

# FIELD IMPLEMENTATION PLAN FOR SURFACE WATER, STORMWATER AND SEDIMENT MONITORING

UNIVERSITY OF CALIFORNIA, BERKELEY  
RICHMOND FIELD STATION  
RICHMOND, CALIFORNIA

*Prepared for*

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## 1.0 FIELD WORK OBJECTIVE

The California Environmental Protection Agency's Department of Toxic Substances Control has requested the University of California, Berkeley (UC Berkeley) implement semi-annual monitoring at Richmond Field Station. This monitoring will continue for a minimum of 5 years, depending on the results of the 5-year review. Samples will be collected and analyzed in accordance with the methods identified in the "Final Report, Groundwater, Surface Water, and Sediment Monitoring Plan, Subunit 2, Meade Street Operable Unit, University of California, Berkeley Richmond Field Station Richmond, California (Tasks 2b, 3b, 4a, and 5a of RWQCB Order No. 01-102)" (Blasland, Bouck & Lee, Inc. 2004).

This Field Implementation Plan summarizes the following activities to be performed by Tetra Tech EMI (Tetra Tech) to implement the semi-annual monitoring plan:

- Surface water monitoring in the marsh portion of Subunit 2A
- Stormwater monitoring in the upland area of Subunit 2A
- Sediment monitoring in the marsh portion of Subunit 2A

This Field Implementation Plan is to be used as a guide for the Tetra Tech field team while implementing the Groundwater, Surface Water, and Sediment Monitoring Plan (Blasland, Bouck & Lee, Inc. 2004).

## 2.0 FIELD TEAM MEMBERS

Table 1 provides the project roles and contact information for the UC Berkeley clients and the Tetra Tech field team members.

**TABLE 1: CLIENT AND FIELD TEAM ROLES AND CONTACT INFORMATION**

Field Implementation Report, Richmond Field Station, Richmond, California

Name	Role	Phone Number
Greg Haet	UC Berkeley Contact	510-642-4848
Karl Hans	UC Berkeley Contact	510-643-9574
Leslie Lundgren	Program Manager	415-222-8205
Brenda McConathy	Deliverable Manager	415-222-8338
Sara Woolley	Chemist/Field Team Lead	415-222-8311
Aimee Kingery	Field Technician	415-222-8254
Aileen Mendoza	Field Technician/Site Health and Safety Coordinator	415-222-8350
Audrey Lin	Field Technician	415-222-8247
Susan Gallagher	Sample Tracker	415-222-8329

### 3.0 FIELD ACTIVITIES

This section describes the field activities to be carried out by the field team during the semi-annual monitoring events.

#### 3.1 SURFACE WATER AND STORMWATER MONITORING

Surface water and stormwater samples will be collected from the locations listed below, as shown on Figure 1. For clarity in the database and on future figures presenting the results of the monitoring, the stormwater sampling locations were renamed from those presented in the Final Report, Groundwater, Surface Water, and Sediment Monitoring Plan (Blasland, Bouck & Lee, Inc. 2004) to have the prefix “STW” instead of “SW.” Table 2 presents the sampling locations, the media to be collected from each location, and the analyses to be performed on each sample.

- Surface water samples will be collected from three locations (SW101, SW102, and SW103) in the eastern portion of the marsh
- A surface water sample will be collected from one location (SW104) in Meeker Slough at the Bay Trail Bridge. A surface water sample will also be collected from this location during the stormwater sampling event.
- Stormwater samples will be collected at the outfalls (STW105 and STW106) for the eastern and western storm drain systems
- Stormwater samples will be collected at the outfall (STW107) in the concrete drainage ditch that extends along the western property boundary
- Stormwater samples will be collected from one location (STW108) in Meeker Slough, just upstream of the confluence of the concrete outfall

Surface water and stormwater samples will be collected using a clean dipper. Water samples will be transferred to clean sample containers supplied by the laboratory. Chain-of-custody records will be used to track possession of the samples. A chain-of-custody entry will be recorded for every sample and will accompany every shipment of samples to the laboratory.

Sample labels will be affixed to each sample bottle. The labels will be durable and water resistant so they remain legible when wet. Each label will contain the following information:

- Sample identification
- Initials of sample collector
- Time and date of sample collection
- Preservatives (if applicable)
- Required analysis

Table 3 describes container, preservative, and holding time requirements for the samples.





Surface Water Locations	SW101
	SW102
	SW103
	SW104
Stormwater Locations	STW105
	STW106
	STW107
	STW108
Sediment Locations	SED101
	SED102
	SED103



Richmond Field Station  
University of California, Berkeley

**FIGURE 1**  
**SURFACE WATER, STORMWATER,**  
**AND SEDIMENT**  
**SAMPLING LOCATIONS**



**TABLE 2: SAMPLE LOCATIONS, MEDIA, AND ANALYSES**  
Field Activity Plan, Richmond Field Station, Richmond, California

Sample Location	Sample Identification No. <sup>c</sup>	Area	Media	Analysis
SED101 <sup>a</sup>	RFSSSED001	Marsh Portion of Subunit 2A	Sediment	Metals, pesticides <sup>d,e</sup> , PCBs, and pH
SED102 <sup>a</sup>	RFSSSED002	Marsh Portion of Subunit 2A	Sediment	Metals, pesticides <sup>d,e</sup> , PCBs, and pH
SED103 <sup>a</sup>	RFSSSED003	Marsh Portion of Subunit 2A	Sediment	Metals, pesticides <sup>d,e</sup> , PCBs, and pH
SW101 <sup>a</sup>	RFSSW001	Marsh Portion of Subunit 2A	Surface Water	Metals <sup>f</sup> (including iron and potassium), pesticides <sup>d,e</sup> , PCBs, pH, nitrogen, nitrate, phosphorus, total dissolved solids
SW102 <sup>a</sup>	RFSSW002	Marsh Portion of Subunit 2A	Surface Water	Metals <sup>e</sup> (including iron and potassium), pesticides <sup>d,e</sup> , PCBs, pH, nitrogen, nitrate, phosphorus, and total dissolved solids
SW103 <sup>a</sup>	RFSSW003	Marsh Portion of Subunit 2A	Surface Water	Metals <sup>f</sup> (including iron and potassium), pesticides <sup>d,e</sup> , PCBs, pH, nitrogen, nitrate, phosphorus, and total dissolved solids
SW104 <sup>a</sup>	RFSSW004	Meeker Slough at Bay Trail	Surface Water	Metals <sup>f</sup> , pesticides <sup>d,e</sup> , PCBs, and pH
SW104 <sup>b</sup>	RFSSTW009	Meeker Slough at Bay Trail	Stormwater	Metals <sup>f</sup> , PCBs, and pH
STW105 <sup>b</sup>	RFSSTW005	East Upland Storm Drain Outfall	Stormwater	Metals <sup>f</sup> , PCBs, and pH
STW106 <sup>b</sup>	RFSSTW006	West Upland Storm Drain Outfall	Stormwater	Metals <sup>f</sup> , PCBs, and pH
STW107 <sup>b</sup>	RFSSTW007	Concrete Drainage Outfall	Stormwater	Metals <sup>f</sup> , PCBs, and pH
STW108 <sup>b</sup>	RFSSTW008	Concrete Drainage Outfall	Stormwater	Metals <sup>f</sup> , PCBs, and pH

Notes:

- a Samples to be collected during an outgoing tide.
- b Samples to be collected during the first fall rainfall event.
- c Sequential numbers will be used for next rounds of sampling.

## TABLE 2: SAMPLE LOCATIONS, MEDIA, AND ANALYSES (CONTINUED)

Field Activity Plan, Richmond Field Station, Richmond, California

Notes (CONTINUED):

- d If pesticides are not detected during the first round of sampling, they will be eliminated from future monitoring events.
- e Pesticides include s-ethyl dipropylthiocarbamate (EPTC), butylate, vernolate, pebulate, molinate, cycloate, fonofos, napropamide, nitrobenzene-ds, 2-fluorobiphenyl and terphenyl-d14.
- f Metals samples to be filtered in the laboratory.
- PCB Polychlorinated biphenyl

**TABLE 3: SAMPLE VOLUME, CONTAINER, PRESERVATIVE, AND HOLDING TIME REQUIREMENTS**

Field Implementation Plan, Richmond Field Station, Richmond, California

Analysis	Sample Method	Volume	Container	Preservative	Holding Time <sup>a</sup>
<b>Water</b>					
Dissolved metals (except mercury)	EPA SW-846 6010B	100 milliliters	250- or 500-milliliter polyethylene	Cool 4 ± 2 °C <sup>b</sup>	6 months
Dissolved mercury	EPA SW-846 7470A	100 milliliters	From metals container	Cool 4 ± 2 °C <sup>b</sup>	28 days
Pesticides	EPA SW-846 8081A	Two 1 liter	Amber glass	Cool 4 ± 2 °C	7 days/40 days
PCBs	EPA SW-846 8082	Two 1 liter	Amber glass	Cool 4 ± 2 °C	7 days/40 days
Nitrogen	EPA 351.4	100 milliliters	250-milliliter polyethylene	Cool 4 ± 2 °C, H <sub>2</sub> SO <sub>4</sub>	28 days
Nitrate	EPA 353.2	100 milliliters	250-milliliter polyethylene	Cool 4 ± 2 °C	28 days
Phosphorus	EPA 365.1	500 milliliters	500-milliliter polyethylene	Cool 4 ± 2 °C, H <sub>2</sub> SO <sub>4</sub>	28 days
pH	EPA SW-846 9040/9045C	250 milliliters	250-milliliter polyethylene	Cool 4 ± 2 °C	1 day
Total dissolved solids	EPA 160.1	One 1 liter	Glass or polyethylene	Cool 4 ± 2 °C	7 days
<b>Sediment</b>					
Metals (except mercury)	EPA SW-846 6010B	2 grams	Sleeve	Cool 4 ± 2 °C	6 months
Mercury	EPA SW-846 7471A	0.2 grams	Sleeve	Cool 4 ± 2 °C	28 days
Pesticides	EPA SW-846 8081A	30 grams	Sleeve	Cool 4 ± 2 °C	14 days/40 days
PCBs	EPA SW-846 8082	30 grams	Sleeve	Cool 4 ± 2 °C	14 days/40 days

Notes:

EPA U.S. Environmental Protection Agency

PCB Polychlorinated biphenyl

a Number of days/number of days refers to the maximum number of days from sampling to extraction and the maximum number of days from extraction to analysis

EPA. 1996. "Test Methods for Evaluating Solid Waste (SW-846), Third Edition." Available online at <http://www.epa.gov/sw-846/main.htm>.



### **3.2 MARSH SEDIMENT MONITORING**

Sediment samples will be collected from three locations (SED101, SED102, and SED103) in the marsh portion of subunit 2A (see Figure 1). Table 2 lists the sampling locations, the media to be collected from each location, and the analyses to be performed on each sample.

Sediment samples will be collected by pushing a 6-inch-long by 2-inch-diameter brass or plastic liner to a depth of 6 inches below ground surface. The liner will be extracted with an intact core and capped with Teflon® sheeting and plastic end caps. Sample labels will be affixed to each sample core. The labels will be durable and water resistant so they remain legible when wet. Each label will contain the following information:

- Sample identification.
- Initials of sample collector.
- Time and date of sample collection.
- Preservatives (if applicable).
- Required analysis.

Table 3 describes container, preservative, and holding time requirements for the samples.

### **4.0 FIELD EQUIPMENT**

The following equipment and supplies will be used in the field by each field team. Sampling equipment may change depending on the type (surface water, stormwater, or sediment) of locations being sampled.

#### Sampling Equipment

- Sample bottles for water samples (provided by laboratory)
- Sampler extension for water collection
- Water collection dipper
- Core sleeves for sediment samples
- Auger for sediment samples
- Sample labels
- GPS unit (hand held)

## Field Operations and Management Supplies

- Chains of custody
- Pens
- Clipboard
- Field log for notes
- Map

## Health and Safety

- Health and Safety Plan
- First aid kit
- Nitrile gloves
- Boots
- Safety glasses
- Long sleeves

## **5.0 MONITORING FREQUENCY**

Surface water and sediment samples will be collected twice a year during an outgoing tide from the eastern portion of the marsh in Subunit 2A, as well as the Meeker Slough sample from below the Bay Trail Bridge in Subunit 2B (see locations SED101 through SED103 and SW101 through SW104 on Figure 1).

The first semi-annual stormwater sampling event will ideally occur during the first rainfall event of the fall producing surface runoff (first flush). The second semi-annual stormwater sampling event will occur in the spring during a rainfall event late in the rainy season (March or April). An appropriate rainfall event for sampling is defined as a storm producing surface runoff into the stormwater drains. The stormwater samples from the storm drain outfalls, concrete ditch, and upper Meeker Slough (see locations STW105 through SWT108 on Figure 1) will be collected during the rainfall event. A surface water sample will also be collected from one location (SW104) in Meeker Slough at the Bay Trail Bridge during the rainfall event. Only rainfall events occurring during daylight hours will be sampled for the safety of the field team members. Additionally, rain events occurring outside of the normal work week (Monday through Friday) will not be sampled under normal circumstances because of limitations with shipping and processing the samples over the weekend.

## 6.0 REFERENCES

- Blasland, Bouck & Lee, Inc. 2004. "Final Report, Groundwater, Surface Water, and Sediment Monitoring Plan, Subunit 2, Meade Street Operable Unit, University of California, Berkeley Richmond Field Station Richmond, California (Tasks 2b, 3b, 4a, and 5a of RWQCB Order No. 01-102." December 3.
- U.S. Environmental Protection Agency. 1996. "Test Methods for Evaluating Solid Waste (SW-846), Third Edition." March. Available online at <http://www.epa.gov/sw-846/main.htm>.