



California Regional Water Quality Control Board

San Francisco Bay Region



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Date: **NOV 05 2004**
File No. 2199.9286 (AVC)

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**SUBJECT: Order Number R2-2004-0086, Site Cleanup Requirements for the Property
Located at the Former Oakland Army Base, Oakland, Alameda County**

Dear Mr. Clough and Ms. Heinze:

Please find enclosed a copy of the Order Number R2-2004-0086, Site Cleanup Requirements (SCR) for the former Oakland Army Base. This Order was considered during the October 20, 2004 San Francisco Bay Region, Regional Water Quality Control Board meeting.

Should you have any questions please contact me at (510) 622-2353.

Sincerely,

Adriana Constantinescu

Adriana Constantinescu
Project Manager for OARB

Enclosures: Order, Site Cleanup Requirements for the Former OARB

Preserving, enhancing, and restoring the Bay Region's waters for over 50 years

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Preserving, enhancing, and restoring the Bay Region's waters for over 50 years

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER No. R2-2004-0086

SITE CLEANUP REQUIREMENTS FOR:

CITY OF OAKLAND AND
PORT OF OAKLAND

for the property located at

FORMER OAKLAND ARMY BASE
OAKLAND, ALAMEDA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter the Water Board), finds that:

- 1. Purpose of Order:** This Order identifies all the parties associated with cleanup that have responsibility since the early transfer from the Army. This Order specifies what cleanup requirements for petroleum impacted soil and groundwater, primarily associated with former underground storage tank ("UST") and aboveground storage tank ("AST") locations and appurtenances, must be met, establishes time frames and initiates cost recovery for Water Board oversight. The Water Board did not have any orders on this site while under direct Army oversight through the Base Realignment and Closure Program. This Order is not intended to cover cleanup currently overseen by the Department of Toxic Substances Control (DTSC).
- 2. Site Location and Ownership:** The former Oakland Army Base (OARB) is located within the corporate limits of the City of Oakland, Alameda County, California (see Figure 1). As shown in Figure 2, the installation comprises approximately 426 acres of which 372 acres are dry land and approximately 56 acres of which are submerged. On August 8, 2003 the Army performed an early transfer of approximately 366 acres of land, including approximately 56 acres of offshore submerged land and excluding uplands and submerged lands of former Parcel 1, to the Oakland Base Reuse Authority (OBRA), a department of the City of Oakland, under the Economic Development Conveyance (EDC) provisions of the Base Realignment and Closure (BRAC) Act. On the same day, OBRA transferred 20 acres of upland and the submerged land to the Port of Oakland. The OARB land owned by OBRA and the Port of Oakland is known as the EDC property.

The OARB is located in a heavily industrialized area at the western edge of Oakland and the eastern terminus of the San Francisco-Oakland Bay Bridge. Land surrounding the OARB is zoned industrial by the City of Oakland. As shown in Figure 3, on the north, the OARB is bounded by the California Department of Transportation right-of-way for the Bay Bridge and the East Bay Municipal Utility District wastewater treatment plant. The Union Pacific railroad-switching yard is located in what is referred to as West Oakland and Port of Oakland facilities are located both south and west of the former base. The Oakland Outer Harbor is located just west of OARB.

As to major thoroughfares, the Interstate 880 approach to the San Francisco-Oakland Bay Bridge crosses the northern end of the base. Maritime Street crosses OARB from the northeast to the southwest.

3. **Site History:** Before 1916, the area which was to become the OARB, consisted of natural tidal marsh and shallow open water. Industrial operations in the subject area began as early as 1918. Filling of the Bay to expand the land area occurred in later years to create additional land for manufacturing buildings.

The War Department acquired the OARB and related property in 1941. The initial name for the site was "Port and General Depot." Official naming and commissioning of the site as the "Oakland Sub-Port of the San Francisco Port of Embarkation" followed in December 1941. The former installation, including piers, wharves, and warehouses, was given its more recent naming as the OARB in January 1944.

OARB was one of two bases (the other being Falls Church, Virginia) under the Military Traffic Management Command (MTMC) from 1965 until closure on September 30, 1999. MTMC's primary mission was to meet military transportation needs. Activities conducted by the Army to support the OARB's primary mission as a distribution center included maintaining and fueling railroad locomotive engines and trucks that transported cargo, draining fluids from vehicles for overseas shipment, and repairing and servicing vehicles, equipment, and base facilities.

4. **Named Dischargers:** The City of Oakland (City) is named as a discharger via OBRA because it now owns part of the EDC property. The Port of Oakland (Port) is named as a discharger because it now owns part of the EDC property.

The environmental remediation responsibility was transferred to the City pursuant to a September 30, 2002 Environmental Services Cooperative Agreement between the Army and the City. The environmental remediation responsibility is shared between OBRA and the Port pursuant to a July 8, 2003 Memorandum of Agreement (MOA). According to the OBRA/Port MOA, each party is responsible for remediating property they own.

If additional information is submitted indicating that other parties caused or permitted any waste to be discharged on the site where it entered or could have entered waters of the state, the Board will consider adding those parties' names to this order.

5. **Acquiring Parties Shall be Named to the Order as Appropriate:** In the event of future property transfers at OARB that contain pollution, the Executive Officer may amend this Order to name the new owners as appropriate.
6. **Regulatory Status:** This site is not currently under a Board Order.
7. **Site Hydrogeology:** Much of the area encompassing the OARB, including the area west of current Maritime Street, was natural tidal marsh before 1916. Filling occurred in later years to create additional land for constructing buildings that predate the OARB and then, later, for expansion of the base. The first fill layer extends to a depth of approximately 5 feet below ground surface (bgs) and consists of gravelly sand materials which were imported from quarries near Lake Temescal and Oak Knoll Naval Hospital. A second layer of fill consists of fine-grained sand that was hydraulically dredged from San Francisco Bay and extends between approximately 5 to 15 feet bgs. More stable sedimentary basin deposits underlie the recent fill, sand and mud.

Groundwater is generally encountered between 5 and 7 feet bgs in the fill layers, which comprise the shallow water-bearing zone at the OARB. Beginning at approximately 15 feet bgs, a sequence of clay on the order of 10 feet thick, referred to as Young Bay Mud, underlies the shallow water-bearing zone. The OARB lies in the East Bay Plain Groundwater basin.

The land surface at the OARB originally sloped to the west or northwest before filling took place and the original flow of groundwater probably followed these contours. Current groundwater flow is modified because of the presence of the seawalls which act, to a certain extent, as a hydrogeologic barrier constructed along portions of the Port of Oakland harbor facilities and other manmade features. As a result, groundwater data collected to date indicate that contaminated groundwater is primarily confined to the boundary of the OARB because the groundwater flow velocity is low compared with the rate of sorption and degradation mechanisms.

8. **Remedial Investigation:** The Army has been conducting comprehensive site environmental investigations since 1989. Identified chemical impacts resulted mostly from the use of petroleum products for activities that supported the OARB's primary military mission as a distribution center. In September 2002, DTSC issued and certified a Remedial Action Plan/Risk Management Plan (RAP/RMP) for the OARB. The RAP/RMP identifies seven RAP sites for remediation within five years following transfer, and numerous RMP locations to be investigated and remediated during

redevelopment. DTSC's jurisdiction is remediation of hazardous substances excluding petroleum releases. Consequently, for this project, the Water Board's role and the subject of this Order are to investigate and close petroleum releases from USTs, ASTs, and other significant petroleum impacted locations.

Underground Storage Tanks

RMP Locations: Petroleum fuels and related constituents in soil are the known or suspected constituents of concern (COCs) at the majority of RMP locations where tanks have been removed. Prior to the early transfer, the Army worked with the City of Oakland Fire Department and the Water Board to close numerous UST and AST sites, and monitored groundwater at seven UST locations. However, in preparation for the early transfer, research by OBRA and the Port revealed additional petroleum impacted locations, primarily suspected or former USTs. Newly discovered or suspected petroleum tank locations and associated releases require follow-up oversight and closure by the Water Board. OBRA prepared a groundwater monitoring plan to continue the Army's monitoring at locations not ready for closure, and to initiate monitoring at additional suspected UST locations.

RAP Sites: One of the RAP sites, USTs 11/12/13, is a petroleum only release site and will be remediated with oversight by the Water Board. Former USTs 11/12/13 (and 11A/12A/13A) were located west of Building 828 (see Figure 2). USTs 11/12/13 were 5,000-gallon tanks that were installed in 1969 and were used for storing and supplying gasoline to the OARB Service Station. In 1990, they were removed and replaced by USTs 11A/12A/13A approximately 20 feet north of the former excavation pit. The replacement USTs were 6,000-gallon double-walled fiberglass tanks containing unleaded gasoline. USTs 11A/12A/13A were removed by the Army in October 1999. Field investigations performed at those USTs show that contamination in the shallow groundwater consists of total petroleum hydrocarbons as gasoline (TPH-g), and benzene above risk-based remediation goals, and methyl tert-butyl ether (MtBE).

Soils: The most significant subsurface contamination is due to operation of a Waste Oil Reclamation Plant (WORP) in the area near former Building 1 (see Figure 2). Tarry residue from the operations at the WORP was generated between 1920s and 1930s. Laboratory analysis of the tarry residue has confirmed its acidic nature. Lead within this tarry residue had been measured at a concentration as high as 11,800 mg/kg. The tarry residue also contains polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), polychlorinated dibenzodioxins (PCDDs), and polychlorinated dibenzofurans (PCDFs) at concentrations of concern.

Groundwater: The most significant groundwater contamination is at RAP sites and consists of volatile organic compounds (VOCs) in the shallow water-bearing zone at the

eastern end of Building 807 (see Figure 2). The VOCs are believed to have been released as a result of the Army's past practice of allowing drums of solvents, paint, or other chemicals that were damaged during shipping to drain along the railroad tracks. The VOCs in groundwater in this area consist primarily of vinyl chloride, cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), trichloroethene (TCE), and 1,1,2,2-tetrachloroethane. Maximum VOC concentrations detected in shallow groundwater in the area of Building 807 are vinyl chloride at 442 µg/L, cis-1,2-DCE at 2,020 µg/L, trans-1,2-DCE at 300 µg/L, TCE at 363 µg/L, and 1,1,2,2-tetrachloroethane at 200 µg/L.

Vinyl chloride and lesser concentrations of other VOCs above the risk-based remediation goals are also present in shallow groundwater in area north of Building 808 and south of Building 823 (see Figure 2). The VOCs are believed to have been released as a result of the Army's past practice of allowing drums of solvents, paint, or other chemicals that were damaged during shipping to drain along the railroad tracks in the area of the Knight Railyard. Vinyl chloride and cis-1,2-DCE have been detected in the shallow water-bearing zone near Building 99 (see Figure 2). The maximum concentrations were 29 µg/L and 41 µg/L, respectively. Possible sources include Building 99 and storm drains and sanitary sewers.

VOCs in shallow groundwater near these RAP sites appear to be steady state and are not migrating beyond the defined plume areas. OBRA's schedule for the remediation of these RAP sites is provided in the DTSC-approved remediation schedule.

9. **Adjacent Sites:** Figure 3 depicts OARB and surrounding land use. On the north, the OARB is bordered by I-80. The area just southwest of the Maritime Area consists of tidelands owned by the General Services Administration. At its northeast corner, the OARB is bordered by EBMUD's Main Wastewater Treatment Plant, which provides primary and secondary treatment to seven East Bay communities. A small parcel lying between OARB and the sewage treatment plant is a US Army Reserve Training Center (not part of OARB). Along its eastern edge, the OARB is bordered by the Union Pacific Railroad's Desert Railyard, which extends from 7th Street north to Emeryville.

The land west of Maritime Street and south of the OARB is owned by the Port. The Port lands in this area are a part of the Outer Harbor, and are occupied by the Port's Container Terminals. These terminals consist of deep-water berths, landside-loading facilities, and large paved lots for container storage.

The lands south of OARB were part of the former Navy's Fleet and Industrial Supply Center, Oakland (FISCO), a 528-acre facility that, until its closure, was a major Naval supply depot. This property has been transferred to the Port and is being converted to a combination of modern marine terminal facilities and public access areas.

10. Environmental Risk Assessment:

To attain the National Contingency Plan (NCP) goals of implementing remedial actions that protect human health and the environment, maintain protection over time, and minimize untreated waste, the remedial action objectives (RAOs) for soil and groundwater associated with the former OARB were established in the RAP/RMP and include, in part, the following:

- Establish media-specific individual remediation goals that correspond to a Hazard Index (HI) of 1 or less for each non-carcinogenic chemical of concern (COC) identified.
- Establish media-specific individual remediation goals that correspond to a 10^{-6} incremental lifetime cancer risk for each potential carcinogenic COC identified at the OARB.
- Remove, or remove and treat, source material (i.e., principal treat waste) that poses significant human health or environmental threats or is prone to continued leaching of COCs to groundwater.

Based on the redevelopment strategy for the OARB presented in the Amended Reuse Plan, the primary, on-site future populations or human receptors that may be potentially exposed to COCs in soil or groundwater consist of the following:

During Redevelopment: Construction workers that will conduct on-site earthwork activities as part of redevelopment.

After Redevelopment: (a) Tenants that will occupy commercial space upon redevelopment (indoor commercial workers). (b) Tenants that will work outdoors and perform industrial activities such as loading, unloading, and transporting of cargo containers (outdoor industrial workers). (c) Groundskeepers, utility maintenance workers, and other personnel that will maintain the new improvements at the OARB (maintenance personnel).

All potentially exposed personnel will follow the risk management protocols that will include the worker protective measures in accordance with the RMP protocols.

For petroleum hydrocarbons in soil and groundwater, site cleanup levels were taken from those presented in the Army's Fuel Storage Tank Sites Cleanup Levels (IT,2000). Further, the lowest risk-based remediation goal for each COC was compared with the Water Board's Soil and Leaching Screening Levels (2001) intended to protect groundwater that is not a potential drinking water supply. The Water Board Soil Leaching Screening Levels were adopted as the OARB soil cleanup levels if they

were less, i.e., more stringent, than the calculated human health risk-based remediation goal. Remediation goals established in the RAP/RMP based upon the Soil Leaching Screening Levels may be amended by additional site-specific evaluation if the need arises in the future. Amendment of remediation goals will be conducted only with DTSC or Water Board consent.

11. **Remedial Measures:** Remedial activities by the Army at OARB primarily included removal of USTs and ASTs, and excavation of contaminated soil.
12. **Closure Plan:** Petroleum impacted soils and groundwater primarily associated with UST and AST locations not already closed by the Army and the Water Board can be divided into four groups:
 - a. Former and suspected UST locations where sufficient data exists for Water Board closure.
 - b. Suspected former UST locations where groundwater monitoring is required to verify the Army's grab groundwater monitoring results.
 - c. RAP site 11/12/13.
 - d. UST, AST, and appurtenance locations discovered during redevelopment, which will be inspected for undiscovered contamination in accordance with the soil and groundwater management protocols in the RMP. Newly discovered petroleum tank locations and associated releases will require follow-up oversight and closure by Water Board.

13. **Basis for Cleanup Standards**

- a. **General:** State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality for chemicals of concern (COCs), or the highest level of water quality which is reasonable if background levels of water quality for COCs cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives. The previously-cited remedial action plan confirms the Water Board's initial conclusion that background levels of water quality cannot be restored. This Order and its requirements are consistent with Resolution No. 68-16.

State Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304," applies to this discharge. This Order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

- b. Beneficial Uses:** The Water Board, on June 21, 1995, adopted, in accordance with Section 13240 et seq. of the CWC, a revised Water Quality Control Plan, San Francisco Bay Basin (Basin Plan). This updated and revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law on July 20, 1995, and November 13, 1995, respectively. A summary of revisions to regulatory provisions is contained in 23 CCR § 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters. This Order is in compliance with the Basin Plan.

State Board Resolution No. 89-39. "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the Region, with limited exceptions for areas of high TDS, low yield, or naturally-high contaminant levels.

The Basin Plan designates the following existing beneficial uses of groundwater underlying and adjacent to the site:

- o Municipal and domestic water supply;
- o Industrial process water supply;
- o Industrial service water supply;
- o Agricultural water supply; and
- o Freshwater replenishment to surface water.

The existing and potential beneficial uses of Lower San Francisco Bay include:

- o Ocean, commercial, sport fishing
- o Estuarine habitat
- o Industrial service water supply
- o Fish migration
- o Navigation
- o Preservation of Rare and Endangered Species
- o Water contact recreation
- o Noncontact water recreation
- o Shellfish harvesting
- o Wildlife habitat.

- c. Basis for Groundwater Cleanup Standards:** The cleanup strategy for petroleum-contaminated sites at the OARB is based on site-specific groundwater quality objectives, the protection of human health and the environment, and risk management. The cleanup strategy also considers long-term projected land usage and cost-effectiveness of the overall corrective action process as described in the RAP/RMP. The groundwater cleanup standards for the site from the RAP/RMP are shown in section B.2 below.

- d. **Basis for Soil Cleanup Standards:** The soil cleanup standards for the site from the RAP/RMP are shown in Table 7-11 attached to this Order. Cleanup to this level is intended to prevent leaching of contaminants to groundwater and will result in acceptable residual risk to humans.
14. **Future Changes to Cleanup Standards:** The goal of this remedial action is to restore the beneficial uses of groundwater underlying and adjacent to the site. Results from other sites suggest that full restoration of beneficial uses to groundwater as a result of active remediation at this site may not be possible. If full restoration of beneficial uses is not technologically nor economically achievable within a reasonable period of time, then the discharger may request modification to the cleanup standards or establishment of a containment zone, a limited groundwater pollution zone where water quality objectives are exceeded. Conversely, if new technical information indicates that cleanup standards can be surpassed, the Water Board may decide that further cleanup actions should be taken.
15. **Reuse or Disposal of Extracted Groundwater:** Water Board Resolution No. 88-160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if it has been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible.
16. **Basis for 13304 Order:** California Water Code Section 13304 authorizes the Water Board to issue orders requiring a discharger to cleanup and abate waste where the discharger has caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance.
17. **Cost Recovery:** Pursuant to California Water Code Section 13304, the dischargers are hereby notified that the Water Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Water Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this order.
18. **CEQA:** This action is an order to enforce the laws and regulations administered by the Water Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321 of the Resources Agency Guidelines.
19. **Notification:** The Water Board has notified the discharger and all interested agencies and persons of its intent under California Water Code Section 13304 to prescribe site cleanup

requirements for the discharge, and has provided them with an opportunity to submit their written comments.

20. **Public Hearing:** The Water Board, at a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the dischargers (or their agents, successors, or assigns) shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous substances in a manner which will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.
2. Further significant migration of wastes or hazardous substances through subsurface transport to waters of the State is prohibited.
3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of wastes or hazardous substances are prohibited.

B. REMEDIAL ACTION PLAN AND CLEANUP STANDARDS

1. **Implement Remedial Action Plan:** The dischargers shall implement the final Remedial Action Plan (RAP) issued and approved on September 27, 2002. The RAP identifies and evaluates the potential remedial alternatives for sites of environmental concern at the OARB and establishes the remedies to be implemented.
2. **Groundwater Cleanup Standards:** The groundwater cleanup levels presented in Table 7-11 of the RAP, attached to this Order, shall be met in all wells identified in the RAP or future groundwater monitoring wells.
3. **Soil Cleanup Standards:** The soil cleanup levels presented in Table 7-11 of the RAP, attached to this Order, shall be met in all on-site vadose-zone soils.

C. TASKS

1. PRE-DEVELOPMENT CLOSURE OF FORMER UST SITES

COMPLIANCE DATE: February 1, 2005

OBRA shall submit a technical report containing a Case Closure Summary Document acceptable to the Water Board's Executive Officer summarizing existing information in order to obtain closure of eleven former UST sites (D,F and K monitored routinely by the Army, and suspected UST locations 651,671,672,677,679, 681,742 and 743 sampled by the Army during the transfer process). The Port shall submit a technical report containing a Case Closure Summary Document acceptable to the Executive Officer summarizing existing information in order to obtain closure of two former UST sites (B/C and Q monitored routinely by the Army). The Water Board will consider providing closure at these locations, and any locations requested for closure by the Army prior to the early transfer, but not yet closed by the Water Board.

2. GROUNDWATER MONITORING AT SUSPECTED FORMER UST SITES

COMPLIANCE DATE: May 2, 2005

OBRA shall submit a technical report acceptable to the Executive Officer documenting completion of well construction and dry season and wet season sampling results at five former suspected UST sites (673,678,682,686, and 688).

3. IMPLEMENTATION OF FINAL SOIL AND GROUNDWATER CLEAN-UP NEAR FORMER USTs 11A/12A/13A

COMPLIANCE DATE: November 6, 2006

OBRA shall submit a technical report acceptable to the Executive Officer documenting the remediation of contaminated source soils at former USTs 11A/12A/13A. Benzene and Methyl Tertiary Butyl Ether (MTBE) impacted soil that may act as source of petroleum hydrocarbons and fuel constituents to groundwater may be addressed by excavating contaminated soil in the vicinity of the former location of the tanks. It is assumed that approximately 110 cubic yards of contaminated soil will be excavated and disposed as non-Resource Conservation and Recovery Act (RCRA) hazardous waste at an off-site permitted facility. Benzene and MTBE above groundwater cleanup standards remaining in

the shallow groundwater may be treated by in-situ bioremediation using Oxygen Release Compound or an equivalent process.

4. INVESTIGATION AND CLOSURE OF PETROLEUM IMPACTED SITES DURING REDEVELOPMENT

COMPLIANCE DATE: December 31, 2013

OBRA and the Port shall submit a technical report containing a Case Closure Summary Document acceptable to the Executive Officer documenting the results of investigations and if applicable, remediation at petroleum impacted sites during redevelopment of their respective property. For example, the Port (which will eventually become the property owner) will investigate and request closure of suspected USTs at the following nine locations: 652, 660, 684, G, H, I, J, L and 732.

5. PROPOSED CURTAILMENT OR CLOSURE

COMPLIANCE DATE: 60 days prior to proposed curtailment or closure

OBRA and the Port shall submit a technical report acceptable to the Executive Officer containing a proposal to curtail remediation or obtain Water Board closure for remaining petroleum impacted sites. Curtailment includes system closure (e.g., well abandonment), system suspension (e.g., cease extraction but wells retained), and significant system modification (e.g., major reduction in extraction rates, closure of individual extraction wells within extraction network). The report should include the rationale for curtailment or closure. Proposals for final closure should demonstrate that cleanup standards have been met, contaminant concentrations are stable, and contaminant migration potential is minimal.

6. IMPLEMENTATION OF CURTAILMENT OR CLOSURE

COMPLIANCE DATE: 60 days after Executive Officer approval

OBRA and the Port shall submit a technical report acceptable to the Executive Officer documenting completion of the tasks identified in Task 5.

7. EVALUATION OF NEW HEALTH CRITERIA

COMPLIANCE DATE: 90 days after requested by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating the effect on the approved remedial action plan of revising one or more cleanup standards in response to revision of drinking water standards, maximum contaminant levels, or other health-based criteria.

8. EVALUATION OF NEW TECHNICAL INFORMATION

COMPLIANCE DATE: 90 days after requested by Executive Officer

Submit a technical report acceptable to the Executive Officer evaluating new technical information which bears upon the approved remedial action plan and cleanup standards for this site. In the case of a new cleanup technology, the report should evaluate the technology using the same criteria used in the RAP/RMP. Such technical reports shall not be requested unless the Executive Officer determines that the new information is reasonably likely to warrant a revision in the approved remedial action plan or cleanup standards.

- 9. Delayed Compliance:** If the dischargers are delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the dischargers shall promptly notify the Executive Officer, and the Water Board may consider revision to this Order.

D. PROVISIONS

- 1. No Nuisance:** The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in California Water Code Section 13050(m).
- 2. Good O&M:** The dischargers shall maintain in good working order and operate as efficiently as possible any facility or control system installed to achieve compliance with the requirements of this Order.
- 3. Cost Recovery:** The dischargers shall be liable, pursuant to California Water Code Section 13304, to the Water Board for all reasonable costs actually incurred by the Water Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the dischargers over reimbursement amounts or methods used

in that program shall be consistent with the dispute resolution procedures for that program.

4. **Access to Site and Records:** In accordance with California Water Code Section 13267(c), the dischargers shall permit the Water Board or its authorized representative:
 - a. Entry upon premises in which any pollution source exists, or may potentially exist, or in which any required records are kept, which are relevant to this Order.
 - b. Access to copy any records required to be kept under the requirements of this Order.
 - c. Inspection of any monitoring or remediation facilities installed in response to this Order.
 - d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the dischargers.
5. **Self-Monitoring Program:** The dischargers shall comply with the Self-Monitoring Program as presented in the RAP and as may be amended by the Executive Officer.
6. **Contractor / Consultant Qualifications:** All technical documents shall be signed by and stamped with the seal of a California registered geologist, a California certified engineering geologist, or a California registered civil engineer.
7. **Lab Qualifications:** All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Water Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control (QA/QC) records for Water Board review. This provision does not apply to analyses that can only reasonably be performed on-site (e.g., temperature).
8. **Document Distribution:** Copies of all correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:
 - a. City of Oakland (OBRA)
 - b. Port of Oakland

- c. Cal-EPA: Department of Toxics Substances Control, Berkeley, CA
- d. U.S. Environmental Protection Agency, Region 9, San Francisco

The Executive Officer may modify this distribution list as needed.

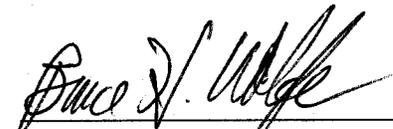
- 9. **Reporting of Changed Owner or Operator:** The dischargers shall file a technical report on any changes in site occupancy or ownership associated with the property described in this Order.
- 10. **Reporting of Hazardous Substance Release:** If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the dischargers shall report such discharge to the Water Board by calling (510) 622-2300 during regular office hours (Monday through Friday, 8:00 to 5:00).

A written report shall be filed with the Water Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified.

This reporting is in addition to any reporting to the Office of Emergency Services required pursuant to the Health and Safety Code.

- 11. **Periodic Order Review:** The Water Board will review this Order periodically and may revise it when necessary.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on October 20, 2004.



Bruce H. Wolfe
Executive Officer

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FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

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Attachments: Figure 1: Site Location Plan

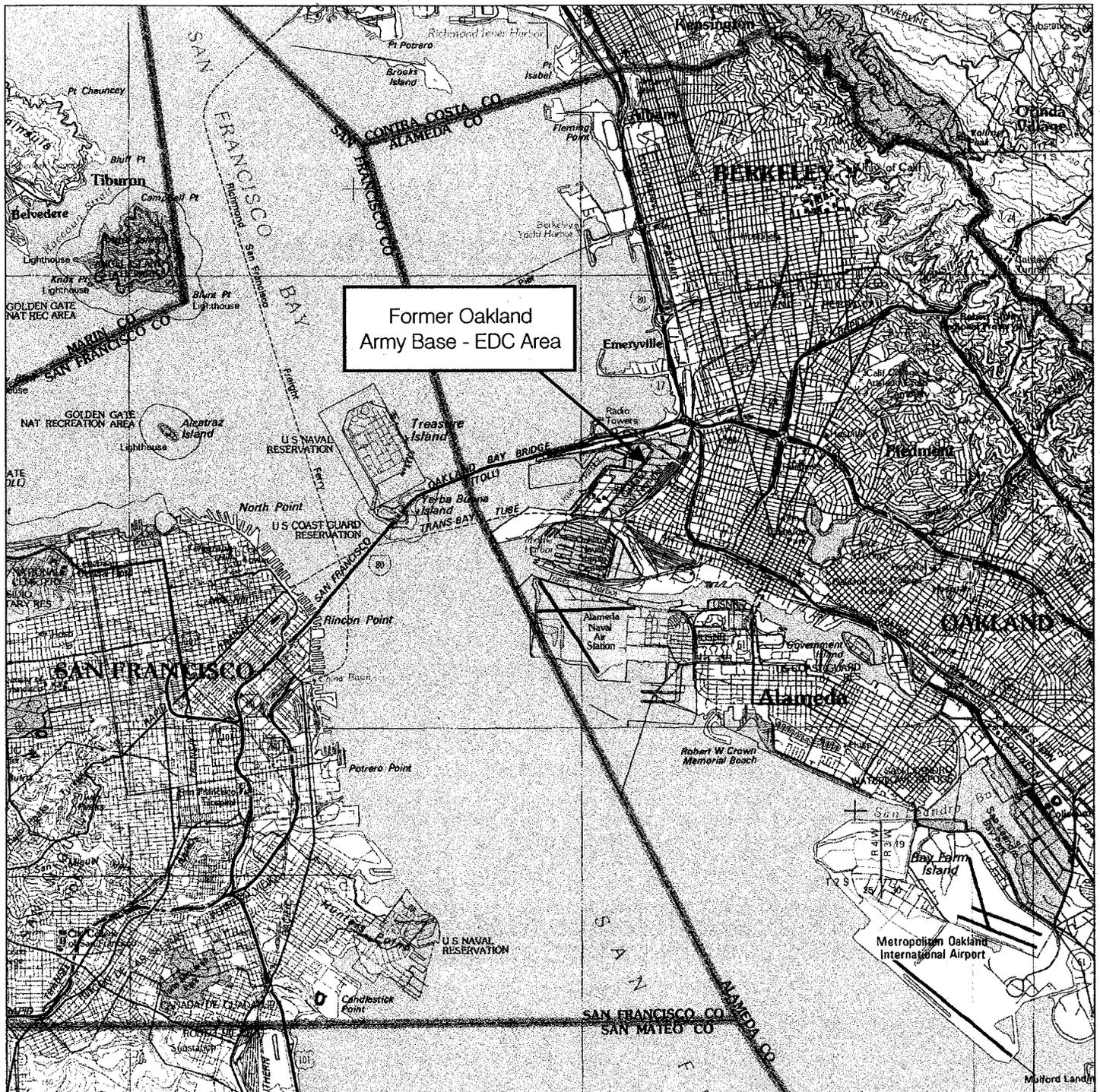
Figure 2: Site Plan

Figure 3: Adjacent Land Uses

RAP Table 7-11: Remediation Goals for Chemicals of Concern in Soil and
Groundwater

FIGURE 1

OAKLAND ARMY BASE LOCATION MAP



Reference: U.S.G.S. 1:100,000 Series Topographic Map, San Francisco Quadrangle, California, 1978.

Notes:

1. All locations are approximate.

Legend:

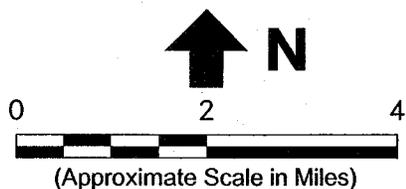
- State Highway
- Interstate Highway

Abbreviation:

EDC = Economic Development Center

Erler & Kalinowski, Inc.

Site Location Map



Former Oakland Army Base - EDC Area
Oakland, CA

July 2004
EKI A10063.00

Figure 1

FIGURE 2

OAKLAND ARMY BASE SITE MAP

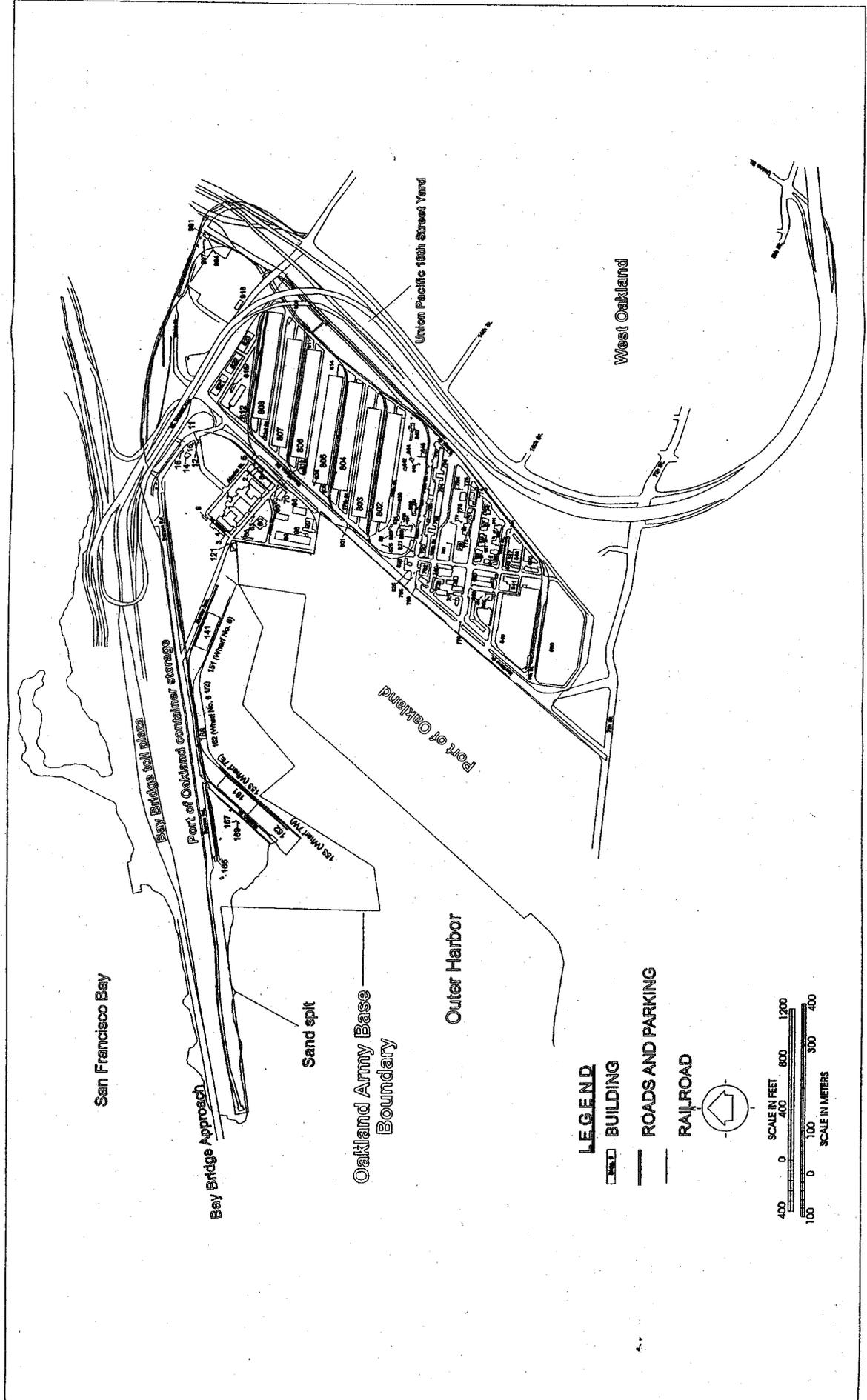


Figure 2
Oakland Army Base Site Map

FIGURE 3

EXISTING OFF-BASE LAND USES

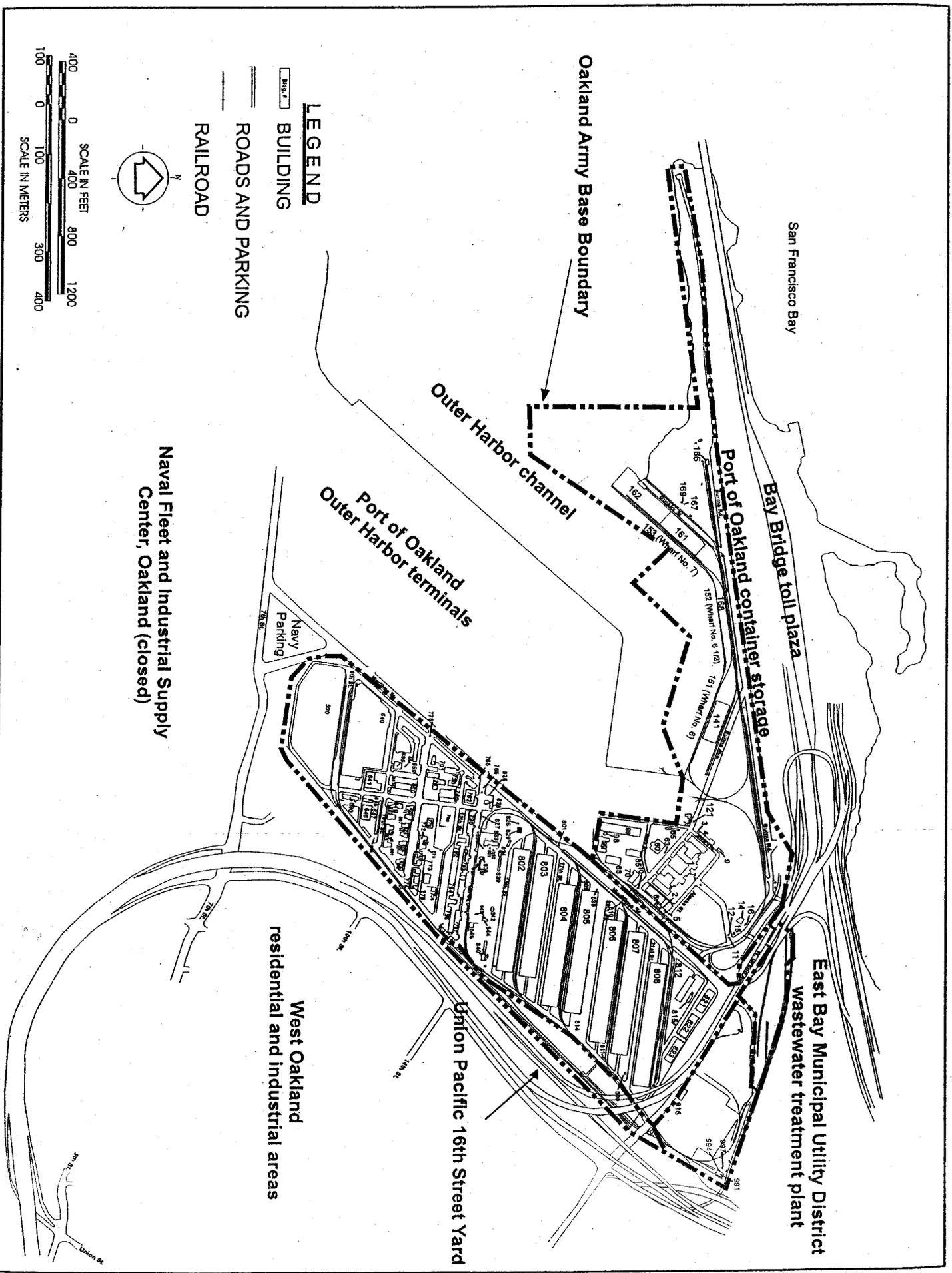


Figure 3
Existing Off-Base Land Uses

TABLE 7-11
REMEDIATION GOALS FOR CHEMICALS OF CONCERN
IN SOIL AND GROUNDWATER

TABLE 7-11
REMEDIATION GOALS FOR CHEMICALS OF CONCERN
IN SOIL AND GROUNDWATER
Oakland Army Base, Oakland, California

Chemical of Concern	Soil Remediation Goal at HI=1 or Risk = 10 ⁻⁶ (mg/kg)	Population or Pathway Governing Soil Remediation Goal (see Table 7-10)	Groundwater Remediation Goal at HI=1 or Risk = 10 ⁻⁶ (µg/L)
Metals			
Antimony	280	Construction Worker	(a)
Arsenic	20	Construction Worker	(a)
Barium	43,000	Construction Worker	(a)
Beryllium	1,300	Construction Worker	(a)
Cadmium	150	Construction Worker	(a)
Chromium (III)	MAX(100,000); (f)	--	(a)
Chromium (VI)	86	Construction Worker	(a)
Chromium, Total	600 (e)	Construction Worker	(a)
Cobalt	42,000	Construction Worker	(a)
Copper	26,000	Construction Worker	(a)
Lead	750 (h)	See Note (h)	(a)
Manganese	25,000	Construction Worker	(a)
Mercury	60	Construction Worker	(a)
Molybdenum	3,500	Construction Worker	(a)
Nickel	14,000	Construction Worker	(a)
Selenium	3,500	Construction Worker	(a)
Silver	3,500	Construction Worker	(a)
Thallium	49	Construction Worker	(a)
Vanadium	4,900	Construction Worker	(a)
Zinc	MAX(100,000)	--	(a)
Volatile Organic Compounds			
1,1,2,2-tetrachloroethane	3.8	Leaching to Groundwater (b)	1,900
1,1,2-trichloroethane	2.7	Indoor Worker	2,800
1,1-dichloroethane	2.1	Leaching to Groundwater (b)	6,700
1,1-dichloroethene	1.7	Leaching to Groundwater (b)	33,000
1,2,3-trichloropropane	0.2	Indoor Worker	100
1,2,4-trimethylbenzene	170	Construction Worker	18,000
1,2-dichloroethane	0.8	Indoor Worker	1,900
1,2-dichloropropane	0.1	Indoor Worker	110
1,3,5-trimethylbenzene	87	Construction Worker	25,000
Acetone	0.5	Leaching to Groundwater (b)	86,000,000
Benzene	0.3	Indoor Worker	420
Bromodichloromethane	0.7	Indoor Worker	850
Carbon disulfide	950	Indoor Worker	230,000
Carbon tetrachloride	0.1	Indoor Worker	72
Chloroform	0.9	Leaching to Groundwater (b)	2,500

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Volatile Organic Compounds			
Dibromochloromethane	2.0	Leaching to Groundwater (b)	2,100
cis-1,2-dichloroethene	18	Leaching to Groundwater (b)	180,000
trans-1,2-dichloroethene	38	Leaching to Groundwater (b)	190,000
Ethylbenzene	24	Leaching to Groundwater (b)	4,200,000
Isopropylbenzene (Cumene)	SAT(3,800); (g)	--	1,800,000
Methyl ethyl ketone	13	Leaching to Groundwater (b)	160,000,000
Methyl isobutyl ketone	4	Leaching to Groundwater (b)	5,300,000
Methyl tertiary butyl ether	1	Leaching to Groundwater (b)	120,000
Methylene chloride	4.8	Leaching to Groundwater (b)	19,000
n-butylbenzene	550	Construction Worker	95,000
n-propylbenzene	350	Construction Worker	100,000
p-cymene (p-isopropyltoluene)	SAT(3,700)	--	1,000,000
sec-butylbenzene	200	Leaching to Groundwater (b)	77,000
tert-butylbenzene	290	Construction Worker	75,000
Tetrachloroethene	2.8	Leaching to Groundwater (b)	960
Toluene	8.4	Leaching to Groundwater (b)	1,600,000
Trichloroethene	2.5	Indoor Worker	2,800
Trichlorofluoromethane	3,600	Indoor Worker	2,800,000
Vinyl chloride	0.05	Indoor Worker	32
Xylenes, Total	1	Indoor Worker	28,000,000
Semi-volatile Organic Compounds			
Acenaphthene	16	Leaching to Groundwater (b)	25,000,000
Acenaphthylene	120	Leaching to Groundwater (b)	(a)
Anthracene	2.9	Leaching to Groundwater (b)	330,000,000
Benzidine	0.02	Construction Worker	(a)
Benzo(a)anthracene	7.6	Construction Worker	(a)
Benzo(a)pyrene	0.8	Construction Worker	(a)
Benzo(b)fluoranthene	7.6	Construction Worker	(a)
Benzo(b,k)fluoranthene	7.6	Construction Worker	(a)
Benzo(g,h,i)perylene	5.3	Leaching to Groundwater (b)	(a)
Benzo(k)fluoranthene	7.6	Construction Worker	(a)
Bis(2-ethylhexyl)phthalate	SAT(100)	--	(a)
Chrysene	4.7	Leaching to Groundwater (b)	(a)
Dibenz(a,h)anthracene	2.2	Construction Worker	(a)
Fluoranthene	60	Leaching to Groundwater (b)	(a)
Fluorene	5.1	Leaching to Groundwater (b)	38,000,000

TABLE 7-11
REMEDIATION GOALS FOR CHEMICALS OF CONCERN
IN SOIL AND GROUNDWATER
Oakland Army Base, Oakland, California

Chemical of Concern	Soil Remediation Goal at HI=1 or Risk = 10 ⁻⁶ (mg/kg)	Population or Pathway Governing Soil Remediation Goal (see Table 7-10)	Groundwater Remediation Goal at HI=1 or Risk = 10 ⁻⁶ (µg/L)
Semi-volatile Organic Compounds			
Hexachlorobutadiene	46	Leaching to Groundwater (b)	(a)
Indeno(1,2,3-c,d)pyrene	7.6	Construction Worker	(a)
Naphthalene	4.9	Leaching to Groundwater (b)	100,000
Phenanthrene	11	Leaching to Groundwater (b)	520,000,000
Pyrene	55	Leaching to Groundwater (b)	200,000,000
Total Petroleum Hydrocarbons			
TPH Diesel	8,000 (c)	See Note (c)	9,600 (c)
TPH Gasoline	2,400 (c)	See Note (c)	7,280 (c)
TPH Motor Oil	58,000 (c)	See Note (c)	(a)
TPH Recoverable	(d)	--	(a)
PCBs, Pesticides, and Herbicides			
Aldrin	1.2	Construction Worker	(a)
Alpha BHC	7.1	Construction Worker	(a)
Alpha endosulfan (Endosulfan I)	1,300	Construction Worker	(a)
Alpha chlordane	16	Construction Worker	(a)
Gamma chlordane	16	Construction Worker	(a)
Dieldrin	0.002	Leaching to Groundwater (b)	(a)
Endosulfan sulfate	1,500	Construction Worker	(a)
Endrin	0.001	Leaching to Groundwater (b)	(a)
Endrin aldehyde	91	Construction Worker	(a)
Endrin ketone	91	Construction Worker	(a)
Gamma BHC (Lindane)	17	Construction Worker	(a)
Heptachlor	0.013	Leaching to Groundwater (b)	(a)
Heptachlor epoxide	0.014	Leaching to Groundwater (b)	(a)
4,4'-DDD	89	Construction Worker	(a)
4,4'-DDE	54	Construction Worker	(a)
4,4'-DDT	4.3	Leaching to Groundwater (b)	(a)
Pentachlorophenol	42	Leaching to Groundwater (b)	(a)
Toxaphene	1.4	Construction Worker	(a)
PCB-1248 (Aroclor 1248)	1.8	Construction Worker	(a)
PCB-1260 (Aroclor 1260)	1.8	Construction Worker	(a)
Dioxin-like Compounds			
2,3,7,8-tetrachlorodibenzo-p-dioxin	0.0001	Construction Worker	(a)

TABLE 7-11
REMEDIATION GOALS FOR CHEMICALS OF CONCERN
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Oakland Army Base, Oakland, California

Notes:

- (a) Vapor intrusion is the only potentially complete exposure pathway for COCs in groundwater. Consequently, as described in Table 7-9, risk-based remediation goals for non-volatile compounds in groundwater were not calculated. However, the narrative goal is to prevent further significant increases of metals and other non-volatile COC concentrations in groundwater.
- (b) A more detailed evaluation should be considered if remediation goals based on leaching to groundwater govern the need for future remediation at RAP sites or RMP locations.
- (c) The Army's Fuel Storage Tank Sites Cleanup Levels (IT, 2000n) have been adopted as the site-specific remediation goals for petroleum hydrocarbons in soil and groundwater at the OARB.
- (d) No site-specific goal established for "TPH recoverable," which is general considered to be weathered, high molecular weight residual TPH. TPH recoverable is normally managed to control nuisance conditions (e.g., odor or deficiency of impacted soil for structural purposes).
- (e) The remediation goal for total chromium was calculated from the chromium (III) and chromium (IV) remediation goal assuming a 1:6 ratio of chromium(VI) to chromium(III), consistent with U.S. EPA Region IX Preliminary Remediation Goals (U.S. EPA, 2000).
- (f) Prefix "MAX" denotes that the calculated risk-based concentration is 100,000 mg/kg or greater. A non-risk based "ceiling limit" concentration for metals and certain SVOCs that are solids at ambient temperatures is given as 100,000 mg/kg, consistent with U.S. EPA Region IX Preliminary Remediation Goals (U.S. EPA, 2000).
- (g) Prefix "SAT" denotes risk-based value exceeds calculated soil saturation concentration, thus, the estimated saturation value is listed inside the parenthesis.
- (h) The U.S. EPA Region IX Preliminary Remediation Goal (U.S. EPA, 2000) has been adopted as the site-specific remediation goal for lead in soil.