlation between total arsenic concentrations and TSS throughout the 10 monitored storm events.

7.4.2.2 Dissolved Arsenic

The greatest variability in detected concentrations of dissolved arsenic was observed in stormwater collected from the Secondary Line Outlet (CB-1). Dissolved arsenic was detected in stormwater from this outlet at the highest concentration in the SWIA data set (1.0 µg/L, a statistical outlier), the second highest concentration (0.8 µg/L), and the smallest concentration (0.2 µg/L) (Figure 7.5, Table 7.1). Throughout the 10 monitored storm events, the dissolved arsenic concentrations detected in stormwater from the Main Line Inlet were generally similar to the Main Line and Secondary Line Outlets.

7.4.3 Petroleum Hydrocarbons

7.4.3.1 Diesel Range Hydrocarbons

Box plots and time series graphs for both diesel range and heavy oil range TPH are shown in Figure 7.5. Diesel range TPH was not detected in the stormwater samples collected from the Secondary Line Outlet (CB-1), and was detected during 2 of the 10 events in stormwater samples collected from the Main Line Outlet. Diesel range TPH was detected during 5 of the 10 events in stormwater samples collected from the Main Line Inlet. The maximum concentration was detected in stormwater from the Main Line Inlet (1.6 mg/L), and was statistically an outlier from the data set, as shown in the box plot in Figure 7.5.

7.4.3.2 Heavy Oil Range Hydrocarbons

Heavy oil range TPH was not detected in stormwater collected from the Secondary Line Outlet Catch Basin (CB-1) (Figure 7.5). Heavy oil range TPH was detected in both the Main Line Inlet and Main Line Outlet. The maximum concentration detected was in stormwater from the Main Line Inlet (7.5 µg/L), and was statistically an outlier from the dataset. The highest overall variability observed in the data set was also observed in stormwater from the Main Line Inlet.

7.4.4 Semivolatile Organics

7.4.4.1 Carcinogenic Polycyclic Aromatic Hydrocarbon Total Equivalency Quotient Values

Box plots and time series graphs for cPAH TEQ values calculated with one-half the reporting limit for non-detects are shown in Figure 7.6. The box plots shown in

Figure 7.6 illustrate similar distributions (e.g., means and inner quartile ranges) of cPAH TEQ values for stormwater samples collected from the Main Line Inlet and Main Line Outlet throughout the 10 monitored storm events. However, higher maximum cPAH TEQ concentrations were detected in stormwater collected from the Main Line Inlet relative to the Main Line Outlet. PAHs were not detected in stormwater from the Secondary Line Outlet (CB-1) location throughout the 10 monitored storm events.

7.4.4.2 Pentachlorophenol

Box plots and time series graphs for PCP are shown in Figure 7.6. PCP was not detected in stormwater sampled from the Secondary Line Outlet (CB-1). Higher PCP concentrations were detected in stormwater from the Main Line Inlet relative to the Main Line Outlet catch basins. Although the median PCP concentrations at the Main Line Inlet and Main Line Outlet were similar (0.56 µg/L and 0.53 µg/L, respectively), the PCP data from the Main Line Inlet exhibited a greater degree of overall variability.

7.4.5 Dioxins

Box plots and time series graphs for dioxin TEQ values calculated with one-half the reporting limit for non-detects are shown in Figure 7.6. The dioxin TEQ concentrations detected in both the Main Line Inlet and Main Line Outlet extend over similar concentration ranges; however, the highest concentrations were detected in stormwater from the Main Line Inlet. The greatest variability in dioxin TEQ concentrations was also observed in stormwater collected from the Main Line Inlet. Significantly lower dioxin TEQ concentrations were detected in stormwater from the Secondary Line Outlet (CB-1), and that data set exhibited little variation.

7.4.6 Comparison of Means Tests

With the exception of total and dissolved arsenic, the data trends across the LL Apartments Parcel are similar for all COCs. The highest analyte concentrations are generally observed for stormwater collected from the Main Line Inlet. However, the median and mean analyte concentrations are often comparable between both the Main Line Inlet and the Main Line Outlet. Analyte concentrations (with the exception of total and dissolved arsenic), measured at the Secondary Line Outlet (CB-1) are substantially lower than those noted for either the Main Line Inlet and Main line Outlet Catch Basins, and generally exhibit the least overall variability.

A comparison of means test (either ANOVA or Kruskal-Wallis) was conducted for all COCs by comparing mean analyte concentrations of stormwater entering the LL Apartments Parcel Main Line Inlet to stormwater exiting the LL Apartments Parcel through the Main Line Outlet (Table 7.7). Although maximum analyte concentrations were consistently observed in stormwater from the Main Line Inlet, results of the comparison of means tests indicate that there is no statistically significant difference in the mean stormwater composition entering and leaving the LL Apartments Parcel through the main line drainage system. This is confirmed for all COCs, but most notably

for cPAH TEQ, dioxin TEQ, arsenic (total and dissolved), diesel range and heavy oil range TPH, PCP, and TSS (Table 7.7).

7.5 SUMMARY OF THE STATISTICAL EVALUATION

The results of the statistical evaluation for the SWIA are presented below:

- The highest analyte concentrations were generally observed in stormwater collected from the Main Line Inlet. However, the mean analyte concentrations are often comparable between both the Main Line Inlet and the Main Line Outlet.
- Analyte concentrations (with the exception of total and dissolved arsenic), measured at the Secondary Line Outlet (CB-1) are substantially lower than those observed at the Main Line Inlet and Main Line Outlet, and generally exhibit the least overall variability.
- For dioxins, arsenic, PCP, and TSS, there were no significant temporal trends (e.g., pre- or post-drainage system cleaning) in the stormwater monitoring data from any of the three locations: the Main Line Inlet, the Main Line Outlet, or the Secondary Line Outlet (CB-1).
- cPAH TEQ and heavy oil range TPH concentrations were statistically significantly lower in stormwater from the Main Line Inlet and Main Line Outlet following vactor drainage system cleaning. Diesel range TPH concentrations were also statistically significantly lower following vactor drainage system cleaning in stormwater from the Main Line Inlet.
- cPAHs, TPH, and PCP were not detected in stormwater collected from the Secondary Line Outlet (CB-1). Dioxins, arsenic, and TSS were detected at lower concentrations relative to the Main Line Inlet and Main Line Outlet locations, and did not exhibit any discernable temporal trend during the 10 monitored storm events.
- The statistical analysis of site-wide variability, including comparison of means tests for stormwater samples from the Main Line Inlet compared to the Main Line Outlet, show that there are no statistically significant changes in analyte concentrations as stormwater is conveyed across the LL Apartments Parcel.

8.0 Summary of Interim Action Findings

The goal of the SWIA is to determine what impact, if any, the LL Apartments Parcel has on the chemical quality of stormwater that leaves the property and discharges to Lora Lake. Specifically, the Port and WSDOE developed the following objectives as SWIA requirements:

- Complete sampling and analysis activities to identify locations where COCs may enter the LL Apartments Parcel storm drain system, including the potential for contaminated groundwater and/or soil to seep into the LL Apartments Parcel stormwater drainage system.
- Collect and chemically analyze stormwater, stormwater solids, and catch basin sediment samples at locations to compare the COC concentrations in media entering and leaving the LL Apartments Parcel.
- Perform sampling activities in accordance with WSDOE guidance for stormwater sampling at industrial facilities and analyze collected samples for site COCs.

The sections below summarize the findings of the SWIA relative to the objectives listed above.

8.1 STORMWATER CONVEYANCE SYSTEM INTEGRITY

TV in-line inspection activities conducted at the LL Apartments Parcel were performed to evaluate where COCs may enter the LL Apartments Parcel storm drain system and the potential for contaminated groundwater and/or soil to seep into the LL Apartments Parcel stormwater drainage system. Approximately 50 percent of the LL Apartments Parcel pipe segments were in good condition and no pipe integrity cracks were observed during the inspection. An additional 11 segments contained visible corrosion, but no cracks or holes. Isolated areas of degradation were observed in the remaining pipe segments, in the form of cracks or holes, and soil and roots were observed to have entered the storm system at select pipe joints. It may also be possible for stormwater to exit the conveyance system through these cracks and joints.

8.2 CATCH BASIN SOLIDS

Catch basin sediment samples were collected and analyzed to evaluate potential COC concentrations that may be present within the LL Apartment Parcel storm drain system. The catch basin sediment analyses reported the following results:

- TOC measurements were consistent with field observations that sediment accumulations in catch basins located within the interior of the LL Apartments Parcel are organic-rich and unconsolidated, with visible organic sheen.

- High TOC, organic-rich sediments from the two Main Line Interior Catch Basins (CS/CB-12 and CB-19) also contain the highest analyte concentrations. TPH, lead, semivolatile organic compounds, and dioxin concentrations detected in catch basin sediments at these locations were elevated relative to catch basin sediments sampled at the Main Line Inlet and the Main Line and Secondary Line Outlet (CB4555 [CS/CB-2]) catch basins. These compounds are typically characterized by high organic carbon coefficients and/or low water solubility.
- The lowest analyte concentrations (including lead, TPH, PAHs, and dioxins) were observed in catch basin sediments sampled from the Main Line Inlet and the Main Line Outlet. The main line sediments also had the lowest TOC concentrations (3.4 percent and 1.3 percent, respectively) and the greatest concentration of total solids (greater than 80 percent).

In January and February 2010, accumulated sediments were removed from the LL Apartments Parcel stormwater catch basins and storm drain conveyance pipes using vactor methods (high velocity vacuum truck). The catch basins and stormwater drainage pipes were cleaned to remove all sediments that had been deposited over time (including those with COC) and to prevent potential COC contribution to stormwater as it is conveyed through the site storm drain system.

8.3 IN-LINE SOLIDS SEDIMENT QUALITY

The in-line stormwater solids samples were collected and analyzed to evaluate potential COC concentrations that may be associated with current flow conditions within the LL Apartment Parcel storm drain system. The in-line solids analyses reported the following results:

- The highest analyte concentrations for the in-line solids (including lead, TPH, PAHs, and dioxins) were observed in the in-line solids that were collected from the sediment trap installed in the Main Line Interior (CB5945).
- Comparing analyte concentrations from the Main Line Inlet trap (CB-31A) and the Main Line Outlet trap (CB4857), the concentration of TPHs, PAHs, and dioxins were either the same or lower in the Main Line Outlet trap (CB4857). The concentrations of lead and PCP were higher for the Main Line Outlet (CB4857) trap sediments compared to the Main Line Inlet trap (CB-31A) solids.
- With a few exceptions (TEQs for cPAHs), the concentrations of all analytes in the Secondary Line Outlet trap (CB-2) in-line solids were less than all other in-line solids sampling locations.
- The highest TOC content was detected in the Main Line Interior trap (CB5945) in-line solids, while the lowest was detected in the Main Line Outlet trap (CB4857) in-line solids. Total solids were highest in the Main Line Outlet

trap (CB4957) in-line solids and lowest in the Secondary Line Outlet trap (CB-2) in-line solids.

- The results of the in-line solids sampling were consistent with the results of the stormwater statistical analysis, which showed that there were no statistically significant changes in analyte concentrations as stormwater is conveyed across the LL Apartments Parcel because the in-line solids concentrations of TPH, PAHs, and dioxins were either the same or lower in the Main Line Outlet trap (CB4857) relative to the Main Line Inlet trap (CB-31A). Additionally, the greater TOC content detected in the Main Line Interior trap (CB5945) is consistent with the results of the catch basin sediment sampling, where elevated TOC content was also detected from the two Main Line Interior Catch Basins (CS/CB-12 and CB-19).

8.4 STORMWATER QUALITY

Stormwater samples were collected from three stormwater catch basin locations (the Main Line Inlet, the Main Line Outlet, and the Secondary Line Outlet [CB-1]) over the course of 10 monitored storm events. The stormwater samples were chemically analyzed for site COCs and the resulting data sets were statistically analyzed to compare and evaluate the COC concentrations entering and leaving the LL Apartments Parcel.

The statistical evaluation of the stormwater monitoring data detailed in Section 7.0 demonstrates that there are no statistically significant changes in analyte concentrations as stormwater is conveyed across the LL Apartments Parcel. Therefore, the stormwater entering the site at the Main Line Inlet, or collected on-property in the Secondary Line, is not adversely impacted as it is conveyed through the LL Apartments Parcel and leaves the site at the Main Line Outlet and/or Secondary Line Outlet (CB-1). In general, the highest COC concentrations were detected in stormwater from the Main Line Inlet. The lowest COC concentrations and the least overall variability in the data were observed in stormwater from the Secondary Line Outlet (CB-1).

Several COCs (cPAHs, diesel range and heavy oil range TPH, and PCP) were not detected in stormwater collected from the Secondary Line Outlet (CB-1), and dioxins and TSS concentrations were detected at lower concentrations relative to the Main Line Inlet and Main Line Outlet locations. The results of the SWIA indicate that the Secondary Line does not contribute elevated COC concentrations or degrade stormwater quality from the LL Apartments Parcel.

9.0 References

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Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Data Report

Tables

FINAL

Table 3.1
Groundwater Elevation Measurements
(Depth to Water in Feet)

	Storm Event									
	#1	**#2**	**#3**	**#4**	**#5**	**#6**	**#7**	**#8**	**#9**	**#10**
Date	12/18/2009	1/2/2010	2/19/2010	2/26/2010	3/10/2010	3/25/2010	3/30/2010	4/2/2010	4/9/2010	4/22/2010
MW-1	16.89	16.66	14.78[1]	NM	NM	NM	NM	NM	NM	NM
MW-2	NM	NM	NM	NM	6.69	6.59	6.41	6.21	6.31	6.36
MW-3	17.56	17.52	16.78	16.94	17.17	17.24	17.24	17.00	16.71	17.08
MW-4	16.55	16.55	15.79	16.02	16.21	16.23	16.09	15.91	15.86	16.02
MW-5	NM	NM	NM	20.11	NM	NM	NM	NM	NM	NM
MW-6	12.20	12.07	11.27	11.28	11.79	11.58	11.98	11.59	10.66	11.51

Note:
1 0.01 feet of light non-aqueous phase liquid was measured in Monitoring Well MW-1.

Abbreviation:
NM Not measured

Table 3.2
TV In-line Inspection

Node Start	Node End	Pipe Diameter (inches)	Length of Pipe Inspected (feet)	Description[1]	Length Marking Comprised Section of Pipe (feet)	Issue/Comments
CB-30	CB-26	24	99.5	E		Pipe OK, pipe was cleaned and re-inspected
RCB-1	RCB-2	54	88.9	D,E		Pipe OK, pipe was cleaned and re-inspected
RCB-5	RCB-6	54	93.2	D,E		Pipe OK, pipe was cleaned and re-inspected
CB-6	CB-7	12	78.1	D,E		Pipe OK, pipe was cleaned and re-inspected
CB-11	CB-12	12	66.6	E		Pipe OK, pipe was cleaned and re-inspected
CB-29	CB-22	24	111.5	E		Pipe OK, pipe was cleaned and re-inspected
CB-1	CB-2	12	106.2			Pipe OK
CB-2	CB-3	12	46	A	28–40	Top of pipe corroded
				C	46	Broken pipe, 4–6 o'clock
CB-3	RCB-1	12	21.2			Pipe OK
CB-4	RCB-2	12	67.9	B	24,32,40	Fine roots at joints
				B	56.2	Root Mass, roots line top 2/3 of pipe
CB-4	CB-8	12	63.9	A	33–33.5	Corrosion
CB-5	CB-4	12	60.9	B	18.2	Corroded and cracked from 11 to 1 o'clock
				A	35	Joint corroded from 11 to 1 o'clock
				A	49.5	Joint corroded from 11 to 1 o'clock
				Potential B	56.9	Potential hole next to joint - camera didn't scan
CB-5	CB-6	12	46.5	A	91	Corroded joint
CB-9	CB-8	12	91	A	91’	Corroded joint on top
CB-10	CB-11	12	26.6*		21	Patch on wall—does not appear to be leaking
				C	26.5	Broken pipe, 05-07 o'clock
						*NOTE: Pipe was not inspected after the hole at 26.5'
CB-12	CB-13	12	62.7	A	26.4	Corrosion on top of pipe
					47	Possible hole - video blurry
CB-12	CB-14	12	35.4			Pipe OK
CB-15	CB-14	12	53.3	C	5.1	Broken pipe from 6 to 9 o'clock
				C	13.4	Broken pipe from 7 to 9 o'clock
				Potential B	18.5	Potential crack from 12 to 2 o'clock
CB-15	CB-14			Potential B	32.5	Potential hole from 3 to 5 o'clock
				C	39	Broken pipe from 7 to 9 o'clock
CB-15	CB-16	12	63.8	Potential C	45–48	Potential hole, lots of debris, "shift" at pipe joint
CB-15	CB-17	12	51.5	Potential B	28	Potential crack from 1 to 3 o'clock
				C	33.4	Broken pipe from 7 to 8 o'clock
				C	35.1	Broken pipe from 8 to 9 o'clock
				A	47	Corrosion from 6 to 9 o'clock, potential water intrusion
CB-18	CB-17	12	42.7	A	7–9	Corrosion, possible leakage, video shows a few small holes
CB-18	CB-19	12	26			Pipe OK
CB-21	CB-20	12	55.6	A	22–24	Corrosion between 10 and 2 o'clock
				A	30–24	Corrosion between 10 and 2 o'clock
				A	40–48	Corrosion between 10 and 2 o'clock
CB-21	CB-22	12	20.6	A	20	Corrosion
CB-23	CB-24	12	80.6			Pipe OK
CB-22	SDMH1	24	125.2	A	45.6	Minor corrosion between 8 and 10 o'clock
				A	105.8	Minor corrosion
CB-23	RCB-8	12	70.1			Pipe OK
CB-25	CB-24	12	47.5			Pipe OK
CB-26	CB-27	24	200.3	A	57	Corrosion
				A	77–87	Corrosion from 10 to 2 o'clock
						Lots of debris and patches of corrosion
CB-28	CB-27	24	88.4			Pipe OK
CB-29	CB-20	24	113	A	8.4	Object intruding—piece of metal or stick
						Lots of debris for length of pipe
CB-29	CB-28	24	73.4			Pipe OK, concrete storm drainage pipe
CB-30	CB-31	24	107.9		21–22	Large pile of debris, camera did not scan area
				C	42.6	Broken pipe from 2 to 3 o'clock—video shows water dripping
						Lots of debris for length of pipe
RCD-7	RCD-8	36	101.5	D		Pipe OK
RCB-3	RCD-8	54	89.9	D		Pipe OK
Storm Drainage Segments Not Inspected						
CB-22	RC-37					

Note:
1 The codes used to describe the pipe conditions are defined below:
- A Corrosion or potential corrosion in pipe
- B Leak or small crack in pipe
- C Hole in pipe
- D Low light in video, difficult to analyze the condition of the sides and top of pipe
- E Pipe was cleaned and second video inspection was completed

Table 6.1
Catch Basin Sediment Analytical Data

	Station	CB4857	CB-12	CB-19	CB-2	CB-31A	
	Sample ID	CB4857-121009-SED	CB12-010710-SED	CB19-010710-SED	CB2-010710-SED	CB31A-011110-SED	CB99-011110-SED
	Sample Date	12/10/2009	1/7/2010	1/7/2010	1/7/2010	1/11/2010	1/11/2010
Conventionals							
Total Organic Carbon	%	1.29 J	44.6	40.7	28.3	3.38	3.63
Total Solids	%	85.1	20.6	23.5	27.3	83.2	84.1
Metals							
Arsenic	mg/kg	6 U	20 U	20 U	20 U	6 U	6 U
Lead	mg/kg	42	270	243	322	32 J	31 J
Total Petroleum Hydrocarbons							
Diesel	mg/kg	19	1300	4200	1200	54	31
Motor Oil	mg/kg	160	6600	18000	6100	270	200
Semivolatile Organic Compounds							
Naphthalene	µg/kg	19 U	220 U	520 U	190 U	20 U	20 U
2-Methylnaphthalene	µg/kg	19 U	220 U	550	190 U	20 U	20 U
1-Methylnaphthalene	µg/kg	19 U	220 U	520 U	190 U	20 U	20 U
Acenaphthylene	µg/kg	19 U	220 U	520 U	190 U	20 U	20 U
Acenaphthene	µg/kg	19 U	220 U	520 U	190 U	13 J	20 U
Fluorene	µg/kg	19 U	220 U	520 U	190 U	16 J	20 U
Phenanthrene	µg/kg	36	460	1000	340 J	180	43
Anthracene	µg/kg	19 U	220 U	520 U	190 U	34	20 U
Total LPAH[1]	µg/kg	36	460	1000	340 J	243 J	43
Fluoranthene	µg/kg	73	970	2200	780 J	340	130
Pyrene	µg/kg	57	1700	3200	1500 J	270 J	96
Benzo(a)anthracene	µg/kg	29	250	590	220 J	95	36
Chrysene	µg/kg	63	980	1900	630 J	150	85
Benzo(b)fluoranthene	µg/kg	53	560 J	1400 J	370 J	140	48
Benzo(k)fluoranthene	µg/kg	53	560 J	1400 J	370 J	140	48
Benzo(a)pyrene	µg/kg	43	390 J	1100 J	300 J	110	43
Indeno(1,2,3-cd)pyrene	µg/kg	11 J	220 J	520 UJ	190 UJ	32	37
Dibenzo(a,h)anthracene	µg/kg	19 U	220 UJ	520 UJ	190 UJ	20 U	19 J
Benzo(g,h,i)perylene	µg/kg	16 J	360 J	850 J	280 J	37	54
Total HPAH[2]	µg/kg	398 J	5990 J	12640 J	4450 J	1314 J	596 J
Summed cPAH TEQ[3,4]	µg/kg	58.23 J	558.8 J	1458 J	402.3 J	152.2	62.65 J
Summed cPAH TEQ with One-Half the Reporting Limits[3,5]	µg/kg	59.18 J	569.8 J	1510 J	421.3 J	153.2	62.65 J
Pentachlorophenol	µg/kg	71 J	25 U	26 U	19 U	25	84
Dibenzofuran	µg/kg	19 U	220 U	520 U	190 U	20 U	20 U
Volatile Organic Compounds							
1,2-Dichloroethane	µg/kg		5.8 U	5 U	2.3 U	1 U	1 U
cis-1,2-Dichloroethene	µg/kg		5.8 U	5 UJ	2.3 U	1 U	1 U
trans-1,2-Dichloroethene	µg/kg		5.8 U	5 UJ	2.3 U	1 U	1 U
Trichloroethene	µg/kg		5.8 U	5 UJ	2.3 U	1 U	1 U
Tetrachloroethene	µg/kg		5.8 U	5 UJ	2.3 U	1 UJ	1 U
Dioxins/Furans							
2,3,7,8-TCDD	pg/g	0.472 U	6.33	4.56	2.84	0.632 J	0.636 J
1,2,3,7,8-PeCDD	pg/g	1.79 J	27.3 J	19.1	10.6 J	3.96 J	3.99 J
1,2,3,4,7,8-HxCDD	pg/g	2.92 J	34.9	29.6	14.8	9.13	8.27
1,2,3,6,7,8-HxCDD	pg/g	10.3	130	79.8	37.6	32.3	28.3
1,2,3,7,8,9-HxCDD	pg/g	5.19 J	95.8	69.8	37.3	17.6	16.7
1,2,3,4,6,7,8-HpCDD	pg/g	353	4510	2370	1110	1210	1070
Total OCDD	pg/g	4480 J	46200 J	23300 J	13300 J	11200	11500
2,3,7,8-TCDF	pg/g	0.183 U	5.13	5.83	2.34	0.332 J	0.405 J
1,2,3,7,8-PeCDF	pg/g	0.586 J	5.09 J	6.06 J	2.38 J	1 J	0.989 J
2,3,4,7,8-PeCDF	pg/g	1.3 J	10.1 J	10.7 J	3.44 J	2.23 J	2.87 J
1,2,3,4,7,8-HxCDF	pg/g	19.6	29.4	28.9	14.9	39.4	43.7
1,2,3,6,7,8-HxCDF	pg/g	5.05 J	22.4 J	19.2	8.67 J	8.55	9.4
2,3,4,6,7,8-HxCDF	pg/g	6.22	30.2	25.3	10.7 J	12.4	13.8
1,2,3,7,8,9-HxCDF	pg/g	1.99 J	4.79 J	4.65 J	2.27 J	2.96 J	3.57 J
1,2,3,4,6,7,8-HpCDF	pg/g	82	1060 J	481 J	209 J	246 J	237 J
1,2,3,4,7,8,9-HpCDF	pg/g	9.51	31.8	22.3	10.6 J	22.6	24.7
Total OCDF	pg/g	243 J	3750 J	1340 J	569 J	914 J	899 J
Summed Dioxin/Furan TEQ[6,7]	pg/g	13.19 J	143.08 J	89.48 J	44.86 J	35.98 J	34.97 J
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[6,8]	pg/g	13.43 J	143.08 J	89.48 J	44.86 J	35.98 J	34.97 J

Notes:

1 Total LPAH includes detected concentrations of naphthalene, acenapthylene, acenaphthene, fluorene, phenanthrene, and anthracene
2 Total HPAH includes detected concentrations of fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene
3 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007)
4 Calculated using detected cPAH concentrations.
5 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected
6 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (van den Berg et al. 2006).
7 Calculated using detected dioxin/furan concentrations.
8 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbor
LPAH Low molecular weight polycyclic aromatic hydrocarbor
HPAH High molecular weight polycyclic aromatic hydrocarbor
TEQ Toxic equivalency quotient

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity
JN Tentative identification with estimated concentration.
U Undetected.
UJ Undetected with estimated concentration.

Table 6.2
Stormwater Analytical Data

Area		Main Line Inlet							
Station		CB-31A							
Event		First	Second	Third	Third (Duplicate)	Fourth	Fifth	Sixth	Seventh
Sample ID		CB31A-121409-GRAB CB31A-121509-COMP	CB31A-123109-GRAB CB31A-123109-COMP	CB31A-022310-GRAB CB31A-022410-COMP	CB100-022310-GRAB CB100-022410-COMP	CB31A-022610-GRAB CB31A-022710-COMP	CB31A-031110-GRAB CB31A-031010-COMP	CB31A-032510-GRAB CB31A-032510-COMP	CB31A-032910-GRAB CB31A -032910-COMP
Sample Date		12/14-15/2009	12/31/2009	2/23-24/2010	2/23-24/2010	2/26-27/2010	3/10-11/2010	3/25/2010	3/29/2010
Conventionals									
pH	pH	6.73	6.68	6.54	6.54	6.54	6.38	6.64	6.55
Total Suspended Solids	mg/L	43.9	59	39.5	42.7	24.1	11.2	40.2	44.5
Metals									
Arsenic, dissolved	µg/L	0.5 U	0.5	0.6	0.5	0.4	0.5 J	0.6	0.4
Arsenic, total	µg/L	1.1	1.2	1.2	1.2	0.7	0.7	1.1	0.6
Total Petroleum Hydrocarbons									
Diesel range	mg/L	1.6	0.73	0.4	0.44	0.25 U	0.3	0.25 U	0.25 U
Heavy oil range	mg/L	7.5	4.9	1.8	2	0.5 U	1.3	0.91	1.1
Semivolatile Organic Compounds									
Naphthalene	µg/L	0.052	0.037	0.023	0.025	0.014	0.014 U	0.017 J	0.014
2-Methylnaphthalene	µg/L	0.034	0.024	0.016	0.017	0.01 U	0.01 U	0.012 J	0.01 U
1-Methylnaphthalene	µg/L	0.018	0.012	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Acenaphthylene	µg/L	0.013	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Acenaphthene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Fluorene	µg/L	0.015	0.01 U	0.01 U	0.01	0.01 U	0.01 U	0.01 UJ	0.01 U
Phenanthrene	µg/L	0.12	0.099	0.074	0.069	0.033	0.023	0.042 J	0.036
Anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Total LPAH[1]	µg/L	0.2	0.14	0.097	0.10	0.047	0.023	0.059 J	0.05
Fluoranthene	µg/L	0.13	0.16	0.14	0.13	0.058	0.033	0.078 J	0.059
Pyrene	µg/L	0.14	0.18	0.18	0.16	0.071	0.038	0.079 J	0.062
Benzo(a)anthracene	µg/L	0.027	0.032	0.023	0.02	0.013 U	0.01 U	0.017 J	0.014
Chrysene	µg/L	0.074	0.094	0.084	0.074	0.036	0.015	0.039 J	0.038
Benzo(b)fluoranthene	µg/L	0.048	0.059	0.034 JN	0.029 JN	0.016 U	0.01 U	0.02 JN	0.019 JN
Benzo(k)fluoranthene	µg/L	0.03	0.048	0.034 JN	0.029 JN	0.016 U	0.01 U	0.02 JN	0.019 JN
Benzo(a)pyrene	µg/L	0.036	0.051	0.032	0.027	0.014 U	0.01 U	0.018 J	0.015
Indeno(1,2,3-cd)pyrene	µg/L	0.03	0.037	0.024	0.019	0.011 U	0.01 U	0.015 J	0.014
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.013	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Benzo(g,h,i)perylene	µg/L	0.066	0.072	0.056	0.048	0.022 U	0.012	0.031 J	0.027
Total HPAH[2]	µg/L	0.58	0.75	0.61 JN	0.54 JN	0.17	0.098	0.32 JN	0.27 JN
Summed cPAH TEQ[3,4]	µg/L	0.050	0.071	0.044 JN	0.037 JN	0.000	0.000	0.026 JN	0.022 JN
Summed cPAH TEQ with One-Half the Reporting Limits[3,5]	µg/L	0.051	0.071	0.045 JN	0.038 JN	0.011	0.008	0.026 JN	0.022 JN
Pentachlorophenol	µg/L	0.82	0.41	0.48	0.45	0.56	0.3	0.84	1.4
Dibenzofuran	µg/L	0.01	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Volatile Organic Compounds									
1,2-Dichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.02 U	0.02 U	0.02 U
cis-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Tetrachloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Table 6.2
Stormwater Analytical Data

Area		Main Line Inlet							
Station		CB-31A							
Event		First	Second	Third	Third (Duplicate)	Fourth	Fifth	Sixth	Seventh
Sample ID		CB31A-121409-GRAB CB31A-121509-COMP	CB31A-123109-GRAB CB31A-123109-COMP	CB31A-022310-GRAB CB31A-022410-COMP	CB100-022310-GRAB CB100-022410-COMP	CB31A-022610-GRAB CB31A-022710-COMP	CB31A-031110-GRAB CB31A-031010-COMP	CB31A-032510-GRAB CB31A-032510-COMP	CB31A-032910-GRAB CB31A -032910-COMP
Sample Date		12/14-15/2009	12/31/2009	2/23-24/2010	2/23-24/2010	2/26-27/2010	3/10-11/2010	3/25/2010	3/29/2010
Dioxins/Furans									
2,3,7,8-TCDD	pg/L	0.674 U	0.765 U	3.52 U	3.14 U	1.67 U	1.65 U	0.507 U	1.09 U
1,2,3,7,8-PeCDD	pg/L	2.86 J	2.17 J	3.61 U	4.03 U	2.66 U	1.91 U	3.33 J	3.7 J
1,2,3,4,7,8-HxCDD	pg/L	5.16 J	4.24 J	7.11 J	7.93 J	6.12 J	3.43 J	6.14 J	9.09 J
1,2,3,6,7,8-HxCDD	pg/L	16.3 J	12.5 J	17.8 J	20.5 J	15 J	6.62 J	17.7 J	26.3
1,2,3,7,8,9-HxCDD	pg/L	9.82 J	8.19 J	12.8 J	14.8 J	10.3 J	5.82 J	11.7 J	17.4 J
1,2,3,4,6,7,8-HpCDD	pg/L	515	405	522	615	500	167	619	897
Total OCDD	pg/L	4880	4540	4290	5430	4270	1390	7770	10800
2,3,7,8-TCDF	pg/L	0.53 U	0.694 U	1.39 U	1.68 U	0.678 U	0.613 U	0.422 U	0.549 U
1,2,3,7,8-PeCDF	pg/L	0.997 U	1.32 U	2.44 U	3.31 U	1.18 U	1.16 U	1.35 U	1.54 U
2,3,4,7,8-PeCDF	pg/L	2.75 J	1.34 U	2.59 U	3.51 U	2.71 J	1.19 U	1.45 U	2.23 J
1,2,3,4,7,8-HxCDF	pg/L	19.1 J	11.8 J	20.7 J	23.8 J	21.7 J	6.61 J	25	32.5
1,2,3,6,7,8-HxCDF	pg/L	10.2 J	9.12 J	14.6 J	16.1 J	6.94 J	3.07 J	15 J	16 J
2,3,4,6,7,8-HxCDF	pg/L	7.78 J	5.19 J	9.09 J	10 J	7.26 J	3.07 J	8.3 J	11.4 J
1,2,3,7,8,9-HxCDF	pg/L	2.25 J	1.46 J	3.76 U	2.82 U	2.49 J	1.14 U	2.42 J	3.06 J
1,2,3,4,6,7,8-HpCDF	pg/L	111	82.2	135	154	108	34.6	154	202
1,2,3,4,7,8,9-HpCDF	pg/L	10.9 J	7.34 J	13.6 J	15.8 J	13 J	4.58 J	14.7 J	17.9 J
Total OCDF	pg/L	359	252	324	376	328	85.2	430	578
Summed Dioxin/Furan TEQ[6,7]	pg/L	18.7 J	13.8 J	16.3 J	18.9 J	15.4 J	5.4 J	22.3 J	30.5 J
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[6,8]	pg/L	19.1 J	14.4 J	20.5 J	23.3 J	17.6 J	7.4 J	22.8 J	31.1 J

Notes:

1 Total LPAH includes detected concentrations of naphthalene, acenapthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
2 Total HPAH includes detected concentrations of fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
3 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007).
4 Calculated using detected cPAH concentrations.
5 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
6 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (van den Berg et al. 2006).
7 Calculated using detected dioxin/furan concentrations.
8 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
HPAH High molecular weight polycyclic aromatic hydrocarbon
TEQ Toxic equivalency quotient

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.
JN Tentative identification with estimated concentration.
U Undetected.
UJ Undetected with estimated concentration.

Table 6.2
Stormwater Analytical Data

Area		Main Line Inlet					Main Line Outlet	
Station		CB-31A					CB-4857	
Event		Seventh (Duplicate)	Eighth	Ninth	Ninth (Duplicate)	Tenth	First	Second
Sample ID		CB100-032910-GRAB CB100-032910-COMP	CB31A-040210-GRAB CB31A-040210-COMP	CB31A-040810-GRAB CB31A-040810-COMP	CB100-040810-GRAB CB100-040810-COMP	CB31A-042110-GRAB CB31A-042110-COMP	CB4857-121409-GRAB CB4857-121509-COMP	CB4857-123109-GRAB CB4857-123109-COMP
Sample Date		3/29/2010	4/2/2010	4/8/2010	4/8/2010	4/21/2010	12/14-15/2009	12/31/2009
Conventionals								
pH	pH	6.62	6.37	6.86	6.8	6.22	6.67	6.81
Total Suspended Solids	mg/L	51.9	32.3	16.4	18.2	37.2	36.5	33.3
Metals								
Arsenic, dissolved	µg/L	0.4	0.3	0.5	0.5	0.4	0.5	0.4
Arsenic, total	µg/L	0.8	0.7	0.8	0.9	0.5	1	1
Total Petroleum Hydrocarbons								
Diesel range	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.43	0.25 U
Heavy oil range	mg/L	1	0.55	0.64	0.66	0.5	2.4	1.4
Semivolatile Organic Compounds								
Naphthalene	µg/L	0.015	0.018 J	0.012	0.013	0.012	0.048	0.026
2-Methylnaphthalene	µg/L	0.01 U	0.011 J	0.01 U	0.01 U	0.01 U	0.032	0.014
1-Methylnaphthalene	µg/L	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.016	0.01 U
Acenaphthylene	µg/L	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.012	0.01 U
Acenaphthene	µg/L	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluorene	µg/L	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.012	0.01 U
Phenanthrene	µg/L	0.033	0.033 J	0.021	0.021	0.028	0.1	0.062
Anthracene	µg/L	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total LPAH[1]	µg/L	0.048	0.051 J	0.033	0.034	0.04	0.17	0.088
Fluoranthene	µg/L	0.066	0.05 J	0.041	0.036	0.061	0.11	0.1
Pyrene	µg/L	0.064	0.054 J	0.049	0.044	0.056	0.13	0.12
Benzo(a)anthracene	µg/L	0.016	0.011 J	0.01 U	0.01 U	0.015	0.025	0.024
Chrysene	µg/L	0.044	0.036 J	0.028	0.024	0.04	0.073	0.068
Benzo(b)fluoranthene	µg/L	0.021 JN	0.015 JN	0.01 U	0.01 U	0.022 JN	0.048	0.044
Benzo(k)fluoranthene	µg/L	0.021 JN	0.015 JN	0.01 U	0.01 U	0.022 JN	0.029	0.033
Benzo(a)pyrene	µg/L	0.018	0.014 J	0.01 U	0.01 U	0.018	0.032	0.03
Indeno(1,2,3-cd)pyrene	µg/L	0.016	0.01 J	0.01 U	0.01 U	0.014	0.027	0.027
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	µg/L	0.028	0.028 J	0.019	0.018	0.022	0.063	0.051
Total HPAH[2]	µg/L	0.29 JN	0.23 JN	0.14	0.12	0.27 JN	0.54	0.50
Summed cPAH TEQ[3,4]	µg/L	0.026 JN	0.019 JN	0.000	0.000	0.026 JN	0.046	0.043
Summed cPAH TEQ with One-Half the Reporting Limits[3,5]	µg/L	0.026 JN	0.020 JN	0.008	0.008	0.026 JN	0.046	0.044
Pentachlorophenol	µg/L	1.5	1.3	0.49	0.43	0.64	0.51	0.25 U
Dibenzofuran	µg/L	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Volatile Organic Compounds								
1,2-Dichloroethane	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Tetrachloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Table 6.2
Stormwater Analytical Data

Area		Main Line Inlet					Main Line Outlet	
Station		CB-31A					CB-4857	
Event		Seventh (Duplicate)	Eighth	Ninth	Ninth (Duplicate)	Tenth	First	Second
Sample ID		CB100-032910-GRAB CB100-032910-COMP	CB31A-040210-GRAB CB31A-040210-COMP	CB31A-040810-GRAB CB31A-040810-COMP	CB100-040810-GRAB CB100-040810-COMP	CB31A-042110-GRAB CB31A-042110-COMP	CB4857-121409-GRAB CB4857-121509-COMP	CB4857-123109-GRAB CB4857-123109-COMP
Sample Date		3/29/2010	4/2/2010	4/8/2010	4/8/2010	4/21/2010	12/14-15/2009	12/31/2009
Dioxins/Furans								
2,3,7,8-TCDD	pg/L	1.22 U	1.34 U	0.939 U	1.19 U	1.13 U	0.697 U	0.599 U
1,2,3,7,8-PeCDD	pg/L	5.83 J	3.14 U	1.51 U	1.8 U	2.7 UJ	2.89 J	1.62 U
1,2,3,4,7,8-HxCDD	pg/L	11.1 J	7.89 J	2.8 J	3.27 J	5.35 J	4.59 J	2.71 J
1,2,3,6,7,8-HxCDD	pg/L	32	23.8 J	8.1 J	9 J	15.8 J	12 J	6.81 J
1,2,3,7,8,9-HxCDD	pg/L	21.4 J	14.9 J	5.9 J	6.64 J	9.17 J	8.43 J	4.83 J
1,2,3,4,6,7,8-HpCDD	pg/L	1030	768	246	290	712	363	212
Total OCDD	pg/L	9960	7380	2160	2560	7550	3580	2380
2,3,7,8-TCDF	pg/L	0.588 U	1.23 U	0.441 U	0.4 U	0.745 U	0.621 U	0.611 U
1,2,3,7,8-PeCDF	pg/L	1.9 J	1.49 U	1.11 U	1.24 U	1.4 UJ	0.887 U	0.866 U
2,3,4,7,8-PeCDF	pg/L	3.14 J	1.56 U	1.18 U	1.27 U	1.47 UJ	2.17 J	0.947 U
1,2,3,4,7,8-HxCDF	pg/L	38.1	32.9 J	9.66 J	10.8 J	19.8 J	14.5 J	7.21 J
1,2,3,6,7,8-HxCDF	pg/L	16.3 J	12.6 J	5.06 J	5.15 J	9.28 J	7.92 J	6.41 J
2,3,4,6,7,8-HxCDF	pg/L	14.4 J	11.9 J	3.84 J	4.57 J	7.36 J	5.36 J	3.15 J
1,2,3,7,8,9-HxCDF	pg/L	3.67 J	3.57 J	1.02 U	1.11 U	2.86 U	1.75 J	0.992 U
1,2,3,4,6,7,8-HpCDF	pg/L	231	178	58.7	66.9	118	89	45.8
1,2,3,4,7,8,9-HpCDF	pg/L	20.8 J	17.8 J	5.63 J	6.48 J	12.2 J	8.29 J	4.3 J
Total OCDF	pg/L	642	517	151	168	358	234	122 J
Summed Dioxin/Furan TEQ[6,7]	pg/L	36.5 J	22.8 J	7.3 J	8.4 J	17.5 J	14.7 J	6.5 J
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[6,8]	pg/L	37.2 J	25.3 J	8.8 J	10.2 J	19.8 J	15.1 J	7.8 J

Notes:

1 Total LPAH includes detected concentrations of naphthalene, acenapthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
2 Total HPAH includes detected concentrations of fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
3 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007).
4 Calculated using detected cPAH concentrations.
5 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
6 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (van den Berg et al. 2006).
7 Calculated using detected dioxin/furan concentrations.
8 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
HPAH High molecular weight polycyclic aromatic hydrocarbon
TEQ Toxic equivalency quotient

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.
JN Tentative identification with estimated concentration.
U Undetected.
UJ Undetected with estimated concentration.

Table 6.2
Stormwater Analytical Data

Area		**Main Line Outlet**						
Station		**CB-4857**						
Event		**Third**	**Fourth**	**Fifth**	**Fifth (Duplicate)**	**Sixth**	**Sixth (Duplicate)**	**Seventh**
Sample ID		CB4857-022310-GRAB CB4857-022410-COMP	CB4857-022610-GRAB CB4857-022710-COMP	CB4857-031110-GRAB CB4857-031010-COMP	CB101-031110-GRAB CB101-031010-COMP	CB4857-032510-GRAB CB4857-032510-COMP	CB101-032510-GRAB CB101-032510-COMP	CB4857-032910-GRAB CB4857-032910-COMP
Sample Date		**2/23-24/2010**	**2/26-27/2010**	**3/10-11/2010**	**3/10-11/2010**	**3/25/2010**	**3/25/2010**	**3/29/2010**
Conventionals								
pH	pH	6.93	6.72	6.97	7.03	6.44	6.59	6.81
Total Suspended Solids	mg/L	42.8	17	7	7.1	35.9	26.7	48.5
Metals								
Arsenic, dissolved	µg/L	0.5	0.3	0.4 J	0.5 J	0.5	0.5	0.3
Arsenic, total	µg/L	1.2	0.5	0.7	0.7	0.9	0.8	0.6
Total Petroleum Hydrocarbons								
Diesel range	mg/L	0.29	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Heavy oil range	mg/L	1.3	0.5 U	0.77	0.79	0.61	0.57	0.68
Semivolatile Organic Compounds								
Naphthalene	µg/L	0.024	0.013	0.015 U	0.011 U	0.016 J	0.016 J	0.014
2-Methylnaphthalene	µg/L	0.014	0.01 U	0.01 U	0.01 U	0.01 J	0.01 UJ	0.01 U
1-Methylnaphthalene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ	0.01 U
Acenaphthylene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ	0.01 U
Acenaphthene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ	0.01 U
Fluorene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ	0.01 U
Phenanthrene	µg/L	0.068	0.026 U	0.017	0.016	0.032 J	0.032 J	0.029
Anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ	0.01 U
Total LPAH[1]	µg/L	0.092	0.013	0.032	0.016	0.048 J	0.048 J	0.043
Fluoranthene	µg/L	0.13	0.046	0.022	0.017	0.056 J	0.062 J	0.058
Pyrene	µg/L	0.16	0.055	0.023	0.02	0.059 J	0.064 J	0.06
Benzo(a)anthracene	µg/L	0.021	0.012 U	0.01 U	0.01 U	0.011 J	0.014 J	0.016
Chrysene	µg/L	0.078	0.03 U	0.014	0.01 U	0.025 J	0.031 J	0.041
Benzo(b)fluoranthene	µg/L	0.033 JN	0.02 U	0.01 U	0.01 U	0.014 JN	0.017 JN	0.022 JN
Benzo(k)fluoranthene	µg/L	0.033 JN	0.012 U	0.01 U	0.01 U	0.014 JN	0.017 JN	0.022 JN
Benzo(a)pyrene	µg/L	0.03	0.012 U	0.01 U	0.01 U	0.013 J	0.015 J	0.02
Indeno(1,2,3-cd)pyrene	µg/L	0.022	0.01 U	0.01 U	0.01 U	0.01 UJ	0.013 J	0.017
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ	0.01 U
Benzo(g,h,i)perylene	µg/L	0.053	0.017 U	0.01 U	0.01 U	0.02 J	0.025 J	0.032
Total HPAH[2]	µg/L	0.56 JN	0.10	0.059	0.037	0.21 JN	0.26 JN	0.29 JN
Summed cPAH TEQ[3,4]	µg/L	0.042 JN	0.000 U	0.000	0.000 U	0.017 JN	0.021 JN	0.028 JN
Summed cPAH TEQ with One-Half the Reporting Limits[3,5]	µg/L	0.042 JN	0.009 U	0.008	0.008 U	0.018 JN	0.022 JN	0.029 JN
Pentachlorophenol	µg/L	0.38	0.45	0.25 U	0.25 U	0.6	0.59	1.3
Dibenzofuran	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 UJ	0.01 U
Volatile Organic Compounds								
1,2-Dichloroethane	µg/L	0.2 U	0.2 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
cis-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Tetrachloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Table 6.2
Stormwater Analytical Data

Area		Main Line Outlet						
Station		CB-4857						
Event		Third	Fourth	Fifth	Fifth (Duplicate)	Sixth	Sixth (Duplicate)	Seventh
Sample ID		CB4857-022310-GRAB CB4857-022410-COMP	CB4857-022610-GRAB CB4857-022710-COMP	CB4857-031110-GRAB CB4857-031010-COMP	CB101-031110-GRAB CB101-031010-COMP	CB4857-032510-GRAB CB4857-032510-COMP	CB101-032510-GRAB CB101-032510-COMP	CB4857-032910-GRAB CB4857-032910-COMP
Sample Date		2/23-24/2010	2/26-27/2010	3/10-11/2010	3/10-11/2010	3/25/2010	3/25/2010	3/29/2010
Dioxins/Furans								
2,3,7,8-TCDD	pg/L	2.88 U	1.47 U	1.36 U	1.75 U	0.404 U	0.46 U	1.18 U
1,2,3,7,8-PeCDD	pg/L	5.73 U	1.99 U	1.4 U	1.64 U	2 J	2.25 J	3.85 J
1,2,3,4,7,8-HxCDD	pg/L	8.14 J	4.35 J	1.65 J	1.57 J	4.03 J	4.09 J	9.07 J
1,2,3,6,7,8-HxCDD	pg/L	19.5 J	11.4 J	3.79 J	3.71 J	11.3 J	11.8 J	24.6
1,2,3,7,8,9-HxCDD	pg/L	15.2 J	8.11 J	3.09 J	3.11 J	7.19 J	8.04 J	16.4 J
1,2,3,4,6,7,8-HpCDD	pg/L	626	348	76.2	78.8	381	405	855
Total OCDD	pg/L	7060	3020	561	557	4200	4430	10900
2,3,7,8-TCDF	pg/L	1.72 U	0.76 U	0.443 U	0.534 U	0.406 U	0.412 U	0.654 U
1,2,3,7,8-PeCDF	pg/L	2.33 U	2 UJ	0.809 U	0.942 U	0.882 U	1.27 U	1.36 U
2,3,4,7,8-PeCDF	pg/L	2.48 U	1.93 U	0.857 U	1.05 U	0.955 U	1.3 U	1.89 J
1,2,3,4,7,8-HxCDF	pg/L	23.8 J	16 J	3.08 J	3.15 J	15.1 J	15.6 J	28.7
1,2,3,6,7,8-HxCDF	pg/L	13.4 J	6.46 J	1.56 J	1.59 J	6.34 J	6.19 J	14.5 J
2,3,4,6,7,8-HxCDF	pg/L	8.8 J	5.55 J	1.98 J	2.08 J	5.3 J	5.41 J	10.9 J
1,2,3,7,8,9-HxCDF	pg/L	2.79 U	1.87 J	0.591 U	0.828 U	1.7 J	1.61 J	3.26 J
1,2,3,4,6,7,8-HpCDF	pg/L	140	80.6	14.2 J	16.9 J	82.2	94.7	186
1,2,3,4,7,8,9-HpCDF	pg/L	15.3 J	9.26 J	1.91 J	2.14 J	8.95 J	9.62 J	16.8 J
Total OCDF	pg/L	346	234	34.8 J	39.5 J	255 J	270 J	500
Summed Dioxin/Furan TEQ[6,7]	pg/L	18.9 J	10.7 J	2.6 J	2.7 J	13.2 J	14.0 J	29.2 J
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[6,8]	pg/L	23.9 J	12.8 J	4.2 J	4.6 J	13.5 J	14.5 J	29.8 J

Notes:

1 Total LPAH includes detected concentrations of naphthalene, acenapthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
2 Total HPAH includes detected concentrations of fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
3 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007).
4 Calculated using detected cPAH concentrations.
5 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
6 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (van den Berg et al. 2006).
7 Calculated using detected dioxin/furan concentrations.
8 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
HPAH High molecular weight polycyclic aromatic hydrocarbon
TEQ Toxic equivalency quotient

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.
JN Tentative identification with estimated concentration.
U Undetected.
UJ Undetected with estimated concentration.

Table 6.2
Stormwater Analytical Data

Area		Main Line Outlet				Secondary Line Outlet			
Station		CB-4857				CB-1			
Event		Eighth	Ninth	Tenth	Tenth (Duplicate)	First	Second	Third	Fourth
Sample ID		CB4857-040210-GRAB CB4857-040310-COMP	CB4857-040810-GRAB CB4857-040810-COMP	CB4857-042110-GRAB CB4857-042110-COMP	CB101-042110-GRAB CB101-042110-COMP	CB1-121409-GRAB CB1-121409-COMP	CB1-123109-GRAB CB1-123109-COMP	CB1-022310-GRAB CB1-022410-COMP	CB1-022610-GRAB CB1-022710-COMP
Sample Date		4/2-3/2010	4/8/2010	4/21/2010	4/21/2010	12/14/2009	12/31/2009	2/23-24/2010	2/26-27/2010
Conventionals									
pH	pH	6.78	7.09	6.63	6.45	6.73	6.82	6.59	6.35
Total Suspended Solids	mg/L	35.9	9.6	34	31.7	4.3	9.2	7.5	7.7
Metals									
Arsenic, dissolved	µg/L	0.3	0.5	0.3	0.4	0.3	0.3	1	0.3
Arsenic, total	µg/L	0.7	0.6	0.6	0.7	0.4	0.5	1.3	0.5
Total Petroleum Hydrocarbons									
Diesel range	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Heavy oil range	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organic Compounds									
Naphthalene	µg/L	0.019 J	0.01 U	0.011	0.011	0.026	0.017	0.015	0.014
2-Methylnaphthalene	µg/L	0.011 J	0.01 U	0.01 U	0.01 U	0.01	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	µg/L	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthylene	µg/L	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	µg/L	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluorene	µg/L	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Phenanthrene	µg/L	0.039 J	0.013	0.024	0.028	0.01	0.012	0.01 U	0.011 U
Anthracene	µg/L	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total LPAH[1]	µg/L	0.058 J	0.013	0.035	0.039	0.036	0.029	0.015	0.014
Fluoranthene	µg/L	0.061 J	0.025	0.046	0.057	0.01 U	0.01 U	0.01 U	0.01 U
Pyrene	µg/L	0.063 J	0.03	0.042	0.052	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)anthracene	µg/L	0.016 J	0.01 U	0.01 U	0.01	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	µg/L	0.043 J	0.016	0.026	0.036	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene	µg/L	0.02 JN	0.01 U	0.014 JN	0.02 JN	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene	µg/L	0.02 JN	0.01 U	0.014 JN	0.02 JN	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene	µg/L	0.019 J	0.01 U	0.011	0.018	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.016 J	0.01 U	0.011	0.012	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	µg/L	0.034 J	0.011	0.018	0.021	0.01 U	0.01 U	0.01 U	0.01 U
Total HPAH[2]	µg/L	0.29 JN	0.082	0.18 JN	0.25 JN	0.01 U	0.01 U	0.01 U	0.01 U
Summed cPAH TEQ[3,4]	µg/L	0.027 JN	0.000	0.015 JN	0.025 JN	0.000 U	0.000 U	0.000 U	0.000 U
Summed cPAH TEQ with One-Half the Reporting Limits[3,5]	µg/L	0.027 JN	0.008	0.016 JN	0.025 JN	0.008 U	0.008 U	0.008 U	0.008 U
Pentachlorophenol	µg/L	0.91	0.31	0.55	0.51	0.25 U	0.25 U	0.25 U	0.25 U
Dibenzofuran	µg/L	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Volatile Organic Compounds									
1,2-Dichloroethane	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Tetrachloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Table 6.2
Stormwater Analytical Data

Area		Main Line Outlet				Secondary Line Outlet			
Station		CB-4857				CB-1			
Event		Eighth	Ninth	Tenth	Tenth (Duplicate)	First	Second	Third	Fourth
Sample ID		CB4857-040210-GRAB CB4857-040310-COMP	CB4857-040810-GRAB CB4857-040810-COMP	CB4857-042110-GRAB CB4857-042110-COMP	CB101-042110-GRAB CB101-042110-COMP	CB1-121409-GRAB CB1-121409-COMP	CB1-123109-GRAB CB1-123109-COMP	CB1-022310-GRAB CB1-022410-COMP	CB1-022610-GRAB CB1-022710-COMP
Sample Date		4/2-3/2010	4/8/2010	4/21/2010	4/21/2010	12/14/2009	12/31/2009	2/23-24/2010	2/26-27/2010
Dioxins/Furans									
2,3,7,8-TCDD	pg/L	0.799 U	1.12 U	1.34 UJ	1.39 U	0.594 U	0.53 U	2.74 U	1.62 U
1,2,3,7,8-PeCDD	pg/L	3.8 J	1.17 U	2.62 UJ	2.87 UJ	0.808 U	1.01 U	2.31 U	1.38 UJ
1,2,3,4,7,8-HxCDD	pg/L	9.12 J	1.93 J	4.78 J	5.24 J	1.65 U	1.17 U	3.55 U	2.23 U
1,2,3,6,7,8-HxCDD	pg/L	25.2 J	5.28 J	14.3 J	14.9 J	1.87 U	1.38 U	4.14 U	2.75 U
1,2,3,7,8,9-HxCDD	pg/L	17.7 J	3.8 J	8.85 J	9.39 J	1.74 U	1.26 U	3.81 U	2.47 U
1,2,3,4,6,7,8-HpCDD	pg/L	726	149	602 J	683 J	10.2 J	20.4 J	18.7 J	15 J
Total OCDD	pg/L	6420	1200	5780 J	7150 J	56.9	151	132	96.7
2,3,7,8-TCDF	pg/L	0.652 U	0.466 U	1.21 UJ	0.628 U	0.352 U	0.686 U	1.22 U	0.939 U
1,2,3,7,8-PeCDF	pg/L	2.5 U	0.905 U	1.98 UJ	2.42 UJ	0.689 U	0.545 U	2.24 U	1.58 UJ
2,3,4,7,8-PeCDF	pg/L	2.46 U	0.933 U	2.11 UJ	2.77 UJ	0.732 U	0.588 U	2.3 U	1.53 U
1,2,3,4,7,8-HxCDF	pg/L	26.9 J	5.72 J	17 J	19.7 J	1.47 U	0.652 U	3.7 U	0.888 U
1,2,3,6,7,8-HxCDF	pg/L	12.1 J	3.27 J	8.31 J	8.34 J	1.46 U	0.669 U	3.81 U	0.888 U
2,3,4,6,7,8-HxCDF	pg/L	10.3 J	2.53 J	6.52 J	7.12 J	1.5 U	0.679 U	3.85 U	0.941 U
1,2,3,7,8,9-HxCDF	pg/L	3.13 J	0.765 U	2.33 UJ	2.56 UJ	1.76 U	0.752 U	4.16 U	1.03 U
1,2,3,4,6,7,8-HpCDF	pg/L	167	35.5	109 J	127 J	2.56 J	4.85 J	4.88 J	3.79 J
1,2,3,4,7,8,9-HpCDF	pg/L	14.1 J	3.74 J	10.6 J	12.9 J	0.746 U	0.719 U	1.83 U	1.35 U
Total OCDF	pg/L	459	86.4	303 J	365 J	3.84 U	13 J	10.7 J	9.46 J
Summed Dioxin/Furan TEQ[6,7]	pg/L	25.4 J	4.5 J	15.0 J	17.0 J	0.1 J	0.3 J	0.3 J	0.2 J
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[6,8]	pg/L	26.2 J	5.9 J	17.5 J	19.7 J	1.6 J	1.5 J	4.6 J	2.6 J

Notes:

1 Total LPAH includes detected concentrations of naphthalene, acenapthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
2 Total HPAH includes detected concentrations of fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
3 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007).
4 Calculated using detected cPAH concentrations.
5 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
6 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (van den Berg et al. 2006).
7 Calculated using detected dioxin/furan concentrations.
8 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
HPAH High molecular weight polycyclic aromatic hydrocarbon
TEQ Toxic equivalency quotient

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.
JN Tentative identification with estimated concentration.
U Undetected.
UJ Undetected with estimated concentration.

Table 6.2
Stormwater Analytical Data

Area		Secondary Line Outlet							
Station		CB-1							
Event		Fourth (Duplicate)	Fifth	Sixth	Seventh	Eighth	Eighth (Duplicate)	Ninth	Tenth
Sample ID		CB102-022610-GRAB CB102-022710-COMP	CB1-031110-GRAB CB1-031010-COMP	CB1-032510-GRAB CB1-032510-COMP	CB1-032910-GRAB CB1-032910-COMP	CB1-040210-GRAB CB1-040210-COMP	CB102-040210-GRAB CB102-040210-COMP	CB1-040810-GRAB CB1-040810-COMP	CB1-042110-GRAB CB1-042110-COMP
Sample Date		2/26-27/2010	3/10-11/2010	3/25/2010	3/29/2010	4/2/2010	4/2/2010	4/8/2010	4/21/2010
Conventionals									
pH	pH	6.38	6.37	6.29	6.25	6.36	6.34	6.8	6.51
Total Suspended Solids	mg/L	8.2	4.4	9.5	15.4	5.5	6.1	3.4	6.5
Metals									
Arsenic, dissolved	µg/L	0.3	0.8 J	0.6	0.5 U	0.2	0.3	0.5	0.3
Arsenic, total	µg/L	0.4	1	0.6	0.5 U	0.3	0.3	0.6	0.4
Total Petroleum Hydrocarbons									
Diesel range	mg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Heavy oil range	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Semivolatile Organic Compounds									
Naphthalene	µg/L	0.016	0.012 U	0.01 UJ	0.01 U	0.014	0.012	0.01 U	0.01 U
2-Methylnaphthalene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthylene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluorene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Phenanthrene	µg/L	0.01 U	0.013	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Anthracene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total LPAH[1]	µg/L	0.016	0.013	0.01 UJ	0.01 U	0.014	0.012	0.01 U	0.01 U
Fluoranthene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Pyrene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)anthracene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total HPAH[2]	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Summed cPAH TEQ[3,4]	µg/L	0.000 U	0.000 U	0.000 UJ	0.000 U	0.000 U	0.000 U	0.000 U	0.000 U
Summed cPAH TEQ with One-Half the Reporting Limits[3,5]	µg/L	0.008 U	0.008 U	0.008 UJ	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U
Pentachlorophenol	µg/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Dibenzofuran	µg/L	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Volatile Organic Compounds									
1,2-Dichloroethane	µg/L	0.2 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
cis-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Tetrachloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Table 6.2
Stormwater Analytical Data

Area		Secondary Line Outlet							
Station		CB-1							
Event		Fourth (Duplicate)	Fifth	Sixth	Seventh	Eighth	Eighth (Duplicate)	Ninth	Tenth
Sample ID		CB102-022610-GRAB CB102-022710-COMP	CB1-031110-GRAB CB1-031010-COMP	CB1-032510-GRAB CB1-032510-COMP	CB1-032910-GRAB CB1-032910-COMP	CB1-040210-GRAB CB1-040210-COMP	CB102-040210-GRAB CB102-040210-COMP	CB1-040810-GRAB CB1-040810-COMP	CB1-042110-GRAB CB1-042110-COMP
Sample Date		2/26-27/2010	3/10-11/2010	3/25/2010	3/29/2010	4/2/2010	4/2/2010	4/8/2010	4/21/2010
Dioxins/Furans									
2,3,7,8-TCDD	pg/L	1.27 U	1.52 U	0.513 UJ	0.888 U	1.02 U	0.944 U	1.15 U	1.45 UJ
1,2,3,7,8-PeCDD	pg/L	1.33 U	1.37 U	0.78 UJ	0.889 U	1.02 U	1.08 U	0.73 U	1.77 UJ
1,2,3,4,7,8-HxCDD	pg/L	2.57 U	2.06 U	0.797 UJ	1.53 U	1.23 U	1.51 U	1.16 U	2.12 UJ
1,2,3,6,7,8-HxCDD	pg/L	2.9 U	2.48 U	0.962 UJ	1.79 U	1.42 U	1.79 U	1.41 U	2.49 UJ
1,2,3,7,8,9-HxCDD	pg/L	2.71 U	2.25 U	0.868 UJ	1.62 U	1.29 U	1.61 U	1.25 U	2.25 UJ
1,2,3,4,6,7,8-HpCDD	pg/L	15.6 J	24.1 J	15.3 J	26	8.02 J	8.43 J	6.99 J	18.5 J
Total OCDD	pg/L	98.5	99.8	90.7 J	196	43.5 J	43.6 J	33.5 J	150 J
2,3,7,8-TCDF	pg/L	0.8 U	0.54 U	0.5 UJ	0.859 U	0.688 U	0.685 U	0.467 U	0.904 UJ
1,2,3,7,8-PeCDF	pg/L	1.36 U	0.92 U	0.908 UJ	0.498 U	0.953 U	1.02 U	0.464 U	1.21 UJ
2,3,4,7,8-PeCDF	pg/L	1.36 U	0.999 U	1.02 UJ	0.489 U	0.991 U	1.04 U	0.501 U	1.27 UJ
1,2,3,4,7,8-HxCDF	pg/L	1.86 U	1.04 U	0.475 UJ	0.771 U	0.609 U	0.744 U	0.791 U	2.48 UJ
1,2,3,6,7,8-HxCDF	pg/L	1.96 U	1.04 U	0.496 UJ	0.785 U	0.592 U	0.764 U	0.814 U	2.47 UJ
2,3,4,6,7,8-HxCDF	pg/L	2.2 U	1.1 U	0.616 UJ	0.82 U	0.609 U	0.774 U	0.821 U	2.59 UJ
1,2,3,7,8,9-HxCDF	pg/L	2.32 U	1.23 U	0.669 UJ	0.838 U	0.65 U	0.826 U	0.874 U	3.31 UJ
1,2,3,4,6,7,8-HpCDF	pg/L	3.47 J	2.73 J	3.56 J	5.2 J	1.49 U	1.34 U	1.67 J	3.09 J
1,2,3,4,7,8,9-HpCDF	pg/L	1.53 U	0.828 U	0.438 UJ	0.65 U	1.54 U	1.33 U	0.38 U	1.74 UJ
Total OCDF	pg/L	7.52 J	3.76 U	6.8 J	13.1 J	3.46 J	3.41 J	2.97 J	6.91 UJ
Summed Dioxin/Furan TEQ[6,7]	pg/L	0.2 J	0.3 J	0.2 J	0.4 J	0.1 J	0.1 J	0.1 J	0.3 J
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[6,8]	pg/L	2.6 J	2.5 J	1.3 J	1.8 J	1.6 J	1.7 J	1.5 J	3.0 J

Notes:

1 Total LPAH includes detected concentrations of naphthalene, acenapthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
2 Total HPAH includes detected concentrations of fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.
3 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007).
4 Calculated using detected cPAH concentrations.
5 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
6 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (van den Berg et al. 2006).
7 Calculated using detected dioxin/furan concentrations.
8 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
LPAH Low molecular weight polycyclic aromatic hydrocarbon
HPAH High molecular weight polycyclic aromatic hydrocarbon
TEQ Toxic equivalency quotient

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.
JN Tentative identification with estimated concentration.
U Undetected.
UJ Undetected with estimated concentration.

Table 6.3
Stormwater In-Line Solids Analytical Results

Location		CB-31A	CB-5945	CB-4857	CB-2
		Main Line Inlet	Main Line	Main Line Outlet	Secondary Line
Sample ID		CB31A121010	CB5945121010	CB4857121010	CB2121010
Sample Date		12/10/2010	12/10/2010	12/10/2010	12/10/2010
Conventionals					
Total Organic Carbon	%	9.42 J	9.97 J	5.28 J	NA
Total Solids	%	65.7	51.8	70.2	21.4
Metals					
Arsenic	mg/kg	7 U	9 U	7 U	NA
Lead	mg/kg	64	208	130	NA
Total Petroleum Hydrocarbons					
Diesel Range Hydrocarbons	mg/kg	290	590	200	NA
Motor Oil	mg/kg	1200	2000	1200	NA
Semivolatile Organic Compounds					
Naphthalene	µg/kg	210 U	260 U	61 U	630 U
2-Methylnaphthalene	µg/kg	210 U	260 U	61 U	630 U
1-Methylnaphthalene	µg/kg	210 U	260 U	61 U	630 U
Acenaphthylene	µg/kg	210 U	260 U	61 U	630 U
Acenaphthene	µg/kg	210 U	260 U	61 U	630 U
Fluorene	µg/kg	210 U	260 U	61 U	630 U
Phenanthrene	µg/kg	390	690	230	630 U
Anthracene	µg/kg	210 U	260 U	61 U	630 U
Total LPAH	µg/kg	390	690	230	0 U
Fluoranthene	µg/kg	840	1700	570	570 J
Pyrene	µg/kg	560	1100	420	400 J
Benzo(a)anthracene	µg/kg	240	470	200	630 U
Chrysene	µg/kg	420	820	330	440 J
Benzofluoranthenes (total)[1]	µg/kg	690	1400	490	600 J
Benzo(a)pyrene	µg/kg	280	570	240	630 U
Indeno(1,2,3-cd)pyrene	µg/kg	120 J	230 J	130	630 U
Dibenzo(a,h)anthracene	µg/kg	210 U	260 U	61 U	630 U
Benzo(g,h,i)perylene	µg/kg	140 J	280	170 J	630 U
Total HPAH	µg/kg	3290 J	6570 J	2550 J	2010 J
Summed cPAH TEQ[2,3]	µg/kg	389 J	788 J	325	64 J
Summed cPAH TEQ with One-half of the Reporting Limits2,4	µg/kg	400 J	801 J	328	474 J
Pentachlorophenol	µg/kg	50	55 J	79 J	NA
Dibenzofuran	µg/kg	210 U	260 U	61 U	630 U
Dioxin/Furans					
2,3,7,8-TCDD	pg/g	1.56	3.38	1.06	3.83
1,2,3,7,8-PeCDD	pg/g	11.8	20.2	8.18	11.4
1,2,3,4,7,8-HxCDD	pg/g	27.3	47.7	15.6	17.9
1,2,3,6,7,8-HxCDD	pg/g	90.6	172	58.2	40.7
1,2,3,7,8,9-HxCDD	pg/g	53.1	101	31.2	42.5
1,2,3,4,6,7,8-HpCDD	pg/g	2780	5020	1500	835
Total OCDD	pg/g	45100	73700 J	18400	8990 J
2,3,7,8-TCDF	pg/g	1.01	2.33	0.9 J	2.81
1,2,3,7,8-PeCDF	pg/g	3.27 J	5.85	3.03 J	2.38 J
2,3,4,7,8-PeCDF	pg/g	7.08	9.43	10.5	3.23 J
1,2,3,4,7,8-HxCDF	pg/g	152	213	83.4 J	18.4
1,2,3,6,7,8-HxCDF	pg/g	35.9	54.6	22.6 J	11.2
2,3,4,6,7,8-HxCDF	pg/g	44.9	68.6	26 J	12.6
1,2,3,7,8,9-HxCDF	pg/g	10.5	14.9	7.03	2.02 J
1,2,3,4,6,7,8-HpCDF	pg/g	735	1240 J	432	204
1,2,3,4,7,8,9-HpCDF	pg/g	85.4	126 J	44.5	14
Total OCDF	pg/g	2400 J	4140 J	1310	589 J
Summed Dioxin/Furan TEQ[5,6]	pg/g	107 J	181 J	63 J	44 J
Summed Dioxin/Furan TEQ with One-half of the Detection Limits[5,7]	pg/g	107 J	181 J	63 J	44 J

Notes:

1 Benzofluoranthenes (total) includes both benzo(b)fluoranthene and benzo(k)fluoranthene. Both analytes have a toxicity equivalency factor of 0.1, therefore, the total of the two analytes is multiplied by 0.1 when calculating the cPAH TEQ.
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007).
3 Calculated using detected cPAH concentrations.
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAH that were not detected.
5 World Health Organization 2005 Toxic Equivalency Factors used to calculate dioxin/furan TEQ (van den Berg et al. 2006).
6 Calculated using detected dioxin/furan concentrations.
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Not analyzed because of limited sample volume
TEQ Toxic equivalency quotient

Qualifiers:

J The analyte was analyzed for an positively identified, but the associated numerical value is an estimated quantity.
U The analyte was not detected at the shown detection limit.

Table 7.1
Summary Statistics and Distribution by Location

Analyte	Unit	Number of Detects	Number of Non Detects	% Non Detects	Minimum	Maximum	Mean	Median	Standard Deviation	Distribution	Outlier Concentration	95% UCL	UCL Method
CB-31A: Main Line Inlet													
Total Suspended Solids	mg/L	13	0	0.00%	11.2	59.0	35.5	39.5	14.3	Normal		42.6	Student's-t
Arsenic, dissolved	µg/L	12	1	7.69%	0.3	0.6	0.5	0.5	0.1	Normal		0.5	KM (t)
Arsenic, total	µg/L	13	0	0.00%	0.5	1.2	0.9	0.8	0.2	Normal		1	Student's-t
TPH Diesel range	mg/L	5	8	61.54%	0.3	1.6	0.7	0.4	0.5	Normal	1.6	0.7	KM (Percentile Bootstrap)
TPH Heavy oil range	mg/L	12	1	7.69%	0.5	7.5	2	1	2	Non-parametric	7.5	4	KM (Chebyshev)
Naphthalene	µg/L	12	1	7.69%	0.012	0.052	0.021	0.016	0.012	Non-parametric	0.052	0.027	KM (BCA)
2-Methylnaphthalene	µg/L	6	7	53.85%	0.011	0.034	0.019	0.017	0.0087	Normal		0.019	KM (Percentile Bootstrap)
1-Methylnaphthalene	µg/L	2	11	84.62%	0.012	0.018	0.015	0.015	0.0042	No Discernable Distribution		0.014	KM (t)
Acenaphthylene	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA			
Fluorene	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA			
Phenanthrene	µg/L	13	0	0.00%	0.021	0.12	0.049	0.033	0.032	Non-parametric		0.067	Approximate Gamma
Fluoranthene	µg/L	13	0	0.00%	0.033	0.16	0.080	0.61	0.044	Non-parametric		0.11	Approximate Gamma
Pyrene	µg/L	13	0	0.00%	0.038	0.18	0.091	0.064	0.054	Non-parametric		0.12	Approximate Gamma
Benzo(a)anthracene	µg/L	9	4	30.77%	0.011	0.032	0.017	0.017	0.0070	Normal		0.02	KM (t)
Chrysene	µg/L	13	0	0.00%	0.015	0.094	0.048	0.039	0.025	Normal		0.060	Student's-t
Benzo(b)fluoranthene	µg/L	9	4	30.77%	0.015	0.059	0.025	0.022	0.014	Normal		0.032	KM (t)
Benzo(k)fluoranthene	µg/L	9	4	30.77%	0.015	0.048	0.023	0.022	0.0095	Normal		0.028	KM (t)
Benzo(a)pyrene	µg/L	9	4	30.77%	0.014	0.051	0.022	0.018	0.011	Normal		0.028	KM (t)
Indeno(1,2,3-cd)pyrene	µg/L	9	4	30.77%	0.010	0.037	0.017	0.016	0.0080	Normal		0.021	KM (t)
Dibenz(a,h)anthracene	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA			
Benzo(g,h,i)perylene	µg/L	12	1	7.69%	0.012	0.072	0.036	0.028	0.020	Normal		0.044	KM (t)
Summed cPAH TEQ[1,2]	µg/L	13	0	0.00%	0.00015	0.0708	0.025	0.026	0.022	Normal		0.036	Student's-t
Summed cPAH TEQ with One-Half of the Reporting Limits[1,3]	µg/L	13	0	0.00%	0.01	0.07	0.03	0.03	0.02	Normal		0.04	Student's-t
Pentachlorophenol	µg/L	13	0	0.00%	0.3	1.5	0.7	0.6	0.4	Non-parametric		1	Approximate Gamma
Dibenzofuran	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA			
1,2,3,7,8-PeCDD	pg/L	5	8	61.54%	2.17	5.83	2.76	3.33	1.03	Normal	5.83	3.72	KM (Percentile Bootstrap)
1,2,3,4,7,8-HxCDD	pg/L	13	0	0.00%	2.8	11.1	6.1	6.1	2.5	Normal		7.3	Student's-t
1,2,3,6,7,8-HxCDD	pg/L	13	0	0.00%	6.62	32.0	17.0	16.3	7.35	Normal		20.7	Student's-t
1,2,3,7,8,9-HxCDD	pg/L	13	0	0.00%	5.82	21.4	11.5	10.3	4.70	Normal		13.8	Student's-t
1,2,3,4,6,7,8-HpCDD	pg/L	13	0	0.00%	167	1030	561	522	252	Normal		685	Student's-t
OCDD	pg/L	13	0	0.00%	1390	10800	5614	4880	2911	Normal		7053	Student's-t
1,2,3,7,8-PeCDF	pg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA			
2,3,4,7,8-PeCDF	pg/L	4	9	69.23%	2.23	3.14	2.39	2.73	0.292	Normal		2.84	KM (Percentile Bootstrap)
1,2,3,4,7,8-HxCDF	pg/L	13	0	0.00%	6.61	38.1	21.0	20.7	9.66	Normal		25.7	Student's-t
1,2,3,6,7,8-HxCDF	pg/L	13	0	0.00%	3.07	16.3	10.7	10.2	4.71	Normal		13.1	Student's-t
2,3,4,6,7,8-HxCDF	pg/L	13	0	0.00%	3.07	14.4	8.01	7.78	3.36	Normal		9.67	Student's-t
1,2,3,7,8,9-HxCDF	pg/L	7	6	46.15%	1.46	3.67	2.25	2.49	0.803	Normal		2.71	KM (t)
1,2,3,4,6,7,8-HpCDF	pg/L	13	0	0.00%	34.6	231	126	118	57.8	Normal		154	Student's-t
1,2,3,4,7,8,9-HpCDF	pg/L	13	0	0.00%	4.58	20.8	12.4	13.0	5.15	Normal		14.9	Student's-t
OCDF	pg/L	13	0	0.00%	85.2	642	351	358	165	Normal		433	Student's-t
Summed Dioxin/Furan TEQ[3,4]	pg/L	13	0	0.00%	5.366	36.52	17.98	17.47	8.831	Normal	36.52	22.35	Student's-t
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[4,5]	pg/L	13	0	0.00%	7.43	37.16	19.8	19.8	8.58	Normal		24.1	Student's-t

Table 7.1
Summary Statistics and Distribution by Location

Analyte	Unit	Number of Detects	Number of Non Detects	% Non Detects	Minimum	Maximum	Mean	Median	Standard Deviation	Distribution	Outlier Concentration	95% UCL	UCL Method
CB4857: Main Line Outlet													
Total Suspended Solids	mg/L	13	0	0.00%	7.0	48.5	28	33	14	Normal		35	Student's-t
Arsenic, dissolved	µg/L	13	0	0.00%	0.3	0.5	0.4	0.4	0.09	No Discernable Distribution		0.5	Student's-t
Arsenic, total	µg/L	13	0	0.00%	0.5	1.2	0.8	0.7	0.2	Normal		0.9	Student's-t
TPH Diesel range	mg/L	2	11	84.62%	0.29	0.43	0.36	0.36	0.099	No Discernable Distribution		0.33	KM (t)
TPH Heavy oil range	mg/L	8	5	38.46%	0.57	2.4	1.1	0.78	0.62	Non-parametric		1.2	KM (Percentile Bootstrap)
Naphthalene	µg/L	10	3	23.08%	0.011	0.048	0.018	0.016	0.010	Non-parametric	0.048	0.023	KM (Percentile Bootstrap)
2-Methylnaphthalene	µg/L	5	8	61.54%	0.01	0.032	0.02	0.01	0.01	Non-parametric	0.03	0.02	KM (t)
1-Methylnaphthalene	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA			
Acenaphthylene	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA			
Fluorene	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA			
Phenanthrene	µg/L	12	1	7.69%	0.013	0.1	0.04	0.03	0.03	Non-parametric		0.05	KM (BCA)
Fluoranthene	µg/L	13	0	0.00%	0.017	0.13	0.061	0.057	0.034	Normal		0.078	Student's-t
Pyrene	µg/L	13	0	0.00%	0.02	0.16	0.07	0.06	0.04	Non-parametric		0.09	Approximate Gamma
Benzo(a)anthracene	µg/L	8	5	38.46%	0.01	0.025	0.01	0.02	0.01	Normal		0.02	KM (t)
Chrysene	µg/L	11	1	8.33%	0.014	0.078	0.037	0.036	0.022	Normal		0.048	KM (t)
Benzo(b)fluoranthene	µg/L	9	4	30.77%	0.014	0.048	0.022	0.020	0.011	Normal		0.028	KM (t)
Benzo(k)fluoranthene	µg/L	9	4	30.77%	0.014	0.033	0.020	0.020	0.0070	Normal		0.024	KM (t)
Benzo(a)pyrene	µg/L	9	4	30.77%	0.011	0.032	0.018	0.019	0.0080	Normal		0.022	KM (t)
Indeno(1,2,3-cd)pyrene	µg/L	8	5	38.46%	0.011	0.027	0.018	0.017	0.0065	Normal		0.019	KM (t)
Benzo(g,h,i)perylene	µg/L	10	3	23.08%	0.011	0.063	0.028	0.029	0.017	Normal		0.037	KM (t)
Summed cPAH TEQ[1,2]	µg/L	13	0	0.00%	0	0.0456	0.0204	0.0214	0.0168	Normal		0.0287	Student's-t
Summed cPAH TEQ with One-Half of the Reporting Limits1,3	µg/L	13	0	0.00%	0.00755	0.0461	0.0231	0.0219	0.0140	Normal		0.0300	Student's-t
Pentachlorophenol	µg/L	10	3	23.08%	0.31	1.3	0.61	0.53	0.29	Non-parametric	1.3	0.69	KM (Percentile Bootstrap)
1,2,3,7,8-PeCDD	pg/L	5	8	61.54%	2.0	3.85	2.4	2.9	0.68	Normal		3.2	KM (Percentile Bootstrap)
1,2,3,4,7,8-HxCDD	pg/L	13	0	0.00%	1.57	9.12	4.71	4.35	2.26	Normal		6.01	Student's-t
1,2,3,6,7,8-HxCDD	pg/L	13	0	0.00%	3.71	25.2	12.7	11.8	7.11	Normal		16.2	Student's-t
1,2,3,7,8,9-HxCDD	pg/L	13	0	0.00%	3.09	17.7	8.78	8.11	4.90	Normal		11.2	Student's-t
1,2,3,4,6,7,8-HpCDD	pg/L	13	0	0.00%	76.2	855	424	381	256	Normal		550	Student's-t
OCDD	pg/L	13	0	0.00%	557	10900	4400	4200	3020	Normal		5900	Student's-t
2,3,4,7,8-PeCDF	pg/L	2	11	84.62%	1.89	2.17	1.92	2.03	0.0840	No Discernable Distribution		2.17	KM (% Bootstrap)
1,2,3,4,7,8-HxCDF	pg/L	13	0	0.00%	3.08	28.7	15.1	15.6	8.48	Normal		19.3	Student's-t
1,2,3,6,7,8-HxCDF	pg/L	13	0	0.00%	1.56	14.5	7.42	6.46	4.08	Normal		9.43	Student's-t
2,3,4,6,7,8-HxCDF	pg/L	13	0	0.00%	1.98	10.9	5.77	5.41	2.95	Normal		7.23	Student's-t
1,2,3,7,8,9-HxCDF	pg/L	6	7	53.85%	1.61	3.26	1.91	1.81	0.557	No Discernable Distribution		2.22	KM (% Bootstrap)
1,2,3,4,6,7,8-HpCDF	pg/L	13	0	0.00%	14.2	186	91.4	89.0	54.4	Normal		118	Student's-t
1,2,3,4,7,8,9-HpCDF	pg/L	13	0	0.00%	1.91	16.8	9.07	9.26	4.94	Normal		11.5	Student's-t
OCDF	pg/L	13	0	0.00%	34.8	500	250	255	149	Normal		324	Student's-t
Summed Dioxin/Furan TEQ[4,5]	pg/L	13	0	0.00%	2.617	29.16	13.41	14.03	8.189	Normal		17.46	Student's-t
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[4,6]	pg/L	13	0	0.00%	4.189	29.8	15.0	14.5	8.26	Normal		19.1	Student's-t

Table 7.1
Summary Statistics and Distribution by Location

Analyte	Unit	Number of Detects	Number of Non Detects	% Non Detects	Minimum	Maximum	Mean	Median	Standard Deviation	Distribution	Outlier Concentration	95% UCL	UCL Method
CB-1: Secondary Line Outlet[7]													
Total Suspended Solids	mg/L	12	0	0.00%	3.4	15.4	7.3	7.0	3.2	Normal	15.4	9.0	Student's-t
Arsenic, dissolved	µg/L	11	1	8.33%	0.2	1	0.4	0.3	0.3	No Discernable Distribution		0.7	KM (Chebyshev)
Arsenic, total	µg/L	11	1	8.33%	0.3	1.3	0.6	0.5	0.3	Non-parametric	1.3	0.7	KM (BCA)
Naphthalene	µg/L	7	5	41.67%	0.012	0.026	0.015	0.015	0.0040	Non-parametric	0.026	0.017	KM (t)
2-Methylnaphthalene	µg/L	1	11	91.67%	NA	NA	NA	NA	NA	NA			
Phenanthrene	µg/L	3	9	75.00%	0.012	0.1	0.02	0.01	0.02	Lognormal		0.1	KM (BCA)
1,2,3,4,6,7,8-HpCDD	pg/L	12	0	0.00%	6.99	26.0	15.6	15.5	6.28	Normal		18.9	Student's-t
OCDD	pg/L	12	0	0.00%	33.5	196	99.4	97.6	50.5	Normal		126	Student's-t
1,2,3,4,6,7,8-HpCDF	pg/L	10	2	16.67%	1.67	5.2	3.3	3.5	1.2	Normal		3.9	KM (t)
OCDF	pg/L	9	3	25.00%	2.97	13.1	6.74	7.52	3.80	Normal		8.84	KM (t)
Summed Dioxin/Furan TEQ[5,6]	pg/L	12	0	0.00%	0.0943	0.375	0.217	0.221	0.0920	Normal		0.265	Student's-t
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[5,7]	pg/L	12	0	0.00%	1.302	4.603	2.203	1.764	0.9370	Non-parametric	4.603	2.722	Approximate Gamma

Notes:

1 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007).
2 Calculated using detected cPAH concentrations.
3 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
4 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (van den Berg et al. 2006).
5 Calculated using detected dioxin/furan concentrations.
6 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.
7 Analytes that were not detected are not shown in this summary table.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Insufficient detections to calculate summary statistics
TEQ Toxic equivalency quotient
UCL Upper Confidence Limit

Table 7.2
Summary Statistics and Distribution for the Main Line Inlet (CB-31A)

Analyte	Unit	Number of Detects	Number of Non-detects	% Non-detects	Minimum	Maximum	Mean	Median	Standard Deviation	Distribution	Outlier Concentration
Total Suspended Solids	mg/L	13	0	0.00%	11.2	59.0	35.5	39.5	14.3	Normal	
Arsenic, dissolved	µg/L	12	1	7.69%	0.3	0.6	0.5	0.5	0.1	Normal	
Arsenic, total	µg/L	13	0	0.00%	0.5	1.2	0.9	0.8	0.2	Normal	
TPH Diesel range	mg/L	5	8	61.54%	0.3	1.6	0.7	0.4	0.5	Normal	1.6
TPH Heavy oil range	mg/L	12	1	7.69%	0.5	7.5	2	1	2	Non-parametric	7.5
Naphthalene	µg/L	12	1	7.69%	0.012	0.052	0.021	0.016	0.012	Non-parametric	0.052
2-Methylnaphthalene	µg/L	6	7	53.85%	0.011	0.034	0.019	0.017	0.0087	Normal	
1-Methylnaphthalene	µg/L	2	11	84.62%	0.012	0.018	0.015	0.015	0.0042	No Discernable Distribution	
Acenaphthylene	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA	
Fluorene	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA	
Phenanthrene	µg/L	13	0	0.00%	0.021	0.12	0.049	0.033	0.032	Non-parametric	
Fluoranthene	µg/L	13	0	0.00%	0.033	0.16	0.080	0.61	0.044	Non-parametric	
Pyrene	µg/L	13	0	0.00%	0.038	0.18	0.091	0.064	0.054	Non-parametric	
Benzo(a)anthracene	µg/L	9	4	30.77%	0.011	0.032	0.017	0.017	0.0070	Normal	
Chrysene	µg/L	13	0	0.00%	0.015	0.094	0.048	0.039	0.025	Normal	
Benzo(b)fluoranthene	µg/L	9	4	30.77%	0.015	0.059	0.025	0.022	0.014	Normal	
Benzo(k)fluoranthene	µg/L	9	4	30.77%	0.015	0.048	0.023	0.022	0.010	Normal	
Benzo(a)pyrene	µg/L	9	4	30.77%	0.014	0.051	0.022	0.018	0.011	Normal	
Indeno(1,2,3-cd)pyrene	µg/L	9	4	30.77%	0.01	0.037	0.02	0.02	0.01	Normal	
Dibenz(a,h)anthracene	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA	
Benzo(g,h,i)perylene	µg/L	12	1	7.69%	0.012	0.072	0.036	0.028	0.020	Normal	
Summed cPAH TEQ[1,2]	µg/L	13	0	0.00%	0.00015	0.0708	0.025	0.026	0.022	Normal	
Summed cPAH TEQ with One-Half of the Reporting Limits1,3	µg/L	13	0	0.00%	0.01	0.07	0.03	0.03	0.02	Normal	
Pentachlorophenol	µg/L	13	0	0.00%	0.3	1.5	0.7	0.6	0.4	Non-parametric	
Dibenzofuran	µg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA	
1,2,3,7,8-PeCDD	pg/L	5	8	61.54%	2.17	5.83	2.76	3.33	1.03	Normal	5.83
1,2,3,4,7,8-HxCDD	pg/L	13	0	0.00%	2.8	11.1	6.1	6.1	2.5	Normal	
1,2,3,6,7,8-HxCDD	pg/L	13	0	0.00%	6.62	32	17	16	7.4	Normal	
1,2,3,7,8,9-HxCDD	pg/L	13	0	0.00%	5.82	21.4	11.5	10.3	4.70	Normal	
1,2,3,4,6,7,8-HpCDD	pg/L	13	0	0.00%	167	1030	561	522	252	Normal	
OCDD	pg/L	13	0	0.00%	1390	10800	5614	4880	2911	Normal	
1,2,3,7,8-PeCDF	pg/L	1	12	92.31%	NA	NA	NA	NA	NA	NA	
2,3,4,7,8-PeCDF	pg/L	4	9	69.23%	2.23	3.14	2.39	2.73	0.292	Normal	
1,2,3,4,7,8-HxCDF	pg/L	13	0	0.00%	6.61	38.1	21.0	20.7	9.66	Normal	
1,2,3,6,7,8-HxCDF	pg/L	13	0	0.00%	3.07	16.3	10.7	10.2	4.71	Normal	
2,3,4,6,7,8-HxCDF	pg/L	13	0	0.00%	3.07	14.4	8.01	7.78	3.36	Normal	
1,2,3,7,8,9-HxCDF	pg/L	7	6	46.15%	1.46	3.67	2.25	2.49	0.803	Normal	
1,2,3,4,6,7,8-HpCDF	pg/L	13	0	0.00%	34.6	231	126	118	57.8	Normal	
1,2,3,4,7,8,9-HpCDF	pg/L	13	0	0.00%	4.58	20.8	12.4	13.0	5.15	Normal	
OCDF	pg/L	13	0	0.00%	85.2	642	351	358	165	Normal	
Summed Dioxin/Furan TEQ[4,5]	pg/L	13	0	0.00%	5.366	36.52	17.98	17.47	8.831	Normal	36.5246
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[4,6]	pg/L	13	0	0.00%	7.43	37.16	19.8	19.8	8.58	Normal	

Notes:

1 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007).
2 Calculated using detected cPAH concentrations.
3 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
4 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (van den Berg et al. 2006).
5 Calculated using detected dioxin/furan concentrations.
6 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Insufficient detections to calculate summary statistics
TEQ Toxic equivalency quotient
UCL Upper Confidence Limit

Table 7.3
Summary Statistics and Distribution for the Combined Stormwater Outlets (CB4857 and CB-1)[1]

Analyte	Unit	Number of Detects	Number of Non-detects	% Non-detects	Minimum	Maximum	Mean	Median	Standard Deviation	Distribution
Total Suspended Solids	mg/L	25	0	0.00%	3.4	48.5	18	9.5	15	No Discernable Distribution
Arsenic, dissolved	µg/L	24	1	4.00%	0.2	1	0.4	0.4	0.2	No Discernable Distribution
Arsenic, total	µg/L	24	1	4.00%	0.3	1.3	0.7	0.6	0.3	Normal
TPH Diesel range	mg/L	2	23	92.00%	0.29	0.43	0.36	0.36	0.099	No Discernable Distribution
TPH Heavy oil range	mg/L	8	17	68.00%	0.57	2.4	1.1	0.78	0.62	Non-parametric
Naphthalene	µg/L	17	8	32.00%	0.011	0.048	0.016	0.016	0.0080	No Discernable Distribution
2-Methylnaphthalene	µg/L	6	19	76.00%	0.01	0.032	0.02	0.01	0.008	No Discernable Distribution
1-Methylnaphthalene	µg/L	1	24	96.00%	NA	NA	NA	NA	NA	NA
Acenaphthylene	µg/L	1	24	96.00%	NA	NA	NA	NA	NA	NA
Fluorene	µg/L	1	24	96.00%	NA	NA	NA	NA	NA	NA
Phenanthrene	µg/L	15	10	40.00%	0.012	0.1	0.03	0.03	0.03	Non-parametric
Fluoranthene	µg/L	13	12	48.00%	0.017	0.13	0.061	0.057	0.034	Normal
Pyrene	µg/L	13	12	48.00%	0.02	0.16	0.07	0.06	0.04	Non-parametric
Benzo(a)anthracene	µg/L	8	17	68.00%	0.01	0.025	0.01	0.02	0.004	Normal
Chrysene	µg/L	11	14	56.00%	0.014	0.078	0.026	0.036	0.020	Normal
Benzo(b)fluoranthene	µg/L	9	16	64.00%	0.014	0.048	0.018	0.021	0.0092	Normal
Benzo(k)fluoranthene	µg/L	9	16	64.00%	0.014	0.033	0.017	0.021	0.0059	Normal
Benzo(a)pyrene	µg/L	9	16	64.00%	0.011	0.032	0.015	0.019	0.0065	Normal
Indeno(1,2,3-cd)pyrene	µg/L	8	17	68.00%	0.011	0.027	0.018	0.017	0.0065	Normal
Benzo(g,h,i)perylene	µg/L	10	15	60.00%	0.011	0.063	0.020	0.029	0.015	Normal
Summed cPAH TEQ[2,3]	µg/L	25	0	0.00%	0	0.0456	0.0106	0.00	0.0158	No Discernable Distribution
Summed cPAH TEQ with One-Half of the Reporting Limits2,4	µg/L	25	0	0.00%	0.00755	0.0461	0.0157	0.0076	0.0127	No Discernable Distribution
Pentachlorophenol	µg/L	10	15	60.00%	0.31	1.3	0.61	0.53	0.29	Non-parametric
1,2,3,7,8-PeCDD	pg/L	5	20	80.00%	2	3.85	2	3	0.5	Normal
1,2,3,4,7,8-HxCDD	pg/L	13	12	48.00%	1.57	9.12	3.22	4.35	2.39	Normal
1,2,3,6,7,8-HxCDD	pg/L	13	12	48.00%	3.71	25.2	8.37	11.8	6.65	Normal
1,2,3,7,8,9-HxCDD	pg/L	13	12	48.00%	3.09	17.7	6.05	8.11	4.43	Normal
1,2,3,4,6,7,8-HpCDD	pg/L	25	0	0.00%	6.99	855	228	76.2	276	No Discernable Distribution
OCDD	pg/L	25	0	0.00%	33.5	10900	2340	557	3060	No Discernable Distribution
2,3,4,7,8-PeCDF	pg/L	2	23	92.00%	1.89	2.17	1.90	2.03	0.0596	No Discernable Distribution
1,2,3,4,7,8-HxCDF	pg/L	13	12	48.00%	3.08	28.7	9.34	15.6	8.41	Normal
1,2,3,6,7,8-HxCDF	pg/L	13	12	48.00%	1.56	14.5	4.61	6.46	4.07	Normal
2,3,4,6,7,8-HxCDF	pg/L	13	12	48.00%	1.98	10.9	3.96	5.41	2.78	Normal
1,2,3,7,8,9-HxCDF	pg/L	6	19	76.00%	1.61	3.26	1.78	1.81	0.444	No Discernable Distribution
1,2,3,4,6,7,8-HpCDF	pg/L	23	2	8.00%	1.67	186	49.1	16.9	58.0	No Discernable Distribution
1,2,3,4,7,8,9-HpCDF	pg/L	13	12	48.00%	1.91	16.8	5.63	9.26	4.95	Normal
OCDF	pg/L	22	3	12.00%	2.97	500	133	63.0	159	No Discernable Distribution
Summed Dioxin/Furan TEQ[5,6]	pg/L	25	0	0.00%	0.0943	29.16	7.08	2.62	8.88	No Discernable Distribution
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[5,7]	pg/L	25	0	0.00%	1.302	29.8	8.88	4.60	8.80	Non-parametric

Notes:

1 No data outliers were identified for the combined stormwater outlet dataset.
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900 (WSDOE 2007).
3 Calculated using detected cPAH concentrations.
4 Calculated using detected cPAH concentrations plus one-half the reporting limit for cPAHs that were not detected.
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (van den Berg et al. 2006).
6 Calculated using detected dioxin/furan concentrations.
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NA Insufficient detections to calculate summary statistics
TEQ Toxic equivalency quotient
UCL Upper Confidence Limit

Table 7.4
Statistical Comparison of the Main Line Inlet (CB-31A) Stormwater Samples Before and After Line Cleaning

Analyte	Distribution	Comparison of Means Test	Statistically Significant Difference
Total Suspended Solids	Normal	ANOVA	No, P=0.085
cPAH TEQ	Normal	ANOVA	Yes, P<0.05
cPAH TEQ (ND = ½ RL)	Normal	ANOVA	Yes, P<0.05
Dioxin/Furan TEQ	Normal	ANOVA	No, P=0.777
Dioxin/Furan TEQ (ND = ½ DL)	Normal	ANOVA	No, P=0.605
Total Arsenic	Normal	ANOVA	No, P=0.101
Dissolved Arsenic	Normal	ANOVA	No, P=0.287
TPH Diesel Range	Normal	ANOVA	Yes, P<0.05
TPH Heavy Oil Range	Non-parametric	Kruskal-Wallis	Yes, P<0.05
Pentachlorophenol	Non-parametric	Kruskal-Wallis	No, P=0.554

Abbreviations:

ANOVA	Analysis of variance
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
DL	Detection limit
ND	Non-detect
RL	Reporting limit
TEQ	Toxic equivalency quotient
TPH	Total petroleum hydrocarbons

Table 7.5
Statistical Comparison of the Main Line Outlet (CB4857) Stormwater Samples Before and After Line Cleaning

Analyte	Distribution	Comparison of Means Test	Statistically Significant Difference
Total Suspended Solids	Normal	ANOVA	No, P=0.473
cPAH TEQ	Normal	ANOVA	Yes, P<0.05
cPAH TEQ (ND = ½ RL)	Normal	ANOVA	Yes, P<0.05
Dioxin/Furan TEQ	Normal	ANOVA	No, P=0.621
Dioxin/Furan TEQ (ND = ½ DL)	Normal	ANOVA	No, P=0.528
Total Arsenic	Normal	ANOVA	No, P=0.076
Dissolved Arsenic	No discernable distribution	Kruskal-Wallis	No, P=0.622
TPH Diesel Range	No discernable distribution	Kruskal-Wallis	No, P=0.324
TPH Heavy Oil Range	Non-parametric	Kruskal-Wallis	Yes, P<0.05
Pentachlorophenol	Non-parametric	Kruskal-Wallis	No, P=0.374

Abbreviations:

ANOVA	Analysis of variance
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
DL	Detection limit
ND	Non-detect
RL	Reporting limit
TEQ	Toxic equivalency quotient
TPH	Total petroleum hydrocarbons

Table 7.6
Statistical Comparison of the Secondary Line Outlet (CB-1) Stormwater Samples Before and After Line Cleaning

Analyte	Distribution	Comparison of Means Test	Statistically Significant Difference
Total Suspended Solids	Normal	ANOVA	No, P=0.802
cPAH TEQ	NA	NA	NA
cPAH TEQ (ND = ½ RL)	NA	NA	NA
Dioxin/Furan TEQ	Normal	ANOVA	No, P=0.928
Dioxin/Furan TEQ (ND = ½ DL)	Non-parametric	Kruskal-Wallis	No, P=0.197
Total Arsenic	Non-parametric	Kruskal-Wallis	No, P=0.914
Dissolved Arsenic	No discernable distribution	Kruskal-Wallis	No, P=0.667
TPH Diesel Range	NA	NA	NA
TPH Heavy Oil Range	NA	NA	NA
Pentachlorophenol	NA	NA	NA

Abbreviations:

ANOVA	Analysis of variance
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
DL	Detection limit
NA	Indicates not enough detected values to run statistical analysis
ND	Non-detect
RL	Reporting limit
TEQ	Toxic equivalency quotient
TPH	Total petroleum hydrocarbons

Table 7.7
Statistical Comparison of Main Line Inlet (CB-31A) and Main Line Outlet (CB4857) Stormwater Samples[1]

Analyte	Distribution	Comparison of Means Test	Statistically Significant Difference
Total Suspended Solids	Normal	ANOVA	No, P=0.196
cPAH TEQ	No discernable distribution	Kruskal-Wallis	No, P=0.522
cPAH TEQ (ND = ½ RL)	Non-parametric	Kruskal-Wallis	No, P=0.590
Dioxin/Furan TEQ	Normal	ANOVA	No, P=0.184
Dioxin/Furan TEQ (ND = ½ DL)	Normal	ANOVA	No, P=0.161
Total Arsenic	Lognormal	Kruskal-Wallis	No, P=0.209
Dissolved Arsenic	No discernable distribution	Kruskal-Wallis	No, P=0.427
TPH Diesel Range	Lognormal	Kruskal-Wallis	No, P=0.249
TPH Heavy Oil Range	No discernable distribution	Kruskal-Wallis	No, P=0.096
Pentachlorophenol	Lognormal	Kruskal-Wallis	No, P=0.174

Note:
1 Statistical comparison of inlet and outlet stormwater concentrations was performed using sampling results for CB-31A and CB4857 from the 10 monitored storm events.

Abbreviations:
ANOVA Analysis of variance
cPAH Carcinogenic polycyclic aromatic hydrocarbon
DL Detection limit
ND Non-detect
RL Reporting limit
TEQ Toxic equivalency quotient
TPH Total petroleum hydrocarbons

Table 7.8
Statistical Comparison of Main Line Inlet (CB-31A) and Combined Main Line and Secondary Line Outlet (CB4857 and CB-1) Stormwater Samples[1]

Analyte	Distribution	Comparison of Means Test	Statistically Significant Difference
Total Suspended Solids	No discernable distribution	Kruskal-Wallis	Yes, P<0.05
cPAH TEQ	No discernable distribution	Kruskal-Wallis	Yes, P<0.05
cPAH TEQ (ND = ½ RL)	No discernable distribution	Kruskal-Wallis	Yes, P<0.05
Dioxin/Furan TEQ	No discernable distribution	Kruskal-Wallis	Yes, P<0.05
Dioxin/Furan TEQ (ND = ½ DL)	Non-parametric	Kruskal-Wallis	Yes, P<0.05
Total Arsenic	Normal	ANOVA	Yes, P<0.05
Dissolved Arsenic	No discernable distribution	Kruskal-Wallis	No, P=0.249
TPH Diesel Range	Non-parametric	Kruskal-Wallis	No, P=0.106
TPH Heavy Oil Range	No discernable distribution	Kruskal-Wallis	Yes, P<0.05
Pentachlorophenol	Lognormal	Kruskal-Wallis	Yes, P<0.05

Note:
1 Statistical comparison of inlet and combined outlet stormwater concentrations was performed using sampling results for CB-31A and CB4857 and CB-1, combined, from the 10 monitored storm events.

Abbreviations:
ANOVA Analysis of variance
cPAH Carcinogenic polycyclic aromatic hydrocarbon
DL Detection limit
ND Non-detect
RL Reporting limit
TEQ Toxic equivalency quotient
TPH Total petroleum hydrocarbons

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Figures

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Figure 1.1
Vicinity Map

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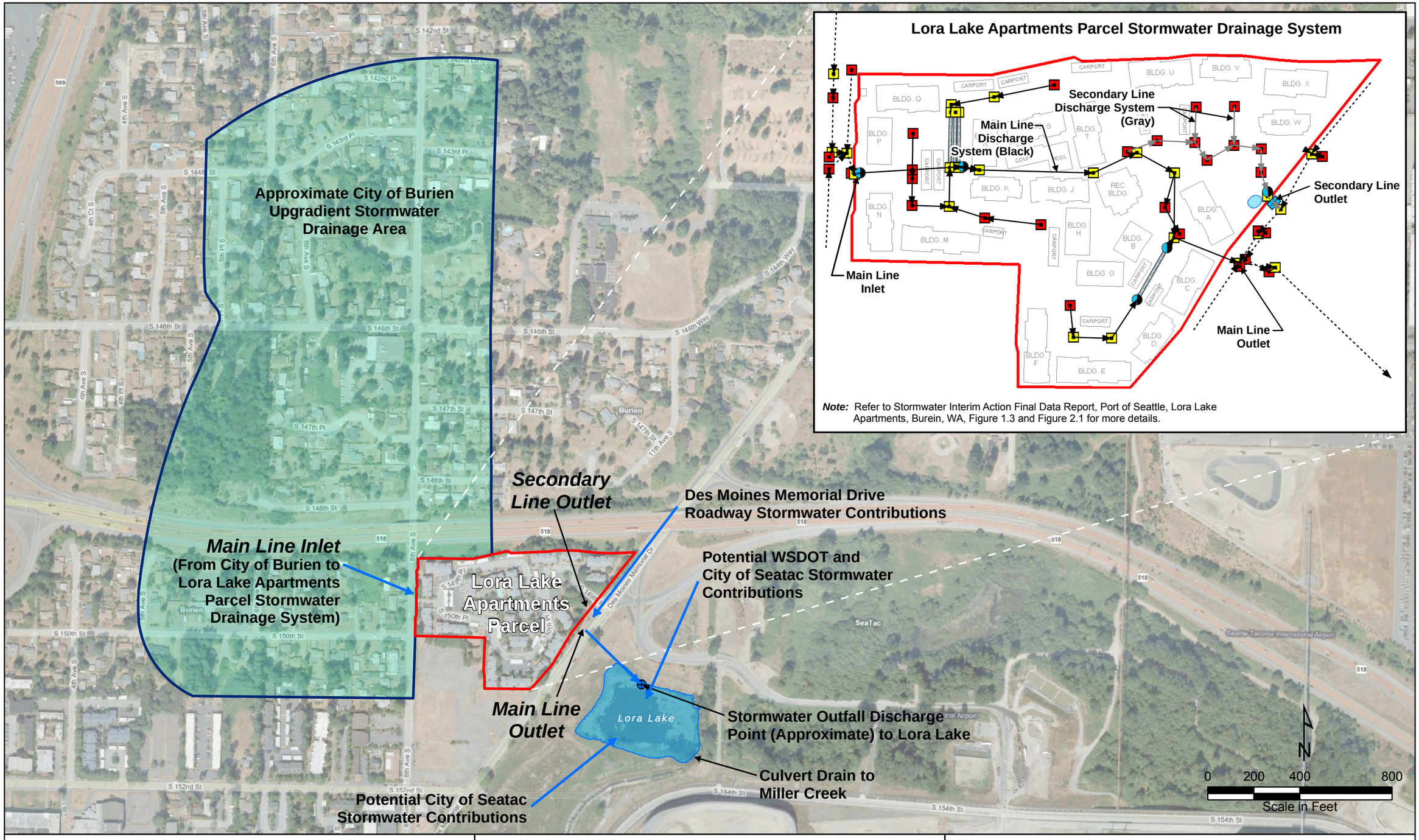

Lora Lake Apartments Parcel Stormwater Drainage System

Note: Refer to Stormwater Interim Action Final Data Report, Port of Seattle, Lora Lake Apartments, Burein, WA, Figure 1.3 and Figure 2.1 for more details.

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Figure 1.2
Potential Off-site Stormwater Contribution Areas

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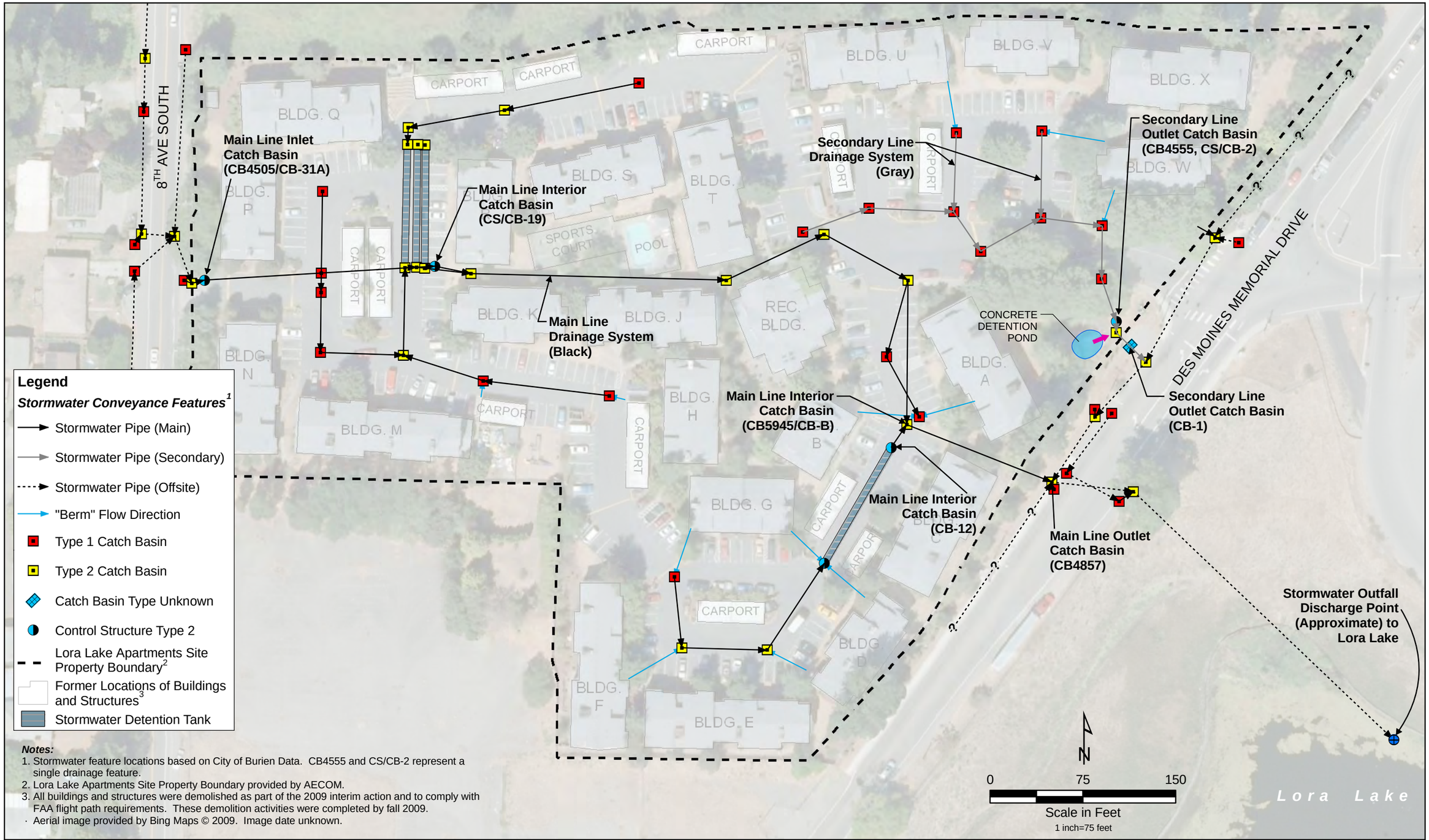

Notes:

1. Stormwater feature locations based on City of Burien Data. CB4555 and CS/CB-2 represent a single drainage feature.
2. Lora Lake Apartments Site Property Boundary provided by AECOM.
3. All buildings and structures were demolished as part of the 2009 interim action and to comply with FAA flight path requirements. These demolition activities were completed by fall 2009.

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Figure 1.3
Lora Lake Apartments Parcel
Stormwater Drainage System

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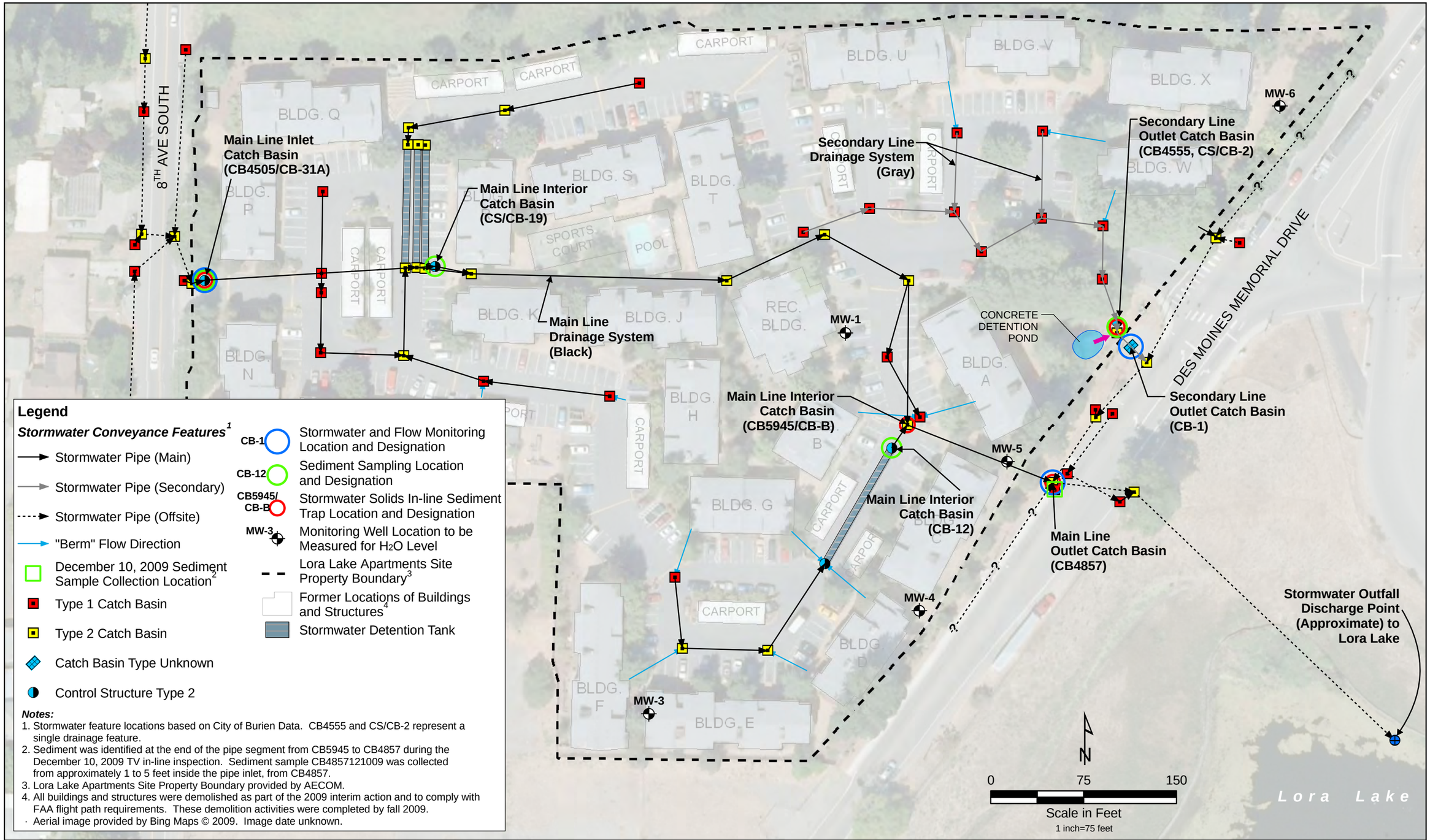

Legend

Stormwater Conveyance Features[1]

- Stormwater Pipe (Main)
- Stormwater Pipe (Secondary)
- Stormwater Pipe (Offsite)
- "Berm" Flow Direction
- December 10, 2009 Sediment Sample Collection Location[2]
- Type 1 Catch Basin
- Type 2 Catch Basin
- Catch Basin Type Unknown
- Control Structure Type 2
- CB-1: Stormwater and Flow Monitoring Location and Designation
- CB-12: Sediment Sampling Location and Designation
- CB5945/CB-B: Stormwater Solids In-line Sediment Trap Location and Designation
- MW-3: Monitoring Well Location to be Measured for H_2O Level
- Lora Lake Apartments Site Property Boundary[3]
- Former Locations of Buildings and Structures[4]
- Stormwater Detention Tank

Notes:

1. Stormwater feature locations based on City of Burien Data. CB4555 and CS/CB-2 represent a single drainage feature.
2. Sediment was identified at the end of the pipe segment from CB5945 to CB4857 during the December 10, 2009 TV in-line inspection. Sediment sample CB4857121009 was collected from approximately 1 to 5 feet inside the pipe inlet, from CB4857.
3. Lora Lake Apartments Site Property Boundary provided by AECOM.
4. All buildings and structures were demolished as part of the 2009 interim action and to comply with FAA flight path requirements. These demolition activities were completed by fall 2009.

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Figure 2.1
Interim Action Sampling and Monitoring Locations

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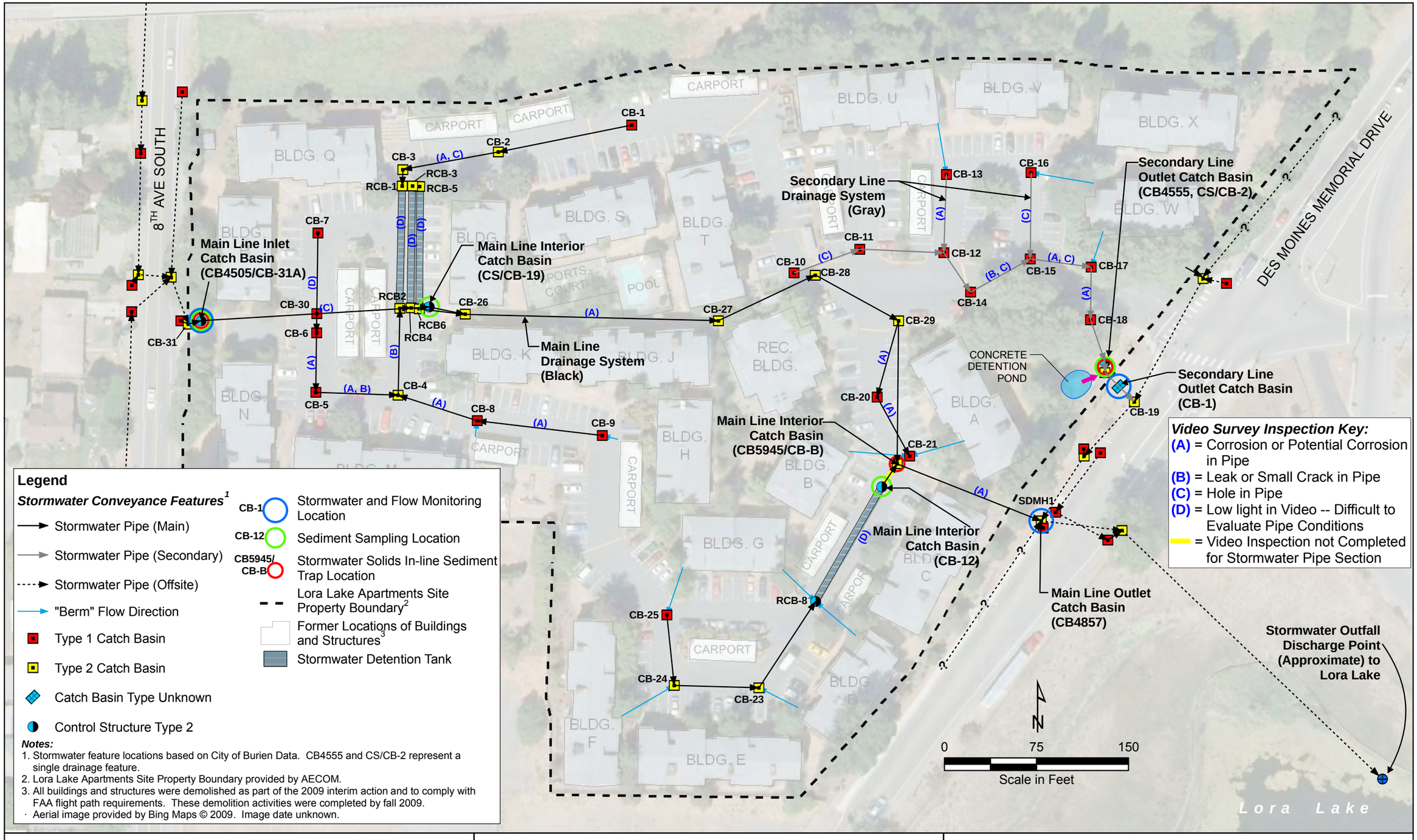

Video Survey Inspection Key:

- **(A)** = Corrosion or Potential Corrosion in Pipe
- **(B)** = Leak or Small Crack in Pipe
- **(C)** = Hole in Pipe
- **(D)** = Low light in Video -- Difficult to Evaluate Pipe Conditions
- = Video Inspection not Completed for Stormwater Pipe Section

Legend

Stormwater Conveyance Features [1]

- Stormwater Pipe (Main)
- Stormwater Pipe (Secondary)
- Stormwater Pipe (Offsite)
- "Berm" Flow Direction
- Type 1 Catch Basin
- Type 2 Catch Basin
- Catch Basin Type Unknown
- Control Structure Type 2

- CB-1 — Stormwater and Flow Monitoring Location
- CB-12 — Sediment Sampling Location
- CB5945/ CB-B — Stormwater Solids In-line Sediment Trap Location
- Lora Lake Apartments Site Property Boundary [2]
- Former Locations of Buildings and Structures [3]
- Stormwater Detention Tank

Notes:

1. Stormwater feature locations based on City of Burien Data. CB4555 and CS/CB-2 represent a single drainage feature.
2. Lora Lake Apartments Site Property Boundary provided by AECOM.
3. All buildings and structures were demolished as part of the 2009 interim action and to comply with FAA flight path requirements. These demolition activities were completed by fall 2009.

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Figure 3.1
TV In-line Inspection

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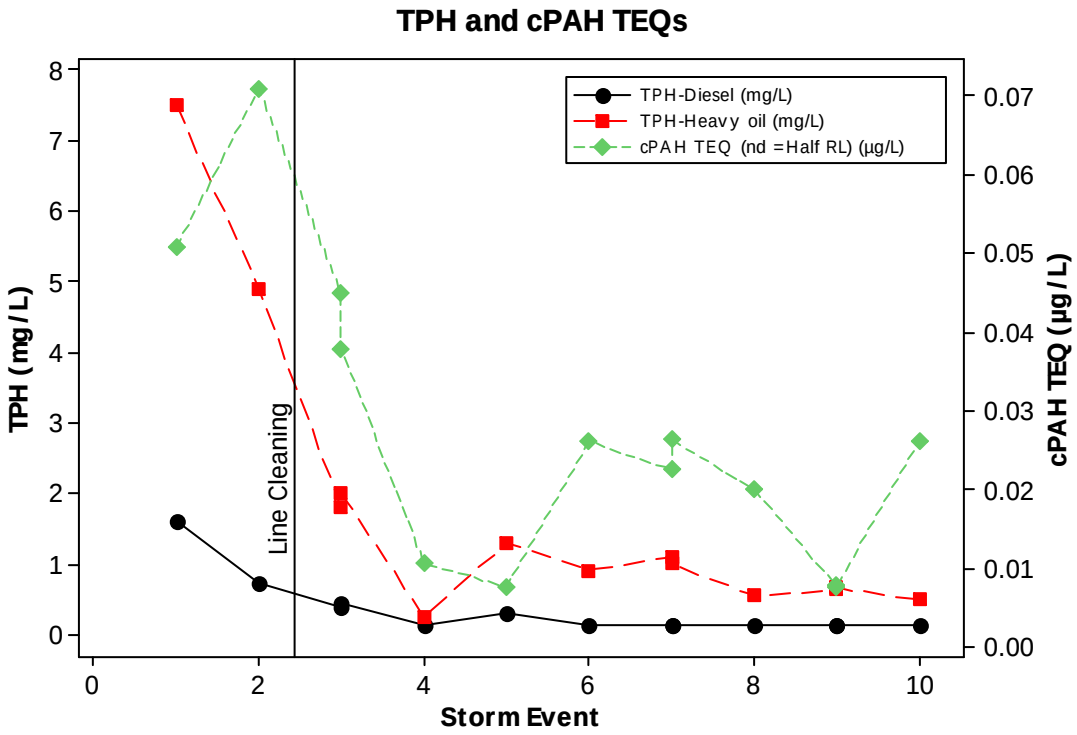

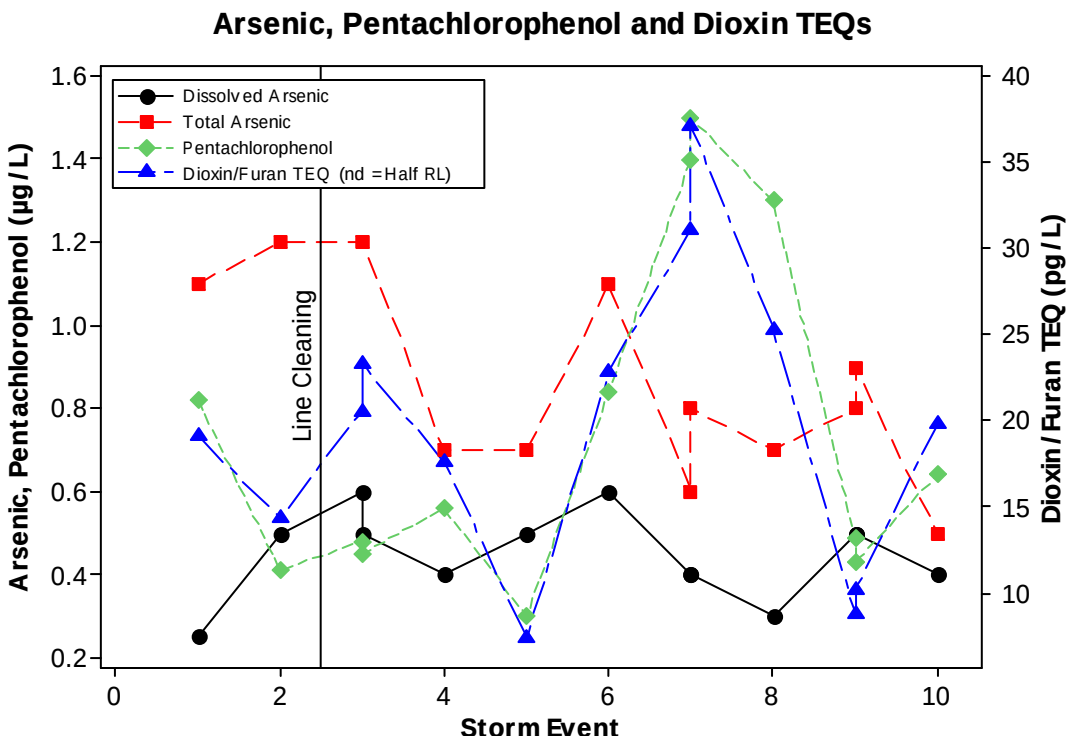

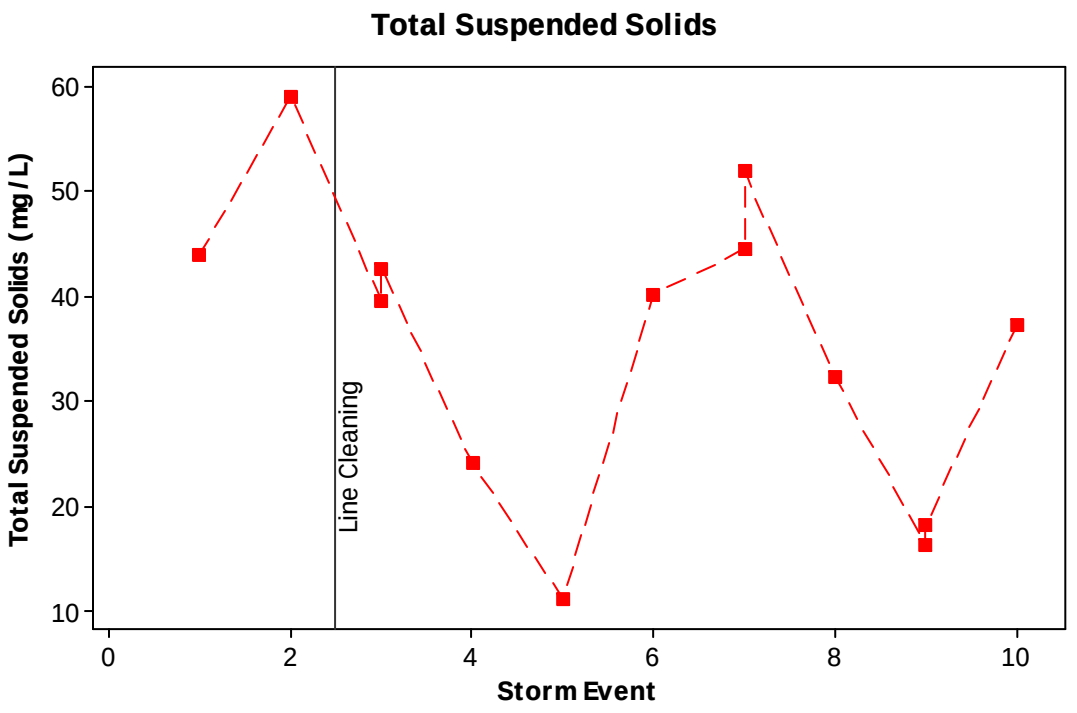

Note:
Line graphs include non-detect results shown as one-half the reporting limit.

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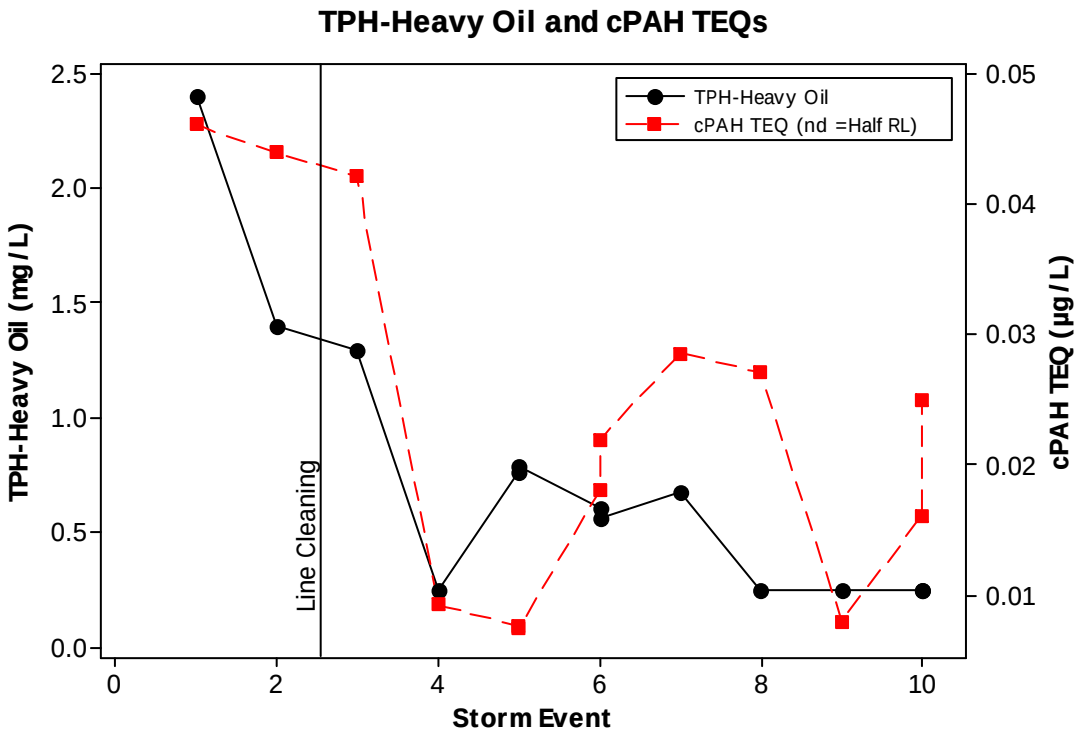
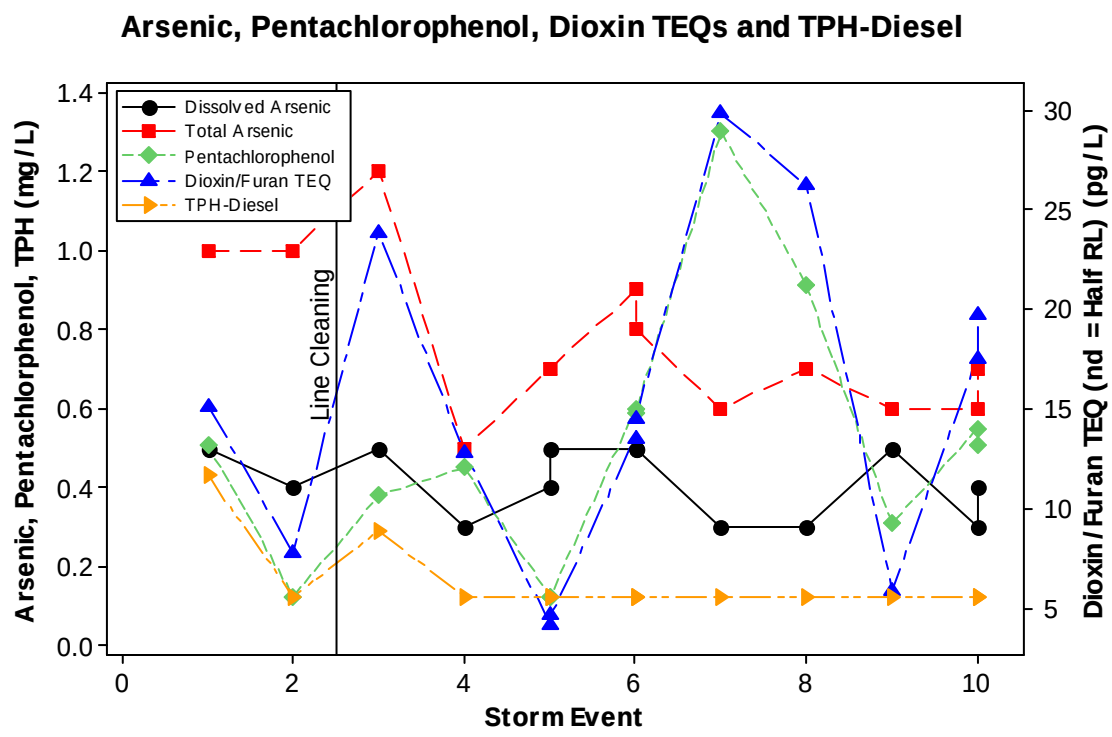
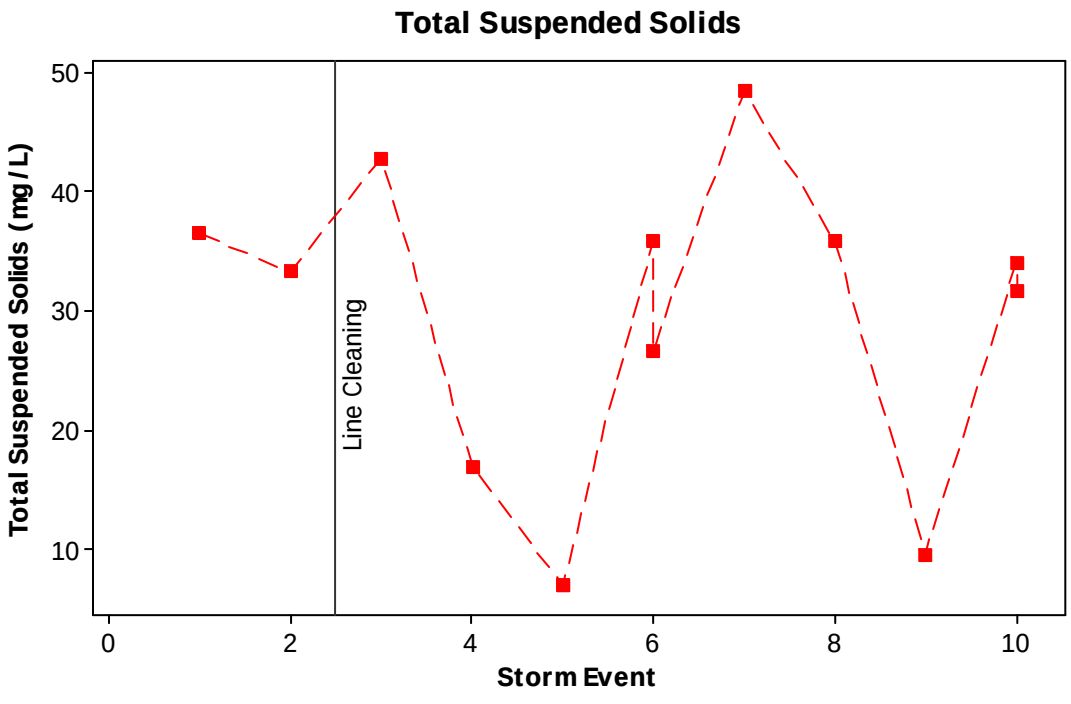
Figure 7.1
Time Series Graphs for all Analytes Detected at Main Line Inlet (CB-31A)







Note:
Line graphs include non-detect results shown as one-half the reporting limit.

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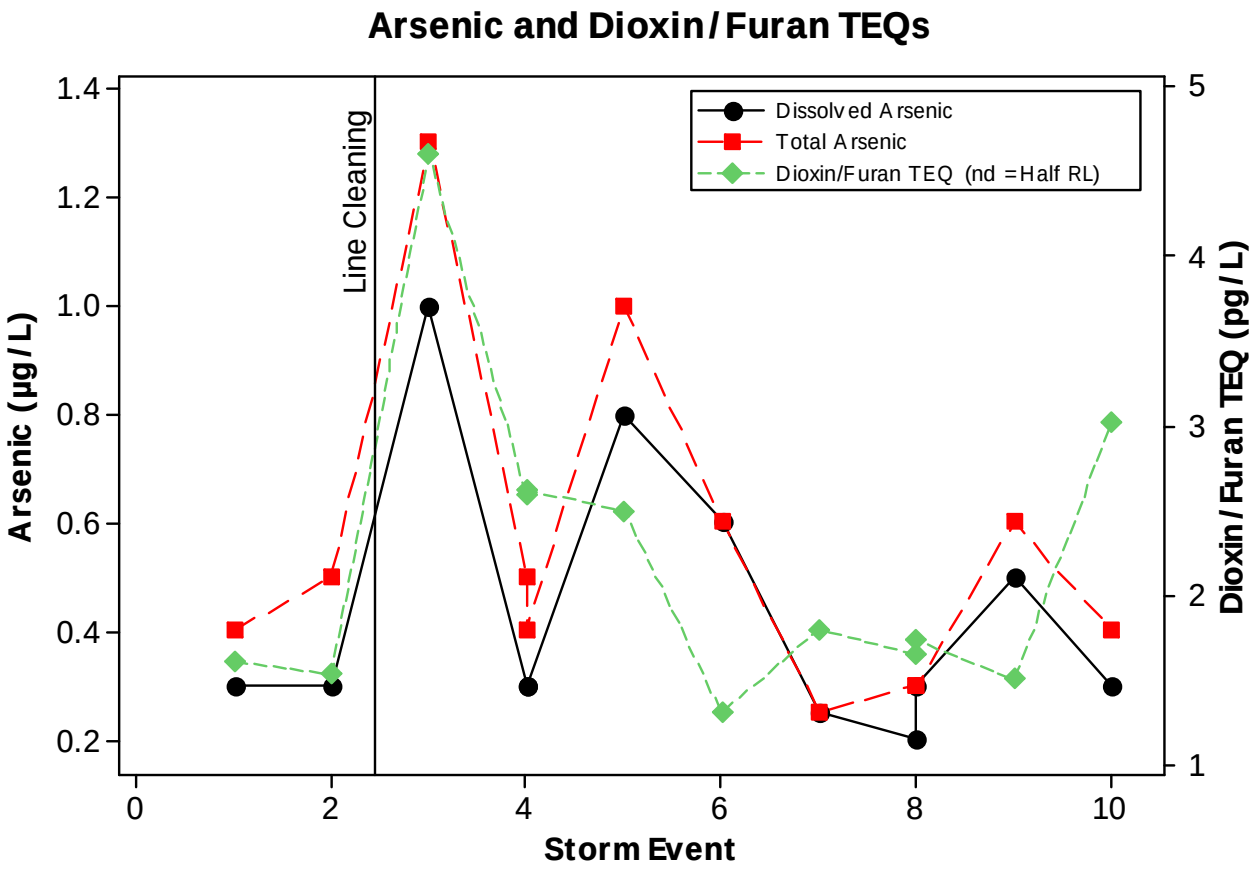
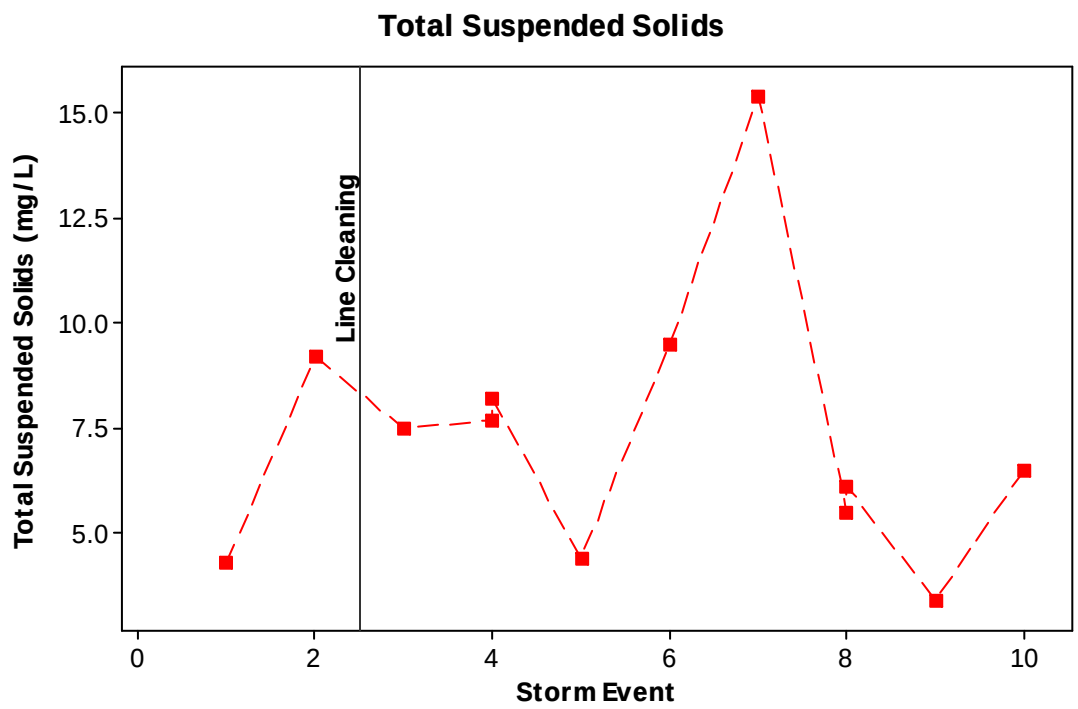
Figure 7.2
Time Series Graphs for all Analytes Detected at the Main Line Outlet (CB4857)





Note:
Line graphs include non-detect results shown as one-half the reporting limit.

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Figure 7.3
Time Series Graphs for all Analytes Detected at the Secondary Line Outlet (CB-1)

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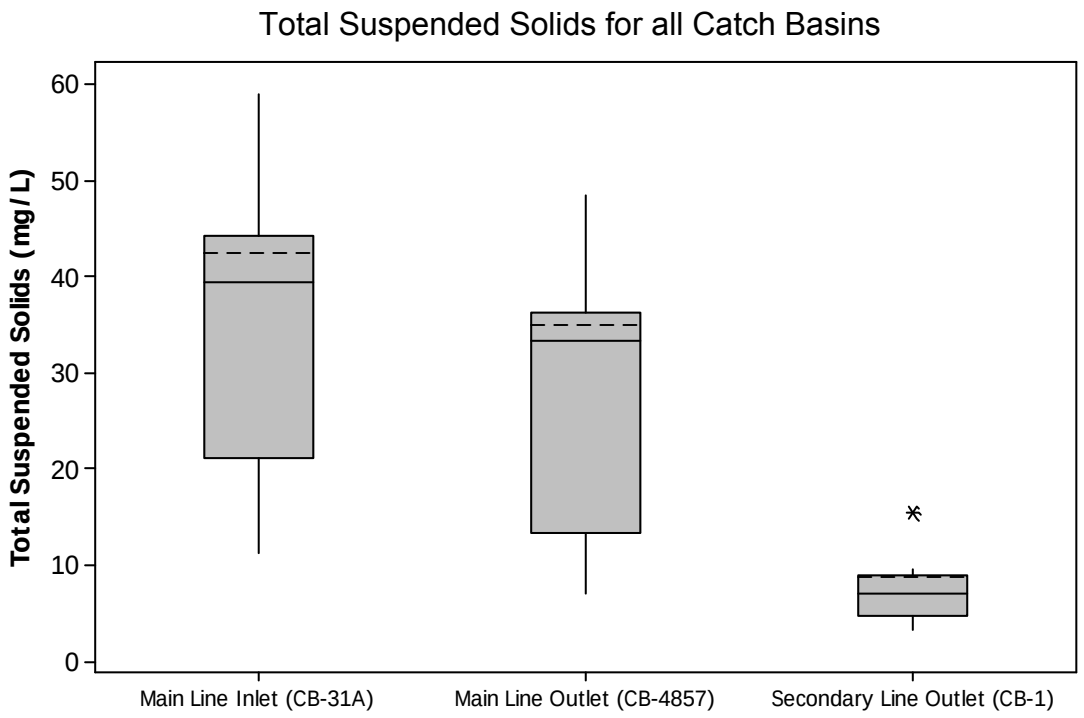

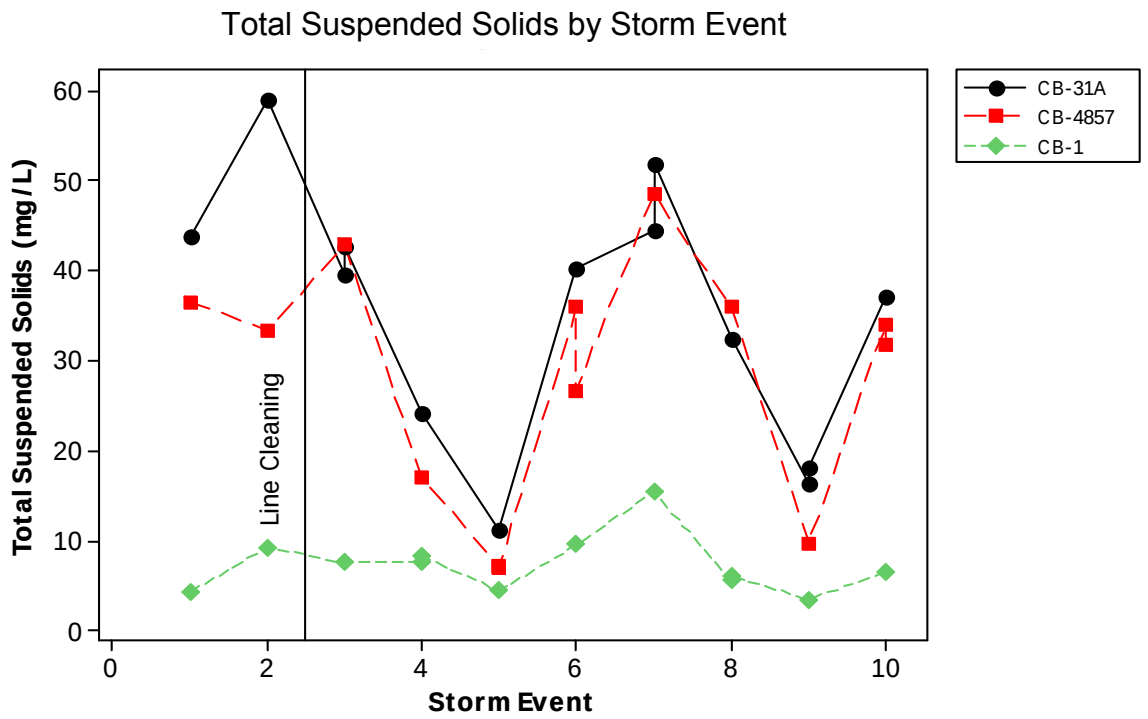

Notes:

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Box plots and graphs include non-detect results shown as one-half the reporting limit.

The solid horizontal line within each box plot represents the mean.

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The flat horizontal line, in place of a box plot, indicates analyte was not detected throughout interim action stormwater monitoring.

Overview Map of Lora Lake Apartments Stormwater Monitoring
Interim Action Locations

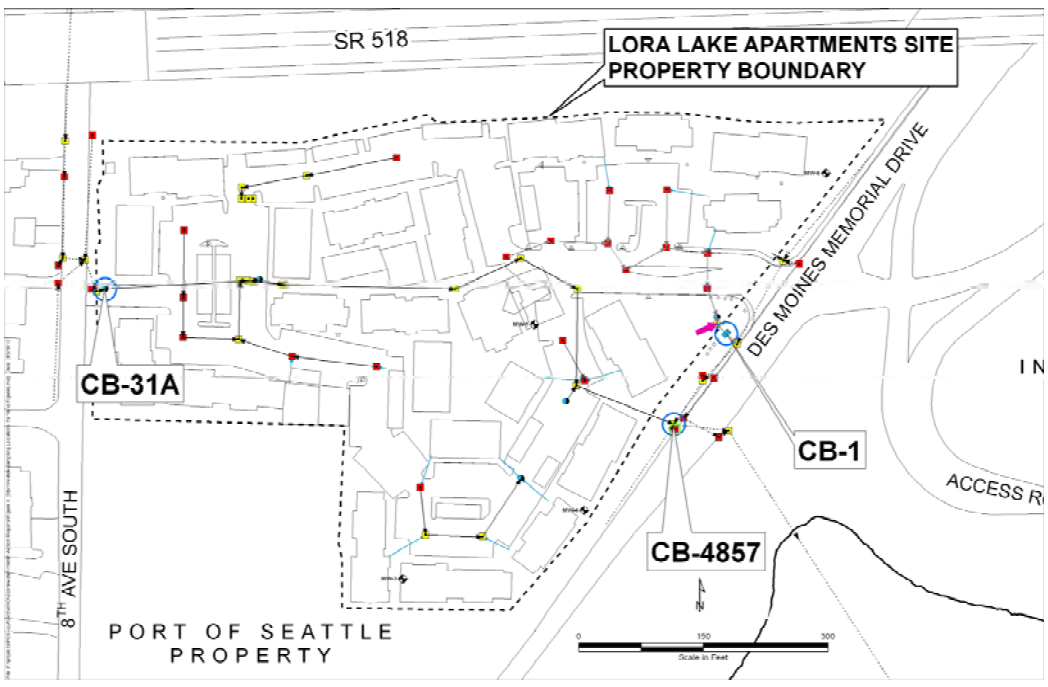

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Figure 7.4
Box Plot and Line Graphs of
Total Suspended Solids

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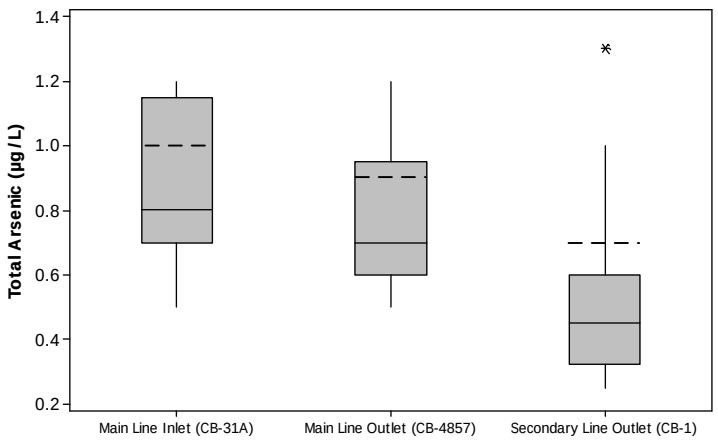
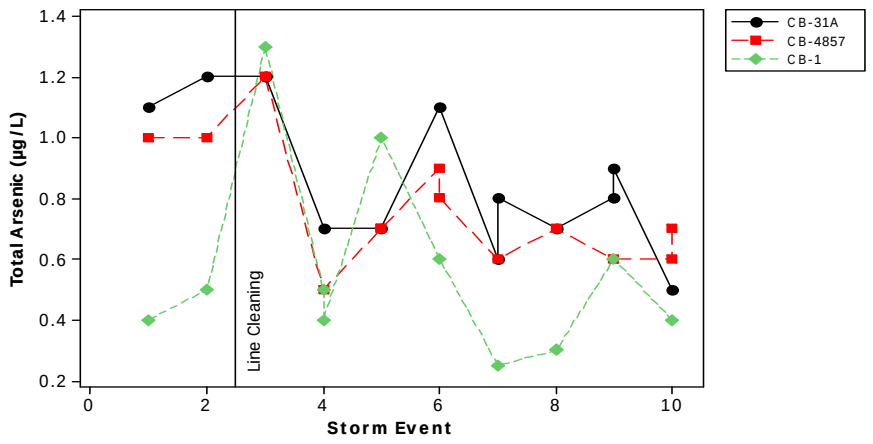
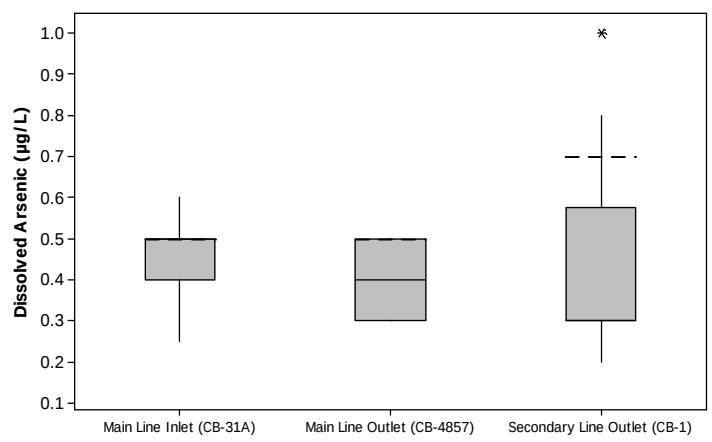
Total Arsenic for all Catch Basins



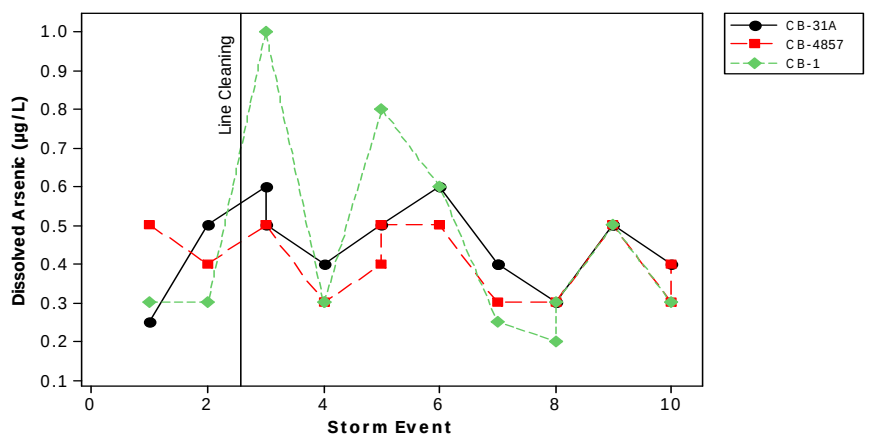
Total Arsenic by Storm Event



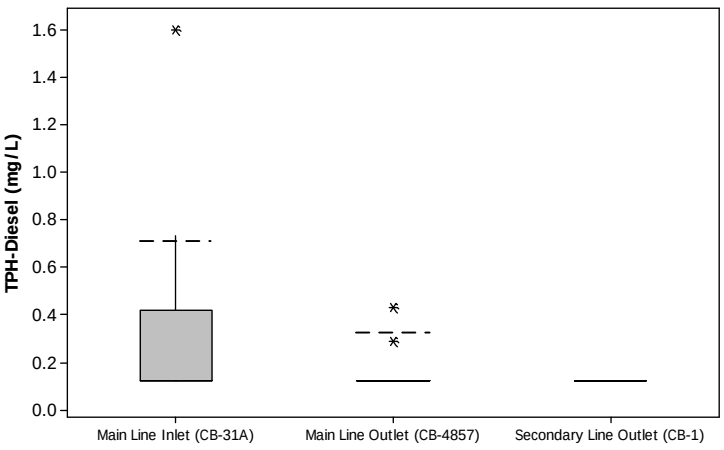
Dissolved Arsenic for all Catch Basins



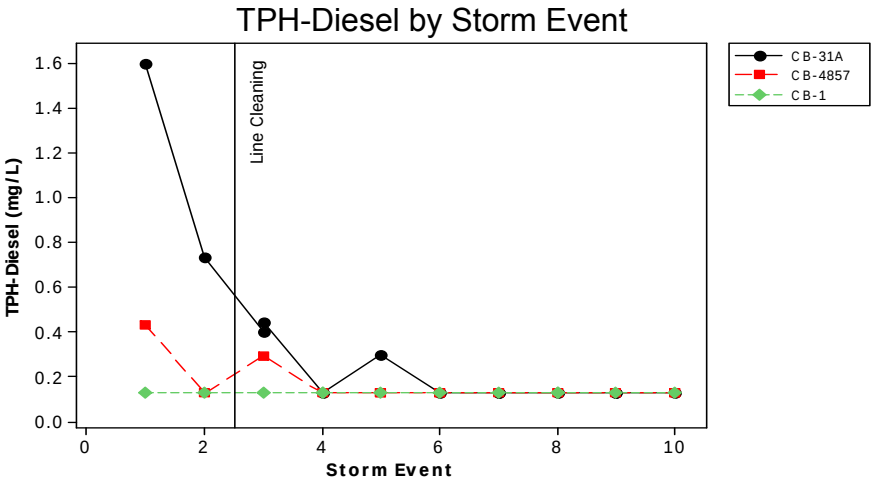
Dissolved Arsenic by Storm Event



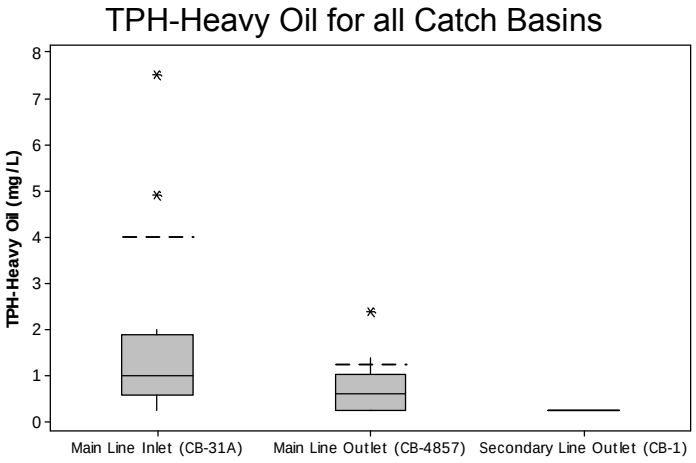
TPH-Diesel for all Catch Basins



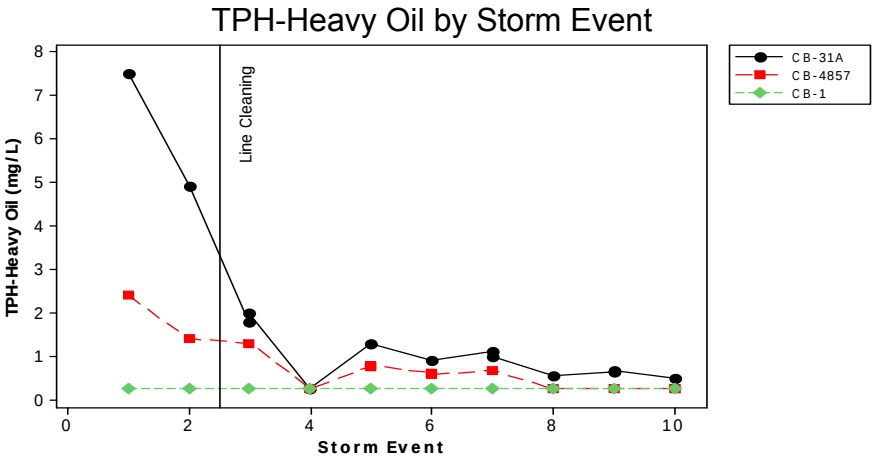
TPH-Diesel by Storm Event



TPH-Heavy Oil for all Catch Basins



TPH-Heavy Oil by Storm Event



Overview Map of Lora Lake Apartments Stormwater Monitoring Interim Action Locations

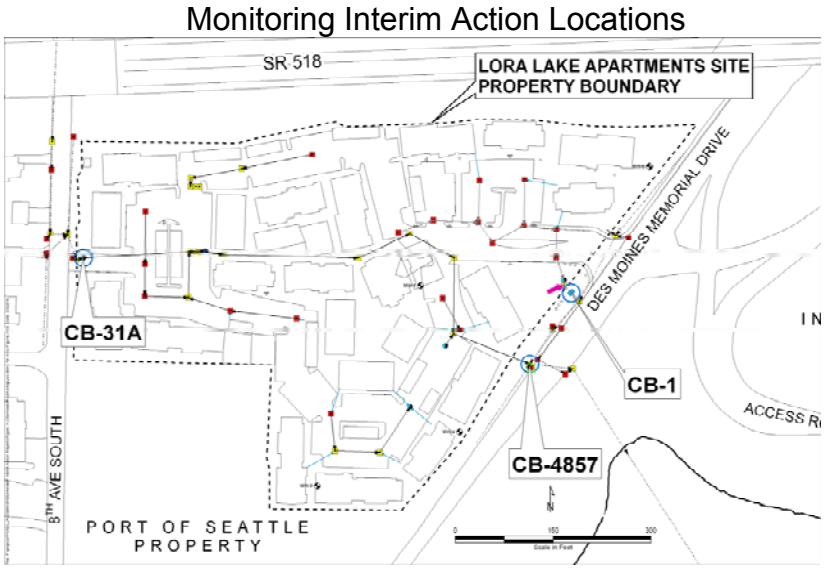


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Figure 7.5
Box Plots and Line Graphs of Arsenic and TPH

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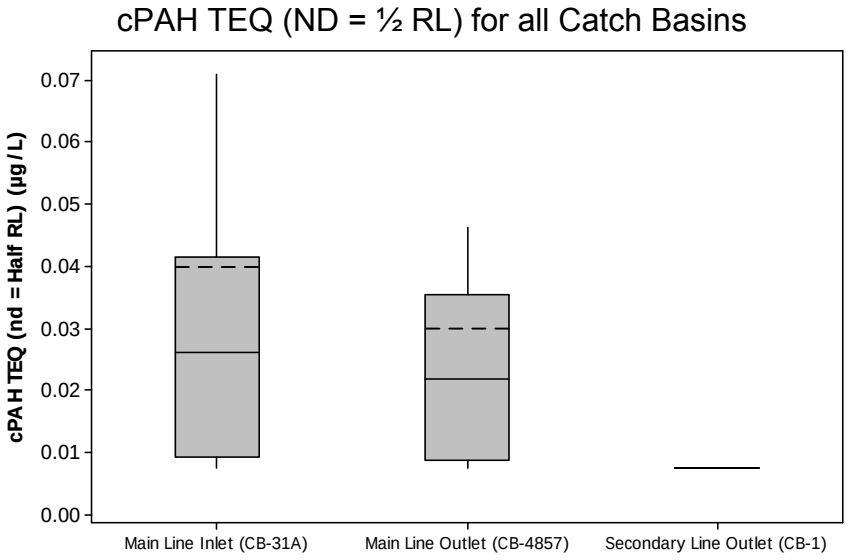

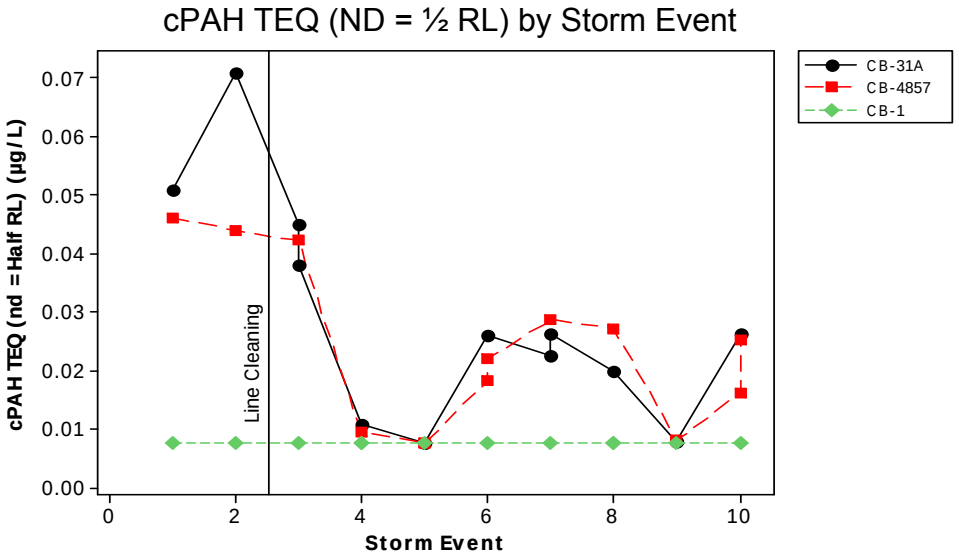

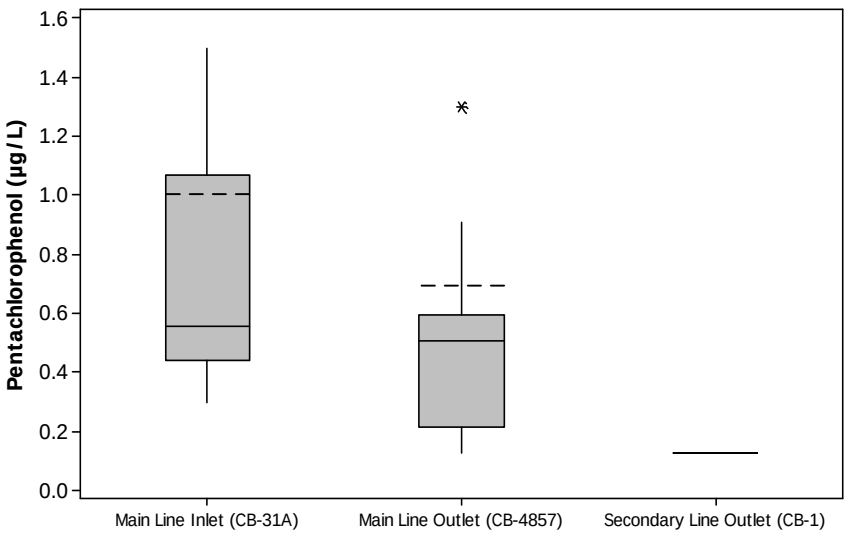

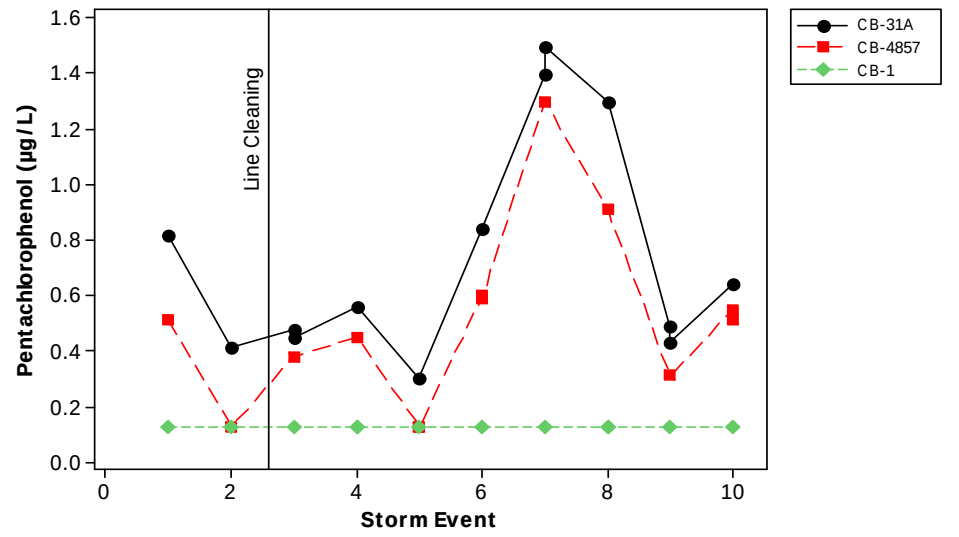

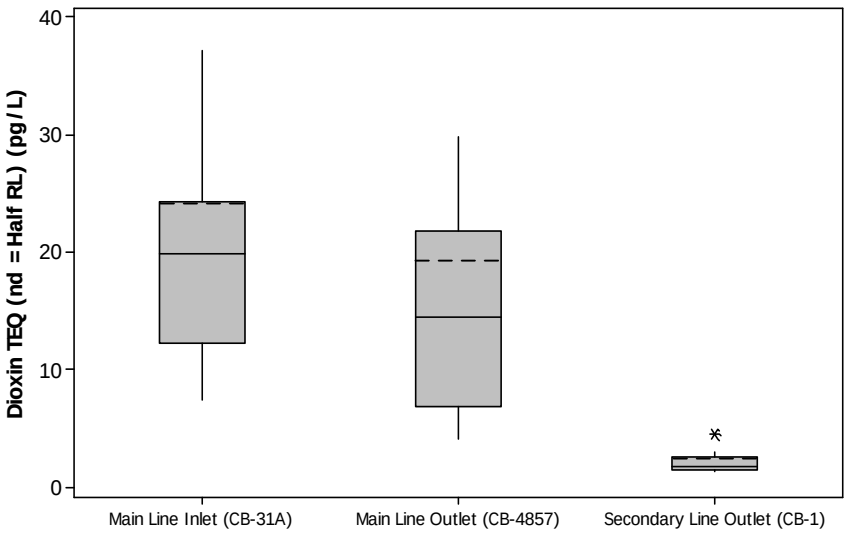

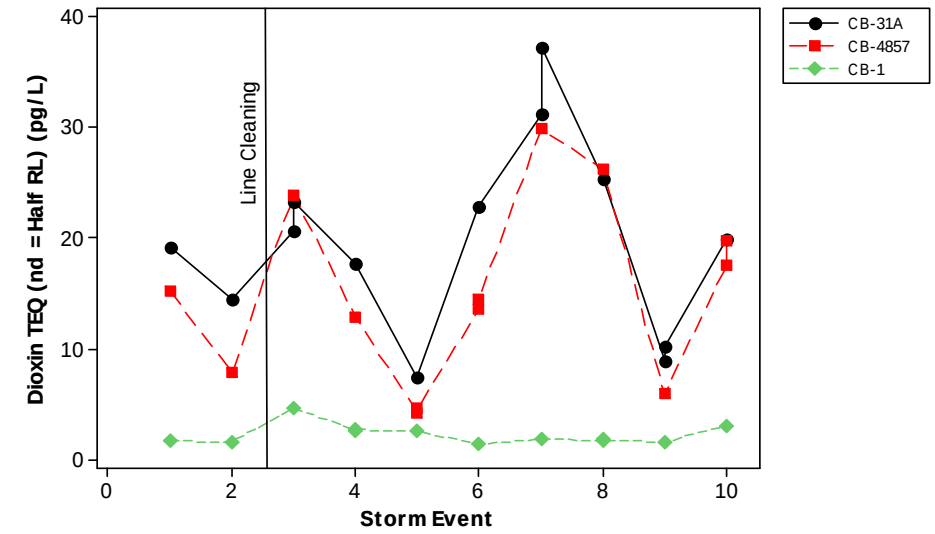

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Overview Map of Lora Lake Apartments Stormwater Monitoring Interim Action Locations

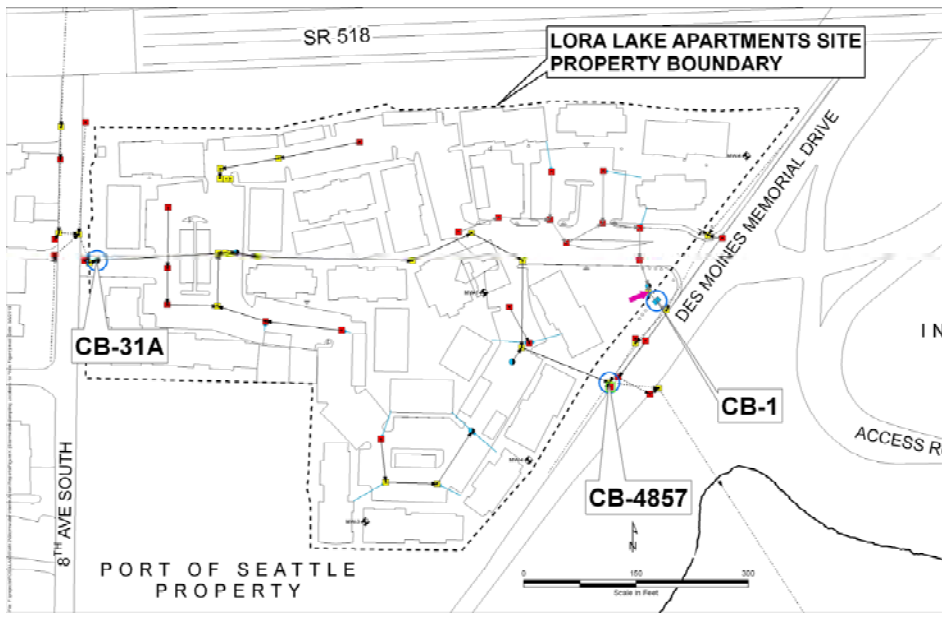

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Figure 7.6
Box Plots and Line Graphs of PAHs, PCP, and Dioxins

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Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Data Report

Appendix A
Stormwater Interim Action Progress Reports

FINAL

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Report 1

Prepared for

Port of Seattle
Aviation Environmental Programs
Seattle-Tacoma International Airport
17900 International Boulevard, Suite 402
SeaTac, Washington 98188-4238

Prepared by

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601 Union Street
Suite 600
Seattle, Washington 98101

March 19, 2010

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List of Abbreviations and Acronyms

Acronym/Abbreviation	Definition
ARI	Analytical Resources, Inc.
COC	Contaminant of concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
1,2-DCA	1,2-Dichloroethane
1,2-DCE	1,2- cis- and trans-1,2-dichloroethene
HPAH	High molecular-weight polycyclic aromatic hydrocarbon
LCS/LCSD	Surrogate and laboratory control sample/laboratory control sample duplicate
LPAH	Low molecular-weight polycyclic aromatic hydrocarbon
MTCA	Model Toxics Control Act
PAH	Polycyclic aromatic hydrocarbon
PCE	Tetrachloroethene
PCP	Pentachlorophenol
Port	Port of Seattle

Acronym/Abbreviation	Definition
RI/FS	Remedial Investigation/Feasibility Study
Site	Lora Lake Apartments Site
SOP	Standard operating procedure
STE	Storm event
STIA	Seattle-Tacoma International Airport
TCE	Trichloroethene
TEF	Toxic equivalency factor
TEQ	Toxic equivalent quantity
TPH	Total petroleum hydrocarbons
TSS	Total suspended solids
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound
WAC	Washington Administrative Code
WSDOE	Washington State Department of Ecology

1.0 Introduction

1.1 BACKGROUND

This document presents the first Stormwater Interim Action Report for the Lora Lake Apartments Site (Site), located at 15001 Des Moines Memorial Drive in Burien, Washington (Figure 1.1). The Site is located near the northwest corner of Seattle-Tacoma International Airport (STIA) and is the location of a former apartment building complex that was developed in 1987, under previous ownership, for use as residential housing. The Site also has an industrial use history that includes a barrel washing facility and an auto wrecking yard.

Environmental investigations conducted by the Port of Seattle (Port) in 2007 and 2008 identified impacted soil and groundwater. Investigations to date indicate that the site contaminants of concern (COCs) are carcinogenic polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH-gasoline range, diesel range, and heavy oil range), dioxins, pentachlorophenol (PCP), tetrachloroethene (PCE), trichloroethene (TCE), 1,2-dichloroethane (1,2-DCA), and arsenic.

The Port entered into a Model Toxics Control Act (MTCA) Agreed Order with the Washington State Department of Ecology (WSDOE) to conduct a Remedial Investigation and Feasibility Study (RI/FS), in order to define appropriate methods to remediate contamination at the Site.

On August 7, 2009, in response to a concern expressed by an interested citizen, WSDOE requested the Port to conduct an additional interim action pursuant to Washington Administrative Code (WAC) 173-340-430(1)(a). Under the interim action, the Port would investigate whether contaminants leave the Site by drainage of stormwater through the site stormwater conveyance system and discharge to off-site receptors, including, specifically, Lora Lake.

The objective of this Stormwater Interim Action is to assess whether the Site adversely impacts stormwater quality as it leaves the Site. The Port is meeting this objective by characterizing the quality of stormwater and stormwater solids entering and exiting the Site from a total of up to 10 storm events, as well as characterizing on-site catch basin sediments. This work was originally planned to be included in the RI/FS Work Plan and implemented during the wet season of 2010 to 2011. However, in response to concerns expressed by the Public, the Port agreed to WSDOE's request to conduct the stormwater investigation as an early interim action.

The Stormwater Interim Action Work Plan completed by Taylor Associates, Inc. and Floyd|Snider (2009) presents the procedures and methods to be implemented during the stormwater investigation, which began in November 2009 and will continue through

May 2010. Taylor Associates, Inc. is the technical field lead for sampling during this investigation.

Floyd|Snider will prepare three Stormwater Interim Action Progress Reports, and a final data report. This data report is the Stormwater Interim Action Progress Report 1 and presents the following:

- The results of the first two stormwater sampling events for stormwater grab and composite samples collected on December 14 and 31, 2009. Stormwater was collected from catch basin locations CB 31A (main line inlet), CB4857 (main line outlet), and CB1 (secondary line outlet).
- The results of a TV in-line inspection conducted in the segment of the stormwater conveyance system between CB5945/Ex.CB-B and CB4857.
- The results of a catch basin sediment sample collected from CB4857.

All stormwater system features and sample locations are shown in Figure 1.2.

1.2 SUMMARY OF INTERIM ACTION OBJECTIVES AND REQUIREMENTS

The interim action scope of work addresses the primary concern expressed about site stormwater: What, if any, site contamination is conveyed from the Site by stormwater drainage? To address that concern, the interim action scope of work provides for the following tasks, in the sequence shown below:

1. Conduct a TV in-line inspection for the specific segment of the on-site storm drain system with structural limitations for stormwater in-line solids sample collection.
2. Collect stormwater samples at locations where stormwater enters and leaves the Site. Analyze samples for site COCs.
3. Collect catch basin sediment samples to assess sediment introduced from or influenced by site sources and potentially transported off-site.
4. Remove catch basin sediment from the storm drainage system using vactor methods.
5. Conduct a TV in-line inspection to determine the potential for contaminated groundwater to enter the storm drain system.
6. Collect stormwater solids using in-line solids “sediment traps” to assess solids introduced from or influenced by site sources and potentially transported from the Site. Collect one round of samples for analysis as sufficient solids accumulate between the date of installation and May 2010.
7. Continue to collect stormwater samples from locations where stormwater enters and leaves the Site, after conveyance system cleaning, to assess

future conditions. Stormwater samples will be collected and analyzed from a total of 10 storm events, or fewer, as agreed by WSDOE upon review of data.

This Stormwater Interim Action Progress Report presents the results of fieldwork designed to address the first two tasks listed above and described in Section 1.1. Subsequent Stormwater Interim Action Progress Reports and the final data report will present the results of the remaining tasks as listed above and described in detail in the Stormwater Interim Action Work Plan.

1.3 REPORT ORGANIZATION

This stormwater interim action data report is organized into the following sections:

- **2.0 Summary of Field Activities:** describes the stormwater and catch basin sediment sampling locations, and specific methods and procedures that were used to (1) complete the TV in-line inspection of a segment of the stormwater conveyance system, (2) collect stormwater samples and a catch basin sediment sample, and (3) to complete laboratory analyses of those samples.
- **3.0 Summary of Analytical Results:** summarizes observations from the TV in-line inspection, and the analytical results from the analyses of the stormwater samples and the catch basin sediment sample.
- **4.0 Statistical Analyses:** presents a summary of the data results and statistical analyses of the inlet and outlet stormwater data. In this first interim report, minimal statistical analyses were performed as only two stormwater sampling events were conducted and there is not yet a dataset of sufficient size for statistical analyses. More robust statistical analyses of the inlet and outlet stormwater data, as described in the Stormwater Interim Action Work Plan, will be performed for the third progress data report after completion of six stormwater monitoring events.
- **5.0 Summary of Preliminary Findings:** gives an overall summary of field observations, analytical results, and TV in-line inspection.
- **6.0 Schedule of Stormwater Interim Action Monitoring:** presents the schedule to complete the stormwater monitoring program.
- **7.0 References:** provides a list of documents cited in this data report.

2.0 Summary of Field Activities

2.1 TV IN-LINE INSPECTION

A TV in-line inspection was conducted on the segment of the site storm drainage system along the eastern portion of the Site between CB5945/Ex.CB-B (upgradient) and CB4857 (downgradient; Figure 1.2). Future sediment data collection would ideally include collection of samples from both CB5945/Ex.CB-B and CB4857. However, the catch basin drainage system at CB4857 has structural limitations that prevent the appropriate placement of an in-line sediment trap. The purpose of the TV in-line inspection, therefore, was to determine the integrity of the storm drain system segment from CB5945/Ex.CB-B to CB4857 (i.e., whether contaminated site soil could enter the storm drain system and migrate downgradient).

The TV in-line inspection of the segment from CB5945/Ex.CB-B to CB4857 was performed on December 10, 2009 by Pipe Experts, LLC, of Tumwater, Washington. The TV in-line inspection was recorded and narrated by the operator who described distance markings and visual observations. These visual observations were comprised of base flow observations, pipe joints, mineral deposits, infiltration observations, and similar items. This storm drain segment was not cleaned prior to inspection. The TV in-line inspection video and inspection forms produced by Pipe Experts are presented in Appendix B.

This segment of pipe consists of a 24-inch corrugated metal pipe. The inspection was conducted on a dry day (without rain) and a small base flow was observed in the line. A total of 120 feet of pipe was TV-inspected. The pipe is in good quality and no pipe integrity cracks were observed during the inspection. However, soil and roots appeared to have entered the storm system at the pipe joints located at approximately 24.8 feet and 82.8 feet down pipe from the catch basin inlet (CB5945/Ex. CB-B; Appendix B).

2.2 CB4857 IN-LINE SEDIMENT SAMPLE COLLECTION

During the TV in-line inspection event, sediment was observed a few feet before the outlet of the pipe to CB4857 (Figure 1.2). Because of the potential for soil infiltration at the pipe joints, an unplanned catch basin sediment sample was collected within the pipe inlet (i.e., sample CB4857121009) and submitted for chemical analyses of site COCs, (except, due to the limited sample volume, volatile organic compounds [VOCs]). This sediment sample was collected from approximately 1 to 5 feet inside the pipe inlet from CB4857. The results of the chemical analyses performed on this sample are presented in Section 3.2.

The CB4857 in-line pipe sediment sample was collected using a decontaminated stainless steel bowl and spoon in accordance with the Stormwater Interim Action Work Plan. Following sample homogenization, the sample was placed into pre-cleaned

sample containers provided by the analytical laboratory and transported on the same day of sample collection in an iced cooler to Analytical Resources, Inc. (ARI) of Tukwila, Washington, under chain-of-custody procedures.

2.3 STORMWATER GRAB AND COMPOSITE SAMPLE COLLECTION

2.3.1 Storm Event Identification

Storm events (STE) #1 and #2 met the conditions established in the Stormwater Interim Action Work Plan to qualify as target storm events. STE #1 was conducted on December 14, 2009 and STE #2 was conducted on December 31, 2009. Stormwater reports for both events are attached in Appendix A and present the event duration, rainfall intensity, length of dry period prior to the event, and other event information.

2.3.2 Sample Collection

Stormwater samples were collected in accordance with the Stormwater Interim Action Work Plan on December 14 and December 31, 2009. Two methods, grab sampling and flow-proportionate composite sampling, were used to collect stormwater samples from the stormwater main line inlet (CB31A), the stormwater main line outlet (CB4857), and, the secondary line outlet (CB1). Composite sampling is a preferred method to obtain representative stormwater samples because the samples are made up of a number of smaller subsamples that are collected at intervals over the course of a storm event (WSDOE 2009). The majority of site COCs sampled for in this interim action can be analyzed from flow-proportional composite samples as described above. However, the VOCs and total petroleum hydrocarbons (TPH-diesel and oil) must be analyzed from grab samples. Grab sampling techniques are necessary to avoid loss of volatile components or adherence of petroleum constituents to sampling containers, which might occur if composite sampling methods are used.

After sample collection, composite and grab samples were stored in coolers containing ice and were submitted under chain-of-custody procedures to ARI for analyses.

2.3.3 Grab Samples

A single grab sample was collected from each catch basin sampling location, as shown on Figure 1.2, per storm event. Grab samples were collected at each location using dedicated Teflon-lined tubing lines attached to a peristaltic pump in accordance with the Stormwater Interim Action Work Plan. Grabs were collected as early as possible during the storm event once runoff was noted and during the rising limb of the storm hydrograph at each monitoring location.

2.3.4 Composite Samples

Flow-weighted composite samples were made up from a set of discrete samples collected with an autosampler in accordance with the Stormwater Interim Action Work Plan. Each of the three autosamplers was programmed to collect samples via time-paced programming—each was set to collect an aliquot every 15 minutes. A single flow-weighted composite sample was collected from each catch basin location per storm event. Samples were manually flow-weighed based on site-specific information. The hydrographs from each monitoring location were examined and decisions were made as to which specific bottles would be included in the composite samples. Hydrographs for each stormwater event are presented in Appendix A.

In STE #1, the stormwater inlet sample from CB31A was composited from seven sample bottles based on hydrograph review and totaled 5,761 milliliters (ml). The stormwater outlet sample from CB4857 was composited from eight sample bottles based on hydrograph review and totaled 4,826 ml. The stormwater secondary line outlet sample from CB1 was composited from three sample bottles, as the remainder of the sample bottles were empty, and totaled 4,601 ml.

In STE #2, CB31A was composited from seven sample bottles based on hydrograph review and totaled 6,278 ml. CB4857 was composited from eight sample bottles based on hydrograph review and totaled 7,437 ml. CB1 was composited from six sample bottles based on hydrograph review and totaled 5,412 ml.

2.4 GROUNDWATER ELEVATION MEASUREMENTS

Groundwater level measurements were collected from four existing monitoring wells located across the Site (MW-1, MW-3, MW-4, and MW-6) to assess the upper-most water table levels and fluctuations over time. Groundwater elevation measurements are presented in each Storm Event Report in Appendix A and are summarized in Table 2.1

3.0 Summary of Analytical Results

3.1 FIRST AND SECOND STORMWATER EVENT RESULTS

Samples collected during both stormwater sampling events were analyzed for the following parameters, as specified in the Stormwater Interim Action Work Plan:

- Total suspended solids (TSS) by U. S. Environmental Protection Agency (USEPA) Method 2540
- pH (field measurement)
- Arsenic (total and dissolved) by USEPA Method 200.8
- PAHs by USEPA Method 8270D-SIM-Low Level
- PCP by USEPA Method 8041
- Dioxin/furans by USEPA Method 1613
- TPH (diesel and oil range) by NWTPH-Dx
- VOCs: PCE; TCE; 1,2- cis-dichloroethene and trans-1,2-dichloroethene (1,2-DCE); and 1,2-DCA by USEPA Method 8260C-SIM

Adequate stormwater sample volumes were collected from each sampling location during both events such that analyses were performed for all parameters. Analytical results of the stormwater samples are summarized below and presented in Table 3.1. Results of the catch basin CB4857 sediment sample are summarized in Section 3.2 and presented in Table 3.2. Analytical laboratory reports, which include chain-of-custody forms, are presented in Appendix C.

3.1.1 Conventionals

The greatest concentration of TSS was measured in the stormwater main line inlet to the Site (CB31A) during both storm events. TSS concentrations of 43.9 milligram per liter (mg/L) and 59 mg/L were measured at CB31A during STE #1 and STE #2, respectively. The lowest TSS concentrations were measured in the stormwater secondary line outlet from the Site (CB1) during both sampling events. TSS concentrations of 4.3 mg/L and 9.2 mg/L were measured at CB1 during STE #1 and STE #2, respectively. In the main line outlet from the Site (CB4857), the measured TSS concentrations were 36.5 mg/L and 33.3 mg/L for STE #1 and STE #2, respectively.

The stormwater pH remained consistent at the sampling locations during both storm events and ranged from 6.67 to 6.83.

3.1.2 Arsenic

Arsenic concentrations were similar across the catch basins and stormwater sampling events. Detected concentrations of dissolved arsenic ranged from 0.3 µg/L (CB1 for STE #1 and STE #2) to 0.5 µg/L (CB31A for STE #1 and STE #2, and CB4857 for STE #1). Total arsenic concentrations were also relatively consistent between locations and sampling events. The lowest total arsenic concentrations were detected at the secondary line outlet (CB1) at concentrations of 0.4 µg/L and 0.5 µg/L. The highest total arsenic concentrations were detected at CB31A at concentrations of 1.1 µg/L and 1.2 µg/L.

3.1.3 Polycyclic Aromatic Hydrocarbons and Pentachorophenol

At the stormwater main line inlet (CB31A), three PAHs, acenaphthene, anthracene, and dibenz(a,h)anthracene were not detected in the STE #1 sample. In the STE #2 sample acenaphthene, anthracene, fluorene, and acenaphthylene were not detected. The detected concentrations of PAHs for STE #1 ranged from 0.013 µg/L to 0.14 µg/L, and for STE # 2 the detected PAH concentrations ranged from 0.012 µg/L to 0.18 µg/L.

At the stormwater main line outlet (CB4857) three PAHs, acenaphthene, anthracene, and dibenz(a,h)anthracene, were not detected in the STE #1 sample. In the STE #2 sample 1-methylnaphthalene, acenapthylene, acenaphthene, anthracene, fluorene, and dibenz(a,h)anthracene were not detected. The detected concentrations of PAHs in STE #1 ranged from 0.012 µg/L to 0.13 µg/L, and in STE #2 the detected PAH concentrations ranged from 0.014 µg/L to 0.12 µg/L.

At the stormwater secondary line outlet (CB1), PAHs were not detected with the exceptions of naphthalene and phenanthrene for STE #1 and STE #2. The detected concentration of naphthalene for STE #1 was 0.026 µg/L and 0.017 µg/L for STE #2. The detected concentration of phenanthrene for STE #1 was 0.1 µg/L and 0.12 µg/L for STE #2. 2-Methylnaphthalene was detected for STE #1 at a concentration of 0.01 µg/L.

The calculation of cPAH total toxic equivalent (TEQ) concentrations was performed using the Cal-EPA 2005 toxicity equivalency factors (TEFs), as presented in Table 708-2 of WAC 173-340-900. A TEF value was assigned to each carcinogenic PAH compound relative to the carcinogenicity of benzo(a)pyrene. The TEQ concentration of a mixture is the sum of the products of the concentration of each compound in a sample and the compound's corresponding TEF value. The California Environmental Protection Agency TEFs as presented in Table 708-2 of WAC 173-340-900 were used to calculate TEQ values for PAH TEFs. TEQ values were determined using two approaches to handling non-detected compounds: (1) use of one-half of the method reporting limit for non-detected compounds and (2) use of zero values for non-detected compounds.

At the stormwater main line inlet (CB31A), the summed carcinogenic PAHs (cPAHs) TEQ concentrations were approximately equivalent using the two different TEQ

calculation approaches. The CB31A cPAH TEQ concentrations were 0.50 µg/L and 0.71 µg/L during STE #1 and STE #2, respectively (concentrations presented exclude non-detects).

At the stormwater main line outlet (CB4857), the cPAH TEQ concentrations were approximately equivalent using the two different TEQ calculation approaches. The cPAH TEQ concentrations were 0.46 µg/L and 0.43 µg/L during STE #1 and STE #2, respectively (concentrations presented exclude non-detects).

At the stormwater secondary line outlet (CB1), cPAHs were not detected. The TEQ concentration calculated using half of the detection limit for non-detected compounds was 0.008 µg/L for both STE #1 and STE #2.

The detected concentrations of PCP for STE #1 were 0.82 µg/L in CB31A and 0.51 µg/L in CB4857. The detected concentration of PCP for STE #2 was 0.41 µg/L in CB31A, and PCP was not detected in CB4857. PCP was not detected in the stormwater secondary line outlet CB1 in either storm event.

3.1.4 Dioxins

The TEF and TEQ method is also used to evaluate dioxins, consistent with the method described above in Section 3.1.3 for PAHs and in the Stormwater Interim Action Work Plan. The dioxin congener TEFs used to calculate TEQ values were the World Health Organization 2005 TEFs (Van den Berg et al. 2006) as presented in Table 708-1 of WAC 173-340-900. TEQ values were determined using the two approaches for incorporating non-detected congeners, described for cPAHs in Section 3.1.3.

At the stormwater main line inlet, the calculated TEQ for STE #1 was 19.1 picogram per liter (pg/L; (including half the detection limit for non-detects in the calculation) and 18.7 pg/L (excluding non-detects from the calculation). The calculated TEQ for STE #2 was 14.4 pg/L (including half the detection limit for non-detects) and 13.8 pg/L (excluding non-detects).

At the stormwater main line outlet (CB4857), the calculated TEQ for STE #1 was 15.1 pg/L (including half the detection limit for non-detects in the calculation) and 14.7 pg/L (excluding non-detects from the calculation). The calculated TEQ for STE #2 was 7.8 pg/L (including half the detection limit for non-detects) and 6.5 pg/L (excluding non-detects).

At the stormwater secondary line outlet (CB1), the dioxin TEQ concentration was similar in concentration from STE #1 to STE #2. The calculated TEQ for STE #1 was 1.6 pg/L (including half the detection limit for non-detects in the calculation) and 0.1 pg/L (excluding non-detects from the calculation). The calculated TEQ for STE #2 was 1.5 pg/L (including half the detection limit for non-detects) and 0.3 pg/L (excluding non-detects).

3.1.5 Volatile Organic Compounds

PCE, TCE, and breakdown products 1,2-DCE (cis- and trans-), and 1,2-DCA were analyzed for and not detected in any samples collected during these first two stormwater sampling events.

3.1.6 Petroleum Hydrocarbons

Diesel and oil range TPHs were not detected or detected at low concentrations near the reporting limit in stormwater samples collected from the catch basin locations during both sampling events.

Diesel and oil range TPHs were not detected in either stormwater samples collected from the secondary line outlet catch basin (CB1). The highest diesel and oil range TPH concentrations were detected at the main line inlet catch basin (CB31A). The maximum diesel range TPH concentration of 1.6 mg/L was detected during STE #1 at CB31A. The maximum oil range TPH concentration of 7.5 mg/L was also detected during STE #1 at CB31A.

3.2 CB4857 SEDIMENT SAMPLE RESULTS

Catch basin sediment sample CB4857121009 was collected from approximately 1 to 5 feet up the pipe from the stormwater main line outlet (CB4857). This sample was analyzed for all target parameters except VOCs because of limited sample volume. This sample was primarily composed of sands and fine gravels.

Analytes were generally detected in low concentrations in the CB4857 catch basin sediment sample. Arsenic was not detected in the sample, while lead was detected at 42 mg/kg. TPHs were reported at concentrations of 19 mg/kg for diesel range and 160 mg/kg for oil range. The following eight PAHs were not detected in the sample: naphthalene, 2-methylnaphthalene, 1-methylnaphthalene, acenapthylene, acenapthene, fluorine, anthracene, and dibenz(a,h)anthracene. The detected PAHs ranged in concentration from 11 µg/kg to 73 µg/kg.

TEFs were calculated for cPAHs and dioxins using the approach described in Sections 3.1.3 and 3.1.4, respectively, and the Stormwater Interim Action Work Plan. The cPAH TEQ concentration was 60 µg/kg (including non-detects) and 58 µg/kg (excluding non-detects, refer to Table 3.2). The dioxin TEQ concentration was 13.4 pg/g (including non-detects) and 13.2 pg/g (excluding non-detects, refer to Table 3.2).

3.3 DATA QUALITY REVIEW

Stormwater and CB4857 sediment analytical data were provided to EcoChem for data validation. A Level III Data Quality Review (Summary Validation) was performed on all the analytical data except dioxins for which a Level IV, Tier III Data Quality Review (Full

Validation) was performed. The analytical data were validated in accordance with the following:

- USEPA CLP National Functional Guidelines for Inorganic Data Review (2004)
- USEPA CLP National Functional Guidelines for Organic Data Review (2008)
- USEPA CLP Region 10 SOP for Validation of Dioxins and Furans (1996)

During the first two stormwater sampling events, field duplicate samples and matrix spike/matrix spike duplicate samples were not collected. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference values.

The analytical laboratories followed the specified analytical methods. The majority of all analytical data was not qualified. The only qualifier that was added to any analytical data was a J qualifier. A J qualifier indicates that the analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample. All data, as reported, are acceptable for use. A summary report presenting the results of the data quality review is included in Appendix D.

4.0 Statistical Analyses

The interim action monitoring activities, based on monitoring data and results of statistical analyses, may be completed following 6 monitoring events or 10 monitoring events. Statistical analysis of the stormwater monitoring data will allow for the comparison of stormwater quality that leaves the Site to the stormwater quality that enters the Site, and the determination of statistically significant changes in analyte concentrations over that distance. Statistical evaluation will begin when sufficient data have been obtained. Reporting of statistical information will be provided on a preliminary basis in Stormwater Interim Action Progress Report 3; final statistical analysis will be provided in the final data report.

5.0 Summary of Preliminary Findings

The first two stormwater sampling events and preliminary statistical analysis showed the following results:

- The first two stormwater events met the stormwater event qualifications and adequate stormwater flows were observed.
- Adequate stormwater sample volumes were collected for all parameter analyses.
- The groundwater elevations measured in MW-1, MW-3, MW-4, and MW-6 during the first two stormwater events are relatively consistent with the elevations measured in the December 2008 previous well sampling event (AECOM 2009). These consistent site groundwater levels indicate that, during the stormwater sampling events, there was no increased potential for inflow and/or infiltration of groundwater into the stormwater drainage system due to an elevated upper-most water table.
- The TV in-line inspection for the segment between CB5495 and CB4857 indicated that the pipe segment is in good quality but there is a potential for soil infiltration at pipe joints.
- An additional catch basin sediment sample was collected up the pipe inlet into the stormwater main line outlet (CB4857). The CB4857 sediment sample consisted primarily of sands and fine gravels.
- The stormwater detected analytes showed relatively similar concentrations at each sampling location during the first two events.
- The reported concentrations detected for all analytes were generally lower in the stormwater outlet samples than the stormwater inlet samples.
- In general, the analyte concentrations detected in the CB4857 sediment sample were non-detect or detected near the reporting limits. Arsenic and the majority of LPAHs were not detected. This data will be further evaluated in the third progress report with the other catch basin sediment sample data.

6.0 Schedule of Stormwater Interim Action Monitoring

The first two tasks of the stormwater interim action have been completed and are summarized in this report. Additionally, as part of the first two tasks, a catch basin sediment sample was collected from CB4857. Implementation of the remainder of the Stormwater Interim Action Work Plan will proceed as planned. In the report period, we deviated from the plan in one instance, collecting one unplanned catch basin sediment sample (an addition to samples called for in the work plan).

For future implementation of the work plan, Floyd|Snider anticipates the potential for an additional deviation from the work plan. Although an in-line stormwater solids trap cannot be installed at CB4857 in the typical configuration, an effort will be made to install a modified in-line solids trap to ensure that stormwater solids are adequately captured in the interim action monitoring program.

Sediment samples were collected from site catch basin locations (identified in Section 1.2 as Task Number 3) on January 7 and 11, 2010. The results of the catch basin sediment sampling event will be summarized in Stormwater Interim Action Progress Report 2. Following the collection of the catch basin sediment samples, the remaining catch basin sediments in the storm drainage system will be removed using vactor methods.

The next tasks to be performed as part of the interim action stormwater program include additional TV in-line inspections of the drainage system and installation of in-line stormwater solids “sediment” traps, followed by additional stormwater sampling events. Once the in-line stormwater solids traps are installed, they will remain in place until the interim action stormwater program is completed, which is anticipated to be May 2010.

Stormwater Interim Action Progress Report 3 will present the results of four additional stormwater sampling events and will summarize the stormwater data collected from the six stormwater sampling events completed at the time of that report. The report will include a preliminary assessment of data and data variability to assess if 6 or 10 events will provide a sufficient body of results to determine if the stormwater quality flowing into the Site is statistically different that that leaving the Site. Recommendations for modifying the sample collection program, including the need and rationale for increasing or decreasing the number of events, shall be provided. The final stormwater report will present the results of the stormwater in-line solids monitoring, the results from any additional stormwater sampling events, and a complete review of the Stormwater Interim Action.

7.0 References

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Tables

Table 2.1
Groundwater Elevation Measurements
During Interim Action Stormwater Sampling Events

Monitoring Well Designation	Date and Time	Top of PVC Elevation (feet)[1,2]	Depth to Water (feet)[3]	Groundwater Elevation (feet)
First Stormwater Event—12/14-15/09				
MW-1	12/18/2009 13:00	305.34	16.89	288.45
MW-3	12/18/2009 13:50	303.94	17.56	286.38
MW-4	12/18/2009 14:30	298.14	16.55	281.59
MW-6	12/18/2009 15:00	298.73	12.20	286.53
Second Stormwater Event—12/31/09				
MW-1	1/2/2010 11:04	305.34	16.66	288.68
MW-3	1/2/2010 11:10	303.94	17.52	286.42
MW-4	1/2/2010 11:15	298.14	16.55	281.59
MW-6	1/2/2010 10:55	298.73	12.07	286.66

Notes:

1 Vertical datum is NAVD88.

2 Top of casing elevation based on PVC Pipe Survey Elevation as presented in Table 3.1 of the Supplemental Groundwater Investigation Report by AECOM (2008).

3 Measured depth to water from top of PVC; measurements in metric feet.

Table 3.1
Stormwater Sampling Results

	Area	Main Line Inlet		Main Line Outlet		Secondary Line Outlet	
	Station	CB31A		CB4857		CB1	
	Event	First	Second	First	Second	First	Second
	Sample ID	CB31A121409GRAB CB31A121509COMP	CB31A123109GRAB CB31A123109COMP	CB4857121409GRAB CB4857121509COMP	CB4857123109GRAB CB4857123109COMP	CB1121409GRAB CB1121409COMP	CB1123109GRAB CB1123109COMP
	Sample Date	12/14/2009, 12/15/2009	12/31/2009	12/14/09, 12/15/09	12/31/2009	12/14/2009	12/31/2009
Parameter	**Units**						
Conventionals							
pH	-	6.73	6.68	6.67	6.81	6.73	6.82
Total Suspended Solids	mg/L	43.9	59	36.5	33.3	4.3	9.2
Metals							
Arsenic, dissolved	µg/L	0.5 U	0.5	0.5	0.4	0.3	0.3
Arsenic, total	µg/L	1.1	1.2	1	1	0.4	0.5
Total Petroleum Hydrocarbons							
Diesel range	mg/L	1.6	0.73	0.43	0.25 U	0.25 U	0.25 U
Heavy oil range	mg/L	7.5	4.9	2.4	1.4	0.50 U	0.5 U
Semivolatile Organic Compounds							
Naphthalene	µg/L	0.052	0.037	0.048	0.026	0.026	0.017
2-Methylnaphthalene	µg/L	0.034	0.024	0.032	0.014	0.01	0.01 U
1-Methylnaphthalene	µg/L	0.018	0.012	0.016	0.01 U	0.01 U	0.01 U
Acenaphthylene	µg/L	0.013	0.01 U	0.012	0.01 U	0.01 U	0.01 U
Acenaphthene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluorene	µg/L	0.015	0.01 U	0.012	0.01 U	0.01 U	0.01 U
Phenanthrene	µg/L	0.12	0.099	0.1	0.062	0.1	0.12
Anthracene	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluoranthene	µg/L	0.13	0.16	0.11	0.1	0.01 U	0.01 U
Pyrene	µg/L	0.14	0.18	0.13	0.12	0.01 U	0.01 U
Benzo(a)anthracene	µg/L	0.027	0.032	0.025	0.024	0.01 U	0.01 U
Chrysene	µg/L	0.074	0.094	0.073	0.068	0.01 U	0.01 U
Benzo(b)fluoranthene	µg/L	0.048	0.059	0.048	0.044	0.01 U	0.01 U
Benzo(k)fluoranthene	µg/L	0.03	0.048	0.029	0.033	0.01 U	0.01 U
Benzo(a)pyrene	µg/L	0.036	0.051	0.032	0.03	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	µg/L	0.03	0.037	0.027	0.027	0.01 U	0.01 U
Dibenz(a,h)anthracene	µg/L	0.01 U	0.013	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	µg/L	0.066	0.072	0.063	0.051	0.01 U	0.01 U
Summed cPAH TEQ[1,2]	µg/L	0.050	0.071	0.046	0.043	0.000	0.000
Summed cPAH TEQ with One-Half of the Detection Limits[1,3]	µg/L	0.051	0.071	0.046	0.044	0.008	0.008
Pentachlorophenol	µg/L	0.82	0.41	0.51	0.25 U	0.25 U	0.25 U
Dibenzofuran	µg/L	0.01	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Volatile Organic Compounds							
1,2-Dichloroethane	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
cis-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
trans-1,2-Dichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Trichloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Tetrachloroethene	µg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

Parameter	Area	Main Line Inlet		Main Line Outlet		Secondary Line Outlet	
	Station	CB31A		CB4857		CB1	
	Event	First	Second	First	Second	First	Second
	Sample ID	CB31A121409GRAB CB31A121509COMP	CB31A123109GRAB CB31A123109COMP	CB4857121409GRAB CB4857121509COMP	CB4857123109GRAB CB4857123109COMP	CB1121409GRAB CB1121409COMP	CB1123109GRAB CB1123109COMP
	Sample Date	12/14/2009, 12/15/2009	12/31/2009	12/14/09, 12/15/09	12/31/2009	12/14/2009	12/31/2009
Dioxins	Units						
2,3,7,8-TCDD	pg/L	0.674 U	0.765 U	0.697 U	0.599 U	0.594 U	0.53 U
1,2,3,7,8-PeCDD	pg/L	2.86 J	2.17 J	2.89 J	1.62 U	0.808 U	1.01 U
1,2,3,4,7,8-HxCDD	pg/L	5.16 J	4.24 J	4.59 J	2.71 J	1.65 U	1.17 U
1,2,3,6,7,8-HxCDD	pg/L	16.3 J	12.5 J	12 J	6.81 J	1.87 U	1.38 U
1,2,3,7,8,9-HxCDD	pg/L	9.82 J	8.19 J	8.43 J	4.83 J	1.74 U	1.26 U
1,2,3,4,6,7,8-HpCDD	pg/L	515	405	363	212	10.2 J	20.4 J
OCDD	pg/L	4880	4540	3580	2380	56.9	151
2,3,7,8-TCDF	pg/L	0.53 U	0.694 U	0.621 U	0.611 U	0.352 U	0.686 U
1,2,3,7,8-PeCDF	pg/L	0.997 U	1.32 U	0.887 U	0.866 U	0.689 U	0.545 U
2,3,4,7,8-PeCDF	pg/L	2.75 J	1.34 U	2.17 J	0.947 U	0.732 U	0.588 U
1,2,3,4,7,8-HxCDF	pg/L	19.1 J	11.8 J	14.5 J	7.21 J	1.47 U	0.652 U
1,2,3,6,7,8-HxCDF	pg/L	10.2 J	9.12 J	7.92 J	6.41 J	1.46 U	0.669 U
2,3,4,6,7,8-HxCDF	pg/L	7.78 J	5.19 J	5.36 J	3.15 J	1.5 U	0.679 U
1,2,3,7,8,9-HxCDF	pg/L	2.25 J	1.46 J	1.75 J	0.992 U	1.76 U	0.752 U
1,2,3,4,6,7,8-HpCDF	pg/L	111	82.2	89	45.8	2.56 J	4.85 J
1,2,3,4,7,8,9-HpCDF	pg/L	10.9 J	7.34 J	8.29 J	4.3	0.746 U	0.719 U
OCDF	pg/L	359	252	234	122	3.84 U	13 J
Summed Dioxin/Furan TEQ[4,5]	pg/L	18.7 J	13.8 J	14.7 J	6.5 J	0.1 J	0.3 J
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[4,6]	pg/L	19.1 J	14.4 J	15.1 J	7.8 J	1.6 J	1.5 J

Notes:

1 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900.
2 Calculated using detected cPAH concentrations.
3 Calculated using detected cPAH concentrations plus one-half the detection limit for cPAHs that were not detected.
4 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006).
5 Calculated using detected dioxin/furan concentrations.
6 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
TEQ Toxic Equivalency Quotient

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quanity.
U Undetected.

Table 3.2
CB4857 Sediment Sample Results

Parameter	Area	Main Line Outlet
	Station	CB4857 [1]
	Sample ID	CB4857121009
	Sample Date	12/10/2009
	Units	
Conventionals		
Total Solids	%	85.1
Total Organic Carbon	%	1.29
Grain Size		
Clay	%	3.1
Silt, Very Fine	%	0.1 U
Silt, Fine	%	0.6
Silt, Medium	%	0.8
Silt, Coarse	%	0.6
Silt, Very Coarse	%	0.9
Sand, Fine	%	24.4
Sand, Medium	%	39.1
Sand, Coarse	%	11.6
Gravel, Fine	%	19.1
Gravel, Coarse	%	0.1 U
Metals		
Arsenic	mg/kg	6 U
Lead	mg/kg	42
Total Petroleum Hydrocarbons		
Diesel range	mg/kg	19
Heavy oil range	mg/kg	160
Semivolatile Organic Compounds		
Naphthalene	µg/kg	19 U
2-Methylnaphthalene	µg/kg	19 U
1-Methylnaphthalene	µg/kg	18 U
Acenaphthylene	µg/kg	19 U
Acenaphthene	µg/kg	19 U
Fluorene	µg/kg	19 U
Phenanthrene	µg/kg	36
Anthracene	µg/kg	19 U
Fluoranthene	µg/kg	73
Pyrene	µg/kg	57
Benzo(a)anthracene	µg/kg	29
Chrysene	µg/kg	63
Benzo(b)fluoranthene	µg/kg	53
Benzo(k)fluoranthene	µg/kg	53
Benzo(a)pyrene	µg/kg	43
Indeno(1,2,3-cd)pyrene	µg/kg	11 J
Dibenz(a,h)anthracene	µg/kg	19 U
Benzo(g,h,i)perylene	µg/kg	16 J
Summed cPAH TEQ[2,3]	µg/kg	58 J
Summed cPAH TEQ with One-Half of the Detection Limits[2,4]	µg/kg	60 J
Pentachlorophenol	µg/kg	71
Dibenzofuran	µg/kg	19 U

Parameter	Area	Main Line Outlet
	Station	CB4857 [1]
	Sample ID	CB4857121009
	Sample Date	12/10/2009
	Units	
Volatile Organic Compounds		
1,2-Dichloroethane	µg/kg	NS
cis-1,2-Dichloroethene	µg/kg	NS
trans-1,2-Dichloroethene	µg/kg	NS
Trichloroethene	µg/kg	NS
Tetrachloroethene	µg/kg	NS
Dioxins		
2,3,7,8-TCDD	pg/g	0.472 U
1,2,3,7,8-PeCDD	pg/g	1.79 J
1,2,3,4,7,8-HxCDD	pg/g	2.92 J
1,2,3,6,7,8-HxCDD	pg/g	10.3
1,2,3,7,8,9-HxCDD	pg/g	5.19 J
1,2,3,4,6,7,8-HpCDD	pg/g	353
OCDD	pg/g	4480
2,3,7,8-TCDF	pg/g	0.183 U
1,2,3,7,8-PeCDF	pg/g	0.586 J
2,3,4,7,8-PeCDF	pg/g	1.3 J
1,2,3,4,7,8-HxCDF	pg/g	19.6
1,2,3,6,7,8-HxCDF	pg/g	5.05 J
2,3,4,6,7,8-HxCDF	pg/g	6.22
1,2,3,7,8,9-HxCDF	pg/g	1.99 J
1,2,3,4,6,7,8-HpCDF	pg/g	82
1,2,3,4,7,8,9-HpCDF	pg/g	9.51
OCDF	pg/g	243
Summed Dioxin/Furan TEQ[5,6]	pg/g	13.2 J
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[5,7]	pg/g	13.4 J

Notes:

1 Sediment was identified at the end of the pipe segment from CB5945 to CB4857 during the December 10, 2009 TV in-line inspection. Sediment sample CB4857121009 was collected from approximately 1 to 5 feet inside the pipe inlet from CB4857.
2 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivalency Factors as presented in Table 708-2 of WAC 173-340-900.
3 Calculated using detected cPAH concentrations.
4 Calculated using detected cPAH concentrations plus one-half the detection limit for cPAHs that were not detected.
5 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006).
6 Calculated using detected dioxin/furan concentrations.
7 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NS Not analyzed due to limited sample volumes
TEQ Toxic Equivalency Quotient

Qualifiers:

J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quanity.
U Undetected.

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Report 1

Figures

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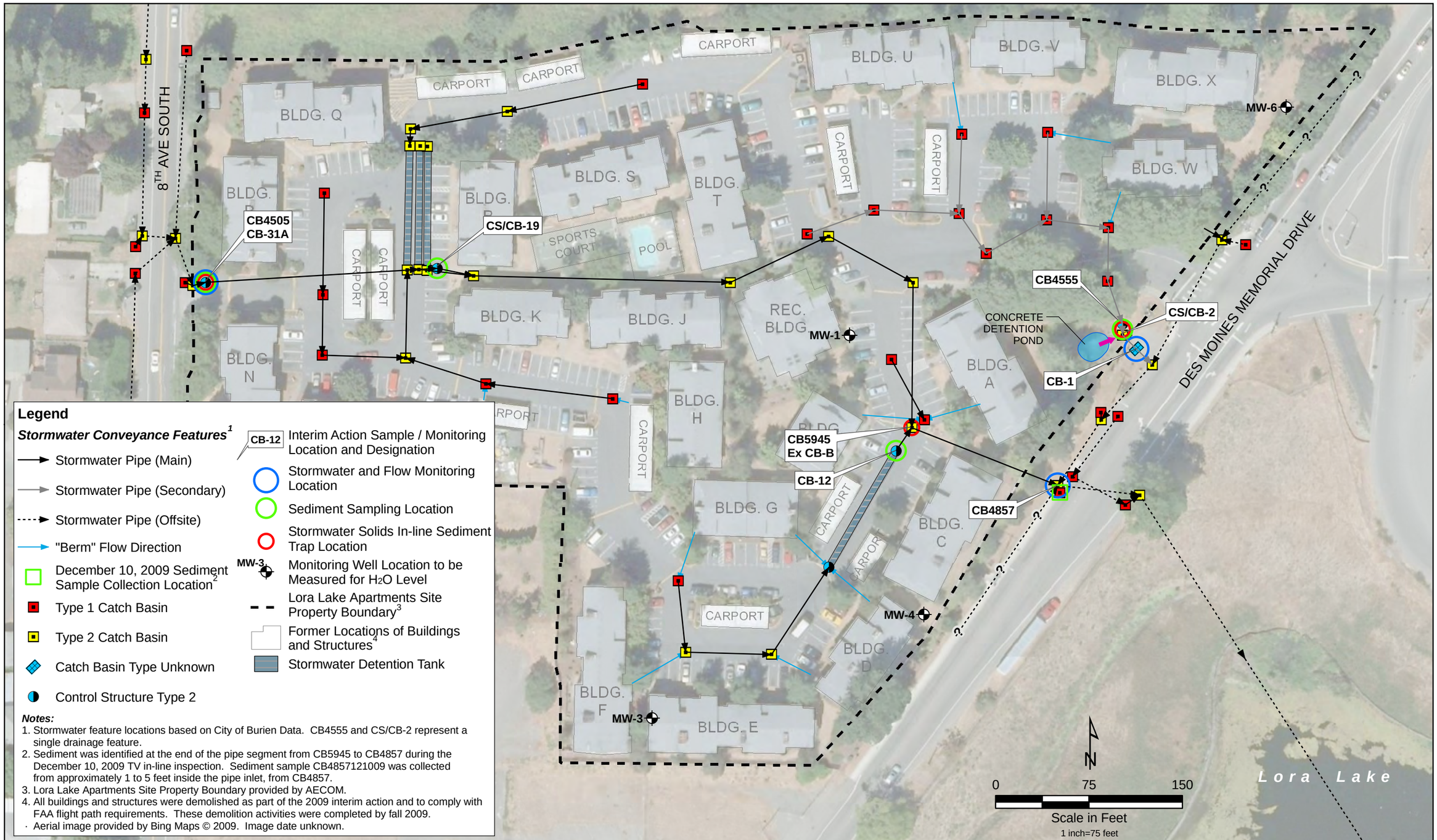
Stormwater Interim Action Progress Report 1
Port of Seattle
Lora Lake Apartments
Burien, Washington

Figure 1.1
Vicinity Map

File: F:\projects\POS-LLA\GIS\MXD\Stormwater Interim Action Reports\Figure 1.1 (Vicinity Map).mxd
Date: 2/11/2010



Legend

Stormwater Conveyance Features[1]

- Stormwater Pipe (Main)
- Stormwater Pipe (Secondary)
- Stormwater Pipe (Offsite)
- "Berm" Flow Direction
- December 10, 2009 Sediment Sample Collection Location[2]
- Type 1 Catch Basin
- Type 2 Catch Basin
- Catch Basin Type Unknown
- Control Structure Type 2
- CB-12 Interim Action Sample / Monitoring Location and Designation
- Stormwater and Flow Monitoring Location
- Sediment Sampling Location
- Stormwater Solids In-line Sediment Trap Location
- MW-3 Monitoring Well Location to be Measured for H_2O Level
- Lora Lake Apartments Site Property Boundary[3]
- Former Locations of Buildings and Structures[4]
- Stormwater Detention Tank

Notes:

1. Stormwater feature locations based on City of Burien Data. CB4555 and CS/CB-2 represent a single drainage feature.
2. Sediment was identified at the end of the pipe segment from CB5945 to CB4857 during the December 10, 2009 TV in-line inspection. Sediment sample CB4857121009 was collected from approximately 1 to 5 feet inside the pipe inlet, from CB4857.
3. Lora Lake Apartments Site Property Boundary provided by AECOM.
4. All buildings and structures were demolished as part of the 2009 interim action and to comply with FAA flight path requirements. These demolition activities were completed by fall 2009.

· Aerial image provided by Bing Maps © 2009. Image date unknown.

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Stormwater Interim Action Progress Report 1
Port of Seattle
Lora Lake Apartments
Burien, Washington

Figure 1.2
Interim Action Sampling and Monitoring Locations

File: F:\projects\POS-LLA\GIS\MXD\Stormwater Interim Action Reports\Figure 1.2 (Interim Action Sampling and Monitoring Locations).mxd
Date: 2/11/2010

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Report 1

Appendix A
Storm Event Reports from Taylor

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	January 14, 2010
TO:	Matt Woltman / Jessi Massingale
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600
	Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #1 (12/14/2009)

Please find included the following:

- Storm report narrative (2 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- Hydrographs (3 pgs),
- Compositing Worksheets (3 pgs),
- Sampler Reports (17 pgs),
- pH Worksheet (1 pg), and
- Weather forecasting information (6 pgs).

Please let me know if you have any questions or need additional information. Thank You.

Dave Metallo, LHG

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #1
December 14th, 2009

General:

This was the first storm event (STE) of the project. Site set up was completed several days prior to STE#1, on 12/11/2009. All equipment operated as designed and programmed. CB-31A (main line inlet station) and CB-4857 (main line outlet station) automatically enabled within 15 minutes of each other. CB-1 (onsite outlet station) was manually enabled. This manual enable was necessary because it was noted that runoff was occurring, stormwater was flowing through the pipe, but the level inside the pipe was not building to any appreciable level. This was due to the sampling point being downstream from the flow control structure at CB-2 - which worked very well in regulating flow in a very shallow manner (< .75"). Once CB-1 was enabled it operated as designed and programmed. Consequently, level (which was accurately measured throughout the event) was used to calculate flow via Mannings Equation (using a slope of 4.098% and roughness coefficient of 0.011).

Grab samples were collected at each station using dedicated lines attached to a peristaltic pump. All grabs were collected as early as possible during the storm event once runoff was noted and during the rising the limb of the storm hydrograph at each monitoring station.

CB-31A and CB-4857 had a total of 127,804 and 142,592 gallons of flow during their sampling periods, respectively. A difference of 14,788 gallons existed between the two stations. This difference can be accounted for in site runoff into the main line system during the storm period.

Compositing Scheme:

The hydrographs from each monitoring station were examined and decisions were made as to what specific bottles were to be included in the composite samples. See the attached field forms and compositing worksheets for details. Each of three autosamplers were programmed to collect samples via time paced programming – each was set to collect an aliquot every 15-minutes (10 storm duration program). All of the samples were manually flow weighed based on site specific information.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. The locations were MW-1, MW-3, MW-4 and MW-6. Measurements are listed in the table below.

Location	Date	Time	Water Level (from TOC) (FT)
MW-1	12/18/09	1300	16.89
MW-3	12/18/09	1350	17.56
MW-4	12/18/09	1430	16.55
MW-6	12/18/09	1500	12.20

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, either grabs or composite samples were placed into cooler and iced. All samples were recorded on Chain-of-Custody forms and were in direct control of project personnel at all times. All samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from all of the stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Anomalies and/or Workplan Deviations:

There were no anomalies observed that would cause any of the STE#1 samples to be non-representative of the conditions from which they were collected. MS/MSD samples were not collected for either the grab or composite portions of the STE#1 field activities. In lieu of these QC samples, additional laboratory QC samples were analyzed and will be described in the first stormwater interim report.

Actions To Be Completed:

The situation at CB-1 will be looked into to determine what can be done in an efficient manner to improve level and flow monitoring and subsequently, sample collection at the "tail" end of storm events. Improving this situation will also aid the auto-enabling function of the monitoring and sampling equipment. At this time it is anticipated that a Thel-Mar insert-able weir will be utilized at this location to help improve the hydraulic storm response.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #1

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Storm Event Data:	
Project Storm Event (STE) #	1
Event Forecast Probability (%)	70 - 90
Antecedent Dry Period (days: hrs: mins)	4:02:20
STE Start Date & Time	12/14/09 17:30
STE Duration (hrs:mins)	8:10
STE End Date & Time	12/15/09 0:10
Period Between Next Measureable Rain (hrs: mins)	11:05
Was Targeted STE Qualified Per LLA QAPP	**Yes**
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.48
Max Rainfall Intensity (in/hr)	0.13
Average Rainfall Intensity	0.06

[1] Sample Collection Criteria:			
Sampling Station	**CB-31A**	**CB-4857**	**CB-1**
Was Grab sample collected?	**Yes**	**Yes**	**Yes**
Grab ID	CB31A121409GRAB	CB4857121409GRAB	CB1121409GRAB
Grab Date /Time	12/14/2009 18:30	12/14/2009 19:30	12/14/2009 19:50
Was runoff occurring at grab collection? If no, was hydrograph at least 10% above background?	**Yes**	**Yes**	**Yes**
Hydrograph stage at grab collection	rising limb	rising limb	rising limb
Grab parameters collected per LLA QAPP ?	**Yes**	**Yes**	**Yes**
Were Trip Blanks included w/ Grab samples ?	**Yes**	**Yes**	**Yes**
Was Comp sample collected?	**Yes**	**Yes**	**Yes**
Comp ID	CB31A121509COMP	CB4857121509COMP	CB1121409GRAB
Comp Date /Time	12/15/2009 2:35	12/15/2009 3:35	12/14/2009 23:45
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	**Yes, 99%**	**Yes, 99%**	**Yes, 88%**
Was a minimum of at least 8 aliquots collected for comp sample ?	**Yes (35)**	**Yes (40)**	**Yes (17)**
Comp parameters collected per LLA QAPP ?	**Yes**	**Yes**	**Yes**
Rainfall during sampling period (in)	0.44	0.46	0.33
pH Measurements Collected ?	Yes	Yes	Yes
Volume sampled during storm period (gallons)	127804	142592	1064
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	**No**	**No**	**No**

[1] If the answer to any of the validation/qualification questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date:_____ Reveiwed By / Date:_____

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:

Turn-around Requested: Standard

Date: 12-14-09

ARI Client Company: ~~POS-Airport~~ JCN: Phone: Floyd/Snider 206-292-2078

Page: 1 of 1

Client Contact: Matt Wolfman

No. of Coolers: 1 Cooler Temps: 4.0

Client Project Name: Lora Lake Apartments

Client Project #: POS-LLA

Samplers: D. Metallo C. Nickerson

Sample ID	Date	Time	Matrix	No. Containers	NWTPH-DX ①	VOC 8260-C SIM							Notes/Comments
CB31A121409GRAB	12.14.09	1830	W	4	X	X							
CB4857121409GRAB	12.14.09	1900	W	4	X	X							
CB1121409GRAB	12.14.09	1950	W	4	X	X							
~~TRIP~~ DM													
TB121409	12.14.09	1800	W	3		X							

Comments/Special Instructions
① - Acid Silica clean-up for TPH-DX

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)				
Printed Name	Dave Metallo	Jonathon Walter		
Company	Taylor Assoc. Inc.	ARI		
Date & Time	12-15-09 (1219)	12/15/09 1225		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Floyd / Snider	Phone: 206-292-2078
Client Contact: Jessi Massingale / Matt Woltman	
Client Project Name: Lora Lake Apts.	
Client Project #: POS-LLA	Samplers: D. Metallo, C. Nickerson, B. Kwasnowski

Date: 12-16-09
Page: 1 of 1
No. of Coolers: 2
Cooler Temps: 2.9, 1.2

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM low level	PCP 8041	Arsenic Total & Diss 200.8	Dioxin / Furans 1613	TSS SM2540D				Notes/Comments
CB31A121509COMP	12.15.09	0235	W	1	X	X	X	X	X				Storm Lab meas'ed pH (see attached sheet) 6.73
CB4857121509COMP	12.15.09	0335	W	1	X	X	X	X	X				6.67
CB1121409COMP	12.14.09	2345	W	1	X	X	X	X	X				6.73

Analysis Requested

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
- See pH Measurements in comments	Printed Name: Brad Kwasnowski	Printed Name: Jonathan Walter	Printed Name:	Printed Name:
	Company: Taylor Associates	Company: ARI	Company:	Company:
	Date & Time: 12/16/09 @ 15:10	Date & Time: 12/16/09 1510	Date & Time:	Date & Time:

Station: CB-31A

8 x 1 gallon bottle set-up
Rev.ed 12/14/09

Section 1. Storm Setup and Inspection

Personnel: DM & PH	Weather: Drizzle & 40°s	Arrival Date/Time: 12-14-09 (1240)	
Carry-over maintenance to do prior to set-up: Newly installed			done? NA
Sampler Battery Voltage	12.61	Changed? Y (N)	New voltage NA
Flow Meter Battery Voltage	NA	Changed? Y N	New voltage

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flowmeter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	NO
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ ft	-0.018'	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ ft	0.00	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ ft	.018'	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	Yes	Diagnostics/Distrubutor arm check?	Yes - good
Velocity (fps)	0	Enable Level ~~(in)~~* ft.	0.03'
Flow Rate (cfs)	0	Pacing Rate (cf)*	NA
Data Downloaded (Yes/No)	Yes	Program Reviewed? (Yes/No) LLA MULTI	- Yes
Channel conditions/observations: • pipe has sed. blockage, ~4+"'s of water. • noticed visible sheen		Sampler "Running"... Prgm Disabled	13:28 MO 14-Dec
		Ice Deployed? (Yes/No)	No
			* NA unless directed by Storm Controller

Notes: Isco Prgm (Multi) set time pacing for a 10-hr storm duration.

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: DM & CN	Weather: Rain, 40°	Arrival Date/Time: 12-14-09 (1820)

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	1830
Grab Sample Bottle ID	CB31A12H09GRAB
Grab Duplicates Collected?	No
Grab Blank Collected?	No
VOA trip blank in cooler?	Yes

Sample Observations: - Water is turbid brown

Internal Flowmeter	
Flowmeter cables OK? (Yes/No)	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes

Notes: Data looks good

Sampler	
Equipment running correctly?	Yes
Composite Begin Time (date/time)	(1804) 12.14.09
On Composite... (Bottle #/ Aliq #)	Btl. 1 4 of 5
Ice deployed?	NO
Sampler Battery Voltage (Changed?):	12.59
Bottle Swap needed? (if yes fill out Section 3)	NO

Section 3. Mid-Storm Check/Bottle Switch

Personnel: DM & DO	Weather: drizzle, 30-40	Arrival Date/Time: 12-14-09 (~~~430~~) pm

* ~~Composite Begin Time (date/time)~~	See Section 5	Round #:	(~2330)
Last Aliquot Taken (date/time, bott #, aliq #)	NA	Data downloaded?	Yes
Comp Bottles Labeled? (Sta. & date)	NA	Sampler Battery Voltage (Changed):	No change
Comp Sample Volume Collected	NA	Ice deployed?	NO

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed
Several aliquots (2 missed + 2 low vol.) on BTL 3

Channel conditions/observations: Water flowing, no issues

Notes/Maintenance Needed: Sampler running fine

Station: CB-31A

Section 4. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

DM

Section 5. Comp Sample Collection/Post Storm

Personnel: PH	Weather: Rain	Arrival Date/Time: 12/15/09 12:45	
Sampler Battery Voltage	—	Changed? Y (N)	New voltage —
Modem Battery Voltage	—	Changed? Y (N)	New voltage —
Composite Begin Time (date/time)	12/14/09 18:04		Round #:
Last Aliquot Taken (date/time, bott #, aliq #)	12/15/09 03:49	Bottle 12, Aliq #5 of 5	
Comp Bottles Labeled? (Sta. & date)	yes	Data downloaded? Yes	
Comp Sample Volume Collected	100% on all ~~12~~ bottles except bottle #3, 80%		

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed
(12/14/09/20:34/3/1)(12/14/09/20:49/3/2)(12/14/09/21:01/3/3)(12/14/09/21:19/3/4)

Channel conditions/observations
ok, None observed

Notes/Maintenance Needed: Standard station reset

Section 6. QC Sampling

Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes: None collected this round			

Comp Info:
Used btls 1-7 for comp'ing after examining the hydrograph
CB31A121509COMP (0235)

12/15/2009
post storm manual flow weighted composite (see comp'ing sheet)

Station: CB4857 | **8 x 1 gallon bottle set-up** Rev.ed 12/14/09 | Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: DM + PH	Weather: overcast, spotty drizzle, 40°s		Arrival Date/Time: 12-14-09 (1420)		
Carry-over maintenance to do prior to set-up:	Newly installed			done? X	
Sampler Battery Voltage	12.43	Changed? (Y) N		New voltage	13.03
Flow Meter Battery Voltage	Same batt. as above	Changed? Y N X		New voltage	X

Flowmeter		Sampler	
Date/time correct? (Yes/No)	12-14-09 (1444) Yes	Pump Tubing OK?	Yes
Flowmeter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ ft	0.033	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ ft	NA	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ ft	NA	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	NO	Diagnostics/Distrubutor arm check?	Yes - ran fine
Velocity (fps)	0.14	Enable Level ~~(in)~~* ft	0.08'
Flow Rate (cfs)	1 gpm	Pacing Rate (cf)*	NA
Data Downloaded (Yes/No)	Yes	Program Reviewed? (Yes/No) LLA Multi	10-hr. Set up
Channel conditions/observations: Slight amt. of base flow		Sampler "Running"... Prgm Disabled	14:57 MO 14-Dec
		Ice Deployed? (Yes/No)	NO

* NA unless directed by Storm Controller

Notes: Set enable to 0.03' (typical) + 0.047 (greatest amt. of "noise" in pipe over last several days) = 0.077' (Rnd'ed to 0.08')

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: DM & CN | Weather: Raining, 40°s | Arrival Date/Time:

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	12-14-09 (1900)
Grab Sample Bottle ID	CB4857121409 GRAB
Grab Duplicates Collected?	NO
Grab Blank Collected?	NO
VOA trip blank in cooler?	Yes

Sample Observations: Water is v. turbid, brown, "dirty-looking" * Need to invest. issue w/ grab line - could not readily pull sample through line w/ peristaltic pump

Internal Flowmeter		Sampler	
Flowmeter cables OK? (Yes/No)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date/time)	12-14-09 (1749)
Notes: data looks good for all parameters		On Composite... (Bottle #/ Aliq #)	BTL# 1 3 of 5
		Ice deployed?	NO
		Sampler Battery Voltage (Changed?):	12.87 - No ▽
		Bottle Swap needed? (if yes fill out Section 3)	No

Section 3. Mid-Storm Check/Bottle Switch

Personnel: DM & DO	Weather: drizzle 30-40	Arrival Date/Time:	12-14-09 (~~1445~~) DM
Composite Begin Time (date/time)	NA - See Section 5	Round #:	(~2345)
Last Aliquot Taken (date/time, bott #, aliq #)	NA	Data downloaded?	Yes
Comp Bottles Labeled? (Sta. & date)	NA	Sampler Battery Voltage (Changed):	12.85, NO
Comp Sample Volume Collected	NA	Ice deployed?	No

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed: No missed aliquots - all fine

Channel conditions/observations: Water flow through to vault, no issues

Notes/Maintenance Needed: Sampler running fine

Station: CB-4857

Section 4. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

DM

Section 5. Comp Sample Collection/Post Storm

Personnel: PH DM	Weather: Rain		Arrival Date/Time: 12/15/09 13:40		
Sampler Battery Voltage	—	Changed? Y (N)		New voltage	—
Modem Battery Voltage	—	Changed? Y (N)		New voltage	—
Composite Begin Time (date/time)	12/14/09 17:49			Round #: 1	
Last Aliquot Taken (date/time, bott #, aliq #)	12/15/09 08:34	Bottle #12, Aliq. 5 of 5			
Comp Bottles Labeled? (Sta. & date)	Yes	Data downloaded? Yes			
Comp Sample Volume Collected	100%				

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed

NONE

Channel conditions/observations

OK, None observed

Notes/Maintenance Needed:

Assess grab ~~[illegible]~~ line for connection issues

Section 6. QC Sampling

Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes:	None Collected this round		

Comping Info:

Used btls 1-8 for comping after reviewing hydrograph

CB4857121509COMP (0335)

12/15/09

post-storm manual flow weighted composite (see comping sheet for details)

Station: CB-1 | **8 x 1 gallon bottle set-up** Rev.ed 12/14/09 | Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: DM & PH	Weather: Overcast, spotty drizzle, 40°s		Arrival Date/Time: 12-14-09 (1320)		
Carry-over maintenance to do prior to set-up:	Newly installed			done?	NA
Sampler Battery Voltage	12.46	Changed? (Y) N		New voltage	12.90
Flow Meter Battery Voltage	12.15	Changed? Y (N)		New voltage	NA

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flowmeter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ ft	-0.052	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ ft	0	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ ft	0.052'	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	Yes	Diagnostics/Distrubutor arm check?	Yes - ran fine
Velocity (fps)	—	Enable Level ~~(in)~~* ft	0.072
Flow Rate (cfs)	—	Pacing Rate (cf)*	NA
Data Downloaded (Yes/No)	Yes	Program Reviewed? (Yes/No)	Yes - 10hr Setup
Channel conditions/observations: No flow in pipe		Sampler "Running"...	See below
		Ice Deployed? (Yes/No)	No

* NA unless directed by Storm Controller

Notes: Current 4150 FM unable to connect to computer - need to swap out
Enable lvl is the thickness of a low flow strainer (0.042') + typical 0.03' = 0.072'

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: DM & CN | Weather: Raining 40°s | Arrival Date/Time: 12-14-09 (1930)

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	12-14-09 (1950)
Grab Sample Bottle ID	CB112409GRAB
Grab Duplicates Collected?	No
Grab Blank Collected?	NO
VOA trip blank in cooler?	Yes

Sample Observations: Water much more clear than at the other main-line stations

Internal Flowmeter		Sampler	
Flowmeter cables OK? (Yes/No)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date/time)	12-14-09 (2013)
Notes: looks for level; Flow depth too shallow to register velocity & flow vol.		On Composite... (Bottle #/ Aliq #)	"Manually" started *
		Ice deployed?	No
		Sampler Battery Voltage (Changed?):	12.86 NO ▽
		Bottle Swap needed? (if yes fill out Section 3)	See below

Section 3. Mid-Storm Check/Bottle Switch

Personnel: DM & DO | Weather: drizzle, 30-40 | Arrival Date/Time: 12-14-09 (~~1200~~) DM

Composite Begin Time (date/time)	See Section 4	Round #:	~(0000)
Last Aliquot Taken (date/time, bott #, aliq #)	—	Data downloaded?	Yes
Comp Bottles Labeled? (Sta. & date)	—	Sampler Battery Voltage (Changed):	No change
Comp Sample Volume Collected	—	Ice deployed?	No

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed: See Section 4

Channel conditions/observations: V. low water level in pipe

Notes/Maintenance Needed: Sampler running fine

(2358) 12-14-09 BtL 4 1of5

Lora Lakes Apartments Stormwater Interim Action - Stormwater Sampling

Taylor Associates, Inc.

Station: CB-1

Section 4. Mid-Storm Check/Bottle Switch			
Personnel: DM & DO	Weather: drizzle (lite) 30-40	Arrival Date/Time:	12-14-09 (0105)
Composite Begin Time (date/time)	12-14-09 (2013)		Round #:
Last Aliquot Taken (date/time, bott #, aliq #)	~~0059 12-15-09~~	Data downloaded?	Yes
Comp Bottles Labeled? (Sta. & date)	Yes	Sampler Battery Voltage (Changed):	12.72 NO ∇
Comp Sample Volume Collected	4-gals 100%	Ice deployed?	NO
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed: See Sampling Rpt - several throughout base			
Channel conditions/observations: Rain has stopped v. low to no flow in pipe			
Notes/Maintenance Needed: Collect Base #1 (BTLs 1-4) & reset w/ fresh 4-BtL base (btls 5-8)			

Section 5. Comp Sample Collection/Post Storm			
Personnel: PH	Weather: Rain	Arrival Date/Time:	12/15/09 13:15
Sampler Battery Voltage	—	Changed? Y (N)	New voltage —
~~Modem~~ Battery Voltage	—	Changed? Y (N)	New voltage —
Composite Begin Time (date/time)	See section 4		Round #: 2
Last Aliquot Taken (date/time, bott #, aliq #)	12/14/09 23:58, Bottle 4, aliq. 1 of 5		
Comp Bottles Labeled? (Sta. & date)	NO, no water	Data downloaded? Yes	
Comp Sample Volume Collected	~~0~~		
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed: All, NLD (2nd base, btls 5-8, NO water collected due to no water in pipe)			
Channel conditions/observations: OK, none observed			
Notes/Maintenance Needed: Lifted head off and no water in base #2.			

Section 6. QC Sampling			
Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes: None Collected this round			

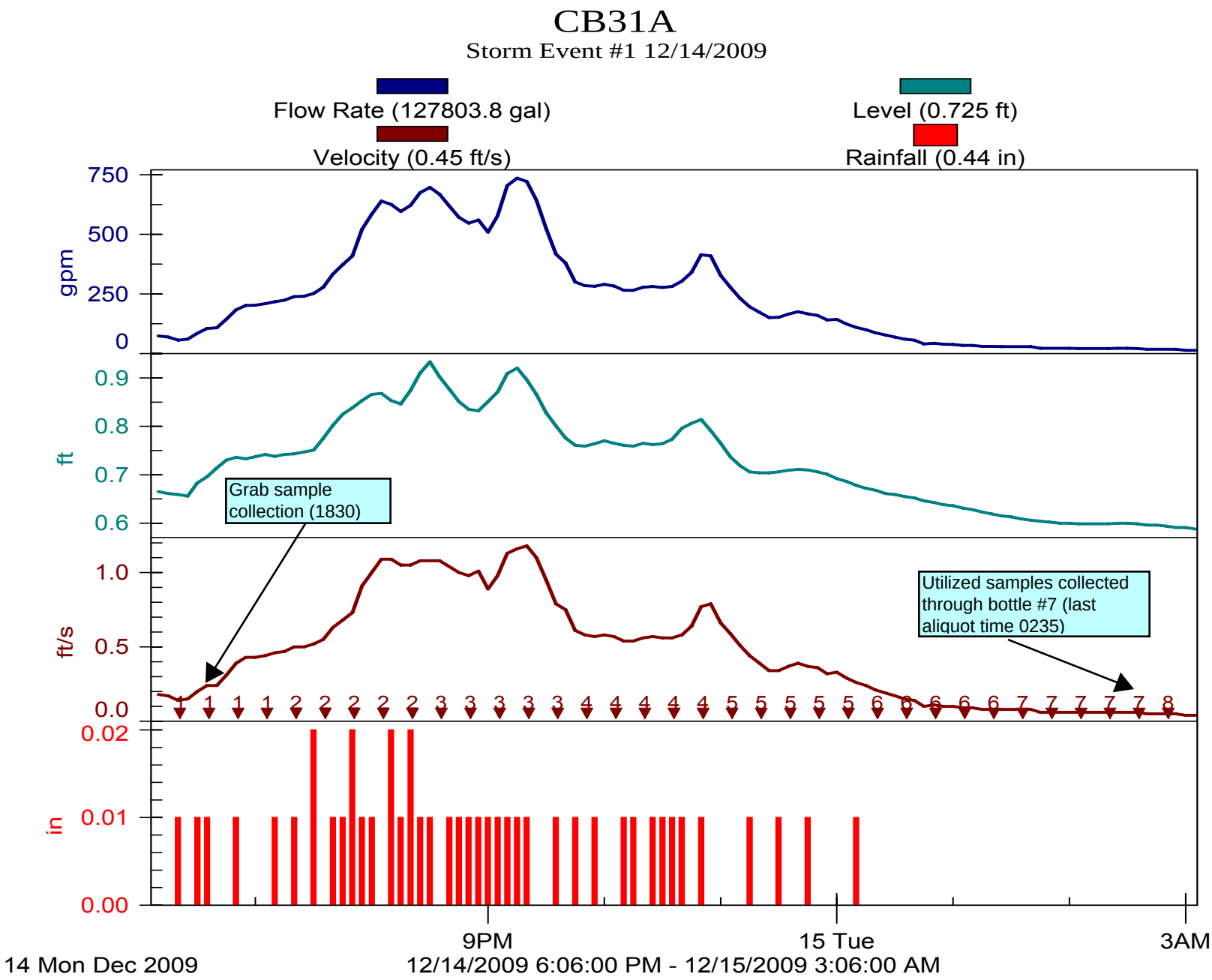
Comping Info:

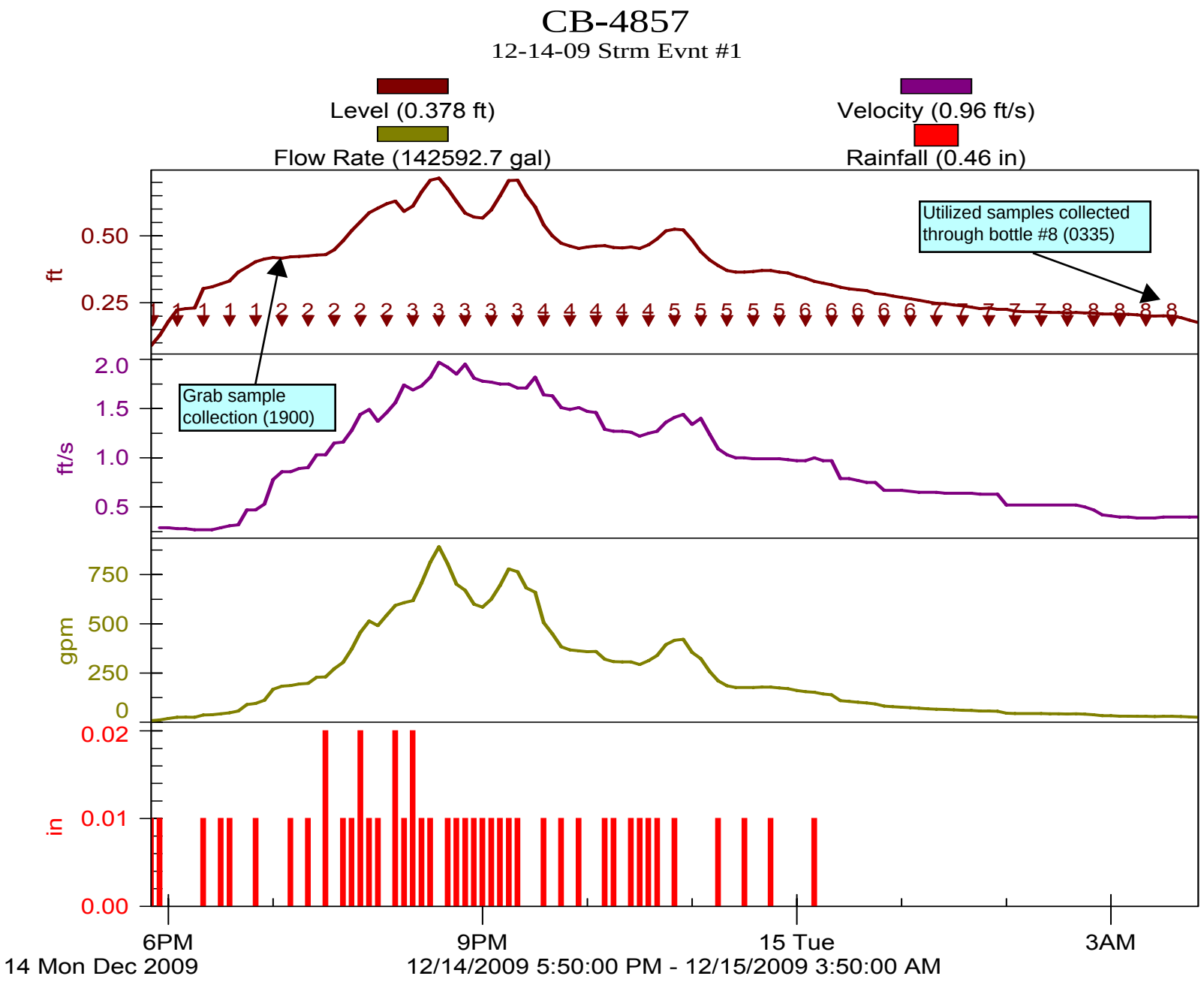
used btls 1-3 (btls 4-8 had no water)

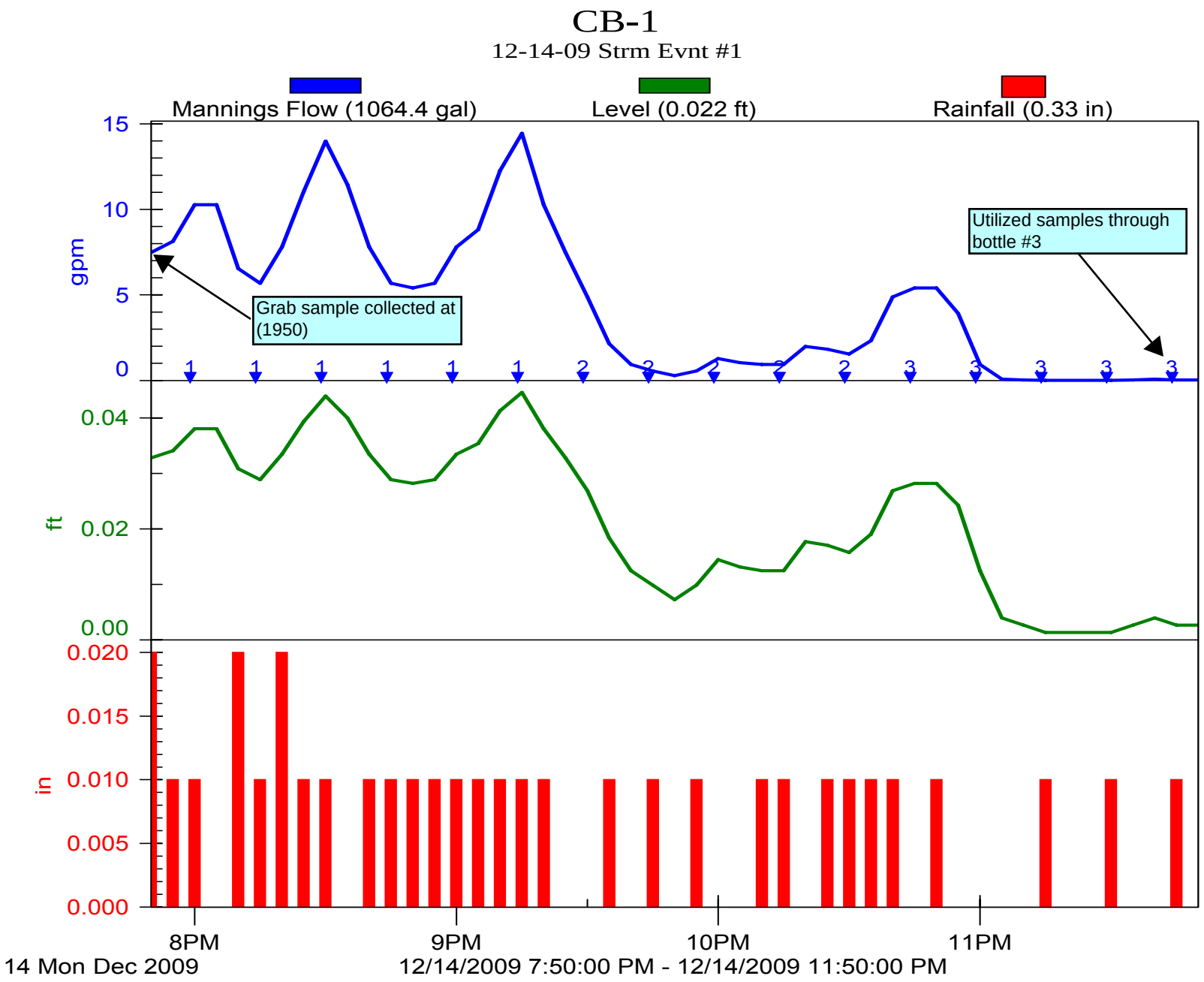
CB1121409Comp (2345)

12/14/09

post-storm manual flow weighted comp's (see comp'ing sheet for details)


CB31A
Storm Event #1 12/14/2009
Flow Rate (127803.8 gal)
Level (0.725 ft)
Velocity (0.45 ft/s)
Rainfall (0.44 in)
750
500
250
0
gpm
0.9
0.8
0.7
0.6
ft
Grab sample collection (1830)
1.0
0.5
0.0
ft/s
Utilized samples collected through bottle #7 (last aliquot time 0235)
1 1 1 1 2 2 2 2 2 3 3 3 3 3 4 4 4 4 4 5 5 5 5 5 6 6 6 6 6 7 7 7 7 7 8
0.02
0.01
0.00
in
9PM
15 Tue
3AM
14 Mon Dec 2009
12/14/2009 6:06:00 PM - 12/15/2009 3:06:00 AM


CB-4857
12-14-09 Strm Evnt #1
Level (0.378 ft)
Velocity (0.96 ft/s)
Flow Rate (142592.7 gal)
Rainfall (0.46 in)
Utilized samples collected through bottle #8 (0335)
Grab sample collection (1900)
ft
0.50
0.25
ft/s
2.0
1.5
1.0
0.5
gpm
750
500
250
0
in
0.02
0.01
0.00
6PM
14 Mon Dec 2009
9PM
15 Tue
3AM
12/14/2009 5:50:00 PM - 12/15/2009 3:50:00 AM


CB-1
12-14-09 Strm Evnt #1
Mannings Flow (1064.4 gal)
Level (0.022 ft)
Rainfall (0.33 in)
gpm
15
10
5
0
Grab sample collected at (1950)
Utilized samples through bottle #3
1 1 1 1 1 1 2 2 2 2 2 3 3 3 3 3
ft
0.04
0.02
0.00
in
0.020
0.015
0.010
0.005
0.000
8PM
9PM
10PM
11PM
14 Mon Dec 2009
12/14/2009 7:50:00 PM - 12/14/2009 11:50:00 PM

CB31A - 121409 STE#1

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot
8585.1	0.193532	387	**1**	6.72%	6.72%
33054.9	0.74515	1490	**2**	25.87%	32.59%
44360.05	1	2000	**3**	34.72%	67.31%
22780.75	0.513542	1027	**4**	17.83%	85.14%
13462.3	0.303478	607	**5**	10.54%	95.67%
3830.1	0.086341	173	**6**	3.00%	98.67%
1698.3	0.038284	77	**7**	1.33%	100.00%

Qtotal 127771.5

max Q 44360.05
min V (ml) 2000 **5761** Volume of Composite Container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB4857 121409 STE#1

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot
2610	0.049909	100	**1**	1.83%	1.83%
22250	0.425471	851	**2**	15.64%	17.48%
52295	1	2000	**3**	36.76%	54.24%
29870	0.571183	1142	**4**	21.00%	75.23%
19795	0.378526	143	**5**	13.92%	89.15%
8665	0.165695	331	**6**	6.09%	95.24%
4170	0.07974	159	**7**	2.93%	98.17%
2600	0.049718	99	**8**	1.83%	100.00%

Qtotal 142255

max Q 52295
min V (ml) 2000 **4826** Volume of composite container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB1 121409 STE#1

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot
560.95	1	3000	**1**	65.21%	65.21%
183.25	0.326678	980	**2**	21.30%	86.51%
116.05	0.206881	621	**3**	13.49%	100.00%

Qtotal 860.25

max Q 560.95
min V (ml) 3000 **4601** Volume of composite container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB31A 121409

SAMPLER ID# 1069569980 12:55 15-DEC-09
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB31A   "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 16 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 15 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1069569980 12:55 15-DEC-09
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB31A
PROGRAM: LLA MULTI
Program Started at 13:26 MO 14-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		13:26	PGM DISABLED		
		18:04	PGM ENABLED		
1,5	1	18:04	E		477
2,5	1	18:19	T		479
3,5	1	18:34	T		479
		18:40	MANUAL PAUSE		
		18:41	MANUAL RESUME		
4,5	1	18:49	T		485
5,5	1	19:04	T		481
1,5	2	19:19	T		485
2,5	2	19:34	T		481
3,5	2	19:49	T		481
4,5	2	20:04	T		493
5,5	2	20:19	T		483
1,5	3	20:34	T	NL	*
2,5	3	20:49	T	NM	*
3,5	3	21:04	T	NL	*
4,5	3	21:19	T	NM	*
5,5	3	21:34	T		503
1,5	4	21:49	T		491
2,5	4	22:04	T		483
3,5	4	22:19	T		481
4,5	4	22:34	T		487
5,5	4	22:49	T		483
1,5	5	23:04	T		481
2,5	5	23:19	T		487

CB31A 121409

		23:23	MANUAL PAUSE	
		23:24	MANUAL RESUME	
3,5	5	23:34	T	483
4,5	5	23:49	T	481
----------		TU 15-DEC-09	----------	
5,5	5	00:04	T	481
1,5	6	00:19	T	481
2,5	6	00:34	T	487
3,5	6	00:49	T	489
4,5	6	01:04	T	483
5,5	6	01:19	T	489
1,5	7	01:34	T	483
2,5	7	01:49	T	489
3,5	7	02:04	T	483
4,5	7	02:19	T	489
5,5	7	02:34	T	485
1,5	8	02:49	T	489
2,5	8	03:04	T	483
3,5	8	03:19	T	489
4,5	8	03:34	T	483
5,5	8	03:49	T	489
1,5	9	04:04	T	483
2,5	9	04:19	T	489
3,5	9	04:34	T	483
4,5	9	04:49	T	489
5,5	9	05:04	T	483
1,5	10	05:19	T	483
2,5	10	05:34	T	487
3,5	10	05:49	T	483
4,5	10	06:04	T	487
5,5	10	06:19	T	489
1,5	11	06:34	T	483
2,5	11	06:49	T	489
3,5	11	07:04	T	485
4,5	11	07:19	T	489
5,5	11	07:34	T	483
1,5	12	07:49	T	489
2,5	12	08:04	T	483
3,5	12	08:19	T	489
4,5	12	08:34	T	483
5,5	12	08:49	T	489
		08:50	PGM DONE 15-DEC	

```
   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
    ERROR NL ==> NO LIQUID DETECTED!
    ERROR NM ==> NO MORE LIQUID!
----------------------------------------
```

SAMPLER ID# 1224319970 13:34 15-DEC-09
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB4857   "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 22 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 15 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1224319970 13:35 15-DEC-09
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB4857
PROGRAM: LLA MULTI
Program Started at 14:56 MO 14-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE ERROR	COUNT TO LIQUID
		14:56	PGM DISABLED	
		17:49	PGM ENABLED	
1,5	1	17:49	E	598
2,5	1	18:04	T	598
3,5	1	18:19	T	601
4,5	1	18:34	T	604
5,5	1	18:49	T	610
		18:59	MANUAL PAUSE	
		19:00	MANUAL RESUME	
1,5	2	19:04	T	601
2,5	2	19:19	T	571
3,5	2	19:34	T	606
4,5	2	19:49	T	602
5,5	2	20:04	T	604
1,5	3	20:19	T	602
2,5	3	20:34	T	604
3,5	3	20:49	T	608
4,5	3	21:04	T	604
5,5	3	21:19	T	601
1,5	4	21:34	T	606
2,5	4	21:49	T	607
3,5	4	22:04	T	607
4,5	4	22:19	T	605
5,5	4	22:34	T	607
1,5	5	22:49	T	607
2,5	5	23:04	T	604

3,5	5	23:19	T	610
4,5	5	23:34	T	606
5,5	5	23:49	T	610
----------	TU 15-DEC-09		----------	
1,5	6	00:04	T	606
2,5	6	00:19	T	610
3,5	6	00:34	T	609
4,5	6	00:49	T	608
5,5	6	01:04	T	604
1,5	7	01:19	T	607
2,5	7	01:34	T	610
3,5	7	01:49	T	603
4,5	7	02:04	T	606
5,5	7	02:19	T	610
1,5	8	02:34	T	609
2,5	8	02:49	T	607
3,5	8	03:04	T	607
4,5	8	03:19	T	608
5,5	8	03:34	T	614
1,5	9	03:49	T	616
2,5	9	04:04	T	608
3,5	9	04:19	T	604
4,5	9	04:34	T	608
5,5	9	04:49	T	607
1,5	10	05:04	T	616
2,5	10	05:19	T	608
3,5	10	05:34	T	614
4,5	10	05:49	T	608
5,5	10	06:04	T	616
1,5	11	06:19	T	616
2,5	11	06:34	T	616
3,5	11	06:49	T	608
4,5	11	07:04	T	616
5,5	11	07:19	T	616
1,5	12	07:34	T	616
2,5	12	07:49	T	608
3,5	12	08:04	T	608
4,5	12	08:19	T	616
5,5	12	08:34	T	610
		08:35	PGM DONE 15-DEC	

SOURCE E ==> ENABLE
SOURCE T ==> TIME

CB1 121409 Base1

SAMPLER ID# 1078487086 01:28 15-DEC-09
  Hardware: A1   Software: 2.20
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1   "

   UNITS SELECTED:
     LENGTH: ft

   4, 3.70 lit BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 15 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

      ENABLE:

  NONE PROGRAMMED

```
    ----------
     ENABLE:
  ONCE ENABLED,
   STAY ENABLED
 SAMPLE AT ENABLE
    ----------
     ENABLE:
0 PAUSE & RESUMES


    ----------

NO DELAY TO START


    ----------
    ----------
    ----------
 LIQUID DETECT ON

QUICK VIEW/CHANGE

    ----------

TAKE MEASUREMENTS
 EVERY  1 MINUTES

    ----------
 DUAL SAMPLER OFF
BTL FULL DETECT OFF
 TIMED BACKLIGHT

    ----------

 EVENT MARK SENT
DURING PUMP CYCLE

    ----------
 PUMP COUNTS FOR
EACH PURGE CYCLE:
  200 PRE-SAMPLE
 AUTO POST-SAMPLE
    ----------
```

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1078487086 01:28 15-DEC-09
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********

CB1 121409 Base1

SITE: CB1
PROGRAM: LLA MULTI
Program Started at 20:13 MO 14-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		20:13	PGM ENABLED		
1,5	1	20:13	S		443
		20:14	MANUAL PAUSE		
		20:15	MANUAL RESUME		
		20:16	MANUAL PAUSE		
		20:16	MANUAL RESUME		
2,5	1	20:28	T		454
3,5	1	20:43	T		446
4,5	1	20:58	T		446
5,5	1	21:13	T		446
1,5	2	21:28	T		440
2,5	2	21:43	T		440
3,5	2	21:58	T		444
4,5	2	22:13	T		442
5,5	2	22:28	T		440
1,5	3	22:43	T		442
2,5	3	22:58	T		443
3,5	3	23:13	T	NM	*
4,5	3	23:28	T	NM	*
5,5	3	23:43	T	NM	*
1,5	4	23:58	T	NM	*
----------	TU 15-DEC-09				----------
2,5	4	00:13	T	NL	*
3,5	4	00:28	T	NL	*
4,5	4	00:43	T	NL	*
5,5	4	00:58	T	NL	*
		00:59	PGM DONE 15-DEC		

SOURCE S ==> START
SOURCE T ==> TIME
ERROR NL ==> NO LIQUID DETECTED!
ERROR NM ==> NO MORE LIQUID!

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1078487086 13:19 15-DEC-09
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********

CB1 121409 Base2

SITE: CB1
PROGRAM: LLA MULTI
Program Started at 01:35 TU 15-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID	
		01:35	PGM ENABLED			
1,5	1	01:35	S	NL		*
2,5	1	01:50	T	NL		*
3,5	1	02:05	T	NL		*
4,5	1	02:20	T	NL		*
5,5	1	02:35	T	NL		*
1,5	2	02:50	T	NL		*
2,5	2	03:05	T	NL		*
3,5	2	03:20	T	NL		*
4,5	2	03:35	T	NL		*
5,5	2	03:50	T	NL		*
1,5	3	04:05	T	NL		*
2,5	3	04:20	T	NL		*
3,5	3	04:35	T	NL		*
4,5	3	04:50	T	NL		*
5,5	3	05:05	T	NL		*
1,5	4	05:20	T	NL		*
2,5	4	05:35	T	NL		*
3,5	4	05:50	T	NL		*
4,5	4	06:05	T	NL		*
5,5	4	06:20	T	NL		*
		06:20	PGM DONE 15-DEC			

SOURCE S ==> START
SOURCE T ==> TIME
ERROR NL ==> NO LIQUID DETECTED!

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: LOMA LAKES
12/16/09

Date: 12/16/09
Staff: EW
pH meter make/model #: THERMO SCIENTIFIC ORION pH METER

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB1121409 COMP	6.73	13:05	
CB4857121509 COMP	6.69	13:15	
CB31A121509 COMP	6.73	13:50	

Post-Measurement Check

Nominal pH value of standard	7.0	
Temperature (deg C)	17.0	
Standard pH, temp corrected	7.01	
Meter pH reading (SU)	6.98	
Difference (SU)	0.03	*Should be < 0.1 (round to 0.0)*
Time	13:55	

Form to be included in storm file, as applicable

NWS Forecast for: Seatac WA

Issued by: National Weather Service Seattle, WA
Last Update: 5:40 am PST Dec 14, 2009

Print

Short Term Forecast

Today: Rain likely after 10am. Cloudy, with a high near 39. Calm wind becoming southeast around 5 mph. Chance of precipitation is 70%.

Tonight: Rain. Low around 37. East southeast wind between 7 and 10 mph. Chance of precipitation is 90%.

Tuesday: Rain. High near 46. South southeast wind between 7 and 10 mph. Chance of precipitation is 80%.

Tuesday Night: Rain. Low around 42. South southwest wind between 13 and 15 mph. Chance of precipitation is 90%.

Wednesday: Rain. High near 48. South wind between 10 and 18 mph. Chance of precipitation is 80%.

Wednesday Night: Rain likely. Cloudy, with a low around 41. Chance of precipitation is 70%.

Thursday: A 40 percent chance of rain. Mostly cloudy, with a high near 47.

Thursday Night: A chance of rain. Mostly cloudy, with a low around 40.

Friday: A chance of rain. Mostly cloudy, with a high near 47.

Friday Night: A chance of rain. Mostly cloudy, with a low around 39.

Saturday: A chance of rain. Mostly cloudy, with a high near 48.

Saturday Night: A chance of rain. Mostly cloudy, with a low around 38.

Sunday: A chance of rain. Mostly cloudy, with a high near 49.

Point Forecast: Seatac WA
47.44°N 122.3°W (Elev. 371 ft)

Visit your local NWS office at: http://www.wrh.noaa.gov/sew

Area Forecast Discussion

Issued by NWS Seattle/Tacoma, WA

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000
FXUS66 KSEW 141300 CCA
AFDSEW

AREA FORECAST DISCUSSION...CORRECTION
```

NATIONAL WEATHER SERVICE SEATTLE WA
330 AM PST MON DEC 14 2009

CORRECTION TO TYPOS.

.SYNOPSIS...SCATTERED LIGHT SHOWERS OVER THE NORTH INTERIOR WILL END THIS MORNING. RAIN WILL INCREASE THIS AFTERNOON AS A WARM FRONT APPROACHES. PRECIPITATION MAY START AS SNOW IN THE NORTH INTERIOR AND HOOD CANAL AREA. HEAVY SNOW IS EXPECTED IN THE MOUNTAINS THROUGH TUESDAY. A SERIES OF FRONTAL SYSTEMS WILL AFFECT THE REGION THROUGH LATE THIS WEEK.

&&

.SHORT TERM...A TRANSITION TO A WETTER AND WARMER PATTERN EXPECTED THIS WEEK ACROSS THE PAC NW.

TEMPS HAVE MODERATED ACROSS THE INTERIOR THIS MORNING UNDER A THICK MARINE LAYER AND ONSHORE FLOW. GENERALLY SEEING READINGS IN THE 30S...WITH COOLER 20S IN THE NORTH INTERIOR THANKS TO FRASER RIVER OUTFLOW. STILL SEEING A FEW LIGHT SHOWERS ON THE RADAR IN THE NORTH PART BUT MAY ONLY SEE A LIGHT DUSTING OR A RAIN/SNOW MIX. THUS WILL LET THE CURRENT BATCH OF ADVISORIES END.

A WARM FRONT WILL SWEEP INLAND LATE THIS AFTERNOON AND MAY SEE PRECIP START OUT AS SNOW...ESPECIALLY THE NORTH INTERIOR AGAIN AS COOLER AIR CONTINUES TO SPILL OUT OF THE FRASER. THE HOOD CANAL AREA COULD SEE A FEW INCHES OF SNOW TOO BEFORE WARMER AIR MOVES INLAND LATE THIS EVENING. WILL ISSUE A WINTER WEATHER ADVISORY FOR THE HOOD CANAL AREA WITH ACCUMULATIONS OF 1 TO 4 INCHES POSSIBLE...HEAVIEST AMOUNTS WILL BE FOUND NEAR THE OLYMPICS. THE MOUNTAINS WILL ALSO GET HAMMERED WITH SNOW LEVELS REMAINING BELOW PASS LEVELS. THE OLYMPICS AND CASCADES WILL NEED WINTER STORM WARNING WITH HEAVY SNOW LASTING THROUGH TUE AFTERNOON. EASTERLY FLOW WILL KEEP PASS TEMPS BELOW FREEZING DESPITE RISING SNOW LEVELS.

THE FORECAST REMAINS ACTIVE THROUGH AT LEAST THE MIDDLE OF THE WEEK WITH ANOTHER SYSTEM ARRIVING ON WED. TEMPS WILL REMAIN MILD WITH LOWS IN THE MID TO UPPER 30S AND HIGHS IN THE 40S. 33

.LONG TERM...NOT MUCH CHANGE TO THE LONG TERM PACKAGE. WE STAY IN AN ACTIVE PATTERN THROUGH THU...THEN A POSSIBLE BREAK IN THE WEATHER ON FRI AS AN UPPER LEVEL RIDGE BUILDS OVER THE PAC NW. THE RIDGE MAY AMPLIFY OVER THE WEEKEND BUT BOTH THE GFS AND ECMWF SHOW MOISTURE CLIPPING THE REGION...MAINLY AFFECTING THE COAST OR NORTH PART OF THE CWA. THE RIDGE MAY BREAK DOWN EARLY NEXT WEEK AS A TROUGH DIGS OFFSHORE AND SHIFTS INLAND. THE GFS IS A BIT MORE PROGRESSIVE WITH THIS NEXT WAVE AND WILL HOLD POPS/TEMPS NEAR CLIMO. 33

&&

.HYDROLOGY...A TRANSITION TO A WETTER PATTERN WILL BEGIN TONIGHT THROUGH AT LEAST THE MIDDLE OF THE WORK WEEK AS A SERIES OF PACIFIC FRONTAL SYSTEMS SWEEP THROUGH WESTERN WASHINGTON. INITIALLY SNOW LEVELS REMAIN LOW WITH HEAVY SNOW EXPECTED TONIGHT THROUGH TUES AFTERNOON IN THE MOUNTAINS. SNOW LEVELS WILL RISE TO AROUND 4000 FT ON WED AS ANOTHER SYSTEMS CLIPS THE REGION. THE FLOOD POTENTIAL

LOOKS LOW AT THE MOMENT AS RIVERS HAVE BEEN RUNNING LOW WITH LITTLE TO NO PRECIP ACROSS THE REGION SINCE LATE NOV. NO FLOOD CONCERNS FOR THE GREEN RIVER.

MODELS TRY TO BUILD AN UPPER LEVEL RIDGE ACROSS THE PAC NW LATE THIS WEEK INTO THE WEEKEND...WITH A BREAK IN THE WEATHER POSSIBLE. THE RIDGE WILL BREAK DOWN EARLY NEXT WEEK BUT EXACT TIMING REMAINS UNCLEAR AS BOTH THE GFS AND ECMWF DIFFER. 33

&&

.AVIATION...CONVERGENCE ZONE BETWEEN WHIDBEY ISLAND AND THE SAN JUANS CONTINUING THIS MORNING WITH SNOW SHOWERS REDUCING VISIBILITIES DOWN TO AS LOW AS A MILE. THE CONVERGENCE WILL DISSIPATE MIDDAY. OUTSIDE OF THE CONVERGENCE ZONE STRATUS LAYER OVER THE CWA WITH CEILINGS BETWEEN 1000 AND 2000 FEET WITH LOCAL CEILINGS BELOW 1000 FEET AND VISIBILITIES 3-5SM IN FOG. THESE CONDITIONS WILL SLOWLY IMPROVE LATE MORNING INTO THE AFTERNOON HOURS AS THE NEXT FRONT APPROACHES THE AREA. PRECIPITATION STARTING ALONG THE COAST IN THE AFTERNOON AND SPREADING INTO THE INTERIOR LATE IN THE AFTERNOON. PRECIPITATION MOSTLY IN THE FORM OF RAIN. THE EXCEPTIONS WILL BE NEAR THE HOOD CANAL AND UP AROUND KBLI WHERE THE PRECIPITATION WILL START OUT AS SNOW BEFORE CHANGING TO RAIN MONDAY EVENING. CEILINGS BY THE TIME THE PRECIPITATION STARTS IN THE 3000 TO 4000 FOOT RANGE. CEILINGS LOWERING BACK DOWN TO THE 1000 TO 2000 FOOT RANGE AS THE FRONT PASSES THROUGH EARLY TUESDAY MORNING.

KSEA...CEILINGS REMAINING IN THE 600 TO 1000 FEET RANGE THROUGH THE MORNING HOURS. SLOW IMPROVEMENT THIS AFTERNOON WITH CEILINGS NEAR 3500 FEET THIS EVENING WITH RAIN. AT THIS POINT IT LOOKS LIKE THE PRECIPITATION WILL BE IN THE FORM OF RAIN FROM THE START AT THE TERMINAL. FRONTAL PASSAGE 09-12Z TUESDAY. LIGHT WINDS THIS MORNING BECOMING SE LESS THAN 10 KNOTS THIS AFTERNOON. FELTON

&&

.MARINE...HIGH PRESSURE OVER SOUTHERN BRITISH COLUMBIA WILL WEAKEN TODAY. A PACIFIC FRONT WILL MOVE INTO THE AREA FROM THE WEST PASSING THROUGH THE WATERS LATE TONIGHT INTO EARLY TUESDAY MORNING. WINDS INCREASING TO GALE FORCE OUT AHEAD OF THE FRONT OVER THE COASTAL WATERS THIS AFTERNOON AND CONTINUING UNTIL THE FRONTAL PASSAGE. WINDS ALSO INCREASING INLAND WITH GALES RIGHT AHEAD OF THE FRONT FOR THE EAST ENTRANCE TO THE STRAIT. SMALL CRAFT ADVISORY WINDS EXPECTED FOR THE WEST ENTRANCE TO THE STRAIT AS WELL AS ADMIRALTY INLET AND THE NORTHERN INLAND WATERS. THE NEXT FRONT...ASSOCIATED WITH A 988 MB LOW MOVING INTO NORTHERN VANCOUVER ISLAND WILL MOVE THROUGH TUESDAY NIGHT WITH GALES POSSIBLE AGAIN OVER THE COASTAL WATERS BEGINNING TUESDAY AFTERNOON.

A SERIES OF FAST MOVING FRONTAL SYSTEMS WILL MOVE ACROSS THE WATERS THROUGH THE REMAINDER OF THE WEEK WITH SMALL CRAFTS OVER PORTIONS OF THE INTERIOR AT TIMES AND NEAR GALE WINDS AT TIMES OVER THE COASTAL WATERS AND SEAS BETWEEN 12 AND 19 FEET. THE PASSAGE OF THESE FRONTAL SYSTEMS ARE DIFFICULT TO TIME AT THIS POINT SO THE LATTER HALF OF THE FORECAST PERIOD ARE BROAD BRUSHED. FELTON

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...A WINTER WEATHER ADVISORY IS IN EFFECT FOR THE HOOD
CANAL AREA FOR MONDAY AFTERNOON THROUGH MONDAY EVENING.

A WINTER STORM WARNING IS IN EFFECT FOR THE OLYMPICS AND
CASCADES FOR MONDAY AFTERNOON THROUGH TUESDAY.

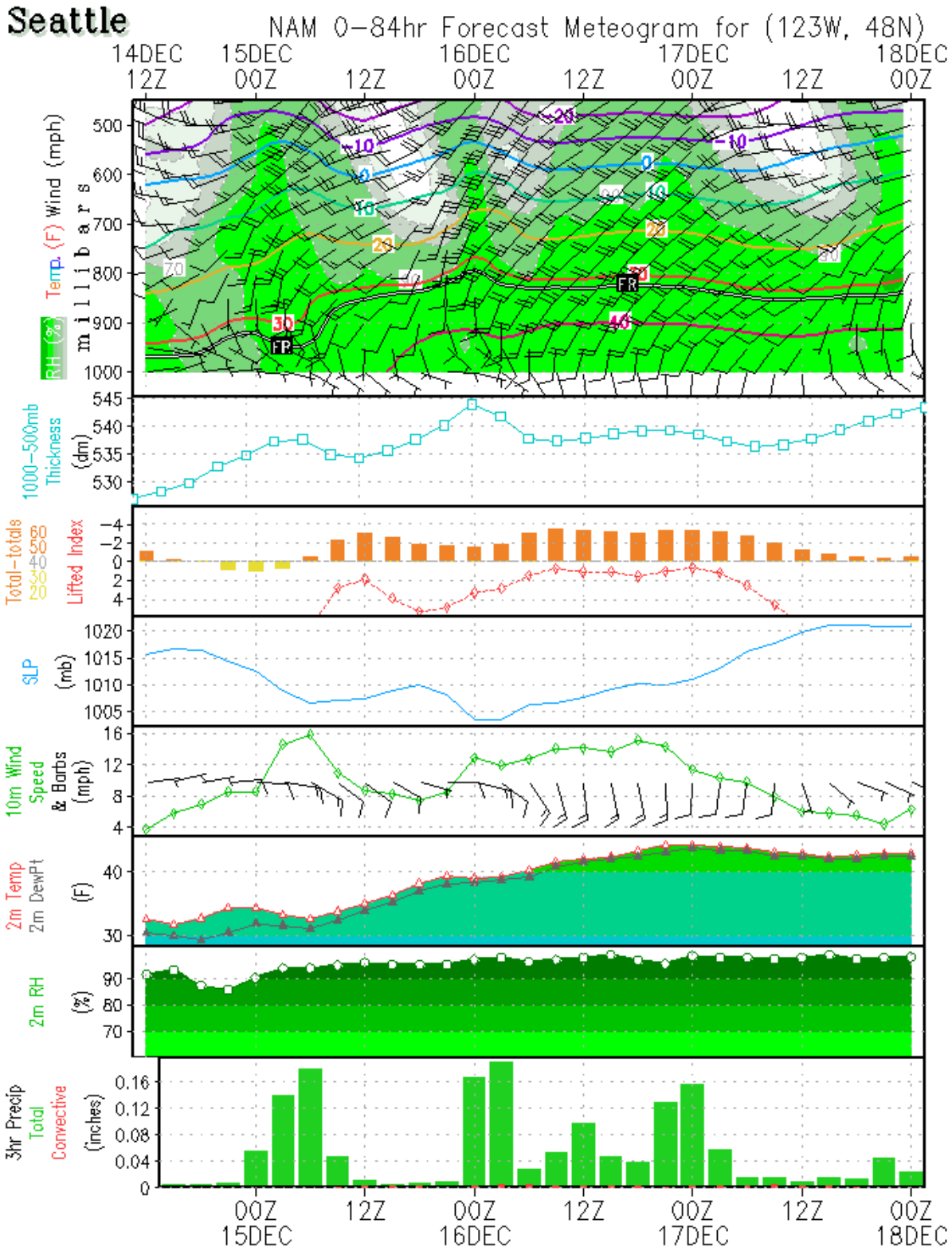
AN AVALANCHE WATCH IS IN EFFECT FOR THE OLYMPICS AND
CASCADES FOR MONDAY NIGHT.

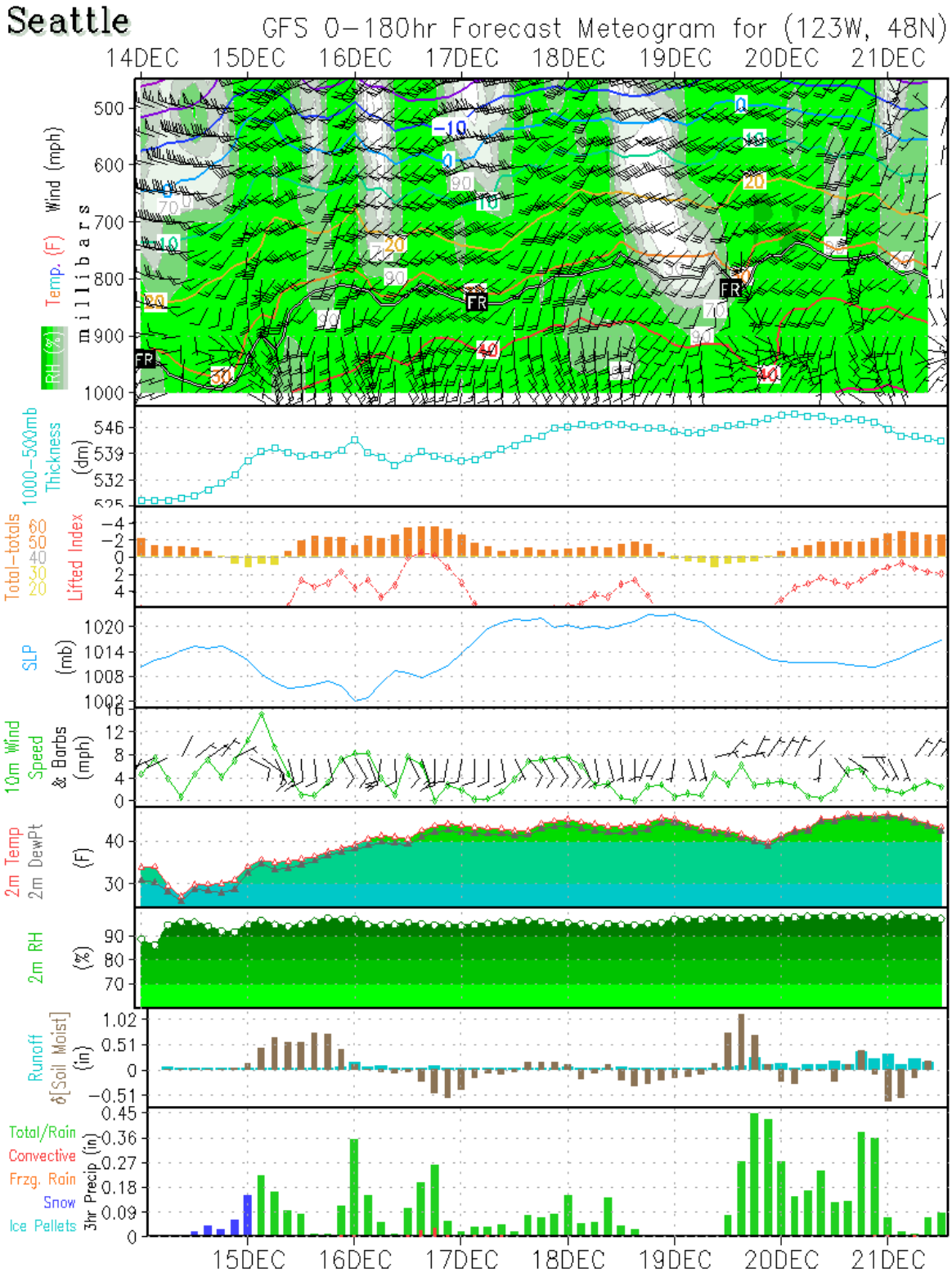
PZ...GALE WARNING COAST AND EAST ENTRANCE TO THE STRAIT.
SMALL CRAFT ADVISORY WEST ENTRANCE TO THE STRAIT...CAMANO
ISLAND TO POINT ROBERTS AND ADMIRALTY INLET.

$$

WWW.WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION...PLEASE SEE
WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML.


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
14DEC 12Z
15DEC 00Z
12Z
16DEC 00Z
12Z
17DEC 00Z
12Z
18DEC 00Z
millibars
Temp. (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
3hr Precip Total
Convective (inches)
00Z 15DEC
12Z
00Z 16DEC
12Z
00Z 17DEC
12Z
00Z 18DEC


Seattle
GFS 0-180hr Forecast Meteogram for (123W, 48N)
14DEC
15DEC
16DEC
17DEC
18DEC
19DEC
20DEC
21DEC
Wind (mph)
Temp. (F)
RH (%)
millibars
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
Runoff
δ[Soil Moist] (in)
Total/Rain
Convective
Frzg. Rain
Snow
Ice Pellets
3hr Precip (in)

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	January 18, 2010
TO:	Matt Woltman / Jessi Massingale
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600
	Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #1 (12/31/2009)

Please find included the following:

- Storm report narrative (2 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (1 pg),
- Sampler Reports (20 pgs),
- pH Worksheet (1 pg), and
- Weather forecasting information (6 pgs).

Please let me know if you have any questions or need additional information. Thank You.

Dave Metallo, LHG

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #2
December 31st, 2009

General:

Prior to STE#2 a sampling event was attempted on the 29th, which produced 0.07" of rain, ultimately resulting in a false-start. During this event only the composite portion was collected (no post-event processing) and no samples were submitted to the analytical laboratory. Storm event (STE) #2 was conducted on December 31st and was the last event of 2009.

All equipment operated as designed and programmed. The three sampling stations (CB-31A, main line inlet; CB-4857, main line outlet; and CB-1 onsite outlet) automatically enabled within 10 minutes of each other. It was noticed by the field crew that the first three aliquots at CB-1 were being directed into the wrong bottle. These aliquots were kept in their collection bottle and the entire CB-1 (master) sampler base was re-set and re-started at (1312). All stations were automatically enabled via area-velocity sensors triggering above certain set-point levels. A Thel-Mar compound volumetric in-pipe weir was installed at CB-1 since STE#1. Use of the weir provides more precise flow measurement at this location in a very low flow level environment in the associated outlet pipe (see STE#1 Storm Report) and allows for a deeper pool behind the weir from which to draw samples.

Grab samples were collected at each station using dedicated Teflon-coated lines attached to a peristaltic pump. All grabs were collected as early as possible during the storm event once runoff was noted and during the rising or cresting limbs of the storm hydrographs at each monitoring station.

CB-31A and CB-4857 had a storm volume difference of only 1,040 gallons. This is well within the calculated potential site runoff volume available for input into the main line system during the storm period. Approximately 0.15 of an acre (of the 5.25 acres) of impervious surface at the site could account for the volume difference between the main line inlet and outlet stations.

See the accompanying ***Storm and Sample Validation/Qualification Checklist Report Spreadsheet*** for complete details regarding STE#2. Several of the key storm report categories are discussed below.

Compositing Scheme:

The hydrographs from each monitoring station were examined and decisions were made as to what specific bottles were to be included in the composite samples. See the attached field forms and compositing worksheets for details. Each of three autosamplers were programmed to collect samples via time paced programming – each was set to collect an aliquot every 18-minutes (12 hour storm duration program). All of the samples were manually flow weighted based on site specific flow information.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. The locations were MW-1, MW-3, MW-4 and MW-6. Measurements are listed in the table below.

Table 1. Groundwater Level Measurements, STE#2

Location	Date	Time	Water Level (from TOC) (FT)
MW-1	1/2/2010	1104	16.66
MW-3	1/2/2010	1110	17.52
MW-4	1/2/2010	1115	16.55
MW-6	1/2/2010	1055	12.07

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grabs or composite samples were placed into coolers and iced. A small portion of the composite samples were poured off for pH measurements. All samples were recorded on Chain-of-Custody forms and were in direct control of project personnel at all times. All samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from all of the stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Anomalies and/or Workplan Deviations:

There were no anomalies observed that would cause any of the STE#2 samples to be non-representative of the conditions from which they were collected. MS/MSD samples were not collected for either the grab or composite portions of the STE#2 samples. In lieu of these QC samples, additional laboratory QC samples were analyzed and will be described in the first stormwater interim report.

Actions To Be Completed:

In-vault sampling infrastructure will be removed from each of the three monitoring stations in preparation for the upcoming sediment sampling and drainage system cleaning (vactoring) events (scheduled for mid-January). Sediment traps will be installed at four pre-determined locations post-vactoring but prior to the resumption of stormwater sampling. Data analysis of the storm depth to discharge response will be completed on the flow data set that has been collected thus far so that beginning with SET#3 the stations might be automatically flow paced.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #2

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Storm Event Data:	
Project Storm Event (STE) #	2
Event Forecast Probability (%)	90%
Antecedent Dry Period (days: hrs: mins)	1:09:25
STE Start Date & Time	12/31/09 11:55
STE Duration (hrs:mins)	7:25
STE End Date & Time	12/31/09 19:20
Period Between Next Measureable Rain (hrs: mins)	7:30
Was Targeted STE Qualified Per LLA QAPP	YES
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.25
Max Rainfall Intensity (in/hr)	0.10
Average Rainfall Intensity	0.02

[1] Sample Collection Criteria:	CB-31A	CB-4857	CB-1
Sampling Station			
Was Grab sample collected?	Yes	Yes	Yes
Grab ID	CB31A123109GRAB	CB4857123109GRAB	CB1123109GRAB
Grab Date /Time	12/31/2009 12:45	12/31/2009 13:25	12/31/2009 13:00
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	Yes	Yes	Yes
Hydrograph stage at grab collection	rising / first crest	sustained crest	sustained crest
Grab parameters collected per LLA QAPP ?	Yes	Yes	Yes
Were Trip Blanks included w/ Grab samples ?	Yes	Yes	Yes
Was Comp sample collected?	Yes	Yes	Yes
Comp ID	CB31A123109COMP	CB4857123109COMP	CB1123109COMP
Comp Date /Time	12/31/2009 22:37	12/31/2009 23:57	12/31/2009 21:37
Total volume measured during storm period (gallons)	57455	58495	1335
Volume sampled during storm period (gallons)	57455	58495	1335
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	Yes (100%)	Yes (100%)	Yes (100%)
Was a minimum of at least 8 aliquots collected for comp sample ?	Yes (35)	Yes (40)	Yes (33)
Comp parameters collected per LLA QAPP ?	Yes	Yes	Yes
Rainfall during sampling period (in)	0.25	0.25	0.25
pH Measurements Collected ?	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No
[1] QC Sample Summary Information:	CB-31A	CB-4857	CB-1
Was Grab sample duplicate collected ?	No	No	No
Grab sample duplicate ID	na	na	na
Grab sample date and time	na	na	na
Was Comp sample duplicate collected ?	No	No	No
Comp sample duplicate ID	na	na	na
Comp sample date and time	na	na	na
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	No	No	No

[1] If the answer to any of the validation/qualification questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 1-18-10 Reveiwed By / Date: 1/18/10

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: STANDARD	Page: 1 of 1	
ARI Client Company: FLOYD / SNIDER	Phone: 206-292-2078	Date: 12/31/09	Ice Present? Yes
Client Contact: MATT WOLTMAN / JESSIE MASSINGALE		No. of Coolers: 1	Cooler Temps: 4.3
Client Project Name: LORA LAKES APARTMENTS			
Client Project #: POS-LLA	Samplers: B. KWASNOWSKI / P. HETZEL		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NWTPH-Dx ①	Analysis Requested: VOC 8260-C SIM	Notes/Comments
CB314123109GRAB	12/31/09	12:45	W	5	X	X	
CB4857123109GRAB	12/31/09	13:25	W	5	X	X	
CB1[illegible]09GRAB	12/31/09	13:00	W	5	X	X	
TB123109	12/31/09	12:00	W	3		X	

Comments/Special Instructions: ① ACID/SILICA CLEAN-UP FOR TPH-Dx	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: BRAD KWASNOWSKI	Printed Name: D. Peterson	Printed Name:	Printed Name:
	Company: Jaycor Associates	Company: ARI	Company:	Company:
	Date & Time: 12/31/09 @ 14:35	Date & Time: 12/31/09 1435	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Floyd/Snider	Phone: 206-292-2078
Client Contact: Jessi Massingale / Matt Woltman	
Client Project Name: Lora Lake Apts	
Client Project #: POS - LLA	Samplers: D. Metallo, C. Nickerson, P. Hetzel

Date: 1-2-2010
Page: 1 of 1
No. of Coolers: 2 Cooler Temps: 2.5/2.6

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM low level	PCP 8041	Arsenic Total & Diss 200.8	Dioxin / Furans 1613	TSS SM2540D				Notes/Comments
CB31A123109COMP	12.31.09	2237	W	1	X	X	X	X	X				6.68
CB4857123109 COMP	12.31.09	2357	W	1	X	X	X	X	X				6.81
CB1123109 COMP	12.31.09	2137	W	1	X	X	X	X	X				6.82

Analysis Requested

Comments/Special Instructions
- Bottles & glassware decon'ed to LLA project specific SOP (see attached)

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)	[signature]	[signature]		
Printed Name	David Metallo	Nikka Matumbu		
Company	Taylor	ARI		
Date & Time	1/2/10 (1352)	1/2/10 1352		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Station: CB3IA

8 x 1 gallon bottle set-up

Rev.ed 12/14/09

Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: BK / SS	Weather: PT. Cloudy		Arrival Date/Time: 12/30/09 13:15		
Carry-over maintenance to do prior to set-up: —					done?
Sampler Battery Voltage	12.50	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	12.45	Changed? Y (N)		New voltage	—

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes (285K)
Flowmeter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ FT	0.523	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ FT	0.523	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ FT	0.000	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	No	Diagnostics/Distrubutor arm check?	Yes
Velocity (fps)	+0.23	Enable Level ~~(in)~~* FT	> 0.083
Flow Rate ~~(cfs)~~ GPM	0	Pacing Rate ~~(cf)~~* TIME	18 min b/w SMPLS
Data Downloaded (Yes/No)	Yes	Program Reviewed? (Yes/No)	Yes
Channel conditions/observations OK		Sampler "Running"...	Yes
		Ice Deployed? (Yes/No)	NO
			* NA unless directed by Storm Controller

Notes:

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: BK / PH Weather: Rain Arrival Date/Time: 12/31/09 12:30

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	12/31/09 12:45
Grab Sample Bottle ID	CB3IA123109GRAB
Grab Duplicates Collected?	NO
Grab Blank Collected?	NO
VOA trip blank in cooler?	Yes

Sample Observations:

Internal Flowmeter		Sampler	
Flowmeter cables OK? (Yes/No)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date/time)	12/31/09 (12:25)
Notes:		On Composite... (Bottle #/ Aliq #)	BTL 1, 2 of 5
		Ice deployed?	NO
		Sampler Battery Voltage (Changed?):	12.40 NO ∇
		Bottle Swap needed? (if yes fill out Section 3)	NO

Section 3. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

Station: CB31A

Section 4. Mid-Storm Check/Bottle Switch			
Personnel: ~~PH CN~~	Weather: Overcast	Arrival Date/Time: ~~1/2/10 10:35~~	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

Section 5. Comp Sample Collection/Post Storm			
Personnel: PH, CN	Weather: Overcast	Arrival Date/Time: 1/2/10 10:35	
Sampler Battery Voltage	12.31	Changed? (Y) N	New voltage 12.54
Modem Battery Voltage	—	Changed? Y (N)	New voltage —
Composite Begin Time (date/time)	12/31/09 12:25		Round #: 1
Last Aliquot Taken (date/time, bott #, aliq #)	1/1/10 06:07 Btl 12, Aliq 5		
Comp Bottles Labeled? (Sta. & date)	Yes	Data downloaded?	Yes, previously
Comp Sample Volume Collected	100%		
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed	None		
Channel conditions/observations	OK		
Notes/Maintenance Needed:	None		

Section 6. QC Sampling			
Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes:	None Collected this storm event		

Comp Info:

- Used bottles 1 through 7 for composite sample after examining station hydrograph

- CB31A123109Comp (2237)

- Post-storm Manually flow weighted composite (see comping sheet for more details)

Station: CB4857

8 x 1 gallon bottle set-up

Rev.ed 12/14/09

Section 1. Storm Setup and Inspection

Personnel: BL/SS	Weather: OVERCAST	Arrival Date/Time: 12/30/09, 12:44	
Carry-over maintenance to do prior to set-up: —			done? —
Sampler Battery Voltage	12.65	Changed? Y (N)	New voltage —
~~Flow Meter Battery Voltage~~ —	—	Changed? ~~Y~~ N	New voltage —

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Y	Pump Tubing OK?	Y. 350 ml
Flowmeter cables OK? (Yes/No)	Y	Pump Tubing Replaced? (Yes/No)	N
Desiccant Canisters OK (Yes/No)	Y	Sample Tubing & Strainer OK?	Y
Flow Meter Level ~~(in)~~ ft	~~0.050~~ 0.050	Backflushed with DI?	Y
Actual level Reading ~~(in)~~ ft	—	Suction line & quick connect attached?	Y
Difference ~~(in)~~ ft	—	Clean bottles installed & lids off?	Y
Level calibrated? (Yes/No)	— N	Diagnostics/Distrubutor arm check?	Y
Velocity (fps)	0.08	Enable Level ~~(in)~~ ft	0.08
Flow Rate ~~(cfs)~~ GPM	1 GPM	Pacing Rate ~~(cf)~~*	18 MINS / EXHAUST
Data Downloaded (Yes/No)	Y	Program Reviewed? (Yes/No)	Y
Channel conditions/observations: CHANNEL OKAY		Sampler "Running"...	Y
		Ice Deployed? (Yes/No)	N
		* NA unless directed by Storm Controller	

Notes: Back flushed w/ DI water

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: BL/PH | Weather: RAIN | Arrival Date/Time: 12/31/09 @ 13:15

Grab Sample Data		Sample Observations:
Runoff Present?	Y	
Grab Collection Time (date/time)	12/31/09 @ 13:25	
Grab Sample Bottle ID	CB4857123116GRAB	
Grab Duplicates Collected?	N	
Grab Blank Collected?	N	
VOA trip blank in cooler?	Y	

Internal Flowmeter		Sampler	
Flowmeter cables OK? (Yes/No)	Y	Equipment running correctly?	Y
Flow Data Downloaded & Reviewed? (Y/N)	Y	Composite Begin Time (date/time)	12/31/09 12:15
Notes:		On Composite... (Bottle #/ Aliq #)	BTL 2 1 of 5
		Ice deployed?	N
		Sampler Battery Voltage (Changed?):	12.65
		Bottle Swap needed? (if yes fill out Section 3)	N

Section 3. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

Station: CB4857

Section 4. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

Section 5. Comp Sample Collection/Post Storm

Personnel: PH, CN	Weather: Overcast		Arrival Date/Time: 1/2/10 10:20		
Sampler Battery Voltage	12.51	Changed? (Y) (N)		New voltage	NA
Modem Battery Voltage	—	Changed? Y (N)		New voltage	—
Composite Begin Time (date/time)	12/31/09 12:15			Round #: 1	
Last Aliquot Taken (date/time, bott #, aliq #)	1/1/10 05:57 BTL 12 5 of 5				
Comp Bottles Labeled? (Sta. & date)	Yes	Data downloaded?		Yes	
Comp Sample Volume Collected	100%				
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed	None				
Channel conditions/observations	OK				
Notes/Maintenance Needed:	Re-set station				

Section 6. QC Sampling

Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes: None Collected this storm event			

Comp Info:

- Used bottles 1 through 8 for comp. sample after examining station hydrograph;
- CB4857123109comp (2357)
- Post-storm manually flow weighted composite (see comping sheet for more details)

Station: CB1

8 x 1 gallon bottle set-up

Rev.ed 12/14/09

Section 1. Storm Setup and Inspection

Personnel: BK / SS	Weather: Overcast / Pt Cloudy		Arrival Date/Time: 12/30/09	14:15	
Carry-over maintenance to do prior to set-up: —				done? NA	
Sampler Battery Voltage (Master)	12.68	Changed? Y (N)	New voltage	—	
Flow Meter Battery Voltage (Slave)	12.56	Changed? Y (N)	New voltage	—	

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Master (110K) Slave (175K)
Flowmeter cables OK? (Yes/No)	750 module	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ FT	-0.093	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ FT	0.00	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ FT	0.093	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	YES	Diagnostics/Distrubutor arm check?	Yes
Velocity (fps)	NA (No Flow)	Enable Level ~~(in)~~* FT	0.01 (Thel-Mar Weir)
Flow Rate (cfs)	NA	Pacing Rate ~~(cf)~~* Time Paced	18 Min b/w Samples
Data Downloaded (Yes/No)	YES	Program Reviewed? (Yes/No)	Yes
Channel conditions/observations OK		Sampler "Running"... Sampler	Disabled - awaiting rain
		Ice Deployed? (Yes/No)	NO
		* NA unless directed by Storm Controller	

Notes: Sampler Vol. Calibrated

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: BK / PH Weather: Rain Arrival Date/Time: 12/31/09 13:00

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	12/31/09 (13:00)
Grab Sample Bottle ID	CB1123109GRAB
Grab Duplicates Collected?	No
Grab Blank Collected?	No
VOA trip blank in cooler?	Yes

Sample Observations:

Internal Flowmeter	
Flowmeter cables OK? (Yes/No)	750 Module - OK
Flow Data Downloaded & Reviewed? (Y/N)	YES

Notes: Reset base after 3rd aliquot due to incorrect position - Keep collected samples - add new btl - restart

Sampler	
Equipment running correctly?	Yes
Composite Begin Time (date/time) orig. =	12:20 12/31 rest. = 13:12 12/31
On Composite... (Bottle #/ Aliq #) orig. =	BTL 1 3 of 5
Ice deployed?	No
Sampler Battery Voltage (Changed?):	12.56 ▽ 12.63 - No ▽
Bottle Swap needed? (if yes fill out Section 3)	No

Section 3. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

Station: CB1

Section 4. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

Section 5. Comp Sample Collection/Post Storm

Personnel: PH CN	Weather: Overcast	Arrival Date/Time: 1/2/10 9:45 am	
Sampler Battery Voltage	12.55	Changed? Y (N)	New voltage —
Modem Battery Voltage	12.54	Changed? Y (N)	New voltage —
Composite Begin Time (date/time)	12/31/09 13:12 B		Round #: 1
Last Aliquot Taken (date/time, bott #, aliq #)	Last good sample 12/31/09 23:07 ~~Btl 8, Aliq. 5~~		Btl 7, Aliq. 5
Comp Bottles Labeled? (Sta. & date)	Yes	Data downloaded? Yes, previously	
Comp Sample Volume Collected	100%		

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed
Missed all 5 samples in btl 8, no liquid detect or no more liquid

Channel conditions/observations
OK

Notes/Maintenance Needed:
~~Missed PT~~ ~~None~~ Removed slave battery, Kept master on

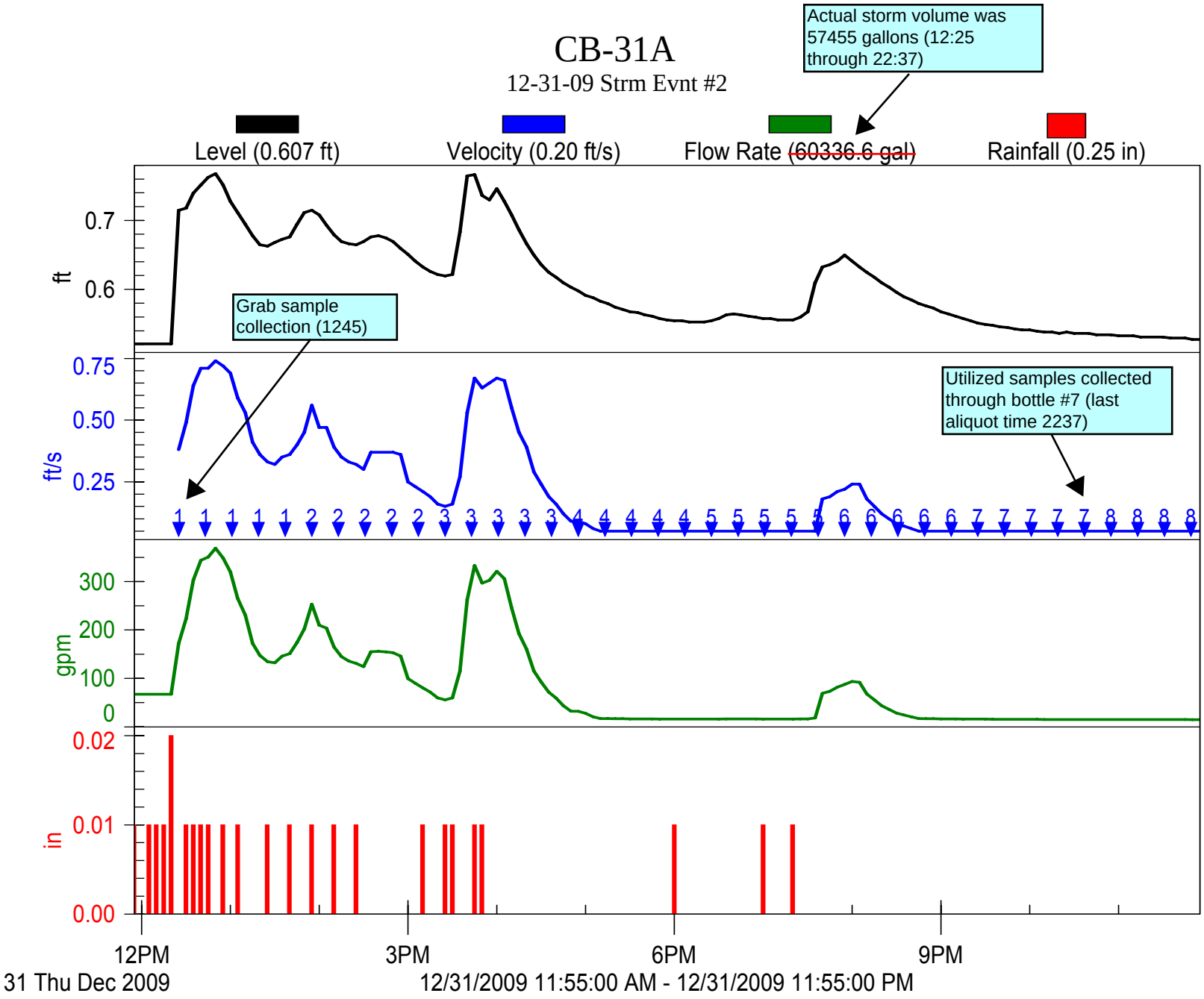
Section 6. QC Sampling

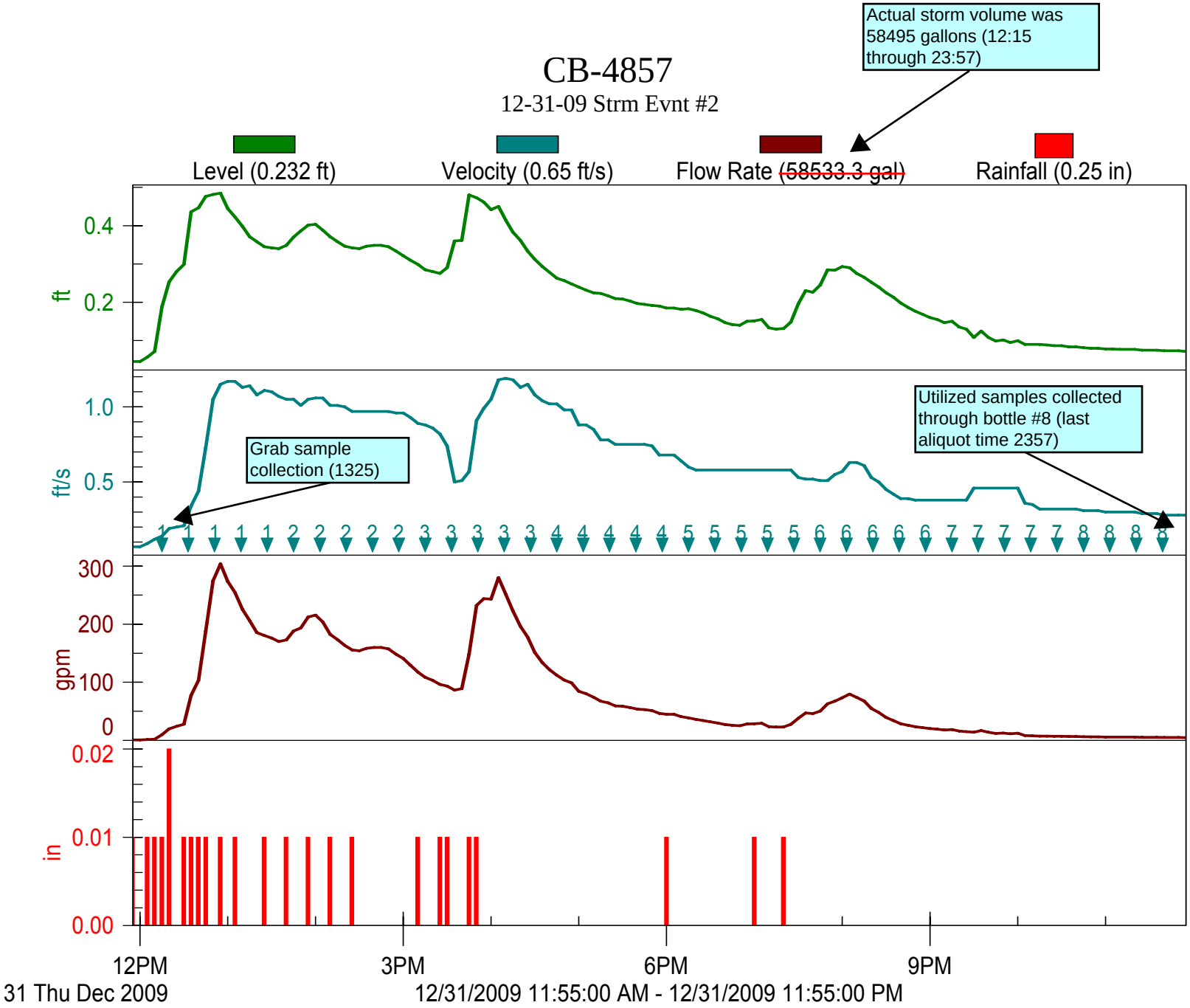
Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	

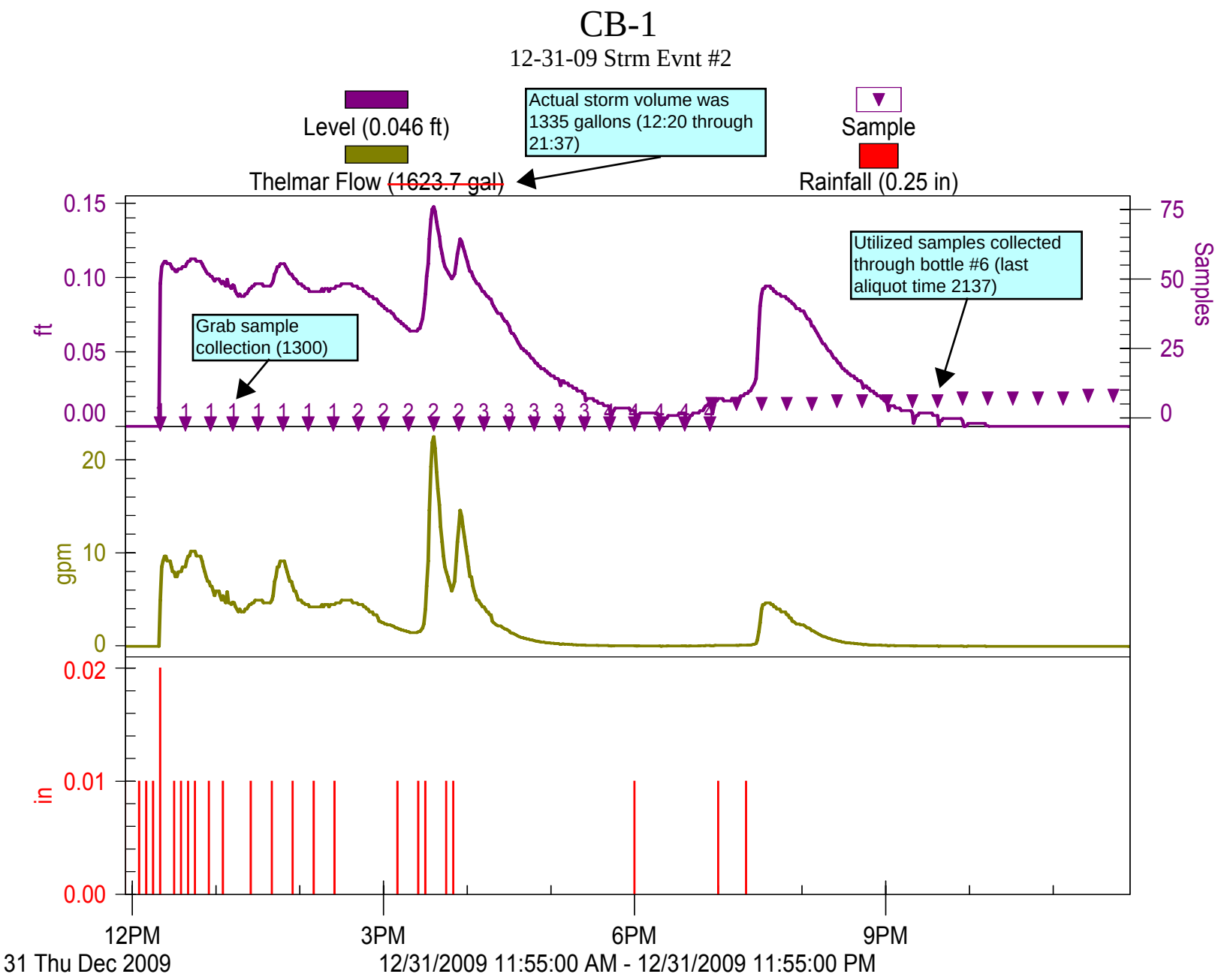
Notes: None Collected this storm event

Comp Info:

- Used btls 1 through 6 (including 3 aliquots from original btl 1, prior to re-set) after examining station hydrograph
- CB1123109 Comp (2137)
- Post-storm manually flow weighted composite (see comping sheet for more details)


CB-31A
12-31-09 Strm Evnt #2
Actual storm volume was 57455 gallons (12:25 through 22:37)
Level (0.607 ft)
Velocity (0.20 ft/s)
Flow Rate (60336.6 gal)
Rainfall (0.25 in)
ft
0.7
0.6
Grab sample collection (1245)
ft/s
0.75
0.50
0.25
Utilized samples collected through bottle #7 (last aliquot time 2237)
1 1 1 1 1 2 2 2 2 2 3 3 3 3 3 4 4 4 4 4 5 5 5 5 5 6 6 6 6 6 7 7 7 7 7 8 8 8 8
gpm
300
200
100
0
in
0.02
0.01
0.00
12PM
3PM
6PM
9PM
31 Thu Dec 2009
12/31/2009 11:55:00 AM - 12/31/2009 11:55:00 PM


CB-4857
12-31-09 Strm Evnt #2
Actual storm volume was 58495 gallons (12:15 through 23:57)
Level (0.232 ft)
Velocity (0.65 ft/s)
Flow Rate (58533.3 gal)
Rainfall (0.25 in)
ft
0.4
0.2
ft/s
1.0
0.5
Grab sample collection (1325)
Utilized samples collected through bottle #8 (last aliquot time 2357)
gpm
300
200
100
0
in
0.02
0.01
0.00
12PM
3PM
6PM
9PM
31 Thu Dec 2009
12/31/2009 11:55:00 AM - 12/31/2009 11:55:00 PM


CB-1
12-31-09 Strm Evnt #2
Level (0.046 ft)
Thelmar Flow (1623.7 gal)
Actual storm volume was 1335 gallons (12:20 through 21:37)
Sample
Rainfall (0.25 in)
Grab sample collection (1300)
Utilized samples collected through bottle #6 (last aliquot time 2137)
ft
gpm
in
Samples
0.15
0.10
0.05
0.00
20
10
0
0.02
0.01
0.00
75
50
25
0
12PM
3PM
6PM
9PM
31 Thu Dec 2009
12/31/2009 11:55:00 AM - 12/31/2009 11:55:00 PM

CB31A 123109 STE#2

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% Evnt Qtot	% Storm Qtot	
18305	1	2000	**1**	31.86%	31.86%	
14250	0.778475826	1557	**2**	24.80%	24.80%	
15715	0.858508604	1717	**3**	27.35%	27.35%	
2060	0.112537558	225	**4**	3.59%	3.59%	
1450	0.07921333	158	**5**	2.52%	2.52%	
4285	0.234089047	468	**6**	7.46%	7.46%	
1390	0.075935537	152	**7**	2.42%	2.42%	
					100.00%	**Total Strm Vol% Rep.'ed in Comp**

Qtotal	57455		
Strm Qtot (gals)	57455		
max Q	18305		
min V (ml)	2000	**6278**	**Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB4857 123109 STE#2

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	% Storm Qtot	
11770	0.748251748	1497	**1**	20.12%	20.12%	
15730	1	2000	**2**	26.89%	26.89%	
14790	0.940241577	1880	**3**	25.28%	25.28%	
7335	0.466306421	933	**4**	12.54%	12.54%	
2805	0.178321678	357	**5**	4.80%	4.80%	
4405	0.280038144	560	**6**	7.53%	7.53%	
1175	0.074698029	149	**7**	2.01%	2.01%	
485	0.030832804	62	**8**	0.83%	0.83%	**Total Strm Vol% Rep.'ed in Comp**
					100.00%	

Qtotal	58495		
Strm Qtot (gals)	58495		
max Q	15730		
min V (ml)	2000	**7437**	Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB1 123109 STE#2

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	% Storm Qtot	
477.24	0.967169261	1934	**1**	35.74%	35.74%	
493.44	1	2000	**2**	36.96%	36.96%	
211.49	0.428603275	857	**3**	15.84%	15.84%	
0.84	0.001702335	3	**4**	0.06%	0.06%	
127.12	0.257619974	515	**5**	9.52%	9.52%	
25.05	0.050766051	102	**6**	1.88%	1.88%	
					100.00%	**Total Strm Vol% Rep.'ed in Comp**

Qtotal	1335		
Strm Qtot (gals)	1335		
max Q	493.44		
min V (ml)	2000	**5412**	**Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB31A 123109

SAMPLER ID# 1069569980 08:38 2-JAN-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB31A SMP "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 16 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 18 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1069569980 08:38 2-JAN-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB31A SMP
PROGRAM: LLA MULTI
Program Started at 08:55 TH 31-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		08:55	PGM DISABLED		
		12:25	PGM ENABLED		
1,5	1	12:25	E		477
2,5	1	12:43	T		477
3,5	1	13:01	T		477
4,5	1	13:19	T		483
5,5	1	13:37	T		481
1,5	2	13:55	T		483
2,5	2	14:13	T		477
3,5	2	14:31	T		477
4,5	2	14:49	T		477
5,5	2	15:07	T		477
1,5	3	15:25	T		483
2,5	3	15:43	T		481
3,5	3	16:01	T		481
4,5	3	16:19	T		481
5,5	3	16:37	T		481
1,5	4	16:55	T		478
2,5	4	17:13	T		477
3,5	4	17:31	T		483
4,5	4	17:49	T		481
5,5	4	18:07	T		481
1,5	5	18:25	T		481
2,5	5	18:43	T		481
3,5	5	19:01	T		481
4,5	5	19:19	T		481

5,5	5	19:37	T	480
1,5	6	19:55	T	479
2,5	6	20:13	T	477
3,5	6	20:31	T	477
4,5	6	20:49	T	483
5,5	6	21:07	T	481
1,5	7	21:25	T	483
2,5	7	21:43	T	477
3,5	7	22:01	T	483
4,5	7	22:19	T	481
5,5	7	22:37	T	481
1,5	8	22:55	T	478
2,5	8	23:13	T	477
3,5	8	23:31	T	483
4,5	8	23:49	T	478
----------	FR 01-JAN-10		----------	
5,5	8	00:07	T	477
1,5	9	00:25	T	477
2,5	9	00:43	T	477
3,5	9	01:01	T	483
4,5	9	01:19	T	478
5,5	9	01:37	T	483
1,5	10	01:55	T	478
2,5	10	02:13	T	483
3,5	10	02:31	T	481
4,5	10	02:49	T	483
5,5	10	03:07	T	483
1,5	11	03:25	T	478
2,5	11	03:43	T	477
3,5	11	04:01	T	483
4,5	11	04:19	T	478
5,5	11	04:37	T	477
1,5	12	04:55	T	483
2,5	12	05:13	T	481
3,5	12	05:31	T	478
4,5	12	05:49	T	483
5,5	12	06:07	T	481
		06:08	PGM DONE 01-JAN	

SOURCE E ==> ENABLE
SOURCE T ==> TIME

SAMPLER ID# 1224319970 08:46 2-JAN-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB4857 SMP"

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 22 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 18 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1224319970 08:46 2-JAN-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB4857 SMP
PROGRAM: LLA MULTI
Program Started at 09:00 TH 31-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		09:00	PGM DISABLED		
		12:15	PGM ENABLED		
1,5	1	12:15	E		598
2,5	1	12:33	T		601
3,5	1	12:51	T		598
4,5	1	13:09	T		599
5,5	1	13:27	T		604
1,5	2	13:45	T		601
2,5	2	14:03	T		604
3,5	2	14:21	T		610
4,5	2	14:39	T		606
5,5	2	14:57	T		602
1,5	3	15:15	T		604
2,5	3	15:33	T		601
3,5	3	15:51	T		604
4,5	3	16:09	T		610
5,5	3	16:27	T		606
1,5	4	16:45	T		610
2,5	4	17:03	T		606
3,5	4	17:21	T		602
4,5	4	17:39	T		604
5,5	4	17:57	T		610
1,5	5	18:15	T		606
2,5	5	18:33	T		602
3,5	5	18:51	T		604
4,5	5	19:09	T		604

```
  5,5     5   19:27      T             604
  1,5     6   19:45      T             602
  2,5     6   20:03      T             604
  3,5     6   20:21      T             602
  4,5     6   20:39      T             604
  5,5     6   20:57      T             610
  1,5     7   21:15      T             603
  2,5     7   21:33      T             605
  3,5     7   21:51      T             604
  4,5     7   22:09      T             610
  5,5     7   22:27      T             604
  1,5     8   22:45      T             604
  2,5     8   23:03      T             604
  3,5     8   23:21      T             610
  4,5     8   23:39      T             606
  5,5     8   23:57      T             608
------------ FR 01-JAN-10 -------------
  1,5     9   00:15      T             610
  2,5     9   00:33      T             606
  3,5     9   00:51      T             610
  4,5     9   01:09      T             606
  5,5     9   01:27      T             610
  1,5    10   01:45      T             606
  2,5    10   02:03      T             610
  3,5    10   02:21      T             606
  4,5    10   02:39      T             610
  5,5    10   02:57      T             606
  1,5    11   03:15      T             610
  2,5    11   03:33      T             606
  3,5    11   03:51      T             608
  4,5    11   04:09      T             610
  5,5    11   04:27      T             606
  1,5    12   04:45      T             610
  2,5    12   05:03      T             604
  3,5    12   05:21      T             606
  4,5    12   05:39      T             604
  5,5    12   05:57      T             604
              05:58  PGM DONE 01-JAN


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
---------------------------------------
```

CBMaster 123109

SAMPLER ID# 1224314456 08:55 2-JAN-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1 MASTER"

   UNITS SELECTED:
     LENGTH: ft

   UNITS SELECTED:
   FLOW RATE: gpm
  FLOW VOLUME: gal
   VELOCITY: fps

  AREA-VEL MODULE:
    DATA POINTS
    "12"THELMAR"
 50 POINTS ENTERED
     ----

      1 MINUTE
   DATA INTERVAL

   4, 3.70 lit BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 18 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.010 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER ON

```
BTL FULL DETECT OFF
  TIMED BACKLIGHT

     ----------

  EVENT MARK SENT
 DURING PUMP CYCLE

     ----------
  PUMP COUNTS FOR
 EACH PURGE CYCLE:
   100 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   NO RAIN GAUGE


     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS
```

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224314456 08:55 2-JAN-10
Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
SITE: CB1 MASTER
PROGRAM: LLA MULTI
Program Started at 13:12 TH 31-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		13:12	PGM ENABLED		
1,5	1	13:12	S		398
2,5	1	13:30	T		401
3,5	1	13:48	T		395
4,5	1	14:06	T		395
5,5	1	14:24	T		395
1,5	2	14:42	T		395
2,5	2	15:00	T		395
3,5	2	15:18	T		398
4,5	2	15:36	T		401
5,5	2	15:54	T		397
1,5	3	16:12	T		398
2,5	3	16:30	T		401
3,5	3	16:48	T		396
4,5	3	17:06	T		401
5,5	3	17:24	T		395

```
                        CBMaster 123109
  1,5     4   17:42       T            399
  2,5     4   18:00       T            397
  3,5     4   18:18       T            399
  4,5     4   18:36       T            394
  5,5     4   18:54       T            399
              18:54  PGM DONE 31-DEC


   SOURCE S  ==> START
   SOURCE T  ==> TIME
-----------------------------------------
```

CBSlave 123109

SAMPLER ID# 1078487086 08:59 2-JAN-10
  Hardware: A1   Software: 2.20
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1 SLAVE "

   UNITS SELECTED:
     LENGTH: ft

   4, 3.70 lit BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 18 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

      ENABLE:

  NONE PROGRAMMED

```
    ----------
     ENABLE:
  ONCE ENABLED,
   STAY ENABLED
 SAMPLE AT ENABLE
    ----------
     ENABLE:
0 PAUSE & RESUMES


    ----------

NO DELAY TO START


    ----------
    ----------
    ----------
 LIQUID DETECT ON

QUICK VIEW/CHANGE

    ----------

TAKE MEASUREMENTS
 EVERY  1 MINUTES

    ----------
 DUAL SAMPLER ON
BTL FULL DETECT OFF
 TIMED BACKLIGHT

    ----------

 EVENT MARK SENT
DURING PUMP CYCLE

    ----------
 PUMP COUNTS FOR
EACH PURGE CYCLE:
  100 PRE-SAMPLE
 AUTO POST-SAMPLE
    ----------
```

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1078487086 08:59 2-JAN-10
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********

CBSlave 123109

SITE: CB1 SLAVE
PROGRAM: LLA MULTI
Program Started at 18:55 TH 31-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		18:55	PGM ENABLED		
1,5	1	18:55	S		481
2,5	1	19:13	T		475
3,5	1	19:31	T		477
4,5	1	19:49	T		474
5,5	1	20:07	T		479
1,5	2	20:25	T		478
2,5	2	20:43	T		472
3,5	2	21:01	T		477
4,5	2	21:19	T		483
5,5	2	21:37	T		477
1,5	3	21:55	T		477
2,5	3	22:13	T		477
3,5	3	22:31	T		477
4,5	3	22:49	T		472
5,5	3	23:07	T		483
1,5	4	23:25	T	NM	*
2,5	4	23:43	T	NL	*
		FR 01-JAN-10			
3,5	4	00:01	T	NL	*
4,5	4	00:19	T	NL	*
5,5	4	00:37	T	NL	*
		00:37	PGM DONE 01-JAN		

SOURCE S ==> START
SOURCE T ==> TIME
ERROR NL ==> NO LIQUID DETECTED!
ERROR NM ==> NO MORE LIQUID!

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: Lora Lake Apartments

Date 1/2/2010
Staff CN
pH meter make/model # ORION

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB31A 123109 comp	6.68	12:27	
CB4857 123109 comp	6.81	12:32	
CB1 123109 comp	6.82	13:13	

Post-Measurement Check

Nominal pH value of standard	7.00	
Temperature (deg C)	16°C	
Standard pH, temp corrected	7.01	
Meter pH reading (SU)	7.00	
Difference (SU)	0.01	*Should be < 0.1 (round to 0.0)*
Time	13:18	

Form to be included in storm file, as applicable

NWS Forecast for: Seatac WA

Issued by: National Weather Service Seattle, WA
Last Update: 4:13 am PST Dec 30, 2009

Today: Showers likely, mainly before 4pm. Cloudy, with a high near 43. South southwest wind around 9 mph. Chance of precipitation is 70%.

Tonight: Scattered showers before 10pm, then a chance of showers after 4am. Mostly cloudy, with a steady temperature around 41. South southwest wind between 5 and 9 mph. Chance of precipitation is 50%.

Thursday: Rain, mainly after 10am. Steady temperature around 40. East southeast wind between 6 and 13 mph. Chance of precipitation is 90%.

Thursday Night: Rain. Low around 42. Southwest wind around 17 mph. Chance of precipitation is 90%.

New Year's Day: Showers. High near 47. South wind between 8 and 11 mph. Chance of precipitation is 90%.

Friday Night: Showers likely. Cloudy, with a low around 41. Chance of precipitation is 70%.

Saturday: A 50 percent chance of showers. Mostly cloudy, with a high near 48.

Saturday Night: A chance of rain. Cloudy, with a low around 38.

Sunday: A chance of rain. Cloudy, with a high near 44.

Sunday Night: A chance of rain. Cloudy, with a low around 37.

Monday: A chance of rain. Cloudy, with a high near 45.

Monday Night: A chance of rain. Cloudy, with a low around 37.

Tuesday: A chance of rain. Cloudy, with a high near 47.

Point Forecast: Seatac WA
47.41°N 122.29°W (Elev. 390 ft)

Visit your local NWS office at: http://www.wrh.noaa.gov/sew

Area Forecast Discussion

Issued by NWS Seattle/Tacoma, WA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000
FXUS66 KSEW 301731
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
935 AM PST WED DEC 30 2009
```

.SYNOPSIS...SCATTERED SHOWERS WILL DECREASE LATER TODAY AS THE REMAINS OF A WEAK UPPER LEVEL TROUGH WEST OF VANCOUVER ISLAND MOVES EAST. A WEAK RIDGE OF HIGH PRES ALOFT AND DEVELOPING LOW LEVEL OFFSHORE FLOW WILL PROVIDE DRIER CONDITIONS TONIGHT THROUGH EARLY THURSDAY. A WARM FRONT WILL LIFT NORTHEAST ACROSS THE AREA THURSDAY AFTERNOON AND THURSDAY NIGHT...AND WILL BE FOLLOWED BY A TROUGH OF LOW PRESSURE ON FRIDAY. WEAK WEATHER SYSTEMS WILL MOVE ACROSS WESTERN WASHINGTON OVER THE WEEKEND.

&&

.SHORT TERM...A TYPICAL EL NINO SPLIT FLOW PATTERN IS SEEN ACROSS THE PACIFIC AND WESTERN NORTH AMERICA WITH THE MAIN SOUTHERN STREAM JET PUSHING INTO FAR SW OREGON AND NORTHERN CALIFORNIA AND THE NORTHERN BRANCH DROPPING FROM THE ARCTIC INTO CENTRAL CANADA. IN THE SHORT TERM...SYNOPTIC SCALE MODELS BRING A SOUTHERN STREAM WARM OCCLUSION...ASSOCIATED WITH A LOW NEAR 41N/150W...NE INTO WA THU NIGHT THEN BRING THE DECAYING AND VERTICALLY STACKED LOW ACROSS SOUTHERN B.C. FRI NIGHT OR EARLY SAT. MODEL CONSISTENCY AND CONTINUITY FALLS OFF AFTER SATURDAY WITH THE ECMWF GENERALLY DEVELOPING A RIDGE OVER SOUTHERN B.C. OR W WA LATER THIS WEEKEND AND EARLY NEXT WEEK...AND THE GFS BRINGING WEAK SYSTEMS THROUGH A SPLITTY/RIDGY FLOW OVER THE E PAC AND WESTERN NORTH AMERICA. NONE OF THE MODELS HAVE RECENTLY HANDLED THE DETAILS CONSISTENTLY OVER OUR AREA IN THE EXTENDED PERIOD...BUT IT APPEARS THAT GENERALLY MILD CONDITIONS AND LIGHTER THAN AVERAGE PRECIPITATION AMOUNTS SHOULD DOMINATE FOR THE NEXT WEEK OR SO.

IN THE SHORT TERM A TROUGH OF LOW PRES IS SITTING W OF VANCOUVER ISLAND AND IS SHIFTING E. THE MAIN JET IS AIMED FROM THE EXTREME SW OREGON COAST SE INTO NEVADA. AS THE TROUGH WEAKENS AND SHEARS EASTWARD EXPECT SHOWER ACTIVITY OVER W WA TO GRADUALLY COME TO AN END LATER TODAY. SHOWERS APPEAR TO BE MOST NUMEROUS FROM KUIL-WESTERN WHATCOM COUNTY...ALONG THE COAST...AND IN THE CASCADES. SOME SHADOWING APPEARS OVER THE PUGET SOUND AREA. WITH ONLY VERY LIGHT AND SCATTERED SHOWERS EXPECTED TODAY OVER THE PUGET SOUND AREA...WILL UPDATE THE FORECASTS THERE FOR LOWER POPS THE REST OF TODAY.

PRECIPITATION WITH THE INCOMING WARM OCCLUSION WILL REACH THE SW WA COAST THU MORNING AND SPREAD INTO THE INTERIOR FROM SEATTLE SOUTHWARD MIDDAY. PRECIPITATION SPREADS INTO THE N INTERIOR DURING THE AFTERNOON. WITH THE JET AXIS AND ASSOCIATED TRIPLE POINT AIMED AT OREGON...EXPECT THAT THE FREEZING LEVEL AND PRECIPITATION FORECASTS FROM THE GFS TO BE ON THE HIGH SIDE...ESPECIALLY OVER THE NORTH CASCADES. LOW LEVEL GRADIENTS REMAIN EASTERLY THROUGH THU NIGHT. THIS LEADS TO SNOW LEVELS IN THE CASCADES AT AROUND 3000 FEET RISING TO OVER PASS LEVEL FOR A FEW HOURS AS THE OCCLUSION PASSES EARLY FRI THEN FALLING BACK TO AROUND 3500-4000 FEET FRI. THE HIGHER ELEVATION SITES SUCH AS PARADISE IN MT RAINIER PARK WILL LIKELY REMAIN MAINLY SNOW. EVEN WITH HEAVIER PRECIPITATION REMAINING SOUTH OF THE STATE...AMOUNTS MAY STILL BE SUFFICIENT TO VERIFY WINTER STORM CRITERIA AT THE VOLCANOES. FOR NOW WILL KEEP THE WINTER STORM WATCH GOING FOR THE CASCADES LATER THU AND THU NIGHT.

AFTER RAIN ON THU AFTERNOON AND THU NIGHT WITH THE FRONT EXPECT BREEZY AND SHOWERY CONDITIONS TO DOMINATE NEW YEARS DAY INTO EARLY

SAT AS THE FILLING LOW OFFSHORE MOVES BY TO THE NORTH OF THE AREA. ALBRECHT

.LONG TERM...PREVIOUS LONG TERM DISCUSSION FOLLOWS...THE EXTENDED FORECAST SHOULD BE MARKED BY A TRANSITION BACK TO DRIER UPPER RIDGING. SHOWER ACTIVITY WILL STILL LINGER ON SATURDAY...BUT MODELS FINALLY HAVE CONSENSUS IN POINTING TO UPPER RIDGING AND MOSTLY DRY WEATHER FROM SUNDAY THROUGH TUESDAY. THERE IS STILL SOME UNCERTAINTY WITH HOW QUICKLY THE TRANSITION TO UPPER RIDGING WILL TAKE PLACE...SO CHANCE POPS LOOKS GOOD FOR SUNDAY. MAY EVENTUALLY NEED TO LOWER POPS FOR MONDAY AND TUESDAY. HANER

&&

.HYDROLOGY...SEVERAL WEATHER SYSTEMS ARE EXPECTED TO IMPACT THE REGION INTO NEXT WEEK...EVERY OTHER DAY OR SO. NONE OF THE SYSTEMS LOOK LIKE THEY WOULD GENERATE ENOUGH PRECIPITATION OVER OUR AREA TO POSE ANY THREAT TO AREA RIVERS AS THE FOCUS OF THE STORMS WILL BE INTO OREGON. THIS IS ESPECIALLY SO AS THE SNOW LEVEL WILL BE RELATIVELY LOW FOR AT LEAST THE FIRST FEW OF THEM. ALSO...THERE IS A SUFFICIENT BREAK BETWEEN SYSTEMS TO ALLOW THE RIVERS TO DRAIN BETWEEN EVENTS. SO BASED ON THAT...NO FLOODING IS EXPECTED FOR THE NEXT WEEK OR MORE ALTHOUGH THERE MAY BE NOTABLE RISES ON A COUPLE OF THE OLYMPIC RIVERS LIKE THE SKOKOMISH.

FLOODING ON THE GREEN RIVER IS NOT EXPECTED FOR THE NEXT 10 DAYS. HANER/ALBRECHT

&&

.AVIATION...A WEAKENING OCCLUDED FRONT OVER THE NORTHWEST INTERIOR WILL CONTINUE TO DISSIPATE THIS MORNING.

CEILINGS THIS MORNING GENERALLY IFR TO MVFR THIS MORNING WITH HIGHEST CIGS FROM KTCM TO KSEA WITH RADAR INDICATING SCATTERED SHOWERS OVER W WA ESPECIALLY OVER THE OLYMPIC PENINSULA AND NORTHWEST INTERIOR. LITTLE CHANGE THROUGH THE MORNING HOURS. LOW LEVEL FLOW STARTING TO TURN OFFSHORE WITH KSEW PROFILER INDICATING LIGHT SSE-SE FLOW UP TO 400 M. THE NEXT FRONTAL SYSTEM DEVELOPS OFF THE SOUTHERN OREGON COAST TODAY AND MOVES TOWARD THE COAST OVERNIGHT. CEILINGS WILL IMPROVE BACK UP INTO THE 4000 TO 6000 FOOT RANGE BY MID TO LATE AFTERNOON INTO THE EVENING HOURS. RAIN ASSOCIATED WITH THE WARM FRONT MOVING INTO WESTERN WASHINGTON INTERIOR AFTER 18Z THURSDAY WITH CEILINGS LOWERING AGAIN THURSDAY MORNING.

KSEA...CEILINGS AROUND 1500 TO 2000 FEET THIS MORNING WITH MULTIPLE CLOUD LAYERS UP TO 10000 FEET. CEILINGS IMPROVING LATER THIS AFTERNOON UP TO THE 4000-5000 FOOT RANGE AND REMAINING IN THAT RANGE OVERNIGHT INTO THURSDAY MORNING. SOUTHERLY WINDS 7 TO 10 KNOTS THROUGH MIDNIGHT...THEN BECOMING LIGHT AND VARIABLE 3 TO 6 KNOTS. PRANGE

&&

.MARINE...A WEAKENING OCCLUDED FRONT OVER THE NORTHWEST INTERIOR WILL GRADUALLY DISSIPATE TODAY. A WEAK RIDGE OF HIGH PRES WILL BUILD

OVER THE AREA LATER TODAY THEN SHIFT EAST TONIGHT. A STRONGER WARM FRONT...ASSOCIATED WITH A SUB 990 MB LOW WEST OF THE OFFSHORE WATERS...WILL MOVE THROUGH THE AREA THU NIGHT. SMALL CRAFT ADVISORIES WINDS WILL BEGIN IN THE COASTAL WATERS EARLY THURSDAY WITH SMALL CRAFT WINDS IN THE WESTERN AND CENTRAL STRAIT DEVELOPING LATER IN THE DAY. THE SURFACE LOW WILL WEAKEN AND TRACK THROUGH THE NORTHERN PORTION OF THE AREA FRI NIGHT. A SURGE OF SMALL CRAFT ADVISORY WESTERLY WINDS IS EXPECTED BEHIND THE LOW SATURDAY MORNING.

THE WAVEWATCH FORECAST MODELS INDICATES THAT A WAVE TRAIN DEVELOPING TO THE SOUTH OF THE DECAYING LOW WILL MOVE ONSHORE AT BETWEEN 18 AND 21 FT LATER FRI OR FRI NIGHT. IT APPEARS THAT MOST OF THE WAVE ENERGY WILL BE DIRECTED TOWARD THE OREGON COAST...BUT SOME WILL LIKELY REACH THE WA COASTLINE.

A TROUGH OF LOW PRESSURE WILL REMAIN OVER THE AREA DURING THE WEEKEND. FELTON/PRANGE

&&

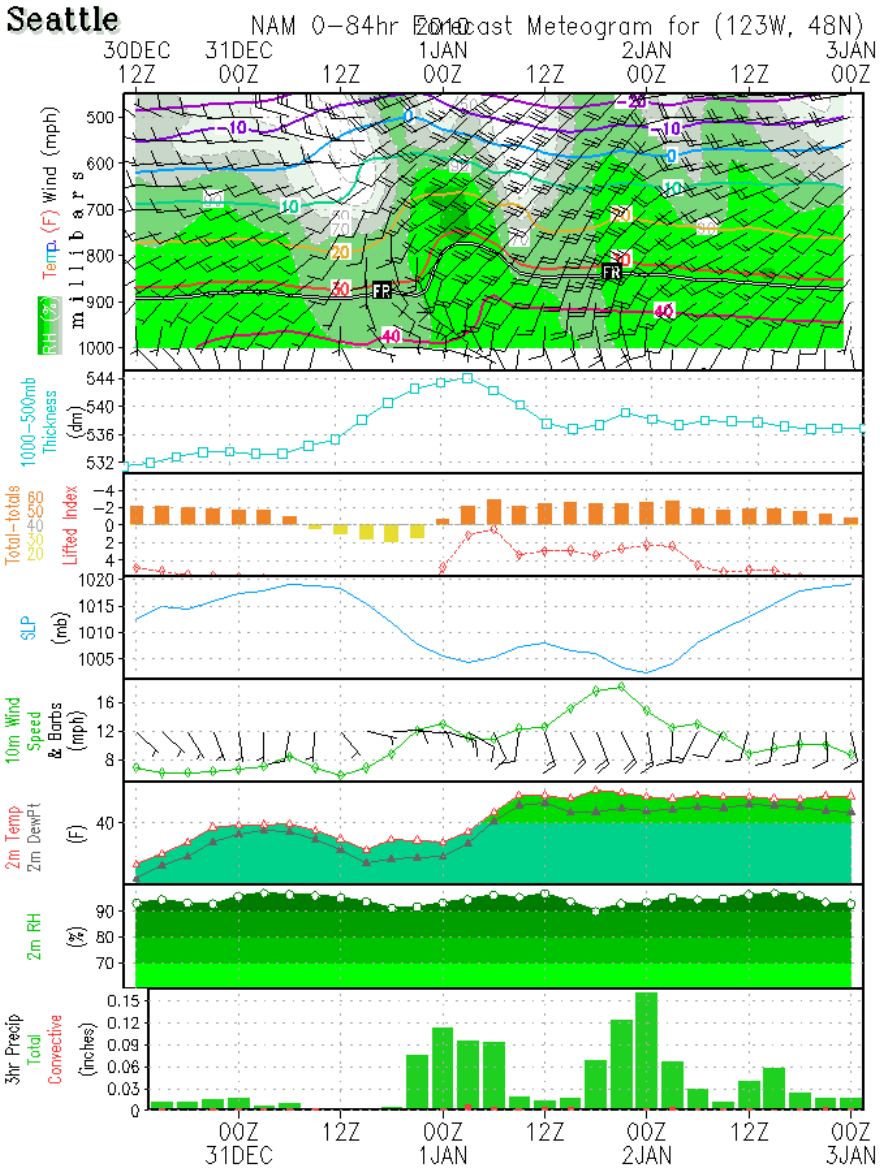
.SEW WATCHES/WARNINGS/ADVISORIES...

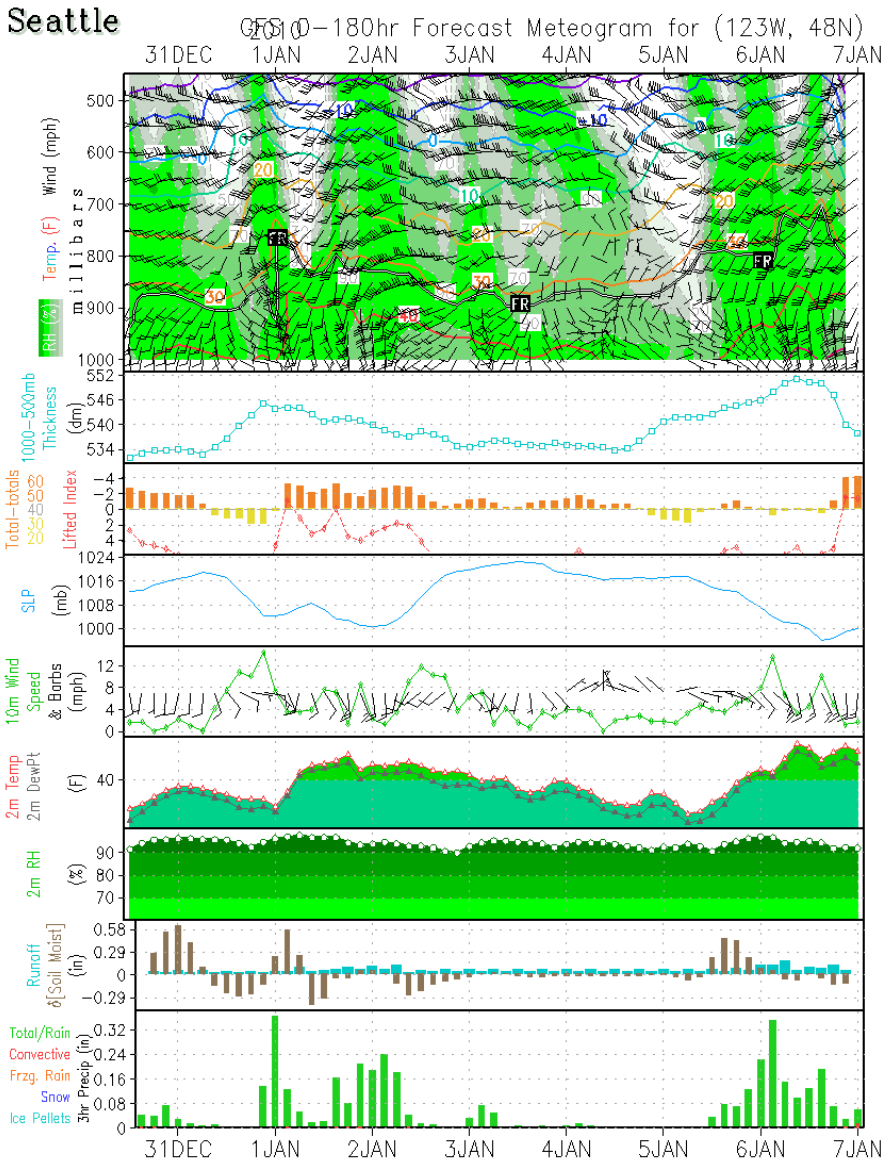
WA...WINTER STORM WATCH FOR THE NORTH AND CENTRAL CASCADES FROM
        THURSDAY MORNING THROUGH THURSDAY NIGHT.
PZ...SMALL CRAFT ADVISORY FOR HAZARDOUS SEAS COAST.
    .SMALL CRAFT ADVISORY FOR ROUGH GRAYS HARBOR BAR.

$$

WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION...PLEASE SEE WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML.


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
30DEC 12Z
31DEC 00Z
12Z
1JAN 00Z
12Z
2JAN 00Z
12Z
3JAN 00Z
millibars
Temp. (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
3hr Precip Total
Convective (inches)
00Z 31DEC
12Z
00Z 1JAN
12Z
00Z 2JAN
12Z
00Z 3JAN


Seattle
GFS 0-180hr Forecast Meteogram for (123W, 48N)
31DEC
1JAN
2JAN
3JAN
4JAN
5JAN
6JAN
7JAN
Wind (mph)
Temp. (F)
RH (%)
millibars
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
Runoff
δ[Soil Moist] (in)
Total/Rain
Convective
Frzg. Rain
Snow
Ice Pellets
3hr Precip (in)

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action
Report 1

Appendix B
TV In-line Inspection Forms and Video

PIPE EXPERTS L.L.C.
855 Trosper RD SW 108-190
Tumwater, WA
Phone: (360)943-5840
Fax: (360)943-5865

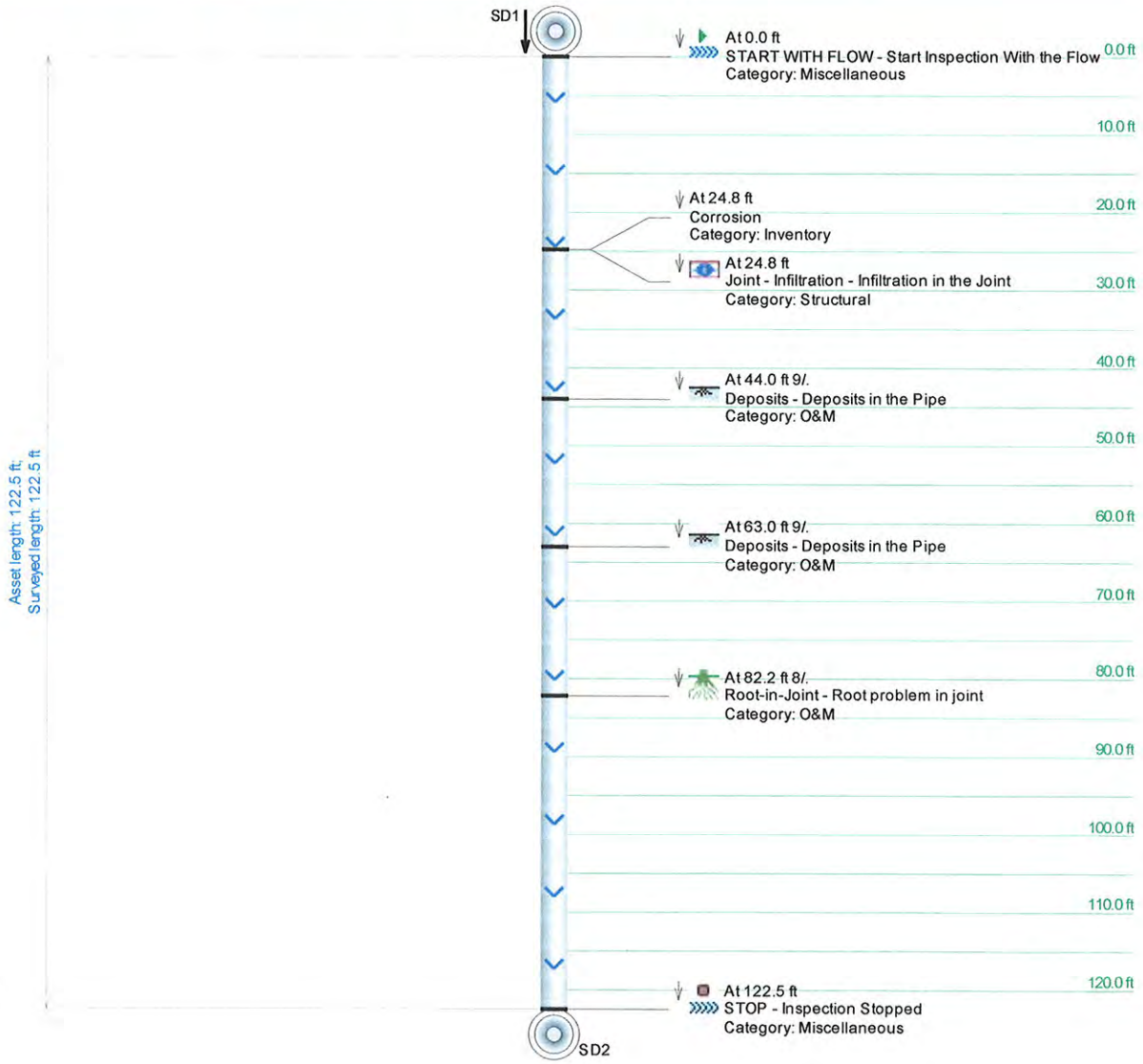
GRANITE XP
Pipeline Inspection and Integration Software

TV Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
APS	SD1-SD2	Burien	Lora Lk. Apartments

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
12/10/2009	24	24	CMP	Asphalt

Direction:	Surveyed footage:	Weather:	MediaLabel
Downstream	122.5	Dry	



PIPE EXPERTS L.L.C.
855 Trosper RD SW 108-190
Tumwater, WA
Phone: (360)943-5840
Fax: (360)943-5865

Observation Report with Still Images

Main Asset ID:	Project Name:	Inspection Date:	Weather:	Operator:
SD1-SD2	APS	12/10/2009 9:11:10 AM	Dry	Brett Shepp

Upstream Node:	Depth US:	Downstream Node:	Depth DS:	Main Length:	Extra:
SD1		SD2		122.5	

Comments:

Observations

Distance	Length	Code	Reversed	Clock Pos.	Severity	Comment
0.0		START WITH FLOW	No	/		
24.8		Corrosion	No	/		
24.8		Joint - Infiltration	No	/	Light	
44.0		Deposits	No	9 /	Medium	
63.0		Deposits	No	9 /	Medium	
82.2		Root-in-Joint	No	8 /	Light	
122.5		STOP	No	/		

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action
Report 1

Appendix C
Laboratory Analytical Reports and COCs
(Refer to Appendix I of the
Final SWIA Data Report)

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Report 1

Appendix D
Data Validation Report

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Port of Seattle
Lora Lake Apartments
Storm Water Interim Action

Prepared for:

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EcoChem Project: C15207-1

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Approved for Release:

Christine Ransom
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PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of both summary and full validation (Level III & IV) performed on stormwater, sediment, and quality control (QC) sample data for the Lora Lakes Apartments Storm Water Interim Action project. A complete list of samples is provided in the **SAMPLE INDEX**.

The Dioxin/Furan analyses were performed by Frontier Analytical Laboratory, El Dorado Hills, California. All other analyses were performed by Analytical Resources, Inc. (ARI), Tukwila, Washington. The analytical methods and EcoChem project chemists are listed in the table below.

Analysis	Method	Primary Review	Secondary Review
Volatile Organic Compounds	SW8260C	Megan Kilner	Chris Ransom
	SW8260C-SIM		
Polynuclear Aromatic Hydrocarbons	SW8270D-SIM	Melissa Swanson	Chris Ransom
Dioxin Furan Compounds	EPA 1613		C. Ransom/E. Strout
Pentachlorophenol	SW8041	Chris Ransom	Lucy Panteleeff
Total Petroleum Hydrocarbons	NWTPH-Dx		
Total and Dissolved Metals	SW6010B & E200.8	Lea Beard	Chris Ransom
Total Solids	EPA 160.3		
Totals Suspended Solids	EPA 160.2		
Total Organic Carbon	Plumb, 1981		
Grain Size	ASTM D422		

The data were reviewed using guidance and quality control criteria documented in *Port of Seattle Lora Lakes Apartments, Stormwater Interim Action Plan* (November 17, 2009; *National Functional Guidelines for Inorganic Data Review* (USEPA 1994 & 2004); *National Functional Guidelines for Organic Data Review* (USEPA 1999); and the analytical methods.

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **APPENDIX A**. A Qualified Data Summary Table is included in **APPENDIX B**. Data Validation Worksheets will be kept on file at EcoChem, Inc.

Sample Index
Floyd Snider
Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Laboratory ID	VOC	VOC SIM	PAH	Dxn	TPH-Dx	PCP	Metals	TOC	Grain Size	TSS	Total Solids
QB37	CB31A121409GRAB	09-30854-QB37A	✓	✓			✓						
QB37	CB4857121409GRAB	09-30855-QB37B	✓	✓			✓						
QB37	CB1121409GRAB	09-30856-QB37C	✓	✓			✓						
QB37	TB121409	09-30857-QB37D	✓	✓									
QB72	CB31A121509COMP	09-30991-QB72A			✓			✓	✓			✓	
QB72	CB4857121509COMP	09-30992-QB72B			✓			✓	✓			✓	
QB72	CB1121409COMP	09-30993-QB72C			✓			✓	✓			✓	
QB72	CB31A121509COMP	09-30994-QB72D							✓				
QB72	CB4857121509COMP	09-30995-QB72E							✓				
QB72	CB1121409COMP	09-30996-QB72F							✓				
QC28	CB4857-121009-SED	09-31268-QC28A			✓		✓	✓	✓	✓	✓	✓	✓
QD62	CB31A123109Grab	09-32251-QD62A	✓	✓			✓						
QD62	CB4857123109Grab	09-32252-QD62B	✓	✓			✓						
QD62	CB1123109Grab	09-32253-QD62C	✓	✓			✓						
QD62	Trip Blanks	09-32254-QD62D	✓	✓									
QD71	CB31A123109COMP	10-14-QD71A			✓			✓	✓			✓	
QD71	CB4857123109COMP	10-15-QD71B			✓			✓	✓			✓	
QD71	CB1123109COMP	10-16-QD71C			✓			✓	✓			✓	
QD71	CB31A123109COMP	10-17-QD71D							✓				
QD71	CB4857123109COMP	10-18-QD71E							✓				
QD71	CB1123109COMP	10-19-QD71F							✓				
5881	CB31A121509COMP	5881-001-SA				✓							
5881	CB4857121509COMP	5881-002-SA				✓							
5881	CB1121409COMP	5881-003-SA				✓							
5887	CB4857-121009-SED	5887-001-SA				✓							
5904	CB31A123109COMP	5904-001-SA				✓							
5904	CB4857123109COMP	5904-002-SA				✓							
5904	CB1123109COMP	5904-003-SA				✓							

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Volatile Organic Compounds by SW846 Method 8260B

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB37	3 Storm Water & 1 Trip Blank	Summary
QD62	3 Storm Water & 1 Trip Blank	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Preservation	1	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
	GC/MS Instrument Performance Check		Field Precision (Duplicates and Replicates)
	Initial Calibration (ICAL)		Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Laboratory Blanks		Reporting Limits
1	Field Blanks		Compound Identification
	Surrogate Compounds		Reported Results
	Laboratory Control Samples (LCS/LCSD)		Calculation Verification (Full Validation only)

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Field Blanks

SDG QB37: One trip blank, TB121409, was submitted. No target analytes were detected in this blank.

SDG QD62: One trip blank, Trip Blanks, was submitted. No target analytes were detected in this blank.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate and LCS/LCSD percent recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Volatile Organic Compounds by SW846 Method 8260C-SIM

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB37	3 Storm Water & 1 Trip Blank	Summary
QD62	3 Storm Water & 1 Trip Blank	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Preservation	1	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
	GC/MS Instrument Performance Check		Field Precision (Duplicates and Replicates)
	Initial Calibration (ICAL)		Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Laboratory Blanks		Reporting Limits
1	Field Blanks		Compound Identification
	Surrogate Compounds		Reported Results
	Laboratory Control Samples (LCS/LCSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Field Blanks

SDG QB37: One trip blank, TB121409, was associated with these samples. No target analytes were detected in this blank.

SDG QD62: One trip blank, Trip Blanks, was associated with these samples. No target analytes were detected in this blank.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate and LCS/LCSD percent recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Polynuclear Aromatic Hydrocarbons by SW846 Method 8270D-SIM

This report documents the review of analytical data from the analyses of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QC28	1 Sediment	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation
GC/MS Instrument Performance Check
Initial Calibration (ICAL)
Continuing Calibration (CCAL)
Blanks
Surrogate Compounds
2 Laboratory Control Samples (LCS)
1 Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Internal Standards
Target Analyte List
Reporting Limits
Compound Identification
Reported Results

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[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Laboratory Control Sample

The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) relative percent difference (RPD) value for benzo(g,h,i)perylene was greater than the control limit. The positive result for this analyte was estimated (J-9) in the associated sample.

The LCSD percent recovery (%R) value for benzo(g,h,i)perylene was less than the lower control limit. The LCS %R value was within control limits; therefore no action was taken.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and LCS/LCSD recoveries. Precision was assessed using LCS/LCSD RPD values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values, with the exception noted above. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values, with the exception previously.

One data point was estimated based on an LCS/LCSD precision outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Polynuclear Aromatic Hydrocarbons by SW846 Method 8270D-SIM

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB72	3 Storm Water	Summary
QD71	3 Storm Water	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	GC/MS Instrument Performance Check		Internal Standards
	Initial Calibration (ICAL)		Target Analyte List
	Continuing Calibration (CCAL)		Reporting Limits
	Blanks		Compound Identification
	Surrogate Compounds		Reported Results
	Laboratory Control Samples (LCS)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QB72: The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Dioxin/Furan Compounds by Method 1613

This report documents the review of analytical data from the analyses of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Frontier Analytical Laboratory, El Dorado Hills, California. Full validation (Level IV) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
5887	1 Sediment	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Receipt		Ongoing Precision and Recovery (OPR)
	Initial Calibration (ICAL)		Field Replicates
	Continuing Calibration (CCAL)		Laboratory Duplicates
	Laboratory Blanks		Compound Identification
	Field Blanks		Reporting Limits
2	Labeled Compounds	1	Calculation Verification (full validation only)
1	Matrix Spikes/Matrix Spike Duplicate (MS/MSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Receipt

The temperature for one sample cooler (0°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Labeled Compounds

Labeled compounds were added to every sample as specified in the method. The recoveries were within the QAPP specified control limits of 70%-130%, with the exceptions noted below. For recoveries greater than the upper control limit, positive results for the associated compounds were estimated (J-13) to indicate a potential high bias. For recoveries less than the lower control limit, results for the associated compounds were estimated (J/UJ-13) to indicate a potential low bias.

The percent recovery (%R) values for six labeled compounds in Sample CB4857-121009-SED were less than the 70% lower control limit. The target analytes associated with the labeled compounds were estimated (J-13).

Matrix Spike/Matrix Spike Duplicate

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Accuracy was evaluated using the labeled compound and ongoing precision and recovery standard (OPR) recoveries. Laboratory precision can be evaluated by comparing the OPR standard results from batch to batch; however there was no way to assess precision within the analytical batch.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the labeled compound and OPR %R values, with the above noted exceptions. Precision could not be evaluated for the analytical batch.

Data were estimated based on labeled compound recovery outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Dioxin/Furan Compounds by Method 1613

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Frontier Analytical Laboratory, El Dorado Hills, California. A full validation (Level IV) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
5881	3 Storm Water	Full
5904	3 Storm Water	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Receipt		Ongoing Precision and Recovery (OPR)
	Initial Calibration (ICAL)		Field Replicates
	Continuing Calibration (CCAL)		Laboratory Duplicates
	Laboratory Blanks	2	Compound Identification
	Field Blanks		Reporting Limits
2	Labeled Compounds		Calculation Verification (full validation only)
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Receipt

The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned

Labeled Compounds

Labeled compounds were added to every sample as specified in the method. The recoveries were within the QAPP specified control limits of 70%-130%, with the exceptions noted below. For recoveries greater than the upper control limit, positive results for the associated compounds were estimated (J-13) to indicate a potential high bias. For recoveries less than the lower control limit, results for the associated compounds were estimated (J/UJ-13) to indicate a potential low bias.

SDG 5904: Sample CB31A123109COMP: 1,2,3,7,8-PeCDD – (J-13) high bias
Sample CB4857123109COMP: OCDF – (J-13) low bias

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Accuracy was evaluated using the labeled compound and ongoing precision and recovery standard (OPR) recoveries. Laboratory precision can be evaluated by comparing the OPR standard results from batch to batch; however there was no way to assess precision within the analytical batch.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the labeled compound and OPR recoveries, with the exceptions noted above. Precision could not be assessed for the analytical batch.

Data were estimated based on labeled compound recovery outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Pentachlorophenol by SW846 Method 8041

This report documents the review of analytical data from the analyses of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QC28	1 Sediment	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

2	Holding Times and Sample Preservation	Second Column Confirmation
	Initial Calibration (ICAL)	Retention Time Window
	Continuing Calibration (CCAL)	Target Analyte List
	Blanks	Reporting Limits
	Surrogate Compounds	Compound Identification
	Laboratory Control Samples (LCS)	Reported Results
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)	

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

Sample CB4857-121009-SED was re-extracted due to low surrogate recovery in the original analysis. The re-extraction was done after the 14 day holding time. The pentachlorophenol result for this sample was estimated (J-1) to indicate a potential low bias.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD RPD values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

The pentachlorophenol result was estimated based on an exceeded holding time.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Pentachlorophenol by SW846 Method 8041

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB72	3 Storm Water	Summary
QD71	3 Storm Water	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	Second Column Confirmation
	Initial Calibration (ICAL)	Retention Time Window
	Continuing Calibration (CCAL)	Target Analyte List
	Blanks	Reporting Limits
	Surrogate Compounds	Compound Identification
	Laboratory Control Samples (LCS)	Reported Results
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)	

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QB72: The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Diesel Range Hydrocarbons by Method NWTPH-Dx

This report documents the review of analytical data from the analyses of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QC28	1 Sediment	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	1 Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Initial Calibration (ICAL)	Target Analyte List
Continuing Calibration (CCAL)	Reporting Limits
Blanks	Compound Identification
Surrogate Compounds	Reported Results
Laboratory Control Samples (LCS)	

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD RPD values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Diesel Range Hydrocarbons by Method NWTPH-Dx

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB37	3 Storm Water	Summary
QD62	3 Storm Water	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	1 Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Initial Calibration (ICAL)	Target Analyte List
Continuing Calibration (CCAL)	Reporting Limits
Blanks	Compound Identification
Surrogate Compounds	Reported Results
Laboratory Control Samples (LCS)	

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Arsenic and Lead by EPA 6010B

This report documents the review of analytical data from the analysis of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QC28	1 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation
Initial Calibration
Continuing Calibration Verification
CRDL Standards
Laboratory Blanks
Laboratory Control Samples (LCS)
Matrix Spikes (MS)
Laboratory Duplicates
Target Analyte List
Reporting Limits
Reported Results

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. The laboratory duplicate relative percent difference values indicated acceptable precision. Accuracy was also acceptable, as demonstrated by matrix spike and laboratory control sample recoveries.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Total and Dissolved Arsenic by EPA 200.8

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QD71	3 Storm Water
QB72	3 Storm Water

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	Matrix Spikes (MS)
	Initial Calibration	Laboratory Duplicates
	Continuing Calibration Verification	ICP-MS Internal Standards
	CRDL Standards	Target Analyte List
	Laboratory Blanks	Reporting Limits
	Laboratory Control Samples (LCS)	Reported Results

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QB72: The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. The laboratory duplicate relative percent difference values indicated acceptable precision. Accuracy was also acceptable, as demonstrated by matrix spike and laboratory control sample recoveries.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Total Organic Carbon by Plumb, 1981 and Total Solids by EPA 160.3

This report documents the review of analytical data from the analysis of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QC28	1 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	2	Matrix Spikes (MS)
Initial Calibration	2	Laboratory Duplicates
Continuing Calibration Verification		Reporting Limits
Laboratory Blanks		Reported Results
Laboratory Control Samples (LCS)		

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Matrix Spikes

The matrix spike recovery for total organic carbon (TOC) was greater than the QAPP-specified upper control limit of 120%. The TOC result was estimated (J-8) to indicate a potential high bias.

Laboratory Duplicates

The relative percent difference (RPD) value for TOC was greater than the QAPP-specified control limit of 20%. The TOC result was estimated (J-9).

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. The laboratory duplicate RPD values indicated acceptable precision, except where previously noted. Accuracy was also acceptable, as demonstrated by MS and laboratory control sample recoveries, except as noted above.

Data were estimated based on MS %R and laboratory duplicate RPD outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Total Suspended Solids by EPA 160.2

This report documents the review of analytical data from the analysis of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QD71	3 Storm Water
QB72	3 Storm Water

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	Laboratory Duplicates
	Laboratory Blanks	Reporting Limits
	Laboratory Control Samples (LCS)	Reported Results

[1] Quality control results are discussed below, but no data were qualified
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Holding Times and Sample Preservation

SDG QB72: The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. The laboratory duplicate relative percent difference values indicated acceptable precision. Accuracy was also acceptable, as demonstrated by laboratory control sample recoveries.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A
DATA QUALIFIER DEFINITIONS REASON CODES AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

1	Holding Time/Sample Preservation
2	Chromatographic pattern in sample does not match pattern of calibration standard.
3	Compound Confirmation
4	Tentatively Identified Compound (TIC) (associated with NJ only)
5A	Calibration (initial)
5B	Calibration (continuing)
6	Field Blank Contamination
7	Lab Blank Contamination (e.g., method blank, instrument, etc.)
8	Matrix Spike(MS & MSD) Recoveries
9	Precision (all replicates)
10	Laboratory Control Sample Recoveries
11	A more appropriate result is reported (associated with “R” and “DNR” only)
12	Reference Material
13	Surrogate Spike Recoveries (a.k.a., labeled compounds & recovery standards)
14	Other (define in validation report)
15	GFAA Post Digestion Spike Recoveries
16	ICP Serial Dilution % Difference
17	ICP Interference Check Standard Recovery
18	Trip Blank Contamination
19	Internal Standard Performance (e.g., area, retention time, recovery)
20	Linear Range Exceeded
21	Potential False Positives
22	Elevated Detection Limit Due to Interference (i.e., laboratory, chemical and/or matrix)

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Hold Time	Waters: 14 days preserved 7 Days: unpreserved (for aromatics) Solids: 14 Days	J(+)/UJ(-) if hold times exceeded If exceeded by > 3X HT: J(+)/R(-) (EcoChem PJ)	1
Tuning	BFB Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Storage Blank	One per SDG <CRQL	U(+) the specific analyte(s) results in all assoc.samples using the 5x or 10x rule	7
Trip Blank	Frequency as per project QAPP	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned	18
Field Blanks (if required in QAPP)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS *low conc. H2O VOA*	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS *regular VOA (H2O & solid)*	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Added to all samples Within method control limits	J(+) if %R >UCL J(+)/UJ(-) if %R <LCL but >10% (see PJ[1]) J(+)/R(-) if <10%	13
Internal Standard (IS)	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

PJ[1] No action if there are 4+ surrogates and only 1 outlier.

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS CLP low conc. H2O only	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS regular SVOA (H2O & solid)	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler/Storage Temperature	Waters/Solids < 4°C Tissues <-10°C	EcoChem PJ, see TM-05	1
Holding Time	Extraction - Water: 30 days from collection *Note:* Under CWA, SDWA, and RCRA the HT for H2O is 7 days* Extraction - Soil: 30 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext > 30 days J(+)/UJ(-) if analysis > 40 Days EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 304.9824 Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift	R(+/-) if not met	14
Window Defining Mix and Column Performance Mix	Window defining mixture/Isomer specificity std run before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) x = ht. of TCDD y = baseline to bottom of valley For all isomers eluting near 2378-TCDD/TCDF isomers (TCDD only for 8290)	J(+) if valley > 25%	5A (ICAL) 5B (CCAL
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD <35% for labeled compounds under 1613b)	J(+) natives if %RSD > 20%	5A
	Abs. RT of $^{13}C_{12}$-1234-TCDD >25 min on DB5 >15 min on DB-225	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10 for all native and labeled compounds in CS1 std.	If <10, elevate Det. Limit or R(-)	

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Continuing Calibration	Analyzed at the start and end of each 12 hour shift. %D+/-20% for native compounds %D +/-30% for labeled compounds (Must meet limits in Table 6, Method 1613B) (If %Ds in the closing CCAL are w/in 25%/35% the avg RF from the two CCAL may be used to calculate samples per Method 8290, Section 8.3.2.4)	Do not qualify labeled compounds. Narrate in report for labeled compound %D outliers. For native compound %D outliers: 8290: J(+)/UJ(-) if %D = 20% - 75% J(+)/R(-) if %D > 75% 1613: J(+)/UJ(-) if %D is outside Table 6 limits J(+)/R(-) if %D is +/- 75% of Table 6 limit	5B
	Abs. RT of $^{13}C_{12}$-1234-TCDD and $^{13}C12$-123789-HxCDD +/- 15 sec of ICAL.	EcoChem PJ, see ICAL section of TM-05	
	RRT of all other compounds must meet Table 2 of 1613B.	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7
Field Blanks (Not Required)	No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	Concentrations must meet limits in Table 6, Method 1613B or lab limits.	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (recovery)	May not analyze MS/MSD %R should meet lab limits.	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	May not analyze MS/MSD RPD < 20%	J(+) in parent sample if RPD > CL	9

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Lab Duplicate	RPD <25% if present.	J(+)/UJ(-) if outside limts	9
Labeled Compounds / Internal Standards	*Method 8290:* %R = 40% - 135% in all samples *Method 1613B:* %R must meet limits specified in Table 7, Method 1613	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 IA ratios meet limits in Table 9 of 1613B or Table 8 of 8290 RRTs w/in limits in Table 2 of 1613B	If RT criteria not met, use PJ (see TM-05) If S/N criteria not met, J(+). if unlabelled ion abundance not met, change to EMPC If labelled ion abundance not met, J(+).	21
EMPC (estimated maximum possible concentration)	If quantitation idenfication criteria are not met, laboratory should report an EMPC value.	If laboratory correctly reported an EMPC value, qualify with U to indicate that the value is a detection limit.	14
Interferences	PCDF interferences from PCDPE	If both detected, change PCDF result to EMPC	14
Second Column Confirmation	All 2378-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC specs in this table must be met for the confirmation analysis.	Report lower of the two values. If not performed use PJ (see TM-05).	3
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used	11

EcoChem Validation Guidelines (Based on SW846 Method 8000 and Organic NFG 1999)

Organochlorine Pesticides by 8081A; Aroclors by 8082; Organophosphorous Pests by 8141A; Chlorinated Herbicides by 8151A; Polyaromatic Hydrocarbons by 8310 (HPLC); and other GC/HPLC analyses performed under Method 8000

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) using PJ if greater than 6°C	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
DDT & Endrin Breakdown (Method 8081A)	At the start of each 12 hr. shift DDT Breakdown: < 15% Endrin Breakdown: <15%	Narrate if frequency criteria not met. J(+) DDT NJ(+) DDD and/or DDE R(-) DDT if (+) for either DDE or DDD J(+) Endrin NJ(+) EK and/or EA R(-) Endrin if (+) for either EK or EA	5B
Initial Calibration	Minimum 5 calibration levels Linear regression: R2 >0.990 RSD of response factors: <20% Quadratic curve requires 6 stds. Method 8081A: Single point calibration for multi-components	J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Continuing Calibration Verification (CCV)	Prior to analysis and after max. 20 samples or 12 hours, whichever comes first. %D <15% Method 8151A: CCV after every 10 samples.	Narrate if frequency criteria not met. J(+) If %R > 115% J(+)/UJ(-) If %R < 85% J(+)R(-) if %D > 90% (EcoChem PJ)	5B
Method Blank	One per matrix per batch (max. 20 samples) No results ≥RL	U (at RL) if sample result is less than RL and less than 5X blank result	7
		U (at reported sample value) if sample result is greater than or equal to RL and less than 5X blank result	7
Field Blank (Not Required)	Not addressed by NFG or SW-846 No results > RL	Apply 5X rule; U(+) < action level using same logic as method blank	6
MS/MSD	One per matrix per batch Lab limits or QAPP criteria	Narrate if frequency not met. Qualify parent only unless other QC indicates systematic problems. J(+) if both %R > UCL; J(+)/UJ(-) if both %R < LCL EcoChem PJ if only one %R outlier No action if parent conc. > 5x the amount spiked.	8

EcoChem Validation Guidelines (Based on SW846 Method 8000 and Organic NFG 1999)

Organochlorine Pesticides by 8081A; Aroclors by 8082; Organophosphorous Pests by 8141A; Chlorinated Herbicides by 8151A; Polyaromatic Hydrocarbons by 8310 (HPLC); and other GC/HPLC analyses performed under Method 8000

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Precision: MS/MSD or LCS/LCSD or Sample/Duplicate	One per matrix per batch Lab limits or QAPP criteria	J(+) if RPD > laboratory CL	9
LCS or LCS/LCSD	One per matrix per batch Lab limits or QAPP criteria	J(+)/UJ(-) If %R < LCL J(+) If > UCL J(+)/R(-) If any %R <10%	10
Surrogates	Added to all samples (inc. QC samples) Lab limits or QAPP criteria	J(+)/UJ(-) If %R < LCL J(+) If > UCL J(+)/R(-) If any %R <10% No action if 2 or more surrogates are used and only one is <LCL or >UCL (EcoChem PJ)	13
Quantitation/ Identification	Analyte within RTW on both columns or detectors RPD between values<40%	NJ(+) if RPD>40% R(+) using EcoChem PJ if RTW criterion not met NJ(+) if no confirmation Refer to Tech. Memo TM-08	3 21 (false +)
Internal Standards (if used)	IS area within -50% to +100% of CCV Methods 8081A & 8082: IS area within +/-50% of CCV	J(+) if IS > 100% J(+)/UJ(-) if IS < 50% J(+)/R(-) if IS is < 25%	19
Field Duplicate	Water: RPD < 35% Soil: RPD < 50%	Narrate (J/UJ if required by project instructions)	9
Two analyses for one sample (e.g. dilution)	Report only one result per analyte	"DNR" results that should not be used to avoid reporting multiple results for one sample. Refer to Tech. Memo TM-04	11

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X (EcoChem PJ)	1
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $R^2 \geq 0.990$ If used, RSD of response factors ≤20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J(+)/UJ(-) if %R < 85% J(+) if %R >115%	5B
Method Blank	At least one per batch (≤10 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7
		U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.	6
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked. Use PJ if only one %R outlier	8
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% (EcoChem PJ)	10

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits. (EcoChem PJ)	13
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2
Field Duplicates	Use project control limits, if stated in QAPP EcoChem default: water: RPD < 35% solids: RPD < 50%	Narrate (Use Professional Judgement to qualify)	9
Two analyses for one sample (dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported. (See TM-04)	11

EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration Tissues: Frozen	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r > 0.995	J(+)/UJ(-) if r < 0.995 (multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blank (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		(Refer to TM-02 for additional information)
			7

Reporting Limit Standard	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Sb, Pb, Tl)	R(-)/J(+) < 2x RL if %R <50% (< 30% Sb, Pb, Tl) J(+) < 2x RL, UJ(-) if %R 50-69% (30-49% Sb, Pb,Tl) J(+) < 2x RL if %R 130-180% (150-200% Sb, Pb, Tl) R(+) < 2x RL if %R > 180% (200% Sb, Pb, Tl)	14
Interference Check Samples (ICSA/ICSAB)	ICSAB %R 80 - 120% for all spiked elements | ICSA | < MDL for all unspiked elements except: K, Na	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R= 50 to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	

EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Matrix Spikes	One per matrix per batch 75-125% for samples less than 4x spike level	J(+) if %R > 125% J(+)/UJ(-) if %R < 75% J(+)/R(-) if %R < 30% or J(+)/UJ(-) if Post Spike %R 75-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, spike at twice the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples >RL and < 5x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL (2x RL for solids) qualify all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample conc. > 50x MDL	J(+)/UJ(-) if %D >10% qualify all samples in batch	16
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Metals Analysis by ICP-MS
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. ≤ 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J(+)/UJ(-) if tune criteria not met	5A
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J(+)/UJ(-) if r<0.995 (for multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R(-),(+) < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J(+) < 2x RL, UJ(-) if %R 50-69% (30%-49% Co,Mn, Zn) J(+) < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R(+) < 2x RL if %R > 180% (200% Co, Mn, Zn)	14
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7

EcoChem Validation Guidelines for Metals Analysis by ICP-MS (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% or J(+)/UJ(-) if Post Spike %R 75%-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J(+)/UJ(-) if %D >10% All samples in batch	16
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J (+)/UJ (-) all analytes associated with IS outlier	19
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < AL in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for coole temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B

Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method
	After each ICV and CCV every ten samples and end of run
	| blank| < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch
	(not to exceed 20 samples)
	blank < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blk value, U(+) results < action level
		For (-) blk value, J(+)/UJ(-) results < action level
			7

Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff<RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Floyd Snider
Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Quals	Val Quals	Val Reason
QC28	CB4857-121009-SED	09-31268-QC28A	SW8041	Pentachlorophenol	71	ug/kg		J	1
QC28	CB4857-121009-SED	09-31268-QC28A	SW8270D-SIM	Benzo(g,h,i)perylene	16	ug/kg	J	J	9
QC28	CB4857-121009-SED	09-31268-QC28A	Plumb, 1980	Total Organic Carbon	1.29	Percent		J	8,9
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	1,2,3,7,8-PeCDD	1.79	pg/g	J	J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	OCDD	4480	pg/g		J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	1,2,3,7,8-PeCDF	0.586	pg/g	J	J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	2,3,4,7,8-PeCDF	1.3	pg/g	J	J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	1,2,3,7,8,9-HxCDF	1.99	pg/g	J	J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	OCDF	243	pg/g		J	13
5904	CB31A123109COMP	5904-001-SA	EPA 1613	1,2,3,7,8-PeCDD	2.17	pg/L	J	J	13
5904	CB4857123109COMP	5904-002-SA	EPA 1613	OCDF	122	pg/L		J	13

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Report 2

Prepared for

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March 19, 2010

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List of Abbreviations and Acronyms

Acronym/Abbreviation	Definition
COC	Contaminant of concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
1,2-DCA	1,2-Dichloroethane
1,2-DCE	cis-1,2-dichloroethene and trans-1,2-dichloroethene
HPAH	High molecular-weight polycyclic aromatic hydrocarbon
LPAH	Low molecular-weight polycyclic aromatic hydrocarbon
MTCA	Model Toxics Control Act
PAH	Polycyclic aromatic hydrocarbon
PCE	Tetrachloroethene
PCP	Pentachlorophenol
Port	Port of Seattle
RI/FS	Remedial Investigation/Feasibility Study
Site	Lora Lake Apartments Site
STE	Storm event
STIA	Seattle-Tacoma International Airport

Acronym/Abbreviation	Definition
TCE	Trichloroethene
TEF	Toxic equivalency factor
TEQ	Toxic equivalent quantity
TOC	Total organic carbon
TPH	Total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound
WAC	Washington Administrative Code
WSDOE	Washington State Department of Ecology

1.0 Introduction

1.1 SITE BACKGROUND

This document presents the second Stormwater Interim Action Progress Report for the Lora Lake Apartments Site (Site), located at 15001 Des Moines Memorial Drive in Burien, Washington (Figure 1.1). The Site is located near the northwest corner of Seattle-Tacoma International Airport (STIA) and is the location of a former apartment building complex that was developed in 1987, under previous ownership, for use as residential housing. The Site also has an industrial use history that includes a barrel washing facility and an auto wrecking yard.

Environmental investigations conducted by the Port of Seattle (Port) in 2007 and 2008 identified impacted soil and groundwater. Investigations to date indicate the site contaminants of concern (COCs) are carcinogenic polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH—gasoline range, diesel range, and heavy oil range), dioxins, pentachlorophenol (PCP), tetrachloroethene (PCE), trichloroethene (TCE), 1,2-dichloroethane (1,2-DCA), and arsenic.

The Port entered into a Model Toxics Control Act (MTCA) Agreed Order with the Washington State Department of Ecology (WSDOE) to conduct a Remedial Investigation and Feasibility Study (RI/FS), in order to define appropriate methods to remediate contamination at the Site.

On August 7, 2009, in response to a concern expressed by an interested citizen, WSDOE requested the Port to conduct an additional interim action pursuant to Washington Administrative Code (WAC) 173-340-430(1)(a). Under the interim action, the Port would investigate whether contaminants leave the Site by drainage of stormwater through the site stormwater conveyance system and discharge to off-site receptors, including, specifically, Lora Lake.

The objective of this Stormwater Interim Action is to assess whether the Site adversely impacts stormwater quality as it leaves the Site. The Port is meeting this objective by characterizing the quality of stormwater and stormwater solids entering and exiting the Site from a total of up to 10 storm events, as well as characterizing on-site catch basin sediments. This work was originally planned to be included in the RI/FS Work Plan and implemented during the wet season of 2010 to 2011. However, in response to concerns expressed by the Public, the Port agreed to WSDOE's request to conduct the stormwater investigation as an early interim action.

The Stormwater Interim Action Work Plan completed by Taylor Associates, Inc. and Floyd|Snider (2009) presents the procedures and methods to be implemented during the stormwater investigation, which began in November 2009 and will continue through

May 2010. Taylor Associates, Inc. is the technical field lead for all sampling during this investigation.

Floyd|Snider will prepare three Stormwater Interim Action Progress Reports, and a Final Stormwater Interim Action Data Report. This data report is the Stormwater Interim Action Progress Report 2 and presents the following:

- The results of a sediment sampling event that included sediment samples collected on January 7 and 11, 2010 from a total of four locations.
- The results of a catch basin sediment sample collected from CB-4857 on December 10, 2009, which were also presented in the Stormwater Interim Action Progress Report 1.

1.2 SUMMARY OF INTERIM ACTION OBJECTIVES AND REQUIREMENTS

The interim action scope of work addresses the primary concern expressed about site stormwater: What, if any, site contamination is conveyed from the Site by stormwater drainage? To address that concern, the interim action scope of work provides for the following tasks, in the sequence shown below:

1. Conduct a TV in-line inspection for the specific segment of the on-site storm drain system with structural limitations for stormwater in-line solids sample collection.
2. Collect stormwater samples at locations where stormwater enters and leaves the Site. Analyze samples for site COCs.
3. Collect catch basin sediment samples to assess sediment introduced from or influenced by upgradient and/or on-site sources, and potentially transported off-site.
4. Remove catch basin sediment from the storm drainage system using vactor methods.
5. Conduct a TV in-line inspection to determine the potential for contaminated groundwater to enter the storm drain system.
6. Collect stormwater solids using in-line solids “sediment traps” to assess solids introduced from or influenced by site sources, and potentially transported from the Site. Collect one round of samples for analysis as sufficient solids accumulate between the date of installation and May 2010.
7. Continue to collect stormwater samples from locations where stormwater enters and leaves the Site, after conveyance system cleaning, to assess future conditions. Stormwater samples will be collected and analyzed from a total of 10 storm events, or fewer, as agreed by WSDOE upon review of data.

This Stormwater Interim Action Progress Report 2 presents the results of fieldwork designed to address the third task listed above, and described in Section 1.1. Subsequent Stormwater Interim Action Progress Reports and the final data report will present the results of the remaining tasks as listed above and described in detail in the Work Plan.

1.3 REPORT ORGANIZATION

This Stormwater Interim Action Progress Report 2 is organized into the following sections:

- **2.0 Summary of Field Activities:** describes the sediment sample locations and specific methods and procedures that were used to collect catch basin sediment samples. This section also summarizes field observations noted during sample collection.
- **3.0 Summary of Analytical Results:** summarizes analytical results for catch basin sediment samples.
- **4.0 Statistical Analyses:** presents a summary of the data results and basic statistical analyses of the catch basin sediment data.
- **5.0 Summary of Preliminary Findings:** includes an overall summary of field observations and analytical results.
- **6.0 Schedule of Stormwater Interim Action Monitoring:** presents the schedule to complete the stormwater monitoring program.
- **7.0 References:** provides a list of materials cited in this data report.

2.0 Summary of Field Activities

2.1 CATCH BASIN SEDIMENT SAMPLE COLLECTION

Sediment sampling was completed in general accordance with the field schedule outlined in the Stormwater Interim Action Work Plan. A round of sediment samples was collected from specified locations on January 7, 2010. This field event was completed following two initial storm events (December 14 and 31, 2009) and TV in-line inspection (December 10, 2009), and is within the time window specified in the Stormwater Interim Action Work Plan.

IA field duplicate and matrix spike/matrix spike duplicate were not collected on January 7, 2010. Additional sampling from location CB-31A was completed on January 11, 2010 to provide adequate material for these field quality control samples and a parent sample from CB-31A.

This report also presents data for sediments collected from CB-4857 on December 10, 2009. Collection of a sediment sample form CB-4857 was not required by the Stormwater Interim Action Work Plan, but sediment was observed during TV inspection and sampled at that time. The field effort for the collection of this sample is described in Stormwater Interim Action Progress Report 1. The data are repeated here for comparison to catch basin sediment data collected during the subsequent field event.

2.1.1 Sample Locations

Sediment samples were collected at five locations to characterize COCs from the inlet, outlet, and key junctions within both the main and secondary drainage systems present on the Site. The sediment sampling locations and their relationship to the main stormwater line system are designated as follows:

- CB-4505/CB-31A is the inlet to the main stormwater line system and to the entire Site.
- CS/CB-19 is a key junction receiving flow from all of the Type I and II catch basins and the associated detention tanks from the western portion of the Site.
- CB-12 is a key junction receiving flow from all of the Type I and II catch basins and the associated detention tank from the central portion of the Site. Stormwater is conveyed to CB-12 through a smaller, side stormwater line adjacent to the main line. This catch basin does not experience the magnitude of flow conveyed through the main line.
- CB-4555/CS/CB-2 is the outlet for the entire smaller on-site drainage system from the Site. A flow control structure in this catch basin traps the majority of

stormwater solids before stormwater is conveyed to the catch basin immediately downgradient (CB-1).

- CB-4857 is the outlet of the main drainage system line from the Site.

Sampling locations are shown on Figure 2.1. Please refer to the Stormwater Interim Action Work Plan for further description and rationale for each of the sampling catch basin locations.

The sediment samples collected from these catch basins in December 2009 and January 2010 are representative of long-term conditions. The stormwater conveyance system at the Site has not been cleaned or otherwise altered since the Port's initial acquisition of the property in 1998. Sediment has accumulated at each catch basin and is, therefore, representative of at least 12 years of sediment accumulation.

2.1.2 Field Observations

The following observations were recorded by field personnel on sample collection field forms as part of the field effort on January 7 and 11, 2010. The field forms are included in this report as Appendix A.

The thickness of sediment observed in each catch basin was approximately 1.0 to 1.5 feet. Stagnant water was also present in CB-2, CB-12, and CB-19 with total water depths from the bottom of the catch basins ranging from 1.5 to 2.5 feet. Flowing water was observed in CB-31 at an approximate depth of 2.5 to 3.0 feet.

The sediments collected from CB-2, CB-12, and CB-19 were black and organic-rich with an earthy or pungent odor. A petroleum odor was noted at CB-12 and CB-19, but not CB-2. Sediments collected from CB-31A consisted of black and gray silt and sand with a pungent, slight petroleum odor. A visible sheen, possibly organic, was noted in sediments at each catch basin location.

2.1.3 Sample Collection Activities

Catch basin sediment samples were collected in accordance with the Stormwater Interim Action Work Plan. All sediment sampling was performed by trained field personnel following the Puget Sound Estuary Program (PSEP) *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound* (1986).

Catch basin sediment samples were collected using stainless steel dip cups and a polyurethane Nasco swing sampler arm (dip cup holder) attached to a fiberglass extension pole. Sediment at each catch basin was accessed from the surface via the catch basin's vault lid. Using the dip cup attached to the extension pole, sediment was scooped from the top 3 to 4 inches of accumulated sediment at multiple locations (a minimum of four) within each catch basin. Individual sediment grabs were placed into a

decontaminated stainless steel bowl for homogenization. Particles greater than 2 centimeters in size were removed from the sample and discarded. To minimize volatile loss, samples of sediment for volatiles analyses were collected from each catch basin (bowl) prior to homogenization, using an Ez-Draw apparatus. The volatile analyses sample consisted of sediment subsets that were collected from various positions within the bowl. After volatiles analyses samples were obtained, the remaining sediment was completely homogenized and placed into pre-cleaned sample containers provided by the analytical laboratory.

All samples were handled and managed in accordance with the Stormwater Interim Action Work Plan. Following sample collection, the labeled sediment sample containers were placed into coolers and iced. All samples were recorded on Chain-of-Custody Forms and were in direct control of field personnel at all times. All samples were delivered to the analytical laboratory, Analytical Resources, Inc. in Tukwila, Washington.

All stainless steel sampling equipment was decontaminated in accordance with the Stormwater Interim Action Work Plan by the analytical laboratory. The Nasco swing arm and the first 6 feet of the extension pole were also decontaminated via the same Stormwater Interim Action Work Plan Standard Operating Procedure prior to starting sample collection and between sampling locations by field personnel.

2.1.4 Work Plan Deviations

It was intended that all sediment samples be collected as part of a single day field event. All locations were sampled on January 7, 2010; however, insufficient sample volume was collected at that time for the field duplicate or matrix spike/matrix spike duplicate. Additional sediment from CB-31A was collected on January 11, 2010 to satisfy requirements for field quality control samples as outlined in the Stormwater Interim Action Work Plan. The January 11, 2010 CB-31A sediment sample was used for both primary analysis and analysis of quality control samples.

3.0 Summary of Analytical Results

3.1 CATCH BASIN SEDIMENT SAMPLING RESULTS

Catch basin sediment samples were analyzed for the following parameters, as specified in the Stormwater Interim Action Work Plan:

- Total solids by U.S. Environmental Protection Agency (USEPA) Method 2540
- Total organic carbon (TOC) by Method Plumb 1981
- Arsenic and lead by USEPA Method 6010
- TPH (diesel and oil range) by NWTPH-Dx
- PAHs by USEPA Method 8270
- PCP by USEPA Method 8041
- VOCs: PCE, TCE, and 1,2-DCA by USEPA Method 8260C
- Dioxin/furans by USEPA Method 1613

Adequate sediment sample volumes were collected from each sampling location such that analyses were performed for all parameters. Sediment sampled from CB-4857 on December 10, 2009 was analyzed for the above listed parameters with the exception of VOCs due to limited sediment volume.

Analytical results for all catch basin sediment samples are summarized below and presented in Table 3.1. Analytical laboratory reports, including Chain-of-Custody Forms, are presented in Appendix B.

In the following sections the catch basin sediment sampling results are summarized by analyte group. The results for each analyte group are presented first for the inlet catch basin location samples (CB-31A and field duplicate), followed by the interior catch basin location samples (CB-19 and CB-12), and then the outlet catch basin location samples (CB-2 and CB-4857).

3.1.1 Conventionals

The highest total solids content was measured at both the main line inlet to the Site (CB-31A: 83.2 percent) and the stormwater main line outlet from the Site (CB-4857: 85.1 percent). TOC percentages of 3.38 percent and 3.36 percent were measured in the sediment collected from the main line inlet to the Site (CB-31A).

Total solids percentages of 23.5 percent and 20.6 percent were measured in sediments collected from the main line interior catch basins (CB-19 and CB-12). The highest TOC contents, 40.7 percent and 44.6 percent, were measured in sediment collected from the main line interior catch basins (CB-19 and CB-12).

Total solids percentages of 27.3 percent and 85.1 percent were measured in the outlet catch basins CB-2 and CB-4857, respectively. A TOC percentage of 28.3 percent was measured in the secondary line outlet catch basin (CB-2). The lowest TOC percentage of 1.29 percent was measured in sediments collected from the main line outlet CB-4857.

3.1.2 Arsenic and Lead

The lowest concentrations of lead were measured in sediments collected from the main line inlet to the Site (CB-31A: 32 mg/kg and 31 mg/kg).

Lead concentrations measured in sediments collected from catch basins within the main line interior (CB-19 and CB-12) ranged from 243 mg/kg up to 270 mg/kg.

The highest lead concentration, 322 mg/kg, was measured in sediments collected from CB-2, which is the secondary line outlet from the Site. A lead concentration of 42 mg/kg was measured in sediment collected from the main line outlet (CB-4857).

Arsenic was not detected in sediment collected from any of the sampled catch basins.

3.1.3 Volatile Organics

PCE, TCE, and breakdown products cis-1,2-dichloroethene and trans-1,2-dichloroethene (1,2-DCE) and 1,2-DCA were not detected in any samples collected during the sediment sampling event.

3.1.4 Semivolatile Organics—Polycyclic Aromatic Hydrocarbons and Pentachlorophenol

3.1.4.1 Polycyclic Aromatic Hydrocarbons

Sediments collected from all five catch basins generally exhibited low concentrations of low molecular-weight PAHs (LPAHs). Phenanthrene was detected in all sediment samples.

The concentration of phenanthrene measured in sediment from the main line inlet (CB-31A) was 180 µg/kg. Low level concentrations of anthracene (34 µg/kg), acenaphthene (13 µg/kg) and fluorene (16 µg/kg) were also detected in the sediment

sample from CB-31A. No other LPAHs were detected in the inlet catch basin sediment samples.

The highest phenanthrene concentration of 1,000 µg/kg was detected in the sediment from the main line interior catch basin (CB-19) located directly downgradient of CB-31A. Further downgradient in CB-12, a phenanthrene concentration of 460 µg/kg was detected. 2-Methylnaphthalene was also detected in the sediment from the main line interior catch basin (CB-19) at a concentration of 550 µg/kg. No other LPAHs were detected in the interior catch basin sediment samples.

Phenathrene was the only LPAH detected in sediment samples collected from the outlet catch basin samples. Phenathrene was detected at a concentration of 340 µg/kg at the secondary line stormwater outlet (CB-2). The lowest phenathrene concentration, 36 µg/kg, was measured at the stormwater outlet from the Site (CB-4857).

High molecular-weight PAHs (HPAHs) were detected in all catch basin samples with the highest concentrations being detected in sediments collected from the main line interior catch basin (CB-19). HPAH concentrations measured in sediments sampled from the inlet catch basin (CB-31) ranged from non-detect for dibenz(a,h)anthracene to 340 µg/kg for fluoranthene.

HPAHs measured in sediments sampled at the interior catch basin (CB-19) range from non-detect for benzo(g,h,i)perylene and dibenz(a,h)anthracene to 3,200 µg/kg for pyrene. HPAH concentrations ranging from non-detect for dibenz(a,h)anthracene to a concentration of 1,700 µg/kg for pyrene were also detected in sediments collected from CB-12.

Similar values were measured for sediments collected from the secondary line outlet. HPAH concentrations for sediments collected from CB-2 ranged from non-detect for dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene to a concentration of 1,500 µg/kg for pyrene. The lowest HPAH concentrations were measured in sediments sampled from CB-4857; these concentrations ranged from non-detect for dibenz(a,h)anthracene to 73 µg/kg for fluoranthene.

The calculation of cPAH total toxic equivalent (TEQ) concentrations was performed using the California Environmental Protection Agency 2005 Toxicity Equivalency Factors (TEFs) as presented in Table 708-2 of WAC 173-340-900. A TEF value was assigned to each cPAH compound relative to the carcinogenicity of benzo(a)pyrene. TEQ values were determined using two approaches to handling non-detected compounds: (1) use of one-half of the method reporting limit for non-detected compounds and (2) use of zero values for non-detected compounds.

TEQs calculated using both approaches are presented in Table 3.1. TEQ values derived utilizing one-half of the detection limit are discussed below.

At the stormwater inlet to the Site (CB-31A), the summed cPAH TEQ concentration was 153 µg/kg and 63 µg/kg for the field duplicate. The highest cPAH TEQ concentration of 1,510 µg/kg was measured for sediments collected from the interior main line catch basin (CB-19). cPAH TEQs decrease downgradient to concentrations of 570 µg/kg and 421 µg/kg for sediments sampled from CB-12 and CB-2, respectively. The lowest cPAH TEQ concentration was measured for sediments sampled the furthest downgradient along the main line. The summed cPAH TEQ concentration for sediments sampled from CB-4857 was 59 µg/kg.

3.1.4.2 Pentachlorophenol

PCP was detected at only two locations: the stormwater inlet to the Site (CB-31A) and the stormwater outlet from the Site, (CB-4857). PCP was not detected in sediments collected from CB-19, CB-12, or CB-2. The highest PCP concentration was measured for the field duplicate collected at CB-31A, which is the stormwater main line inlet to the Site. The PCP concentration for the field sample collected at CB-31A was 25 µg/kg and the field duplicate PCP concentration was 84 µg/kg. PCP was measured at a concentration of 71 µg/kg in sediments collected from the stormwater outlet from the Site (CB-4857).

3.1.5 Dioxins

The TEF and TEQ method was also used to evaluate dioxins, which is consistent with the method described above in Section 3.1.4 for PAHs and in the Stormwater Interim Action Work Plan. The dioxin congener TEFs used to calculate TEQ values were the World Health Organization 2005 TEFs (Van den Berg et al. 2006) as presented in Table 708-1 of WAC 173-340-900. TEQ values were determined using the two approaches for incorporating non-detected congeners, as described for cPAHs in Section 3.1.4. Dioxin TEQs calculated using both approaches are presented in Table 3.1. TEQ values derived utilizing one-half of the detection limit are discussed below.

The TEQ concentration measured for sediments collected from main line inlet (CB-31A) was 36.0 pg/g. The highest dioxin TEQ concentration was measured in the main line interior. The dioxin TEQ concentrations measured in sediments collected from CB-12 and CB-19 were 143.1 pg/g and 89.5 pg/g, respectively. The TEQ concentration measured for sediments collected downgradient at the secondary line outlet (CB-2) was 44.9 pg/g. The lowest dioxin TEQ was 13.4 pg/g, which was measured in sediments collected at the stormwater outlet from the Site (CB-4857).

3.1.6 Petroleum Hydrocarbons

Detected concentrations of heavy oil range TPH at the stormwater inlet catch basin (CB-31A) were 270 mg/kg and 200 mg/kg for the parent sample and field duplicate sample, respectively. Heavy oil range TPH concentrations were highest for sediments

collected from the interior catch basins (CB-19 and CB-12). Heavy oil range TPH concentrations ranged from 6,600 mg/kg at CB-12 to 18,000 mg/kg at CB-19. At the outlet catch basins (CB-2 and CB-4857), heavy oil range TPH concentrations ranged from 6,100 mg/kg to 160 mg/kg, respectively.

Detected concentrations of diesel range TPH at the stormwater inlet catch basin (CB 31A) were 54 mg/kg and 31 mg/kg for the parent sample and field duplicate sample, respectively. The highest diesel TPH concentrations were measured in sediments collected from the interior catch basins (CB-19 and CB-12), ranging from a maximum of 4,200 mg/kg at CB-19 to 1,300 mg/kg at CB-12. At the outlet catch basins (CB-2 and CB-4857), diesel range TPH concentrations ranged from 1,200 mg/kg to 19 mg/kg, respectively.

3.2 DATA QUALITY REVIEW

All sediment analytical data were provided to EcoChem for data validation. A Level III Data Quality Review (Summary Validation) was performed on the analytical data except for dioxins, for which a Level IV, Tier III Data Quality Review (Full Validation) was performed. The analytical data were validated in accordance with the following:

- USEPA CLP National Functional Guidelines for Inorganic Data Review (2004)
- USEPA CLP National Functional Guidelines for Organic Data Review (2008)
- USEPA CLP Region 10 SOP for Validation of Dioxins and Furans (1996)

The analytical laboratories followed the specified analytical methods. The PAH Method 8270 analysis was performed at a 1x and 3x dilution. The results of the 1x dilution were selected to achieve the lowest analytical detection limits and the results of the 3x dilution were rejected. The PCP Method 8051 analysis was performed at a 1x and 10x dilution due to continuing calibration outliers. The results of the 1x dilution were selected and the results from the 10x dilution were rejected. The majority of all analytical data was not qualified. The only qualifier that was added to any analytical data was a J qualifier. A J qualifier indicates that the analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample. All data, excluding rejected dilution analyses as described above, as reported, are acceptable for use. A summary report presenting the results of the data quality review is included in Appendix C.

4.0 Statistical Analyses

The interim action *stormwater* monitoring activities will be completed following either 6 or 10 stormwater monitoring events. The monitoring duration will be determined based on monitoring data and results of statistical analyses. Statistical evaluation will begin when sufficient data have been obtained. Reporting of statistical information will be provided on a preliminary basis in Stormwater Interim Action Progress Report 3; final statistical analysis will be provided in the final data report.

This Stormwater Interim Action Progress Report 2 presents the results of the only scheduled catch basin *sediment* sampling event. Sediment data, arithmetic means, and percent non-detects are discussed below, focusing on the comparison of concentrations detected at the stormwater inlet (CB-31A) to the Site, parent and field duplicate samples, to concentrations detected within the main line interior (CB-12 and CB-19 combined) and the site stormwater outlet locations (CB-4857 and CB-1 combined).

Catch basin solids collected from in-line sediment traps will be analyzed at the close of the interim action sampling program. Sediment data presented in this report will be re-evaluated in the final data report and interpreted within the larger context of stormwater and in-line solids data.

4.1 STATISTICAL METHODS

The summary statistics that were calculated for the catch basin sediment data (i.e., arithmetic mean) were performed using the USEPA recommended software program ProUCL Version 4.00.02. For these simple summary statistics, ProUCL does not use the non-detect values and considers only actual detected values. In the third interim report, more robust statistical ProUCL analyses will be performed and non-detects will be labeled as such and the detection limit value used.

4.2 STORMWATER DATA COMPARISON

Table 4.1 presents the percent non-detect and mean comparisons for the sediment sampling results for the combined inlet, interior, and outlet samples. Figures 4.1 and 4.2 present the mean analyte concentrations for each of the combined; inlet, interior, and outlet catch basin locations. Mean analyte concentrations for lead, total cPAH TEQ, PCP, and total dioxin TEQ are shown on Figure 4.1. Mean analyte concentrations for diesel range and heavy oil range TPH are shown on Figure 4.2.

The TOC concentration is highest in the main line interior. The mean TOC concentration for the interior catch basins was 42.65 percent. This is consistent with field observations describing sediment from CB-12 and CB-19 as having an earthy or pungent aroma with an organic sheen. The average TOC concentration for the combined outlets was 14.8 percent and, for the main line inlet catch basin sample and duplicate, was

3.51 percent. The highest total solids concentration, 83.65 percent, was also observed at the main line inlet catch basin (CB-31A).

Mean analyte concentrations (including lead, TPH, PAHs, and dioxins) correlate with TOC concentrations. The highest mean analyte concentrations were observed in sediments of the main line interior. Mean analyte concentrations decrease downgradient at the outlets, and are lowest at the main line inlet to the Site. For example the mean lead concentration measured for sediments sampled from the main line inlet to the Site was 31.5 mg/kg. This concentration was the lowest measured along the stormwater conveyance line. The lead concentration increases to a mean value of 256.5 mg/kg for samples collected from the main line interior, and then decreases to a mean value of 182 mg/kg at the combined outlets, prior to exiting the Site.

PCP is the single analyte that was not detected at the highest concentrations in the main line interior catch basins where TOC concentrations were also the highest. Mean PCP concentrations were greatest for the stormwater inlet to the Site and stormwater outlet from the Site. The PCP concentration for the main line inlet was 54.5 µg/kg, whereas the mean PCP concentration for the outlet was 71 µg/kg. PCP was not detected in the main line interior or the secondary line outlet (CB-2).

The cPAH mean TEQ concentrations (using the one-half non-detect method for calculating TEQs) for sediments collected from the main line inlet (CB-31A) was 107.9 µg/kg, while the mean cPAH TEQ concentration for the combined outlets was 240.2 µg/kg. The highest cPAH TEQ concentration was measured in sediments collected from the main line interior catch basins. The cPAH mean TEQ concentration for sediments collected from the main line interior was 1,040 µg/kg.

Similarly, the dioxin mean TEQ concentration (using the one-half non-detect method for calculating TEQs) calculated for the inlet samples was 35.47 pg/g, and the mean dioxin TEQ concentration calculated for the combined outlet samples was 29.14 pg/g. The highest dioxin TEQ concentration of 116.3 pg/g, was detected in sediments collected from the main line interior.

5.0 Summary of Preliminary Findings

The key points from catch basin sediment sampling and basic statistical analysis are summarized below:

- Sufficient sediment accumulation at all locations allowed for sampling and analysis of nearly the entire proposed suite of analytes.
- Sediment accumulation in the catch basins at the Site represent at least 12 years of undisturbed deposition.
- The greatest TOC concentrations were measured for sediments collected from the main line interior. The mean TOC concentration for the main line interior (CB-12 and CB-19 combined) was 43 percent. This value was greater than 10 times the mean TOC concentration measured for sediments collected from the main line inlet to the Site (CB-31A), and greater than 2 times the mean TOC concentration measured for sediments collected from the stormwater outlets (CB-2 and CB-4857 combined).
- TOC measurements were consistent with field observations that sediment accumulations in catch basins located within the interior of the Site are organic-rich and mucky with visible organic sheen.
- High TOC, organic-rich sediments from the main line interior (CB-12 and CB-19) also contain the highest analyte concentrations. TPH, lead, SVOCs, and dioxin concentrations detected in the interior main line sediments were elevated relative to sediments sampled at the stormwater inlet to the Site, and stormwater outlets (CB-2 and CB-4857) of the Site.
- As, expected, lead and other organic compounds (TPH, PAHs, and dioxins) analyzed as part of this interim action which are characterized by high organic-carbon coefficients and/or low water solubilities, were detected at higher concentrations in sediments collected from the interior catch basins with elevated TOC levels, than in the inlet and outlet catch basins with lower TOC levels.
- The lowest analyte concentrations (including lead, TPH, PAHs, and dioxins) are observed for sediments sampled from the main line inlet (CB-31A) and the main line outlet (CB-4857). Sediments sampled from CB-31A and CB-4857 had the lowest TOC concentrations (3.4 percent and 1.3 percent, respectively) and the greatest concentration of total solids (greater than 80 percent).

Analytical data and preliminary statistical analysis indicate sediments in the main line interior generally have the highest analyte concentrations. Lead and organic compounds have a high affinity for soils, particularly if the soils contain substantial organic carbon. The long-term accumulation of COCs on organic-rich sediments of the

main line interior is likely contributing to the elevated sediment concentrations observed within the central area of the Site. Results of the system-wide video inspection (to be included in the next interim report) will assist in determining the contribution of COCs from site soils and/or groundwater.

The data obtained from the collection of in-line stormwater solids samples will provide additional information regarding the potential transport of solids from the Site.

6.0 Schedule of Stormwater Interim Action Monitoring

The first two tasks of the Stormwater Interim Action Work Plan have been completed and were summarized in the Stormwater Interim Action Progress Report 1. That report includes stormwater data for the first two storm events and the results of the TV in-line inspection performed on a selected segment of the drainage system. Additionally, as part of the first two tasks, a catch basin sediment sample was collected from CB-4857, and also described in the first Stormwater Interim Action Progress Report. This Stormwater Interim Action Progress Report 2 presents the result of the catch basin sediment sampling event, identified in Section 1.2 as Task Number 3. The catch basin sediment samples were collected on January 7 and 11, 2010.

Following the collection of the catch basin sediment samples, the remaining catch basin sediments in the storm drainage system were removed using vactor methods on February 9, 2010. Tasks that have recently been performed as part of the stormwater interim action program include additional TV in-line inspections of the drainage system and installation of the in-line stormwater solids “sediment” traps, which are currently in progress. Once the in-line stormwater solids traps are installed, they will remain in place until the completion of the stormwater interim action program, anticipated to be May 2010.

Stormwater Interim Action Progress Report 3 will present the results of an additional four stormwater sampling events, and summarize the stormwater data collected from all six stormwater sampling events completed at the time of that report. The report will include a preliminary assessment of data variability and general results to assess if 6 or 10 events will provide a sufficient body of results to determine if the stormwater quality flowing into the Site is statistically different that that leaving the Site. Recommendations for modifying the sample collection program, including the need and rationale for increasing or decreasing the number of events shall be provided. The final stormwater data report will present the results of the stormwater in-line solids monitoring, the results of additional stormwater sampling events, and a complete review of the Stormwater Interim Action.

7.0 References

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Tables

Table 3.1
Catch Basin Sediment Sampling Results

				Main Line Interior		Main Line/Secondary Line Outlets	
	Area	Main Line Inlet		Upgradient	Downgradient	Secondary Line Outlet	Main Line Outlet
	Station	CB-31A	CB-31A Dup	CB-19	CB-12	CB-2	CB-4857
	Sample ID	CB31A011110Sed	CB99011110Sed	CB19010710Sed	CB12010710Sed	CB2010710Sed	CB4857121009
	Sample Date	1/11/2010	1/11/2010	1/7/2010	1/7/2010	1/7/2010	12/10/2009
Parameter	**Units**						
Conventionals							
Total Solids	%	83.2	84.1	23.5	20.6	27.3	85.1
Total organic carbon	%	3.38	3.63	40.7	44.6	28.3	1.29
Metals							
Arsenic	mg/kg	6.0 U	6.0 U	20.0 U	20 U	20 U	6 U
Lead	mg/kg	32.0 J	31.0 J	243	270	322	42
Total Petroleum Hydrocarbons							
Diesel range	mg/kg	54	31	4,200	1,300	1,200	19
Heavy range	mg/kg	270	200	18,000	6,600	6,100	160
Semivolatile Organic Compounds							
Naphthalene	µg/kg	20 U	20 U	520 U	220 U	190 U	19 U
2-Methylnaphthalene	µg/kg	20 U	20 U	550	220 U	190 U	19 U
1-Methylnaphthalene	µg/kg	20 U	20 U	520 U	220 U	190 U	18 U
Acenaphthylene	µg/kg	20 U	20 U	520 U	220 U	190 U	19 U
Acenaphthene	µg/kg	13 J	20 U	520 U	220 U	190 U	19 U
Fluorene	µg/kg	16 J	20 U	520 U	220 U	190 U	19 U
Phenanthrene	µg/kg	180	43	1,000	460	340 J	36
Anthracene	µg/kg	34	20 U	520 U	220 U	190 U	19 U
Fluoranthene	µg/kg	340	130	2,200	970	780 J	73
Pyrene	µg/kg	270 J	96	3,200	1,700	1,500 J	57
Benzo(a)anthracene	µg/kg	95	36	590	250	220 J	29
Chrysene	µg/kg	150	85	1,900	980	630 J	63
Benzo(b)fluoranthene	µg/kg	140	48	1,400 J	560 J	370 J	53
Benzo(k)fluoranthene	µg/kg	140	48	1,400 J	560 J	370 J	53
Benzo(a)pyrene	µg/kg	110	43	1,100	390 J	300 J	43
Indeno(1,2,3-cd)pyrene	µg/kg	32	37	520 UJ	220 J	190 UJ	11 J
Dibenz(a,h)anthracene	µg/kg	20 U	19 J	520 UJ	220 UJ	190 UJ	19 U
Benzo(g,h,i)perylene	µg/kg	37	54	850 J	360 J	280 J	16 J
Summed cPAH TEQ[1,2]	µg/kg	152 J	63 J	1,458 J	559 J	402 J	58 J
Summed cPAH TEQ with One-Half of the Detection Limits[1,3]	µg/kg	153 J	63 J	1,510 J	570 J	421 J	59 J
Pentachlorophenol	µg/kg	25	84	26 U	25 U	19 U	71
Dibenzofuran	µg/kg	20 U	20 U	520 U	220 U	190 U	19 U

	Area	Main Line Inlet		Main Line Interior		Main Line/Secondary Line Outlets	
				Upgradient	Downgradient	Secondary Line Outlet	Main Line Outlet
	Station	CB-31A	CB-31A Dup	CB-19	CB-12	CB-2	CB-4857
	Sample ID	CB31A011110Sed	CB99011110Sed	CB19010710Sed	CB12010710Sed	CB2010710Sed	CB4857121009
	Sample Date	1/11/2010	1/11/2010	1/7/2010	1/7/2010	1/7/2010	12/10/2009
Parameter	**Units**						
Volatile Organic Compounds							
1,2-Dichloroethane	µg/kg	1 U	1 U	5 U	5.8 U	2.3 U	NS
cis-1,2-Dichloroethene	µg/kg	1 U	1 U	5 UJ	5.8 U	2.3 U	NS
trans-1,2-Dichloroethene	µg/kg	1 U	1 U	5 UJ	5.8 U	2.3 U	NS
Trichloroethene	µg/kg	1 U	1 U	5 UJ	5.8 U	2.3 U	NS
Tetrachloroethene	µg/kg	1 UJ	1 U	5 UJ	5.8 U	2.3 U	NS
Dioxins							
2,3,7,8-TCDD	pg/g	0.632 J	0.636 J	4.56	6.33	2.84	0.472 U
1,2,3,7,8-PeCDD	pg/g	3.96 J	3.99 J	19.1	27.3 J	10.6 J	1.79 J
1,2,3,4,7,8-HxCDD	pg/g	9.13	8.27	29.6	34.9	14.8	2.92 J
1,2,3,6,7,8-HxCDD	pg/g	32.3	28.3	79.8	130	37.6	10.3
1,2,3,7,8,9-HxCDD	pg/g	17.6	16.7	69.8	95.8	37.3	5.19 J
1,2,3,4,6,7,8-HpCDD	pg/g	1,210	1,070	2,370	4,510	1,110	353
OCDD	pg/g	11,200	11,500	23,300 J	46,200 J	13,300 J	4,480
2,3,7,8-TCDF	pg/g	0.332 J	0.405 J	5.83 F	5.13 F	2.34	0.183 U
1,2,3,7,8-PeCDF	pg/g	1 J	0.989 J	6.06 J	5.09 J	2.38 J	0.586 J
2,3,4,7,8-PeCDF	pg/g	2.23 J	2.87 J	10.7 J	10.1 J	3.44 J	1.3 J
1,2,3,4,7,8-HxCDF	pg/g	39.4	43.7	28.9	29.4	14.9	19.6
1,2,3,6,7,8-HxCDF	pg/g	8.55	9.4	19.2	22.4 J	8.67 J	5.05 J
2,3,4,6,7,8-HxCDF	pg/g	12.4	13.8	25.3	30.2	10.7 J	6.22
1,2,3,7,8,9-HxCDF	pg/g	2.96 J	3.57 J	4.65 J	4.79 J	2.27 J	1.99 J
1,2,3,4,6,7,8-HpCDF	pg/g	246 J	237 J	481 J	1,060 J	209 J	82
1,2,3,4,7,8,9-HpCDF	pg/g	22.6	24.7	22.3	31.8	10.6 J	9.51
OCDF	pg/g	914 J	899 J	1,340 J	3,750 J	569 J	243
Summed Dioxin/Furan TEQ[4,5]	pg/g	36.0 J	35.0 J	89.5 J	143.1 J	44.9 J	13.2 J
Summed Dioxin/Furan TEQ with One-Half of the Detection Limits[4,6]	pg/g	36.0 J	35.0 J	89.5 J	143.1 J	44.9 J	13.4 J

Notes:

1 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivalency Factors as presented in Table 708-2 of WAC 173-340-900.
2 Calculated using detected cPAH concentrations.
3 Calculated using detected cPAH concentrations plus one-half the detection limit for cPAHs that were not detected.
4 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006).
5 Calculated using detected dioxin/furan concentrations.
6 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon
NS Not sampled due to limited sediment sample volume
TEQ Toxic Equivalency Quotient

Qualifiers:

F Analyte confirmation on secondary column.
J The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quanity.
U Undetected.

Table 4.1
Summary Statistics for Catch Basin Sediment Sampling Results

	Area	Main Line Inlet		Main Line Interior (Combined)		Outlets (Combined)	
	Station	CB-31A and CB-31A Dup		CB-12 and CB-19		CB-2 and CB-4857	
Parameter	Units	% NDs	Mean	% NDs	Mean	% NDs	Mean
Conventionals							
Total Solids	%	0%	83.65	0%	22.05	0%	56.2
Total Organic Carbon	%	0%	3.51	0%	42.65	0%	14.8
Metals							
Arsenic	mg/kg	100%	NA	100%	NA	100%	NA
Lead	mg/kg	0%	31.50	0%	256.5	0%	182
Total Petroleum Hydrocarbons							
Diesel range	mg/kg	0%	42.50	0%	2,750	0%	609.5
Heavy oil range	mg/kg	0%	235.00	0%	12,300	0%	3,130
Semivolatile Organic Compounds							
Naphthalene	µg/kg	100%	NA	100%	NA	100%	NA
2-Methylnaphthalene	µg/kg	100%	NA	50%	550	100%	NA
1-Methylnaphthalene	µg/kg	100%	NA	100%	NA	100%	NA
Acenaphthylene	µg/kg	100%	NA	100%	NA	100%	NA
Acenaphthene	µg/kg	50%	13	100%	NA	100%	NA
Fluorene	µg/kg	50%	16	100%	NA	100%	NA
Phenanthrene	µg/kg	0%	111.5	0%	730	0%	188
Anthracene	µg/kg	50%	34	100%	NA	100%	NA
Fluoranthene	µg/kg	0%	235	0%	1,585	0%	426.5
Pyrene	µg/kg	0%	183	0%	2,450	0%	778.5
Benzo(a)anthracene	µg/kg	0%	65.5	0%	420	0%	124.5
Chrysene	µg/kg	0%	117.5	0%	1,440	0%	346.5
Benzo(b)fluoranthene	µg/kg	0%	94	0%	980	0%	211.5
Benzo(k)fluoranthene	µg/kg	0%	94	0%	980	0%	211.5
Benzo(a)pyrene	µg/kg	0%	76.5	0%	745	0%	171.5
Indeno(1,2,3-cd)pyrene	µg/kg	0%	34.5	50%	220	50%	11
Dibenz(a,h)anthracene	µg/kg	50%	19	100%	NA	100%	NA
Benzo(g,h,i)perylene	µg/kg	0%	46	0%	605	0%	148
Summed cPAH TEQ[1,2]	µg/kg	0%	107.4	0%	1,008	0%	230.3
Summed cPAH TEQ with One-Half of the Detection	µg/kg	0%	107.9	0%	1,040	0%	240.2
Pentachlorophenol	µg/kg	0%	54.5	100%	NA	50%	71
Dibenzofuran	µg/kg	100%	NA	100%	NA	100%	NA
Volatile Organic Compounds							
1,2-Dichloroethane	µg/kg	100%	NA	100%	NA	100%	NA
cis-1,2-Dichloroethene	µg/kg	100%	NA	100%	NA	100%	NA
trans-1,2-Dichloroethene	µg/kg	100%	NA	100%	NA	100%	NA
Trichloroethene	µg/kg	100%	NA	100%	NA	100%	NA
Tetrachloroethene	µg/kg	100%	NA	100%	NA	100%	NA
Dioxins							
Summed Dioxin/Furan TEQ[4,5]	pg/g	0%	35.47	0%	116.3	0%	29.02
Summed Dioxin/Furan TEQ with One-Half of the	pg/g	0%	35.47	0%	116.3	0%	29.14

Notes:

1 Calculation of cPAH TEQ concentrations was performed using the California Environmental Protection Agency 2005 Toxic Equivancy Factors as presented in Table 708-2 of WAC 173-340-900.
2 Calculated using detected cPAH concentrations.
3 Calculated using detected cPAH concentrations plus one-half the detection limit for cPAHs that were not detected.
4 World Health Organization 2005 Toxic Equivalency Factors used for calculation of dioxin/furan TEQ (Van den Berg et al. 2006).
5 Calculated using detected dioxin/furan concentrations.
6 Calculated using detected dioxin/furan concentrations plus one-half the detection limit for dioxins/furans that were not detected.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon.
NA Not applicable; the analyte was not detected during the first two stormwater monitoring events.
ND Non-detect.
TEQ Toxic Equivalency Quotient.

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Figures

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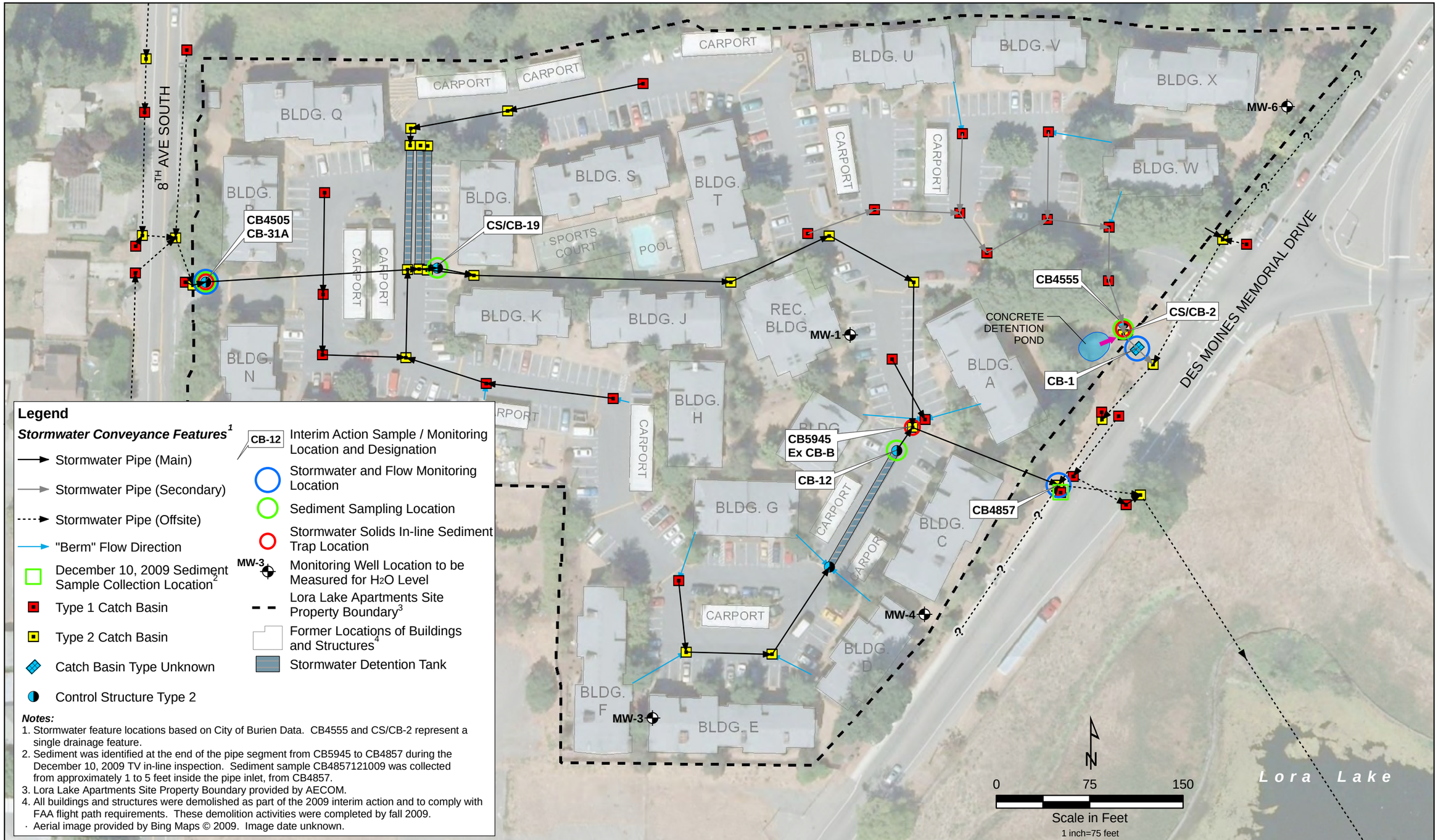
Port of Seattle
Lora Lake Apartments
Burien, Washington

Figure 1.1
Vicinity Map

File: F:\projects\POS-LLA\GIS\MXD\Stormwater Interim Action Reports\Figure 1.1 (Vicinity Map - Report 2).mxd
Date: 2/17/2010



Legend

Stormwater Conveyance Features[1]

- Stormwater Pipe (Main)
- Stormwater Pipe (Secondary)
- Stormwater Pipe (Offsite)
- "Berm" Flow Direction
- December 10, 2009 Sediment Sample Collection Location[2]
- Type 1 Catch Basin
- Type 2 Catch Basin
- Catch Basin Type Unknown
- Control Structure Type 2
- CB-12 — Interim Action Sample / Monitoring Location and Designation
- Stormwater and Flow Monitoring Location
- Sediment Sampling Location
- Stormwater Solids In-line Sediment Trap Location
- MW-3 — Monitoring Well Location to be Measured for H_2O Level
- Lora Lake Apartments Site Property Boundary[3]
- Former Locations of Buildings and Structures[4]
- Stormwater Detention Tank

Notes:

1. Stormwater feature locations based on City of Burien Data. CB4555 and CS/CB-2 represent a single drainage feature.
2. Sediment was identified at the end of the pipe segment from CB5945 to CB4857 during the December 10, 2009 TV in-line inspection. Sediment sample CB4857121009 was collected from approximately 1 to 5 feet inside the pipe inlet, from CB4857.
3. Lora Lake Apartments Site Property Boundary provided by AECOM.
4. All buildings and structures were demolished as part of the 2009 interim action and to comply with FAA flight path requirements. These demolition activities were completed by fall 2009.

· Aerial image provided by Bing Maps © 2009. Image date unknown.

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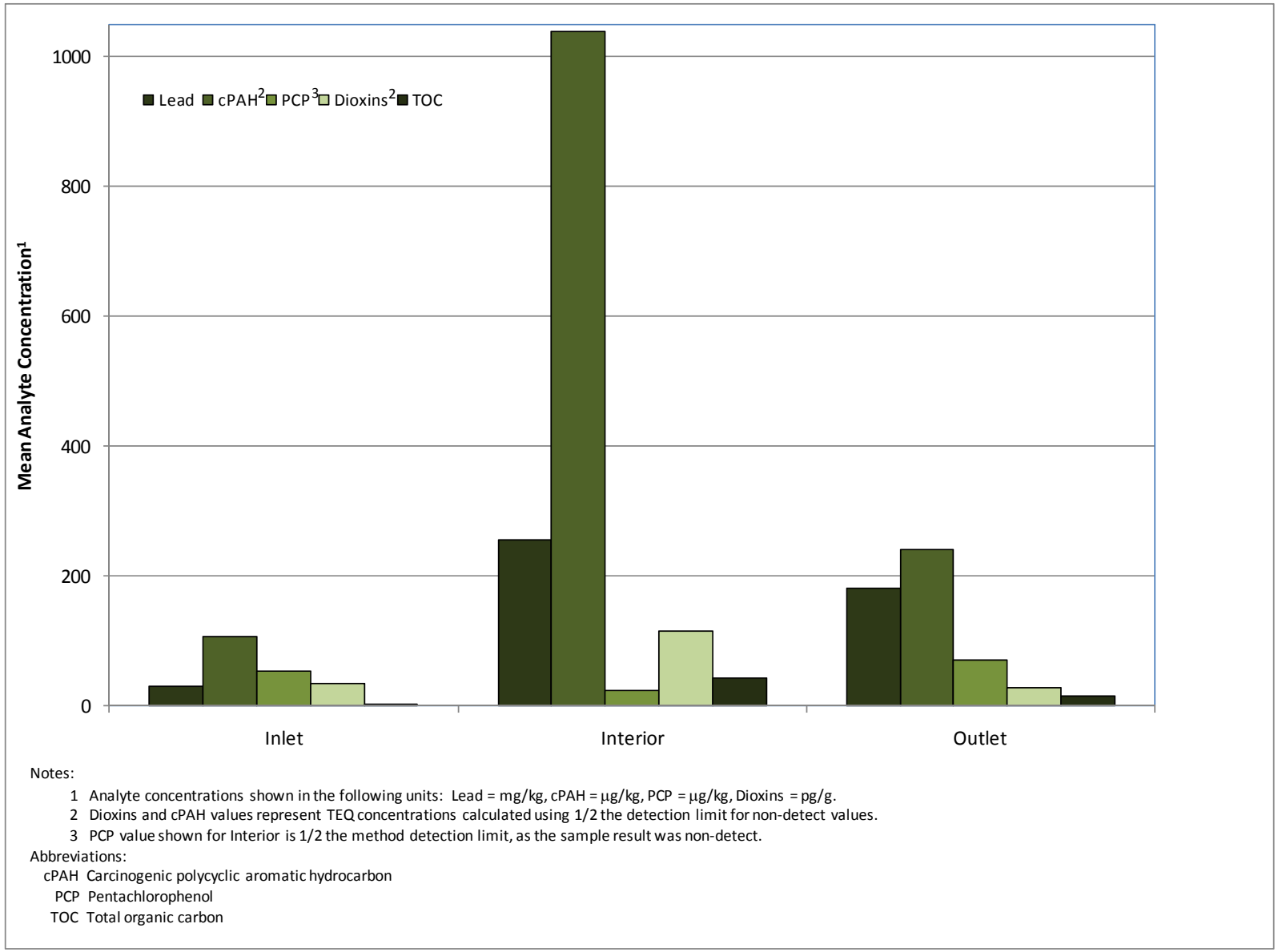
Figure 2.1
Interim Action Sampling and Monitoring Locations

File: F:\projects\POS-LLA\GIS\MXD\Stormwater Interim Action Reports\Figure 2.1 (Interim Action Sampling and Monitoring Locations).mxd
Date: 2/18/2010



Notes:

1 Analyte concentrations shown in the following units: Lead = mg/kg, cPAH = µg/kg, PCP = µg/kg, Dioxins = pg/g.

2 Dioxins and cPAH values represent TEQ concentrations calculated using 1/2 the detection limit for non-detect values.

3 PCP value shown for Interior is 1/2 the method detection limit, as the sample result was non-detect.

Abbreviations:

cPAH Carcinogenic polycyclic aromatic hydrocarbon

PCP Pentachlorophenol

TOC Total organic carbon

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Figure 4.1
COC Mean Concentrations for Inlet, Interior, and Outlet Catch Basins

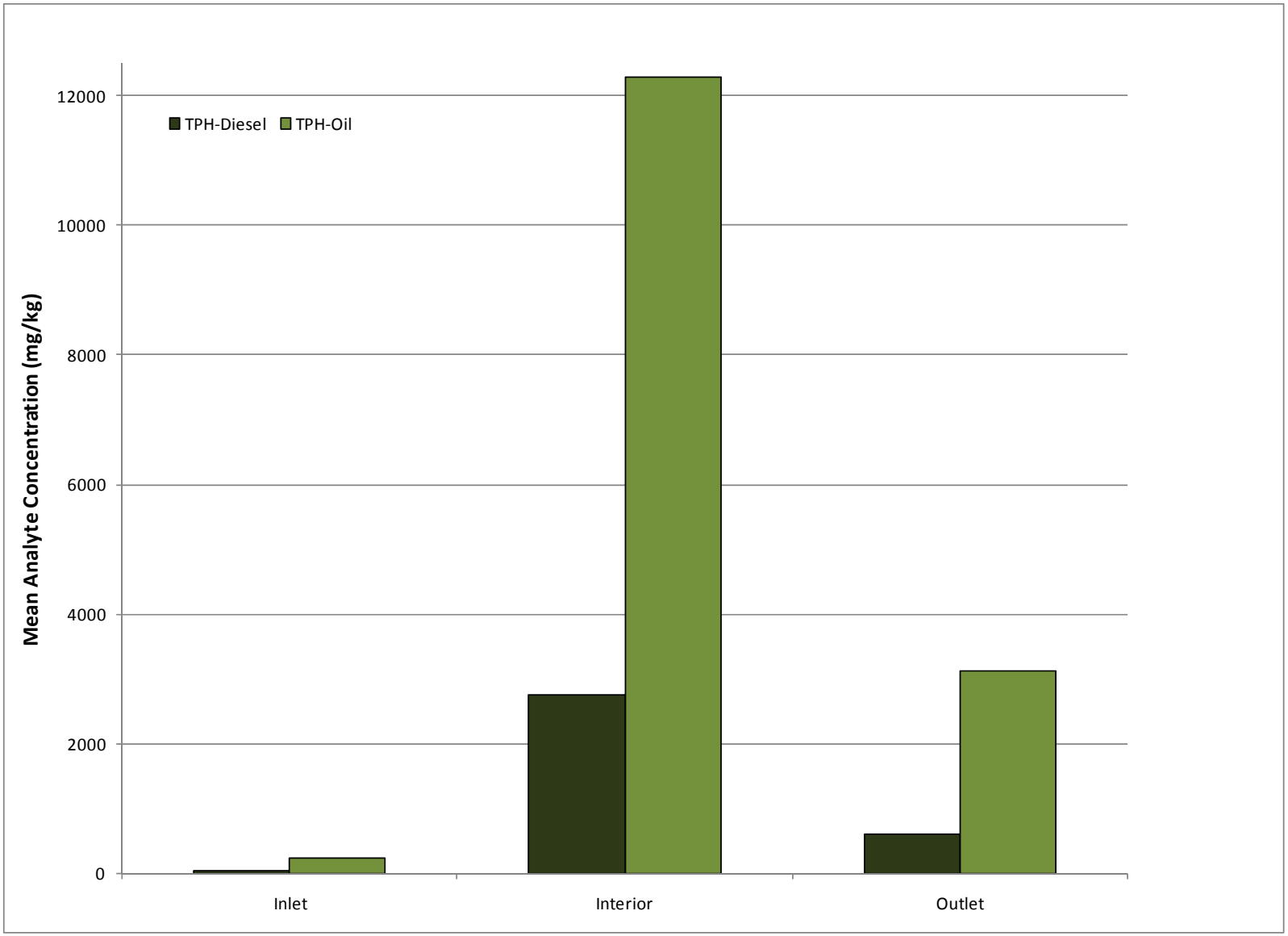

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Figure 4.2
TPH Mean Concentrations for Inlet, Interior, and Outlet Catch Basins

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Stormwater Interim Action Report 2

Appendix A
Field Reports from Taylor

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	January 27, 2010
TO:	Matt Woltman / Jessi Massingale
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600
	Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Sediment Sampling Event Report (01/07-11/2010)

Please find included the following:

- Sediment sampling event narrative (2 pg),
- Sediment sampling event summary table (1 pg),
- COC forms (2 pgs), and
- Field Sheets (5 pgs).

Please let me know if you have any questions or need additional information. Thank You.

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal
and Freshwater Sciences

Dave Metallo, LHG

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Sediment Sampling Event Narrative Report
January 7th – 11th, 2010

General:

Sediment sampling at the Lora Lake Apartments (LLA) project site was conducted as a one-time event. The event was conducted over the course of two field days; January 7th and 11th. Sediment was sampled at four individual stations (in order of inlet to outlet flow); CB-31A, CB-19, CB-12 and CB-2. These locations are shown on maps in the LLA Work Plan.

See the accompanying ***Sediment Sampling Event Summary Spreadsheet,*** **Chain of Custody records and field sheets** for details regarding the event. Several of the key event categories are discussed below.

Sampling Methodology:

Sampling equipment included stainless steel spoons, scoops, bowls, dip cups and a polyurethane Nasco swing sampler arm (dip cup holder) attached to a fiberglass extension pole. Sediment at each station was accessed from the surface, via the catch basin's vault lid. Using the dip cup attached to the extension pole, sediment was scooped from various locations within each catch basin and placed into a bowl. Once sufficient coverage of the catch basin interior was completed (striving for a representative sample) and enough material was collected to fill all of the requisite analytical containers the material was homogenized by folding and mixing with scoops. The volatile portion was collected with an Ez-Draw apparatus, prior to vigorous homogenization, by sampling from within various positions within the bowl. This was done in an effort to minimize volatile loss. The remaining parameter jars were filled, capped, labeled and placed on ice in sturdy coolers. The cooler containing the volatile samples was accompanied by trip blanks provided by the analytical testing facility, Analytical Resources, Inc. (ARI) of Tukwila, WA. Any leftover material in the mixing bowl was placed back into the catch basin of its origin.

Equipment Decontamination:

All stainless steel sampling equipment was decontaminated per the SOP provided in the LLA Work Plan under laboratory conditions at ARI by their chemistry staff. The Nasco swing arm and extension pole (first six feet) were also decontaminated via the same LLA Work Plan SOP but were done in the field between sampling locations. All sampling personnel employed USEPA recommended "clean hands" techniques when conducting sampling procedures or sample management tasks.

Sampling Parameters:

As per the LLA Work Plan; volatile organic compounds (included PCE, TCE and 1,2-DCA), polyaromatic hydrocarbons, pentachlorophenol (PCP), total petroleum hydrocarbons, metals (arsenic and lead), dioxin/furans, total solids and total organic carbon. Samples collected from all locations, including quality control samples, were submitted to the laboratory for all of the above listed parameters.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected samples were placed into coolers and iced. All samples were recorded on Chain-of-Custody forms and were in direct control of project personnel at all times. All samples were delivered to the testing facility, ARI, in good, useable and properly chilled condition. Enough sample was collected from all of the stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Sample Types:

"Normal" or routine scheduled samples were collected at each of the four monitoring locations noted above. Sample volumes were collected as detailed in the LLA Work Plan. Additional sample volume was collected at CB-31A for the analysis of a method spike and method spike duplicate (MS/MSD). A duplicate split sample was also collected at CB-31A. All of the quality control samples were collected, managed and submitted for the same analyses as the normal samples. A trip blanks accompanied the volatile portion of the samples and were submitted for the same analysis as the normal and quality control samples (for the volatile fraction).

Anomalies and/or Work Plan Deviations:

There were no anomalies observed that would cause any of the sediment samples to be non-representative of the conditions from which they were collected. Initially, CB-31A was sampled on January 7 th and submitted to ARI along with the other samples collected that day. It was then realized that a duplicate (split) and MS/MSD sample and sample volume were not submitted. After discussions between Taylor Associates, Floyd / Snider and ARI it was decided that CB-31A would be re-sampled on January 11 th. Thus CB-31A is indicated on both event Chain-of-Custody forms. However, only that sample from January 11th was actually analyzed.

Related Future Site Actions To Be Completed:

In-vault sampling infrastructure will be removed from each of the three monitoring stations in preparation for the upcoming sediment sampling and drainage system cleaning (vactoring) events (scheduled for mid-January). Sediment traps will be installed at four pre-determined locations post-vactoring but prior to the resumption of stormwater sampling.

POS Lora Lake Apartments Interim Action Tasks
Sediment Sampling Event Summary Spreadsheet

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Sample Event Data:	
Project Sediment Sampling Event (SSE) #	1
STE Start Date	1/7/2010
STE End Date	1/11/2010

[1] Sample Collection Data:				
Sampling Station	CB-31A	CB-99	CB-19	CB-12
Was "normal" or duplicate sample collected?	Yes	Dup (see below)	Yes	Yes
Sampl ID	CB31A011110SED	na	CB19010710SED	CB12010710SED
Sample Date /Time	01/11/2010 10:00	na	01/07/2010 11:50	01/07/2010 13:30
Sample parameters collected per LLA QAPP ?	Yes	Yes	Yes	Yes
Were Trip Blanks included w/ samples ?	Yes	Yes	Yes	Yes
Was a proper sample volume collected for for all scheduled analyses ?	Yes	Yes	Yes	Yes
Were samples collected per LLA Work Plan ?	Yes	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No	No
[1] QC Sample Summary Information:	CB-31A		CB-4857	CB-1
Was duplicate collected ?	Yes	Dup of CB-31A	No	No
Sample duplicate ID	na	CB99011110SED	na	na
Grab sample date and time	na	01/11/2010 10:30	na	na
Was additional volume collected for MS/MSD analysis ?	Yes	na	na	na

[1] If the answer to any of the validation/qualification questions are "no" OR indicate non-representative conditions, then these issues should be explained in SSE Summary Narrative.

Validation Check List Report Completed By / Date: 1-25-10 Reveiwed By / Date: 1-25-10

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Floyd / Snider	Phone: (206) 292-2078	Date: 1-7-2010	Ice Present? Yes
Client Contact: Matt Waltman / Jessi Massingale		No. of Coolers: 1	Cooler Temps: 6.0
Client Project Name: POS-LLA (Lora Lake Apts)			
Client Project #: POS-LLA	Samplers: D. Metallo, P. Heltzel		

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D	PCP 8041	TPH-D NWTPH-Dx	As + Pb 6010	Dioxin / Furans 1613	VOC ① 8260D	Total Solids SM2540B	T.O.C. Plumb 1981	Notes/Comments
CB31A010710SED	1-7-10	1030	Sed	9	X	X	X	X	X	X	X	X	
CB19010710SED	1-7-10	1150	Sed	9	X	X	X	X	X	X	X	X	
CB12010710SED	1-7-10	1330	Sed	9	X	X	X	X	X	X	X	X	
CB2010710SED	1-7-10	1430	Sed	9	X	X	X	X	X	X	X	X	
TB010710~~SED~~ DM	1-7-10	0900	~~Sed~~ Water DM	3						X			

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
① tetrachloroethene, trichloroethene, 1,2-Dichloroethane	Printed Name: Peter Heltzel	Printed Name: Jonathon Walter	Printed Name:	Printed Name:
	Company: TAI	Company: ARI	Company:	Company:
	Date & Time: 1/7/10 4:34 pm	Date & Time: 1/7/10 1634	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Floyd/Snider	Phone: (206) 292-2078	Date: 1-11-2010	Ice Present? Yes
Client Contact: Jessi Massingale / Matt Woltman		No. of Coolers: 1	Cooler Temps: 2.2
Client Project Name: POS - Lora Lake Apts Interim Action			
Client Project #: POS-LLA	Samplers: D. Metallo		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	VOC[1] 8260C	PAH 8270	PCP 8041	TPH NWTPH-Dx	Metals As & Pb 6010	Dioxin / Furans 1613	Total solids SM2540B	T.O.C. Plumb 1981	Notes/Comments
CB31A011110SED	1-11-10	1000	Sed	18	X	X	X	X	X	X	X	X	run MS/MSD
CB9901111OSED	1-11-10	1030	Sed	9	X	X	X	X	X	X	X	X	
TB011110	1-11-10	0900	Water	3	X								trip blank

Comments/Special Instructions
[1] includes; PCE, TCE and 1,2-DCA

Relinquished by: (Signature)	Dave Metallo	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name:	Dave Metallo	Printed Name: D. Peterson	Printed Name:	Printed Name:
Company:	Taylor Associates Inc.	Company: ART	Company:	Company:
Date & Time:	1-12-10 (1044)	Date & Time: 1/12/10 1044	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

TAYLOR ASSOCIATES, INC.

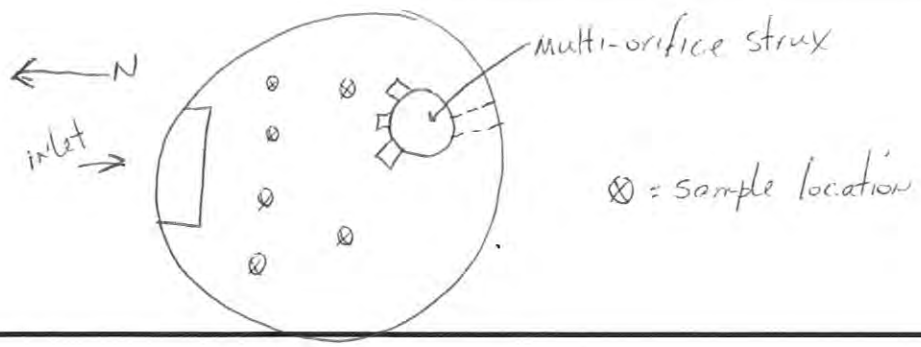
POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel:	D. Metallo / P. Hetzel	**Date/Time:**	1-7-~~10~~2010 (1405)
Weather	Partly sunny / overcast, breezy, 40's, no precip. in last 24-hrs		

Station ID:	CB-2
Manhole/CB #:	CB4555 / CS-CB2
Location Description:	terminal end of on-site drainage system, loc. has multi-orifice strux
Sampling Methodology:	ext. pole w/ Nasco swing arm sampler & dip cup, homogenize, fill jars
Sampling Equipment Used:	stainless steel bowls, spoons, dip cup - Nasco swing arm
Decon'ed per/LLA ?:	Yes; bowls, spoons, cups decon'ed @ ARI, Nasco swing arm decon'ed in field
Trip Blanks ?:	Yes (TB010710 @ 0900)
Sediment Grab Sample ID:	CB20107105ED
Sample time:	(1430) **Bottles labeled?:** Yes
Parameters for Testing:	Per LLA QAPP (VOCs, TOC, PAH-PCP-TPH, Ar, Dioxin/furans) + Pb, Tot. Solids
Sediment Present? Approx depth?	Yes ~1 to 15'
Water Present? Approx depth?	Yes ~2.5'
Water flowing? Stagnant?	Stagnant
Sed. color: brown, (black), grey, yellow, red, mottled	**Sed. odor:** petroleum, (pungent), sewage, (earthy), salty
Sed. sheen: none, some, (lots) (likely organic derived)	**Sed. consistency:** gravelly, sandy, silty, clayey, (organic)
Est. % of sample removed (particles ≥ 2 cm):	1-2%

Notes: *"Sed" is highly organic in nature w/ less than 20% actual grains (grains f-vfg sand & silt). VOC analysis questionable due to organic matter(?)

Sketch:



TAYLOR ASSOCIATES, INC.

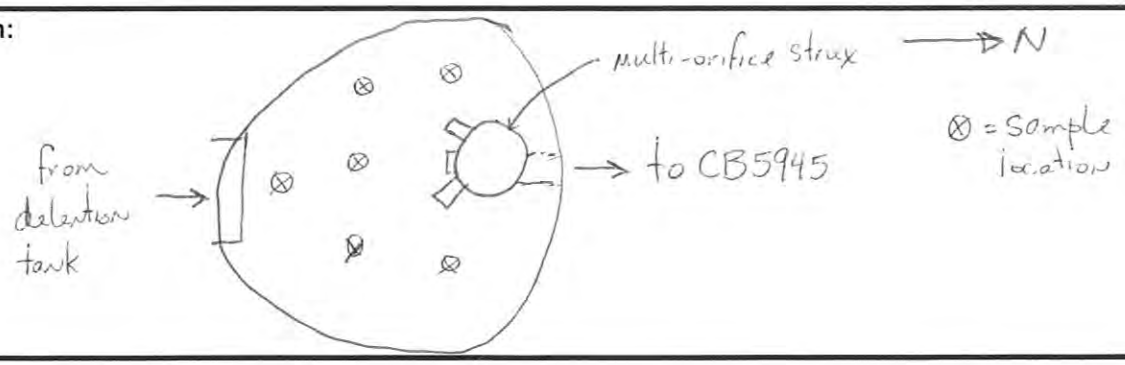
POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel: D. Metallo, P. Heltzel	**Date/Time:** 1-7-2010 (12:59)
Weather Partly sunny, clouds moving in, 40°s, breezy, no precip. in last 24-hrs	

Station ID:	CB-12
Manhole/CB #:	CB-12
Location Description:	end (north end) of detention tank @ SE portion of site, just prior to re-entry to main line @ CB5945
Sampling Methodology:	ext. pole w/ Nasco swing arm + dip cup, homogenize in bowl, fill jars
Sampling Equipment Used:	Stainless steel bowls, cups, spoons, Nasco swing arm
Decon'ed per/LLA ?:	Yes ARI decon'ed all except swing arm (decon'ed in field)
Trip Blanks ?:	Yes (TB010710 @ 0900)
Sediment Grab Sample ID:	CB12010710SED
Sample time: (1330)	**Bottles labeled?:** Yes
Parameters for Testing:	Per LLA QAPP (PAH-PCP-TPH, Ar, Dioxin/furan, VOC + TOC) + Pb, Tot. Solids
Sediment Present? Approx depth?	~1.5'
Water Present? Approx depth?	Yes ~1.5'-2'
Water flowing? Stagnant?	Stagnant
Sed. color: brown, (black), grey, yellow, red, mottled	**Sed. odor:** (petroleum), pungent, sewage, (earthy), salty
Sed. sheen: none, (some), lots (maybe organic derived)	**Sed. consistency:** gravelly, sandy, silty, clayey, (organic)
Est. % of sample removed (particles ≥ 2 cm):	~5-10% (detris) Sed v. organic w/ vfg sand & silt

Notes:
- "Sediment" dominated by organic matter - VOC sample questionable

Sketch:



TAYLOR ASSOCIATES, INC.

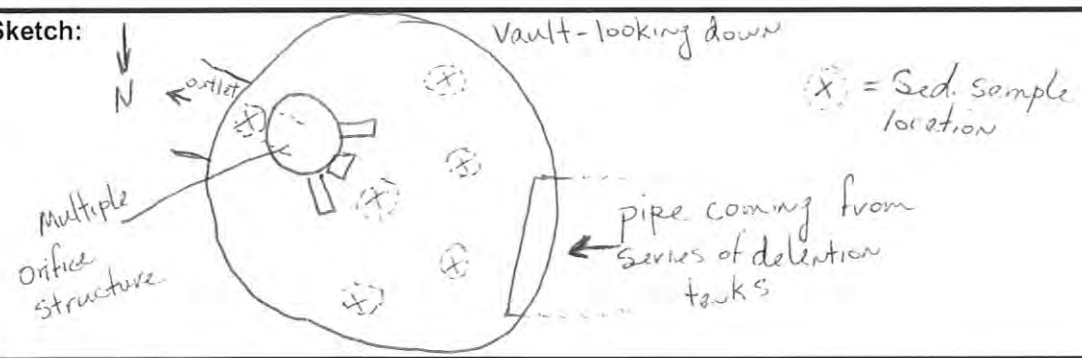
POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel: D. Metallo, P. Heltzel	**Date/Time:** 1-7-2010 (1130)
Weather Sunny - clear, breezy, 30-40°s, no precip in last 24 hrs	

Station ID:	CB-19
Manhole/CB #:	CS/CB-19
Location Description:	end node of (3) detention tanks (NW portion of site) just prior to re-entry to main SW line.
* **Sampling Methodology:**	ext. pole + SS dip cup, sample placed into SS bowl, homogenized, placed into jars
Sampling Equipment Used:	stainless steel bowls, spoons + dip cup; Nasco swing arm sampler
Decon'ed per/LLA ?:	Yes bowls + spoons - cups decon'ed by ARI, Nasco decon'ed in field
Trip Blanks ?:	Yes (TB010710 @ 0900)
Sediment Grab Sample ID:	CB19010710SED
Sample time: (1150)	**Bottles labeled?:** Yes
Parameters for Testing:	Per LLA QAPP (PAHs/PCP, TPH, Ar, Dioxins/furans, VOC + TOC) + Pb, Tot. Solids
Sediment Present? Approx depth?	Yes, ~ 1 to 1.5'
Water Present? Approx depth?	Yes, ~ 2 to 2.5'
Water flowing? Stagnant?	Stagnant
Sed. color: brown, black, grey, yellow, red, mottled	**Sed. odor:** petroleum, pungent, sewage, earthy, salty
Sed. sheen: none, some, lots	**Sed. consistency:** gravelly, sandy, silty, clayey, organic
Est. % of sample removed (particles ≥ 2 cm):	less than 1% → v. mucky

Notes: * VOC collected from SS bowl prior to brisk homogenation.
- Accumulated material very "mucky" + "soupy", persistent hydrocarbon odor, sheen noticeable

Sketch:



TAYLOR ASSOCIATES, INC.

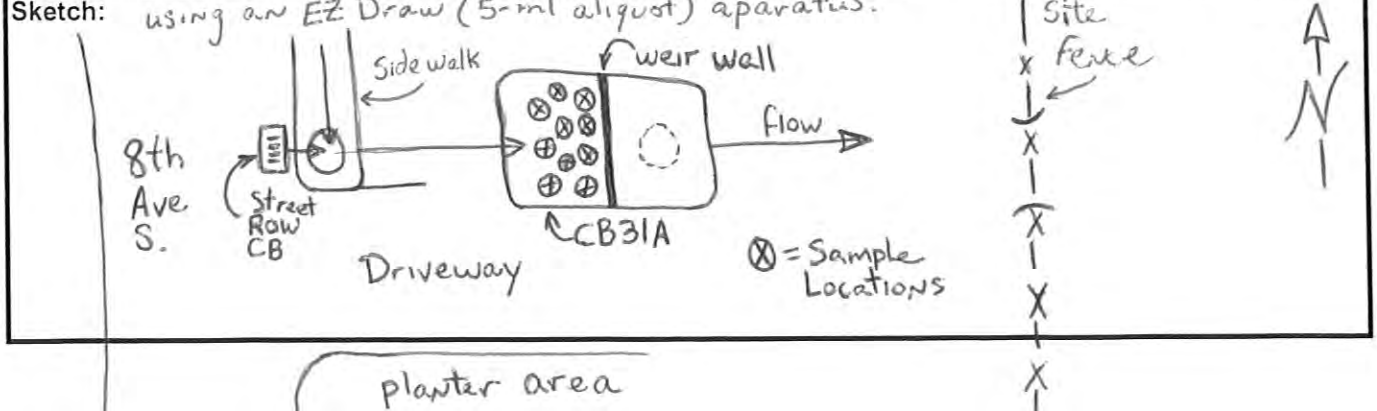
POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel: D. Metello	**Date/Time:** 1-11-2010 (0915)
Weather Rain, 40°s, breezy	

Station ID:	CB-31A
Manhole/CB #:	CB-31A
Location Description:	LLA project site & main drainage line inlet station, western half of double vault
Sampling Methodology:	ext. pole w/ Nasco swing arm sampler + SS dip cup, homogenize, fill jars
Sampling Equipment Used:	stainless steel bowls, spoons & dip cup - Nasco swing arm
Decon'ed per/LLA ?:	Yes; bowls, spoons & dip cup decon'ed @ ARI, Nasco swing arm decon'ed in field.
Trip Blanks ?:	Yes (TB011110 @ 0900)
Sediment Grab Sample ID:	CB31A011110SED ** collected triple vol. for MS/MSD analysis
Sample time: (1000)	**Bottles labeled?:** Yes
Parameters for Testing:	per LLA QAPP (VOCs, TPH, Dioxin/furans, PAH, PCP, TOC, As & Pb, Tot. Solids)
Sediment Present? Approx depth?	Yes, >1'+
Water Present? Approx depth?	Yes, ~2.5-3'
Water flowing? Stagnant?	flowing
Sed. color: brown, black, grey, yellow, red, mottled	**Sed. odor:** slight petroleum, pungent, sewage, earthy, salty
Sed. sheen: none, some, lots	**Sed. consistency:** gravelly, sandy, silty, clayey, organic
Est. % of sample removed (particles ≥ 2 cm):	< 1-2%

Notes: Sediment collected from western portion of divided double vault structure (inlet side of weir wall). Abundant amount of floatable debris (bottles, cans, plastic containers, balls, etc.). Used extention pole to Sample sediment from various ~~portions~~ PM locations around vault interior (sump area). Was also able to sample sed. from various depths. VOC portion of samples collected from SS bowl prior to brisk homogenation using an EZ Draw (5-ml aliquot) aparatus.

Sketch:



TAYLOR ASSOCIATES, INC.

POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel: D. Metallo	**Date/Time:** 1-11-2010 (1015)
Weather Rain, 40°s, breezy	

Station ID: CB99 (duplicate of CB-31A)	
Manhole/CB #: CB-31A	
Location Description: LLA project site stormwater main drainage line inlet station	
Sampling Methodology:	
Sampling Equipment Used:	
Decon'ed per/LLA ?:	
Trip Blanks ?: Yes (TB011110 @ 0900)	
Sediment Grab Sample ID: CB99011110SED	
Sample time: (1030)	**Bottles labeled?:** Yes
Parameters for Testing: per LLA QAPP (VOCs, TPH, Dioxin/furans, PAH, PCP, As & Pb, tot. solids)	
Sediment Present? Approx depth? } see form for CB-31A	
Water Present? Approx depth?	
Water flowing? Stagnant?	
Sed. color: brown, black, grey, yellow, red, mottled	**Sed. odor:** petroleum, pungent, sewage, earthy, salty
Sed. sheen: none, some, lots	**Sed. consistency:** gravelly, sandy, silty, clayey, organic
Est. % of sample removed (particles ≥ 2 cm):	

Notes: CB-99 sample is a duplicate split of CB-31A. Refer to CB-31A field form for collection and sediment description details.

Sketch:

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Report 2

Appendix B
Laboratory Analytical Reports and Chain-of-Custody Forms

(Refer to Appendix I of the Final SWIA Data Report)

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Report 2

Appendix C
Data Validation Report

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Port of Seattle
Lora Lake Apartments
Storm Water Interim Action

Prepared for:

Floyd/Snider
601 Union Street, Suite 600
Seattle, Washington 98101

Prepared by:

EcoChem, Inc.
710 Second Avenue, Suite 660
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EcoChem Project: C15207-2

February 22, 2010

Approved for Release:

Christine Ransom
Project Manager
EcoChem, Inc.

PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of both summary and full validation (Level III & IV) performed on catch basin sediment and quality control (QC) sample data for the Lora Lake Apartments Storm Water Interim Action project. A complete list of samples is provided in the **SAMPLE INDEX**.

The Dioxin/Furan analyses were performed by Frontier Analytical Laboratory, El Dorado Hills, California. All other analyses were performed by Analytical Resources, Inc. (ARI), Tukwila, Washington. The analytical methods and EcoChem project chemists are listed in the table below.

Analysis	Method	Primary Review	Secondary Review
Volatile Organic Compounds	SW8260C	Megan Kilner	Chris Ransom
Dioxin Furan Compounds	EPA 1613	Melissa Swanson	Eric Strout
Polynuclear Aromatic Hydrocarbons	SW8270D-SIM	Lucy Panteleeff	Chris Ransom
Pentachlorophenol	SW8041		
Total Petroleum Hydrocarbons	NWTPH-Dx		
Metals	SW6010B	Megan Kilner	Chris Ransom
Total Solids	EPA 160.3		
Total Organic Carbon	Plumb, 1981		

The data were reviewed using guidance and quality control criteria documented in the analytical methods; *Port of Seattle Lora Lakes Apartments, Stormwater Interim Action Plan* (Floyd/Snider, November 17, 2009); *National Functional Guidelines for Inorganic Data Review* (USEPA 1994 & 2004); and *National Functional Guidelines for Organic Data Review* (USEPA 1999 & 2008)

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **APPENDIX A**. A Qualified Data Summary Table is included in **APPENDIX B**. Data Validation Worksheets will be kept on file at EcoChem, Inc.

Sample Index
Floyd Snider
Port of Seattle - Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Lab ID	Dioxins	VOC	PAH	PCP	TPH-Dx	Metals	TOC	Total Solids
QE56	CB19010710Sed	QE56B		X	X	X	X	X	X	X
	CB12010710Sed	QE56C		X	X	X	X	X	X	X
	CB2010710Sed	QE56D		X	X	X	X	X	X	X
	Trip Blank	QE56E		X						
QF10	CB31A011110SED	QF10A		X	X	X	X	X	X	X
	CB99011110SED	QF10B		X	X	X	X	X	X	X
	Trip Blank	QF10C		X						
5913	CB19010710SED	5913-001-SA	X							
	CB12010710SED	5913-002-SA	X							
	CB2010710SED	5913-003-SA	X							
5914	CB31A011110SED	5914-001-SA	X							
	CB99011110SED	5914-002-SA	X							

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Dioxin/Furan Compounds by Method 1613

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Frontier Analytical Laboratory, El Dorado Hills, California. Full validation (Level IV) was performed on all data. See the **Sample Index** for a complete list of samples reviewed.

SDG	Number of Samples
5913	3 Sediment
5914	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The quality control (QC) requirements reviewed are summarized in the following table:

1	Sample Receipt, Preservation, and Holding Time		Ongoing Precision and Recovery (OPR)
	System Performance and Resolution Checks	1	Field Duplicates
	Initial Calibration (ICAL)		Target Analyte List
	Calibration Verification (CVER)	2	Reported Results
	Method Blanks		Compound Identification
2	Labeled Compound Recovery	1	Calculation Verification
1	Matrix Spike/Matrix Spike Duplicates (MS/MSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Receipt, Preservation, and Holding Times

The temperatures for two sample coolers (both at 0°C) were outside of the advisory control range of 2°C to 6°C. The temperature outliers did not impact data quality; therefore no qualifiers were assigned.

Labeled Compounds

Labeled compounds were added to every sample as specified in the method. The percent recovery (%R) values were within the QAPP specified control limits of 70% - 130%, with the exceptions noted below. For recoveries greater than the upper control limit, positive results for the associated compounds were estimated (J-13) to indicate a potential high bias. For recoveries less than the lower control limit, results for the associated compounds were estimated (J/UJ-13) to indicate a potential low bias.

SDG 5913: The %R values for three labeled compounds in Sample CB19010710SED, five labeled compounds in Sample CB12010710SED, and seven labeled compounds in Sample CB2010710SED were less than the 70% lower control limit. All associated target analytes were detected and were estimated (J-13). The %R values for four labeled compounds in the method blank and two labeled compounds in the ongoing precision and recovery standard (OPR) were less than the 70% lower control limit. No qualifiers were applied to these QC samples.

SDG 5914: The %R values for four labeled compounds in Sample CB31A011110SED and five labeled compounds in Sample CB99011110SED were less than the 70% lower control limit. All associated target analytes were detected and were estimated (J-13). The %R values for four labeled compounds in the method blank and two labeled compounds in the ongoing precision and recovery standard (OPR) were less than the 70% lower control limit. No qualifiers were applied to these QC samples.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Accuracy was evaluated using the labeled compound and OPR recoveries. Precision was assessed using the field duplicate analyses.

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) value control limit is 30% for results greater than five times the reporting limit (RL). For results less than five times the RL, the difference between the sample and duplicate must be less than two times the RL. No data were qualified based on field duplicate precision outliers. Users of the data should consider the impact of field precision outliers on the reported results.

SDG 5914: The data for one pair of field duplicates, CB31A01110SED and CB9901110SED, were submitted. The RPD value for total TCDD was greater than the 30% control limit.

Reported Results

The laboratory assigned "D,M" flags to several of the reported homologue group totals to indicate that a diphenyl ether (D) interference was present, which may result in a high bias (M) to the reported result. Due to this, all of the totals that were "D,M" flagged by the laboratory were estimated (J-14).

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the labeled compound and OPR %R values, with the above noted exceptions. Precision was acceptable as demonstrated by the field duplicate RPD values, with the exception noted above.

Data were estimated based on labeled compound recovery outliers and interference from diphenyl ether, causing a potential high bias.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Volatile Organic Compounds by SW846 Method 8260B

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples
QE56	3 Sediment & 1 Trip Blank
QF10	2 Sediment & 1 Trip Blank

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Preservation	2	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
	GC/MS Instrument Performance Check	1	Field Duplicates
	Initial Calibration (ICAL)		Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Laboratory Blanks		Reporting Limits
1	Field Blanks		Compound Identification
	Surrogate Compounds	1	Reported Results
	Laboratory Control Samples (LCS/LCSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Field Blanks

SDG QE56: One trip blank, Trip Blank, was submitted. No target analytes were detected in this blank.

SDG QF10: One trip blank, Trip Blank, was submitted. No target analytes were detected in this blank.

Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed at the required frequency. The MS/MSD recovery values were within the laboratory control limits, with the exceptions noted below. No action was taken if only one of the MS/MSD recoveries was outside of the control limits. For MS/MSD recoveries greater than the upper control limit, positive results in the parent sample only were estimated (J-8) to indicate a potential high bias. For recoveries less than the lower control limit, positive results and reporting limits in the parent sample were estimated (J/UJ-8) to indicate a potential low bias.

The MS/MSD RPD values were within the laboratory control limits, with the exceptions noted below. The following outliers resulted in qualification of data:

SDG QE56: QC Sample CB19010710Sed: trans-1,2-dichloroethene, cis-1,2-dichloroethene, trichloroethene, tetrachloroethene – low bias (UJ-8)

SDG QF10: QC Sample CB31A011110SED: tetrachloroethene – low bias (UJ-8)

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 50% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. There were no positive results for either sample; field precision was acceptable.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate, MS/MSD, and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) percent recovery values, with the exceptions previously noted. Precision was also acceptable as demonstrated by the MS/MSD, LCS/LCSD, and field duplicate RPD values.

Data were estimated based on MS/MSD recovery outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Polycyclic Aromatic Hydrocarbons by SW846 Method 8270D-SIM

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody record, but was not sampled. The location was later sampled on January 11, 2010 and included in SDG QF10.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Preservation	2	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	GC/MS Instrument Performance Check	1	Field Duplicates
	Initial Calibration (ICAL)	2	Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Blanks		Reporting Limits
2	Surrogate Compounds		Compound Identification
	Laboratory Control Samples (LCS)	2	Reported Results

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Surrogate Compounds

SDG QE56: The recovery for the surrogate d14-p-terphenyl was greater than the upper control limit of 160% for the 1X analysis of Sample CB2010710Sed. All positive results for this sample were estimated (J-13) to indicate a potential high bias.

Matrix Spike/Matrix Spike Duplicates

SDG QE56: Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Sample CB2010710SED. The MS/MSD %R values for pyrene were greater than the QAPP specified upper control limit of 160%. The pyrene result in the parent sample was estimated (J-8) to indicate a potential high bias.

SDG QF10: The MS/MSD analyses were performed using Sample CB31A011110SED. The MS %R value for pyrene was less than the QAPP specified lower control limit of 40%. The MSD recovery was right at the lower control limit. Because of the potential low bias, the pyrene result in the parent sample was estimated (J-8).

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 50% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. The relative percent difference (RPD) value for fluoranthene was greater than the control limit. The difference between the sample and duplicate was greater than 2X the RL for the following compounds: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, phenanthrene, and pyrene.

Internal Standards

SDG QE56: The recoveries for the internal standard perylene-d12 were less than the 50% lower control limit in the 1X analyses of all samples. The results for the compounds associated with this internal standard were estimated (J/UJ-19).

Reported Results

SDG QE56: The samples were analyzed at both 1X and 3X dilutions. In order to achieve the lowest possible reporting limits, the results from the 1X analyses should be used. The results for the 3X analyses were rejected (R-11).

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample, and MS/MSD %R values, with the exceptions noted above. Precision was also acceptable as demonstrated by the MS/MSD and field duplicate RPD values, with the exceptions previously noted.

Data were estimated due to internal standard, surrogate, and MS/MSD recovery outliers.

Data were rejected to indicate which result should be used from multiple reported analyses. A usable result remains for all analytes and all samples; therefore completeness is unaffected.

Rejected data should not be used for any purpose.

All other data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Pentachlorophenol by EPA Method 8041

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Receipt	1	Field Duplicates
	Initial Calibration (ICAL)		Second Column Confirmation
	Continuing Calibration (CCAL)		Retention Time Window
	Laboratory Blanks		Target Analyte List
1	Surrogate Compounds		Reporting Limits
	Laboratory Control Samples (LCS)		Compound Identification
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)	2	Reported Results

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Surrogate Compounds

SDG QE56: The percent recovery (%R) value for the surrogate 2,4,6-tribromophenol was less than the lower control limit in the method blank, MB-011210. No qualifiers are required for QC samples; therefore no action was taken.

Matrix Spike/Matrix Spike Duplicates

SDG QF10: Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Sample CB31A011110SED. The MS percent recovery (%R) value for pentachlorophenol was greater than the upper control limit. No action was required, as the MSD %R value for this analyte was within the control limits.

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 50% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. The RPD value for pentachlorophenol was greater than the control limit.

Reported Results

SDG QE56: The samples were re-analyzed at a 10x dilution due to continuing calibration outliers. The outliers were for non-target analytes; therefore the results from the 1x dilution should be used. All results from the 10x dilutions were rejected (R-11).

SDG QF10: Sample CB31A011110SED was initially analyzed at a 10x dilution. The sample was re-analyzed to obtain a lower reporting limit. The data from the re-analysis should be used. The pentachlorophenol result from the 10x dilution was rejected (R-11).

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample and MS/MSD recoveries, with the exception noted above. Precision was also acceptable as demonstrated by the MS/MSD and field duplicate RPD values, with the exception previously noted.

Data were rejected to indicate which result should be used from multiple reported analyses. A usable result remains for all analytes and all samples; therefore completeness is unaffected.

Rejected data should not be used for any purpose.

All other data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Diesel Range Hydrocarbons by Method NWTPH-Dx

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Initial Calibration (ICAL)	1	Field Duplicates
Continuing Calibration (CCAL)		Target Analyte List
Blanks		Compound Identification
Surrogate Compounds		Reporting Limits
Laboratory Control Samples (LCS)		Reported Results

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Matrix Spike/Matrix Spike Duplicates

SDG QE56: Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Sample CB2010710SED. The MSD percent recovery (%R) value for diesel was less than the lower control limit of 50%. The MS %R value for this analyte was within the control limits; therefore no action was taken for the MSD outlier.

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 50% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. The RPD value for diesel range organics was greater than the control limit.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample, and MS/MSD percent recovery values, with the exception previously noted. Precision was also acceptable as demonstrated by the MS/MSD and field duplicate RPD values, with the exception noted above.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Arsenic and Lead by EPA 6010B

This report documents the review of analytical data from the analysis of catch basin sediment samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation		2	Laboratory Duplicates
Initial Calibration		1	Field Duplicates
Continuing Calibration Verification			Interference Check Standards
CRDL Standards			Target Analyte List
Laboratory Blanks		1	Reporting Limits
Laboratory Control Samples (LCS)			Reported Results
Matrix Spikes (MS)			

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Laboratory Duplicates

Laboratory duplicate percent difference (RPD) values were used to evaluate precision. The relative percent difference (RPD) values were within the control limit of 20% for sample results greater than five times the reporting limit (for results less than five times the reporting limit, the absolute difference was less than twice the reporting limit) with the exceptions noted below. For RPD values exceeding the control limits, associated positive results and non-detects were qualified as estimated (J/UJ-9).

SDG QF10: Duplicate analyses were performed using Sample CB31A011110SED. The RPD value for lead (51.2%) was greater than control limit. The associated results were estimated (J-9).

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 20% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. All field precision criteria were met.

Reporting Limits

SDG QE56: The QAPP specified reporting limit of 5.0 mg/kg for arsenic was not met due to the high moisture content of the samples. The arsenic reporting limit was 20 mg/kg.

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. The laboratory and field duplicate RPD values indicated acceptable precision, with the exception noted above. Accuracy was also acceptable, as demonstrated by the matrix spike and laboratory control sample recoveries.

Data were estimated based on a laboratory duplicate RPD outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Total Organic Carbon by Plumb, 1981 and Total Solids by EPA 160.3

This report documents the review of analytical data from the analysis of catch basin sediment samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation		Matrix Spikes (MS)
Initial Calibration		Laboratory Replicates
Continuing Calibration Verification	1	Field Duplicates
Laboratory Blanks		Reporting Limits
Laboratory Control Samples (LCS)		Reported Results
Standard Reference Material (SRM)		

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 20% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. All field precision criteria were met.

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. The laboratory replicate percent relative standard deviation (%RSD) and field duplicated RPD values indicated acceptable precision. Accuracy was also acceptable, as demonstrated by the standard reference material, matrix spike, and laboratory control sample recoveries.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A
DATA QUALIFIER DEFINITIONS REASON CODES AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

1	Holding Time/Sample Preservation
2	Chromatographic pattern in sample does not match pattern of calibration standard.
3	Compound Confirmation
4	Tentatively Identified Compound (TIC) (associated with NJ only)
5A	Calibration (initial)
5B	Calibration (continuing)
6	Field Blank Contamination
7	Lab Blank Contamination (e.g., method blank, instrument, etc.)
8	Matrix Spike(MS & MSD) Recoveries
9	Precision (all replicates)
10	Laboratory Control Sample Recoveries
11	A more appropriate result is reported (associated with “R” and “DNR” only)
12	Reference Material
13	Surrogate Spike Recoveries (a.k.a., labeled compounds & recovery standards)
14	Other (define in validation report)
15	GFAA Post Digestion Spike Recoveries
16	ICP Serial Dilution % Difference
17	ICP Interference Check Standard Recovery
18	Trip Blank Contamination
19	Internal Standard Performance (e.g., area, retention time, recovery)
20	Linear Range Exceeded
21	Potential False Positives
22	Elevated Detection Limit Due to Interference (i.e., laboratory, chemical and/or matrix)

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler/Storage Temperature	Waters/Solids < 4°C Tissues <-10°C	EcoChem PJ, see TM-05	1
Holding Time	Extraction - Water: 30 days from collection *Note:* Under CWA, SDWA, and RCRA the HT for H2O is 7 days* Extraction - Soil: 30 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext > 30 days J(+)/UJ(-) if analysis > 40 Days EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 304.9824 Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift	R(+/-) if not met	14
Window Defining Mix and Column Performance Mix	Window defining mixture/Isomer specificity std run before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) x = ht. of TCDD y = baseline to bottom of valley For all isomers eluting near 2378-TCDD/TCDF isomers (TCDD only for 8290)	J(+) if valley > 25%	5A (ICAL) 5B (CCAL
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD <35% for labeled compounds under 1613b)	J(+) natives if %RSD > 20%	5A
	Abs. RT of $^{13}C_{12}$-1234-TCDD >25 min on DB5 >15 min on DB-225	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10 for all native and labeled compounds in CS1 std.	If <10, elevate Det. Limit or R(-)	

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Continuing Calibration	Analyzed at the start and end of each 12 hour shift. %D+/-20% for native compounds %D +/-30% for labeled compounds (Must meet limits in Table 6, Method 1613B) (If %Ds in the closing CCAL are w/in 25%/35% the avg RF from the two CCAL may be used to calculate samples per Method 8290, Section 8.3.2.4)	Do not qualify labeled compounds. Narrate in report for labeled compound %D outliers. For native compound %D outliers: 8290: J(+)/UJ(-) if %D = 20% - 75% J(+)/R(-) if %D > 75% 1613: J(+)/UJ(-) if %D is outside Table 6 limits J(+)/R(-) if %D is +/- 75% of Table 6 limit	5B
	Abs. RT of $^{13}C_{12}$-1234-TCDD and $^{13}C12$-123789-HxCDD +/- 15 sec of ICAL.	EcoChem PJ, see ICAL section of TM-05	
	RRT of all other compounds must meet Table 2 of 1613B.	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7
Field Blanks (Not Required)	No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	Concentrations must meet limits in Table 6, Method 1613B or lab limits.	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (recovery)	May not analyze MS/MSD %R should meet lab limits.	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	May not analyze MS/MSD RPD < 20%	J(+) in parent sample if RPD > CL	9

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Lab Duplicate	RPD <25% if present.	J(+)/UJ(-) if outside limts	9
Labeled Compounds / Internal Standards	*Method 8290:* %R = 40% - 135% in all samples *Method 1613B:* %R must meet limits specified in Table 7, Method 1613	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 IA ratios meet limits in Table 9 of 1613B or Table 8 of 8290 RRTs w/in limits in Table 2 of 1613B	If RT criteria not met, use PJ (see TM-05) If S/N criteria not met, J(+). if unlabelled ion abundance not met, change to EMPC If labelled ion abundance not met, J(+).	21
EMPC (estimated maximum possible concentration)	If quantitation idenfication criteria are not met, laboratory should report an EMPC value.	If laboratory correctly reported an EMPC value, qualify with U to indicate that the value is a detection limit.	14
Interferences	PCDF interferences from PCDPE	If both detected, change PCDF result to EMPC	14
Second Column Confirmation	All 2378-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC specs in this table must be met for the confirmation analysis.	Report lower of the two values. If not performed use PJ (see TM-05).	3
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used	11

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Hold Time	Waters: 14 days preserved 7 Days: unpreserved (for aromatics) Solids: 14 Days	J(+)/UJ(-) if hold times exceeded If exceeded by > 3X HT: J(+)/R(-) (EcoChem PJ)	1
Tuning	BFB Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Storage Blank	One per SDG <CRQL	U(+) the specific analyte(s) results in all assoc.samples using the 5x or 10x rule	7
Trip Blank	Frequency as per project QAPP	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned	18
Field Blanks (if required in QAPP)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS *low conc. H2O VOA*	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS *regular VOA (H2O & solid)*	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Added to all samples Within method control limits	J(+) if %R >UCL J(+)/UJ(-) if %R <LCL but >10% (see PJ[1]) J(+)/R(-) if <10%	13
Internal Standard (IS)	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

PJ[1] No action if there are 4+ surrogates and only 1 outlier.

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS CLP low conc. H2O only	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS regular SVOA (H2O & solid)	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

EcoChem Validation Guidelines (Based on SW846 Method 8000 and Organic NFG 1999)

Organochlorine Pesticides by 8081A; Aroclors by 8082; Organophosphorous Pests by 8141A; Chlorinated Herbicides by 8151A; Polyaromatic Hydrocarbons by 8310 (HPLC); and other GC/HPLC analyses performed under Method 8000

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) using PJ if greater than 6°C	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
DDT & Endrin Breakdown (Method 8081A)	At the start of each 12 hr. shift DDT Breakdown: < 15% Endrin Breakdown: <15%	Narrate if frequency criteria not met. J(+) DDT NJ(+) DDD and/or DDE R(-) DDT if (+) for either DDE or DDD J(+) Endrin NJ(+) EK and/or EA R(-) Endrin if (+) for either EK or EA	5B
Initial Calibration	Minimum 5 calibration levels Linear regression: R2 >0.990 RSD of response factors: <20% Quadratic curve requires 6 stds. Method 8081A: Single point calibration for multi-components	J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Continuing Calibration Verification (CCV)	Prior to analysis and after max. 20 samples or 12 hours, whichever comes first. %D <15% Method 8151A: CCV after every 10 samples.	Narrate if frequency criteria not met. J(+) If %R > 115% J(+)/UJ(-) If %R < 85% J(+)R(-) if %D > 90% (EcoChem PJ)	5B
Method Blank	One per matrix per batch (max. 20 samples) No results ≥RL	U (at RL) if sample result is less than RL and less than 5X blank result	7
		U (at reported sample value) if sample result is greater than or equal to RL and less than 5X blank result	7
Field Blank (Not Required)	Not addressed by NFG or SW-846 No results > RL	Apply 5X rule; U(+) < action level using same logic as method blank	6
MS/MSD	One per matrix per batch Lab limits or QAPP criteria	Narrate if frequency not met. Qualify parent only unless other QC indicates systematic problems. J(+) if both %R > UCL; J(+)/UJ(-) if both %R < LCL EcoChem PJ if only one %R outlier No action if parent conc. > 5x the amount spiked.	8

EcoChem Validation Guidelines (Based on SW846 Method 8000 and Organic NFG 1999)

Organochlorine Pesticides by 8081A; Aroclors by 8082; Organophosphorous Pests by 8141A; Chlorinated Herbicides by 8151A; Polyaromatic Hydrocarbons by 8310 (HPLC); and other GC/HPLC analyses performed under Method 8000

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Precision: MS/MSD or LCS/LCSD or Sample/Duplicate	One per matrix per batch Lab limits or QAPP criteria	J(+) if RPD > laboratory CL	9
LCS or LCS/LCSD	One per matrix per batch Lab limits or QAPP criteria	J(+)/UJ(-) If %R < LCL J(+) If > UCL J(+)/R(-) If any %R <10%	10
Surrogates	Added to all samples (inc. QC samples) Lab limits or QAPP criteria	J(+)/UJ(-) If %R < LCL J(+) If > UCL J(+)/R(-) If any %R <10% No action if 2 or more surrogates are used and only one is <LCL or >UCL (EcoChem PJ)	13
Quantitation/ Identification	Analyte within RTW on both columns or detectors RPD between values<40%	NJ(+) if RPD>40% R(+) using EcoChem PJ if RTW criterion not met NJ(+) if no confirmation Refer to Tech. Memo TM-08	3 21 (false +)
Internal Standards (if used)	IS area within -50% to +100% of CCV Methods 8081A & 8082: IS area within +/-50% of CCV	J(+) if IS > 100% J(+)/UJ(-) if IS < 50% J(+)/R(-) if IS is < 25%	19
Field Duplicate	Water: RPD < 35% Soil: RPD < 50%	Narrate (J/UJ if required by project instructions)	9
Two analyses for one sample (e.g. dilution)	Report only one result per analyte	"DNR" results that should not be used to avoid reporting multiple results for one sample. Refer to Tech. Memo TM-04	11

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X (EcoChem PJ)	1
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $R^2 \geq 0.990$ If used, RSD of response factors ≤20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J(+)/UJ(-) if %R < 85% J(+) if %R >115%	5B
Method Blank	At least one per batch (≤10 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7
		U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.	6
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked. Use PJ if only one %R outlier	8
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% (EcoChem PJ)	10

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits. (EcoChem PJ)	13
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2
Field Duplicates	Use project control limits, if stated in QAPP EcoChem default: water: RPD < 35% solids: RPD < 50%	Narrate (Use Professional Judgement to qualify)	9
Two analyses for one sample (dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported. (See TM-04)	11

EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration Tissues: Frozen	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r > 0.995	J(+)/UJ(-) if r < 0.995 (multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blank (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		(Refer to TM-02 for additional information)
			7

Reporting Limit Standard	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Sb, Pb, Tl)	R(-)/J(+) < 2x RL if %R <50% (< 30% Sb, Pb, Tl) J(+) < 2x RL, UJ(-) if %R 50-69% (30-49% Sb, Pb,Tl) J(+) < 2x RL if %R 130-180% (150-200% Sb, Pb, Tl) R(+) < 2x RL if %R > 180% (200% Sb, Pb, Tl)	14
Interference Check Samples (ICSA/ICSAB)	ICSAB %R 80 - 120% for all spiked elements | ICSA | < MDL for all unspiked elements except: K, Na	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R= 50 to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	

EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Matrix Spikes	One per matrix per batch 75-125% for samples less than 4x spike level	J(+) if %R > 125% J(+)/UJ(-) if %R < 75% J(+)/R(-) if %R < 30% or J(+)/UJ(-) if Post Spike %R 75-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, spike at twice the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples >RL and < 5x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL (2x RL for solids) qualify all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample conc. > 50x MDL	J(+)/UJ(-) if %D >10% qualify all samples in batch	16
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Metals Analysis by ICP-MS
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. ≤ 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J(+)/UJ(-) if tune criteria not met	5A
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J(+)/UJ(-) if r<0.995 (for multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R(-),(+) < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J(+) < 2x RL, UJ(-) if %R 50-69% (30%-49% Co,Mn, Zn) J(+) < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R(+) < 2x RL if %R > 180% (200% Co, Mn, Zn)	14
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7

EcoChem Validation Guidelines for Metals Analysis by ICP-MS (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% or J(+)/UJ(-) if Post Spike %R 75%-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J(+)/UJ(-) if %D >10% All samples in batch	16
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J (+)/UJ (-) all analytes associated with IS outlier	19
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < AL in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for coole temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B

Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method
	After each ICV and CCV every ten samples and end of run
	| blank| < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch
	(not to exceed 20 samples)
	blank < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blk value, U(+) results < action level
		For (-) blk value, J(+)/UJ(-) results < action level
			7

Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff<RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

QUALIFIED DATA SUMMARY TABLE
Floyd Snider
Port of Seattle - Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifiers	DV Reason
QE56	CB19010710Sed	10-433-QE56BDL	SW8041	Pentachlorophenol	260	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Naphthalene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	2-Methylnaphthalene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	1-Methylnaphthalene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Acenaphthylene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Acenaphthene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Dibenzofuran	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Fluorene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Phenanthrene	1200	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Anthracene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Fluoranthene	2200	ug/kg		R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Pyrene	2200	ug/kg		R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(a)anthracene	730	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Chrysene	1900	ug/kg		R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Benzo(b)fluoranthene	1400	ug/kg		J	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(b)fluoranthene	1300	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Benzo(k)fluoranthene	1400	ug/kg		J	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(k)fluoranthene	1300	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Benzo(a)pyrene	1100	ug/kg		J	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(a)pyrene	1000	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Indeno(1,2,3-cd)pyrene	520	ug/kg	U	UJ	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Indeno(1,2,3-cd)pyrene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Dibenz(a,h)anthracene	520	ug/kg	U	UJ	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Dibenz(a,h)anthracene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Benzo(g,h,i)perylene	850	ug/kg		J	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(g,h,i)perylene	980	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8260C	trans-1,2-Dichloroethene	5	ug/kg	U	UJ	8
QE56	CB19010710Sed	10-433-QE56B	SW8260C	cis-1,2-Dichloroethene	5	ug/kg	U	UJ	8
QE56	CB19010710Sed	10-433-QE56B	SW8260C	Trichloroethene	5	ug/kg	U	UJ	8
QE56	CB19010710Sed	10-433-QE56B	SW8260C	Tetrachloroethene	5	ug/kg	U	UJ	8
QE56	CB12010710Sed	10-434-QE56CDL	SW8041	Pentachlorophenol	250	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Naphthalene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	2-Methylnaphthalene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	1-Methylnaphthalene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Acenaphthylene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Acenaphthene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Dibenzofuran	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Fluorene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Phenanthrene	500	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Anthracene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Fluoranthene	1100	ug/kg		R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Pyrene	1000	ug/kg		R	11

QUALIFIED DATA SUMMARY TABLE
Floyd Snider
Port of Seattle - Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifiers	DV Reason
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(a)anthracene	300	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Chrysene	990	ug/kg		R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Benzo(b)fluoranthene	560	ug/kg		J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(b)fluoranthene	580	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Benzo(k)fluoranthene	560	ug/kg		J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(k)fluoranthene	580	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Benzo(a)pyrene	390	ug/kg		J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(a)pyrene	400	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Indeno(1,2,3-cd)pyrene	220	ug/kg	J	J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Indeno(1,2,3-cd)pyrene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Dibenz(a,h)anthracene	220	ug/kg	U	UJ	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Dibenz(a,h)anthracene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Benzo(g,h,i)perylene	360	ug/kg		J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(g,h,i)perylene	670	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8041	Pentachlorophenol	190	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Naphthalene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	2-Methylnaphthalene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	1-Methylnaphthalene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Acenaphthylene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Acenaphthene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Dibenzofuran	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Fluorene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Phenanthrene	340	ug/kg		J	13
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Phenanthrene	360	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Anthracene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Fluoranthene	900	ug/kg		R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Fluoranthene	780	ug/kg		J	13
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Pyrene	1500	ug/kg		J	8,13
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Pyrene	790	ug/kg		R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(a)anthracene	220	ug/kg		J	13
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(a)anthracene	250	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Chrysene	630	ug/kg		J	13
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Chrysene	700	ug/kg		R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(b)fluoranthene	370	ug/kg		J	13,19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(b)fluoranthene	450	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(k)fluoranthene	370	ug/kg		J	13,19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(k)fluoranthene	450	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(a)pyrene	300	ug/kg		J	13,19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(a)pyrene	260	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Indeno(1,2,3-cd)pyrene	190	ug/kg	U	UJ	19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Indeno(1,2,3-cd)pyrene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Dibenz(a,h)anthracene	190	ug/kg	U	UJ	19

QUALIFIED DATA SUMMARY TABLE
Floyd Snider
Port of Seattle - Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifiers	DV Reason
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Dibenz(a,h)anthracene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(g,h,i)perylene	280	ug/kg		J	13,19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(g,h,i)perylene	580	ug/kg	U	R	11
QF10	CB31A011110SED	10-690-QF10ADL	SW8041	Pentachlorophenol	80	ug/kg	U	R	11
QF10	CB31A011110SED	10-690-QF10A	SW8270D	Pyrene	270	ug/kg		J	8
QF10	CB31A011110SED	10-690-QF10A	SW6010B	Lead	32	mg/kg		J	9
QF10	CB31A011110SED	10-690-QF10A	SW8260C	Tetrachloroethene	1	ug/kg	U	UJ	8
QF10	CB99011110SED	10-691-QF10B	SW6010B	Lead	31	mg/kg		J	9
5913	CB19010710SED	5913-001-SA	EPA 1613	OCDD	23300	pg/g		J	13
5913	CB19010710SED	5913-001-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	481	pg/g		J	13
5913	CB19010710SED	5913-001-SA	EPA 1613	OCDF	1340	pg/g		J	13
5913	CB19010710SED	5913-001-SA	EPA 1613	Total HxCDF	513	pg/g	D,M	J	14
5913	CB12010710SED	5913-002-SA	EPA 1613	1,2,3,7,8-PeCDD	27.3	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	OCDD	46200	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	1,2,3,6,7,8-HxCDF	22.4	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	1060	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	OCDF	3750	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	Total TCDF	136	pg/g	D,M	J	14
5913	CB12010710SED	5913-002-SA	EPA 1613	Total HxCDF	785	pg/g	D,M	J	14
5913	CB2010710SED	5913-003-SA	EPA 1613	1,2,3,7,8-PeCDD	10.6	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	OCDD	13300	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	1,2,3,6,7,8-HxCDF	8.67	pg/g	J	J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	2,3,4,6,7,8-HxCDF	10.7	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	209	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	1,2,3,4,7,8,9-HpCDF	10.6	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	OCDF	569	pg/g		J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	1,2,3,7,8-PeCDD	3.96	pg/g	J	J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	2,3,4,7,8-PeCDF	2.23	pg/g	J	J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	246	pg/g		J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	OCDF	914	pg/g		J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	Total TCDF	8.48	pg/g	D,M	J	14
5914	CB31A011110SED	5914-001-SA	EPA 1613	Total PeCDF	49.5	pg/g	D,M	J	14
5914	CB31A011110SED	5914-001-SA	EPA 1613	Total HxCDF	349	pg/g	D,M	J	14
5914	CB99011110SED	5914-002-SA	EPA 1613	1,2,3,7,8-PeCDD	3.99	pg/g	J	J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	1,2,3,7,8-PeCDF	0.989	pg/g	J	J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	2,3,4,7,8-PeCDF	2.87	pg/g	J	J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	237	pg/g		J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	OCDF	899	pg/g		J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	Total PeCDF	47.5	pg/g	D,M	J	14
5914	CB99011110SED	5914-002-SA	EPA 1613	Total HxCDF	340	pg/g	D,M	J	14

Port of Seattle
Lora Lake Apartments

Stormwater Interim Action Data Report

Appendix B
Storm Event Reports
(Events 1 through 10)

FINAL

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	January 14, 2010
TO:	Matt Woltman / Jessi Massingale
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600
	Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #1 (12/14/2009)

Please find included the following:

- Storm report narrative (2 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- Hydrographs (3 pgs),
- Compositing Worksheets (3 pgs),
- Sampler Reports (17 pgs),
- pH Worksheet (1 pg), and
- Weather forecasting information (6 pgs).

Please let me know if you have any questions or need additional information. Thank You.

Dave Metallo, LHG

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #1
December 14th, 2009

General:

This was the first storm event (STE) of the project. Site set up was completed several days prior to STE#1, on 12/11/2009. All equipment operated as designed and programmed. CB-31A (main line inlet station) and CB-4857 (main line outlet station) automatically enabled within 15 minutes of each other. CB-1 (onsite outlet station) was manually enabled. This manual enable was necessary because it was noted that runoff was occurring, stormwater was flowing through the pipe, but the level inside the pipe was not building to any appreciable level. This was due to the sampling point being downstream from the flow control structure at CB-2 - which worked very well in regulating flow in a very shallow manner (< .75"). Once CB-1 was enabled it operated as designed and programmed. Consequently, level (which was accurately measured throughout the event) was used to calculate flow via Mannings Equation (using a slope of 4.098% and roughness coefficient of 0.011).

Grab samples were collected at each station using dedicated lines attached to a peristaltic pump. All grabs were collected as early as possible during the storm event once runoff was noted and during the rising the limb of the storm hydrograph at each monitoring station.

CB-31A and CB-4857 had a total of 127,804 and 142,592 gallons of flow during their sampling periods, respectively. A difference of 14,788 gallons existed between the two stations. This difference can be accounted for in site runoff into the main line system during the storm period.

Compositing Scheme:

The hydrographs from each monitoring station were examined and decisions were made as to what specific bottles were to be included in the composite samples. See the attached field forms and compositing worksheets for details. Each of three autosamplers were programmed to collect samples via time paced programming – each was set to collect an aliquot every 15-minutes (10 storm duration program). All of the samples were manually flow weighed based on site specific information.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. The locations were MW-1, MW-3, MW-4 and MW-6. Measurements are listed in the table below.

Location	Date	Time	Water Level (from TOC) (FT)
MW-1	12/18/09	1300	16.89
MW-3	12/18/09	1350	17.56
MW-4	12/18/09	1430	16.55
MW-6	12/18/09	1500	12.20

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, either grabs or composite samples were placed into cooler and iced. All samples were recorded on Chain-of-Custody forms and were in direct control of project personnel at all times. All samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from all of the stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Anomalies and/or Workplan Deviations:

There were no anomalies observed that would cause any of the STE#1 samples to be non-representative of the conditions from which they were collected. MS/MSD samples were not collected for either the grab or composite portions of the STE#1 field activities. In lieu of these QC samples, additional laboratory QC samples were analyzed and will be described in the first stormwater interim report.

Actions To Be Completed:

The situation at CB-1 will be looked into to determine what can be done in an efficient manner to improve level and flow monitoring and subsequently, sample collection at the "tail" end of storm events. Improving this situation will also aid the auto-enabling function of the monitoring and sampling equipment. At this time it is anticipated that a Thel-Mar insert-able weir will be utilized at this location to help improve the hydraulic storm response.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #1

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Storm Event Data:	
Project Storm Event (STE) #	1
Event Forecast Probability (%)	70 - 90
Antecedent Dry Period (days: hrs: mins)	4:02:20
STE Start Date & Time	12/14/09 17:30
STE Duration (hrs:mins)	8:10
STE End Date & Time	12/15/09 0:10
Period Between Next Measureable Rain (hrs: mins)	11:05
Was Targeted STE Qualified Per LLA QAPP	**Yes**
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.48
Max Rainfall Intensity (in/hr)	0.13
Average Rainfall Intensity	0.06

[1] Sample Collection Criteria:			
Sampling Station	**CB-31A**	**CB-4857**	**CB-1**
Was Grab sample collected?	**Yes**	**Yes**	**Yes**
Grab ID	CB31A121409GRAB	CB4857121409GRAB	CB1121409GRAB
Grab Date /Time	12/14/2009 18:30	12/14/2009 19:30	12/14/2009 19:50
Was runoff occurring at grab collection? If no, was hydrograph at least 10% above background?	**Yes**	**Yes**	**Yes**
Hydrograph stage at grab collection	rising limb	rising limb	rising limb
Grab parameters collected per LLA QAPP ?	**Yes**	**Yes**	**Yes**
Were Trip Blanks included w/ Grab samples ?	**Yes**	**Yes**	**Yes**
Was Comp sample collected?	**Yes**	**Yes**	**Yes**
Comp ID	CB31A121509COMP	CB4857121509COMP	CB1121409GRAB
Comp Date /Time	12/15/2009 2:35	12/15/2009 3:35	12/14/2009 23:45
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	**Yes, 99%**	**Yes, 99%**	**Yes, 88%**
Was a minimum of at least 8 aliquots collected for comp sample ?	**Yes (35)**	**Yes (40)**	**Yes (17)**
Comp parameters collected per LLA QAPP ?	**Yes**	**Yes**	**Yes**
Rainfall during sampling period (in)	0.44	0.46	0.33
pH Measurements Collected ?	Yes	Yes	Yes
Volume sampled during storm period (gallons)	127804	142592	1064
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	**No**	**No**	**No**

[1] If the answer to any of the validation/qualification questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date:_____ Reveiwed By / Date:_____

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:

Turn-around Requested: Standard

Date: 12-14-09

ARI Client Company: ~~POS-Airport~~ JCN: Phone: Floyd/Snider 206-292-2078

Page: 1 of 1

Client Contact: Matt Wolfman

No. of Coolers: 1 Cooler Temps: 4.0

Client Project Name: Lora Lake Apartments

Client Project #: POS-LLA

Samplers: D. Metallo C. Nickerson

Sample ID	Date	Time	Matrix	No. Containers	NWTPH-DX ①	VOC 8260-C SIM							Notes/Comments
CB31A121409GRAB	12.14.09	1830	W	4	X	X							
CB4857121409GRAB	12.14.09	1900	W	4	X	X							
CB1121409GRAB	12.14.09	1950	W	4	X	X							
~~TRIP~~ DM													
TB121409	12.14.09	1800	W	3		X							

Comments/Special Instructions
① - Acid Silica clean-up for TPH-DX

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)				
Printed Name	Dave Metallo	Jonathon Walter		
Company	Taylor Assoc. Inc.	ARI		
Date & Time	12-15-09 (1219)	12/15/09 1225		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Floyd / Snider	Phone: 206-292-2078
Client Contact: Jessi Massingale / Matt Woltman	
Client Project Name: Lora Lake Apts.	
Client Project #: POS-LLA	Samplers: D. Metallo, C. Nickerson, B. Kwasnowski

Date: 12-16-09
Page: 1 of 1
No. of Coolers: 2
Cooler Temps: 2.9, 1.2

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM low level	PCP 8041	Arsenic Total & Diss 200.8	Dioxin / Furans 1613	TSS SM2540D				Notes/Comments
CB31A121509COMP	12.15.09	0235	W	1	X	X	X	X	X				Storm Lab meas'ed pH (see attached sheet) 6.73
CB4857121509COMP	12.15.09	0335	W	1	X	X	X	X	X				6.67
CB1121409COMP	12.14.09	2345	W	1	X	X	X	X	X				6.73

Analysis Requested

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
- See pH Measurements in comments	Printed Name: Brad Kwasnowski	Printed Name: Jonathan Walter	Printed Name:	Printed Name:
	Company: Taylor Associates	Company: ARI	Company:	Company:
	Date & Time: 12/16/09 @ 15:10	Date & Time: 12/16/09 1510	Date & Time:	Date & Time:

Station: CB-31A

8 x 1 gallon bottle set-up
Rev.ed 12/14/09

Page: 1 of 2 (pages per station)

Section 1. Storm Setup and Inspection

Personnel: DM & PH	Weather: Drizzle & 40°s	Arrival Date/Time: 12-14-09 (1240)	
Carry-over maintenance to do prior to set-up: Newly installed		done? NA	
Sampler Battery Voltage	12.61	Changed? Y (N)	New voltage NA
Flow Meter Battery Voltage	NA	Changed? Y N	New voltage

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flowmeter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	NO
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ ft	-0.018'	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ ft	0.00	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ ft	.018'	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	Yes	Diagnostics/Distrubutor arm check?	Yes - good
Velocity (fps)	0	Enable Level ~~(in)~~* ft.	0.03'
Flow Rate (cfs)	0	Pacing Rate (cf)*	NA
Data Downloaded (Yes/No)	Yes	Program Reviewed? (Yes/No) LLA MULTI	- Yes
Channel conditions/observations: • pipe has sed. blockage, ~4+"'s of water. • noticed visible sheen		Sampler "Running"... Prgm Disabled	13:28 MO 14-Dec
		Ice Deployed? (Yes/No)	No
		* NA unless directed by Storm Controller	

Notes: Isco Prgm (Multi) set time pacing for a 10 hr storm duration.

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: DM & CN   Weather: Rain, 40°   Arrival Date/Time: 12-14-09 (1820)

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	1830
Grab Sample Bottle ID	CB31A12H09GRAB
Grab Duplicates Collected?	No
Grab Blank Collected?	No
VOA trip blank in cooler?	Yes

Sample Observations: - Water is turbid brown

Internal Flowmeter	
Flowmeter cables OK? (Yes/No)	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes

Notes: Data looks good

Sampler	
Equipment running correctly?	Yes
Composite Begin Time (date/time)	(1804) 12.14.09
On Composite... (Bottle #/ Aliq #)	Btl. 1 4 of 5
Ice deployed?	NO
Sampler Battery Voltage (Changed?):	12.59
Bottle Swap needed? (if yes fill out Section 3)	NO

Section 3. Mid-Storm Check/Bottle Switch

Personnel: DM & DO   Weather: drizzle, 30-40   Arrival Date/Time: 12-14-09 (~~~430~~) pm

* ~~Composite Begin Time (date/time)~~	See Section 5	Round #:	(~2330)
Last Aliquot Taken (date/time, bott #, aliq #)	NA	Data downloaded?	Yes
Comp Bottles Labeled? (Sta. & date)	NA	Sampler Battery Voltage (Changed):	No change
Comp Sample Volume Collected	NA	Ice deployed?	NO

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed
Several aliquots (2 missed + 2 low vol.) on BTL 3

Channel conditions/observations: Water flowing, no issues

Notes/Maintenance Needed: Sampler running fine

Station: CB-31A

Section 4. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

DM

Section 5. Comp Sample Collection/Post Storm

Personnel: PH	Weather: Rain	Arrival Date/Time: 12/15/09 12:45	
Sampler Battery Voltage	—	Changed? Y (N)	New voltage —
Modem Battery Voltage	—	Changed? Y (N)	New voltage —
Composite Begin Time (date/time)	12/14/09 18:04		Round #:
Last Aliquot Taken (date/time, bott #, aliq #)	12/15/09 03:49	Bottle 12, Aliq #5 of 5	
Comp Bottles Labeled? (Sta. & date)	yes	Data downloaded? Yes	
Comp Sample Volume Collected	100% on all ~~12~~ bottles except bottle #3, 80%		

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed
(12/14/09/20:34/3/1)(12/14/09/20:49/3/2)(12/14/09/21:01/3/3)(12/14/09/21:19/3/4)

Channel conditions/observations
ok, None observed

Notes/Maintenance Needed: Standard station reset

Section 6. QC Sampling

Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes: None collected this round			

Comp Info:
Used btls 1-7 for comp'ing after examining the hydrograph
CB31A121509COMP (0235)

12/15/2009
post storm manual flow weighted composite (see comp'ing sheet)

Station: CB4857 | **8 x 1 gallon bottle set-up** Rev.ed 12/14/09 | Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: DM + PH	Weather: overcast, spotty drizzle, 40°s		Arrival Date/Time: 12-14-09 (1420)		
Carry-over maintenance to do prior to set-up:	Newly installed			done? X	
Sampler Battery Voltage	12.43	Changed? (Y) N		New voltage	13.03
Flow Meter Battery Voltage	Same batt. as above	Changed? Y N X		New voltage	X

Flowmeter		Sampler	
Date/time correct? (Yes/No)	12-14-09 (1444) Yes	Pump Tubing OK?	Yes
Flowmeter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ ft	0.033	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ ft	NA	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ ft	NA	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	NO	Diagnostics/Distrubutor arm check?	Yes - ran fine
Velocity (fps)	0.14	Enable Level ~~(in)~~* ft	0.08'
Flow Rate (cfs)	1 gpm	Pacing Rate (cf)*	NA
Data Downloaded (Yes/No)	Yes	Program Reviewed? (Yes/No) LLA Multi	10-hr. Set up
Channel conditions/observations: Slight amt. of base flow		Sampler "Running"... Prgm Disabled	14:57 MO 14-Dec
		Ice Deployed? (Yes/No)	NO

* NA unless directed by Storm Controller

Notes: Set enable to 0.03' (typical) + 0.047 (greatest amt. of "noise" in pipe over last several days) = 0.077' (Rnd'ed to 0.08')

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: DM & CN | Weather: Raining, 40°s | Arrival Date/Time:

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	12-14-09 (1900)
Grab Sample Bottle ID	CB4857121409 GRAB
Grab Duplicates Collected?	NO
Grab Blank Collected?	NO
VOA trip blank in cooler?	Yes

Sample Observations: Water is v. turbid, brown, "dirty-looking" * Need to invest. issue w/ grab line - could not readily pull sample through line w/ peristaltic pump

Internal Flowmeter		Sampler	
Flowmeter cables OK? (Yes/No)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date/time)	12-14-09 (1749)
Notes: data looks good for all parameters		On Composite... (Bottle #/ Aliq #)	BTL# 1 3 of 5
		Ice deployed?	NO
		Sampler Battery Voltage (Changed?):	12.87 - No ▽
		Bottle Swap needed? (if yes fill out Section 3)	No

Section 3. Mid-Storm Check/Bottle Switch

Personnel: DM & DO	Weather: drizzle 30-40	Arrival Date/Time:	12-14-09 (~~1445~~) DM
Composite Begin Time (date/time)	NA - See Section 5	Round #:	(~2345)
Last Aliquot Taken (date/time, bott #, aliq #)	NA	Data downloaded?	Yes
Comp Bottles Labeled? (Sta. & date)	NA	Sampler Battery Voltage (Changed):	12.85, NO
Comp Sample Volume Collected	NA	Ice deployed?	No

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed: No missed aliquots - all fine

Channel conditions/observations: Water flow through to vault, no issues

Notes/Maintenance Needed: Sampler running fine

Station: CB-4857

Section 4. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

DM

Section 5. Comp Sample Collection/Post Storm

Personnel: PH DM	Weather: Rain		Arrival Date/Time: 12/15/09 13:40		
Sampler Battery Voltage	—	Changed? Y (N)		New voltage	—
Modem Battery Voltage	—	Changed? Y (N)		New voltage	—
Composite Begin Time (date/time)	12/14/09 17:49			Round #: 1	
Last Aliquot Taken (date/time, bott #, aliq #)	12/15/09 08:34	Bottle #12, Aliq. 5 of 5			
Comp Bottles Labeled? (Sta. & date)	Yes	Data downloaded? Yes			
Comp Sample Volume Collected	100%				

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed

NONE

Channel conditions/observations

OK, None observed

Notes/Maintenance Needed:

Assess grab ~~[illegible]~~ line for connection issues

Section 6. QC Sampling

Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes:	None Collected this round		

Comping Info:

Used btls 1-8 for comping after reviewing hydrograph

CB4857121509COMP (0335)

12/15/09

post-storm manual flow weighted composite (see comping sheet for details)

Station: CB-1 | **8 x 1 gallon bottle set-up** Rev.ed 12/14/09 | Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: DM & PH	Weather: Overcast, spotty drizzle, 40°s		Arrival Date/Time: 12-14-09 (1320)		
Carry-over maintenance to do prior to set-up:	Newly installed			done?	NA
Sampler Battery Voltage	12.46	Changed? (Y) N		New voltage	12.90
Flow Meter Battery Voltage	12.15	Changed? Y (N)		New voltage	NA

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flowmeter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ ft	-0.052	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ ft	0	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ ft	0.052'	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	Yes	Diagnostics/Distrubutor arm check?	Yes - ran fine
Velocity (fps)	—	Enable Level ~~(in)~~* ft	0.072
Flow Rate (cfs)	—	Pacing Rate (cf)*	NA
Data Downloaded (Yes/No)	Yes	Program Reviewed? (Yes/No)	Yes - 10hr Setup
Channel conditions/observations: No flow in pipe		Sampler "Running"...	See below
		Ice Deployed? (Yes/No)	No

* NA unless directed by Storm Controller

Notes: Current 4150 FM unable to connect to computer - need to swap out
Enable lvl is the thickness of a low flow strainer (0.042') + typical 0.03' = 0.072'

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: DM & CN | Weather: Raining 40°s | Arrival Date/Time: 12-14-09 (1930)

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	12-14-09 (1950)
Grab Sample Bottle ID	CB112409GRAB
Grab Duplicates Collected?	No
Grab Blank Collected?	NO
VOA trip blank in cooler?	Yes

Sample Observations: Water much more clear than at the other main-line stations

Internal Flowmeter		Sampler	
Flowmeter cables OK? (Yes/No)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date/time)	12-14-09 (2013)
Notes: looks for level; Flow depth too shallow to register velocity & flow vol.		On Composite... (Bottle #/ Aliq #)	"Manually" started *
		Ice deployed?	No
		Sampler Battery Voltage (Changed?):	12.86 NO ▽
		Bottle Swap needed? (if yes fill out Section 3)	See below

Section 3. Mid-Storm Check/Bottle Switch

Personnel: DM & DO | Weather: drizzle, 30-40 | Arrival Date/Time: 12-14-09 (~~1200~~) DM

Composite Begin Time (date/time)	See Section 4	Round #:	~(0000)
Last Aliquot Taken (date/time, bott #, aliq #)	—	Data downloaded?	Yes
Comp Bottles Labeled? (Sta. & date)	—	Sampler Battery Voltage (Changed):	No change
Comp Sample Volume Collected	—	Ice deployed?	No

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed: See Section 4

Channel conditions/observations: V. low water level in pipe

Notes/Maintenance Needed: Sampler running fine

(2358) 12-14-09 BtL 4 1of5

Lora Lakes Apartments Stormwater Interim Action - Stormwater Sampling

Taylor Associates, Inc.

Station: CB-1

Section 4. Mid-Storm Check/Bottle Switch			
Personnel: DM & DO	Weather: drizzle (lite) 30-40	Arrival Date/Time:	12-14-09 (0105)
Composite Begin Time (date/time)	12-14-09 (2013)		Round #:
Last Aliquot Taken (date/time, bott #, aliq #)	~~0059 12-15-09~~	Data downloaded?	Yes
Comp Bottles Labeled? (Sta. & date)	Yes	Sampler Battery Voltage (Changed):	12.72 NO ∇
Comp Sample Volume Collected	4-gals 100%	Ice deployed?	NO
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed: See Sampling Rpt - several throughout base			
Channel conditions/observations: Rain has stopped v. low to no flow in pipe			
Notes/Maintenance Needed: Collect Base #1 (BTLs 1-4) & reset w/ fresh 4-BtL base (btls 5-8)			

Section 5. Comp Sample Collection/Post Storm			
Personnel: PH	Weather: Rain	Arrival Date/Time:	12/15/09 13:15
Sampler Battery Voltage	—	Changed? Y (N)	New voltage —
~~Modem~~ Battery Voltage	—	Changed? Y (N)	New voltage —
Composite Begin Time (date/time)	See section 4		Round #: 2
Last Aliquot Taken (date/time, bott #, aliq #)	12/14/09 23:58, Bottle 4, aliq. 1 of 5		
Comp Bottles Labeled? (Sta. & date)	NO, no water	Data downloaded? Yes	
Comp Sample Volume Collected	~~0~~		
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed: All, NLD (2nd base, btls 5-8, NO water collected due to no water in pipe)			
Channel conditions/observations: OK, none observed			
Notes/Maintenance Needed: Lifted head off and no water in base #2.			

Section 6. QC Sampling			
Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes: None Collected this round			

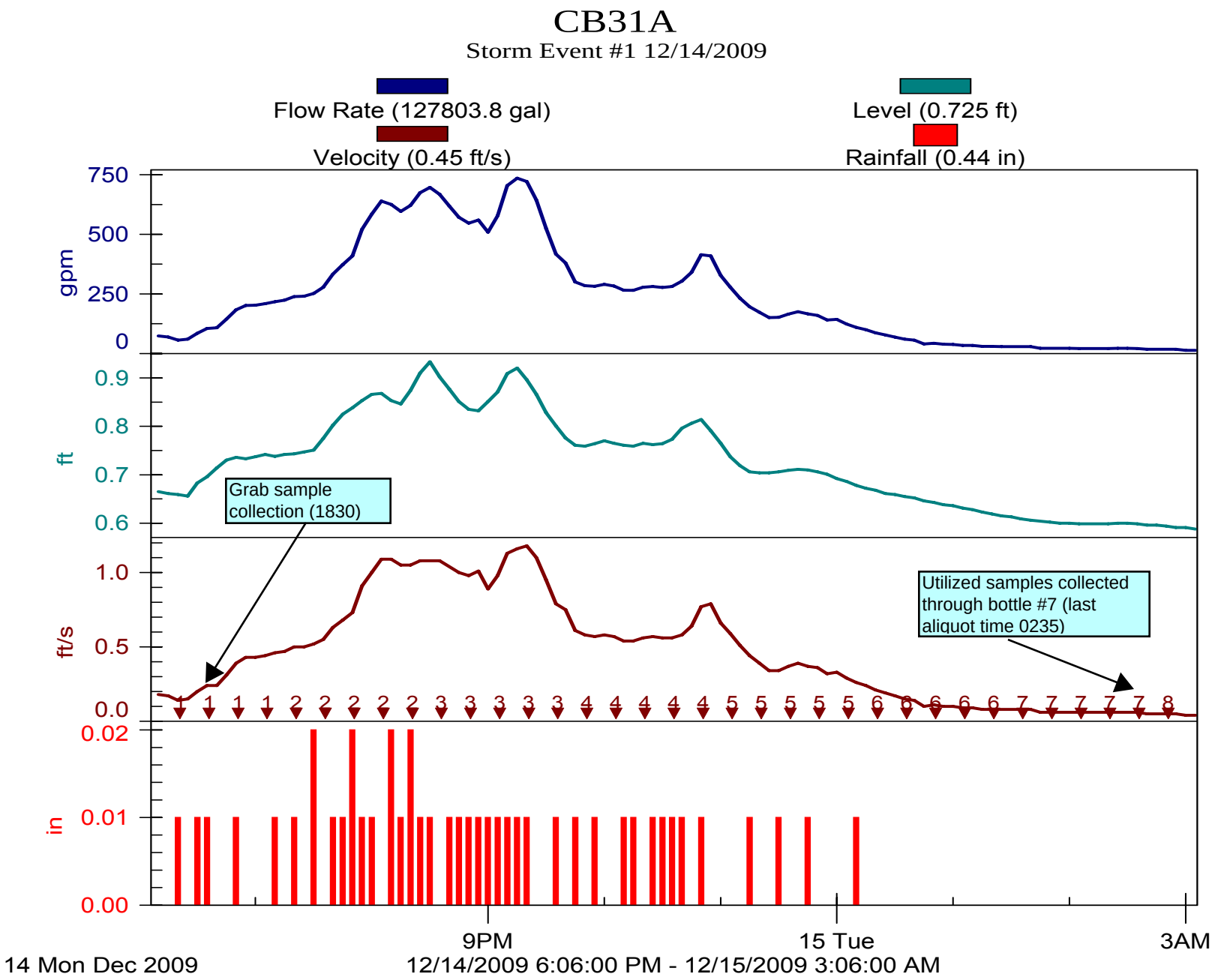
Comping Info:

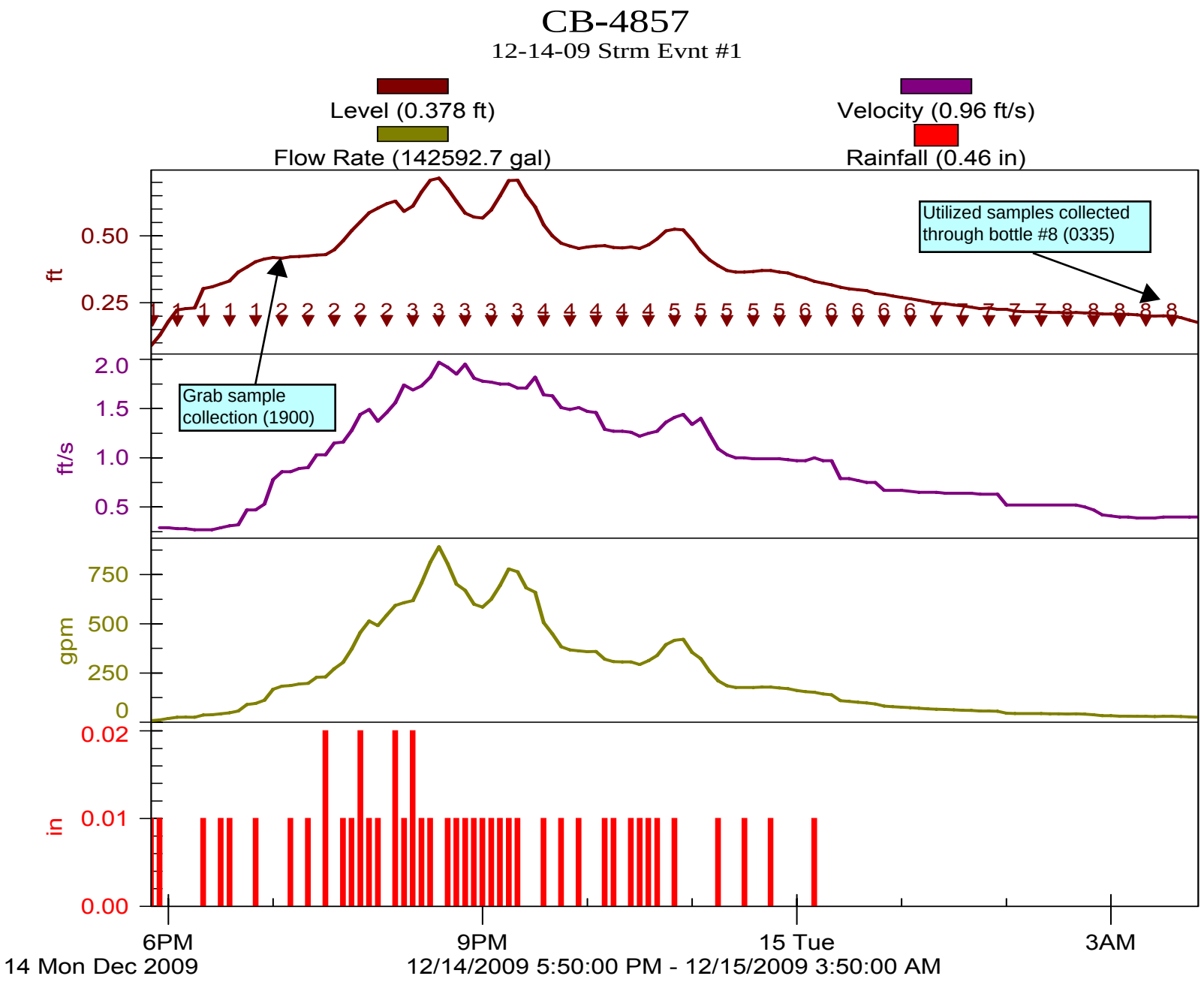
used btls 1-3 (btls 4-8 had no water)

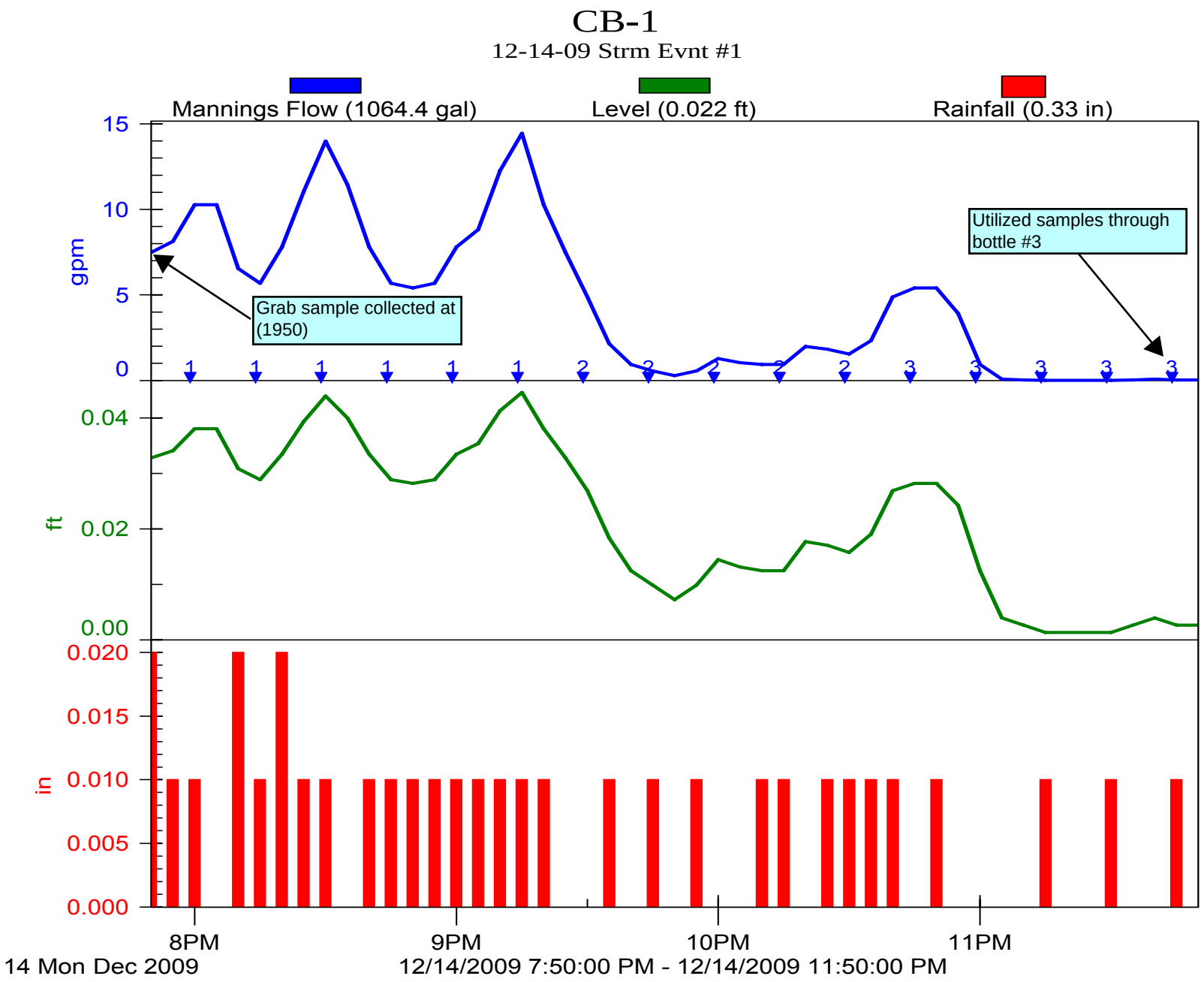
CB1121409Comp (2345)

12/14/09

post-storm manual flow weighted comp's (see comp'ing sheet for details)


CB31A
Storm Event #1 12/14/2009
Flow Rate (127803.8 gal)
Level (0.725 ft)
Velocity (0.45 ft/s)
Rainfall (0.44 in)
750
500
250
0
gpm
0.9
0.8
0.7
0.6
ft
Grab sample collection (1830)
1.0
0.5
0.0
ft/s
Utilized samples collected through bottle #7 (last aliquot time 0235)
1 1 1 1 2 2 2 2 2 3 3 3 3 3 4 4 4 4 4 5 5 5 5 5 6 6 6 6 6 7 7 7 7 7 8
0.02
0.01
0.00
in
9PM
15 Tue
3AM
14 Mon Dec 2009
12/14/2009 6:06:00 PM - 12/15/2009 3:06:00 AM


CB-4857
12-14-09 Strm Evnt #1
Level (0.378 ft)
Velocity (0.96 ft/s)
Flow Rate (142592.7 gal)
Rainfall (0.46 in)
Utilized samples collected through bottle #8 (0335)
Grab sample collection (1900)
ft
0.50
0.25
ft/s
2.0
1.5
1.0
0.5
gpm
750
500
250
0
in
0.02
0.01
0.00
6PM
14 Mon Dec 2009
9PM
15 Tue
3AM
12/14/2009 5:50:00 PM - 12/15/2009 3:50:00 AM


CB-1
12-14-09 Strm Evnt #1
Mannings Flow (1064.4 gal)
Level (0.022 ft)
Rainfall (0.33 in)
gpm
15
10
5
0
Grab sample collected at (1950)
Utilized samples through bottle #3
1 1 1 1 1 1 2 2 2 2 2 3 3 3 3 3
ft
0.04
0.02
0.00
in
0.020
0.015
0.010
0.005
0.000
8PM
9PM
10PM
11PM
14 Mon Dec 2009
12/14/2009 7:50:00 PM - 12/14/2009 11:50:00 PM

CB31A - 121409 STE#1

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot
8585.1	0.193532	387	**1**	6.72%	6.72%
33054.9	0.74515	1490	**2**	25.87%	32.59%
44360.05	1	2000	**3**	34.72%	67.31%
22780.75	0.513542	1027	**4**	17.83%	85.14%
13462.3	0.303478	607	**5**	10.54%	95.67%
3830.1	0.086341	173	**6**	3.00%	98.67%
1698.3	0.038284	77	**7**	1.33%	100.00%

Qtotal 127771.5

max Q 44360.05
min V (ml) 2000 **5761** Volume of Composite Container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB4857 121409 STE#1

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot
2610	0.049909	100	**1**	1.83%	1.83%
22250	0.425471	851	**2**	15.64%	17.48%
52295	1	2000	**3**	36.76%	54.24%
29870	0.571183	1142	**4**	21.00%	75.23%
19795	0.378526	143	**5**	13.92%	89.15%
8665	0.165695	331	**6**	6.09%	95.24%
4170	0.07974	159	**7**	2.93%	98.17%
2600	0.049718	99	**8**	1.83%	100.00%

Qtotal 142255

max Q 52295
min V (ml) 2000 **4826** Volume of composite container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB1 121409 STE#1

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot
560.95	1	3000	**1**	65.21%	65.21%
183.25	0.326678	980	**2**	21.30%	86.51%
116.05	0.206881	621	**3**	13.49%	100.00%

Qtotal 860.25

max Q 560.95
min V (ml) 3000 **4601** Volume of composite container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB31A 121409

SAMPLER ID# 1069569980 12:55 15-DEC-09
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB31A   "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 16 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 15 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1069569980 12:55 15-DEC-09
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB31A
PROGRAM: LLA MULTI
Program Started at 13:26 MO 14-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		13:26	PGM DISABLED		
		18:04	PGM ENABLED		
1,5	1	18:04	E		477
2,5	1	18:19	T		479
3,5	1	18:34	T		479
		18:40	MANUAL PAUSE		
		18:41	MANUAL RESUME		
4,5	1	18:49	T		485
5,5	1	19:04	T		481
1,5	2	19:19	T		485
2,5	2	19:34	T		481
3,5	2	19:49	T		481
4,5	2	20:04	T		493
5,5	2	20:19	T		483
1,5	3	20:34	T	NL	*
2,5	3	20:49	T	NM	*
3,5	3	21:04	T	NL	*
4,5	3	21:19	T	NM	*
5,5	3	21:34	T		503
1,5	4	21:49	T		491
2,5	4	22:04	T		483
3,5	4	22:19	T		481
4,5	4	22:34	T		487
5,5	4	22:49	T		483
1,5	5	23:04	T		481
2,5	5	23:19	T		487

CB31A 121409

		23:23	MANUAL PAUSE	
		23:24	MANUAL RESUME	
3,5	5	23:34	T	483
4,5	5	23:49	T	481
----------		TU 15-DEC-09	----------	
5,5	5	00:04	T	481
1,5	6	00:19	T	481
2,5	6	00:34	T	487
3,5	6	00:49	T	489
4,5	6	01:04	T	483
5,5	6	01:19	T	489
1,5	7	01:34	T	483
2,5	7	01:49	T	489
3,5	7	02:04	T	483
4,5	7	02:19	T	489
5,5	7	02:34	T	485
1,5	8	02:49	T	489
2,5	8	03:04	T	483
3,5	8	03:19	T	489
4,5	8	03:34	T	483
5,5	8	03:49	T	489
1,5	9	04:04	T	483
2,5	9	04:19	T	489
3,5	9	04:34	T	483
4,5	9	04:49	T	489
5,5	9	05:04	T	483
1,5	10	05:19	T	483
2,5	10	05:34	T	487
3,5	10	05:49	T	483
4,5	10	06:04	T	487
5,5	10	06:19	T	489
1,5	11	06:34	T	483
2,5	11	06:49	T	489
3,5	11	07:04	T	485
4,5	11	07:19	T	489
5,5	11	07:34	T	483
1,5	12	07:49	T	489
2,5	12	08:04	T	483
3,5	12	08:19	T	489
4,5	12	08:34	T	483
5,5	12	08:49	T	489
		08:50	PGM DONE 15-DEC	

```
   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
    ERROR NL ==> NO LIQUID DETECTED!
    ERROR NM ==> NO MORE LIQUID!
----------------------------------------
```

SAMPLER ID# 1224319970 13:34 15-DEC-09
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB4857   "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 22 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 15 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1224319970 13:35 15-DEC-09
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB4857
PROGRAM: LLA MULTI
Program Started at 14:56 MO 14-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE ERROR	COUNT TO LIQUID
		14:56	PGM DISABLED	
		17:49	PGM ENABLED	
1,5	1	17:49	E	598
2,5	1	18:04	T	598
3,5	1	18:19	T	601
4,5	1	18:34	T	604
5,5	1	18:49	T	610
		18:59	MANUAL PAUSE	
		19:00	MANUAL RESUME	
1,5	2	19:04	T	601
2,5	2	19:19	T	571
3,5	2	19:34	T	606
4,5	2	19:49	T	602
5,5	2	20:04	T	604
1,5	3	20:19	T	602
2,5	3	20:34	T	604
3,5	3	20:49	T	608
4,5	3	21:04	T	604
5,5	3	21:19	T	601
1,5	4	21:34	T	606
2,5	4	21:49	T	607
3,5	4	22:04	T	607
4,5	4	22:19	T	605
5,5	4	22:34	T	607
1,5	5	22:49	T	607
2,5	5	23:04	T	604

3,5	5	23:19	T	610
4,5	5	23:34	T	606
5,5	5	23:49	T	610
----------	TU 15-DEC-09		----------	
1,5	6	00:04	T	606
2,5	6	00:19	T	610
3,5	6	00:34	T	609
4,5	6	00:49	T	608
5,5	6	01:04	T	604
1,5	7	01:19	T	607
2,5	7	01:34	T	610
3,5	7	01:49	T	603
4,5	7	02:04	T	606
5,5	7	02:19	T	610
1,5	8	02:34	T	609
2,5	8	02:49	T	607
3,5	8	03:04	T	607
4,5	8	03:19	T	608
5,5	8	03:34	T	614
1,5	9	03:49	T	616
2,5	9	04:04	T	608
3,5	9	04:19	T	604
4,5	9	04:34	T	608
5,5	9	04:49	T	607
1,5	10	05:04	T	616
2,5	10	05:19	T	608
3,5	10	05:34	T	614
4,5	10	05:49	T	608
5,5	10	06:04	T	616
1,5	11	06:19	T	616
2,5	11	06:34	T	616
3,5	11	06:49	T	608
4,5	11	07:04	T	616
5,5	11	07:19	T	616
1,5	12	07:34	T	616
2,5	12	07:49	T	608
3,5	12	08:04	T	608
4,5	12	08:19	T	616
5,5	12	08:34	T	610
		08:35	PGM DONE 15-DEC	

SOURCE E ==> ENABLE
SOURCE T ==> TIME

CB1 121409 Base1

SAMPLER ID# 1078487086 01:28 15-DEC-09
  Hardware: A1   Software: 2.20
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1   "

   UNITS SELECTED:
     LENGTH: ft

   4, 3.70 lit BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 15 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

      ENABLE:

  NONE PROGRAMMED

```
    ----------
     ENABLE:
  ONCE ENABLED,
   STAY ENABLED
 SAMPLE AT ENABLE
    ----------
     ENABLE:
0 PAUSE & RESUMES


    ----------

NO DELAY TO START


    ----------
    ----------
    ----------
 LIQUID DETECT ON

QUICK VIEW/CHANGE

    ----------

TAKE MEASUREMENTS
 EVERY  1 MINUTES

    ----------
 DUAL SAMPLER OFF
BTL FULL DETECT OFF
 TIMED BACKLIGHT

    ----------

 EVENT MARK SENT
DURING PUMP CYCLE

    ----------
 PUMP COUNTS FOR
EACH PURGE CYCLE:
  200 PRE-SAMPLE
 AUTO POST-SAMPLE
    ----------
```

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1078487086 01:28 15-DEC-09
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********

CB1 121409 Base1

SITE: CB1
PROGRAM: LLA MULTI
Program Started at 20:13 MO 14-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		20:13	PGM ENABLED		
1,5	1	20:13	S		443
		20:14	MANUAL PAUSE		
		20:15	MANUAL RESUME		
		20:16	MANUAL PAUSE		
		20:16	MANUAL RESUME		
2,5	1	20:28	T		454
3,5	1	20:43	T		446
4,5	1	20:58	T		446
5,5	1	21:13	T		446
1,5	2	21:28	T		440
2,5	2	21:43	T		440
3,5	2	21:58	T		444
4,5	2	22:13	T		442
5,5	2	22:28	T		440
1,5	3	22:43	T		442
2,5	3	22:58	T		443
3,5	3	23:13	T	NM	*
4,5	3	23:28	T	NM	*
5,5	3	23:43	T	NM	*
1,5	4	23:58	T	NM	*
----------	TU 15-DEC-09				----------
2,5	4	00:13	T	NL	*
3,5	4	00:28	T	NL	*
4,5	4	00:43	T	NL	*
5,5	4	00:58	T	NL	*
		00:59	PGM DONE 15-DEC		

SOURCE S ==> START
SOURCE T ==> TIME
ERROR NL ==> NO LIQUID DETECTED!
ERROR NM ==> NO MORE LIQUID!

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1078487086 13:19 15-DEC-09
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********

CB1 121409 Base2

SITE: CB1
PROGRAM: LLA MULTI
Program Started at 01:35 TU 15-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID	
		01:35	PGM ENABLED			
1,5	1	01:35	S	NL		*
2,5	1	01:50	T	NL		*
3,5	1	02:05	T	NL		*
4,5	1	02:20	T	NL		*
5,5	1	02:35	T	NL		*
1,5	2	02:50	T	NL		*
2,5	2	03:05	T	NL		*
3,5	2	03:20	T	NL		*
4,5	2	03:35	T	NL		*
5,5	2	03:50	T	NL		*
1,5	3	04:05	T	NL		*
2,5	3	04:20	T	NL		*
3,5	3	04:35	T	NL		*
4,5	3	04:50	T	NL		*
5,5	3	05:05	T	NL		*
1,5	4	05:20	T	NL		*
2,5	4	05:35	T	NL		*
3,5	4	05:50	T	NL		*
4,5	4	06:05	T	NL		*
5,5	4	06:20	T	NL		*
		06:20	PGM DONE 15-DEC			

SOURCE S ==> START
SOURCE T ==> TIME
ERROR NL ==> NO LIQUID DETECTED!

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: LOMA LAKES
12/16/09

Date: 12/16/09
Staff: EW
pH meter make/model #: THERMO SCIENTIFIC ORION pH METER

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB1121409 COMP	6.73	13:05	
CB4857121509 COMP	6.69	13:15	
CB31A121509 COMP	6.73	13:50	

Post-Measurement Check

Nominal pH value of standard	7.0	
Temperature (deg C)	17.0	
Standard pH, temp corrected	7.01	
Meter pH reading (SU)	6.98	
Difference (SU)	0.03	*Should be < 0.1 (round to 0.0)*
Time	13:55	

Form to be included in storm file, as applicable

NWS Forecast for: Seatac WA

Issued by: National Weather Service Seattle, WA
Last Update: 5:40 am PST Dec 14, 2009

Print

Short Term Forecast

Today: Rain likely after 10am. Cloudy, with a high near 39. Calm wind becoming southeast around 5 mph. Chance of precipitation is 70%.

Tonight: Rain. Low around 37. East southeast wind between 7 and 10 mph. Chance of precipitation is 90%.

Tuesday: Rain. High near 46. South southeast wind between 7 and 10 mph. Chance of precipitation is 80%.

Tuesday Night: Rain. Low around 42. South southwest wind between 13 and 15 mph. Chance of precipitation is 90%.

Wednesday: Rain. High near 48. South wind between 10 and 18 mph. Chance of precipitation is 80%.

Wednesday Night: Rain likely. Cloudy, with a low around 41. Chance of precipitation is 70%.

Thursday: A 40 percent chance of rain. Mostly cloudy, with a high near 47.

Thursday Night: A chance of rain. Mostly cloudy, with a low around 40.

Friday: A chance of rain. Mostly cloudy, with a high near 47.

Friday Night: A chance of rain. Mostly cloudy, with a low around 39.

Saturday: A chance of rain. Mostly cloudy, with a high near 48.

Saturday Night: A chance of rain. Mostly cloudy, with a low around 38.

Sunday: A chance of rain. Mostly cloudy, with a high near 49.

Point Forecast: Seatac WA
47.44°N 122.3°W (Elev. 371 ft)

Visit your local NWS office at: http://www.wrh.noaa.gov/sew

Area Forecast Discussion

Issued by NWS Seattle/Tacoma, WA

```
000
FXUS66 KSEW 141300 CCA
AFDSEW

AREA FORECAST DISCUSSION...CORRECTION
```

NATIONAL WEATHER SERVICE SEATTLE WA
330 AM PST MON DEC 14 2009

CORRECTION TO TYPOS.

.SYNOPSIS...SCATTERED LIGHT SHOWERS OVER THE NORTH INTERIOR WILL END THIS MORNING. RAIN WILL INCREASE THIS AFTERNOON AS A WARM FRONT APPROACHES. PRECIPITATION MAY START AS SNOW IN THE NORTH INTERIOR AND HOOD CANAL AREA. HEAVY SNOW IS EXPECTED IN THE MOUNTAINS THROUGH TUESDAY. A SERIES OF FRONTAL SYSTEMS WILL AFFECT THE REGION THROUGH LATE THIS WEEK.

&&

.SHORT TERM...A TRANSITION TO A WETTER AND WARMER PATTERN EXPECTED THIS WEEK ACROSS THE PAC NW.

TEMPS HAVE MODERATED ACROSS THE INTERIOR THIS MORNING UNDER A THICK MARINE LAYER AND ONSHORE FLOW. GENERALLY SEEING READINGS IN THE 30S...WITH COOLER 20S IN THE NORTH INTERIOR THANKS TO FRASER RIVER OUTFLOW. STILL SEEING A FEW LIGHT SHOWERS ON THE RADAR IN THE NORTH PART BUT MAY ONLY SEE A LIGHT DUSTING OR A RAIN/SNOW MIX. THUS WILL LET THE CURRENT BATCH OF ADVISORIES END.

A WARM FRONT WILL SWEEP INLAND LATE THIS AFTERNOON AND MAY SEE PRECIP START OUT AS SNOW...ESPECIALLY THE NORTH INTERIOR AGAIN AS COOLER AIR CONTINUES TO SPILL OUT OF THE FRASER. THE HOOD CANAL AREA COULD SEE A FEW INCHES OF SNOW TOO BEFORE WARMER AIR MOVES INLAND LATE THIS EVENING. WILL ISSUE A WINTER WEATHER ADVISORY FOR THE HOOD CANAL AREA WITH ACCUMULATIONS OF 1 TO 4 INCHES POSSIBLE...HEAVIEST AMOUNTS WILL BE FOUND NEAR THE OLYMPICS. THE MOUNTAINS WILL ALSO GET HAMMERED WITH SNOW LEVELS REMAINING BELOW PASS LEVELS. THE OLYMPICS AND CASCADES WILL NEED WINTER STORM WARNING WITH HEAVY SNOW LASTING THROUGH TUE AFTERNOON. EASTERLY FLOW WILL KEEP PASS TEMPS BELOW FREEZING DESPITE RISING SNOW LEVELS.

THE FORECAST REMAINS ACTIVE THROUGH AT LEAST THE MIDDLE OF THE WEEK WITH ANOTHER SYSTEM ARRIVING ON WED. TEMPS WILL REMAIN MILD WITH LOWS IN THE MID TO UPPER 30S AND HIGHS IN THE 40S. 33

.LONG TERM...NOT MUCH CHANGE TO THE LONG TERM PACKAGE. WE STAY IN AN ACTIVE PATTERN THROUGH THU...THEN A POSSIBLE BREAK IN THE WEATHER ON FRI AS AN UPPER LEVEL RIDGE BUILDS OVER THE PAC NW. THE RIDGE MAY AMPLIFY OVER THE WEEKEND BUT BOTH THE GFS AND ECMWF SHOW MOISTURE CLIPPING THE REGION...MAINLY AFFECTING THE COAST OR NORTH PART OF THE CWA. THE RIDGE MAY BREAK DOWN EARLY NEXT WEEK AS A TROUGH DIGS OFFSHORE AND SHIFTS INLAND. THE GFS IS A BIT MORE PROGRESSIVE WITH THIS NEXT WAVE AND WILL HOLD POPS/TEMPS NEAR CLIMO. 33

&&

.HYDROLOGY...A TRANSITION TO A WETTER PATTERN WILL BEGIN TONIGHT THROUGH AT LEAST THE MIDDLE OF THE WORK WEEK AS A SERIES OF PACIFIC FRONTAL SYSTEMS SWEEP THROUGH WESTERN WASHINGTON. INITIALLY SNOW LEVELS REMAIN LOW WITH HEAVY SNOW EXPECTED TONIGHT THROUGH TUES AFTERNOON IN THE MOUNTAINS. SNOW LEVELS WILL RISE TO AROUND 4000 FT ON WED AS ANOTHER SYSTEMS CLIPS THE REGION. THE FLOOD POTENTIAL

LOOKS LOW AT THE MOMENT AS RIVERS HAVE BEEN RUNNING LOW WITH LITTLE TO NO PRECIP ACROSS THE REGION SINCE LATE NOV. NO FLOOD CONCERNS FOR THE GREEN RIVER.

MODELS TRY TO BUILD AN UPPER LEVEL RIDGE ACROSS THE PAC NW LATE THIS WEEK INTO THE WEEKEND...WITH A BREAK IN THE WEATHER POSSIBLE. THE RIDGE WILL BREAK DOWN EARLY NEXT WEEK BUT EXACT TIMING REMAINS UNCLEAR AS BOTH THE GFS AND ECMWF DIFFER. 33

&&

.AVIATION...CONVERGENCE ZONE BETWEEN WHIDBEY ISLAND AND THE SAN JUANS CONTINUING THIS MORNING WITH SNOW SHOWERS REDUCING VISIBILITIES DOWN TO AS LOW AS A MILE. THE CONVERGENCE WILL DISSIPATE MIDDAY. OUTSIDE OF THE CONVERGENCE ZONE STRATUS LAYER OVER THE CWA WITH CEILINGS BETWEEN 1000 AND 2000 FEET WITH LOCAL CEILINGS BELOW 1000 FEET AND VISIBILITIES 3-5SM IN FOG. THESE CONDITIONS WILL SLOWLY IMPROVE LATE MORNING INTO THE AFTERNOON HOURS AS THE NEXT FRONT APPROACHES THE AREA. PRECIPITATION STARTING ALONG THE COAST IN THE AFTERNOON AND SPREADING INTO THE INTERIOR LATE IN THE AFTERNOON. PRECIPITATION MOSTLY IN THE FORM OF RAIN. THE EXCEPTIONS WILL BE NEAR THE HOOD CANAL AND UP AROUND KBLI WHERE THE PRECIPITATION WILL START OUT AS SNOW BEFORE CHANGING TO RAIN MONDAY EVENING. CEILINGS BY THE TIME THE PRECIPITATION STARTS IN THE 3000 TO 4000 FOOT RANGE. CEILINGS LOWERING BACK DOWN TO THE 1000 TO 2000 FOOT RANGE AS THE FRONT PASSES THROUGH EARLY TUESDAY MORNING.

KSEA...CEILINGS REMAINING IN THE 600 TO 1000 FEET RANGE THROUGH THE MORNING HOURS. SLOW IMPROVEMENT THIS AFTERNOON WITH CEILINGS NEAR 3500 FEET THIS EVENING WITH RAIN. AT THIS POINT IT LOOKS LIKE THE PRECIPITATION WILL BE IN THE FORM OF RAIN FROM THE START AT THE TERMINAL. FRONTAL PASSAGE 09-12Z TUESDAY. LIGHT WINDS THIS MORNING BECOMING SE LESS THAN 10 KNOTS THIS AFTERNOON. FELTON

&&

.MARINE...HIGH PRESSURE OVER SOUTHERN BRITISH COLUMBIA WILL WEAKEN TODAY. A PACIFIC FRONT WILL MOVE INTO THE AREA FROM THE WEST PASSING THROUGH THE WATERS LATE TONIGHT INTO EARLY TUESDAY MORNING. WINDS INCREASING TO GALE FORCE OUT AHEAD OF THE FRONT OVER THE COASTAL WATERS THIS AFTERNOON AND CONTINUING UNTIL THE FRONTAL PASSAGE. WINDS ALSO INCREASING INLAND WITH GALES RIGHT AHEAD OF THE FRONT FOR THE EAST ENTRANCE TO THE STRAIT. SMALL CRAFT ADVISORY WINDS EXPECTED FOR THE WEST ENTRANCE TO THE STRAIT AS WELL AS ADMIRALTY INLET AND THE NORTHERN INLAND WATERS. THE NEXT FRONT...ASSOCIATED WITH A 988 MB LOW MOVING INTO NORTHERN VANCOUVER ISLAND WILL MOVE THROUGH TUESDAY NIGHT WITH GALES POSSIBLE AGAIN OVER THE COASTAL WATERS BEGINNING TUESDAY AFTERNOON.

A SERIES OF FAST MOVING FRONTAL SYSTEMS WILL MOVE ACROSS THE WATERS THROUGH THE REMAINDER OF THE WEEK WITH SMALL CRAFTS OVER PORTIONS OF THE INTERIOR AT TIMES AND NEAR GALE WINDS AT TIMES OVER THE COASTAL WATERS AND SEAS BETWEEN 12 AND 19 FEET. THE PASSAGE OF THESE FRONTAL SYSTEMS ARE DIFFICULT TO TIME AT THIS POINT SO THE LATTER HALF OF THE FORECAST PERIOD ARE BROAD BRUSHED. FELTON

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...A WINTER WEATHER ADVISORY IS IN EFFECT FOR THE HOOD
CANAL AREA FOR MONDAY AFTERNOON THROUGH MONDAY EVENING.

A WINTER STORM WARNING IS IN EFFECT FOR THE OLYMPICS AND
CASCADES FOR MONDAY AFTERNOON THROUGH TUESDAY.

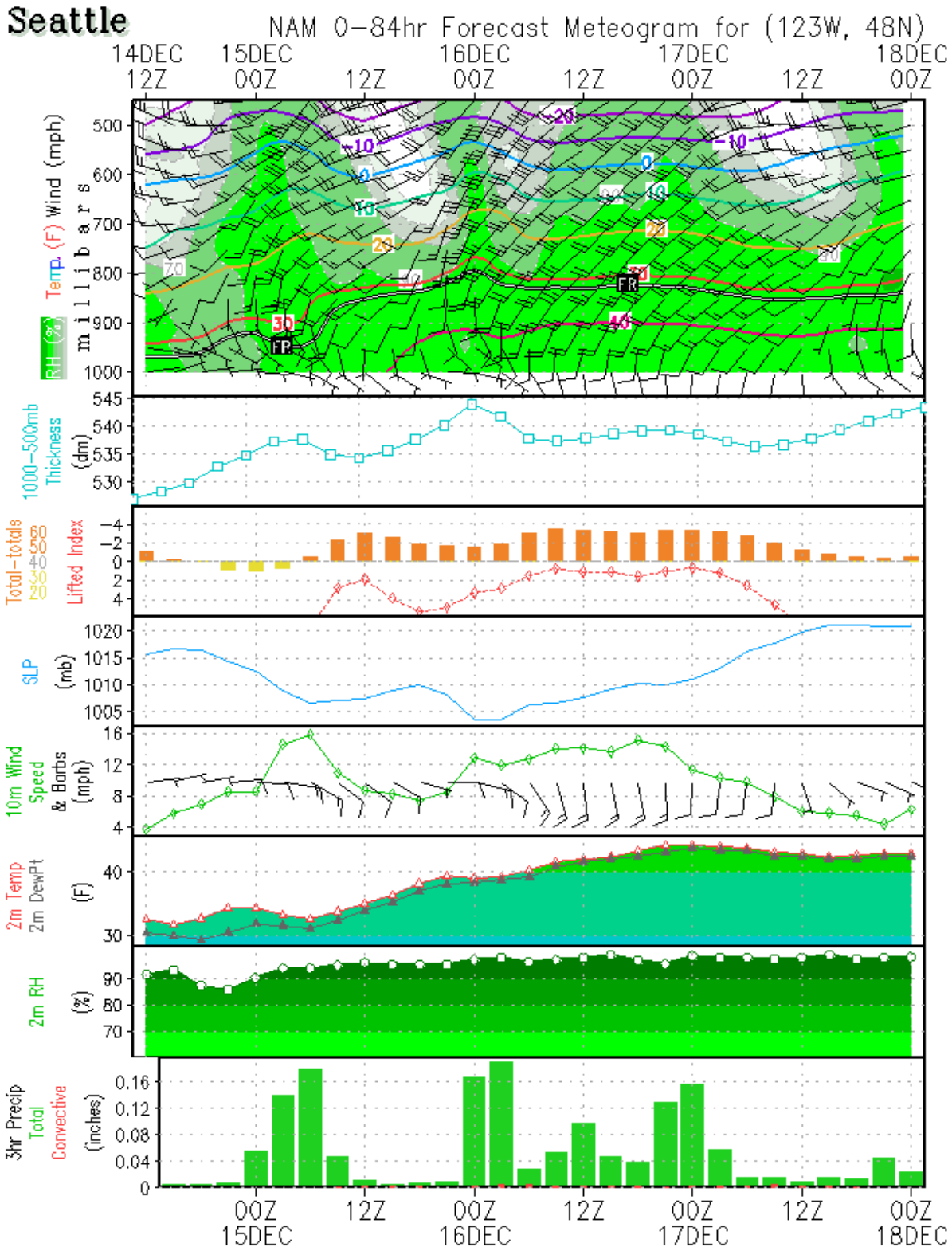
AN AVALANCHE WATCH IS IN EFFECT FOR THE OLYMPICS AND
CASCADES FOR MONDAY NIGHT.

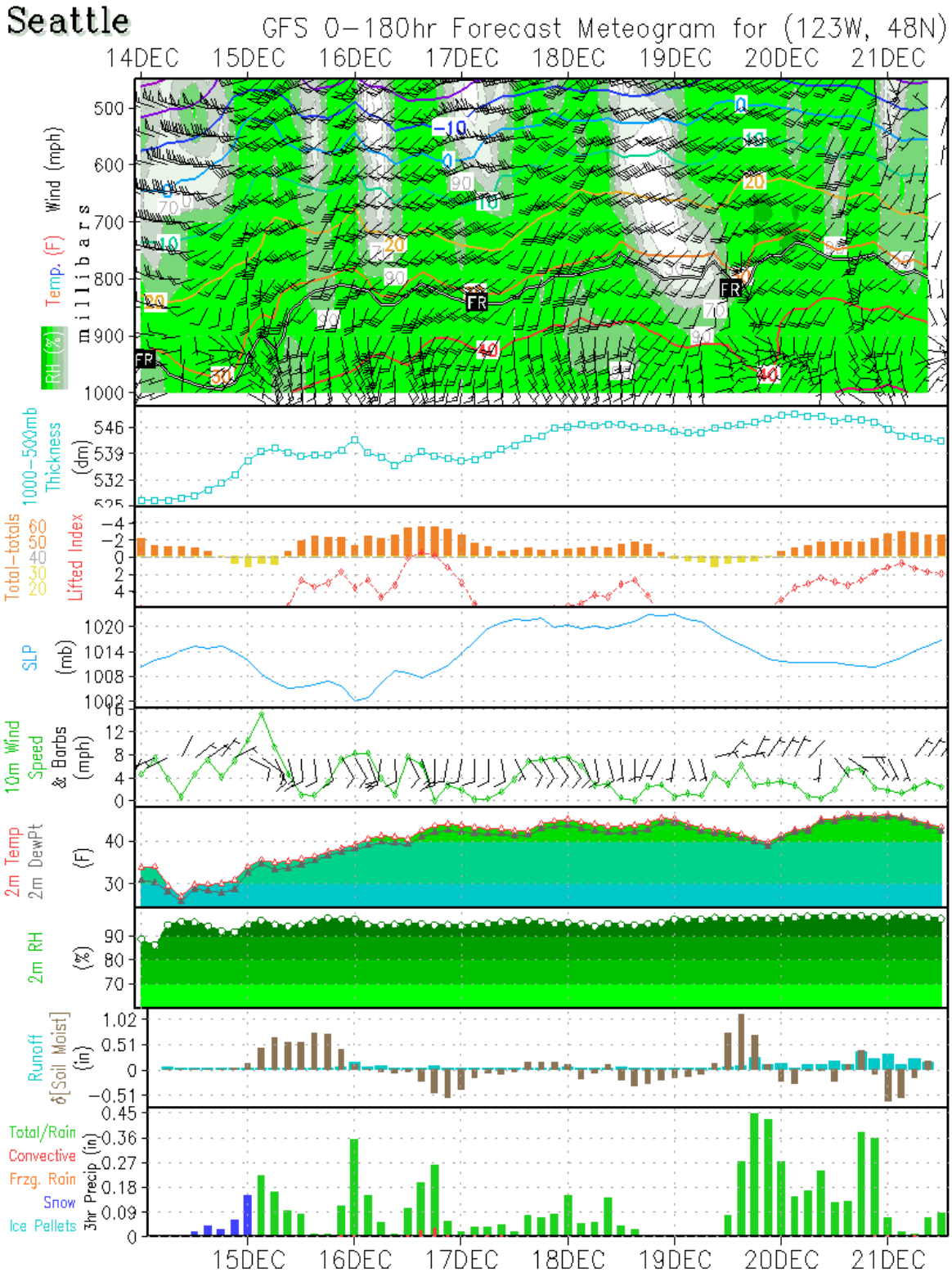
PZ...GALE WARNING COAST AND EAST ENTRANCE TO THE STRAIT.
SMALL CRAFT ADVISORY WEST ENTRANCE TO THE STRAIT...CAMANO
ISLAND TO POINT ROBERTS AND ADMIRALTY INLET.

$$

WWW.WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION...PLEASE SEE
WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML.


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
14DEC 12Z
15DEC 00Z
12Z
16DEC 00Z
12Z
17DEC 00Z
12Z
18DEC 00Z
millibars
Temp. (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
3hr Precip Total
Convective (inches)
00Z 15DEC
12Z
00Z 16DEC
12Z
00Z 17DEC
12Z
00Z 18DEC


Seattle
GFS 0-180hr Forecast Meteogram for (123W, 48N)
14DEC
15DEC
16DEC
17DEC
18DEC
19DEC
20DEC
21DEC
Wind (mph)
Temp. (F)
RH (%)
millibars
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
Runoff
δ[Soil Moist] (in)
Total/Rain
Convective
Frzg. Rain
Snow
Ice Pellets
3hr Precip (in)

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	January 18, 2010
TO:	Matt Woltman / Jessi Massingale
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600
	Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #1 (12/31/2009)

Please find included the following:

- Storm report narrative (2 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (1 pg),
- Sampler Reports (20 pgs),
- pH Worksheet (1 pg), and
- Weather forecasting information (6 pgs).

Please let me know if you have any questions or need additional information. Thank You.

Dave Metallo, LHG

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #2
December 31st, 2009

General:

Prior to STE#2 a sampling event was attempted on the 29th, which produced 0.07" of rain, ultimately resulting in a false-start. During this event only the composite portion was collected (no post-event processing) and no samples were submitted to the analytical laboratory. Storm event (STE) #2 was conducted on December 31st and was the last event of 2009.

All equipment operated as designed and programmed. The three sampling stations (CB-31A, main line inlet; CB-4857, main line outlet; and CB-1 onsite outlet) automatically enabled within 10 minutes of each other. It was noticed by the field crew that the first three aliquots at CB-1 were being directed into the wrong bottle. These aliquots were kept in their collection bottle and the entire CB-1 (master) sampler base was re-set and re-started at (1312). All stations were automatically enabled via area-velocity sensors triggering above certain set-point levels. A Thel-Mar compound volumetric in-pipe weir was installed at CB-1 since STE#1. Use of the weir provides more precise flow measurement at this location in a very low flow level environment in the associated outlet pipe (see STE#1 Storm Report) and allows for a deeper pool behind the weir from which to draw samples.

Grab samples were collected at each station using dedicated Teflon-coated lines attached to a peristaltic pump. All grabs were collected as early as possible during the storm event once runoff was noted and during the rising or cresting limbs of the storm hydrographs at each monitoring station.

CB-31A and CB-4857 had a storm volume difference of only 1,040 gallons. This is well within the calculated potential site runoff volume available for input into the main line system during the storm period. Approximately 0.15 of an acre (of the 5.25 acres) of impervious surface at the site could account for the volume difference between the main line inlet and outlet stations.

See the accompanying ***Storm and Sample Validation/Qualification Checklist Report Spreadsheet*** for complete details regarding STE#2. Several of the key storm report categories are discussed below.

Compositing Scheme:

The hydrographs from each monitoring station were examined and decisions were made as to what specific bottles were to be included in the composite samples. See the attached field forms and compositing worksheets for details. Each of three autosamplers were programmed to collect samples via time paced programming – each was set to collect an aliquot every 18-minutes (12 hour storm duration program). All of the samples were manually flow weighted based on site specific flow information.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. The locations were MW-1, MW-3, MW-4 and MW-6. Measurements are listed in the table below.

Table 1. Groundwater Level Measurements, STE#2

Location	Date	Time	Water Level (from TOC) (FT)
MW-1	1/2/2010	1104	16.66
MW-3	1/2/2010	1110	17.52
MW-4	1/2/2010	1115	16.55
MW-6	1/2/2010	1055	12.07

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grabs or composite samples were placed into coolers and iced. A small portion of the composite samples were poured off for pH measurements. All samples were recorded on Chain-of-Custody forms and were in direct control of project personnel at all times. All samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from all of the stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Anomalies and/or Workplan Deviations:

There were no anomalies observed that would cause any of the STE#2 samples to be non-representative of the conditions from which they were collected. MS/MSD samples were not collected for either the grab or composite portions of the STE#2 samples. In lieu of these QC samples, additional laboratory QC samples were analyzed and will be described in the first stormwater interim report.

Actions To Be Completed:

In-vault sampling infrastructure will be removed from each of the three monitoring stations in preparation for the upcoming sediment sampling and drainage system cleaning (vactoring) events (scheduled for mid-January). Sediment traps will be installed at four pre-determined locations post-vactoring but prior to the resumption of stormwater sampling. Data analysis of the storm depth to discharge response will be completed on the flow data set that has been collected thus far so that beginning with SET#3 the stations might be automatically flow paced.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #2

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Storm Event Data:	
Project Storm Event (STE) #	2
Event Forecast Probability (%)	90%
Antecedent Dry Period (days: hrs: mins)	1:09:25
STE Start Date & Time	12/31/09 11:55
STE Duration (hrs:mins)	7:25
STE End Date & Time	12/31/09 19:20
Period Between Next Measureable Rain (hrs: mins)	7:30
Was Targeted STE Qualified Per LLA QAPP	YES
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.25
Max Rainfall Intensity (in/hr)	0.10
Average Rainfall Intensity	0.02

[1] Sample Collection Criteria:	CB-31A	CB-4857	CB-1
Sampling Station			
Was Grab sample collected?	Yes	Yes	Yes
Grab ID	CB31A123109GRAB	CB4857123109GRAB	CB1123109GRAB
Grab Date /Time	12/31/2009 12:45	12/31/2009 13:25	12/31/2009 13:00
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	Yes	Yes	Yes
Hydrograph stage at grab collection	rising / first crest	sustained crest	sustained crest
Grab parameters collected per LLA QAPP ?	Yes	Yes	Yes
Were Trip Blanks included w/ Grab samples ?	Yes	Yes	Yes
Was Comp sample collected?	Yes	Yes	Yes
Comp ID	CB31A123109COMP	CB4857123109COMP	CB1123109COMP
Comp Date /Time	12/31/2009 22:37	12/31/2009 23:57	12/31/2009 21:37
Total volume measured during storm period (gallons)	57455	58495	1335
Volume sampled during storm period (gallons)	57455	58495	1335
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	Yes (100%)	Yes (100%)	Yes (100%)
Was a minimum of at least 8 aliquots collected for comp sample ?	Yes (35)	Yes (40)	Yes (33)
Comp parameters collected per LLA QAPP ?	Yes	Yes	Yes
Rainfall during sampling period (in)	0.25	0.25	0.25
pH Measurements Collected ?	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No
[1] QC Sample Summary Information:	CB-31A	CB-4857	CB-1
Was Grab sample duplicate collected ?	No	No	No
Grab sample duplicate ID	na	na	na
Grab sample date and time	na	na	na
Was Comp sample duplicate collected ?	No	No	No
Comp sample duplicate ID	na	na	na
Comp sample date and time	na	na	na
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	No	No	No

[1] If the answer to any of the validation/qualification questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 1-18-10 Reveiwed By / Date: 1/18/10

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: STANDARD	Page: 1 of 1	
ARI Client Company: FLOYD / SNIDER	Phone: 206-292-2078	Date: 12/31/09	Ice Present? Yes
Client Contact: MATT WOLTMAN / JESSIE MASSINGALE		No. of Coolers: 1	Cooler Temps: 4.3
Client Project Name: LORA LAKES APARTMENTS			
Client Project #: POS-LLA	Samplers: B. KWASNOWSKI / P. HETZEL		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NWTPH-Dx ①	Analysis Requested: VOC 8260-C SIM	Notes/Comments
CB314123109GRAB	12/31/09	12:45	W	5	X	X	
CB4857123109GRAB	12/31/09	13:25	W	5	X	X	
CB1[illegible]09GRAB	12/31/09	13:00	W	5	X	X	
TB123109	12/31/09	12:00	W	3		X	

Comments/Special Instructions: ① ACID/SILICA CLEAN-UP FOR TPH-Dx	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: BRAD KWASNOWSKI	Printed Name: D. Peterson	Printed Name:	Printed Name:
	Company: Jaycor Associates	Company: ARI	Company:	Company:
	Date & Time: 12/31/09 @ 14:35	Date & Time: 12/31/09 1435	Date & Time:	Date & Time:

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Floyd/Snider	Phone: 206-292-2078
Client Contact: Jessi Massingale / Matt Woltman	
Client Project Name: Lora Lake Apts	
Client Project #: POS - LLA	Samplers: D. Metallo, C. Nickerson, P. Hetzel

Date: 1-2-2010
Page: 1 of 1
No. of Coolers: 2 Cooler Temps: 2.5/2.6

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM low level	PCP 8041	Arsenic Total & Diss 200.8	Dioxin / Furans 1613	TSS SM2540D				Notes/Comments
CB31A123109COMP	12.31.09	2237	W	1	X	X	X	X	X				6.68
CB4857123109 COMP	12.31.09	2357	W	1	X	X	X	X	X				6.81
CB1123109 COMP	12.31.09	2137	W	1	X	X	X	X	X				6.82

Analysis Requested

Comments/Special Instructions
- Bottles & glassware decon'ed to LLA project specific SOP (see attached)

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)	[signature]	[signature]		
Printed Name	David Metallo	Nikka Matumbu		
Company	Taylor	ARI		
Date & Time	1/2/10 (1352)	1/2/10 1352		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Station: CB3IA

8 x 1 gallon bottle set-up

Rev.ed 12/14/09

Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: BK / SS	Weather: PT. Cloudy		Arrival Date/Time: 12/30/09 13:15		
Carry-over maintenance to do prior to set-up: —					done?
Sampler Battery Voltage	12.50	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	12.45	Changed? Y (N)		New voltage	—

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes (285K)
Flowmeter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ FT	0.523	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ FT	0.523	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ FT	0.000	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	No	Diagnostics/Distrubutor arm check?	Yes
Velocity (fps)	+0.23	Enable Level ~~(in)~~* FT	> 0.083
Flow Rate ~~(cfs)~~ GPM	0	Pacing Rate ~~(cf)~~* TIME	18 min b/w SMPLS
Data Downloaded (Yes/No)	Yes	Program Reviewed? (Yes/No)	Yes
Channel conditions/observations OK		Sampler "Running"...	Yes
		Ice Deployed? (Yes/No)	NO
			* NA unless directed by Storm Controller

Notes:

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: BK / PH Weather: Rain Arrival Date/Time: 12/31/09 12:30

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	12/31/09 12:45
Grab Sample Bottle ID	CB3IA123109GRAB
Grab Duplicates Collected?	NO
Grab Blank Collected?	NO
VOA trip blank in cooler?	Yes

Sample Observations:

Internal Flowmeter		Sampler	
Flowmeter cables OK? (Yes/No)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date/time)	12/31/09 (12:25)
Notes:		On Composite... (Bottle #/ Aliq #)	BTL 1, 2 of 5
		Ice deployed?	NO
		Sampler Battery Voltage (Changed?):	12.40 NO ∇
		Bottle Swap needed? (if yes fill out Section 3)	NO

Section 3. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

Station: CB31A

Section 4. Mid-Storm Check/Bottle Switch			
Personnel: ~~PH CN~~	Weather: Overcast	Arrival Date/Time: ~~1/2/10 10:35~~	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

Section 5. Comp Sample Collection/Post Storm			
Personnel: PH, CN	Weather: Overcast	Arrival Date/Time: 1/2/10 10:35	
Sampler Battery Voltage	12.31	Changed? (Y) N	New voltage 12.54
Modem Battery Voltage	—	Changed? Y (N)	New voltage —
Composite Begin Time (date/time)	12/31/09 12:25		Round #: 1
Last Aliquot Taken (date/time, bott #, aliq #)	1/1/10 06:07 Btl 12, Aliq 5		
Comp Bottles Labeled? (Sta. & date)	Yes	Data downloaded?	Yes, previously
Comp Sample Volume Collected	100%		
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed	None		
Channel conditions/observations	OK		
Notes/Maintenance Needed:	None		

Section 6. QC Sampling			
Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes:	None Collected this storm event		

Comp Info:

- Used bottles 1 through 7 for composite sample after examining station hydrograph

- CB31A123109Comp (2237)

- Post-storm Manually flow weighted composite (see comping sheet for more details)

Station: CB4857

8 x 1 gallon bottle set-up

Rev.ed 12/14/09

Section 1. Storm Setup and Inspection

Personnel: BL/SS	Weather: OVERCAST	Arrival Date/Time: 12/30/09, 12:44	
Carry-over maintenance to do prior to set-up: —			done? —
Sampler Battery Voltage	12.65	Changed? Y (N)	New voltage —
~~Flow Meter Battery Voltage~~ —	—	Changed? ~~Y~~ N	New voltage —

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Y	Pump Tubing OK?	Y. 350 ml
Flowmeter cables OK? (Yes/No)	Y	Pump Tubing Replaced? (Yes/No)	N
Desiccant Canisters OK (Yes/No)	Y	Sample Tubing & Strainer OK?	Y
Flow Meter Level ~~(in)~~ ft	~~0.050~~ 0.050	Backflushed with DI?	Y
Actual level Reading ~~(in)~~ ft	—	Suction line & quick connect attached?	Y
Difference ~~(in)~~ ft	—	Clean bottles installed & lids off?	Y
Level calibrated? (Yes/No)	— N	Diagnostics/Distrubutor arm check?	Y
Velocity (fps)	0.08	Enable Level ~~(in)~~ ft	0.08
Flow Rate ~~(cfs)~~ GPM	1 GPM	Pacing Rate ~~(cf)~~*	18 MINS / EXHAUST
Data Downloaded (Yes/No)	Y	Program Reviewed? (Yes/No)	Y
Channel conditions/observations: CHANNEL OKAY		Sampler "Running"...	Y
		Ice Deployed? (Yes/No)	N
		* NA unless directed by Storm Controller	

Notes: Back flushed w/ DI water

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: BL/PH | Weather: RAIN | Arrival Date/Time: 12/31/09 @ 13:15

Grab Sample Data		Sample Observations:
Runoff Present?	Y	
Grab Collection Time (date/time)	12/31/09 @ 13:25	
Grab Sample Bottle ID	CB4857123116GRAB	
Grab Duplicates Collected?	N	
Grab Blank Collected?	N	
VOA trip blank in cooler?	Y	

Internal Flowmeter		Sampler	
Flowmeter cables OK? (Yes/No)	Y	Equipment running correctly?	Y
Flow Data Downloaded & Reviewed? (Y/N)	Y	Composite Begin Time (date/time)	12/31/09 12:15
Notes:		On Composite... (Bottle #/ Aliq #)	BTL 2 1 of 5
		Ice deployed?	N
		Sampler Battery Voltage (Changed?):	12.65
		Bottle Swap needed? (if yes fill out Section 3)	N

Section 3. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

Station: CB4857

Section 4. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed			
Channel conditions/observations			
Notes/Maintenance Needed:			

Section 5. Comp Sample Collection/Post Storm

Personnel: PH, CN	Weather: Overcast		Arrival Date/Time: 1/2/10 10:20		
Sampler Battery Voltage	12.51	Changed? (Y) (N)		New voltage	NA
Modem Battery Voltage	—	Changed? Y (N)		New voltage	—
Composite Begin Time (date/time)	12/31/09 12:15			Round #: 1	
Last Aliquot Taken (date/time, bott #, aliq #)	1/1/10 05:57 BTL 12 5 of 5				
Comp Bottles Labeled? (Sta. & date)	Yes	Data downloaded?		Yes	
Comp Sample Volume Collected	100%				
Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed	None				
Channel conditions/observations	OK				
Notes/Maintenance Needed:	Re-set station				

Section 6. QC Sampling

Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	
Notes: None Collected this storm event			

Comp Info:

- Used bottles 1 through 8 for comp. sample after examining station hydrograph;
- CB4857123109comp (2357)
- Post-storm manually flow weighted composite (see comping sheet for more details)

Station: CB1

8 x 1 gallon bottle set-up

Rev.ed 12/14/09

Section 1. Storm Setup and Inspection

Personnel: BK / SS	Weather: Overcast / Pt Cloudy		Arrival Date/Time: 12/30/09	14:15	
Carry-over maintenance to do prior to set-up: —				done? NA	
Sampler Battery Voltage (Master)	12.68	Changed? Y (N)	New voltage	—	
Flow Meter Battery Voltage (Slave)	12.56	Changed? Y (N)	New voltage	—	

Flowmeter		Sampler	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Master (110K) Slave (175K)
Flowmeter cables OK? (Yes/No)	750 module	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level ~~(in)~~ FT	-0.093	Backflushed with DI?	Yes
Actual level Reading ~~(in)~~ FT	0.00	Suction line & quick connect attached?	Yes
Difference ~~(in)~~ FT	0.093	Clean bottles installed & lids off?	Yes
Level calibrated? (Yes/No)	YES	Diagnostics/Distrubutor arm check?	Yes
Velocity (fps)	NA (No Flow)	Enable Level ~~(in)~~* FT	0.01 (Thel-Mar Weir)
Flow Rate (cfs)	NA	Pacing Rate ~~(cf)~~* Time Paced	18 Min b/w Samples
Data Downloaded (Yes/No)	YES	Program Reviewed? (Yes/No)	Yes
Channel conditions/observations OK		Sampler "Running"... Sampler	Disabled - awaiting rain
		Ice Deployed? (Yes/No)	NO
		* NA unless directed by Storm Controller	

Notes: Sampler Vol. Calibrated

Section 2. Grab Sample Collection/ Initial Station Check

Personnel: BK / PH Weather: Rain Arrival Date/Time: 12/31/09 13:00

Grab Sample Data	
Runoff Present?	Yes
Grab Collection Time (date/time)	12/31/09 (13:00)
Grab Sample Bottle ID	CB1123109GRAB
Grab Duplicates Collected?	No
Grab Blank Collected?	No
VOA trip blank in cooler?	Yes

Sample Observations:

Internal Flowmeter	
Flowmeter cables OK? (Yes/No)	750 Module - OK
Flow Data Downloaded & Reviewed? (Y/N)	YES

Notes: Reset base after 3rd aliquot due to incorrect position - Keep collected samples - add new btl - restart

Sampler	
Equipment running correctly?	Yes
Composite Begin Time (date/time) orig. =	12:20 12/31 rest. = 13:12 12/31
On Composite... (Bottle #/ Aliq #) orig. =	BTL 1 3 of 5
Ice deployed?	No
Sampler Battery Voltage (Changed?):	12.56 ▽ 12.63 - No ▽
Bottle Swap needed? (if yes fill out Section 3)	No

Section 3. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

Station: CB1

Section 4. Mid-Storm Check/Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, bott #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (Sta. & date)		Sampler Battery Voltage (Changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

Section 5. Comp Sample Collection/Post Storm

Personnel: PH CN	Weather: Overcast	Arrival Date/Time: 1/2/10 9:45 am	
Sampler Battery Voltage	12.55	Changed? Y (N)	New voltage —
Modem Battery Voltage	12.54	Changed? Y (N)	New voltage —
Composite Begin Time (date/time)	12/31/09 13:12 B		Round #: 1
Last Aliquot Taken (date/time, bott #, aliq #)	Last good sample 12/31/09 23:07 ~~Btl 8, Aliq. 5~~		Btl 7, Aliq. 5
Comp Bottles Labeled? (Sta. & date)	Yes	Data downloaded? Yes, previously	
Comp Sample Volume Collected	100%		

Aliquots missed/NLD (date/time/bott #/aliq #) continue on back if needed
Missed all 5 samples in btl 8, no liquid detect or no more liquid

Channel conditions/observations
OK

Notes/Maintenance Needed:
~~Missed PT~~ ~~None~~ Removed slave battery, Kept master on

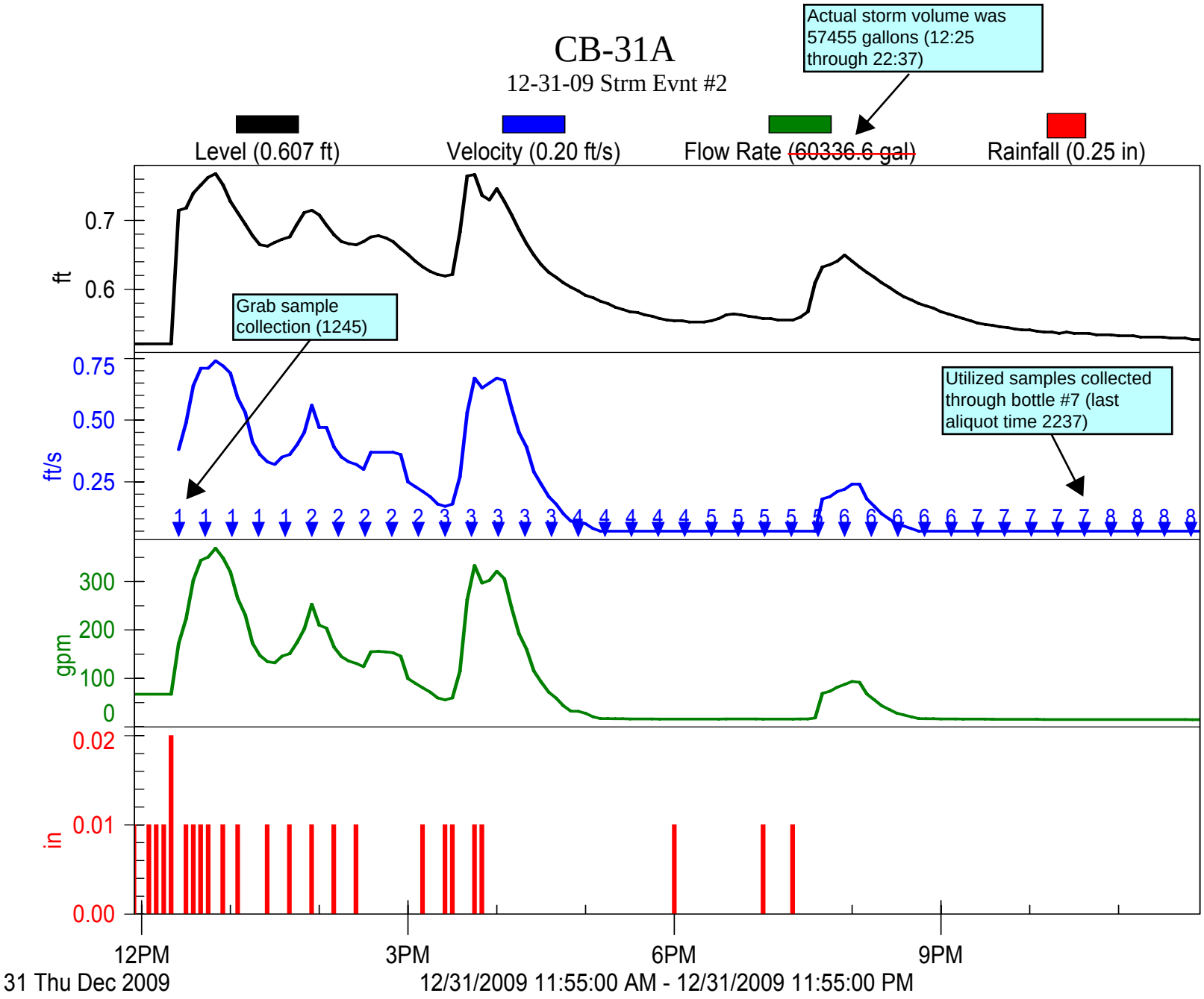
Section 6. QC Sampling

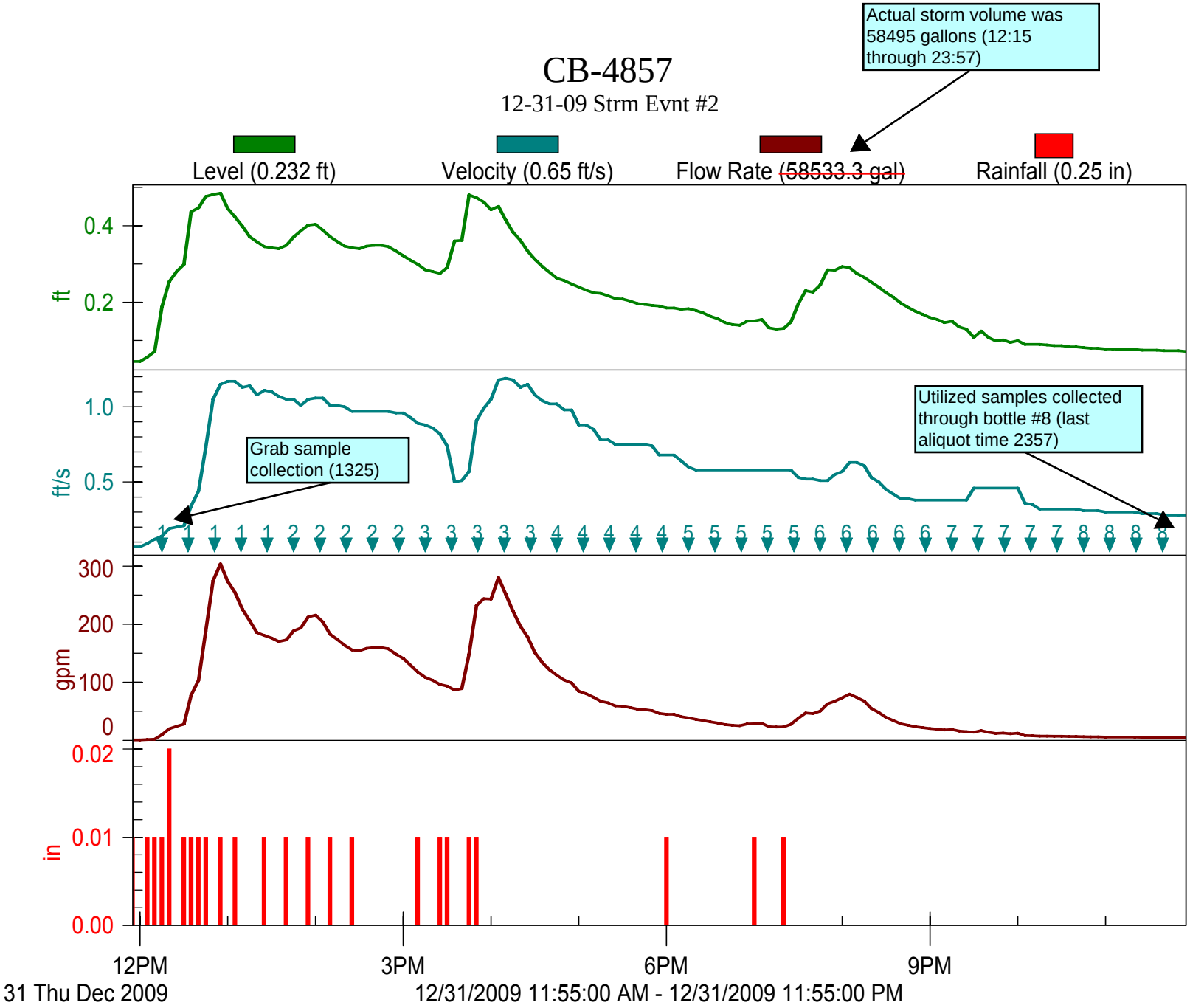
Personnel:			
Field Blank Collected? (date/time)		Duplicate comp sample? Yes/No	
Blank id:		Duplicate sample ID	

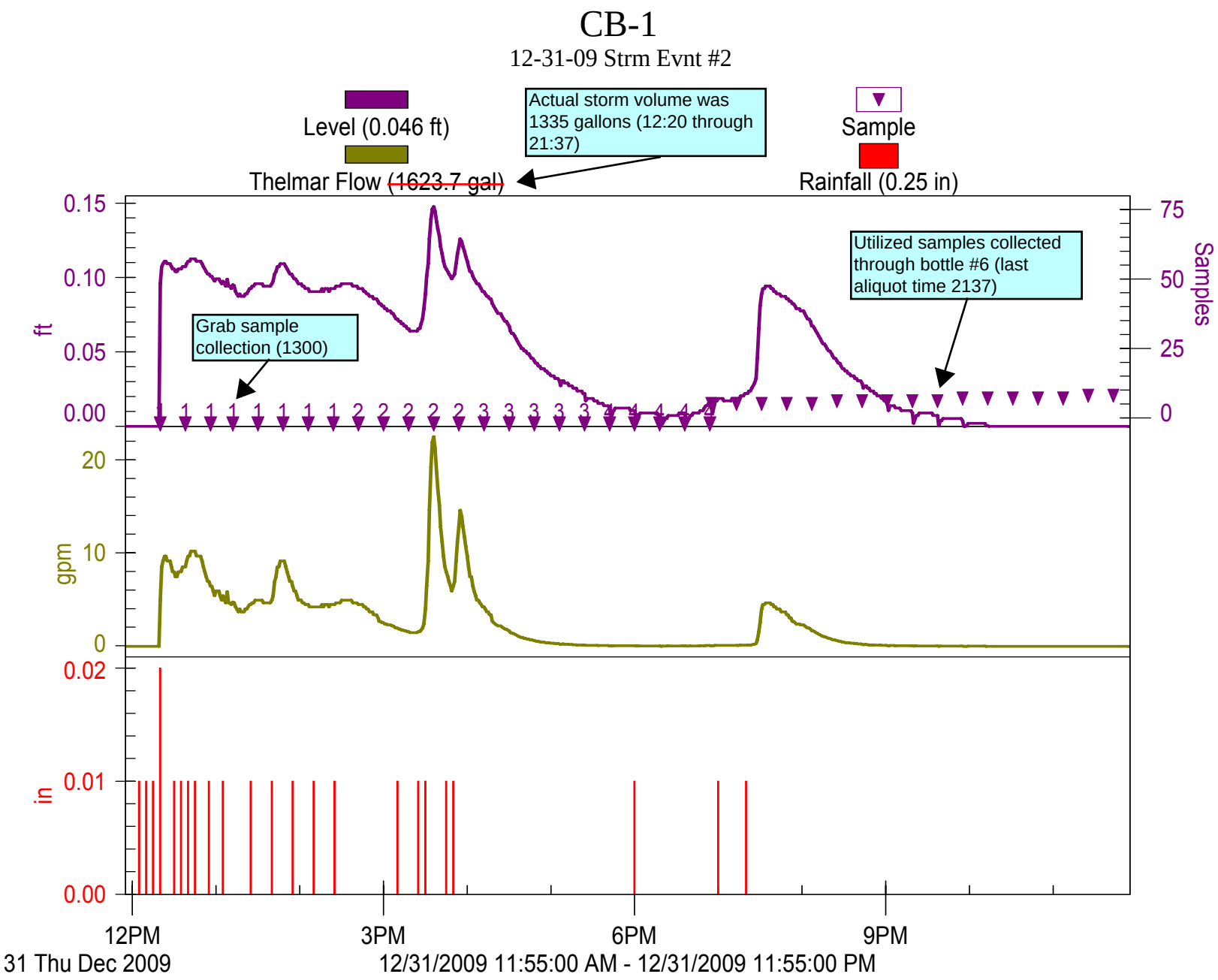
Notes: None Collected this storm event

Comp Info:

- Used btls 1 through 6 (including 3 aliquots from original btl 1, prior to re-set) after examining station hydrograph
- CB1123109 Comp (2137)
- Post-storm manually flow weighted composite (see comping sheet for more details)


CB-31A
12-31-09 Strm Evnt #2
Actual storm volume was 57455 gallons (12:25 through 22:37)
Level (0.607 ft)
Velocity (0.20 ft/s)
Flow Rate (60336.6 gal)
Rainfall (0.25 in)
ft
0.7
0.6
Grab sample collection (1245)
ft/s
0.75
0.50
0.25
Utilized samples collected through bottle #7 (last aliquot time 2237)
1 1 1 1 1 2 2 2 2 2 3 3 3 3 3 4 4 4 4 4 5 5 5 5 5 6 6 6 6 6 7 7 7 7 7 8 8 8 8
gpm
300
200
100
0
in
0.02
0.01
0.00
12PM
3PM
6PM
9PM
31 Thu Dec 2009
12/31/2009 11:55:00 AM - 12/31/2009 11:55:00 PM


CB-4857
12-31-09 Strm Evnt #2
Actual storm volume was 58495 gallons (12:15 through 23:57)
Level (0.232 ft)
Velocity (0.65 ft/s)
Flow Rate (58533.3 gal)
Rainfall (0.25 in)
ft
0.4
0.2
ft/s
1.0
0.5
Grab sample collection (1325)
Utilized samples collected through bottle #8 (last aliquot time 2357)
gpm
300
200
100
0
in
0.02
0.01
0.00
12PM
3PM
6PM
9PM
31 Thu Dec 2009
12/31/2009 11:55:00 AM - 12/31/2009 11:55:00 PM


CB-1
12-31-09 Strm Evnt #2
Level (0.046 ft)
Thelmar Flow (1623.7 gal)
Actual storm volume was 1335 gallons (12:20 through 21:37)
Sample
Rainfall (0.25 in)
Grab sample collection (1300)
Utilized samples collected through bottle #6 (last aliquot time 2137)
ft
gpm
in
Samples
0.15
0.10
0.05
0.00
20
10
0
0.02
0.01
0.00
75
50
25
0
12PM
3PM
6PM
9PM
31 Thu Dec 2009
12/31/2009 11:55:00 AM - 12/31/2009 11:55:00 PM

CB31A 123109 STE#2

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% Evnt Qtot	% Storm Qtot	
18305	1	2000	**1**	31.86%	31.86%	
14250	0.778475826	1557	**2**	24.80%	24.80%	
15715	0.858508604	1717	**3**	27.35%	27.35%	
2060	0.112537558	225	**4**	3.59%	3.59%	
1450	0.07921333	158	**5**	2.52%	2.52%	
4285	0.234089047	468	**6**	7.46%	7.46%	
1390	0.075935537	152	**7**	2.42%	2.42%	
					100.00%	**Total Strm Vol% Rep.'ed in Comp**

Qtotal	57455		
Strm Qtot (gals)	57455		
max Q	18305		
min V (ml)	2000	**6278**	**Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB4857 123109 STE#2

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	% Storm Qtot	
11770	0.748251748	1497	**1**	20.12%	20.12%	
15730	1	2000	**2**	26.89%	26.89%	
14790	0.940241577	1880	**3**	25.28%	25.28%	
7335	0.466306421	933	**4**	12.54%	12.54%	
2805	0.178321678	357	**5**	4.80%	4.80%	
4405	0.280038144	560	**6**	7.53%	7.53%	
1175	0.074698029	149	**7**	2.01%	2.01%	
485	0.030832804	62	**8**	0.83%	0.83%	**Total Strm Vol% Rep.'ed in Comp**
					100.00%	

Qtotal	58495		
Strm Qtot (gals)	58495		
max Q	15730		
min V (ml)	2000	**7437**	Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB1 123109 STE#2

Sample Bottle Compositing Worksheet

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	% Storm Qtot	
477.24	0.967169261	1934	**1**	35.74%	35.74%	
493.44	1	2000	**2**	36.96%	36.96%	
211.49	0.428603275	857	**3**	15.84%	15.84%	
0.84	0.001702335	3	**4**	0.06%	0.06%	
127.12	0.257619974	515	**5**	9.52%	9.52%	
25.05	0.050766051	102	**6**	1.88%	1.88%	
					100.00%	**Total Strm Vol% Rep.'ed in Comp**

Qtotal	1335		
Strm Qtot (gals)	1335		
max Q	493.44		
min V (ml)	2000	**5412**	**Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.

CB31A 123109

SAMPLER ID# 1069569980 08:38 2-JAN-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB31A SMP "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 16 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 18 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1069569980 08:38 2-JAN-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB31A SMP
PROGRAM: LLA MULTI
Program Started at 08:55 TH 31-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		08:55	PGM DISABLED		
		12:25	PGM ENABLED		
1,5	1	12:25	E		477
2,5	1	12:43	T		477
3,5	1	13:01	T		477
4,5	1	13:19	T		483
5,5	1	13:37	T		481
1,5	2	13:55	T		483
2,5	2	14:13	T		477
3,5	2	14:31	T		477
4,5	2	14:49	T		477
5,5	2	15:07	T		477
1,5	3	15:25	T		483
2,5	3	15:43	T		481
3,5	3	16:01	T		481
4,5	3	16:19	T		481
5,5	3	16:37	T		481
1,5	4	16:55	T		478
2,5	4	17:13	T		477
3,5	4	17:31	T		483
4,5	4	17:49	T		481
5,5	4	18:07	T		481
1,5	5	18:25	T		481
2,5	5	18:43	T		481
3,5	5	19:01	T		481
4,5	5	19:19	T		481

5,5	5	19:37	T	480
1,5	6	19:55	T	479
2,5	6	20:13	T	477
3,5	6	20:31	T	477
4,5	6	20:49	T	483
5,5	6	21:07	T	481
1,5	7	21:25	T	483
2,5	7	21:43	T	477
3,5	7	22:01	T	483
4,5	7	22:19	T	481
5,5	7	22:37	T	481
1,5	8	22:55	T	478
2,5	8	23:13	T	477
3,5	8	23:31	T	483
4,5	8	23:49	T	478
----------	FR 01-JAN-10		----------	
5,5	8	00:07	T	477
1,5	9	00:25	T	477
2,5	9	00:43	T	477
3,5	9	01:01	T	483
4,5	9	01:19	T	478
5,5	9	01:37	T	483
1,5	10	01:55	T	478
2,5	10	02:13	T	483
3,5	10	02:31	T	481
4,5	10	02:49	T	483
5,5	10	03:07	T	483
1,5	11	03:25	T	478
2,5	11	03:43	T	477
3,5	11	04:01	T	483
4,5	11	04:19	T	478
5,5	11	04:37	T	477
1,5	12	04:55	T	483
2,5	12	05:13	T	481
3,5	12	05:31	T	478
4,5	12	05:49	T	483
5,5	12	06:07	T	481
		06:08	PGM DONE 01-JAN	

SOURCE E ==> ENABLE
SOURCE T ==> TIME

SAMPLER ID# 1224319970 08:46 2-JAN-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB4857 SMP"

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 22 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 18 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1224319970 08:46 2-JAN-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB4857 SMP
PROGRAM: LLA MULTI
Program Started at 09:00 TH 31-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		09:00	PGM DISABLED		
		12:15	PGM ENABLED		
1,5	1	12:15	E		598
2,5	1	12:33	T		601
3,5	1	12:51	T		598
4,5	1	13:09	T		599
5,5	1	13:27	T		604
1,5	2	13:45	T		601
2,5	2	14:03	T		604
3,5	2	14:21	T		610
4,5	2	14:39	T		606
5,5	2	14:57	T		602
1,5	3	15:15	T		604
2,5	3	15:33	T		601
3,5	3	15:51	T		604
4,5	3	16:09	T		610
5,5	3	16:27	T		606
1,5	4	16:45	T		610
2,5	4	17:03	T		606
3,5	4	17:21	T		602
4,5	4	17:39	T		604
5,5	4	17:57	T		610
1,5	5	18:15	T		606
2,5	5	18:33	T		602
3,5	5	18:51	T		604
4,5	5	19:09	T		604

```
  5,5     5   19:27      T             604
  1,5     6   19:45      T             602
  2,5     6   20:03      T             604
  3,5     6   20:21      T             602
  4,5     6   20:39      T             604
  5,5     6   20:57      T             610
  1,5     7   21:15      T             603
  2,5     7   21:33      T             605
  3,5     7   21:51      T             604
  4,5     7   22:09      T             610
  5,5     7   22:27      T             604
  1,5     8   22:45      T             604
  2,5     8   23:03      T             604
  3,5     8   23:21      T             610
  4,5     8   23:39      T             606
  5,5     8   23:57      T             608
------------ FR 01-JAN-10 -------------
  1,5     9   00:15      T             610
  2,5     9   00:33      T             606
  3,5     9   00:51      T             610
  4,5     9   01:09      T             606
  5,5     9   01:27      T             610
  1,5    10   01:45      T             606
  2,5    10   02:03      T             610
  3,5    10   02:21      T             606
  4,5    10   02:39      T             610
  5,5    10   02:57      T             606
  1,5    11   03:15      T             610
  2,5    11   03:33      T             606
  3,5    11   03:51      T             608
  4,5    11   04:09      T             610
  5,5    11   04:27      T             606
  1,5    12   04:45      T             610
  2,5    12   05:03      T             604
  3,5    12   05:21      T             606
  4,5    12   05:39      T             604
  5,5    12   05:57      T             604
              05:58  PGM DONE 01-JAN


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
---------------------------------------
```

CBMaster 123109

SAMPLER ID# 1224314456 08:55 2-JAN-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1 MASTER"

   UNITS SELECTED:
     LENGTH: ft

   UNITS SELECTED:
   FLOW RATE: gpm
  FLOW VOLUME: gal
   VELOCITY: fps

  AREA-VEL MODULE:
    DATA POINTS
    "12"THELMAR"
 50 POINTS ENTERED
     ----

      1 MINUTE
   DATA INTERVAL

   4, 3.70 lit BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 18 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.010 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER ON

```
BTL FULL DETECT OFF
  TIMED BACKLIGHT

     ----------

  EVENT MARK SENT
 DURING PUMP CYCLE

     ----------
  PUMP COUNTS FOR
 EACH PURGE CYCLE:
   100 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   NO RAIN GAUGE


     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS
```

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224314456 08:55 2-JAN-10
Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
SITE: CB1 MASTER
PROGRAM: LLA MULTI
Program Started at 13:12 TH 31-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		13:12	PGM ENABLED		
1,5	1	13:12	S		398
2,5	1	13:30	T		401
3,5	1	13:48	T		395
4,5	1	14:06	T		395
5,5	1	14:24	T		395
1,5	2	14:42	T		395
2,5	2	15:00	T		395
3,5	2	15:18	T		398
4,5	2	15:36	T		401
5,5	2	15:54	T		397
1,5	3	16:12	T		398
2,5	3	16:30	T		401
3,5	3	16:48	T		396
4,5	3	17:06	T		401
5,5	3	17:24	T		395

```
                        CBMaster 123109
  1,5     4   17:42       T            399
  2,5     4   18:00       T            397
  3,5     4   18:18       T            399
  4,5     4   18:36       T            394
  5,5     4   18:54       T            399
              18:54  PGM DONE 31-DEC


   SOURCE S  ==> START
   SOURCE T  ==> TIME
-----------------------------------------
```

CBSlave 123109

SAMPLER ID# 1078487086 08:59 2-JAN-10
  Hardware: A1   Software: 2.20
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1 SLAVE "

   UNITS SELECTED:
     LENGTH: ft

   4, 3.70 lit BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 18 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

      ENABLE:

  NONE PROGRAMMED

```
    ----------
     ENABLE:
  ONCE ENABLED,
   STAY ENABLED
 SAMPLE AT ENABLE
    ----------
     ENABLE:
0 PAUSE & RESUMES


    ----------

NO DELAY TO START


    ----------
    ----------
    ----------
 LIQUID DETECT ON

QUICK VIEW/CHANGE

    ----------

TAKE MEASUREMENTS
 EVERY  1 MINUTES

    ----------
 DUAL SAMPLER ON
BTL FULL DETECT OFF
 TIMED BACKLIGHT

    ----------

 EVENT MARK SENT
DURING PUMP CYCLE

    ----------
 PUMP COUNTS FOR
EACH PURGE CYCLE:
  100 PRE-SAMPLE
 AUTO POST-SAMPLE
    ----------
```

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1078487086 08:59 2-JAN-10
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********

CBSlave 123109

SITE: CB1 SLAVE
PROGRAM: LLA MULTI
Program Started at 18:55 TH 31-DEC-09
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		18:55	PGM ENABLED		
1,5	1	18:55	S		481
2,5	1	19:13	T		475
3,5	1	19:31	T		477
4,5	1	19:49	T		474
5,5	1	20:07	T		479
1,5	2	20:25	T		478
2,5	2	20:43	T		472
3,5	2	21:01	T		477
4,5	2	21:19	T		483
5,5	2	21:37	T		477
1,5	3	21:55	T		477
2,5	3	22:13	T		477
3,5	3	22:31	T		477
4,5	3	22:49	T		472
5,5	3	23:07	T		483
1,5	4	23:25	T	NM	*
2,5	4	23:43	T	NL	*
		FR 01-JAN-10			
3,5	4	00:01	T	NL	*
4,5	4	00:19	T	NL	*
5,5	4	00:37	T	NL	*
		00:37	PGM DONE 01-JAN		

SOURCE S ==> START
SOURCE T ==> TIME
ERROR NL ==> NO LIQUID DETECTED!
ERROR NM ==> NO MORE LIQUID!

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: Lora Lake Apartments

Date 1/2/2010
Staff CN
pH meter make/model # ORION

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB31A 123109 comp	6.68	12:27	
CB4857 123109 comp	6.81	12:32	
CB1 123109 comp	6.82	13:13	

Post-Measurement Check

Nominal pH value of standard	7.00	
Temperature (deg C)	16°C	
Standard pH, temp corrected	7.01	
Meter pH reading (SU)	7.00	
Difference (SU)	0.01	*Should be < 0.1 (round to 0.0)*
Time	13:18	

Form to be included in storm file, as applicable

NWS Forecast for: Seatac WA

Issued by: National Weather Service Seattle, WA
Last Update: 4:13 am PST Dec 30, 2009

Today: Showers likely, mainly before 4pm. Cloudy, with a high near 43. South southwest wind around 9 mph. Chance of precipitation is 70%.

Tonight: Scattered showers before 10pm, then a chance of showers after 4am. Mostly cloudy, with a steady temperature around 41. South southwest wind between 5 and 9 mph. Chance of precipitation is 50%.

Thursday: Rain, mainly after 10am. Steady temperature around 40. East southeast wind between 6 and 13 mph. Chance of precipitation is 90%.

Thursday Night: Rain. Low around 42. Southwest wind around 17 mph. Chance of precipitation is 90%.

New Year's Day: Showers. High near 47. South wind between 8 and 11 mph. Chance of precipitation is 90%.

Friday Night: Showers likely. Cloudy, with a low around 41. Chance of precipitation is 70%.

Saturday: A 50 percent chance of showers. Mostly cloudy, with a high near 48.

Saturday Night: A chance of rain. Cloudy, with a low around 38.

Sunday: A chance of rain. Cloudy, with a high near 44.

Sunday Night: A chance of rain. Cloudy, with a low around 37.

Monday: A chance of rain. Cloudy, with a high near 45.

Monday Night: A chance of rain. Cloudy, with a low around 37.

Tuesday: A chance of rain. Cloudy, with a high near 47.

Point Forecast: Seatac WA
47.41°N 122.29°W (Elev. 390 ft)

Visit your local NWS office at: http://www.wrh.noaa.gov/sew

Area Forecast Discussion

Issued by NWS Seattle/Tacoma, WA


```
000
FXUS66 KSEW 301731
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
935 AM PST WED DEC 30 2009
```

.SYNOPSIS...SCATTERED SHOWERS WILL DECREASE LATER TODAY AS THE REMAINS OF A WEAK UPPER LEVEL TROUGH WEST OF VANCOUVER ISLAND MOVES EAST. A WEAK RIDGE OF HIGH PRES ALOFT AND DEVELOPING LOW LEVEL OFFSHORE FLOW WILL PROVIDE DRIER CONDITIONS TONIGHT THROUGH EARLY THURSDAY. A WARM FRONT WILL LIFT NORTHEAST ACROSS THE AREA THURSDAY AFTERNOON AND THURSDAY NIGHT...AND WILL BE FOLLOWED BY A TROUGH OF LOW PRESSURE ON FRIDAY. WEAK WEATHER SYSTEMS WILL MOVE ACROSS WESTERN WASHINGTON OVER THE WEEKEND.

&&

.SHORT TERM...A TYPICAL EL NINO SPLIT FLOW PATTERN IS SEEN ACROSS THE PACIFIC AND WESTERN NORTH AMERICA WITH THE MAIN SOUTHERN STREAM JET PUSHING INTO FAR SW OREGON AND NORTHERN CALIFORNIA AND THE NORTHERN BRANCH DROPPING FROM THE ARCTIC INTO CENTRAL CANADA. IN THE SHORT TERM...SYNOPTIC SCALE MODELS BRING A SOUTHERN STREAM WARM OCCLUSION...ASSOCIATED WITH A LOW NEAR 41N/150W...NE INTO WA THU NIGHT THEN BRING THE DECAYING AND VERTICALLY STACKED LOW ACROSS SOUTHERN B.C. FRI NIGHT OR EARLY SAT. MODEL CONSISTENCY AND CONTINUITY FALLS OFF AFTER SATURDAY WITH THE ECMWF GENERALLY DEVELOPING A RIDGE OVER SOUTHERN B.C. OR W WA LATER THIS WEEKEND AND EARLY NEXT WEEK...AND THE GFS BRINGING WEAK SYSTEMS THROUGH A SPLITTY/RIDGY FLOW OVER THE E PAC AND WESTERN NORTH AMERICA. NONE OF THE MODELS HAVE RECENTLY HANDLED THE DETAILS CONSISTENTLY OVER OUR AREA IN THE EXTENDED PERIOD...BUT IT APPEARS THAT GENERALLY MILD CONDITIONS AND LIGHTER THAN AVERAGE PRECIPITATION AMOUNTS SHOULD DOMINATE FOR THE NEXT WEEK OR SO.

IN THE SHORT TERM A TROUGH OF LOW PRES IS SITTING W OF VANCOUVER ISLAND AND IS SHIFTING E. THE MAIN JET IS AIMED FROM THE EXTREME SW OREGON COAST SE INTO NEVADA. AS THE TROUGH WEAKENS AND SHEARS EASTWARD EXPECT SHOWER ACTIVITY OVER W WA TO GRADUALLY COME TO AN END LATER TODAY. SHOWERS APPEAR TO BE MOST NUMEROUS FROM KUIL-WESTERN WHATCOM COUNTY...ALONG THE COAST...AND IN THE CASCADES. SOME SHADOWING APPEARS OVER THE PUGET SOUND AREA. WITH ONLY VERY LIGHT AND SCATTERED SHOWERS EXPECTED TODAY OVER THE PUGET SOUND AREA...WILL UPDATE THE FORECASTS THERE FOR LOWER POPS THE REST OF TODAY.

PRECIPITATION WITH THE INCOMING WARM OCCLUSION WILL REACH THE SW WA COAST THU MORNING AND SPREAD INTO THE INTERIOR FROM SEATTLE SOUTHWARD MIDDAY. PRECIPITATION SPREADS INTO THE N INTERIOR DURING THE AFTERNOON. WITH THE JET AXIS AND ASSOCIATED TRIPLE POINT AIMED AT OREGON...EXPECT THAT THE FREEZING LEVEL AND PRECIPITATION FORECASTS FROM THE GFS TO BE ON THE HIGH SIDE...ESPECIALLY OVER THE NORTH CASCADES. LOW LEVEL GRADIENTS REMAIN EASTERLY THROUGH THU NIGHT. THIS LEADS TO SNOW LEVELS IN THE CASCADES AT AROUND 3000 FEET RISING TO OVER PASS LEVEL FOR A FEW HOURS AS THE OCCLUSION PASSES EARLY FRI THEN FALLING BACK TO AROUND 3500-4000 FEET FRI. THE HIGHER ELEVATION SITES SUCH AS PARADISE IN MT RAINIER PARK WILL LIKELY REMAIN MAINLY SNOW. EVEN WITH HEAVIER PRECIPITATION REMAINING SOUTH OF THE STATE...AMOUNTS MAY STILL BE SUFFICIENT TO VERIFY WINTER STORM CRITERIA AT THE VOLCANOES. FOR NOW WILL KEEP THE WINTER STORM WATCH GOING FOR THE CASCADES LATER THU AND THU NIGHT.

AFTER RAIN ON THU AFTERNOON AND THU NIGHT WITH THE FRONT EXPECT BREEZY AND SHOWERY CONDITIONS TO DOMINATE NEW YEARS DAY INTO EARLY

SAT AS THE FILLING LOW OFFSHORE MOVES BY TO THE NORTH OF THE AREA. ALBRECHT

.LONG TERM...PREVIOUS LONG TERM DISCUSSION FOLLOWS...THE EXTENDED FORECAST SHOULD BE MARKED BY A TRANSITION BACK TO DRIER UPPER RIDGING. SHOWER ACTIVITY WILL STILL LINGER ON SATURDAY...BUT MODELS FINALLY HAVE CONSENSUS IN POINTING TO UPPER RIDGING AND MOSTLY DRY WEATHER FROM SUNDAY THROUGH TUESDAY. THERE IS STILL SOME UNCERTAINTY WITH HOW QUICKLY THE TRANSITION TO UPPER RIDGING WILL TAKE PLACE...SO CHANCE POPS LOOKS GOOD FOR SUNDAY. MAY EVENTUALLY NEED TO LOWER POPS FOR MONDAY AND TUESDAY. HANER

&&

.HYDROLOGY...SEVERAL WEATHER SYSTEMS ARE EXPECTED TO IMPACT THE REGION INTO NEXT WEEK...EVERY OTHER DAY OR SO. NONE OF THE SYSTEMS LOOK LIKE THEY WOULD GENERATE ENOUGH PRECIPITATION OVER OUR AREA TO POSE ANY THREAT TO AREA RIVERS AS THE FOCUS OF THE STORMS WILL BE INTO OREGON. THIS IS ESPECIALLY SO AS THE SNOW LEVEL WILL BE RELATIVELY LOW FOR AT LEAST THE FIRST FEW OF THEM. ALSO...THERE IS A SUFFICIENT BREAK BETWEEN SYSTEMS TO ALLOW THE RIVERS TO DRAIN BETWEEN EVENTS. SO BASED ON THAT...NO FLOODING IS EXPECTED FOR THE NEXT WEEK OR MORE ALTHOUGH THERE MAY BE NOTABLE RISES ON A COUPLE OF THE OLYMPIC RIVERS LIKE THE SKOKOMISH.

FLOODING ON THE GREEN RIVER IS NOT EXPECTED FOR THE NEXT 10 DAYS. HANER/ALBRECHT

&&

.AVIATION...A WEAKENING OCCLUDED FRONT OVER THE NORTHWEST INTERIOR WILL CONTINUE TO DISSIPATE THIS MORNING.

CEILINGS THIS MORNING GENERALLY IFR TO MVFR THIS MORNING WITH HIGHEST CIGS FROM KTCM TO KSEA WITH RADAR INDICATING SCATTERED SHOWERS OVER W WA ESPECIALLY OVER THE OLYMPIC PENINSULA AND NORTHWEST INTERIOR. LITTLE CHANGE THROUGH THE MORNING HOURS. LOW LEVEL FLOW STARTING TO TURN OFFSHORE WITH KSEW PROFILER INDICATING LIGHT SSE-SE FLOW UP TO 400 M. THE NEXT FRONTAL SYSTEM DEVELOPS OFF THE SOUTHERN OREGON COAST TODAY AND MOVES TOWARD THE COAST OVERNIGHT. CEILINGS WILL IMPROVE BACK UP INTO THE 4000 TO 6000 FOOT RANGE BY MID TO LATE AFTERNOON INTO THE EVENING HOURS. RAIN ASSOCIATED WITH THE WARM FRONT MOVING INTO WESTERN WASHINGTON INTERIOR AFTER 18Z THURSDAY WITH CEILINGS LOWERING AGAIN THURSDAY MORNING.

KSEA...CEILINGS AROUND 1500 TO 2000 FEET THIS MORNING WITH MULTIPLE CLOUD LAYERS UP TO 10000 FEET. CEILINGS IMPROVING LATER THIS AFTERNOON UP TO THE 4000-5000 FOOT RANGE AND REMAINING IN THAT RANGE OVERNIGHT INTO THURSDAY MORNING. SOUTHERLY WINDS 7 TO 10 KNOTS THROUGH MIDNIGHT...THEN BECOMING LIGHT AND VARIABLE 3 TO 6 KNOTS. PRANGE

&&

.MARINE...A WEAKENING OCCLUDED FRONT OVER THE NORTHWEST INTERIOR WILL GRADUALLY DISSIPATE TODAY. A WEAK RIDGE OF HIGH PRES WILL BUILD

OVER THE AREA LATER TODAY THEN SHIFT EAST TONIGHT. A STRONGER WARM FRONT...ASSOCIATED WITH A SUB 990 MB LOW WEST OF THE OFFSHORE WATERS...WILL MOVE THROUGH THE AREA THU NIGHT. SMALL CRAFT ADVISORIES WINDS WILL BEGIN IN THE COASTAL WATERS EARLY THURSDAY WITH SMALL CRAFT WINDS IN THE WESTERN AND CENTRAL STRAIT DEVELOPING LATER IN THE DAY. THE SURFACE LOW WILL WEAKEN AND TRACK THROUGH THE NORTHERN PORTION OF THE AREA FRI NIGHT. A SURGE OF SMALL CRAFT ADVISORY WESTERLY WINDS IS EXPECTED BEHIND THE LOW SATURDAY MORNING.

THE WAVEWATCH FORECAST MODELS INDICATES THAT A WAVE TRAIN DEVELOPING TO THE SOUTH OF THE DECAYING LOW WILL MOVE ONSHORE AT BETWEEN 18 AND 21 FT LATER FRI OR FRI NIGHT. IT APPEARS THAT MOST OF THE WAVE ENERGY WILL BE DIRECTED TOWARD THE OREGON COAST...BUT SOME WILL LIKELY REACH THE WA COASTLINE.

A TROUGH OF LOW PRESSURE WILL REMAIN OVER THE AREA DURING THE WEEKEND. FELTON/PRANGE

&&

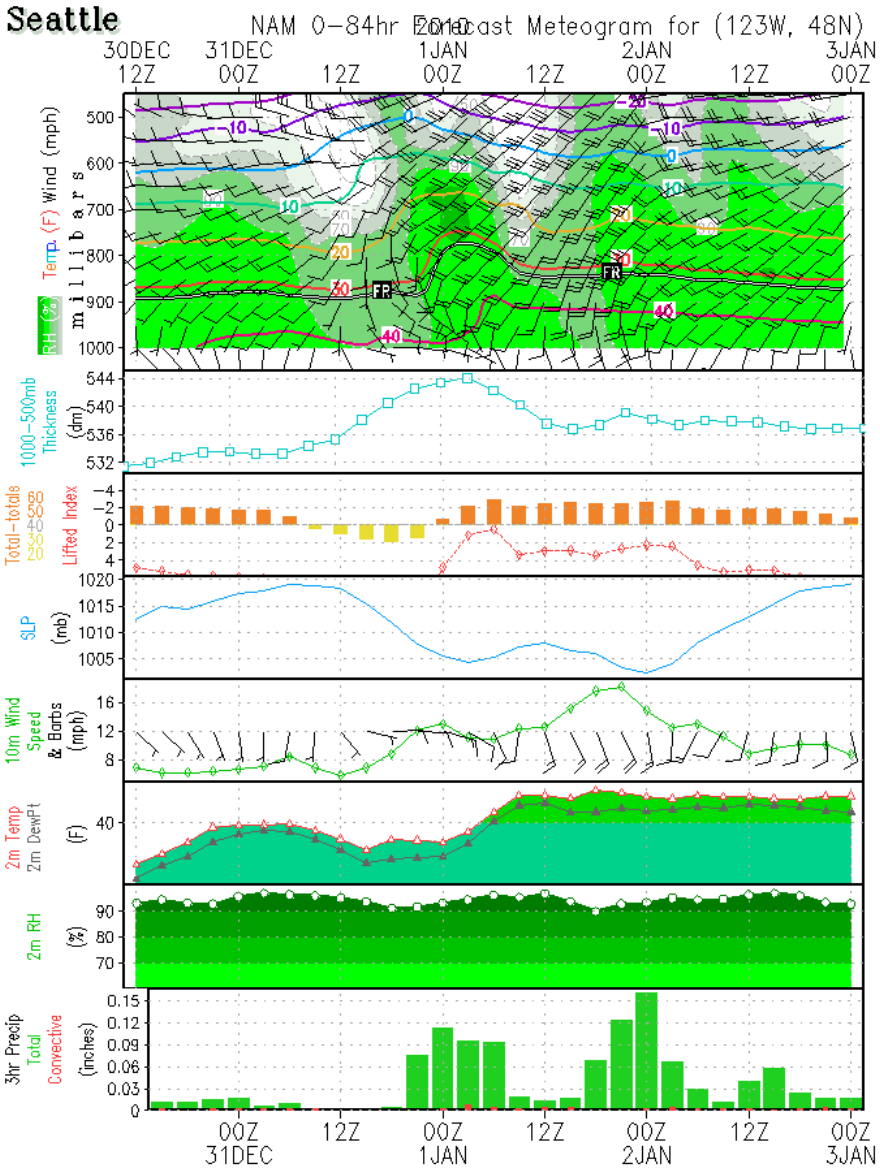
.SEW WATCHES/WARNINGS/ADVISORIES...

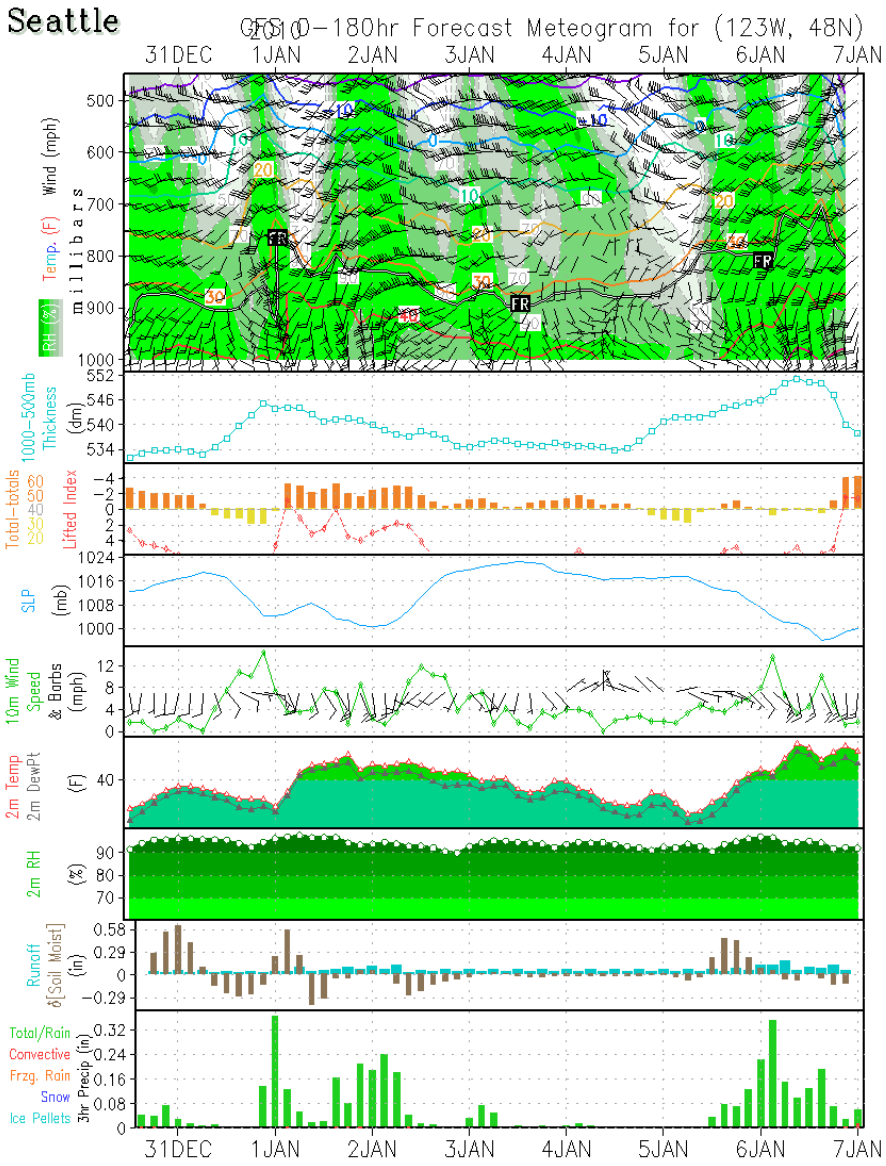
WA...WINTER STORM WATCH FOR THE NORTH AND CENTRAL CASCADES FROM
        THURSDAY MORNING THROUGH THURSDAY NIGHT.
PZ...SMALL CRAFT ADVISORY FOR HAZARDOUS SEAS COAST.
    .SMALL CRAFT ADVISORY FOR ROUGH GRAYS HARBOR BAR.

$$

WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION...PLEASE SEE WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML.


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
30DEC 12Z
31DEC 00Z
12Z
1JAN 00Z
12Z
2JAN 00Z
12Z
3JAN 00Z
millibars
Temp. (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
3hr Precip Total
Convective (inches)
00Z 31DEC
12Z
00Z 1JAN
12Z
00Z 2JAN
12Z
00Z 3JAN


Seattle
GFS 0-180hr Forecast Meteogram for (123W, 48N)
31DEC
1JAN
2JAN
3JAN
4JAN
5JAN
6JAN
7JAN
Wind (mph)
Temp. (F)
RH (%)
millibars
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
Runoff
δ[Soil Moist] (in)
Total/Rain
Convective
Frzg. Rain
Snow
Ice Pellets
3hr Precip (in)

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	April 2, 2010
TO:	Matt Woltman / Megan McCullough
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600
	Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #3 (02/23/2010)

Please find included the following:

- Storm report narrative (3 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- pH Worksheet (1 pg),
- Groundwater level measurement form, (1 pg)
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (2 pg),
- Sampler Reports (18 pgs), and
- Weather forecasting information (5 pgs).

Please let me know if you have any questions or need additional information. Thank You.

Dave Metallo, LHG

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #3
February 23rd, 2010

General:

Prior to Stormwater Sampling Event (STE) #3 a scheduled catch basin sediment sampling event was conduct between the 7th and 11th of January, 2010. Also prior to STE#3 the POS conducted vactor cleaning and TV-video inspection of the Lora Lake Apartments (LLA) site drainage system. This cleaning and inspection event was conducted between January 11th and February 9th. Sediment traps (intended to collect stormwater solids) were installed and the stormwater sampling infrastructure was re-installed at the associated sites during the week of February 15th. STE #3 was conducted on February 23rd and was the first LLA stormwater sampling event of 2010.

All equipment operated as designed and programmed. There was an enabling communication error between the master sampler at CB1 and its subordinate sampler (slave unit). This error prevented bottles 8-12 from receiving corresponding time-paced sample aliquots. More detail regarding this situation is provided in the *Anomalies and/or Workplan Deviations* section below.

Sampling stations CB-31A (main line inlet) and CB-1 (onsite drainage system outlet) automatically enabled within 10 minutes of each other. CB-4857 (main line outlet) did not automatically enable until approximately four hours after the other samplers. This was due to using enabling conditions developed prior to the vactor cleaning of the drainage system. It was observed during this event that the hydrologic response at CB4857, and the associated piping and nearby catch basins, has changed. These changes were noted and the necessary enabling adjustments will be made at this station during subsequent events. Hydrographs, showing level, flow and rainfall data, as well as sample markers and grab sample collection indications, for each of the monitoring stations are attached to this report.

All stations were automatically enabled via the use of area-velocity sensors set to trigger sampling above certain pre-determined set-point levels. A Thel-Mar compound volumetric in-pipe weir was installed at CB-1 since STE#1. Use of the weir provides more precise flow measurement at this location in a very low flow level environment in the associated outlet pipe (see STE#1 Storm Report) and allows for a deeper pool behind the weir from which to draw samples. However, it was observed during this STE that the on site drainage system was much more responsive to rainfall and seemed to pass a greater volume of runoff / size of storm then was previously noted. This is also likely a consequence from the drainage system vactoring event.

Grab samples were collected at each station using dedicated Teflon-coated lines attached to a peristaltic pump. All grabs were collected as early as possible during the storm event once runoff was noted and during the rising limbs of the storm hydrographs at each monitoring station.

CB-31A and CB-4857 had a storm volume difference of 20,000 gallons, with the inlet recording more flow then the outlet. This is also a consequence of the system vactoring. Since accumulated sediment was removed from the piping and vaults associated with CB4857 water flows more freely and is not being impounded to the degree that it previously was at CB4857. Water depth in the pipe (at the area-velocity sensor anchor position) did not increase as readily in association with rainfall as it had done during past events and observations. These shallower conditions in the pipe (field measured to have a 4% slope) tended to make flow monitoring more difficult.

Storm and Sample Validation / Qualification:

All validation and qualification conditions for this storm event were met. The only exception was the 75% flow hydrograph coverage requirement for CB1. During this STE the samples collected at CB1 provided 65% of the total storm flow hydrograph. The decreased storm flow hydrograph coverage was caused by not having samples in bottles 9 through 12. After conferring with the POS Project Manager they felt that the majority of the storm (especially the beginning and middle) was adequately represented by the samples that had been collected. Another factor is that CB 1 is a much smaller drainage system, with all inputs coming from shallow Type I catch basin draining only surface runoff, where the difference between 65% and 75% was only 90 gallons. The POS's decision was made to analyze the samples from CB1 for STE#3. See the accompanying *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding STE#3.

Compositing Scheme:

The hydrographs from each monitoring station were examined and decisions were made as to what specific bottles were to be included in the composite samples. See the attached field forms and compositing worksheets for these details. Each of three autosamplers were programmed to collect samples via time paced programming – each was set to collect an aliquot every 24-minutes (16 to 24 hour storm duration program). All of the composite samples were manually flow weighted based on site specific flow information.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. The locations were MW-1, MW-3, MW-4 and MW-6. Details regarding the measurement event are contained in the attached field sheet. Measurements are listed in the table below.

Groundwater Level Measurements, STE#3

Location	Date	Time	Water Level from TOC (FT)	Notes
MW-1	2/19/2010	14:40	14.78	free-phase product encountered
MW-3	2/19/2010	14:12	16.78	
MW-4	2/19/2010	14:21	15.79	
MW-6	2/19/2010	15:04	11.27	

Free-phase hydrocarbon based product was encountered during the time of gauging at MW-1. The product material was a light non-aqueous phase liquid (LNAPL) as evidenced by encountering it at the top of the water column. The material that was adhered to the water level indicator probe was dark golden brown in color and had a "motor oil-like" appearance and hydrocarbon odor. At the original time of water level gauging thickness gauging was not conducted. Subsequent measurement of this well conducted by Floyd/Snider at a later date also detected the presence of this material. Their assessed thickness of this LNAPL was noted to be 0.01 feet or less.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grabs or composite samples were placed into coolers and put on ice to maintain temperatures between 2 and 6 °C. A small portion of the composite samples were poured

off for the assessment of pH. All samples were recorded on Chain-of-Custody forms and were in direct control of project personnel at all times. Samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from all of the stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Anomalies and/or Workplan Deviations:

There were no anomalies observed that would cause any of the STE#3 samples to be non-representative of the conditions from which they were collected. There was an enabling communication error that occurred between the master sampler and its subordinate (slave) sampler unit. In master/slave mode several sampler units can be linked together, with one designated as the lead unit, such that once it has completed its sampling program a signal is sent to the next unit to then begin its collection routine. During this STE a communication failure between these sampler units developed. It was unclear whether this situation was the result of an improper programming setting or a hardware issue (e.g. electrical short in the cabling). The result was that the sampler containing bottles 9 through 12 did not activate and fill the containers. To correct this problem a thorough review of the sampler units programming was conducted, the programming was reviewed and verified by a manufacture's representative and all of the connection cables were either bench-tested and/or replaced. Subsequent field testing indicate that the connection between sampler unit is functioning properly.

Quality Control Samples:

During this event duplicate and MS/MSD samples were collected for both the grab and composite samples. Both the grab and composite duplicates were collected at CB 31A – which was designated CB100. The grab MS/MSD was collected at CB31A and the composite MS/MSDS was collected at CB1. Trip blanks accompanied all volatile organic samples collected during this STE. See the attached *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding QC sample collection.

Actions To Be Completed:

Routine maintenance and flow meter (level) calibrations will be conducted at a regular frequency to assure proper equipment operation. The project is now in stormwater sampling mode. An attempt will be made to conduct seven more events before late-May, 2010. The focus of the field efforts will be in maintaining proper station and equipment operation, data and resource management and storm-tracking tasks.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #3

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Storm Event Data:	
Project Storm Event (STE) #	3
Event Forecast Probability (%)	80%
Antecedent Dry Period (days: hrs: mins)	7:06:30
STE Start Date & Time	2/23/10 13:20
STE Duration (hrs:mins)	27:10
STE End Date & Time	2/24/10 16:30
Period Between Next Measureable Rain (hrs: mins)	7:10
Was Targeted STE Qualified Per LLA QAPP	YES
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.52
Max 1-hr Rainfall Intensity (in/hr)	0.11
Average 1-hr Rainfall Intensity (in/hr)	0.02

[1] Sample Collection Criteria:	CB-31A	CB-4857	CB-1
Sampling Station			
Was Grab sample collected?	Yes	Yes	Yes
Grab ID	CB31A022310GRAB	CB4857022310GRAB	CB1022310GRAB
Grab Date /Time	2/23/2010 14:50	2/23/2010 18:15	2/23/2010 15:40
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	Yes	Yes	Yes
Hydrograph stage at grab collection	rising / first crest	rising / first crest	rising / first crest
Grab parameters collected per LLA QAPP ?	Yes	Yes	Yes
Were Trip Blanks included w/ Grab samples ?	Yes (TB022310)	Yes (TB022310)	Yes (TB022310)
Was Comp sample collected?	Yes	Yes	Yes
Comp ID	CB31A022410COMP	CB4857022410COMP	CB1022410COMP
Comp Date /Time	2/24/2010 14:14	2/24/2010 17:38	2/24/2010 5:38
Total volume measured during storm period (gallons)	40790	20590	925
Volume sampled during storm period (gallons)	40790	20590	602
Volume utilized for comp. sample	40790	17200	602
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	Yes (100%)	Yes (84%)	No (65%)
Was a minimum of 8 aliquots collected for comp sample ?	Yes (60)	Yes (35)	Yes (40)
Comp parameters collected per LLA QAPP ?	Yes	Yes	Yes
Rainfall during sampling period (in)	0.43	0.43	0.37
pH Measurements Collected ?	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No
[1] QC Sample Summary Information:	**CB-31A**	**CB-4857**	**CB-1**
Was Grab sample duplicate collected ?	Yes	No	No
Grab sample duplicate ID	CB100022310GRAB	na	na
Grab sample date and time	2/23/2010 15:50	na	na
Was Comp sample duplicate collected ?	Yes	No	No
Comp sample duplicate ID	CB100022410COMP	na	na
Comp sample date and time	2/24/2010 15:00	na	na
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	Yes (grab)	No	Yes (comp)

[1] If the answer to any of the Storm Event or Sample Collection Criteria questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 3/5/10 **Reveiwed By / Date:**

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Floyd / Snider	Phone: 206-292-2078
Client Contact: Matt Woltman / Jessi Massingale	
Client Project Name: Lora Lake Apartments	
Client Project #: POS-LLA	Samplers: D. Metallo B. Kwasnowski

Date: 2-23-2010

Page: 1 of 1

No. of Coolers: 1 Cooler Temps: 2 2

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NW-TPH-Dx ①	Analysis Requested: VOC 8260-C SIM	Notes/Comments
CB31A022310GRAB	2-23-10	1450	W	13	X	X	Run MS/MSD
CB100022310GRAB	2-23-10	1550	W	5	X	X	
CB4857022310GRAB	2-23-10	1815	W	5	X	X	
CB1022310GRAB	2-23-10	1540	W	5	X	X	
TB022310	2-23-10	1400	W	3		X	

Comments/Special Instructions
① Acid/silica gel clean up for TPH-Dx

Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Dave Metallo	Printed Name: Peter Heltzel	Printed Name: Peter Heltzel	Printed Name: D. Peterson
Company: Taylor	Company: TAI	Company: TAI	Company: ARI
Date & Time: 2-24-10 (1430)	Date & Time: 2-24-10 (1430)	Date & Time: 2-24-10 (1500)	Date & Time: 2/24/10 1500

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: | Turn-around Requested: Standard | Date: 2-24-10

ARI Client Company: Floyd / Snider | Phone: 206-292-2078 | Page: 1 of 1

Client Contact: Matt Woltman | No. of Coolers: 2 | Cooler Temps: 4.0, 2.5

Client Project Name: Lora Lake Apartments

Client Project #: POS-LLA | Samplers: D. Metallo, P. Heltzel

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270-D SIM low level	PCP 8041	Arsenic Tot & Diss. 200.8	Dioxin/ Furans 1613	TSS SM 2540D				Notes/Comments
CB31A022410COMP	2.24.10	1414	W	1	X	X	X	X	X				pH - storm lab measured (see attached sheet) 6.54
CB4857022410COMP	2.24.10	1738	W	1	X	X	X	X	X				6.93
CB1022410COMP	2.24.10	0538	W	1	X	X	X	X	X	Run MS/MSD			6.59
CB100022410COMP	2.24.10	1500	W	1	X	X	X	X	X				6.54

Comments/Special Instructions
- Bottles & glassware decon'ed to LLA project specific SOP

Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Dave Metallo	Printed Name: Peter Heltzel	Printed Name: Peter Heltzel	Printed Name: S. Peterson
Company: Taylor Assoc.	Company: TAH	Company: TAH	Company: ARI
Date & Time: DM 2/24/10 1640 25	Date & Time: 2/25/10 1640	Date & Time: 2/25/10 1726	Date & Time: 2/25/10 1726

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: LLA

Date: 2/25/10
Staff: PH
pH meter make/model #: Orion 2 Star

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB4857022410 COMP	6.93	16:30	
CB1022410COMP	6.59	16:36	
CB31A022410COMP	6.54	16:43	
CB1000224100COMP	6.54	16:50	

Post-Measurement Check

Nominal pH value of standard	7.00
Temperature (deg C)	13
Standard pH, temp corrected	7.06
Meter pH reading (SU)	7.06
Difference (SU)	0
Time	16:55

Should be < 0.1 (round to 0.0)

Form to be included in storm file, as applicable

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action

Groundwater Level Measurement Field Form

Personnel: D. Metallo	**Arrival Date/Time:** 2-19-10 (1400)
Weather: Sunny, 50-60; breezy,	
Precip in Last 24-hrs / Last Measureable Rain Event: No precip in last ~72 hrs, last rain was 2-15/2-16	

Monitoring Well ID	Time	Water Level (FT)	Meas. Reference
MW-3	1412	16.78	Top PVC casing
MW-4	1421	15.79	Top PVC casing
MW-1	1440	14.78	Top PVC casing
MW-6	1504	11.27	Top PVC casing

Notes:

1) MW-1 has free product (dark golden brown - motor oil appearance) that is stuck to ~ bottom 2' of WLI tape. Product is floating on top of water table. Thickness unknown - no interface probe on-site. * When wiping WLI probe w/ towel, product was noted to be "sticky" & or "tacky".

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB-31A

8 or (12) x 1 gallon bottle set-up

Rev.ed 2/11/2010

Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: D. Metallo	Weather: Sunny, 50s, breezy		Arrival Date/Time: 2-19-10 (1215)		
Carry-over maintenance to do prior to set-up:	Re-installation of samp. lines & flow sensor			done?	Yes
Sampler Battery Voltage	12.92	Changed? Y (N)		New voltage	12.92
Flow Meter Battery Voltage	NA	Changed? Y N NA		New voltage	NA

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	NO (count is good)
Desiccant Canisters OK (Yes/No)	Changed	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	0.383 / .398	Comp and Grab Lines Back flushed with DI?	Yes (1-gal ea. 2-11)
Actual level Reading (FT)	NA	Desiccant Condition, replaced?	Good
Difference (FT)	NA	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	No (last 2/10/10)	Clean bottles installed & lids off? *	Yes / Yes
Velocity (fps)	too low to register	Diagnostics / Distributor arm check?	Yes - passed
Flow Rate (gpm)	NA / 1.49pm	Enable Level (FT) *	0.45'
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate *	Time / 24 min
Channel conditions/observations OK		Program Reviewed? (Yes/No)	Yes
		Last Screen *	Prgm Disabled 1529...
		Ice Deployed? (Yes/No)	NA

Notes: - Calibrated sampler aliquot vol. (700ml); enable level = 0.4 + 0.05 = 0.45'

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: D. Metallo Weather: Drizzle, 40°s Arrival Date/Time: 2-23-10 (1420)

Grab Sample Data	
Runoff Present or Hydrograph Elevated?	Yes
Grab Collection Time (date/time)	2/23/10 (1450)
Grab Sample ID	CB31A022310GRAB
Grab Duplicates Collected?	Yes
Grab Duplicate Collection (date/time)	2/23/10 (1550)
Grab Duplicate ID	CB10022310GRAB
Grab MS/MSD Collected ?	Yes
VOA Trip Blank in cooler?, ID Yes	TB022310

Sample Observations:
- Sample water is sl. cldy / yellowish
- See notes below for re-start info.

Flow Meter	
Flow meter cables OK? (Y/N)	Y
Flow Data Downloaded & Reviewed? (Y/N)	Y

Sampler	
Equipment running correctly?	No - See below
Composite Begin Time (date / time)	2/23/10 (1438)
On Composite... (bottle # / aliq #)	1/1 BTL 1
Ice deployed?	NO
Sampler Battery Voltage (changed?):	NO
Flow Meter Battery Voltage/Change? (if different)	—
Bottle Swap needed? (if yes fill out Section 3)	NA

Notes: - Errors had occurred w/ the Liquid Level Detector on Sampler - reset & re-cal.ed vol.
- Empty & replaced BTL #1 - orig st. = 1355 re-start @ 1438)

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

DH

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB-31A

Section 4. Comp. Bottles Retrieval

Personnel: PH, DM	Weather: drizzle		Arrival Date/Time: 2/24/10 1140		
Sampler Battery Voltage	12.70	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	—	Changed? Y (N)		New voltage	—
Comp Sample Volume Collected	100%	Data downloaded? Yes			
Composite Begin Time (date/time)	2/23/10 14:38			Round #:	—
Last Aliquot Taken (date/time, btl #, aliq #)	2/24/10 1214 BTL 11 5/5 → Came back @ ~1500 last aliq. = BTL 12				
Comp Bottles Labeled? (sta. & btl #)	Yes				5/5@, 14:14 2.24.10

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

NONE

Channel conditions/observations Observed from ground level - appears to be normal

Notes/Maintenance Needed: Keep an eye on sediment bottle, assess bottle height setting - At visit lip of bottle just barely above WL

Section 5. Post Storm Comp. Sample Processing

Personnel: DM PH		Date/Time: 2/25/2010 (1300)	
Processing Location: POS Stormwater Lab			
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes			Rain Gauge Info: Yes
How Many Comp. Bottles Were Collected? 12		Approximate Total Comp. Volume Collected: 42 L	
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (Incldng QC Smpls): 4830		Actual Comp. Sample Vol. Available: ~42L	
Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp.)		Other (explain):	
Bottles (Btl #s) used for Comp. Sample: 1 - 12		Comp. Sample Container Size & Material: 2.5 gal WM glass	
Comp Collection Time (date/time): 2.24.10 (1414)		Comp Sample ID: CB31A022410COMP	
pH Measurements Collected On Comp. Sample ?: Yes 6.54			
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes			

Notes: Sample iced & put into cooler

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes	
Duplicate Sample Collected ? ~~NO~~ DM Yes	Duplicate Sample Vol.: ~~NA~~ DM 4830
Duplicate sample Date / Time: ~~DM NA~~ 2.24.10 (1500)	Duplicate Sample ID: ~~NA~~ DM CB10022410COMP
pH Measurement Collected on Duplicate Comp. Sample?: ~~NA~~ DM Yes 6.54	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: NA	
MS/MSD Vol. submitted: NA	
Were any other QC sample types colelcted? (if yes, provide details) NO	
DI Water Information All DI used was provided by ARI Labs	

Notes: Sample iced & put into cooler

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB-4857

8 or (12) x 1 gallon bottle set-up

Rev.ed 2/11/2010

Section 1. Storm Setup and Inspection

Personnel: D. Metallo	Weather: Sunny, 50s, breezy		Arrival Date/Time: 2-19-2010 (1310)		
Carry-over maintenance to do prior to set-up:	Re-installed sample lines & flow meter sensor			done?	Yes
Sampler Battery Voltage	13.06	Changed? Y (N)		New voltage	13.01
Flow Meter Battery Voltage	NA	Changed? Y N NA		New voltage	NA

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No (counts good)
Desiccant Canisters OK (Yes/No)	Changed	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	0.42' / 0.03	Comp and Grab Lines Back flushed with DI?	Yes (2-19-10) 1-gallon
Actual level Reading (FT)	NA	Desiccant Condition, replaced?	OK
Difference (FT)	NA	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	NO (done on 2/15)	Clean bottles installed & lids off? #	Yes / Yes
Velocity (fps)	0.13	Diagnostics / Distributor arm check?	Yes - passed
Flow Rate (gpm)		Enable Level (FT) Current = 0.03 + 0.05 = 0.08 → 0.09 (1)(2)	
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate #	Time / 24 min
Channel conditions/observations OK - visible flow out of inlet pipe into vault		Program Reviewed? (Yes/No)	Yes
		Last Screen #	Prg in Disabled 11.07.
		Ice Deployed? (Yes/No)	NA

Notes: - Not enough water in pipe to calibrate sampler aliquot vol. - needs to be done prior to sampling event. → Cal'ed Sampler Vol (700 ml) 2-23-10 (1045)

(1) Checked Smplr there's increased flow in pipe, Level not at 0.09, re-set enable for 0.04 to activate

(2) at current lvl (0.03 to 0.05) there's not enough over the strainer to pull sample - reset to 0.09'

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: D. Metallo Weather: Drizzle, lt. rain, 40°s Arrival Date/Time: 2-23-10 (1750)

Grab Sample Data		Sample Observations:
Runoff Present or Hydrograph Elevated?	Yes	
Grab Collection Time (date/time)	2-23-10 (1815)	
Grab Sample ID	CB4857022310GRAB	
Grab Duplicates Collected?	No	
Grab Duplicate Collection (date/time)	NA	
Grab Duplicate ID	NA	
Grab MS/MSD Collected ?	No	
VOA Trip Blank in cooler?, ID Yes	TB022310	

Flow Meter	
Flow meter cables OK? (Y/N)	Y
Flow Data Downloaded & Reviewed? (Y/N)	Y

Sampler	
Equipment running correctly?	Yes
Composite Begin Time (date / time)	2-23-10 (1802)
On Composite... (bottle # / aliq #)	BTL 1 1 of 5
Ice deployed?	No - cold enough
Sampler Battery Voltage (changed?):	12.65
Flow Meter Battery Voltage/Change? (if different)	NA
Bottle Swap needed? (if yes fill out Section 3)	NA

Notes: - Collected grab w/o incident

Section 3. Mid-Storm Check / Bottle Switch

Personnel: DM, PH	Weather: Rain at times, 40°s	Arrival Date/Time: 2-24-10 (1245)	
Composite Begin Time (date / time)	2/23/10 (1802)		Round #: 1
Last Aliquot Taken (date / time, btl #, aliq #)	BTL 10 3 of 5	Data downloaded?	Yes
Comp Bottles Labeled? (sta. & btl #)	Yes	Sampler/Flow Meter Batt. Voltage (changed):	12.52
Comp Sample Volume Collected	Varied, See below	Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

#4 BTL 2 - NML; #5 BTL 2 - NML; All of BTL #3; 1-2 of BTL #4; 4-5 of BTL #6; 1-2 NML BTL #7; 3-5 NLD BTL 7; 1 BTL 8 NLD; 2-5 NML BTL 8; 1-2 NML #9; 3-5 NLD #9; 1-2 NLD #10; 1-2 #12 NML; 3-5 #12 NLD

Channel conditions/observations: Water flowing into vault - doesn't appear to be ponding

Notes/Maintenance Needed: NA

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB-4857

Section 4. Comp. Bottles Retrieval

Personnel: PH	Weather: drizzle		Arrival Date/Time: 2/25/10 7:10		
Sampler Battery Voltage	12.57	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	N/A	Changed? Y (N)		New voltage	—
Comp Sample Volume Collected	100% - 50%	Data downloaded?	Yes		
Composite Begin Time (date/time)	2/23/10 (1802)			Round #: 2	
Last Aliquot Taken (date/time, btl #, aliq #)	2/24/10 (1738) NLD BTL 12, 5/5				
Comp Bottles Labeled? (sta. & btl #)	Yes				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

1-2 NML #11

Bottle #11 over filled

1-2 NML #12 3-5 NLD #12

Channel conditions/observations

OK

Notes/Maintenance Needed:

Section 5. Post Storm Comp. Sample Processing

Personnel: DM / PH Date/Time: 2/25/10 (~1300)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes Rain Gauge Info: Yes 500

How Many Comp. Bottles Were Collected? 12 Approximate Total Comp. Volume Collected: 7 X 3+ liters, 5 ~~5000 ml~~

Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4684 Actual Comp. Sample Vol. Available: 7 full btls

Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted) (Manual Comp., Other (explain): FWMC

Bottles (Btl #s) used for Comp. Sample: 1, 2, 4-6, 10-11 Comp. Sample Container Size & Material: 2.5 gal glass WM jar

Comp Collection Time (date/time): 2-24-10 (1738) Comp Sample ID: CB4857022410 COMP

pH Measurements Collected On Comp. Sample ?: 6.93

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes: Sample iced and put into cooler

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): NA - Site not Selected

Duplicate Sample Collected ? NO	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: ~~NA~~ NA

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: NA

MS/MSD Vol. submitted:

Were any other QC sample types colelcted? (if yes, provide details)

DI Water Information

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB-1 | (8) or 12 x 1 gallon bottle set-up | Rev.ed 2/11/2010 | Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: D. Metallo | Weather: Sunny, 50-60, breezy | Arrival Date/Time: 2-19-10 (1510)

Carry-over maintenance to do prior to set-up: Re-install sampl. lines, flow sensor & thalmar weir | done? Yes

Sampler Battery Voltage - Master	12.76	Changed? Y (N)	New voltage	12.76	
Flow Meter Battery Voltage - Slave	12.85	Changed? Y (N)	New voltage	12.85	
Flow Meter	Flow Module	**Sampler/s**	Master	Slave	
Date/time correct? (Yes/No)	Same as sampler	Pump Tubing OK?	Yes	Yes	
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No	No	
Desiccant Canisters OK (Yes/No)	Replaced	Sample Tubing & Strainer OK?	Yes	Yes	
Flow Meter Level (FT)	-0.032	Comp and Grab Lines Back flushed with DI?	Yes - Iged	Yes - Iged	
Actual level Reading (FT)	NA	Desiccant Condition, replaced?	No	No	
Difference (FT)	NA	Suction line & quick connect attached?	Yes	Yes	
Level calibrated? (Yes/No)	No (last on 2.10.10)	Clean bottles installed & lids off? *	Yes/Yes	Yes/Yes	
Velocity (fps)	NA	Diagnostics / Distributor arm check?	OK	OK	
Flow Rate (gpm)	NM	Enable Level (FT) *	0.03'		
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate *	T/12 min	T/12 min	
Channel conditions/observations OK		Program Reviewed? (Yes/No)	Yes	Yes	
* Don't forget to set delay time on Slave Sampler		Last Screen *	Prgm Dis. 10	? Waiting...	
		Ice Deployed? (Yes/No)	NA	NA	

Notes:
- Unable to calibrate Flow module level or Sampler aliquot vol. due to absense of water in inlet pipe. Need to calibrate prior to storm event (25-Mar-09)
- Internal Sampler batt. on Slave unit should be replaced - it's past its exp. date ✓

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: D. Metallo, B Kwasnowski | Weather: Drizzle, 40's | Arrival Date/Time: 2-23-10 (1530)

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?	Yes	water sl. cldy / clear	
Grab Collection Time (date/time)	2-23-10 (1540)		
Grab Sample ID	CB1022310GRAB		
Grab Duplicates Collected?	NO	**Sampler**	
Grab Duplicate Collection (date/time)	NA	Equipment running correctly?	Yes
Grab Duplicate ID	NA	Composite Begin Time (date / time)	2-23-10 (1402)
Grab MS/MSD Collected ?	NO	On Composite... (bottle # / aliq #)	515 BTL1
VOA Trip Blank in cooler?, ID Yes	TB022310	Ice deployed?	NO - cold enough
Flow Meter		Sampler Battery Voltage (changed?):	NO
Flow meter cables OK? (Y/N)	Y	Flow Meter Battery Voltage/Change? (if different)	—
Flow Data Downloaded & Reviewed? (Y/N)	Reviewed Only	Bottle Swap needed? (If yes fill out Section 3)	NA

Notes: * Cal'ed Master+Slave Sampler Vol.s 2-23-10 (1010), 700-ml, prior to STE

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

Channel conditions/observations

DM

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB-1

Section 4. Comp. Bottles Retrieval

Personnel: D. Metallo, P. Hetzel	Weather: rainy, 40°s	Arrival Date/Time: 2-24-10 (1225)	
Sampler Battery Voltage – Master	12.40	Changed? Y (N)	New voltage —
Flow Meter Battery Voltage – Slave	12.66	Changed? Y (N)	New voltage —
Comp Sample Volume Collected		Data downloaded? Yes	
Composite Begin Time (date/time)	2-23-10 (1402)		Round #: 1
Last Aliquot Taken (date/time, btl #, aliq #)	2-24-10 (0538) BTL 8 5/5		
Comp Bottles Labeled? (sta. & btl #)	Yes		

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

None Missed

Channel conditions/observations

Notes/Maintenance Needed: Did not re-set Master base (Round 2) for collection beyond bottle #8

Section 5. Post Storm Comp. Sample Processing

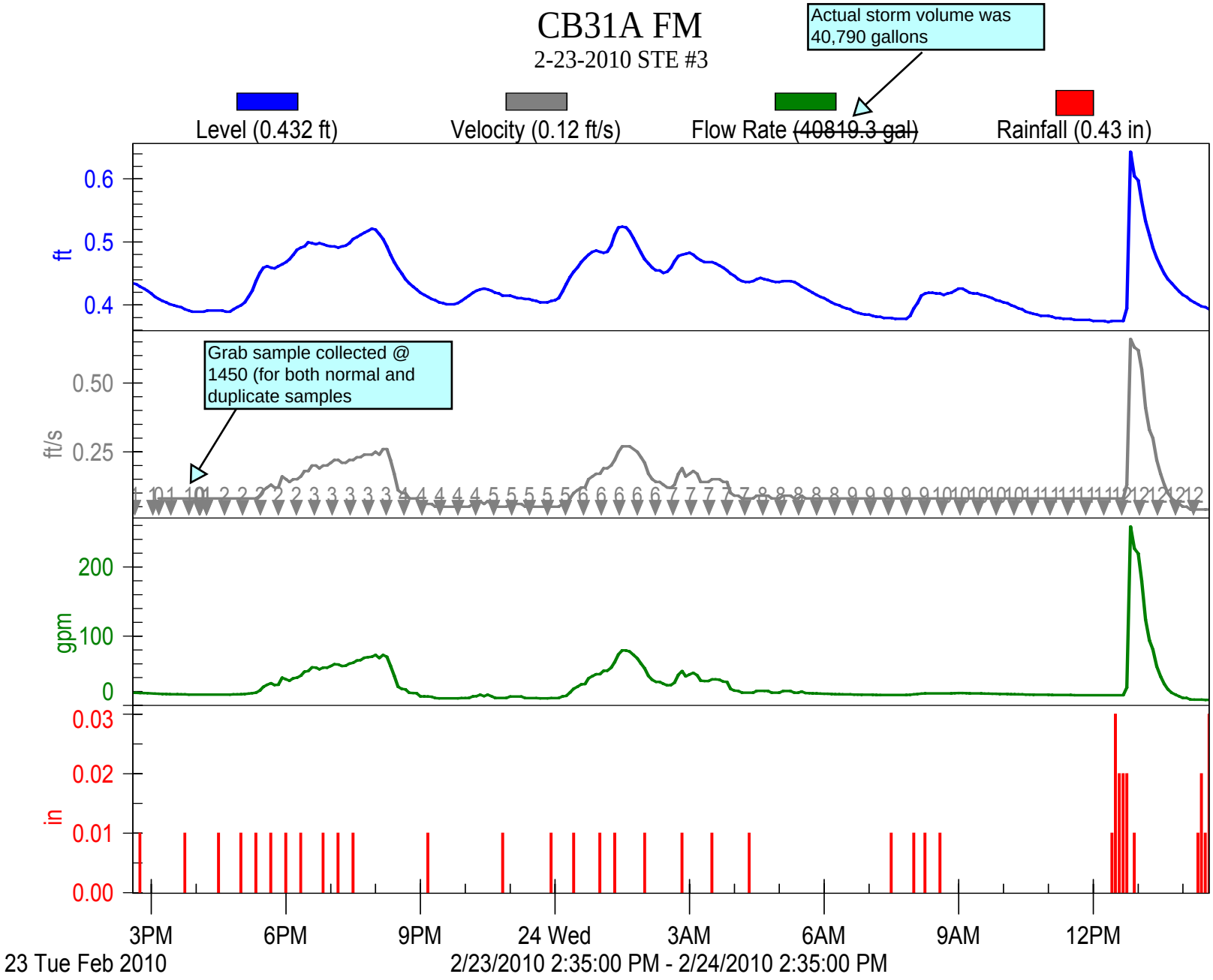
Personnel: DM / PH	Date/Time: 2/25/2010 (~1300)
Processing Location: POS Stormwater Lab	
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes	Rain Gauge Info: Yes
How Many Comp. Bottles Were Collected? 8	Approximate Total Comp. Volume Collected: 8 X 1 gal bottles
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 9050	Actual Comp. Sample Vol. Available: ~32 L
Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted) (Manual) Comp., Other (explain): FWMC	
Bottles (Btl #s) used for Comp. Sample: 1 through 8	Comp. Sample Container Size & Material: 2-5 gal. glass WM
Comp Collection Time (date/time): 02-24-10 (0538)	Comp Sample ID: CB102241OCOMP
pH Measurements Collected On Comp. Sample ?: 6.59	
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes	

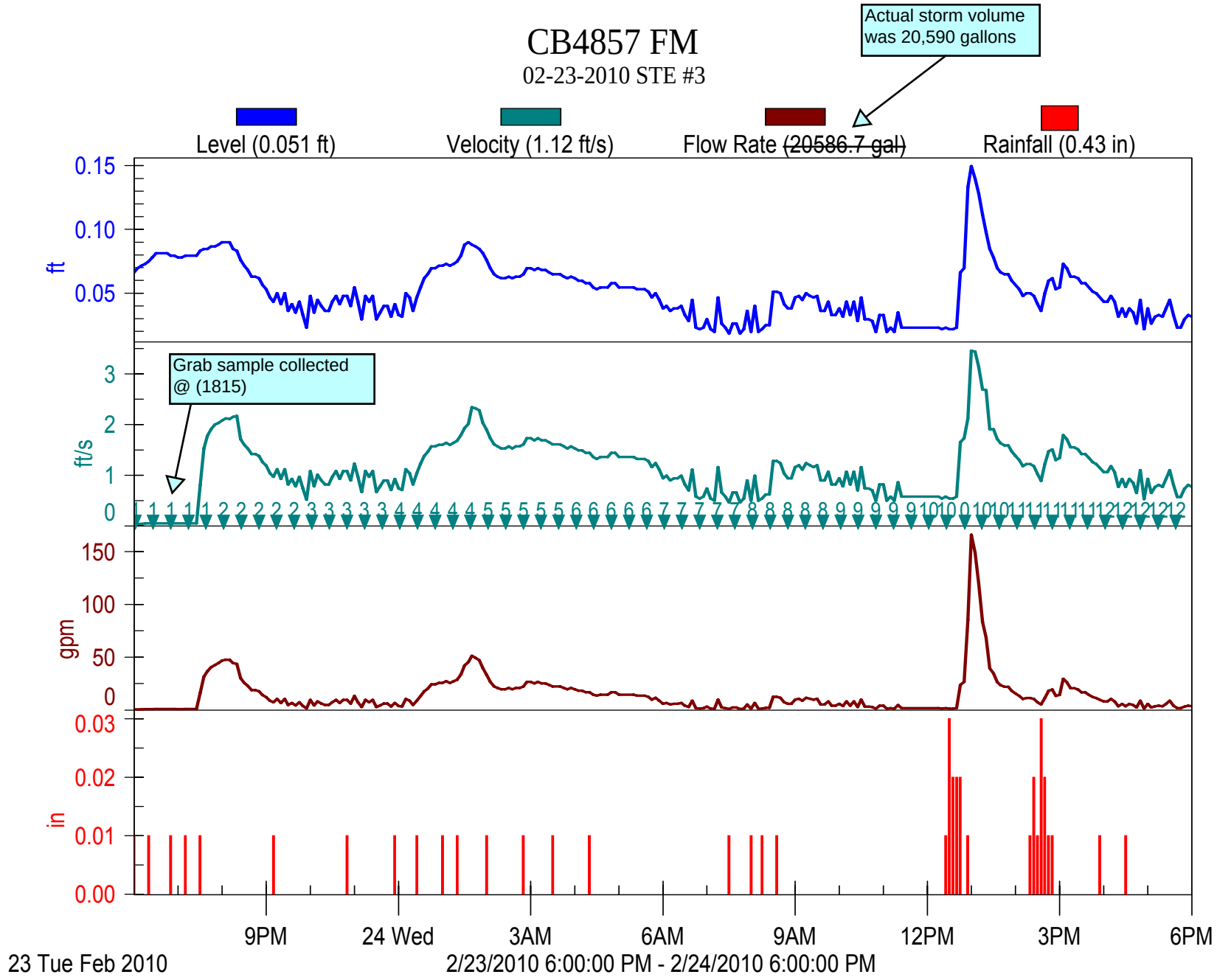
Notes: Comp. Sample represented 65% of total Storm (duration) volume. Recieved "OK" from POS to proceed w/ processing & submittal of this sample.

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes	
Duplicate Sample Collected ? NO	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA
pH Measurement Collected on Duplicate Comp. Sample?: NA	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: YES	
MS/MSD Vol. submitted: Total comp vol = 9050 (Sample = 4500 mL) (MS/MSD portion available = 4550 ml)	
Were any other QC sample types colelcted? (if yes, provide details) NO	
DI Water Information – Any DI if used, was provided by ARI Labs	

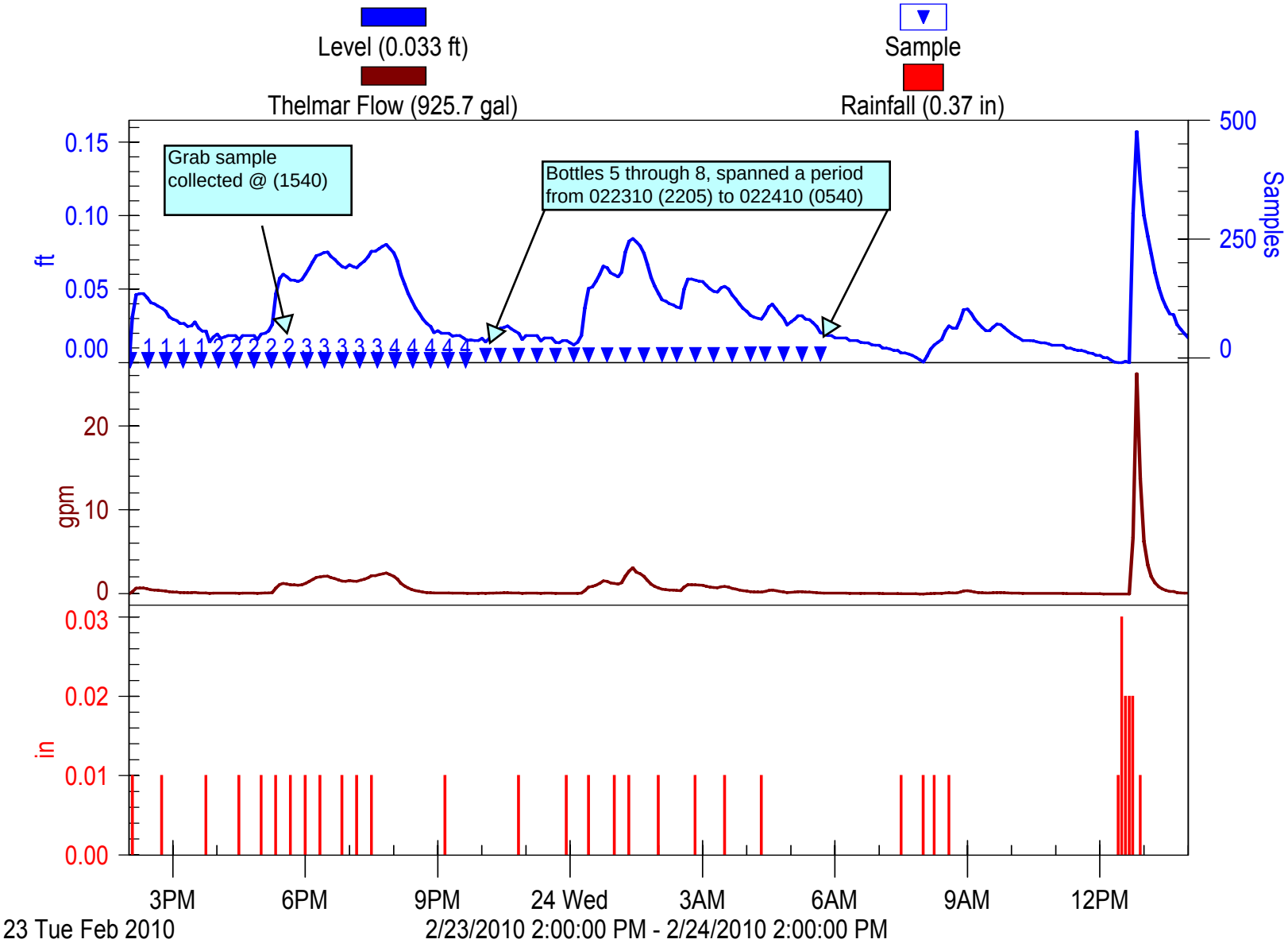
Notes: Sample iced and put into cooler


CB31A FM
2-23-2010 STE #3
Actual storm volume was 40,790 gallons
Level (0.432 ft)
Velocity (0.12 ft/s)
Flow Rate (40819.3 gal)
Rainfall (0.43 in)
ft
0.6
0.5
0.4
Grab sample collected @ 1450 (for both normal and duplicate samples
ft/s
0.50
0.25
gpm
200
100
0
in
0.03
0.02
0.01
0.00
3PM
6PM
9PM
24 Wed
3AM
6AM
9AM
12PM
23 Tue Feb 2010
2/23/2010 2:35:00 PM - 2/24/2010 2:35:00 PM


CB4857 FM
02-23-2010 STE #3
Actual storm volume was 20,590 gallons
Level (0.051 ft)
Velocity (1.12 ft/s)
Flow Rate (~~20586.7 gal~~)
Rainfall (0.43 in)
ft
0.15
0.10
0.05
Grab sample collected @ (1815)
ft/s
3
2
1
0
gpm
150
100
50
0
in
0.03
0.02
0.01
0.00
9PM
24 Wed
3AM
6AM
9AM
12PM
3PM
6PM
23 Tue Feb 2010
2/23/2010 6:00:00 PM - 2/24/2010 6:00:00 PM

CB1

02-23-2010 STE #3



CB31A - STE#3 022310

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
1720	0.226315789	204	**1**	4.22%	4.22%	4.22%
2860	0.376315789	339	**2**	7.01%	11.23%	7.01%
7235	0.951973684	857	**3**	17.74%	28.97%	17.74%
2025	0.266447368	240	**4**	4.96%	33.93%	4.96%
1390	0.182894737	165	**5**	3.41%	37.34%	3.41%
5980	0.786842105	708	**6**	14.66%	52.00%	14.66%
4070	0.535526316	482	**7**	9.98%	61.98%	9.98%
2225	0.292763158	263	**8**	5.45%	67.43%	5.45%
1850	0.243421053	219	**9**	4.54%	71.97%	4.54%
2025	0.266447368	240	**10**	4.96%	76.93%	4.96%
1810	0.238157895	214	**11**	4.44%	81.37%	4.44%
7600	1	900	**12**	18.63%	100.00%	18.63%
				100.00%		100.00%

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	40790		
Strm Qtot (gals)	40790		
max Q	7600		
min V (ml)	900	**4830**	**Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.
Used all 12 bottles
COMP Label = CB31A022410COMP **Time (1414)**

CB100 - STE#3022310 (DUPLICATE of CB31A)

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
1720	0.226315789	204	**1**	4.22%	4.22%	4.22%
2860	0.376315789	339	**2**	7.01%	11.23%	7.01%
7235	0.951973684	857	**3**	17.74%	28.97%	17.74%
2025	0.266447368	240	**4**	4.96%	33.93%	4.96%
1390	0.182894737	165	**5**	3.41%	37.34%	3.41%
5980	0.786842105	708	**6**	14.66%	52.00%	14.66%
4070	0.535526316	482	**7**	9.98%	61.98%	9.98%
2225	0.292763158	263	**8**	5.45%	67.43%	5.45%
1850	0.243421053	219	**9**	4.54%	71.97%	4.54%
2025	0.266447368	240	**10**	4.96%	76.93%	4.96%
1810	0.238157895	214	**11**	4.44%	81.37%	4.44%
7600	1	900	**12**	18.63%	100.00%	18.63%
				100.00%		100.00%

Total Strm Vol% Rep.'ed in Comp

Qtotal	40790		
Strm Qtot (gals)	40790		
max Q	7600		
min V (ml)	900	**4830**	**Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.
Used all 12 bottles
CB100 is a duplicate sample of CB31A
Comp Label = CB100022410COMP **Time (1500)**

CB4857 - STE#3 022310

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
515	0.118937644	167	**1**	2.99%	2.99%	2.50%
2890	0.66743649	934	**2**	16.80%	19.80%	14.04%
	0	0	**3**	0.00%	19.80%	0.00%
2440	0.563510393	789	**4**	14.19%	33.98%	11.85%
3155	0.728637413	1020	**5**	18.34%	52.33%	15.32%
1950	0.45034642	630	**6**	11.34%	63.66%	9.47%
	0	0	**7**	0.00%	63.66%	0.00%
	0	0	**8**	0.00%	63.66%	0.00%
	0	0	**9**	0.00%	63.66%	0.00%
4330	1	1400	**10**	25.17%	88.84%	21.03%
1920	0.443418014	621	**11**	11.16%	100.00%	9.32%
	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		83.54%

Total Strm Vol% Rep.'ed in Comp

Qtotal	17200
Strm Qtot (gals)	20590
max Q	4330
min V (ml)	1400

5561 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.
Used bottles 1,2,4-6,10 and 11. Bottles 3, 7-9 and 12 were either empty or only partially filled (v.low vol)
Comp Label = CB4857022410COMP **Time (1738)**

CB1 - STE#3 022310

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
29.45	0.147619048	443	**1**	4.89%	4.89%	3.18%
30.9	0.154887218	465	**2**	5.13%	10.03%	3.34%
199.5	1	3000	**3**	33.15%	43.18%	21.57%
77.95	0.390726817	1172	**4**	12.95%	56.13%	8.43%
6.05	0.030325815	91	**5**	1.01%	57.13%	0.65%
135.15	0.677443609	2032	**6**	22.46%	79.59%	14.61%
93.95	0.470927318	1413	**7**	15.61%	95.20%	10.16%
28.9	0.144862155	435	**8**	4.80%	100.00%	3.12%
				100.00%		**65.06%**

Total Strm Vol% Rep.'ed in Comp

Qtotal	601.85
Strm Qtot (gals)	925
max Q	199.5
min V (ml)	3000

9050 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon cubitainer.
Used all 8 bottles
**Vol. includes enough sample for lab to run an MS/MSD
Comp Label = CB1022410COMP **Time (0538)**

SAMPLER ID# 1069569980 16:19 24-FEB-10
Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

PROGRAM NAME:
"LLA MULTI "
SITE DESCRIPTION:
"CB31A SMP "

UNITS SELECTED:
LENGTH: ft

---

1 MINUTE
DATA INTERVAL

12, 3700 ml BTLS
20 ft SUCTION LINE
AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

ONE-PART PROGRAM

PACING:
TIME, EVERY
0 HOURS, 24 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

0.01 inch TIP
RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1069569980 16:20 24-FEB-10
Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
SITE: CB31A SMP
PROGRAM: LLA MULTI
Program Started at 14:38 TU 23-FEB-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		14:38	PGM ENABLED		
1,5	1	14:38	S		596
		14:40	MANUAL PAUSE		
		14:40	MANUAL RESUME		
2,5	1	15:02	T		935
		15:09	MANUAL PAUSE		
700 ml	GRAB	15:10	C		597
			700 ml DELIVERED		
		15:11	MANUAL RESUME		
		15:11	MANUAL PAUSE		
		15:11	MANUAL RESUME		
3,5	1	15:26	T		591
4,5	1	15:50	T		591
		16:03	MANUAL PAUSE		
700 ml	GRAB	16:04	C		587
			700 ml DELIVERED		
700 ml	GRAB	16:05	C	US	*
700 ml	GRAB	16:05	C		595
			700 ml DELIVERED		
		16:06	MANUAL RESUME		
		16:08	MANUAL PAUSE		
		16:09	MANUAL RESUME		
5,5	1	16:14	T		587
1,5	2	16:38	T		591
2,5	2	17:02	T		597
3,5	2	17:26	T		605

4,5	2	17:50	T	576
5,5	2	18:14	T	573
1,5	3	18:38	T	573
2,5	3	19:02	T	573
3,5	3	19:26	T	573
4,5	3	19:50	T	574
5,5	3	20:14	T	570
1,5	4	20:38	T	573
2,5	4	21:02	T	573
3,5	4	21:26	T	573
4,5	4	21:50	T	578
5,5	4	22:14	T	573
1,5	5	22:38	T	579
2,5	5	23:02	T	573
3,5	5	23:26	T	573
4,5	5	23:50	T	570
----------		WE 24-FEB-10		----------
5,5	5	00:14	T	573
1,5	6	00:38	T	573
2,5	6	01:02	T	573
3,5	6	01:26	T	573
4,5	6	01:50	T	573
5,5	6	02:14	T	576
1,5	7	02:38	T	568
2,5	7	03:02	T	575
3,5	7	03:26	T	573
4,5	7	03:50	T	570
5,5	7	04:14	T	570
1,5	8	04:38	T	579
2,5	8	05:02	T	570
3,5	8	05:26	T	573
4,5	8	05:50	T	570
5,5	8	06:14	T	573
1,5	9	06:38	T	570
2,5	9	07:02	T	567
3,5	9	07:26	T	575
4,5	9	07:50	T	569
5,5	9	08:14	T	570
1,5	10	08:38	T	570
2,5	10	09:02	T	573
3,5	10	09:26	T	570
4,5	10	09:50	T	573
5,5	10	10:14	T	570
1,5	11	10:38	T	576

CB31A 022310

2,5	11	11:02	T	576
3,5	11	11:26	T	612
4,5	11	11:50	T	597
		12:06	MANUAL PAUSE	
		12:08	MANUAL RESUME	
5,5	11	12:14	T	613
		12:16	MANUAL PAUSE	
		12:23	MANUAL RESUME	
1,5	12	12:38	T	609
2,5	12	13:02	T	613
3,5	12	13:26	T	609
4,5	12	13:50	T	594
5,5	12	14:14	T	605
		14:14	PGM DONE 24-FEB	

```
  SOURCE S  ==> START
  SOURCE T  ==> TIME
  SOURCE C  ==> CALIBRATE SAMPLE
   ERROR US ==> USER STOPPED!
----------------------------------------
```

CB4857smp 022310

SAMPLER ID# 1224319970 09:36 25-FEB-10
Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

PROGRAM NAME:
"LLA MULTI "
SITE DESCRIPTION:
"CB4857 SMP"

UNITS SELECTED:
LENGTH: ft

---

1 MINUTE
DATA INTERVAL

12, 3700 ml BTLS
26 ft SUCTION LINE
AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

ONE-PART PROGRAM

PACING:
TIME, EVERY
0 HOURS, 24 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

0.01 inch TIP
RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224319970 09:36 25-FEB-10
Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
SITE: CB4857 SMP
PROGRAM: LLA MULTI
Program Started at 15:41 TU 23-FEB-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		15:41	PGM DISABLED		
		17:54	MANUAL PAUSE		
		17:54	MANUAL RESUME		
		17:55	MANUAL PAUSE		
		17:55	MANUAL RESUME		
		18:01	MANUAL PAUSE		
		18:01	MANUAL RESUME		
		18:02	PGM ENABLED		
1,5	1	18:02	E		672
		18:05	MANUAL PAUSE		
		18:06	MANUAL RESUME		
		18:06	MANUAL PAUSE		
		18:06	MANUAL RESUME		
2,5	1	18:26	T		678
3,5	1	18:50	T		678
4,5	1	19:14	T		678
5,5	1	19:38	T		678
1,5	2	20:02	T		678
2,5	2	20:26	T		678
3,5	2	20:50	T		762
4,5	2	21:14	T	NM	*
5,5	2	21:38	T	NM	*
1,5	3	22:02	T	NM	*
2,5	3	22:26	T	NM	*
3,5	3	22:50	T	NM	*
4,5	3	23:14	T	NM	*

5,5	3	23:38	T	NM	*
----------		WE 24-FEB-10			----------
1,5	4	00:02	T	NM	*
2,5	4	00:26	T	NM	*
3,5	4	00:50	T		682
4,5	4	01:14	T		680
5,5	4	01:38	T		680
1,5	5	02:02	T		680
2,5	5	02:26	T		678
3,5	5	02:50	T		672
4,5	5	03:14	T		678
5,5	5	03:38	T		678
1,5	6	04:02	T		684
2,5	6	04:26	T		1002
3,5	6	04:50	T		1022
4,5	6	05:14	T	NM	*
5,5	6	05:38	T	NM	*
1,5	7	06:02	T	NM	*
2,5	7	06:26	T	NM	*
3,5	7	06:50	T	NL	*
4,5	7	07:14	T	NL	*
5,5	7	07:38	T	NL	*
1,5	8	08:02	T	NL	*
2,5	8	08:26	T	NM	*
3,5	8	08:50	T	NM	*
4,5	8	09:14	T	NM	*
5,5	8	09:38	T	NM	*
1,5	9	10:02	T	NM	*
2,5	9	10:26	T	NM	*
3,5	9	10:50	T	NL	*
4,5	9	11:14	T	NL	*
5,5	9	11:38	T	NL	*
1,5	10	12:02	T	NL	*
2,5	10	12:26	T	NL	*
		12:47	MANUAL	PAUSE	
3,5	10	12:50	T	Sk	*
		12:50	MANUAL	RESUME	
		12:50	MANUAL	PAUSE	
		12:50	MANUAL	RESUME	
		12:50	MANUAL	PAUSE	
		12:51	MANUAL	RESUME	
		12:51	MANUAL	PAUSE	
700 ml	GRAB	12:51	G		693
		12:52	MANUAL	RESUME	

CB4857smp 022310

		12:52	MANUAL	PAUSE	
		12:52	MANUAL	RESUME	
		12:54	MANUAL	PAUSE	
		12:54	MANUAL	RESUME	
4,5	10	13:14	T		678
		13:21	MANUAL	PAUSE	
		13:28	MANUAL	RESUME	
		13:28	MANUAL	PAUSE	
		13:28	MANUAL	RESUME	
5,5	10	13:38	T		686
1,5	11	14:02	T	NM	*
2,5	11	14:26	T	NM	*
3,5	11	14:50	T		792
4,5	11	15:14	T		680
5,5	11	15:38	T		816
1,5	12	16:02	T	NM	*
2,5	12	16:26	T	NM	*
3,5	12	16:50	T	NL	*
4,5	12	17:14	T	NL	*
5,5	12	17:38	T	NL	*
		17:39	PGM DONE 24-FEB		

SOURCE E ==> ENABLE
SOURCE T ==> TIME
SOURCE G ==> GRAB SAMPLE
ERROR NL ==> NO LIQUID DETECTED!
ERROR NM ==> NO MORE LIQUID!
ERROR Sk ==> SAMPLE SKIPPED!

CB1 Master 022310

SAMPLER ID# 1224314456 13:38 24-FEB-10
Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

PROGRAM NAME:
"LLA MULTI "
SITE DESCRIPTION:
"CB1 MASTER"

UNITS SELECTED:
LENGTH: ft

UNITS SELECTED:
FLOW RATE: gpm
FLOW VOLUME: gal
VELOCITY: fps

AREA-VEL MODULE:
DATA POINTS
"12"THELMAR"
50 POINTS ENTERED

---

5 MINUTE
DATA INTERVAL

4, 3.70 lit BTLS
17 ft SUCTION LINE
AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

ONE-PART PROGRAM

PACING:
TIME, EVERY
0 HOURS, 24 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.030 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER ON

BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
100 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224314456 13:38 24-FEB-10
Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
SITE: CB1 MASTER
PROGRAM: LLA MULTI
Program Started at 10:17 TU 23-FEB-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		10:17	PGM DISABLED		
		14:02	PGM ENABLED		
1,5	1	14:02	E		413
2,5	1	14:26	T		407
3,5	1	14:50	T		407
4,5	1	15:14	T		413
		15:27	MANUAL PAUSE		
		15:27	MANUAL RESUME		
5,5	1	15:38	T		407
1,5	2	16:02	T		410
2,5	2	16:26	T		411
3,5	2	16:50	T		409
4,5	2	17:14	T		407
5,5	2	17:38	T		413
1,5	3	18:02	T		413
2,5	3	18:26	T		409

3,5	3	18:50	T	410
4,5	3	19:14	T	408
5,5	3	19:38	T	408
1,5	4	20:02	T	413
2,5	4	20:26	T	410
3,5	4	20:50	T	408
4,5	4	21:14	T	411
5,5	4	21:38	T	407
		21:38	PGM DONE 23-FEB	

SOURCE E ==> ENABLE
SOURCE T ==> TIME

SAMPLER ID# 1078487086 13:42 24-FEB-10
  Hardware: A1   Software: 2.20
********** SAMPLING RESULTS **********
   SITE: CB1 SLAVE
PROGRAM: LLA MULTI
Program Started at 21:38 TU 23-FEB-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		21:38	PGM ENABLED		
1,5	1	22:02	S		491
2,5	1	22:26	T		478
3,5	1	22:50	T		476
4,5	1	23:14	T		480
5,5	1	23:38	T		478
----------		WE 24-FEB-10			----------
1,5	2	00:02	T		478
2,5	2	00:26	T		476
3,5	2	00:50	T		478
4,5	2	01:14	T		478
5,5	2	01:38	T		478
1,5	3	02:02	T		478
2,5	3	02:26	T		478
3,5	3	02:50	T		478
4,5	3	03:14	T		478
5,5	3	03:38	T		478
1,5	4	04:02	T		478
2,5	4	04:26	T		478
3,5	4	04:50	T		478
4,5	4	05:14	T		478
5,5	4	05:38	T		478
		05:39	PGM DONE 24-FEB		

   SOURCE S ==> START
   SOURCE T ==> TIME

NWS Forecast for: Seatac WA

Issued by: National Weather Service Seattle, WA
Last Update: 4:11 am PST Feb 24, 2010

Today: Showers likely. Cloudy, with a high near 50. South southwest wind around 11 mph. Chance of precipitation is 70%.

Tonight: Showers likely, mainly before 10pm. Mostly cloudy, with a low around 42. South southwest wind around 10 mph. Chance of precipitation is 60%.

Thursday: Showers likely, mainly after 4pm. Mostly cloudy, with a high near 53. South southwest wind between 7 and 9 mph. Chance of precipitation is 60%.

Thursday Night: Rain. Low around 45. East southeast wind between 6 and 10 mph. Chance of precipitation is 90%.

Friday: Rain. High near 52. South southeast wind between 9 and 11 mph. Chance of precipitation is 90%.

Friday Night: A 40 percent chance of showers. Mostly cloudy, with a low around 39.

Saturday: A 30 percent chance of showers. Mostly cloudy, with a high near 53.

Saturday Night: Mostly cloudy, with a low around 39.

Sunday: Partly sunny, with a high near 54.

Sunday Night: Mostly cloudy, with a low around 42.

Monday: A chance of rain. Mostly cloudy, with a high near 56.

Monday Night: A chance of rain. Mostly cloudy, with a low around 43.

Tuesday: A chance of rain. Mostly cloudy, with a high near 51.

Point Forecast: Seatac WA
47.41°N 122.29°W (Elev. 390 ft)

Visit your local NWS office at: http://www.wrh.noaa.gov/sew

Area Forecast Discussion

Issued by NWS Seattle/Tacoma, WA

Current Version | Previous Version | Graphics & Text | Print | Product List | Glossary Off
Versions: **1** 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

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000
FXUS66 KSEW 241655
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
900 AM PST WED FEB 24 2010

.SYNOPSIS...MOIST WESTERLY FLOW AND SHOWERS WILL PREVAIL ACROSS
WESTERN WASHINGTON TODAY AS A FRONT MOVES EAST. SHOWER ACTIVITY WILL
```

DECREASE TONIGHT. A WEAK UPPER LEVEL RIDGE WILL BRIEFLY MOVE OVER WESTERN WASHINGTON ON THURSDAY. FOR A LULL IN THE PRECIPITATION. A STRONGER FRONTAL SYSTEM WILL BRING MORE RAIN THURSDAY NIGHT AND FRIDAY. HIGH PRESSURE BUILDS OVER THE WEEKEND WITH A TREND TOWARD DRIER AND SLIGHTLY WARMER WEATHER. THE NEXT FRONT WILL BRING MORE RAIN EARLY NEXT WEEK.

&&

.SHORT TERM...AN ILL DEFINED COLD FRONT IS PUSHED EAST OF THE CASCADES THIS MORNING WITH MOIST WESTERLY FLOW PREVAILING TODAY THROUGH TONIGHT. CLOUDS SEEM TO BE FILLING IN A BIT OFF THE COAST AS COLDER AIR FILTERS IN PRODUCING ENOUGH INSTABILITY FOR SHOWERS. MODERATE WLY 850 MB FLOW WILL SQUEEZE OUT ADDITIONAL SNOWFALL ACROSS THE MOUNTAINS THROUGH TONIGHT. SO FAR THE PASSES HAVE PICKED UP ROUGHLY 1-3 INCHES WITH ANOTHER COUPLE INCHES LIKELY TODAY. WILL NEED TO WATCH SNOWFALL RATES AS SNOW AMOUNTS COULD APPROACH ADVISORY LEVEL...6 INCHES IN 24 HOURS...BUT RIGHT NOW IT LOOKS MORE LIKELY THE PASSES WILL COME UP JUST SHORT OF THAT. SNOW LEVELS TODAY WILL RUN AROUND 3000 FT.

SHOWERS PERSIST TONIGHT WITH SNOW SHOWERS IN THE MOUNTAINS. THE HIGHEST ACCUMULATIONS WILL BE ACROSS THE N CASCADES WHERE PLACES LIKE MT. BAKER COULD PICK UP A FEW MORE INCHES OF SNOW. BY THURSDAY MORNING...SHOWERS WILL DECREASE ACROSS THE ENTIRE AREA AS BRIEF RIDGING DEVELOPS OUT AHEAD OF A MUCH STRONGER SYSTEM APPROACHES OFFSHORE. BOTH THE NAM AND GFS TIME-HEIGHT SECTIONS SHOW SOME AFTERNOON CLEARING SO I WILL PROBABLY REDUCE CLOUD COVER FOR THURSDAY AFTERNOON WITH THE NEXT FORECAST.

MODELS DEVELOP A SUB 980 MB LOW OUTSIDE 130 W THURSDAY EVENING AND LIFT THE SYSTEM DUE NWD DURING THE NIGHT. THE ASSOCIATED WARM FRONT WILL BRING RAIN TO ALL OF WRN WA THURSDAY NIGHT WITH STRONG SLY FLOW ALOFT. LATEST MODEL RUNS ARE SHOWING SOME LOWER LEVEL SELY FLOW CAUSING SOME DRYING IN THE LOWER LEVELS OVER INTERIOR WRN WA. THIS SHOWS UP WELL ON BOTH THE GFS/NAM TIME-HEIGHTS. THIS MAY REDUCE RAINFALL TOTALS IN THE LOWLANDS. THE HIGHEST AMOUNTS WILL BE SEEN IN THE OLYMPICS. THE CASCADES ARE A BIT TRICKIER AS THE GFS SHOWS MUCH HIGHER QPF THERE THAN THE NAM. IS THE GFS IS CORRECT...ELY GRADIENTS COULD KEEP COLDER TEMPS IN THE PASSES WITH ACCUMULATING SNOW. THE NAM WOULD IMPLY SUB ADVISORY LEVEL AMOUNTS. WILL LOOK AT THIS CLOSER TODAY. THE FRONT BECOMES OCCLUDED AS IT PASSES THROUGH WRN WA FRIDAY MORNING. PRECIP WILL CHANGE TO SHOWERS DURING THE MORNING.

.LONG TERM...PREVIOUS DISCUSSION FOLLOWS...AFTER BEING IN GOOD AGREEMENT LAST NIGHT THE EXTENDED MODELS ARE SHOWING VERY LITTLE CONSISTENCY EARLY ON. ON SATURDAY THE ECMWF HAS THE UPPER LEVEL LOW ASSOCIATED WITH THE FRONTAL SYSTEM THAT MOVES THROUGH THE AREA FRIDAY DIGGING SOUTH AND MOVING INTO CALIFORNIA LEAVING JUST A WEAK TROUGH OVER WESTERN WASHINGTON. THE 00Z GFS KEEPS THE UPPER LOW OFF THE WASHINGTON COAST AND SWINGS IT INLAND DURING THE DAY ON SATURDAY ACROSS VANCOUVER ISLAND. THE ECMWF HAS BEEN FAIRLY CONSISTENT RUN TO RUN FOR THE LAST FEW RUNS SO WILL TAKE THE FORECAST IN THAT DIRECTION...JUST A CHANCE OF SHOWERS FOR THE AREA. FOR SUNDAY THE GFS DRAGS A WARM FRONT ACROSS THE AREA WHILE THE ECMWF HAS THIS FEATURE WEAKER AND FURTHER NORTH. WILL STAY WITH THE ECMWF SOLUTION AT THIS TIME AND DRY THE FORECAST OUT A BIT ON SUNDAY. THERE IS SOME

AGREEMENT IN THE MODELS FOR THE SYSTEM ON MONDAY WITH BOTH THE ECMWF AND GFS BEGINNING TO SLOW THE SYSTEM DOWN WITH THE JET STILL AIMED AT NORTHERN CALIFORNIA. THE GFS IS A LITTLE FASTER AND FURTHER EAST WITH THE FRONT SO WILL HAVE TO KEEP A CHANCE OF RAIN IN THE FORECAST FOR MONDAY. BOTH THE MODELS DRAG THE WEAKENING FRONT THROUGH THE AREA MONDAY NIGHT INTO TUESDAY KEEPING A CHANCE OF RAIN IN THE FORECAST. FELTON

&&

.HYDROLOGY...NO FLOODING IS EXPECTED THROUGH THURSDAY WITH LOWER SNOW LEVELS DOWN TO AROUND 3000-3500 FEET AND LIGHT PRECIP TOTALS.

THE NEXT SYSTEM WILL BE MUCH STRONGER AS IT DEVELOPS WELL OFFSHORE THURSDAY NIGHT. MODELS INITIALLY TRACK THE DEEP SURFACE LOW NWD OUTSIDE 130 W BUT THE ASSOCIATED WARM FRONT WILL LIFT ACROSS WRN WA THURSDAY NIGHT. THIS SYSTEM WILL BRING APPRECIABLE QPF TO MAINLY THE OLYMPICS THURSDAY NIGHT INTO FRIDAY MORNING...WITH LIGHTER AMOUNTS INLAND AND OVER THE CASCADES. MODELS VARY ON 12 HOUR PRECIP TOTAL OVER THE CASCADES RANGING FROM 1.5 INCHES ON THE GFS TO NEARLY 2 INCHES ON THE NAM-12. WITH SLY FLOW AROUND 50 KT DURING THE PERIOD...2 INCHES SEEMS REASONABLE OVER THE OLYMPICS. HOWEVER...THE SKOKOMISH RIVER IS RUNNING RATHER LOW CURRENTLY AND HYDRO MODELS SUGGEST THIS WILL NOT BE ENOUGH PRECIP TO PUSH THE RIVER NEAR FLOOD STAGE. WILL NEED TO MONITOR BUT THE THREAT OF FLOODING IN THE OLYMPIC BASIN IS CONSIDERED LOW DURING THIS PERIOD. FLOODING IS NOT EXPECTED ELSEWHERE.

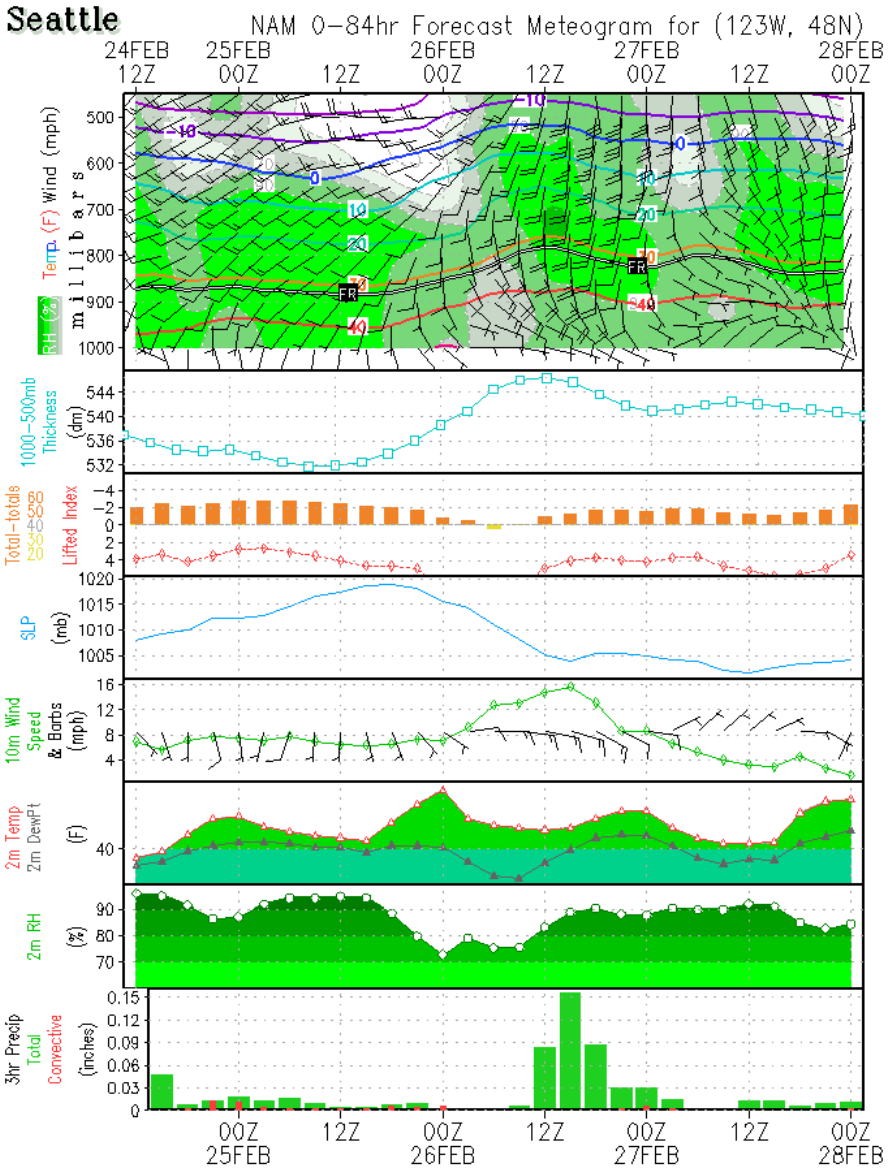
LITTLE PRECIPITATION IS FORECAST OVER THE WEEKEND. THE NEXT SYSTEM FOR MONDAY INTO TUESDAY WILL BE SPLITTING EVEN MORE THAN THE COLD FRONT ON FRIDAY. BEYOND NEXT TUESDAY THE MODELS CONTINUE TO SHOW A LACK OF CONSISTENCY WITH THE GFS INDICATING THE FLOW ALOFT OVER THE EASTERN PACIFIC CONSOLIDATING TOWARD THE END OF NEXT WEEK WHILE THE ECMWF KEEPS THE CURRENT PATTERN INTACT. THE ECMWF SOLUTION IS FAVORED AT THIS TIME.

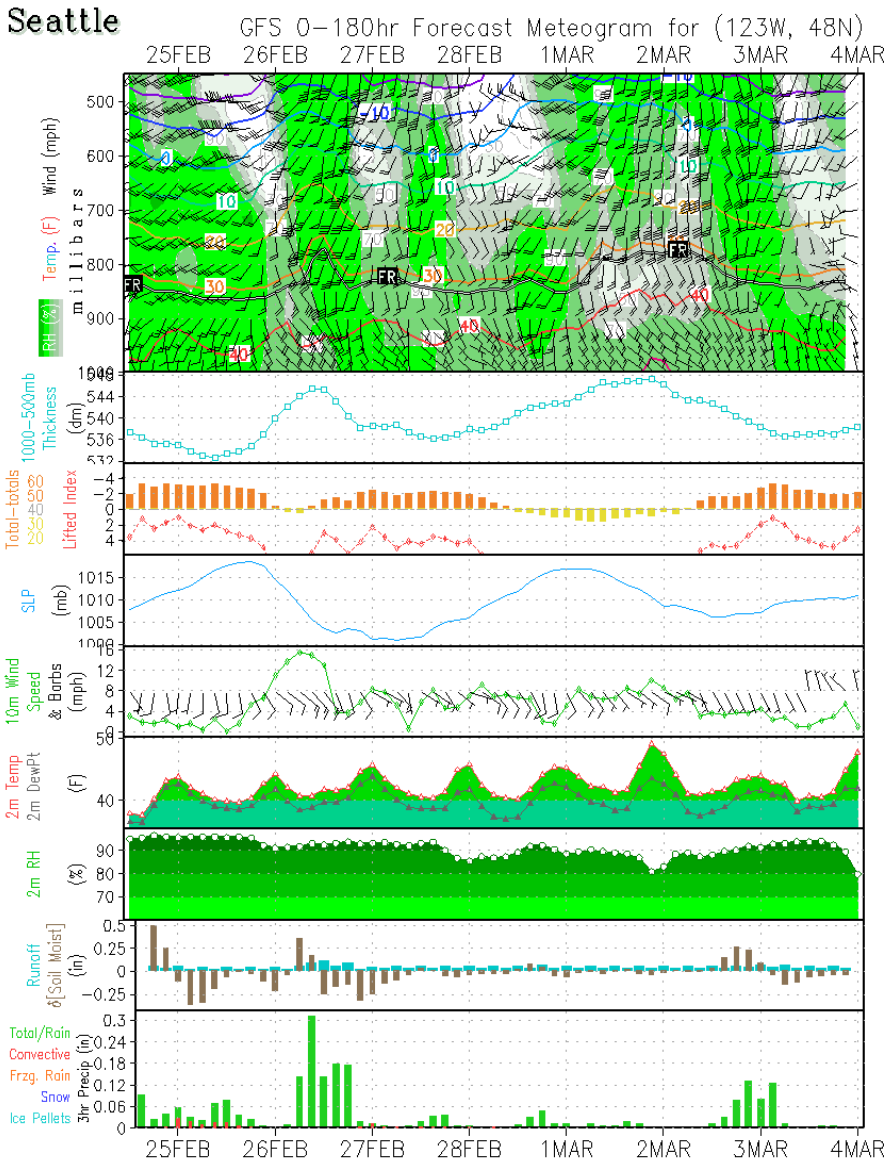
THE FLOOD POTENTIAL FOR THE NEXT 10 DAYS INCLUDING THE GREEN RIVER IS LOW. FELTON/MERCER

&&

.AVIATION...AN UPPER LEVEL TROUGH OVER W WA...WITH MOIST SW FLOW ALOFT AND LOW LEVEL SW ONSHORE FLOW...WILL MAINTAIN SHOWERS AND GENERALLY LOW VFR TO MVFR CIGS ACROSS THE AREA THROUGH THIS AFTERNOON. A WEAK FRONT CROSSED THE AREA EARLY THIS MORNING AND APPEARS TO HAVE BROKEN UP CROSSING THE CASCADES. CURRENT CONDITIONS AT 16Z HAVE A MIX OF IFR/MVFR CIGS/VIS THROUGH PUGET SOUND. EXPECT CONDITIONS TO LIFT THIS AFTERNOON AS MORE UNSTABLE AIR JUST OFFSHORE INCREASES THE LOW LEVEL MIXING. SHOULD SEE VFR CIGS BKN030-050 THIS AFTERNOON...ONLY DROPPING LOWER AROUND SHOWERS. VISIBILITIES SHOULD GO VFR AS WELL WITH ONLY BRIEF LOCALIZED MVFR VIS IN SHOWERS.

KSEA...EXPECT OCCASIONAL IFR CIGS/MVFR VIS TO CONTINUE THROUGH 19Z WITH MVFR CIGS BKN015-025 THROUGH ABOUT 21Z-22Z. CONTINUING ONSHORE FLOW THIS AFTERNOON...WEAK INSTABILITY WITH A FEW SHOWERS SHOULD ALLOW A BKN040-060 CIG TO PERSIST THROUGH 00Z. SURFACE WINDS WILL REMAIN S-SW AROUND 10KT. KAM


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
24FEB 12Z
25FEB 00Z
26FEB 12Z
27FEB 00Z
28FEB 00Z
millibars
Temp. (F) Wind (mph) RH (%)
1000-500mb Thickness (dm)
Total-totals Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp 2m DewPt (F)
2m RH (%)
3hr Precip Total Convective (inches)
00Z 25FEB
12Z
00Z 26FEB
12Z
00Z 27FEB
12Z
00Z 28FEB


Seattle
GFS 0-180hr Forecast Meteogram for (123W, 48N)
25FEB
26FEB
27FEB
28FEB
1MAR
2MAR
3MAR
4MAR
Wind (mph)
Temp. (F)
RH (%)
millibars
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
Runoff
δ[Soil Moist] (in)
Total/Rain
Convective
Frzg. Rain
Snow
Ice Pellets
3hr Precip (in)

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	April 20, 2010
TO:	Matt Woltman / Megan McCullough
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600
	Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409 (office) or 206-794-0095 (cell)
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #4 (02/26/2010)

Please find included the following:

- Storm report narrative (3 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- pH Worksheet (1 pg),
- Groundwater level measurement form, (1 pg)
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (2 pg),
- Sampler Reports (18 pgs), and
- Weather forecasting information (6 pgs).

Please let me know if you have any questions or need additional information. Thank You.

Dave Metallo, LHG , Project Manager

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #4
February 26th, 2010

Stormwater Sampling Event (STE) #4 occurred on February 26th, 2010. A rapid response effort was employed to get the monitoring stations reset after STE#3, which had just occurred two days earlier. The Lora Lake Apartments project sampling stations were CB-31A (main line inlet), CB-4857 (main line outlet) and CB-1 (onsite drainage system outlet).

Storm and Sample Validation / Qualification:

All validation and qualification conditions for this storm event were met. See the accompanying *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding STE#4. This event had a forecasted precipitation probability for 80 to 100% with rainfall totals of 0.5-inches or greater. Detailed weather forecast information is attached with this event report.

Enabling and Sampling:

All stations were automatically enabled via the use of area-velocity sensors set to trigger sampling above certain pre-determined threshold set-point levels. These threshold levels are determined based on an examination of recent base-flow condition levels, known periodic or cyclic events (e.g. timed watering, construction pumping, etc. that occur in the basin) and runoff response from past events. All sampling and flow monitoring equipment operated as designed and programmed.

The three sampling stations automatically level enabled (based on pre-programmed threshold conditions) within 11 minutes of each other. The hydraulic conditions at CB-4857, noted in the STE#3 Report, were better anticipated during this event. Enabling conditions had been tailored to the current piping conditions, thus allowing for the appropriate response to runoff and water level (in-pipe) conditions.

A Thel-Mar compound volumetric in-pipe weir, installed at CB-1 since late December, 2009, provided for precise flow measurement at this location. CB-1 is a low water level / low flow rate environment. Use of the Thel-Mar weir allows for a deeper pool behind the weir from which to draw samples. Although the onsite drainage system is now much more responsive to rainfall and passes a greater volume of runoff (as noted in the STE#3 Report), mainly due to the vactoring of the piping system and surface cleaning, the Thel-Mar weir has been left in place. The weir will continue to be utilized for its enhancement of sampling capabilities and added precision and accuracy in flow assessment at CB-1.

Each of three autosamplers were programmed to collect samples via time paced programming – each was set to collect an aliquot every 24-minutes (16 to 24 hour storm duration program). All of the composite samples were manually flow weighted based on site specific flow information. Details pertaining to the programming and event-specific operation of each sampler unit is contained in the attached sampler reports.

Grab samples were collected using Teflon-lined tubing, dedicated at each station, attached to an point adjacent to the intake of the sampling line. A peristaltic pump was used to collect the grab samples through these dedicated lines at each station. All grabs were collected as early as possible during the storm event once runoff was noted and at points in the hydrograph that were elevated above base flow conditions.

CB-31A and CB-4857 had a storm volume difference of approximately 28,000 gallons, with the inlet recording more flow then the outlet. This may also be a consequence of the system vactoring. Since accumulated sediment was removed from the piping and vaults associated

with CB4857, water flows more freely and is not being impounded to the degree that it previously was at CB4 857. Water depth in the pipe (at the area-velocity sensor anchor position) did not increase as readily in association with rainfall as it had done during past events and observations. These shallower water conditions in the pipe, coupled with its 4% slope (field measured) tended to make flow monitoring more difficult.

Hydrographs showing, level, flow and rainfall data, as well as sample markers and grab sample collection indications, for each of the monitoring stations are attached to this report.

Compositing Scheme:

The hydrographs from each monitoring station were examined and decisions were made as to what specific bottles were to be included in the composite samples. See the attached *Sampling Field Forms* and their accompanying compositing worksheets for these details. A small portion of each of the of the composite samples were poured off for the assessment of pH. pH measurements were collected prior to delivery of the samples to the lab. These measurements were recorded on the attached *pH Measurement Worksheet.*

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. The locations were MW-3, MW-4, MW-5 and MW-6. Details regarding the measurement event are contained in the attached *Groundwater Level Measurement* field sheet. Measurements are listed in the table below.

Groundwater Level Measurements, STE#4

Location	Date	Time	Water Level from TOC (FT)	Notes
MW-3	2/26/2010	10:23	16.94	
MW-4	2/26/2010	10:30	16.02	
MW-5	2/26/2010	14:15	20.11	replacement for MW-1
MW-6	2/26/2010	10:12	11.28	

It was noted in the STE#3 Report that free-phase product was encountered at MW-1. Monitoring well MW-5 was a replacement measurement location for MW-1.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grabs or composite samples were placed into coolers and put on ice to maintain temperatures between 2 and 6 °C. All samples were recorded on *Chain-of-Custody forms* (attached) and were in direct control of project personnel at all times. Samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from all of the stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Quality Control Samples:

During this event adequate water volume for duplicate and MS/MSD analyses was collected and submitted for both the grab and composite samples. The grab and composite duplicates were collected at CB1 – which were designated as location “CB102”. This was done so as to not readily identify these duplicates to the testing facility. Both the grab and composite MS/MSD volumes were collected at CB31A – and were labeled as such. Trip blanks

accompanied all volatile organic samples collected during this STE. See the attached *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding QC sample collection.

Anomalies and/or Work Plan Deviations:

There were no anomalies observed that would cause any of the STE#4 samples to be non-representative of the conditions from which they were collected.

Actions To Be Completed:

Routine sampler maintenance and flow meter (level) calibrations will be conducted at a regular frequency to assure proper equipment operation. This was the fourth of ten anticipated storm sampling events. An attempt will be made to conduct six more events before late-May, 2010. The current focus of the field efforts will be in maintaining proper station and equipment operation, data and resource management and storm-tracking tasks. Taylor Associates will also consider installing a 12-bottle capacity ("mega") sampler at CB-1, similar to the units at CB-31A and CB-4857. This is being considered to increase sampling capabilities at CB-1 and to streamline the sampler set-up configuration.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #4 (02-26-2010)

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] *Storm Event Data:*	
Project Storm Event (STE) #	4
Event Forecast Probability (%)	100%
Antecedent Dry Period (days: hrs: mins)	0:13:30
STE Start Date & Time	2/26/10 1:15
STE Duration (hrs:mins)	27:20
STE End Date & Time	2/27/10 4:35
Period Between Next Measureable Rain (hrs: mins)	7:50
Was Targeted STE Qualified Per LLA QAPP	YES
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.03
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.47
Max 1-hr Rainfall Intensity (in/hr)	0.09
Average 1-hr Rainfall Intensity (in/hr)	0.02

[1] *Sample Collection Criteria:*	CB-31A	CB-4857	CB-1
Sampling Station	CB-31A	CB-4857	CB-1
Was Grab sample collected?	Yes	Yes	Yes
Grab ID	CB31A022610GRAB	CB4857022610GRAB	CB1022610GRAB
Grab Date /Time	2/26/2010 14:30	2/26/2010 15:00	2/26/2010 13:15
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	Yes	Yes	Yes
Hydrograph stage at grab collection	elevated/ mid-storm	falling limb/mid-storm	rising limb/mid-storm
Grab parameters collected per LLA QAPP ?	Yes	Yes	Yes
Were Trip Blanks included w/ Grab samples ?	Yes (TB022610)	Yes (TB022610)	Yes (TB022610)
Was Comp sample collected?	Yes	Yes	Yes
Comp ID	CB31A022710COMP	CB4857022710COMP	CB1022710COMP
Comp Date /Time	2/27/2010 1:11	2/27/2010 1:00	2/27/2010 1:05
Total volume measured during storm period (gallons)	114915	87040	4364
Volume sampled during storm period (gallons)	114915	87040	4108
Volume utilized for comp. sample (gallons)	112955	86115	4108
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	Yes (98%)	Yes (99%)	Yes (94%)
Was a minimum of 8 aliquots collected for comp sample ?	Yes (50)	Yes (46)	Yes (50)
Comp parameters collected per LLA QAPP ?	Yes	Yes	Yes
Rainfall during sampling period (in)	0.45	0.44	0.44
pH Measurements Collected ?	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No
[1] *QC Sample Summary Information:*	CB-31A	CB-4857	CB-1
Was Grab sample duplicate collected ?	No	No	Yes
Grab sample duplicate ID	na	na	CB102022610GRAB
Grab sample date and time	na	na	2/26/2010 14:00
Was Comp sample duplicate collected ?	No	No	Yes
Comp sample duplicate ID	na	na	CB102022710COMP
Comp sample date and time	na	na	2/27/2010 2:05
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	Yes (both)	No	No

[1] If the answer to any of the Storm Event or Sample Collection Criteria questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 4/19/2010 **Reveiwed By / Date:** 4/29/10

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Floyd/Snider	Phone: 206-292-2078
Client Contact: Matt Woltman / Jessi Massingale	
Client Project Name: Lora Lake Apartments	
Client Project #: POS-LLA	Samplers: D. Metallo B. Kwasnowski

Date: 2-26-2010
Page: 1 of 1
No. of Coolers: 1 Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: (1) NW-TPH Dx	VOC 8260C-SIM							Notes/Comments
CB31A022610GRAB	2.26.10	1430	W	13	X	X							Run MS/MSD
CB4857022610GRAB	2.26.10	1500	W	5	X	X							
CB1022610GRAB	2.26.10	1315	W	5	X	X							
CB1D2022610GRAB	2.26.10	1400	W	5	X	X							
TB022610	2-26-10	0830	W	3	X								

Comments/Special Instructions
(1) Acid/Silica gel clean up for TPH-Dx

Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Dave Metallo	Printed Name: Brad Kwasnowski	Printed Name: Brad Kwasnowski	Printed Name: A. Volgardsen
Company: Taylor	Company: Taylor Associates	Company: Taylor Associates	Company: ARI
Date & Time: 2-26-10 (1650)	Date & Time: 02/26/10 @ 16:50	Date & Time: 02/26/10 @ 17:00	Date & Time: 2/26/10 1706

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: | Turn-around Requested: Standard | Date: 3-1-2010

ARI Client Company: Floyd / Snider | Phone: 206-292-2078 | Page: 1 of 1

Client Contact: Matt Wolfman / Jessi Massingale | No. of Coolers: 2 | Cooler Temps:

Client Project Name: Lora Lake Apartments

Client Project #: POS-LLA | Samplers: D. Metallo, P. Heltzel

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM low level	PCP 8041	Arsenic Total+Diss 200.8	Dioxin / Furan 1613	TSS SM 2540D				Notes/Comments	pH
CB31A022710COMP	2.27.10	0111	W	1	X	X	X	X	X				Run MS/MSD①	6.54
CB4857022710COMP	2.27.10	0100	W	1	X	X	X	X	X					6.72
CB1022710COMP	2.27.10	0105	W	1	X	X	X	X	X					6.35
CB102022710COMP	2.27.10	0205	W	1	X	X	X	X	X					6.38

Comments/Special Instructions
① Extra vol. collected for MS/MSD analysis (No extra vol. for Dioxin/Furan analysis)

Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Dave Metallo	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
Company: Taylor Assoc.	Company: ARI	Company:	Company:
Date & Time: 3-1-10 (1503)	Date & Time: 3/1/10 1503	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB31A

8 or 12 x 1 gallon bottle set-up
Rev.ed 2/11/2010

Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: PH	Weather: SUN		Arrival Date/Time: 2/25/10 1400		
Carry-over maintenance to do prior to set-up:	NONE for sampling event, see last storm for other			done? —	
Sampler Battery Voltage	12.59	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	N/A	Changed? Y (N)		New voltage	—

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flow meter cables OK? (Yes/No)	OK	Pump Tubing Replaced? (Yes/No)	NO
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	0.376	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	N/A	Desiccant Condition, replaced?	OK, NO
Difference (FT)	N/A	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	N/A	Clean bottles installed & lids off?	Yes
Velocity (fps)	0.03	Diagnostics / Distributor arm check?	Y25, Arm Flex = 13
Flow Rate (gpm)	6.0	Enable Level (FT)	0.426
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T, 24 min
Channel conditions/observations: OK		Program Reviewed? (Yes/No)	Yes
		Last Screen	program disabled
		Ice Deployed? (Yes/No)	NO

Notes: Calibrated pump
1st = 660
2nd = 700

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: PH, DM | Weather: drizzle | Arrival Date/Time: 2/26/10 9:28

Grab Sample Data		Sample Observations:
Runoff Present or Hydrograph Elevated?		Typical
Grab Collection Time (date/time)	2/26/10 (1430)	
Grab Sample ID	CB31A022610GRAB	
Grab Duplicates Collected?	No	
Grab Duplicate Collection (date/time)	NA	
Grab Duplicate ID	NA	
Grab MS/MSD Collected ?	Yes	
VOA Trip Blank in cooler?, ID	Yes, TB022610	

Flow Meter		Sampler	
Flow meter cables OK? (Y/N)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date / time)	2/26/10 (01:35)
		On Composite... (bottle # / aliq #)	Bottle 5, aliq 1
		Ice deployed?	NO
		Sampler Battery Voltage (changed?):	12.47
		Flow Meter Battery Voltage/Change? (if different)	N/A
		Bottle Swap needed? (if yes fill out Section 3)	NO

Notes: Collected vol. for MS/MSD (grab)

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

DM

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB 31A

Section 4. Comp. Bottles Retrieval

Personnel: BL/JB	Weather: 27. RAIN		Arrival Date/Time: 02/27/10 @ 11:45		
Sampler Battery Voltage	12.44	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	12.44	Changed? Y (N)		New voltage	—
Comp Sample Volume Collected	100%	Data downloaded? Y			
Composite Begin Time (date/time)	02/26/10 @ 01:35			Round #: 1	
Last Aliquot Taken (date/time, btl #, aliq #)	02/27/10 @ 01:11, BOTTLE #12, AliQ #5				
Comp Bottles Labeled? (sta. & btl #)	CB 31A #1-12				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

NONE MISSED

Channel conditions/observations

CHANNEL OKAY

Notes/Maintenance Needed:

Section 5. Post Storm Comp. Sample Processing

Personnel: DM / PH — Date/Time: 3-1-2010 (1020)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes — Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: 12 X 3500 ml
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (inclding QC Smpls): 8500 ml	Actual Comp. Sample Vol. Available: 8721 ml
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp., Other (explain): F.W.M.C.	
Bottles (Btl #s) used for Comp. Sample: 1-4, 7-12	Comp. Sample Container Size & Material: 2.5 gal. glass WM
Comp Collection Time (date/time): 2-27-10 (0111)	Comp Sample ID: CB31A022710COMP
pH Measurements Collected On Comp. Sample ?: Yes 6.54	

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes: BTL's 5&6 represented mainly base flow conditions and were not used for comp. creation.

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes

Duplicate Sample Collected ? NO	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: NA

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: Yes (add. 4721 ml collected/comp'ed)

MS/MSD Vol. submitted: Total Comp = 8721 MS/MSD Vol = 4721 ml

Were any other QC sample types colelcted? (if yes, provide details) NO

DI Water Information If any used it was provided by ARI Labs

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB4857

8 or 12 x 1 gallon bottle set-up

Rev.ed 2/11/2010

Section 1. Storm Setup and Inspection

Personnel: PH, DM	Weather: SUNNY, 50°S		Arrival Date/Time: 2/25/10 15:15		
Carry-over maintenance to do prior to set-up:	None for storm, see past storm for other				done?
Sampler Battery Voltage	12.48	Changed? Y (N)		New voltage	~ 13.01
Flow Meter Battery Voltage	N/A	Changed? Y (N)		New voltage	

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	NO
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	0.030	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	NA	Desiccant Condition, replaced?	OK NO
Difference (FT)	NA	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	NO	Clean bottles installed & lids off?	Yes
Velocity (fps)	0.71	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	3	Enable Level (FT)	0.05
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T / 24 min
Channel conditions/observations		Program Reviewed? (Yes/No)	~~No~~ DM Yes
Observed from Surface - OK		Last Screen	Prgm Disabled / 7:15....
		Ice Deployed? (Yes/No)	NO

Notes: * Need to put in bottle #12. Should change battery → ∇'ed

Only put bottles in (lids off)*, backflushed, and diagnostics/distributor arm check, Left on, program not running → now running "disabled"

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: PH, DM Weather: drizzle Arrival Date/Time: 2/26/10 (10:43)

Grab Sample Data	
Runoff Present or Hydrograph Elevated?	Yes
Grab Collection Time (date/time)	2.26.10 (1500)
Grab Sample ID	CB4857022610GRAB
Grab Duplicates Collected?	NO
Grab Duplicate Collection (date/time)	NA
Grab Duplicate ID	NA
Grab MS/MSD Collected ?	NO
VOA Trip Blank in cooler?, ID Yes,	TB022610

Sample Observations: Typical, visual confirmation of flow

Flow Meter	
Flow meter cables OK? (Y/N)	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes

Sampler	
Equipment running correctly?	yes
Composite Begin Time (date / time)	2/26/10 (01:24)
On Composite... (bottle # / aliq #)	Bottle #5, 5 of 5
Ice deployed?	NO
Sampler Battery Voltage (changed?):	12.69
Flow Meter Battery Voltage/Change? (if different)	— N/A
Bottle Swap needed? (if yes fill out Section 3)	N/A

Notes: 1

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

NLD Btl #1, Aliq. 1 NML Btl 5, 1-4

NML Btl #4, Aliq. 4, 5

Channel conditions/observations

Notes/Maintenance Needed: * Mid-storm check info reported as part of Sec. #2

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB4857

Section 4. Comp. Bottles Retrieval

Personnel: BK / JB	Weather: LT. RAIN	Arrival Date/Time: 02/27/10 @ 11:30	
Sampler Battery Voltage	12.55	Changed? Y (N)	New voltage: —
Flow Meter Battery Voltage	12.55	Changed? Y (N)	New voltage: —
Comp Sample Volume Collected	VARIES 10-120%*	Data downloaded? Y	
Composite Begin Time (date/time)	02/26/10 @ 01:24		Round #: 1
Last Aliquot Taken (date/time, btl #, aliq #)	02/27/10 @ 01:00, BOTTLE # 12, ALIQ # 5		
Comp Bottles Labeled? (sta. & btl #)	CB4857 #1-12		

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

BOTTLES #5 & 6 ARE 10% FULL, SAMPLER REPORTS "NO MORE LIQUID" FOR ALL ALIQUOTS.

Channel conditions/observations

CHANNEL OKAY, NONE OBSERVED

Notes/Maintenance Needed: * BOTTLES #5 & 6 ARE FILLED TO 10%, BOTTLE #6 IS OVERFILLED TO APPROX 120%, SAMPLER REPORTS "NO MORE LIQUID" AND APPROX DOUBLE AVERAGE PUMP COUNTS.

Section 5. Post Storm Comp. Sample Processing

Personnel: DM / PH		Date/Time: 3-1-2010 (1200)	
Processing Location: POS Storm Lab			
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes			Rain Gauge Info: Yes
How Many Comp. Bottles Were Collected? 12		Approximate Total Comp. Volume Collected: ~(10 X 3500) + (2 X 500) ml	
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4500 ml		Actual Comp. Sample Vol. Available: 4698 ml	
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp., Other (explain): FWMC			
Bottles (Btl #s) used for Comp. Sample: 1-4 and 7-12		Comp. Sample Container Size & Material: 2.5 gal glass WM	
Comp Collection Time (date/time): 2-27-2010 (0100)		Comp Sample ID: CB4857022710COMP	
pH Measurements Collected On Comp. Sample ?: Yes 6.72			
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes			

Notes: BTLS # 5 & 6 represented mainly base flow - thus were not used in Comp'ing Scheme

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): yes - but NO QC Samps

Duplicate Sample Collected ?	Duplicate Sample Vol.:
Duplicate sample Date / Time:	Duplicate Sample ID:
pH Measurement Collected on Duplicate Comp. Sample?:	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?:	
MS/MSD Vol. submitted:	
Were any other QC sample types colelcted? (if yes, provide details)	
DI Water Information	

Notes: No QC samples collected at this location during this event

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB1

(8) or 12 x 1 gallon bottle set-up
Rev.ed 2/11/2010

Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel:	PH, DM	Weather:	sunny, 50's	Arrival Date/Time:	2/25/10 1445
Carry-over maintenance to do prior to set-up:	None for this storm, see last storm for other				done? —
Sampler Battery Voltage	MASTER 12.25	Changed? Y (N)		New voltage	—12.90
Flow Meter Battery Voltage	SLAVE 12.52	Changed? Y (N)		New voltage	—13.02

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	NO
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	0.002	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	0.002	Desiccant Condition, replaced?	OK, no
Difference (FT)	0.000	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	Not needed	Clean bottles installed & lids off?	Yes
Velocity (fps)	NA	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	0 gpm	Enable Level (FT)	0.032'
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T/24 min T/24 min
Channel conditions/observations	OK - typical	Program Reviewed? (Yes/No)	No
		Last Screen	Prgm Disabled 16:57, ... Dual Smpl. → waiting 16:58
		Ice Deployed? (Yes/No)	No

Notes: Batteries need changing! → changed
Only put bottles in (lids off), backflushed, and diagnostics/distributor arm. Left both on, program not running.

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel:	PH/DM	Weather:	drizzle
Arrival Date/Time:	2/26/10 9:40		

Grab Sample Data		Sample Observations:
Runoff Present or Hydrograph Elevated?	Yes, flow over weir	- Sample water v. clear
Grab Collection Time (date/time)	(1315) 2.26.10	
Grab Sample ID	CB1022610GRAB	
Grab Duplicates Collected?	Yes	
Grab Duplicate Collection (date/time)	(1400) 2.26.10	
Grab Duplicate ID	CB1020226 10GRAB	
Grab MS/MSD Collected ?	No	
VOA Trip Blank in cooler?, ID	Yes, TB022610	

Flow Meter		Sampler	
Flow meter cables OK? (Y/N)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	yes, yes	Composite Begin Time (date / time)	2/26/10 (01:29)
		On Composite... (bottle # / aliq #)	Btle 5, 2 of 5
		Ice deployed?	No
		Sampler Battery Voltage (changed?): Master	12.56
		Flow Meter Battery Voltage/Change? (if different)	12.79
		Bottle Swap needed? (if yes fill out Section 3)	Yes, see section 3

Notes: ~~1st~~ Master program ended (09:05), 2/26/10
slave program started (09:05), 1st sample taken @ (09:29) 2/26/10

Section 3. Mid-Storm Check/ Bottle Switch

Personnel:	PH, DM	Weather:	drizzle
Arrival Date/Time:	2/26/10 1710		
Composite Begin Time (date / time)	2/26/10 (01:29) → 5 of 5	Round #:	2
Last Aliquot Taken (date / time, btl #, aliq #)	(in slave base) 2/26/10 17:05 Btl 8	Data downloaded?	yes
Comp Bottles Labeled? (sta. & btl #)	yes	Sampler/Flow Meter Batt. Voltage (changed):	Master = 12.73
Comp Sample Volume Collected	100% → BTL 5 (85%)	Ice deployed?	No

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed
No aliquots missed in slave base.

Channel conditions/observations
Ok

Notes/Maintenance Needed:
Took slave base, started 2nd 2 of master (bottles 9-12)

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB-1

Section 4. Comp. Bottles Retrieval

Personnel: BK / JB	Weather: RAIN	Arrival Date/Time: 02/27/10 @ 11:15	
Sampler Battery Voltage	12.81	Changed? Y (N)	New voltage: —
Flow Meter Battery Voltage	12.55	Changed? Y (N)	New voltage: —
Comp Sample Volume Collected	100%	Data downloaded? Y	
Composite Begin Time (date/time)	02/26/10 @ 17:29		Round #: 2
Last Aliquot Taken (date/time, btl #, aliq #)	02/27/10 @ 1:05, BOTTLE #4, ALIQ #5		
Comp Bottles Labeled? (sta. & btl #)	CB1 #9-12		

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

BOTTLE #9 BROKE WHILE HANDLING, LIKELY DUE TO A FRACTURE IN THE BOTTLE.

Channel conditions/observations

CHANNEL OKAY, NONE OBSERVED

Notes/Maintenance Needed:

—

Section 5. Post Storm Comp. Sample Processing

Personnel: DM/PH	Date/Time: 3-1-2010 (0900)
Processing Location: POS Storm Lab	
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes	Rain Gauge Info: Yes
How Many Comp. Bottles Were Collected? 11	Approximate Total Comp. Volume Collected: 11 X 3500 ml
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (inclding QC Smpls): 4500 ml	Actual Comp. Sample Vol. Available: 4558 ml
Comp. Sample Type (Time Paced, Flow Paced, (F)low Weighted (M)anual Comp., Other (explain): FWMC	
Bottles (Btl #s) used for Comp. Sample: (1) 1-4, 6-8, 10-12	Comp. Sample Container Size & Material: 2.5gal. glass WM
Comp Collection Time (date/time): 02/27/10 (0105)	Comp Sample ID: CB102270 10COMP
pH Measurements Collected On Comp. Sample ?: Yes 6.38	
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes	

Notes: (1) BTL #5 was not used because it repvesented mainly base flow; BTL #9 was broken in the field

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes	
Duplicate Sample Collected ? Yes	Duplicate Sample Vol.: 4558 ml
Duplicate sample Date / Time: 2-27-10 (0205)	Duplicate Sample ID: CB102270 10COMP
pH Measurement Collected on Duplicate Comp. Sample?: Yes 6.35	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: N/O	
MS/MSD Vol. submitted: NA	
Were any other QC sample types colelcted? (if yes, provide details) No	
DI Water Information any used provided by ARI Labs	

Notes:

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: LLA

Date 3/1/10
Staff PH
pH meter make/model # Orion 2 star, pH benchtop
(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB31A022710COMP	6.54	14:13	
CB1022710COMP	6.35	14:18	
CB4857022710COMP	6.72	14:23	
CB1020227 10COMP	6.38	14:29	

Post-Measurement Check

Nominal pH value of standard	7.00	
Temperature (deg C)	13	
Standard pH, temp corrected	7.06	
Meter pH reading (SU)	7.10	
Difference (SU)	0.04	*Should be < 0.1 (round to 0.0)*
Time	14:33	

Form to be included in storm file, as applicable

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action

Groundwater Level Measurement Field Form

Personnel: D. Metallo P. Heltzel	**Arrival Date/Time:** 2-26-10 (1000)
Weather: Drizzle, 50's (low)	
Precip in Last 24-hrs / Last Measureable Rain Event: 0.03" (~0.23" in last 12 hrs)	

Monitoring Well ID	Time	Water Level (FT)	Meas. Reference
MW-6	1012	11.28	Top PVC casing
MW-3	1023	16.94	Top PVC casing
MW-4	1030	16.02	Top PVC casing
①—	—	—	—

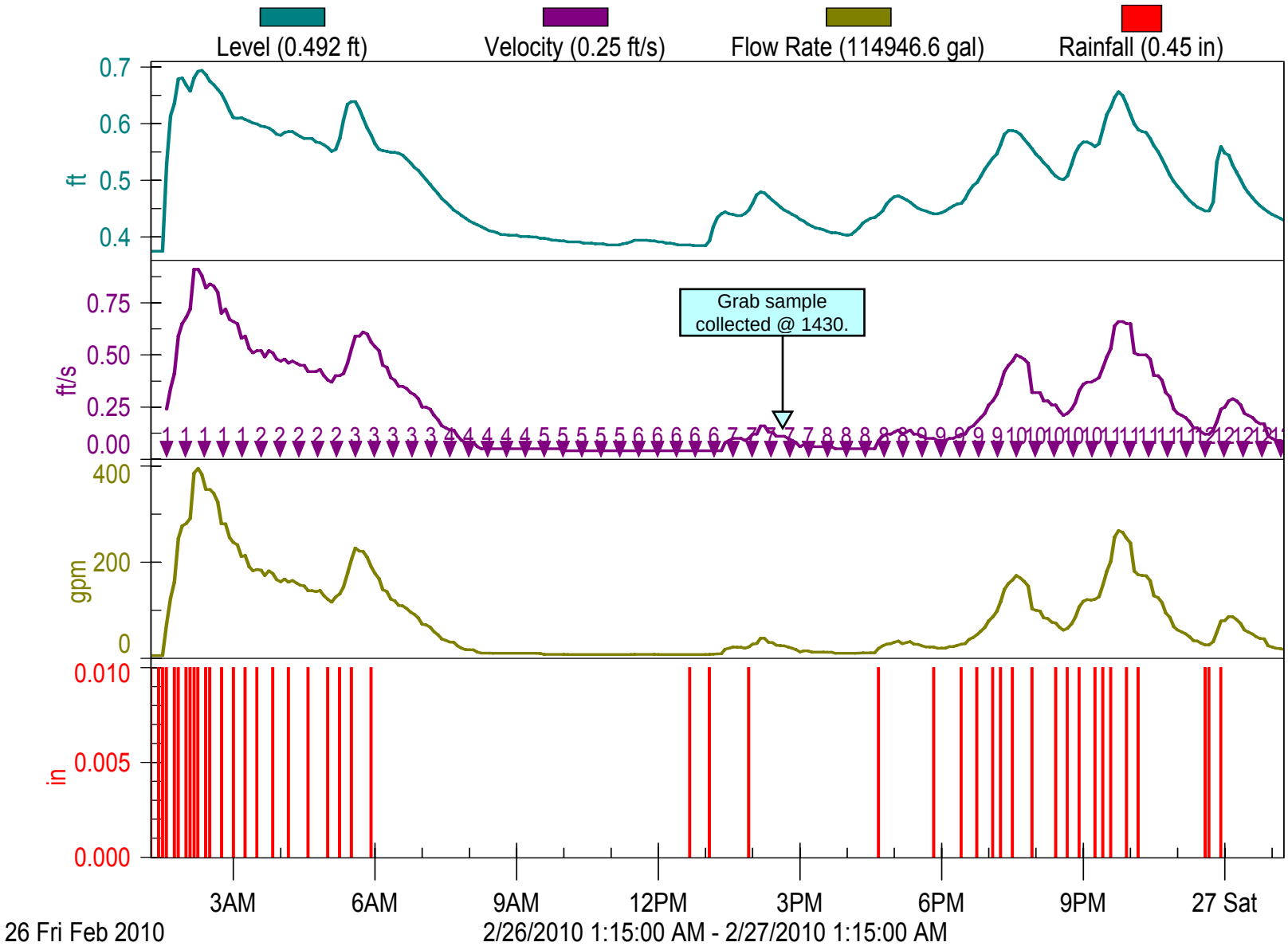
Notes:

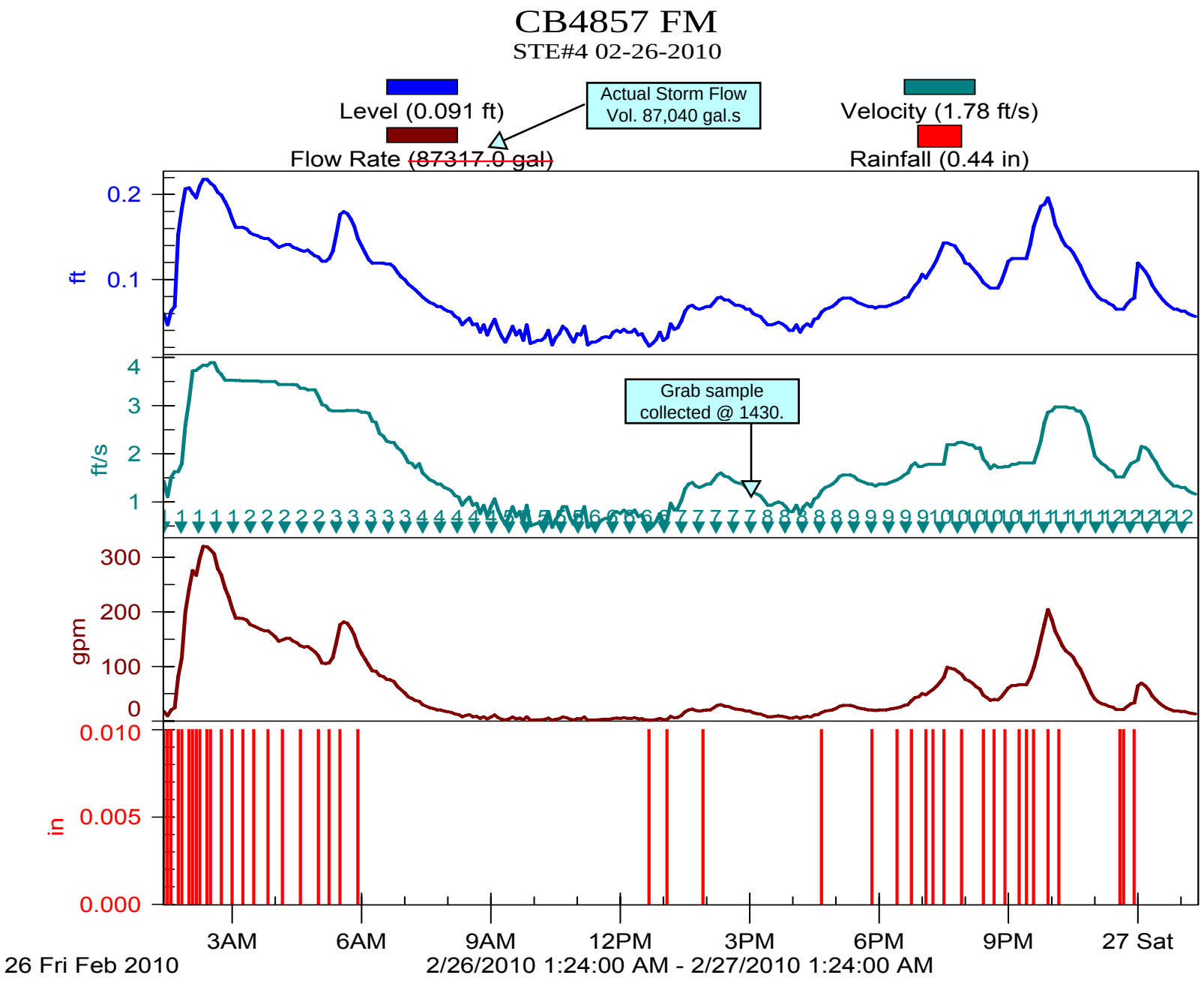
① — Suspended measurement taken at MW-1 due to encountering free-phase product during a measurement event on 2/15/10

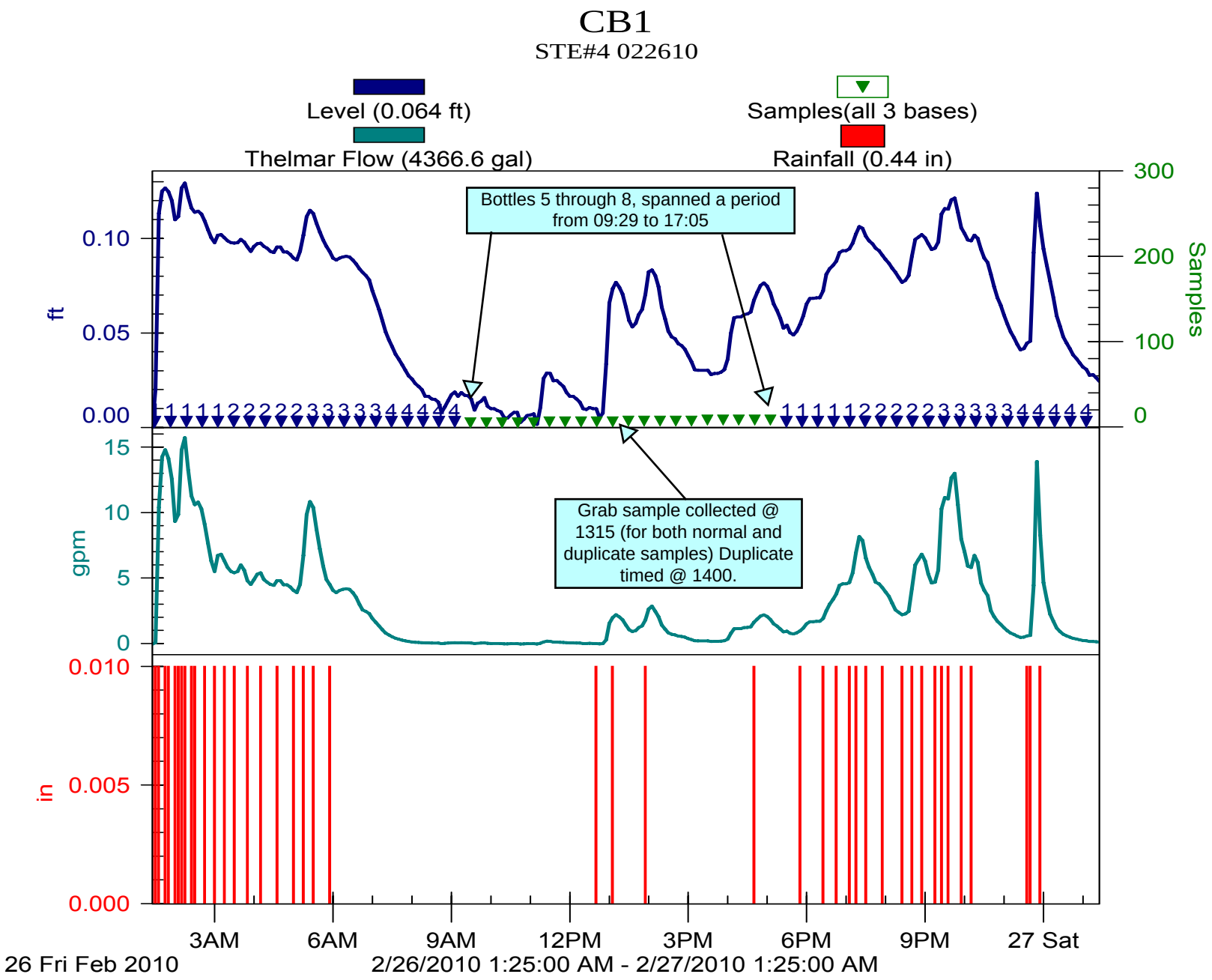
MW-5 | 1415 | 20.11 | top PVC casing

CB31A FM

STE#4 02-26-2010




CB4857 FM
STE#4 02-26-2010
Level (0.091 ft)
Flow Rate (87317.0 gal)
Actual Storm Flow
Vol. 87,040 gal.s
Velocity (1.78 ft/s)
Rainfall (0.44 in)
ft
0.2
0.1
ft/s
4
3
2
1
Grab sample
collected @ 1430.
gpm
300
200
100
0
in
0.010
0.005
0.000
3AM
6AM
9AM
12PM
3PM
6PM
9PM
27 Sat
26 Fri Feb 2010
2/26/2010 1:24:00 AM - 2/27/2010 1:24:00 AM


CB1
STE#4 022610
Level (0.064 ft)
Samples(all 3 bases)
Thelmar Flow (4366.6 gal)
Rainfall (0.44 in)
Bottles 5 through 8, spanned a period from 09:29 to 17:05
Grab sample collected @ 1315 (for both normal and duplicate samples) Duplicate timed @ 1400.
ft
0.10
0.05
0.00
Samples
300
200
100
0
gpm
15
10
5
0
in
0.010
0.005
0.000
3AM
6AM
9AM
12PM
3PM
6PM
9PM
27 Sat
26 Fri Feb 2010
2/26/2010 1:25:00 AM - 2/27/2010 1:25:00 AM

CB31A - STE#4 022610

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
28495	1	2200	**1**	25.23%	25.23%	24.80%
18645	0.65432532	1440	**2**	16.51%	41.73%	16.23%
16635	0.583786629	1284	**3**	14.73%	56.46%	14.48%
2190	0.076855589	169	**4**	1.94%	58.40%	1.91%
	0	0	**5**	0.00%	58.40%	0.00%
	0	0	**6**	0.00%	58.40%	0.00%
2840	0.099666608	219	**7**	2.51%	60.91%	2.47%
2075	0.072819793	160	**8**	1.84%	62.75%	1.81%
5065	0.177750483	391	**9**	4.48%	67.23%	4.41%
13290	0.466397614	1026	**10**	11.77%	79.00%	11.57%
18100	0.635199158	1397	**11**	16.02%	95.02%	15.75%
5620	0.197227584	434	**12**	4.98%	100.00%	4.89%
				100.00%		**98.29%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	112955
Strm Qtot (gals)	114915
max Q	28495
min V (ml)	2200

8721 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
** Vol includes enough sample for MS/MSD analysis
Used bottles 1-4 and 7-12, the remainder represented baseflow conditions

COMP Label = CB31A022710COMP **TIME (0111)**

CB4857 - STE#4 022610

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
20165	1	1100	**1**	23.42%	23.42%	23.17%
18790	0.931812546	1025	**2**	21.82%	45.24%	21.59%
13300	0.659558641	726	**3**	15.44%	60.68%	15.28%
2250	0.111579469	123	**4**	2.61%	63.29%	2.59%
	0	0	**5**	0.00%	63.29%	0.00%
	0	0	**6**	0.00%	63.29%	0.00%
2245	0.111331515	122	**7**	2.61%	65.90%	2.58%
1335	0.066203818	73	**8**	1.55%	67.45%	1.53%
3265	0.161914208	178	**9**	3.79%	71.24%	3.75%
7720	0.382841557	421	**10**	8.96%	80.21%	8.87%
13025	0.645921151	711	**11**	15.13%	95.33%	14.96%
4020	0.199355319	219	**12**	4.67%	100.00%	4.62%
				100.00%		**98.94%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	86115
Strm Qtot (gals)	87040
max Q	20165
min V (ml)	1100

4698 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Used bottles 1-4 and 7-12, the remainder represented baseflow conditions

Comp Label = CB4857022710COMP **TIME (0100)**

CB1 - STE#4 022610

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
1036.4	1	1150	**1**	25.23%	25.23%	23.75%
605.3	0.584040911	672	**2**	14.74%	39.97%	13.87%
595.75	0.574826322	661	**3**	14.50%	54.47%	13.65%
31.15	0.030055963	35	**4**	0.76%	55.23%	0.71%
	0	0	**5**	0.00%	55.23%	0.00%
23.8	0.022964107	26	**6**	0.58%	55.81%	0.55%
157.65	0.152113084	175	**7**	3.84%	59.65%	3.61%
108.05	0.104255114	120	**8**	2.63%	62.28%	2.48%
	0	0	**9**	0.00%	62.28%	0.00%
584.3	0.563778464	648	**10**	14.22%	76.50%	13.39%
726.8	0.70127364	806	**11**	17.69%	94.19%	16.65%
238.5	0.230123504	265	**12**	5.81%	100.00%	5.47%
				100.00%		**94.13%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	4107.7
Strm Qtot (gals)	4364
max Q	1036.4
min V (ml)	1150

4558 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Collected additional vol. for duplicate analysis - see comp sheet for CB102
Did not use bottle #5 because hydrograph was mostly baseflow and bottle #9 was broken in the field

Comp Label = CB1022710COMP **TIME (0105)**

CB102 - STE#4 022610 (DUPLICATE of CB1)

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
1036.4	1	1150	**1**	25.23%	25.23%	23.75%
605.3	0.584040911	672	**2**	14.74%	39.97%	13.87%
595.75	0.574826322	661	**3**	14.50%	54.47%	13.65%
31.15	0.030055963	35	**4**	0.76%	55.23%	0.71%
	0	0	**5**	0.00%	55.23%	0.00%
23.8	0.022964107	26	**6**	0.58%	55.81%	0.55%
157.65	0.152113084	175	**7**	3.84%	59.65%	3.61%
108.05	0.104255114	120	**8**	2.63%	62.28%	2.48%
	0	0	**9**	0.00%	62.28%	0.00%
584.3	0.563778464	648	**10**	14.22%	76.50%	13.39%
726.8	0.70127364	806	**11**	17.69%	94.19%	16.65%
238.5	0.230123504	265	**12**	5.81%	100.00%	5.47%
				100.00%		**94.13%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	4107.7
Strm Qtot (gals)	4364
max Q	1036.4
min V (ml)	1150

4558 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
CB102 is a duplicate of CB1
Did not use bottle #5 because hydrograph was mostly baseflow and bottle #9 was broken in the field

Comp Label = CB102022710COMP **(Time = 0205)**

CB31A 022710 base 1

SAMPLER ID# 1069569980 12:46 27-FEB-10
Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

PROGRAM NAME:
"LLA MULTI "
SITE DESCRIPTION:
"CB31A SMP "

UNITS SELECTED:
LENGTH: ft

---

1 MINUTE
DATA INTERVAL

12, 3700 ml BTLS
20 ft SUCTION LINE
AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

ONE-PART PROGRAM

PACING:
TIME, EVERY
0 HOURS, 24 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

0.01 inch TIP
RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1069569980 12:47 27-FEB-10
Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
SITE: CB31A SMP
PROGRAM: LLA MULTI
Program Started at 14:32 TH 25-FEB-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		14:32	PGM DISABLED		
----------		FR 26-FEB-10	----------		
		01:35	PGM ENABLED		
1,5	1	01:35	E		566
2,5	1	01:59	T		562
3,5	1	02:23	T		570
4,5	1	02:47	T		570
5,5	1	03:11	T		570
1,5	2	03:35	T		570
2,5	2	03:59	T		570
3,5	2	04:23	T		570
4,5	2	04:47	T		573
5,5	2	05:11	T		570
1,5	3	05:35	T		570
2,5	3	05:59	T		570
3,5	3	06:23	T		573
4,5	3	06:47	T		570
5,5	3	07:11	T		570
1,5	4	07:35	T		573
2,5	4	07:59	T		573
3,5	4	08:23	T		573
4,5	4	08:47	T		576
5,5	4	09:11	T		576
		09:28	MANUAL PAUSE		
		09:29	MANUAL RESUME		
1,5	5	09:35	T		573

2,5	5	09:59	T	573
3,5	5	10:23	T	5
4,5	5	10:47	T	574
5,5	5	11:11	T	573
1,5	6	11:35	T	579
2,5	6	11:59	T	579
3,5	6	12:23	T	579
4,5	6	12:47	T	579
5,5	6	13:11	T	579
1,5	7	13:35	T	573
2,5	7	13:59	T	579
3,5	7	14:23	T	579
4,5	7	14:47	T	573
5,5	7	15:11	T	573
1,5	8	15:35	T	573
2,5	8	15:59	T	573
3,5	8	16:23	T	579
4,5	8	16:47	T	573
5,5	8	17:11	T	573
1,5	9	17:35	T	573
2,5	9	17:59	T	573
3,5	9	18:23	T	573
4,5	9	18:47	T	570
5,5	9	19:11	T	573
1,5	10	19:35	T	573
2,5	10	19:59	T	570
3,5	10	20:23	T	573
4,5	10	20:47	T	573
5,5	10	21:11	T	573
1,5	11	21:35	T	573
2,5	11	21:59	T	573
3,5	11	22:23	T	573
4,5	11	22:47	T	573
5,5	11	23:11	T	573
1,5	12	23:35	T	573
2,5	12	23:59	T	573
----------		SA 27-FEB-10		----------
3,5	12	00:23	T	573
4,5	12	00:47	T	573
5,5	12	01:11	T	573
		01:11	PGM DONE 27-FEB	

SOURCE E ==> ENABLE

CB4857 022710

SAMPLER ID# 1224319970 11:56 27-FEB-10
Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

PROGRAM NAME:
"LLA MULTI "
SITE DESCRIPTION:
"CB4857 SMP"

UNITS SELECTED:
LENGTH: ft

---

1 MINUTE
DATA INTERVAL

12, 3700 ml BTLS
26 ft SUCTION LINE
AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

ONE-PART PROGRAM

PACING:
TIME, EVERY
0 HOURS, 24 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

0.01 inch TIP
RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224319970 11:56 27-FEB-10
Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
SITE: CB4857 SMP
PROGRAM: LLA MULTI
Program Started at 17:15 TH 25-FEB-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		17:15	PGM DISABLED		
----------		FR 26-FEB-10	----------		
		01:24	PGM ENABLED		
1,5	1	01:24	E	NL	*
2,5	1	01:48	T		678
3,5	1	02:12	T		678
4,5	1	02:36	T		678
5,5	1	03:00	T		678
1,5	2	03:24	T		678
2,5	2	03:48	T		678
3,5	2	04:12	T		678
4,5	2	04:36	T		678
5,5	2	05:00	T		678
1,5	3	05:24	T		678
2,5	3	05:48	T		678
3,5	3	06:12	T		682
4,5	3	06:36	T		688
5,5	3	07:00	T		678
1,5	4	07:24	T		678
2,5	4	07:48	T		681
3,5	4	08:12	T		784
4,5	4	08:36	T	NM	*
5,5	4	09:00	T	NM	*
1,5	5	09:24	T	NM	*
2,5	5	09:48	T	NM	*
3,5	5	10:12	T	NM	*

4,5	5	10:36	T	NM	*
		10:46	MANUAL	PAUSE	
		10:49	MANUAL	RESUME	
5,5	5	11:00	T	NM	*
1,5	6	11:24	T	NM	*
2,5	6	11:48	T	NM	*
3,5	6	12:12	T	NM	*
4,5	6	12:36	T	NM	*
5,5	6	13:00	T	NM	*
1,5	7	13:24	T		822
		13:28	MANUAL	PAUSE	
		13:28	MANUAL	RESUME	
2,5	7	13:48	T		686
3,5	7	14:12	T		686
4,5	7	14:36	T		678
5,5	7	15:00	T		774
1,5	8	15:24	T		1990
2,5	8	15:48	T	NM	*
3,5	8	16:12	T	NM	*
4,5	8	16:36	T		784
5,5	8	17:00	T		682
1,5	9	17:24	T		684
2,5	9	17:48	T		686
3,5	9	18:12	T		684
4,5	9	18:36	T		678
5,5	9	19:00	T		678
1,5	10	19:24	T		678
2,5	10	19:48	T		678
3,5	10	20:12	T		678
4,5	10	20:36	T		678
5,5	10	21:00	T		678
1,5	11	21:24	T		678
2,5	11	21:48	T		678
3,5	11	22:12	T		678
4,5	11	22:36	T		678
5,5	11	23:00	T		678
1,5	12	23:24	T		682
2,5	12	23:48	T		682
----------		SA 27-FEB-10			----------
3,5	12	00:12	T		680
4,5	12	00:36	T		678
5,5	12	01:00	T		678
		01:01	PGM DONE 27-FEB		

CB1 Master 022610 R1

SAMPLER ID# 1224314456 09:53 26-FEB-10
Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

PROGRAM NAME:
"LLA MULTI "
SITE DESCRIPTION:
"CB1 MASTER"

UNITS SELECTED:
LENGTH: ft

UNITS SELECTED:
FLOW RATE: gpm
FLOW VOLUME: gal
VELOCITY: fps

AREA-VEL MODULE:
DATA POINTS
"12"THELMAR"
50 POINTS ENTERED

---

5 MINUTE
DATA INTERVAL

4, 3.70 lit BTLS
17 ft SUCTION LINE
AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

ONE-PART PROGRAM

PACING:
TIME, EVERY
0 HOURS, 24 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.032 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER ON

BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
100 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224314456 09:53 26-FEB-10
Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
SITE: CB1 MASTER
PROGRAM: LLA MULTI
Program Started at 16:57 TH 25-FEB-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		16:57	PGM DISABLED		
----------		FR 26-FEB-10	----------		
		01:29	PGM ENABLED		
1,5	1	01:29		E	419
2,5	1	01:53		T	411
3,5	1	02:17		T	409
4,5	1	02:41		T	416
5,5	1	03:05		T	417
1,5	2	03:29		T	411
2,5	2	03:53		T	411
3,5	2	04:17		T	411
4,5	2	04:41		T	413
5,5	2	05:05		T	412
1,5	3	05:29		T	416
2,5	3	05:53		T	414
3,5	3	06:17		T	413

```
                    CB1 Master 022610 R1
4,5      3    06:41        T              410
5,5      3    07:05        T              416
1,5      4    07:29        T              413
2,5      4    07:53        T              414
3,5      4    08:17        T              411
4,5      4    08:41        T              416
5,5      4    09:05        T              413
              09:05   PGM DONE 26-FEB

  SOURCE E  ==> ENABLE
  SOURCE T  ==> TIME
-----------------------------------------
```

SAMPLER ID# 1078487086 17:11 26-FEB-10
  Hardware: A1   Software: 2.20
********** SAMPLING RESULTS **********
   SITE: CB1 SLAVE
PROGRAM: LLA MULTI
Program Started at 09:05 FR 26-FEB-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		09:05	PGM ENABLED		
1,5	1	09:29	S		497
		09:48	MANUAL PAUSE		
2,5	1	09:53	T	Sk	*
		09:54	MANUAL RESUME		
3,5	1	10:17	T		492
4,5	1	10:41	T		474
5,5	1	11:05	T		476
1,5	2	11:29	T		474
2,5	2	11:53	T		474
3,5	2	12:17	T		476
4,5	2	12:41	T		474
5,5	2	13:05	T		481
1,5	3	13:29	T		484
2,5	3	13:53	T		478
3,5	3	14:17	T		478
4,5	3	14:41	T		478
5,5	3	15:05	T		478
1,5	4	15:29	T		478
2,5	4	15:53	T		478
3,5	4	16:17	T		478
4,5	4	16:41	T		478
5,5	4	17:05	T		478
		17:06	PGM DONE 26-FEB		

  SOURCE S ==> START
  SOURCE T ==> TIME
   ERROR Sk ==> SAMPLE SKIPPED!

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224314456 11:35 27-FEB-10
Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
SITE: CB1 MASTER
PROGRAM: LLA MULTI
Program Started at 17:29 FR 26-FEB-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		17:29	PGM	ENABLED	
1,5	1	17:29		S	417
2,5	1	17:53		T	415
3,5	1	18:17		T	411
4,5	1	18:41		T	410
5,5	1	19:05		T	413
1,5	2	19:29		T	411
2,5	2	19:53		T	410
3,5	2	20:17		T	413
4,5	2	20:41		T	407
5,5	2	21:05		T	416
1,5	3	21:29		T	413
2,5	3	21:53		T	415
3,5	3	22:17		T	411
4,5	3	22:41		T	413
5,5	3	23:05		T	410

```
                          CB1 022710 base3
  1,5    124   23:29       T          413
  2,5      4   23:53       T          414
------------ SA 27-FEB-10 -------------
  3,5      4   00:17       T          411
  4,5      4   00:41       T          415
  5,5      4   01:05       T          413
               01:05   PGM DONE 27-FEB

   SOURCE S  ==> START
   SOURCE T  ==> TIME
---------------------------------------
```

NWS Forecast for: Seatac WA

Issued by: National Weather Service Seattle, WA
Last Update: 9:13 am PST Feb 26, 2010

Print

Today: Rain. High near 53. East southeast wind around 11 mph. Chance of precipitation is 100%.

Tonight: Showers. Low around 42. South wind between 9 and 14 mph. Chance of precipitation is 80%.

Saturday: Showers likely, mainly before 10am. Mostly cloudy, with a high near 52. Southwest wind between 5 and 8 mph. Chance of precipitation is 60%.

Saturday Night: Mostly cloudy, with a low around 40. South southeast wind between 3 and 7 mph.

Sunday: Mostly sunny, with a high near 54. Southeast wind 5 to 7 mph becoming west southwest.

Sunday Night: Partly cloudy, with a low around 40.

Monday: Mostly sunny, with a high near 59.

Monday Night: Rain likely. Cloudy, with a low around 44.

Tuesday: Rain likely. Cloudy, with a high near 52.

Tuesday Night: A chance of showers. Mostly cloudy, with a low around 41.

Wednesday: A chance of showers. Mostly cloudy, with a high near 52.

Wednesday Night: A chance of rain. Mostly cloudy, with a low around 42.

Thursday: A chance of rain. Mostly cloudy, with a high near 54.

Point Forecast: Seatac WA
47.41°N 122.29°W (Elev. 390 ft)

Visit your local NWS office at: http://www.wrh.noaa.gov/sew

Area Forecast Discussion

Issued by NWS Seattle/Tacoma, WA

Current Version | Previous Version | Graphics & Text | Print | Product List | Glossary Off
Versions: **1** 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

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000
FXUS66 KSEW 261730
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
930 AM PST FRI FEB 26 2010

.SYNOPSIS...A FRONTAL SYSTEM WILL CONTINUE TO BRING RAIN TO THE AREA
THIS AFTERNOON. THE FRONT WILL MOVE THROUGH WESTERN WASHINGTON EARLY
THIS EVENING. A COOL TROUGH OF LOW PRESSURE WILL MOVE OVER WESTERN
```

WASHINGTON TONIGHT INTO SATURDAY KEEPING SHOWERS IN THE FORECAST. HIGH PRESSURE WILL BUILD SATURDAY NIGHT AND REMAIN OVER WESTERN WASHINGTON THROUGH MONDAY FOR A SPELL OF DRIER AND SLIGHTLY WARMER WEATHER. THE NEXT FRONT WILL INITIALLY STALL OFF THE COAST BEFORE FINALLY MOVING INLAND AROUND TUESDAY.

&&

.SHORT TERM...A LARGE UPPER LOW IS CURRENTLY AMBLING ACROSS THE ERN PAC. LOOKS LIKE THE STRONGEST PART OF THIS SYSTEM WILL MOVE ONSHORE WELL TO OUR SOUTH OVER NRN CAL. EVEN SO...A WEAK FRONT IS TRYING TO MAKE HEADWAY INTO WRN WA BUT APPEARS TO HAVE STALLED FOR THE TIME BEING. THIS HAS CAUSED LIGHT RAIN TO PERSIST FOR MUCH OF THE MORNING...THOUGH SOUTHERLY FLOW ALOFT IS RAIN SHADOWING LOCATIONS NORTH OF THE OLYMPIC MTNS AND NORTH OF MT RAINIER. A WAVE OFF THE SRN ORE COAST WILL MOVE NORTH TODAY AND SHOULD FINALLY PUSH THE FRONT INLAND THIS EVENING.

BEHIND THE FRONT...AN UPPER LEVEL TROUGH WITH COOLER TEMPERATURES ALOFT WILL ARRIVE TONIGHT AND SATURDAY. THE AIR MASS WILL BECOME SOMEWHAT UNSTABLE AS 500 MB TEMPS FALL TONIGHT INTO THE -26C TO -28C RANGE. THE MOST CONVECTIVELY FAVORABLE COMBINATION OF MOISTURE AND INSTABILITY WILL BE IN PLACE EARLY SAT MORNING...BUT NEARLY ALL OF THE LARGE-SCALE LIFT WILL HAVE EXITED BY THAT TIME. THEREFORE...NOT LOOKING FOR THUNDER...BUT A CONTINUATION OF SHOWERY WEATHER IS TO BE EXPECTED TONIGHT AND SAT.

THE UPPER TROUGH WILL MOVE EAST ON SAT NIGHT WITH UPPER LEVEL RIDGING QUICKLY REBOUNDING. THE UPPER RIDGE AXIS WILL PASS WRN WA ON SUN AFTN. THE LARGE-SCALE SUBSIDENCE AND A GRADUAL DRYING WITH THE RIDGE WILL CAUSE SHOWERS TO END ON SAT EVENING. THE TREND WILL CONTINUE SUNDAY WITH A LOT OF SUNSHINE BY SUN AFTN AND A TURN TO LIGHT OFFSHORE LOW-LEVEL FLOW. HANER

.LONG TERM...FROM PREVIOUS DISCUSSION...EXTENDED MODELS IN GOOD AGREEMENT THAT A COLD FRONT OFFSHORE ON MONDAY WILL STALL AS THE UPPER LEVEL TROUGH BEHIND THE FRONT CONTINUES TO DIG SOUTH. LOW LEVEL OFFSHORE FLOW COMBINED WITH A STALLING FRONT IS A GOOD SCENARIO FOR ABOVE NORMAL HIGH TEMPERATURES IN WESTERN WASHINGTON THIS TIME OF YEAR AND HAVE GONE FOR MAX TEMPS 5-10 DEGREES ABOVE NORMAL ON MONDAY. SOME SMALL TIMING DIFFERENCES ON WHEN THE FRONT MOVES INLAND WITH THE GFS ABOUT 12 HOURS FASTER THE ECMWF. GIVEN THE DIGGING TROUGH AND THE SPLITTING OF THE FRONT WILL TREND TOWARD THE SLOWER TIMING OF THE ECMWF AND GO WITH RAIN LIKELY FOR MONDAY NIGHT AND TUESDAY. BEHIND THE FRONT UPPER LEVEL TROUGH MOVING INTO THE AREA BUT ONCE AGAIN THE MAIN ENERGY AND THE JET WILL BE AIMED AT NORTHERN CALIFORNIA WITH JUST A WEAK SPLITTING TROUGH MOVING INTO WESTERN WASHINGTON. WILL KEEP POPS IN THE CHANCE CATEGORY. SOME DIFFERENCES IN THE MODELS START SHOWING UP WEDNESDAY NIGHT INTO THURSDAY WITH THE ECMWF MOVING A SYSTEM DOWN THE BRITISH COLUMBIA COAST INTO WESTERN WASHINGTON WEDNESDAY NIGHT AND THURSDAY WHILE THE GFS TAKES A MORE WESTERLY TRACK WITH THIS FEATURE AND DIGS IT SOUTH OFF THE COAST DURING THE SAME TIME FRAME. GIVEN THE UNCERTAINTY IN THE MODELS WILL STAY WITH CHANCE POPS FOR WEDNESDAY NIGHT INTO THURSDAY. FELTON

&&

.HYDROLOGY...THE CURRENT ROUND OF RAIN IS EXPECTED TO CAUSE SMALL RISES ON AREA RIVERS TODAY AND SATURDAY...BUT ALL RIVERS (INCLUDING THE SKOKOMISH) ARE EXPECTED TO REMAIN COMFORTABLY BELOW FLOOD STAGE. MOSTLY DRY WEATHER IS EXPECTED FROM SATURDAY NIGHT THROUGH MONDAY. SYSTEMS MOVING INTO WESTERN WASHINGTON NEXT WEEK WILL CONTINUE TO SPLIT BEFORE THEY REACH THE AREA RESULTING IN HYDROLOGICALLY INSIGNIFICANT PRECIPITATION.

THE FLOOD POTENTIAL FOR THE NEXT 10 DAYS...INCLUDING THE GREEN RIVER...IS LOW. HANER

&&

.AVIATION...A WEAKENING COLD FRONT JUST OFFSHORE WILL MOVE VERY SLOWLY EAST TODAY...AS A WAVE OVER SW OREGON MOVES N ALONG THE FRONT. THIS WILL KEEP FRONTAL MOISTURE AND UPWARD MOTION STUCK OVER W WA. EXPECT PERIODS OF RAIN TO CONTINUE OVER W WA INTO TONIGHT. CIGS RUNNING GENERALLY OVC035-050 WITH A FEW LOWER SPOTS WITH VIS GENERALLY 5-10SM IN -RA BR...WITH ISOLATED LOWER SPOTS. THE OVERALL TREND IS FOR CIGS TO GRADUALLY LOWER TO MVFR BY TONIGHT...AS THE CONTINUING RAIN SLOWLY SATURATES THE LOWER AIR MASS. EXPECT THE ACTUAL SURFACE FRONT TO DISSIPATE OVER THE AREA BY TONIGHT...BUT THE FRONTAL MOISTURE LOOKS LIKE IT WILL REMAIN OVER W WA THROUGH SATURDAY. KAM

KSEA...WEAKENING COLD FRONT JUST OFFSHORE IS MOVING VERY SLOWLY EAST AND WILL EVENTUALLY DISSIPATE OVER W WA THIS EVENING. FRONTAL MOISTURE WILL REMAIN STUCK OVER THE AREA PROBABLY THROUGH SATURDAY. PERIODS OF RAIN WILL GRADUALLY SATURATE THE LOWER AIR MASS SO EXPECT CIGS TO GRADUALLY LOWER THROUGH THE DAY...PROBABLY GOING MVFR THIS EVENING. EXPECT GUSTY E WINDS TO EASE THIS AFTERNOON...POSSIBLY GOING NE LATE THIS AFTERNOON/THIS EVENING AS A WEAK SURFACE LOW MOVES UP THE OREGON COAST. KAM

&&

.MARINE...SATELLITE IMAGERY SHOWS THE WEAKENING COLD FRONT JUST OFFSHORE HAS SLOWED IN RESPONSE TO A WAVE MOVING N ALONG THE FRONT OVER OREGON. MODELS SEEM TO BE TRACKING THIS DEVELOPMENT WELL BY KEEPING THE FRONT OVER W WA THROUGH TONIGHT.

IN THE SHORT TERM...WITH THE FRONT STILL OFFSHORE...E-SE GRADIENTS ARE STILL UP HIGH ENOUGH TO BE PRODUCING SCA WINDS FROM THE CENTRAL STRAIT ACROSS THE N INLAND WATERS. WILL KEEP THESE SCAS GOING THROUGH 00Z...BUT THE WINDS MAY END UP EASING BEFORE THEN. WILL ALSO KEEP THE SCA GOING FOR THE INNER COASTAL WATERS...ESPECIALLY SINCE THE UNSTABLE AIR MASS MAY ALLOW STRONGER 925 MB WIND OF 25-30 KT TO MIX DOWN TO THE SURFACE AT TIMES. OTHERWISE WILL HAVE A SCA FOR HAZARDOUS SEAS GOING FOR THE COAST.

FOR TONIGHT/SATURDAY...THE 12Z GFS SHOWS A WEAK SURFACE LOW FORMING IN THE WAVE OVER OREGON...WHICH THEN MOVES UP OVER THE OLYMPICS LATE TONIGHT. 12Z NAM SHOWS THE SAME SURFACE LOW BUT TAKES IT N ALONG THE WA COAST LATE TONIGHT/SATURDAY MORNING WHILE THE GFS MOVES IT INLAND OVER THE NW INTERIOR. 00Z ECMWF SPLITS THE DIFFERENCE. THE TRACK WILL MAKE A BIG DIFFERENCE IN WIND DIRECTION...ESPECIALLY ALONG THE

COAST AND THROUGH THE STRAIT LATE TONIGHT AND SATURDAY. KAM

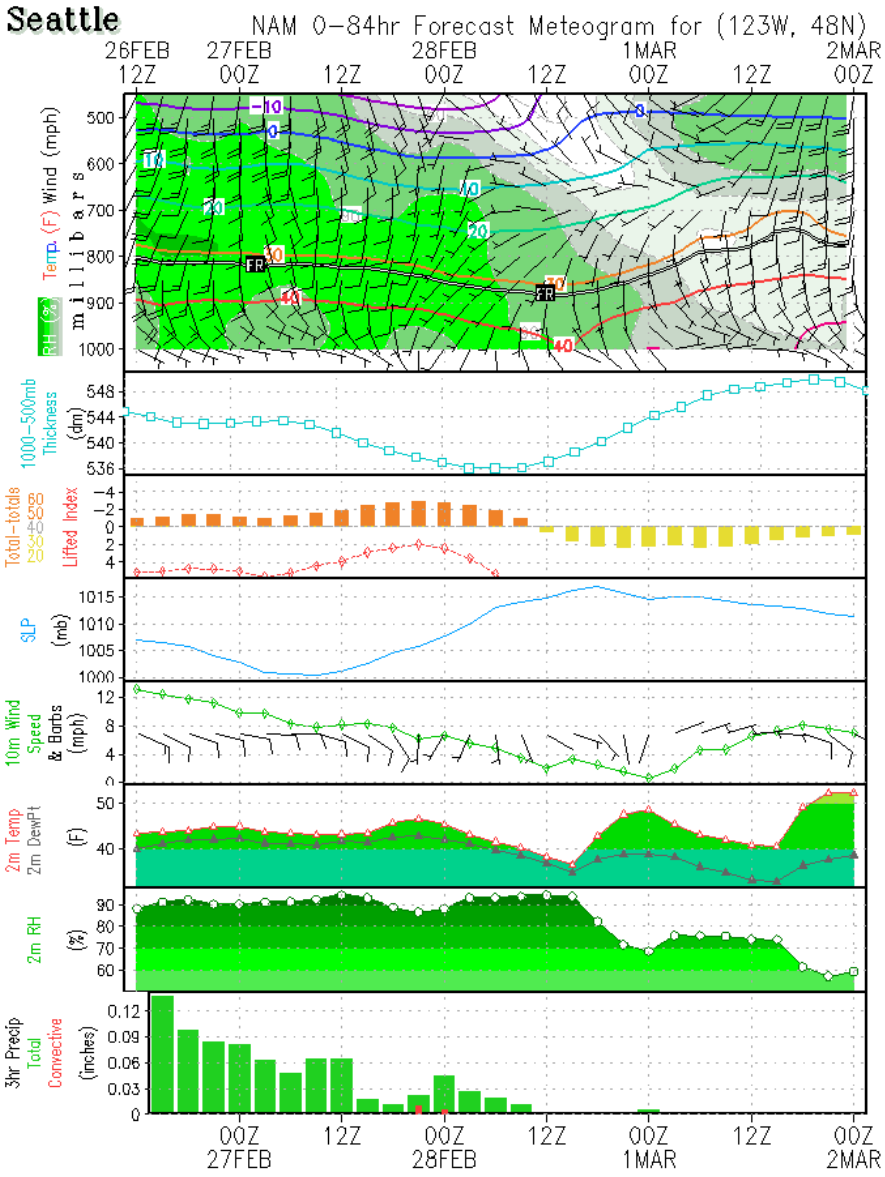
&&

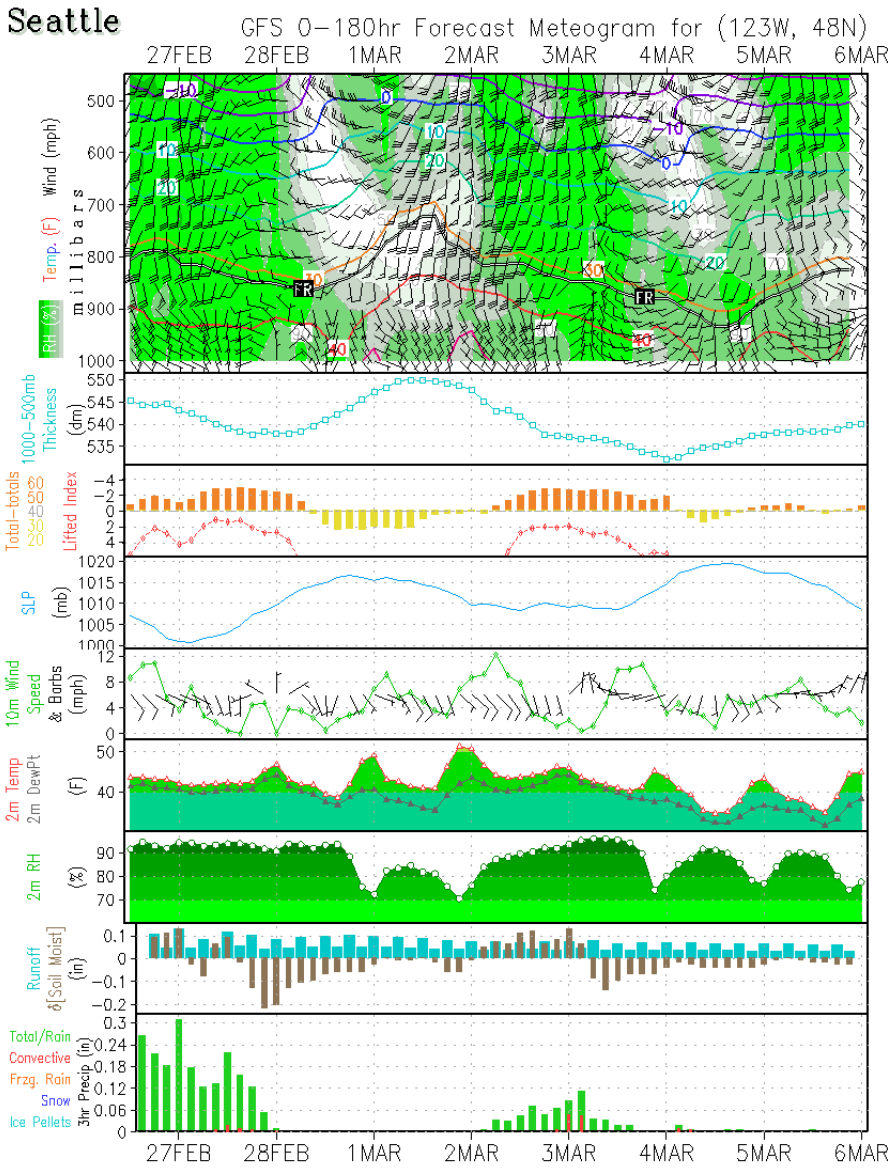
.SEW WATCHES/WARNINGS/ADVISORIES...
WA...NONE.
PZ...SMALL CRAFT ADVISORY OUTER COASTAL WATERS FOR HAZARDOUS SEAS
SMALL CRAFT ADVISORY INNER COASTAL WATERS TIL 4 PM THEN SCA FOR
HAZARDOUS SEAS.
SMALL CRAFT ADVISORY CENTRAL STRAIT...EAST ENTRANCE...NORTHERN
INLAND WATERS.
SMALL CRAFT ADVISORY FOR ROUGH GRAYS HARBOR BAR.

$$

WWW.WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION PLEASE SEE
WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML (ALL LOWERCASE).


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
26FEB 12Z
27FEB 00Z
12Z
28FEB 00Z
12Z
1MAR 00Z
12Z
2MAR 00Z
millibars
Temp. (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
3hr Precip Total Convective (inches)
00Z 27FEB
12Z
00Z 28FEB
12Z
00Z 1MAR
12Z
00Z 2MAR


Seattle
GFS 0-180hr Forecast Meteogram for (123W, 48N)
27FEB
28FEB
1MAR
2MAR
3MAR
4MAR
5MAR
6MAR
Wind (mph)
Temp. (F)
RH (%)
millibars
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
Runoff
d[Soil Moist] (in)
Total/Rain
Convective
Frzg. Rain
Snow
Ice Pellets
3hr Precip (in)

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	April 23, 2010
TO:	Matt Woltman / Megan McCullough
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600
	Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409 (office) or 206-794-0095 (cell)
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #5 (03/10/2010)

Please find included the following:

- Storm report narrative (3 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (12 pgs),
- pH Worksheet (1 pg),
- Groundwater level measurement form, (1 pg)
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (2 pg),
- Sampler Reports (15 pgs), and
- Weather forecasting information (7 pgs).

Please let me know if you have any questions or need additional information. Thank You.

Dave Metallo, LHG , Project Manager

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #5
March 10th and 11th, 2010

Prior to the current sampling event a 12-bottle capacity "mega"-style sampler unit was installed at monitoring station CB-1 (onsite drainage system outlet). As indicated in the STE#4 Report, this modification was completed to increase sampling capabilities and to streamline the sampler set-up configuration. Both of the other project monitoring stations, CB31A (main line inlet) and CB4857 (main line outlet), also utilize "mega"-style sampler units.

Stormwater Sampling Event (STE) #5 occurred on March 10th and 11th, 2010. The weather between STE#4 and #5 was a relatively dry period during the first nine days of March, which was punctuated by brief and intermittent periods of low volume rainfall. The Team decision was made to target the next runoff producing rainfall. An event was targeted for March 10th. This too was a short duration / low volume, although qualifying, event. Because the chance of rain was at a 30% probability and forecaste d to start between mid-night and 6AM, no personal were scheduled to be on-site. The rain did occur at 12:20 AM but only lasted for approximately four hours. So by the time the field crew arrived on-site the event was over. Only composite samples were collected during the March 10th rain event. Exactly 24-hours after the end of the March 10th rain event another event occurred. This was a larger event producing 1.05 inches of rain. Because of the post-storm tasks necessary for sample compositing and management there was not enough time to fully reset all of the sampling stations for the March 11th event. Since grab samples were not collected on the 10th they were in fact targeted and collected on Mach 11th, as grab sampling does not require station reset tasks. The Lora Lake Apartments Quality Assurance Project Plan permits unpaired collection of grab and composite samples. Therefore, both events and their corresponding samples were qualified for use. Composite samples were collected from the March 10th event and grab samples were collected from the March 11th event.

Storm and Sample Validation / Qualification:

All validation and qualification conditions for this storm event were met. See the accompanying *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding STE#5. The March 10th event had a forecasted precipitation probability of 30% with rainfall totals of 0.11 to 0.21. The March 11th event had a forecasted precipitation probability of 70% with rainfall totals of 0.31 to 0.65. So why not solely target the event on the 11th and conduct paired sampling from a larger event? The risk would have been not to sample the event on the 10th so that paired sampling could have been conducted on the 11th, however a situation could have occurred where the antecedent dry period condition was not met – thus disqualifying the event altogether and having no samples to show for our efforts from either rain event. Detailed weather forecast information is attached with this event report.

Enabling and Sampling:

All stations were automatically enabled via the use of area-velocity sensors set to trigger sampling above certain pre-determined threshold set-point levels. These threshold levels were determined based on an examination of recent base-flow condition levels, known periodic or cyclic events (e.g. timed watering, construction pumping, etc. that occur in the basin) and runoff response from past events. All sampling and flow monitoring equipment operated as designed and programmed. The three sampling stations automatically level enabled (based on pre-programmed threshold conditions) within 31 minutes of each other.

Each of three autosamplers were programmed to collect samples via time paced programming. Each autosampler was set to collect an aliquot every 9-minutes, which provided 45-minutes per discrete sample bottle and allowed for 9 hours of storm duration coverage. This was an appropriate programming selection given the forecasted storm parameters. All of the composite samples were manually flow weighted based on site specific flow information. Details pertaining to the programming and event-specific operation of each sampler unit is contained in the attached sampler reports.

CB-31A and CB-4857 had a storm volume difference of approximately 5,400 gallons, with the inlet recording more flow then the outlet. This may be a consequence of the system vactoring and resultant change in hydraulic conditions at CB4857 noted in STE Reports #'s 3 and 4. Since accumulated sediment was removed from the piping and vaults associated with CB4857, water flows more freely and is not being impounded to the degree previously noted prior to the vactoring event. Water depth in the pipe (at the area-velocity sensor anchor position) does not increase as readily in association with rainfall as it had done during past events and observations. These shallower water conditions in the pipe, coupled with its 4% slope (field measured) tended to make flow monitoring more difficult.

Grab samples were collected using Teflon-lined tubing, dedicated at each station, attached to a point adjacent to the intake of the sampling line. A peristaltic pump was used to collect the grab samples through these dedicated lines at each station. All grabs were collected as early as possible during the storm event once runoff was noted and at points in the hydrograph that were elevated above base flow conditions.

As noted above the grab and composite samples were collected unpaired in relation to each other from different storm events. Separate hydrographs for each event from each station were drafted and examined for associated storm information. These hydrographs showing, level, flow and rainfall data, as well as sample markers and grab sample collection indications, for each of the monitoring stations are attached to this report.

Compositing Scheme:

The hydrographs from each monitoring station were examined and decisions were made as to what specific discrete sampler bottles were to be included in the composite samples. Because this was a short duration sampling event only four to six out of the 12 available bottles were utilized. In fact the sampler units at CB4857 and CB1 were manually shut off late into their programmed collection because water levels in the pipe had returned to base flow conditions. See the attached *Field Sampling Forms* and their accompanying *Compositing Worksheets* for these details.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grabs or composite samples were placed into coolers and put on ice to maintain temperatures between 2 and 6 °C. A small portion of each of the of the composite samples were poured off for the assessment of pH. pH measurements were collected prior to delivery of the samples to the lab. These measurements were recorded on the attached *pH Measurement Worksheet.* All samples were recorded on *Chain-of-Custody forms* (attached) and were in direct control of project personnel at all times. Samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from all of the stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Quality Control Samples:

During this event adequate water volume for duplicate and MS/MSD analyses was collected and submitted for both the grab and composite samples. The grab and composite duplicates were collected at CB4857 – which were designated as location "CB101". This was done to present a "blind" sample (not readily identifying these duplicates) to the testing facility. Both the grab and composite MS/MSD volumes were collected at CB31A – and were labeled as such. Trip blanks accompanied all volatile organic samples collected during this STE. See the attached *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* and the *Field Sampling Forms* for details regarding QC sample collection.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. These locations were MW-2, MW-3, MW-4, and MW-6. Details regarding the measurement event are contained in the attached *Groundwater Level Measurement* field sheet. Measurements are listed in the table below.

Groundwater Level Measurements, STE#4

Location	Date	Time	Water Level from TOC (FT)	Notes
MW-2	3/10/2010	12:07	6.69	replacement for MW-1
MW-3	3/10/2010	12:02	17.17	
MW-4	3/10/2010	11:57	16.21	
MW-6	3/10/2010	11:51	11.79	

Monitoring well MW-5 was noted to have issues relating to its construction, completion, and/or positioning, which in turn has been previously reported, to some degree, effect its ability to provide representative water level information (information from Floyd/Snider). Groundwater level monitoring at MW-5 was suspended and this location will be replaced by level monitoring at MW-2 (northwest corner of the site).

Anomalies and/or Work Plan Deviations:

There were no anomalies observed that would cause any of the STE#5 samples to be non-representative of the conditions from which they were collected.

Actions To Be Completed:

Routine sampler maintenance and flow meter (level) calibrations will be conducted at a regular frequency to assure proper equipment operation. This was the fifth of ten anticipated storm sampling events. An attempt will be made to conduct five more events before late-May, 2010. The current focus of the field efforts will be in maintaining proper station and equipment operation, data and resource management and storm-tracking tasks.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #5 (03-10 thru 11-2010)

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Storm Event Data:	Comp Only	Grab Only
Project Storm Event (STE) #	5	5
Event Forecast Probability (%)	30%	70%
Antecedent Dry Period (days: hrs: mins)	1:12:05	0:24:00
STE Start Date & Time	3/10/10 0:20	3/11/10 4:15
STE Duration (hrs:mins)	3:55	28:15
STE End Date & Time	3/10/10 4:15	3/12/10 8:30
Period Between Next Measureable Rain (hrs: mins)	24:00	6:00
Was Targeted STE Qualified Per LLA QAPP	YES	YES
Rainfall Summary:	**Comp Only**	**Grab Only**
Rainfall Prior 24-hrs to STE Start	0.00	0.00
Rainfall Prior 12-hrs to STE Start	0.00	0.00
Rainfall Total for Storm Period (in)	0.08	1.04
Max 1-hr Rainfall Intensity (in/hr)	0.03	0.25
Average 1-hr Rainfall Intensity (in/hr)	0.02	0.09

[1] Sample Collection Criteria:			
Sampling Station	CB-31A	CB-4857	CB-1
Was Grab sample collected?	Yes	Yes	Yes
Grab ID	CB31A031110GRAB	CB4857031110GRAB	CB1031110GRAB
Grab Date /Time	3/11/2010 9:20	3/11/2010 10:05	3/11/2010 9:45
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	Yes	Yes	Yes
Hydrograph stage at grab collection	mid-storm/falling limb	mid-storm/falling limb	mid-storm/falling limb
Grab parameters collected per LLA QAPP ?	Yes	Yes	Yes
Were Trip Blanks included w/ Grab samples ?	Yes (TB031110)	Yes (TB031110)	Yes (TB031110)
Was Comp sample collected?	Yes	Yes	Yes
Comp ID	CB31A031010COMP	CB4857031010COMP	CB1031010COMP
Comp Date /Time	3/10/2010 6:16	3/10/2010 5:51	3/10/2010 5:45
Total volume measured during storm period (gallons)	7111	1709	176
Volume sampled during storm period (gallons)	6840	1690	176
Volume utilized for comp. sample (gallons)	6840	1690	176
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	Yes (96%)	Yes (99%)	Yes (100%)
Were a minimum of 8 aliquots collected for comp sample ?	Yes (30)	Yes (25)	Yes (25)
Comp parameters collected per LLA QAPP ?	Yes	Yes	Yes
Rainfall during sampling period (in)	0.06	0.05	0.05
pH Measurements Collected ?	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No
[1] QC Sample Summary Information:	CB-31A	CB-4857	CB-1
Was Grab sample duplicate collected ?	No	Yes	No
Grab sample duplicate ID	na	CB101031110GRAB	na
Grab sample date and time	na	3/11/2010 11:05	na
Was Comp sample duplicate collected ?	No	Yes	No
Comp sample duplicate ID	na	CB101031110COMP	na
Comp sample date and time	na	3/10/2010 6:51	na
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	Yes (both)	No	No

[1] If the answer to any of the Storm Event or Sample Collection Criteria questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 4/22/2010 **Reveiwed By / Date:** 4/23/10

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Floyd / Snider	Phone: 206-292-2078
Client Contact: Matt Wohlman / Jessi Massingale	
Client Project Name: Lora Lake Apartments	
Client Project #: POS-LLA	Samplers: D. Metallo P. Heltzel

Date: 3-11-2010
Page: 1 of 1
No. of Coolers: 1 Cooler Temps: 4.3

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOC 8260C-SIM	Analysis Requested: NWTPH-DX(I)	Notes/Comments
CB31A031110GRAB	3-11-10	0920	W	13	X	X	Run MS/MSD
CB1031110GRAB	3-11-10	0945	W	5	X	X	
CB485703110GRAB	3-11-10	1005	W	5	X	X	
CB101031110GRAB	3-11-10	1105	W	5	X	X	
TB031110~~GRAB~~ DW	3-11-10	0800	W	3	X		Trip blank

Comments/Special Instructions
(1) Acid/silica gel clean up for NWTPH-DX

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)	Dave Metallo			
Printed Name:	Dave Metallo	A. Volgardsen		
Company:	Taylor Assoc., Inc.	ARI		
Date & Time:	3-11-2010 (1204)	3/11/10 1204		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

ARI Assigned Number:	Turn-around Requested: Standard	Date: 3-10-2010
ARI Client Company: Floyd/Snider	Phone: 206-292-2078	Page: 1 of 1
Client Contact: Matt Wolfman / Jessi Massingale		No. of Coolers: 2 Cooler Temps:
Client Project Name: Lora Lake Apartments		
Client Project #:	Samplers: D. Metallo, P. Hettzel	

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM low level	PCP 8041	Arsenic Total Diss 200.8	Dioxin/Furans 1613	TSS SM2540D				Notes/Comments
CB31A031010COMP	3-10-10	0616	W	1	X	X	X	X	X				PH Measurements (see attached worksheet)
CB48570310 10 COMP	3-10-10	0551	W	1	X	X	X	X	X				6.97
CB1031010COMP	3-10-10	0545	W	1	X	X	X	X	X				6.37
CB101031010COMP	3-10-10	0651	W	1	X	X	X	X	X				7.03

① RUN MS/MSD

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
- Bottles & glassware decon'ed to LLA project specific SOP (see attached sht)	Printed Name: Dave Metallo	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
	Company: Taylor Assoc. Inc.	Company: ARI	Company:	Company:
	Date & Time: 3-10-10 (1523)	Date & Time: 3/10/10 1523	Date & Time:	Date & Time:

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

① MS/MSD vol. does not include extra vol. for Dioxin/Furan analysis

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB314 | **8 or (12) x 1 gallon bottle set-up** | Rev.ed 2/11/2010 | Page: 1 of 2 pages per station

Section 1 Storm Setup and Inspection

Personnel:	PH	Weather:	overcast (cool)	Arrival Date/Time:	3/2/10 12:30
Carry-over maintenance to do prior to set-up:					done?
Sampler Battery Voltage	12.27	Changed? (Y) N		New voltage	13.12
Flow Meter Battery Voltage	N/A	Changed? Y N	N/A	New voltage	N/A

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	0.375	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	N/A	Desiccant Condition, replaced?	ok, no
Difference (FT)	N/A	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	No	Clean bottles installed & lids off?	Yes
Velocity (fps)	0.01	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	7.0	Enable Level (FT)	0.41
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T / 9 min / 6 hr event
Channel conditions/observations		Program Reviewed? (Yes/No)	Yes
None observed, ok		Last Screen	Program Disabled 17:23
		Ice Deployed? (Yes/No)	No

Notes: Arm Flexure = 13

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: | Weather: | Arrival Date/Time:

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?			
Grab Collection Time (date/time)	DM		
Grab Sample ID			
Grab Duplicates Collected?		Sampler	
Grab Duplicate Collection (date/time)		Equipment running correctly?	
Grab Duplicate ID		Composite Begin Time (date / time)	
Grab MS/MSD Collected ?		On Composite... (bottle # / aliq #)	
VOA Trip Blank in cooler?, ID		Ice deployed?	
Flow Meter		Sampler Battery Voltage (changed?):	
Flow meter cables OK? (Y/N)		Flow Meter Battery Voltage/Change? (if different)	
Flow Data Downloaded & Reviewed? (Y/N)		Bottle Swap needed? (if yes fill out Section 3)	

Notes: * Collected comp's only - No grabs from this short duration event

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed DM

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB31A

Section 4. Comp. Bottles Retrieval

Personnel: PH, DM	Weather: overcast		Arrival Date/Time: 3/10/10 10:30		
Sampler Battery Voltage	12.63	Changed? Y (N)		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N N/A		New voltage	N/A
Comp Sample Volume Collected	100 %	Data downloaded? Yes			
Composite Begin Time (date/time)	3/10/10 01:55			Round #: 1	
Last Aliquot Taken (date/time, btl #, aliq #)	3/10/10 Bottle 12, 5 of 5				
Comp Bottles Labeled? (sta. & btl #)	Yes				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

None

Channel conditions/observations

None observed, ok

Notes/Maintenance Needed:

calibrate level

Section 5. Post Storm Comp. Sample Processing

Personnel: DM, PH — Date/Time: 3/10/2010 (~1200)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes — Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? (12)	Approximate Total Comp. Volume Collected: 12x 3500 ml
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 8500 ml	Actual Comp. Sample Vol. Available: 8867 ml
Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp.), Other (explain):	
Bottles (Btl #s) used for Comp. Sample: 1-6	Comp. Sample Container Size & Material: 2.5 gal glass jug
Comp Collection Time (date/time): 3-10-10 (0616)	Comp Sample ID: CB31A031010COMP
pH Measurements Collected On Comp. Sample ?: Yes (6.38)	

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes

Duplicate Sample Collected ? NO	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: NA

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: Yes

MS/MSD Vol. submitted: 4367 ml

Were any other QC sample types colelcted? (if yes, provide details) No

DI Water Information - None used

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB-31A | 8 or 12 x 1 gallon bottle set-up | Rev.ed 2/11/2010 | Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel:	Weather:	Arrival Date/Time:		
Carry-over maintenance to do prior to set-up:				done?
Sampler Battery Voltage		Changed? Y N	New voltage	
Flow Meter Battery Voltage		Changed? Y N	New voltage	

Flow Meter		Sampler/s		
Date/time correct? (Yes/No)		Pump Tubing OK?		
Flow meter cables OK? (Yes/No)		Pump Tubing Replaced? (Yes/No)		
Desiccant Canisters OK (Yes/No)		Sample Tubing & Strainer OK?		
Flow Meter Level (FT)		Comp and Grab Lines Back flushed with DI?		
Actual level Reading (FT)		Desiccant Condition, replaced?		
Difference (FT)		Suction line & quick connect attached?		
Level calibrated? (Yes/No)		Clean bottles installed & lids off?		
Velocity (fps)		Diagnostics / Distributor arm check?		
Flow Rate (gpm)		Enable Level (FT)		
Data Downloaded (Yes/No)		Pacing Type ("T"ime/"F"low), interval / rate		
Channel conditions/observations		Program Reviewed? (Yes/No)		
		Last Screen		
		Ice Deployed? (Yes/No)		

Notes: *Grab-only event

DM

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: D. Mutsillo P. Meltzel | Weather: lite Rain, 40°s | Arrival Date/Time: 3-11-2010 (0905)

Grab Sample Data		Sample Observations:
Runoff Present or Hydrograph Elevated?	Yes, both	*Grab ONly event
Grab Collection Time (date/time)	3-11-2010 (0920)	
Grab Sample ID	CB31A03111OGRAB	
Grab Duplicates Collected?	NO	
Grab Duplicate Collection (date/time)	NA	
Grab Duplicate ID	NA	
Grab MS/MSD Collected ?	Yes	
VOA Trip Blank in cooler?, ID Yes	TB031110	

Flow Meter		Sampler	
Flow meter cables OK? (Y/N)	Y	Equipment running correctly?	NA
Flow Data Downloaded & Reviewed? (Y/N)	Y	Composite Begin Time (date / time)	NA
		On Composite... (bottle # / aliq #)	NA
		Ice deployed?	NA
		Sampler Battery Voltage (changed?):	12.85
		Flow Meter Battery Voltage/Change? (if different)	NO ∇
		Bottle Swap needed? (if yes fill out Section 3)	NA

Notes: hydrograph is elevated, just barely on downside of highest storm event crest

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

DM

Channel conditions/observations

Notes/Maintenance Needed:

This Section not applicable

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB-31A

Section 4. Comp. Bottles Retrieval

Personnel:	Weather:		Arrival Date/Time:		
Sampler Battery Voltage		Changed? Y N		New voltage	
Flow Meter Battery Voltage		Changed? Y N		New voltage	
Comp Sample Volume Collected		Data downloaded?			
Composite Begin Time (date/time)				Round #:	
Last Aliquot Taken (date/time, btl #, aliq #)					
Comp Bottles Labeled? (sta. & btl #)					

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

Channel conditions/observations

Notes/Maintenance Needed:

This section not applicable

DM

Section 5. Post Storm Comp. Sample Processing

Personnel:	Date/Time:	
Processing Location:		
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). :		Rain Gauge Info:
How Many Comp. Bottles Were Collected?	Approximate Total Comp. Volume Collected:	
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls):		Actual Comp. Sample Vol. Available:
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp., Other (explain):		
Bottles (Btl #s) used for Comp. Sample:	Comp. Sample Container Size & Material:	
Comp Collection Time (date/time):	Comp Sample ID:	
pH Measurements Collected On Comp. Sample ?:		
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?:		

Notes:

This section not applicable

DM

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below):	
Duplicate Sample Collected ?	Duplicate Sample Vol.:
Duplicate sample Date / Time:	Duplicate Sample ID:
pH Measurement Collected on Duplicate Comp. Sample?:	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?:	
MS/MSD Vol. submitted:	
Were any other QC sample types colelcted? (if yes, provide details)	
DI Water Information	

Notes:

This section not applicable

DM

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB4857

8 or 12 x 1 gallon bottle set-up
Rev.ed 2/11/2010

Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: PH	Weather: Overcast		Arrival Date/Time:	3/8/10	14:13
Carry-over maintenance to do prior to set-up: None for this trip				done?	N/a
Sampler Battery Voltage	12.43	Changed? (Y) N		New voltage	13.28
Flow Meter Battery Voltage	N/A	Changed? Y N N/A		New voltage	N/A

Flow Meter		Sampler/s		
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes	
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No	
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes	
Flow Meter Level (FT)	0.042 / 0.01	Comp and Grab Lines Back flushed with DI?	Yes	
Actual level Reading (FT)	N/A / NA	Desiccant Condition, replaced?	OK, No	
Difference (FT)	N/A / NA	Suction line & quick connect attached?	Yes	
Level calibrated? (Yes/No)	No / NO	Clean bottles installed & lids off?	Yes	
Velocity (fps)	1.09 / 0.3	Diagnostics / Distributor arm check?	Yes	
Flow Rate (gpm)	7.0 / 0	Enable Level (FT)	0.04	Not yet set
Data Downloaded (Yes/No)	Yes / Yes	Pacing Type ("T"ime/"F"low), interval / rate	T/9min	6-hr event
Channel conditions/observations		Program Reviewed? (Yes/No)	Yes	
None observed, ok		Last Screen Prgm Disabled	17:38 TU	
		Ice Deployed? (Yes/No)	No	

Notes: Level was up a bit, took calibration sample w/o bubblers in line
Arm flexure = 10 * Needs bottle 12!! → Done 3/9/10

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel:	Weather:	Arrival Date/Time:	
Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?			
Grab Collection Time (date/time)			
Grab Sample ID			
Grab Duplicates Collected?	DM	**Sampler**	
Grab Duplicate Collection (date/time)		Equipment running correctly?	
Grab Duplicate ID		Composite Begin Time (date / time)	
Grab MS/MSD Collected ?		On Composite... (bottle # / aliq #)	
VOA Trip Blank in cooler?, ID		Ice deployed?	
Flow Meter		Sampler Battery Voltage (changed?):	
Flow meter cables OK? (Y/N)		Flow Meter Battery Voltage/Change? (if different)	
Flow Data Downloaded & Reviewed? (Y/N)		Bottle Swap needed? (if yes fill out Section 3)	

Notes: * No grabs collected during this short duration event

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed DM

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB4857

Section 4. Comp. Bottles Retrieval

Personnel: Pit, Din	Weather: Mostly Cloudy		Arrival Date/Time: 3/10/10 9:58		
Sampler Battery Voltage	12.74	Changed? Y (N)		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N	N/A	New voltage	N/A
Comp Sample Volume Collected	100%	Data downloaded?	Yes		
Composite Begin Time (date/time)	3/10/10 02:14			Round #: 1	
Last Aliquot Taken (date/time, btl #, aliq #)	3/10/10 Bottle(11), Aliq (3)				
Comp Bottles Labeled? (sta. & btl #)	Yes				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

None

Channel conditions/observations

None observed, ok

Notes/Maintenance Needed:

Warning: Replace pump tubing

Section 5. Post Storm Comp. Sample Processing

Personnel: D. Metallo, P. Heltzel Date/Time: 3-10-10 (1300)

Processing Location: POS Stormwater Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12 DM 11 | Approximate Total Comp. Volume Collected: 12 DM 11 x 3500 ml

Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 9000 ml Actual Comp. Sample Vol. Available: 4538 ml

Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp.) Other (explain):

Bottles (Btl #s) used for Comp. Sample: 1-5 | Comp. Sample Container Size & Material: 2.5 gal WM glass

Comp Collection Time (date/time): 3-10-2010 (0551) | Comp Sample ID: CB4857031010comP

pH Measurements Collected On Comp. Sample ?: Yes (6.99)

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes: Manually stopped sampler program at 3/5 BTL# 99 - base flow

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes

Duplicate Sample Collected ? Yes | Duplicate Sample Vol.: 4538 ml

Duplicate sample Date / Time: 3-10-2010 (0651) | Duplicate Sample ID: CB10103101OcomP

pH Measurement Collected on Duplicate Comp. Sample?: Yes (7.03)

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: No

MS/MSD Vol. submitted: N/A

Were any other QC sample types colelcted? (if yes, provide details) No

DI Water Information None Used

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB-4857

8 or 12 x 1 gallon bottle set-up

Rev.ed 2/11/2010

Section 1. Storm Setup and Inspection

Personnel:	Weather:		Arrival Date/Time:		
Carry-over maintenance to do prior-to set-up:					done?
Sampler Battery Voltage		Changed? Y N		New voltage	
Flow Meter Battery Voltage		Changed? Y N		New voltage	
Flow Meter		**Sampler/s**			
Date/time correct? (Yes/No)		Pump Tubing OK?			
Flow meter cables OK? (Yes/No)		Pump Tubing Replaced? (Yes/No)			
Desiccant Canisters OK (Yes/No)		Sample Tubing & Strainer OK?			
Flow Meter Level (FT)	DM	Comp and Grab Lines Back flushed with DI?			
Actual level Reading (FT)		Desiccant Condition, replaced?			
Difference (FT)		Suction line & quick connect attached?			
Level calibrated? (Yes/No)		Clean bottles installed & lids off?			
Velocity (fps)		Diagnostics / Distributor arm check?			
Flow Rate (gpm)		Enable Level (FT)			
Data Downloaded (Yes/No)		Pacing Type ("T"ime/"F"low), interval / rate			
Channel conditions/observations		Program Reviewed? (Yes/No)			
		Last Screen			
		Ice Deployed? (Yes/No)			

Notes:
* Grab-only event

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: D. Metzilo, P. Hetzel Weather: Lite Rain, 40°s, Arrival Date/Time: 3-11-2010 (0959)

Grab Sample Data		Sample Observations:
Runoff Present or Hydrograph Elevated?	Yes	* Grab-only event
Grab Collection Time (date/time)	3-11-2010 (1005)	
Grab Sample ID	CB4857031110GRAB	
Grab Duplicates Collected?	Yes	**Sampler**
Grab Duplicate Collection (date/time)	3-11-2010 (1105)	Equipment running correctly? NA
Grab Duplicate ID	CB10103111OGRAB	Composite Begin Time (date / time)
Grab MS/MSD Collected ?	No	On Composite... (bottle # / aliq #)
VOA Trip Blank in cooler?, ID	Yes TB031110	Ice deployed? ↓
Flow Meter		Sampler Battery Voltage (changed?): 12.91
Flow meter cables OK? (Y/N)	Y	Flow Meter Battery Voltage/Change? (if different) No ∇
Flow Data Downloaded & Reviewed? (Y/N)	Y	Bottle Swap needed? (if yes fill out Section 3) NA

Notes: Grab samples collected on downward limb of peak portion of storm hydrograph (to this point in the storm). Noteable discharge from 4857 pipe into vault.

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

DM

Channel conditions/observations

Notes/Maintenance Needed:
This section not applicable

Station: CB-4857

Section 4. Comp. Bottles Retrieval

Personnel:	Weather:	Arrival Date/Time:	
Sampler Battery Voltage		Changed? Y N	New voltage
Flow Meter Battery Voltage		Changed? Y N	New voltage
Comp Sample Volume Collected		Data downloaded?	
Composite Begin Time (date/time)			Round #:
Last Aliquot Taken (date/time, btl #, aliq #)			
Comp Bottles Labeled? (sta. & btl #)			

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

DM

Channel conditions/observations

Notes/Maintenance Needed:

This Section Not Applicable

Section 5. Post Storm Comp. Sample Processing

Personnel:	Date/Time:
Processing Location:	
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). :	Rain Gauge Info:
How Many Comp. Bottles Were Collected?	Approximate Total Comp. Volume Collected:
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls):	Actual Comp. Sample Vol. Available:
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp., Other (explain):	
Bottles (Btl #s) used for Comp. Sample:	Comp. Sample Container Size & Material:
Comp Collection Time (date/time):	Comp Sample ID:
pH Measurements Collected On Comp. Sample ?:	
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?:	

Notes:

DM

This Section Not Applicable

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below):	
Duplicate Sample Collected ?	Duplicate Sample Vol.:
Duplicate sample Date / Time:	Duplicate Sample ID:
pH Measurement Collected on Duplicate Comp. Sample?:	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?:	
MS/MSD Vol. submitted:	
Were any other QC sample types colelcted? (if yes, provide details)	
DI Water Information	

Notes:

DM

This Section Not Applicable

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB-1

8 or (12) x 1 gallon bottle set-up

Rev.ed 2/11/2010

Section 1. Storm Setup and Inspection

Personnel: PH	Weather: Rain Mixed w/ Snow		Arrival Date/Time: 3/8/10 13:15		
Carry-over maintenance to do prior to set-up: None					done?
Sampler Battery Voltage Master	12.31	Changed? (Y) N		New voltage	12.89
Flow Meter Battery Voltage Slave	12.67	Changed? Y (N)		New voltage	NA

Flow Meter		Sampler/s (*)	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes - new
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	Yes - new
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	0.06	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	N/A - 0.06	Desiccant Condition, replaced?	New
Difference (FT)	N/A	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	No	Clean bottles installed & lids off?	Yes
Velocity (fps)	0.46	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	1.0	Enable Level (FT)	0.03'
Data Downloaded (Yes/No)	Yes (Master only)	Pacing Type ("T"ime/"F"low), interval / rate	T, 9 min 16 hr event
Channel conditions/observations OK		Program Reviewed? (Yes/No)	Yes
		Last Screen Prgm Disabled. . .	
		Ice Deployed? (Yes/No)	NO

Notes:
Arm flexure = 12 (Master)
= 13 (slave)

(*) Changed Sampler set up to a 12-bott. mega configuration on 3-9-10 (~1430 - 1730)

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: Weather: Arrival Date/Time:

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?			
Grab Collection Time (date/time)			
Grab Sample ID			
Grab Duplicates Collected?		Sampler	
Grab Duplicate Collection (date/time)		Equipment running correctly?	
Grab Duplicate ID		Composite Begin Time (date / time)	
Grab MS/MSD Collected ?		On Composite... (bottle # / aliq #)	
VOA Trip Blank in cooler?, ID		Ice deployed?	
Flow Meter		Sampler Battery Voltage (changed?):	
Flow meter cables OK? (Y/N)		Flow Meter Battery Voltage/Change? (if different)	
Flow Data Downloaded & Reviewed? (Y/N)		Bottle Swap needed? (if yes fill out Section 3)	

DM

Notes: No grabs collected during this short duration event - comps only

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

DM

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB-1

Section 4. Comp. Bottles Retrieval

Personnel: PH, DM	Weather: Overcast, cool, 40°s		Arrival Date/Time: 3-10-10 09:15		
Sampler Battery Voltage	12.74	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	N/A	Changed? Y N	NA	New voltage	NA
Comp Sample Volume Collected	100%	Data downloaded?	Yes		
Composite Begin Time (date/time)	3/10/10 02:09			Round #:	1
Last Aliquot Taken (date/time, btl #, aliq #)	3/10/10 07:15 BTL 7 5of5 -				
Comp Bottles Labeled? (sta. & btl #)	Yes				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed
No liquid (either NLD or NML) in BTLs 8 - 10

Channel conditions/observations OK

Notes/Maintenance Needed: - Stopped prgm part way through BTL 10 - hydrograph back to baseflow

Section 5. Post Storm Comp. Sample Processing

Personnel: DM, PH		Date/Time: 3-10-2010 (~1400)	
Processing Location: POS Storm Lab			
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes			Rain Gauge Info: Yes
How Many Comp. Bottles Were Collected? 7		Approximate Total Comp. Volume Collected: 7 X 3500 ml	
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4500 ml		Actual Comp. Sample Vol. Available: 4654 ml	
Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp.), Other (explain):			
Bottles (Btl #s) used for Comp. Sample: 1-5		Comp. Sample Container Size & Material: 2.5 gal glass WM jug	
Comp Collection Time (date/time): 3-10-2010 (0545)		Comp Sample ID: CB1031010COMP	
pH Measurements Collected On Comp. Sample ?: Yes (6.37)			
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes			

Notes: Manually shut off sampler @ 3/5 BTL #10, no water collected from 1/5 BTL #8 through #10

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): NA - no QC samples	
Duplicate Sample Collected ? NO	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA
pH Measurement Collected on Duplicate Comp. Sample?: NA	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: No	
MS/MSD Vol. submitted: NA	
Were any other QC sample types colelcted? (if yes, provide details) No	
DI Water Information None	
Notes:	

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB-1	8 or 12 x 1 gallon bottle set-up	Page: 1 of 2
	Rev.ed 2/11/2010	pages per station

Section 1. Storm Setup and Inspection

Personnel:–	Weather:		Arrival Date/Time:		
Carry-over maintenance to do prior to set-up:					done?
Sampler Battery Voltage		Changed? Y N		New voltage	
Flow Meter Battery Voltage		Changed? Y N		New voltage	
Flow Meter		**Sampler/s**			
Date/time correct? (Yes/No)		Pump Tubing OK?			
Flow meter cables OK? (Yes/No)		Pump Tubing Replaced? (Yes/No)			
Desiccant Canisters OK (Yes/No)	DM	Sample Tubing & Strainer OK?			
Flow Meter Level (FT)		Comp and Grab Lines Back flushed with DI?			
Actual level Reading (FT)		Desiccant Condition, replaced?			
Difference (FT)		Suction line & quick connect attached?			
Level calibrated? (Yes/No)		Clean bottles installed & lids off?			
Velocity (fps)		Diagnostics / Distributor arm check?			
Flow Rate (gpm)		Enable Level (FT)			
Data Downloaded (Yes/No)		Pacing Type ("T"ime/"F"low), interval / rate			
Channel conditions/observations		Program Reviewed? (Yes/No)			
		Last Screen			
		Ice Deployed? (Yes/No)			

Notes: *Grab-only event

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: D. Metcalfe, P. Hetzel | Weather: Rain, lite, 40's | Arrival Date/Time: 3-11-2010 (0935)

Grab Sample Data		Sample Observations: Grab only event	
Runoff Present or Hydrograph Elevated?			
Grab Collection Time (date/time)	3-11-2010 (0945)		
Grab Sample ID	CB031110GRAB		
Grab Duplicates Collected?	NO	**Sampler**	
Grab Duplicate Collection (date/time)	NA	Equipment running correctly?	NA
Grab Duplicate ID	NA	Composite Begin Time (date / time)	|
Grab MS/MSD Collected ?	NO	On Composite... (bottle # / aliq #)	|
VOA Trip Blank in cooler?, ID	TB031110	Ice deployed?	V
Flow Meter		Sampler Battery Voltage (changed?):	12.74
Flow meter cables OK? (Y/N)	Y	Flow Meter Battery Voltage/Change? (if different)	No ∇
Flow Data Downloaded & Reviewed? (Y/N)	Y	Bottle Swap needed? (if yes fill out Section 3)	NA

Notes: - Grabs collected at peak hydrograph point, just barely on downward limb. However, rain intensity was increasing at time of collection and there was notable runoff at weir.

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
Last Aliquot Taken (date / time, btl #, aliq #)		Data downloaded?	
Comp Bottles Labeled? (sta. & btl #)		Sampler/Flow Meter Batt. Voltage (changed):	
Comp Sample Volume Collected		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed DM

Channel conditions/observations

Notes/Maintenance Needed: This Section Not Applicable

Station: ~~CB-31A~~ on CB-1

Section 4. Comp. Bottles Retrieval

Personnel:	Weather:		Arrival Date/Time:		
Sampler Battery Voltage		Changed? Y N		New voltage	
Flow Meter Battery Voltage		Changed? Y N		New voltage	
Comp Sample Volume Collected		Data downloaded?			
Composite Begin Time (date/time)				Round #:	
Last Aliquot Taken (date/time, btl #, aliq #)					
Comp Bottles Labeled? (sta. & btl #)					

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

DM

Channel conditions/observations

Notes/Maintenance Needed:

This Section not applicable

Section 5. Post Storm Comp. Sample Processing

Personnel:	Date/Time:	
Processing Location:		
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). :		Rain Gauge Info:
How Many Comp. Bottles Were Collected?	Approximate Total Comp. Volume Collected:	
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls):	Actual Comp. Sample Vol. Available:	
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp., Other (explain):		
Bottles (Btl #s) used for Comp. Sample:	Comp. Sample Container Size & Material:	
Comp Collection Time (date/time):	Comp Sample ID:	
pH Measurements Collected On Comp. Sample ?:		
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?:		

Notes:

This Section not applicable

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below):	
Duplicate Sample Collected ?	Duplicate Sample Vol.:
Duplicate sample Date / Time:	Duplicate Sample ID:
pH Measurement Collected on Duplicate Comp. Sample?:	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?:	
MS/MSD Vol. submitted:	
Were any other QC sample types colelcted? (if yes, provide details)	
DI Water Information	

Notes:

This Section not applicable

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: Lora Lake Apts

Date: 3/10/10
Staff: PH
pH meter make/model #: Orion 2 Star

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB1031010comp	6.37	13:38	
CB31A031010comp	6.38	13:47	
CB4857031010comp	6.97	13:51	
CB1010310100comp	7.03	13:56	

Post-Measurement Check

Nominal pH value of standard	7.00	
Temperature (deg C)	13.5	
Standard pH, temp corrected	7.06	
Meter pH reading (SU)	7.10	
Difference (SU)	0.04	*Should be < 0.1 (round to 0.0)*
Time	13:58	

Form to be included in storm file, as applicable

TAYLOR ASSOCIATES, INC.

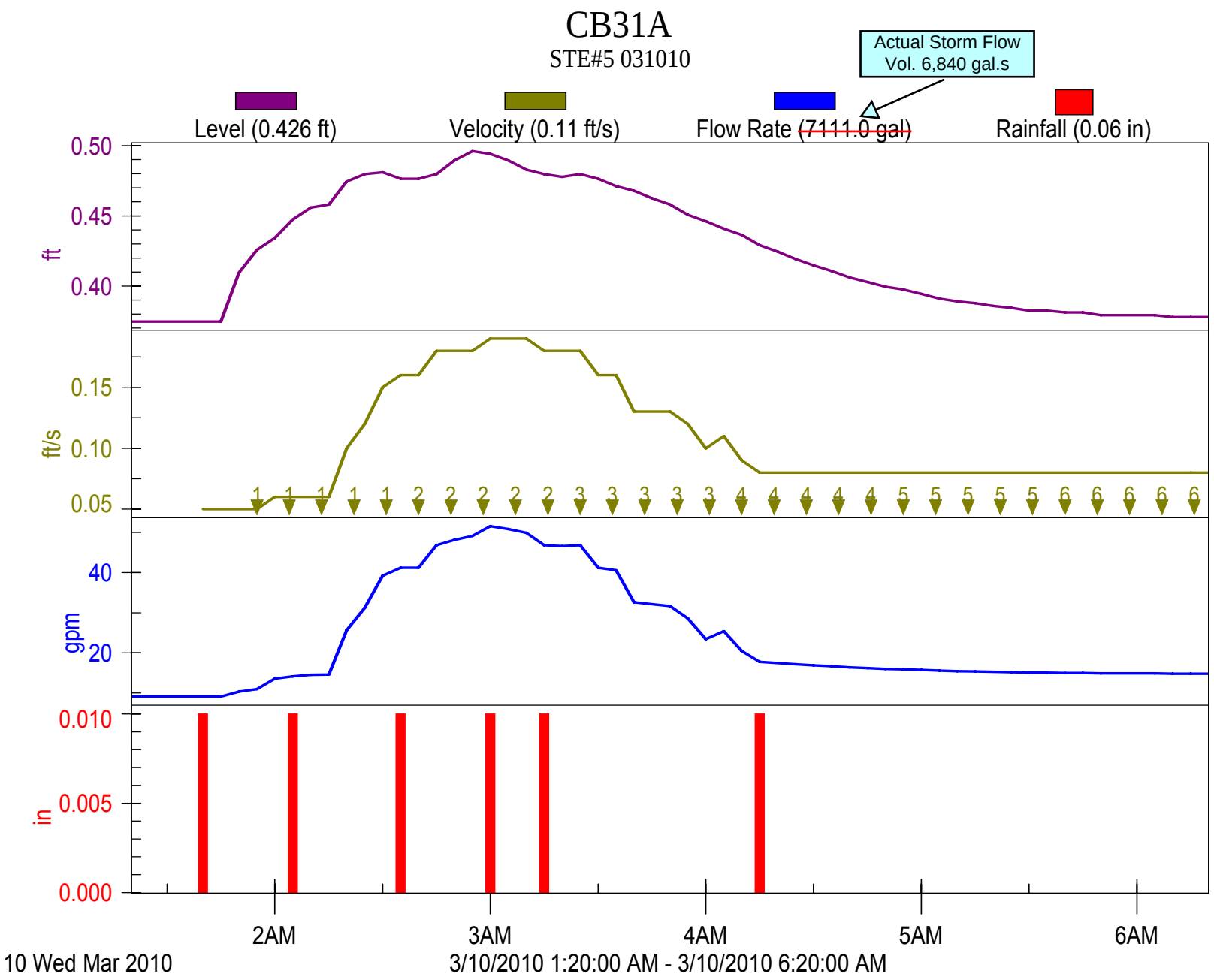
POS - Lora Lake Apartments Stormwater Interim Action

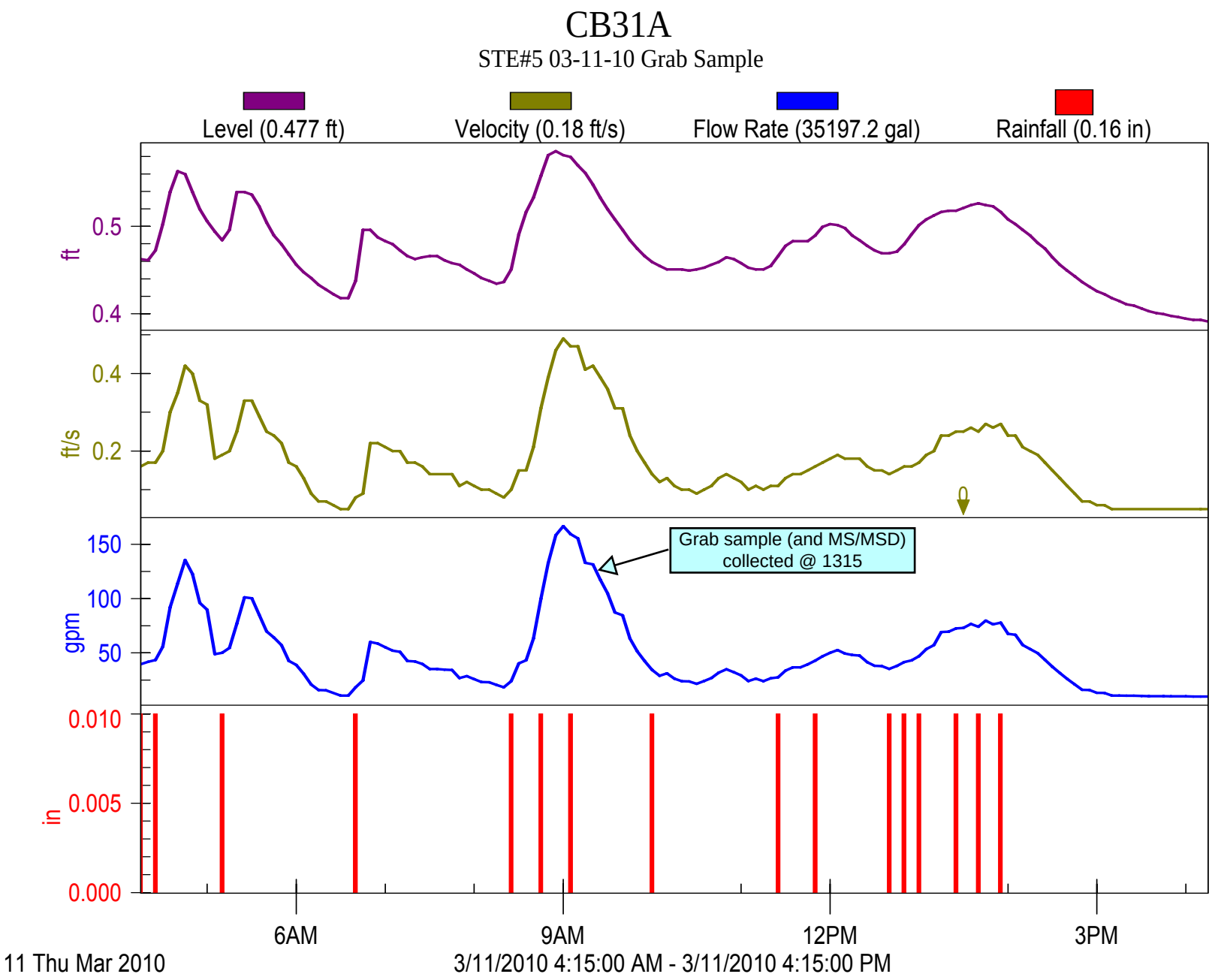
Groundwater Level Measurement Field Form

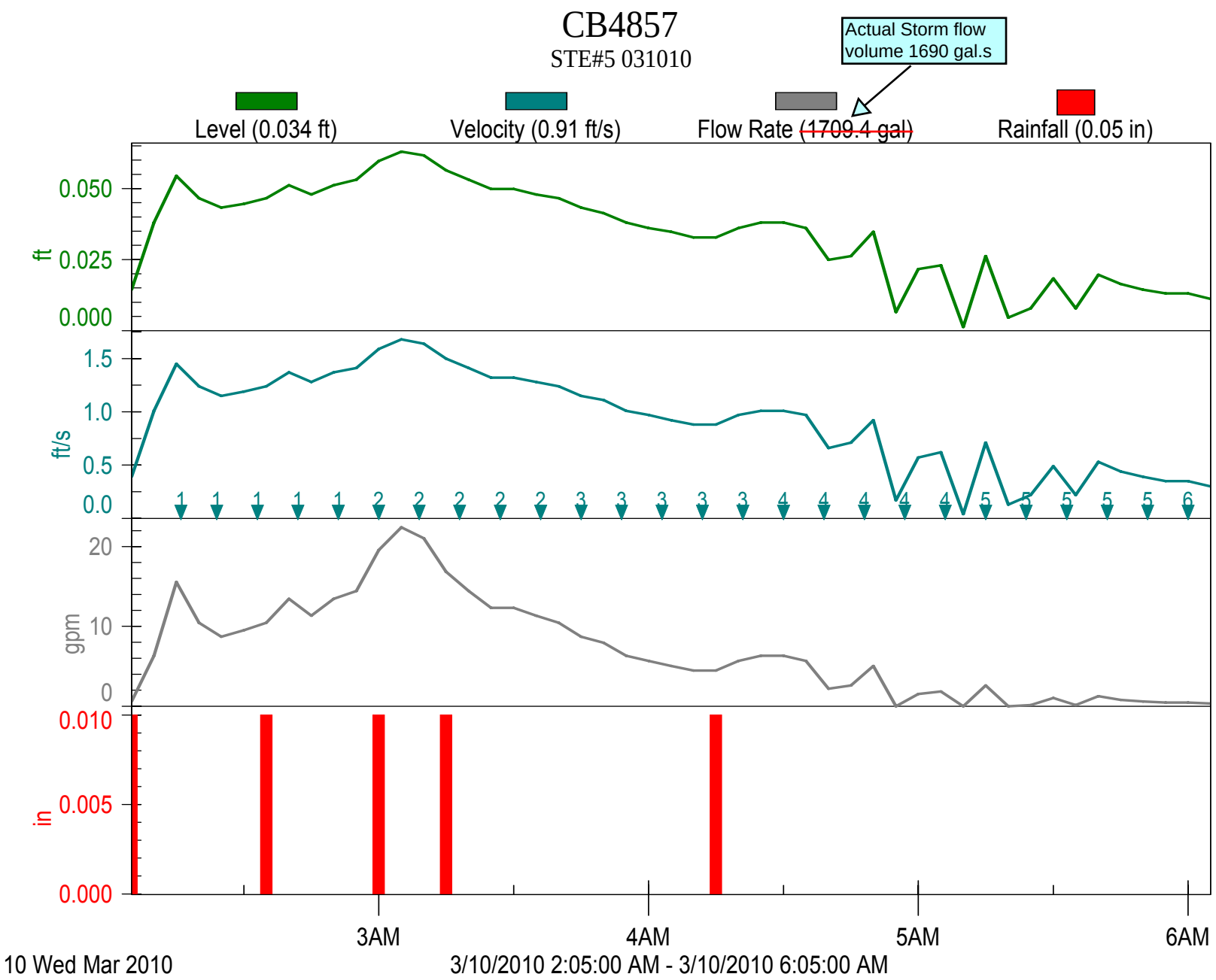
Personnel: Peter Heltzel	**Arrival Date/Time:** 3/10/10 11:45
Weather: Mostly sunny / cool	
Precip in Last 24-hrs / Last Measureable Rain Event: 0.08"	

Monitoring Well ID	Time	Water Level (FT)	Meas. Reference
MW-6	11:51	11.79	Top PVC casing
MW-4	11:57	16.21	↓
MW-3	12:02	17.17	↓
MW-2	12:07	6.69	↓

Notes: MW-2 new to measurement tasks this round – replaced measurement collected @ MW-1 (due to product) and MW-5 (reported to have physical well issues? per Floyd/Snider)

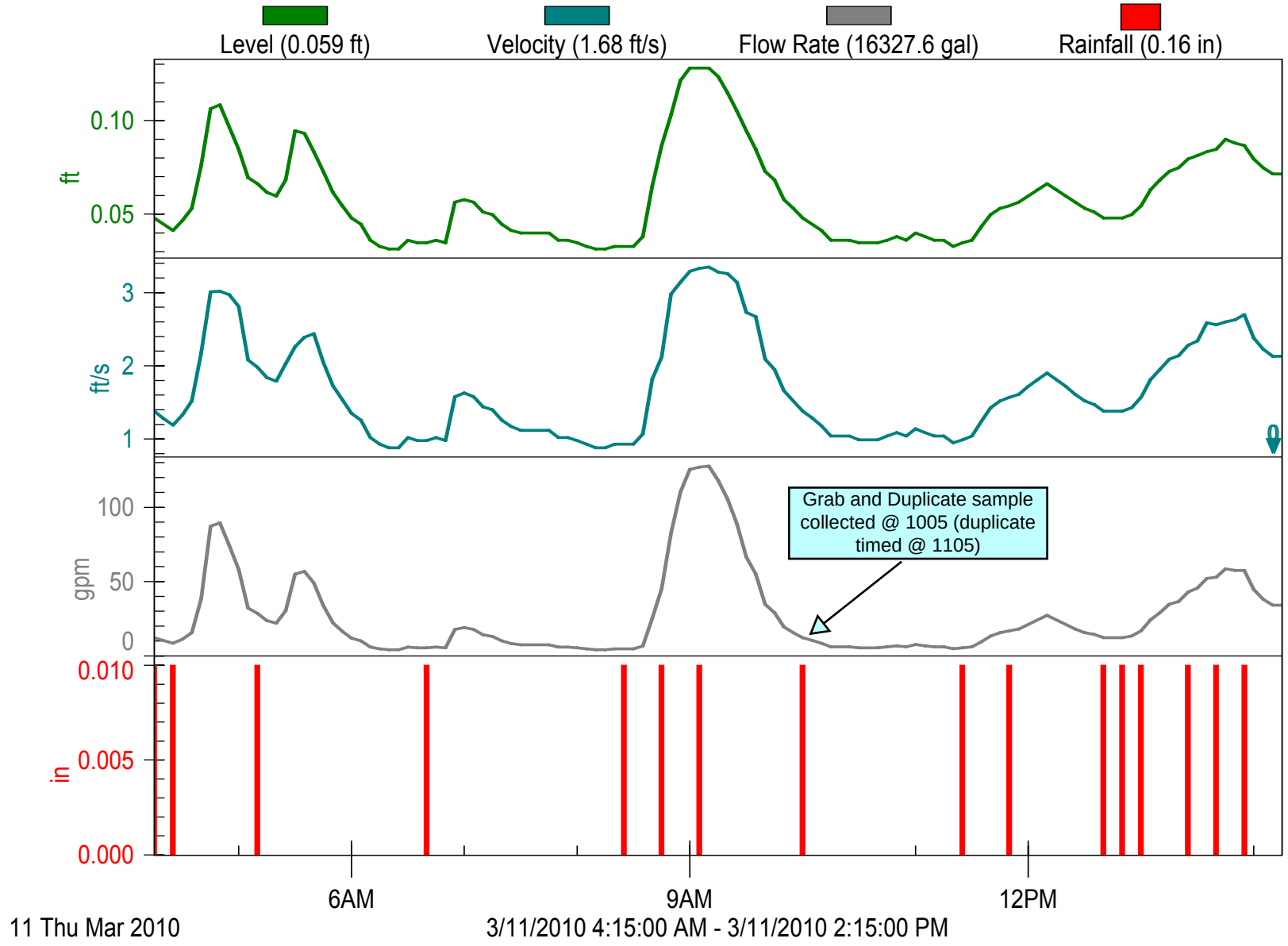

CB31A
STE#5 031010
Actual Storm Flow
Vol. 6,840 gal.s
Level (0.426 ft)
Velocity (0.11 ft/s)
Flow Rate (7111.0 gal)
Rainfall (0.06 in)
0.50
0.45
0.40
ft
0.15
0.10
0.05
ft/s
40
20
gpm
0.010
0.005
0.000
in
2AM
3AM
4AM
5AM
6AM
10 Wed Mar 2010
3/10/2010 1:20:00 AM - 3/10/2010 6:20:00 AM

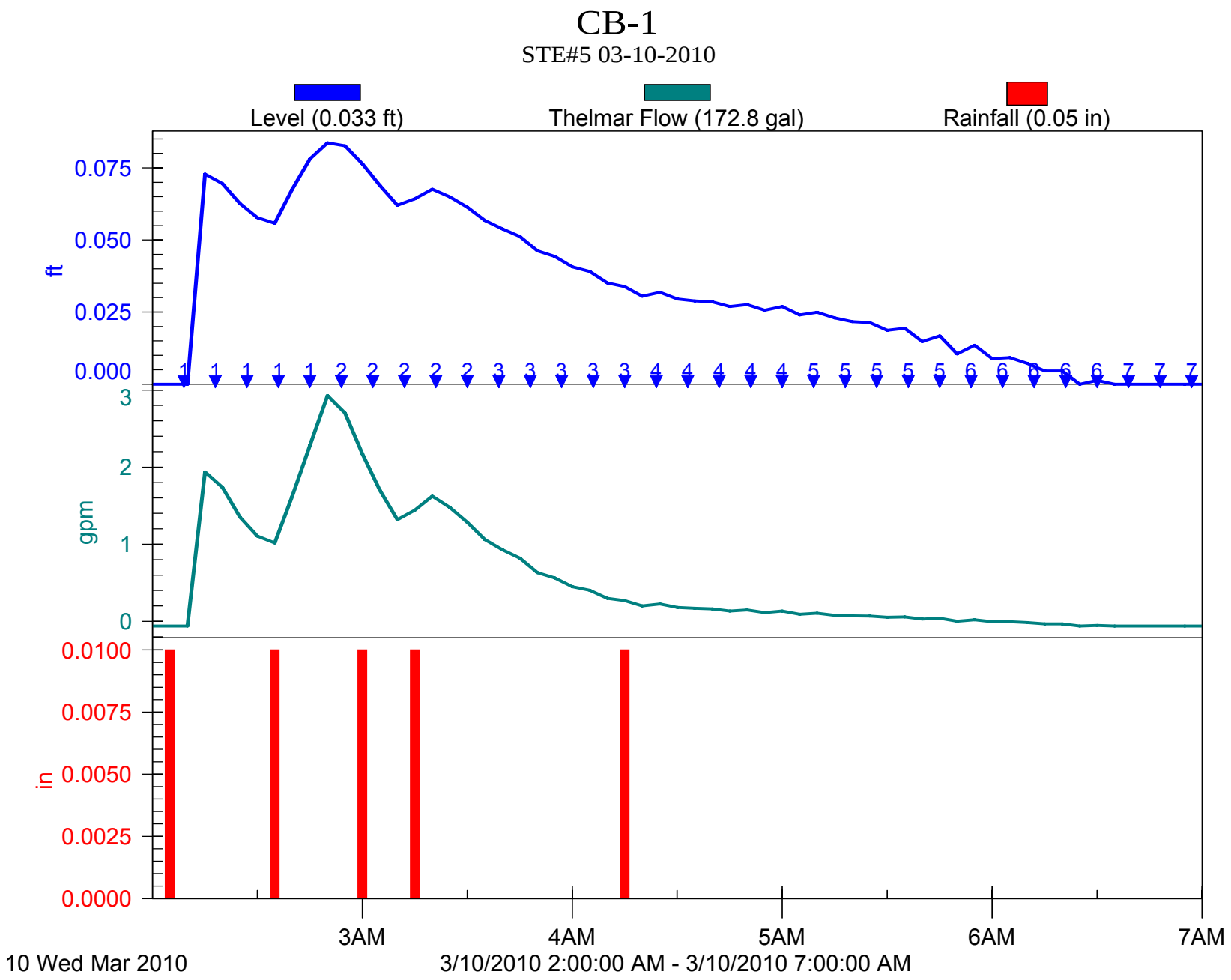

CB31A
STE#5 03-11-10 Grab Sample
Level (0.477 ft)
Velocity (0.18 ft/s)
Flow Rate (35197.2 gal)
Rainfall (0.16 in)
ft
0.5
0.4
ft/s
0.4
0.2
0
gpm
150
100
50
Grab sample (and MS/MSD)
collected @ 1315
in
0.010
0.005
0.000
6AM
9AM
12PM
3PM
11 Thu Mar 2010
3/11/2010 4:15:00 AM - 3/11/2010 4:15:00 PM


CB4857
STE#5 031010
Actual Storm flow volume 1690 gal.s
Level (0.034 ft)
Velocity (0.91 ft/s)
Flow Rate (1709.4 gal)
Rainfall (0.05 in)
ft
0.050
0.025
0.000
ft/s
1.5
1.0
0.5
0.0
gpm
20
10
0
in
0.010
0.005
0.000
3AM
4AM
5AM
6AM
10 Wed Mar 2010
3/10/2010 2:05:00 AM - 3/10/2010 6:05:00 AM

CB4857

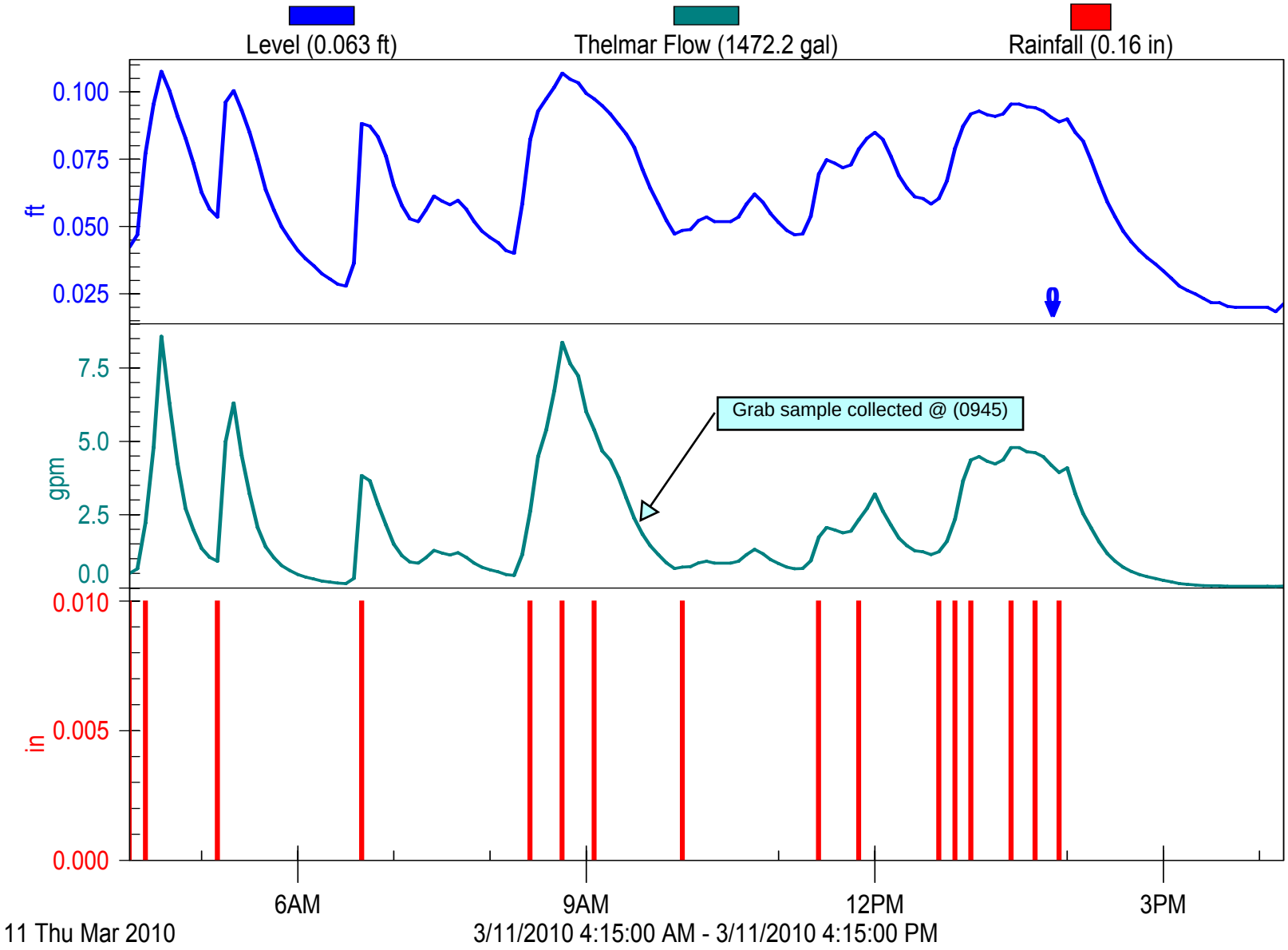
STE#5 031110 Grab-only




CB-1
STE#5 03-10-2010
Level (0.033 ft)
Thelmar Flow (172.8 gal)
Rainfall (0.05 in)
ft
0.075
0.050
0.025
0.000
gpm
3
2
1
0
in
0.0100
0.0075
0.0050
0.0025
0.0000
3AM
4AM
5AM
6AM
7AM
10 Wed Mar 2010
3/10/2010 2:00:00 AM - 3/10/2010 7:00:00 AM

CB-1

STE#5 03-11-2010 Grab-only



CB31A - STE#5 031010

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
1030	0.476851852	1335	**1**	15.06%	15.06%	14.48%
2160	1	2800	**2**	31.58%	46.64%	30.38%
1515	0.701388889	1964	**3**	22.15%	68.79%	21.31%
770	0.356481481	998	**4**	11.26%	80.04%	10.83%
690	0.319444444	894	**5**	10.09%	90.13%	9.70%
675	0.3125	875	**6**	9.87%	100.00%	9.49%
	0	0	**7**	0.00%	100.00%	0.00%
	0	0	**8**	0.00%	100.00%	0.00%
	0	0	**9**	0.00%	100.00%	0.00%
	0	0	**10**	0.00%	100.00%	0.00%
	0	0	**11**	0.00%	100.00%	0.00%
	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		**96.19%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	6840
Strm Qtot (gals)	7111
max Q	2160
min V (ml)	2800

8867 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
** Vol includes enough sample for MS/MSD analysis
Used bottles 1-6, the remainder represented baseflow conditions

COMP Label = CB31A031010COMP **TIME (0616)**

CB4857 - STE#5 031010

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
490	0.685314685	1316	**1**	28.99%	28.99%	28.67%
715	1	1920	**2**	42.31%	71.30%	41.84%
290	0.405594406	779	**3**	17.16%	88.46%	16.97%
160	0.223776224	430	**4**	9.47%	97.93%	9.36%
35	0.048951049	94	**5**	2.07%	100.00%	2.05%
	0	0	**6**	0.00%	100.00%	0.00%
	0	0	**7**	0.00%	100.00%	0.00%
	0	0	**8**	0.00%	100.00%	0.00%
	0	0	**9**	0.00%	100.00%	0.00%
	0	0	**10**	0.00%	100.00%	0.00%
	0	0	**11**	0.00%	100.00%	0.00%
	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		**98.89%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	1690
Strm Qtot (gals)	1709
max Q	715
min V (ml)	1920

4538 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Used bottles 1-4, the remainder represented baseflow conditions
Collected a duplicate from this station. See CB101 comp sheet for details.

Comp Label = CB4857031010COMP **(Time = 0551)**

CB101- STE#5 031010 (DUPLICATE of CB4857)

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
490	0.685314685	1316	**1**	28.99%	28.99%	28.67%
715	1	1920	**2**	42.31%	71.30%	41.84%
290	0.405594406	779	**3**	17.16%	88.46%	16.97%
160	0.223776224	430	**4**	9.47%	97.93%	9.36%
35	0.048951049	94	**5**	2.07%	100.00%	2.05%
	0	0	**6**	0.00%	100.00%	0.00%
	0	0	**7**	0.00%	100.00%	0.00%
	0	0	**8**	0.00%	100.00%	0.00%
	0	0	**9**	0.00%	100.00%	0.00%
	0	0	**10**	0.00%	100.00%	0.00%
	0	0	**11**	0.00%	100.00%	0.00%
	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		**98.89%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	1690
Strm Qtot (gals)	1709
max Q	715
min V (ml)	1920

4538 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
CB101 is a duplicate of CB4857
Used bottles 1-4, the remainder represented baseflow conditions

Comp Label = CB101031010COMP **(Time = 0651)**

CB1 - STE#5 031010

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
55.3	0.664264264	1461	**1**	31.40%	31.40%	31.42%
83.25	1	2200	**2**	47.27%	78.68%	47.30%
27.1	0.325525526	716	**3**	15.39%	94.07%	15.40%
7.45	0.089489489	197	**4**	4.23%	98.30%	4.23%
3	0.036036036	79	**5**	1.70%	100.00%	1.70%
	0	0	**6**	0.00%	100.00%	0.00%
	0	0	**7**	0.00%	100.00%	0.00%
	0	0	**8**	0.00%	100.00%	0.00%
	0	0	**9**	0.00%	100.00%	0.00%
	0	0	**10**	0.00%	100.00%	0.00%
	0	0	**11**	0.00%	100.00%	0.00%
	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		**100.06%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	176.1
Strm Qtot (gals)	176
max Q	83.25
min V (ml)	2200

4654 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Used bottles 1-5, the remainder represented baseflow conditions

Comp Label = CB1031010COMP **(Time = 0545)**

CB31A 031010

SAMPLER ID# 1069569980 10:50 10-MAR-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB31A SMP "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 20 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 9 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1069569980 10:50 10-MAR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB31A SMP
PROGRAM: LLA MULTI
Program Started at 17:53 TU 9-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		17:53	PGM DISABLED		
----------		WE 10-MAR-10	----------		
		01:55	PGM ENABLED		
1,5	1	01:55	E		564
2,5	1	02:04	T		572
3,5	1	02:13	T		570
4,5	1	02:22	T		573
5,5	1	02:31	T		584
1,5	2	02:40	T		578
2,5	2	02:49	T		579
3,5	2	02:58	T		585
4,5	2	03:07	T		609
5,5	2	03:16	T		584
1,5	3	03:25	T		579
2,5	3	03:34	T		579
3,5	3	03:43	T		585
4,5	3	03:52	T		587
5,5	3	04:01	T		581
1,5	4	04:10	T		585
2,5	4	04:19	T		582
3,5	4	04:28	T		585
4,5	4	04:37	T		585
5,5	4	04:46	T		585
1,5	5	04:55	T		585
2,5	5	05:04	T		585
3,5	5	05:13	T		585

4,5	5	05:22	T	585
5,5	5	05:31	T	585
1,5	6	05:40	T	585
2,5	6	05:49	T	585
3,5	6	05:58	T	581
4,5	6	06:07	T	584
5,5	6	06:16	T	585
1,5	7	06:25	T	585
2,5	7	06:34	T	591
3,5	7	06:43	T	585
4,5	7	06:52	T	591
5,5	7	07:01	T	582
1,5	8	07:10	T	582
2,5	8	07:19	T	582
3,5	8	07:28	T	585
4,5	8	07:37	T	585
5,5	8	07:46	T	591
1,5	9	07:55	T	587
2,5	9	08:04	T	581
3,5	9	08:13	T	584
4,5	9	08:22	T	591
5,5	9	08:31	T	584
1,5	10	08:40	T	585
2,5	10	08:49	T	585
3,5	10	08:58	T	585
4,5	10	09:07	T	591
5,5	10	09:16	T	584
1,5	11	09:25	T	591
2,5	11	09:34	T	584
3,5	11	09:43	T	585
4,5	11	09:52	T	593
5,5	11	10:01	T	584
1,5	12	10:10	T	585
2,5	12	10:19	T	588
3,5	12	10:28	T	587
4,5	12	10:37	T	4
5,5	12	10:46	T	591
		10:47	PGM DONE 10-MAR	

SOURCE E ==> ENABLE
SOURCE T ==> TIME

CB4857 031010

SAMPLER ID# 1224319970 11:06 10-MAR-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB4857 SMP"

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 26 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 9 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

0.01 inch TIP
RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224319970 11:06 10-MAR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB4857 SMP
PROGRAM: LLA MULTI
Program Started at 17:38 TU 9-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		17:38	PGM DISABLED		
----------		WE 10-MAR-10	----------		
		02:14	PGM ENABLED		
1,5	1	02:14	E		664
2,5	1	02:23	T		666
3,5	1	02:32	T		670
4,5	1	02:41	T		672
5,5	1	02:50	T		674
1,5	2	02:59	T		673
2,5	2	03:08	T		672
3,5	2	03:17	T		677
4,5	2	03:26	T		676
5,5	2	03:35	T		674
1,5	3	03:44	T		672
2,5	3	03:53	T		672
3,5	3	04:02	T		682
4,5	3	04:11	T		674
5,5	3	04:20	T		673
1,5	4	04:29	T		676
2,5	4	04:38	T		672
3,5	4	04:47	T		670
4,5	4	04:56	T		674
5,5	4	05:05	T		666
1,5	5	05:14	T		672
2,5	5	05:23	T		720
3,5	5	05:32	T		706

CB4857 031010

4,5	5	05:41	T	673
5,5	5	05:50	T	666
1,5	6	05:59	T	672
2,5	6	06:08	T	678
3,5	6	06:17	T	664
4,5	6	06:26	T	668
5,5	6	06:35	T	762
1,5	7	06:44	T	768
2,5	7	06:53	T	762
3,5	7	07:02	T	748
4,5	7	07:11	T	768
5,5	7	07:20	T	682
1,5	8	07:29	T	760
2,5	8	07:38	T	688
3,5	8	07:47	T	682
4,5	8	07:56	T	774
5,5	8	08:05	T	760
1,5	9	08:14	T	766
2,5	9	08:23	T	766
3,5	9	08:32	T	766
4,5	9	08:41	T	756
5,5	9	08:50	T	776
1,5	10	08:59	T	742
2,5	10	09:08	T	766
3,5	10	09:17	T	778
4,5	10	09:26	T	760
5,5	10	09:35	T	774
1,3	11	09:44	T	742
2,3	11	09:53	T	776
3,3	11	10:02	T	774
		10:03	MANUAL PAUSE	
		10:03	PGM STOPPED 10-MAR	

SOURCE E ==> ENABLE
SOURCE T ==> TIME

```
SAMPLER ID# 1072249987  09:26 10-MAR-10
  Hardware: A1      Software: 2.20
********** PROGRAM SETTINGS **********
     ----------
   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1-MEGA  "
     ----------
   UNITS SELECTED:
     LENGTH: ft


     ----------
   UNITS SELECTED:
   FLOW RATE: gpm
  FLOW VOLUME: gal
   VELOCITY: fps
     ----------
  AREA-VEL MODULE:
        WEIR
        90
      V-NOTCH
     ----------

      5 MINUTE
   DATA INTERVAL

     ----------
  12,  3750 ml BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES
     ----------

  ONE-PART PROGRAM


     ----------
      PACING:
    TIME, EVERY
 0 HOURS,  9 MINUTES
```

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.030 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF

BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1072249987 09:26 10-MAR-10
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********
SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 17:20 TU 9-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		17:20	PGM DISABLED		
		WE 10-MAR-10			
		02:09	PGM ENABLED		
1,5	1	02:09	E		445
2,5	1	02:18	T		443
3,5	1	02:27	T		443
4,5	1	02:36	T		443
5,5	1	02:45	T		443
1,5	2	02:54	T		447
2,5	2	03:03	T		443
3,5	2	03:12	T		443
4,5	2	03:21	T		443
5,5	2	03:30	T		443
1,5	3	03:39	T		447
2,5	3	03:48	T		447
3,5	3	03:57	T		447
4,5	3	04:06	T		447
5,5	3	04:15	T		447
1,5	4	04:24	T		447
2,5	4	04:33	T		447
3,5	4	04:42	T		447

4,5	4	04:51	T		447
5,5	4	05:00	T		447
1,5	5	05:09	T		447
2,5	5	05:18	T		447
3,5	5	05:27	T		447
4,5	5	05:36	T		447
5,5	5	05:45	T		447
1,5	6	05:54	T		447
2,5	6	06:03	T		447
3,5	6	06:12	T		447
4,5	6	06:21	T		447
5,5	6	06:30	T		447
1,5	7	06:39	T		447
2,5	7	06:48	T		447
3,5	7	06:57	T		447
4,5	7	07:06	T		447
5,5	7	07:15	T		447
1,5	8	07:24	T	NM	*
2,5	8	07:33	T	NL	*
3,5	8	07:42	T	NL	*
4,5	8	07:51	T	NL	*
5,5	8	08:00	T	NL	*
1,5	9	08:09	T	NL	*
2,5	9	08:18	T	NL	*
3,5	9	08:27	T	NL	*
4,5	9	08:36	T	NL	*
5,5	9	08:45	T	NL	*
1,3	10	08:54	T	NL	*
2,3	10	09:03	T	NL	*
3,3	10	09:12	T	NL	*
		09:12	MANUAL PAUSE		
		09:14	MANUAL RESUME		
		09:15	MANUAL PAUSE		
		09:15	PGM STOPPED 10-MAR		

SOURCE E ==> ENABLE
SOURCE T ==> TIME
ERROR NL ==> NO LIQUID DETECTED!
ERROR NM ==> NO MORE LIQUID!

National Weather Service
Seattle,WA

Print This Page Go Back | Version: **Current** 1 2 3 4 5 6 7 8 9 10 | Font: A **A** A | **Product FAQ**

AREA FORECAST DISCUSSION

FXUS66 KSEW 100543
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
940 PM PST TUE MAR 9 2010

.SYNOPSIS...A WEAKENING FRONTAL SYSTEM WILL MOVE THROUGH THE AREA OVERNIGHT. THE PRECIPITATION MAY MIX WITH SNOW...MAINLY AROUND THE HOOD CANAL. SHOWERS WILL TAPER OFF WEDNESDAY WITH SOME SUN BREAKS IN THE AFTERNOON. A SERIES OF STRONGER SYSTEMS WILL AFFECT THE AREA BEGINNING LATE WEDNESDAY NIGHT AND LASTING THROUGH FRIDAY. SHOWERS WILL BE IN PLACE FRIDAY NIGHT AND SATURDAY...WITH SHORTWAVE RIDGING BUILDING OVERHEAD SATURDAY NIGHT. A FRONTAL SYSTEM WILL STALL ALONG THE COAST ON SUNDAY.

&&

.SHORT TERM...SATELLITE IMAGERY SHOWS FRONT ALONG THE COAST THIS EVENING. JET CONTINUES TO BE AIMED DOWN INTO NORTHERN CALIFORNIA WHICH IS STRETCHING OUT AND WEAKENING THE FRONT AS IT MOVES INLAND. WITH THE EXCEPTION OF A BRIEF BURST OF HEAVY RAIN AT ASTORIA...PRECIPITATION AMOUNTS SO FAR HAVE BEEN LIGHT WITH ALL LOCATIONS IN WESTERN WASHINGTON REPORTING LESS THAN A TENTH OF AN INCH SO FAR. WITH THE FRONT WEAKENING DO NOT EXPECT THE PRECIPITATION RATES TO PICK UP MUCH AS THE FRONT MOVES INTO THE CASCADES BY LATE TONIGHT. ARO PROFILER AT WESTPORT SHOWS THE SNOW LEVEL WITH THE FRONT RIGHT AROUND 1200 FEET. THE AIR MASS REMAINS FAIRLY DRY OVER THE INTERIOR OF WESTERN WASHINGTON WITH DEW POINTS BELOW FREEZING IN MANY LOCATIONS. WITH THE DRY AIR IN PLACE WITH THE ONSET OF PRECIPITATION THE TEMPERATURES WILL FALL BUT WITH THE PRECIPITATION RATES SO LIGHT THE PRECIPITATION TYPE WILL HAVE A HARD TIME CHANGING OVER TO SNOW. THE EXCEPTION TO THIS WILL BE NEAR THE HOOD CANAL. ALL OF THE PROFILIERS...SANDPOINT...WESTPORT AND SPANAWAY SHOW SE WINDS FROM THE SURFACE UP TO 1500 FEET. COOL AIR ALREADY IN PLACE WITH KPWT AT 36 DEGREES AND KSHN AT 35 DEGREES AND DROPPING WITH RAIN ALREADY STARTING. THE SOUTHEASTERLY WINDS OFF THE GROUND WILL ADD A LITTLE UPSLOPE COMPONENT INTO THE OLYMPICS. THIS COMBINED WITH THE COOL AIR POCKET COULD BE ENOUGH TO PUSH THE PRECIPITATION TYPE OVER TO SNOW. WILL KEEP THE SNOW ADVISORY GOING FOR NOW BUT UPDATE THE ZONES TO REMOVE THE POSSIBILITY OF SNOW ACCUMULATIONS ELSEWHERE. UPPER LEVEL TROUGH FOLLOWING THE FRONT MOVING THROUGH WESTERN WASHINGTON 09Z-15Z BUT MOST OF THE SHOWER

ACTIVITY BEHIND THE FRONT IS GETTING PULLED SOUTHEAST DOWN INTO OREGON. WITH THE TROUGH AXIS MOVING THROUGH WILL KEEP A CHANCE OF SHOWERS IN THE FORECAST. SOME WEAK CONVERGENCE POSSIBLE OVER THE CENTRAL SOUND WEDNESDAY MORNING AS WELL. A SMALL BREAK IN THE PRECIPITATION WEDNESDAY AFTERNOON WITH THE PRECIPITATION OUT AHEAD OF THE NEXT FRONT REACHING THE WASHINGTON COAST WEDNESDAY EVENING AND SPREADING INLAND OVERNIGHT INTO THURSDAY MORNING. 00Z MODEL RUNS HAVE CONTINUED WITH THE IDEA OF THE FRONT ACTUALLY DROPPING SOUTH INTO OREGON DURING THE DAY ON THURSDAY BEFORE LIFTING BACK UP AGAIN OVER THE AREA ON FRIDAY MAKING FRIDAY THE WETTEST DAY OF THE TWO. FELTON

.LONG TERM...PREVIOUS DISCUSSION FOLLOWS. MODELS IN GOOD AGREEMENT IN POST FRONTAL ENVIRONMENT FOR SATURDAY WITH SHOWERS SLOWLY DIMINISHING THROUGH THE DAY AS SHORTWAVE RIDGING BUILDS IN THE AFTERNOON. WARM FRONTAL PRECIPITATION FROM THE NEXT SYSTEM BEGINS TO BRUSH THE COAST SUNDAY MORNING. ECMWF BUILDS THE RIDGE OVER E WA/MT STANDING UP THE FRONT ON SUNDAY WHILE GFS PUSHES PRECIP FURTHER INLAND. FOR NOW HAVE CONTINUED TO KEEP THE INTERIOR DRY. AS A DEEP TROUGH DEVELOPS OVER THE NE PACIFIC...A SERIES OF SYSTEMS WILL LIFT NORTH OFF THE COASTAL WATERS. THE PLACEMENT VARIES WITH MODEL CHOICE...BUT GENERAL PATTERN WILL BE SOUTHWEST FLOW ALOFT WITH A BETTER CHANCE OF LIGHT RAIN FURTHER WEST THROUGH EARLY NEXT WEEK. DAMICO

&&

.HYDROLOGY...SPLITTING FRONTAL SYSTEM WILL PUSH INLAND TONIGHT DROPPING LIGHT AMOUNTS OF PRECIP MOSTLY IN THE FORM OF SNOW ACROSS HIGHER TERRAIN. NEXT SYSTEM ASSOCIATED WITH A DEEPENING LOW PRES SYSTEM IN THE NE PACIFIC WILL BRING A MORE CONSOLIDATED BOUT OF PRECIPITATION BEGINNING WEDNESDAY NIGHT. STRONG S-SW FLOW OROGRAPHIC ENHANCEMENT WILL HELP PRODUCE UP TO AN INCH AND A HALF OF PRECIPITATION OVER THE OLYMPICS AND NORTH CASCADES IN A 12 HOUR PERIOD. THE FRONT DROPS SOUTH ON THURSDAY WITH COOLER AIR MOVING OVER WESTERN WASHINGTON. AS THE FRONT LIFTS BACK TO THE NORTH ON FRIDAY THE COMBINATION OF THE AIR MASS NOT WARMING UP MUCH AND PRECIPITATION AMOUNTS NOW ONLY IN THE ONE AND HALF INCH RANGE AGAIN FOR THE OLYMPICS AND NORTHERN CASCADES REDUCES THE FLOOD THREAT. MODEL SOLUTIONS HAVE NOT BEEN CONSISTENT WITH THE SCENARIO FOR THURSDAY AND FRIDAY SO WILL KEEP AN EYE ON IT BUT THIS CURRENT SOLUTION DOES NOT LOOK LIKE IT WILL CAUSE ANY FLOODING PROBLEMS EVEN IN THE OLYMPICS. SHOWERY WEATHER WILL FOLLOW FRIDAY NIGHT AND SATURDAY WITH A BREAK IN THE ACTION THROUGH EARLY SUNDAY. A DEEP TROUGH WILL SET UP IN THE NE PACIFIC DIRECTING A SERIES OF SYSTEMS IN MILDER SW FLOW TOWARD THE REGION. PLACEMENT AND TIMING OF HEAVIER PRECIP IS VERY UNCERTAIN AT THIS TIME.

AT THIS TIME THE FLOOD THREAT IS LOW ALONG THE GREEN RIVER FOR THE NEXT 10 DAYS. DAMICO/FELTON

&&

.AVIATION...A COLD FRONT ALONG THE COAST WILL MOVE INLAND TONIGHT. FROPA TIMING IS AROUND 09Z INTERIOR. OVERALL...MAINLY EXPECTING LIGHT OFF-AND-ON SHOWERS OCCASIONALLY LOWERING CIGS INTO THE MVFR RANGE. THE SHARP UPPER LEVEL TROUGH AXIS WILL SHIFT EAST OF THE CASCADES WED MORNING...BUT WEAK CONVERGENCE MAY DEVELOP OVER THE NORTH SOUND /KPAE AREA/. OTHERWISE WILL DRY OUT WITH THE FLOW BECOMING OFFSHORE. RAIN WILL INCREASE ONCE AGAIN WED NIGHT AS THE NEXT SYSTEM DROPS DOWN FROM B.C. 33

KSEA...LIGHT RAIN ACROSS THE REGION TONIGHT WITH MAINLY VFR CONDITIONS. THE COLD FRONT WILL PASS THROUGH THE INTERIOR AROUND 09Z. WINDS WILL REMAIN SLY. DRIER WEATHER ON TAP FOR WED AFTERNOON...THEN RAIN INCREASING ONCE AGAIN WED NIGHT. 33

&&

.MARINE...A STRONG COLD FRONT OVER THE COASTAL WATERS WILL MOVE INLAND TONIGHT...WITH MOD ONSHORE FLOW DEVELOPING. UNTIL THEN STILL ANTICIPATING S/SE PRE-FRONTAL GALES ACROSS THE COASTAL WATERS AND ENTRANCES TO THE STRAIT. BRIEF GALES ALSO POSSIBLE IN THE NORTHERN INLAND WATERS. MEANWHILE...LARGE W SWELLS ARE REACHING THE AREA WITH SEAS OVER 20 FEET. WINDS WILL EASE LATE TONIGHT...BUT WILL LIKELY NEED TO COVER MOST WATERS WITH A SMALL CRAFT ADVISORY THROUGH THE MORNING HOURS. THE PATTERN WILL REMAIN ACTIVE THROUGH THE REST OF THE WEEK WITH ANOTHER VIGOROUS SYSTEM REACHING THE AREA WED NIGHT INTO THU...FOLLOWED BY ANOTHER SYSTEM ON FRI. 33

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...WINTER WEATHER ADVISORY HOOD CANAL.
     HIGH SURF ADVISORY COAST.
PZ...GALE WARNING COASTAL WATERS AND WEST AND EAST ENTRANCE JUAN DE FUCA...NORTHERN INLAND WATERS.
     SMALL CRAFT ADVISORY CENTRAL STRAIT AND ADMIRALTY INLET.
     SMALL CRAFT ADVISORY FOR ROUGH BAR GRAYS HARBOR BAR.

WWW.WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION PLEASE SEE WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML (ALL LOWERCASE).

Your National Weather Service forecast

Burien WA

Enter Your "City, ST" or zip code Go

BOOKMARK

NWS Seattle, WA

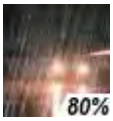
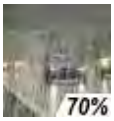
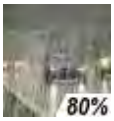
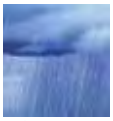
Point Forecast: Burien WA
47.48°N 122.31°W (Elev. 305 ft)

Mobile Weather Information | En Español

Last Update: 5:16 pm PST Mar 9, 2010

Forecast Valid: 12am PST Mar 10, 2010-6pm PDT Mar 16, 2010

Forecast at a Glance

Overnight	Wednesday	Wednesday Night	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night
								
Rain	Chance Showers	Chance Rain	Rain Likely	Rain Likely	Rain	Showers	Chance Showers	Mostly Cloudy
Lo 37 °F	Hi 50 °F	Lo 37 °F	Hi 46 °F	Lo 42 °F	Hi 52 °F	Lo 39 °F	Hi 49 °F	Lo 36 °F

Detailed 7-day Forecast

Overnight: Rain, mainly before 4am. Low around 37. South southwest wind between 6 and 10 mph. Chance of precipitation is 80%.

Wednesday: A 30 percent chance of showers before 10am. Mostly cloudy, with a high near 50. South southwest wind around 6 mph.

Wednesday Night: A 40 percent chance of rain after 10pm. Mostly cloudy, with a low around 37. South southwest wind around 9 mph.

Thursday: Rain likely. Cloudy, with a high near 46. South wind around 11 mph. Chance of precipitation is 70%.

Thursday Night: Rain likely. Cloudy, with a low around 42. South wind around 9 mph. Chance of precipitation is 60%.

Friday: Rain. High near 52. Chance of precipitation is 80%.

Friday Night: Showers. Low around 39. Chance of precipitation is 80%.

Saturday: A chance of showers. Mostly cloudy, with a high near 49.

Saturday Night: Mostly cloudy, with a low around 36.

Sunday: Partly sunny, with a high near 52.

Sunday Night: A chance of rain. Mostly cloudy, with a low around 43.

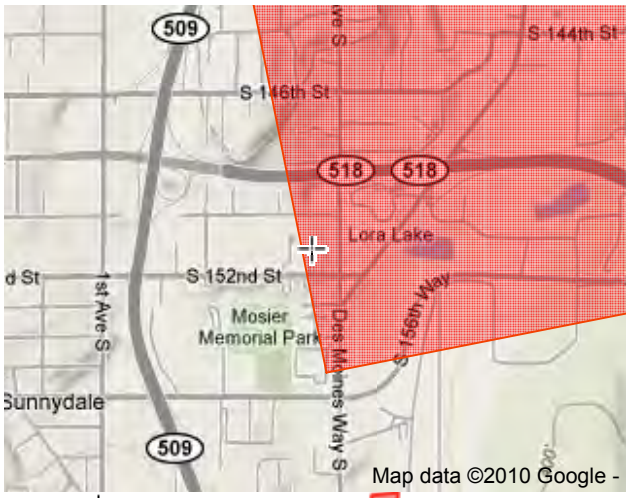
Monday: A chance of rain. Mostly cloudy, with a high near 55.

Monday Night: A chance of rain. Mostly cloudy, with a low around 43.

Tuesday: A chance of rain. Mostly cloudy, with a high near

Detailed Point Forecast [Move Down]

Click Map for Forecast Disclaimer



Requested Location Forecast Area

Lat/Lon: 47.48°N 122.31°W **Elevation:**305 ft

XML

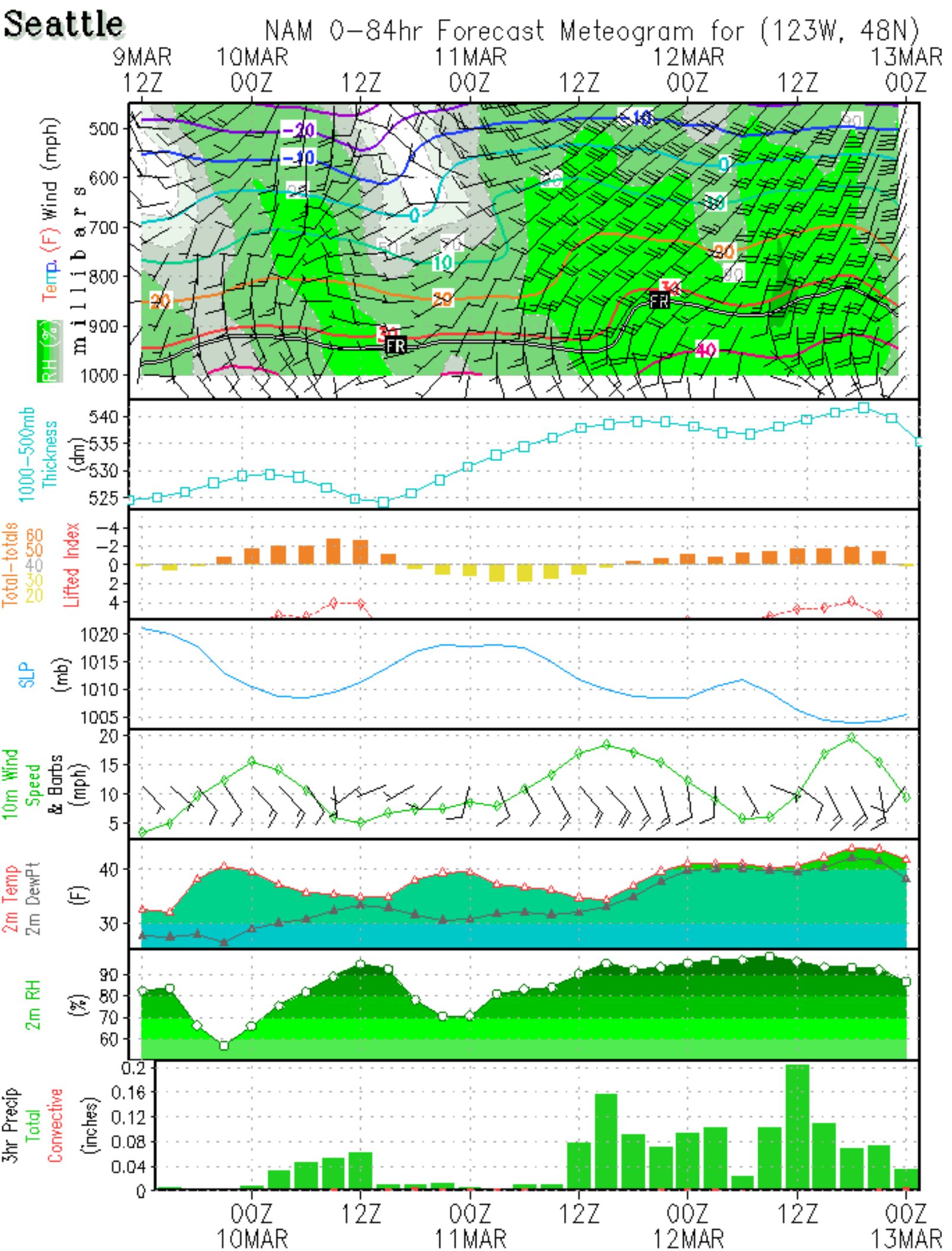
Current Conditions [Move Up]

Seattle, Seattle-Tacoma International Airport
Last Update on 09 Mar 21:53 PST

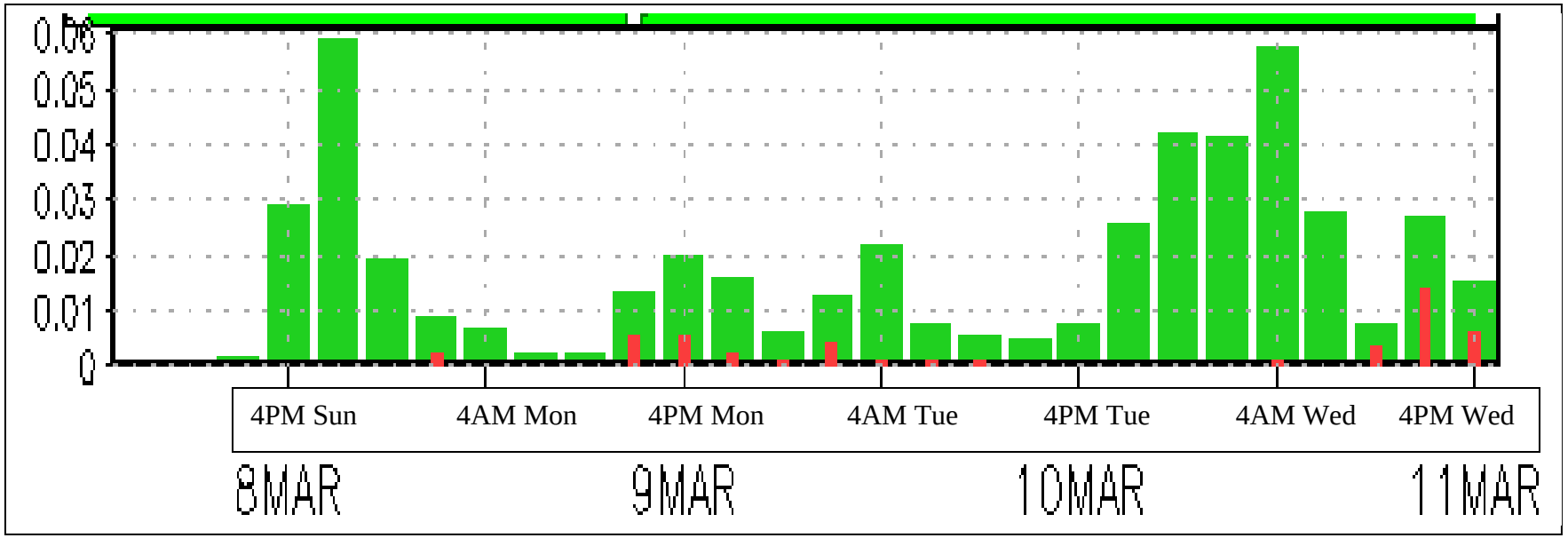
Overcast

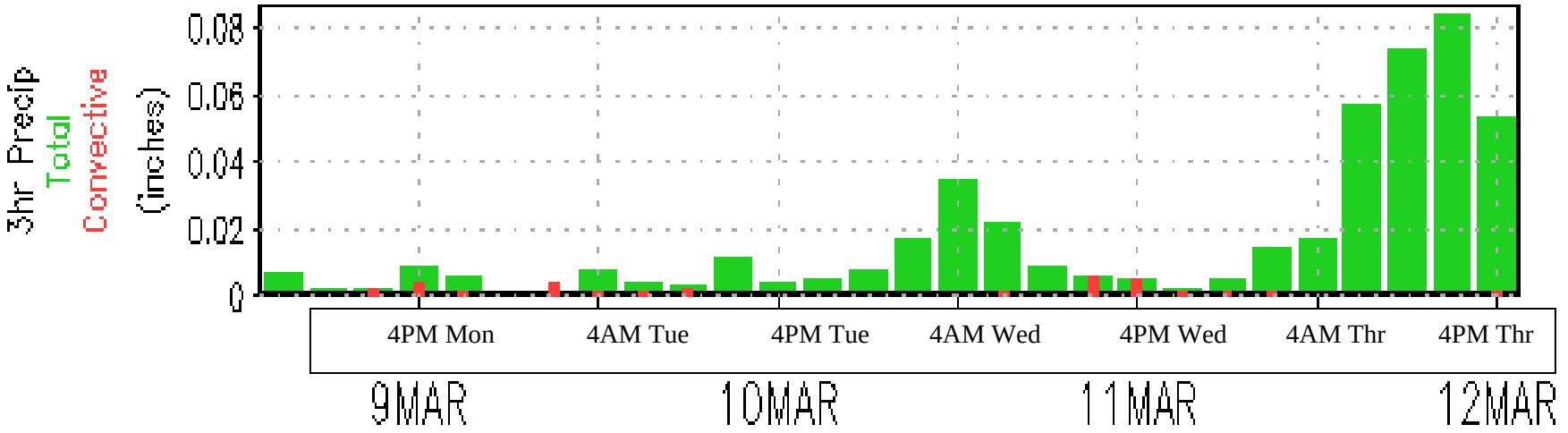
43°F

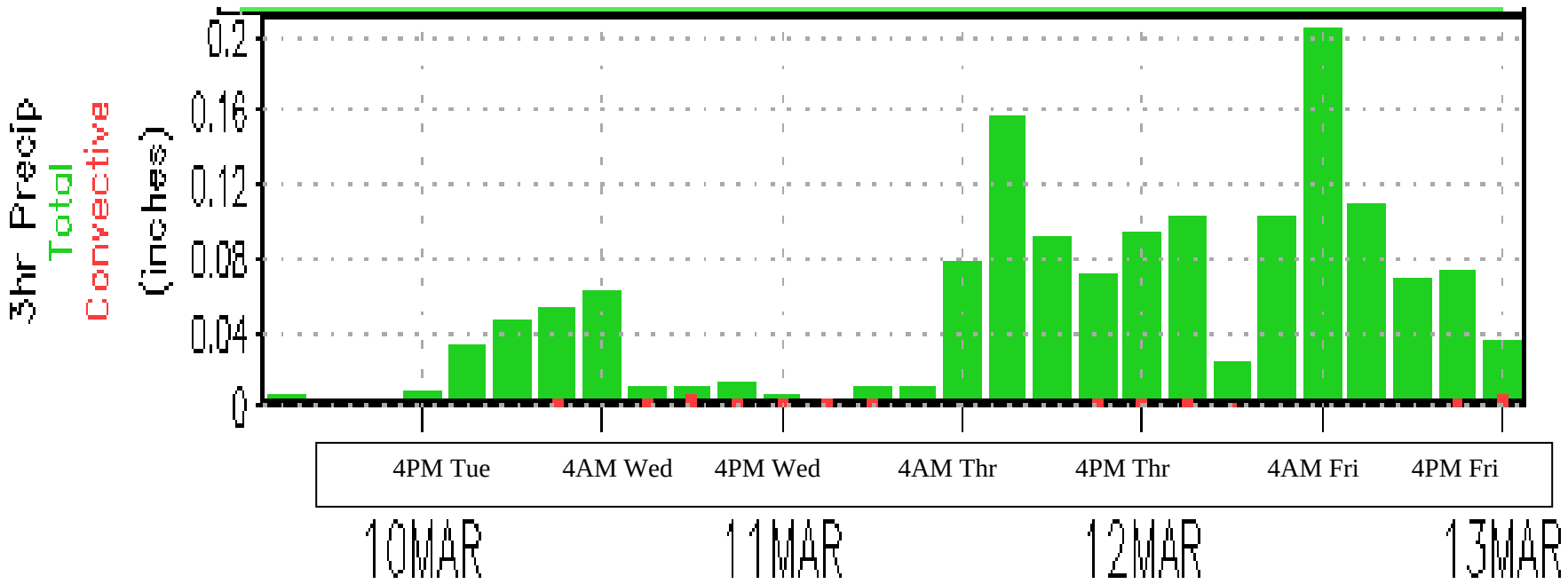
Humidity:	60 %
Wind Speed:	ESE 8 MPH
Barometer:	29.85 in (1011.70 mb)
Dewpoint:	30°F (-1°C)
Wind Chill:	38°F (3°C)


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
9MAR 12Z
10MAR 00Z
10MAR 12Z
11MAR 00Z
11MAR 12Z
12MAR 00Z
12MAR 12Z
13MAR 00Z
Temp. (F) Wind (mph)
RH (%)
millibars
500
600
700
800
900
1000
-20
-10
0
10
20
30
40
FR
1000-500mb Thickness
(dm)
540
535
530
525
Total-totals
Lifted Index
SLP
(mb)
1020
1015
1010
1005
10m Wind Speed & Barbs (mph)
20
15
10
5
2m Temp
2m DewPt
(F)
40
30
2m RH
(%)
90
80
70
60
3hr Precip
Total
Convective
(inches)
0.2
0.16
0.12
0.08
0.04
0
00Z 10MAR
12Z
00Z 11MAR
12Z
00Z 12MAR
12Z
00Z 13MAR

Lora Lake Apartments
Interim Stormwater Action
Weather forecast Meteogram
STE #5
March 7th – 13th






3hr Precip
Total
Convective
(inches)
0.2
0.16
0.12
0.08
0.04
0
4PM Tue
4AM Wed
4PM Wed
4AM Thr
4PM Thr
4AM Fri
4PM Fri
10MAR
11MAR
12MAR
13MAR

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	May 4, 2010
TO:	Matt Woltman / Megan McCullough
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600 Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409 (office) or 206-794-0095 (cell)
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #6 (03/25/2010)

Please find included the following:

- Storm report narrative (3 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- pH Worksheet (1 pg),
- Groundwater level measurement form, (1 pg)
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (2 pg),
- Sampler Reports (18 pgs), and
- Weather forecasting information (5 pgs).

Please let me know if you have any questions or need additional information. Thank You.

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

Dave Metallo, LHG , Project Manager

POS Lora Lake Apartments (LLA) Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #6
March 25th, 2010

Prior to the current sampling event an attempt was made to conduct a stormwater sampling event on March 16th. This attempt resulted in a false start due to the storm dissipating (producing only 0.05 inches) before the required number of grabs and composite samples could be collected.

As had been the case between STE#4 and #5, the weather during the middle period of the month (13th through the 24th) was relatively dry with a few periods of scattered showers and weak storm systems. Stormwater Sampling Event (STE) #6 occurred on March 25th, 2010. The storm that occurred on the 25th was a moderately strong and regionally organized system that produced 0.64 inches of rain over the project area. Detailed weather forecast information is attached to this report.

Storm and Sample Validation / Qualification:

All validation and qualification conditions for this storm event were met. These validation and qualification conditions included forecast probability, antecedent dry period, runoff occurrence / hydrograph stage, parameters collected, 75 % flow representation, minimum number of aliquots, pH measurement, quality control sample collection and anomalous conditions. See the accompanying *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding STE#6.

Grab Sampling, Autosampler Enabling and Composite Sampling:

The three sampling LLA Project sampling stations were CB31A (main line inlet), CB4857 (main line outlet) and CB1 (onsite system outlet). Grab samples were collected using Teflon-lined tubing, dedicated at each sampling station, which was attached to a point adjacent to the intake of the composite sampling line. A peristaltic pump was used to collect the grab samples through these dedicated lines at each station. All grabs were collected as early as possible during the storm event once runoff was noted and at points within the associated station hydrographs that were elevated above base flow conditions.

All three sampling stations were automatically enabled via the use of flow meters that were connected to autosamplers. The flow meters were pre-programmed to trigger sampling above certain pre-determined threshold set- point levels. These thresholds levels were determined based on an examination of pre-storm base-flow condition levels, known periodic or cyclic events (e.g. timed watering, construction pumping, etc. that occur in the basin) and runoff response from past events. CB31A and CB4857 used stand-alone in-pipe area-velocity sensors for sample triggering and direct measurement of water level in the pipe, flow velocity and flow volume. CB1 used an area-velocity sensor in combination with a Thel-Mar volumetric weir. At this location the area-velocity sensor was used only for direct measurement of level (calibrated to the weir crest). Flow volume was then post-calculated based on the acquired level data. All sampling and flow monitoring equipment operated as designed and programmed. The three sampling stations automatically level enabled within 34 minutes from the beginning of the storm event (3/25/10 03:35), with CB4857 and CB1 enabling within two minutes relative to each other.

Each of the three autosamplers were programmed to collect samples via time paced programming. Each autosampler was set to collect an aliquot every 24-minutes, which provided 120-minutes per discrete sample bottle and allowed for 24 hours of storm duration coverage. This was an appropriate programming selection given the forecasted storm

parameters. All of the composite samples were manually flow weighted based on site specific flow information. Details pertaining to the programming and event-specific operation of each sampler unit is contained in the attached *Sampler Reports*.

CB-31A and CB-4857 had a storm volume difference of approximately 49,580 gallons, with the inlet recording more flow then the outlet. This is likely a consequence of the drainage system vactoring and resultant change in hydraulic conditions at CB4857 noted in STE Reports #'s 3 and 4. Since accumulated sediment was removed from the piping and vaults associated with CB4857, water flows more freely and is not being impounded to the degree previously noted prior to the vactoring event. Water depth in the pipe (at the area-velocity sensor anchor position) does not increase as readily in association with rainfall as it had done during past events and observations. These shallower water conditions in the pipe at CB4857, coupled with its 4% slope (field measured) tended to make flow monitoring more difficult. However, highly accurate and precise flow measurement for the purpose of mass balance calculation through the piping system was not a project objective. Nor is it a critical factor in the representative characterization of stormwater chemistry at this site. Flow hydrographs are relative to their associated sampling stations and were noted to have very similar runoff response signatures when compared to each other for a given storm event. Storm event specific hydrographs showing, level, flow and rainfall data, as well as sample markers and grab sample collection indications, for each of the monitoring stations are attached to this report.

Compositing Scheme:

The hydrographs from each monitoring station were examined and decisions were made as to what specific discrete sampler bottles were to be included in the composite samples. Due to the nature of this particular storm event all three sampling stations utilized bottles one through four and seven through nine (out of 12). The remainder of the bottles represented base flow conditions. See the attached *Field Sampling Forms* and their accompanying *Compositing Worksheets* for these details.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grabs or composite samples were placed into coolers and put on ice to maintain temperatures between 2 and 6 °C. A small portion of each of the of the composite samples was poured off for the assessment of pH. pH measurements were collected prior to delivery of the samples to the lab. These measurements were recorded on the attached *pH Measurement Worksheet.* All sample IDs, collection date and time, matrix, requested parameter analysis and other associated information were documented on *Chain-of-Custody forms* (attached). Samples were in direct control of project and/or laboratory personnel at all times. Samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from the targeted stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Quality Control Samples:

During this event adequate water volume for duplicate and MS/MSD analyses was collected and submitted for both the grab and composite samples. Both the grab and composite duplicates were collected at CB4857 – which were designated as location "CB101". This was done to present a "blind" sample (not readily identifying these duplicates) to the testing facility. Both the grab and composite MS/MSD volumes were collected at CB31A – and were labeled as such. Trip blanks accompanied all volatile organic samples collected during

this STE. See the attached *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* and the *Field Sampling Forms* for details regarding QC sample collection.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. These locations were MW-2, MW-3, MW-4, and MW-6. Details regarding the measurement event are contained in the attached *Groundwater Level Measurement* field sheet. Measurements are listed in the table below.

Groundwater Level Measurements, STE#4

Location	Date	Time	Water Level from TOC (FT)	Notes
MW-2	3/25/10	1358	6.59	replacement for MW-1 and MW-5, as previously noted
MW-3	3/25/10	1405	17.24	
MW-4	3/25/10	1410	16.23	
MW-6	3/25/10	1418	11.58	

Anomalies and/or Work Plan Deviations:

There were no anomalies observed that would have otherwise caused any of the STE#6 samples to be non-representative of the conditions from which they were collected.

Actions To Be Completed:

Routine sampler maintenance and flow meter (level) calibrations will be conducted at a regular frequency to assure proper equipment operation. This was the sixth of ten anticipated storm sampling events. An attempt will be made to conduct four more events before late-May, 2010. The current focus of the field efforts will be in maintaining proper station and equipment operation, data and resource management and storm-tracking tasks.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #6 (03-25-2010)

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Storm Event Data:	
Project Storm Event (STE) #	6
Event Forecast Probability (%)	75%
Antecedent Dry Period (days: hrs: mins)	3:11:35
STE Start Date & Time	3/25/10 3:35
STE Duration (hrs:mins)	22:20
STE End Date & Time	3/26/10 1:55
Period Between Next Measureable Rain (hrs: mins)	51:25
Was Targeted STE Qualified Per LLA QAPP	YES
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.64
Max 1-hr Rainfall Intensity (in/hr)	0.12
Average 1-hr Rainfall Intensity (in/hr)	0.03

[1] Sample Collection Criteria:	CB-31A	CB-4857	CB-1
Sampling Station			
Was Grab sample collected?	Yes	Yes	Yes
Grab ID	CB31A032510GRAB	CB4857032510GRAB	CB1032510GRAB
Grab Date /Time	3/25/2010 8:30	3/25/2010 8:50	3/25/2010 9:15
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	Yes	Yes	Yes
Hydrograph stage at grab collection	mid-storm/falling limb	mid-storm/falling limb	mid-storm/falling limb
Grab parameters collected per LLA QAPP ?	Yes	Yes	Yes
Were Trip Blanks included w/ Grab samples ?	Yes (TB032510)	Yes (TB032510)	Yes (TB032510)
Was Comp sample collected?	Yes	Yes	Yes
Comp ID	CB31A032510COMP	CB4857032510COMP	CB1032510COMP
Comp Date /Time	3/25/2010 21:47	3/25/2010 22:20	3/25/2010 22:19
Total volume measured during storm period (gallons)	139460	89243	5048
Volume sampled during storm period (gallons)	138760	89180	5048
Volume utilized for comp. sample (gallons)	131200	88935	5043
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	Yes (95%)	Yes (99%)	Yes (100%)
Were a minimum of 8 aliquots collected for comp sample ?	Yes (35)	Yes (35)	Yes (35)
Comp parameters collected per LLA QAPP ?	Yes	Yes	Yes
Rainfall during sampling period (in)	0.62	0.60	0.60
pH Measurements Collected ?	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No
[1] QC Sample Summary Information:	CB-31A	CB-4857	CB-1
Was Grab sample duplicate collected ?	No	Yes	No
Grab sample duplicate ID	na	CB101032510GRAB	na
Grab sample date and time	na	3/25/2010 9:50	na
Was Comp sample duplicate collected ?	No	Yes	No
Comp sample duplicate ID	na	CB101032510COMP	na
Comp sample date and time	na	3/25/2010 23:20	na
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	Yes (both)	No	No

[1] If the answer to any of the Storm Event or Sample Collection Criteria questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 5/4/10 **Reveiwed By / Date:** 5/4/10

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

ARI Assigned Number:	Turn-around Requested: Standard	Date: 3-25-2010	
ARI Client Company: Floyd / Snider	Phone: 206-292-2078	Page: 1 of 1	
Client Contact: Matt Woltman / Megan McCullough		No. of Coolers: 1	Cooler Temps: 2.3 °C
Client Project Name: Lora Lake Apartments			
Client Project #: POS-LLA	Samplers: D. Metallo		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOC 8260C-SIM	Analysis Requested: NWTPH-DX (1)	Notes/Comments
CB31A032510GRAB	3.25.10	0830	W	13	X	X	RUN MS/MSD
CB4857032510GRAB	3.25.10	0850	W	5	X	X	
CB1032510GRAB	3.25.10	0915	W	5	X	X	
CB10103251OGRAB	3.25.10	0950	W	5	X	X	
TB032510	3.25.10	0800	W	3	X		Trip blank

Comments/Special Instructions
(1) Acid/silica gel clean up for NWTPH-DX

	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
Printed Name	DAVE METALLO	Nikka Mulumba		
Company	Taylor Assoc., Inc.	ARI		
Date & Time	3-25-10 (1224)	3/25/10 1230		

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

ARI Assigned Number:	Turn-around Requested: Standard	Date: 3-26-2010	
ARI Client Company: Floyd / Snider	Phone: 206-292-2078	Page: 1 of 1	
Client Contact: Matt Wolfman / Megan McCullough		No. of Coolers: 2	Cooler Temps: 3.4, 4.4
Client Project Name: Lora Lake Apartments			
Client Project #: POS-LLA	Samplers: D. Metallo, P. Heltzel		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM low level	PCP 8041	Arsenic Total+Diss 200.8	Dioxin/Furan 1613	TSS SM 2540D				Notes/Comments
CB31A032510COMP	3.25.10	2147	W	1	X	X	X	X	X				pH Measurements (See attached worksheets) 6.64
CB485T032510COMP	3.25.10	2220	W	1	X	X	X	X	X				6.44
CB1032510COMP	3.25.10	2219	W	1	X	X	X	X	X				6.29
CB101032510COMP	3.25.10	2320	W	1	X	X	X	X	X				6.59

Analysis Requested

(1) Run MS/MSD

Comments/Special Instructions	Relinquished by (Signature)	Received by (Signature)	Relinquished by (Signature)	Received by (Signature)
- Bottles & glassware decon'ed to LLA project specific SOP (See attached sheet)	Printed Name: Dave Metallo	Printed Name: A. Vorgardsen	Printed Name:	Printed Name:
	Company: Taylor	Company: ARI	Company:	Company:
	Date & Time: 3-26-10 (1435)	Date & Time: 3/26/10 1435	Date & Time:	Date & Time:

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

(1) MS/MSD vol. does not include extra vol. for Dioxin/furan analysis

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB31A

8 or 12 x 1 gallon bottle set-up
Rev.ed 2/11/2010

Page: 1 of 2
pages per station

Section 1. Storm Setup and Inspection

Personnel:	PH	Weather: SUN	Arrival Date/Time:	3/18/10	13:10
Carry-over maintenance to do prior to set-up:	NONE (3/19/10)			done?	N/A
Sampler Battery Voltage	12.56/12.47	Changed? Y (N)	New voltage	N/A	
Flow Meter Battery Voltage		Changed? Y N	New voltage		

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flow meter cables OK? (Yes/No)	yes	Pump Tubing Replaced? (Yes/No)	NO
Desiccant Canisters OK (Yes/No)	yes 3/24/10	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	~~0.376~~ 0.400	Comp and Grab Lines Back flushed with DI?	yes
Actual level Reading (FT)	N/A	Desiccant Condition, replaced?	~~No~~ OK
Difference (FT)	N/A	Suction line & quick connect attached?	yes
Level calibrated? (Yes/No)	No	Clean bottles installed & lids off?	yes ~~(lids on)~~ lids off
Velocity (fps)	0.05	Diagnostics / Distributor arm check?	yes
Flow Rate (gpm)	9	Enable Level (FT)	~~0.410~~ 0.480 3/24/10
Data Downloaded (Yes/No)	yes	Pacing Type ("T"ime/"F"low), interval / rate	T / 24min / 24 hr storm
Channel conditions/observations: Ok, none observed		Program Reviewed? (Yes/No)	yes
		Last Screen	program disabled
		Ice Deployed? (Yes/No)	NO

Notes:
Arm flex = 13
Δ'd battery, set enable, lids off, set pacing (3/19/10) PH
(12.99) data download
3/21/10 (DO) changed pacing to 12 min (8 hr storm)
3/24/10 Δ'd pacing to 24 min.

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel:	DM	Weather: Raining	Arrival Date/Time:	3-25-10 (0820)

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?	Yes	Clear water	
Grab Collection Time (date/time)	0830		
Grab Sample ID	CB31A032510GRAB		
Grab Duplicates Collected?	NO	**Sampler**	
Grab Duplicate Collection (date/time)	NA	Equipment running correctly?	Yes
Grab Duplicate ID	NA	Composite Begin Time (date / time)	2 of 5 BTL#3
Grab MS/MSD Collected ?	Yes	On Composite... (bottle # / aliq #)	(0411) 3/25/2010
VOA Trip Blank in cooler?, ID	Yes TB032510	Ice deployed?	No
Flow Meter		Sampler Battery Voltage (changed?):	12.78 No ∇
Flow meter cables OK? (Y/N)	Yes	Flow Meter Battery Voltage/Change? (if different)	NA
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Bottle Swap needed? (if yes fill out Section 3)	NA

Notes: NML BTL# DM

Section 3. Mid-Storm Check / Bottle Switch

Personnel: DM	Weather: Overcast, 60	Arrival Date/Time:	3-25-10 (1310)
Composite Begin Time (date / time)	0411 3/25/10	Round #:	NA
Last Aliquot Taken (date / time, btl #, aliq #)	5/5 BTL#5	Data downloaded?	Yes
Comp Bottles Labeled? (sta. & btl #)	NA	Sampler/Flow Meter Batt. Voltage (changed):	NA
Comp Sample Volume Collected	NA	Ice deployed?	NO

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed: NML Aliq's 3+4 BTL#5

Channel conditions/observations: OK

Notes/Maintenance Needed: Replaced pump head tubing DM

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB31A

Section 4. Comp. Bottles Retrieval

Personnel: PH CM	Weather: Overcast		Arrival Date/Time: 3/26/10 8:20		
Sampler Battery Voltage	12.57	Changed? Y (N)		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N N/A		New voltage	N/A
Comp Sample Volume Collected	100 %	Data downloaded?	Yes		
Composite Begin Time (date/time)	3/25/10 04:11			Round #:	1
Last Aliquot Taken (date/time, btl #, aliq #)	3/26/10 03:47 Bottle 12, Aliq 5				
Comp Bottles Labeled? (sta. & btl #)	Yes				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

see section 3

Channel conditions/observations

OK, none observed

Notes/Maintenance Needed:

See section 3

Section 5. Post Storm Comp. Sample Processing

Personnel: PH / DM		Date/Time: 3-26-10 ~1030	
Processing Location: POS Storm Lab			
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes			Rain Gauge Info: Yes
How Many Comp. Bottles Were Collected? 12		Approximate Total Comp. Volume Collected: 12 x 1 gal	
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): ~~8562 PM~~ 8500		Actual Comp. Sample Vol. Available: 8562+	
Comp. Sample Type (Time Paced, Flow Paced, (F)low (W)eighted (M)anual (C)omp., Other (explain): F WMC			
Bottles (Btl #s) used for Comp. Sample: 1-4 & 7-9		Comp. Sample Container Size & Material: 2.5 gal WM glass	
Comp Collection Time (date/time): (2147) 3-25-10		Comp Sample ID: CB31A032510COMP	
pH Measurements Collected On Comp. Sample ?: Yes 6.64			
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes			
Notes:			

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes			
Duplicate Sample Collected ? NO		Duplicate Sample Vol.: NA	
Duplicate sample Date / Time: NA		Duplicate Sample ID: NA	
pH Measurement Collected on Duplicate Comp. Sample?: NA			
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: Yes			
MS/MSD Vol. submitted: 8562 total comp vol. ; 4000-ml staled for MS/MSD			
Were any other QC sample types colelcted? (if yes, provide details) NO			
DI Water Information : Provided by ARI Labs			
Notes: Samples immediately iced after comp. completion			

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB4857

8 or 12 x 1 gallon bottle set-up

Rev.ed 2/11/2010

Page: 1 of 2 pages per station

Section 1, Storm Setup and Inspection

Personnel:	PH	Weather:	Sun	Arrival Date/Time:	3/18/10 13:52
Carry-over maintenance to do prior to set-up:					done?
Sampler Battery Voltage	12.67	Changed? Y (N)		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N N/A		New voltage	N/A

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes 3/24/10	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	~~0.005~~ 0.00	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	N/A	Desiccant Condition, replaced?	OK
Difference (FT)	N/A	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	No	Clean bottles installed & lids off?	Yes (lids on)
Velocity (fps)	0.15	Diagnostics / Distributor arm check?	Yes 3/24/10
Flow Rate (gpm)	0	Enable Level (FT)	~~0.035~~ 0.030
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T/24 min/24 hr storm
Channel conditions/observations		Program Reviewed? (Yes/No)	Yes
ok, none observed		Last Screen	program disabled
		Ice Deployed? (Yes/No)	No

Notes: Arm flex = 11
Δ'd battery, set enable, lids off, set pacing, data download (3/18/10) PH (13.17)
3/21/10 (DC) Δ'd pacing to 12 min/8 hr storm
* warning replace pump tubing
Δ'd pacing to 24 min. 3/24/10

Section 2, Grab Sample & QC Collection/Initial Station Check

Personnel: DM Weather: Raining 50°s Arrival Date/Time: 3-25-10 (0845)

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?	Yes		
Grab Collection Time (date/time)	(0850) 3-25-10		
Grab Sample ID	CB4857032510GRAB		
Grab Duplicates Collected?	Yes	**Sampler**	
Grab Duplicate Collection (date/time)	(0950) 3-25-10	Equipment running correctly?	Yes
Grab Duplicate ID	CB10103251OGRAB	Composite Begin Time (date / time)	(0444) 3-25-2010
Grab MS/MSD Collected ?	No	On Composite... (bottle # / aliq #)	1 of 5 BTL #3
VOA Trip Blank in cooler?, ID Yes	TB032510	Ice deployed?	NO
Flow Meter		Sampler Battery Voltage (changed?):	12.93 No ▽
Flow meter cables OK? (Y/N)	Yes	Flow Meter Battery Voltage/Change? (if different)	NA
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Bottle Swap needed? (if yes fill out Section 3)	NA

Notes: Collected duplicate Grab sample

Section 3, Mid-Storm Check / Bottle Switch

Personnel: DM	Weather: Overcast, 60	Arrival Date/Time:	3-25-10 (1442)
Composite Begin Time (date / time)	3-25-10 (0444)		Round #: 1
Last Aliquot Taken (date / time, btl #, aliq #)	5/5 BTL #5	Data downloaded?	Yes
Comp Bottles Labeled? (sta. & btl #)	NA	Sampler/Flow Meter Batt. Voltage (changed):	12.90 No ▽
Comp Sample Volume Collected	NA	Ice deployed?	NO

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed NML aliq's 4+5 BTL #5 (due to low water conditions) stopped 1 of 5 BTL 6 after ~700 ml - was about to over-pump (low water conds)

Channel conditions/observations: OK - water flowing

Notes/Maintenance Needed: Re-set post-storm event * Replace pump tubing

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB4857

Section 4. Comp. Bottles Retrieval

Personnel: PH, CM	Weather: overcast		Arrival Date/Time: 3/26/10 9:15		
Sampler Battery Voltage	12.61	Changed? Y (N) ~~N~~		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N	N/A	New voltage	N/A
Comp Sample Volume Collected	100% Some over-filled	Data downloaded?	Yes		
Composite Begin Time (date/time)	3/25/10 04:44			Round #:	1
Last Aliquot Taken (date/time, btl #, aliq #)	3/26/10 04:20 Btl 12, aliq 5				
Comp Bottles Labeled? (sta. & btl #)	Yes				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

1 of 5 btl 6 user stopped

3-5 btl 6 NML

Channel conditions/observations

ok, none observed

Notes/Maintenance Needed:

See section 3

Section 5. Post Storm Comp. Sample Processing

Personnel: PH / DM Date/Time: 3-26-10 (~1145)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info).: Yes Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: (12 x 1 gal) - aliq's missed
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4500 X 2 (dup)	Actual Comp. Sample Vol. Available: 4659 ml
Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp.))	Other (explain):
Bottles (Btl #s) used for Comp. Sample: 1-4, 7-9	Comp. Sample Container Size & Material: 2.5 gal. glass WM jug
Comp Collection Time (date/time): 3-25-10 (2220)	Comp Sample ID: CB4857032510COMP

pH Measurements Collected On Comp. Sample ?: Yes 6.44

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes

Duplicate Sample Collected ? Yes	Duplicate Sample Vol.: ~~CB101~~ DM 4659 ml
Duplicate sample Date / Time: 3-25-10 (2320)	Duplicate Sample ID: CB101032510COMP

pH Measurement Collected on Duplicate Comp. Sample?: Yes 6.59

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: No

MS/MSD Vol. submitted: NA

Were any other QC sample types colelcted? (if yes, provide details) No

DI Water Information None used

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB1

8 or 12 x 1 gallon bottle set-up
Rev.ed 2/11/2010

Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: PH	Weather: SUN		Arrival Date/Time: 3/18/10 13:30		
Carry-over maintenance to do prior to set-up:	NONE			done? N/A	
Sampler Battery Voltage	12.52	Changed? Y (N)		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N		New voltage	N/A

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK?	Yes
Flow meter cables OK? (Yes/No)	Yes	Pump Tubing Replaced? (Yes/No)	No
Desiccant Canisters OK (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Flow Meter Level (FT)	-0.01	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	N/A	Desiccant Condition, replaced?	ok
Difference (FT)	N/A	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	No	Clean bottles installed & lids off?	yes Bottles & lids off
Velocity (fps)	N/A	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	N/A	Enable Level (FT)	0.03
Data Downloaded (Yes/No)	NO *	Pacing Type ("T"ime/"F"low), interval / rate	T/24 min/24 hr storm
Channel conditions/observations		Program Reviewed? (Yes/No)	Yes
ok, none observed		Last Screen	Program Disabled
		Ice Deployed? (Yes/No),	No

Notes: * sampler not on @ arrival, did not download (3/18/10) / Arm filter = 13
** left sampler on / 3/21/10 DO) Δ'd pacing to 12 min 8 hr storm / Δ'd battery (13.27) set enable, lids off set pacing, data dunload (3/19/10) PH
3/24/10 Δ'd pacing to 24 min.

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM	Weather: Raining, 50's	Arrival Date/Time: 3-25-10 (0908)	
Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?	Yes		
Grab Collection Time (date/time)	(0915)		
Grab Sample ID	CB1032510GRAB		
Grab Duplicates Collected?	NO	**Sampler**	
Grab Duplicate Collection (date/time)	NA	Equipment running correctly?	Yes
Grab Duplicate ID	NA	Composite Begin Time (date / time)	(0443) 3.25.2010
Grab MS/MSD Collected ?	NO	On Composite... (bottle # / aliq #)	2 of 5 BTL #3
VOA Trip Blank in cooler?, ID Yes	TB032510	Ice deployed?	No
Flow Meter		Sampler Battery Voltage (changed?):	12.80
Flow meter cables OK? (Y/N)	Yes	Flow Meter Battery Voltage/Change? (if different)	NA
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Bottle Swap needed? (if yes fill out Section 3)	NA

Notes: Grab collection went fine, station operating as designed

Section 3. Mid-Storm Check / Bottle Switch

Personnel: DM	Weather: Overcast, 60's	Arrival Date/Time: (1420) 3.25.10	
Composite Begin Time (date / time)	3.25.10 (0443)	Round #: 1	
Last Aliquot Taken (date / time, btl #, aliq #)	5/5 BTL #5	Data downloaded?	Yes
Comp Bottles Labeled? (sta. & btl #)	NA	Sampler/Flow Meter Batt. Voltage (changed):	NO ▽ 12.74
Comp Sample Volume Collected	NA (100%)	Ice deployed?	No

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed: None

Channel conditions/observations: Ok

Notes/Maintenance Needed: Re-set post-storm event

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB 1

Section 4. Comp. Bottles Retrieval

Personnel: PH, CM	Weather: overcast		Arrival Date/Time: 3/26/10 8:45		
Sampler Battery Voltage	12.45	Changed? Y (N)		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N N/A		New voltage	N/A
Comp Sample Volume Collected	100%	Data downloaded? Yes			
Composite Begin Time (date/time)	3/25/10 04:43			Round #: 1	
Last Aliquot Taken (date/time, btl #, aliq #)	3/26/10 03:31 Btl 12, Aliq. 3 (last good sample)				
Comp Bottles Labeled? (sta. & btl #)	Yes				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

3/25/10, 15:15, Btl 6 Aliq 4, NML
" 15:19, Btl 6, Aliq 5, NLD
3/26/10, 03:15, Btl 12, Aliq 4, NML
" 04:19, Btl 12, Aliq 5, NLD

Channel conditions/observations

OK, none observed

Notes/Maintenance Needed:

See section 3

Section 5. Post Storm Comp. Sample Processing

Personnel: PH/DM Date/Time: 3-26-10 (~1100)

Processing Location: POS storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld Info).: Yes Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: 12x1 gal (- aliqs missed)
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4500 ml	Actual Comp. Sample Vol. Available: 4672
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp.) Other (explain):	
Bottles (Btl #s) used for Comp. Sample: 1-4 & 7-9	Comp. Sample Container Size & Material: 2.5gal glass WM jug
Comp Collection Time (date/time): 3-25-10 (2219)	Comp Sample ID: CB1032510CompP
pH Measurements Collected On Comp. Sample ?: Yes 6.29	
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes	

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): NA - no QC Samples collected from this site

Duplicate Sample Collected ? NA	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: NA

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: NA

MS/MSD Vol. submitted: NA

Were any other QC sample types colelcted? (if yes, provide details) NA

DI Water Information None used

Notes:

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: Lord Lake

Date: 3/26/10
Staff: PH
pH meter make/model #: Orion 2 star

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB1032510comp	6.29	11:53	
CB31A032510comp	6.64	11:58	
CB4857032510comp	6.44	12:00	
CB1010325 10comp	~~7~~ 6.59	12:04	

Post-Measurement Check

Nominal pH value of standard	7.00	
Temperature (deg C)	17°C	
Standard pH, temp corrected	7.01	
Meter pH reading (SU)	6.99	
Difference (SU)	0.02	*Should be < 0.1 (round to 0.0)*
Time	12:07	

Form to be included in storm file, as applicable

TAYLOR ASSOCIATES, INC.

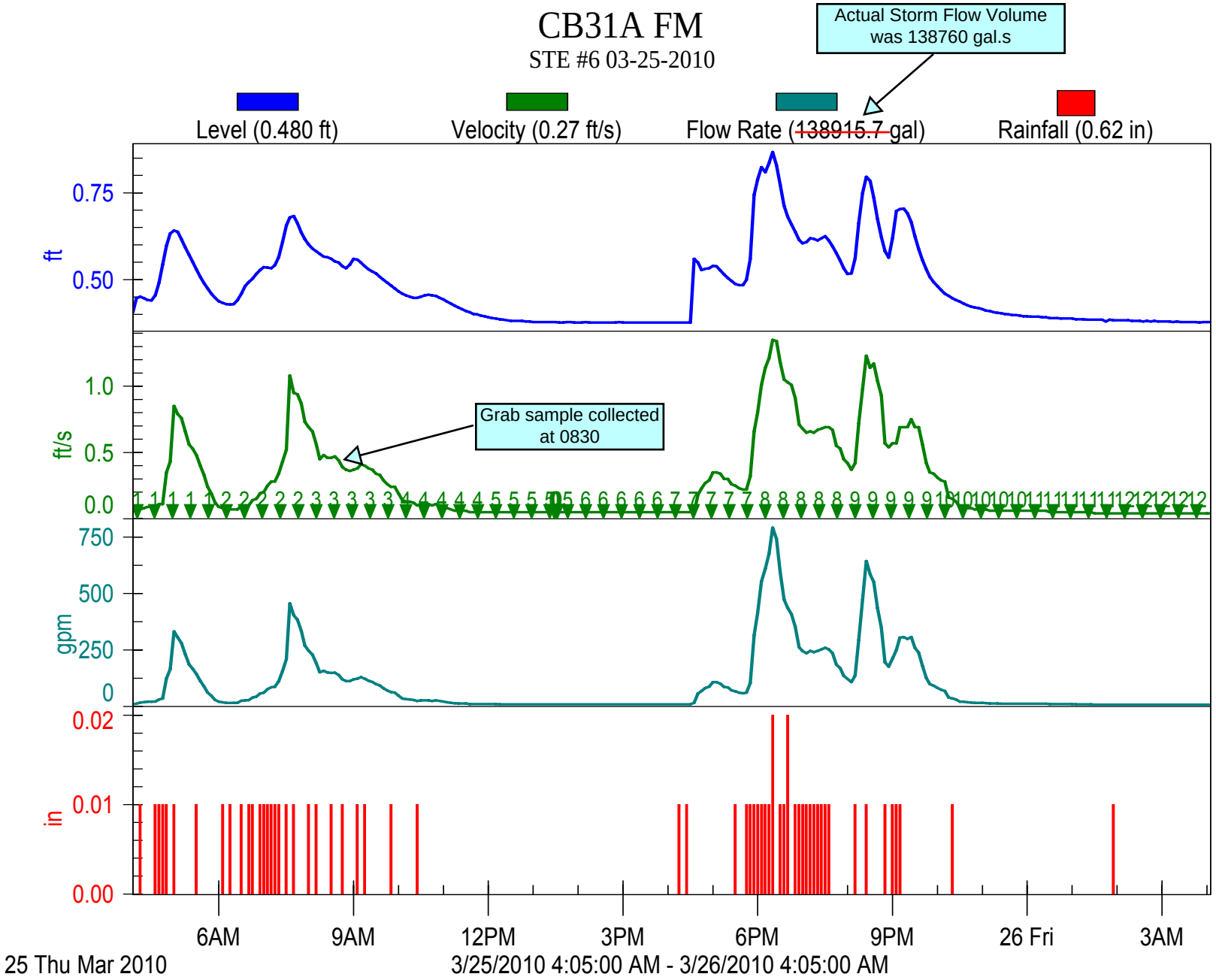
POS - Lora Lake Apartments Stormwater Interim Action

Groundwater Level Measurement Field Form

Personnel: D. Metallo	**Arrival Date/Time:** 3-25-10 (1330)
Weather: Overcast, lite drizzle, 50°s	
Precip in Last 24-hrs / Last Measureable Rain Event: Rain started ~(0400) on 3.25.10, 0.3 in last 24-hrs	

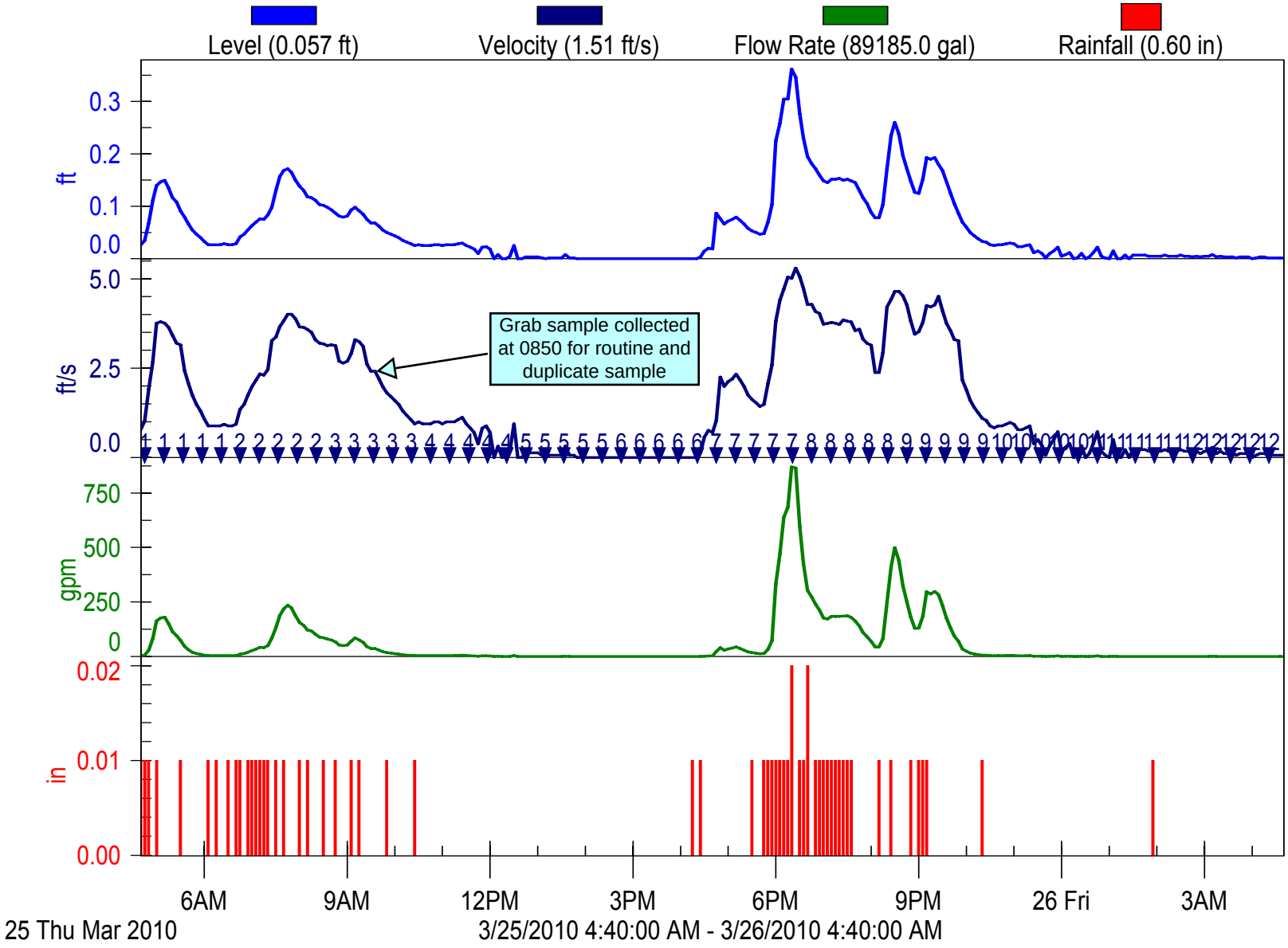
Monitoring Well ID	Time	Water Level (FT)	Meas. Reference
MW-2	1358	6.59	Top PVC casing
MW-3	1405	17.24	Top PVC casing
MW-4	1410	16.23	Top PVC casing
MW-6	1418	11.58	Top PVC casing

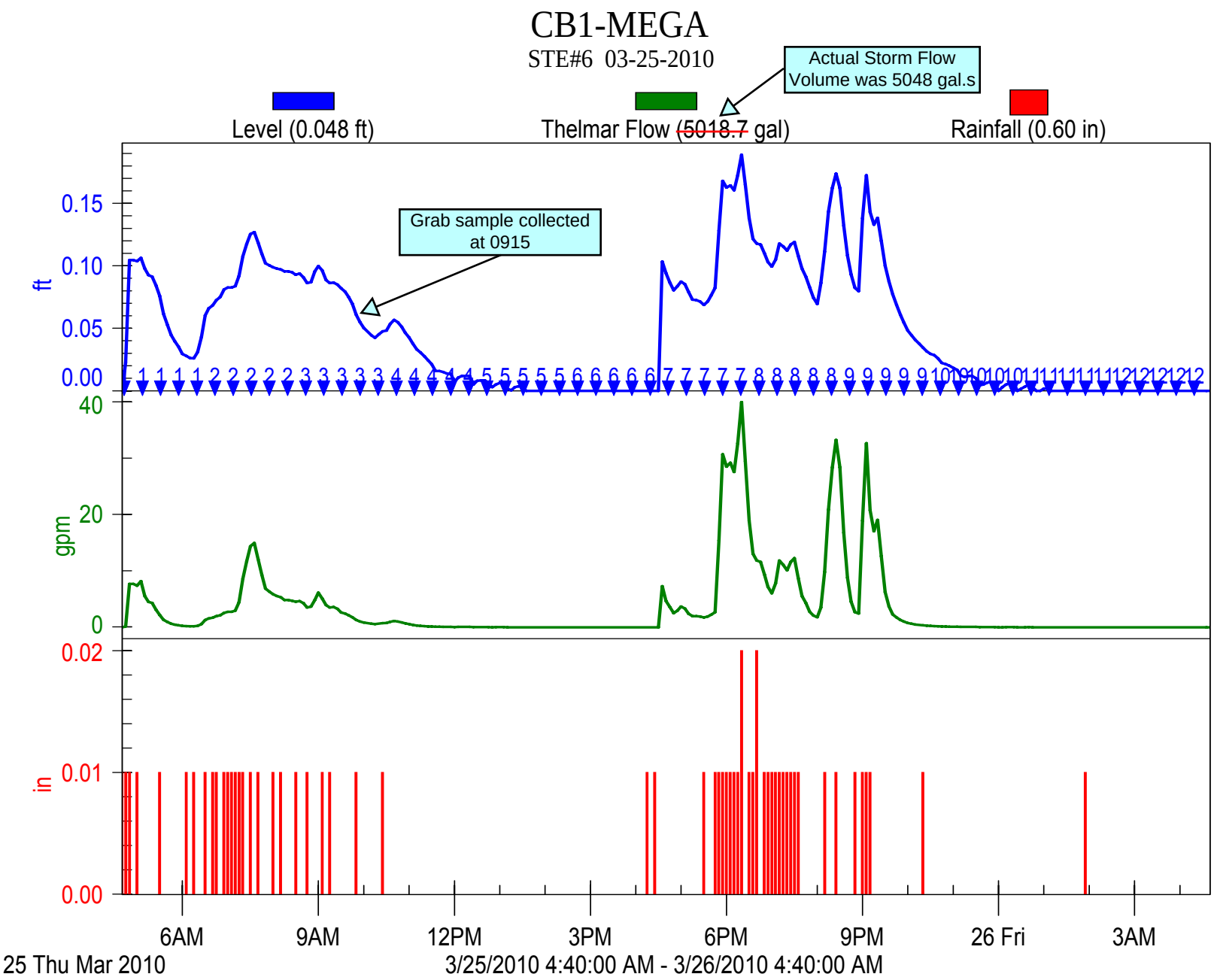
Notes:


CB31A FM
STE #6 03-25-2010
Actual Storm Flow Volume was 138760 gal.s
Level (0.480 ft)
Velocity (0.27 ft/s)
Flow Rate (138915.7 gal)
Rainfall (0.62 in)
ft
0.75
0.50
ft/s
1.0
0.5
0.0
Grab sample collected at 0830
gpm
750
500
250
0
in
0.02
0.01
0.00
6AM
9AM
12PM
3PM
6PM
9PM
26 Fri
3AM
25 Thu Mar 2010
3/25/2010 4:05:00 AM - 3/26/2010 4:05:00 AM

CB4857 FM

STE #6 03-25-2010




CB1-MEGA
STE#6 03-25-2010
Actual Storm Flow Volume was 5048 gal.s
Level (0.048 ft)
Thelmar Flow (5018.7 gal)
Rainfall (0.60 in)
Grab sample collected at 0915
ft
0.15
0.10
0.05
0.00
gpm
40
20
0
in
0.02
0.01
0.00
6AM
9AM
12PM
3PM
6PM
9PM
26 Fri
3AM
25 Thu Mar 2010
3/25/2010 4:40:00 AM - 3/26/2010 4:40:00 AM

CB31A - STE#6 032510

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
12095	0.263106374	789	1	9.22%	9.22%	8.72%
13545	0.294648684	884	2	10.32%	19.54%	9.76%
16465	0.358168371	1075	3	12.55%	32.09%	11.87%
2780	0.060474222	181	4	2.12%	34.21%	2.00%
	0	0	5	0.00%	34.21%	0.00%
	0	0	6	0.00%	34.21%	0.00%
6435	0.139982597	420	7	4.90%	39.12%	4.64%
45970	1	3000	8	35.04%	74.15%	33.13%
33910	0.737654992	2213	9	25.85%	100.00%	24.44%
	0	0	10	0.00%	100.00%	0.00%
	0	0	11	0.00%	100.00%	0.00%
	0	0	12	0.00%	100.00%	0.00%
				100.00%		94.55%

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	131200
Strm Qtot (gals)	138760
max Q	45970
min V (ml)	3000

8562 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.
**Vol. includes enough sample for lab to run an MS/MSD
Used bottles 1-4 and 7-9; the remainder represented baseflow conditions

COMP Label = CB31A032510COMP Time (2147)

CB4857 STE#6 032510

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
6020	0.22525725	315	1	6.77%	6.77%	6.75%
10705	0.400561272	561	2	12.04%	18.81%	12.00%
5395	0.201870907	283	3	6.07%	24.87%	6.05%
300	0.011225444	16	4	0.34%	25.21%	0.34%
	0	0	5	0.00%	25.21%	0.00%
	0	0	6	0.00%	25.21%	0.00%
17255	0.64565014	904	7	19.40%	44.61%	19.35%
26725	1	1400	8	30.05%	74.66%	29.97%
22535	0.843217961	1181	9	25.34%	100.00%	25.27%
	0	0	10	0.00%	100.00%	0.00%
	0	0	11	0.00%	100.00%	0.00%
	0	0	12	0.00%	100.00%	0.00%
				100.00%		99.73%

Total Strm Vol% Rep.'ed in Comp

Qtotal	88935
Strm Qtot (gals)	89180
max Q	26725
min V (ml)	1400

4659 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.
Used bottles 1-4 and 7-9; the remainder of the bottles represented baseflow conditions

Comp Label = CB4857032510COMP Time (2220)

CB101 - STE#6 032510 (DUPLICATE of CB4847)

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
6020	0.22525725	315	**1**	6.77%	6.77%	6.75%
10705	0.400561272	561	**2**	12.04%	18.81%	12.00%
5395	0.201870907	283	**3**	6.07%	24.87%	6.05%
300	0.011225444	16	**4**	0.34%	25.21%	0.34%
	0	0	**5**	0.00%	25.21%	0.00%
	0	0	**6**	0.00%	25.21%	0.00%
17255	0.64565014	904	**7**	19.40%	44.61%	19.35%
26725	1	1400	**8**	30.05%	74.66%	29.97%
22535	0.843217961	1181	**9**	25.34%	100.00%	25.27%
	0	0	**10**	0.00%	100.00%	0.00%
	0	0	**11**	0.00%	100.00%	0.00%
	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		99.73%

Total Strm Vol% Rep.'ed in Comp

Qtotal	88935
Strm Qtot (gals)	89180
max Q	26725
min V (ml)	1400

4659 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.
Used bottles 1-4 and 7-9; the remainder of the bottles represented baseflow conditions
CB101 is a duplicate sample of CB4857

Comp Label = CB101032510COMP **Time (2320)**

CB1 STE#6 032510

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
272.55	0.210406454	252	**1**	5.40%	5.40%	5.40%
670.95	0.517968117	622	**2**	13.30%	18.71%	13.29%
346	0.267109275	321	**3**	6.86%	25.57%	6.85%
38.05	0.0293743	35	**4**	0.75%	26.32%	0.75%
0	0	0	**5**	0.00%	26.32%	0.00%
0	0	0	**6**	0.00%	26.32%	0.00%
1240.5	0.957656232	1149	**7**	24.60%	50.92%	24.57%
1295.35	1	1200	**8**	25.69%	76.61%	25.66%
1179.6	0.910641911	1093	**9**	23.39%	100.00%	23.37%
0	0	0	**10**	0.00%	100.00%	0.00%
0	0	0	**11**	0.00%	100.00%	0.00%
0	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		**99.90%**

Total Strm Vol% Rep.'ed in Comp

Qtotal	5043
Strm Qtot (gals)	5048
max Q	1295.35
min V (ml)	1200

4672 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.
Used bottles 1-4 and 7-9; the remainder represented baseflow conditions

Comp Label = CB1032510COMP **Time (2219)**

CB31A 032510

SAMPLER ID# 1069569980 08:52 26-MAR-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB31A SMP "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 20 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 24 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1069569980 08:52 26-MAR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB31A SMP
PROGRAM: LLA MULTI
Program Started at 15:05 WE 24-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		15:05	PGM DISABLED		
----------		TH 25-MAR-10	----------		
		04:11	PGM ENABLED		
1,5	1	04:11	E		585
2,5	1	04:35	T		577
3,5	1	04:59	T		583
4,5	1	05:23	T		585
5,5	1	05:47	T		585
1,5	2	06:11	T		585
2,5	2	06:35	T		585
3,5	2	06:59	T		585
4,5	2	07:23	T		585
5,5	2	07:47	T		579
1,5	3	08:11	T		579
		08:23	MANUAL PAUSE		
		08:24	MANUAL RESUME		
2,5	3	08:35	T		589
3,5	3	08:59	T		581
4,5	3	09:23	T		587
5,5	3	09:47	T		581
1,5	4	10:11	T		582
2,5	4	10:35	T		585
3,5	4	10:59	T		585
4,5	4	11:23	T		585
5,5	4	11:47	T		585
1,5	5	12:11	T		591

2,5	5	12:35	T		2
3,5	5	12:59	T	NM	*
4,5	5	13:23	T	NM	*
		13:27	MANUAL PAUSE		
		13:28	MANUAL RESUME		
		13:29	MANUAL PAUSE		
700 ml GRAB		13:29	C		591
			730 ml DELIVERED		
700 ml GRAB		13:30	C		591
			710 ml DELIVERED		
700 ml GRAB		13:31	C		598
			720 ml DELIVERED		
700 ml GRAB		13:32	C		603
			700 ml DELIVERED		
		13:34	MANUAL RESUME		
		13:34	MANUAL PAUSE		
		13:34	MANUAL RESUME		
5,5	5	13:47	T		597
1,5	6	14:11	T		644
2,5	6	14:35	T		627
3,5	6	14:59	T		596
4,5	6	15:23	T		589
5,5	6	15:47	T		591
1,5	7	16:11	T		593
2,5	7	16:35	T		584
3,5	7	16:59	T		585
4,5	7	17:23	T		585
5,5	7	17:47	T		585
1,5	8	18:11	T		583
2,5	8	18:35	T		585
3,5	8	18:59	T		577
4,5	8	19:23	T		577
5,5	8	19:47	T		579
1,5	9	20:11	T		579
2,5	9	20:35	T		581
3,5	9	20:59	T		587
4,5	9	21:23	T		585
5,5	9	21:47	T		587
1,5	10	22:11	T		585
2,5	10	22:35	T		587
3,5	10	22:59	T		585
4,5	10	23:23	T		581
5,5	10	23:47	T		585

---------- FR 26-MAR-10 ----------

```
                          CB31A 032510
  1,5    11   00:11      T            579
  2,5    11   00:35      T            585
  3,5    11   00:59      T            585
  4,5    11   01:23      T            585
  5,5    11   01:47      T            584
  1,5    12   02:11      T            583
  2,5    12   02:35      T            585
  3,5    12   02:59      T            585
  4,5    12   03:23      T            585
  5,5    12   03:47      T            585
               03:48  PGM DONE 26-MAR


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
   SOURCE C  ==> CALIBRATE SAMPLE
    ERROR NM ==> NO MORE LIQUID!
----------------------------------------
```

CB4857 032510

SAMPLER ID# 1224319970 08:28 26-MAR-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB4857 SMP"

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 26 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 24 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

0.01 inch TIP
RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224319970 08:28 26-MAR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB4857 SMP
PROGRAM: LLA MULTI
Program Started at 15:17 WE 24-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		15:17	PGM DISABLED		
----------		TH 25-MAR-10	----------		
		04:44	PGM ENABLED		
1,5	1	04:44	E		670
2,5	1	05:08	T		670
3,5	1	05:32	T		664
4,5	1	05:56	T		670
5,5	1	06:20	T		666
1,5	2	06:44	T		666
2,5	2	07:08	T		670
3,5	2	07:32	T		670
4,5	2	07:56	T		665
5,5	2	08:20	T		668
		08:39	MANUAL PAUSE		
		08:39	MANUAL RESUME		
1,5	3	08:44	T		666
2,5	3	09:08	T		670
3,5	3	09:32	T		670
4,5	3	09:56	T		670
5,5	3	10:20	T		670
1,5	4	10:44	T		670
2,5	4	11:08	T		670
3,5	4	11:32	T		664
4,5	4	11:56	T		706
5,5	4	12:20	T		846
1,5	5	12:44	T		768

2,5	5	13:08	T		754
3,5	5	13:32	T		760
4,5	5	13:56	T	NM	*
5,5	5	14:20	T	NM	*
1,5	6	14:44	T	US	*
2,5	6	15:08	T		412
3,5	6	15:32	T	NM	*
4,5	6	15:56	T	NM	*
5,5	6	16:20	T	NM	*
1,5	7	16:44	T		674
2,5	7	17:08	T		671
3,5	7	17:32	T		676
4,5	7	17:56	T		670
5,5	7	18:20	T		670
1,5	8	18:44	T		664
2,5	8	19:08	T		664
3,5	8	19:32	T		664
4,5	8	19:56	T		664
5,5	8	20:20	T		670
1,5	9	20:44	T		670
2,5	9	21:08	T		664
3,5	9	21:32	T		664
4,5	9	21:56	T		664
5,5	9	22:20	T		664
1,5	10	22:44	T		670
2,5	10	23:08	T		666
3,5	10	23:32	T		656
4,5	10	23:56	T		784
----------	FR 26-MAR-10				----------
5,5	10	00:20	T		905
1,5	11	00:44	T		644
2,5	11	01:08	T		1022
3,5	11	01:32	T		772
4,5	11	01:56	T		734
5,5	11	02:20	T		754
1,5	12	02:44	T		750
2,5	12	03:08	T		756
3,5	12	03:32	T		754
4,5	12	03:56	T		750
5,5	12	04:20	T		768
		04:22	PGM DONE 26-MAR		

SOURCE E ==> ENABLE

```
   SOURCE T  ==> TIME
    ERROR NM ==> NO MORE LIQUID!
    ERROR US ==> USER STOPPED!
----------------------------------------
```

```
SAMPLER ID# 1072249987  08:38 26-MAR-10
  Hardware: A1      Software: 2.20
********** PROGRAM SETTINGS **********
     ----------
   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1-MEGA  "
     ----------
   UNITS SELECTED:
     LENGTH: ft


     ----------
   UNITS SELECTED:
   FLOW RATE: gpm
  FLOW VOLUME: gal
   VELOCITY: fps
     ----------
  AREA-VEL MODULE:
        WEIR
        90
      V-NOTCH
     ----------

      5 MINUTE
   DATA INTERVAL

     ----------
  12,  3750 ml BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES
     ----------

  ONE-PART PROGRAM


     ----------
      PACING:
    TIME, EVERY
 0 HOURS, 24 MINUTES
```

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.030 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF

BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1072249987 08:38 26-MAR-10
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********
SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 15:12 WE 24-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		15:12	PGM DISABLED		
		TH 25-MAR-10			
		04:43	PGM ENABLED		
1,5	1	04:43	E		445
2,5	1	05:07	T		439
3,5	1	05:31	T		439
4,5	1	05:55	T		441
5,5	1	06:19	T		441
1,5	2	06:43	T		441
2,5	2	07:07	T		441
3,5	2	07:31	T		439
4,5	2	07:55	T		441
5,5	2	08:19	T		441
1,5	3	08:43	T		441
		08:58	MANUAL PAUSE		
		08:59	MANUAL RESUME		
2,5	3	09:07	T		445
3,5	3	09:31	T		441
4,5	3	09:55	T		441
5,5	3	10:19	T		441
1,5	4	10:43	T		441

CB1 032510

2,5	4	11:07	T		447
3,5	4	11:31	T		445
4,5	4	11:55	T		441
5,5	4	12:19	T		441
1,5	5	12:43	T		447
2,5	5	13:07	T		446
3,5	5	13:31	T		441
4,5	5	13:55	T		447
5,5	5	14:19	T		444
1,5	6	14:43	T		446
2,5	6	15:07	T		447
3,5	6	15:31	T		447
4,5	6	15:55	T	NM	*
5,5	6	16:19	T	NL	*
1,5	7	16:43	T		443
2,5	7	17:07	T		446
3,5	7	17:31	T		447
4,5	7	17:55	T		447
5,5	7	18:19	T		441
1,5	8	18:43	T		441
2,5	8	19:07	T		441
3,5	8	19:31	T		441
4,5	8	19:55	T		441
5,5	8	20:19	T		447
1,5	9	20:43	T		441
2,5	9	21:07	T		446
3,5	9	21:31	T		445
4,5	9	21:55	T		447
5,5	9	22:19	T		441
1,5	10	22:43	T		441
2,5	10	23:07	T		441
3,5	10	23:31	T		441
4,5	10	23:55	T		447
----------	FR 26-MAR-10				----------
5,5	10	00:19	T		446
1,5	11	00:43	T		441
2,5	11	01:07	T		445
3,5	11	01:31	T		447
4,5	11	01:55	T		445
5,5	11	02:19	T		447
1,5	12	02:43	T		445
2,5	12	03:07	T		441
3,5	12	03:31	T		441
4,5	12	03:55	T	NM	*

```
                          CB1 032510
  5,5    12   04:19       T  NL          *
              04:19  PGM DONE 26-MAR


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
    ERROR NL ==> NO LIQUID DETECTED!
    ERROR NM ==> NO MORE LIQUID!
----------------------------------------



SAMPLER ID# 1072249987  08:39 26-MAR-10
  Hardware: A1      Software: 2.20
 AREA-VEL MODULE: 1073479663
  Hardware: A0      Software: 1.04
*********** COMBINED RESULTS ***********
   SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 15:12 WE 24-MAR-10
Nominal Sample Volume =  700 ml
                                          FLOW          TOTAL
                       LEVEL  VELOCITY    RATE           FLOW

SAMPLE  BOTTLE TIME      ft       fps     gpm             gal
------- ------ ----  -----     -----  ----- -------------
------------------- TH 25-MAR-10 ------

  1,5     1   04:43  0.065      0.33  0.656  000000000000
  2,5     1   05:07  0.099      0.33  3.935  000000000000
  3,5     1   05:31  0.072      0.33  1.299  000000000000
  4,5     1   05:55  0.033      0.33  0.000  000000000000
  5,5     1   06:19  0.033      0.33  0.000  000000000000
  1,5     2   06:43  0.072      0.33  1.299  000000000000
  2,5     2   07:07  0.084      0.33  2.456  000000000000
  3,5     2   07:31  0.127      0.33  6.700  000000000000
  4,5     2   07:55  0.100      0.33  4.096  000000000000
  5,5     2   08:19  0.095      0.33  3.613  000000000000
  1,5     3   08:43  0.087      0.33  2.778  000000000000
  2,5     3   09:07  0.090      0.33  3.099  000000000000
  3,5     3   09:31  0.082      0.33  2.295  000000000000
  4,5     3   09:55  0.053      0.33  0.000  000000000000
  5,5     3   10:19  0.045      0.33  0.000  000000000000
  1,5     4   10:43  0.055      0.33  0.000  000000000000
```

AREA FORECAST DISCUSSION

FXUS66 KSEW 242218
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
318 PM PDT WED MAR 24 2010

.SYNOPSIS...A LOW OFFSHORE WILL MOVE INLAND EARLY THURSDAY BRINGING SHOWERS TO THE REGION. SHOWERS WILL CONTINUE THROUGH THURSDAY NIGHT AS LOW LEVEL **ONSHORE FLOW** DEVELOPS AND A **TROUGH** PASSES THROUGH. WILL SEE SOME DRYING ACROSS THE REGION FRIDAY AFTERNOON THROUGH SATURDAY AS ANOTHER **RIDGE** DEVELOPS OVER THE AREA. WETTER AND COOLER WEATHER IS EXPECTED EARLY NEXT WEEK.

&&

.SHORT TERM...**TEMPS** ARE WARMING UP NICELY ACROSS WESTERN WA THIS AFTERNOON...WITH HIGHS IN THE 60S ACROSS MOST AREAS. MAY STILL BREAK A FEW RECORDS ALTHOUGH OLYMPIA MAY BE A STRETCH. THE RECORD IS 66 AT SEATAC...69 AT OLYMPIA AND 62 AT BELLINGHAM ALL SET IN 1960.

CLOUDS WILL INCREASE ACROSS THE AREA TONIGHT AS OUR NEXT SYSTEM OFFSHORE APPROACHES THE COAST. THIS SYSTEM WILL BEGIN TO MOVE INLAND LATE TONIGHT BUT MODELS KEEP **BACKING** OFF ON PRECIP...MAYBE ONLY AFFECTING THE SOUTHERN TIER OF THE **CWA**. RAIN WILL SPREAD NORTH THROUGH THE MORNING AND AFTERNOON AS THE NEGATIVE TILT **UPPER LEVEL TROUGH** BEGINS TO LIFT **NE**. WILL KEEP HIGHER **POPS** THROUGH THU NIGHT AS A GOOD ONSHORE PUSH DEVELOPS. THE NAM12 AND UW **WRF GFS** SHOW A PUGET SOUND **CONVERGENCE** ZONE DEVELOPING THU NIGHT OVER SNOHOMISH COUNTY. TIMING IS A BIT OFF BETWEEN THE MODELS BUT LOOKS LIKE THERE WILL BE SOME LOW LEVEL **CONVERGENCE** BY 06-09Z.

FRI AND **SAT**...SCATTERED SHOWERS ARE EXPECTED THROUGH THE FRI MORNING...THEN SOME DRYING IN THE AFTERNOON AS ANOTHER **RIDGE** BUILDS INLAND. SHOULD SEE **PARTLY SUNNY** SKIES BY MIDDAY. MODELS HAVE SOME TROUBLE DECIDING ON WHAT A WEAK **WARM FRONT** WILL DO ON **SAT**. THE TAIL END OF THE **FRONT** MAY ONLY GLANCE THE COAST BUT **QPF** AMOUNTS ARE FAIRLY LIGHT. WITH THE **RIDGE** STILL OVER THE REGION WILL KEEP THE ENTIRE AREA DRY FOR NOW. 33

.LONG TERM...A TRANSITION TO A WETTER AND COOLER PATTERN IS FORECAST THROUGHOUT MUCH OF THE LONG TERM PERIOD. A **COLD FRONT** OFFSHORE WILL MOVE INLAND **SAT** NIGHT OR SUNDAY AS THE **UPPER LEVEL RIDGE** SHIFTS INTO MONTANA. THE **JET** WILL LIE OVER THE AREA THROUGH EARLY NEXT WEEK SENDING MORE ENERGY AND **MOISTURE** INTO **W** WA. 500 **MB** HEIGHTS WILL BE QUITE LOW...DOWN INTO THE 520 DAM WITH MORE SNOW EXPECTED IN THE MOUNTAINS. A DEEP **TROUGH** WILL REMAIN OVER THE **PAC NW** THROUGH **MID** WEEK...MAINTAINING THE COOLER AND SHOWERY WEATHER PATTERN. 33

&&

Contact Us
FAQ
Webmaster E-mail

.AVIATION...HIGH **PRES** SHIFTING EAST OF THE CASCADES IS PRODUCING **OFFSHORE FLOW**. EXPECT JUST BROKEN **CIRRUS** OVER WESTERN WASHINGTON THROUGH THIS EVENING.

MODELS ARE CONSISTENT WITH PREVIOUS SOLUTIONS IN SURGING SOME LOW LEVEL **MOISTURE** IN FROM THE SOUTH AND **SW** AS THE NEGATIVELY TILTED FRONTAL SYSTEM IN THE OFFSHORE WATERS APPROACHES. **MESOSCALE** MODELS SHOW A SURGE OF LOW LEVEL SOUTHERLY **FLOW** FROM THE SOUTH MOVING IN SHORTLY AFTER ABOUT 10Z WITH **STRATUS** AND BASES 2000 TO 2500 **FT** COMING WITH IT. LOWER CONDITIONS ARE LIKELY ON THE COAST.

THE AIR MASS DESTABILIZES MIDDAY THU ALLOWING SUFFICIENT MIXING TO LIFT CEILINGS TO 040-050. SHOWERS WILL INCREASINGLY BE TIED TO THE TERRAIN IN **ONSHORE FLOW** THU **AFTN** AND EVENING WITH THE SOMEWHAT UNSTABLE **SW FLOW**.

KSEA...**VFR** CONDITIONS WITH ONLY THIN HIGH **CIRRUS** THROUGH ABOUT 10Z WITH WIND E/SE 6-10 **KT**. SCT-BKN020-025 WILL SURGE IN FROM THE SOUTH AROUND 10Z AND SHOWERS WITH THE INCOMING **FRONT** WILL MOVE IN 13-17Z. THE SOUTHERLY SURGE 10Z-18Z WILL PRODUCE **S** WIND 12G19 **KT** WITH GUSTY WIND CONTINUING IN THE AFTERNOON AS MOMENTUM MIXES DOWN FROM ALOFT. ALBRECHT

&&

.MARINE...HIGH **PRES E** OF THE CASCADES WILL GIVE LIGHT **OFFSHORE FLOW** THROUGH THIS EVENING. A MODERATE **COLD FRONT** IN THE OFFSHORE WATERS WILL MOVE THROUGH THE **COASTAL WATERS** TONIGHT AND THROUGH THE INLAND WATERS THU MORNING. A 10 **FT** SWELL FROM THE OFFSHORE SYSTEM WILL MOVE INTO THE **COASTAL WATERS** EARLY THIS EVENING AND CONTINUE OVERNIGHT. **SMALL CRAFT ADVISORY** CONDITIONS IN GUSTY S/SW WINDS ARE MOST LIKELY STARTING **MID** MORNING THU AND CONTINUING THROUGH MUCH OF FRI AS GUSTY WINDS MIX DOWN IN AN **UNSTABLE AIR** MASS BEHIND THE FRONTAL SYSTEM AND AS TWO **UPPER LEVEL** TROUGHS MOVE ACROSS THE AREA.

SMALL CRAFT ADVISORY CONDITIONS WILL ALSO LIKELY DEVELOP IN THE PUGET SOUND AREA EARLY THU MORNING WITH STRONG **SLY PRES** GRADIENTS ALONG AND BEHIND THE **FRONT**...AND CONTINUE MUCH OF THU NIGHT AND FRI AS A **TROUGH** OF LOW **PRES** MOVES ACROSS THE AREA WITH UNSTABLE **FLOW** ALOFT.

A PASSING **RIDGE** OF HIGH **PRES** AT THE SURFACE AND ALOFT WILL GIVE LIGHT TO MODERATE **OFFSHORE FLOW** LATER FRI INTO **SAT**. A STRONGER **FRONT** WILL APPROACH THE COAST LATE **SAT** NIGHT AND MOVE INLAND EARLY SUN MORNING. QUITE UNSETTLED CONDITIONS WILL DOMINATE OVER THE WATERS NEXT WEEK. ALBRECHT

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...NONE.
PZ...**SMALL CRAFT ADVISORY COASTAL WATERS** FOR HAZARDOUS **SEAS**.
SMALL CRAFT ADVISORY FOR ROUGH BAR CONDITIONS GRAYS HARBOR BAR.

WWW.WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION PLEASE SEE WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML (ALL LOWERCASE).

Your National Weather Service forecast

Seatac WA

Enter Your "City, ST" or zip code Go

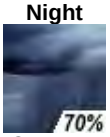
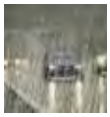
BOOKMARK

NWS Seattle, WA

Point Forecast: Seatac WA
47.46°N 122.31°W (Elev. 400 ft)

Mobile Weather Information | **En Español**
Last Update: 3:29 pm PDT Mar 24, 2010
Forecast Valid: 5pm PDT Mar 24, 2010-6pm PDT Mar 31, 2010

Forecast at a Glance

Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday	Sunday Night
								
Mostly Cloudy Lo 48 °F	Showers Hi 54 °F	Showers Likely Lo 45 °F	Showers Likely Hi 53 °F	Mostly Cloudy Lo 43 °F	Partly Sunny Hi 60 °F	Chance Rain Lo 48 °F	Rain Likely Hi 55 °F	Chance Rain Lo 46 °F

Detailed 7-day Forecast

Tonight: Mostly cloudy, with a low around 48. East wind 7 to 11 mph becoming south.

Thursday: Showers. High near 54. South southwest wind between 13 and 17 mph. Chance of precipitation is 80%.

Thursday Night: Showers likely. Mostly cloudy, with a low around 45. Breezy, with a southwest wind between 14 and 22 mph. Chance of precipitation is 70%.

Friday: Showers likely, mainly before 11am. Mostly cloudy, with a high near 53. Breezy, with a southwest wind between 22 and 28 mph, with gusts as high as 36 mph. Chance of precipitation is 70%.

Friday Night: Mostly cloudy, with a low around 43. Southwest wind between 11 and 14 mph.

Saturday: Partly sunny, with a high near 60.

Saturday Night: A 40 percent chance of rain. Mostly cloudy, with a low around 48.

Sunday: Rain likely. Mostly cloudy, with a high near 55.

Sunday Night: A chance of rain. Mostly cloudy, with a low around 46.

Monday: Rain likely. Cloudy, with a high near 53.

Monday Night: Rain likely. Cloudy, with a low around 43.

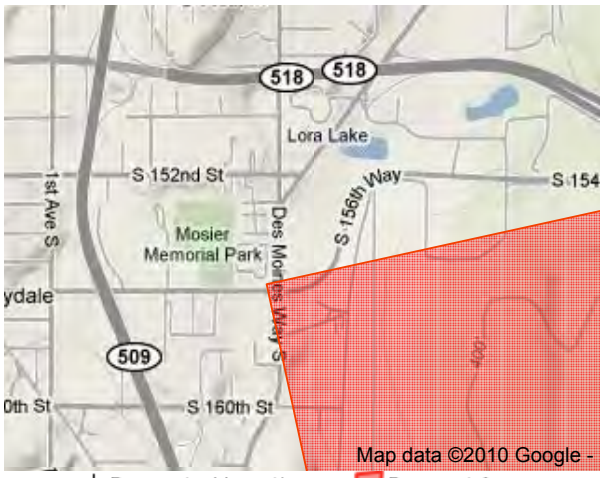
Tuesday: A chance of showers. Mostly cloudy, with a high near 54.

Tuesday Night: A chance of showers. Mostly cloudy, with a low around 40.

Wednesday: A chance of showers. Mostly cloudy, with a high near 55.

Detailed Point Forecast [Move Down]

Click Map for Forecast Disclaimer



Requested Location Forecast Area

Lat/Lon: 47.46°N 122.31°W **Elevation:**400 ft

XML

Current Conditions [Move Up]

Seattle, Seattle-Tacoma International Airport
Last Update on 24 Mar 15:53 PDT

Mostly Cloudy

68°F (20°C)

Humidity:	32 %
Wind Speed:	NW 8 MPH
Barometer:	29.77 in (1008.80 mb)
Dewpoint:	37°F (3°C)
Heat Index:	76°F (24°C)
Visibility:	10.00 Miles
More Local Wx:	**3 Day History:**

Radar and Satellite Images

weather.gov

National Weather Service Forecast Office
Seattle, WA

Home News Organization Search for: NWS All NOAA Go

Point Forecast: Seatac WA
47.46N 122.31W (Elev. 400 ft)

En Español

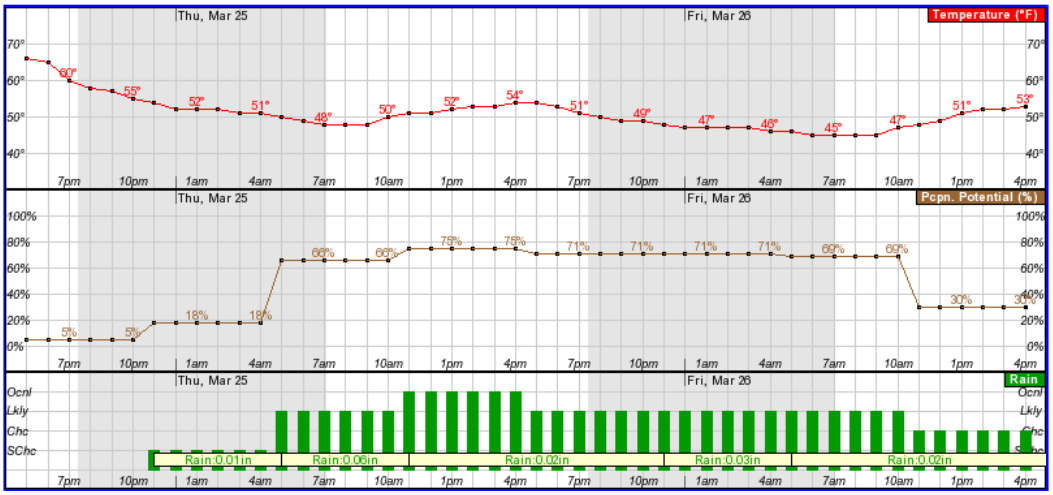
Last Update: 3:29 pm PDT Mar 24, 2010

Hourly Weather Forecast Graph

[dashes/dots] | [b/w] | [hide menu]

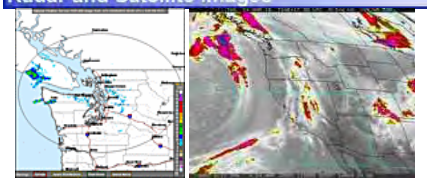
☑ Temperature (°F)	☐ Surface Wind mph	☐ Thunder
☐ Dewpoint (°F)	☐ Sky Coverage	☑ Rain
☐ Wind Chill (°F)	☑ Precipitation Potential	☐ Snow
	☐ Relative Humidity	☐ Freezing Rain
		☐ Sleet

48-Hour Period Starting: 5pm Wed, Mar 24 Submit Back 2 Days Forward 2 Days



Thursday, March 25 at 6am
Temperature: 49 °F
Precipitation Potential: 66%
Rain: Likely (60%-70%)

Radar and Satellite Images



Additional Forecasts & Information

International System of Units
Forecast Discussion
7-Day Forecast
Tabular Forecast
Quick Forecast

Webmaster
NOAA's National Weather Service
Seattle, WA

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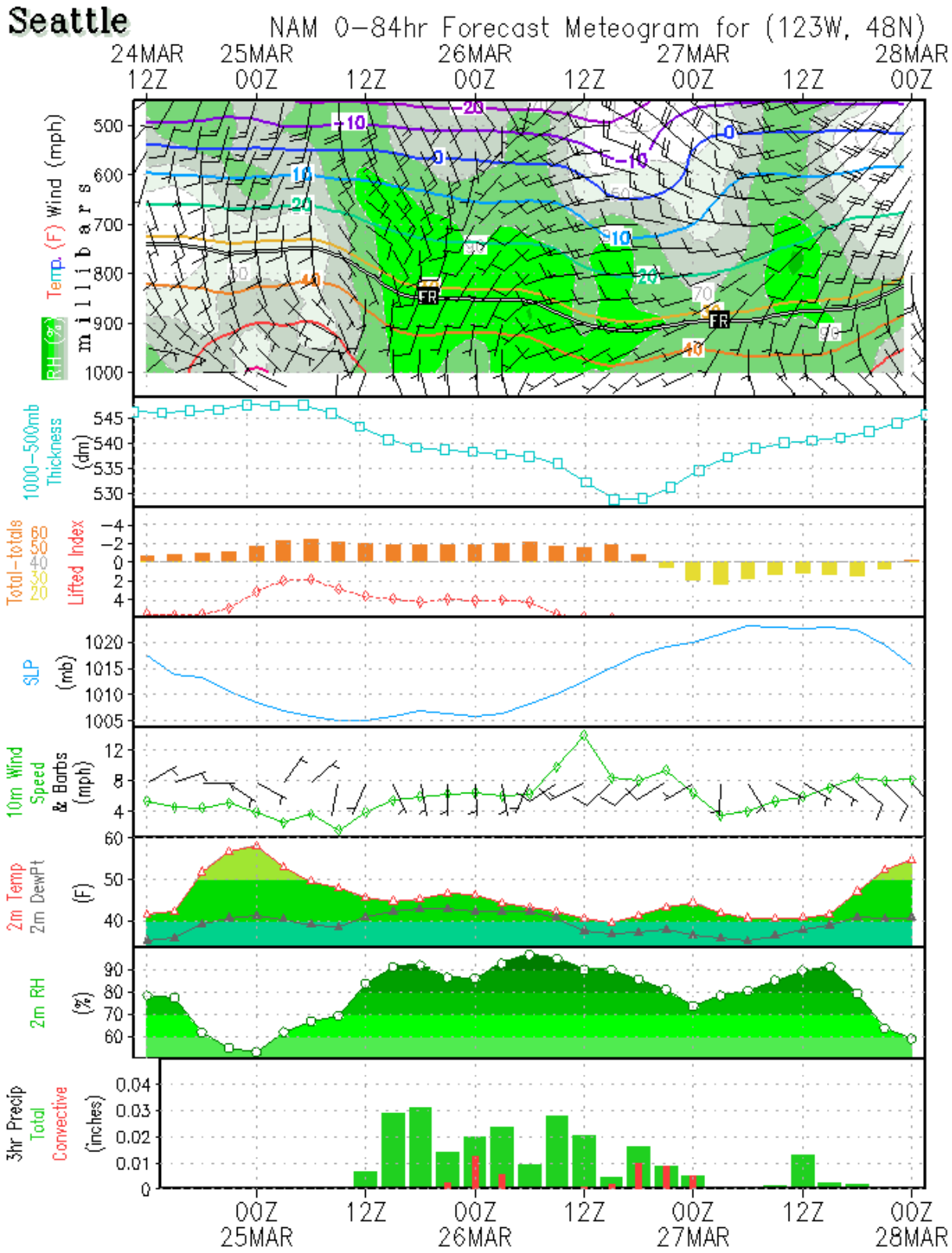
Career Opportunities


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
24MAR 12Z
25MAR 00Z
12Z
26MAR 00Z
12Z
27MAR 00Z
12Z
28MAR 00Z
Temp (F) Wind (mph) RH (%)
millibars
500
600
700
800
900
1000
1000-500mb Thickness (dm)
545
540
535
530
Total-totals
Lifted Index
SLP (mb)
1020
1015
1010
1005
10m Wind Speed & Barbs (mph)
2m Temp 2m DewPt (F)
2m RH (%)
3hr Precip Total Convective (inches)
0.04
0.03
0.02
0.01
0
00Z 25MAR
12Z
00Z 26MAR
12Z
00Z 27MAR
12Z
00Z 28MAR

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	May 10, 2010
TO:	Matt Woltman / Megan McCullough
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600 Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409 (office) or 206-794-0095 (cell)
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #7 (03/28/2010)

Please find included the following:

- Storm report narrative (3 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- pH Worksheet (1 pg),
- Groundwater level measurement form, (1 pg)
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (2 pg),
- Sampler Reports (18 pgs), and
- Weather forecasting information (6 pgs).

Please let me know if you have any questions or need additional information. Thank You.

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

Dave Metallo, LHG , Project Manager

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments (LLA) Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #7
March 28th, 2010

The relatively drier period and weak storm systems that had characterized the first three weeks of the month finally gave way to a wetter period during last week of March. Storm events that occurred during the last week in March were stronger and better organized regionally throughout the central Puget Lowlands. Stormwater Sampling Event (STE) #7 occurred on March 28th, 2010. The storm that occurred on the 28th started as a moderate event with scattered showers and heavier periods of rain in the early morning, afternoon and late evening periods. However, a second much stronger wetter and windier system pushed into the region causing rain, heavy at times, starting mid-morning of the 29th and ending mid-morning on the 30th as a broad upper level trough settled over the area. The storm event produced a total of nearly one and a half (1.49) inches of rain over the surrounding project area, with the LLA monitoring stations sampling between 1.11 and 1.22 inches of this rainfall depth. Detailed weather forecast information is attached to this report.

Storm and Sample Validation / Qualification:

All validation and qualification conditions for this storm event were met. These validation and qualification conditions included forecast probability, antecedent dry period, runoff occurrence / hydrograph stage, parameters collected, 75 % flow representation, minimum number of aliquots, pH measurement, quality control sample collection and anomalous conditions. See the accompanying *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding STE#7.

Grab Sampling, Composite Sampling and Autosampler Enabling:

The three sampling LLA Project sampling stations were CB31A (main line inlet), CB4857 (main line outlet) and CB1 (onsite system outlet). Grab samples were collected using Teflon-lined tubing, dedicated at each sampling station, which was attached to a point adjacent to the intake of the composite sampling line. A peristaltic pump was used to collect the grab samples through these dedicated lines at each station. All grabs were collected as early as possible during the storm event once runoff was noted and at points within the associated station hydrographs that were elevated above base flow conditions.

Composite samples were collected via autosamplers with a 12 (1-gallon glass) bottle arrangement also utilizing Teflon-lined tubing dedicated at each sampling station. Each of the three autosamplers were programmed to collect samples via time paced programming. Initially each autosampler was set to collect an aliquot every 24-minutes (providing for 120-minutes per discrete sample bottle giving 24 hours of storm duration coverage). However, based on updated forecast information and optimal compositing requirements, the sample collection pacing rate was adjusted to 42-minutes, thus allowing for a total collection time of up to approximately 38-hours. This was an appropriate programming selection given the forecast information. Details pertaining to the programming and event-specific operation of each sampler unit is contained in the attached *Sampler Reports*. Collection of grab and composite samples followed the methodology detailed in the LLA Work Plan.

All three sampling stations were automatically enabled via the use of flow meters that were connected to autosamplers. The flow meters were pre-programmed to trigger sampling above certain pre-determined threshold levels. These threshold levels were determined based on an examination of pre-storm base-flow condition levels, known periodic or cyclic events (e.g. timed watering, construction pumping, etc. that occur in the basin) and runoff response from past events. CB31A and CB4857 used stand-alone in-pipe area-velocity

sensors for sample triggering and direct measurement of water level in the pipe, flow velocity and flow volume. CB1 used an area-velocity sensor in combination with a Thel-Mar volumetric weir. At this location the area-velocity sensor was used only for direct measurement of level (calibrated to the weir crest). Flow volume was then post-calculated via manufacturers published stage-discharge relationship information based on the acquired level data. All sampling and flow monitoring equipment operated as designed and programmed. All three sampling stations automatically level enabled within 29 minutes from the beginning of the storm event (3/28/10 04:20), with CB4857 and CB1 enabling within six minutes relative to each other.

Flow Data Summary:

CB-31A and CB-4857 had a storm volume difference of approximately 113,325 gallons, with the inlet recording more flow then the outlet. This is likely a consequence of the drainage system vactoring and resultant change in hydraulic conditions at CB4857 noted in STE Reports #'s 3 and 4. Since accumulated sediment was removed from the piping and vaults associated with CB4857, water flows more freely and is not being impounded to the degree previously noted prior to the vactoring event. Water depth in the pipe (at the area-velocity sensor anchor position) does not increase as readily in association with rainfall as it had done during past events and observations. These shallower water conditions in the pipe at CB4857, coupled with its 4% slope (field measured) tended to make flow monitoring more difficult. However, highly accurate and precise flow measurement for the purpose of mass balance calculation through the piping system was not a project objective. Nor is it a critical factor in the representative characterization of stormwater chemistry at this site. Flow hydrographs are relative to their associated sampling stations and were noted to have very similar runoff response signatures when compared to each other for a given storm event.

CB1 had a measured storm flow volume of 17, 763 gallons. This was by far the highest single event volume total noted at this location. However, it is consistent with the amount of rainfall that occurred during this storm event. Storm event specific hydrographs showing, level, flow and rainfall data, as well as sample markers and grab sample collection indications, for each of the monitoring stations are attached to this report.

Compositing Scheme:

All of the composite samples were manually flow weighted based on site specific flow information. The hydrographs from each monitoring station were examined and decisions were made as to what specific discrete sampler bottles were to be included in the composite samples. Due to the nature of this particular storm event all three sampling stations utilized bottles one, five, seven, nine, 10 and 12 (out of 12). The remainder of the bottles represented base flow or mostly base flow conditions. See the attached *Field Sampling Forms* and their accompanying *Compositing Worksheets* for these details.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grabs or composite samples were placed into coolers and put on ice to maintain temperatures between 2 and 6 °C. A small portion of each of the of the composite samples was poured off for the assessment of pH. pH measurements were collected prior to delivery of the samples to the lab. These measurements were recorded on the attached *pH Measurement Worksheet.* All sample IDs, collection date and time, matrix, requested parameter analysis and other associated information were documented on *Chain-of-Custody forms* (attached). Samples were in direct control of project and/or laboratory personnel at all times. Samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was

collected from the targeted stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Quality Control Samples:

During this event adequate water volume for duplicate and MS/MSD analyses was collected and submitted for both the grab and composite samples. Both the grab and composite duplicates were collected at CB31A – which were designated as location "CB100". This was done to present a "blind" sample (not readily identifying these duplicates) to the testing facility. Both the grab and composite MS/MSD volumes were collected at CB1 – and were labeled as such. Trip blanks accompanied all volatile organic samples collected during this STE. See the attached *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* and the *Field Sampling Forms* for details regarding QC sample collection.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. These locations were MW-2, MW-3, MW-4, and MW-6. Details regarding the measurement event are contained in the attached *Groundwater Level Measurement* field sheet. Measurements are listed in the table below.

Groundwater Level Measurements, STE#7

Location	Date	Time	Water Level from TOC (FT)	Notes
MW-2	3/30/2010	10:10	6.41	replacement for MW-1 and MW-5, as previously noted
MW-3	3/30/2010	10:07	17.24	
MW-4	3/30/2010	10:03	16.09	
MW-6	3/30/2010	09:58	11.98	

Anomalies and/or Work Plan Deviations:

There were no anomalies observed that would have otherwise caused any of the STE#7 samples to be non-representative of the conditions from which they were collected. Composite sampling duration for this event, as noted above, lasted up to 38 hours at each of the monitoring stations. This longer period was chosen so that stormwater concentrations could be better represented over more of the total duration of the storm event. There were no observed 12-hour rainfall gaps observed in the station hydrographs, which would have stipulated ending the sampling event, anywhere within this 38-hour period.

Actions To Be Completed:

Routine sampler maintenance and flow meter (level) calibrations will be conducted at a regular frequency to assure proper equipment operation. This was the seventh of ten anticipated storm sampling events. An attempt will be made to conduct three more events before late-May, 2010. The current focus of the field efforts will be in maintaining proper station and equipment operation, data and resource management and storm-tracking tasks.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #7 (03-28-2010)

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] *Storm Event Data:*	
Project Storm Event (STE) #	7
Event Forecast Probability (%)	90%
Antecedent Dry Period (days: hrs: mins)	2:02:25
STE Start Date & Time	3/28/10 4:20
STE Duration (hrs:mins)	51:55
STE End Date & Time	3/30/10 8:15
Period Between Next Measureable Rain (hrs: mins)	11:15
Was Targeted STE Qualified Per LLA QAPP	**YES**
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	1.49
Max 1-hr Rainfall Intensity (in/hr)	0.16
Average 1-hr Rainfall Intensity (in/hr)	0.03

[1] *Sample Collection Criteria:*			
Sampling Station	**CB-31A**	**CB-4857**	**CB-1**
Was Grab sample collected?	**Yes**	**Yes**	**Yes**
Grab ID	CB31A032910GRAB	CB4857032910GRAB	CB1032910GRAB
Grab Date /Time	3/29/2010 7:40	3/29/2010 8:00	3/29/2010 8:15
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	**Yes**	**Yes**	**Yes**
Hydrograph stage at grab collection	intra-storm peak	intra-storm peak	intra-storm peak
Grab parameters collected per LLA QAPP ?	**Yes**	**Yes**	**Yes**
Were Trip Blanks included w/ Grab samples ?	**Yes (TB032810)**	**Yes (TB032810)**	**Yes (TB032810)**
Was Comp sample collected?	**Yes**	**Yes**	**Yes**
Comp ID	CB31A032910COMP	CB4857032910COMP	CB1032910COMP
Comp Date /Time	3/29/2010 18:12	3/29/2010 19:00	3/29/2010 18:54
Total volume measured during storm period (gallons)	375920	362595	17763
Volume sampled during storm period (gallons)	375920	362595	17763
Volume utilized for comp. sample (gallons)	348890	359495	17092
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	**Yes (93%)**	**Yes (99%)**	**Yes (96%)**
Were a minimum of 8 aliquots collected for comp sample ?	**Yes (30)**	**Yes (30)**	**Yes (30)**
Comp parameters collected per LLA QAPP ?	**Yes**	**Yes**	**Yes**
Rainfall during sampling period (in)	1.11	1.19	1.22
pH Measurements Collected ?	**Yes**	**Yes**	**Yes**
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	**No**	**No**	**No**
[1] *QC Sample Summary Information:*	**CB-31A**	**CB-4857**	**CB-1**
Was Grab sample duplicate collected ?	**Yes**	**No**	**No**
Grab sample duplicate ID	CB100032910GRAB	na	na
Grab sample date and time	3/29/2010 8:40	na	na
Was Comp sample duplicate collected ?	**Yes**	**No**	**na**
Comp sample duplicate ID	CB100032910COMP	na	na
Comp sample date and time	3/29/2010 19:12	na	na
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	**No**	**No**	**Yes (both)**

[1] If the answer to any of the Storm Event or Sample Collection Criteria questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 5/10/10 **Reveiwed By / Date:** 5/11/10

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

ARI Assigned Number:	Turn-around Requested: Standard	Date: 3-29-2010	
ARI Client Company: Floyd / Snider	Phone: 206-292-2078	Page: 1 of 1	
Client Contact: Matt Woltman / Megan McCullough		No. of Coolers: 1	Cooler Temps:
Client Project Name: Lora Lake Apartments			
Client Project #: POS-LLA	Samplers: D. Metallo		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-5200 206-695-5201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOC 8260C-SIM	Analysis Requested: NWTPH-Dx (1)	Notes/Comments
CB31A032910GRAB	3.29.10	0740	W	5	X	X	
CB4857032910GRAB	3-29-10	0800	W	5	X	X	
CB1032910GRAB	3-29-10	0815	W	13	X	X	Run MS/MSD
CB10003291OGRAB	3-29-10	0840	W	5	X	X	
TB032810	3-28-10	1830	W	3	X		Trip blank

Comments/Special Instructions
(1) Acid/silica gel clean up for NWTPH-Dx

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)	Dave Metallo	Jonathon Walter		
Printed Name:	Dave Metallo	Jonathon Walter		
Company:	Taylor Assoc. Inc.	ARI		
Date & Time:	3-29-10 (1040)	3/29/10 1040		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: | Turn-around Requested: Standard

ARI Client Company: Floyd/Snider | Phone: 206-292-2078

Client Contact: Matt Waltman / Megan McCullough

Client Project Name: Lora Lake Apts

Client Project #: | Samplers: D. Metallo, P. Heltzel, J. Hamman

Date: 3-30-2010

Page: 1 of 1

No. of Coolers: 2 | Cooler Temps: 4.6, 5.9

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM low level	PCP 8041	Arsenic Total+Diss 200.8	Dioxin/Furan 1613	TSS SM2540D				Notes/Comments
					Analysis Requested								
CB31A032910COMP	3.29.10	1812	W	1									pH Measurements (see attached worksheet) 6.55
CB48570329 10COMP	3.29.10	1900	W	1									6.81
CB1032910COMP	3.29.10	1854	W	1									6.25
CB10003291DCOMP	3.29.10	1912	W	1									6.62

① Run MS/MSD

Comments/Special Instructions
- Bottles & glassware decon'ed to LLA project specific SOP (see attached sheet)

Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Peter Heltzel	Printed Name: A. Volgamsen	Printed Name:	Printed Name:
Company: TAI	Company: ARI	Company:	Company:
Date & Time: 3/30/10 2:44	Date & Time: 3/30/10 1444	Date & Time:	Date & Time:

① MS/MSD vol. does NOT include extra vol. for Dioxin/Furan analysis

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB314 — 8 or 12 x 1 gallon bottle set-up — Rev.ed 2/11/2010 — Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: BK/DH/SS		Weather: PT CLOUDY		Arrival Date/Time: 03/26/10 @ 13:40	
Carry-over maintenance to do prior to set-up:	NONE			done?	—
Sampler Battery Voltage	12.41	Changed? (Y) N		New voltage	12.92
Flow Meter Battery Voltage	12.41	Changed? (Y) N		New voltage	12.92
Flow Meter		**Sampler/s**			
Date/time correct? (Yes/No)	Y	Pump Tubing OK?	Y		
Flow meter cables OK? (Yes/No)	Y	Pump Tubing Replaced? (Yes/No)	N 124% *		
Desiccant Canisters OK (Yes/No)	Y	Sample Tubing & Strainer OK?	Y		
Flow Meter Level (FT)	0.376	Comp and Grab Lines Back flushed with DI?	Y	Y	
Actual level Reading (FT)	—	Desiccant Condition, replaced?	OK, NOT REPLACED		
Difference (FT)	—	Suction line & quick connect attached?	Y		
Level calibrated? (Yes/No)	Y	Clean bottles installed & lids off?	Y		
Velocity (fps)	* 0.06 *	Diagnostics / Distributor arm check?	Y		
Flow Rate (gpm)	11	Enable Level (FT)	0.410		
Data Downloaded (Yes/No)	N	Pacing Type ("T"ime/"F"low), interval / rate	T, 24 [illegible]		
Channel conditions/observations: CHANNEL clay, NO UNUSUAL OBSERVATIONS		Program Reviewed? (Yes/No)	Y		
		Last Screen	DISABLED		
		Ice Deployed? (Yes/No)	N		

Notes: PUMP TUBING SHOULD BE REPLACED BEFORE NEXT SAMPLE EVENT!
REPLACED BATTERY DESICCANT IN FLOW METER.

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM — Weather: Rain, 40-50°F — Arrival Date/Time: 3.28.10 (0720)

Grab Sample Data		Sample Observations: Starting to rain hard!	
Runoff Present or Hydrograph Elevated?	Yes		
Grab Collection Time (date/time)	3.28.10 (0740)		
Grab Sample ID	CB31A032810GRAB		
Grab Duplicates Collected?	Yes	**Sampler**	
Grab Duplicate Collection (date/time)	3.28.10 (0840)	Equipment running correctly?	Yes
Grab Duplicate ID	CB100032810GRAB	Composite Begin Time (date / time)	3.28.10 (0431)
Grab MS/MSD Collected ?	No	On Composite... (bottle # / aliq #)	5 of 5 BTL #9
VOA Trip Blank in cooler?, ID	Yes TB032810	Ice deployed?	NO
Flow Meter		Sampler Battery Voltage (changed?):	12.85 NO V
Flow meter cables OK? (Y/N)	Yes	Flow Meter Battery Voltage/Change? (if different)	NA
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Bottle Swap needed? (if yes fill out Section 3)	NO

Notes:

Section 3. Mid-Storm Check / Bottle Switch

Personnel: VH — Weather: overcast — Arrival Date/Time: 09:10 3.28.10

Composite Begin Time (date / time)	3/28/10 04:31	Round #:	1
Last Aliquot Taken (date / time, btl #, aliq #)	3/28/10 08:55 Btl 3 Aliq 2	Data downloaded?	Yes
Comp Bottles Labeled? (sta. & btl #)	No, mid storm v	Sampler/Flow Meter Batt. Voltage (changed):	12.68, N
Comp Sample Volume Collected	100%	Ice deployed? No	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed
None

Channel conditions/observations
ok, none observed

Notes/Maintenance Needed:
* Changed pacing to 42 min / sample

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: 31A

Section 4. Comp. Bottles Retrieval

Personnel: JH/PH	Weather: CLOUDY		Arrival Date/Time: 3/30/10	1045	
Sampler Battery Voltage	12.65	Changed? (Y) ~~(N)~~ YES	New voltage	13.00	
Flow Meter Battery Voltage	—	Changed? Y N	New voltage	—	
Comp Sample Volume Collected 100%	Except 6, 12 = 85%	Data downloaded? YES			
Composite Begin Time (date/time)	3/28/10 04:31		Round #: 1		
Last Aliquot Taken (date/time, btl #, aliq #)	3/29/10 - 18:13	BTL# 12 / ALIQ# 5			
Comp Bottles Labeled? (sta. & btl #)	YES				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed
3/29/10 17:31 BTL# 12/ALIQ# 4 (4 COUNTS)
3/28/10 19:49 BTL# 6/ALIQ# 3 (96 COUNTS

Channel conditions/observations

Notes/Maintenance Needed:

Section 5. Post Storm Comp. Sample Processing

Personnel: PH/DM	Date/Time: 3-30-2010 (~1130)
Processing Location: POS Storm Lab	
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info).: YES	Rain Gauge Info: YES
How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: 12X (3500 ml)
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4500 ml	Actual Comp. Sample Vol. Available: 4602 ml
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp.)	Other (explain):
Bottles (Btl #s) used for Comp. Sample: 1, 5, 7, 9, 10 & 12	Comp. Sample Container Size & Material: 2.5 gal WM glass jug
Comp Collection Time (date/time): 3-29-10 (1812)	Comp Sample ID: CB31A032910COMP
pH Measurements Collected On Comp. Sample ?: YES 6.55	
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: YES	

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): ~~NO QC SAMPLES~~ YES	
Duplicate Sample Collected ? ~~NO~~ YES	Duplicate Sample Vol.: ~~NA~~ 4602 ml
Duplicate sample Date / Time: ~~NA~~ 3-29-2010 (1912)	Duplicate Sample ID: ~~NA~~ CB10003291OCOMP
pH Measurement Collected on Duplicate Comp. Sample?: ~~NA~~ YES 6.62	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: NO	
MS/MSD Vol. submitted: NA	
Were any other QC sample types colelcted? (if yes, provide details) NO	
DI Water Information None Used	

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB4857

8 or 12 x 1 gallon bottle set-up
Rev.ed 2/11/2010

Page: 1 of 2
pages per station

Section 1. Storm Setup and Inspection

Personnel: BK / DM / SS	Weather: PT CLOUDY			Arrival Date/Time: 03/26/10 @ 14:30	
Carry-over maintenance to do prior to set-up:	NONE				done? —
Sampler Battery Voltage	12.70	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	12.70	Changed? Y (N)		New voltage	—

Flow Meter		Sampler/s	
Date/time correct? (Yes/No)	Y	Pump Tubing OK?	N, ISSUE WITH ISM
Flow meter cables OK? (Yes/No)	Y	Pump Tubing Replaced? (Yes/No)	Y
Desiccant Canisters OK (Yes/No)	N, CHANGED	Sample Tubing & Strainer OK?	Y
Flow Meter Level (FT)	-0.002	Comp and Grab Lines Back flushed with DI?	Y Y
Actual level Reading (FT)	—	Desiccant Condition, replaced?	N, REPLACED
Difference (FT)	—	Suction line & quick connect attached?	Y
Level calibrated? (Yes/No)	N	Clean bottles installed & lids off?	Y
Velocity (fps)	Ø	Diagnostics / Distributor arm check?	Y
Flow Rate (gpm)	Ø	Enable Level (FT)	0.03
Data Downloaded (Yes/No)	N	Pacing Type ("T"ime/"F"low), interval / rate	TIME, 24 MINS/ACH
Channel conditions/observations: LIGHT OIL SHEEN ON SURFACE		Program Reviewed? (Yes/No)	Y
		Last Screen	DISABLED
		Ice Deployed? (Yes/No)	N

Notes:

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM | Weather: Rain, 40-50° | Arrival Date/Time: 3-28-10 (0750)

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?	Yes		
Grab Collection Time (date/time)	3-28-10 (0800)		
Grab Sample ID	CB485703281OGRAB		
Grab Duplicates Collected?	NO	**Sampler**	
Grab Duplicate Collection (date/time)	NA	Equipment running correctly?	Yes
Grab Duplicate ID	NA	Composite Begin Time (date / time)	3-28-10 (0500)
Grab MS/MSD Collected ?	NO	On Composite... (bottle # / aliq #)	5 of 5 BTL#9
VOA Trip Blank in cooler?, ID Yes	TB032810~~GRAB~~	Ice deployed?	NO
Flow Meter		Sampler Battery Voltage (changed?):	12.68 No ✓
Flow meter cables OK? (Y/N)	Yes	Flow Meter Battery Voltage/Change? (if different)	NA
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Bottle Swap needed? (if yes fill out Section 3)	NA

Notes:

Section 3. Mid-Storm Check / Bottle Switch

Personnel: PH | Weather: OVERCAST, PART SUN | Arrival Date/Time: 3/28/10 9:36

Composite Begin Time (date / time)	3/28/10 05:00		Round #: 1
Last Aliquot Taken (date / time, btl #, aliq #)	3/28/10 07:48 Btl 2, Aliq 3 (last good)	Data downloaded?	Yes
Comp Bottles Labeled? (sta. & btl #)	No, mid-storm ✓	Sampler/Flow Meter Batt. Voltage (changed):	12.58, N
Comp Sample Volume Collected	100%, some overfilled	Ice deployed?	No

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed
3/28/10 08:12 Btl 2, Aliq 4-5 (NML)
3/28/10 09:00 Btl 3, Aliq 1-2 (NML)

Channel conditions/observations
Ok, none observed

Notes/Maintenance Needed:
* changed pacing to 42 min/sample

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB 4457

Section 4. Comp. Bottles Retrieval

Personnel: PH, JH	Weather: Overcast		Arrival Date/Time: 3/30/10	10:20	
Sampler Battery Voltage	12.79	Changed? (Y) N	New voltage	13.25	
Flow Meter Battery Voltage	N/A	Changed? Y N N/A	New voltage	N/A	
Comp Sample Volume Collected	100L some overbilled	Data downloaded? Yes			
Composite Begin Time (date/time)	3/28/10 05:00		Round #: 1		
Last Aliquot Taken (date/time, btl #, aliq #)	3/29/10 19:00 Bottle 12, Aliq 5				
Comp Bottles Labeled? (sta. & btl #)	Yes				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

Bottle 3, Aliq 3-5, NML

Bottle 4, Aliq 1-4, NML

See Section 3, for other missed (NML)

Channel conditions/observations

Notes/Maintenance Needed:

Section 5. Post Storm Comp. Sample Processing

Personnel: PH/DM Date/Time: 3-30-2010 (~1200)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info).: Yes Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: (12 X 3500 ml) - aliq's missed
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4500	Actual Comp. Sample Vol. Available: 4660
Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp.)	Other (explain):
Bottles (Btl #s) used for Comp. Sample: 1, 5, 7, 9, 10-12	Comp. Sample Container Size & Material: 2.5 gal glass w/M jug
Comp Collection Time (date/time): 3-29-10 (1900)	Comp Sample ID: CB4857032910COMP
pH Measurements Collected On Comp. Sample ?: Yes (6.81	

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): NO QC Samples

Duplicate Sample Collected ? NO	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: NO

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: NO

MS/MSD Vol. submitted: NA

Were any other QC sample types colelcted? (if yes, provide details) NO

DI Water Information None used

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB1

8 or 12 x 1 gallon bottle set-up

Rev.ed 2/11/2010

Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: BK/PH/SS Weather: PT CLOUDY Arrival Date/Time: 03/26/10 @ 14:15

Carry-over maintenance to do prior to set-up: NONE done? ——

Sampler Battery Voltage	12.56	Changed? (Y) N	New voltage	12.82
Flow Meter Battery Voltage	12.56	Changed? (Y) N	New voltage	12.82

Flow Meter		Sampler/s		
Date/time correct? (Yes/No)	Y	Pump Tubing OK?	Y 376 K	
Flow meter cables OK? (Yes/No)	Y	Pump Tubing Replaced? (Yes/No)	N	
Desiccant Canisters OK (Yes/No)	Y *	Sample Tubing & Strainer OK?	Y	
Flow Meter Level (FT)	-0.01	Comp and Grab Lines Back flushed with DI?	Y	Y
Actual level Reading (FT)	——	Desiccant Condition, replaced?	ok *	
Difference (FT)	——	Suction line & quick connect attached?	Y	
Level calibrated? (Yes/No)	N	Clean bottles installed & lids off?	Y	
Velocity (fps)	n/a	Diagnostics / Distributor arm check?	Y	FLEXIBLE 3/4
Flow Rate (gpm)	n/a	Enable Level (FT)	0.03	
Data Downloaded (Yes/No)	N	Pacing Type ("T"ime/"F"low), interval / rate	T / 24 mins / ALIQ.	
Channel conditions/observations: CHANNEL OKAY		Program Reviewed? (Yes/No)	Y	
		Last Screen	DISABLED	
		Ice Deployed? (Yes/No)	N	

Notes: * REPLACE FM DESICCANT BEFORE NEXT STORM EVENT

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM Weather: Rain 40-50° Arrival Date/Time: 3-28-10 (0810)

Grab Sample Data	
Runoff Present or Hydrograph Elevated?	Yes
Grab Collection Time (date/time)	3-28-10 (0815)
Grab Sample ID	CB1032810GRAB
Grab Duplicates Collected?	NO
Grab Duplicate Collection (date/time)	NA
Grab Duplicate ID	NA
Grab MS/MSD Collected ?	Yes
VOA Trip Blank in cooler?, ID Yes	TB032810

Sample Observations: @ time of sampl. collection weir level = 0.92' runoff was occurring - sampl. event drew weir down to 0.75'

Sampler	
Equipment running correctly?	Yes
Composite Begin Time (date / time)	3-28-10 (0454)
On Composite... (bottle # / aliq #)	5 of 5 BTL # 9
Ice deployed?	NO
Sampler Battery Voltage (changed?):	12.77 NO V
Flow Meter Battery Voltage/Change? (if different)	NA
Bottle Swap needed? (if yes fill out Section 3)	NA

Flow Meter	
Flow meter cables OK? (Y/N)	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes

Notes:

Section 3. Mid-Storm Check / Bottle Switch

Personnel: PH Weather: overcast / partly sun Arrival Date/Time: 9:25 3/28/10

Composite Begin Time (date / time)	3/28/10 04:54	Round #: 1	
Last Aliquot Taken (date / time, btl #, aliq #)	3/28/10 09:18 ~~3F~~/BH, 3/Al, 2	Data downloaded?	yes
Comp Bottles Labeled? (sta. & btl #)	NO, mid storm V	Sampler/Flow Meter Batt. Voltage (changed):	12.66, N
Comp Sample Volume Collected	100%	Ice deployed? NO	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

None

Channel conditions/observations

OK, none observed

Notes/Maintenance Needed:

* changed pacing to 42 min/sample

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB1

Section 4. Comp. Bottles Retrieval

Personnel: PH / JH	Weather: Cloudy		Arrival Date/Time: 3/30/10	09:34	
Sampler Battery Voltage	12.53	Changed? (Y) N	New voltage	13.18	
Flow Meter Battery Voltage	—	Changed? Y N —	New voltage	—	
Comp Sample Volume Collected	100% EXCEPT BTL#7 = 75%	Data downloaded?	YES		
Composite Begin Time (date/time)	3/28/10 / 0454		Round #: 1		
Last Aliquot Taken (date/time, btl #, aliq #)	3/29/10 / 1854 BTL#12 / ALIQ #5				
Comp Bottles Labeled? (sta. & btl #) YES	~~100% EXCEPT BTL#7 = 75%~~ (1 - BTL 4)				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed
3/28/10 ~1412 - BTL#4 / ALIQ#4 - NML

Channel conditions/observations

Notes/Maintenance Needed:
Water in batt. box

Section 5. Post Storm Comp. Sample Processing

Personnel: PH / DM — Date/Time: 3-30-10 (~1230)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info).: Yes — Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: 12 x 3500 ml
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (Incldng QC Smpls): 8506	Actual Comp. Sample Vol. Available: 8768
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp) Other (explain):	
Bottles (Btl #s) used for Comp. Sample: 1, 5, 7, 9, 10 & 12	Comp. Sample Container Size & Material: 2.5 gal glass WM jug
Comp Collection Time (date/time): 3-29-10 (1854)	Comp Sample ID: CB1032910COMP

pH Measurements Collected On Comp. Sample ?: Yes 6.25

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes

Duplicate Sample Collected ? NO	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: NA

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: Yes

MS/MSD Vol. submitted: ~~8500~~ 8768 Total → 4268 ml for MS/MSD

Were any other QC sample types colelcted? (if yes, provide details) NO

DI Water Information None used

Notes:

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: LoraLake Apts

Date: 3/30/10
Staff: PH
pH meter make/model #: Orion 2 Star

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB10329/0comp	6.25	13:02	
CB31A0329/0comp	6.55	13:06	
CB1000329/0comp	6.62	13:10	
CB4857032910comp	6.81	~~13:06~~	13:16

Post-Measurement Check

Nominal pH value of standard	7.00	
Temperature (deg C)	17	
Standard pH, temp corrected	7.01	
Meter pH reading (SU)	7.07	
Difference (SU)	0.06	*Should be < 0.1 (round to 0.0)*
Time	13:22	

Form to be included in storm file, as applicable

TAYLOR ASSOCIATES, INC.

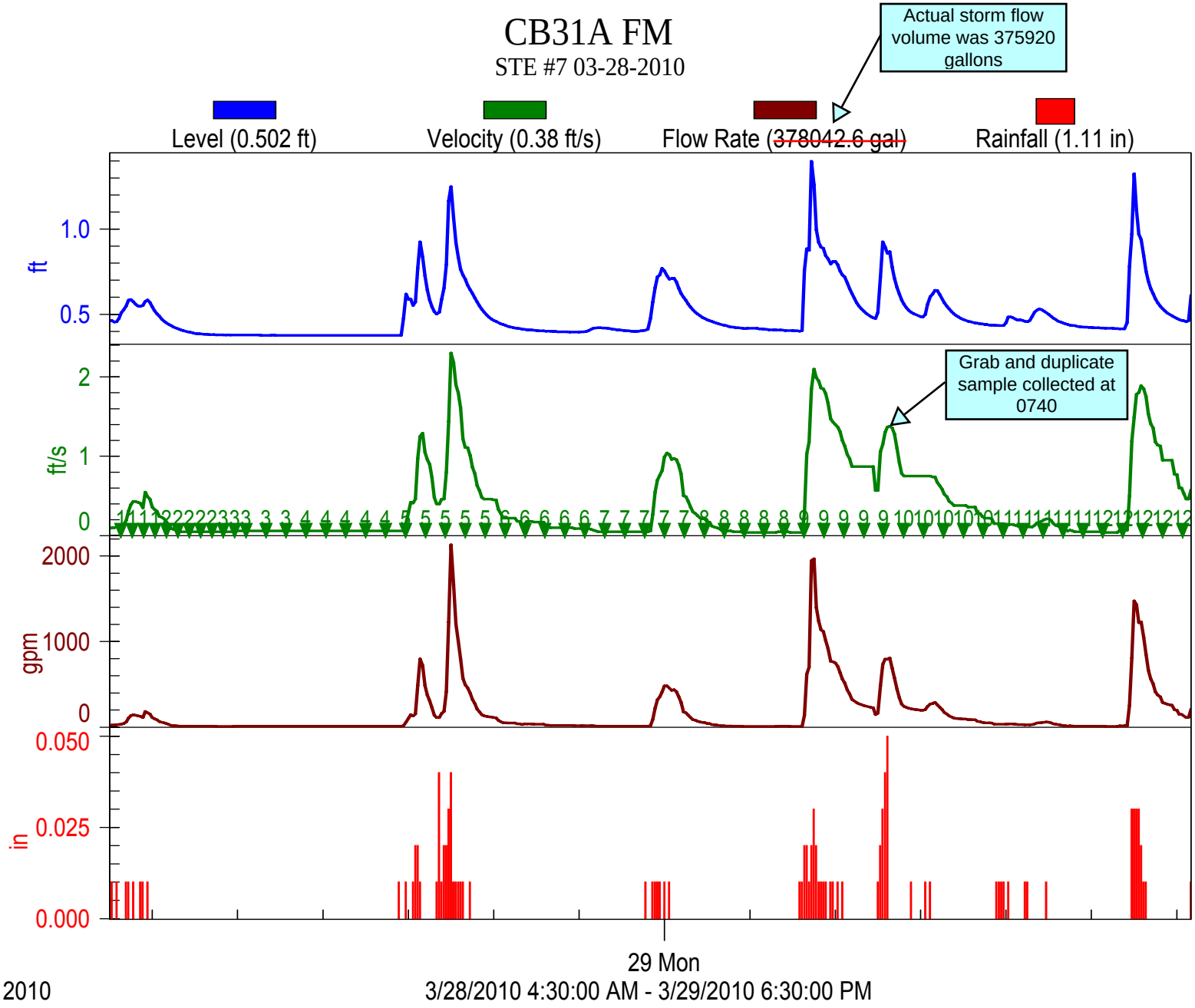
POS - Lora Lake Apartments Stormwater Interim Action

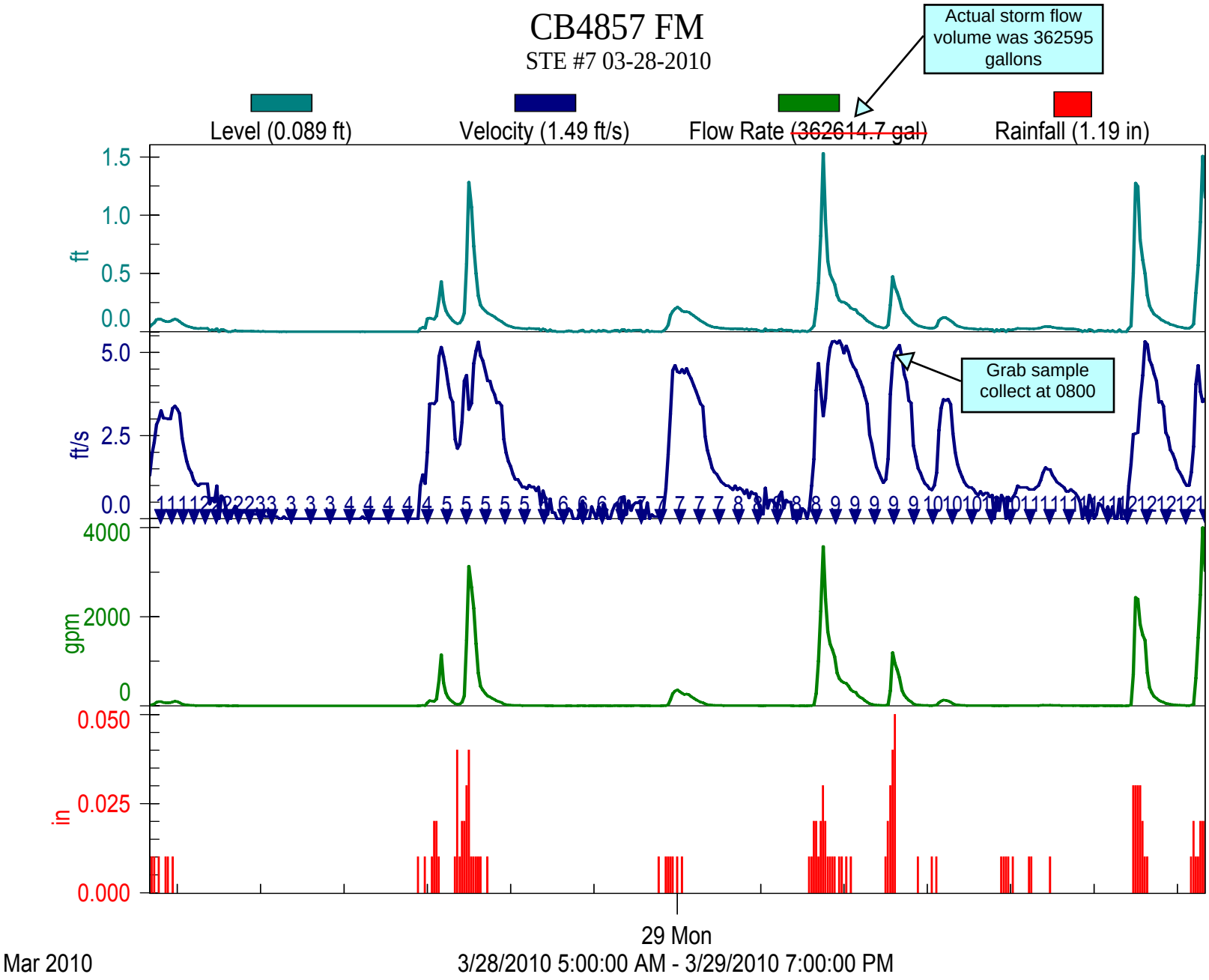
Groundwater Level Measurement Field Form

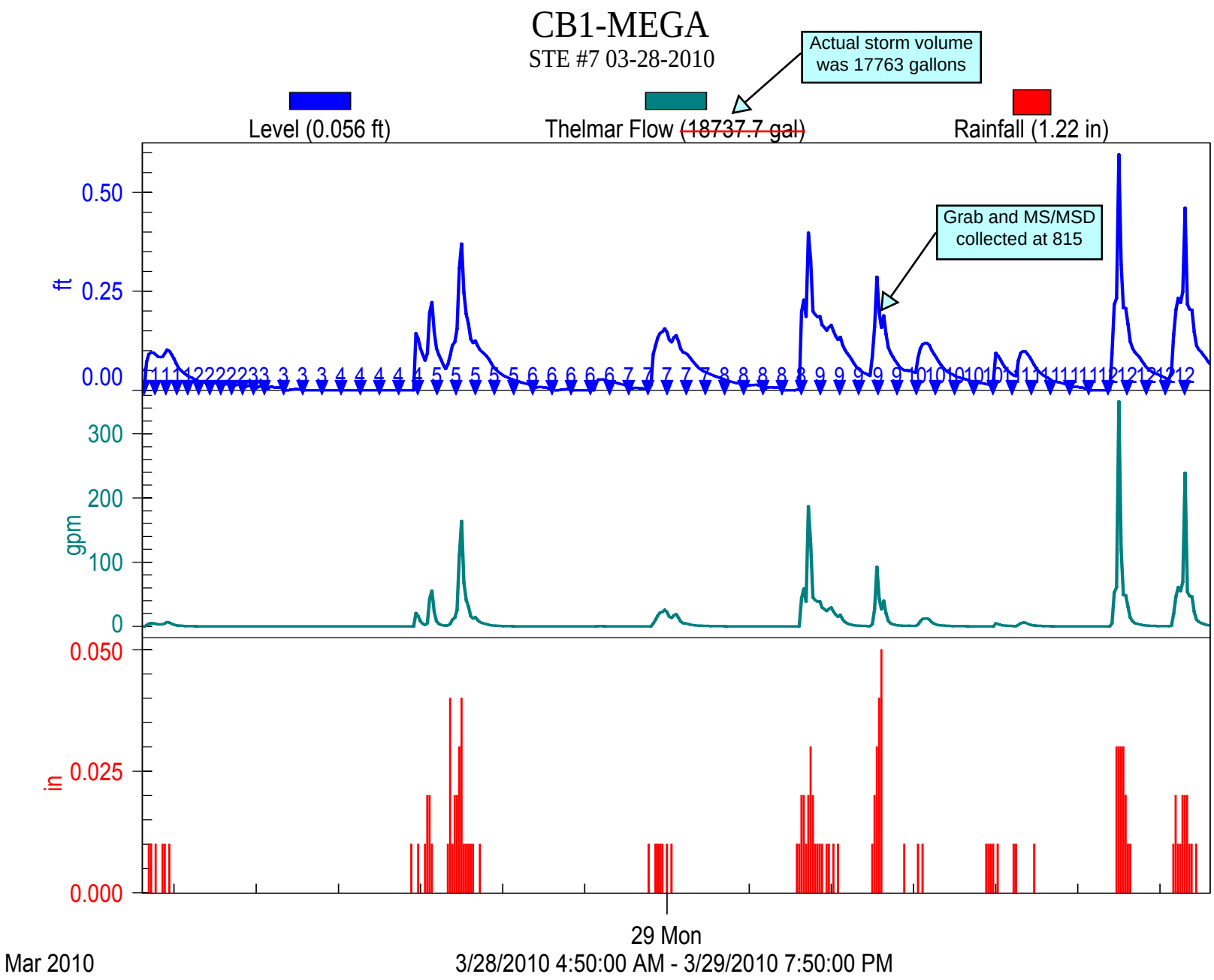
Personnel: JH / PH	**Arrival Date/Time:** 3/30/10 / 09:58
Weather: CLOUDY	
Precip in Last 24-hrs / Last Measureable Rain Event: Rained throughout 3/28 & 3/29, last rain was at (0815) (0.01") 3/30/10	

Monitoring Well ID	Time	Water Level (FT)	Meas. Reference
MW-6	9:58	11.98	Top of PVC
MW-4	10:03	16.09	Top of PVC
MW-3	10:07	17.24	Top of PVC
MW-2	10:10	6.41	Top of PVC

Notes:


CB31A FM
STE #7 03-28-2010
Actual storm flow volume was 375920 gallons
Level (0.502 ft)
Velocity (0.38 ft/s)
Flow Rate (378042.6 gal)
Rainfall (1.11 in)
ft
1.0
0.5
ft/s
2
1
0
Grab and duplicate sample collected at 0740
gpm
2000
1000
0
in
0.050
0.025
0.000
29 Mon
Mar 2010
3/28/2010 4:30:00 AM - 3/29/2010 6:30:00 PM


CB4857 FM
STE #7 03-28-2010
Actual storm flow volume was 362595 gallons
Level (0.089 ft)
Velocity (1.49 ft/s)
Flow Rate (362614.7 gal)
Rainfall (1.19 in)
ft
1.5
1.0
0.5
0.0
ft/s
5.0
2.5
0.0
Grab sample collect at 0800
gpm
4000
2000
0
in
0.050
0.025
0.000
29 Mon
Mar 2010
3/28/2010 5:00:00 AM - 3/29/2010 7:00:00 PM


CB1-MEGA
STE #7 03-28-2010
Actual storm volume was 17763 gallons
Level (0.056 ft)
Thelmar Flow (18737.7 gal)
Rainfall (1.22 in)
Grab and MS/MSD collected at 815
ft
0.50
0.25
0.00
gpm
300
200
100
0
in
0.050
0.025
0.000
29 Mon
Mar 2010
3/28/2010 4:50:00 AM - 3/29/2010 7:50:00 PM

CB31A - STE#7 032810

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
9790	0.08609621	129	1	2.81%	2.81%	2.60%
	0	0	2	0.00%	2.81%	0.00%
	0	0	3	0.00%	2.81%	0.00%
	0	0	4	0.00%	2.81%	0.00%
82665	0.726980916	1090	5	23.69%	26.50%	21.99%
	0	0	6	0.00%	26.50%	0.00%
26970	0.237182306	356	7	7.73%	34.23%	7.17%
	0	0	8	0.00%	34.23%	0.00%
113710	1	1500	9	32.59%	66.82%	30.25%
47875	0.421027174	632	10	13.72%	80.54%	12.74%
	0	0	11	0.00%	80.54%	0.00%
67880	0.596957172	895	12	19.46%	100.00%	18.06%
				100.00%		92.81%
						Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	348890
Strm Qtot (gals)	375920
max Q	113710
min V (ml)	1500

4602 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug. .
Used bottles 1, 5, 7, 9, 10 and 12; the remainder represented baseflow conditions

COMP Label = CB31A032910COMP **Time (1812)**

CB100 - STE#7 032810 (DUPLICATE of CB31A)

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
9790	0.08609621	129	1	2.81%	2.81%	2.60%
	0	0	2	0.00%	2.81%	0.00%
	0	0	3	0.00%	2.81%	0.00%
	0	0	4	0.00%	2.81%	0.00%
82665	0.726980916	1090	5	23.69%	26.50%	21.99%
	0	0	6	0.00%	26.50%	0.00%
26970	0.237182306	356	7	7.73%	34.23%	7.17%
	0	0	8	0.00%	34.23%	0.00%
113710	1	1500	9	32.59%	66.82%	30.25%
47875	0.421027174	632	10	13.72%	80.54%	12.74%
	0	0	11	0.00%	80.54%	0.00%
67880	0.596957172	895	12	19.46%	100.00%	18.06%
				100.00%		92.81%
						Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	348890
Strm Qtot (gals)	375920
max Q	113710
min V (ml)	1500

4602 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.
Used bottles 1, 5, 7, 9, 10 and 12; the remainder represented baseflow conditions
CB100 is a duplicate sample of CB31A

Comp Label = CB100032910COMP **Time (1912)**

CB4857 - STE#7 032810

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
5245	0.042497164	68	1	1.46%	1.46%	1.45%
	0	0	2	0.00%	1.46%	0.00%
	0	0	3	0.00%	1.46%	0.00%
	0	0	4	0.00%	1.46%	0.00%
87665	0.710298169	1136	5	24.39%	25.84%	24.18%
	0	0	6	0.00%	25.84%	0.00%
16740	0.135634419	217	7	4.66%	30.50%	4.62%
	0	0	8	0.00%	30.50%	0.00%
123420	1	1600	9	34.33%	64.83%	34.04%
4235	0.034313725	55	10	1.18%	66.01%	1.17%
	0	0	11	0.00%	66.01%	0.00%
122190	0.99003403	1584	12	33.99%	100.00%	33.70%
				100.00%		99.15%

Total Strm Vol% Rep.'ed in Comp

Qtotal	359495
Strm Qtot (gals)	362595
max Q	123420
min V (ml)	1600

4660 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.
Used bottles 1, 5, 7, 9, 10 and 12; the remainder of the bottles represented baseflow conditions

Comp Label = CB4857032910COMP **Time (1900)**

CB1 - STE#7 032810

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
284.65	0.045631978	146	1	1.67%	1.67%	1.60%
	0	0	2	0.00%	1.67%	0.00%
	0	0	3	0.00%	1.67%	0.00%
	0	0	4	0.00%	1.67%	0.00%
3522.65	0.564712766	1807	5	20.61%	22.28%	19.83%
	0	0	6	0.00%	22.28%	0.00%
1159.85	0.185934482	595	7	6.79%	29.06%	6.53%
	0	0	8	0.00%	29.06%	0.00%
5463.1	0.875784513	2803	9	31.96%	61.03%	30.76%
423.55	0.067898909	217	10	2.48%	63.50%	2.38%
	0	0	11	0.00%	63.50%	0.00%
6237.95	1	3200	12	36.50%	100.00%	35.12%
				100.00%		**96.22%**

Total Strm Vol% Rep.'ed in Comp

Qtotal	17091.75
Strm Qtot (gals)	17763
max Q	6237.95
min V (ml)	1500

8768 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.
**Vol. includes enough sample for lab to run an MS/MSD
Used bottles 1, 5, 7, 9, 10 and 12 ; the remainder represented baseflow conditions

Comp Label = CB1032910COMP **Time (1854)**

CB31A 032810

SAMPLER ID# 1069569980 09:44 30-MAR-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB31A SMP "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 20 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 24 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1069569980 09:44 30-MAR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB31A SMP
PROGRAM: LLA MULTI
Program Started at 14:01 FR 26-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		14:01	PGM DISABLED		
----------		SU 28-MAR-10	----------		
		04:31	PGM ENABLED		
1,5	1	04:31	E		609
2,5	1	04:55	T		609
3,5	1	05:19	T		577
4,5	1	05:43	T		581
5,5	1	06:07	T		587
1,5	2	06:31	T		585
2,5	2	06:55	T		587
3,5	2	07:19	T		585
4,5	2	07:43	T		587
5,5	2	08:07	T		585
1,5	3	08:31	T		589
2,5	3	08:55	T		591
		08:56	MANUAL PAUSE		
		08:56	INTERVAL CHANGED TO 0 HRS, 42 MIN		
		08:58	MANUAL RESUME		
		08:58	MANUAL PAUSE		
		08:59	MANUAL RESUME		
		08:59	MANUAL PAUSE		
		08:59	MANUAL RESUME		
		09:12	MANUAL PAUSE		
		09:13	MANUAL RESUME		
3,5	3	09:19	T		587

4,5	3	10:01	T	630
5,5	3	10:43	T	593
1,5	4	11:25	T	623
2,5	4	12:07	T	597
3,5	4	12:49	T	622
4,5	4	13:31	T	599
5,5	4	14:13	T	591
1,5	5	14:55	T	589
2,5	5	15:37	T	597
3,5	5	16:19	T	581
4,5	5	17:01	T	585
5,5	5	17:43	T	585
1,5	6	18:25	T	585
2,5	6	19:07	T	585
		19:08	MANUAL PAUSE	
		19:08	MANUAL RESUME	
3,5	6	19:49	T	96
4,5	6	20:31	T	587
5,5	6	21:13	T	583
1,5	7	21:55	T	587
2,5	7	22:37	T	585
3,5	7	23:19	T	593
----------		MO 29-MAR-10		----------
4,5	7	00:01	T	585
5,5	7	00:43	T	587
1,5	8	01:25	T	582
2,5	8	02:07	T	577
3,5	8	02:49	T	585
4,5	8	03:31	T	587
5,5	8	04:13	T	583
1,5	9	04:55	T	579
2,5	9	05:37	T	588
3,5	9	06:19	T	593
4,5	9	07:01	T	585
5,5	9	07:43	T	593
1,5	10	08:25	T	585
2,5	10	09:07	T	584
3,5	10	09:49	T	583
4,5	10	10:31	T	585
5,5	10	11:13	T	585
1,5	11	11:55	T	585
2,5	11	12:37	T	585
3,5	11	13:19	T	585
4,5	11	14:01	T	585

```
                          CB31A 032810
  5,5    11   14:43      T            585
  1,5    12   15:25      T            591
  2,5    12   16:07      T            591
  3,5    12   16:49      T            586
  4,5    12   17:31      T              4
  5,5    12   18:13      T            583
              18:13  PGM DONE 29-MAR


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
-----------------------------------------
```

CB4857 032810

SAMPLER ID# 1224319970 10:06 30-MAR-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB4857 SMP"

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 26 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 24 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1224319970 10:07 30-MAR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB4857 SMP
PROGRAM: LLA MULTI
Program Started at 14:58 FR 26-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR		COUNT TO LIQUID
		14:58	PGM DISABLED			
----------		SU 28-MAR-10	----------			
		05:00	PGM ENABLED			
1,5	1	05:00	E			651
2,5	1	05:24	T			644
3,5	1	05:48	T			648
4,5	1	06:12	T			652
5,5	1	06:36	T			652
1,5	2	07:00	T			652
2,5	2	07:24	T			706
3,5	2	07:48	T			858
4,5	2	08:12	T	NM		*
5,5	2	08:36	T	NM		*
1,5	3	09:00	T	NM		*
		09:07	MANUAL PAUSE			
		09:08	INTERVAL CHANGED			
			TO 0 HRS, 42 MIN			
		09:08	MANUAL RESUME			
2,5	3	09:24	T	NM		*
		09:36	MANUAL PAUSE			
		09:40	MANUAL RESUME			
3,5	3	10:06	T	NM		*
4,5	3	10:48	T	NM		*
5,5	3	11:30	T	NM		*
1,5	4	12:12	T	NM		*
2,5	4	12:54	T	NM		*

3,5	4	13:36	T	NM	*
4,5	4	14:18	T	NM	*
5,5	4	15:00	T		654
1,5	5	15:42	T		656
2,5	5	16:24	T		648
3,5	5	17:06	T		652
4,5	5	17:48	T		652
5,5	5	18:30	T		652
1,5	6	19:12	T		682
		19:34	MANUAL PAUSE		
		19:34	MANUAL RESUME		
2,5	6	19:54	T		864
3,5	6	20:36	T		676
4,5	6	21:18	T		808
5,5	6	22:00	T		736
1,5	7	22:42	T		804
2,5	7	23:24	T		766
----------		MO 29-MAR-10			----------
3,5	7	00:06	T		652
4,5	7	00:48	T		654
5,5	7	01:30	T		652
1,5	8	02:12	T		652
2,5	8	02:54	T		736
3,5	8	03:36	T		724
4,5	8	04:18	T		642
5,5	8	05:00	T		652
1,5	9	05:42	T		652
2,5	9	06:24	T		652
3,5	9	07:06	T		652
4,5	9	07:48	T		652
		08:01	POWER FAILED!		
		08:01	POWER RESTORED		
5,5	9	08:30	T		656
1,5	10	09:12	T		658
2,5	10	09:54	T		652
3,5	10	10:36	T		658
4,5	10	11:18	T		658
5,5	10	12:00	T		658
1,5	11	12:42	T		658
2,5	11	13:24	T		652
3,5	11	14:06	T		659
4,5	11	14:48	T		676
5,5	11	15:30	T		708
1,5	12	16:12	T		660

```
                        CB4857 032810
  2,5    12   16:54      T            656
  3,5    12   17:36      T            656
  4,5    12   18:18      T            658
  5,5    12   19:00      T            646
               19:01  PGM DONE 29-MAR


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
    ERROR NM ==> NO MORE LIQUID!
----------------------------------------
```

```
SAMPLER ID# 1072249987  09:56 30-MAR-10
  Hardware: A1      Software: 2.20
********** PROGRAM SETTINGS **********
     ----------
   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1-MEGA  "
     ----------
   UNITS SELECTED:
     LENGTH: ft


     ----------
   UNITS SELECTED:
   FLOW RATE: gpm
  FLOW VOLUME: gal
   VELOCITY: fps
     ----------
  AREA-VEL MODULE:
        WEIR
        90
      V-NOTCH
     ----------

      5 MINUTE
   DATA INTERVAL

     ----------
  12,  3750 ml BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES
     ----------

  ONE-PART PROGRAM


     ----------
      PACING:
    TIME, EVERY
 0 HOURS, 24 MINUTES
```

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.030 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF

BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1072249987 09:57 30-MAR-10
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********
SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 14:26 FR 26-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		14:26	PGM DISABLED		
----------		SU 28-MAR-10	----------		
		04:54	PGM ENABLED		
1,5	1	04:54	E		442
2,5	1	05:18	T		441
3,5	1	05:42	T		441
4,5	1	06:06	T		439
5,5	1	06:30	T		438
1,5	2	06:54	T		438
2,5	2	07:18	T		438
3,5	2	07:42	T		441
4,5	2	08:06	T		441
5,5	2	08:30	T		436
1,5	3	08:54	T		441
		09:05	MANUAL PAUSE		
		09:05	INTERVAL CHANGED TO 0 HRS, 42 MIN		
		09:05	MANUAL RESUME		
2,5	3	09:18	T		438
		09:28	MANUAL PAUSE		
		09:29	MANUAL RESUME		

CB1 032810

3,5	3	10:00	T		435
4,5	3	10:42	T		439
5,5	3	11:24	T		445
1,5	4	12:06	T		447
2,5	4	12:48	T		453
3,5	4	13:30	T		447
4,5	4	14:12	T	NM	*
5,5	4	14:54	T		445
1,5	5	15:36	T		442
2,5	5	16:18	T		441
3,5	5	17:00	T		438
4,5	5	17:42	T		438
5,5	5	18:24	T		441
1,5	6	19:06	T		438
2,5	6	19:48	T		441
3,5	6	20:30	T		441
4,5	6	21:12	T		438
5,5	6	21:54	T		441
1,5	7	22:36	T		441
2,5	7	23:18	T		438
----------	MO 29-MAR-10				----------
3,5	7	00:00	T		441
4,5	7	00:42	T		438
5,5	7	01:24	T		441
1,5	8	02:06	T		441
2,5	8	02:48	T		441
3,5	8	03:30	T		438
4,5	8	04:12	T		441
5,5	8	04:54	T		438
1,5	9	05:36	T		438
2,5	9	06:18	T		438
3,5	9	07:00	T		441
4,5	9	07:42	T		438
5,5	9	08:24	T		441
1,5	10	09:06	T		447
2,5	10	09:48	T		439
3,5	10	10:30	T		439
4,5	10	11:12	T		442
5,5	10	11:54	T		447
1,5	11	12:36	T		445
2,5	11	13:18	T		441
3,5	11	14:00	T		447
4,5	11	14:42	T		442
5,5	11	15:24	T		447

CB1 032810

1,5	12	16:06	T	447
2,5	12	16:48	T	447
3,5	12	17:30	T	442
4,5	12	18:12	T	447
5,5	12	18:54	T	445
		18:54	PGM DONE 29-MAR	

SOURCE E ==> ENABLE
SOURCE T ==> TIME
ERROR NM ==> NO MORE LIQUID!

SAMPLER ID# 1072249987 09:57 30-MAR-10
Hardware: A1 Software: 2.20
AREA-VEL MODULE: 1073479663
Hardware: A0 Software: 1.04
*********** COMBINED RESULTS ***********
SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 14:26 FR 26-MAR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	LEVEL ft	VELOCITY fps	FLOW RATE gpm	TOTAL FLOW gal
-------------------- SU 28-MAR-10 ------						
1,5	1	04:54	0.030	0.48	0.000	000000000000
2,5	1	05:18	0.089	0.48	2.938	000000000000
3,5	1	05:42	0.099	0.48	3.935	000000000000
4,5	1	06:06	0.064	0.48	0.495	000000000000
5,5	1	06:30	0.035	0.48	0.000	000000000000
1,5	2	06:54	0.022	0.48	0.000	000000000000
2,5	2	07:18	0.018	0.48	0.000	000000000000
3,5	2	07:42	0.017	0.48	0.000	000000000000
4,5	2	08:06	0.015	0.48	0.000	000000000000
5,5	2	08:30	0.013	0.48	0.000	000000000000
1,5	3	08:54	0.010	0.48	0.000	000000000000
2,5	3	09:18	0.008	0.48	0.000	000000000000
3,5	3	10:00	0.005	0.48	0.000	000000000000
4,5	3	10:42	0.002	0.48	0.000	000000000000

National Weather Service
Seattle,WA

AREA FORECAST DISCUSSION

FXUS66 KSEW 272227
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
330 PM PDT SAT MAR 27 2010

.SYNOPSIS...A COLD FRONT WILL SWEEP ACROSS WESTERN WASHINGTON TONIGHT BRINGING RAIN AND BREEZY CONDITIONS. RAIN WILL CHANGE TO SHOWERS BEHIND THE FRONT SUNDAY MORNING. THE NEXT MUCH STRONGER SYSTEM WILL QUICKLY FOLLOW WITH RAIN REDEVELOPING ACROSS THE AREA SUNDAY NIGHT. THIS SYSTEM WILL BE MUCH WETTER AND ALSO BRING STRONG WINDS TO MUCH OF WESTERN WASHINGTON. SNOW LEVELS WILL FALL BEHIND THE FRONT ON MONDAY WITH ACCUMULATING SNOW IN THE MOUNTAINS AND SOME PASSES. A BROAD UPPER TROUGH SETTLES OVER THE PACIFIC NORTHWEST THROUGH WEDNESDAY...RESULTING IN COOL AND SHOWERY WEATHER. A LULL OR BREAK IN PRECIPITATION IS POSSIBLE THURSDAY BEFORE THE NEXT SYSTEM ARRIVES FRIDAY.

&&

.SHORT TERM...LATEST IR IMAGERY SHOWS HIGH CLOUDS SPREADING INTO WRN WA OUT AHEAD OF A COLD FRONT APPROACHING 130 W. THE DEEPENING OF THE THE ASSOCIATED SURFACE LOW TRACKING WELL N INTO THE QUEEN CHARLOTTES APPEARS TO BE CAUSING SOME SLOWING OF THE FRONT. MODELS NOW DEVELOP SOME LIGHT QPF ON THE COAST BEGINNING LATE THIS EVENING...BUT THEN QUICKLY SPREAD PRECIP INLAND. A FEW HOURS OF RAIN SHOULD GIVE WAY TO SHOWERS SUNDAY MORNING AS THE FRONT WEAKENS AS IT PASSES THE AREA. QPF AMOUNTS LOOK QUITE LIGHT DUE TO THE STRETCHING OF THE FRONT AND LACK OF MOISTURE.

THE NEXT MUCH STRONGER SYSTEM WILL QUICKLY FOLLOW...WITH RAIN STARTING TO REDEVELOP BY EARLY MONDAY EVENING. THIS SYSTEM WILL BRING STRONG WINDS...HEAVY RAIN...AND POST FRONTAL MOUNTAIN SNOW BY MONDAY. AS FOR HEAVY RAIN...MODELS ARE STILL VERY STRONG WITH THE SLY 850 MB FLOW WITH AN A GOOD MOISTURE TAP. SEE THE LATEST HYDRO SECTION FOR DETAILS.

STRONG WINDS WILL ALSO BE A CONCERN ACROSS MUCH OF WRN WA SUNDAY NIGHT. MODELS SHOW SLY 925 MB WINDS REACHING 60 KT ALONG THE COAST...AND UP TO 50 KT OVER THE INTERIOR. GUSTS JUST BELOW THOSE SPEEDS COULD SURFACE AT TIMES AS THE FRONT SWINGS THROUGH LATER SUNDAY NIGHT. THE MM5 SHOWS SUSTAINED WINDS REACHING 40 KT ALONG THE COAST AND 30-35 KT INLAND...STRONGEST FROM WHIDBEY ISLAND NWD. DECIDED TO GO WITH A HIGH WIND WATCH FOR THE COAST GIVEN THE MM5 DATA. THE INTERIOR IS A CLOSE CALL BUT THE MM5 SEEMS TO KEEP THE SMALL AREA OF 35 KT OVER THE NRN OPEN WATERS. GIVEN THE GRADIENTS

AND STRONG FLOW JUST OFF THE SURFACE IT SEEMS POSSIBLE TO VERIFY IN GUSTS OVER THE N. THERE IS STILL TOO MUCH UNCERTAINTY SO I WILL OPT TO ISSUE AN SPS HIGHLIGHTING STRONG WINDS FOR THE INTERIOR SUNDAY NIGHT JUST BELOW WARNING CRITERIA. THE STRONGEST WINDS SHOULD BE N OF PUGET SOUND BUT SRN PARTS OF THE FORECAST AREA MAY STILL BE STRONG ENOUGH TO EVENTUALLY WARRANT AN ADVISORY.

SNOW LEVELS WILL FALL BEHIND THE FRONT ON MONDAY AS A COOL SHOWERY AIR MASS MOVES IN. MODERATE POST-FRONTAL AND RATHER MOIST SW FLOW SHOULD KEEP SNOW GOING IN THE MOUNTAINS...INCREASING IN INTENSITY ALONG W FACING SLOPES INCLUDING THE PASSES. A FOOT OR MORE OF SNOW SEEMS POSSIBLE AT THIS POINT BUT WE ARE JUST OUTSIDE THE WATCH PERIOD SO I HOLD OFF ON THIS FOR NOW.

A BROAD TROUGH SETTLES OVER THE AREA ON TUESDAY WITH COOL AND SHOWERY WEATHER. THE FLOW WEAKENS ACROSS THE MOUNTAINS BY THIS TIME SO SNOW ACCUMULATIONS SHOULD BECOME LIGHT.

.LONG TERM...COOL AND SHOWERY WEATHER WILL PERSIST INTO WEDNESDAY AS A BROAD TROUGH REMAINS PARKED OVER THE PAC NW. A WEAK RIDGE TRANSVERSES THE AREA ON THURSDAY WHICH MAY PROVIDE A LULL IN SHOWERS. HOWEVER...MODES STILL KEEP SOME SPOTTY LIGHT QPF AROUND WHICH WARRANTS LEAVING SOME LOW POPS IN THAT FAR OUT. THE NEXT SYSTEM ARRIVES THURSDAY WITH ANOTHER ROUND OF RAIN. SHOWERS WILL PERSIST INTO SATURDAY BEHIND THE FRONT. MERCER

&&

.HYDROLOGY...THE FRONT MOVING ACROSS THE AREA TONIGHT WILL STRETCH AND WEAKEN...LIMITING QPF AMOUNTS. THE MOUNTAINS SHOULD RECEIVE LESS THAN AN INCH OF RAIN AND THE LOWLANDS LESS THAN A QUARTER INCH FOR MOST AREA.

OF MORE INTEREST IS THE NEXT STORM SYSTEM EXPECTED SUNDAY NIGHT. MODELS SHOW AN ABUNDANCE OF MOISTURE AND VERY STRONG 850 MB FLOW...AS STRONG AS 70 KT INTO THE OLYMPICS. THE LATEST MM5 MODELS GENERATE UP TO 4 INCHES IN 12 HOURS SUNDAY NIGHT WHICH SHOULD CAUSE AT LEAST SOME MINOR FLOODING ON THE SKOKOMISH RIVER IN MASON COUNTY. A FLOOD WATCH WILL BE ISSUED FOR THIS. THE FLOW ACROSS THE CASCADES IS NOT CONDUCIVE FOR FLOODING.

NO FLOODING IS EXPECTED ON THE GREEN RIVER. MERCER

&&

.AVIATION...SYNOPTIC PATTERN SHOWS SOUTHWEST FLOW ALOFT WITH INCREASING SOUTHERLY SURFACE FLOW AS A COLD FRONT APPROACHES THE COAST. THE FRONT WILL REACH THE COAST LATE TONIGHT AND MOVE INLAND SUNDAY MORNING. A STRONGER FRONT WILL REACH THE COAST SUNDAY NIGHT.

THIS EVENING WILL CONTINUE THE PATTERN OF TODAY WITH BANDS OF MID AND HIGH CLOUDS. LOWER CLOUDS WILL INCREASE TONIGHT...WITH MVFR CEILINGS ON THE COAST AFTER 06Z AND INLAND AFTER 12Z. RAIN WILL

DEVELOP ON THE COAST BY 09Z AND INLAND BY 15Z SUNDAY.

KSEA...DISCUSSION ABOVE HOLDS FOR KSEA. CLOUDS INCREASE RAPIDLY LATE TONIGHT WITH RAIN DEVELOPING AROUND DAYBREAK SUNDAY. LIGHT AND VARIABLE WIND WILL BECOME SOUTHEAST THIS EVENING AND RISE TO 8-12 KT AFTER 12Z. CHB

&&

.MARINE...APPROACHING FRONT INCREASED OFFSHORE GRADIENTS ENOUGH TO GIVE SMALL CRAFT ADVISORY EASTERLIES DOWN THE STRAIT THIS AFTERNOON. OTHERWISE HAVE KEPT THE ORIGINAL SCRIPT INTACT. FRONT MOVING ASHORE LATE TONIGHT WILL BRING GALES TO THE COAST AND WEST ENTRANCE AND SMALL CRAFT ADVISORY WINDS TO THE EAST ENTRANCE...NORTHERN INLAND WATERS...AND ADMIRALTY INLET. THE PERIOD OF STRONGEST WIND WILL BE 03Z-12Z TONIGHT...WITH THE WIND DIMINISHING ON SUNDAY. THERE COULD BE A BRIEF SURGE OF WESTERLIES DOWN THE STRAIT ON SUNDAY AFTER THE FRONT PASSES BUT THIS WILL BE VERY SHORT AS THE NEXT SYSTEM TURNS GRADIENTS BACK OFFSHORE.

THIS NEXT SYSTEM CONTINUES TO LOOK STRONG IN THE MODELS. HIGH END GALES LOOK LIKELY ON THE COAST...WITH LOWER GALES AT THE ENTRANCES AND OVER THE NORTH INTERIOR...AND SMALL CRAFT ADVISORY WINDS ELSEWHERE. THIS WOULD BE FOR THE SUNDAY NIGHT TO MONDAY TIME FRAME. THERE IS A HIGH WIND WATCH IN EFFECT FOR THE COAST TO MATCH THE HIGH END GALE. IF LATER SHIFTS DETERMINE THERE IS A NEED FOR A HIGH WIND WARNING ON THE COAST THEN THE MARINE WARNING WILL PROBABLY GET BOOSTED TO A STORM WARNING.

ONSHORE FLOW DEVELOPS MONDAY AND THERE WILL BE A DECENT SURGE DOWN THE STRAIT. CURRENTLY THE MODELS SHOW ONLY SMALL CRAFT ADVISORY WESTERLIES IN THE STRAIT BUT LOW END GALES SEEM POSSIBLE.

AFTER MONDAY NIGHT THINGS SETTLE DOWN AND THERE DOES NOT APPEAR TO BE ANOTHER SYSTEM UNTIL ABOUT NEXT THURSDAY OR FRIDAY. CHB

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...FLOOD WATCH FOR MASON COUNTY
    .HIGH WIND WATCH COAST FOR THE NORTH AND CENTRAL WASHINGTON
     COAST SUNDAY NIGHT.
PZ...GALE WARNING COAST AND WEST ENTRANCE TONIGHT.
    .SMALL CRAFT ADVISORY REST OF STRAIT...ADMIRALTY INLET...AND
     CAMANO ISLAND TO POINT ROBERTS TONIGHT.

WWW.WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION PLEASE SEE WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML (ALL LOWERCASE)

Your National Weather Service forecast

Burien WA

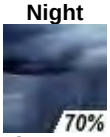
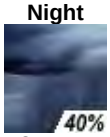
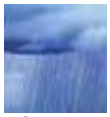
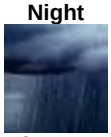
Enter Your "City, ST" or zip code Go

BOOKMARK

NWS Seattle, WA
Point Forecast: Burien WA
47.48°N 122.31°W (Elev. 305 ft)

Mobile Weather Information | **En Español**
Last Update: 4:01 pm PDT Mar 27, 2010
Forecast Valid: 7pm PDT Mar 27, 2010-6pm PDT Apr 3, 2010

Forecast at a Glance

Tonight	Sunday	Sunday Night	Monday	Monday Night	Tuesday	Tuesday Night	Wednesday	Wednesday Night
								
Increasing Clouds	Showers	Rain	Showers	Showers Likely	Chance Showers	Chance Showers	Chance Showers	Chance Showers
Lo 47 °F	Hi 56 °F	Lo 48 °F	Hi 52 °F	Lo 40 °F	Hi 49 °F	Lo 39 °F	Hi 54 °F	Lo 36 °F

Detailed 7-day Forecast

Hazardous weather condition(s):

Special Weather Statement

Tonight: Increasing clouds, with a low around 47. South southeast wind between 10 and 16 mph.

Sunday: Showers. High near 56. South southwest wind between 10 and 16 mph. Chance of precipitation is 80%.

Sunday Night: Rain. Low around 48. Breezy, with a south southwest wind between 15 and 23 mph. Chance of precipitation is 100%.

Monday: Showers. High near 52. Southwest wind around 18 mph. Chance of precipitation is 100%.

Monday Night: Showers likely. Cloudy, with a low around 40. Southwest wind around 15 mph. Chance of precipitation is 70%.

Tuesday: A 50 percent chance of showers. Mostly cloudy, with a high near 49.

Tuesday Night: A 40 percent chance of showers. Mostly cloudy, with a low around 39.

Wednesday: A chance of showers. Mostly cloudy, with a high near 54.

Wednesday Night: A chance of showers. Mostly cloudy, with a low around 36.

Thursday: A chance of rain. Mostly cloudy, with a high near 51.

Thursday Night: A chance of rain. Mostly cloudy, with a low around 43.

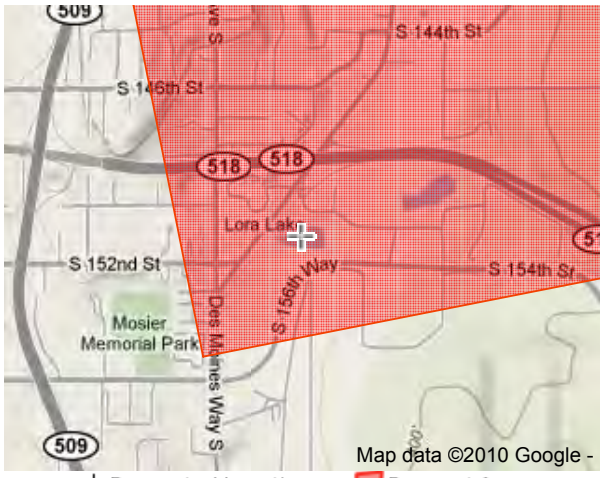
Friday: A chance of rain. Mostly cloudy, with a high near 55.

Friday Night: A chance of showers. Mostly cloudy, with a low around 43.

Saturday: A chance of showers. Mostly cloudy, with a high

Detailed Point Forecast [Move Down]

Click Map for Forecast Disclaimer



Requested Location Forecast Area

Lat/Lon: 47.48°N 122.31°W **Elevation:**305 ft

XML

Current Conditions [Move Up]

Seattle, Seattle-Tacoma International Airport
Last Update on 27 Mar 16:53 PDT

Overcast

58°F (14°C)

Humidity:	46 %
Wind Speed:	calm
Barometer:	29.99 in (1016.40 mb)
Dewpoint:	37°F (3°C)
Wind Chill:	58°F (14°C)
Visibility:	10.00 Miles
More Local Wx:	**3 Day History:**

Radar and Satellite Images

weather.gov

National Weather Service Forecast Office
Seattle, WA

Home News Organization Search for: NWS All NOAA Go

Point Forecast: Burien WA
47.48N 122.31W (Elev. 305 ft)

En Español

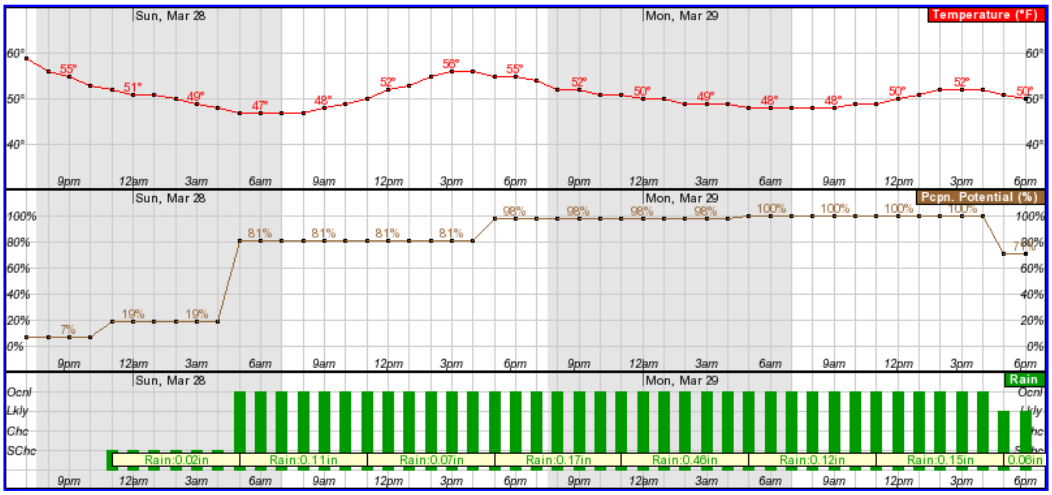
Last Update: 4:01 pm PDT Mar 27, 2010

Hourly Weather Forecast Graph

[dashes/dots] | [b/w] | [hide menu]

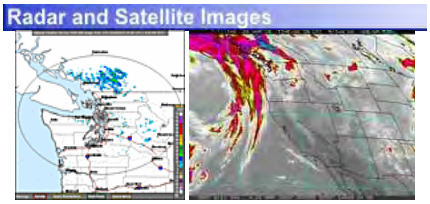
☑ Temperature (°F)	☐ Surface Wind mph	☐ Thunder
☐ Dewpoint (°F)	☐ Sky Coverage	☑ Rain
☐ Wind Chill (°F)	☑ Precipitation Potential	☐ Snow
	☐ Relative Humidity	☐ Freezing Rain
		☐ Sleet

48-Hour Period Starting: 7pm Sat, Mar 27 Submit Back 2 Days Forward 2 Days



Saturday, March 27 at 10pm
Temperature: 53 °F
Precipitation Potential: 7%
Rain: <10%

Radar and Satellite Images



Additional Forecasts & Information

International System of Units
Forecast Discussion
7-Day Forecast
Tabular Forecast
Quick Forecast

Webmaster
NOAA's National Weather Service
Seattle, WA

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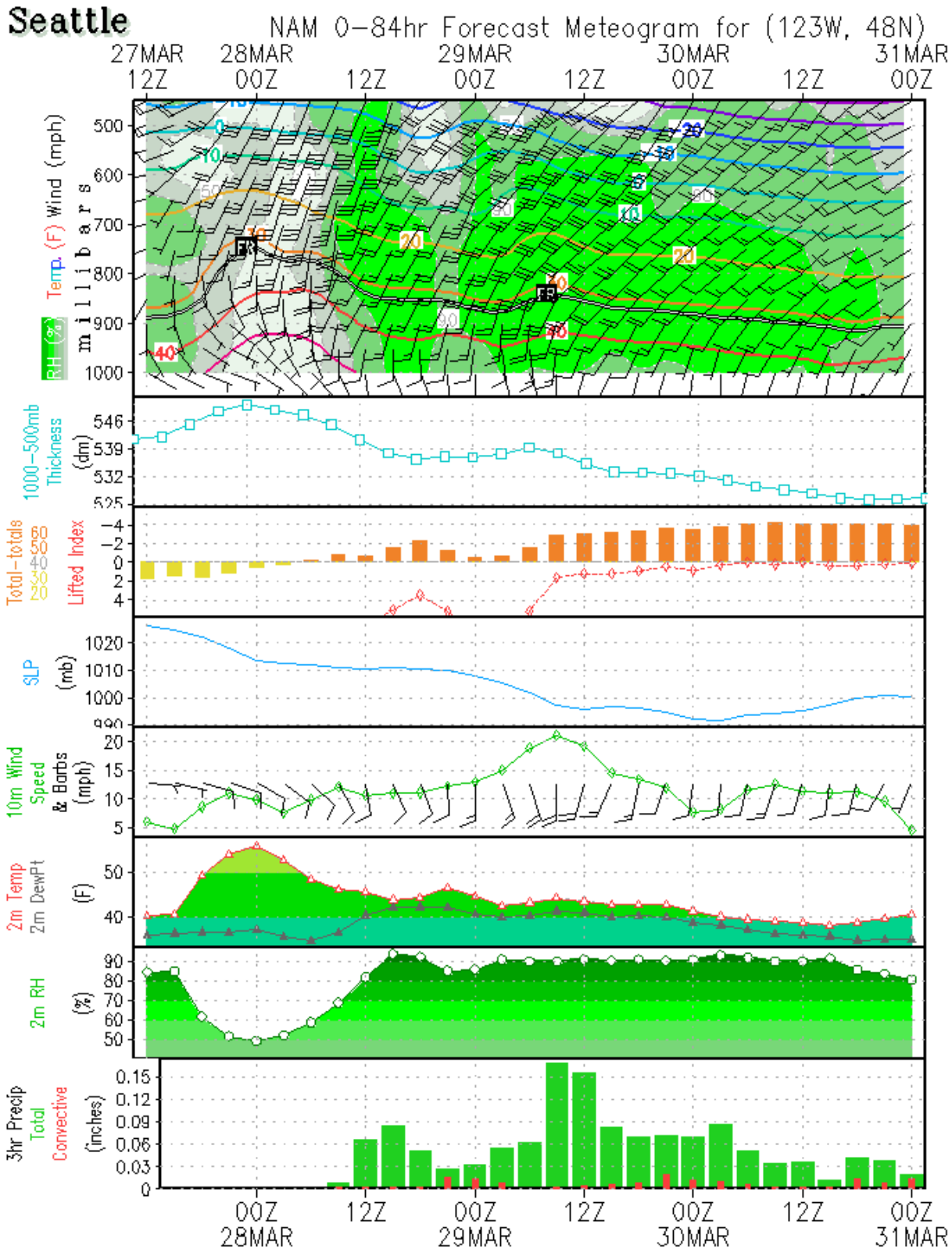

Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
27MAR 12Z
28MAR 00Z
12Z
29MAR 00Z
12Z
30MAR 00Z
12Z
31MAR 00Z
millibars
Temp (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
3hr Precip (inches)
Total
Convective
00Z 28MAR
12Z
00Z 29MAR
12Z
00Z 30MAR
12Z
00Z 31MAR

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	May 17, 2010
TO:	Matt Woltman / Megan McCullough
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600 Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409 (office) or 206-794-0095 (cell)
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #8 (04/01/2010)

Please find included the following:

- Storm report narrative (4 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- pH Worksheet (1 pg),
- Groundwater level measurement form, (1 pg)
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (2 pg),
- Sampler Reports (6 pgs), and
- Weather forecasting information (8 pgs).

Please let me know if you have any questions or need additional information. Thank You.

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

Dave Metallo, LHG , Project Manager

POS Lora Lake Apartments (LLA) Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #8
April 1st, 2010

The wetter period that developed during the last week in March continued into the beginning of April. Stormwater Sampling Event (STE) #8 occurred on April 1st, 2010. A strong weather system pushed inland from the northern tip of the Olympic Peninsula / Vancouver Island area down into the central Puget Sound Lowland region on the first day of April. A cool and unstable air mass emanating from this system dominated the area during and for several days after the targeted rain event. The April 1st storm event was forecasted for a great deal of moisture and strong winds. The bulk of STE#8 was slated to occur on the afternoon of April 2nd. However, the potential for precipitation to begin during the early evening of the 1st was also included in the area forecast discussion.

STE#8 started as a moderately light event with scattered showers producing 0.04-inches of rain between 4PM on the April 1st and the early morning hours of April 2nd. A second front arrived over the project area around 6AM on April 2nd bringing periods of gusty winds and heavier rain that continued through the early hours of April 3rd.

The storm event produced a total of 0.67 inches of rain over the surrounding project area, with the LLA monitoring stations sampling between 0.41 and 0.59 inches of this rainfall depth. Detailed weather forecast information is attached to this report.

Storm and Sample Validation / Qualification:

All validation and qualification conditions for this storm event were met. These validation and qualification conditions included forecast probability, antecedent dry period, runoff occurrence / hydrograph stage, parameters collected, 75 % flow representation, minimum number of aliquots, pH measurement, quality control sample collection and anomalous conditions assessment. See the accompanying *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding STE#8.

Grab Sampling, Composite Sampling and Autosampler Enabling:

The three LLA Project sampling stations were CB31A (main line inlet), CB4857 (main line outlet) and CB1 (onsite system outlet). Grab samples were collected using Teflon-lined tubing, dedicated at each sampling station, which was attached to a point adjacent to the intake of the composite sampling line. A peristaltic pump was used to collect the grab samples through these dedicated lines at each station. All grabs were collected as early as possible during the storm event once runoff was noted and at points within the associated station hydrographs that were elevated above base flow conditions.

Composite samples were collected via autosamplers with a 12 (1-gallon glass) bottle arrangement also utilizing Teflon-lined tubing dedicated at each sampling station. All three sampling stations were automatically enabled via the use of flow meters that were connected to autosamplers. The flow meters were pre-programmed to enable sampling above certain pre-determined threshold levels. These threshold levels were determined based on an examination of pre-storm base-flow condition levels, known periodic or cyclic events (e.g. timed watering, construction pumping, etc. that occur in the basin) and runoff response from past events. CB31A and CB4857 used stand-alone in-pipe area-velocity sensors for enable sampling and direct measurement of water level in the pipe, flow velocity and auto-calculation of flow volume. CB1 used an area-velocity sensor in combination with a Thel-Mar volumetric weir. At this location the area-velocity sensor was used only for direct measurement of level (calibrated to the weir crest). Flow volume was then post-calculated

via manufacturers published stage-discharge relationship information based on the acquired level data.

Each of the three autosamplers were programmed to collect time paced composite samples. Initially each autosampler was set to collect an aliquot every 18-minutes (providing for 90-minutes per discrete sample bottle and lasting up to 18 hours total). As mentioned above, precipitation fell over the project area in the late afternoon of April 1st. This initial rainfall caused a runoff response at CB31A and CB1 thus enabling the autosamplers at these locations within 6 minutes from each other approximately half an hour after the beginning of the storm event (6:40 PM and 6:34 PM on April 1st, respectively). Due to the small amount and light intensity of this initial rainfall and the specific hydraulic conditions at the monitoring station, the sampler at CB4857 did not enable until later in the storm event (6:20AM on April 2nd), when heavier rain began to fall (and approximately 8 hours after the initial 0.04-inches of rainfall). See the attached *Field Sampling Forms* for additional enabling and station specific details.

Based on updated forecast information and optimal compositing requirements, the sample collection pacing rates at CB31A and CB1 were adjusted to 42-minutes after the samplers enabled, thus allowing for a total collection time of up to 23-hours at these stations. This was an appropriate programming selection given the forecast information. The sample pacing rate at CB4857 was not adjusted due to its delayed start. Samples collected at CB31A and CB1 were comprised of the beginning and the middle of the storm event period. Samples collect at CB4857 were comprised of the middle and later storm event periods. However, all qualification and validation criteria for each of the sampling stations was met. Unmatched and independent sampling at the monitoring stations is permitted by design of the LLA Work Plan.

All sampling and flow monitoring equipment operated as designed and programmed. Details pertaining to the programming and event-specific operation of CB4857 sampler unit are contained in the attached *Sampler Report*. During this particular event the sampler report files for CB31A and CB1 were corrupted and the information was lost. However, the sampler unit programming configuration for these two stations was the same as CB4857. Other information typically contained in the sampler reports, such as discrete sampler bottle collection times and missed aliquots are also contained in other project field reporting sources. Collection of grab and composite samples followed the methodology detailed in the LLA Work Plan.

Compositing Scheme:

All of the composite samples were manually flow weighted based on site specific flow information. The hydrographs from each monitoring station were examined and decisions were made as to what specific discrete sampler bottles were to be included in the composite samples. Due to the nature of this particular storm event each monitoring location used a station specific set of collection bottles for creation of its composite sample. CB31A used bottles 9 through 12 for its composite sample. Although this sampler was enabled during the early portion of the storm event, based on level and flow response the decision was made to not include this bottles contents in the composite sample. CB4857 used all 12 bottles for its composite sample. CB1 used bottles 1 and 9 through 12 for its composite sample. The remainder of the unused bottles represented base flow or mostly base flow conditions. See the attached *Field Sampling Forms* and their accompanying *Compositing Worksheets* for these details.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grabs or composite samples were placed into coolers and put on ice to attempt to

maintain temperatures between 2 and 6 °C. A small portion of each of the of the composite samples was poured off for the assessment of pH. pH measurements were collected prior to delivery of the samples to the lab. These measurements were recorded on the attached *pH Measurement Worksheet.* All sample IDs, collection date and time, matrix, requested parameter analysis and other associated information were documented on *Chain-of-Custody forms* (attached). Samples were in direct control of project and/or laboratory personnel at all times. Samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from the targeted stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Quality Control Samples:

During this event adequate water volume for duplicate and MS/MSD analyses was collected and submitted for both the grab and composite samples. Both the grab and composite duplicates were collected at CB1 – which were designated as location "CB102". This was done to present a "blind" sample (not readily identifying these duplicates) to the testing facility. Both the grab and composite MS/MSD volumes were collected at CB4857 – and were labeled as such. Trip blanks accompanied all volatile organic samples collected during this STE. See the attached *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* and the *Field Sampling Forms* for details regarding QC sample collection.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. These locations were MW-2, MW-3, MW-4, and MW-6. Details regarding the measurement event are contained in the attached *Groundwater Level Measurement* field sheet. Measurements are listed in the table below.

Groundwater Level Measurements, STE#8

Location	Date	Time	Water Level from TOC (FT)	Notes
MW-2	4/2/2010	10:12	6.21	replacement for MW-1 and MW-5, as previously noted
MW-3	4/2/2010	10:17	17.00	
MW-4	4/2/2010	10:23	15.91	
MW-6	4/2/2010	10:35	11.59	

Anomalies and/or Work Plan Deviations:

Three minor anomalies occurred during this storm event. These are 1) the cooler temperature reported for the composite cooler was reported to be 9.1°C, when the targeted range is 2-6°C. This higher sample temperature resulted from the short residence time the composite bottles spent in the iced cooler between their creation and delivery to the lab. It also a typical practice to pour deionized water into the cooler, providing an ice bath for the composite bottles, thus accelerating the cooling process. There was not enough DI water on hand to fill the coolers to a level where this cooling effect was noticed over the short residence time. 2) The composite sample time listed on the CoC for CB31A was April 2nd at 18:41. The correct time for this sample should have been April 2nd at 17:35. In fact 18:41

was the start of the sa mple collection at CB31A and it was a simple matter of erroneous data entry that the composite time was misidentified. 3) As noted above the sampler reports for CB31A and CB1 were corrupted in the field and the data contained was lost.

However, none of the anomalies described above would have otherwise caused any of the STE#8 samples to be non-representative of the conditions from which they were collected. No deviations to the LLA Work Plan were noted to occur during this sampling event.

Actions To Be Completed:

Routine sampler maint enance and flow meter (l evel) calibrations will be conducted at a regular frequency to a ssure proper equipme nt operation. This was the eighth of ten anticipated storm sampling events. An attempt will be made to condu ct two more events before late-May, 2010. The current focus of the field effort s will be in maintaining proper station and equipment operation, data and resource management and storm-tracking tasks.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #8 (04-01-2010)

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Storm Event Data:	
Project Storm Event (STE) #	8
Event Forecast Probability (%)	80%
Antecedent Dry Period (days: hrs: mins)	1:19:40
STE Start Date & Time	4/1/10 16:10
STE Duration (hrs:mins)	33:45
STE End Date & Time	4/3/10 1:55
Period Between Next Measureable Rain (hrs: mins)	17:10
Was Targeted STE Qualified Per LLA QAPP	YES
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.67
Max 1-hr Rainfall Intensity (in/hr)	0.09
Average 1-hr Rainfall Intensity (in/hr)	0.02

[1] Sample Collection Criteria:	CB-31A	CB-4857	CB-1
Sampling Station			
Was Grab sample collected?	Yes	Yes	Yes
Grab ID	CB31A040210GRAB	CB4857040210GRAB	CB1040210GRAB
Grab Date /Time	4/2/2010 8:40	4/2/2010 9:35	4/2/2010 9:05
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	Yes	Yes	Yes
Hydrograph stage at grab collection	event peak	peak on crest	peak on crest
Grab parameters collected per LLA QAPP ?	Yes	Yes	Yes
Were Trip Blanks included w/ Grab samples ?	Yes (TB040210)	Yes (TB040210)	Yes (TB040210)
Was Comp sample collected?	Yes	Yes	Yes
Comp ID	CB31A040210COMP	CB4857040310COMP	CB1040210COMP
Comp Date /Time	4/2/2010 18:41	4/3/2010 0:02	4/2/2010 16:40
Total volume measured during storm period (gallons)	147750	189175	4919
Volume sampled during storm period (gallons)	147750	187660	4919
Volume utilized for comp. sample (gallons)	136320	187410	4787
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	Yes (92%)	Yes (99%)	Yes (97%)
Were a minimum of 8 aliquots collected for comp sample ?	Yes (20)	Yes (60)	Yes (25)
Comp parameters collected per LLA QAPP ?	Yes	Yes	Yes
Rainfall during sampling period (in)	0.41	0.59	0.41
pH Measurements Collected ?	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No
[1] QC Sample Summary Information:	**CB-31A**	**CB-4857**	**CB-1**
Was Grab sample duplicate collected ?	No	No	Yes
Grab sample duplicate ID	na	na	CB102040210GRAB
Grab sample date and time	na	na	4/2/2010 10:05
Was Comp sample duplicate collected ?	No	No	Yes
Comp sample duplicate ID	na	na	CB102040210COMP
Comp sample date and time	na	na	4/2/2010 17:40
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	No	Yes (both)	No

[1] If the answer to any of the Storm Event or Sample Collection Criteria questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 5/14/10 **Reveiwed By / Date:** 5/17/10

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

ARI Assigned Number:	Turn-around Requested: Standard
ARI Client Company: Floyd / Snider	Phone: 206-292-2078
Client Contact: Matt Woltman / Megan McCullough	
Client Project Name: Lora Lake Apartments	
Client Project #: POS-LLA	Samplers: D. Metallo / P. Heltzel

Date: 4-2-2010
Page: 1 of 1
No. of Coolers: 1
Cooler Temps: 3.1°

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-5200 206-695-5201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOC 8260C SIM	Analysis Requested: NWTPH-Dx	Notes/Comments
CB31A040210GRAB	4.2.10	0840	W	5	X	X	
CB4857040210GRAB	4.2.10	0935	W	13	X	X	run MS/MSD
CB1040210GRAB	4.2.10	0905	W	5	X	X	
CB10204021OGRAB	4.2.10	~~0905~~ 1005 DM	W	5	X	X	
TB040210	4.2.10	~~1005~~ 0815 DM	W	3	X		Trip blank

Comments/Special Instructions
① Acid/Silica gel cleanup for NWTPH-Dx

Relinquished by: (Signature)	Dave Metallo	Received by: (Signature)	
Printed Name:	Dave Metallo	Printed Name:	A. Volgardsen
Company:	Taylor Assoc., Inc.	Company:	ARI
Date & Time:	4-2-10 (1155)	Date & Time:	4/2/10 1155

Relinquished by: (Signature)		Received by: (Signature)	
Printed Name:		Printed Name:	
Company:		Company:	
Date & Time:		Date & Time:	

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

ARI Assigned Number:	Turn-around Requested: Standard	Date: 4/3/10	
ARI Client Company: Floyd/Snider	Phone: 206-292-2078	Page: 1 of 1	
Client Contact: Matt Wolfman / Megan McCullough		No. of Coolers: 2	Cooler Temps: 9.1°C
Client Project Name: Lora Lake Apts			
Client Project #:	Samplers: Dan O'Brien		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-5201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	PAH low level 8270-SIM	PCP 8041	Arsenic Total Diss. 200.8	Dioxin/Furan 1613	TSS SM2540D				Notes/Comments
CB31A040210COMP	4/2/10	18:41	W	1	X	X	X	X	X				6.37
CB485704031OCOMP	4/3/10	00:02	W	1	X	X	X	X	X				6.78
CB104021OCOMP	4/2/10	16:40	W	1	X	X	X	X	X				6.36
CB102040210COMP	4/2/10	17:40	W	1	X	X	X	X	X				6.34

Run MS/MSD

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Dan O'Brien	Printed Name: Carla Milesi	Printed Name: Carla Milesi	Printed Name: Mikka Mulumba
	Company: TAI	Company: TAI	Company: TAI	Company: ARI
	Date & Time: 4/3/10 1030	Date & Time: 4/3/10 1030	Date & Time: 4/3/10 1255	Date & Time: 4/3/10 1255

-temp = 9.1°

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB31A

12 x 1 gallon bottle set-up
Rev.ed 3/30/2010

Section 1. Storm Setup and Inspection

Personnel: PH BK	Weather: part sun, cool		Arrival Date/Time: 4/1/10 10:30		
Carry-over maintenance to do prior to set-up:	change pump tube, calibrate level, dessicant change.			done? Yes	
Sampler Battery Voltage	12.75	Changed? Y (N)		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N N/A		New voltage	N/A

Flow Meter Information		Sampler Information	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK? Replaced? (Yes/No)	No, replaced
Flow meter cables OK? (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Desiccant Canisters OK (Yes/No)	No, changed ~~Silica~~	Sample Aliquot Size / Calibrated ?	750, yes
Flow Meter Level (FT)	0.398	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	0.39	Desiccant Condition, replaced?	OK
Difference (FT)	0.008	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	N	Clean bottles installed & lids off?	Yes
Velocity (fps)	*0.05 x 1	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	10 /	Enable Level (FT)	0.43 * changed to 0.44
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T, 18 min / 12 hr storm
Channel conditions/observations		Program Reviewed? (Yes/No)	Yes
OK, none observed		Last Screen	program disabled
		Ice Deployed? (Yes/No)	No

Notes:

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM/PH Weather: Raining, 50°s Arrival Date/Time: 4-2-10 (0825)

Grab Sample Data		Sample Observations:
Runoff Present or Hydrograph Elevated?	Yes	Water sl.'ly turbid w/ visible suspended particles
Grab Collection Time (date/time)	4.2.10 (0840)	
Grab Sample ID	CB31A040210GRAB	
Grab Duplicates Collected?	No	
Grab Duplicate Collection (date/time)	—	
Grab Duplicate ID	—	
Grab MS/MSD Collected ?	No	
VOA Trip Blank in cooler?, ID Yes	TB040210 (0815)	

Flow Meter		Sampler	
Flow meter cables OK? (Y/N)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date / time)	4.1.10 (1941)
		On Composite... (bottle # / aliq #)	2/5 RTL #10
		Ice deployed?	NO
		Sampler Battery Voltage (changed?):	12.71 NO ∇
		Flow Meter Battery Voltage/Change? (if different)	~~12.71~~ pm NA
		Bottle Swap needed? (if yes fill out Section 3)	NO

Notes: - Water flowing at "decent" rate through vault as observed from surface
**Due to storm particulars the time pacing interval was increased to 42 min/smpl

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
On Composite.... (bottle # / aliq #)		Data downloaded?	
Comp Btl Levels (under vol., overfilled, OK)		Sampler/Flow Meter Batt. Voltage (changed):	
Pacing Rate OK for Event?, Changed?		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB31A

Section 4. Comp. Bottles Retrieval

Personnel: DO/HW	Weather: OC - no rain		Arrival Date/Time: 4/3/10 09:24		
Sampler Battery Voltage	12.49	Changed? Y (N)		New voltage	n/a
Flow Meter Battery Voltage	n/a	Changed? Y N		New voltage	n/a
Comp Sample Volume Collected	10090	Data downloaded?	Yes		
Composite Begin Time (date/time)	~~4/1/10~~ 4/1/10 18:41			Round #:	1
Last Aliquot Taken (date/time, btl #, aliq #)	4/2/10 17:35 Bott 12 Aliq 5/5				
Comp Bottles Labeled? (sta. & btl #)	Yes				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

None.

Channel conditions/observations

OK.

Notes/Maintenance Needed:

None

Section 5. Post Storm Comp. Sample Processing

Personnel: SS, DO Date/Time: 4/3/2010 ~(0830)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info).: Yes Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: 12 X 3500
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4500 ml	Actual Comp. Sample Vol. Available: 5049 ml
Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp.), Other (explain):	
Bottles (Btl #s) used for Comp. Sample: 9 - 12	Comp. Sample Container Size & Material: 2-5 gal WM glass jug
Comp Collection Time (date/time): 4/2/2010 (1841)	Comp Sample ID: CB31A040210COMP
pH Measurements Collected On Comp. Sample ?: Yes 6.37	

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): NA - no QC Sampl. collected @ this location

Duplicate Sample Collected ? NA	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: NA

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: NA

MS/MSD Vol. submitted: NA

Were any other QC sample types colelcted? (if yes, provide details) NA

DI Water Information : None used

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB4852

12 x 1 gallon bottle set-up
Rev.ed 3/30/2010

Section 1. Storm Setup and Inspection

Personnel:	PH, BK	Weather:	Overcast, cool	Arrival Date/Time:	4/1/10 11:55
Carry-over maintenance to do prior to set-up:					done?
Sampler Battery Voltage	12.96	Changed? Y (N)		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N	N/A	New voltage	N/A

Flow Meter Information		Sampler Information	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK? Replaced? (Yes/No)	Yes
Flow meter cables OK? (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Desiccant Canisters OK (Yes/No)	OK	Sample Aliquot Size / Calibrated ?	700 Yes
Flow Meter Level (FT)	* ~~0.09~~ 0.073	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	0.09	Desiccant Condition, replaced?	OK
Difference (FT)	0.017	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	Yes	Clean bottles installed & lids off?	Yes
Velocity (fps)	2.17	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	61	Enable Level (FT)	0.09, changed to 0.085
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T, 18 min, 12 hr storm
Channel conditions/observations		Program Reviewed? (Yes/No)	Yes
OK, none observed		Last Screen	Program disabled **
		Ice Deployed? (Yes/No)	No

Notes:
* used sand bag to calibrate level and calibrate volume
Flow meter level is when sand bag was in place
Level @ 0.025 when sand bag removed, actual reading 0.02

** turned off liquid detect
changed suction head to 11 ft.

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM/PH Weather: Rain, 50's Arrival Date/Time: 4-2-10 (0917)

Grab Sample Data		Sample Observations:
Runoff Present or Hydrograph Elevated?	Yes (0935)	
Grab Collection Time (date/time)	4.2.10 ~~(0925)~~ DM	
Grab Sample ID	CB4857040210GRAB	
Grab Duplicates Collected?	NO	
Grab Duplicate Collection (date/time)	—	
Grab Duplicate ID	—	
Grab MS/MSD Collected ?	Yes	
VOA Trip Blank in cooler?, ID Yes	TB040210 (0815)	

Flow Meter		Sampler	
Flow meter cables OK? (Y/N)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date / time)	4.2.10 (0620)
		On Composite... (bottle # / aliq #)	1/5 BTL #3
		Ice deployed?	NO
		Sampler Battery Voltage (changed?):	12.76 NO
		Flow Meter Battery Voltage/Change? (if different)	NA
		Bottle Swap needed? (if yes fill out Section 3)	—

Notes:
- No errors recorded in sampler report re: ~~bottle~~ DM Sample collection
- Did not change time pacing at this Station

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
On Composite.... (bottle #/ aliq #)		Data downloaded?	
Comp Btl Levels (under vol., overfilled, OK)		Sampler/Flow Meter Batt. Voltage (changed):	
Pacing Rate OK for Event?, Changed?		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB4857

Section 4. Comp. Bottles Retrieval

Personnel: DO, TD	Weather: OC - no rain		Arrival Date/Time: 4/3/10		
Sampler Battery Voltage	12.68	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	—	Changed? ~~Y~~ ~~N~~		New voltage	—
Comp Sample Volume Collected	100%	Data downloaded? Y			
Composite Begin Time (date/time)	4/2/10 0620			Round #: 1	
Last Aliquot Taken (date/time, btl #, aliq #)	4/3/10 0002 Btl 12 5 of 5				
Comp Bottles Labeled? (sta. & btl #)	Y				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

none

Channel conditions/observations

OK

Notes/Maintenance Needed:

none

Section 5. Post Storm Comp. Sample Processing

Personnel: SS, DO. Date/Time: 4/3/2010 (~0900)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12 Approximate Total Comp. Volume Collected: 12 X 3500 ml

Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 8500 ml Actual Comp. Sample Vol. Available: 8936 ml

Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp), Other (explain):

Bottles (Btl #s) used for Comp. Sample: all 12 Comp. Sample Container Size & Material: 2-5gal WM glass jug

Comp Collection Time (date/time): 4/3/2010 (0002) Comp Sample ID: CB485704031OComp

pH Measurements Collected On Comp. Sample ?: Yes 6.78

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes

Duplicate Sample Collected ? NA	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: NA

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: Yes

MS/MSD Vol. submitted: Total 8936 ml MS/MSD Specific = 4436 ml

Were any other QC sample types colelcted? (if yes, provide details) No

DI Water Information No Used.

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB1	12 x 1 gallon bottle set-up Rev.ed 3/30/2010	Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: PH, BK	Weather: Overcast, (60)		Arrival Date/Time:	4/1/10	11:25
Carry-over maintenance to do prior to set-up:	Change module dessicant.			done?	Yes
Sampler Battery Voltage	12.82	Changed? Y (N)		New voltage	N/A
Flow Meter Battery Voltage	N/A	Changed? Y N N/A		New voltage	N/A

Flow Meter Information		Sampler Information	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK? Replaced? (Yes/No)	OK, no
Flow meter cables OK? (Yes/No)	Yes	Sample Tubing & Strainer OK?	Yes
Desiccant Canisters OK (Yes/No)	No, changed module	Sample Aliquot Size / Calibrated ?	700, Yes
Flow Meter Level (FT)	-0.07	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	N/A	Desiccant Condition, replaced?	ok
Difference (FT)	N/A	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	No	Clean bottles installed & lids off?	Yes
Velocity (fps)	N/A	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	N/A	Enable Level (FT)	0.63
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T, 18min 12hr Storm
Channel conditions/observations		Program Reviewed? (Yes/No)	Yes
OK, none observed		Last Screen	Program disabled *
		Ice Deployed? (Yes/No)	NO

Notes:

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM / PH	Weather: Raining, 50°s	Arrival Date/Time:	4-2-10 (0856)

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?	Yes	Water had visible suspended material	
Grab Collection Time (date/time)	4.2.10 (0905)		
Grab Sample ID	CB104D210GRAB		
Grab Duplicates Collected?	Yes	**Sampler**	
Grab Duplicate Collection (date/time)	4.2.10 (1005)	Equipment running correctly?	Yes
Grab Duplicate ID	CB102040210GRAB	Composite Begin Time (date / time)	~~4.1.10~~ 4.1.10 (1834)
Grab MS/MSD Collected ?	No	On Composite... (bottle # / aliq #)	4/5 BTL #10
VOA Trip Blank in cooler?, ID Yes	TB040210 (0815)	Ice deployed?	No
Flow Meter		Sampler Battery Voltage (changed?):	12.92 NOD
Flow meter cables OK? (Y/N)	Yes	Flow Meter Battery Voltage/Change? (if different)	NA
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Bottle Swap needed? (if yes fill out Section 3)	NO

Notes: * Changed pacing rate to 42 min/smpl @ 5/5 BTL #10

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
On Composite.... (bottle # / aliq #)		Data downloaded?	
Comp Btl Levels (under vol., overfilled, OK)		Sampler/Flow Meter Batt. Voltage (changed):	
Pacing Rate OK for Event?, Changed?		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB1

Section 4. Comp. Bottles Retrieval

Personnel: DO, HW	Weather: OC - no rain	Arrival Date/Time: 4/3/10	
Sampler Battery Voltage	12.67	Changed? Y (N)	New voltage
Flow Meter Battery Voltage	———	Changed? ~~Y~~ ~~N~~	New voltage ———
Comp Sample Volume Collected	100% except Btl 5-8	Data downloaded? Y	
Composite Begin Time (date/time)	4/1/10 1834		Round #: 1
Last Aliquot Taken (date/time, btl #, aliq #)	4/2/10 1640 Btl 12 5 of 5		
Comp Bottles Labeled? (sta. & btl #)	Y		

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

Btl 5 → 3/4 full
6 → little water
7 → empty
8 → 1/4 full

4/2 1:10 Btl 5 - 3/5
" 128 5 - 4/5
146 5 - 5/5
→ Btl 8 4/5 4/2 empty 5:58

Channel conditions/observations: channel OK

Notes/Maintenance Needed: none

Section 5. Post Storm Comp. Sample Processing

Personnel: SS, DO — Date/Time: 4/3/2010 (~0945)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info).: Yes — Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: See Sec. #4
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 9000 ml (optimal)	Actual Comp. Sample Vol. Available: ~~See Sec. #4 D/M~~
Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp.))	Other (explain): ①(4159 ml) → 8318 ml
Bottles (Btl #s) used for Comp. Sample: 1, 9-12	Comp. Sample Container Size & Material: 2.5 gal WM glass jug
Comp Collection Time (date/time): 4/2/2010 (16:40)	Comp Sample ID: CB1040210COMP
pH Measurements Collected On Comp. Sample ?: Yes 6.36	
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes	

Notes: ① Minimal vol req'ed for standard analysis = 2,500 ml; optimal = 4,500 ml — for this sample 8318 ml total was for normal sample + equal vol. for duplicate

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes

Duplicate Sample Collected ? Yes	Duplicate Sample Vol.: 4159 ml
Duplicate sample Date / Time: 4/2/2010 (17:40)	Duplicate Sample ID: CB1020402 10COMP
pH Measurement Collected on Duplicate Comp. Sample?: Yes 6.34	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: No	
MS/MSD Vol. submitted: NA	
Were any other QC sample types colelcted? (if yes, provide details) NA	
DI Water Information None used	

Notes:

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: LLA

Date: 4/3/10
Staff: SS
pH meter make/model #: ORION

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB31A040210COMP	6.37	12:03	
CB102040210COMP	6.34	12:08	
CB1040210COMP	6.36	12:11	
CB4857040310COMP	6.78	12:18	

Post-Measurement Check

Nominal pH value of standard	7.0	
Temperature (deg C)	15	
Standard pH, temp corrected	7.05	
Meter pH reading (SU)	7.14	
Difference (SU)	0.09	*Should be < 0.1 (round to 0.0)*
Time	12:25	

Form to be included in storm file, as applicable

TAYLOR ASSOCIATES, INC.

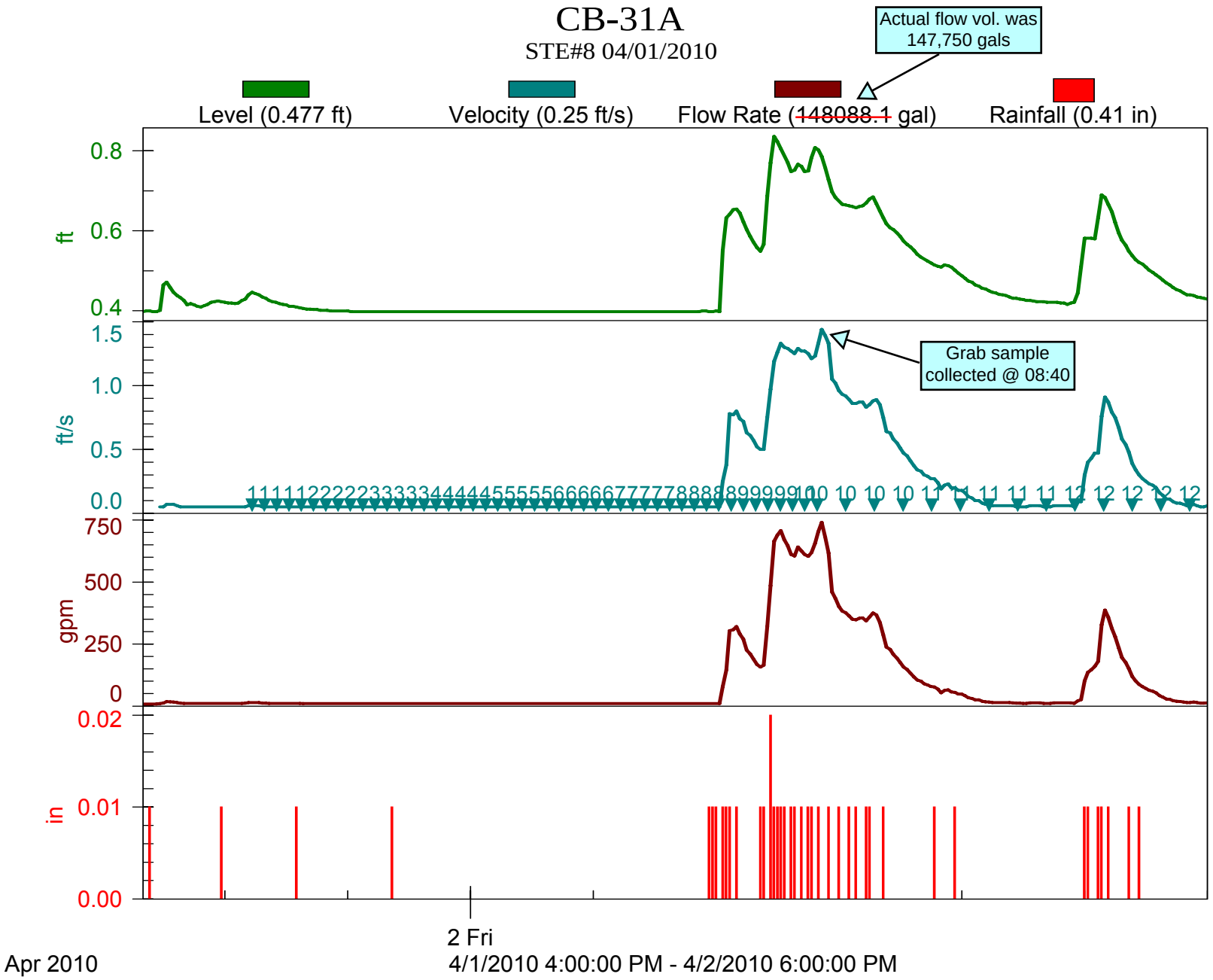
POS - Lora Lake Apartments Stormwater Interim Action

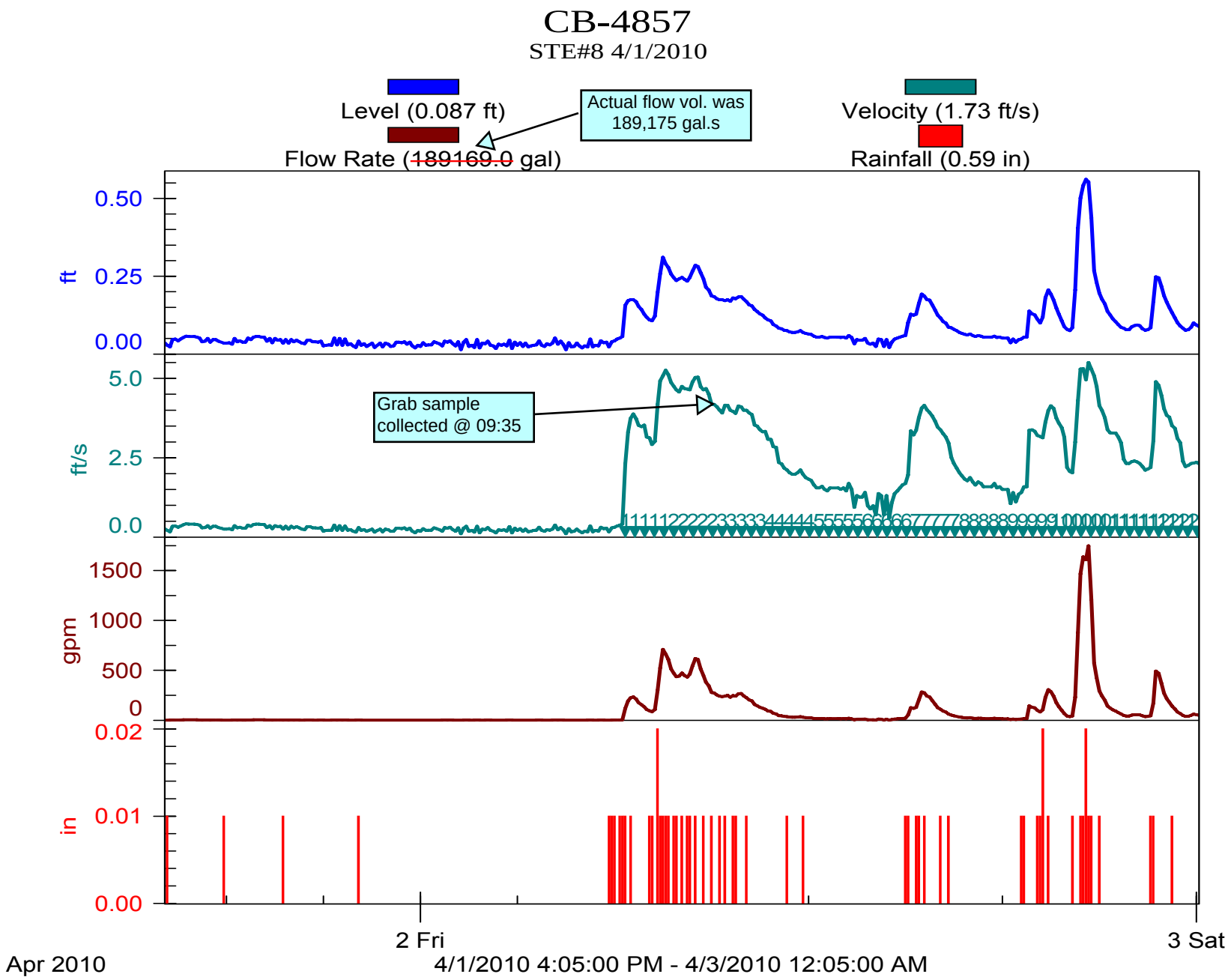
Groundwater Level Measurement Field Form

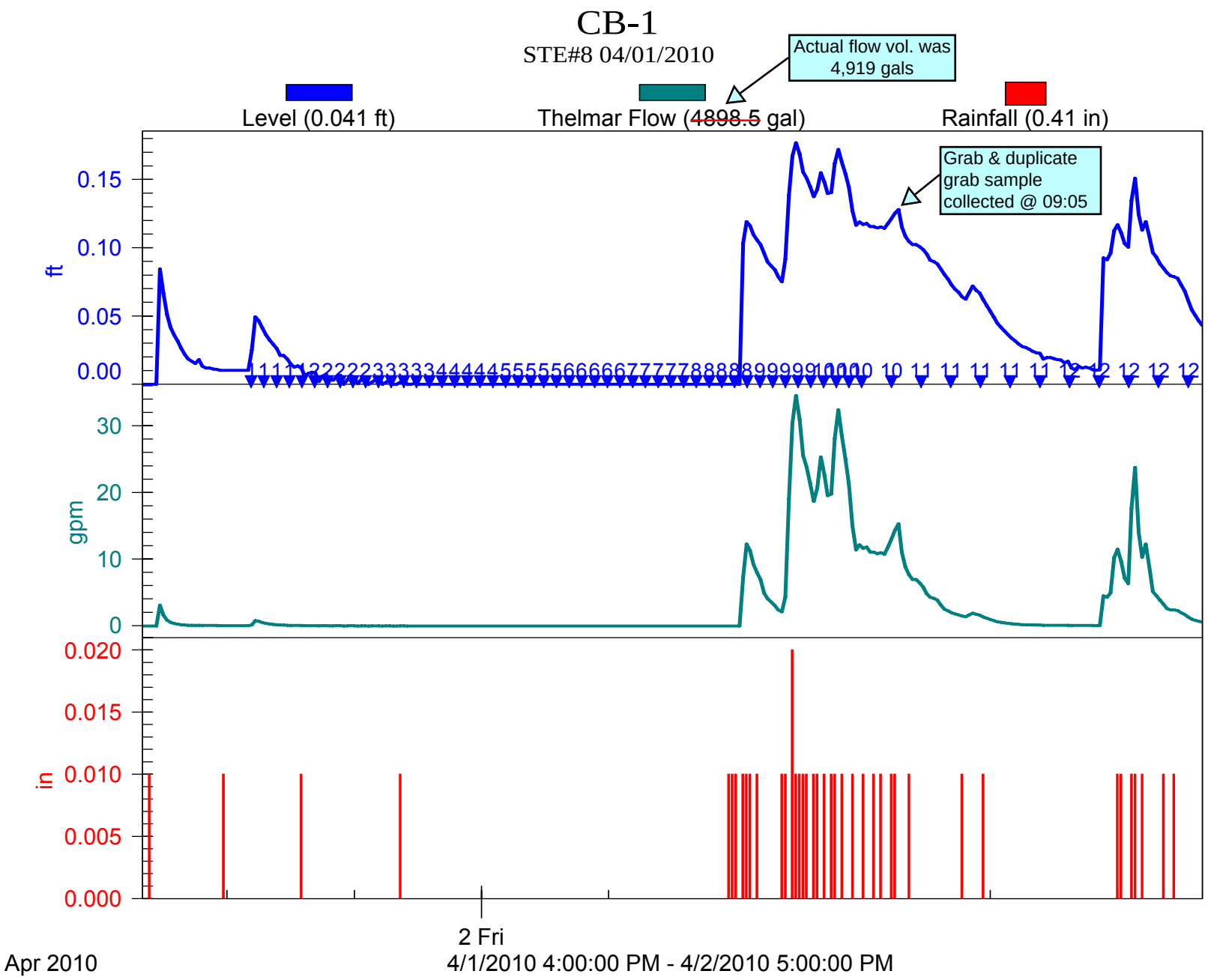
Personnel: D. Metallo, P. Heltzel	**Arrival Date/Time:** 4.2.2010 (1010)
Weather: Raining, breezy, 50°s	
Precip in Last 24-hrs / Last Measureable Rain Event: Rainned b/w 1600 - ~2200 4.1.10, then started rainning ~0600 to present	

Monitoring Well ID	Time	Water Level (FT)	Meas. Reference
MW-2	1012	6.21	Top PVC casing
MW-3	1017	17.00	↓
MW-4	1023	15.91	↓
MW-6	1035	11.59	↓

Notes:


CB-31A
STE#8 04/01/2010
Actual flow vol. was 147,750 gals
Level (0.477 ft)
Velocity (0.25 ft/s)
Flow Rate (~~148088.1~~ gal)
Rainfall (0.41 in)
ft
0.8
0.6
0.4
ft/s
1.5
1.0
0.5
0.0
Grab sample collected @ 08:40
gpm
750
500
250
0
in
0.02
0.01
0.00
2 Fri
Apr 2010
4/1/2010 4:00:00 PM - 4/2/2010 6:00:00 PM


CB-4857
STE#8 4/1/2010
Level (0.087 ft)
Flow Rate (189169.0 gal)
Actual flow vol. was 189,175 gal.s
Velocity (1.73 ft/s)
Rainfall (0.59 in)
ft
0.50
0.25
0.00
ft/s
5.0
2.5
0.0
Grab sample collected @ 09:35
gpm
1500
1000
500
0
in
0.02
0.01
0.00
2 Fri
3 Sat
Apr 2010
4/1/2010 4:05:00 PM - 4/3/2010 12:05:00 AM


CB-1
STE#8 04/01/2010
Actual flow vol. was 4,919 gals
Level (0.041 ft)
Thelmar Flow (4898.5 gal)
Rainfall (0.41 in)
Grab & duplicate grab sample collected @ 09:05
ft
0.15
0.10
0.05
0.00
gpm
30
20
10
0
in
0.020
0.015
0.010
0.005
0.000
2 Fri
Apr 2010
4/1/2010 4:00:00 PM - 4/2/2010 5:00:00 PM

CB31A - STE#8 040110

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
	0	0	1	0.00%	0.00%	0.00%
	0	0	2	0.00%	0.00%	0.00%
	0	0	3	0.00%	0.00%	0.00%
	0	0	4	0.00%	0.00%	0.00%
	0	0	5	0.00%	0.00%	0.00%
	0	0	6	0.00%	0.00%	0.00%
	0	0	7	0.00%	0.00%	0.00%
	0	0	8	0.00%	0.00%	0.00%
35500	0.505698006	1315	9	26.04%	26.04%	24.03%
70200	1	2600	10	51.50%	77.54%	47.51%
9815	0.139814815	364	11	7.20%	84.74%	6.64%
20805	0.296367521	771	12	15.26%	100.00%	14.08%
				100.00%		92.26%

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	136320
Strm Qtot (gals)	147750
max Q	70200
min V (ml)	2600

5049 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.
Used bottles 9, 10,11, and 12.; the remainder represented baseflow conditions

COMP Label = CB31A040210COMP **Time (17:35)**

CB4857 - STE#8 040110

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
16875	0.309462681	805	1	9.00%	9.00%	8.92%
43440	0.796625711	2071	2	23.18%	32.18%	22.96%
20270	0.371721988	966	3	10.82%	43.00%	10.71%
4785	0.087749862	228	4	2.55%	45.55%	2.53%
1450	0.026590867	69	5	0.77%	46.33%	0.77%
885	0.016229598	42	6	0.47%	46.80%	0.47%
12975	0.237942417	619	7	6.92%	53.72%	6.86%
1925	0.035301669	92	8	1.03%	54.75%	1.02%
8120	0.148908858	387	9	4.33%	59.08%	4.29%
54530	1	2600	10	29.10%	88.18%	28.83%
7575	0.138914359	361	11	4.04%	92.22%	4.00%
14580	0.267375756	695	12	7.78%	100.00%	7.71%
				100.00%		99.07%

Total Strm Vol% Rep.'ed in Comp

Qtotal	187410
Strm Qtot (gals)	189175
max Q	54530
min V (ml)	2600

8936 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon WM glass jug.
Used all 12 bottles for composite.
**Vol. includes enough sample for lab to run an MS/MSD

Comp Label = CB4857040310COMP **Time (00:02)**

CB1- STE#8 040110

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
15.4	0.007644767	13	1	0.32%	0.32%	0.31%
	0	0	2	0.00%	0.32%	0.00%
	0	0	3	0.00%	0.32%	0.00%
	0	0	4	0.00%	0.32%	0.00%
	0	0	5	0.00%	0.32%	0.00%
	0	0	6	0.00%	0.32%	0.00%
	0	0	7	0.00%	0.32%	0.00%
	0	0	8	0.00%	0.32%	0.00%
1226.05	0.608627665	1065	9	25.61%	25.93%	24.92%
2014.45	1	1750	10	42.08%	68.01%	40.95%
648.5	0.321924098	563	11	13.55%	81.56%	13.18%
882.9	0.438283402	767	12	18.44%	100.00%	17.95%
				100.00%		97.32%

Total Strm Vol% Rep.'ed in Comp

Qtotal 4787.3
Strm Qtot (gals) 4919
max Q 2014.45
min V (ml) 1750

4159 **Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.
Collected a duplicate sample at this location. See comp. sheet for CB102 for details.
Used bottles 1, 9, 10, 11, and 12 ; the remainder represented baseflow conditions

Comp Label = CB1040210COMP **Time (16:40)**

CB102 STE#8 040110 (DUPLICATE of CB1)

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
15.4	0.007644767	13	1	0.32%	0.32%	0.31%
	0	0	2	0.00%	0.32%	0.00%
	0	0	3	0.00%	0.32%	0.00%
	0	0	4	0.00%	0.32%	0.00%
	0	0	5	0.00%	0.32%	0.00%
	0	0	6	0.00%	0.32%	0.00%
	0	0	7	0.00%	0.32%	0.00%
	0	0	8	0.00%	0.32%	0.00%
1226.05	0.608627665	1065	9	25.61%	25.93%	24.92%
2014.45	1	1750	10	42.08%	68.01%	40.95%
648.5	0.321924098	563	11	13.55%	81.56%	13.18%
882.9	0.438283402	767	12	18.44%	100.00%	17.95%
				100.00%		**97.32%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals) 4787.3
Strm Qtot (gals) 4919
max Q 2014.45
min V (ml) 1750

4159 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass WM jug.

Used bottles 1, 9, 10, 11, and 12 ; the remainder represented baseflow conditions
CB102 is a duplicate sample of CB1

Comp Label = CB102040210COMP **Time (17:40)**

```
SAMPLER ID# 1072249987  09:43  3-APR-10
  Hardware: A1      Software: 2.20
********** PROGRAM SETTINGS **********
     ----------
   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1-MEGA  "
     ----------
   UNITS SELECTED:
     LENGTH: ft


     ----------
   UNITS SELECTED:
   FLOW RATE: gpm
  FLOW VOLUME: gal
   VELOCITY: fps
     ----------
  AREA-VEL MODULE:
        WEIR
        90
      V-NOTCH
     ----------

      5 MINUTE
   DATA INTERVAL

     ----------
  12,  3750 ml BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES
     ----------

  ONE-PART PROGRAM


     ----------
      PACING:
    TIME, EVERY
 0 HOURS, 18 MINUTES
```

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.030 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF

BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1072249987 09:43 3-APR-10
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********
SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 17:17 TH 1-APR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		17:17	PGM DISABLED		
		18:34	PGM ENABLED		
1,5	1	18:34	E		451
2,5	1	18:52	T		444
3,5	1	19:10	T		449
4,5	1	19:28	T		445
5,5	1	19:46	T		447
1,5	2	20:04	T		447
2,5	2	20:22	T		445
3,5	2	20:40	T		444
4,5	2	20:58	T		449
5,5	2	21:16	T		444
1,5	3	21:34	T		448
2,5	3	21:52	T		443
3,5	3	22:10	T		447
4,5	3	22:28	T		447
5,5	3	22:46	T		447
1,5	4	23:04	T		447
2,5	4	23:22	T		447
3,5	4	23:40	T		446
4,5	4	23:58	T		443

----------	FR 02-APR-10	----------			
5,5	4	00:16	T		444
1,5	5	00:34	T		440
2,5	5	00:52	T		443
3,5	5	01:10	T	NM	*
4,5	5	01:28	T	NL	*
5,5	5	01:46	T	NL	*
1,5	6	02:04	T	NL	*
2,5	6	02:22	T	NL	*
3,5	6	02:40	T	NL	*
4,5	6	02:58	T	NL	*
5,5	6	03:16	T	NL	*
1,5	7	03:34	T	NL	*
2,5	7	03:52	T	NL	*
3,5	7	04:10	T	NL	*
4,5	7	04:28	T	NL	*
5,5	7	04:46	T	NL	*
1,5	8	05:04	T	NL	*
2,5	8	05:22	T	NL	*
3,5	8	05:40	T	NL	*
4,5	8	05:58	T	NL	*
5,5	8	06:16	T		447
1,5	9	06:34	T		444
2,5	9	06:52	T		443
3,5	9	07:10	T		447
4,5	9	07:28	T		444
5,5	9	07:46	T		440
1,5	10	08:04	T		441
2,5	10	08:22	T		440
3,5	10	08:40	T		442
		08:49	MANUAL PAUSE		
		08:50	INTERVAL CHANGED TO 0 HRS, 42 MIN		
		08:50	MANUAL RESUME		
		08:50	MANUAL PAUSE		
		08:51	MANUAL RESUME		
4,5	10	08:58	T		449
5,5	10	09:40	T		441
1,5	11	10:22	T		447
2,5	11	11:04	T		447
3,5	11	11:46	T		441
4,5	11	12:28	T		441
5,5	11	13:10	T		441
1,5	12	13:52	T		447

```
                          CB1040310
  2,5    12   14:34      T            447
  3,5    12   15:16      T            453
  4,5    12   15:58      T            453
  5,5    12   16:40      T            453
              16:40  PGM DONE 02-APR


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
    ERROR NL ==> NO LIQUID DETECTED!
    ERROR NM ==> NO MORE LIQUID!
----------------------------------------



SAMPLER ID# 1072249987  09:44  3-APR-10
  Hardware: A1      Software: 2.20
 AREA-VEL MODULE: 1073479663
  Hardware: A0      Software: 1.04
********** COMBINED RESULTS **********
   SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 17:17 TH  1-APR-10
Nominal Sample Volume =  700 ml
                                          FLOW          TOTAL
                      LEVEL  VELOCITY     RATE          FLOW
SAMPLE  BOTTLE TIME     ft       fps      gpm           gal
------- ------ ----  -----     -----    -----  -------------
  1,5     1   18:34  0.037      0.37   0.000  000000000000
  2,5     1   18:52  0.038      0.37   0.000  000000000000
  3,5     1   19:10  0.025      0.37   0.000  000000000000
  4,5     1   19:28  0.017      0.37   0.000  000000000000
  5,5     1   19:46  0.012      0.37   0.000  000000000000
  1,5     2   20:04  0.008      0.37   0.000  000000000000
  2,5     2   20:22  0.008      0.37   0.000  000000000000
  3,5     2   20:40  0.007      0.37   0.000  000000000000
  4,5     2   20:58  0.007      0.37   0.000  000000000000
  5,5     2   21:16  0.005      0.37   0.000  000000000000
  1,5     3   21:34  0.005      0.37   0.000  000000000000
  2,5     3   21:52  0.003      0.37   0.000  000000000000
  3,5     3   22:10  0.003      0.37   0.000  000000000000
  4,5     3   22:28  0.002      0.37   0.000  000000000000
  5,5     3   22:46  0.000      0.37   0.000  000000000000
  1,5     4   23:04  0.000      0.37   0.000  000000000000
```

National Weather Service
Seattle,WA

AREA FORECAST DISCUSSION

FXUS66 KSEW 012338 AAB
AFDSEW

AREA FORECAST DISCUSSION...UPDATED
NATIONAL WEATHER SERVICE SEATTLE WA
438 PM PDT THU APR 1 2010

UPDATED THE AVIATION...MARINE...AND WATCH/WARNING/ADVISORY SEGMENTS.

.SYNOPSIS...A STRONG LATE SEASON STORM SYSTEM DEVELOPING OVER THE EASTERN PACIFIC TONIGHT WILL MOVE INTO VANCOUVER ISLAND JUST OFF THE NORTHWEST TIP OF THE OLYMPIC PENINSULA FRIDAY AFTERNOON. THIS SYSTEM WILL DRIVE A STRONG FRONT ACROSS THE AREA FRIDAY PRODUCING VERY WINDY CONDITIONS ACROSS MUCH OF WESTERN WASHINGTON. COOL AND UNSTABLE AIR WILL INVADE THE REGION BEHIND THIS SYSTEM FRIDAY NIGHT AND SATURDAY. ANOTHER...WEAKER SYSTEM WILL APPROACH THE WEST COAST LATER SUNDAY AND LINGER OVER THE REGION THROUGH MONDAY. A SERIES OF WEATHER SYSTEMS WILL CONTINUE THE UNSETTLED WEATHER PATTERN THROUGH THE MIDDLE OF NEXT WEEK.

&&

.SHORT TERM...LATEST RADAR LOOP INDICATES SCATTERED SHOWER ACTIVITY CONTINUING ACROSS MUCH OF WRN WA LATE THIS AFTERNOON. THE ATMOSPHERE REMAIN MOIST AND SOMEWHAT UNSTABLE BUT DIURNAL INSTABILITY WILL WANE OVER THE NEXT FEW HOURS. WILL LEAVE POPS IN THE CHANCE CATEGORY WITH THE EXPECTATION THAT SHOWERS WILL START TO DECREASE IN COVERAGE.

WV AND IR SATELLITE IMAGERY SHOWS THE NEXT STRONG LOW PRESSURE SYSTEM BEGINNING TO DEVELOP OUT NEAR 150 W AND 45 N. A VERY STRONG 190+ KT JET WILL SPUR A SURFACE LOW TO DEEPEN OVERNIGHT. THE JET WILL WEAKEN SOMEWHAT BUT THE FLOW WILL BUCKLE PUTTING THE PAC NW IN THE STORM TRACK. ALL MODELS AGREE THAT A DEEPENING LOW WILL TRACK INLAND SOMEWHERE BETWEEN THE N WA COAST AND THE CENTRAL VANCOUVER COAST FRIDAY AFTERNOON. THE ECMWF/NAM/AND MOST GFS ENSEMBLE MEMBERS TRACK A SUB 980 MB SURFACE LOW INTO S/CENTRAL VANCOUVER ISLAND. THIS SCENARIO WOULD LIKELY PRODUCE THE STRONGEST AND MOST WIDESPREAD WINDS ACROSS WRN WA. THE OPERATIONAL GFS AND MM5 ARE WEAKER AND TRACK A BROADER SURFACE LOW ACROSS THE OLYMPIC PENINSULA WITH A SOMEWHAT LESS FAVORABLE TRAJECTORY. BASED ON FORECAST SURFACE GRADIENTS AND THE MEAN MODEL SURFACE LOW TRACK...IT SEEMS PRUDENT TO CONVERT THE HIGH WIND WATCHES TO A WARNINGS FOR THE COAST...STRAIT...AND N INTERIOR SINCE THESE LOCATIONS WILL PROBABLY VERIFY AT LEAST IN GUSTS IN EITHER OUTCOME. AS FOR THE GREATER PUGET SOUND REGION AND SW INTERIOR...THE EXACT DEPTH AND LANDFALL LOCATION WILL MAKE A BIGGER DIFFERENCE ON WIND SPEEDS. THESE LOCATIONS COULD END UP LOWER END ADVISORY OR POSSIBLY LOW END HIGH WIND CRITERIA.

SINCE THE STRONGER WINDS HOLD OFF HERE UNTIL FRIDAY AFTERNOON I HAVE OPTED TO LEAVE THE WATCH IN PLACE AND LET THE NEXT SHIFT LOOK AT ADDITIONAL MODEL RUNS BEFORE MAKING A DECISION. WILL WORD THE STATEMENT TO LEAN TOWARD ADVISORY LEVEL WINDS FOR NOW.

THIS SYSTEM WILL ALSO PACK A GOOD DEAL OF MOISTURE AND STRONG SLY FLOW BECOMING WLY BEHIND THE FRONT FRIDAY AFTERNOON. SLOPES THAT DO WELL IN S AND W FLOW REGIMES WILL SEE THE HEAVIEST AMOUNT OF PRECIPITATION. SNOW LEVELS WILL REMAIN FAIRLY LOW...GENERALLY IN THE 2000-2500 FOOT RANGE. THE HEAVIEST SNOW IN THE PASSES WILL LIKELY OCCUR LATER FRIDAY AFTERNOON AND EVENING AS STRONG POST FRONTAL WESTERLIES WILL BE IDEAL FOR OROGRAPHIC ENHANCEMENT. THE MOUNTAINS AND PASSES SHOULD RECEIVE 1 TO 2 FEET OF SNOW BY THE END OF THE EVENT SATURDAY MORNING...WITH LOCALLY 3 FEET POSSIBLE IN THE HIGHER ELEVATIONS FAVORED BY BOTH S AND W FLOW SUCH AS MT BAKER AND PARADISE. IN ADDITION...VERY STRONG WEST WINDS OF 40 MPH WITH GUSTS TO 60 MPH ARE EXPECTED TO DEVELOP IN THE MOUNTAINS AND PASSES FRIDAY AFTERNOON AND EVENING PRODUCING BLOWING AND DRIFTING SNOW. THIS WILL CREATE REDUCED VISIBILITY AND HAZARDOUS DRIVING CONDITIONS OVER THE PASSES. THE WINTER STORM WATCH WILL BE CONVERTED TO A WARNING THIS AFTERNOON.

SNOW WILL FIRST TAPPER OFF TO SHOWERS OVER THE OLYMPICS FRIDAY NIGHT THEN ACROSS THE CASCADES BY MIDDAY SATURDAY AS THE FLOW WEAKENS. A DEEPENING TROUGH OFFSHORE SATURDAY NIGHT WILL FORCE SOME WEAK RIDGING OVER WA ALLOWING PRECIP TO BECOME JUST SCATTERED SHOWERS. MODELS SLOW THE EWD PROGRESS OF THE LOW ON SUNDAY BUT BRING IT JUST CLOSE ENOUGH TO THE COAST TO WARRANT CHANCE POPS ACROSS THE AREA.

.LONG TERM...THE COOL AND UNSETTLED WEATHER PATTERN WILL CONTINUE THROUGH MUCH OF NEXT WEEK. MODELS SWING A LOW IN ACROSS THE AREA ON MONDAY WITH A BETTER CHANCE OF LIGHT RAIN AND MOUNTAIN SNOW. COOL AND MOIST NW FLOW IS LEFT IN ITS WAKE WHICH EXTENDS UPSTREAM TO THE GULF OF ALASKA. THIS PATTERN IS PRETTY GOOD FOR PRODUCING OROGRAPHICALLY ENHANCED SNOWFALL IN THE MOUNTAINS WITH SNOW LEVELS REMAINING DOWN TO PASS LEVELS. A SERIES OF WEAK SYSTEM WILL TRANSVERSE WRN WA THROUGH MID WEEK WITH SNOW AT TIMES IN THE MOUNTAINS AND UNSEASONABLY LOW SNOW LEVELS. MERCER

&&

.HYDRO...A STRONG FRONTAL SYSTEM WILL BRING HEAVY RAIN AND SNOW TO THE OLYMPICS AND CASCADES LATER TONIGHT THROUGH FRIDAY. SNOW LEVELS WILL REMAIN FAIRLY LOW...AROUND 2000 TO 2500 FEET WHICH WILL MITIGATE THE RISK OF FLOODING IN MOST BASINS. THE STRONG SLY FLOW OUT AHEAD OF THE LOW WILL FAVOR HEAVY PRECIPITATION OVER THE S FACING SLOPES OF THE OLYMPICS WHERE MODELS ARE PRODUCING 2-3 INCHES QPF. AT THIS TIME...THE ONLY RIVER AT SLIGHT RISK FOR FLOODING IS THE SKOKOMISH RIVER SINCE PART OF THE BASIN LIES BELOW THE SNOW LEVEL. HOWEVER...THE LATEST HYDRO MODELS DO NOT BRING THE SKOKOMISH RIVER TO FLOOD STAGE. NO PRODUCTS WILL BE ISSUED AT THIS TIME. CONTINUE TO MONITOR FORECASTS AND ANY FLOOD STATEMENTS. NO FLOODING IS EXPECTED ON OTHER RIVERS INCLUDING THE GREEN. MERCER

&&

.AVIATION...
WEAK...HIGH PRES ALOFT WILL PREVAIL OVER THE REGION OVERNIGHT AHEAD OF A POTENT LOW PRES SYSTEM DEEPENING WELL OFFSHORE. ANTICIPATE INCREASING SW FLOW ALOFT TONIGHT. THE LOW LEVEL FLOW WILL BECOME OFFSHORE OVERNIGHT IN RESPONSE TO STRONG PRES FALLS OVER THE PAC. THE UPPER TROF AND ASSOCIATED VIGOROUS...COLD FRONT WILL MOVE ACROSS THE AREA DURING THE DAY FRI. ANTICIPATE STRONG SLY FLOW TO DEVELOP OUT AHEAD OF THE FRONT...BECOMING STRONG ONSHORE OR WLY BEHIND IT. CONDITIONS /MAINLY CIGS/ WILL BEGIN TO DETERIORATE LATE TONIGHT. BY 1800 UTC CIGS SHOULD GENERALLY BE IN THE 1-3K FT RANGE.

SFC WINDS WILL BACK TO ELY OVERNIGHT AS THE INTENSIFYING SFC LOW APPROACHES FROM THE SW. HOWEVER...JUST ABOVE THE SFC...WINDS WILL INCREASE FROM THE S AND THIS WILL RESULT IN LLWS. THE STRONG SLY WINDS WILL MIX DOWN TO THE SFC JUST AHEAD OF THE CDFNT. THE CDFNT IS EXPECTED TO MOVE ONSHORE LATE FRI MORNING AND THEN QUICKLY E IN THE AFTERNOON.

A PUGET SOUND CONVERGENCE ZONE /PSCZ/ WILL LIKELY DEVELOP JUST N OF THE KING/SNOHOMISH COUNTY BORDER FRI EVENING...AND THEN PERSIST THRU FRI NIGHT. WOULD NOT RULE OUT ISOLATED TSTMS WITHIN THE PSCZ. ALSO...THE AIR MASS WILL BECOME COLD ENOUGH FOR THE POSSIBILITY OF WET SNOW MIXING WITH THE RAIN /WITHIN THE PSCZ/ LATE FRI NIGHT.

KSEA...CIGS WILL GENERALLY BE IN THE 3-5K FT RANGE THE REST OF THIS AFTERNOON BEFORE LIFTING ABOVE 5K FT THIS EVENING. THERE IS A 10 PERCENT CHANCE OF A LIGHTNING STRIKE IN THE VICINITY OF THE TERMINAL THIS AFTERNOON. EXPECT LLWS TO DEVELOP LATE TONIGHT AS SLY WINDS INCREASE JUST ABOVE THE SFC BUT WINDS AT THE SFC BECOME ELY. CIGS WILL LOWER INTO THE 1-2K FT RANGE FRI MORNING AS THE RAIN INCREASES ACROSS THE AREA. EXPECT FROPA ABOUT 2100 UTC FRI.

NOTE...EFFECTIVE AT 15Z TUESDAY APRIL 6 2010 THE NWS IN SEATTLE WILL BEGIN 3-HOURLY TAF ISSUANCES FOR KSEA. THE INTERMEDIATE TAF ISSUANCES AT 03Z...09Z...15Z...AND 21Z WILL BE ISSUED AS AMENDMENTS TO THE TAFS ISSUED AT 00Z...06Z...12Z...AND 18Z. THE INTERMEDIATE TAFS WILL BE ISSUED DURING A 20-MINUTE WINDOW BETWEEN 50 MINUTES AFTER THE HOUR AND 10 MINUTES AFTER THE HOUR.

&&

.MARINE...
A DEVELOPING SURFACE LOW WELL OFF THE OREGON COAST WILL DEEPEN OVERNIGHT AND RACE NE TOWARD THE COASTAL WATERS. THIS LOW IS EXPECTED TO DEEPEN TO NEAR 975 MB /OR PERHAPS LOWER/ BEFORE MOVING ACROSS VANCOUVER ISLAND EARLY FRI AFTERNOON. THE ASSOCIATED STRONG...COLD FRONT WILL SWEEP ACROSS THE COASTAL WATERS FRI MORNING...AND THE INTERIOR IN THE AFTERNOON. GALE TO STORM WINDS ARE LIKELY OVERNIGHT OR ON FRIDAY. STRONG ONSHORE FLOW WILL OCCUR BEHIND THE FRONT FRI NIGHT...BUT WILL WEAKEN ON SATURDAY.

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...WINTER STORM WARNINGS ARE IN EFFECT FOR THE OLYMPICS AND
CASCADES FROM MIDNIGHT TONIGHT THRU SATURDAY MORNING.

HIGH WIND WARNINGS ARE IN EFFECT FOR THE COAST...NORTH
INTERIOR...SW INTERIOR...AND STRAIT OF JUAN DE FUCA FROM
LATE TONIGHT THRU FRI EVENING.

A HIGH WIND WATCH REMAINS IN EFFECT FOR THE REST OF THE
LOWLANDS FOR FRI.

PZ...A STORM WARNING IS IN EFFECT FOR THE COASTAL WATERS FOR FRI.

GALE WARNING IN EFFECT FOR THE REMAINING WATERS THRU FRI NIGHT.

A SMALL CRAFT ADVISORY FOR ROUGH GRAYS HARBOR BAR CONDITIONS IS
IN EFFECT THRU SATURDAY AFTERNOON.

WWW.WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION PLEASE SEE
WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML (ALL LOWERCASE).

Your National Weather Service forecast

Burien WA

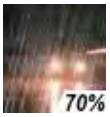
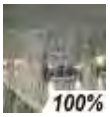
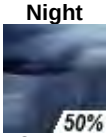
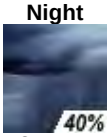
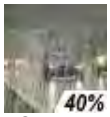
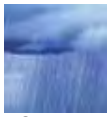
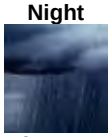
Enter Your "City, ST" or zip code Go

BOOKMARK

NWS Seattle, WA
Point Forecast: Burien WA
47.45°N 122.34°W (Elev. 200 ft)

Mobile Weather Information | **En Español**
Last Update: 5:27 pm PDT Apr 1, 2010
Forecast Valid: 9pm PDT Apr 1, 2010-6pm PDT Apr 8, 2010

Forecast at a Glance

Tonight	Friday	Friday Night	Saturday	Saturday Night	Sunday	Sunday Night	Monday	Monday Night
								
Rain Likely	Rain	Chance Showers	Chance Showers	Chance Showers	Chance Rain	Chance Rain	Chance Showers	Chance Showers
Lo 40 °F	Hi 46 °F	Lo 37 °F	Hi 48 °F	Lo 37 °F	Hi 53 °F	Lo 41 °F	Hi 51 °F	Lo 41 °F

Detailed 7-day Forecast

Hazardous weather condition(s):

High Wind Watch

Tonight: Rain likely, mainly after 11pm. Cloudy, with a low around 40. South wind 7 to 10 mph becoming east. Chance of precipitation is 70%.

Friday: Rain. High near 46. Windy, with a east wind 11 to 14 mph becoming south southwest between 27 and 30 mph. Winds could gust as high as 55 mph. Chance of precipitation is 100%.

Friday Night: A 50 percent chance of showers. Mostly cloudy, with a low around 37. Breezy, with a southwest wind 22 to 25 mph decreasing to between 13 and 16 mph. Winds could gust as high as 38 mph.

Saturday: A 50 percent chance of showers. Mostly cloudy, with a high near 48. Southwest wind between 10 and 16 mph.

Saturday Night: A 40 percent chance of showers. Mostly cloudy, with a low around 37. South wind between 8 and 13 mph.

Sunday: A 40 percent chance of rain. Mostly cloudy, with a high near 53.

Sunday Night: A 50 percent chance of rain. Cloudy, with a low around 41.

Monday: A chance of showers. Cloudy, with a high near 51.

Monday Night: A chance of showers. Mostly cloudy, with a low around 41.

Tuesday: A chance of showers. Mostly cloudy, with a high near 53.

Tuesday Night: A chance of showers. Mostly cloudy, with a low around 43.

Wednesday: A chance of showers. Mostly cloudy, with a high near 53.

Detailed Point Forecast

[Move Down]

Click Map for Forecast Disclaimer

Requested Location Forecast Area

Lat/Lon: 47.45°N 122.34°W **Elevation:**200 ft

XML

Current Conditions

[Move Up]

Seattle, Seattle-Tacoma International Airport
Last Update on 01 Apr 19:53 PDT

Lt Rain

44°F (7°C)

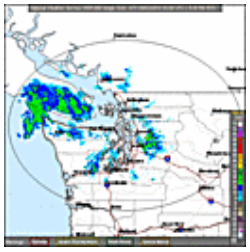
Humidity:	79 %
Wind Speed:	S 10 MPH
Barometer:	29.94 in (1014.70 mb)
Dewpoint:	38°F (3°C)
Wind Chill:	39°F (4°C)
Visibility:	7.00 Miles

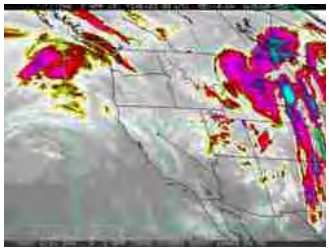
More Local Wx: **3 Day History:**

Radar and Satellite Images

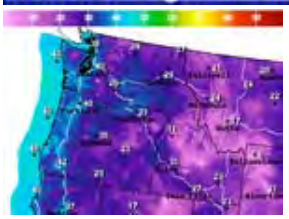
Wednesday Night: A chance of showers. Mostly cloudy, with a low around 39.

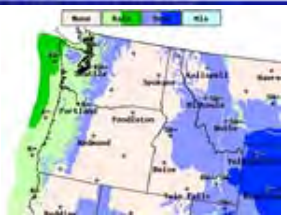
Thursday: A chance of showers. Mostly cloudy, with a high near 54.





National Digital Forecast Database





Additional Forecasts & Information

Zone Area Forecast for Seattle/Bremerton Area, WA
Forecast Discussion
Printable Forecast | Text Only Forecast
Hourly Weather Graph | Tabular Forecast
Quick Forecast
International System of Units | About Point Forecasts
Forecast Weather Table Interface

Webmaster
National Weather Service:
Seattle, WA

Back to Previous Page

weather.gov

National Weather Service Forecast Office
Seattle, WA

Home News Organization Search for: NWS All NOAA Go

Point Forecast: Burien WA
47.45N 122.34W (Elev. 200 ft)

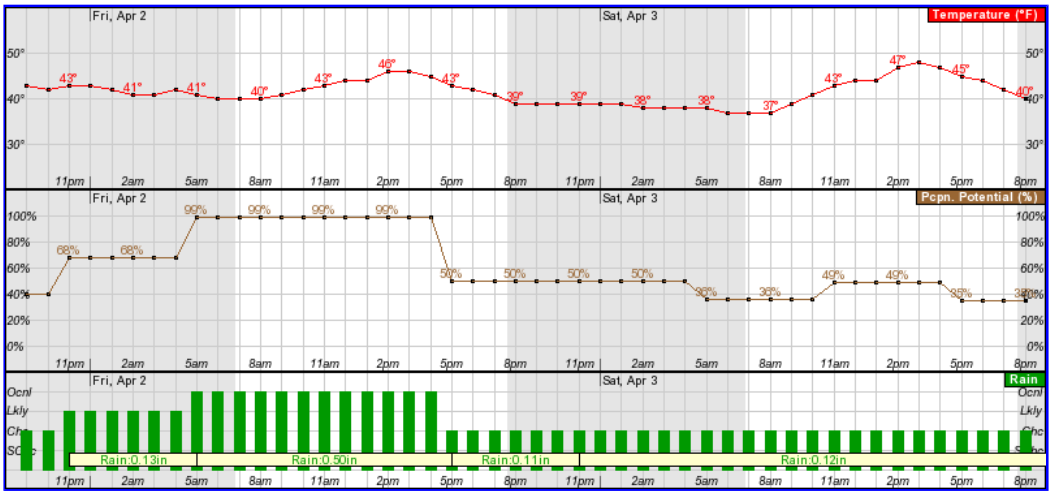
En Español
Last Update: 5:27 pm PDT Apr 1, 2010

Hourly Weather Forecast Graph

[dashes/dots] | [b/w] | [hide menu]

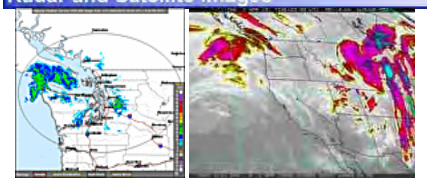
☑ Temperature (°F)	☐ Surface Wind mph	☐ Thunder
☐ Dewpoint (°F)	☐ Sky Coverage	☑ Rain
☐ Wind Chill (°F)	☑ Precipitation Potential	☐ Snow
	☐ Relative Humidity	☐ Freezing Rain
		☐ Sleet

48-Hour Period Starting: 9pm Thu, Apr 1 Submit Back 2 Days Forward 2 Days



Thursday, April 1 at 9pm
Temperature: 43 °F
Precipitation Potential: 40%
Rain: Chance (30%-50%)

Radar and Satellite Images



Additional Forecasts & Information

International System of Units
7-Day Forecast
Forecast Discussion
Tabular Forecast
Quick Forecast

Webmaster
NOAA's National Weather Service
Seattle, WA

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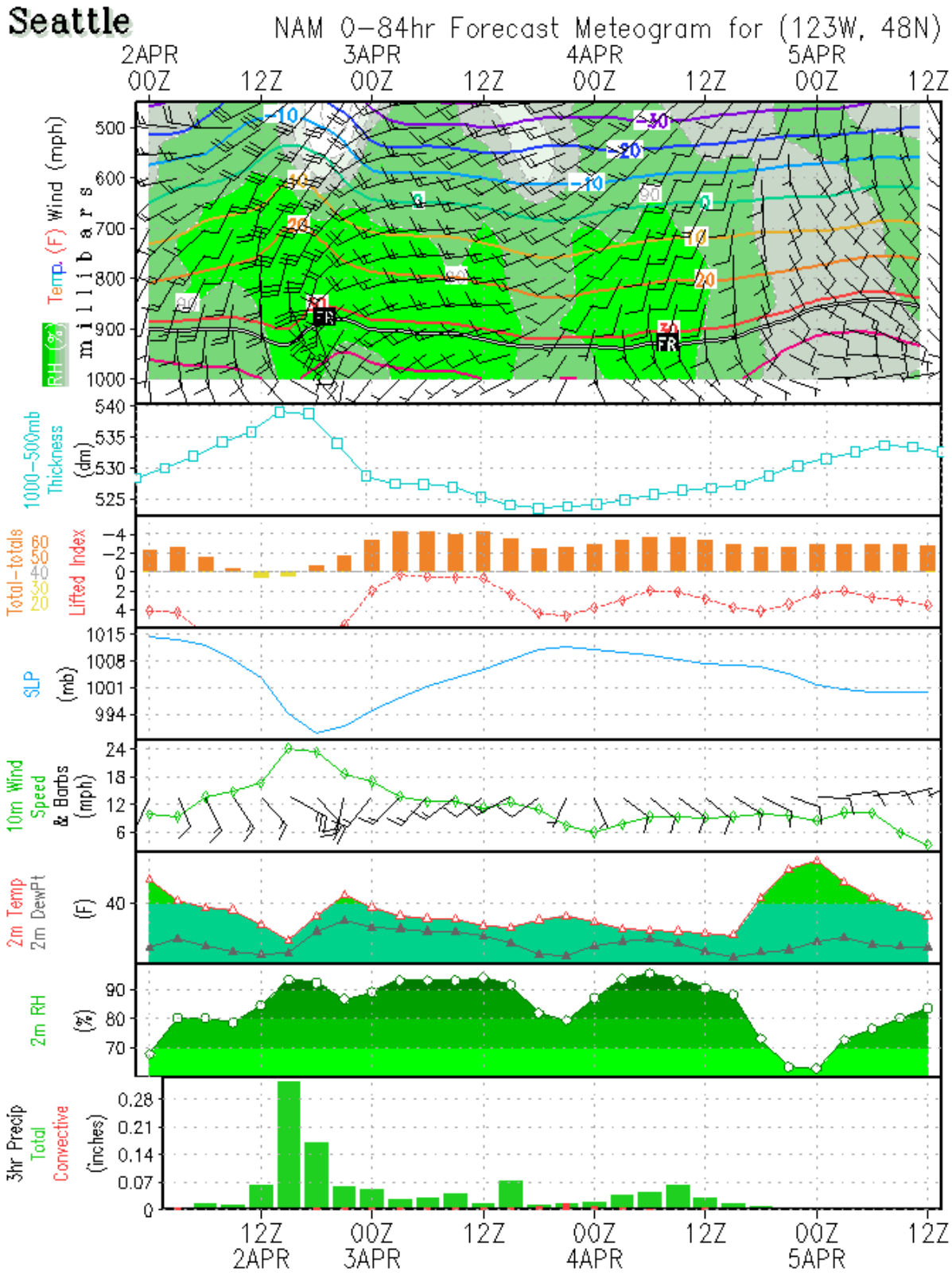
Privacy Policy
About Us
Career Opportunities


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
2APR 00Z
12Z
3APR 00Z
12Z
4APR 00Z
12Z
5APR 00Z
12Z
millibars
Temp (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
3hr Precip
Total
Convective
(inches)

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	May 25, 2010
TO:	Matt Woltman / Megan McCullough
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600 Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409 (office) or 206-794-0095 (cell)
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #9 (04/07/2010)

Please find included the following:

- Storm report narrative (4 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- pH Worksheet (1 pg),
- Groundwater level measurement form, (1 pg)
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (2 pg),
- Sampler Reports (18 pgs), and
- Weather forecasting information (6 pgs).

Please let me know if you have any questions or need additional information. Thank You.

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

Dave Metallo, LHG , Project Manager

POS Lora Lake Apartments (LLA) Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #9
April 7th, 2010

Sampling Event (STE) #9 began on April 7th, 2010. The storm period dating back to the last week in March (2010), characterized by moderate to strong, well organized precipitation events extended into the first full week of April. A cold front with a strong pressure gradient pushed downward from southern B. C. brining rain throughout the Puget Sound Lowlands and strong winds through the Strait of Juan de Fuca and the Admiralty Inlet. STE#9 was forecasted for upwards of nearly an inch (0.88") of rain. The forecast called for the start of the event during the late evening of the 7th, continuing through Thursday the 8th. then tapering off during the morning of Friday the 9th. The bulk of the event was forecast to occur over an 18-hour period from late evening on the 7th through mid-afternoon on the 8th.

STE#9 actually began over the project area during the early afternoon (14:05) of April 7th and consisted of two main waves of precipitation. The first wave occurred from 14:05 to 16:55 on the 7th delivering 0.12 inches of rain. The second wave of precipitation occurred from 23:25 on the 7th through 02:15 on April 8th delivering 0.04 inches of rain. The STE#9 weather system was weaker then forecasted. A transition to northerly offshore flow occurred ahead of schedule, bringing drier and cooler temperatures to the project area. This was in line with the longer range forecast which predicated higher level (closed) low pressure systems, which result in less organized systems brining showery rain and periods of sun, although cooler temperatures.

This particular storm event produced a total of 0.16 inches of rain over the surrounding project area. All of the LLA monitoring stations were able to sample the entire rainfall depth. Detailed weather forecast information is attached to this report.

Storm and Sample Validation / Qualification:

All validation and qualification conditions for this storm event were met. These validation and qualification conditions included forecast probability, antecedent dry period, runoff occurrence / hydrograph stage, parameters collected, 75 % flow representation, minimum number of aliquots, pH measurement, quality control sample collection and anomalous conditions assessment. See the accompanying *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding STE#9.

Grab Sampling, Composite Sampling and Autosampler Enabling:

The three LLA Project sampling stations were CB31A (main line inlet), CB4857 (main line outlet) and CB1 (onsite system outlet). Grab samples were collected using Teflon-lined tubing, dedicated at each sampling station, which was attached to a point adjacent to the intake of the composite sampling line. A peristaltic pump was used to collect the grab samples through these dedicated lines at each station. All grabs were collected as early as possible during the storm event once runoff was noted and at points within the associated station hydrographs that were elevated above base flow conditions.

Composite samples were collected via autosamplers with a 12 (1-gallon glass) bottle arrangement also utilizing Teflon-lined tubing dedicated at each sampling station. All three sampling stations were automatically enabled via the use of flow meters that were connected to autosamplers. The flow meters were pre-programmed to enable sampling above certain pre-determined threshold levels. These threshold levels were determined based on an examination of pre-storm base-flow condition levels, known periodic or cyclic events (e.g. timed watering, construction pumping, etc. that occur in the basin) and runoff response from past events. CB31A and CB4857 used stand-alone in-pipe area -velocity

sensors to enable sampling and direct measurement of water level in the pipe, flow velocity and auto-calculation of flow volume. CB1 used an area-velocity sensor in combination with a Thel-Mar volumetric weir. At this location the area-velocity sensor was used only for direct measurement of level (calibrated to the weir crest). Flow volume was then post-calculated via manufacturers published stage-discharge relationship information based on the acquired level data.

Each of the three autosamplers were programmed to collect time paced composite samples. Initially each autosampler was set to collect an aliquot every 21-minutes (providing for 105-minutes per discrete sample bottle and lasting up to 21 hours total). Due to the extended base flow period noted at each station after the initial (first wave) rainfall the sample collection pacing was adjusted to 24-minutes to allow for a slightly longer (2 3-hour) sampling period.

The initial rainfall caused a runoff response at each of the sampling stations enabling the autosamplers within 24 minutes from each other (with CB31A and CB1 enabling within 10 minutes of each other). CB-1 and CB-31A responded at 41 and 51-minutes, respectively, after the beginning of the storm event (2:05 PM April 7th). Due to the light intensity of this initial rainfall and the specific hydraulic conditions at the monitoring station, the sampler at CB4857 did not enable until 70-minutes (3:10 PM on April 7th) after the beginning of the storm event. See the attached *Field Sampling Forms* for additional enabling and station specific details.

All sampling and flow monitoring equipment operated as designed and programmed. Details pertaining to the programming and event-specific operation of each monitoring station sampler unit is contained in the attached *Sampler Reports*. Collection of grab and composite samples followed the methodology detailed in the LLA Work Plan.

Flow Data Summary:

CB-31A and CB-4857 had a storm volume difference of approximately 10,520 gallons, with the inlet recording more flow then the outlet. The storm sampling volume difference between these stations was approximately 8,000 gallons. This is likely a consequence of the drainage system vactoring and resultant change in hydraulic conditions at CB4857 noted in STE Reports #'s 3 and 4. Since accumulated sediment was removed from the piping and vaults associated with CB4857, water flows more freely and is not being impounded to the degree previously noted prior to the vactoring event. Water depth in the pipe (at the area-velocity sensor anchor position) does not increase as readily in association with rainfall as it had done during past events and observations. These shallower water conditions at CB4857, coupled with its 4% pipe slope (field measured) tended to make flow monitoring more difficult. However, highly accurate flow measurements for the purpose of mass balance calculation through the drainage piping system or assessment of total flow at each station were not project data quality objectives. Nor are these critical factors in the representative characterization of stormwater chemistry at this site. Flow metering at each monitoring station is considered to have the necessary precision to allow for consistent and effective sampler enabling and the generation of representative storm hydrographs. Flow hydrographs were noted to have very similar runoff response signatures when compared to each other for both this current and past storm events.

CB1 had a measured storm flow volume of 1,051 gallons. This was consistent with the amount of rainfall that occurred during this storm event. *Storm Event Hydrographs* showing, level, flow and rainfall data, as well as sample markers and grab sample collection indications, for each of the monitoring stations are attached to this report.

Compositing Scheme:

All of the composite samples were manually flow weighted based on site specific flow information. The hydrographs from each monitoring station were examined and decisions were made as to what specific discrete sampler bottles were to be included in the overall composite samples. Due to the nature of this particular storm event all three sampling stations utilized discrete bottles one, two, six and seven out of 12 total bottles. The remainder of the unused bottles represented base flow or mostly base flow conditions. See the attached *Field Sampling Forms* and their accompanying *Compositing Worksheets* for these details.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grabs or composite samples were placed into coolers and put on ice to attempt to maintain temperatures between 2 and 6 °C. A small portion of each of the of the composite samples was poured off for the assessment of pH. pH measurements were collected prior to delivery of the samples to the lab. These measurements were recorded on the attached *pH Measurement Worksheet.*

All sample IDs, collection date and time, matrix, requested parameter analysis and other associated information were documented on *Chain-of-Custody forms* (attached). Samples were in direct control of project and/or laboratory personnel at all times. Samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from the targeted stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Quality Control Samples:

During this event adequate water volume for duplicate and MS/MSD analyses was collected and submitted for both the grab and composite samples. Both the grab and composite duplicates were collected at CB31A – which were designated as location "CB100". This was done to present a "blind" sample (not readily identifying these duplicates) to the testing facility. Both the grab and composite MS/MSD volumes were collected at CB1 – and were labeled as such. Trip blanks accompanied all volatile organic samples collected during this STE. See the attached *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* and the *Field Sampling Forms* for details regarding QC sample collection.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. These locations were MW-2, MW-3, MW-4, and MW-6. Details regarding the measurement event are contained in the attached *Groundwater Level Measurement* field sheet. Measurements are listed in the table below.

Groundwater Level Measurements, STE#9

Location	Date	Time	Water Level from TOC (FT)	Notes
MW-2	4/9/2010	09:55	6.31	replacement for MW-1 and MW-5, as previously noted
MW-3	4/9/2010	10:01	16.71	
MW-4	4/9/2010	10:06	15.86	

Groundwater Level Measurements, STE#9

Location	Date	Time	Water Level from TOC (FT)	Notes
MW-6	4/9/2010	10:12	10.66	

Anomalies and/or Work Plan Deviations:

There were no anomalies observed that would have otherwise caused any of the STE#9 samples to be non-representative of the conditions from which they were collected.

Actions To Be Completed:

Routine sampler maintenance and flow meter (level) calibrations will be conducted at a regular frequency to assure proper equipment operation. This was the ninth of ten anticipated storm sampling events. An attempt will be made to conduct one more event before late-May, 2010. The current focus of the field efforts will be in maintaining proper station and equipment operation, data and resource management and storm-tracking tasks.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #9 (04-07-2010)

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] *Storm Event Data:*	
Project Storm Event (STE) #	9
Event Forecast Probability (%)	85%
Antecedent Dry Period (days: hrs: mins)	1:15:30
STE Start Date & Time	4/7/10 14:05
STE Duration (hrs:mins)	12:10
STE End Date & Time	4/8/10 2:15
Period Between Next Measureable Rain (hrs: mins)	120:35
Was Targeted STE Qualified Per LLA QAPP	**YES**
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.16
Max 1-hr Rainfall Intensity (in/hr)	0.05
Average 1-hr Rainfall Intensity (in/hr)	0.01

[1] *Sample Collection Criteria:*			
Sampling Station	**CB-31A**	**CB-4857**	**CB-1**
Was Grab sample collected?	**Yes**	**Yes**	**Yes**
Grab ID	CB31A040810GRAB	CB4857040210GRAB	CB1040810GRAB
Grab Date /Time	4/8/2010 0:20	4/8/2010 1:30	4/8/2010 0:50
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	**Yes**	**Yes**	**Yes**
Hydrograph stage at grab collection	inter-event peak	inter-event crest	inter-event peak
Grab parameters collected per LLA QAPP ?	**Yes**	**Yes**	**Yes**
Were Trip Blanks included w/ Grab samples ?	**Yes (TB040710)**	**Yes (TB040710)**	**Yes (TB040710)**
Was Comp sample collected?	**Yes**	**Yes**	**Yes**
Comp ID	CB31A040810COMP	CB4857040810COMP	CB1040810COMP
Comp Date /Time	4/8/2010 3:23	4/8/2010 3:37	4/8/2010 3:13
Total volume measured during storm period (gallons)	35955	25435	1051
Volume sampled during storm period (gallons)	30225	22160	1051
Volume utilized for comp. sample (gallons)	28040	20045	1042
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	**Yes (93%)**	**Yes (90%)**	**Yes (99%)**
Were a minimum of 8 aliquots collected for comp sample ?	**Yes (20)**	**Yes (20)**	**Yes (20)**
Comp parameters collected per LLA QAPP ?	**Yes**	**Yes**	**Yes**
Rainfall during sampling period (in)	0.16	0.16	0.16
pH Measurements Collected ?	**Yes**	**Yes**	**Yes**
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	**No**	**No**	**No**
[1] *QC Sample Summary Information:*	**CB-31A**	**CB-4857**	**CB-1**
Was Grab sample duplicate collected ?	**Yes**	**No**	**No**
Grab sample duplicate ID	CB100040810GRAB	na	na
Grab sample date and time	4/8/2010 1:20	na	na
Was Comp sample duplicate collected ?	**Yes**	**No**	**No**
Comp sample duplicate ID	CB100040810COMP	na	na
Comp sample date and time	4/8/2010 4:23	na	na
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	**No**	**No**	**Yes (both)**

[1] If the answer to any of the Storm Event or Sample Collection Criteria questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 5/21/10 **Reveiwed By / Date:** 25 May 10

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: | Turn-around Requested: Standard | Date: 4-8-2010

ARI Client Company: Floyd / Snider | Phone: 206-292-2078 | Page: 1 of 1

Client Contact: Megan McCullough / Matt Wollman | No. of Coolers: 1 | Cooler Temps:

Client Project Name: Lora Lake Apartments

Client Project #: POS-LLA | Samplers: D. Metallo

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOC 8260C-SIM	Analysis Requested: (1) NWTPH-Dx	Notes/Comments
CB31A040810GRAB	4-8-10	0020	W	5	X	X	
CB4857040810GRAB	4-8-10	0130	W	5	X	X	
CB1040810GRAB	4-8-10	0050	W	13	X	X	Run MS/MSD
CB10004081OGRAB	4-8-10	0120	W	5	X	X	
TB040710	4.7.10	2130	W	3	X		Trip blank

Comments/Special Instructions: (1) Acid/Silica gel clean up for NWTPH-Dx

Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Dave Metallo	Printed Name: Dan O'Brien	Printed Name: Dan O'Brien	Printed Name: Jonathon Walter
Company: Taylor Assoc. Inc.	Company: TAI	Company: TAI	Company: ARI
Date & Time: 4-9-2010 (1300)	Date & Time: 4/9/10 1300	Date & Time: 4/9/10 1458	Date & Time: 4/9/10 1458

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: | Turn-around Requested: Standard | Date: 4-9-2010

ARI Client Company: ~~X~~ Floyd/Snider | Phone: 206-292-2078 | Page: 1 of 1

Client Contact: Megan McCullough / Matt Wolfman | No. of Coolers: 2 | Cooler Temps:

Client Project Name: Lora Lake Apts

Client Project #: LLA-POS | Samplers: D. Metallo / D. O'brien

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM low level	PCP 8041	Arsenic Tot + Diss 200.8	Dioxin/ Furans 1613	TSS SM2540D				Notes/Comments
					Analysis Requested								
CB31A040810 COMP	4.8.10	0323	W	1	X	X	X	X	X				pH Measurements (see attached wrksht) 6.86
CB48570 40810 COMP	4.8.10	0337	W	1	X	X	X	X	X				7.09
CB1040810COMP	4.8.10	0313	W	1	X	X	X	X	X				6.80 ① Run MS/MSD
CB10004 0810 COMP	4.8.10	0423	W	1	X	X	X	X	X				6.80

Comments/Special Instructions: - Bottles + glassware decon'ed to LLA project specific SOP (see attached sht)

Relinquished by: (Signature)	Printed Name	Company	Date & Time	Received by: (Signature)	Printed Name	Company	Date & Time
Dan OBrien	Dan OBrien	TAI	4/9/10 1459	Jonathan Walter	Jonathan Walter	ARI	4/9/10 1459

① MS/MSD vol. does not include extra vol. for Dioxin/Furan analysis

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB31A ~~CB310~~ | 12 x 1 gallon bottle set-up | Rev.ed 3/30/2010 | Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: PH	Weather: Mostly cloudy		Arrival Date/Time: 4/6/10	9:50	
Carry-over maintenance to do prior to set-up:	NONE			done? —	
Sampler Battery Voltage	12.51	Changed? (Y) N	New voltage	~~N~~ 12.96	
Flow Meter Battery Voltage	N/A	Changed? Y N	New voltage	N/A	

Flow Meter Information		Sampler Information	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK? Replaced? (Yes/No)	OK
Flow meter cables OK? (Yes/No)	Yes	Sample Tubing & Strainer OK?	OK
Desiccant Canisters OK (Yes/No)	Yes	Sample Aliquot Size / Calibrated ?	700, Yes
Flow Meter Level (FT)	0.398	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	N/A	Desiccant Condition, replaced?	OK
Difference (FT)	N/A	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	No	Clean bottles installed & lids off?	Yes
Velocity (fps)	* 0.04 *	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	8	Enable Level (FT)	0.43
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T, 21 MINS/ALIQUOT
Channel conditions/observations		Program Reviewed? (Yes/No)	Y
ok, none observed		Last Screen	DISABLED
		Ice Deployed? (Yes/No)	NO

Notes:
Enable and pacing will be set on 4/7/10
ENABLE & PACING SET BY DM ON 04/07/10 @ 11:00

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM | Weather: Raining, 50-40's | Arrival Date/Time: 4-7-10 (2350)

Grab Sample Data	
Runoff Present or Hydrograph Elevated?	Yes
Grab Collection Time (date/time)	4-8-10 (0020)
Grab Sample ID	CB31A040810GRAB
Grab Duplicates Collected?	Yes
Grab Duplicate Collection (date/time)	4-8-10 (0120)
Grab Duplicate ID	CB10004081OGRAB
Grab MS/MSD Collected ?	No
VOA Trip Blank in cooler?, ID Yes	TB040710(2130)
Flow Meter	
Flow meter cables OK? (Y/N)	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes

Sample Observations:
- runoff into adjacent storm drain is occurring - starting to rain harder

Sampler	
Equipment running correctly?	Yes
Composite Begin Time (date / time)	4-7-10 (1456)
On Composite... (bottle # / aliq #)	415 BTL #5 (2258)
Ice deployed?	NO
Sampler Battery Voltage (changed?):	12.93 NO ▽
Flow Meter Battery Voltage/Change? (if different)	NA
Bottle Swap needed? (if yes fill out Section 3)	—

Notes: * Adjusted pacing to 24-mins/smpl

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
On Composite.... (bottle # / aliq #)		Data downloaded?	
Comp Btl Levels (under vol., overfilled, OK)		Sampler/Flow Meter Batt. Voltage (changed):	
Pacing Rate OK for Event?, Changed?		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

DCM

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB31A

Section 4. Comp. Bottles Retrieval

Personnel: DO / Chris	Weather: overcast	Arrival Date/Time: 0920 4/9/10	
Sampler Battery Voltage	12.69	Changed? Y (N)	New voltage —
Flow Meter Battery Voltage	"	Changed? Y (N)	New voltage —
Comp Sample Volume Collected	100%	Data downloaded? Yes	Yes
Composite Begin Time (date/time)	4/7/10 1456		Round #: 1
Last Aliquot Taken (date/time, btl #, aliq #)	4/8/10 1323 Btl 12 / 5 of 5		
Comp Bottles Labeled? (sta. & btl #)	Y		

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

none

Channel conditions/observations

OK

Notes/Maintenance Needed:

NA

Section 5. Post Storm Comp. Sample Processing

Personnel: DM, DO — Date/Time: 4.9.10 (1100)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info).: Yes — Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: 12 X 3500-ml
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 9000 ml (Samp + Dup)	Actual Comp. Sample Vol. Available: 9090 (4545 x 2)
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp, Other (explain):	
Bottles (Btl #s) used for Comp. Sample: 4	Comp. Sample Container Size & Material: 2.5 gal WM glass jug
Comp Collection Time (date/time): 4/8/10 (0323)	Comp Sample ID: CB31A040810COMP
pH Measurements Collected On Comp. Sample ?: Yes 6.86	
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes	

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes

Duplicate Sample Collected ? Yes	Duplicate Sample Vol.: 4545
Duplicate sample Date / Time: 4/8/10 (0423)	Duplicate Sample ID: CB10004081OCOMP
pH Measurement Collected on Duplicate Comp. Sample?: Yes 6.80	

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: No

MS/MSD Vol. submitted: NA

Were any other QC sample types colelcted? (if yes, provide details) No

DI Water Information None Used

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB4857

12 x 1 gallon bottle set-up
Rev.ed 3/30/2010

Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: PH	Weather: Mostly cloudy		Arrival Date/Time: 4/6/10	11:00	
Carry-over maintenance to do prior to set-up: NONE				done? —	
Sampler Battery Voltage	12.56	Changed? (Y) N	New voltage	13.09	
Flow Meter Battery Voltage	N/A	Changed? Y N N/A	New voltage	N/A	

Flow Meter Information		Sampler Information	
Date/time correct? (Yes/No)	Yes	Pump Tubing OK? Replaced? (Yes/No)	OK
Flow meter cables OK? (Yes/No)	Yes	Sample Tubing & Strainer OK?	OK
Desiccant Canisters OK (Yes/No)	Yes	Sample Aliquot Size / Calibrated ?	700 NO
Flow Meter Level (FT)	0.036	Comp and Grab Lines Back flushed with DI?	Yes
Actual level Reading (FT)	N/A	Desiccant Condition, replaced?	OK
Difference (FT)	N/A	Suction line & quick connect attached?	Yes
Level calibrated? (Yes/No)	NO	Clean bottles installed & lids off?	Yes
Velocity (fps)	1.41	Diagnostics / Distributor arm check?	Yes
Flow Rate (gpm)	11	Enable Level (FT)	0.07
Data Downloaded (Yes/No)	Yes	Pacing Type ("T"ime/"F"low), interval / rate	T / 2.1 pacing MIN
Channel conditions/observations: ok, none observed		Program Reviewed? (Yes/No)	Y
		Last Screen	DISABLED
		Ice Deployed? (Yes/No)	NO

Notes:
Enable and pacing will be set 4/7/10
ENABLE LEVEL, PACING, AND SAMPLER SET ON 04/07/10 @ 11:15, BL/JH

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM Weather: Raining 40's Arrival Date/Time: 4-8-10 (0107)

Grab Sample Data		Sample Observations:
Runoff Present or Hydrograph Elevated?	Yes	- Runoff occurring
Grab Collection Time (date/time)	4-8-10 (0130)	
Grab Sample ID	CB4857040810GRAB	
Grab Duplicates Collected?	NO	
Grab Duplicate Collection (date/time)	NA	
Grab Duplicate ID	NA	
Grab MS/MSD Collected ?	NO	
VOA Trip Blank in cooler?, ID Yes	TB040710(2130)	

Flow Meter		Sampler	
Flow meter cables OK? (Y/N)	Yes	Equipment running correctly?	Yes
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Composite Begin Time (date / time)	4-7-10 (1510)
		On Composite... (bottle # / aliq #)	3/5 BTL #5 (2243)
		Ice deployed?	No
		Sampler Battery Voltage (changed?):	12.94 NO ∇
		Flow Meter Battery Voltage/Change? (if different)	NA
		Bottle Swap needed? (if yes fill out Section 3)	—

Notes: * Changed pacing to 24-min/smpl.

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
On Composite.... (bottle # / aliq #)		Data downloaded?	
Comp Btl Levels (under vol., overfilled, OK)		Sampler/Flow Meter Batt. Voltage (changed):	
Pacing Rate OK for Event?, Changed?		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

DCM

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB4857

Section 4. Comp. Bottles Retrieval

Personnel: DO / Chris	Weather: overcast		Arrival Date/Time: 4/9/10 1018		
Sampler Battery Voltage	12.71	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	"	Changed? Y (N)		New voltage	—
Comp Sample Volume Collected	80 - 80%	Data downloaded?	Dave (Yes)		
Composite Begin Time (date/time)	4/7/10 1510			Round #: 1	
Last Aliquot Taken (date/time, btl #, aliq #)	4/8/10 1337 12/ 5 of 5				
Comp Bottles Labeled? (sta. & btl #)	Y				

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

no pump counts shown

Channel conditions/observations

DNC

Notes/Maintenance Needed:

NA

Section 5. Post Storm Comp. Sample Processing

Personnel: DM, DO — Date/Time: 4.9.10 (~1200)

Processing Location: PDS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info).: Yes — Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12 — Approximate Total Comp. Volume Collected: ~27L

Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4500 — Actual Comp. Sample Vol. Available: 4550

Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp.), Other (explain):

Bottles (Btl #s) used for Comp. Sample: 4 — Comp. Sample Container Size & Material: 2.5 gal wm glass jug

Comp Collection Time (date/time): 04/08/10 (0337) — Comp Sample ID: CB4857040810COMP

pH Measurements Collected On Comp. Sample ?: Yes 7.09

Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): No QC Smpl.s collected

Duplicate Sample Collected ? NO — Duplicate Sample Vol.: NA

Duplicate sample Date / Time: NA — Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: NA

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: NO

MS/MSD Vol. submitted: NA

Were any other QC sample types colelcted? (if yes, provide details) NO

DI Water Information NA

Notes:

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB1 | MS/MSD | 12 x 1 gallon bottle set-up | Rev.ed 3/30/2010 | Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: PH | Weather: Mostly Cloudy | Arrival Date/Time: 4/6/10 10:30

Carry-over maintenance to do prior to set-up: None | done? —

Sampler Battery Voltage	12.72	Changed? (Y) N		New voltage	12.86
Flow Meter Battery Voltage	N/A	Changed? Y N N/A		New voltage	N/A

Flow Meter Information		Sampler Information	
Date/time correct? (Yes/No)	yes	Pump Tubing OK? Replaced? (Yes/No)	ok
Flow meter cables OK? (Yes/No)	yes	Sample Tubing & Strainer OK?	ok
Desiccant Canisters OK (Yes/No)	yes	Sample Aliquot Size / Calibrated ?	700, yes
Flow Meter Level (FT)	0.002	Comp and Grab Lines Back flushed with DI?	yes
Actual level Reading (FT)	N/A	Desiccant Condition, replaced?	ok
Difference (FT)	N/A	Suction line & quick connect attached?	yes
Level calibrated? (Yes/No)	No	Clean bottles installed & lids off?	yes
Velocity (fps)	N/A	Diagnostics / Distributor arm check?	yes
Flow Rate (gpm)	N/A	Enable Level (FT)	0.03
Data Downloaded (Yes/No)	yes	Pacing Type ("T"ime/"F"low), interval / rate	T; 21 mins/aliquot
Channel conditions/observations: OK, none observed		Program Reviewed? (Yes/No)	Y
		Last Screen	DISABLED
		Ice Deployed? (Yes/No)	NO

Notes: Enable and pacing will be set on 4/7/10

ENABLE LEVEL AND PROGRAM SET ON 04/07 @ 11:10; BL/JH

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DM | Weather: Raining, 40's | Arrival Date/Time: 4-8-10 (0033)

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?	Yes	- Runoff occurring	
Grab Collection Time (date/time)	4-8-10 (0050)		
Grab Sample ID	CB1040810GRAB		
Grab Duplicates Collected?	NO	**Sampler**	
Grab Duplicate Collection (date/time)	NA	Equipment running correctly?	Yes
Grab Duplicate ID	NA	Composite Begin Time (date / time)	4-7-10 (1446)
Grab MS/MSD Collected ?	Yes	On Composite... (bottle # / aliq #)	4-5 BTL#5 @2235
VOA Trip Blank in cooler?, ID Yes	TB040710(2130)	Ice deployed?	No
Flow Meter		Sampler Battery Voltage (changed?):	12.80 No ▽
Flow meter cables OK? (Y/N)	Yes	Flow Meter Battery Voltage/Change? (if different)	No
Flow Data Downloaded & Reviewed? (Y/N)	Yes	Bottle Swap needed? (if yes fill out Section 3)	—

Notes: * Due to baseflow period of several hrs pacing rate was changed to 24 mins

Section 3. Mid-Storm Check / Bottle Switch

Personnel: | Weather: | Arrival Date/Time:

Composite Begin Time (date / time)			Round #:
On Composite.... (bottle # / aliq #)		Data downloaded?	
Comp Btl Levels (under vol., overfilled, OK)		Sampler/Flow Meter Batt. Voltage (changed):	
Pacing Rate OK for Event?, Changed?		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

DCM

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB1

Section 4. Comp. Bottles Retrieval

Personnel: DO / Chris	Weather: overcast	Arrival Date/Time: 4/9/10 0940	
Sampler Battery Voltage	12.61	Changed? Y (N)	New voltage —
Flow Meter Battery Voltage	11	Changed? Y (N)	New voltage —
Comp Sample Volume Collected	100%	Data downloaded? Dave (Yes)	
Composite Begin Time (date/time)	4/7/10 1446		Round #: 1
Last Aliquot Taken (date/time, btl #, aliq #)	4/8/10 0849 Btl 10/4 of 5		
Comp Bottles Labeled? (sta. & btl #)	Y		

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

4/9/10 0849 10/4 NML
9/8 0913 10/5 NLD
937 11/1 NLD
1001 11/2 NLD
1025 11/3 "
↓
12/5

Channel conditions/observations: DNC

Notes/Maintenance Needed: NA

Section 5. Post Storm Comp. Sample Processing

Personnel: DM, DO — Date/Time: 4.9.10 (~1300)

Processing Location: POS Storm Lab

Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Yes — Rain Gauge Info: Yes

How Many Comp. Bottles Were Collected? 12	Approximate Total Comp. Volume Collected: 12 X 3500 ml
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 8500 ml	Actual Comp. Sample Vol. Available: 8523 ml
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp.; Other (explain):	
Bottles (Btl #s) used for Comp. Sample: 4	Comp. Sample Container Size & Material: 2.5 gal WM glass jug
Comp Collection Time (date/time): 04/08/10 (0313)	Comp Sample ID: CB1040810COMP
pH Measurements Collected On Comp. Sample ?: Yes 6.80	
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes	

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Yes

Duplicate Sample Collected ? NO	Duplicate Sample Vol.: NA
Duplicate sample Date / Time: NA	Duplicate Sample ID: NA

pH Measurement Collected on Duplicate Comp. Sample?: NA

MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: Yes

MS/MSD Vol. submitted: 8523 ml total (4023 for MS/MSD analysis)

Were any other QC sample types colelcted? (if yes, provide details) No

DI Water Information None Used

Notes:

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: Lora Lake Apts.

Date: 4-9-2010
Staff: D. O'brien
pH meter make/model #: Orion 2Star

(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB31A	6.86	13:50	—
CB4857	7.09	13:36	—
CB1	6.80	13:44	—
CB100	6.80	13:32	—

Post-Measurement Check

Nominal pH value of standard	7.00	
Temperature (deg C)	16	
Standard pH, temp corrected	7.00	
Meter pH reading (SU)	6.97	
Difference (SU)	0.0	*Should be < 0.1 (round to 0.0)*
Time	13:57	

Form to be included in storm file, as applicable

TAYLOR ASSOCIATES, INC.

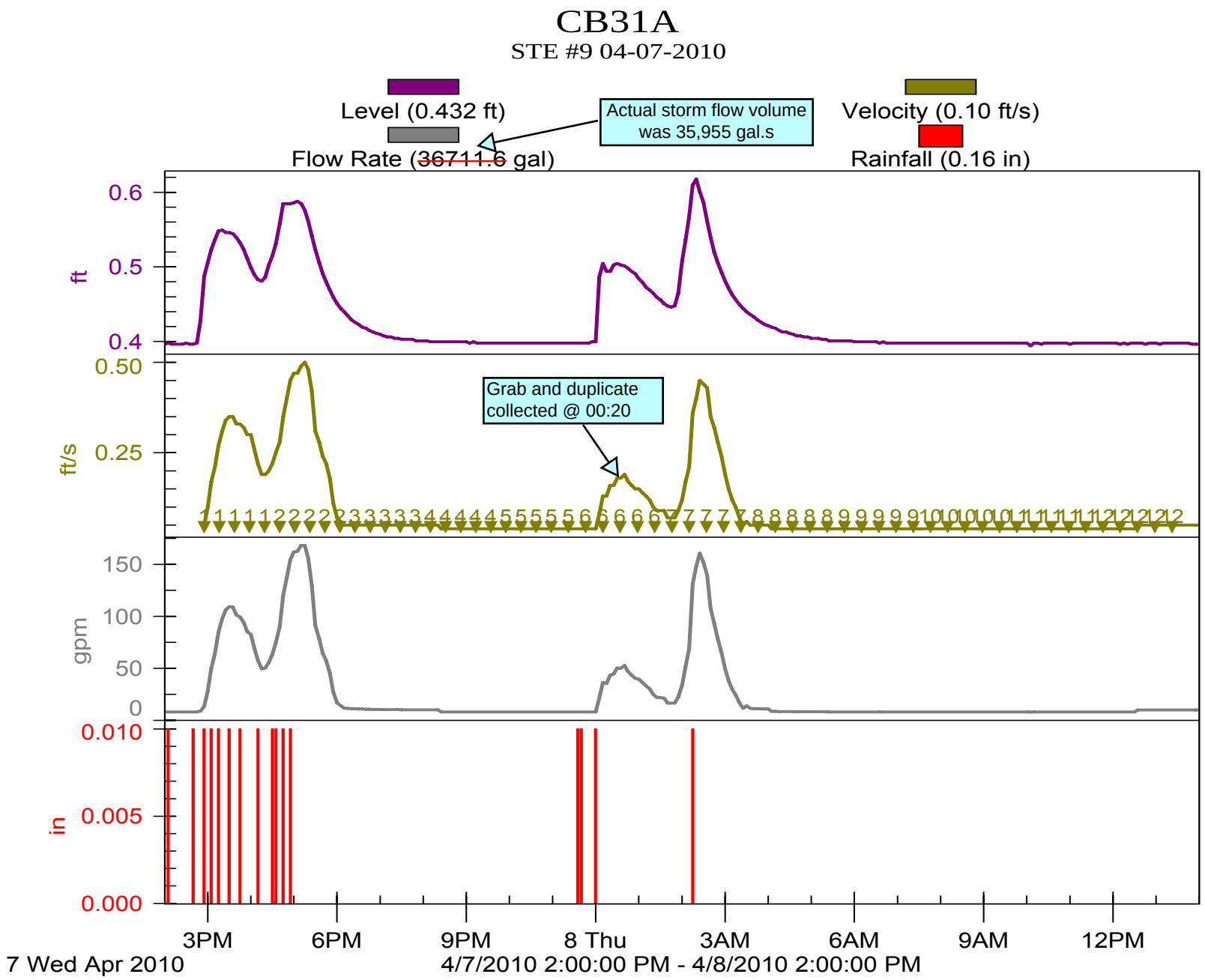
POS - Lora Lake Apartments Stormwater Interim Action

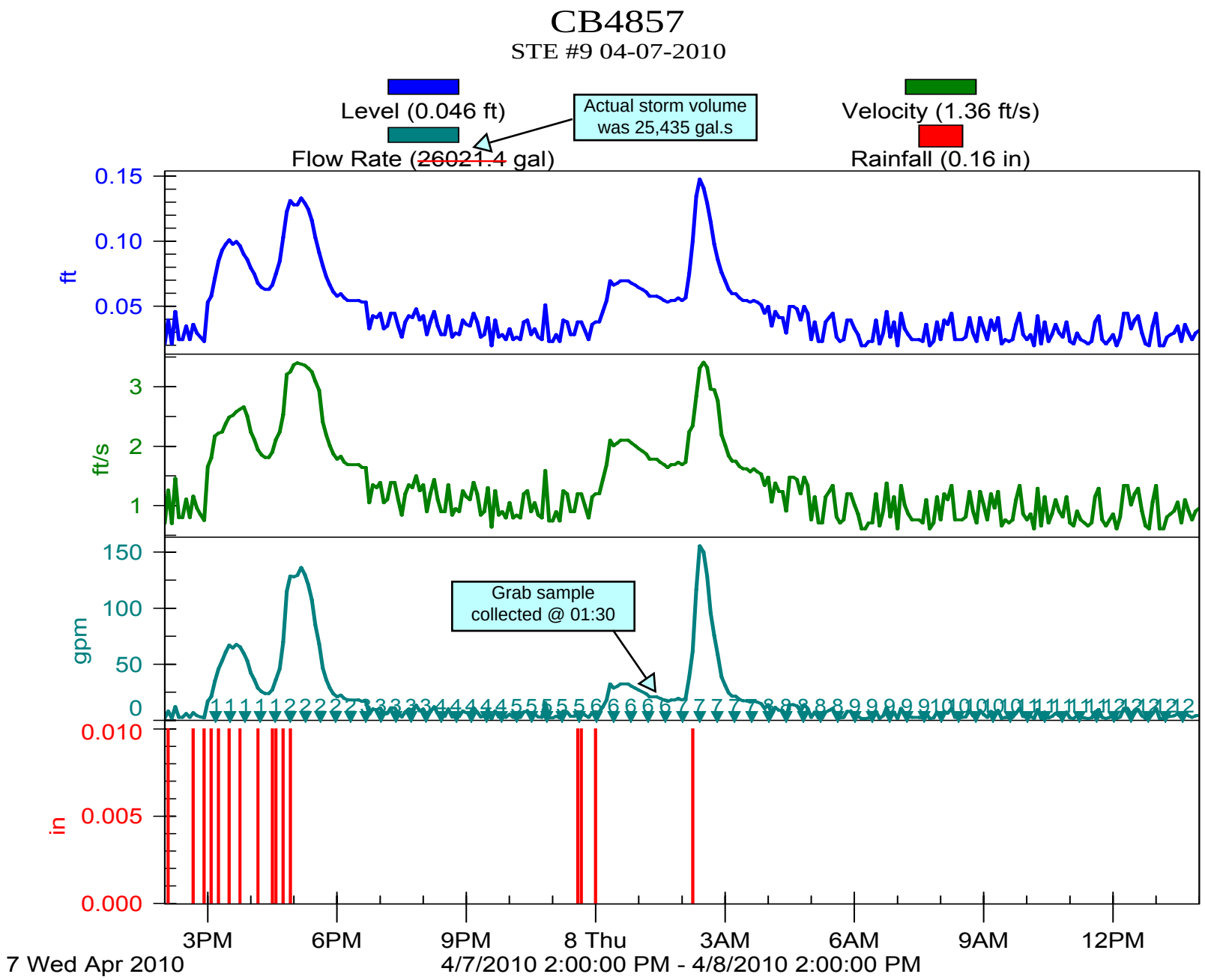
Groundwater Level Measurement Field Form

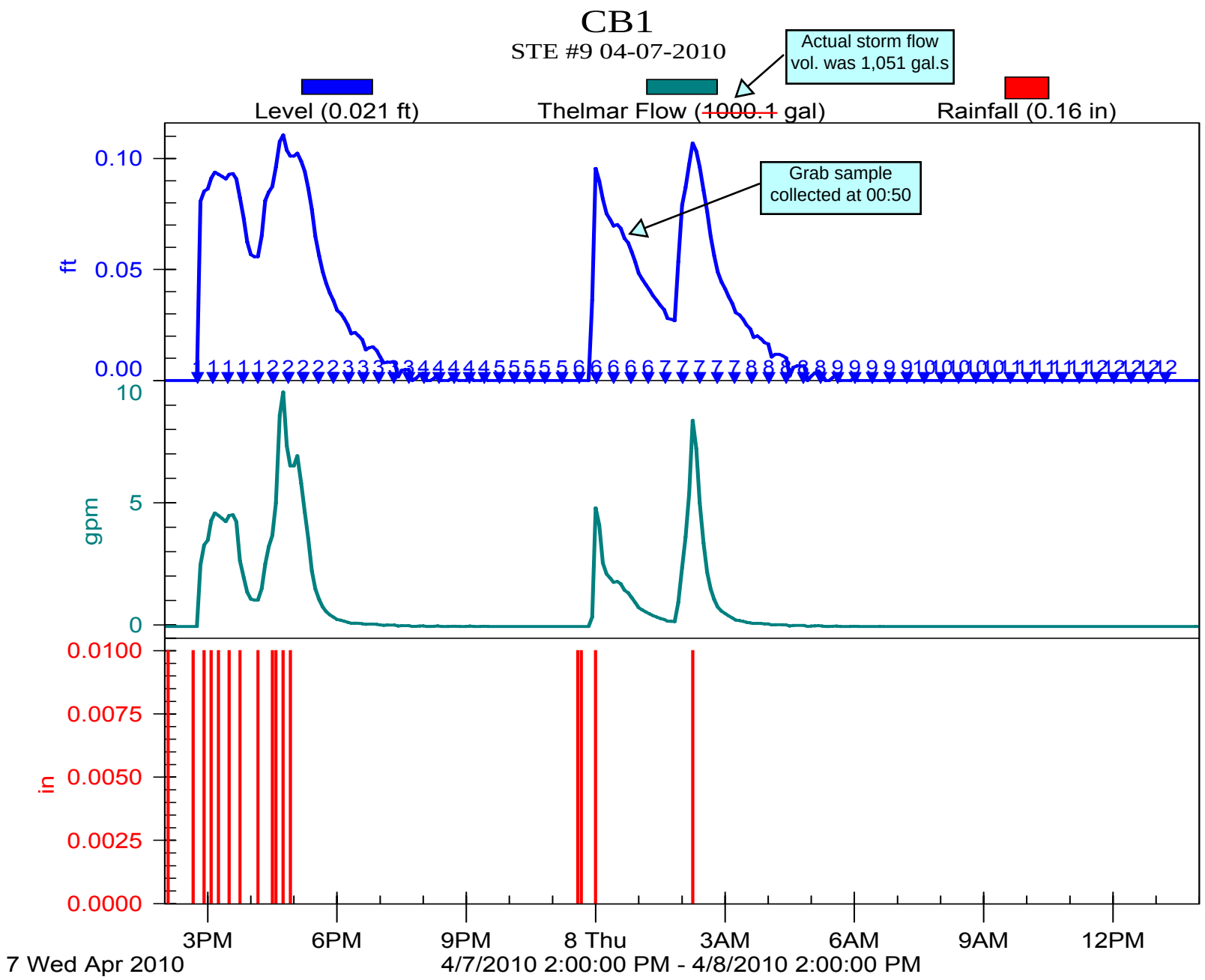
Personnel:	Arrival Date/Time:
Dan / Chris M.	4/9/2010
Weather: Overcast	
Precip in Last 24-hrs / Last Measureable Rain Event: ~0900 (4/8) to ~0900/1030 (4/9) Rain = 0.00"	

Monitoring Well ID	Time	Water Level (FT)	Meas. Reference
MW-2	0955	6.31	Top of PVC
MW-3	1001	16.71	Top of PVC
MW-4	1006	15.86	Top of PVC
MW-6	1012	10.66	Top of PVC

Notes:


CB31A
STE #9 04-07-2010
Level (0.432 ft)
Flow Rate (36711.6 gal)
Actual storm flow volume was 35,955 gal.s
Velocity (0.10 ft/s)
Rainfall (0.16 in)
ft
0.6
0.5
0.4
ft/s
0.50
0.25
Grab and duplicate collected @ 00:20
gpm
150
100
50
0
in
0.010
0.005
0.000
3PM
6PM
9PM
8 Thu
3AM
6AM
9AM
12PM
7 Wed Apr 2010
4/7/2010 2:00:00 PM - 4/8/2010 2:00:00 PM


CB4857
STE #9 04-07-2010
Level (0.046 ft)
Flow Rate (26021.4 gal)
Actual storm volume was 25,435 gal.s
Velocity (1.36 ft/s)
Rainfall (0.16 in)
ft
0.15
0.10
0.05
ft/s
3
2
1
gpm
150
100
50
0
Grab sample collected @ 01:30
in
0.010
0.005
0.000
3PM
6PM
9PM
8 Thu
3AM
6AM
9AM
12PM
7 Wed Apr 2010
4/7/2010 2:00:00 PM - 4/8/2010 2:00:00 PM


CB1
STE #9 04-07-2010
Actual storm flow vol. was 1,051 gal.s
Level (0.021 ft)
Thelmar Flow (1000.1 gal)
Rainfall (0.16 in)
Grab sample collected at 00:50
ft
0.10
0.05
0.00
gpm
10
5
0
in
0.0100
0.0075
0.0050
0.0025
0.0000
3PM
6PM
9PM
8 Thu
3AM
6AM
9AM
12PM
7 Wed Apr 2010
4/7/2010 2:00:00 PM - 4/8/2010 2:00:00 PM

CB31A - STE#9 040710

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
6760	0.664047151	1096	**1**	24.11%	24.11%	22.37%
10180	1	1650	**2**	36.31%	60.41%	33.68%
0	0	0	**3**	0.00%	60.41%	0.00%
0	0	0	**4**	0.00%	60.41%	0.00%
0	0	0	**5**	0.00%	60.41%	0.00%
3520	0.345776031	571	**6**	12.55%	72.97%	11.65%
7580	0.74459725	1229	**7**	27.03%	100.00%	25.08%
0	0	0	**8**	0.00%	100.00%	0.00%
0	0	0	**9**	0.00%	100.00%	0.00%
0	0	0	**10**	0.00%	100.00%	0.00%
0	0	0	**11**	0.00%	100.00%	0.00%
0	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		**92.77%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	28040
Strm Qtot (gals)	30225
max Q	10180
min V (ml)	1650

4545 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Used bottles 1,2, 6 and 7; the remainder represented baseflow conditions

Collected duplicate at this station - see comp sheet for CB100

COMP Label = CB31A040810COMP Time (0323)

CB100 - 040710 (DUPLICATE of CB31A)

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
6760	0.664047151	1096	**1**	24.11%	24.11%	22.37%
10180	1	1650	**2**	36.31%	60.41%	33.68%
0	0	0	**3**	0.00%	60.41%	0.00%
0	0	0	**4**	0.00%	60.41%	0.00%
0	0	0	**5**	0.00%	60.41%	0.00%
3520	0.345776031	571	**6**	12.55%	72.97%	11.65%
7580	0.74459725	1229	**7**	27.03%	100.00%	25.08%
0	0	0	**8**	0.00%	100.00%	0.00%
0	0	0	**9**	0.00%	100.00%	0.00%
0	0	0	**10**	0.00%	100.00%	0.00%
0	0	0	**11**	0.00%	100.00%	0.00%
0	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		92.77%

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	28040
Strm Qtot (gals)	30225
max Q	10180
min V (ml)	1650

4545 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Used bottles 1,2, 6 and 7; the remainder represented baseflow conditions
CB100 is a duplicate sample of CB31A

Comp Label = CB100040810COMP **Time (0423)**

CB4857 STE#9 040710

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
4085	0.545393858	927	**1**	20.38%	20.38%	18.43%
7490	1	1700	**2**	37.37%	57.75%	33.80%
	0	0	**3**	0.00%	57.75%	0.00%
	0	0	**4**	0.00%	57.75%	0.00%
	0	0	**5**	0.00%	57.75%	0.00%
2490	0.332443258	565	**6**	12.42%	70.17%	11.24%
5980	0.798397864	1357	**7**	29.83%	100.00%	26.99%
	0	0	**8**	0.00%	100.00%	0.00%
	0	0	**9**	0.00%	100.00%	0.00%
	0	0	**10**	0.00%	100.00%	0.00%
	0	0	**11**	0.00%	100.00%	0.00%
	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		90.46%

Total Strm Vol% Rep.'ed in Comp

Qtotal	20045
Strm Qtot (gals)	22160
max Q	7490
min V (ml)	1700

4550 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Used bottles 1,2,6 and 7; the remainder of the bottles represented baseflow conditions

Comp Label = CB4857040810COMP **Time (0337)**

CB1 STE#9 040710

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
266.85	0.651648352	2183	**1**	25.61%	25.61%	25.39%
409.5	1	3350	**2**	39.30%	64.92%	38.96%
0	0	0	**3**	0.00%	64.92%	0.00%
0	0	0	**4**	0.00%	64.92%	0.00%
0	0	0	**5**	0.00%	64.92%	0.00%
140	0.341880342	1145	**6**	13.44%	78.35%	13.32%
225.55	0.550793651	1845	**7**	21.65%	100.00%	21.46%
0	0	0	**8**	0.00%	100.00%	0.00%
0	0	0	**9**	0.00%	100.00%	0.00%
0	0	0	**10**	0.00%	100.00%	0.00%
0	0	0	**11**	0.00%	100.00%	0.00%
0	0	0	**12**	0.00%	100.00%	0.00%
				100.00%		**99.13%**

Total Strm Vol% Rep.'ed in Comp

Qtotal	1041.9
Strm Qtot (gals)	1051
max Q	409.5
min V (ml)	3350

8523 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
**Vol. includes enough sample for lab to run an MS/MSD
Used bottles 1,2,6 and 7; the remainder represented baseflow conditions

Comp Label = CB1040810COMP **Time (0313)**

CB31A 040710 Smpl Rpt

SAMPLER ID# 1069569980 10:02 9-APR-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB31A SMP "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 20 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 21 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

0.01 inch TIP
RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1069569980 10:02 9-APR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB31A SMP
PROGRAM: LLA MULTI
Program Started at 11:01 WE 7-APR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		11:01	PGM DISABLED		
		14:56	PGM ENABLED		
1,5	1	14:56	E		559
2,5	1	15:17	T		561
3,5	1	15:38	T		558
4,5	1	15:59	T		567
5,5	1	16:20	T		563
1,5	2	16:41	T		559
2,5	2	17:02	T		561
3,5	2	17:23	T		561
4,5	2	17:44	T		561
5,5	2	18:05	T		561
1,5	3	18:26	T		561
2,5	3	18:47	T		567
3,5	3	19:08	T		569
4,5	3	19:29	T		569
5,5	3	19:50	T		563
1,5	4	20:11	T		567
2,5	4	20:32	T		563
3,5	4	20:53	T		567
4,5	4	21:14	T		563
5,5	4	21:35	T		561
1,5	5	21:56	T		561
2,5	5	22:17	T		567
3,5	5	22:38	T		563
		22:57	MANUAL PAUSE		

		22:57	MANUAL RESUME	
		22:57	MANUAL PAUSE	
		22:57	MANUAL RESUME	
		22:58	MANUAL PAUSE	
		22:58	INTERVAL CHANGED TO 0 HRS, 24 MIN	
		22:58	MANUAL RESUME	
		22:58	MANUAL PAUSE	
		22:58	MANUAL RESUME	
4,5	5	22:59	T	561
5,5	5	23:23	T	561
1,5	6	23:47	T	561
----------		TH 08-APR-10	----------	
2,5	6	00:11	T	561
3,5	6	00:35	T	561
4,5	6	00:59	T	561
5,5	6	01:23	T	561
1,5	7	01:47	T	561
2,5	7	02:11	T	561
3,5	7	02:35	T	561
4,5	7	02:59	T	561
5,5	7	03:23	T	561
1,5	8	03:47	T	585
2,5	8	04:11	T	561
3,5	8	04:35	T	559
4,5	8	04:59	T	561
5,5	8	05:23	T	561
1,5	9	05:47	T	561
2,5	9	06:11	T	561
3,5	9	06:35	T	561
4,5	9	06:59	T	558
5,5	9	07:23	T	561
1,5	10	07:47	T	559
2,5	10	08:11	T	561
3,5	10	08:35	T	561
4,5	10	08:59	T	567
5,5	10	09:23	T	569
1,5	11	09:47	T	618
2,5	11	10:11	T	567
3,5	11	10:35	T	575
4,5	11	10:59	T	597
5,5	11	11:23	T	579
1,5	12	11:47	T	581
2,5	12	12:11	T	587

```
                    CB31A 040710 Smpl Rpt
  3,5    12   12:35       T            601
  4,5    12   12:59       T            583
  5,5    12   13:23       T            599
              13:24  PGM DONE 08-APR


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
-----------------------------------------
```

CB4857 040710 smpl rpt

SAMPLER ID# 1224319970 09:46 9-APR-10
Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

PROGRAM NAME:
"LLA MULTI "
SITE DESCRIPTION:
"CB4857 SMP"

UNITS SELECTED:
LENGTH: ft

---

1 MINUTE
DATA INTERVAL

12, 3700 ml BTLS
26 ft SUCTION LINE
11 ft SUCTION HEAD

ONE-PART PROGRAM

PACING:
TIME, EVERY
0 HOURS, 21 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT OFF

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

0.01 inch TIP
RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO EXTERNAL MODEM

NO ALARM
CONDITIONS SET

SAMPLER ID# 1224319970 09:47 9-APR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB4857 SMP
PROGRAM: LLA MULTI
Program Started at 11:16 WE 7-APR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		11:16	PGM DISABLED		
		15:10	PGM ENABLED		
1,5	1	15:10	E		0
2,5	1	15:31	T		0
3,5	1	15:52	T		0
4,5	1	16:13	T		0
5,5	1	16:34	T		0
1,5	2	16:55	T		0
2,5	2	17:16	T		0
3,5	2	17:37	T		0
4,5	2	17:58	T		0
5,5	2	18:19	T		0
1,5	3	18:40	T		0
2,5	3	19:01	T		0
3,5	3	19:22	T		0
4,5	3	19:43	T		0
5,5	3	20:04	T		0
1,5	4	20:25	T		0
2,5	4	20:46	T		0
3,5	4	21:07	T		0
4,5	4	21:28	T		0
5,5	4	21:49	T		0
1,5	5	22:10	T		0
2,5	5	22:31	T		0
		22:43	MANUAL PAUSE		
		22:43	MANUAL RESUME		

3,5	5	22:52	T	0
		23:11	MANUAL PAUSE	
		23:12	INTERVAL CHANGED TO 0 HRS, 24 MIN	
		23:12	MANUAL RESUME	
		23:12	MANUAL PAUSE	
		23:12	MANUAL RESUME	
4,5	5	23:13	T	0
5,5	5	23:37	T	0
----------		TH 08-APR-10	----------	
1,5	6	00:01	T	0
2,5	6	00:25	T	0
3,5	6	00:49	T	0
4,5	6	01:13	T	0
5,5	6	01:37	T	0
1,5	7	02:01	T	0
2,5	7	02:25	T	0
3,5	7	02:49	T	0
4,5	7	03:13	T	0
5,5	7	03:37	T	0
1,5	8	04:01	T	0
2,5	8	04:25	T	0
3,5	8	04:49	T	0
4,5	8	05:13	T	0
5,5	8	05:37	T	0
1,5	9	06:01	T	0
2,5	9	06:25	T	0
3,5	9	06:49	T	0
4,5	9	07:13	T	0
5,5	9	07:37	T	0
1,5	10	08:01	T	0
2,5	10	08:25	T	0
3,5	10	08:49	T	0
4,5	10	09:13	T	0
5,5	10	09:37	T	0
1,5	11	10:01	T	0
2,5	11	10:25	T	0
3,5	11	10:49	T	0
4,5	11	11:13	T	0
5,5	11	11:37	T	0
1,5	12	12:01	T	0
2,5	12	12:25	T	0
3,5	12	12:49	T	0
4,5	12	13:13	T	0

```
                    CB4857 040710 smpl rpt
  5,5    12   13:37       T              0
              13:38  PGM DONE 08-APR


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
----------------------------------------
```

CB1 040710 smpl rpt

SAMPLER ID# 1072249987 09:26 9-APR-10
  Hardware: A1   Software: 2.20
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1-MEGA "

   UNITS SELECTED:
     LENGTH: ft

   UNITS SELECTED:
   FLOW RATE: gpm
  FLOW VOLUME: gal
   VELOCITY: fps

  AREA-VEL MODULE:
        WEIR
        90
      V-NOTCH
     ----

      5 MINUTE
   DATA INTERVAL

  12, 3750 ml BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 21 MINUTES

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.030 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF

BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR
EACH PURGE CYCLE:
200 PRE-SAMPLE
AUTO POST-SAMPLE

NO PERIODIC
SERIAL OUTPUT

INTERROGATOR
CONNECTOR
POWER ALWAYS ON

NO RAIN GAUGE

NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

I/O1= NONE
I/O2= NONE
I/O3= NONE

---

0 ANALOG OUTPUTS

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1072249987 09:27 9-APR-10
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********
SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 11:07 WE 7-APR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		11:07	PGM DISABLED		
		14:46	PGM ENABLED		
1,5	1	14:46	E		441
2,5	1	15:07	T		441
3,5	1	15:28	T		447
4,5	1	15:49	T		447
5,5	1	16:10	T		447
1,5	2	16:31	T		447
2,5	2	16:52	T		447
3,5	2	17:13	T		447
4,5	2	17:34	T		447
5,5	2	17:55	T		447
1,5	3	18:16	T		447
2,5	3	18:37	T		447
3,5	3	18:58	T		447
4,5	3	19:19	T		438
5,5	3	19:40	T		440
1,5	4	20:01	T		440
2,5	4	20:22	T		443
3,5	4	20:43	T		447
4,5	4	21:04	T		441

5,5	4	21:25	T	441
1,5	5	21:46	T	441
2,5	5	22:07	T	441
3,5	5	22:28	T	441
		22:29	MANUAL PAUSE	
		22:29	MANUAL RESUME	
		22:29	MANUAL PAUSE	
		22:30	MANUAL RESUME	
		22:30	MANUAL PAUSE	
		22:31	MANUAL RESUME	
		22:31	MANUAL PAUSE	
		22:32	INTERVAL CHANGED TO 0 HRS, 24 MIN	
		22:32	MANUAL RESUME	
		22:32	MANUAL PAUSE	
		22:32	MANUAL RESUME	
		22:32	MANUAL PAUSE	
		22:32	MANUAL RESUME	
		22:32	MANUAL PAUSE	
		22:32	MANUAL RESUME	
4,5	5	22:49	T	441
5,5	5	23:13	T	441
1,5	6	23:37	T	441
----------	TH 08-APR-10		----------	
2,5	6	00:01	T	441
3,5	6	00:25	T	441
4,5	6	00:49	T	441
5,5	6	01:13	T	441
1,5	7	01:37	T	441
2,5	7	02:01	T	441
3,5	7	02:25	T	441
4,5	7	02:49	T	441
5,5	7	03:13	T	441
1,5	8	03:37	T	441
2,5	8	04:01	T	441
3,5	8	04:25	T	441
4,5	8	04:49	T	441
5,5	8	05:13	T	441
1,5	9	05:37	T	441
2,5	9	06:01	T	441
3,5	9	06:25	T	441
4,5	9	06:49	T	441
5,5	9	07:13	T	441
1,5	10	07:37	T	441

```
  2,5    10   08:01      T            441
  3,5    10   08:25      T            435
  4,5    10   08:49      T  NM          *
  5,5    10   09:13      T  NL          *
  1,5    11   09:37      T  NL          *
  2,5    11   10:01      T  NL          *
  3,5    11   10:25      T  NL          *
  4,5    11   10:49      T  NL          *
  5,5    11   11:13      T  NL          *
  1,5    12   11:37      T  NL          *
  2,5    12   12:01      T  NL          *
  3,5    12   12:25      T  NL          *
  4,5    12   12:49      T  NL          *
  5,5    12   13:13      T  NL          *
               13:13  PGM DONE 08-APR


   SOURCE E  ==> ENABLE
   SOURCE T  ==> TIME
    ERROR NL ==> NO LIQUID DETECTED!
    ERROR NM ==> NO MORE LIQUID!
----------------------------------------



SAMPLER ID# 1072249987  09:27  9-APR-10
  Hardware: A1      Software: 2.20
 AREA-VEL MODULE: 1073479663
  Hardware: A0      Software: 1.04
*********** COMBINED RESULTS ***********
   SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 11:07 WE  7-APR-10
Nominal Sample Volume =  700 ml
```

SAMPLE	BOTTLE	TIME	LEVEL ft	VELOCITY fps	FLOW RATE gpm	TOTAL FLOW gal
1,5	1	14:46	0.077	0.40	1.813	000000000000
2,5	1	15:07	0.094	0.40	3.453	000000000000
3,5	1	15:28	0.092	0.40	3.260	000000000000
4,5	1	15:49	0.072	0.40	1.299	000000000000
5,5	1	16:10	0.057	0.40	0.000	000000000000
1,5	2	16:31	0.090	0.40	3.099	000000000000

National Weather Service
Seattle,WA

AREA FORECAST DISCUSSION

FXUS66 KSEW 071642
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
942 AM PDT WED APR 7 2010

.SYNOPSIS...A WARM FRONT WILL BRUSH THE AREA TODAY. A STRONG COLD FRONT...WITH WIND...RAIN AND MOUNTAIN SNOW WILL AFFECT THE AREA LATE TONIGHT THROUGH THURSDAY. THIS WILL BE FOLLOWED BY A COOLER AND UNSTABLE AIR MASS FRIDAY THEN DRIER WEATHER INTO THE EARLY PART OF THE WEEKEND. AN UPPER TROUGH WILL DEVELOP OFFSHORE WHICH WILL CONTINUE THE RUN OF COOL AND OCCASIONALLY SHOWERY WEATHER.

&&

.SHORT TERM...PAC FRONTAL SYSTEM LIES JUST OFFSHORE TODAY...WITH THE WARM FRONT BRUSHING WESTERN WA. LIGHT RAIN EXPECTED ALONG THE COAST WITH JUST A FEW SPRINKLES IN THE INTERIOR. CURRENT FORECAST LOOKS GOOD.

THE MAIN FOCUS WILL BE ON THE STRONG COLD FRONT AS IT SWEEPS THROUGH THE AREA TONIGHT. MODELS CONTINUE TO SHOW STRONG PRES GRADIENTS ACROSS THE REGION AS THE LOW TRACKS THROUGH SOUTHERN B.C. BLUSTERY S/SW WINDS EXPECTED ACROSS THE AREA. THERE WILL ALSO BE A STRONG WESTERLY PUSH THROUGH THE STRAIT OF JUAN DE FUCA. GIVEN THE TIGHT THICKNESS PACKING AND STRONG COLD AIR ADVECTION...AS SEEN ON THE IR...WILL NO DOUBT SEE A JUMP IN THE WINDS. THE KUIL-KBLI PRES GRAD WILL POP TO PLUS 5-6MB AS THE FRONT PASSES...AND WILL LIKELY NEED A WIND ADVISORY FOR THE STRAIT AND ALSO THE ADMIRALTY INLET AREA. WINDS LOOK BELOW ADVISORY CRITERIA ELSEWHERE.

IN ADDITION...HEAVY SNOW IS EXPECTED IN THE OLYMPICS AND CASCADES ONCE AGAIN. COMBO OF STRONG MOIST ONSHORE FLOW...AND CONVERGENCE ZONES OFF THE OLYMPICS AND VANCOUVER ISLAND...1-2 FEET LOOKS GOOD FOR THE CASCADES. WILL ALSO CONVERT THE WINTER STORM WATCH OVER TO A WARNING THIS AFTERNOON...BUT WANT TO SEE THE LATEST MODELS AS WE MAY NEED TO ADJUST THE TIMING A BIT. HEAVY SNOW MAY NOT TAPER OFF UNTIL LATE FRI MORNING.

SPEAKING OF FRI MORNING...WITH THE COLD AIR MASS IN PLACE MAY SEE A FEW SNOW SHOWERS IN THE THE LOWLANDS WITH SNOW LEVELS ONLY A FEW HUNDRED FT AGL. DO NOT THINK WE WILL SEE SIGNIFICANT ACCUMULATIONS...JUST A DUSTING WITH HEAVIER SHOWERS AND MAINLY ON THE HIGHER HILLS. LOWS SHOULD REMAIN ABOVE FREEZING.

AT LEAST THE WEEKEND STILL LOOKS QUIETER. 33

.LONG TERM...PREVIOUS DISCUSSION...BY SATURDAY THE REGION TRANSITIONS TO A NORTHERLY OFFSHORE FLOW PATTERN WHICH WILL BRING A DRY AND SOMEWHAT SUNNY DAY TO THE REGION. THE CLOUDS ARE EXPECTED TO BREAK UP FRIDAY NIGHT WHICH WHEN COMBINED WITH THE COOL AIR MASS IN PLACE WILL ALLOW FOR SOME BELOW FREEZING TEMPERATURES SATURDAY MORNING IN THE NORMALLY COLDER LOCATIONS AND FROST EVERYWHERE ELSE. SO IF YOU HAPPENED TO PUT OUT FROST/FREEZE SENSITIVE PLANTS ALREADY THEY WILL LIKELY NEED PROTECTING.

BEYOND THAT...A BROAD AND RATHER DIFFUSE UPPER TROUGH IS EXPECTED TO DEVELOP OFF THE WEST COAST SUNDAY AND MIGRATE OVER THE WESTERN US INTO NEXT WEEK...POSSIBLY CLOSING OFF AS AN UPPER LOW. THE GFS AND ECMWF ARE IN ROUGH AGREEMENT WITH THIS BASIC IDEA AS WELL AS THE ENSEMBLES...HOWEVER THE DETAILS DIFFER QUITE A BIT WHICH IS NOT UNUSUAL. THIS PATTERN WILL BE GOOD FOR COOLER THAN NORMAL TEMPERATURES AND A HIGHER THAN NORMAL THREAT OF SHOWERS. HOWEVER...UPPER LOWS THIS TIME OF YEAR CAN ALSO ALLOW FOR SOME PERIODS WHERE THE SUN WILL MAKE ITSELF KNOWN FOR A DECENT DAY HERE AND THERE...ITS JUST NOT POSSIBLE TO TIME THAT TYPE OF THING THAT FAR OUT IN THE FORECAST. CERNIGLIA

&&

.AVIATION...A STRONG AND VIGOROUS COLD FRONT WILL QUICKLY CROSS WRN WA LATE TONIGHT. IN ADVANCE OF THE FRONT...WARM ADVECTION TODAY WILL MAINTAIN SOLID STRATIFORM CLOUDS...PROBABLY NOT MUCH HOUR-TO-HOUR VARIABILITY. COVERAGE AND INTENSITY OF RAIN WILL INCREASE THROUGH THE DAY AND EVENING AS FLOW ALOFT BECOMES STRONGER AND BACKS AROUND FROM A MORE SOUTHERLY DIRECTION.

COLD FROPA WILL OCCUR ARND 09Z-12Z. A SHIFT TO STRONG ONSHORE FLOW WILL OCCUR...AND THE AIR MASS WILL RAPIDLY DESTABILIZE. STRONG COLD ADVECTION BEHIND THE FRONT WILL CAUSE FREEZING LEVELS TO FALL RAPIDLY. A VIGOROUS PUGET SOUND CONVERGENCE ZONE WILL DEVELOP BEHIND THE FRONT AND PERSIST FOR MUCH OF THU SOMEWHERE BETWEEN SOUTHERN SNOHOMISH AND CENTRAL KING COUNTIES. COULD BE SOME SNOW MIXED IN IF THE CONVERGENCE ZONE BECOMES INTENSE ENOUGH.

KSEA...FAIRLY STEADY CIGS TODAY IN THE 030-045 RANGE. CIGS WILL START TO DROP MORE QUICKLY AFT 03Z. RAIN WILL ALSO DEVELOP AFT 03Z AND INTENSIFY THROUGH 12Z. STRONG FROPA WILL OCCUR 10Z-12Z WITH GUSTY SW WINDS FOLLOWING. VIGOROUS PUGET SOUND CONVERGENCE ZONE OVER NORTH KING COUNTY ON THU MORNING WILL AFFECT THE NORTHERN TRAFFIC MIXING POINT...EVEN IF THE PSCZ FAILS TO REACH THE TERMINAL ITSELF. HANER

&&

.MARINE...A WARM FRONT BRUSHING BY TO THE NORTH COULD BRING BRIEF GALE CONDITIONS LATE THIS MORNING NEAR TATOOSH ISLAND. OTHERWISE... HAVE HOISTED GALE WARNINGS FOR THE COAST...STRAIT AND ADMIRALTY INLET IN ANTICIPATION OF THE STRONG COLD FRONT EXPECTED TO MOVE IN

FROM THE NORTHWEST LATE TONIGHT AND EARLY THU MORNING. THE FRONT WILL BE FOLLOWED BY A STRONG NORTHWESTERLY AND ONSHORE PUSH. GALES ALONG THE COAST COULD BE MARGINAL...BUT MID- TO HIGH-END GALES ARE LIKELY ON THU FOR THE CENTRAL AND EASTERN STRAIT. SHOULD ALSO BE A STRONG WESTERLY PUSH INTO SOUTH PUGET SOUND ON THU...BUT HAVE OPTED FOR HIGH-END SMALL CRAFT CONDITIONS FOR THE FORECAST THERE. SHOULD BE A WELL DEVELOPED PUGET SOUND CONVERGENCE ZONE ON THU MORNING. HANER

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...WINTER STORM WATCH FOR THE OLYMPICS AND CASCADES FOR LATE TONIGHT INTO FRIDAY.

PZ...GALE WARNING FOR THE COAST...ENTIRE STRAIT...AND ADMIRALTY INLET.
SMALL CRAFT ADVISORY PUGET SOUND AND THE NORTH INLAND WATERS.
SMALL CRAFT ADVISORY FOR ROUGH GRAYS HARBOR BAR.

WWW.WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION PLEASE SEE WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML (ALL LOWERCASE).

Your National Weather Service forecast

Burien WA

Enter Your "City, ST" or zip code Go

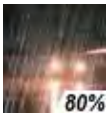
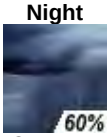
BOOKMARK

NWS Seattle, WA

Point Forecast: Burien WA
47.47°N 122.34°W (Elev. 335 ft)

Mobile Weather Information | **En Español**
Last Update: 10:00 am PDT Apr 7, 2010
Forecast Valid: 11am PDT Apr 7, 2010-6pm PDT Apr 13, 2010

Forecast at a Glance

Today	Tonight	Thursday	Thursday Night	Friday	Friday Night	Saturday	Saturday Night	Sunday
								
Chance Sprinkles	Rain	Showers	Showers Likely	Chance Showers	Mostly Cloudy	Partly Sunny	Mostly Cloudy	Mostly Cloudy
Hi 55 °F	Lo 41 °F	Hi 49 °F	Lo 38 °F	Hi 50 °F	Lo 36 °F	Hi 52 °F	Lo 38 °F	Hi 53 °F

Detailed 7-day Forecast

Today: A chance of sprinkles. Mostly cloudy, with a high near 55. South wind around 13 mph.

Tonight: Rain after 11pm. Low around 41. South wind between 3 and 11 mph. Chance of precipitation is 80%.

Thursday: Showers. High near 49. Southwest wind 6 to 9 mph increasing to between 18 and 21 mph. Chance of precipitation is 90%.

Thursday Night: Showers likely, mainly before 11pm. Mostly cloudy, with a low around 38. Southwest wind between 15 and 18 mph, with gusts as high as 28 mph. Chance of precipitation is 60%.

Friday: A 40 percent chance of showers. Mostly cloudy, with a high near 50. Southwest wind between 9 and 11 mph.

Friday Night: Mostly cloudy, with a low around 36.

Saturday: Partly sunny, with a high near 52.

Saturday Night: Mostly cloudy, with a low around 38.

Sunday: Mostly cloudy, with a high near 53.

Sunday Night: A chance of showers. Mostly cloudy, with a low around 39.

Monday: A chance of showers. Mostly cloudy, with a high near 51.

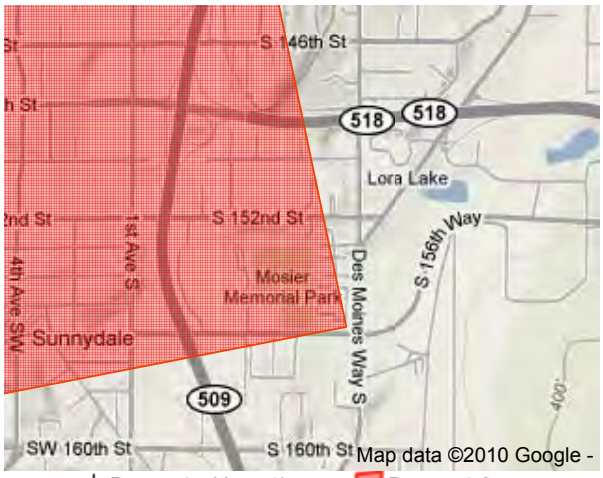
Monday Night: A chance of showers. Mostly cloudy, with a low around 39.

Tuesday: A chance of showers. Mostly cloudy, with a high near 53.

Detailed Point Forecast

[Move Down]

Click Map for Forecast Disclaimer



Requested Location Forecast Area

Lat/Lon: 47.47°N 122.34°W **Elevation:**335 ft

XML

Current Conditions

[Move Up]

Seattle, Seattle-Tacoma International Airport
Last Update on 07 Apr 9:53 PDT

Overcast

48°F (9°C)

Humidity:	63 %
Wind Speed:	S 10 MPH
Barometer:	30.32 in (1027.30 mb)
Dewpoint:	36°F (2°C)
Wind Chill:	44°F (7°C)
Visibility:	10.00 Miles

More Local Wx: **3 Day History:**

Radar and Satellite Images

weather.gov

National Weather Service Forecast Office
Seattle, WA

Home News Organization Search for: NWS All NOAA Go

Point Forecast: Burien WA
47.47N 122.34W (Elev. 335 ft)

En Español

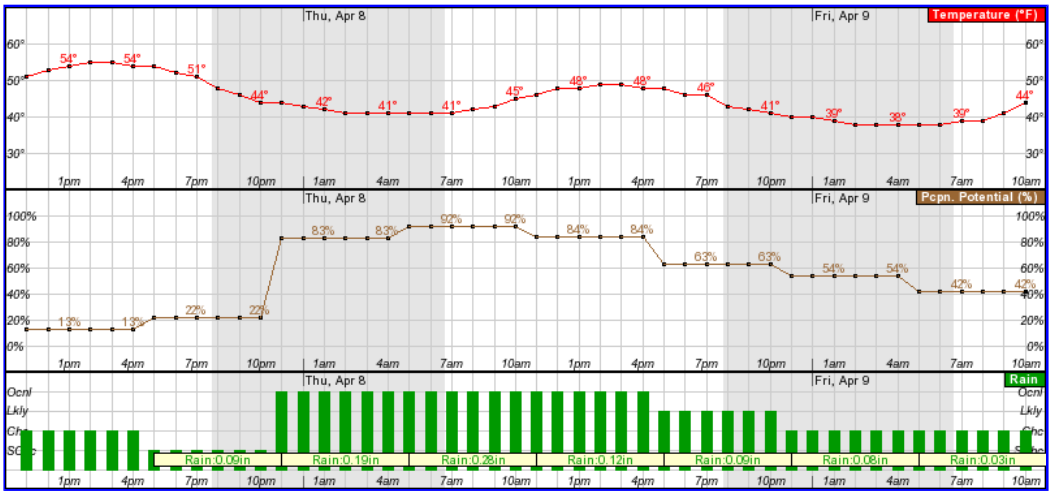
Last Update: 10:00 am PDT Apr 7, 2010

Hourly Weather Forecast Graph

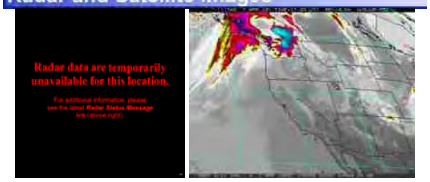
[dashes/dots] | [b/w] | [hide menu]

☑ Temperature (°F)	☐ Surface Wind mph	☐ Thunder
☐ Dewpoint (°F)	☐ Sky Coverage	☑ Rain
☐ Wind Chill (°F)	☑ Precipitation Potential	☐ Snow
	☐ Relative Humidity	☐ Freezing Rain
		☐ Sleet

48-Hour Period Starting: 11am Wed, Apr 7 Submit Back 2 Days Forward 2 Days



Radar and Satellite Images



Additional Forecasts & Information

International System of Units
7-Day Forecast
Forecast Discussion
Tabular Forecast
Quick Forecast

Webmaster
NOAA's National Weather Service
Seattle, WA

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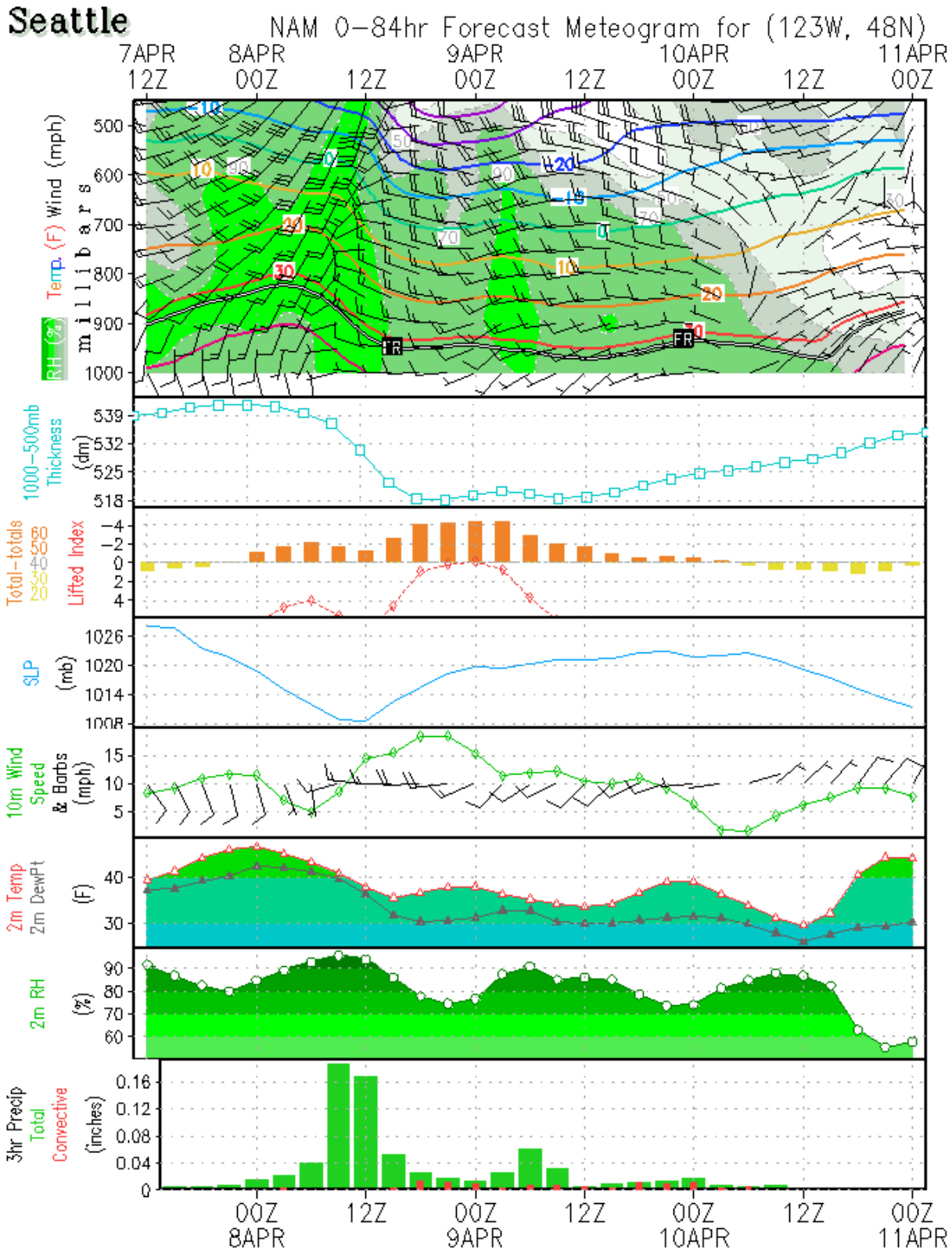

Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
7APR 12Z
8APR 00Z
8APR 12Z
9APR 00Z
9APR 12Z
10APR 00Z
10APR 12Z
11APR 00Z
millibars
Temp (F) Wind (mph)
RH (%)
1000-500mb Thickness (dm)
Total-totals
Lifted Index
SLP (mb)
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt (F)
2m RH (%)
3hr Precip
Total
Convective
(inches)

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	May 26, 2010
TO:	Matt Woltman / Megan McCullough
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600 Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409 (office) or 206-794-0095 (cell)
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Storm Event Report #10 (04/21/2010)

Please find included the following:

- Storm report narrative (4 pgs),
- Storm file Table (1 pg),
- COC forms (2 pgs),
- Field Sheets (6 pgs),
- pH Worksheet (1 pg),
- Groundwater level measurement form, (1 pg)
- Hydrographs (3 pgs),
- Combined Compositing Worksheets (2 pg),
- Sampler Reports (15 pgs), and
- Weather forecasting information (6 pgs).

Please let me know if you have any questions or need additional information. Thank You.

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

Dave Metallo, LHG , Project Manager

POS Lora Lake Apartments (LLA) Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Narrative Report
Stormwater Sampling Event #10
April 21st, 2010

During the first nine days of April STE's #8 and #9 were conducted during a cooler and rainy period where 1.18 inches of precipitation fell across the project area. The next 13 days were warmer and drier, with a combined rainfall total of 0.47 inches. Although the NWS on April 20th reported that the chance of precipitation was 70% for the pending storm event, it also reported this rain would be light and showery, with depths reported in the 3.5 day meteogram of less than 0.15 inches. The forecast called for Wednesday April 21st to be mostly cloudy and dry with showers in the Cascades as a weak deformed frontal band remained stalled over the mountains. An onshore flow brought cooler temperatures to the region and was expected to keep this deformation band pinned eastwards against the mountains. However, the precipitation produced by the deformation band drifted westward against weaker then expected flows and a secondary system set up a Puget Sound convergence zone which, when these systems combined, resulted in much higher actual rainfall fall totals over the Puget Sound area. These combined systems were short lived as another upper level trough pressed down from B.C. moving the deformation band back eastwards, and with it the rain.

Sampling Event (STE) #10 began on April 21st, 2010. The bulk of the event was forecasted to occur over a 12-hour period from late evening on the 20th through mid-afternoon on the 21st. Rain began to fall over the project area during the early morning of April 21st at 12:15 AM and consisted of one main wave of precipitation lasting nearly 10 hours.

This particular storm event produced a total of 0.97 inches of rain over the surrounding project area. All of the LLA monitoring stations were able to sample the nearly the entire rainfall depth, ranging in sampling coverage from 0.93 to 0.95 inches at the monitoring stations. Detailed weather forecast information is attached to this report.

Storm and Sample Validation / Qualification:

All validation and qualification conditions for this storm event were met. These validation and qualification conditions included forecast probability, antecedent dry period, runoff occurrence / hydrograph stage, parameters collected, 75 % flow representation, minimum number of aliquots, pH measurement, quality control sample collection and anomalous conditions assessment. See the accompanying *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* for complete details regarding STE#10.

Grab Sampling, Composite Sampling and Autosampler Enabling:

The three LLA Project sampling stations were CB31A (main line inlet), CB4857 (main line outlet) and CB1 (onsite system outlet). Grab samples were collected using Teflon-lined tubing, dedicated at each sampling station, which was attached to a point adjacent to the intake of the composite sampling line. A peristaltic pump was used to collect the grab samples through these dedicated lines at each station. All grabs were collected as early as possible during the storm event once runoff was noted and at points within the associated station hydrographs that were elevated above base flow conditions.

Composite samples were collected via autosamplers with a 12 (1-gallon glass) bottle arrangement also utilizing Teflon-lined tubing dedicated at each sampling station. All three sampling stations were automatically enabled via the use of flow meters that were connected to autosamplers. The flow meters were pre-programmed to enable sampling above certain pre-determined threshold levels. These threshold levels were determined based on an examination of pre-storm base-flow condition levels, known periodic or cyclic

events (e.g. timed watering, construction pumping, etc. that occur in the basin) and runoff response from past events. CB31A and CB4857 used stand-alone in-pipe area-velocity sensors to enable sampling and direct measurement of water level in the pipe, flow velocity and auto-calculation of flow volume. CB1 used an area-velocity sensor in combination with a Thel-Mar volumetric weir. At this location the area-velocity sensor was used only for direct measurement of level (calibrated to the weir crest). Flow volume was then post-calculated via manufacturers published stage-discharge relationship information based on the acquired level data.

Each of the three autosamplers were programmed to collect time paced composite samples. The autosamplers were programmed to collect an aliquot every 12-minutes, providing for 60-minutes per discrete sample bottle. This configuration allowed up to 12-hours of sampling coverage.

The rainfall caused a runoff response at each of the sampling stations enabling the autosamplers within 10-minutes from each other (with CB31A and CB1 enabling within 4-minutes of each other). All of the samplers enabled within 35-minutes of the beginning of the storm event (4/21/2010 12:15 AM). See the attached *Field Sampling Forms* for additional enabling and station specific details.

All sampling and flow monitoring equipment operated as designed and programmed. Details pertaining to the programming and event-specific operation of each monitoring station sampler unit is contained in the attached *Sampler Reports*. Collection of grab and composite samples followed the methodology detailed in the LLA Work Plan.

Flow Data Summary:

CB-31A and CB-4857 had storm volume and sampling volume differences of approximately 31,000 gallons, with the inlet recording more flow then the outlet. This is likely a consequence of the drainage system vactoring and resultant change in hydraulic conditions at CB4857 noted in STE Reports #'s 3 and 4. Since accumulated sediment was removed from the piping and vaults associated with CB4857, water flows more freely and is not being impounded to the degree previously noted prior to the vactoring event. Water depth in the pipe (at the area-velocity sensor anchor position) does not increase as readily in association with rainfall as was noted during observations and events prior to the system vactoring. These shallower water conditions at CB4857, coupled with its 4% pipe slope (field measured) tended to make flow monitoring more difficult, especially during periods of low-flow depths. However, highly accurate flow measurements for the purpose of mass balance calculation through the drainage piping system or assessment of total flow at each station were not project data quality objectives. Nor are these critical factors in the representative characterization of stormwater chemistry at this site. Flow metering at each monitoring station is considered to have the necessary precision to allow for consistent and effective sampler enabling and the generation of station-representative storm hydrographs. Flow hydrographs were noted to have very similar runoff response signatures when compared to each other for both this current and past storm events.

CB1 had a measured storm flow volume of 9,853 gallons. This was consistent with the amount of rainfall that occurred during this storm event. *Storm Event Hydrographs* showing, level, flow and rainfall data, as well as sample markers and grab sample collection indications, for each of the monitoring stations are attached to this report.

Compositing Scheme:

All of the composite samples were manually flow weighted based on site specific flow information. The hydrographs from each monitoring station were examined and decisions were made as to what specific discrete sampler bottles were to be included in the overall composite samples. Due to the nature of this particular storm event CB31A and CB4857

utilized all 12 discrete bottles to formulate the composite samples from these locations. CB1 used bottles 1 through 11 of 12 total discrete bottles. Bottle 12 represented base flow or mostly base flow conditions. See the attached *Field Sampling Forms* and their accompanying *Compositing Worksheets* for these details.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected, both grab and composite samples were placed into coolers and put on ice to maintain temperatures between 2 and 6 °C. A small portion of each of the of the composite samples was poured off for the assessment of pH. pH measurements were collected prior to delivery of the samples to the lab. These measurements were recorded on the attached *pH Measurement Worksheet.*

All sample IDs, collection date and time, matrix, requested parameter analysis and other associated information were documented on *Chain-of-Custody (CoC) forms* (attached). Samples were in direct control of project and/or laboratory personnel at all times. Samples were delivered to the testing facility, Analytical Resources Inc. of Tukwila, WA, in good, useable and properly chilled condition. Enough sample was collected from the targeted stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Quality Control Samples:

During this event adequate water volume for duplicate and MS/MSD analyses was collected and submitted for both the grab and composite samples. Both the grab and composite duplicates were collected at CB4857. These duplicate samples were designated as location "CB101". This was done to present "blind" samples (not readily identifying these duplicates) to the testing facility. The grab MS/MSD volume was collected at CB4857. The composite MS/MSD volume was collected at CB1. Trip blanks accompanied all samples slated for volatile organic analysis collected during this STE. See the attached *Storm and Sample Validation/Qualification Checklist Report Spreadsheet* and the *Field Sampling Forms* for details regarding QC sample collection.

Groundwater Level Measurements:

Groundwater level measurements were collected from four locations across the LLA site. These locations were MW-2, MW-3, MW-4, and MW-6. Details regarding the measurement event are contained in the attached *Groundwater Level Measurement* field sheet. Measurements are listed in the table below.

Groundwater Level Measurements, STE#10

Location	Date	Time	Water Level from TOC (FT)	Notes
MW-2	4/22/2010	20:55	6.36	replacement for MW-1 and MW-5, as previously noted
MW-3	4/22/2010	20:45	17.08	
MW-4	4/22/2010	20:35	16.02	
MW-6	4/22/2010	20:25	11.51	

Anomalies and/or Work Plan Deviations:

There were no anomalies observed that would have otherwise caused any of the STE#10 samples to be non-representative of the conditions from which they were collected. There were two minor discrepancies regarding the CoC forms. The composite sample CoC originally directed the laboratory to run the MS/MSD analysis on CB4857. However, additional volume for this analysis was collected from CB1. ARI was contacted about this discrepancy and the Laboratory Project Manager confirmed that the MS/MSD analysis was conducted on the extra sample volume submitted with the CB1 sample. The composite COC was also devoid of sample collection times. These times (available via several sources) were added to the CoC in this report package. This issue was brought to the attention of the RI Consultant Project Manager. Neither of these minor discrepancies have caused reporting complications or have impacted the analysis process.

Actions To Be Completed:

This was the tenth and final storm sampling event. No further stormwater sampling events are anticipated at this time. The current focus of the field efforts will be in collecting ample stormwater solids samples. Stormwater solids devices were set in place during February, 2010 after the drainage system vactoring event was completed. The four solids containers were checked back in late April. At that time the containers were observed to be between 10 and 20% full. The POS has decided to leave these containers in their current field positions through the Fall of 2010. The plan is re-check these containers to assess their capacities once or twice between May and mid-Fall.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Storm and Sample Validation/Qualification Checklist Report
Stormwater Sampling Event #10 (04-21-2010)

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Storm Event Data:	
Project Storm Event (STE) #	10
Event Forecast Probability (%)	70%
Antecedent Dry Period (days: hrs: mins)	03:00:05
STE Start Date & Time	4/21/10 0:15
STE Duration (hrs:mins)	9:35
STE End Date & Time	4/21/10 9:50
Period Between Next Measureable Rain (hrs: mins)	57:30
Was Targeted STE Qualified Per LLA QAPP	YES
Rainfall Summary:	
Rainfall Prior 24-hrs to STE Start	0.00
Rainfall Prior 12-hrs to STE Start	0.00
Rainfall Total for Storm Period (in)	0.97
Max 1-hr Rainfall Intensity (in/hr)	0.20
Average 1-hr Rainfall Intensity (in/hr)	0.10

[1] Sample Collection Criteria:	CB-31A	CB-4857	CB-1
Sampling Station			
Was Grab sample collected?	Yes	Yes	Yes
Grab ID	CB31A042110GRAB	CB4857040210GRAB	CB1042110GRAB
Grab Date /Time	4/21/2010 8:55	4/21/2010 9:23	4/21/2010 9:13
Was runoff occurring OR was site hydrograph at least 10% above background at grab collection ? If no, explain in summary narrative.	Yes	Yes	Yes
Hydrograph stage at grab collection	inter-event crest	inter-event crest	inter-event crest
Grab parameters collected per LLA QAPP ?	Yes	Yes	Yes
Were Trip Blanks included w/ Grab samples ?	Yes (TB042110)	Yes (TB042110)	Yes (TB042110)
Was Comp sample collected?	Yes	Yes	Yes
Comp ID	CB31A042110COMP	CB4857042110COMP	CB1042110COMP
Comp Date /Time	4/21/2010 12:29	4/21/2010 12:38	4/21/2010 11:32
Total volume measured during storm period (gallons)	286710	255710	9865
Volume sampled during storm period (gallons)	286710	255710	9865
Volume utilized for comp. sample (gallons)	286710	255710	9853
Do Comp samples represent at least 75% of the storm hydrograph at that station w/in the first 24-hrs of collection ?	Yes (100%)	Yes (100%)	Yes (99%)
Were a minimum of 8 aliquots collected for comp sample ?	Yes (60)	Yes (60)	Yes (55)
Comp parameters collected per LLA QAPP ?	Yes	Yes	Yes
Rainfall during sampling period (in)	0.95	0.93	0.94
pH Measurements Collected ?	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No
[1] QC Sample Summary Information:	**CB-31A**	**CB-4857**	**CB-1**
Was Grab sample duplicate collected ?	No	Yes	No
Grab sample duplicate ID	na	CB101042110GRAB	na
Grab sample date and time	na	4/21/2010 10:23	na
Was Comp sample duplicate collected ?	No	Yes	No
Comp sample duplicate ID	na	CB101042110COMP	na
Comp sample date and time	na	4/21/2010 13:38	na
Was additional volume collected for MS/MSD analysis (grab, comp or both) ?	No	Yes (Grab)	Yes (Comp)

[1] If the answer to any of the Storm Event or Sample Collection Criteria questions are "no" OR indicate non-representative conditions, then these issues should be explained in STE Summary Narrative.

Validation Check List Report Completed By / Date: 5-26-10 **Reveiwed By / Date:** 26 May 10

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:

Turn-around Requested: STANDARD

Date: 04/21/10

Page: 1 of 1

ARI Client Company: FLOYD/SNIDER

Phone: (206) 292-2078

Client Contact: MEGAN McCULLOUGH / MATT WORTMAN

Client Project Name: LONG LAKES APARTMENTS

Client Project #: 205-LLA

Samplers: B. KWASNOWSKI / D. OBRIEN

No. of Coolers: 1

Cooler Temps: 9.0 C

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOC 8260C-SIM	Analysis Requested: NWTPH-Dx *	Notes/Comments
CB31A042110GRAB	04/21/10	08:55	W	5	X	X	
CB1042110GRAB	04/21/10	09:13	W	5	X	X	
CB485704211OGRAB	04/21/10	09:23	W	13	X	X	RUN MS/MSD
CB101042110GRAB	04/21/10	10:23	W	5	X	X	
TB042110	04/21/10	8:30	W	3	X		TRIP BLANK

Comments/Special Instructions
* ACID/SILICA GEL CLEAN-UP FOR NWTPH-Dx

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)				
Printed Name:	BRAD KWASNOWSKI	A. Volgardsen		
Company:	Taylor Associates	ARI		
Date & Time:	04/21/10 16:18	4/21/10 1618		

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: STANDARD
ARI Client Company: FLOYD/SNIDER	Phone: (206) 292-2078
Client Contact: MEGHAN McCREIGHT / MATT NEIMAN	
Client Project Name: LORA LAKES APTS.	
Client Project #: LLA-PRS	Samplers: B. KNASNOWSKI / D. OBRIEN

Date: 4/22/10
Page: 1 of 1
No. of Coolers:
Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D-SIM LOW LEVEL	PCP 8041	ARSENIC TOTAL & DISS 200.8	TSS SM 2540D					Notes/Comments
CB31A042110COMP	04/21/10	1229	W	1	X	X	X	X					pH MEASUREMENT (SEE ATTACHED WORKSHT)
CB1042110COMP	04/21/10	1132	W	1	X	X	X	X					6.22
CB485704211COMP	04/21/10	1238	W	1	X	X	X	X					6.51
CB101042110COMP	04/21/10	1338	W	1	X	X	X	X					6.63
													6.45

* RUN MS/MSD

MS/MSD was analyzed from CB1 -- not CB4857 DM

Analysis Requested

Comments/Special Instructions	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:
		BRAD KNASNOWSKI	TAYLOR ASSOCIATES	04/22/10 @ 16:57	J. Peterson	J. Peterson	ARI	4/22/10 1657
	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

* MS/MSD VOL. DOES NOT INCLUDE EXTRA VOL. FOR DIOXIN/FURAN ANALYSIS

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB314	12 x 1 gallon bottle set-up Rev.ed 3/30/2010	Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: BK/DO Weather: PT. CLOUDY Arrival Date/Time: 04/

Carry-over maintenance to do prior to set-up: NONE done? —

Sampler Battery Voltage	12.60	Changed? Y (N)	New voltage	—	
Flow Meter Battery Voltage	12.60	Changed? Y (N)	New voltage	—	

Flow Meter Information		Sampler Information	
Date/time correct? (Yes/No)	Y	Pump Tubing OK? Replaced? (Yes/No)	Y / N
Flow meter cables OK? (Yes/No)	Y	Sample Tubing & Strainer OK?	Y
Desiccant Canisters OK (Yes/No)	Y	Sample Aliquot Size / Calibrated ?	
Flow Meter Level (FT)	0.400	Comp and Grab Lines Back flushed with DI?	Y
Actual level Reading (FT)	—	Desiccant Condition, replaced?	Okay / N
Difference (FT)	—	Suction line & quick connect attached?	Y
Level calibrated? (Yes/No)	—	Clean bottles installed & lids off?	Y
Velocity (fps)	0.05	Diagnostics / Distributor arm check?	Y
Flow Rate (gpm)	10	Enable Level (FT)	0.43
Data Downloaded (Yes/No)	Y	Pacing Type ("T"ime/"F"low), interval / rate	T / 24 MINS/aliq
Channel conditions/observations: CHANNEL okay.		Program Reviewed? (Yes/No)	Y
		Last Screen	DISABLED
		Ice Deployed? (Yes/No)	N

Notes: D'ed sample pacing rate from 24-min to 12-min based on current forecast info. (4/20/10)

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DO / BK Weather: rain Arrival Date/Time: 4/21/10 0852

Grab Sample Data		Sample Observations:
Runoff Present or Hydrograph Elevated?	Y	CLEAR, NO ODOR/SHEEN
Grab Collection Time (date/time)	4/21/10 0855	
Grab Sample ID	CBCIA042110GRAB	
Grab Duplicates Collected?	N	
Grab Duplicate Collection (date/time)	—	
Grab Duplicate ID	—	
Grab MS/MSD Collected ?	N	
VOA Trip Blank in cooler?, ID	Y TB042110 (0830)	

Flow Meter		Sampler	
Flow meter cables OK? (Y/N)	Y	Equipment running correctly?	Y
Flow Data Downloaded & Reviewed? (Y/N)	N	Composite Begin Time (date / time)	04/21/10 @ 00:41
		On Composite... (bottle # / aliq #)	BOTTLE #3/ALIQ #3/
		Ice deployed?	N
		Sampler Battery Voltage (changed?):	12.40 / N
		Flow Meter Battery Voltage/Change? (if different)	—
		Bottle Swap needed? (if yes fill out Section 3)	N

Notes:

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
On Composite.... (bottle # / aliq #)		Data downloaded?	
Comp Btl Levels (under vol., overfilled, OK)		Sampler/Flow Meter Batt. Voltage (changed):	
Pacing Rate OK for Event?, Changed?		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

Station: CB31A

Section 4. Comp. Bottles Retrieval

Personnel: BK/DO	Weather: OVERCAST	Arrival Date/Time: 04/21/10 @ 14:25	
Sampler Battery Voltage	———	Changed? ~~Y~~ N	New voltage ———
Flow Meter Battery Voltage	———	Changed? ~~Y~~ N	New voltage ———
Comp Sample Volume Collected	100%	Data downloaded? Y	
Composite Begin Time (date/time)	04/21/10 @ 00:41		Round #: 1
Last Aliquot Taken (date/time, btl #, aliq #)	04/21/10 @ 12:29, BOTTLE #12, AUG #5		
Comp Bottles Labeled? (sta. & btl #)	31A #1-12		

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

NONE MISSED

Channel conditions/observations

CHANNEL OKAY, NO UNUSUAL OBSERVATIONS

Notes/Maintenance Needed:

———

Section 5. Post Storm Comp. Sample Processing

Personnel: BK		Date/Time: 04/22/10 @ 14:15	
Processing Location: PBS LAB			
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Y			Rain Gauge Info: Y
How Many Comp. Bottles Were Collected? 12		Approximate Total Comp. Volume Collected: 4 GAL.	
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 4500 ml		Actual Comp. Sample Vol. Available: 4971 ml	
Comp. Sample Type (Time Paced, Flow Paced, (Flow Weighted Manual Comp), Other (explain):		TIME DM	
Bottles (Btl #s) used for Comp. Sample: 12		Comp. Sample Container Size & Material: 2.5 GAL. GLASS	
Comp Collection Time (date/time): 04/21/10 @ 12:29		Comp Sample ID: CB31A042110 COMP	
pH Measurements Collected On Comp. Sample ?: Y 6.22			
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: Yes			
Notes:			

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): No QC Samples collected	
Duplicate Sample Collected ? NO	Duplicate Sample Vol.:
Duplicate sample Date / Time:	Duplicate Sample ID:
pH Measurement Collected on Duplicate Comp. Sample?:	
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: NO	
MS/MSD Vol. submitted:	
Were any other QC sample types colelcted? (if yes, provide details) NO	
DI Water Information None Used	
Notes:	

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB4857 | **12 x 1 gallon bottle set-up** Rev.ed 3/30/2010 | Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: DO / BK	Weather: sunny			Arrival Date/Time: 4/17/10	1145
Carry-over maintenance to do prior to set-up: —					done? —
Sampler Battery Voltage	12,64	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	—	Changed? Y N		New voltage	—

Flow Meter Information		Sampler Information	
Date/time correct? (Yes/No)	Y	Pump Tubing OK? Replaced? (Yes/No)	OK → 588K
Flow meter cables OK? (Yes/No)	Y	Sample Tubing & Strainer OK?	Y
Desiccant Canisters OK (Yes/No)	Y	Sample Aliquot Size / Calibrated ?	700mL / N
Flow Meter Level (FT)	0.023	Comp and Grab Lines Back flushed with DI?	Y
Actual level Reading (FT)	DNC	Desiccant Condition, replaced?	OK
Difference (FT)	—	Suction line & quick connect attached?	Y
Level calibrated? (Yes/No)	N	Clean bottles installed & lids off?	Y
Velocity (fps)	0.73	Diagnostics / Distributor arm check?	Y
Flow Rate (gpm)	1 gpm	Enable Level (FT)	2.07
Data Downloaded (Yes/No)	Y	Pacing Type ("T"ime/"F"low), interval / rate	T / 24 mins → 12 mins*
Channel conditions/observations		Program Reviewed? (Yes/No)	Y
		Last Screen	Diagnostics
		Ice Deployed? (Yes/No)	N

Notes: * Pacing rate switch to 12-mins (from 24) based on forecast (4/20/10)

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DO / BK | Weather: rain | Arrival Date/Time: 4/21/10 0920

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?	Y		
Grab Collection Time (date/time)	4/21/10 09:23		
Grab Sample ID	CB4857042110GRAB		
Grab Duplicates Collected?	Y	**Sampler**	
Grab Duplicate Collection (date/time)	04/21/10 10:23	Equipment running correctly?	Y
Grab Duplicate ID	CB101042110GRAB	Composite Begin Time (date / time)	4/21/10 0050
Grab MS/MSD Collected ?	Y	On Composite... (bottle # / aliq #)	Btl 9 / 4 of 5
VOA Trip Blank in cooler?, ID	Y/TB042110 (083)	Ice deployed?	N
Flow Meter		Sampler Battery Voltage (changed?):	12,48 / N
Flow meter cables OK? (Y/N)	Y	Flow Meter Battery Voltage/Change? (if different)	—
Flow Data Downloaded & Reviewed? (Y/N)	N	Bottle Swap needed? (if yes fill out Section 3)	N

Notes:

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
On Composite.... (bottle # / aliq #)		Data downloaded?	
Comp Btl Levels (under vol., overfilled, OK)		Sampler/Flow Meter Batt. Voltage (changed):	
Pacing Rate OK for Event?, Changed?		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB4857

Section 4. Comp. Bottles Retrieval

Personnel: BK/DD	Weather: OVERCAST	Arrival Date/Time: 04/21/10 @ 14:55	
Sampler Battery Voltage	—	Changed? ~~Y~~ N	New voltage —
Flow Meter Battery Voltage	—	Changed? ~~Y~~ N	New voltage —
Comp Sample Volume Collected	100%	Data downloaded?	
Composite Begin Time (date/time)	04/21/10 @ 00:50		Round #: 1
Last Aliquot Taken (date/time, btl #, aliq #)	04/21/10 @ 12:38, BOTTLE #12, ALIQ #5		
Comp Bottles Labeled? (sta. & btl #)	4857 #1-12		

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed.

NONE MISSED

Channel conditions/observations: CHANNEL CLEAN, NO UNUSUAL OBSERVATIONS

Notes/Maintenance Needed: —

Section 5. Post Storm Comp. Sample Processing

Personnel: BK		Date/Time: 04/21/10 @ 15:15	
Processing Location: POS LAB			
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). : Y		Rain Gauge Info: Y	
How Many Comp. Bottles Were Collected? 12		Approximate Total Comp. Volume Collected: 48 L.	
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls): 9000 ml		Actual Comp. Sample Vol. Available: 10,352 ml	
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp.)		Other (explain): ~~TIME PACED~~ DM	
Bottles (Btl #s) used for Comp. Sample: 12		Comp. Sample Container Size & Material: 2.5 GAL GLASS	
Comp Collection Time (date/time): 04/21/10 @ ~~04:23~~ 12:38		Comp Sample ID: CB4857042110COMP	
pH Measurements Collected On Comp. Sample ?: Y 6.63 → 12:38			
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?: — Yes			

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below): Y			
Duplicate Sample Collected ? Y @ 13:38		Duplicate Sample Vol.: SPLIT FROM 4857 COMP.	
Duplicate sample Date / Time: 04/21/10 @ 10:23		Duplicate Sample ID: CB101042110 COMP	
pH Measurement Collected on Duplicate Comp. Sample?: Y 6.45			
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?: Y			
MS/MSD Vol. submitted: 4357 - ml			
Were any other QC sample types colelcted? (if yes, provide details) N			
DI Water Information – NONE USED			

Notes: * MS/MSD vol. & analysis was actually taken from CB1 – not 4857 (DM)

TAYLOR ASSOCIATES, INC.

POS - Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form

Station: CB1 - Mega	12 x 1 gallon bottle set-up Rev.ed 3/30/2010	Page: 1 of 2 pages per station

Section 1. Storm Setup and Inspection

Personnel: DO / BK	Weather: Sunny		Arrival Date/Time: 4/16/10	1120	
Carry-over maintenance to do prior to set-up: —				done? —	
Sampler Battery Voltage	12.58	Changed? Y (N)		New voltage	—
Flow Meter Battery Voltage	—	Changed? ~~Y~~ ~~N~~		New voltage	—

Flow Meter Information		Sampler Information	
Date/time correct? (Yes/No)	Y	Pump Tubing OK? Replaced? (Yes/No)	OK → 875K
Flow meter cables OK? (Yes/No)	Y	Sample Tubing & Strainer OK?	Y
Desiccant Canisters OK (Yes/No)	Y	Sample Aliquot Size / Calibrated ?	700mL / N
Flow Meter Level (FT)	-0.015'	Comp and Grab Lines Back flushed with DI?	Y
Actual level Reading (FT)	—	Desiccant Condition, replaced?	OK
Difference (FT)	—	Suction line & quick connect attached?	Y
Level calibrated? (Yes/No)	N	Clean bottles installed & lids off?	Y
Velocity (fps)	0	Diagnostics / Distributor arm check?	Y
Flow Rate (gpm)	0	Enable Level (FT)	0.03
Data Downloaded (Yes/No)	Y	Pacing Type ("T"ime/"F"low), interval / rate	Time 12 minutes *
Channel conditions/observations		Program Reviewed? (Yes/No)	Y
		Last Screen	ENABLED
		Ice Deployed? (Yes/No)	N

Notes:
* Pacing rate ∇'ed from 24 to 12-min based on current forecast (4/20/10)

Section 2. Grab Sample & QC Collection/ Initial Station Check

Personnel: DO / BK Weather: rain Arrival Date/Time: 4/21/10 0910

Grab Sample Data		Sample Observations:	
Runoff Present or Hydrograph Elevated?	Y		
Grab Collection Time (date/time)	4/21/10 0913		
Grab Sample ID	CB1042110GRAE		
Grab Duplicates Collected?	N	**Sampler**	
Grab Duplicate Collection (date/time)	—	Equipment running correctly?	Y
Grab Duplicate ID	—	Composite Begin Time (date / time)	4/21/10 0044
Grab MS/MSD Collected ?	N	On Composite... (bottle # / aliq #)	Btl 9, 4 of 5
VOA Trip Blank in cooler?, ID	Y TB042110 (0830)	Ice deployed?	N
Flow Meter		Sampler Battery Voltage (changed?):	12.36 / N
Flow meter cables OK? (Y/N)	Y	Flow Meter Battery Voltage/Change? (if different)	—
Flow Data Downloaded & Reviewed? (Y/N)	N	Bottle Swap needed? (if yes fill out Section 3)	N

Notes:

Section 3. Mid-Storm Check / Bottle Switch

Personnel:	Weather:	Arrival Date/Time:	
Composite Begin Time (date / time)			Round #:
On Composite.... (bottle # / aliq #)		Data downloaded?	
Comp Btl Levels (under vol., overfilled, OK)		Sampler/Flow Meter Batt. Voltage (changed):	
Pacing Rate OK for Event?, Changed?		Ice deployed?	

Aliquots missed/NLD (date/time/btl #/aliq #) continue on back if needed

Channel conditions/observations

Notes/Maintenance Needed:

TAYLOR ASSOCIATES, INC.

Lora Lake Apartments Stormwater Interim Action - Stormwater Sampling Field Form, Continued

Station: CB I

Section 4. Comp. Bottles Retrieval

Personnel: BK/DD	Weather: OVERCAST	Arrival Date/Time: 04/21/10 @ 14:40	
Sampler Battery Voltage	—	Changed? ~~Y~~ N	New voltage —
Flow Meter Battery Voltage	—	Changed? ~~Y~~ N	New voltage —
Comp Sample Volume Collected	100%	Data downloaded? Y	
Composite Begin Time (date/time)	04/21/10 @ 08:44		Round #: 1
Last Aliquot Taken (date/time, btl #, aliq #)	04/21/10 @ 12:32, Bottle #12, Aliq #5		
Comp Bottles Labeled? (sta. & btl #)	CBI #1-12		

Aliquots missed/NLD (date/time/btl #/aliq #) continue in "Notes" if needed

NONE MISSED

Channel conditions/observations

CHANNEL CLEAR, WAS NO UNUSUAL OBSERVATIONS

Notes/Maintenance Needed:

—

Section 5. Post Storm Comp. Sample Processing

Personnel: BK		Date/Time: 04/22/10 @ 14:45	
Processing Location: POS LAB			
Was All Required Data Downloaded or Recorded? (Smpler Rpt, Flow/Lvl Data, Fld info). :	Y	Rain Gauge Info: Y	
How Many Comp. Bottles Were Collected?	12	Approximate Total Comp. Volume Collected:	4gal.
Comp'ing Wrksht Total Vol. Req'ed for All Analysis Types (incldng QC Smpls):	8500	Actual Comp. Sample Vol. Available:	8857
Comp. Sample Type (Time Paced, Flow Paced, Flow Weighted Manual Comp, Other (explain):		TIME DM	
Bottles (Btl #s) used for Comp. Sample:	12 11 ea	Comp. Sample Container Size & Material:	2.5 GAL GLASS
Comp Collection Time (date/time):	04/21/10 @ 12:32 PM → 11:32	Comp Sample ID:	CBI 04/21/10 COMP
pH Measurements Collected On Comp. Sample ?:	Y 6.51		
Were all collection and comp. bottles and associated glassware (graduated cylinders, etc.) cleaned per LLA QAPP SOP?:	—		Yes

Notes:

Section 6. Comp. QC Sample Information (completed in conjunction w/ main comp. sample preparation)

Was there enough sample volume collected for QC sample submission to testing facility (if No, explain in notes below):

Duplicate Sample Collected ?	No	Duplicate Sample Vol.:	NA
Duplicate sample Date / Time:	NA	Duplicate Sample ID:	NA
pH Measurement Collected on Duplicate Comp. Sample?:	NA		
MS/MSD Collected (additional vol., per LLA QAPP, submitted along with normal comp. sample)?:	Yes		
MS/MSD Vol. submitted:	4357-ml		
Were any other QC sample types colelcted? (if yes, provide details)	NO		
DI Water Information	None Used		

Notes:

* Collected MS/MSD from this location (DM)

POS STIA Stormwater Monitoring Program
pH measurement worksheet

Project: POS - CORAL LAKES APTS.

Date 04/21/10
Staff B. KWASNOWSKI
pH meter make/model # THERMO SCIENTIFIC ORION 2 STAR
(meter calibration and maintenance to be kept in log book for meter)

Sample ID	pH (SU)	time of measurement	notes
CB3104211O COMP	6.22	16:12	
CB104211O COMP	6.51	16:30	
~~CB485704211O COMP~~	~~6.22~~	~~16:13~~	
CB10104211O COMP	6.45	16:05	
CB485704211O COMP	6.63	16:20	

Post-Measurement Check

Nominal pH value of standard	4.00	
Temperature (deg C)	~~3.99~~ 20°C	
Standard pH, temp corrected	3.99	
Meter pH reading (SU)	4.00	
Difference (SU)	0.01	*Should be < 0.1 (round to 0.0)*
Time	16:35	

Form to be included in storm file, as applicable

TAYLOR ASSOCIATES, INC.

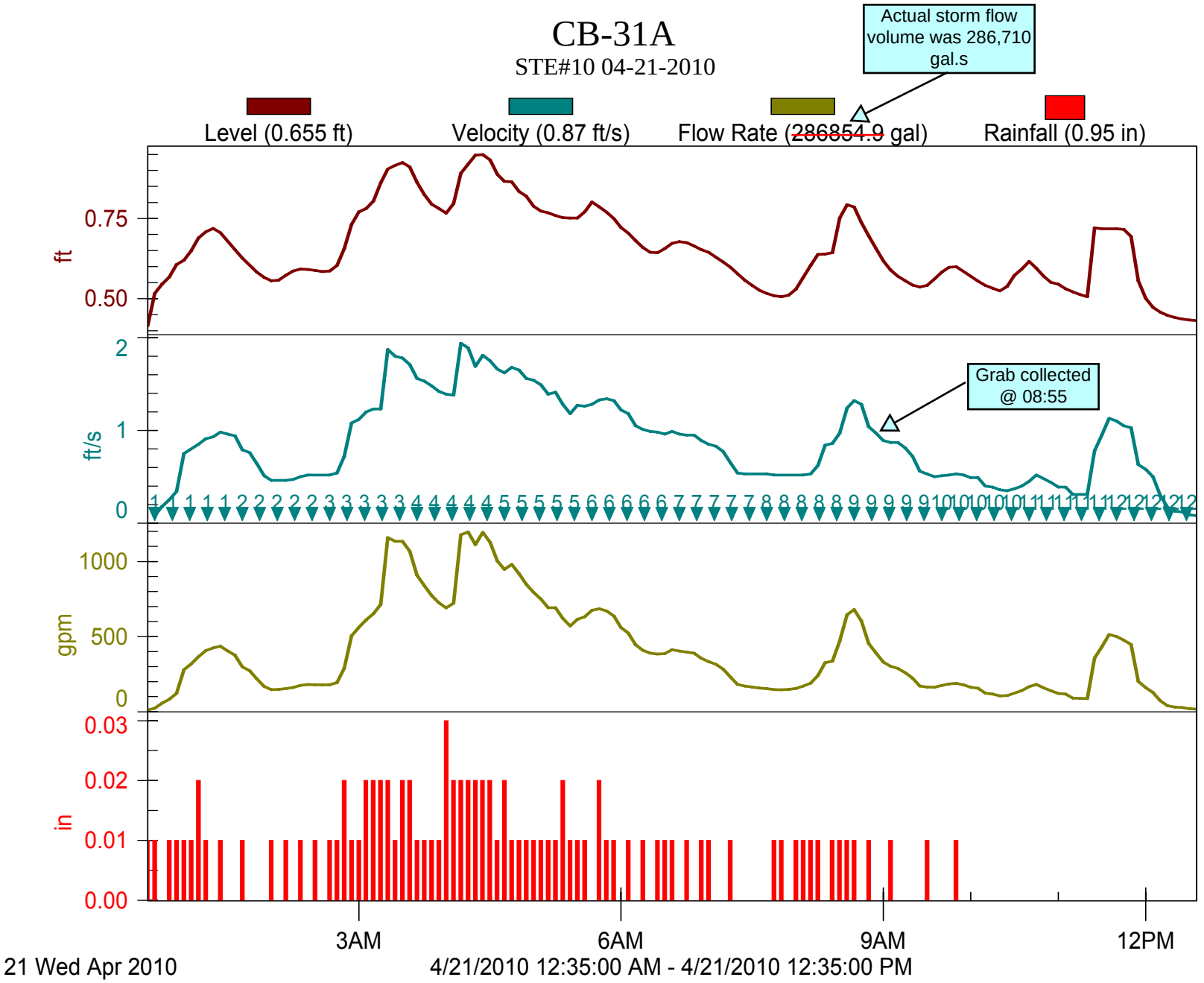
POS - Lora Lake Apartments Stormwater Interim Action

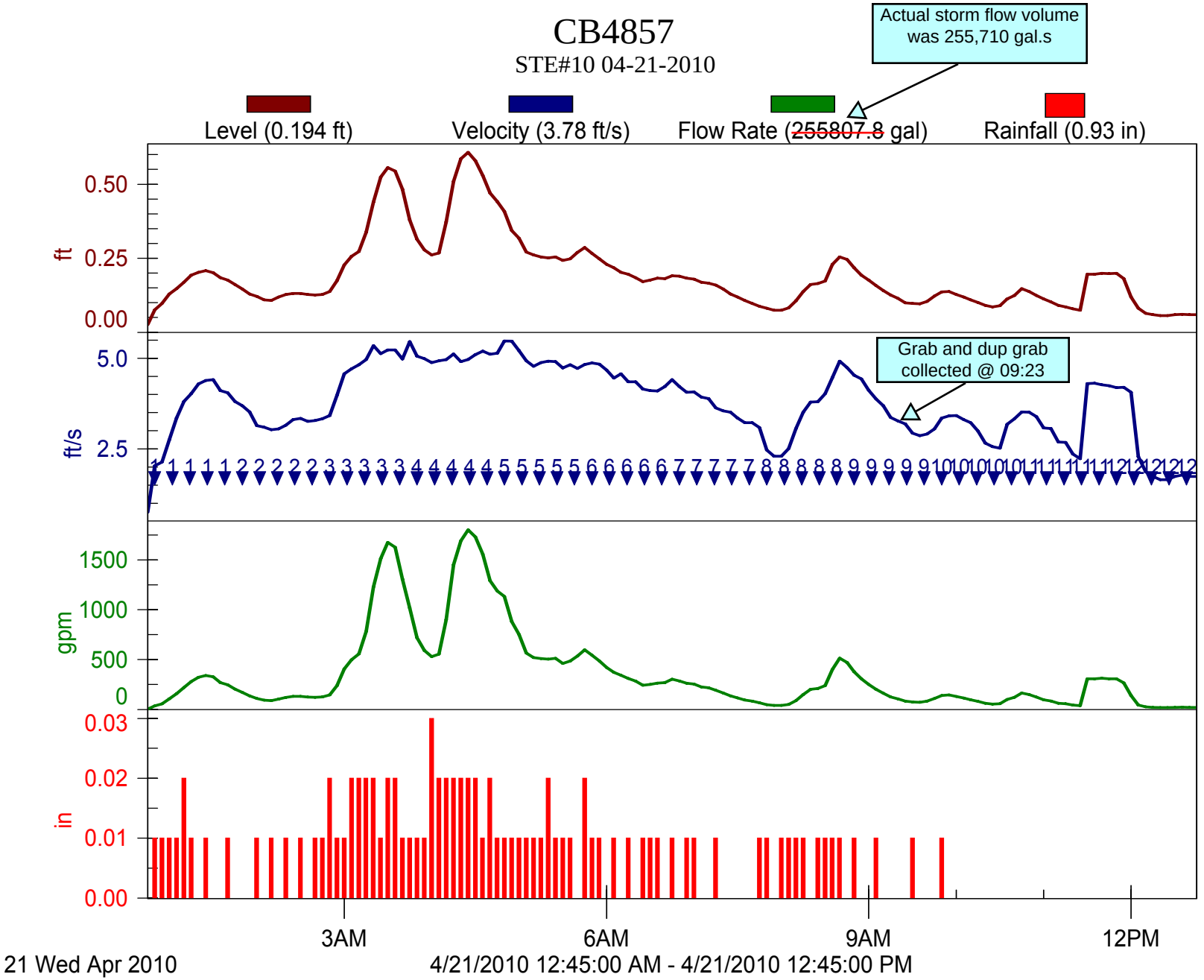
Groundwater Level Measurement Field Form

Personnel:	Arrival Date/Time:
BK - BRAD KNASNOWSKI	04/22/10 @ 20:25
Weather:	
PT Cloudy	
Precip in Last 24-hrs / Last Measureable Rain Event:	
0" IN LAST 24 hrs / 0.97" ON 02/21/10	

Monitoring Well ID	Time	Water Level (FT)	Meas. Reference
MW-6	20:25	11.51'	N. SIDE PVC WELL
MW-4	20:35	16.02'	" "
MW-3	20:45	17.08'	" "
MW-2	20:55	6.36'	" "

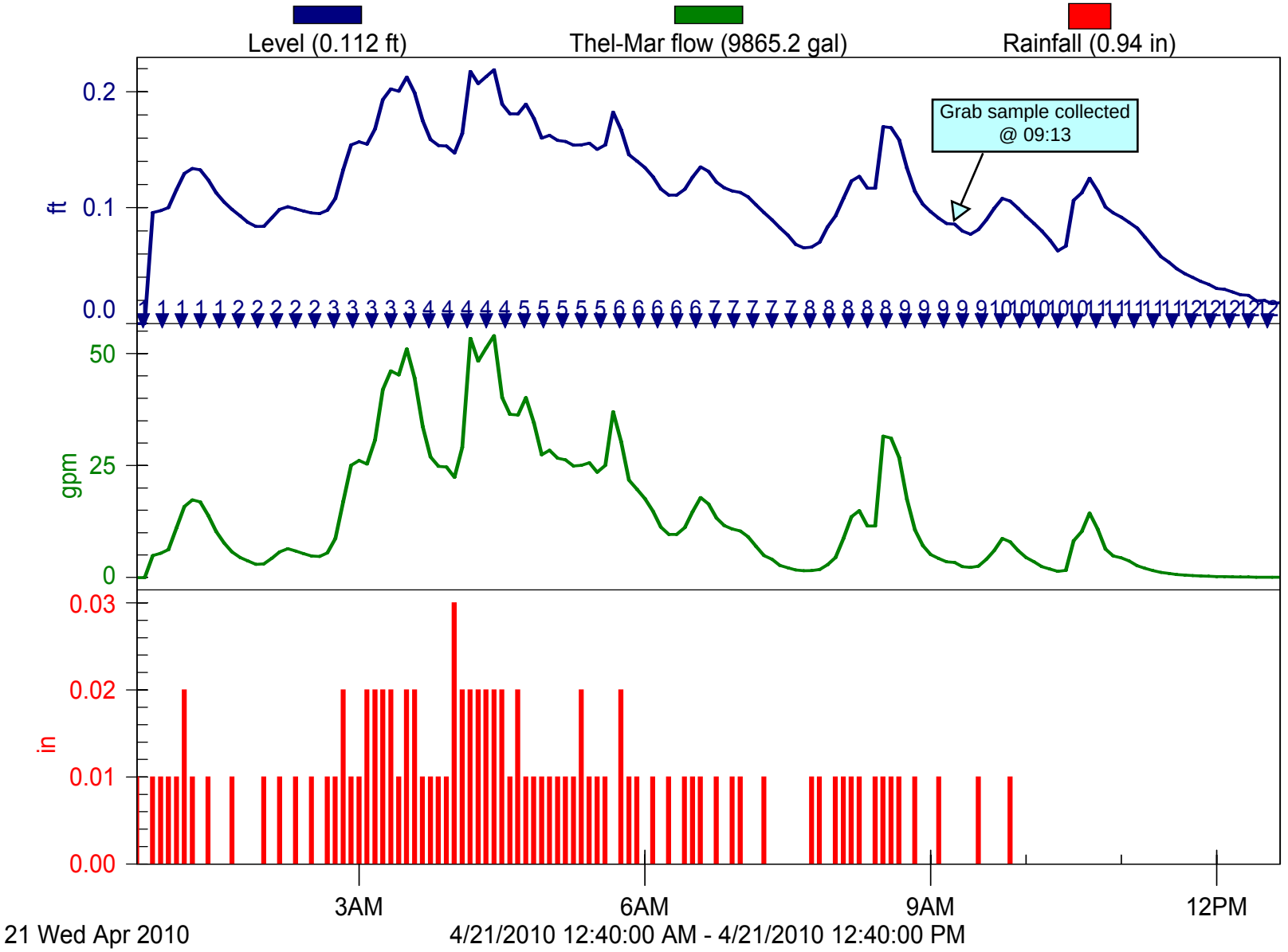
Notes:


CB-31A
STE#10 04-21-2010
Actual storm flow volume was 286,710 gal.s
Level (0.655 ft)
Velocity (0.87 ft/s)
Flow Rate (286854.9 gal)
Rainfall (0.95 in)
ft
0.75
0.50
ft/s
2
1
0
Grab collected @ 08:55
gpm
1000
500
0
in
0.03
0.02
0.01
0.00
3AM
6AM
9AM
12PM
21 Wed Apr 2010
4/21/2010 12:35:00 AM - 4/21/2010 12:35:00 PM


CB4857
STE#10 04-21-2010
Actual storm flow volume was 255,710 gal.s
Level (0.194 ft)
Velocity (3.78 ft/s)
Flow Rate (255807.8 gal)
Rainfall (0.93 in)
ft
0.50
0.25
0.00
ft/s
5.0
2.5
Grab and dup grab collected @ 09:23
gpm
1500
1000
500
0
in
0.03
0.02
0.01
0.00
3AM
6AM
9AM
12PM
21 Wed Apr 2010
4/21/2010 12:45:00 AM - 4/21/2010 12:45:00 PM

CB-1

STE#10 04-21-2010



CB31A - STE#10 042110

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
14595	0.253033981	253	1	5.09%	5.09%	5.09%
12395	0.21489251	215	2	4.32%	9.41%	4.32%
36555	0.633755201	634	3	12.75%	22.16%	12.75%
57680	1	1000	4	20.12%	42.28%	20.12%
47185	0.81804785	818	5	16.46%	58.74%	16.46%
31975	0.554351595	554	6	11.15%	69.89%	11.15%
18185	0.315273925	315	7	6.34%	76.23%	6.34%
13200	0.228848821	229	8	4.60%	80.84%	4.60%
22540	0.390776699	391	9	7.86%	88.70%	7.86%
8905	0.154386269	154	10	3.11%	91.81%	3.11%
10405	0.180391817	180	11	3.63%	95.43%	3.63%
13090	0.226941748	227	12	4.57%	100.00%	4.57%
				100.00%		**100.00%**

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals)	286710
Strm Qtot (gals)	286710
max Q	57680
min V (ml)	1000

4971 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Used all 12 bottles for composite sample.

COMP Label = CB31A042110COMP **Time (1228)**

CB4857 - STE#10 042110

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
11800	0.170594188	239	1	4.61%	4.61%	4.61%
7690	0.111175365	156	2	3.01%	7.62%	3.01%
50530	0.730519011	1023	3	19.76%	27.38%	19.76%
69170	1	1400	4	27.05%	54.43%	27.05%
40225	0.581538239	814	5	15.73%	70.16%	15.73%
21920	0.31690039	444	6	8.57%	78.74%	8.57%
11665	0.168642475	236	7	4.56%	83.30%	4.56%
10235	0.147968773	207	8	4.00%	87.30%	4.00%
11595	0.167630476	235	9	4.53%	91.83%	4.53%
6050	0.087465664	122	10	2.37%	94.20%	2.37%
8755	0.126572213	177	11	3.42%	97.62%	3.42%
6075	0.087827093	123	12	2.38%	100.00%	2.38%
				100.00%		**100.00%**

Total Strm Vol% Rep.'ed in Comp

Qtotal	255710
Strm Qtot (gals)	255710
max Q	69170
min V (ml)	1400

5176 **Volume of Compositing Container**

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Used all 12 bottles for the composite sample

Comp Label = CB4857042110COMP **Time (1238)**

CB101 - STE#10 042110 (DUPLICATE of CB4857)

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
11800	0.170594188	239	1	4.61%	4.61%	4.61%
7690	0.111175365	156	2	3.01%	7.62%	3.01%
50530	0.730519011	1023	3	19.76%	27.38%	19.76%
69170	1	1400	4	27.05%	54.43%	27.05%
40225	0.581538239	814	5	15.73%	70.16%	15.73%
21920	0.31690039	444	6	8.57%	78.74%	8.57%
11665	0.168642475	236	7	4.56%	83.30%	4.56%
10235	0.147968773	207	8	4.00%	87.30%	4.00%
11595	0.167630476	235	9	4.53%	91.83%	4.53%
6050	0.087465664	122	10	2.37%	94.20%	2.37%
8755	0.126572213	177	11	3.42%	97.62%	3.42%
6075	0.087827093	123	12	2.38%	100.00%	2.38%
				100.00%		100.00%

Total Strm Vol% Rep.'ed in Comp

Qtotal (gals) 255710
Strm Qtot (gals) 255710
max Q 69170
min V (ml) 1400

5176 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
Used all 12 bottles for composite sample
CB101 is a duplicate sample of CB4857

Comp Label = CB101042110COMP **Time (1338)**

CB1 - STE#10 042110

tot Q/bott	proportion	vol (ml)	bottle #	% of Qtot	Additive % Qtot	% Storm Qtot
546.4	0.24558959	491	1	5.55%	5.55%	5.54%
284.05	0.127671528	255	2	2.88%	8.43%	2.88%
1836.1	0.825269119	1651	3	18.63%	27.06%	18.61%
2224.85	1	2000	4	22.58%	49.64%	22.55%
1718.5	0.772411623	1545	5	17.44%	67.08%	17.42%
1076.2	0.483718003	967	6	10.92%	78.01%	10.91%
469.4	0.210980516	422	7	4.76%	82.77%	4.76%
674.55	0.303188979	606	8	6.85%	89.62%	6.84%
446.25	0.20057532	401	9	4.53%	94.15%	4.52%
311.05	0.139807178	280	10	3.16%	97.30%	3.15%
265.75	0.119446255	239	11	2.70%	100.00%	2.69%
	0	0	12	0.00%	100.00%	0.00%
				100.00%		**99.88%**

Total Strm Vol% Rep.'ed in Comp

Qtotal 9853.1
Strm Qtot (gals) 9865
max Q 2224.85
min V (ml) 2000

8857 Volume of Compositing Container

Adjusted minimum volume to provide sample in 2 1/2 gallon glass jug.
****Vol. includes enough sample for lab to run an MS/MSD**
Used bottles 1-11, bottle 12 represented mostly base flow and was not used.

Comp Label = CB1042110COMP **Time (1132)**

CB31A_SMPLR_042110

SAMPLER ID# 1069569980 08:29 22-APR-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB31A SMP "

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 20 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 12 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1069569980 08:30 22-APR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB31A SMP
PROGRAM: LLA MULTI
Program Started at 15:34 MO 19-APR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		15:34	PGM DISABLED		
	WE 21-APR-10				
		00:41	PGM ENABLED		
1,5	1	00:41	E		563
2,5	1	00:53	T		573
3,5	1	01:05	T		565
4,5	1	01:17	T		591
5,5	1	01:29	T		557
1,5	2	01:41	T		565
2,5	2	01:53	T		581
3,5	2	02:05	T		579
4,5	2	02:17	T		582
5,5	2	02:29	T		585
1,5	3	02:41	T		579
2,5	3	02:53	T		594
3,5	3	03:05	T		585
4,5	3	03:17	T		597
5,5	3	03:29	T		593
1,5	4	03:41	T		586
2,5	4	03:53	T		565
3,5	4	04:05	T		567
4,5	4	04:17	T		567
5,5	4	04:29	T		564
1,5	5	04:41	T		563
2,5	5	04:53	T		561
3,5	5	05:05	T		567

4,5	5	05:17	T	561
5,5	5	05:29	T	558
1,5	6	05:41	T	561
2,5	6	05:53	T	565
3,5	6	06:05	T	561
4,5	6	06:17	T	565
5,5	6	06:29	T	561
1,5	7	06:41	T	562
2,5	7	06:53	T	561
3,5	7	07:05	T	561
4,5	7	07:17	T	561
5,5	7	07:29	T	561
1,5	8	07:41	T	561
2,5	8	07:53	T	561
3,5	8	08:05	T	558
4,5	8	08:17	T	559
5,5	8	08:29	T	558
1,5	9	08:41	T	559
2,5	9	08:53	T	558
		09:02	MANUAL PAUSE	
		09:03	MANUAL RESUME	
3,5	9	09:05	T	565
4,5	9	09:17	T	561
5,5	9	09:29	T	562
1,5	10	09:41	T	563
2,5	10	09:53	T	561
3,5	10	10:05	T	558
4,5	10	10:17	T	565
5,5	10	10:29	T	561
1,5	11	10:41	T	559
2,5	11	10:53	T	561
3,5	11	11:05	T	561
4,5	11	11:17	T	561
5,5	11	11:29	T	573
1,5	12	11:41	T	562
2,5	12	11:53	T	563
3,5	12	12:05	T	561
4,5	12	12:17	T	558
5,5	12	12:29	T	564
		12:30	PGM DONE 21-APR	

SOURCE E ==> ENABLE
SOURCE T ==> TIME

CB4857042110

SAMPLER ID# 1224319970 15:00 21-APR-10
  Hardware: A1 Software: 2.33
********** PROGRAM SETTINGS **********

   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB4857 SMP"

   UNITS SELECTED:
     LENGTH: ft

     ----

      1 MINUTE
   DATA INTERVAL

  12, 3700 ml BTLS
 26 ft SUCTION LINE
 11 ft SUCTION HEAD

  ONE-PART PROGRAM

      PACING:
    TIME, EVERY
 0 HOURS, 12 MINUTES

    DISTRIBUTION:
   5 SAMPLES/BOTTLE

      VOLUME:

   700 ml SAMPLES

ENABLE:

NONE PROGRAMMED

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT OFF

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF
BTL FULL DETECT OFF
TIMED BACKLIGHT

EVENT MARK SENT
DURING PUMP CYCLE

PUMP COUNTS FOR

```
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   0.01 inch TIP
     RAIN GAUGE

     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS


     ----------

 NO EXTERNAL MODEM


     ----------

      NO ALARM
   CONDITIONS SET
```


SAMPLER ID# 1224319970 15:00 21-APR-10
  Hardware: A1 Software: 2.33
********** SAMPLING RESULTS **********
   SITE: CB4857 SMP
PROGRAM: LLA MULTI
Program Started at 15:39 MO 19-APR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		15:39	PGM DISABLED		
WE 21-APR-10					
		00:50	PGM ENABLED		
1,5	1	00:50	E		0
2,5	1	01:02	T		0
3,5	1	01:14	T		0
4,5	1	01:26	T		0
5,5	1	01:38	T		0
1,5	2	01:50	T		0
2,5	2	02:02	T		0
3,5	2	02:14	T		0
4,5	2	02:26	T		0
5,5	2	02:38	T		0
1,5	3	02:50	T		0
2,5	3	03:02	T		0
3,5	3	03:14	T		0
4,5	3	03:26	T		0
5,5	3	03:38	T		0
1,5	4	03:50	T		0
2,5	4	04:02	T		0
3,5	4	04:14	T		0
4,5	4	04:26	T		0
5,5	4	04:38	T		0
1,5	5	04:50	T		0
2,5	5	05:02	T		0
3,5	5	05:14	T		0

CB4857042110

4,5	5	05:26	T	0
5,5	5	05:38	T	0
1,5	6	05:50	T	0
2,5	6	06:02	T	0
3,5	6	06:14	T	0
4,5	6	06:26	T	0
5,5	6	06:38	T	0
1,5	7	06:50	T	0
2,5	7	07:02	T	0
3,5	7	07:14	T	0
4,5	7	07:26	T	0
5,5	7	07:38	T	0
1,5	8	07:50	T	0
2,5	8	08:02	T	0
3,5	8	08:14	T	0
4,5	8	08:26	T	0
5,5	8	08:38	T	0
1,5	9	08:50	T	0
2,5	9	09:02	T	0
3,5	9	09:14	T	0
		09:21	MANUAL PAUSE	
		09:22	MANUAL RESUME	
4,5	9	09:26	T	0
5,5	9	09:38	T	0
1,5	10	09:50	T	0
2,5	10	10:02	T	0
3,5	10	10:14	T	0
4,5	10	10:26	T	0
5,5	10	10:38	T	0
1,5	11	10:50	T	0
2,5	11	11:02	T	0
3,5	11	11:14	T	0
4,5	11	11:26	T	0
5,5	11	11:38	T	0
1,5	12	11:50	T	0
2,5	12	12:02	T	0
3,5	12	12:14	T	0
4,5	12	12:26	T	0
5,5	12	12:38	T	0
		12:39	PGM DONE 21-APR	

SOURCE E ==> ENABLE
SOURCE T ==> TIME

CB1_SMPLR_042110

```
SAMPLER ID# 1072249987  08:37 22-APR-10
  Hardware: A1      Software: 2.20
********** PROGRAM SETTINGS **********
     ----------
   PROGRAM NAME:
    "LLA MULTI "
 SITE DESCRIPTION:
    "CB1-MEGA  "
     ----------
   UNITS SELECTED:
     LENGTH: ft


     ----------
   UNITS SELECTED:
   FLOW RATE: gpm
  FLOW VOLUME: gal
   VELOCITY: fps
     ----------
  AREA-VEL MODULE:
        WEIR
        90
      V-NOTCH
     ----------

      5 MINUTE
   DATA INTERVAL

     ----------
  12,  3750 ml BTLS
 17 ft SUCTION LINE
 AUTO SUCTION HEAD
0 RINSES, 0 RETRIES
     ----------

  ONE-PART PROGRAM


     ----------
      PACING:
    TIME, EVERY
 0 HOURS, 12 MINUTES
```

DISTRIBUTION:
5 SAMPLES/BOTTLE

VOLUME:

700 ml SAMPLES

ENABLE:

LEVEL >0.030 ft

ENABLE:
ONCE ENABLED,
STAY ENABLED
SAMPLE AT ENABLE

ENABLE:
0 PAUSE & RESUMES

NO DELAY TO START

LIQUID DETECT ON

QUICK VIEW/CHANGE

TAKE MEASUREMENTS
EVERY 1 MINUTES

DUAL SAMPLER OFF

```
BTL FULL DETECT OFF
  TIMED BACKLIGHT

     ----------

  EVENT MARK SENT
 DURING PUMP CYCLE

     ----------
  PUMP COUNTS FOR
 EACH PURGE CYCLE:
   200 PRE-SAMPLE
  AUTO POST-SAMPLE
     ----------

    NO PERIODIC
   SERIAL OUTPUT

     ----------
    INTERROGATOR
     CONNECTOR
  POWER ALWAYS ON

     ----------
     ----------
     ----------

   NO RAIN GAUGE


     ----------
  NO SDI-12 SONDE

AUTO SDI-12 SCAN OFF

     ----------
 I/O1= NONE
 I/O2= NONE
 I/O3= NONE

     ----------

  0 ANALOG OUTPUTS
```

NO DIALOUT
CONDITIONS SET

SAMPLER ID# 1072249987 08:37 22-APR-10
Hardware: A1 Software: 2.20
********** SAMPLING RESULTS **********
SITE: CB1-MEGA
PROGRAM: LLA MULTI
Program Started at 15:37 MO 19-APR-10
Nominal Sample Volume = 700 ml

SAMPLE	BOTTLE	TIME	SOURCE	ERROR	COUNT TO LIQUID
		15:37	PGM DISABLED		
		WE 21-APR-10			
		00:44	PGM ENABLED		
1,5	1	00:44	E		439
2,5	1	00:56	T		435
3,5	1	01:08	T		440
4,5	1	01:20	T		442
5,5	1	01:32	T		437
1,5	2	01:44	T		441
2,5	2	01:56	T		436
3,5	2	02:08	T		443
4,5	2	02:20	T		441
5,5	2	02:32	T		441
1,5	3	02:44	T		447
2,5	3	02:56	T		441
3,5	3	03:08	T		441
4,5	3	03:20	T		441
5,5	3	03:32	T		441
1,5	4	03:44	T		447
2,5	4	03:56	T		438
3,5	4	04:08	T		443

CB1_SMPLR_042110

4,5	4	04:20	T	438
5,5	4	04:32	T	440
1,5	5	04:44	T	440
2,5	5	04:56	T	443
3,5	5	05:08	T	446
4,5	5	05:20	T	445
5,5	5	05:32	T	441
1,5	6	05:44	T	441
2,5	6	05:56	T	441
3,5	6	06:08	T	447
4,5	6	06:20	T	447
5,5	6	06:32	T	441
1,5	7	06:44	T	447
2,5	7	06:56	T	447
3,5	7	07:08	T	441
4,5	7	07:20	T	447
5,5	7	07:32	T	447
1,5	8	07:44	T	441
2,5	8	07:56	T	441
3,5	8	08:08	T	441
4,5	8	08:20	T	447
5,5	8	08:32	T	447
1,5	9	08:44	T	447
2,5	9	08:56	T	447
3,5	9	09:08	T	441
		09:10	MANUAL PAUSE	
		09:11	MANUAL RESUME	
4,5	9	09:20	T	441
5,5	9	09:32	T	441
1,5	10	09:44	T	441
2,5	10	09:56	T	441
3,5	10	10:08	T	441
4,5	10	10:20	T	441
5,5	10	10:32	T	447
1,5	11	10:44	T	447
2,5	11	10:56	T	441
3,5	11	11:08	T	447
4,5	11	11:20	T	446
5,5	11	11:32	T	443
1,5	12	11:44	T	441
2,5	12	11:56	T	441
3,5	12	12:08	T	447
4,5	12	12:20	T	446
5,5	12	12:32	T	443

AREA FORECAST DISCUSSION

FXUS66 KSEW 210353
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
900 PM PDT TUE APR 20 2010

.SYNOPSIS...**RESIDUAL MOISTURE** FROM A FRONTAL SYSTEM WILL RESULT IN A CHANCE OF LIGHT RAIN TONIGHT. THE CLOUD BAND WILL REMAIN OVER THE WESTERN WASHINGTON ON WEDNESDAY WITH THE BEST CHANCE OF SHOWERS OVER THE CASCADES. AN **UPPER LEVEL RIDGE** AND LOW LEVEL **ONSHORE FLOW** THURSDAY WILL KEEP THE AREA DRY WITH PARTIAL AFTERNOON SUNSHINE. DRY WEATHER WILL CONTINUE UNTIL FRIDAY AFTERNOON WHEN A WEAK **COLD FRONT** WILL BRING A LITTLE RAIN TO THE AREA. AN **UPPER LEVEL TROUGH** WILL BRING A CHANCE OF SHOWERS SATURDAY...FOLLOWED BY AN **UPPER LEVEL RIDGE** AND MORE SUNSHINE SUNDAY AFTERNOON. ANOTHER **FRONT** WILL ARRIVE MONDAY.

&&

.SHORT TERM...A WEAK FRONTAL BAND REMAINS STALLED OVER THE CASCADES THIS EVENING WITH LOW LEVEL **MOISTURE** INCREASING ACROSS **WRN** WA. THE RESULT HAS BEEN AN INCREASE IN **DRIZZLE** OR LIGHT RAIN OVER PORTIONS OF THE INTERIOR LOWLANDS...MAINLY EAST OF PUGET SOUND. STEADIER LIGHT RAIN CONTINUES OVER THE CASCADES WITH SNOW LEVELS DOWN TO AROUND 5500 FEET THIS EVENING AS SOMEWHAT COOLER AIR HAS FILTERED INTO THE AREA. NOT EXPECTING MORE THAN SOME MIXED PRECIP IN THE HIGHER PASSES WITH LIGHT ACCUMULATIONS ABOVE PASS LEVELS. DON`T SEE A NEED FOR A **SNOW ADVISORY** AT THIS POINT EVEN WITH THE INCREASING **NW FLOW** ALOFT. THE SPLIT UPPER **TROUGH** OVER WA WILL SLOWLY SHIFT **E** LATER TONIGHT AND WEDNESDAY WITH MOIST THE ENERGY DIVING **S** WITH THE UPPER LOW GOING INTO **CA**. THE **NRN** BRANCH WILL STILL BRING A CHANCE OF SHOWERS TO MAINLY THE CASCADES ON WEDNESDAY. **ONSHORE FLOW** WILL KEEP **TEMPS** COOL WITH CLOUDS AROUND THE LOWLANDS.

MODELS ARE BACK TO A WEAKER **TROUGH** TROUGH SOLUTION ON THURSDAY WITH MOST THE ENERGY BYPASSING WA TO THE **N**. THE CURRENT DRY FORECAST LOOKS GOOD RIGHT NOW. THE MAIN EFFECT FROM THIS SYSTEM WILL BE CONTINUED **ONSHORE FLOW**...THOUGH WEAKER...ALLOWING FOR PERHAPS SOME PARTIAL AFTERNOON SUNSHINE AND SLIGHTLY WARMER **TEMPS**.

THE GFS/ECMWF BOTH BRING THE NEXT SLIGHTLY STRONGER **TROUGH** INTO THE AREA ON FRIDAY WITH AN INCREASING CHANCE OF LIGHT RAIN ALONG THE COAST DURING THE MORNING. PRECIP WILL LIKELY HOLD OFF ACROSS THE INTERIOR UNTIL LATE IN THE DAY. MERCER

.LONG TERM...PREVIOUS DISCUSSION FOLLOWS...GFS/ECMWF ARE IN DECENT AGREEMENT OUT THROUGH SUNDAY...SO WILL GO WITH A CHANCE OF SHOWERS SATURDAY AS THE **UPPER LEVEL TROUGH** TRAILING FRIDAYS **FRONT** CROSSES THE AREA. BOTH MODELS HAVE A **RIDGE** BUILDING OVER THE AREA SUNDAY...BUT THE **ECMWF** IS SLOWER THAN THE **GFS** AND STILL SHOWS A

Contact Us
FAQ
Webmaster E-mail

LITTLE RESIDUAL PRECIP OVER THE AREA EARLY SUNDAY MORNING. WENT WITH THE DRY **GFS** SOLUTION HERE...WHICH GIVEN WEAK **ONSHORE FLOW** MEANS MORNING CLOUDS AND AFTERNOON SUNSHINE. TIMING DIFFERENCE BETWEEN THE GFS/ECMWF HAS AN EVEN GREATER IMPACT ON MONDAYS FORECAST. THE SLOWER **ECMWF** WOULD GIVE US A WARM **SUNNY** MONDAY...BUT HAVE OPTED TO PLAY THIS ONE CONSERVATIVELY AND PER THE **GFS** SHOW A CHANCE OF RAIN FROM THE NEXT APPROACHING **FRONT**. GIVEN THE MODEL DIFFERENCES CONFIDENCE IS LOW FROM SUNDAY NIGHT ONWARD. KAM

&&

.AVIATION...MODERATE LOW LEVEL **ONSHORE FLOW** IS BEING OVERRUN BY **MID** AND **UPPER LEVEL MOISTURE** WRAPPING NORTHWARD AROUND A DEEP UPPER LEVEL LOW OVER KSFO AND AN **UPPER LEVEL TROUGH** EXTENDING FROM THE NORTH OF THE LOW TO AROUND 50N 130W. IN THIS PATTERN LIGHT RAIN OR **DRIZZLE** AND RATHER LOW CIGS ARE OCCURING OVER THE INTERIOR VALLEYS OF WESTERN WASHINGTON AND WILL CONTINUE OVERNIGHT. AS THE UPPER **TROUGH** MOVES TO THE EAST OF THE AREA ABOUT 15Z WED...EXPECT **PRECIPITATION** TO COME TO AN END AND LOW LEVEL **MOISTURE** TO GRADUALLY DECREASE. **VFR** CONDITIONS ARE EXPECTED BY AROUND 18Z THU AND WILL CONTINUE ACROSS THE REGION UNTIL THE EARLY MORNING HOURS THU WHEN AREAS OF LOW **STRATUS** AND **FOG** DEVELOP AS A RESULT OF RESIDUAL LOW LEVEL **MOISTURE** AND **RADIATIONAL COOLING**.

KSEA...THE TERMINAL WILL REMAIN NEAR THE BOUNDARY OF **NLY** WINDS COMING DOWN THE PUGET SOUND AND **WSW** WINDS COMING UP FROM THE CHEHALIS GAP. -DZ THIS EVENING WILL ALLOW CIGS TO FILTER DOWN TO **MVFR** BY 06Z AND CIGS WILL REMAIN GENERALLY BELOW 020 UNTIL ABOUT 16-18Z THU. DRY AIR WILL FILTER IN THU AFTERNOON AND EVENING AND **NW** WIND 5-8 **KT** WINDS WILL BECOME DOMINATE. ALBRECHT

&&

.MARINE...HIGH **PRES** IN THE OFFSHORE WATERS COMBINED WITH LOWER **PRES E** OF THE CASCADES WILL GIVE MODERATE **ONSHORE FLOW** THROUGH THU OR THU NIGHT. EXPECT **SCA** CONDITIONS ALONG THE COAST...THROUGH THE STRAIT OF JUAN DE FUCA...AND IN ADMIRALTY INLET AT LEAST THROUGH WED EVENING AND POSSIBLY INTO THU. ROUGH BAR CONDITIONS WILL CONTINUE AT THE GRAYS HARBOR BAR THROUGH WED NIGHT.

A WEAK **FRONT** WILL PUSH THROUGH THE WATERS LATE FRI AND WILL BE FOLLOWED BY LIGHT TO MODERATE **ONSHORE FLOW SAT** AND SUN. ALBRECHT

&&

.SEW WATCHES/WARNINGS/ADVISORIES...
WA...NONE.
PZ...**SMALL CRAFT ADVISORY COASTAL WATERS**...ENTIRE STRAIT OF JUAN DE FUCA AND ADMIRALTY INLET.
.**SMALL CRAFT ADVISORY** FOR ROUGH BAR CONDITIONS GRAYS HARBOR BAR.

WEATHER.GOV/SEATTLE

FOR AN ILLUSTRATED VERSION OF THE FORECAST DISCUSSION PLEASE SEE WWW.WEATHER.GOV/SEATTLE/GAFD/LATEST_WEBAFD.HTML (ALL LOWERCASE).

NWS Forecast for: Seatac WA

Issued by: National Weather Service Seattle, WA
Last Update: 4:08 am PDT Apr 20, 2010

Today: Showers. High near 55. Southwest wind between 3 and 7 mph. Chance of precipitation is 80%.

Tonight: Showers likely before 11pm. Cloudy, with a low around 44. West northwest wind around 6 mph becoming calm. Chance of precipitation is 70%.

Wednesday: Cloudy, then gradually becoming mostly sunny, with a high near 57. South wind around 6 mph becoming calm.

Wednesday Night: Partly cloudy, with a low around 43. North northwest wind between 5 and 8 mph becoming calm.

Thursday: Partly sunny, with a high near 60. Calm wind.

Thursday Night: Mostly cloudy, with a low around 42.

Friday: A 30 percent chance of showers. Mostly cloudy, with a high near 58.

Friday Night: Showers likely. Mostly cloudy, with a low around 42.

Saturday: A chance of showers. Mostly cloudy, with a high near 56.

Saturday Night: A chance of showers. Mostly cloudy, with a low around 42.

Sunday: A chance of showers. Mostly cloudy, with a high near 59.

Sunday Night: A chance of showers. Mostly cloudy, with a low around 42.

Monday: A chance of showers. Mostly cloudy, with a high near 61.

Area Forecast Discussion

Issued by NWS Seattle/Tacoma, WA

000
FXUS66 KSEW 211624
AFDSEW

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SEATTLE WA
925 AM PDT WED APR 21 2010

.SYNOPSIS...A DEFORMATION BAND WILL CONTINUE TO BRING RAIN TO THE INTERIOR FROM PUGET SOUND EASTWARD THROUGH EARLY AFTERNOON. RAIN WILL END AS THE BAND MOVES SLOWLY EAST. ONSHORE FLOW WILL PRODUCE MORNING CLOUDS AND AFTERNOON CLEARING WITH NEAR NORMAL TEMPERATURES THURSDAY AND FRIDAY MORNING. A COLD FRONT WILL SPREAD A LITTLE RAIN INLAND FRIDAY AFTERNOON. THE UPPER LEVEL TROUGH FOLLOWING THE FRONT WILL BRING A CHANCE OF SHOWERS TO THE AREA SATURDAY. AN UPPER LEVEL RIDGE WILL PRODUCE WARMER AND SUNNIER WEATHER SUNDAY AND POSSIBLY MONDAY.

&&

.SHORT TERM...MISSED IT BY THAT MUCH...OR ABOUT 20 MILES...WHICH IS ABOUT THE WIDTH OF THE SEATTLE METRO CORRIDOR ZONE WHERE THE BULK OF THE W WA POPULATION IS. YESTERDAYS MODELS HAD PRECIP SLOP-OVER FROM THE DEFORMATION BAND OVER THE CASCADES...EXTENDING WEST OVER THE EAST PUGET SOUND LOWLANDS...WHICH IN RETROSPECT WAS ABOUT 20 MILES TOO FAR EAST. A CONVERGENCE ZONE HAS BEEN ADDING TO THE PRECIP OVER CENTRAL PUGET SOUND AS WELL. THAT MUST BE MOTHER NATURE PILING ON.

OTHER THAN THAT MINNOOORRR ERROR...THE FORECAST REMAINS ON TRACK. IR IMAGERY SHOWS CLOUD TOPS WARMING IN THE WRAP-AROUND MOISTURE FEEDING THE DEFORMATION BAND...SO IT IS PROBABLY STARTING TO WEAKEN. WATER VAPOR IMAGERY SHOWS THE UPPER LEVEL SHORTWAVE TROUGH AXIS OVER VANCOUVER ISLAND MOVING SLOWLY EAST...SO CONTINUED PROGRESSION OF THE TROUGH SHOULD PUSH THE DEFORMATION BAND FAR ENOUGH EAST FOR THE RAIN TO END OVER THE LOWLANDS EARLY THIS AFTERNOON. ZONES HAVE BEEN UPDATED TO REFLECT THIS.

GFS/NAM SHOW THE NEXT UPPER LEVEL SHORTWAVE TROUGH COMING OUT OF THE WEST CROSSING B.C....THUS MISSING W WA AND KEEPING THE AREA DRY. 00Z ECMWF HAS FLIP-FLOPPED OVER TO A STRONGER TROUGH AND THUS HAS SOME LIGHT PRECIP OVER THE N PART OF W WA. WILL STAY WITH THE CURRENT DRY FORECAST UNLESS THE 12Z GFS/18Z NAM FLIP-FLOP AS WELL. THIS LEAVES ONSHORE FLOW AS THE DOMINANT FACTOR FOR THURSDAY. WILL STICK WITH THE MORNING CLOUDS AND AFTERNOON CLEARING FORECAST FOR NOW...BUT THE LATEST NAM/GFS TIME-HEIGHT SECTION FOR KSEA SUGGESTS THAT WHATEVER STRATUS FORMS MAY TAKE A LITTLE LONGER TO CLEAR IN THE AFTERNOON...OR THAT IT WILL BE CLOSER TO PARTLY SUNNY RATHER THAN MOSTLY SUNNY.

ONSHORE FLOW WILL WEAKEN THURSDAY EVENING SO THERE SHOULD BE LESS STRATUS AROUND FRIDAY MORNING. MODELS STILL SHOW THE NEXT COLD FRONT ARRIVING FRIDAY AFTERNOON. LATEST MODEL TIMING HAS THE ECMWF A HAIR SLOWER AND THE GFS A TINY BIT FASTER. INCREASING HIGH CLOUDS IN THE SW FLOW ALOFT AHEAD OF THE SYSTEM WILL CUT BACK ON ANY POTENTIAL SUNSHINE FRIDAY. CURRENT POPS LOOK FINE WITH RAIN LIKELY WEST OF PUGET SOUND IN THE AFTERNOON AND A CHANCE OF RAIN FROM PUGET SOUND EASTWARD. KAM

.LONG TERM...THE PLAN FOR THE LONG TERM STILL LOOKS ON TRACK. THE UPPER LEVEL TROUGH FOLLOWING FRIDAYS FRONT WILL KEEP SHOWERS GOING OVER W WA ON SATURDAY. A NICE UPPER LEVEL RIDGE BUILDS JUST OFFSHORE SATURDAY NIGHT THEN SHIFTS INLAND OVER THE AREA ON SUNDAY. ONSHORE FLOW WILL BE DECREASING. DESPITE SOME CIRRUS OVER THE AREA IT SHOULD BE A MOSTLY SUNNY DAY AFTER SOME AREAS OF MORNING CLOUDS. 850 MB TEMPS ARE NOT REALLY THAT WARM SO MAX TEMPS IN THE LOWER TO MID 60S LOOKS FINE. THE FORECAST FOR MONDAY THROUGH WEDNESDAY IS MORE IFFY SINCE THE GFS/ECMWF ARE STILL SQUABBLING OVER TIMING. AT THIS POINT MONDAY IS STARTING TO LOOK DRY AND PROBABLY QUITE A BIT WARMER THAN SUNDAY...HIGHS NEAR 70 MIGHT BE POSSIBLE. TUESDAY/WEDNESDAY WILL PROBABLY END UP BEING A CLIMO FORECAST. KAM

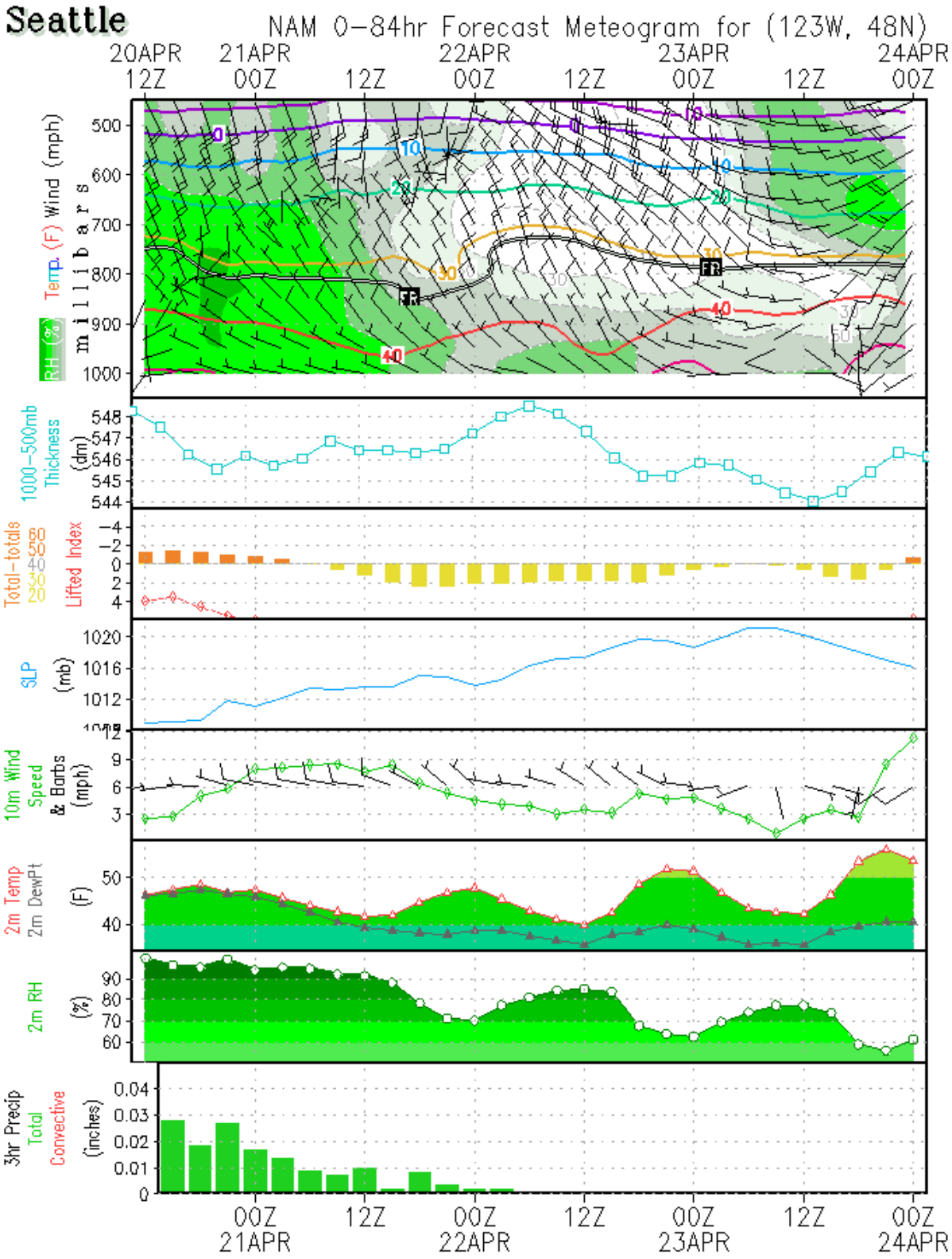
&&

.AVIATION...A DEEP UPPER LOW DIGGING SE INTO CALIFORNIA CONTINUES TO WRAP BANDS OF MODERATE RAIN NORTHWARD OVER THE CASCADES AND EXTENDING WESTWARD ALONG THE I-5 CORRIDOR. IFR TO MVFR CONDITIONS EAST OF A LINE FROM PORT ANGELES TO THE CHEHALIS VALLEY STAND IN STARK CONTRAST TO THE 030-040 STRATOCU FIELD OVER THE COAST. THE AREA OF RAIN IS STRETCHING AS THE MAIN ENERGY FROM THE SYSTEM HEADS SOUTH...AND EVENTUALLY AN UPPER LEVEL SHORTWAVE WILL HELP KICK THE REMAINING MID AND HIGH LEVEL MOISTURE OUT. GENERAL SCATTERING FROM WEST TO EAST SHOULD HAPPEN TODAY...WITH A SLOWER BREAKOUT FOR SEATTLE AND SOUTH AND EAST. SOME STRATUS SHOULD FORM TONIGHT WITH GOOD RADIATIONAL COOLING. ANOTHER SHORTWAVE WILL PASS TO OUR NORTH ON THURSDAY...BRINGING A BIT OF CLOUD COVER IN THE AFTERNOON NEAR THE CANADIAN BORDER. THE WESTPORT PROFILER SHOWS 25 KT WINDS JUST ABOVE THE SURFACE ALONG THE CENTRAL COAST. GUSTY NW WINDS WILL MIX DOWN THIS AFTERNOON FOR KHQM.

KSEA...VARIABLE WINDS TODAY AS THE AREA OF LOW LEVEL CONVERGENCE OSCILLATES NEAR THE TERMINAL. NW FLOW WILL EVENTUALLY TAKE HOLD IN THE AFTERNOON. EXPECT A SLOW SCATTERING THIS AFTERNOON FOLLOWED BY CLEARING EARLY THIS EVENING. DAMICO

&&

.MARINE...MODERATE ONSHORE FLOW WILL CONTINUE TODAY WITH HIGHER PRES OFFSHORE AND LOW PRES EAST OF THE CASCADES. HIGH END SMALL CRAFT ADVISORY WINDS WILL CONTINUE ALONG THE CENTRAL STRAIT AND COASTAL WATERS TODAY. ONSHORE GRADIENTS WILL GENERALLY EASE OFF LATE TONIGHT...AND PICK BACK UP THURSDAY AFTERNOON. A FRONTAL SYSTEM WILL ENTER THE COASTAL WATERS FRIDAY AFTERNOON.


Seattle
NAM 0-84hr Forecast Meteogram for (123W, 48N)
20APR 12Z
21APR 00Z
12Z
22APR 00Z
12Z
23APR 00Z
12Z
24APR 00Z
millibars
500
600
700
800
900
1000
Temp. (F) Wind (mph)
RH (%)
FR
1000-500mb Thickness (dm)
548
547
546
545
544
Total-totals
Lifted Index
SLP (mb)
1020
1016
1012
10m Wind Speed & Barbs (mph)
2m Temp
2m DewPt
(F)
2m RH
(%)
3hr Precip
Total
Convective
(inches)
0.04
0.03
0.02
0.01
0
00Z 21APR
12Z
00Z 22APR
12Z
00Z 23APR
12Z
00Z 24APR

Port of Seattle
Lora Lake Apartments

Remedial Investigation/ Feasibility Study Work Plan

Appendix C
TV In-line Inspection
Video Inspection Report

FINAL

PIPE EXPERTS L.L.C.
855 Trosper RD SW 108-190
Tumwater, WA
Phone: (360)943-5840
Fax: (360)943-5865

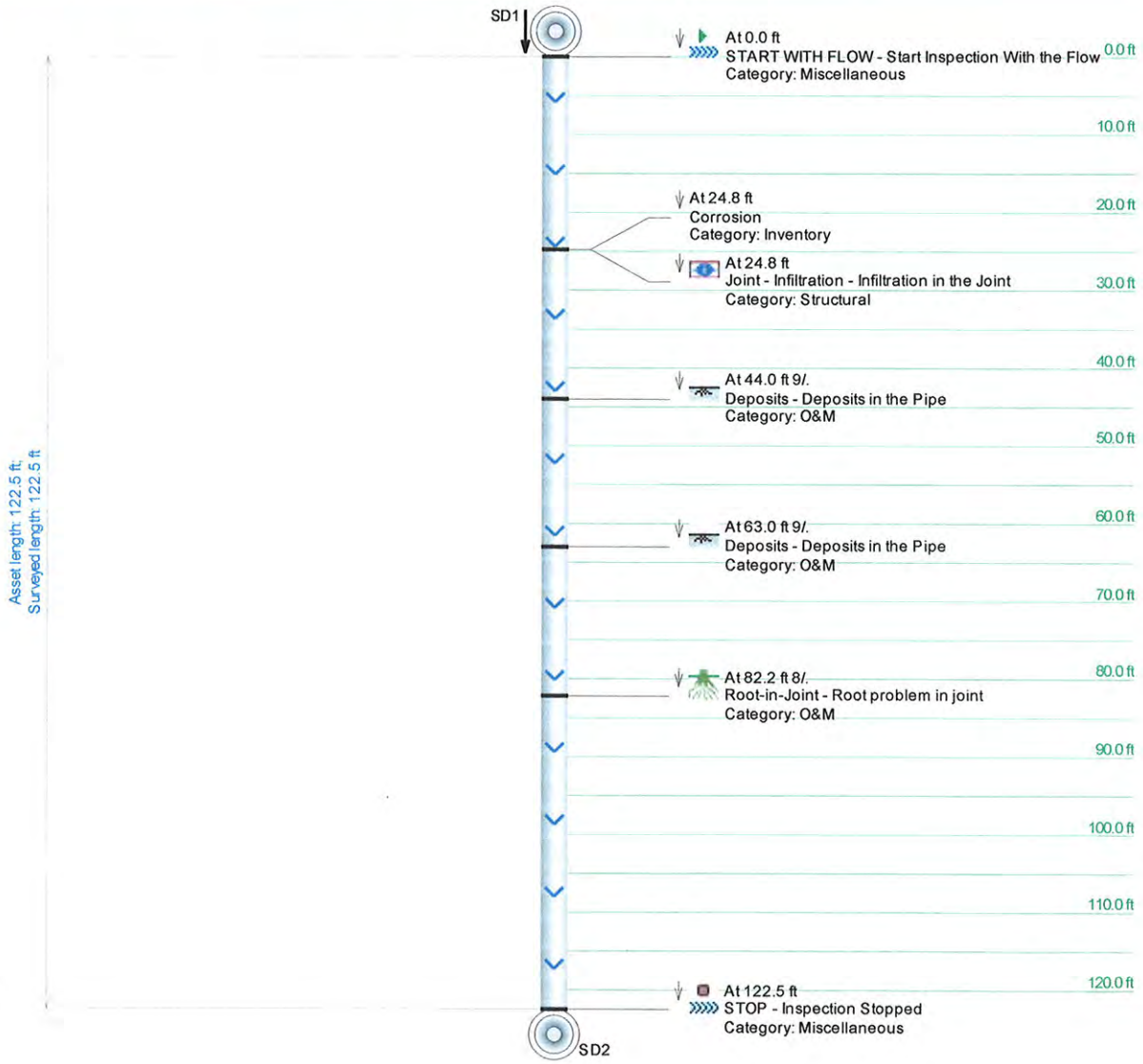
GRANITE XP
Pipeline Inspection and Integration Software

TV Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
APS	SD1-SD2	Burien	Lora Lk. Apartments

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
12/10/2009	24	24	CMP	Asphalt

Direction:	Surveyed footage:	Weather:	MediaLabel
Downstream	122.5	Dry	



PIPE EXPERTS L.L.C.
855 Trosper RD SW 108-190
Tumwater, WA
Phone: (360)943-5840
Fax: (360)943-5865

Observation Report with Still Images

Main Asset ID:	Project Name:	Inspection Date:	Weather:	Operator:
SD1-SD2	APS	12/10/2009 9:11:10 AM	Dry	Brett Shepp

Upstream Node:	Depth US:	Downstream Node:	Depth DS:	Main Length:	Extra:
SD1		SD2		122.5	

Comments:

Observations

Distance	Length	Code	Reversed	Clock Pos.	Severity	Comment
0.0		START WITH FLOW	No	/		
24.8		Corrosion	No	/		
24.8		Joint - Infiltration	No	/	Light	
44.0		Deposits	No	9 /	Medium	
63.0		Deposits	No	9 /	Medium	
82.2		Root-in-Joint	No	8 /	Light	
122.5		STOP	No	/		

Tabular Report of PLR CB1 X **for POS**

Work Order	**Contract**	**Video**	**Setup** 4
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 106.2 **Ft**	**From** CB1	**Depth** 4.50 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB2	**Depth** 5.00 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB1
	0.0		WL	Water level				1	
	106.2		MH	Manhole/Node					CB2
	106.2		FH	Finish of Surveys					end of inspection at cb2

106.2 Ft **Total Length Surveyed**

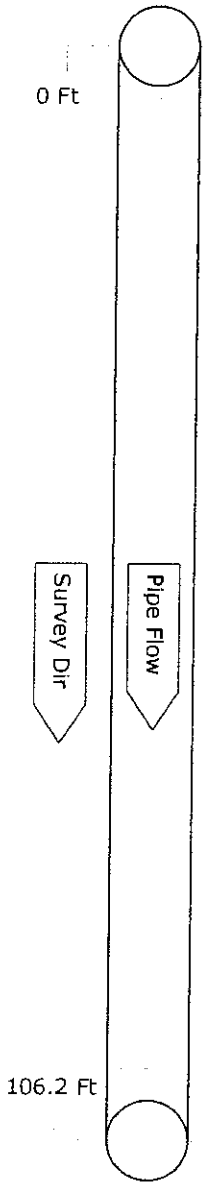
Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Pipe Graphic Report of PLR CB1 X for POS

Work Order		**Contract**		**Video**	**Setup** 4
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	106.2 Ft	**From** CB1	**Depth** 4.50 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB2	**Depth** 5.00 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	**Hydraulic**



0.0 Ft Start of Survey
Manhole/Node [CB1]
Water level 1

106.2 Ft Manhole/Node [CB2]
Finish of Surveys [end of inspection at cb2]

PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Tabular Report of PLR CB2 X **for POS**

Work Order	**Contract**	**Video**	**Setup** 5
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 46.0 **Ft**	**From** CB2 **Depth** 5.00 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB3 **Depth** 4.90 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB2
	0.0		WL	Water level				1	
	46.0		B	Broken Pipe		04	06		broken/hole in cmp, ground ex...
	46.0		GC	General Comment					broken
	75.5		MH	Manhole/Node					CB3
	75.5		FH	Finish of Surveys					end of inspection at cb3

75.5 Ft **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

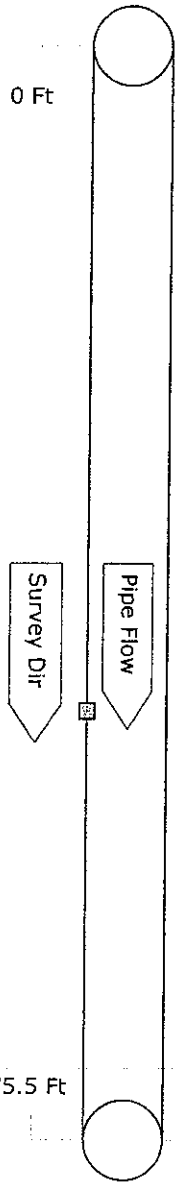
PIPELOGIX INC
PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Pipe Graphic Report of PLR CB2 X for POS

Work Order		**Contract**		**Video**	**Setup** 5
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	46.0 Ft	**From** CB2	**Depth** 5.00 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB3	**Depth** 4.90 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Downstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note	Structural	Service	Constructional
Location note	Miscellaneous	**Hydraulic**	



0 Ft

0.0 Ft — Start of Survey
Manhole/Node [CB2]
Water level 1

46.0 Ft — Broken Pipe 04 to 06 o'clock [broken/hole in cmp, ground exposed]
General Comment [broken]

75.5 Ft

75.5 Ft — Manhole/Node [CB3]
Finish of Surveys [end of inspection at cb3]

PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Tabular Report of PLR CB3 X **for POS**

Work Order	**Contract**	**Video**	**Setup** 6
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 21.2 **Ft**	**From** CB3 **Depth** 4.90 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** RCB1 **Depth** 5.00 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note	Structural	Service	Constructional
Location note	Miscellaneous	**Hydraulic**	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB3
	0.0		WL	Water level				1	
	21.2		MH	Manhole/Node					RCB1
	21.2		FH	Finish of Surveys					END OF INSPECTION AT RCB1

21.2 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

PIPELOGIX INC

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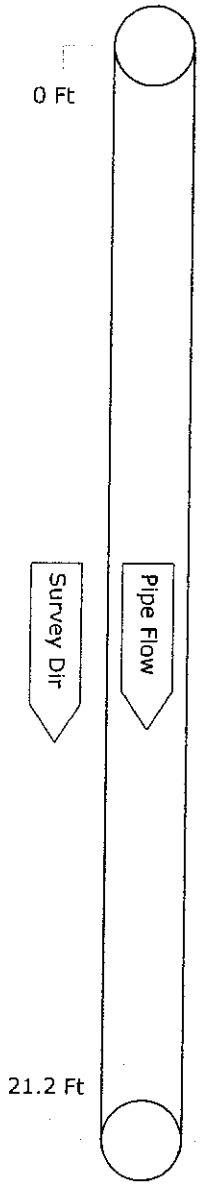
Phone: 866-299-3150
Fax: 760-406-6023

Pipe Graphic Report of PLR CB3 X for POS

Work Order		**Contract**		**Video**	**Setup** 6
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	21.2 Ft	**From** CB3	**Depth** 4.90 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** RCB1	**Depth** 5.00 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Downstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note	Structural	Service	Constructional
Location note	Miscellaneous	**Hydraulic**	



0 Ft — 0.0 Ft — Start of Survey
Manhole/Node [CB3]
Water level 1

21.2 Ft — 21.2 Ft — Manhole/Node [RCB1]
Finish of Surveys [END OF INSPECTION AT RCB1]

PiPE LOGIX INC
PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Tabular Report of PLR CB4 X **for POS**

Work Order	**Contract**	**Video**	**Setup** 7
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 0.0 Ft	**From** CB4	**Depth** 6.30 Ft
Shape Circular	**Size** 12 **by** 12 ins	**To** RCB2	**Depth** 6.00 Ft
Material Steel - Corrugated (ARMCO)	**Joint Spacing** Ft	**Direction** Down	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB4
	0.0		WL	Water level				1	
	16.9		RFJ	Roots fine (at joint)					FINE ROOTS AT JOINT
	56.2		RMJ	Roots mass (at joint)				0005	ROOT MASS AT JOINT
	67.9		MH	Manhole/Node					RCB2
	67.9		FH	Finish of Surveys					END OF INSPECTION AT RCB2

67.9 **Ft** **Total Length Surveyed**

Scores

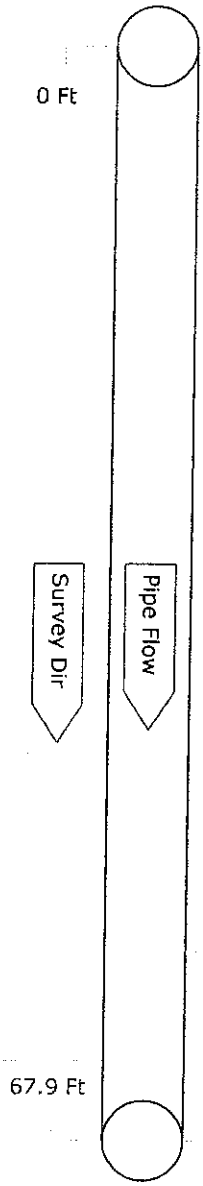
Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

PIPELOGIX INC

PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Pipe Graphic Report of PLR CB4 X for POS

Work Order		**Contract**		**Video**	**Setup** 7
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	0.0 Ft	**From** CB4	**Depth** 6.30 Ft
Shape	Circular	**Size**	12 by 12 ins	**To** RCB2	**Depth** 6.00 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	**Hydraulic**



0.0 Ft	Start of Survey Manhole/Node [CB4] Water level 1
16.9 Ft	Roots fine (at joint) [FINE ROOTS AT JOINT]
56.2 Ft	Roots mass (at joint) 0005 [ROOT MASS AT JOINT]
67.9 Ft	Manhole/Node [RCB2] Finish of Surveys [END OF INSPECTION AT RCB2]

PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Tabular Report of PLR CB8 A **for POS**

Work Order	**Contract**	**Video**	**Setup** 11
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 63.9 **Ft**	**From** CB4 **Depth** 6.00 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB8 **Depth** 5.00 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note

Location note

Structural Service Constructional
Miscellaneous **Hydraulic**

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB4
	0.0		WL	Water level				1	
	63.9		MH	Manhole/Node					CB8
	63.9		FH	Finish of Surveys					END OF INSPECTION AT CB8

63.9 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

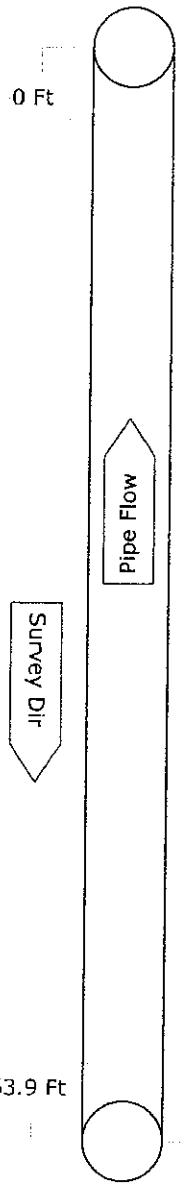
PiPE LOGIX INC
PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Pipe Graphic Report of PLR CB8 A for POS

Work Order		**Contract**		**Video**	**Setup** 11
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/20/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	63.9 Ft	**From** CB4	**Depth** 6.00 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB8	**Depth** 5.00 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Upstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note		Structural	Service	Constructional
Location note		Miscellaneous	**Hydraulic**	



0.0 Ft — Start of Survey
Manhole/Node [CB4]
Water level 1

63.9 Ft — Manhole/Node [CB8]
Finish of Surveys [END OF INSPECTION AT CB8]

PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Tabular Report of PLR CB4 A **for POS**

Work Order	**Contract**	**Video**	**Setup** 12
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 60.9 **Ft**	**From** CB5	**Depth** 4.70 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB4	**Depth** 6.30 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB5
	0.0		WL	Water level				1	
	65.0		MH	Manhole/Node					CB4
	65.0		FH	Finish of Surveys					END OF INSPECTION AT CB4

65.0 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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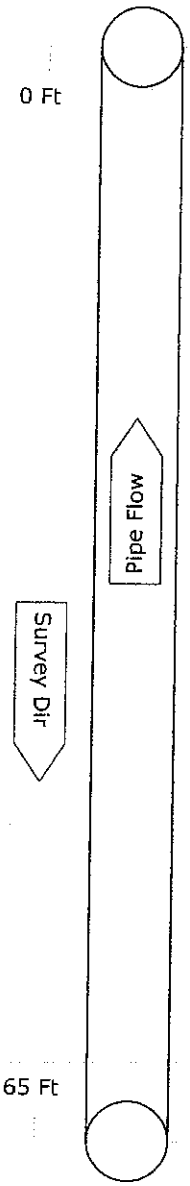
Pipe Graphic Report of PLR CB4 A for POS

Work Order		**Contract**		**Video**	**Setup** 12
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	60.9 Ft	**From** CB5	**Depth** 4.70 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB4	**Depth** 6.30 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	**Hydraulic**



0 Ft — 0.0 Ft — Start of Survey
Manhole/Node [CB5]
Water level 1

65 Ft — 65.0 Ft — Manhole/Node [CB4]
Finish of Surveys [END OF INSPECTION AT CB4]

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Tabular Report of PLR CB6 A **for POS**

Work Order	**Contract**	**Video**	**Setup** 13
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 46.5 **Ft**	**From** CB5 **Depth** 4.70 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB6 **Depth** 4.25 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note

Location note

Structural Service Constructional
Miscellaneous **Hydraulic**

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB5
	0.0		WL	Water level				1	
	46.5		MH	Manhole/Node					CB6
	46.5		FH	Finish of Surveys					END OF INSPECTION AT CB6

46.5 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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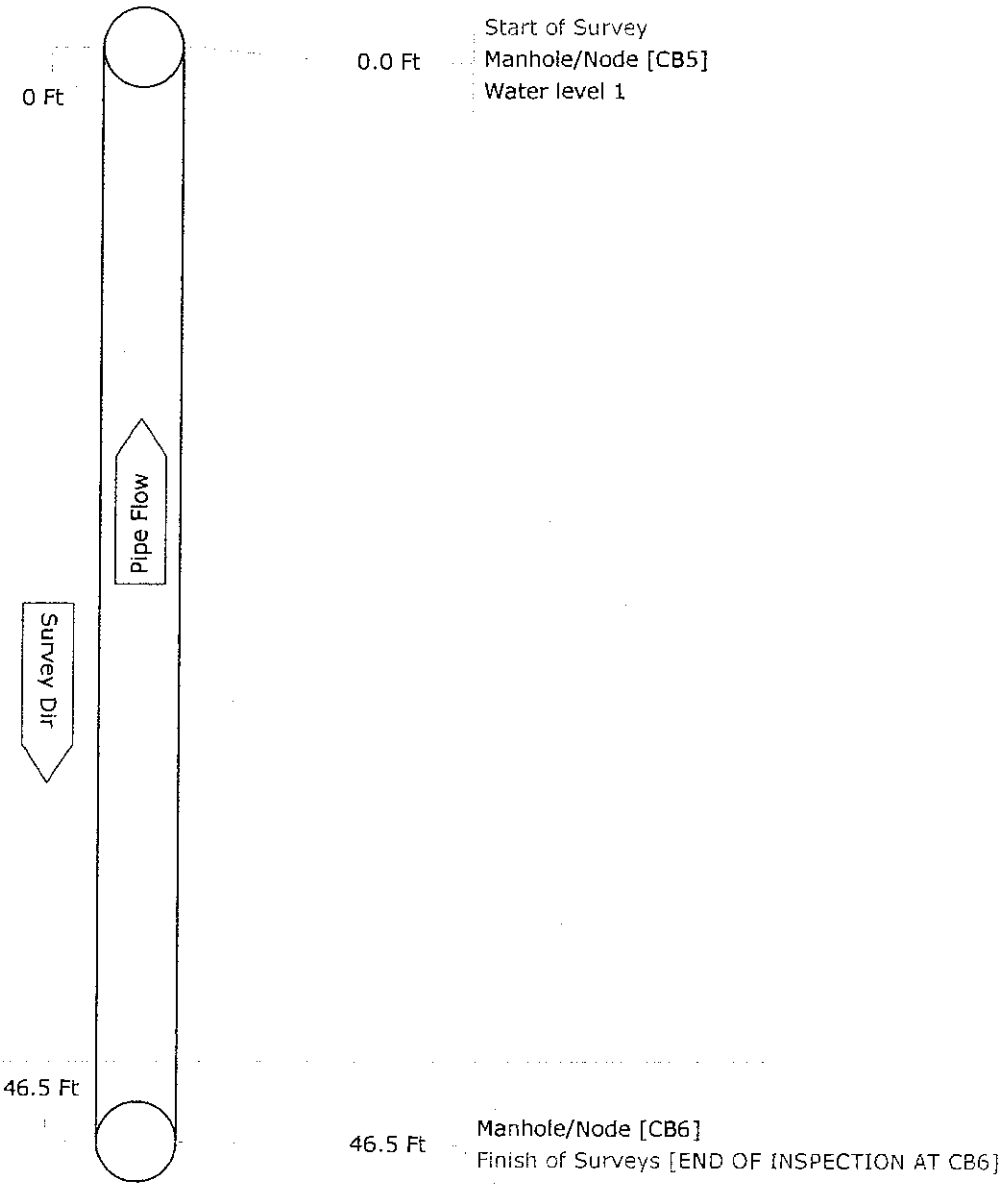
Pipe Graphic Report of PLR CB6 A **for** POS

Work Order		**Contract**		**Video**	**Setup** 13
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	46.5 Ft	**From** CB5	**Depth** 4.70 Ft
Shape	Circular	**Size**	12 by 12 ins	**To** CB6	**Depth** 4.25 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB7 A **for POS**

Work Order	**Contract**	**Video**	**Setup** 14
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 26.6 **Ft**	**From** CB6 **Depth** 4.25 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB7 **Depth** 4.40 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB6
	0.0		WL	Water level				2	
	24.2		GC	General Comment					10 PERCENT OF BOTTOM OF PIPE ...
	26.6		DES	Debris silt				0010	CAN NOT CONTINUE DUE TO DEBRI...
	29.1		MH	Manhole/Node					CB7
	29.1		FH	Finish of Surveys					END OF INSPECTION

29.1 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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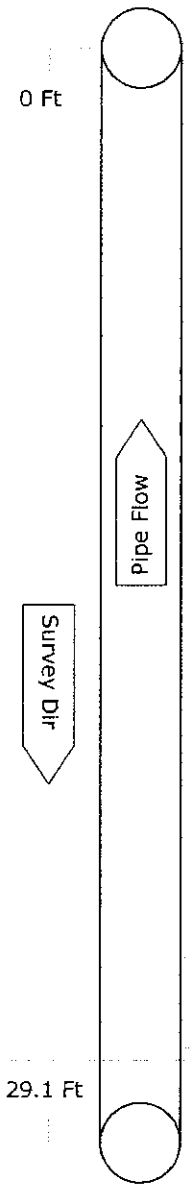
Pipe Graphic Report of PLR CB7 A **for** POS

Work Order		**Contract**		**Video**	**Setup** 14
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	26.6 Ft	**From**	CB6	**Depth**	4.25 Ft
Shape	Circular	**Size**	12 by 12 ins	**To**	CB7	**Depth**	4.40 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream		
Lining		**Year laid**		**Pre-clean**	N	**Last cleaned**	

General note	Structural	Service	Constructional
Location note	Miscellaneous	**Hydraulic**	



0.0 Ft	Start of Survey Manhole/Node [CB6] Water level 2
24.2 Ft	General Comment [10 PERCENT OF BOTTOM OF PIPE DEBRIS/SILT]
26.6 Ft	Debris silt 0010 [CAN NOT CONTINUE DUE TO DEBRIS IN PIPE]
29.1 Ft	Manhole/Node [CB7] Finish of Surveys [END OF INSPECTION]

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Tabular Report of PLR CB9 A **for POS**

Work Order	**Contract**	**Video**	**Setup** 15
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 100.1 **Ft**	**From** CB9 **Depth** 4.90 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB8 **Depth** 4.70 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB9
	0.0		WL	Water level				1	
	100.1		MH	Manhole/Node					CB8
	100.1		FH	Finish of Surveys					END OF INSPECTION AT CB8

100.1 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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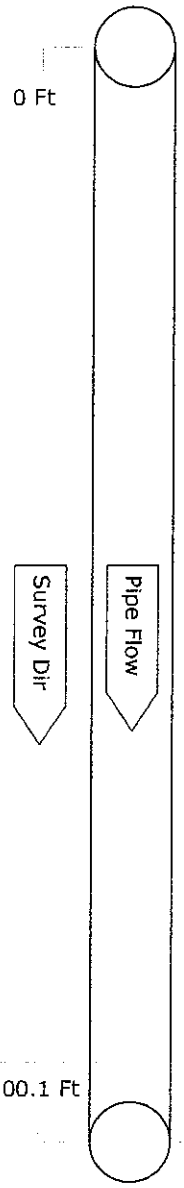
Pipe Graphic Report of PLR CB9 A for POS

Work Order		**Contract**		**Video**	**Setup** 15
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	100.1 Ft	**From** CB9	**Depth** 4.90 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB8	**Depth** 4.70 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Downstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note	Structural	Service	Constructional
Location note	Miscellaneous	Hydraulic	



0 Ft — 0.0 Ft — Start of Survey
Manhole/Node [CB9]
Water level 1

100.1 Ft — 100.1 Ft — Manhole/Node [CB8]
Finish of Surveys [END OF INSPECTION AT CB8]

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Tabular Report of PLR CB10 A **for POS**

Work Order	**Contract**	**Video**	**Setup** 16
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 26.6 **Ft**	**From** CB10	**Depth** 5.80 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB11	**Depth** 4.80 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB10
	0.0		WL	Water level				1	
	21.0		GC	General Comment					MAYBE A PATCH
	26.5		B	Broken Pipe		07	05		BOTTOM OF PIPE BROKEN OUT
	26.6		GC	General Comment					END OF INSPECTION DUE TO BROK...
	26.6		MH	Manhole/Node					CB11
	26.6		FH	Finish of Surveys					END OF INSPECTION

26.6 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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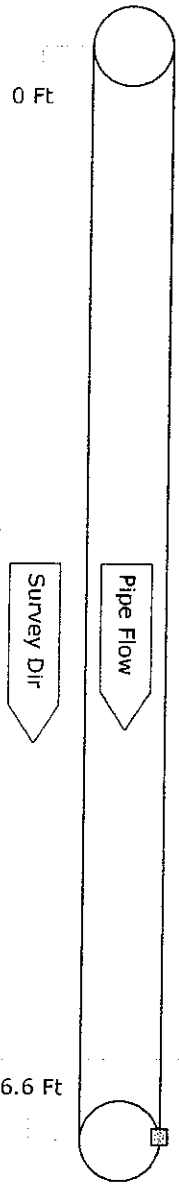
Pipe Graphic Report of PLR CB10 A for POS

Work Order		**Contract**		**Video**	**Setup** 16
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/21/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	26.6 Ft	**From** CB10	**Depth** 5.80 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB11	**Depth** 4.80 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



0.0 Ft	Start of Survey Manhole/Node [CB10] Water level 1
21.0 Ft	General Comment [MAYBE A PATCH]
26.5 Ft	Broken Pipe 07 to 05 o'clock [BOTTOM OF PIPE BROKEN OUT]
26.6 Ft	General Comment [END OF INSPECTION DUE TO BROKEN PIPE] Manhole/Node [CB11] Finish of Surveys [END OF INSPECTION]

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Tabular Report of PLR CB11 A **for POS**

Work Order	**Contract**	**Video**	**Setup** 17
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 24.6 **Ft**	**From** CB11	**Depth** 4.80 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB12	**Depth** 4.50 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB11
	0.0		WL	Water level				1	
	24.6		MH	Manhole/Node					CB12
	24.6		FH	Finish of Surveys					END OF INSPECTION
	26.5		DES	Debris silt				0020	DEBRIS IN PIPE, CAN NOT CONTI...

26.5 Ft **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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Pipe Graphic Report of PLR CB11 A for POS

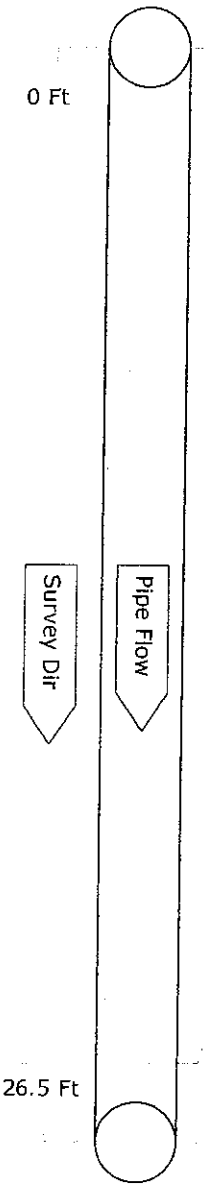
Work Order		**Contract**		**Video**	**Setup** 17
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	24.6 Ft	**From** CB11	**Depth** 4.80 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB12	**Depth** 4.50 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Downstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note

Location note

Structural Service Constructional
Miscellaneous **Hydraulic**



0.0 Ft Start of Survey
Manhole/Node [CB11]
Water level 1

24.6 Ft Manhole/Node [CB12]
Finish of Surveys [END OF INSPECTION]

26.5 Ft Debris silt 0020 [DEBRIS IN PIPE, CAN NOT CONTINUE INSPECTION 20PERCENT OF PIPE]

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Tabular Report of PLR CB11 B **for** POS

Work Order	**Contract**	**Video**	**Setup** 18
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 39.4 **Ft**	**From** CB12	**Depth** 4.50 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB11	**Depth** 4.80 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**

General note

Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB12
	0.0		WL	Water level				1	
	39.4		DES	Debris silt				0015	DEBRIS/SILT, CAN NOT CONTINUE...
	39.4		MH	Manhole/Node					CB11
	39.4		FH	Finish of Surveys					END OF INSPECITON DUE TO DEBR...

39.4 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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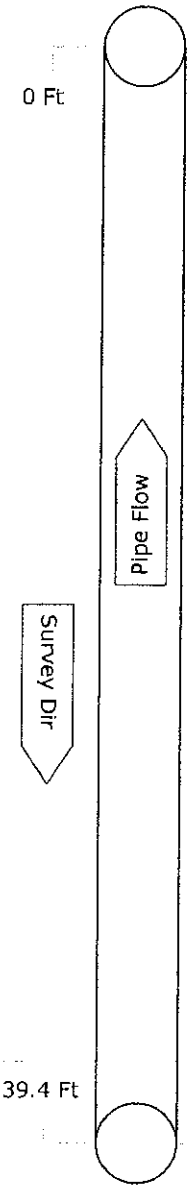
Pipe Graphic Report of PLR CB11 B for POS

Work Order		**Contract**		**Video**	**Setup** 18
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	39.4 Ft	**From** CB12	**Depth** 4.50 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB11	**Depth** 4.80 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Upstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note	Structural	Service	Constructional
Location note	Miscellaneous	**Hydraulic**	



0.0 Ft — Start of Survey
Manhole/Node [CB12]
Water level 1

39.4 Ft — Debris silt 0015 [DEBRIS/SILT, CAN NOT CONTINUE INSP.]
Manhole/Node [CB11]
Finish of Surveys [END OF INSPECITON DUE TO DEBRIS/SILT]

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Tabular Report of PLR CB13 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 19
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 62.7 Ft	**From** CB12	**Depth** 4.50 Ft
Shape Circular	**Size** 12 **by** 12 ins	**To** CB13	**Depth** 4.80 Ft
Material Steel - Corrugated (ARMCO)	**Joint Spacing** Ft	**Direction** Up	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous **Hydraulic**	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB12
	0.0		WL	Water level				1	
	62.7		MH	Manhole/Node					CB13
	62.7		FH	Finish of Surveys					END OF INSPECTION AT CB13

62.7 Ft **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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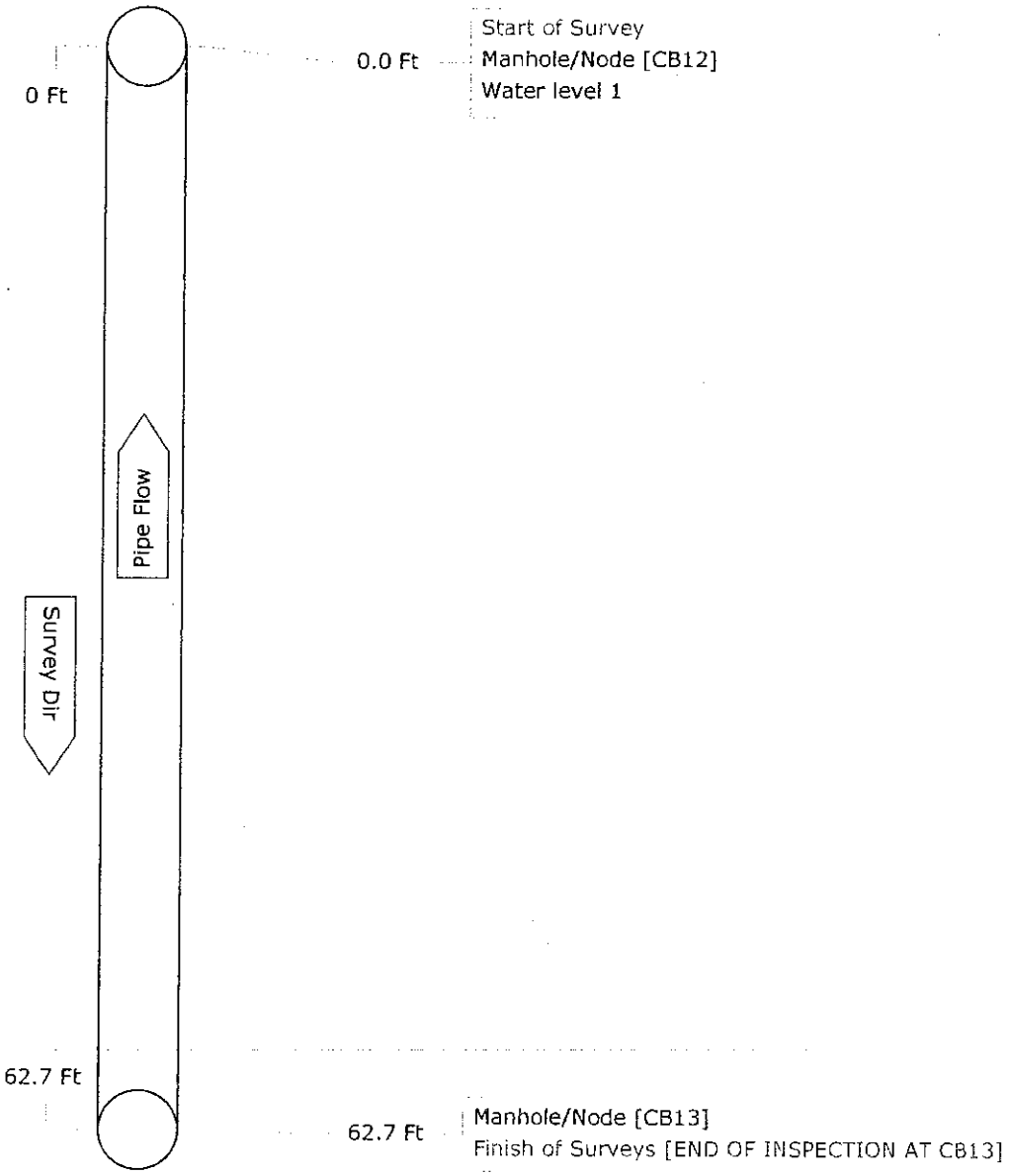
Pipe Graphic Report of PLR CB13 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 19
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	62.7 Ft	**From** CB12	**Depth** 4.50 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB13	**Depth** 4.80 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Upstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note		Structural	Service	Constructional
Location note		Miscellaneous	**Hydraulic**	



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Tabular Report of PLR CB12 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 20
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 35.4 **Ft**	**From** CB12 **Depth** 4.50 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB14 **Depth** 5.00 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous **Hydraulic**

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB12
	0.0		WL	Water level				1	
	35.4		MH	Manhole/Node					CB14
	35.4		FH	Finish of Surveys					end of inspection at cb14

35.4 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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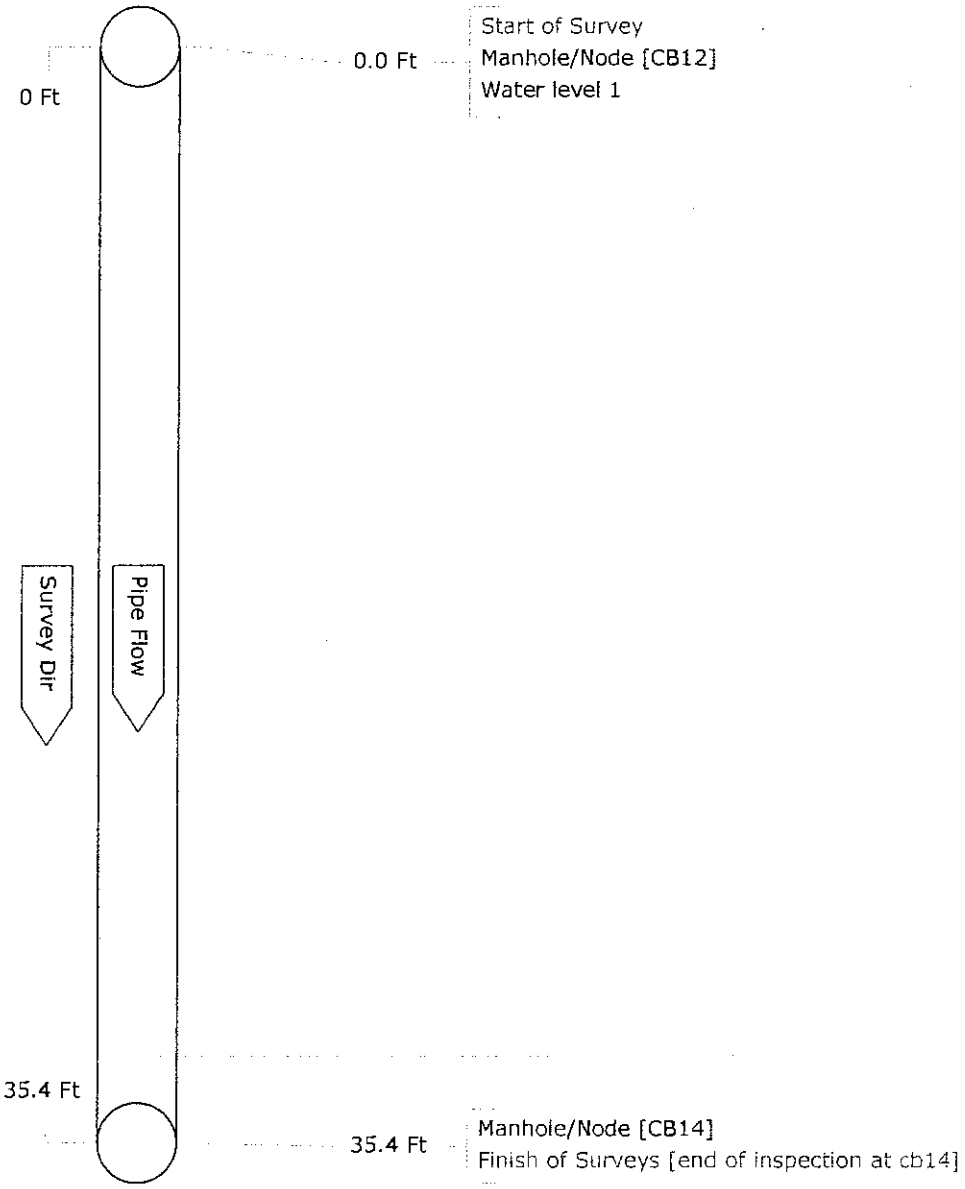
Pipe Graphic Report of PLR CB12 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 20
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	35.4 Ft	**From** CB12	**Depth** 4.50 Ft
Shape	Circular	**Size** 12	**by** 12 ins	**To** CB14	**Depth** 5.00 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	**Hydraulic**



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Tabular Report of PLR CB14 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 21
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 53.3 **Ft**	**From** CB15 **Depth** 3.60 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB14 **Depth** 5.00 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB15
	0.0		WL	Water level				1	
	5.1		B	Broken Pipe	L	06	09		broken pipe, exposed dirt
	5.1		GC	General Comment					broken pipe
	13.4		B	Broken Pipe	M	07	09		tear/broken pipe
	39.0		B	Broken Pipe	S	07	09		broken pipe
	53.3		MH	Manhole/Node					CB14
	53.3		FH	Finish of Surveys					end of inspection at cb14

53.3 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 55	**Mean Defect** 18.3	**Peak** 40	**Mean Pipe** 1
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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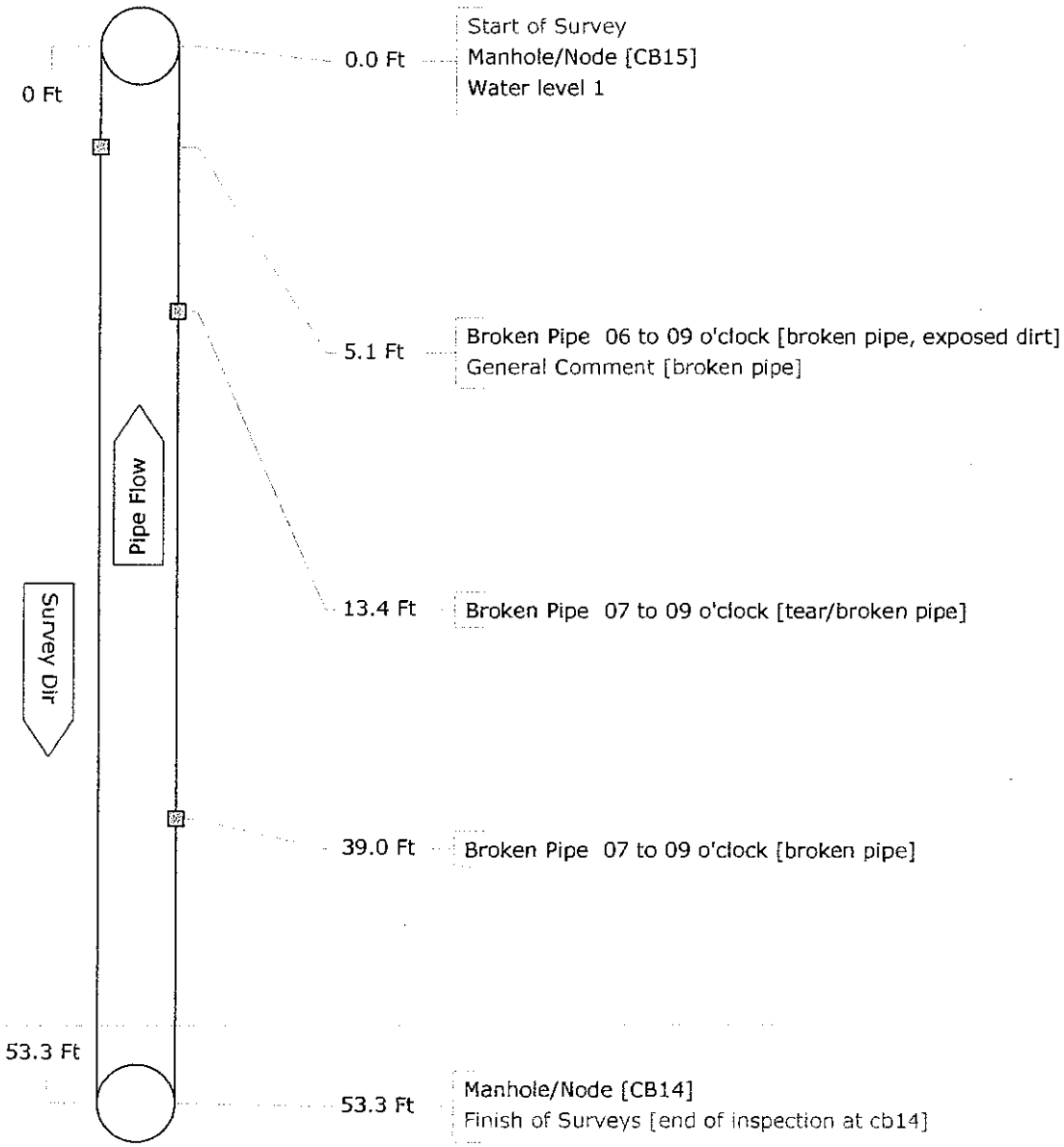
Pipe Graphic Report of PLR CB14 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 21
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	53.3 Ft	**From** CB15	**Depth** 3.60 Ft
Shape	Circular	**Size** 12	**by** 12 ins	**To** CB14	**Depth** 5.00 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB16 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 22
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 63.8 **Ft**	**From** CB15	**Depth** 3.60 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB16	**Depth** 5.50 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up	
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**	
General note		Structural Service Constructional	
Location note		Miscellaneous Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB15
	0.0		WL	Water level				1	
	63.8		MH	Manhole/Node					CB16
	63.8		FH	Finish of Surveys					END OF INSPECTION

63.8 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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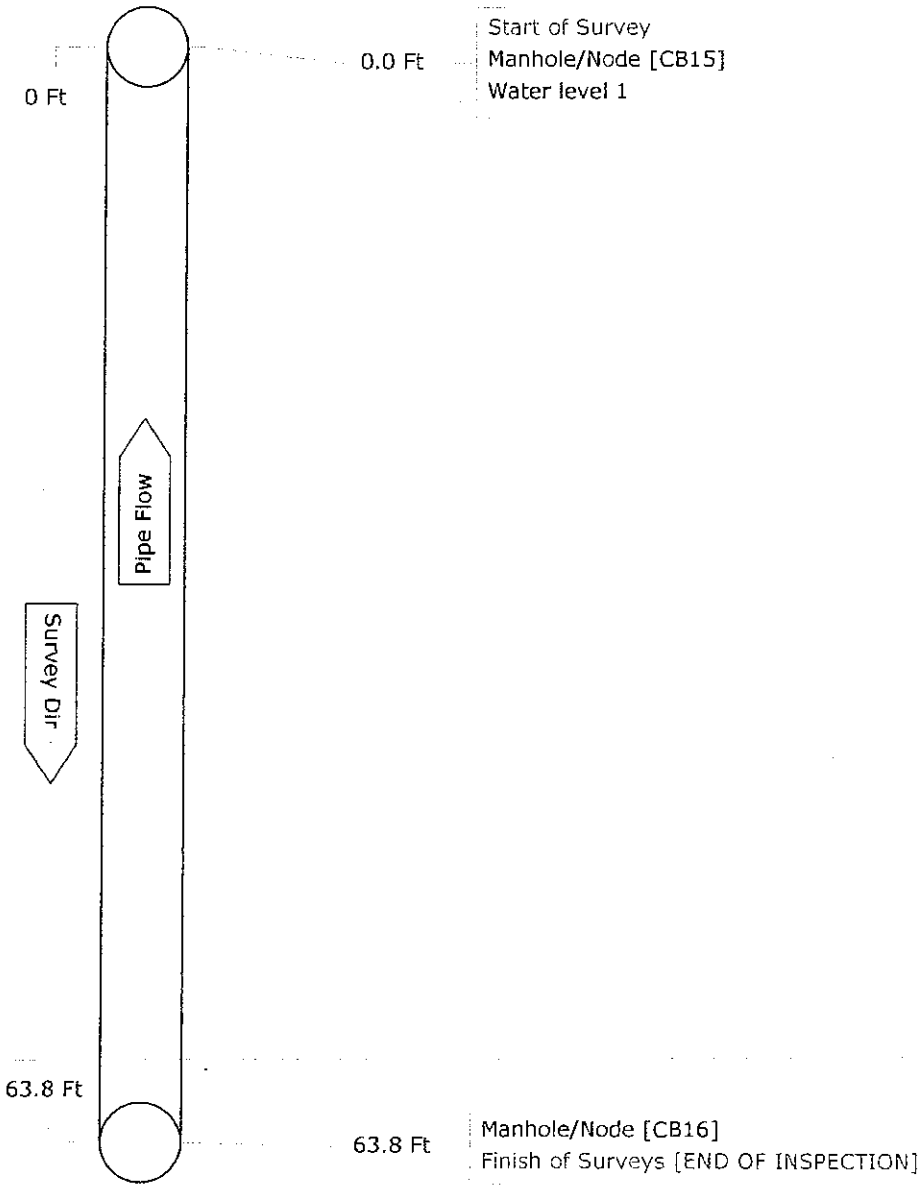
Pipe Graphic Report of PLR CB16 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 22
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	63.8 Ft	**From** CB15	**Depth** 3.60 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB16	**Depth** 5.50 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	**Hydraulic**



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Tabular Report of PLR CB15 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 24
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 51.5 **Ft**	**From** CB15	**Depth** 3.60 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB17	**Depth** 3.20 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous **Hydraulic**	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB15
	0.0		WL	Water level				1	
	33.4		B	Broken Pipe		07	08		TEAR IN PIPE/BROKEN
	35.1		B	Broken Pipe		08	09		TEAR/BROKEN PIPE
	47.0		C	Corrosion of CI	S	06	09		CORROSION ON PIPE MAY HAVE WA...
	51.5		MH	Manhole/Node					CB17
	51.5		FH	Finish of Surveys					END OF INSPECTION AT CB17

51.5 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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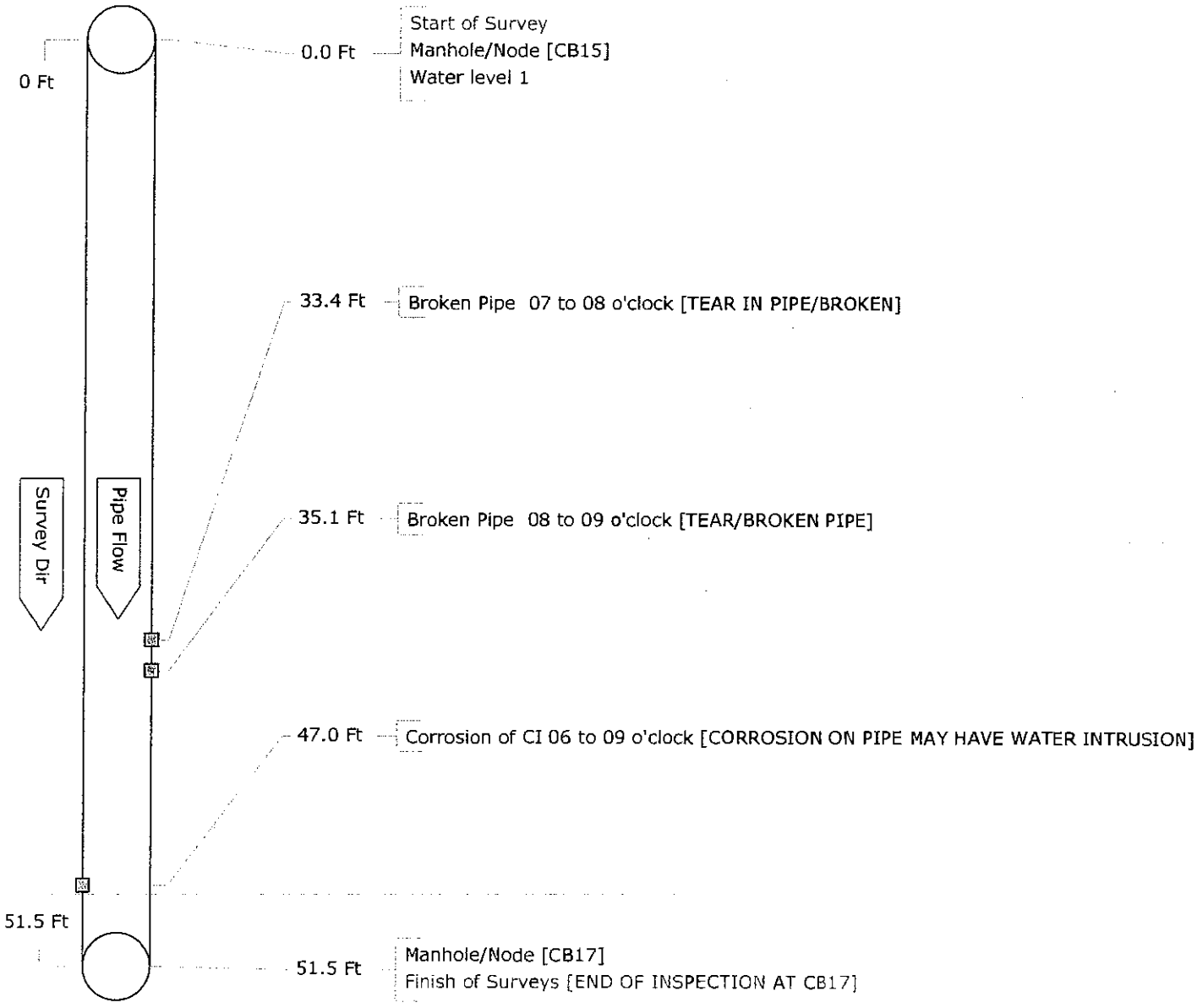
Pipe Graphic Report of PLR CB15 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 24
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	51.5 Ft	**From** CB15	**Depth** 3.60 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB17	**Depth** 3.20 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB20 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 25
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 55.6	**Ft**	**From** CB21	**Depth** 3.11	**Ft**
Shape Circular	**Size** 12	**by** 12 **ins**	**To** CB20	**Depth** 3.80	**Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing**	**Ft**	**Direction** Up		
Lining	**Year laid**		**Pre-clean** N	**Last Cleaned**	

General note	Structural	Service	Constructional
Location note	Miscellaneous	Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB21
	0.0		WL	Water level				1	
	55.6		MH	Manhole/Node					CB20
	55.6		FH	Finish of Surveys					END OF INSPECTION

55.6 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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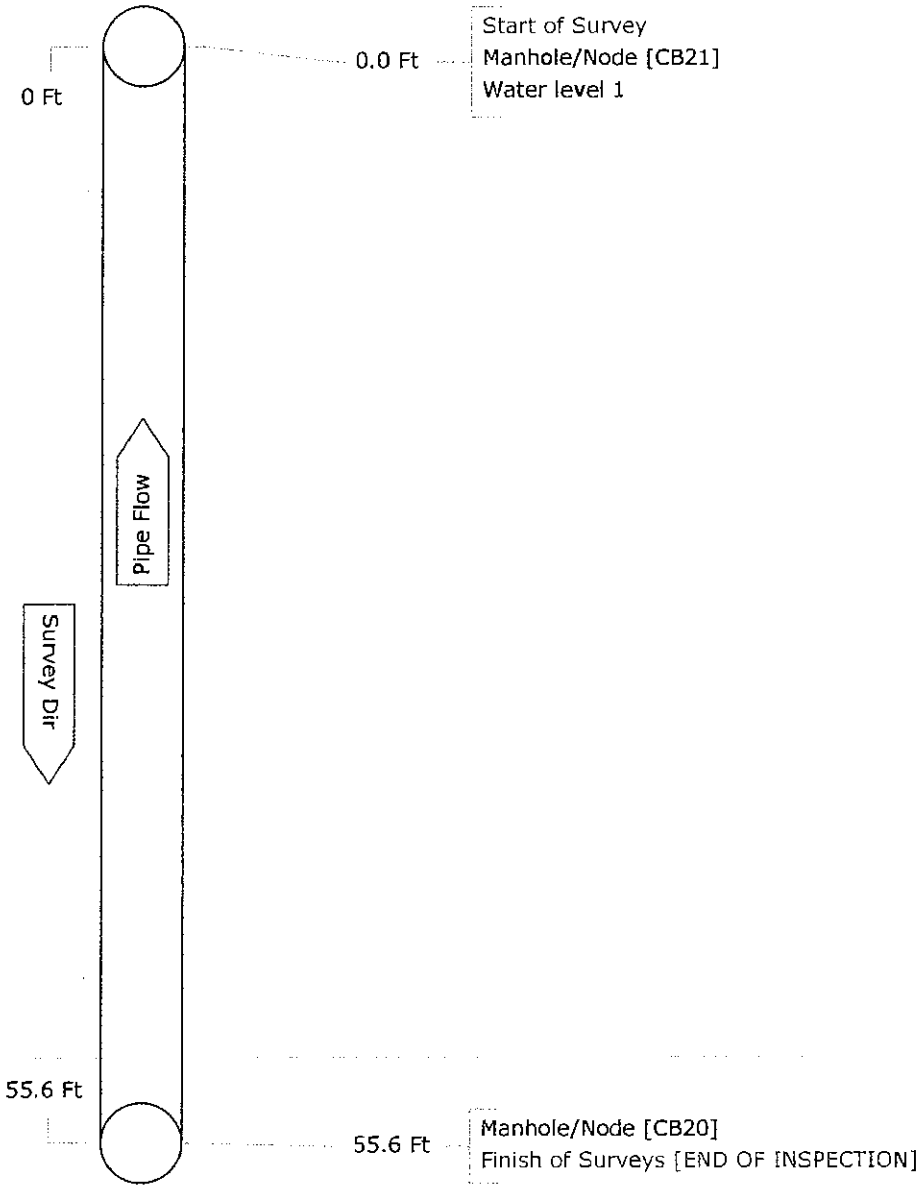
Pipe Graphic Report of PLR CB20 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 25
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	55.6 Ft	**From** CB21	**Depth** 3.11 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB20	**Depth** 3.80 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	**Hydraulic**



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Tabular Report of PLR CB21 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 26
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 20.2 **Ft**	**From** CB21	**Depth** 3.11 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB22	**Depth** 8.50 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous **Hydraulic**	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB21
	0.0		WL	Water level				1	
	20.2		MH	Manhole/Node					CB22
	20.2		FH	Finish of Surveys					END OF INSPECTION

20.2 Ft **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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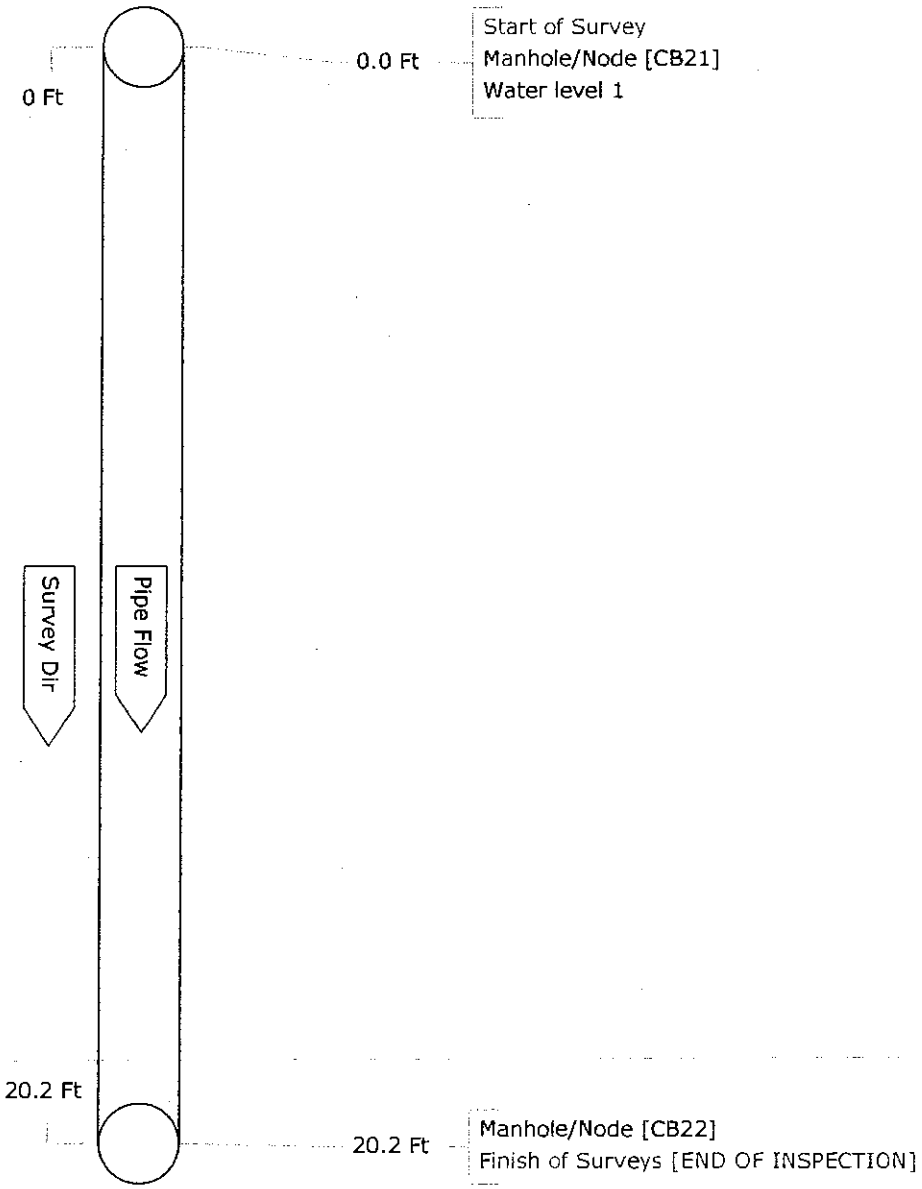
Pipe Graphic Report of PLR CB21 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 26
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	20.2 Ft	**From** CB21	**Depth** 3.11 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB22	**Depth** 8.50 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB24 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 27
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 80.6	Ft	**From** CB23	**Depth** 8.50	Ft
Shape Circular	**Size** 12	**by** 12 ins	**To** CB24	**Depth** 5.11	Ft
Material Steel - Corrugated (ARMCO)	**Joint Spacing**	Ft	**Direction** Up		
Lining	**Year laid**		**Pre-clean** N	**Last Cleaned**	

General note		Structural	Service	Constructional
Location note		Miscellaneous	Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB23
	0.0		WL	Water level				1	
	80.6		MH	Manhole/Node					CB24
	80.6		FH	Finish of Surveys					END OF INSPECTION

80.6 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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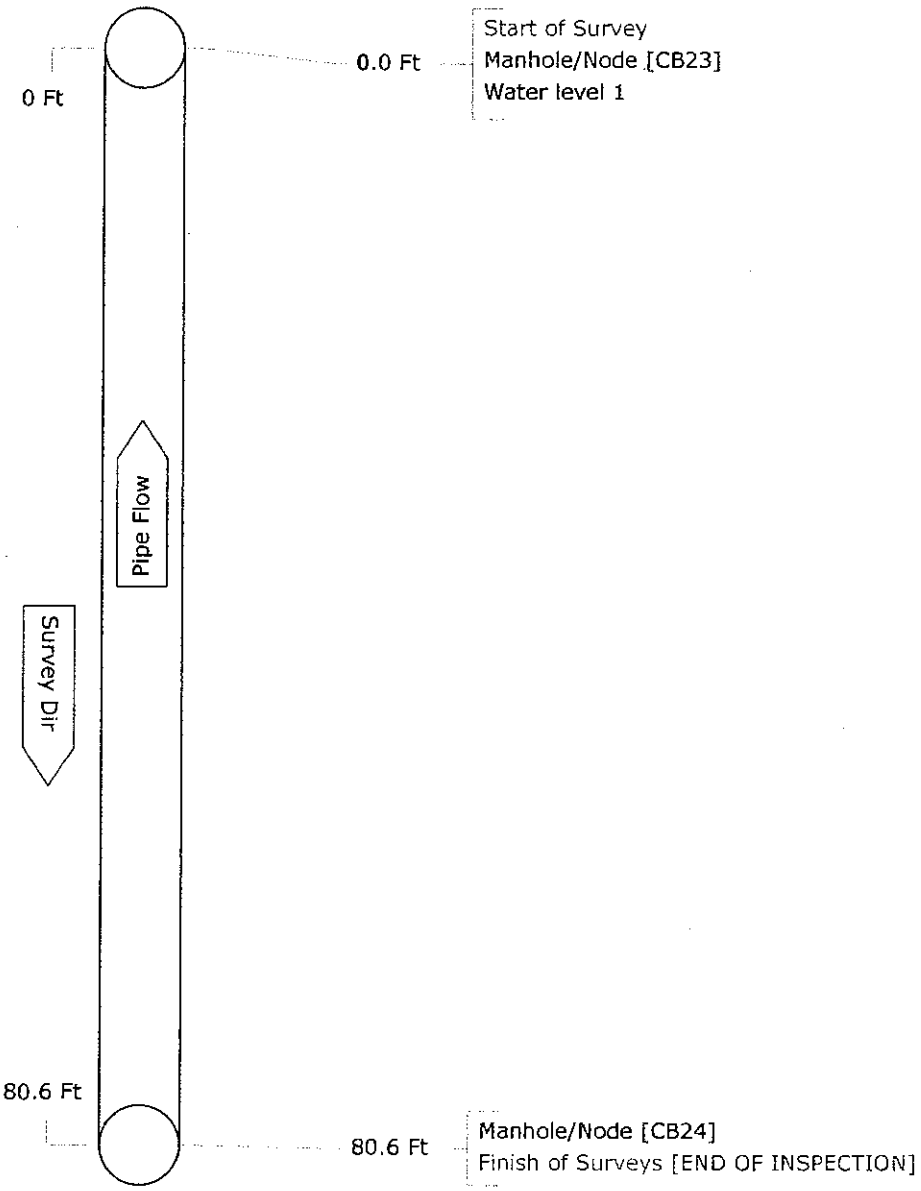
Pipe Graphic Report of PLR CB24 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 27
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	80.6 Ft	**From** CB23	**Depth** 8.50 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB24	**Depth** 5.11 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Upstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note	Structural	Service	Constructional
Location note	Miscellaneous	Hydraulic	



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Tabular Report of PLR CB23 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 28
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 70.1 **Ft**	**From** CB23 **Depth** 4.60 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** RCB8 **Depth** 7.70 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB23
	0.0		WL	Water level				1	
	70.1		MH	Manhole/Node					RCB8
	70.1		FH	Finish of Surveys					END OF INSPECTION

70.1 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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Pipe Graphic Report of PLR CB23 B **for** POS

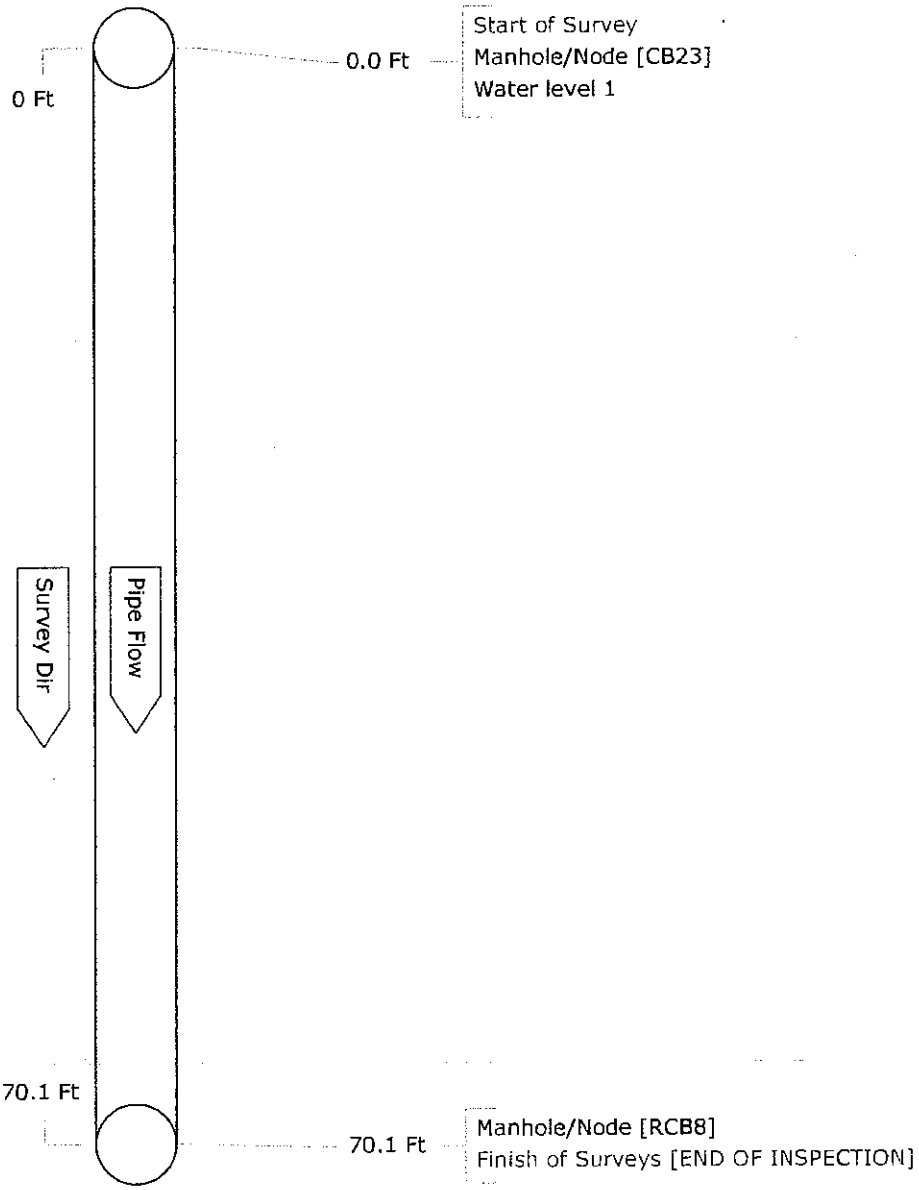
Work Order		**Contract**		**Video**	**Setup** 28
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	70.1 Ft	**From** CB23	**Depth** 4.60 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** RCB8	**Depth** 7.70 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Downstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note

Location note

Structural Service Constructional
Miscellaneous Hydraulic



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Tabular Report of PLR CB25 B for POS

Work Order	**Contract**	**Video**	**Setup** 29
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 47.5 **Ft**	**From** CB25 **Depth** 3.60 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB24 **Depth** 5.11 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note

Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB25
	0.0		WL	Water level				0	
	47.5		FH	Finish of Surveys					END OF INSPECTION

47.5 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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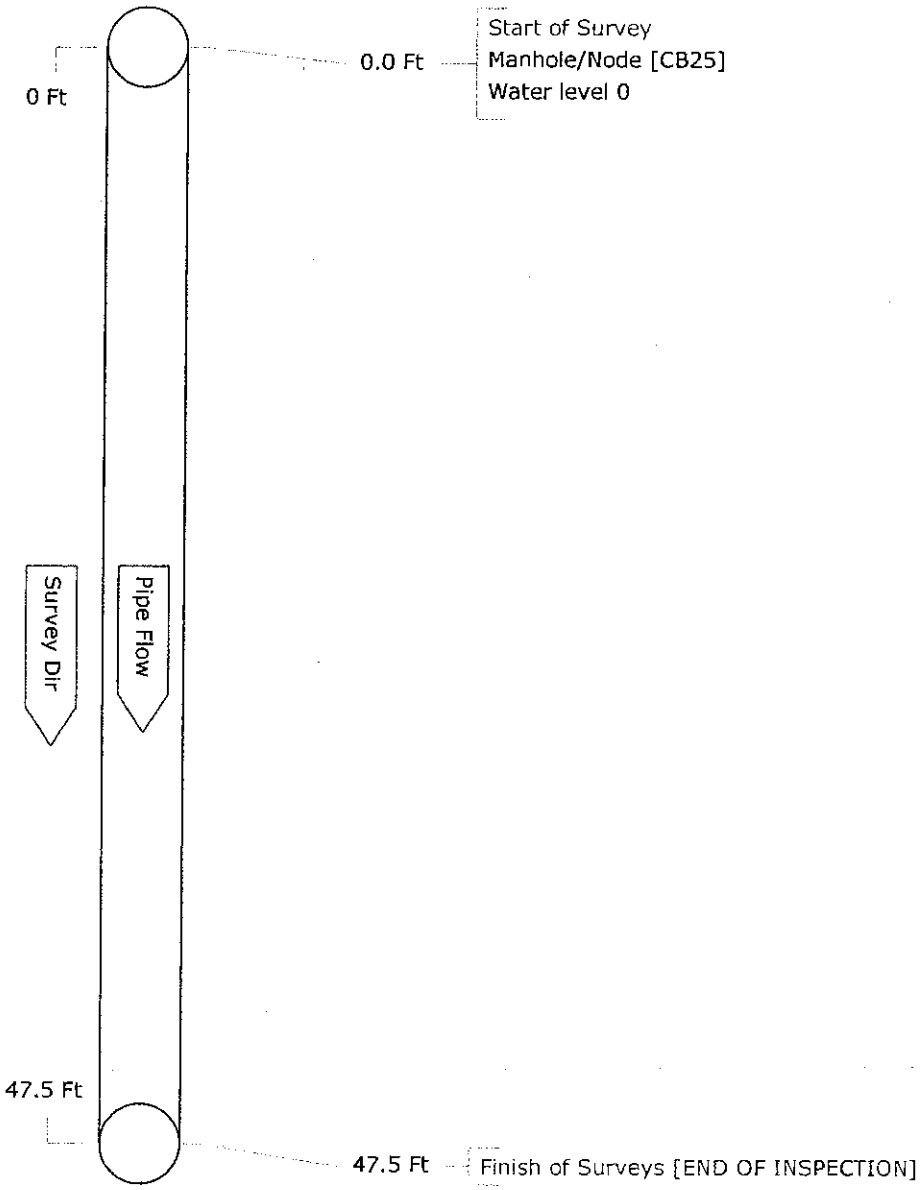
Pipe Graphic Report of PLR CB25 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 29
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/25/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	47.5 Ft	**From**	CB25 **Depth** 3.60 Ft
Shape	Circular	**Size**	12 by 12 ins	**To**	CB24 **Depth** 5.11 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean**	N **Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB18 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 30
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 26.0 **Ft**	**From** CB18 **Depth** 4.00 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB19 **Depth** 0.00 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB18
	0.0		WL	Water level				1	
	26.0		MH	Manhole/Node					CB19
	26.0		FH	Finish of Surveys					END OF INSPECTION

26.0 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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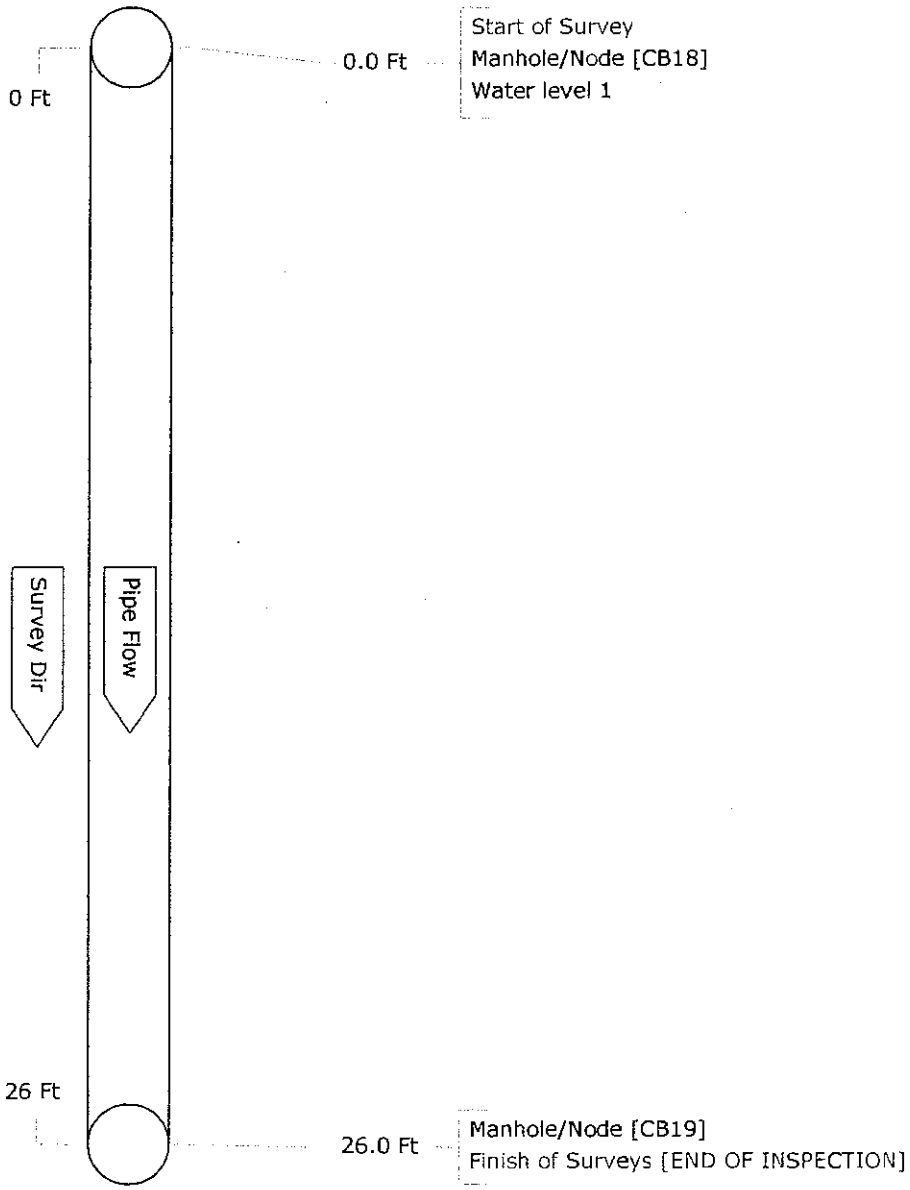
Pipe Graphic Report of PLR CB18 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 30
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	26.0 Ft	**From** CB18	**Depth** 4.00 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB19	**Depth** 0.00 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Downstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note		Structural	Service	Constructional
Location note		Miscellaneous	Hydraulic	



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Tabular Report of PLR CB17 B **for POS**

Work Order	**Contract**	**Video**	**Setup** 32
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 42.7 **Ft**	**From** CB18 **Depth** 4.00 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB17 **Depth** 3.20 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB18
	0.0		WL	Water level				1	
	8.4		GC	General Comment					POSSIBLE CORROSION
	42.7		MH	Manhole/Node					CB17
	42.7		FH	Finish of Surveys					END OF INSPECTION

42.7 Ft **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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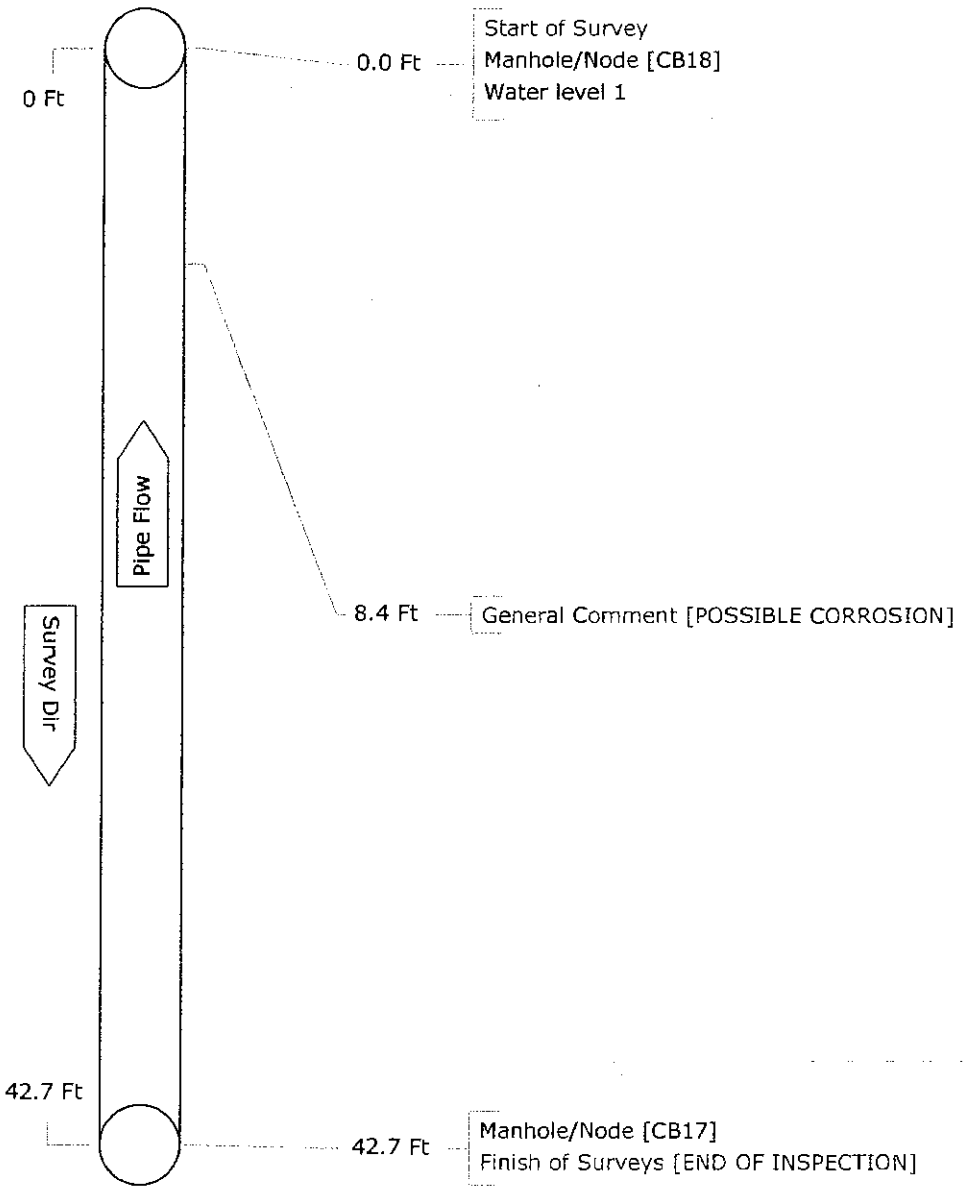
Pipe Graphic Report of PLR CB17 B **for** POS

Work Order		**Contract**		**Video**	**Setup** 32
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	42.7 Ft	**From** CB18	**Depth** 4.00 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB17	**Depth** 3.20 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note	Structural	Service	Constructional
Location note	Miscellaneous	Hydraulic	



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Tabular Report of PLR CB26 C **for POS**

Work Order	**Contract**	**Video**	**Setup** 35
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 200.3 **Ft**	**From** CB26	**Depth** 11.20 **Ft**
Shape Circular	**Size** 24 **by** 24 **ins**	**To** CB27	**Depth** 14.10 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down	
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**	
General note		Structural Service Constructional	
Location note		Miscellaneous Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB26
	0.0		WL	Water level				1	
	200.3		MH	Manhole/Node					CB27
	200.3		FH	Finish of Surveys					END OF INSPECTION

200.3 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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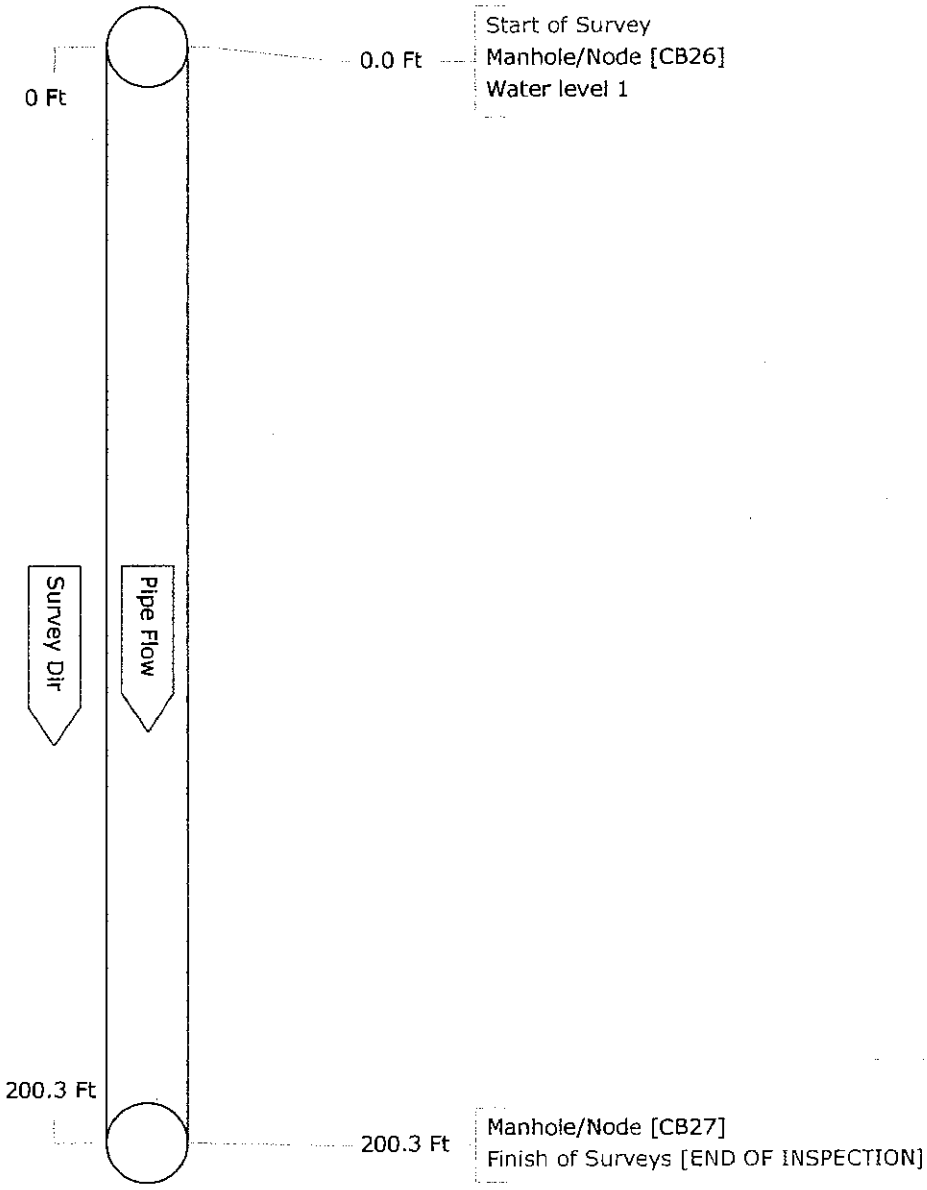
Pipe Graphic Report of PLR CB26 C **for** POS

Work Order		**Contract**		**Video**	**Setup** 35
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	200.3 Ft	**From** CB26	**Depth** 11.20 Ft
Shape	Circular	**Size** 24 **by** 24 ins		**To** CB27	**Depth** 14.10 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural Service	Constructional
Location note				Miscellaneous **Hydraulic**	



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Tabular Report of PLR CB30 C **for POS**

Work Order	**Contract**	**Video**	**Setup** 36
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 103.2 **Ft**	**From** CB26 **Depth** 11.20 **Ft**
Shape Circular	**Size** 24 **by** 24 **ins**	**To** CB30 **Depth** 7.60 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB26
	0.0		WL	Water level				2	
	22.9		GC	General Comment					STARTING CONTINUOS DEBRIS
	103.2		MH	Manhole/Node					CB30
	103.2		FH	Finish of Surveys					END OF INSPECTION

103.2 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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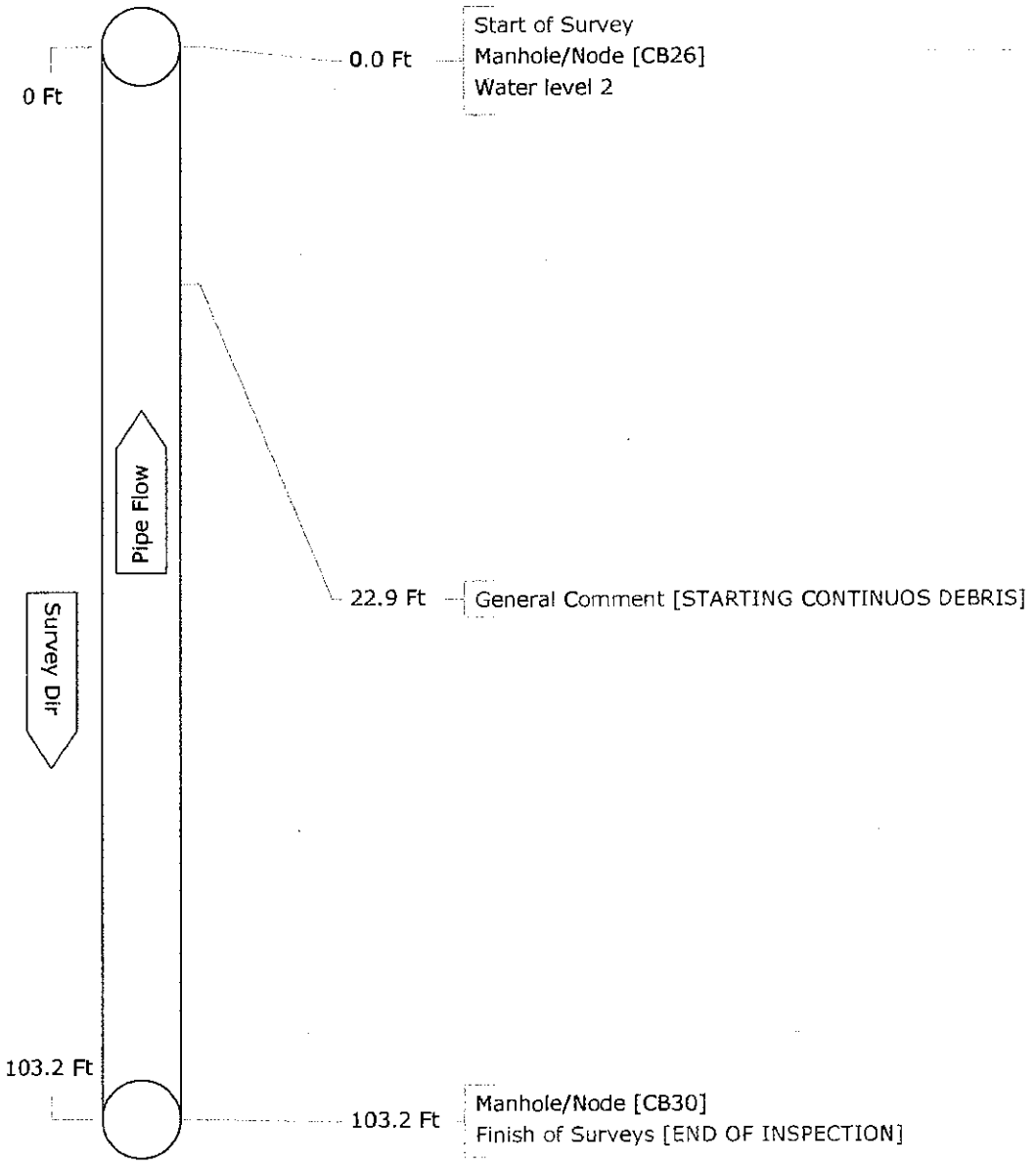
Pipe Graphic Report of PLR CB30 C **for** POS

Work Order		**Contract**		**Video**	**Setup** 36
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	103.2 Ft	**From** CB26	**Depth** 11.20 Ft
Shape	Circular	**Size** 24 **by** 24 ins		**To** CB30	**Depth** 7.60 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	**Hydraulic**



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Tabular Report of PLR CB31 D **for POS**

Work Order	**Contract**	**Video**	**Setup** 37
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 107.9 **Ft**	**From** CB30	**Depth** 7.60 **Ft**
Shape Circular	**Size** 24 **by** 24 **ins**	**To** CB31	**Depth** 7.60 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB30
	0.0		WL	Water level				2	
	42.6		B	Broken Pipe	S	02	03		BROKEN
	42.6		ID	Infiltration dripper		02	03		WATER INF
	107.9		MH	Manhole/Node					CB31
	107.9		FH	Finish of Surveys					END OF INSPECTION

107.9 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 5	**Mean Defect** 5	**Peak** 5	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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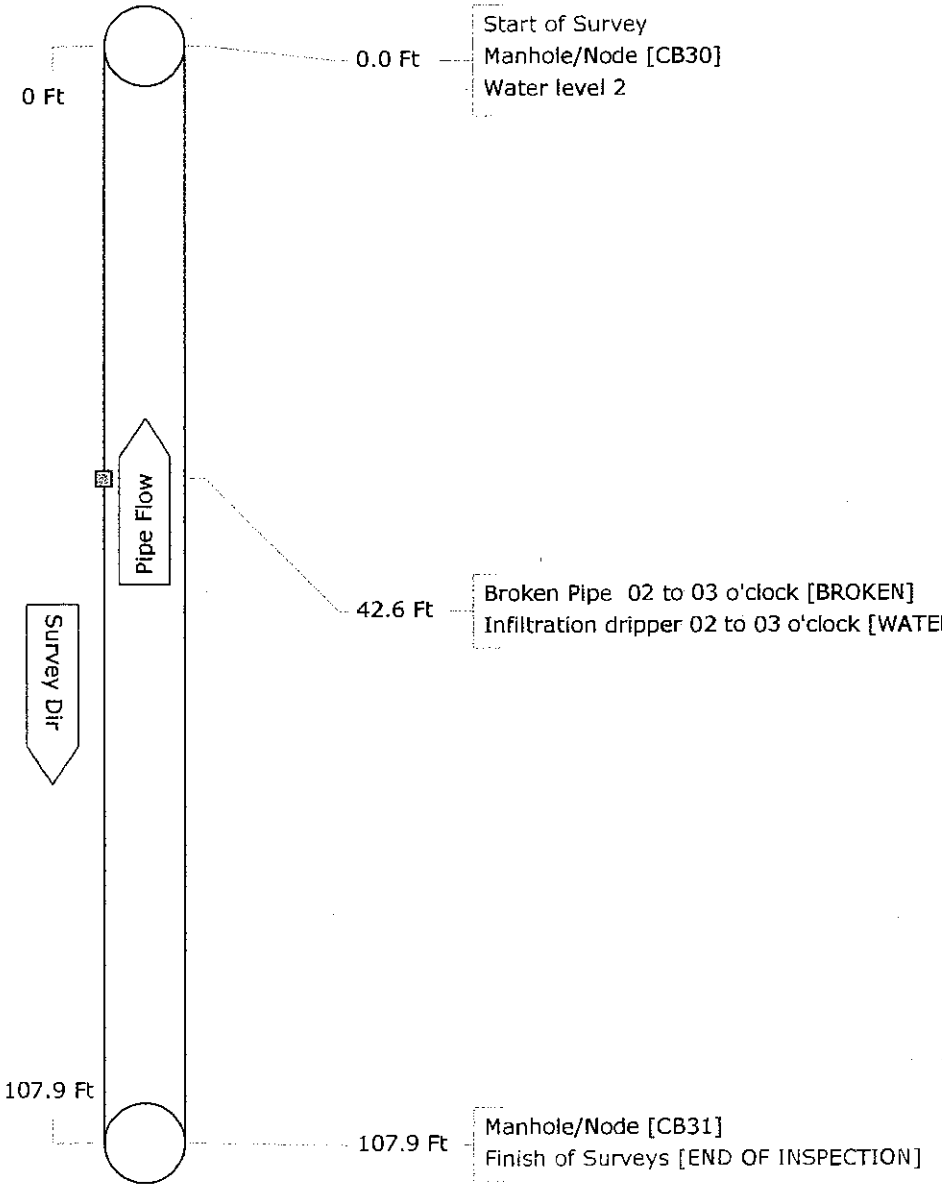
Pipe Graphic Report of PLR CB31 D **for** POS

Work Order		**Contract**		**Video**	**Setup** 37
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	107.9 Ft	**From** CB30	**Depth** 7.60 Ft
Shape	Circular	**Size** 24 **by** 24 ins		**To** CB31	**Depth** 7.60 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Upstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural Service	Constructional
Location note				Miscellaneous **Hydraulic**	



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Tabular Report of PLR CB27 E **for POS**

Work Order	**Contract**	**Video**	**Setup** 39
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 88.4 **Ft**	**From** CB28 **Depth** 16.60 **Ft**
Shape Circular	**Size** 24 **by** 24 **ins**	**To** CB27 **Depth** 15.10 **Ft**
Material Concrete	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB28
	0.0		WL	Water level				2	
	58.5		LO	Lateral or connection exists OK		01			ACTIVE LATERAL
	88.3		MH	Manhole/Node					CB27
	88.4		MH	Manhole/Node					CB27
	88.4		FH	Finish of Surveys					END OF INSPECTION

88.4 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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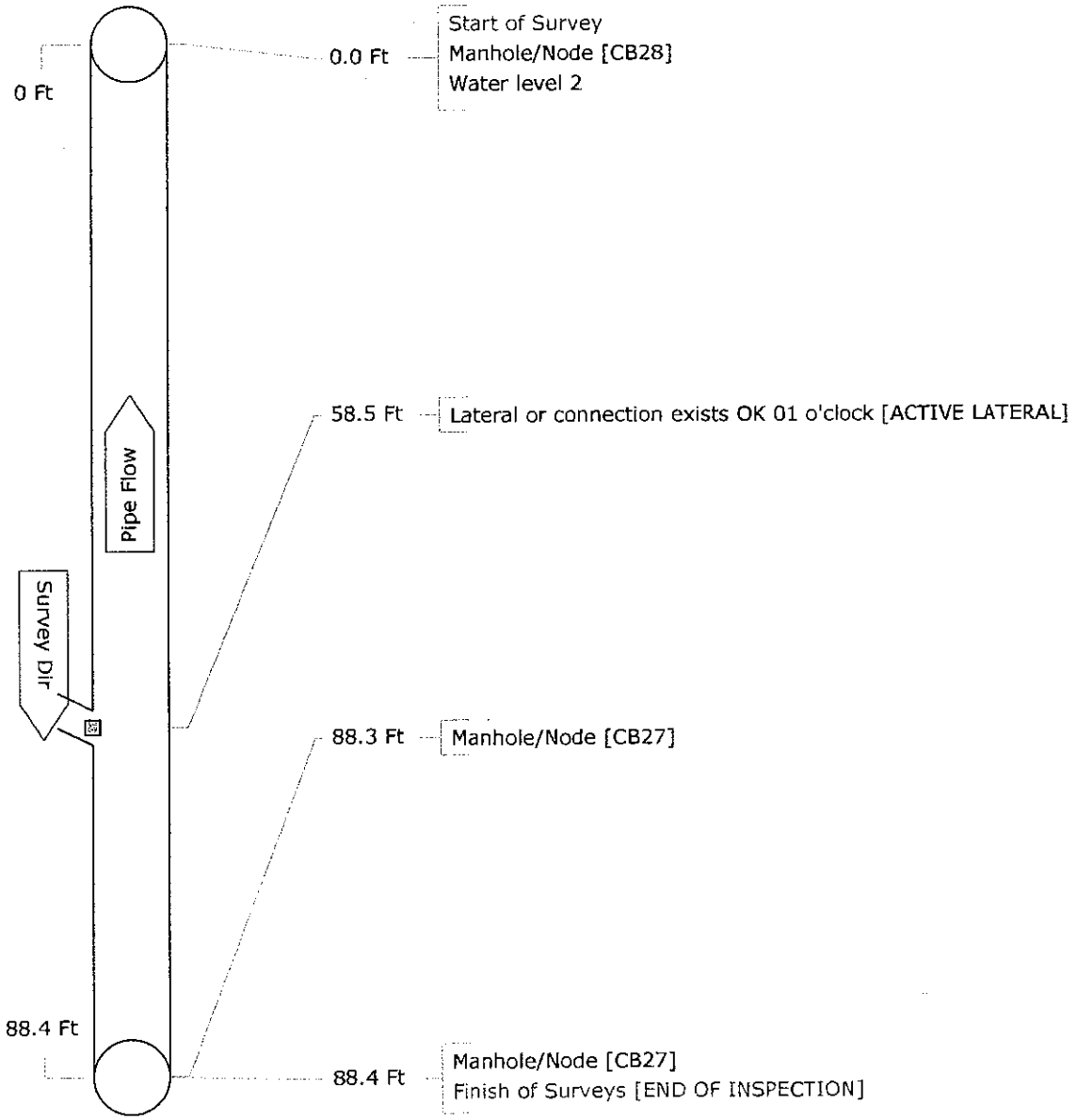
Pipe Graphic Report of PLR CB27 E **for** POS

Work Order		**Contract**		**Video**	**Setup** 39
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	88.4 Ft	**From** CB28	**Depth** 16.60 Ft
Shape	Circular	**Size** 24 **by** 24 ins		**To** CB27	**Depth** 15.10 Ft
Material	Concrete	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB28 E **for POS**

Work Order	**Contract**	**Video**	**Setup** 40
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 73.4 **Ft**	**From** CB29 **Depth** 14.90 **Ft**
Shape Circular	**Size** 24 **by** 24 **ins**	**To** CB28 **Depth** 16.60 **Ft**
Material Concrete	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous **Hydraulic**

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB29
	0.0		WL	Water level				3	
	73.4		MH	Manhole/Node					CB28
	73.4		FH	Finish of Surveys					END OF INSPECTION

73.4 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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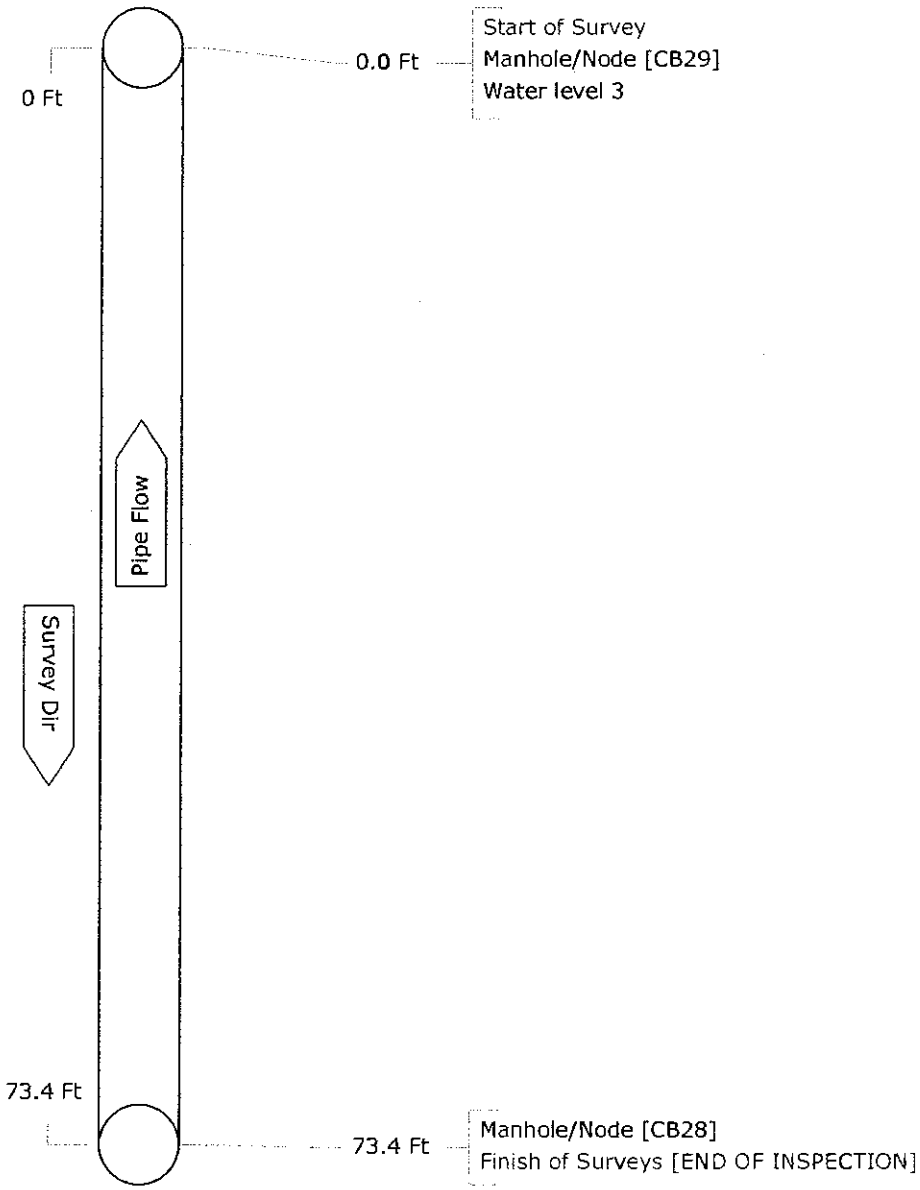
Pipe Graphic Report of PLR CB28 E **for** POS

Work Order		**Contract**		**Video**	**Setup** 40
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	73.4 Ft	**From**	CB29 **Depth** 14.90 Ft
Shape	Circular	**Size**	24 **by** 24 ins	**To**	CB28 **Depth** 16.60 Ft
Material	Concrete	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean**	N **Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB29 E **for POS**

Work Order	**Contract**	**Video**	**Setup** 41
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 113.0 **Ft**	**From** CB29 **Depth** 14.90 **Ft**
Shape Circular	**Size** 24 **by** 24 **Ins**	**To** CB20 **Depth** 8.50 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB29
	0.0		WL	Water level				2	
	6.5		DE	Debris (Not grease or silt)	S				BEGINING OF DEBRIS
	8.4		GC	General Comment					OBJECT INTRUDING AT 10 O'CLOC...
	113.0		MH	Manhole/Node					CB20
	113.0		FH	Finish of Surveys					END OF INSPECTION

113.0 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 5	**Mean Defect** 2.5	**Peak** 5	**Mean Pipe** 0

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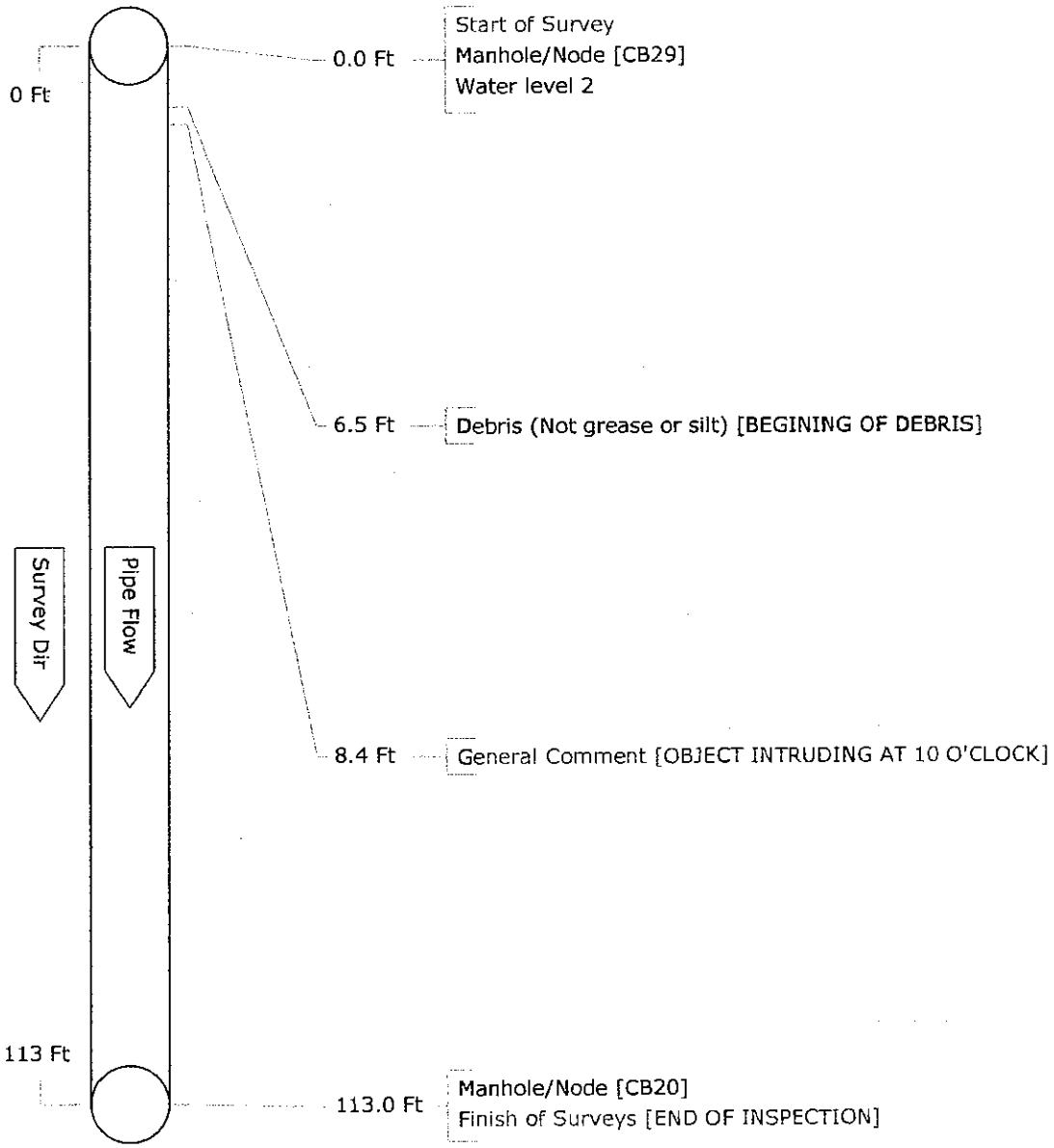
Pipe Graphic Report of PLR CB29 E **for** POS

Work Order		**Contract**		**Video**	**Setup** 41
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	113.0 Ft	**From** CB29	**Depth** 14.90 Ft
Shape	Circular	**Size** 24 **by** 24 ins		**To** CB20	**Depth** 8.50 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB22 E **for POS**

Work Order	**Contract**	**Video**	**Setup** 42
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 125.2 **Ft**	**From** CB22 **Depth** 8.50 **Ft**
Shape Circular	**Size** 24 **by** 24 **ins**	**To** SDMH1 **Depth** 0.00 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous **Hydraulic**

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB22
	0.0		WL	Water level				2	
	45.6		CJ	Corrosion	S	08	10		CORROSIN FROM 8 O'CLOCK TO 10...
	125.2		MH	Manhole/Node					SDMH1
	125.2		FH	Finish of Surveys					END OF INSPECTION

125.2 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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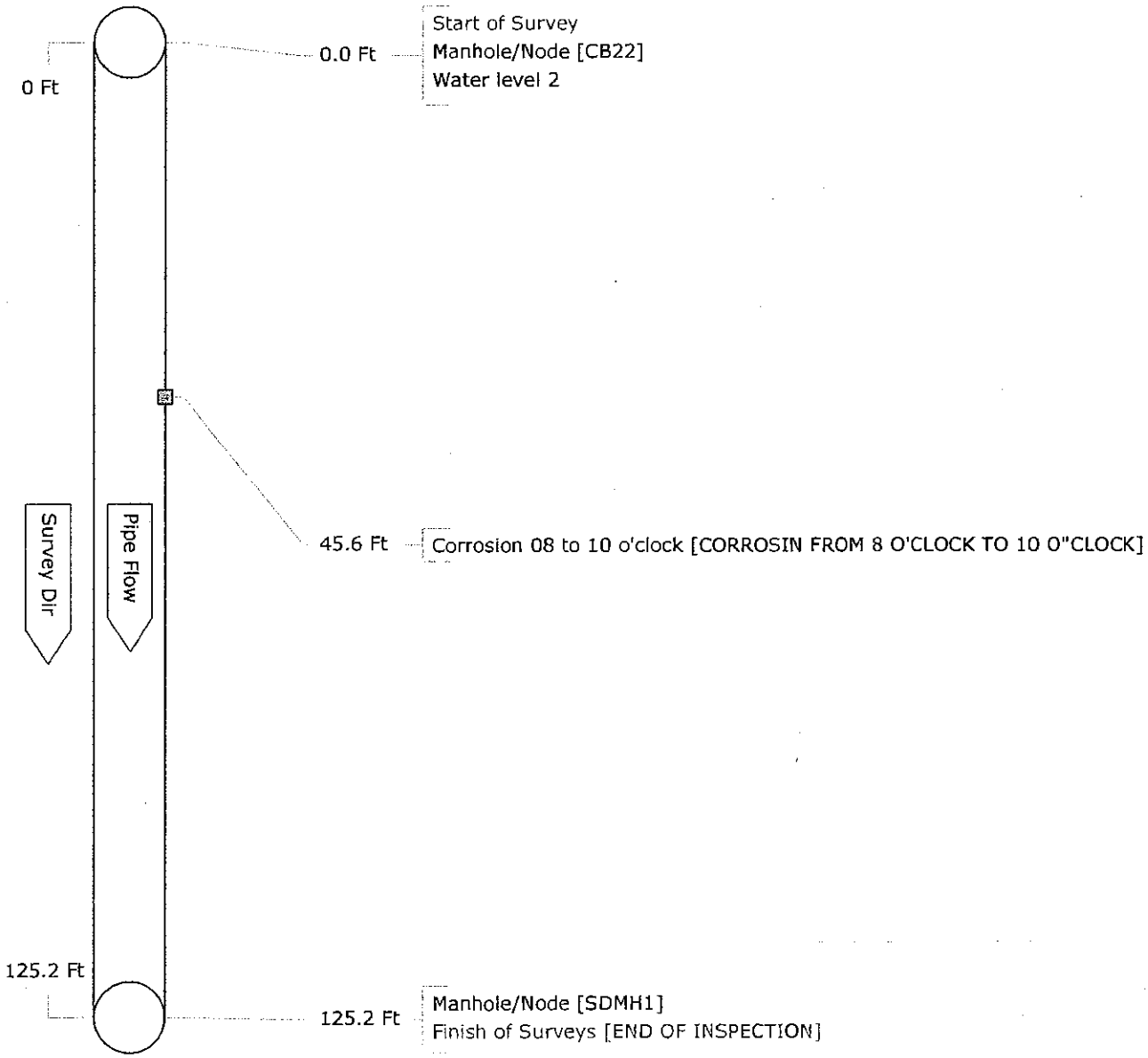
Pipe Graphic Report of PLR CB22 E **for** POS

Work Order		**Contract**		**Video**	**Setup** 42
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	125.2 Ft	**From**	CB22	**Depth**	8.50 Ft
Shape	Circular	**Size**	24 by 24 ins	**To**	SDMH1	**Depth**	0.00 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream		
Lining		**Year laid**		**Pre-clean**	N	**Last cleaned**	

General note	Structural	Service	Constructional
Location note	Miscellaneous	Hydraulic	



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Tabular Report of PLR RCB8 F **for POS**

Work Order	**Contract**	**Video**	**Setup** 44
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 101.5 **Ft**	**From** RCB7	**Depth** 9.00 **Ft**
Shape Circular	**Size** 36 **by** 36 **ins**	**To** RCB8	**Depth** 9.20 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**

General note

Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					RCB7
	0.0		WL	Water level				2	
	101.5		MH	Manhole/Node					RCB8
	101.5		FH	Finish of Surveys					END OF INSPECTION

101.5 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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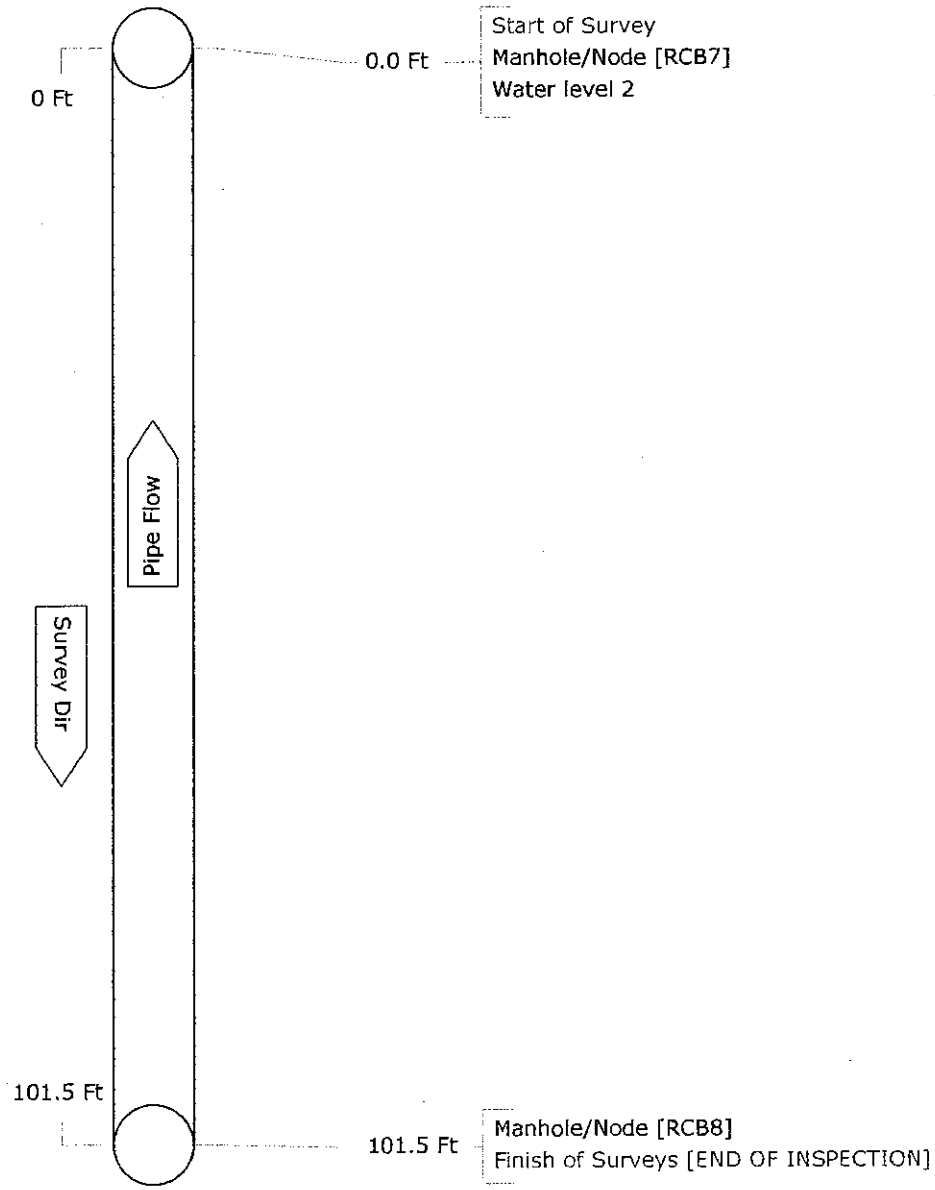
Pipe Graphic Report of PLR RCB8 F for POS

Work Order		**Contract**		**Video**	**Setup** 44
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	101.5 Ft	**From** RCB7	**Depth** 9.00 Ft
Shape	Circular	**Size** 36 **by** 36 ins		**To** RCB8	**Depth** 9.20 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Upstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**

General note		Structural	Service	Constructional
Location note		Miscellaneous	Hydraulic	



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Tabular Report of PLR RCB2 F **for POS**

Work Order	**Contract**	**Video**	**Setup** 45
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 90.0 **Ft**	**From** RCB1 **Depth** 8.90 **Ft**
Shape Circular	**Size** 54 **by** 54 **ins**	**To** RCB2 **Depth** 7.80 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous **Hydraulic**

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					RCB1
	0.0		WL	Water level				2	
	18.9		GC	General Comment					SILT THROUGHOUT PIPE
	90.0		MH	Manhole/Node					RCB2
	90.0		FH	Finish of Surveys					END OF INSPECTION

90.0 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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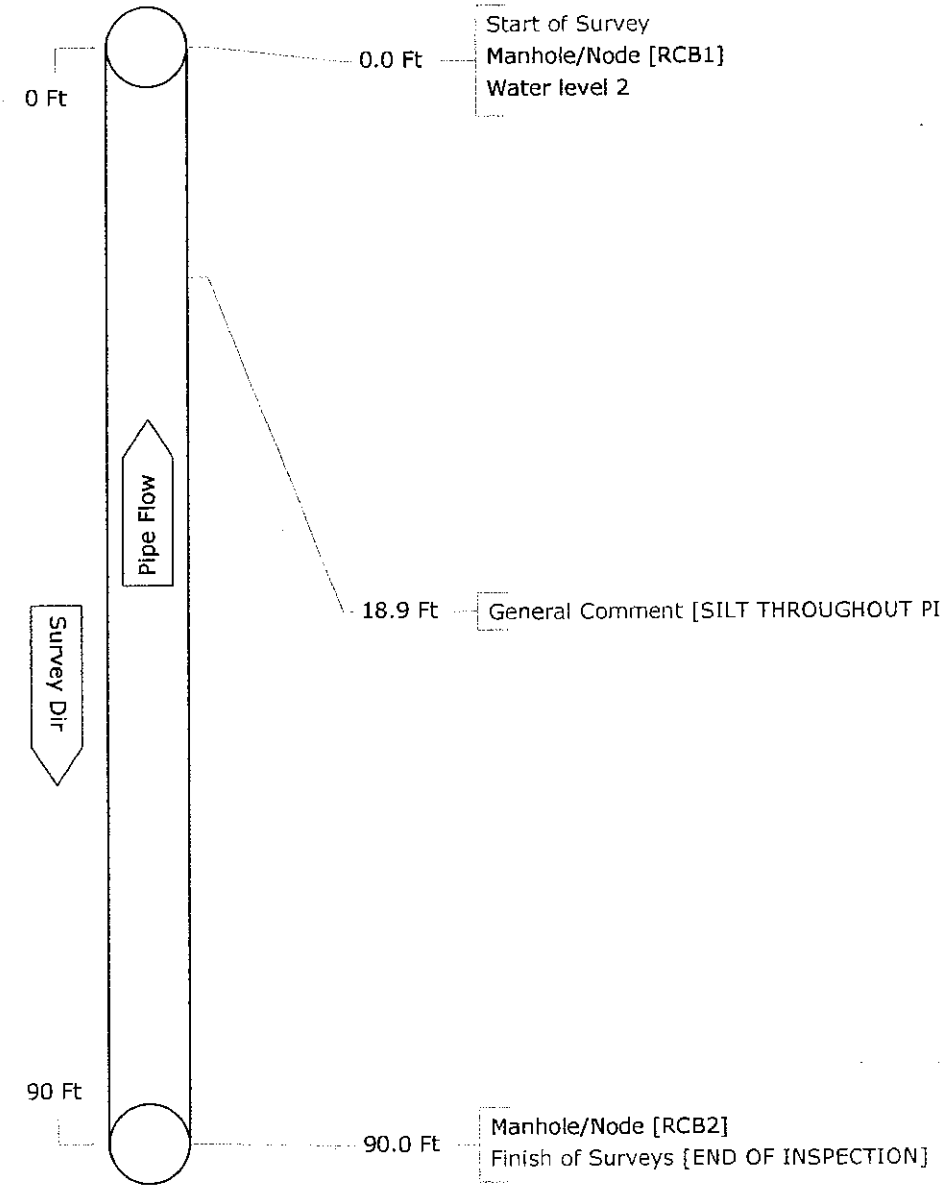
Pipe Graphic Report of PLR RCB2 F **for** POS

Work Order		**Contract**		**Video**	**Setup** 45
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	90.0 Ft	**From** RCB1	**Depth** 8.90 Ft
Shape	Circular	**Size** 54 **by** 54 ins		**To** RCB2	**Depth** 7.80 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Upstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural Service	Constructional
Location note				Miscellaneous **Hydraulic**	



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Tabular Report of PLR RCB4 F **for POS**

Work Order	**Contract**	**Video**	**Setup** 46
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 89.9 **Ft**	**From** RCB3 **Depth** 8.90 **Ft**
Shape Circular	**Size** 54 **by** 54 **ins**	**To** RCB4 **Depth** 7.80 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up
Lining	**Year laid**	**Pre-clean** N **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					RCB3
	0.0		WL	Water level				2	
	89.9		MH	Manhole/Node					RCB4
	89.9		FH	Finish of Surveys					END OF INSPECTION

89.9 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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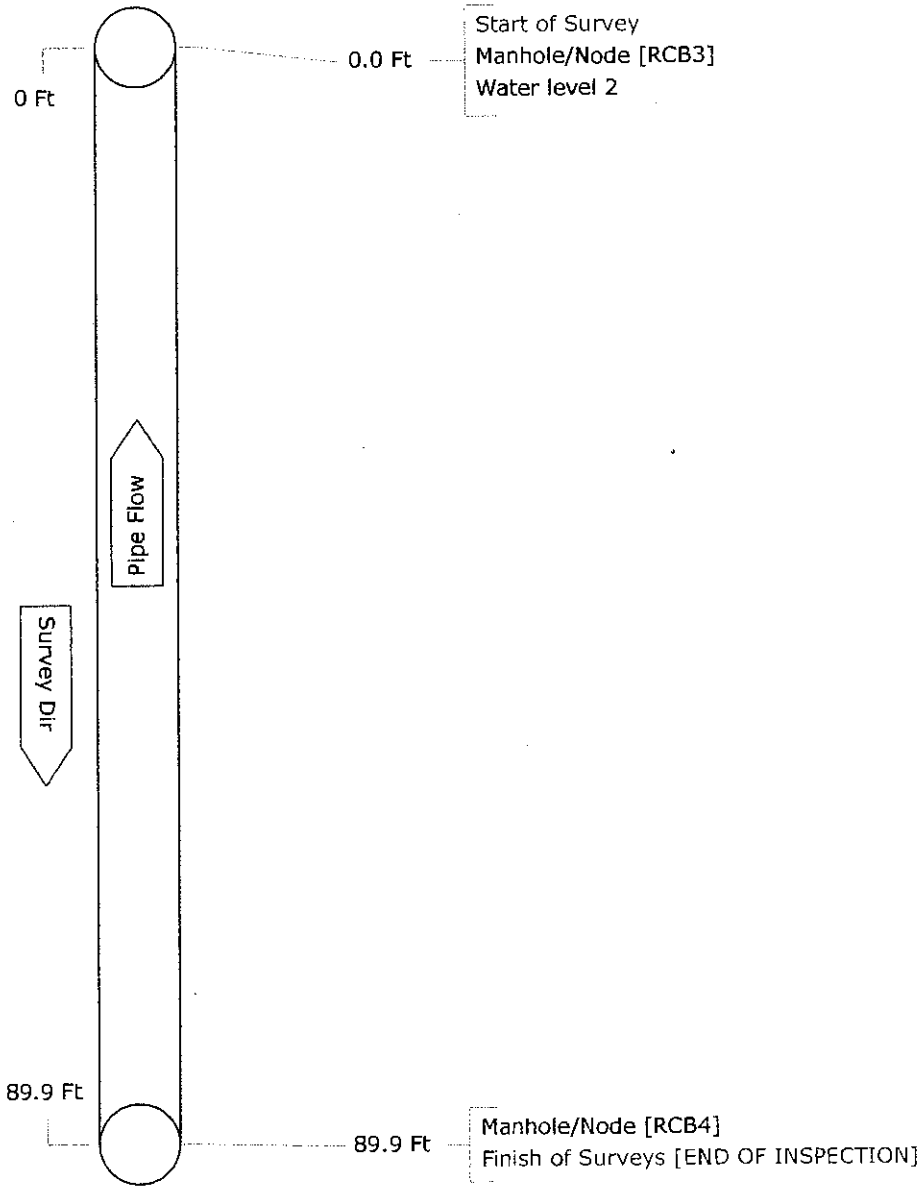
Pipe Graphic Report of PLR RCB4 F **for** POS

Work Order		**Contract**		**Video**	**Setup** 46
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	89.9 Ft	**From**	RCB3 **Depth** 8.90 Ft
Shape	Circular	**Size**	54 **by** 54 ins	**To**	RCB4 **Depth** 7.80 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean**	N **Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR RCB6 F **for POS**

Work Order	**Contract**	**Video**	**Setup** 47
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 01/28/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 88.2 **Ft**	**From** RCB5	**Depth** 8.90 **Ft**
Shape Circular	**Size** 54 **by** 54 **ins**	**To** RCB6	**Depth** 7.80 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Up	
Lining	**Year laid**	**Pre-clean** N	**Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous **Hydraulic**

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					RCB5
	0.0		WL	Water level				2	
00001	66.6		GC	General Comment					DEBRIS IN PIPE
	88.2		MH	Manhole/Node					RCB6
	88.2		FH	Finish of Surveys					END OF INSPECTION

88.2 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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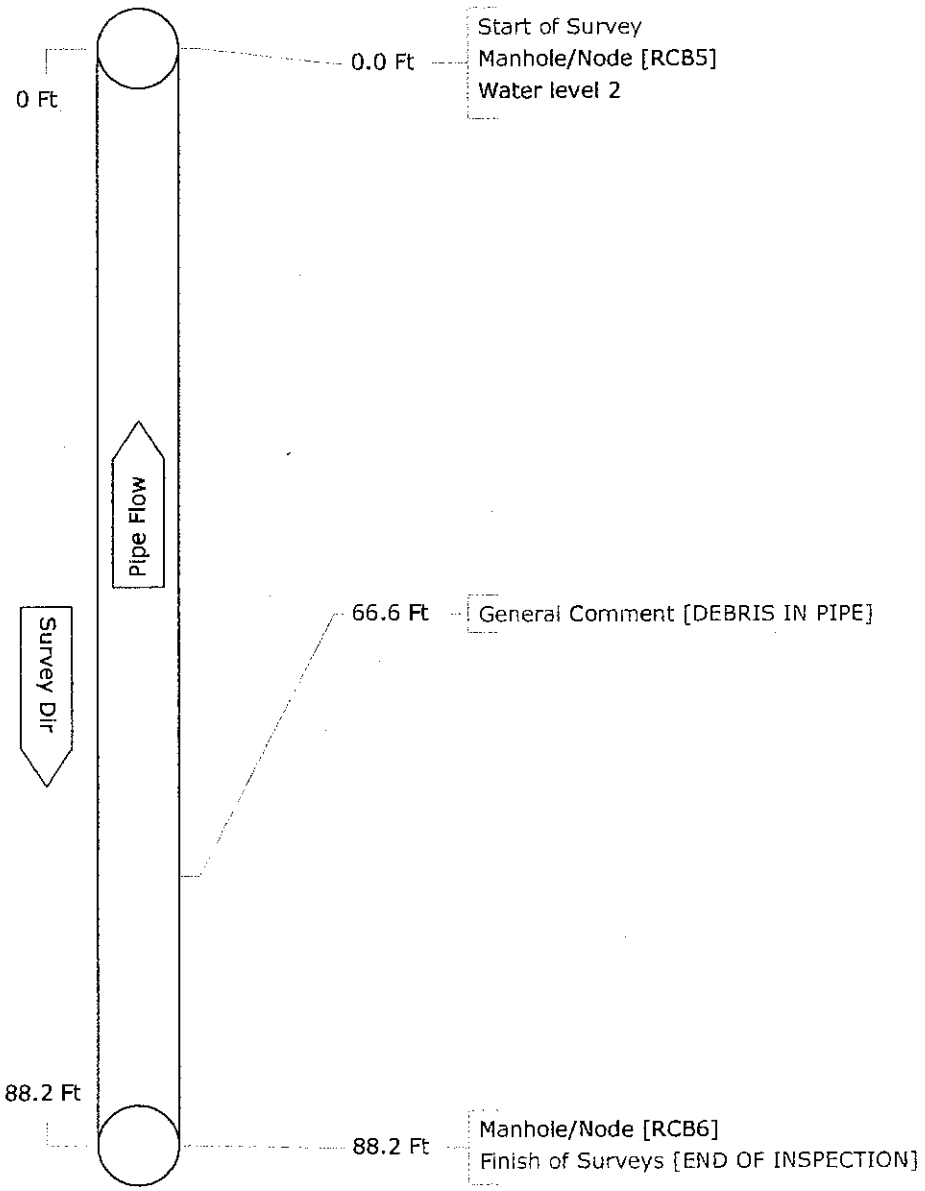
Pipe Graphic Report of PLR RCB6 F **for** POS

Work Order		**Contract**		**Video**	**Setup** 47
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 01/28/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	88.2 Ft	**From** RCB5	**Depth** 8.90 Ft
Shape	Circular	**Size** 54 **by** 54 ins		**To** RCB6	**Depth** 7.80 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Upstream	
Lining		**Year laid**		**Pre-clean** N	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB7 F **for POS**

Work Order	**Contract**	**Video**	**Setup** 50
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 02/05/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 78.1	**Ft**	**From** CB6	**Depth** 4.27	**Ft**
Shape Circular	**Size** 12	**by** 12 **ins**	**To** CB7	**Depth** 4.40	**Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing**	**Ft**	**Direction** Up		
Lining	**Year laid**		**Pre-clean** Y	**Last Cleaned**	

General note		Structural	Service	Constructional
Location note		Miscellaneous	Hydraulic	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB6
	0.0		WL	Water level				2	
	78.1		MH	Manhole/Node					CB7
	78.1		FH	Finish of Surveys					END OF INSPECTION

78.1 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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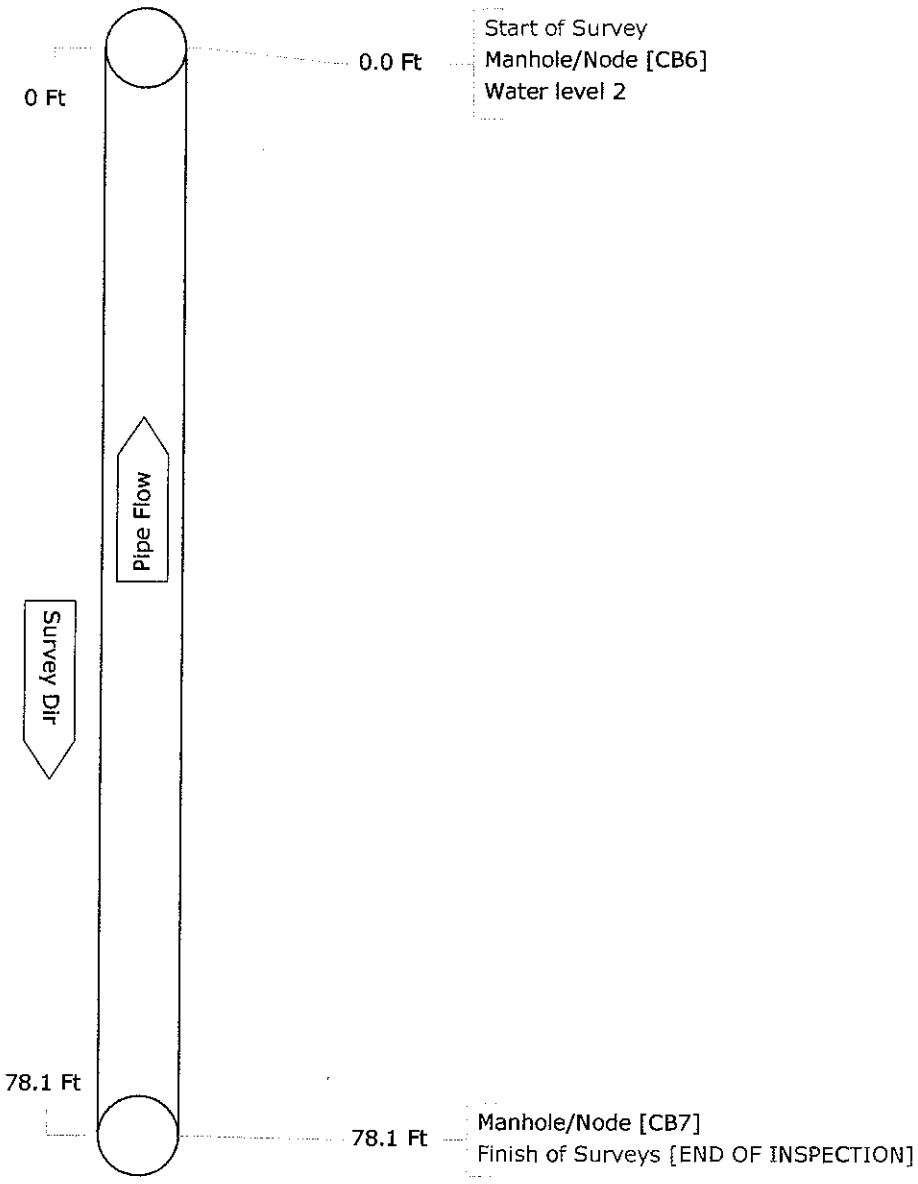
Pipe Graphic Report of PLR CB7 F **for** POS

Work Order		**Contract**		**Video**	**Setup** 50
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 02/05/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	78.1 Ft	**From** CB6	**Depth** 4.27 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB7	**Depth** 4.40 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Upstream
Lining		**Year laid**		**Pre-clean** Y	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB11 F **for POS**

Work Order	**Contract**	**Video**	**Setup** 48
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 02/05/2010

Street Name Des Moines Memorial Dr **City** Seatac
Location type Private - with easement
Surface Hotmix road
Survey purpose Random survey of pipes and things **Weather** Dry

Pipe Use Storm	**Sched length** 66.6 **Ft**	**From** CB11 **Depth** 4.80 **Ft**
Shape Circular	**Size** 12 **by** 12 **ins**	**To** CB12 **Depth** 4.50 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** Y **Last Cleaned**

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB11
	0.0		WL	Water level				1	
	66.6		MH	Manhole/Node					CB12
	66.6		FH	Finish of Surveys					END OF INSPECTION

66.6 **Ft** **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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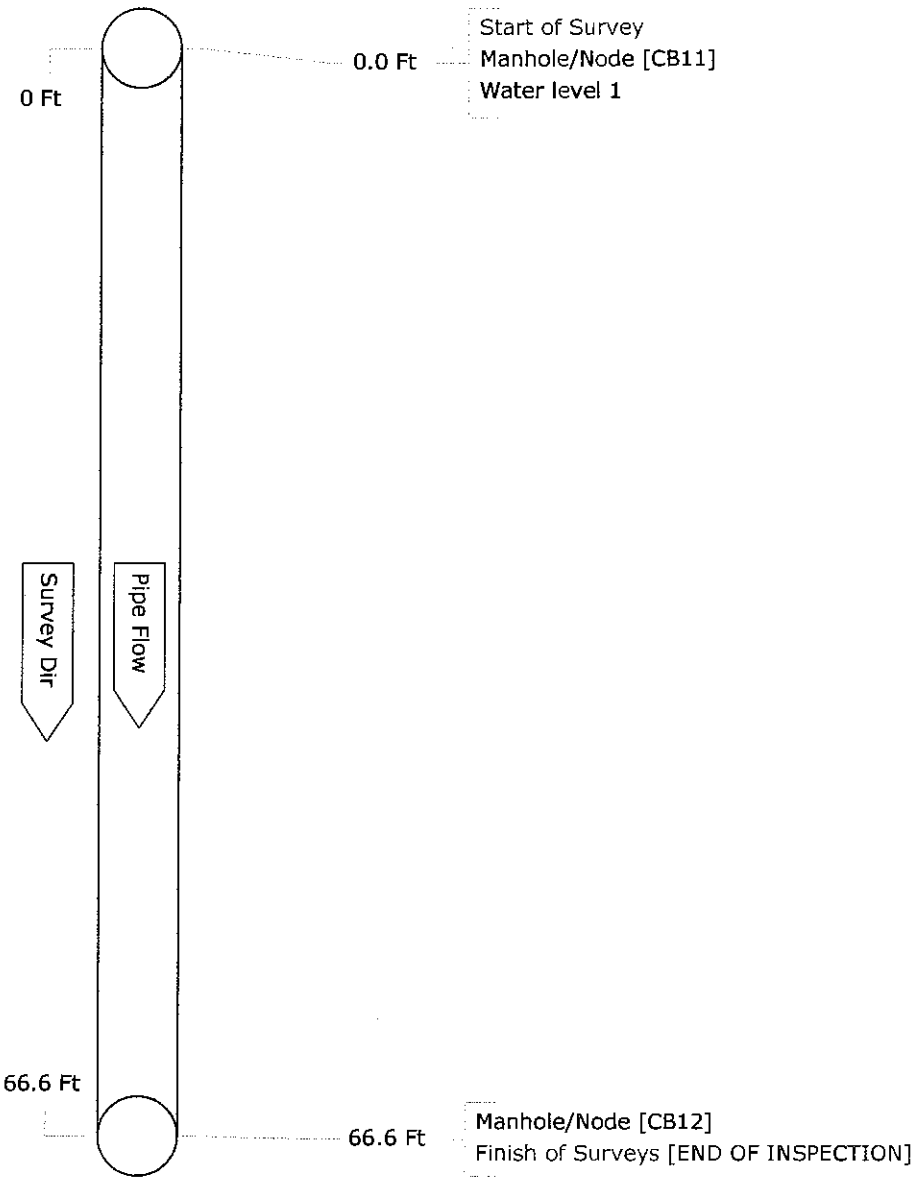
Pipe Graphic Report of PLR CB11 F **for** POS

Work Order		**Contract**		**Video**	**Setup** 48
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 02/05/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	66.6 Ft	**From** CB11	**Depth** 4.80 Ft
Shape	Circular	**Size** 12 **by** 12 ins		**To** CB12	**Depth** 4.50 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** Y	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	Hydraulic



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Tabular Report of PLR CB29 F **for POS**

Work Order	**Contract**	**Video**	**Setup** 49
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 02/05/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	
Pipe Use Storm	**Sched length** 111.5 **Ft**	**From** CB29	**Depth** 14.90 **Ft**
Shape Circular	**Size** 24 **by** 24 **ins**	**To** CB22	**Depth** 8.50 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down	
Lining	**Year laid**	**Pre-clean** Y	**Last Cleaned**
General note		Structural Service Constructional	
Location note		Miscellaneous **Hydraulic**	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB29
	0.0		WL	Water level				2	
	111.5		MH	Manhole/Node					CB22
	111.5		FH	Finish of Surveys					END OF INSPECTION

111.5 Ft **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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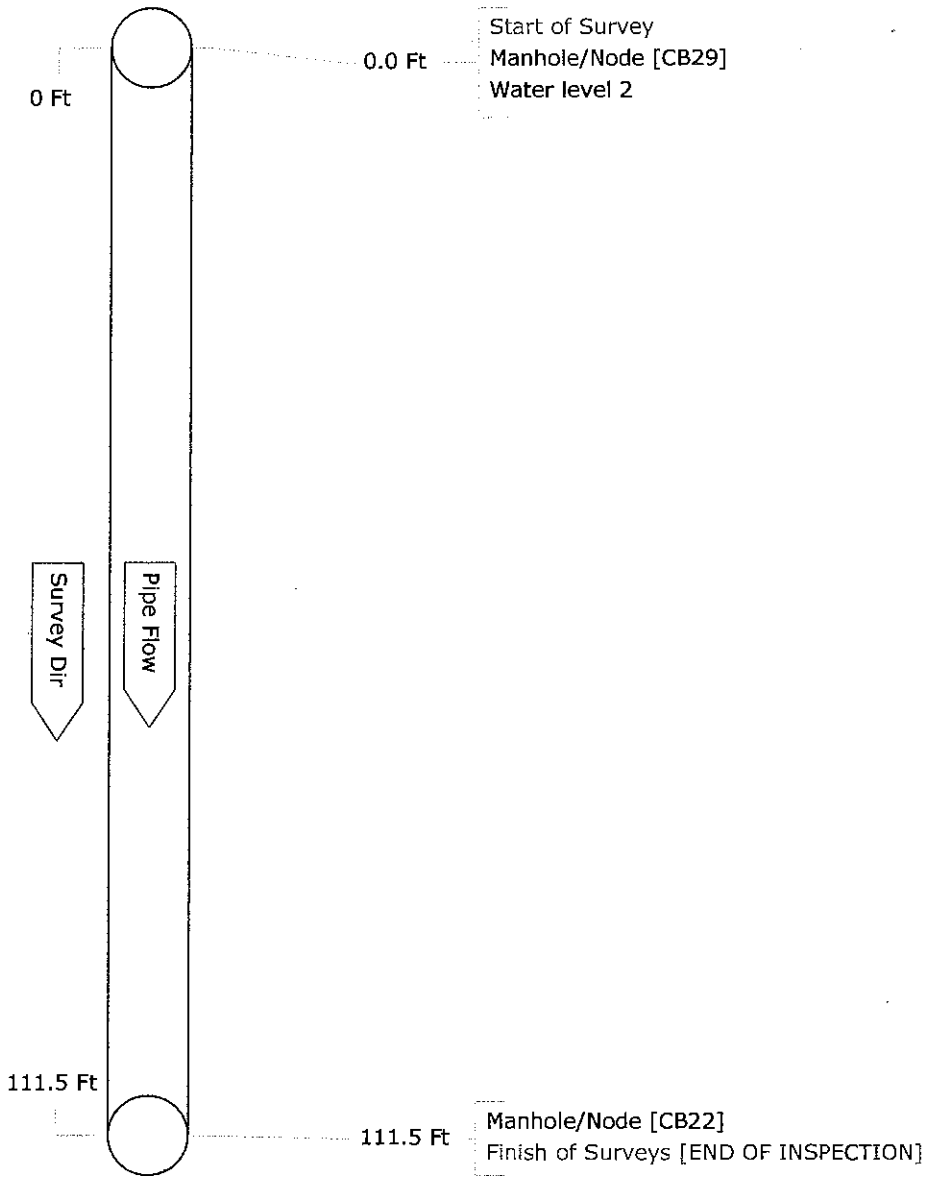
Pipe Graphic Report of PLR CB29 F **for** POS

Work Order		**Contract**		**Video**	**Setup** 49
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 02/05/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	111.5 Ft	**From** CB29	**Depth** 14.90 Ft
Shape	Circular	**Size** 24 **by** 24 ins		**To** CB22	**Depth** 8.50 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** Y	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	**Hydraulic**



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Tabular Report of PLR CB30 I **for POS**

Work Order	**Contract**	**Video**	**Setup** 56
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 02/08/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 99.5 **Ft**	**From** CB30 **Depth** 7.11 **Ft**
Shape Circular	**Size** 24 **by** 24 **ins**	**To** CB26 **Depth** 11.20 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** Y **Last Cleaned**
General note		Structural Service Constructional
Location note		Miscellaneous **Hydraulic**

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					CB30
	0.0		WL	Water level				2	
	99.5		MH	Manhole/Node					CB26
	99.5		FH	Finish of Surveys					END OF INSPECTION

99.5 Ft **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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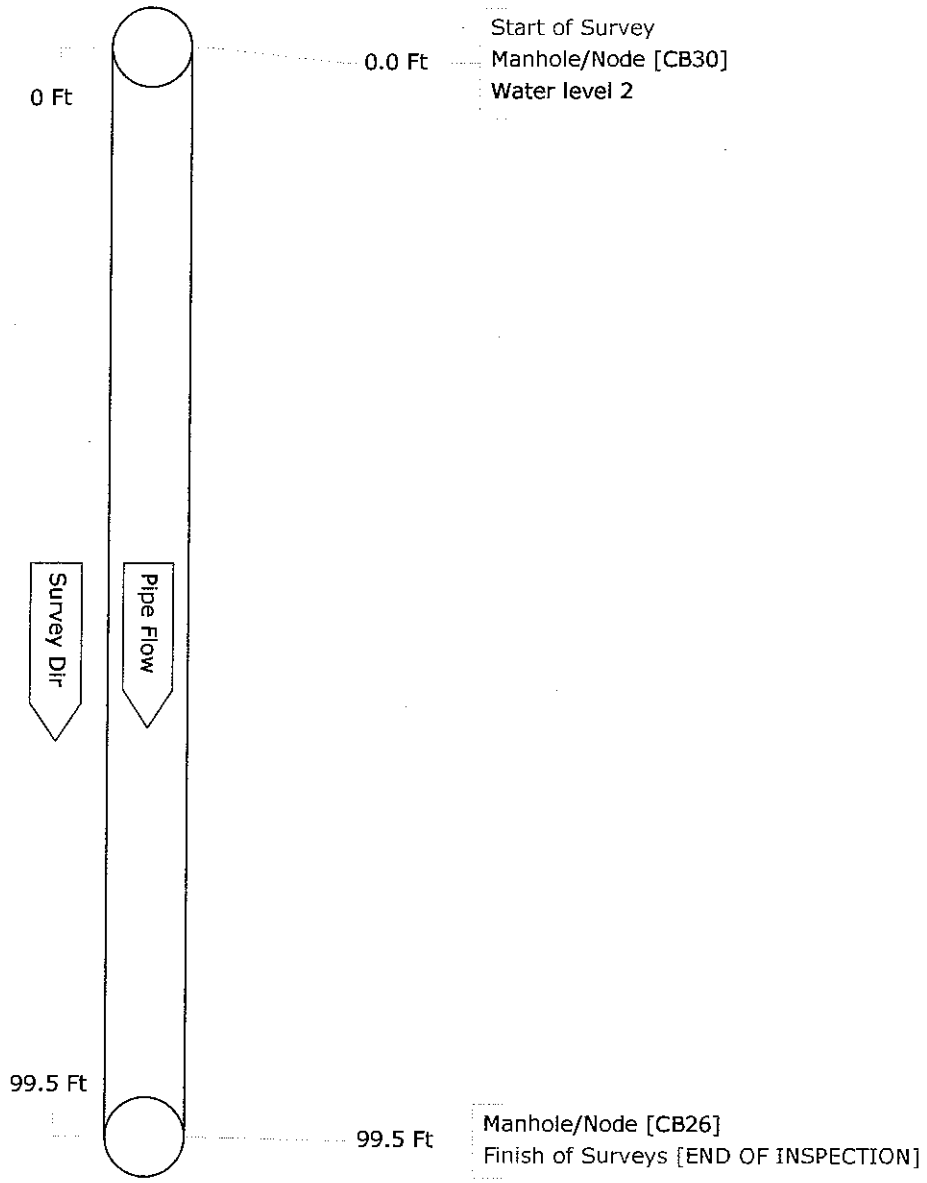
Pipe Graphic Report of PLR CB30 I **for** POS

Work Order		**Contract**		**Video**	**Setup** 56
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 02/08/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	99.5 Ft	**From** CB30	**Depth** 7.11 Ft
Shape	Circular	**Size** 24 **by** 24 ins		**To** CB26	**Depth** 11.20 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** Y	**Last cleaned**
General note				Structural	Service Constructional
Location note				Miscellaneous	**Hydraulic**



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Tabular Report of PLR RCB1 I **for POS**

Work Order	**Contract**	**Video**	**Setup** 57
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 02/08/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 88.9 **Ft**	**From** RCB1 **Depth** 8.90 **Ft**
Shape Circular	**Size** 54 **by** 54 **ins**	**To** RCB2 **Depth** 7.80 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down
Lining	**Year laid**	**Pre-clean** Y **Last Cleaned**

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					RCB1
	0.0		WL	Water level				1	
	88.9		MH	Manhole/Node					RCB2
	88.9		FH	Finish of Surveys					END OF INSPECTION

88.9 Ft **Total Length Surveyed**

Scores

Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

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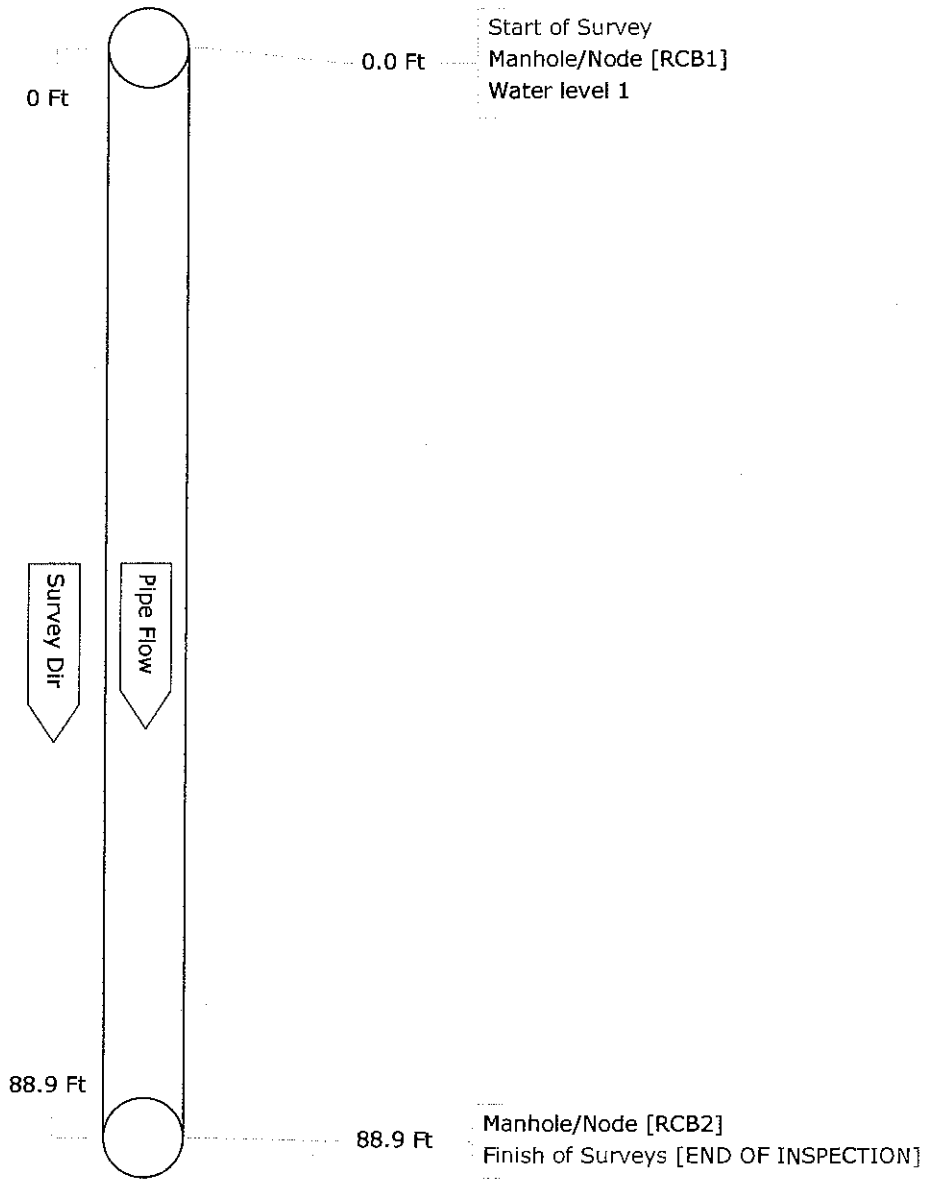
Pipe Graphic Report of PLR RCB1 I **for** POS

Work Order		**Contract**		**Video**	**Setup** 57
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 02/08/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry

Pipe Use	Storm	**Schedule length**	88.9 Ft	**From** RCB1	**Depth** 8.90 Ft
Shape	Circular	**Size** 54 **by** 54 ins		**To** RCB2	**Depth** 7.80 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction** Downstream	
Lining		**Year laid**		**Pre-clean** Y	**Last cleaned**

General note	Structural	Service	Constructional
Location note	Miscellaneous	**Hydraulic**	



PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Tabular Report of PLR RCB5 J **for POS**

Work Order	**Contract**	**Video**	**Setup** 58
Facility	**Operator** Jayme Keith	**Van Ref** 15	**Surveyed On** 02/08/2010
Street Name Des Moines Memorial Dr		**City** Seatac	
Location type Private - with easement			
Surface Hotmix road			
Survey purpose Random survey of pipes and things		**Weather** Dry	

Pipe Use Storm	**Sched length** 93.2 **Ft**	**From** RCB5	**Depth** 8.90 **Ft**
Shape Circular	**Size** 54 **by** 54 **ins**	**To** RCB6	**Depth** 7.80 **Ft**
Material Steel - Corrugated (ARMCO)	**Joint Spacing** **Ft**	**Direction** Down	
Lining	**Year laid**	**Pre-clean** Y	**Last Cleaned**
General note		Structural Service	Constructional
Location note		Miscellaneous **Hydraulic**	

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					RCB5
	0.0		WL	Water level				1	
	93.2		MH	Manhole/Node					RCB6
	93.2		FH	Finish of Surveys					END OF INSPECTION

93.2 Ft **Total Length Surveyed**

Scores

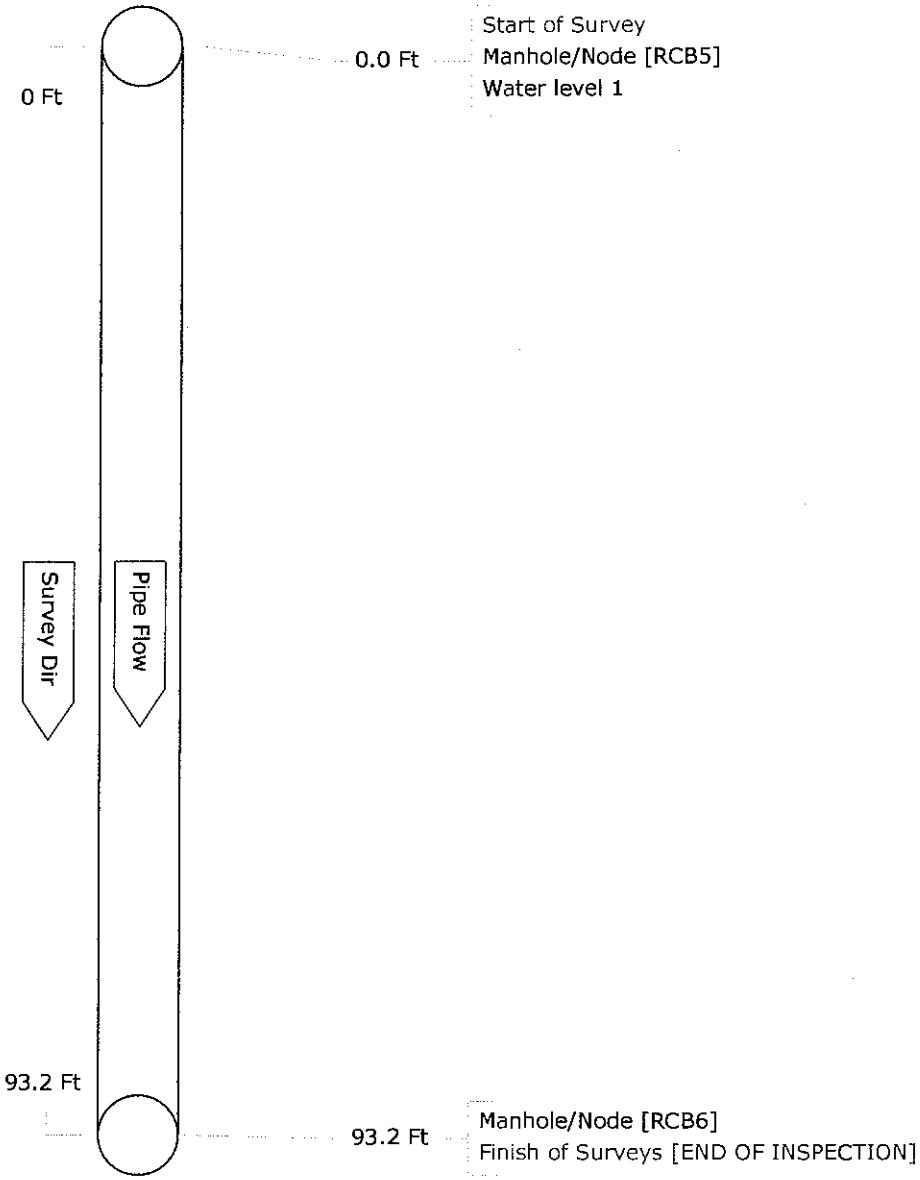
Structural:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0
Service:	**Total** 0	**Mean Defect** 0	**Peak** 0	**Mean Pipe** 0

PIPELOGIX INC

PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Pipe Graphic Report of PLR RCB5 J **for** POS

Work Order		**Contract**		**Video**	**Setup** 58
Facility		**Operator** Jayme Keith		**Van Ref** 15	**Surveyed On** 02/08/2010
Street Name	Des Moines Memorial Dr	**City**	Seatac		
Location type	Private - with easement				
Surface	Hotmix road				
Survey purpose	Random survey of pipes and things			**Weather**	Dry
Pipe Use	Storm	**Schedule length**	93.2 Ft	**From** RCB5	**Depth** 8.90 Ft
Shape	Circular	**Size** 54 **by** 54 ins		**To** RCB6	**Depth** 7.80 Ft
Material	Steel - Corrugated (ARMCO)	**Joint spacing**	Ft	**Direction**	Downstream
Lining		**Year laid**		**Pre-clean** Y	**Last cleaned**
General note				Structural Service	Constructional
Location note				Miscellaneous Hydraulic	



PipeLogix Inc.
Phone: 866-299-3150
Fax: 760-406-6023

Port of Seattle
Lora Lake Apartments

Remedial Investigation/ Feasibility Study Work Plan

Appendix D
Catch Basin Sediment Field Sampling Forms

FINAL

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	January 27, 2010
TO:	Matt Woltman / Jessi Massingale
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600
	Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409
CC:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Sediment Sampling Event Report (01/07-11/2010)

Please find included the following:

- Sediment sampling event narrative (2 pg),
- Sediment sampling event summary table (1 pg),
- COC forms (2 pgs), and
- Field Sheets (5 pgs).

Please let me know if you have any questions or need additional information. Thank You.

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal
and Freshwater Sciences

Dave Metallo, LHG

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Sediment Sampling Event Narrative Report
January 7th – 11th, 2010

General:

Sediment sampling at the Lora Lake Apartments (LLA) project site was conducted as a one-time event. The event was conducted over the course of two field days; January 7th and 11th. Sediment was sampled at four individual stations (in order of inlet to outlet flow); CB-31A, CB-19, CB-12 and CB-2. These locations are shown on maps in the LLA Work Plan.

See the accompanying ***Sediment Sampling Event Summary Spreadsheet,*** **Chain of Custody records and field sheets** for details regarding the event. Several of the key event categories are discussed below.

Sampling Methodology:

Sampling equipment included stainless steel spoons, scoops, bowls, dip cups and a polyurethane Nasco swing sampler arm (dip cup holder) attached to a fiberglass extension pole. Sediment at each station was accessed from the surface, via the catch basin's vault lid. Using the dip cup attached to the extension pole, sediment was scooped from various locations within each catch basin and placed into a bowl. Once sufficient coverage of the catch basin interior was completed (striving for a representative sample) and enough material was collected to fill all of the requisite analytical containers the material was homogenized by folding and mixing with scoops. The volatile portion was collected with an Ez-Draw apparatus, prior to vigorous homogenization, by sampling from within various positions within the bowl. This was done in an effort to minimize volatile loss. The remaining parameter jars were filled, capped, labeled and placed on ice in sturdy coolers. The cooler containing the volatile samples was accompanied by trip blanks provided by the analytical testing facility, Analytical Resources, Inc. (ARI) of Tukwila, WA. Any leftover material in the mixing bowl was placed back into the catch basin of its origin.

Equipment Decontamination:

All stainless steel sampling equipment was decontaminated per the SOP provided in the LLA Work Plan under laboratory conditions at ARI by their chemistry staff. The Nasco swing arm and extension pole (first six feet) were also decontaminated via the same LLA Work Plan SOP but were done in the field between sampling locations. All sampling personnel employed USEPA recommended "clean hands" techniques when conducting sampling procedures or sample management tasks.

Sampling Parameters:

As per the LLA Work Plan; volatile organic compounds (included PCE, TCE and 1,2-DCA), polyaromatic hydrocarbons, pentachlorophenol (PCP), total petroleum hydrocarbons, metals (arsenic and lead), dioxin/furans, total solids and total organic carbon. Samples collected from all locations, including quality control samples, were submitted to the laboratory for all of the above listed parameters.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected samples were placed into coolers and iced. All samples were recorded on Chain-of-Custody forms and were in direct control of project personnel at all times. All samples were delivered to the testing facility, ARI, in good, useable and properly chilled condition. Enough sample was collected from all of the stations to proceed with the scheduled analysis of all parameters per the LLA QAPP.

Sample Types:

"Normal" or routine scheduled samples were collected at each of the four monitoring locations noted above. Sample volumes were collected as detailed in the LLA Work Plan. Additional sample volume was collected at CB-31A for the analysis of a method spike and method spike duplicate (MS/MSD). A duplicate split sample was also collected at CB-31A. All of the quality control samples were collected, managed and submitted for the same analyses as the normal samples. A trip blanks accompanied the volatile portion of the samples and were submitted for the same analysis as the normal and quality control samples (for the volatile fraction).

Anomalies and/or Work Plan Deviations:

There were no anomalies observed that would cause any of the sediment samples to be non-representative of the conditions from which they were collected. Initially, CB-31A was sampled on January 7 th and submitted to ARI along with the other samples collected that day. It was then realized that a duplicate (split) and MS/MSD sample and sample volume were not submitted. After discussions between Taylor Associates, Floyd / Snider and ARI it was decided that CB-31A would be re-sampled on January 11 th. Thus CB-31A is indicated on both event Chain-of-Custody forms. However, only that sample from January 11th was actually analyzed.

Related Future Site Actions To Be Completed:

In-vault sampling infrastructure will be removed from each of the three monitoring stations in preparation for the upcoming sediment sampling and drainage system cleaning (vactoring) events (scheduled for mid-January). Sediment traps will be installed at four pre-determined locations post-vactoring but prior to the resumption of stormwater sampling.

POS Lora Lake Apartments Interim Action Tasks
Sediment Sampling Event Summary Spreadsheet

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Sample Event Data:	
Project Sediment Sampling Event (SSE) #	1
STE Start Date	1/7/2010
STE End Date	1/11/2010

[1] Sample Collection Data:				
Sampling Station	CB-31A	CB-99	CB-19	CB-12
Was "normal" or duplicate sample collected?	Yes	Dup (see below)	Yes	Yes
Sampl ID	CB31A011110SED	na	CB19010710SED	CB12010710SED
Sample Date /Time	01/11/2010 10:00	na	01/07/2010 11:50	01/07/2010 13:30
Sample parameters collected per LLA QAPP ?	Yes	Yes	Yes	Yes
Were Trip Blanks included w/ samples ?	Yes	Yes	Yes	Yes
Was a proper sample volume collected for for all scheduled analyses ?	Yes	Yes	Yes	Yes
Were samples collected per LLA Work Plan ?	Yes	Yes	Yes	Yes
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No	No
[1] QC Sample Summary Information:	CB-31A		CB-4857	CB-1
Was duplicate collected ?	Yes	Dup of CB-31A	No	No
Sample duplicate ID	na	CB99011110SED	na	na
Grab sample date and time	na	01/11/2010 10:30	na	na
Was additional volume collected for MS/MSD analysis ?	Yes	na	na	na

[1] If the answer to any of the validation/qualification questions are "no" OR indicate non-representative conditions, then these issues should be explained in SSE Summary Narrative.

Validation Check List Report Completed By / Date: 1-25-10 Reveiwed By / Date: 1-25-10

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Floyd / Snider	Phone: (206) 292-2078	Date: 1-7-2010	Ice Present? Yes
Client Contact: Matt Waltman / Jessi Massingale		No. of Coolers: 1	Cooler Temps: 6.0
Client Project Name: POS-LLA (Lora Lake Apts)			
Client Project #: POS-LLA	Samplers: D. Metallo, P. Heltzel		

Sample ID	Date	Time	Matrix	No. Containers	PAH 8270D	PCP 8041	TPH-D NWTPH-Dx	As + Pb 6010	Dioxin / Furans 1613	VOC ① 8260D	Total Solids SM2540B	T.O.C. Plumb 1981	Notes/Comments
CB31A010710SED	1-7-10	1030	Sed	9	X	X	X	X	X	X	X	X	
CB19010710SED	1-7-10	1150	Sed	9	X	X	X	X	X	X	X	X	
CB12010710SED	1-7-10	1330	Sed	9	X	X	X	X	X	X	X	X	
CB2010710SED	1-7-10	1430	Sed	9	X	X	X	X	X	X	X	X	
TB010710~~SED~~ DM	1-7-10	0900	~~Sed~~ Water DM	3						X			

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
① tetrachloroethene, trichloroethene, 1,2-Dichloroethane	Printed Name: Peter Heltzel	Printed Name: Jonathon Walter	Printed Name:	Printed Name:
	Company: TAI	Company: ARI	Company:	Company:
	Date & Time: 1/7/10 4:34 pm	Date & Time: 1/7/10 1634	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Standard	Page: 1 of 1	
ARI Client Company: Floyd/Snider	Phone: (206) 292-2078	Date: 1-11-2010	Ice Present? Yes
Client Contact: Jessi Massingale / Matt Woltman		No. of Coolers: 1	Cooler Temps: 2.2
Client Project Name: POS - Lora Lake Apts Interim Action			
Client Project #: POS-LLA	Samplers: D. Metallo		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	VOC[1] 8260C	PAH 8270	PCP 8041	TPH NWTPH-Dx	Metals As & Pb 6010	Dioxin / Furans 1613	Total solids SM2540B	T.O.C. Plumb 1981	Notes/Comments
CB31A011110SED	1-11-10	1000	Sed	18	X	X	X	X	X	X	X	X	run MS/MSD
CB9901111OSED	1-11-10	1030	Sed	9	X	X	X	X	X	X	X	X	
TB011110	1-11-10	0900	Water	3	X								trip blank

Comments/Special Instructions
[1] includes; PCE, TCE and 1,2-DCA

Relinquished by: (Signature)	Dave Metallo	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name:	Dave Metallo	Printed Name: D. Peterson	Printed Name:	Printed Name:
Company:	Taylor Associates Inc.	Company: ART	Company:	Company:
Date & Time:	1-12-10 (1044)	Date & Time: 1/12/10 1044	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

TAYLOR ASSOCIATES, INC.

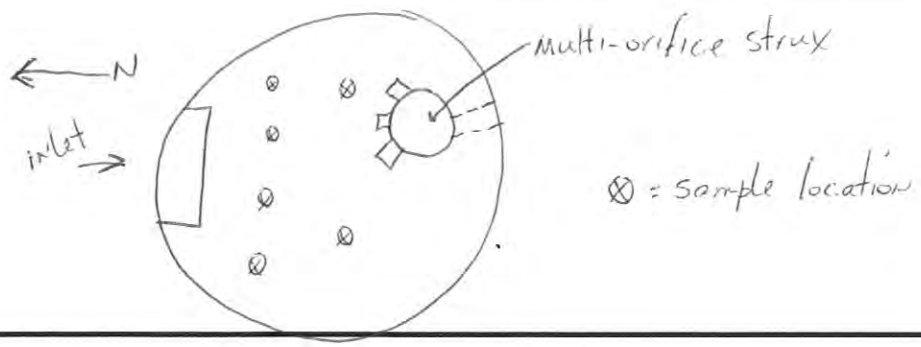
POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel:	D. Metallo / P. Hetzel	**Date/Time:**	1-7-~~10~~2010 (1405)
Weather	Partly sunny / overcast, breezy, 40's, no precip. in last 24-hrs		

Station ID:	CB-2
Manhole/CB #:	CB4555 / CS-CB2
Location Description:	terminal end of on-site drainage system, loc. has multi-orifice strux
Sampling Methodology:	ext. pole w/ Nasco swing arm sampler & dip cup, homogenize, fill jars
Sampling Equipment Used:	stainless steel bowls, spoons, dip cup - Nasco swing arm
Decon'ed per/LLA ?:	Yes; bowls, spoons, cups decon'ed @ ARI, Nasco swing arm decon'ed in field
Trip Blanks ?:	Yes (TB010710 @ 0900)
Sediment Grab Sample ID:	CB20107105ED
Sample time:	(1430) **Bottles labeled?:** Yes
Parameters for Testing:	Per LLA QAPP (VOCs, TOC, PAH-PCP-TPH, Ar, Dioxin/furans) + Pb, Tot. Solids
Sediment Present? Approx depth?	Yes ~1 to 15'
Water Present? Approx depth?	Yes ~2.5'
Water flowing? Stagnant?	Stagnant
Sed. color: brown, (black), grey, yellow, red, mottled	**Sed. odor:** petroleum, (pungent), sewage, (earthy), salty
Sed. sheen: none, some, (lots) (likely organic derived)	**Sed. consistency:** gravelly, sandy, silty, clayey, (organic)
Est. % of sample removed (particles ≥ 2 cm):	1-2%

Notes: *"Sed" is highly organic in nature w/ less than 20% actual grains (grains f-vfg sand & silt). VOC analysis questionable due to organic matter(?)

Sketch:



TAYLOR ASSOCIATES, INC.

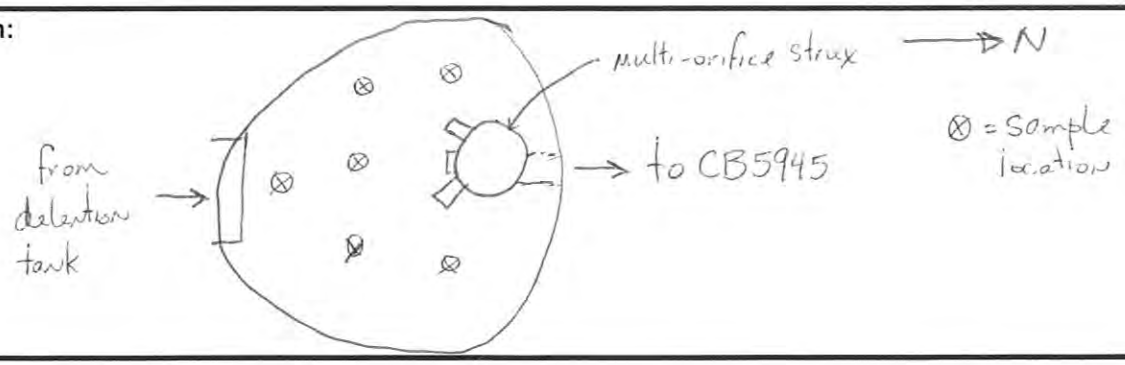
POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel: D. Metallo, P. Heltzel	**Date/Time:** 1-7-2010 (12:59)
Weather Partly sunny, clouds moving in, 40°s, breezy, no precip. in last 24-hrs	

Station ID:	CB-12
Manhole/CB #:	CB-12
Location Description:	end (north end) of detention tank @ SE portion of site, just prior to re-entry to main line @ CB5945
Sampling Methodology:	ext. pole w/ Nasco swing arm + dip cup, homogenize in bowl, fill jars
Sampling Equipment Used:	Stainless steel bowls, cups, spoons, Nasco swing arm
Decon'ed per/LLA ?:	Yes ARI decon'ed all except swing arm (decon'ed in field)
Trip Blanks ?:	Yes (TB010710 @ 0900)
Sediment Grab Sample ID:	CB12010710SED
Sample time: (1330)	**Bottles labeled?:** Yes
Parameters for Testing:	Per LLA QAPP (PAH-PCP-TPH, Ar, Dioxin/furan, VOC + TOC) + Pb, Tot. Solids
Sediment Present? Approx depth?	~1.5'
Water Present? Approx depth?	Yes ~1.5'-2'
Water flowing? Stagnant?	Stagnant
Sed. color: brown, (black), grey, yellow, red, mottled	**Sed. odor:** (petroleum), pungent, sewage, (earthy), salty
Sed. sheen: none, (some), lots (maybe organic derived)	**Sed. consistency:** gravelly, sandy, silty, clayey, (organic)
Est. % of sample removed (particles ≥ 2 cm):	~5-10% (detris) Sed v. organic w/ vfg sand & silt

Notes:
- "Sediment" dominated by organic matter - VOC sample questionable

Sketch:



TAYLOR ASSOCIATES, INC.

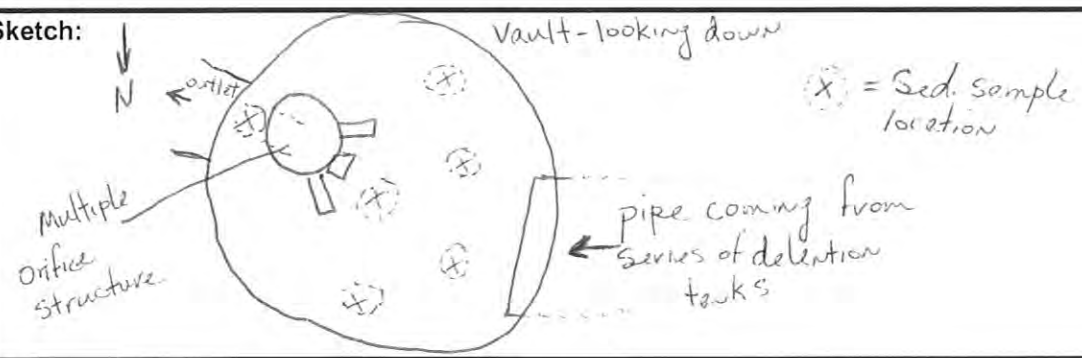
POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel: D. Metallo, P. Heltzel	**Date/Time:** 1-7-2010 (1130)
Weather Sunny - clear, breezy, 30-40°s, no precip in last 24 hrs	

Station ID:	CB-19
Manhole/CB #:	CS/CB-19
Location Description:	end node of (3) detention tanks (NW portion of site) just prior to re-entry to main SW line.
* **Sampling Methodology:**	ext. pole + SS dip cup, sample placed into SS bowl, homogenized, placed into jars
Sampling Equipment Used:	stainless steel bowls, spoons + dip cup; Nasco swing arm sampler
Decon'ed per/LLA ?:	Yes bowls + spoons - cups decon'ed by ARI, Nasco decon'ed in field
Trip Blanks ?:	Yes (TB010710 @ 0900)
Sediment Grab Sample ID:	CB19010710SED
Sample time: (1150)	**Bottles labeled?:** Yes
Parameters for Testing:	Per LLA QAPP (PAHs/PCP, TPH, Ar, Dioxins/furans, VOC + TOC) + Pb, Tot. Solids
Sediment Present? Approx depth?	Yes, ~ 1 to 1.5'
Water Present? Approx depth?	Yes, ~ 2 to 2.5'
Water flowing? Stagnant?	Stagnant
Sed. color: brown, black, grey, yellow, red, mottled	**Sed. odor:** petroleum, pungent, sewage, earthy, salty
Sed. sheen: none, some, lots	**Sed. consistency:** gravelly, sandy, silty, clayey, organic
Est. % of sample removed (particles ≥ 2 cm):	less than 1% → v. mucky

Notes: * VOC collected from SS bowl prior to brisk homogenation.
- Accumulated material very "mucky" + "soupy", persistent hydrocarbon odor, sheen noticeable

Sketch:



TAYLOR ASSOCIATES, INC.

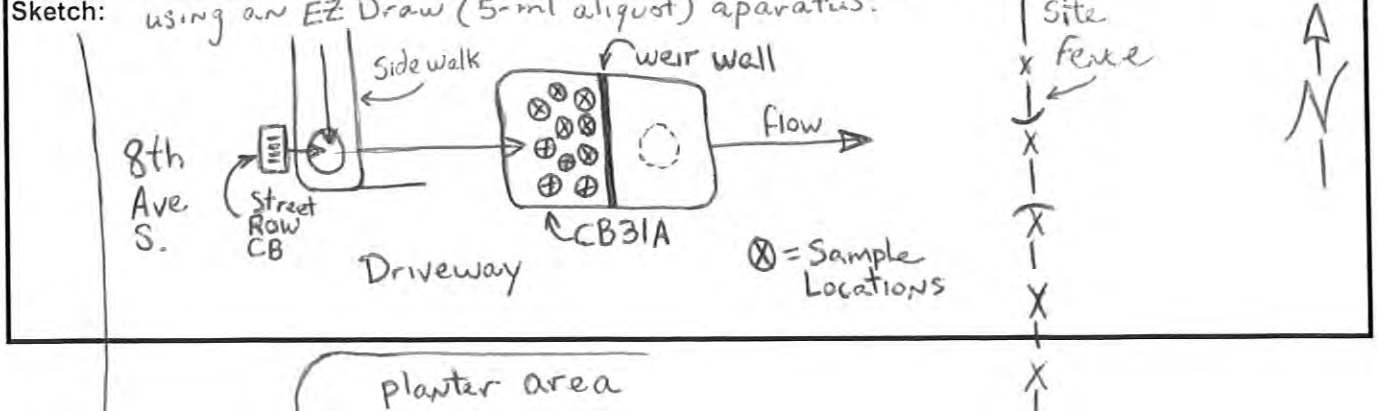
POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel: D. Metello	**Date/Time:** 1-11-2010 (0915)
Weather Rain, 40°s, breezy	

Station ID:	CB-31A
Manhole/CB #:	CB-31A
Location Description:	LLA project site & main drainage line inlet station, western half of double vault
Sampling Methodology:	ext. pole w/ Nasco swing arm sampler + SS dip cup, homogenize, fill jars
Sampling Equipment Used:	stainless steel bowls, spoons & dip cup - Nasco swing arm
Decon'ed per/LLA ?:	Yes; bowls, spoons & dip cup decon'ed @ ARI, Nasco swing arm decon'ed in field.
Trip Blanks ?:	Yes (TB011110 @ 0900)
Sediment Grab Sample ID:	CB31A011110SED ** collected triple vol. for MS/MSD analysis
Sample time: (1000)	**Bottles labeled?:** Yes
Parameters for Testing:	per LLA QAPP (VOCs, TPH, Dioxin/furans, PAH, PCP, TOC, As & Pb, Tot. Solids)
Sediment Present? Approx depth?	Yes, >1'+
Water Present? Approx depth?	Yes, ~2.5-3'
Water flowing? Stagnant?	flowing
Sed. color: brown, black, grey, yellow, red, mottled	**Sed. odor:** slight petroleum, pungent, sewage, earthy, salty
Sed. sheen: none, some, lots	**Sed. consistency:** gravelly, sandy, silty, clayey, organic
Est. % of sample removed (particles ≥ 2 cm):	< 1-2%

Notes: Sediment collected from western portion of divided double vault structure (inlet side of weir wall). Abundant amount of floatable debris (bottles, cans, plastic containers, balls, etc.). Used extention pole to Sample sediment from various ~~portions~~ PM locations around vault interior (sump area). Was also able to sample sed. from various depths. VOC portion of samples collected from SS bowl prior to brisk homogenation using an EZ Draw (5-ml aliquot) aparatus.

Sketch:



TAYLOR ASSOCIATES, INC.

POS - Lora Lakes Apartments Stormwater Interim Action - Sediment Sampling
Sediment Grab Sample Collection Field Sheet

Personnel: D. Metallo	**Date/Time:** 1-11-2010 (1015)
Weather Rain, 40°s, breezy	

Station ID: CB99 (duplicate of CB-31A)	
Manhole/CB #: CB-31A	
Location Description: LLA project site stormwater main drainage line inlet station	
Sampling Methodology:	
Sampling Equipment Used:	
Decon'ed per/LLA ?:	
Trip Blanks ?: Yes (TB011110 @ 0900)	
Sediment Grab Sample ID: CB99011110SED	
Sample time: (1030)	**Bottles labeled?:** Yes
Parameters for Testing: per LLA QAPP (VOCs, TPH, Dioxin/furans, PAH, PCP, As & Pb, tot. solids)	
Sediment Present? Approx depth? } see form for CB-31A	
Water Present? Approx depth?	
Water flowing? Stagnant?	
Sed. color: brown, black, grey, yellow, red, mottled	**Sed. odor:** petroleum, pungent, sewage, earthy, salty
Sed. sheen: none, some, lots	**Sed. consistency:** gravelly, sandy, silty, clayey, organic
Est. % of sample removed (particles ≥ 2 cm):	

Notes: CB-99 sample is a duplicate split of CB-31A. Refer to CB-31A field form for collection and sediment description details.

Sketch:

Port of Seattle
Lora Lake Apartments

Remedial Investigation/ Feasibility Study Work Plan

Appendix E
Waste Designation Memorandum

FINAL

Memorandum

Date: 15 June 2010

To: File

From: Port of Seattle Aviation Environmental – Hazardous Waste Management Program

Subject: Lora Lake Apartments Stormwater Catch Basin Sediment Waste Designation

This memorandum summarizes the waste designation that was conducted for disposal of sediment removed from storm water catch basins and conveyance piping at the Lora Lake Apartment Complex at 15001 Des Moines Memorial Drive, Burien, WA in January and February of 2010. The designation was based on soil, catch basin sediment and groundwater sampling and analysis compiled for the MTCA Agreed Order with the WA State Department of Ecology [1], [2], [3].

WASTE DESIGNATION

1. **RCRA Solid Waste:**

The catch basin sediment removed from the stormwater conveyance system met the definition of a solid waste under 40 CFR 261.2.

2. **RCRA Hazardous Waste:**

The catch basin sediment was not excluded from regulation as a hazardous waste under CFR 261.4(b); therefore the waste was evaluated to determine if the sediment met any of the criteria that would classify it as a RCRA hazardous waste.

Discarded Chemical Products List (U, P Series): Sample analysis indicated trace constituents listed in 40 CFR 261.33, *Discarded commercial chemical products, off-specification species, container residues and spill residues.* However, the original processes generating any of these trace constituents are unknown and any previously applicable waste codes are unknown. Therefore, none of the RCRA U and P Series listings are applicable.

Non-Specific Sources (RCRA F Series): Sample analysis indicated trace constituents listed in 40 CFR 261.31, *Wastes from Non-Specific Sources*. However, the original processes generating any of these trace constituents are unknown and any previously applicable waste codes are unknown. Therefore, none of the RCRA F Series listings are applicable.

Specific Sources (RCRA K Series): The original processes generating any trace constituents at the site are unknown and any previously applicable waste codes are unknown. Therefore, none of the RCRA K Series listings are applicable.

Characteristic Waste (RCRA D Series): After review and evaluation of all sample data complied, it was determined that the sediment does not meet the RCRA regulatory threshold standard for any toxic characteristics nor does it meet the RCRA regulatory threshold for characteristic codes of ignitibility, corrosivity or reactivity.

Three sediment samples contained total lead concentration above twenty times the TCLP threshold value. The total lead concentrations for these samples were 243, 270, and 322 mg/kg, respectively. TCLP analysis was conducted on these samples and lead was not detected in the TCLP extract. The method reporting limit was 0.5 mg/l. None of the other seven RCRA heavy metals exhibited total concentrations above twenty times the TCLP threshold value for their respective toxic characteristic.

Dioxin Discussion – RCRA: If a waste containing dioxin does not meet the listing criteria of F020, F021, F022, F023, F026, F027, F028, F032 or any other listing criteria, then the waste containing dioxin is by definition, not a RCRA hazardous waste. As discussed previously, no F Series listing applied to the subject sediment and therefore this waste is not a RCRA hazardous waste. However, dioxin-containing waste can be regulated in WA State under the Dangerous Waste Regulations (WAC-173-303) as a criteria waste due to toxicity, as discussed below.

3. WA State Dangerous Waste Designation

Persistent Dangerous Waste, HOCs: In accordance with WAC-173-303-100, a waste will designate as a persistent dangerous waste and carry a WA State Dangerous Waste code of WP02 if it contains a halogenated organic compound (HOC) total concentration of 0.01% - 1.0 % (100 – 10,000 ppm) and a WA State Dangerous Waste code of WP01 if HOCs exceed 1.0% (10,000 ppm). Taking a conservative screening approach, the highest individual HOC concentration reported from the available data was used to calculate the sum of the HOC's. The worksheet used to calculate the HOC mass percent value is included as an attachment to this memorandum. The worksheet displays a total HOC mass percent of 0.0000165.

Persistent Dangerous Waste, PAHs: In accordance with WAC-173-303-100, a waste will designate as a persistent dangerous waste and carry a WA State Dangerous Waste code of WP03 if it contains a total polycyclic aromatic hydrocarbon (PAH) concentration of greater than 1.0% (10,000 ppm). Taking a conservative screening approach, the highest individual PAH concentration reported from the available data was used to calculate the sum of the PAHs. The worksheet used to calculate the PAH mass percent value is included as an attachment to this memorandum. The worksheet displays a total PAH mass percent of 0.0019.

Toxic Dangerous Waste: In accordance with WAC 173-303-100, a waste will designate as toxic dangerous waste and carry a WA State Dangerous Waste code of WT02 if the waste has an equivalent concentration equal to 0.001% and less than 1.0%. Equivalent concentration calculations are based on toxicity data obtained by direct bioassay testing or by *book designation* which utilizes toxicity data available from approved sources such as the Registry of Toxic Effects of Chemical Substances (RTECS), The National Library of Medicine's Hazardous Substances Database and The USEPA's ECOTOX Database.

The book designation approach was performed using all sample data available. Instead of designating each sample individually, a conservative screening measure was used where the highest concentration reported for each analyte was included to calculate a worst case equivalent concentration.

Limited dioxin and furan toxicity data are available in the approved literature that is compatible with the book designation procedures of WAC 173-303-100. Therefore, when directly comparable dioxin and furan congener toxicity data were not available, the dioxin and furan congener in question was assigned the most toxic book designation category, Toxic Category X.

Similar to dioxin and furan, limited toxicity data is available for many of the PAHs detected. Where no comparable data was available, the PAH analyte in question was equated to benzo(a)pyrene and assigned to Toxic Category C.

Taking further conservative measures, where contaminants were not detected (those values assigned a U modifier, by the laboratory); the reporting limit value was used in the determination of the total concentration mass percent for the equivalent concentration calculations. In addition, where laboratory estimates (those values assigned a J modifier) exceeded reported values, the estimated values were used in the determination of the total concentration mass percent for the equivalent concentration calculations.

The book designation procedure for the evaluation of the subject sediment produced a calculated equivalent concentration of 0.0000983%. This value is well below the threshold for toxic criteria designation level of 0.001% under the Dangerous Waste Regulations. The worksheet used to calculate this value is included as an attachment to this memorandum along with the toxicology references.

Designation and Management Summary

Based on all available data, the sediment collected and removed from the Lora Lake Apartments site for the Stormwater Interim Action Plan was not regulated as a Hazardous Waste under RCRA or as Dangerous Waste under the WA State Dangerous Waste Regulations.

Based on the RCRA and DW evaluation, the stormwater sediment was regulated as a nonhazardous solid waste under 40 CFR 261.2 and WAC 173-350. This designation required the material to be disposed of at a facility that meets the requirements of 40 CFR 258 and WAC 173-351, which requires the facility to have a municipal solid waste handling permit. This permit is typically issued by the jurisdictional state or county health department.

Consistent with the foregoing analysis, the stormwater sediment was designated as a nonhazardous solid waste and was disposed of at the LRI Landfill in Puyallup, WA. This facility is fully licensed and permitted by the Pierce County Department of Health and meets the requirements of 40 CFR 258 and WAC 173-351.

References

1. AECOM*, Summary Report- Investigations and Data Gap Evaluation for Lora Lake Apartments*, September 2009

2. AECOM, *Lora Lake Apartments Interim Action Completion Report*, December 2009

3. Floyd|Snider, *Port of Seattle Lora Lake Apartments, Stormwater Interim Action,* February 2010

Lora Lake Sediment Halogenated Organic Compound Mass %

Analyte	CAS	Concentration*	Concentration (mass %) X
DIOXINS/FURANS			
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	46200 ng/kg	4.62E-06
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	39001-02-0	3750 ng/kg	3.75E-07
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	4510 ng/kg	4.51E-07
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	1060 ng/kg	1.06E-07
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	31.8 ng/kg	3.18E-09
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	34.9 ng/kg	3.49E-09
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	43.7 ng/kg	4.37E-09
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	130 ng/kg	1.30E-08
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	22.4 ng/kg	2.24E-09
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	95.8 ng/kg	9.58E-09
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	4.70 ng/kg	4.79E-10
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	27.3 ng/kg	2.73E-09
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	6.06 ng/kg	6.06E-10
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	30.2 ng/kg	3.02E-09
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	10.7 ng/kg	1.07E-09
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	6.33 ng/kg	6.33E-10
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	5.83 ng/kg	5.83E-10
VOLATILES			
1,2-Dichloroethane	107-06-2	5 ug/kg	5.00E-07
cis-1,2-Dichloroethene	156-59-2	5 ug/kg	5.00E-07
trans-1,2-Dichloroethene	156-60-5	5 ug/kg	5.00E-07
Trichloroethene	79-01-6	5 ug/kg	5.00E-07
Tetrachloroethene	127-18-4	5 ug/kg	5.00E-07
SEMIVOLATILES			
Pentachlorophenol	87-86-5	84 ug/kg	8.40E-06
		HOC MASS %	**0.0000165**

***Dangerous Waste Designation of WP02 Requires an HOC Mass% of 0.01%**

Lora Lake Sediment PAH Mass %

Analyte	CAS	Concentration (ug/kg)	Concentration (mass %)
SEMIVOLATILES			
2-methylnaphthalene	91-57-6	550	0.00006
1-methylnaphthalene	90-12-0	520	0.00005
Acenaphthene	83-32-9	520	0.00005
Acenaphthylene	208-96-8	520	0.00005
Anthracene	120-12-7	520	0.00005
Benzo(a)anthracene	56-55-3	590	0.00006
Benzo(a)pyrene	50-32-8	1,100	0.00011
Benzo(b)fluoranthene	205-99-2	1,400	0.00014
Benzo(g,h,i)perylene	198-55-0	850	0.00009
Benzo(k)fluoranthene	207-08-9	1,400	0.00014
Chrysene	218-01-9	1,900	0.00019
Dibenz(a,h)anthracene	53-70-3	520	0.00005
Dibenzofuran	132-64-9	520	0.00005
Fluoranthene	206-44-0	2,200	0.00022
Fluorene	86-73-7	520	0.00005
Indeno(1,2,3-cd)pyrene	193-39-5	520	0.00005
Naphthalene	91-20-3	520	0.00005
Pentachlorophenol	87-86-5	84	0.00001
Phenanthrene	85-01-8	1,000	0.00010
Pyrene	129-00-0	3,200	0.00032
		PAH MASS %	**0.0019**

***Dangerous Waste Designation of WP03 Requires an PAH Mass% of 1.0%**

DW Book Designation
Lora Lake CB Sediment
Performed by: David Hill, DH Environmental, Inc.

Conversions: 1 ng/kg = 10^-10 %; 1 ug/kg = 10^-7 %; 1 mg/kg = 10^-4 %

(mass %)

Analyte	CAS	Concentration*	Toxicity[Source]	Toxic Category	Concentration (mass %) X	A	B	C	D
DIOXINS/FURANS									
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	3268-87-9	46200 ng/kg	1 mg/kg Oral Rat LD50[2]	A		4.62E-06			
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	39001-02-0	3750 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	3.75E-07				
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	35822-46-9	4510 ng/kg	6.325 mg/kg Oral Rat LD50[1]	B			4.51E-07		
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	67562-39-4	1060 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	1.06E-07				
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	55673-89-7	31.8 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	3.18E-09				
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	39227-28-6	34.9 ng/kg	0.825 mg/kg Oral Rat LD50[1]	A		3.49E-09			
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	70648-26-9	43.7 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	4.37E-09				
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	57653-85-7	130 ng/kg	0.25 mg/kg Oral Rat LD50[1]	X	1.30E-08				
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	57117-44-9	22.4 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	2.24E-09				
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	19408-74-3	95.8 ng/kg	1.8 mg/kg Oral Rat LD50[2]	A		9.58E-09			
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	72918-21-9	4.70 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	4.79E-10				
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	40321-76-4	27.3 ng/kg	LC50 Oryzias latipes (Medaka, high-eyes) 0.027 (0.023-0.031) ug/L[3]	X	2.73E-09				
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	57117-41-6	6.06 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	6.06E-10				
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	60851-34-5	30.2 ng/kg	NO DATA AVAILABLE - ASSIGNED TO TOXIC CATEGORY X	X	3.02E-09				
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	57117-31-4	10.7 ng/kg	0.916 mg/kg Oral Rat LD50[1]	A		1.07E-09			
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1746-01-6	6.33 ng/kg	0.022 mg/kg Dermal Rabbit LD50[2]	X	6.33E-10				
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	51207-31-9	5.83 ng/kg	1.0 mg/kg Oral Rat LD50[1]	A		5.83E-10			
METALS									
Arsenic	7440-38-2	20 mg/kg	763 mg/kg Oral Rat LD50[2]	D					2.00E-03
Lead	7439-92-1	322 mg/kg	LC50 Oncorhynchus mykiss (Rainbow trout) 1170 ug/L 96hr[3]	C				3.22E-02	
VOLATILES									
1,2-Dichloroethane	107-06-2	5 ug/kg	LD50 Rat oral 670-890 mg/kg[2]	D					5.00E-07
cis-1,2-Dichloroethene	156-59-2	5 ug/kg	LC50 Lepomis machrochirus (bluegill) 135,000 ug/l/96 hr[2]	NOT APPLICABLE					
trans-1,2-Dichloroethene	156-60-5	5 ug/kg	LD50 Rat oral 1235 mg/kg[2]	D					5.00E-07
Trichloroethene	79-01-6	5 ug/kg	LC50 Pimephales promelas (fathead minnow) 40.7 mg/l/96 hr[2]	D					5.00E-07
Tetrachloroethene	127-18-4	5 ug/kg	LC50 Salmo gairdneri (Oncorhynchus mykiss - rainbow trout) 5 mg/l/96 hr[2]	C				5.00E-07	
SEMIVOLATILES									
2-methylnaphthalene	91-57-6	550 ug/kg	1630 mg/kg Oral Rat LD50[2]	D					5.50E-05
1-methylnaphthalene	90-12-0	520 ug/kg	1840 mg/kg Oral Rate LD50[2]	D					5.20E-05
Acenaphthene	83-32-9	520 ug/kg	LC50 Oncorhynchus mykiss (Rainbow trout) 1570 ug/L 96hr[3]	C				5.20E-05	
Acenaphthylene	208-96-8	520 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poeciliopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				5.20E-05	
Anthracene	120-12-7	520 ug/kg	LC50 Lepomis macrochirus (bluegill) 1.27 ug/L 96hr[2]	X	5.20E-05				
Benzo(a)anthracene	56-55-3	590 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poeciliopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				5.90E-05	
Benzo(a)pyrene	50-32-8	1100 ug/kg	LC50 Poeciliopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				1.10E-04	
Benzo(b)fluoranthene	205-99-2	1400 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poeciliopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				1.40E-04	
Benzo(g,h,i)perylene	198-55-0	850 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poeciliopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				8.50E-05	
Benzo(k)fluoranthene	207-08-9	1400 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poeciliopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				1.40E-04	
Chrysene	218-01-9	1900 ug/kg	LC50 Neanthes arenaceodentata (fish) > 1 mg/L96 hr[2]	C				1.90E-04	
Dibenz(a,h)anthracene	53-70-3	520 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poeciliopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				5.20E-05	
Dibenzofuran	132-64-9	520 ug/kg	LC50 Pimephales promelas (fathead minnow)1050 ug/l 24-hr[3]	C				5.20E-05	
Fluoranthene	206-44-0	2200 ug/kg	LC50 Lepomis macrochirus (bluegill) 3980 ug/L 96hr[2]	C				2.20E-04	
Fluorene	86-73-7	520 ug/kg	LC50 Oncorhynchus mykiss (Rainbow trout) 820 ug/L 96hr[3]	B			5.20E-05		
Indeno(1,2,3-cd)pyrene	193-39-5	520 ug/kg	NO DATA AVAILABLE: Taken as equivalent to Benzo(a)pyrene, LC50 Poeciliopsis lucida (Clearfin livebearer) 1.2-3.7 mg/l 24-hr[2]	C				5.20E-05	
Naphthalene	91-20-3	520 ug/kg	LC50 Oncorhynchus gorbuscha (pink salmon) 1.4 mg/L/96 hr[2]	C				5.20E-05	
Pentachlorophenol	87-86-5	84 ug/kg	LC50 Cyprinus carpio (Common carp, larvae) 0.01 mg/L for 96 hr[2]	A		8.40E-06			
Phenanthrene	85-01-8	1000 ug/kg	LC50 Oncorhynchus mykiss (Rainbow trout, larvae) 40 ug/L 27 days[2]	A		1.00E-04			
Pyrene	129-00-0	3200 ug/kg	LC50 Oncorhynchus mykiss (Rainbow trout) 2000 ug/L 96hr[3]	C				3.20E-04	
Petroleum Hydrocarbons									
Diesel Range	68334-30-5	4200 mg/kg	TAKEN AS DIESEL: 7500 mg/kg Oral Rat LD50[1]	Not Applicable					
Heavy Hydrocarbon Range (Lube Oil Range)	64742-65-0	18,000 mg/kg	TAKEN AS Lube Oil Range: > 5000 mg/kg Oral Rat LD50[1]	Not Applicable					
Total (SUM)					0.0000525	0.000113	0.0000525	0.0338	0.00211

	∑X% / 1	∑A% / 10	∑B% / 100	∑C% / 1000	∑D% / 10000	EC	Designation
Enter Toxic Category Mass % Here →	5.25E-05	1.13E-04	5.25E-05	3.38E-02	2.11E-03		
	5.25E-05	1.13E-05	5.25E-07	3.38E-05	2.11E-07	0.0000983	Non-Dangerous Waste

Sources
1 RTECS: Registry of Toxic Effects of Chemical Substances
2 HSDB: Hazardous Substances Data Bank, National Library of Medicine
3 ECOTOX Database: United States Environmental Protection Agency

*Concentration assumed from highest possible value from all samples

Port of Seattle
Lora Lake Apartments

Remedial Investigation/ Feasibility Study Work Plan

Appendix F
Stormwater Solids Sampling Event Report

FINAL

TAYLOR ASSOCIATES, INC.

TRANSMITTAL

DATE:	December 14, 2010
TO:	Matt Woltman / Megan McCullough
COMPANY:	Floyd /Snider
ADDRESS:	Two Union Square – 601 Union St #600 Seattle, WA 98101 (206) 292-2078
FROM:	Dave Metallo
PHONE NUMBER:	267-1409 (office) or 206-794-0095 (cell)
Cc:	Bob Duffner, POS Aviation Enviro.

☐ URGENT ☒ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

RE: Lora Lake Apts. Stormwater Solids Sampling Event (2/11 – 12/10 /2010)

Please find included the following:

- Stormwater solids sampling event narrative (2 pg),
- Stormwater solids sampling event summary table (1 pg),
- COC forms (1 pg),
- Field Inspection email briefings (4 pgs),
- Field Inspection Forms (4 pgs) and
- Field Installation and Retrieval Forms (4 pgs).

Please let me know if you have any questions or need additional information. Thank You.

Dave Metallo, LHG , Project Manager

7104 Greenwood Ave. N.
Seattle, WA 98103
main (206) 267-1400
fax (206) 267-1401

Consulting in the Coastal and Freshwater Sciences

TAYLOR ASSOCIATES, INC.

POS Lora Lake Apartments Interim Action Stormwater Monitoring Tasks
Stormwater Solids Sampling Event Narrative Report
February 11th – December 12th, 2010

General:

Stormwater solids sampling at the Lora Lake Apartments (LLA) project site was co nducted over the period from February 11 th through December 12 th, 2010. Stormwater solids were sampled at four individual station s. Three of stations were located along the main stormwater drainage system; (in or der of inlet to outlet flow); CB31A, CB5945 and CB4857. One station was locate d at the outlet of the on-site stor mwater drainage system; CB2. These locations are shown on figures in the LLA Work Pl an. After the initial pla cement, several inspection events (April – November) were conduct ed to assess bottle capacity and general condition of the sediment traps. After t he last in spection event in Novemb er 2010 the monitored location containers were either full, full eno ugh for most analysis or showed no capacity change for over six months. The POS instructed Taylor to proceed with the collection event in December, 2010.

See the accompanying *Stormwater Solids Sampling Event Summary Spreadsheet, Chain of Custody, Field Inspection Email Briefings, Field Inspection Forms* and *Field Installation and Retrieval Forms* for det ails regarding the eve nt. Several of the key event categ ories are discussed below.

Sampling Methodology:

Sampling equipment in cluded stainless steel sediment trap bottle cradles (see Figure 5.2 LLA Work Plan), stainless steel br ackets, mounting hardware and clamps, and glass and Teflon® collection bottle s. Sediment traps were strategically mounted at each location to maximize stormwater s olids collection during periods of stormwater runoff and to try to exclude collection of solids during p eriods of ba se flow. The attached *Field Installation and Retrieval Forms* detail specific sediment trap p lacement at each location. Sediment traps were initially placed in early February 2010 after the POS h ad conducted the final stage of the drainage system va ctoring event and the dr ainage systems were flushed by several rain events. Sediment traps were installed on catch basin vault walls (CB31A, CB5945 and CB2) or in the centerline of pipes (CB4857). At vault location sediment traps were positioned such that the collection conta iner was set a shor t height (approximately 0.25 -inches) above the outlet invert elevation and not directly adjacent to the vault's inlet pipe. The traps passively collect stormwater solids by allowing storm flows to pass over the top of (or to be "staked" on top of) t he collection container; thus providing a space where settleable materials can accumulate in a lower energy environment (the collection container). Once set, the sediment traps were left in place to collect solids from each passing storm event.

Equipment Decontamination:

All stormwater solids sampling materials / items were decontaminated per the SOP provided in the LLA Work Plan. Collectio n containers were decontaminated under laboratory conditions at ARI by th eir chemistry staff. Other stainless steel sampling equipment was decontaminated via the same LLA Work Plan SOP but wa s conducted at the POS Storm Lab by Ta ylor project personnel. All sampling personnel employed USEPA recommended "clean hands" techniqu es when conducting sa mpling procedures or sample man agement tasks.

Inspection Events:

Five inspection events (4/26, 6/0 4, 6/25, 9/ 03 and 11/ 12) were conducted to assess collection bottle capacity, the general condit ion of each sediment t rap unit an d minor maintenance (e.g. tightening bolts on retainer ring, removing any debris over bottle opening,

etc.). See the attached *Field Inspection Email Briefings, Field Inspection Forms* for a chronological history of these events.

Stormwater Solids Material Retrieval:

All stormwater solids material that had been collected in their respective containers were retrieved during a single-day event on December 12th, 2010. Each container was sealed in-place with its original matching lid, which had been stored in zip-lock baggies at the POS Storm Lab. No sample fractionation was conducted in the field. No additional quality control samples were collected or fractionated in the field. The outer portion of each retrieved container was cleaned with paper towels, labels were affixed and then each container was sealed in zip-lock baggies.

Sampling Parameters:

As per the LLA Work Plan; volatile organic compounds (included PCE, TCE and 1,2-DCA), polyaromatic hydrocarbons, pentachlorophenol (PCP), total petroleum hydrocarbons, metals (arsenic and lead), dioxin/furans, total solids and total organic carbon. Samples collected from all locations were submitted to the laboratory for all of the above listed parameters. Special instructions listed on the COC form included "hold all analysis until contact with Floyd/Snider" and DO NOT Freeze Samples".

Sample Types:

"Normal" (non quality control) samples were collected at each of the four monitoring locations noted above and as detailed in the LLA Work Plan.. Sample volumes varied as detailed on the *Field Inspection Forms* and *Field Installation and Retrieval Forms*. A trip blank (three 40-ml VOA vials) accompanied the volatile portion of the samples and were submitted for the same analysis as the normal samples (for the volatile fraction). Determination of sample analysis prioritization for those locations where sample volume was less then what was required for all analyses was the responsibility of ARI as directed by POS and Floyd/Snider.

Sample Management:

All samples were handled and managed as stipulated in the LLA QAPP and in a manner acceptable and standard regarding practices typical for tasks of this nature. Once collected samples were placed into coolers and iced. The sample cooler also contained trip blanks provided by the analytical testing facility, Analytical Resources, Inc. (ARI) of Tukwila, WA. All samples were recorded on Chain-of-Custody forms and were in direct control of project personnel at all times. All samples were delivered to the testing facility in good, useable condition. Sample fractionation, including any quality control aliquots, was the responsibility of ARI and as directed by POS and Floyd/Snider.

Anomalies and/or Work Plan Deviations:

There were no anomalies observed that would cause any of the stormwater solids samples to be non-representative of the conditions from which they were collected. It was noted after the April field inspection event that very little material had been collected at CB4857; due mainly to how tall the collection bottle was in relation to the majority of storm flows in its associated pipe. Four additional containers; two four-inch tall 16oz soil jars and two two-inch low profile rectangular glass containers, were added to CB4857. This was done to enhance the ability to collect an adequate amount of stormwater solids at this site.

Other Actions Completed:

Sediment traps and related in-vault stormwater solids sampling infrastructure was removed from each of the four monitoring stations. Three of the four sediment traps were returned to the POS Storm Lab and the fourth unit, on loan from the Seaport, was returned to the Taylor office.

POS Lora Lake Apartments Interim Action Tasks
Stormwater Solids Sampling Event Summary Spreadsheet

TAYLOR ASSOCIATES, INC.

This form acknowledges representativeness criteria described in the project QAPP.
Mark with "Yes" to acknowledge acceptable, "No" for not acceptable, "NA" or "- -" if not applicable.

[1] Sample Event Data:	
Project Stormwater Solids Sampling (SWSOL) Event #	1
SWSOL Start Date	2/11/2010
SWSOL End Date	12/10/2010

[1] Sample Collection Data:				
Sampling Station	CB-31A	CB-5945	CB-4857	CB-2
Were samples collected per LLA Work Plan ?	Yes	Yes	Yes	Yes
Was "normal" or duplicate sample collected?	normal	normal	normal	normal
Sampl ID	CB31A121010SWSOL	CB5945121010SWSOL	CB4857121010SWSOL	CB2121010SWSOL
Sample Date /Time	12/10/2010 09:50	12/10/2010 10:33	12/10/2010 11:40	12/10/2010 10:50
Sample parameters collected per LLA QAPP ? (see attached COC form)	Yes	Yes	Yes	Yes
Was a proper sample volume collected for for all scheduled analyses ?	[2]Yes	[2]Yes	[2]Yes	[2]Yes
How many containers per sampling location were collected	1	1	5	1
Approximate volume in collection containers	90-100%	50-60%	25-100%	<25%
Did any anomalous conditions exist that could make samples non-representative? Explain if "Yes"	No	No	No	No
[1] QC Sample Summary Information:	CB-31A	CB-5945	CB-4857	CB-2
Was a field duplicate collected ?	No	No	No	No
Were Trip Blanks included w/ samples ?	Yes	Yes	Yes	Yes
Was additional volume collected in field for MS/MSD analysis ?	No	No	No	No

[1] If the answer to any of the validation/qualification questions are "no" OR indicate non-representative conditions, then these issues should be explained in SSE Summary Narrative.
[2]Entire sample volume collected during the event period, contained in the various field bottles, was submitted to the laboratory. Volumes necessary to conduct analytical testing and analysis priority is to be determined by the laboratory and/or Floyd/Snider

Validation Check List Report Completed By / Date: 12-13-10 Reviewed By / Date: 12/14/10

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: | Turn-around Requested: Standard

ARI Client Company: Floyd/Snider | Phone: (206) 292-2078

Client Contact: Jessi Massingale / Matt Woltman

Client Project Name: POS - Lora Lake Apts Interim Action

Client Project #: POS - LLA | Samplers: P.Heltzel / I.Sahlberg

Date: 12/10/10

Page: 1 of 1

No. of Coolers: | Cooler Temps:

Sample ID	Date	Time	Matrix	No. Containers	VOC ① 8260C	PAH 8270	PCP 8041	TPH NWTPH-Dx	Metals As + Pb 6010	Dioxin/ Furans 1613	Total Solids SM2540B	T.O.C. Plumb 1981	Notes/Comments
CB4857121010SWSOL	12.10.10	1140	sed	5	X	X	X	X	X	X	X	X	*For all smpls,
CB31A121010SWSOL	12.10.10	0950	sed	1	X	X	X	X	X	X	X	X	-Hold analysis
CB2121010SWSOL	12.10.10	1050	sed	1	X	X	X	X	X	X	X	X	until contact w/
CB5945121010SWSOL	12.10.10	1033	sed	1	X	X	X	X	X	X	X	X	F/S
TB121010	12.10.10	0900	water	3	X								trip blank
													* DO NOT *
													Freeze Smpls!

Comments/Special Instructions
① includes; PCE, TCE and 1,2-DCA

Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature) Peter Heltzel	(Signature) Jennifer Millsap	(Signature)	(Signature)
Printed Name: Peter Heltzel	Printed Name: Jennifer Millsap	Printed Name:	Printed Name:
Company: TEC	Company: ARI	Company:	Company:
Date & Time: 12/10/10 1350	Date & Time: 12/10/10 1350	Date & Time:	Date & Time:

Metallo, David C.

From: Matt Woltman [Matt.Woltman@floydsnider.com]
Sent: Tuesday, April 27, 2010 3:28 PM
To: Duffner, Bob
Cc: Dave Metallo; 'Robbins, Don'; Megan McCullough
Subject: Lora Lake Stormwater Interim Action Sediment Trap Samples and Plan Forward

Hi Bob,

We've been talking with yourself and Dave M. (and have brought Don up to speed today) about the status of the sediment trap sampling devices deployed for the LLA stormwater interim action (SWIA) and sequencing for inspection of the traps and sample processing to complete the data collection efforts for the interim action work. In order to run all required chemical testing on these samples, we need to have approximately 75% sample volume collected in the sediment trap sample jars. As you may already know, Dave's crew inspected the four sediment trap samplers at the site yesterday and discovered the following:

- 2 of the 4 sample locations (inlet to site @ CB31A and interior @ CB5945) have sample jars that are approximately 20% full; and
- 2 of the 4 sample locations (outlet from site @ CB4857 and outlet from site @ CB2) have very little to no sediment collected.

Given these results, we are not in a good position to pull the sediment traps and conduct chemical testing on the samples. We are obligated under the requirements of the work plan to keep the sediment traps deployed for a period of up to 5 months which would extend the time of sample collection to mid-June 2010. Given the observations made yesterday, it is likely that we will still not have sufficient sediment volume to analyze these samples in June, and we are now at a decision point to consider leaving the traps deployed until spring 2011.

Our current recommendation is to check the sediment traps again in mid-June to observe the volume of collected sediment, and decide if the traps should be left in place until 2011 for further collection or pulled for sampling and analysis. Additionally, we think it would be beneficial for Taylor and Associates to spend some effort developing options for reconfiguration or relocation of the two sediment traps that are currently not collecting sediment (CB4857 and CB2). We'd appreciate your thoughts on this approach as it may have the following implications to the existing contract that the Port carries with Taylor and Associates for completion of the SWIA at the LLA site:

- If sediment trap deployment extends into 2011, a contract extension may need to be implemented with Taylor and Associates to allow work to be completed in 2011. Additional scope/budget may also be required for inspections of the sediment traps, and sample processing and equipment removal in 2011?
- Additional scope/budget may be required for Taylor to consider options for relocation/reconfiguration of the sediment traps at CB4857 and CB2 and to complete the relocation/reconfiguration activities in the field as necessary.
- The Port currently has one sediment trap sampling device on loan from the Seaport Division. Permission to continue using this sampler would be needed if the traps are to stay deployed until 2011.

We are meeting with Ecology this Friday and are planning to talk through the status of the sediment trap samples for the SWIA. It would be great if you could provide your feedback to these thoughts before Friday to help us in our discussions with Ecology.

Let me know if you have any questions.

Thanks,

Matt

Matt Woltman, PE
FLOYD|SNIDER
Two Union Square
601 Union Street, Suite 600

Metallo, David C.

From: Dave Metallo
Sent: Friday, June 04, 2010 3:16 PM
To: 'Megan McCullough'
Cc: Curtis Nickerson; 'Duffner, Bob'; Matt Woltman
Subject: POS LLA sed trap additions

Megan,
I was able to get out into the field today and place 4 additional containers into the pipe at CB4857. Two of the containers are 16oz glass jars anchored to the existing sediment trap. The other two are small rectangular shaped glass containers anchored to their own base plate. All of the banding material, clamps, etc. are stainless steel. The openings on each of the 4 additional containers are the same 1 ¾" diameter opening as the original Teflon bottle. We also rechecked the Teflon bottle at CB4857. There appears to be the same amount or maybe just slightly more material then when we checked back in late April. Still only 10 to 15% full. My plan regarding the sediment traps is to have someone go around a couple times this summer and fall to recheck them for content % and for maintenance purposes (blockages, etc.). Thanks.

Dave Metallo, LHG
Hydrogeologist / Project Manager

Taylor Associates, Inc
7104 Greenwood Ave. N.
Seattle, WA 98103
Phone: 206-267-1409 (direct)
Cellular: 206-794-0095
Fax: 206-267-1401
dave@Taylorassoc.net

Metallo, David C.

From: Dave Metallo
Sent: Wednesday, September 15, 2010 1:15 PM
To: Megan McCullough; 'Duffner, Bob'
Cc: Matt Woltman; Jessi Massingale; Curtis Nickerson; 'Robbins, Don'
Subject: Lora Lake Apts Sediment Trap and CB Sed Inspections

Megan / Bob,
I wanted to follow up from the field event that was conducted at the LLA complex on 3 September, 2010. The purpose of this field event was to inspected sediment thickness in all four of the current sediment trap locations (and associated catch basins at those stations were sediment was also sampled) and two additional sites where sediment was previously collected from catch basins only (no traps). The attached form documents the sediment thickness in all four of the traps (trap bottles) currently deployed. Also noted is the thickness of sediment in the additional containers placed at CB4857 (CB4857-1, -2, -3, -4) - which the crew reported that there is at least some "small" amount in each of those containers. The field form indicates the amount of sediment re-accumulation in the catch basins themselves at CB31 (east and west sides of the weir wall within this structure), CB19 and CB12. Although not noted, the crew reported to me that there was little (<1") to no re-accumulated sediment in the catch basin at CB4555 (aka CB2), which is located directly upstream from CB4857.

I had the crew measure the re-accumulated sediment in the catch basin associated with CB4857, even though no sediment samples were collected at this location, it seems to be a point of some interest. It was noted that sediment is mounded up in the center of this vault at a maximum depth of approximately six inches, tapering to bare floor near the edges of vault. I noted that a couple of weeks after the drainage system vactoring (end of Feb / early March) that this vault was completely devoid of sediment.

I've attached several photos showing the sediment trap bottles from the current stations. The title of the photos explains its location. My plan is to re-inspect the traps (and catch basins if directed by POS) again in late October. Just a reminder - the collection of the traps needs to be completed by late December.

Please let me know if there are any questions, etc. Thanks

Dave Metallo, LHG
Hydrogeologist / Project Manager

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dave@Taylorassoc.net

Metallo, David C.

From: Metallo, David C.
Sent: Monday, November 22, 2010 4:02 PM
To: Duffner, Bob; Matt Woltman; Megan McCullough; Jessi Massingale; Robbins, Don
Cc: Nickerson, Curtis M.
Subject: Lora Lake Apts Sed Trap Insp's

All,
I'm providing this very brief follow up to the Lora Lake Apartment Sediment Trap Inspection event that occurred on 11-12-10. All four current sediment trap locations (CB31A, CB4867, CB2 and CB5945) were inspected to assess %-full of their associated collection bottles. Attached is the completed field form from the event. There has been a notable increase in the amount of sediment in most of the collection containers. CB31A (westernmost location, main line entrance to the site) is now 100% full. CB5945, which is near the end of the main stormwater drainage line is now 50% full. This is an interesting location because its vault is completely devoid of any sediment, as are most of the catch basins between it and CB31A. The sediment in this bottle is truly from suspended loads being transported down the pipe with stormwater. At the end of main stormwater drainage line is CB4857. Our sediment trap is located several feet upstream from the actual catch basin. At this location we added 4 additional containers to aid in sediment collection. The original bottle needed to be positioned up inside of the pipe along its centerline in a section with a 4% slope. The nearly 9 inch tall bottle in this particular section of pipe was only effected during larger storm events. Additional bottles (2 at aprrox 4 inches tall and 2 glass rectangular containers approx. 2 inches tall) were placed at this location so that more average sized storm events were also represented in the sediment collection process. The main bottle at CB4857(1) is only 20% full. However, CB4857(2) and (3), the 4 inch tall bottles, are both 100% full. CB4857 (4) and (5), the 2 inch tall containers, are both 95% full. CB2 is the outflow from the smaller onsite stormwater drainage system. Its bottle is only 10% full - no change from the last inspection event back in early September. This is not surprising as this smaller system is in relatively good condition with no surface sediment inputs. Before the system was vactored back in January 2010 the CB2 basin had only very fine organic matter in its sump and no larger grained sediment was ever noted at this location.

Here are my recommendations - we should retrieve the sediment trap bottles.

- CB31A - no more room,
- CB4857 - the smaller bottles are full and can only be lost during future storm events,
- CB5945 - although there's more room, there likely enough material for most of the analyses and it would be representative of the time frame of the other trap bottles,
- CB2 - likely will not collect any additional volume or anything other then the "muddy" organic material currently in the bottle

Options

- Replace the sediment bottles and re-deploy during the collection event
- Leave the trap holder units in place and re-deploy additional bottles later in the course in the RI work
- Collect the sediment trap bottles and remove the holder units

ACTION ITEM - per Taylor/TEC's contract, assuming no modifications, I'll need to complete all of the LLA stormwater field action by 12-31-2010, hopefully with a couple to spare. Note: this applies to the stormwater monitoring station as well.

Please let me know if you have any questions and/or when you'd like to discuss the game plan for moving forward. Thanks !!

Dave Metallo, LHG
Hydrogeologist / Project Manager

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7104 Greenwood Ave. N.
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DCMetallo@TECinc.com

Port of Seattle - Lora Lake Apartments Sediment Sampling
Sediment Trap Inspection and Retrieval

Consultant

Page: 1 of ___

Personnel: JH/DO	Weather: CLOUDY

Date: 4/26/10

Sediment Trap Inspection

Station	Arrival time	Sediment trap housing/ bracket ok?	Debris at trap opening? If so, remove	Trap bottle condition ok?	Sediment trap percent filled?	Sedment trap retrieved? (if yes fill in retreival section below)	Sediment trap redeployed and secured?	Notes
CB 4505	1415	YES	YES	YES	25%	NO	YES	SOME TRASH IN CB
CB 5945	1440	YES	NO	YES	15%	NO	YES	
CB 4555	1500	YES	NO	YES	<5%	NO	YES	
CB 4857	1510	YES	NO	YES	5%	NO	YES	

Sediment Trap Retrieval

Station	Time of retrieval	Sample ID	Sample placed in cooler on ice?	New trap deployed? (if yes complete deployment form)	Notes

Port of Seattle - Lora Lake Apartments Sediment Sampling
Sediment Trap Inspection and Retrieval

Consultant

Page: 1 of 1

Personnel: BL / JB	Weather: PT Cloudy

Date: 06/25/10

Sediment Trap Inspection

Station	Arrival time	Sediment trap housing/ bracket ok?	Debris at trap opening? If so, remove	Trap bottle condition ok?	Sediment trap percent filled?	Sedment trap retrieved? (if yes fill in retreival section below)	Sediment trap redeployed and secured?	Notes
4857-1	10:00	Y	N	Y	≈5%	N	Y	PRIMARY (TEFLON) BOTTLE
4857-2	10:00	Y	N	Y	≈15%	N	Y	2 GLASS JARS ON PRIMARY TRAP
4857-3	10:00	Y	N	Y	≈10%	N	Y	2 PLASTIC CONTAINERS ON SCISSOR BAND

Sediment Trap Retrieval

Station	Time of retrieval	Sample ID	Sample placed in cooler on ice?	New trap deployed? (if yes complete deployment form)	Notes

Port of Seattle - Lora Lake Apartments Sediment Sampling
Sediment Trap Inspection and Retrieval

Consultant

Page: 1 of 1

Personnel: BK/DO	Weather: PT Cloudy

Date: 09/03/10

Sediment Trap Inspection

Station	Arrival time	Sediment trap housing/ bracket ok?	Debris at trap opening? If so, remove	Trap bottle condition ok?	Sediment trap percent filled?	Sedment trap retrieved? (if yes fill in retreival section below)	Sediment trap redeployed and secured?	Notes
CB4555	10:15	Y	Y	Y	50%	N	Y	WEST SIDE OF VAULT MEASURES
AKA	31-A							0.92' OF SEDIMENT. EAST
								SIDE OF VAULT MEASURES 0.51'
CB-19	11:15	N/A	N/A	N/A	NEGLIGABLE	N/A	N/A	- NO SED TRAP.
CB-12	11:45	N/A	N/A	N/A	NEGLIGABLE	N/A	N/A	- NO SED TRAP.
CB5945	12:15	Y	N	Y	20%	N	Y	
CB4555	12:30	Y	N	Y	5-10%	N	Y	
CB4657	12:30	Y	N	Y	<10%	N	Y	
-1	" / "	Y	N	Y	<5%	N	Y	
-2	/	Y	N	Y	<5%	N	Y	
-3	/	Y	N	Y	<5%	N	Y	
-4	↓	Y	N	Y	<5%	N	Y	

Sediment Trap Retrieval

Station	Time of retrieval	Sample ID	Sample placed in cooler on ice?	New trap deployed? (if yes complete deployment form)	Notes

Port of Seattle - Lora Lake Apartments Sediment Sampling
Sediment Trap Inspection and Retrieval

Consultant

Page: 1 of 1

Personnel: PH, BR	Weather: mostly sunny

Date: 11/12/10

Sediment Trap Inspection

	Station	Arrival time	Sediment trap housing/ bracket ok?	Debris at trap opening? If so, remove	Trap bottle condition ok?	Sediment trap percent filled?	Sedment trap retrieved? (if yes fill in retreival section below)	Sediment trap redeployed and secured?	Notes
	CB3IA	11:30	Y	Y	Y	100%	N	Y	
(1)	CB4857	12:40	Y	Y	Y	80%	N	Y	main large bottle
(2)	"	"	Y	Y	Y	100%	N	Y	small R of main
(3)	"	"	Y	Y	Y	100%	N	Y	small L of main
(4)	"	"	Y	Y	Y	95%	N	Y	upstream big square L
(5)	"	"	Y	Y	Y	95%	N	Y	upstream ~~big~~ little square R
	CB2	1330	Y	N	Y	10%	N	Y	
	CB5945	1420	Y	Y	Y	50%	N	Y	

Sediment Trap Retrieval

Station	Time of retrieval	Sample ID	Sample placed in cooler on ice?	New trap deployed? (if yes complete deployment form)	Notes

TAYLOR ASSOCIATES, INC.

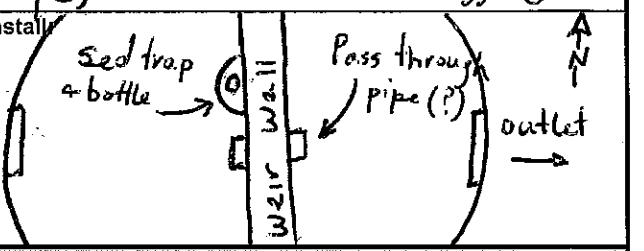
POS - Lora Lakes Apartments Stormwater Interim Action
Stormwater Solids Collection
Sediment Trap Installation and Retrieval Field Sheet

Station ID:	CB-31A
Manhole/CB #:	CB-31A
Location Description:	Main stormwater drainage line - system inlet (along 8th Ave S)

Sediment Trap Installation:

Personnel:	D. Metallo, Pete Heltzel — Date/Time: 2-11-2010 (1050)
Weather:	Broken sky - mostly cldy but clearing, rain in last 24hrs, 40-50°, no wind
Mounting Type: (pipe wall (vault) other)	mounted in inlet side (w) of divide vault
Sediment Trap Mounted To Material Type: ((concrete) corrugated metal plastic other)	mounting plate attached to uni-strut
Pipe / Vault condition: ((good) cracked eroded smooth deformed other)	solid, no cracks
Mounting Description / Direction Relative to Flow:	across from inlet pipe, offset north ~2' from pipe center
Inlet Pipe Diameter (in): 24" — Outlet Pipe Diameter (in): 24" — Mounting Hardware Material:	Stainless Steel
Collection Bottle Material / Description:	teflon "nalgene water bottle" style, wide mouth
Collection Bottle Trap Material / Description:	stainless steel, design present in LLA QAPP
Sediment Trap and Collection Bottle Decon'ed per/LLA QAPP?	YES
Water in vault ? Yes — Depth (FT): approx 5 ft. — Water Level (from surface) (FT):	86 inches (lower lid rim)
Sediment Trap Position Description:	opposite wall from inlet pipe, offset north
Distance of Collection Bottle Lip to Water Surface:	0.04 ft.
Distance of Collection Bottle to Pipe/Vault Outlet Invert:	length = 20.5 inches
Sediment Present in Vault ? Yes — Approx. Thickness (in):	1-3 inches (post vactoring)
Collection Bottle Securly Fastened? yes — Lid Off? Yes — Stored?	in clean baggie @SW lab
Notes / Photos Info:	Water level inside vault is equal to pipe invert

Sketch of Install:



Sediment Trap Retrieval

Personnel	PH, IS — Date/Time 12/10/10 9:45
Weather	mostly sunny
Sample ID & Time:	CB31A121010SWSOL
Bottle labeled? Yes — Lid Clean? Yes — Lid Secured on Bottle?	Yes
Approx volume of sed in bottle: water only <1/4 1/4-1/2 1/2-3/4 >3/4 (4/4)	
Description of Bottle Contents:	sandy, organics, brown
Photo Info.	~~None~~
Notes:	Trap removed

TAYLOR ASSOCIATES, INC.

POS - Lora Lakes Apartments Stormwater Interim Action
Stormwater Solids Collection
Sediment Trap Installation and Retrieval Field Sheet

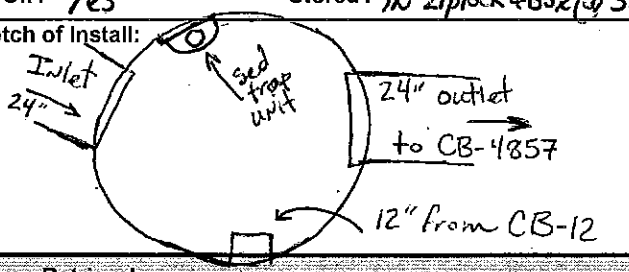
Station ID:	CB5945
Manhole/CB #:	exCB-B
Location Description:	upstream vault from CB4857, where mainline is conveyed off-site

Sediment Trap Installation:

Personnel: D. Metallo B. Kwasnowski	Date/Time: 2-18-2010 (1520)
Weather:	Sunny, 50°s, NW breeze, no rain in last ~48 hrs
Mounting Type: (pipe wall (vault) other)	
Sediment Trap Mounted To Material Type: (concrete) corrugated metal plastic other)	
Pipe / Vault condition: ((good) cracked eroded smooth deformed other)	
Mounting Description / Direction Relative to Flow:	Mounted on vault bottom offset to east side of inlet pipe
Inlet Pipe Diameter (in): 24"	Outlet Pipe Diameter (in): 24" Mounting Hardware Material: stainless steel
Collection Bottle Material / Description:	teflon "Nalgene water bottle style" wide mouth
Collection Bottle Trap Material / Description:	S.S. design as presented in LLA QAPP
Sediment Trap and Collection Bottle Decon'ed per/LLA QAPP?	Yes
Water in vault ? YES	Depth (FT): 0.52' Water Level (from surface) (FT): 133.5" (inside pipe)
Sediment Trap Position Description:	b/w inlet and outlet pipes
Distance of Collection Bottle Lip to Water Surface:	0.18' (above)
Distance of Collection Bottle to Pipe/Vault Outlet Invert:	1.55' across, water level in outlet pipe is 0.05 ft. deep
Sediment Present in Vault ? No (some scattered gravel)	Approx. Thickness (in): NA
Collection Bottle Securly Fastened? Yes	Lid Off? Yes Stored? in ziplock+box @ SW lab

Notes / Photos Info:
inlet invert is 0.5 ft above water level at time of install

Sketch of Install:



Sediment Trap Retrieval

Personnel PH, IS	Date/Time 12/10/10 1033
Weather mostly sunny	
Sample ID & Time: CB5945121010SWSOL	
Bottle labeled? Yes	Lid Clean? Yes Lid Secured on Bottle? Yes
Approx volume of sed in bottle:	water only <1/4 1/4-1/2 (1/2-3/4) >3/4 4/4
Description of Bottle Contents:	silty, sandy, brown
Photo Info.	
Notes:	Trap removed

TAYLOR ASSOCIATES, INC.

POS - Lora Lakes Apartments Stormwater Interim Action
Stormwater Solids Collection
Sediment Trap Installation and Retrieval Field Sheet

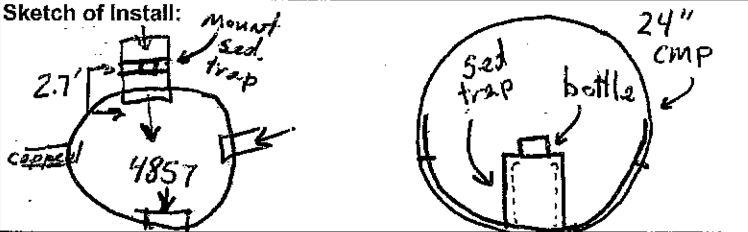
Station ID: CB-4857
Manhole/CB #: CB-4857
Location Description: LLA STORM SYSTEM OUTLET ON DES MOINES MEMORIAL DR.

Sediment Trap Installation:

Personnel: B. KWASNOWSKI, D. METALLO **Date/Time:** 02/18/2010 @ 12:15
Weather: SUNNY, 55°F
Mounting Type: (~~pipe~~ (circled) wall vault other)
Sediment Trap Mounted To Material Type: (concrete (corrugated metal) plastic (other)) SCISSOR RING IN CMP
(Pipe) Vault condition: ((good) cracked eroded smooth deformed other) 24" dia. CMP
Mounting Description / Direction Relative to Flow: Mounted in center of pipe
Inlet Pipe Diameter (in): 24 **Outlet Pipe Diameter (in):** NA **Mounting Hardware Material:** S/S SCISSOR RING, HARDWARE
Collection Bottle Material / Description: TEFLON "NALGENE WATER BOTTLE", WIDE MOUTH
Collection Bottle Trap Material / Description: S/S HOUSING AS DETAILED IN LLA QAPP
Sediment Trap and Collection Bottle Decon'ed per/LLA QAPP? YES.
Water in (pipe) ~~vault~~? YES **Depth (FT):** 0.05 **Water Level (from surface) (FT):** 7.23' (bottom lid rim)
Sediment Trap Position Description: Centered inside of pipe, mounted of Isco plate, bottom of pipe
Distance of Collection Bottle Lip to Water Surface: 0.07' ft.
Distance of Collection Bottle to Pipe/Vault Outlet ~~Invert~~: END OF PIPE: 2.70 ft.
Sediment Present in (pipe) ~~Vault~~? NO ("clean") **Approx. Thickness (in):** sed. in vault ~.2'
Collection Bottle Securly Fastened? Y **Lid Off?** Y **Stored?** Y

Notes / Photos Info:
SEDIMENT DEPTH IN RECEIVING VAULT IS ≈ 0.15 ft.

Sketch of Install:



Sediment Trap Retrieval

Personnel PH, IS **Date/Time** 12/10/10 1120
Weather partly sunny
Sample ID & Time: CB4857121010SWSOL
Bottle labeled? Yes **Lid Clean?** Yes **Lid Secured on Bottle?** Yes
Approx volume of sed in bottle: water only <1/4 1/4-1/2 1/2-3/4 >3/4 4/4 See below
Description of Bottle Contents: tall nalgene = 1/4, both square = 1/2 - 3/4, small jars = 4/4
~~Photo Info.~~ sandy, silty, some organics, brown/black
Notes:
Removed trap and scissor rings (left scissor ring for AV)

TAYLOR ASSOCIATES, INC.

POS - Lora Lakes Apartments Stormwater Interim Action
Stormwater Solids Collection
Sediment Trap Installation and Retrieval Field Sheet

Station ID: CB-2

Manhole/CB #: CB4555 /CS/CB-2

Location Description: Control structure near end of on-site drainage system/line (U.S. from CB-1)

Sediment Trap Installation:

Personnel: D. Metallo B. Kwasnowski **Date/Time:** 2-18-10 (1405)

Weather: Sunny, 50°s, lite NW breeze, no precip in last ~48 hrs

Mounting Type: (pipe wall (vault) other)

Sediment Trap Mounted To Material Type: ((concrete) corrugated metal plastic other)

Pipe / Vault condition: ((good) cracked eroded smooth deformed other)

Mounting Description / Direction Relative to Flow: 2.45' AWAY FROM INLET PIPE, 0.35 ft BELOW LID, IS

Inlet Pipe Diameter (in): 12" **Outlet Pipe Diameter (in):** 12" **Mounting Hardware Material:** S.S. UNI-strut & trap

Collection Bottle Material / Description: teflon "nalgene water bottle style" wide mouth

Collection Bottle Trap Material / Description: S.S., design as detailed in LLA QAPP

Sediment Trap and Collection Bottle Decon'ed per/LLA QAPP? YES

Water in vault ? YES **Depth (FT):** 46"; 3.87 ft. **Water Level (from surface) (FT):** 3.96"

Sediment Trap Position Description: MOUNTED TO VAULT WALL ADJACENT TO LADDER CROSSING OUTLET

Distance of Collection Bottle Lip to Water Surface: AT STATIC WATER LEVEL.

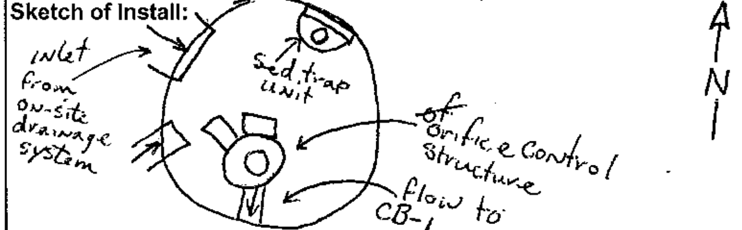
Distance of Collection Bottle to Pipe/Vault Outlet Invert: ~3' ACROSS TO OUTLET PIPE

Sediment Present in Vault ? NEGLIGABLE. **Approx. Thickness (in):** —

Collection Bottle Securly Fastened? Y **Lid Off?** Y **Stored?** Y, in box at SW lab in ziplock

Notes / Photos Info:

Sketch of Install:



Sediment Trap Retrieval

Personnel PH, IS **Date/Time** 12/10/10 1045

Weather mostly sunny

Sample ID & Time: CB2121010SWSOL

Bottle labeled? yes **Lid Clean?** yes **Lid Secured on Bottle?** yes

Approx volume of sed in bottle: water only (<1/4) 1/4-1/2 1/2-3/4 >3/4 4/4

Description of Bottle Contents: silty, organics, dark brown blackish

Photo Info.

Notes:
Trap removed

Port of Seattle
Lora Lake Apartments

Remedial Investigation/ Feasibility Study Work Plan

Appendix G
Storm Event 3 Equipment Blank Laboratory Analytical Report

FINAL

FRONTIER
ANALYTICAL LABORATORY

March 10, 2010

FAL Project ID: 6004

Ms. Sue Dunnihoo
Analytical Resources Incorporated
4611 South 134th Place
Tukwila, WA 98168-3240

Dear Ms. Dunnihoo,

Attached are the results for Frontier Analytical Laboratory project **6004**. This corresponds to your **Dioxin Test in Pitcher** project under ARI project number **QL95**. One aqueous sample was received on 3/2/2010 in good condition. This sample was extracted and analyzed by EPA Method 1613 for tetra through octa chlorinated dibenzo dioxins and furans. The 2005 World Health Organizations toxic equivalency factors were used to calculate the toxic equivalents (TEQ) on your report. Analytical Resources Incorporated requested a turnaround time of fifteen business days for project **6004**.

The following report consists of an Analytical Data section and a Sample Receipt section. The Analytical Data section contains our project-sample tracking log and the analytical results. The Sample Receipt section contains your chain of custody, our sample login form and a sample photo. The attached results are specifically for the sample referenced in this report only. These results meet all NELAC requirements and shall not be reproduced except in full. The Level I summary report and the Electronic Data Deliverables (EDD) have been sent to you via email, per your request. A hard copy of the report will not be sent unless specifically requested.

If you have any questions regarding project **6004**, please contact me at (916) 934-0900. Thank you for choosing Frontier Analytical Laboratory for your analytical testing needs.

Sincerely,

Bradley B. Silverbush
Director of Operations

Frontier Analytical Laboratory

Sample Tracking Log

FAL Project ID: **6004**

Received on: **03/02/2010** Project Due: **03/24/2010** Storage: **R1**

FAL Sample ID	Dup	Client Project ID	Client Sample ID	Requested Method	Matrix	Sampling Date	Sampling Time	Hold Time Due Date
6004-001-SA	1	QL95	Pitcher Test	EPA 1613 D/F	Aqueous	03/01/2010	12:52 pm	03/01/2011

EPA Method 1613
PCDD/F

FRONTIER ANALYTICAL LABORATORY

FAL ID: 6004-001-MB
Client ID: Method Blank
Matrix: Aqueous
Batch No: X1958

Date Extracted: 03-08-2010
Date Received: NA
Amount: 1.000 L

ICal: PCDDFAL3-11-18-09
GC Column: DB5
Units: pg/L

Acquired: 03-09-2010
2005 WHO TEQ: 0.00

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	ND	1.65		-	0.212				
1,2,3,7,8-PeCDD	ND	2.04		-	0.302				
1,2,3,4,7,8-HxCDD	ND	2.01		-	0.328				
1,2,3,6,7,8-HxCDD	ND	2.35		-	0.381	Total TCDD	ND	1.65	
1,2,3,7,8,9-HxCDD	ND	2.17		-	0.351	Total PeCDD	ND	2.04	
1,2,3,4,6,7,8-HpCDD	ND	3.35		-	0.495	Total HxCDD	ND	2.35	
OCDD	ND	6.03		-	1.02	Total HpCDD	ND	3.35	
2,3,7,8-TCDF	ND	0.886		-	0.112				
1,2,3,7,8-PeCDF	ND	1.53		-	0.219				
2,3,4,7,8-PeCDF	ND	1.66		-	0.232				
1,2,3,4,7,8-HxCDF	ND	1.42		-	0.162				
1,2,3,6,7,8-HxCDF	ND	1.42		-	0.167				
2,3,4,6,7,8-HxCDF	ND	1.48		-	0.167				
1,2,3,7,8,9-HxCDF	ND	1.93		-	0.185	Total TCDF	ND	0.887	
1,2,3,4,6,7,8-HpCDF	ND	1.70		-	0.251	Total PeCDF	ND	1.66	
1,2,3,4,7,8,9-HpCDF	ND	2.04		-	0.280	Total HxCDF	ND	1.93	
OCDF	ND	4.27		-	0.451	Total HpCDF	ND	2.04	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	86.8	25.0 - 164	
13C-1,2,3,7,8-PeCDD	70.5	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	77.3	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	83.3	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	76.5	23.0 - 140	
13C-OCDD	76.7	17.0 - 157	
13C-2,3,7,8-TCDF	85.8	24.0 - 169	
13C-1,2,3,7,8-PeCDF	70.1	24.0 - 185	
13C-2,3,4,7,8-PeCDF	70.2	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	75.7	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	82.0	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	77.9	28.0 - 136	
13C-1,2,3,7,8,9-HxCDF	72.0	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	71.1	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	69.1	26.0 - 138	
13C-OCDF	71.6	17.0 - 157	

Cleanup Surrogate		
37Cl-2,3,7,8-TCDD	99.0	35.0 - 197

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: _____
Date: 3/10/10

Reviewed By: DN
Date: 3/10/10

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EPA Method 1613
PCDD/F

FRONTIER ANALYTICAL LABORATORY

FAL ID: 6004-001-OPR
Client ID: OPR
Matrix: Aqueous
Batch No: X1958

Date Extracted: 03-08-2010
Date Received: NA
Amount: 1.000 L

ICal: PCDDFAL3-11-18-09
GC Column: DB5
Units: ng/ml

Acquired: 03-09-2010
2005 WHO TEQ: NA

Compound	Conc	QC Limits	Qual
2,3,7,8-TCDD	10.7	6.70 - 15.8	
1,2,3,7,8-PeCDD	53.1	35.0 - 71.0	
1,2,3,4,7,8-HxCDD	52.0	35.0 - 82.0	
1,2,3,6,7,8-HxCDD	51.5	38.0 - 67.0	
1,2,3,7,8,9-HxCDD	50.4	32.0 - 81.0	
1,2,3,4,6,7,8-HpCDD	51.6	35.0 - 70.0	
OCDD	103	78.0 - 144	
2,3,7,8-TCDF	10.3	7.50 - 15.8	
1,2,3,7,8-PeCDF	51.0	40.0 - 67.0	
2,3,4,7,8-PeCDF	50.7	34.0 - 80.0	
1,2,3,4,7,8-HxCDF	51.7	36.0 - 67.0	
1,2,3,6,7,8-HxCDF	52.2	42.0 - 65.0	
2,3,4,6,7,8-HxCDF	52.4	35.0 - 78.0	
1,2,3,7,8,9-HxCDF	51.0	39.0 - 65.0	
1,2,3,4,6,7,8-HpCDF	50.9	41.0 - 61.0	
1,2,3,4,7,8,9-HpCDF	52.0	39.0 - 69.0	
OCDF	99.9	63.0 - 170	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	85.7	20.0 - 175	
13C-1,2,3,7,8-PeCDD	70.3	21.0 - 227	
13C-1,2,3,4,7,8-HxCDD	74.2	21.0 - 193	
13C-1,2,3,6,7,8-HxCDD	83.8	25.0 - 163	
13C-1,2,3,4,6,7,8-HpCDD	77.7	26.0 - 166	
13C-OCDD	75.4	13.0 - 198	
13C-2,3,7,8-TCDF	85.6	22.0 - 152	
13C-1,2,3,7,8-PeCDF	70.0	21.0 - 192	
13C-2,3,4,7,8-PeCDF	69.9	13.0 - 328	
13C-1,2,3,4,7,8-HxCDF	75.5	19.0 - 202	
13C-1,2,3,6,7,8-HxCDF	82.1	21.0 - 159	
13C-2,3,4,6,7,8-HxCDF	76.3	22.0 - 176	
13C-1,2,3,7,8,9-HxCDF	71.1	17.0 - 205	
13C-1,2,3,4,6,7,8-HpCDF	74.8	21.0 - 158	
13C-1,2,3,4,7,8,9-HpCDF	68.7	20.0 - 186	
13C-OCDF	72.3	13.0 - 198	

Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	101	31.0 - 191	

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: _____
Date: 3/10/10

Reviewed By: _____
Date: 3/16/10

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EPA Method 1613
PCDD/F

ANALYTICAL LABORATORY

FAL ID: 6004-001-SA
Client ID: Pitcher Test
Matrix: Aqueous
Batch No: X1958

Date Extracted: 03-08-2010
Date Received: 03-02-2010
Amount: 0.983 L

ICal: PCDDFAL3-11-18-09
GC Column: DB5
Units: pg/L

Acquired: 03-09-2010
2005 WHO TEQ: 0.00

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	ND	1.89		-	0.212				
1,2,3,7,8-PeCDD	ND	2.21		-	0.302				
1,2,3,4,7,8-HxCDD	ND	2.09		-	0.328				
1,2,3,6,7,8-HxCDD	ND	2.38		-	0.381	Total TCDD	ND	1.89	
1,2,3,7,8,9-HxCDD	ND	2.22		-	0.351	Total PeCDD	ND	2.21	
1,2,3,4,6,7,8-HpCDD	ND	2.97		-	0.495	Total HxCDD	ND	2.38	
OCDD	ND	4.42		-	1.02	Total HpCDD	ND	2.97	
2,3,7,8-TCDF	ND	0.913		-	0.112				
1,2,3,7,8-PeCDF	ND	1.68		-	0.219				
2,3,4,7,8-PeCDF	ND	1.77		-	0.232				
1,2,3,4,7,8-HxCDF	ND	1.23		-	0.162				
1,2,3,6,7,8-HxCDF	ND	1.24		-	0.167				
2,3,4,6,7,8-HxCDF	ND	1.36		-	0.167				
1,2,3,7,8,9-HxCDF	ND	1.67		-	0.185	Total TCDF	ND	0.913	
1,2,3,4,6,7,8-HpCDF	ND	1.60		-	0.251	Total PeCDF	ND	1.77	
1,2,3,4,7,8,9-HpCDF	ND	2.06		-	0.280	Total HxCDF	ND	1.67	
OCDF	ND	3.46		-	0.451	Total HpCDF	ND	2.06	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	80.9	25.0 - 164	
13C-1,2,3,7,8-PeCDD	66.6	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	78.2	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	88.7	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	81.3	23.0 - 140	
13C-OCDD	81.3	17.0 - 157	
13C-2,3,7,8-TCDF	80.5	24.0 - 169	
13C-1,2,3,7,8-PeCDF	66.9	24.0 - 185	
13C-2,3,4,7,8-PeCDF	66.0	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	79.0	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	84.7	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	82.8	28.0 - 136	
13C-1,2,3,7,8,9-HxCDF	74.2	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	76.2	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	73.8	26.0 - 138	
13C-OCDF	75.7	17.0 - 157	

Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	90.8	35.0 - 197	

A	Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
B	Analyte is present in Method Blank
C	Chemical Interference
D	Presence of Diphenyl Ethers
E	Analyte concentration is above calibration range
F	Analyte confirmation on secondary column
J	Analyte concentration is below calibration range
M	Maximum possible concentration
ND	Analyte Not Detected
NP	Not Provided
S	Sample acceptance criteria not met
X	Matrix interferences
*	Result taken from dilution or reinjection

Analyst: _____
Date: 3/10/10

Reviewed By: DN
Date: 3/10/10

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SUBCONTRACTOR ANALYSIS REQUEST
CUSTODY TRANSFER 03/01/10

ANALYTICAL RESOURCES INCORPORATED

ARI Project: QL95

Laboratory: Frontier Analytical Laboratory
Lab Contact: BRAD SILVERBUSH
Lab Address: 5172 Hillsdale Circle
El Dorado Hills, CA 95762
Phone: 916-934-0900
Fax: 916-934-0999

6004
0°C

ARI Client: Analytical Resources, Inc.
Project ID: Dioxin Test in Pitcher
ARI PM: Sue Dunnihoo
Phone:
Fax: 206-695-6201

Analytical Protocol: In-house
Special Instructions:

Requested Turn Around: **03/09/10**
Fax Results (Y/N): **email**

Limits of Liability. *Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or sucessors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.*

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
10-5052-QL95A	Pitcher Test	03/01/10 12:52	Water		Dioxin/Furans 1613(Sub)

Special Instructions: None

EDD

Carrier UPS		Airbill 1Z8326950150869347		Date 3/1/10
Relinquished by [signature]	Company ARI		Date 3/1/10	Time 1600
Received by Kathy Zipp	Company Frontier		Date 3-2-10	Time 9:55

Subcontractor Custody Form - **QL95**

Frontier Analytical Laboratory

Sample Login Form

FAL Project ID: **6004**

Client:	Analytical Resources Inc. Sue Dunnihoo
Client Project ID:	QL95
Date Received:	03/02/2010
Time Received:	09:55 am
Received By:	KZ
Logged In By:	KZ
# of Samples Received:	1
Duplicates:	1
Storage Location:	R1

Method of Delivery:	UPS
Tracking Number:	1Z8326950150869347
Shipping Container Received Intact	Yes
Custody seals(s) present?	Yes
Custody seals(s) intact?	Yes
Sample Arrival Temperature (C)	0
Cooling Method	Ice
Chain Of Custody Present?	Yes
Return Shipping Container To Client	Yes
Test for residual Chlorine	Yes
Thiosulfate Added	No
Earliest Sample Hold Time Expiration	03/01/2011
Adequate Sample Volume	Yes
Anomalies or additional comments:	


Frontier Analytical Laboratory
6004-001-SA
Client ID: Pitcher Test
Storage: R1
(01 of 02)
Frontier Analytical Laboratory
6004-001-SA
Client ID: Pitcher Test
Storage: R1
(02 of 02)
Client:
Sample
Date
Time
Sampler
Site
Project
Analysis
Comments:

Port of Seattle
Lora Lake Apartments

Remedial Investigation/ Feasibility Study Work Plan

Appendix H
Data Validation Reports

FINAL

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Port of Seattle
Lora Lake Apartments
Storm Water Interim Action

Prepared for:

Floyd Snider
601 Union Street, Suite 600
Seattle, WA 98101

Prepared by:

EcoChem, Inc.
710 Second Avenue, Suite 660
Seattle, Washington 98104

EcoChem Project: C15207-1

February 9, 2010

Approved for Release:

Christine Ransom
Project Manager
EcoChem, Inc.

PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of both summary and full validation (Level III & IV) performed on stormwater, sediment, and quality control (QC) sample data for the Lora Lakes Apartments Storm Water Interim Action project. A complete list of samples is provided in the **SAMPLE INDEX**.

The Dioxin/Furan analyses were performed by Frontier Analytical Laboratory, El Dorado Hills, California. All other analyses were performed by Analytical Resources, Inc. (ARI), Tukwila, Washington. The analytical methods and EcoChem project chemists are listed in the table below.

Analysis	Method	Primary Review	Secondary Review
Volatile Organic Compounds	SW8260C	Megan Kilner	Chris Ransom
	SW8260C-SIM		
Polynuclear Aromatic Hydrocarbons	SW8270D-SIM	Melissa Swanson	Chris Ransom
Dioxin Furan Compounds	EPA 1613		C. Ransom/E. Strout
Pentachlorophenol	SW8041	Chris Ransom	Lucy Panteleeff
Total Petroleum Hydrocarbons	NWTPH-Dx		
Total and Dissolved Metals	SW6010B & E200.8	Lea Beard	Chris Ransom
Total Solids	EPA 160.3		
Totals Suspended Solids	EPA 160.2		
Total Organic Carbon	Plumb, 1981		
Grain Size	ASTM D422		

The data were reviewed using guidance and quality control criteria documented in *Port of Seattle Lora Lakes Apartments, Stormwater Interim Action Plan* (November 17, 2009; *National Functional Guidelines for Inorganic Data Review* (USEPA 1994 & 2004); *National Functional Guidelines for Organic Data Review* (USEPA 1999); and the analytical methods.

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **APPENDIX A**. A Qualified Data Summary Table is included in **APPENDIX B**. Data Validation Worksheets will be kept on file at EcoChem, Inc.

Sample Index
Floyd Snider
Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Laboratory ID	VOC	VOC SIM	PAH	Dxn	TPH-Dx	PCP	Metals	TOC	Grain Size	TSS	Total Solids
QB37	CB31A121409GRAB	09-30854-QB37A	✓	✓			✓						
QB37	CB4857121409GRAB	09-30855-QB37B	✓	✓			✓						
QB37	CB1121409GRAB	09-30856-QB37C	✓	✓			✓						
QB37	TB121409	09-30857-QB37D	✓	✓									
QB72	CB31A121509COMP	09-30991-QB72A			✓			✓	✓			✓	
QB72	CB4857121509COMP	09-30992-QB72B			✓			✓	✓			✓	
QB72	CB1121409COMP	09-30993-QB72C			✓			✓	✓			✓	
QB72	CB31A121509COMP	09-30994-QB72D							✓				
QB72	CB4857121509COMP	09-30995-QB72E							✓				
QB72	CB1121409COMP	09-30996-QB72F							✓				
QC28	CB4857-121009-SED	09-31268-QC28A			✓		✓	✓	✓	✓	✓	✓	✓
QD62	CB31A123109Grab	09-32251-QD62A	✓	✓			✓						
QD62	CB4857123109Grab	09-32252-QD62B	✓	✓			✓						
QD62	CB1123109Grab	09-32253-QD62C	✓	✓			✓						
QD62	Trip Blanks	09-32254-QD62D	✓	✓									
QD71	CB31A123109COMP	10-14-QD71A			✓			✓	✓			✓	
QD71	CB4857123109COMP	10-15-QD71B			✓			✓	✓			✓	
QD71	CB1123109COMP	10-16-QD71C			✓			✓	✓			✓	
QD71	CB31A123109COMP	10-17-QD71D							✓				
QD71	CB4857123109COMP	10-18-QD71E							✓				
QD71	CB1123109COMP	10-19-QD71F							✓				
5881	CB31A121509COMP	5881-001-SA				✓							
5881	CB4857121509COMP	5881-002-SA				✓							
5881	CB1121409COMP	5881-003-SA				✓							
5887	CB4857-121009-SED	5887-001-SA				✓							
5904	CB31A123109COMP	5904-001-SA				✓							
5904	CB4857123109COMP	5904-002-SA				✓							
5904	CB1123109COMP	5904-003-SA				✓							

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Volatile Organic Compounds by SW846 Method 8260B

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB37	3 Storm Water & 1 Trip Blank	Summary
QD62	3 Storm Water & 1 Trip Blank	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Preservation	1	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
	GC/MS Instrument Performance Check		Field Precision (Duplicates and Replicates)
	Initial Calibration (ICAL)		Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Laboratory Blanks		Reporting Limits
1	Field Blanks		Compound Identification
	Surrogate Compounds		Reported Results
	Laboratory Control Samples (LCS/LCSD)		Calculation Verification (Full Validation only)

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Field Blanks

SDG QB37: One trip blank, TB121409, was submitted. No target analytes were detected in this blank.

SDG QD62: One trip blank, Trip Blanks, was submitted. No target analytes were detected in this blank.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate and LCS/LCSD percent recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Volatile Organic Compounds by SW846 Method 8260C-SIM

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB37	3 Storm Water & 1 Trip Blank	Summary
QD62	3 Storm Water & 1 Trip Blank	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Preservation	1	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
	GC/MS Instrument Performance Check		Field Precision (Duplicates and Replicates)
	Initial Calibration (ICAL)		Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Laboratory Blanks		Reporting Limits
1	Field Blanks		Compound Identification
	Surrogate Compounds		Reported Results
	Laboratory Control Samples (LCS/LCSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Field Blanks

SDG QB37: One trip blank, TB121409, was associated with these samples. No target analytes were detected in this blank.

SDG QD62: One trip blank, Trip Blanks, was associated with these samples. No target analytes were detected in this blank.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate and LCS/LCSD percent recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Polynuclear Aromatic Hydrocarbons by SW846 Method 8270D-SIM

This report documents the review of analytical data from the analyses of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QC28	1 Sediment	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation
GC/MS Instrument Performance Check
Initial Calibration (ICAL)
Continuing Calibration (CCAL)
Blanks
Surrogate Compounds
2 Laboratory Control Samples (LCS)
1 Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Internal Standards
Target Analyte List
Reporting Limits
Compound Identification
Reported Results

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[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Laboratory Control Sample

The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) relative percent difference (RPD) value for benzo(g,h,i)perylene was greater than the control limit. The positive result for this analyte was estimated (J-9) in the associated sample.

The LCSD percent recovery (%R) value for benzo(g,h,i)perylene was less than the lower control limit. The LCS %R value was within control limits; therefore no action was taken.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and LCS/LCSD recoveries. Precision was assessed using LCS/LCSD RPD values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values, with the exception noted above. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values, with the exception previously.

One data point was estimated based on an LCS/LCSD precision outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Polynuclear Aromatic Hydrocarbons by SW846 Method 8270D-SIM

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB72	3 Storm Water	Summary
QD71	3 Storm Water	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	GC/MS Instrument Performance Check		Internal Standards
	Initial Calibration (ICAL)		Target Analyte List
	Continuing Calibration (CCAL)		Reporting Limits
	Blanks		Compound Identification
	Surrogate Compounds		Reported Results
	Laboratory Control Samples (LCS)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QB72: The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Dioxin/Furan Compounds by Method 1613

This report documents the review of analytical data from the analyses of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Frontier Analytical Laboratory, El Dorado Hills, California. Full validation (Level IV) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
5887	1 Sediment	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Receipt		Ongoing Precision and Recovery (OPR)
	Initial Calibration (ICAL)		Field Replicates
	Continuing Calibration (CCAL)		Laboratory Duplicates
	Laboratory Blanks		Compound Identification
	Field Blanks		Reporting Limits
2	Labeled Compounds	1	Calculation Verification (full validation only)
1	Matrix Spikes/Matrix Spike Duplicate (MS/MSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Receipt

The temperature for one sample cooler (0°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Labeled Compounds

Labeled compounds were added to every sample as specified in the method. The recoveries were within the QAPP specified control limits of 70%-130%, with the exceptions noted below. For recoveries greater than the upper control limit, positive results for the associated compounds were estimated (J-13) to indicate a potential high bias. For recoveries less than the lower control limit, results for the associated compounds were estimated (J/UJ-13) to indicate a potential low bias.

The percent recovery (%R) values for six labeled compounds in Sample CB4857-121009-SED were less than the 70% lower control limit. The target analytes associated with the labeled compounds were estimated (J-13).

Matrix Spike/Matrix Spike Duplicate

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Accuracy was evaluated using the labeled compound and ongoing precision and recovery standard (OPR) recoveries. Laboratory precision can be evaluated by comparing the OPR standard results from batch to batch; however there was no way to assess precision within the analytical batch.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the labeled compound and OPR %R values, with the above noted exceptions. Precision could not be evaluated for the analytical batch.

Data were estimated based on labeled compound recovery outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Dioxin/Furan Compounds by Method 1613

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Frontier Analytical Laboratory, El Dorado Hills, California. A full validation (Level IV) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
5881	3 Storm Water	Full
5904	3 Storm Water	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Receipt		Ongoing Precision and Recovery (OPR)
	Initial Calibration (ICAL)		Field Replicates
	Continuing Calibration (CCAL)		Laboratory Duplicates
	Laboratory Blanks	2	Compound Identification
	Field Blanks		Reporting Limits
2	Labeled Compounds		Calculation Verification (full validation only)
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Receipt

The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned

Labeled Compounds

Labeled compounds were added to every sample as specified in the method. The recoveries were within the QAPP specified control limits of 70%-130%, with the exceptions noted below. For recoveries greater than the upper control limit, positive results for the associated compounds were estimated (J-13) to indicate a potential high bias. For recoveries less than the lower control limit, results for the associated compounds were estimated (J/UJ-13) to indicate a potential low bias.

SDG 5904: Sample CB31A123109COMP: 1,2,3,7,8-PeCDD – (J-13) high bias
Sample CB4857123109COMP: OCDF – (J-13) low bias

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Accuracy was evaluated using the labeled compound and ongoing precision and recovery standard (OPR) recoveries. Laboratory precision can be evaluated by comparing the OPR standard results from batch to batch; however there was no way to assess precision within the analytical batch.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the labeled compound and OPR recoveries, with the exceptions noted above. Precision could not be assessed for the analytical batch.

Data were estimated based on labeled compound recovery outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Pentachlorophenol by SW846 Method 8041

This report documents the review of analytical data from the analyses of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QC28	1 Sediment	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

2	Holding Times and Sample Preservation	Second Column Confirmation
	Initial Calibration (ICAL)	Retention Time Window
	Continuing Calibration (CCAL)	Target Analyte List
	Blanks	Reporting Limits
	Surrogate Compounds	Compound Identification
	Laboratory Control Samples (LCS)	Reported Results
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)	

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

Sample CB4857-121009-SED was re-extracted due to low surrogate recovery in the original analysis. The re-extraction was done after the 14 day holding time. The pentachlorophenol result for this sample was estimated (J-1) to indicate a potential low bias.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD RPD values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

The pentachlorophenol result was estimated based on an exceeded holding time.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Pentachlorophenol by SW846 Method 8041

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB72	3 Storm Water	Summary
QD71	3 Storm Water	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	Second Column Confirmation
	Initial Calibration (ICAL)	Retention Time Window
	Continuing Calibration (CCAL)	Target Analyte List
	Blanks	Reporting Limits
	Surrogate Compounds	Compound Identification
	Laboratory Control Samples (LCS)	Reported Results
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)	

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QB72: The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Diesel Range Hydrocarbons by Method NWTPH-Dx

This report documents the review of analytical data from the analyses of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QC28	1 Sediment	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	1 Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Initial Calibration (ICAL)	Target Analyte List
Continuing Calibration (CCAL)	Reporting Limits
Blanks	Compound Identification
Surrogate Compounds	Reported Results
Laboratory Control Samples (LCS)	

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD RPD values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Diesel Range Hydrocarbons by Method NWTPH-Dx

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QB37	3 Storm Water	Summary
QD62	3 Storm Water	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	1 Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Initial Calibration (ICAL)	Target Analyte List
Continuing Calibration (CCAL)	Reporting Limits
Blanks	Compound Identification
Surrogate Compounds	Reported Results
Laboratory Control Samples (LCS)	

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Arsenic and Lead by EPA 6010B

This report documents the review of analytical data from the analysis of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QC28	1 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation
Initial Calibration
Continuing Calibration Verification
CRDL Standards
Laboratory Blanks
Laboratory Control Samples (LCS)
Matrix Spikes (MS)
Laboratory Duplicates
Target Analyte List
Reporting Limits
Reported Results

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. The laboratory duplicate relative percent difference values indicated acceptable precision. Accuracy was also acceptable, as demonstrated by matrix spike and laboratory control sample recoveries.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Total and Dissolved Arsenic by EPA 200.8

This report documents the review of analytical data from the analyses of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QD71	3 Storm Water
QB72	3 Storm Water

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	Matrix Spikes (MS)
	Initial Calibration	Laboratory Duplicates
	Continuing Calibration Verification	ICP-MS Internal Standards
	CRDL Standards	Target Analyte List
	Laboratory Blanks	Reporting Limits
	Laboratory Control Samples (LCS)	Reported Results

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QB72: The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. The laboratory duplicate relative percent difference values indicated acceptable precision. Accuracy was also acceptable, as demonstrated by matrix spike and laboratory control sample recoveries.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Total Organic Carbon by Plumb, 1981 and Total Solids by EPA 160.3

This report documents the review of analytical data from the analysis of one catch basin sediment sample and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QC28	1 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	2	Matrix Spikes (MS)
Initial Calibration	2	Laboratory Duplicates
Continuing Calibration Verification		Reporting Limits
Laboratory Blanks		Reported Results
Laboratory Control Samples (LCS)		

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Matrix Spikes

The matrix spike recovery for total organic carbon (TOC) was greater than the QAPP-specified upper control limit of 120%. The TOC result was estimated (J-8) to indicate a potential high bias.

Laboratory Duplicates

The relative percent difference (RPD) value for TOC was greater than the QAPP-specified control limit of 20%. The TOC result was estimated (J-9).

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. The laboratory duplicate RPD values indicated acceptable precision, except where previously noted. Accuracy was also acceptable, as demonstrated by MS and laboratory control sample recoveries, except as noted above.

Data were estimated based on MS %R and laboratory duplicate RPD outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Total Suspended Solids by EPA 160.2

This report documents the review of analytical data from the analysis of storm water samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QD71	3 Storm Water
QB72	3 Storm Water

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	Laboratory Duplicates
	Laboratory Blanks	Reporting Limits
	Laboratory Control Samples (LCS)	Reported Results

[1] Quality control results are discussed below, but no data were qualified
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Holding Times and Sample Preservation

SDG QB72: The temperature for one sample cooler (1.2°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. The laboratory duplicate relative percent difference values indicated acceptable precision. Accuracy was also acceptable, as demonstrated by laboratory control sample recoveries.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A
DATA QUALIFIER DEFINITIONS REASON CODES AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

1	Holding Time/Sample Preservation
2	Chromatographic pattern in sample does not match pattern of calibration standard.
3	Compound Confirmation
4	Tentatively Identified Compound (TIC) (associated with NJ only)
5A	Calibration (initial)
5B	Calibration (continuing)
6	Field Blank Contamination
7	Lab Blank Contamination (e.g., method blank, instrument, etc.)
8	Matrix Spike(MS & MSD) Recoveries
9	Precision (all replicates)
10	Laboratory Control Sample Recoveries
11	A more appropriate result is reported (associated with “R” and “DNR” only)
12	Reference Material
13	Surrogate Spike Recoveries (a.k.a., labeled compounds & recovery standards)
14	Other (define in validation report)
15	GFAA Post Digestion Spike Recoveries
16	ICP Serial Dilution % Difference
17	ICP Interference Check Standard Recovery
18	Trip Blank Contamination
19	Internal Standard Performance (e.g., area, retention time, recovery)
20	Linear Range Exceeded
21	Potential False Positives
22	Elevated Detection Limit Due to Interference (i.e., laboratory, chemical and/or matrix)

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Hold Time	Waters: 14 days preserved 7 Days: unpreserved (for aromatics) Solids: 14 Days	J(+)/UJ(-) if hold times exceeded If exceeded by > 3X HT: J(+)/R(-) (EcoChem PJ)	1
Tuning	BFB Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Storage Blank	One per SDG <CRQL	U(+) the specific analyte(s) results in all assoc.samples using the 5x or 10x rule	7
Trip Blank	Frequency as per project QAPP	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned	18
Field Blanks (if required in QAPP)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS *low conc. H2O VOA*	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS *regular VOA (H2O & solid)*	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Added to all samples Within method control limits	J(+) if %R >UCL J(+)/UJ(-) if %R <LCL but >10% (see PJ[1]) J(+)/R(-) if <10%	13
Internal Standard (IS)	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

PJ[1] No action if there are 4+ surrogates and only 1 outlier.

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS CLP low conc. H2O only	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS regular SVOA (H2O & solid)	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler/Storage Temperature	Waters/Solids < 4°C Tissues <-10°C	EcoChem PJ, see TM-05	1
Holding Time	Extraction - Water: 30 days from collection *Note:* Under CWA, SDWA, and RCRA the HT for H2O is 7 days* Extraction - Soil: 30 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext > 30 days J(+)/UJ(-) if analysis > 40 Days EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 304.9824 Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift	R(+/-) if not met	14
Window Defining Mix and Column Performance Mix	Window defining mixture/Isomer specificity std run before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) x = ht. of TCDD y = baseline to bottom of valley For all isomers eluting near 2378-TCDD/TCDF isomers (TCDD only for 8290)	J(+) if valley > 25%	5A (ICAL) 5B (CCAL
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD <35% for labeled compounds under 1613b)	J(+) natives if %RSD > 20%	5A
	Abs. RT of $^{13}C_{12}$-1234-TCDD >25 min on DB5 >15 min on DB-225	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10 for all native and labeled compounds in CS1 std.	If <10, elevate Det. Limit or R(-)	

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Continuing Calibration	Analyzed at the start and end of each 12 hour shift. %D+/-20% for native compounds %D +/-30% for labeled compounds (Must meet limits in Table 6, Method 1613B) (If %Ds in the closing CCAL are w/in 25%/35% the avg RF from the two CCAL may be used to calculate samples per Method 8290, Section 8.3.2.4)	Do not qualify labeled compounds. Narrate in report for labeled compound %D outliers. For native compound %D outliers: 8290: J(+)/UJ(-) if %D = 20% - 75% J(+)/R(-) if %D > 75% 1613: J(+)/UJ(-) if %D is outside Table 6 limits J(+)/R(-) if %D is +/- 75% of Table 6 limit	5B
	Abs. RT of $^{13}C_{12}$-1234-TCDD and $^{13}C12$-123789-HxCDD +/- 15 sec of ICAL.	EcoChem PJ, see ICAL section of TM-05	
	RRT of all other compounds must meet Table 2 of 1613B.	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7
Field Blanks (Not Required)	No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	Concentrations must meet limits in Table 6, Method 1613B or lab limits.	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (recovery)	May not analyze MS/MSD %R should meet lab limits.	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	May not analyze MS/MSD RPD < 20%	J(+) in parent sample if RPD > CL	9

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Lab Duplicate	RPD <25% if present.	J(+)/UJ(-) if outside limts	9
Labeled Compounds / Internal Standards	*Method 8290:* %R = 40% - 135% in all samples *Method 1613B:* %R must meet limits specified in Table 7, Method 1613	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 IA ratios meet limits in Table 9 of 1613B or Table 8 of 8290 RRTs w/in limits in Table 2 of 1613B	If RT criteria not met, use PJ (see TM-05) If S/N criteria not met, J(+). if unlabelled ion abundance not met, change to EMPC If labelled ion abundance not met, J(+).	21
EMPC (estimated maximum possible concentration)	If quantitation idenfication criteria are not met, laboratory should report an EMPC value.	If laboratory correctly reported an EMPC value, qualify with U to indicate that the value is a detection limit.	14
Interferences	PCDF interferences from PCDPE	If both detected, change PCDF result to EMPC	14
Second Column Confirmation	All 2378-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC specs in this table must be met for the confirmation analysis.	Report lower of the two values. If not performed use PJ (see TM-05).	3
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used	11

EcoChem Validation Guidelines (Based on SW846 Method 8000 and Organic NFG 1999)

Organochlorine Pesticides by 8081A; Aroclors by 8082; Organophosphorous Pests by 8141A; Chlorinated Herbicides by 8151A; Polyaromatic Hydrocarbons by 8310 (HPLC); and other GC/HPLC analyses performed under Method 8000

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) using PJ if greater than 6°C	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
DDT & Endrin Breakdown (Method 8081A)	At the start of each 12 hr. shift DDT Breakdown: < 15% Endrin Breakdown: <15%	Narrate if frequency criteria not met. J(+) DDT NJ(+) DDD and/or DDE R(-) DDT if (+) for either DDE or DDD J(+) Endrin NJ(+) EK and/or EA R(-) Endrin if (+) for either EK or EA	5B
Initial Calibration	Minimum 5 calibration levels Linear regression: R2 >0.990 RSD of response factors: <20% Quadratic curve requires 6 stds. Method 8081A: Single point calibration for multi-components	J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Continuing Calibration Verification (CCV)	Prior to analysis and after max. 20 samples or 12 hours, whichever comes first. %D <15% Method 8151A: CCV after every 10 samples.	Narrate if frequency criteria not met. J(+) If %R > 115% J(+)/UJ(-) If %R < 85% J(+)R(-) if %D > 90% (EcoChem PJ)	5B
Method Blank	One per matrix per batch (max. 20 samples) No results ≥RL	U (at RL) if sample result is less than RL and less than 5X blank result	7
		U (at reported sample value) if sample result is greater than or equal to RL and less than 5X blank result	7
Field Blank (Not Required)	Not addressed by NFG or SW-846 No results > RL	Apply 5X rule; U(+) < action level using same logic as method blank	6
MS/MSD	One per matrix per batch Lab limits or QAPP criteria	Narrate if frequency not met. Qualify parent only unless other QC indicates systematic problems. J(+) if both %R > UCL; J(+)/UJ(-) if both %R < LCL EcoChem PJ if only one %R outlier No action if parent conc. > 5x the amount spiked.	8

EcoChem Validation Guidelines (Based on SW846 Method 8000 and Organic NFG 1999)

Organochlorine Pesticides by 8081A; Aroclors by 8082; Organophosphorous Pests by 8141A; Chlorinated Herbicides by 8151A; Polyaromatic Hydrocarbons by 8310 (HPLC); and other GC/HPLC analyses performed under Method 8000

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Precision: MS/MSD or LCS/LCSD or Sample/Duplicate	One per matrix per batch Lab limits or QAPP criteria	J(+) if RPD > laboratory CL	9
LCS or LCS/LCSD	One per matrix per batch Lab limits or QAPP criteria	J(+)/UJ(-) If %R < LCL J(+) If > UCL J(+)/R(-) If any %R <10%	10
Surrogates	Added to all samples (inc. QC samples) Lab limits or QAPP criteria	J(+)/UJ(-) If %R < LCL J(+) If > UCL J(+)/R(-) If any %R <10% No action if 2 or more surrogates are used and only one is <LCL or >UCL (EcoChem PJ)	13
Quantitation/ Identification	Analyte within RTW on both columns or detectors RPD between values<40%	NJ(+) if RPD>40% R(+) using EcoChem PJ if RTW criterion not met NJ(+) if no confirmation Refer to Tech. Memo TM-08	3 21 (false +)
Internal Standards (if used)	IS area within -50% to +100% of CCV Methods 8081A & 8082: IS area within +/-50% of CCV	J(+) if IS > 100% J(+)/UJ(-) if IS < 50% J(+)/R(-) if IS is < 25%	19
Field Duplicate	Water: RPD < 35% Soil: RPD < 50%	Narrate (J/UJ if required by project instructions)	9
Two analyses for one sample (e.g. dilution)	Report only one result per analyte	"DNR" results that should not be used to avoid reporting multiple results for one sample. Refer to Tech. Memo TM-04	11

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X (EcoChem PJ)	1
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $R^2 \geq 0.990$ If used, RSD of response factors ≤20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J(+)/UJ(-) if %R < 85% J(+) if %R >115%	5B
Method Blank	At least one per batch (≤10 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7
		U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.	6
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked. Use PJ if only one %R outlier	8
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% (EcoChem PJ)	10

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits. (EcoChem PJ)	13
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2
Field Duplicates	Use project control limits, if stated in QAPP EcoChem default: water: RPD < 35% solids: RPD < 50%	Narrate (Use Professional Judgement to qualify)	9
Two analyses for one sample (dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported. (See TM-04)	11

EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration Tissues: Frozen	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r > 0.995	J(+)/UJ(-) if r < 0.995 (multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blank (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		(Refer to TM-02 for additional information)
			7

Reporting Limit Standard	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Sb, Pb, Tl)	R(-)/J(+) < 2x RL if %R <50% (< 30% Sb, Pb, Tl) J(+) < 2x RL, UJ(-) if %R 50-69% (30-49% Sb, Pb,Tl) J(+) < 2x RL if %R 130-180% (150-200% Sb, Pb, Tl) R(+) < 2x RL if %R > 180% (200% Sb, Pb, Tl)	14
Interference Check Samples (ICSA/ICSAB)	ICSAB %R 80 - 120% for all spiked elements | ICSA | < MDL for all unspiked elements except: K, Na	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R= 50 to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	

EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Matrix Spikes	One per matrix per batch 75-125% for samples less than 4x spike level	J(+) if %R > 125% J(+)/UJ(-) if %R < 75% J(+)/R(-) if %R < 30% or J(+)/UJ(-) if Post Spike %R 75-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, spike at twice the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples >RL and < 5x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL (2x RL for solids) qualify all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample conc. > 50x MDL	J(+)/UJ(-) if %D >10% qualify all samples in batch	16
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Metals Analysis by ICP-MS
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. ≤ 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J(+)/UJ(-) if tune criteria not met	5A
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J(+)/UJ(-) if r<0.995 (for multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R(-),(+) < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J(+) < 2x RL, UJ(-) if %R 50-69% (30%-49% Co,Mn, Zn) J(+) < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R(+) < 2x RL if %R > 180% (200% Co, Mn, Zn)	14
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7

EcoChem Validation Guidelines for Metals Analysis by ICP-MS (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% or J(+)/UJ(-) if Post Spike %R 75%-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J(+)/UJ(-) if %D >10% All samples in batch	16
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J (+)/UJ (-) all analytes associated with IS outlier	19
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < AL in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for coole temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B

Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method
	After each ICV and CCV every ten samples and end of run
	| blank| < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch
	(not to exceed 20 samples)
	blank < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blk value, U(+) results < action level
		For (-) blk value, J(+)/UJ(-) results < action level
			7

Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff<RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Floyd Snider
Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Quals	Val Quals	Val Reason
QC28	CB4857-121009-SED	09-31268-QC28A	SW8041	Pentachlorophenol	71	ug/kg		J	1
QC28	CB4857-121009-SED	09-31268-QC28A	SW8270D-SIM	Benzo(g,h,i)perylene	16	ug/kg	J	J	9
QC28	CB4857-121009-SED	09-31268-QC28A	Plumb, 1980	Total Organic Carbon	1.29	Percent		J	8,9
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	1,2,3,7,8-PeCDD	1.79	pg/g	J	J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	OCDD	4480	pg/g		J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	1,2,3,7,8-PeCDF	0.586	pg/g	J	J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	2,3,4,7,8-PeCDF	1.3	pg/g	J	J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	1,2,3,7,8,9-HxCDF	1.99	pg/g	J	J	13
5887	CB4857-121009-SED	5887-001-SA	EPA 1613	OCDF	243	pg/g		J	13
5904	CB31A123109COMP	5904-001-SA	EPA 1613	1,2,3,7,8-PeCDD	2.17	pg/L	J	J	13
5904	CB4857123109COMP	5904-002-SA	EPA 1613	OCDF	122	pg/L		J	13

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Port of Seattle
Lora Lake Apartments
Stormwater Interim Action – Sampling Events 3 through 10

Prepared for:

Floyd/Snider
601 Union Street, Suite 600
Seattle, WA 98101

Prepared by:

EcoChem, Inc.
710 Second Avenue, Suite 660
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EcoChem Project: C15207-3

June 22, 2010

Approved for Release:

Christine Ransom
Project Manager
EcoChem, Inc.

PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of validation performed on stormwater and quality control (QC) sample data for the Lora Lake Apartments Stormwater Interim Action project. The dioxin data received full (Level IV) validation; all other parameters received summary (Level III) validation. A complete list of samples is provided in the **SAMPLE INDEX**.

The Dioxin/Furan analyses were performed by Frontier Analytical Laboratory, El Dorado Hills, California. All other analyses were performed by Analytical Resources, Inc. (ARI), Tukwila, Washington. The analytical methods and EcoChem project chemists are listed in the table below.

Analysis	Method	Primary Review	Secondary Review
Volatile Organic Compounds	SW8260C & SW8260C-SIM	M. Kilner/J. Hall	E. Strout/C. Ransom/M. Swanson
Dioxin Furan Compounds	EPA 1613	M. Swanson	E. Strout
Polynuclear Aromatic Hydrocarbons	SW8270D-SIM	L. Panteleeff/J. Hall/D. Kerlin	E. Strout/C. Ransom/M. Swanson
Pentachlorophenol	SW8041	L. Panteleeff/J. Hall	
Total Petroleum Hydrocarbons	NWTPH-Dx	M. Kilner/J. Hall	E. Strout/C. Ransom/M. Swanson
Total and Dissolved Arsenic	EPA 200.8	L. Beard/D. Kerlin/T. Ugrai	Chris Ransom/M. Swanson
Total Suspended Solids	EPA 160.2		

The data were reviewed using guidance and quality control criteria documented in the analytical methods; *Port of Seattle Lora Lakes Apartments, Stormwater Interim Action Plan* (Floyd/Snider, November 17, 2009); *National Functional Guidelines for Inorganic Data Review* (USEPA 1994 & 2004); and *National Functional Guidelines for Organic Data Review* (USEPA 1999 & 2008).

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **APPENDIX A**. A Qualified Data Summary Table is included in **APPENDIX B**. Communications are included in **Appendix C**. Data Validation Worksheets will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) is also submitted with this report.

Sample Index
Lora Lake Apartments Storm Water Interim Action
Analytical Resources Inc.

SDG	Event	Sample ID	Lab ID	VOC	VOC-SIM	PAH	TPH-Dx	PCP	Tot Arsenic	Diss Arsenic	TSS
QL34	3	CB31A022310GRAB	10-4685-QL34A	✓	✓		✓				
		CB100022310GRAB	10-4686-QL34B	✓	✓		✓				
		CB4857022310GRAB	10-4687-QL34C	✓	✓		✓				
		CB1022310GRAB	10-4688-QL34D	✓	✓		✓				
		TB022310	10-4689-QL34E	✓	✓						
QL58	3	CB31A022410Comp	10-4796-QL58A			✓		✓	✓		✓
		CB4857022410Comp	10-4797-QL58B			✓		✓	✓		✓
		CB1022410Comp	10-4798-QL58C			✓		✓	✓		✓
		CB100022410Comp	10-4799-QL58D			✓		✓	✓		✓
		CB31A022410Comp	10-4800-QL58E							✓	
		CB4857022410Comp	10-4801-QL58F							✓	
		CB1022410Comp	10-4802-QL58G							✓	
		CB100022410Comp	10-4803-QL58H							✓	
QL85	4	CB31A022610GRAB	10-4943-QL85A	✓	✓		✓				
		CB4857022610GRAB	10-4944-QL85B	✓	✓		✓				
		CB1022610GRAB	10-4945-QL85C	✓	✓		✓				
		CB102022610GRAB	10-4946-QL85D	✓	✓		✓				
		TB022610	10-4947-QL85E	✓	✓						
QM04	4	CB31A022710COMP	10-5087-QM04A			✓		✓	✓		✓
		CB4857022710COMP	10-5088-QM04B			✓		✓	✓		✓
		CB1022710COMP	10-5089-QM04C			✓		✓	✓		✓
		CB102022710COMP	10-5090-QM04D			✓		✓	✓		✓
		CB31A022710COMP	10-5091-QM04E							✓	
		CB4857022710COMP	10-5092-QM04F							✓	
		CB1022710COMP	10-5093-QM04G							✓	
		CB102022710COMP	10-5094-QM04H							✓	
QN21	5	CB31A031010COMP	10-5974-QN21A			✓		✓	✓		✓
		CB4857031010COMP	10-5975-QN21B			✓		✓	✓		✓
		CB1031010COMP	10-5976-QN21C			✓		✓	✓		✓
		CB101031010COMP	10-5977-QN21D			✓		✓	✓		✓
		CB31A031010COMP	10-5978-QN21E							✓	
		CB4857031010COMP	10-5979-QN21F							✓	
		CB1031010COMP	10-5980-QN21G							✓	
		CB101031010COMP	10-5981-QN21H							✓	
QN31	5	CB31A031110GRAB	10-6027-QN31A	✓	✓		✓				
		CB1031110GRAB	10-6028-QN31B	✓	✓		✓				
		CB4857031110GRAB	10-6029-QN31C	✓	✓		✓				
		CB101031110GRAB	10-6030-QN31D	✓	✓		✓				
		TB031110	10-6031-QN31E	✓	✓						
QP69	6	CB31A032510GRAB	10-7709-QP69A		✓		✓				
		CB4857032510GRAB	10-7710-QP69B		✓		✓				
		CB1032510GRAB	10-7711-QP69C		✓		✓				
		CB101032510GRAB	10-7712-QP69D		✓		✓				
		TB032510	10-7713-QP69E		✓						

Sample Index
Lora Lake Apartments Storm Water Interim Action
Analytical Resources Inc.

SDG	Event	Sample ID	Lab ID	VOC	VOC-SIM	PAH	TPH-Dx	PCP	Tot Arsenic	Diss Arsenic	TSS
QQ20	6	CB31A032510COMP	10-8030-QQ20A			✓		✓	✓		✓
		CB4857032510COMP	10-8031-QQ20B			✓		✓	✓		✓
		CB1032510COMP	10-8032-QQ20C			✓		✓	✓		✓
		CB101032510COMP	10-8033-QQ20D			✓		✓	✓		✓
		CB31A032510COMP	10-8034-QQ20E							✓	
		CB4857032510COMP	10-8035-QQ20F							✓	
		CB1032510COMP	10-8036-QQ20G							✓	
		CB101032510COMP	10-8037-QQ20H							✓	
QQ22	7	CB31A032910GRAB	10-8052-QQ22A		✓		✓				
		CB4857032910GRAB	10-8053-QQ22B		✓		✓				
		CB1032910GRAB	10-8054-QQ22C		✓		✓				
		CB100032910GRAB	10-8055-QQ22D		✓		✓				
		TB032810	10-8056-QQ22E		✓						
QQ59	7	CB31A032910COMP	10-8212-QQ59A			✓		✓	✓		✓
		CB4857032910COMP	10-8213-QQ59B			✓		✓	✓		✓
		CB1032910COMP	10-8214-QQ59C			✓		✓	✓		✓
		CB100032910COMP	10-8215-QQ59D			✓		✓	✓		✓
		CB31A032910COMP	10-8216-QQ59E							✓	
		CB4857032910COMP	10-8217-QQ59F							✓	
		CB1032910COMP	10-8218-QQ59G							✓	
		CB100032910COMP	10-8219-QQ59H							✓	
QR09	8	CB31A040210GRAB	10-8553-QR09A		✓		✓				
		CB4857040210GRAB	10-8554-QR09B		✓		✓				
		CB1040210GRAB	10-8555-QR09C		✓		✓				
		CB102040210GRAB	10-8556-QR09D		✓		✓				
		TB040210	10-8557-QR09E		✓						
QR34	8	CB31A040210COMP	10-8675-QR34A			✓		✓		✓	✓
		CB4857040310COMP	10-8676-QR34B			✓		✓		✓	✓
		CB1040210COMP	10-8677-QR34C			✓		✓		✓	✓
		CB102040210COMP	10-8678-QR34D			✓		✓		✓	✓
		CB31A040210COMP	10-8679-QR34E						✓		
		CB4857040310COMP	10-8680-QR34F						✓		
		CB1040210COMP	10-8681-QR34G						✓		
		CB102040210COMP	10-8682-QR34H						✓		
QS23	9	CB31A040810COMP	10-9292-QS23A			✓		✓	✓		✓
		CB4857040810COMP	10-9293-QS23B			✓		✓	✓		✓
		CB1040810COMP	10-9294-QS23C			✓		✓	✓		✓
		CB100040810COMP	10-9295-QS23D			✓		✓	✓		✓
		CB31A040810GRAB	10-9296-QS23E		✓		✓				
		CB4857040810GRAB	10-9297-QS23F		✓		✓				
		CB1040810GRAB	10-9298-QS23G		✓		✓				
		CB100040810GRAB	10-9299-QS23H		✓		✓				
		TB040710	10-9300-QS23I		✓						
		CB31A040810COMP	10-9301-QS23J							✓	
		CB4857040810COMP	10-9302-QS23K							✓	
		CB1040810COMP	10-9303-QS23L							✓	
		CB100040810COMP	10-9304-QS23M							✓	

Sample Index
Lora Lake Apartments Storm Water Interim Action
Analytical Resources Inc.

SDG	Event	Sample ID	Lab ID	VOC	VOC-SIM	PAH	TPH-Dx	PCP	Tot Arsenic	Diss Arsenic	TSS
QT81	10	CB31A042110GRAB	10-10138-QT81A		✓		✓				
		CB1042110GRAB	10-10139-QT81B		✓		✓				
		CB4857042110GRAB	10-10140-QT81C		✓		✓				
		CB101042110GRAB	10-10141-QT81D		✓		✓				
		TB042110	10-10142-QT81E		✓						
QU08	10	CB31A042110COMP	10-10294-QU08A			✓		✓	✓		✓
		CB1042110COMP	10-10295-QU08B			✓		✓	✓		✓
		CB4857042110COMP	10-10296-QU08C			✓		✓	✓		✓
		CB101042110COMP	10-10297-QU08D			✓		✓	✓		✓
		CB31A042110COMP	10-10298-QU08E							✓	
		CB1042110COMP	10-10299-QU08F							✓	
		CB4857042110COMP	10-10300-QU08G							✓	
		CB101042110COMP	10-10301-QU08H							✓	

Sample Index
Lora Lake Apartments Storm Water Interim Action
Frontier Analytical Laboratories

SDG	Sample ID	Lab ID	Dioxins
6005	CB31A022410Comp	6005-001-SA	✓
	CB4857022410Comp	6005-002-SA	✓
	CB1022410Comp	6005-003-SA	✓
	CB100022410Comp	6005-004-SA	✓
6012	CB31A022710COMP	6012-001-SA	✓
	CB4857022710COMP	6012-002-SA	✓
	CB1022710COMP	6012-003-SA	✓
	CB102022710COMP	6012-004-SA	✓
6030	CB31A031010COMP	6030-001-SA	✓
	CB4857031010COMP	6030-002-SA	✓
	CB1031010COMP	6030-003-SA	✓
	CB101031010COMP	6030-004-SA	✓
6069	CB31A032510COMP	6069-001-SA	✓
	CB4857032510COMP	6069-002-SA	✓
	CB1032510COMP	6069-003-SA	✓
	CB101032510COMP	6069-004-SA	✓
6076	CB1032910COMP	6076-003-SA	✓
	CB31A032910COMP	6076-001-SA	✓
	CB4857032910COMP	6076-002-SA	✓
	CB100032910COMP	6076-004-SA	✓
6083	CB1040210COMP	6083-003-SA	✓
	CB102040210COMP	6083-004-SA	✓
	CB31A040210COMP	6083-001-SA	✓
	CB4857040310COMP	6083-002-SA	✓
6090	CB31A040810COMP	6090-001-SA	✓
	CB4857040810COMP	6090-002-SA	✓
	CB1040810COMP	6090-003-SA	✓
	CB100040810COMP	6090-004-SA	✓
6118	CB31A042110COMP	6118-001-SA	✓
	CB1042110COMP	6118-002-SA	✓
	CB4857042110COMP	6118-003-SA	✓
	CB101042110COMP	6118-004-SA	✓

DATA VALIDATION REPORT
Lora Lake Apartments Stormwater Interim Action
Dioxin/Furan Compounds by Method 1613

This report documents the review of analytical data from the analyses of stormwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Frontier Analytical Laboratory, El Dorado Hills, California. Full validation (Level IV) was performed on all data. The **Sample Index** contains a complete list of samples.

SDG	Number of Samples
6005	4 Stormwater
6012	4 Stormwater
6030	4 Stormwater
6069	4 Stormwater
6076	4 Stormwater
6083	4 Stormwater
6090	4 Stormwater
6118	4 Stormwater

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The quality control (QC) requirements reviewed are summarized in the following table:

1	Holding Times and Sample Preservation		Ongoing Precision and Recovery (OPR)
	System Performance and Resolution Checks	1	Field Duplicates
	Initial Calibration (ICAL)		Target Analyte List
	Calibration Verification (CVER)	2	Reported Results
	Method Blanks		Compound Identification
2	Labeled Compound Recovery	1	Calculation Verification
1	Matrix Spike/Matrix Spike Duplicates (MS/MSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

All SDG: The samples were transferred from Analytical Resources, Inc (ARI) to Frontier Analytical Laboratory. The temperatures of the coolers were outside the advisory control range

upon receipt at Frontier, ranging down to 0.0°C. The temperature outliers did not impact data quality; therefore no qualifiers were assigned.

Labeled Compound Recovery

Labeled compounds were added to every sample as specified in the method. The percent recovery (%R) values were within the QAPP specified control limits of 70% - 130%, with the exceptions noted below.

All recovery outliers were less than 70%. For recoveries less than the lower control limit in a field sample, the results for the associated compounds were estimated (J/UJ-13) to indicate a potential low bias. For outliers associated with method blank and ongoing precision and recovery (OPR) QC samples, no qualifiers are applied. The following outliers resulted in qualification of data.

SDG	Sample ID	Number of Outliers	Qualifiers
6012	CB4857022710COMP	1	J-13
	CB1022710COMP	2	
6069	CB4857032510COMP	1	J/UJ-13
	CB101032510COMP	1	
	CB1032510COMP	16 (all)	
6118	CB31A042110COMP	4	J/UJ-13
	CB1042110COMP	16 (all)	
	CB4857042110COMP	16 (all)	
	CB101042110COMP	10	

Matrix Spike/Matrix Spike Duplicates

All SDG: Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Accuracy was evaluated using the labeled compound and ongoing precision and recovery (OPR) standard recoveries. Precision was assessed using the field duplicate analyses.

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) value control limit is 30% for results greater than five times the reporting limit (RL). For results less than five times the RL, the difference between the sample and duplicate must be less than the RL.

SDG 6005: The data for one field duplicate set, CB31A02240COMP and CB101022410COMP, were submitted. Field precision was acceptable.

SDG 6012: The data for one field duplicate set CB1022710COMP and CB102022710COMP, were submitted. Field precision was acceptable.

SDG 6030: The data for one field duplicate set, CB4857031010COMP and CB101031010COMP, were submitted. Field precision was acceptable.

SDG 6069: The data for one field duplicate set, CB4857032510COMP and CB101032510COMP, were submitted. Field precision was acceptable.

SDG 6076: The data for one field duplicate set, CB31A032910COMP and CB100032910COMP, were submitted. Field precision was acceptable.

SDG 6083: The data for one field duplicate set, CB1040210COMP and CB102040210COMP, were submitted. Field precision was acceptable.

SDG 6090: The data for one field duplicate set, CB31A040810COMP and CB100040810COMP, were submitted. Field precision was acceptable.

SDG 6118: The data for one field duplicate set, CB4857042110COMP and CB101042110COMP, were submitted. Field precision was acceptable.

Reported Results

All SDG: The laboratory assigned "D,M" flags to several of the reported homologue group totals to indicate that a diphenyl ether (D) interference was present, which may result in a high bias (M) to the reported result. All homologue group totals that were "D,M" flagged by the laboratory were estimated (J-14).

Calculation Verification

All SDG: Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the labeled compound and OPR %R values, with the above noted exceptions. Precision was acceptable as demonstrated by the field duplicate RPD values.

Data were estimated based on labeled compound recovery outliers and interference from diphenyl ether.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Stormwater Interim Action
Volatile Organic Compounds by SW846 Method 8260C

This report documents the review of analytical data from the analyses of stormwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. The **Sample Index** contains a complete list of samples.

SDG	Number of Samples
QL34	4 Stormwater & 1 Trip Blank
QL85	4 Stormwater & 1 Trip Blank
QN31	4 Stormwater & 1 Trip Blank

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	1	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
	GC/MS Instrument Performance Check	1	Field Duplicates
	Initial Calibration (ICAL)		Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Laboratory Blanks	1	Reporting Limits
1	Field Blanks		Compound Identification
	Surrogate Compounds	2	Reported Results
	Laboratory Control Samples (LCS/LCSD)		Calculation Verification (Full Validation only)

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QL85: The temperature for one sample cooler was outside of the advisory control range of 2°C to 6°C (at 0.6°C). This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Field Blanks

SDG QL34: One trip blank, TB022310, was submitted. No target analytes were detected in this blank.

SDG QL85: One trip blank, TB022610, was submitted. No target analytes were detected in this blank.

SDG QN31: One trip blank, TB031110, was submitted. No target analytes were detected in this blank.

Matrix Spike/Matrix Spike Duplicates

SDG QL34: Due to limited sample volume, matrix spike/matrix spike duplicates (MS/MSD) were analyzed on a different day than the field samples in order to ensure that sufficient volume was available for the VOC-SIM analysis. This did not impact data quality; therefore no qualifiers were assigned.

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) value control limit is 50% for results greater than five times the reporting limit (RL). For results less than five times the RL, the difference between the sample and duplicate must be less than the RL.

SDG QL34: One set of field duplicates, CB31A022310GRAB and CB100022310GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QL85: One set of field duplicates, CB122610GRAB and CB102022610GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QN31: One set of field duplicates, CB4857031010GRAB and CB101031010GRAB, was submitted. No target analytes were detected; field precision was acceptable.

Reporting Limits

The QAPP-specified reporting limit (RL) for 1,2-dichloroethane is 0.02 ug/L. The laboratory reported an RL of 0.2 ug/L for 1,2-dichloroethane. No action was taken other than to note the discrepancy.

Reported Results

SDG QN31: The samples were analyzed for 1,2-dichloroethane by Method SW8260B and also by Method SW8260-SIM. Since the detection limits are significantly lower for the SIM analyses, the SW8260B results were rejected (R-11) in favor of the SIM results. Since a usable result remains for 1,2-dichloroethane in each sample, completeness is not affected.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample/ laboratory control sample (LCS/LCSD), and MS/MSD %R values. Precision was also acceptable as demonstrated by the LCS/LCSD, MS/MSD, and field duplicate RPD values.

Data were rejected to indicate which result, of multiple results, should not be used.

Rejected data should not be used for any reason.

All other data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Stormwater Interim Action
Volatile Organic Compounds by SW846 Method 8260C-SIM

This report documents the review of analytical data from the analyses of stormwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. The **Sample Index** contains a complete list of samples.

SDG	Number of Samples
QL34	4 Stormwater & 1 Trip Blank
QL85	4 Stormwater & 1 Trip Blank
QN31	4 Stormwater & 1 Trip Blank
QP69	4 Stormwater & 1 Trip Blank
QQ22	4 Stormwater & 1 Trip Blank
QR09	4 Stormwater & 1 Trip Blank
QS23	4 Stormwater & 1 Trip Blank
QT81	4 Stormwater & 1 Trip Blank

I. DATA PACKAGE COMPLETENESS

SDG QQ22: All results for trans-1,2-dichloroethene were missing on the summary forms and in the EDD. The results were present in the raw data. The laboratory was contacted and submitted corrected summary forms and EDD. No additional action was necessary.

The laboratory submitted all other required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation		Matrix Spike/Matrix Spike Duplicate (MS/MSD)
	GC/MS Instrument Performance Check	1	Field Duplicates
	Initial Calibration (ICAL)		Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Laboratory Blanks		Reporting Limits
1	Field Blanks		Compound Identification
	Surrogate Compounds		Reported Results
	Laboratory Control Samples (LCS/LCSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QL85: The temperature for one sample cooler was outside of the advisory control range of 2°C to 6°C (at 0.6°C). This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Field Blanks

No target analytes were detected in any submitted trip blank.

SDG QL34: One trip blank, TB022310, was submitted.

SDG QL85: One trip blank, TB022610, was submitted.

SDG QN31: One trip blank, TB031110, was submitted.

SDG QP69: One trip blank, TB032510, was submitted.

SDG QQ22: One trip blank, TB032810, was submitted.

SDG QR09: One trip blank, TB040210, was submitted.

SDG QS23: One trip blank, TB040710, was submitted.

SDG QT81: One trip blank, TB042110, was submitted.

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) value control limit is 50% for results greater than five times the reporting limit (RL). For results less than five times the RL, the difference between the sample and duplicate must be less than the RL.

SDG QL34: One set of field duplicates, CB31A022310GRAB and CB100022310GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QL85: One set of field duplicates, CB122610GRAB and CB102022610GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QN31: One set of field duplicates, CB4857031010GRAB and CB101031010GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QP69: One set of field duplicates, CB4857032510GRAB and CB101032510GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QQ22: One set of field duplicates, CB31A032910GRAB and CB100032910GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QR09: One set of field duplicates, CB1040210GRAB and CB102040210GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QS23: One set of field duplicates, CB1040810GRAB and CB100040810GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QT81: One set of field duplicates, CB4857042110GRAB and CB101042110GRAB, was submitted. No target analytes were detected; field precision was acceptable.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample/ laboratory control sample (LCS/LCSD), and matrix spike/matrix spike duplicate (MS/MSD) %R values. Precision was also acceptable as demonstrated by the LCS/LCSD, MS/MSD, and field duplicate RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Stormwater Interim Action
Polycyclic Aromatic Hydrocarbons by SW846 Method 8270D-SIM

This report documents the review of analytical data from the analyses of stormwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. The **Sample Index** contains a complete list of samples

SDG	Number of Samples
QL58	4 Stormwater
QM04	4 Stormwater
QN21	4 Stormwater
QQ20	4 Stormwater
QQ59	4 Stormwater
QR34	4 Stormwater
QS23	4 Stormwater
QU08	4 Stormwater

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	2	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	GC/MS Instrument Performance Check	1	Field Duplicates
	Initial Calibration (ICAL)		Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
2	Laboratory Blanks		Reporting Limits
2	Surrogate Compounds	2	Compound Identification
	Laboratory Control Samples (LCS)		Reported Results

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QR34: The temperature for the sample cooler was outside of the advisory control range of 2°C to 6°C (at 9.1°C). This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Laboratory Blanks

Method blanks were analyzed at the appropriate frequency. To assess the impact of each blank contaminant on the reported sample results, action levels were established at five times (5x) the concentrations reported in the blanks. If a contaminant was detected reported in an associated field sample and the concentration was less than the action level, the result was qualified as not detected (U-7). If the result was also less than the reporting limit, then the result was elevated to the reporting limit. No action was taken if the sample result was greater than the action level, or for non-detected results.

The following analytes were qualified based on method blank contamination:

SDG QM04:

Sample CB31A022710COMP: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene

Sample CB4857022710COMP: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, phenanthrene

Sample CB1022710COMP: phenanthrene

SDG QN21:

All samples: naphthalene

Surrogate Compounds

Surrogate compounds were added to every sample as specified in the method. The percent recovery (%R) values were within the QAPP specified control limits of 40% - 160%, with the exceptions noted below. For recoveries less than the lower control limit, results for the associated compounds were estimated (J/UJ-13) to indicate a potential low bias. The d14-dibenz(a,h)anthracene recoveries were less than the lower control limit in the following samples:

SDG QL58: Sample CB1022410COMP

SDG QN21: Sample CB31A031010COMP

SDG QQ20: all samples

SDG QR34: Samples CB31A040210COMP and CB4857040310COMP

Matrix Spike/Matrix Spike Duplicate

SDG QQ20: Matrix spike/ matrix spike duplicate (MS/MSD) analyses were performed using Sample CB31A032510COMP. The %R values for benzo(a)pyrene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene and benzo(g,h,i)perylene were less than the lower control limit. These analytes were estimated (J/UJ-8) in the parent sample to indicate a potential low bias.

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 50% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 1x the RL.

SDG QL58: One set of field duplicates, CB31A022410COMP and CB100022410COMP, was submitted. Field precision was acceptable.

SDG QM04: One set of field duplicates, CB1022710COMP and CB102022710COMP, was submitted. Field precision was acceptable.

SDG QN21: One set of field duplicates, CB4857031010COMP and CB101031010COMP, was submitted. Field precision was acceptable.

SDG QQ20: One set of field duplicates, CB4857032510COMP and CB101032510COMP, was submitted. Field precision was acceptable.

SDG QQ59: One set of field duplicates, CB31A032910COMP and CB100032910COMP, was submitted. All field precision criteria were met.

SDG QR34: One set of field duplicates, CB1040210COMP and CB102040210COMP, was submitted. No target analytes were detected; field precision was acceptable.

SDG QS23: One set of field duplicates, CB31A040810COMP and CB100040810COMP, was submitted. Field precision was acceptable.

SDG QU08: One set of field duplicates, CB4857042110COMP and CB101042110COMP, was submitted. Field precision was acceptable.

Compound Identification

The isomers benzo(b)fluoranthene and benzo(k)fluoranthene typically elute within two seconds of each other. For most of the field samples, at the benzo(b)fluoranthene and benzo(k)fluoranthene retention times, either a single peak or closely co-eluting peaks were present. Since the individual isomers could not be chromatographically distinguished, the laboratory used half of the peak area to calculate the benzo(b)fluoranthene concentration, and the other half to calculate benzo(k)fluoranthene.

Since it is not possible to determine whether only one or both analytes were present, the positive results for these analytes were tentatively identified and estimated (NJ-14).

SDG QR34: The laboratory misidentified indeno(1,2,3-cd)pyrene in the continuing calibration verification standard on 4/12/2010. The laboratory resubmitted the corrected raw data, result forms, and EDD on 5/11/2010. No further action was necessary.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, LCS, and MS/MSD %R values, with the exceptions noted above. Precision was also acceptable as demonstrated by the MS/MSD and field duplicate RPD values.

Data were estimated based on surrogate and MS/MSD recovery outliers. Data were qualified as not detected based on method blank contamination. Data were also qualified as estimated with tentative identification due to the co-elution of two isomers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Stormwater Interim Action
Pentachlorophenol by EPA Method 8041

This report documents the review of analytical data from the analyses of stormwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. The **Sample Index** contains a complete list of samples

SDG	Number of Samples
QL58	4 Stormwater
QM04	4 Stormwater
QN21	4 Stormwater
QQ20	4 Stormwater
QQ59	4 Stormwater
QR34	4 Stormwater
QS23	4 Stormwater
QU08	4 Stormwater

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	1	Field Duplicates
	Initial Calibration (ICAL)		Second Column Confirmation
	Continuing Calibration (CCAL)		Retention Time Window
	Laboratory Blanks		Target Analyte List
	Surrogate Compounds		Reporting Limits
	Laboratory Control Samples (LCS)		Compound Identification
	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)		Reported Results

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QR34: The temperature for the sample cooler was outside of the advisory control range of 2°C to 6°C (at 9.1°C). This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) value control limit is 50% for results greater than five times the reporting limit (RL). For results less than five times the RL, the difference between the sample and duplicate must be less than the RL.

SDG QL58: One set of field duplicates, CB31A022410COMP and CB100022410COMP, was submitted. Field precision was acceptable.

SDG QM04: One set of field duplicates, CB1022710COMP and CB102022710COMP, was submitted. Pentachlorophenol was not detected either sample; field precision was acceptable.

SDG QN21: One set of field duplicates, CB4857031010COMP and CB101031010COMP, was submitted. Pentachlorophenol was not detected either sample; field precision was acceptable.

SDG QQ20: One set of field duplicates, CB4857032510COMP and CB101032510COMP, was submitted. Field precision was acceptable.

SDG QQ59: One set of field duplicates, CB31A032910COMP and CB100032910COMP, was submitted. All field precision criteria were met.

SDG QR34: One set of field duplicates, CB1040210COMP and CB102040210COMP, was submitted. Pentachlorophenol was not detected either sample; field precision was acceptable.

SDG QS23: One set of field duplicates, CB31A040810COMP and CB100040810COMP, was submitted. Field precision was acceptable.

SDG QU08: One set of field duplicates, CB4857042110COMP and CB101042110COMP, was submitted. Field precision was acceptable.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample and matrix spike/matrix spike duplicate (MS/MSD) percent recoveries. Precision was also acceptable as demonstrated by the field duplicate and MS/MSD RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Stormwater Interim Action
Diesel Range Hydrocarbons by Method NWTPH-Dx

This report documents the review of analytical data from the analyses of stormwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples	Validation Level
QL34	4 Stormwater	Summary
QL85	4 Stormwater	Summary
QN31	4 Stormwater	Summary
QP69	4 Stormwater	Summary
QQ22	4 Stormwater	Summary
QR09	4 Stormwater	Summary
QS23	4 Stormwater	Summary
QT81	4 Stormwater	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation		Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	Initial Calibration (ICAL)	1	Field Duplicates
	Continuing Calibration (CCAL)		Target Analyte List
	Blanks		Reporting Limits
	Surrogate Compounds		Compound Identification
	Laboratory Control Samples (LCS/LCSD)		Reported Results

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QL85: The temperature for one sample cooler was outside of the advisory control range of 2°C to 6°C (at 0.6°C). This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) value control limit is 50% for results greater than five times the reporting limit (RL). For results less than five times the RL, the difference between the sample and duplicate must be less than the RL. No data were qualified based on field duplicate precision outliers. Users of the data should consider the impact of field precision outliers on the reported results.

SDG QL34: One set of field duplicates, CB31A022310GRAB and CB100022310GRAB, was submitted. Field precision was acceptable.

SDG QL85: One set of field duplicates, CB122610GRAB and CB102022610GRAB, was submitted. No target analytes were detected; field precision was acceptable.

SDG QN31: One set of field duplicates, CB4857031010GRAB and CB101031010GRAB, was submitted. Field precision was acceptable.

SDG QP69: One set of field duplicates, CB4857032510GRAB and CB101032510GRAB, was submitted. Field precision was acceptable.

SDG QQ22: One set of field duplicates, CB31A032910GRAB and CB100032910GRAB, was submitted. Field precision was acceptable.

SDG QR09: One set of field duplicates, CB1040210COMP and CB102040210COMP, was submitted. No target analytes were detected; field precision was acceptable.

SDG QS23: One set of field duplicates, CB31A040810GRAB and CB100040810GRAB, was submitted. Field precision was acceptable.

SDG QT81: One set of field duplicates, CB4857042110GRAB and CB101042110GRAB, was submitted. Field precision was acceptable.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample/ laboratory control sample (LCS/LCSD), and matrix spike/matrix spike duplicate (MS/MSD) %R values. Precision was also acceptable as demonstrated by the LCS/LCSD, MS/MSD, and field duplicate RPD values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Stormwater Interim Action
Total and Dissolved Arsenic by EPA 200.8

This report documents the review of analytical data from the analyses of stormwater samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data. The **Sample Index** contains a complete list of samples.

SDG	Number of Samples
QL58	4 Stormwater
QM04	4 Stormwater
QN21	4 Stormwater
QQ20	4 Stormwater
QQ59	4 Stormwater
QR34	4 Stormwater
QS23	4 Stormwater
QU08	4 Stormwater

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables, except as noted below. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QN21: A post-digestion spike was analyzed by the laboratory for dissolved arsenic. The post-digestion spike summary data was not provided in the package from the laboratory. Raw data was used to assess the post-spike. No further action was necessary.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1 Holding Times and Sample Preservation
Initial Calibration
Continuing Calibration Verification
CRDL Standards
Laboratory Blanks
Laboratory Control Samples (LCS)
2 Matrix Spike (MS)
Laboratory Duplicates
1 Field Duplicates
ICP-MS Internal Standards
Target Analyte List
1 Reporting Limits
1 Reported Results

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

SDG QR34: The temperature for one sample cooler (9.1°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Matrix Spike

SDG QN21: The matrix spike (MS) percent recovery (%R) value for dissolved arsenic (126%) was greater than the upper control limit of 125%. The associated dissolved arsenic results were estimated (J-8) to indicate a potential high bias.

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) value control limit is 20% for results greater than five times the reporting limit (RL). For results less than five times the RL, the difference between the sample and duplicate must be less than the RL.

SDG QL58: One set of field duplicates, CB31A022410COMP and CB100022410COMP, was submitted. All field precision criteria were met.

SDG QM04: One set of field duplicates, CB1022710COMP and CB102022710COMP, was submitted. All field precision criteria were met.

SDG QN21: One set of field duplicates, CB4857031010COMP and CB101031010COMP, was submitted. All field precision criteria were met.

SDG QQ20: One set of field duplicates, CB4857032510COMP and CB101032510COMP, was submitted. All field precision criteria were met.

SDG QQ59: One set of field duplicates, CB31A032910COMP and CB100032910COMP, was submitted. All field precision criteria were met.

SDG QR34: One set of field duplicates, CB1040210COMP and CB102040210COMP, was submitted. All field precision criteria were met.

SDG QS23: One set of field duplicates, CB31A040810COMP and CB100040810COMP, was submitted. All field precision criteria were met.

SDG QU08: One set of field duplicates, CB101042110COMP and CB4857042110COMP, was submitted. All field precision criteria were met.

Reported Results

SDG QS23: For Sample CB1040810COMP, the laboratory originally reported dissolved arsenic using an alternate selenium correction. This resulted in an elevated reporting limit (RL). It was determined that the arsenic result should be reported using the standard correction with the lower RL. Summary forms and EDDs were resubmitted. No further action was required.

Reporting Limits

SDG QQ59: The reporting limits for total and dissolved arsenic for sample CB1040810COMP were elevated due to matrix interference.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the laboratory control sample and MS percent recovery values, except at previously noted. Precision was also acceptable as demonstrated by the laboratory and field duplicate RPD values.

Data were qualified based on a matrix spike recovery outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Stormwater Interim Action
Total Suspended Solids by EPA 160.2

This report documents the review of analytical data from the analysis of stormwater samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data. The **Sample Index** contains a complete list of samples.

SDG	Number of Samples
QL58	4 Stormwater
QM04	4 Stormwater
QN21	4 Stormwater
QQ20	4 Stormwater
QR34	4 Stormwater
QU08	4 Stormwater

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Holding Times and Sample Preservation	1	Field Duplicates
	Laboratory Blanks		Reporting Limits
	Laboratory Control Samples (LCS)		Reported Results
	Laboratory Duplicates		

[1] Quality control results are discussed below, but no data were qualified
[2] Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Holding Times and Sample Preservation

SDG QR34: The temperature for one sample cooler (9.1°C) was outside of the advisory control range of 2°C to 6°C. This temperature outlier did not impact data quality; therefore no qualifiers were assigned.

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) value control limit is 20% for results greater than five times the reporting limit (RL). For results less than five times the RL, the difference between the sample and duplicate must be less

than two times the RL. No data were qualified based on field duplicate precision outliers; however, data users should consider the impact of field precision outliers on the reported results.

SDG QL58: One set of field duplicates, CB31A022410COMP and CB100022410COMP, was submitted. All field precision criteria were met.

SDG QM04: One set of field duplicates, CB1022710COMP and CB102022710COMP, was submitted. All field precision criteria were met.

SDG QN21: One set of field duplicates, CB4857031010COMP and CB101031010COMP, was submitted. All field precision criteria were met.

SDG QQ20: One set of field duplicates, CB4857032510COMP and CB101032510COMP, was submitted. The RPD value for TSS (29.4%) was greater than the control limit.

SDG QQ59: One set of field duplicates, CB31A032910COMP and CB100032910COMP, was submitted. All field precision criteria were met.

SDG QR34: One set of field duplicates, CB1040210COMP and CB102040210COMP, was submitted. All field precision criteria were met.

SDG QS23: One set of field duplicates, CB31A040810COMP and CB100040810COMP, was submitted. All field precision criteria were met.

SDG QU08: One set of field duplicates, CB101042110COMP and CB4857042110COMP, was submitted. All field precision criteria were met.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the laboratory control sample percent recovery values. Precision was also acceptable as demonstrated by the laboratory and field duplicate RPD values, except as noted above.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS, REASON CODES, AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

1	Holding Time/Sample Preservation
2	Chromatographic pattern in sample does not match pattern of calibration standard.
3	Compound Confirmation
4	Tentatively Identified Compound (TIC) (associated with NJ only)
5A	Calibration (initial)
5B	Calibration (continuing)
6	Field Blank Contamination
7	Lab Blank Contamination (e.g., method blank, instrument, etc.)
8	Matrix Spike(MS & MSD) Recoveries
9	Precision (all replicates)
10	Laboratory Control Sample Recoveries
11	A more appropriate result is reported (associated with “R” and “DNR” only)
12	Reference Material
13	Surrogate Spike Recoveries (a.k.a., labeled compounds & recovery standards)
14	Other (define in validation report)
15	GFAA Post Digestion Spike Recoveries
16	ICP Serial Dilution % Difference
17	ICP Interference Check Standard Recovery
18	Trip Blank Contamination
19	Internal Standard Performance (e.g., area, retention time, recovery)
20	Linear Range Exceeded
21	Potential False Positives
22	Elevated Detection Limit Due to Interference (i.e., laboratory, chemical and/or matrix)

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler/Storage Temperature	Waters/Solids < 4°C Tissues <-10°C	EcoChem PJ, see TM-05	1
Holding Time	Extraction - Water: 30 days from collection *Note:* Under CWA, SDWA, and RCRA the HT for H2O is 7 days* Extraction - Soil: 30 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext > 30 days J(+)/UJ(-) if analysis > 40 Days EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 304.9824 Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift	R(+/-) if not met	14
Window Defining Mix and Column Performance Mix	Window defining mixture/Isomer specificity std run before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) x = ht. of TCDD y = baseline to bottom of valley For all isomers eluting near 2378-TCDD/TCDF isomers (TCDD only for 8290)	J(+) if valley > 25%	5A (ICAL) 5B (CCAL
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD <35% for labeled compounds under 1613b)	J(+) natives if %RSD > 20%	5A
	Abs. RT of $^{13}C_{12}$-1234-TCDD >25 min on DB5 >15 min on DB-225	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10 for all native and labeled compounds in CS1 std.	If <10, elevate Det. Limit or R(-)	

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Continuing Calibration	Analyzed at the start and end of each 12 hour shift. %D+/-20% for native compounds %D +/-30% for labeled compounds (Must meet limits in Table 6, Method 1613B) (If %Ds in the closing CCAL are w/in 25%/35% the avg RF from the two CCAL may be used to calculate samples per Method 8290, Section 8.3.2.4)	Do not qualify labeled compounds. Narrate in report for labeled compound %D outliers. For native compound %D outliers: 8290: J(+)/UJ(-) if %D = 20% - 75% J(+)/R(-) if %D > 75% 1613: J(+)/UJ(-) if %D is outside Table 6 limits J(+)/R(-) if %D is +/- 75% of Table 6 limit	5B
	Abs. RT of $^{13}C_{12}$-1234-TCDD and $^{13}C12$-123789-HxCDD +/- 15 sec of ICAL.	EcoChem PJ, see ICAL section of TM-05	
	RRT of all other compounds must meet Table 2 of 1613B.	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7
Field Blanks (Not Required)	No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	Concentrations must meet limits in Table 6, Method 1613B or lab limits.	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (recovery)	May not analyze MS/MSD %R should meet lab limits.	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	May not analyze MS/MSD RPD < 20%	J(+) in parent sample if RPD > CL	9

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Lab Duplicate	RPD <25% if present.	J(+)/UJ(-) if outside limts	9
Labeled Compounds / Internal Standards	*Method 8290:* %R = 40% - 135% in all samples *Method 1613B:* %R must meet limits specified in Table 7, Method 1613	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 IA ratios meet limits in Table 9 of 1613B or Table 8 of 8290 RRTs w/in limits in Table 2 of 1613B	If RT criteria not met, use PJ (see TM-05) If S/N criteria not met, J(+). if unlabelled ion abundance not met, change to EMPC If labelled ion abundance not met, J(+).	21
EMPC (estimated maximum possible concentration)	If quantitation idenfication criteria are not met, laboratory should report an EMPC value.	If laboratory correctly reported an EMPC value, qualify with U to indicate that the value is a detection limit.	14
Interferences	PCDF interferences from PCDPE	If both detected, change PCDF result to EMPC	14
Second Column Confirmation	All 2378-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC specs in this table must be met for the confirmation analysis.	Report lower of the two values. If not performed use PJ (see TM-05).	3
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used	11

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Hold Time	Waters: 14 days preserved 7 Days: unpreserved (for aromatics) Solids: 14 Days	J(+)/UJ(-) if hold times exceeded If exceeded by > 3X HT: J(+)/R(-) (EcoChem PJ)	1
Tuning	BFB Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Storage Blank	One per SDG <CRQL	U(+) the specific analyte(s) results in all assoc.samples using the 5x or 10x rule	7
Trip Blank	Frequency as per project QAPP	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned	18
Field Blanks (if required in QAPP)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS *low conc. H2O VOA*	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS *regular VOA (H2O & solid)*	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Added to all samples Within method control limits	J(+) if %R >UCL J(+)/UJ(-) if %R <LCL but >10% (see PJ[1]) J(+)/R(-) if <10%	13
Internal Standard (IS)	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

PJ[1] No action if there are 4+ surrogates and only 1 outlier.

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS low conc. H2O SVOA	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS regular SVOA (H2O & solid)	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X (EcoChem PJ)	1
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $R^2 \geq 0.990$ If used, RSD of response factors $\leq$20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J(+)/UJ(-) if %R < 85% J(+) if %R >115%	5B
Method Blank	At least one per batch ($\leq$10 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7
		U (at reported sample value) if sample result is $\geq$ RL and < 5X blank result	7
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.	6
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked. Use PJ if only one %R outlier	8
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch ($\leq$10 samples) RPD $\leq$ lab control limit	J(+) if RPD > lab control limits	9
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% (EcoChem PJ)	10

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits. (EcoChem PJ)	13
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2
Field Duplicates	Use project control limits, if stated in QAPP EcoChem default: water: RPD < 35% solids: RPD < 50%	Narrate (Use Professional Judgement to qualify)	9
Two analyses for one sample (dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported. (See TM-04)	11

EcoChem Validation Guidelines for Metals Analysis by ICP-MS
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. ≤ 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J(+)/UJ(-) if tune criteria not met	5A
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J(+)/UJ(-) if r<0.995 (for multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R(-),(+) < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J(+) < 2x RL, UJ(-) if %R 50-69% (30%-49% Co,Mn, Zn) J(+) < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R(+) < 2x RL if %R > 180% (200% Co, Mn, Zn)	14
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7

EcoChem Validation Guidelines for Metals Analysis by ICP-MS
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% or J(+)/UJ(-) if Post Spike %R 75%-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J(+)/UJ(-) if %D >10% All samples in batch	16
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J (+)/UJ (-) all analytes associated with IS outlier	19
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < AL in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for coole temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B

Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method
	After each ICV and CCV every ten samples and end of run
	| blank| < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch
	(not to exceed 20 samples)
	blank < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blk value, U(+) results < action level
		For (-) blk value, J(+)/UJ(-) results < action level
			7

Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff<RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Lora Lake Apartments Stormwater Interim Action

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
QL58	CB31A022410Comp	10-4796-QL58A	SW8270D SIM	Benzo(b)fluoranthene	0.034	ug/L		NJ	14
QL58	CB31A022410Comp	10-4796-QL58A	SW8270D SIM	Benzo(k)fluoranthene	0.034	ug/L		NJ	14
QL58	CB4857022410Comp	10-4797-QL58B	SW8270D SIM	Benzo(b)fluoranthene	0.033	ug/L		NJ	14
QL58	CB4857022410Comp	10-4797-QL58B	SW8270D SIM	Benzo(k)fluoranthene	0.033	ug/L		NJ	14
QL58	CB100022410Comp	10-4799-QL58D	SW8270D SIM	Benzo(b)fluoranthene	0.029	ug/L		NJ	14
QL58	CB100022410Comp	10-4799-QL58D	SW8270D SIM	Benzo(k)fluoranthene	0.029	ug/L		NJ	14
QU08	CB31A042110COMP	10-10294-QU08A	SW8270D SIM	Benzo(b)fluoranthene	0.022	ug/L		NJ	14
QU08	CB31A042110COMP	10-10294-QU08A	SW8270D SIM	Benzo(k)fluoranthene	0.022	ug/L		NJ	14
QU08	CB4857042110COMP	10-10296-QU08C	SW8270D SIM	Benzo(b)fluoranthene	0.014	ug/L		NJ	14
QU08	CB4857042110COMP	10-10296-QU08C	SW8270D SIM	Benzo(k)fluoranthene	0.014	ug/L		NJ	14
QU08	CB101042110COMP	10-10297-QU08D	SW8270D SIM	Benzo(b)fluoranthene	0.02	ug/L		NJ	14
QU08	CB101042110COMP	10-10297-QU08D	SW8270D SIM	Benzo(k)fluoranthene	0.02	ug/L		NJ	14
QM04	CB31A022710COMP	10-5087-QM04A	SW8270D SIM	Benzo(a)anthracene	0.013	ug/L	B	U	7
QM04	CB31A022710COMP	10-5087-QM04A	SW8270D SIM	Benzo(a)pyrene	0.014	ug/L	B	U	7
QM04	CB31A022710COMP	10-5087-QM04A	SW8270D SIM	Benzo(b)fluoranthene	0.016	ug/L	B	U	7
QM04	CB31A022710COMP	10-5087-QM04A	SW8270D SIM	Benzo(g,h,i)perylene	0.022	ug/L	B	U	7
QM04	CB31A022710COMP	10-5087-QM04A	SW8270D SIM	Benzo(k)fluoranthene	0.016	ug/L	B	U	7
QM04	CB31A022710COMP	10-5087-QM04A	SW8270D SIM	Indeno(1,2,3-cd)pyrene	0.011	ug/L	B	U	7
QM04	CB4857022710COMP	10-5088-QM04B	SW8270D SIM	Benzo(a)anthracene	0.012	ug/L	B	U	7
QM04	CB4857022710COMP	10-5088-QM04B	SW8270D SIM	Benzo(a)pyrene	0.012	ug/L	B	U	7
QM04	CB4857022710COMP	10-5088-QM04B	SW8270D SIM	Benzo(b)fluoranthene	0.02	ug/L	B	U	7
QM04	CB4857022710COMP	10-5088-QM04B	SW8270D SIM	Benzo(g,h,i)perylene	0.017	ug/L	B	U	7
QM04	CB4857022710COMP	10-5088-QM04B	SW8270D SIM	Benzo(k)fluoranthene	0.012	ug/L	B	U	7
QM04	CB4857022710COMP	10-5088-QM04B	SW8270D SIM	Chrysene	0.03	ug/L	B	U	7
QM04	CB4857022710COMP	10-5088-QM04B	SW8270D SIM	Indeno(1,2,3-cd)pyrene	0.01	ug/L	B	U	7
QM04	CB4857022710COMP	10-5088-QM04B	SW8270D SIM	Phenanthrene	0.026	ug/L	B	U	7
QM04	CB1022710COMP	10-5089-QM04C	SW8270D SIM	Phenanthrene	0.011	ug/L	B	U	7
QN21	CB31A031010COMP	10-5974-QN21A	SW8270D SIM	Naphthalene	0.014	ug/L	B	U	7
QN21	CB4857031010COMP	10-5975-QN21B	SW8270D SIM	Naphthalene	0.015	ug/L	B	U	7
QN21	CB1031010COMP	10-5976-QN21C	SW8270D SIM	Naphthalene	0.012	ug/L	B	U	7
QN21	CB101031010COMP	10-5977-QN21D	SW8270D SIM	Naphthalene	0.011	ug/L	B	U	7
QN21	CB31A031010COMP	10-5978-QN21E	E200.8	Arsenic	0.5	ug/L		J	8
QN21	CB4857031010COMP	10-5979-QN21F	E200.8	Arsenic	0.4	ug/L		J	8
QN21	CB1031010COMP	10-5980-QN21G	E200.8	Arsenic	0.8	ug/L		J	8
QN21	CB101031010COMP	10-5981-QN21H	E200.8	Arsenic	0.5	ug/L		J	8
QN31	CB31A031110GRAB	10-6027-QN31A	SW8260C	1,2-Dichloroethane	0.2	ug/L	U	R	11
QN31	CB1031110GRAB	10-6028-QN31B	SW8260C	1,2-Dichloroethane	0.2	ug/L	U	R	11
QN31	CB4857031110GRAB	10-6029-QN31C	SW8260C	1,2-Dichloroethane	0.2	ug/L	U	R	11
QN31	CB101031110GRAB	10-6030-QN31D	SW8260C	1,2-Dichloroethane	0.2	ug/L	U	R	11
QN31	TB031110	10-6031-QN31E	SW8260C	1,2-Dichloroethane	0.2	ug/L	U	R	11
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	1-Methylnaphthalene	0.01	ug/L	U	UJ	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	2-Methylnaphthalene	0.012	ug/L		J	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Acenaphthene	0.01	ug/L	U	UJ	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Acenaphthylene	0.01	ug/L	U	UJ	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Anthracene	0.01	ug/L	U	UJ	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Benzo(a)anthracene	0.017	ug/L		J	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Benzo(a)pyrene	0.018	ug/L		J	8,13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Benzo(b)fluoranthene	0.02	ug/L		NJ	13,14
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Benzo(g,h,i)perylene	0.031	ug/L		J	8,13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Benzo(k)fluoranthene	0.02	ug/L		NJ	8,13,14

Qualified Data Summary Table
Lora Lake Apartments Stormwater Interim Action

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Chrysene	0.039	ug/L	Q	J	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Dibenz(a,h)anthracene	0.01	ug/L	U	UJ	8,13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Dibenzofuran	0.01	ug/L	U	UJ	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Fluoranthene	0.078	ug/L		J	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Fluorene	0.01	ug/L	U	UJ	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Indeno(1,2,3-cd)pyrene	0.015	ug/L		J	8,13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Naphthalene	0.017	ug/L		J	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Phenanthrene	0.042	ug/L		J	13
QQ20	CB31A032510COMP	10-8030-QQ20A	SW8270D SIM	Pyrene	0.079	ug/L		J	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	1-Methylnaphthalene	0.01	ug/L	U	UJ	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	2-Methylnaphthalene	0.01	ug/L		J	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Acenaphthene	0.01	ug/L	U	UJ	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Acenaphthylene	0.01	ug/L	U	UJ	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Anthracene	0.01	ug/L	U	UJ	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Benzo(a)anthracene	0.011	ug/L		J	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Benzo(a)pyrene	0.013	ug/L		J	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Benzo(b)fluoranthene	0.014	ug/L		NJ	13,14
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Benzo(g,h,i)perylene	0.02	ug/L		J	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Benzo(k)fluoranthene	0.014	ug/L		NJ	13,14
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Chrysene	0.025	ug/L	Q	J	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Dibenz(a,h)anthracene	0.01	ug/L	U	UJ	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Dibenzofuran	0.01	ug/L	U	UJ	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Fluoranthene	0.056	ug/L		J	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Fluorene	0.01	ug/L	U	UJ	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Indeno(1,2,3-cd)pyrene	0.01	ug/L	U	UJ	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Naphthalene	0.016	ug/L		J	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Phenanthrene	0.032	ug/L		J	13
QQ20	CB4857032510COMP	10-8031-QQ20B	SW8270D SIM	Pyrene	0.059	ug/L		J	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	1-Methylnaphthalene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	2-Methylnaphthalene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Acenaphthene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Acenaphthylene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Anthracene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Benzo(a)anthracene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Benzo(a)pyrene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Benzo(b)fluoranthene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Benzo(g,h,i)perylene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Benzo(k)fluoranthene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Chrysene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Dibenz(a,h)anthracene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Dibenzofuran	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Fluoranthene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Fluorene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Indeno(1,2,3-cd)pyrene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Naphthalene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Phenanthrene	0.01	ug/L	U	UJ	13
QQ20	CB1032510COMP	10-8032-QQ20C	SW8270D SIM	Pyrene	0.01	ug/L	U	UJ	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	1-Methylnaphthalene	0.01	ug/L	U	UJ	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	2-Methylnaphthalene	0.01	ug/L	U	UJ	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Acenaphthene	0.01	ug/L	U	UJ	13

Qualified Data Summary Table
Lora Lake Apartments Stormwater Interim Action

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Acenaphthylene	0.01	ug/L	U	UJ	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Anthracene	0.01	ug/L	U	UJ	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Benzo(a)anthracene	0.014	ug/L		J	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Benzo(a)pyrene	0.015	ug/L		J	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Benzo(b)fluoranthene	0.017	ug/L		NJ	13,14
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Benzo(g,h,i)perylene	0.025	ug/L		J	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Benzo(k)fluoranthene	0.017	ug/L		NJ	13,14
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Chrysene	0.031	ug/L	Q	J	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Dibenz(a,h)anthracene	0.01	ug/L	U	UJ	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Dibenzofuran	0.01	ug/L	U	UJ	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Fluoranthene	0.062	ug/L		J	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Fluorene	0.01	ug/L	U	UJ	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Indeno(1,2,3-cd)pyrene	0.013	ug/L		J	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Naphthalene	0.016	ug/L		J	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Phenanthrene	0.032	ug/L		J	13
QQ20	CB101032510COMP	10-8033-QQ20D	SW8270D SIM	Pyrene	0.064	ug/L		J	13
QQ59	CB31A032910COMP	10-8212-QQ59A	SW8270D SIM	Benzo(b)fluoranthene	0.019	ug/L		NJ	14
QQ59	CB31A032910COMP	10-8212-QQ59A	SW8270D SIM	Benzo(k)fluoranthene	0.019	ug/L		NJ	14
QQ59	CB4857032910COMP	10-8213-QQ59B	SW8270D SIM	Benzo(b)fluoranthene	0.022	ug/L		NJ	14
QQ59	CB4857032910COMP	10-8213-QQ59B	SW8270D SIM	Benzo(k)fluoranthene	0.022	ug/L		NJ	14
QQ59	CB100032910COMP	10-8215-QQ59D	SW8270D SIM	Benzo(b)fluoranthene	0.021	ug/L		NJ	14
QQ59	CB100032910COMP	10-8215-QQ59D	SW8270D SIM	Benzo(k)fluoranthene	0.021	ug/L		NJ	14
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	1-Methylnaphthalene	0.01	ug/L	U	UJ	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	2-Methylnaphthalene	0.011	ug/L		J	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Acenaphthene	0.01	ug/L	U	UJ	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Acenaphthylene	0.01	ug/L	U	UJ	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Anthracene	0.01	ug/L	U	UJ	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Benzo(a)anthracene	0.011	ug/L		J	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Benzo(a)pyrene	0.014	ug/L		J	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Benzo(b)fluoranthene	0.015	ug/L		NJ	13,14
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Benzo(g,h,i)perylene	0.028	ug/L		J	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Benzo(k)fluoranthene	0.015	ug/L		NJ	13,14
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Chrysene	0.036	ug/L		J	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Dibenz(a,h)anthracene	0.01	ug/L	U	UJ	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Dibenzofuran	0.01	ug/L	U	UJ	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Fluoranthene	0.05	ug/L		J	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Fluorene	0.01	ug/L	U	UJ	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Indeno(1,2,3-cd)pyrene	0.01	ug/L		J	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Naphthalene	0.018	ug/L		J	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Phenanthrene	0.033	ug/L		J	13
QR34	CB31A040210COMP	10-8675-QR34A	SW8270D SIM	Pyrene	0.054	ug/L		J	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	1-Methylnaphthalene	0.01	ug/L	U	UJ	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	2-Methylnaphthalene	0.011	ug/L		J	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Acenaphthene	0.01	ug/L	U	UJ	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Acenaphthylene	0.01	ug/L	U	UJ	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Anthracene	0.01	ug/L	U	UJ	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Benzo(a)anthracene	0.016	ug/L		J	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Benzo(a)pyrene	0.019	ug/L		J	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Benzo(b)fluoranthene	0.02	ug/L		NJ	13,14
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Benzo(g,h,i)perylene	0.034	ug/L		J	13

Qualified Data Summary Table
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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Benzo(k)fluoranthene	0.02	ug/L		NJ	13,14
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Chrysene	0.043	ug/L		J	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Dibenz(a,h)anthracene	0.01	ug/L	U	UJ	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Dibenzofuran	0.01	ug/L	U	UJ	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Fluoranthene	0.061	ug/L		J	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Fluorene	0.01	ug/L	U	UJ	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Indeno(1,2,3-cd)pyrene	0.016	ug/L		J	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Naphthalene	0.019	ug/L		J	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Phenanthrene	0.039	ug/L		J	13
QR34	CB4857040310COMP	10-8676-QR34B	SW8270D SIM	Pyrene	0.063	ug/L		J	13
6005	CB31A022410Comp	6005-001-SA	EPA 1613 D/F	Total HxCDF	315	pg/L	D,M	J	14
6005	CB31A022410Comp	6005-001-SA	EPA 1613 D/F	Total PeCDF	86.8	pg/L	D,M	J	14
6005	CB31A022410Comp	6005-001-SA	EPA 1613 D/F	Total TCDF	24.3	pg/L	D,M	J	14
6005	CB4857022410Comp	6005-002-SA	EPA 1613 D/F	Total HxCDF	321	pg/L	D,M	J	14
6005	CB4857022410Comp	6005-002-SA	EPA 1613 D/F	Total PeCDF	91.5	pg/L	D,M	J	14
6005	CB4857022410Comp	6005-002-SA	EPA 1613 D/F	Total TCDF	28.1	pg/L	D,M	J	14
6005	CB100022410Comp	6005-004-SA	EPA 1613 D/F	Total HxCDF	365	pg/L	D,M	J	14
6005	CB100022410Comp	6005-004-SA	EPA 1613 D/F	Total PeCDF	96	pg/L	D,M	J	14
6005	CB100022410Comp	6005-004-SA	EPA 1613 D/F	Total TCDF	28.9	pg/L	D,M	J	14
6012	CB31A022710COMP	6012-001-SA	EPA 1613 D/F	Total HxCDF	196	pg/L	D,M	J	14
6012	CB31A022710COMP	6012-001-SA	EPA 1613 D/F	Total PeCDF	34.4	pg/L	D,M	J	14
6012	CB31A022710COMP	6012-001-SA	EPA 1613 D/F	Total TCDF	7.53	pg/L	D,M	J	14
6012	CB4857022710COMP	6012-002-SA	EPA 1613 D/F	1,2,3,7,8-PeCDF	2	pg/L	U	UJ	13
6012	CB4857022710COMP	6012-002-SA	EPA 1613 D/F	Total HxCDF	173	pg/L	D,M	J	14
6012	CB4857022710COMP	6012-002-SA	EPA 1613 D/F	Total PeCDF	39.6	pg/L	D,M	J	14
6012	CB4857022710COMP	6012-002-SA	EPA 1613 D/F	Total TCDF	10.1	pg/L	D,M	J	14
6012	CB1022710COMP	6012-003-SA	EPA 1613 D/F	1,2,3,7,8-PeCDD	1.38	pg/L	U	UJ	13
6012	CB1022710COMP	6012-003-SA	EPA 1613 D/F	1,2,3,7,8-PeCDF	1.58	pg/L	U	UJ	13
6030	CB31A031010COMP	6030-001-SA	EPA 1613 D/F	Total HxCDF	69.2	pg/L	D,M	J	14
6030	CB31A031010COMP	6030-001-SA	EPA 1613 D/F	Total TCDF	4.89	pg/L	D,M	J	14
6069	CB31A032510COMP	6069-001-SA	EPA 1613 D/F	Total HxCDF	386	pg/L	D,M	J	14
6069	CB31A032510COMP	6069-001-SA	EPA 1613 D/F	Total PeCDF	90.6	pg/L	D,M	J	14
6069	CB31A032510COMP	6069-001-SA	EPA 1613 D/F	Total TCDF	26.2	pg/L	D,M	J	14
6069	CB4857032510COMP	6069-002-SA	EPA 1613 D/F	OCDF	255	pg/L		J	13
6069	CB4857032510COMP	6069-002-SA	EPA 1613 D/F	Total HxCDF	176	pg/L	D,M	J	14
6069	CB4857032510COMP	6069-002-SA	EPA 1613 D/F	Total PeCDF	38	pg/L	D,M	J	14
6069	CB4857032510COMP	6069-002-SA	EPA 1613 D/F	Total TCDF	12.7	pg/L	D,M	J	14
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,4,6,7,8-HpCDD	15.3	pg/L	J	J	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,4,6,7,8-HpCDF	3.56	pg/L	J	J	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,4,7,8,9-HpCDF	0.438	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,4,7,8-HxCDD	0.797	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,4,7,8-HxCDF	0.475	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,6,7,8-HxCDD	0.962	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,6,7,8-HxCDF	0.496	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,7,8,9-HxCDD	0.868	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,7,8,9-HxCDF	0.669	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,7,8-PeCDD	0.78	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	1,2,3,7,8-PeCDF	0.908	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	2,3,4,6,7,8-HxCDF	0.616	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	2,3,4,7,8-PeCDF	1.02	pg/L	U	UJ	13

Qualified Data Summary Table
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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	2,3,7,8-TCDD	0.513	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	2,3,7,8-TCDF	0.5	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	OCDD	90.7	pg/L		J	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	OCDF	6.8	pg/L	J	J	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	Total HpCDD	31.8	pg/L		J	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	Total HpCDF	7.45	pg/L	J	J	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	Total HxCDD	5.65	pg/L	J	J	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	Total HxCDF	3.67	pg/L	J	J	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	Total PeCDD	0.78	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	Total PeCDF	1.02	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	Total TCDD	0.513	pg/L	U	UJ	13
6069	CB1032510COMP	6069-003-SA	EPA 1613 D/F	Total TCDF	0.5	pg/L	U	UJ	13
6069	CB101032510COMP	6069-004-SA	EPA 1613 D/F	OCDF	270	pg/L		J	13
6069	CB101032510COMP	6069-004-SA	EPA 1613 D/F	Total HxCDF	172	pg/L	D,M	J	14
6069	CB101032510COMP	6069-004-SA	EPA 1613 D/F	Total PeCDF	39	pg/L	D,M	J	14
6069	CB101032510COMP	6069-004-SA	EPA 1613 D/F	Total TCDF	11.5	pg/L	D,M	J	14
6076	CB31A032910COMP	6076-001-SA	EPA 1613 D/F	Total HxCDF	442	pg/L	D,M	J	14
6076	CB31A032910COMP	6076-001-SA	EPA 1613 D/F	Total PeCDF	94.8	pg/L	D,M	J	14
6076	CB31A032910COMP	6076-001-SA	EPA 1613 D/F	Total TCDF	34	pg/L	D,M	J	14
6076	CB4857032910COMP	6076-002-SA	EPA 1613 D/F	Total HxCDF	396	pg/L	D,M	J	14
6076	CB4857032910COMP	6076-002-SA	EPA 1613 D/F	Total PeCDF	85.1	pg/L	D,M	J	14
6076	CB4857032910COMP	6076-002-SA	EPA 1613 D/F	Total TCDF	29.5	pg/L	D,M	J	14
6076	CB100032910COMP	6076-004-SA	EPA 1613 D/F	Total HxCDF	488	pg/L	D,M	J	14
6076	CB100032910COMP	6076-004-SA	EPA 1613 D/F	Total PeCDF	105	pg/L	D,M	J	14
6076	CB100032910COMP	6076-004-SA	EPA 1613 D/F	Total TCDF	35.8	pg/L	D,M	J	14
6083	CB31A040210COMP	6083-001-SA	EPA 1613 D/F	Total HxCDF	371	pg/L	D,M	J	14
6083	CB31A040210COMP	6083-001-SA	EPA 1613 D/F	Total PeCDF	81.1	pg/L	D,M	J	14
6083	CB31A040210COMP	6083-001-SA	EPA 1613 D/F	Total TCDF	26.2	pg/L	D,M	J	14
6083	CB4857040310COMP	6083-002-SA	EPA 1613 D/F	Total HxCDF	332	pg/L	D,M	J	14
6083	CB4857040310COMP	6083-002-SA	EPA 1613 D/F	Total PeCDF	72.2	pg/L	D,M	J	14
6083	CB4857040310COMP	6083-002-SA	EPA 1613 D/F	Total TCDF	22	pg/L	D,M	J	14
6090	CB31A040810COMP	6090-001-SA	EPA 1613 D/F	Total HxCDF	119	pg/L	D,M	J	14
6090	CB31A040810COMP	6090-001-SA	EPA 1613 D/F	Total PeCDF	26.5	pg/L	D,M	J	14
6090	CB31A040810COMP	6090-001-SA	EPA 1613 D/F	Total TCDF	8.59	pg/L	D,M	J	14
6090	CB4857040810COMP	6090-002-SA	EPA 1613 D/F	Total HxCDF	74.7	pg/L	D,M	J	14
6090	CB4857040810COMP	6090-002-SA	EPA 1613 D/F	Total PeCDF	17.5	pg/L	D,J,M	J	14
6090	CB4857040810COMP	6090-002-SA	EPA 1613 D/F	Total TCDF	8.42	pg/L	D,M	J	14
6090	CB100040810COMP	6090-004-SA	EPA 1613 D/F	Total HxCDF	122	pg/L	D,M	J	14
6090	CB100040810COMP	6090-004-SA	EPA 1613 D/F	Total PeCDF	27.5	pg/L	D,M	J	14
6090	CB100040810COMP	6090-004-SA	EPA 1613 D/F	Total TCDF	7.94	pg/L	D,M	J	14
6118	CB31A042110COMP	6118-001-SA	EPA 1613 D/F	1,2,3,4,7,8,9-HpCDF	12.2	pg/L	J	J	13
6118	CB31A042110COMP	6118-001-SA	EPA 1613 D/F	1,2,3,7,8-PeCDD	2.7	pg/L	U	UJ	13
6118	CB31A042110COMP	6118-001-SA	EPA 1613 D/F	1,2,3,7,8-PeCDF	1.4	pg/L	U	UJ	13
6118	CB31A042110COMP	6118-001-SA	EPA 1613 D/F	2,3,4,7,8-PeCDF	1.47	pg/L	U	UJ	13
6118	CB31A042110COMP	6118-001-SA	EPA 1613 D/F	Total HxCDF	252	pg/L	D,M	J	14
6118	CB31A042110COMP	6118-001-SA	EPA 1613 D/F	Total PeCDF	59.4	pg/L	D,M	J	14
6118	CB31A042110COMP	6118-001-SA	EPA 1613 D/F	Total TCDF	18.4	pg/L	D,M	J	14
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,4,6,7,8-HpCDD	18.5	pg/L	J	J	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,4,6,7,8-HpCDF	3.09	pg/L	J	J	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,4,7,8,9-HpCDF	1.74	pg/L	U	UJ	13

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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Laboratory Qualifier	Validator Qualifier	Validator Reason
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,4,7,8-HxCDD	2.12	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,4,7,8-HxCDF	2.48	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,6,7,8-HxCDD	2.49	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,6,7,8-HxCDF	2.47	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,7,8,9-HxCDD	2.25	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,7,8,9-HxCDF	3.31	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,7,8-PeCDD	1.77	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	1,2,3,7,8-PeCDF	1.21	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	2,3,4,6,7,8-HxCDF	2.59	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	2,3,4,7,8-PeCDF	1.27	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	2,3,7,8-TCDD	1.45	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	2,3,7,8-TCDF	0.904	pg/L	U	UJ	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	OCDD	150	pg/L		J	13
6118	CB1042110COMP	6118-002-SA	EPA 1613 D/F	OCDF	6.91	pg/L	U	UJ	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,4,6,7,8-HpCDD	602	pg/L		J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,4,6,7,8-HpCDF	109	pg/L		J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,4,7,8,9-HpCDF	10.6	pg/L	J	J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,4,7,8-HxCDD	4.78	pg/L	J	J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,4,7,8-HxCDF	17	pg/L	J	J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,6,7,8-HxCDD	14.3	pg/L	J	J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,6,7,8-HxCDF	8.31	pg/L	J	J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,7,8,9-HxCDD	8.85	pg/L	J	J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,7,8,9-HxCDF	2.33	pg/L	U	UJ	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,7,8-PeCDD	2.62	pg/L	U	UJ	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	1,2,3,7,8-PeCDF	1.98	pg/L	U	UJ	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	2,3,4,6,7,8-HxCDF	6.52	pg/L	J	J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	2,3,4,7,8-PeCDF	2.11	pg/L	U	UJ	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	2,3,7,8-TCDD	1.34	pg/L	U	UJ	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	2,3,7,8-TCDF	1.21	pg/L	U	UJ	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	OCDD	5780	pg/L		J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	OCDF	303	pg/L		J	13
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	Total HxCDF	227	pg/L	D,M	J	14
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	Total PeCDF	52.5	pg/L	D,M	J	14
6118	CB4857042110COMP	6118-003-SA	EPA 1613 D/F	Total TCDF	20.5	pg/L	D,M	J	14
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	1,2,3,4,6,7,8-HpCDD	683	pg/L		J	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	1,2,3,4,6,7,8-HpCDF	127	pg/L		J	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	1,2,3,4,7,8,9-HpCDF	12.9	pg/L	J	J	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	1,2,3,4,7,8-HxCDF	19.7	pg/L	J	J	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	1,2,3,7,8,9-HxCDF	2.56	pg/L	U	UJ	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	1,2,3,7,8-PeCDD	2.87	pg/L	U	UJ	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	1,2,3,7,8-PeCDF	2.42	pg/L	U	UJ	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	2,3,4,7,8-PeCDF	2.77	pg/L	U	UJ	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	OCDD	7150	pg/L		J	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	OCDF	365	pg/L		J	13
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	Total HxCDF	239	pg/L	D,M	J	14
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	Total PeCDF	56.7	pg/L	D,M	J	14
6118	CB101042110COMP	6118-004-SA	EPA 1613 D/F	Total TCDF	16.7	pg/L	D,M	J	14

EcoChem, INC.
Environmental Data Quality

APPENDIX C
COMMUNICATION RECORDS

Eric Strout

From: Elysebeth Joshi [ejoshi@arilabs.com]
Sent: Tuesday, May 11, 2010 3:33 PM
To: Chris Ransom
Subject: Lora Lake SDG QR34 SIM Corrections

Attachments: QR34_SIM_Corrections.pdf

QR34_SIM_Cor
:tions.pdf (2 ME

Hi Chris,
Attached are the corrections for the misidentified indeno (1,2,3-cd) pyrene peak.

Elysebeth Joshi
Client Services
Analytical Resources, Inc.
(206)695-6216
ejoshi@arilabs.com

dorothy kerlin

From: Chris Ransom
Sent: Tuesday, May 11, 2010 11:41 AM
To: dorothy kerlin
Subject: FW: FW: Lora Lake SDG QS23

it looks like they will be revising the summary forms and resubmitting. This was all predicated on the MS results. I'm not sure how this will affect the other SDG. We'll have to take a close look at that one as well....

-----Original Message-----
From: Cheronne Oreiro [mailto:cheronneo@arilabs.com]
Sent: Tuesday, May 11, 2010 11:25 AM
To: Chris Ransom
Subject: Re: FW: Lora Lake SDG QS23

Hi Chris,

I spoke with the metals supervisor today and he is revising the forms for QS23L, QS23L Dup, and QS23L MS.
The reason why the second Arsenic was chosen for these samples, was because the Se values had an RPD of ~2% for the MS. (Sorry I was mistaken, they evaluate at 2% not 5%.) Our protocols state that if one of the QC samples is greater than 2%, than the parent sample, and all other QC for this sample should be reported from the second Arsenic value (even if the parent and duplicate Se values are non-detect or <2%). After reviewing the data again, it was noted that the RPD for Se values for the MS was at about 1.9%. So pages for this report will be revised and re-sent to you.
I will have Liz or Bob email you the forms this afternoon with appropriate page numbers.
Please let me know if this all makes sense.
-Cheronne

Cheronne Oreiro
Project Manager
Analytical Resources, Inc.
4611 S. 134th Place, Suite 100
Tukwila, WA 98168-3240
cheronneo@arilabs.com
(206)-695-6214

Chris Ransom wrote:
> Sorry to be such a pain, but I'm looking at the other samples in this
> SDG and there seem to be similar cases of high RPDs between Se82 and
> Se78, but QS23L was the only sample where the arsenic RL was elevated
> to
> 0.5 ug/l. For example:
>
> Sample QS23K: Se82 was 0.131, Se78 was 0.784, As-1 was 0.473 and As
> was
> 0.611 - the reported result for arsenic was 0.5 with an RL of 0.2 ug/L.
>
>

> Sample QS23L: Se82 was 0.131, Se78 was 0.168, As-1 was 0.484 and As
> was 0.480, but the reported arsenic value was ND with an RL of 0.5
> ug/L
>
> What is also a little strange is that QS23L is the dissolved arsenic
> sample. It would seem that whatever matrix effect was happening in
> the dissolved fraction would also happen in the total fraction
> (QS23C), but total arsenic was reported from As-1 (0.58 ug/l).
>
> Would you mind pestering the metals analyst for me again?
>
> Thanks
>
> Chris
>
>
>
> -----Original Message-----
> From: Cheronne Oreiro [mailto:cheronneo@arilabs.com]
> Sent: Monday, May 10, 2010 3:11 PM
> To: Chris Ransom
> Subject: Re: FW: Lora Lake SDG QS23
>
> Yes, you got it. And the RPD used is 5%.
> -C
>
>
> Chris Ransom wrote:
>
>> So, the RPD between the Se78 and Se82 values indicate which arsenic
>> should be used? Does this mean that that the As-1 option uses Se82
>> correction and the other As option uses only the Se78 correction?
>> Just want to keep things straight in my head :)
>>
>> -----Original Message-----
>> From: Cheronne Oreiro [mailto:cheronneo@arilabs.com]
>> Sent: Monday, May 10, 2010 2:04 PM
>> To: Chris Ransom
>> Subject: Re: FW: Lora Lake SDG QS23
>>
>> Hi Chris,
>>
>> I had the head of our metals dept look at the data and he just sent
>> me
>>
>
>
>> this explanation...
>>
>> "Because of an uncorrected interference on Se82 the less sensitive
>> Se78 isotope needed to be used to correct for the ArCl interference
>> on
>>
> As75."
>
>> Does this help?
>> -C
>>
>> Cheronne Oreiro
>> Project Manager
>> Analytical Resources, Inc.
>> 4611 S. 134th Place, Suite 100
>> Tukwila, WA 98168-3240
>> cheronneo@arilabs.com
>> (206)-695-6214
>>
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>> If you have received this correspondence in error, please notify
>> sender immediately. Thank you.
>>
>>
>>
>> Chris Ransom wrote:
>>
>>
>>> Hi Cheronne,
>>>
>>> Sue just sent me an e-mail saying that your SOP has an RPD limit
>>> that
>>>
>
>
>>> is used to determine if there are any interferences on arsenic.
>>> could
>>>
>>>
>>
>>
>>> you let me know what the limit is? The As-1 (mass 75) value for
>>> this
>>>
>
>
>>> sample was 0.484 and the As (mass 75) value was 0.480, so the RPD
>>> was
>>>
>
>
>>> less than 1%.
>>>
>>> -----Original Message-----
>>> From: Cheronne Oreiro [mailto:cheronneo@arilabs.com]
>>> Sent: Monday, May 10, 2010 12:39 PM
>>> To: Chris Ransom
>>> Cc: Elysebeth Joshi
>>> Subject: Re: FW: Lora Lake SDG QS23
>>>
>>> Hi Chris,
>>>
>>> Without looking at the data, I can already tell you that the second
>>> Arsenic value is usually used if the sample contained an
>>> interference
>>>
>
>
>>> for Arsenic. I will look into it further to confirm this.
>>> -Cheronne
>>>
>>> Cheronne Oreiro
>>> Project Manager
>>> Analytical Resources, Inc.
>>> 4611 S. 134th Place, Suite 100
>>> Tukwila, WA 98168-3240
>>> cheronneo@arilabs.com
>>> (206)-695-6214
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>>> If you have received this correspondence in error, please notify
>>> sender immediately. Thank you.
>>>
>>>
>>>
>>> Chris Ransom wrote:
>>>
>>>
>>>
>>>> Hi - I see that Sue is out of the office this week. Could one of
>>>> you
>>>>
>
>
>>>> check on this for me?
>>>> Thanks
>>>> Chris
>>>>
>>>> ----------
>>>> -
>>>> -
>>>> -
>>>> --
>>>> *From:* Chris Ransom
>>>> *Sent:* Monday, May 10, 2010 12:43 PM
>>>> *To:* 'Sue Dunnihoo'
>>>> *Subject:* Lora Lake SDG QS23
>>>>
>>>> Hi Sue,
>>>> I have a question for you regarding the arsenic data for QS23.
>>>> Sample
>>>>
>>>>
>>
>>
>>>> CB1040810COMP (QS23L) was reported from the second arsenic value,
>>>> which has the the higher reporting limit of 0.5 ug/L. The MS and
>>>> Dup
>>>>
>
>
>>>> were also reported this way, however all of the other samples were
>>>> reported from As-1 with a reporting limit of 0.2 ug/L. Could you
>>>> let
>>>>
>
>
>>>> me know why the alternate arsenic value was used for this sample?
>>>> If
>>>>
>
>
>>>> the As-1 value is used, then the result would be 0.48 ug/l instead
>>>> of
>>>> 0.5 U.
>>>> Thanks

>>>> Chris
>>>>
>>>> *Christine Ransom
>>>> **EcoChem, Inc.*
>>>> */Senior Project Chemist/*
>>>>
>>>> 710 Second Ave, Suite 660, Seattle, WA 98104
>>>> DIRECT: 206.233.9332 ext. 109 * FAX: 206.233.0114
>>>> EMAIL: cransom@ecochem.net <mailto:cransom@ecochem.net>
>>>>
>>>> As Environmental Quality Assurance Specialists, *EcoChem, Inc*. is
>>>> dedicated to developing data into reliable and accessible
>>>> environmental information.
>>>> Through proper planning and focused QA coordination and oversight,
>>>> we
>>>>
>>>>
>>
>>
>>>> ensure data of known quality and usability. We prepare specific
>>>> QA/QC
>>>>
>>>>
>>
>>
>>>> documents and implement data management solutions that accomplish
>>>> your
>>>>
>>>>
>>>>
>>>
>>>
>>>
>>>> program needs.
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>

Chris Ransom

From: Elysebeth Joshi [ejoshi@arilabs.com]
Sent: Tuesday, May 11, 2010 3:05 PM
To: Chris Ransom
Subject: Re: Lora Lake SDG QS23

Attachments: QS23_MS_Fix.pdf

QS23_MS_Fix.pdf
(39 KB)

Hi Chris,
Attached is the corrected MS Summary form.
Chris Ransom wrote:
> Hi Elysebeth,
>
> Thanks for the forms - just one small change. The value for the
> parent sample on the MS summary still shows 0.5 U. The result should
> be 0.5, with a %R value of 104%.
>
> Thanks
>
> Chris
>
> -----Original Message-----
> From: Elysebeth Joshi [mailto:ejoshi@arilabs.com]
> Sent: Tuesday, May 11, 2010 12:22 PM
> To: Chris Ransom
> Subject: Lora Lake SDG QS23
>
> Hi Chris,
> Attached are the corrected pages for sample L Dissolved Arsenic.
>
> --
> Elysebeth Joshi
> Client Services
> Analytical Resources, Inc.
> (206)695-6216
> ejoshi@arilabs.com
>
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>

--
Elysebeth Joshi
Client Services
Analytical Resources, Inc.
(206)695-6216
ejoshi@arilabs.com

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EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

Port of Seattle
Lora Lake Apartments
Storm Water Interim Action

Prepared for:

Floyd/Snider
601 Union Street, Suite 600
Seattle, Washington 98101

Prepared by:

EcoChem, Inc.
710 Second Avenue, Suite 660
Seattle, Washington 98104

EcoChem Project: C15207-2

February 22, 2010

Approved for Release:

Christine Ransom
Project Manager
EcoChem, Inc.

PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of both summary and full validation (Level III & IV) performed on catch basin sediment and quality control (QC) sample data for the Lora Lake Apartments Storm Water Interim Action project. A complete list of samples is provided in the **SAMPLE INDEX**.

The Dioxin/Furan analyses were performed by Frontier Analytical Laboratory, El Dorado Hills, California. All other analyses were performed by Analytical Resources, Inc. (ARI), Tukwila, Washington. The analytical methods and EcoChem project chemists are listed in the table below.

Analysis	Method	Primary Review	Secondary Review
Volatile Organic Compounds	SW8260C	Megan Kilner	Chris Ransom
Dioxin Furan Compounds	EPA 1613	Melissa Swanson	Eric Strout
Polynuclear Aromatic Hydrocarbons	SW8270D-SIM	Lucy Panteleeff	Chris Ransom
Pentachlorophenol	SW8041		
Total Petroleum Hydrocarbons	NWTPH-Dx		
Metals	SW6010B	Megan Kilner	Chris Ransom
Total Solids	EPA 160.3		
Total Organic Carbon	Plumb, 1981		

The data were reviewed using guidance and quality control criteria documented in the analytical methods; *Port of Seattle Lora Lakes Apartments, Stormwater Interim Action Plan* (Floyd/Snider, November 17, 2009); *National Functional Guidelines for Inorganic Data Review* (USEPA 1994 & 2004); and *National Functional Guidelines for Organic Data Review* (USEPA 1999 & 2008)

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **APPENDIX A**. A Qualified Data Summary Table is included in **APPENDIX B**. Data Validation Worksheets will be kept on file at EcoChem, Inc.

Sample Index
Floyd Snider
Port of Seattle - Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Lab ID	Dioxins	VOC	PAH	PCP	TPH-Dx	Metals	TOC	Total Solids
QE56	CB19010710Sed	QE56B		X	X	X	X	X	X	X
	CB12010710Sed	QE56C		X	X	X	X	X	X	X
	CB2010710Sed	QE56D		X	X	X	X	X	X	X
	Trip Blank	QE56E		X						
QF10	CB31A011110SED	QF10A		X	X	X	X	X	X	X
	CB99011110SED	QF10B		X	X	X	X	X	X	X
	Trip Blank	QF10C		X						
5913	CB19010710SED	5913-001-SA	X							
	CB12010710SED	5913-002-SA	X							
	CB2010710SED	5913-003-SA	X							
5914	CB31A011110SED	5914-001-SA	X							
	CB99011110SED	5914-002-SA	X							

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Dioxin/Furan Compounds by Method 1613

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Frontier Analytical Laboratory, El Dorado Hills, California. Full validation (Level IV) was performed on all data. See the **Sample Index** for a complete list of samples reviewed.

SDG	Number of Samples
5913	3 Sediment
5914	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. TECHNICAL DATA VALIDATION

The quality control (QC) requirements reviewed are summarized in the following table:

1	Sample Receipt, Preservation, and Holding Time		Ongoing Precision and Recovery (OPR)
	System Performance and Resolution Checks	1	Field Duplicates
	Initial Calibration (ICAL)		Target Analyte List
	Calibration Verification (CVER)	2	Reported Results
	Method Blanks		Compound Identification
2	Labeled Compound Recovery	1	Calculation Verification
1	Matrix Spike/Matrix Spike Duplicates (MS/MSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Receipt, Preservation, and Holding Times

The temperatures for two sample coolers (both at 0°C) were outside of the advisory control range of 2°C to 6°C. The temperature outliers did not impact data quality; therefore no qualifiers were assigned.

Labeled Compounds

Labeled compounds were added to every sample as specified in the method. The percent recovery (%R) values were within the QAPP specified control limits of 70% - 130%, with the exceptions noted below. For recoveries greater than the upper control limit, positive results for the associated compounds were estimated (J-13) to indicate a potential high bias. For recoveries less than the lower control limit, results for the associated compounds were estimated (J/UJ-13) to indicate a potential low bias.

SDG 5913: The %R values for three labeled compounds in Sample CB19010710SED, five labeled compounds in Sample CB12010710SED, and seven labeled compounds in Sample CB2010710SED were less than the 70% lower control limit. All associated target analytes were detected and were estimated (J-13). The %R values for four labeled compounds in the method blank and two labeled compounds in the ongoing precision and recovery standard (OPR) were less than the 70% lower control limit. No qualifiers were applied to these QC samples.

SDG 5914: The %R values for four labeled compounds in Sample CB31A011110SED and five labeled compounds in Sample CB99011110SED were less than the 70% lower control limit. All associated target analytes were detected and were estimated (J-13). The %R values for four labeled compounds in the method blank and two labeled compounds in the ongoing precision and recovery standard (OPR) were less than the 70% lower control limit. No qualifiers were applied to these QC samples.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Accuracy was evaluated using the labeled compound and OPR recoveries. Precision was assessed using the field duplicate analyses.

Field Duplicates

The following acceptance criteria were used to evaluate precision: the relative percent difference (RPD) value control limit is 30% for results greater than five times the reporting limit (RL). For results less than five times the RL, the difference between the sample and duplicate must be less than two times the RL. No data were qualified based on field duplicate precision outliers. Users of the data should consider the impact of field precision outliers on the reported results.

SDG 5914: The data for one pair of field duplicates, CB31A01110SED and CB9901110SED, were submitted. The RPD value for total TCDD was greater than the 30% control limit.

Reported Results

The laboratory assigned "D,M" flags to several of the reported homologue group totals to indicate that a diphenyl ether (D) interference was present, which may result in a high bias (M) to the reported result. Due to this, all of the totals that were "D,M" flagged by the laboratory were estimated (J-14).

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the labeled compound and OPR %R values, with the above noted exceptions. Precision was acceptable as demonstrated by the field duplicate RPD values, with the exception noted above.

Data were estimated based on labeled compound recovery outliers and interference from diphenyl ether, causing a potential high bias.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Volatile Organic Compounds by SW846 Method 8260B

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples
QE56	3 Sediment & 1 Trip Blank
QF10	2 Sediment & 1 Trip Blank

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Preservation	2	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
	GC/MS Instrument Performance Check	1	Field Duplicates
	Initial Calibration (ICAL)		Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Laboratory Blanks		Reporting Limits
1	Field Blanks		Compound Identification
	Surrogate Compounds	1	Reported Results
	Laboratory Control Samples (LCS/LCSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Field Blanks

SDG QE56: One trip blank, Trip Blank, was submitted. No target analytes were detected in this blank.

SDG QF10: One trip blank, Trip Blank, was submitted. No target analytes were detected in this blank.

Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed at the required frequency. The MS/MSD recovery values were within the laboratory control limits, with the exceptions noted below. No action was taken if only one of the MS/MSD recoveries was outside of the control limits. For MS/MSD recoveries greater than the upper control limit, positive results in the parent sample only were estimated (J-8) to indicate a potential high bias. For recoveries less than the lower control limit, positive results and reporting limits in the parent sample were estimated (J/UJ-8) to indicate a potential low bias.

The MS/MSD RPD values were within the laboratory control limits, with the exceptions noted below. The following outliers resulted in qualification of data:

SDG QE56: QC Sample CB19010710Sed: trans-1,2-dichloroethene, cis-1,2-dichloroethene, trichloroethene, tetrachloroethene – low bias (UJ-8)

SDG QF10: QC Sample CB31A011110SED: tetrachloroethene – low bias (UJ-8)

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 50% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. There were no positive results for either sample; field precision was acceptable.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate, MS/MSD, and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) percent recovery values, with the exceptions previously noted. Precision was also acceptable as demonstrated by the MS/MSD, LCS/LCSD, and field duplicate RPD values.

Data were estimated based on MS/MSD recovery outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Polycyclic Aromatic Hydrocarbons by SW846 Method 8270D-SIM

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody record, but was not sampled. The location was later sampled on January 11, 2010 and included in SDG QF10.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Preservation	2	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	GC/MS Instrument Performance Check	1	Field Duplicates
	Initial Calibration (ICAL)	2	Internal Standards
	Continuing Calibration (CCAL)		Target Analyte List
	Blanks		Reporting Limits
2	Surrogate Compounds		Compound Identification
	Laboratory Control Samples (LCS)	2	Reported Results

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Surrogate Compounds

SDG QE56: The recovery for the surrogate d14-p-terphenyl was greater than the upper control limit of 160% for the 1X analysis of Sample CB2010710Sed. All positive results for this sample were estimated (J-13) to indicate a potential high bias.

Matrix Spike/Matrix Spike Duplicates

SDG QE56: Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Sample CB2010710SED. The MS/MSD %R values for pyrene were greater than the QAPP specified upper control limit of 160%. The pyrene result in the parent sample was estimated (J-8) to indicate a potential high bias.

SDG QF10: The MS/MSD analyses were performed using Sample CB31A011110SED. The MS %R value for pyrene was less than the QAPP specified lower control limit of 40%. The MSD recovery was right at the lower control limit. Because of the potential low bias, the pyrene result in the parent sample was estimated (J-8).

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 50% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. The relative percent difference (RPD) value for fluoranthene was greater than the control limit. The difference between the sample and duplicate was greater than 2X the RL for the following compounds: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, phenanthrene, and pyrene.

Internal Standards

SDG QE56: The recoveries for the internal standard perylene-d12 were less than the 50% lower control limit in the 1X analyses of all samples. The results for the compounds associated with this internal standard were estimated (J/UJ-19).

Reported Results

SDG QE56: The samples were analyzed at both 1X and 3X dilutions. In order to achieve the lowest possible reporting limits, the results from the 1X analyses should be used. The results for the 3X analyses were rejected (R-11).

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample, and MS/MSD %R values, with the exceptions noted above. Precision was also acceptable as demonstrated by the MS/MSD and field duplicate RPD values, with the exceptions previously noted.

Data were estimated due to internal standard, surrogate, and MS/MSD recovery outliers.

Data were rejected to indicate which result should be used from multiple reported analyses. A usable result remains for all analytes and all samples; therefore completeness is unaffected.

Rejected data should not be used for any purpose.

All other data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Pentachlorophenol by EPA Method 8041

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

	Holding Times and Sample Receipt	1	Field Duplicates
	Initial Calibration (ICAL)		Second Column Confirmation
	Continuing Calibration (CCAL)		Retention Time Window
	Laboratory Blanks		Target Analyte List
1	Surrogate Compounds		Reporting Limits
	Laboratory Control Samples (LCS)		Compound Identification
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)	2	Reported Results

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Surrogate Compounds

SDG QE56: The percent recovery (%R) value for the surrogate 2,4,6-tribromophenol was less than the lower control limit in the method blank, MB-011210. No qualifiers are required for QC samples; therefore no action was taken.

Matrix Spike/Matrix Spike Duplicates

SDG QF10: Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Sample CB31A011110SED. The MS percent recovery (%R) value for pentachlorophenol was greater than the upper control limit. No action was required, as the MSD %R value for this analyte was within the control limits.

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 50% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. The RPD value for pentachlorophenol was greater than the control limit.

Reported Results

SDG QE56: The samples were re-analyzed at a 10x dilution due to continuing calibration outliers. The outliers were for non-target analytes; therefore the results from the 1x dilution should be used. All results from the 10x dilutions were rejected (R-11).

SDG QF10: Sample CB31A011110SED was initially analyzed at a 10x dilution. The sample was re-analyzed to obtain a lower reporting limit. The data from the re-analysis should be used. The pentachlorophenol result from the 10x dilution was rejected (R-11).

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample and MS/MSD recoveries, with the exception noted above. Precision was also acceptable as demonstrated by the MS/MSD and field duplicate RPD values, with the exception previously noted.

Data were rejected to indicate which result should be used from multiple reported analyses. A usable result remains for all analytes and all samples; therefore completeness is unaffected.

Rejected data should not be used for any purpose.

All other data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Diesel Range Hydrocarbons by Method NWTPH-Dx

This report documents the review of analytical data from the analyses of catch basin sediment samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington. Summary validation (Level III) was performed on all data. See the **Sample Index** for a complete list of samples for which data were reviewed.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
Initial Calibration (ICAL)	1	Field Duplicates
Continuing Calibration (CCAL)		Target Analyte List
Blanks		Compound Identification
Surrogate Compounds		Reporting Limits
Laboratory Control Samples (LCS)		Reported Results

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Matrix Spike/Matrix Spike Duplicates

SDG QE56: Matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Sample CB2010710SED. The MSD percent recovery (%R) value for diesel was less than the lower control limit of 50%. The MS %R value for this analyte was within the control limits; therefore no action was taken for the MSD outlier.

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 50% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. The RPD value for diesel range organics was greater than the control limit.

III. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample, and MS/MSD percent recovery values, with the exception previously noted. Precision was also acceptable as demonstrated by the MS/MSD and field duplicate RPD values, with the exception noted above.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Arsenic and Lead by EPA 6010B

This report documents the review of analytical data from the analysis of catch basin sediment samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation		2	Laboratory Duplicates
Initial Calibration		1	Field Duplicates
Continuing Calibration Verification			Interference Check Standards
CRDL Standards			Target Analyte List
Laboratory Blanks		1	Reporting Limits
Laboratory Control Samples (LCS)			Reported Results
Matrix Spikes (MS)			

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Laboratory Duplicates

Laboratory duplicate percent difference (RPD) values were used to evaluate precision. The relative percent difference (RPD) values were within the control limit of 20% for sample results greater than five times the reporting limit (for results less than five times the reporting limit, the absolute difference was less than twice the reporting limit) with the exceptions noted below. For RPD values exceeding the control limits, associated positive results and non-detects were qualified as estimated (J/UJ-9).

SDG QF10: Duplicate analyses were performed using Sample CB31A011110SED. The RPD value for lead (51.2%) was greater than control limit. The associated results were estimated (J-9).

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 20% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. All field precision criteria were met.

Reporting Limits

SDG QE56: The QAPP specified reporting limit of 5.0 mg/kg for arsenic was not met due to the high moisture content of the samples. The arsenic reporting limit was 20 mg/kg.

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. The laboratory and field duplicate RPD values indicated acceptable precision, with the exception noted above. Accuracy was also acceptable, as demonstrated by the matrix spike and laboratory control sample recoveries.

Data were estimated based on a laboratory duplicate RPD outlier.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
Lora Lake Apartments Storm Water Interim Action
Total Organic Carbon by Plumb, 1981 and Total Solids by EPA 160.3

This report documents the review of analytical data from the analysis of catch basin sediment samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources Incorporated, Seattle, Washington. Summary validation (Level III) was performed on all data.

SDG	Number of Samples
QE56	3 Sediment
QF10	2 Sediment

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG QE56: Sample CB31A010710Sed was included on the chain of custody, but was not sampled. The location was re-sampled on January 11, 2010 and included in **SDG QF10**.

II. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

Holding Times and Sample Preservation		Matrix Spikes (MS)
Initial Calibration		Laboratory Replicates
Continuing Calibration Verification	1	Field Duplicates
Laboratory Blanks		Reporting Limits
Laboratory Control Samples (LCS)		Reported Results
Standard Reference Material (SRM)		

[1] ***Quality control results are discussed below, but no data were qualified***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Field Duplicates

The field duplicate relative percent difference (RPD) control limit is 20% for concentrations greater than 5x the reporting limit (RL). For concentrations less than 5x the RL, the difference between the sample result and the duplicate result must be less than 2x the RL. No data were qualified based on field duplicate precision outliers; however users of the data should consider the impact of field precision outliers on the reported results.

SDG QF10: One set of field duplicates was submitted: CB31A011110SED and CB99011110SED. All field precision criteria were met.

III. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. The laboratory replicate percent relative standard deviation (%RSD) and field duplicated RPD values indicated acceptable precision. Accuracy was also acceptable, as demonstrated by the standard reference material, matrix spike, and laboratory control sample recoveries.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A
DATA QUALIFIER DEFINITIONS REASON CODES AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

1	Holding Time/Sample Preservation
2	Chromatographic pattern in sample does not match pattern of calibration standard.
3	Compound Confirmation
4	Tentatively Identified Compound (TIC) (associated with NJ only)
5A	Calibration (initial)
5B	Calibration (continuing)
6	Field Blank Contamination
7	Lab Blank Contamination (e.g., method blank, instrument, etc.)
8	Matrix Spike(MS & MSD) Recoveries
9	Precision (all replicates)
10	Laboratory Control Sample Recoveries
11	A more appropriate result is reported (associated with “R” and “DNR” only)
12	Reference Material
13	Surrogate Spike Recoveries (a.k.a., labeled compounds & recovery standards)
14	Other (define in validation report)
15	GFAA Post Digestion Spike Recoveries
16	ICP Serial Dilution % Difference
17	ICP Interference Check Standard Recovery
18	Trip Blank Contamination
19	Internal Standard Performance (e.g., area, retention time, recovery)
20	Linear Range Exceeded
21	Potential False Positives
22	Elevated Detection Limit Due to Interference (i.e., laboratory, chemical and/or matrix)

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler/Storage Temperature	Waters/Solids < 4°C Tissues <-10°C	EcoChem PJ, see TM-05	1
Holding Time	Extraction - Water: 30 days from collection *Note:* Under CWA, SDWA, and RCRA the HT for H2O is 7 days* Extraction - Soil: 30 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext > 30 days J(+)/UJ(-) if analysis > 40 Days EcoChem PJ, see TM-05	1
Mass Resolution	>=10,000 resolving power at m/z 304.9824 Exact mass of m/z 380.9760 w/in 5 ppm of theoretical value (380.97410 to 380.97790) . Analyzed prior to ICAL and at the start and end of each 12 hr. shift	R(+/-) if not met	14
Window Defining Mix and Column Performance Mix	Window defining mixture/Isomer specificity std run before ICAL and CCAL Valley < 25% (valley = (x/y)*100%) x = ht. of TCDD y = baseline to bottom of valley For all isomers eluting near 2378-TCDD/TCDF isomers (TCDD only for 8290)	J(+) if valley > 25%	5A (ICAL) 5B (CCAL
Initial Calibration	Minimum of five standards %RSD < 20% for native compounds %RSD <30% for labeled compounds (%RSD <35% for labeled compounds under 1613b)	J(+) natives if %RSD > 20%	5A
	Abs. RT of $^{13}C_{12}$-1234-TCDD >25 min on DB5 >15 min on DB-225	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10 for all native and labeled compounds in CS1 std.	If <10, elevate Det. Limit or R(-)	

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Continuing Calibration	Analyzed at the start and end of each 12 hour shift. %D+/-20% for native compounds %D +/-30% for labeled compounds (Must meet limits in Table 6, Method 1613B) (If %Ds in the closing CCAL are w/in 25%/35% the avg RF from the two CCAL may be used to calculate samples per Method 8290, Section 8.3.2.4)	Do not qualify labeled compounds. Narrate in report for labeled compound %D outliers. For native compound %D outliers: 8290: J(+)/UJ(-) if %D = 20% - 75% J(+)/R(-) if %D > 75% 1613: J(+)/UJ(-) if %D is outside Table 6 limits J(+)/R(-) if %D is +/- 75% of Table 6 limit	5B
	Abs. RT of $^{13}C_{12}$-1234-TCDD and $^{13}C12$-123789-HxCDD +/- 15 sec of ICAL.	EcoChem PJ, see ICAL section of TM-05	
	RRT of all other compounds must meet Table 2 of 1613B.	EcoChem PJ, see TM-05	
	Ion Abundance ratios within QC limits (Table 8 of method 8290) (Table 9 of method 1613B)	EcoChem PJ, see TM-05	
	S/N ratio > 10	If <10, elevate Det. Limit or R(-)	
Method Blank	One per matrix per batch No positive results	If sample result <5X action level, qualify U at reported value.	7
Field Blanks (Not Required)	No positive results	If sample result <5X action level, qualify U at reported value.	6
LCS / OPR	Concentrations must meet limits in Table 6, Method 1613B or lab limits.	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
MS/MSD (recovery)	May not analyze MS/MSD %R should meet lab limits.	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	May not analyze MS/MSD RPD < 20%	J(+) in parent sample if RPD > CL	9

EcoChem Validation Guidelines for Dioxin/Furan Analysis by HRMS
(Based on EPA Reg. 10 SOP, Rev. 2, 1996 & EPA SW-846, Methods 1613b and 8290)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Lab Duplicate	RPD <25% if present.	J(+)/UJ(-) if outside limts	9
Labeled Compounds / Internal Standards	*Method 8290:* %R = 40% - 135% in all samples *Method 1613B:* %R must meet limits specified in Table 7, Method 1613	J(+)/UJ(-) if %R = 10% to LCL J(+) if %R > UCL J(+)/R(-) if %R < 10%	13
Quantitation/ Identification	Ions for analyte, IS, and rec. std. must max w/in 2 sec. S/N >2.5 IA ratios meet limits in Table 9 of 1613B or Table 8 of 8290 RRTs w/in limits in Table 2 of 1613B	If RT criteria not met, use PJ (see TM-05) If S/N criteria not met, J(+). if unlabelled ion abundance not met, change to EMPC If labelled ion abundance not met, J(+).	21
EMPC (estimated maximum possible concentration)	If quantitation idenfication criteria are not met, laboratory should report an EMPC value.	If laboratory correctly reported an EMPC value, qualify with U to indicate that the value is a detection limit.	14
Interferences	PCDF interferences from PCDPE	If both detected, change PCDF result to EMPC	14
Second Column Confirmation	All 2378-TCDF hits must be confirmed on a DB-225 (or equiv) column. All QC specs in this table must be met for the confirmation analysis.	Report lower of the two values. If not performed use PJ (see TM-05).	3
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used	11

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Hold Time	Waters: 14 days preserved 7 Days: unpreserved (for aromatics) Solids: 14 Days	J(+)/UJ(-) if hold times exceeded If exceeded by > 3X HT: J(+)/R(-) (EcoChem PJ)	1
Tuning	BFB Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Storage Blank	One per SDG <CRQL	U(+) the specific analyte(s) results in all assoc.samples using the 5x or 10x rule	7
Trip Blank	Frequency as per project QAPP	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned	18
Field Blanks (if required in QAPP)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Volatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS *low conc. H2O VOA*	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS *regular VOA (H2O & solid)*	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Added to all samples Within method control limits	J(+) if %R >UCL J(+)/UJ(-) if %R <LCL but >10% (see PJ[1]) J(+)/R(-) if <10%	13
Internal Standard (IS)	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

PJ[1] No action if there are 4+ surrogates and only 1 outlier.

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS (Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS CLP low conc. H2O only	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS regular SVOA (H2O & solid)	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

EcoChem Validation Guidelines (Based on SW846 Method 8000 and Organic NFG 1999)

Organochlorine Pesticides by 8081A; Aroclors by 8082; Organophosphorous Pests by 8141A; Chlorinated Herbicides by 8151A; Polyaromatic Hydrocarbons by 8310 (HPLC); and other GC/HPLC analyses performed under Method 8000

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) using PJ if greater than 6°C	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
DDT & Endrin Breakdown (Method 8081A)	At the start of each 12 hr. shift DDT Breakdown: < 15% Endrin Breakdown: <15%	Narrate if frequency criteria not met. J(+) DDT NJ(+) DDD and/or DDE R(-) DDT if (+) for either DDE or DDD J(+) Endrin NJ(+) EK and/or EA R(-) Endrin if (+) for either EK or EA	5B
Initial Calibration	Minimum 5 calibration levels Linear regression: R2 >0.990 RSD of response factors: <20% Quadratic curve requires 6 stds. Method 8081A: Single point calibration for multi-components	J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Continuing Calibration Verification (CCV)	Prior to analysis and after max. 20 samples or 12 hours, whichever comes first. %D <15% Method 8151A: CCV after every 10 samples.	Narrate if frequency criteria not met. J(+) If %R > 115% J(+)/UJ(-) If %R < 85% J(+)R(-) if %D > 90% (EcoChem PJ)	5B
Method Blank	One per matrix per batch (max. 20 samples) No results ≥RL	U (at RL) if sample result is less than RL and less than 5X blank result	7
		U (at reported sample value) if sample result is greater than or equal to RL and less than 5X blank result	7
Field Blank (Not Required)	Not addressed by NFG or SW-846 No results > RL	Apply 5X rule; U(+) < action level using same logic as method blank	6
MS/MSD	One per matrix per batch Lab limits or QAPP criteria	Narrate if frequency not met. Qualify parent only unless other QC indicates systematic problems. J(+) if both %R > UCL; J(+)/UJ(-) if both %R < LCL EcoChem PJ if only one %R outlier No action if parent conc. > 5x the amount spiked.	8

EcoChem Validation Guidelines (Based on SW846 Method 8000 and Organic NFG 1999)

Organochlorine Pesticides by 8081A; Aroclors by 8082; Organophosphorous Pests by 8141A; Chlorinated Herbicides by 8151A; Polyaromatic Hydrocarbons by 8310 (HPLC); and other GC/HPLC analyses performed under Method 8000

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Precision: MS/MSD or LCS/LCSD or Sample/Duplicate	One per matrix per batch Lab limits or QAPP criteria	J(+) if RPD > laboratory CL	9
LCS or LCS/LCSD	One per matrix per batch Lab limits or QAPP criteria	J(+)/UJ(-) If %R < LCL J(+) If > UCL J(+)/R(-) If any %R <10%	10
Surrogates	Added to all samples (inc. QC samples) Lab limits or QAPP criteria	J(+)/UJ(-) If %R < LCL J(+) If > UCL J(+)/R(-) If any %R <10% No action if 2 or more surrogates are used and only one is <LCL or >UCL (EcoChem PJ)	13
Quantitation/ Identification	Analyte within RTW on both columns or detectors RPD between values<40%	NJ(+) if RPD>40% R(+) using EcoChem PJ if RTW criterion not met NJ(+) if no confirmation Refer to Tech. Memo TM-08	3 21 (false +)
Internal Standards (if used)	IS area within -50% to +100% of CCV Methods 8081A & 8082: IS area within +/-50% of CCV	J(+) if IS > 100% J(+)/UJ(-) if IS < 50% J(+)/R(-) if IS is < 25%	19
Field Duplicate	Water: RPD < 35% Soil: RPD < 50%	Narrate (J/UJ if required by project instructions)	9
Two analyses for one sample (e.g. dilution)	Report only one result per analyte	"DNR" results that should not be used to avoid reporting multiple results for one sample. Refer to Tech. Memo TM-04	11

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X (EcoChem PJ)	1
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $R^2 \geq 0.990$ If used, RSD of response factors ≤20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if R^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J(+)/UJ(-) if %R < 85% J(+) if %R >115%	5B
Method Blank	At least one per batch (≤10 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7
		U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.	6
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked. Use PJ if only one %R outlier	8
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% (EcoChem PJ)	10

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits. (EcoChem PJ)	13
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2
Field Duplicates	Use project control limits, if stated in QAPP EcoChem default: water: RPD < 35% solids: RPD < 50%	Narrate (Use Professional Judgement to qualify)	9
Two analyses for one sample (dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported. (See TM-04)	11

EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration Tissues: Frozen	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r > 0.995	J(+)/UJ(-) if r < 0.995 (multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blank (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		(Refer to TM-02 for additional information)
			7

Reporting Limit Standard	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Sb, Pb, Tl)	R(-)/J(+) < 2x RL if %R <50% (< 30% Sb, Pb, Tl) J(+) < 2x RL, UJ(-) if %R 50-69% (30-49% Sb, Pb,Tl) J(+) < 2x RL if %R 130-180% (150-200% Sb, Pb, Tl) R(+) < 2x RL if %R > 180% (200% Sb, Pb, Tl)	14
Interference Check Samples (ICSA/ICSAB)	ICSAB %R 80 - 120% for all spiked elements | ICSA | < MDL for all unspiked elements except: K, Na	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R= 50 to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	

EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Matrix Spikes	One per matrix per batch 75-125% for samples less than 4x spike level	J(+) if %R > 125% J(+)/UJ(-) if %R < 75% J(+)/R(-) if %R < 30% or J(+)/UJ(-) if Post Spike %R 75-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, spike at twice the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples >RL and < 5x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL (2x RL for solids) qualify all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample conc. > 50x MDL	J(+)/UJ(-) if %D >10% qualify all samples in batch	16
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Metals Analysis by ICP-MS
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. ≤ 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J(+)/UJ(-) if tune criteria not met	5A
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J(+)/UJ(-) if r<0.995 (for multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R(-),(+) < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J(+) < 2x RL, UJ(-) if %R 50-69% (30%-49% Co,Mn, Zn) J(+) < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R(+) < 2x RL if %R > 180% (200% Co, Mn, Zn)	14
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7

EcoChem Validation Guidelines for Metals Analysis by ICP-MS (Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% or J(+)/UJ(-) if Post Spike %R 75%-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J(+)/UJ(-) if %D >10% All samples in batch	16
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J (+)/UJ (-) all analytes associated with IS outlier	19
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < AL in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for coole temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B

Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method
	After each ICV and CCV every ten samples and end of run
	| blank| < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch
	(not to exceed 20 samples)
	blank < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blk value, U(+) results < action level
		For (-) blk value, J(+)/UJ(-) results < action level
			7

Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff<RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9

EcoChem, INC.
Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

QUALIFIED DATA SUMMARY TABLE
Floyd Snider
Port of Seattle - Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifiers	DV Reason
QE56	CB19010710Sed	10-433-QE56BDL	SW8041	Pentachlorophenol	260	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Naphthalene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	2-Methylnaphthalene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	1-Methylnaphthalene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Acenaphthylene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Acenaphthene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Dibenzofuran	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Fluorene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Phenanthrene	1200	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Anthracene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Fluoranthene	2200	ug/kg		R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Pyrene	2200	ug/kg		R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(a)anthracene	730	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Chrysene	1900	ug/kg		R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Benzo(b)fluoranthene	1400	ug/kg		J	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(b)fluoranthene	1300	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Benzo(k)fluoranthene	1400	ug/kg		J	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(k)fluoranthene	1300	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Benzo(a)pyrene	1100	ug/kg		J	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(a)pyrene	1000	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Indeno(1,2,3-cd)pyrene	520	ug/kg	U	UJ	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Indeno(1,2,3-cd)pyrene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Dibenz(a,h)anthracene	520	ug/kg	U	UJ	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Dibenz(a,h)anthracene	1600	ug/kg	U	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8270D	Benzo(g,h,i)perylene	850	ug/kg		J	19
QE56	CB19010710Sed	10-433-QE56BDL	SW8270D	Benzo(g,h,i)perylene	980	ug/kg	J	R	11
QE56	CB19010710Sed	10-433-QE56B	SW8260C	trans-1,2-Dichloroethene	5	ug/kg	U	UJ	8
QE56	CB19010710Sed	10-433-QE56B	SW8260C	cis-1,2-Dichloroethene	5	ug/kg	U	UJ	8
QE56	CB19010710Sed	10-433-QE56B	SW8260C	Trichloroethene	5	ug/kg	U	UJ	8
QE56	CB19010710Sed	10-433-QE56B	SW8260C	Tetrachloroethene	5	ug/kg	U	UJ	8
QE56	CB12010710Sed	10-434-QE56CDL	SW8041	Pentachlorophenol	250	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Naphthalene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	2-Methylnaphthalene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	1-Methylnaphthalene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Acenaphthylene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Acenaphthene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Dibenzofuran	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Fluorene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Phenanthrene	500	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Anthracene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Fluoranthene	1100	ug/kg		R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Pyrene	1000	ug/kg		R	11

QUALIFIED DATA SUMMARY TABLE
Floyd Snider
Port of Seattle - Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifiers	DV Reason
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(a)anthracene	300	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Chrysene	990	ug/kg		R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Benzo(b)fluoranthene	560	ug/kg		J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(b)fluoranthene	580	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Benzo(k)fluoranthene	560	ug/kg		J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(k)fluoranthene	580	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Benzo(a)pyrene	390	ug/kg		J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(a)pyrene	400	ug/kg	J	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Indeno(1,2,3-cd)pyrene	220	ug/kg	J	J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Indeno(1,2,3-cd)pyrene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Dibenz(a,h)anthracene	220	ug/kg	U	UJ	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Dibenz(a,h)anthracene	670	ug/kg	U	R	11
QE56	CB12010710Sed	10-434-QE56C	SW8270D	Benzo(g,h,i)perylene	360	ug/kg		J	19
QE56	CB12010710Sed	10-434-QE56CDL	SW8270D	Benzo(g,h,i)perylene	670	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8041	Pentachlorophenol	190	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Naphthalene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	2-Methylnaphthalene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	1-Methylnaphthalene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Acenaphthylene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Acenaphthene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Dibenzofuran	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Fluorene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Phenanthrene	340	ug/kg		J	13
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Phenanthrene	360	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Anthracene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Fluoranthene	900	ug/kg		R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Fluoranthene	780	ug/kg		J	13
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Pyrene	1500	ug/kg		J	8,13
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Pyrene	790	ug/kg		R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(a)anthracene	220	ug/kg		J	13
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(a)anthracene	250	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Chrysene	630	ug/kg		J	13
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Chrysene	700	ug/kg		R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(b)fluoranthene	370	ug/kg		J	13,19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(b)fluoranthene	450	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(k)fluoranthene	370	ug/kg		J	13,19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(k)fluoranthene	450	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(a)pyrene	300	ug/kg		J	13,19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(a)pyrene	260	ug/kg	J	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Indeno(1,2,3-cd)pyrene	190	ug/kg	U	UJ	19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Indeno(1,2,3-cd)pyrene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Dibenz(a,h)anthracene	190	ug/kg	U	UJ	19

QUALIFIED DATA SUMMARY TABLE
Floyd Snider
Port of Seattle - Lora Lake Apartments Storm Water Interim Action

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifiers	DV Reason
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Dibenz(a,h)anthracene	580	ug/kg	U	R	11
QE56	CB2010710Sed	10-435-QE56D	SW8270D	Benzo(g,h,i)perylene	280	ug/kg		J	13,19
QE56	CB2010710Sed	10-435-QE56DDL	SW8270D	Benzo(g,h,i)perylene	580	ug/kg	U	R	11
QF10	CB31A011110SED	10-690-QF10ADL	SW8041	Pentachlorophenol	80	ug/kg	U	R	11
QF10	CB31A011110SED	10-690-QF10A	SW8270D	Pyrene	270	ug/kg		J	8
QF10	CB31A011110SED	10-690-QF10A	SW6010B	Lead	32	mg/kg		J	9
QF10	CB31A011110SED	10-690-QF10A	SW8260C	Tetrachloroethene	1	ug/kg	U	UJ	8
QF10	CB99011110SED	10-691-QF10B	SW6010B	Lead	31	mg/kg		J	9
5913	CB19010710SED	5913-001-SA	EPA 1613	OCDD	23300	pg/g		J	13
5913	CB19010710SED	5913-001-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	481	pg/g		J	13
5913	CB19010710SED	5913-001-SA	EPA 1613	OCDF	1340	pg/g		J	13
5913	CB19010710SED	5913-001-SA	EPA 1613	Total HxCDF	513	pg/g	D,M	J	14
5913	CB12010710SED	5913-002-SA	EPA 1613	1,2,3,7,8-PeCDD	27.3	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	OCDD	46200	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	1,2,3,6,7,8-HxCDF	22.4	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	1060	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	OCDF	3750	pg/g		J	13
5913	CB12010710SED	5913-002-SA	EPA 1613	Total TCDF	136	pg/g	D,M	J	14
5913	CB12010710SED	5913-002-SA	EPA 1613	Total HxCDF	785	pg/g	D,M	J	14
5913	CB2010710SED	5913-003-SA	EPA 1613	1,2,3,7,8-PeCDD	10.6	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	OCDD	13300	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	1,2,3,6,7,8-HxCDF	8.67	pg/g	J	J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	2,3,4,6,7,8-HxCDF	10.7	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	209	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	1,2,3,4,7,8,9-HpCDF	10.6	pg/g		J	13
5913	CB2010710SED	5913-003-SA	EPA 1613	OCDF	569	pg/g		J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	1,2,3,7,8-PeCDD	3.96	pg/g	J	J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	2,3,4,7,8-PeCDF	2.23	pg/g	J	J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	246	pg/g		J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	OCDF	914	pg/g		J	13
5914	CB31A011110SED	5914-001-SA	EPA 1613	Total TCDF	8.48	pg/g	D,M	J	14
5914	CB31A011110SED	5914-001-SA	EPA 1613	Total PeCDF	49.5	pg/g	D,M	J	14
5914	CB31A011110SED	5914-001-SA	EPA 1613	Total HxCDF	349	pg/g	D,M	J	14
5914	CB99011110SED	5914-002-SA	EPA 1613	1,2,3,7,8-PeCDD	3.99	pg/g	J	J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	1,2,3,7,8-PeCDF	0.989	pg/g	J	J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	2,3,4,7,8-PeCDF	2.87	pg/g	J	J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	1,2,3,4,6,7,8-HpCDF	237	pg/g		J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	OCDF	899	pg/g		J	13
5914	CB99011110SED	5914-002-SA	EPA 1613	Total PeCDF	47.5	pg/g	D,M	J	14
5914	CB99011110SED	5914-002-SA	EPA 1613	Total HxCDF	340	pg/g	D,M	J	14

Port of Seattle
Lora Lake Apartments

Remedial Investigation/ Feasibility Study Work Plan

Appendix I
Laboratory Analytical Data Reports

FINAL

DIOXIN/FURAN ANALYTICAL METHODS AND REPORTING LIMIT DEFINITIONS

Frontier Analytical Laboratories analyzed soil, groundwater, and sediment samples collected as part of the Lora Lake Apartments Remedial Investigation and Feasibility Study (RI/FS) for dioxins/furans using U.S. Environmental Protection Agency (USEPA) Method 1613.

Currently, there are eight analytical methods that are routinely used for the determination of dioxins and furans. Of those, USEPA Methods 8290 and 1613 are fine-scale analytical methods comparable in the quality of analysis and results.[1] Both employ high resolution gas chromatography/high-resolution mass spectrometry processes that provide test results as low as parts per trillion (ppt) for solid samples and parts per quadrillion (ppq) for aqueous samples.

Analytical requirements for dioxins/furans are unique compared to other routinely monitored contaminants. Because dioxins/furans are toxic at much lower concentrations than other contaminants and dioxin/furan analysis requires speciation of many congeners, the analytical requirements are far more sophisticated and sensitive. For instance, most contaminants are commonly measured in parts per million (ppm) and parts per billion (ppb) whereas dioxins/furans are commonly measured in ppt and ppq. Stable isotopically labeled analogs of the target compounds are used to determine exact retention times and to correct targets for recovery, providing a more analytically precise value for the dioxins/furans than most other analyte groups.

USEPA Method 1613 defines three analytical limits for dioxin/furan analysis that are critical to the evaluation of the reported data and assessment of data quality. The Minimum Limit (ML) is the highest (least fine scale) limit, the Detection Limit (DL) is a mid-range limit, and the Method Detection Limit (MDL) is the lowest (finest scale) limit (refer to Figure I.1). These limit definitions have significant importance in the calculation of dioxin/furan toxic equivalency quotients (TEQs), as discussed below.

The MDL is defined as “The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the value is above zero and is determined from analysis of a sample in a given matrix type containing the analyte.” (USEPA SW-846).[2] Therefore, there is a statistically valid 99 percent probability that any analyte observed greater than the MDL is, indeed, present in the sample. The USEPA has established the MDL as a reporting threshold. By laboratory and USEPA standards

[1] The primary differences in these methods are analyte recovery limits, internal standards, and sample holding times (described in detail in the Lora Lake Apartments RI/FS Work Plan). USEPA Method 1613 was selected to analyze the Lora Lake Apartments Site RI samples to take advantage of the method holding time of 1 year (in contrast to the USEPA Method 8290 holding time of 30 days). The longer holding time made it possible to follow the tiered dioxin/furan soil analysis approach described in the Lora Lake Apartments RI/FS Work Plan (Floyd|Snider 2010).

[2] The MDL is a statistically calculated value, and for operational purposes the USEPA states that when it is necessary to determine the MDL in a matrix, the MDL should be determined by multiplying the appropriate one-sided 99 percent t-statistic by the standard deviation obtained from a minimum of three analyses of matrix spike containing the analyte of interest at a concentration three to five times the estimated MDL, where the t-statistic is obtained from standard references or as described in Chapter 1 of SW-846 (USEPA 1992).

and industry convention, the analyte is considered "not present" even if a measured value less than this level is reported by the analytical process.

For USEPA Method 1613 the term Minimum Limit is used to represent the lowest point of calibration on the instrument or lowest standard. Minimum requirements for the MLs for dioxin/furan congeners are specified in the method. The ML is equivalent to a "reporting limit" (RL) as that term is used for other analytical methods (e.g., USEPA Method 6010 for metals or USEPA Method 8290 for semivolatile organic compounds). MLs and RLs are equivalent, and, in common practice are used interchangeably to refer to the lowest concentration of an analyte that the laboratory will routinely report or can reliably measure within specified control limits. Detected concentrations greater than or equal to the ML are quantified with a known and acceptable level of precision and accuracy.

MDLs and RLs are terms used to define analytical process limits used consistently across various analytical methods. USEPA Method 1613 dioxin/furan analysis also uses the term Detection Limit or DL. The DL is a "real response" that is based on the method-specific minimum signal-to-noise ratio for each congener, for each analysis run. The DL represents the sample- and matrix-specific level at which a congener can be detected. The DL level or concentration is greater than the MDL, but less than the ML. By definition, to designate a positive detection of an analyte, the analyte concentration must be measured at more than the method-specific minimum signal-to-noise ratio. A positive detection greater than the MDL and less than the ML is given a "J" qualifier to indicate that the analyte or congener was positively identified, but that the concentration was estimated because the precision and accuracy of the result is unknown at this low level. For USEPA Method 1613, the DL is effectively equivalent to the Estimated Detection Limit or EDL used for USEPA Method 8290. An EDL is often still calculated for USEPA Method 1613, per the Contract Laboratory Program requirements.

Given these definitions of analytical limits used for USEPA Method 1613, the common term "non-detect" or "non-detected" means that the analyte measurement was less than the MDL, where potential instrument responses are within the background noise associated with the equipment and analyses. When calculating dioxin/furan TEQ concentrations, non-detect congeners may be assigned a value of one-half of the DL, (WSDOE 2007) or may be assigned "zero." Because dioxins/furans are toxic at very low concentrations, the approach of assigning one-half of the DL for non-detected congeners or setting non-detect compounds to zero for the calculation of dioxin/furan TEQ concentrations is important in evaluating environmental data. Risk-based cleanup levels are often at low levels that may be near or less than the DLs.

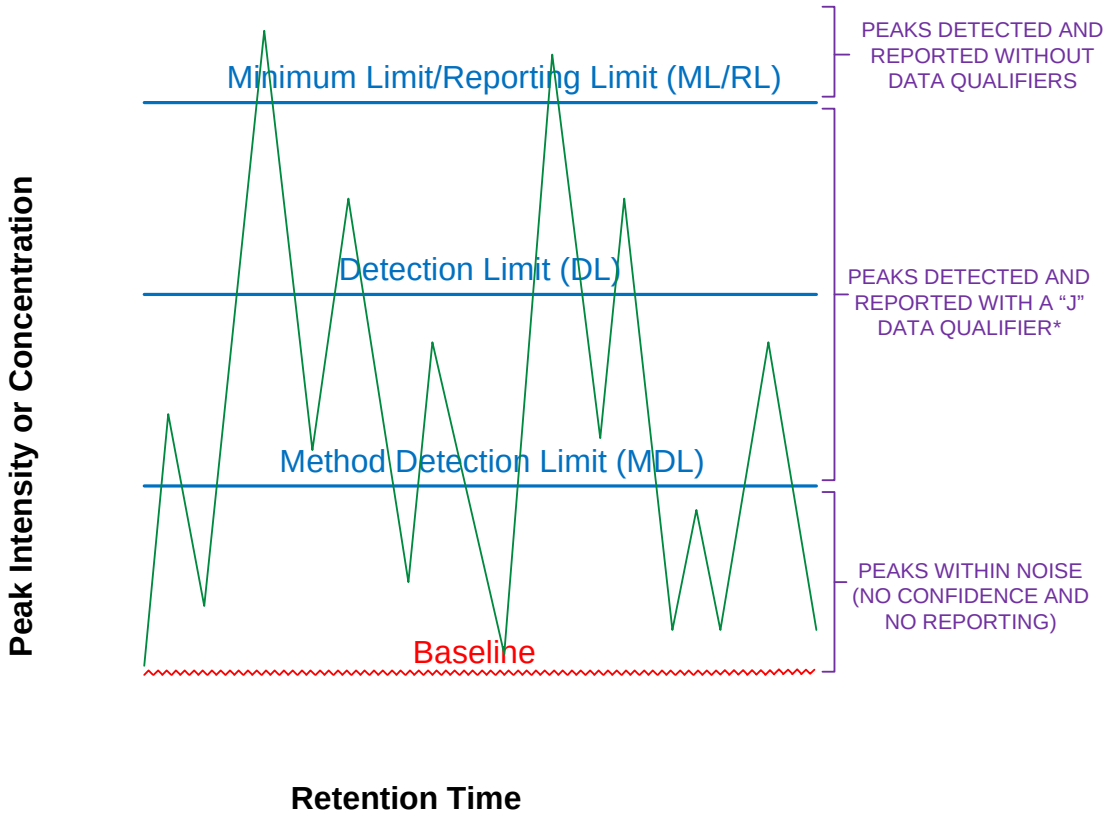
REFERENCES

Floyd|Snider. 2010. *Lora Lake Apartments Final Remedial Investigation/Feasibility Study Work Plan*. Prepared for Port of Seattle. 30 July.

U.S. Environmental Protection Agency (USEPA). 1992. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)*. Third Edition. Chapter 1.

http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm. Last accessed on November 29, 2011.

Washington State Department of Ecology (WSDOE). 2007. *Concise Explanatory Statement and Responsiveness Summary for the Amendment of Chapter 173-340 WAC, Model Toxics Control Act Cleanup Regulation*. Publication Number 07-09-108. October.



Note:

* "J" qualifier indicated that the analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

FLOYD | SNIDER strategy • science • engineering	**Remedial Investigation/ Feasibility Study Port of Seattle Lora Lake Apartments Site Burien, Washington**	Figure I.1 USEPA Method 1613 Analytical Limits

Analytical Resources, Incorporated
Analytical Chemists and Consultants

December 29, 2009

Jessie Massingale
Floyd-Snider Inc.
601 Union Street, Suite 600
Seattle, WA 98101-2341

RE: Client Project: Lora Lake Apartments, POS-LLA
ARI Job No: QB37

Dear Ms. Massingale:

Please find enclosed the original Chain-of-Custody (COC) record, sample receipt documentation, and the final data package for samples from the project referenced above.

Sample receipt and detail of these analyses are discussed in the Case Narrative.

An electronic copy of this package will remain on file with ARI. Should you have any questions or problems, please feel free to contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Susan D. Dunnihoo
Director, Client Services
sue@arilabs.com
206-695-6207

Enclosures

cc: eFile QB37

SD/co

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody
Documentation

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

Port of Seattle

ARI Assigned Number:	Turn-around Requested: Standard	Date: 12-14-09	
ARI Client Company: ~~POS-Airport~~ POS	Phone: 206-292-2078 Floyd/Snider	Page: 1 of 1	
Client Contact: Matt Wolfman		No. of Coolers: 1	Cooler Temps: 4.0
Client Project Name: Lora Lake Apartments			
Client Project #: POS-LLA	Samplers: D. Metallo C. Nickerson		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NWTPH-Dx ①	Analysis Requested: VOC 8260-C SIM	Notes/Comments
CB31A121409GRAB	12.14.09	1830	W	4	X	X	
CB4857121409GRAB	12.14.09	1900	W	4	X	X	
CB1121409GRAB	12.14.09	1950	W	4	X	X	
~~TRIP~~ DM							
TB121409	12.14.09	1800	W	3		X	

Comments/Special Instructions
① - Acid Silica clean-up for TPH-Dx

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)				
Printed Name	Dave Metallo	Jonathon Walter		
Company	Taylor Assoc. Inc	ARI		
Date & Time	12-15-09 (1219)	12/15/09 1225		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Floyd Snider

Project Name: Lora Lake

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: _____

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.0		
If cooler temperature is out of compliance fill out form 00070F	Temp Gun ID#: 90941619	

Cooler Accepted by: JW Date: 12/15/09 Time: 1225

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other:		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	(NA)	YES	NO
Were all VOC vials free of air bubbles?	NA	(YES)	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	12/11/09	12/10/09

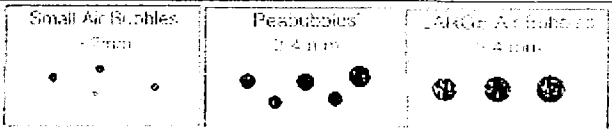
Samples Logged by: MW Date: 12/15/09 Time: 1345

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Case Narrative

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

Case Narrative

Client: Floyd Snider
Project: Lora Lake Apartments, POS-LLA
Matrix: Water
ARI Job No.: QB37

Sample receipt

Analytical Resources, Inc. (ARI) accepted three water samples and a trip blank on December 15, 2009 under ARI job QB37. The cooler temperature measured by IR thermometer following ARI SOP was 4.0°C. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form.

1,2-Dichloroethane by SW8260C

The samples were analyzed within the method recommended holding time.

Initial calibrations and continuing calibrations were within limits. Internal standards were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limit. The LCS and LCSD percent recoveries were within control limits.

SIM Volatiles by SW8260C

The samples were analyzed within the method recommended holding time.

Initial calibrations and continuing calibrations were within limits. Internal standards were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limit. The LCS and LCSD percent recoveries were within control limits.

NWTPH-Dx

The samples were extracted and analyzed within the method recommended holding time.

Initial calibrations and continuing calibrations were within limits.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits. The LCS and LCSD percent recoveries were within control limits.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 7/10/2009

Inorganic Data

U Indicates that the target analyte was not detected at the reported concentration

* Duplicate RPD is not within established control limits

B Reported value is less than the CRDL but ≥ the Reporting Limit

N Matrix Spike recovery not within established control limits

NA Not Applicable, analyte not spiked

H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U Indicates that the target analyte was not detected at the reported concentration

* Flagged value is not within established control limits

B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J Estimated concentration when the value is less than ARI's established reporting limits

D The spiked compound was not detected due to sample extract dilution

E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

Data Reporting Qualifiers

Effective 7/10/2009

NA The flagged analyte was not analyzed for

NR Spiked compound recovery is not reported due to chromatographic interference

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

11/06/2009

LABL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1667-4	PCB	20	ACETONE	10/29/10
2#	1472-3	BCOC PEST	10	ACETONE	NA
3	1620-4	PEST	02/04/20	ACETONE	06/26/10
4	1667-1	LOW PEST	0.2/0.4/2	ACETONE	06/26/10
5	1580-2	EPH	1500	MECL2	01/29/10
6	1655-3	PCP	12.5/125	ACETONE	09/24/10
7	1635-1	ABN	100	ACETONE	02/01/10
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1621-4	ABN ACID	100/200	MEOH	07/14/10
11	1642-2	TPHD	15000	ACETONE	09/07/10
12	1622-2	ABN BASE	200	ACETONE	02/05/10
13	1613-1	LOW PCB	2	ACETONE	06/08/10
14*	1547-1	LOW ABN ACID	10/20	MEOH	04/10/10
15*	1591-3	SIM PNA	15/75	MEOH	08/28/10
16	1602-3	DIOXANE	100	MEOH	03/20/10
17	1644-1	1248 PCB	10	ACETONE	09/10/10
18*	1591-4	LOW SIM PNA	1.5	ACETONE	08/28/10
19	1574-4	AK103	7500	MECL2	12/02/09
20	1572-2	PNA	100	ACETONE	12/26/09
21	1593-3	SKY/BHT	100	MEOH	03/31/10
22	1631-1	HERB	12.5/12500	MEOH	02/19/10
23*	1505-1	LW ABN BASE	20	MEOH	03/20/10
24	1613-2	LOW ABN	10	ACETONE	02/28/10
25#	1481-1	DIPHENYL	100	MEOH	NA
26*	1545-2	OP-PEST	25	MEOH	02/16/10
27	1668-3	STEROLS	200	MEOH	10/30/10
28#	1595-1	ADD. PEST	4	ACETONE	NA
29#	1496-3	DECANES	100	MEOH	NA
30	1620-1	EDB/DBCP	0.2	MEOH	06/22/10
31	1596-1	TERPINEOL	100	MEOH	04/03/10

LCS SOLUTIONS

11/06/2009

32	1619-3	GUAIACOL	50-200	ACETONE	04/30/10
33	1639-3	RETENE	100	MEOH	09/03/10
34	1633-1	CONGENERS	2.5	ACETONE	08/11/10
35	1601-2	ALKYL PNA A	10	MEOH	04/03/10
36	1601-3	ALKYL PNA B	10	MEOH	05/13/10
50	1617-1	FULL RESIN	250	ACETONE	06/17/10
51	1611-3	DDTS	2.5	ACETONE	06/04/10
52	1613-5	1232 PCB	20	ACETONE	06/16/10
	*=REVERIFIED SOLUTION				
#=PROJECT SPECIFIC SOLUTION					

SURR SOLUTIONS

11/06/2009

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1662-3	ABN	100/150	MEOH	10/08/10
B	1633-3	SIM PNA	15/75	MEOH	08/12/10
C*	1559-1	SIM ABN	25/37.5	MEOH	03/13/10
D	1635-2	LOW PCB	0.2	ACETONE	05/29/10
E	1661-2	HERB	62.5	MEOH	10/02/10
F	1574-3	PCP	12.5	ACETONE	01/06/10
G*	1534-1	1,4DIOXANE	100	MEOH	02/20/10
H	1594-1	OP-PEST	25	MEOH	04/01/10
I	1634-1	LOW S. PNA	1.5	MEOH	08/12/10
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1612-1	MED PCB	20	ACETONE	05/29/10
L	1584-4	TBT	2.5	MECL2	12/04/09
M	1578-1	EPH	1500	MECL2	12/09/09
N	1612-2	PCB	2	ACETONE	05/29/10
O	1647-2	TPH	450	MECL2	07/02/10
P	1666-3	HCID	2250	MECL2	05/06/10
Q	1620-2	EDB	1	MEOH	06/22/10
R	1615-1	RESIN ACID	250	ACETONE	06/17/10
S	1568-5	PBDE	.25	MEOH	12/11/09
T	1601-1	ALKYL PNA	10	MEOH	11/26/09
U	1633-1	CONGENER	2.5	ACETONE	08/11/10
V					
*reverified solution					
X					
Y					
Z					

Spike Recovery Control Limits for Analysis of Aqueous Samples Volatile Organic Compounds (VOA) EPA SW-846 Methods 8260C 10 mL Purge Volume [1,7]

Effective: 5/1/09

Control limits are updated periodically. Assure that you have ARI's current control limits by downloading the files at the time of use. http://www.arilabs.com/portal/downloads/ARI-CLs.zip

	ARI Control Limits	ARI ME Control Limits[2]
LCS Spike Recovery [6]		
tert-Butanol	49 - 150	32 - 167
Metyl-*tert*-butylether	47 - 154	29 - 172
Di-*iso*-propylether	43 - 149	25 - 167
Ethyl-*tert*-butylether	45 - 155	27 - 173
tert-Amyl methylether	52 - 151	35 - 168
Dichlorodifluoromethane	59 - 129	47 - 141
Chloromethane	66 - 123	57 - 133
Vinyl Chloride	68 - 121	59 - 130
Bromomethane	55 - 148	40 - 164
Chloroethane	47 - 155	29 - 173
Trichlorofluoromethane	70 - 129	60 - 139
Acrolein	24 170	**10** - 194
Trichlorotrifluoroethane	74 - 127	65 - 136
Acetone	70 - 130	60 - 140
1,1-Dichloroethene	72 - **120**	64 - 127
Bromoethane	73 - 131	63 - 141
Methyl Iodide	34 - 183	**10** - 208
Methylene Chloride	70 - 124	61 - 133
Acrylonitrile	71 - 135	60 - 146
Methyl tert-Butyl Ether	78 - **120**	72 - 122
Carbon Disulfide	66 - 129	56 - 140
trans-1,2-Dichloroethene	76 - **120**	70 - 120
Vinyl Acetate	49 - 134	35 - 148
1,1-Dichloroethane	75 - **120**	68 - 124
2-Butanone	78 - 131	69 - 140
2,2-Dichloropropane	68 - 121	59 - 130
cis-1,2-Dichloroethene	80 - **120**	75 - **120**
Chloroform	78 - **120**	72 - 121
Bromodichloromethane	79 - **120**	73 - **120**
1,1,1-Trichloroethane	76 - **120**	69 - 123
1,1-Dichloropropene	78 - **120**	72 - 120
Carbon Tetrachloride	70 - 126	61 - 135
1,2-Dichloroethane	78 - **120**	72 - **120**
Benzene	79 - **120**	73 - **120**
Trichloroethene	78 - **120**	72 - 122
1,2-Dichloropropane	80 - **120**	75 - **120**
Bromochloromethane	78 - **120**	72 - 124

Dibromomethane	80 - **120**	75 - **120**
2-Chloroethylvinylether	68 - 134	57 - 145
4-Methyl-2-Pentanone	73 - 131	63 - 141
cis-1,3-Dichloropropene	78 - **120**	72 - 121
Toluene	79 - **120**	74 - **120**
trans-1,3-Dichloropropene	75 - **120**	68 - 124
2-Hexanone	75 - 130	66 - 139
1,1,2-Trichloroethane	79 - **120**	74 - **120**
1,3-Dichloropropane	78 - **120**	72 - 120
Tetrachloroethene	72 - **120**	65 - 125
Dibromochloromethane	78 - **120**	71 - 125
Ethylene Dibromide	75 - **120**	68 - 125
Chlorobenzene	79 - **120**	73 - **120**
Ethylbenzene	78 - 121	71 - 128
1,1,2,2-Tetrachloroethane	72 - **120**	64 - 127
m,p-Xylene	65 - 129	54 - 140
o-Xylene	76 - 120	69 - 127
Styrene	74 - 121	66 - 129
Isopropylbenzene	74 - 120	66 - 128
Bromoform	71 - 120	63 - 128
1,1,1,2-Tetrachloroethane	75 - **120**	68 - 126
1,2,3-Trichloropropane	73 - 120	65 - 128
trans-1,4-Dichloro-2-butene	65 - 135	53 - 147
n-Propylbenzene	76 - 121	69 - 129
Bromobenzene	72 - **120**	64 - 126
1,3,5-Trimethylbenzene	74 - 123	66 - 131
2-Chlorotoluene	74 - **120**	67 - 127
4-Chlorotoluene	75 - **120**	68 - 125
tert-Butylbenzene	73 - 121	65 - 129
1,2,4-Trimethylbenzene	73 - 124	65 - 133
sec-Butylbenzene	75 - 123	67 - 131
4-Isopropyltoluene	**71** - 125	62 - 134
1,3-Dichlorobenzene	72 - **120**	64 - 127
1,4-Dichlorobenzene	76 - **120**	69 - 123
n-Butylbenzene	72 - 124	63 - 133
1,2-Dichlorobenzene	75 - **120**	68 - 124
1,2-Dibromo-3-chloropropane	67 - 121	58 - 130
1,2,4-Trichlorobenzene	71 - 120	63 - 128
Hexachloro-1,3-butadiene	67 - 124	58 - 134
Naphthalene	71 - 125	62 - 134
1,2,3-Trichlorobenzene	61 - 134	49 - 146
MB/LCS Surrogate Recovery		
Dibromofluoromethane	64 - 133	(3)
d4-1,2-Dichloroethane	70 - 132	(3)
d8-Toluene	**80** - **120**	(3)

4-Bromofluorobenzene	**80 - 120**	(3)
d4-1,2-Dichlorobenzene	**80 - 120**	(3)
Sample Surrogate Recovery		
Dibromofluoromethane	30 - 160 [5]	(3)
d4-1,2-Dichloroethane	**80** - 143	(3)
d8-Toluene	**80 - 120**	(3)
4-Bromofluorobenzene	**80 - 120**	(3)
D4-1,2-Dichlorobenzene	**80** - 120	(3)

(1) Control Limits calculated using all data generated 1/1/08 through 4/15/09.
(2) **ME** = A **marginal exceedance** defined in the NELAC Standard[4] as beyond the LCS-CL but still within the ME limits. ME limits are between 3 and 4 standard deviations around the mean. A maximum of four marginal exceedances are acceptable. Five or more marginal exceedances require corrective action.
(3) Marginal Exceedances not allowed for surrogate standards.
(4) **2003 NELAC Standard (EPA/600/R-04/003), July 2003**, Chapter 5, pages 251-252.
(5) 30 – 160 are default, advisory control limits used when there is insufficient data to calculate historic control limits. **DO NOT** use these limits as the sole reason to reject the data from a batch of analyses
(6) Laboratory Control Sample (LCS) spike recovery control limits also used as advisory control limits for sample matrix spike (MS) analyzes. MS recovery values are advisory and not used to assess the acceptability of an analytical batch.
(7) Highlighted control limits (**bold font**) are adjusted from the calculated values as follows:

a) ARI does not use control limits < 10 for the lower limit or < 100 for the upper limit.
b) Control limits for analyzes with no separate preparation procedure are adjusted to reflect the minimum uncertainty in the calibration of the instrument allowed by the referenced analytical method.

Spike Recovery Control Limits for SIM VOA
EPA Method SW-846-8260C [1,2]

Effective 12/24/07

Control limits are updated periodically. Assure that you have ARI's current control limits by downloading the files at the time of use.
http://www.arilabs.com/portal/downloads/ARI-CLs.zip

Sample Matrix:	Water
Purge Volume:	10 mL
LCS Spike Recovery [3]	
Vinyl Chloride	76 - **120**
1,1-Dichloroethene	79 - 126
cis-1,2-Dichloroethene	76 - 127
Trichloroethene	79 - **120**
Benzene	75 - 121
Tetrachloroethene	75 - 123
1,1,2,2-Tetrachloroethane	72 - 129
Method Blank/LCS Surrogate Recovery	
d4-1,2-Dichloroethane	80 - 133
d8-Toluene	**80** - 121
Sample Surrogate Recovery	
d4-1,2-Dichloroethane	**80** - 136
d8-Toluene	**80** - **120**

(1) Control limits calculated using historic data collected from 4/1/05 to 11/15/07
(2) Highlighted control limits (**bold font**) adjusted from the calculated values as follows:

a) ARI does not use control limits < 10
b) Control limits for analyzes with no separate preparation procedure are adjusted to reflect the minimum uncertainty in the calibration of the instrument allowed by the referenced analytical method.

(3) Laboratory Control Sample (LCS) spike recovery control limits also used as advisory control limits for sample matrix spike (MS) analyzes. MS recovery values are advisory and not used to assess the acceptability of an analytical batch.

Analytical Resources,Incorporated
Analytical Chemists and Consultants

Spike Recovery Control Limits Hydrocarbon Identification (NWTPH-HCID) and Diesel Range Petroleum Hydrocarbons (NWTPH-D & AK-102) [1]

Effective 5/1/09

Control limits are updated periodically. Assure that you have ARI's current control limits by downloading the files at the time of use. http://www.arilabs.com/portal/downloads/ARI-CLs.zip

Method:	NWTPH-HCID [2]	NWTPH-D		AK102 [2]
Sample Matrix:	Water& Soil	Water	Soil	Water & Soil
Preparation:	500 to 1 mL	500 to 1 mL	10g to 1 mL	500 to 1 mL or 10g to 1 mL
LCS Spike Recovery [3]				
Diesel	-- - --	56 - 103	55 - 104	75 - 125
Diesel with Acid & Silica Clean-up	-- - --	43 - 100	54 - 96	(4)
Diesel with Silica Clean-up	-- --	43 - 100	54 - 96	75 - 125
Method Blank/LCS Surrogate Recovery				
o-Terphenyl	-- - --	57 - 120	58 - 121	60 - 120
o-Terphenyl with Acid & Silica Clean-up	-- - --	51 - 120	63 - 115	(4)
o-Terphenyl Silica Clean-up		51 - 120	63 - 115	60 - 120
Sample Surrogate Recovery				
o-Terphenyl	50 - 150	35 - 131	53 - 118	50 - 150
o-Terphenyl with Acid & Silica Clean-up	-- - --	41 - 121	49 - 120	(4)
o-Terphenyl with Silica Clean-up		41 - 121	49 - 120	50 - 150

1. Control Limits calculated using all data generated 1/1/08 through 12/31/08
2. Method specified, non-prescriptive limits. The NWTPH-HCID Method does not include LCS or MS analyses.
3. Laboratory Control Sample (LCS) spike recovery control limits also used as advisory control limits for sample matrix spike (MS) analyzes. MS recovery values are advisory and not used to assess the acceptability of an analytical batch.
4. Alaska State UST Methods do not allow acid cleanup of sample extracts.

Data Summary Package

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

VOLATILE ANALYSIS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: CB31A121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37A
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized: VT
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 14:13

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	90.8%
d8-Toluene	97.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: CB4857121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37B
LIMS ID: 09-30855
Matrix: Water
Data Release Authorized: VTS
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 14:39

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	90.9%
d8-Toluene	97.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: CB1121409GRAB SAMPLE**
Page 1 of 1

Lab Sample ID: QB37C
LIMS ID: 09-30856
Matrix: Water
Data Release Authorized: VTB
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 15:04

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	90.6%
d8-Toluene	99.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: TB121409**
Page 1 of 1 **TRIP BLANK**

Lab Sample ID: QB37D
LIMS ID: 09-30857
Matrix: Water
Data Release Authorized: VTS
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 12:30

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	90.4%
d8-Toluene	98.2%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-122209	Method Blank	10	91.5%	98.8%	NA	NA	0
LCS-122209	Lab Control	10	88.6%	99.5%	NA	NA	0
LCSD-122209	Lab Control Dup	10	87.5%	99.7%	NA	NA	0
QB37A	CB31A121409GRAB	10	90.8%	97.3%	NA	NA	0
QB37B	CB4857121409GRAB	10	90.9%	97.9%	NA	NA	0
QB37C	CB1121409GRAB	10	90.6%	99.4%	NA	NA	0
QB37D	TB121409	10	90.4%	98.2%	NA	NA	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	70-132	80-143
(TOL) = d8-Toluene	80-120	80-120
(BFB) = Bromofluorobenzene	80-120	80-120
(DCB) = d4-1,2-Dichlorobenzene	80-120	80-120

Prep Method: SW5030B
Log Number Range: 09-30854 to 09-30857

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-122209**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-122209
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized: VTS
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT5/PKC
LCSD: NT5/PKC
Date Analyzed LCS: 12/22/09 10:37
LCSD: 12/22/09 11:03

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
1,2-Dichloroethane	9.1	10.0	91.0%	8.8	10.0	88.0%	3.4%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	88.6%	87.5%
d8-Toluene	99.5%	99.7%

4A

VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1222A

Lab Name: ANALYTICAL RESOURCES, INC

Client: FLOYD/SNIDER

ARI Job No: QB37

Project: LORA LAKE APARTMENTS

Lab File ID: 12220906

Lab Sample ID: MB1222A

Date Analyzed: 12/22/09

Time Analyzed: 1205

Instrument ID: NT5

Heated Purge: (Y/N) N

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1222	LCS1222	12220903	1037
02	LCSD1222	LCSD1222	12220904	1103
03	TB121409	QB37D	12220907	1230
04	CB31A121409G	QB37A	12220911	1413
05	CB4857121409	QB37B	12220912	1439
06	CB1121409GRA	QB37C	12220913	1504
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COMMENTS:

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-122209**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-122209
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized: VTB
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 12:05

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	91.5%
d8-Toluene	98.8%

SIM VOLATILE ANALYSIS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: CB31A121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37A
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 20:12

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	103%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: CB4857121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37B
LIMS ID: 09-30855
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 20:39

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	105%
d8-Toluene	103%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: CB1121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37C
LIMS ID: 09-30856
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 21:06

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	103%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: TB121409**
Page 1 of 1 **TRIP BLANK**

Lab Sample ID: QB37D
LIMS ID: 09-30857
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 13:59

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	100%

FORM I

ANALYTICAL RESOURCES INCORPORATED

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA

Client ID	DCE	TOL	TOT OUT
MB-121809	99.7%	101%	0
LCS-121809	92.4%	102%	0
LCSD-121809	94.1%	101%	0
CB31A121409GRAB	104%	103%	0
CB4857121409GRAB	105%	103%	0
CB1121409GRAB	103%	103%	0
TB121409	102%	100%	0

	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(80-133)	(80-136)
(TOL) = d8-Toluene	(80-121)	(80-120)

Prep Method: SW5030
Log Number Range: 09-30854 to 09-30857

FORM-II SW8260-SIM

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-121809

LAB CONTROL SAMPLE

Lab Sample ID: LCS-121809
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT7/PKC
LCSD: NT7/PKC
Date Analyzed LCS: 12/18/09 11:10
LCSD: 12/18/09 11:37

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
cis-1,2-Dichloroethene	0.899	1.00	89.9%	0.902	1.00	90.2%	0.3%
trans-1,2-Dichloroethene	0.918	1.00	91.8%	0.914	1.00	91.4%	0.4%
Trichloroethene	0.950	1.00	95.0%	0.929	1.00	92.9%	2.2%
Tetrachloroethene	0.962	1.00	96.2%	0.942	1.00	94.2%	2.1%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	92.4%	94.1%
d8-Toluene	102%	101%

4A

VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1217

Lab Name: ANALYTICAL RESOURCES, INC

Client: FLOYD/SNIDER

ARI Job No: QB37

Project: LORA LAKE APARTMENTS

Lab File ID: 12180906

Lab Sample ID: MB1217

Date Analyzed: 12/18/09

Time Analyzed: 1203

Instrument ID: NT7

Heated Purge: (Y/N) N

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1217	LCS1217	12180904	1110
02	LCSD1217	LCSD1217	12180905	1137
03	TB121409	QB37D	12180910	1359
04	CB31A121409G	QB37A	12180924	2012
05	CB4857121409	QB37B	12180925	2039
06	CB1121409GRA	QB37C	12180926	2106
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COMMENTS:

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: MB-121809**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-121809
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 12:03

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.7%
d8-Toluene	101%

FORM I

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Ical Midpoint ID: 11230917 Ical Date: 11/23/09

Instrument ID: NT7 Project Run Date: 12/18/09

		IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	381756	5.32	546077	5.75		
	UPPER LIMIT	763512	5.82	1092154	6.25		
	LOWER LIMIT	190878	4.82	273038	5.25		
	Sample ID						
01	LCS1217	281461	5.31	402622	5.75		
02	LCSD1217	275872	5.32	396506	5.75		
03	MB1217	261838	5.31	376390	5.75		
04	TB121409	247108	5.31	355484	5.75		
05	CB31A121409G	225127	5.32	324470	5.75		
06	CB4857121409	226847	5.32	329073	5.75		
07	CB1121409GRA	229107	5.32	327928	5.75		
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IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

TPHD ANALYSIS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Page 1 of 1
Matrix: Water

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA

Data Release Authorized: VTS
Reported: 12/19/09

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-121609	Method Blank	12/16/09	12/17/09	1.00	Diesel	0.25	< 0.25 U
09-30854	HC ID: ---		FID9	1.0	Motor Oil	0.50	< 0.50 U
					o-Terphenyl		73.4%
QB37A	CB31A121409GRAB	12/16/09	12/17/09	1.00	**Diesel**	**0.25**	**1.6**
09-30854	HC ID: **DRO/MOTOR OIL**		FID9	1.0	**Motor Oil**	**0.50**	**7.5**
					o-Terphenyl		72.6%
QB37B	CB4857121409GRAB	12/16/09	12/17/09	1.00	**Diesel**	**0.25**	**0.43**
09-30855	HC ID: **DRO/MOTOR OIL**		FID9	1.0	**Motor Oil**	**0.50**	**2.4**
					o-Terphenyl		69.5%
QB37C	CB1121409GRAB	12/16/09	12/17/09	1.00	Diesel	0.25	< 0.25 U
09-30856	HC ID: ---		FID9	1.0	Motor Oil	0.50	< 0.50 U
					o-Terphenyl		68.2%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.
Motor Oil quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

FORM I

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA

Client ID	OTER	TOT OUT
MB-121609	73.4%	0
LCS-121609	75.0%	0
LCSD-121609	68.6%	0
CB31A121409GRAB	72.6%	0
CB4857121409GRAB	69.5%	0
CB1121409GRAB	68.2%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(51-120)	(41-121)

Prep Method: SW3510C
Log Number Range: 09-30854 to 09-30856

FORM-II TPHD

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-121609**
Page 1 of 1 **LCS/LCSD**

Lab Sample ID: LCS-121609
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized: VTS
Reported: 12/19/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Date Extracted LCS/LCSD: 12/16/09

Date Analyzed LCS: 12/17/09 15:26
LCSD: 12/17/09 15:45
Instrument/Analyst LCS: FID/MS
LCSD: FID/MS

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.27	3.00	75.7%	2.12	3.00	70.7%	6.8%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	75.0%	68.6%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

TPH METHOD BLANK SUMMARY

BLANK NO.: QB53MBW1

Lab Name: ANALYTICAL RESOURCES, INC
Client: FLOYD/SNIDER

SDG No.: QB37
Project No.: LORA LAKE APT.

Date Extracted: 12/16/09
Matrix: LIQUID

Date Analyzed : 12/17/09
Instrument ID : FID9

Time Analyzed : 1605

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	QB53LCSW1	QB53LCSW1	12/17/09
02	QB53LCSDW1	QB53LCSDW1	12/17/09
03	CB31A121409G	QB37A	12/17/09
04	CB4857121409	QB37B	12/17/09
05	CB1121409GRA	QB37C	12/17/09

FORM IV TPH

Laboratory Data Package

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

Volatile Analysis
QC Summary Data

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-122209	Method Blank	10	91.5%	98.8%	NA	NA	0
LCS-122209	Lab Control	10	88.6%	99.5%	NA	NA	0
LCSD-122209	Lab Control Dup	10	87.5%	99.7%	NA	NA	0
QB37A	CB31A121409GRAB	10	90.8%	97.3%	NA	NA	0
QB37B	CB4857121409GRAB	10	90.9%	97.9%	NA	NA	0
QB37C	CB1121409GRAB	10	90.6%	99.4%	NA	NA	0
QB37D	TB121409	10	90.4%	98.2%	NA	NA	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	70-132	80-143
(TOL) = d8-Toluene	80-120	80-120
(BFB) = Bromofluorobenzene	80-120	80-120
(DCB) = d4-1,2-Dichlorobenzene	80-120	80-120

Prep Method: SW5030B
Log Number Range: 09-30854 to 09-30857

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-122209**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-122209
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized: VTS
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT5/PKC
LCSD: NT5/PKC
Date Analyzed LCS: 12/22/09 10:37
LCSD: 12/22/09 11:03

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
1,2-Dichloroethane	9.1	10.0	91.0%	8.8	10.0	88.0%	3.4%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	88.6%	87.5%
d8-Toluene	99.5%	99.7%

4A

VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1222A

Lab Name: ANALYTICAL RESOURCES, INC

Client: FLOYD/SNIDER

ARI Job No: QB37

Project: LORA LAKE APARTMENTS

Lab File ID: 12220906

Lab Sample ID: MB1222A

Date Analyzed: 12/22/09

Time Analyzed: 1205

Instrument ID: NT5

Heated Purge: (Y/N) N

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1222	LCS1222	12220903	1037
02	LCSD1222	LCSD1222	12220904	1103
03	TB121409	QB37D	12220907	1230
04	CB31A121409G	QB37A	12220911	1413
05	CB4857121409	QB37B	12220912	1439
06	CB1121409GRA	QB37C	12220913	1504
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COMMENTS:

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES, INC Contract: FLOYD/SNIDER

Lab Code: ARI Case No.: LORA LAKE APARTMENTS SDG No.: QB37

Lab File ID: 11180901 BFB Injection Date: 11/18/09

Instrument ID: NT5 BFB Injection Time: 1105

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	15.3
75	30.0 - 66.0% of mass 95	45.8
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.4
173	Less than 2.0% of mass 174	0.5 (0.5)1
174	50.0 - 101.0% of mass 95	89.7
175	4.0 - 9.0% of mass 174	6.6 (7.3)1
176	93.0 - 101.0% of mass 174	85.9 (95.8)1
177	5.0 - 9.0% of mass 176	6.2 (7.2)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	60_1118	60_1118	11180905	11/18/09	1321
02	40_1118	40_1118	11180906	11/18/09	1347
03	20_1118	20_1118	11180907	11/18/09	1413
04	10_1118	10_1118	11180909	11/18/09	1503
05	2_1118	2_1118	11180910	11/18/09	1529
06	1_1118	1_1118	11180911	11/18/09	1554
07	0.5_1118	0.5_1118	11180912	11/18/09	1620
08	0.2_1118	0.2_1118	11180913	11/18/09	1646
09	ICV_1118	ICV_1118	11180914	11/18/09	1711
10					
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5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES, INC Contract: FLOYD/SNIDER

Lab Code: ARI Case No.: LORA LAKE APARTMENTS SDG No.: QB37

Lab File ID: 12220901 BFB Injection Date: 12/22/09

Instrument ID: NT5 BFB Injection Time: 0933

GC Column: RTXVMS ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	14.8
75	30.0 - 66.0% of mass 95	44.7
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.6
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 101.0% of mass 95	89.0
175	4.0 - 9.0% of mass 174	6.5 (7.3)1
176	93.0 - 101.0% of mass 174	83.8 (94.1)1
177	5.0 - 9.0% of mass 176	5.6 (6.7)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	CC1222	CC1222	12220902	12/22/09	1012
02	LCS1222	LCS1222	12220903	12/22/09	1037
03	LCSD1222	LCSD1222	12220904	12/22/09	1103
04	MB1222A	MB1222A	12220906	12/22/09	1205
05	TB121409	QB37D	12220907	12/22/09	1230
06	CB31A121409GRAB	QB37A	12220911	12/22/09	1413
07	CB4857121409GRAB	QB37B	12220912	12/22/09	1439
08	CB1121409GRAB	QB37C	12220913	12/22/09	1504
09					
10					
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FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Calibration Date: 11/18/09

LAB FILE ID: RF0.2: 11180913 RF0.5: 11180912 RF1: 11180911
RF2: 11180910 RF10: 11180909

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
Chloromethane	0.550	0.429	0.376	0.448	0.366
Vinyl Chloride	0.625	0.481	0.524	0.587	0.509
Bromomethane	0.205	0.200	0.229	0.273	0.272
Chloroethane	0.311	0.333	0.323	0.375	0.291
Trichlorofluoromethane	0.821	0.706	0.694	0.816	0.704
Acrolein			0.032	0.035	0.034
112Trichloro122Trifluoroetha	0.543	0.424	0.478	0.546	0.454
Acetone		0.085	0.074	0.063	0.052
1,1-Dichloroethene	0.472	0.415	0.458	0.543	0.448
Bromoethane	0.314	0.253	0.257	0.304	0.254
Iodomethane		0.468	0.454	0.547	0.516
Methylene Chloride		0.501	0.482	0.544	0.444
Acrylonitrile			0.097	0.090	0.072
Carbon Disulfide	1.812	1.363	1.478	1.648	1.435
Trans-1,2-Dichloroethene	0.615	0.488	0.544	0.600	0.502
Vinyl Acetate			0.486	0.571	0.496
1,1-Dichloroethane	0.817	0.685	0.724	0.849	0.700
2-Butanone		0.035	0.038	0.038	0.032
2,2-Dichloropropane	0.858	0.713	0.704	0.834	0.693
Cis-1,2-Dichloroethene	0.558	0.474	0.486	0.581	0.498
Chloroform	0.816	0.713	0.759	0.896	0.769
Bromochloromethane	0.254	0.220	0.212	0.244	0.211
1,1,1-Trichloroethane	0.762	0.751	0.765	0.867	0.758
1,1-Dichloropropene	0.457	0.433	0.424	0.514	0.430
Carbon Tetrachloride	0.393	0.393	0.407	0.478	0.425
1,2-Dichloroethane	0.432	0.378	0.354	0.399	0.351
Benzene	1.395	1.242	1.271	1.447	1.233
Trichloroethene	0.390	0.394	0.398	0.447	0.385
1,2-Dichloropropane	0.329	0.258	0.282	0.318	0.260
Bromodichloromethane	0.375	0.351	0.360	0.428	0.376
Dibromomethane	0.219	0.147	0.156	0.183	0.154
2-Chloroethyl Vinyl Ether			0.106	0.123	0.112
4-Methyl-2-Pentanone		0.058	0.057	0.069	0.059
Cis 1,3-dichloropropene	0.538	0.489	0.488	0.554	0.478
Toluene	0.917	0.872	0.866	0.993	0.847
Trans 1,3-Dichloropropene	0.435	0.428	0.422	0.467	0.409
2-Hexanone		0.098	0.098	0.112	0.098

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Calibration Date: 11/18/09

LAB FILE ID: RF0.2: 11180913 RF0.5: 11180912 RF1: 11180911
RF2: 11180910 RF10: 11180909

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
1,1,2-Trichloroethane	0.239	0.229	0.238	0.266	0.224
1,3-Dichloropropane	0.456	0.422	0.436	0.498	0.422
Tetrachloroethene	0.499	0.462	0.469	0.562	0.462
Chlorodibromomethane	0.308	0.292	0.284	0.360	0.322
1,2-Dibromoethane	0.252	0.236	0.234	0.263	0.230
Chlorobenzene	1.164	1.054	1.078	1.234	1.061
Ethyl Benzene	2.055	1.828	1.961	2.336	1.872
1,1,1,2-Tetrachloroethane	0.387	0.365	0.369	0.436	0.373
m,p-xylene	0.774	0.706	0.728	0.887	0.734
o-Xylene	0.750	0.655	0.702	0.806	0.715
Styrene	1.132	1.013	1.128	1.344	1.166
Bromoform	0.367	0.300	0.301	0.342	0.316
1,1,2,2-Tetrachloroethane	0.404	0.400	0.417	0.467	0.415
1,2,3-Trichloropropane		0.146	0.149	0.158	0.138
Trans-1,4-Dichloro 2-Butene		0.144	0.136	0.143	0.119
N-Propyl Benzene	3.982	3.237	3.581	4.176	3.548
Bromobenzene	0.946	0.822	0.902	0.976	0.835
Isopropyl Benzene	3.231	2.902	3.182	3.778	3.204
2-Chloro Toluene	2.186	2.049	2.180	2.528	2.175
4-Chloro Toluene	2.374	2.066	2.310	2.664	2.278
T-Butyl Benzene	2.432	2.166	2.349	2.763	2.393
1,3,5-Trimethyl Benzene	2.702	2.521	2.702	3.194	2.702
1,2,4-Trimethylbenzene	2.650	2.509	2.661	3.234	2.729
S-Butyl Benzene	3.371	3.027	3.378	3.921	3.355
4-Isopropyl Toluene	2.827	2.524	2.922	3.409	2.878
1,3-Dichlorobenzene	1.795	1.604	1.677	1.927	1.601
1,4-Dichlorobenzene	1.854	1.595	1.666	1.940	1.622
N-Butyl Benzene	2.566	2.132	2.359	2.838	2.425
1,2-Dichlorobenzene	1.785	1.468	1.506	1.748	1.439
1,2-Dibromo 3-Chloropropane		0.114	0.097	0.098	0.081
1,2,4-Trichlorobenzene		1.090	1.054	1.213	0.974
Hexachloro 1,3-Butadiene		0.361	0.486	0.572	0.467
Naphthalene		1.759	1.748	2.047	1.609
1,2,3-Trichlorobenzene		0.866	0.862	1.019	0.774
Dichlorodifluoromethane	0.556	0.469	0.500	0.582	0.516
Methyl tert butyl ether	1.225	0.989	1.097	1.252	1.069

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Calibration Date: 11/18/09

LAB FILE ID: RF0.2: 11180913 RF0.5: 11180912 RF1: 11180911
RF2: 11180910 RF10: 11180909

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
d4-1,2-Dichloroethane	0.388	0.376	0.376	0.383	0.379
d8-Toluene	1.032	1.041	1.050	1.046	1.050
4-Bromofluorobenzene	0.458	0.462	0.464	0.459	0.458
d4-1,2-Dichlorobenzene	0.896	0.894	0.905	0.898	0.902
Dibromofluoromethane	0.349	0.345	0.352	0.349	0.365

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Calibration Date: 11/18/09

LAB FILE ID: RF20: 11180907 RF40: 11180906 RF60: 11180905

COMPOUND	RF20	RF40	RF60
Chloromethane	0.433	0.433	0.446
Vinyl Chloride	0.564	0.552	0.563
Bromomethane	0.337	0.346	0.359
Chloroethane	0.290	0.272	0.274
Trichlorofluoromethane	0.782	0.757	0.746
Acrolein	0.038	0.039	0.040
112Trichloro122Trifluoroetha	0.499	0.482	0.479
Acetone	0.055	0.055	0.057
1,1-Dichloroethene	0.476	0.469	0.459
Bromoethane	0.294	0.297	0.290
Iodomethane	0.547	0.538	0.512
Methylene Chloride	0.496	0.490	0.486
Acrylonitrile	0.080	0.082	0.083
Carbon Disulfide	1.496	1.447	1.434
Trans-1,2-Dichloroethene	0.561	0.550	0.540
Vinyl Acetate	0.562	0.562	0.549
1,1-Dichloroethane	0.788	0.775	0.759
2-Butanone	0.036	0.035	0.036
2,2-Dichloropropane	0.812	0.796	0.802
Cis-1,2-Dichloroethene	0.556	0.549	0.541
Chloroform	0.859	0.838	0.835
Bromochloromethane	0.240	0.243	0.237
1,1,1-Trichloroethane	0.846	0.832	0.832
1,1-Dichloropropene	0.475	0.478	0.458
Carbon Tetrachloride	0.502	0.505	0.495
1,2-Dichloroethane	0.392	0.394	0.380
Benzene	1.358	1.330	1.240
Trichloroethene	0.434	0.431	0.422
1,2-Dichloropropane	0.291	0.289	0.277
Bromodichloromethane	0.426	0.428	0.412
Dibromomethane	0.170	0.170	0.166
2-Chloroethyl Vinyl Ether	0.133	0.135	0.128
4-Methyl-2-Pentanone	0.065	0.065	0.060
Cis 1,3-dichloropropene	0.532	0.534	0.507
Toluene	0.940	0.921	0.876
Trans 1,3-Dichloropropene	0.459	0.460	0.442
2-Hexanone	0.108	0.111	0.108

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Calibration Date: 11/18/09

LAB FILE ID: RF20: 11180907 RF40: 11180906 RF60: 11180905

COMPOUND	RF20	RF40	RF60
1,1,2-Trichloroethane	0.249	0.249	0.241
1,3-Dichloropropane	0.466	0.466	0.456
Tetrachloroethene	0.512	0.510	0.501
Chlorodibromomethane	0.365	0.371	0.366
1,2-Dibromoethane	0.259	0.258	0.251
Chlorobenzene	1.152	1.130	1.073
Ethyl Benzene	2.058	2.003	1.778
1,1,1,2-Tetrachloroethane	0.418	0.419	0.413
m,p-xylene	0.796	0.755	0.702
o-Xylene	0.788	0.787	0.772
Styrene	1.296	1.253	1.201
Bromoform	0.367	0.374	0.380
1,1,2,2-Tetrachloroethane	0.470	0.480	0.491
1,2,3-Trichloropropane	0.160	0.160	0.163
Trans-1,4-Dichloro 2-Butene	0.138	0.141	0.144
N-Propyl Benzene	3.819	3.516	3.294
Bromobenzene	0.912	0.902	0.915
Isopropyl Benzene	3.463	3.243	3.075
2-Chloro Toluene	2.394	2.300	2.242
4-Chloro Toluene	2.485	2.376	2.323
T-Butyl Benzene	2.611	2.491	2.446
1,3,5-Trimethyl Benzene	2.978	2.801	2.707
1,2,4-Trimethylbenzene	2.999	2.810	2.743
S-Butyl Benzene	3.640	3.355	3.157
4-Isopropyl Toluene	3.165	2.957	2.816
1,3-Dichlorobenzene	1.751	1.712	1.693
1,4-Dichlorobenzene	1.766	1.720	1.719
N-Butyl Benzene	2.648	2.518	2.438
1,2-Dichlorobenzene	1.594	1.546	1.549
1,2-Dibromo 3-Chloropropane	0.092	0.094	0.096
1,2,4-Trichlorobenzene	1.085	1.046	1.028
Hexachloro 1,3-Butadiene	0.511	0.483	0.475
Naphthalene	1.839	1.817	1.631
1,2,3-Trichlorobenzene	0.864	0.845	0.804
Dichlorodifluoromethane	0.573	0.567	0.597
Methyl tert butyl ether	1.190	1.164	1.123

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Calibration Date: 11/18/09

LAB FILE ID: RF20: 11180907 RF40: 11180906 RF60: 11180905

COMPOUND	RF20	RF40	RF60
d4-1,2-Dichloroethane	0.381	0.377	0.377
d8-Toluene	1.044	1.062	1.025
4-Bromofluorobenzene	0.462	0.471	0.477
d4-1,2-Dichlorobenzene	0.881	0.885	0.910
Dibromofluoromethane	0.363	0.360	0.346

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Calibration Date: 11/18/09

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
Chloromethane	AVRG	0.435	12.8
Vinyl Chloride	AVRG	0.551	8.2
Bromomethane	2ORDR		0.9993
Chloroethane	AVRG	0.308	11.2
Trichlorofluoromethane	AVRG	0.753	6.6
Acrolein	AVRG	0.037	8.6
112Trichloro122Trifluoroetha	AVRG	0.488	8.4
Acetone	AVRG	0.063	19.5
1,1-Dichloroethene	AVRG	0.467	7.7
Bromoethane	AVRG	0.283	8.6
Iodomethane	AVRG	0.512	7.4
Methylene Chloride	AVRG	0.492	6.0
Acrylonitrile	AVRG	0.084	10.2
Carbon Disulfide	AVRG	1.514	9.6
Trans-1,2-Dichloroethene	AVRG	0.550	7.9
Vinyl Acetate	AVRG	0.538	6.9
1,1-Dichloroethane	AVRG	0.762	7.4
2-Butanone	AVRG	0.036	5.6
2,2-Dichloropropane	AVRG	0.777	8.2
Cis-1,2-Dichloroethene	AVRG	0.530	7.3
Chloroform	AVRG	0.810	7.4
Bromochloromethane	AVRG	0.233	6.9
1,1,1-Trichloroethane	AVRG	0.802	5.9
1,1-Dichloropropene	AVRG	0.459	6.6
Carbon Tetrachloride	AVRG	0.450	11.1
1,2-Dichloroethane	AVRG	0.385	6.7
Benzene	AVRG	1.314	6.1
Trichloroethene	AVRG	0.413	5.7
1,2-Dichloropropane	AVRG	0.288	8.7
Bromodichloromethane	AVRG	0.394	8.2
Dibromomethane	AVRG	0.171	13.3
2-Chloroethyl Vinyl Ether	AVRG	0.123	9.3
4-Methyl-2-Pentanone	AVRG	0.062	7.2
Cis 1,3-dichloropropene	AVRG	0.515	5.4
Toluene	AVRG	0.904	5.3
Trans 1,3-Dichloropropene	AVRG	0.440	4.7
2-Hexanone	AVRG	0.105	6.1

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Calibration Date: 11/18/09

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
1,1,2-Trichloroethane	AVRG	0.242	5.3
1,3-Dichloropropane	AVRG	0.453	5.7
Tetrachloroethene	AVRG	0.497	6.8
Chlorodibromomethane	AVRG	0.334	10.8
1,2-Dibromoethane	AVRG	0.248	5.2
Chlorobenzene	AVRG	1.118	5.6
Ethyl Benzene	AVRG	1.986	8.8
1,1,1,2-Tetrachloroethane	AVRG	0.397	6.9
m,p-xylene	AVRG	0.760	8.0
o-Xylene	AVRG	0.747	7.0
Styrene	AVRG	1.192	8.8
Bromoform	AVRG	0.343	9.7
1,1,2,2-Tetrachloroethane	AVRG	0.443	8.5
1,2,3-Trichloropropane	AVRG	0.153	6.1
Trans-1,4-Dichloro 2-Butene	AVRG	0.138	6.4
N-Propyl Benzene	AVRG	3.644	9.0
Bromobenzene	AVRG	0.901	5.7
Isopropyl Benzene	AVRG	3.260	8.0
2-Chloro Toluene	AVRG	2.257	6.6
4-Chloro Toluene	AVRG	2.360	7.3
T-Butyl Benzene	AVRG	2.456	7.2
1,3,5-Trimethyl Benzene	AVRG	2.789	7.4
1,2,4-Trimethylbenzene	AVRG	2.792	8.2
S-Butyl Benzene	AVRG	3.401	8.1
4-Isopropyl Toluene	AVRG	2.937	8.9
1,3-Dichlorobenzene	AVRG	1.720	6.2
1,4-Dichlorobenzene	AVRG	1.735	6.7
N-Butyl Benzene	AVRG	2.491	8.4
1,2-Dichlorobenzene	AVRG	1.579	8.0
1,2-Dibromo 3-Chloropropane	AVRG	0.096	10.2
1,2,4-Trichlorobenzene	AVRG	1.070	6.9
Hexachloro 1,3-Butadiene	AVRG	0.479	13.1
Naphthalene	AVRG	1.778	8.2
1,2,3-Trichlorobenzene	AVRG	0.862	9.0
Dichlorodifluoromethane	AVRG	0.545	8.2
Methyl tert butyl ether	AVRG	1.139	7.6

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Calibration Date: 11/18/09

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
d4-1,2-Dichloroethane	AVRG	0.380	1.1
d8-Toluene	AVRG	1.044	1.1
4-Bromofluorobenzene	AVRG	0.464	1.5
d4-1,2-Dichlorobenzene	AVRG	0.896	1.1
Dibromofluoromethane	AVRG	0.354	2.2

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Cont. Calib. Date: 12/22/09

Init. Calib. Date: 11/18/09 Cont. Calib. Time: 1012

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
Chloromethane	0.435	0.488	0.100	AVRG	12.2	
Vinyl Chloride	0.551	0.582	0.010	AVRG	5.6	
Bromomethane	10.000	8.100	0.010	2ORDR	-19.0	
Chloroethane	0.309	0.341	0.010	AVRG	10.4	
Trichlorofluoromethane	0.753	0.758	0.010	AVRG	0.7	
Acrolein	0.036	0.042	0.010	AVRG	16.7	
112Trichloro122Trifluoroetha	0.488	0.518	0.010	AVRG	6.1	
Acetone	0.063	0.046	0.010	AVRG	-27.0	<-
1,1-Dichloroethene	0.468	0.514	0.010	AVRG	9.8	
Bromoethane	0.283	0.339	0.010	AVRG	19.8	
Iodomethane	0.512	0.462	0.010	AVRG	-9.8	
Methylene Chloride	0.492	0.521	0.010	AVRG	5.9	
Acrylonitrile	0.084	0.076	0.010	AVRG	-9.5	
Carbon Disulfide	1.514	1.668	0.010	AVRG	10.2	
Trans-1,2-Dichloroethene	0.550	0.580	0.010	AVRG	5.4	
Vinyl Acetate	0.538	0.523	0.010	AVRG	-2.8	
1,1-Dichloroethane	0.762	0.841	0.100	AVRG	10.4	
2-Butanone	0.036	0.031	0.010	AVRG	-13.9	
2,2-Dichloropropane	0.776	0.837	0.010	AVRG	7.9	
Cis-1,2-Dichloroethene	0.530	0.577	0.010	AVRG	8.9	
Chloroform	0.811	0.875	0.010	AVRG	7.9	
Bromochloromethane	0.233	0.236	0.010	AVRG	1.3	
1,1,1-Trichloroethane	0.802	0.837	0.010	AVRG	4.4	
1,1-Dichloropropene	0.459	0.468	0.010	AVRG	2.0	
Carbon Tetrachloride	0.450	0.426	0.010	AVRG	-5.3	
1,2-Dichloroethane	0.385	0.337	0.010	AVRG	-12.5	
Benzene	1.314	1.390	0.010	AVRG	5.8	
Trichloroethene	0.413	0.421	0.010	AVRG	1.9	
1,2-Dichloropropane	0.288	0.295	0.010	AVRG	2.4	
Bromodichloromethane	0.394	0.393	0.010	AVRG	-0.2	
Dibromomethane	0.171	0.146	0.010	AVRG	-14.6	
2-Chloroethyl Vinyl Ether	0.123	0.108	0.010	AVRG	-12.2	
4-Methyl-2-Pentanone	0.062	0.053	0.010	AVRG	-14.5	
Cis 1,3-dichloropropene	0.515	0.507	0.010	AVRG	-1.6	
Toluene	0.904	0.948	0.010	AVRG	4.9	
Trans 1,3-Dichloropropene	0.440	0.413	0.010	AVRG	-6.1	
2-Hexanone	0.105	0.079	0.010	AVRG	-24.8	<-

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII VOA

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Cont. Calib. Date: 12/22/09

Init. Calib. Date: 11/18/09 Cont. Calib. Time: 1012

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
1,1,2-Trichloroethane	0.242	0.224	0.010	AVRG	-7.4	
1,3-Dichloropropane	0.453	0.392	0.010	AVRG	-13.5	
Tetrachloroethene	0.497	0.456	0.010	AVRG	-8.2	
Chlorodibromomethane	0.334	0.293	0.010	AVRG	-12.3	
1,2-Dibromoethane	0.248	0.217	0.010	AVRG	-12.5	
Chlorobenzene	1.118	1.050	0.300	AVRG	-6.1	
Ethyl Benzene	1.986	1.988	0.010	AVRG	0.1	
1,1,1,2-Tetrachloroethane	0.398	0.356	0.010	AVRG	-10.6	
m,p-xylene	0.760	0.750	0.010	AVRG	-1.3	
o-Xylene	0.747	0.725	0.010	AVRG	-2.9	
Styrene	1.192	1.150	0.010	AVRG	-3.5	
Bromoform	0.343	0.255	0.100	AVRG	-25.6	<-
1,1,2,2-Tetrachloroethane	0.443	0.350	0.300	AVRG	-21.0	<-
1,2,3-Trichloropropane	0.153	0.107	0.010	AVRG	-30.1	<-
Trans-1,4-Dichloro 2-Butene	0.138	0.100	0.010	AVRG	-27.5	<-
N-Propyl Benzene	3.644	3.189	0.010	AVRG	-12.5	
Bromobenzene	0.901	0.726	0.010	AVRG	-19.4	
Isopropyl Benzene	3.260	2.865	0.010	AVRG	-12.1	
2-Chloro Toluene	2.257	1.980	0.010	AVRG	-12.3	
4-Chloro Toluene	2.360	2.032	0.010	AVRG	-13.9	
T-Butyl Benzene	2.456	2.127	0.010	AVRG	-13.4	
1,3,5-Trimethyl Benzene	2.788	2.420	0.010	AVRG	-13.2	
1,2,4-Trimethylbenzene	2.792	2.448	0.010	AVRG	-12.3	
S-Butyl Benzene	3.400	2.938	0.010	AVRG	-13.6	
4-Isopropyl Toluene	2.937	2.571	0.010	AVRG	-12.5	
1,3-Dichlorobenzene	1.720	1.394	0.010	AVRG	-19.0	
1,4-Dichlorobenzene	1.735	1.395	0.010	AVRG	-19.6	
N-Butyl Benzene	2.490	2.131	0.010	AVRG	-14.4	
1,2-Dichlorobenzene	1.579	1.214	0.010	AVRG	-23.1	<-
1,2-Dibromo 3-Chloropropane	0.096	0.064	0.010	AVRG	-33.3	<-
1,2,4-Trichlorobenzene	1.070	0.820	0.010	AVRG	-23.4	<-
Hexachloro 1,3-Butadiene	0.479	0.369	0.010	AVRG	-23.0	<-
Naphthalene	1.778	1.350	0.010	AVRG	-24.1	<-
1,2,3-Trichlorobenzene	0.862	0.645	0.010	AVRG	-25.2	<-
Dichlorodifluoromethane	0.545	0.471	0.010	AVRG	-13.6	
Methyl tert butyl ether	1.139	1.056	0.010	AVRG	-7.3	

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII VOA

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT5 Cont. Calib. Date: 12/22/09

Init. Calib. Date: 11/18/09 Cont. Calib. Time: 1012

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
d4-1,2-Dichloroethane	0.380	0.332	0.010	AVRG	-12.6
d8-Toluene	1.044	1.047	0.010	AVRG	0.3
4-Bromofluorobenzene	0.464	0.487	0.010	AVRG	5.0
d4-1,2-Dichlorobenzene	0.896	0.884	0.010	AVRG	-1.3
Dibromofluoromethane	0.354	0.376	0.010	AVRG	6.2

<- Exceeds QC limit of 20% D
* RF less than minimum RF

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES, INC | Client: FLOYD/SNIDER

ARI Job No: QB37 | Project: LORA LAKE APARTMENTS

Ical Midpoint ID: 11180909 | Ical Date: 11/18/09

Instrument ID: NT5 | Project Run Date: 12/22/09

		IS1(PFB)		IS2(DFB)		IS3(CLB)	
		AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	818327	4.83	1179007	5.28	1047488	7.74
	UPPER LIMIT	1636654	5.33	2358014	5.78	2094976	8.24
	LOWER LIMIT	409164	4.33	589504	4.78	523744	7.24
	Sample ID						
01	LCS1222	1020746	4.83	1549505	5.28	1498788	7.74
02	LCSD1222	1016685	4.83	1543771	5.28	1488843	7.74
03	MB1222A	1044559	4.83	1566240	5.28	1442739	7.74
04	TB121409	1026968	4.83	1552837	5.28	1420341	7.74
05	CB31A121409G	1033167	4.83	1526025	5.28	1395253	7.74
06	CB4857121409	1030022	4.83	1520616	5.28	1405581	7.74
07	CB1121409GRA	1034913	4.83	1511086	5.28	1402882	7.74
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES, INC | Client: FLOYD/SNIDER

ARI Job No: QB37 | Project: LORA LAKE APARTMENTS

Ical Midpoint ID: 11180909 | Ical Date: 11/18/09

Instrument ID: NT5 | Project Run Date: 12/22/09

		IS4(DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	586906	9.81				
	UPPER LIMIT	1173812	10.31				
	LOWER LIMIT	293453	9.31				
	Sample ID						
01	LCS1222	925596	9.81				
02	LCSD1222	917156	9.80				
03	MB1222A	812570	9.80				
04	TB121409	792390	9.80				
05	CB31A121409G	784473	9.80				
06	CB4857121409	781548	9.80				
07	CB1121409GRA	779022	9.81				
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

Volatile Analysis
Sample Data

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: CB31A121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37A
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized: VT
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 14:13

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	90.8%
d8-Toluene	97.3%

PC 12/23/09

Analytical Resources, Inc.

8260C

Data file : /chem1/nt5.i/22DEC09.b/12220911.d
Lab Smp Id: QB37A Client Smp ID: CB31A121409GRAB
Inj Date : 22-DEC-2009 14:13
Operator : PC Inst ID: nt5.i
Smp Info : QB37A,10,10,0,
Misc Info : 09-30854
Comment :
Method : /chem1/nt5.i/22DEC09.b/VO111809L.m
Meth Date : 23-Dec-2009 14:31 paul Quant Type: ISTD
Cal Date : 18-NOV-2009 16:46 Cal File: 11180913.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: voa.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
1 Dichlorodifluoromethane	85	Compound Not Detected.					
2 Chloromethane	50	Compound Not Detected.					
3 Vinyl Chloride	62	Compound Not Detected.					
4 Bromomethane	94	Compound Not Detected.					
5 Chloroethane	64	Compound Not Detected.					
6 Trichlorofluoromethane	101	Compound Not Detected.					
12 Acrolein	56	2.369	2.375	(0.491)	8168	2.16016	2.160(M)
9 112Trichloro122Trifluoroethane	101	Compound Not Detected.					
14 Acetone	43	2.658	2.652	(0.550)	69993	10.7505	10.750(M)
7 1,1-Dichloroethene	96	Compound Not Detected.					
11 Bromoethane	108	Compound Not Detected.					
10 Iodomethane	142	Compound Not Detected.					
13 Methylene Chloride	84	Compound Not Detected.					
18 Acrylonitrile	53	Compound Not Detected.					
16 Methyl tert butyl ether	73	Compound Not Detected.					
8 Carbon Disulfide	76	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	15 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	19 Vinyl Acetate	43	Compound Not Detected.					
	17 1,1-Dichloroethane	63	Compound Not Detected.					
	29 2-Butanone	72	4.502	4.490	(0.932)	6217	1.68188	1.682(QM)
	21 2,2-Dichloropropane	77	Compound Not Detected.					
	20 Cis-1,2-Dichloroethene	96	Compound Not Detected.					
*	32 Pentafluorobenzene	168	4.830	4.830	(1.000)	1033167	10.0000	
	23 Chloroform	83	Compound Not Detected.					
	22 Bromochloromethane	128	Compound Not Detected.					
$	25 Dibromofluoromethane	111	4.360	4.355	(0.903)	376979	10.3143	10.314
	26 1,1,1-Trichloroethane	97	Compound Not Detected.					
	28 1,1-Dichloropropene	75	Compound Not Detected.					
	24 Carbon Tetrachloride	117	Compound Not Detected.					
$	31 d4-1,2-Dichloroethane	65	4.819	4.819	(0.998)	356237	9.08203	9.082
	33 1,2-Dichloroethane	62	Compound Not Detected.					
	30 Benzene	78	4.700	4.694	(0.891)	171980	0.85728	0.8573
*	35 1,4-Difluorobenzene	114	5.277	5.277	(1.000)	1526025	10.0000	
	34 Trichloroethene	130	Compound Not Detected.					
	38 1,2-Dichloropropane	63	Compound Not Detected.					
	39 Bromodichloromethane	83	Compound Not Detected.					
	37 Dibromomethane	93	Compound Not Detected.					
	40 2-Chloroethyl Vinyl Ether	63	Compound Not Detected.					
	45 4-Methyl-2-Pentanone	58	6.827	6.827	(1.294)	68832	7.30707	7.307
	41 Cis 1,3-dichloropropene	75	Compound Not Detected.					
$	42 d8-Toluene	98	6.437	6.436	(1.220)	1549661	9.72888	9.729
	43 Toluene	92	6.482	6.482	(1.228)	52230	0.37853	0.3785
	46 Trans 1,3-Dichloropropene	75	Compound Not Detected.					
	51 2-Hexanone	43	Compound Not Detected.					
	47 1,1,2-Trichloroethane	97	Compound Not Detected.					
	49 1,3-Dichloropropane	76	Compound Not Detected.					
	44 Tetrachloroethene	166	Compound Not Detected.					
	48 Chlorodibromomethane	129	Compound Not Detected.					
	50 1,2-Dibromoethane	107	Compound Not Detected.					
*	52 d5-Chlorobenzene	117	7.743	7.743	(1.000)	1395253	10.0000	
	53 Chlorobenzene	112	7.755	7.755	(1.001)	28044	0.17974	0.1797
	54 Ethyl Benzene	91	Compound Not Detected.					
	55 1,1,1,2-Tetrachloroethane	131	Compound Not Detected.					
	56 m,p-xylene	106	Compound Not Detected.					
	57 o-Xylene	106	Compound Not Detected.					
	58 Styrene	104	Compound Not Detected.					
	60 Isopropyl Benzene	105	Compound Not Detected.					
	59 Bromoform	173	Compound Not Detected.					
	64 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					
$	61 4-Bromofluorobenzene	95	8.807	8.807	(1.137)	635493	9.81389	9.814
	66 1,2,3-Trichloropropane	110	Compound Not Detected.					
	68 Trans-1,4-Dichloro 2-Butene	53	Compound Not Detected.					
	63 N-Propyl Benzene	91	Compound Not Detected.					

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
62 Bromobenzene	156	Compound Not Detected.					
67 1,3,5-Trimethyl Benzene	105	Compound Not Detected.					
65 2-Chloro Toluene	91	Compound Not Detected.					
69 4-Chloro Toluene	91	Compound Not Detected.					
70 T-Butyl Benzene	119	Compound Not Detected.					
71 1,2,4-Trimethylbenzene	105	Compound Not Detected.					
72 S-Butyl Benzene	105	Compound Not Detected.					
73 4-Isopropyl Toluene	119	9.706	9.706	(0.990)	59745	0.25929	0.2593
74 1,3-Dichlorobenzene	146	Compound Not Detected.					
* 75 d4-1,4-Dichlorobenzene	152	9.802	9.808	(1.000)	784473	10.0000	
76 1,4-Dichlorobenzene	146	Compound Not Detected.					
77 N-Butyl Benzene	91	Compound Not Detected.					
$ 78 d4-1,2-Dichlorobenzene	152	10.187	10.187	(1.039)	710067	10.0973	10.097
79 1,2-Dichlorobenzene	146	Compound Not Detected.					
81 1,2-Dibromo 3-Chloropropane	75	Compound Not Detected.					
83 1,2,4-Trichlorobenzene	180	Compound Not Detected.					
82 Hexachloro 1,3-Butadiene	225	Compound Not Detected.					
84 Naphthalene	128	11.901	11.895	(1.214)	15085	0.10812	0.1081
85 1,2,3-Trichlorobenzene	180	Compound Not Detected.					

QC Flag Legend

Q - Qualifier signal failed the ratio test.
M - Compound response manually integrated.

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt5.i
Lab File ID: 12220911.d
Lab Smp Id: QB37A
Analysis Type: VOA
Quant Type: ISTD
Operator: PC
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-30854

Calibration Date: 22-DEC-2009
Calibration Time: 10:12
Client Smp ID: CB31A121409GRAB
Level: LOW
Sample Type: Water

Test Mode:
Use Initial Calibration Level 5.
If Continuing Cal. use Initial Cal. Level 5

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	818327	409164	1636654	1033167	26.25
35 1,4-Difluorobenze	1179007	589504	2358014	1526025	29.43
52 d5-Chlorobenzene	1047488	523744	2094976	1395253	33.20
75 d4-1,4-Dichlorobe	586906	293453	1173812	784473	33.66

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	4.83	4.33	5.33	4.83	0.00
35 1,4-Difluorobenze	5.28	4.78	5.78	5.28	0.00
52 d5-Chlorobenzene	7.74	7.24	8.24	7.74	0.00
75 d4-1,4-Dichlorobe	9.81	9.31	10.31	9.80	-0.06

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name: Floyd/Snider
Sample Matrix: LIQUID
Lab Smp Id: QB37A
Level: LOW
Data Type: MS DATA
SpikeList File: all.spk
Sublist File: voa.sub
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-30854

Client SDG: QB37
Fraction: VOA
Client Smp ID: CB31A121409GRAB
Operator: PC
SampleType: SAMPLE
Quant Type: ISTD

SURROGATE COMPOUND	AMOUNT ADDED ug/L	AMOUNT RECOVERED ug/L	% RECOVERED	LIMITS
$ 25 Dibromofluorometha	10.000	10.314	103.14	64-133
$ 31 d4-1,2-Dichloroeth	10.000	9.082	90.82	70-132
$ 42 d8-Toluene	10.000	9.729	97.29	80-120
$ 61 4-Bromofluorobenze	10.000	9.814	98.14	80-120
$ 78 d4-1,2-Dichloroben	10.000	10.097	100.97	80-120

Data File: /chem1/nt5.i/22DEC09.b/12220911.d

Date : 22-DEC-2009 14:13

Client ID: CB31A121409GRAB

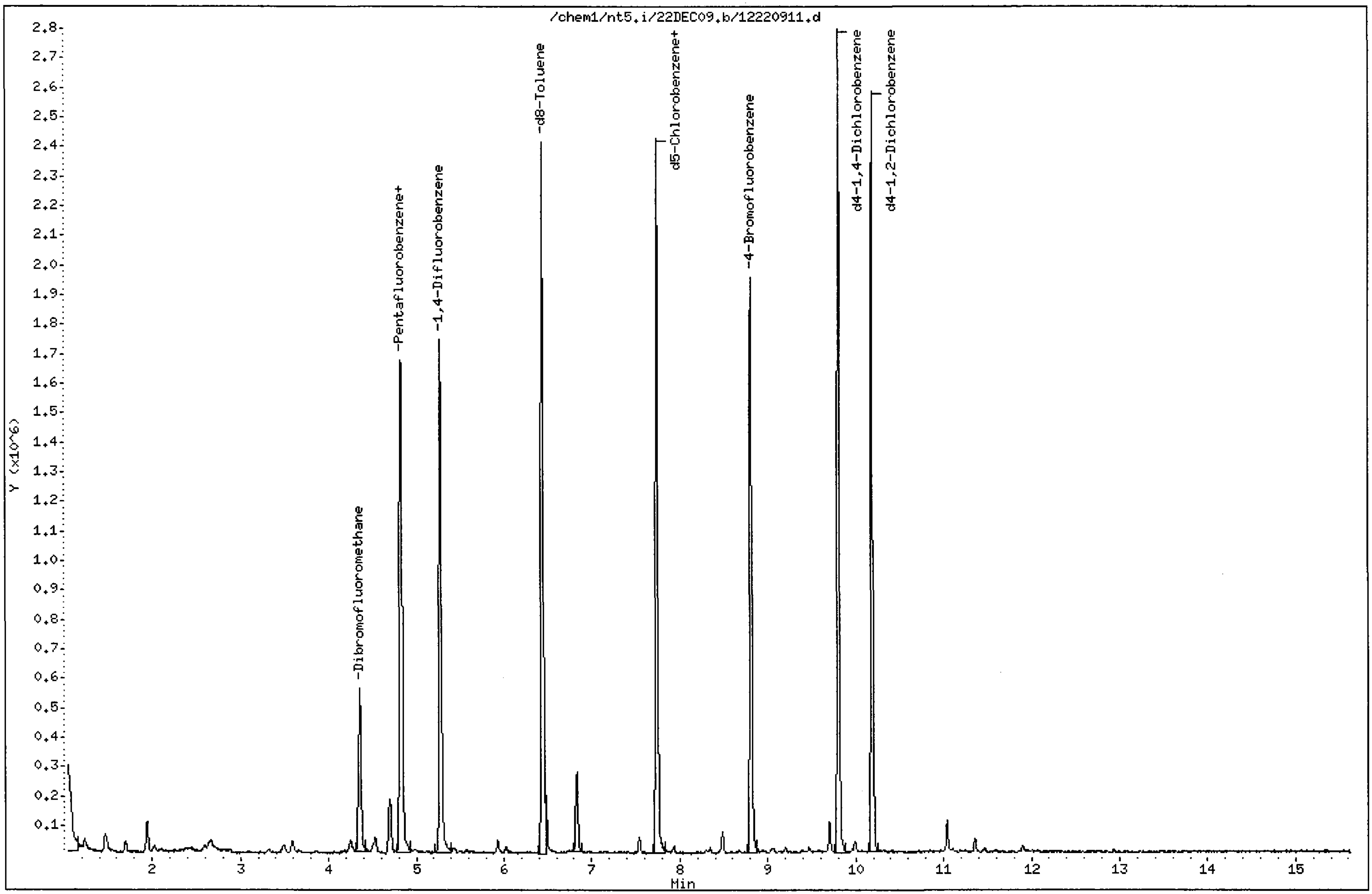
Sample Info: QB37A,10,10,0,

Column phase: RTXVMS

Instrument: nt5.i

Operator: PC

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: CB4857121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37B
LIMS ID: 09-30855
Matrix: Water
Data Release Authorized: VTS
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 14:39

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	90.9%
d8-Toluene	97.9%

12/23/09

Analytical Resources, Inc.

8260C

Data file : /chem1/nt5.i/22DEC09.b/12220912.d
Lab Smp Id: QB37B Client Smp ID: CB4857121409GRAB
Inj Date : 22-DEC-2009 14:39
Operator : PC Inst ID: nt5.i
Smp Info : QB37B,10,10,0,
Misc Info : 09-30855
Comment :
Method : /chem1/nt5.i/22DEC09.b/VO111809L.m
Meth Date : 23-Dec-2009 14:31 paul Quant Type: ISTD
Cal Date : 18-NOV-2009 16:46 Cal File: 11180913.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: voa.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
1 Dichlorodifluoromethane	85	Compound Not Detected.					
2 Chloromethane	50	Compound Not Detected.					
3 Vinyl Chloride	62	Compound Not Detected.					
4 Bromomethane	94	Compound Not Detected.					
5 Chloroethane	64	Compound Not Detected.					
6 Trichlorofluoromethane	101	Compound Not Detected.					
12 Acrolein	56	Compound Not Detected.					
9 112Trichloro122Trifluoroethane	101	Compound Not Detected.					
14 Acetone	43	2.658	2.652	(0.550)	38932	5.99802	5.998(M)
7 1,1-Dichloroethene	96	Compound Not Detected.					
11 Bromoethane	108	Compound Not Detected.					
10 Iodomethane	142	Compound Not Detected.					
13 Methylene Chloride	84	Compound Not Detected.					
18 Acrylonitrile	53	Compound Not Detected.					
16 Methyl tert butyl ether	73	Compound Not Detected.					
8 Carbon Disulfide	76	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	15 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	19 Vinyl Acetate	43	Compound Not Detected.					
	17 1,1-Dichloroethane	63	Compound Not Detected.					
	29 2-Butanone	72	4.502	4.490	(0.932)	3074	0.83416	0.8342(QM)
	21 2,2-Dichloropropane	77	Compound Not Detected.					
	20 Cis-1,2-Dichloroethene	96	Compound Not Detected.					
*	32 Pentafluorobenzene	168	4.830	4.830	(1.000)	1030022	10.0000	
	23 Chloroform	83	Compound Not Detected.					
	22 Bromochloromethane	128	Compound Not Detected.					
$	25 Dibromofluoromethane	111	4.360	4.355	(0.903)	366890	10.0689	10.069
	26 1,1,1-Trichloroethane	97	Compound Not Detected.					
	28 1,1-Dichloropropene	75	Compound Not Detected.					
	24 Carbon Tetrachloride	117	Compound Not Detected.					
$	31 d4-1,2-Dichloroethane	65	4.824	4.819	(0.999)	355652	9.09480	9.095
	33 1,2-Dichloroethane	62	Compound Not Detected.					
	30 Benzene	78	4.700	4.694	(0.891)	41489	0.20755	0.2075
*	35 1,4-Difluorobenzene	114	5.277	5.277	(1.000)	1520616	10.0000	
	34 Trichloroethene	130	Compound Not Detected.					
	38 1,2-Dichloropropane	63	Compound Not Detected.					
	39 Bromodichloromethane	83	Compound Not Detected.					
	37 Dibromomethane	93	Compound Not Detected.					
	40 2-Chloroethyl Vinyl Ether	63	Compound Not Detected.					
	45 4-Methyl-2-Pentanone	58	6.832	6.827	(1.295)	20842	2.22042	2.220
	41 Cis 1,3-dichloropropene	75	Compound Not Detected.					
$	42 d8-Toluene	98	6.436	6.436	(1.220)	1554095	9.79142	9.791
	43 Toluene	92	6.476	6.482	(1.227)	32051	0.23311	0.2331
	46 Trans 1,3-Dichloropropene	75	Compound Not Detected.					
	51 2-Hexanone	43	Compound Not Detected.					
	47 1,1,2-Trichloroethane	97	Compound Not Detected.					
	49 1,3-Dichloropropane	76	Compound Not Detected.					
	44 Tetrachloroethene	166	Compound Not Detected.					
	48 Chlorodibromomethane	129	Compound Not Detected.					
	50 1,2-Dibromoethane	107	Compound Not Detected.					
*	52 d5-Chlorobenzene	117	7.743	7.743	(1.000)	1405581	10.0000	
	53 Chlorobenzene	112	Compound Not Detected.					
	54 Ethyl Benzene	91	Compound Not Detected.					
	55 1,1,1,2-Tetrachloroethane	131	Compound Not Detected.					
	56 m,p-xylene	106	Compound Not Detected.					
	57 o-Xylene	106	Compound Not Detected.					
	58 Styrene	104	Compound Not Detected.					
	60 Isopropyl Benzene	105	Compound Not Detected.					
	59 Bromoform	173	Compound Not Detected.					
	64 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					
$	61 4-Bromofluorobenzene	95	8.807	8.807	(1.137)	621691	9.53020	9.530
	66 1,2,3-Trichloropropane	110	Compound Not Detected.					
	68 Trans-1,4-Dichloro 2-Butene	53	Compound Not Detected.					
	63 N-Propyl Benzene	91	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	62 Bromobenzene	156	Compound Not Detected.					
	67 1,3,5-Trimethyl Benzene	105	Compound Not Detected.					
	65 2-Chloro Toluene	91	Compound Not Detected.					
	69 4-Chloro Toluene	91	Compound Not Detected.					
	70 T-Butyl Benzene	119	Compound Not Detected.					
	71 1,2,4-Trimethylbenzene	105	Compound Not Detected.					
	72 S-Butyl Benzene	105	Compound Not Detected.					
	73 4-Isopropyl Toluene	119	9.706	9.706	(0.990)	35681	0.15543	0.1554
	74 1,3-Dichlorobenzene	146	Compound Not Detected.					
*	75 d4-1,4-Dichlorobenzene	152	9.802	9.808	(1.000)	781548	10.0000	
	76 1,4-Dichlorobenzene	146	Compound Not Detected.					
	77 N-Butyl Benzene	91	Compound Not Detected.					
$	78 d4-1,2-Dichlorobenzene	152	10.187	10.187	(1.039)	700255	9.99506	9.995
	79 1,2-Dichlorobenzene	146	Compound Not Detected.					
	81 1,2-Dibromo 3-Chloropropane	75	Compound Not Detected.					
	83 1,2,4-Trichlorobenzene	180	Compound Not Detected.					
	82 Hexachloro 1,3-Butadiene	225	Compound Not Detected.					
	84 Naphthalene	128	Compound Not Detected.					
	85 1,2,3-Trichlorobenzene	180	Compound Not Detected.					

QC Flag Legend

Q - Qualifier signal failed the ratio test.
M - Compound response manually integrated.

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt5.i
Lab File ID: 12220912.d
Lab Smp Id: QB37B
Analysis Type: VOA
Quant Type: ISTD
Operator: PC
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-30855

Calibration Date: 22-DEC-2009
Calibration Time: 10:12
Client Smp ID: CB4857121409GRAB
Level: LOW
Sample Type: Water

Test Mode:
Use Initial Calibration Level 5.
If Continuing Cal. use Initial Cal. Level 5

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	818327	409164	1636654	1030022	25.87
35 1,4-Difluorobenze	1179007	589504	2358014	1520616	28.97
52 d5-Chlorobenzene	1047488	523744	2094976	1405581	34.19
75 d4-1,4-Dichlorobe	586906	293453	1173812	781548	33.16

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	4.83	4.33	5.33	4.83	0.00
35 1,4-Difluorobenze	5.28	4.78	5.78	5.28	0.00
52 d5-Chlorobenzene	7.74	7.24	8.24	7.74	0.00
75 d4-1,4-Dichlorobe	9.81	9.31	10.31	9.80	-0.06

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name: Floyd/Snider
Sample Matrix: LIQUID
Lab Smp Id: QB37B
Level: LOW
Data Type: MS DATA
SpikeList File: all.spk
Sublist File: voa.sub
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-30855

Client SDG: QB37
Fraction: VOA
Client Smp ID: CB4857121409GRAB
Operator: PC
SampleType: SAMPLE
Quant Type: ISTD

SURROGATE COMPOUND	AMOUNT ADDED ug/L	AMOUNT RECOVERED ug/L	% RECOVERED	LIMITS
$ 25 Dibromofluorometha	10.000	10.069	100.69	64-133
$ 31 d4-1,2-Dichloroeth	10.000	9.095	90.95	70-132
$ 42 d8-Toluene	10.000	9.791	97.91	80-120
$ 61 4-Bromofluorobenze	10.000	9.530	95.30	80-120
$ 78 d4-1,2-Dichloroben	10.000	9.995	99.95	80-120

Data File: /chem1/nt5.i/22DEC09.b/12220912.d

Date : 22-DEC-2009 14:39

Client ID: CB4857121409GRAB

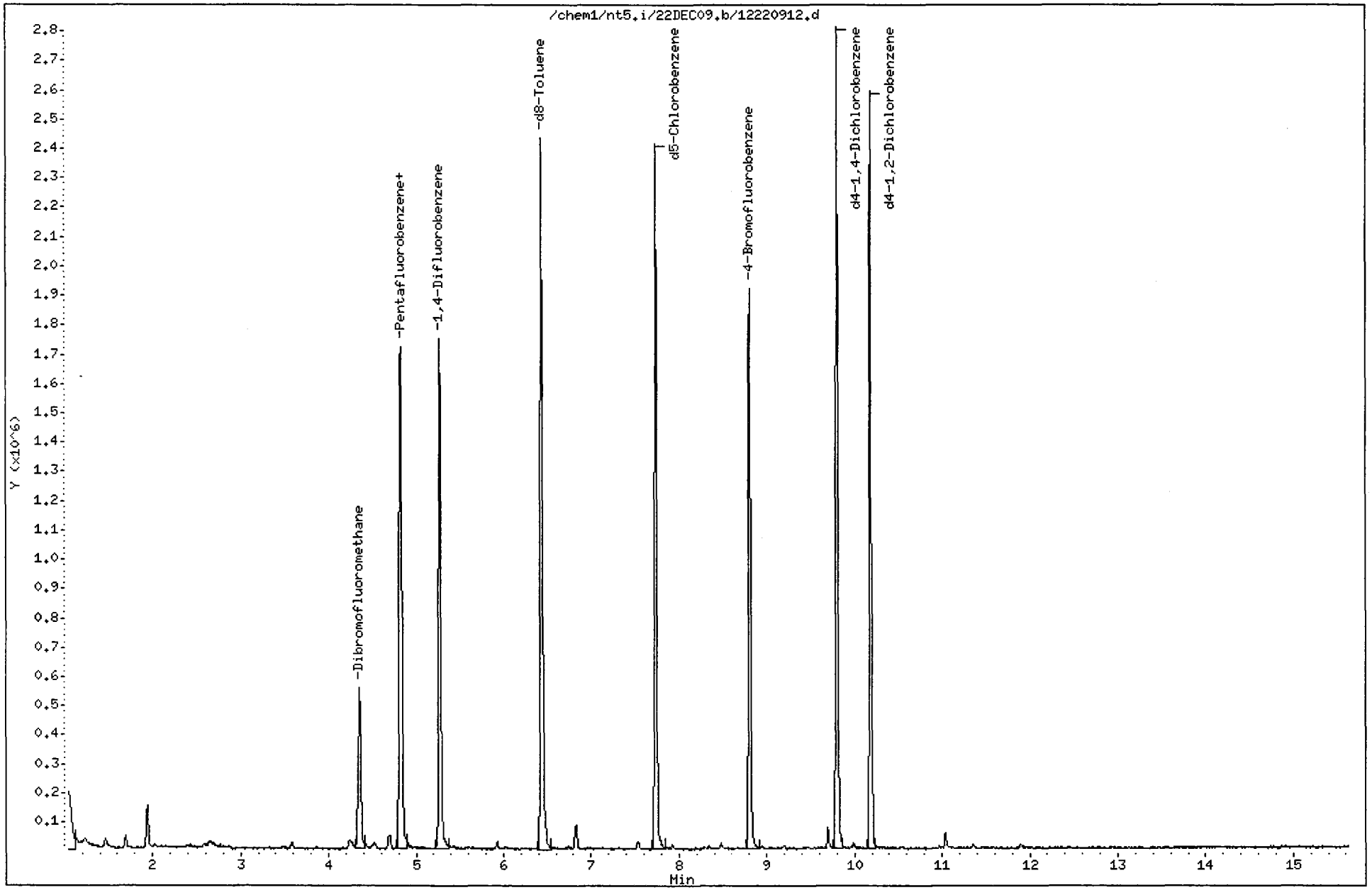
Instrument: nt5.i

Sample Info: QB37B,10,10,0,

Operator: PC

Column phase: RTXVMS

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: CB1121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37C
LIMS ID: 09-30856
Matrix: Water
Data Release Authorized: VTS
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 15:04

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	90.6%
d8-Toluene	99.4%

PC 12/28/09

Analytical Resources, Inc.

8260C

Data file : /chem1/nt5.i/22DEC09.b/12220913.d
Lab Smp Id: QB37C Client Smp ID: CB1121409GRAB
Inj Date : 22-DEC-2009 15:04
Operator : PC Inst ID: nt5.i
Smp Info : QB37C,10,10,0,
Misc Info : 09-30856
Comment :
Method : /chem1/nt5.i/22DEC09.b/VO111809L.m
Meth Date : 23-Dec-2009 14:31 paul Quant Type: ISTD
Cal Date : 18-NOV-2009 16:46 Cal File: 11180913.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: voa.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
1 Dichlorodifluoromethane	85	Compound Not Detected.					
2 Chloromethane	50	Compound Not Detected.					
3 Vinyl Chloride	62	Compound Not Detected.					
4 Bromomethane	94	Compound Not Detected.					
5 Chloroethane	64	Compound Not Detected.					
6 Trichlorofluoromethane	101	Compound Not Detected.					
12 Acrolein	56	Compound Not Detected.					
9 112Trichloro122Trifluoroethane	101	Compound Not Detected.					
14 Acetone	43	2.652	2.652	(0.549)	18784	2.88020	2.880(M)
7 1,1-Dichloroethene	96	Compound Not Detected.					
11 Bromoethane	108	Compound Not Detected.					
10 Iodomethane	142	Compound Not Detected.					
13 Methylene Chloride	84	Compound Not Detected.					
18 Acrylonitrile	53	Compound Not Detected.					
16 Methyl tert butyl ether	73	Compound Not Detected.					
8 Carbon Disulfide	76	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	15 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	19 Vinyl Acetate	43	Compound Not Detected.					
	17 1,1-Dichloroethane	63	Compound Not Detected.					
	29 2-Butanone	72	Compound Not Detected.					
	21 2,2-Dichloropropane	77	Compound Not Detected.					
	20 Cis-1,2-Dichloroethene	96	Compound Not Detected.					
*	32 Pentafluorobenzene	168	4.830	4.830	(1.000)	1034913	10.0000	
	23 Chloroform	83	Compound Not Detected.					
	22 Bromochloromethane	128	Compound Not Detected.					
$	25 Dibromofluoromethane	111	4.360	4.355	(0.903)	365914	9.99462	9.995
	26 1,1,1-Trichloroethane	97	Compound Not Detected.					
	28 1,1-Dichloropropene	75	Compound Not Detected.					
	24 Carbon Tetrachloride	117	Compound Not Detected.					
$	31 d4-1,2-Dichloroethane	65	4.819	4.819	(0.998)	355898	9.05808	9.058
	33 1,2-Dichloroethane	62	Compound Not Detected.					
	30 Benzene	78	Compound Not Detected.					
*	35 1,4-Difluorobenzene	114	5.277	5.277	(1.000)	1511086	10.0000	
	34 Trichloroethene	130	Compound Not Detected.					
	38 1,2-Dichloropropane	63	Compound Not Detected.					
	39 Bromodichloromethane	83	Compound Not Detected.					
	37 Dibromomethane	93	Compound Not Detected.					
	40 2-Chloroethyl Vinyl Ether	63	Compound Not Detected.					
	45 4-Methyl-2-Pentanone	58	Compound Not Detected.					
	41 Cis 1,3-dichloropropene	75	Compound Not Detected.					
$	42 d8-Toluene	98	6.436	6.436	(1.220)	1567568	9.93859	9.939
	43 Toluene	92	Compound Not Detected.					
	46 Trans 1,3-Dichloropropene	75	Compound Not Detected.					
	51 2-Hexanone	43	Compound Not Detected.					
	47 1,1,2-Trichloroethane	97	Compound Not Detected.					
	49 1,3-Dichloropropane	76	Compound Not Detected.					
	44 Tetrachloroethene	166	Compound Not Detected.					
	48 Chlorodibromomethane	129	Compound Not Detected.					
	50 1,2-Dibromoethane	107	Compound Not Detected.					
*	52 d5-Chlorobenzene	117	7.743	7.743	(1.000)	1402882	10.0000	
	53 Chlorobenzene	112	Compound Not Detected.					
	54 Ethyl Benzene	91	Compound Not Detected.					
	55 1,1,1,2-Tetrachloroethane	131	Compound Not Detected.					
	56 m,p-xylene	106	Compound Not Detected.					
	57 o-Xylene	106	Compound Not Detected.					
	58 Styrene	104	Compound Not Detected.					
	60 Isopropyl Benzene	105	Compound Not Detected.					
	59 Bromoform	173	Compound Not Detected.					
	64 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					
$	61 4-Bromofluorobenzene	95	8.807	8.807	(1.137)	632564	9.71554	9.716
	66 1,2,3-Trichloropropane	110	Compound Not Detected.					
	68 Trans-1,4-Dichloro 2-Butene	53	Compound Not Detected.					
	63 N-Propyl Benzene	91	Compound Not Detected.					

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
62 Bromobenzene	156	Compound Not Detected.					
67 1,3,5-Trimethyl Benzene	105	Compound Not Detected.					
65 2-Chloro Toluene	91	Compound Not Detected.					
69 4-Chloro Toluene	91	Compound Not Detected.					
70 T-Butyl Benzene	119	Compound Not Detected.					
71 1,2,4-Trimethylbenzene	105	Compound Not Detected.					
72 S-Butyl Benzene	105	Compound Not Detected.					
73 4-Isopropyl Toluene	119	Compound Not Detected.					
74 1,3-Dichlorobenzene	146	Compound Not Detected.					
* 75 d4-1,4-Dichlorobenzene	152	9.808	9.808	(1.000)	779022	10.0000	
76 1,4-Dichlorobenzene	146	Compound Not Detected.					
77 N-Butyl Benzene	91	Compound Not Detected.					
$ 78 d4-1,2-Dichlorobenzene	152	10.187	10.187	(1.039)	693451	9.93004	9.930
79 1,2-Dichlorobenzene	146	Compound Not Detected.					
81 1,2-Dibromo 3-Chloropropane	75	Compound Not Detected.					
83 1,2,4-Trichlorobenzene	180	Compound Not Detected.					
82 Hexachloro 1,3-Butadiene	225	Compound Not Detected.					
84 Naphthalene	128	Compound Not Detected.					
85 1,2,3-Trichlorobenzene	180	Compound Not Detected.					

QC Flag Legend

M - Compound response manually integrated.

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt5.i
Lab File ID: 12220913.d
Lab Smp Id: QB37C
Analysis Type: VOA
Quant Type: ISTD
Operator: PC
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-30856

Calibration Date: 22-DEC-2009
Calibration Time: 10:12
Client Smp ID: CB1121409GRAB
Level: LOW
Sample Type: Water

Test Mode:
Use Initial Calibration Level 5.
If Continuing Cal. use Initial Cal. Level 5

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	818327	409164	1636654	1034913	26.47
35 1,4-Difluorobenze	1179007	589504	2358014	1511086	28.17
52 d5-Chlorobenzene	1047488	523744	2094976	1402882	33.93
75 d4-1,4-Dichlorobe	586906	293453	1173812	779022	32.73

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	4.83	4.33	5.33	4.83	0.00
35 1,4-Difluorobenze	5.28	4.78	5.78	5.28	0.00
52 d5-Chlorobenzene	7.74	7.24	8.24	7.74	0.00
75 d4-1,4-Dichlorobe	9.81	9.31	10.31	9.81	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name: Floyd/Snider
Sample Matrix: LIQUID
Lab Smp Id: QB37C
Level: LOW
Data Type: MS DATA
SpikeList File: all.spk
Sublist File: voa.sub
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-30856

Client SDG: QB37
Fraction: VOA
Client Smp ID: CB1121409GRAB
Operator: PC
SampleType: SAMPLE
Quant Type: ISTD

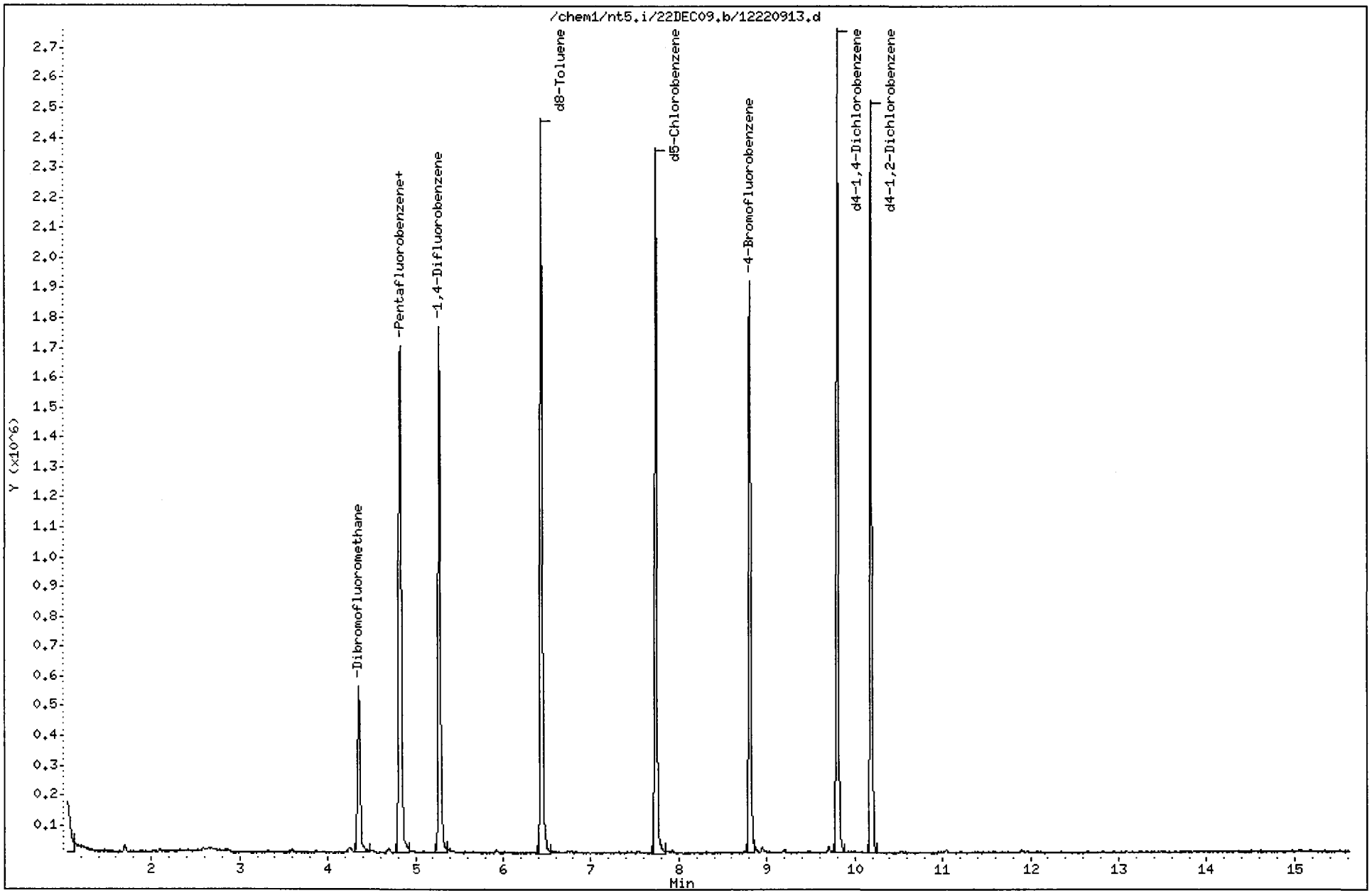
SURROGATE COMPOUND	AMOUNT ADDED ug/L	AMOUNT RECOVERED ug/L	% RECOVERED	LIMITS
$ 25 Dibromofluorometha	10.000	9.995	99.95	64-133
$ 31 d4-1,2-Dichloroeth	10.000	9.058	90.58	70-132
$ 42 d8-Toluene	10.000	9.939	99.39	80-120
$ 61 4-Bromofluorobenze	10.000	9.716	97.16	80-120
$ 78 d4-1,2-Dichloroben	10.000	9.930	99.30	80-120

Data File: /chem1/nt5.i/22DEC09.b/12220913.d
Date : 22-DEC-2009 15:04
Client ID: CB1121409GRAB
Sample Info: QB37C,10,10,0,

Instrument: nt5.i

Operator: PC
Column diameter: 0.18

Column phase: RTXVMS



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: TB121409**
Page 1 of 1 **TRIP BLANK**

Lab Sample ID: QB37D
LIMS ID: 09-30857
Matrix: Water
Data Release Authorized: VTS
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 12:30

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	90.4%
d8-Toluene	98.2%

PC
12/23/09

Analytical Resources, Inc.

8260C

Data file : /chem1/nt5.i/22DEC09.b/12220907.d
Lab Smp Id: QB37D Client Smp ID: TB121409
Inj Date : 22-DEC-2009 12:30
Operator : PC Inst ID: nt5.i
Smp Info : QB37D,10,10,0,
Misc Info : 09-30857
Comment :
Method : /chem1/nt5.i/22DEC09.b/VO111809L.m
Meth Date : 23-Dec-2009 14:31 paul Quant Type: ISTD
Cal Date : 18-NOV-2009 16:46 Cal File: 11180913.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: voa.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
1 Dichlorodifluoromethane	85	Compound Not Detected.					
2 Chloromethane	50	Compound Not Detected.					
3 Vinyl Chloride	62	Compound Not Detected.					
4 Bromomethane	94	Compound Not Detected.					
5 Chloroethane	64	Compound Not Detected.					
6 Trichlorofluoromethane	101	Compound Not Detected.					
12 Acrolein	56	Compound Not Detected.					
9 112Trichloro122Trifluoroethane	101	Compound Not Detected.					
14 Acetone	43	Compound Not Detected.					
7 1,1-Dichloroethene	96	Compound Not Detected.					
11 Bromoethane	108	Compound Not Detected.					
10 Iodomethane	142	Compound Not Detected.					
13 Methylene Chloride	84	2.590	2.590	(0.536)	14325	0.28358	0.2836(Q)
18 Acrylonitrile	53	Compound Not Detected.					
16 Methyl tert butyl ether	73	Compound Not Detected.					
8 Carbon Disulfide	76	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	15 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	19 Vinyl Acetate	43	Compound Not Detected.					
	17 1,1-Dichloroethane	63	Compound Not Detected.					
	29 2-Butanone	72	Compound Not Detected.					
	21 2,2-Dichloropropane	77	Compound Not Detected.					
	20 Cis-1,2-Dichloroethene	96	Compound Not Detected.					
*	32 Pentafluorobenzene	168	4.830	4.830	(1.000)	1026968	10.0000	
	23 Chloroform	83	Compound Not Detected.					
	22 Bromochloromethane	128	Compound Not Detected.					
$	25 Dibromofluoromethane	111	4.355	4.355	(0.902)	377262	10.3843	10.384
	26 1,1,1-Trichloroethane	97	Compound Not Detected.					
	28 1,1-Dichloropropene	75	Compound Not Detected.					
	24 Carbon Tetrachloride	117	Compound Not Detected.					
$	31 d4-1,2-Dichloroethane	65	4.824	4.819	(0.999)	352548	9.04224	9.042
	33 1,2-Dichloroethane	62	Compound Not Detected.					
	30 Benzene	78	Compound Not Detected.					
*	35 1,4-Difluorobenzene	114	5.277	5.277	(1.000)	1552837	10.0000	
	34 Trichloroethene	130	Compound Not Detected.					
	38 1,2-Dichloropropane	63	Compound Not Detected.					
	39 Bromodichloromethane	83	Compound Not Detected.					
	37 Dibromomethane	93	Compound Not Detected.					
	40 2-Chloroethyl Vinyl Ether	63	Compound Not Detected.					
	45 4-Methyl-2-Pentanone	58	Compound Not Detected.					
	41 Cis 1,3-dichloropropene	75	Compound Not Detected.					
$	42 d8-Toluene	98	6.437	6.436	(1.220)	1592437	9.82481	9.825
	43 Toluene	92	Compound Not Detected.					
	46 Trans 1,3-Dichloropropene	75	Compound Not Detected.					
	51 2-Hexanone	43	Compound Not Detected.					
	47 1,1,2-Trichloroethane	97	Compound Not Detected.					
	49 1,3-Dichloropropane	76	Compound Not Detected.					
	44 Tetrachloroethene	166	Compound Not Detected.					
	48 Chlorodibromomethane	129	Compound Not Detected.					
	50 1,2-Dibromoethane	107	Compound Not Detected.					
*	52 d5-Chlorobenzene	117	7.743	7.743	(1.000)	1420341	10.0000	
	53 Chlorobenzene	112	Compound Not Detected.					
	54 Ethyl Benzene	91	Compound Not Detected.					
	55 1,1,1,2-Tetrachloroethane	131	Compound Not Detected.					
	56 m,p-xylene	106	Compound Not Detected.					
	57 o-Xylene	106	Compound Not Detected.					
	58 Styrene	104	Compound Not Detected.					
	60 Isopropyl Benzene	105	Compound Not Detected.					
	59 Bromoform	173	Compound Not Detected.					
	64 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					
$	61 4-Bromofluorobenzene	95	8.807	8.807	(1.137)	643110	9.75610	9.756
	66 1,2,3-Trichloropropane	110	Compound Not Detected.					
	68 Trans-1,4-Dichloro 2-Butene	53	Compound Not Detected.					
	63 N-Propyl Benzene	91	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	62 Bromobenzene	156	Compound Not Detected.					
	67 1,3,5-Trimethyl Benzene	105	Compound Not Detected.					
	65 2-Chloro Toluene	91	Compound Not Detected.					
	69 4-Chloro Toluene	91	Compound Not Detected.					
	70 T-Butyl Benzene	119	Compound Not Detected.					
	71 1,2,4-Trimethylbenzene	105	Compound Not Detected.					
	72 S-Butyl Benzene	105	Compound Not Detected.					
	73 4-Isopropyl Toluene	119	Compound Not Detected.					
	74 1,3-Dichlorobenzene	146	Compound Not Detected.					
*	75 d4-1,4-Dichlorobenzene	152	9.802	9.808	(1.000)	792390	10.0000	
	76 1,4-Dichlorobenzene	146	Compound Not Detected.					
	77 N-Butyl Benzene	91	Compound Not Detected.					
$	78 d4-1,2-Dichlorobenzene	152	10.187	10.187	(1.039)	696433	9.80449	9.804
	79 1,2-Dichlorobenzene	146	Compound Not Detected.					
	81 1,2-Dibromo 3-Chloropropane	75	Compound Not Detected.					
	83 1,2,4-Trichlorobenzene	180	Compound Not Detected.					
	82 Hexachloro 1,3-Butadiene	225	Compound Not Detected.					
	84 Naphthalene	128	Compound Not Detected.					
	85 1,2,3-Trichlorobenzene	180	Compound Not Detected.					

QC Flag Legend

Q - Qualifier signal failed the ratio test.

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt5.i
Lab File ID: 12220907.d
Lab Smp Id: QB37D
Analysis Type: VOA
Quant Type: ISTD
Operator: PC
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-30857

Calibration Date: 22-DEC-2009
Calibration Time: 10:12
Client Smp ID: TB121409
Level: LOW
Sample Type: Water

Test Mode:
Use Initial Calibration Level 5.
If Continuing Cal. use Initial Cal. Level 5

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	818327	409164	1636654	1026968	25.50
35 1,4-Difluorobenze	1179007	589504	2358014	1552837	31.71
52 d5-Chlorobenzene	1047488	523744	2094976	1420341	35.59
75 d4-1,4-Dichlorobe	586906	293453	1173812	792390	35.01

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	4.83	4.33	5.33	4.83	0.00
35 1,4-Difluorobenze	5.28	4.78	5.78	5.28	0.00
52 d5-Chlorobenzene	7.74	7.24	8.24	7.74	0.00
75 d4-1,4-Dichlorobe	9.81	9.31	10.31	9.80	-0.06

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name: Floyd/Snider
Sample Matrix: LIQUID
Lab Smp Id: QB37D
Level: LOW
Data Type: MS DATA
SpikeList File: all.spk
Sublist File: voa.sub
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-30857

Client SDG: QB37
Fraction: VOA
Client Smp ID: TB121409
Operator: PC
SampleType: SAMPLE
Quant Type: ISTD

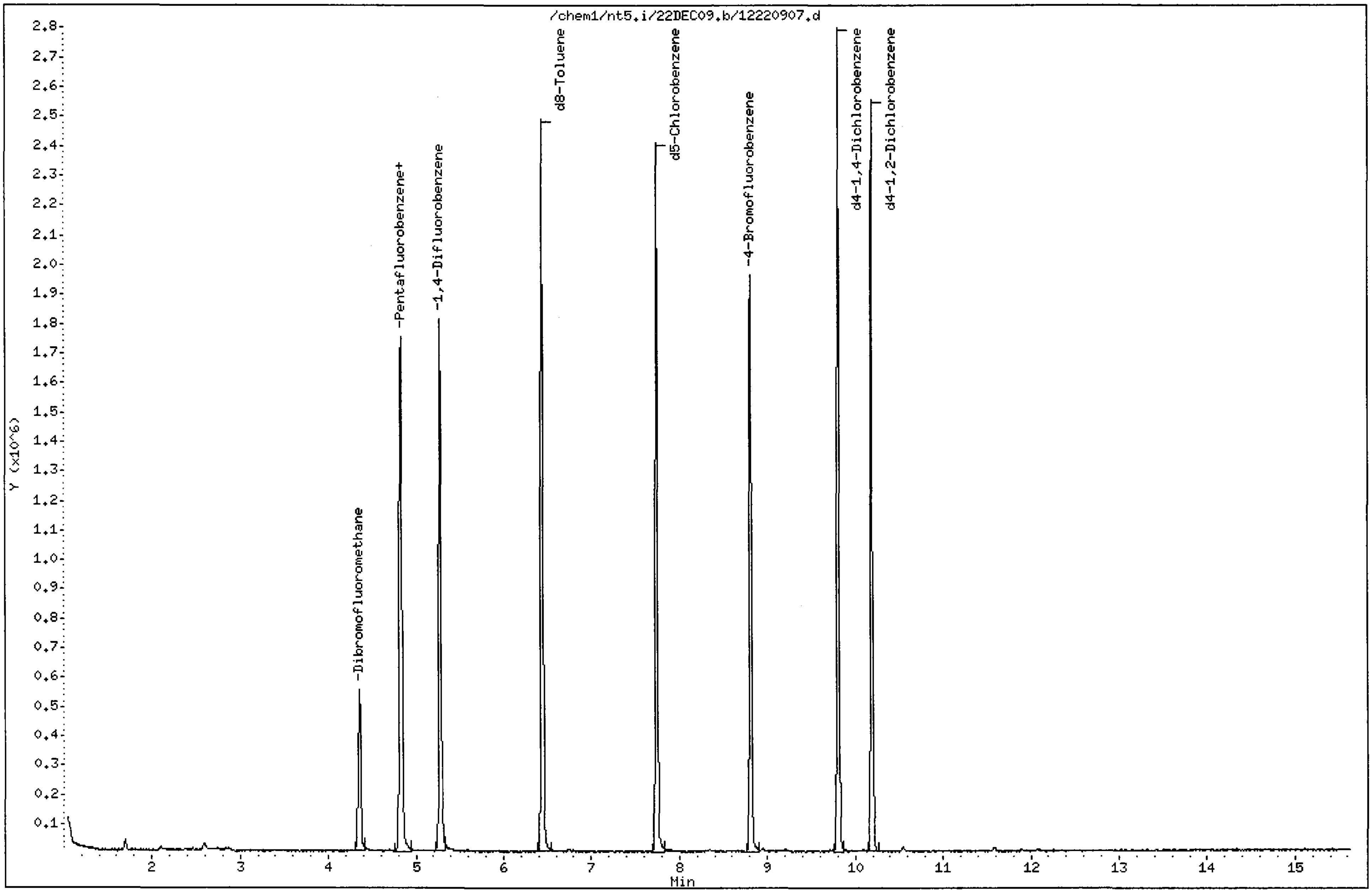
SURROGATE COMPOUND	AMOUNT ADDED ug/L	AMOUNT RECOVERED ug/L	% RECOVERED	LIMITS
$ 25 Dibromofluorometha	10.000	10.384	103.84	64-133
$ 31 d4-1,2-Dichloroeth	10.000	9.042	90.42	70-132
$ 42 d8-Toluene	10.000	9.825	98.25	80-120
$ 61 4-Bromofluorobenze	10.000	9.756	97.56	80-120
$ 78 d4-1,2-Dichloroben	10.000	9.804	98.04	80-120

Data File: /chem1/nt5.i/22DEC09.b/12220907.d
Date : 22-DEC-2009 12:30
Client ID: TB121409
Sample Info: QB37D,10,10,0,

Column phase: RTXVMS

Instrument: nt5.i

Operator: PC
Column diameter: 0.18



Volatile Analysis
QC Raw Data

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

PC
11/19/09

Data File: /chem1/nt5.i/18NOV09.b/11180901.d

Date : 18-NOV-2009 11:05

Client ID: BFB1118

Instrument: nt5.i

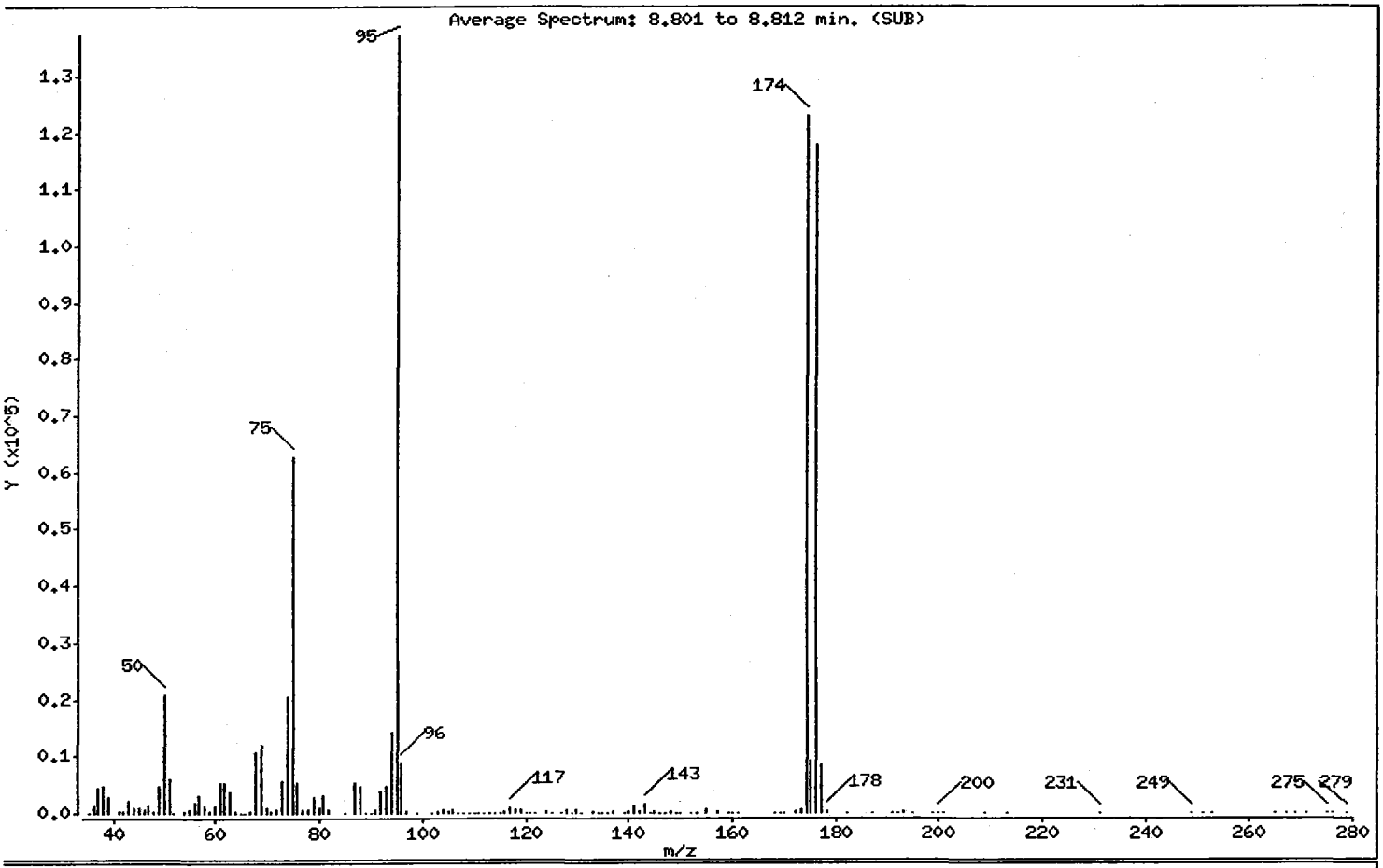
Sample Info: BFB1118,BFB1118,1,18NOV09,

Operator: PC

Column phase: RTXVMS

Column diameter: 0.18

1 Bromofluorobenzene



m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
95	Base Peak, 100% relative abundance	100.00
50	8.00 - 40.00% of mass 95	15.26
75	30.00 - 66.00% of mass 95	45.79
96	5.00 - 9.00% of mass 95	6.41
173	Less than 2.00% of mass 174	0.46 (0.52)
174	50.00 - 101.00% of mass 95	89.66
175	4.00 - 9.00% of mass 174	6.56 (7.31)
176	93.00 - 101.00% of mass 174	85.89 (95.80)
177	5.00 - 9.00% of mass 176	6.17 (7.18)

Data File: /chem1/nt5.i/18NOV09.b/11180901.d

Date : 18-NOV-2009 11:05

Client ID: BFB1118 Instrument: nt5.i

Sample Info: BFB1118,BFB1118,1,18NOV09,

Operator: PC

Column phase: RTXVMS Column diameter: 0.18

Data File: 11180901.d

Spectrum: Average Spectrum: 8.801 to 8.812 min. (SUB)

Location of Maximum: 95.00

Number of points: 143

m/z	Y	m/z	Y	m/z	Y	m/z	Y
35.00	86	73.00	5584	115.00	93	159.00	126
36.00	1290	74.00	20352	116.00	371	160.00	38
37.00	4568	75.00	62856	117.00	948	161.00	79
38.00	4637	76.00	5508	118.00	566	168.00	46
39.00	2925	77.00	742	119.00	669	169.00	33
41.00	311	78.00	626	120.00	53	170.00	63
42.00	255	79.00	2881	121.00	89	172.00	266
43.00	2323	80.00	808	122.00	92	173.00	635
44.00	906	81.00	3137	124.00	184	174.00	123080
45.00	1070	82.00	542	125.00	74	175.00	9001
46.00	672	85.00	117	127.00	48	176.00	117912
47.00	1202	87.00	5358	128.00	503	177.00	8471
48.00	438	88.00	4637	129.00	71	178.00	220
49.00	4758	89.00	47	130.00	699	182.00	63
50.00	20944	90.00	101	131.00	107	187.00	62
51.00	6045	91.00	570	133.00	305	191.00	146
52.00	88	92.00	3859	134.00	52	192.00	52
54.00	213	93.00	4656	135.00	122	193.00	191
55.00	505	94.00	14345	136.00	51	195.00	61
56.00	1958	95.00	137216	137.00	207	199.00	67
57.00	3084	96.00	8798	139.00	36	200.00	79
58.00	1200	97.00	421	140.00	195	201.00	48
59.00	274	99.00	53	141.00	1358	209.00	70
60.00	1319	102.00	42	142.00	240	213.00	61
61.00	5417	103.00	268	143.00	1516	231.00	35
62.00	5458	104.00	614	144.00	125	249.00	98
63.00	3766	105.00	355	145.00	217	251.00	43
64.00	458	106.00	589	146.00	98	253.00	41
65.00	112	107.00	119	147.00	74	265.00	47
66.00	42	108.00	55	148.00	342	267.00	53
67.00	385	109.00	93	149.00	38	269.00	39
68.00	10700	110.00	115	150.00	94	271.00	55
69.00	11916	111.00	94	152.00	96	275.00	59
70.00	818	112.00	110	153.00	127	276.00	37
71.00	261	113.00	36	155.00	520	279.00	64

Date : 18-NOV-2009 11:05

Client ID: BFB1118 Instrument: nt5.i

Sample Info: BFB1118,BFB1118,1,18NOV09,

Operator: PC

Column phase: RTXVMS Column diameter: 0.18

Data File: 11180901.d

Spectrum: Average Spectrum: 8.801 to 8.812 min. (SUB)

Location of Maximum: 95.00

Number of points: 143

m/z	Y	m/z	Y	m/z	Y	m/z	Y
72.00	781	114.00	141	157.00	383		

Data File: /chem1/nt5.i/18NOV09.b/11180901.d

Date : 18-NOV-2009 11:05

Client ID: BFB1118

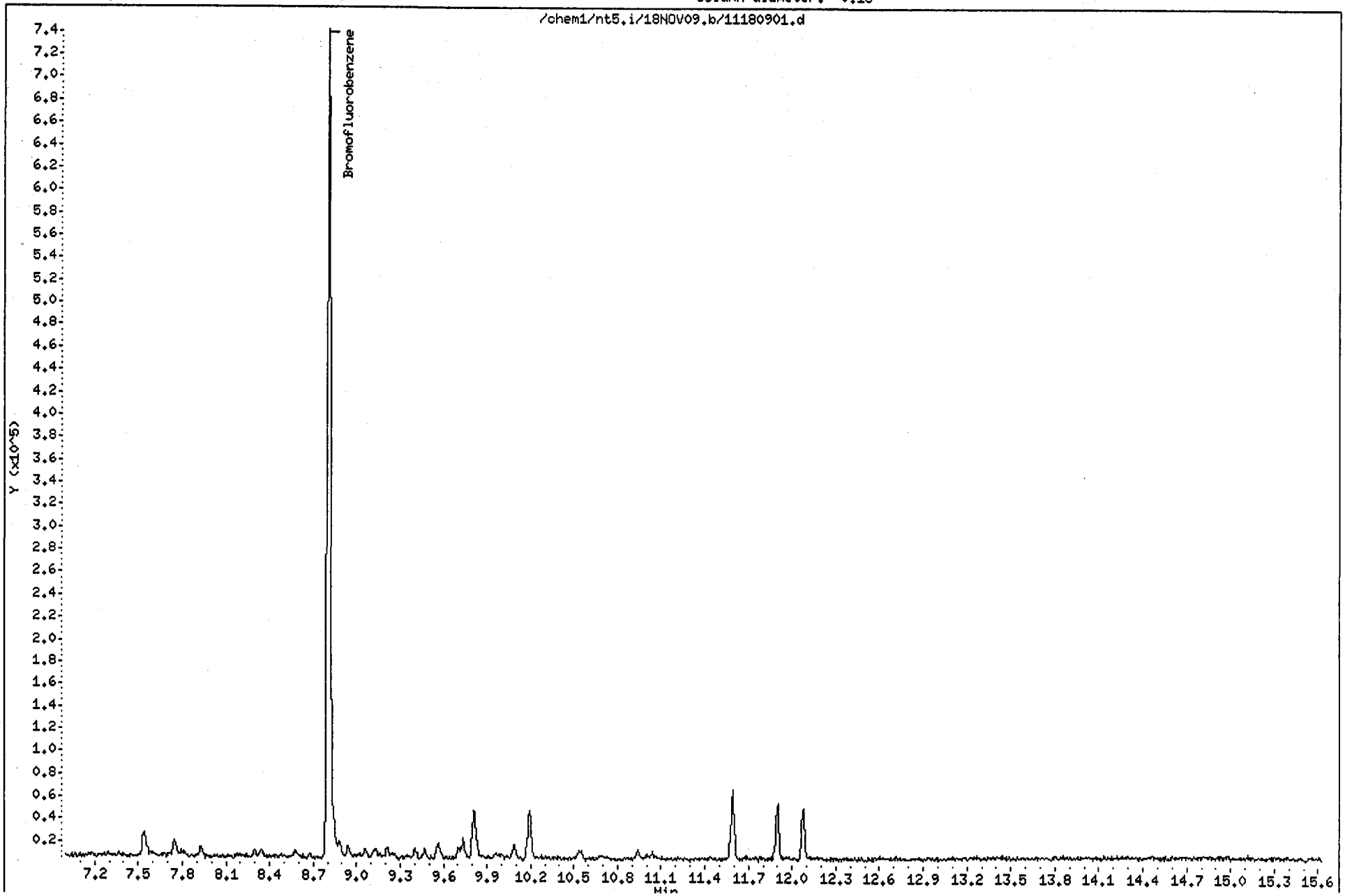
Sample Info: BFB1118,BFB1118,1,18NOV09,

Column phase: RTXVMS

Instrument: nt5.i

Operator: PC

Column diameter: 0.18



Data File: /chem1/nt5.i/22DEC09.b/12220901.d

Date : 22-DEC-2009 09:33

Client ID: BFB1222

Instrument: nt5.i

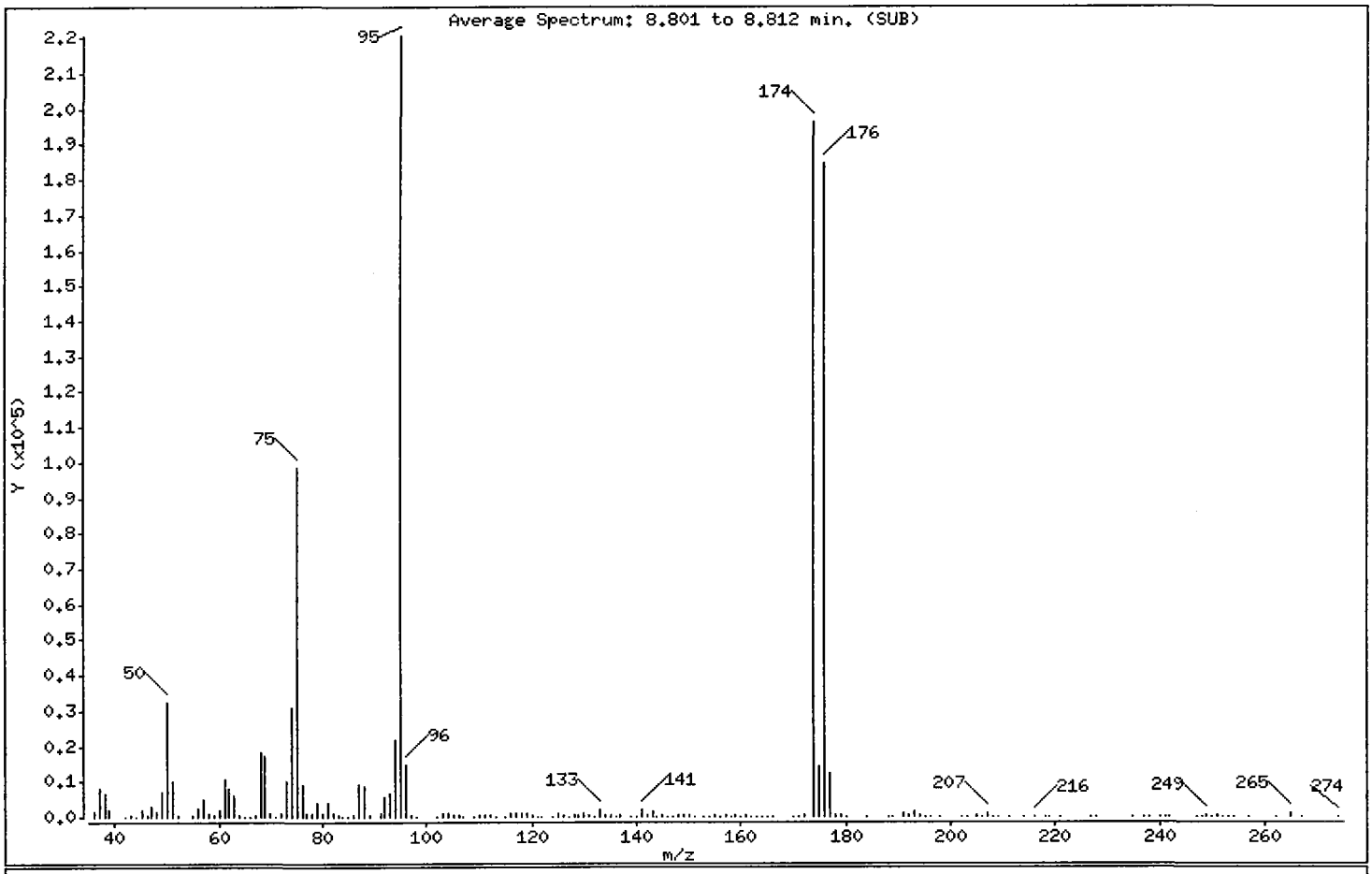
Sample Info: BFB1222,BFB1222,1,22DEC09,

Operator: PC

Column phase: RTXVMS

Column diameter: 0.18

1 Bromofluorobenzene



m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
95	Base Peak, 100% relative abundance	100.00
50	8.00 - 40.00% of mass 95	14.81
75	30.00 - 66.00% of mass 95	44.66
96	5.00 - 9.00% of mass 95	6.64
173	Less than 2.00% of mass 174	0.00 (0.00)
174	50.00 - 101.00% of mass 95	89.01
175	4.00 - 9.00% of mass 174	6.51 (7.31)
176	93.00 - 101.00% of mass 174	83.79 (94.14)
177	5.00 - 9.00% of mass 176	5.58 (6.66)

Data File: /chem1/nt5.i/22DEC09.b/12220901.d

Date : 22-DEC-2009 09:33

Client ID: BFB1222 Instrument: nt5.i

Sample Info: BFB1222,BFB1222,1,22DEC09,

Operator: PC

Column phase: RTXVMS Column diameter: 0.18

Data File: 12220901.d
Spectrum: Average Spectrum: 8.801 to 8.812 min. (SUB)
Location of Maximum: 95.00
Number of points: 172

m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	1731	84.00	41	135.00	517	192.00	276
37.00	7991	85.00	89	136.00	90	193.00	1340
38.00	6500	86.00	354	137.00	393	194.00	394
39.00	1982	87.00	9254	139.00	60	195.00	184
42.00	113	88.00	8501	140.00	77	196.00	58
43.00	294	89.00	326	141.00	2218	198.00	33
44.00	207	91.00	835	142.00	331	202.00	42
45.00	1975	92.00	5511	143.00	1733	203.00	51
46.00	264	93.00	6716	144.00	75	205.00	576
47.00	3123	94.00	21976	145.00	394	206.00	73
48.00	1327	95.00	220672	146.00	128	207.00	993
49.00	6986	96.00	14653	147.00	173	208.00	61
50.00	32680	97.00	440	148.00	506	209.00	87
51.00	10088	98.00	89	149.00	320	211.00	41
52.00	700	102.00	124	150.00	330	214.00	33
55.00	534	103.00	838	151.00	92	216.00	121
56.00	2733	104.00	854	153.00	35	218.00	44
57.00	4944	105.00	404	154.00	34	219.00	58
58.00	761	106.00	734	155.00	363	221.00	52
59.00	685	107.00	191	156.00	212	227.00	34
60.00	2041	109.00	118	157.00	329	228.00	43
61.00	10557	110.00	442	158.00	74	235.00	200
62.00	8207	111.00	538	159.00	264	237.00	46
63.00	5883	112.00	336	160.00	34	238.00	35
64.00	686	113.00	57	161.00	402	240.00	39
65.00	166	115.00	214	162.00	35	241.00	38
66.00	60	116.00	989	163.00	222	242.00	83
67.00	547	117.00	1105	164.00	225	247.00	110
68.00	18464	118.00	992	165.00	219	248.00	99
69.00	17376	119.00	1084	166.00	34	249.00	740
70.00	1206	120.00	310	170.00	65	250.00	58
71.00	211	121.00	74	171.00	43	251.00	450
72.00	1086	122.00	169	172.00	256	252.00	56
73.00	10103	124.00	195	174.00	196416	253.00	40
74.00	30896	125.00	848	175.00	14369	254.00	43

Data File: /chem1/nt5.i/22DEC09.b/12220901.d

Date : 22-DEC-2009 09:33

Client ID: BFB1222

Instrument: nt5.i

Sample Info: BFB1222,BFB1222,1,22DEC09,

Operator: PC

Column phase: RTXVMS

Column diameter: 0.18

Data File: 12220901.d

Spectrum: Average Spectrum: 8.801 to 8.812 min. (SUB)

Location of Maximum: 95.00

Number of points: 172

m/z	Y	m/z	Y	m/z	Y	m/z	Y
75.00	98560	126.00	448	176.00	184896	257.00	66
76.00	8977	127.00	60	177.00	12319	262.00	72
77.00	1169	128.00	685	178.00	468	265.00	1011
78.00	984	129.00	499	179.00	564	267.00	211
79.00	4159	130.00	778	180.00	51	274.00	72
80.00	1155	131.00	336	184.00	39		
81.00	4288	132.00	133	188.00	179		
82.00	925	133.00	2025	189.00	237		
83.00	442	134.00	561	191.00	1057		

Data File: /chem1/nt5.i/22DEC09.b/12220901.d

Date : 22-DEC-2009 09:33

Client ID: BFB1222

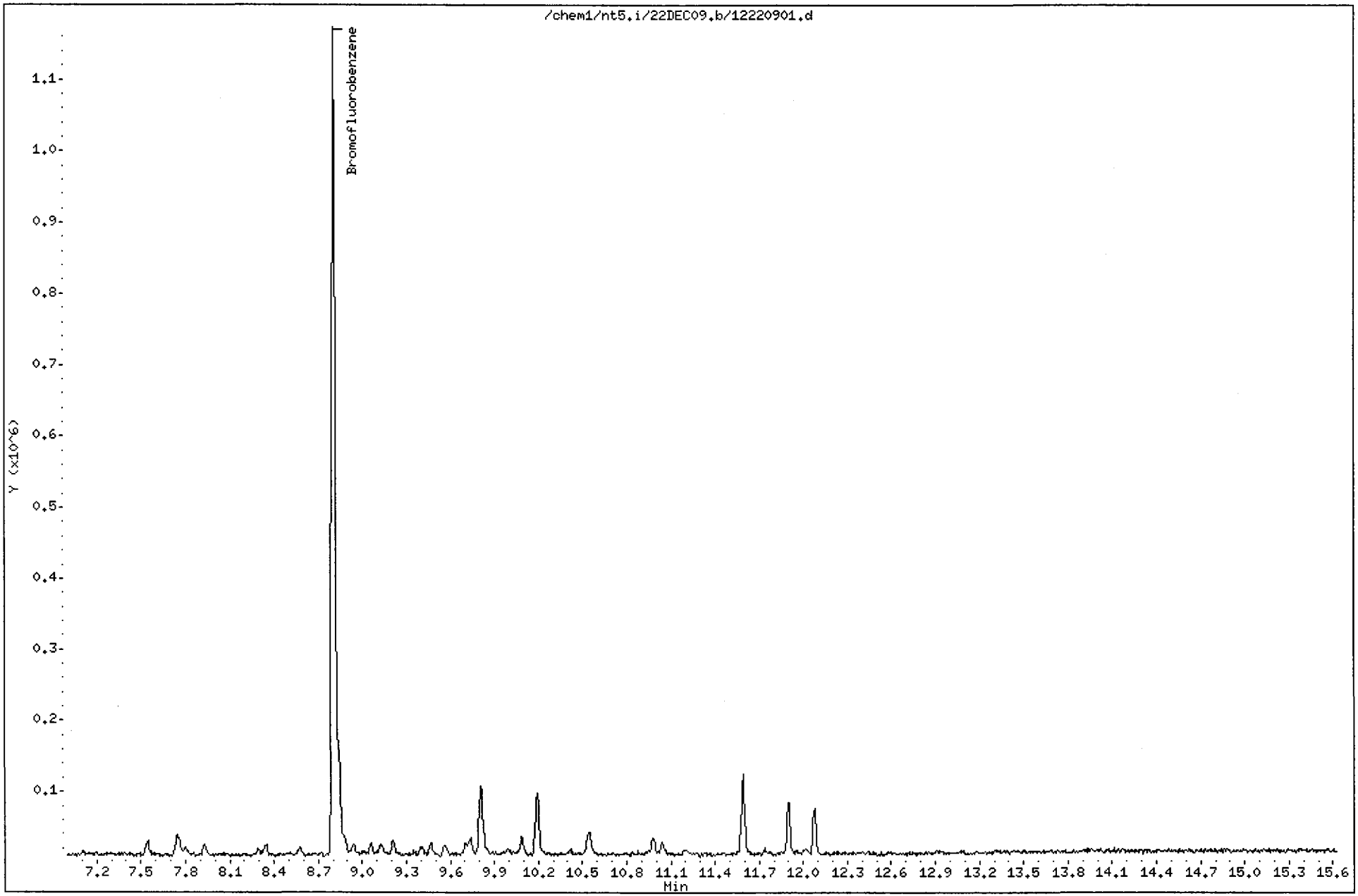
Sample Info: BFB1222,BFB1222,1,22DEC09,

Column phase: RTXVMS

Instrument: nt5.i

Operator: PC

Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-122209**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-122209
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized: VB
Reported: 12/23/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT5/PKC
Date Analyzed: 12/22/09 12:05

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
107-06-2	1,2-Dichloroethane	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	91.5%
d8-Toluene	98.8%

PC 12/23/09

Analytical Resources, Inc.

8260C

Data file : /chem1/nt5.i/22DEC09.b/12220906.d
Lab Smp Id: MB1222A Client Smp ID: MB1222A
Inj Date : 22-DEC-2009 12:05
Operator : PC Inst ID: nt5.i
Smp Info : MB1222A,10,10,0,
Misc Info : 09-
Comment :
Method : /chem1/nt5.i/22DEC09.b/VO111809L.m
Meth Date : 23-Dec-2009 14:31 paul Quant Type: ISTD
Cal Date : 18-NOV-2009 16:46 Cal File: 11180913.d
Als bottle: 1 QC Sample: BLANK
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: voa.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
1 Dichlorodifluoromethane	85	Compound Not Detected.					
2 Chloromethane	50	Compound Not Detected.					
3 Vinyl Chloride	62	Compound Not Detected.					
4 Bromomethane	94	Compound Not Detected.					
5 Chloroethane	64	Compound Not Detected.					
6 Trichlorofluoromethane	101	Compound Not Detected.					
12 Acrolein	56	Compound Not Detected.					
9 112Trichloro122Trifluoroethane	101	Compound Not Detected.					
14 Acetone	43	Compound Not Detected.					
7 1,1-Dichloroethene	96	Compound Not Detected.					
11 Bromoethane	108	Compound Not Detected.					
10 Iodomethane	142	Compound Not Detected.					
13 Methylene Chloride	84	2.590	2.590	(0.536)	14401	0.28030	0.2803(M)
18 Acrylonitrile	53	Compound Not Detected.					
16 Methyl tert butyl ether	73	Compound Not Detected.					
8 Carbon Disulfide	76	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	15 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	19 Vinyl Acetate	43	Compound Not Detected.					
	17 1,1-Dichloroethane	63	Compound Not Detected.					
	29 2-Butanone	72	Compound Not Detected.					
	21 2,2-Dichloropropane	77	Compound Not Detected.					
	20 Cis-1,2-Dichloroethene	96	Compound Not Detected.					
*	32 Pentafluorobenzene	168	4.830	4.830	(1.000)	1044559	10.0000	
	23 Chloroform	83	Compound Not Detected.					
	22 Bromochloromethane	128	Compound Not Detected.					
$	25 Dibromofluoromethane	111	4.355	4.355	(0.902)	380346	10.2929	10.293
	26 1,1,1-Trichloroethane	97	Compound Not Detected.					
	28 1,1-Dichloropropene	75	Compound Not Detected.					
	24 Carbon Tetrachloride	117	Compound Not Detected.					
$	31 d4-1,2-Dichloroethane	65	4.819	4.819	(0.998)	362811	9.14876	9.149
	33 1,2-Dichloroethane	62	Compound Not Detected.					
	30 Benzene	78	Compound Not Detected.					
*	35 1,4-Difluorobenzene	114	5.277	5.277	(1.000)	1566240	10.0000	
	34 Trichloroethene	130	Compound Not Detected.					
	38 1,2-Dichloropropane	63	Compound Not Detected.					
	39 Bromodichloromethane	83	Compound Not Detected.					
	37 Dibromomethane	93	Compound Not Detected.					
	40 2-Chloroethyl Vinyl Ether	63	Compound Not Detected.					
	45 4-Methyl-2-Pentanone	58	Compound Not Detected.					
	41 Cis 1,3-dichloropropene	75	Compound Not Detected.					
$	42 d8-Toluene	98	6.437	6.436	(1.220)	1614529	9.87587	9.876
	43 Toluene	92	Compound Not Detected.					
	46 Trans 1,3-Dichloropropene	75	Compound Not Detected.					
	51 2-Hexanone	43	Compound Not Detected.					
	47 1,1,2-Trichloroethane	97	Compound Not Detected.					
	49 1,3-Dichloropropane	76	Compound Not Detected.					
	44 Tetrachloroethene	166	Compound Not Detected.					
	48 Chlorodibromomethane	129	Compound Not Detected.					
	50 1,2-Dibromoethane	107	Compound Not Detected.					
*	52 d5-Chlorobenzene	117	7.738	7.743	(1.000)	1442739	10.0000	
	53 Chlorobenzene	112	Compound Not Detected.					
	54 Ethyl Benzene	91	Compound Not Detected.					
	55 1,1,1,2-Tetrachloroethane	131	Compound Not Detected.					
	56 m,p-xylene	106	Compound Not Detected.					
	57 o-Xylene	106	Compound Not Detected.					
	58 Styrene	104	Compound Not Detected.					
	60 Isopropyl Benzene	105	Compound Not Detected.					
	59 Bromoform	173	Compound Not Detected.					
	64 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					
$	61 4-Bromofluorobenzene	95	8.807	8.807	(1.138)	673185	10.0538	10.054
	66 1,2,3-Trichloropropane	110	Compound Not Detected.					
	68 Trans-1,4-Dichloro 2-Butene	53	Compound Not Detected.					
	63 N-Propyl Benzene	91	Compound Not Detected.					

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	62 Bromobenzene	156	Compound Not Detected.					
	67 1,3,5-Trimethyl Benzene	105	Compound Not Detected.					
	65 2-Chloro Toluene	91	Compound Not Detected.					
	69 4-Chloro Toluene	91	Compound Not Detected.					
	70 T-Butyl Benzene	119	Compound Not Detected.					
	71 1,2,4-Trimethylbenzene	105	Compound Not Detected.					
	72 S-Butyl Benzene	105	Compound Not Detected.					
	73 4-Isopropyl Toluene	119	Compound Not Detected.					
	74 1,3-Dichlorobenzene	146	Compound Not Detected.					
*	75 d4-1,4-Dichlorobenzene	152	9.802	9.808	(1.000)	812570	10.0000	
	76 1,4-Dichlorobenzene	146	Compound Not Detected.					
	77 N-Butyl Benzene	91	Compound Not Detected.					
$	78 d4-1,2-Dichlorobenzene	152	10.187	10.187	(1.039)	725887	9.96536	9.965
	79 1,2-Dichlorobenzene	146	Compound Not Detected.					
	81 1,2-Dibromo 3-Chloropropane	75	Compound Not Detected.					
	83 1,2,4-Trichlorobenzene	180	Compound Not Detected.					
	82 Hexachloro 1,3-Butadiene	225	Compound Not Detected.					
	84 Naphthalene	128	Compound Not Detected.					
	85 1,2,3-Trichlorobenzene	180	Compound Not Detected.					

QC Flag Legend

M - Compound response manually integrated.

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt5.i
Lab File ID: 12220906.d
Lab Smp Id: MB1222A
Analysis Type: VOA
Quant Type: ISTD
Operator: PC
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-

Calibration Date: 22-DEC-2009
Calibration Time: 10:12
Client Smp ID: MB1222A
Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 5.
If Continuing Cal. use Initial Cal. Level 5

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	818327	409164	1636654	1044559	27.65
35 1,4-Difluorobenze	1179007	589504	2358014	1566240	32.84
52 d5-Chlorobenzene	1047488	523744	2094976	1442739	37.73
75 d4-1,4-Dichlorobe	586906	293453	1173812	812570	38.45

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	4.83	4.33	5.33	4.83	0.00
35 1,4-Difluorobenze	5.28	4.78	5.78	5.28	0.00
52 d5-Chlorobenzene	7.74	7.24	8.24	7.74	-0.07
75 d4-1,4-Dichlorobe	9.81	9.31	10.31	9.80	-0.06

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Lab Smp Id: MB1222A
Level: LOW
Data Type: MS DATA
SpikeList File: all.spk
Sublist File: voa.sub
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-

Client SDG: 22DEC09
Fraction: VOA
Client Smp ID: MB1222A
Operator: PC
SampleType: BLANK
Quant Type: ISTD

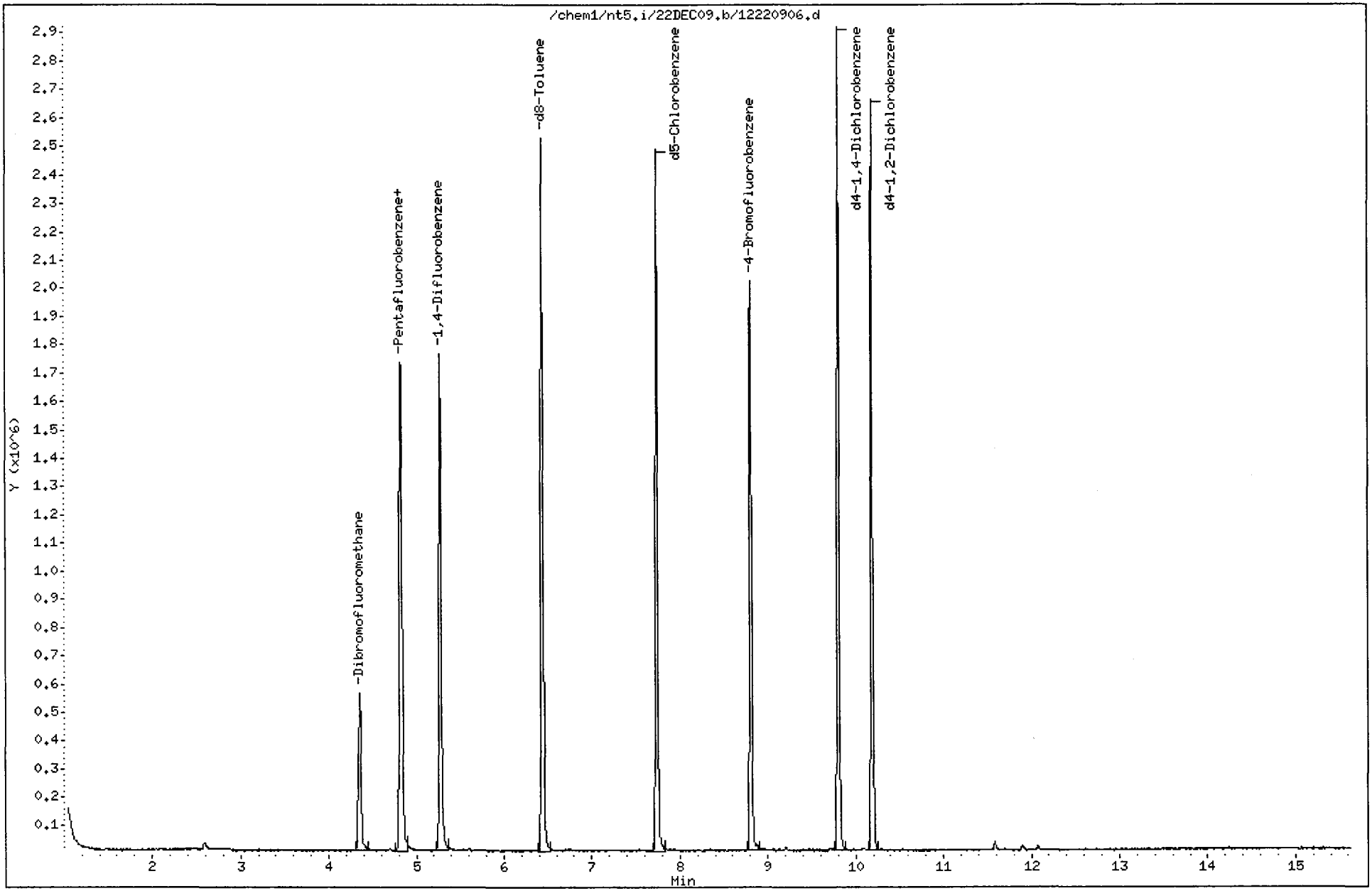
SURROGATE COMPOUND	AMOUNT ADDED ug/L	AMOUNT RECOVERED ug/L	% RECOVERED	LIMITS
$ 25 Dibromofluorometha	10.000	10.293	102.93	64-133
$ 31 d4-1,2-Dichloroeth	10.000	9.149	91.49	70-132
$ 42 d8-Toluene	10.000	9.876	98.76	80-120
$ 61 4-Bromofluorobenze	10.000	10.054	100.54	80-120
$ 78 d4-1,2-Dichloroben	10.000	9.965	99.65	80-120

Data File: /chem1/nt5.i/22DEC09.b/12220906.d
Date : 22-DEC-2009 12:05
Client ID: MB1222A
Sample Info: MB1222A,10,10,0,

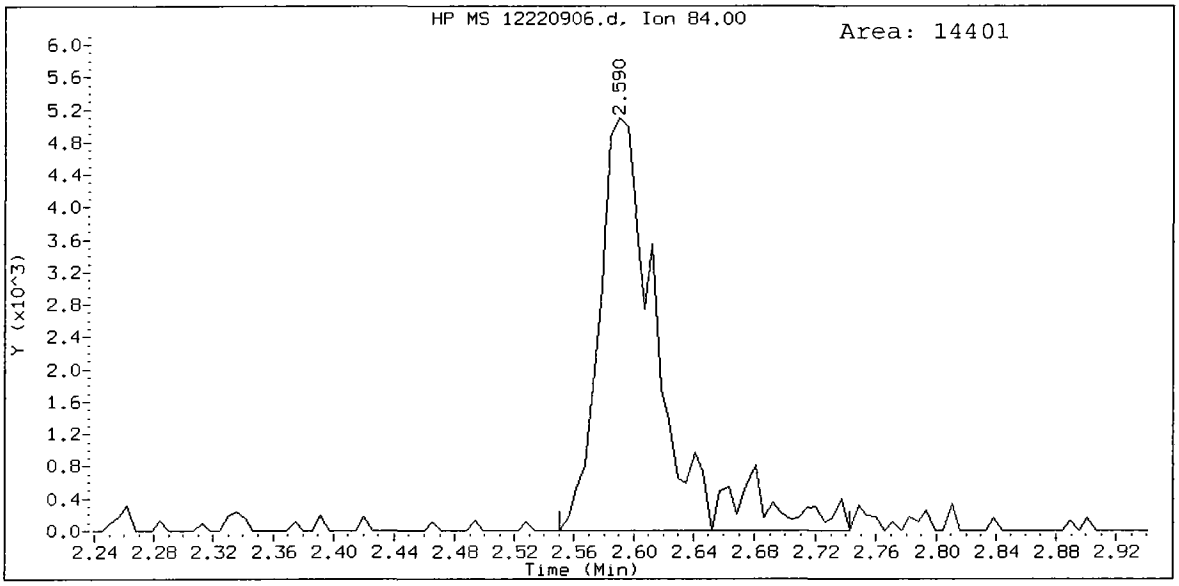
Instrument: nt5.i

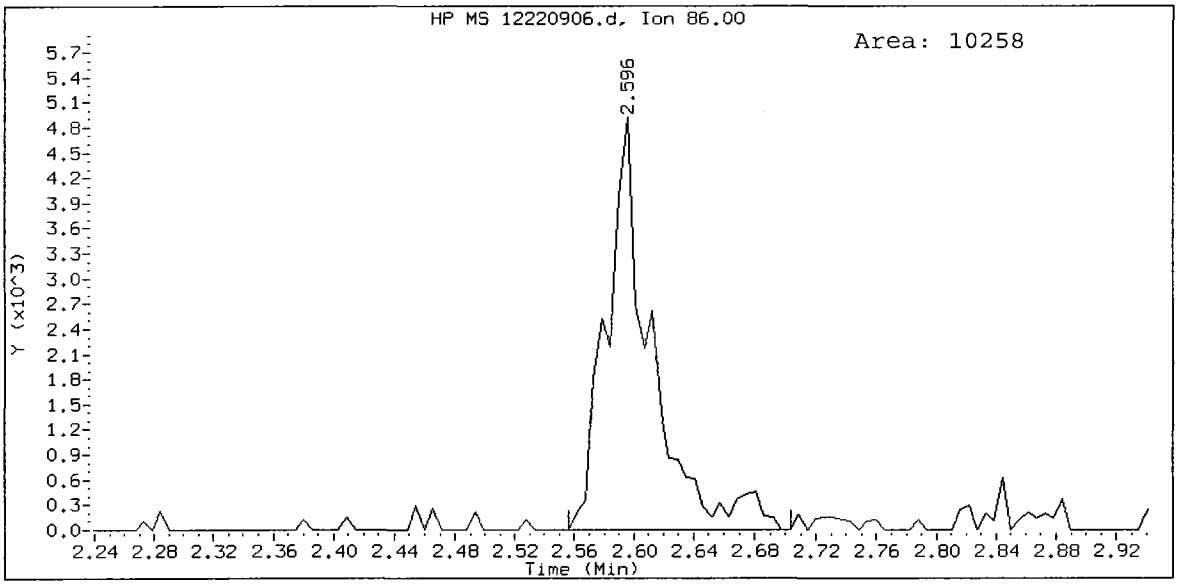
Operator: PC
Column diameter: 0.18

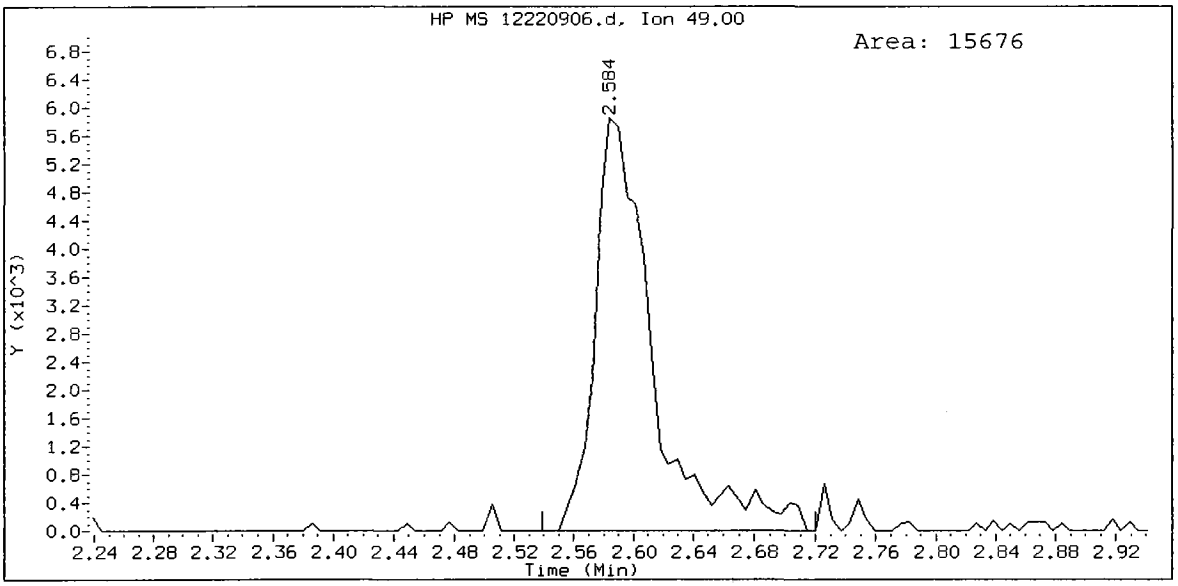
Column phase: RTXVMS



MB1222A, /chem1/nt5.i/22DEC09.b/12220906.d
Methylene Chloride Amount: 0.28







PC 12/23/09

Analytical Resources, Inc.

8260C

Data file : /chem1/nt5.i/22DEC09.b/12220903.d
Lab Smp Id: LCS1222 Client Smp ID: LCS1222
Inj Date : 22-DEC-2009 10:37
Operator : PC Inst ID: nt5.i
Smp Info : LCS1222,10,10,0,
Misc Info : 09-
Comment :
Method : /chem1/nt5.i/22DEC09.b/VO111809L.m
Meth Date : 23-Dec-2009 14:30 paul Quant Type: ISTD
Cal Date : 18-NOV-2009 16:46 Cal File: 11180913.d
Als bottle: 1 QC Sample: LCS
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: voa.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
1 Dichlorodifluoromethane	85	1.091	1.091	(0.226)	489367	8.79828	8.798(M)
2 Chloromethane	50	1.221	1.215	(0.253)	495138	11.1481	11.148
3 Vinyl Chloride	62	1.272	1.272	(0.263)	606193	10.7822	10.782
4 Bromomethane	94	1.498	1.498	(0.310)	281282	8.57102	8.571
5 Chloroethane	64	1.589	1.594	(0.329)	347301	11.0267	11.027
6 Trichlorofluoromethane	101	1.696	1.696	(0.351)	786726	10.2307	10.231(M)
12 Acrolein	56	2.381	2.375	(0.493)	217868	58.3146	58.315
9 112Trichloro122Trifluoroethane	101	2.137	2.132	(0.442)	528592	10.6060	10.606(Q)
14 Acetone	43	2.652	2.652	(0.549)	233056	36.2310	36.231
7 1,1-Dichloroethene	96	2.092	2.086	(0.433)	541536	11.3487	11.349(M)
11 Bromoethane	108	2.301	2.301	(0.476)	355569	12.3074	12.307(M)
10 Iodomethane	142	2.194	2.194	(0.454)	499325	9.55956	9.560
13 Methylene Chloride	84	2.590	2.590	(0.536)	549849	10.9512	10.951(M)
18 Acrylonitrile	53	3.433	3.433	(0.711)	74833	8.71191	8.712(M)
16 Methyl tert butyl ether	73	2.878	2.873	(0.596)	1105041	9.50729	9.507
8 Carbon Disulfide	76	2.098	2.098	(0.434)	1718036	11.1148	11.115

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	15 Trans-1,2-Dichloroethene	96	2.748	2.743	(0.569)	606829	10.8062	10.806
	19 Vinyl Acetate	43	3.682	3.682	(0.762)	554168	10.0939	10.094
	17 1,1-Dichloroethane	63	3.376	3.376	(0.699)	865784	11.1297	11.130
	29 2-Butanone	72	4.491	4.490	(0.930)	153854	42.1277	42.128
	21 2,2-Dichloropropane	77	4.010	4.010	(0.830)	861352	10.8658	10.866
	20 Cis-1,2-Dichloroethene	96	3.914	3.913	(0.810)	591261	10.9193	10.919
*	32 Pentafluorobenzene	168	4.830	4.830	(1.000)	1020746	10.0000	
	23 Chloroform	83	4.191	4.191	(0.868)	908131	10.9768	10.977
	22 Bromochloromethane	128	4.100	4.095	(0.849)	242365	10.2073	10.207
$	25 Dibromofluoromethane	111	4.355	4.355	(0.902)	377198	10.4458	10.446
	26 1,1,1-Trichloroethane	97	4.355	4.355	(0.902)	878291	10.7321	10.732
	28 1,1-Dichloropropene	75	4.474	4.473	(0.848)	730971	10.2844	10.284
	24 Carbon Tetrachloride	117	4.287	4.287	(0.812)	681073	9.76977	9.770
$	31 d4-1,2-Dichloroethane	65	4.824	4.819	(0.999)	343178	8.85557	8.856
	33 1,2-Dichloroethane	62	4.881	4.881	(0.925)	544067	9.12067	9.121
	30 Benzene	78	4.700	4.694	(0.891)	2184069	10.7221	10.722
*	35 1,4-Difluorobenzene	114	5.277	5.277	(1.000)	1549505	10.0000	
	34 Trichloroethene	130	5.226	5.226	(0.990)	674372	10.5456	10.546
	38 1,2-Dichloropropane	63	5.667	5.667	(1.074)	467764	10.4778	10.478
	39 Bromodichloromethane	83	5.741	5.741	(1.088)	621740	10.1708	10.171
	37 Dibromomethane	93	5.577	5.577	(1.057)	232088	8.77943	8.779
	40 2-Chloroethyl Vinyl Ether	63	6.256	6.261	(1.185)	171704	9.01923	9.019(Q)
	45 4-Methyl-2-Pentanone	58	6.827	6.827	(1.294)	423049	44.2295	44.230
	41 Cis 1,3-dichloropropene	75	6.284	6.284	(1.191)	802850	10.0624	10.062
$	42 d8-Toluene	98	6.437	6.436	(1.220)	1609815	9.95338	9.953
	43 Toluene	92	6.482	6.482	(1.228)	1511142	10.7860	10.786
	46 Trans 1,3-Dichloropropene	75	6.844	6.844	(1.297)	637121	9.33824	9.338
	51 2-Hexanone	43	7.540	7.540	(0.974)	609279	38.7393	38.739
	47 1,1,2-Trichloroethane	97	6.974	6.974	(1.322)	349282	9.31832	9.318
	49 1,3-Dichloropropane	76	7.195	7.194	(0.929)	600602	8.84876	8.849
	44 Tetrachloroethene	166	6.799	6.798	(0.878)	698704	9.37871	9.379
	48 Chlorodibromomethane	129	7.110	7.110	(0.918)	439554	8.79275	8.793
	50 1,2-Dibromoethane	107	7.291	7.291	(1.382)	351737	9.15337	9.153
*	52 d5-Chlorobenzene	117	7.743	7.743	(1.000)	1498788	10.0000	
	53 Chlorobenzene	112	7.755	7.755	(1.001)	1608905	9.59945	9.599(Q)
	54 Ethyl Benzene	91	7.800	7.800	(1.007)	2839763	9.53825	9.538
	55 1,1,1,2-Tetrachloroethane	131	7.817	7.817	(1.009)	549593	9.22582	9.226
	56 m,p-xylene	106	7.930	7.930	(1.024)	2265748	19.8852	19.885
	57 o-Xylene	106	8.292	8.292	(1.071)	1115567	9.96501	9.965
	58 Styrene	104	8.343	8.343	(1.077)	1786219	10.0010	10.001
	60 Isopropyl Benzene	105	8.575	8.575	(0.874)	2722747	9.02409	9.024
	59 Bromoform	173	8.337	8.343	(0.850)	230666	7.25515	7.255
	64 1,1,2,2-Tetrachloroethane	83	9.010	9.010	(0.919)	330412	8.05830	8.058
$	61 4-Bromofluorobenzene	95	8.807	8.807	(1.137)	739560	10.6320	10.632
	66 1,2,3-Trichloropropane	110	9.112	9.112	(0.929)	101917	7.17433	7.174(R)
	68 Trans-1,4-Dichloro 2-Butene	53	9.163	9.163	(0.934)	92089	7.20842	7.208
	63 N-Propyl Benzene	91	8.943	8.942	(0.912)	3026406	8.97236	8.972

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	62 Bromobenzene	156	8.886	8.886	(0.906)	685424	8.21692	8.217
	67 1,3,5-Trimethyl Benzene	105	9.129	9.129	(0.931)	2302496	8.92048	8.920
	65 2-Chloro Toluene	91	9.061	9.061	(0.924)	1870959	8.95645	8.956
	69 4-Chloro Toluene	91	9.208	9.208	(0.939)	1911120	8.74971	8.750
	70 T-Butyl Benzene	119	9.401	9.401	(0.958)	1994439	8.77199	8.772
	71 1,2,4-Trimethylbenzene	105	9.469	9.469	(0.965)	2302788	8.91093	8.911
	72 S-Butyl Benzene	105	9.565	9.565	(0.975)	2814255	8.94084	8.941
	73 4-Isopropyl Toluene	119	9.706	9.706	(0.990)	2438621	8.96980	8.970
	74 1,3-Dichlorobenzene	146	9.735	9.734	(0.992)	1343953	8.44148	8.441
*	75 d4-1,4-Dichlorobenzene	152	9.808	9.808	(1.000)	925596	10.0000	
	76 1,4-Dichlorobenzene	146	9.819	9.819	(1.001)	1324264	8.24484	8.245(Q)
	77 N-Butyl Benzene	91	10.085	10.085	(1.028)	2014651	8.73880	8.739
$	78 d4-1,2-Dichlorobenzene	152	10.187	10.187	(1.039)	824853	9.94123	9.941
	79 1,2-Dichlorobenzene	146	10.198	10.198	(1.040)	1169816	8.00295	8.003(Q)
	81 1,2-Dibromo 3-Chloropropane	75	10.945	10.945	(1.116)	56930	6.41920	6.419(QR)
	83 1,2,4-Trichlorobenzene	180	11.590	11.590	(1.182)	779933	7.87367	7.874
	82 Hexachloro 1,3-Butadiene	225	11.584	11.584	(1.181)	348017	7.84383	7.844
	84 Naphthalene	128	11.895	11.895	(1.213)	1302069	7.90948	7.909
	85 1,2,3-Trichlorobenzene	180	12.071	12.076	(1.231)	609533	7.63814	7.638

QC Flag Legend

Q - Qualifier signal failed the ratio test.
R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt5.i
Lab File ID: 12220903.d
Lab Smp Id: LCS1222
Analysis Type: VOA
Quant Type: ISTD
Operator: PC
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-

Calibration Date: 22-DEC-2009
Calibration Time: 10:12
Client Smp ID: LCS1222
Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 5.
If Continuing Cal. use Initial Cal. Level 5

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	818327	409164	1636654	1020746	24.74
35 1,4-Difluorobenze	1179007	589504	2358014	1549505	31.42
52 d5-Chlorobenzene	1047488	523744	2094976	1498788	43.08
75 d4-1,4-Dichlorobe	586906	293453	1173812	925596	57.71

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	4.83	4.33	5.33	4.83	0.00
35 1,4-Difluorobenze	5.28	4.78	5.78	5.28	0.00
52 d5-Chlorobenzene	7.74	7.24	8.24	7.74	0.00
75 d4-1,4-Dichlorobe	9.81	9.31	10.31	9.81	0.00

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name: Client SDG: 22DEC09
Sample Matrix: LIQUID Fraction: VOA
Lab Smp Id: LCS1222 Client Smp ID: LCS1222
Level: LOW Operator: PC
Data Type: MS DATA SampleType: LCS
SpikeList File: all.spk Quant Type: ISTD
Sublist File: voa.sub
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-

SPIKE	COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
1	Dichlorodifluorome	10.000	8.798	87.98	59-129
16	Methyl tert butyl	10.000	9.507	95.07	78-120
2	Chloromethane	10.000	11.148	111.48	66-123
3	Vinyl Chloride	10.000	10.782	107.82	68-121
4	Bromomethane	10.000	8.571	85.71	55-148
5	Chloroethane	10.000	11.027	110.27	47-155
6	Trichlorofluoromet	10.000	10.231	102.31	70-129
12	Acrolein	50.000	58.315	116.63	24-170
9	112Trichloro122Tri	10.000	10.606	106.06	74-127
14	Acetone	50.000	36.231	72.46	70-130
7	1,1-Dichloroethene	10.000	11.349	113.49	72-120
11	Bromoethane	10.000	12.307	123.07	73-131
10	Iodomethane	10.000	9.560	95.60	34-183
13	Methylene Chloride	10.000	10.951	109.51	70-124
8	Carbon Disulfide	10.000	11.115	111.15	66-129
18	Acrylonitrile	10.000	8.712	87.12	71-135
15	Trans-1,2-Dichloro	10.000	10.806	108.06	76-120
19	Vinyl Acetate	10.000	10.094	100.94	49-134
17	1,1-Dichloroethane	10.000	11.130	111.30	75-120
29	2-Butanone	50.000	42.128	84.26	78-131
21	2,2-Dichloropropan	10.000	10.866	108.66	68-121
20	Cis-1,2-Dichloroet	10.000	10.919	109.19	80-120
23	Chloroform	10.000	10.977	109.77	78-120
22	Bromochloromethane	10.000	10.207	102.07	79-120
26	1,1,1-Trichloroeth	10.000	10.732	107.32	76-120
28	1,1-Dichloropropen	10.000	10.284	102.84	78-120
24	Carbon Tetrachlori	10.000	9.770	97.70	70-126
33	1,2-Dichloroethane	10.000	9.121	91.21	78-120
30	Benzene	10.000	10.722	107.22	79-120
34	Trichloroethene	10.000	10.546	105.46	78-120
38	1,2-Dichloropropan	10.000	10.478	104.78	80-120
39	Bromodichlorometha	10.000	10.171	101.71	78-120
37	Dibromomethane	10.000	8.779	87.79	80-120

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
40 2-Chloroethyl Viny	10.000	9.019	90.19	68-134
45 4-Methyl-2-Pentano	50.000	44.230	88.46	73-131
41 Cis 1,3-dichloropr	10.000	10.062	100.62	78-120
43 Toluene	10.000	10.786	107.86	79-120
46 Trans 1,3-Dichloro	10.000	9.338	93.38	75-120
51 2-Hexanone	50.000	38.739	77.48	75-130
47 1,1,2-Trichloroeth	10.000	9.318	93.18	79-120
49 1,3-Dichloropropan	10.000	8.849	88.49	78-120
44 Tetrachloroethene	10.000	9.379	93.79	72-120
48 Chlorodibromometha	10.000	8.793	87.93	78-120
50 1,2-Dibromoethane	10.000	9.153	91.53	75-120
53 Chlorobenzene	10.000	9.599	95.99	79-120
55 1,1,1,2-Tetrachlor	10.000	9.226	92.26	75-120
54 Ethyl Benzene	10.000	9.538	95.38	78-121
56 m,p-xylene	20.000	19.885	99.43	65-129
57 o-Xylene	10.000	9.965	99.65	76-120
58 Styrene	10.000	10.001	100.01	74-121
60 Isopropyl Benzene	10.000	9.024	90.24	74-120
59 Bromoform	10.000	7.255	72.55	71-120
64 1,1,2,2-Tetrachlor	10.000	8.058	80.58	72-120
66 1,2,3-Trichloropro	10.000	7.174	71.74*	73-120
68 Trans-1,4-Dichloro	10.000	7.208	72.08	65-135
63 N-Propyl Benzene	10.000	8.972	89.72	76-121
62 Bromobenzene	10.000	8.217	82.17	72-120
67 1,3,5-Trimethyl Be	10.000	8.920	89.20	74-123
65 2-Chloro Toluene	10.000	8.956	89.56	74-120
69 4-Chloro Toluene	10.000	8.750	87.50	75-120
70 T-Butyl Benzene	10.000	8.772	87.72	73-121
71 1,2,4-Trimethylben	10.000	8.911	89.11	73-124
72 S-Butyl Benzene	10.000	8.941	89.41	75-123
73 4-Isopropyl Toluen	10.000	8.970	89.70	71-125
74 1,3-Dichlorobenzen	10.000	8.441	84.41	72-120
76 1,4-Dichlorobenzen	10.000	8.245	82.45	76-120
77 N-Butyl Benzene	10.000	8.739	87.39	72-124
79 1,2-Dichlorobenzen	10.000	8.003	80.03	75-120
81 1,2-Dibromo 3-Chlo	10.000	6.419	64.19*	67-121
83 1,2,4-Trichloroben	10.000	7.874	78.74	71-120
82 Hexachloro 1,3-But	10.000	7.844	78.44	67-124
84 Naphthalene	10.000	7.909	79.09	71-125
85 1,2,3-Trichloroben	10.000	7.638	76.38	61-134

SURROGATE COMPOUND	AMOUNT ADDED ug/L	AMOUNT RECOVERED ug/L	% RECOVERED	LIMITS
$ 25 Dibromofluorometha	10.000	10.446	104.46	64-133

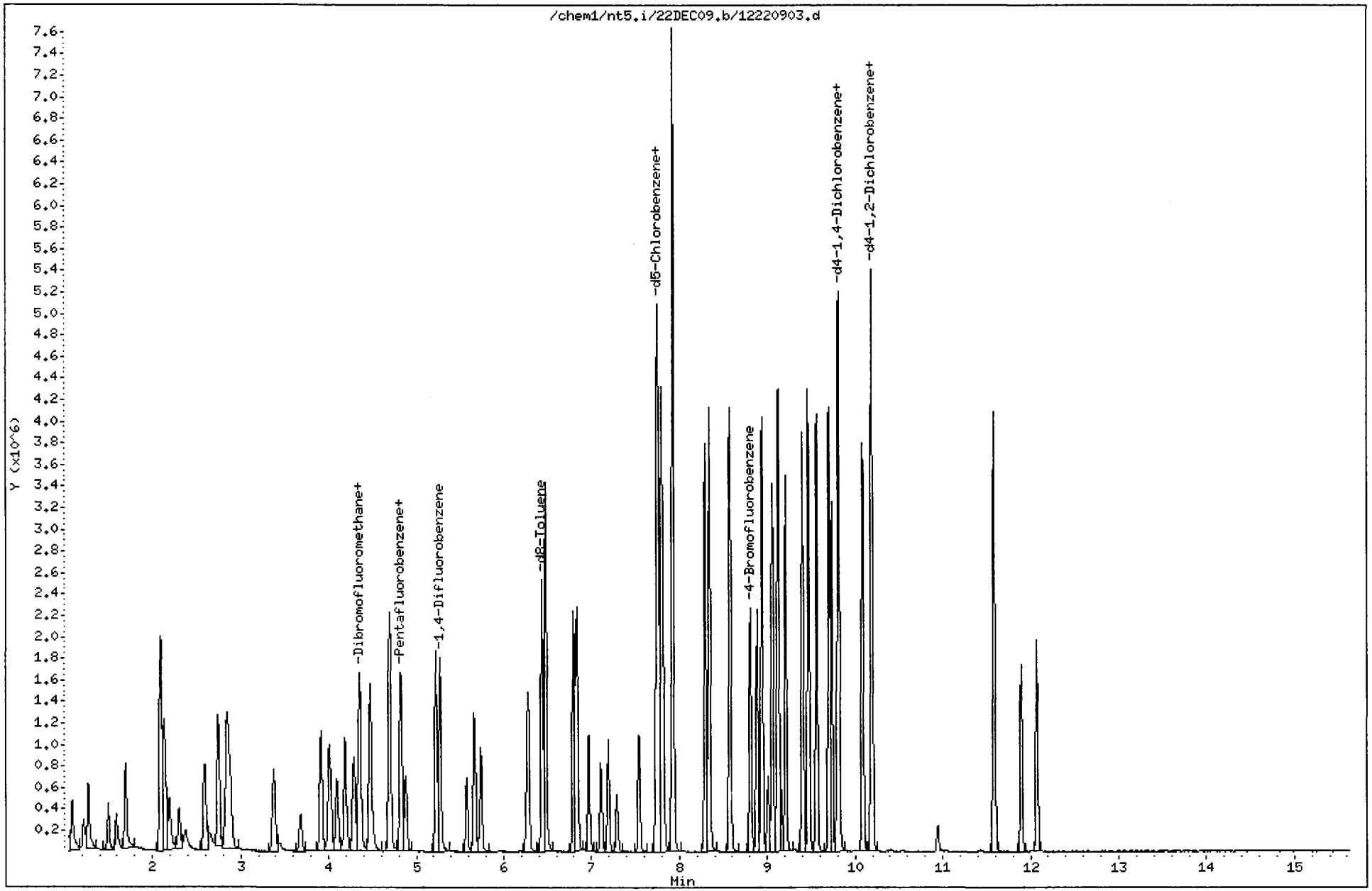
SURROGATE COMPOUND	AMOUNT ADDED ug/L	AMOUNT RECOVERED ug/L	% RECOVERED	LIMITS
$ 31 d4-1,2-Dichloroeth	10.000	8.856	88.56	70-132
$ 42 d8-Toluene	10.000	9.953	99.53	80-120
$ 61 4-Bromofluorobenze	10.000	10.632	106.32	80-120
$ 78 d4-1,2-Dichloroben	10.000	9.941	99.41	80-120

Data File: /chem1/nt5.i/22DEC09.b/12220903.d
Date : 22-DEC-2009 10:37
Client ID: LCS1222
Sample Info: LCS1222,10,10,0,

Instrument: nt5.i

Operator: PC
Column diameter: 0.18

Column phase: RTXVMS



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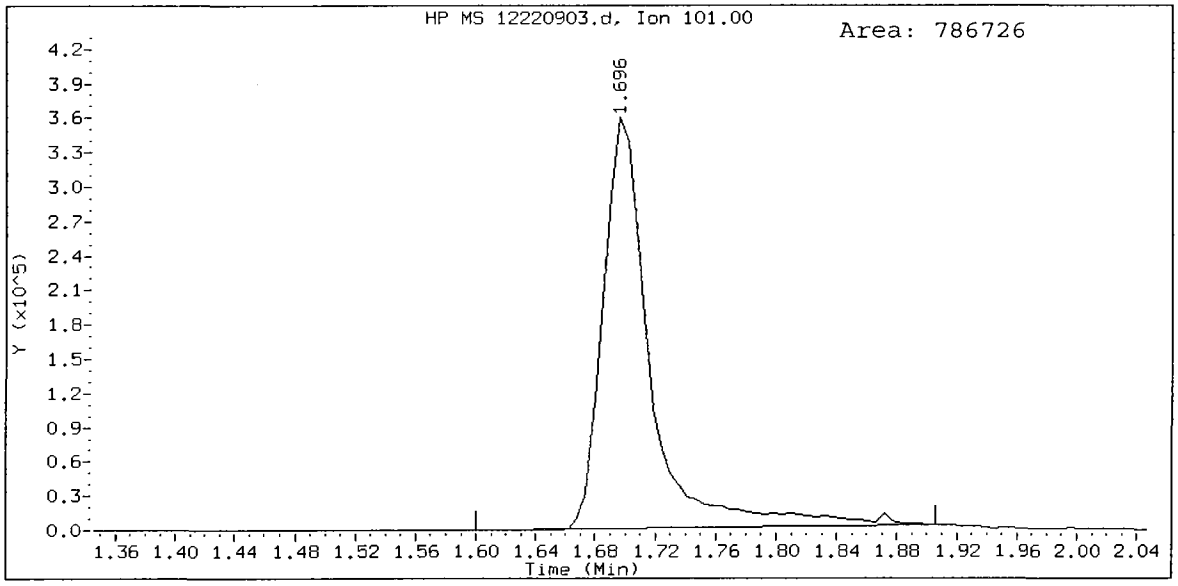

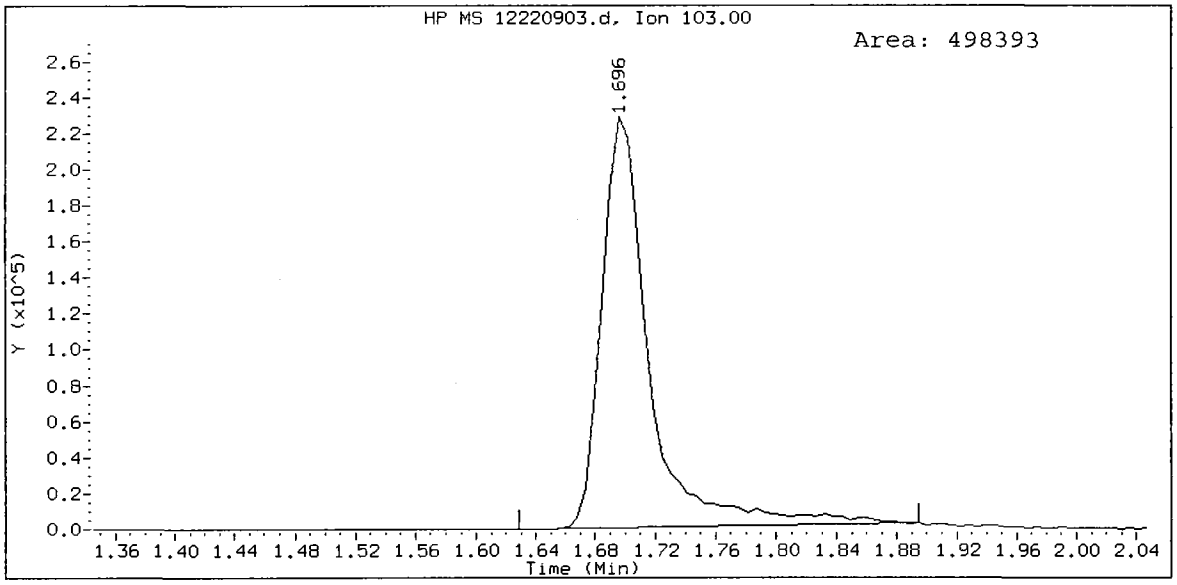

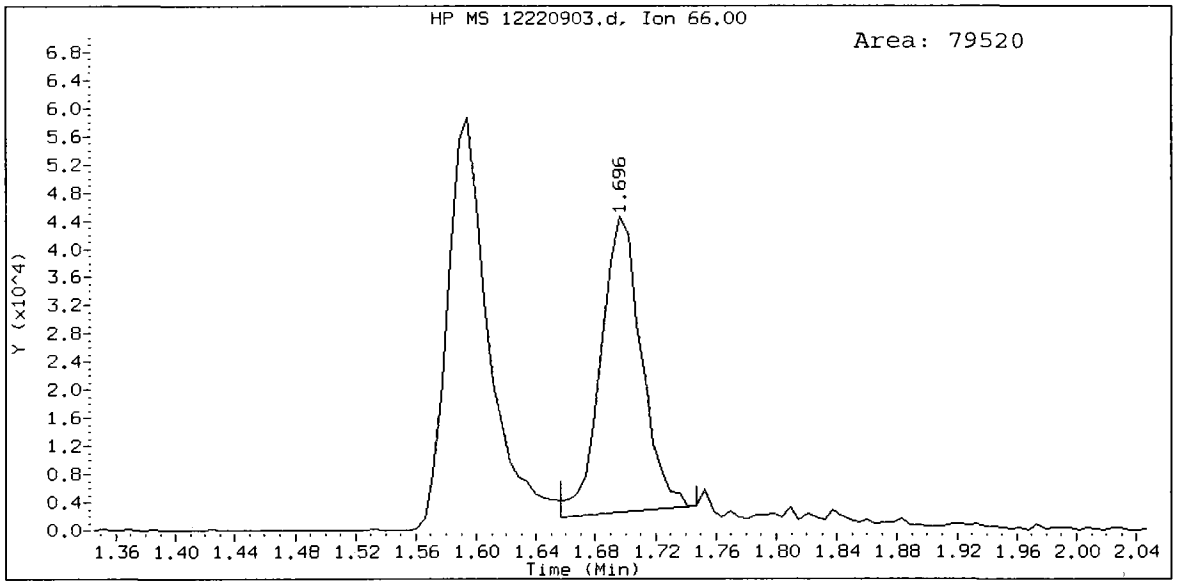

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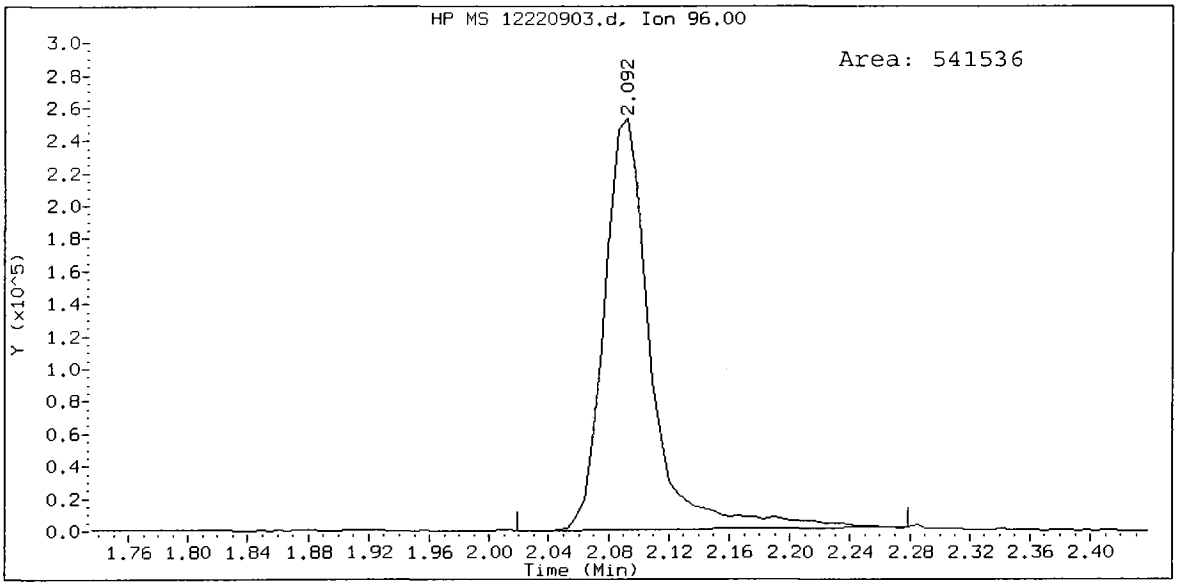
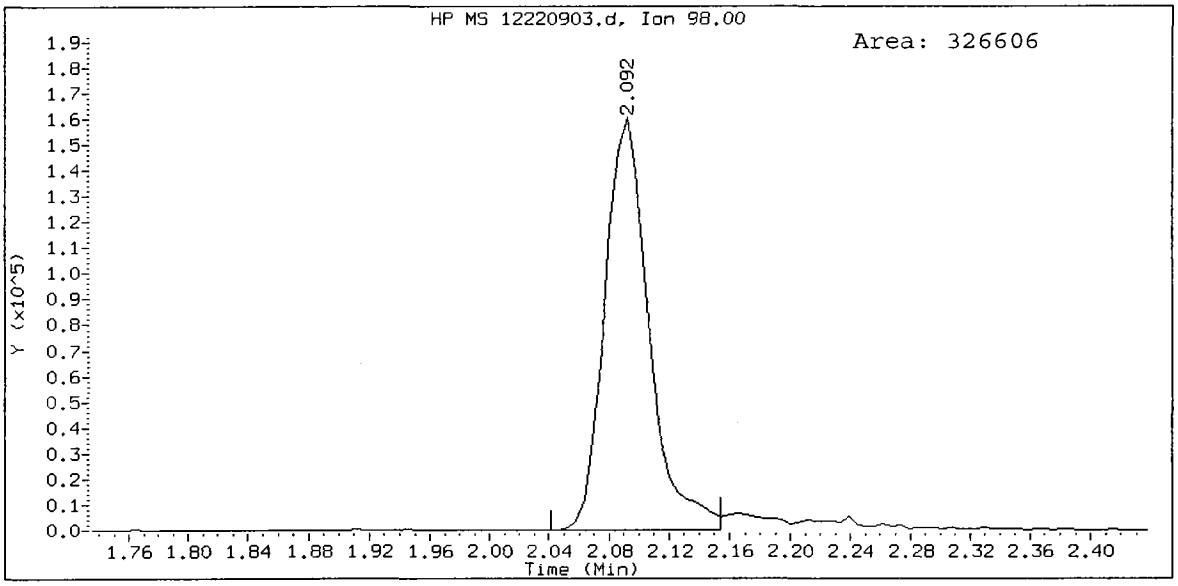
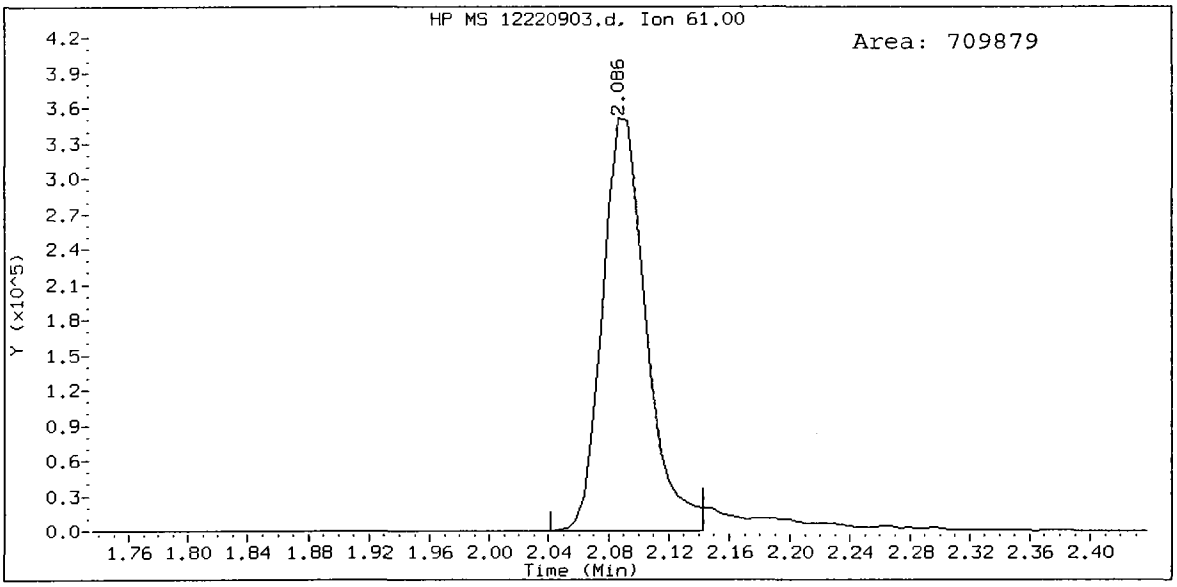
1,1-Dichloroethene Amount: 11.35







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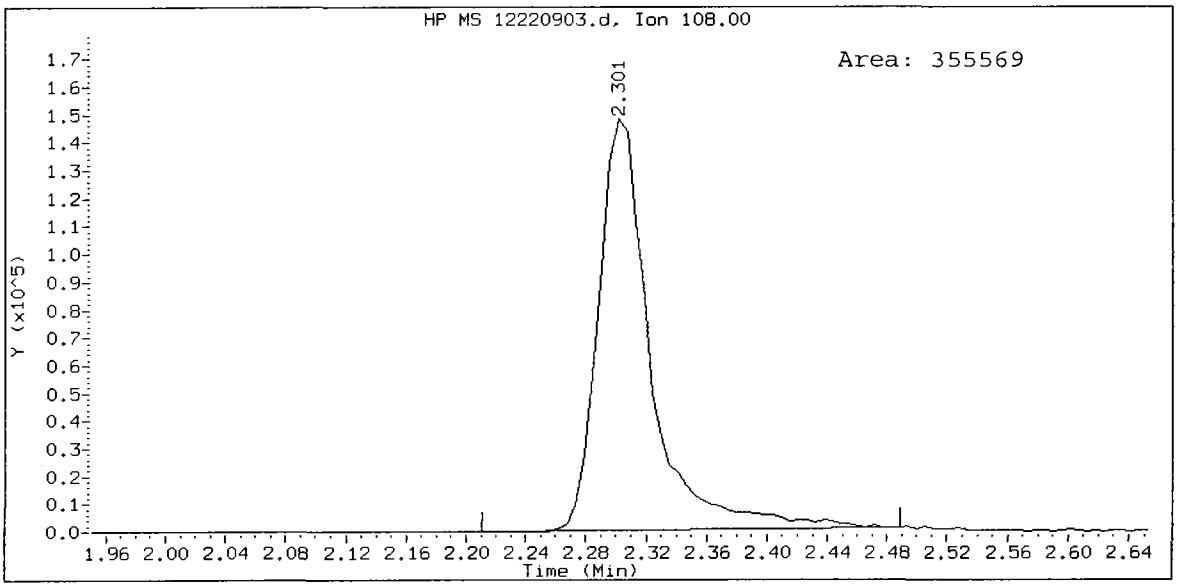
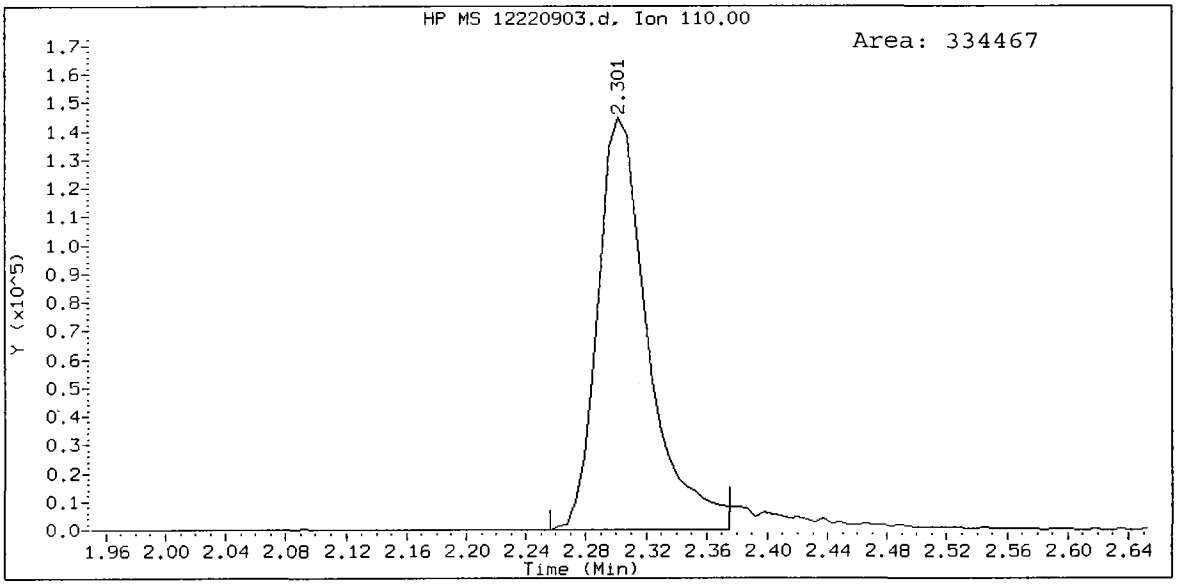
Bromoethane Amount: 12.31





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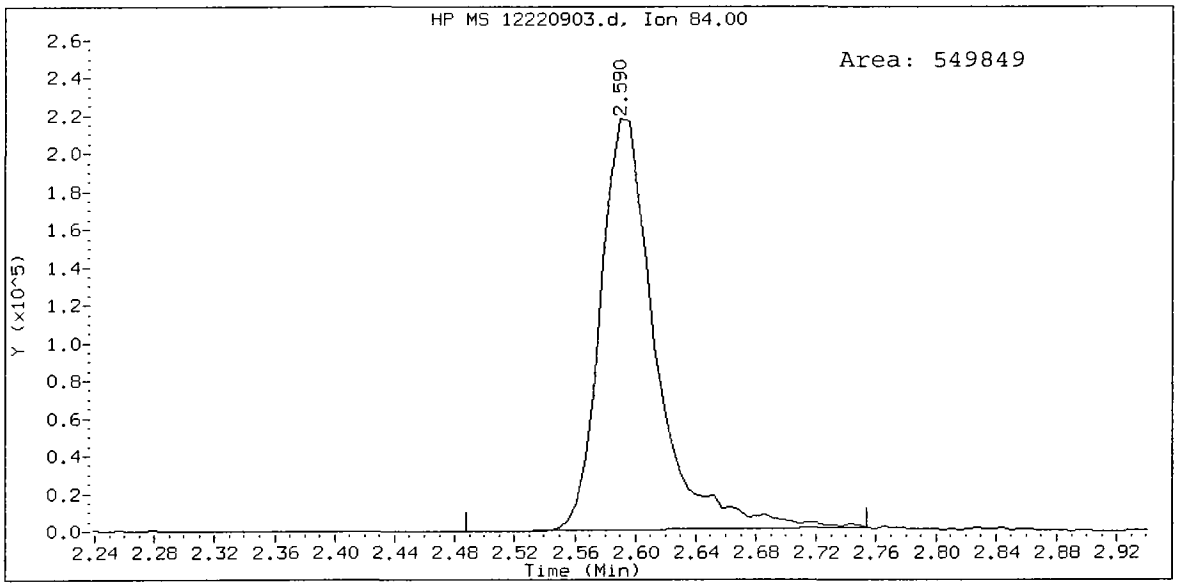
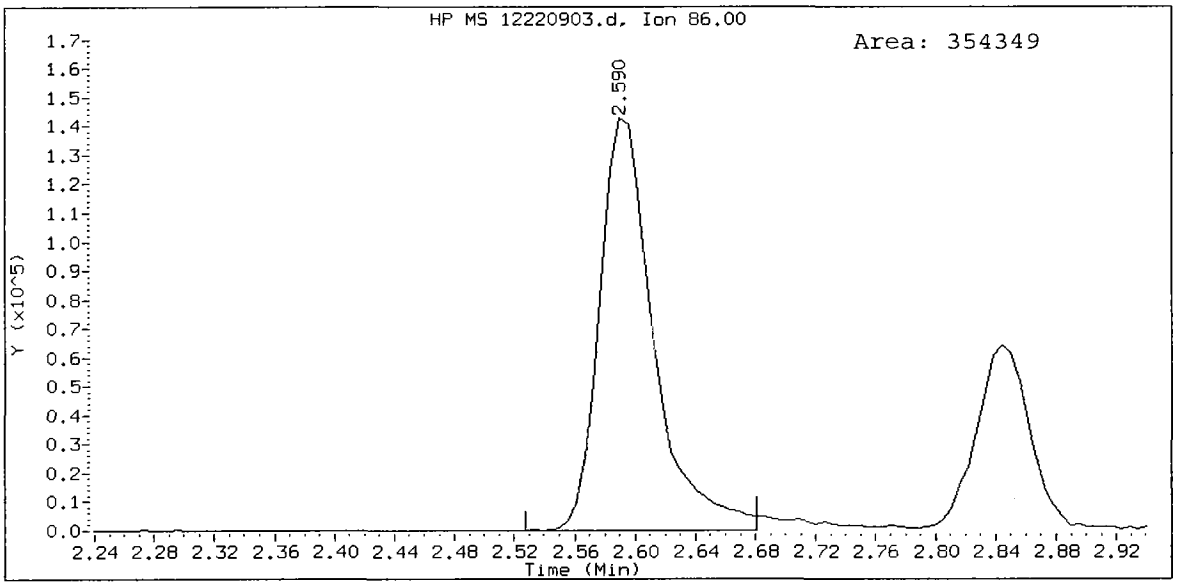
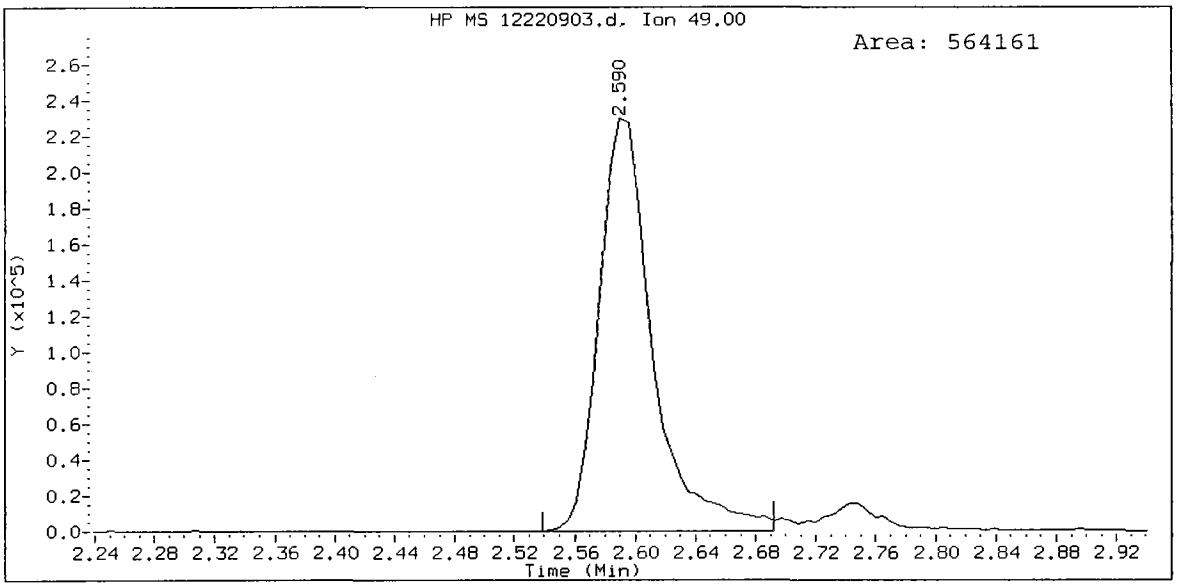
Methylene Chloride Amount: 10.95







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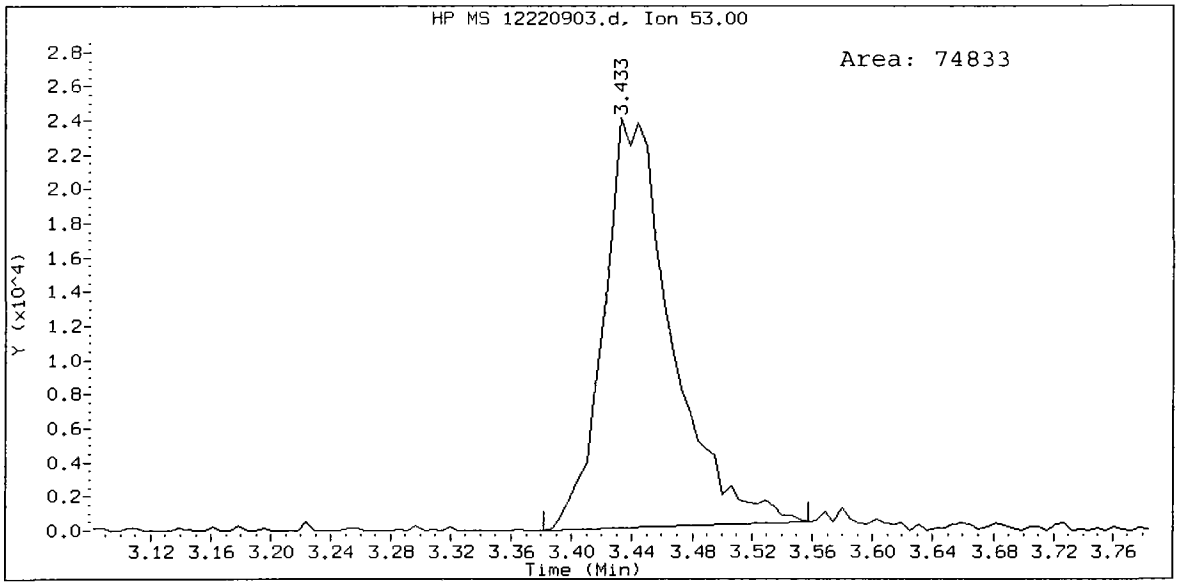
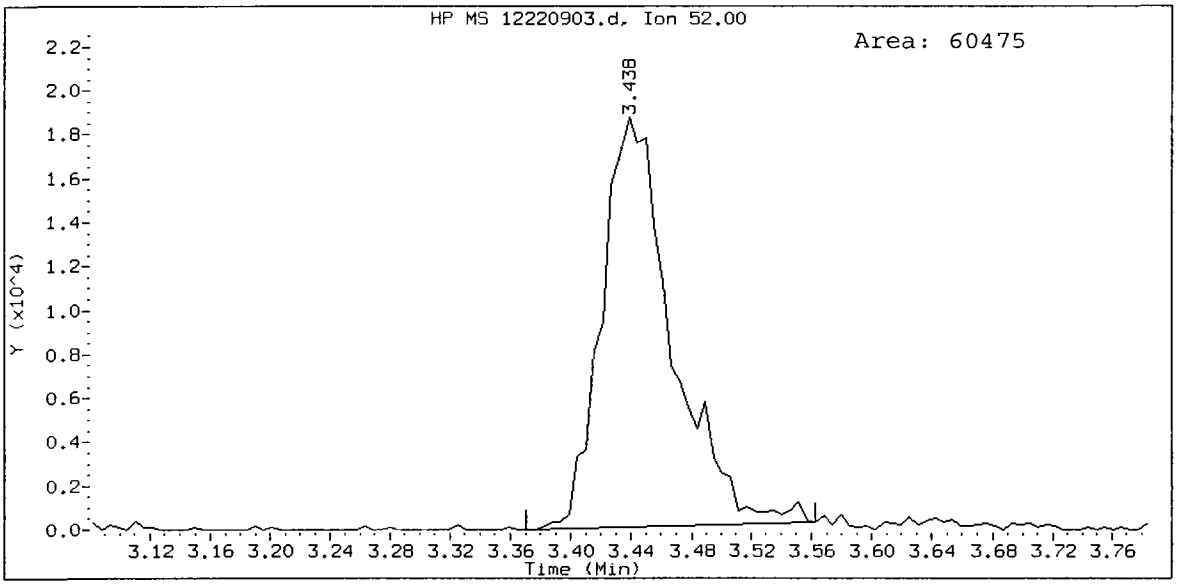
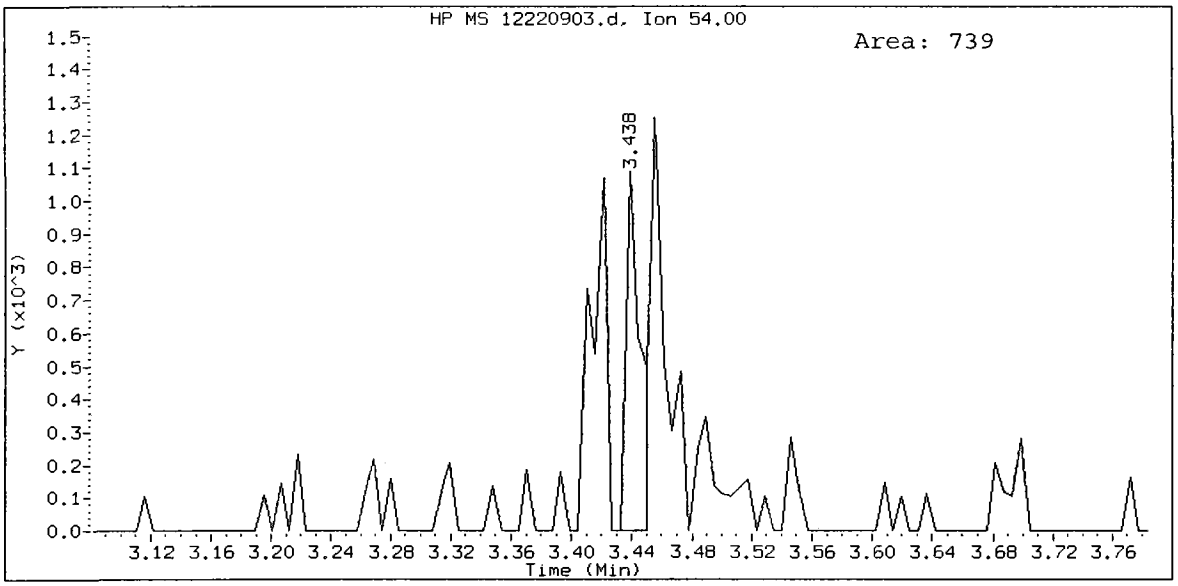
Acrylonitrile Amount: 8.71







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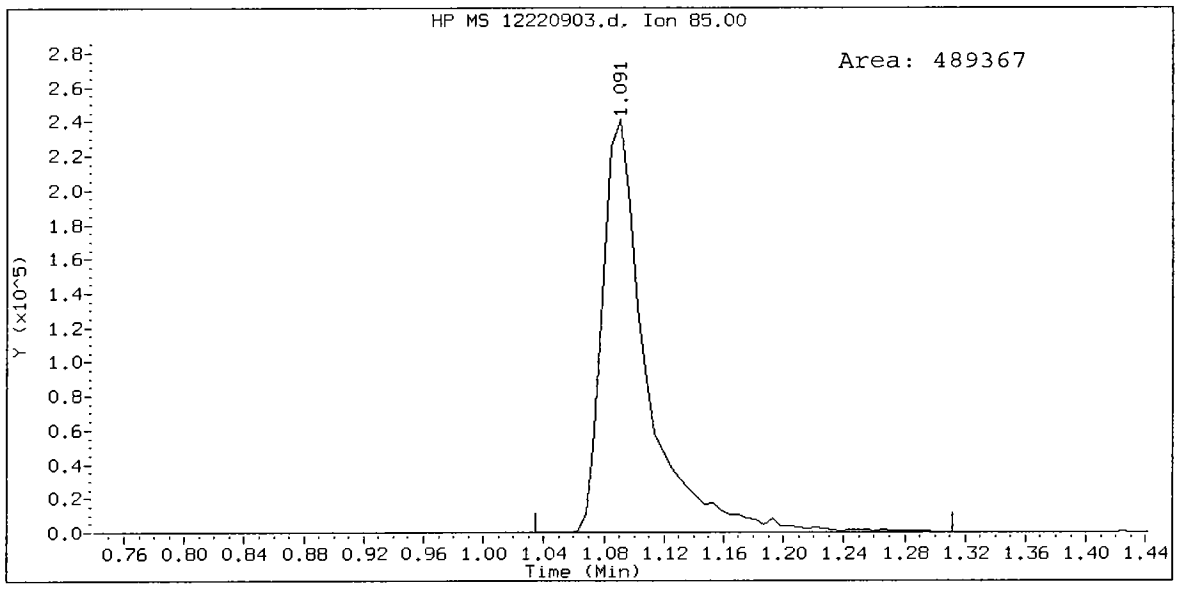
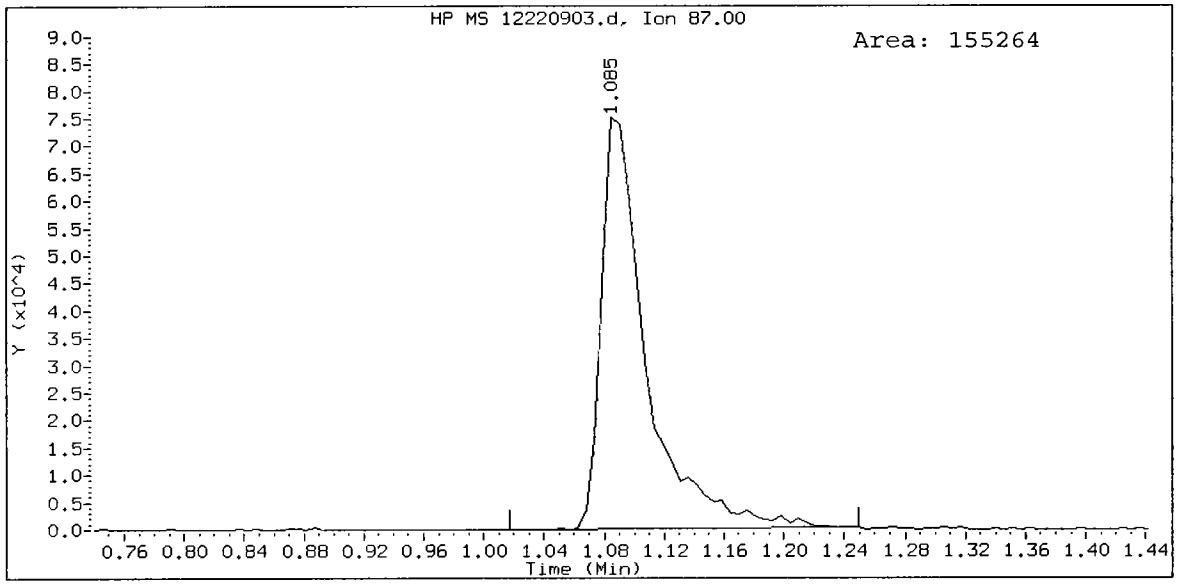
Dichlorodifluoromethane Amount: 8.80





PC 12/22/1

Analytical Resources, Inc.

8260C

Data file : /chem1/nt5.i/22DEC09.b/12220904.d
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Inj Date : 22-DEC-2009 11:03
Operator : PC Inst ID: nt5.i
Smp Info : LCSD1222,10,10,0,
Misc Info : 09-
Comment :
Method : /chem1/nt5.i/22DEC09.b/VO111809L.m
Meth Date : 23-Dec-2009 14:30 paul Quant Type: ISTD
Cal Date : 18-NOV-2009 16:46 Cal File: 11180913.d
Als bottle: 1 QC Sample: LCSD
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: voa.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
1 Dichlorodifluoromethane	85	1.091	1.091	(0.226)	480028	8.66484	8.665(M)
2 Chloromethane	50	1.221	1.215	(0.253)	478107	10.8077	10.808
3 Vinyl Chloride	62	1.272	1.272	(0.263)	598487	10.6876	10.688
4 Bromomethane	94	1.498	1.498	(0.310)	261941	8.02169	8.022
5 Chloroethane	64	1.594	1.594	(0.330)	342767	10.9263	10.926(M)
6 Trichlorofluoromethane	101	1.696	1.696	(0.351)	774071	10.1063	10.106(M)
12 Acrolein	56	2.381	2.375	(0.493)	209300	56.2450	56.245
9 112Trichloro122Trifluoroethane	101	2.137	2.132	(0.442)	521526	10.5060	10.506(Q)
14 Acetone	43	2.658	2.652	(0.550)	251094	39.1912	39.191(M)
7 1,1-Dichloroethene	96	2.086	2.086	(0.432)	514722	10.8298	10.830(M)
11 Bromoethane	108	2.301	2.301	(0.476)	347775	12.0857	12.086(M)
10 Iodomethane	142	2.194	2.194	(0.454)	484221	9.30743	9.307
13 Methylene Chloride	84	2.590	2.590	(0.536)	544479	10.8876	10.888(Q)
18 Acrylonitrile	53	3.438	3.433	(0.712)	74653	8.72572	8.726(M)
16 Methyl tert butyl ether	73	2.873	2.873	(0.595)	1082486	9.35043	9.350
8 Carbon Disulfide	76	2.098	2.098	(0.434)	1662639	10.7994	10.799

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
	15 Trans-1,2-Dichloroethene	96	2.748	2.743	(0.569)	578945	10.3508	10.351
	19 Vinyl Acetate	43	3.682	3.682	(0.762)	534029	9.76590	9.766
	17 1,1-Dichloroethane	63	3.376	3.376	(0.699)	867296	11.1937	11.194
	29 2-Butanone	72	4.491	4.490	(0.930)	150273	41.3115	41.311
	21 2,2-Dichloropropane	77	4.010	4.010	(0.830)	830608	10.5198	10.520
	20 Cis-1,2-Dichloroethene	96	3.914	3.913	(0.810)	574896	10.6595	10.659
*	32 Pentafluorobenzene	168	4.830	4.830	(1.000)	1016685	10.0000	
	23 Chloroform	83	4.191	4.191	(0.868)	881200	10.6938	10.694
	22 Bromochloromethane	128	4.095	4.095	(0.848)	239604	10.1314	10.131
$	25 Dibromofluoromethane	111	4.355	4.355	(0.902)	383373	10.6592	10.659
	26 1,1,1-Trichloroethane	97	4.355	4.355	(0.902)	863754	10.5966	10.597
	28 1,1-Dichloropropene	75	4.474	4.473	(0.848)	714474	10.0896	10.090
	24 Carbon Tetrachloride	117	4.293	4.287	(0.813)	654076	9.41736	9.417
$	31 d4-1,2-Dichloroethane	65	4.819	4.819	(0.998)	337793	8.75143	8.751
	33 1,2-Dichloroethane	62	4.881	4.881	(0.925)	525673	8.84504	8.845
	30 Benzene	78	4.700	4.694	(0.891)	2132107	10.5059	10.506
*	35 1,4-Difluorobenzene	114	5.277	5.277	(1.000)	1543771	10.0000	
	34 Trichloroethene	130	5.226	5.226	(0.990)	648563	10.1797	10.180
	38 1,2-Dichloropropane	63	5.667	5.667	(1.074)	456865	10.2717	10.272
	39 Bromodichloromethane	83	5.741	5.741	(1.088)	604418	9.92413	9.924
	37 Dibromomethane	93	5.577	5.577	(1.057)	227729	8.64654	8.647
	40 2-Chloroethyl Vinyl Ether	63	6.261	6.261	(1.187)	167035	8.80657	8.807(Q)
	45 4-Methyl-2-Pentanone	58	6.827	6.827	(1.294)	419701	44.0425	44.042
	41 Cis 1,3-dichloropropene	75	6.284	6.284	(1.191)	785335	9.87944	9.879
$	42 d8-Toluene	98	6.437	6.436	(1.220)	1607109	9.97356	9.974
	43 Toluene	92	6.482	6.482	(1.228)	1474059	10.5604	10.560
	46 Trans 1,3-Dichloropropene	75	6.844	6.844	(1.297)	622578	9.15898	9.159
	51 2-Hexanone	43	7.540	7.540	(0.974)	619619	39.6599	39.660
	47 1,1,2-Trichloroethane	97	6.968	6.974	(1.321)	348017	9.31906	9.319
	49 1,3-Dichloropropane	76	7.195	7.194	(0.930)	580500	8.60972	8.610
	44 Tetrachloroethene	166	6.799	6.798	(0.879)	674321	9.11187	9.112
	48 Chlorodibromomethane	129	7.110	7.110	(0.919)	437460	8.80931	8.809
	50 1,2-Dibromoethane	107	7.291	7.291	(1.382)	345177	9.01602	9.016
*	52 d5-Chlorobenzene	117	7.738	7.743	(1.000)	1488843	10.0000	
	53 Chlorobenzene	112	7.755	7.755	(1.002)	1565711	9.40413	9.404(Q)
	54 Ethyl Benzene	91	7.794	7.800	(1.007)	2921501	9.87833	9.878
	55 1,1,1,2-Tetrachloroethane	131	7.817	7.817	(1.010)	534970	9.04034	9.040
	56 m,p-xylene	106	7.930	7.930	(1.025)	2181209	19.2711	19.271
	57 o-Xylene	106	8.292	8.292	(1.072)	1076155	9.67716	9.677
	58 Styrene	104	8.343	8.343	(1.078)	1715001	9.66639	9.666
	60 Isopropyl Benzene	105	8.575	8.575	(0.875)	2640588	8.83233	8.832
	59 Bromoform	173	8.343	8.343	(0.851)	228699	7.25948	7.259
	64 1,1,2,2-Tetrachloroethane	83	9.011	9.010	(0.919)	321915	7.92332	7.923
$	61 4-Bromofluorobenzene	95	8.807	8.807	(1.138)	733164	10.6105	10.610
	66 1,2,3-Trichloropropane	110	9.112	9.112	(0.930)	99326	7.05628	7.056(R)
	68 Trans-1,4-Dichloro 2-Butene	53	9.163	9.163	(0.935)	92307	7.29198	7.292
	63 N-Propyl Benzene	91	8.943	8.942	(0.912)	2934576	8.78017	8.780

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ug/L)	FINAL (ug/L)
62 Bromobenzene	156	8.886	8.886	(0.906)	659385	7.97751	7.978
67 1,3,5-Trimethyl Benzene	105	9.129	9.129	(0.931)	2219790	8.67920	8.679
65 2-Chloro Toluene	91	9.061	9.061	(0.924)	1811252	8.75042	8.750
69 4-Chloro Toluene	91	9.208	9.208	(0.939)	1873699	8.65733	8.657
70 T-Butyl Benzene	119	9.401	9.401	(0.959)	1941920	8.61960	8.620
71 1,2,4-Trimethylbenzene	105	9.469	9.469	(0.966)	2254618	8.80482	8.805
72 S-Butyl Benzene	105	9.565	9.565	(0.976)	2703994	8.66960	8.670
73 4-Isopropyl Toluene	119	9.701	9.706	(0.990)	2334249	8.66491	8.665
74 1,3-Dichlorobenzene	146	9.735	9.734	(0.993)	1281671	8.12436	8.124
* 75 d4-1,4-Dichlorobenzene	152	9.802	9.808	(1.000)	917156	10.0000	
76 1,4-Dichlorobenzene	146	9.819	9.819	(1.002)	1300932	8.17411	8.174(Q)
77 N-Butyl Benzene	91	10.085	10.085	(1.029)	1957872	8.57067	8.571
$ 78 d4-1,2-Dichlorobenzene	152	10.187	10.187	(1.039)	830306	10.0990	10.099
79 1,2-Dichlorobenzene	146	10.198	10.198	(1.040)	1133759	7.82765	7.828(Q)
81 1,2-Dibromo 3-Chloropropane	75	10.940	10.945	(1.116)	57271	6.51708	6.517(R)
83 1,2,4-Trichlorobenzene	180	11.590	11.590	(1.182)	758294	7.72566	7.726
82 Hexachloro 1,3-Butadiene	225	11.584	11.584	(1.182)	342604	7.79289	7.793
84 Naphthalene	128	11.896	11.895	(1.214)	1292589	7.92415	7.924
85 1,2,3-Trichlorobenzene	180	12.071	12.076	(1.231)	604937	7.65030	7.650

QC Flag Legend

Q - Qualifier signal failed the ratio test.
R - Spike/Surrogate failed recovery limits.
M - Compound response manually integrated.

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt5.i
Lab File ID: 12220904.d
Lab Smp Id: LCSD1222
Analysis Type: VOA
Quant Type: ISTD
Operator: PC
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-

Calibration Date: 22-DEC-2009
Calibration Time: 10:12
Client Smp ID: LCSD1222
Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 5.
If Continuing Cal. use Initial Cal. Level 5

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	818327	409164	1636654	1016685	24.24
35 1,4-Difluorobenze	1179007	589504	2358014	1543771	30.94
52 d5-Chlorobenzene	1047488	523744	2094976	1488843	42.13
75 d4-1,4-Dichlorobe	586906	293453	1173812	917156	56.27

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
32 Pentafluorobenzen	4.83	4.33	5.33	4.83	0.00
35 1,4-Difluorobenze	5.28	4.78	5.78	5.28	0.00
52 d5-Chlorobenzene	7.74	7.24	8.24	7.74	-0.07
75 d4-1,4-Dichlorobe	9.81	9.31	10.31	9.80	-0.06

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Lab Smp Id: LCSD1222
Level: LOW
Data Type: MS DATA
SpikeList File: all.spk
Sublist File: voa.sub
Method File: /chem1/nt5.i/22DEC09.b/VO111809L.m
Misc Info: 09-

Client SDG: 22DEC09
Fraction: VOA
Client Smp ID: LCSD1222
Operator: PC
SampleType: LCSD
Quant Type: ISTD

SPIKE	COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
1	Dichlorodifluorome	10.000	8.665	86.65	59-129
16	Methyl tert butyl	10.000	9.350	93.50	78-120
2	Chloromethane	10.000	10.808	108.08	66-123
3	Vinyl Chloride	10.000	10.688	106.88	68-121
4	Bromomethane	10.000	8.022	80.22	55-148
5	Chloroethane	10.000	10.926	109.26	47-155
6	Trichlorofluoromet	10.000	10.106	101.06	70-129
12	Acrolein	50.000	56.245	112.49	24-170
9	112Trichloro122Tri	10.000	10.506	105.06	74-127
14	Acetone	50.000	39.191	78.38	70-130
7	1,1-Dichloroethene	10.000	10.830	108.30	72-120
11	Bromoethane	10.000	12.086	120.86	73-131
10	Iodomethane	10.000	9.307	93.07	34-183
13	Methylene Chloride	10.000	10.888	108.88	70-124
8	Carbon Disulfide	10.000	10.799	107.99	66-129
18	Acrylonitrile	10.000	8.726	87.26	71-135
15	Trans-1,2-Dichloro	10.000	10.351	103.51	76-120
19	Vinyl Acetate	10.000	9.766	97.66	49-134
17	1,1-Dichloroethane	10.000	11.194	111.94	75-120
29	2-Butanone	50.000	41.311	82.62	78-131
21	2,2-Dichloropropan	10.000	10.520	105.20	68-121
20	Cis-1,2-Dichloroet	10.000	10.659	106.59	80-120
23	Chloroform	10.000	10.694	106.94	78-120
22	Bromochloromethane	10.000	10.131	101.31	79-120
26	1,1,1-Trichloroeth	10.000	10.597	105.97	76-120
28	1,1-Dichloropropen	10.000	10.090	100.90	78-120
24	Carbon Tetrachlori	10.000	9.417	94.17	70-126
33	1,2-Dichloroethane	10.000	8.845	88.45	78-120
30	Benzene	10.000	10.506	105.06	79-120
34	Trichloroethene	10.000	10.180	101.80	78-120
38	1,2-Dichloropropan	10.000	10.272	102.72	80-120
39	Bromodichlorometha	10.000	9.924	99.24	78-120
37	Dibromomethane	10.000	8.647	86.47	80-120

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
40 2-Chloroethyl Viny	10.000	8.807	88.07	68-134
45 4-Methyl-2-Pentano	50.000	44.042	88.08	73-131
41 Cis 1,3-dichloropr	10.000	9.879	98.79	78-120
43 Toluene	10.000	10.560	105.60	79-120
46 Trans 1,3-Dichloro	10.000	9.159	91.59	75-120
51 2-Hexanone	50.000	39.660	79.32	75-130
47 1,1,2-Trichloroeth	10.000	9.319	93.19	79-120
49 1,3-Dichloropropan	10.000	8.610	86.10	78-120
44 Tetrachloroethene	10.000	9.112	91.12	72-120
48 Chlorodibromometha	10.000	8.809	88.09	78-120
50 1,2-Dibromoethane	10.000	9.016	90.16	75-120
53 Chlorobenzene	10.000	9.404	94.04	79-120
55 1,1,1,2-Tetrachlor	10.000	9.040	90.40	75-120
54 Ethyl Benzene	10.000	9.878	98.78	78-121
56 m,p-xylene	20.000	19.271	96.36	65-129
57 o-Xylene	10.000	9.677	96.77	76-120
58 Styrene	10.000	9.666	96.66	74-121
60 Isopropyl Benzene	10.000	8.832	88.32	74-120
59 Bromoform	10.000	7.259	72.59	71-120
64 1,1,2,2-Tetrachlor	10.000	7.923	79.23	72-120
66 1,2,3-Trichloropro	10.000	7.056	70.56*	73-120
68 Trans-1,4-Dichloro	10.000	7.292	72.92	65-135
63 N-Propyl Benzene	10.000	8.780	87.80	76-121
62 Bromobenzene	10.000	7.978	79.78	72-120
67 1,3,5-Trimethyl Be	10.000	8.679	86.79	74-123
65 2-Chloro Toluene	10.000	8.750	87.50	74-120
69 4-Chloro Toluene	10.000	8.657	86.57	75-120
70 T-Butyl Benzene	10.000	8.620	86.20	73-121
71 1,2,4-Trimethylben	10.000	8.805	88.05	73-124
72 S-Butyl Benzene	10.000	8.670	86.70	75-123
73 4-Isopropyl Toluen	10.000	8.665	86.65	71-125
74 1,3-Dichlorobenzen	10.000	8.124	81.24	72-120
76 1,4-Dichlorobenzen	10.000	8.174	81.74	76-120
77 N-Butyl Benzene	10.000	8.571	85.71	72-124
79 1,2-Dichlorobenzen	10.000	7.828	78.28	75-120
81 1,2-Dibromo 3-Chlo	10.000	6.517	65.17*	67-121
83 1,2,4-Trichloroben	10.000	7.726	77.26	71-120
82 Hexachloro 1,3-But	10.000	7.793	77.93	67-124
84 Naphthalene	10.000	7.924	79.24	71-125
85 1,2,3-Trichloroben	10.000	7.650	76.50	61-134

SURROGATE COMPOUND	AMOUNT ADDED ug/L	AMOUNT RECOVERED ug/L	% RECOVERED	LIMITS
$ 25 Dibromofluorometha	10.000	10.659	106.59	64-133

SURROGATE COMPOUND	AMOUNT ADDED ug/L	AMOUNT RECOVERED ug/L	% RECOVERED	LIMITS
$ 31 d4-1,2-Dichloroeth	10.000	8.751	87.51	70-132
$ 42 d8-Toluene	10.000	9.974	99.74	80-120
$ 61 4-Bromofluorobenze	10.000	10.610	106.10	80-120
$ 78 d4-1,2-Dichloroben	10.000	10.099	100.99	80-120

Data File: /chem1/nt5.i/22DEC09.b/12220904.d

Date : 22-DEC-2009 11:03

Client ID: LCSD1222

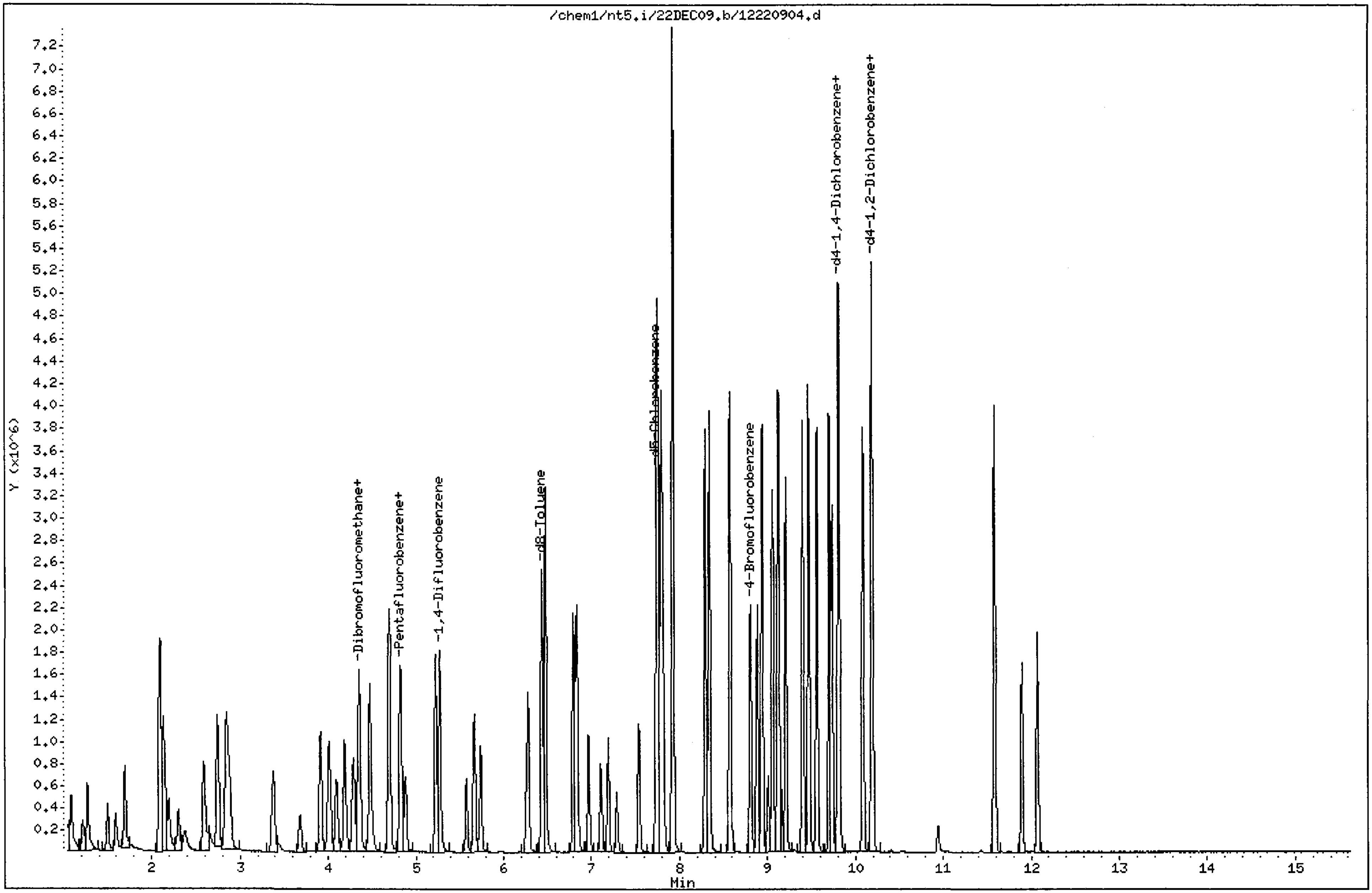
Sample Info: LCSD1222,10,10,0,

Column phase: RTXVMS

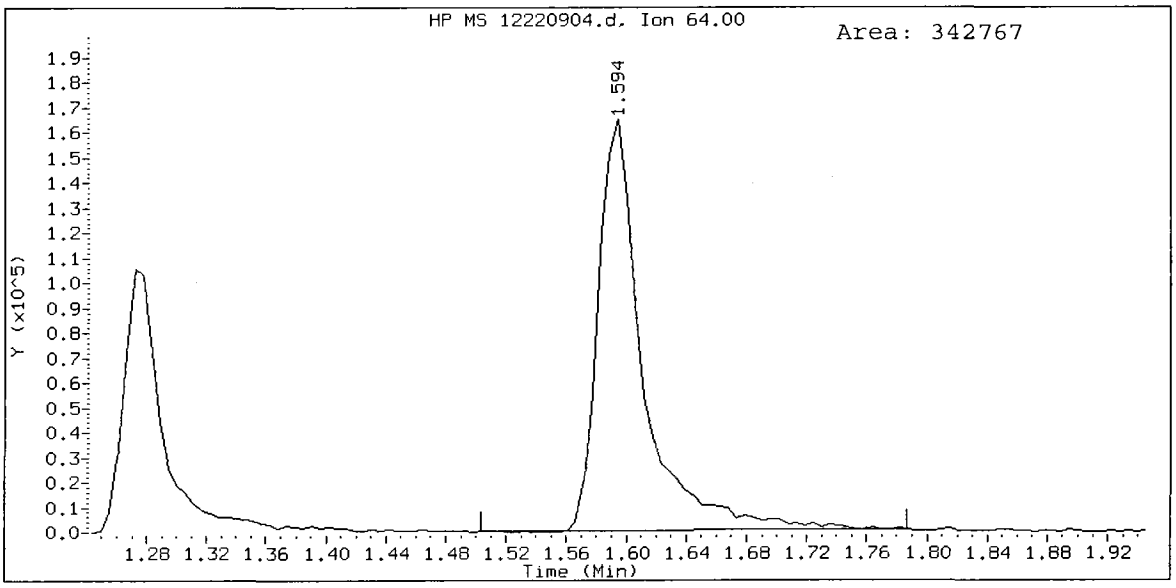
Instrument: nt5.i

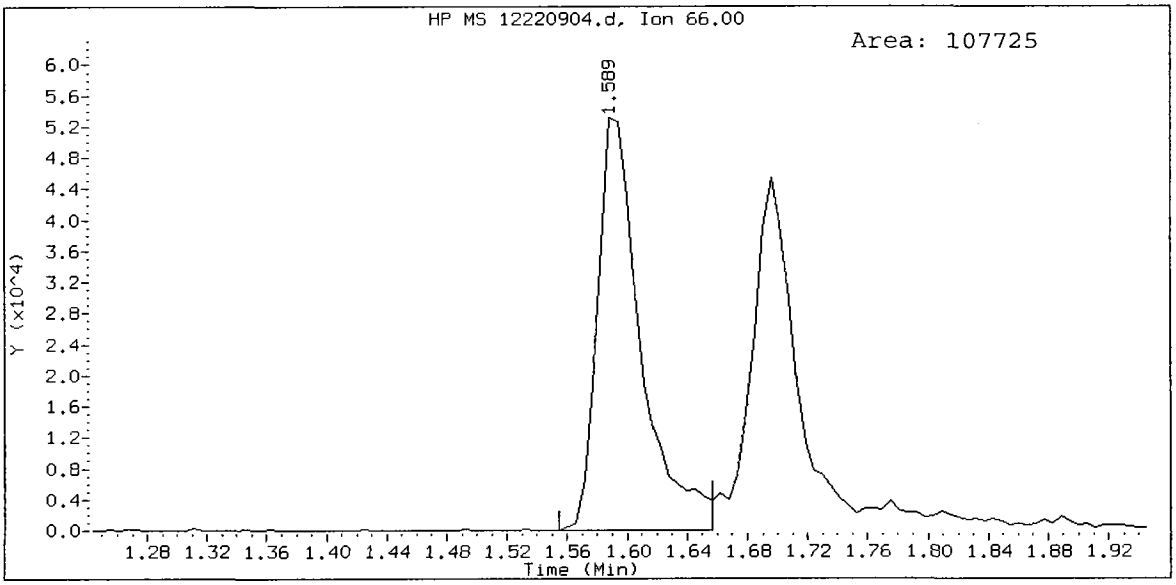
Operator: PC

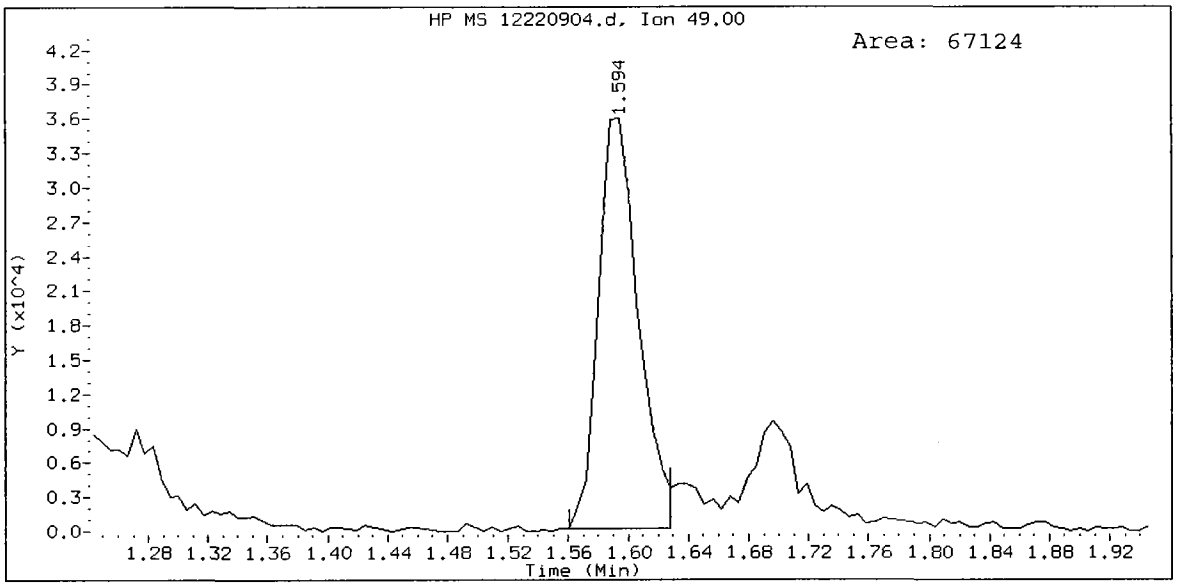
Column diameter: 0.18



LCSD1222, /chem1/nt5.i/22DEC09.b/12220904.d
Chloroethane Amount: 10.93







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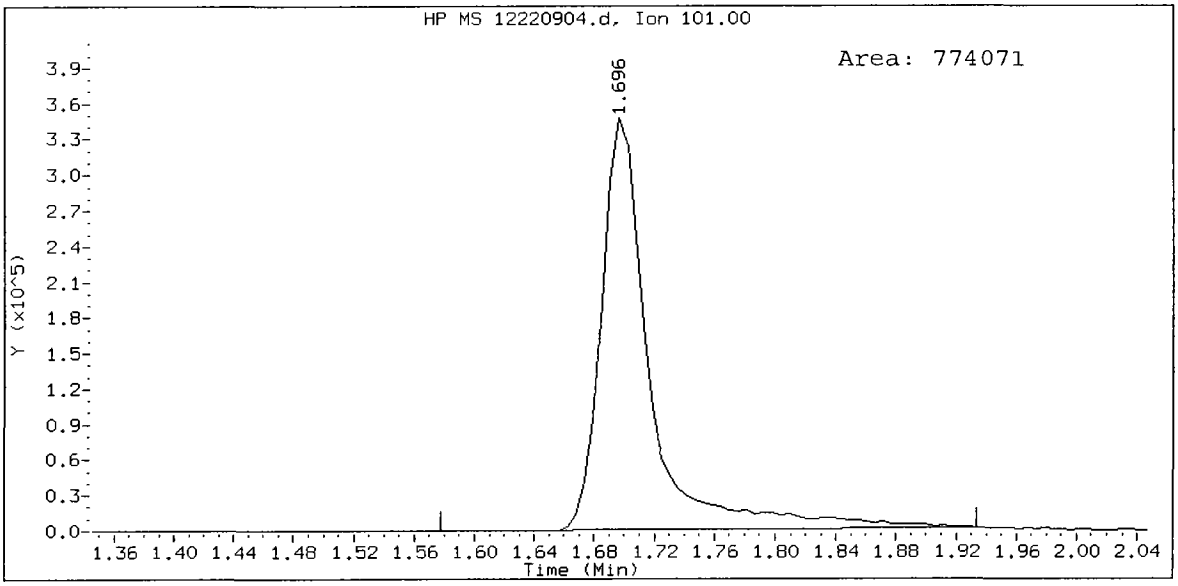
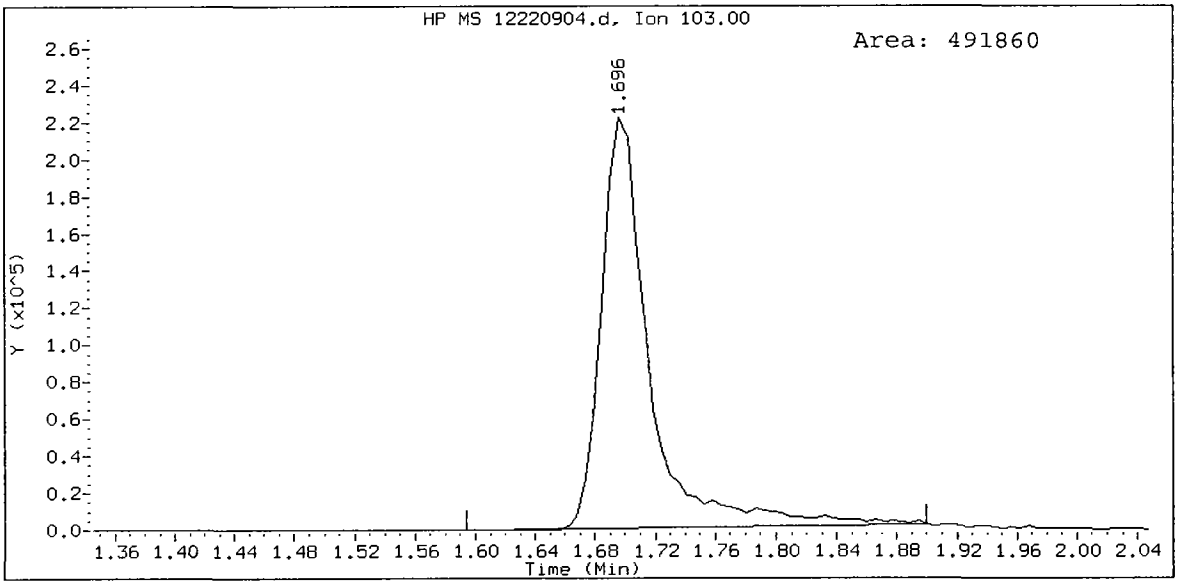
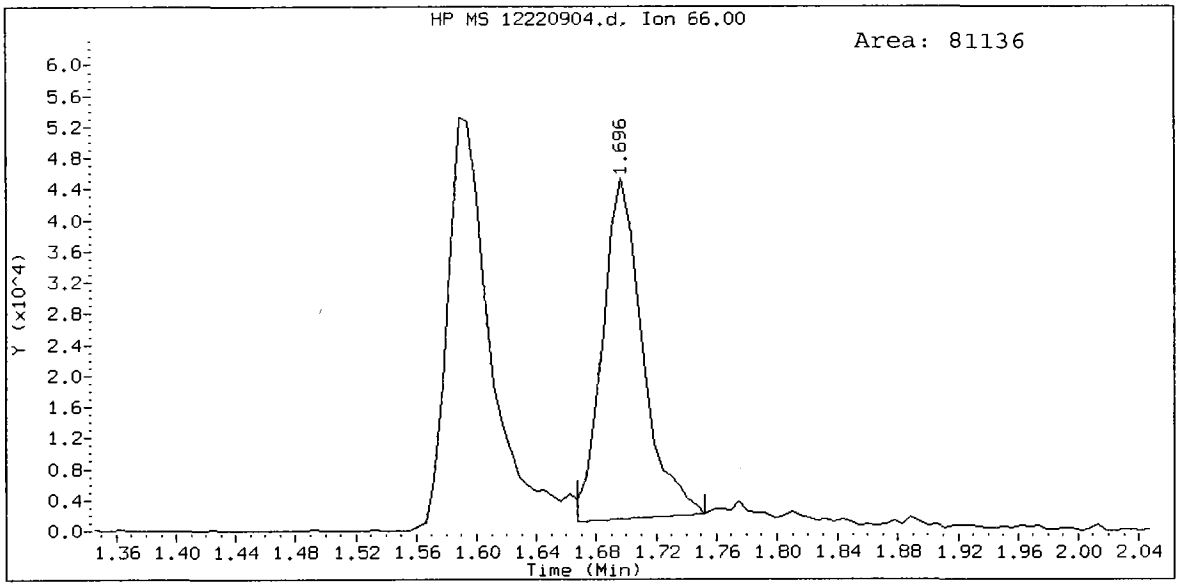
Trichlorofluoromethane Amount: 10.11







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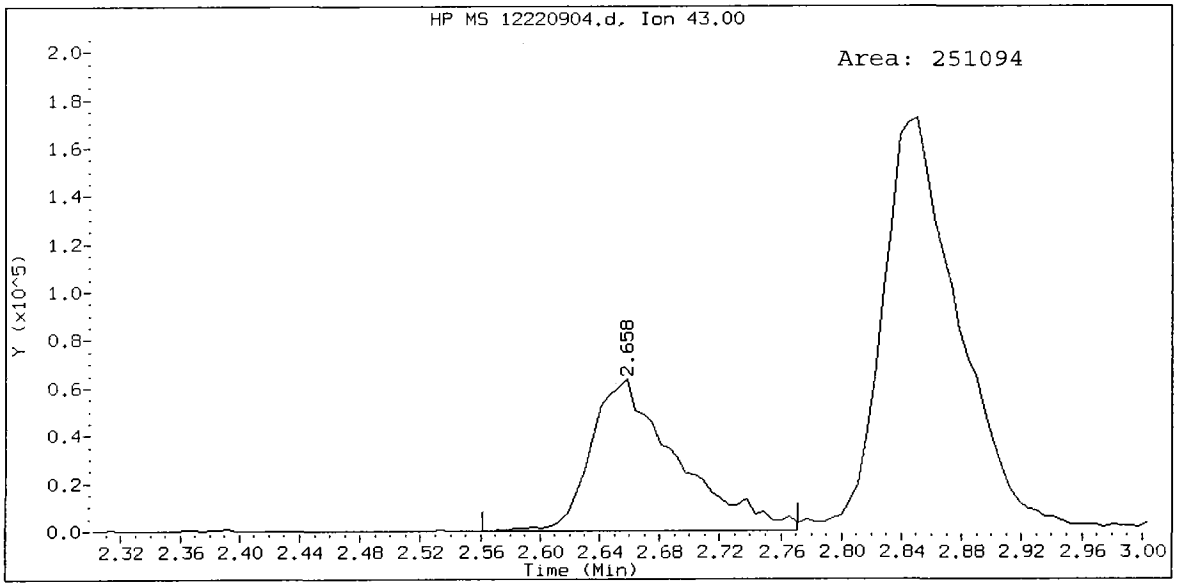
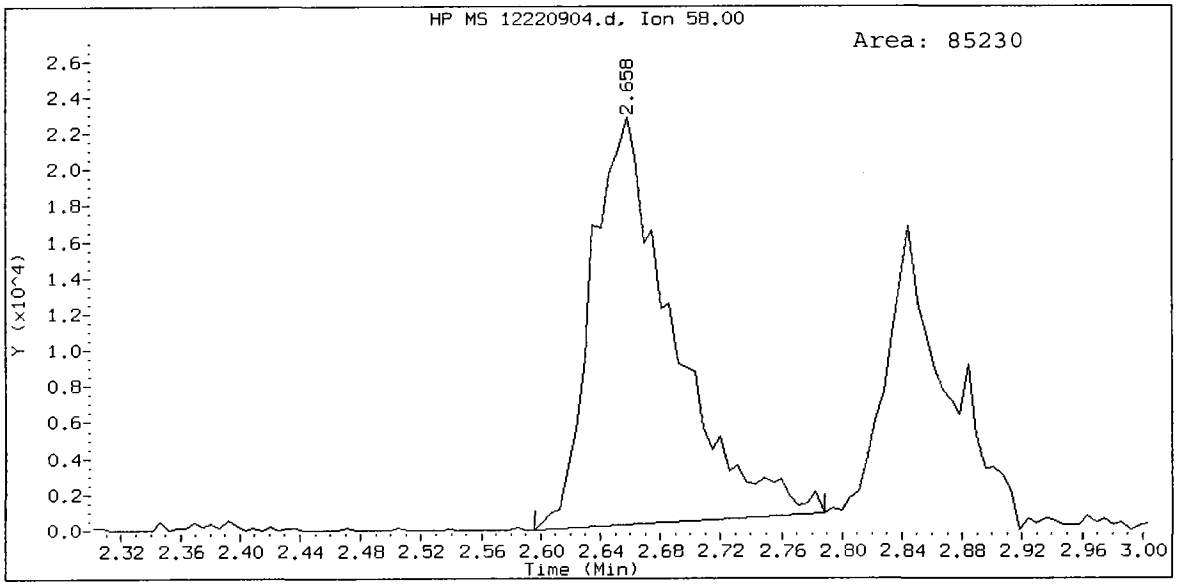
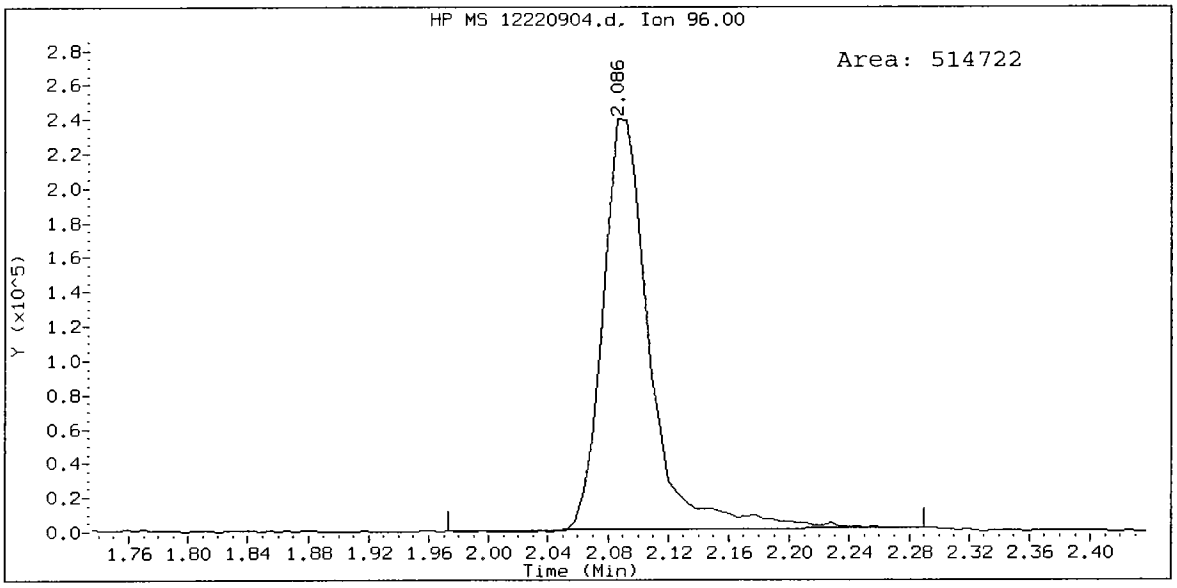
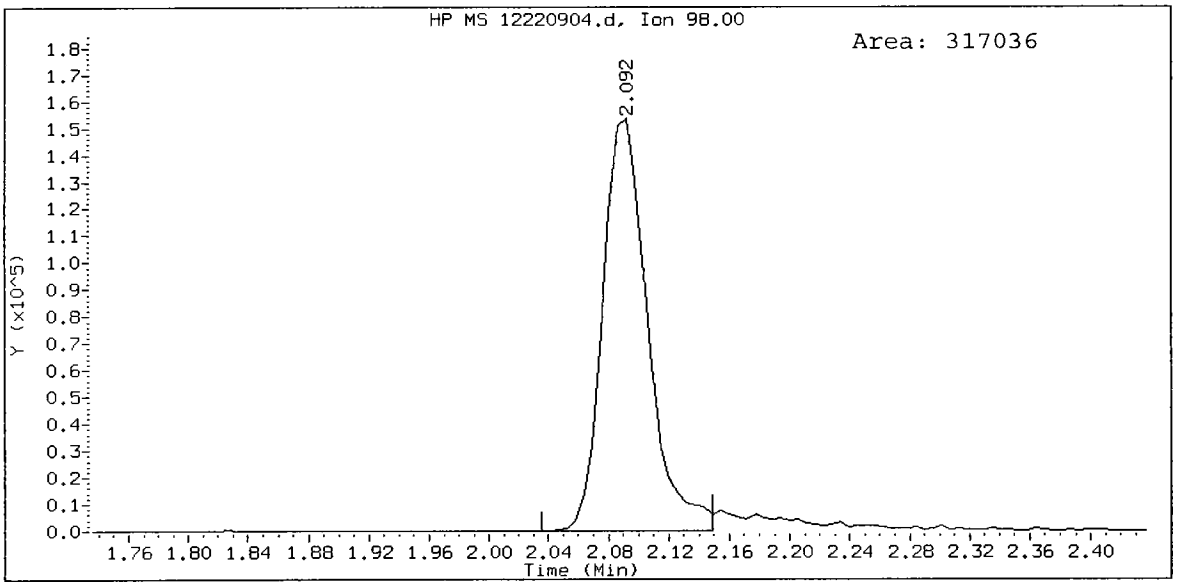
Acetone Amount: 39.19

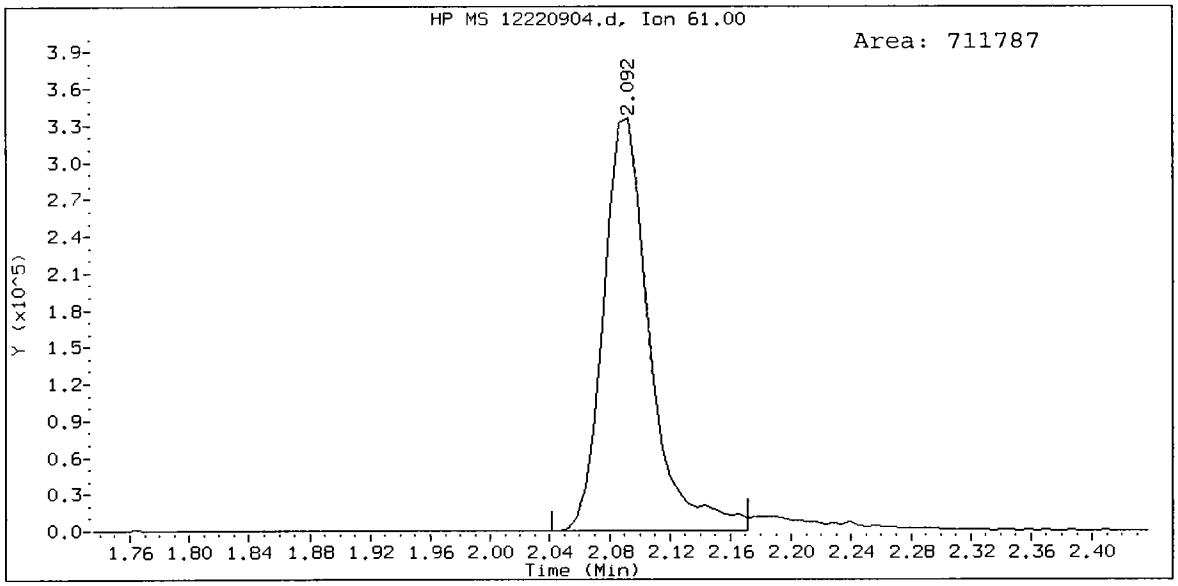




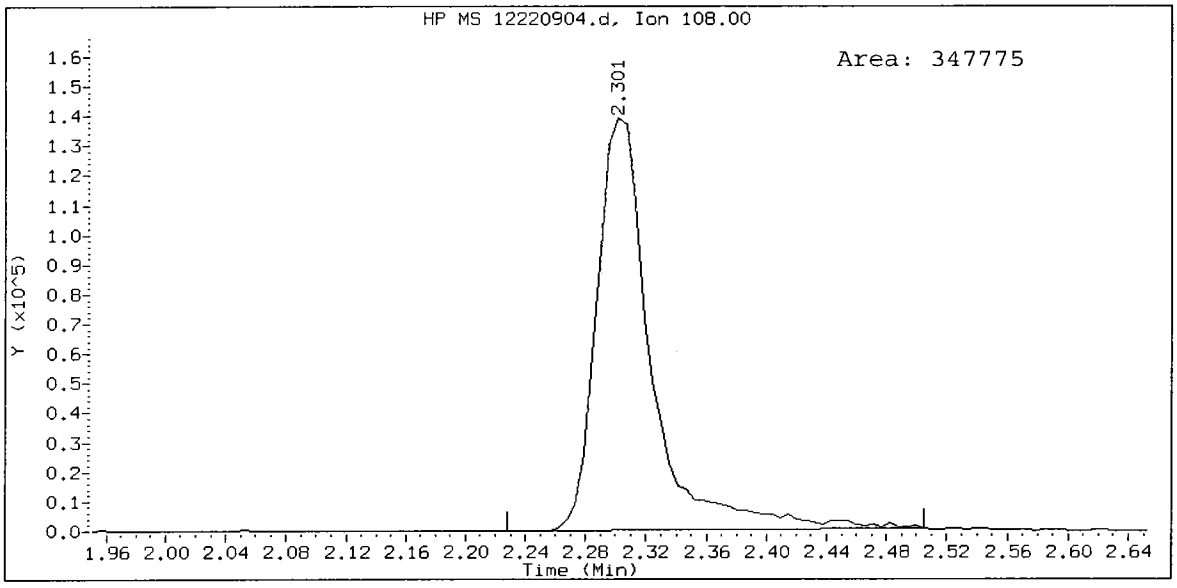
LCSD1222, /chem1/nt5.i/22DEC09.b/12220904.d
1,1-Dichloroethene Amount: 10.83

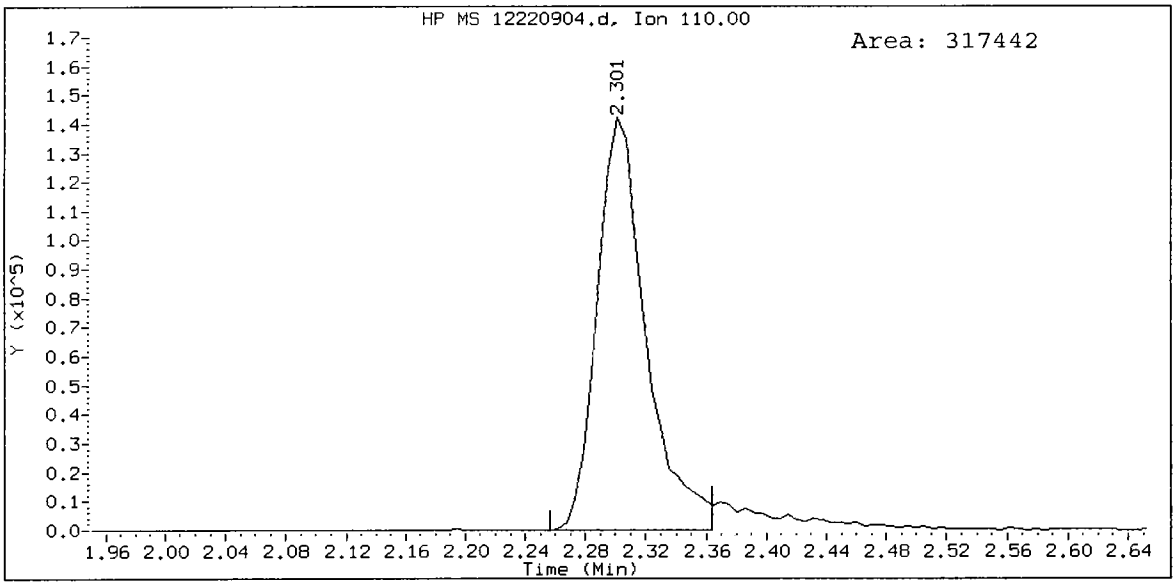




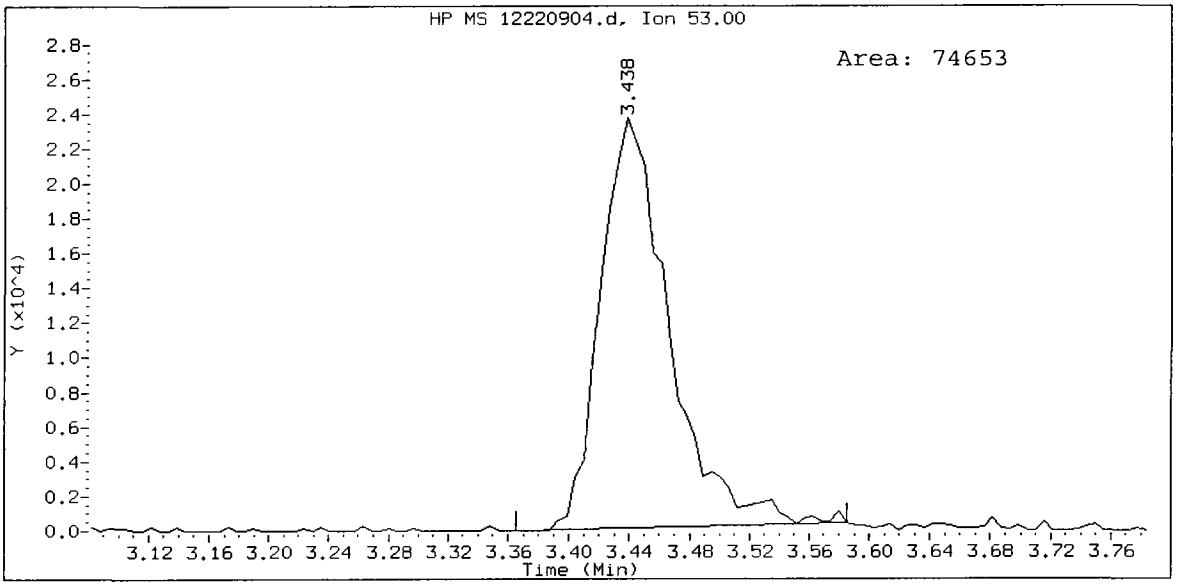


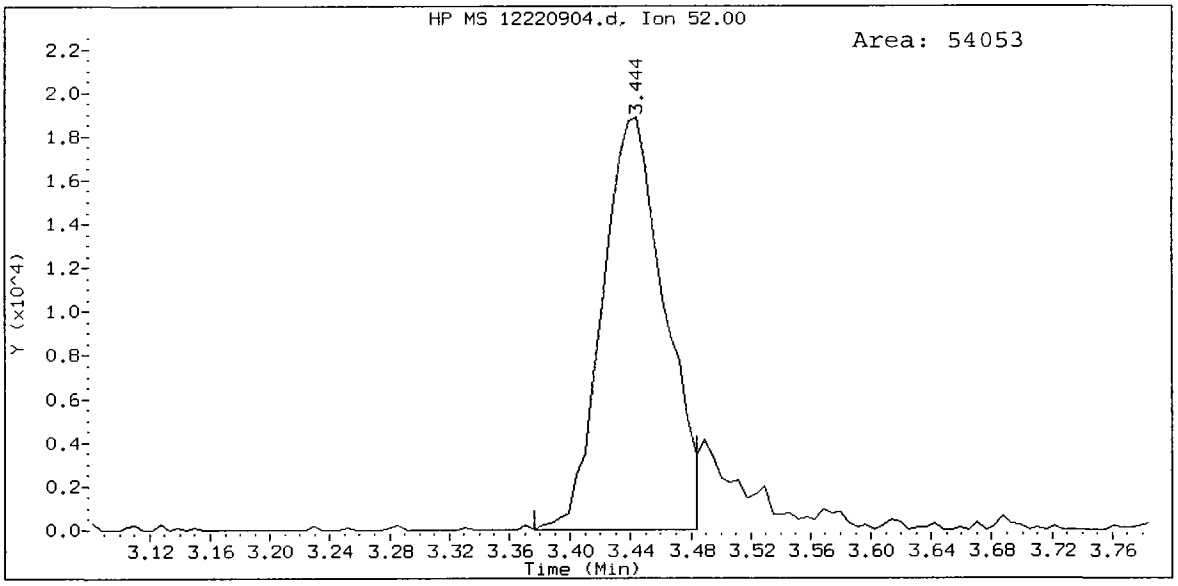
LCSD1222, /chem1/nt5.i/22DEC09.b/12220904.d
Bromoethane Amount: 12.09

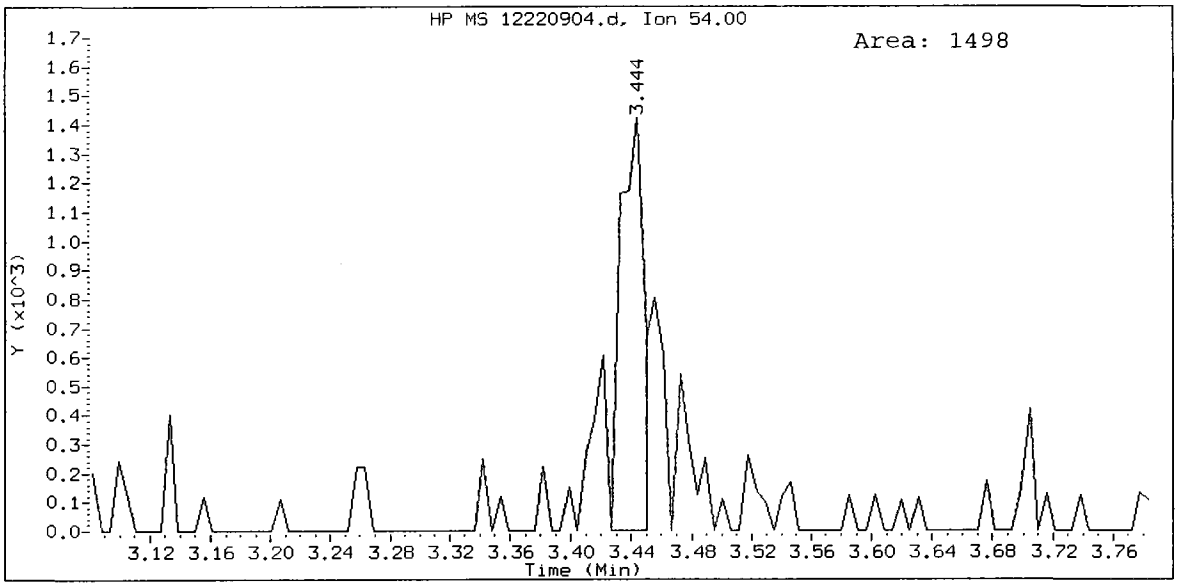




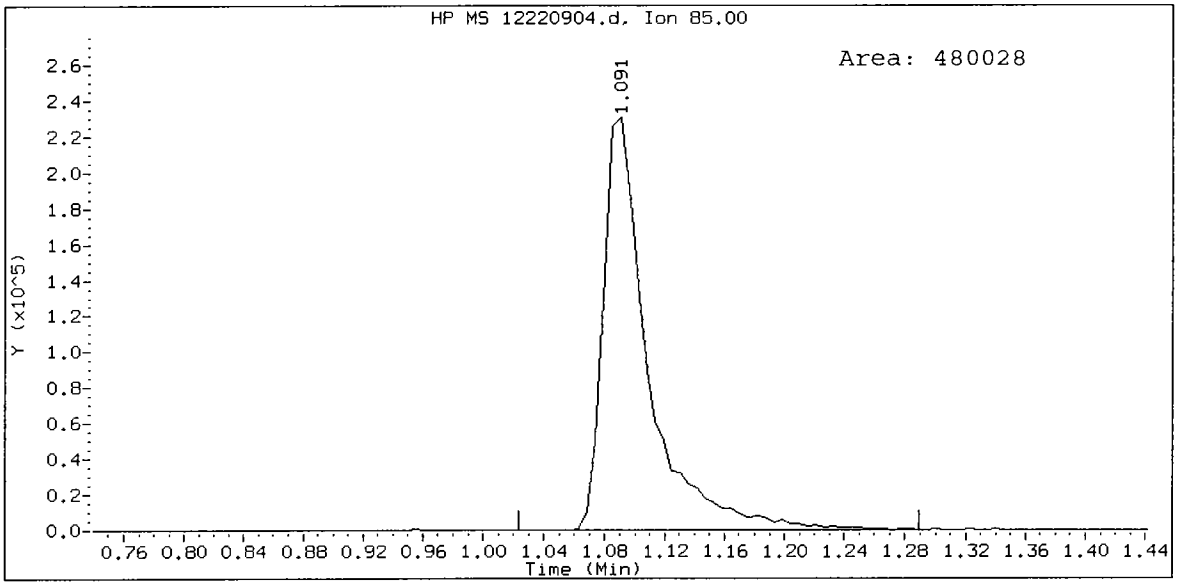
LCSD1222, /chem1/nt5.i/22DEC09.b/12220904.d
Acrylonitrile Amount: 8.73

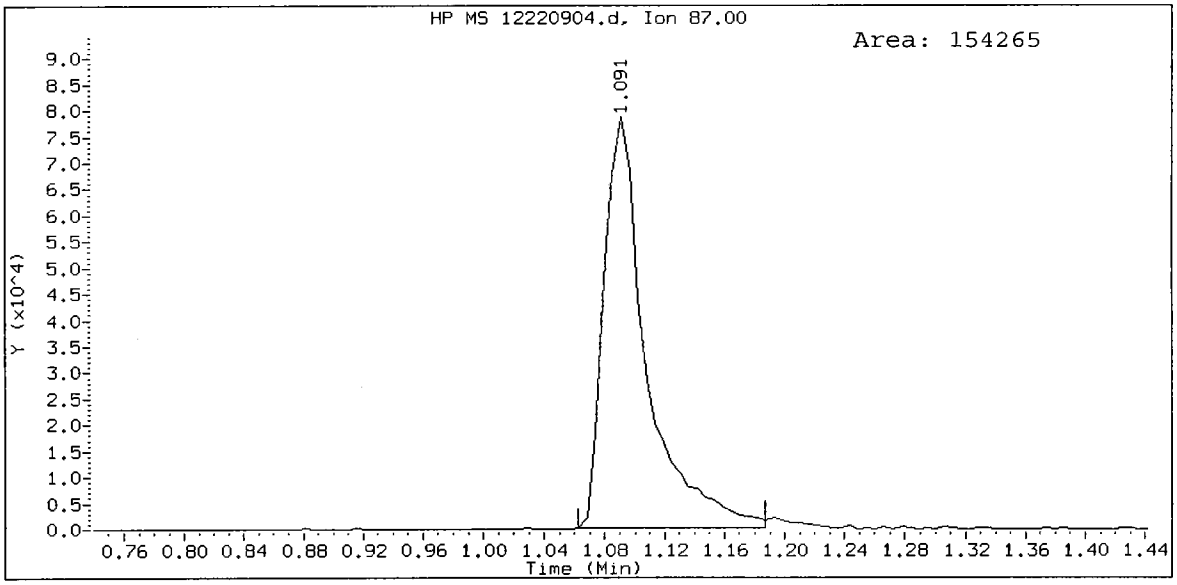






LCSD1222, /chem1/nt5.i/22DEC09.b/12220904.d
Dichlorodifluoromethane Amount: 8.66





Volatile Analysis
Run Logs

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

Analytical Resources Inc.: Volatile Organics Instrument Log

NT-5 Serial No.:GC=US10228086, MS=US10462818

Date: 11/18/09 Analysis: VOA 8260C Analyst: PC

GC Program: VOA8A Column No: 850322 Column Type: RTX-VMS

Instrument Tune (.U or .CT.): 11180901 EM Voltage: 1729

Calibration File: 11180909 Curve Date: 11/18/09

IS/SS	Ical/Ccal	LCS/ICV
VW608-2	VW607-3	VW581-2
	VW608-1	VW569-5
	VW610-2	VW590-2
	VW604-4	VW585-5
	VW610-3	VW589-1

INTERNAL STANDARD SUMMARY FOR DATABATCH - /chem1/nt5.i/18NOV09.b

	Time	Filename	LabID	ClientID	WT								
1	1105	11180901.d	BFB1118	BFB1118	0.00								
2	1143	11180902.d	CC1118		1	4.83	788889	5.28	1095261	7.74	987535	9.81	576798
3	1209	11180903.d	LCS1118		1	4.84	773143	5.28	1087586	7.74	989395	9.81	570290
4	1234	11180904.d	LCSD1118		1	4.84	770016	5.28	1099363	7.74	997277	9.81	579880
5	1321	11180905.d	60_1118	60_1118	1	4.83	789196	5.28	1150397	7.74	1007031	9.81	567161
6	1347	11180906.d	40_1118	40_1118	1	4.83	819001	5.28	1168887	7.74	1037101	9.81	594753
7	1413	11180907.d	20_1118	20_1118	1	4.84	827550	5.28	1194976	7.74	1068607	9.81	600337
8	1438	11180908.d	error		1	4.83	835188	5.28	1188741	7.74	1062972	9.81	597599
9	1503	11180909.d	10_1118	10_1118	1	4.83	813127	5.28	1179007	7.74	1047438	9.81	596306
10	1529	11180910.d	2_1118	2_1118	1	4.84	820164	5.28	1193254	7.74	1058521	9.80	594411
11	1554	11180911.d	1_1118	1_1118	1	4.83	815029	5.28	1156047	7.74	1049560	9.81	580895
12	1620	11180912.d	0.5_1118	0.5_1118	1	4.84	804312	5.28	1141288	7.74	1036287	9.80	575694
13	1646	11180913.d	0.2_1118	0.2_1118	1	4.83	773848	5.28	1117099	7.74	1008886	9.80	564556
14	1711	11180914.d	ICV_1118		1	4.83	794776	5.28	1116445	7.74	1004776	9.81	579642

PC 11/19/09

Maintenance / Comments

Maintenance Verification (Identify ICal or CCal that demonstrates the instrument is in control):

Every line must contain information or be lined out. Make all entries legible. Start a new page for each QC period.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

VOA Analyst Notes / Corrective Action Log

ARI Project ID: VOA Cal 4th ext Client ID: _____

ARI SOP: **404S**(Gas) **410S**(BTEX) **430S**(VPH) **703S**(SIM) **706S**(524.2) **708S**(8260C) **710S**(MME)

Parameter(s): 8260 list

Instrument: NT-3 (NT-5) NT-7 NT-9 NT-10 PID-1 PID-2 PID-3 FID-6 FINN-5

Purge Volume (mL) 10 Curve Date: 4/18/09 Analysis Start Date: _____

pH ≤ 2.0 YES / NO / NA

Method Blank In Control? (YES) / NO

BFB Tune Meets Criteria? (YES) / NO / NA

LCS / LCSD Recovery In Control? (YES) / NO

Internal Standard Meets Criteria? (YES) / NO / NA

Surrogate Recovery In Control? (YES) / NO

Special Analysis Criteria Met? (YES) / NO / NA

ICal acceptable? (YES) / NO; Q flag applied? YES / (NO) / NA

CCal acceptable? (YES) / NO; Q flag applied? YES / (NO) / NA

Bubbles/Headspace: None SM (≤ 2mm •) PB (2-4mm) LG (> 4mm ●) Head Space

Detail problems, corrective actions and/or other pertinent information below (use reverse side when necessary):

Dichlorodifluoromethane and vinyl acetate < 70% in ICV. — Poor performance

Bromomethane quadratic

Additional Details on Reverse: Yes / No

Analyst Signature: Paul Eggleston **Date:** 4/19/09

Reviewer's Signature: [signature] **Date:** 11/12/09

Analytical Resources Inc.: Volatile Organics Instrument Log

NT-5 Serial No.:GC=US10228086, MS=US10462818

Date: 12/22/09 Analysis: 8260C Analyst: PC

GC Program: V0A10A Column No: 850322 Column Type: DB624

Instrument Tune (.U or .CT.): 12220901 EM Voltage: 1765

Calibration File: 12220902 Curve Date: 11/18/09

IS/SS	Ical/Ccal	LCS/ICV
VW614-1	VA612-3	
	VW608-1	
	VW610-2	
	VW611-3	
	VW610-3	

INTERNAL STANDARD SUMMARY FOR DATABATCH - /chem1/nt5.i/22DEC09.b

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1	0933	12220901.d	BFB1222	BFB1222	0.00								
2	1012	12220902.d	CC1222	CC1222		1 | 4.83	1031524 | 5.28	1571217 | 7.74	1510713 | 9.81	936997 |			
3	1037	12220903.d	LCS1222	LCS1222		1 | 4.83	1020746 | 5.28	1549505 | 7.74	1498788 | 9.81	925596 |			
4	1103	12220904.d	LCSD1222	LCSD1222		1 | 4.83	1016685 | 5.28	1543771 | 7.74	1488843 | 9.80	917156 |			
5	1129	12220905.d	MB1222	MB1222		1 | 4.83	994553 | 5.28	1537897 | 7.74	1477589 | 9.80	893180 |			
6	1205	12220906.d	MB1222A	MB1222A		1 | 4.83	1044559 | 5.28	1566240 | 7.74	1442739 | 9.80	812570 |			
7	1230	12220907.d	QB37D	TB121409	3	1 | 4.83	1026968 | 5.28	1552837 | 7.74	1420341 | 9.80	792390 |			
8	1256	12220908.d	QB92C	Trip Blank	1	1 | 4.83	1038144 | 5.28	1544589 | 7.74	1416812 | 9.80	803296 |			
9	1322	12220909.d	QB75C	TRIP BLANKS	1	1 | 4.83	1021313 | 5.28	1548936 | 7.74	1394471 | 9.80	797286 |			
10	1347	12220910.d	QB76O	Trip Blank	2	1 | 4.83	1025483 | 5.28	1519933 | 7.74	1413323 | 9.80	790121 |			
11	1413	12220911.d	QB37A	CB31A121409GRAB	2	1 | 4.83	1033167 | 5.28	1526025 | 7.74	1395253 | 9.80	784473 |			
12	1439	12220912.d	QB37B	CB4857121409GRAB	2	1 | 4.83	1030022 | 5.28	1520616 | 7.74	1405581 | 9.80	781548 |			
13	1504	12220913.d	QB37C	CB1121409GRAB	2	1 | 4.83	1034913 | 5.28	1511086 | 7.74	1402882 | 9.81	779022 |			
14	1530	12220914.d	QB92B	GK BTEX	1	1 | 4.83	1026626 | 5.28	1532305 | 7.74	1397794 | 9.80	796342 |			
15	1556	12220915.d	QB75A	MW-4c	6	1 | 4.83	1031569 | 5.28	1518813 | 7.74	1385539 | 9.80	783133 |			
16	1621	12220916.d	QB75B	MW-2c	7	1 | 4.83	1029949 | 5.28	1515481 | 7.74	1382164 | 9.80	783576 |			
17	1647	12220917.d	QB75D	MW-6a	6	1 | 4.83	1020836 | 5.28	1523789 | 7.74	1377575 | 9.80	763063 |			
18	1713	12220918.d	QB75E	MW-6c	6	1 | 4.83	1020096 | 5.28	1504260 | 7.74	1377850 | 9.80	775749 |			
19	1738	12220919.d	QB75F	MW-1a	7	1 | 4.83	1025277 | 5.28	1504887 | 7.74	1378418 | 9.80	771110 |			
20	1804	12220920.d	QB76A	PSC-135-50-121509	2	1 | 4.83	1015373 | 5.28	1491322 | 7.74	1351268 | 9.81	757945 |			
21	1830	12220921.d	QB76C	MW-8-70-121509	1	1 | 4.83	1010790 | 5.28	1483651 | 7.74	1365539 | 9.80	758584 |			
22	1855	12220922.d	QB76H	MW-17-60-121509	2	1 | 4.84	1034764 | 5.30	1200518 | 7.74	1346095 | 9.81	762472 |			
23	1921	12220923.d	QB76I	MW-16-75-121609	1	1 | 4.83	1009213 | 5.28	1479253 | 7.74	1333393 | 9.80	728170 |			
24	1947	12220924.d	QB78A	MW-11a	2	1 | 4.83	993694 | 5.28	1473706 | 7.74	1336599 | 9.80	735173 |			
25	2012	12220925.d	QB78B	MW-23a	2	1 | 4.83	998269 | 5.28	1440857 | 7.74	1350756 | 9.80	742325 |			
26	2038	12220926.d	QB78C	MW-10a	2	1 | 4.83	983508 | 5.28	1446580 | 7.74	1323360 | 9.80	729440 |			

12/23/09

Maintenance / Comments

TCE carry over into last 4 entries from QB76H

Maintenance Verification (Identify ICal or CCal that demonstrates the instrument is in control):

Every line must contain information or be lined out. Make all entries legible. Start a new page for each QC period.

QB37 : QB41C

Analytical Resources, Incorporated
Analytical Chemists and Consultants

VOA Analyst Notes / Corrective Action Log

ARI Project ID: QB37 Client ID: Floyd/Snider

ARI SOP: **404S**(Gas) **410S**(BTEX) **430S**(VPH) **703S**(SIM) **706S**(524.2) **708S**(8260C) **710S**(MME)

Parameter(s): 8260C

Instrument: NT-3 (NT-5) NT-7 NT-9 NT-10 PID-1 PID-2 PID-3 FID-6 FINN-5

Purge Volume (mL) 10 Curve Date: 11/18/09 Analysis Start Date: 12/22/09

RH ≤ 2.0 (YES) / NO / NA Method Blank In Control? (YES) / NO

BFB Tune Meets Criteria? (YES) / NO / NA LCS / LCSD Recovery In Control? (YES) / NO

Internal Standard Meets Criteria? (YES) / NO / NA Surrogate Recovery In Control? (YES) / NO

Special Analysis Criteria Met? YES / NO / (NA)

ical acceptable? (YES) / NO; Q flag applied? YES / (NO) / NA

Cal acceptable? (YES) / NO; Q flag applied? YES / (NO) / NA

Bubbles/Headspace: (None) SM (≤ 2mm •) PB (2-4mm) LG (> 4mm ●) Head Space

Detail problems, corrective actions and/or other pertinent information below (use reverse side when necessary):

Q flag acetone ↓ 26.9%
Q flag 2 hexanone ↓ 24.6%
Q flag bromoform ↓ 25.9%
Q flag 1,1,2,2 tetrachloroethane ↓ 21.1%
Q flag 1,2,3 trichloropropane ↓ 30.3%
Q flag trans 1,4 dichloro 2 butene ↓ 27.5%

Q flag 1,2 dichlorobenzene ↓ 23.1%
Q flag 1,2 dibromo 3 chloropropane ↓ 33.6%
Q flag 1,2,4 trichlorobenzene ↓ 23.4%
Q flag hexachloro 1,3 butadiene ↓ 22.9%
Q flag naphthalene ↓ 24.1%
Q flag 1,2,3 trichlorobenzene ↓ 25.2%

None of these are requested compounds

Additional Details on Reverse: Yes / No

Analyst Signature: Paul Taylor Date: 12/23/09

Reviewer's Signature: [signature] Date: 12-23-2009

SIM Volatile Analysis
QC Summary Data

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

ANALYTICAL RESOURCES INCORPORATED

SW8260-SIM SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA

Client ID	DCE	TOL	TOT OUT
MB-121809	99.7%	101%	0
LCS-121809	92.4%	102%	0
LCSD-121809	94.1%	101%	0
CB31A121409GRAB	104%	103%	0
CB4857121409GRAB	105%	103%	0
CB1121409GRAB	103%	103%	0
TB121409	102%	100%	0

	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(80-133)	(80-136)
(TOL) = d8-Toluene	(80-121)	(80-120)

Prep Method: SW5030
Log Number Range: 09-30854 to 09-30857

FORM-II SW8260-SIM

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: LCS-121809
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-121809
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT7/PKC
LCSD: NT7/PKC
Date Analyzed LCS: 12/18/09 11:10
LCSD: 12/18/09 11:37

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
cis-1,2-Dichloroethene	0.899	1.00	89.9%	0.902	1.00	90.2%	0.3%
trans-1,2-Dichloroethene	0.918	1.00	91.8%	0.914	1.00	91.4%	0.4%
Trichloroethene	0.950	1.00	95.0%	0.929	1.00	92.9%	2.2%
Tetrachloroethene	0.962	1.00	96.2%	0.942	1.00	94.2%	2.1%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	92.4%	94.1%
d8-Toluene	102%	101%

4A

VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB1217

Lab Name: ANALYTICAL RESOURCES, INC

Client: FLOYD/SNIDER

ARI Job No: QB37

Project: LORA LAKE APARTMENTS

Lab File ID: 12180906

Lab Sample ID: MB1217

Date Analyzed: 12/18/09

Time Analyzed: 1203

Instrument ID: NT7

Heated Purge: (Y/N) N

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	LCS1217	LCS1217	12180904	1110
02	LCSD1217	LCSD1217	12180905	1137
03	TB121409	QB37D	12180910	1359
04	CB31A121409G	QB37A	12180924	2012
05	CB4857121409	QB37B	12180925	2039
06	CB1121409GRA	QB37C	12180926	2106
07				
08				
09				
10				
11				
12				
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28				
29				
30				

COMMENTS:

QB37:001417

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES, INC Contract: FLOYD/SNIDER

Lab Code: ARI Case No.: LORA LAKE APARTMENTS SDG No.: QB37

Lab File ID: 11230905 BFB Injection Date: 11/23/09

Instrument ID: NT7 BFB Injection Time: 1251

GC Column: RTX502.2 ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	12.4
75	30.0 - 66.0% of mass 95	42.6
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.9
173	Less than 2.0% of mass 174	0.3 (0.4)1
174	50.0 - 101.0% of mass 95	83.3
175	4.0 - 9.0% of mass 174	5.8 (6.9)1
176	93.0 - 101.0% of mass 174	80.1 (96.1)1
177	5.0 - 9.0% of mass 176	5.5 (6.9)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	00201123	00201123	11230914	11/23/09	1725
02	00501123	00501123	11230915	11/23/09	1753
03	01001123	01001123	11230916	11/23/09	1820
04	05001123	05001123	11230917	11/23/09	1848
05	10001123	10001123	11230918	11/23/09	1916
06	20001123	20001123	11230919	11/23/09	1943
07	40001123	40001123	11230920	11/23/09	2011
08	ICV1123	ICV1123	11230921	11/23/09	2039
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES, INC Contract: FLOYD/SNIDER

Lab Code: ARI Case No.: LORA LAKE APARTMENTS SDG No.: QB37

Lab File ID: 12180902 BFB Injection Date: 12/18/09

Instrument ID: NT7 BFB Injection Time: 1007

GC Column: RTX502.2 ID: 0.18 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	8.0 - 40.0% of mass 95	14.5
75	30.0 - 66.0% of mass 95	47.0
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.4
173	Less than 2.0% of mass 174	0.2 (0.2)1
174	50.0 - 101.0% of mass 95	84.7
175	4.0 - 9.0% of mass 174	6.0 (7.1)1
176	93.0 - 101.0% of mass 174	83.0 (98.0)1
177	5.0 - 9.0% of mass 176	5.6 (6.8)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	CC1217	CC1217	12180903	12/18/09	1043
02	LCS1217	LCS1217	12180904	12/18/09	1110
03	LCSD1217	LCSD1217	12180905	12/18/09	1137
04	MB1217	MB1217	12180906	12/18/09	1203
05	TB121409	QB37D	12180910	12/18/09	1359
06	CB31A121409GRAB	QB37A	12180924	12/18/09	2012
07	CB4857121409GRAB	QB37B	12180925	12/18/09	2039
08	CB1121409GRAB	QB37C	12180926	12/18/09	2106
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT7 Calibration Date: 11/23/09

LAB FILE ID: RF20: 11230914 RF50: 11230915 RF100: 11230916
RF500: 11230917 RF1000: 11230918

COMPOUND	RF20	RF50	RF100	RF500	RF1000
Vinyl Chloride	0.552	0.599	0.385	0.510	0.441
1,1-Dichloroethene	0.556	0.544	0.378	0.412	0.401
Trans-1,2-Dichloroethene	0.554	0.580	0.395	0.438	0.426
cis-1,2-dichloroethene	0.621	0.586	0.410	0.448	0.438
Benzene	1.807	1.703	1.146	1.254	1.228
Trichloroethene	0.496	0.423	0.325	0.352	0.343
Tetrachloroethene	0.493	0.447	0.314	0.353	0.345
1,1,2,2-Tetrachloroethane	0.228	0.199	0.147	0.175	0.182
d4-1,2-Dichloroethane	0.386	0.410	0.417	0.377	0.369
d8-Toluene	1.121	1.124	1.128	1.122	1.128

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT7 Calibration Date: 11/23/09

LAB FILE ID: RF2000: 11230919 RF4000: 11230920

COMPOUND	TYPE	RF	CURVE OR R^2	AVE	%RSD
Vinyl Chloride	0.468	0.465	AVRG	0.488	14.6
1,1-Dichloroethene	0.429	0.426	AVRG	0.449	15.8
Trans-1,2-Dichloroethene	0.454	0.453	AVRG	0.472	14.6
cis-1,2-dichloroethene	0.468	0.471	AVRG	0.492	16.2
Benzene	1.281	1.250	AVRG	1.382	18.8
Trichloroethene	0.363	0.361	AVRG	0.380	15.6
Tetrachloroethene	0.364	0.358	AVRG	0.382	16.6
1,1,2,2-Tetrachloroethane	0.197	0.204	AVRG	0.190	13.5
d4-1,2-Dichloroethane	0.364	0.363	AVRG	0.384	5.7
d8-Toluene	1.123	1.103	AVRG	1.121	0.8

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

ARI Job No: QB37 Project: LORA LAKE APARTMENTS

Instrument ID: NT7 Cont. Calib. Date: 12/18/09

Init. Calib. Date: 11/23/09 Cont. Calib. Time: 1043

COMPOUND	CalAmt or ARF	CC Amt 1000	MIN RRF	CURVE TYPE	%D or Drift	
Vinyl Chloride	0.488	0.450	0.010	AVRG	-7.8	
1,1-Dichloroethene	0.449	0.412	0.010	AVRG	-8.2	
Trans-1,2-Dichloroethene	0.471	0.431	0.010	AVRG	-8.5	
cis-1,2-dichloroethene	0.492	0.443	0.010	AVRG	-10.0	
Benzene	1.381	1.220	0.010	AVRG	-11.6	
Trichloroethene	0.380	0.361	0.010	AVRG	-5.0	
Tetrachloroethene	0.382	0.367	0.010	AVRG	-3.9	
1,1,2,2-Tetrachloroethane	0.190	0.188	0.300	AVRG	-1.0	*
d4-1,2-Dichloroethane	0.384	0.358	0.010	AVRG	-6.8	
d8-Toluene	1.121	1.136	0.010	AVRG	1.3	

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII VOA

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES, INC | Client: FLOYD/SNIDER

ARI Job No: QB37 | Project: LORA LAKE APARTMENTS

Ical Midpoint ID: 11230917 | Ical Date: 11/23/09

Instrument ID: NT7 | Project Run Date: 12/18/09

		IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	381756	5.32	546077	5.75		
	UPPER LIMIT	763512	5.82	1092154	6.25		
	LOWER LIMIT	190878	4.82	273038	5.25		
	Sample ID						
01	LCS1217	281461	5.31	402622	5.75		
02	LCSD1217	275872	5.32	396506	5.75		
03	MB1217	261838	5.31	376390	5.75		
04	TB121409	247108	5.31	355484	5.75		
05	CB31A121409G	225127	5.32	324470	5.75		
06	CB4857121409	226847	5.32	329073	5.75		
07	CB1121409GRA	229107	5.32	327928	5.75		
08							
09							
10							
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17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

SIM Volatile Analysis
Sample Data

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: CB31A121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37A
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 20:12

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	103%

FORM I

Analytical Resources, Inc.

SW8260C SIM

Data file : /chem1/nt7.i/18dec2009.b/12180924.d
Lab Smp Id: QB37A Client Smp ID: CB31A121409GRAB
Inj Date : 18-DEC-2009 20:12
Operator : PKC Inst ID: nt7.i
Smp Info : QB37A,10,10,0
Misc Info : 09-30854
Comment :
Method : /chem1/nt7.i/18dec2009.b/sim112309.m
Meth Date : 21-Dec-2009 10:54 paul Quant Type: ISTD
Cal Date : 23-NOV-2009 17:53 Cal File: 11230915.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sim.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/L)	FINAL (ug/L)
	1 Vinyl Chloride	62	Compound Not Detected.					
	2 1,1-Dichloroethene	96	Compound Not Detected.					
	175 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	3 cis-1,2-dichloroethene	96	Compound Not Detected.					
	6 Benzene	78	5.205	5.204	(0.905)	39742	88.6505	88.650
*	4 Pentafluorobenzene	168	5.316	5.316	(1.000)	225127	1000.00	
$	5 d4-1,2-Dichloroethane	65	5.324	5.324	(1.001)	90159	1043.57	1043.6
	8 Trichloroethene	130	Compound Not Detected.					
*	7 1,4-Difluorobenzene	114	5.754	5.742	(1.000)	324470	1000.00	
$	9 d8-Toluene	98	6.902	6.890	(1.200)	374290	1028.85	1028.9
	10 Tetrachloroethene	166	Compound Not Detected.					
	11 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt7.i
Lab File ID: 12180924.d
Lab Smp Id: QB37A
Analysis Type: VOA
Quant Type: ISTD
Operator: PKC
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-30854

Calibration Date: 18-DEC-2009
Calibration Time: 10:43
Client Smp ID: CB31A121409GRAB
Level: LOW
Sample Type: Water

Test Mode:
Use Initial Calibration Level 5.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	389727	194864	779454	225127	-42.23
7 1,4-Difluorobenze	553230	276615	1106460	324470	-41.35

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	5.32	4.82	5.82	5.32	0.01
7 1,4-Difluorobenze	5.74	5.24	6.24	5.75	0.21

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name: Floyd/Snider
Sample Matrix: LIQUID
Lab Smp Id: QB37A
Level: LOW
Data Type: MS DATA
SpikeList File: sim.spk
Sublist File: sim.sub
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-30854

Client SDG: QB37
Fraction: VOA
Client Smp ID: CB31A121409GRAB
Operator: PKC
SampleType: SAMPLE
Quant Type: ISTD

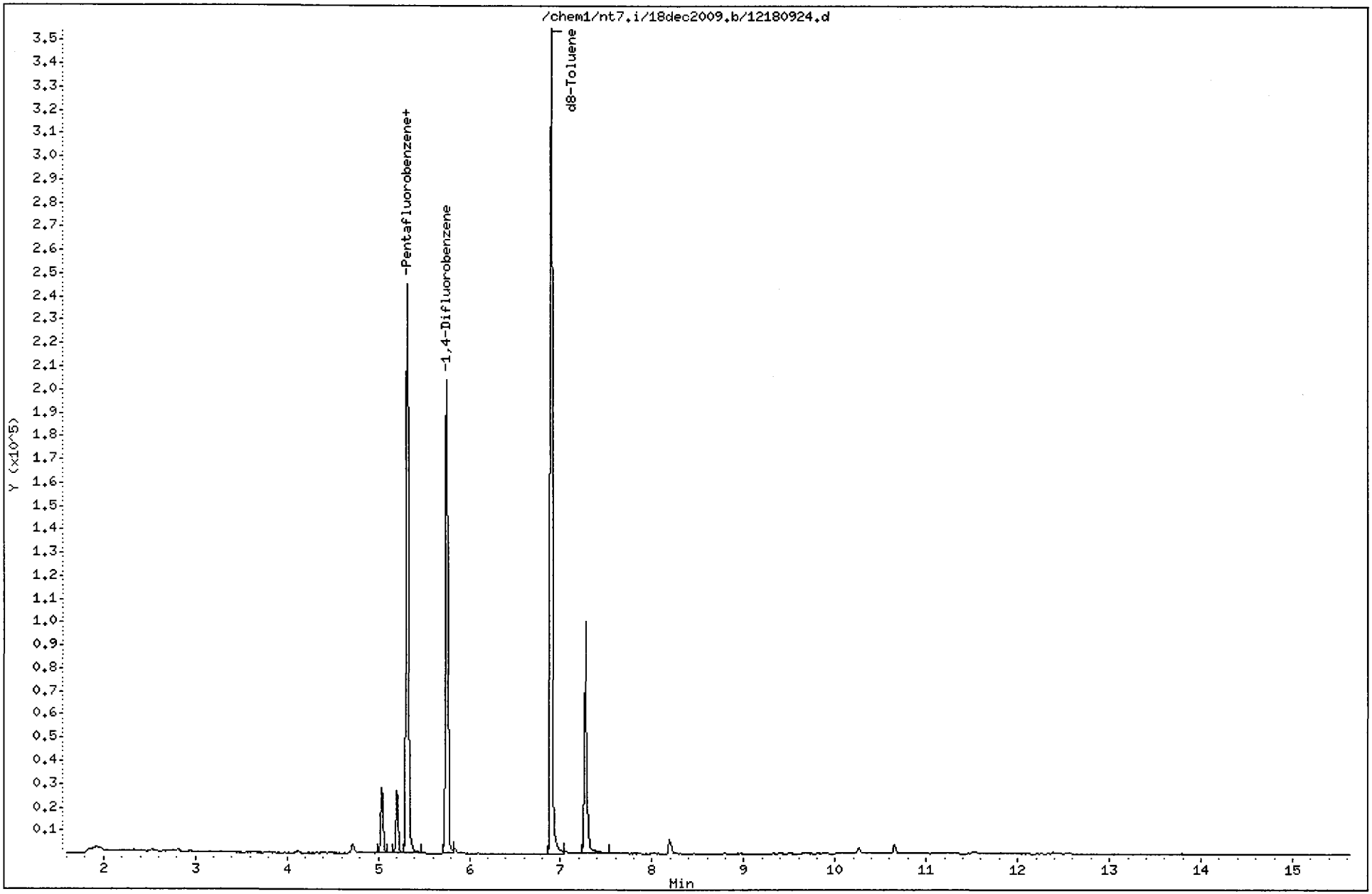
SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 5 d4-1,2-Dichloroeth	1000.0	1043.6	104.36	80-136
$ 9 d8-Toluene	1000.0	1028.9	102.89	80-120

Data File: /chem1/nt7.i/18dec2009.b/12180924.d
Date : 18-DEC-2009 20:12
Client ID: CB31A121409GRAB
Sample Info: QB37A,10,10,0

Instrument: nt7.i

Operator: PKC
Column diameter: 0.18

Column phase: RTXVMS



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: CB4857121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37B
LIMS ID: 09-30855
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 20:39

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	105%
d8-Toluene	103%

FORM I

Analytical Resources, Inc.

SW8260C SIM

Data file : /chem1/nt7.i/18dec2009.b/12180925.d
Lab Smp Id: QB37B Client Smp ID: CB4857121409GRAB
Inj Date : 18-DEC-2009 20:39
Operator : PKC Inst ID: nt7.i
Smp Info : QB37B,10,10,0
Misc Info : 09-30855
Comment :
Method : /chem1/nt7.i/18dec2009.b/sim112309.m
Meth Date : 21-Dec-2009 10:54 paul Quant Type: ISTD
Cal Date : 23-NOV-2009 17:53 Cal File: 11230915.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sim.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/L)	FINAL (ug/L)
	1 Vinyl Chloride	62	Compound Not Detected.					
	2 1,1-Dichloroethene	96	Compound Not Detected.					
	175 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	3 cis-1,2-dichloroethene	96	Compound Not Detected.					
	6 Benzene	78	5.204	5.204	(0.905)	12851	28.2671	28.267
*	4 Pentafluorobenzene	168	5.315	5.316	(1.000)	226847	1000.00	
$	5 d4-1,2-Dichloroethane	65	5.323	5.324	(1.001)	91539	1051.51	1051.5
	8 Trichloroethene	130	Compound Not Detected.					
*	7 1,4-Difluorobenzene	114	5.753	5.742	(1.000)	329073	1000.00	
$	9 d8-Toluene	98	6.902	6.890	(1.200)	379086	1027.46	1027.5
	10 Tetrachloroethene	166	Compound Not Detected.					
	11 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt7.i
Lab File ID: 12180925.d
Lab Smp Id: QB37B
Analysis Type: VOA
Quant Type: ISTD
Operator: PKC
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-30855

Calibration Date: 18-DEC-2009
Calibration Time: 10:43
Client Smp ID: CB4857121409GRAB
Level: LOW
Sample Type: Water

Test Mode:
Use Initial Calibration Level 5.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	389727	194864	779454	226847	-41.79
7 1,4-Difluorobenze	553230	276615	1106460	329073	-40.52

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	5.32	4.82	5.82	5.32	-0.01
7 1,4-Difluorobenze	5.74	5.24	6.24	5.75	0.20

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name: Floyd/Snider
Sample Matrix: LIQUID
Lab Smp Id: QB37B
Level: LOW
Data Type: MS DATA
SpikeList File: sim.spk
Sublist File: sim.sub
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-30855

Client SDG: QB37
Fraction: VOA
Client Smp ID: CB4857121409GRAB
Operator: PKC
SampleType: SAMPLE
Quant Type: ISTD

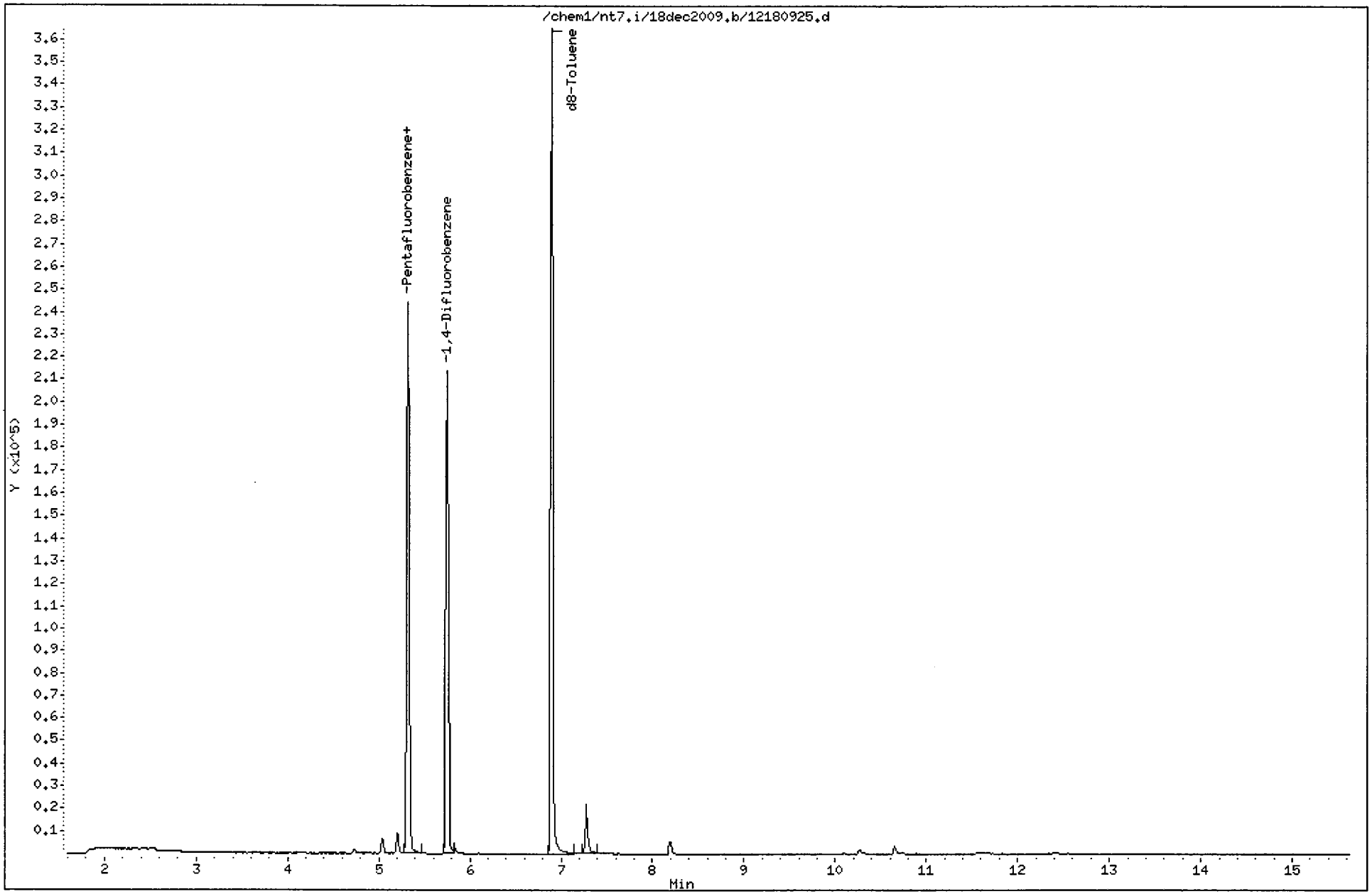
SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 5 d4-1,2-Dichloroeth	1000.0	1051.5	105.15	80-136
$ 9 d8-Toluene	1000.0	1027.5	102.75	80-120

Data File: /chem1/nt7.i/18dec2009.b/12180925.d
Date : 18-DEC-2009 20:39
Client ID: CB4857121409GRAB
Sample Info: QB37B,10,10,0

Instrument: nt7.i

Operator: PKC
Column diameter: 0.18

Column phase: RTXVMS



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: CB1121409GRAB**
Page 1 of 1 **SAMPLE**

Lab Sample ID: QB37C
LIMS ID: 09-30856
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 21:06

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	103%

FORM I

Analytical Resources, Inc.

SW8260C SIM

Data file : /chem1/nt7.i/18dec2009.b/12180926.d
Lab Smp Id: QB37C Client Smp ID: CB1121409GRAB
Inj Date : 18-DEC-2009 21:06
Operator : PKC Inst ID: nt7.i
Smp Info : QB37C,10,10,0
Misc Info : 09-30856
Comment :
Method : /chem1/nt7.i/18dec2009.b/sim112309.m
Meth Date : 21-Dec-2009 10:54 paul Quant Type: ISTD
Cal Date : 23-NOV-2009 17:53 Cal File: 11230915.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sim.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/L)	FINAL (ug/L)
	1 Vinyl Chloride	62	Compound Not Detected.					
	2 1,1-Dichloroethene	96	Compound Not Detected.					
	175 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	3 cis-1,2-dichloroethene	96	Compound Not Detected.					
	6 Benzene	78	5.212	5.204	(0.906)	7336	16.1915	16.192
*	4 Pentafluorobenzene	168	5.315	5.316	(1.000)	229107	1000.00	
$	5 d4-1,2-Dichloroethane	65	5.323	5.324	(1.001)	90931	1034.22	1034.2
	8 Trichloroethene	130	Compound Not Detected.					
*	7 1,4-Difluorobenzene	114	5.754	5.742	(1.000)	327928	1000.00	
$	9 d8-Toluene	98	6.903	6.890	(1.200)	377341	1026.30	1026.3
	10 Tetrachloroethene	166	Compound Not Detected.					
	11 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt7.i
Lab File ID: 12180926.d
Lab Smp Id: QB37C
Analysis Type: VOA
Quant Type: ISTD
Operator: PKC
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-30856

Calibration Date: 18-DEC-2009
Calibration Time: 10:43
Client Smp ID: CB1121409GRAB
Level: LOW
Sample Type: Water

Test Mode:
Use Initial Calibration Level 5.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	389727	194864	779454	229107	-41.21
7 1,4-Difluorobenze	553230	276615	1106460	327928	-40.72

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	5.32	4.82	5.82	5.32	-0.01
7 1,4-Difluorobenze	5.74	5.24	6.24	5.75	0.21

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name: Floyd/Snider
Sample Matrix: LIQUID
Lab Smp Id: QB37C
Level: LOW
Data Type: MS DATA
SpikeList File: sim.spk
Sublist File: sim.sub
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-30856

Client SDG: QB37
Fraction: VOA
Client Smp ID: CB1121409GRAB
Operator: PKC
SampleType: SAMPLE
Quant Type: ISTD

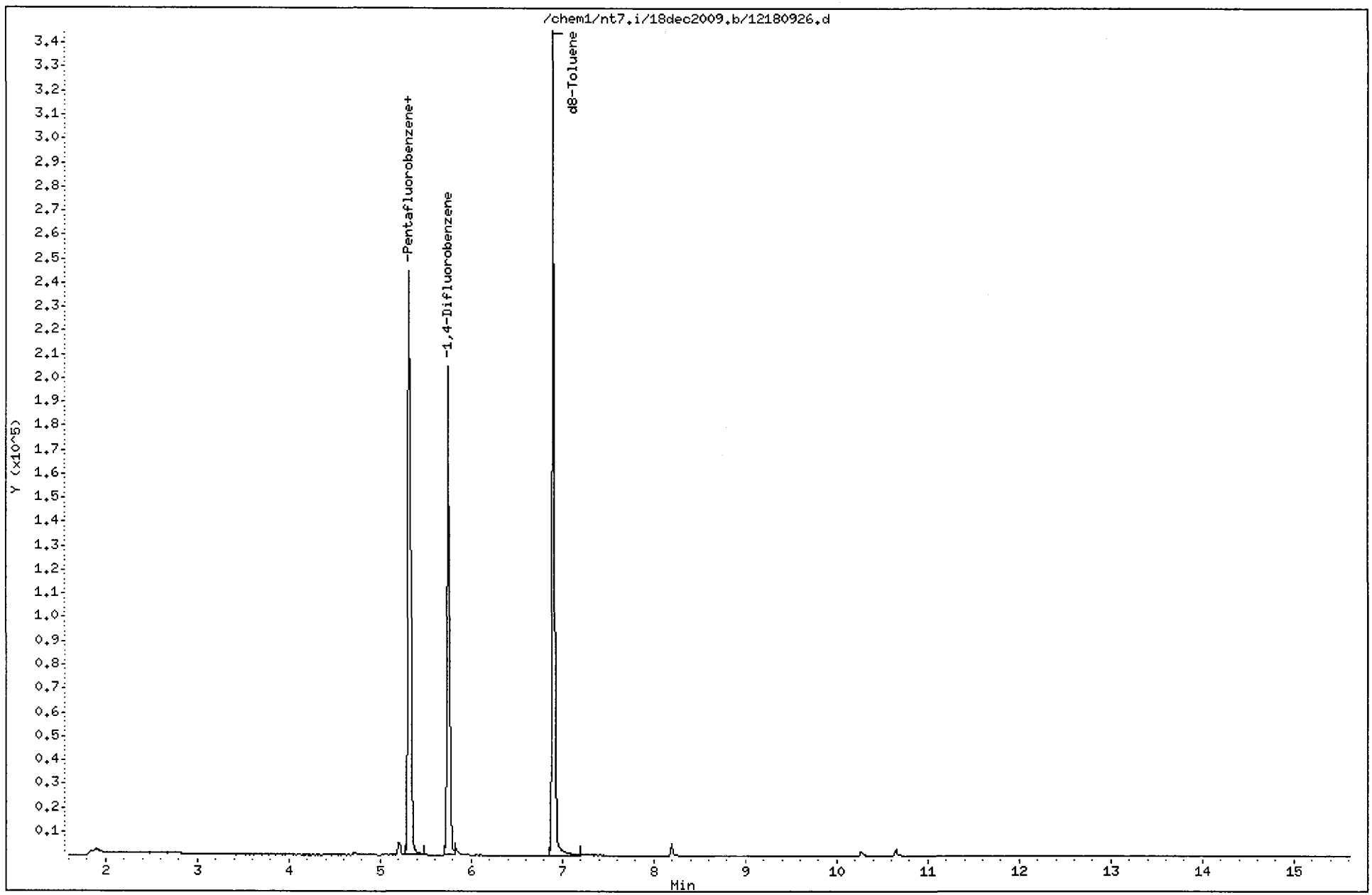
SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 5 d4-1,2-Dichloroeth	1000.0	1034.2	103.42	80-136
$ 9 d8-Toluene	1000.0	1026.3	102.63	80-120

Data File: /chem1/nt7.i/18dec2009.b/12180926.d
Date : 18-DEC-2009 21:06
Client ID: CB1121409GRAB
Sample Info: QB37C,10,10,0

Instrument: nt7.i

Operator: PKC
Column diameter: 0.18

Column phase: RTXVMS



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM **Sample ID: TB121409**
Page 1 of 1 **TRIP BLANK**

Lab Sample ID: QB37D
LIMS ID: 09-30857
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 13:59

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	100%

FORM I

PC 12/23/09

Analytical Resources, Inc.

SW8260C SIM

Data file : /chem1/nt7.i/18dec2009.b/12180910.d
Lab Smp Id: QB37D Client Smp ID: TB121409
Inj Date : 18-DEC-2009 13:59
Operator : PKC Inst ID: nt7.i
Smp Info : QB37D,10,10,0
Misc Info : 09-30857
Comment :
Method : /chem1/nt7.i/18dec2009.b/sim112309.m
Meth Date : 21-Dec-2009 10:54 paul Quant Type: ISTD
Cal Date : 23-NOV-2009 17:53 Cal File: 11230915.d
Als bottle: 1
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sim.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/L)	FINAL (ug/L)
	1 Vinyl Chloride	62	Compound Not Detected.					
	2 1,1-Dichloroethene	96	Compound Not Detected.					
	175 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	3 cis-1,2-dichloroethene	96	Compound Not Detected.					
	6 Benzene	78	Compound Not Detected.					
*	4 Pentafluorobenzene	168	5.315	5.316	(1.000)	247108	1000.00	
$	5 d4-1,2-Dichloroethane	65	5.323	5.324	(1.001)	97090	1023.83	1023.8
	8 Trichloroethene	130	Compound Not Detected.					
*	7 1,4-Difluorobenzene	114	5.752	5.742	(1.000)	355484	1000.00	
$	9 d8-Toluene	98	6.903	6.890	(1.200)	399318	1001.88	1001.9
	10 Tetrachloroethene	166	Compound Not Detected.					
	11 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt7.i
Lab File ID: 12180910.d
Lab Smp Id: QB37D
Analysis Type: VOA
Quant Type: ISTD
Operator: PKC
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-30857

Calibration Date: 18-DEC-2009
Calibration Time: 10:43
Client Smp ID: TB121409
Level: LOW
Sample Type: Water

Test Mode:
Use Initial Calibration Level 5.

		AREA LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	389727	194864	779454	247108	-36.59
7 1,4-Difluorobenze	553230	276615	1106460	355484	-35.74

		RT LIMIT			
COMPOUND	STANDARD	LOWER	UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	5.32	4.82	5.82	5.31	-0.02
7 1,4-Difluorobenze	5.74	5.24	6.24	5.75	0.18

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name: Floyd/Snider
Sample Matrix: LIQUID
Lab Smp Id: QB37D
Level: LOW
Data Type: MS DATA
SpikeList File: sim.spk
Sublist File: sim.sub
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-30857

Client SDG: QB37
Fraction: VOA
Client Smp ID: TB121409
Operator: PKC
SampleType: SAMPLE
Quant Type: ISTD

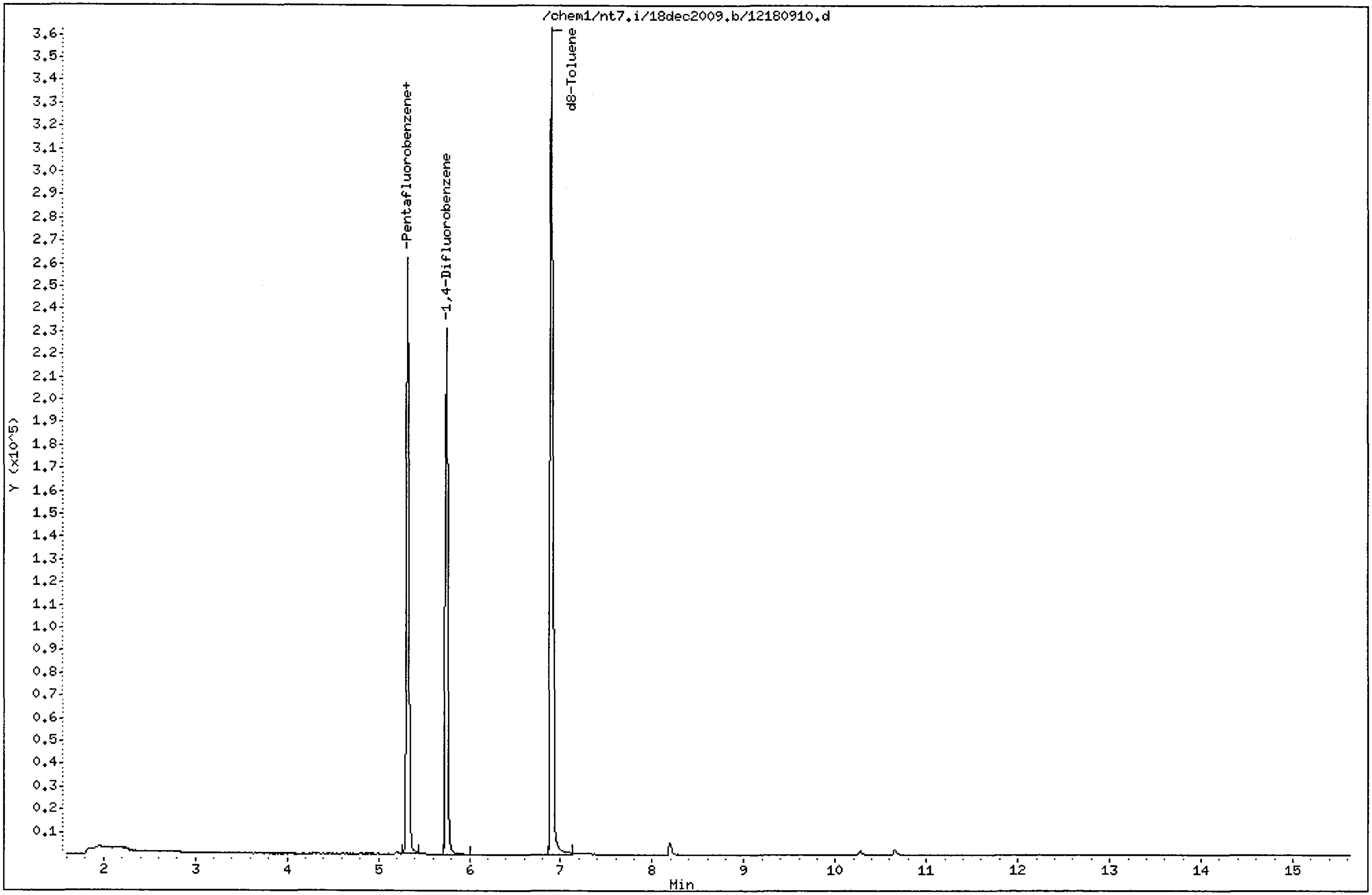
SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 5 d4-1,2-Dichloroeth	1000.0	1023.8	102.38	80-136
$ 9 d8-Toluene	1000.0	1001.9	100.19	80-120

Data File: /chem1/nt7.i/18dec2009.b/12180910.d
Date : 18-DEC-2009 13:59
Client ID: TB121409
Sample Info: QB37D,10,10,0

Column phase: RTXVMS

Instrument: nt7.i

Operator: PKC
Column diameter: 0.18



SIM Volatile Analysis
QC Raw Data

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

Data File: /chem1/nt7.i/23nov2009.b/11230905.d

Date : 23-NOV-2009 12:51

Client ID: BFB1123

Instrument: nt7.i

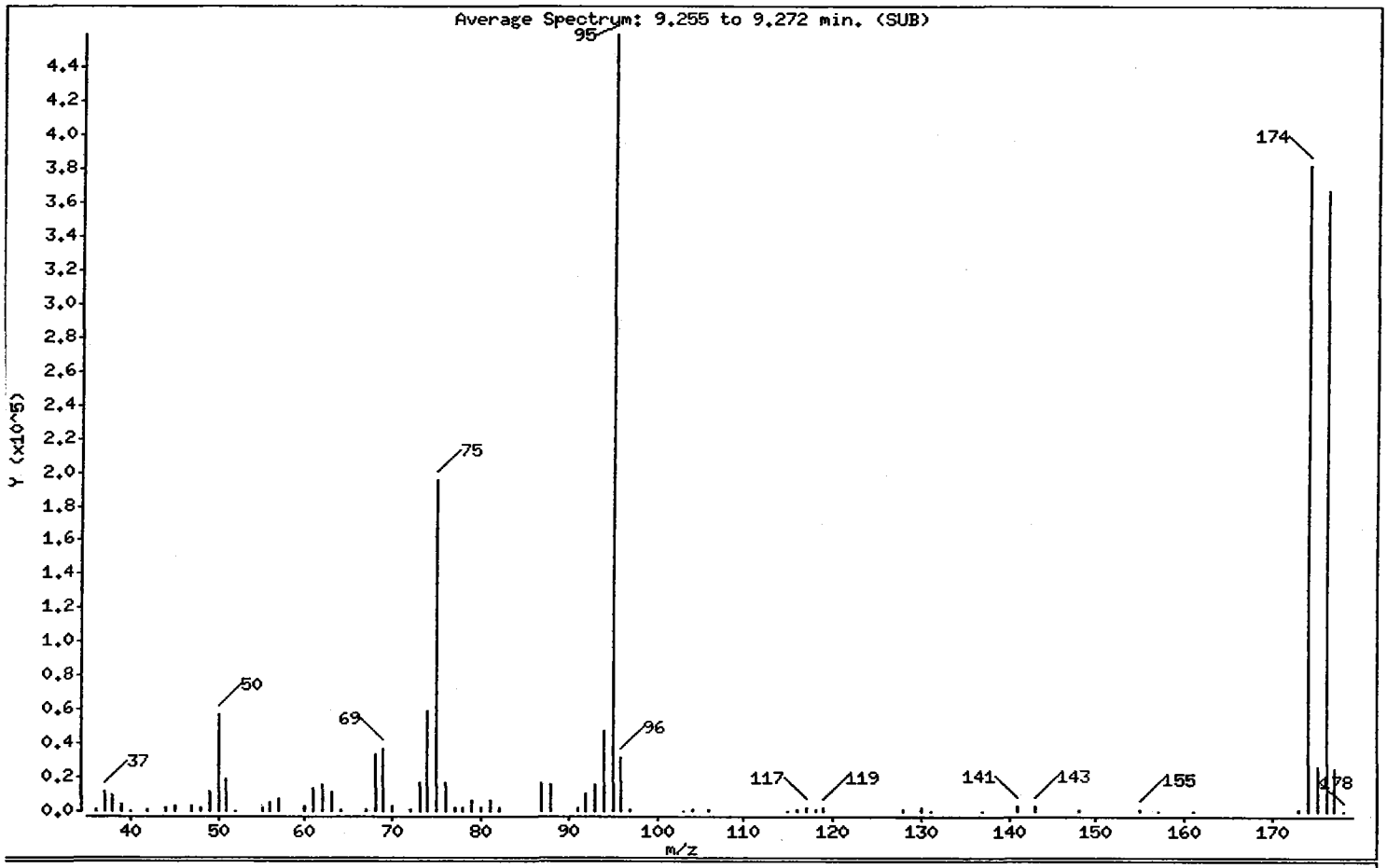
Sample Info: BFB1123,BFB1123,5,0

Operator: MH

Column phase: RTX502.2

Column diameter: 0.18

1 Bromofluorobenzene



m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
95	Base Peak, 100% relative abundance	100.00
50	8.00 - 40.00% of mass 95	12.44
75	30.00 - 66.00% of mass 95	42.57
96	5.00 - 9.00% of mass 95	6.93
173	Less than 2.00% of mass 174	0.33 (0.40)
174	50.00 - 101.00% of mass 95	83.29
175	4.00 - 9.00% of mass 174	5.77 (6.93)
176	93.00 - 101.00% of mass 174	80.06 (96.12)
177	5.00 - 9.00% of mass 176	5.51 (6.88)

Data File: /chem1/nt7.i/23nov2009.b/11230905.d

Date : 23-NOV-2009 12:51

Client ID: BFB1123

Instrument: nt7.i

Sample Info: BFB1123,BFB1123,5,0

Operator: MH

Column phase: RTX502.2

Column diameter: 0.18

Data File: 11230905.d

Spectrum: Average Spectrum: 9.255 to 9.272 min. (SUB)

Location of Maximum: 95.00

Number of points: 70

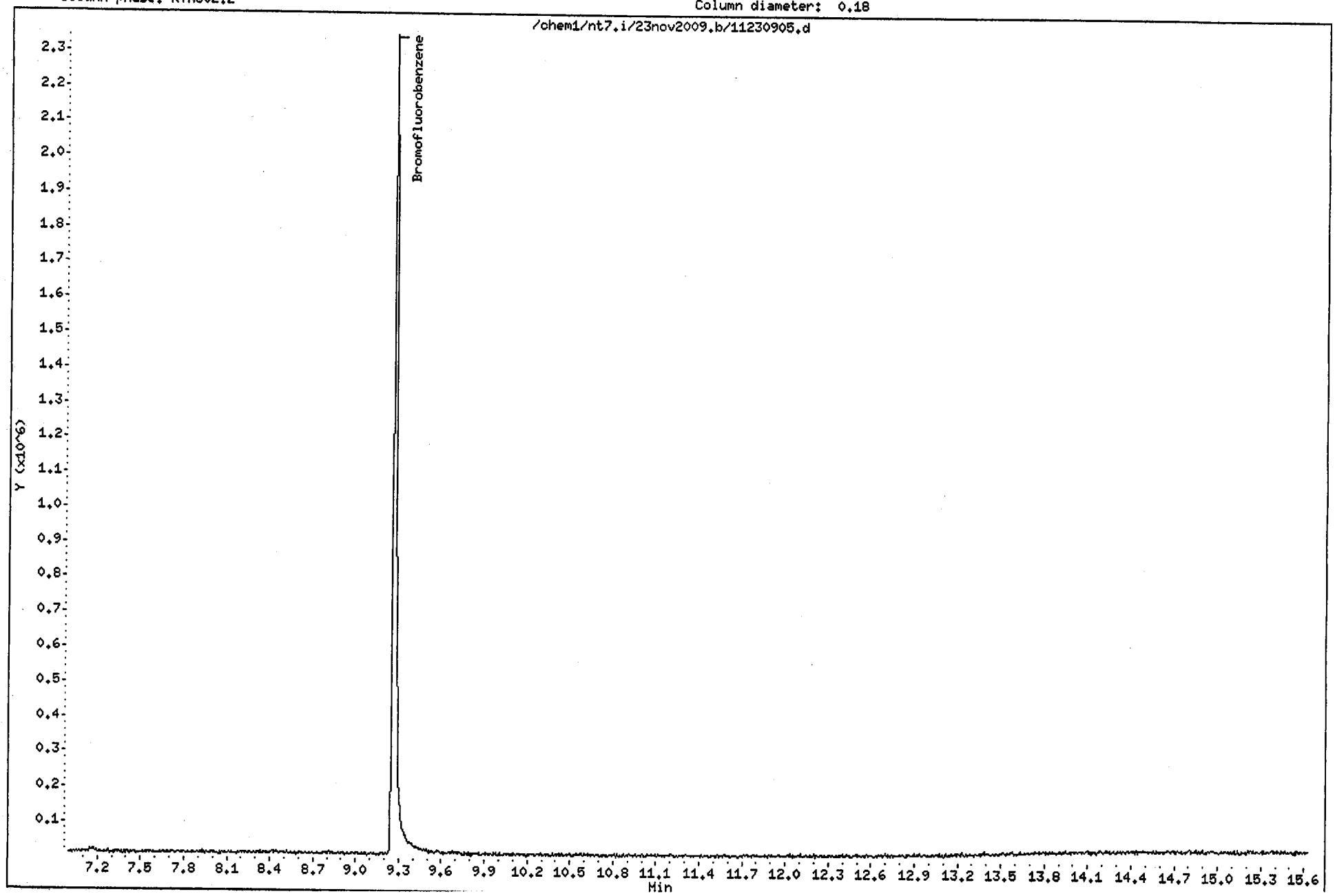
m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	1500	61.00	13591	82.00	1666	128.00	1390
37.00	11145	62.00	15412	87.00	16672	130.00	1602
38.00	9717	63.00	11139	88.00	15688	131.00	296
39.00	4385	64.00	1390	91.00	1753	137.00	348
40.00	199	67.00	1091	92.00	10667	141.00	3646
42.00	561	68.00	34128	93.00	16034	143.00	3305
44.00	1684	69.00	37104	94.00	47080	148.00	573
45.00	2787	70.00	3335	95.00	459328	155.00	1251
47.00	3572	72.00	1467	96.00	31808	157.00	264
48.00	2195	73.00	16496	97.00	1153	161.00	266
49.00	11543	74.00	59584	103.00	410	173.00	1524
50.00	57128	75.00	195520	104.00	1135	174.00	382592
51.00	18680	76.00	16592	106.00	1133	175.00	26504
52.00	293	77.00	2559	115.00	262	176.00	367744
55.00	1775	78.00	2046	116.00	1258	177.00	25304
56.00	4769	79.00	5939	117.00	2450	178.00	265
57.00	7896	80.00	2058	118.00	715		
60.00	3130	81.00	6738	119.00	2186		

Data File: /chem1/nt7.i/23nov2009.b/11230905.d
Date : 23-NOV-2009 12:51
Client ID: BFB1123
Sample Info: BFB1123,BFB1123,5,0

Column phase: RTX502.2

Instrument: nt7.i

Operator: MH
Column diameter: 0.18



Data File: /chem1/nt7.i/18dec2009.b/12180902.d

Date : 18-DEC-2009 10:07

Client ID: BFB1217

Instrument: nt7.i

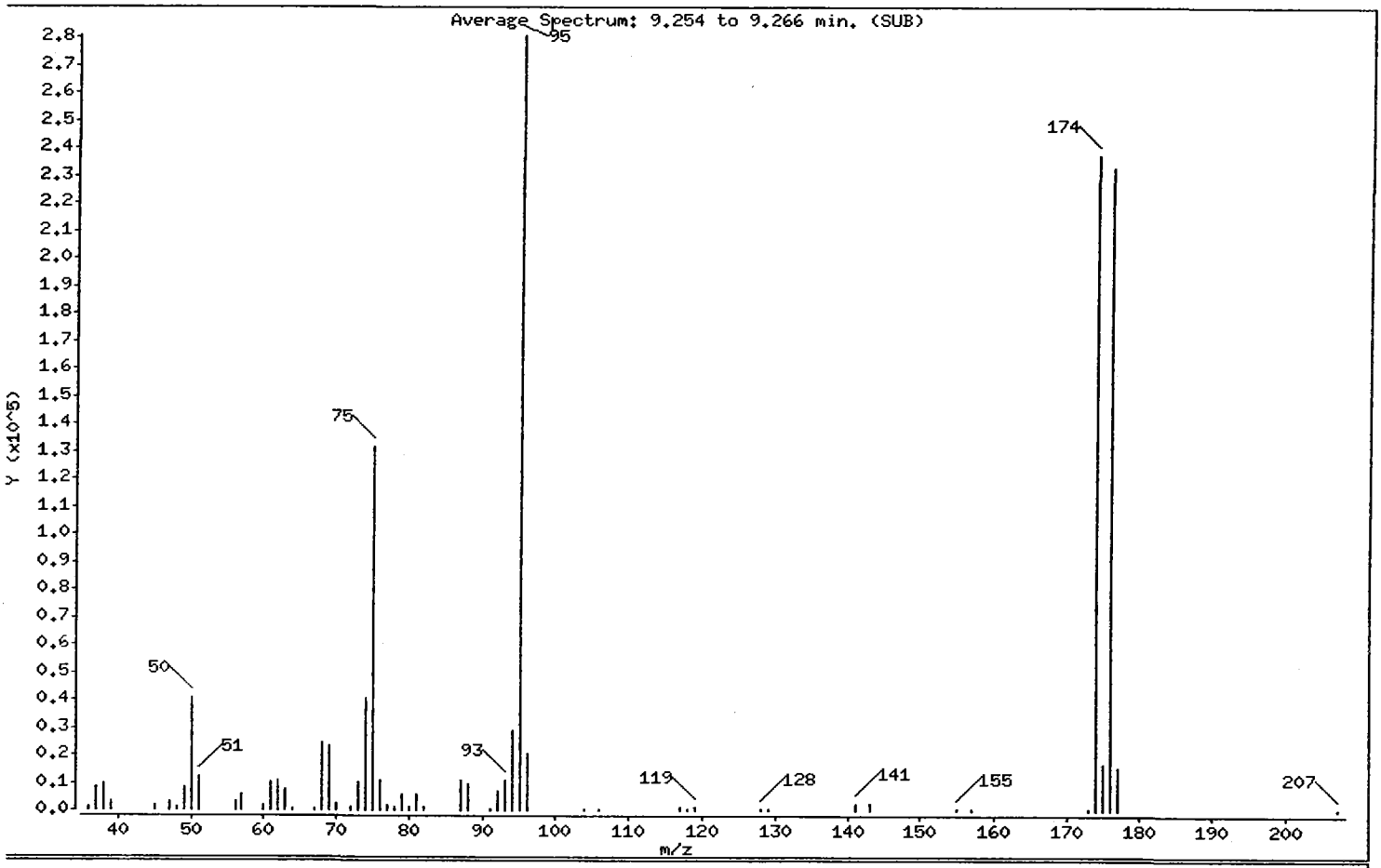
Sample Info: BFB1217,BFB1217,5,0

Operator: PKC

Column phase: RTX502.2

Column diameter: 0.18

1 Bromofluorobenzene



m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
95	Base Peak, 100% relative abundance	100.00
50	8.00 - 40.00% of mass 95	14.47
75	30.00 - 66.00% of mass 95	47.00
96	5.00 - 9.00% of mass 95	7.42
173	Less than 2.00% of mass 174	0.20 (0.24)
174	50.00 - 101.00% of mass 95	84.72
175	4.00 - 9.00% of mass 174	6.04 (7.13)
176	93.00 - 101.00% of mass 174	83.01 (97.99)
177	5.00 - 9.00% of mass 176	5.62 (6.77)

Data File: /chem1/nt7.i/18dec2009.b/12180902.d

Date : 18-DEC-2009 10:07

Client ID: BFB1217

Instrument: nt7.i

Sample Info: BFB1217,BFB1217,5,0

Operator: PKC

Column phase: RTX502.2

Column diameter: 0.18

Data File: 12180902.d

Spectrum: Average Spectrum: 9.254 to 9.266 min. (SUB)

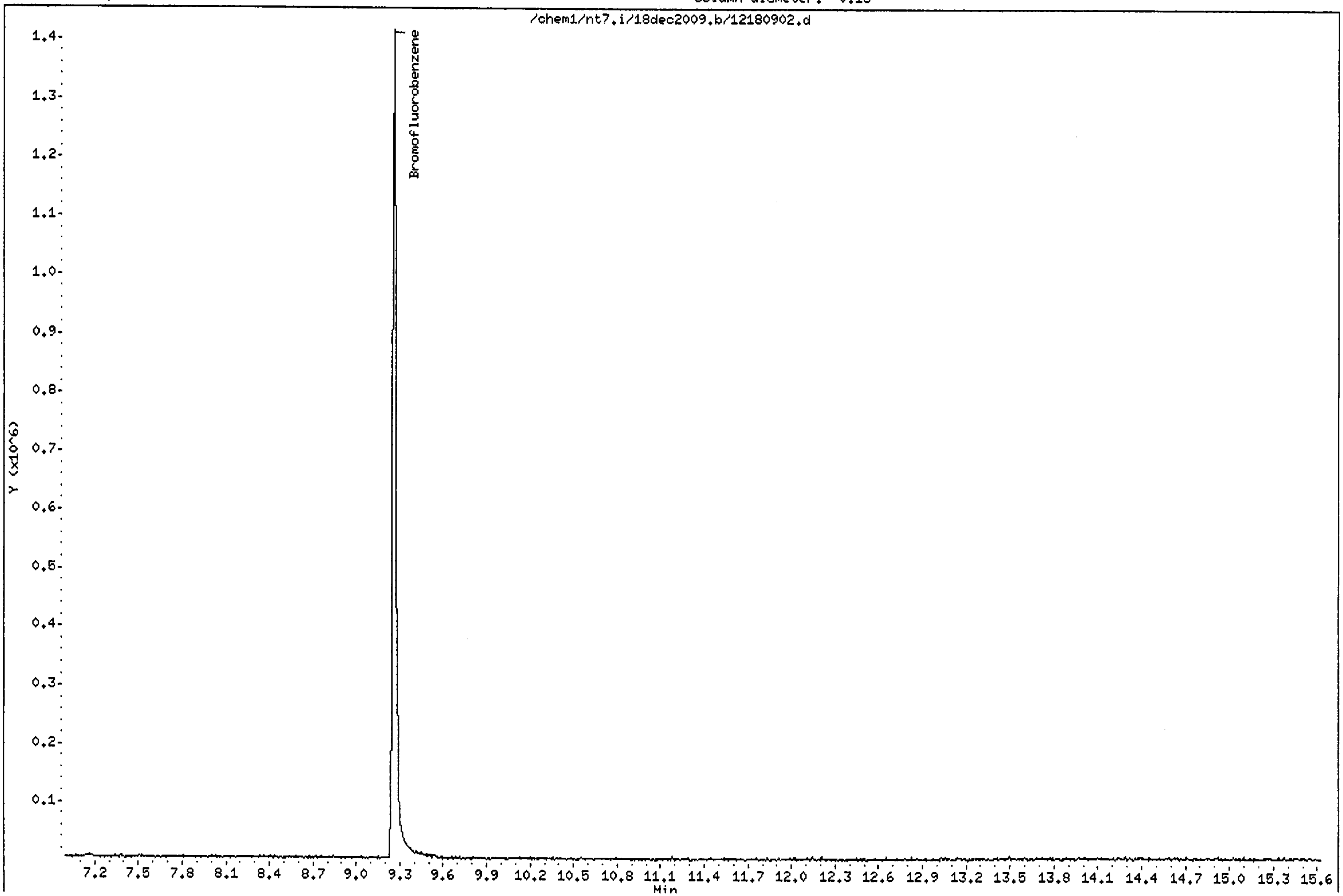
Location of Maximum: 95.00

Number of points: 57

m/z	Y	m/z	Y	m/z	Y	m/z	Y
36.00	1519	63.00	7863	81.00	5831	128.00	368
37.00	8329	64.00	762	82.00	1077	129.00	352
38.00	9530	67.00	335	87.00	10915	141.00	2399
39.00	3409	68.00	24512	88.00	9586	143.00	2305
45.00	1923	69.00	23368	91.00	367	155.00	420
47.00	2951	70.00	2557	92.00	7114	157.00	340
48.00	1352	72.00	1179	93.00	10957	173.00	566
49.00	8460	73.00	10079	94.00	28992	174.00	237888
50.00	40624	74.00	40496	95.00	280832	175.00	16968
51.00	12122	75.00	131968	96.00	20824	176.00	233088
56.00	3357	76.00	11000	104.00	344	177.00	15780
57.00	6023	77.00	2068	106.00	688	207.00	366
60.00	1949	78.00	1201	117.00	1264		
61.00	10434	79.00	5654	118.00	772		
62.00	10692	80.00	1531	119.00	1565		

Data File: /chem1/nt7.i/18dec2009.b/12180902.d
Date : 18-DEC-2009 10:07
Client ID: BFB1217
Sample Info: BFB1217,BFB1217,5,0
Column phase: RTX502.2

Instrument: nt7.i
Operator: PKC
Column diameter: 0.18



ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C-SIM Sample ID: MB-121809
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-121809
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized:
Reported: 12/22/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS POS-LLA
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT7/PKC
Date Analyzed: 12/18/09 12:03

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	RL	Result	Q
156-59-2	cis-1,2-Dichloroethene	0.020	< 0.020	U
156-60-5	trans-1,2-Dichloroethene	0.020	< 0.020	U
79-01-6	Trichloroethene	0.020	< 0.020	U
127-18-4	Tetrachloroethene	0.020	< 0.020	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.7%
d8-Toluene	101%

FORM I

PC 12/21/09

Analytical Resources, Inc.

SW8260C SIM

Data file : /chem1/nt7.i/18dec2009.b/12180906.d
Lab Smp Id: MB1217
Inj Date : 18-DEC-2009 12:03
Operator : PKC Inst ID: nt7.i
Smp Info : MB1217,10,10,0
Misc Info : 09-
Comment :
Method : /chem1/nt7.i/18dec2009.b/sim112309.m
Meth Date : 21-Dec-2009 10:54 paul Quant Type: ISTD
Cal Date : 23-NOV-2009 17:53 Cal File: 11230915.d
Als bottle: 1 QC Sample: BLANK
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sim.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/L)	FINAL (ug/L)
	1 Vinyl Chloride	62	Compound Not Detected.					
	2 1,1-Dichloroethene	96	Compound Not Detected.					
	175 Trans-1,2-Dichloroethene	96	Compound Not Detected.					
	3 cis-1,2-dichloroethene	96	Compound Not Detected.					
	6 Benzene	78	Compound Not Detected.					
*	4 Pentafluorobenzene	168	5.315	5.316	(1.000)	261838	1000.00	
$	5 d4-1,2-Dichloroethane	65	5.323	5.324	(1.001)	100213	997.308	997.31
	8 Trichloroethene	130	Compound Not Detected.					
*	7 1,4-Difluorobenzene	114	5.752	5.742	(1.000)	376390	1000.00	
$	9 d8-Toluene	98	6.902	6.890	(1.200)	427776	1013.67	1013.7
	10 Tetrachloroethene	166	Compound Not Detected.					
	11 1,1,2,2-Tetrachloroethane	83	Compound Not Detected.					

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt7.i
Lab File ID: 12180906.d
Lab Smp Id: MB1217
Analysis Type: VOA
Quant Type: ISTD
Operator: PKC
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-

Calibration Date: 18-DEC-2009
Calibration Time: 10:43

Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 5.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	389727	194864	779454	261838	-32.82
7 1,4-Difluorobenze	553230	276615	1106460	376390	-31.97

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	5.32	4.82	5.82	5.31	-0.01
7 1,4-Difluorobenze	5.74	5.24	6.24	5.75	0.18

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Lab Smp Id: MB1217
Level: LOW
Data Type: MS DATA
SpikeList File: sim.spk
Sublist File: sim.sub
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-

Client SDG: 18dec2009
Fraction: VOA

Operator: PKC
SampleType: BLANK
Quant Type: ISTD

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 5 d4-1,2-Dichloroeth	1000.0	997.31	99.73	80-136
$ 9 d8-Toluene	1000.0	1013.7	101.37	80-120

Data File: /chem1/nt7.i/18dec2009.b/12180906.d

Date : 18-DEC-2009 12:03

Client ID:

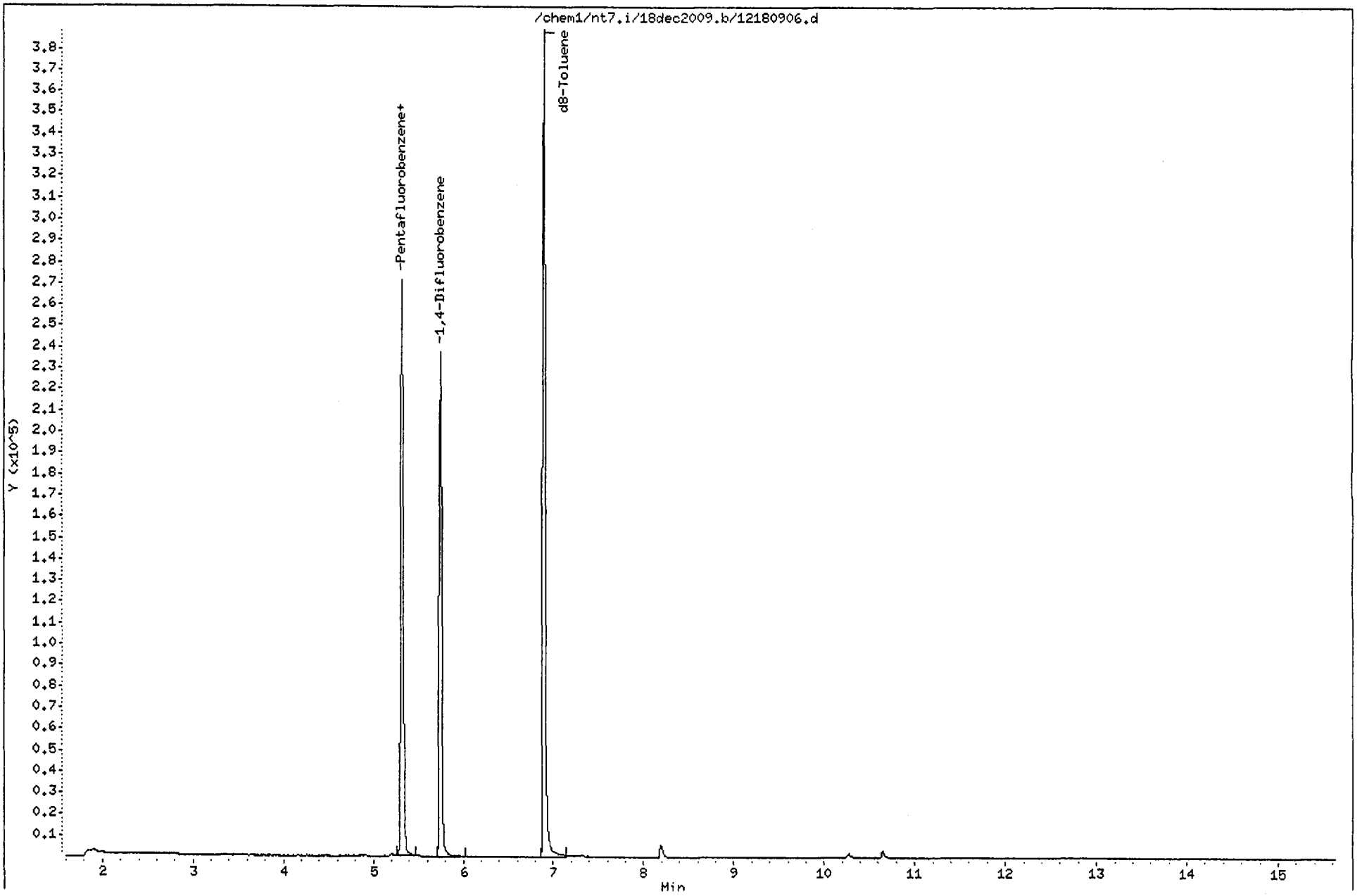
Sample Info: MB1217,10,10,0

Column phase: RTXVMS

Instrument: nt7.i

Operator: PKC

Column diameter: 0.18



PC
NT7

Analytical Resources, Inc.

SW8260C SIM

Data file : /chem1/nt7.i/18dec2009.b/12180904.d
Lab Smp Id: LCS1217
Inj Date : 18-DEC-2009 11:10
Operator : PKC Inst ID: nt7.i
Smp Info : LCS1217,10,10,0
Misc Info : 09-
Comment :
Method : /chem1/nt7.i/18dec2009.b/sim112309.m
Meth Date : 21-Dec-2009 10:54 paul Quant Type: ISTD
Cal Date : 23-NOV-2009 17:53 Cal File: 11230915.d
Als bottle: 1 QC Sample: LCS
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sim.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/L)	FINAL (ug/L)
1 Vinyl Chloride	62	1.549	1.557	(0.291)	117152	851.988	851.99
2 1,1-Dichloroethene	96	2.517	2.510	(0.474)	115947	916.542	916.54
175 Trans-1,2-Dichloroethene	96	3.295	3.289	(0.620)	121782	917.536	917.54
3 cis-1,2-dichloroethene	96	4.440	4.441	(0.835)	124501	899.342	899.34
6 Benzene	78	5.203	5.204	(0.904)	501192	900.974	900.97
4 Pentafluorobenzene	168	5.314	5.316	(1.000)	281461	1000.00	
5 d4-1,2-Dichloroethane	65	5.322	5.324	(1.001)	99780	923.774	923.77
8 Trichloroethene	130	5.707	5.707	(0.992)	145574	950.057	950.06
7 1,4-Difluorobenzene	114	5.753	5.742	(1.000)	402622	1000.00	
9 d8-Toluene	98	6.902	6.890	(1.200)	459368	1017.61	1017.6
10 Tetrachloroethene	166	7.259	7.258	(1.262)	148023	962.342	962.34
11 1,1,2,2-Tetrachloroethane	83	9.446	9.445	(1.642)	73795	963.386	963.39

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt7.i
Lab File ID: 12180904.d
Lab Smp Id: LCS1217
Analysis Type: VOA
Quant Type: ISTD
Operator: PKC
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-

Calibration Date: 18-DEC-2009
Calibration Time: 10:43

Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 5.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	389727	194864	779454	281461	-27.78
7 1,4-Difluorobenze	553230	276615	1106460	402622	-27.22

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	5.32	4.82	5.82	5.31	-0.03
7 1,4-Difluorobenze	5.74	5.24	6.24	5.75	0.20

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Lab Smp Id: LCS1217
Level: LOW
Data Type: MS DATA
SpikeList File: sim.spk
Sublist File: sim.sub
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-

Client SDG: 18dec2009
Fraction: VOA

Operator: PKC
SampleType: LCS
Quant Type: ISTD

	SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
1	Vinyl Chloride	1000.0	851.99	85.20	76-120
175	Trans-1,2-Dichloro	1000.0	917.54	91.75	70-130
2	1,1-Dichloroethene	1000.0	916.54	91.65	79-126
3	cis-1,2-dichloroet	1000.0	899.34	89.93	76-127
6	Benzene	1000.0	900.97	90.10	75-121
8	Trichloroethene	1000.0	950.06	95.01	79-120
10	Tetrachloroethene	1000.0	962.34	96.23	75-123
11	1,1,2,2-Tetrachlor	1000.0	963.39	96.34	72-129

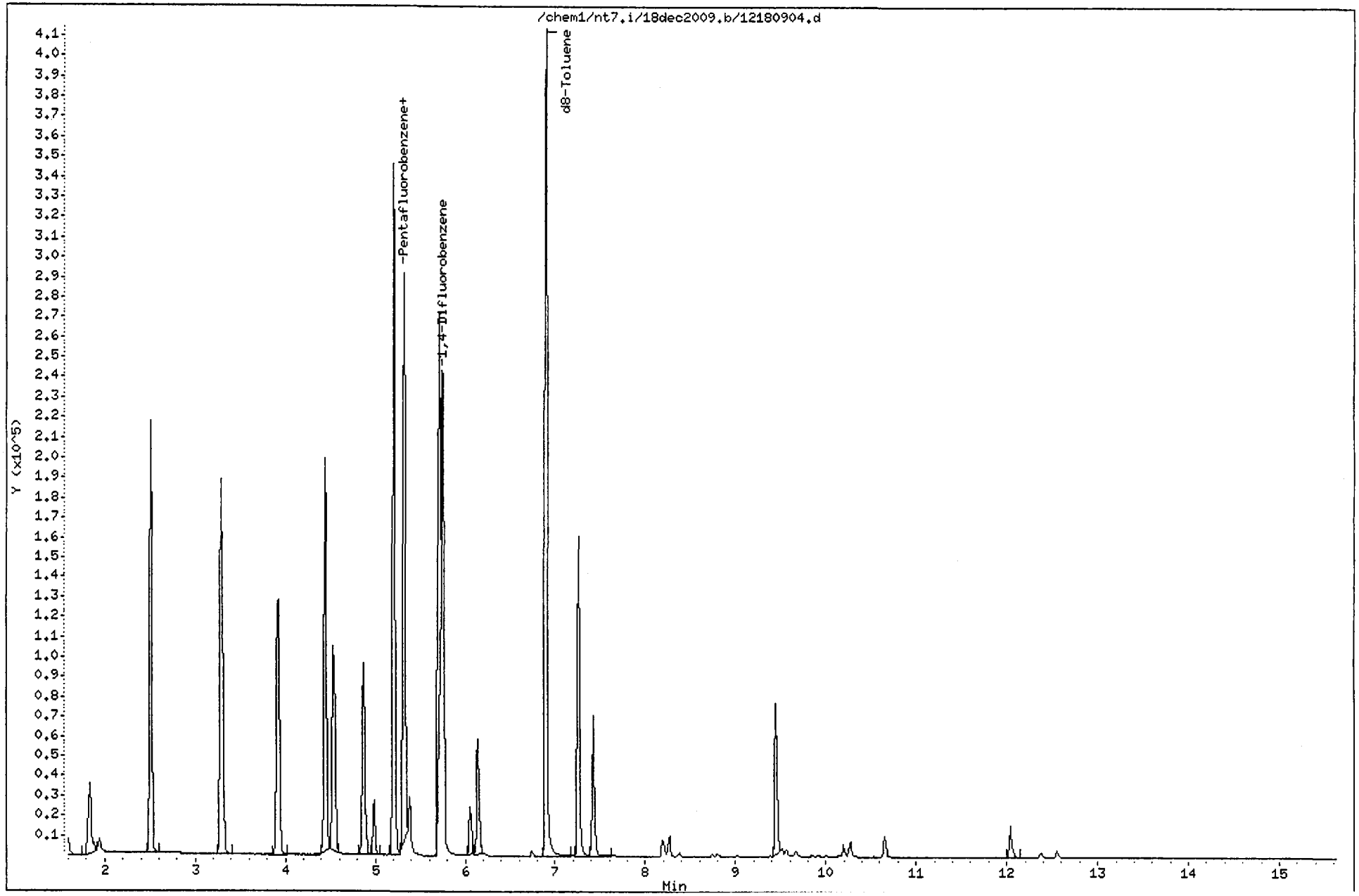
	SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 5	d4-1,2-Dichloroeth	1000.0	923.77	92.38	80-136
$ 9	d8-Toluene	1000.0	1017.6	101.76	80-120

Data File: /chem1/nt7.i/18dec2009.b/12180904.d
Date : 18-DEC-2009 11:10
Client ID:
Sample Info: LCS1217,10,10,0

Instrument: nt7.i

Operator: PKC
Column diameter: 0.18

Column phase: RTXVMS



PC 12/21/09

Analytical Resources, Inc.

SW8260C SIM

Data file : /chem1/nt7.i/18dec2009.b/12180905.d
Lab Smp Id: LCSD1217
Inj Date : 18-DEC-2009 11:37
Operator : PKC Inst ID: nt7.i
Smp Info : LCSD1217,10,10,0
Misc Info : 09-
Comment :
Method : /chem1/nt7.i/18dec2009.b/sim112309.m
Meth Date : 21-Dec-2009 10:54 paul Quant Type: ISTD
Cal Date : 23-NOV-2009 17:53 Cal File: 11230915.d
Als bottle: 1 QC Sample: LCS
Dil Factor: 1.00000
Integrator: HP RTE Compound Sublist: sim.sub
Target Version: 3.50

Concentration Formula: Amt * DF * Pv / Sa * CpndVariable

Name	Value	Description
DF	1.00000	Dilution Factor
Pv	10.00000	Purge Volume (mL)
Sa	10.00000	Sample Amount (mL)

Cpnd Variable Local Compound Variable

	Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	CONCENTRATIONS ON-COLUMN (ng/L)	FINAL (ug/L)
1	Vinyl Chloride	62	1.550	1.557	(0.292)	113188	839.835	839.84
2	1,1-Dichloroethene	96	2.518	2.510	(0.474)	112376	906.315	906.32
175	Trans-1,2-Dichloroethene	96	3.297	3.289	(0.620)	118974	914.544	914.54
3	cis-1,2-dichloroethene	96	4.441	4.441	(0.836)	122443	902.400	902.40
6	Benzene	78	5.204	5.204	(0.905)	480613	877.307	877.31
4	Pentafluorobenzene	168	5.316	5.316	(1.000)	275872	1000.00	
5	d4-1,2-Dichloroethane	65	5.324	5.324	(1.001)	99633	941.097	941.10
8	Trichloroethene	130	5.707	5.707	(0.992)	140247	929.408	929.41
7	1,4-Difluorobenzene	114	5.753	5.742	(1.000)	396506	1000.00	
9	d8-Toluene	98	6.902	6.890	(1.200)	449027	1010.05	1010.0
10	Tetrachloroethene	166	7.258	7.258	(1.262)	142722	942.195	942.20
11	1,1,2,2-Tetrachloroethane	83	9.445	9.445	(1.642)	70968	940.767	940.77

Analytical Resources, Inc.

INTERNAL STANDARD COMPOUNDS
AREA AND RT SUMMARY

Instrument ID: nt7.i
Lab File ID: 12180905.d
Lab Smp Id: LCSD1217
Analysis Type: VOA
Quant Type: ISTD
Operator: PKC
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-

Calibration Date: 18-DEC-2009
Calibration Time: 10:43

Level: LOW
Sample Type: WATER

Test Mode:
Use Initial Calibration Level 5.

COMPOUND	STANDARD	AREA LIMIT LOWER	AREA LIMIT UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	389727	194864	779454	275872	-29.21
7 1,4-Difluorobenze	553230	276615	1106460	396506	-28.33

COMPOUND	STANDARD	RT LIMIT LOWER	RT LIMIT UPPER	SAMPLE	%DIFF
4 Pentafluorobenzen	5.32	4.82	5.82	5.32	0.00
7 1,4-Difluorobenze	5.74	5.24	6.24	5.75	0.20

AREA UPPER LIMIT = +100% of internal standard area.
AREA LOWER LIMIT = - 50% of internal standard area.
RT UPPER LIMIT = + 0.50 minutes of internal standard RT.
RT LOWER LIMIT = - 0.50 minutes of internal standard RT.

Analytical Resources, Inc.

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Lab Smp Id: LCSD1217
Level: LOW
Data Type: MS DATA
SpikeList File: sim.spk
Sublist File: sim.sub
Method File: /chem1/nt7.i/18dec2009.b/sim112309.m
Misc Info: 09-

Client SDG: 18dec2009
Fraction: VOA

Operator: PKC
SampleType: LCS
Quant Type: ISTD

	SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
1	Vinyl Chloride	1000.0	839.84	83.98	76-120
175	Trans-1,2-Dichloro	1000.0	914.54	91.45	70-130
2	1,1-Dichloroethene	1000.0	906.32	90.63	79-126
3	cis-1,2-dichloroet	1000.0	902.40	90.24	76-127
6	Benzene	1000.0	877.31	87.73	75-121
8	Trichloroethene	1000.0	929.41	92.94	79-120
10	Tetrachloroethene	1000.0	942.20	94.22	75-123
11	1,1,2,2-Tetrachlor	1000.0	940.77	94.08	72-129

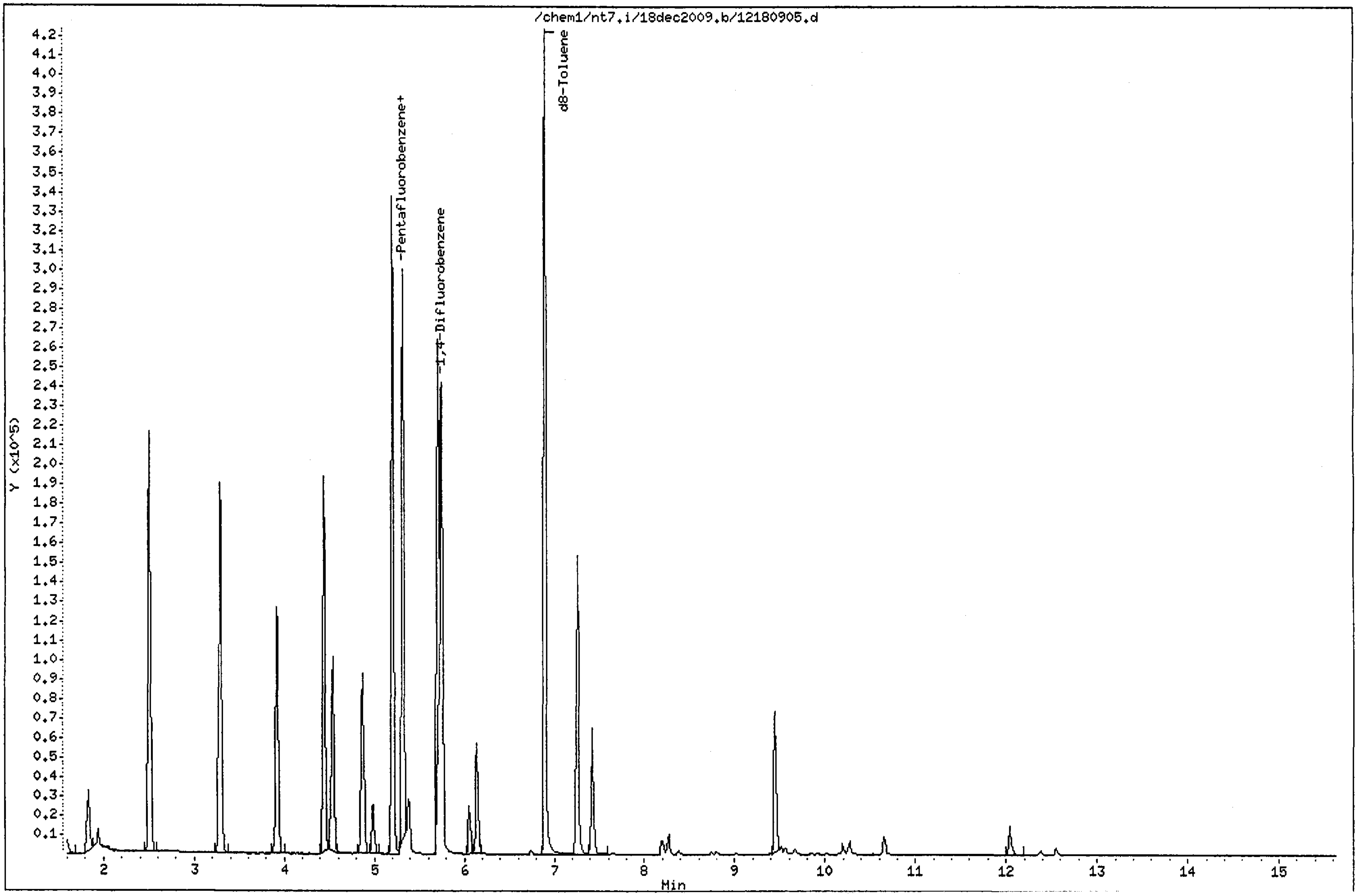
	SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 5	d4-1,2-Dichloroeth	1000.0	941.10	94.11	80-136
$ 9	d8-Toluene	1000.0	1010.0	101.00	80-120

Data File: /chem1/nt7.i/18dec2009.b/12180905.d
Date : 18-DEC-2009 11:37
Client ID:
Sample Info: LCSD1217,10,10,0

Column phase: RTXVMS

Instrument: nt7.i

Operator: PKC
Column diameter: 0.18



SIM Volatile Analysis
Run Logs

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

Analytical Resources Inc.: Volatile Organics Instrument Log

NT-7 Serial No.:GC=US00024417, MS=US72821196

Date: 11/23/09 Analysis: SIM VOA Analyst: MH/PC

GC Program: VC Column No: 850322 Column Type: RTXVMS

Instrument Tune (.U or .CT.): 1N30905 EM Voltage: 11/23/09 1565

Calibration File: 11130911 Curve Date: 11/23/09

IS/SS	Ical/Ccal	LCS/ICV
VW609-3	VW607-3	VW607-3

INTERNAL STANDARD SUMMARY FOR DATABATCH - /chem1/nt7.i/23nov2009.b

	Time	Filename	LabID	ClientID	WT				
1	1017	11230901.d	BFB1123	BFB1123	0.00				
2	1050	11230902.d	BFB1123	BFB1123	0.00				
3	1141	11230903.d	BFB1123	BFB1123	0.00				
4	1218	11230904.d	test1123		1				
5	1251	11230905.d	BFB1123	BFB1123	0.00 | 0.00	0|	0.00	0|	
6	1343	11230906.d	00201123		1 | 5.31	455906|	5.75	637932|	
7	1406	11230907.d	00501123		1 | 5.31	392708|	5.75	563435|	
8	1434	11230908.d	01001123		1 | 5.32	419237|	5.75	586792|	
9	1501	11230909.d	05001123		1 | 5.32	432998|	5.75	603782|	
0	1529	11230910.d	10001123		1 | 5.32	442351|	5.75	614549|	
1	1557	11230911.d	20001123		1 | 5.31	425942|	5.75	594311|	
2	1624	11230912.d	40001123		1 | 5.32	425175|	5.75	591748|	
3	1652	11230913.d	ICV1123		1 | 5.32	403586|	5.75	563524|	
	1725	11230914.d	00201123		1 | 5.32	377044|	5.75	515990|	
	1753	11230915.d	00501123		1 | 5.31	366704|	5.74	519359|	
	1820	11230916.d	01001123		1 | 5.32	365438|	5.74	528357|	
	1848	11230917.d	05001123		1 | 5.32	381756|	5.75	546077|	
	1916	11230918.d	10001123		1 | 5.31	389727|	5.74	553230|	
	1943	11230919.d	20001123		1 | 5.32	389109|	5.75	556845|	
	2011	11230920.d	40001123		1 | 5.32	387153|	5.74	551283|	
	2039	11230921.d	ICV1123		1 | 5.32	373713|	5.74	533962|	

MH 12/1/09

laintenance / Comments

aintenance Verification (Identify ICal or CCal that demonstrates the instrument is in control):

y line must contain information or be lined out. Make all entries legible. Start a new page for each QC period.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

VOA Analyst Notes / Corrective Action Log

ARI Project ID: 5/M VOA Cal Client ID: _____

ARI SOP: **404S**(Gas) **410S**(BTEX) **430S**(VPH) **703S**(SIM) **706S**(524.2) **708S**(8260C) **710S**(MME)

Parameter(s): SIM

Instrument: NT-3 NT-5 NT-7 NT-9 NT-10 PID-1 PID-2 PID-3 FID-6 FINN-5

Purge Volume (mL) 10 Curve Date: 11/23/09 Analysis Start Date: 11/23/09

pH ≤ 2.0	YES / NO / NA	Method Blank In Control?	YES / NO
BFB Tune Meets Criteria?	YES / NO / NA	LCS / LCSD Recovery In Control?	YES / NO
Internal Standard Meets Criteria?	YES / NO / NA	Surrogate Recovery In Control?	YES / NO
Special Analysis Criteria Met?	YES / NO / NA		

ICal acceptable? YES / NO; Q flag applied? YES / NO / NA

CCal acceptable? YES / NO; Q flag applied? YES / NO / NA

Bubbles/Headspace: None SM (≤ 2mm •) PB (2-4mm) LG (> 4mm ●) Head Space

Detail problems, corrective actions and/or other pertinent information below (use reverse side when necessary):

All averaged.

ICV target 100

Additional Details on Reverse: Yes / No

Analyst Signature: Paul Caylett **Date:** 12/21/09

Reviewer's Signature: _____ **Date:** 12/24/09

QB37 : 00197

Analytical Resources Inc.: Volatile Organics Instrument Log

NT-7 Serial No.:GC=US00024417, MS=US72821196

Date: 12/18/09 Analysis: SIM Analyst: PC

GC Program: VC Column No: 850322 Column Type: ...VMS

Instrument Tune (.U or .CT.): 12180902 EM Voltage: 1624

Calibration File: 12180903 Curve Date: 11/23/09

IS/SS	Ical/Ccal	LCS/ICV
VW612-1	VW607-3	VW607-3

INTERNAL STANDARD SUMMARY FOR DATABATCH - /chem1/nt7.i/18dec2009.b

	Time	Filename	LabID	ClientID	Vial#	pH	DF				
1	0941	12180901.d	rb1217				1	NO ISTDS FOUND			
2	1007	12180902.d	BFB1217	BFB1217		0.00					
3	1043	12180903.d	CC1217	CC1217			1	5.32	281604	5.74	403441
4	1110	12180904.d	LCS1217				1	5.31	281461	5.75	402622
5	1137	12180905.d	LCSD1217				1	5.32	275872	5.75	396506
6	1203	12180906.d	MB1217				1	5.31	261838	5.75	376390
7	1239	12180907.d	QA85H	TRIP BLANK	2	<2	1	5.32	256592	5.75	371829
8	1306	12180908.d	QB93C	TRIP BLANK	1		1	5.31	258197	5.75	368995
9	1333	12180909.d	QB04H	TRIP BLANKS	2		1	5.32	253279	5.75	363166
10	1359	12180910.d	QB37D	TB121409	1		1	5.31	247108	5.75	355484
11	1426	12180911.d	QA85A	AGW130-091210	2		1	5.32	246414	5.75	362031
12	1453	12180912.d	QA85B	AGW044-091210	2		1	5.32	243502	5.75	351245
13	1519	12180913.d	QA85C	AGW115-091210	2		1	5.32	249614	5.75	354674
14	1546	12180914.d	QA85D	AGW129-091210	2		1	5.32	238325	5.75	353834
15	1613	12180915.d	QA85E	AGW128-091210	2		1	5.31	238699	5.75	344730
16	1639	12180916.d	QA85F	AGW116-091210	2		1	5.32	236806	5.75	342325
17	1706	12180917.d	QA85G	AGW118-091210	2		1	5.32	234792	5.75	342662
18	1734	12180918.d	QB93A	EGW178-091217	1		1	5.32	226161	5.75	324991
19	1759	12180919.d	QB93B	EGW177-091217	1		1	5.32	233889	5.75	335835
20	1826	12180920.d	QB04A	AGW037-091211	2		1	5.32	234479	5.75	353948
21	1852	12180921.d	QB04E	AGW039-091211	2		1	5.31	230514	5.75	337698
22	1919	12180922.d	QB04F	AGW153-091211	2		1	5.32	224382	5.75	327370
23	1946	12180923.d	QB04G	AGW133-091211	2		1	5.32	226505	5.75	325464
24	2012	12180924.d	QB37A	CB31A121409GRAB	1		1	5.32	225127	5.75	324470
25	2039	12180925.d	QB37B	CB4B57121409GRAB	1	<2	1	5.32	226847	5.75	329073
26	2106	12180926.d	QB37C	CB1121409GRAB	1		1	5.32	229107	5.75	327928

PC 12/21/09

Maintenance / Comments

Maintenance Verification (Identify ICal or CCal that demonstrates the instrument is in control):

Every line must contain information or be lined out. Make all entries legible. Start a new page for each QC period.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

VOA Analyst Notes / Corrective Action Log

ARI Project ID: QB37 Client ID: Floyd/Snider

ARI SOP: **404S**(Gas) **410S**(BTEX) **430S**(VPH) **703S**(SIM) **706S**(524.2) **708S**(8260C) **710S**(MME)

Parameter(s): SIM VOA

Instrument: NT-3 NT-5 NT-7 NT-9 NT-10 PID-1 PID-2 PID-3 FID-6 FINN-5

Purge Volume (mL) 10 Curve Date: 11/23/01 Analysis Start Date: 12/8/09

pH ≤ 2.0 YES / NO / NA

Method Blank In Control? YES / NO

BFB Tune Meets Criteria? YES / NO / NA

LCS / LCSD Recovery In Control? YES / NO

Internal Standard Meets Criteria? YES / NO / NA

Surrogate Recovery In Control? YES / NO

Special Analysis Criteria Met? YES / NO / NA

ICal acceptable? YES / NO; Q flag applied? YES / NO / NA

CCal acceptable? YES / NO; Q flag applied? YES / NO / NA

Bubbles/Headspace: None SM (≤ 2mm •) PB (2-4mm) LG (> 4mm ●) Head Space

Detail problems, corrective actions and/or other pertinent information below (use reverse side when necessary):

Additional Details on Reverse: Yes / No

Analyst Signature: Paul Caywell **Date:** 12/21/09

Reviewer's Signature: [signature] **Date:** 12/21/09

TPHD Analysis
QC Summary Data

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

ANALYTICAL RESOURCES INCORPORATED

CLEANED TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA

Client ID	OTER	TOT OUT
MB-121609	73.4%	0
LCS-121609	75.0%	0
LCSD-121609	68.6%	0
CB31A121409GRAB	72.6%	0
CB4857121409GRAB	69.5%	0
CB1121409GRAB	68.2%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(51-120)	(41-121)

Prep Method: SW3510C
Log Number Range: 09-30854 to 09-30856

FORM-II TPHD

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID-Silica and Acid Cleaned **Sample ID: LCS-121609**
Page 1 of 1 **LCS/LCSD**

Lab Sample ID: LCS-121609
LIMS ID: 09-30854
Matrix: Water
Data Release Authorized: VTS
Reported: 12/19/09

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA
Date Sampled: 12/14/09
Date Received: 12/15/09

Date Extracted LCS/LCSD: 12/16/09

Date Analyzed LCS: 12/17/09 15:26
LCSD: 12/17/09 15:45
Instrument/Analyst LCS: FID/MS
LCSD: FID/MS

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.27	3.00	75.7%	2.12	3.00	70.7%	6.8%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	75.0%	68.6%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

TPH METHOD BLANK SUMMARY

BLANK NO.

QB53MBW1

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

SDG No.: QB37 Project No.: LORA LAKE APT.

Date Extracted: 12/16/09 Matrix: LIQUID

Date Analyzed : 12/17/09 Instrument ID : FID9

Time Analyzed : 1605

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	QB53LCSW1	QB53LCSW1	12/17/09
02	QB53LCSDW1	QB53LCSDW1	12/17/09
03	CB31A121409G	QB37A	12/17/09
04	CB4857121409	QB37B	12/17/09
05	CB1121409GRA	QB37C	12/17/09

FORM IV TPH

6a

NW DIESEL INITIAL CALIBRATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: FLOYD/SNIDER

Instrument: FID9.I Project: LORA LAKE APT.

Calibration Date: 10-DEC-2009 SDG No.: QB37

Diesel Range	RF1 50	RF2 100	RF3 250	RF4 500	RF5 1000	RF6 2500	Ave RF	%RSD
WA Diesel	16575	17156	17799	19101	19702	19487	18303	7.1
AK Diesel	19755	20208	20875	22282	22905	22541	21428	6.2
OR Diesel	19899	20301	21011	22462	23133	22846	21609	6.4
o-Terph	24075	24006	24516	25887	26100	26578	25194	4.5

<- Indicates %RSD outside limits
Surrogate areas are not included in Diesel RF calculation.

Quant Ranges : WA Diesel C12-C24 (3.163-6.039)
AK Diesel C10-C25 (2.571-6.229)
OR Diesel C10-C28 (2.571-6.717)

Calibration Files	Analysis Time
1210A036.D	10-DEC-2009 21:53
1210A037.D	10-DEC-2009 22:13
1210A038.D	10-DEC-2009 22:33
1210A039.D	10-DEC-2009 22:52
1210A040.D	10-DEC-2009 23:12
1210A041.D	10-DEC-2009 23:32

6a
NW MOTOR OIL INITIAL CALIBRATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: FLOYD/SNIDER

Instrument: FID9.I Project: LORA LAKE APT.

Calibration Date: 11-DEC-2009 SDG No.: QB37

Motor Oil Range	RF1 100	RF2 250	RF3 500	RF4 1000	RF5 2500	RF6 5000	Ave RF	%RSD
WA M.Oil	15805	15092	13372	13715	13016	12491	13915	9.2
AK M.Oil	13160	12744	11364	11709	11173	10942	11849	7.6
OR M.Oil	14461	13134	11338	11510	10942	9898	11880	13.8
Triac Surr	26332	27656	25673	26283	26111	26670	26454	2.5

<- Indicates %RSD outside limits
Surrogate areas are not included in Motor Oil RF calculation.

Quant Ranges : WA M.Oil C24-C38
AK M.Oil C25-C36
OR M.Oil C28-C40

Calibration Files	Analysis Time
1210A044.D	11-DEC-2009 00:30
1210A045.D	11-DEC-2009 00:50
1210A046.D	11-DEC-2009 01:10
1210A047.D	11-DEC-2009 01:29
1210A049.D	11-DEC-2009 02:08
1210A051.D	11-DEC-2009 02:48

7a

DIESEL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: FLOYD/SNIDER

ICal Date: 10-DEC-2009 Project: LORA LAKE APT.

CCal Date: 17-DEC-2009 SDG No.: QB37

Analysis Time: 14:26 Lab ID: DIESEL#1

Instrument: FID9.I Lab File Name: 1217A004.D

Diesel Range	Area*	CalcAmnt	NomAmnt	% D
WADies(C12-C24)	5122297	279.9	250	11.9
AK102 (C10-C25)	6007571	280.4	250	12.1
Terphenyl	1274940	50.6	45	12.5

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

Quant Ranges : WA Diesel C12-C24
AK Diesel C10-C25

7a

MOTOR OIL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: FLOYD/SNIDER

ICal Date: 10-DEC-2009 Project: LORA LAKE APT.

CCal Date: 17-DEC-2009 SDG No.: QB37

Analysis Time: 14:46 Lab ID: MOIL#1

Instrument: FID9.I Lab File Name: 1217A005.D

M.oil Range	Area*	CalcAmnt	NomAmnt	% D	
WAMoil(C24-C38)	7038149	505.8	500	1.2	
AK103 (C25-C36)	6234283	659.2	500	31.8	<-
n-Triacontane	1322671	50.0	45	11.1	

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

Quant Ranges : WA M.Oil C24-C38
AK M.Oil C25-C36

7a

DIESEL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: FLOYD/SNIDER

ICal Date: 10-DEC-2009 Project: LORA LAKE APT.

CCal Date: 17-DEC-2009 SDG No.: QB37

Analysis Time: 16:25 Lab ID: DIESEL#2

Instrument: FID9.I Lab File Name: 1217A010.D

Diesel Range	Area*	CalcAmnt	NomAmnt	% D
WADies(C12-C24)	5172462	282.6	250	13.0
AK102 (C10-C25)	6044356	282.1	250	12.8
Terphenyl	1273896	50.6	45	12.4

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

Quant Ranges : WA Diesel C12-C24
AK Diesel C10-C25

7a

MOTOR OIL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: FLOYD/SNIDER

ICal Date: 10-DEC-2009 Project: LORA LAKE APT.

CCal Date: 17-DEC-2009 SDG No.: QB37

Analysis Time: 16:45 Lab ID: MOIL#2

Instrument: FID9.I Lab File Name: 1217A011.D

M.oil Range	Area*	CalcAmnt	NomAmnt	% D	
WAMoil(C24-C38)	7063001	507.6	500	1.5	
AK103 (C25-C36)	6224882	658.2	500	31.6	<-
n-Triacontane	1351759	51.1	45	13.6	

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

Quant Ranges : WA M.Oil C24-C38
AK M.Oil C25-C36

7a

DIESEL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: FLOYD/SNIDER

ICal Date: 10-DEC-2009 Project: LORA LAKE APT.

CCal Date: 17-DEC-2009 SDG No.: QB37

Analysis Time: 18:04 Lab ID: DIESEL#3

Instrument: FID9.I Lab File Name: 1217A015.D

Diesel Range	Area*	CalcAmnt	NomAmnt	% D
WADies(C12-C24)	4608121	251.8	250	0.7
AK102 (C10-C25)	5399127	252.0	250	0.8
Terphenyl	1145180	45.5	45	1.0

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

Quant Ranges : WA Diesel C12-C24
AK Diesel C10-C25

7a

MOTOR OIL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: FLOYD/SNIDER

ICal Date: 10-DEC-2009 Project: LORA LAKE APT.

CCal Date: 17-DEC-2009 SDG No.: QB37

Analysis Time: 18:23 Lab ID: MOIL#3

Instrument: FID9.I Lab File Name: 1217A016.D

M.oil Range	Area*	CalcAmnt	NomAmnt	% D
WAMoil(C24-C38)	6519168	468.5	500	-6.3
AK103 (C25-C36)	5777969	611.0	500	22.2
n-Triacontane	1244050	47.0	45	4.5

* Surrogate areas are subtracted from range areas

<- Indicates a %D outside QC limits

Quant Ranges : WA M.Oil C24-C38
AK M.Oil C25-C36

TPH ANALYTICAL SEQUENCE

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

SDG No.: QB37 Project: LORA LAKE APT.

Instrument ID: FID9 GC Column: RTX-1

Run Date: 12/17/09

THE ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS, IS GIVEN BELOW:

SURROGATE RT FROM DAILY STANDARD
TERPH: 4.89 TRIAC: 7.07

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TERPH RT #	TRIAC RT #
01	ZZZZZ	ZZZZZ	12/17/09	1327	4.90	7.09
02	RT	RT	12/17/09	1347	4.89	7.07
03	IB	IB	12/17/09	1407	4.90	7.07
04	DIESEL#1	DIESEL#1	12/17/09	1426	4.90	7.06
05	MOIL#1	MOIL#1	12/17/09	1446	4.89	7.08
06	ZZZZZ	ZZZZZ	12/17/09	1506	4.89	7.07
07	QB53LCSW1	QB53LCSW1	12/17/09	1526	4.90	7.07
08	QB53LCSDW1	QB53LCSDW1	12/17/09	1545	4.90	7.08
09	QB53MBW1	QB53MBW1	12/17/09	1605	4.89	7.09
10	DIESEL#2	DIESEL#2	12/17/09	1625	4.90	7.06
11	MOIL#2	MOIL#2	12/17/09	1645	4.90	7.09
12	CB31A121409G	QB37A	12/17/09	1704	4.89	7.13*
13	CB4857121409	QB37B	12/17/09	1724	4.89	7.10
14	CB1121409GRA	QB37C	12/17/09	1744	4.89	7.10
15	DIESEL#3	DIESEL#3	12/17/09	1804	4.90	7.06
16	MOIL#3	MOIL#3	12/17/09	1823	4.89	7.08

QC LIMITS

TERPH = o-terph (+/- 0.05 MINUTES)
TRIAC = Triacon Surr (+/- 0.05 MINUTES)

* Values outside of QC limits.

FORM VIII TPH

TPH ANALYTICAL SEQUENCE

Lab Name: ANALYTICAL RESOURCES, INC Client: FLOYD/SNIDER

SDG No.: QB37 Project: LORA LAKE APT.

Instrument ID: FID9 GC Column: RTX-1

Run Date: 12/11/09

THE ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS, IS GIVEN BELOW:

SURROGATE RT FROM DAILY STANDARD
TERPH: 4.85 TRIAC: 7.03

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TERPH RT #	TRIAC RT #
01		RT	12/10/09	2114	4.85	7.03
02		IB	12/10/09	2134	4.86	7.02
03		DIESEL 50	12/10/09	2153	4.84	7.03
04		DIESEL 100	12/10/09	2213	4.85	7.05
05		DIESEL 250	12/10/09	2233	4.87	7.03
06		DIESEL 500	12/10/09	2252	4.89	7.03
07		DIESEL 1000	12/10/09	2312	4.90*	7.02
08		DIESEL 2500	12/10/09	2332	4.94*	7.03
09		DIESEL ICV	12/10/09	2351	4.89	7.03
10		IB	12/11/09	0011	4.82	7.01
11		MOIL 100	12/11/09	0030	4.85	7.04
12		MOIL 250	12/11/09	0050	4.85	7.05
13		MOIL 500	12/11/09	0110	4.85	7.06
14		MOIL 1000	12/11/09	0129	4.85	7.07
15		IB	12/11/09	0149	4.82	7.01
16		MOIL 2500	12/11/09	0208	4.85	7.10*
17		IB	12/11/09	0228	4.82	7.02
18		MOIL 5000	12/11/09	0248	4.85	7.13*
19		IB	12/11/09	0307	4.82	7.02
20		MOIL ICV	12/11/09	0327	4.85	7.06
21		IB	12/11/09	0346	4.82	7.01
22		AK103 100	12/11/09	0406	4.84	7.05
23		AK103 250	12/11/09	0425	4.85	7.05
24		AK103 500	12/11/09	0445	4.85	7.06
25		AK103 1000	12/11/09	0505	4.85	7.08
26		IB	12/11/09	0524	4.82	7.01
27		AK103 2500	12/11/09	0544	4.85	7.10*
28		IB	12/11/09	0603	4.83	7.02
29		AK103 5000	12/11/09	0623	4.85	7.13*
30		IB	12/11/09	0643	4.83	7.03
31		AK103 ICV	12/11/09	0702	4.84	7.08

QC LIMITS

TERPH = o-terph (+/- 0.05 MINUTES)
TRIAC = Triacon Surr (+/- 0.05 MINUTES)

* Values outside of QC limits.

FORM VIII TPH

TPHD Analysis
Sample Data

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID-Silica and Acid Cleaned
Page 1 of 1
Matrix: Water

QC Report No: QB37-Floyd/Snider
Project: LORA LAKE APARTMENTS
POS-LLA

Data Release Authorized: VTB
Reported: 12/19/09

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-121609	Method Blank	12/16/09	12/17/09	1.00	Diesel	0.25	< 0.25 U
09-30854	HC ID: ---		FID9	1.0	Motor Oil	0.50	< 0.50 U
					o-Terphenyl		73.4%
QB37A	CB31A121409GRAB	12/16/09	12/17/09	1.00	**Diesel**	**0.25**	**1.6**
09-30854	HC ID: **DRO/MOTOR OIL**		FID9	1.0	**Motor Oil**	**0.50**	**7.5**
					o-Terphenyl		72.6%
QB37B	CB4857121409GRAB	12/16/09	12/17/09	1.00	**Diesel**	**0.25**	**0.43**
09-30855	HC ID: **DRO/MOTOR OIL**		FID9	1.0	**Motor Oil**	**0.50**	**2.4**
					o-Terphenyl		69.5%
QB37C	CB1121409GRAB	12/16/09	12/17/09	1.00	Diesel	0.25	< 0.25 U
09-30856	HC ID: ---		FID9	1.0	Motor Oil	0.50	< 0.50 U
					o-Terphenyl		68.2%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.
Motor Oil quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

FORM I

Analytical Resources Inc.
TPH Quantitation Report

MH 12/18/09

Data file: /chem2/fid9.i/20091217.B/1217A012.D
Method: /chem2/fid9.i/20091217.B/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 12/18/2009
Macro: 10-DEC-2009
Calibration Dates: Gas:01-OCT-2009 Diesel:10-DEC-2009 M.Oil:10-DEC-2009

ARI ID: QB37A
Client ID: CB31A121409GRAB
Injection: 17-DEC-2009 17:04

Dilution Factor: 1

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.784	-0.008	3574	4099	GAS (Tol-C12)	170917	13
C8	1.978	0.002	6221	4947	DIESEL (C12-C24)	14361711	785
C10	2.589	-0.014	949	967	M.OIL (C24-C38)	52284537	3757
C12	3.189	-0.010	2068	1618	AK-102 (C10-C25)	16271443	759
C14	3.731	0.003	11211	8178	AK-103 (C25-C36)	47781168	5052
C16	4.200	0.000	45314	26715	OR.DIES (C10-C28)	35426296	2364
C18	4.662	-0.002	92770	75559	OR.MOIL (C28-C40)	32707556	4710
C20	5.206	0.000	138281	182778			
C22	5.691	0.009	260513	305880			
C24	6.090	-0.001	377958	200259			
C25	6.276	-0.002	457337	304247			
C26	6.445	-0.005	533989	327128			
C28	6.769	0.001	621224	436471			
C32	7.361	0.001	391244	101311			
C34	7.701	0.001	245409	63031	CREOSOT (C12-C22)	6537604	1567
Filter Peak	9.143	-0.003	28368	17239			
C36	8.125	0.003	124305	56498			
C38	8.670	0.005	53650	21274			
C40	9.386	0.002	22134	18893			
o-terph	4.894	-0.001	1102405	823586	JET-A (C10-C18)	861646	51
Triacon Surr	7.134	0.063	1251897	1055789			

Range Times: NW Diesel(3.199 - 6.091) AK102(2.60 - 6.28) Jet A(2.60 - 4.66)
NW M.Oil(6.09 - 8.66) AK103(6.28 - 8.12) OR Diesel(2.60 - 6.77)

Surrogate	Area	Amount	%Rec
o-Terphenyl	823586	32.7	72.6
Triacontane	1055789	39.9	88.7

Analyte	RF	Curve Date
o-Terph Surr	25193.6	10-DEC-2009
Triacon Surr	26454.2	11-DEC-2009
Gas	12943.2	01-OCT-2009
Diesel	18303.2	10-DEC-2009
Motor Oil	13915.4	10-DEC-2009
AK102	21427.7	10-DEC-2009
AK103	9457.0	10-DEC-2009
JetA	17037.4	11-JUN-2009
OR Diesel	14983.0	
OR M.Oil	6945.0	
Bunker C	7267.4	04-MAR-2009
Creosote	4171.8	22-AUG-2009

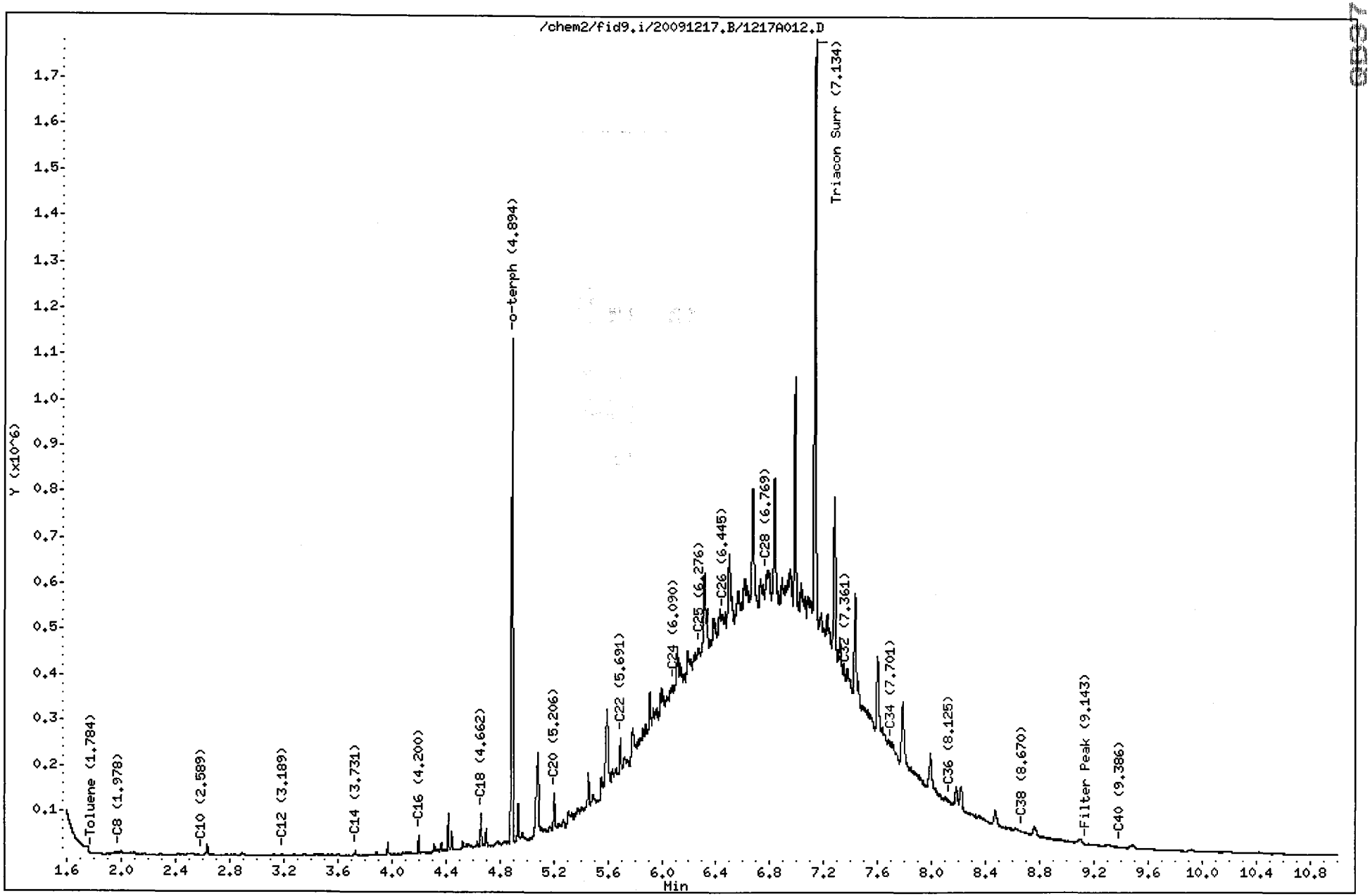
Data File: /chem2/fid9.i/20091217.B/1217A012.D
Date : 17-DEC-2009 17:04
Client ID: CB31A121409GRAB
Sample Info: QB37A

Column phase: RTX-1

Instrument: fid9.i

Operator: MS
Column diameter: 0.25

QB37 - 05217



12/18/09

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem2/fid9.i/20091217.B/1217A013.D
Method: /chem2/fid9.i/20091217.B/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 12/18/2009
Macro: 10-DEC-2009
Calibration Dates: Gas:01-OCT-2009 Diesel:10-DEC-2009 M.Oil:10-DEC-2009

ARI ID: QB37B
Client ID: CB4857121409GRAB
Injection: 17-DEC-2009 17:24

Dilution Factor: 1

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.789	-0.003	2595	2995	GAS (Tol-C12)	118790	9
C8	1.981	0.005	3336	2618	DIESEL (C12-C24)	3958187	216
C10	2.591	-0.012	697	724	M.OIL (C24-C38)	16552754	1190
C12	3.191	-0.008	920	680	AK-102 (C10-C25)	4683203	219
C14	3.736	0.008	3681	2552	AK-103 (C25-C36)	15018787	1588
C16	4.203	0.003	11741	6860	OR.DIES (C10-C28)	10777632	719
C18	4.662	-0.002	21412	18026	OR.MOIL (C28-C40)	10266280	1478
C20	5.204	-0.001	34117	44649			
C22	5.683	0.000	73896	71402			
C24	6.097	0.006	145769	165007			
C25	6.276	-0.002	147116	97593			
C26	6.442	-0.008	162853	61049			
C28	6.764	-0.004	174999	41489			
C32	7.356	-0.004	123441	81502			
C34	7.699	-0.001	72988	50689	CREOSOT (C12-C22)	1777474	426
Filter Peak	9.145	0.000	10545	3751			
C36	8.124	0.002	87086	137315			
C38	8.668	0.003	19137	8303			
C40	9.380	-0.003	8595	3904			
o-terph	4.893	-0.001	1118919	788084	JET-A (C10-C18)	248165	15
Triacon Surr	7.100	0.030	1327899	906319			

Range Times: NW Diesel(3.199 - 6.091) AK102(2.60 - 6.28) Jet A(2.60 - 4.66)
NW M.Oil(6.09 - 8.66) AK103(6.28 - 8.12) OR Diesel(2.60 - 6.77)

Surrogate	Area	Amount	%Rec
o-Terphenyl	788084	31.3	69.5
Triacontane	906319	34.3	76.1

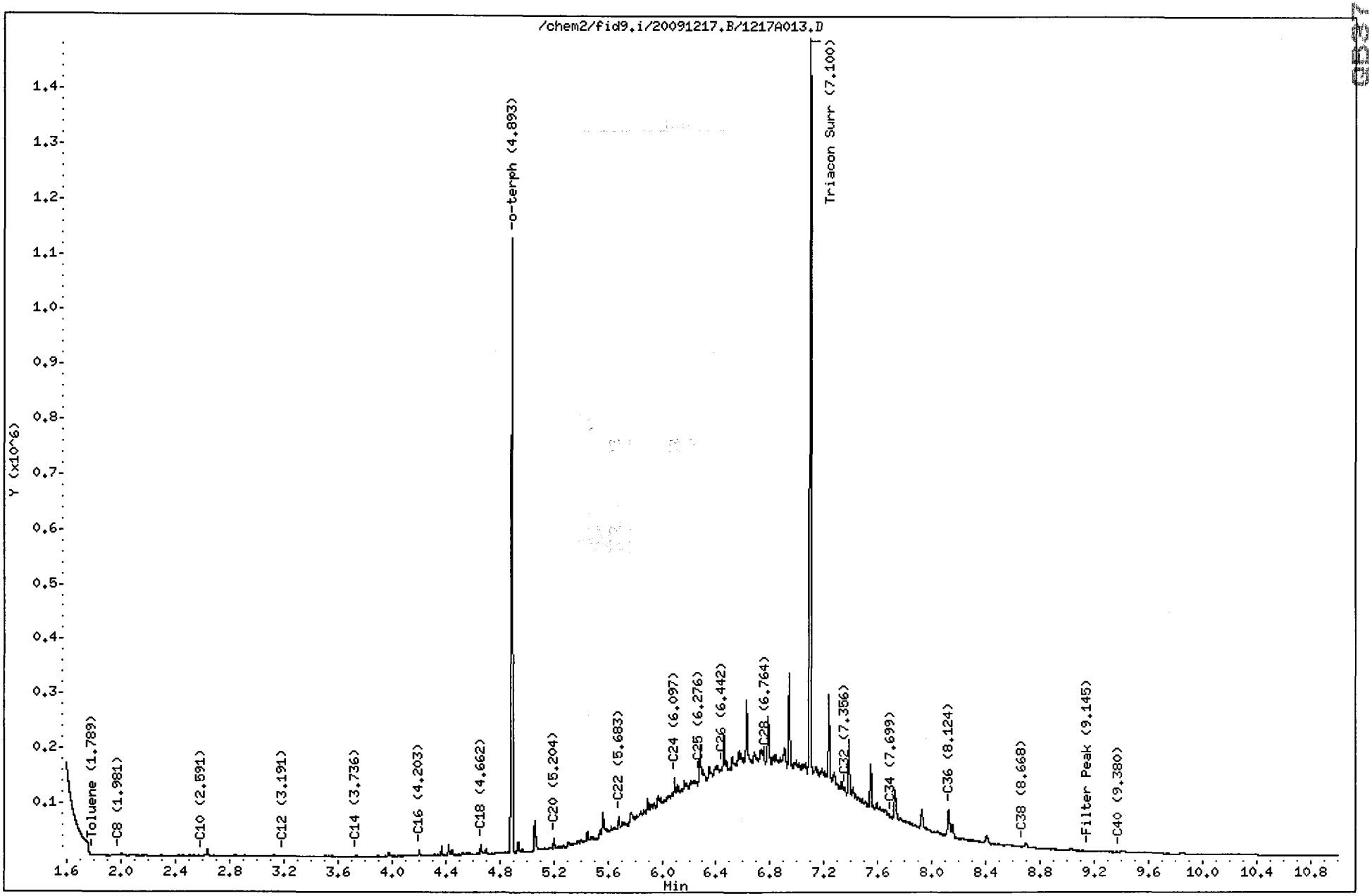
Analyte	RF	Curve Date
o-Terph Surr	25193.6	10-DEC-2009
Triacon Surr	26454.2	11-DEC-2009
Gas	12943.2	01-OCT-2009
Diesel	18303.2	10-DEC-2009
Motor Oil	13915.4	10-DEC-2009
AK102	21427.7	10-DEC-2009
AK103	9457.0	10-DEC-2009
JetA	17037.4	11-JUN-2009
OR Diesel	14983.0	
OR M.Oil	6945.0	
Bunker C	7267.4	04-MAR-2009
Creosote	4171.8	22-AUG-2009

Data File: /chem2/fid9.i/20091217.B/1217A013.D
Date : 17-DEC-2009 17:24
Client ID: CB4857121409GRAB
Sample Info: QB37B

Column phase: RTX-1

Instrument: fid9.i

Operator: MS
Column diameter: 0.25



Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem2/fid9.i/20091217.B/1217A014.D
Method: /chem2/fid9.i/20091217.B/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 12/18/2009
Macro: 10-DEC-2009
Calibration Dates: Gas:01-OCT-2009 Diesel:10-DEC-2009 M.Oil:10-DEC-2009

ARI ID: QB37C
Client ID: CB1121409GRAB
Injection: 17-DEC-2009 17:44
Dilution Factor: 1

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.790	-0.002	1907	2489	GAS (Tol-C12)	104614	8
C8	1.981	0.005	1392	1582	DIESEL (C12-C24)	157394	9
C10	2.613	0.010	1515	1060	M.OIL (C24-C38)	762857	55
C12	3.195	-0.004	833	1369	AK-102 (C10-C25)	204769	10
C14	3.718	-0.010	180	147	AK-103 (C25-C36)	668242	71
C16	4.208	0.008	1044	731	OR.DIES (C10-C28)	414862	28
C18	4.662	-0.003	763	515	OR.MOIL (C28-C40)	630819	91
C20	5.207	0.002	1060	998			
C22	5.680	-0.003	2258	2689			
C24	6.089	-0.002	4733	4499			
C25	6.275	-0.003	30889	24695			
C26	6.451	0.001	7266	8870			
C28	6.758	-0.010	5690	1469			
C32	7.365	0.006	5760	8950			
C34	7.699	-0.001	3736	3294	CREOSOT (C12-C22)	87896	21
Filter Peak	9.140	-0.005	1919	2006			
C36	8.134	0.012	46231	52854			
C38	8.661	-0.004	2251	3202			
C40	9.389	0.005	1800	859			
o-terph	4.891	-0.004	1025035	773509	JET-A (C10-C18)	71771	4
Triacon Surr	7.099	0.028	1212506	843232			

Range Times: NW Diesel(3.199 - 6.091) AK102(2.60 - 6.28) Jet A(2.60 - 4.66)
NW M.Oil(6.09 - 8.66) AK103(6.28 - 8.12) OR Diesel(2.60 - 6.77)

Surrogate	Area	Amount	%Rec
o-Terphenyl	773509	30.7	68.2
Triacontane	843232	31.9	70.8

Analyte	RF	Curve Date
o-Terph Surr	25193.6	10-DEC-2009
Triacon Surr	26454.2	11-DEC-2009
Gas	12943.2	01-OCT-2009
Diesel	18303.2	10-DEC-2009
Motor Oil	13915.4	10-DEC-2009
AK102	21427.7	10-DEC-2009
AK103	9457.0	10-DEC-2009
JetA	17037.4	11-JUN-2009
OR Diesel	14983.0	
OR M.Oil	6945.0	
Bunker C	7267.4	04-MAR-2009
Creosote	4171.8	22-AUG-2009

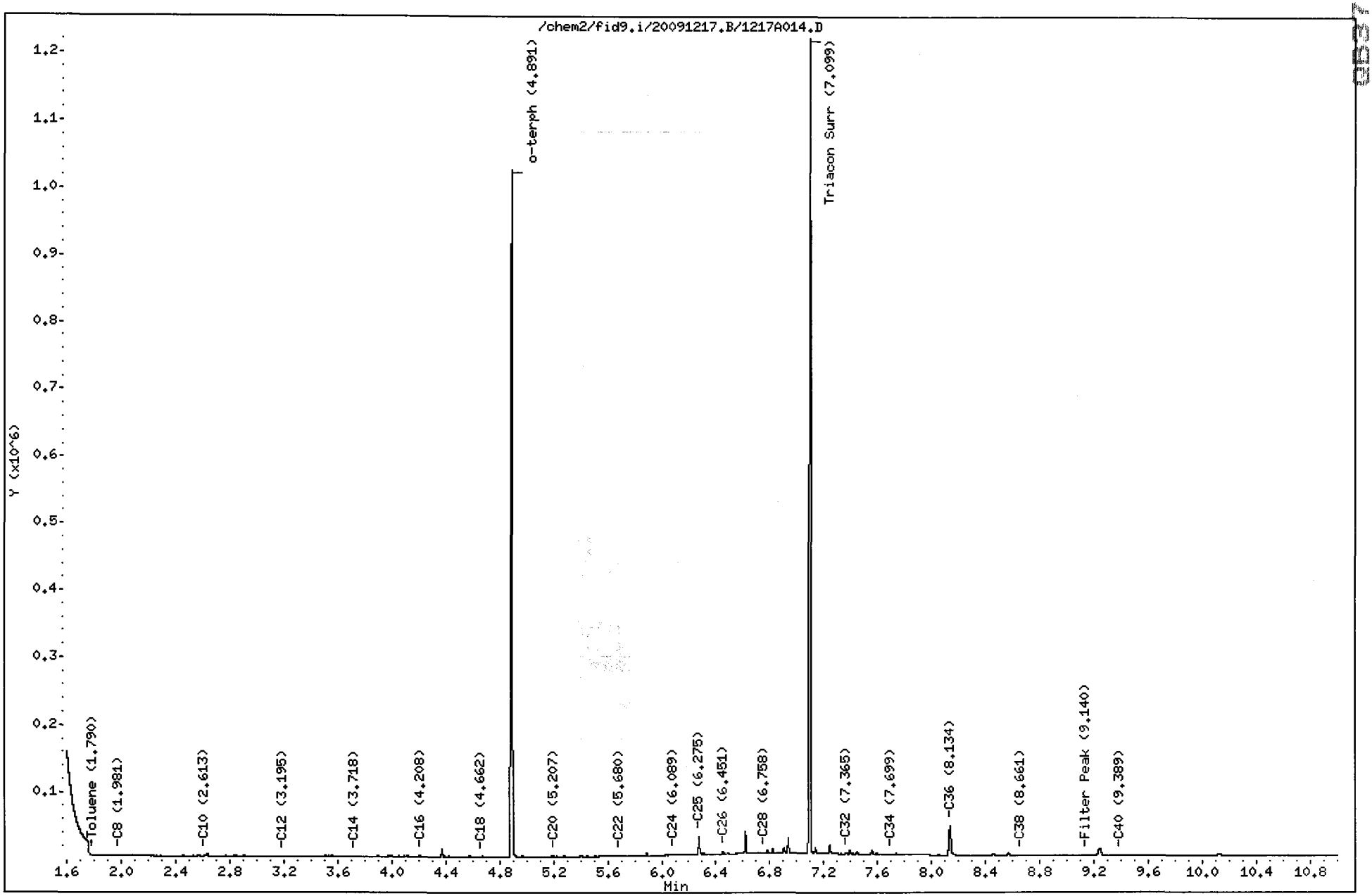
Data File: /chem2/fid9.i/20091217.B/1217A014.D
Date : 17-DEC-2009 17:44
Client ID: CB1121409GRAB
Sample Info: QB37C

Column phase: RTX-1

Instrument: fid9.i

Operator: MS
Column diameter: 0.25

QB37-092211



ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: QB37
Matrix: Water Project: LORA LAKE APARTMENTS
Date Received: 12/15/09 POS-LLA

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
09-30854-121609MB1	Method Blank	500 mL	1.00 mL	12/16/09
09-30854-121609LCS1	Lab Control	500 mL	1.00 mL	12/16/09
09-30854-121609LCSD1	Lab Control Dup	500 mL	1.00 mL	12/16/09
09-30854-QB37A	CB31A121409GRAB	500 mL	1.00 mL	12/16/09
09-30855-QB37B	CB4857121409GRAB	500 mL	1.00 mL	12/16/09
09-30856-QB37C	CB1121409GRAB	500 mL	1.00 mL	12/16/09

TPHD Analysis
QC Raw Data

prepared
for

Floyd/Snider

Project: LORA LAKE APARTMENTS, POS-LLA

ARI JOB NO: QB37

prepared
by

Analytical Resources, Inc.

12/18/09

Analytical Resources Inc.
TPH Quantitation Report

Data file: /chem2/fid9.i/20091217.B/1217A009.D
Method: /chem2/fid9.i/20091217.B/ftphfid9a.m
Instrument: fid9.i
Operator: MS
Report Date: 12/18/2009
Macro: 10-DEC-2009
Calibration Dates: Gas:01-OCT-2009 Diesel:10-DEC-2009 M.Oil:10-DEC-2009

ARI ID: QB53MBW1
Client ID: QB53MBW1
Injection: 17-DEC-2009 16:05
Dilution Factor: 1

FID:9 RESULTS

Compound	RT	Shift	Height	Area	Range	Total Area	Conc
Toluene	1.789	-0.003	1888	1646	GAS (Tol-C12)	78052	6
C8	1.980	0.004	1398	1774	DIESEL (C12-C24)	73272	4
C10	2.614	0.011	1477	1089	M.OIL (C24-C38)	164060	12
C12	3.192	-0.008	1275	1966	AK-102 (C10-C25)	102454	5
C14	3.729	0.001	322	93	AK-103 (C25-C36)	130556	14
C16	4.197	-0.003	611	276	OR.DIES (C10-C28)	113504	8
C18	4.663	-0.002	1519	1046	OR.MOIL (C28-C40)	196423	28
C20	5.207	0.002	1050	1358			
C22	5.684	0.002	549	776			
C24	6.092	0.001	257	189			
C25	6.275	-0.003	232	215			
C26	6.452	0.002	218	297			
C28	6.762	-0.006	312	159			
C32	7.358	-0.002	1951	2819			
C34	7.703	0.003	1045	946	CREOSOT (C12-C22)	68641	16
Filter Peak	9.145	-0.001	1043	640			
C36	8.127	0.004	42628	48724			
C38	8.658	-0.007	1160	1092			
C40	9.381	-0.002	1009	973			
o-terph	4.893	-0.001	1092760	831904	JET-A (C10-C18)	85045	5
Triacon Surr	7.093	0.022	1291194	930547			

Range Times: NW Diesel(3.199 - 6.091) AK102(2.60 - 6.28) Jet A(2.60 - 4.66)
NW M.Oil(6.09 - 8.66) AK103(6.28 - 8.12) OR Diesel(2.60 - 6.77)

Surrogate	Area	Amount	%Rec
o-Terphenyl	831904	33.0	73.4
Triacontane	930547	35.2	78.2

Analyte	RF	Curve Date
o-Terph Surr	25193.6	10-DEC-2009
Triacon Surr	26454.2	11-DEC-2009
Gas	12943.2	01-OCT-2009
Diesel	18303.2	10-DEC-2009
Motor Oil	13915.4	10-DEC-2009
AK102	21427.7	10-DEC-2009
AK103	9457.0	10-DEC-2009
JetA	17037.4	11-JUN-2009
OR Diesel	14983.0	
OR M.Oil	6945.0	
Bunker C	7267.4	04-MAR-2009
Creosote	4171.8	22-AUG-2009

Data File: /chem2/fid9.i/20091217.B/1217A009.D

Date : 17-DEC-2009 16:05

Client ID: QB53MBW1

Sample Info: QB53MBW1

Column phase: RTX-1

Instrument: fid9.i

Operator: MS

Column diameter: 0.25