



**OPERATIONS AND MAINTENANCE PLAN  
AREA T - EAST SHORE AREAS  
MARINA BAY PROJECT  
RICHMOND, CALIFORNIA**

**OCTOBER 24, 2008**

By:

A handwritten signature in blue ink that reads "Ann Loomis".

Ann Loomis, P.E.  
Senior Engineer



A handwritten signature in blue ink that reads "Kyle S. Flory".

Kyle S. Flory, P.G.  
Principal Geologist

**644.001.01.001**

**OPERATIONS AND MAINTENANCE PLAN  
AREA T – EAST SHORE AREAS  
MARINA BAY PROJECT  
RICHMOND, CALIFORNIA**

This plan has been prepared on behalf of Richmond Community Redevelopment Agency by PES Environmental, Inc. (PES) to describe the operation and maintenance program for Area T in the East Shore Areas of the Marina Bay Project in Richmond, California (Plate 1). Regulatory oversight of Area T is provided by California Environmental Protection Agency (EPA), Department of Toxic Substances Control (DTSC). Area T encompasses approximately 1.7 acres, and is bounded on the southwest by Peninsula Drive, on the southeast by Marina Bay Parkway, on the northeast by a concrete sidewalk then multi-family residential buildings, and on the northwest by a concrete esplanade then Richmond Marina Bay (Plate 2). Area T is presently undeveloped and the generally unvegetated ground surface is covered by wood chips. Six groundwater monitoring wells and four separate-phase hydrocarbon characterization/removal wells are located on the property (Plate 3). The future land use for Area T has not been determined.

## **BACKGROUND**

In 2005, a Remedial Action Plan Amendment<sup>1</sup> (2005 RAP Amendment) was submitted for the subject property and described the following remedial action: (1) selected excavation and offsite disposal of paint and paint debris, petroleum hydrocarbon- and lead-bearing soil exceeding target soil cleanup goals, in order to reduce chemical concentrations in portions of the site; (2) excavation, analytical testing and on-site reuse of alkali pond sediments; (3) land use restrictions to eliminate potential exposure pathways to remaining affected soil; and (4) groundwater monitoring for two quarters to provide additional groundwater data for future decision-making purposes. These remedial actions have been completed, as described below.

A Covenant to Restrict Use of Property<sup>2</sup> (Covenant) was filed at the Contra Costa County Records Office prior to conducting the soil excavation and groundwater monitoring activities. The Covenant states “all or a portion of the surface and subsurface soils within 10 feet of the surface” of Area T contain hazardous substances and hazardous materials, including lead and total petroleum hydrocarbons (TPH). Exhibit A to the Covenant provides a detailed description of the location and boundaries of Area T. The Covenant requires annual operation and maintenance of a soil cap over the entirety of Area T, as described in this plan.

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<sup>1</sup> PES Environmental, Inc. (PES), 2005. *Remedial Action Plan Amendment, Area T-East Shore Areas, Marina Bay Project, Richmond, California*. March 7.

<sup>2</sup> *Covenant to Restrict Use of Property, Environmental Restriction, Parcel T, Marina Bay Redevelopment, Richmond, California* dated August 18, 2004.

The soil excavation components of the 2005 RAP Amendment have been completed as described in the Remedial Action Implementation Report<sup>3</sup> (RAIR). Plate 3 shows the area that was excavated and backfilled in the northwest portion of Area T during implementation of the remedial action. Plate 3 also shows the other areas of TPH- and/or lead-affected soil that were identified during previous site characterizations but were capped in-place in accordance with the 2005 RAP Amendment. The RAIR also described the installation of three groundwater monitoring wells following completion of excavation and backfilling remedial activities. During the initial monitoring event, separate-phase hydrocarbons were observed in one of the new groundwater monitoring wells and concentrations of TPH exceeding cleanup goals were detected in two of the three other groundwater monitoring wells.

Based on the findings of the initial post-excavation groundwater monitoring activities, the RAIR proposed: (1) the groundwater monitoring well in which separate-phase hydrocarbons were detected be used as a separate-phase hydrocarbon removal well, (2) installation of four additional separate-phase hydrocarbon characterization/removal wells; and (3) installation of two additional groundwater monitoring wells to further characterize the lateral extent of petroleum hydrocarbons in groundwater. These wells have since been installed, as shown on Plate 3. In 2008 an additional Remedial Action Plan Amendment<sup>4</sup> (2008 RAP Amendment) was prepared to describe the separate-phase hydrocarbon removal program and current groundwater monitoring requirements. The 2008 RAP Amendment has been adopted by DTSC.

The components of the 2005 and 2008 RAP Amendments remaining to be implemented are: (1) operation and maintenance of the cap, (2) continued groundwater monitoring; and (3) separate-phase hydrocarbon removal. In addition, five-year reviews of the remedial actions will be required. This O&M Plan addresses these remaining requirements in the following sections.

## **OPERATION AND MAINTENANCE OF THE CAP**

The land use restrictions in the Covenant require a vegetated soil cap across the entirety of Area T. The site has some vegetation, but is primarily covered with wood chips to stabilize the underlying soil in lieu of vegetation. As shown on Plate 3, portions of a hardscaped walkway are located within the northeastern boundary of Area T. Because the hardscaped surface overlies the soil cover, this plan will focus on the inspection and maintenance of the soil cover only.

Operation and maintenance procedures for the cap consist of: (1) routine inspection and maintenance procedures and reporting requirements; and (2) non-routine operation and maintenance procedures. Each of these procedures and requirements are described below.

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<sup>3</sup> PES, 2007. *Remedial Action Implementation Report, Area T - East Shore Areas, Marina Bay Project, Richmond, California.* April 12.

<sup>4</sup> PES Environmental, Inc. (PES), 2008. *Final Remedial Action Plan Amendment, Area T-East Shore Areas, Marina Bay Project, Richmond, California.* July 24.

### **Routine Inspection, Maintenance and Reporting Procedures**

Annually, the site owner will cause the cap to be inspected during the month of February (unless an extension of time is obtained from DTSC). Inspection and maintenance procedures for the soil cap at Area T are presented below.

The maintenance of the soil cap will proceed by the following guidelines:

- The soil cap will be inspected by a California-registered civil engineer for evidence of wilted vegetation, barren areas, discoloration, and/or burrowing animals in the vegetation that might cause erosion of the soil. Areas with stressed vegetation and bare areas will be evaluated to determine the possible cause or causes. Field notes describing the observations made at the time of inspection will be prepared and will detail the condition of the soil cap;
- Barren areas will be covered with wood chips or revegetated to minimize the potential for soil erosion, as deemed appropriate by the owner's groundskeepers; and
- Areas where distressed vegetation is observed will be covered with wood chips or revegetated and/or fertilized within 30 days of the inspection.

Annually, the site owner or its designee will submit a report to DTSC within 45 days of the inspection. The report will include the field inspection notes and a description of repairs recommended for the soil cap.

### **Non-Routine Operation and Maintenance**

This plan is intended to describe only those procedures for routine inspection and maintenance of the cap. If it is determined by the site owner that cap repairs or other subsurface construction activities are needed at Area T that will result in penetration of the cover to any depth, then: (1) all applicable regulations to provide protection of worker safety and health will be followed; (2) a Soil Management Plan including a Health and Safety Plan will be submitted to DTSC for review and approval prior to any construction activity; and (3) DTSC will be notified prior to commencement of work.

## **GROUNDWATER MONITORING AND SEPARATE-PHASE HYDROCARBON REMOVAL**

As described in the 2008 RAP Amendment, additional groundwater monitoring and implementation of a separate-phase hydrocarbon removal program are required. These requirements are summarized in the following sections.

## **Groundwater Monitoring**

The following sections present requirements for: (1) groundwater monitoring; (2) installation of additional wells and/or destruction of existing wells; (3) well maintenance; (4) reporting; and (5) cessation of groundwater monitoring.

### **Groundwater Monitoring Requirements**

It is anticipated that at a minimum of two years of post-excavation quarterly groundwater monitoring will be performed. Groundwater monitoring will continue until site cleanup goals have been achieved and/or DTSC has concurred with cessation of monitoring.

Groundwater sampling will be conducted on a quarterly basis in a sequential process in accordance with the procedures outlined in the 2008 RAP Amendment. First, the depth to groundwater will be gauged for all wells. If present, the thickness of the separate-phase hydrocarbon layer will also be measured. After the wells have been gauged, groundwater samples will be collected from selected wells. Two-inch diameter monitoring wells (TW-1 through TW-5 and WSS17) will be sampled on a quarterly basis and 4-inch diameter hydrocarbon characterization wells (CW-1 through CW-4) will be sampled on a quarterly basis. Wells with a separate-phase hydrocarbon layer will not be sampled, as the presence of separate-phase hydrocarbon precludes the collection of groundwater samples intended to assess concentrations of petroleum hydrocarbons dissolved in groundwater.

During sampling, the groundwater monitoring wells will be purged using a submersible pump and/or disposable bailer equipped with a bottom-draining device during which field measurements of groundwater parameters will be recorded (i.e., pH, specific conductance, temperature, and turbidity). Samples will be collected with a submersible pump and/or disposable bailer equipped with a bottom-draining device. Samples will be decanted into laboratory provided containers, sealed, labeled, logged on a Chain-of-Custody form, and submitted to a State-certified laboratory for chemical analysis.

Samples will be analyzed for TVH (quantified as gasoline and Stoddard solvent) and TEPH (quantified as diesel and motor oil) by EPA Test Method 8015-Modified. Additionally, because xylenes and naphthalene were detected during waste characterization analyses of soil excavated from Area T, groundwater samples will also be analyzed for naphthalene and benzene, toluene, ethylbenzene and xylenes (BTEX) by USEPA Test Method 8260B on a quarterly basis for the first year, and on an annual basis thereafter. Because dissolved lead was not detected above cleanup goals during the first four groundwater monitoring events, dissolved lead has been removed from the list of analytes for the groundwater monitoring program. Groundwater monitoring results will be reported in quarterly groundwater monitoring reports.

## Well Maintenance

The following groundwater monitoring well maintenance requirements will be implemented during each sampling event. The well box will be checked for the presence or absence of water and the condition of the well box, lock, lid and concrete apron will be noted. Upon opening the well box, the presence and condition of the well compression cap and lock will also be evaluated. Well box maintenance will be performed and parts will be replaced as necessary during or following each sampling event.

## Reporting

Results of separate-phase hydrocarbon removal and groundwater gauging and sampling events are presented to DTSC in quarterly groundwater monitoring reports. Laboratory analytical results will be compared to the DTSC-approved cleanup goals for groundwater, as follows:

- TVHss - 680 micrograms per liter ( $\mu\text{g/L}$ );
- TVHg - 500  $\mu\text{g/L}$ ;
- TEPHd - 640  $\mu\text{g/L}$ ;
- TEPHmo - 640  $\mu\text{g/L}$ ; and
- pH - 6.5 to 8.5 SU.

Table 1 presents a summary of laboratory reporting limits and site cleanup goals.

## Separate-Phase Hydrocarbon Removal

Due to the presence of separate-phase hydrocarbon detected in well TW-3 and the potential to encounter separate-phase hydrocarbon in additional wells, procedures have been developed to remove the separate-phase hydrocarbon. Separate-phase hydrocarbon removal activities will be conducted as described below, in accordance with the 2008 RAP Amendment, including the *Site Specific Health & Safety Plan* (HASP) that was amended in July 24, 2008 to cover the planned separate-phase hydrocarbon removal activities. Removal of separate-phase hydrocarbon will be conducted using one or a combination of methods, including hand bailing, absorbent materials, passive hydrocarbon recovery units and/or pumping. Separate-phase hydrocarbons will be stored on-site in a locked, metal storage container pending transportation and off-site disposal or recycling. Documentation of separate-phase hydrocarbon removal activities will be included in the quarterly groundwater monitoring reports. Procedures for separate-phase hydrocarbon removal, storage, disposal/recycling and reporting are summarized below. More detailed procedures are included in the 2008 RAP Amendment.

## **Separate-Phase Hydrocarbon Removal Methods**

Four possible methods for removal of separate-phase hydrocarbon were described in the 2008 RAP Amendment: (1) hand bailing; (2) absorbent materials; (3) passive hydrocarbon recovery units; and (4) pumping. The removal method to be used at each location will be selected based on the thickness of the separate-phase hydrocarbon at the particular well, and the rate of recharge during removal operations. Generally speaking, and dependent on the rate of recharge following separate-phase hydrocarbon removal, the method will be selected as follows: absorbent material will be selected if the separate-phase hydrocarbon layer thickness is between a sheen and 0.01 foot; a passive skimmer will be used if the thickness is between 0.01 foot and 0.5 foot; hand bailing will be used if the thickness is between 0.5 and 2 feet; and pumping will be used if the separate-phase hydrocarbon thickness is greater than 2 feet. Procedures for implementing each of the separate-phase hydrocarbon removal methods are presented below.

### Hand Bailing

If separate-phase hydrocarbon is removed via hand bailing, the material will be collected using a bottom-loading bailer. Prior to removal, the thickness of the material will be measured using an oil-water interface probe or clear bailer. The volume of separate-phase hydrocarbon removed during each event will be recorded and the cumulative volume will also be calculated. The material will be removed from each affected well and placed into 55-gallon drums for temporary on-site storage, pending proper disposal. Separate-phase hydrocarbon removal will initially be conducted bi-weekly. The frequency of removal will vary as the volume of separate-phase hydrocarbon is reduced.

### Absorbent Materials

Absorbent materials may also be used for removal of free phase hydrocarbons. If this method is selected, absorbent socks designed for use in monitoring wells will be utilized. Absorbent socks consist of a sturdy, permeable, non-reactive fabric encasing filler material engineered to absorb oil but not water or water-based liquids. They are sized with a diameter slightly smaller than the inner well diameter and are generally 2 or 3 feet long. These socks can be suspended in the well across the oil/water interface to absorb the separate-phase hydrocarbon from the groundwater surface. If used, the socks will be removed and replaced at regular intervals. The socks will be checked on a weekly basis initially, and replaced as necessary. Used absorbent socks containing petroleum hydrocarbons will be containerized in 55-gallon drums for temporary on-site storage, pending proper disposal. Product thickness will be measured during replacement of the absorbent socks and on a quarterly basis during groundwater sampling.

### Passive Collection Devices

The passive hydrocarbon recovery system, if used, will consist of a passive skimmer that contains a hydrophobic membrane which separates floating hydrocarbons from water, leaving

the water behind. This passive hydrocarbon removal system responds to water table fluctuations. The system will be checked and emptied regularly, on a weekly basis initially. The volume of separate-phase hydrocarbon removed during each event will be recorded and the cumulative volume will also be calculated. The material will be removed from each affected well and placed into 55-gallon drums for temporary on-site storage, pending proper disposal or recycling. The frequency of checking the passive hydrocarbon removal system will vary as the volume of separate-phase hydrocarbon is reduced. Product thickness will be measured during hydrocarbon removal events and during groundwater sampling on a quarterly basis.

### Pumping

A portable pump or vacuum truck may be used to remove separate-phase hydrocarbon from the wells. The depth and thickness of the separate-phase hydrocarbon layer will be measured prior to each removal event. The portable pump or vacuum truck will be fitted with a suction hose with an outer-diameter small enough to fit in the 4-inch diameter separate-phase hydrocarbon well with an oil-water interface probe. A non-sparking pump will be used to extract separate-phase petroleum hydrocarbon from the well into a drum or an integral tank in the vacuum truck. The depth and thickness of the separate-phase hydrocarbon will be monitored with an oil/water interface probe during the pumping process to check for drawdown of the separate-phase hydrocarbon thickness and/or groundwater level. The suction hose intake depth will be adjusted as necessary based on the interface probe readings, in order to maintain the suction hose intake within the separate-phase hydrocarbon layer. If a portable pump is used, evacuated separate-phase hydrocarbon and groundwater will be containerized in a 55-gallon drum and stored onsite in the temporary storage area. The drum contents will be allowed to separate, and the thickness of the water and product will be measured in order to calculate the volumes removed. If a vacuum truck is used, it is anticipated that the truck will transport the separate-phase hydrocarbon directly to a recycling or disposal facility. The vacuum truck tank gauges and/or the disposal/recycling facility receipts will be used to estimate the quantity of separate-phase hydrocarbon removed. Separate-phase hydrocarbon removal using a portable pump or vacuum truck will initially be conducted weekly. The frequency of removal will vary as the volume of separate-phase hydrocarbon is reduced.

### **Separate-Phase Hydrocarbon Storage and Disposal/Recycling**

The separate-phase hydrocarbon wastes generated during removal activities, including recovered liquid and/or affected materials such as spent absorbent, will be stored in sealed, appropriately labeled 55-gallon metal drums designed to contain flammable/hazardous materials. The lab analyses performed during the extensive site investigation conducted to date did not indicate the presence of VOCs, and given the age of the separate-phase hydrocarbon it is expected to be weathered and not highly volatile. To minimize the potential for accumulation of vapors in the storage area, the drums will be tightly sealed with a rubber gasket between the lid and the container, and the drum bungs will be tightly closed using a non-sparking (e.g. brass or bronze) bung wrench. The drums will be stored onsite in a temporary, locked storage area consisting of a metal storage container. The metal storage

container will be equipped with passive sidewall vents to facilitate air circulation inside the container. The atmosphere within the storage container will be monitored through the vents prior to opening the doors, in accordance with the amended HASP. Air monitoring logs and separate-phase hydrocarbon removal documentation will be stored in the container. The separate-phase hydrocarbon containers will be stored atop a polyethylene secondary containment pallet with a containment capacity greater than 55 gallons. Spill kits containing absorbent pads, absorbent socks and disposal bags appropriate for containing the separate-phase hydrocarbon will also be located in the storage container. Separate-phase hydrocarbon removal equipment, decontamination rinsate and purge water from groundwater sampling will also be stored in the storage container.

The storage container will be labeled with appropriate hazardous materials placards, and the containers of separate-phase hydrocarbon wastes will be labeled in accordance with applicable regulations. The hazardous materials placards will be determined following laboratory analysis of the separate phase hydrocarbon. A maximum of one 55-gallon drum of separate-phase hydrocarbon and one 55-gallon container of solid waste, such as gloves, bailers and absorbent pads, will be stored onsite at any given time. Separate-phase hydrocarbon wastes will be stored onsite for a maximum of 90 days, prior to being transported offsite for disposal or recycling. The disposal/recycling facility will be selected based on the characteristics of the separate-phase hydrocarbon.

The maximum amount of separate-phase hydrocarbon expected to be generated during a single manual removal event (e.g. using hand bailing, absorbent material, passive collection device, or portable peristaltic pump) is 55 gallons. If conditions indicate that more than 55 gallons may be removed, the removal event will be discontinued and arrangements will be made to either: (1) have a vacuum truck perform the removal event; or (2) have a disposal contractor standing by during the next removal event in order to transport separate-phase hydrocarbon wastes for off-site disposal or recycling immediately following the removal event. In the event a vacuum truck is used to pump out the separate-phase hydrocarbon, the removed separate-phase hydrocarbon may be transported directly to the disposal or recycling facility.

## **FIVE-YEAR REVIEWS**

Every five years a review of the remedial actions will be conducted by a California registered civil engineer. The review shall be conducted in accordance with the following: (1) the five-year review shall describe the results of all sample analyses, tests, observations, and other data generated or received, and evaluate the adequacy of the implemented remedy in protecting public health, safety and the environment; and (2) the United States EPA *Comprehensive Five-Year Review Guidance* document (OSWER No. 9355.7-03B-P) dated June 2001; and (3) Section 121(c) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 U.S.C. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, Pub. L. 99-499. Ninety (90) days before the end of the 5-year period, the site owner will submit a workplan to DTSC describing how the 5-year

review will be conducted. The 5-year review report will be submitted to DTSC 60 days after approval of the workplan.

Attachments: Table 1 – Summary of Site Cleanup Goals and Laboratory Reporting Limits

Plate 1 – Site Location Map

Plate 2 – Vicinity Map

Plate 3 – Site Plan

**ATTACHMENTS**

**Table 1**  
**Summary of Site Cleanup Goals and Laboratory Reporting Limits**  
**Operations and Maintenance Plan**  
**Area T - East Shore Areas**  
**Marina Bay Project**  
**Richmond, California**

<b>Constituent</b>	<b>Units</b>	<b>Site Cleanup Goal</b>	<b>Laboratory Reporting Limits</b>
<b>TVHss</b>	µg/L	680 <sup>1</sup>	50
<b>TVHg</b>	µg/L	500 <sup>2</sup>	50
<b>TEPHd</b>	µg/L	640 <sup>2</sup>	50
<b>TEPHmo</b>	µg/L	640 <sup>2</sup>	300
<b>Dissolved Lead</b>	µg/L	8.1 <sup>1</sup>	3.0
<b>pH</b>	SU	6.5-8.5 <sup>1</sup>	0-14

**Notes**

TVHss = Total volatile hydrocarbons quantified as Stoddard solvent

TVHg = Total volatile hydrocarbons quantified as gasoline

TEPHd = Total extractable petroleum hydrocarbons quantified as diesel

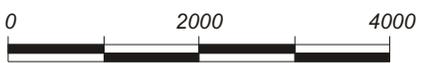
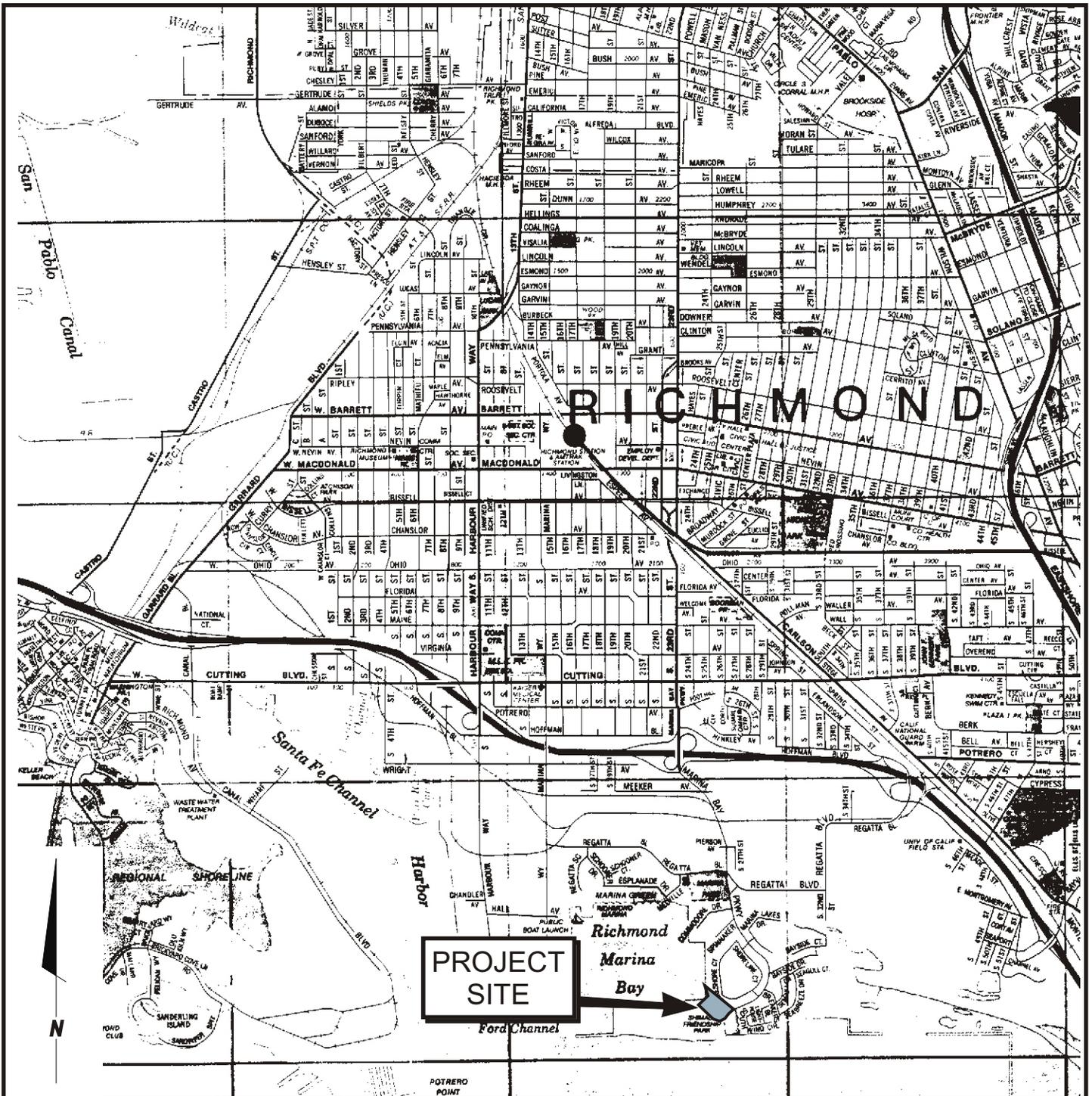
TEPHmo = Total extractable petroleum hydrocarbons quantified as motor oil

µg/L = micrograms per liter

SU = Standard units

1 = Cleanup goal established in PES' March 7, 2005 RAP Amendment.

2 = Cleanup goal established in PES' July 24, 2008 Final RAP Amendment.



Scale in Feet

Ref: California State Automobile Association Map; Richmond, Ca.; 4/94



**PES Environmental, Inc.**  
Engineering & Environmental Services

**Site Location Map**  
Operations and Maintenance Plan  
Area T - East Shore Areas  
Marina Bay Project  
Richmond, California

PLATE

**1**

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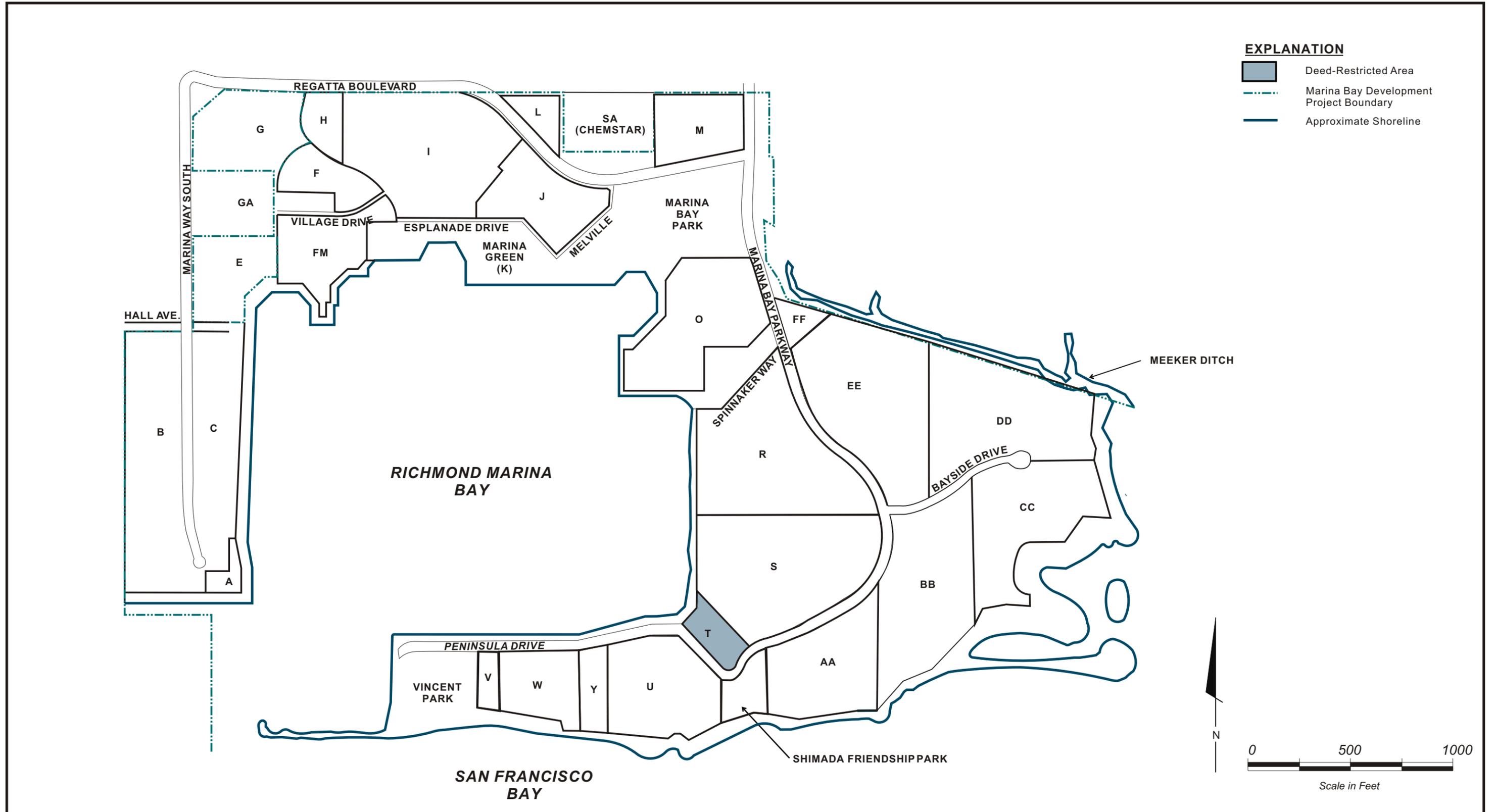
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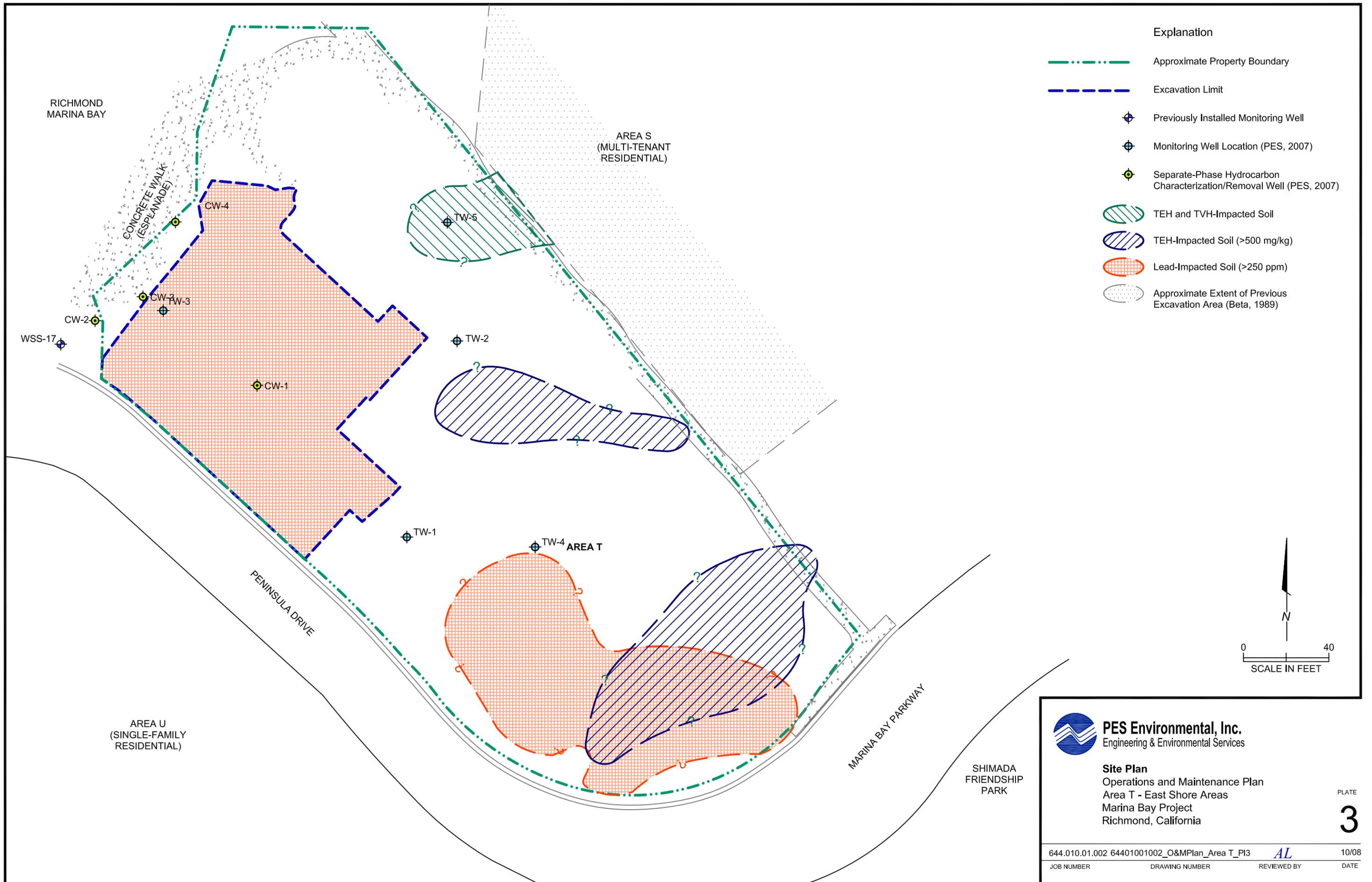
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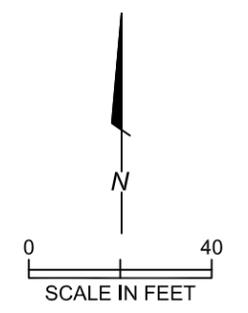
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- Explanation**
- · - · - Approximate Property Boundary
  - - - - - Excavation Limit
  - ⊕ Previously Installed Monitoring Well
  - ⊕ Monitoring Well Location (PES, 2007)
  - ⊕ Separate-Phase Hydrocarbon Characterization/Removal Well (PES, 2007)
  - ▨ TEH and TVH-Impacted Soil
  - ▨ TEH-Impacted Soil (>500 mg/kg)
  - ▨ Lead-Impacted Soil (>250 ppm)
  - ▨ Approximate Extent of Previous Excavation Area (Beta, 1989)



**PES Environmental, Inc.**  
Engineering & Environmental Services

**Site Plan**  
Operations and Maintenance Plan  
Area T - East Shore Areas  
Marina Bay Project  
Richmond, California

PLATE  
**3**