

**APPENDIX D1
EXCAVATION, DISPOSAL, AND RESTORATION PLAN SAMPLE**

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PREFACE

This appendix presents a Sample for an Excavation, Disposal, and Restoration Plan. In general, the site-specific Excavation, Disposal, and Restoration Plan should look similar to the outline presented in this Sample.

This document is for guidance only, and is applicable on a case-by-case basis. Some elements of this Sample may apply to your site, and others may not. Additional elements than are addressed by this Sample may also be needed.

Instructions for suggested content (denoted by boxed text) are included under most major headings. Some sections provide example text that could be applied to any site. The example text is shown as normal text with brackets and underline to indicate locations for inserting site-specific information.

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[Other tables as appropriate]

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Work Area Plan
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[Other figures as appropriate]

APPENDICES

Boring Logs and Cross-Sections
Transportation Plan
Health and Safety Plan (including Air Monitoring Plan)
Soil Confirmation Sampling Plan
Public Participation Plan
Stockpile Sampling Plan
Storm Water Pollution Prevention Plan
[Other appendices as appropriate]

EXECUTIVE SUMMARY

Instructions: Introduce the site, its location, and history. Address key points regarding the nature of contamination, excavation, disposal and restoration to provide decision makers with a quick overview of the plan. Briefly discuss the time of year, length of project, cost and acres per day undergoing vegetative removal, excavation, and backfilling.

This Excavation, Disposal and Restoration Plan has been prepared by [name of preparer] for [name of site] on behalf of [owner of the site] to address remediation of contaminated soils at the site. The workplan describes the logistical procedures and field work that will be carried out at [name of site] to excavate and dispose of approximately [#] cubic yards of soil contaminated with metals and restore the site for [anticipated landuse].

The [name of site] is located in [city, county, state or distance to major city]. Between [year] and [year] the site was use for [discuss activities that may have contributed to contamination]. A series of site assessments / site characterizations were conducted to determine the extent to which soils had been impacted by site activities.

The data gathered during [list the pertinent investigations] were used to evaluate the risks and hazards associated with metals found in the soils. Using the information gathered during the characterization and investigations, several possible remedial technologies were identified and evaluated. Other alternatives included no action and containment/capping. After a screening process, excavation and off-site disposal was selected as the remedy of choice.

The excavation activities are anticipated to begin around [month and year] and last approximately [# days/weeks/months]. The excavation activities are projected to cost [\$]. The excavation activities will begin by clearing approximately [#] acres of vegetation per day. Once excavation activities begin, approximately [#] cubic yards of soil will be removed per day over a period of [#] days. The excavated soil will be [describe how the soil will be managed, transported, and disposed]. After confirmation sampling demonstrates that cleanup goals have been achieved, the excavated areas will be backfilled with [describe material] using [describe methods] to [describe final grade].

1.0 INTRODUCTION

Instructions: Summarize previous investigations and interim actions. Include pertinent information that addresses site background, hydrogeologic conditions, and the nature and extent of contaminants.

This Excavation, Disposal and Restoration Plan (Plan) has been prepared to support a soil removal action for areas of concern at [name of site]. This Plan describes the soil excavation, soil management and disposal and site restoration that will be performed.

1.1 SITE LOCATION AND BACKGROUND

The site consists of a [#] acre parcel of land located in [city or distance to major city]. The site is bounded by [feature] to the [direction], [feature] to the [direction], [describe other features as appropriate]. [Reference the figure(s) showing the site location and surrounding features.] Improvements to the site include [describe any buildings, paved parking areas and landscaping and reference figure showing site plan and utilities]. Surrounding land use is generally [residential, commercial, industrial]. The site is currently zoned as [landuse].

Historically the site was owned and operated by [name owners, operators and activities that are believed to have contributed to contamination]. Site investigations have identified [metals that require remediation] concentrations that exceed background levels and require remediation.

1.2 PREVIOUS INVESTIGATIONS

In [month, year] a [investigation reference] was conducted to identify potential areas of concern. [Investigation] activities included [#] soil boring locations, [#] monitoring wells, [#] surface soil samples, and [describe other investigation activities].

[Describe other investigation phases, as appropriate.]

The investigations have revealed the following areas of concern:

- Area 1 also known as [name of area] located [describe location]
- Area 2 also known as [name of area] located [describe location]
- [Describe other areas of concern]

Additional information on these areas of concern is provided in the [report titles and dates].

1.2.1 Nature and Extent of Contaminants

Soils contaminated with [list metals] are located in [area of concern] at a depth of [#] to [#] feet bgs. [Discuss all of the areas of concern, including the associated depths]. Table [#] summarizes the metals concentrations detected in each area of concern. Figure [#] shows the distribution of metals in soil at the site.

Concentrations of [metals] in soil located in [area of concern] exceed the cleanup goals summarized in Table [#].

1.2.2 Interim Actions

[Describe any interim actions that have been taken to address the impacted soils.]

1.2.3 Climatology

The site is located within the [#] year floodplain in a [climate type, e.g., semi arid] region.

1.2.4 Geology and Hydrogeology

Geotechnical borings have revealed fill materials underlain by [lithologies encountered, depth to bedrock]. [Describe geologic features relevant to excavation activities. Reference the boring logs and cross-sections in an appendix.]

Depth to groundwater ranges from [#] to [#] feet and generally flows toward the [direction] at a flow rate of about [#] feet per year.

1.2.5 Groundwater Quality

[Discuss any analytical data indicating groundwater impacts. Describe plume extent, if relevant.]

2.0 OBJECTIVES AND SCOPE

Instructions: Present the objectives, scope and goal of the plan. Identify the contaminants of concern, the cleanup goals, and until what point the excavation activities will be carried out (i.e., until either the limits of the contaminants of concern have been removed or until the analytical data demonstrates that the concentrations are below cleanup goals). Indicate whether the excavation will return the site to unrestricted land use.

The purpose of this plan is to present the design and implementation of excavation activities described in the approved [title of remedy decision document]. Soil containing metal constituents of concern greater than established cleanup goals (Table [#]) will be excavated to achieve [residential, industrial] standards and hauled off-site to an appropriate disposal facility. The excavation activities will address the areas depicted Figure [#]. The objective of the cleanup action is to achieve the cleanup goal for the site, which is a total theoretical excess cancer risk of less than 1 in [#] and a total theoretical noncancer hazard index equal to or less than 1.

3.0 PROJECT ORGANIZATION, SCHEDULE AND COST

Instructions: Identify the personnel in charge, their qualifications, the project schedule, and under what conditions changes would be made. Address the anticipated costs for implementation of the plan. Include a table of costs.

A qualified and experienced project team will execute the cleanup activities identified in this Plan. The following relationships will apply for this project:

Owner: [name];
Engineer/Contractor: [name], contracted with [name];
Earthwork Contractor: [name], contracted with [name];
Regulatory Agencies: [names], [indicate lead agency].

The following project team has been identified for the project:

Owner Project Manager: [name of individual]
Engineer/Contractor: [names of individuals, roles, credentials]
Earthwork Contractor: [company name]

3.1 RESPONSIBILITIES OF ENGINEER/CONTRACTOR

The Engineer/Contractor will provide overall project management and technical services on the project, including the following:

- [List the specific responsibilities.]

3.2 RESPONSIBILITIES OF EARTHWORK CONTRACTOR

The Earthwork Contractor will perform all earthwork activities, including

- [List the specific responsibilities.]

3.3 SCHEDULE

The proposed schedule for the cleanup action is presented in Figure [#].

3.4 COST

Table [#] summarizes the projected costs for the excavation, disposal, and restoration activities.

4.0 BASIS FOR TECHNICAL APPROACH

Instructions: Describe the basis for determining the excavation and off-site disposal as the alternative of choice. Summarize the findings of the cleanup alternative evaluation. Reference figures showing the location, approximate extent, and excavation depths of areas proposed for excavation.

The [title of remedy decision document] selected a cleanup alternative consisting of: (1) soil excavation until performance requirements (as determined by confirmation sampling) are satisfied; (2) stockpiling and profiling excavated soil; and (3) off-haul and off-site disposal. This Plan utilized the following data to develop the projected excavation extents and depths.

- Laboratory data for soil samples obtained during [investigation reference] [report citation].
- Investigation results reported in [report title] [report citation].
- [List all data sources used to develop the plan and provide references.]

These data were utilized in the design of soil excavation plans for [areas of concern]. Figure [#] presents the excavation layout, Figure [#] presents the Excavation Plan, and Table [#] summarizes the projected excavation depths. The Excavation Plan shown on Figure [#] was developed to meet the cleanup goals for the areas of concern identified in Section 1.2. The planned excavation extends up to [#] feet below ground surface. Approximately [#] cubic yards will be removed from [area of concern 1], approximately [#] cubic yards of soil will be removed from [area of concern 2], [insert more volumes and areas of concern as appropriate].

Figure [#] and Table [#] identify the initial excavation limits using the cleanup goals summarized in Table [#]. These limits were developed based on a comprehensive review of existing site data. After removal of soil from the initial excavation limits, the status of the excavation will be evaluated using confirmation samples. If the confirmation sampling results are higher than the cleanup goal(s), further excavation will occur until subsequent confirmation samples indicate that the cleanup goals have been achieved. The Soil Confirmation Sampling Plan (Appendix [#]) outlines the sampling protocol and procedures that will be used to process sample analytical results such that a decision and/or statistical assessment of the analytical results can be made to continue or terminate the excavation.

5.0 PRE-EXCAVATION ACTIVITIES

Instructions: Describe the project management and regulatory tasks that must be completed prior to field work.

5.1 PERMITS AND NOTIFICATIONS

All cleanup activities will be conducted in accordance with applicable local, state, and federal regulations. The following permits and notifications are necessary for implementation of this work:

- Notification to [entity names] for excavation activities.
- Notification to [entity names] utility clearance within excavation areas.
- Permits for excavation, shoring, and grading at [list areas of concern] will be obtained from [list agencies].
- An encroachment permit will be obtained from [list agencies] for work activities in [areas of concern].
- A [city name] water meter will be obtained by [entity] to supply water from the [city name] hydrant on [location] for dust control and other project needs.

- [Describe any other notifications or permits needed for the cleanup activities.]

5.2 UTILITIES

The locations of facilities on and adjacent to [areas of concern] are shown on Figure [#]. [Describe any key utilities in the vicinity of the site (e.g., gas lines, sewer laterals, water mains) and how these utilities will be addressed prior to and during construction activities.]

Prior to any excavation, [entity names] will be contacted in order to mark and verify the locations of public and private utilities that could be affected by the work. In the event that an active utility is damaged, the following procedures will occur:

- [List procedures, including names and contact information for persons to be notified, and timeframes for making each notification.]

5.3 SITE PREPARATION AND CONTROL MEASURES

[Describe the activities that will be performed to prepare the site for excavation (e.g., establish work areas, set up decontamination stations, set up survey control of areas to be excavated, set up air monitoring stations). Reference the figure showing the Work Area Plan].

Personnel exiting the work areas will decontaminate and remove personal protective equipment (PPE) at the personnel decontamination stations established adjacent to the work areas. Personnel will follow the decontamination procedures described in the approved Health and Safety Plan (Appendix [#]). Boot wash water will be transferred to on-site water storage tanks for testing and disposal. Used PPE will be discarded and placed in containers for disposal.

5.4 SITE SECURITY AND CONTROL

[Describe the activities that will be used to secure site security and control (e.g., set up temporary fencing, set up visual barriers, establish access and egress points).]

5.5 PUBLIC PARTICIPATION

[Describe the public participation activities to be conducted during the cleanup action and reference the Public Participation Plan.]

6.0 EXCAVATION ACTIVITIES

Instructions: Address the type of equipment being used, the progression of excavation activities, shoring/setbacks to prevent cave-ins. Provide a detailed description of the approach for clearing and debris removal, including the estimated volumes to be removed. Include a detailed description of the soil excavation, supported by the estimated excavation depths and soil volumes to be removed. Describe how and where soils will be temporarily stockpiled and staged. Describe the transportation and handling of contaminated soils.

Implementation of this plan generally consists of the following steps:

- Clear the site and remove debris;
- Excavate soil up to the initial excavation limits (Figure [#], Table [#]);
- Perform confirmation sampling in accordance with the Soil Confirmation Sampling Plan (Appendix [#]), determine whether cleanup goals have been satisfied, and if needed, conduct additional excavation followed by another round of confirmation sampling;
- Stage excavated soil, characterize each stockpile in accordance with the Stockpile Sampling Plan (Appendix [#]), and identify an appropriate off-site disposal facility;
- Load stockpiled soil into trucks for off-haul in accordance with the Transportation Plan (Appendix [#]);
- Transport for off-site disposal; and
- Backfilling, grading, and restoring the site.

6.1 EXCAVATION LIMITS

6.1.1 Site Clearing and Debris Removal

Prior to beginning soil excavation, the [areas of concern] will be cleared of obstructing features and vegetation. [Describe the site clearing and removal activities. Reference the Site Clearing and Removal Plan.]

6.1.2 Equipment

Implementation of this plan will require [list all earth moving equipment]. Operation of equipment will require trained construction workers.

6.1.3 Shoring and Setbacks

The excavation will be shored where the depth of excavation could endanger nearby structures or site personnel during construction. The excavation will be shored where [describe locations of shoring]. Shoring or other measures will be implemented as necessary within the excavation to ensure that the excavation meets OSHA safety standards for construction personnel. [Describe shoring and setback requirements.]

6.1.4 Excavation Procedures and Progression

Each area of concern will be excavated to the proposed excavation depth and extent identified in Table [#] and Figure [#]. Excavated areas will be widened or deepened if soil confirmation sampling data indicate that the excavation objective has not been achieved. Excavation will continue until [indicate criteria for terminating excavation].

Soil will be excavated with [equipment type] and moved to [location] with [equipment type] to established [management areas, loading zones]. The [management areas, loading zones] will shift as the work and excavation progresses as shown on Figure [#]. [Provide further details on the progression of the excavation procedures.] Temporary soil management areas may be located [location] for [period of time] as needed to perform the work. Soils will be managed for dust control as necessary based on air monitoring measurements and physical conditions. If wetting is insufficient for dust control, soil may be covered or removed.

Loaded trucks will move to the truck decontamination station where soil will be removed from fenders and tires and the bed will be covered. Each loaded truck will leave the site with a completed manifest or bill of lading for transport of soil or other material to the disposal location. Soil loading and off-haul routes are designated in the Transportation Plan (Appendix [#]).

Excavation and removal will be performed by a California-licensed hazardous substances removal contractor. Personnel on site will observe OSHA safety standards and follow the approved Health and Safety Plan (Appendix [#]), which addresses the safety of personnel entering excavations for the purposes of surveying and operating equipment.

6.1.5 Surveying Activities

The site will be surveyed multiple times during the removal action. All surveying activities will be performed under the direction of a California-licensed surveyor. [Describe the coordinate system to be used for the project.] Survey data will be recorded and documented in the Completion Report.

Surveying will include:

- Pre-excavation survey performed to document the site grade prior to excavation;

- Excavation limits (both pre- and post-excavation).
- Confirmation sample locations; and
- Post-excavation survey to document the final site grade.

6.2 DUST CONTROL

Dust control measures will be implemented during excavation and soil-moving activities as required by the Health and Safety Plan. Dust control measures will also be used to manage soil located in temporary storage areas or stockpile areas. [Describe dust control measures.]

6.3 AIR MONITORING

Air monitoring will be performed in accordance with the Air Monitoring Plan included in Appendix [#]. [Describe any perimeter air monitoring to be conducted.]

6.4. EROSION AND RUNOFF CONTROL

Erosion control measures will be implemented to control incidental run-off from the excavation areas. Erosion control measures will be in accordance with [insert standards to be used], and will include [describe erosion control measures to be implemented. Describe runoff control measures to be implemented.]

Excavation will be scheduled outside of the rainy season to the extent possible, and surface water run-off and erosion control measures should minimize the water entering the excavation. Based on the amounts of water expected in the excavation, [#] gallons of water storage capacity will be available to store water pumped from the excavation. Water stored in this tank will be sampled and analyzed prior to disposal at an appropriately permitted disposal facility.

6.5 CONFIRMATION SAMPLING

Soil confirmation samples will be collected to demonstrate that soil exceeding cleanup goals has been removed. Upon reaching the initial excavation limits (Figure [#], Table [#]), confirmation samples will be collected analyzed in accordance with the Soil Confirmation Sampling Plan (Appendix [#]). The results of the confirmation sampling will direct termination or continuation of the excavation. If additional excavation is conducted, it will be followed by additional round(s) of confirmation sampling. The Confirmation Sampling Plan provides guidance as to how confirmation sampling results will be interpreted to support a decision whether the excavation has met the performance standard or whether additional excavation is needed.

7.0 WASTE MANAGEMENT

Instructions: Address the waste management practices that will be followed for excavated soil and materials removed during clearing and debris removal.

Waste management will include management of materials generated from clearing and debris removal, and excavation of soil.

7.1 CLEARING AND DEBRIS REMOVAL.

[Describe how wastes generated during clearing and debris removal will be managed and disposed.]

7.2 SOIL MANAGEMENT, STOCKPILING AND PROFILING

Waste materials generated during soil excavation include soil, water used to decontaminate personnel and equipment, and [list other potential waste materials, e.g., surface water runoff].

[Indicate whether soil will be loaded directly from the excavation, in temporary soil management areas, or in temporary stockpiles. Indicate how temporary soil management areas and stockpiles will be managed (e.g., location, duration of staging materials, plastic liner, plastic cover, dust control).] Excavated soil will be stockpiled on-site in piles measuring approximately [#] cubic yards. The stockpiles will be located [location] and placed on top of a [liner type] to reduce contamination of underlying soil. The stockpiles will be covered with [cover type] to control dust and reduce infiltration of any rainwater. Stockpiles will be sequenced as presented in Figure [#]. After the stockpile is constructed, the sampling and analysis as presented in the Stockpile Sampling Plan (Appendix [#]) will be followed. The sampling and analysis of the stockpile samples is necessary to profile soil for off-site transportation and disposal. The Stockpile Sampling Plan provides guidance as to how sampling results will be interpreted to make a profile decision for stockpiled soil. Procedures for documenting this decision are outlined in the Stockpile Sampling Plan.

A tracking and record keeping system will be implemented to manage each stockpile generated from the excavation. The guidelines for tracking and recordkeeping are included in the Stockpile Sampling Plan. The information that will be recorded and tracked includes:

- Identification number that links the stockpile with the excavation source;
- Location of the stockpile within the site;
- Date(s) stockpile was generated and approximate volume;
- Sampling information, including number of samples collected, sample identifiers, date of sampling, and requested analyses; and
- Analytical data that characterizes the stockpile.

The recordkeeping system will track the stockpiled soil from the time of excavation until it is placed in a truck for off-haul.

Once the soil had been profiled, the soil will be acceptable for off-site disposal. Excavated soil will be loaded into [trucks, bins, rail cars] for off-haul and disposal. It is anticipated that the soil will be disposed off-site as [types of waste expected, e.g., RCRA-regulated, California hazardous waste.]

7.3 LOAD CHECKING

Prior to leaving the site, the origin (i.e., which stockpile, which portion of the excavation) will be documented as described in Section 7.2. A manifest or bill of lading will be prepared. The truck will be inspected to ensure that the load is properly covered and that the truck has been properly decontaminated.

7.4 TRANSPORTATION

Each loaded truck will leave the site with a completed manifest or bill of lading for transport of soil or other material to the disposal location. Soil loading and off-haul routes are designated in the Transportation Plan (Appendix [#]).

8.0 BACKFILL AND RESTORATION

Instructions: Describe the procedures for backfilling and restoring the site. Address how an appropriate borrow source will be identified and evaluated. Describe the backfill activities. Also address grading and drainage.

8.1 BORROW SOURCE EVALUATION

[Fill source] will be used to backfill the excavation. Sources of fill will be inspected and samples analyzed for the presence of chemicals before the fill is brought to the site. Sample collection and QA/QC procedures will be in accordance with [document title]. Potential fill material stockpiles will be sampled at the fill source at a frequency of one [type of sample, e.g., composite] sample per [#] cubic yards. [Describe the analyses to be conducted on the fill. Specify the values that will be used for comparison of chemical concentrations detected in the fill, e.g., site background concentrations.]

8.2 SITE RESTORATION ACTIVITIES

Backfilling operations will begin after confirmation sampling determines that cleanup goals have been achieved. Fill will be placed into the excavation in [#]-inch lifts and compacted to [indicate compaction standard to be achieved]. The surface of the fill will be graded in accordance with the Grading and Drainage Plan shown on Figure [#]. The ground surface will be graded to match existing grades at the edge of the excavation. [Indicate whether the ground surface will be modified after grading, e.g., hydroseeding.]

Following backfilling and grading, surface drainage from [location] will generally be towards [direction], as shown on Figure [#].

[Describe any other activities needed to restore the site.]

9.0 QUALITY CONTROL/ QUALITY ASSURANCE

Instructions: Address the QA/QC procedures that will be followed. Reference the QAPP.

9.1 FIELD OVERSIGHT AND REPORTING

Field oversight of the excavation, disposal, and restoration cleanup and associated activities is the responsibility of [entity name, e.g., Owner, Engineer/Contractor]. The [entity name, e.g., Owner, Engineer/Contractor] is responsible for ensuring appropriate documentation of field activities, preparing periodic reports of cleanup progress, notifying other project team members as issues arise, and preparing the Completion Report.

9.2 FIELD DOCUMENTATION

Field documentation of the cleanup activities will consist of:

- Daily field reports,
- Documentation associated with soil confirmation sampling (as outlined in the Soil Confirmation Sampling Plan);
- Documentation of profiling of soil stockpiles (as outlined in the Stockpile Sampling Plan and discussed in Section 7.2); and
- Copies of manifests or bill of lading for each off-haul.

9.3 CONFIRMATION SAMPLING

The Soil Confirmation Sampling Plan (Appendix [#]) outlines the data quality objectives and sampling design (i.e., sample locations, number of samples) for soil confirmation sampling. This plan addresses all aspects of sample collection and analysis, and includes a Quality Assurance Project Plan (QAPP) for the soil confirmation sampling effort. The plan also describes the recordkeeping requirements for confirmation sampling.

10.0 HEALTH AND SAFETY MONITORING

Cleanup activities include soil excavation and shoring, soil loading and off-hauling, backfilling and grading, and [list other activities]. The Health and Safety Plan (Appendix [#]) establishes site-specific health and safety procedures to be followed during the cleanup.

[Entity] will perform worker and perimeter/environmental air monitoring during the work activities most likely to generate higher concentrations of airborne dust and air emissions. The Air Monitoring Plan included in Appendix [#] presents the requirements and methods to collect air monitoring data during remediation activities. If specific action levels are exceeded, corrective action including worker upgrade to a higher PPE and/or stopping work and implementing control measures such as dust suppression will be undertaken.

11.0 COMPLETION REPORT

Instructions: Identify the key elements that will be covered in the Completion Report and the anticipated timeframe for submittal.

A Completion Report will be prepared at the conclusion of the excavation and restoration activities. The report will be submitted in accordance with the schedule shown in Figure [#]. The report will document the following: work performed; any difficulties encountered; confirmation sampling results and comparison to the performance standards; written and tabular summary of disposal activities (including volumes removed and excavation depths); and results of restoration activities. [If applicable, the completion report should also include a post cleanup evaluation.¹]

12.0 REFERENCES

Instructions: List all references cited in the plan.

¹ For further information regarding the post-cleanup evaluation, see Section 5.5 of the PT&R Guidance for Remediation of Metals in Soil.