



Linda S. Adams
Secretary for
Environmental Protection

California Regional Water Quality Control Board

San Francisco Bay Region

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
<http://www.waterboards.ca.gov/sanfranciscobay>



Arnold Schwarzenegger
Governor

DRAFT

TECHNICAL REFERENCE DOCUMENT

CHARACTERIZATION AND REUSE OF SOIL FROM MULTIPLE SOURCES FOR MAINTENANCE OF LEVEES ADJACENT TO AQUATIC ENVIRONMENTS

This document describes recommended testing methods and conditions for the reuse of excavated upland soil for stabilization and maintenance of levees adjacent to aquatic environments (tidal wetlands, managed ponds, tidal sloughs, tidally influenced portions of creeks and rivers, etc.), where the soil may come into contact with aquatic biological receptors after placement. Examples of the types of levees to which this document may apply include levees with surface water bodies on both sides, severely subsided, eroded, or otherwise degraded levees built on peat or other unstable foundation material, and levees which are at risk of being overtopped or breached during winter storm events. The intent of this document is to assure that the reuse of soil on these types of levees is protective of the beneficial uses of waters of the State.

In order to expedite levee repair, especially in emergency situations, this document is intended to establish a “self-certification” process whereby the property owner retains the required compliance documentation, but no formal approval by Regional Board staff is provided unless required as a condition of an existing permit. Documentation of compliance with the evaluation criteria and conditions for reuse of excavated soil on levees must be retained by the property owner and be provided to the Regional Board upon request.

If Water Board staff approval is required as a condition of an existing permit involving reuse of upland soil to reinforce levees adjacent to estuarine aquatic habitats in the San Francisco Bay region, the project proponent should prepare a **Source Material Characterization Report (SMCR)** demonstrating that the soil is appropriate for reuse in the proposed location(s). Even if the self-certification option applies to the project, it is recommended that the proponent prepare and retain an SMCR to ensure complete documentation should it ever be needed. The SMCR should be prepared under the supervision of and signed by a California registered engineer, registered professional geologist, or certified engineering geologist and should contain a statement certifying compliance with the restrictions, site conditions, sampling and analysis, and evaluation criteria described below. If Water Board staff approval is required, the project proponent should submit the SMCR to staff at least **30 days** prior to the proposed start date for material placement. The SMCR should include the following information items listed below.

1.0 Soil Source-area Description

Provide a source-area description that includes information that identifies the physical setting of the soil source in relation to the surrounding area. In general, soil proposed for use on levees adjacent to aquatic habitats should come from non-industrial areas, i.e., land that is either undeveloped, or used solely for residential or agricultural purposes. Undesirable sources of soil include industrial and/or commercial sites where hazardous materials were used, handled or stored as part of the business operations, or unpaved parking areas where petroleum hydrocarbons could have been spilled or leaked into the soil. Commercial sites that should be avoided include former gasoline service stations, retail strip malls that contained dry cleaners or photographic processing facilities, paint stores, auto repair and/or painting facilities. Industrial facilities that should be avoided include metal processing shops, manufacturing facilities, aerospace facilities, oil refineries, waste treatment plants, etc. Alternatives to using fill from construction sites include the use of fill material obtained from a commercial supplier of fill material or from soil pits in rural or suburban areas. However, care should be taken to ensure that those materials are also uncontaminated. To be considered adequately comprehensive, the description of the source area should include at a minimum:

- Site name: Name of current business operation and/or land use at the site.
- Location: Street address, parcel number, or other physical location descriptor as appropriate.

Two maps are useful, (please include a scale and a north arrow):

- A map locating the site within the general San Francisco Bay Area which identifies major highways, surface waters, and land use; and,
 - A site-specific map (facility diagram) showing significant site features (buildings, tanks, ponds, etc.), both current and historical.
- Contact Person(s): Name(s) of the main contact person(s) for the above cited operation and contact information (telephone number and e-mail address).
 - Site Status and History: Describe any site-specific and/or nearby land- or water-based activities that may have affected soil quality in the proposed source area.

2.0 Contaminant Screening Data

2.1 Target Analytes and Screening Thresholds

To document that the soil source area is not contaminated, it must be sampled and analyzed for all of the **target chemicals listed in Table 1** unless adequate documentation is provided to justify elimination of certain compounds from the testing program. For example, if the source area has been in agricultural use for several decades and no non-agricultural chemicals or petroleum fuel products have been stored on site, VOCs, semi-VOCs, TPH, and PCBs need not be analyzed. After sampling and analysis has been completed, a summary of the laboratory data, as well as the standard laboratory data package including QA/QC sample results, should accompany all analytical reports.

In order for Water Board staff to approve the soil for use on levees that may impact aquatic environments, the analytical data must demonstrate that it meets the most current screening **thresholds for wetland surface (cover) reuse shown in Table 2**. Case-by-case exceptions to these thresholds may be acceptable based on more intensive testing and/or project-specific design details provided by the project-proponent. For example, higher chemical thresholds may be appropriate if the material will be contained in specially engineered cells that prevent contact with surface water, or if the material is otherwise placed on the levee in a manner that ensures that it is not subject to overtopping or erosion from surface runoff.

2.2 Soil Sampling Frequency

The minimum recommended soil sampling frequency is shown in Table 3. Composite sampling for fill material characterization may or may not be appropriate, depending on quality and homogeneity of source/borrow area, and compounds of concern. If compositing is performed, the material should be stockpiled at the borrow area and originate from the same source area. In addition, if samples are composited, they should be from the same soil layer, and not from different soil layers.

The information that should be included in contaminant screening section of the SMCR is summarized below.

- An estimate of the volume of soil proposed for levee reuse.
- A description and justification of the sampling methodology and the sample location/selection process (Examples: uniform grid pattern, random, or based on professional judgment and field screening indications).
- A plot plan and/or photograph of each soil stockpile or area sampled with the sample locations clearly marked.
- A copy of all sample results, chain of custody documents, and QA/QC supporting data (field and laboratory sample identification numbers should either be the same, or be cross-referenced to a unified identification system).
- A summary table of the laboratory results for the soil sampling.
- A map of the reuse location and site showing where the soil is intended to be placed and a description of the method that will be used to offload, place, and grade it, if necessary.

Table 1: Target Analytes for Evaluation of Soil for Reuse on Levees in Areas of Potential Aquatic Habitat Impact

Parameter	Target Reporting Limit (dry wt)
<i>Conventional Parameters</i>	
Grain size (%)	0.1
Total organic carbon [TOC] (%)	0.1
<i>Metals (mg/kg)</i> (EPA methods 6010B or 6020 and 7471A)	
Arsenic	0.1
Cadmium	0.1
Chromium	0.1
Copper	0.1
Lead	0.1
Mercury	0.02
Nickel	0.1
Selenium	0.1
Silver	0.1
Zinc	1
<i>Organic Compounds (mg/kg)</i>	
VOCs (EPA method 8260)	0.02 each
SVOCs (EPA method 8270 - 8270 SIM if only PAH compounds are being analyzed)	0.02 each
PCB Aroclors (EPA method 8082)	0.02 each
Organochlorine Pesticides (EPA method 8081A)	0.002 each

Table 2: Recommended Soil Chemistry Screening Thresholds for Reuse of Soil on Levees in Areas of Potential Aquatic Habitat Impact

ANALYTE	Wetland Surface Material	
	Concentration	Decision Basis
METALS (mg/kg)		
Arsenic	15.3	Ambient Values ¹
Cadmium	0.33	Ambient Values
Chromium	112	Ambient Values
Copper	68.1	Ambient Values
Lead	43.2	Ambient Values
Mercury	0.43	Ambient Values
Nickel	112	Ambient Values
Selenium	0.64	Ambient Values
Silver	0.58	Ambient Values
Zinc	158	Ambient Values
ORGANOCHLORINE PESTICIDES/PCBS (µg/kg)		
DDTS, sum	7.0	Ambient Values
Chlordanes, sum	2.3	TEL
Dieldrin	0.72	TEL
Hexachlorocyclohexane, sum	0.78	Ambient Values
Hexachlorobenzene	0.485	Ambient Values
PCBs, sum	22.7	ER-L
POLYCYCLIC AROMATIC HYDROCARBONS (µg/kg)		
PAHs, total	3,390	Ambient Values
Low molecular weight PAHs, sum	434	Ambient Values
High molecular weight PAHs, sum	3,060	Ambient Values
1-Methylnaphthalene	12.1	Ambient Values
1-Methylphenanthrene	31.7	Ambient Values
2,3,5-Trimethylnaphthalene	9.8	Ambient Values
2,6-Dimethylnaphthalene	12.1	Ambient Values
2-Methylnaphthalene	19.4	Ambient Values
Acenaphthene	26.0	Ambient Values
Acenaphthylene	88.0	Ambient Values
Anthracene	88.0	Ambient Values
Benz(a)anthracene	412	Ambient Values
Benzo(a)pyrene	371	Ambient Values
Benzo(e)pyrene	294	Ambient Values
Benzo(b)fluoranthene	371	Ambient Values
Benzo(g,h,i)perylene	310	Ambient Values
Benzo(k)fluoranthene	258	Ambient Values
Biphenyl	12.9	Ambient Values
Chrysene	289	Ambient Values
Dibenz(a,h)anthracene	32.7	Ambient Values
Fluoranthene	514	Ambient Values
Fluorene	25.3	Ambient Values
Indeno(1,2,3-c,d)pyrene	382	Ambient Values
Naphthalene	55.8	Ambient Values
Perylene	145	Ambient Values
Phenanthrene	237	Ambient Values
Pyrene	665	Ambient Values

Volatile Organic Compounds VOCs (g/kg)		
Examples: Solvents (PCE, TCE); Benzene; MTBE	TBD	Ambient values have not been established

¹ Ambient concentrations of contaminants in San Francisco Bay sediments (SFBRWQCB, 1998) statistically derived from data collected by the Regional Monitoring Program for Trace Substances and the Bay Protection and Toxic Substances Cleanup Program Reference Study

Table 3: Recommended Sampling Schedule for Reuse of Soil on Levees in Areas of Potential Aquatic Habitat Impact

Volume of Borrow Area Stockpile	Samples per Volume
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for the first 1,000 cubic yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for the first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards