

# California Institute of Technology

## Lead Management Program



Caltech Environmental Health and Safety Office  
1200 E. California Blvd., M/C B125-6  
Pasadena, CA 91125  
Phone: 626.395.6727  
Fax: 626.577.6028  
Email: [safety@caltech.edu](mailto:safety@caltech.edu)  
Website: [safety.caltech.edu](http://safety.caltech.edu)

2024

[This Page Intentionally Left Blank]

## Table of Contents

<b>INTRODUCTION</b> .....	<b>4</b>
<b>SCOPE</b> .....	<b>4</b>
<b>ROLES AND RESPONSIBILITIES</b> .....	<b>4</b>
ENVIRONMENTAL HEALTH AND SAFETY.....	4
LEAD PROJECT OVERSIGHT .....	4
COORDINATE FACILITIES TRAINING .....	5
FACILITIES: PLANNING DESIGN AND CONSTRUCTION].....	5
FACILITIES: .....	5
OPERATIONS, FACULTY HOUSING, SHOPS, AND STUDENT HOUSING .....	5
GENERAL LEAD AWARENESS TRAINING.....	6
<b>LEAD PROCESS FLOW</b> .....	<b>6</b>
PART I: PROJECT SCOPE ASSESSMENT .....	7
PART II: LEAD PROJECT PROCEDURES.....	8
<b>APPENDIX I: List of Caltech Buildings Built Prior to 1980</b> .....	<b>9</b>
<b>APPENDIX II: Lead Process Flow</b> .....	<b>10</b>
<b>APPENDIX III: Lead Project Procedures</b> .....	<b>11</b>
<b>APPENDIX IV: Lead Containing Materials</b> .....	<b>12</b>
DEFINITIONS OF LEAD-CONTAINING MATERIALS .....	12
SAMPLING OF LEAD-CONTAINING MATERIALS .....	12
<b>APPENDIX V: Lead Abatement contractors with certified workers/supervisors</b> .....	<b>13</b>
<b>APPENDIX VI: Disposal of Hazardous Waste Materials</b> .....	<b>14</b>
CALTECH APPROVED HAZARDOUS WASTE DISPOSAL SITES .....	14
<b>APPENDIX VII: Project Summary Form</b> .....	<b>15</b>
<b>APPENDIX VIII: Applicable State and Federal Regulations</b> .....	<b>16</b>

## INTRODUCTION

The Caltech Lead Management Program establishes specific procedures to identify, minimize, and control construction-related activities when conducting work that involves lead-containing building materials. The following sections provide additional information on the specific process plans and the responsibilities of each work group. These procedures ensure that lead-containing materials (LCM) are properly maintained and handled and that no one is exposed to an airborne concentration of lead exceeding the [specific standards set by Cal/OSHA](#) during their work at the Institute.

## SCOPE

The Caltech Lead Management Program applies to all demolition, renovation, and repair activities that might directly or indirectly disturb building materials that contain lead on the Caltech campus or affiliated offsites managed directly by Caltech. Projects involving the disruption of building materials that contain lead are categorized as “lead projects.”

Lead projects require planning and coordination between EH&S and Facilities Operations group(s). Coordination of efforts ensures that building materials containing lead are properly identified and managed before any planned work is likely to disturb them. The Facilities Operations groups are identified as follows:

- Planning, Design and Construction (PD&C)
- Facilities Shops
- Facilities Operations and Maintenance
- Faculty Housing
- Student Housing

## ROLES AND RESPONSIBILITIES

### ENVIRONMENTAL HEALTH AND SAFETY

The role of the EH&S Office is to oversee all campus lead-related projects. Under the supervision of the Senior Director of EH&S, the campus Environmental Programs Manager will interact with the various project stakeholders to ensure that the established lead process is followed, and all project results are documented, in addition to providing campus oversight.

### LEAD PROJECT OVERSIGHT

- Compiling lead sampling documentation and sample results into a project summary report.
- Maintaining Caltech’s Online Campus Lead Archive.
- Providing technical assistance for Facilities Operations groups and PD&C with planning and coordinating lead-related projects.
- Coordinating with Facilities Operations groups to ensure lead-related projects are staffed with certified lead contractors.
- Signing off on hazardous waste manifest(s).
- Responding to South Coast Air Quality Management District (SCAQMD) and California Department of Public Health (CDPH) inspections and document requests related to lead projects, when applicable.
- Incidental collection of bulk samples of suspected or presumed LCM.
  - Collected samples are sent for laboratory testing by a laboratory accredited under the American Industrial Hygiene Association (AIHA) and Environmental Laboratory Accreditation Program (ELAP) for analysis.

## **COORDINATE FACILITIES TRAINING**

The Caltech EH&S Office coordinates Lead Renovation, Repair and Painting (RRP) training for select Facilities employees. As part of this task, EH&S monitors and maintains training files for all identified Facilities staff members of the Caltech Operations and Maintenance team.

Training coordination includes:

- Selecting a certified Lead RRP training provider
- Scheduling of onsite training for all Facilities staff
- Inputting lead training certifications into Caltech's centralized training tracking platform.

## **FACILITIES: PLANNING DESIGN AND CONSTRUCTION]**

The Planning Design and Construction (PD&C) team is tasked with capital construction and renovation projects across the Caltech main campus and Caltech affiliated sites. These projects may actively or inactively disturb building materials that contain lead.

Caltech PD&C is responsible for the following:

1. Project coordination with the EH&S office for all projects that may disturb and release LCM.
2. Contract consultants who are CDPH-certified lead professionals and capable of providing:
3. Pre-Renovation/Demolition Hazardous Materials Building Survey(s) to identify all potential sources of lead that might be disturbed during planned construction work.
4. Ensure collected samples are sent to a laboratory certified under AIHA and ELAP standards.
5. Coordinate advance notification to regulatory agencies.
6. CDPH – Lead Hazard Evaluation Form
7. SCAQMD – Air Monitoring (if applicable)
8. All applicable abatement project notifications
9. Contracting a certified lead contractor who can abate lead-containing material and is current with the CDPH Lead-Related Construction certification.
10. Coordinating with the Caltech EH&S office to implement the contractor work plans and safe work requirements.
11. Coordinating between Caltech EH&S and the selected lead abatement contractor on the selection of the hazardous waste disposal site and hazardous waste manifest signature.
12. Providing all requested documents to EH&S to ensure the project close-out summary form is completed.

## **FACILITIES: OPERATIONS, FACULTY HOUSING, SHOPS, AND STUDENT HOUSING**

Facilities Operations, Faculty Housing, and Facilities Shops have key employees who have undergone additional hands-on training by contracted certified CDPH instructors. The Lead RRP certification permits certified employees to work safely with LCM while performing small-scale renovation, repair, and maintenance projects. Caltech defines small-scale projects as projects involving <100 square or linear feet.

The Lead RRP certification is an 8-hour in-person training class required to be renewed every five years. Lead RRP employees must enroll in the Caltech Respiratory Protection Program and are medically evaluated, trained, and fit-tested to wear respiratory protection annually.

Facilities Operations may decide to contract out lead-related projects if the planned project's scope and scale are outside the Facilities Shops' capability or calendar availability. Facilities Operations and Shops are responsible for selecting, managing, and overseeing the work of third-party certified lead consultants and lead abatement contractors.

These duties are as follows:

1. Project coordination with the EH&S Office for all projects that may disturb or release LCM.
2. Contract coordination with consultants who are CDPH-certified lead professionals and capable of providing:
  - a. Pre-Renovation/Demolition Hazardous Materials Building Survey(s) to identify all potential sources of lead that might be disturbed during planned construction work.
  - b. Assurance that collected samples are sent to a laboratory certified under AIHA and ELAP standards.
  - c. Coordination of advance notification to regulatory agencies:
    - i. CDPH – Lead Hazard Evaluation Form
    - ii. SCAQMD – Air Monitoring (if applicable)
    - iii. All regulated abatement project notifications
3. Contract a certified lead contractor who can abate lead-containing material and is current with the CDPH Lead-Related Construction certification.
4. Coordinate with the Caltech EH&S office to implement the contractor work plans and safe work requirements.
5. Coordinate between the Caltech EH&S office and the selected lead abatement contractor on selecting the hazardous waste disposal site and the hazardous waste manifest signature. Provide all requested documents to EH&S to ensure the project close-out summary form is completed.
6. Provide all requested documents to EH&S to ensure the project close-out summary form is completed.

### **GENERAL LEAD AWARENESS TRAINING**

Facilities staff who may interact with or encounter LCM are provided lead awareness training via Caltech's MyLearn system. General lead awareness training is provided annually. The Facilities Training Matrix identifies all Facilities shops required to complete the annual general awareness training.

Facilities Supervisors are responsible for onboarding new employees and ensuring that employees under their immediate supervision complete the annually assigned lead awareness training.

### **LEAD PROCESS FLOW**

The EH&S office has established a lead process flow to ensure proper management LCM. The following procedures are to be implemented whenever there is a possibility that lead may be disturbed during any of the following activities:

- Demolition
- Construction/Renovation
- Utility Installation
- Repair
- Maintenance

The lead process flow is categorized into two parts:

1. Project Scope Assessment – Determines if the planned project area contains building materials that may contain lead. Information about the presence of lead is confirmed via existing sampling records and new, pre-renovation sampling if no previous sampling records are available.
2. Lead Project Procedures – If LCM is determined to be present in the planned project area, the project is categorized as a lead project and required to follow the lead project procedures.

## PART I: PROJECT SCOPE ASSESSMENT

Procedures:	Available Resource
1. Determine project scope: <ol style="list-style-type: none"> <li>a. Was the building identified as potentially containing lead or built pre-1980?</li> <li>b. Will planned work disturb existing building materials?</li> </ol>	<a href="#">Appendix I:</a> List of Caltech buildings built prior to 1980.
2. Are there existing lead material surveys for the planned work that can be used to determine the presence of LCM?	BOX Drive: Campus Lead Survey Archive – <a href="#">request access here</a>
3. If existing records exist: <ol style="list-style-type: none"> <li>a. Past sampling records confirm no LCM in the planned work area. The project can proceed without further testing.</li> <li>b. If the previous sampling record confirms the LCM and the planned work is greater than &gt;100 square feet, then the project is classified as a lead project.</li> </ol>	<a href="#">Appendix II – Lead Process Flow</a>
4. If no previous records are available, then a pre-renovation/demolition hazardous materials building survey must be conducted by a CDPH certified assessor prior to the start of work.	N/A
5. New lead survey sample results: <ol style="list-style-type: none"> <li>a. Lead survey results return as a none-detect or less than the lead threshold of 5000 ppm, the project can proceed as is.</li> <li>b. Lead survey results demonstrate positive for lead above the contamination threshold of 5000 ppm. The project is considered a lead project. Follow the lead project process.</li> </ol>	<a href="#">Appendix III: Lead Project Procedures</a>

## PART II: LEAD PROJECT PROCEDURES

Procedures:	Notes
1. Select a certified lead abatement contractor(s) and Consultants. Collect the following documents: <ul style="list-style-type: none"> <li>a) Certified Abatement Company               <ul style="list-style-type: none"> <li>i. Lead Supervisor Certification</li> <li>ii. Lead Worker Certification</li> </ul> </li> <li>b) Lead-Related Construction Certificate               <ul style="list-style-type: none"> <li>i. Inspector/Assessor Certification</li> </ul> </li> </ul>	
2. Selected contractor to provide specific work plan: <ul style="list-style-type: none"> <li>a) Area protection</li> <li>b) Lead work signs around the work area</li> <li>c) Applicable PPE for workers</li> </ul>	EH&S can assist in reviewing site-specific work plans.
3. Area notification – notification will be provided by Caltech’s Service Interruption Notice at least seven days prior to start of work.	
4. Project Monitoring – the project manager monitors and supervises abatement contractors. Abatement contractors are required to adhere to the approved work plan.	EH&S can assist with technical and safety related concerns.
5. EH&S will sign off on the hazardous waste manifest	
6. The project manager will collect all information required to complete the Lead Project Summary Form.	<a href="#">Project Summary Form</a>
7. EH&S will update the BOX cloud drive and include summary documents for each completed project.	BOX Archive: Campus Lead Survey Archive – <a href="#">request access here</a>

[This Area Intentionally Left Blank]



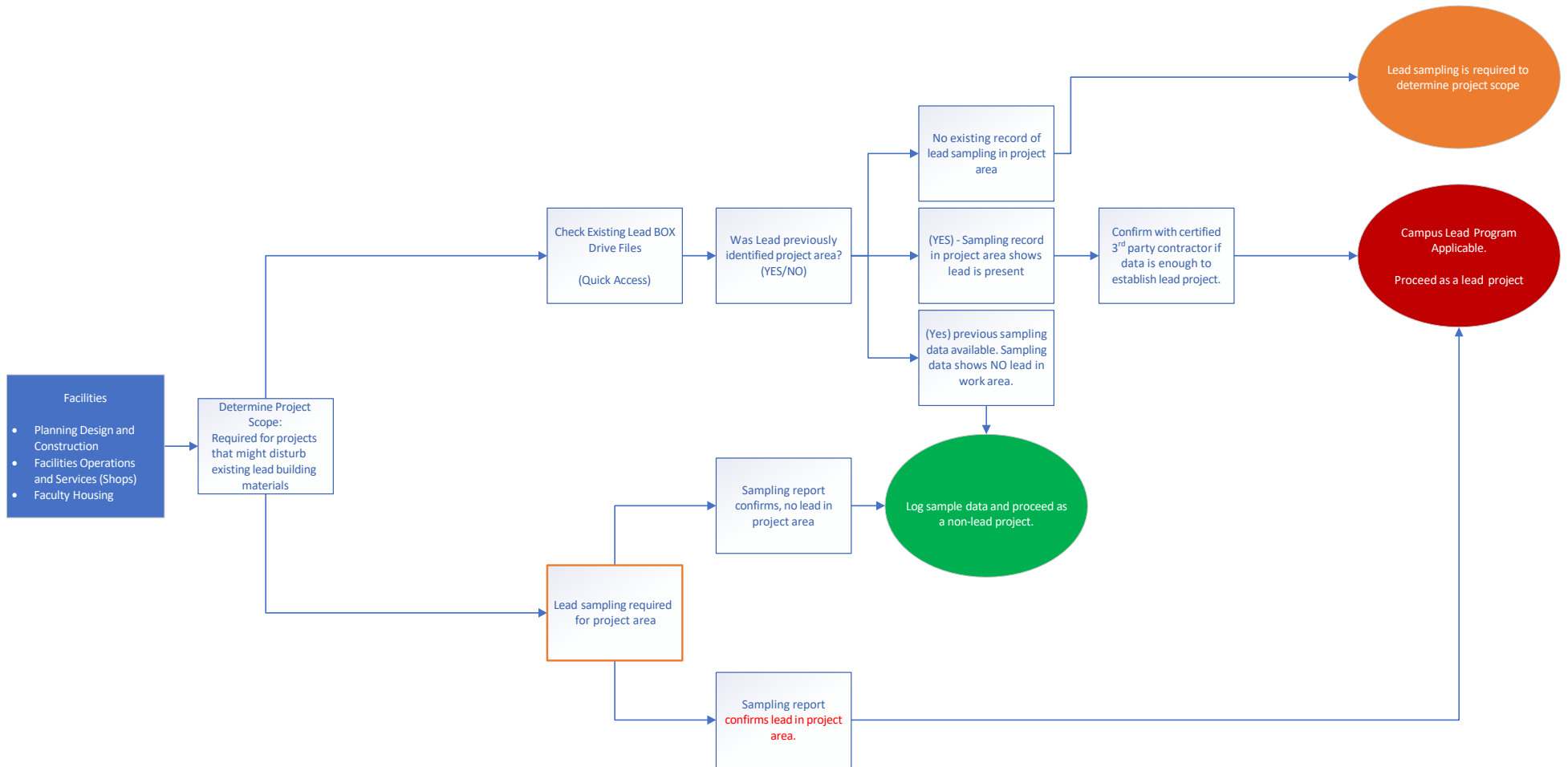
## APPENDIX I: List of Caltech Buildings Built Prior to 1980

Paints and other surfacing materials applied prior to 1978 must be suspected as being lead-containing materials (LCM) until bulk testing of these suspected materials proves otherwise. Below is a list of Caltech buildings that were built prior to 1978. This list is intended as a guide for campus buildings that may contain lead.

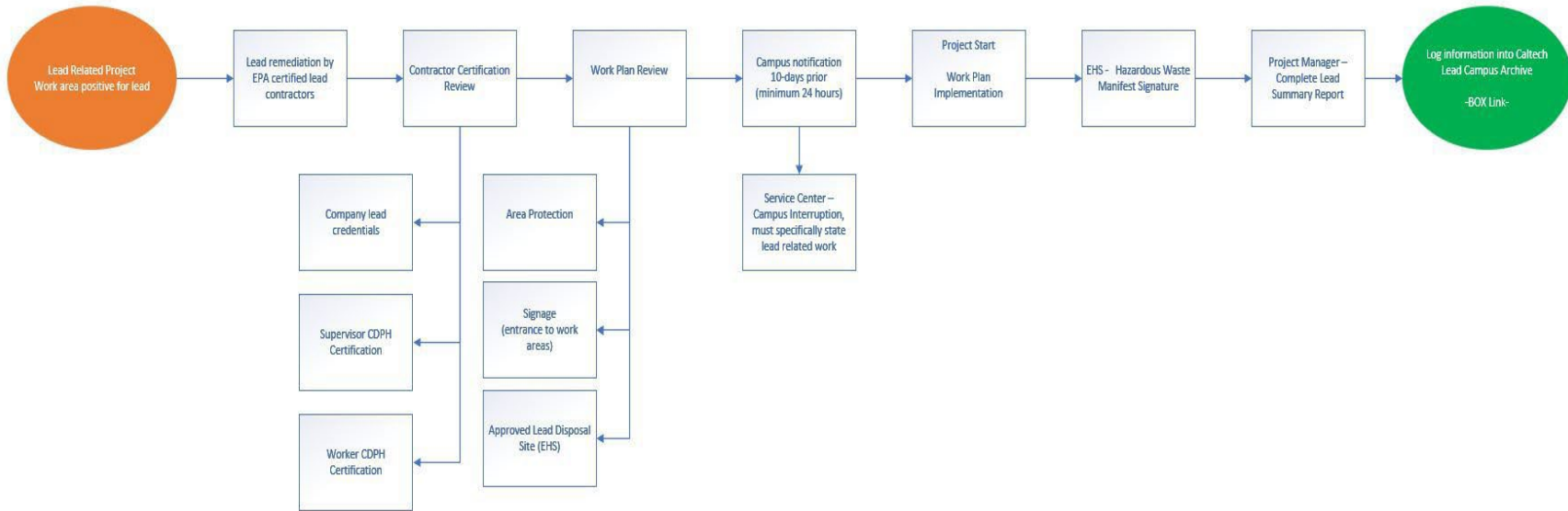
Suspected materials found in buildings not on this list should still be tested to determine if the materials contain lead.

Campus Buildings		Caltech Housing Properties
Alles Laboratory	Keith Spalding	South Wilson Properties:
Alumni House	Kellogg Laboratory	241 South Wilson
Arms Laboratory	Kerckhoff Laboratory	255 South Wilson
Athenaeum	Lauritsen Laboratory	315 South Wilson
Baxter Hall	Lloyd House	373 South Wilson
Beckman Auditorium	Marks House	375 South Wilson
Beckman Behavioral Biology	Caltech Hall	505 South Wilson
Blacker House	Mudd Laboratory, North	515 South Wilson
Braun House	Mudd Laboratory, South	535 South Wilson
Bridge (East, West, Annex)	Noyes Laboratory	551 South Wilson
Brown Gymnasium	Page House	565 South Wilson
Browne Dining Hall	Parsons-Gates	
Center for Student Services	Powell-Booth Laboratory	South Hill Properties:
Central Engineering Services	Public Events Ticket Office	275 South Hill
Central Plant	Public Relations	287 South Hill
Church Laboratory	Ricketts House	295 South Hill
Crellin Laboratory	Robinson Laboratory	305 South Hill
Dabney Hall	Linde Hall	315 South Hill
Dabney House	South Hill Buildings	345 South Hill
Downs Laboratory	South Wilson Buildings	383 South Hill
Facilities Management	Spalding Laboratory	
Firestone Laboratory	Steele Laboratory	Chester:
Fleming House	Synchrotron Laboratory	266 S. Chester
Gates Annex	Thomas Laboratory	
Guggenheim Laboratory	Transportation Center	
Isotope Laboratory	Venerable House	
Jorgensen Laboratory	Young Health Center	

# APPENDIX II: Lead Process Flow



# APPENDIX III: Lead Project Procedures



# APPENDIX IV: Lead Containing Materials

## DEFINITIONS OF LEAD-CONTAINING MATERIALS

Cal/OSHA has two distinct definitions of lead-containing materials.

As the cutoff level that triggers exposure assessment (i.e., air sampling), Cal/OSHA defines lead-containing materials as surface coatings or materials that contain lead at concentrations equal to or exceeding 0.06% (600 ppm) lead (weight to weight). This cutoff level would apply to both lead abatement contractors who are performing large-scale lead abatement projects (>100 square or linear feet), and Facilities Department painters who are performing small-scale lead abatement projects (<100 square or linear feet).

As the cutoff level that triggers lead work pre-job notification to Cal/OSHA, Cal/OSHA defines lead-containing materials as surface coatings or materials that contain lead at concentrations equal to or exceeding 0.5% (5,000 ppm) lead (weight to weight), or 1.0 mg/cm<sup>2</sup> (X-Ray Fluorescence). This cutoff level would only apply to lead abatement contractors who are performing large-scale lead abatement projects (>100 square or linear feet).

## SAMPLING OF LEAD-CONTAINING MATERIALS

Any painted surface (including stained and varnished surfaces) in buildings constructed before 1978 must be sampled for lead before any significant disturbance occurs. Any other materials (e.g., window glazes, putties, plumbing solders, ceramic glazes) suspected of containing lead must also be sampled before significant disturbance occurs.

The following list has been developed as a reference for commonly encountered LCM. This list does not include every product or material that may contain lead. It is intended as a general guide to highlight types of materials should be considered suspect.

- Paints, Stains, and Varnishes
- Ceramic Tiles
- Pipes, Plumbing Fixtures, Faucets, Fluxes, and Solders
- Caulking X-Ray and Radioactive Source Shielding
- Contaminated Soil
- Mini Blinds (Non-Glossy)
- Metal Flashing
- Lead-Jacketed Electrical Lines

## **APPENDIX V: Lead Abatement contractors with certified workers/supervisors**

Due to the nature of lead abatement work, only contractors whose workers, supervisors, and project designers are trained by an accredited training provider and certified by the California Department of Public Health ([CDPH](#)) can perform large-scale (>100 square or linear feet) lead-related construction work at the Institute. This ensures that lead abatement contractors have all of the required training, licensing, and insurance to conduct lead abatement work. If contractors do not have the required credentials or insurance, then they are not allowed to perform lead abatement work on campus.

Lead-related construction work is defined as any construction, alteration, painting, demolition, salvage, renovation, repair, or maintenance of any residential or public building, including preparation and cleanup that, by using or disturbing lead-containing materials or soil, may result in significant exposure of adults or children to lead. As used in the definition of lead-related construction work, “public building” is defined as a structure that is generally accessible to the public, including, but not limited to, schools, daycare centers, museums, airports, hospitals, stores, convention centers, government facilities, office buildings, and any other building which is not an industrial building or a residential building.

CDPH certification is required for all those doing lead hazard evaluations, lead abatement plan preparation, lead abatement work, and lead clearance inspections for residential and public buildings in California. An index of lead certified professionals in California is available on the [CDPH website](#). These individuals can be certified in one or more of the following six lead-related construction specialties: Project Designer, Project Monitor, Inspector/Assessor, Sampling Technician, Supervisor, and Worker.

## **APPENDIX VI: Disposal of Hazardous Waste Materials**

The Office of Environmental, Health, and Safety (EH&S) is responsible for signing the hazardous waste manifests (as the generator representative), keeping the generator copy of each manifest, and coordinating the proper disposal of hazardous waste.

EH&S reviews the contractor's hazardous waste procedures when disposing of lead contaminated material before the hazardous waste materials leave the Campus. Only approved hazardous waste sites are to be utilized by selected 3<sup>rd</sup> party contractors.

Construction and Demolition materials painted with intact (non-peeling) lead-based paint can be disposed of as regular construction and demolition waste if the waste has been tested and meets the waste characterization requirements under the California State Regulations in Title 22 of the California Code of Regulations (CCR). EHS should review the testing procedures and results before the waste is removed from the Campus.

### **CALTECH APPROVED HAZARDOUS WASTE DISPOSAL SITES**

#### **WASTE MANAGEMENT – KETTLEMAN**

35251 Skyline Road  
Kettleman City, CA 93239  
559-386-9711


#### **CROSBY & OVERTON – LONG BEACH**

1630 W. 17<sup>th</sup> Street  
Long Beach, CA 90813 Long Beach, CA 90813  
562-432-5445

#### **CLEAN HARBORS**

2500 Lokern Rd.  
Buttonwillow, CA 93206  
Coordinate Disposal with EH&S

## APPENDIX VII: Project Summary Form ([Available Online](#))

  
**Lead Project Summary**

Project Name/Description: \_\_\_\_\_  
Project Manager/Supervisor: \_\_\_\_\_  
Division/Business Group: \_\_\_\_\_  
Project Start Date: \_\_\_\_\_  
Project Completion Date: \_\_\_\_\_

The purpose of this document is to describe the project area and identify the outcome of any building materials that were identified as containing lead (>5000 ppm). Please complete the form after all abatement activities have been completed and file in the Campus Lead Survey Archive.

<b>1. Building Name and Room(s) sampled</b>

<b>2. Itemize what material(s) were sampled that contain lead</b>

<b>3. Itemize building materials that were abated/removed as part of the project</b>

<b>4. Itemize building materials identified as containing lead that were not removed</b>
<input type="checkbox"/> Checkmark if not applicable (all known lead-containing materials were removed)

File Path: FAC.EH&S → Campus Lead Survey Archive.EH&S → Building → Floor → (Project Folder)

## **APPENDIX VIII: Applicable State and Federal Regulations**

1. California Occupational Safety and Health Administration (Cal/OSHA), Title 8, California Code of Regulations (CCR), Construction Safety Orders (CSO), Section 1532.1, Lead.
2. California Occupational Safety and Health Administration (Cal/OSHA), Title 8, California Code of Regulations (CCR), General Industry Safety Orders (GISO), Section 5198, Lead.
3. California Department of Public Health (CDPH), Title 17, California Code of Regulations (CCR), Division 1, Chapter 11, Section 38005, Occupational Lead Poisoning Fee.
4. California Department of Public Health (CDPH), Title 17, California Code of Regulations (CCR), Division 1, Chapter 8, Sections 35001-36100, Accreditation, Certification, and Work Practices for Lead-Based Paint and Lead Hazards.
5. California Health and Safety Code (HSC), Sections 105250-105257, Accreditation of Training Providers and Certification of Individuals.
6. California Health and Safety Code, Section 116875, "Lead-Free" Solders, Fluxes, and Wetted Surfaces of Pipes, Pipe Fittings, Plumbing Fittings and Fixtures in Potable Drinking Water Systems.
7. California Department of Public Health (CDPH), Title 22, California Code of Regulations (CCR), Division 4, Chapter 17.5, Section 64672.3, Determination of Compliance with Lead and Copper Action Levels.
8. Federal Environmental Protection Agency (EPA), Title 40, Code of Federal Regulations (CFR), Section 745.90, Lead Renovation, Repair and Painting (RRP) Rule, Renovator Certification.

\* \* \*