SEPTEMBER 1999

BMP Retrofit Pilot Program

OPERATION MAINTENANCE AND MONITORING PLAN DISTRICT 11

BMP Stormwater Monitoring Field Guidance Notebooks

CTSW-RT-99-053

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California Department of Transportation

Prepared By:

KINNETIC LABORATORIES INCORPORATED

6911

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Note: This list is linked to the applicable Field Guidance Notebook for the individual BMP. Click on the title of the BMP to go directly to the Field Guidance Notedbook for that BMP.

Extended Detention Basins

Infiltration basins

Sand Filters

Biofiltration Strips/Infiltration Trenches

Biofiltration Swales

Media Filters

Wet Basin

BMP Type	BMP Location	WQ Site ID.
Biofiltration Strip	Carlsbad MS	112207a
Biofiltration Swale	SR-78/Melrose Dr	112205
Biofiltration Swale	I-5/Palomar Airport Rd	112206
Extended Detention Basin	I-5/SR-56	111101
Extended Detention Basin	I-15/SR-78	111102
Extended Detention Basin	I-5/Manchester Ave	111105
Infiltration Basin	I-5/La Costa Ave (W)	111103
Infiltration Trench	Carlsbad MS	112207b
Media Filter, Sand, Austin	I-5/La Costa Ave Park & Ride	112203
Media Filter, Sand, Austin	I-5/SR-78 Park & Ride	112204
Media Filter, Sand, Delaware	Escondido MS	112202
Media Filter, StormFilter	Kearny Mesa MS	112201
Wet Basin	I-5/La Costa Ave (SE)	111104

CALTRANS
BMP RETROFIT PILOT PROGRAM

BMP OPERATION, MAINTENANCE, AND MONITORING PLAN

VOLUME II

BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK FOR EXTENDED DETENTION BASINS

DISTRICT 11, SAN DIEGO

September 1999

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1.0 INTRODUCTION

This Field Guidance Notebook (*FGN*) gives inspectors, maintenance, and monitoring personnel appropriate field evaluation and documentation for the District 11 extended detention basins (EDBs) belonging to the Caltrans Retrofit Pilot Program. Field observations and conditions must be clearly and concisely documented on the field forms provided.

Refer to Appendix I-A of this guidance document for supporting information on detention basin technology and characteristics.

1.1 Data to be Collected

The following data will be collected to assess the performance and maintenance aspects of an extended detention basin:

- Water quality and quantity data of runoff into and discharge from the detention basin from flow-composite samples and grab (as soon as possible after the start of runoff) samples for at least 10 storm events during two wet seasons, weather permitting.
- Rainfall data recorded as a function of time, from rainfall events during the study period.
- Observations of water quality, weather, antecedent conditions, spills, etc.
- Documentation records of inspections and maintenance activities performed.
- Vector monitoring and management data.
- Records of vector control measures taken.
- Vegetation management records.
- Continuous water basin level data

Consultants will be responsible for data management. Overall management of the data will be consistent with established Caltrans procedures for stormwater monitoring projects.

1.2 Field Activities to be Performed

Field activities that will be performed at the extended detention basin facilities include:

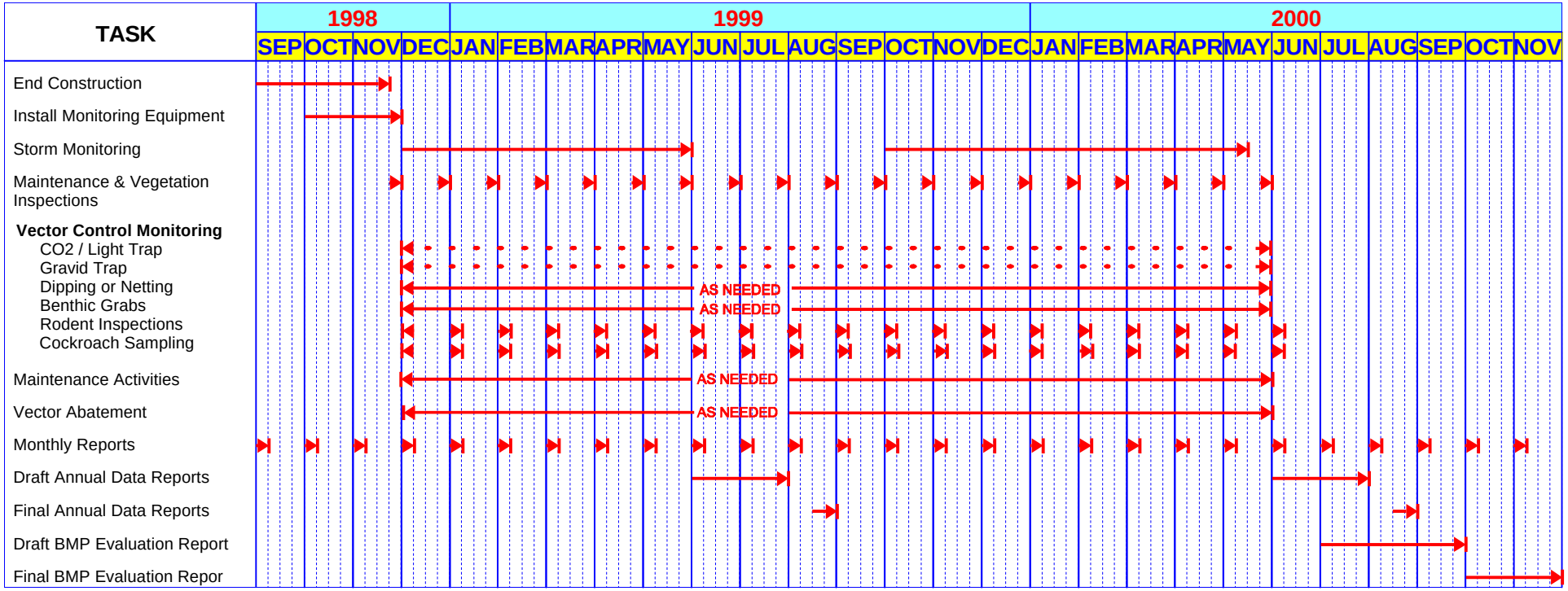
- Empirical Observation of Extended Detention Basin Operation.
- Monitoring Equipment Installations.
- Monitoring Equipment Maintenance.
- Facility Inspections.
- Facility Maintenance.
- Vector and Nuisance Animal Control Inspections.
- Vegetation Control.
- Stormwater Monitoring.

Vector management may also be necessary at extended detention basin facilities, but may be contingent on facility housekeeping and other environmental influences. Refer to Appendix IV volume II if vector management is necessary.

1.3 Master Schedule

The schedule on the following page shows the time-line for each phase of the extended detention basin OMM program.

Figure 1.3
Projected Schedule
Extended Detention Basin OMM



2.0 SITE INFORMATION

Access requirements for each site are summarized in Table 2.1, in the encroachment permit found in Tab 9, and in the Site Location Maps in Tab 1. ***Encroachment permits must be on hand*** for each site visit, and notification ***requirements found in these permits must be followed***.

Always check in with the appropriate Caltrans personnel before conducting any site fieldwork.

Table 2.1
Caltrans District 11 Extended Detention Basins Site Summary

Site No.	Site Name	Site Location	Access and Parking
111101	I-5/SR-56	Between the eastbound SR-56 to southbound I-5 connector and Sorrento Valley Rd. in the City of San Diego.	Enter off SR-78 through locked gate at P.M. 26.6. Use key CCL. Park within gate on access road to the EDB.
111102	SR-78/I-15	Between SR-78/I-15, and connector from eastbound SR-78 to southbound I-15 in the City of Escondido.	Enter off southbound I-5 through locked gate at P.M. 32.9 (just south of the connector from SR56). Use Key CCL. Park within gate on access road to the EDB.
111105	I-5/Manchester Ave.	Within the northbound I-5 exit loop to Manchester Ave.	Enter off Manchester Ave. just west of the northbound I-5 exit ramp. Use Key CCL Park on access road to the EDB.

2.1 Extended Detention Basins (EDB)

Refer to the accompanying Appendix for a general description of Extended Detention Basins. The sections below provide site-specific information for each EDB site in District 11.

Refer to Tab 9 for a summary of the hydraulic characteristics for these sites.

2.1.1 Site 111101 I-5/SR-56

An existing basin between Sorrento Valley Road and State Route 56 has been modified into an EDB. Runoff from catchments on I-5 is conveyed to the EDB. When runoff fills the 0.25-acre basin it spills into an outlet riser. When the outlet and basin surpass capacity (i.e. more than 25-year storm events), the overflow enters a concrete spillway and trapezoidal ditch. Quality of the discharge through the spillway will not be monitored. However, the depth sensor in the inlet conveyance will be used to determine when overflow occurs.

The inflow sampling point will be located approximately 5 m upstream of the outfall to the basin. Access to this point will be through a manhole located on the south corner of the basin near the service ramp (see Tab 1). Because the inflow sampling point will submerge during high

basin levels, an AV flow meter will be installed to measure flow. The depth and velocity sensors will be secured to the invert of the conveyance using a mounting ring supplied by the manufacturer.

The effluent sampling point will be located approximately 17 m downstream of the outlet riser. Access to the discharge conveyance will be through a manhole located above the west corner of the basin on the back edge of the service road (see Tab 1). A 600 mm standard Palmer Bowlus flume combined with an acoustic look-down depth sensor will be used to measure flow in the discharge conveyance. The depth of water 300 mm in front of the flume will be measured. This flume will accommodate flows up to 11.8 cfs, which is slightly higher than flows anticipated for a 25-year storm (9.7 cfs).

Confined space procedures must be followed when accessing the sampling points (refer to Appendix II).

Refer to Tab 1 for Site Location Maps and BMP Facility Plans.

2.1.2 Site 111102 SR-78/I-15

At the SR-78 and I-15 EDB, runoff from SR-78 fills a 1-acre basin until it reaches an outlet riser connected to a discharge conveyance. The riser and conveyance at the SR-78 and I-15 basin is designed to handle flows that are generated from less than 25-year storm events. Discharge from greater than 25-year storm events will spill into a second outlet riser. This facility has been designed to optimally treat total runoff from storm events that are less than a 1-year average storm.

The inflow sampling point will be located approximately 15-meters upstream of the outfall to the basin. Access to this point will be through a manhole located on the north berm of the basin berms (see Tab 1). Because the inflow sampling point will most likely be submerged during storms, an AV flow meter will be installed. The depth and velocity sensors will be secured to the invert of the conveyance using a mounting ring supplied by the manufacturer.

The effluent sampling point will be located approximately 16-meters downstream of the outlet riser. Access to the discharge conveyance will be through a manhole located on top of the south berm of the basin (see Tab 1). A 750 mm standard Palmer Bowlus flume combined with an acoustic look-down depth sensor will be used to measure flow in the discharge conveyance. The depth of water 325 mm in front of the flume will be measured. This flume will accommodate flows up to 20 cfs which is slightly higher than the anticipated flow for a 25-year storm event (19.1 cfs). Flows of less than 0.3 cfs will be measured with higher error.

Confined space procedures must be followed when accessing the sampling points (refer to Appendix II).

Refer to Tab 1 for Site Location Maps and BMP Facility Plans.

2.1.3 Site 111105 I-5 and Manchester Ave.

At the I-5 and Manchester Avenue EDB, runoff from a portion of northbound I-5 and the northbound I-5 off ramp is conveyed through a 450mm APC to the detention basin. Runoff leaves the basin through and outlet riser connected to a 450mm discharge conveyance. The riser and conveyance at the I-5 and Manchester Avenue basin is designed to handle and regulate flows that are generated from less than a 1-year storm event. Discharge from greater than 1-year storm events will flow over the top of the water quality riser. Significantly larger storm events will pass through the concrete spillway to a rock-lined channel. This facility has been designed to optimally treat total runoff from storm events that are less than a 1-year average storm.

The inflow sampling point will be located approximately 8-meters upstream of the outfall to the basin. Access to this point will be through a manhole located adjacent to the access road on the southeast side of the basin (see Tab 1). Because the inflow sampling point will most likely be submerged during storms, an AV flow meter will be installed. The depth and velocity sensors will be secured to the invert of the conveyance using a mounting ring supplied by the manufacturer.

The effluent sampling point will be located approximately 20-meters downstream of the outlet riser. Access to the discharge conveyance will be through a manhole located adjacent to the access road between the basin and Manchester Avenue(see Tab 1). A 450 mm standard Palmer Bowlus flume combined with an acoustic look-down depth sensor will be used to measure flow in the discharge conveyance. The depth of water 225 mm in front of the flume will be measured. This flume will accommodate flows up to 4.6 cfs. Flows of less than 0.05 cfs will be measured with higher error.

Confined space procedures must be followed when accessing the sampling points (refer to Appendix II).

Refer to Tab 1 for Site Location Maps and BMP Facility Plans.

2.2 Emergency Hospital Routes

See the "**Emergency Procedures" Tab 2** for maps and descriptions showing the direct routes to the nearest hospitals and for emergency and site-related telephone contacts.

2.3 Site Specific Health and Safety Concerns and Precautions

This subsection only identifies health and safety concerns and precautions. Appendix II provides more extensive health and safety concerns and requirements. Note that at detention basins, field crews will consist of a minimum of 2 people. Refer to the site Encroachment Permit (Tab 9) for additional health and safety requirements.

2.3.1 Traffic Safety Precautions

Activities at detention basins bring up traffic concerns including access and parking on shoulders or at pullouts (if necessary). During access and routine visits to the facilities, the following precautions will be taken:

- Minimize the time spent on the shoulder of the highway (exit shoulder immediately).
- Enter the facility access road or pullout (if available), open access gate, and park inside the facility.
- Affiliated personnel must wear an orange safety vest, hard hat, and appropriate shoes.
- Rotating amber lights must be operated on work vehicles if shoulder work is performed.
- Use cones and shoulder closed signs at facilities where shoulder parking is required.

According to Chapter 8 (Protection of Workers) of the *Caltrans Maintenance Manual*, working for more than 10 minutes on the shoulder involves a shoulder closure procedure. This shoulder closure procedure will conform to the safety precautions below and the site-specific instruction provided in the Encroachment Permits (Exhibit 9.3 of Tab 9).

- Prior to beginning any work on or adjacent to a major roadway, the local highway patrol traffic control department shall be notified. See the Emergency Contacts List in Tab 2 for a listing of the local highway patrol phone numbers.
- Whenever possible, plan the timing of the work for non-peak traffic congestion periods if long-term parking on the shoulder is required.
- Use enough cones and barricades to sufficiently divert traffic safely around the work area (adhere to specific shoulder closure requirements detailed in the Encroachment Permits).
- Any open manhole or ditch must be barricaded.
- Remember that visibility is the key to minimizing the dangers of working in traffic.
- Upon completion of the work, the area must be cleaned up of materials and left in a clean and orderly state.

2.3.2 General Safety

In addition to traffic hazards, field crews may face a variety of potential dangers while maintaining the extended detention basin facilities, installing equipment, and performing environmental monitoring. Be aware of:

- Slippery conditions.
- Lightning.
- Fast moving water.

- Unstable earth.
- Poor visibility, especially at night.
- Lifting heavy objects.
- Transients.
- Muggers and other criminals.
- Power tools and heavy equipment.
- High places.
- Sharp edges - broken glass.
- Overhead dangers.
- Dogs and other biological hazards.
- Electrical hazards posed by equipment malfunctions.

Other <u>important field precautions</u> include:

- Stay away from the edges of a fast moving body of water. These edges are usually slippery and unstable during rainy conditions.
- If sampling is required at the edge of a fast moving body of water, use a lifeline and a personal flotation device. Use grabbing devices when possible.
- Never work alone at night and avoid working alone during the day.
- Avoid leaving materials, tools and equipment lying around where someone can trip over them.
- Maximize lighting, especially at night.
- Keep a phone or other means of communication nearby.
- Do not use your back to lift heavy objects. Get help.
- Never use drugs or alcohol while working.
- Always wear a hard hat and an orange vest.
- Do not use power tools and heavy equipment unless trained in the proper use and care of the specific power tools.
- Always wear eye protection when working with tools or chemicals.
- Wear rain gear
- Never leave open holes unattended or not barricaded.
- Do not sample during lightning
- Clean up the work area before leaving.

3.0 FIELD PREPARATION

Use Table 3.1 on the following page as a guide to find appropriate forms and information required for field visits. This table covers aspects of the field OMM program including mobilization, observation, and monitoring checklists. The key in preparing for field visits, whether for maintenance or monitoring, is by obtaining and going through each item on the table pertaining to the field task at hand. Prior to the operational phase of this program, items contained in this table will be assembled into separate logbooks for facility operations and maintenance, vector control, storm monitoring, and office monitoring.

Table 3.1
List and Locations of Required Stormwater Monitoring Forms and Checklists
For Extended Detention Basins

Tab No.	Item	Form or Exhibit No.	Use and Frequency
1	Site Maps	NA	Prior to site visits
	BMP Layout Diagrams	NA	Prior to site visits
	Sampling Point Diagrams	NA	Prior to site visits and sampling
2	Emergency Contacts List	NA	Consult for emergency phone numbers.
	Hospital Route Maps	NA	Quick guide to the nearest hospital.
	Project Contacts List	NA	Refer for pertinent support staff.
3	Storm Monitoring Decision Tree	Ex. 3.1	Prior to each monitored storm.
	Mobilization Checklist	Form A	Before each storm and maintenance visit.
	Storm Staffing Plan	Form B	Filled out prior to storm event for crew and equipment assignments.
4	BMP Site Inspection Checklist	Form C	Filled out for each inspection visit
	Monitoring Equipment Inspection Checklist	Form D	Filled out for each equipment inspection
5	BMP Site Maintenance Activity Checklist	Form E	Filled out for each maintenance inspection
	Monitoring Equipment Maintenance Activity Checklist	Form F	Filled out for each maintenance inspection of sampling equipment
	Stockpile/Sediment Sampling Checklist	Form G	Complete for any stockpile or waste sampling
	Title 22 Characterization Requirements	Ex. 5.1	Reference for sediment stockpile sampling
6	Empirical Observations Field Data Log Sheet for Storm Events	Form H	Each time a visit is made during wet weather. Separate observations will be made of the inflow, outflow, and basin.
	Field Data Log Sheet	Form I	Each storm station visit. Separate logs will be filled out for the inflow and outflow.
	User-Entered Program Parameter Log Sheet for Influent/Control Sampling Point	Form J1	Each time a program parameter is changed.
	User-Entered Program Parameter Log Sheet for Effluent Sampling Point	Form J2	Each time a program parameter is changed.
	Station Phone Log	Form K	Each time station is contacted.
7	Chain-of-Custody Form	Form M	Whenever samples are collected.
	Chemical Analyses List	Ex. 7.1	Reference for each sampling event and lab analysis request submittal
8	Vector Control Checklists	Forms O1 and O2	Fill out for each site visit related to vector monitoring.
9	Runoff Coefficient Listing	Ex. 9.1	Reference: for calculations
	"Volume-to-Sample" Tables	Ex. 9.2	Consult to set sampling frequency.
	Encroachment Permits	Ex. 9.3	Explains access and safety requirements. Must always accompany field crews.

NA=Not Applicable

4.0 FACILITY OPERATIONS AND MAINTENANCE

4.1 Facility Operation Inspections

Each EDB will be inspected on a regular basis according to the following minimum rates:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation).
- On a weekly basis during extended periods of wet weather.

Optimal BMP operation is dependent on field inspections. When inspecting the facility, follow the procedural steps below. ***Document inspections on Forms C and D (Tab 4)***.

1. Prior to arrival, contact the appropriate Caltrans District 11 personnel identified in the Encroachment Permit (Exhibit 9.3 in Tab 9).
2. Completely walk around the BMP while looking for obvious problems, damage, or malfunctions.
3. Inspect and assess needs for:

    - General aesthetics (graffiti, vandalism),
    - Vegetation management (grass, shrubs, trees),
    - Erosion and slope stability,
    - BMP performance (fouling, blockage, damage),
    - Equipment repair/maintenance (BMP components, autosampler),
    - Sediment accumulation (within BMP, at influent confluence),
    - Storage of accumulated sediment or other wastes, and
    - Vector control.

4. Complete Form C (see Tab 4) during inspections.
5. Log field activities and their corresponding time accurately.
6. If immediate corrective or preventive maintenance is needed, call the appropriate contacts listed in the Project Contacts List in Tab 2.

4.2 Facility Maintenance

Functional (performance and safety) and aesthetic (public acceptance) maintenance is critical. For these BMP sites, focus on:

- Trash and Debris Removal.
- Sediment Removal and Management.
- Mechanical Equipment Maintenance.
- Structural Repairs.
- General Facility Maintenance.

- Vector Control.
- Vandalism.

The frequency of individual maintenance activities at the EDB facilities will be conducted according to the schedule listed in the maintenance indicator document, included as Appendix V of Volume II.

Maintenance activities performed will be documented using the Forms E and F in Tab 5. See Section 2.0 of Appendix I-A for complete details on maintenance activities.

4.3 Vegetation Management

Maintenance and control of vegetation is essential to the optimal operation and performance of a BMP. The condition of the native vegetation will be inspected on a monthly basis at a minimum to ensure that

- vegetation is kept relatively short,
- slope vegetation is protected and kept healthy, and
- undesirable plant species do not take root.

Shorter vegetation on the EDBs optimize the treatment capacity, the residence time of runoff, and will aid in vector control. Maintaining healthy and continuous vegetation on the slopes will minimize erosion. Preventing undesirable plant species from taking root will prevent plants with large root systems from damaging the embankments. Use the inspection and maintenance checklists (Forms C through F) whenever inspections and maintenance activities for vegetation management are performed. See Sections 2.0 and 4.0 of Appendix I-A for specific details on controlling vegetation.

4.4 Disposal of Trash and Debris

Trash and debris from EDBs is ultimately the responsibility of Caltrans. Consultants responsible for operating, maintaining, and monitoring the BMP will be responsible for removal and disposal of the trash and debris. This disposal will comply with applicable local, county, state, and federal waste control programs. Table 2.1 in the accompanying Appendix for Extended Detention Basins shows a few possible disposal services for waste material.

4.5 Deposited Sediment Management and Characterization Sampling

Handling and appropriate disposal of sediment residues from BMPs is critical. Stockpiling is only allowed at the facility under the following conditions:

- Sandbag berms are created (8-inch minimum) and are placed around the stockpile area.
- At least 0.5-mil plastic is used to contain any dewatered liquids (overlying sandbags).

- Stockpiles are covered and covers are anchored.

Once sediment stockpile storage has reached disposal quantity, chemical characterization must be conducted to satisfy land disposal requirements (LDRs). Document any evidence of oil and grease, antifreeze, solvents, fuel, hydrogen sulfide, and any other noxious substance (Form G, Tab 5). These observations will assist in determining if hazardous waste disposal analyses are required. Refer to Form G in Tab 5 for additional details on conducting this sampling.

For sediment stockpiles, the minimum number of discrete samples initially required must comply with Form G, Tab 5. Random samples will be selected from locations on a three-dimensional grid. If the presence of materials such as boulders, debris, etc. hinder the application of this process, the sample will be collected as close as possible to the randomly selected point without altering the essence of the random selection process.

Stockpile sediment samples will be collected in the following manner:

1. Don personal protective equipment.
2. Locate the sample point in the stockpile or drum.
3. Collect the sample using a soil probe or equivalent. Ensure that the sample is collected at the correct depth and location that was randomly selected.
4. Fill one 8-ounce glass jar with a portion of the sample and close the container with the cap, using care not to aerate (volatilize) the sample. This jar will be labeled and analyzed for volatile TRPH and VOC.
5. Homogenize the other portion of the sample in a disposable bowl using a disposable spatula or spoon. Fill a second 8-ounce glass jar with this portion of the sample and close the container with the cap. This sample will be labeled and analyzed for metals.
6. Wipe the outside of each sample container with a clean paper towel.
7. Record the sampler's initials, date, and time on the pre-labeled sample bottle.
8. Place the sample containers in individual zip-top plastic bags and seal the bags.
9. Immediately pack the samples into a chilled cooler.
10. Record the required information on the Chain-of-Custody Form.
11. Document the sampling event, recording information in the designated field logbook.
12. Repeat the above steps until the minimum number of samples has been collected.

Unless observations indicate additional testing, sediment samples submitted to the laboratory will be analyzed for the list of analytes in Exhibit 5.1 in Tab 5 using Title 22 criteria (State of California, 1985).

4.6 Vector and Nuisance Animal Control

Vector monitoring and management will be performed in accordance with Appendix IV by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

5.0 STORM MONITORING

Careful preparation and planning is critically important. Representative samples *must* be obtained for each storm event. Always double-check that equipment, supplies, and personal protective gear are readied for each field deployment.

Before crews are deployed to the field, be sure that onsite rainfall meets the sampling criteria:

1. A minimum of 48 hours of dry weather preceded the storm (72 hours is preferred).
2. The Deployment Criteria defined in Exhibit 3.1.

Check appropriate sources for onsite weather conditions before deploying field staff. Use the Storm Monitoring Decision Tree (Exhibit 3.1, Tab 3) for a decision tree on when and how to mobilize field personnel and equipment.

5.1 Storm Characteristics and Sampling Equipment

Section 5.0 of Appendix I-A details the stormwater equipment, equipment maintenance requirements, stormwater monitoring procedures, sediment sampling procedures, and analytical methods, reporting limits, and holding times for samples from EDBs sites. Appendix III contains the BMP Retrofit Pilot Program Quality Assurance and Quality Control Plan.

A separate logbook is used for each EDB facility. Pertinent checklists, log forms, and information necessary to conduct a successful monitoring program and to be contained in the site-specific field logbooks are listed in Table 3.1 in Section 3.0. The pertinent checklists and log forms are located in Tabs 1 through 9. Table 3.1 also lists analytical and office forms, contains corresponding form and table numbers, identifies the location in this document, and explains when each form is to be filled out.

Sampling equipment shall be inspected for proper function, staging, and sampling preparation (if wet season) and documented. There are three principal phases of documenting stormwater sampling at BMP sites:

- Pre-Storm preparation,
- Storm event sampling (grab samples and composite sample collection of both influent and effluent), and
- Post-Storm sample analyses.

5.1.1 Pre-Storm Preparation

1. Consult the Storm Monitoring Decision Tree (Exhibit 3.1 in Tab 3) for when to mobilize.
2. Review the Mobilization Checklist for appropriate equipment, sampling devices, and sample bottles (Form A, Tab 3).

3. Verify sample bottle quantities, number of analyses for each parameter, in-situ sampling equipment, and other necessary gear/support materials.
4. Decontaminate and assemble decontaminanted sample containers, teflon® hose, and other sampling equipment according to the following procedures:

   Cleaning Procedures for Sample Bottles

   Bottles will be:

   a. Rinsed three times with warm tap water.
   b. Scrubbed with a clean plastic brush.
   c. Soaked in a 2% detergent (e.g., Contrad®) solution for at least 48-hours.
   d. Rinsed three times with tap water.
   e. Rinsed five times with Milli-Q or equivalent water, rotating the bottle to ensure contact with the entire inside surface.
   f. Rinsed three times with hexane while rotating the bottle, and then air-dried.
   g. Rinsed six times with Milli-Q water.
   h. Soaked in 2N nitric acid for a minimum of 24-hours.
   i. Rinsed six times with Milli-Q water.

   Cleaning Procedures for Teflon®Hose and Other Sampling Equipment

   Teflon® hose and other sampling equipment will be:

   a. Teflon® hose will be rinsed three times with a 2% Micro® solution or equivalent. Other sampling equipment will be washed with a 2% Micro® solution and a clean plastic brush.
   b. Rinsed three times with warm tap water.
   c. Rinsed three times with Milli-Q or equivalent water.
   d. Rinsed three times with 2N nitric acid.
   e. Soaked at least 24-hours in 2N nitric acid.
   f. Rinsed three times with Milli-Q water.

5. Inspect monitoring equipment for proper operation (use Form D, Tab 4). At each sampling location do the following:

   a. Check battery voltages and electrical connections.
   b. Inspect the pump tubing and replace if necessary.
   c. Inspect desiccant cartridges in flow meter.
   d. Inspect intake tubing condition and connections. Make sure intakes, flow structures, and sensors are clear of debris (this is only possible if all confined space requirements are met).
   e. Make sure the correct user-entered program parameters are entered (use Forms I, J1, J2 and K in Tab 6).
   f. Set system status flags.

g. Make sure the automatic sampler is set up properly by verifying that the correct bottle size, number of bottles, hose diameter, hose material, hose length, head height, aliquot volume, number of samples to fill the bottle, and number of pulses to sample has been entered correctly.
h. Make sure the sampler is set to take a sample automatically after receiving a pulse form the data logger.

6. Ice composite bottles.
7. From the office or field set "Volume-to-Sample" numbers (Exhibit 9.2 in Tab 9) and initiate equipment to begin sampling automatically when flow is detected. Fill out the phone log (Form K, Tab 6).
8. Prepare necessary sample bottles for first-flush (as soon as possible after the start of runoff) grab samples. Grab samples will be collected twice per year as directed by the Task Order Manager.

5.1.2 Storm Event and Sample Collection

1. Once onsite, fill out the Empirical Observations Field Data Log and a Field Data Log Sheets (Forms H1 and I in Tab 6) to document storm characteristics.
2. Locate influent/control autosampler and inspect for proper operation.
3. Locate effluent autosampler and inspect for proper operation.
4. Change composite bottles and re-initiate equipment as needed.
5. Take grab samples as needed (two will be taken per monitoring season at the influent and effluent locations of the EDB).

5.1.3 Post-Storm Sample Analyses

After a storm event has ended as determined by Storm Control, the autosampler stations need to be shut down and left ready for the next storm event in the following manner:

1. Reset the storm monitoring program to prepare for another storm event.
2. Replace the sample bottle in the autosampler and the reset the sampler.
3. Physically inspect the station to determine if any damage was sustained during the storm event. Inspect the flow sensor and intake for debris blockage or clogging. (This is only possible if all confined space requirements are met).
4. Retrieve data via modem from the remote monitoring computer.
5. Check all battery voltages; replace batteries that are low.

Data Retrieval

Data will be retrieved (dumped) from the data logger after each storm event during the storm season, and, during dry weather, approximately every month.

Chain of Custody Forms

When all of the grab samples have been collected, the paperwork will be filled out to ensure a smooth transfer of samples to the analytical laboratory. Chain-of-Custody forms (Form M, Tab 7) will be filled out in detail describing the type of sample, the quantity of samples, and the time that the samples were collected. These forms will accompany the samples to the laboratory.

5.2 Empirical Observations

Complete and succinct empirical observations are required during all site visits (rain/runoff and BMP characteristics). Observations shall be taken throughout the facility as they apply to the BMP (particularly at the influent and effluent locations). Particularly note the following:

- Meteorological characteristics (present and preceding period).
- Hydrologic and hydraulic characteristics (flowing and/or standing water).
- Inlet conditions (problems affecting performance).
- Water quality appearance (visual, olfactory) to roughly assess changes in water quality.
- Solids deposition (trash and debris, sediments, organics) and resuspension.
- Treatment medium condition.
- Outlet conditions (problems affecting performance).
- Mosquitoes and other vectors.
- Structural condition of facility.
- Monitoring equipment condition.

Refer to Form H in Tab 6 for recording empirical observation information.

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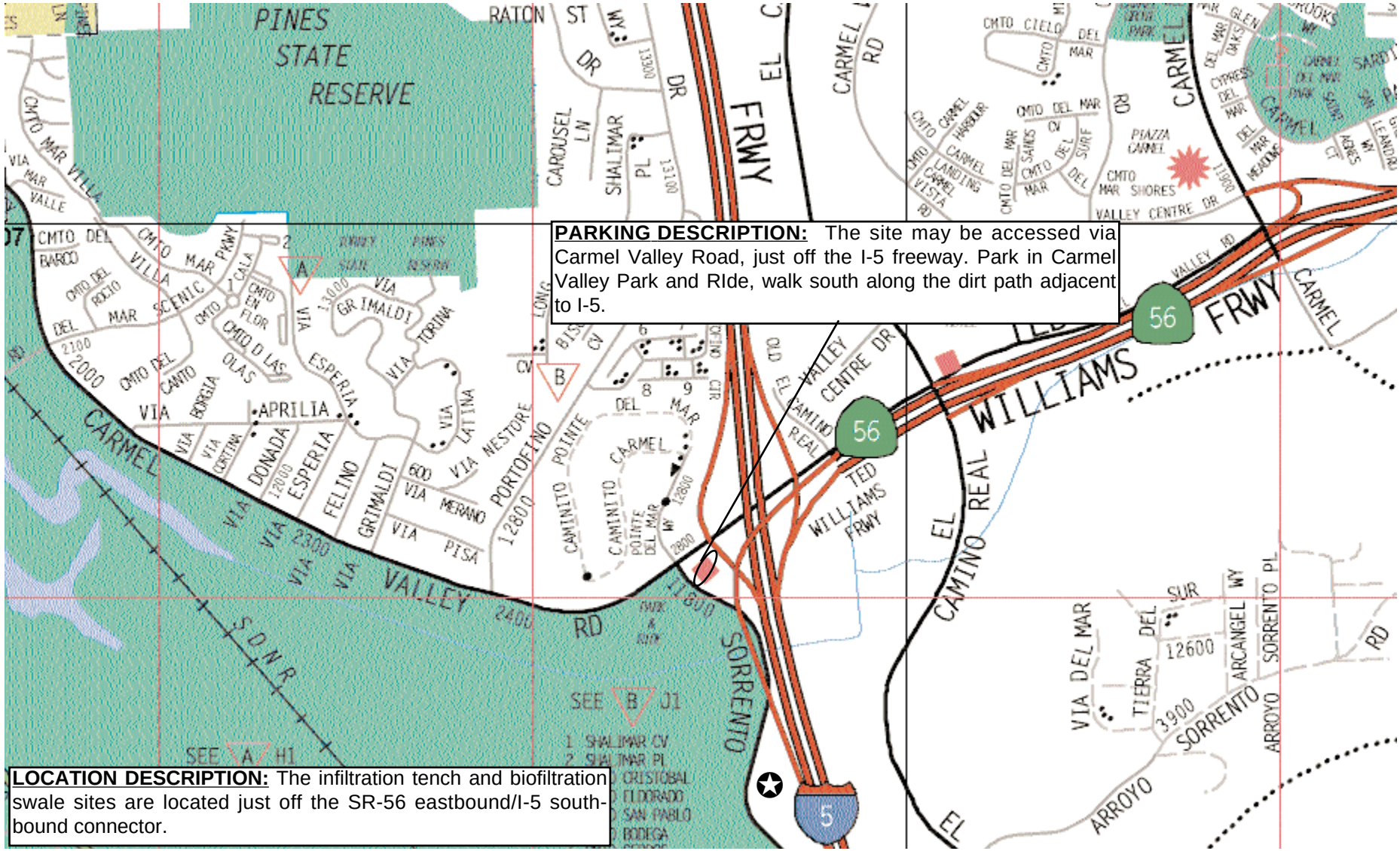
TAB 1

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

MAPS

Site Location Maps
BMP Facility Plans



PARKING DESCRIPTION: The site may be accessed via Carmel Valley Road, just off the I-5 freeway. Park in Carmel Valley Park and RIde, walk south along the dirt path adjacent to I-5.

LOCATION DESCRIPTION: The infiltration tench and biofiltration swale sites are located just off the SR-56 eastbound/I-5 south-bound connector.

SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

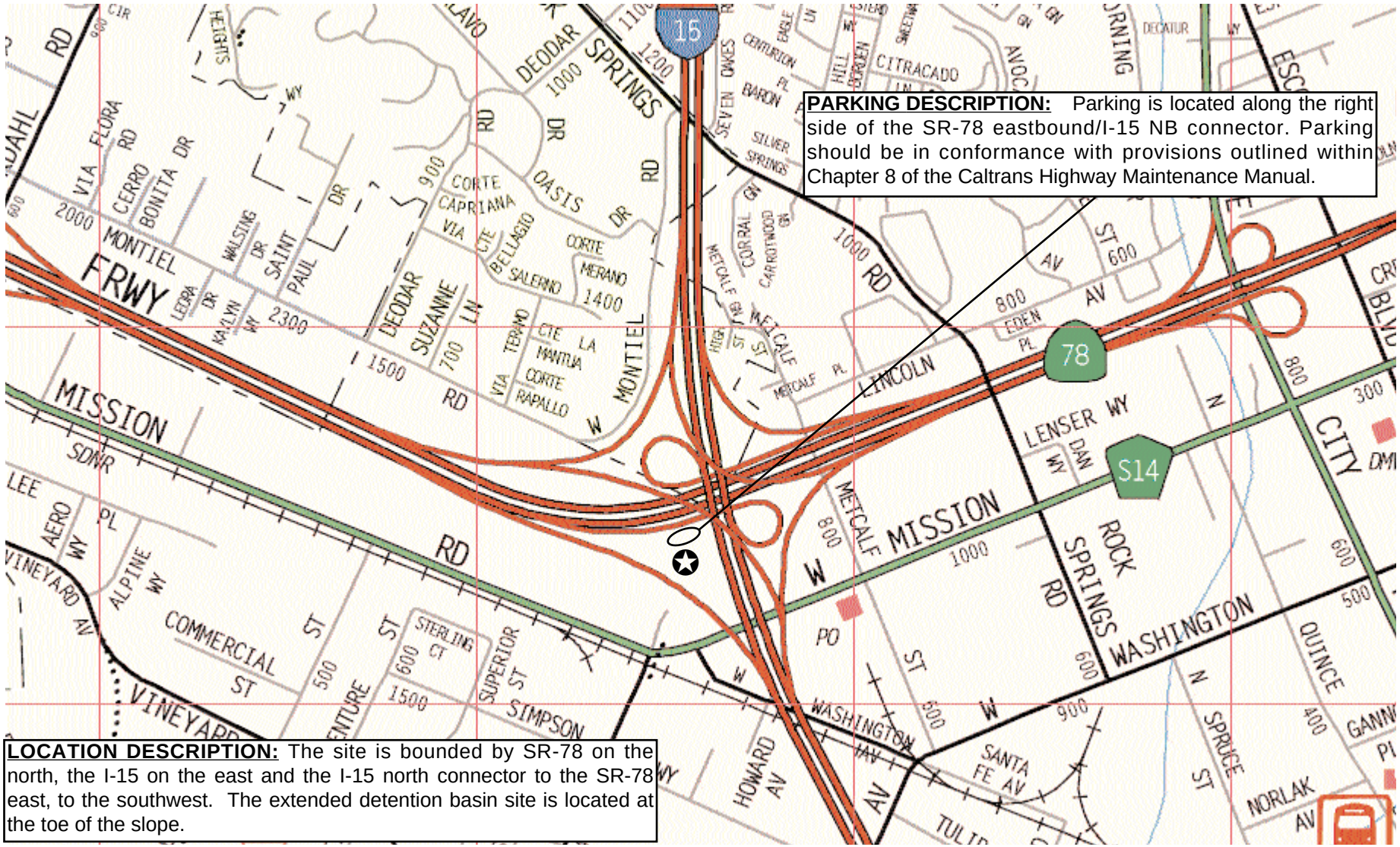
CALIFORNIA DEPARTMENT OF TRANSPORTATION

I-5/SR-56 Interchange
BMP Pilot Study Site #111101

District 11

Robert Bein, William Frost & Associates

6/98 JN 34618



PARKING DESCRIPTION: Parking is located along the right side of the SR-78 eastbound/I-15 NB connector. Parking should be in conformance with provisions outlined within Chapter 8 of the Caltrans Highway Maintenance Manual.

LOCATION DESCRIPTION: The site is bounded by SR-78 on the north, the I-15 on the east and the I-15 north connector to the SR-78 east, to the southwest. The extended detention basin site is located at the toe of the slope.

SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

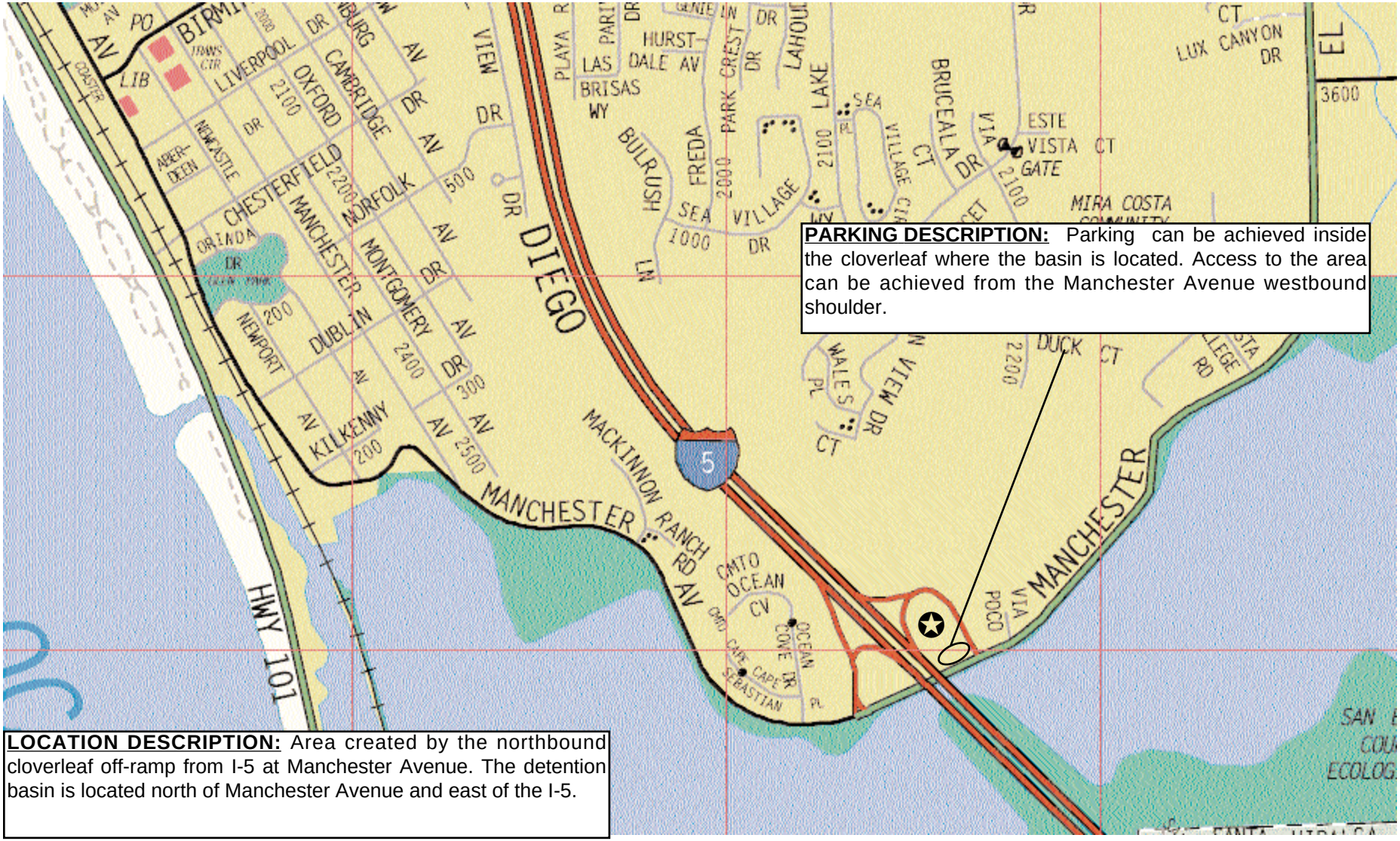
CALIFORNIA DEPARTMENT OF TRANSPORTATION

I-15/SR-78 Interchange
BMP Pilot Study Site #111102

District 11

Robert Bein, William Frost & Associates

6/98 JN 34618



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

CALIFORNIA DEPARTMENT OF TRANSPORTATION

I-5/Manchester Avenue (east)
BMP Pilot Study Site #111104

District 11

Robert Bein, William Frost & Associates

5/99 JN 34618

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5/56	52.9		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA

ROBERT BEIN, WILLIAM FROST & ASSOCIATES
14725 ALTON PARKWAY
IRVINE, CA 92618

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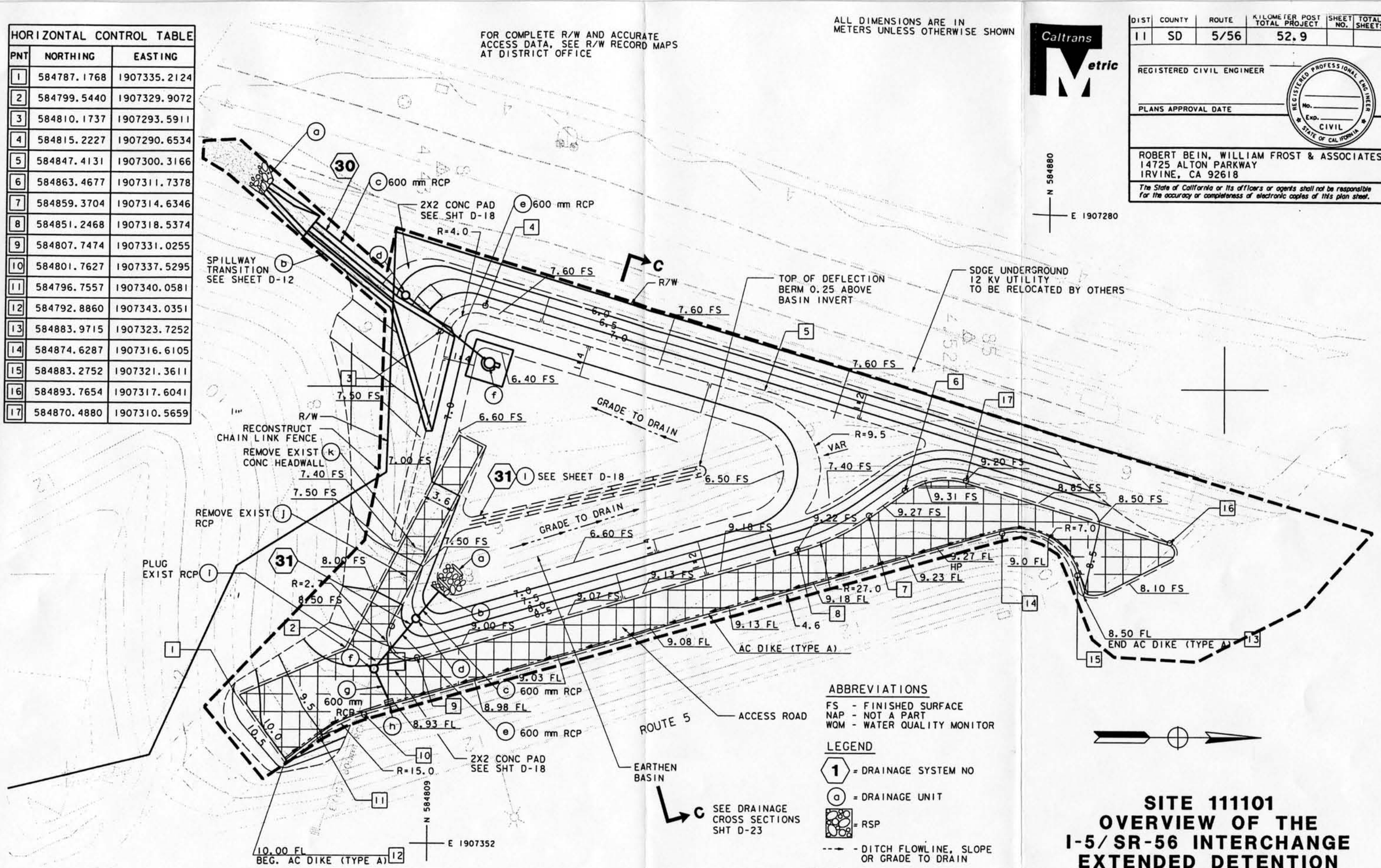
Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

FOR COMPLETE R/W AND ACCURATE ACCESS DATA, SEE R/W RECORD MAPS AT DISTRICT OFFICE

HORIZONTAL CONTROL TABLE		
PNT	NORTHING	EASTING
1	584787.1768	1907335.2124
2	584799.5440	1907329.9072
3	584810.1737	1907293.5911
4	584815.2227	1907290.6534
5	584847.4131	1907300.3166
6	584863.4677	1907311.7378
7	584859.3704	1907314.6346
8	584851.2468	1907318.5374
9	584807.7474	1907331.0255
10	584801.7627	1907337.5295
11	584796.7557	1907340.0581
12	584792.8860	1907343.0351
13	584883.9715	1907323.7252
14	584874.6287	1907316.6105
15	584883.2752	1907321.3611
16	584893.7654	1907317.6041
17	584870.4880	1907310.5659



ABBREVIATIONS

FS - FINISHED SURFACE
NAP - NOT A PART
WQM - WATER QUALITY MONITOR

LEGEND

1 = DRAINAGE SYSTEM NO
a = DRAINAGE UNIT
= RSP
- DITCH FLOWLINE, SLOPE OR GRADE TO DRAIN
- ACCESS ROADWAY
- BMP PILOT PROGRAM MAINTENANCE LIMITS

SITE 111101
OVERVIEW OF THE I-5/SR-56 INTERCHANGE EXTENDED DETENTION BASIN BMP

SCALE: 1:200

DATE	REVISED BY	DATE	REVISED BY

CALCULATED/DESIGNED BY	NYW	9/98
CHECKED BY	MC	9/98

DESIGN OVERSIGHT
CHRISTIAN HERENCIA

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

18 JUN 99 5 c:\winnt\profiles\aw\desktop\vrbfdl.dgn

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	78/15	26.6		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

ROBERT BEIN, WILLIAM FROST & ASSOCIATES
14725 ALTON PARKWAY
IRVINE, CA 92618

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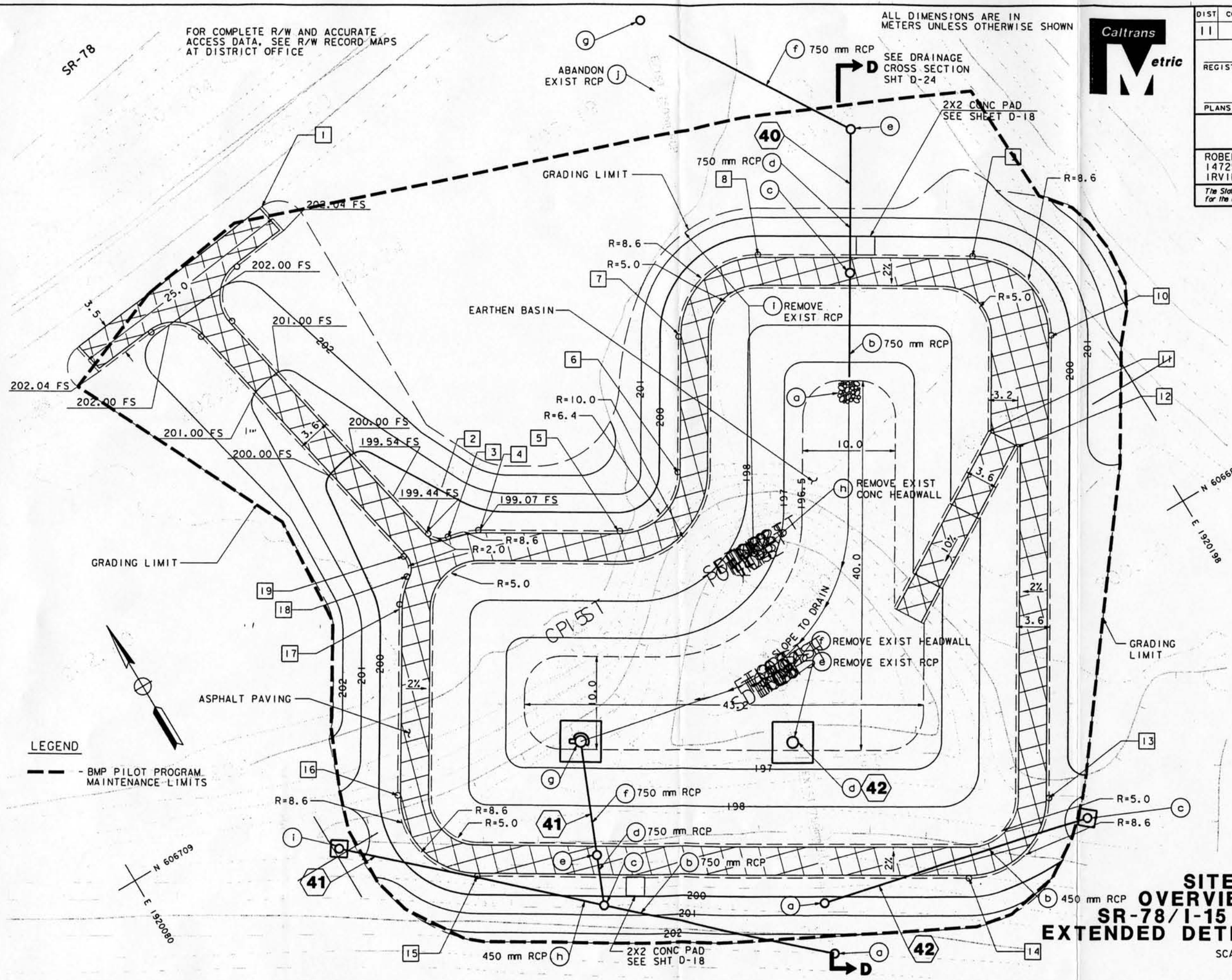
Caltrans Metric



LEGEND

- - - BMP PILOT PROGRAM MAINTENANCE LIMITS

HORIZONTAL CONTROL TABLE		
PNT	NORTHING	EASTING
1	606763.1359	1920118.1568
2	606725.1004	1920125.9821
3	606723.5206	1920127.6802
4	606722.3508	1920131.0120
5	606714.5704	1920143.8631
6	606716.7228	1920152.6209
7	606729.5740	1920160.4016
8	606732.4767	1920172.2123
9	606720.4659	1920192.0504
10	606708.6551	1920194.9531
11	606703.2499	1920183.7424
12	606700.1708	1920185.6076
13	606665.8836	1920169.0571
14	606662.9810	1920157.2463
15	606690.5285	1920111.7458
16	606702.3394	1920108.8431
17	606719.4481	1920119.2013
18	606722.0780	1920121.6817
19	606724.1284	1920122.5067
20	606754.9375	1920116.1681
21	606753.5357	1920099.7130
22	606761.4264	1920098.0896

SITE 111102
OVERVIEW OF THE SR-78/I-15 INTERCHANGE EXTENDED DETENTION BASIN BMP

SCALE: 1:200

DATE	REVISED BY	DATE REVISED
9/98	NYW	9/98

CALCULATED/DESIGNED BY NYW
CHECKED BY MC

DESIGN OVERSIGHT
CHRISTIAN HERENCIA

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

Caltrans Metric

			TOTAL PROJECT	NO	SHEETS
11	SD	5	70.7		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — NO. — EXP. — CIVIL — STATE OF CALIFORNIA

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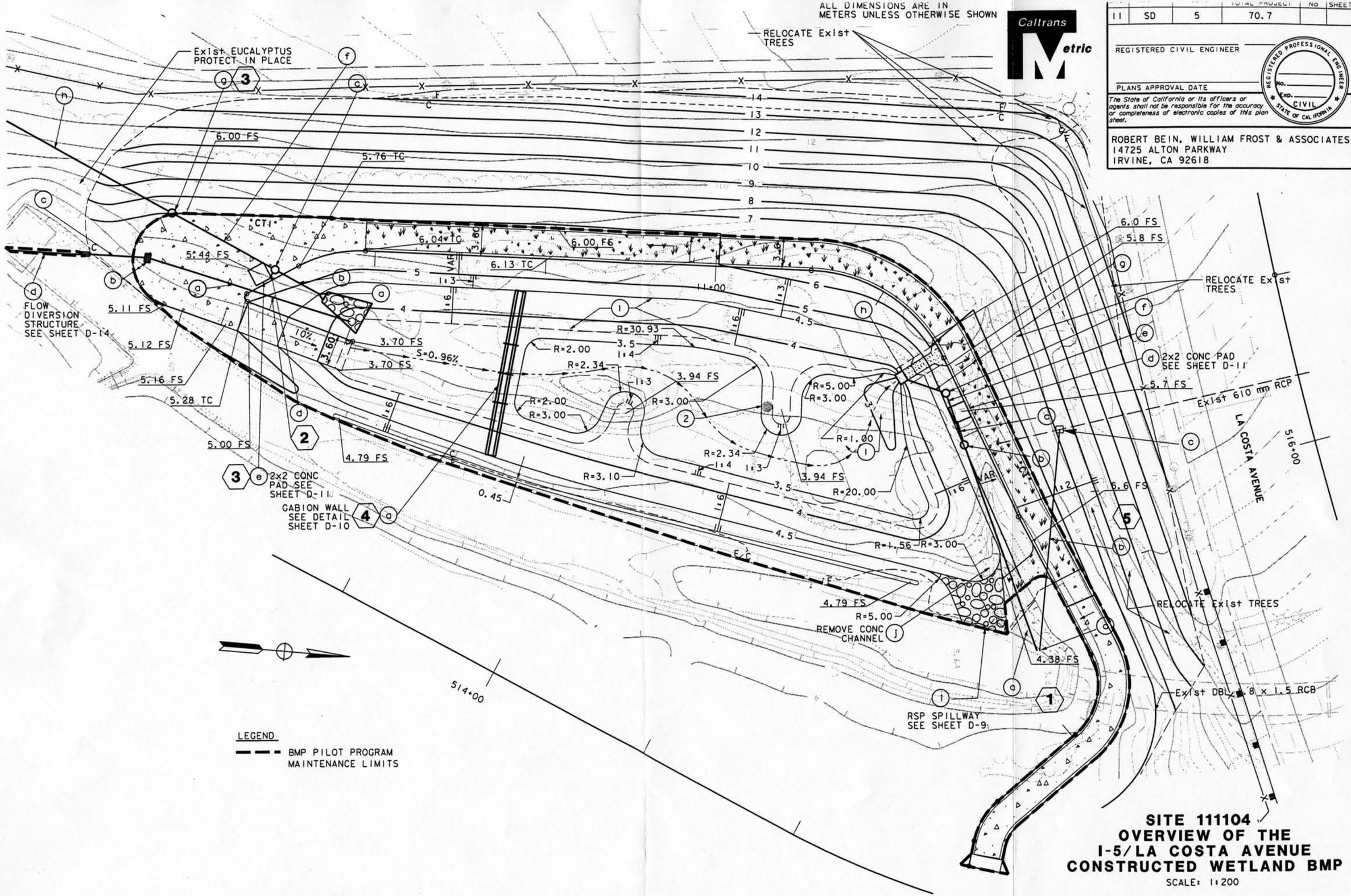
14725 ALTON PARKWAY
IRVINE, CA 92618



SITE 111104 OVERVIEW OF THE I-5/LA COSTA AVENUE CONSTRUCTED WETLAND BMP

SCALE: 1:200

DATE	REVISED BY	DATE	REVISED BY
1/99	AMW	1/99	MC

CALCULATED/DESIGNED BY — CHECKED BY

DESIGN OVERSIGHT

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

NPDES

CID TESORO

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LAST REVISION

TAB 2

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

EMERGENCY PROCEDURES SUPPORT

Emergency Contacts Lists
Hospital Route Maps
Project Contacts List

Document all information related to any accident or incident that resulted in injury or damage and report it to Jon Toal at KLI at (831) 457-3950

Emergency Contacts

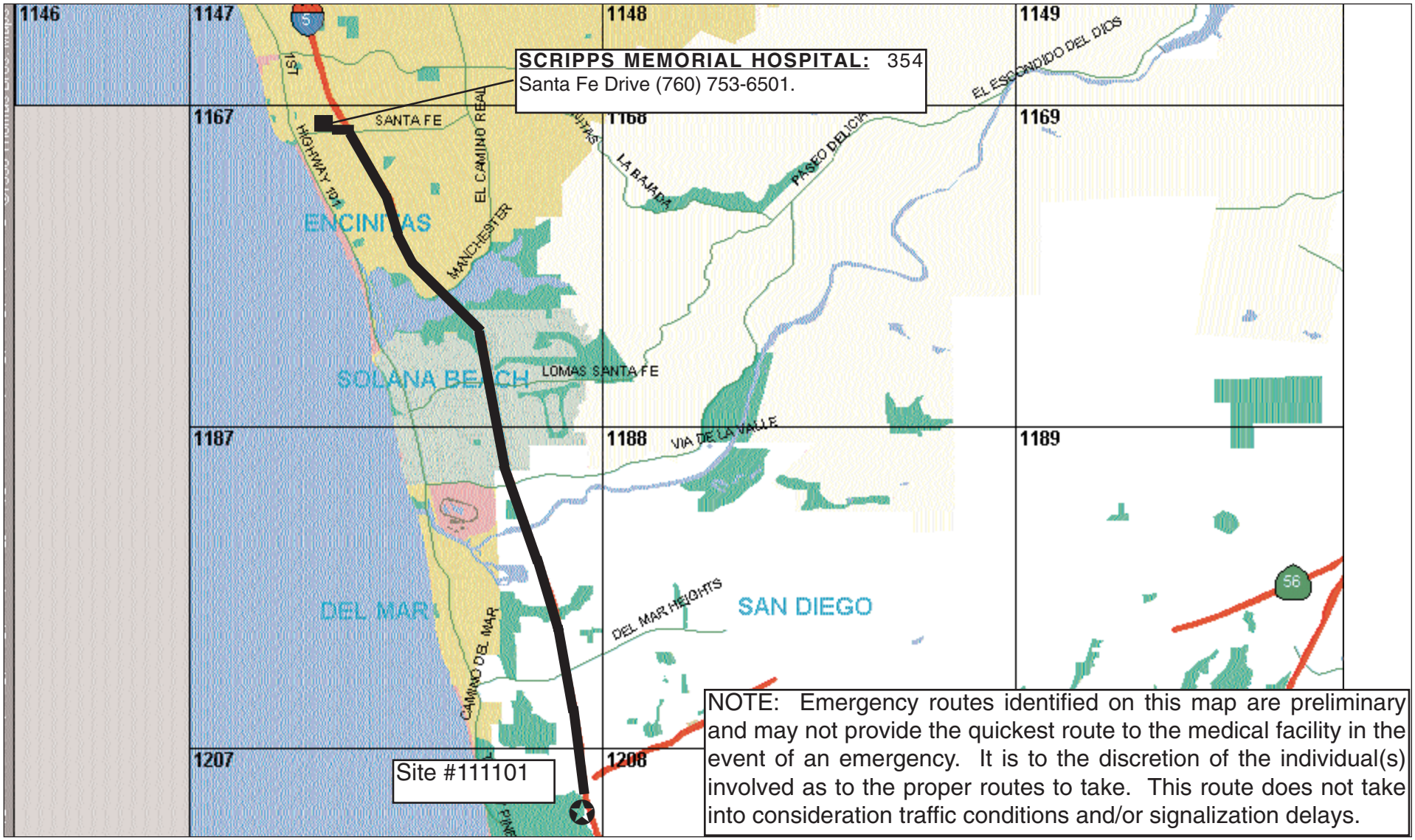
Site 111101: I-5/ SR-56 Interchange

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Police Department	911	From landline phone
Fire Department Emergency Dispatch	911	From landline phone
Fire Non-Emergency Dispatch	(619) 974-9891	Call for confined spaces
Scripps Memorial Hospital	(760) 633-7685	Nearest hospital
Local Highway Patrol	(760) 757-1675	Call prior to beginning work
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Bob Wu)	(213) 897-8636	Notify for any accident or injury

Emergency Contacts

Site 111102: SR-78/I-15 Interchange

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Police Department	911	From landline phone
Local Police Emergency Dispatch	(760) 839-4611	From landline phone
Fire Emergency Dispatch	(760) 839-4622	Call immediately in case of fire or hazardous spills
Palomar Medical Hospital	(760) 739-3300	Nearest hospital
Local Highway Patrol	(760) 757-1675	Call prior to beginning work
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Bob Wu)	(213) 897-8636	Notify for any accident or injury



NOTE: Emergency routes identified on this map are preliminary and may not provide the quickest route to the medical facility in the event of an emergency. It is to the discretion of the individual(s) involved as to the proper routes to take. This route does not take into consideration traffic conditions and/or signalization delays.

SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

Potential Emergency Route

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Hospital Emergency Route

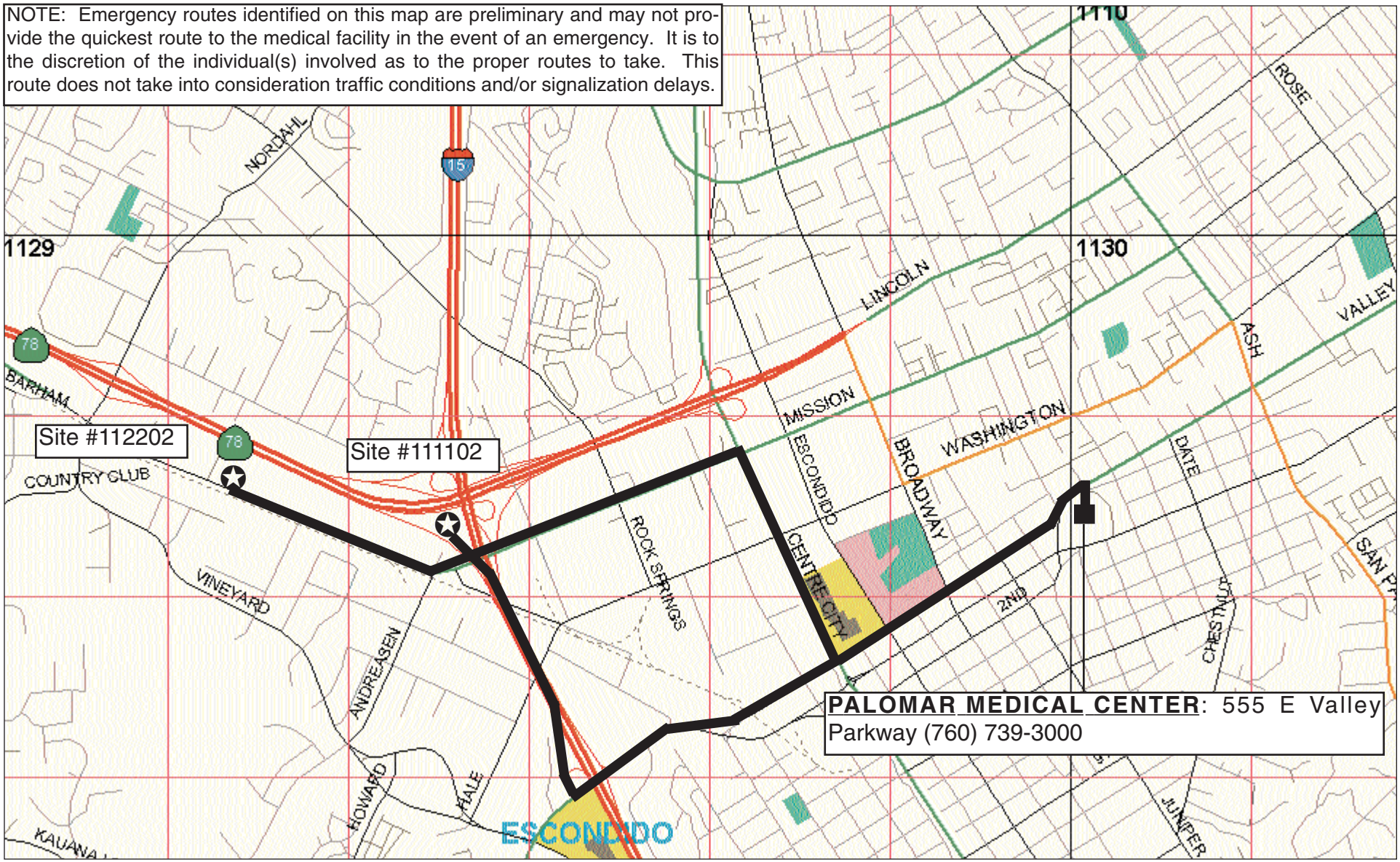
District 11

Robert Bein, William Frost & Associates

7/98

JN 34618

NOTE: Emergency routes identified on this map are preliminary and may not provide the quickest route to the medical facility in the event of an emergency. It is to the discretion of the individual(s) involved as to the proper routes to take. This route does not take into consideration traffic conditions and/or signalization delays.



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

Potential Emergency Route

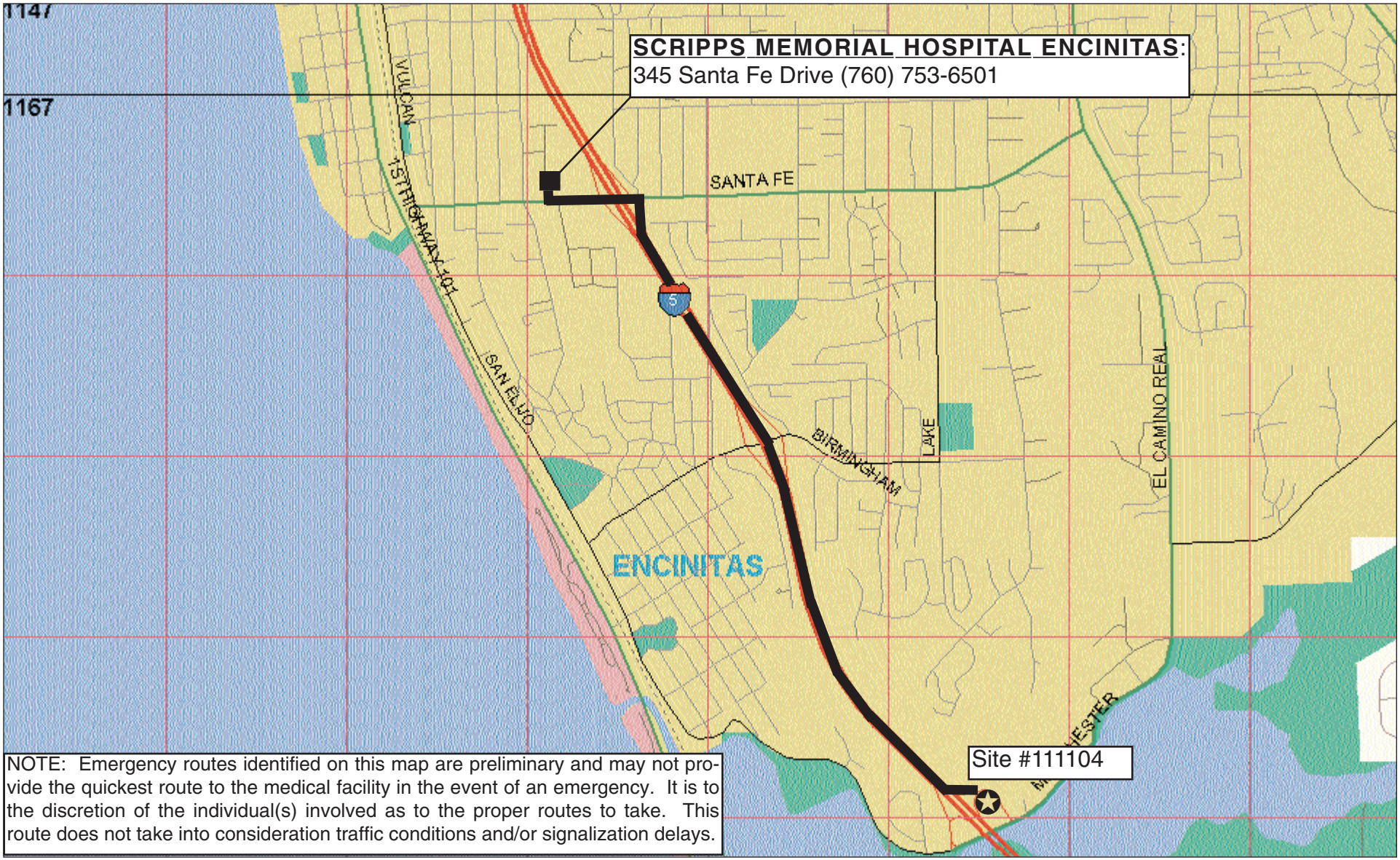
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Hospital Emergency Route

District 11

Robert Bein, William Frost & Associates

7/98 JN 34618



NOTE: Emergency routes identified on this map are preliminary and may not provide the quickest route to the medical facility in the event of an emergency. It is to the discretion of the individual(s) involved as to the proper routes to take. This route does not take into consideration traffic conditions and/or signalization delays.

SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

Potential Emergency Route

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Hospital Emergency Route

District 11

Robert Bein, William Frost & Associates

5/99 JN 34618

Project Contacts

Name	Organization	Phone	Fax Mobile	Email
Bill Whittenberg	RBF	(949) 855-5771-w	(949) 586-6531-f	whittenberg@rbf.com
Bob Wu	Caltrans Contract Manager	(213) 897-8636	(916) 506-9018p	Robert_wu@dot.ca.gov
Pat Kinney	KLI Task Order Manager	(916) 551-1380-w	(831) 640-9882-m	pkinney@cruzio.com
Ken Kronschnabl	KLI	(831) 457-3950-w (831) 688-5443-h	(831) 426-0405-f (831) 640-9883-m	kkronsch@cruzio.com
Cid Tesoro	Caltrans-District 11	(619) 688-3626	(619) 688-6998	cid_tesoro@dot.ca.gov
Rick Dey	Isco Service Center	(800) 228-4373	(402) 465-3089	RickD@isco.com
John Masiti	American Sigma Inc.	(800) 635-4567	(800) 235-1230	Sigma@americasigma.com
Internet	National Weather Service	--	--	http://nimbo.wrh.noaa.gov/San diego/nws.html
Internet	San Diego Alert System	--	--	http://nimbo.wrh.noaa.gov/San diego/fd_pcb.html
Jim Vanderswan	Channel 8 Weather Service, Lead Meteorologist	(831) 656-1725	--	--
Dean Messer	Mosquitoes and Midges Vector Abatement Specialist	30 753-6400	--	deanmn@lwadavis.com
Mike Devine	County of San Diego Vector Control	(619) 694-2888	(619) 694-3559-f	Mdevineh@co.san-diego.ca.us
Fred Beams	Rodents Vector Abatement Specialist	(626) 586-5143	--	Geoscrc1@ix.netcom.com
Phil Carpenter	Toxscan	(831) 724-4522-w		PCarpenter@Toxscan.com
	Associated Laboratories	(714) 771-6900-w	(714) 538-1209-f	

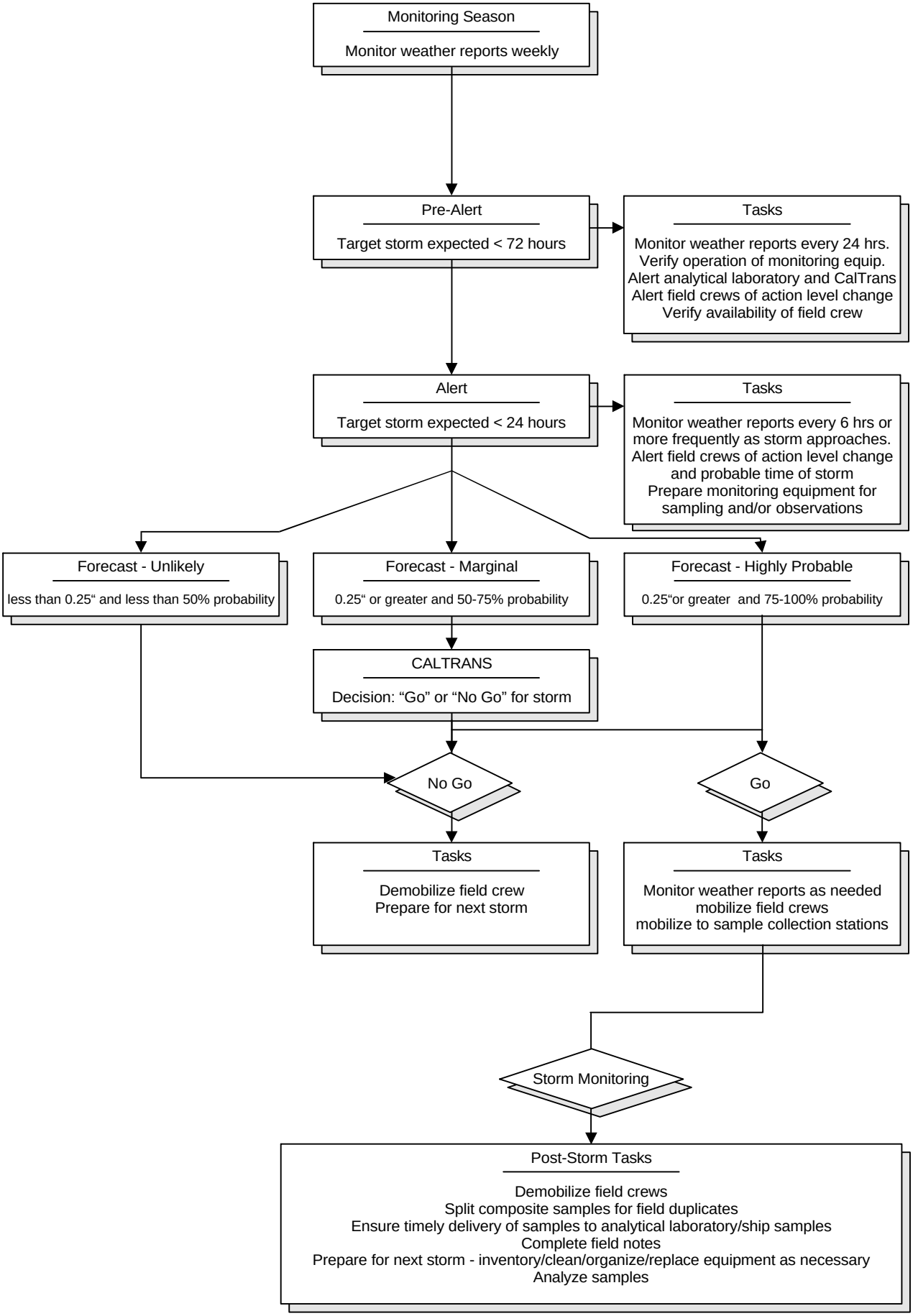
TAB 3

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

FIELD PREPARATION/MOBILIZATION FORMS

Exhibit 3.1: Storm Monitoring Decision Tree
Form A: Mobilization Checklist
Form B: Storm Staffing Plan

Exhibit 3.1
Storm Action Levels For BMP Facilities During Wet Season Monitoring



FORM A **Caltrans BMP Retrofit Pilot Program Mobilization Checklist**			
General			
	Recent storm tracking information (e.g., www.weather.com)		Communication channels established
	Staff mobilized		Routes & BMPs identified
	Field Guidance Notebook		Emergency/Caltrans contact list
	Phone card		Volume to sample matrix
			Vendor's autosampler manual
Storm Kit Equipment List			
	Keypad/display		9-pin cable from keypad to data logger
	Full set of keys (on floatable bobber)		Flashlights (2)
	Maps for all required areas		Large flat screwdriver
	Small flat screwdriver		Umbrella
	High quality alkaline D-cell batteries		Spare sample labels
	Pencils and indelible markers		Desiccant (packages and jar)
	Diagonal clipper		Electrical tape
	Cable ties (assorted sizes)		Utility knife
	Ziplock baggies (assorted sizes)		Labeling tape
	Polyethylene gloves		Rubber bands
Storm Mobilization List			
	Storm kit		Log books
	pH meter		Paper towels
	DI (de-ionized) water squirt bottles		Tape gun with clear packaging tape
	pH grab bottles		Spare sample labels
	Ice scoop		Sample control paperwork (COC)
	Extra fine indelible markers		20 liter bottles in 10 gallon containment buckets
	Grab sample bottles (see below)		Coolers and ice (at least one extra)
	Grab pole and extension		DI water (3-gallon jug)
	Two-way radio or cellular phone		Personal rain gear
	Any necessary safety gear		Trash bags
Sampling Checklist			
	Sample bottles w/ preservatives		Analyte list
	for each required analysis		Analytical Lab telephone number
	for each QA/QC analysis		Backup lab contact number (after hours)
	for each BMP site		Sample coolers, plus extra
	prelabeled bottles		
	extra bottles in case of breakage		

FORM B

FORM B

Storm Staffing Plan

Caltrans **Retrofit Pilot Program** **Stormwater Sampling**		Storm Date:	
Zone #1	Zone #2	Zone #3	Zone #4
Estimated Start:		**End Time:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Startup	**Zone #2 Startup**	**Zone #3 Startup**	**Zone #4 Startup**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio
Relief Start:		**Relief End:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Relief	**Zone #2 Relief**	**Zone #3 Relief**	**Zone #4 Relief**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio

TAB 4

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

INSPECTION FORMS

Form C: BMP Site Inspection Checklist
Form D: Monitoring Equipment Inspection Checklist

PATIENT NAME: _____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Extended Detention Basins

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:			Maintenance Reqd?	
Sediment depth (is average sediment depth in excess of 18 inches, 10% of basin volume or is there an alluvial type deposit impeding EDB hydraulics at the inlet):			☐ yes	☐ no
Sediment type and location:				
Standing water or other drainage problems? Comments:	☐ yes	☐ no	☐ yes	☐ no
If yes, what is the depth of water? What is the extent of the water? Where is the location of the water?				
Evidence of erosion, rilling, or undercutting?	☐ yes	☐ no	☐ yes	☐ no
Seeps?	☐ yes	☐ no	☐ yes	☐ no
Embankment slumping or cracking?	☐ yes	☐ no	☐ yes	☐ no
Comments:				

VEGETATION:			Maintenance Reqd?	
Height of vegetation *(if length >18 inches mark yes):*			☐ yes	☐ no
Does vegetation cover all of the detention basin's floor and/or slopes? Is vegetation management required?	☐ yes	☐ no	☐ yes	☐ no
Is native vegetation, weeds, leaves, or other organic debris present in the basin?	☐ yes	☐ no	☐ yes	☐ no
If yes, what type:				
Does native vegetation, weeds, leaves, or other organic debris interfere with the operation of the detention basin by (a) overgrowing the detention basin vegetation, (b) interfering with the hydraulic resident time of the detention basin, or (c) saturation of the bottom with dead or dying vegetation or (d) in another way? If so, explain:	☐ yes	☐ no	☐ yes	☐ no
Evidence of flattening of vegetation? If so, which species?	☐ yes	☐ no	☐ yes	☐ no
Condition of landscaping? ☐ Inhibited Growth ☐ Excessive Growth ☐ Normal Growth Comments:			☐ yes	☐ no

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Extended Detention Basins

STRUCTURAL:	Maintenance Reqd?
Are flumes, flume-to-basin transitions, basin -to-flume transitions, and energy dissipaters clear of sediment? ☐ yes ☐ no	☐ yes ☐ no
Risers and Conveyances: Blockage or sediment in risers? : ☐ yes ☐ no If yes, extent and location:_____	☐ yes ☐ no
Is corrosion present? ☐ yes ☐ no ☐ not applicable If yes, extent and location: _____	☐ yes ☐ no
Evidence of concrete scour, spalling, or cracking of structural parts? ☐ yes ☐ no	☐ yes ☐ no
Fences: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Locks: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Other general maintenance concerns/comments:	

ANIMAL CONCERNS:	Maintenance Reqd?
Is there evidence of small animals (burrows, droppings, trails, gnawing marks, or stained rub marks)? ☐ yes ☐ no	☐ yes ☐ no
Comments:	

AESTHETIC CONCERNS:			
Debris (non-trash)?	☐ yes	☐ no	Type, amount and location:
Trash?	☐ yes	☐ no	Type, amount and location:
Graffiti?	☐ yes	☐ no	Description and location:
Other general aesthetic concerns:			

WATER MANAGEMENT:

☐ ***Dewatering (describe):***

Start time: End time: Total time:
More work required? ☐ yes ☐ no

Equipment used:

NON-STORMWATER CONCERNS:

Non-storm water discharge to BMP ☐ yes ☐ no
BMP wet from obvious non-stormwater discharge (no rain) ☐ yes ☐ no
If yes, print your name and contact number below and fax this form to Cid Tesoro at 619-688-6998
From: Contact Number:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Extended Detention Basins

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

Comments:

OVERALL:

Other concerns affecting operation:

Condition of facility: ☐ acceptable ☐ not acceptable
Comments:

Dates for maintenance to be completed by:

_____
(Team Leader's Signature)

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM D
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Inspection Checklist for Extended Detention Basins

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:	Influent Effluent (circle one)	

SAMPLING AND FLOW MEASUREMENT EQUIPMENT:	Maintenance Reqd?
Is the monitoring station enclosure locked? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the monitoring station enclosure structurally sound? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the system status of the automatic sampler online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the automatic sampler properly programmed and calibrated? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the peristaltic pump tubing need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the intake tubing and/or connections need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Do the desiccant cartridges in the flow meter need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is internal modem online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Are the DC marine battery and connect cable present? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are voltage and current of DC battery within normal parameters? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are cables to power source present and properly connected, and is AC power available? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Is the flow meter properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no

For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM D
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Inspection Checklist for Extended Detention Basins
(continued)

SAMPLING AND FLOW MEASUREMENT EQUIPMENT (cont.):	Maintenance Reqd?
Is the flow meter tubing free of kinks, free of obstructions, and properly connected to pump? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the acoustic level meter properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the AV meter sensors properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the AV meter sensors free of obstructions? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is strainer clean and free of obstruction? ☐ yes ☐ no Comments:	☐ yes ☐ no

INFLUENT SAMPLING LOCATION:				Maintenance Reqd?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

EFFLUENT SAMPLING LOCATION:				Maintenance Reqd?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

Comments:

Dates for maintenance to be completed by:

_____
(Team Leader's Signature)

For Internal Use Only

TAB 5

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

MAINTENANCE FORMS

Form E: BMP Site Maintenance Activity Checklist
Form F: Monitoring Equipment Maintenance Activity Checklist
Form G: Sediment Sampling Checklist
Exhibit 5.1: Title 22 Characterization Requirements

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Extended Detention Basins

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:

☐ ***Sediment removal or sediment management***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Clean flumes, and/or cracks in stormwater conveyance system***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Erosion repair (including vegetative stabilization)***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Embankment/slope repair(s)***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

VEGETATION:

☐ ***Detention basin grass mowing/trimming and removal of cuttings***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Detention basin vegetation trimming and tree pruning***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replant EDB vegetation***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Extended Detention Basins
(continued)

☐ ***Weed control***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

STRUCTURAL:

☐ ***Structural repairs (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

ANIMAL CONCERNS:

☐ ***Burrow control***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

AESTHETIC CONCERNS:

☐ ***Debris and trash removal***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Graffiti removal***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Painting***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

_____ (Team Leader's Signature)	General Comments:

Only Complete Applicable Sections

FACILITY NAME: _____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM F
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Maintenance Activity Checklist
for Extended Detention Basins

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

☐ ***Clean flumes, orifices, and other components***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Diagnostic test of automatic sampler***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of peristaltic pump tubing***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of flow meter tubing, pump tubing, or intake tubing***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of strainer***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of 12-volt marine battery***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Removal of kinks or obstructions from flow meter***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of desiccant cartridges in the flow meter and/or sampler***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

Only Complete Applicable Sections
For Internal Use Only

FACILITY NAME: _____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM F
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Maintenance Activity Checklist
for Extended Detention Basins (continued)

☐ ***Repair and maintenance of AV meter***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair and maintenance of look-down level meter***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other maintenance/calibration of automatic sampling equipment (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other maintenance of flow measurement equipment (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

_____ (Team Leader's Signature)	General Comments:

Only Complete Applicable Sections
For Internal Use Only

FACILITY NAME: _____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM G
Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

GENERAL INFORMATION:			
Date:	Time In:	Team Leader's Initials:	Time Out:
Location:			

SEDIMENT CHARACTERISTICS IN BMP PRIOR TO STOCKPILING:					
Depth of sediment:					
Color:	☐ black	☐ brown	☐ green	☐ tan	☐ other
Consistency:	☐	☐ sandy	☐ silty	☐ granular	☐ other
Odors:	☐ petroleum ☐ none	☐ solvents ☐ other	☐ organic (rotten eggs)		☐ sewage
Depth of sediment:					

SEDIMENT SAMPLE COLLECTION MOBILIZATION LIST	
Powder Free Nitrile Gloves	
Soil Proble or equivalent for sample collection	
8-ounce glass jar labeled Total Petroleum Hydrocarbons (TPH)	
Plastic bags, seal bags	
Chilled cooler	
Chain-of-Custody form	
Log book for record keeping	

STOCKPILE/DRUMMED SEDIMENT:	Maintenance Reqd?	
Does the stockpile/drum require additional protection from causing environmental impact? (i.e., is underlying plastic, sandbag berming, and an anchored weather-proof covering in place?) If so, check yes.	☐ yes	☐ no
If not stockpiled, are the drums or other containers adequately stored, protected from weather, and free of damage/leakage? If not, check yes.	☐ yes	☐ no
Is the amount of onsite sediment reaching an unmanageable quantity? (Is disposal necessary?) If so, check yes.	☐ yes	☐ no
Are onsite equipment and materials sufficient to perform sediment sampling? If not, check no.	☐ yes	☐ no

SEDIMENT COLLECTION:	
<10 cubic yards: *Minimum of* ***2 samples, one randomly from each half of the soil mass***	
10-20 cubic yards: *Minimum of* ***3 samples, one randomly from each third of the soil mass***	
20-100 cubic yards: *Minimum of* ***4 samples, one randomly from each quarter of the soil mass***	
100-500 cubic yards: ***Minimum of 1 sample per 25 c.y. of each 25 c.y. section of the soil mass***	
Over 500 cubic yards: *Collect a minimum of* ***1 sample per 25 c.y. portion of the soil mass***	*Contact Dept. of Environmental Health for Guidance*

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM G
Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

SEDIMENT SAMPLE COLLECTION	
Observation sheet completed	
Personal and equipment decon completed	
Number of aliquots taken from composite _____	
Sample IDs: 1. _____ Analysis requested:_____ 2. _____ Analysis requested:_____ 3. _____ Analysis requested:_____ 4. _____ Analysis requested:_____ 5. _____ Analysis requested:_____ 6. _____ Analysis requested:_____	
Photos taken:	
Chain of Custody form attached	
Record information in logbook for record keeping	
Comments:	

Exhibit 5.1: *Title 22 Characterization Requirements*

Sediment Matrix (Disposal)
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Parameter	Method	Units	Reporting Limit	Maximum Holding Time	Preservation	Container Size/Type(1)
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 418.1	mg/kg	10	28 days	$4^{o}C$	8 oz glass jar
Volatile Organic Compounds	EPA 8260B	mg/kg	SW – 846 (5) requirements	14 days	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Metals(2):	EPA 6020/7471	mg/kg	SW – 846 (5) requirements	180 days 28 days for mercury	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Waste Extraction Test (WET) Metals(3):	STLC Extraction	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA
Toxicity Characteristic Leaching Procedure (TCLP) Metals(4):	TCLP 1311	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA

(1) Each sample will be collected in two 8 oz glass jars
(2) California Code of Regulation (CCR), Title 22 Metals (Sb, As, Ba, Be, Cd, Cr (total), Co, Cu, Hg, Pb, Mo, Ni, Se, Ag, Tl, V, and Zn). Initial waste characterization results may lead to a shorter list of metals for subsequent sediment disposal.
(3) Any sample for total metals that are below the Total Threshold Limit Concentration [TTLC] but exceed the ten times Soluble Threshold Limit Concentration (STLC) will be further analyzed using the WET procedure. WET extracts will be analyzed only for metals which exceed the ten times STLC criteria. Sediments associated with total metal results that exceed TTLC values are automatically considered hazardous and therefore do not need to undergo the WET procedure.
(4) If any of the WET-soluble concentrations are equal to or greater than the TCLP regulatory thresholds, analyze the waste by TCLP. “Test Methods for Evaluating Solid Waste, Physical /Chemical Methods”. SW-846, Update III.(SW-846)

TAB 6

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MONITORING FORMS

Form H: Empirical Observations Field Data Log Sheet for Storm Events
Form I: Field Data Log Sheet
Form J1: User-Entered Program Parameters (Influent/Control)
Form J2: User-Entered Program Parameters (Effluent)
Form K: Station Phone Log

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Extended Detention Basins

GENERAL INFORMATION:

Date:	Time in:
Team leader:	Stormwater Consultant:
Other personnel:	Location of facility:

METEOROLOGICAL CHARACTERISTICS:

Present rainfall: ☐ None ☐ Mist ☐ Drizzle ☐ Sprinkle ☐ Light, Steady ☐ Moderate ☐ Heavy

Time present rain event started: _____

Wind speed: ☐ 0-5 mph (light) ☐ 5-10 mph (moderate) ☐ 10-15 mph (brisk) ☐ >15 mph (strong)

Cloud cover: % Temperature _____

Distribution of Rainfall: ☐ Uniform ☐ Localized cells ☐ Scattered showers

Meteorological characteristics comments:

HYDROLOGIC AND HYDRAULIC CHARACTERISTICS:

Flow conditions (*check all that apply*):

☐ Runoff entering facility
☐ Facility discharging through regular outlet
☐ Facility discharging via emergency overflow Time occurred: _____
☐ Flow bypassing facility Time occurred: _____

Standing water conditions (*record measurements as appropriate and check all that apply*):

☐ Water standing over entire basin. Depth: _____
☐ Other water standing pool(s): Describe Location: _____
Depth: _____

If during a Storm Event:
Record maximum depth of pooled water: Depth: _____
Comments: _____
_____

INLET CONDITIONS:

Describe any erosion or resuspension of settled solids being caused by the flow in the influent channel and/or the basin: _____
_____

Describe any obstructions or restrictions interfering with inflow/influent: _____
_____

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Extended Detention Basins

INFLUENT WATER QUALITY APPEARANCE:
(Check all that apply and describe under comments)

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide
☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

SOLIDS DEPOSITION AND RESUSPENSION:

For the following locations, record the type (trash or debris, oil and grease, other organics), location(s), area(s) covered, and depth(s), as applicable:

In inflow/influent channel: _____

_____

Over entire basin: _____

_____

In one spot: _____

_____

In multiple spots: _____

_____

In outflow/effluent channel: _____

_____

Solids resuspension evident (*check all that apply*):
☐ In inflow/influent channel ☐ Near inlet ☐ Near outlet ☐ In outflow/effluent channel
☐ Other (describe):

Solids deposition and resuspension comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Extended Detention Basins

EROSION:

For the following locations, record erosion locations, area(s) covered, and depth(s), as applicable:

In inflow/influent channel: _____

_____

Near inlet: _____

_____

Basin bed: _____

_____

Basin side slopes: _____

_____

Near outlet: _____

_____

In outflow/effluent channel: _____

Comments: _____

_____

VEGETATION CONDITION:

Basin bed vegetation cover:
☐ Complete ☐ Few small bare spots ☐ Few large bare spots ☐ Many small bare spots
☐ Many large bare spots ☐ Large areas bare ☐ All or nearly bare

Basin side slopes vegetation cover:
☐ Complete ☐ Few small bare spots ☐ Few large bare spots ☐ Many small bare spots
☐ Many large bare spots ☐ Large areas bare ☐ All or nearly bare

Basin bed vegetation type:
☐ All grasses ☐ Mostly grasses, some wetland plants ☐ Mostly wetland plants, some grasses
☐ All wetland plants
Extent of woody shrubs or trees:
_____

Basin side slopes vegetation type:
☐ All grasses ☐ Mostly grasses, some wetland plants ☐ Mostly wetland plants, some grasses
☐ All wetland plants
Extent of woody shrubs or trees:
_____

Vegetation condition comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Extended Detention Basins

OUTLET CONDITIONS:

Describe any obstructions or restrictions interfering with outflow/effluent:

EFFLUENT WATER QUALITY APPEARANCE:
Check all that apply and describe under comments

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide
☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

VECTORS:

Presence of vectors: ☐ Yes ☐ No
If yes, what type: ☐ Mosquitoes ☐ Blackfly ☐ Cockroaches ☐ Rats
☐ Other_____

Comments:

STRUCTURAL CONDITION OF FACILITY:

Record the presence of the following (*check all that apply and give location in comments*):
☐ Inlet structure damage ☐ Outlet structure damage ☐ Vandalism
Comments:

MONITORING EQUIPMENT CONDITIONS:

Equipment functional: ☐ Yes ☐ No ☐ N/A
Comments:

FACILITY NAME: _____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program

Empirical Observations Field Data Log Sheet for Storm Events

for Extended Detention Basins

CHANGES DURING STORM SINCE LAST OBSERVATION:

Date:_____ Time: _____

Comments:

Date:_____ Time: _____

Comments:

Date:_____ Time: _____

Comments:

ADDITIONAL COMMENTS:

_____

_____

_____

_____

_____

_____

_____

_____

(Team Leader's Signature)

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM I
Caltrans BMP Retrofit Pilot Program
Extended Detention Basin Field Data Log Sheet

GENERAL INFORMATION		Julian Day (*5AA):
Date:	Time in (PST,*5):	Team Leader's Initials:
Location:	Crew:	
Influent ***or*** *Effluent* ***(circle one)***	**Storm Event Visit** or **Maintenance Visit** (circle one)	

SYSTEM STATUS FLAGS (*****6AD; 1=high, 0=low)
Arr: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____
Dep: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

PROGRAM SIGNATURE (*****B)
Arrive: _____
Depart: _____

DATA LOGGER INFORMATION (*****6)

All Site Visits:		*Samp. Batt Volt*	*22:*	*Manual Rain Gauge:*	
Basin Staff Gauge:		Cell Batt Volt	82:	Total Rain (in.)	25:
Flow Sensor Stage:		Flow Meter Batt Volt	28:	Total Storm Vol.	72:
Stage (ft)	02:	<u>Storm Site Visits:</u>		*Strm Vol Smpld*	*75:*
Velocity (ft/s)	03:	Volume (kcf)	05:	Max Stage Day	51:
Flow (cfs)	04:	Storm Sum (kcf)	06:	Max Stage Time	52:
Station ID	21:	Percent Capture	08:	Max Stage (ft)	53:
		Volume2Sample	14:	*Date Last Sample*	*105:*
		Sample Count	17:	*Time Last Sample*	*106:*

AUTOSAMPLER INFORMATION

Storm only

Bottle # in: _____

Number of Samples Total: _____
Number of Samples Remaining: _____

Bottle # out: _____
Bottle Volume: _____
Volume2Sampl: _____

GRAB SAMPLE COLLECTION

	Time:
TRPH (VOAs)	_____
Bacteria	_____
Oil and Grease	_____
Other: _____	_____

CALIBRATIONS and CHECKS

Stage: ☐
Sample Volume: ☐
Rain Gauge: ☐
Other:

SAMPLING EQUIPMENT AND REPAIR NEEDS:

ACTION TAKEN:

Team Leader's Signature_____

FORM J1

User-Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **INFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
02 Flow Meter Stage Offset (feet)					
03 Volume to sample (kcf)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
08 Flow Meter Speed Offset (feet/second)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
36 Cellular phone battery state control parameter					
37 Duration of cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM J2

User Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **EFFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
03 Volume to sample (kcf)					
04 Level Meter Stage Offset (feet)					
05 Level Meter Multiplier (feet/mv)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. Failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
30					
31					
34 Flume Parameter 1					
35 Flume Parameter 2					
36 Cellular phone battery state control parameter					
37 Duration when cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM K

Station Phone Log

Time	Station	Stage	% Capture	PkFlow (time)	PkFlow (feet)	Sample Count	Volume 2Sample	Storm Sum	Volume	Flow (Q)

TAB 7

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

LABORATORY ANALYSIS FORMS

Form M: Chain-of-Custody Form
Exhibit 7.1: Chemical Analyses List

FORM M

Chain-of-Custody Form

Laboratory:	Lab #_____ Date Received:_____	**From:**
Project: **P.O.#:**	**Project #:** **Required Completion Date:**	

Sample ID #	**Site ID #**	**Lab ID #**	**Matrix/ Analysis**	**Containers**	**Pres.**	**Sample Date/Time**		**Condition Upon Receipt**

Data Reports **WILL** include the following: Sample/Site ID, Analytical Method, Reporting Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Relinquished by:	Date/Time	Transporter	Received by: Date/Time
Relinquished by:	Date/Time	Transporter	Received by: Date/Time
Relinquished by:	Date/Time	Transporter	Received by: Date/Time

Exhibit 7.1: ***Chemical Analyses List for Stormwater***
Stormwater Matrix
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Analyte	Priority Rank	Reporting Limit	Units	Analytical Technique	Method Number	Holding Time	Minimum Sample Volume	Preferred Volume and Container Type[1]	Preservation
Conventionals									
pH	1	0.1	Unit	Electrode	EPA 150.1	Immediately[2]	100 mL	1-100 mL glass/plastic	4°C
Specific Conductance	1	1.0	µmhos/cm	Electrometric	EPA 120.1	Immediately[2]	500 mL	1-500 mL glass/plastic	4°C
Hardness	5	2	mg/L	Titrimetric/ Colorimetric	EPA 130.2	6 months	100 mL	1-200 mL glass/plastic	HNO_3 to pH<2, 4°C
Total Suspended Solids	1	1	mg/L	Dried Filter Weight	EPA 160.2	7 days[3]	1 L	1-500 mL glass/plastic	4°C
Nutrients									
Nitrate-Nitrogen	2	0.01	mg/L	Colorimetric Ion Chromatography	EPA 353.3 EPA 300.0	28 days 48 hours	200 mL 200 mL	1-500 mL plastic 1-500 mL plastic	4°C and H_2SO_4 to pH<2 4°C
Total Kjeldahl Nitrogen	3	0.1	mg/L	Titrimetric/ Colorimetric	EPA 351.3	28 days	500 mL	1-1L plastic	4°C and H_2SO_4 to pH<2
Total Phosphorus	4	0.002	mg/L	Colorimetric	EPA 365.3	28 days	100 mL	1-250 mL plastic	4°C and H_2SO_4 to pH<2
Total/Dissolved Metals[4],[5]									
Copper	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Lead	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Zinc	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Organics[6]									
Total Petroleum Hydrocarbons – Diesel Oil	Grab	250/200	µg/L	GC	EPA 8015M	14 days	1 L	2-1L amber glass	4°C
Total Petroleum Hydrocarbons - Gasoline	Grab	50	µg/L	GC	EPA 8015M	14 days	2-40 mL	3-40 mL VOA vials	4°C, HCl to pH<2
Bacteria[6]									
Fecal Coliform	Grab	2	MPN/100 mL	Multiple-tube	SM 9221E	6 hours[7]	50 mL	1-100 mL plastic	4°C

1. Analytes with the same preservative can be combined into a single container if the same laboratory is performing the analyses.
2. pH and Specific Conductance will be measured by the laboratory immediately upon receipt of the samples.
3. 7 days based upon limit for measuring TSS/no regulatory limit.
4. Total and dissolved metals samples are collected in separate containers. Only the total metals container will receive nitric acid.
5. Dissolved metals will be filtered in the laboratory prior to acidification.
6. Total Petroleum Hydrocarbon and Fecal Coliform grab samples will be collected for two storms per year.
7. Attempts will be made to maintain the 6-hour holding time for bacteria samples to the extent possible. When not possible, a maximum holding time of 24 hours will be followed in accordance with "Standard Methods for the Examination of Water and Wastewater", 18th Edition.

TAB 8

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

VECTOR CONTROL AND MONITORING FORMS

Form O1: Inspection Checklist for Vertebrate Vectors Monitoring
Form O2: Vertebrate Vectorp Cpmtrol-Related Maintenance Activity

VECTOR MONITORING FORMS

Vector monitoring forms will be provided by the applicable Vector Control Agency subcontracted to perform monitoring.

TAB 9

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

TECHNICAL SUPPORT INFORMATION

Exhibit 9.1: Runoff Coefficients
Exhibit 9.2: Volume-to-Sample Tables
Exhibit 9.3: Encroachment Permits

Exhibit 9.1
Runoff Coefficient Matrix Table for Extended Detention Basins
Caltrans District 11

Site No.	Site Name	Drainage Area (acres)	Runoff Coefficient C
111101	I-605/SR-56	5.3	.84
111102	I-15/SR-78	13.32	.64
111105	I-5/Manchester Av.	4.8	.88

"Volume to Sample" in Kilo-Cubic Feet for *SR-56 / I-5 Extended Detention Basin*

Number of Sample Aliquots	Acreage	Runoff Coefficient
72	5.3	0.84

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0224	2.6	0.5836
0.2	0.0449	2.7	0.6060
0.3	0.0673	2.8	0.6285
0.4	0.0898	2.9	0.6509
0.5	0.1122	3.0	0.6734
0.6	0.1347	3.1	0.6958
0.7	0.1571	3.2	0.7183
0.8	0.1796	3.3	0.7407
0.9	0.2020	3.4	0.7631
1.0	0.2245	3.5	0.7856
1.1	0.2469	3.6	0.8080
1.2	0.2693	3.7	0.8305
1.3	0.2918	3.8	0.8529
1.4	0.3142	3.9	0.8754
1.5	0.3367	4.0	0.8978
1.6	0.3591	4.1	0.9203
1.7	0.3816	4.2	0.9427
1.8	0.4040	4.3	0.9652
1.9	0.4265	4.4	0.9876
2.0	0.4489	4.5	1.0100
2.1	0.4714	4.6	1.0325
2.2	0.4938	4.7	1.0549
2.3	0.5162	4.8	1.0774
2.4	0.5387	4.9	1.0998
2.5	0.5611	5.0	1.1223

"Volume to Sample" in Kilo-Cubic Feet for *SR-78 / I-15 Extended Detention Basin*

Number of Sample Aliquots	Acreage	Runoff Coefficient
72	13.32	0.64

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0430	2.6	1.1175
0.2	0.0860	2.7	1.1604
0.3	0.1289	2.8	1.2034
0.4	0.1719	2.9	1.2464
0.5	0.2149	3.0	1.2894
0.6	0.2579	3.1	1.3324
0.7	0.3009	3.2	1.3753
0.8	0.3438	3.3	1.4183
0.9	0.3868	3.4	1.4613
1.0	0.4298	3.5	1.5043
1.1	0.4728	3.6	1.5473
1.2	0.5158	3.7	1.5902
1.3	0.5587	3.8	1.6332
1.4	0.6017	3.9	1.6762
1.5	0.6447	4.0	1.7192
1.6	0.6877	4.1	1.7621
1.7	0.7306	4.2	1.8051
1.8	0.7736	4.3	1.8481
1.9	0.8166	4.4	1.8911
2.0	0.8596	4.5	1.9341
2.1	0.9026	4.6	1.9770
2.2	0.9455	4.7	2.0200
2.3	0.9885	4.8	2.0630
2.4	1.0315	4.9	2.1060
2.5	1.0745	5.0	2.1490

"Volume to Sample" in Kilo-Cubic Feet for
I-5 / Manchester Ave. Extended Detention Basin

Number of Sample Aliquots	Acreage	Runoff Coefficient
78	4.8	0.088

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0020	2.6	0.0511
0.2	0.0039	2.7	0.0531
0.3	0.0059	2.8	0.0550
0.4	0.0079	2.9	0.0570
0.5	0.0098	3.0	0.0590
0.6	0.0118	3.1	0.0609
0.7	0.0138	3.2	0.0629
0.8	0.0157	3.3	0.0649
0.9	0.0177	3.4	0.0668
1.0	0.0197	3.5	0.0688
1.1	0.0216	3.6	0.0708
1.2	0.0236	3.7	0.0727
1.3	0.0256	3.8	0.0747
1.4	0.0275	3.9	0.0767
1.5	0.0295	4.0	0.0786
1.6	0.0315	4.1	0.0806
1.7	0.0334	4.2	0.0826
1.8	0.0354	4.3	0.0845
1.9	0.0373	4.4	0.0865
2.0	0.0393	4.5	0.0885
2.1	0.0413	4.6	0.0904
2.2	0.0432	4.7	0.0924
2.3	0.0452	4.8	0.0944
2.4	0.0472	4.9	0.0963
2.5	0.0491	5.0	0.0983

CALTRANS
BMP RETROFIT PILOT PROGRAM

BMP OPERATION, MAINTENANCE, AND MONITORING PLAN

VOLUME II

BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK FOR INFILTRATION BASINS

DISTRICT 11, SAN DIEGO

September 1999

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APPENDIX I-B: INFILTRATION BASINS

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APPENDIX IV: VECTOR CONTROL PLAN

APPENDIX V: MAINTENANCE INDICATOR DOCUMENT

1.0 INTRODUCTION

This Field Guidance Notebook (*FGN*) gives inspectors, maintenance, and monitoring personnel the appropriate field evaluation and documentation for the District 11 Infiltration Basin (IB) belonging to the Caltrans BMP Retrofit Pilot Program. Field observations and conditions must be clearly and concisely documented on the field forms provided.

Refer to Appendix I-B of this guidance document for supporting information on IB technology and characteristics.

1.1 Data to Be Collected

The following data will be collected to assess the performance and maintenance aspects of an IB:

- Continuous basin level data, recorded as a function of time, from rainfall events during the study period.
- Rainfall data, recorded as a function of time, from rainfall events during the study period.
- Observations of water quality, weather, antecedent conditions, spills, etc.
- Documentation records of inspections and maintenance activities performed.
- Vector monitoring data.
- Records of vector control measures taken.
- Vegetation management records.

Consultants will be responsible for data management. Overall management of the data will be consistent with established Caltrans procedures for stormwater monitoring projects.

1.2 Field Activities to Be Performed

Field activities that will be performed at the IB facilities include:

- Empirical Observation of Infiltration Basin Operation.
- Monitoring Equipment Installations.
- Monitoring Equipment Maintenance.
- Facility Inspections.
- Facility Maintenance.
- Vector and Nuisance Animal Control Inspections.
- Vegetation Control.
- Stormwater Monitoring.

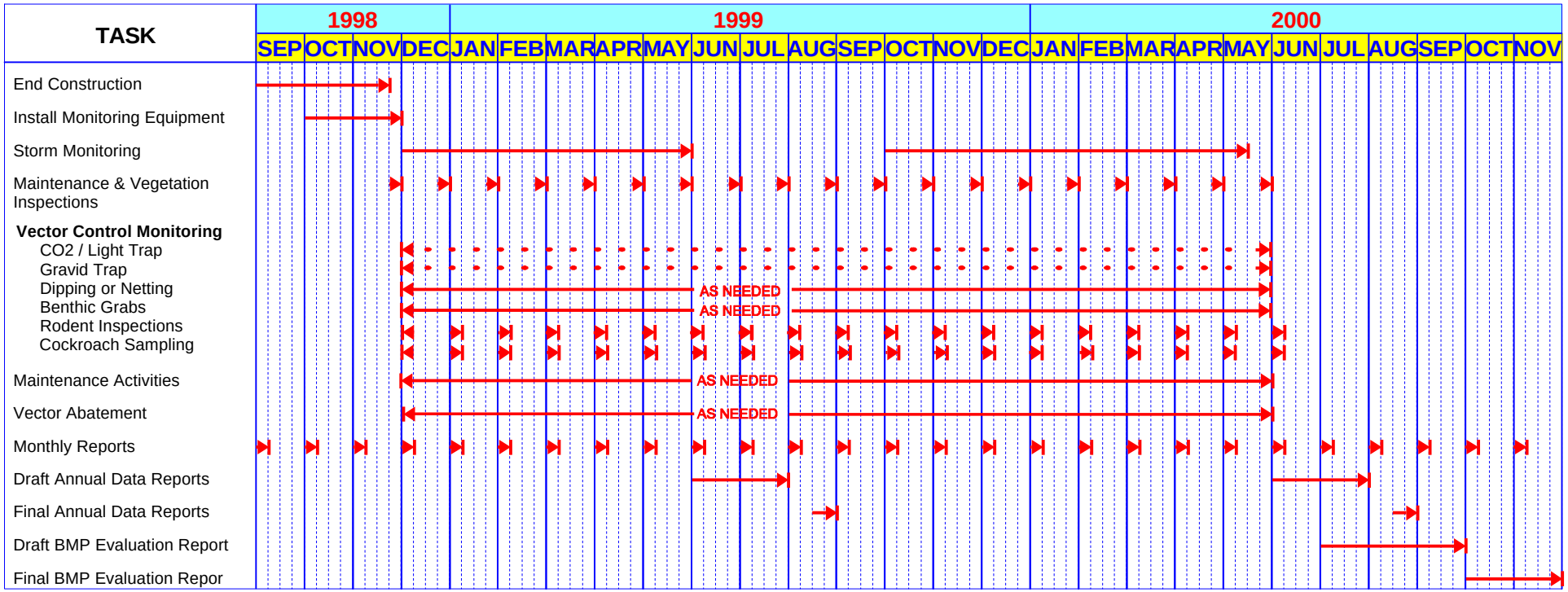
- Soil and Sediment Sampling.

Also, vector control and/or management may occur at the IB facility, but may be contingent on facility housekeeping and other environmental influence. Please see Appendix IV of Volume II for further details.

1.3 Master Schedule

The schedule on the following page shows the time-line for each phase of the IB OMM program.

Figure 1.3
Projected Schedule
Infiltration Basin OMM



2.0 SITE INFORMATION

Access requirements for the site are summarized in Table 2.1, in the Encroachment Permit found in Tab 9, and in the Site Location Map in Tab 1. ***Encroachment Permits must be on hand*** for each site visit, and ***notification requirements found in these permits must be followed***.

Check in with appropriate Caltrans personnel before conducting field work.

Table 2.1
Caltrans District 11 Infiltration Basin Site Summary

Site No.	Site Name	Site Location	Access and Parking
111103	I-5/La Costa Ave.	West of the southbound I-5 exit ramp to La Costa Ave. in the City of Leucadia.	Enter off the southbound ramp to La Costa Ave. at P.M. 44.1. Use Caltrans CCL key. Park within gate on access road to the IB.

2.1 Infiltration Basins

Refer to the accompanying appendix for a general description of the Infiltration Basin. The sections below provide site-specific information for the IB site in District 11.

Refer to Tab 9 for a summary of the hydraulic characteristics for this site. The following figure illustrates an overview of the Infiltration Basin.

Figure 2.1 Overview of an Infiltration Basin

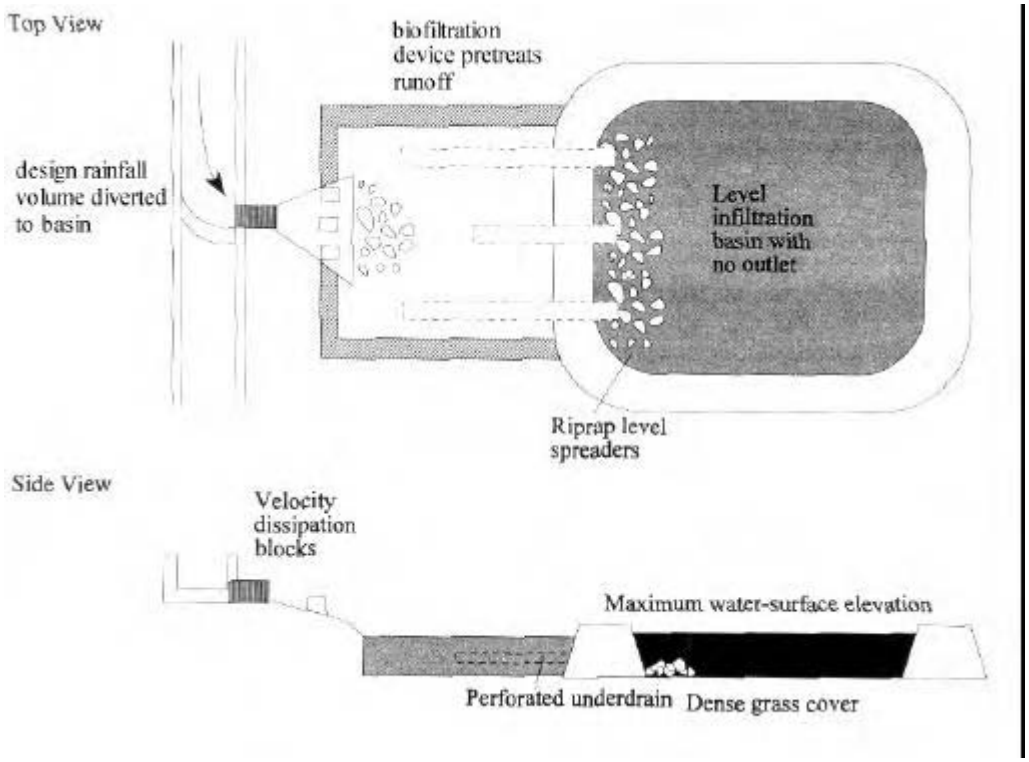


Figure 2.1 Schematic of Infiltration Basin Design

2.1.1 Site 111103: I-5/La Costa Avenue

An infiltration basin has been constructed between the west side of I-5 just north of the I-5 southbound off-ramp to La Costa Avenue, see in Tab 1. An overview of the I-5 and La Costa Avenue infiltration basin is illustrated in Tab 1.

Inflow to the basin will be through a 600 mm RCP (Tab 1). Since runoff infiltrates through the pond, inflow and effluent will not be quantified. Instead, ground water and sediment deposition will be monitored. To determine infiltration rates, the depth of water in the basin will be monitored using a bubbler level meter. Basin water depth data will be continuously logged with a data logger/controller. A staff gauge will be installed in the basin for calibrating the depth sensor.

Bubbler tubing will be routed through 25 mm conduit from the water level monitoring point to an equipment enclosure located adjacent to the perimeter road. This conduit will be installed after construction of the basin. The equipment enclosures will house the data

logger/controller assemblies, cellular modem equipment, and batteries. A rain gauge will be mounted on a 4 m tall, 50 mm diameter pole located adjacent to the equipment enclosure. This pole will also support a cellular phone antenna and solar panel.

Please refer to Tab 1 for the Site location maps and BMP facility plans.

2.2 Emergency Hospital Routes

See the "**Emergency Procedures Support", Tab 2,** for a map and description showing the route to the nearest hospital and for emergency and site-related telephone contacts.

2.3 Site-Specific Health and Safety Concerns and Precautions

This subsection only identifies health and safety concerns and precautions. Appendix II provides more extensive health and safety concerns and requirements. Note that field crews at an IB will consist of a minimum of two people. Refer to the site Encroachment Permit (Tab 9) for additional health and safety requirements.

2.3.1 Traffic Safety Precautions

Activities at an IB brings up traffic concerns including access and parking at pullouts. During access and routine visits to the facilities, the following precautions will be taken:

- Minimize the time spent on the shoulder of the highway.
- Park on the facility access road.
- Affiliated personnel shall wear a reflective orange safety vest, a hard hat, and appropriate shoes.
- Rotating amber lights shall be mounted and operational on work vehicles.

While it is not anticipated that personnel will work on a highway shoulder for the I-5/La Costa Ave. IB, the following information is provided if such work becomes necessary.

According to Chapter 8 (Protection of Workers) of the *Caltrans Maintenance Manual* (see Appendix D-2 of Volume I), working for more than 10 minutes on the shoulder involves a shoulder closure procedure. This shoulder closure procedure will conform to the safety precautions below and the site-specific instruction provided in the Encroachment Permits (Exhibit 9.1 of Tab 9).

- Prior to beginning any work on or adjacent to a major roadway, the local highway patrol traffic control department shall be notified. See the Emergency Contacts List in Tab 2 for a listing of the local highway patrol phone numbers.
- Whenever possible, plan the timing of the work for non-peak traffic congestion periods if long-term parking on the shoulder is required.

- Use enough cones and barricades to sufficiently divert traffic safely around the work area (adhere to specific shoulder closure requirements detailed in the Encroachment Permits).
- Any open manhole or ditch must be barricaded.
- Remember that visibility is the key to minimizing the dangers of working in traffic.
- Upon completion of the work, the area must be cleaned up of materials and left in a clean and orderly state.

2.3.2 General Safety

In addition to traffic hazards, field crews may face a variety of potential dangers while maintaining the IB facilities, installing equipment, and performing environmental monitoring. Be aware of:

- Slippery conditions.
- Lightning.
- Fast moving water.
- Unstable earth.
- Poor visibility, especially at night.
- Lifting heavy objects.
- Muggers and other criminals.
- Transients
- Power tools and heavy equipment.
- Ledges.
- Sharp edges - broken glass.
- Overhead dangers.
- Dogs and other biological hazards.
- Electrical hazards posed by equipment malfunctions.

Other important field precautions include:

- Stay away from the edges of a fast moving body of water. These edges are usually slippery and unstable during rainy conditions.
- If sampling is required at the edge of a fast moving body of water, use a lifeline and a personal flotation device. Use grabbing devices when possible.
- Never work alone at night and avoid working alone during the day.
- Avoid leaving materials, tools and equipment lying around where someone can trip over them.
- Maximize lighting, especially at night.
- Keep a phone or other means of communication nearby.
- Do not use your back to lift heavy objects. Get help.
- Never use drugs or alcohol while working.

- Always wear a hard hat and orange safety vest.
- Do not use power tools and heavy equipment unless trained in the proper use and care of the specific power tools.
- Always wear eye protection when working with tools or chemicals
- Wear rain gear.
- Never leave open holes unattended or unbarricaded.
- Do not sample during lightning.
- Clean up the work area before leaving.

3.0 FIELD PREPARATION

Use Table 3.1 on the following page as a guide to find appropriate forms and information required for field visits. This table covers aspects of the field OMM program including mobilization, observation, and monitoring checklists. The key in preparing for field visits, whether for maintenance or monitoring, is by obtaining and going through each item on the table pertaining to the field task at hand. Prior to the operational phase of this program, items contained in this table will be assembled into separate logbooks for facility operations and maintenance, vector control, storm monitoring, and office monitoring.

Table 3.1
List and Locations of Required Stormwater Monitoring Forms and Checklists for Infiltration Basins

Tab No.	Item	Form or Exhibit No.	Use and Frequency
1	Site Location Map	NA	Prior to site visits.
	BMP Facility Plan	NA	Prior to site visits.
2	Emergency Contacts List	NA	Consult for emergency phone numbers.
	Hospital Route Maps	NA	Quick guide to the nearest hospital.
	Project Contacts List	NA	Refer for pertinent support staff.
3	Storm Monitoring Decision Tree	Ex. 3.1	Prior to each monitored storm.
	Mobilization Checklist	Form A	Before each storm and maintenance visit.
	Storm Staffing Plan	Form B	Filled out prior to storm event for crew and equipment assignments.
4	BMP Site Inspection Checklist for Infiltration Basins	Form C	Filled out for each inspection visit.
	Monitoring Equipment Inspection Checklist for Infiltration Basins	Form D	Filled out for each equipment inspection.
5	BMP Site Maintenance Activity Checklist for Infiltration Basins	Form E	Filled out for each maintenance inspection.
	Monitoring Equipment Maintenance Activity Checklist for Infiltration Basins	Form F	Filled out for each maintenance inspection of sampling equipment.
	Stockpile/Sediment Sampling Checklist	Form G	Complete for any stockpile or waste sampling.
	Title 22 Characterization Requirements	Ex. 5.1	Reference for sediment stockpile sampling.
6	Empirical Observations Field Data Log Sheet for Storm Events for Infiltration Basins	Form H1	Each time a visit is made during wet weather. Separate observations will be made of the inflow, outflow, and BMP.
	Sediment and Soil Sampling Field Data Log Sheet (for BMP Performance Evaluation)	Form H2	During annual collection of sediment and soil samples.
	Field Data Log Sheet for Infiltration Basins	Form I	Each storm station visit. Separate logs will be filled out for the inflow and outflow.
	User-Entered Program Parameters	Form J	Each time a program parameter is changed.
	Station Phone Log	Form K	Each time station is contacted.
7	Chain-of-Custody Form	Form M	Whenever samples are collected.
	Chemical Analyses Lists	Ex. 7.1	References for each sampling event and laboratory analysis request submittal.
8	Vector Control and Monitoring Forms	Forms O1 and O2	Fill out for each site visit related to vector monitoring.
9	Encroachment Permits	Ex. 9.1	Explains access and safety requirements. Must always accompany field crews.

4.0 FACILITY OPERATIONS AND MAINTENANCE

4.1 Facility Operation Inspections

Each IB will be inspected on a regular basis according to the following minimum rates:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation).
- On a weekly basis during extended periods of wet weather.

Optimal BMP operation is dependent on field inspections. When inspecting the facility, follow the procedural steps below. ***Document inspections on Forms C and D (Tab 4)***.

1. Prior to arrival, contact appropriate Caltrans District 11 personnel identified in the Encroachment Permit (Exhibit 9.1 in Tab 9).
2. Completely walk around the BMP while looking for obvious problems, damage, or malfunctions.
3. Inspect and assess needs for:

    - General aesthetics (graffiti, vandalism),
    - Vegetation management (grass, shrubs, trees),
    - Erosion and slope stability,
    - BMP performance (fouling, blockage, damage),
    - Equipment repair/maintenance (BMP components, autosampler),
    - Sediment accumulation (within BMP, at influent confluence),
    - Storage of accumulated sediment or other wastes, and
    - Vector control.

4. Complete Form C (see Tab 4) during inspections.
5. Log field activities and their corresponding time accurately.
6. If immediate corrective or preventive maintenance is needed, call the appropriate contacts listed in the Project Contacts List in Tab 2.

4.2 Facility Maintenance

Functional (performance and safety) and aesthetic (public acceptance) maintenance is critical. For these BMP sites, focus on:

- Trash and Debris Removal.
- Sediment Removal and Management.
- Mechanical Equipment Maintenance.

- Structural Repairs.
- General Facility Maintenance.
- Vector Control.
- Vandalism.

The frequency of individual maintenance activities at the IB facilities will be conducted according to the schedule listed in the maintenance indicator document, included as Appendix V of Volume II.

Maintenance activities performed will be documented using Forms E and F in Tab 5. See Section 2 of Appendix I-B for full details on maintenance activities.

4.3 Vegetation Management

Maintenance and control of vegetation is essential to the optimal operation and performance of an IB. The IB will be seeded with native, low-growing grasses.

The condition of the native vegetation will be inspected on a monthly basis at a minimum. These inspections will ensure:

- that the IB vegetation is kept at an average height of 12 in;
- that the vegetation protecting the slopes is kept healthy and continuous; and
- undesirable plant species do not take root.

4.3.1 Maintenance Requirements for Vegetation Control

Mowing, trimming, and pruning are the preferred means for controlling vegetation at an IB. Controlling standing water will also be essential to controlling vegetation. Burning will not be allowed.

When equipment is used to remove vegetation, care will be taken to prevent ruts, holes, and an uneven IB floor. Such depressions can cause standing water that will create problems of vector control.

Maintenance activities will be conducted in a fashion that minimizes soil compaction.

Maintenance activities that will be conducted on landscaped vegetation include:

- Weeding.
- Pruning.
- Replacement of dead or dying plants.

Vegetation removed from an IB will be promptly hauled off and disposed of properly. Cut vegetation will not be stockpiled onsite, especially in the IB.

4.3.2 Checklists for Vegetation Control

During the routine vegetation inspections of an IB, the BMP Site Inspection Checklist and Monitoring Equipment Inspection Checklists (Forms C and D in Tab 4) will be completely filled out and signed by the inspector. These checklists incorporate the necessary vegetation inspection requirements. A BMP Site Maintenance Activity Checklist and Monitoring Equipment Maintenance Checklist (Forms E and F in Tab 5) will be filled out for maintenance activities performed.

4.4 Disposal of Trash and Debris

Trash and debris from an IB is ultimately the responsibility of Caltrans because they are the owner. Consultants responsible for operating, maintaining, and monitoring the BMP will be responsible for removal and disposal of the trash and debris. This disposal will comply with applicable local, county, state, and federal waste control programs. Table 2.1 in the accompanying appendix for IBs shows some possible disposal services for waste material.

4.5 Deposited Sediment Management and Characterization Sampling

This section refers to sediment that needs to be sampled and characterized for disposal purposes. Refer to Section 5.4 for sampling of soil and sediment for BMP performance evaluation. *Handling and appropriate disposal of sediment residues from BMPs is critical*. Stockpiling is only allowed at the facility under the following conditions:

- Sandbag berms are created (8-inch minimum) and are placed around the stockpile area.
- At least 0.5-mil plastic is used to contain any dewatered liquids (overlying sandbags).
- Stockpiles are covered and covers are anchored.

Once sediment stockpile storage has reached disposal quantity, chemical characterization must be conducted to satisfy land disposal requirements (LDRs). Document any evidence of oil and grease, antifreeze, solvents, fuel, hydrogen sulfide, and any other noxious substance (Form G, Tab 5). These observations will assist in determining if hazardous waste disposal analyses are required. Refer to Form G in Tab 5 for additional details on conducting this sampling.

For sediment stockpiles, the minimum number of discrete samples initially required must comply with Form G, Tab 5. Random samples will be selected from locations on a three-dimensional grid. If the presence of materials such as boulders, debris, etc. hinder the

application of this process, the sample will be collected as close as possible to the randomly selected point without altering the essence of the random selection process.

Stockpile sediment samples will be collected in the following manner:

1. Don personal protective equipment.
2. Locate the sample point in the stockpile or drum.
3. Collect the sample using a soil probe or equivalent. Ensure that the sample is collected at the correct depth and location that was randomly selected.
4. Fill one 8-ounce glass jar with a portion of the sample and close the container with the cap, using care not to aerate (volatilize) the sample. This jar will be labeled and analyzed for TPH and VOC.
5. Homogenize the other portion of the sample in a disposable bowl using a disposable spatula or spoon. Fill a second 8-ounce glass jar with this portion of the sample and close the container with the cap. This sample will be labeled and analyzed for metals.
6. Wipe the outside of each sample container with a clean paper towel.
7. Record the sampler's initials, date, and time on the pre-labeled sample bottle.
8. Place the sample containers in individual zip-top plastic bags and seal the bags.
9. Immediately pack the samples into a chilled cooler.
10. Record the required information on the Chain-of-Custody Form.
11. Document the sampling event, recording information in the designated field logbook.
12. Repeat the above steps until the minimum number of samples has been collected.

Unless observations indicate additional testing, sediment samples submitted to the laboratory will be analyzed for the list of analytes in Exhibit 5.1 in Tab 5 using CCR, Title 22 criteria (State of California, 1985).

4.6 Sediment Management

Alluvial deposits at the inlet structures may create zones of ponded water. Upon these occurrences, these deposits will be graded within the IB to maintain the functionality of the BMP. Sediment grading will be accomplished by manually raking the deposits.

4.7 Vector and Nuisance Animal Control

Vector monitoring and management will be performed in accordance with Appendix IV by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

5.0 STORM MONITORING

Careful preparation and planning is critically important. Always double-check that equipment, supplies, and personal protective gear are readied for each field deployment.

Before crews are deployed to the field, be sure that onsite rainfall meets the sampling criteria:

1. A minimum of 48 hours of dry weather preceded the storm (72 hours is preferred).
2. The Deployment Criteria defined in Exhibit 3.1.

Check appropriate sources for onsite weather conditions before deploying field staff. Use the Storm Monitoring Decision Tree (Exhibit 3.1, Tab 3) for a decision tree on when and how to mobilize field personnel and equipment.

5.1 Decontamination Procedures

Prior to basin water level measurements, groundwater well monitoring and soil/sediment sample collections, assemble necessary decontaminanted sample containers other sampling equipment according to the following procedures:

5.1.1 Cleaning Procedures for Sample Bottles

Bottles will be:

1. Rinsed three times with warm tap water.
2. Scrubbed with a clean plastic brush.
3. Soaked in a 2% detergent (e.g., Contrad®) solution for at least 48-hours.
4. Rinsed three times with tap water.
5. Rinsed five times with Milli-Q or equivalent water, rotating the bottle to ensure contact with the entire inside surface.
6. Rinsed three times with hexane while rotating the bottle, and then air-dried.
7. Rinsed six times with Milli-Q water.
8. Soaked in 2N nitric acid for a minimum of 24-hours.
9. Rinsed six times with Milli-Q water.

5.1.2 Cleaning Procedures for Teflon® Hose and Other Sampling Equipment that May be Used at an Infiltration Basin

Teflon® hose and other sampling equipment will be:

1. Teflon® hose will be rinsed three times with a 2% Micro® solution or equivalent. Other sampling equipment will be washed with a 2% Micro® solution and a clean plastic brush.
2. Rinsed three times with warm tap water.
3. Rinsed three times with Milli-Q or equivalent water.
4. Rinsed three times with 2N nitric acid.
5. Soaked at least 24-hours in 2N nitric acid.
6. Rinsed three times with Milli-Q water.

5.2 Basin Water Level Measurements

The depth of water inside the basin is measured using a bubbler meter. Basin water level depth will be continually logged with a data logger/controller. A staff gauge inside the basin will be used to calibrate the bubbler. Basin water level changes will be used to estimate the percolation rate.

Pertinent checklists, log forms, and information necessary to conduct a successful monitoring program and to be contained in the site-specific field logbooks are listed in Table 3.1 in Section 3.0. The pertinent checklists and log forms are located in Forms D, F, H1, I, J and K in Tabs 4 to 6. Table 3.1 also contains corresponding form and table numbers, identifies the location in this document, and explains when each form is to be filled out.

5.3 Groundwater Well Monitoring

Baseline sampling is scheduled to occur immediately after construction of each IB. Each well will be sampled two additional times during each storm season after significant rainfall events (once in December/January and once in February/March). Storm season analytical results will be compared to the baseline analytical results.

The water level and the depth of the well will be measured using a water level indicator. These values will be used to calculate the required purge volume. Each well will be allowed to equilibrate with atmospheric pressure before the water elevation is measured.

Using a Teflon or stainless-steel bailer, a minimum of three submerged case volumes will be removed during purging of the monitoring well. During the purging process, the electrical conductivity, pH, turbidity, and temperature of the water will be measured at the beginning , in between each volume purged, and at the end of purging. These data will be recorded on the field visitation log (Tab 6, Form I in the *FGN*). Once the well is sufficiently purged and the measured parameters are stabilized, the well will be considered ready for sampling.

Well purging will continue until the following parameters have stabilized. Stabilized conditions will be defined as follows:

1.	Electrical conductivity	± 10 percent
2.	pH	± 0.4 units
3.	Temperature	± 2 °C

Measurements will be collected during the purging process. Turbidity will be compared to historic conditions for the well as well as stabilization.

After purging, a groundwater sample will be collected using a decontaminated stainless steel or disposable Teflon bailer with a bottom-emptying device. Care will be taken when lowering and raising the bailer to minimize the turbulence of the water within the well. Sample bottles will be filled completely, then capped, labeled, and placed in a cooler with ice immediately after sample collection. After samples have been collected, the static water level will be measured. Water level probes will be decontaminated between uses in compliance with the appropriate decontamination procedures.

Information pertaining to the groundwater sampling will be recorded in the field logbook and appropriate log sheets.

5.4 Soil and Sediment Sampling for BMP Performance Evaluation

Core soil and surface sediment samples will be collected from within the IB and will be used in part to evaluate the BMP's performance. A baseline set of nine core soil samples will be collected from within the IB following completion of its construction. Annual sampling of core soil and surface sediment will be performed at the same locations following the end of the 1998/1999 and 1999/2000 wet seasons. Samples will be analyzed for constituents listed in Exhibit 7.1b. In addition, surface sediment accumulation rate within the IB and surface sediment grain size distribution will be determined by making measurements at the end of each wet season.

Nine cores will be collected from locations on an equilateral basin grid (superimposed over the basin) to quantify annual sediment accumulation and quality data. If the presence of materials such as boulders, debris, etc. hinders the application of this process or if there is a lack of sediment, the cores will be collected as close as possible to the selected point. Each of the nine cores will be collected using a hand-held, stainless steel soil probe, or equivalent. The cores will be driven 1 m [3.28 ft] below the sediment surface and recovered. Using the log shown in Form H2, soil borings will be logged for depth of penetration and recovery, location, and geotechnical characteristics. Each core will then be subdivided into three sections as follows:

1. Section 1 is from the sediment surface to the surface of the native soils.
2. Section 2 is from 0.3 m [0.98 ft] to 0.5 m [1.64 ft] below the surface of the native soils
3. Section 3 is from 0.6 m [1.97 ft] to 0.8 m [2.62 ft] below the surface of the native soils.

Use the following steps in collecting sediment and soil samples:

1. Don powder-free nitrile gloves.
2. Locate the sample locations within the IB.
3. Using a transit, determine the sediment surface elevation from a referenced benchmark on the IB embankment.
4. Collect the core samples at the nine locations using a soil probe or equivalent. Ensure that the sample is collected to a depth of 1 m [3.28 ft] below the original IB floor elevation and in the correct location. Record the sediment depth at each location. Discard soil below the bottom sample interval (i.e., soil below 1 m [3.28 ft] from the IB floor).
5. Record sample characteristics, and subdivide each core into three sections as described above.
6. Deposit each selection of each core into stainless steel mixing bowls.
7. Homogenize the sample in each bowl.
8. Fill four 8-ounce glass jars and close the containers with the caps. One jar will be labeled and analyzed for Total Petroleum Hydrocarbons (TPH); one jar will be labeled and analyzed for metals; the remaining two jars will be combined in the laboratory and analyzed for grain size.
9. Wipe the outside of each sample container with a clean paper towel.
10. Record initials, date, and time on the pre-labeled sample bottle.
11. Place the sample containers in individual zip-top plastic bags and seal the bags.
12. Immediately pack the samples into a chilled cooler.
13. Record the required information on the Chain-of-Custody Form (Form M in Tab 7).
14. Document the sampling event, recording information in the designated field logbook.

5.5 Empirical Observations

Complete and succinct empirical observations, for both rain/runoff and the BMP, are required during each site visit related to wet season monitoring. These observations will be taken throughout the facility as they apply to the BMP (particularly at the influent locations of the IB at I-5/La Costa Ave. The following empirical observations will be recorded on Form H1 in Tab 6:

- Meteorological characteristics (present and preceding period).
- Hydrologic and hydraulic characteristics (flowing and/or standing water).
- Inlet conditions (problems affecting performance).

- Water quality appearance (visual, olfactory).
- Solids deposition (trash and debris, sediments, organics) and resuspension.
- Erosion.
- Vegetation condition.
- Infiltration surface condition (signs of potential clogging).
- Mosquitoes and other vectors.
- Structural condition of facility.
- Monitoring equipment condition.

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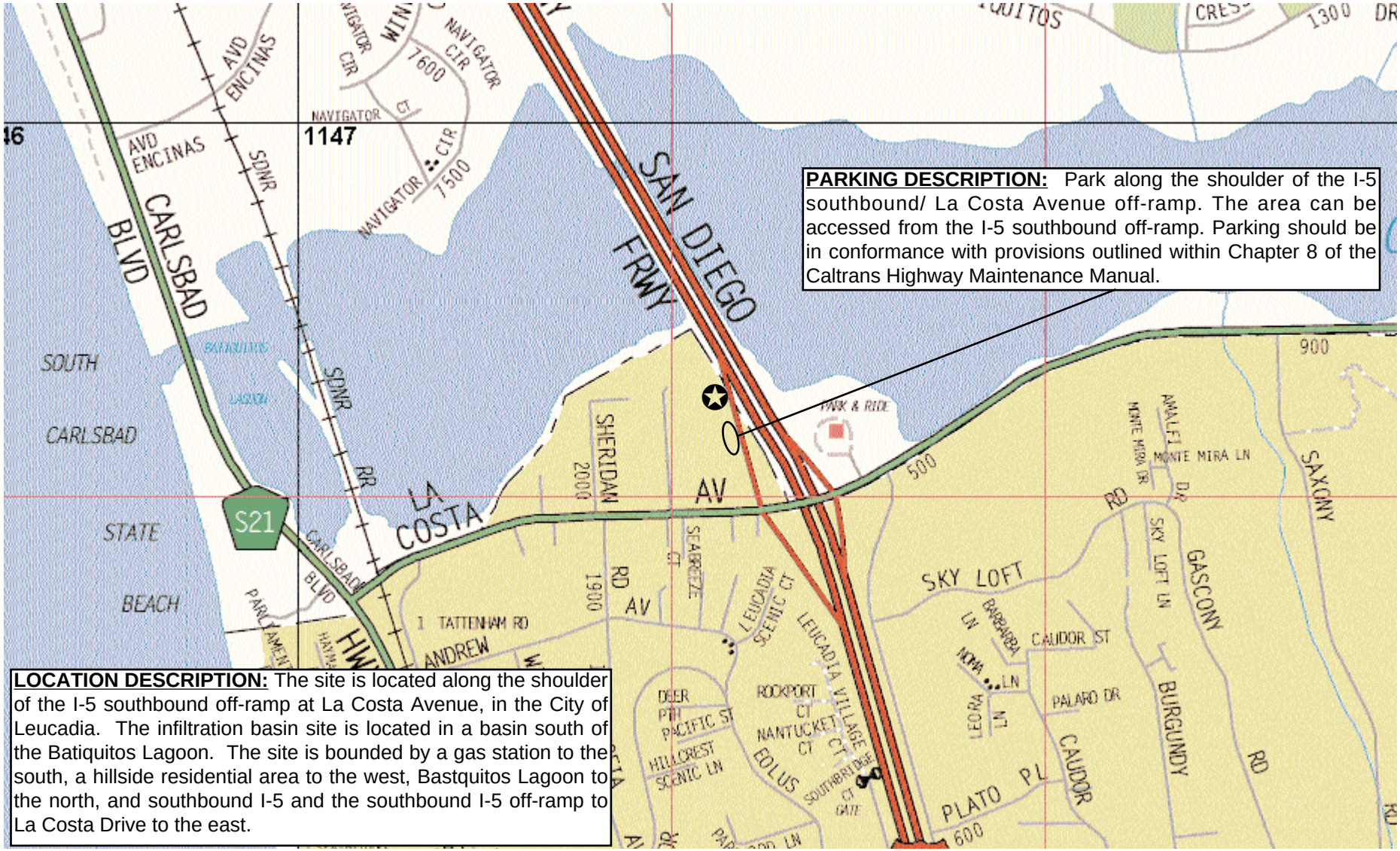
TAB 1

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MAPS

Site Location Maps
BMP Facility Plans



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

CALIFORNIA DEPARTMENT OF TRANSPORTATION

I-5/La Costa Boulevard (west)
BMP Pilot Study Site #111103

District 11

Robert Bein, William Frost & Associates

6/98 JN 34618

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	70.9		

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER MIKE CHESNEY No. 48913 Exp. 9-30-00 CIVIL STATE OF CALIFORNIA

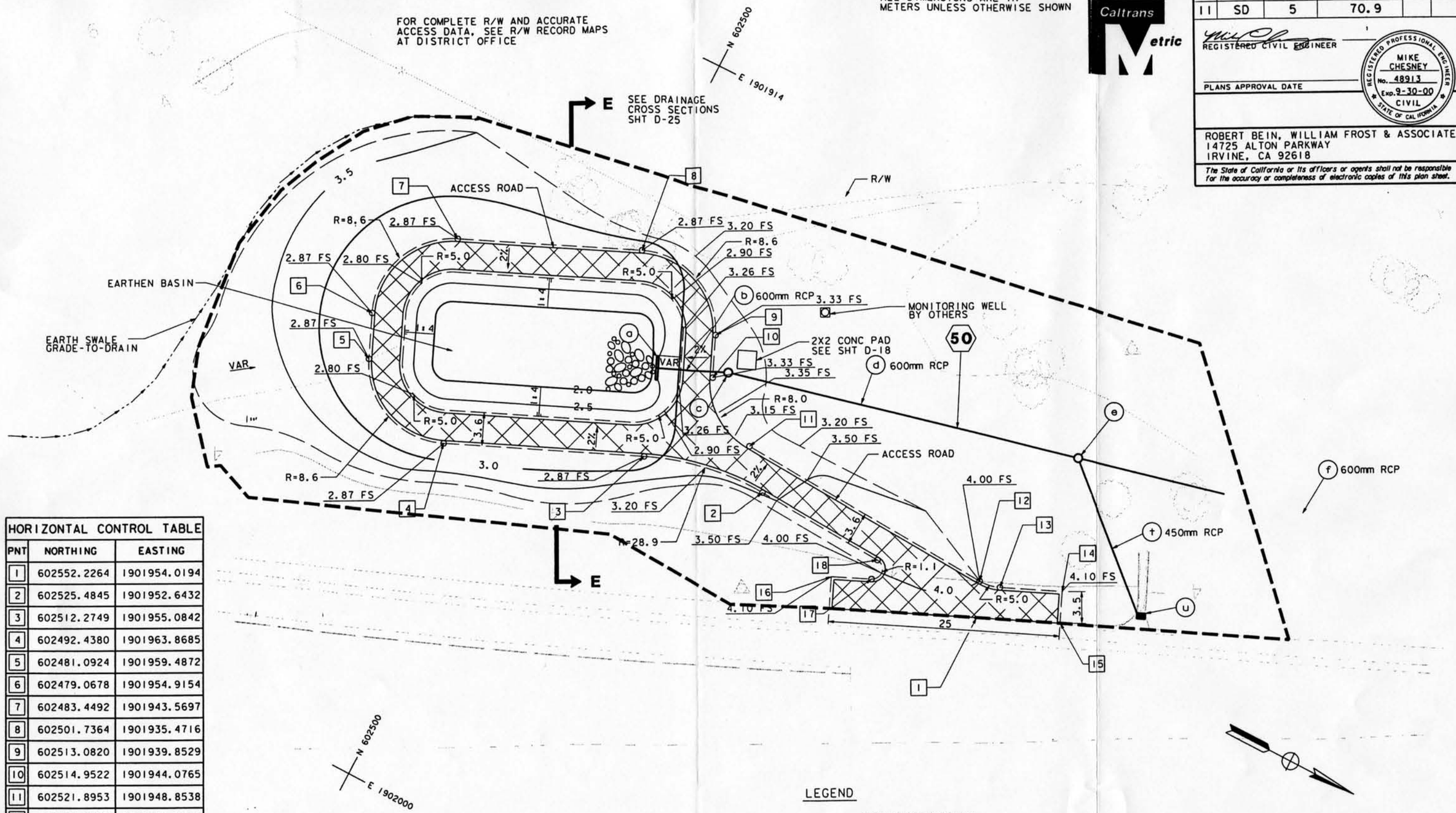
ROBERT BEIN, WILLIAM FROST & ASSOCIATES
14725 ALTON PARKWAY
IRVINE, CA 92618

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Caltrans Metric

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

FOR COMPLETE R/W AND ACCURATE ACCESS DATA, SEE R/W RECORD MAPS AT DISTRICT OFFICE



HORIZONTAL CONTROL TABLE		
PNT	NORTHING	EASTING
1	602552.2264	1901954.0194
2	602525.4845	1901952.6432
3	602512.2749	1901955.0842
4	602492.4380	1901963.8685
5	602481.0924	1901959.4872
6	602479.0678	1901954.9154
7	602483.4492	1901943.5697
8	602501.7364	1901935.4716
9	602513.0820	1901939.8529
10	602514.9522	1901944.0765
11	602521.8953	1901948.8538
12	602550.6843	1901950.3353
13	602552.9657	1901949.9137
14	602559.1682	1901947.1672
15	602560.5540	1901950.3073
16	602536.2903	1901957.2395
17	602540.2472	1901955.4872
18	602539.8583	1901953.3829

LEGEND

- - - BMP PILOT PROGRAM MAINTENANCE LIMITS

ROUTE 5

SITE 111103 OVERVIEW OF THE I-5/LA COSTA AVENUE INFILTRATION BASIN BMP

SCALE: 1:200

DATE	REVISED BY	DATE REVISED
9/98		

CALCULATED/DESIGNED BY NYW
CHECKED BY MC

DESIGN OVERSIGHT
CHRISTIAN HERENCIA

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

TAB 2

CALTRANS BMP STORMWATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

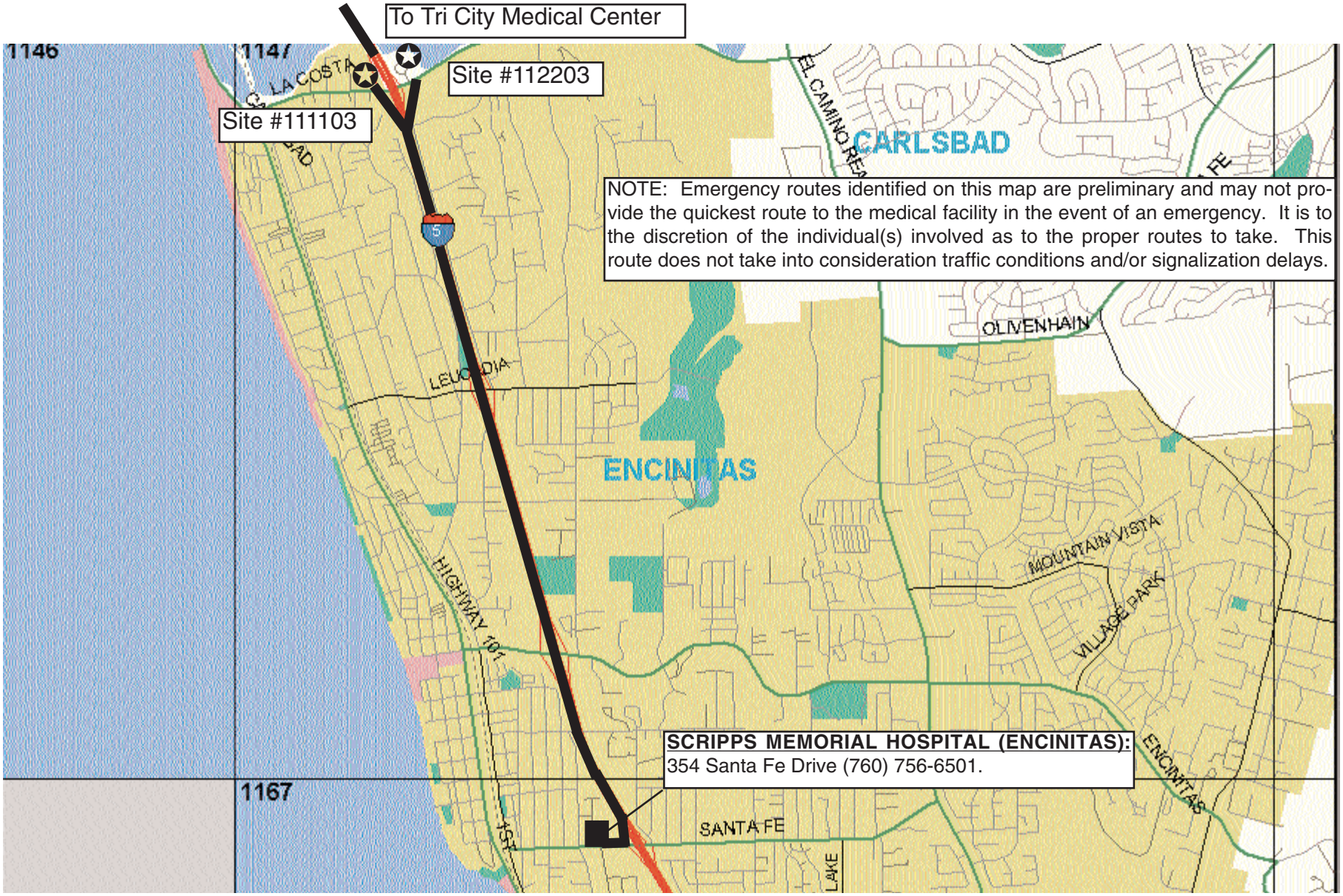
EMERGENCY PROCEDURES SUPPORT

Emergency Contacts List
Hospital Route Map
Project Contacts List

Document information related to the accident or incident that resulted in injury or damage and report it to Jon Toal at KLI at (831) 457-3950

Emergency Contacts for Site 111103: I-5/La Costa Avenue

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Police Department	911	From landline phone
Fire Department Emergency Dispatch	911	From landline phone
Fire Non-Emergency Dispatch	(760) 931-2141	Call for confined spaces
Non-Emergency Police Dispatch	(760) 931-2197	Non-emergency
Local Highway Patrol	(619) 467-3300	Call before beginning work
Scripps Memorial Hospital	(760) 633-7685	Nearest hospital
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Local Highway Patrol	(760) 757-1675	Call prior to beginning work
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Marcelo Peinado)	(619) 688-0226	Notify for any accident or injury



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

Potential Emergency Route

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Hospital Emergency Route

District 11

Robert Bein, William Frost & Associates

7/98

JN 34618

Project Contacts

Name	Organization	Phone	Fax Mobile	Email
Bill Whittenberg	RBF	(949) 855-5771-w	(949) 586-6531-f	whittenberg@rbf.com
Robert Wu	Caltrans Contract Manager	(916) 653-2649-w	(916) 653-6366-f	Robert_wu@dot.ca.gov
Pat Kinney	KLI Task Order Manager	(916) 551-1380-w	(831) 640-9882-m	pkinney@cruzio.com
Ken Kronschnabl	KLI	(831) 457-3950-w (831) 688-5443-h	(831) 426-0405-f (831) 640-9883-m	kkronsch@cruzio.com
Cid Tesoro	Caltrans-District 11	(619) 688-3626	(619) 688-6998	cid_tesoro@dot.ca.gov
Rick Dey	Isco Service Center	(800) 228-4373	(402) 465-3089	RickD@isco.com
John Masiti	American Sigma Inc.	(800) 635-4567	(800) 235-1230	Sigma@americasigma.com
Internet	National Weather Service	--	--	http://nimbo.wrh.noaa.gov/San diego/nws.html
Internet	San Diego Alert System	--	--	http://nimbo.wrh.noaa.gov/San diego/fd_pcb.html
Jim Vanderswan	Channel 8 Weather Service, Lead Meteorologist	(831) 656-1725	--	--
Dean Messer	Mosquitoes and Midges Vector Abatement Specialist	30 753-6400	--	eanm@lwadavis.com
Mike Devine	County of San Diego Vector Control	(619) 694-2888	(619) 694-3559-f	Mdevineh@co.san-diego.ca.us
Fred Beams	Rodents Vector Abatement Specialist	(626) 586-5143	--	Geoscrc1@ix.netcom.com
Phil Carpenter	Toxscan	(831) 724-4522-w		PCarpenter@Toxscan.com
	Associated Laboratories	(714) 771-6900-w	(714) 538-1209-f	

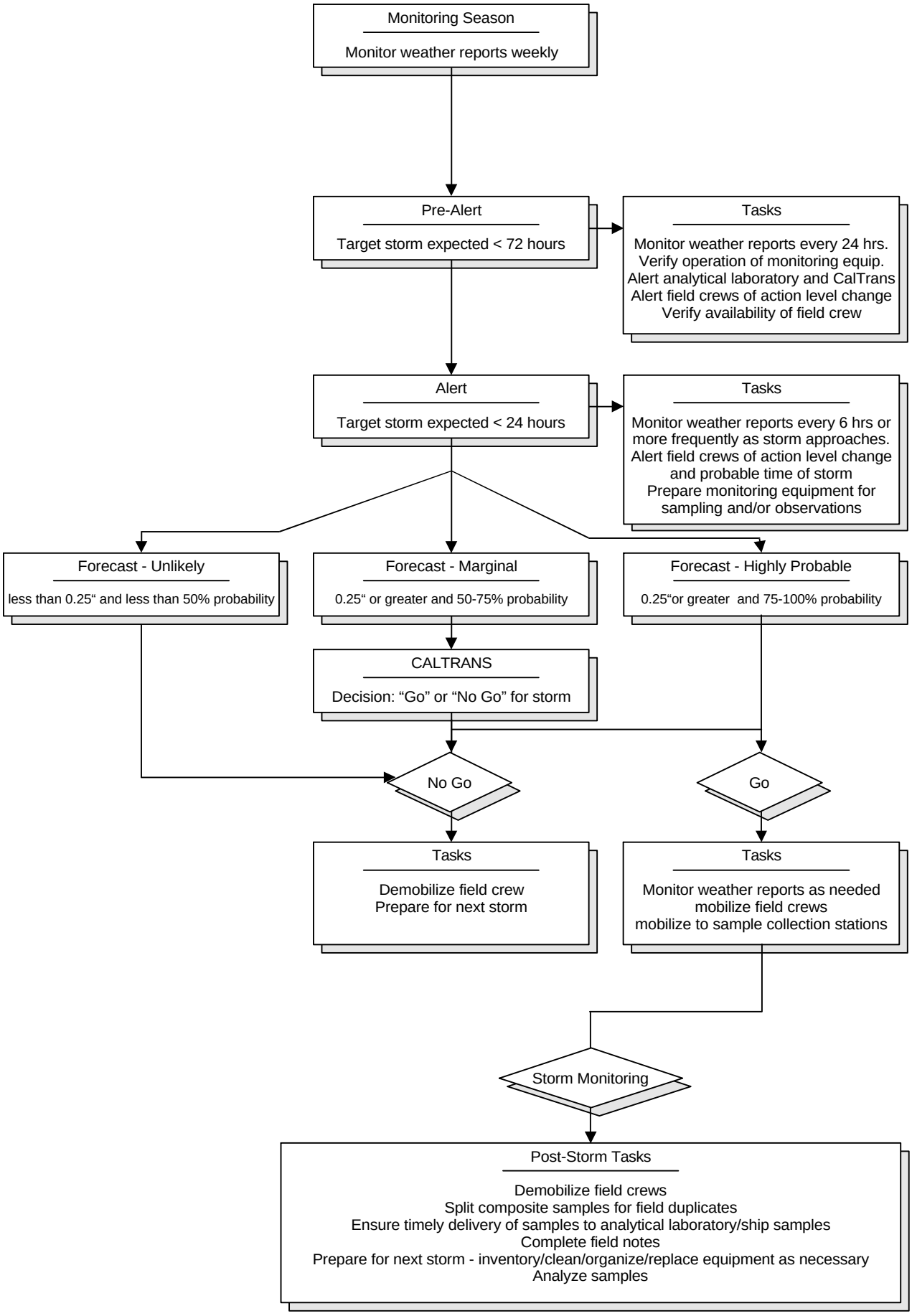
TAB 3

CALTRANS BMP STORMWATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

FIELD PREPARATION/MOBILIZATION FORMS

Exhibit 3.1: Storm Monitoring Decision Tree
Form A: Mobilization Checklist
Form B: Storm Staffing Plan

Exhibit 3.1
Storm Action Levels For BMP Facilities During Wet Season Monitoring



FORM A **Caltrans BMP Retrofit Pilot Program Mobilization Checklist**			
General			
	Recent storm tracking information (e.g., www.weather.com)		Communication channels established
	Staff mobilized		Routes & BMPs identified
	Field Guidance Notebook		Emergency/Caltrans contact list
	Phone card		Vendor's bubbler manual
Storm Kit Equipment List			
	Keypad/display		9-pin cable from keypad to data logger
	Full set of keys (on floatable bobber)		Two flashlights
	Maps for all required areas		Large flat screwdriver
	Small flat screwdriver		Umbrella
	High quality alkaline D-cell batteries		Spare sample labels
	Pencils and indelible markers		Desiccant (packages and jar)
	Diagonal clipper		Electrical tape
	Cable ties (assorted sizes)		Utility knife
	Ziplock baggies (assorted sizes)		Labeling tape
	Powder-free nitrile gloves		Rubber bands
Storm Mobilization List			
	Storm kit		Logbooks
	Paper towels		Tape gun with clear tape
	Ice scoop		Sample control paperwork (COC)
	Extra fine indelible markers		Personal rain gear
	Two-way radio or cellular phone		Trash bags
	Any necessary safety gear		Other:
Sampling Checklist			
	Sample bottles w/ preservatives		Analyte list
	for each required analysis		Analytical Laboratory telephone number
	for each QA/QC analysis		Backup laboratory contact number (after hours)
	for each BMP site		Sample coolers, plus extra
	prelabeled bottles		
	extra bottles in case of breakage		

FORM B

Storm Staffing Plan

Caltrans BMP Retrofit Pilot Program Stormwater Sampling		**Storm Date:**	
Zone #1	Zone #2	Zone #3	Zone #4
Estimated Start:		**End Time:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Startup	**Zone #2 Startup**	**Zone #3 Startup**	**Zone #4 Startup**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio
Relief Start:		**Relief End:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Relief	**Zone #2 Relief**	**Zone #3 Relief**	**Zone #4 Relief**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio

TAB 4

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

INSPECTION FORMS

Form C: BMP Site Inspection Checklist for Infiltration Basins
Form D: Monitoring Equipment Inspection Checklist for Infiltration Basins

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C

CALTRANS BMP RETROFIT PILOT PROGRAM

BMP Site Inspection Checklist for Infiltration Basins

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:			Maintenance Reqd?	
Sediment depth *(if sediment takes up 10% of the basin, is 18 inches deep, clogs the basin, destroys the vegetation, or creates standing water, maintenance is required):* Sediment type and location:			☐ yes	☐ no
Standing water or other drainage problems? *(If more than 72 hours then maintenance is required.)* Comments:	☐ yes	☐ no	☐ yes	☐ no
If yes, what is the depth of water? What is the extent of the water? Where is the location of the water?				
Is contributing drainage area unstable?	☐ yes	☐ no	☐ yes	☐ no
Evidence of erosion?	☐ yes	☐ no		
Seeps?	☐ yes	☐ no	☐ yes ☐ yes	☐ no ☐ no
Comments:				

VEGETATION:			Maintenance Reqd?	
Height of IB vegetation *(if height is more than approximately 12 in. mark yes):*			☐ yes	☐ no
Does vegetation cover at least 90% of the IB's floor and/or slopes?	☐ yes	☐ no	☐ yes	☐ no
Is native vegetation, weeds, leaves, or other organic debris present in the IB?	☐ yes	☐ no	☐ yes	☐ no
If yes, what type:				
Does native vegetation, weeds, leaves, or other organic debris interfere with the operation of the IB by (a) overgrowing the IB vegetation, (b) interfering with the percolation rate, or (c) saturation of the bottom with dead or dying vegetation or (d) in another way? ☐ yes	☐ no		☐ yes	☐ no
If so, explain:				
Evidence of flattening of vegetation? If so, which species?	☐ yes	☐ no	☐ yes	☐ no

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Infiltration Basins

VEGETATION: (continued)	Maintenance Reqd?
Condition of landscaping? ☐ Inhibited Growth ☐ Excessive Growth ☐ Normal Growth	☐ yes ☐ no

STRUCTURAL:	Maintenance Reqd?
Are access roads and ramps in good condition? ☐ yes ☐ no ☐ not applicable	☐ yes ☐ no
Is corrosion present? ☐ yes ☐ no ☐ not applicable If yes, extent and location:	☐ yes ☐ no
Evidence of concrete scour, spalling, or cracking of structural parts? ☐ yes ☐ no	☐ yes ☐ no
Embankment or slopes slumping or cracking or is there rip rap failure? ☐ yes ☐ no	☐ yes ☐ no
Fences: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Locks: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Other general maintenance concerns/comments:	

ANIMAL CONCERNS:	Maintenance Reqd?
Is there evidence of small animals (burrows, droppings, trails, gnawing marks, or stained rub marks)? ☐ yes ☐ no	☐ yes ☐ no
Comments:	

AESTHETIC CONCERNS:			Maintenance Reqd?
Debris (non-trash)?	☐ yes ☐ no	Type, amount and location:	☐ yes ☐ no
Trash?	☐ yes ☐ no	Type, amount and location:	☐ yes ☐ no
Graffiti or vandalism?	☐ yes ☐ no	Description and location:	☐ yes ☐ no
Theft?	☐ yes ☐ no	Description and location:	☐ yes ☐ no
Vehicle accident?	☐ yes ☐ no	Description and location:	☐ yes ☐ no
Other general aesthetic concerns:			

NON-STORMWATER CONCERNS:

Non-storm water discharge to BMP ☐ yes ☐ no

BMP wet from obvious non-stormwater discharge (no rain) ☐ yes ☐ no

If yes, print your name and contact number below and fax this form to Cid Tesoro at 619-688-6998

From: Contact Number:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Infiltration Basins

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

OVERALL:

Other concerns affecting operation:

Condition of facility: ☐ acceptable ☐ not acceptable
Comments:

Dates for maintenance to be completed by:

_____
(Team Leader's Signature)

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM D

Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Inspection Checklist for Infiltration Basins

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

WATER LEVEL MEASUREMENT EQUIPMENT:	Maintenance Required?
Is the monitoring station enclosure locked? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the monitoring station enclosure structurally sound? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the system status of the water level meter (bubbler) online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the water level meter (bubbler) properly programmed and calibrated? ☐ yes ☐ no Comments:	☐ yes ☐ no
Do the desiccant cartridges in water level meter (bubbler) need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is internal modem online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Are the DC marine battery and connect cable present? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are voltage and current of DC battery within normal parameters? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are cables to power source present and properly connected, and is AC power available? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Is the bubbler tubing free of kinks, free of obstructions, and properly connected to pump? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the water level meter (bubbler) properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM D
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Inspection Checklist for Infiltration Basins (continued)

GROUNDWATER WELL EQUIPMENT:			Maintenance Required?	
Is the metal cap locked? Comments:	☐ yes	☐ no	☐ yes	☐ no
Is there any sign of corrosion on the casing? Comments:	☐ yes	☐ no	☐ yes	☐ no
Evidence of spalling or cracking of the concrete seal? Comments:	☐ yes	☐ no	☐ yes	☐ no

INFLUENT/OVERFLOW LOCATION:				Maintenance Required?	
Sediment in inlet?	☐ yes	☐ no	Amount:	☐ yes	☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes	☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes	☐ no
Comments:					

PHOTOGRAPHS (mandatory if maintenance is required):

Date	**Time**	**Description**	**Direction Facing**	**Roll**	**Photograph No.**

Dates for maintenance to be completed by:

_____
(Team Leader's Signature)

For Internal Use Only

TAB 5

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MAINTENANCE FORMS

Form E: BMP Site Maintenance Activity Checklist for Infiltration Basins
Form F: Monitoring Equipment Maintenance Activity Checklist for Infiltration Basins
Form G: Stockpile/Sediment Sampling Checklist
Exhibit 5.1: CCR, Title 22 Characterization Requirements

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Infiltration Basins

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:

☐ ***Sediment removal from the IB or sediment management***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Clean orifices and/or cracks in stormwater conveyance system***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Erosion repair (including vegetative stabilization)***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Embankment/slope repair(s) or stabilization of contributing drainage area***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

VEGETATION:

☐ ***IB vegetation mowing/trimming and removal of cuttings***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replant IB vegetation***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Infiltration Basins (continued)

VEGETATION (cont.):

☐ ***Weed control***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Leaf collection and removal of dead/rotting vegetation***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

STRUCTURAL:

☐ ***Structural repairs (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

ANIMAL CONCERNS:

☐ ***Burrow control***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

AESTHETIC CONCERNS:

☐ ***Debris and trash removal***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Graffiti removal or replacement of vandalized or stolen property***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Infiltration Basins (continued)

☐ ***Painting***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

_____ (Team Leader's Signature)	General Comments:

Only Complete Applicable Sections

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM F

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Maintenance Activity Checklist for Infiltration Basins

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

GROUNDWATER WELL:

☐ ***Repair/replacement of metal cap or lock***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair of casing***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair of concrete seal***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

WATER LEVEL METER:

☐ ***Diagnostic test of bubbler***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of bubbler tubing***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of 12-volt marine battery***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

Only Compete Applicable Sections
For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM F

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Maintenance Activity Checklist for Infiltration Basins (continued)

☐ ***Removal of kinks or obstructions from bubbler tubing***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Replacement of desiccant cartridge in flow meter***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other maintenance/calibration of bubbler equipment (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

_____ (Team Leader's Signature)	General Comments:

Only Compete Applicable Sections
For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM G
Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

GENERAL INFORMATION:

Date:	Time In:	Team Leader's Initials:	Time Out:
Location:			

SEDIMENT CHARACTERISTICS IN BMP PRIOR TO STOCKPILING:

Depth of sediment:					
Color:	☐ black	☐ brown	☐ green	☐ tan	☐ other
Consistency:	☐	☐ sandy	☐ silty	☐ granular	☐ other
Odors:	☐ petroleum ☐ none	☐ solvents ☐ other	☐ organic (rotten eggs)		☐ sewage
Depth of sediment:					

SEDIMENT SAMPLE COLLECTION MOBILIZATION LIST	
Powder Free Nitrile Gloves	
Soil Probe or equivalent for sample collection	
8-ounce glass jar labeled Total Petroleum Hydrocarbons (TPH)	
Plastic bags, seal bags	
Chilled cooler	
Chain-of-Custody form	
Log book for record keeping	

STOCKPILE/DRUMMED SEDIMENT:	Maintenance Required?
Does the stockpile/drum require additional protection from causing environmental impact? (i.e., is underlying plastic, sandbag berming, and an anchored weather-proof covering in place?) If so, check yes.	☐ yes ☐ no
If not stockpiled, are the drums or other containers adequately stored, protected from weather, and free of damage/leakage? If not, check yes.	☐ yes ☐ no
Is the amount of onsite sediment reaching an unmanageable quantity? (Is disposal necessary?) If so, check yes.	☐ yes ☐ no
Are onsite equipment and materials sufficient to perform sediment sampling? If not, check no.	☐ yes ☐ no

SEDIMENT COLLECTION:

<10 cubic yards:
*Minimum of **2 samples, one randomly from each half of the soil mass***

10-20 cubic yards:
*Minimum of **3 samples, one randomly from each third of the soil mass***

20-100 cubic yards:
*Minimum of **4 samples, one randomly from each quarter of the soil mass***

100-500 cubic yards:
Minimum of 1 sample per 25 c.y. of each 25 c.y. section of the soil mass

Over 500 cubic yards:
*Collect a minimum of **1 sample per 25 c.y. portion of the soil mass***

Contact Dept. of Environmental Health for Guidance

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM G
Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

SEDIMENT SAMPLE COLLECTION	
Observation sheet completed	
Personal and equipment decon completed	
Number of aliquots taken from composite _____	
Sample IDs: 1. _____ Analysis requested: _____ 2. _____ Analysis requested: _____ 3. _____ Analysis requested: _____ 4. _____ Analysis requested: _____ 5. _____ Analysis requested: _____ 6. _____ Analysis requested: _____	
Photos taken:	
Chain of Custody form attached	
Record information in logbook for record keeping	
Comments:	

Exhibit 5.1: *CCR Title 22 Characterization Requirements*

Sediment Matrix (Disposal)
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Parameter	Method	Units	Reporting Limit	Maximum Holding Time	Preservation	Container Size/Type(1)
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 418.1	mg/kg	10	28 days	$4^{o}C$	8 oz glass jar
Volatile Organic Compounds	EPA 8260B	mg/kg	SW – 846 (5) requirements	14 days	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Metals(2):	EPA 6020/7471	mg/kg	SW – 846 (5) requirements	180 days 28 days for mercury	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Waste Extraction Test (WET) Metals(3):	STLC Extraction	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA
Toxicity Characteristic Leaching Procedure (TCLP) Metals(4):	TCLP 1311	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA

(1) Each sample will be collected in two 8 oz glass jars

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

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

(4) If any of the WET-soluble concentrations are equal to or greater than the TCLP regulatory thresholds, analyze the waste by TCLP."Test Methods for Evaluating Solid Waste, Physical /Chemical Methods". SW-846, Update III.(SW-846)

TAB 6

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MONITORING FORMS

Form H1: Empirical Observations Field Data Log Sheet for Storm Events for Infiltration Basins
Form H2: Sediment and Soil Sampling Field Data Log Sheet (for BMP Performance Evaluation)
Form I: Field Data Log Sheet
Form J: User-Entered Program Parameters
Form K: Station Phone Log

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H1
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Infiltration Basins

GENERAL INFORMATION:

Date:	Time in:
Team leader:	Stormwater Consultant:
Other personnel:	Location of facility:

METEOROLOGICAL CHARACTERISTICS:

Time since end of previous storm event visit: ☐ > 72 hours ☐ 48-72 hours ☐ 24-48 hours ☐ < 24 hours

Present rainfall: ☐ None ☐ Mist ☐ Drizzle ☐ Sprinkle ☐ Light, Steady ☐ Moderate ☐ Heavy

Time present rain event started: _____

Wind speed: ☐ 0-5 mph (light) ☐ 5-10 mph (moderate) ☐ 10-15 mph (brisk) ☐ >15 mph (strong)

Cloud cover: _____%

Distribution of Rainfall: ☐ Uniform ☐ Localized cells ☐ Scattered showers

Meteorological characteristics comments:

HYDROLOGIC AND HYDRAULIC CHARACTERISTICS:

Flow conditions (*check all that apply*):

☐ Runoff entering facility
☐ Facility discharging through regular overflow
☐ Facility discharging via emergency overflow Time occurred: _____
☐ Flow bypassing facility Time occurred: _____

Standing water conditions (*record measurements as appropriate and check all that apply*):

☐ Water standing over entire basin. Depth: _____
☐ Other water standing pool(s): Describe Location: _____
Depth: _____
☐ Water standing in multiple pools: Describe Locations: _____
Depths: _____

If during a Storm Event:
Record maximum depth of pooled water: Depth: _____
Time to drain from the first entrance of runoff? _____
Time to drain from the maximum depth? _____
Comments: _____
_____

INLET CONDITIONS:

Describe any erosion or resuspension of settled solids being caused by the flow in the influent channel and/or the basin: _____
_____

Describe any obstructions or restrictions interfering with inflow/influent: _____

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H1
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Infiltration Basins

_____

INFLUENT WATER QUALITY APPEARANCE:

(Check all that apply and describe under comments)

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

SOLIDS DEPOSITION AND RESUSPENSION:

For the following locations, record the type (trash or debris, oil and grease, other organics), location(s), area(s) covered, and depth(s), as applicable:

In inflow/influent channel: _____

_____

Over entire basin: _____

_____

In one spot: _____

_____

In multiple spots: _____

_____

In outflow/effluent channel: _____

_____

Solids resuspension evident (*check all that apply*):
☐ In inflow/influent channel ☐ Near inlet ☐ Near overflow ☐ In outflow/effluent channel
☐ Other (describe): _____

EROSION:

For the following locations, record erosion locations, area(s) covered, and depth(s), as applicable:
In inflow/influent channel: _____

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H1
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Infiltration Basins

_____

Near inlet: _____

_____

Basin bed: _____

_____

Basin side slopes: _____

_____

Near overflow: _____

_____

In outflow/effluent channel: _____

Comments: _____

_____

VEGETATION CONDITION:

Basin bed vegetation cover:
☐ Complete ☐ Few small bare spots ☐ Few large bare spots ☐ Many small bare spots
☐ Many large bare spots ☐ Large areas bare ☐ All or nearly bare

Basin side slopes vegetation cover:
☐ Complete ☐ Few small bare spots ☐ Few large bare spots ☐ Many small bare spots
☐ Many large bare spots ☐ Large areas bare ☐ All or nearly bare

Basin bed vegetation type:
☐ All grasses ☐ Mostly grasses, some wetland plants ☐ Mostly wetland plants, some grasses
☐ All wetland plants
Extent of woody shrubs or trees: _____

Basin side slopes vegetation type:
☐ All grasses ☐ Mostly grasses, some wetland plants ☐ Mostly wetland plants, some grasses
☐ All wetland plants
Extent of woody shrubs or trees: _____

Vegetation condition comments:

INFILTRATION CONDITIONS:

Describe any obstructions or restrictions interfering with infiltration:

VECTORS:

Presence of vectors: ☐ Yes ☐ No
If yes, what type: ☐ Mosquitoes ☐ Blackfly ☐ Cockroaches ☐ Rats
☐ Other_____

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H1
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Infiltration Basins

Comments:

STRUCTURAL CONDITION OF FACILITY:

Record the presence of the following (*check all that apply and give location in comments*):

☐ Inlet structure damage ☐ Overflow structure damage ☐ Vandalism

Comments:

MONITORING EQUIPMENT CONDITIONS:

Equipment functional: ☐ Yes ☐ No ☐ N/A

Comments:

CHANGES DURING STORM SINCE LAST OBSERVATION:

Date:_____ Time: _____

Comments:

Date:_____ Time: _____

Comments:

Date:_____ Time: _____

Comments:

ADDITIONAL COMMENTS:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

_____

(Team Leader's Signature)

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H2

Caltrans BMP Retrofit Pilot Program

Sediment and Soil Sampling Field Data Log Sheet (for BMP Performance Evaluation)

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		Sheet __ of __

Location ID	Time	Surface Elevation (ft)	Core Length Required	Core Length Obtained	Coordinates	Physical Description

Sketch/remarks:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM I

Caltrans BMP Retrofit Pilot Program
Infiltration Basin Field Data Log Sheet

GENERAL INFORMATION

Date:	Time In :	Team Leader's Initials:

Location: *I5 and La Costa Ave.*

Station Identifier:

Storm Event Visit, Well Sampling Visit, or Maintenance Visit (circle one)

BASIN LEVEL AND RAINFALL EQUIPMENT DATA LOGGER INFORMATION

SYSTEM STATUS FLAGS (*****6-AD; 1=high, 0=low) **PROGRAM SIGNATURE** (*****B)

Arr: 1 ____ 3 _____ 4 _____ 8 _____ Arr:

Dep: 1 ____ 3 _____ 4 _____ 8 _____ Dep:

Real Time Data (*****6)

Stage (ft) 02:	Station ID 21:	Max. Stage (ft) 52:
Staff Gauge	Battery Voltage 22:	Total Rain (in) 25:
Basin Volume (kcf) 05:	Bubbler Meter Batt. 23:	
15 min. Change in Basin Volume 06:	Cell Equip. Batt 24:	
Previous 1-Hour Infiltration Rate 07:		

MONITORING WELL

Total ell Depth (feet):	Depth to Water (feet): *Before Bailing:* *Before Sampling:*	Depth of Water (feet): *Before Bailing:* *Before Sampling:*

Time	Temp (°C)	pH	Cond (FS/cm)	Turbidity (NTU)	Vol. Removed (Gal)	Observations

Did well Dewater ? Yes No If yes, gallons: Gallons Actually Evacuated:

Was Field Equipment Blank Conducted? Yes No

MONITORING EQUIPMENT AND REPAIR NEEDS:

ACTION TAKEN:

CALIBRATIONS:

Bubbler Meter: Turbidity:

pH:

Conductivity:

_____

Team Leader's Signature

FORM J

User-Entered Program Parameters*

(Fill out when any program parameters is changed)

Facility Type: <u>Infiltration Basin</u>

Station Name:

Date:					
Time:					
01 Station ID					
02 Stage Offset (feet)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
36 Cellular phone battery state control parameter					
37 Duration of cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM K

Station Phone Log

Time	Station	Stage	% Capture	PkFlow (time)	PkFlow (feet)	Sample Count	Volume 2Sample	Storm Sum	Volume	Flow (Q)

TAB 7

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

LABORATORY ANALYSIS FORMS

Form M: Chain-of-Custody Form
Exhibit 7.1: Chemical Analyses Lists

FORM M

Chain-of-Custody Form

Laboratory:	Lab # _____ Date Received	From:
Project: P.O.#:	Project #: Required Completion Date:	

Sample ID #	Site ID #	Lab ID #	Matrix / Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt

Data Reports WILL include the following: Sample/Site ID, Analytical Method, Reporting Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time

Exhibit 7.1: *Chemical Analyses List for Groundwater*
Groundwater Matrix
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Analyte	Priority Rank	Reporting Limit	Units	Analytical Technique	Method Number	Holding Time	Minimum Sample Volume	Preferred Volume and Container Type[1]	Preservation
Conventionals									
pH	1	0.1	Unit	Electrode	EPA 150.1	Immediately[2]	100 mL	1-100 mL glass/plastic	4°C
Specific Conductance	1	1.0	µmhos/cm	Electrometric	EPA 120.1	Immediately[2]	500 mL	1-500 mL glass/plastic	4°C
Hardness	5	2	mg/L	Titrimetric/ Colorimetric	EPA 130.2	6 months	100 mL	1-200 mL glass/plastic	HNO_3 to pH<2, 4°C
Total Suspended Solids	1	1	mg/L	Dried Filter Weight	EPA 160.2	7 days[3]	1 L	1-500 mL glass/plastic	4°C
Nutrients									
Nitrate-Nitrogen	2	0.01	mg/L	Colorimetric Ion Chromatography	EPA 353.3 EPA 300.0	28 days 48 hours	200 mL 200 mL	1-500 mL plastic 1-500 mL plastic	4°C and H_2SO_4 to pH<2 4°C
Total Kjeldahl Nitrogen	3	0.1	mg/L	Titrimetric/ Colorimetric	EPA 351.3	28 days	500 mL	1-1L plastic	4°C and H_2SO_4 to pH<2
Total Phosphorus	4	0.002	mg/L	Colorimetric	EPA 365.3	28 days	100 mL	1-250 mL plastic	4°C and H_2SO_4 to pH<2
Total/Dissolved Metals[4],[5]									
Copper	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Lead	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Zinc	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Organics[6]									
Total Petroleum Hydrocarbons – Diesel/ Oil	Grab	250/200	µg/L	GC	EPA 8015M	14 days	1 L	2-1L amber glass	4°C
Total Petroleum Hydrocarbons - Gasoline	Grab	50	µg/L	GC	EPA 8015M	14 days	2-40 mL	3-40 mL VOA vials	4°C, HCl to pH<2
Bacteria[6]									
Fecal Coliform	Grab	2	MPN/100 mL	Multiple-tube	SM 9221E	6 hours[7]	50 mL	1-100 mL plastic	4°C

1. Analytes with the same preservative can be combined into a single container if the same laboratory is performing the analyses.
2. pH and Specific Conductance will be measured by the laboratory immediately upon receipt of the samples.
3. 7 days based upon limit for measuring TSS/no regulatory limit.
4. Total and dissolved metals samples are collected in separate containers. Only the total metals container will receive nitric acid.
5. Dissolved metals will be filtered in the laboratory prior to acidification.
6. Total Petroleum Hydrocarbon and Fecal Coliform grab samples will be collected for two storms per year.
7. Attempts will be made to maintain the 6-hour holding time for bacteria samples to the extent possible. When not possible, a maximum holding time of 24 hours will be followed in accordance with "Standard Methods for the Examination of Water and Wastewater", 18th Edition.

Exhibit 7.1b: ***Chemical Analyses List for Soil/Sediment Samples***

Soil and Sediment Matrix for BMP Performance Evaluation
Analytical Parameters, Methodologies, Reporting Limits, Holding Times,
Container Volumes and Types, and Preservation

Parameter	Method	Units	Reporting Limit	Maximum Holding Time	Preservation	Container Size/Type[1]
Total Petroleum Hydrocarbons (TPH)	418.1 (IR) / 1664 HEM	mg/kg	10	28 days	4°C	8-oz glass jar
Total Metals: - Copper - Lead - Zinc	6020	mg/kg	 2.5 0.3 2.0	180 days	4°C	8-oz glass jar
Grain Size Distribution: (Method of Tests for Sieve Analysis of Fine and Course Aggregates)	Caltrans Test 202	---	---	---	---	2 8-oz glass jars (500 ± 25 grams)

1. Each sample will be collected in four 8-oz glass jars

TAB 8

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

VECTOR CONTROL AND MONITORING FORMS

VECTOR MONITORING FORMS

Vector monitoring forms will be provided by the applicable Vector Control Agency subcontracted to perform vector monitoring.

TAB 9

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

TECHNICAL SUPPORT INFORMATION

Exhibit 9.1: Encroachment Permits

CALTRANS
BMP RETROFIT PILOT PROGRAM

BMP OPERATION, MAINTENANCE, AND MONITORING PLAN

VOLUME II

BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK FOR SAND FILTERS

DISTRICT 11, SAN DIEGO

September 1999

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APPENDIX III: QUALITY ASSURANCE/QUALITY CONTROL PLAN

APPENDIX IV: VECTOR CONTROL PLAN

APPENDIX V: MAINTENANCE INDICATOR DOCUMENT

1.0 INTRODUCTION

This Field Guidance Notebook (*FGN*) gives inspectors, maintenance, and monitoring personnel appropriate field evaluation and documentation for the Caltrans Retrofit Pilot Program District 11 sand filters (SFs). Field observations and conditions must be clearly and concisely documented on the field forms provided.

Refer to Appendix I-C of this guidance document for supporting information on SF technology and characteristics.

1.1 Data to be Collected

The following data will be collected to assess the performance and maintenance aspects of an SF:

- Water quality and quantity data of runoff into and discharge from the SF from flow-composite and first-flush (as soon as possible after the start of runoff) grab samples for at least eight storm events during two wet seasons.
- Rainfall data recorded as a function of time, from rainfall events during the study period.
- Observations of water quality, weather, antecedent conditions, spills, etc.
- Documentation records of inspections and maintenance activities performed.
- Vector monitoring and abatement data.
- Records of vector control measures taken.

Consultants will be responsible for data management. Overall management of the data will be consistent with established Caltrans procedures for stormwater monitoring projects.

1.2 Field Activities to be Performed

Field activities that will be performed at the SF facilities include:

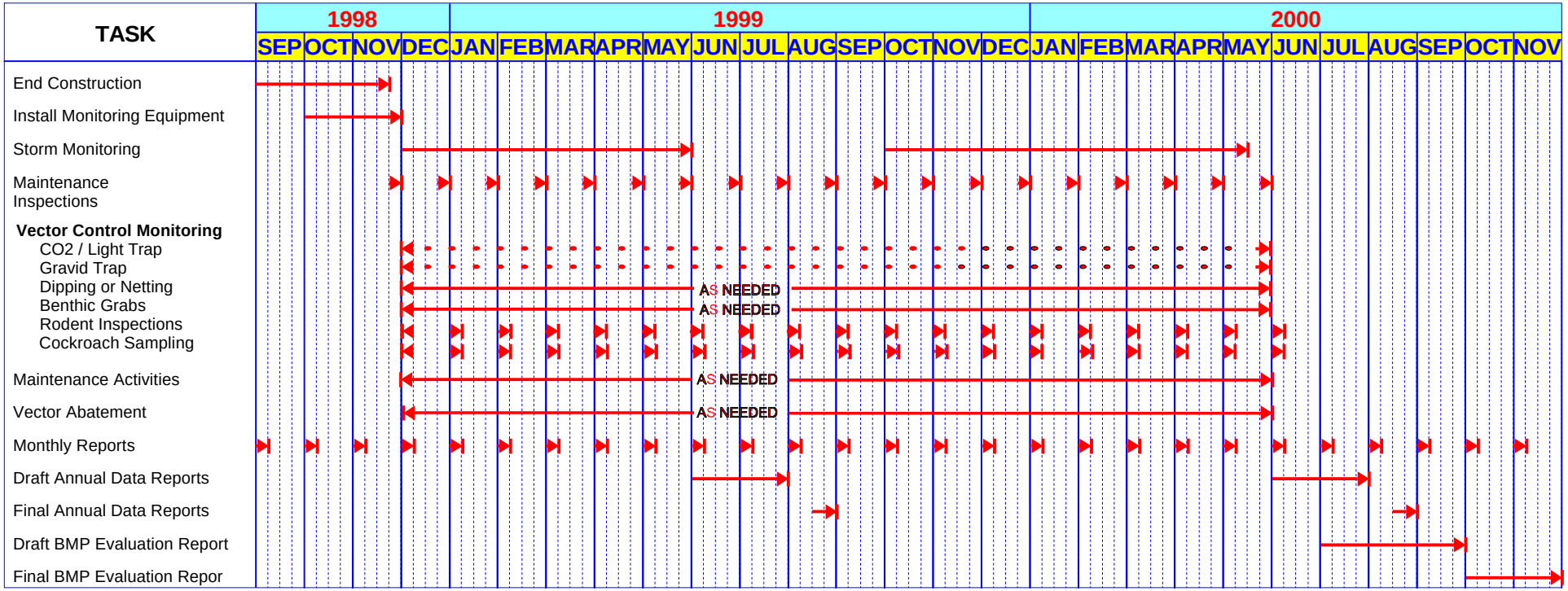
- Empirical Observation of Sand Filter Operation.
- Monitoring Equipment Installations.
- Monitoring Equipment Maintenance.
- Facility Inspections.
- Facility Maintenance.
- Vector and Nuisance Animal Control Inspections.
- Vegetation Control.
- Stormwater Monitoring.

Vector management may also be necessary at SF facilities, but may be contingent on facility housekeeping and other environmental influences. Please see Appendix IV, if vector management is necessary.

1.3 Master Schedule

The schedule on the following page shows the time-line for each phase of the SF OMM program.

Figure 1.3
Projected Schedule
Sand Media Filter OMM



2.0 SITE INFORMATION

Access requirements for each site are summarized in Table 2.1, in the encroachment permit found in Tab 9, and in the Site Location Maps in Tab 1. ***Encroachment permits must be on hand*** for each site visit, and ***notification requirements found in these permits must be followed***.

Check in with appropriate Caltrans personnel before conducting any site fieldwork.

Table 2.1
Caltrans District 11 Sand Filters Site Summary

Site No.	Site Name	Site Location	Access and Parking
112202	Escondido Maintenance Station	1780 West Mission Ave.	Parking within the maintenance facility. Special arrangements must be made for nighttime access.
112203	La Costa Avenue Park and Ride	East of I-5 at La Costa Avenue	Enter facility from la Costa Ave. Park in designated parking stalls.
112204	SR-78/I-5 Park and Ride	Adjacent to southbound I-5, prior to westbound SR-78 connector.	Enter facility from westbound SR-78. Park in designated parking stalls.

2.1 Sand Filters

Refer to the accompanying Appendix for a general description of the SF. The sections below provide site-specific information for each SF site in District 11.

Refer to Tab 9 for a summary of the hydraulic characteristics for these BMPs. Figures 2.1 and 2.2 show a typical schematic of an SF.

Figure 2.1 Overview of a Sand Filter Type I

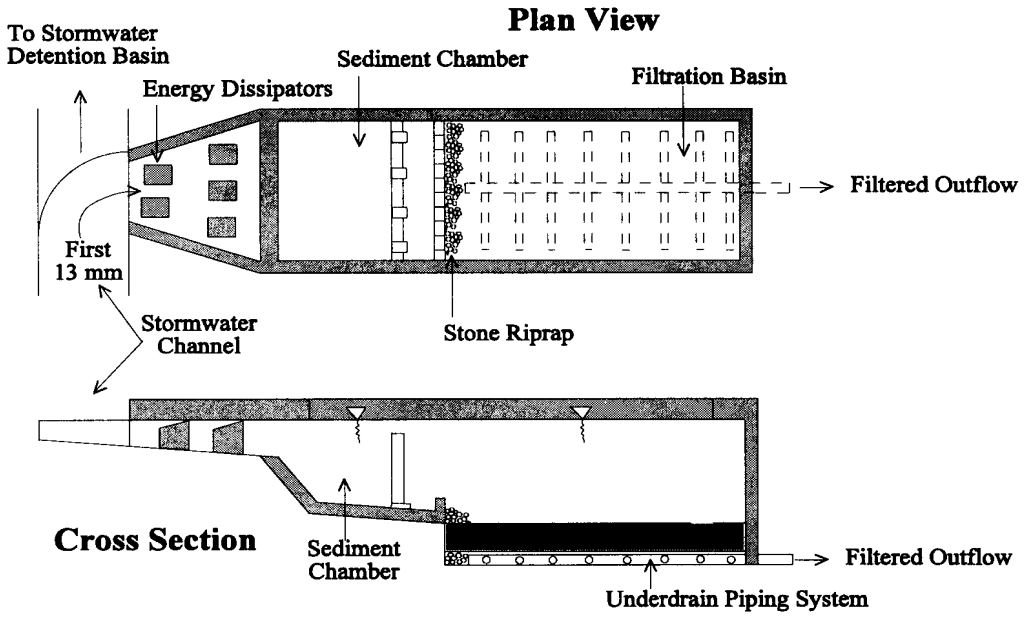
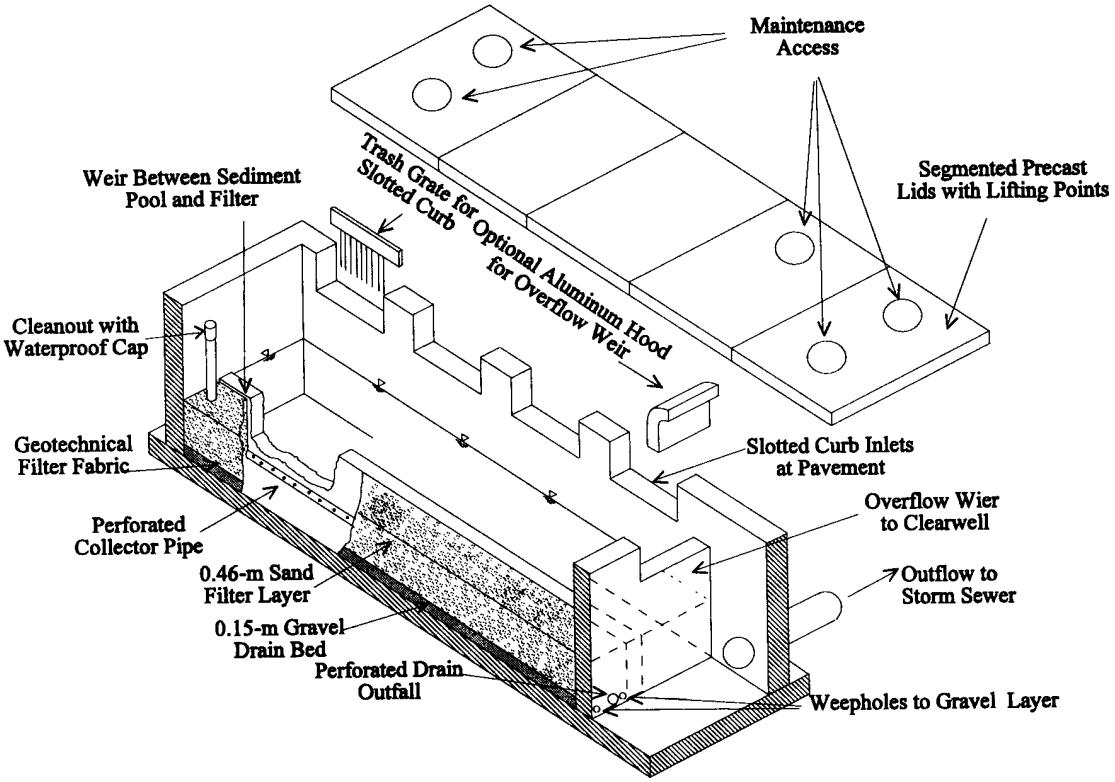


Figure 2.2 Overview of a Sand Filter Type II



2.1.1 Site 11202: Escondido Maintenance Station

At the Escondido Maintenance Station, the site drainage system consists of three grate inlets, one culvert inlet and one curb spillway runoff. The flow pattern for this area consists of mostly curb, swale, and sheet flow. The maintenance station discharges through a municipal storm drain system approximately three miles in length to Escondido Creek. The discharge point into the creek is concrete lined.

A Type II SF has been installed to treat runoff from the Escondido maintenance facility. Inflow to this facility is through a 250 mm AP, and discharge from the facility is through a 380 mm AP. Manholes are installed above each conveyance to access sampling points. The inflow manhole is positioned approximately 7 m upstream of the SF, and the discharge manhole is positioned approximately 6 m down stream of the SF (see Tab 1, Figure 1.2A). A 380 mm low-flow version of a Palmer Bowlus flume in combination with an ultrasonic look-down depth sensor is installed to measure low-flow conditions in the discharge conveyance. The depth of water 190 mm in front of this flume will be measured. This flume will accurately measure flows between 0.02 cfs and 1.2 cfs. Flows in each conveyance with stages greater than about 50 mm will be measured with ultrasonic Doppler area velocity (AV) meters.

Confined space procedures must be followed when accessing the sampling points (refer to Appendix II).

Refer to Tab 1 for Site Location Maps and BMP Facility Plans.

2.1.2 Site 112203: La Costa Avenue Park and Ride

A Type I SF will be installed at the La Costa Avenue Park and Ride to treat sheet flow runoff from the parking lot. Inflow to this facility will be through a 1 m rectangular channel, and discharge from the facility will be through a 380 mm AP. A manhole was installed above the discharge conveyance, to access the sampling point.

A 150 mm Parshall flume in combination with a bubbler level meter is installed to measure low-flow in the inflow conveyance. The flume is positioned approximately 2 m upstream of the sand filter. This flume accurately measures flows ranging from 0.054 cfs to 3.91 cfs. Because the potential for back-watering exists in the inflow conveyance, an ultrasonic Doppler AV meter was also installed.

Refer to Tab 1 for Site Location Maps and BMP Facility Plans.

2.1.3 Site 112204: SR78/I-5 Park and Ride

A Type I SF will be installed at the Route 78 and I-5 Park and Ride to treat sheet flow runoff from the parking lot. Inflow to this facility will be through a 200 mm AP. Discharge from this facility will be through a 380 mm AP. Manholes were installed above each conveyance to access sampling points. The inflow manhole is located approximately 9 m upstream of the sand filter, and the discharge manhole is located approximately 6 m downstream of the sand filter.

Because of a wide range of anticipated flows and because the potential exists for back-watering, dual flow metering methods will be used to measure both the inflow to and discharge from the media filter. A 200 mm, low-flow version of a Palmer Bowlus flume in combination with an ultrasonic look-down depth sensor was installed to measure low-flow conditions in the inflow conveyance. This flume will accurately measure flows ranging from 0.01 to 0.25 cfs. The depth of water 100 mm in front of the flume will be measured.

Refer to Tab 1 for Site Location Maps and BMP Facility Plans.

2.2 Emergency Hospital Routes

See the "**Emergency Procedures" Tab 2** for maps and descriptions showing the direct routes to the nearest hospitals and for emergency and site-related telephone contacts.

2.3 Site-Specific Health and Safety Concerns and Precautions

This subsection only identifies health and safety concerns and precautions. Appendix II provides more extensive health and safety concerns and requirements. Note that at an SF, field crews will consist of a minimum of 2 people. Refer to the site Encroachment Permit (Tab 9) for additional health and safety requirements.

2.3.1 Traffic Safety Precautions

Because the SF sites are situated in a Caltrans Park & Ride and at maintenance station locations, there are no real onsite traffic concerns. However, when at these facilities, the following apply:

- Be aware of the Emergency Contacts List in Tab 2 in case of accidents.
- Affiliated personnel must wear an orange safety vest, a hard hat, and appropriate shoes.
- Do not block any access lanes or parking stalls that interfere with daily operations.
- If needed, use cones and barricades to provide a margin of safety from onsite activities. (adhere to specific encroachment permits requirements).
- Barricade any open manholes or ditches.

- Leave nothing behind. Upon completion of the work, the area must be cleaned up and orderly. Remove any extraneous litter.

2.3.2 General Safety

In addition to traffic hazards, field crews may face a variety of potential dangers while maintaining the SF facility, installing equipment, and performing environmental monitoring. Be aware of:

- Fast moving water.
- Unstable earth.
- Ledges.
- Slippery conditions.
- Lightening.
- Poor visibility, especially at night.
- Lifting heavy objects.
- Transients.
- Muggers and other criminals.
- Power tools and heavy equipment.
- Sharp edges – broken glass.
- Overhead dangers.
- Dogs and other biological hazards.
- Electrical hazards posed by equipment malfunctions.

Other important field precautions include:

- Always wear a hard hat.
- Wear rain gear, when appropriate.
- Always work in pairs: use the buddy system.
- Always have means of communication nearby.
- Maximize lighting, especially at night.
- Do not sample during lightning.
- Use extended sample grabbing devices when possible.
- Do not leave tools or equipment lying around.
- Do not lift heavy objects without help.
- Never use drugs or alcohol while working. Report those who do.
- Do not use power tools or heavy equipment if unless trained in their proper use.
- Avoid leaving materials, tools, and equipment lying around where it creates a tripping hazard.
- Always wear eye protection when hammering or working with power tools.
- Never leave open holes unattended or unbarricaded.
- Clean up the work area before leaving.

3.0 FIELD PREPARATION

Use Table 3.1 to find appropriate forms and information required for aspects of the field OMM program, including mobilization, observation, and monitoring checklists. The key in preparing for field visits, whether for maintenance or monitoring, is to review and assemble each item in Table 3.1 pertaining to the field task at hand. Prior to the operational phase of this program, items contained in this table will be assembled into separate logbooks: facility operations and maintenance, vector control, storm monitoring, and office monitoring.

Table 3.1
List and Locations of Required Stormwater Monitoring Forms and Checklists For Sand Filters

Tab No.	Item	Form or Exhibit No.	Use and Frequency
1	Site Maps	NA	Prior to site visits.
	BMP Layout Diagrams	NA	Prior to site visits.
	Sampling Point Diagrams	NA	Prior to site visits and sampling.
2	Emergency Contacts List	NA	Consult for emergency phone numbers.
	Hospital Route Maps	NA	Quick guide to the nearest hospital.
	Project Contacts List	NA	Refer for pertinent support staff.
3	Storm Monitoring Decision Tree	Ex. 3.1	Prior to each monitored storm.
	Mobilization Checklist	Form A	Before each storm and maintenance visit.
	Storm Staffing Plan	Form B	Filled out prior to storm event for crew and equipment assignments.
4	BMP Site Inspection Checklist	Form C	Filled out for each inspection visit.
	Monitoring Equipment Inspection Checklist	Form D	Filled out for each equipment inspection.
5	BMP Site Maintenance Activity Checklist	Form E	Filled out for each maintenance inspection.
	Monitoring Equipment Maintenance Activity Checklist	Form F	Filled out for each maintenance inspection of sampling equipment.
	Stockpile/Sediment Sampling Checklist	Form G	Complete for any stockpile or waste sampling.
	Title 22 Characterization Requirements	Ex. 5.1	Reference for sediment stockpile sampling.
6	Empirical Observations Field Data Log Sheet for Storm Events	Form H	Each time a visit is made during wet weather. Separate observations will be made of the inflow, outflow, and basin.
	Field Data Log Sheet	Form I	Each storm station visit. Separate logs will be filled out for the inflow and outflow.
	User-Entered Program Parameter Log Sheet for Influent/Control Sampling Point	Form J1	Each time a program parameter is changed.
	User-Entered Program Parameter Log Sheet for Effluent Sampling Point	Form J2	Each time a program parameter is changed.
	Station Phone Log	Form K	Each time station is contacted.
7	Chain-of-Custody Form	Form M	Whenever samples are collected.
	Chemical Analyses List	Ex. 7.1	Reference for each sampling event and lab analysis request submittal.
8	Vector Control Checklists	Forms O1 and O2	Fill out for each site visit when vectors are observed.
9	Runoff Coefficient Listing	Ex. 9.1	Reference: for calculations.
	"Volume-to-Sample" Tables	Ex. 9.2	Consult to set sampling frequency.
	Encroachment Permits	Ex. 9.3	Explains access and safety requirements. Must always accompany field crews.

NA=Not Applicable

4.0 FACILITY OPERATIONS AND MAINTENANCE

4.1 Facility Operation Inspections

At a minimum, each SF will be inspected:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.5 inch of precipitation).
- On a weekly basis during extended periods of wet weather.

Optimal BMP operation is dependent on field inspections. When inspecting the facility, follow the procedural steps below. ***Document inspections on Form C (Tab 4)***.

1. Contact appropriate Caltrans personnel in accordance with Encroachment Permit requirements (see Tab 9, Exhibit 9.3).
2. Completely walk around the site while looking for obvious problems, damage, or malfunctions.
3. Inspect and assess needs for:
   - General aesthetics (graffiti, vandalism).
   - Vegetation management (grass, shrubs, trees).
   - Erosion and slope stability.
   - BMP performance (fouling, blockage, damage).
   - Equipment repair/maintenance (BMP components, autosampler).
   - Sediment accumulation (within BMP, at influent confluence).
   - Storage of accumulated sediment or other wastes.
   - Vector control.
4. Log field activities and their corresponding time accurately.
5. Call the appropriate contacts (Project Contacts List, Tab 2) if immediate corrective or preventative maintenance is needed.

4.2 Facility Maintenance

Functional (performance and safety) and aesthetic (public acceptance) maintenance is critical. For these BMP sites, focus on:

- Trash and Debris Removal.
- Sediment Removal and Management.
- Equipment Maintenance.
- Structural Repairs.
- Vector Control.
- Vandalism.

Frequency of individual maintenance activities at the SF facilities will be conducted in accordance with the maintenance indicator document, included as Appendix V of Volume II.

Maintenance activities performed will be documented using the Forms E and F in Tab 5. See Section 2.0 of Appendix I-C for full details on maintenance activities.

4.3 Vegetation Management

SF installations will not require the maintenance and control of vegetation. However, if a site accommodates vegetation, use the maintenance checklists (Form C, Tab 4 and Form E, Tab 5) whenever vegetation management is applicable. See Sections 2.0 and 4.0 of Appendix I-C for specific details on controlling vegetation.

4.4 Disposal of Trash and Debris

Trash and debris from the SF is ultimately the responsibility of Caltrans. Consultants responsible for operating, maintaining, and monitoring the sand filters will be responsible for their removal and disposal of waste material by independent contractors. Disposal of trash and debris will be contracted out in accordance with local, county, state, and federal waste control programs. Table 2.1 of Appendix I-C shows a few possible disposal services for waste material.

4.5 Sediment Management and Characterization Sampling

Handling and appropriate disposal of sediment residues from BMPs is critical. When sediment removal is required, chemical characterization must be conducted to determine appropriate land disposal requirements (LDRs). Such chemical characterization testing will be conducted from stockpiles in such a fashion as to minimize disturbance and exposure potentials.

If sediment stockpiles are created, their management must, at a minimum, include the following:

- Sandbags berms are created (8-inch minimum) surrounding the stockpile area.
- At least 0.5-mil plastic is used to contain any dewater liquids (overlying sandbags).
- Stockpiles are covered and covers are anchored.

When sampling sediments, document any evidence of oil and grease, antifreeze, solvents, fuel, hydrogen sulfide, and any other noxious substance (Form G, Tab 5). These observations will assist in determining if hazardous waste disposal analyses are required. Refer to Form G in Tab 5 for additional details on conducting this sampling.

Random samples will be selected from locations on a three-dimensional grid. If the presence of materials such as boulders, debris, etc. hinder this process, the sample will be collected as close as possible to the randomly selected point without altering the essence of the random selection process. Sediment samples will be collected in the following manner:

1. Don personal protective equipment.
2. Locate the sample point in the sediment chamber.
3. Collect the sample using a submersible sediment sampler or equivalent. Ensure that the sample is collected near the center of the sediment layer and at the location that was randomly selected. Great care must be taken not to make contact with the metal casing.
4. Fill one 8-ounce glass jar with a portion of the sample and close the container with the cap, using care not to aerate (volatilize) the sample. This jar will be labeled and analyzed for TPH and VOC.
5. Homogenize the other portion of the sample in a disposable bowl using a disposable spatula or spoon. Fill a second 8-ounce glass jar with this portion of the sample and close the container with the cap. This sample will be labeled and analyzed for metals.
6. Wipe the outside of each sample container with a clean paper towel.
7. Record the sampler's initials, date, and time on the pre-labeled sample bottle.
8. Place the sample containers in individual zip-top plastic bags and seal the bags.
9. Immediately pack the samples into a chilled cooler.
10. Record the required information on the Chain-of-Custody Form.
11. Document the sampling event, recording information in the designated field logbook.
12. Repeat the above steps until the minimum number of samples has been collected.

Unless observations indicate additional testing, sediment samples submitted to the laboratory will be analyzed for the list of analytes in Exhibit 5.1 in Tab 5 using CCR Title 22 criteria (State of California, 1985).

4.6 Vector and Nuisance Animal Control

Vector monitoring and management will be performed in accordance with Appendix IV by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

5.0 STORM MONITORING

Careful preparation and planning is critically important. Representative samples *must* be obtained for each storm event. Always double-check that equipment, supplies, and personal protective gear are readied for each field deployment.

Before crews are deployed to the field, be sure that onsite rainfall meets the sampling criteria:

1. A minimum of 48 hours of dry weather preceded the storm (72 hours is preferred).
2. The Deployment Criteria defined in Exhibit 3.1.

Check appropriate sources for onsite weather conditions before deploying field staff. Use Storm Monitoring Decision Tree (Exhibit 3.1, Tab 3) for determining when and how to mobilize field personnel and equipment.

5.1 Storm Characteristics and Sampling Equipment

Section 5.0 of Appendix I-C details the stormwater equipment, equipment maintenance requirements, stormwater monitoring procedures, sediment sampling procedures, and analytical methods, detection limits, and holding times for stormwater sampling. Appendix III details the quality assurance and quality control requirements of this program.

Checklists, log forms, and information necessary to conduct a successful monitoring program at SF facilities are listed in Table 3.1 (Section 3.0), and shall be completed.

Sampling equipment shall be inspected for proper function, staging, and sampling preparation (if wet season) and documented. There are three principal phases of documenting storm water sampling at BMP sites:

- Pre-Storm preparation.
- Storm event sampling (grab and composite sample collection).
- Post-Storm sample analyses.

5.1.1 Pre-Storm Preparation

1. Consult the Storm Monitoring Decision Tree (Exhibit 3.1) for when to mobilize.
2. Review the Mobilization Checklist for appropriate equipment, sampling devices, and sample bottles (Form A, Tab 3).
3. Verify sample bottle quantities, number of analyses for each parameter, in-situ sampling equipment, and other necessary gear/support materials.
4. Assemble decontaminated sample containers for influent and effluent autosamplers.

Cleaning Procedures for Composite Bottles

Bottles will be:

a. Rinsed three times with warm tap water.
b. Scrubbed with a clean plastic brush.
c. Soaked in a 2% detergent (e.g., Contrad®) solution for at least 48-hours.
d. Rinsed three times with tap water.
e. Rinsed five times with Milli-Q or equivalent water, rotating the bottle to ensure contact with the entire inside surface.
f. Rinsed three times with hexane while rotating the bottle, and then air-dried.
g. Rinsed six times with Milli-Q water.
h. Soaked in 2N nitric acid for a minimum of 24-hours.
i. Rinsed six times with Milli-Q water.

Cleaning Procedures for Teflon®Hose and Other Sampling Equipment

Teflon® hose and other sampling equipment will be:

a. Teflon hose will be rinsed three times with a 2% Micro® solution or equivalent. Other sampling equipment will be washed with a 2% Micro® solution and a clean plastic brush.
b. Rinsed three times with warm tap water.
c. Rinsed three times with Milli-Q or equivalent water.
d. Rinsed three times with 2N nitric acid.
e. Soaked at least 24-hours in 2N nitric acid.
f. Rinsed three times with Milli-Q water.

5. Inspect monitoring equipment for proper operation (use Form D, Tab 4). At each sampling location do the following:
   a. Inspect the pump tubing and replace if necessary.
   b. Inspect intake tubing condition and connections.
   c. Inspect desiccant cartridges in sampler and flow meter.
   d. Check electrical connections.
   e. Check battery voltages.
   f. Make sure intakes, flow structures, and sensors are clear of debris (this is only possible if confined space requirements are met).
   g. Make sure the correct user-entered program parameters are entered (use Forms I, J and K in Tab 6)
   h. Set system status flags.

i. Verify automatic sampler set up by confirming that the correct bottle size, hose diameter, hose material, hose length, head height, aliquot volume, number of samples to fill the bottle, and number of pulses to sample has been entered correctly.
j. Make sure the sampler is set to take a sample automatically after receiving a pulse from the data logger.

6. Verify that refrigerated samplers are chilling bottles.
7. From the office set "Volume-to-Sample" numbers (Exhibit 9.2) and initiate equipment to begin sampling automatically when flow is detected. Fill out the phone log (Form K, Tab 6).

5.1.2 Storm Event and Sample Collection

1. Once on site, fill out Empirical Observation Field Data Log and a Field Data Log Sheet (Forms H and I, Tab 6) to document storm characteristics.
2. Locate influent/control autosampler and inspect for proper operation.
3. Locate effluent autosampler and inspect for proper operation.
4. Take grab samples as needed.
5. Change composite bottles and re-initiate equipment as needed.

5.1.3 Post-Storm Sample Analyses

After a storm event has ended, the autosampler stations need to be shut down and left ready for the next storm event in the following manner:

1. Reset the storm monitoring program to prepare for another storm event.
2. Replace the sample bottle(s) in the autosampler and the reset the sampler.
3. Physically inspect the station to determine if any damage was sustained during the storm event. Inspect the flow sensor and intake for debris blockage or clogging. (This is only possible if confined space requirements are met).
4. Check battery voltages; replace batteries that are low.
5. Retrieve data via modem from the remote monitoring computer.

Data Retrieval

Data will be retrieved (dumped) from the data logger after each storm event during the storm season, and, during dry weather, approximately every month.

Chain-of-Custody Forms

When the grab samples have been collected, the paperwork will be filled out to ensure a smooth transfer of samples to the analytical laboratory. Chain-of-Custody forms (Form M, Tab 7) will be filled out in detail describing the type of sample, the quantity of samples, and the time that the samples were collected. These forms will accompany the samples to the laboratory.

5.2 Empirical Observations

Complete and succinct empirical observations are required during site visits (rain/runoff and BMP characteristics). Observations shall be taken throughout the facility as they apply to the BMP (particularly at the influent and effluent locations). Please refer to Volume II, Appendix I-C, Section 5.8 for a complete discussion of empirical observation at SFs. Particularly note the following:

- Meteorological characteristics (present and preceding period).
- Hydrologic and hydraulic characteristics (flowing and/or standing water).
- Inlet conditions (problems affecting performance).
- Water quality appearance (visual, olfactory) to roughly assess changes in water quality.
- Solids deposition (trash and debris, sediments, organics) and resuspension.
- Treatment medium condition.
- Outlet conditions (problems affecting performance).
- Mosquitoes and other vectors.
- Structural condition of facility.
- Monitoring equipment condition.

Refer to Form H in Tab 6 for recording empirical observation information.

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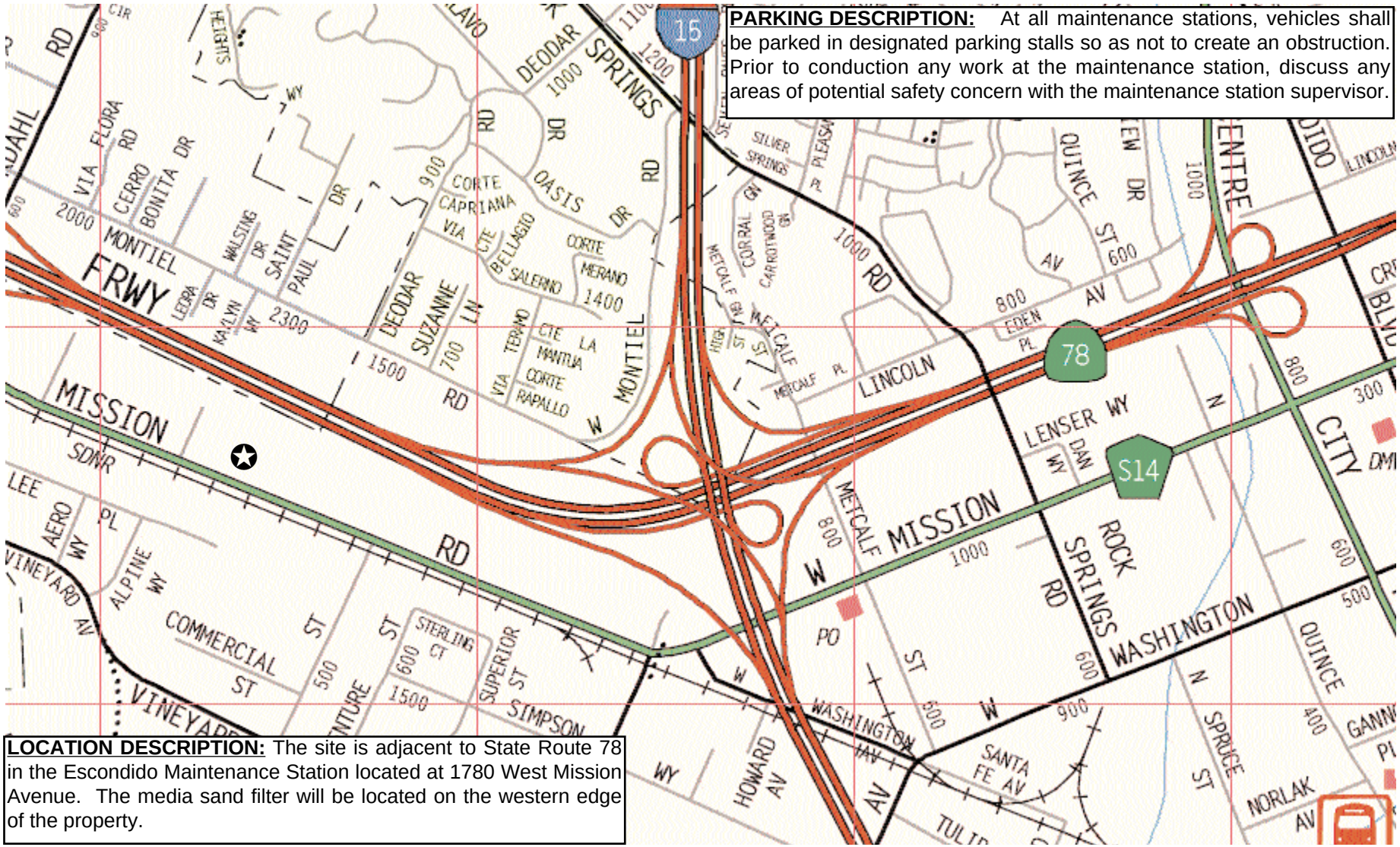
- Exhibit 9.3: Encroachment Permits

TAB 1

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MAPS

Site Location Maps
BMP Facility Plans



PARKING DESCRIPTION: At all maintenance stations, vehicles shall be parked in designated parking stalls so as not to create an obstruction. Prior to conduction any work at the maintenance station, discuss any areas of potential safety concern with the maintenance station supervisor.

LOCATION DESCRIPTION: The site is adjacent to State Route 78 in the Escondido Maintenance Station located at 1780 West Mission Avenue. The media sand filter will be located on the western edge of the property.

SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Escondido Maintenance Station
BMP Pilot Study Site #112202

District 11

Robert Bein, William Frost & Associates

6/98 JN 34618

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	var	var	15	60

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER ERWIN FOGERSON NO. 049060 EXP. 9-30-99 CIVIL STATE OF CALIFORNIA

Metric

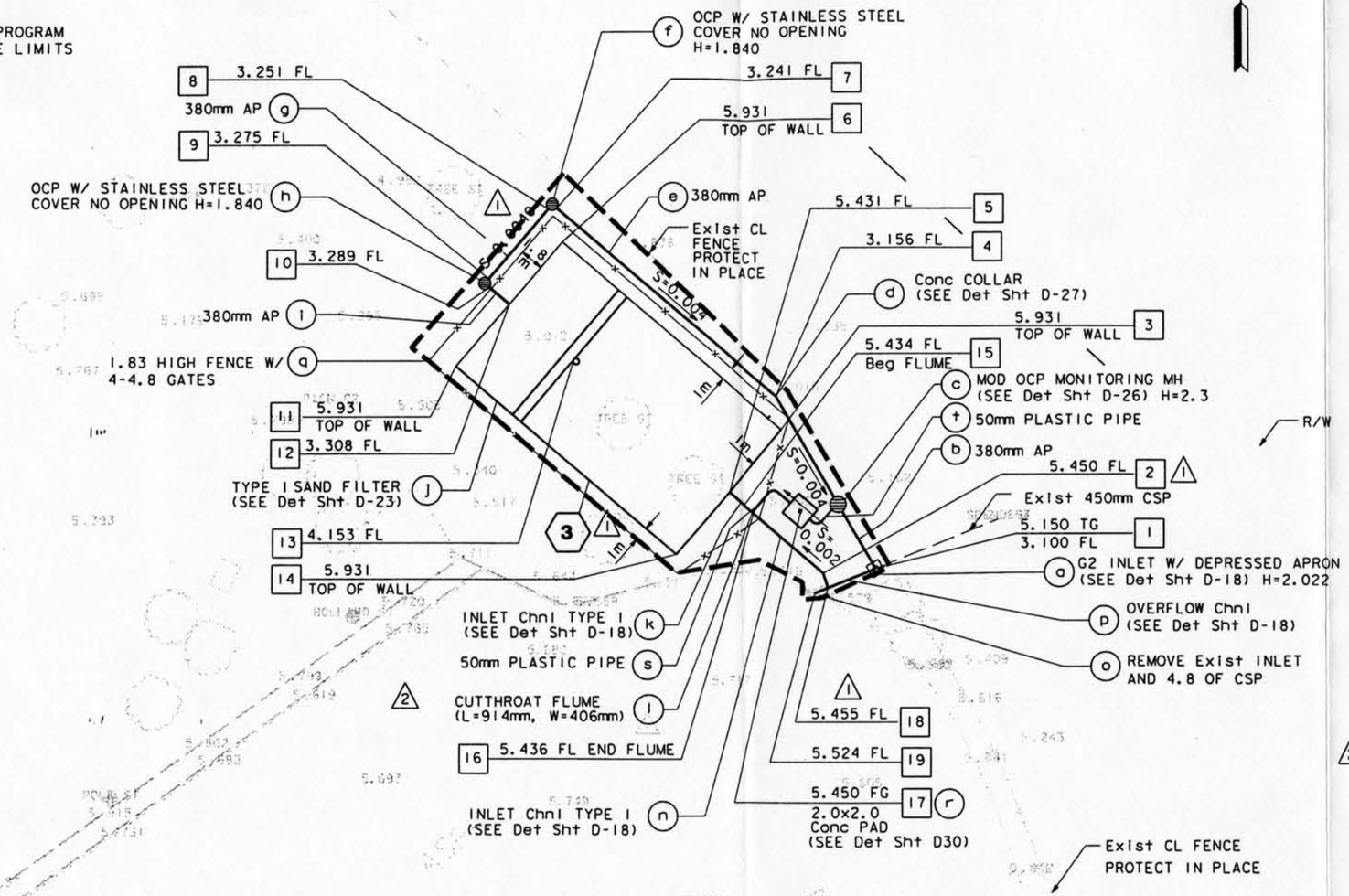
AGUILAR ENGINEERING INCORPORATED
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324

NOTES:

1. FOR COMPLETE R/W AND ACCURATE ACCESS DATA, SEE R/W RECORD MAPS AT DISTRICT 11 OFFICE.
2. SEE Sht D-18 AND D-19 FOR Const DETAILS.

LEGEND

BMP PILOT PROGRAM MAINTENANCE LIMITS



COORDINATE POINT	NORTHING	EASTING
1	602424.049	1902243.455
2	602423.723	1902239.635
3	602434.259	1902236.540
4	602436.693	1902236.155
5	602429.698	1902232.643
6	602448.056	1902220.391
7	602450.520	1902219.971
8	602450.470	1902219.336
9	602445.376	1902214.984
10	602444.742	1902215.034
11	602438.933	1902212.597
12	602443.495	1902216.494
13	602439.441	1902221.238
14	602425.136	1902228.745
15	602428.716	1902233.792
16	602428.122	1902234.487
17	602428.288	1902238.003
18	602422.643	1902239.996
19	602422.256	1902239.045

LA COSTA AVE PARK AND RIDE (3)

THIS PLAN ACCURATE FOR DRAINAGE ONLY

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

SITE 112203
OVERVIEW OF THE
LA COSTA AVENUE PARK & RIDE
SAND MEDIA FILTER BMP

SCALE 1 : 200

	DATE	REVISED BY	DATE REVISED
2			
1			10-5-98 12-1-98

CALCULATED/DESIGNED BY
CHECKED BY
PROJECT ENGINEER

18 JUN 99 15:3 c:\winnt\profiles\ow\desktop\3.div

TAB 2

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

EMERGENCY PROCEDURES SUPPORT

Emergency Contacts Lists
Hospital Route Maps
Project Contacts List

Document information related to the accident or incident that resulted in injury or damage and report it to Jon Toal at KLI at (831) 457-3950

Emergency Contacts for Site 112202: Escondido Maintenance Station

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Local Police Department	911	From landline phone
Local Police Emergency Dispatch	(760) 839-4611	From landline phone
Fire Emergency Dispatch	(760) 839-4622	Call immediately in case of fire or hazardous spills
Non-Emergency Police Dispatch	(760) 931-2197	Non-emergency
Non-Emergency Fire Dispatch	(760) 931-2141	Non-emergency
Local Highway Patrol	(619) 467-3300	Call before beginning work
Palomar Medical Hospital	(760) 739-3300	Nearest hospital
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Bob Wu)	(213) 897-8636	Notify for any accident or injury

Emergency Contacts for Site 112203: La Costa Avenue Park & Ride

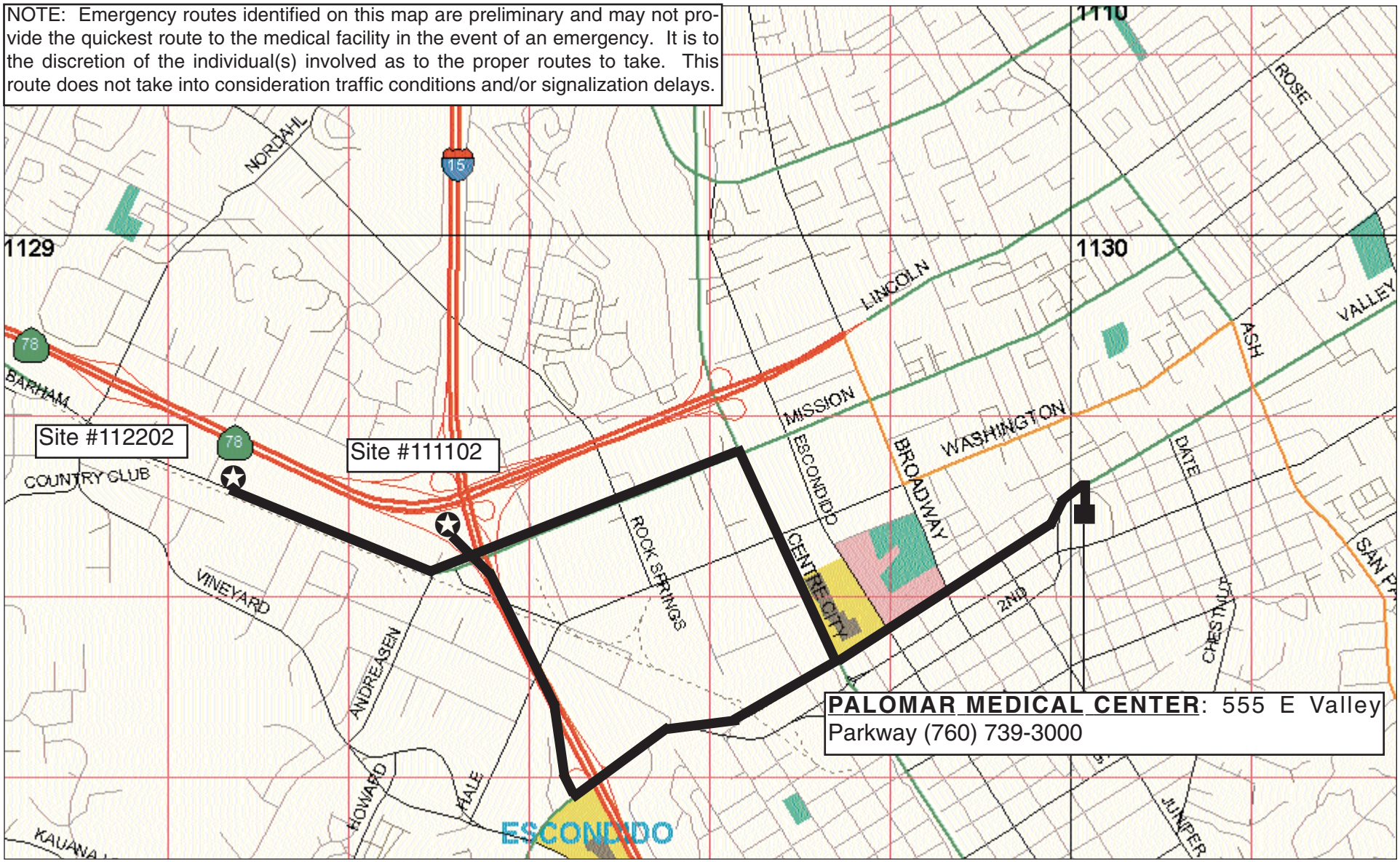
Name	Phone	Comments
California Highway Patrol	911	From cell phone
Police Department	911	From landline phone
Fire Department Emergency Dispatch	911	From landline phone
Fire Non-Emergency Dispatch	(760) 931-2141	Call for confined spaces
Non-Emergency Police Dispatch	(760) 931-2197	Non-emergency
Local Highway Patrol	(619) 467-3300	Call before beginning work
Hospital	(760) 633-7685	Nearest hospital
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 ((Bob Wu)	(213) 897-8636	Notify for any accident or injury

Document information related to the accident or incident that resulted in injury or damage and report it to Jon Toal at KLI at (831) 457-3950

Emergency Contacts for Site 112204: SR78/I-5 Park and Ride

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Police Department	911	From landline phone
Fire Department Emergency Dispatch	911	From landline phone
Fire Non-Emergency Dispatch	(760) 931-2141	Call for confined spaces
Non-Emergency Police Dispatch	(760) 931-2197	Non-emergency
Local Highway Patrol	(619) 467-3300	Call before beginning work
Tri- City Medical Center	(760) 633-7685	Nearest hospital
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Bob Wu)	(213) 897-8636	Notify for any accident or injury

NOTE: Emergency routes identified on this map are preliminary and may not provide the quickest route to the medical facility in the event of an emergency. It is to the discretion of the individual(s) involved as to the proper routes to take. This route does not take into consideration traffic conditions and/or signalization delays.



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

Potential Emergency Route

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Hospital Emergency Route

District 11

Robert Bein, William Frost & Associates

7/98 JN 34618

Project Contacts

Name	Organization	Phone	Fax Mobile	Email
Bill Whittenberg	RBF	(949) 855-5771-w	(949) 586-6531-f	whittenberg@rbf.com
Bob Wu	Caltrans Contract Manager	(213) 897-8636	(916) 506-9018p	Robert_wu@dot.ca.gov
Pat Kinney	KLI Task Order Manager	(916) 551-1380-w	(831) 640-9882-m	pkinney@cruzio.com
Ken Kronschnabl	KLI	(831) 457-3950-w (831) 688-5443-h	(831) 426-0405-f (831) 640-9883-m	kkronsch@cruzio.com
Cid Tesoro	Caltrans-District 11	(619) 688-3626	(619) 688-6998	cid_tesoro@dot.ca.gov
Rick Dey	Isco Service Center	(800) 228-4373	(402) 465-3089	RickD@isco.com
John Masiti	American Sigma Inc.	(800) 635-4567	(800) 235-1230	Sigma@americasigma.com
Internet	National Weather Service	--	--	http://nimbo.wrh.noaa.gov/San diego/nws.html
Internet	San Diego Alert System	--	--	http://nimbo.wrh.noaa.gov/San diego/fd_pcb.html
Jim Vanderswan	Channel 8 Weather Service, Lead Meteorologist	(831) 656-1725	--	--
Dean Messer	Mosquitoes and Midges Vector Abatement Specialist	530 753-6400	--	deanm@lwadavis.com
Mike Devine	County of San Diego Vector Control	(619) 694-2888	(619) 694-3559-f	Mdevineh@co.san-diego.ca.us
Fred Beams	Rodents Vector Abatement Specialist	(626) 586-5143	--	Geoscrc1@ix.netcom.com
Phil Carpenter	Toxscan	(831) 724-4522-w		PCarpenter@Toxscan.com
	Associated Laboratories	(714) 771-6900-w	(714) 538-1209-f	

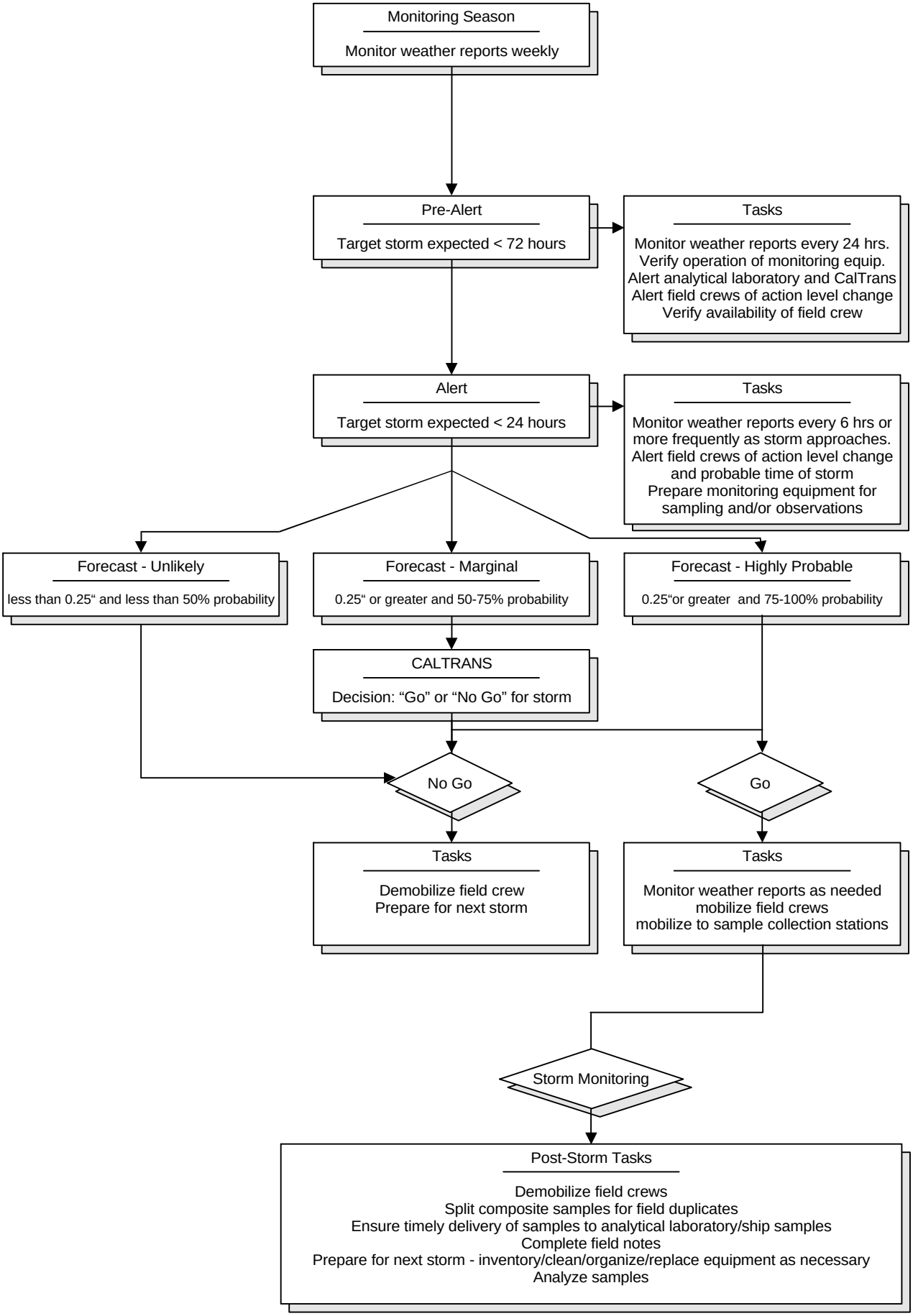
TAB 3

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

FIELD PREPARATION/MOBILIZATION FORMS

Exhibit 3.1: Storm Monitoring Decision Tree
Form A: Mobilization Checklist
Form B: Storm Staffing Plan

Exhibit 3.1
Storm Action Levels For BMP Facilities During Wet Season Monitoring



FORM A
Caltrans BMP Retrofit Pilot Program
Mobilization Checklist

General			
	Recent storm tracking information (e.g., www.weather.com)		Communication channels established
	Staff mobilized		Routes & BMPs identified
	Field Guidance Notebook		Emergency/Caltrans contact list
	Mobile phone		Volume to sample matrix
	Vendor's autosampler manual		Vendor name and contact
Storm Kit Equipment List			
	Keypad/display		9-pin cable from keypad to data logger
	Full set of keys (on floatable bobber)		Flashlights (2)
	Rope and throw rope		Gaff
	Maps for required areas		Large flat screwdriver
	Small flat screwdriver		Umbrella
	High quality alkaline D-cell batteries		Spare sample labels
	Pencils and indelible markers		Desiccant (packages and jar)
	Diagonal clipper		Electrical tape
	Cable ties (assorted sizes)		Utility knife
	Ziplock baggies (assorted sizes)		Labeling tape
	Polyethylene gloves		Rubber bands
Storm Mobilization List			
	Storm kit		Log books
	pH meter		Paper towels (cloth towels)
	DI (de-ionized) water squirt bottles		Tape gun with clear packaging tape
	pH grab bottles		Spare sample labels (waterproof)
	Ice scoop		Sample control paperwork (COC)
	Extra fine indelible markers		20 liter bottles in 10 gallon containment buckets
	Grab sample bottles (see below)		Coolers and ice (at least one extra)
	Grab pole and extension		DI water (3-gallon jug)
	Two-way radio or cellular phone		Personal rain gear
	Any necessary safety gear		Trash bags
Sampling Checklist			
	Sample bottles w/ preservatives		Analyte list
	for each required analysis		Analytical Lab telephone number
	for each QA/QC analysis		Backup lab contact number (after hours)
	for each BMP site		Sample coolers, plus extra
	prelabeled bottles		
	extra bottles in case of breakage		

FORM B

Storm Staffing Plan

Caltrans Retrofit Pilot Program Stormwater Sampling		Storm Date:	
Zone #1	Zone #2	Zone #3	Zone #4
Estimated Start:		**End Time:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Startup	**Zone #2 Startup**	**Zone #3 Startup**	**Zone #4 Startup**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio
Relief Start:		**Relief End:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Relief	**Zone #2 Relief**	**Zone #3 Relief**	**Zone #4 Relief**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio

TAB 4

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

INSPECTION FORMS

Form C: BMP Site Inspection Checklist
Form D: Monitoring Equipment Inspection Checklist

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Sand Filters

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENTATION BASIN:	Maintenance Reqd?
Sediment depth *(if sediment >12" maintenance is required):*_____inches	☐ yes ☐ no
Removal of accumulated paper, trash and debris every six(6) months or as necessary	☐ yes ☐ no
Vegetation growth within the basin(if exceeds 18" maintenance is required): ___ inches	☐ yes ☐ no
If drain time of standing water exceeds 48 hours, corrective maintenance is required	☐ yes ☐ no
Annual inspection and repair of structure	☐ yes ☐ no
Comments:	

FILTER MEDIA:	Maintenance Reqd?
Silt accumulation on Filter (if exceeds ½ inch- maintenance required): ___ inches	☐ yes ☐ no
Removal of accumulated paper, trash and debris every six (6) months as necessary	
Vegetation growth within the basin(if exceeds 18" maintenance is required): ___ inches	☐ yes ☐ no
Draw down time: _____ hours (If more than 36 hours, replace filter fabric around the media filter)	☐ yes ☐ no
Annual inspection and repair of structure	☐ yes ☐ no
Comments:	

STRUCTURAL:	Maintenance Reqd?
List any damage to fences:	☐ yes ☐ no
List any damage to locks:	☐ yes ☐ no
Any damage to inlet channels, outlet chambers, sampling chambers, grating, etc.? If any, please list.	☐ yes ☐ no
Annual inspection and repair of structure Other general maintenance concerns:	

VEGETATION:	Maintenance Reqd?
Evidence of vegetation in filter? ☐ yes ☐ no (If yes, maintenance is required)	☐ yes ☐ no
Does surrounding vegetation impair component functionality? ☐ yes ☐ no (If yes, maintenance is required) Comments:	☐ yes ☐ no

For Internal Use Only

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Sand Filters (continued)

ANIMAL CONCERNS:	Maintenance Reqd?
Is there evidence of small animals (burrows, droppings, trails, gnawing marks, or stained rub marks)? ☐ yes ☐ no	☐ yes ☐ no
Comments:	

AESTHETIC CONCERNS:

Debris (non-trash)?	☐ yes	☐ no	Type, amount and location:
Trash?	☐ yes	☐ no	Type, amount and location:
Graffiti?	☐ yes	☐ no	Description and location:
Other general aesthetic concerns:			

NON-STORMWATER CONCERNS:

Non-storm water discharge to BMP ☐ yes ☐ no
BMP wet from obvious non-stormwater discharge (no rain) ☐ yes ☐ no
If yes, print your name and contact number below and fax this form to Cid Tesoro at 619-688-6998
From: Contact Number:

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction (facing)	Roll	Photograph No.

OVERALL:

Other concerns affecting operation:

Condition of facility: ☐ acceptable ☐ not acceptable
Comments:

Dates for maintenance to be completed by:

(Team Leader's Signature)

For Internal Use Only

FORM D

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Inspection Checklist for Sand Filters

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SAMPLING AND FLOW MEASUREMENT EQUIPMENT:	Maintenance Required?
Is the monitoring station enclosure locked? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the monitoring station enclosure structurally sound? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the system status of the automatic sampler online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the automatic sampler properly programmed and calibrated? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the peristaltic pump tubing need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the intake tubing and/or connections need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Do the desiccant cartridges in sampler and flow meter need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is internal modem online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Are the DC marine battery and connect cable present? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are voltage and current of DC battery within normal parameters? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are cables to power source present and properly connected, and is AC power available? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Is the flow meter properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no

SAMPLING AND FLOW MEASUREMENT EQUIPMENT (cont.):	Maintenance Required?
Is the flow meter tubing free of kinks, free of obstructions, and properly connected to pump? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the bubbler tubing free of kinks, free of obstructions, and properly connected to pump? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no

For Internal Use Only

FORM D
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Inspection Checklist for Sand Filters

Are the AV meter sensors properly installed? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are the AV meter sensors free from obstruction? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Is the acoustic level meter or bubbler properly installed? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Is strainer clean and free of obstruction? ☐ yes ☐ no Comments:	☐ yes ☐ no

INFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

EFFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction (facing)	Roll	Photograph No.

Dates for maintenance to be completed by:

_____

(Team Leader's Signature)

For Internal Use Only

TAB 5

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

MAINTENANCE FORMS

Form E: BMP Site Maintenance Activity Checklist
Form F: Monitoring Equipment Maintenance Activity Checklist
Form G: Sediment Sampling Checklist
Exhibit 5.1: Title 22 Characterization Requirements

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE of

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Sand Filters

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

Fill out Appropriate Sections Only

SEDIMENT BUILD UP/FOULING:

☐ ***Sediment removal from Sedimentation Basin***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Approximate volume of sediment removed:
Comments:

MECHANICAL:

☐ ***Sump Pumps***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

Approximate Volume of Oil Waste generated: Waste Properly Labeled? ☐ yes ☐ no

FILTER MEDIA:

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:

VEGETATION:

☐ ***Weed Control:***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Leaf Collection and removal of dead/rotting vegetation:***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE of

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Sand Filters (continued)

STRUCTURAL:

☐ ***Fences, Locks, etc.***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Inlet/Outlet Channels, Grating, etc.(Describe Maintenance):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

ANIMAL CONCERNS:

☐ ***Irradication and control***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

AESTHETIC CONCERNS:

☐ ***Debris and trash removal***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Comments:

☐ ***Graffiti removal***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Painting***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

_____ (Team Leader's Signature)	General Comments:

For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE of

FORM F
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Maintenance Activity Checklist for Sand Filters

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

Fill out appropriate sections only

☐ ***Clean flumes, orifices, and other components***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Diagnostic test of automatic sampler***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of peristaltic pump tubing***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of flow meter tubing, pump tubing, or intake tubing***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of strainer***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of 12-volt marine battery***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Removal of kinks or obstructions from flow meter***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of desiccant cartridges in sampler and flow meter***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair and maintenance of flow meter:*** ***Type:_____***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

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For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE of

FORM F

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Maintenance Activity Checklist for Sand Filters

(continued)

☐ ***Other maintenance/calibration of automatic sampling equipment (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other maintenance of flow measurement equipment (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

_____

(Team Leader's Signature)

General Comments:

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FORM G
Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

GENERAL INFORMATION:			
Date:	Time In:	Team Leader's Initials:	Time Out:
Location:			

SEDIMENT CHARACTERISTICS IN BMP PRIOR TO STOCKPILING:					
Depth of sediment:					
Color:	☐ black	☐ brown	☐ green	☐ tan	☐ other
Consistency:	☐	☐ sandy	☐ silty	☐ granular	☐ other
Odors:	☐ petroleum ☐ none	☐ solvents ☐ other	☐ organic (rotten eggs)		☐ sewage
Depth of sediment:					

SEDIMENT SAMPLE COLLECTION MOBILIZATION LIST	
Powder Free Nitrile Gloves	
Soil Probe or equivalent for sample collection	
8-ounce glass jar labeled Total Petroleum Hydrocarbons (TPH)	
Plastic bags, seal bags	
Chilled cooler	
Chain-of-Custody form	
Log book for record keeping	

FACILITY NAME:_____
DTE: _____ TIME: _____
PAGE of

STOCKPILE/DRUMMED SEDIMENT:	Maintenance Required?	
Does the stockpile/drum require additional protection from causing environmental impact? (i.e., is underlying plastic, sandbag berming, and an anchored weather-proof covering in place?) If so, check yes.	☐ yes	☐ no
If not stockpiled, are the drums or other containers adequately stored, protected from weather, and free of damage/leakage? If not, check yes.	☐ yes	☐ no
Is the amount of onsite sediment reaching an unmanageable quantity? (Is disposal necessary?) If so, check yes.	☐ yes	☐ no
Are onsite equipment and materials sufficient to perform sediment sampling? If not, check no.	☐ yes	☐ no

SEDIMENT COLLECTION:

<10 cubic yards:
Minimum of ***2 samples, one randomly from each half of the soil mass***

10-20 cubic yards:
Minimum of ***3 samples, one randomly from each third of the soil mass***

20-100 cubic yards:
Minimum of ***4 samples, one randomly from each quarter of the soil mass***

100-500 cubic yards:
Minimum of 1 sample per 25 c.y. of each 25 c.y. section of the soil mass

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM G
Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

Over 500 cubic yards: *Collect a minimum of* ***1 sample per 25 c.y. portion of the soil mass***	*Contact Dept. of Environmental Health for Guidance*

SEDIMENT SAMPLE COLLECTION	
Observation sheet completed	
Personal and equipment decon completed	
Number of aliquots taken from composite _____	
Sample IDs: 1. _____ Analysis requested: _____ 2. _____ Analysis requested: _____ 3. _____ Analysis requested: _____ 4. _____ Analysis requested: _____ 5. _____ Analysis requested: _____ 6. _____ Analysis requested: _____	
Photos taken:	
Chain of Custody form attached	
Record information in logbook for record keeping	
Comments:	

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Exhibit 5.1: *CCR Title 22 Characterization Requirements*

Sediment Matrix (Disposal)
Analytical Parameters, Methodologies, Detection Limits, Holding Times, Container Volumes and Types, and Preservation

Parameter	Method	Units	Detection Limit	Maximum Holding Time	Preservation	Container Size/Type(1)
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 418.1	mg/kg	10	28 days	$4^{o}C$	8 oz glass jar
Volatile Organic Compounds	EPA 8260B	mg/kg	SW – 846 (5) requirements	14 days	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Metals(2):	EPA 6020/7471	mg/kg	SW – 846 (5) requirements	180 days 28 days for mercury	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Waste Extraction Test (WET) Metals(3):	STLC Extraction	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA
Toxicity Characteristic Leaching Procedure (TCLP) Metals(4):	TCLP 1311	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA

(1) Each sample will be collected in two 8 oz glass jars
(2) California Code of Regulation (CCR), Title 22 Metals (Sb, As, Ba, Be, Cd, Cr (total), Co, Cu, Hg, Pb, Mo, Ni, Se, Ag, Tl, V, and Zn). Initial waste characterization results may lead to a shorter list of metals for subsequent sediment disposal.
(3) Any sample for total metals that are below the Total Threshold Limit Concentration [TTLC] but exceed the ten times Soluble Threshold Limit Concentration (STLC) will be further analyzed using the WET procedure. WET extracts will be analyzed only for metals which exceed the ten times STLC criteria. Sediments associated with total metal results that exceed TTLC values are automatically considered hazardous and therefore do not need to undergo the WET procedure.
(4) If any of the WET-soluble concentrations are equal to or greater than the TCLP regulatory thresholds, analyze the waste by TCLP.
(5) "Test Methods for Evaluating Solid Waste, Physical /Chemical Methods". SW-846, Update III.(SW-846)

TAB 6

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MONITORING FORMS

Form H: Empirical Observations Field Data Log Sheet for Storm Events
Form I: Field Data Log Sheet
Form J1: User-Entered Program Parameters (Influent/Control)
Form J2: User-Entered Program Parameters (Effluent)
Form K: Station Phone Log

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Sand Filters

GENERAL INFORMATION:

Date:	Time in:
Team leader:	Stormwater Consultant:
Other personnel:	Location of facility:

METEOROLOGICAL CHARACTERISTICS:

Present rainfall: ☐ None ☐ Mist ☐ Drizzle ☐ Sprinkle ☐ Light, Steady ☐ Moderate ☐ Heavy

Time present rain event started: _____

Wind speed: ☐ 0-5 mph (light) ☐ 5-10 mph (moderate) ☐ 10-15 mph (brisk) ☐ >15 mph (strong)

Cloud cover: % Temperature _____

Distribution of Rainfall: ☐ Uniform ☐ Localized cells ☐ Scattered showers

Meteorological characteristics comments:

HYDROLOGIC AND HYDRAULIC CHARACTERISTICS:

Flow conditions (*check all that apply*):

☐ Runoff entering facility
☐ Flow from pretreatment sedimentation chamber to sand chamber occurring
☐ Flow passing overflow weir to outlet bay (Austin type only)
☐ Facility discharging
☐ Facility discharging via emergency overflow Time occurred: _____
☐ Flow bypassing facility Time occurred: _____

Standing water conditions (*record measurements as appropriate and check all that apply*):

☐ Standing water in pretreatment sedimentation chamber Depth: _____
☐ Standing water in sand chamber Describe Location: _____
Depth: _____
☐ Standing water in Outlet Bay (Austin Type Only):
Describe Locations: _____
Depths: _____

Are there any indications of leakage (e.g. falling water level without flow occurring from a chamber?) if so, what indications and where _____
_____

Comments: _____
_____

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FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Sand Filters

INLET CONDITIONS:

Describe flow distribution where flow passes weir or baffle at exit of inlet chamber:

☐ Flow is uniformly distributed
☐ Flow is not uniformly distributed, if so describe below:

Describe any obstructions or restrictions interfering with inflow/influent: _____

_____

INFLUENT WATER QUALITY APPEARANCE:

(Check all that apply and describe under comments)

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

SOLIDS DEPOSITION AND RESUSPENSION:

For the following locations, record the type (trash or debris, oil and grease, other organics), location(s), area(s) covered, and depth(s), as applicable:

In pretreatment sedimentation chamber: _____

_____

In sand chamber: _____

_____

In outlet bay: _____

_____

In multiple spots: _____

_____

In outflow/effluent channel: _____

_____

Solids resuspension evident (*check all that apply*):
☐ In inflow/influent channel ☐ Near inlet ☐ Near outlet ☐ In outflow/effluent channel
☐ Other (describe): _____

Solids deposition and resuspension comments:

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FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Sand Filters

TREATMENT MEDIUM CONDITIONS

Describe any indications that the filter medium is clogging or that hydraulic capacity is otherwise being reduced:

OUTLET CONDITIONS:

Describe any obstructions or restrictions interfering with outflow/effluent:

EFFLUENT WATER QUALITY APPEARANCE:

Check all that apply and describe under comments

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

VECTORS:

Presence of vectors: ☐ Yes ☐ No
If yes, what type: ☐ Mosquitoes ☐ Blackfly ☐ Cockroaches ☐ Rats
☐ Other_____

Comments:

STRUCTURAL CONDITION OF FACILITY:

Record the presence of the following (*check all that apply and give location in comments*):
☐ Inlet structure damage ☐ Outlet structure damage ☐ Vandalism
Comments:

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FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Sand Filters

MONITORING EQUIPMENT CONDITIONS:

Equipment functional: ☐ Yes ☐ No ☐ N/A
Comments:

CHANGES DURING STORM SINCE LAST OBSERVATION:

Date:_____ Time: _____
Comments:

Date:_____ Time: _____
Comments:

Date:_____ Time: _____
Comments:

ADDITIONAL COMMENTS:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

_____
(Team Leader's Signature)

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FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM I

Caltrans BMP Retrofit Pilot Program
Sand Filter Field Data Log Sheet

GENERAL INFORMATION		Julian Day (*5AA):
Date:	Time in (PST,*5):	Team Leader's Initials:
Location:	Crew:	
Influent ***or*** *Effluent* ***(circle one)***	**Storm Event Visit** or **Maintenance Visit** (circle one)	

SYSTEM STATUS FLAGS (*****6AD; 1=high, 0=low)

Arr: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

Dep: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

PROGRAM SIGNATURE (*****B)

Arrive: _____

Depart: _____

DATA LOGGER INFORMATION (*****6)

All Site Visits:		Samp. Batt Volt	22:	Manual Rain Gauge:	
Basin Staff Gauge:		Cell Batt Volt	82:	Total Rain (in.)	25:
Flow Sensor Stage:		Flow Meter Batt Volt	28:	Total Storm Vol.	72:
Stage (ft)	02:	Storm Site Visits:		Strm Vol Smpld	75:
Velocity (ft/s)	03:	Volume (kcf)	05:	Max Stage Day	51:
Flow (cfs)	04:	Storm Sum (kcf)	06:	Max Stage Time	52:
Station ID	21:	Percent Capture	08:	Max Stage (ft)	53:
		Volume2Sample	14:	Date Last Sample	105:
		Sample Count	17:	Time Last Sample	106:

AUTOSAMPLER INFORMATION

Storm only		Bottle # in: _____
Number of Samples Total: _____	Bottle # out: _____	
Number of Samples Remaining: _____	Bottle Volume: _____	
	Volume2Sampl: _____	

GRAB SAMPLE COLLECTION	Time:	**CALIBRATIONS and CHECKS**	
TPH (VOAs)	_____	Stage:	☐
Bacteria	_____	Sample Volume:	☐
Oil and Grease	_____	Rain Gauge:	☐
Other: _____	_____	Other:	

SAMPLING EQUIPMENT AND REPAIR NEEDS:

ACTION TAKEN:

Team Leader's Signature_____

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FORM J1

User-Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **INFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
02 Flow Meter Stage Offset (feet)					
03 Volume to sample (kcf)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
08 Flow Meter Speed Offset (feet/second)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
36 Cellular phone battery state control parameter					
37 Duration of cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

**Subject to Revisions*

For Internal Use Only

FORM J2

User Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **EFFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
03 Volume to sample (kcf)					
04 Level Meter Stage Offset (feet)					
05 Level Meter Multiplier (feet/mv)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. Failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
30					
31					
34 Flume Parameter 1					
35 Flume Parameter 2					
36 Cellular phone battery state control parameter					
37 Duration when cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

For Internal Use Only

FORM K

Station Phone Log

Time	Station	Stage	% Capture	PkFlow (time)	PkFlow (feet)	Sample Count	Volume 2Sample	Storm Sum	Volume	Flow (Q)

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TAB 7

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

LABORATORY ANALYSIS FORMS

Form M: Chain-of-Custody Form
Exhibit 7.1: Chemical Analyses List

For Internal Use Only

FORM M

Chain-of-Custody Form

Laboratory:	Lab # Date Received	**From:**
Project: **P.O.#:**	**Project #:** **Required Completion Date:**	

Sample ID #	**Site ID #**	**Lab ID #**	**Matrix/ Analysis**	**Containers**	**Pres.**	**Sample Date/Time**		**Condition Upon Receipt**

Data Reports **WILL** include the following: Sample/Site ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Relinquished by:	Date/Time	Transporter	Received by: Date/Time
Relinquished by:	Date/Time	Transporter	Received by: Date/Time
Relinquished by:	Date/Time	Transporter	Received by: Date/Time

For Internal Use Only

Exhibit 7.1: *Chemical Analyses List for Stormwater*
Stormwater Matrix
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Analyte	Priority Rank	Reporting Limit	Units	Analytical Technique	Method Number	Holding Time	Minimum Sample Volume	Preferred Volume and Container Type[1]	Preservation
Conventionals									
pH	1	0.1	Unit	Electrode	EPA 150.1	Immediately[2]	100 mL	1-100 mL glass/plastic	4°C
Specific Conductance	1	1.0	µmhos/cm	Electrometric	EPA 120.1	Immediately[2]	500 mL	1-500 mL glass/plastic	4°C
Hardness	5	2	mg/L	Titrimetric/ Colorimetric	EPA 130.2	6 months	100 mL	1-200 mL glass/plastic	HNO_3 to pH<2, 4°C
Total Suspended Solids	1	1	mg/L	Dried Filter Weight	EPA 160.2	7 days[3]	1 L	1-500 mL glass/plastic	4°C
Nutrients									
Nitrate-Nitrogen	2	0.01	mg/L	Colorimetric Ion Chromatography	EPA 353.3 EPA 300.0	28 days 48 hours	200 mL 200 mL	1-500 mL plastic 1-500 mL plastic	4°C and H_2SO_4 to pH<2 4°C
Total Kjeldahl Nitrogen	3	0.1	mg/L	Titrimetric/ Colorimetric	EPA 351.3	28 days	500 mL	1-1L plastic	4°C and H_2SO_4 to pH<2
Total Phosphorus	4	0.002	mg/L	Colorimetric	EPA 365.3	28 days	100 mL	1-250 mL plastic	4°C and H_2SO_4 to pH<2
Total/Dissolved Metals[4],[5]									
Copper	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Lead	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Zinc	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Organics[6]									
Total Petroleum Hydrocarbons – Diesel/ Oil	Grab	250/200	µg/L	GC	EPA 8015M	14 days	1 L	2-1L amber glass	4°C
Total Petroleum Hydrocarbons - Gasoline	Grab	50	µg/L	GC	EPA 8015M	14 days	2-40 mL	3-40 mL VOA vials	4°C, HCl to pH<2
Bacteria[6]									
Fecal Coliform	Grab	2	MPN/100 mL	Multiple-tube	SM 9221E	6 hours[7]	50 mL	1-100 mL plastic	4°C

1. Analytes with the same preservative can be combined into a single container if the same laboratory is performing the analyses.
2. pH and Specific Conductance will be measured by the laboratory immediately upon receipt of the samples.
3. 7 days based upon limit for measuring TSS/no regulatory limit.
4. Total and dissolved metals samples are collected in separate containers. Only the total metals container will receive nitric acid.
5. Dissolved metals will be filtered in the laboratory prior to acidification.
6. Total Petroleum Hydrocarbon and Fecal Coliform grab samples will be collected for two storms per year.
7. Attempts will be made to maintain the 6-hour holding time for bacteria samples to the extent possible. When not possible, a maximum holding time of 24 hours will be followed in accordance with "Standard Methods for the Examination of Water and Wastewater", 18th Edition.

TAB 8

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

VECTOR CONTROL AND MONITORING FORMS

Form O: Vector Monitoring and Control Report

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VECTOR MONITORING FORMS

Vector monitoring forms will be provided by the applicable Vector Control Agency subcontracted to perform vector monitoring.

TAB 9

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

TECHNICAL SUPPORT INFORMATION

Exhibit 9.1: Runoff Coefficients
Exhibit 9.2: Volume-to-Sample Tables
Exhibit 9.3: Encroachment Permits

Exhibit 9.1

Runoff Coefficient Matrix Table for Sand Filters
Caltrans District 11

Site No.	Site Name	Drainage Area (acres)	Runoff Coefficient C
112202	Escondido Maintenance Station	0.82	0.9
112203	La Costa Avenue Park and Ride	2.78	0.6
112204	Route 78 and I-5 Park and Ride	0.75	0.75

"Volume to Sample" in Kilo-Cubic Feet for *Escondido Maintenance Station Sand Filter*

Number of Sample Aliquots	Acreage	Runoff Coefficient
72	0.82	0.9

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0037	2.6	0.0967
0.2	0.0074	2.7	0.1005
0.3	0.0112	2.8	0.1042
0.4	0.0149	2.9	0.1079
0.5	0.0186	3.0	0.1116
0.6	0.0223	3.1	0.1153
0.7	0.0260	3.2	0.1191
0.8	0.0298	3.3	0.1228
0.9	0.0335	3.4	0.1265
1.0	0.0372	3.5	0.1302
1.1	0.0409	3.6	0.1339
1.2	0.0446	3.7	0.1377
1.3	0.0484	3.8	0.1414
1.4	0.0521	3.9	0.1451
1.5	0.0558	4.0	0.1488
1.6	0.0595	4.1	0.1526
1.7	0.0633	4.2	0.1563
1.8	0.0670	4.3	0.1600
1.9	0.0707	4.4	0.1637
2.0	0.0744	4.5	0.1674
2.1	0.0781	4.6	0.1712
2.2	0.0819	4.7	0.1749
2.3	0.0856	4.8	0.1786
2.4	0.0893	4.9	0.1823
2.5	0.0930	5.0	0.1860

"Volume to Sample" in Kilo-Cubic Feet for *La Costa Park and Ride Sand Filter*

Number of Sample Aliquots	Acreage	Runoff Coefficient
72	2.78	0.6

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0084	2.6	0.2186
0.2	0.0168	2.7	0.2271
0.3	0.0252	2.8	0.2355
0.4	0.0336	2.9	0.2439
0.5	0.0420	3.0	0.2523
0.6	0.0505	3.1	0.2607
0.7	0.0589	3.2	0.2691
0.8	0.0673	3.3	0.2775
0.9	0.0757	3.4	0.2859
1.0	0.0841	3.5	0.2943
1.1	0.0925	3.6	0.3027
1.2	0.1009	3.7	0.3112
1.3	0.1093	3.8	0.3196
1.4	0.1177	3.9	0.3280
1.5	0.1261	4.0	0.3364
1.6	0.1346	4.1	0.3448
1.7	0.1430	4.2	0.3532
1.8	0.1514	4.3	0.3616
1.9	0.1598	4.4	0.3700
2.0	0.1682	4.5	0.3784
2.1	0.1766	4.6	0.3868
2.2	0.1850	4.7	0.3952
2.3	0.1934	4.8	0.4037
2.4	0.2018	4.9	0.4121
2.5	0.2102	5.0	0.4205

"Volume to Sample" in Kilo-Cubic Feet for *SR-78 / I-5 Park and Ride Sand Filter*

Number of Sample Aliquots	Acreage	Runoff Coefficient
72	0.75	0.75

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0028	2.6	0.0737
0.2	0.0057	2.7	0.0766
0.3	0.0085	2.8	0.0794
0.4	0.0113	2.9	0.0822
0.5	0.0142	3.0	0.0851
0.6	0.0170	3.1	0.0879
0.7	0.0199	3.2	0.0908
0.8	0.0227	3.3	0.0936
0.9	0.0255	3.4	0.0964
1.0	0.0284	3.5	0.0993
1.1	0.0312	3.6	0.1021
1.2	0.0340	3.7	0.1049
1.3	0.0369	3.8	0.1078
1.4	0.0397	3.9	0.1106
1.5	0.0425	4.0	0.1134
1.6	0.0454	4.1	0.1163
1.7	0.0482	4.2	0.1191
1.8	0.0510	4.3	0.1219
1.9	0.0539	4.4	0.1248
2.0	0.0567	4.5	0.1276
2.1	0.0596	4.6	0.1305
2.2	0.0624	4.7	0.1333
2.3	0.0652	4.8	0.1361
2.4	0.0681	4.9	0.1390
2.5	0.0709	5.0	0.1418

CALTRANS
BMP RETROFIT PILOT PROGRAM

BMP OPERATION, MAINTENANCE, AND MONITORING PLAN

VOLUME II

BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK FOR BIOFILTRATION STRIPS/ INFILTRATION TRENCHES

DISTRICT 11, SAN DIEGO

September 1999

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1.0 INTRODUCTION

This Field Guidance Notebook *(FGN*) gives inspectors, maintenance, and monitoring personnel the appropriate field evaluation and documentation for the District 11 Biofiltration Strip/Infiltration Trench (Strip/IT) belonging to the Caltrans BMP Retrofit Pilot Program. Field observations and conditions must be clearly and concisely documented on the field forms provided.

Refer to Appendix I-D of this guidance document for supporting information on Strip/IT technology and characteristics.

1.1 Data to be Collected

The following data will be collected to assess the performance and maintenance aspects of a Strip/IT:

- Water quality and quantity data of runoff discharged into the IT from the pretreatment Strip from flow-composite and first-flush (as soon as possible after the start of runoff) grab samples for at least eight storm events during two wet seasons, weather permitting.
- Rainfall data, recorded as a function of time, from rainfall events during the study period.
- Continuous trench water level data and overflow data.
- Vadose zone water quality sampling data.
- Groundwater well monitoring data.
- Observations of water quality, traffic, rainfall, antecedent conditions, spills, etc.
- Documentation records of inspections and maintenance activities performed.
- Vector monitoring and abatement data.
- Records of vector control measures taken.
- Vegetation management records.

Consultants will be responsible for data management. Overall management of the data will be consistent with established Caltrans procedures for stormwater monitoring projects.

1.2 Field Activities to be Performed

Field activities that will be performed at the Strip/IT facility include:

- Monitoring Equipment Installations
- Monitoring Equipment Maintenance
- Facility Maintenance Inspections

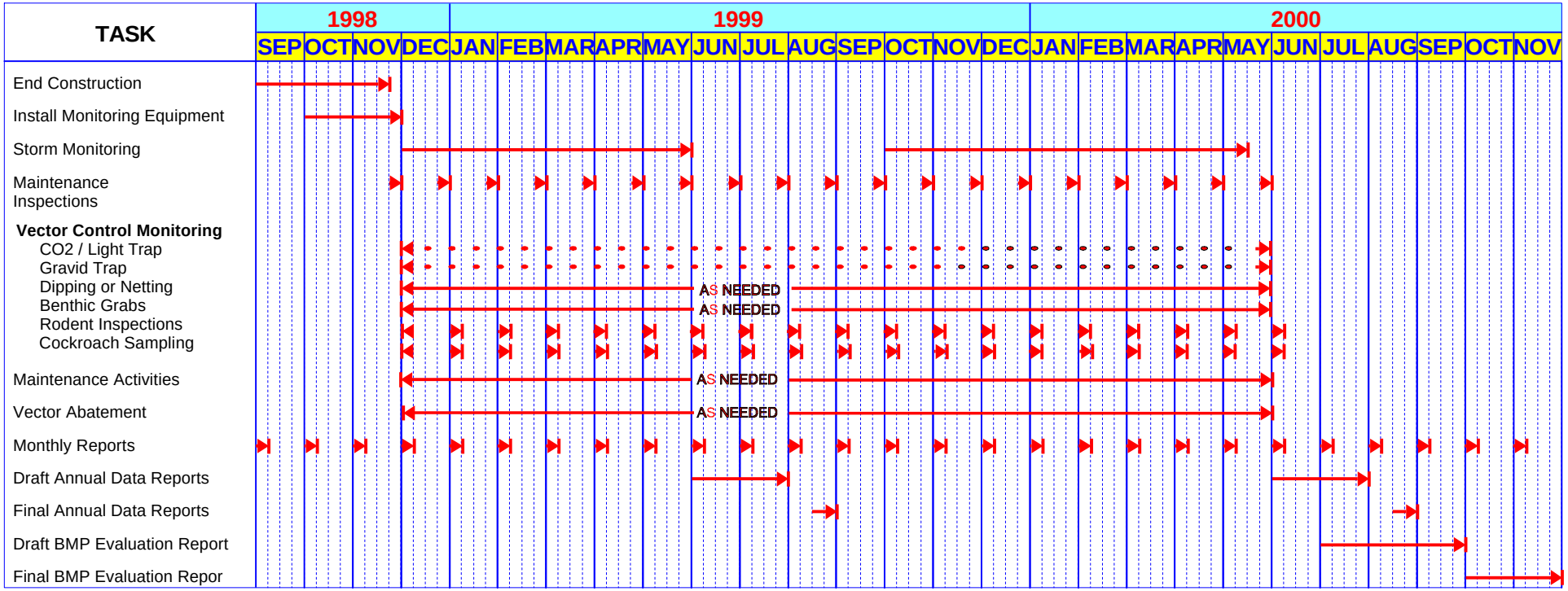
- Facility Maintenance
- Vector and Nuisance Animal Control Inspections
- Vegetation Control
- Stormwater, Vadose Zone, and Groundwater Monitoring and Observation
- Empirical Observations of the Strip/IT

Vector management may also be necessary at the Strip/IT facility, but may be contingent on facility housekeeping and other environmental influences.

1.3 Master Schedule

The schedule on the following pages shows the time-line for each phase of the Strip/IT OMM program.

Figure 1.3
Projected Schedule
Sand Media Filter OMM



2.0 SITE INFORMATION

Access requirements for the site are summarized in Table 2.1, the Site Location Map is in Tab 1, and the Encroachment Permit is found in Tab 9. ***Encroachment permits must be on hand*** for each site visit, and ***notification requirements found in these permits must be followed***.

Always check in with the appropriate Caltrans personnel before conducting any site fieldwork.

Table 2.1
Caltrans District 11 Biofiltration Strip / Infiltration Trench Site Summary

Site No.	Site Name	Site Location	Access and Parking
112207	Carlsbad Maintenance Station Strip/IT	6050 Paseo Del Norte. Approx. 1 block south of Palomar Airport Road.	Park in a space within the maintenance facility. Special arrangements need to be made for nighttime access.

2.1 Biofiltration Strip/Infiltration Trench (Strip/IT)

Refer to the accompanying Appendix for a general description of a Strip/IT. The section below provides site-specific information for the Strip/IT site in District 11. Figure 2.1 provides a cross-section diagram of the IT. Figures 2.2 through 2.6 provide the details of the monitoring equipment used to monitor the Strip/IT.

Refer to Tab 9 for a summary of the hydraulic characteristics for these sites.

Figure 2.1 Cross-section of Infiltration Trench

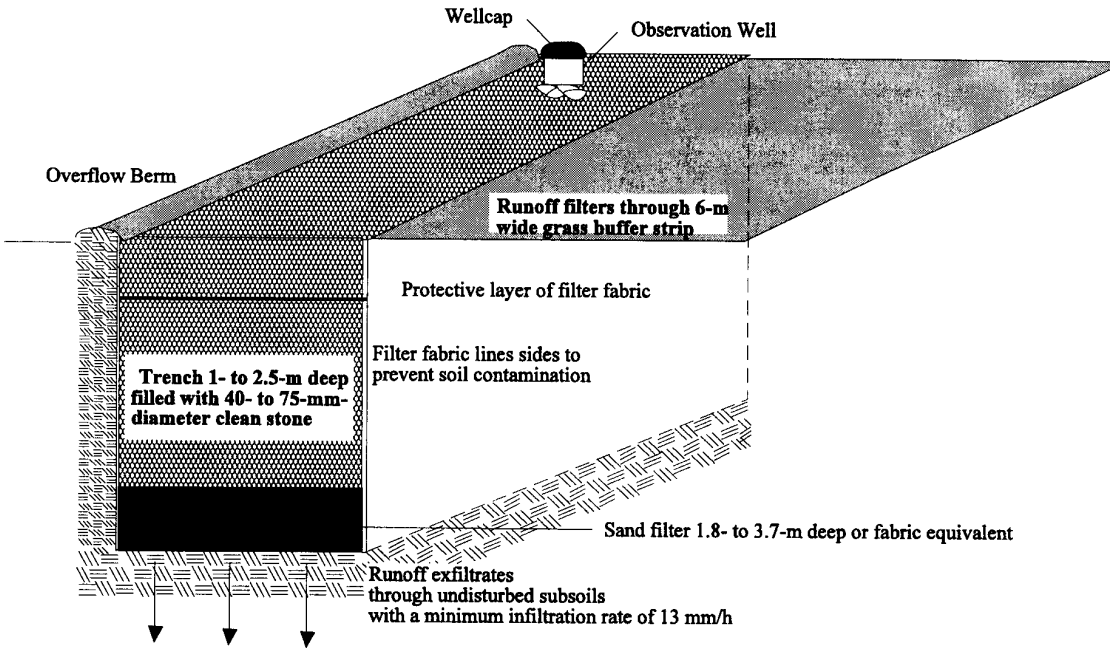


Figure 2.1 Cross-section of an Infiltration Trench

2.1.1 Site 112207: Carlsbad Maintenance Station

At the Carlsbad Maintenance Station, site drainage is sheet flow to concrete swales and gutters, concentrating along a gutter in the entrance drive to the station and ultimately discharging to Encinas Creek, about one-quarter mile south of the site.

An existing groundwater well will be sampled after construction of the Strip/IT is completed. This will be done to assess baseline conditions. In addition, an observation well will be installed at the infiltration trench to monitor trench water levels and infiltration rates. Since pollutant loading estimates of sheet flow to the infiltration trench cannot be made, the biofiltration strip outflow water quality data will be used to estimate these loadings. Because there is no effluent sampling point at the IT, a direct reduction in mass loadings cannot be determined. Instead, water infiltrated to the zone of native soils 1-2 m below the IT will be analyzed to see if pollutants are removed from the treated runoff prior to reaching the groundwater.

A 150 mm Parshall flume in combination with a bubbler level meter will be installed in the inflow channel to the Strip. This flume will accurately measure flows ranging between 0.035 to 3.91 cfs. Maximum anticipated flow to the strip and trench is 3.0 cfs for a 25-year storm. The depth of water 0.3 m in front of the throat opening will be measured.

A 50 mm 30E WSC trapezoidal flume in combination with a bubbler level meter will be installed in Biofiltration Strip discharge conveyance. This flume has a capacity range of 0.04 cfs to about 3.0 cfs. Maximum anticipated outflow from the Strip is 1.0 cfs for a 25-year storm. The depth of water 35 mm in front of the converging section of the flume will be measured.

Please see the Site Location Map and BMP Facility Plan in Tab 1.

Water level measurements will be used to evaluate the infiltration rate of an IT using a trench observation well. These data along with observation of the trench during storm events, will be used to estimate the quantity of runoff bypassing the trench through an overflow structure and will be used to determine if the IT is clogged and requires maintenance.

2.2 Emergency Hospital Routes

See the "**Emergency Procedure" Tab 2** for maps and descriptions showing the direct routes to the nearest hospitals and for emergency and site-related telephone contacts.

2.3 Site-Specific Health and Safety Concerns and Precautions

This subsection only identifies health and safety concerns and precautions. Appendix II provides more extensive health and safety concerns and requirements. Note that at the Strip/IT, field crews will consist of a minimum of two people. Refer to the site Encroachment Permit (Tab 9) for additional health and safety requirements.

2.3.1 Traffic Safety Precautions

Activities at the Strip/IT bring up traffic concerns including access and parking at the maintenance station. Care will be taken to be aware of surrounding activities at the maintenance station.

2.3.2 General Safety

In addition to traffic hazards, field crews may face a variety of potential dangers while maintaining the Strip/IT facility, installing equipment and performing environmental monitoring. Be aware of:

- Slippery conditions.
- Lightning.
- Fast moving water.
- Unstable earth.
- Poor visibility, especially at night.
- Lifting heavy objects.
- Transients.
- Muggers and other criminals.
- Power tools and heavy equipment.
- Ledges.
- Sharp edges - broken glass.
- Overhead dangers.
- Dogs and other biological hazards.
- Electrical hazards posed by equipment malfunctions.

Other <u>important field precautions</u> include:

- Stay away from the edges of a fast moving body of water. These edges are usually slippery and unstable during rainy conditions.
- If sampling is required at the edge of a fast moving body of water, use a lifeline and a personal flotation device. Use grabbing devices when possible.
- Never work alone at night and avoid working alone during the day.
- Avoid leaving materials, tools and equipment lying around where someone can trip over them.
- Maximize lighting at all times, especially at night.
- Keep a phone or other means of communication nearby.
- Do not use your back to lift heavy objects. Get help.
- Never use drugs or alcohol while working.
- Always wear a hard hat and orange vest.
- Do not use power tools and heavy equipment unless trained in the proper use and care of the specific power tools.

- Always wear eye protection when hammering with tools or chemicals.
- Wear rain gear.
- Never leave open holes unattended or not barricaded.
- Do not sample during lightning.
- Clean up the work area before leaving.

3.0 FIELD PREPARATION

Use Table 3.1 on the following page as a guide to find appropriate forms and information required for field visits. This table covers aspects of the field OMM program including mobilization, observation, and storm event monitoring checklists. The key in preparing for field visits, whether for maintenance or monitoring, is obtaining and going through each item on the table pertaining to the field task at hand. Prior to the operational phase of this program, items contained in this table will be assembled into separate logbooks: facility operations and maintenance, vector control, storm monitoring, and office monitoring.

Table 3.1
List and Locations of Required Stormwater Monitoring Forms and Checklists for a Biofiltration Strip/Infiltration Trench

Tab No.	Item	Form or Exhibit No.	Use and Frequency
1	Site Map	NA	Prior to site visits.
	BMP Facility Plan	NA	Prior to site visits.
2	Emergency Contacts List	NA	Consult for emergency phone numbers.
	Hospital Route Map	NA	Quick guide to the nearest hospital.
	Project Contacts List	NA	Refer for pertinent support staff.
3	Storm Monitoring Decision Tree	Ex. 3.1	Prior to each monitored storm.
	Mobilization Checklist	Form A	Before each storm and maintenance visit.
	Storm Staffing Plan	Form B	Filled out prior to storm event for crew and equipment assignments.
4	BMP Site Inspection Checklist	Forms CA/CB	Filled out for each inspection visit.
	Monitoring Equipment Inspection Checklist	Forms DA/DB	Filled out for each equipment inspection.
5	BMP Site Maintenance Activity Checklist	Forms EA/EB	Filled out for each maintenance inspection.
	Monitoring Equipment Maintenance Activity Checklist	Forms FA/FB	Filled out for each maintenance inspection of sampling equipment.
	Stockpile/Sediment Sampling Checklist	Form G	Complete for any stockpile or waste sampling.
	CCR Title 22 Characterization Requirements	Ex. 5.1	Reference for all sediment stockpile sampling.
6	Empirical Observations Field Data Log Sheet for Storm Events	Form H	Each time a visit is made during wet weather. Separate observations will be made of the inflow, outflow, and basin.
	Field Data Log Sheet	Form I	Each storm station visit. Separate logs will be filled out for the inflow and outflow.
	User-Entered Program Parameter Log Sheet for Influent/Control Sampling Point	Form J1	Each time a program parameter is changed.
	User-Entered Program Parameter Log Sheet for Effluent Sampling Point	Form J2	Each time a program parameter is changed.
	Station Phone Log	Form K	Each time station is contacted.
7	Chain-of-Custody Form	Form M	Whenever samples are collected.
	Chemical Analyses Lists	Ex. 7.1	Reference for each sampling event and lab analysis request submittal.
8	Vector Control and Monitoring Forms	Forms O1 and O2	Fill out for each site visit related to vector monitoring.
9	Runoff Coefficient Listing	Ex. 9.1	Reference: for calculations.
	"Volume-to-Sample" Table	Ex. 9.2	Consult to set sampling frequency.
	Encroachment Permit	Ex. 9.3	Explains access and safety requirements. Must always accompany field crews.

4.0 FACILITY OPERATIONS AND MAINTENANCE

4.1 Facility Operation Inspections

The Strip/IT will be inspected on a regular basis according to the following minimum rates:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation).
- On a weekly basis during extended periods of wet weather.

Inspection visits will be completely documented using the checklists shown in Tab 4 (Forms CA and CB).

Optimal BMP operation is dependent on field inspections. When inspecting the facility, follow the procedural steps below. ***Document inspections on Forms CA and CB (Tab 4)***.

1. Make the appropriate contacts with Caltrans District 11 personnel prior to arrival.
2. Completely walk around the BMP while looking for obvious problems, damage, or malfunctions
3. <u>Inspect and assess</u> needs for:

    - General aesthetics (graffiti, vandalism).
    - Vegetation management (grass, shrubs, trees).
    - Erosion and slope stability.
    - BMP performance (fouling, blockage, damage).
    - Equipment repair/maintenance (BMP components, autosampler).
    - Sediment accumulation (within BMP, at influent confluence).
    - Storage of accumulated sediment or other wastes.
    - Vector control.

4. Fill out Forms CA and CB (see Tab 4) during inspections.
5. Log the field activities and their corresponding time accurately.
6. If immediate corrective or preventative maintenance is needed, call the appropriate contacts listed in the Project Contacts List in Tab 2.

4.2 Facility Maintenance

Functional (performance and safety) and aesthetic (public acceptance) maintenance is critical. For the BMP site, focus on:

- Trash and Debris Removal.
- Sediment Removal and Management.
- Equipment Maintenance.
- Structural Repairs.
- Vector Control.
- Vandalism
- Standing or Stagnating Water.

The frequency of individual maintenance activities at the Strip/IT facility will be conducted according to the schedule listed in the maintenance indicator document, included as Appendix V of Volume II.

Maintenance activities performed will be documented using Forms EA, EB, FA, and FB in Tab 5. See Section 2.0 of Appendix I-D for full details on maintenance activities.

4.3 Vegetation Management

Maintenance and control of vegetation is essential to the optimal operation and performance of a Strip. The condition of the native vegetation will be *inspected on a monthly basis* at a minimum to ensure that:

- vegetation is kept at approximately 6 inches,
- vegetation is protected and kept healthy, and
- undesirable plant species do not take root.

Maintaining healthy and continuous vegetation on the slopes will minimize erosion. Preventing undesirable plant species from taking root will prevent plants with large root systems from damaging the embankments. Herbicides will not be used because they could interfere with water quality monitoring. The vegetation seed mix was designed so that it did not require irrigation or fertilizers. But, if vegetation desiccates, the use of irrigation and fertilizers will be discussed with Caltrans and the Plaintiffs. Use the maintenance checklists (Forms CA and CB in Tab 4 and Forms EA and EB in Tab 5) whenever inspections and maintenance activities for vegetation management are performed. See Sections 2.0 and 4.0 of Appendix I-D for specific details on controlling vegetation.

4.4 Disposal of Trash and Debris

Trash and debris from the Strip/IT is ultimately the responsibility of Caltrans. Consultants responsible for operating, maintaining, and monitoring the BMP will be responsible for removal and disposal of the trash and debris. This disposal will comply with applicable local, county, state, and federal waste control programs. Table 2.1 in the accompanying Appendix for the Strip/IT shows a few possible disposal services for waste material.

4.5 Deposited Sediment Management and Characterization Sampling

Handling and appropriate disposal of sediment residues from BMPs are critical. Stockpiling is only allowed at the facility under the following conditions:

- Sandbag berms are created (8-inch minimum) to surround the stockpile area.
- At least 0.5-mil plastic is used to contain any dewatered liquids (overlying sandbags).
- Stockpiles are covered and covers are anchored.

Once sediment stockpile storage has reached disposal quantity, chemical characterization must be conducted to satisfy land disposal requirements (LDRs). Document any evidence of oil and grease, antifreeze, solvents, fuel, hydrogen sulfide, and any other noxious substance (Form G, Tab 5). These observations will assist in determining if hazardous waste disposal analyses are required. Refer to Form G, Tab 5 for additional details on conducting this sampling.

For sediment stockpiles, the minimum number of discrete samples initially required must comply with Form G, Tab 5. Random samples will be selected from locations on a three-dimensional grid. If the presence of materials such as boulders, debris, etc. hinder the application of this process, the sample will be collected as close as possible to the randomly selected point without altering the essence of the random selection process.

Stockpile sediment samples will be collected in the following manner:

1. Don personal protective equipment.
2. Locate the sample point in the stockpile or drum.
3. Collect the sample using a soil probe or equivalent. Ensure that the sample is collected at the correct depth and location that was randomly selected.
4. Fill one 8-ounce glass jar with a portion of the sample and close the container with the cap, using care not to aerate (volatilize) the sample. This jar will be labeled and analyzed for TRPH and VOC.
5. Homogenize the other portion of the sample in a disposable bowl using a disposable spatula or spoon. Fill a second 8-ounce glass jar with this portion of the sample and close the container with the cap. This sample will be labeled and analyzed for metals.
6. Wipe the outside of each sample container with a clean paper towel.

7. Record the sampler's initials, date, and time on the pre-labeled sample bottle.
8. Place the sample containers in individual zip-top plastic bags and seal the bags.
9. Immediately pack the samples into a chilled cooler.
10. Record the required information on the Chain-of-Custody Form.
11. Document the sampling event, recording information in the designated field logbook.
12. Repeat the above steps until the minimum number of samples has been collected.

Unless observations indicate additional testing, the sediment samples submitted to the laboratory will be analyzed for the list of analytes in Exhibit 5.1 in Tab 5 using CCR Title 22 criteria (State of California, 1985).

4.6 Vector and Nuisance Animal Control

Vector monitoring and management will be performed in accordance with Appendix IV by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

5.0 STORM MONITORING

Careful preparation and planning is critically important. High quality samples *must* be obtained for each storm event. Always double-check that appropriate equipment, supplies, and personal protective gear are readied for each field deployment.

Before crews are deployed to the field, be sure that local rainfall meets the sampling criteria:

1. A minimum of 48 hours of dry weather preceded the storm (72 hours is preferred).
2. The Deployment Criteria defined in Exhibit 3.1.

Check the appropriate sources for local weather conditions before deploying field staff. Use Storm Monitoring Decision Tree (Exhibit 3.1, Tab 3) for a decision tree on when and how to mobilize field personnel and equipment.

5.1 Storm Characteristics and Sampling Equipment

Section 5.0 of Appendix I-D details the stormwater equipment, equipment maintenance requirements, stormwater monitoring procedures, sediment sampling procedures, and analytical methods, reporting limits, and holding times for samples from Strip/IT sites. Appendix III contains the BMP Retrofit Pilot Program Quality Assurance and Quality Control Plan.

Pertinent checklists, log forms, and information necessary to conduct a successful monitoring program and to be contained in the site-specific field logbooks are listed in Table 3.1 in Section 3.0. The pertinent checklists and log forms are located in Tabs 1 through 9. Table 3.1 also lists analytical and office forms, contains corresponding form and table numbers, identifies the location in this document, and explains when each form is to be filled out.

Sampling equipment shall be inspected for proper function, staging, and sampling preparation (if wet season) and documented. There are three principal phases of documenting stormwater sampling at BMP sites:

- Pre-Storm preparation,
- Storm event sampling (grab samples and composite sample collection of both influent and effluent), and
- Post-Storm sample analyses.

5.1.1 Pre-Storm Preparation

1. Consult the Storm Monitoring Decision Tree (Exhibit 3.1 in Tab 3) for when to mobilize.
2. Review the Mobilization Checklist for appropriate equipment, sampling devices, and sample bottles (Form A, Tab 3).
3. Verify sample bottle quantities, number of analyses for each parameter, in-situ sampling equipment, and other necessary gear/support materials.
4. Decontaminate and assemble decontaminanted sample containers, teflon® hose, and other sampling equipment according to the following procedures:

   Cleaning Procedures for Sample Bottles

   Bottles will be:

   a. Rinsed three times with warm tap water.
   b. Scrubbed with a clean plastic brush.
   c. Soaked in a 2% detergent (e.g., Contrad®) solution for at least 48-hours.
   d. Rinsed three times with tap water
   e. Rinsed five times with Milli-Q or equivalent water, rotating the bottle to ensure contact with the entire inside surface.
   f. Rinsed three times with hexane while rotating the bottle, and then air-dried.
   g. Rinsed six times with Milli-Q water.
   h. Soaked in 2N nitric acid for a minimum of 24-hours.
   i. Rinsed six times with Milli-Q water.

   Cleaning Procedures for Teflon®Hose and Other Sampling Equipment

   Teflon® hose and other sampling equipment will be:

   a. Teflon® hose will be rinsed three times with a 2% Micro® solution or equivalent. Other sampling equipment will be washed with a 2% Micro® solution and a clean plastic brush.
   b. Rinsed three times with warm tap water.
   c. Rinsed three times with Milli-Q or equivalent water.
   d. Rinsed three times with 2N nitric acid.
   e. Soaked at least 24-hours in 2N nitric acid.
   f. Rinsed three times with Milli-Q water.

5. Inspect monitoring equipment for proper operation (use Form D, Tab 4). At each sampling location do the following:

a. Check battery voltages and electrical connections.
b. Inspect the pump tubing and replace if necessary.
c. Inspect desiccant cartridges in flow meter.
d. Inspect intake tubing condition and connections. Make sure intakes, flow structures, and sensors are clear of debris (this is only possible if confined space requirements are met).
e. Make sure the correct user-entered program parameters are entered (use Forms I, J1, J2 and K in Tab 6).
f. Set system status flags.
g. Make sure the automatic sampler is set up properly by verifying that the correct bottle size, number of bottles, hose diameter, hose material, hose length, head height, aliquot volume, number of samples to fill the bottle, and number of pulses to sample has been entered correctly.
h. Make sure the sampler is set to take a sample automatically after receiving a pulse form the data logger.

6. Ice composite bottles.
7. From the office or field set "Volume-to-Sample" numbers (Exhibit 9.2 in Tab 9) and initiate equipment to begin sampling automatically when flow is detected. Fill out the phone log (Form K, Tab 6).
8. Prepare necessary sample bottles for first-flush (as soon as possible after the start of runoff) grab samples. Grab samples will be collected twice per year as directed by the Task Order Manager.

Storm Event and Sample Collection

1. Once onsite, fill out the Empirical Observations Field Data Log and a Field Data Log Sheets (Forms H1 and I in Tab 6) to document storm characteristics.
2. Locate influent/control autosampler and inspect for proper operation.
3. Locate effluent autosampler and inspect for proper operation.
4. Change composite bottles and re-initiate equipment as needed.
5. Take grab samples as needed (two will be taken per monitoring season at the influent and effluent locations of the Strip/IT).

5.1.2 Post-Storm Sample Analyses

After a storm event has ended, the autosampler stations need to be shut down and left ready for the next storm event in the following manner:

1. Reset the storm monitoring program to prepare for another storm event.
2. Replace the four 1-gallon autosampler sample bottles and the reset the sampler.
3. Physically inspect the station to determine if any damage was sustained during the storm event. Inspect the flow sensor and intake for debris blockage or clogging. (This is only possible if confined space requirements are met).

4. Check battery voltages; replace batteries that are low.
5. Retrieve data via field modem interrogator or from the remote monitoring computer.

Data Retrieval

Data will be retrieved (dumped) from the data logger after each storm event during the storm season, and, during dry weather, approximately every month.

Chain-of-Custody Forms

When the grab samples have been collected, the paperwork will be filled out to ensure a smooth transfer of samples to the analytical laboratory. Chain-of-Custody Forms (Form M, Tab 7) will be filled out in detail describing the type of sample, the quantity of samples, and the time that the samples were collected. These forms will accompany the samples to the laboratory.

5.2 Well Monitoring

Ground water will be sampled one time after construction of the BMP is completed. This will be done to establish a ground water quality baseline for the site (see Appendix I-D).

5.2.1 Groundwater Sampling

This section discusses the procedures for well purging and sampling at a Strip/IT facility. Baseline sampling is scheduled to occur immediately after construction of the Strip/IT. The well will be sampled two additional times during each storm season after significant rainfall events (once in December/January and once in February/March). Storm season analytical results will be compared to the baseline analytical results.

Groundwater Purging and Collection

The water level and the depth of the well will be measured using a water level indicator. These values will be used to calculate the required purge volume. The well will be allowed to equilibrate with atmospheric pressure before the water elevation is measured.

Using a Teflon or stainless-steel bailer, a minimum of three submerged case volumes will be removed during purging of the monitoring well. During the purging process, the electrical conductivity, pH, turbidity, and temperature of the water will be measured at the beginning , in between each volume purged, and at the end of purging. These data will be recorded on the field visitation log (Form I, Tab 6). Once the well is sufficiently purged and the measured parameters are stabilized, the well will be considered ready for sampling.

Well purging will continue until the following parameters have stabilized. Stabilized conditions will be defined as follows:

1.	Electrical conductivity	± 10 percent
2.	pH	± 0.4 units
3.	Temperature	± 2 °C

Measurements will be collected during the purging process. Turbidity will be compared to historic conditions for the well as well as stabilization.

After purging, a groundwater sample will be collected using a decontaminated stainless steel or disposable Teflon bailer with a bottom-emptying device. Care will be taken when lowering and raising the bailer to minimize the turbulence of the water within the well. All sample bottles will be filled completely, then capped, labeled, and placed in a cooler with ice immediately after sample collection. After all samples have been collected, the static water level will be measured. Water level probes will be decontaminated between uses in compliance with the appropriate decontamination procedures.

All information pertaining to the groundwater sampling will be recorded in the field logbook and appropriate log sheets.

5.3 Vadose Zone Monitoring

Samples of pore liquid will be collected by applying a vacuum. The following protocol will be used to collect pore liquid samples using the lysimeter:

1. Place the lysimeter in the sample extraction mode by closing the sample collection stopcock.
2. Connect a 12-volt electric vacuum pump to the vacuum/pressure port. Slowly regulate the vacuum to 10 psi (508 mm of Hg) by adjusting the pressure vacuum stopcock on the lysimeter head assembly and then seal the system.
3. Once the vacuum is generated, pore liquid will be drawn from the soil pores and into the lysimeter. When the vacuum drops to 5 psi (254 mm of Hg) or less, attempt sample recovery.
4. Fit a clean, rigid, polyethylene sample container (400 mL minimum volume) with a two-port bung to the sample collection tube, making a sealed system (refer to Figure 5.2 of Appendix I-D). The tube from the lysimeter will protrude into the sample container approximately one-half inch (13 mm). The tube to the vacuum/pressure pump will be flush with the bung.
5. Ensure that the vacuum/pressure tube and sample collection tube stopcocks are in the open position.
6. Evacuate the sample from the lysimeter by applying a vacuum of approximately 10 psi (508 mm of Hg).

7. A minimum volume of 100 mL (300 mL is recommended) is required for the analysis of dissolved copper, lead, and zinc. Transfer the sample to an unpreserved polyethylene bottle provided by the laboratory. If the required volume was not obtained, repeat Steps 1 through 6.
8. When the minimum volume of sample has been obtained, properly pack and transport the sample in accordance with the procedures described in Section 5.9 of Appendix I-D. Ensure that a note has been recorded on the Chain-of Custody Form requiring the laboratory to filter the sample upon receipt.
9. In accordance with the manufacturer's recommendations, lysimeter equipment decontamination is not necessary.

5.4 Empirical Observations

Complete and succinct empirical observations for both rain/runoff and the BMP, are required during each site visit related to wet season monitoring. These observations will be taken throughout the facility as they apply to the BMP (particularly at the influent and effluent locations). These empirical observations will be recorded on Form H in Tab 6.

The following observations shall be made for each storm event visit and documented using Form H:

- Meteorological characteristics (present and preceding period).
- Hydrologic and hydraulic characteristics (flowing and/or standing water, channelization).
- Inlet conditions (problems affecting performance).
- Water quality appearance (visual, olfactory).
- Solids deposition (trash and debris, sediments, organics) and resuspension.
- Erosion.
- Vegetation condition.
- Outlet conditions (problems affecting performance).
- Mosquitoes and vectors.
- Structural condition of facility.
- Monitoring equipment condition.
- Infiltration medium condition (surface and observation well).

Refer to Form H in Tab 6 for recording empirical observation information.

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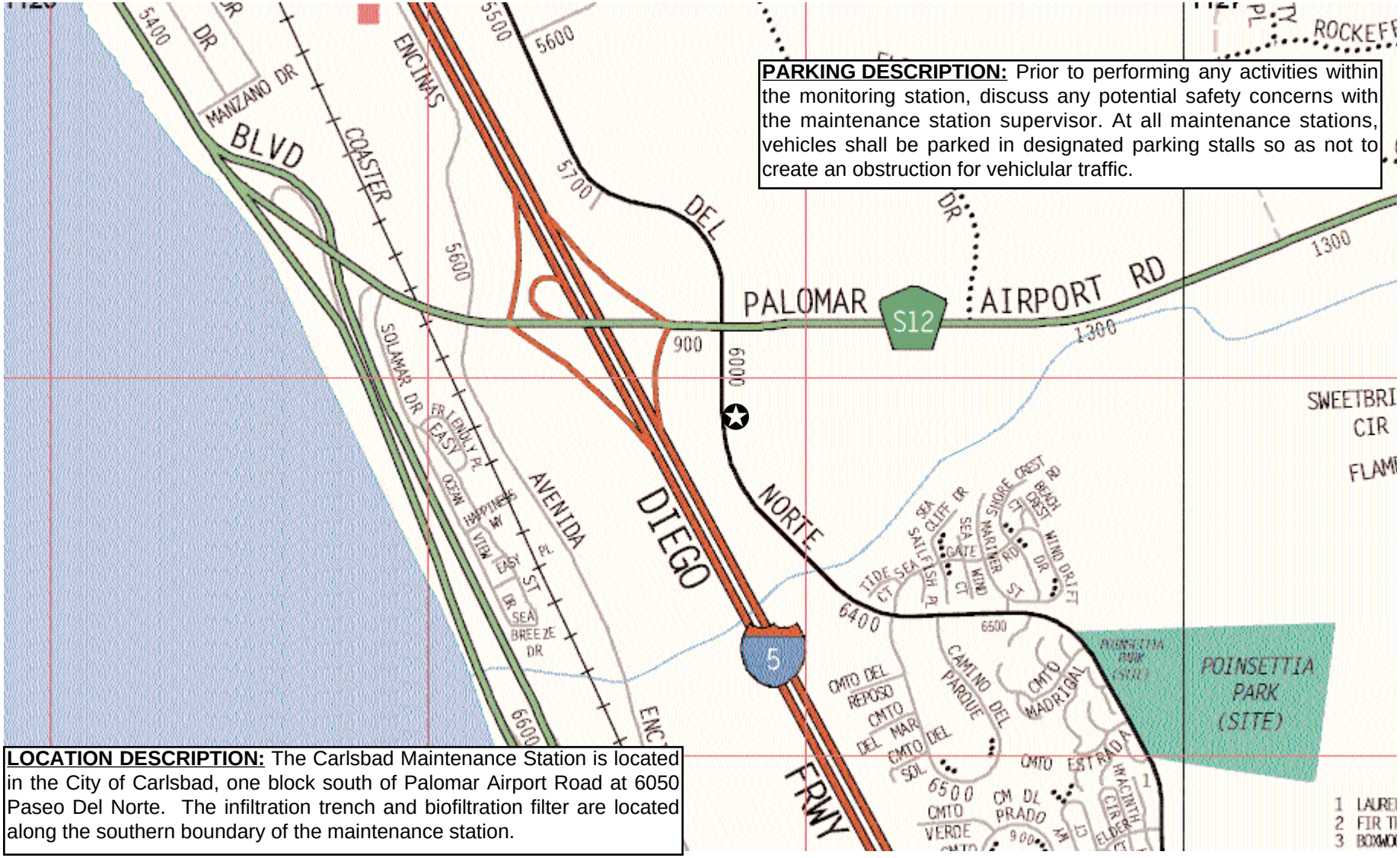
TAB 1

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MAPS

Site Location Map
BMP Facility Plan



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Carlsbad Maintenance Station
BMP Pilot Study Site #112207

District 11

Robert Bein, William Frost & Associates

6/98 JN 34618

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	var	var	20	60

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER ERWIN FOGERSON No. 049060 Exp. 9-30-99 CIVIL STATE OF CALIFORNIA

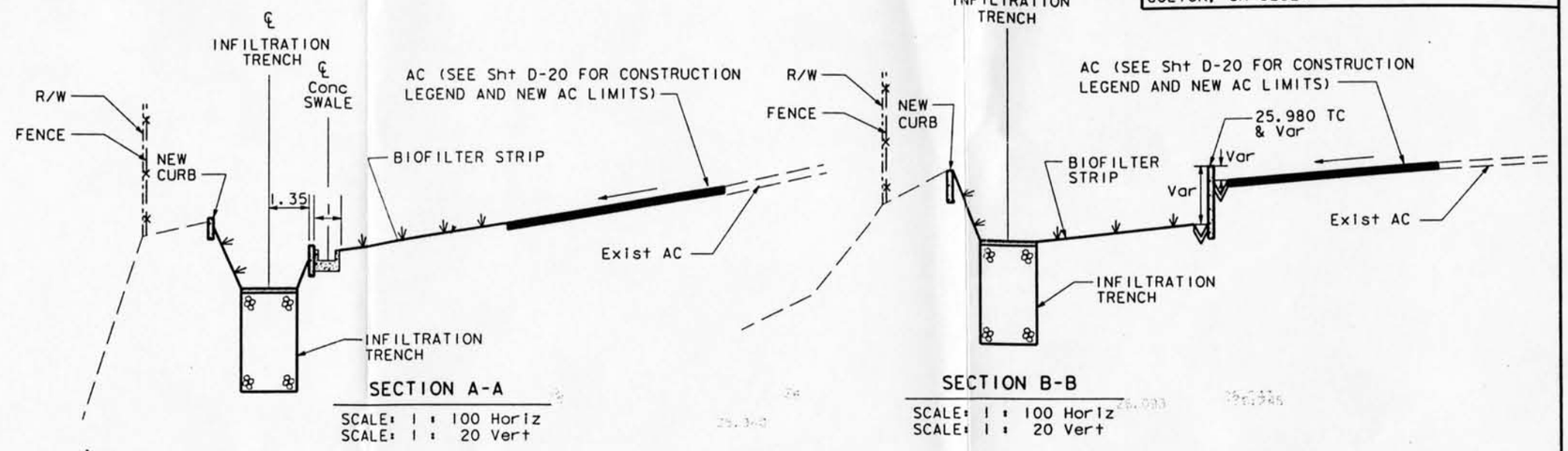
AGUILAR ENGINEERING INCORPORATED
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324

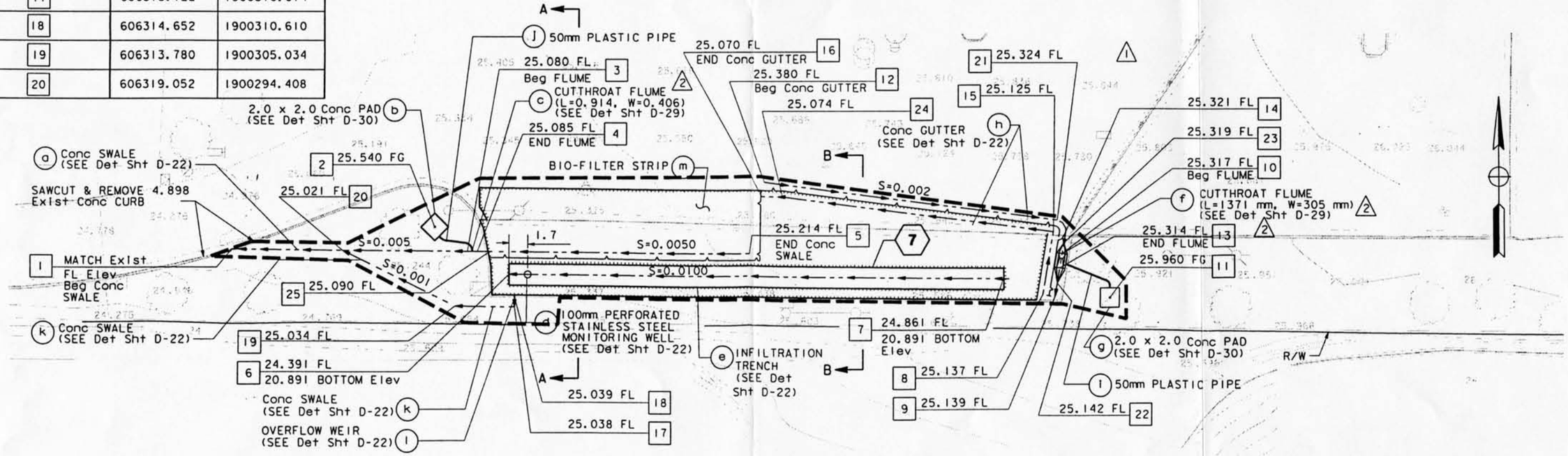
NOTE:

1. FOR COMPLETE R/W AND ACCURATE ACCESS DATA, SEE R/W RECORD MAPS AT DISTRICT 11 OFFICE.

Metric

COORDINATE POINT	NORTHING	EASTING	COORDINATE POINT	NORTHING	EASTING
1	606319.168	1900283.939	21	606321.814	1900362.132
2	606321.235	1900303.114	22	606315.872	1900362.129
2 3	606318.933	1900306.203	23	606319.638	1900362.768
4	606318.927	1900307.117	24	606324.060	1900336.207
5	606318.668	1900332.969	25	606318.833	1900308.138
6	606316.788	1900310.099			
7	606316.377	1900357.072			
8	606314.788	1900360.778			
9	606314.591	1900361.912			
10	606318.652	1900362.604			
11	606314.493	1900367.111			
12	606325.449	1900334.460			
13	606317.300	1900362.372			
14	606320.699	1900362.948			
15	606320.700	1900361.782			
16	606324.082	1900334.219			
17	606313.722	1900310.614			
18	606314.652	1900310.610			
19	606313.780	1900305.034			
20	606319.052	1900294.408			





LEGEND

BIO-FILTER STRIP

RETAINING CURB (MOD TYPE A1-200)

BMP PILOT PROGRAM MAINTENANCE LIMITS

CARLSBAD MAINTENANCE STATION

THIS PLAN ACCURATE FOR DRAINAGE ONLY

SITE 112207
OVERVIEW OF THE CARLSBAD MAINTENANCE STATION INFILTRATION TRENCH/BIOFILTRATION STRIP BMP

SCALE 1 : 200

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

1	12-1-98	DATE REVISED	REVISED BY
2			

CALCULATED/DESIGNED BY

CHECKED BY

PROJECT ENGINEER

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

18 JUN 99 13:2

TAB 2

CALTRANS BMP STORMWATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

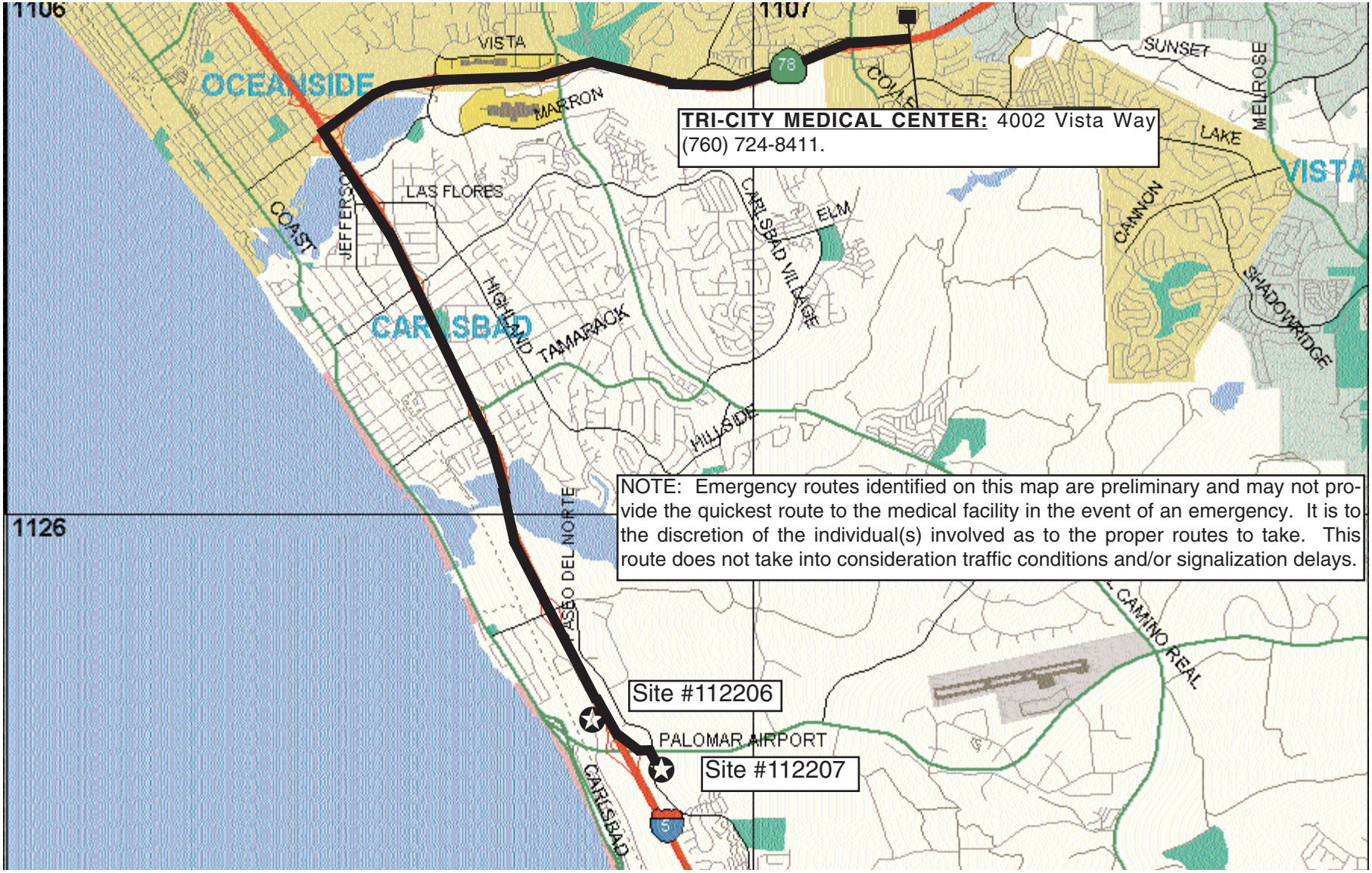
EMERGENCY PROCEDURES SUPPORT

Emergency Contacts List
Hospital Route Map
Project Contacts List

Document all information related to the accident or incident that resulted in injury or damage and report it to Jon Toal at KLI at (831) 457-3950

Emergency Contacts for Site 112207: Carlsbad Maintenance Station

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Police Department	911	From landline phone
Fire Department Emergency Dispatch	911	From landline phone
Fire Department	(760) 931-2100	Call for confined spaces
Non-Emergency Police Dispatch	(760) 931-2141	Non-emergency
Non-Emergency Fire Dispatch	(760) 931-2197	Non-emergency
Local Highway Patrol	(619) 467-3300	Call before beginning work
Scripps Memorial Hospital	(760) 633-7685	Nearest hospital
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Robert Wu)	(213) 897-8636	Notify for any accident or injury



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

Potential Emergency Route

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Hospital Emergency Route

District 11

Robert Bein, William Frost & Associates

7/98 JN 34618

Project Contacts

Name	Organization	Phone	Fax Mobile	Email
Bill Whittenberg	RBF	(949) 855-5771-w	(949) 586-6531-f	whittenberg@rbf.com
Robert Wu	Caltrans Contract Manager	(213) 897-8636	(916) 506-9018p	Robert _wu@dot.ca.gov
Pat Kinney	KLI Task Order Manager	(916) 551-1380-w	(831) 640-9882-m	pkinney@cruzio.com
Ken Kronschnabl	KLI	(831) 457-3950-w (831) 688-5443-h	(831) 426-0405-f (831) 640-9883-m	kkronsch@cruzio.com
Cid Tesoro	Caltrans-District 11	(619) 688-3626	(619) 688-6998	cid_tesoro@dot.ca.gov
Rick Dey	Isco Service Center	(800) 228-4373	(402) 465-3089	RickD@isco.com
John Masiti	American Sigma Inc.	(800) 635-4567	(800) 235-1230	Sigma@americasigma.com
Internet	National Weather Service	--	--	http://nimbo.wrh.noaa.gov/San diego/nws.html
Internet	San Diego Alert System	--	--	http://nimbo.wrh.noaa.gov/San diego/fd_pcb.html
Jim Vanderswan	Channel 8 Weather Service, Lead Meteorologist	(831) 656-1725	--	--
Dean Messer	Mosquitoes and Midges Vector Abatement Specialist	30 753-6400	--	deanm@lwadavis.com
Mike Devine	County of San Diego Vector Control	(619) 694-2888	(619) 694-3559-f	Mdevineh@co.san-diego.ca.us
Fred Beams	Rodents Vector Abatement Specialist	(626) 586-5143	--	Geoscrc1@ix.netcom.com
Phil Carpenter	Toxscan	(831) 724-4522-w		PCarpenter@Toxscan.com
	Associated Laboratories	(714) 771-6900-w	(714) 538-1209-f	

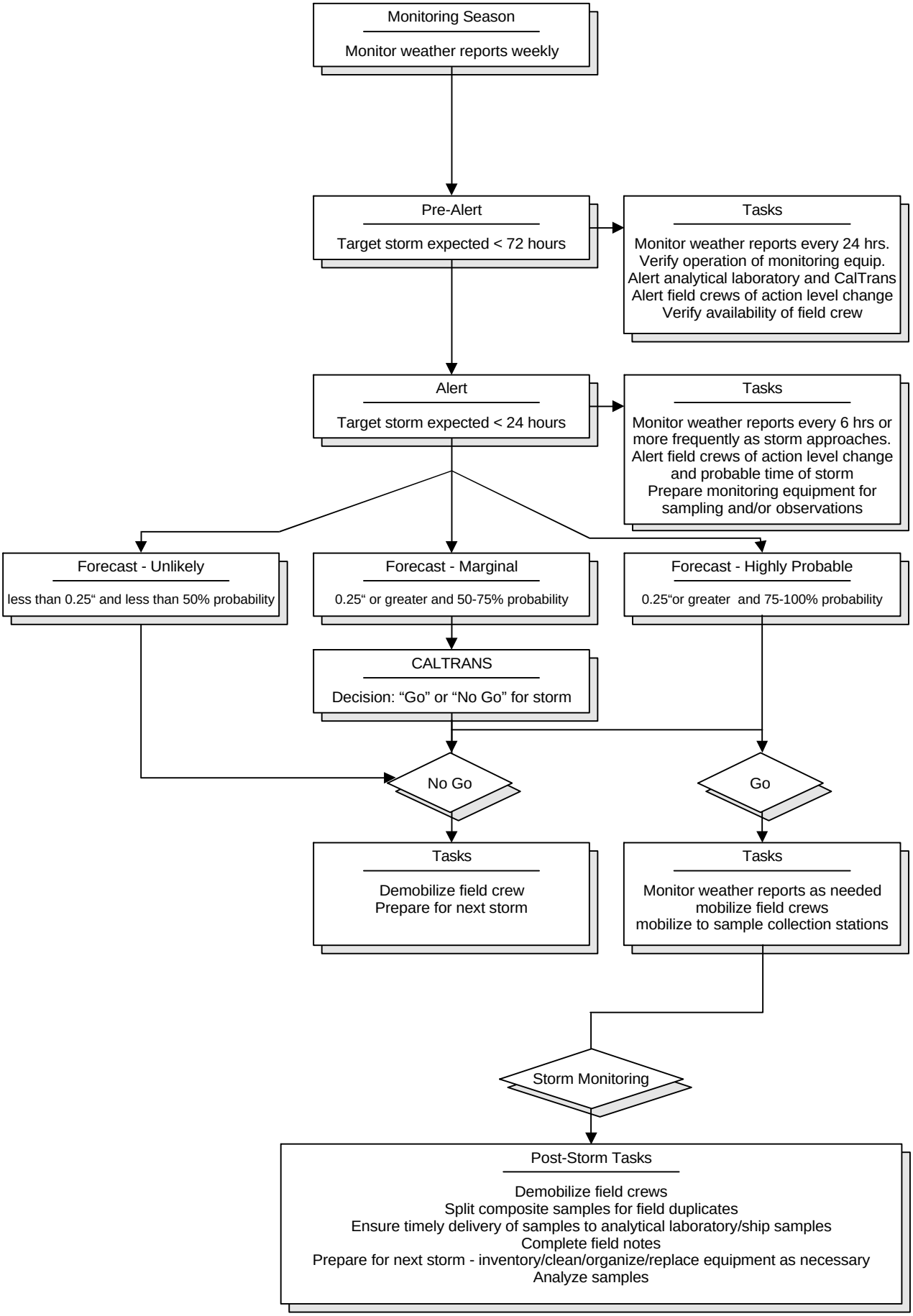
TAB 3

CALTRANS BMP STORMWATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

FIELD PREPARATION/MOBILIZATION FORMS

Exhibit 3.1: Storm Monitoring Decision Tree
Form A: Mobilization Checklist
Form B: Storm Staffing Plan

Exhibit 3.1
Storm Action Levels For BMP Facilities During Wet Season Monitoring



FORM A **Caltrans BMP Retrofit Pilot Program Mobilization Checklist for a Strip/IT**			
General			
	Recent storm tracking information (e.g., www.weather.com)		Communication channels established
	Staff mobilized		Routes & BMPs identified
	Field Guidance Notebook		Emergency/Caltrans contact list
	Phone card		Volume to sample matrix
			Vendor's autosampler manual
Storm Kit Equipment List			
	Electric vacuum pump		Electronic water level meter
	Keypad/display		9-pin cable from keypad to data logger
	Full set of keys (on floatable bobber)		Flashlights (2)
	Maps for all required areas		Large flat screwdriver
	Small flat screwdriver		Umbrella
	High quality alkaline D-cell batteries		Spare sample labels
	Pencils and indelible markers		Desiccant (packages and jar)
	Diagonal clipper		Electrical tape
	Cable ties (assorted sizes)		Utility knife
	Ziplock baggies (assorted sizes)		Labeling tape
	Polyethylene gloves		Rubber bands
Storm Mobilization List			
	Storm Kit		Log books
	Grab sample bottles (see below)		Paper towels
	DI (de-ionized) water squirt bottles		Tape gun with clear packaging tape
	Coolers and ice (at least one extra)		Spare sample labels
	Ice scoop		Sample control paperwork (COC)
	Extra fine indelible markers		4 1-gallon glass bottles
	Grab pole and extension		DI water (3-gallon jug)
	Two-way radio or cellular phone		Personal rain gear
	Any necessary safety gear		Trash bags
Sampling Checklist			
	Sample bottles w/ preservatives		Analyte list
	for each required analysis		Analytical Lab telephone number
	for each QA/QC analysis		Backup lab contact number (after hours)
	for each BMP site		Sample coolers, plus extra
	prelabeled bottles		
	extra bottles in case of breakage		

Form B:
Storm Staffing Plan

Caltrans **Retrofit Pilot Program** **Stormwater Sampling**		Storm Date:	
Zone #1	Zone #2	Zone #3	Zone #4
Estimated Start:		**End Time:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Startup	**Zone #2 Startup**	**Zone #3 Startup**	**Zone #4 Startup**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio
Relief Start:		**Relief End:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Relief	**Zone #2 Relief**	**Zone #3 Relief**	**Zone #4 Relief**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio

TAB 4

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

INSPECTION FORMS

Forms CA & CB: BMP Site Inspection Checklists
Forms DA & DB: Monitoring Equipment Inspection Checklists

FORM CA
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Biofiltration Strip

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:	Maintenance Reqd?
Sediment depth *(if sediment is at or near plant height or could interfere with flow or operation, maintenance is required):*	☐ yes ☐ no
Sediment type and location:	
Standing water or other drainage problems? ☐ yes ☐ no Comments:	☐ yes ☐ no
If yes, what is the depth of water? What is the extent of the water? Where is the location of the water?	
Evidence of erosion, channeling, or undercutting? ☐ yes ☐ no Seeps? ☐ yes ☐ no Embankment slumping or cracking? ☐ yes ☐ no	☐ yes ☐ no ☐ yes ☐ no ☐ yes ☐ no
Comments:	

VEGETATION:	Maintenance Reqd?
Height of Strip vegetation *(maintenance required if height exceeds 10 inches):*	☐ yes ☐ no
Does vegetation cover all of the Strip's floor and/or slopes? ☐ yes ☐ no If no, percentage coverage: (0% - 100%): _____	☐ yes ☐ no
Is native vegetation (including woody or wetland vegetation), weeds, leaves, or other organic debris present in the Strip or BMP maintenance area? ☐ yes ☐ no If yes, what type: Does native vegetation, weeds, leaves, or other organic debris interfere with the operation of the Strip by (a) overgrowing the Strip vegetation, (b) interfering with the hydraulic resident time of the Strip, or (c) saturation of the bottom with dead or dying vegetation or (d) in another way? ☐ yes ☐ no If so, explain:	☐ yes ☐ no ☐ yes ☐ no
Evidence of flattening of vegetation? ☐ yes ☐ no	☐ yes ☐ no

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM CA
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Biofiltration Strip (continued)

VEGETATION (continued)	Maintenance Reqd?
Condition of landscaping? ☐ Inhibited Growth ☐ Excessive Growth ☐ Normal Growth Comments:	☐ yes ☐ no

STRUCTURAL:	Maintenance Reqd?
Is corrosion present? ☐ yes ☐ no ☐ not applicable If yes, extent and location	☐ yes ☐ no
Evidence of concrete scour, spalling, or cracking of structural parts? ☐ yes ☐ no	☐ yes ☐ no
Fences: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Locks: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Other general maintenance concerns/comments:	

ANIMAL CONCERNS:	Maintenance Reqd?
Is there evidence of small animals (burrows, droppings, trails, gnawing marks, or stained rub marks)? ☐ yes ☐ no	☐ yes ☐ no
Comments:	

AESTHETIC CONCERNS:	Maintenance Reqd?
Debris (non-trash)? ☐ yes ☐ no Type, amount and location:	☐ yes ☐ no
Trash? ☐ yes ☐ no Type, amount and location:	☐ yes ☐ no
Graffiti or vandalism? ☐ yes ☐ no Description and location:	☐ yes ☐ no
Theft? ☐ yes ☐ no Description and location:	☐ yes ☐ no
Vehicle accident? ☐ yes ☐ no Description and location:	☐ yes ☐ no
Other general aesthetic concerns:	

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM CA
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Biofiltration Strip

NON-STORMWATER CONCERNS:

Non-storm water discharge to BMP ☐ yes ☐ no
BMP wet from obvious non-stormwater discharge (no rain) ☐ yes ☐ no
If yes, print your name and contact number below and fax this form to Cid Tesoro at 619-688-6998
From: Contact Number:

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

OVERALL:

Other concerns affecting operation:

Condition of facility: ☐ acceptable ☐ not acceptable
Comments:

Dates for maintenance to be completed by:

_____
(Team Leader's Signature)

FORM CB
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Infiltration Trench

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
Location:		
Date of Last Rainfall:		

TRASH/DEBRIS CONTROL:		Maintenance Reqd?
Trench surface clear of trash/debris?	☐ yes ☐ no	☐ yes ☐ no
Inlet structure clear of trash/debris?	☐ yes ☐ no	☐ yes ☐ no
Overflow berm clear of trash/debris?	☐ yes ☐ no	☐ yes ☐ no
Comments:		

EROSION/INFRASTRUCTURE CONTROL:	Maintenance Reqd?
Evidence of erosion, seepage, slumping or cracking at inlet area, inlet structure, overflow berm, or filter/soil interface? ☐ yes ☐ no	☐ yes ☐ no
Is contributing drainage area stable? ☐ yes ☐ no	☐ yes ☐ no
Comments:	

STRUCTURAL:			Maintenance Reqd?
Fence/Gate?	☐ OK ☐ not OK	☐ not applicable	☐ yes ☐ no
Lock(s)?	☐ OK ☐ not OK	☐ not applicable	☐ yes ☐ no
Other general maintenance concerns/comments:			

ANIMAL CONCERNS:	Maintenance Required?
Evidence of small animals (burrows, droppings, trails, gnawing marks, or stained rub marks)? ☐ yes ☐ no	☐ yes ☐ no
Comments:	

INFILTRATION TRENCH:	Maintenance Reqd?
Standing water in the trench? (*if it has been more than 72 hours since the last storm event, maintenance is required*) ☐ yes ☐ no	☐ yes ☐ no
If there is standing water, what is the water level? _____ what is the color of the water? _____ are there any floating materials? _____ what is the turbidity? ☐ low ☐ moderate ☐ high are there any rodents, birds, reptiles, insects? _____	
Comments:	

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM CB

Caltrans BMP Retrofit Pilot Program

BMP Site Inspection Checklist for Infiltration Trench

INFILTRATION TRENCH (continued):	Maintenance Reqd?
Evidence of sediment in the stone aggregate? (*if sediment reaches the top of the trench, the sediment must be removed and the stone aggregate and top filter fabric washed and reinstalled*) ☐ yes ☐ no If yes, what is its depth relative to the filter fabric (150 mm [0.50 feet] below the top of the trench? _____ Sediment type: Amount and location of sediment: Comments:	☐ yes ☐ no
Evidence of scouring or resuspension near inlet? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the stone aggregate appear clean? ☐ yes ☐ no If no, describe:	☐ yes ☐ no
Does the filter fabric appear to be clogged? ☐ yes ☐ no Comments:	☐ yes ☐ no
Any rips or tears in the filter fabric? ☐ yes ☐ no Comments:	☐ yes ☐ no
Any unpleasant odors? ☐ yes ☐ no Comments:	☐ yes ☐ no

AESTHETIC CONCERNS:			Maintenance Required?
Debris (non-trash)?	☐ yes ☐ no	Type, amount and location:	☐ yes ☐ no
Trash?	☐ yes ☐ no	Type, amount and location:	☐ yes ☐ no
Graffiti or vandalism?	☐ yes ☐ no	Description and location:	☐ yes ☐ no
Theft?	☐ yes ☐ no	Description and location:	☐ yes ☐ no
Vehicle accident?	☐ yes ☐ no	Description and location:	☐ yes ☐ no
Other general aesthetic concerns:			

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM CB

Caltrans BMP Retrofit Pilot Program

BMP Site Inspection Checklist for Infiltration Trench

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

OVERALL:

Other concerns affecting operation:

Condition of facility: ☐ acceptable ☐ not acceptable

Comments:

Dates for maintenance to be completed by:

_____

(Team Leader's Signature)

FORM DA

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Inspection Checklist for Biofiltration Strip

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SAMPLING AND FLOW MEASUREMENT EQUIPMENT:	Maintenance Reqd?
Is the monitoring station enclosure locked? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the monitoring station enclosure structurally sound? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the system status of the automatic sampler online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the automatic sampler properly programmed and calibrated? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the peristaltic pump tubing need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the intake tubing and/or connections need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the desiccant cartridge in the flow meter need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is internal modem online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Are the DC marine battery and connect cable present? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are voltage and current of DC battery within normal parameters? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are cables to power source present and properly connected, and is AC power available? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Is the bubbler properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no

For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM DA
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Inspection Checklist for Biofiltration Strip
(continued)

SAMPLING AND FLOW MEASUREMENT EQUIPMENT (cont.):	Maintenance Required?
Is the bubbler tubing free of kinks, free of obstructions, and properly connected to pump? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is strainer clean and free of obstruction? ☐ yes ☐ no Comments:	☐ yes ☐ no

INFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

EFFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

Dates for maintenance to be completed by:

_____
(Team Leader's Signature)

For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM DB

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Inspection Checklist for Infiltration Trench

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
Location:		
Date of Last Rainfall:		

OBSERVATION WELL AND PRESSURE TRANSDUCER:	Maintenance Required?
Is the metal cap locked? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is there any sign of corrosion on the steel casing? ☐ yes ☐ no Comments:	☐ yes ☐ no
Evidence of erosion, seepage, slumping or cracking of the concrete seal? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the system status of the pressure transducer online and calibrated? ☐ yes ☐ no Comments:	☐ yes ☐ no

LYSIMETER EQUIPMENT:	Maintenance Required?
Is the metal cap locked? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is there any sign of corrosion on the steel casing? ☐ yes ☐ no Comments:	☐ yes ☐ no
Evidence of spalling or cracking of the concrete seal? ☐ yes ☐ no Comments:	☐ yes ☐ no

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM DB

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Inspection Checklist for Infiltration Trench (continued)

OVERALL:

Other concerns affecting operation:

Condition of facility? ☐ acceptable ☐ not acceptable

Comments:

Dates for maintenance to be completed by:

_____

(Team Leader's Signature)

For Internal Use Only

TAB 5

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MAINTENANCE FORMS

Forms EA & EB: BMP Site Maintenance Activity Checklists
Forms FA & FB: Monitoring Equipment Maintenance Activity Checklists
Form G: Stockpile/Sediment Sampling Checklist
Exhibit 5.1: CCR Title 22 Characterization Requirements

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM EA
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Biofiltration Strip

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:

☐ ***Sediment removal from level spreader and strip***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Clean orifices, and/or cracks in stormwater conveyance system***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Erosion repair (including vegetative stabilization) or stabilization of drainage area***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Embankment/slope repair(s)***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

VEGETATION:

☐ ***Strip vegetation mowing/trimming and removal of cuttings***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replant Strip vegetation***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

Complete only applicable sections

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM EA
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Biofiltration Strip (continued)

☐ ***Weed control***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

VEGETATION (cont.):

☐ ***Leaf collection and removal of dead/rotting vegetation***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

STRUCTURAL:

☐ ***Structural repairs (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

ANIMAL CONCERNS:

☐ ***Burrow control***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

AESTHETIC CONCERNS:

☐ ***Debris and trash removal***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

Complete only applicable sections

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM EA
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Biofiltration Strip (continued)

AESTHETIC CONCERNS (cont.):

☐ ***Graffiti removal or replacement of vandalized or stolen parts***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Painting***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

_____ (Team Leader's Signature)	General Comments:

Complete only applicable sections

FORM EB
BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Infiltration Trench

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Signature:	Stormwater Consultant:	
Location:		

EROSION/INFRASTRUCTURE/STRUCTURAL CONTROL:

☐ ***Erosion/infrastructure repair***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Fence/gate/lock replacement or repair***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

ANIMAL CONCERNS:

☐ ***Describe:***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:

INFILTRATION TRENCH:

☐ ***Removal of standing water***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Removal of top layer of stone aggregate***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of top layer of stone aggregate and/or filter fabric***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:

Comments:

FORM EB
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Infiltration Trench (continued)

INFILTRATION TRENCHES (cont.)

☐ ***Removal of sediment from top layer***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Removal of filter fabric (the layer at 150 mm [0.50 feet])***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of filter fabric (the layer at 150 mm [0.50 feet])***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

AESTHETIC CONCERNS:

☐ ***Debris and trash removal***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Graffiti removal or replacement of vandalized or stolen equipment***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

FORM EB

Caltrans BMP Retrofit Pilot Program

BMP Site Maintenance Activity Checklist for Infiltration Trench (continued)

AESTHETIC CONCERNS (cont.):

☐ ***Painting***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

_____ (Team Leader's Signature)	General Comments:

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM FA

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Maintenance Activity Checklist for Biofiltration Strip

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

☐ ***Clean H-flumes, orifices, and/or cracks***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Diagnostic test of automatic sampler***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of peristaltic pump tubing***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of bubbler tubing, pump tubing, or intake tubing***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of strainer***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Comments:

☐ ***Replacement of 12-volt marine battery***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Removal of kinks or obstructions from bubbler tubing***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of desiccant cartridge in flow meter***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

Complete only applicable sections
For internal use only

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM FA

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Maintenance Activity Checklist for Biofiltration Strip (continued)

☐ ***Other maintenance of automatic sampling equipment (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other maintenance/calibration of flow measurement equipment (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

_____ (Team Leader's Signature)	General Comments:

For Internal Use Only

Complete only applicable sections
For internal use only

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM FB
BMP Retrofit Pilot Program
Monitoring Equipment Maintenance Activity Checklist for Infiltration Trench

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Signature:	Stormwater Consultant:	
Location:		

LYSIMETER:

☐ ***Repair/replacement of metal cap or lock***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair of steel casing***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair of concrete seal***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

OBSERVATION WELL AND PRESSURE TRANSDUCER:

☐ ***Repair/replacement of metal cap or lock***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair of steel casing***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair of concrete seal***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

Complete only applicable sections
For internal use only

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM FB
BMP Retrofit Pilot Program
Monitoring Equipment Maintenance Activity Checklist for Infiltration Trench (continued)

OBSERVATION WELL AND PRESSURE TRANSDUCER (cont.):

☐ ***Calibration and diagnostic test of data logger***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

_____ (Team Leader's Signature)	General Comments:

Complete only applicable sections
For internal use only

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM G
Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

GENERAL INFORMATION:			
Date:	Time In:	Team Leader's Initials:	Time Out:
Location:			

SEDIMENT CHARACTERISTICS IN BMP PRIOR TO STOCKPILING:					
Depth of sediment:					
Color:	☐ black	☐ brown	☐ green	☐ tan	☐ other
Consistency:	☐	☐ sandy	☐ silty	☐ granular	☐ other
Odors:	☐ petroleum ☐ none	☐ solvents ☐ other	☐ organic (rotten eggs)		☐ sewage
Depth of sediment:					

SEDIMENT SAMPLE COLLECTION MOBILIZATION LIST	
Powder Free Nitrile Gloves	
Soil Probe or equivalent for sample collection	
8-ounce glass jar labeled Total Petroleum Hydrocarbons (TPH)	
Plastic bags, seal bags	
Chilled cooler	
Chain-of-Custody form	
Log book for record keeping	

STOCKPILE/DRUMMED SEDIMENT:	Maintenance Required?	
Does the stockpile/drum require additional protection from causing environmental impact? (i.e., is underlying plastic, sandbag berming, and an anchored weather-proof covering in place?) If so, check yes.	☐ yes	☐ no
If not stockpiled, are the drums or other containers adequately stored, protected from weather, and free of damage/leakage? If not, check yes.	☐ yes	☐ no
Is the amount of onsite sediment reaching an unmanageable quantity? (Is disposal necessary?) If so, check yes.	☐ yes	☐ no
Are onsite equipment and materials sufficient to perform sediment sampling? If not, check no.	☐ yes	☐ no

SEDIMENT COLLECTION:
<10 cubic yards: *Minimum of* ***2 samples, one randomly from each half of the soil mass***
10-20 cubic yards: *Minimum of* ***3 samples, one randomly from each third of the soil mass***
20-100 cubic yards: *Minimum of* ***4 samples, one randomly from each quarter of the soil mass***
100-500 cubic yards: ***Minimum of 1 sample per 25 c.y. of each 25 c.y. section of the soil mass***

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM G
Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

Over 500 cubic yards: *Collect a minimum of* ***1 sample per 25 c.y. portion of the soil mass***	*Contact Dept. of Environmental Health for Guidance*
Observation sheet completed	
Personal and equipment decon completed	
SEDIMENT SAMPLE COLLECTION	
Number of aliquots taken from composite _____	
Sample IDs: 1. _____ Analysis requested:_____ 2. _____ Analysis requested:_____ 3. _____ Analysis requested:_____ 4. _____ Analysis requested:_____ 5. _____ Analysis requested:_____ 6. _____ Analysis requested:_____	
Photos taken:	
Chain of Custody form attached	
Record information in logbook for record keeping	
Comments:	

Exhibit 5.1: *CCR Title 22 Characterization Requirements*

Sediment Matrix (Disposal)
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Parameter	Method	Units	Reporting Limit	Maximum Holding Time	Preservation	Container Size/Type(1)
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 418.1	mg/kg	10	28 days	$4^{o}C$	8 oz glass jar
Volatile Organic Compounds	EPA 8260B	mg/kg	SW – 846 (5) requirements	14 days	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Metals(2):	EPA 6020/7471	mg/kg	SW – 846 (5) requirements	180 days 28 days for mercury	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Waste Extraction Test (WET) Metals(3):	STLC Extraction	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA
Toxicity Characteristic Leaching Procedure (TCLP) Metals(4):	TCLP 1311	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA

(1) Each sample will be collected in two 8 oz glass jars

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

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

(4) If any of the WET-soluble concentrations are equal to or greater than the TCLP regulatory thresholds, analyze the waste by TCLP. “Test Methods for Evaluating Solid Waste, Physical /Chemical Methods”. SW-846, Update III.(SW-846)

TAB 6

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MONITORING FORMS

Form H: Empirical Observations Field Data Log Sheet for Storm Events
Form I: Field Data Log Sheet
Form J1: User-Entered Program Parameters (Influent/Control)
Form J2: User-Entered Program Parameters (Effluent)
Form K: Station Phone Log

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Strip/Infiltration Trench

GENERAL INFORMATION:	
Date:	Time :
Team leader's initial:	Stormwater consultant:
Other personnel:	Location of facility:
Site ID:	

METEOROLOGICAL CHARACTERISTICS:

Time since end of previous storm event visit: ☐ > 72 hours ☐ 48-72 hours ☐ 24-48 hours ☐ < 24 hours

Present rainfall: ☐ None ☐ Mist ☐ Drizzle ☐ Sprinkle ☐ Light, Steady ☐ Moderate ☐ Heavy

Time present rain event started: _____

Wind speed: ☐ 0-5 mph (light) ☐ 5-10 mph (moderate) ☐ 10-15 mph (brisk) ☐ >15 mph (strong)

Cloud cover: __%

Distribution of Rainfall: ☐ Uniform ☐ Localized cells ☐ Scattered showers

Meteorological characteristics comments:

HYDROLOGIC AND HYDRAULIC CHARACTERISTICS *for Biofiltration Strip:*

Flow conditions (check all that apply): ☐ Runoff entering facility
☐ Flow distributed uniformly throughout Biofiltration Strip
☐ Flow not uniformly distributed throughout Biofiltration Strip

If flow is not uniformly distributed throughout the Biofiltration Strip, describe distribution (e.g., where concentrated, where channelized, approximate dimensions and depths of concentrations and/or channel):

Flow conditions continued (check all that apply):
☐ Water flowing through Biofiltration Strip at a perceptible velocity
☐ Facility discharging
☐ Flow bypassing facility
☐ Flow overtopping facility
Comments:

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Strip/Infiltration Trench (continued)

Standing water conditions (*record measurements as appropriate*):
☐ Water standing over entire Biofiltration Strip. Depth: _____
☐ Water standing in one isolated pool. Describe Location:
_____
Depth: _____
☐ Water standing in multiple pools: Describe Locations:
_____
_____
Depths:
_____
Comments:

HYDROLOGIC AND HYDRAULIC CHARACTERISTICS *for Infiltration Trench:*

Flow conditions (check all that apply): ☐ Runoff entering facility
☐ Flow bypassing facility
☐ Effluent from Biofiltration Strip is surfacing in IT instead of infiltrating

If flow is not uniformly distributed throughout the Biofiltration Strip, describe distribution (e.g., where concentrated, where channelized, approximate dimensions and depths of concentrations and/or channel):

Standing water conditions (*record measurements as appropriate*):
☐ Water standing in observation well. Depth: _____
☐ Water standing over the top of the infiltration medium. Depth: _____
Comments:

INLET CONDITIONS *for Biofiltration Strip*:

Describe flow distribution where flow enters vegetated treatment zone:
☐ Flow is uniformly distributed across full width of the Biofiltration Strip.
☐ Flow is not uniformly distributed across full width of the Biofiltration Strip.
Explain:

Describe any erosion being caused by the flow upstream or at the entrance to the Biofiltration Strip:

Describe any obstructions or restrictions interfering with inflow/influent:

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Strip/Infiltration Trench (continued)

INLET CONDITIONS ***for Infiltration Trench:***

Describe any erosion being caused by the flow upstream or at the entrance to the infiltration medium:

Describe any obstructions or restrictions interfering with inflow/influent:

WATER QUALITY APPEARANCE ***for Biofiltration Strip:***
Check all that apply and describe under comments.

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide
☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

WATER QUALITY APPEARANCE ***for Biofiltration Strip (cont.):***
Check all that apply and describe under comments.

Water quality appearance comments:

WATER QUALITY APPEARANCE ***for Infiltration Trench:***
Check all that apply and describe under comments.

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide
☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Strip/Infiltration Trench (continued)

SOLIDS DEPOSITION AND RESUSPENSION *for Biofiltration Strip:*

For the following locations, record the type (trash or debris, oil and grease, other organics), location(s), area(s) covered, and depth(s), as applicable:

In inflow/influent channel:
_____
_____
_____

Over entire Biofiltration Strip:
_____
_____
_____

In one spot:
_____
_____
_____

In multiple spots:
_____
_____
_____

In outflow/effluent channel:
_____
_____
_____

Solids resuspension evident (*check all that apply*):
☐ In inflow/influent channel ☐ Near inlet ☐ Near outlet ☐ In outflow/effluent channel
☐ Other (describe):
_____

Solids deposition and resuspension comments:

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Strip/Infiltration Trench (continued)

SOLIDS DEPOSITION AND RESUSPENSION *for Infiltration Trench:*

For the following locations, record the type (trash or debris, oil and grease, other organics), location(s), area(s) covered, and depth(s), as applicable:

Over entire IT surface: _____
_____

In one surface spot: _____
_____

In multiple spots: _____
_____

In observation well: _____
_____

Filter fabric: _____
_____

Solids resuspension evident (*check all that apply*):

☐ Upstream of IT ☐ Where flow enters IT ☐ From IT surface
☐ Other (describe): _____

Solids deposition and resuspension comments:

EROSION *for Biofiltration Strip only:*

For the following locations, record erosion locations, area(s) covered, and depth(s), as applicable:

Near flow entrance _____
_____

Biofiltration Strip slope_____
_____

Near flow discharge: _____
_____

In outflow/effluent channel: _____
_____

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Strip/Infiltration Trench (continued)

Erosion comments:

VEGETATION CONDITION *for Biofiltration Strip only:*

Biofiltration Strip vegetation cover:
☐ Complete ☐ Few small bare spots ☐ Few large bare spots ☐ Many small bare spots
☐ Many large bare spots ☐ Large areas bare ☐ All or nearly bare

Biofiltration Strip vegetation type:
☐ All grasses ☐ Mostly grasses, some wetland plants ☐ Mostly wetland plants, some grasses
☐ All wetland plants
Extent of woody shrubs or trees: _____

Vegetation condition comments:

INFILTRATION MEDIUM CONDITION *for Infiltration Trench only:*

Describe any indications that the infiltration medium is clogging or that the infiltration rate is otherwise being reduced:

OUTLET CONDITIONS *for Biofiltration Strip:*

Describe any obstructions or restrictions interfering with outflow/effluent:

OVERFLOW CONDITIONS *for Infiltration Trench:*

Is the IT overflowing?
☐ Yes ☐ No
If yes, explain:

WATER QUALITY APPEARANCE *for Biofiltration Strip:*

Check all that apply and describe under comments.

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Strip/Infiltration Trench (continued)

WATER QUALITY APPEARANCE *for Infiltration Trench:*

Check all that apply and describe under comments.

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

VECTORS *for Biofiltration Strip:*

Presence of vectors: ☐ Yes ☐ No
If yes, what type: ☐ Mosquitoes ☐ Blackfly ☐ Cockroaches ☐ Rats
☐ Other_____

Comments:

VECTORS *for Infiltration Trench:*

Presence of vectors: ☐ Yes ☐ No
If yes, what type: ☐ Mosquitoes ☐ Blackfly ☐ Cockroaches ☐ Rats
☐ Other_____

Comments:

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM H
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Strip/Infiltration Trench (continued)

STRUCTURAL CONDITION OF *Biofiltration Strip:*

Record the presence of the following (*check all that apply and give location in comments*):

☐ Inlet structure damage ☐ Outlet structure damage ☐ Vandalism

Comments:

STRUCTURAL CONDITION OF *Infiltration Trench:*

Record the presence of the following (*check all that apply and give location in comments*):

☐ Inlet structure damage ☐ Overflow structure damage ☐ Vandalism

Comments:

MONITORING EQUIPMENT CONDITIONS for the Site:

Equipment functional: ☐ Yes ☐ No ☐ N/A

Comments:

CHANGES DURING STORM SINCE LAST OBSERVATION:

Date:_____

Comments:

Date:_____

Comments:

Date:_____

Comments:

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM H

Caltrans BMP Retrofit Pilot Program

Empirical Observations Field Data Log Sheet for Storm Events for Biofiltration Strip/Infiltration Trench (continued)

Comments:

_____

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(Team Leader's Signature)

FACILITY NAME:_____
DATE: _____ TIME:_____
PAGE _____ OF _____

FORM I
Caltrans BMP Retrofit Pilot Program
Biofiltration Strips Field Data Log Sheet

GENERAL INFORMATION		Julian Day (*5AA):
Date:	Time in (PST,*5):	Team Leader's Initials:
Location:	Crew:	
Influent or **Effluent** (circle one)	**Storm Event Visit** or **Maintenance Visit** (circle one)	

SYSTEM STATUS FLAGS (*****6AD; 1=high, 0=low)
Arr: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____
Dep: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

PROGRAM SIGNATURE (*****B)
Arrive: _____
Depart: _____

DATA LOGGER INFORMATION (*****6)

All Site Visits:	Samp. Batt Volt 22:	Manual Rain Gauge:
Basin Staff Gauge:	Cell Batt Volt 82:	Total Rain (in.) 25:
Flow Sensor Stage:	Flow Meter Batt Volt 28:	Total Storm Vol. 72:
Stage (ft) 02:	Storm Site Visits:	Strm Vol Smpld 75:
Velocity (ft/s) 03:	Volume (kcf) 05:	Max Stage Day 51:
Flow (cfs) 04:	Storm Sum (kcf) 06:	Max Stage Time 52:
Station ID 21:	Percent Capture 08:	Max Stage (ft) 53:
	Volume2Sample 14:	Date Last Sample 105:
	Sample Count 17:	Time Last Sample 106:

AUTOSAMPLER INFORMATION

Storm only

Number of Samples Total: _____
Number of Samples Remaining: _____

Bottle # out: _____
Bottle Volume: _____
Volume2Sampl: _____

Bottle # in: _____

GRAB SAMPLE COLLECTION

	Time:
TRPH (VOAs)	_____
Bacteria	_____
Oil and Grease	_____
Other: _____	_____

CALIBRATIONS and CHECKS

Stage: ☐
Sample Volume: ☐
Rain Gauge: ☐
Other:

SAMPLING EQUIPMENT AND REPAIR NEEDS:

ACTION TAKEN:

Team Leader's Signature_____

FORM J1

User-Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **INFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
02 Flow Meter Stage Offset (feet)					
03 Volume to sample (kcf)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
08 Flow Meter Speed Offset (feet/second)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
36 Cellular phone battery state control parameter					
37 Duration of cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM J2

User Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **EFFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
03 Volume to sample (kcf)					
04 Level Meter Stage Offset (feet)					
05 Level Meter Multiplier (feet/mv)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. Failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
30					
31					
34 Flume Parameter 1					
35 Flume Parameter 2					
36 Cellular phone battery state control parameter					
37 Duration when cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

FORM K: Station Phone Log

Time	Station	Stage	% Capture	PkFlow (time)	PkFlow (feet)	Sample Count	Volume 2Sample	Storm Sum	Volume	Flow (Q)

TAB 7

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

LABORATORY ANALYSIS FORMS

Form M: Chain-of-Custody Form Exhibits 7.1A and 7.1B

FORM M:
CHAIN-OF-CUSTODY FORM

Laboratory:	Lab # Date Rec'd	**From:**

Project: **P.O.#:**	**Project #:** **Required Completion Date:**

Sample ID #	**Site ID #**	**Lab ID #**	**Matrix/ Analysis**	**Containers**	**Pres.**	**Sample Date/Time**		**Condition Upon Receipt**

Data Reports **WILL** include the following: Sample/Site ID, Analytical Method, Reporting Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time

Exhibit 7.1a: ***Chemical Analyses List for Stormwater***
Stormwater Matrix
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Analyte	Priority Rank	Reporting Limit	Units	Analytical Technique	Method Number	Holding Time	Minimum Sample Volume	Preferred Volume and Container Type[1]	Preservation
Conventionals									
pH	1	0.1	Unit	Electrode	EPA 150.1	Immediately[2]	100 mL	1-100 mL glass/plastic	4°C
Specific Conductance	1	1.0	µmhos/cm	Electrometric	EPA 120.1	Immediately[2]	500 mL	1-500 mL glass/plastic	4°C
Hardness	5	2	mg/L	Titrimetric/ Colorimetric	EPA 130.2	6 months	100 mL	1-200 mL glass/plastic	HNO_3 to pH<2, 4°C
Total Suspended Solids	1	1	mg/L	Dried Filter Weight	EPA 160.2	7 days[3]	1 L	1-500 mL glass/plastic	4°C
Nutrients									
Nitrate-Nitrogen	2	0.01	mg/L	Colorimetric Ion Chromatography	EPA 353.3 EPA 300.0	28 days 48 hours	200 mL 200 mL	1-500 mL plastic 1-500 mL plastic	4°C and H_2SO_4 to pH<2 4°C
Total Kjeldahl Nitrogen	3	0.1	mg/L	Titrimetric/ Colorimetric	EPA 351.3	28 days	500 mL	1-1L plastic	4°C and H_2SO_4 to pH<2
Total Phosphorus	4	0.002	mg/L	Colorimetric	EPA 365.3	28 days	100 mL	1-250 mL plastic	4°C and H_2SO_4 to pH<2
Total/Dissolved Metals[4],[5]									
Copper	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Lead	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Zinc	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Organics[6]									
Total Petroleum Hydrocarbons – Diesel/Oil	Grab	250/200	µg/L	GC	EPA 8015M	14 days	1 L	2-1L amber glass	4°C
Total Petroleum Hydrocarbons - Gasoline	Grab	50	µg/L	GC	EPA 8015M	14 days	2-40 mL	3-40 mL VOA vials	4°C, HCl to pH<2
Bacteria[6]									
Fecal Coliform	Grab	2	MPN/100 mL	Multiple-tube	SM 9221E	6 hours[7]	50 mL	1-100 mL plastic	4°C

1. Analytes with the same preservative can be combined into a single container if the same laboratory is performing the analyses.
2. pH and Specific Conductance will be measured by the laboratory immediately upon receipt of the samples.
3. 7 days based upon limit for measuring TSS/no regulatory limit.
4. Total and dissolved metals samples are collected in separate containers. Only the total metals container will receive nitric acid.
5. Dissolved metals will be filtered in the laboratory prior to acidification.
6. Total Petroleum Hydrocarbon and Fecal Coliform grab samples will be collected for two storms per year.
7. Attempts will be made to maintain the 6-hour holding time for bacteria samples to the extent possible. When not possible, a maximum holding time of 24 hours will be followed in accordance with "Standard Methods for the Examination of Water and Wastewater", 18th Edition.

Exhibit 7.1b: Chemical Analyses for Vadose Zone Pore Liquid

Groundwater Matrix (Vadose Zone)
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Analyte	Priority Rank	Method Reporting Limit	Units	Analytical Technique	Method Number	Holding Time	Preferred Volume and Container Type[1]	Preservation
Dissolved Metals[2]								
Copper	1	1	µg/L	ICP-MS	EPA 200.8	6 months	1 100 mL plastic	4°C and HNO_3 to pH<2 and filter
Lead	1	1	µg/L	ICP-MS	EPA 200.8	6 months	1 100 mL plastic	4°C and HNO_3 to pH<2 and filter
Zinc	1	1	µg/L	ICP-MS	EPA 200.8	6 months	1 100 mL plastic	4°C and HNO_3 to pH<2 and filter

1. Analytes with the same preservative can be combined into a single container, if the same laboratory is performing the analyses.
2. Dissolved metals will be filtered in the laboratory prior to acidification

TAB 8

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

VECTOR CONTROL AND MONITORING FORMS

Form O: Vector Monitoring and Control Report

VECTOR MONITORING FORMS

Vector monitoring Fforms will be provided by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

TAB 9

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

TECHNICAL SUPPORT INFORMATION

Exhibit 9.1: Runoff Coefficients for a Strip/IT
Exhibit 9.2: "Volume-to-Sample" Table
Exhibit 9.3: Encroachment Permits

Exhibit 9.1
Runoff Coefficient Matrix Table for Biofiltration Strip/Infiltration Trench

Site No.	Site Name	Drainage Area (acres)	Runoff Coefficient C
112207	Carlsbad Maintenance Station	0.66	0.7

"Volume to Sample" in Kilo-Cubic Feet for
Carlsbad Maintenance Station Infiltration Trench / Biofilter Strip

Number of Sample Aliquots	Acreage	Runoff Coefficient
72	0.66	0.7

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0023	2.6	0.0606
0.2	0.0047	2.7	0.0629
0.3	0.0070	2.8	0.0652
0.4	0.0093	2.9	0.0675
0.5	0.0116	3.0	0.0699
0.6	0.0140	3.1	0.0722
0.7	0.0163	3.2	0.0745
0.8	0.0186	3.3	0.0769
0.9	0.0210	3.4	0.0792
1.0	0.0233	3.5	0.0815
1.1	0.0256	3.6	0.0839
1.2	0.0280	3.7	0.0862
1.3	0.0303	3.8	0.0885
1.4	0.0326	3.9	0.0908
1.5	0.0349	4.0	0.0932
1.6	0.0373	4.1	0.0955
1.7	0.0396	4.2	0.0978
1.8	0.0419	4.3	0.1002
1.9	0.0443	4.4	0.1025
2.0	0.0466	4.5	0.1048
2.1	0.0489	4.6	0.1071
2.2	0.0512	4.7	0.1095
2.3	0.0536	4.8	0.1118
2.4	0.0559	4.9	0.1141
2.5	0.0582	5.0	0.1165

CALTRANS
BMP RETROFIT PILOT PROGRAM

BMP OPERATION, MAINTENANCE, AND MONITORING PLAN

VOLUME II

BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK FOR BIOFILTRATION SWALES

DISTRICT 11, SAN DIEGO

September 1999

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3.1 Lists and Locations of Required Stormwater Monitoring Forms and Checklists for Biofiltration Swales

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APPENDIX II: HEALTH AND SAFETY PLAN

APPENDIX III: QUALITY ASSURANCE/QUALITY CONTROL PLAN

APPENDIX IV: VECTOR CONTROL PLAN

APPENDIX V: MAINTENANCE INDICATOR DOCUMENT

1.0 INTRODUCTION

This Field Guidance Notebook *(FGN)* gives inspectors, maintenance, and monitoring personnel the appropriate field evaluation and documentation for the District 11 Biofiltration Swales (Swales) belonging to the Caltrans BMP Retrofit Pilot Program. Field observations and conditions must be clearly and concisely documented on the field forms provided.

Refer to Appendix I-E of this guidance document for supporting information on Swale technology and characteristics.

1.1 Data to Be Collected

The following data will be collected to assess the performance and maintenance aspects of a Swale:

- Water quality and quantity data of runoff into and discharge from the Swale from flow-composite samples and first-flush (as soon as possible after the start of runoff) grab samples for at least eight storm events during two wet seasons, weather permitting.
- Rainfall data, recorded as a function of time, from rainfall events during the study period.
- Observations of water quality, weather, antecedent conditions, spills, etc.
- Documentation records of inspections and maintenance activities performed.
- Vector monitoring data.
- Records of vector control measures taken.
- Vegetation management records.

Consultants will be responsible for data management. Overall management of the data will be consistent with established Caltrans procedures for stormwater monitoring projects.

1.2 Field Activities to Be Performed

Field activities that will be performed at the Swale facilities include:

- Empirical Observation of Biofiltration Swale Operation.
- Monitoring Equipment Installations.
- Monitoring Equipment Maintenance.
- Facility Maintenance Inspections and Facility Maintenance.
- Vector and Nuisance Animal Control Inspections.

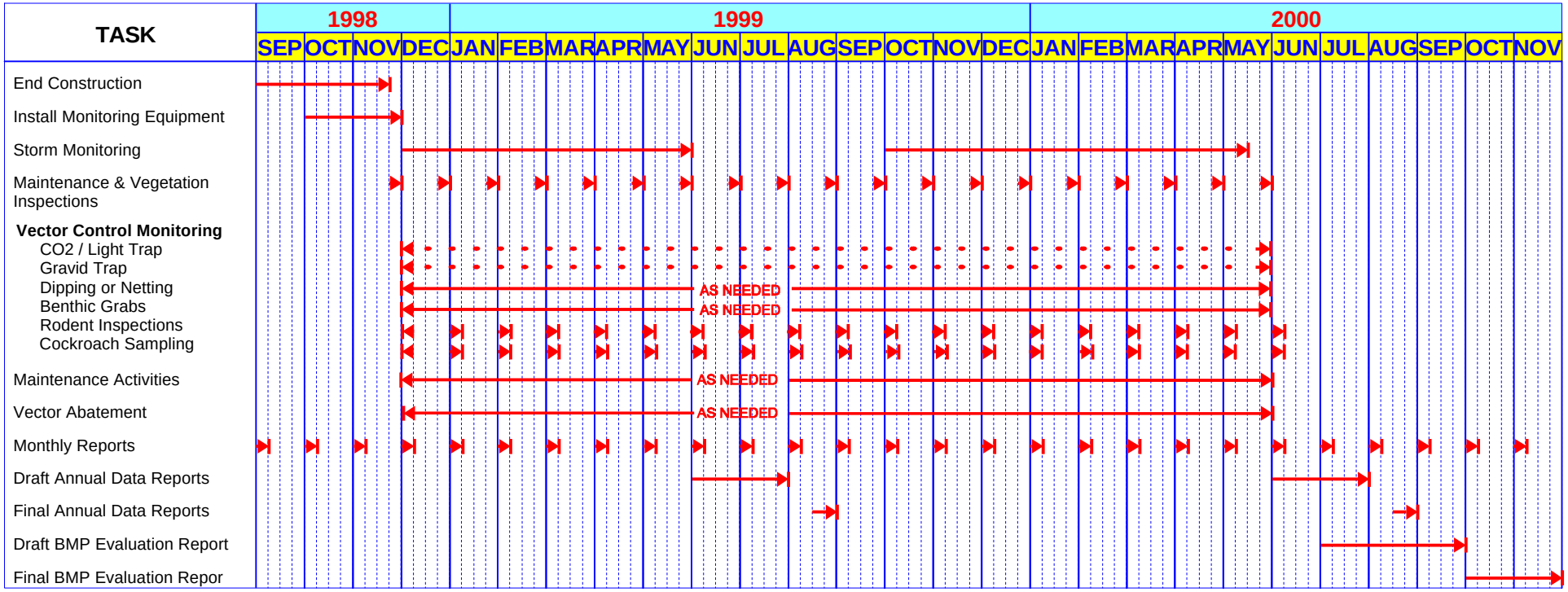
- Vegetation Control.
- Stormwater Monitoring.

Also, vector management may occur at the Swale facilities, but may be contingent on facility housekeeping and other environmental influences. Please see Appendix IV of Volume II for further details.

1.3 Master Schedule

The schedule on the following page shows the time-line for each phase of the Swale OMM program.

Figure 1.3
Projected Schedule
Biofilter Swale OMM



2.0 SITE INFORMATION

Access requirements for each site are summarized in Table 2.1, in the Encroachment Permit found in Tab 9, and in the Site Location Maps in Tab 1. ***Encroachment Permits must be on hand*** for each site visit, and ***notification requirements found in these permits must be followed***.

Check in with appropriate Caltrans personnel before conducting field work.

Table 2.1
Caltrans District 11 Biofiltration Swales Site Summary

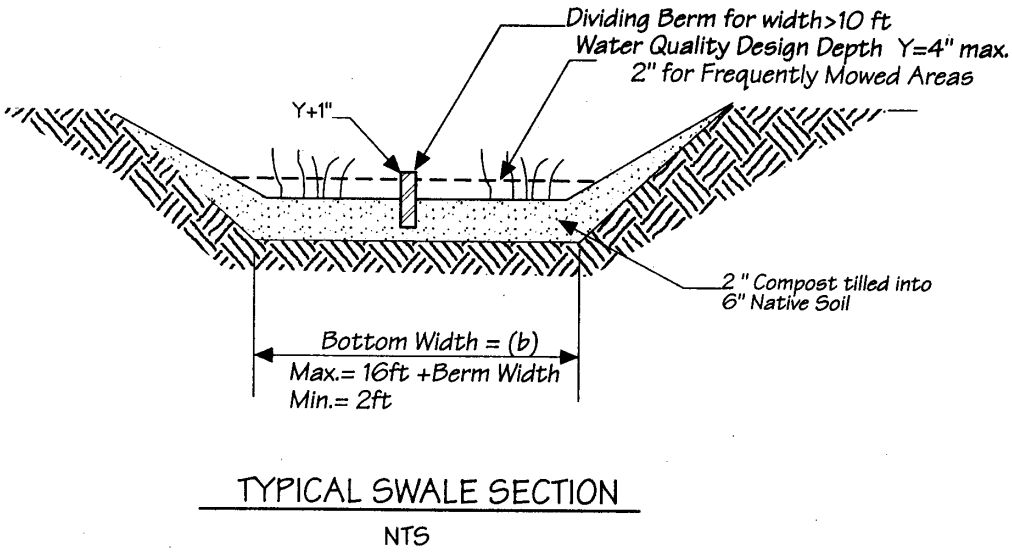
Site No.	Site Name	Site Location	Access and Parking
112205	SR-78/Melrose Avenue Exit	Adjacent to the SR-78 eastbound shoulder, west of the Melrose Ave. off-ramp. The swale is between the area parallel to the SR-78 freeway and Hacienda Dr.	Access the BMP through the gate located off Hacienda Dr. Park on Hacienda Dr. Use key CCL.
112206	I-5/Palomar Airport Road	Adjacent to the I-5 southbound shoulder, north of the Palomar Airport Road off-ramp. The location for the swale is along the area of Caltrans right-of-way parallel to the I-5 shoulder.	Access to the area is achieved from the I-5 southbond shoulder. Park on shoulder as far as possible from the flow of traffic. Use key CCL.

2.1 Biofiltration Swales

Refer to the accompanying Appendix for a general description of a Biofiltration Swale. The sections below provide site-specific information for the Swale sites in District 11.

Refer to Tab 9 for a summary of the hydraulic characteristics for these sites. The following figure illustrates a cross-sectional diagram of a Biofiltration Swale.

Figure 2.1 Cross-section of a Biofiltration Swale



2.1.1 Site 112205: State Route 78/Melrose Avenue Exit

A Swale has been constructed along the eastbound shoulder of Route 78 and along the off-ramp to Melrose Avenue. A site plan for this facility can be found in Tab 1. The Swale is approximately 3 m wide (at the invert) along 20 m of the Swale, and 6 m wide (at the invert) along 100 m of the Swale. The Swale is approximately 3 m deep with a slope of 0.8%. Flow enters and exits the Swale through 1 m trapezoidal channels. A transition stucture from the inlet trapezoidal channel to the Swale distributes runoff evenly across the invert of the Swale. Hydraulic characteristics for the drainage area can be found in Exhibit 9.1, Tab 9.

For flow measurements, a 300 mm 45E trapezoidal flume in combination with bubbler level meter will be installed in each of the conveyances leading to and from the Swale, before and after the transition structures. This flume will accurately measure flows between 0.16 and 7.08 cfs. Peak flow through the Swale is anticipated to be about 6.1 cfs for a 25-year, 24-hour storm. The depth of water 150 mm in front of the converging section of each flume will be measured.

Please see the Site Location Map and BMP Facility Plan in Tab 1.

2.1.2 Site 112206: I-5/Palomar Airport Road

A Swale has been constructed along the shoulder of southbound I-5 approximately 80 m north of the off-ramp to Palomar Airport Road. A site plan for this facility can be found in Tab 1. A concrete swale collects runoff along approximately 400 m of the southbound lanes of I-5 and

diverts it to the Swale. The Swale is approximately 2.5 m wide (at the invert), 50 m long, and 1 m deep. The Swale slope is approximately 0.8%. Runoff exits the Swale through a v-shaped concrete channel. A transition stucture from the inlet trapezoidal channel to the Swale distributes runoff evenly across the invert of the Swale. Hydraulic characteristics for the drainage area can be found in Exhibit 9.1, Tab 9.

For flow measurements, a 2-inch 30E trapezoidal flume in combination with bubbler level meter will be installed in each of the conveyances leading to and from the Swale, before and after the transition structures. This flume has an accuracy range of 0.04 cfs to about 3.0 cfs. Peak flow through the swale is anticipated to be about 3.8 cfs for a 25-year, 24-hour storm. The depth of water 35 mm in front of the converging section of each flume will be measured.

Please see the Site Location Map and BMP Facility Plan in Tab 1.

2.2 Emergency Hospital Routes

See the "**Emergency Procedures Support", Tab 2,** for maps and descriptions showing routes to the nearest hospitals and for emergency and site-related telephone contacts.

2.3 Site-Specific Health and Safety Concerns and Precautions

This subsection only identifies health and safety concerns and precautions. Appendix II provides more extensive health and safety concerns and requirements. Note that at Swales, field crews will consist of a minimum of two people. Refer to the site Encroachment Permit (Tab 9) for additional health and safety requirements.

2.3.1 Traffic Safety Precautions

Activities at Swales bring up traffic concerns including access and parking at pullouts. During access and routine visits to the facilities, the following precautions will be taken:

- Minimize the time spent on the shoulder of the highway.
- Park on the facility access road or pullout, as appropriate to the specific site.
- Affiliated personnel shall wear a reflective orange safety vest, a hard hat, and appropriate shoes.
- Rotating amber lights shall be mounted and operational on work vehicles.

According to Chapter 8 (Protection of Workers) of the *Caltrans Maintenance Manual*, working for more than 10 minutes on the shoulder involves a shoulder closure procedure. This shoulder closure procedure will conform to the safety precautions below and the site-specific instruction provided in the Encroachment Permits (Exhibit 9.3 of Tab 9).

- Prior to beginning any work on or adjacent to a major roadway, the local highway patrol traffic control department shall be notified. See the Emergency Contacts List in Tab 2 for a listing of the local highway patrol phone numbers.
- Whenever possible, plan the timing of the work for non-peak traffic congestion periods if long-term parking on the shoulder is required.
- Use enough cones and barricades to sufficiently divert traffic safely around the work area (adhere to specific shoulder closure requirements detailed in the Encroachment Permits).
- Any open manhole or ditch must be barricaded.
- Remember that visibility is the key to minimizing the dangers of working in traffic.
- Upon completion of the work, the area must be cleaned up of materials and left in a clean and orderly state.

2.3.2 General Safety

In addition to traffic hazards, field crews may face a variety of potential dangers while maintaining the Swale facilities, installing equipment, and performing environmental monitoring. Be aware of:

- Slippery conditions.
- Lightning.
- Fast moving water.
- Unstable earth.
- Poor visibility, especially at night.
- Lifting heavy objects.
- Muggers and other criminals.
- Transients
- Power tools and heavy equipment.
- Ledges.
- Sharp edges - broken glass.
- Overhead dangers.
- Dogs and other biological hazards.
- Electrical hazards posed by equipment malfunctions.

Other important field precautions include:

- Stay away from the edges of a fast moving body of water. These edges are usually slippery and unstable during rainy conditions.
- If sampling is required at the edge of a fast moving body of water, use a lifeline and a personal flotation device. Use grabbing devices when possible.
- Never work alone at night and avoid working alone during the day.
- Avoid leaving materials, tools and equipment lying around where someone can trip over them.
- Maximize lighting, especially at night.

- Keep a phone or other means of communication nearby.
- Do not use your back to lift heavy objects. Get help.
- Never use drugs or alcohol while working.
- Always wear a hard hat and orange safety vest.
- Do not use power tools and heavy equipment unless trained in the proper use and care of the specific power tools.
- Always wear eye protection when working with tools or chemicals
- Wear rain gear.
- Never leave open holes unattended or unbarricaded.
- Do not sample during lightning.
- Clean up the work area before leaving.

3.0 FIELD PREPARATION

Use Table 3.1 on the following page as a guide to find appropriate forms and information required for field visits. This table covers appropriate aspects of the field OMM program including mobilization, observation, and monitoring checklists. The key in preparing for field visits, whether for maintenance or monitoring, is by obtaining and going through each item on the table pertaining to the field task at hand. Prior to the operational phase of this program, items contained in this table will be assembled into separate logbooks for facility operations and maintenance, vector control, storm monitoring, and office monitoring.

Table 3.1
List and Locations of Required Stormwater Monitoring Forms and Checklists for Biofiltration Swales

Tab No.	Item	Form or Exhibit No.	Use and Frequency
1	Site Location Maps	NA	Prior to site visits.
	BMP Facility Plans	NA	Prior to site visits.
2	Emergency Contacts Lists	NA	Consult for emergency phone numbers.
	Hospital Route Maps	NA	Quick guide to the nearest hospital.
	Project Contacts List	NA	Refer for pertinent support staff.
3	Storm Monitoring Decision Tree	Ex. 3.1	Prior to each monitored storm.
	Mobilization Checklist	Form A	Before each storm and maintenance visit.
	Storm Staffing Plan	Form B	Filled out prior to storm event for crew and equipment assignments.
4	BMP Site Inspection Checklist for Biofiltration Swales	Form C	Filled out for each inspection visit.
	Monitoring Equipment Inspection Checklist for Biofiltration Swales	Form D	Filled out for each equipment inspection.
5	BMP Site Maintenance Activity Checklist for Biofiltration Swales	Form E	Filled out for each maintenance inspection.
	Monitoring Equipment Maintenance Activity Checklist for Biofiltration Swales	Form F	Filled out for each maintenance inspection of sampling equipment.
	Stockpile/Sediment Sampling Checklist	Form G	Complete for any stockpile or waste sampling.
	CCR Title 22 Characterization Requirements	Ex. 5.1	Reference for sediment stockpile sampling.
6	Empirical Observations Field Data Log Sheet for Storm Events for Biofiltration Swales	Form H1	Each time a visit is made during wet weather. Separate observations will be made of the inflow, outflow, and BMP.
	Hydraulic Residence Time Calculation Checklist	Form H2	One time per monitoring season.
	Field Data Log Sheet for Biofiltration Swales	Form I	Each storm station visit. Separate logs will be filled out for the inflow and outflow.
	User-Entered Program Parameter Log Sheet (Influent/Control)	Form J1	Each time a program parameter is changed.
	User-Entered Program Parameter Log Sheet (Effluent Sampling)	Form J2	Each time a program parameter is changed.
	Station Phone Log	Form K	Each time station is contacted.
7	Chain-of-Custody Form	Form M	Whenever samples are collected.
	Chemical Analyses List	Ex. 7.1	Reference for each sampling event and laboratory analysis request submittal.
8	Vector Control and Monitoring Forms	Forms O1 and O2	Fill out for each site visit related to vector monitoring.
9	Runoff Coefficients for Biofiltration Swales	Ex. 9.1	Reference for calculations.
	"Volume-to-Sample" Tables	Ex. 9.2	Consult to set sampling frequency.
	Encroachment Permits	Ex. 9.3	Explains access and safety requirements. Must always accompany field crews.

4.0 FACILITY OPERATIONS AND MAINTENANCE

4.1 Facility Operation Inspections

Each Swale will be inspected on a regular basis according to the following minimum rates:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation).
- On a weekly basis during extended periods of wet weather.

Optimal BMP operation is dependent on field inspections. When inspecting the facility, follow the procedural steps below. Document inspections on Forms C and D (Tab 4).

1. Prior to arrival, contact the appropriate Caltrans District 11 personnel identified in the Encroachment Permit (Exhibit 9.3 in Tab 9).
2. Completely walk around the BMP while looking for obvious problems, damage, or malfunctions.
3. Inspect and assess needs for:

    - General aesthetics (graffiti, vandalism),
    - Vegetation management (grass, shrubs, trees),
    - Erosion and slope stability,
    - BMP performance (fouling, blockage, damage),
    - Equipment repair/maintenance (BMP components, autosampler),
    - Sediment accumulation (within BMP, at influent confluence),
    - Storage of accumulated sediment or other wastes, and
    - Vector control.

4. Complete Form C (see Tab 4) during inspections.
5. Log field activities and their corresponding time accurately.
6. If immediate corrective or preventive maintenance is needed, call the appropriate contacts listed in the Project Contacts List in Tab 2.

4.2 Facility Maintenance

Functional (performance and safety) and aesthetic (public acceptance) maintenance is critical. For these BMP sites, focus on:

- Trash and Debris Removal.
- Sediment Removal and Management.
- Equipment Maintenance.
- Structural Repairs.

- Standing or Stagnating Water
- Vector Control.
- Vandalism.

The frequency of individual maintenance activities at the Swale facilities will be conducted according to the schedule listed in the maintenance indicator document, included as Appendix V of Volume II.

Maintenance activities performed will be documented using Forms E and F in Tab 5. See Section 2.0 of Appendix I-E for full details on maintenance activities.

4.3 Vegetation Management

Maintenance and control of vegetation is essential to the optimal operation and performance of a BMP. The condition of the native vegetation will be inspected on a monthly basis at a minimum to ensure that

- vegetation is kept relatively short,
- slope vegetation is protected and kept healthy, and
- undesirable plant species do not take root.

Shorter vegetation on the Swales optimize the treatment capacity, the residence time of runoff, and will aid in vector control. Maintaining healthy and continuous vegetation on the slopes will minimize erosion. Preventing undesirable plant species from taking root will prevent plants with large root systems from damaging the embankments. Use the inspection and maintenance checklists (Forms C through F) whenever inspections and maintenance activities for vegetation management are performed. See Sections 2.0 and 4.0 of Appendix I-E for specific details on controlling vegetation.

4.4 Disposal of Trash and Debris

Trash and debris from Swales is ultimately the responsibility of Caltrans. Consultants responsible for operating, maintaining, and monitoring the BMP will be responsible for removal and disposal of the trash and debris. This disposal will comply with applicable local, county, state, and federal waste control programs. Table 2.1 in the accompanying Appendix for Biofiltration Swales shows a few possible disposal services for waste material.

4.5 Deposited Sediment Management and Characterization Sampling

Handling and appropriate disposal of sediment residues from BMPs is critical. Stockpiling is only allowed at the facility under the following conditions:

- Sandbag berms are created (8-inch minimum) and are placed around the stockpile area.
- At least 0.5-mil plastic is used to contain any dewatered liquids (overlying sandbags).

- Stockpiles are covered and covers are anchored.

Once sediment stockpile storage has reached disposal quantity, chemical characterization must be conducted to satisfy land disposal requirements (LDRs). Document any evidence of oil and grease, antifreeze, solvents, fuel, hydrogen sulfide, and any other noxious substance (Form G, Tab 5). These observations will assist in determining if hazardous waste disposal analyses are required. Refer to Form G in Tab 5 for additional details on conducting this sampling.

For sediment stockpiles, the minimum number of discrete samples initially required must comply with Form G, Tab 5. Random samples will be selected from locations on a three-dimensional grid. If the presence of materials such as boulders, debris, etc. hinder the application of this process, the sample will be collected as close as possible to the randomly selected point without altering the essence of the random selection process.

Stockpile sediment samples will be collected in the following manner:

1. Don personal protective equipment.
2. Locate the sample point in the stockpile or drum.
3. Collect the sample using a soil probe or equivalent. Ensure that the sample is collected at the correct depth and location that was randomly selected.
4. Fill one 8-ounce glass jar with a portion of the sample and close the container with the cap, using care not to aerate (volatilize) the sample. This jar will be labeled and analyzed for volatile TPH and VOC.
5. Homogenize the other portion of the sample in a disposable bowl using a disposable spatula or spoon. Fill a second 8-ounce glass jar with this portion of the sample and close the container with the cap. This sample will be labeled and analyzed for metals.
6. Wipe the outside of each sample container with a clean paper towel.
7. Record the sampler's initials, date, and time on the pre-labeled sample bottle.
8. Place the sample containers in individual zip-top plastic bags and seal the bags.
9. Immediately pack the samples into a chilled cooler.
10. Record the required information on the Chain-of-Custody Form.
11. Document the sampling event, recording information in the designated field logbook.
12. Repeat the above steps until the minimum number of samples has been collected.

Unless observations indicate additional testing, sediment samples submitted to the laboratory will be analyzed for the list of analytes in Exhibit 5.1 in Tab 5 using CCR Title 22 criteria (State of California, 1985).

4.6 Vector and Nuisance Animal Control

Vector monitoring and management will be performed in accordance with Appendix IV by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

5.0 STORM MONITORING

Careful preparation and planning is critically important. Representative samples *must* be obtained for each storm event. Always double-check that equipment, supplies, and personal protective gear are readied for each field deployment.

Before crews are deployed to the field, be sure that local rainfall meets the sampling criteria:

1. A minimum of 48 hours of dry weather preceded the storm (72 hours is preferred).
2. The Deployment Criteria defined in Exhibit 3.1.

Check appropriate sources for local weather conditions before deploying field staff. Use the Storm Monitoring Decision Tree (Exhibit 3.1, Tab 3) for a decision tree on when and how to mobilize field personnel and equipment.

5.1 Storm Characteristics and Sampling Equipment

Section 5.0 of Appendix I-E details the stormwater equipment, equipment maintenance requirements, stormwater monitoring procedures, sediment sampling procedures, and analytical methods, reporting limits, and holding times for samples from Swales sites. Appendix III contains the BMP Retrofit Pilot Program Quality Assurance and Quality Control Plan.

A separate logbook is used for each Swale facility. Pertinent checklists, log forms, and information necessary to conduct a successful monitoring program and to be contained in the site-specific field logbooks are listed in Table 3.1 in Section 3.0. The pertinent checklists and log forms are located in Tabs 1 through 9. Table 3.1 also lists analytical and office forms, contains corresponding form and table numbers, identifies the location in this document, and explains when each form is to be filled out.

Sampling equipment shall be inspected for proper function, staging, and sampling preparation (if wet season) and documented. There are three principal phases of documenting stormwater sampling at BMP sites:

- Pre-Storm preparation,
- Storm event sampling (grab samples and composite sample collection of both influent and effluent), and
- Post-Storm sample analyses.

5.1.1 Pre-Storm Preparation

1. Consult the Storm Monitoring Decision Tree (Exhibit 3.1 in Tab 3) for when to mobilize.
2. Review the Mobilization Checklist for appropriate equipment, sampling devices, and sample bottles (Form A, Tab 3).

3. Verify sample bottle quantities, number of analyses for each parameter, in-situ sampling equipment, and other necessary gear/support materials.
4. Decontaminate and assemble decontaminanted sample containers, teflon® hose, and other sampling equipment according to the following procedures:

   Cleaning Procedures for Sample Bottles

   Bottles will be:

   a. Rinsed three times with warm tap water.
   b. Scrubbed with a clean plastic brush.
   c. Soaked in a 2% detergent (e.g., Contrad®) solution for at least 48-hours.
   d. Rinsed three times with tap water.
   e. Rinsed five times with Milli-Q or equivalent water, rotating the bottle to ensure contact with the entire inside surface.
   f. Rinsed three times with hexane while rotating the bottle, and then air-dried.
   g. Rinsed six times with Milli-Q water.
   h. Soaked in 2N nitric acid for a minimum of 24-hours.
   i. Rinsed six times with Milli-Q water.

   Cleaning Procedures for Teflon®Hose and Other Sampling Equipment

   Teflon® hose and other sampling equipment will be:

   a. Teflon® hose will be rinsed three times with a 2% Micro® solution or equivalent. Other sampling equipment will be washed with a 2% Micro® solution and a clean plastic brush.
   b. Rinsed three times with warm tap water.
   c. Rinsed three times with Milli-Q or equivalent water.
   d. Rinsed three times with 2N nitric acid.
   e. Soaked at least 24-hours in 2N nitric acid.
   f. Rinsed three times with Milli-Q water.

5. Inspect monitoring equipment for proper operation (use Form D, Tab 4). At each sampling location do the following:

   a. Check battery voltages and electrical connections.
   b. Inspect the pump tubing and replace if necessary.
   c. Inspect desiccant cartridges in flow meter.
   d. Inspect intake tubing condition and connections. Make sure intakes, flow structures, and sensors are clear of debris (this is only possible if confined space requirements are met).
   e. Make sure the correct user-entered program parameters are entered (use Forms I, J1, J2 and K in Tab 6).
   f. Set system status flags.

g. Make sure the automatic sampler is set up properly by verifying that the correct bottle size, number of bottles, hose diameter, hose material, hose length, head height, aliquot volume, number of samples to fill the bottle, and number of pulses to sample has been entered correctly.
h. Make sure the sampler is set to take a sample automatically after receiving a pulse form the data logger.

6. Ice composite bottles.
7. From the office or field set "Volume-to-Sample" numbers (Exhibit 9.2 in Tab 9) and initiate equipment to begin sampling automatically when flow is detected. Fill out the phone log (Form K, Tab 6).
8. Prepare necessary sample bottles for first-flush (as soon as possible after the start of runoff) grab samples. Grab samples will be collected twice per year as directed by the Task Order Manager.

5.1.2 Storm Event and Sample Collection

1. Once onsite, fill out the Empirical Observations Field Data Log and a Field Data Log Sheets (Forms H1 and I in Tab 6) to document storm characteristics.
2. Locate influent/control autosampler and inspect for proper operation.
3. Locate effluent autosampler and inspect for proper operation.
4. Change composite bottles and re-initiate equipment as needed.
5. Take grab samples as needed (two will be taken per monitoring season at the influent and effluent locations of the Swale).

5.1.3 Post-Storm Sample Analyses

After a storm event has ended, the autosampler stations need to be shut down and left ready for the next storm event in the following manner:

1. Reset the storm monitoring program to prepare for another storm event.
2. Replace the four 1-gallon autosampler sample bottles and the reset the sampler.
3. Physically inspect the station to determine if any damage was sustained during the storm event. Inspect the flow sensor and intake for debris blockage or clogging. (This is only possible if confined space requirements are met).
4. Check battery voltages; replace batteries that are low.
5. Retrieve data via field modem interrogator or from the remote monitoring computer.

Data Retrieval

Data will be retrieved (dumped) from the data logger after each storm event during the storm season, and, during dry weather, approximately every month.

Chain-of-Custody Forms

When the grab samples have been collected, the paperwork will be filled out to ensure a smooth transfer of samples to the analytical laboratory. Chain-of-Custody Forms (Form M, Tab 7) will be filled out in detail describing the type of sample, the quantity of samples, and the time that the samples were collected. These forms will accompany the samples to the laboratory.

5.2 Empirical Observations

Complete and succinct empirical observations for both rain/runoff and the BMP, are required during each site visit related to wet season monitoring. These observations will be taken throughout the facility as they apply to the BMP (particularly at the influent and effluent locations). These empirical observations will be recorded on Form H1 in Tab 6.

Observations will be succinct but complete. For a Swale performance evaluation, the following observations will be taken at the influent location, within the Swale, and at the effluent location:

- Meteorological characteristics (present and preceding period).
- Hydrologic and hydraulic characteristics (flowing and/or standing water, channelization).
- Inlet conditions (problems affecting performance).
- Water quality appearance (visual, olfactory) to roughly assess changes in water quality.
- Solids deposition (trash and debris, sediments, organics) and resuspension.
- Erosion.
- Vegetation condition.
- Outlet conditions (problems affecting performance).
- Mosquitoes and other vectors.
- Structural condition of facility.
- Monitoring equipment condition.
- Hydraulic residence time measurements (Swales only).

Refer to Form H1 in Tab 6 for recording empirical observation information.

5.3 Hydraulic Residence Time Evaluation

Removal of pollutants from stormwater is dependent on a variety of design factors including the hydraulic residence time. The hydraulic residence time is the amount of time it takes a slug of stormwater to flow through a Swale, and will be evaluated at each Swale during one storm event during each monitoring season. To determine the hydraulic residence time, a residence time distribution analysis will be carried out by injecting dye into stormwater runoff entering the Swale and monitoring the concentration (absorbance) of the dye in the runoff at the downstream end of the Swale. These results will be plotted to produce a flow-through curve, which will be

used to evaluate performance indices (e.g., time to reach peak concentration and time to reach the centroid of the curve). The following procedure will be used to determine the hydraulic residence time of each Swale.

1. Mobilize a team for a storm event where the amount of rain predicted is greater than or equal to 0.10 inch. This event should **not** be an event during which stormwater monitoring (i.e., sampling) will be conducted.
2. Measure the Swale vegetation height and record it on Form H2.
3. Remove any obstructions from the Swale and its inlet and outlet structures.
4. Initiate the flow monitoring equipment and ensure that it is properly calibrated. Program the bubbler to measure flow after each 1-minute interval (lowest possible setting). Set the flow monitoring equipment so that flow volume is totaled. After calibration and programming, begin data logging flow rates.
5. Pour 10 mL of yellow/green dye liquid (*Formulabs* or equivalent) into the inlet flume.
6. Once the dyed water reaches the beginning of the vegetation, start a stopwatch and begin timing the travel of the dyed water.
7. Record observation of the dyed water as it travels through the Swale.
8. Collect a sample at the downstream end of the Swale and use a colorimeter, or equivalent, to measure the absorbance in the sample.
9. Record the absorbance measurement, the time when the sample was collected, and the flow volume when the sample was collected on Form H2.
10. Repeat Steps 8 and 9 every 2 minutes for a period of 1 hour or until the absorbance decreases to less than or equal to 10 percent of the peak absorbance measured, whichever occurs first.

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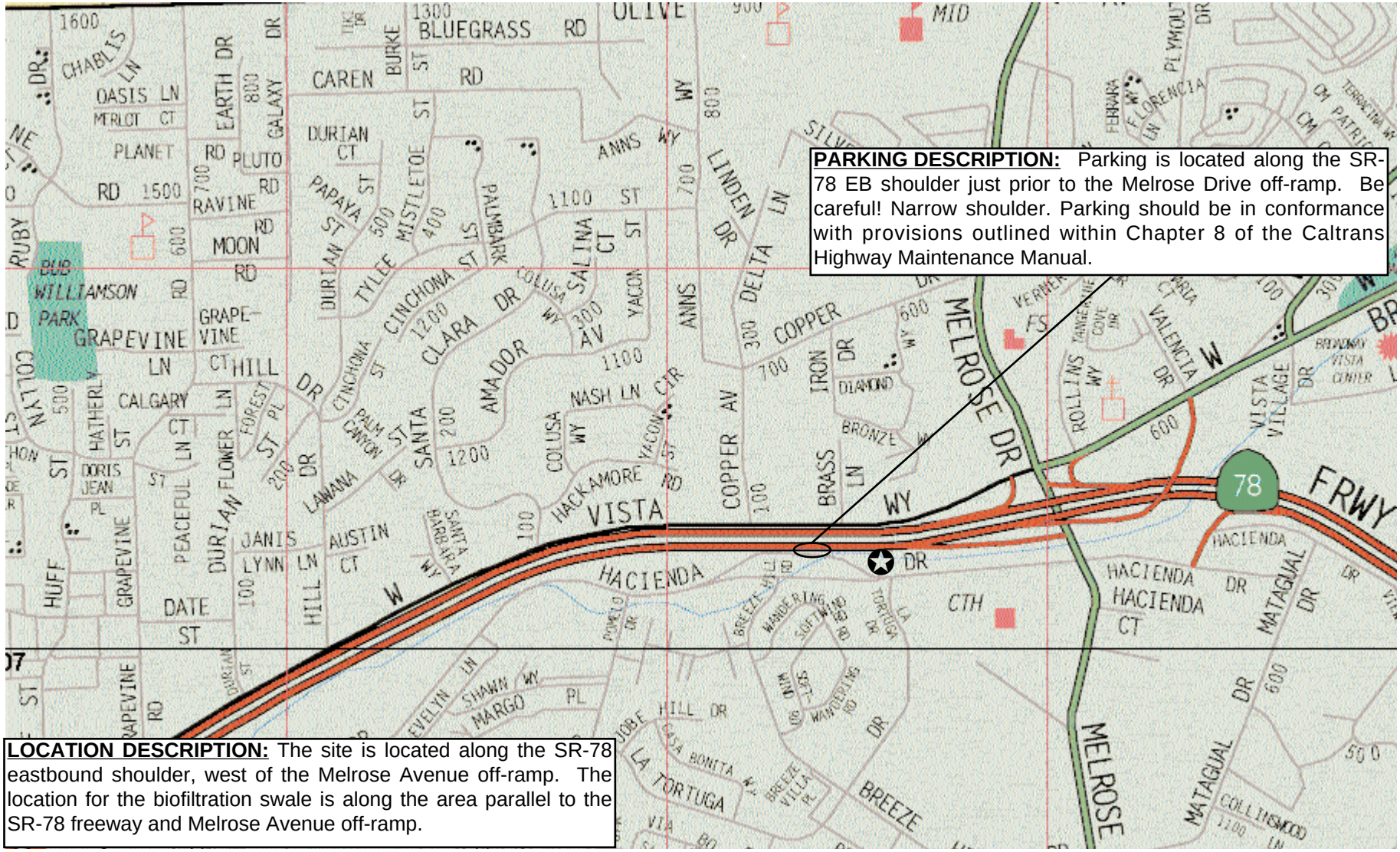
TAB 1

CALTRANS BMP STORMWATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

MAPS

Site Location Maps
BMP Facility Plans



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

CALIFORNIA DEPARTMENT OF TRANSPORTATION

SR-78 (east)/Melrose Avenue Exit
BMP Pilot Study Site #112205

District 11

Robert Bein, William Frost & Associates

6/98 JN 34618

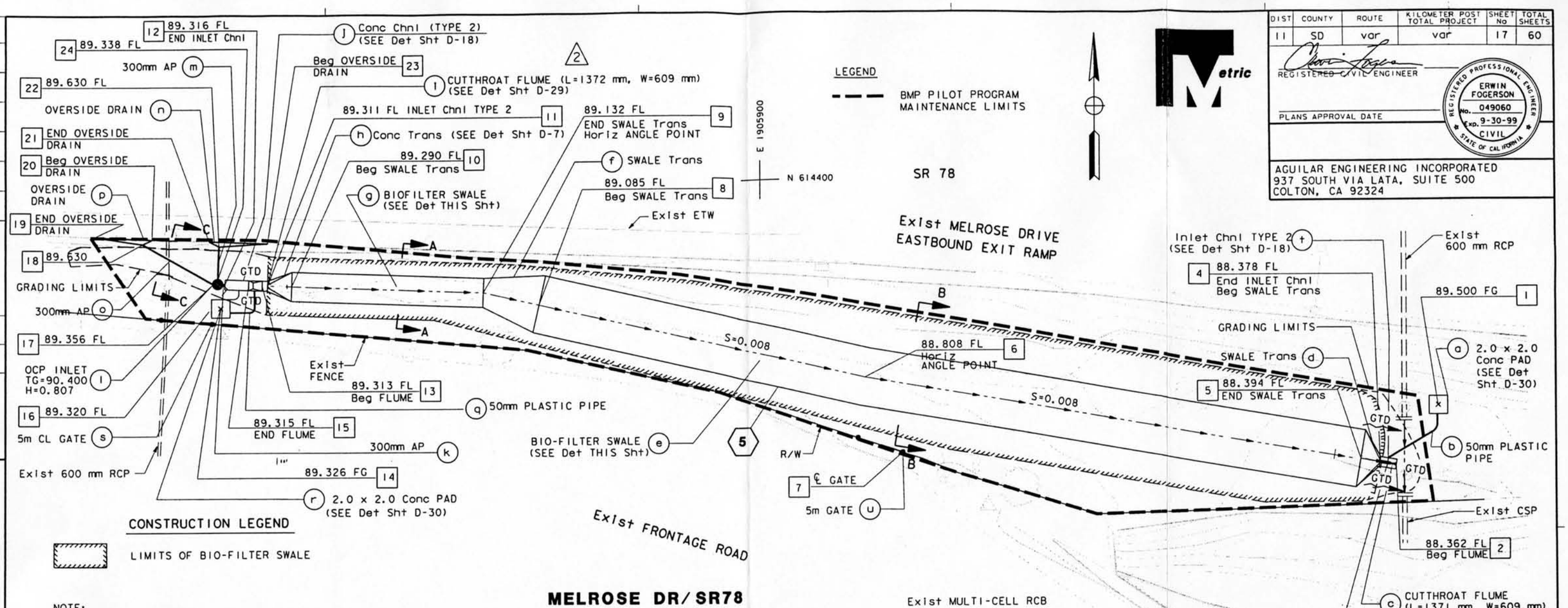
DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	var	var	17	60

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER ERWIN FOGERSON No. 049060 Exp. 9-30-99 CIVIL STATE OF CALIFORNIA

AGUILAR ENGINEERING INCORPORATED
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324



CONSTRUCTION LEGEND

LIMITS OF BIO-FILTER SWALE

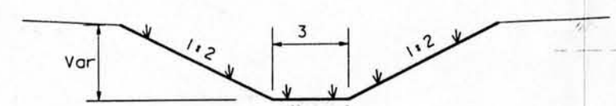
MELROSE DR/SR78

NOTE:

1. FOR COMPLETE R/W AND ACCURATE ACCESS DATA, SEE R/W RECORD MAPS AT DISTRICT OFFICE.

COORDINATE POINT	NORTHING	EASTING	COORDINATE POINT	NORTHING	EASTING
1	614376.484	1905969.877	12	614389.526	1905844.651
2	614370.324	1905965.542	13	614389.368	1905848.481
3	614370.554	1905964.190	14	614387.037	1905844.231
4	614370.736	1905963.860	15	614389.444	1905846.660
5	614370.955	1905961.869	16	614389.538	1905844.353
6	614379.608	1905910.840	17	614389.540	1905843.454
7	614371.821	1905914.718	18	614393.685	1905836.157
8	614387.252	1905877.017	19	614394.431	1905831.157
9	614388.538	1905871.328	20	614394.137	1905837.157
10	614389.271	1905851.576	21	614393.930	1905843.047
11	614389.344	1905849.029	22	614393.406	1905844.047
			23	614393.701	1905849.047
			24	614390.004	1905843.921

THIS PLAN ACCURATE FOR DRAINAGE ONLY



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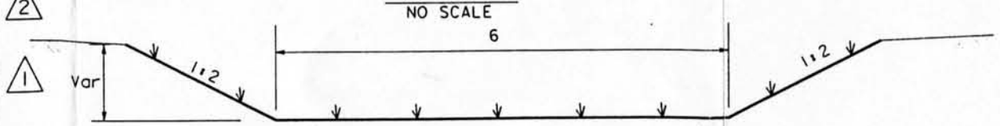
NO SCALE



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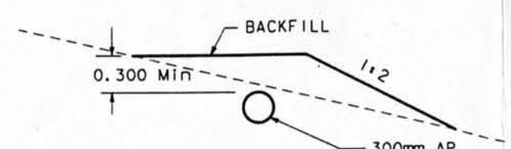


SECTION C-C
NO SCALE

ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE SHOWN

SITE 112205 OVERVIEW OF THE MELROSE DRIVE/SR-78 BIOFILTER SWALE BMP

SCALE 1 : 200

DATE	REVISED BY	DATE REVISED
2		12-1-98
1		10-5-98

CALCULATED/DESIGNED BY
CHECKED BY
PROJECT ENGINEER

18 JUN 99 12:47:7 \winnt\profiles\aw\desktop\5.div

LAST REVISION

TAB 2

CALTRANS BMP STORMWATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

EMERGENCY PROCEDURES SUPPORT

Emergency Contacts Lists
Hospital Route Maps
Project Contacts List

Document information related to the accident or incident that resulted in injury or damage and report it to Jon Toal at KLI at (831) 457-3950

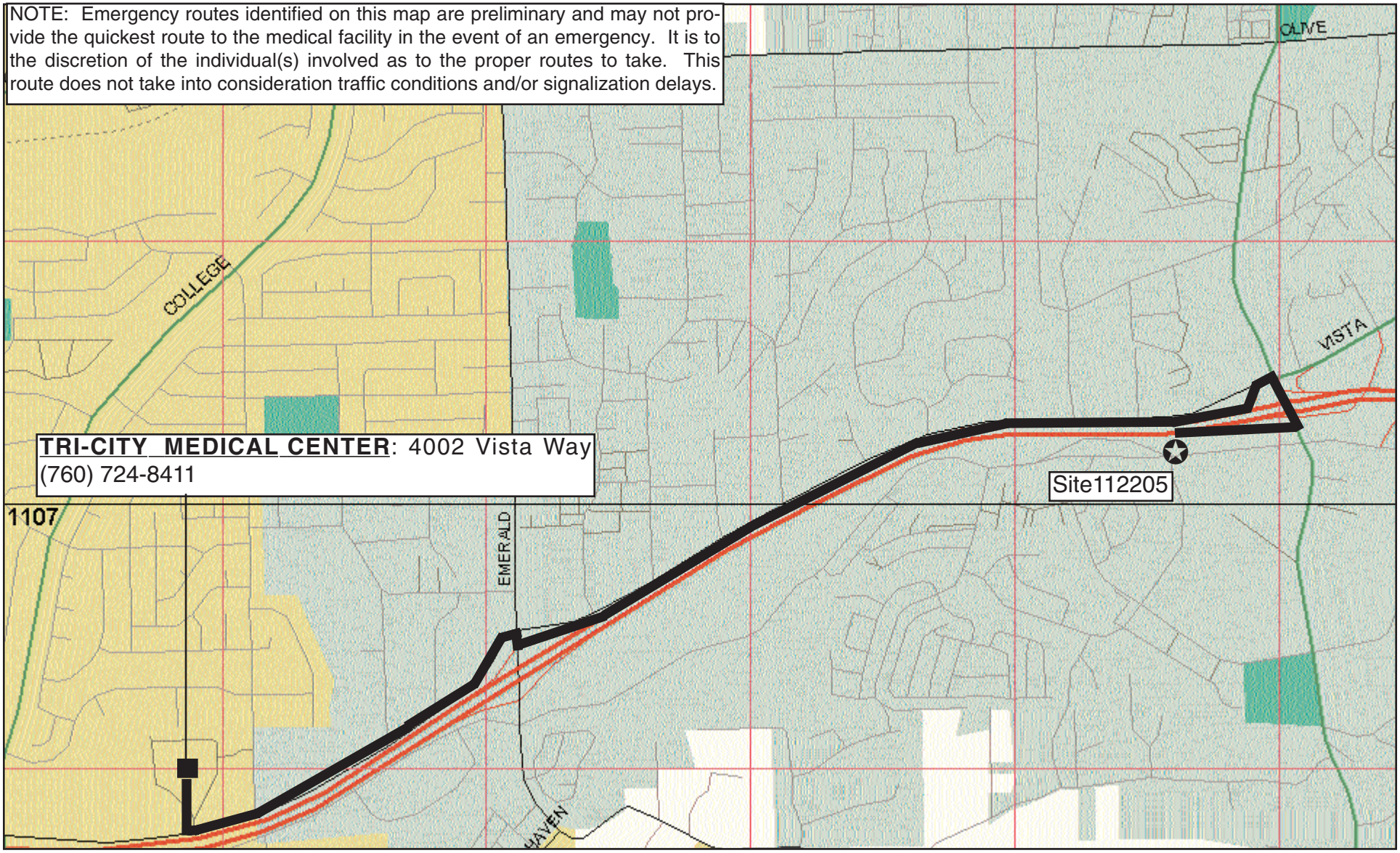
Emergency Contacts for Site 112205: SR-78/Melrose Avenue Exit

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Police Department	911	From landline phone
Local Police Emergency Dispatch	911	From landline phone
Fire Emergency Dispatch	911	Call immediately in case of fire or hazardous spills
Non-Emergency Police Dispatch	(760) 931-2197	Non-emergency
Non-Emergency Fire Dispatch	(760) 931-2141	Non-emergency
Local Highway Patrol	(619) 467-3300	Call before beginning work
Hospital	(760) 724-8411	Nearest hospital
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Bob Wu)	(213) 897-8636	Notify for any accident or injury

Emergency Contacts for Site 112206: I-5/Palomar Airport Road

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Local Police Emergency Dispatch	911	From landline phone
Fire Emergency Dispatch	911	Call immediately in case of fire or hazardous spills
Non-Emergency Police Dispatch	(760) 931-2197	Non-emergency
Non-Emergency Fire Dispatch	(760) 931-2141	Non-emergency
Local Highway Patrol	(619) 467-3300	Call before beginning work
Hospital	(760) 753-6501	Nearest hospital
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Bob Wu)	(213) 897-8636	Notify for any accident or injury

NOTE: Emergency routes identified on this map are preliminary and may not provide the quickest route to the medical facility in the event of an emergency. It is to the discretion of the individual(s) involved as to the proper routes to take. This route does not take into consideration traffic conditions and/or signalization delays.



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

Potential Emergency Route

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Hospital Emergency Route

District 11

Robert Bein, William Frost & Associates

7/98

JN 34618

Project Contacts

Name	Organization	Phone	Fax Mobile	Email
Bill Whittenberg	RBF	(949) 855-5771-w	(949) 586-6531-f	whittenberg@rbf.com
Bob Wu	Caltrans Contract Manager	(213) 897-8636	(916) 506-9018p	Robert_wu@dot.ca.gov
Pat Kinney	KLI Task Order Manager	(916) 551-1380-w	(831) 640-9882-m	pkinney@cruzio.com
Ken Kronschnabl	KLI	(831) 457-3950-w (831) 688-5443-h	(831) 426-0405-f (831) 640-9883-m	kkronsch@cruzio.com
Cid Tesoro	Caltrans-District 11	(619) 688-3626	(619) 688-6998	cid_tesoro@dot.ca.gov
Rick Dey	Isco Service Center	(800) 228-4373	(402) 465-3089	RickD@isco.com
John Masiti	American Sigma Inc.	(800) 635-4567	(800) 235-1230	Sigma@americasigma.com
Internet	National Weather Service	--	--	http://nimbo.wrh.noaa.gov/San diego/nws.html
Internet	San Diego Alert System	--	--	http://nimbo.wrh.noaa.gov/San diego/fd_pcb.html
Jim Vanderswan	Channel 8 Weather Service, Lead Meteorologist	(831) 656-1725	--	--
Dean Messer	Mosquitoes and Midges Vector Abatement Specialist	530) 753-6400	--	deanm@lwadavis.com
Mike Devine	County of San Diego Vector Control	(619) 694-2888	(619) 694-3559-f	Mdevineh@co.san-diego.ca.us
Fred Beams	Rodents Vector Abatement Specialist	(626) 586-5143	--	Geoscrc1@ix.netcom.com
Phil Carpenter	Toxscan	(831) 724-4522-w		PCarpenter@Toxscan.com
	Associated Laboratories	(714) 771-6900-w	(714) 538-1209-f	

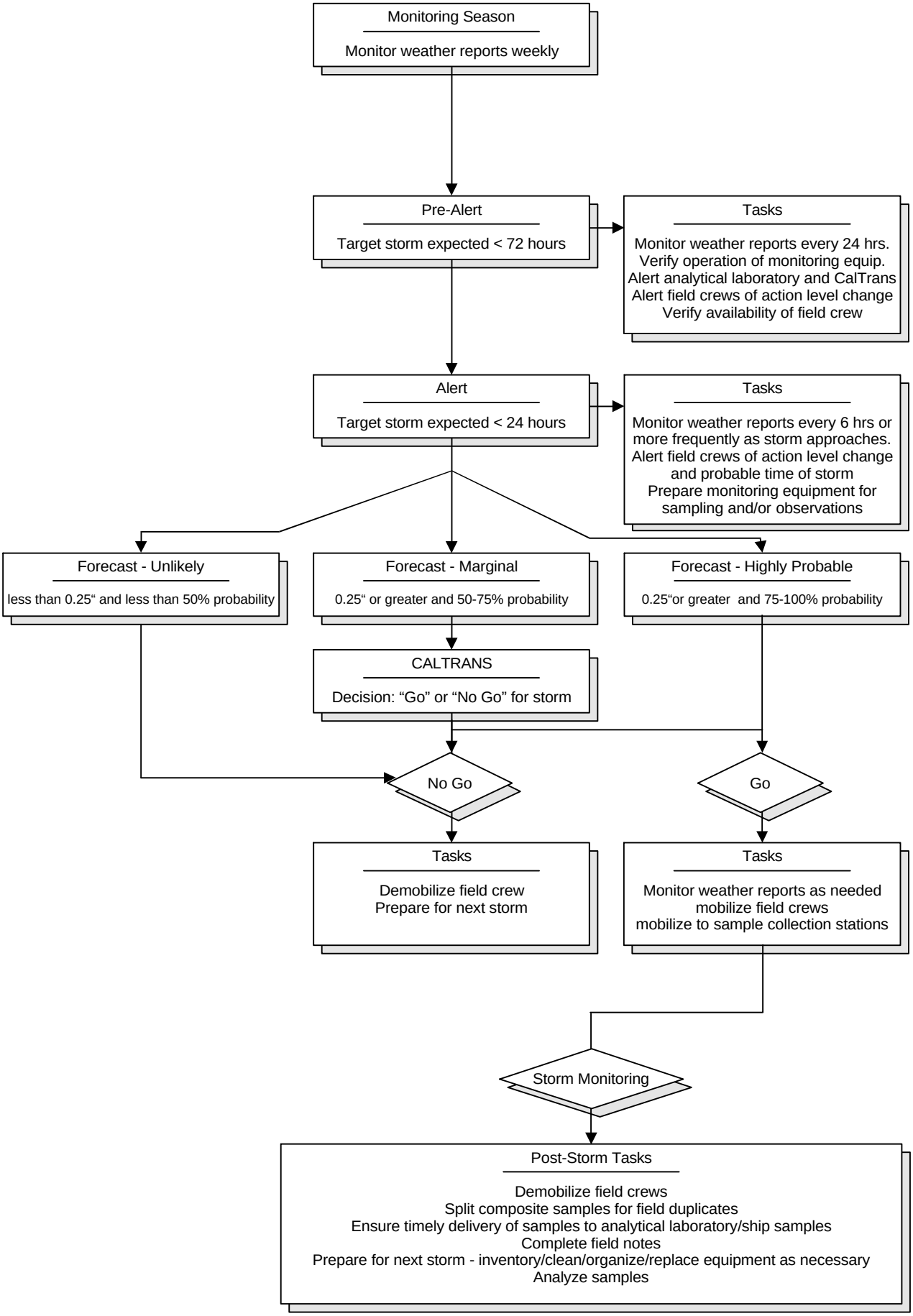
TAB 3

CALTRANS BMP STORMWATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

FIELD PREPARATION/MOBILIZATION FORMS

Exhibit 3.1: Storm Monitoring Decision Tree
Form A: Mobilization Checklist
Form B: Storm Staffing Plan

Exhibit 3.1
Storm Action Levels For BMP Facilities During Wet Season Monitoring



FORM A

Caltrans BMP Retrofit Pilot Program

Mobilization Checklist

General			
	Recent storm tracking information (e.g., www.weather.com)		Communication channels established
	Staff mobilized		Routes & BMPs identified
	Field Guidance Notebook		Emergency/Caltrans contact list
	Phone card		Volume-to-Sample matrix
			Vendor's autosampler manual
Storm Kit Equipment List			
	Keypad/display		9-pin cable from keypad to data logger
	Full set of keys (on floatable bobber)		Flashlights (2)
	Maps for required areas		Large flat screwdriver
	Small flat screwdriver		Umbrella
	High quality alkaline D-cell batteries		Spare sample labels
	Pencils and indelible markers		Desiccant (packages and jar)
	Diagonal clipper		Electrical tape
	Cable ties (assorted sizes)		Utility knife
	Ziplock baggies (assorted sizes)		Labeling tape
	Polyethylene gloves		Rubber bands
Storm Mobilization List			
	Storm kit		Log books
	DI (de-ionized) water squirt bottles		Tape gun with clear packaging tape
	Ice scoop		Sample control paperwork (COC)
	Extra fine indelible markers		Four 1-gallon glass bottles
	Grab sample bottles (see below)		Coolers and ice (at least one extra)
	Grab pole and extension		DI water (3-gallon jug)
	Two-way radio or cellular phone		Personal rain gear
	Any necessary safety gear		Trash bags
Sampling Checklist			
	Sample bottles w/ preservatives		Analyte list
	for each required analysis		Analytical Laboratory telephone number
	for each QA/QC analysis		Backup laboratory contact number (after hours)
	for each BMP site		Sample coolers, plus extra
	prelabeled bottles		
	extra bottles in case of breakage		

FORM B

Storm Staffing Plan

Caltrans **BMP Retrofit Pilot Program** **Stormwater Sampling**		Storm Date:	
Zone #1	Zone #2	Zone #3	Zone #4
Estimated Start:		**End Time:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Startup	**Zone #2 Startup**	**Zone #3 Startup**	**Zone #4 Startup**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio
Relief Start:		**Relief End:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Relief	**Zone #2 Relief**	**Zone #3 Relief**	**Zone #4 Relief**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio

TAB 4

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

INSPECTION FORMS

Form C: BMP Site Inspection Checklist for Biofiltration Swales
Form D: Monitoring Equipment Inspection Checklist for Biofiltration Swales

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Biofiltration Swales

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:	Maintenance Reqd?
Sediment depth *(if sediment is at or near plant height or could interfere with flow or operation, maintenance is required):*	☐ yes ☐ no
Sediment type and location:	
Standing water or other drainage problems? ☐ yes ☐ no Comments:	☐ yes ☐ no
If yes, what is the depth of water? What is the extent of the water? Where is the location of the water?	
Evidence of erosion, channeling, or undercutting? ☐ yes ☐ no Seeps? ☐ yes ☐ no Embankment slumping or cracking? ☐ yes ☐ no	☐ yes ☐ no ☐ yes ☐ no ☐ yes ☐ no
Comments:	

VEGETATION:	Maintenance Reqd?
Height of Swale vegetation *(if height exceeds 10 inches mark yes):*	☐ yes ☐ no
Does vegetation cover all of the Swale's floor and/or slopes? ☐ yes ☐ no If no, percent coverage: (0% - 100%) _____	☐ yes ☐ no
Is native vegetation, weeds, leaves, or other organic debris present in the Swale? ☐ yes ☐ no If yes, what type: Does native vegetation, weeds, leaves, or other organic debris interfere with the operation of the Swale by (a) overgrowing the Swale vegetation, (b) interfering with the hydraulic resident time of the Swale, or (c) saturation of the bottom with dead or dying vegetation or (d) in another way? ☐ yes ☐ no If so, explain:	☐ yes ☐ no ☐ yes ☐ no
Evidence of flattening of vegetation? ☐ yes ☐ no	☐ yes ☐ no
Condition of landscaping? ☐ Inhibited Growth ☐ Excessive Growth ☐ Normal Growth Comments:	☐ yes ☐ no

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Biofiltration Swales

STRUCTURAL:				Maintenance Reqd?	
Is corrosion present? ☐ yes ☐ no ☐ not applicable If yes, extent and location				☐ yes	☐ no
Evidence of concrete scour, spalling, or cracking of structural parts? ☐ yes ☐ no				☐ yes	☐ no
Fences:	☐ OK	☐ not OK	☐ not applicable	☐ yes	☐ no
Locks:	☐ OK	☐ not OK	☐ not applicable	☐ yes	☐ no
Other general maintenance concerns/comments:					

ANIMAL CONCERNS:	Maintenance Reqd?	
Is there evidence of small animals (burrows, droppings, trails, gnawing marks, or stained rub marks)? ☐ yes ☐ no	☐ yes	☐ no
Comments:		

AESTHETIC CONCERNS:				Maintenance Reqd?	
Debris (non-trash)?	☐ yes	☐ no	Type, amount and location:	☐ yes	☐ no
Trash?	☐ yes	☐ no	Type, amount and location:	☐ yes	☐ no
Graffiti or vandalism?	☐ yes	☐ no	Description and location:	☐ yes	☐ no
Theft?	☐ yes	☐ no	Description and location:	☐ yes	☐ no
Vehicle accident?	☐ yes	☐ no	Description and location:	☐ yes	☐ no
Other general aesthetic concerns:					

NON-STORMWATER CONCERNS:

Non-storm water discharge to BMP ☐ yes ☐ no

If yes, print your name and contact number below and fax this form to Cid Tesoro at 619-688-6998

From: Contact Number:

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM C

Caltrans BMP Retrofit Pilot Program

BMP Site Inspection Checklist for Biofiltration Swales (continued)

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

OVERALL:

Other concerns affecting operation:

Condition of facility: ☐ acceptable ☐ not acceptable

Comments:

Dates for maintenance to be completed by:

_____

(Team Leader's Signature)

FORM D

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Inspection Checklist for Biofiltration Swales

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SAMPLING AND FLOW MEASUREMENT EQUIPMENT:	Maintenance Required?
Is the monitoring station enclosure locked? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the monitoring station enclosure structurally sound? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the system status of the automatic sampler online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the automatic sampler properly programmed and calibrated? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the peristaltic pump tubing need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the intake tubing and/or connections need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the desiccant cartridge in the flow meter need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is internal modem online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Are the DC marine battery and connect cable present? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are voltage and current of DC battery within normal parameters? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are cables to power source present and properly connected, and is AC power available? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Is the bubbler properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no

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FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM D

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Inspection Checklist for Biofiltration Swales (continued)

SAMPLING AND FLOW MEASUREMENT EQUIPMENT (cont.):	Maintenance Required?
Is the bubbler tubing free of kinks, free of obstructions, and properly connected to pump? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is strainer clean and free of obstruction? ☐ yes ☐ no Comments:	☐ yes ☐ no

INFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

EFFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

Dates for maintenance to be completed by:

_____

(Team Leader's Signature)

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TAB 5

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MAINTENANCE FORMS

Form E: BMP Site Maintenance Activity Checklist for Biofiltration Swales
Form F: Monitoring Equipment Maintenance Activity Checklist for Biofiltration Swales
Form G: Stockpile/Sediment Sampling Checklist
Exhibit 5.1: CCR Title 22 Characterization Requirements

FORM E

Caltrans BMP Retrofit Pilot Program

BMP Site Maintenance Activity Checklist for Biofiltration Swales

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:

☐ ***Sediment removal from level spreader and/or swale***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Clean orifices, and/or cracks in stormwater conveyance system***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Erosion repair (including vegetative stabilization)***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Embankment/slope repair(s)***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

VEGETATION:

☐ ***Swale vegetation mowing/trimming and removal of cuttings***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Replant Swale vegetation***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM E

Caltrans BMP Retrofit Pilot Program

BMP Site Maintenance Activity Checklist for Biofiltration Swales (continued)

☐ ***Weed control***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

VEGETATION (cont.):

☐ ***Leaf collection and removal of dead/rotting vegetation***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

STRUCTURAL:

☐ ***Structural repairs (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

ANIMAL CONCERNS:

☐ ***Burrow control***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

AESTHETIC CONCERNS:

☐ ***Debris and trash removal***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM E

Caltrans BMP Retrofit Pilot Program

BMP Site Maintenance Activity Checklist for Biofiltration Swales (continued)

☐ ***Graffiti removal or replacement of vandalized or stolen property***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Painting***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

AESTHETIC CONCERNS (cont.):

☐ ***Other (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

WATER LEVEL MANAGEMENT:

☐ ***Dewatering***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

_____ (Team Leader's Signature)	General Comments:

Complete only applicable sections

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM F

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Maintenance Activity Checklist for Biofiltration Swales

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

☐ ***Clean H-flumes, orifices, and/or cracks***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Diagnostic test of automatic sampler***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of peristaltic pump tubing***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of bubbler tubing, pump tubing, or intake tubing***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of strainer***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of 12-volt marine battery***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Removal of kinks or obstructions from bubbler tubing***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

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FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM F

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Maintenance Activity Checklist for Biofiltration Swales (continued)

☐ ***Replacement of desiccant cartridge in flow meter***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other maintenance/calibration of automatic sampling equipment (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other maintenance of flow measurement equipment (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time:

More work required? ☐ yes ☐ no

Equipment used:

Comments:

_____ (Team Leader's Signature)	General Comments:

Complete only applicable sections
For internal use only

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM G

Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

GENERAL INFORMATION:			
Date:	Time In:	Team Leader's Initials:	Time Out:
Location:			

SEDIMENT CHARACTERISTICS IN BMP PRIOR TO STOCKPILING:					
Depth of sediment:					
Color:	☐ black	☐ brown	☐ green	☐ tan	☐ other
Consistency:	☐	☐ sandy	☐ silty	☐ granular	☐ other
Odors:	☐ petroleum ☐ none	☐ solvents ☐ other	☐ organic (rotten eggs)		☐ sewage
Depth of sediment:					

SEDIMENT SAMPLE COLLECTION MOBILIZATION LIST	
Powder Free Nitrile Gloves	
Soil Proble or equivalent for sample collection	
8-ounce glass jar labeled Total Petroleum Hydrocarbons (TPH)	
Plastic bags, seal bags	
Chilled cooler	
Chain-of-Custody form	
Log book for record keeping	

STOCKPILE/DRUMMED SEDIMENT:	Maintenance Required?
Does the stockpile/drum require additional protection from causing environmental impact? (i.e., is underlying plastic, sandbag berming, and an anchored weather-proof covering in place?) If so, check yes.	☐ yes ☐ no
If not stockpiled, are the drums or other containers adequately stored, protected from weather, and free of damage/leakage? If not, check yes.	☐ yes ☐ no
Is the amount of onsite sediment reaching an unmanageable quantity? (Is disposal necessary?) If so, check yes.	☐ yes ☐ no
Are onsite equipment and materials sufficient to perform sediment sampling? If not, check no.	☐ yes ☐ no

SEDIMENT COLLECTION:	
<10 cubic yards: *Minimum of **2 samples, one randomly from each half of the soil mass***	
10-20 cubic yards: *Minimum of **3 samples, one randomly from each third of the soil mass***	
20-100 cubic yards: *Minimum of **4 samples, one randomly from each quarter of the soil mass***	
100-500 cubic yards: ***Minimum of 1 sample per 25 c.y. of each 25 c.y. section of the soil mass***	
Over 500 cubic yards: *Collect a minimum of **1 sample per 25 c.y. portion of the soil mass***	*Contact Dept. of Environmental Health for Guidance*
Observation sheet completed	
Personal and equipment decon completed	
Number of aliquots taken from composite _____	

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM G

Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

SEDIMENT SAMPLE COLLECTION	
Sample IDs: 1. _____ Analysis requested: _____ 2. _____ Analysis requested: _____ 3. _____ Analysis requested: _____ 4. _____ Analysis requested: _____ 5. _____ Analysis requested: _____ 6. _____ Analysis requested: _____	
Photos taken:	
Chain of Custody form attached	
Record information in logbook for record keeping	
Comments:	

Exhibit 5.1: *CCR Title 22 Characterization Requirements*

Sediment Matrix (Disposal)
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Parameter	Method	Units	Reporting Limit	Maximum Holding Time	Preservation	Container Size/Type(1)
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 418.1	mg/kg	10	28 days	$4^{o}C$	8 oz glass jar
Volatile Organic Compounds	EPA 8260B	mg/kg	SW – 846 (5) requirements	14 days	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Metals(2):	EPA 6020/7471	mg/kg	SW – 846 (5) requirements	180 days 28 days for mercury	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Waste Extraction Test (WET) Metals(3):	STLC Extraction	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA
Toxicity Characteristic Leaching Procedure (TCLP) Metals(4):	TCLP 1311	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA

(1) Each sample will be collected in two 8 oz glass jars

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

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

(4) If any of the WET-soluble concentrations are equal to or greater than the TCLP regulatory thresholds, analyze the waste by TCLP. “Test Methods for Evaluating Solid Waste, Physical /Chemical Methods”. SW-846, Update III.(SW-846)

TAB 6

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MONITORING FORMS

Form H1: Empirical Observations Field Data Log Sheet for Storm Events for Biofiltration Swales
Form H2: Hydraulic Residence Time Calculation Checklist
Form I: Field Data Log Sheet
Form J1: User-Entered Program Parameters (Influent/Control)
Form J2: User-Entered Program Parameters (Effluent)
Form K: Station Phone Log

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM H1

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Swales

GENERAL INFORMATION:

Date:	Time In:
Team leader's initial:	Stormwater consultant:
Other personnel:	Location of facility:
BMP type:	

METEOROLOGICAL CHARACTERISTICS:

Present rainfall: ☐ None ☐ Mist ☐ Drizzle ☐ Sprinkle ☐ Light, Steady ☐ Moderate ☐ Heavy

Time present rain event started: _____

Wind speed: ☐ 0-5 mph (light) ☐ 5-10 mph (moderate) ☐ 10-15 mph (brisk) ☐ >15 mph (strong)

Cloud cover: ____% Temperature _____

Distribution of Rainfall: ☐ Uniform ☐ Localized cells ☐ Scattered showers

Meteorological characteristics comments:

HYDROLOGIC AND HYDRAULIC CHARACTERISTICS:

Flow conditions (*check all that apply*): ☐ Runoff entering facility
☐ Flow distributed uniformly throughout Swale
☐ Flow not uniformly distributed throughout Swale

If flow is not uniformly distributed throughout the Swale, describe distribution (e.g., where concentrated, where channelized, approximate dimensions and depths of concentrations and/or channel):

Flow conditions continued (*check all that apply*):
☐ Water flowing through Swale at a perceptible velocity
☐ Facility discharging
☐ Flow bypassing facility
☐ Flow overtopping facility
Time occurred: _____
Comments:

Standing water conditions (*record measurements as appropriate*):
☐ Water standing over entire Swale. Depth: _____
☐ Other standing pool(s) Describe Location: _____
Depth: _____
Comments:

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM H1
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Swales (continued)

INLET CONDITIONS:

Describe flow distribution where flow enters vegetated treatment zone:
☐ Flow is uniformly distributed across full width of the Swale.
☐ Flow is not uniformly distributed across full width of the Swale.
Explain:

Describe any erosion being caused by the flow upstream or at the entrance to the Swale:

Describe any obstructions or restrictions interfering with inflow/influent:

WATER QUALITY APPEARANCE:

Check all that apply and describe under comments.

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

SOLIDS DEPOSITION AND RESUSPENSION:

For the following locations, record the type (trash or debris, oil and grease, other organics), location(s), area(s) covered, and depth(s), as applicable:

In inflow/influent channel: _____
_____

Over entire Swale: _____
_____

In one spot: _____
_____

In multiple spots: _____
_____

In outflow/effluent channel: _____
_____

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM H1

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Swales (continued)

SOLIDS DEPOSITION AND RESUSPENSION (cont.):

Solids resuspension evident (*check all that apply*):

☐ In inflow/influent channel ☐ Near inlet ☐ Near outlet ☐ In outflow/effluent channel

☐ Other (describe): _____

Solids deposition and resuspension comments:

EROSION:

For the following locations, record erosion locations, area(s) covered, and depth(s), as applicable:

In inflow/influent channel: _____
_____

Near inlet: _____
_____

Swale bed (Swales only): _____
_____

Swale side slopes (Swales only): _____
_____

Near outlet _____
_____

In outflow/effluent channel: _____
_____

Erosion comments:

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM H1
Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Swales (continued)

VEGETATION CONDITION:

Swale bed vegetation cover:
☐ Complete ☐ Few small bare spots ☐ Few large bare spots ☐ Many small bare spots
☐ Many large bare spots ☐ Large areas bare ☐ All or nearly bare

Swale side slopes vegetation cover (Swales only):
☐ Complete ☐ Few small bare spots ☐ Few large bare spots ☐ Many small bare spots
☐ Many large bare spots ☐ Large areas bare ☐ All or nearly bare

Swale bed vegetation type:
☐ All grasses ☐ Mostly grasses, some wetland plants ☐ Mostly wetland plants, some grasses
☐ All wetland plants
Extent of woody shrubs or trees: _____

Swale side slopes vegetation type (Swales only):
☐ All grasses ☐ Mostly grasses, some wetland plants ☐ Mostly wetland plants, some grasses
☐ All wetland plants
Extent of woody shrubs or trees: _____

Vegetation condition comments:

OUTLET CONDITIONS:

Describe any obstructions or restrictions interfering with outflow/effluent:

WATER QUALITY APPEARANCE:

Check all that apply and describe under comments.

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM H1

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Biofiltration Swales (continued)

VECTORS:

Presence of vectors: ☐ Yes ☐ No

If yes, what type: ☐ Mosquitoes ☐ Blackfly ☐ Cockroaches ☐ Rats
☐ Other_____

Comments:

STRUCTURAL CONDITION OF FACILITY:

Record the presence of the following (*check all that apply and give location in comments*):

☐ Inlet structure damage ☐ Outlet structure damage ☐ Vandalism

Comments:

MONITORING EQUIPMENT CONDITION:

Equipment functional: ☐ Yes ☐ No ☐ N/A

Comments:

CHANGES DURING STORM SINCE LAST OBSERVATION:

Date:___

Comments:

Date:___

Comments:

Date:___

Comments:

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM H1

Caltrans BMP Retrofit Pilot Program

Empirical Observations Field Data Log Sheet for Storm Events for Biofiltration Swales (continued)

HYDRAULIC RESIDENCE TIME:

Hydraulic residence time for Swales will be measured using Form H2 once per year, during non-sampling events. Was the hydraulic residence time measured for this storm event?

☐ Yes, result: _____ ☐ No, not required during this event.

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Team Leader's Signature)

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM H2

Caltrans BMP Retrofit Pilot Program

Hydraulic Residence Time Calculation Checklist

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
Location:	Site Number:	

Step 1:	Mobilize a team for a storm event where the amount of rain predicted is greater than or equal to 0.10 inch. This event should **not** be an event during which stormwater monitoring (i.e., sampling) will be conducted. Team mobilized for non-stormwater monitoring event: ☐ yes ☐ no
Step 2.	Measure the Swale vegetation height:
Step 3.	Remove any obstructions from the Swale and its inlet and outlet structures. Obstructions removed: ☐ yes ☐ no
Step 4.	Initiate the flow monitoring equipment and ensure that it is properly calibrated. Program the bubbler to measure flow after each 1-minute interval (lowest possible setting). Set the flow monitoring equipment so that flow volume is totaled. After calibration and programming, begin data logging flow rates. Flow monitoring equipment is calibrated and programmed: ☐ yes ☐ no
Step 5.	Pour 10 mL of yellow/green dye liquid into the inlet flume.
Step 6.	Once the dyed water reaches the beginning of the vegetation, start a stopwatch and begin timing the travel of the dyed water.
Step 7.	Record observation of the dyed water as it travels through the Swale:

Comments:

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM H2
Caltrans BMP Retrofit Pilot Program
Hydraulic Residence Time Calculation Checklist (continued)

Step 8: Record the absorbance measurement, the time when the sample was collected, and the flow volume when the sample was collected.

Time	Absorbance Measurement	Flow Volume	Time	Absorbance Measurement	Flow Volume
1.			16.		
2.			17.		
3.			18.		
4.			19.		
5.			20.		
6.			21.		
7.			22.		
8.			23.		
9.			24.		
10.			25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

_____

(Team Leader's Signature)

FACILITY NAME:_____
DATE:_____TIME_____
PAGE_____of_____

FORM I

Caltrans BMP Retrofit Pilot Program
Biofiltration Swales Field Data Log Sheet

GENERAL INFORMATION		Julian Day (*5AA):
Date:	Time in (PST,*5):	Team Leader's Initials:
Location:	Crew:	
Influent or **Effluent** (circle one)	**Storm Event Visit** or **Maintenance Visit** (circle one)	

SYSTEM STATUS FLAGS (*6AD; 1=high, 0=low)
Arr: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____
Dep: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

PROGRAM SIGNATURE (*B)
Arrive: _____
Depart: _____

DATA LOGGER INFORMATION (*6)

All Site Visits:	Samp. Batt Volt 22:	Manual Rain Gauge:
Basin Staff Gauge:	Cell Batt Volt 82:	Total Rain (in.) 25:
Flow Sensor Stage:	Flow Meter Batt Volt 28:	Total Storm Vol. 72:
Stage (ft) 02:	Storm Site Visits:	Strm Vol Smpld 75:
Velocity (ft/s) 03:	Volume (kcf) 05:	Max Stage Day 51:
Flow (cfs) 04:	Storm Sum (kcf) 06:	Max Stage Time 52:
Station ID 21:	Percent Capture 08:	Max Stage (ft) 53:
	Volume2Sample 14:	Date Last Sample 105:
	Sample Count 17:	Time Last Sample 106:

AUTOSAMPLER INFORMATION

Storm only

Number of Samples Total: _____
Number of Samples Remaining: _____

Bottle # out: _____
Bottle Volume: _____
Volume2Sampl: _____

Bottle # in: _____

GRAB SAMPLE COLLECTION

	Time:
TPH (VOAs)	_____
Bacteria	_____
Oil and Grease	_____
Other: _____	_____

CALIBRATIONS and CHECKS

Stage: ☐
Sample Volume: ☐
Rain Gauge: ☐
Other:

SAMPLING EQUIPMENT AND REPAIR NEEDS:

ACTION TAKEN:

Team Leader's Signature_____

FORM J1

User-Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **INFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
02 Flow Meter Stage Offset (feet)					
03 Volume to sample (kcf)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
08 Flow Meter Speed Offset (feet/second)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
36 Cellular phone battery state control parameter					
37 Duration of cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM J2

User Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **EFFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
03 Volume to sample (kcf)					
04 Level Meter Stage Offset (feet)					
05 Level Meter Multiplier (feet/mv)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. Failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
30					
31					
34 Flume Parameter 1					
35 Flume Parameter 2					
36 Cellular phone battery state control parameter					
37 Duration when cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM K

Station Phone Log

Time	Station	Stage	% Capture	PkFlow (time)	PkFlow (feet)	Sample Count	Volume 2Sample	Storm Sum	Volume	Flow (Q)

TAB 7

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

LABORATORY ANALYSIS FORMS

Form M: Chain-of-Custody Form
Exhibit 7.1: Chemical Analysis List

FORM M: Example CHAIN-OF-CUSTODY FORM

Laboratory:	Laboratory # Date Rec'd	**From:**

Project: **P.O.#:**	**Project #:** **Required Completion Date:**

Sample ID #	Site ID #	Laboratory ID #	Matrix/ Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt

Data Reports **WILL** include the following: Sample/Site ID, Analytical Method, Reporting Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time

Exhibit 7.1: ***Chemical Analyses List for Stormwater***
Stormwater Matrix
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Analyte	Priority Rank	Reporting Limit	Units	Analytical Technique	Method Number	Holding Time	Minimum Sample Volume	Preferred Volume and Container Type[1]	Preservation
Conventionals									
pH	1	0.1	Unit	Electrode	EPA 150.1	Immediately[2]	100 mL	1-100 mL glass/plastic	4°C
Specific Conductance	1	1.0	µmhos/cm	Electrometric	EPA 120.1	Immediately[2]	500 mL	1-500 mL glass/plastic	4°C
Hardness	5	2	mg/L	Titrimetric/ Colorimetric	EPA 130.2	6 months	100 mL	1-200 mL glass/plastic	HNO_3 to pH<2, 4°C
Total Suspended Solids	1	1	mg/L	Dried Filter Weight	EPA 160.2	7 days[3]	1 L	1-500 mL glass/plastic	4°C
Nutrients									
Nitrate-Nitrogen	2	0.01	mg/L	Colorimetric Ion Chromatography	EPA 353.3 EPA 300.0	28 days 48 hours	200 mL 200 mL	1-500 mL plastic 1-500 mL plastic	4°C and H_2SO_4 to pH<2 4°C
Total Kjeldahl Nitrogen	3	0.1	mg/L	Titrimetric/ Colorimetric	EPA 351.3	28 days	500 mL	1-1L plastic	4°C and H_2SO_4 to pH<2
Total Phosphorus	4	0.002	mg/L	Colorimetric	EPA 365.3	28 days	100 mL	1-250 mL plastic	4°C and H_2SO_4 to pH<2
Total/Dissolved Metals[4],[5]									
Copper	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Lead	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Zinc	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Organics[6]									
Total Petroleum Hydrocarbons – Diesel/oil	Grab	250/200	µg/L	GC	EPA 8015M	14 days	1 L	2-1L amber glass	4°C
Total Petroleum Hydrocarbons - Gasoline	Grab	50	µg/L	GC	EPA 8015M	14 days	2-40 mL	3-40 mL VOA vials	4°C, HCl to pH<2
Bacteria[6]									
Fecal Coliform	Grab	2	MPN/100 mL	Multiple-tube	SM 9221E	6 hours[7]	50 mL	1-100 mL plastic	4°C

1. Analytes with the same preservative can be combined into a single container if the same laboratory is performing the analyses.
2. pH and Specific Conductance will be measured by the laboratory immediately upon receipt of the samples.
3. 7 days based upon limit for measuring TSS/no regulatory limit.
4. Total and dissolved metals samples are collected in separate containers. Only the total metals container will receive nitric acid.
5. Dissolved metals will be filtered in the laboratory prior to acidification.
6. Total Petroleum Hydrocarbon and Fecal Coliform grab samples will be collected for two storms per year.
7. Attempts will be made to maintain the 6-hour holding time for bacteria samples to the extent possible. When not possible, a maximum holding time of 24 hours will be followed in accordance with "Standard Methods for the Examination of Water and Wastewater", 18th Edition.

TAB 8

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

VECTOR CONTROL AND MONITORING FORMS

Form O: Vector Monitoring and Control Report

VECTOR MONITORING FORMS

Vector monitoring forms will be provided by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

TAB 9

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

TECHNICAL SUPPORT INFORMATION

Exhibit 9.1: Runoff Coefficients
Exhibit 9.2: Volume-to-Sample Tables
Exhibit 9.3: Encroachment Permits

Exhibit 9.1
Runoff Coefficient Matrix Table for Biofiltration Swales

Site No.	Site Name	Drainage Area (acres)	Runoff Coefficient C
112206	SR-76/Melrose Dr	2.4	0.9
112205	I-5/Palomar Airport Rd	2.32	0.8

"Volume to Sample" in Kilo-Cubic Feet for *Melrose Drive / SR-78 Bofiltration Swale*

Number of Sample Aliquots	Acreage	Runoff Coefficient
72	2.4	0.9

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0109	2.6	0.2831
0.2	0.0218	2.7	0.2940
0.3	0.0327	2.8	0.3049
0.4	0.0436	2.9	0.3158
0.5	0.0545	3.0	0.3267
0.6	0.0653	3.1	0.3376
0.7	0.0762	3.2	0.3485
0.8	0.0871	3.3	0.3594
0.9	0.0980	3.4	0.3703
1.0	0.1089	3.5	0.3812
1.1	0.1198	3.6	0.3920
1.2	0.1307	3.7	0.4029
1.3	0.1416	3.8	0.4138
1.4	0.1525	3.9	0.4247
1.5	0.1634	4.0	0.4356
1.6	0.1742	4.1	0.4465
1.7	0.1851	4.2	0.4574
1.8	0.1960	4.3	0.4683
1.9	0.2069	4.4	0.4792
2.0	0.2178	4.5	0.4901
2.1	0.2287	4.6	0.5009
2.2	0.2396	4.7	0.5118
2.3	0.2505	4.8	0.5227
2.4	0.2614	4.9	0.5336
2.5	0.2723	5.0	0.5445

"Volume to Sample" in Kilo-Cubic Feet for *Palomar Airport Road Biofiltration Swale*

Number of Sample Aliquots	Acreage	Runoff Coefficient
72	2.32	0.8

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0094	2.6	0.2433
0.2	0.0187	2.7	0.2526
0.3	0.0281	2.8	0.2620
0.4	0.0374	2.9	0.2714
0.5	0.0468	3.0	0.2807
0.6	0.0561	3.1	0.2901
0.7	0.0655	3.2	0.2994
0.8	0.0749	3.3	0.3088
0.9	0.0842	3.4	0.3181
1.0	0.0936	3.5	0.3275
1.1	0.1029	3.6	0.3369
1.2	0.1123	3.7	0.3462
1.3	0.1216	3.8	0.3556
1.4	0.1310	3.9	0.3649
1.5	0.1404	4.0	0.3743
1.6	0.1497	4.1	0.3837
1.7	0.1591	4.2	0.3930
1.8	0.1684	4.3	0.4024
1.9	0.1778	4.4	0.4117
2.0	0.1871	4.5	0.4211
2.1	0.1965	4.6	0.4304
2.2	0.2059	4.7	0.4398
2.3	0.2152	4.8	0.4492
2.4	0.2246	4.9	0.4585
2.5	0.2339	5.0	0.4679

CALTRANS
BMP RETROFIT PILOT PROGRAM

BMP OPERATION, MAINTENANCE, AND MONITORING PLAN

VOLUME II

BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK FOR STORMFILTER™ (PERLITE / ZEOLITE)

DISTRICT 11, SAN DIEGO

September 1999

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APPENDIX III: QUALITY ASSURANCE/QUALITY CONTROL PLAN.

APPENDIX IV: VECTOR CONTROL

APPENDIX V: MAINTENANCE INDICATOR DOCUMENT

1.0 INTRODUCTION

This Field Guidance Notebook (*FGN*) gives inspectors, maintenance, and monitoring personnel appropriate field evaluation and documentation for the District 11 StormFilter™ (MF) belonging to the Caltrans BMP Retrofit Pilot Program. Field observations and conditions must be clearly and concisely documented on the field forms provided.

Refer to Appendix I-F of this guidance document for supporting information on MF technology and characteristics.

1.1 Data to be Collected

The following data will be collected to assess the performance and maintenance aspects of a MF:

- Water quality and quantity data of runoff into and discharge from the media filter from flow-composite samples and grab (as soon as possible after the start of runoff) samples for at least 8 storm events during two wet seasons, weather permitting.
- Rainfall data recorded as a function of time, from rainfall events during the study period.
- Observations of water quality, weather, antecedent conditions, spills, etc.
- Documentation records of inspections and maintenance activities performed.
- Vector monitoring and management data.
- Records of vector control measures taken.

Consultants will be responsible for data management. Overall management of the data will be consistent with established Caltrans procedures for stormwater monitoring projects.

1.2 Field Activities to be Performed

Field activities that will be performed at the MF facility include:

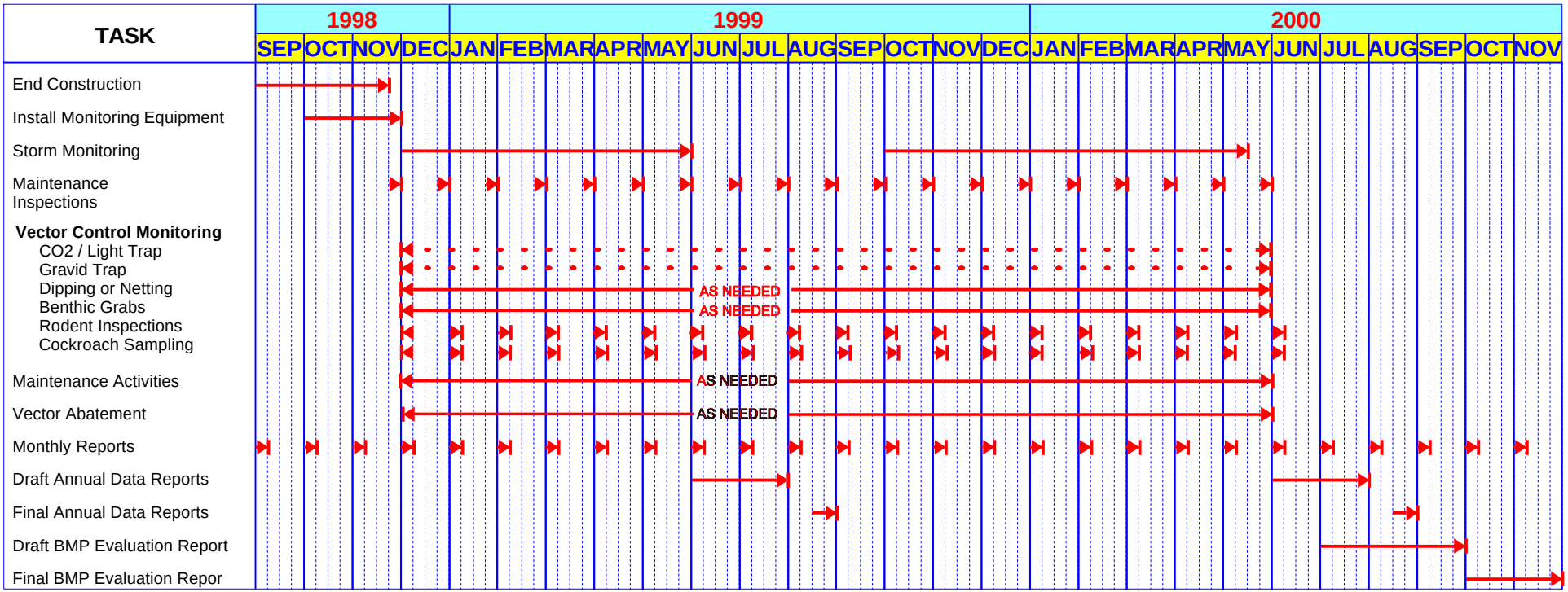
- Empirical Observation of Media Filter Operation.
- Monitoring Equipment Installations.
- Monitoring Equipment Maintenance.
- Facility Inspections.
- Facility Maintenance.
- Vector and Nuisance Animal Control Inspections.
- Vegetation Control.
- Stormwater Monitoring.

Vector management may also be necessary at a media filter facility, but is contingent on facility housekeeping and other environmental influences.

1.3 Master Schedule

The schedule on the following page shows the time-line for each phase of the MF OMM program.

Figure 1.3
Projected Schedule
Stormwater Management Media Filter (Perlite/Zeolite) OMM



2.0 SITE INFORMATION

Access requirements for the site are summarized in Table 2.1, the Site Location Maps in Tab 1, and in the encroachment permit found in Tab 9. ***Encroachment permits must be on hand*** for each site visit, and ***notification requirements found in these permits must be followed***.

Always check in with the appropriate Caltrans personnel before conducting any site fieldwork.

Table 2.1
Caltrans District 11 StormFilter ä Site Summary

Site No.	Site Name	Site Location	Access and Parking
112201	Kearny Mesa Maintenance Station	7179 Opportunity Road. Adjacent to the I805 freeway in the City of San Diego.	Park in a space within the maintenance facility. Special arrangements need to be made for nighttime access.

2.1 StormFilter ä (MF)

Refer to the accompanying Appendix for a general description of the StormFilter™. The sections below provide site-specific information for the MF site in District 11.

Refer to Tab 9 for a summary of the hydraulic characteristics for this site. As a conceptual aide the following figures illustrate the major components of the filter.

Figure 2.1
StormFilter ä Plan View and Section View

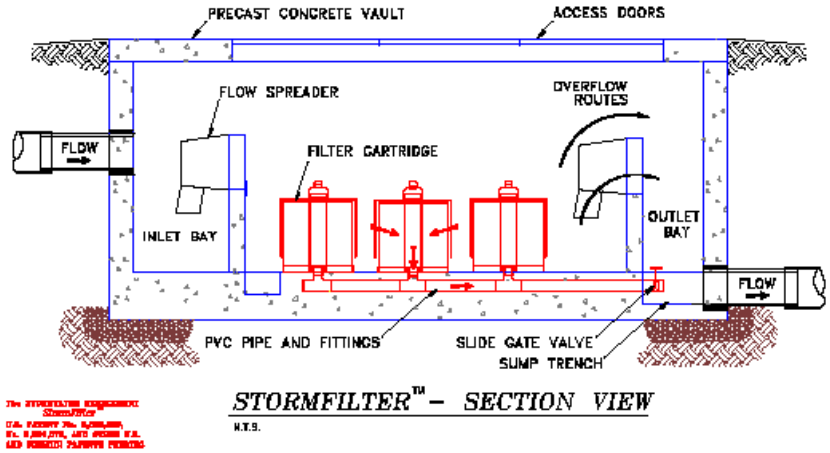
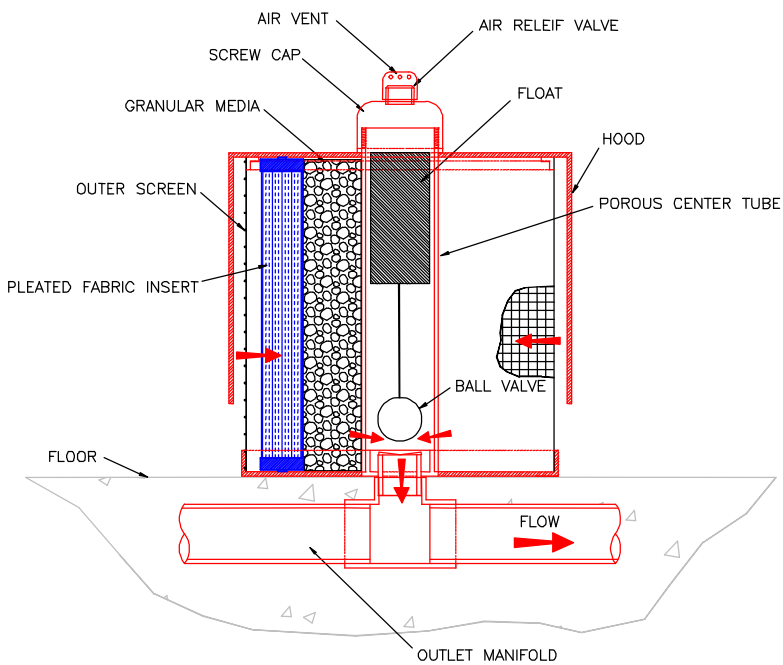


Figure 2.2
Fiter Cartridge Section View



Refer to Tab 9 for a summary of the hydraulic characteristics for these BMPs.

2.1.1 Kearny Mesa Maintenance Station

At the Kearny Mesa Maintenance Station, drainage is divided into two main areas; the easterly portion of the site functions as a tributary for drain inlets and an underground drainage system. The westerly portion of the site is tributary to an overside drain that discharges to a culvert passing under I-805. The entire station is a tributary, via Caltrans and downstream municipal storm drain systems, to Tecolote Creek and Mission Bay. The discharge path to Mission Bay is sufficiently buffered by a distance of five miles of municipal storm drain system and intermediate reaches of natural creek.

Inflow and discharge to and from this facility will be through 380mm APs. Manholes will be installed above each conveyance to access sampling points. The inflow manhole will be installed approximately 6 m upstream of the filter, and the discharge manhole will be positioned 6 m down stream of the filter. (see Tab 1, Figure 1.2A). A 380 mm low flow Palmer Bowlus flume in combination with an ultrasonic look-down depth sensor will be installed in each conveyance to measure low flow conditions. The depth of water 190 mm in front of the flumes will be measured. These flumes will accurately measure flows between 0.02 and 1.2 cfs. Flows with stages greater than 50 mm will be measured with ultrasonic Doppler AV meters.

Refer to Tab 1 for BMP facility plans and site location maps.

2.2 Emergency Hospital Routes

See the "**Emergency Procedure" Tab 2** for maps and descriptions showing the direct routes to the nearest hospitals and for emergency and site-related telephone contacts.

2.3 Site-specific Health and Safety Concerns and Precautions

This subsection only identifies health and safety concerns and precautions. Appendix II provides more extensive health and safety concerns and requirements. Note that at a MF, field crews will consist of a minimum of 2 people. Program-related health and safety requirements are defined in Appendix II of the District 11 Retrofit Pilot Program OMM Plan. Refer to the site Encroachment Permit (Tab 9) for additional health and safety requirements.

2.3.1 Traffic Safety Precautions

Activities at the Media Filter bring up traffic concerns including access and parking at the maintenance station. Care will be taken to be aware of surrounding activities at the maintenance station.

2.3.2 General Safety

In addition to traffic hazards, field crews may face a variety of potential dangers while maintaining the MF facility, installing equipment and performing environmental monitoring.
Be aware of:

- Slippery conditions.
- Lightning.
- Fast moving water.
- Unstable earth.
- Poor visibility, especially at night.
- Lifting heavy objects.
- Transients.
- Muggers and other criminals.
- Power tools and heavy equipment.
- High places.
- Sharp edges - broken glass.
- Overhead dangers.
- Dogs and other biological hazards.
- Electrical hazards posed by equipment malfunction.
- Confined space entry. At the Media Filter site, it is anticipated that Class D Confined Space Entry will be required. Verification of the class of confined space entry will be determined onsite prior to entry, using the testing and procedures discussed in Appendix II.

Other important field precautions include:

- Stay away from the edges of a fast moving body of water. These edges are usually slippery and unstable during rainy conditions.
- If sampling is required at the edge of a fast moving body of water, use a lifeline and a personal flotation device. Use grabbing devices when possible.
- Never work alone at night and avoid working alone during the day.
- Avoid leaving tools and equipment lying around where someone can trip over them.
- Maximize lighting, especially at night.
- Keep a phone or other means of communication nearby.
- Do not use your back to lift heavy objects. Get help.
- Never use drugs or alcohol while working.
- Always wear a hard hat and orange vest.
- Do not use power tools and heavy equipment unless trained in the proper use and care of the specific power tools.
- Always wear eye protection when working with tools or chemicals.
- Wear rain gear.
- Never leave open holes unattended or not barricaded.
- Do not sample during lightning.
- Clean up the work area before leaving.

3.0 FIELD PREPARATION

Use Table 3.1 on the following page as a guide to find appropriate forms and information required for field visits. This table covers aspects of the field OMM program including mobilization, observation, and monitoring checklists. The key in preparing for field visits, whether for maintenance or monitoring, is by obtaining and going through each item on the table pertaining to the field task at hand. Prior to the operational phase of this program, items contained in this table will be assembled into separate logbooks: facility operations and maintenance, vector control, storm monitoring, and office monitoring.

Table 3.1
List and Locations of Required Stormwater Monitoring Forms and Checklists For Perlite/Zeolite Media Filters

Tab No.	Item	Form or Exhibit No.	Use and Frequency
1	Site Maps	NA	Prior to site visits
	BMP Layout Diagrams	NA	Prior to site visits
2	Emergency Contacts List	NA	Consult for emergency phone numbers.
	Hospital Route Maps	NA	Quick guide to the nearest hospital.
	Project Contacts List	NA	Refer for pertinent support staff.
3	Storm Monitoring Decision Tree	Ex. 3.1	Prior to each monitored storm.
	Mobilization Checklist	Form A	Before each storm and maintenance visit.
	Storm Staffing Plan	Form B	Filled out prior to storm event for crew and equipment assignments.
4	BMP Site Inspection Checklist	Form C	Filled out for each inspection visit
	Monitoring Equipment Inspection Checklist	Form D	Filled out for each equipment inspection
5	BMP Site Maintenance Activity Checklist	Form E	Filled out for each maintenance inspection
	Monitoring Equipment Maintenance Activity Checklist	Form F	Filled out for each maintenance inspection of sampling equipment
	Stockpile/Sediment Sampling Checklist	Form G	Complete for any stockpile or waste sampling
	Title 22 Characterization Requirements	Ex. 5.1	Reference for sediment stockpile sampling
6	Empirical Observations Field Data Log Sheet for Storm Events	Form H	Each time a visit is made. Separate observations will be made of the inflow, outflow, and basin.
	Field Data Log Sheet	Form I	Each storm station visit. Separate logs will be filled out for the inflow and outflow.
	User-Entered Program Parameter Log Sheet for Influent/Control Sampling Point	Form J1	Each time a program parameter is changed.
	User-Entered Program Parameter Log Sheet for Effluent Sampling Point	Form J2	Each time a program parameter is changed.
	Station Phone Log	Form K	Each time station is contacted.
7	Chain-of-Custody Form	Form M	Whenever samples are collected.
	Chemical Analyses List	Ex. 7.1	Reference for each sampling event and lab analysis request submittal
8	Vector Control Checklists	Forms O1 and O2	Fill out for each site visit related to vector monitoring
9	Runoff Coefficient Listing	Ex. 9.1	Reference: for calculations
	Volume to Sample	Ex. 9.2	Consult to set sampling frequency
	Encroachment Permits	Ex. 9.3	Explains access and safety requirements. Must always accompany field crews.

NA=Not Applicable

4.0 FACILITY OPERATIONS AND MAINTENANCE

4.1 Facility Operation Inspections

The District 11 MF will be inspected on a regular basis according to the following minimum rates in accordance with the manufacturer (Stormwater Management):

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.5 inches of precipitation).
- On a weekly basis during extended periods of wet weather.

The Stormwater Management StormFilter™ Product Manual has been made available to Field Crews and has been used to complete this OMM.

Optimal BMP operation is dependent on field inspections. When inspecting the facility, follow the procedural steps below. ***Document inspections on Form C (Tab 4)*** .

1. Make the appropriate contacts with Caltrans District 11 personnel upon arrival.
2. Completely walk around the BMP while looking for obvious problems, damage, or malfunctions (the Stormwater Management StormFilter™ Product Manual Section 2.4 must be followed when performing minor and major maintenance).
3. Inspect and assess needs for:
   - General aesthetics (graffiti, vandalism).
   - Vegetation management .
   - BMP performance (fouling, blockage, damage).
   - Equipment repair/maintenance (BMP components, autosampler).
   - Sediment accumulation (within BMP, at influent confluence).
   - Storage of accumulated sediment or other wastes.
   - Vector control.
4. Fill out Form C (see Tab 4) and Form H (see Tab 6) completely during inspections.
5. Log field activities and their corresponding time accurately.
6. If immediate corrective or preventative maintenance is needed, call the appropriate contacts listed in the Project Contacts List in Tab 2.

4.2 Facility Maintenance

Functional (performance and safety) and aesthetic (public acceptance) maintenance is critical (Stormwater Management™, Product Manual). For this BMP site, focus on:

- Trash and Debris Removal.
- Sediment Removal and Management.
- Mechanical Equipment Maintenance.
- Structural Repairs.

- General Facility Maintenance.
- Vector Control.
- Vandalism.
- Grass Trimming.

The frequency of individual maintenance activities at the MF facility will be conducted according to the schedule listed in Appendix V.

Maintenance activities performed will be documented using the Forms E and F in Tab 5. See Section 2 of Appendix I-F for full details on maintenance activities.

4.3 Vegetation Management

Maintenance and control of vegetation is essential to the optimal operation and performance of a BMP. With reference to this site, vegetation management will consist of ensuring that growth does not impede with any of the components functionality. Use the maintenance checklists (Form C, Tab 4 and Form E, Tab 5) whenever inspections and maintenance activities for vegetation management are performed. See Sections 2.0 and 4.0 of Appendix I-F for specific details on controlling vegetation.

4.4 Disposal of Trash and Debris

Trash and debris from Perlite/Zeolite Filters is ultimately the responsibility of Caltrans. Consultants responsible for operating, maintaining, and monitoring the BMP will be responsible for removal and disposal of the trash and debris. This disposal will comply with applicable local, county, state, and federal waste control programs. Table 2.1 in the accompanying Appendix for Perlite/Zeolite Filters shows a few possible disposal services for waste material.

4.5 Sediment Management and Characterization Sampling

Handling and appropriate disposal of sediment residues from BMPs is critical. Stockpiling is only allowed at the facility under the following conditions:

- Sandbag berms are created (8-inch minimum) and are placed around the stockpile area.
- At least 0.5-mil plastic is used to contain any dewatered liquids (overlying sandbags).
- Stockpiles are covered and covers are anchored.

Once sediment stockpile storage has reached disposal quantity, chemical characterization must be conducted to satisfy land disposal requirements (LDRs). Document any evidence of oil and grease, antifreeze, solvents, fuel, hydrogen sulfide, and any other noxious substance (Form G, Tab 5). These observations will assist in determining if hazardous waste disposal analyses are required. Refer to Form G in Tab 5 for additional details on conducting this sampling.

For sediment stockpiles, the minimum number of discrete samples initially required must comply with Form G, Tab 5. Random samples will be selected from locations on a three-dimensional grid. If the presence of materials such as boulders, debris, etc. hinder the application of this process, the sample will be collected as close as possible to the randomly selected point without altering the essence of the random selection process.

Stockpile sediment samples will be collected in the following manner:

1. Don personal protective equipment.
2. Locate the sample point in the stockpile or drum.
3. Collect the sample using a soil probe or equivalent. Ensure that the sample is collected at the correct depth and location that was randomly selected.
4. Fill one 8-ounce glass jar with a portion of the sample and close the container with the cap, using care not to aerate (volatilize) the sample. This jar will be labeled and analyzed for volatile TRPH and VOC.
5. Homogenize the other portion of the sample in a disposable bowl using a disposable spatula or spoon. Fill a second 8-ounce glass jar with this portion of the sample and close the container with the cap. This sample will be labeled and analyzed for metals.
6. Wipe the outside of each sample container with a clean paper towel.
7. Record the sampler's initials, date, and time on the pre-labeled sample bottle.
8. Place the sample containers in individual zip-top plastic bags and seal the bags.
9. Immediately pack the samples into a chilled cooler.
10. Record the required information on the Chain-of-Custody Form.
11. Document the sampling event, recording information in the designated field logbook.
12. Repeat the above steps until the minimum number of samples has been collected.

Unless observations indicate additional testing, sediment samples submitted to the laboratory will be analyzed for the list of analytes in Exhibit 5.1 in Tab 5 using Title 22 criteria (State of California, 1985)

4.6 Vector and Nuisance Animal Control

Vector monitoring and management will be performed in accordance with Appendix IV by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

5.0 STORM MONITORING

Careful preparation and planning is critically important. Representative samples *must* be obtained for each storm event. Always double-check that equipment, supplies, and personal protective gear are readied for each field deployment.

Before crews are deployed to the field, be sure that onsite rainfall meets the sampling criteria:

1. A minimum of 48 hours of dry weather preceded the storm (72 hours is preferred).
2. The Deployment Criteria defined in Exhibit 3.1.

Check appropriate sources for onsite weather conditions before deploying field staff. Use the Storm Monitoring Decision Tree (Exhibit 3.1, Tab 3) for a decision tree on when and how to mobilize field personnel and equipment.

5.1 Storm Characteristics and Sampling Equipment

Section 5.0 of Appendix I-F details the stormwater equipment, equipment maintenance requirements, stormwater monitoring procedures, sediment sampling procedures, and analytical methods, detection limits, and holding times for samples from the MF site. Appendix III contains the BMP Retrofit Pilot Program Quality Assurance and Quality Control Plan.

Pertinent checklists, log forms, and information necessary to conduct a successful monitoring program and to be contained in the site-specific field logbooks are listed in Table 3.1 in Section 3.0. The pertinent checklists and log forms are located in Tabs 1 through 9. Table 3.1 also lists analytical and office forms, contains corresponding form and table numbers, identifies the location in this document, and explains when each form is to be filled out.

Sampling equipment shall be inspected for proper function, staging, and sampling preparation (if wet season) and documented. There are three principal phases of documenting stormwater sampling at BMP sites:

- Pre-Storm preparation,
- Storm event sampling (grab samples and composite sample collection of both influent and effluent), and
- Post-Storm sample analyses.

5.1.1 Pre-Storm Preparation

1. Consult the Storm Monitoring Decision Tree (Exhibit 3.1 in Tab 3) for when to mobilize.
2. Review the Mobilization Checklist for appropriate equipment, sampling devices, and sample bottles (Form A, Tab 3).
3. Verify sample bottle quantities, number of analyses for each parameter, in-situ sampling equipment, and other necessary gear/support materials.

4. Decontaminate and assemble decontaminanted sample containers, teflon® hose, and other sampling equipment according to the following procedures:

   Cleaning Procedures for Sample Bottles

   Bottles will be:

   a. Rinsed three times with warm tap water.
   b. Scrubbed with a clean plastic brush.
   c. Soaked in a 2% detergent (e.g., Contrad®) solution for at least 48-hours.
   d. Rinsed three times with tap water.
   e. Rinsed five times with Milli-Q or equivalent water, rotating the bottle to ensure contact with the entire inside surface.
   f. Rinsed three times with hexane while rotating the bottle, and then air-dried.
   g. Rinsed six times with Milli-Q water.
   h. Soaked in 2N nitric acid for a minimum of 24-hours.
   i. Rinsed six times with Milli-Q water.

   Cleaning Procedures for Teflon®Hose and Other Sampling Equipment

   Teflon® hose and other sampling equipment will be:

   a. Teflon® hose will be rinsed three times with a 2% Micro® solution or equivalent. Other sampling equipment will be washed with a 2% Micro® solution and a clean plastic brush.
   b. Rinsed three times with warm tap water.
   c. Rinsed three times with Milli-Q or equivalent water.
   d. Rinsed three times with 2N nitric acid.
   e. Soaked at least 24-hours in 2N nitric acid.
   f. Rinsed three times with Milli-Q water.

5. Inspect monitoring equipment for proper operation (use Form D, Tab 4). At each sampling location do the following:

   a. Check battery voltages and electrical connections.
   b. Inspect the pump tubing and replace if necessary.
   c. Inspect desiccant cartridges in flow meter.
   d. Inspect intake tubing condition and connections. Make sure intakes, flow structures, and sensors are clear of debris (this is only possible if confined space requirements are met).
   e. Make sure the correct user-entered program parameters are entered (use Forms I, J1, J2 and K in Tab 6).
   f. Set system status flags.
   g. Make sure the automatic sampler is set up properly by verifying that the correct bottle size, number of bottles, hose diameter, hose material, hose length, head height, aliquot

volume, number of samples to fill the bottle, and number of pulses to sample has been entered correctly.

h. Make sure the sampler is set to take a sample automatically after receiving a pulse form the data logger.

6. Ice composite bottles.
7. From the office or field set "Volume-to-Sample" numbers (Exhibit 9.2 in Tab 9) and initiate equipment to begin sampling automatically when flow is detected. Fill out the phone log (Form K, Tab 6).
8. Prepare necessary sample bottles for first-flush (as soon as possible after the start of runoff) grab samples. Grab samples will be collected twice per year as directed by the Task Order Manager.

5.1.2 Storm Event and Sample Collection

1. Once onsite, fill out the Empirical Observations Field Data Log and a Field Data Log Sheets (Forms H1 and I in Tab 6) to document storm characteristics.
2. Locate influent/control autosampler and inspect for proper operation.
3. Locate effluent autosampler and inspect for proper operation.
4. Change composite bottles and re-initiate equipment as needed.
5. Take grab samples as needed (two will be taken per monitoring season at the influent and effluent locations of the MF).

5.1.3 Post-Storm Sample Analyses

After a storm event has ended as determined by Storm Control, the autosampler stations need to be shut down and left ready for the next storm event in the following manner:

1. Reset the storm monitoring program to prepare for another storm event.
2. Replace the sample bottle in the autosampler and the reset the sampler.
3. Physically inspect the station to determine if any damage was sustained during the storm event. Inspect the flow sensor and intake for debris blockage or clogging. (This is only possible if confined space requirements are met).
4. Retrieve data via modem from the remote monitoring computer.
5. Check battery voltages; replace batteries that are low.

Data Retrieval

Data will be retrieved (dumped) from the data logger after each storm event during the storm season, and, during dry weather, approximately every month.

Chain of Custody Forms

When the grab samples have been collected, the paperwork will be filled out to ensure a smooth transfer of samples to the analytical laboratory. Chain-of-Custody forms (Form M, Tab 7) will be

filled out in detail describing the type of sample, the quantity of samples, and the time that the samples were collected. These forms will accompany the samples to the laboratory.

5.2 Empirical Observations

Complete and succinct empirical observations are required during site visits (rain/runoff and BMP characteristics). Observations shall be taken throughout the facility as they apply to the BMP (particularly at the influent and effluent locations). Particularly note the following:

- Meteorological characteristics (present and preceding period).
- Hydrologic and hydraulic characteristics (flowing and/or standing water).
- Inlet conditions (problems affecting performance).
- Water quality appearance (visual, olfactory) to roughly assess changes in water quality.
- Solids deposition (trash and debris, sediments, organics) and resuspension.
- Treatment medium condition.
- Outlet conditions (problems affecting performance).
- Mosquitoes and other vectors.
- Structural condition of facility.
- Monitoring equipment condition.

Refer to Form H in Tab 6 for recording empirical observation information.

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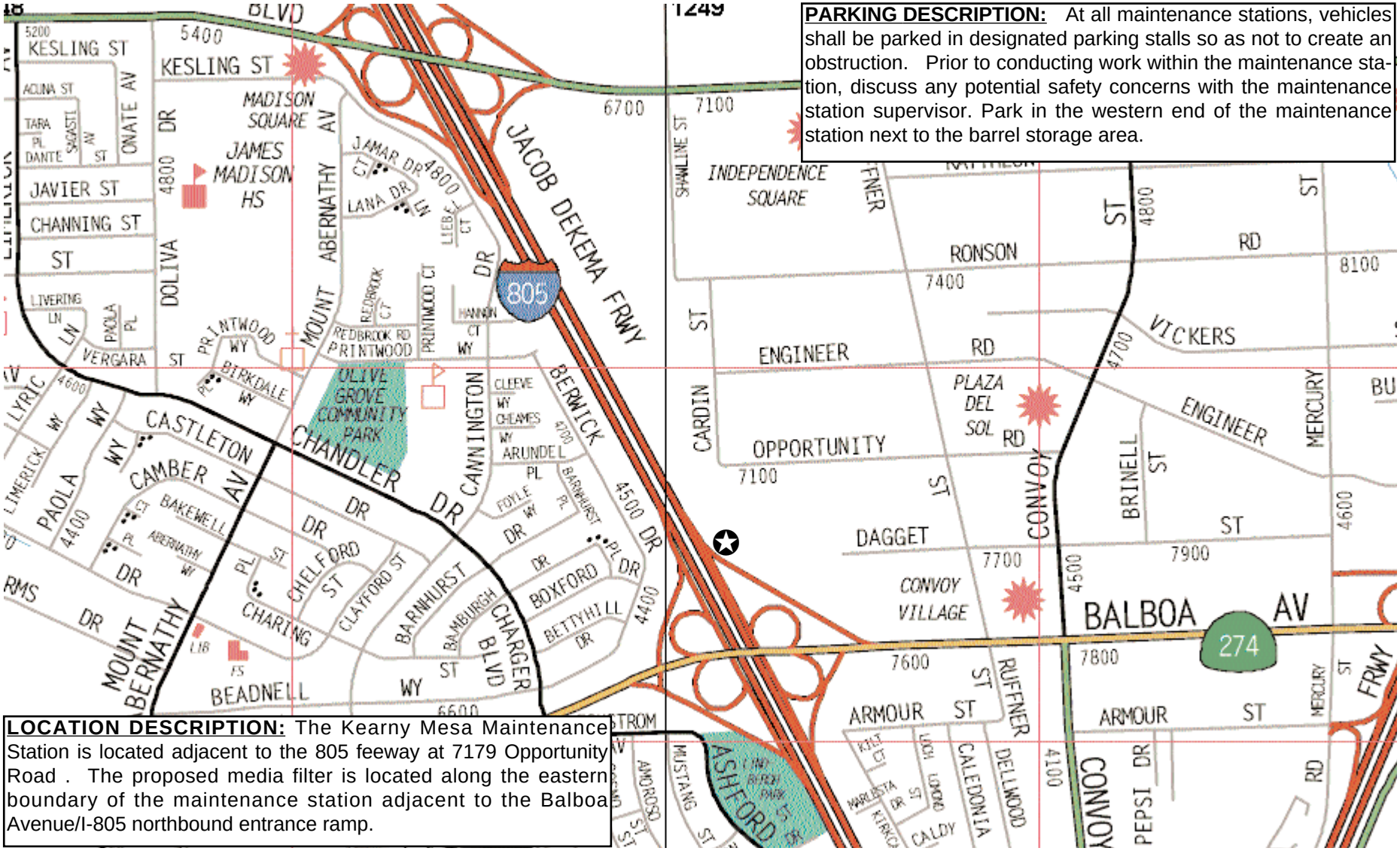
- Exhibit 9.3: Encroachment Permits

TAB 1

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

MAPS

Site Location Map
BMP Facility Plan



PARKING DESCRIPTION: At all maintenance stations, vehicles shall be parked in designated parking stalls so as not to create an obstruction. Prior to conducting work within the maintenance station, discuss any potential safety concerns with the maintenance station supervisor. Park in the western end of the maintenance station next to the barrel storage area.

LOCATION DESCRIPTION: The Kearny Mesa Maintenance Station is located adjacent to the 805 feeway at 7179 Opportunity Road . The proposed media filter is located along the eastern boundary of the maintenance station adjacent to the Balboa Avenue/I-805 northbound entrance ramp.

SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Kearny Mesa Maintenance Station
BMP Pilot Study Site #112201

District 11

Robert Bein, William Frost & Associates

6/98 JN 34618

DIST	COUNTY	ROUTE	TOTAL PROJECT	NO	SHEETS
11	SD	var	var	13	60

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

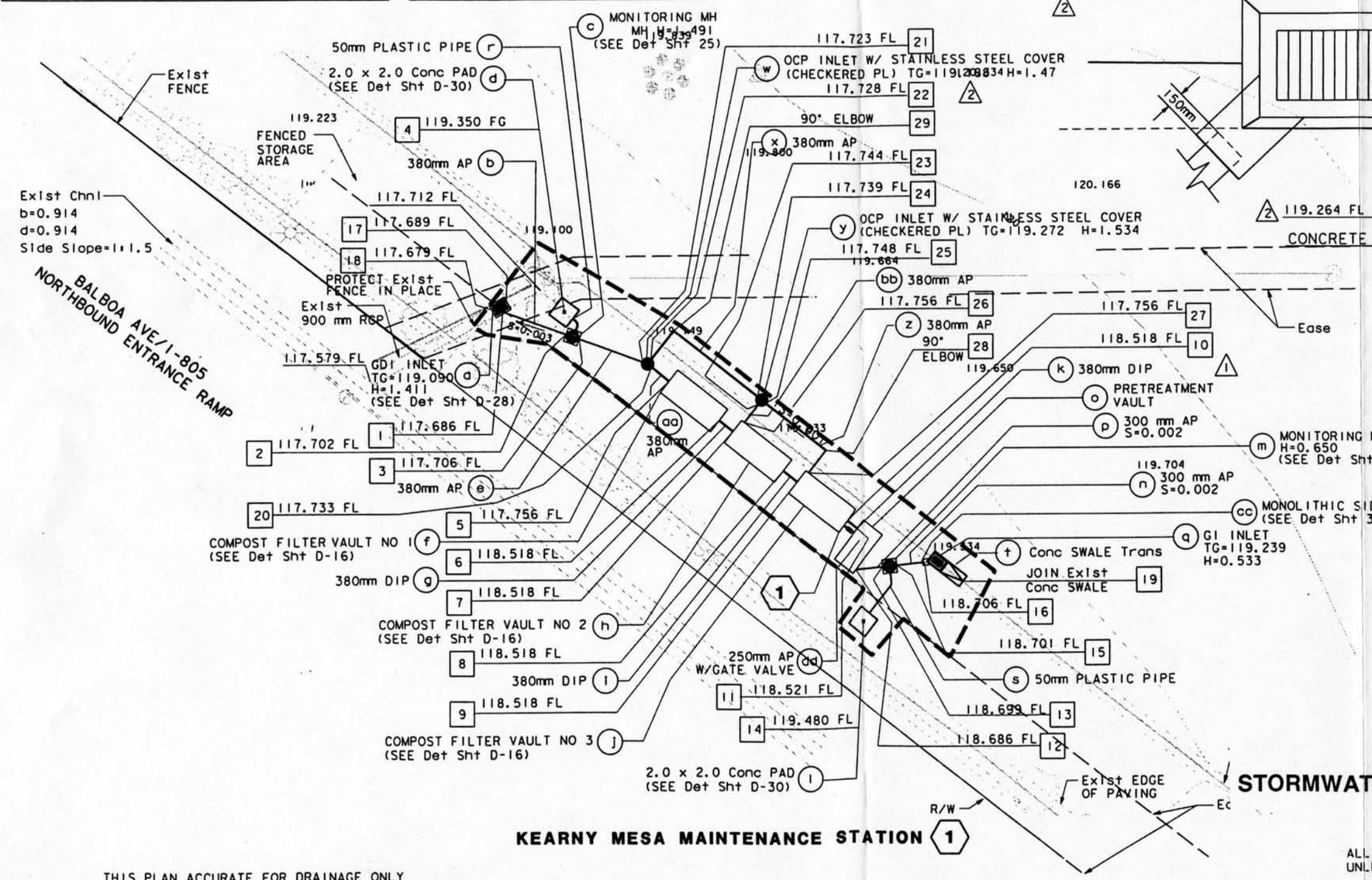
REGISTERED PROFESSIONAL ENGINEER ERWIN FOGERSON No. 049060 EXP. 9-30-99 CIVIL STATE OF CALIFORNIA

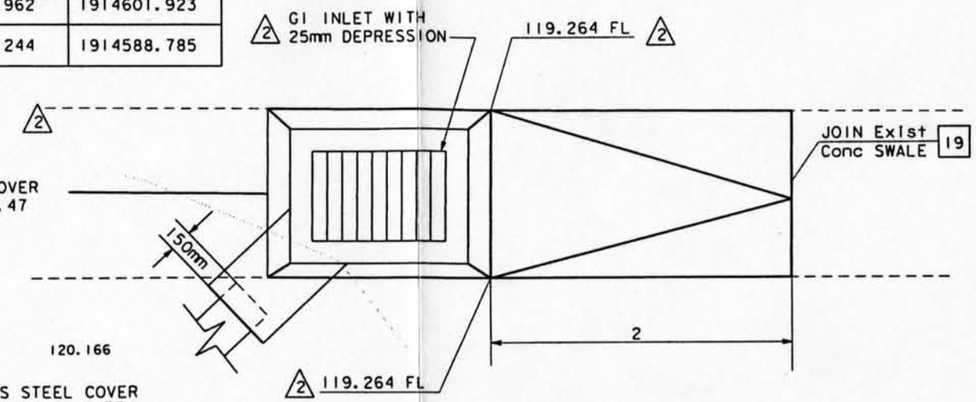
AGUILAR ENGINEERING INCORPORATED
937 SOUTH VIA LATA, SUITE 500
COLTON, CA 92324

COORDINATE POINT	NORTHING	EASTING
1	573218.919	1914574.201
2	573216.940	1914579.594
3	573216.526	1914580.721
4	573218.872	1914579.466
5	573212.895	1914588.389
6	573209.520	1914592.714
7	573208.582	1914593.915
8	573205.207	1914598.240
9	573204.269	1914599.441
10	573200.894	1914603.766

COORDINATE POINT	NORTHING	EASTING
11	573200.213	1914604.639
12	573196.689	1914604.509
13	573196.948	1914606.866
14	573192.330	1914605.191
15	573197.079	1914608.059
16	573197.340	1914610.437
17	573219.600	1914574.493
18	573219.020	1914573.466
19	573195.693	1914613.723
20	573214.114	1914586.890

COORDINATE POINT	NORTHING	EASTING
21	573214.547	1914586.114
22	573214.751	1914586.820
23	573210.935	1914596.132
24	573211.569	1914596.056
25	573210.997	1914596.753
26	573209.359	1914594.902
27	573205.406	1914600.428
28	573206.962	1914601.923
29	573217.244	1914588.785





CONCRETE SWALE TRANSITION DETAIL

SCALE 1 : 20

NOTE:

1. FOR COMPLETE R/W AND ACCURATE ACCESS DATA, SEE R/W RECORD MAPS AT DISTRICT 11 OFFICE.

LEGEND

DIP : DUCTILE IRON PIPE
GTD : GRADE TO DRAIN

BMP PILOT PROGRAM MAINTENANCE LIMITS

SITE 112201
OVERVIEW OF THE KEARNY MESA MAINTENANCE STATION
STORMWATER MANAGEMENT™ MEDIA FILTER BMP

SCALE 1 : 200

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

THIS PLAN ACCURATE FOR DRAINAGE ONLY

DATE	REVISED BY	DATE REVISED
2		
1		7-8-98 10-5-98

CALCULATED/DESIGNED BY

CHECKED BY

PROJECT ENGINEER

18 JUN 99 08:2 c:\WINNT\Profiles\aw\Desktop\1.div

TAB 2

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

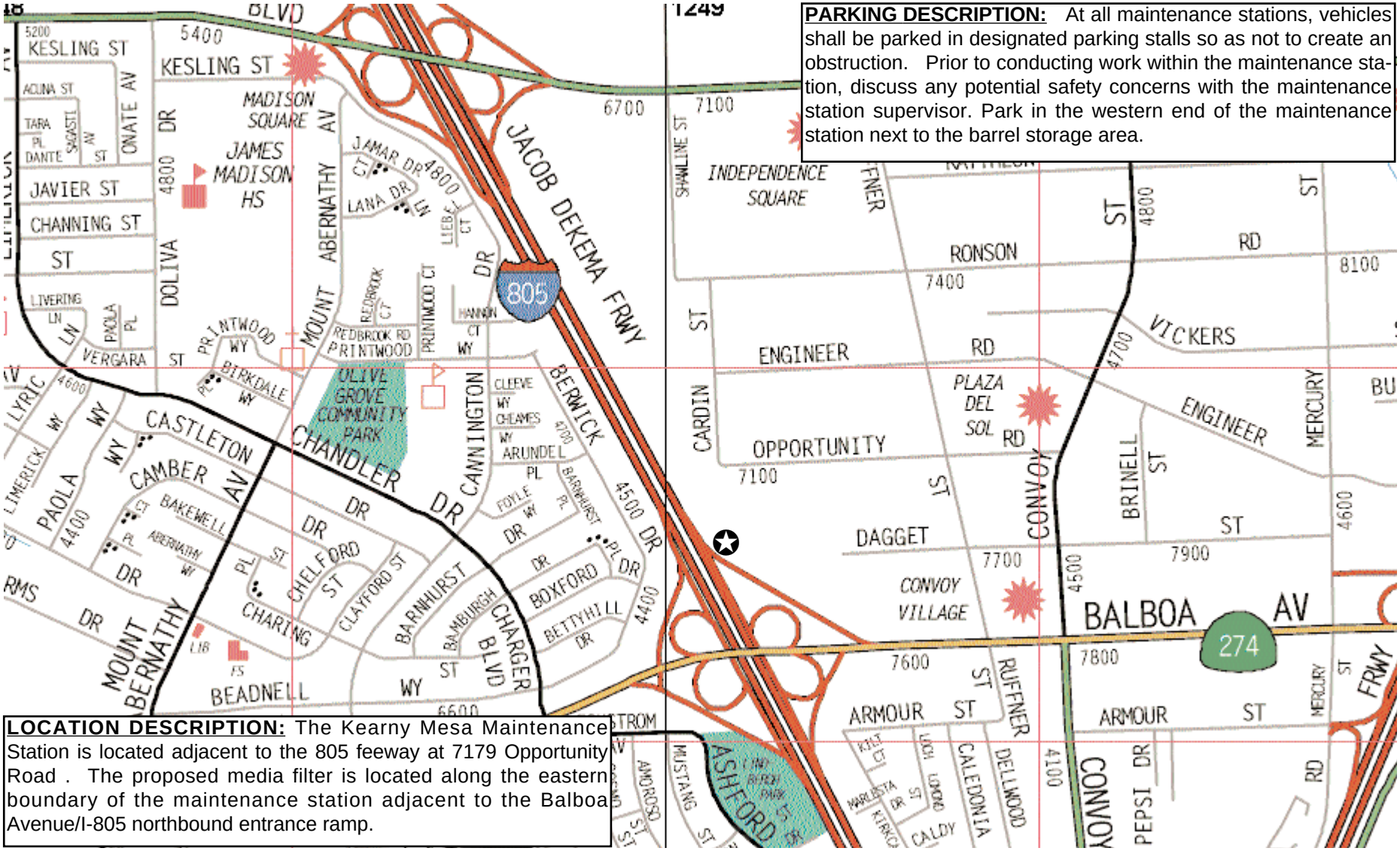
EMERGENCY PROCEDURES SUPPORT

Emergency Contacts Lists
Hospital Route Maps
Project Contacts List

Document information related to the accident or incident that resulted in injury or damage and report it to Jon Toal at KLI at (831) 457-3950

Emergency Contacts for Site 112201: Kearny Mesa Maintenance Station

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Police Department	911	From landline phone
Local Police Emergency Dispatch	911	From landline phone
Fire Non-Emergency Dispatch	(619) 974-9891	Call for confined spaces
Local Highway Patrol	(619) 467-3300	Call before beginning work
UCSD Medical Center	(619) 543-5400	Nearest hospital
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Bob Wu)	(213) 896-8636	Notify for any accident or injury



PARKING DESCRIPTION: At all maintenance stations, vehicles shall be parked in designated parking stalls so as not to create an obstruction. Prior to conducting work within the maintenance station, discuss any potential safety concerns with the maintenance station supervisor. Park in the western end of the maintenance station next to the barrel storage area.

LOCATION DESCRIPTION: The Kearny Mesa Maintenance Station is located adjacent to the 805 feeway at 7179 Opportunity Road . The proposed media filter is located along the eastern boundary of the maintenance station adjacent to the Balboa Avenue/I-805 northbound entrance ramp.

SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Kearny Mesa Maintenance Station
BMP Pilot Study Site #112201

District 11

Robert Bein, William Frost & Associates

6/98 JN 34618

Project Contacts

Name	Organization	Phone	Fax Mobile	Email
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Pat Kinney	KLI Task Order Manager	(916) 551-1380-w	(831) 640-9882-m	pkinney@cruzio.com
Ken Kronschnabl	KLI	(831) 457-3950-w (831) 688-5443-h	(831) 426-0405-f (831) 640-9883-m	kkronsch@cruzio.com
Cid Tesoro	Caltrans-District 11	(619) 688-3626	(619) 688-6998	cid_tesoro@dot.ca.gov
Rick Dey	Isco Service Center	(800) 228-4373	(402) 465-3089	RickD@isco.com
John Masiti	American Sigma Inc.	(800) 635-4567	(800) 235-1230	Sigma@americasigma.com
Internet	National Weather Service	--	--	http://nimbo.wrh.noaa.gov/San diego/nws.html
Internet	San Diego Alert System	--	--	http://nimbo.wrh.noaa.gov/San diego/fd_pcb.html
Jim Vanderswan	Channel 8 Weather Service, Lead Meteorologist	(831) 656-1725	--	--
Dean Messer	Mosquitoes and Midges Vector Abatement Specialist	530 753-6400	--	deanm@lwadavis.com
Mike Devine	County of San Diego Vector Control	(619) 694-2888	(619) 694-3559-f	Mdevineh@co.san-diego.ca.us
Fred Beams	Rodents Vector Abatement Specialist	(626) 586-5143	--	Geoscrc1@ix.netcom.com
Phil Carpenter	Toxscan	(831) 724-4522-w		PCarpenter@Toxscan.com
	Associated Laboratories	(714) 771-6900-w	(714) 538-1209-f	

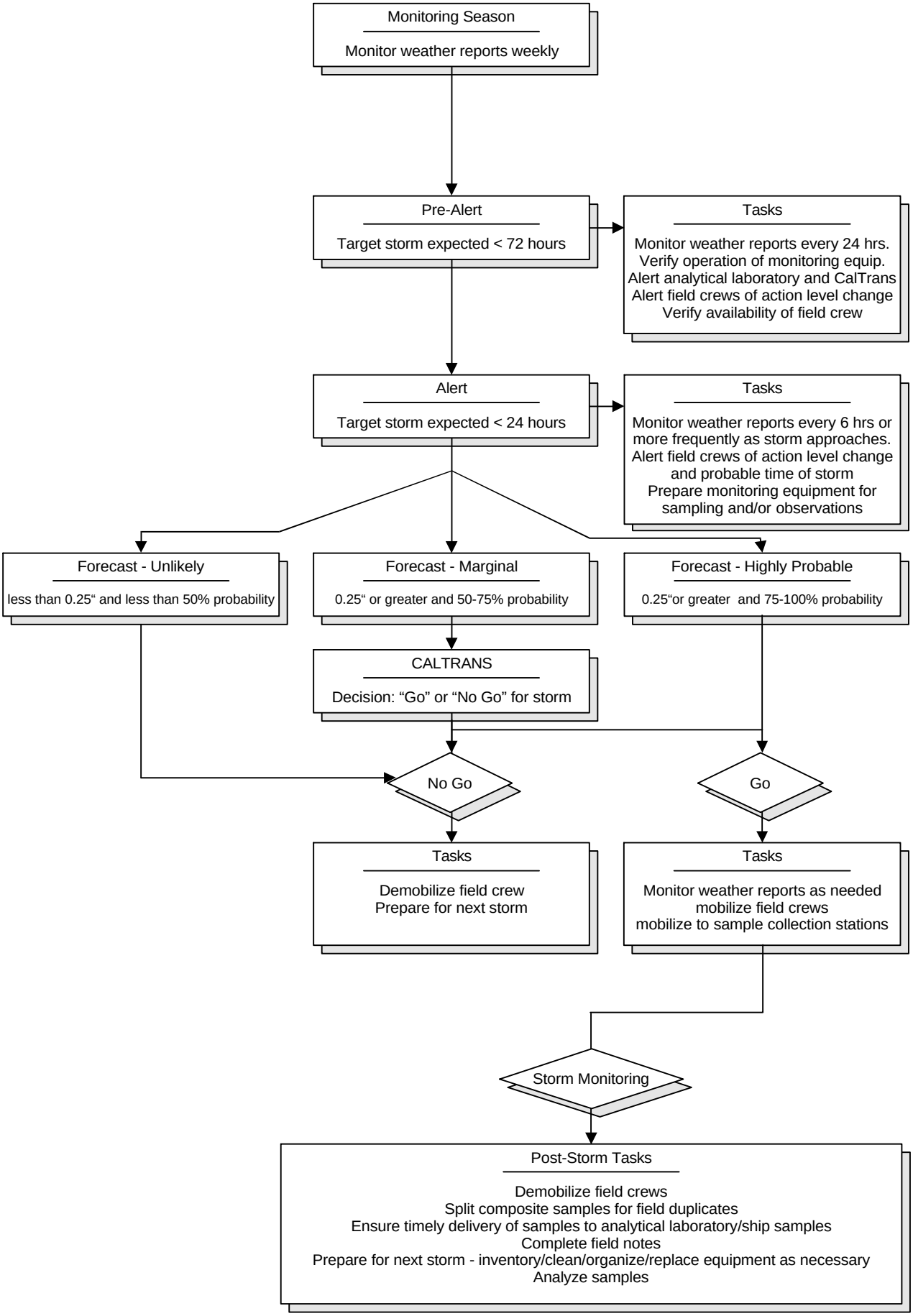
TAB 3

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

FIELD PREPARATION/MOBILIZATION FORMS

Exhibit 3.1: Storm Monitoring Decision Tree
Form A: Mobilization Checklist
Form B: Storm Staffing Plan

Exhibit 3.1
Storm Action Levels For BMP Facilities During Wet Season Monitoring



FORM A

Caltrans BMP Retrofit Pilot Program

Mobilization Checklist for StormFilter ä

General			
	Recent storm tracking information (e.g., www.weather.com)		Communication channels established
	Staff mobilized		Routes & BMPs identified
	Field Guidance Notebook		Emergency/Caltrans contact list
	Phone card		Volume to sample matrix
			Vendor's autosampler manual
Storm Kit Equipment List			
	Keypad/display		9-pin cable from keypad to data logger
	Full set of keys (on floatable bobber)		Flashlights (2)
	Maps for required areas		Large flat screwdriver
	Small flat screwdriver		Umbrella
	High quality alkaline D-cell batteries		Spare sample labels
	Pencils and indelible markers		Desiccant (packages and jar)
	Diagonal clipper		Electrical tape
	Cable ties (assorted sizes)		Utility knife
	Ziplock baggies (assorted sizes)		Labeling tape
	Polyethylene gloves		Rubber bands
Storm Mobilization List			
	Storm kit		Log books
	pH meter		Paper towels
	DI (de-ionized) water squirt bottles		Tape gun with clear packaging tape
	pH grab bottles		Spare sample labels
	Ice scoop		Sample control paperwork (COC)
	Extra fine indelible markers		20 liter bottles in 10 gallon containment buckets
	Grab sample bottles (see below)		Coolers and ice (at least one extra)
	Grab pole and extension		DI water (3-gallon jug)
	Two-way radio or cellular phone		Personal rain gear
	Any necessary safety gear		Trash bags
Sampling Checklist			
	Sample bottles w/ preservatives		Analyte list
	for each required analysis		Analytical Lab telephone number
	for each QA/QC analysis		Backup lab contact number (after hours)
	for each BMP site		Sample coolers, plus extra
	prelabeled bottles		
	extra bottles in case of breakage		

Form B: Storm Staffing Plan for StormFilter™

Caltrans Retrofit Pilot Program Stormwater Sampling		Storm Date:	
Zone #1	Zone #2	Zone #3	Zone #4
Estimated Start:		**End Time:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Startup	**Zone #2 Startup**	**Zone #3 Startup**	**Zone #4 Startup**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio
Relief Start:		**Relief End:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Relief	**Zone #2 Relief**	**Zone #3 Relief**	**Zone #4 Relief**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio

TAB 4

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

INSPECTION FORMS

Form C: BMP Site Inspection Checklist
Form D: Monitoring Equipment Inspection Checklist

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Stormwater Management ä Media Filters

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:	Maintenance Reqd?
Sediment depth Pretreatment vault_____ Vault 1_____ Vault 2 _____ Vault 3 _____	☐ yes ☐ no ☐ yes ☐ no ☐ yes ☐ no ☐ yes ☐ no
Sediment type and location:	
Standing water or other drainage problems? Pretreatment vault Vault 1 _____ Vault 2_____ Vault 3_____	☐ yes ☐ no ☐ yes ☐ no ☐ yes ☐ no ☐ yes ☐ no
If yes, what is the depth of water and conditions ?	
Evidence of erosion, channelization, or undercutting? ☐ yes ☐ no Seeps? ☐ yes ☐ no	☐ yes ☐ no ☐ yes ☐ no
Comments:	

DEBRIS/TRASH		Maintenance Reqd?
Accumulation	Pretreatment vault_____	☐ yes ☐ no
	Vault 1_____	☐ yes ☐ no
	Vault2_____	☐ yes ☐ no
	Vault 3_____	☐ yes ☐ no

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Stormwater Management ä Media Filters (continued)

DEBRIS/TRASH (continued)			Maintenance Reqd?
Accumulation at Swale transition inlet? _____			☐ yes ☐ no
Is the drainage system obstructed by debris?	Conveyance to filter	☐ yes ☐ no	☐ yes ☐ no
	Stormwater Management™ filter	☐ yes ☐ no	☐ yes ☐ no
	Effluent conveyance	☐ yes ☐ no	☐ yes ☐ no

STRUCTURAL:	Maintenance Reqd?
Is corrosion present? ☐ yes ☐ no ☐ not applicable If yes, extent and location	☐ yes ☐ no
Evidence of concrete scour, spalling, or cracking of structural parts? ☐ yes ☐ no	☐ yes ☐ no
Fences: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Locks: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Other general maintenance concerns/comments:	

STORM FILTER CARTRIDGE	Maintenance Reqd?
Does the cartridge need replacement?	☐ yes ☐ no
Vault 1_____	☐ yes ☐ no
Vault 2_____	☐ yes ☐ no
Vault 3_____	

VEGETATION:	☐ yes ☐ no
Is native vegetation, weeds, leaves, or other organic debris present in the Filter Cartridge?…… ☐ yes ☐ no If yes, what type: Does native vegetation, weeds, leaves, or other organic debris interfere with the operation of the Filter: ☐ yes ☐ no If so, explain:	☐ yes ☐ no

ANIMAL CONCERNS:	Maintenance Reqd?
Is there evidence of small animals (burrows, droppings, trails, gnawing marks, or stained rub marks)? ☐ yes ☐ no	☐ yes ☐ no
Comments:	

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Stormwater Management ä Media Filters (continued)

AESTHETIC CONCERNS:

Graffiti? ☐ yes ☐ no Description and location:

Other general aesthetic concerns:

NON-STORMWATER CONCERNS:

Non-storm water discharge to BMP ☐ yes ☐ no
BMP wet from obvious non-stormwater discharge (no rain) ☐ yes ☐ no
If yes, print your name and contact number below and fax this form to Cid Tesoro at 619-688-6998
From: Contact Number:

OVERALL:

Other concerns affecting operation:

Condition of facility: ☐ acceptable ☐ not acceptable
Comments:

Dates for maintenance to be completed by:

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

_____
(Team Leader's Signature)

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM D

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Inspection Checklist for StormFilter ä

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SAMPLING AND FLOW MEASUREMENT EQUIPMENT:	Maintenance Required?
Is the monitoring station enclosure locked? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the monitoring station enclosure structurally sound? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the system status of the automatic sampler online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the automatic sampler properly programmed and calibrated? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the peristaltic pump tubing need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the intake tubing and/or connections need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Do the desiccant cartridges in the flow meter and/or sampler need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is internal modem online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Are the DC marine battery and connect cable present? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are voltage and current of DC battery within normal parameters? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are cables to power source present and properly connected, and is AC power available? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Is the level meter properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no

For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM D
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Inspection Checklist for StormFilter ä
(continued)

SAMPLING AND FLOW MEASUREMENT EQUIPMENT (cont.):	Maintenance Required?
Is the level reading in calibration? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is strainer clean and free of obstruction? ☐ yes ☐ no Comments:	☐ yes ☐ no

INFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

EFFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				
Dates for maintenance to be completed by:				

PHOTOGRAPHS (mandatory if maintenance is required):

Date	**Time**	**Description**	**Direction Facing**	**Roll**	**Photograph No.**

_____
(Team Leader's Signature)

For Internal Use Only

TAB 5

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

MAINTENANCE FORMS

Form E: BMP Site Maintenance Activity Checklist
Form F: Monitoring Equipment Maintenance Activity Checklist
Form G: Stockpile/Sediment Sampling Checklist
Exhibit 5.1: Title 22 Characterization Requirements

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM E

Caltrans BMP Retrofit Pilot Program

BMP Site Maintenance Activity Checklist for StormFilter ä

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:

☐ ***Sediment removal or sediment management***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Clean flumes, and/or cracks in stormwater conveyance system***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Erosion repair (including vegetative stabilization)***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Embankment/slope repair(s)***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for StormFilter ä
(continued)

STRUCTURAL:

☐ ***Structural repairs (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

ANIMAL CONCERNS:

☐ ***Burrow control***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

AESTHETIC CONCERNS:

☐ ***Debris and trash removal***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Graffiti removal***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Painting***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

_____ (Team Leader's Signature)	General Comments:

Only Complete Applicable Sections

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM F

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Maintenance Activity Checklist for StormFilter ä

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Consultant:	
BMP Location:		

☐ ***Clean flumes, orifices, and/or cracks***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Diagnostic test of automatic sampler***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of peristaltic pump tubing***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of intake tubing***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of strainer***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of 12-volt marine battery***

Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM F
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Maintenance Activity Checklist for StormFilter ä
(continued)

☐ ***Replacement of desiccant cartridges in sampler and flow meter***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair and maintenance of AV meter***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Repair and maintenance of look-down level meter***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other maintenance of automatic sampling equipment (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other maintenance of flow measurement equipment (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time:
More work required? ☐ yes ☐ no
Equipment used:
Comments:

_____ Signature of crew leader	General Comments:

Only Complete Applicable Sections
For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM G

Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

GENERAL INFORMATION:			
Date:	Time In:	Team Leader's Initials:	Time Out:
Location:			

SEDIMENT CHARACTERISTICS IN BMP PRIOR TO STOCKPILING:					
Depth of sediment:					
Color:	☐ black	☐ brown	☐ green	☐ tan	☐ other
Consistency:	☐	☐ sandy	☐ silty	☐ granular	☐ other
Odors:	☐ petroleum ☐ none	☐ solvents ☐ other	☐ organic (rotten eggs)		☐ sewage
Depth of sediment:					

SEDIMENT SAMPLE COLLECTION MOBILIZATION LIST	
Powder Free Nitrile Gloves	
Soil Proble or equivalent for sample collection	
8-ounce glass jar labeled Total Petroleum Hydrocarbons (TPH)	
Plastic bags, seal bags	
Chilled cooler	
Chain-of-Custody form	
Log book for record keeping	

STOCKPILE/DRUMMED SEDIMENT:	Maintenance Required?	
Does the stockpile/drum require additional protection from causing environmental impact? (i.e., is underlying plastic, sandbag berming, and an anchored weather-proof covering in place?) If so, check yes.	☐ yes	☐ no
If not stockpiled, are the drums or other containers adequately stored, protected from weather, and free of damage/leakage? If not, check yes.	☐ yes	☐ no
Is the amount of onsite sediment reaching an unmanageable quantity? (Is disposal necessary?) If so, check yes.	☐ yes	☐ no
Are onsite equipment and materials sufficient to perform sediment sampling? If not, check no.	☐ yes	☐ no

SEDIMENT COLLECTION:	
<10 cubic yards: *Minimum of **2 samples, one randomly from each half of the soil mass***	
10-20 cubic yards: *Minimum of **3 samples, one randomly from each third of the soil mass***	
20-100 cubic yards: *Minimum of **4 samples, one randomly from each quarter of the soil mass***	
100-500 cubic yards: ***Minimum of 1 sample per 25 c.y. of each 25 c.y. section of the soil mass***	
Over 500 cubic yards: *Collect a minimum of **1 sample per 25 c.y. portion of the soil mass***	*Contact Dept. of Environmental Health for Guidance*

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM G

Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

SEDIMENT SAMPLE COLLECTION	
Observation sheet completed	
Personal and equipment decon completed	
Number of aliquots taken from composite _____	
Sample IDs: 1. _____ Analysis requested: _____ 2. _____ Analysis requested: _____ 3. _____ Analysis requested: _____ 4. _____ Analysis requested: _____ 5. _____ Analysis requested: _____ 6. _____ Analysis requested: _____	
Photos taken:	
Chain of Custody form attached	
Record information in logbook for record keeping	
Comments:	

Exhibit 5.1: *Title 22 Characterization Requirements*

Sediment Matrix (Disposal)
Analytical Parameters, Methodologies, Detection Limits, Holding Times, Container Volumes and Types, and Preservation

Parameter	Method	Units	Detection Limit	Maximum Holding Time	Preservation	Container Size/Type(1)
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 418.1	mg/kg	10	28 days	$4^{o}C$	8 oz glass jar
Volatile Organic Compounds	EPA 8260B	mg/kg	SW – 846 (5) requirements	14 days	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Metals(2):	EPA 6020/7471	mg/kg	SW – 846 (5) requirements	180 days 28 days for mercury	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Waste Extraction Test (WET) Metals(3):	STLC Extraction	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA
Toxicity Characteristic Leaching Procedure (TCLP) Metals(4):	TCLP 1311	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA

(1) Each sample will be collected in two 8 oz glass jars

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

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

(4) If any of the WET-soluble concentrations are equal to or greater than the TCLP regulatory thresholds, analyze the waste by TCLP. “Test Methods for Evaluating Solid Waste, Physical /Chemical Methods”. SW-846, Update III.(SW-846)

TAB 6

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MONITORING FORMS

Form H: Empirical Observations Field Data Log Sheet for Storm Events
Form I: Field Data Log Sheet
Form J1: User-Entered Program Parameters (Influent/Control)
Form J2: User-Entered Program Parameters (Effluent)
Form K: Station Phone Log

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for StormFilter ä

GENERAL INFORMATION:

Date:	Time in:
Team leader:	Stormwater Consultant:
Other personnel:	Location of facility:

METEOROLOGICAL CHARACTERISTICS:

Present rainfall: ☐ None ☐ Mist ☐ Drizzle ☐ Sprinkle ☐ Light, Steady ☐ Moderate ☐ Heavy

Time present rain event started: _____

Wind speed: ☐ 0-5 mph (light) ☐ 5-10 mph (moderate) ☐ 10-15 mph (brisk) ☐ >15 mph (strong)

Cloud cover: % Temperature _____

Distribution of Rainfall: ☐ Uniform ☐ Localized cells ☐ Scattered showers

Meteorological characteristics comments:

HYDROLOGIC AND HYDRAULIC CHARACTERISTICS:

Flow conditions (*check all that apply*):

☐ Runoff entering facility
☐ Flow over inlet baffle occurring
☐ Underdrain manifold from cartridge bay flowing to outlet bay.
☐ Facility discharging
☐ Facility discharging via emergency overflow Time occurred: _____
☐ Flow bypassing facility Time occurred: _____

Standing water conditions (*record measurements as appropriate and check all that apply*):

☐ Standing water in pretreatment sedimentation chamber Depth: _____
☐ Standing water in Inlet bay:
Describe Location: _____
Depth: _____
☐ Standing water in Cartridge bay :
Describe Locations: _____
Depths: _____
☐ Standing water in Outlet bay:
Describe Locations: _____
Depths: _____

Are there any indication of leakeage (e.g., falling water level without flow occurring from a chamber)? If so, what indications and where? _____

Comments: _____

_____

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for StormFilter ä

INLET CONDITIONS:

Describe flow distribution where flow passes weir or baffle at exit of inlet chamber:

☐ Flow is uniformly distributed

☐ Flow is not uniformly distributed, if so describe below:

Describe any obstructions or restrictions interfering with inflow/influent: _____

_____

INFLUENT WATER QUALITY APPEARANCE:

(Check all that apply and describe under comments)

Odor:

☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:

☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:

☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:

☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity

☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

SOLIDS DEPOSITION AND RESUSPENSION:

For the following locations, record the type (trash or debris, oil and grease, other organics), location(s), area(s) covered, and depth(s), as applicable:

In pretreatment sedimentation chamber: _____

_____

In Inlet bay: _____

_____

In Cartridge bay:_____

_____

In Outlet bay: _____

Comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for StormFilter ä

Solids resuspension evident (*check all that apply*):
☐ Pretreatment Sedimentation Chamber ☐ Inlet bay ☐ Cartridge Bay ☐ Outlet Bay
☐ Other (describe): _____

Solids deposition and resuspension comments:

TREATMENT MEDIUM CONDITION:

Describe any indications that the filter medium is clogging or that hydraulic capacity is otherwise being reduced:

OUTLET CONDITIONS:

Describe any obstructions or restrictions interfering with outflow/effluent:

EFFLUENT WATER QUALITY APPEARANCE:

Check all that apply and describe under comments

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

VECTORS:

Presence of vectors: ☐ Yes ☐ No
If yes, what type: ☐ Mosquitoes ☐ Blackfly ☐ Cockroaches ☐ Rats
☐ Other_____

Comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for StormFilter ä

STRUCTURAL CONDITION OF FACILITY:

Record the presence of the following (*check all that apply and give location in comments*):

☐ Inlet structure damage ☐ Outlet structure damage ☐ Vandalism

Comments:

MONITORING EQUIPMENT CONDITIONS:

Equipment functional: ☐ Yes ☐ No ☐ N/A

Comments:

CHANGES DURING STORM SINCE LAST OBSERVATION:

Date:_____ Time: _____

Comments:

Date:_____ Time: _____

Comments:

Date:_____ Time: _____

Comments:

ADDITIONAL COMMENTS:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

_____

(Team Leader's Signature)

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM I
Caltrans BMP Retrofit Pilot Program
StormFilter ä Field Data Log Sheet

GENERAL INFORMATION		Julian Day (*5AA):
Date:	Time in (PST,*5):	Team Leader's Initials:
Location:	Crew:	
Influent or **Effluent** (circle one)	**Storm Event Visit** or **Maintenance Visit** (circle one)	

SYSTEM STATUS FLAGS (*6AD; 1=high, 0=low)
Arr: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____
Dep: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

PROGRAM SIGNATURE (*B)
Arrive: _____
Depart: _____

DATA LOGGER INFORMATION (*6)

All Site Visits:		Samp. Batt Volt	22:	Manual Rain Gauge:	
Basin Staff Gauge:		Cell Batt Volt	82:	Total Rain (in.)	25:
Flow Sensor Stage:		Flow Meter Batt Volt	28:	Total Storm Vol.	72:
Stage (ft)	02:	Storm Site Visits:		Strm Vol Smpld	75:
Velocity (ft/s)	03:	Volume (kcf)	05:	Max Stage Day	51:
Flow (cfs)	04:	Storm Sum (kcf)	06:	Max Stage Time	52:
Station ID	21:	Percent Capture	08:	Max Stage (ft)	53:
		Volume2Sample	14:	Date Last Sample	105:
		Sample Count	17:	Time Last Sample	106:

AUTOSAMPLER INFORMATION

Storm only

Number of Samples Total: _____
Number of Samples Remaining: _____

Bottle # out: _____
Bottle Volume: _____
Volume2Sampl: _____

Bottle # in: _____

GRAB SAMPLE COLLECTION

	Time:
TRPH (VOAs)	_____
Bacteria	_____
Oil and Grease	_____
Other: _____	_____

CALIBRATIONS and CHECKS

Stage: ☐
Sample Volume: ☐
Rain Gauge: ☐
Other:

SAMPLING EQUIPMENT AND REPAIR NEEDS:

ACTION TAKEN:

Team Leader's Signature_____

FORM J1

User-Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **INFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
02 Flow Meter Stage Offset (feet)					
03 Volume to sample (kcf)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
08 Flow Meter Speed Offset (feet/second)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
36 Cellular phone battery state control parameter					
37 Duration of cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM J2

User Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **EFFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
03 Volume to sample (kcf)					
04 Level Meter Stage Offset (feet)					
05 Level Meter Multiplier (feet/mv)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. Failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
30					
31					
34 Flume Parameter 1					
35 Flume Parameter 2					
36 Cellular phone battery state control parameter					
37 Duration when cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM K:

STATION PHONE LOG FOR StormFilter ä

Time	Station	Stage	% Capture	PkFlow (time)	PkFlow (feet)	Sample Count	Volume 2Sample	Storm Sum	Volume	Flow (Q)

TAB 7

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

LABORATORY ANALYSIS FORMS

Form M: Chain-of-Custody Form
Exhibit 7.1

FORM M:

CHAIN-OF-CUSTODY FORM FOR StormFilter ä

Laboratory:	Lab # Date Rec'd	**From:**

Project: **P.O.#:**	**Project #:** **Required Completion Date:**

Sample ID #	Site ID #	Lab ID #	Matrix/ Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt

Data Reports **WILL** include the following: Sample/Site ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time

Exhibit 7.1: ***Chemical Analyses List for Stormwater***
Stormwater Matrix
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Analyte	Priority Rank	Reporting Limit	Units	Analytical Technique	Method Number	Holding Time	Minimum Sample Volume	Preferred Volume and Container Type[1]	Preservation
Conventionals									
pH	1	0.1	Unit	Electrode	EPA 150.1	Immediately[2]	100 mL	1-100 mL glass/plastic	4°C
Specific Conductance	1	1.0	µmhos/cm	Electrometric	EPA 120.1	Immediately[2]	500 mL	1-500 mL glass/plastic	4°C
Hardness	5	2	mg/L	Titrimetric/ Colorimetric	EPA 130.2	6 months	100 mL	1-200 mL glass/plastic	HNO_3 to pH<2, 4°C
Total Suspended Solids	1	1	mg/L	Dried Filter Weight	EPA 160.2	7 days[3]	1 L	1-500 mL glass/plastic	4°C
Nutrients									
Nitrate-Nitrogen	2	0.01	mg/L	Colorimetric Ion Chromatography	EPA 353.3 EPA 300.0	28 days 48 hours	200 mL 200 mL	1-500 mL plastic 1-500 mL plastic	4°C and H_2SO_4 to pH<2 4°C
Total Kjeldahl Nitrogen	3	0.1	mg/L	Titrimetric/ Colorimetric	EPA 351.3	28 days	500 mL	1-1L plastic	4°C and H_2SO_4 to pH<2
Total Phosphorus	4	0.002	mg/L	Colorimetric	EPA 365.3	28 days	100 mL	1-250 mL plastic	4°C and H_2SO_4 to pH<2
Total/Dissolved Metals[4],[5]									
Copper	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Lead	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Zinc	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Organics[6]									
Total Petroleum Hydrocarbons – Diesel/ Oil	Grab	250/200	µg/L	GC	EPA 8015M	14 days	1 L	2-1L amber glass	4°C
Total Petroleum Hydrocarbons - Gasoline	Grab	50	µg/L	GC	EPA 8015M	14 days	2-40 mL	3-40 mL VOA vials	4°C, HCl to pH<2
Bacteria[6]									
Fecal Coliform	Grab	2	MPN/100 mL	Multiple-tube	SM 9221E	6 hours[7]	50 mL	1-100 mL plastic	4°C

1. Analytes with the same preservative can be combined into a single container if the same laboratory is performing the analyses.
2. pH and Specific Conductance will be measured by the laboratory immediately upon receipt of the samples.
3. 7 days based upon limit for measuring TSS/no regulatory limit.
4. Total and dissolved metals samples are collected in separate containers. Only the total metals container will receive nitric acid.
5. Dissolved metals will be filtered in the laboratory prior to acidification.
6. Total Petroleum Hydrocarbon and Fecal Coliform grab samples will be collected for two storms per year.
7. Attempts will be made to maintain the 6-hour holding time for bacteria samples to the extent possible. When not possible, a maximum holding time of 24 hours will be followed in accordance with "Standard Methods for the Examination of Water and Wastewater", 18th Edition.

TAB 8

CALTRANS BMP STORM WATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

VECTOR CONTROL AND MONITORING FORMS

Form O: Vector Monitoring and Control Report

VECTOR MONITORING FORMS

Vector monitoring forms will be provided by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

TAB 9

CALTRANS BMP STORM WATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

TECHNICAL SUPPORT INFORMATION

Exhibit 9.1: Runoff Coefficients
Exhibit 9.2: Volume-to-Sample Tables
Exhibit 9.3: Encroachment Permits

Exhibit 9.1
Runoff Coefficient Matrix Table for StormFilter ä

Site No.	Site Name	Drainage Area (acres)	Runoff Coefficient C
11	Kearny Mesa Maintenance Station	1.46	0.9

"Volume to Sample" in Kilo-Cubic Feet for *Kearney Mesa Maintenance Station Media Filter*

Number of Sample Aliquots	Acreage	Runoff Coefficient
72	1.46	0.9

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0066	2.6	0.1722
0.2	0.0132	2.7	0.1789
0.3	0.0199	2.8	0.1855
0.4	0.0265	2.9	0.1921
0.5	0.0331	3.0	0.1987
0.6	0.0397	3.1	0.2054
0.7	0.0464	3.2	0.2120
0.8	0.0530	3.3	0.2186
0.9	0.0596	3.4	0.2252
1.0	0.0662	3.5	0.2319
1.1	0.0729	3.6	0.2385
1.2	0.0795	3.7	0.2451
1.3	0.0861	3.8	0.2517
1.4	0.0927	3.9	0.2584
1.5	0.0994	4.0	0.2650
1.6	0.1060	4.1	0.2716
1.7	0.1126	4.2	0.2782
1.8	0.1192	4.3	0.2849
1.9	0.1259	4.4	0.2915
2.0	0.1325	4.5	0.2981
2.1	0.1391	4.6	0.3047
2.2	0.1457	4.7	0.3114
2.3	0.1524	4.8	0.3180
2.4	0.1590	4.9	0.3246
2.5	0.1656	5.0	0.3312

CALTRANS
BMP RETROFIT PILOT PROGRAM
BMP OPERATION, MAINTENANCE, AND MONITORING PLAN

VOLUME II

BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK FOR WET BASINS

DISTRICT 11, SAN DIEGO

September 1999

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APPENDIX I-G: WET BASINS

APPENDIX II: HEALTH AND SAFETY PLAN

APPENDIX III: QUALITY ASSURANCE/QUALITY CONTROL PLAN

APPENDIX IV: VECTOR CONTROL PLAN

APPENDIX V: MAINTENANCE INDICATOR DOCUMENT

1.0 INTRODUCTION

This Field Guidance Notebook (*FGN*) gives inspectors, maintenance, and monitoring personnel the appropriate field evaluation and documentation for the District 11 Wet Basin belonging to the Caltrans BMP Retrofit Pilot Program. Field observations and conditions must be clearly and concisely documented on the field forms provided.

Refer to Appendix I-G of this guidance document for supporting information on Wet Basin technology and characteristics.

1.1 Data to Be Collected

The following data will be collected to assess the performance and maintenance aspects of a Wet Basin:

- Water quality and quantity data of runoff into and discharge from the Wet Basin from flow-composite samples and first-flush (as soon as possible after the start of runoff) grab samples for at least eight storm events during two wet seasons, weather permitting.
- Monthly 48-hour time-weighted composite samples from September through May each monitoring year.
- Annual sediment sampling of the bottom of the wet basin at the end of each monitoring year.
- Rainfall data, recorded as a function of time, from rainfall events during the study period.
- Observations of water quality, weather, antecedent conditions, spills, etc.
- Documentation records of inspections and maintenance activities performed.
- Vector monitoring data.
- Records of vector control measures taken.
- Vegetation management records.

Consultants will be responsible for data management. Overall management of the data will be consistent with established Caltrans procedures for stormwater monitoring projects.

1.2 Field Activities to Be Performed

Field activities that will be performed at the Wet Basin facility include:

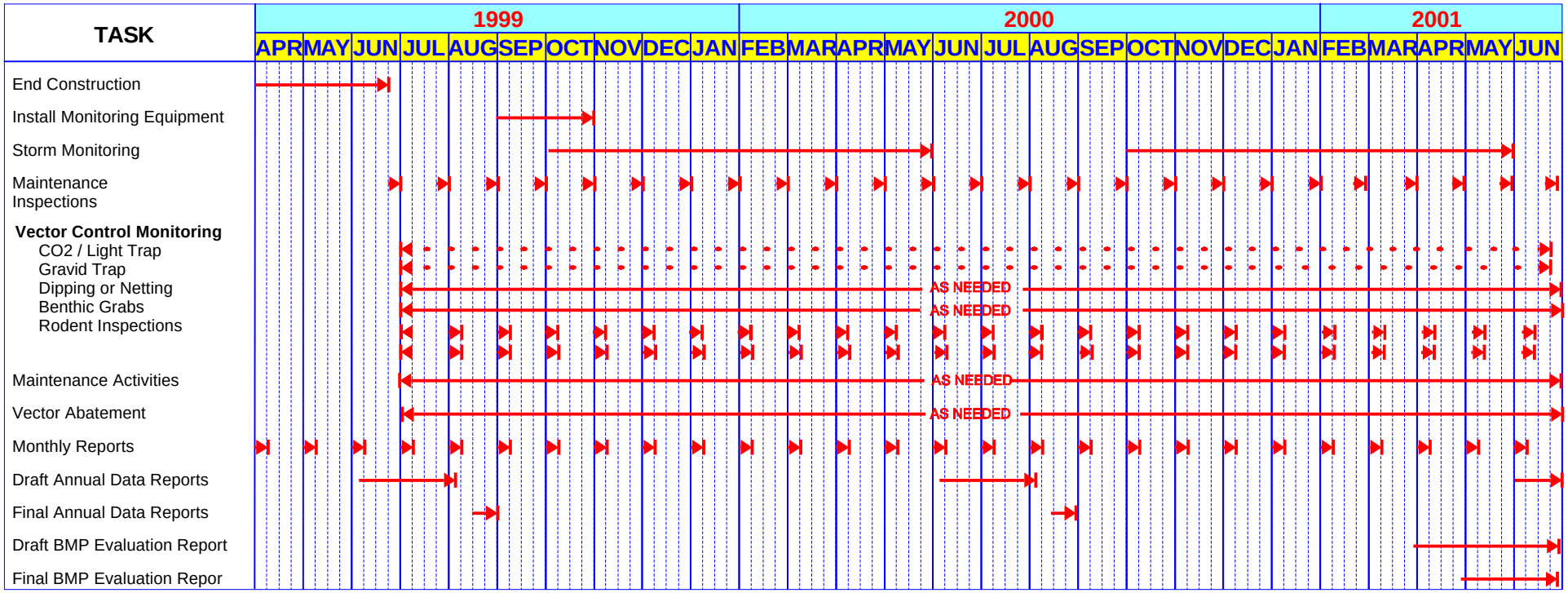
- Empirical Observation of Wet Basin Operation.
- Monitoring Equipment Installations.
- Monitoring Equipment Maintenance.
- Facility Maintenance Inspections and Facility Maintenance.
- Vector and Nuisance Animal Control Inspections.
- Vegetation Control.
- Stormwater Monitoring.

Also, vector management may occur at the Wet Basin facility, but may be contingent on facility housekeeping and other environmental influences. Please see Appendix IV of Volume II for further details.

1.3 Master Schedule

The schedule on the following page shows the time-line for each phase of the Wet Basin OMM program.

Figure 1.3
Projected Schedule
Wet Basin OMM



2.0 SITE INFORMATION

Access requirements for each site are summarized in Table 2.1, in the Encroachment Permit found in Tab 9, and in the Site Location Maps in Tab 1. ***Encroachment Permits must be on hand*** for each site visit, and ***notification requirements found in these permits must be followed***.

Check in with appropriate Caltrans personnel before conducting field work.

Table 2.1
Caltrans District 11 Wet Basin Site Summary

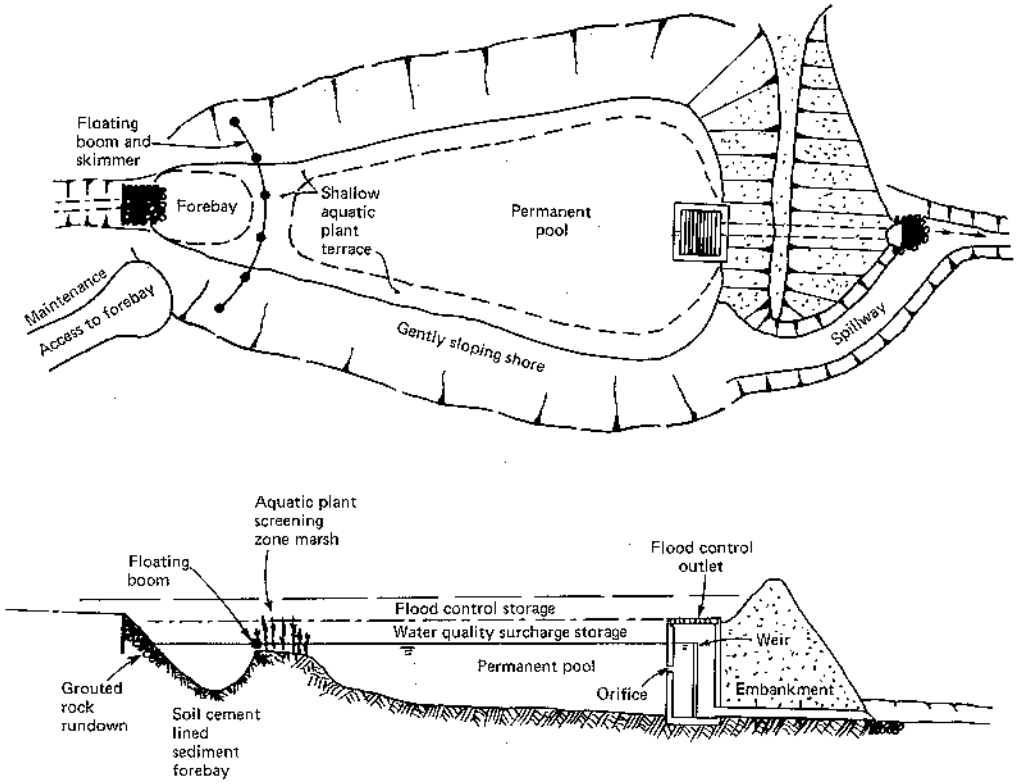
Site No.	Site Name	Site Location	Access and Parking
111104	La Costa Ave. / I-5 Northbound off ramp	Located off the La Costa Ave northbound I-5 off ramp, in the City of Carlsbad.	Access the BMP through the gate to the service road located off of Piraeus St. Use a key CCL to unlock the gate.

2.1 Wet Basins

Refer to the accompanying Appendix for a general description of the Wet Basin. The sections below provide site-specific information for the Wet Basin site in District 11.

Refer to Tab 9 for a summary of the hydraulic characteristics for this site. The following figure illustrates an overview of the Wet Basin.

Figure 2.1 Overview of a Wet Basin



(Urbonas and Stahre, 1993

2.1.1 Site 111104: La Costa Ave. / I-5 Northbound off ramp

The wet basin is located in the area bounded by the northbound I-5 La Costa Avenue off ramp, La Costa Avenue, and Piraeus Street. This off-line, constructed wetland has a tributary area that includes mainline freeway and the wetland surface area for a total tributary area of 16,997 square meters. The water quality runoff tributary to the BMP is diverted to the basin by way of a new storm drain system located from the northbound I-5 mainline through several inlets located along the shoulder and the off ramp. This runoff combines into a single 450-mm APC(S) that enters the southern end of the basin. The water quality volume, 1-year, 24-hour volume, is discharged through a single orifice cut into the sidewall of a 200-mm PVC pipe. The orifice was set at the permanent pool water surface elevation. Runoff exceeding the 1-year, 24-hour volume will discharge through the weir opening of the outlet structure set at the 1-year, 24-hour storage elevation. Runoff exits the basin through an outlet structure and a 450- mm APC(S) on the northeast side of the basin. Discharges significantly greater than 1-year storm event will enter a secondary overflow, specifically, a rock lined spillway.

The basin's permanent pool source is from the trapezoidal channel located along the eastern side of the basin. A concrete structure located in the invert of the channel diverts water from the channel, through a 150-mm PVC pipe to the basin.

The sampling point for the inflow will be approximately 10 m upstream of the outfall to the basin. The inlet sampling point will be accessed though a manhole located adjacent to the access road. The sampling point for the effluent will be in the 200-mm connection pipe to the outlet structure.

Because the inflow sampling point will be submerged during high basin levels, an AV flow meter will be installed to measure flow. The depth and velocity sensors will be secured to the invert of the conveyance using a mounting ring supplied by the manufacturer.

A 300-mm H-flume was installed at the overflow of the spillway. This flume will handle flows up to 0.057 m^3/s; a bubbler will be installed in combination with the flume. In addition, an AV flow meter will be installed in the 200-mm pipe connection to the outlet structure because this pipe will be submerged. These two flow measuring devices will allow for adequate measurements

Please see the Site Location Map and BMP Facility Plan in Tab 1.

2.2 Emergency Hospital Routes

See the "**Emergency Procedures Support", Tab 2,** for maps and descriptions showing routes to the nearest hospitals and for emergency and site-related telephone contacts.

2.3 Site-Specific Health and Safety Concerns and Precautions

This subsection only identifies health and safety concerns and precautions. Appendix II provides more extensive health and safety concerns and requirements. Note that at a Wet Basin, field crews will consist of a minimum of two people. Refer to the site Encroachment Permit (Tab 9) for additional health and safety requirements.

2.3.1 Traffic Safety Precautions

Activities at a Wet Basin bring up traffic concerns including access and parking at pullouts. During access and routine visits to the facility, the following precautions will be taken:

- Minimize the time spent on the shoulder of the highway.
- Park on the facility access road or pullout, as appropriate to the specific site.
- Affiliated personnel shall wear a reflective orange safety vest, a hard hat, and appropriate shoes.
- Rotating amber lights shall be mounted and operational on work vehicles.

According to Chapter 8 (Protection of Workers) of the *Caltrans Maintenance Manual*, working for more than 10 minutes on the shoulder involves a shoulder closure procedure. This shoulder closure procedure will conform to the safety precautions below and the site-specific instruction provided in the Encroachment Permits (Exhibit 9.3 of Tab 9).

- Prior to beginning any work on or adjacent to a major roadway, the local highway patrol traffic control department shall be notified. See the Emergency Contacts List in Tab 2 for a listing of the local highway patrol phone numbers.
- Whenever possible, plan the timing of the work for non-peak traffic congestion periods if long-term parking on the shoulder is required.
- Use enough cones and barricades to sufficiently divert traffic safely around the work area (adhere to specific shoulder closure requirements detailed in the Encroachment Permits).
- Any open manhole or ditch must be barricaded.

- Remember that visibility is the key to minimizing the dangers of working in traffic.
- Upon completion of the work, the area must be cleaned up of materials and left in a clean and orderly state.

2.3.2 General Safety

In addition to traffic hazards, field crews may face a variety of potential dangers while maintaining the Wet Basin facility, installing equipment, and performing environmental monitoring. Be aware of:

- Slippery conditions.
- Lightning.
- Fast moving water.
- Unstable earth.
- Poor visibility, especially at night.
- Lifting heavy objects.
- Muggers and other criminals.
- Transients
- Power tools and heavy equipment.
- Ledges.
- Sharp edges - broken glass.
- Overhead dangers.
- Dogs and other biological hazards.
- Electrical hazards posed by equipment malfunctions.

Other important field precautions include:

- Stay away from the edges of a fast moving body of water. These edges are usually slippery and unstable during rainy conditions.
- If sampling is required at the edge of a fast moving body of water, use a lifeline and a personal flotation device. Use grabbing devices when possible.
- Never work alone at night and avoid working alone during the day.
- Avoid leaving materials, tools and equipment lying around where someone can trip over them.
- Maximize lighting, especially at night.
- Keep a phone or other means of communication nearby.
- Do not use your back to lift heavy objects. Get help.
- Never use drugs or alcohol while working.
- Always wear a hard hat and orange safety vest.
- Do not use power tools and heavy equipment unless trained in the proper use and care of the specific power tools.
- Always wear eye protection when working with tools or chemicals
- Wear rain gear.
- Never leave open holes unattended or unbarricaded.
- Do not sample during lightning.
- Clean up the work area before leaving.

3.0 FIELD PREPARATION

Use Table 3.1 on the following page as a guide to find appropriate forms and information required for field visits. This table covers aspects of the field OMM program including mobilization, observation, and monitoring checklists. The key in preparing for field visits, whether for maintenance or monitoring, is by obtaining and going through each item on the table pertaining to the field task at hand. Prior to the operational phase of this program, items contained in this table will be assembled into separate logbooks for facility operations and maintenance, vector control, storm monitoring, and office monitoring.

Table 3.1
List and Locations of Required Stormwater Monitoring Forms and Checklists for Wet Basin

Tab No.	Item	Form or Exhibit No.	Use and Frequency
1	Site Location Maps	NA	Prior to site visits.
	BMP Facility Plans	NA	Prior to site visits.
2	Emergency Contacts Lists	NA	Consult for emergency phone numbers.
	Hospital Route Maps	NA	Quick guide to the nearest hospital.
	Project Contacts List	NA	Refer for pertinent support staff.
3	Storm Monitoring Decision Tree	Ex. 3.1	Prior to each monitored storm.
	Mobilization Checklist	Form A	Before each storm and maintenance visit.
	Storm Staffing Plan	Form B	Filled out prior to storm event for crew and equipment assignments.
4	BMP Site Inspection Checklist for Wet Basins	Form C	Filled out for each inspection visit.
	Monitoring Equipment Inspection Checklist for Wet Basins	Form D	Filled out for each equipment inspection.
5	BMP Site Maintenance Activity Checklist for Wet Basins	Form E	Filled out for each maintenance inspection.
	Monitoring Equipment Maintenance Activity Checklist for Wet Basins	Form F	Filled out for each maintenance inspection of sampling equipment.
	Stockpile/Sediment Sampling Checklist	Form G	Complete for any stockpile or waste sampling.
	Title 22 Characterization Requirements	Ex. 5.1	Reference for sediment stockpile sampling.
6	Empirical Observations Field Data Log Sheet for Storm Events for Wet Basins	Form H	Each time a visit is made during wet weather. Separate observations will be made of the inflow, outflow, and BMP.
	Field Data Log Sheet for Wet Basins	Form I	Each storm station visit. Separate logs will be filled out for the inflow and outflow.
	User-Entered Program Parameter Log Sheet (Influent/Control)	Form J1	Each time a program parameter is changed.
	User-Entered Program Parameter Log Sheet (Effluent Sampling)	Form J2	Each time a program parameter is changed.
	Station Phone Log	Form K	Each time station is contacted.
7	Chain-of-Custody Form	Form M	Whenever samples are collected.
	Chemical Analyses List	Ex. 7.1	Reference for each sampling event and laboratory analysis request submittal.
8	Vector Control Checklists	Forms O1 and O2	Fill out for each site visit related to vector monitoring.
9	Runoff Coefficients for Wet Basin	Ex. 9.1	Reference for calculations.
	"Volume-to-Sample" Tables	Ex. 9.2	Consult to set sampling frequency.
	Encroachment Permits	Ex. 9.3	Explains access and safety requirements. Must always accompany field crews.

4.0 FACILITY OPERATIONS AND MAINTENANCE

4.1 Facility Operation Inspections

The Wet Basin will be inspected on a regular basis according to the following minimum rates:

- Once a month at a minimum.
- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation).
- On a weekly basis during extended periods of wet weather.

Optimal BMP operation is dependent on field inspections. When inspecting the facility, follow the procedural steps below. ***Document inspections on Forms C and D (Tab 4)***.

1. Prior to arrival, contact the appropriate Caltrans District 11 personnel identified in the Encroachment Permit (Exhibit 9.3 in Tab 9).
2. Completely walk around the BMP while looking for obvious problems, damage, or malfunctions.
3. <u>Inspect and assess</u> needs for:

    - General aesthetics (graffiti, vandalism),
    - Vegetation management (less than 30% vegetative coverage or greater than 75%),
    - Erosion and slope stability,
    - BMP performance (fouling, blockage, damage),
    - Equipment repair/maintenance (BMP components, autosampler),
    - Sediment accumulation (within BMP, at influent confluence),
    - Storage of accumulated sediment or other wastes, and
    - Vector control.

4. Complete Form C (see Tab 4) during inspections.
5. Log field activities and their corresponding time accurately.
6. If immediate corrective or preventive maintenance is needed, call the appropriate contacts listed in the Project Contacts List in Tab 2.

4.2 Facility Maintenance

Functional (performance and safety) and aesthetic (public acceptance) maintenance is critical. For this BMP site, focus on:

- Vegetation Management.
- Vector Control.
- Trash and Debris Removal.
- Sediment Removal and Management.
- Mechanical Equipment Maintenance.
- Structural Repairs.
- General Facility Maintenance.
- Vandalism.

The frequency of individual maintenance activities at the Wet Basin facility will be conducted according to the schedule listed in the maintenance indicator document, included as Appendix V of Volume II.

Maintenance activities performed will be documented using Forms E and F in Tab 5. See Section 2 of Appendix I-G for full details on maintenance activities.

4.3 Vegetation Management

Maintenance and control of vegetation is essential to the optimal operation and performance of a BMP. The condition of the native vegetation will be inspected on a monthly basis at a minimum to ensure that

- basin vegetation density is more than the "as constructed" density,
- at least 30% open water space remains in the permanent pool,
- slope vegetation is protected and kept healthy, and
- undesirable plant species do not take root.

Maintaining the correct coverage in the Wet Basins will optimize the treatment capacity and the residence time of runoff, and aid in vector control. Maintaining healthy and continuous vegetation on the slopes will minimize erosion. Preventing undesirable plant species from taking root will prevent plants with large root systems from damaging the embankments. Use the inspection and maintenance checklists (Forms C through F) whenever inspections and maintenance activities for vegetation management are performed. See Sections 2.0 and 4.0 of Appendix I-E for specific details on controlling vegetation.

4.4 Disposal of Trash and Debris

Trash and debris from Wet Basins is ultimately the responsibility of Caltrans. Consultants responsible for operating, maintaining, and monitoring the BMP will be responsible for removal and disposal of the trash and debris. This disposal will comply with applicable local, county, state, and federal waste control programs. Table 2.1 in the accompanying Appendix for Wet Basins shows a few possible disposal services for waste material.

4.5 Deposited Sediment Management and Characterization Sampling

Handling and appropriate disposal of sediment residues from BMPs is critical. Stockpiling is only allowed at the facility under the following conditions:

- Sandbag berms are created (8-inch minimum) and are placed around the stockpile area.
- At least 0.5-mil plastic is used to contain any dewatered liquids (overlying sandbags).
- Stockpiles are covered and covers are anchored.

Once sediment stockpile storage has reached disposal quantity, chemical characterization must be conducted to satisfy land disposal requirements (LDRs). Document any evidence of oil and grease, antifreeze, solvents, fuel, hydrogen sulfide, and any other noxious substance (Form G,

Tab 5). These observations will assist in determining if hazardous waste disposal analyses are required. Refer to Form G in Tab 5 for additional details on conducting this sampling.

For sediment stockpiles, the minimum number of discrete samples initially required must comply with Form G, Tab 5. Random samples will be selected from locations on a three-dimensional grid. If the presence of materials such as boulders, debris, etc. hinder the application of this process, the sample will be collected as close as possible to the randomly selected point without altering the essence of the random selection process.

Stockpile sediment samples will be collected in the following manner:

1. Don personal protective equipment.
2. Locate the sample point in the stockpile or drum.
3. Collect the sample using a soil probe or equivalent. Ensure that the sample is collected at the correct depth and location that was randomly selected.
4. Fill one 8-ounce glass jar with a portion of the sample and close the container with the cap, using care not to aerate (volatilize) the sample. This jar will be labeled and analyzed for volatile TRPH and VOC.
5. Homogenize the other portion of the sample in a disposable bowl using a disposable spatula or spoon. Fill a second 8-ounce glass jar with this portion of the sample and close the container with the cap. This sample will be labeled and analyzed for metals.
6. Wipe the outside of each sample container with a clean paper towel.
7. Record the sampler's initials, date, and time on the pre-labeled sample bottle.
8. Place the sample containers in individual zip-top plastic bags and seal the bags.
9. Immediately pack the samples into a chilled cooler.
10. Record the required information on the Chain-of-Custody Form.
11. Document the sampling event, recording information in the designated field logbook.
12. Repeat the above steps until the minimum number of samples has been collected.

Unless observations indicate additional testing, sediment samples submitted to the laboratory will be analyzed for the list of analytes in Exhibit 5.1 in Tab 5 using Title 22 criteria (State of California, 1985).

4.6 Vector and Nuisance Animal Control

Vector monitoring and management will be performed in accordance with Appendix IV by sub-contracted County of San Diego Department of Environmental Health Vector Surveillance and Control.

5.0 STORM MONITORING

Careful preparation and planning is critically important. Representative samples *must* be obtained for each storm event. Always double-check that equipment, supplies, and personal protective gear are readied for each field deployment.

Before crews are deployed to the field, be sure that onsite rainfall meets the sampling criteria:

1. A minimum of 48 hours of dry weather preceded the storm (72 hours is preferred).
2. The Deployment Criteria defined in Exhibit 3.1.

Check appropriate sources for onsite weather conditions before deploying field staff. Use the Storm Monitoring Decision Tree (Exhibit 3.1, Tab 3) for a decision on when and how to mobilize field personnel and equipment.

5.1 Storm Characteristics and Sampling Equipment

Section 5.0 of Appendix I-G details the stormwater equipment, equipment maintenance requirements, stormwater monitoring procedures, sediment sampling procedures, and analytical methods, reporting limits, and holding times for samples from the Wet Basin site. Appendix III contains the BMP Retrofit Pilot Program Quality Assurance and Quality Control Plan.

A separate logbook is used for the Wet Basin facility. Pertinent checklists, log forms, and information necessary to conduct a successful monitoring program are to be contained in the site-specific field logbooks. These checklists and log forms are listed in Table 3.1 in Section 3.0. The pertinent checklists and log forms are located in Tabs 1 through 9. Table 3.1 also lists analytical and office forms, contains corresponding form and table numbers, identifies the location in this document, and explains when each form is to be filled out.

Sampling equipment shall be inspected for proper function, staging, and sampling preparation (if wet season) and documented. There are three principal phases of documenting stormwater sampling at the BMP site:

- Pre-Storm preparation,
- Storm event sampling (grab samples and composite sample collection of both influent and effluent), and
- Post-Storm sample analyses.

5.1.1 Pre-Storm Preparation

1. Consult the Storm Monitoring Decision Tree (Exhibit 3.1 in Tab 3) for when to mobilize.
2. Review the Mobilization Checklist for appropriate equipment, sampling devices, and sample bottles (Form A, Tab 3).
3. Verify sample bottle quantities, number of analyses for each parameter, in-situ sampling equipment, and other necessary gear/support materials.
4. Decontaminate and assemble decontaminated sample containers, and other sampling equipment according to the following procedures:

Cleaning Procedures for Sample Bottles

Bottles will be:

a. Rinsed three times with warm tap water.
b. Scrubbed with a clean plastic brush.
c. Soaked in a 2% detergent (e.g., Contrad®) solution for at least 48-hours.
d. Rinsed three times with tap water.
e. Rinsed five times with Milli-Q or equivalent water, rotating the bottle to ensure contact with the entire inside surface.
f. Rinsed three times with hexane while rotating the bottle, and then air-dried.
g. Rinsed six times with Milli-Q water.
h. Soaked in 2N nitric acid for a minimum of 24-hours.
i. Rinsed six times with Milli-Q water.

Cleaning Procedures for Teflon®Hose and Other Sampling Equipment

Teflon® hose and other sampling equipment will be:

a. Teflon® hose will be rinsed three times with a 2% Micro® solution or equivalent. Other sampling equipment will be washed with a 2% Micro® solution and a clean plastic brush.
b. Rinsed three times with warm tap water.
c. Rinsed three times with Milli-Q or equivalent water.
d. Rinsed three times with 2N nitric acid.
e. Soaked at least 24-hours in 2N nitric acid.
f. Rinsed three times with Milli-Q water.

5. Inspect monitoring equipment for proper operation (use Form D, Tab 4). At each sampling location do the following:

   a. Check battery voltages and electrical connections.
   b. Inspect the pump tubing and replace if necessary.
   c. Inspect desiccant cartridges in flow meter.
   d. Inspect intake tubing condition and connections. Make sure intakes, flow structures, and sensors are clear of debris (this is only possible if confined space requirements are met).
   e. Make sure the correct user-entered program parameters are entered (use Forms I, J1, J2 and K in Tab 6).
   f. Set system status flags.
   g. Make sure the automatic sampler is set up properly by verifying that the correct bottle size, number of bottles, hose diameter, hose material, hose length, head height, aliquot volume, number of samples to fill the bottle, and number of pulses to sample has been entered correctly.
   h. Make sure the sampler is set to take a sample automatically after receiving a pulse form the data logger.

6. Ice composite bottles.

7. From the office or field set "Volume-to-Sample" numbers (Exhibit 9.2 in Tab 9) and initiate equipment to begin sampling automatically when flow is detected. Fill out the phone log (Form K, Tab 6).
8. Prepare necessary sample bottles for first-flush (as soon as possible after the start of runoff) grab samples. Grab samples will be collected twice per year as directed by the Task Order Manager.

5.1.2 Storm Event and Sample Collection

1. Once onsite, fill out the Empirical Observations Field Data Log and a Field Data Log Sheets (Forms H and I in Tab 6) to document storm characteristics.
2. Locate influent/control autosampler and inspect for proper operation.
3. Locate effluent autosampler and inspect for proper operation.
4. If necessary, change composite bottle and re-initiate equipment as needed.
5. Take grab samples as needed (two will be taken per monitoring season at the influent and effluent locations of the Wet Basin).

5.1.3 Post-Storm Sample Analyses

After a storm event has ended, the autosampler stations need to be shut down and left ready for the next storm event in the following manner:

1. Reset the storm monitoring program to prepare for another storm event.
2. Replace the autosampler sample bottle and reset the sampler.
3. Physically inspect the station to determine if any damage was sustained during the storm event. Inspect the flow sensor and intake for debris blockage or clogging. (This is only possible if confined space requirements are met).
4. Check battery voltages; replace batteries that are low.
5. Retrieve data via field modem interrogator or from the remote monitoring computer.

Data Retrieval

Data will be retrieved (dumped) from the data logger after each storm event during the storm season, and, during dry weather, approximately every month.

Chain of Custody Forms

When the grab and composite samples have been collected, the paperwork will be filled out to ensure a smooth transfer of samples to the analytical laboratory. Chain-of-Custody Forms (Form M, Tab 7) will be filled out in detail describing the type of sample, the quantity of samples, and the time that the samples were collected. These forms will accompany the samples to the laboratory.

5.2 Empirical Observations

Complete and succinct empirical observations for both rain/runoff and the BMP, are required during each site visit related to wet season monitoring. These observations will be taken

throughout the facility as they apply to the BMP (particularly at the influent and effluent locations). These empirical observations will be recorded on Form H in Tab 6.

Observations will be succinct but complete. For a Wet Basin performance evaluation, the following observations will be taken at the influent location, within the Wet Basin, and at the effluent location:

- Meteorological characteristics (present and preceding period)
- Rainfall (start and end times, time since last rain, and intensity indication)
- Hydrologic and hydraulic characteristics (flowing and/or standing water, channelization)
- Water level
- Inlet conditions (problems affecting performance)
- Description of amount and location of sediment accumulation in basin
- Water quality appearance (visual, olfactory) to roughly assess changes in water quality
- Solids deposition (trash and debris, sediments, organics) and resuspension
- Erosion
- Vegetation condition
- Outlet conditions (problems affecting performance)
- Mosquitoes and other vectors
- Structural condition of facility
- Monitoring equipment condition
- Approximate draw down time
- Predominant type of litter found in basin
- Condition/clogging of outlet structure
- Degree and type of vegetation establishment in the basin
- Evidence of vandalism of equipment or basin structure

Refer to Form H in Tab 6 for recording empirical observation information.

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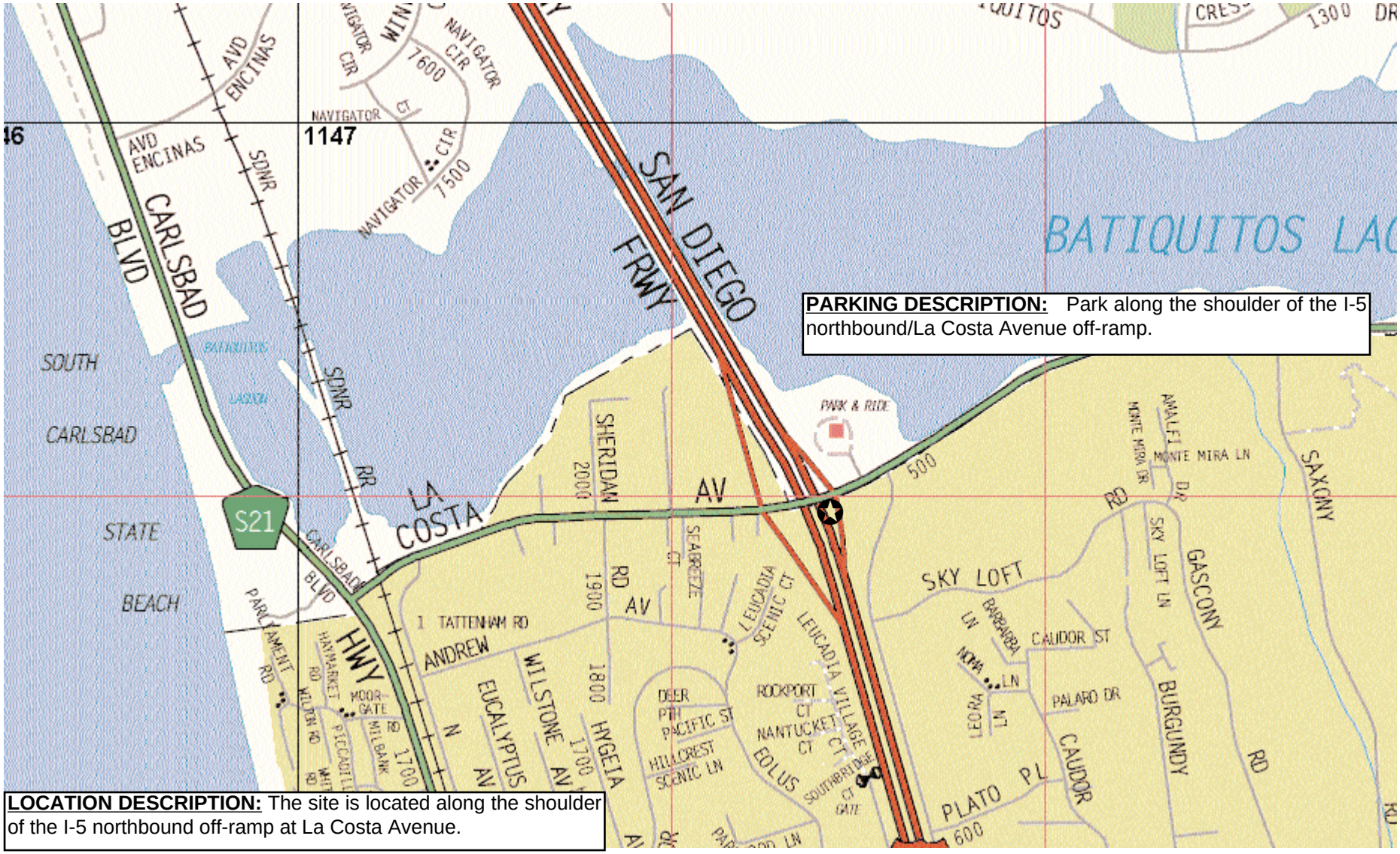
- Exhibit 9.3: Encroachment Permits

TAB 1

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MAPS

Site Location Maps
BMP Facility Plans



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

CALIFORNIA DEPARTMENT OF TRANSPORTATION

La Costa Avenue East

BMP Pilot Study Site #111105

District 11

Robert Bein, William Frost & Associates

5/99 JN 34618

FOR COMPLETE R/W AND ACCURATE ACCESS DATA, SEE R/W RECORD MAPS AT DISTRICT OFFICE

ABBREVIATIONS

WQM - WATER QUALITY MONITOR

LEGEND

- ESA - ENVIRONMENTALLY SENSITIVE AREA
- CONCRETE APRON, RAMP OR SPILLWAY
- ACCESS ROADWAY
- RSP
- (1) - DRAINAGE SYSTEM No.
- (a) - DRAINAGE UNIT
- DITCH OR SLOPE PAVING FLOWLINE, SLOPE OR GRADE TO DRAIN
- BMP PILOT PROGRAM MAINTENANCE LIMITS

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

Caltrans Metric

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
11	SD	5	62.04	3	

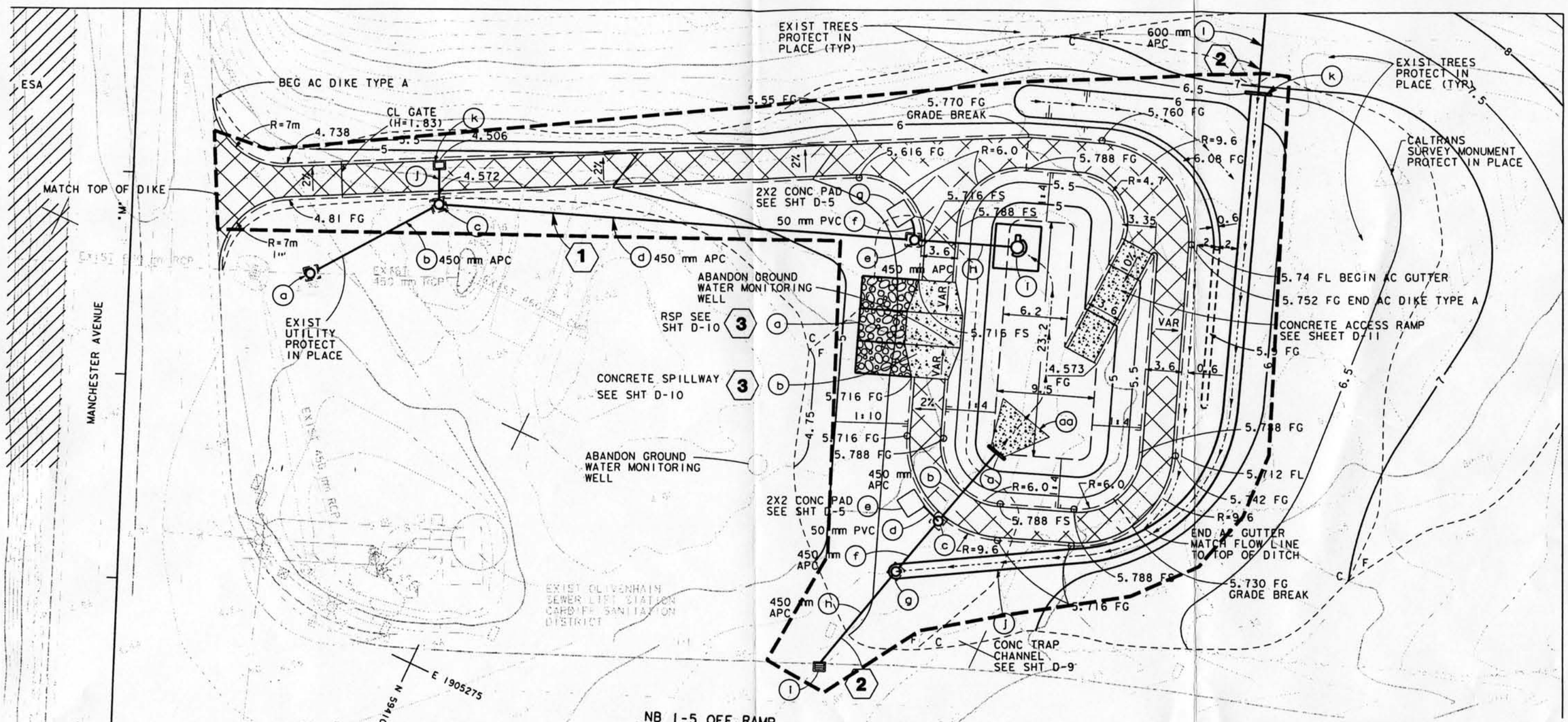
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER A.M. WALKER No. 57716 Exp. 12-31-01 CIVIL STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

ROBERT BEIN, WILLIAM FROST & ASSOCIATES
14725 ALTON PARKWAY
IRVINE, CA 92618



SITE 111105
OVERVIEW OF THE I-5/MANCHESTER AVENUE EXTENDED DETETION BASIN BMP

SCALE: 1:200

CALCULATED/ DESIGNED BY	AMW	DATE 1/99	REVISED BY
CHECKED BY	MC	1/99	DATE REVISED

DESIGN OVERSIGHT

CID TESORO

STATE OF CALIFORNIA — DEPARTMENT OF TRANSPORTATION

Caltrans

NPDES

18 JUN 99 15: c:\winnt\profiles\aw\desktop\rbfd4.dgn

TAB 2

CALTRANS BMP STORMWATER MONITORING
FIELD GUIDANCE NOTEBOOK
CALTRANS DISTRICT 11

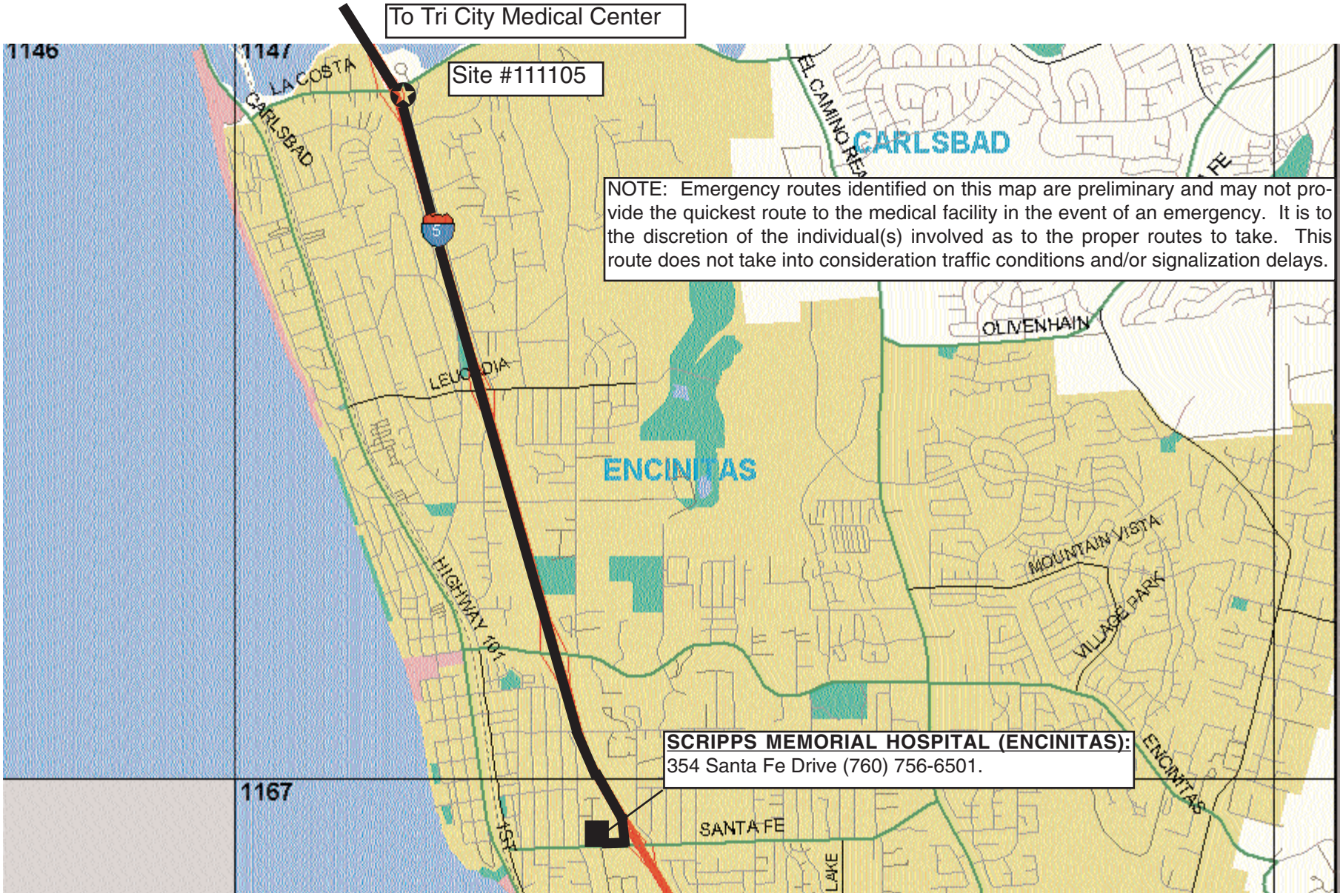
EMERGENCY PROCEDURES SUPPORT

Emergency Contacts Lists
Hospital Route Maps
Project Contacts List

Document information related to the accident or incident that resulted in injury or damage and report it to Jon Toal at KLI at (831) 457-3950

Emergency Contacts for Site 111104: La Costa Ave./I-5 Northbound Off ramp

Name	Phone	Comments
California Highway Patrol	911	From cell phone
Local Police Emergency Dispatch	911	From landline phone
Fire Emergency Dispatch	911	Call immediately in case of fire or hazardous spills
Non-Emergency Police Dispatch	(760) 931-2197	**Non-emergency**
Non-Emergency Fire Dispatch	(760) 931-2141	**Non-emergency**
Local Highway Patrol	(619) 467-3300	**Call before beginning work**
Hospital	(760) 753-6501	**Nearest hospital**
Department of Transportation's National Response Center (NRC)	(800) 424-8802	Call in case of hazardous spills
Caltrans Field Inspector	(916) 653-5250	Notify for any accident or injury
KLI Program Manager (Pat Kinney)	(916) 551-1380	Notify for any accident or injury
KLI Safety Officer (Jon Toal)	(831) 457-3950	Notify for any accident or injury
Caltrans Program Manager District 11 (Bob Wu)	(213) 897-8636	Notify for any accident or injury



SOURCE: Thomas Bros., San Diego County, 1997

BMP Pilot Site

Not to Scale

Potential Emergency Route

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Hospital Emergency Route

District 11

Robert Bein, William Frost & Associates

5/99

JN 34618

Project Contacts

Name	Organization	Phone	Fax Mobile	Email
Bill Whittenberg	RBF	(949) 855-5771-w	(949) 586-6531-f	whittenberg@rbf.com
Bob Wu	Caltrans Contract Manager	(213) 897-8636	(916) 653-6366-f	Robert_wu@dot.ca.gov
Pat Kinney	KLI Task Order Manager	(916) 551-1380-w	(831) 640-9882-m	pkinney@cruzio.com
Ken Kronschnabl	KLI	(831) 457-3950-w (831) 688-5443-h	(831) 426-0405-f (831) 640-9883-m	kkronsch@cruzio.com
Cid Tesoro	Caltrans-District 11	(619) 688-3626	(619) 688-6998	cid_tesoro@dot.ca.gov
Rick Dey	Isco Service Center	(800) 228-4373	(402) 465-3089	RickD@isco.com
John Masiti	American Sigma Inc.	(800) 635-4567	(800) 235-1230	Sigma@americasigma.com
Internet	National Weather Service	--	--	http://nimbo.wrh.noaa.gov/San diego/nws.html
Internet	San Diego Alert System	--	--	http://nimbo.wrh.noaa.gov/San diego/fd_pcb.html
Jim Vanderswan	Channel 8 Weather Service, Lead Meteorologist	(831) 656-1725	--	--
Dean Messer	Mosquitoes and Midges Vector Abatement Specialist	(530) 753-6400	--	deanm@lwadavis.com
Mike Devine	County of San Diego Vector Control	(619) 694-2888	(619) 694-3559-f	Mdevineh@co.san-diego.ca.us
Fred Beams	Rodents Vector Abatement Specialist	(626) 586-5143	--	Geoscrc1@ix.netcom.com
Phil Carpenter	Toxscan	(831) 724-4522-w		PCarpenter@Toxscan.com
	Associated Laboratories	(714) 771-6900-w	(714) 538-1209-f	

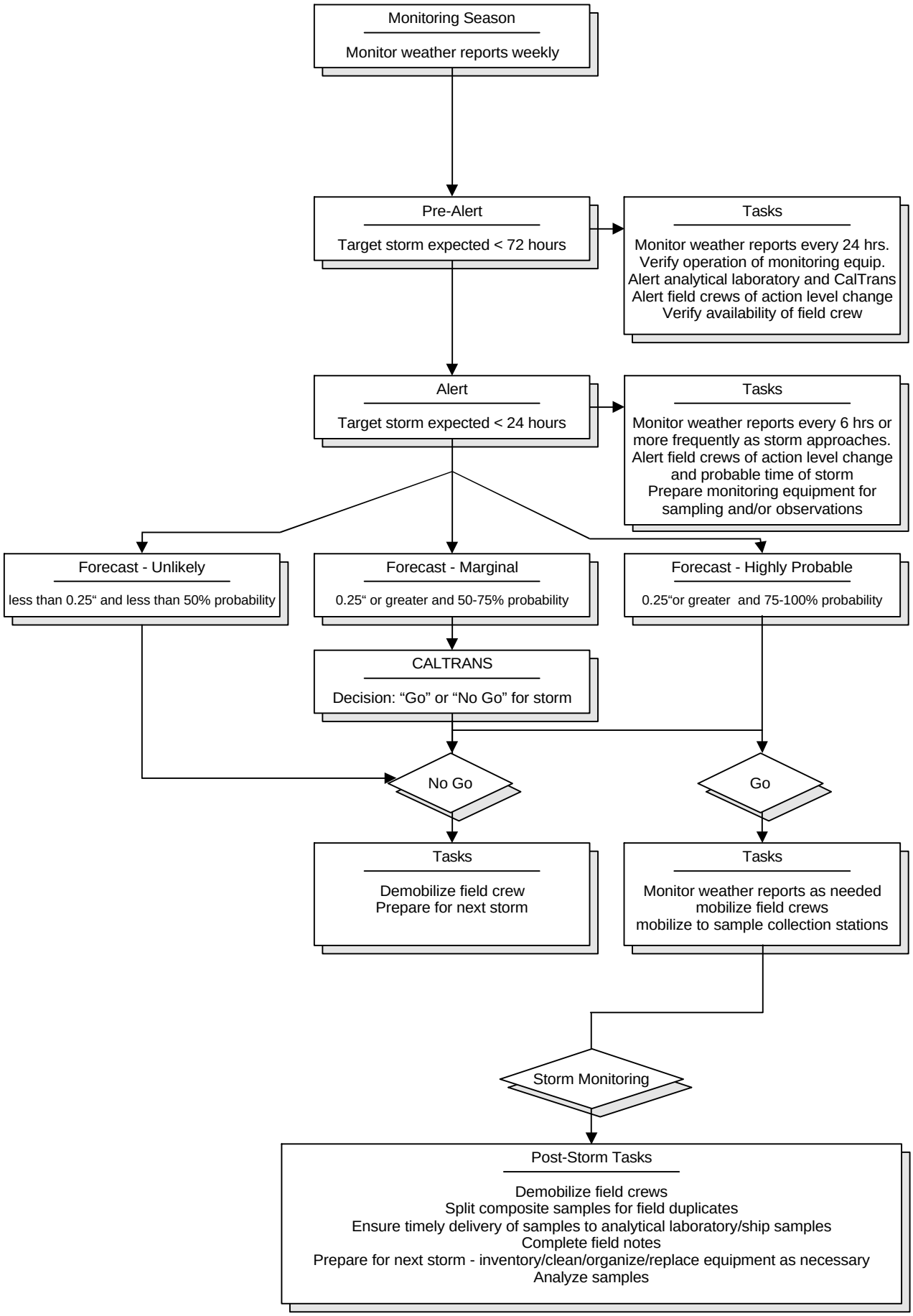
TAB 3

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

FIELD PREPARATION/MOBILIZATION FORMS

Exhibit 3.1: Storm Monitoring Decision Tree
Form A: Mobilization Checklist
Form B: Storm Staffing Plan

Exhibit 3.1
Storm Action Levels For BMP Facilities During Wet Season Monitoring



FORM A

Caltrans BMP Retrofit Pilot Program

Mobilization Checklist

General			
	Recent storm tracking information (e.g., www.weather.com)		Communication channels established
	Staff mobilized		Routes & BMPs identified
	Field Guidance Notebook		Emergency/Caltrans contact list
	Phone card		Volume-to-Sample matrix
			Vendor's autosampler manual
Storm Kit Equipment List			
	Keypad/display		9-pin cable from keypad to data logger
	Full set of keys (on floatable bobber)		Flashlights (2)
	Maps for required areas		Large flat screwdriver
	Small flat screwdriver		Umbrella
	High quality alkaline D-cell batteries		Spare sample labels
	Pencils and indelible markers		Desiccant (packages and jar)
	Diagonal clipper		Electrical tape
	Cable ties (assorted sizes)		Utility knife
	Ziplock baggies (assorted sizes)		Labeling tape
	Polyethylene gloves		Rubber bands
Storm Mobilization List			
	Storm kit		Log books
	DI (de-ionized) water squirt bottles		Tape gun with clear packaging tape
	Ice scoop		Sample control paperwork (COC)
	Extra fine indelible markers		Four 1-gallon glass bottles
	Grab sample bottles (see below)		Coolers and ice (at least one extra)
	Grab pole and extension		DI water (3-gallon jug)
	Two-way radio or cellular phone		Personal rain gear
	Any necessary safety gear		Trash bags
Sampling Checklist			
	Sample bottles w/ preservatives		Analyte list
	for each required analysis		Analytical Laboratory telephone number
	for each QA/QC analysis		Backup laboratory contact number (after hours)
	for each BMP site		Sample coolers, plus extra
	prelabeled bottles		
	extra bottles in case of breakage		

FORM B

Storm Staffing Plan

Caltrans **BMP Retrofit Pilot Program** **Stormwater Sampling**		Storm Date:	
Zone #1	Zone #2	Zone #3	Zone #4
Estimated Start:		**End Time:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Startup	**Zone #2 Startup**	**Zone #3 Startup**	**Zone #4 Startup**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio
Relief Start:		**Relief End:**	
Storm Control:		Phone Number:	
Shift Leader:		Phone/Radio:	
Zone #1 Relief	**Zone #2 Relief**	**Zone #3 Relief**	**Zone #4 Relief**
Crew	Crew	Crew	Crew
Vehicle	Vehicle	Vehicle	Vehicle
Phone/Radio	Phone/Radio	Phone/Radio	Phone/Radio

TAB 4

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

INSPECTION FORMS

Form C: BMP Site Inspection Checklist for Wet Basins
Form D: Monitoring Equipment Inspection Checklist for Wet Basins

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Wet Basins

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:	Maintenance Reqd?
Sediment depth *(if sediment is more than 2 in. in forebay or 4 in. in main pond, maintenance is required):*	☐ yes ☐ no
Sediment type and location:	
Drain down time greater than 25 hours? ☐ yes ☐ no Comments:	☐ yes ☐ no
Evidence of erosion, channeling, or undercutting? ☐ yes ☐ no Seeps? ☐ yes ☐ no Embankment slumping or cracking? ☐ yes ☐ no	☐ yes ☐ no ☐ yes ☐ no ☐ yes ☐ no
Comments:	

VEGETATION:	Maintenance Reqd?
Vegetation coverage *(if vegetation is not at "as constructed" density or less than 30% of open water space remains in the permanent pool, mark yes):*	☐ yes ☐ no
Does vegetation cover all of the Wet Basin's slopes? ☐ yes ☐ no	☐ yes ☐ no
Is native vegetation, weeds, leaves, or other organic debris present in the Wet Basin? ☐ yes ☐ no If yes, what type: Does native vegetation, weeds, leaves, or other organic debris interfere with the operation of the Wet Basin by (a) overgrowing the Wet Basin vegetation, (b) interfering with the hydraulic resident time or draw down time of the Wet Basin, or (c) saturation of the bottom with dead or dying vegetation or (d) in another way? ☐ yes ☐ no If so, explain:	☐ yes ☐ no ☐ yes ☐ no
Evidence of flattening of vegetation? ☐ yes ☐ no	☐ yes ☐ no

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Wet Basins (continued)

VEGETATION: (continued)	Maintenance Reqd?
Condition of landscaping? ☐ Inhibited Growth ☐ Excessive Growth ☐ Normal Growth Comments:	☐ yes ☐ no

STRUCTURAL:	Maintenance Reqd?
Is corrosion present? ☐ yes ☐ no ☐ not applicable If yes, extent and location	☐ yes ☐ no
Evidence of concrete scour, spalling, or cracking of structural parts? ☐ yes ☐ no	☐ yes ☐ no
Fences: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Locks: ☐ OK ☐ not OK ☐ not applicable	☐ yes ☐ no
Other general maintenance concerns/comments:	

ANIMAL CONCERNS:	Maintenance Reqd?
Are there mosquito fish present in the basin? ☐ yes ☐ no If yes, to what extent:	☐ yes ☐ no
Is there evidence of small animals (burrows, droppings, trails, gnawing marks, or stained rub marks)? ☐ yes ☐ no	☐ yes ☐ no
Comments:	

AESTHETIC CONCERNS:				Maintenance Reqd?
Debris (non-trash)?	☐ yes	☐ no	Type, amount and location:	☐ yes ☐ no
Trash?	☐ yes	☐ no	Type, amount and location:	☐ yes ☐ no
Graffiti or vandalism?	☐ yes	☐ no	Description and location:	☐ yes ☐ no
Theft?	☐ yes	☐ no	Description and location:	☐ yes ☐ no
Vehicle accident?	☐ yes	☐ no	Description and location:	☐ yes ☐ no
Other general aesthetic concerns:				

NON-STORMWATER CONCERNS:

Non-storm water discharge to BMP ☐ yes ☐ no
BMP wet from obvious non-stormwater discharge (no rain) ☐ yes ☐ no
If yes, print your name and contact number below and fax this form to Cid Tesoro at 619-688-6998
From: Contact Number:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM C
Caltrans BMP Retrofit Pilot Program
BMP Site Inspection Checklist for Wet Basins

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

OVERALL:

Other concerns affecting operation:

Condition of facility: ☐ acceptable ☐ not acceptable

Comments:

Dates for maintenance to be completed by:

_____

(Team Leader's Signature)

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM D
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Inspection Checklist for Wet Basins

GENERAL INFORMATION:		
Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SAMPLING AND FLOW MEASUREMENT EQUIPMENT:	Maintenance Required?
Is the monitoring station enclosure locked? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the monitoring station enclosure structurally sound? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the system status of the automatic sampler online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the automatic sampler properly programmed and calibrated? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the peristaltic pump tubing need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the intake tubing and/or connections need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Does the desiccant cartridge in the flow meter need replacement? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is internal modem online? ☐ yes ☐ no Comments:	☐ yes ☐ no
Are the DC marine battery and connect cable present? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are voltage and current of DC battery within normal parameters? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Are cables to power source present and properly connected, and is AC power available? ☐ yes ☐ no ☐ not applicable Comments:	☐ yes ☐ no
Is the bubbler properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no

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FACILITY NAME: _____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM D
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Inspection Checklist for Wet Basins
(continued)

SAMPLING AND FLOW MEASUREMENT EQUIPMENT (cont.):	Maintenance Required?
Is the bubbler tubing free of kinks, free of obstructions, and properly connected to pump? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the acoustic level meter properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the AV meter sensors properly installed? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is the AV meter sensors free of obstructions? ☐ yes ☐ no Comments:	☐ yes ☐ no
Is strainer clean and free of obstruction? ☐ yes ☐ no Comments:	☐ yes ☐ no

INFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

EFFLUENT SAMPLING LOCATION:				Maintenance Required?
Sediment in flumes?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Flow?	☐ yes	☐ no	Rate:	☐ yes ☐ no
Trash or debris?	☐ yes	☐ no	Amount:	☐ yes ☐ no
Comments:				

PHOTOGRAPHS (mandatory if maintenance is required):

Date	Time	Description	Direction Facing	Roll	Photograph No.

Dates for maintenance to be completed by:

_____
(Team Leader's Signature)

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TAB 5

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MAINTENANCE FORMS

Form E: BMP Site Maintenance Activity Checklist for Wet Basins
Form F: Monitoring Equipment Maintenance Activity Checklist for Wet Basins
Form G: Stockpile/Sediment Sampling Checklist
Exhibit 5.1: Title 22 Characterization Requirements

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Wet Basins

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

SEDIMENT/EROSION CONTROL:

☐ ***Sediment removal from forebay or main pond***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Clean orifices, and/or cracks in stormwater conveyance system***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Erosion repair (including vegetative stabilization)***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Embankment/slope repair(s)***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

VEGETATION:

☐ ***Surrounding Wet Basin vegetation mowing/trimming and removal of cuttings***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replant or Thinning of Basin wetland vegetation (wetland scientist must be contacted)***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Weed control***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Wet Basins (continued)

VEGETATION (cont.):

☐ ***Leaf collection and removal of dead/rotting vegetation***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

STRUCTURAL:

☐ ***Structural repairs (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

ANIMAL CONCERNS:

☐ ***Mosquito Control***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Burrow control or Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

AESTHETIC CONCERNS:

☐ ***Debris and trash removal***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Graffiti removal or replacement of vandalized or stolen property***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Painting***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM E
Caltrans BMP Retrofit Pilot Program
BMP Site Maintenance Activity Checklist for Wet Basins (continued)

AESTHETIC CONCERNS (cont.):

☐ ***Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

WATER LEVEL MANAGEMENT:

☐ ***Dewatering to achieve permanent pool elevation***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

_____ (Team Leader's Signature)	General Comments:

Only Complete Applicable Sections

FORM F
Caltrans BMP Retrofit Pilot Program
Monitoring Equipment Maintenance Activity Checklist for Wet Basins

GENERAL INFORMATION:

Date:	Time In:	Time Out:
Team Leader's Initials:	Stormwater Consultant:	
BMP Location:		

☐ ***Clean Palmer-Bowlus flumes, orifices, and/or cracks***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Diagnostic test of automatic sampler***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of peristaltic pump tubing***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of bubbler tubing, pump tubing, or intake tubing***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of strainer***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of 12-volt marine battery***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Removal of kinks or obstructions from bubbler tubing***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

☐ ***Replacement of desiccant cartridge in flow meter***
Start time: End time: Total time: More work required? ☐ yes ☐ no
Equipment used:
Comments:

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FORM F

Caltrans BMP Retrofit Pilot Program

Monitoring Equipment Maintenance Activity Checklist for Wet Basins (continued)

☐ ***Other maintenance/calibration of automatic sampling equipment (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other maintenance of flow measurement equipment (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

☐ ***Other (describe):***

Start time: End time: Total time: More work required? ☐ yes ☐ no

Equipment used:

Comments:

_____ (Team Leader's Signature)	General Comments:

Only Complete Applicable Sections
For Internal Use Only

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM G

Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

GENERAL INFORMATION:			
Date:	Time In:	Team Leader's Initials:	Time Out:
Location:			

SEDIMENT CHARACTERISTICS IN BMP PRIOR TO STOCKPILING:					
Depth of sediment:					
Color:	☐ black	☐ brown	☐ green	☐ tan	☐ other
Consistency:	☐	☐ sandy	☐ silty	☐ granular	☐ other
Odors:	☐ petroleum ☐ none	☐ solvents ☐ other	☐ organic (rotten eggs)		☐ sewage
Depth of sediment:					

SEDIMENT SAMPLE COLLECTION MOBILIZATION LIST	
Powder Free Nitrile Gloves	
Soil Probe or equivalent for sample collection	
8-ounce glass jar labeled Total Petroleum Hydrocarbons (TPH)	
Plastic bags, seal bags	
Chilled cooler	
Chain-of-Custody form	
Log book for record keeping	

STOCKPILE/DRUMMED SEDIMENT:	Maintenance Required?	
Does the stockpile/drum require additional protection from causing environmental impact? (i.e., is underlying plastic, sandbag berming, and an anchored weather-proof covering in place?) If so, check yes.	☐ yes	☐ no
If not stockpiled, are the drums or other containers adequately stored, protected from weather, and free of damage/leakage? If not, check yes.	☐ yes	☐ no
Is the amount of onsite sediment reaching an unmanageable quantity? (Is disposal necessary?) If so, check yes.	☐ yes	☐ no
Are onsite equipment and materials sufficient to perform sediment sampling? If not, check no.	☐ yes	☐ no

SEDIMENT COLLECTION:	
<10 cubic yards: *Minimum of **2 samples, one randomly from each half of the soil mass***	
10-20 cubic yards: *Minimum of **3 samples, one randomly from each third of the soil mass***	
20-100 cubic yards: *Minimum of **4 samples, one randomly from each quarter of the soil mass***	
100-500 cubic yards: ***Minimum of 1 sample per 25 c.y. of each 25 c.y. section of the soil mass***	
Over 500 cubic yards: *Collect a minimum of **1 sample per 25 c.y. portion of the soil mass***	*Contact Dept. of Environmental Health for Guidance*

SEDIMENT SAMPLE COLLECTION	
Observation sheet completed	

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM G

Caltrans BMP Retrofit Pilot Program
Stockpile/Sediment Sampling Checklist

Personal and equipment decon completed	
Number of aliquots taken from composite _____	
Sample IDs: 1. _____ Analysis requested: _____ 2. _____ Analysis requested: _____ 3. _____ Analysis requested: _____ 4. _____ Analysis requested: _____ 5. _____ Analysis requested: _____ 6. _____ Analysis requested: _____	
Photos taken:	
Chain of Custody form attached	
Record information in logbook for record keeping	
Comments:	

Exhibit 5.1: *Title 22 Characterization Requirements*

Sediment Matrix (Disposal)
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Parameter	Method	Units	Reporting Limit	Maximum Holding Time	Preservation	Container Size/Type(1)
Total Recoverable Petroleum Hydrocarbons (TRPH)	EPA 418.1	mg/kg	10	28 days	$4^{o}C$	8 oz glass jar
Volatile Organic Compounds	EPA 8260B	mg/kg	SW – 846 (5) requirements	14 days	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Metals(2):	EPA 6020/7471	mg/kg	SW – 846 (5) requirements	180 days 28 days for mercury	$4^{o}C$	8 oz glass jar
California Code of Regulations (CCR), Title 22 Waste Extraction Test (WET) Metals(3):	STLC Extraction	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA
Toxicity Characteristic Leaching Procedure (TCLP) Metals(4):	TCLP 1311	mg/L	SW – 846 (5) requirements	180 days 28 days for mercury	4° C	NA

(1) Each sample will be collected in two 8 oz glass jars

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

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

(4) If any of the WET-soluble concentrations are equal to or greater than the TCLP regulatory thresholds, analyze the waste by TCLP. “Test Methods for Evaluating Solid Waste, Physical /Chemical Methods”. SW-846, Update III.(SW-846)

TAB 6

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

MONITORING FORMS

Form H: Empirical Observations Field Data Log Sheet for Storm Events for Wet Basins
Form I: Field Data Log Sheet
Form J1: User-Entered Program Parameters (Influent/Control)
Form J2: User-Entered Program Parameters (Effluent)
Form K: Station Phone Log

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events for Wet Basins

GENERAL INFORMATION:

Date:	Time in:
Team leader:	Stormwater Consultant:
Other personnel:	Location of facility:

METEOROLOGICAL CHARACTERISTICS:

Present rainfall: ☐ None ☐ Mist ☐ Drizzle ☐ Sprinkle ☐ Light, Steady ☐ Moderate ☐ Heavy

Time present rain event started: _____

Wind speed: ☐ 0-5 mph (light) ☐ 5-10 mph (moderate) ☐ 10-15 mph (brisk) ☐ >15 mph (strong)

Cloud cover: % Temperature _____

Distribution of Rainfall: ☐ Uniform ☐ Localized cells ☐ Scattered showers

Meteorological characteristics comments:

HYDROLOGIC AND HYDRAULIC CHARACTERISTICS:

Flow conditions (*check all that apply*):

☐ Runoff entering facility
☐ Facility discharging through regular outlet
☐ Facility discharging via emergency overflow Time occurred: _____
☐ Flow bypassing facility Time occurred: _____

Standing water conditions (*record measurements as appropriate and check all that apply*):

☐ Water standing over entire basin. Depth: _____
☐ Other water standing pool(s): Describe Location: _____
Depth: _____

If during a Storm Event:
Record maximum depth of pooled water: Depth: _____
Comments: _____
_____

INLET CONDITIONS:

Describe any erosion or resuspension of settled solids being caused by the flow in the influent channel and/or the basin: _____
_____

Describe any obstructions or restrictions interfering with inflow/influent: _____
_____

INFLUENT WATER QUALITY APPEARANCE:

(Check all that apply and describe under comments)

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Wet Basins

☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

Water quality appearance comments:

SOLIDS DEPOSITION AND RESUSPENSION:

For the following locations, record the type (trash or debris, oil and grease, other organics), location(s), area(s) covered, and depth(s), as applicable:

In inflow/influent channel: _____

_____

Over entire basin: _____

_____

In one spot: _____

_____

In multiple spots: _____

_____

In outflow/effluent channel: _____

_____

Solids resuspension evident (*check all that apply*):
☐ In inflow/influent channel ☐ Near inlet ☐ Near outlet ☐ In outflow/effluent channel
☐ Other (describe): _____

Solids deposition and resuspension comments:

EROSION:

For the following locations, record erosion locations, area(s) covered, and depth(s), as applicable:
In inflow/influent channel: _____

_____

Near inlet: _____

_____

Basin bed: _____

_____

Basin side slopes: _____

_____

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Wet Basins

Near outlet: _____

_____

In outflow/effluent channel: _____

Comments: _____

_____

VEGETATION CONDITION:

Basin bed vegetation cover:
☐ Complete ☐ Few small bare spots ☐ Few large bare spots ☐ Many small bare spots
☐ Many large bare spots ☐ Large areas bare ☐ All or nearly bare

Basin side slopes vegetation cover:
☐ Complete ☐ Few small bare spots ☐ Few large bare spots ☐ Many small bare spots
☐ Many large bare spots ☐ Large areas bare ☐ All or nearly bare

Basin bed vegetation type:
☐ All grasses ☐ Mostly grasses, some wetland plants ☐ Mostly wetland plants, some grasses
☐ All wetland plants
Extent of woody shrubs or trees: _____

Basin side slopes vegetation type:
☐ All grasses ☐ Mostly grasses, some wetland plants ☐ Mostly wetland plants, some grasses
☐ All wetland plants
Extent of woody shrubs or trees: _____

Vegetation condition comments:

OUTLET CONDITIONS:

Describe any obstructions or restrictions interfering with outflow/effluent:

EFFLUENT WATER QUALITY APPEARANCE:

Check all that apply and describe under comments

Odor:
☐ Hydrogen sulfide ☐ Musty ☐ Sewage ☐ Ammonia ☐ Hydrocarbon ☐ Pesticide or herbicide ☐ None

Floating materials:
☐ Oil and grease (see below) ☐ Trash or debris ☐ Surface film ☐ Organic material ☐ None

Oil and grease:
☐ Sheen ☐ Heavy floating concentration ☐ Emulsion ☐ Deposit ☐ None

Color:
☐ Colorless ☐ Red ☐ Orange ☐ Yellow ☐ Green ☐ Blue ☐ Violet ☐ Brown ☐ Black
☐ Gray ☐ White ☐ Other: _____

Turbidity
☐ None ☐ Some cloudiness but transparent ☐ Cloudy, translucent ☐ Heavy cloudiness, opaque

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM H

Caltrans BMP Retrofit Pilot Program
Empirical Observations Field Data Log Sheet for Storm Events
for Wet Basins

Water quality appearance comments:

VECTORS:

Presence of vectors: ☐ Yes ☐ No
If yes, what type: ☐ Mosquitoes ☐ Blackfly ☐ Cockroaches ☐ Rats
☐ Other_____
Comments:

STRUCTURAL CONDITION OF FACILITY:

Record the presence of the following (*check all that apply and give location in comments*):
☐ Inlet structure damage ☐ Outlet structure damage ☐ Vandalism
Comments:

MONITORING EQUIPMENT CONDITIONS:

Equipment functional: ☐ Yes ☐ No ☐ N/A
Comments:

CHANGES DURING STORM SINCE LAST OBSERVATION:

Date:_____ Time: _____
Comments:

Date:_____ Time: _____
Comments:

Date:_____ Time: _____
Comments:

ADDITIONAL COMMENTS:

_____
_____
_____
_____
_____
_____
_____

_____
(Team Leader's Signature)

FACILITY NAME:_____
DATE: _____ TIME: _____
PAGE _____ of _____

FORM I
Caltrans BMP Retrofit Pilot Program
Wet Basin Field Data Log Sheet

GENERAL INFORMATION			Julian Day (*5AA):
Date:	Time in (PST,*5):	Time out:	Team Leader's Initials:
Location: La Costa / I-5 Northbound		Crew:	
Influent or **Effluent** (circle one)		**Storm Event Visit** or **Maintenance Visit** (circle one)	

SYSTEM STATUS FLAGS (*****6AD; 1=high, 0=low)
Arr: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____
Dep: 1 ____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

PROGRAM SIGNATURE (*****B)
Arrive: _____
Depart: _____

DATA LOGGER INFORMATION (*****6)

<u>All Site Visits:</u>	Samp. Batt Volt 22:	Manual Rain Gauge:
Basin Staff Gauge:	Cell Batt Volt 82:	Total Rain (in.) 25:
Flow Sensor Stage:	Flow Meter Batt Volt 28:	Total Storm Vol. 72:
Stage (ft) 02:	<u>Storm Site Visits:</u>	Strm Vol Smpld 75:
Velocity (ft/s) 03:	Volume (kcf) 05:	Max Stage Day 51:
Flow (cfs) 04:	Storm Sum (kcf) 06:	Max Stage Time 52:
Station ID 21:	Percent Capture 08:	Max Stage (ft) 53:
	Volume2Sample 14:	Date Last Sample 105:
	Sample Count 17:	Time Last Sample 106:

AUTOSAMPLER INFORMATION

Storm only

Bottle # in: _____

Number of Samples Total: _____
Number of Samples Remaining: _____

Bottle # out: _____
Bottle Volume: _____
Volume2Sampl: _____

GRAB SAMPLE COLLECTION

	Time:
TPH (VOAs)	_____
Bacteria	_____
Oil and Grease	_____
Other: _____	_____

CALIBRATIONS and CHECKS

Stage: ☐
Sample Volume: ☐
Rain Gauge: ☐
Other:

SAMPLING EQUIPMENT AND REPAIR NEEDS:

ACTION TAKEN:

Team Leader's Signature_____

FORM J1

User-Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **INFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
02 Flow Meter Stage Offset (feet)					
03 Volume to sample (kcf)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
08 Flow Meter Speed Offset (feet/second)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
36 Cellular phone battery state control parameter					
37 Duration of cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM J2

User Entered Program Parameters*

(Fill out this form every time a program parameter changes)

Facility Type: _____ **EFFLUENT**

Station Name: _____

Date:					
Time:					
01 Station ID					
03 Volume to sample (kcf)					
04 Level Meter Stage Offset (feet)					
05 Level Meter Multiplier (feet/mv)					
07 Storm Stage Offset (ft.; add to prev. 15 min. avg.)					
09 Minimum Stage Threshold (feet)					
10 Storm Stage Trigger Level (feet)					
11 Storm End Factor (times storm trigger stage)					
12 No. of Seq. Trans. Failures Before Raising Flag 6					
13 Time (min.) to wait after 1st set of trans. Failures					
14 No. samples of depth taken for avg. 1 prog. exe.					
15 No. samples of speed taken for avg. 1 prog. exe.					
17 Amount of rain per bucket tip (inches)					
18 Amt. rain samp. before rain data recorded (in.)					
19 Number of samples collected until bottle is full					
20 No. of times Flag 7 goes high before var. reset					
23 Data avg. int. (min.) when storm conditions exist					
24 Data avg. int. (min.) storm conditions don't exist					
30					
31					
34 Flume Parameter 1					
35 Flume Parameter 2					
36 Cellular phone battery state control parameter					
37 Duration when cellular phone battery is on					
38 Period of cellular phone battery state control					
Program Signature (*B)					

*Subject to Revisions

FORM K

Station Phone Log

Time	Station	Stage	% Capture	PkFlow (time)	PkFlow (feet)	Sample Count	Volume 2Sample	Storm Sum	Volume	Flow (Q)

TAB 7

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

LABORATORY ANALYSIS FORMS

Form M: Chain-of-Custody Form
Exhibit 7.1: Chemical Analysis List

FORM M: CHAIN-OF-CUSTODY FORM

Laboratory:	Laboratory # Date Rec'd	**From:**
Project: **P.O.#:**	**Project #:** **Required Completion Date:**	

Sample ID #	Site ID #	Laboratory ID #	Matrix/ Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt

Data Reports **WILL** include the following: Sample/Site ID, Analytical Method, Reporting Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time
Relinquished By: Date/Time	Transporter	Received By: Date/Time

Exhibit 7.1: ***Chemical Analyses List for Stormwater***
Stormwater Matrix
Analytical Parameters, Methodologies, Reporting Limits, Holding Times, Container Volumes and Types, and Preservation

Analyte	Priority Rank	Reporting Limit	Units	Analytical Technique	Method Number	Holding Time	Minimum Sample Volume	Preferred Volume and Container Type[1]	Preservation
Conventionals									
pH	1	0.1	Unit	Electrode	EPA 150.1	Immediately[2]	100 mL	1-100 mL glass/plastic	4°C
Specific Conductance	1	1.0	µmhos/cm	Electrometric	EPA 120.1	Immediately[2]	500 mL	1-500 mL glass/plastic	4°C
Hardness	5	2	mg/L	Titrimetric/ Colorimetric	EPA 130.2	6 months	100 mL	1-200 mL glass/plastic	HNO_3 to pH<2, 4°C
Total Suspended Solids	1	1	mg/L	Dried Filter Weight	EPA 160.2	7 days[3]	1 L	1-500 mL glass/plastic	4°C
Nutrients									
Nitrate-Nitrogen	2	0.01	mg/L	Colorimetric Ion Chromatography	EPA 353.3 EPA 300.0	28 days 48 hours	200 mL 200 mL	1-500 mL plastic 1-500 mL plastic	4°C and H_2SO_4 to pH<2 4°C
Total Kjeldahl Nitrogen	3	0.1	mg/L	Titrimetric/ Colorimetric	EPA 351.3	28 days	500 mL	1-1L plastic	4°C and H_2SO_4 to pH<2
Total Phosphorus	4	0.002	mg/L	Colorimetric	EPA 365.3	28 days	100 mL	1-250 mL plastic	4°C and H_2SO_4 to pH<2
Total/Dissolved Metals[4],[5]									
Copper	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Lead	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Zinc	1	1	µg/L	ICP-MS	EPA 200.8	6 months	2 @ 500 mL	2-1L plastic	4°C and HNO_3 to pH<2 and filter
Organics[6]									
Total Petroleum Hydrocarbons – Diesel/ Oil	Grab	250/200	µg/L	GC	EPA 8015M	14 days	1 L	2-1L amber glass	4°C
Total Petroleum Hydrocarbons - Gasoline	Grab	50	µg/L	GC	EPA 8015M	14 days	2-40 mL	3-40 mL VOA vials	4°C, HCl to pH<2
Bacteria[6]									
Fecal Coliform	Grab	2	MPN/100 mL	Multiple-tube	SM 9221E	6 hours[7]	50 mL	1-100 mL plastic	4°C

1. Analytes with the same preservative can be combined into a single container if the same laboratory is performing the analyses.
2. pH and Specific Conductance will be measured by the laboratory immediately upon receipt of the samples.
3. 7 days based upon limit for measuring TSS/no regulatory limit.
4. Total and dissolved metals samples are collected in separate containers. Only the total metals container will receive nitric acid.
5. Dissolved metals will be filtered in the laboratory prior to acidification.
6. Total Petroleum Hydrocarbon and Fecal Coliform grab samples will be collected for two storms per year.
7. Attempts will be made to maintain the 6-hour holding time for bacteria samples to the extent possible. When not possible, a maximum holding time of 24 hours will be followed in accordance with "Standard Methods for the Examination of Water and Wastewater", 18th Edition.

TAB 8

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

VECTOR CONTROL AND MONITORING FORMS

Vector Monitoring Forms

All vector control monitoring forms will be provided by the applicable Vector Control Monitoring agency.

TAB 9

CALTRANS BMP STORMWATER MONITORING FIELD GUIDANCE NOTEBOOK CALTRANS DISTRICT 11

TECHNICAL SUPPORT INFORMATION

Exhibit 9.1: Runoff Coefficients
Exhibit 9.2: Volume-to-Sample Tables
Exhibit 9.3: Encroachment Permits

Exhibit 9.1
Runoff Coefficient Matrix Table for the Wet Basin

Site No.	Site Name	Drainage Area (acres)	Runoff Coefficient C
111104	La Costa Ave. / I-5 Northbound off ramp	4.2	0.88

"Volume to Sample" in Kilo-Cubic Feet for
I-5 / La Costa Ave. Wet Basin

Number of Sample Aliquots	Acreage	Runoff Coefficient
78	4.2	0.088

Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)	Predicted Rainfall Amount (inches)	"Volume to Sample" (Kilo-ft^3)
0.1	0.0017	2.6	0.0447
0.2	0.0034	2.7	0.0464
0.3	0.0052	2.8	0.0482
0.4	0.0069	2.9	0.0499
0.5	0.0086	3.0	0.0516
0.6	0.0103	3.1	0.0533
0.7	0.0120	3.2	0.0550
0.8	0.0138	3.3	0.0568
0.9	0.0155	3.4	0.0585
1.0	0.0172	3.5	0.0602
1.1	0.0189	3.6	0.0619
1.2	0.0206	3.7	0.0636
1.3	0.0224	3.8	0.0654
1.4	0.0241	3.9	0.0671
1.5	0.0258	4.0	0.0688
1.6	0.0275	4.1	0.0705
1.7	0.0292	4.2	0.0722
1.8	0.0310	4.3	0.0740
1.9	0.0327	4.4	0.0757
2.0	0.0344	4.5	0.0774
2.1	0.0361	4.6	0.0791
2.2	0.0378	4.7	0.0808
2.3	0.0396	4.8	0.0826
2.4	0.0413	4.9	0.0843
2.5	0.0430	5.0	0.0860