

## **APPENDIX D**

### ***HEALTH AND SAFETY PLAN PREPARATION***

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This appendix includes specific information on the many components that should be included in a project health and safety plan (HSP). The information provided is presented as guidance and should be superseded by any established Caltrans standard operating procedures.

The following items should be discussed in the HSP:

- **Assignment of a Health and Safety Officer**
- **Field Activities**
- **Potential Hazards**
- **Health and Safety Precautions**
- **Health and Safety Training and Documentation**
- **Emergency Response/Contingency Plan**

#### ➤ **ASSIGN A HEALTH AND SAFETY OFFICER**

A project health and safety officer should be assigned to oversee all health and safety activities. The responsibilities of the health and safety officer should include the following:

- ✓ Assure that each monitoring team member is familiar with the requirements of the HSP and that all personnel have received the necessary training.
- ✓ Implement the HSP, special safety considerations, and the emergency response/contingency plan.
- ✓ Alert appropriate emergency services before starting work and provide a copy of the emergency response/contingency plan to the respective emergency services.
- ✓ Record all significant health and safety activities and incidents.
- ✓ Suspend work due to health or safety related concerns.

All health and safety activities that differ from those stated in the final HSP must be approved by the designated health and safety officer.

## ► DESCRIBE FIELD ACTIVITIES

Carefully review the stormwater monitoring program and list all of the field activities that will be involved. A typical stormwater monitoring program may include accessing and occupying monitoring sites in difficult areas, lifting heavy or bulky equipment and other items, and handling stormwater samples, often under challenging conditions. The following describes some specific activities associated with stormwater monitoring.

### **Equipment installation and routine maintenance**

Flow meters, water samplers and ancillary equipment may need to be installed, depending on the objectives and scope of the monitoring program. Installation usually requires entry into confined spaces and the use of power tools. The flow meter and automatic water sampler are suspended within the maintenance chamber or in an equipment shelter. Sampler intakes and flow meter sensors are secured to the stormwater conduit using a mounting strap. Sample tubing and sensor cables are secured and routed to the water sampler and flow meter. Routine maintenance consists of visual inspections of sampler intakes, flow meter sensors, mounting hardware, and equipment desiccants. Equipment calibrations may also be performed during maintenance visits.

### **Travel to and from sites**

Field crews will be required to drive to and from each monitoring site, often in stormy conditions and sometimes at night.

### **Establish work zone and traffic controls**

Traffic may be of concern at most Caltrans sampling sites. Therefore, Caltrans field crews will need to establish safe work zones and provide traffic control. All work zones and traffic control systems must provide for the safety of both field crews and general public (and must comply with applicable Caltrans regulations).

### **Opening and closing maintenance hole covers**

Field crews will need to remove and replace maintenance hole covers. Maintenance hole lids should be removed and replaced using a specially designed maintenance hole hook. Maintenance hole covers should only be removed after the atmosphere inside the maintenance hole has been checked.

### **Flow meter and automatic water sampler setup**

Both the flow meter and automatic water sampler will need to be programmed and started before each storm. Usually, the sampler is made operational from a keypad located on the sampler. The flow meter is made operational by using a keypad, laptop computer, or telemetry. If the keypad is used, confined space entry may be required since the meter is often located in a maintenance chamber.

## **Remove and replace automatic water sampler**

Automatic water samplers located in maintenance chambers will need to be removed and replaced to service the sample bottles (i.e., install, check, remove). A cable harness can be rigged as the lifting handle. Full samplers can weigh 60 to 70 pounds.

## **Manually collect grab samples**

Some projects may entail grab sampling using manual methods. In some cases, grab sampling can be accomplished by immersing the sample container into the channel. In other cases, a bailer or a beaker attached to a lanyard, pole, or other dipping apparatus may be required. In such cases, the sampler is lowered into the flow stream to collect the sample, which is then transferred into sample bottles.

## **► IDENTIFY POTENTIAL HAZARDS**

Before workers can be adequately protected, the activities must be analyzed, and the anticipated hazards to their health and safety must be identified. The following summarizes the general classes of hazards expected to be present during stormwater sampling. The summary provided here is not intended to include every type of hazard that could be encountered; rather, it is intended to serve as a starting point for a site-specific analysis for a given project.

### **Confined Spaces**

Storm sewers are classified as “confined spaces” under OSHA regulations. Regulations for entry into confined spaces are contained in 29 CFR 1910.146 and California Code of Regulation (CCR)-Title 8,-Article 108, confined spaces. The regulations require that no person shall enter a confined space without proper training and equipment. The risks associated with confined spaces include dangerous atmospheres, engulfment, falls, falling objects, and bodily harm due to explosion.

### **Physical Hazards**

Physical hazards may include vehicle traffic, open maintenance holes and maintenance hole lids, and open water. Basic information is provided below regarding each of these hazards, however, specific Caltrans standard operating procedures should be used in the final HSP.

## Vehicle traffic

Traffic hazards may be a primary concern at most Caltrans sampling sites. These hazards are greatest during times of reduced visibility, such as during storm events and at night. The primary threats associated with working in or alongside roadways are workers being struck by passing vehicles or being involved in a vehicular collision. The risk associated with these threats is severe bodily injury or death.

## Open Maintenance Hole and Maintenance Hole Lids

Storm sewer sampling sites are often located below grade, such that maintenance holes must be opened during water sample collection and equipment maintenance activities. Opening maintenance holes requires the removal of heavy steel lids. Improper maintenance hole lid removal techniques can result in back injuries and/or crushed toes or feet. Specially designed maintenance hole hooks along with proper lifting techniques provide the easiest and safest way for removing maintenance hole lids.

Open maintenance holes pose a threat to workers and general public. Limited visibility, inattention, poor site control, slips, and/or trips could result in someone falling into an open maintenance hole. The risks of such a fall include minor to fatal bodily injury.

## Open Water Hazards

High flows associated with storm events present a threat to workers. Slippery conditions, stream side vegetation, and unstable stream banks could cause a worker to fall into a stream. The risks of such a fall include hypothermia, bodily injury, and drowning.

## **Biological Hazards**

Rodents and pathogenic microorganisms (including viruses), are potential biological hazards of concern. The primary threats associated with these hazards are injury from bites and/or the contraction of diseases.

## **Chemical Hazards**

Although most stormwater sewers are not intended to contain hazardous materials, there is a potential for hazardous gaseous and/or liquid contaminants to be present as the result of industrial runoff, illicit sanitary sewer connections, and/or illegal dumping of wastes. The presence of chemicals and/or chemical vapors may result in (but not limited to) one or more of the following threats: toxic conditions, oxygen displacement, explosion, and/or fire. The risks associated with these threats include poisoning (acute and/or chronic), asphyxiation, and bodily injury.

## ► HEALTH AND SAFETY PRECAUTIONS

The following provides an overview of safety precautions and protective measures typically used to minimize the hazards described above. Again, this guidance is general in nature; it is not comprehensive and is not a substitute for a detailed, site-specific evaluation, or established safety regulations (Cal OSHA).

In addition to the items mentioned below, it should be noted that effective communication can enhance the health and safety of monitoring personnel. Cellular phones can be especially useful in this regard. If field personnel encounter unusual conditions, or are unclear as to how to deal with a given situation, they can contact their health and safety officer for guidance. Also, cellular phones can be used to summon help in the event of an accident or other emergency.

### **Confined Space Entry**

Protective measures include use of atmospheric monitoring devices, portable ventilators, air purifying respirators, and entrant retrieval systems. Other precautions include prohibiting entry to some sites during storms and erecting pedestrian barriers. Caltrans confined space entry standard operating procedures should be adhered to if it is necessary for any personnel to enter a confined space for stormwater monitoring activities.

### **Physical Hazards**

All field personnel should have the following personal protective equipment while working in the field:

- ✓ Hard hat
- ✓ Leather gloves (when working with maintenance hole covers, grates, and other related heavy objects, but not when handling samples or sampling equipment).
- ✓ Reflective traffic vest
- ✓ Steel-toed boots
- ✓ Eye protection
- ✓ Rain gear (during rainfall events)

This list represents the minimum protective equipment. The site-specific hazards evaluation for each project may determine that additional equipment is warranted for some sites/activities.

## Traffic Hazards

Traffic should be controlled per existing Caltrans methods. All sampling personnel should be trained in proper traffic control including precautions and installation and use of appropriate controls. To the extent possible, try to schedule site visits for non-peak traffic periods.

## Open Maintenance Hole and Maintenance Hole Lids

Maintenance hole safety precautions include both handling the heavy lids and controlling access to maintenance hole openings. Maintenance hole lids should only be moved using a hole hook; picks and crow bars are not acceptable substitutes. Maintenance hole hooks are designed not to slip while moving the lid. Safe lifting practices should be used when working with maintenance hole lids. Controlling access to maintenance hole openings can be done by erecting barriers and assigning a crew member to act as lookout and warn people away.

## **Open Water Hazards**

The most effective precaution against open water hazards is to conduct work from a safe location such as bridge deck. If access to the waters edge is required, then a flotation vest and lifeline should be used.

## **Biological Hazards**

To protect against bacterial and viral hazards, crews should avoid contact with stormwater samples. The use of powder-free nitrile gloves when handling samples is recommended. Crews should wash hands with soap and water before handling any food or drink. Any animals encountered during sampling should be avoided.

## **Chemical Hazards**

Hazardous chemicals in storm sewers can be in either the liquid or vapor phase. Precautions against the liquid phase are similar to those described for biological hazards. Precautions against chemical vapors include use of air-purifying respirators and portable ventilators.

## **► HEALTH AND SAFETY TRAINING AND DOCUMENTATION**

All persons who engage in stormwater sampling should receive some level of formal health and safety training. At a minimum, the project HSP should be presented and discussed in detail. This training should be recorded using an employee acknowledgment form. Regular safety meetings should also be held during the project to review and update safety procedures. The meeting content and persons in attendance should be documented.

Additional training in confined space entry may be necessary. Confined space entry requires specialized training as described in 29 CFR 1910.146 (or consult Caltrans existing standard operating procedures). The training should include how to identify confined spaces, atmosphere monitoring, lock-out and tag-out, retrieval systems, emergency response, and permit preparation. Any person entering a confined space must have documentation to support that they have received the required training.

Establish protocols to ensure that new additions to the monitoring team receive the proper health and safety training. Also, the training program should include periodic “refresher” courses.

### ► **DEVELOP AN EMERGENCY RESPONSE/CONTINGENCY PLAN**

An emergency response/contingency plan must be developed prior to any sampling activities. The plan should include instruction and procedures for medical emergencies, fires/explosions, hazardous material spills, and site evacuations. All emergency conditions require concise and timely actions conducted in a manner that minimizes the health and safety risks. All monitoring personnel should be familiar with the emergency response/contingency plan.

In most instances, the health and safety officer is responsible for assessing emergency situations and contacting the appropriate emergency services if necessary. If the health and safety officer is not available, emergency assistance should be contacted immediately. All personnel should be trained in basic first aid, be familiar with proper evacuation procedures, and have access to emergency numbers and routes to the nearest medical emergency facilities from each site. Emergency numbers should include at least the following: local police and fire department (911), closest hospital, county environmental health, and Hazmat team.