PORT OF OAKLAND

RECEIVED
By Alameda County Environmental Health at 2:55 pm, Apr 11, 2014

April 4, 2014

Mr. Keith Nowell
Hazardous Materials Specialist
Alameda County Environmental Health Department
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: **Low-Threat Closure Request**
RO0000101
Kaiser Yard UST, Berth 30
2801 Seventh Street
Port of Oakland
Oakland, California

Dear Mr. Nowell:

ARCADIS U.S., Inc. (ARCADIS) has prepared this Low-Threat Closure Request on the behalf of the Port of Oakland (Port) regarding an underground storage tank (UST) site. The UST site is in the former Kaiser Steel Yard, which today is part of the Port's Berth 30-32 container terminals. The Kaiser UST Site contained 3 USTs, which were identified as located at 2801 7th Street, Oakland, California. The documents that accompany this letter includes the signatory page of the responsible professional geologist and the March 27, 2014 Low-Threat Closure Request.

I declare, to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct.

If you have any questions or comments regarding the content of this report, please contact me at 510.627.1373 or by e-mail at jprall@portoakland.com.

Sincerely,

John Prall, PG
Port Associate Environmental Scientist
Environmental Programs & Planning Division

Enclosures noted in text

CC: William Semel, ARCADIS
Anne Whittington, Port of Oakland
Michele Heffes, Port of Oakland
Jeff Rubin, Port of Oakland

ARCADIS U.S., Inc.
100 Montgomery Street
Suite 300
San Francisco
California 94104
Tel 415.374.2744
Fax 415.374.2745
www.arcadis-us.com

ENVIRONMENT

Mr. Keith Nowell
Hazardous Materials Specialist
Alameda County Environmental Health Department
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject:
Low-Threat Closure Request
Kaiser Yard UST, Berth 30
Port of Oakland
2801 7th Street
Oakland, California

Date:
April 8, 2014

Contact:
Katherine Brandt

Phone:
510.596.9675

Email:
Katherine.brandt@arcadis-us.com

Our ref:
04656020.LTCP

Dear Mr. Nowell:

ARCADIS U.S., Inc. (ARCADIS) has prepared this Low-Threat Closure Request (LTC Request) for the Port of Oakland's (the Port's) Kaiser Yard, Berth 30 site (Kaiser Yard), located at 2801 7th street in Oakland, California. At Kaiser Yard, a total of four underground storage tanks (USTs) have been removed during two separate events (three USTs removed in April 1992 and one UST removed in July 1992). This LTC Request is for the three USTs removed in April 1992 (the "Site"; Attachment 1). This LTC Request was prepared in response to the State Water Resources Control Board's (SWRCB's) resolution 2012-0016 adopted on May 1, 2012, and effective on August 17, 2012, known as the Low-Threat Underground Storage Tank Case Closure Policy (Low-Threat Closure Policy; SWRCB 2012).

The purpose of this LTC Request is to present an evaluation of Site-specific conditions to support that the concentrations of residual Site-related constituents in environmental media are not expected to pose adverse health effects to potential current and future receptors. The SWRCB Low-Threat Closure Policy Checklist is included as Attachment 2. This letter presents the evaluation of Site conditions against the LTC Policy criteria. Based on this evaluation, the Site qualifies for Low-Threat Closure.

Brief Site History

Berth 30 (of which the Site is a part) historically operated as the Albers Brothers Milling Company, Nestle USA, Inc., Powerine Oil Co., and Kaiser Steel Corporation ("Kaiser"). Kaiser leased a portion of Berth 30 from 1965 to 1985 for the manufacturing and shipping of steel products, as well as dredging of the Outer Harbor. During operation of Berth 30 as Kaiser, three USTs (one steel 5,000-gallon diesel UST, one steel 5,000-gallon gasoline UST, and one steel 3,000-gallon gasoline UST) were operational and were likely used for vehicle refueling (Prall 2008 - correspondence). Vent piping, two dispenser islands, and conveyance piping associated with the three USTs, were located on top of a concrete pad above the USTs. The concrete pad was approximately 21 feet long and 32 feet wide. When operations at the Kaiser facility ceased in 1985, the USTs and associated infrastructure were left in place (Ballati 2006-correspondence). It is unknown whether the USTs and associated infrastructure were used during the time between the closure of the Kaiser facility and their removal. During redevelopment of Berth 30 in April 1992, the three USTs, concrete pad, two dispenser islands, vent piping, conveyance piping and associated fill were removed from the Site (Geomatrix 1992; Prall 2008- correspondence).

From April 14 through 16, 1992, the concrete pad, dispenser islands and piping were removed from the Site and disposed of at an off-site facility. In addition, the three USTs were removed from the Site. At the time the USTs were removed, they were identified as inactive and it is unknown when this infrastructure was installed or when it became inactive. No cracks or holes were observed in any of the USTs (Geomatrix 1992).

Prior to UST removal, the diesel UST contained no residual liquid, whereas each of the gasoline USTs contained approximately 1 to 1.5 inches of residual liquid before the USTs were rendered inert using dry ice. The aerial extent of the excavation was approximately 38 feet by 17 feet and the depth of the excavation pit ranged from approximately 9.5 to 11 feet bgs. Approximately 120 cubic yards of soil were removed from the excavation and groundwater was encountered at 8.5 to 9 feet bgs. During excavation activities, no staining or petroleum odors were observed in soil removed from above the USTs, in-between the USTs, or in the sidewalls of the excavation. However, petroleum odors and staining were observed in soil from the excavation floor beneath the two 5,000-gallon USTs, which was below the water table (Geomatrix 1992).

During UST removal activities on April 15, 1992, six soil samples (POK-EX-1 through POK-EX-6) were collected from the excavation sidewalls and two four-point composite soil samples ("POK-SP-1 through -4" and "POK-SP-5 through -8") were collected from the stockpiled soil generated from removal activities. The soil samples from the UST pit sidewalls were collected at approximately 8.5 feet bgs due to the presence of groundwater. Soil samples collected were analyzed for total petroleum hydrocarbons (TPH) as diesel (TPH-d), TPH as gasoline (TPH-g), benzene, toluene, ethylbenzene, and total xylenes (BTEX, collectively), and total lead (Geomatrix 1992).

The soil samples collected from the excavation sidewalls did not contain concentrations of TPH-g, TPH-d, or BTEX above their respective laboratory reporting limit (LRL). Stockpiled soil sample, POK-SP-1 through -4, had detectable concentrations of TPH-g (0.5 mg/kg), toluene (0.033 mg/kg), ethylbenzene (0.007 mg/kg), and total xylenes (0.044 mg/kg). TPH-d and benzene were not detected above their LRLs in this stockpile soil sample collected. The other stockpile soil sample collected did not have concentrations of constituents of concern (COC) above their respective LRLs (Geomatrix 1992). Based on the non-detect concentrations of COCs in one of the two stockpile soil samples ("POK-SP-5 through -8"), the portion of the stockpiled soil that was non-detect for COCs was reused as backfill and mixed with clean engineered fill material.

During UST excavation activities, groundwater was present and observed to have a film of petroleum product up to 0.25 inches thick. After removal of the USTs, groundwater was pumped from the excavation. Groundwater was allowed to recharge and the process was repeated. A total of approximately 800 gallons of groundwater was removed from the excavation during purge and recharge activities. While a film of product appeared to be present on the surface of the groundwater after each recharge, the analytical results from the grab groundwater analytical sample (POK-GW-1) discussed below indicate that the presence of free product at the Site was unlikely. On April 16, 1992, after purge and recharge activities of the excavation pit, one grab groundwater sample (POK-GW-1) was collected. The grab groundwater sample (POK-GW-1) was analyzed for TPH-d, TPH-g, BTEX, and lead. POK-GW-1 had detectable concentrations of TPH-g (4,100 micrograms per liter [µg/L]), benzene (3.4 µg/L), toluene (62 µg/L), ethylbenzene (1.4 µg/L), and total xylenes (860 µg/L). TPH-d and total lead were not detected above their LRLs in the grab groundwater sample collected. Once removal activities finished, the excavation pit was backfilled with engineered fill and clean stockpiled soil generated from UST removal activities (Geomatrix 1992).

A map showing the Site location and excavation details are included in Attachment 1. Historical soil and groundwater analytical results are summarized in Table 1 and Table 2, respectively.

Assessment of Site Conditions Relative to Low-Threat Closure Policy Criteria

The Low-Threat Closure Policy outlines eight General Criteria to assess whether sites are candidates for low-threat case closure, and three categories of Media-Specific Criteria (groundwater, petroleum vapor intrusion to indoor air, and direct contact and outdoor air exposure) that also must be met. Current Site conditions are evaluated against the corresponding General and Media-Specific Criteria. Based on this evaluation, ARCADIS concludes that the Site meets the requirements for Low-Threat Closure.

Evaluation of Low-Threat Closure General Criteria

Criteria a - The unauthorized release is located within the service area of a public water system

The Site is located within the service area of the East Bay Municipal Utility District (EBMUD) public water system. Ninety percent of water within the EBMUD public water system, which includes drinking water at the site, is supplied by the Mokelumne Watershed. Local runoff stored in reservoirs supplements that supply, and water from the Sacramento River is available when needed during dry years (EBMUD 2011).

Criteria b - The unauthorized release consists only of petroleum

Soil and groundwater impacts likely occurred as a result of an unauthorized release of petroleum hydrocarbons from the USTs. The primary COCs identified at the Site include TPH-g and BTEX. There have been no non-petroleum impacts or releases documented at the Site.

Criteria c - The unauthorized release has been stopped

The unauthorized release of petroleum hydrocarbons at the Site, likely associated with three USTs, stopped when they were removed in April 1992 (Geomatrix 1992). The dispenser islands and associated piping were also removed during this time.

Criteria d - Free product has been removed to the maximum extent practicable

After removal of the USTs, the excavation was dewatered, allowed to recharge and then dewatered again. In total, approximately 800 gallons of affected groundwater was removed from the excavation pit (Geomatrix 1992). Before the first purge, the excavation contained a film of product up to 0.25 inches thick. While a film of product appeared to be present on the surface of the groundwater after each recharge, the analytical results from the grab groundwater analytical sample (POK-GW-1) indicate that the presence of free product at the Site was unlikely. Therefore, given the low concentration of constituents of concern (COCs) detected in the grab groundwater sample collected, it is unlikely that the film of product was the result of a leaking UST; it was likely caused by a minor release from the USTs during removal or the equipment used during removal activities (Table 2). Therefore, given the volume of groundwater removed from the tank pit and the low concentrations of COCs detected in the grab groundwater sample collected, free product has been removed to the maximum extent practicable.

Criteria e - A conceptual site model that assesses the nature, extent, and mobility of the release has been developed

In order to determine the nature, extent, mobility, and risks and exposure pathways associated with the unauthorized release, a brief Conceptual Site Model has been completed for the Site below.

Limited geological information is available at the Site; however, a geotechnical investigation of Berth 30 (of which the Site is a part) was conducted in 1990, 1992 and 2006 (Woodward-Clyde Consultants 1990; Kaldveer Associates Geoscience Consultants 1992; Fugro West, Inc. 2006). A review of the boring logs from the Berth 30 geotechnical investigations showed poorly-graded sands, gravels, and fill from the ground surface to approximately five feet bgs. Below five feet bgs to the maximum depth of the investigations (approximately 84.5 feet bgs) the lithology generally consists of interbedded sands and clays. Clays in one boring (WCC-4A) were identified as Bay Mud and occurred interbedded with silty sand from 18 to 35 feet bgs. At the Site during UST removal activities, field personnel observed a brown, medium-grained sand containing shells in the excavation area (Geomatrix 1992).

Based on soil samples collected from the sidewalls of the UST excavation pit, as well as from stockpiled soil, the lateral and vertical extent of impacted soil has been delineated. Soil samples taken from each of the sidewalls did not contain COCs above their respective LRL. In addition, composite soil samples from the stockpiled

soil had detected concentrations of COCs just above their LRLs (Geomatrix 1992). Given the non-detect concentrations of COCs from the sidewalls of the excavation pit, the lateral extent of impacted soil has been delineated. In addition, while soil samples were not collected from the base of the excavation pit due to the presence of groundwater, the stockpiled soil contained soil from beneath the water table and had concentrations of COCs close to the LRL, indicating that the fill material surrounding the USTs (including soil beneath the USTs) was not impacted by the unauthorized release. Therefore, soil at the Site appears to be vertically delineated as well.

One groundwater sample collected from the bottom of the excavation pit showed detections of TPH-g and BTEX. Given the concentrations of COCs found in the grab groundwater sample, the age of the sample, and the biodegradation of these COCs, the groundwater plume is assumed to be stable and confined to the UST excavation area (if present) (see the Groundwater Media-Specific Criteria below).

A review of potential receptors was conducted based on the Site's location and current and expected land use. The Site is paved with asphalt and located within a shipping container storage yard. Therefore, reasonably anticipated current and future receptors include on- and off-Site commercial workers. In addition, should utility work or redevelopment occur at the Site, on- and off-Site construction and utility workers could be potential receptors.

An analysis of exposure pathways was also conducted for the Site. COCs may be retained in Site soils, or become subject to transport mechanisms, such as wind erosion and transport, volatilization into indoor air of current or future buildings or outdoor air, percolation to groundwater, migration in groundwater and biodegradation/attenuation in subsurface soil and/or groundwater.

Given that the Site is completely paved, inhalation of COCs from dust produced by wind is not considered a complete exposure pathway for any of the receptors identified above. In addition, given the lack of buildings present on- and off-Site (nearest building located approximately 600 feet east of the Site), the vapor intrusion exposure pathway is considered to be incomplete for all receptors.

Commercial workers will not encounter groundwater or soil at the Site because it is paved. In addition, commercial workers will not ingest groundwater at the Site due to the drinking water supply being provided by EBMUD (see General Criteria A above).

Construction/Utility workers may encounter surface and subsurface soil during redevelopment or utility work at the Site; however, this exposure pathway is considered to be insignificant as the historical concentrations of benzene and ethylbenzene in Site soil are below the No Significant Risk Values (NSRVs) for utility and construction workers (see Table B below). Therefore, the incidental ingestion or inhalation of surface and subsurface soils is deemed to be insignificant for current and future, on- and off-Site construction and utility workers. Finally, construction/utility workers may also encounter groundwater during work. Construction and utility workers typically work at depths less than 10 feet bgs. Depth to water at the Site was documented to be approximately 8.5 to 9 feet bgs. Therefore, construction/utility workers are unlikely to come into contact with groundwater. However, should they work at depths approaching 10 feet bgs, the bottom of trenches are typically dewatered so workers do not stand or perform work in pooled water. Therefore, dermal contact and incidental ingestion of groundwater for construction/utility workers is determined to be insignificant.

The nearest surface water bodies are the Oakland Outer Harbor, located approximately 500 feet north of the Site, and the Oakland Middle Harbor, located approximately 600 feet south of the Site. Given the current and past land use at the Site and surrounding areas, it is unlikely that water supply wells are located with 1,000 feet from the Site. Since impacted soil was removed and groundwater impacts are assumed to be stable and confined to the UST excavation area (if present), impacts to the Oakland Outer Harbor and the Oakland Middle Harbor are not anticipated.

A summary of the potential receptors and exposure pathways are presented in Figure 1.

Criteria f - Secondary source has been removed to the extent practicable

Secondary source at the Site has been removed to the extent practical with the excavation of impacted soil and the removal of approximately 800 gallons of affected groundwater and the film of product during April 1992. All six soil samples collected from the excavation sidewalls had non-detect concentrations of COCs. In addition, based on the non-detect concentrations of COCs in one of the two stockpile soil samples (“POK-SP-5 through -8”), the portion of the stockpiled soil that was non-detect for COCs was reused as backfill and mixed with clean engineered fill material. (Geomatrix 1992).

Criteria g - Soil and groundwater have been tested for methyl tert-butyl ether (MTBE) and results reported in accordance with Health and Safety Code section 25296.15

Soil and groundwater samples collected at the Site in April 1992 were not analyzed for MTBE. Based on Site history, it is assumed the USTs were left in-place and considered out of use when Kaiser ceased operations in 1985.

Prior to around 1989, MTBE was used primarily as an octane booster in a small percentage of the gasoline pool, usually in newly introduced premium unleaded blends. To achieve an increase in octane and a reduction in engine knocking, MTBE was added to gasoline in small quantities (up to 2%; Stout et al. 2006). After circa 1988, MTBE was added to gasoline at higher quantities (up to 15%), per a mandate by the United States Environmental Protection Agency (USEPA), to reduce smog in many major metropolitan areas across the United States. The USTs at the Site operated from an unknown date through 1985, thus MTBE is not anticipated to have been a significant component of the gasoline that was stored in the gasoline USTs. Additionally, low concentrations of benzene in the groundwater sample (3.4 µg/L) suggest that MTBE concentrations would be low as well, if present at all.

Therefore, the absence of MTBE analytical data in soil and groundwater samples collected does not constitute a data gap.

Criteria h - Nuisance as defined by Water Code section 13050 does not exist at the site

Nuisance does not exist at the Site. Site conditions and the treatment and disposal of site wastes are not injurious to health, indecent or offensive to the senses, do not obstruct free use of property or interfere with the comfortable enjoyment of life or property. Site conditions and the treatment and disposal of Site wastes do not affect an entire community or neighborhood or any considerable number of persons. Site impacts are restricted to the subsurface, and are present in a limited area that does not adversely affect the community at large.

Evaluation of Low-Threat Closure (LTC) Media Specific Criteria

1. ***Groundwater***

Site groundwater does not currently pose a risk to the existing or anticipated future beneficial uses of groundwater. The Low-Threat Closure Policy states that “the contaminant plume that exceeds water quality objectives (WQOs) must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the

five classes of sites." The following section summarizes the plume stability and additional groundwater specific criteria.

Plume Stability

According to the California Regional Water Quality Control Board (RWQCB 2012), *Technical Justification for Groundwater Media-Specific Criteria*, plume stability can be demonstrated in two ways: 1) "routinely observed non-detect values for groundwater parameters in down-gradient wells" or 2) "stable or decreasing concentration levels in down-gradient wells".

While groundwater monitoring wells have not been installed at the Site, plume stability was established using a lines of evidence approach including: 1) the removal of the primary and secondary source material, 2) estimates of plume length based on the *Technical Justification of Groundwater Media-Specific Criteria* (RWQCB 2012), and 3) conservative estimates of current groundwater concentrations based on calculation of biodegradation.

Primary and secondary sources were removed during UST excavation activities in April 1992. As described in General Criteria F, approximately 800 gallons of affected groundwater were removed from the excavation pit in a series of purging and recharging activities. In addition, the excavated stockpiled soil samples, which extended to beneath the water table and the USTs, were generally non-detect for COCs. The concentrations of COCs in the grab groundwater sample collected were not indicative of free product.

Benzene was detected in the grab groundwater sample collected in April 1992 at a concentration of 3.4 µg/L. Given that this sample was collected after purging and recharging and at the suspected source area, it is likely that this is the maximum concentration of benzene at the Site. According to the *Technical Justification for Groundwater Media-Specific Criteria* (RWQCB 2012), the average estimated plume length at sites which have benzene concentrations of 5 µg/L is approximately 198 feet in length from the source area. Therefore, given that the sample was collected at the suspected source area over 20 years ago and that the benzene concentration as less than 5 µg/L, the estimated length of 198 feet is assumed to be conservative for the 1992 benzene plume length.

Finally, the COCs detected in the grab groundwater sample include TPH-g and BTEX, which are known to degrade under both anaerobic and aerobic biodegradation (RWQCB 2012). The biodegradation of BTEX in groundwater has

been widely studied and has been found to follow first-order kinetics (USEPA 1996). As contaminants are transported in the subsurface they are attenuated by a variety of different mechanisms including biodegradation, diffusion, dispersion, and sorption. Assuming that no other attenuation processes other than biodegradation occurred, the present day groundwater concentrations of BTEX were calculated using conservative first-order half-lives (American Society for Testing and Materials [ASTM] 1995). A conservative estimate of the biodegradation half-life for TPH-g was taken as 2 years, based on the high end observed biodegradation half-lives for benzene. Table A below shows the results of these calculations, assuming first-order decay and using the estimated half-lives described above. The present-day concentration of TPH-g is predicted to be approximately 2.8 µg/L, while the present-day concentrations of BTEX are predicted to be virtually zero. Therefore, it is likely that minimal impacts are present in groundwater and that the plume has attenuated below applicable water quality objectives.

Table A: Predicted Present-Day Concentrations of TPH-g and BTEX in Groundwater at the Source Area

Constituent	Estimated Half-Life (years)	Initial 1992 Concentration (µg/L)	Predicted 2013 concentration (µg/L)[1]
TPH-g	2	4,100	2.8
Benzene	2	3.4	$2.4x10^{-3}$
Ethylbenzene	0.17	1.4	$9.1x10^{-38}$
Toluene	0.62	62	$4.0x10^{-9}$
Xylenes	1	860	$4.1x10^{-4}$

Note:
1 – Assumes first order decay and an attenuation period of 21 years (1992 to 2013)

Additional Groundwater Specific Criteria

As described in the Low-Threat Closure Policy (SWRCB 2012), a site can meet the Groundwater Media-Specific Criteria through one of five main classes. Given that COCs at the Site have been predicted to be less than applicable water quality objectives, there are no plume lengths associated with the Site. Therefore, Site conditions meet the characteristics of groundwater-specific criteria for ***Class 1.***

Groundwater-specific criteria for ***Class 1*** are outlined below.

1a. The contaminant plume that exceeds water quality objectives is less than 100 feet in length

Table A above shows the results of biodegradation estimates for COCs at the Site given initial concentrations identified in the 1992 sampling event. The present-day

concentration of TPH-g is predicted to be approximately 2.8 µg/L, while the present-day concentrations of BTEX are predicted to be virtually zero. Therefore, it is likely that minimal impacts are present in groundwater and that the plume has attenuated below applicable water quality objectives. As a result, there are no plume lengths associated with the Site.

1b. There is no free-product

As described in General Criteria (d), a film of product was removed from the Site during UST removal activities. Approximately 800 gallons of affected groundwater were removed during purge and recharge activities (Geomatrix 1992). While a film of product appeared to be present on the surface of the groundwater after each recharge, the analytical results from the grab groundwater analytical sample (POK-GW-1) indicate that the presence of free product at the Site was unlikely. The grab groundwater analytical data is included in Table 2.

1c. The nearest existing water supply well or surface-water body is greater than 250 feet from the defined plume boundary

Given the current and past land use at the Site and surrounding areas, it is unlikely that water supply wells are located within 250 feet from the Site. While the nearest surface water bodies are the Oakland Outer Harbor, located approximately 500 feet north of the Site, and the Oakland Middle Harbor, located approximately 600 feet south of the Site, there are no plume lengths associated with the Site, as COCs have been predicted to be below applicable water quality objectives. Therefore, the proximity to the Oakland Outer Harbor and the Oakland Middle Harbor is unlikely to be affected by the unauthorized release.

Petroleum Vapor Intrusion to Indoor Air

As described in the Low-Threat Closure Policy, satisfaction of the Vapor Intrusion Media-Specific Criteria (RWQCB 2012a) is not required for sites with: 1) no existing buildings currently occupied or that may be occupied in the future and 2) no buildings for human occupancy expected to be constructed in the future above the plume. The Site is currently a shipping container storage area, with non-occupancy structures present. In phone conversations between Mr. John Prall of the Port and Mr. William Semel of ARCADIS on October 7, 2013, Mr. Prall stated that there are no plans to redevelop the Site in the future. Therefore, because no buildings are present or proposed to be present at the Site, vapor intrusion to indoor air is not considered an

exposure pathway and is, therefore, not subjected to the requirements stated in this Media-Specific Criterion.

2. Direct Contact and Outdoor Air Exposure

As described in the Low-Threat Closure Policy, sites will meet the Media-Specific Criteria for direct contact with contaminated soil or inhalation of contaminants volatized to outdoor air if:

1) The maximum concentrations of COCs in soil are less than or equal to those listed in Table 1 of the Low-Threat Closure Policy.

2) A site-specific risk assessment shows that COCs present in soil will not adversely affect human health.

3) Exposure to COCs is mitigated through engineering controls.

The Site meets the first criteria as summarized below:

Benzene and ethylbenzene concentrations were evaluated using concentrations for commercial/industrial exposure because the Site is not anticipated to be re-developed for residential use (Table 1, SWRCB 2012). No waste-oil USTs were on-Site; therefore, analysis of polycyclic aromatic hydrocarbons (PAHs) is not required. Given the low concentrations of benzene, it is assumed that naphthalene concentrations would likely also be low. Therefore, the lack of naphthalene data does not constitute a data gap.

Table B. Comparison of maximum concentrations of benzene and ethylbenzene in soil against the No Significant Risk Values

Chemical	Commercial/Industrial Workers				Utility Worker	
	0 to 5 feet bgs mg/kg		Volatilization to outdoor air (5 to 10 feet bgs) mg/kg		0 to 10 feet bgs mg/kg	
	LTC Policy Table 1	Site Maximum	LTC Policy Table 1	Site Maximum	LTC Policy Table 1	Site Maximum
Benzene	8.2	<0.005[a]	12	<0.005	14	<0.005
Ethylbenzene	89	0.007[a]	134	<0.005	314	<0.005

a = Analytical data presented from the stockpiled soil samples collected which contained the maximum concentrations.

While excavation sidewall soil samples were collected at 8.5 feet bgs, it should be noted that soil samples were not collected from ground surface to 5 feet bgs within the excavation pit. However, stockpiled soil samples are representative of soil excavated from the Site. Given the non-detect concentrations of COCs in one of the two stockpile soil samples ("POK-SP-5 through -8"), the portion of the stockpiled soil that was non-detect for COCs was reused as backfill and mixed with clean engineered fill material. It is unlikely impacted soil is present within the top five feet of soil based on results of the stockpiled soil sample. In addition, soil samples collected from 0 to 5 feet bgs represent the maximum concentration acceptable for the direct contact exposure pathway. As described in General Criteria E, direct contact with soil is an incomplete exposure pathway for commercial/industrial workers. While this pathway may be complete for utility workers, given the concentrations present in the sidewall samples of the excavation and the soil stockpile samples, this exposure pathway was deemed to be insignificant.

As shown in Table B above, the maximum concentrations of benzene and ethylbenzene are below the Low-Threat Closure Policy Table 1 NSRVs for Commercial/Industrial Workers direct contact and volatilization to outdoor air pathways and the Utility Worker direct contact pathway in soil samples collected from ground surface to 10 feet bgs. Therefore, benzene and ethylbenzene are below the NSRVs (Table 1; SWRCB 2012).

Conclusions and Recommendations

Site conditions meet all the general and media-specific criteria established in the Low-Threat Closure Policy, and therefore, pose a low threat to human health, safety, and the environment, and satisfy the case-closure requirements of Health and Safety Code Section 25296.10, and case closure is consistent with Resolution 92-49. Based on the results of this evaluation, Low-Threat Closure is recommended for this Site.

If you have any questions or comments regarding the contents of this document, please contact Katherine Brandt of ARCADIS at 510.596.9675 or by e-mail at Katherine.Brandt@arcadis-us.com.

Sincerely,
ARCADIS U.S., Inc.

Katherine Brandt, P.G.
Project Geologist

William Semel
Staff Environmental Engineer

Copies:
Mr. John Prall
Mr. Jeff Rubin
GeoTracker

Figures:

Figure 1	Conceptual Site Model – Human Exposure Pathways

Tables:

Table 1	Historical Soil Analytical Results
Table 2	Historical Groundwater Analytical Results

Attachments:

Attachment 1	Historical Soil Sampling Locations and Site Maps
Attachment 2	State Water Resource Control Board LTC Policy Checklist

References:

Alameda County Health Care Services 1992. Underground Storage Tank Closure Plan. March, 1992.

American Society for Testing and Materials. 1995. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites. ASTM E-1739-95. Philadelphia, PA.

Ballati, 2006. Correspondence between Deborah S. Ballati (Farella, Braun, and Martel Attorneys at Law) and Zurich Insurance Company. December 8, 2006.

California Regional Water Quality Control Board, San Francisco Region. 2013. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Volume 2: Background Documentation for the Development of Tier 1 Environmental Screening Levels. Interim Final. May. Online at http://www.swrcb.ca.gov/sanfranciscobay/esl.shtml.

East Bay Municipal Utility District 2011. All About EBMUD, PUB. 132 (Rev 4/11 RP 4/11) 2M.2011.

Fugro West, Inc. 2006. Geotechnical Study, Berth 30 Yard Reconstruction, Port of Oakland, California. Fugro Project No. 1698.004. October.

Geomatrix. 1992. Removal of Underground Storage Tanks, Kaiser Yard, 8201 Seventh Street, Oakland, California.

Kaldveer Associates Geoscience Consultants. 1992. Geotechnical Investigation for Berth 30 Terminal Improvements, Oakland, California. Project No. K431-108-996. January.

Prall 2008. Correspondence between John Prall (Port of Oakland) and Steven Plunkett (Alameda County Environmental Health Department), August 29, 2008.

RWQCB. 2012. Technical Justification for Groundwater Media-Specific Criteria. April 24.

State Water Resources Control Board (SWRCB). 2012. Low-Threat Underground Storage Tank Case Closure Policy, Adopted May 1, 2012, Effective August 17, 2012.

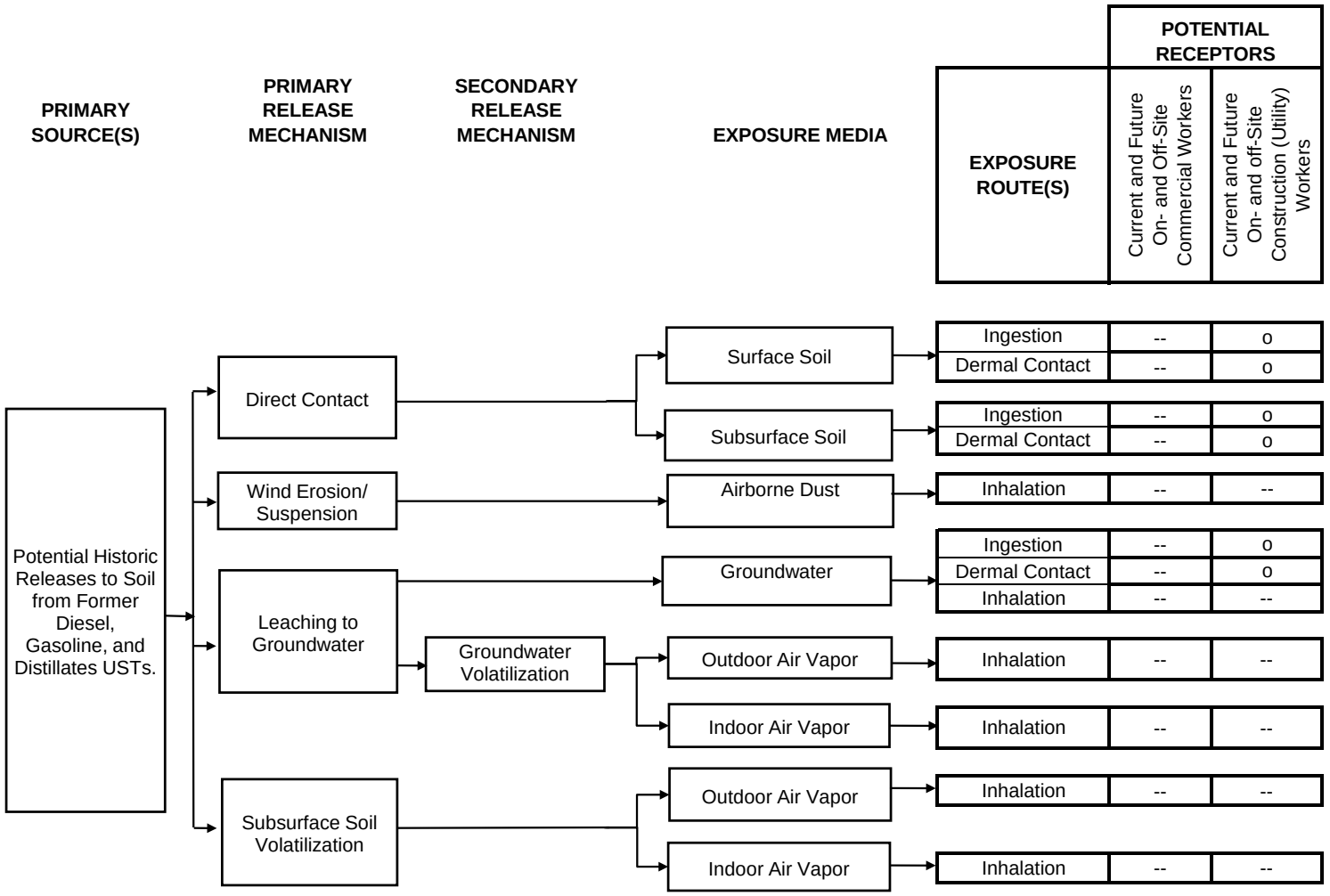
Stout, S., G. Douglad, and A. Uhler. 2006. Automotive Gasoline. In: Environmental Forensics Contaminant Specific Guide, R. Morrison and B Murphy eds., Elsevier, Amsterdam.

United States Environmental Protection Agency (USEPA) 1996. BIOSCREEN, Natural Attenuation Decision Support System User's Manual Version 1.3. Office of Research and Development, Washington DC, 20460. EPA/600/R-96/087. August, 1996.

Woodward-Clyde Consultants. 1990. Geotechnical Engineering Study, 7th Street Realignment and Carnation Terminal Yard, Port of Oakland, California. Project No. 90C0023A. October.

ARCADIS

Figures



Notes:

- ● = Potentially complete exposure pathway
- o = Potentially complete but insignificant exposure pathway
- -- = Incomplete exposure pathway or not applicable

PORT OF OAKLAND
KAISER YARD UST, BERTH 30
2801 7th STREET
OAKLAND, CALIFORNIA

CONCEPTUAL SITE MODEL
HUMAN EXPOSURE PATHWAYS

ARCADIS

FIGURE
1

ARCADIS

Tables

Table 1 - Historical Soil Analytical Results
Port of Oakland
Kaiser Yard UST, Berth 30
2801 7th Street, Oakland, California

Sample ID	Sample Date	Location of Sample	Sample Depth (feet bgs)	TPH-d (mg/kg)	TPH-g (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Total Lead (mg/kg)
POK-EX-1	4/15/1992	Excavation Sidewall	8.0 - 8.5	<1.0	<0.3	<0.005	<0.005	<0.005	<0.005	**2**
POK-EX-2			8.0 - 8.5	<1.0	<0.3	<0.005	<0.005	<0.005	<0.005	**9**
POK-EX-3			8.0 - 8.5	<1.0	<0.3	<0.005	<0.005	<0.005	<0.005	**2**
POK-EX-4			8.0 - 8.5	<1.0	<0.3	<0.005	<0.005	<0.005	<0.005	**8**
POK-EX-5			8.0 - 8.5	<5.0	<0.3	<0.005	<0.005	<0.005	<0.005	--
POK-EX-6			8.0 - 8.5	<2.0	<0.3	<0.005	<0.005	<0.005	<0.005	--
POK-SP-1 through -4	4/15/1992	Stockpiled Soil	--	<2.0	**0.5**	<0.005	**0.033**	**0.007**	**0.044**	**10**
POK-SP-5 through -8				<2.0	<0.3	<0.005	<0.005	<0.005	<0.005	**17**

Notes:

bgs - below ground surface

mg/kg - miligrams per kilogram

TPH-d - Total petroleum hydrocarbons as diesel

TPH-g - Total petroleum hydrocarbons as gasoline

Bold - value exceeds laboratory reporting limit

< - Not detected at the indicated laboratory reporting limit

-- = Not analyzed/Not applicable

Table 2 - Historical Grab Groundwater Analytical Results
Port of Oakland
Kaiser Yard UST, Berth 30
2801 7th Street, Oakland, California

Sample ID	Sample Date	Location of Sample	Depth to Groundwater (feet bgs)	TPH-d (µg/L)	TPH-g (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	Total Lead (µg/L)
POK-GW-1	4/16/1992	Excavation bottom	8.5 - 9.0	<200	**4100**	**3.4**	**1.4**	**62**	**860**	**<0.05**

Notes:

bgs - below ground surface

µg/L - micrograms per liter

TPH-d - Total petroleum hydrocarbons as diesel

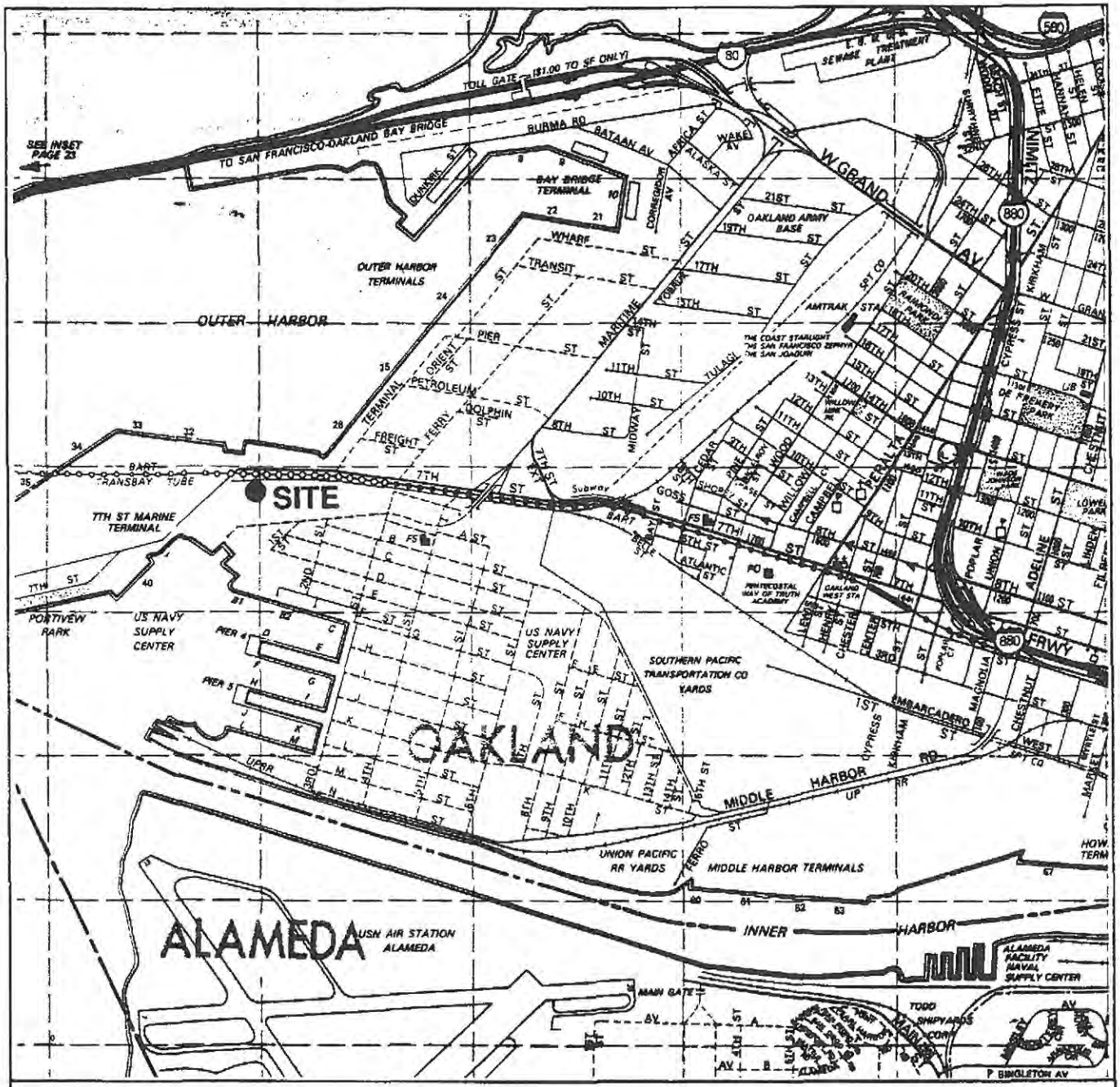
TPH-g - Total petroleum hydrocarbons as gasoline

Bold - value exceeds laboratory reporting limit

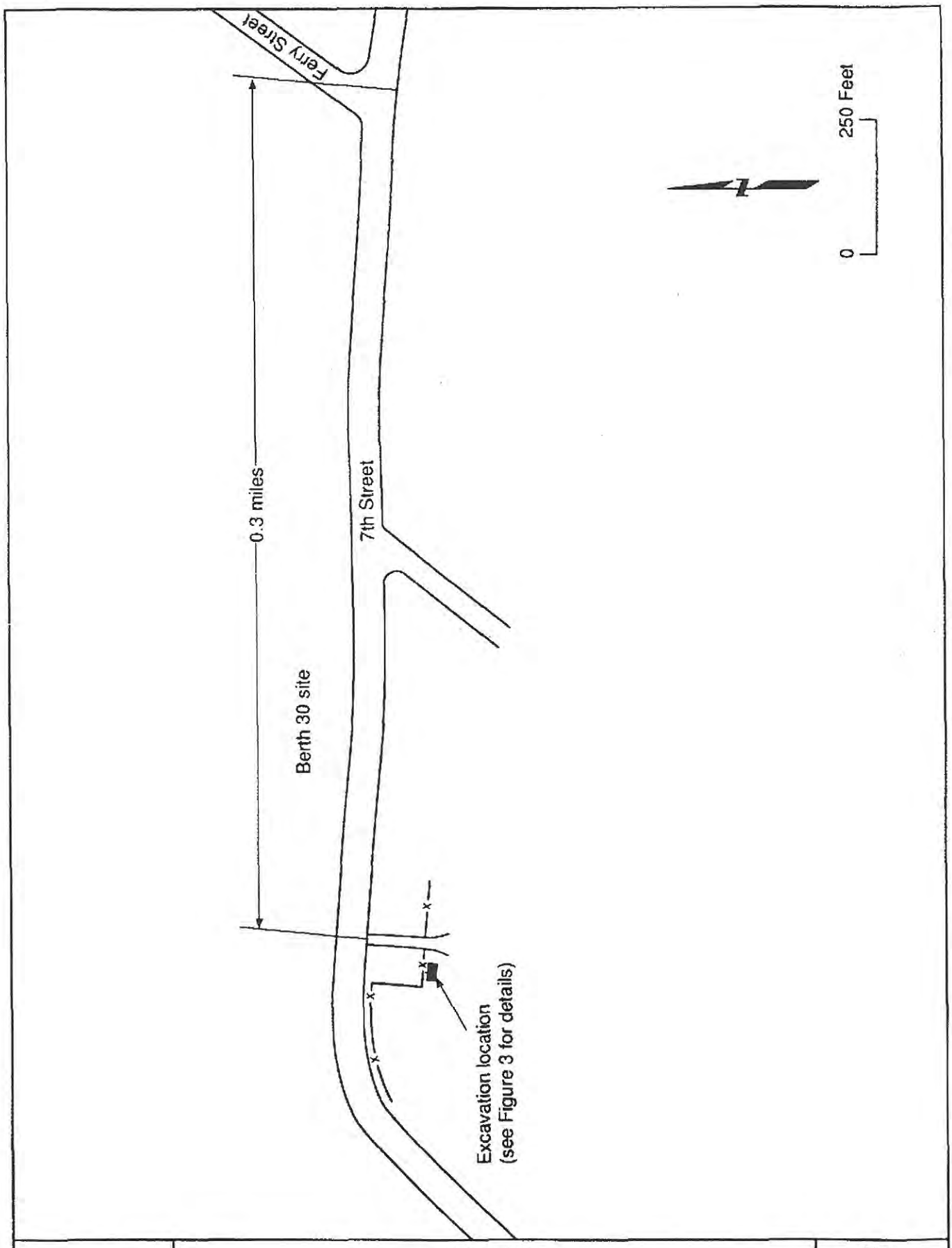
< - Not detected at or above the concentration identified

ARCADIS

Attachment 1
Historical Soil Sampling Locations and Site Maps



GEOMATRIX	SITE LOCATION MAP Port of Oakland - Kaiser Yard 2801 Seventh Street Oakland, California	Figure 1 Project No. 2026.01

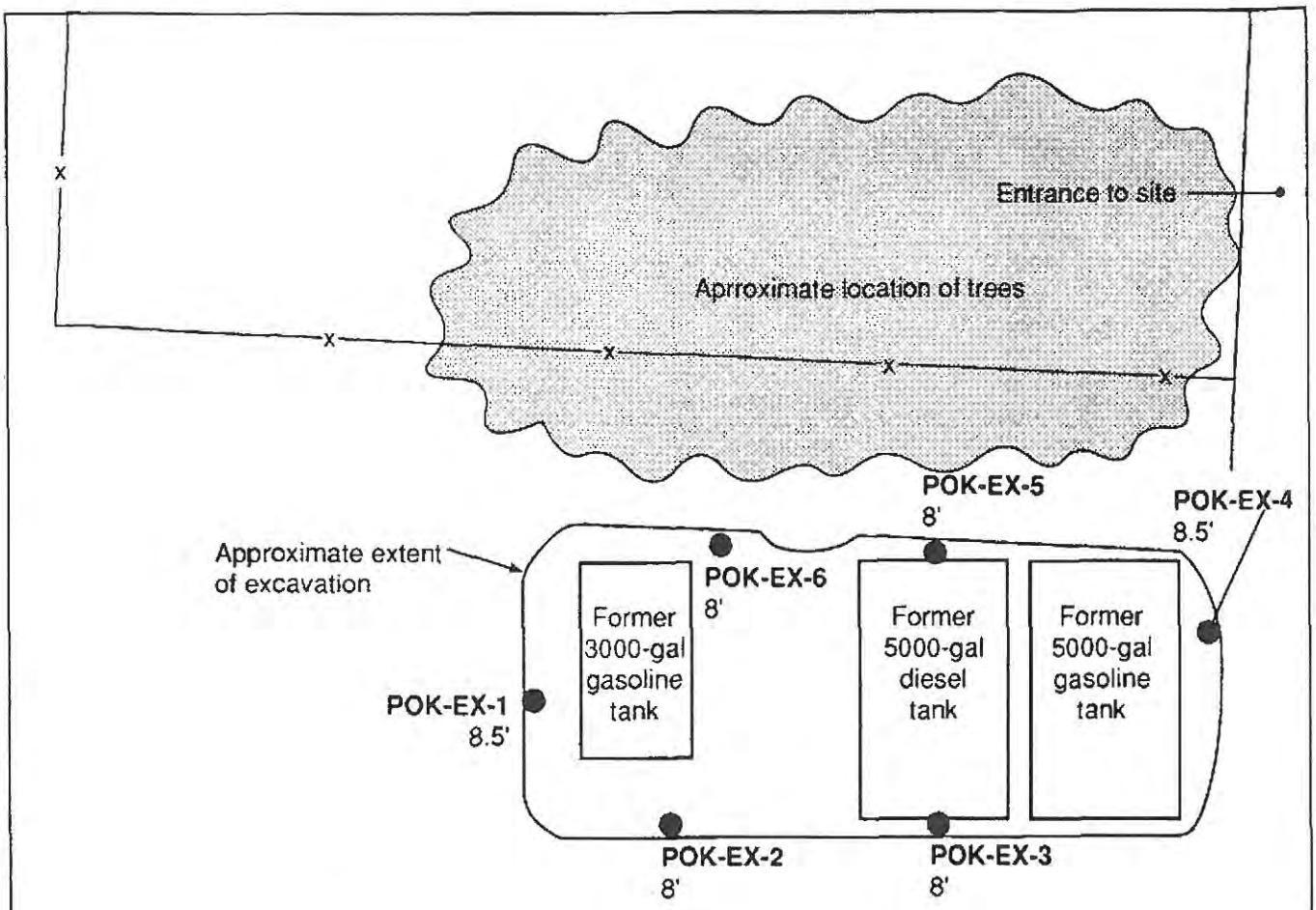


GEOMATRIX

SITE PLAN
Port of Oakland - Kaiser Yard
2801 Seventh Street
Oakland, California

Figure
2

Project No.
2026.01



EXPLANATION

POK-EX-1 ● Soil sample location

8.5' Sample depth (feet)

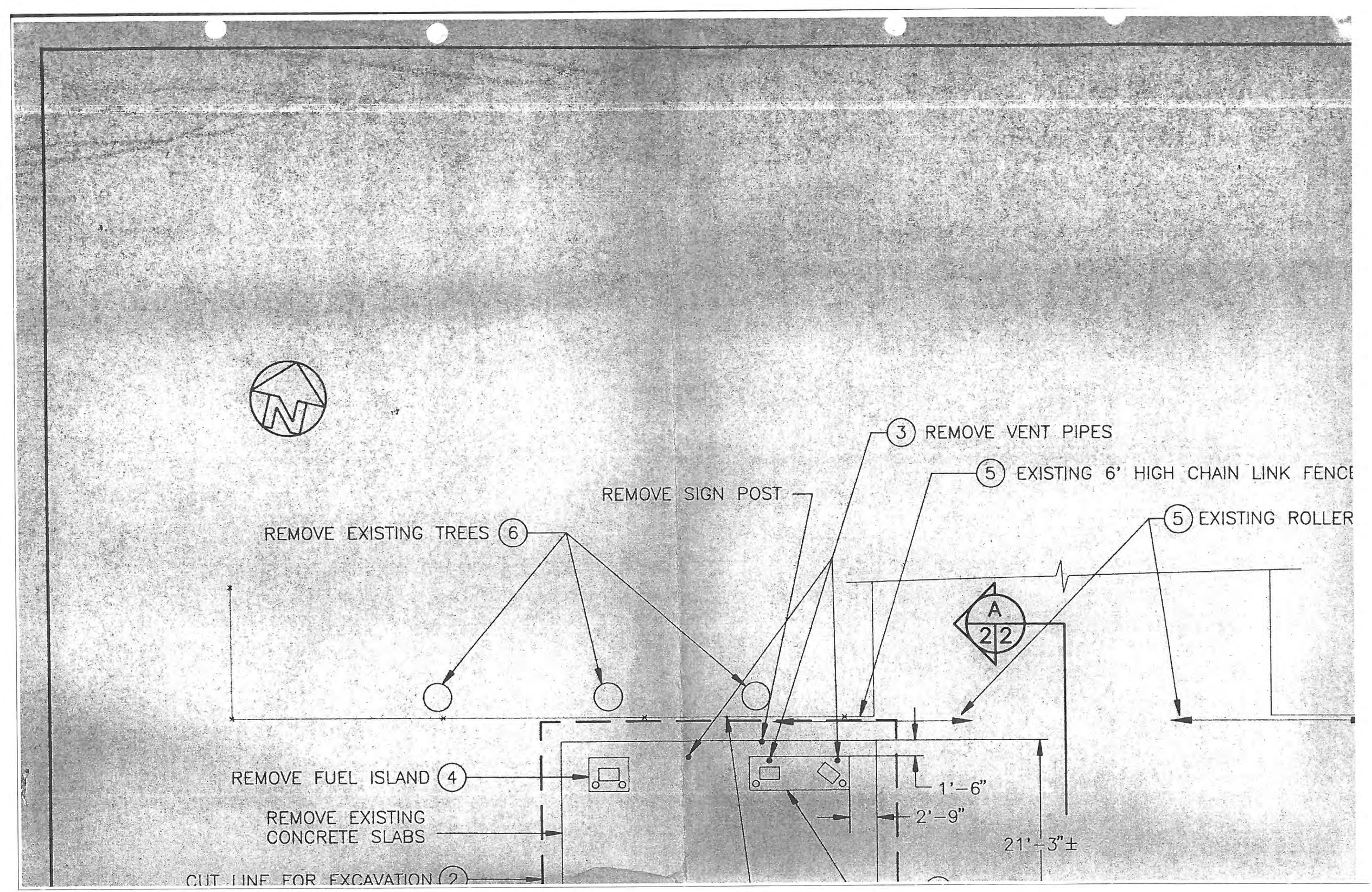
0 10 Feet

GEOMATRIX

LOCATIONS OF EXCAVATION, TANKS, AND SOIL SAMPLES
Port of Oakland - Kaiser Yard
2801 Seventh Street
Oakland, California

Figure
3

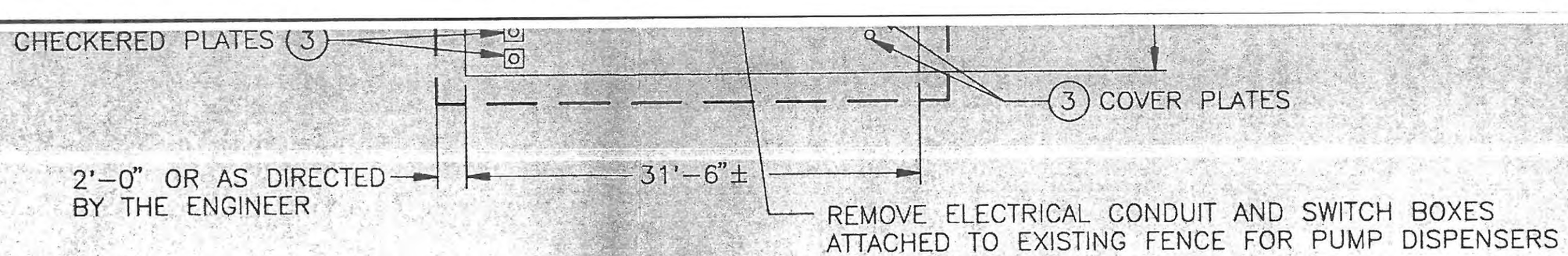
Project No.
2026.01


N
3 REMOVE VENT PIPES
5 EXISTING 6' HIGH CHAIN LINK FENCE
REMOVE SIGN POST
5 EXISTING ROLLER
REMOVE EXISTING TREES 6
A
2 2
REMOVE FUEL ISLAND 4
1'-6"
2'-9"
REMOVE EXISTING
CONCRETE SLABS
21'-3"±
CUT LINE FOR EXCAVATION 2

NOTES:

1. DESCRIPTION OF INACTIVE UNDERGROUND PETROLEUM (GASOLINE AND DIESEL) STORAGE TANKS FOR REMOVAL:
   A. TANK CF14: 5,000 GALLON CAPACITY STEEL TANK.
   B. TANK CF15: 3,000 GALLON CAPACITY STEEL TANK.
   C. TANK CF16: 5,000 GALLON CAPACITY STEEL TANK.
2. LOCATION OF EXISTING UNDERGROUND UTILITIES IS NOT KNOWN.
3. REMOVE FILL, DISCHARGE, AND VENT PIPING FROM TANKS CF14, CF15, AND CF16. ALL PIPING FROM TANKS TO FUEL ISLANDS SHALL BE REMOVED.
4. REMOVE TWO FUEL ISLANDS WITH GASOLINE AND DIESEL PUMP DISPENSERS.
5. REMOVE EXISTING FENCE AND GATE AS REQUIRED FOR EXCAVATION AND TREE REMOVAL ACCESS. INSTALL A TEMPORARY GATE AS REQUIRED TO SECURE SITE ACCESS IF EXISTING GATE IS REMOVED. COORDINATE WITH ENGINEER FOR GATE LOCK(S). REPLACE FENCE AND GATE AS REQUIRED TO RESTORE SITE AT COMPLETION OF CONTRACT WORK.
6. REMOVE THREE EXISTING EVERGREEN TREES INCLUDING THEIR STUMPS AND ROOTS FOR DISPOSAL OFF PORT PROPERTY.
7. WATER TABLE LEVEL VARIES.
8. INSTALL AN APPROVED GEOTEXTILE FABRIC OVER PERMEABLE BACKFILL (PRIOR TO NEW AGGREGATE SUBBASE). DO NOT INSTALL FABRIC BELOW THE WATER TABLE. OVERLAP ADJACENT SHEETS OF FABRIC A MINIMUM OF 18".

\TE



DETAIL 2 / 1|2
N.T.S.

(CONSTRUCTION SITE PERIMETER SECURITY FENCE NOT SHOWN FOR CLARITY)

REFERENCES

PLANS

FIELD BOOKS

"PORT OF OAKLAND DATUM" IS 3.20' BELOW MEAN SEA LEVEL

NO.	REVISIONS	DATE	APP'D

REVIEWED _____ ENGINEERING DEPARTMENT

REVIEWED _____ CONSTRUCTION DEPARTMENT

REVIEWED _____ PROJECT PLANNING DEPARTMENT

DRAWN

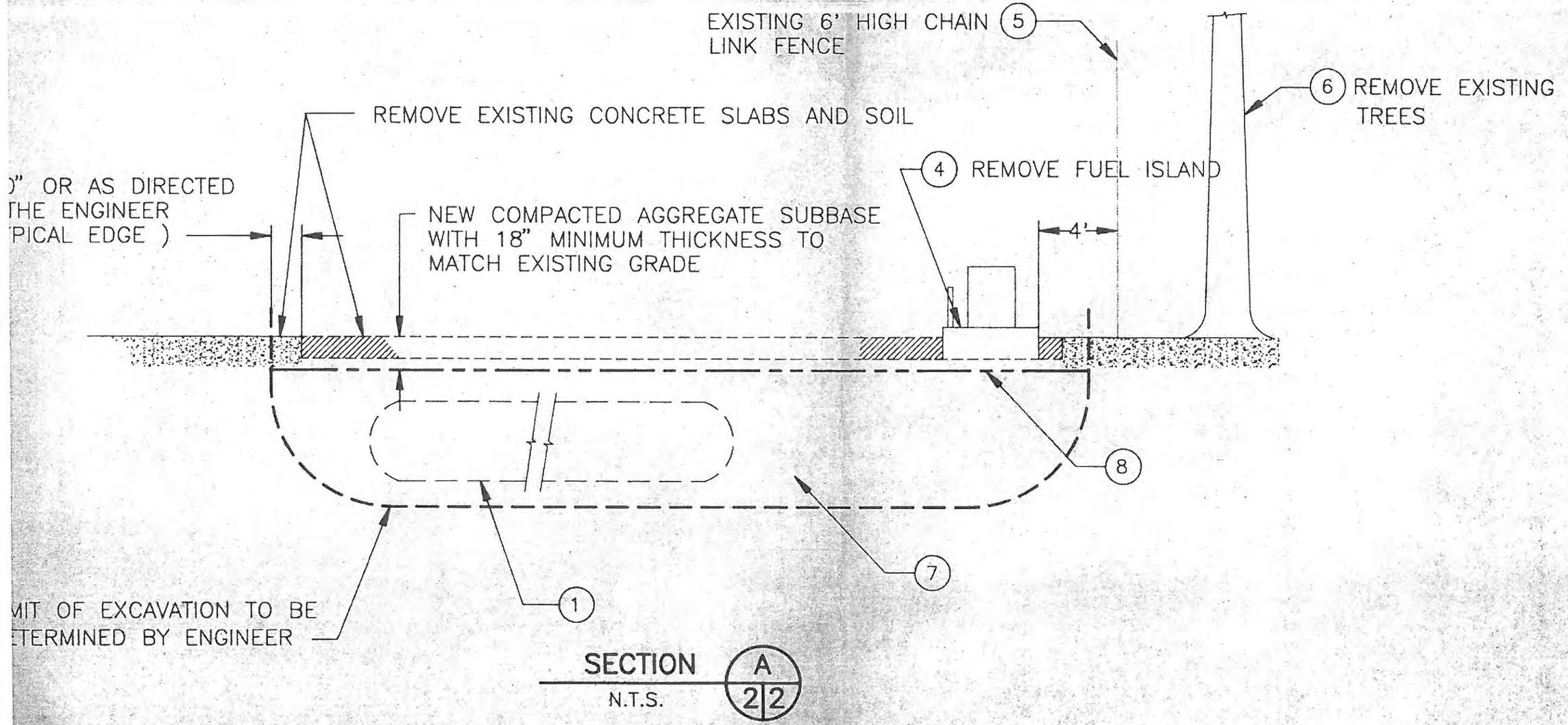
DESIGNED Harold W. Bump Jr. REG. ENGINEER NO.

CHECKED Harold W. Bump Jr. REG. ENGINEER NO.

REVIEWED M17555 REG. ENGINEER NO.

PORT

CAUTION - CHECK TRACING FOR LATEST REVISIONS



SECTION A 2|2
N.T.S.

OF OAKLAND

530 WATER STREET OAKLAND, CALIFORNIA

CHIEF ENGINEER

T H Daniels C17439
REG. ENGINEER NO.

APPROVED [signature] M13338
REG. ENGINEER NO.

RECOMMENDED [signature] M17555
REG. ENGINEER NO.

OUTER HARBOR TERMINAL OAKLAND, CA
BERTH 30

REMOVAL OF INACTIVE UNDERGROUND PETROLEUM STORAGE TANKS CF14, CF15, AND CF16

DETAIL AND SECTION

DATE DEC 3, 1991
SCALE N.T.S.
SHEET 2 OF 2 SHEETS
FILE AA-3091

UTION: THIS PLAN MAY BE REDUCED

0 1" 2" ORIGINAL SCALE

7 TH STREET

ACCESS

RAILROAD TRACKS

64'±

44'±

60' MIN

TEMPORARY STOCKPILE AREA FOR EXCAVATED SOIL

EXISTING 6' HIGH CHAIN LINK FENCE

VEHICLE ACCESS GATE IN TEMPORARY SECURITY FENCE

EXISTING ROLLER GATE

DESIGNATED PARKING AREA FOR CONTRACTI EMPLOYEES' PRIVATE VEHICLES

2
1|2

STORAGE AREA FOR CONTRACTOR

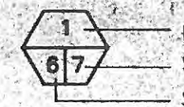
VEHICLE ACCESS GATE IN TEMPORARY SECURITY FENCE

OUTER HARBOR

0.3 MILES ODOMETI

PROJECT AREA 1
—

LEGEND



DETAIL IDENTIFICATION NO.
SHEET NO. ON WHICH DETAIL IS DRAWN
SHEET NO. FROM WHICH DETAIL IS TAKEN

SECTION IDENTIFICATION NO.
SHEET NO. ON WHICH SECTION IS DRAWN
SHEET NO. FROM WHICH SECTION IS TAKEN

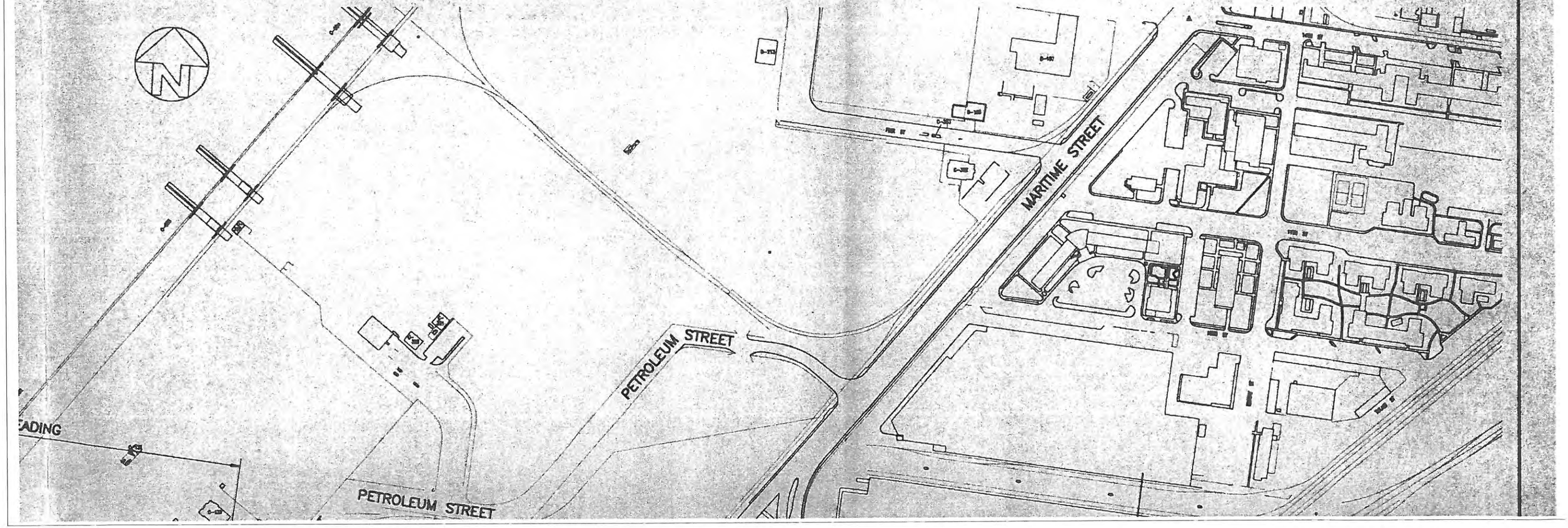
DETAIL IS TAKEN AND DRAWN ON SAME SHEET

SECTION IS TAKEN AND DRAWN ON SAME SHEET

GENERAL NOTES:

1. THIS DRAWING FORMS A PART OF PORT OF OAKLAND SPECIFICATION: "REMOVAL OF INACTIVE UNDERGROUND PETROLEUM STORAGE TANKS CF14, CF15, AND CF16 LOCATED ADJACENT TO SEVENTH STREET AT BERTH 30, OUTER HARBOR TERMINAL, OAKLAND, CALIFORNIA"

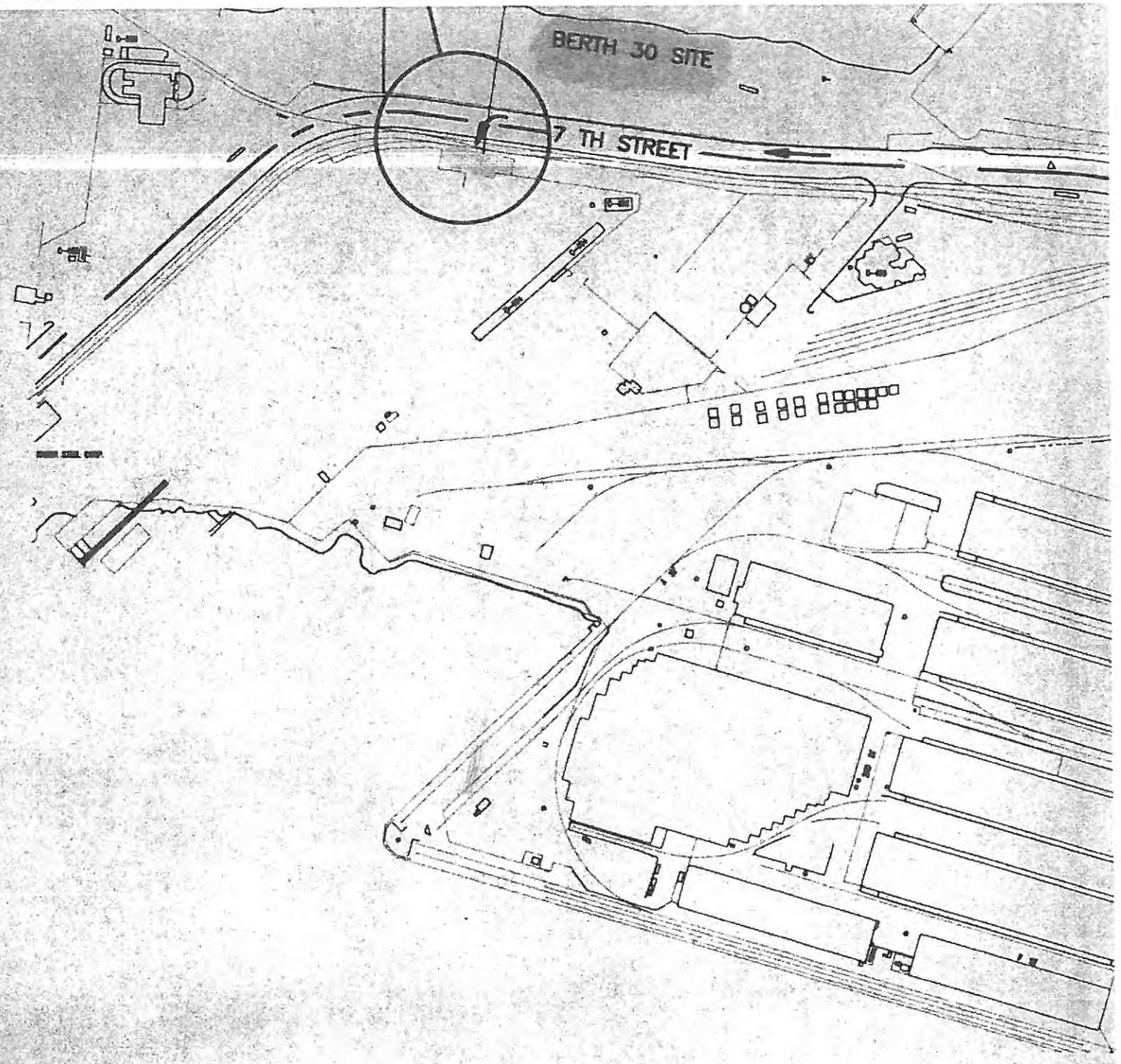
2. DETAIL AND SECTION VIEWS FOR TANK REMOVAL ARE SHOWN ON SHEET 2.



CONSTRUCTION SITE PERIMETER: INSTALL AND MAINTAIN A TEMPORARY/MOVABLE CHAIN LINK SECURITY FENCE (6' HEIGHT MINIMUM) WITH ACCESS GATES AROUND THIS PERIMETER, OR AS DIRECTED BY THE ENGINEER. ONE VEHICLE GATE SHALL BE ACCESSIBLE TO EMERGENCY VEHICLES AT ALL TIMES.

SITE ACCESS DETAIL 1

N.T.S.



REFERENCES

PLANS

FIELD BOOKS

"PORT OF OAKLAND DATUM" IS 3.20' BELOW MEAN SEA LEVEL

NO.	REVISIONS	DATE	APP'D

REVIEWED _____ FACILITIES DEPARTMENT

REVIEWED _____ CONSTRUCTION DEPARTMENT

REVIEWED _____ PROJECT PLANNING DEPARTMENT

DRAWN _____

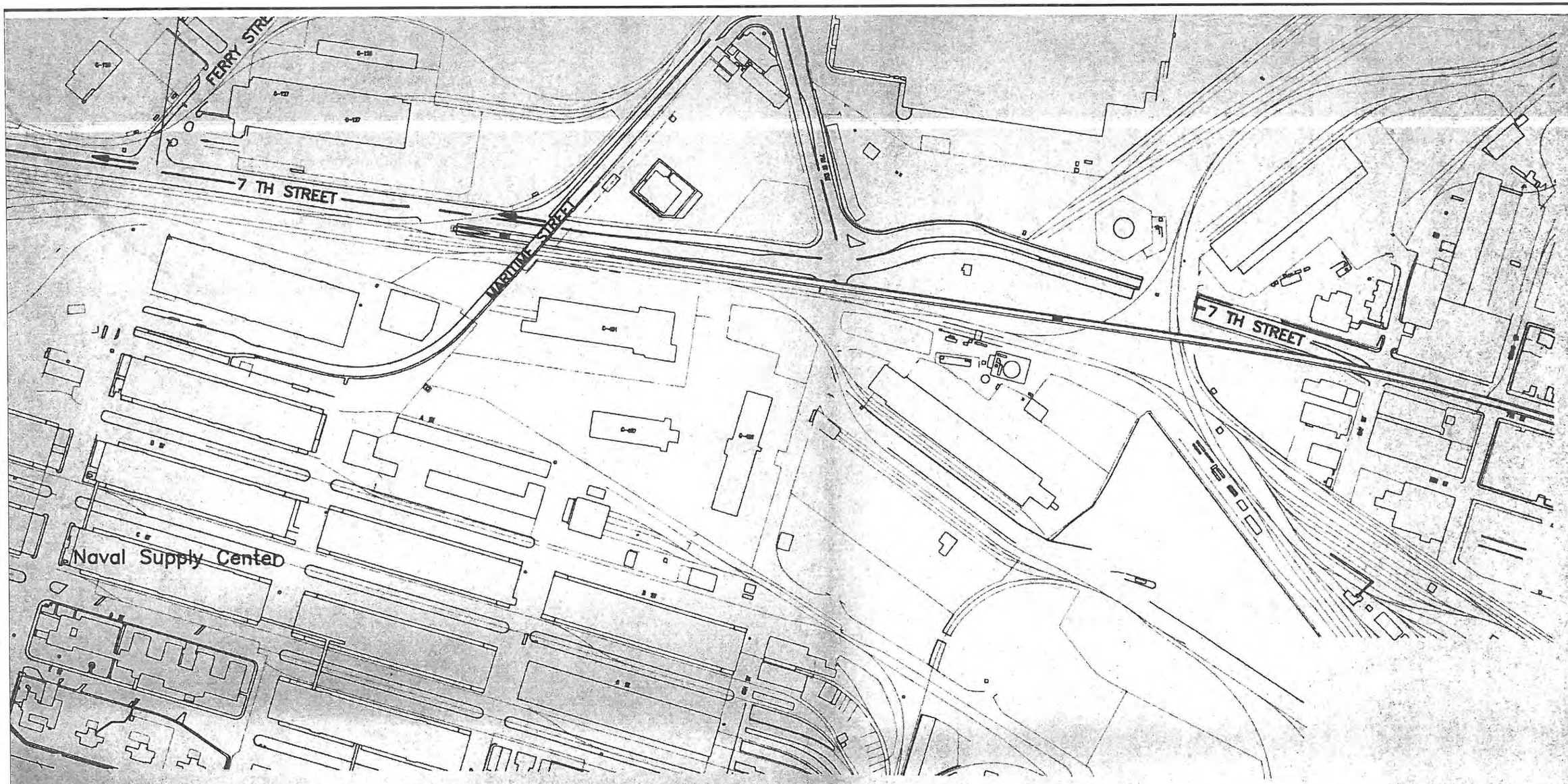
DESIGNED Harold W. Bump Jr. REG. ENGINEER NO.

CHECKED Harold W. Bump Jr. REG. ENGINEER NO.

REVIEWED _____ REG. ENGINEER NO.

PORT

CAUTION - CHECK TRACING FOR LATEST REVISIONS



LOCATION MAP

OF OAKLAND

WATER STREET OAKLAND, CALIFORNIA

CHIEF ENGINEER

J.H. Daniels C17439 REG. ENGINEER NO.

APPROVED [illegible] M13336 REG. ENGINEER NO.

RECOMMENDED Lee Straley M17355 REG. ENGINEER NO.

OUTER HARBOR TERMINAL OAKLAND, CA
BERTH 30

REMOVAL OF INACTIVE UNDERGROUND PETROLEUM STORAGE TANKS
CF14, CF15, AND CF16
SITE PLAN

DATE DEC 3, 1991

SCALE N.T.S.

SHEET 1 OF 2 SHEETS

FILE AA-3091

CAUTION: THIS PLAN MAY BE REDUCED

0 1" 2" ORIGINAL SCALE

ARCADIS

Attachment 2
State Water Resources Control Board LTC Policy Checklist

Site Name: Kaiser Yard UST, Berth30
Site Address: 2801 Seventh Street, Oakland, CA

Site meets the criteria of the Low-Threat Underground Storage Tank (UST) Case Closure Policy as described below.[1]

General Criteria General criteria that must be satisfied by all candidate sites:	
Is the unauthorized release located within the service area of a public water system?	■ Yes ☐ No
Does the unauthorized release consist only of petroleum?	■ Yes ☐ No
Has the unauthorized ("primary") release from the UST system been stopped?	■ Yes ☐ No
Has free product been removed to the maximum extent practicable?	■ Yes ☐ No ☐ NA
Has a conceptual site model that assesses the nature, extent, and mobility of the release been developed?	■ Yes ☐ No
Has secondary source been removed to the extent practicable?	■ Yes ☐ No
Has soil or groundwater been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15?	☐ Yes ■ No
Does nuisance as defined by Water Code section 13050 exist at the site?	☐ Yes ■ No
Are there unique site attributes or site-specific conditions that demonstrably increase the risk associated with residual petroleum constituents?	☐ Yes ■ No
Media-Specific Criteria Candidate sites must satisfy all three of these media-specific criteria:	
1. Groundwater: To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites:	
Is the contaminant plume that exceeds water quality objectives stable or decreasing in areal extent?	■ Yes ☐ No ☐ NA
Does the contaminant plume that exceeds water quality objectives meet all of the additional characteristics of one of the five classes of sites?	▣ Yes ☐ No ☐ NA
If YES, check applicable class: ■ **1** ☐ **2** ☐ **3** ☐ **4** ☐ **5**	

[1] Refer to the Low-Threat Underground Storage Tank Case Closure Policy for closure criteria for low-threat petroleum UST sites.

For sites with releases that have not affected groundwater, do mobile constituents (leachate, vapors, or light non-aqueous phase liquids) contain sufficient mobile constituents to cause groundwater to exceed the groundwater criteria?	☐ Yes ☐ No ■ NA
2. Petroleum Vapor Intrusion to Indoor Air: The site is considered low-threat for vapor intrusion to indoor air if site-specific conditions satisfy all of the characteristics of one of the three classes of sites (a through c) or if the exception for active commercial fueling facilities applies. **Is the site an active commercial petroleum fueling facility?** Exception: Satisfaction of the media-specific criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk. **a. Do site-specific conditions at the release site satisfy all of the applicable characteristics and criteria of scenarios 1 through 3 or all of the applicable characteristics and criteria of scenario 4?** If YES, check applicable scenarios: ☐ **1** ☐ **2** ☐ **3** ☐ **4** **b. Has a site-specific risk assessment for the vapor intrusion pathway been conducted and demonstrates that human health is protected to the satisfaction of the regulatory agency?** **c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that petroleum vapors migrating from soil or groundwater will have no significant risk of adversely affecting human health?**	☐ Yes ■ No ☐Yes ☐ No ■ NA ■ Yes ☐ No ☐ NA ☐ Yes ☐ No ■ NA
3. Direct Contact and Outdoor Air Exposure: The site is considered low-threat for direct contact and outdoor air exposure if site-specific conditions satisfy one of the three classes of sites (a through c). **a. Are maximum concentrations of petroleum constituents in soil less than or equal to those listed in Table 1 for the specified depth below ground surface (bgs)?** **b. Are maximum concentrations of petroleum constituents in soil less than levels that a site specific risk assessment demonstrates will have no significant risk of adversely affecting human health?** **c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that the concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health?**	■ Yes ☐ No ☐ NA ☐ Yes ☐ No ■ NA ☐ Yes ☐ No ■ NA