



June 15, 2006

Mr. Amir Gholami
Alameda County Environmental Health
1131 Harbor Parkway
Alameda, CA 94502

Subject: Low-Risk Case Closure Report

Site: Caltrans South Oakland Maintenance Station, 1112 29th Avenue
Oakland, California

Dear Mr. Gholami:

Please find enclosed one copy of the above referenced report. The report was prepared on behalf of Caltrans for the purpose of acquiring case closure from the Alameda County Environmental Health Department.

If you have any questions concerning the contents of the report please give me a call at (925) 371-5900.

Sincerely,
GEOCON CONSULTANTS, INC.

John Love, PG
Sr. Project Geologist

LOW RISK CASE CLOSURE SUMMARY REPORT

SOUTH OAKLAND
MAINTENANCE STATION
1112 29TH AVENUE
OAKLAND, CALIFORNIA



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GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
111 GRAND AVENUE
OAKLAND, CALIFORNIA

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CALTRANS CONTRACT NO. 04A1862
TASK ORDER NO. 32

GEOCON PROJECT NO. E8220-06-32

June 2006



Project No. E8220-06-32

June 14, 2006

Mr. Bahram Sazegar
California Department of Transportation - District 4
111 Grand Avenue, 14th Floor
Post Office Box 23660
Oakland, California 94623-0660

Subject: LOW RISK CASE CLOSURE SUMMARY REPORT
SOUTH OAKLAND MAINTENANCE STATION – 1112 29TH AVENUE
OAKLAND, CALIFORNIA
CONTRACT NO. 04A1862, TASK ORDER NO. 32

Dear Mr. Sazegar:

In accordance with California Department of Transportation (Caltrans) Contract No. 04A1862 and Task Order No. 32, Geocon has performed environmental engineering services associated with the Caltrans South Oakland Maintenance Station located at 1112 29th Avenue in Oakland, California.

The scope of services contained in this report consisted of compiling data presented in reports prepared by Geocon and other consultants for the purpose assessing subsurface soil and groundwater quality conditions with current regulatory guidelines required for case closure as a low risk soil and groundwater site.

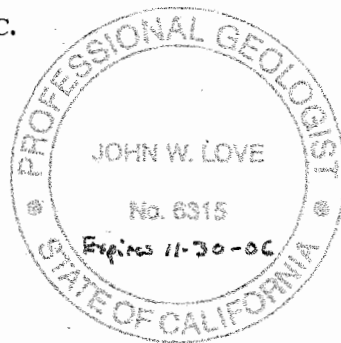
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If there are any questions concerning the contents of this report, or if Geocon may be of further service, please contact the undersigned at your convenience.

Sincerely,

GEOCON CONSULTANTS, INC.

John Love, PG
Sr. Project Geologist



Richard W. Day, CEG, CHG
Regional Manager

JL:RWD:rjk

- (3) Addressee
- (1) Amir Gholami, Alameda County Department of Environmental Health

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LOW RISK CASE CLOSURE SUMMARY REPORT

1.0 INTRODUCTION

This Low Risk Case Closure Summary Report for the California Department of Transportation (Caltrans) South Oakland Maintenance Station was prepared under Caltrans Contract No. 4A1862 and Task Order (TO) No. 32. The report was prepared to summarize soil and groundwater sample results obtained during previous source removal and characterization studies for the purpose of obtaining case closure from the Alameda County Department of Environmental Health (DEH) and Regional Water Quality Control Board – San Francisco Bay Region (RWQCB).

1.1 Site Description

The subject site is located at 1112 29th Avenue in Oakland, California. The site is used by Caltrans to store and service maintenance vehicles and equipment. The approximate location of the site is depicted on the Vicinity Map, Figure 1. The approximate site boundaries and existing structures are depicted on the Site Plan, Figure 2.

1.2 Background

One 4,000-gallon underground storage tank (UST) and one 2,000-gallon gasoline UST were removed from the site on March 11, 1997. The tank pit was over-excavated and approximately 52 tons of petroleum-impacted soil was transported on March 14, 1997 to TPS Technologies in Richmond, California for thermal treatment. Confirmation soil samples collected from the UST excavation indicated that total petroleum hydrocarbon compounds as gasoline (TPHg) and as diesel (TPHd) were reported as high as 380 and 21 milligrams per kilogram (mg/kg), respectively. Benzene, toluene, ethylbenzene, total xylenes (BTEX compounds) were reported as high as 48 mg/kg and methyl tertiary butyl ether (MTBE) was reported as high as 9.15 mg/kg. Excavation sample results are presented in Table 1.

On April 6 and 7, 1999, soil and groundwater samples were collected from six soil borings (B-1 through B-6) installed at the site. Soil sample results indicated that TPHg and MTBE were detected in one sample location (B-6 at 10 feet) at concentrations of 13 mg/kg and 0.16 mg/kg, respectively. No other contaminants were detected above the laboratory reporting limits in soil samples collected from the other soil borings. Groundwater sample results indicated that TPHg was present at concentrations of 520 micrograms per liter (ug/l) in two boring locations (B-3 and B-4), and it was reported as non-detect in the other four soil boring locations. Benzene was detected at 6.3 ug/l at one location (B-3), above its maximum contaminant level (MCL) of 1 ug/l. MTBE was detected above its MCL of 13 ug/l at two locations (B-5 and B-6), with reported concentrations of 6,600 ug/l and 24 ug/l.

On August 13, 1999, three additional soil borings (SB-7 through SB-9) were drilled at the site along the property boundary. Results indicated that MTBE was present in groundwater in two sample locations (B-7 and B-8) at concentrations of 5,600 and 9.0 ug/l. Soil sample results are presented in Table 1, and grab groundwater sample results are presented in Tables 2 and 2A.

In June and July 2000, Professional Service Industries (PSI) completed a supplemental investigation that included the installation of four monitoring wells (MW-1 through MW-4). Analytical laboratory results of groundwater samples collected from MW-1 through MW-4 indicated that TPHg and BTEX compounds were present at low concentrations in monitoring wells MW-1 and MW-3, and MTBE was present in groundwater samples collected from all four monitoring wells at concentrations ranging from 18 ug/l to 5,000 ug/l.

In August 2001, PSI drilled three offsite soil borings (B-10 to B-12). The borings were positioned in the downgradient groundwater flow direction at the All-Aboard Mini-Storage property. Analytical laboratory results of groundwater samples collected from the three temporary boring locations indicated that MTBE was not present in groundwater at concentrations that exceeded the MCL. Based on these results, PSI recommended no further investigation downgradient of the South Oakland Maintenance Station.

Quarterly groundwater sampling of monitoring wells MW-1 through MW-4 was conducted at the site from June 2000 through September 2002. The monitoring wells were also sampled in May 2004 and May 2005. Groundwater sample results from MW-1 through MW-4 are presented in Table 3.

2.0 SITE LITHOLOGY AND HYDROGEOLOGIC CONDITIONS

Subsurface soil and groundwater conditions were obtained from boring logs included in several site investigation reports prepared by PSI in 1999, 2000, and 2001.

2.1 Site Lithology

The site is underlain by sand and gravel fill below the asphalt-paved ground surface to depths ranging from three to five feet below ground surface (bgs). Underlying the fill material are fine grain soils consisting primarily of inter-bedded clayey sands and silts, and clays to a depth of approximately 25 feet bgs. Some sand and gravel was logged in the MW-1 borehole from approximately 18 to 25 feet bgs; however, this unit does not appear to be continuous beneath the area.

Copies of soil boring logs and well construction details are provided in Appendix A, and geologic cross sections of the study area are provided on Figures 3 and 4.

2.2 Hydrogeologic Conditions

Groundwater was encountered under confined conditions at most sample locations beneath the study area. Groundwater was generally encountered during drilling operations at depths ranging from 10 to 32 feet bgs, and it was reported to have stabilized between 5 and 14.5 feet bgs in all borehole locations (see boring logs in Appendix A).

In June 2000, monitoring wells MW-1 through MW-4 were constructed. Since that time, depth to groundwater in all four monitoring wells has been reported at depths ranging from 7.65 feet to 10.76 feet below top of well casing (see Table 3).

Based on depth to groundwater measurements collected from MW-1 through MW-4 during quarterly monitoring events, the groundwater flow direction and magnitude has ranged from west in June 2000 at a magnitude of 0.005 feet per foot (ft/ft) to south in May 2005 at a magnitude of 0.01 ft/ft.

3.0 SOIL AND GROUNDWATER QUALITY CONDITIONS

Soil and groundwater sample results were compiled from previous investigations conducted by A.E. Schmidt Environmental (1997), PSI (1999, 2000, and 2001), and Geocon (2005).

3.1 Excavation Soil Sample Results

In March 1997, A.E. Schmidt Environmental over-excavated approximately 8½ tons of petroleum hydrocarbon-impacted soil from the UST excavation shown on Figure 2. The depth of the excavation and subsequent soil sample depths were not presented in the 1997 UST Closure Report; however, based on the size of the USTs and the volume of soil removed from the excavation, the depth of the excavation and confirmation soil samples was approximately 10 feet bgs.

Two soil samples were collected beneath each end of the unleaded and diesel fuel USTs. The samples collected beneath the 2,000-gallon unleaded gasoline UST designated as CAL-OAK-UNL-N and CAL-OAK-UNL-S, and the samples collected beneath the 4,000-gallon diesel fuel UST were designated as CAL-OAK-DIS-N and CAL-OAK-DIS-S. The samples collected beneath the unleaded gasoline UST were analyzed for TPHg, BTEX, MTBE, and total lead; the samples collected beneath the diesel fuel UST were analyzed for TPHd, BTEX, and total lead.

Soil sample CAL-OAK-UNL-N collected beneath the west end of the gasoline UST was reported to contain benzene, toluene, ethylbenzene, xylenes, and MTBE at concentrations of 1,650 ug/kg, 11,860 ug/kg, 8,040 ug/kg, 48,860 ug/kg, and 9,150 ug/kg, respectively; however, other soil samples collected within close proximity (within the same excavation) to CAL-OAK-UNL-N were only reported to contain benzene, ethylbenzene, and MTBE at concentrations ranging from non-detect to 380 ug/kg, indicating that the CAL-OAK-UNL-N soil sample was likely collected from an isolated “hot spot” within the former UST excavation.

All excavation confirmation and stockpile soil sample results are tabulated in Table 1.

3.2 Temporary Boring and Monitoring Well Borehole Soil Sample Results

Between April 1999 and August 2001, twelve temporary borings (B-1 through B-12) were advanced at the site and offsite area to the south-southwest to characterize the vertical and lateral extent of petroleum hydrocarbon impacts to soil and groundwater associated with the former USTs. The boring locations are shown on Figure 2.

Soil samples were collected for laboratory analysis from borings B-1 through B-12 at 5-foot sample intervals beginning at 5 feet bgs and extending to depths ranging from 10 to 25 feet bgs. Soil samples were analyzed for TPHg, BTEX, MTBE, and in some instances other fuel oxygenate compounds (FOCs) and volatile organic compounds (VOCs). Soil sample results are presented in Table 1, and graphically shown on the cross-sections, Figures 3 and 4.

BTEX compounds were reported as non-detect in soil samples, and TPHg was only reported in two soil samples (B-6 at 10 feet and B-9 at 15 feet) at concentrations of 0.54 mg/kg and 13 mg/kg. MTBE was reported in three soil samples from borings B-5, B-7, and B-8 at concentrations ranging 11 ug/kg to 160 ug/kg.

Soil sample results obtained from borings B-1 through B-12 indicate that soil contamination beneath most of the study area was the result of contaminant migration through groundwater zones located within clayey soils situated west and south of the former USTs (see Figure 3 and 4).

3.3 Temporary Boring Grab Groundwater Sample Results

Grab groundwater samples were collected from first encountered groundwater in borings B-1 through B-12. All groundwater samples were analyzed for TPHg, BTEX, MTBE, and in some instances FOCs and VOCs. Results of grab groundwater samples collected from borings B-1 through B-12 are presented in Tables 2 and 2A, and grab groundwater sample results for MTBE are plotted on the cross-sections, Figures 3, 4, and on Figure 5.

All target analytes were reported as non-detect in borings B-1 and B-2. TPHg, BTEX, and several VOCs were reported at low concentrations in borings B-3 through B-12. MTBE was reported in several boring locations situated south and down gradient of the former USTs. MTBE was detected at concentrations exceeding the maximum contaminant level (MCL) in three boring locations (B-5 through B-7). MTBE was reported at concentrations of 6,600 ug/l in B-5, 24 ug/l in B-6, and 5,600 ug/l in B-7.

An isoconcentration map of MTBE concentrations reported in grab groundwater samples collected from borings B-1 through B-12 is presented as Figure 5. The map indicates the highest MTBE concentrations are located immediately south of the former UST excavation, centered in the vicinity of MW-3. These sample results coincide with groundwater sample results obtained from monitoring wells MW-1 through MW-4, which are discussed in the following Section.

3.4 Monitoring Well Groundwater Sample Results

Groundwater samples have been collected 12 times from monitoring wells MW-1 through MW-4 since June 2000. All groundwater samples were analyzed for TPHg, BTEX, and FOCs. Groundwater sample results from the four wells are presented in Table 3, and sample results for MTBE are plotted on the cross-sections, Figures 3, 4, and on Figures 6 and 7.

The highest MTBE concentrations in groundwater are from samples collected from MW-1 located within several feet of the former UST excavation in the upgradient groundwater flow direction; and MW-3 situated approximately 25 feet south of the former UST excavation in the down gradient groundwater flow direction.

Isoconcentration maps of initial MTBE concentrations (June 2000), and the most recent MTBE concentrations (May 2005) are presented as Figures 6 and 7, respectively. The isoconcentration contours shown on Figures 6 and 7 indicate the highest MTBE concentrations are located immediately south of the former USTs near MW-3, and that the lateral extent of the MTBE plume is decreasing with time.

MTBE concentrations in MW-3 have fluctuated since June 2000; however, as the MTBE concentration charts for MW-1 through MW-4 provided in Appendix B indicates, the MTBE concentration trend in MW-3 shows a stabilized to slightly decreasing trend and the MTBE concentration trends in MW-1, MW-2, and MW-3 display decreasing trends over the same time period.

4.0 SENSITIVE RECEPTORS

A sensitive receptor survey was completed by PSI in 1999. The findings of the survey were included in a report entitled *Hazardous Waste Preliminary Site Investigation Report*, dated December 1, 1999.

Findings of the survey indicated that there were no utility trenches within the vicinity of the former UST excavation; however, there were two industrial wells located south of the Caltrans Maintenance facility and Southern Pacific Railroad right-of-way on the All Aboard Mini-Storage site. The All Aboard Mini-Storage site used to be owned by the Del Monte Corporation and the wells were reported to be 873 feet and 875 feet deep. The 875-foot well was reportedly abandoned, however, there was no information found pertaining to the disposition of the other well.

The 873-foot industrial well was likely abandoned before the Del Monte site was redeveloped as a mini-storage facility; however, even if it were still in existence, it is unlikely this well would provide a conduit for the vertical migration of petroleum hydrocarbons from the Caltrans site because groundwater samples collected from borings B-10, B-11, and B-12 drilled on the All Aboard Mini-Storage site indicates the hydrocarbon plume terminates somewhere northeast of this property beneath the Pacific Railroad right-of-way.

The nearest surface waters within proximity of the Caltrans site are Sausal Creek located approximately 650 feet to the northeast and a San Francisco Bay tidal canal located approximately ½ mile southwest of the site (see Figure 1). Neither water body is threatened by the petroleum hydrocarbon plume beneath the Caltrans site.

5.0 COMPARISON OF CONTAMINANT CONCENTRATIONS AND CITY OF OAKLAND ENVIRONMENTAL RISK-BASED SCREENING LEVELS

Tier 1 Risk-Based Screening Levels (RBSLs) developed by the City of Oakland Public Works Agency, Environmental Services Division (PWA), and Tier 3 Site Specific Target Levels (SSTLs) developed using PWA software, were compared with contaminant concentrations in soil and groundwater beneath the Caltrans site. The applied RBSLs and SSTLs were based on viable exposure pathways associated with present and potential future property uses of the Caltrans site. Tier 1 RBSLs and Tier 3 SSTLs are presented in Appendix C, along with the input parameters used to develop each.

Since shallow-depth groundwater beneath the site is not used for drinking water purposes, the only exposure pathways applicable for the site are vapor intrusion from groundwater and soil to indoor and outdoor air, and direct exposure to soil (workers contacting excavated soil). Additionally, although RBSL and SSTL comparisons were made for both residential and commercial sites, the appropriate classification of the Caltrans site is that of a commercial property underlain by low permeable soils (clays and silts).

Geocon completed the City of Oakland Risk-Based Corrective Action (RBCA) Eligibility Checklist (provided in Appendix C) to determine if the site was eligible for comparison with the Tier 1 or Tier 2 RBSLs, or whether comparison with Tier 3 SSTLs was necessary. Results of the checklist indicate that establishment of Tier 3 SSTLs was necessary for the Caltrans South Oakland site because groundwater is less than 10 feet below ground surface (bgs), and inhalation of volatilized contaminants of concern (COCs) from groundwater to indoor air or outdoor air is a pathway of concern but groundwater ingestion is not.

Tier 3 SSTLs were calculated for the site using the City of Oakland software available on the PWA website. Based on the site lithology, Geocon used the clayey silts input default parameters, and site specific depth to groundwater and depth to subsurface soil data to calculate Tier 3 SSTLs.

Since the Tier 3 SSTLs are typically less stringent than the Tier 1 RBSLs, comparison of COC concentrations in soil and groundwater beneath the site with both the Tier 1 RBSLs and Tier 3 SSTLs are presented to further justify the site's qualification for low risk closure.

5.1 Volatilization of Contaminants in Groundwater to Indoor and Outdoor Air

A comparison of COC concentrations in groundwater beneath the site with the Tier 1 RBSLs established by the City of Oakland for BTEX and MTBE volatilization from groundwater to indoor and outdoor air are shown in Tables 4 and 4A, and Tier 3 SSTL comparisons are provided in Tables 5 and 5A. For comparison purposes, the maximum reported concentrations at the site were used, as were the most recent concentrations (May 2005) reported in monitoring well MW-3 (the monitoring well with the highest contaminant concentrations). The contaminant concentrations were compared with the RBSLs and SSTLs established for both residential and commercial sites.

The maximum reported contaminant concentrations at the site do not exceed the Tier 3 SSTLs.

The only exceedance noted in the comparison of groundwater concentrations with the Tier 1 RBSLs was benzene. The highest benzene concentration of 220 ug/l exceeded the Tier 1 residential carcinogenic RBSL of 110 ug/l (see Table 4). No other Tier 1 RBSLs were exceeded.

5.1.1 Calculated MTBE Half-Life Concentrations in Groundwater

The lateral extent of the petroleum hydrocarbon plume has changed through time, as shown in Figures 5 through 7. Currently, MTBE concentrations have stabilized near MW-3 and are decreasing around the margins of the plume. This conclusion is supported by MTBE concentration trends plotted on charts for monitoring wells MW-1 through MW-4 provided in Appendix B.

Both natural and logarithmic graphs were plotted for MTBE concentrations reported in MW-1 through MW-4 from June 2000 to May 2005. With the exception of MW-3, wells MW-1, MW-2, and MW-4 show clear decreasing MTBE concentration trends, while MW-3 shows a stable to slightly decreasing concentration trend.

Based on the contaminant trend slopes of each well, the ½-life for MTBE concentrations in MW-1 through MW-4 can be calculated using the following formula:

$$t_{0.5} = \ln(0.5) / \text{slope}.$$

Where:

$$\begin{aligned} t_{0.5} &= \text{half-life of MTBE [days]} \\ \ln(0.5) &= \text{natural log of 0.5 (equals -0.693)} \\ \text{slope} &= \text{first order degradation constant [day}^{-1}\text{]} \end{aligned}$$

The degradation constants (trendline slope) for wells MW-1, MW-2, and MW-4 range from -0.0008 to -0.0012. This equates to a MTBE half-life ranging from 866 days (2.37 years) to 578 days (1.58 years). The degradation constant for well MW-3 is -0.00006, which equates to a MTBE ½-life of 11,552 days (31.6 years).

This graphical method used to determine site-specific degradation rate and ½-life is consistent with the approach presented in “*Regression Techniques and Analytical Solutions to Demonstrate Intrinsic Bioremediation. In: Intrinsic Bioremediation*” (Buscheck and Alcantar, 1995).

5.2 Volatilization of Contaminants in Soil to Indoor and Outdoor Air

A worse case scenario of volatilization of contaminants in soil to indoor and outdoor air was used to compare with the Tier 1 RBSLs and Tier 3 SSTLs. In evaluating a worse case scenario, only post-remediation excavation soil samples (collected from a depth of 10 feet bgs or less), and soil samples from boreholes located within, adjacent, and down gradient from the former USTs were used in calculating the 95% upper confidence limit (UCL) concentration for comparison with the RBSLs and SSTLs. Soil samples from post-remediation excavation sample CAL-OAK-UNL-S and CAL-OAK-UNL-N, temporary borings B-2, B-3, B-4, B-5, and monitoring wells MW-1, MW-2, and MW-3 were used to calculate the 95% UCL concentrations for comparisons with the RBSL and SSTLs.

ProUCL software published by the EPA (EPA/600/R04/079, April 2004) was used to evaluate the data distribution and calculate 95% UCL concentrations in soil. The 95% UCL of the true mean is defined as that value that, when calculated repeatedly for randomly drawn subsets of site data, equals or exceeds the true mean 95% of the time. The UCLs of the true mean concentration are used as the mean concentrations because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from the site. The UCLs therefore account for uncertainties due to limited sampling data. As data become less limited at a site, uncertainties decrease and the UCLs move closer to the true mean.

Based on the distribution of contaminant concentrations in soil samples collected from the sample locations mentioned above, the ProUCL software computed the data set for each COC is non-parametric, and the Chebychev statistical method should be utilized to calculate an appropriate UCL concentration for each analyte. Copies of the ProUCL software calculations for each analyte are provided in Appendix D, and the resultant values are presented in Tables 6, 6A, 7, and 7A for comparison with the Tier 1 RBSLs and Tier 3 SSTLs.

The 95% UCL concentrations at the site do not exceed the Tier3 SSTLs.

The only exceedances noted in the comparison of soil concentrations with Tier 1 RBSLs was benzene. The 95% UCL benzene concentration of 809 ug/kg exceeded the Tier 1 residential carcinogenic RBSL of 62 ug/kg for volatilization from soil to indoor air, as well as the Tier 1 residential and commercial carcinogenic RBSLs of 190 ug/kg and 730 ug/kg, respectively, for volatilization from soil to outdoor air. No other RBSLs were exceeded.

It should also be pointed out that the 95% UCL used to calculate the contaminant concentrations in soils beneath the site were heavily skewed as a result of one soil sample collected (CAL-OAK-UNL-N) from the former UST excavation. As Tables 6, 6A, 7, and 7A show, if this potentially

anomalous result is omitted from the calculation, no Tier 1 RBSL for either residential or commercial use scenario is exceeded.

5.3 Direct Exposure to Contaminants in Soil

Should soil excavation take place at some point in the future as the result of redevelopment or modification to the Caltrans site, workers could potentially come into direct contact with petroleum-impacted soils. Contaminant concentrations in soil used to compare with the Tier 1 RBSLs and Tier 3 SSTLs for direct exposure are the same as those calculated for the volatilization to indoor and outdoor air scenarios described in Section 5.2. The RBSLs and SSTLs used to simulate the direct exposure pathway are those values listed under the surficial soil exposure route in the City of Oakland RBSL and SSTL tables provided in Appendix C.

Tables 8 and 9 present the 95% UCL contaminant concentrations in soil comparisons with the Tier 1 RBSLs and Tier 3 SSTLs for direct exposure with surficial soils. As the tables indicate, all COCs are below the residential and commercial RBSLs and SSTLs for the direct contact with soils exposure pathway.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of previous investigations and quarterly groundwater monitoring the following is concluded:

- Source removal was conducted in 1997 when the USTs and contaminated soil surrounding the USTs were removed from the site.
- After several investigations, and quarterly groundwater monitoring events, the lateral and vertical extent of soil and groundwater contamination was adequately characterized. Impacts to soil are primarily restricted to the immediate vicinity of the excavation and area immediately south near MW-3. Other impacts to soils, as those reported in soil samples collected from the MW-3 borehole, appear to be the result of saturated soil samples collected within the boundaries of the petroleum hydrocarbon plume.

The lateral extent of the petroleum hydrocarbon plume has changed through time, as shown in Figures 6 and 7. Currently, MTBE concentrations appear to have stabilized near MW-3 and are decreasing around the margins of the plume.

- The groundwater flow direction beneath the site has ranged from west to southwest since June 2000.
- A comparison of soil and groundwater contaminant concentrations with City of Oakland SSTLs indicates that no Tier 3 SSTL (which the site is classified under according to City of Oakland RBCA criteria) was exceeded under the residential or commercial land use scenarios. To further support case closure contaminant concentrations were also compared to Tier 1 RBSLs. The only compound which exceeds the Tier 1 RBSLs was benzene.
- A sensitive receptor survey was completed by PSI in 2001. Results of the survey indicated that there is potentially one 873-foot deep industrial well located on the All-Aboard Mini Storage site located southwest of the Caltrans site; however, grab groundwater samples collected from borings B-7 through B-12 indicate the MTBE plume likely terminates somewhere beneath the Southern Pacific Railroad right-of-way situated between the Caltrans and All-Aboard Mini Storage sites.

Based on the information presented in this report, the lateral extent of the plume is decreasing with time, and current MTBE concentrations do not pose an undue risk to the environment or human health. Therefore, Geocon recommends the DEH consider this site for case closure as a low risk groundwater site.

7.0 LIMITATIONS

This report has been prepared exclusively for Caltrans. The information contained herein is only valid as of the date of the report, and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

8.0 REFERENCES

A.E. Schmidt Environmental, April 1997, UST Closure Report, State of California Department of Transportation, Oakland Maintenance Yard

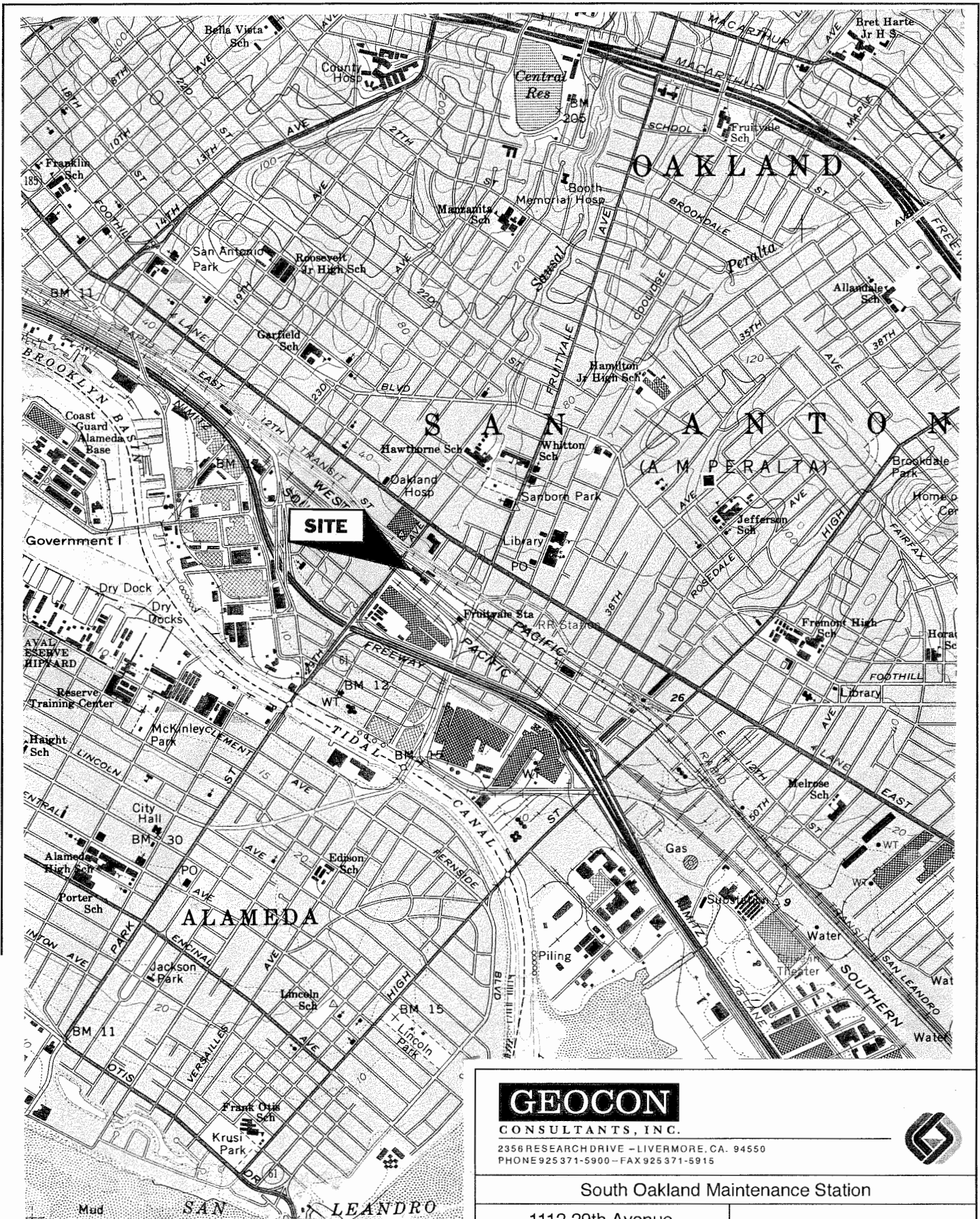
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1112 29th Avenue
 Oakland, California

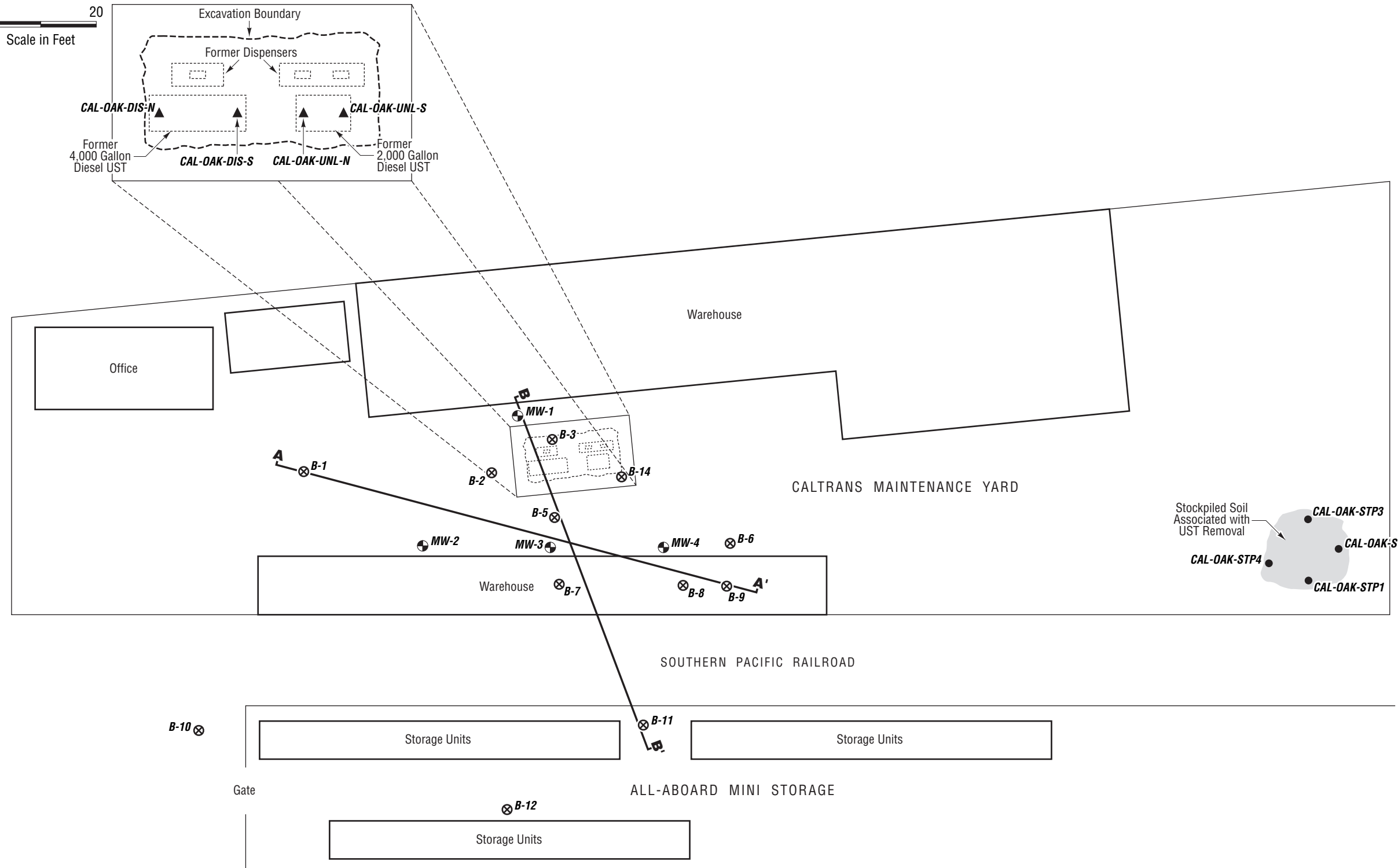
VICINITY MAP

GEOCON Proj. No. E8220-06-32

Task Order No. 32

June 2006

Figure 1



LEGEND:

- MW-1 ⊕ Approximate Monitoring Well Location
- B-1 ⊗ Approximate Temporary Boring Location
- CAL-OAK-DIS-N ▲ Approximate Excavation Sample Location
- CAL-OAK-STP1 ● Approximate Stockpile Sample Location
- A—A' Cross-Section Location (See Figures 3 and 4)



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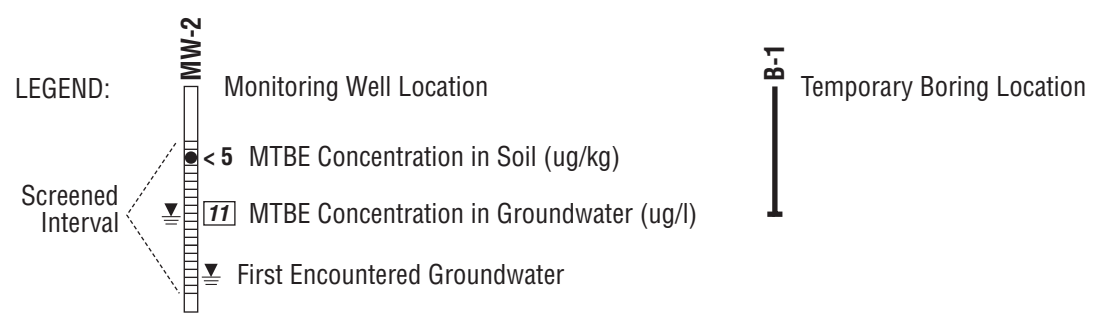
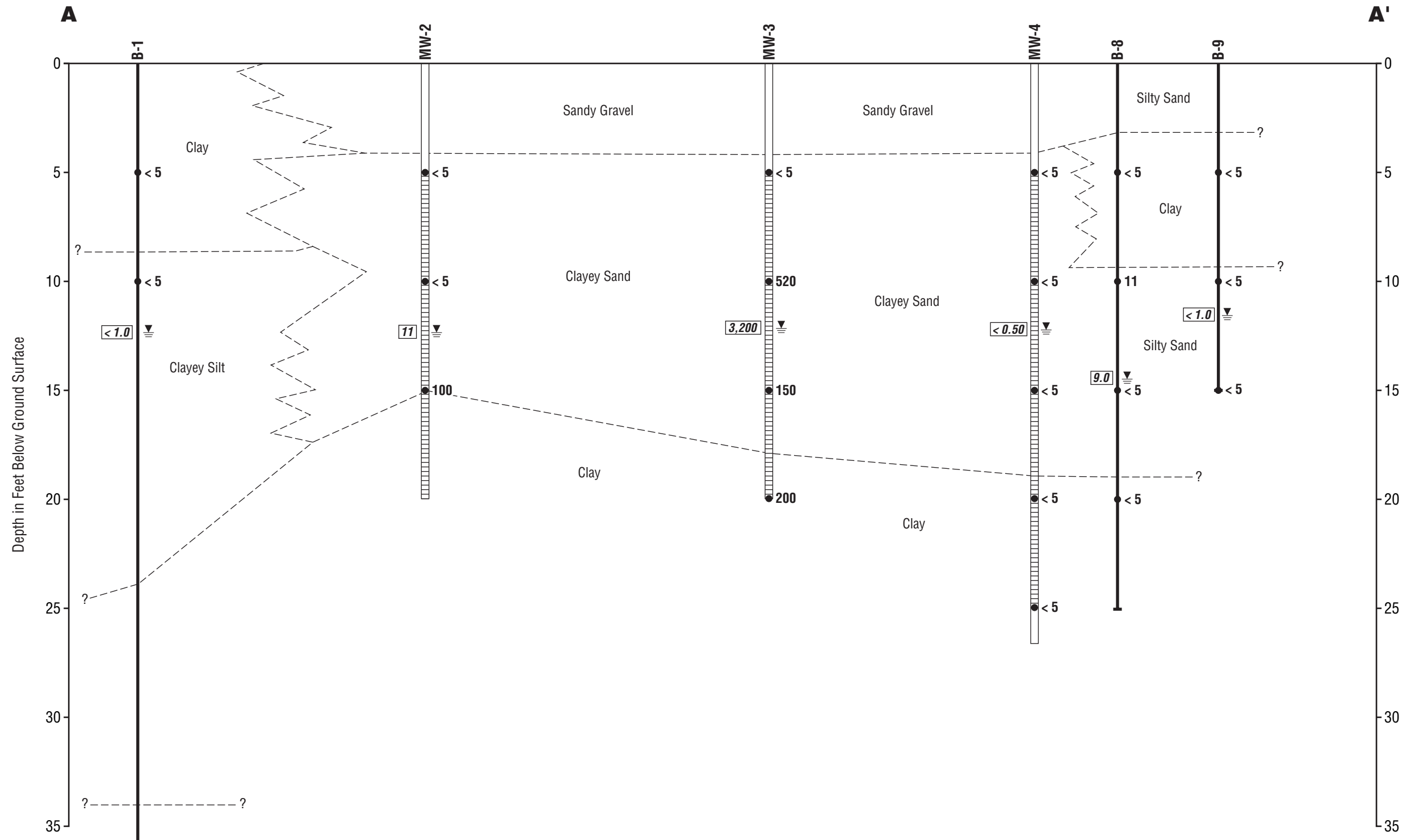


South Oakland Maintenance Station

1112 29th Avenue
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 GEOCON Proj. No. E8220-06-32
 Task Order No. 32

SITE PLAN

June 2006 Figure 2



HORIZONTAL SCALE: 1" = 20'
 VERTICAL SCALE: 1" = 5'

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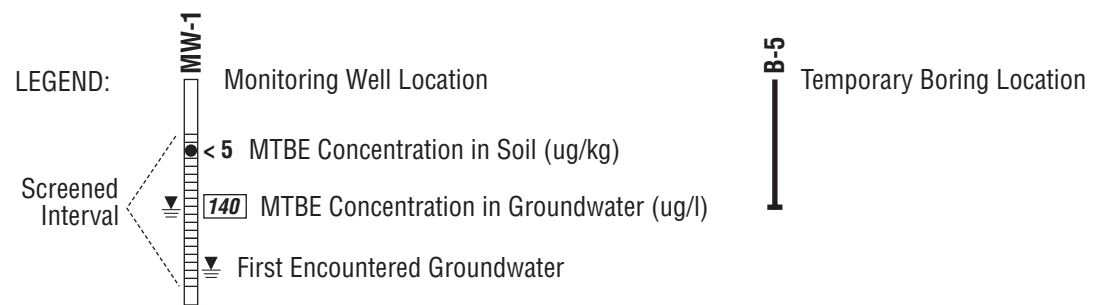
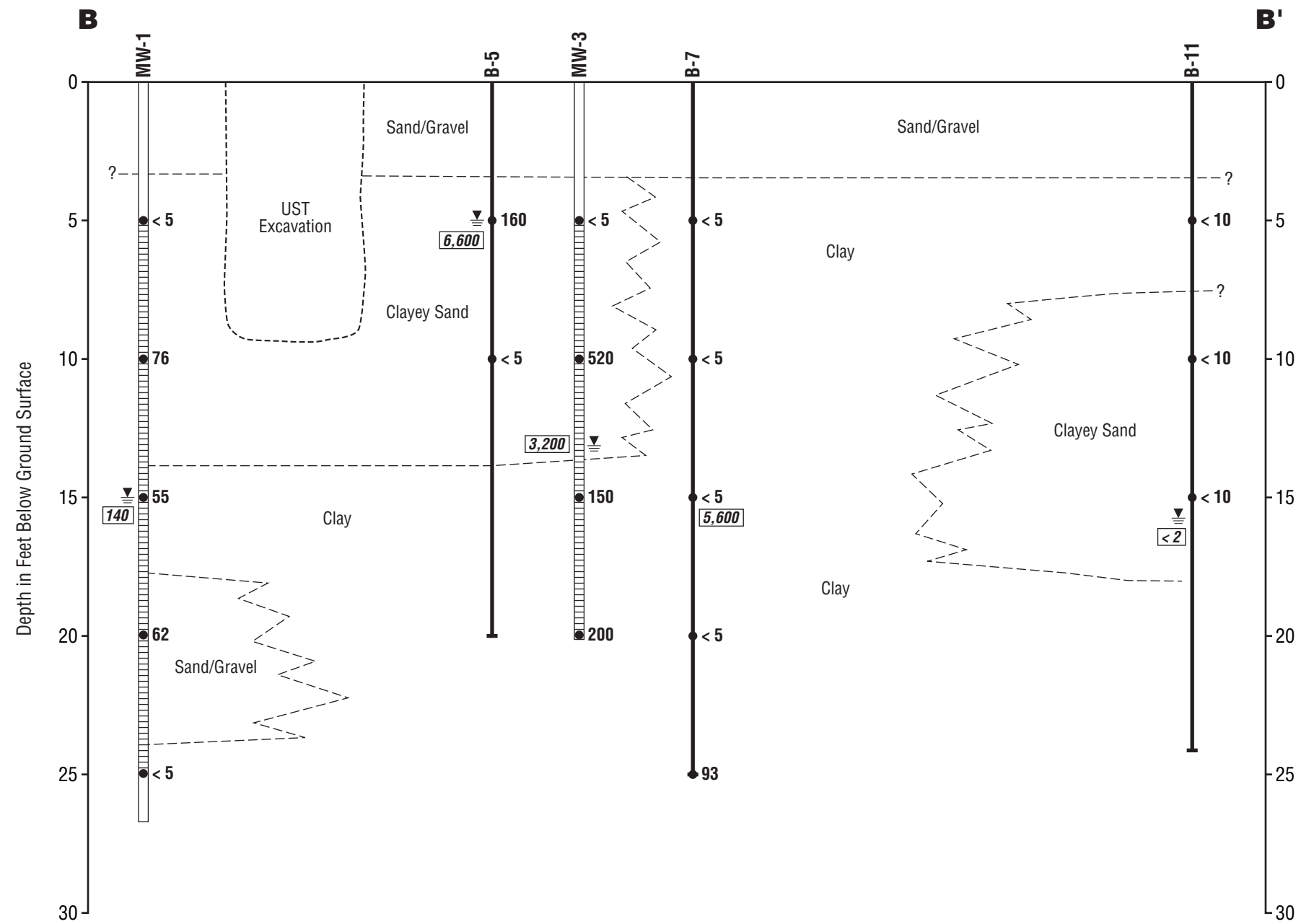
GEOCON Proj. No. E8220-06-32

Task Order No. 32

**CROSS-SECTION
 A - A'**

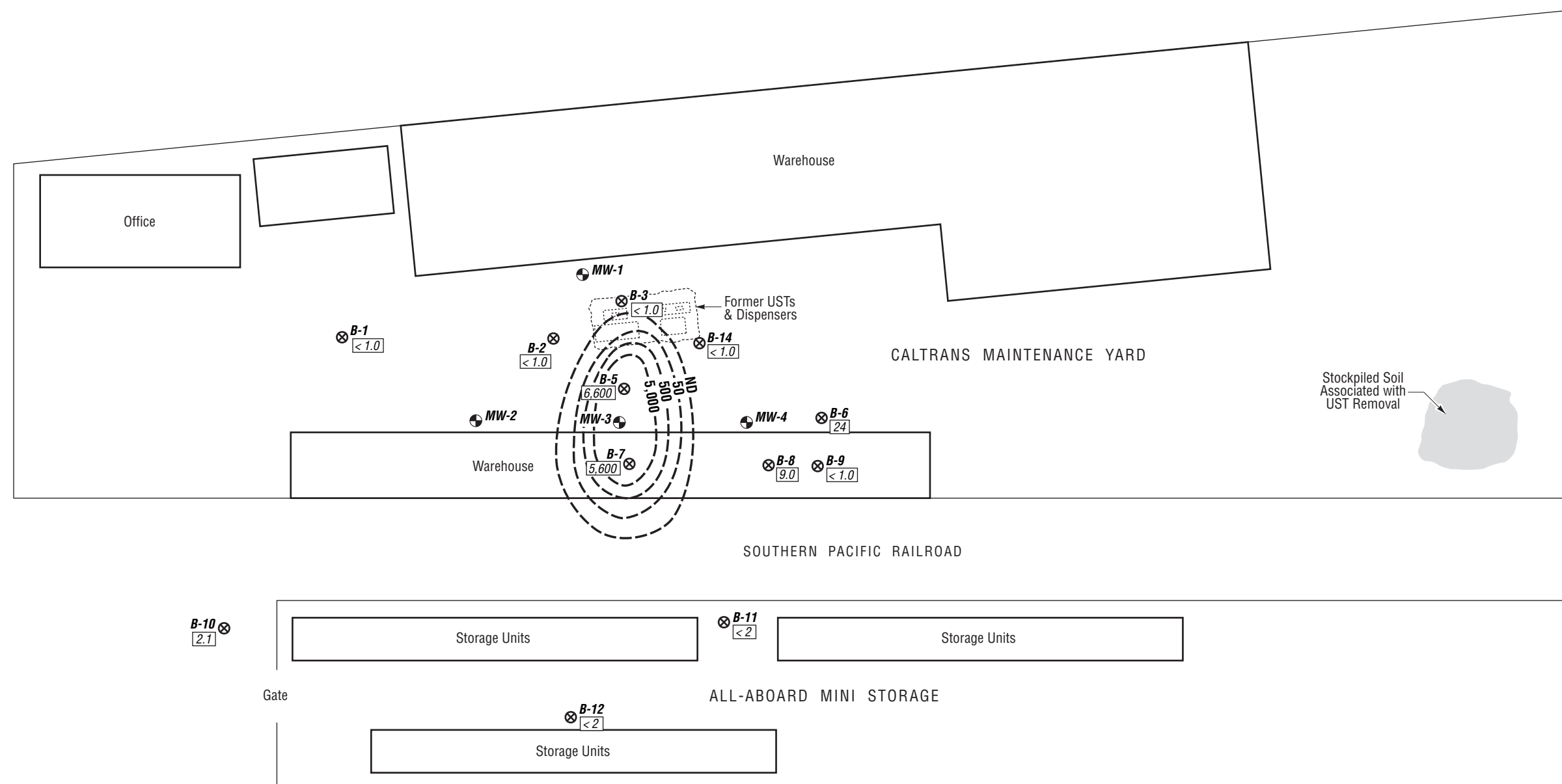
June 2006

Figure 3



HORIZONTAL SCALE: 1" = 20'
 VERTICAL SCALE: 1" = 5'

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South Oakland Maintenance Station		
1112 29th Avenue Oakland, California		CROSS-SECTION B - B'
GEOCON Proj. No. E8220-06-32		
Task Order No. 32	June 2006	Figure 4

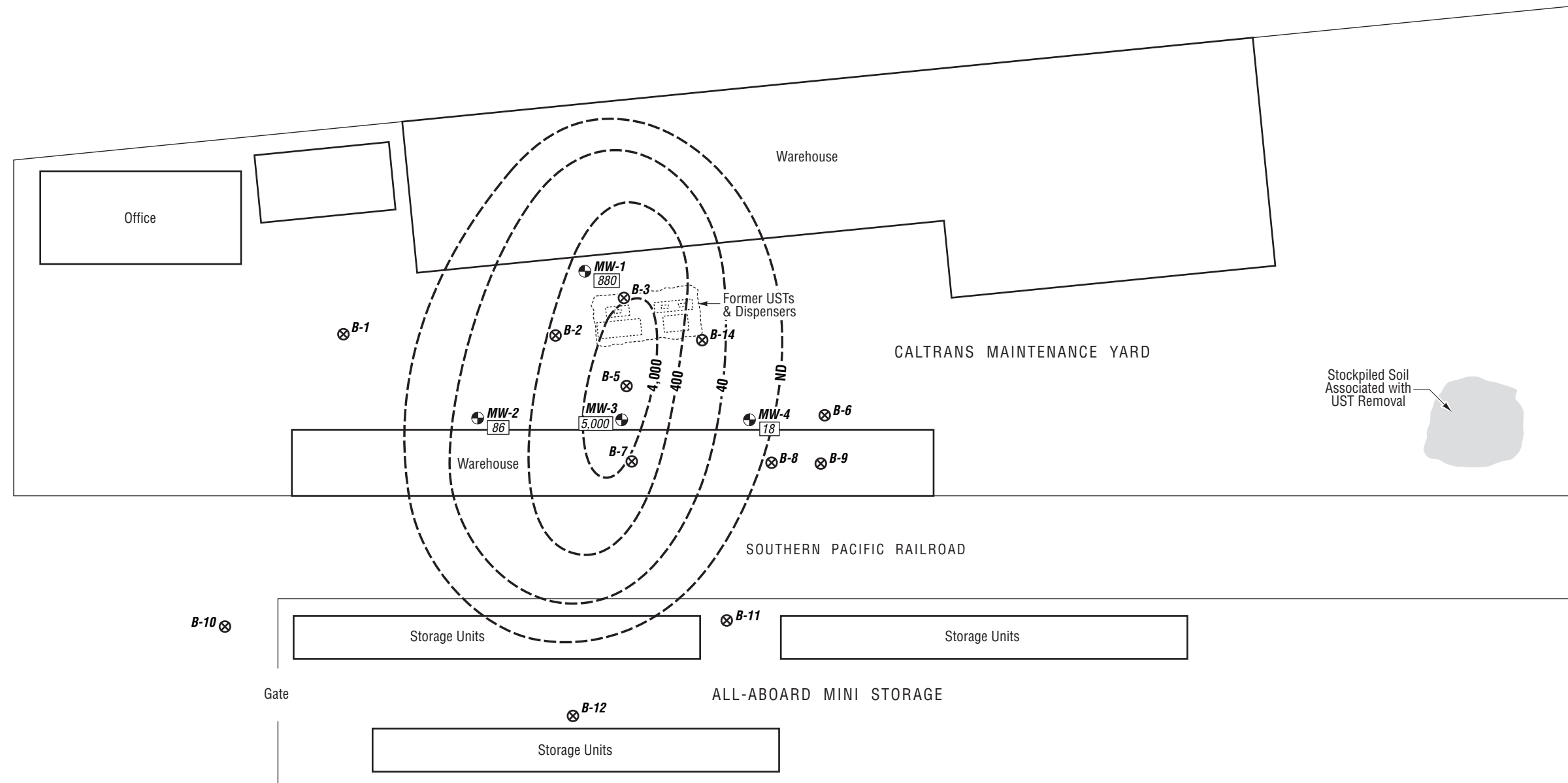


LEGEND:

- MW-1** Approximate Monitoring Well Location
- B-1** Approximate Temporary Boring Location
- 6,600** MTBE Concentration (ug/l)
- 5,000** MTBE Isoconcentration Contour (ug/l)



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South Oakland Maintenance Station		
1112 29th Avenue Oakland, California		Isoconcentration Map - MTBE Concentrations in Grab Groundwater Samples
GEOCON Proj. No. E8220-06-32		
Task Order No. 32	June 2006	Figure 5



LEGEND:

- MW-1 Approximate Monitoring Well Location
- B-1 Approximate Temporary Boring Location
- MTBE Concentration (ug/l)
- 4,000 MTBE Isoconcentration Contour (ug/l)



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South Oakland Maintenance Station

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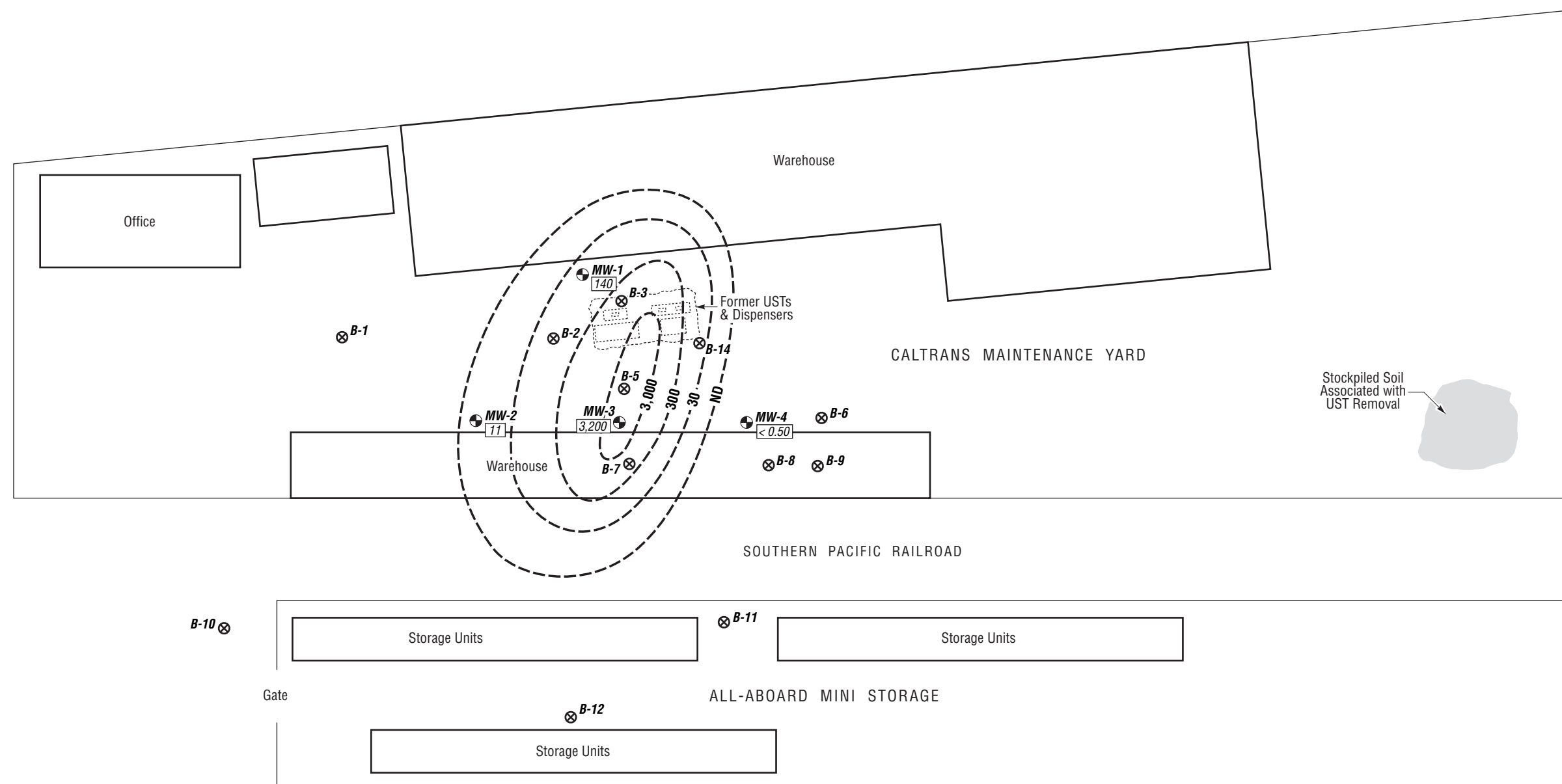
**Isoconcentration Map -
 MTBE Concentrations
 in Groundwater
 (June 2000)**

GEOCON Proj. No. E8220-06-32

Task Order No. 32

June 2006

Figure 6



- LEGEND:**
- MW-1 ● Approximate Monitoring Well Location
 - B-1 ⊗ Approximate Temporary Boring Location
 - 3,200 MTBE Concentration (ug/l)
 - 3,000 - - - - MTBE Isoconcentration Contour (ug/l)



GEOCON CONSULTANTS, INC.		
<small>2356 RESEARCH DRIVE - LIVERMORE, CA. 94550 PHONE 925 371-5900 - FAX 925 371-5915</small>		
South Oakland Maintenance Station		
1112 29th Avenue Oakland, California		Isoconcentration Map - MTBE Concentrations in Groundwater (May 2005)
GEOCON Proj. No. E8220-06-32		
Task Order No. 32	June 2006	Figure 7

Table 1
Soil Sample Results
Caltrans South Oakland Maintenance Station
Oakland, California

Sample Location	Sample Type	Sample Date	Sample Depth (feet)	TPHg (mg/kg)	TPHd (mg/kg)	Lead (mg/kg)	Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	Xylenes (ug/kg)	MTBE (ug/kg)	VOCs (ug/kg)	FOCs (ug/kg)
CAL-OAK-STP1	Stockpile	3/11/97	10	2.3	18	8.7	<5	<5	7.2	145	293	--	--
CAL-OAK-STP2	Stockpile	3/11/97	10	2.4	33	<5.0	<5	15	5.4	76	125	--	--
CAL-OAK-STP3	Stockpile	3/11/97	10	4.4	20	<5.0	<5	<5	11	280	<5	--	--
CAL-OAK-STP4	Stockpile	3/11/97	10	1.2	18	<5.0	<5	<5	<5	43	52	--	--
CAL-OAK-UNL-N	Excavation	3/11/97	10	380	--	<5.0	1,650	11,860	8,040	48,860	9,150	--	--
CAL-OAK-UNL-S	Excavation	3/11/97	10	<1.0	--	<5.0	75	<5	10	<5	380	--	--
CAL-OAK-DIS-N	Excavation	3/11/97	10	--	4.9	<5.0	<5	<5	<5	<5	112	--	--
CAL-OAK-DIS-S	Excavation	3/11/97	10	--	21	<5.0	<5	<5	<5	<5	41	--	--
B-1	Soil Boring	4/6/99	5	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-1	Soil Boring	4/6/99	10	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-2	Soil Boring	4/6/99	5	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-2	Soil Boring	4/6/99	10	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-3	Soil Boring	4/6/99	5	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-3	Soil Boring	4/6/99	10	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-4	Soil Boring	4/7/99	5	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-4	Soil Boring	4/7/99	10	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-5	Soil Boring	4/7/99	5	<1.0	<10	--	<1	<1	<1	<3	160	ND	--
B-5	Soil Boring	4/7/99	10	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-6	Soil Boring	4/7/99	5	<1.0	<10	--	<1	<1	<1	<3	<5	ND	--
B-6	Soil Boring	4/7/99	10	13	<10	--	<1	<1	<1	<3	<5	ND	--
B-7	Soil Boring	8/13/99	5	<0.5	<10	--	<1	<1	<1	<3	<5	ND	--
B-7	Soil Boring	8/13/99	10	<0.5	<10	--	<1	<1	<1	<3	<5	ND	--
B-7	Soil Boring	8/13/99	15	<0.5	<10	--	<1	<1	<1	<3	<5	ND	--
B-7	Soil Boring	8/13/99	20	<0.5	<10	--	<1	<1	<1	<3	93	ND	--
B-8	Soil Boring	8/13/99	5	<0.5	<10	--	<1	<1	<1	<3	<5	ND	--
B-8	Soil Boring	8/13/99	10	<0.5	<10	--	<1	<1	<1	<3	11	1 (PCE)	--
B-8	Soil Boring	8/13/99	15	<0.5	<10	--	<1	<1	<1	<3	<5	ND	--
B-8	Soil Boring	8/13/99	20	<0.5	<10	--	<1	<1	<1	<3	<5	ND	--
B-9	Soil Boring	8/13/99	5	<0.5	<10	--	<1	<1	<1	<3	<5	1 (PCE)	--
B-9	Soil Boring	8/13/99	10	<0.5	<10	--	<1	<1	<1	<3	<5	ND	--
B-9	Soil Boring	8/13/99	15	0.54	<10	--	<1	<1	<1	<3	<5	ND	--

Table 1
Soil Sample Results
Caltrans South Oakland Maintenance Station
Oakland, California

Sample Location	Sample Type	Sample Date	Sample Depth (feet)	TPHg (mg/kg)	TPHd (mg/kg)	Lead (mg/kg)	Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	Xylenes (ug/kg)	MTBE (ug/kg)	VOCs (ug/kg)	FOCs (ug/kg)
MW-1	MW Borehole	6/8/00	5	<0.5	--	--	<1	<1	<1	<3	<5	ND	--
MW-1	MW Borehole	6/8/00	10	<0.5	--	--	<1	<1	<1	<3	76	ND	--
MW-1	MW Borehole	6/8/00	15	<0.5	--	--	<1	<1	<1	<3	55	ND	--
MW-1	MW Borehole	6/8/00	20	<0.5	--	--	<1	<1	<1	<3	62	ND	--
MW-1	MW Borehole	6/8/00	25	<0.5	--	--	<1	<1	<1	<3	<5	ND	--
MW-2	MW Borehole	6/8/00	5	<0.5	--	--	<1	<1	<1	<3	<5	ND	--
MW-2	MW Borehole	6/8/00	10	<0.5	--	--	<1	<1	<1	<3	<5	ND	--
MW-2	MW Borehole	6/8/00	15	<0.5	--	--	<1	<1	<1	<3	100	ND	--
MW-3	MW Borehole	6/8/00	5	<0.5	23	--	<1	<1	<1	<3	<5	ND	--
MW-3	MW Borehole	6/8/00	10	<0.5	10	--	<1	<1	<1	<3	520	ND	--
MW-3	MW Borehole	6/8/00	15	<0.5	<10	--	<1	<1	<1	<3	150	ND	--
MW-3	MW Borehole	6/8/00	20	<0.5	<10	--	<1	<1	<1	<3	200	ND	--
MW-4	MW Borehole	6/8/00	5	<0.5	--	--	<1	<1	<1	<3	<5	ND	--
MW-4	MW Borehole	6/8/00	10	<0.5	--	--	<1	<1	<1	<3	<5	ND	--
MW-4	MW Borehole	6/8/00	15	<0.5	--	--	<1	<1	<1	<3	<5	ND	--
MW-4	MW Borehole	6/8/00	20	<0.5	--	--	<1	<1	<1	<3	<5	ND	--
MW-4	MW Borehole	6/8/00	25	<0.5	--	--	<1	<1	<1	<3	<5	ND	--
B-10	Soil Boring	8/24/01	5	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-10	Soil Boring	8/24/01	10	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-10	Soil Boring	8/24/01	25	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-10	Soil Boring	8/24/01	20	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-10	Soil Boring	8/24/01	25	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-11	Soil Boring	8/24/01	5	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-11	Soil Boring	8/24/01	10	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-11	Soil Boring	8/24/01	15	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-12	Soil Boring	8/24/01	5	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-12	Soil Boring	8/24/01	10	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND
B-12	Soil Boring	8/24/01	15	<1.0	--	--	<5.0	<5.0	<5.0	<10.0	<10	ND	ND

Notes -

Bold type indicates compound detected above reporting limit

mg/kg - milligrams per kilogram

ug/kg - Micrograms per kilogram

-- Not analyzed

PCE - tetrachloroethene

VOCs - volatile organic compounds analyzed using Test Method 8260B

FOCs - fuel oxygenate compounds including tert-Butanol (TBA), tert-amyl-methyl ether (TAME), tert-butyl ethyl ether (ETBE), and di-isopropyl ether (DIPE)

MTBE - methyl tertiary butyl ether

Table 2
Grab Groundwater Sample Results
Caltrans South Oakland Maintenance Station
Oakland, California

Sample Location	Sample Type	Sample Date	First Encountered Groundwater (feet bgs)	TPHg (mg/l)	TPHd (mg/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	MTBE (ug/l)	VOCs (ug/l)	FOCs (ug/l)
B-1	Temp. Boring	4/6/99	32	<0.5	<10	<0.5	<0.5	<0.5	2.0	<1.0	ND	--
B-2	Temp. Boring	4/6/99	19	<0.5	<10	<0.5	<0.5	<0.5	<1.5	<1.0	ND	--
B-3	Temp. Boring	4/6/99	10	0.52	<10	6.3	2.2	11	40	<1.0	see table 2A	--
B-4	Temp. Boring	4/7/99	9.5	0.52	<10	<0.5	<0.5	3.7	7.7	<1.0	see table 2A	--
B-5	Temp. Boring	4/7/99	5.5	<0.5	<10	<0.5	0.6	<0.5	<1.5	6,600	ND	--
B-6	Temp. Boring	4/7/99	8	<0.5	<10	<0.5	<0.5	<0.5	<1.5	24	see table 2A	--
B-7	Temp. Boring	8/13/99	15	3.8	0.73	<0.5	<0.5	<0.5	<1.5	5,600	ND	ND
B-8	Temp. Boring	8/13/99	14.5	<0.5	<0.42	<0.5	<0.5	<0.5	<1.5	9.0	see table 2A	ND
B-9	Temp. Boring	8/13/99	11.5	<0.5	<0.42	<0.5	<0.5	<0.5	<1.5	<1.0	see table 2A	ND
B-10	Temp. Boring	8/24/01	15.5	<0.5	--	<1.0	<1.0	<1.0	<3.0	2.1	see table 2A	ND
B-11	Temp. Boring	8/24/01	15	<0.5	--	<1.0	<1.0	<1.0	<3.0	<2	see table 2A	ND
B-12	Temp. Boring	8/24/01	15	<0.5	--	<1.0	<1.0	<1.0	<3.0	<2	see table 2A	ND

Notes -

Bold type indicates compound detected above reporting limit

feet bgs - feet below ground surface

mg/l - milligrams per liter

ug/l - Micrograms per liter

-- Not analyzed

VOCs - volatile organic compounds analyzed using Test Method 8260B

FOCs - fuel oxygenate compounds including tert-Butanol (TBA), tert-amyl-methyl ether (TAME), tert-butyl ethyl ether (ETBE), and di-isopropyl ether (DIPE)

MTBE - methy tertiary butyl ether

Table 2A
Grab Groundwater Sample Results (Other VOCs)
Caltrans South Oakland Maintenance Station
Oakland, California

Sample Location	Sample Date	First Encountered Groundwater (feet bgs)	Chloromethane (ug/l)	Isopropylbenzene (ug/l)	n-Propylbenzene (ug/l)	Naphthalene (ug/l)	1,2,4-Trimethylbenzene (ug/l)	1,3,5-Trimethylbenzene (ug/l)	Chloroform (ug/l)	Tetrachlorethene (ug/l)
B-3	4/6/99	10	<0.5	1.8	5.4	3.5	31	12	<0.5	<0.5
B-4	4/6/99	9.5	<0.5	1.3	3.0	2.6	19	6.3	2.4	<0.5
B-6	4/7/99	8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.7	12
B-8	8/13/99	14.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	10	<0.5
B-9	8/13/99	11.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	16	<0.5
B-10	8/24/01	15.5	4.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
B-11	8/24/01	15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0
B-12	8/24/01	15	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Notes -

Bold type indicates compound detected above reporting limit

feet bgs - feet below ground surface

ug/l - Micrograms per liter

VOCs - volatile organic compounds analyzed using Test Method 8260B

**Table 3
Depth to Water and Monitoring Well Sample Results
Caltrans South Oakland Maintenance Station
Oakland, California**

Well	Date	*TOC Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	Screened Interval (feet bgs)	TPHg (mg/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl- benzene (ug/l)	Xylenes (ug/l)	MTBE (ug/l)	ETBE (ug/l)	TAME (ug/l)	TBA (ug/l)	DIPE (ug/l)
MW-1	27-Jun-00	99.57	9.13	90.44	5-25	0.85	20	< 1.0	< 1.0	19	880	---	< 5.0	< 50	---
	11-Sep-00	99.57	9.52	90.05	5-25	0.92	14	< 1.0	1.6	3.6	860	---	< 5.0	190	---
	28-Nov-00	99.57	9.62	89.95	5-25	< 0.5	3.6	< 2.5	< 2.5	< 7.5	610	---	< 25	< 250	---
	27-Mar-01	99.57	8.79	90.78	5-25	< 0.2	< 0.5	< 0.5	< 0.5	< 1.0	29	< 5.0	< 5.0	< 200	< 5.0
	26-Jun-01	99.57	9.80	89.77	5-25	0.24	< 0.5	< 0.5	< 0.5	< 1.0	200	< 5.0	< 5.0	< 200	< 5.0
	24-Aug-01	---	---	---	5-25	< 0.5	< 25	< 25	< 25	< 75	520	---	< 50	< 1,200	---
	05-Dec-01	99.57	8.32	91.25	5-25	0.388	3.5	< 0.3	2.4	15.4	505	---	< 0.5	< 100	---
	04-Mar-01	99.57	8.66	90.91	5-25	0.69	< 0.5	< 0.5	< 0.5	< 1.0	55	< 0.5	< 0.5	< 50	< 0.5
	14-Jun-02	99.57	9.53	90.04	5-25	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	5.3	< 0.5	< 0.5	< 0.5	< 0.5
	24-Sep-02	99.57	10.06	89.51	5-25	0.166	< 0.5	< 0.5	0.5	1.6	60.0	< 0.5	< 0.5	< 50	< 0.5
	05-May-04	99.57	9.06	90.51	5-25	< 0.05	0.5	< 0.5	0.6	1.7	201	< 0.5	< 0.5	< 50	< 0.5
	12-May-05	99.57	8.53	91.04	5-25	0.19	< 1.0	< 1.0	1.2	< 1.0	140	< 1.0	< 1.0	50	< 1.0
	MW-2	27-Jun-00	98.91	9.05	89.86	5-20	< 0.5	< 1.0	< 1.0	< 1.0	< 3.0	86	---	< 5	< 50
11-Sep-00		98.91	9.95	88.96	5-20	< 0.5	< 1.0	< 1.0	< 1.0	< 3.0	110	---	< 5	< 50	---
28-Nov-00		98.91	9.94	88.97	5-20	< 0.5	< 1.0	< 1.0	< 1.0	< 3.0	130	---	< 5	< 50	---
27-Mar-01		98.91	8.35	90.56	5-20	< 0.2	< 0.5	< 0.5	< 0.5	< 1.0	110	< 5.0	< 5.0	< 200	< 5.0
26-Jun-01		98.91	10.76	88.15	5-20	0.11	< 0.5	< 0.5	< 0.5	< 1.0	51	< 5.0	< 5.0	< 200	< 5.0
24-Aug-01		---	---	---	5-20	< 0.5	< 2.0	< 2.0	< 2.0	< 6.0	36	---	< 4	< 100	---
05-Dec-01		98.91	8.53	90.38	5-20	0.06	< 0.3	< 0.3	< 0.3	< 0.6	79	---	< 0.5	< 100	---
04-Mar-01		98.91	8.25	90.66	5-20	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	9	< 0.5	< 0.5	< 50	< 0.5
14-Jun-02		98.91	9.50	89.41	5-20	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	25.0	< 0.5	< 0.5	< 0.5	< 0.5
24-Sep-02		98.91	10.31	88.60	5-20	< 0.05	< 0.5	< 0.5	< 0.5	< 1.0	34.6	< 0.5	< 0.5	< 50	< 0.5
05-May-04		98.91	8.46	90.45	5-20	< 0.05	< 0.5	< 0.5	< 0.5	< 1.0	13.5	< 0.5	< 0.5	< 50	< 0.5
12-May-05		98.91	8.21	90.70	5-20	< 0.05	< 1.0	< 1.0	< 1.0	< 1.0	11	< 1.0	< 1.0	< 1.0	< 1.0
MW-3		27-Jun-00	98.98	8.76	90.22	5-20	2.7	73	1.7	1.2	4.6	5,000	---	11	1,500
	11-Sep-00	98.98	9.28	89.70	5-20	1.9	19	< 1.0	< 1.0	< 3.0	2,700	---	10	310	---
	28-Nov-00	98.98	9.36	89.62	5-20	1.7	27	92	< 10	< 30	2,500	---	< 100	< 1,000	---
	27-Mar-01	98.98	8.35	90.63	5-20	5.2	220	5.9	2.2	< 1.0	5,500	< 5.0	12	270	< 5.0
	26-Jun-01	98.98	10.51	88.47	5-20	2.5	20	< 0.5	< 0.5	< 1.0	2,800	< 5.0	12	230	< 5.0
	24-Aug-01	---	---	---	5-20	1.7	< 100	< 100	< 100	< 300	2,800	---	< 200	< 5,000	---
	05-Dec-01	98.98	8.05	90.93	5-20	1.86	18.3	0.3	1.2	1.0	2,240	---	< 200	< 5,000	---
	04-Mar-01	98.98	8.05	90.93	5-20	3.23	94.2	0.8	2.4	6.9	7,520	< 0.5	11	< 50	< 0.5
	14-Jun-02	98.98	9.35	89.63	5-20	2.32	3.6	< 0.5	< 0.5	< 1.0	5,290	< 0.5	8.9	< 0.5	< 0.5
	24-Sep-02	98.98	10.28	88.70	5-20	2.06	24.0	0.5	1.2	3.4	2,020	< 0.5	7.6	< 50	< 0.5
	05-May-04	98.98	8.88	90.10	5-20	0.27	32.2	< 0.5	0.8	4.8	4,420	< 0.5	< 0.5	< 50	< 0.5
	12-May-05	98.98	9.15	89.83	5-20	1.3	40	< 5.0	< 5.0	< 5.0	3,200	< 5.0	< 5.0	890	< 5.0

Table 3
Depth to Water and Monitoring Well Sample Results
Caltrans South Oakland Maintenance Station
Oakland, California

Well	Date	*TOC Elevation (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	Screened Interval (feet bgs)	TPHg (mg/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl- benzene (ug/l)	Xylenes (ug/l)	MTBE (ug/l)	ETBE (ug/l)	TAME (ug/l)	TBA (ug/l)	DIPE (ug/l)
MW-4	27-Jun-00	99.04	8.74	90.30	5-25	< 0.5	< 1.0	< 1.0	< 1.0	< 3.0	18	---	< 5	< 50	---
	11-Sep-00	99.04	9.30	89.74	5-25	< 0.5	< 1.0	< 1.0	< 1.0	< 3.0	< 1.0	---	< 5	< 50	---
	28-Nov-00	99.04	9.32	89.72	5-25	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 1.0	---	< 5	< 50	---
	27-Mar-01	99.04	7.96	91.08	5-25	< 0.2	< 0.5	< 0.5	< 0.5	< 1.0	< 5.0	< 5.0	< 5.0	< 200	< 5.0
	26-Jun-01	99.04	9.56	89.48	5-25	< 0.05	< 0.5	< 0.5	< 0.5	< 1.0	< 5.0	< 5.0	< 5.0	< 200	< 5.0
	24-Aug-01	---	---	---	5-25	< 0.5	< 1.0	< 1.0	< 1.0	< 3.0	< 2	---	< 4	< 100	---
	05-Dec-01	99.04	8.58	90.46	5-25	< 0.05	< 0.3	< 0.3	< 0.3	< 0.6	< 0.3	---	< 0.5	< 100	---
	04-Mar-01	99.04	8.00	91.04	5-25	< 0.5	0.5	< 0.5	< 0.5	< 1.0	5.00	< 0.5	< 0.5	< 0.5	< 0.5
	14-Jun-02	99.04	8.79	90.25	5-25	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	24-Sep-02	99.04	9.75	89.29	5-25	< 0.05	< 0.5	< 0.5	< 0.5	< 1.0	1.3	< 0.5	< 0.5	< 50	< 0.5
	05-May-04	99.04	8.55	90.49	5-25	< 0.05	< 0.5	< 0.5	< 0.5	< 1.0	2.2	< 0.5	< 0.5	< 50	< 0.5
	12-May-05	99.04	7.65	91.39	5-25	< 0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0	< 10	< 1.0

Notes-

Bold type indicates compound detected above reporting limit

mg/l - milligrams per liter

ug/l - micrograms per liter

TOC - top of casing

bgs - below ground surface

* - elevation measured relative to an arbitrary datum assigned a value of 100.00 feet

MTBE - methyl tertiary butyl ether

ETBE - Ethyl tertiary butyl ether

TAME - tertiary amyl methyl ether

TBA - tert-butanol

DIPE - di-isopropyl ether

Table 4
Tier 1 RBSL Comparison Table
Groundwater to Indoor Air
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial		Actual Concentrations	
	Carcinogenic (ug/l)	Hazard (ug/l)	Carcinogenic (ug/l)	Hazard (ug/l)	*Maximum Concentration (ug/l)	**Most Current Concentration in MW-3 (ug/l)
Benzene	110	3,700	1,800	112,000	220	40
Toluene	NV	210,000	NV	>SOL	92	<5
Ethylbenzene	>SOL	>SOL	>SOL	>SOL	2.4	<5
Xylenes	>SOL	>SOL	>SOL	>SOL	19	<5
MTBE	NV	24,000,000	NV	>SOL	7,520	3,200

Table 4A
Tier 1 RBSL Comparison Table
Groundwater to Outdoor Air
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial		Actual Concentrations	
	Carcinogenic (ug/l)	Hazard (ug/l)	Carcinogenic (ug/l)	Hazard (ug/l)	*Maximum Concentration (ug/l)	**Most Current Concentration in MW-3 (ug/l)
Benzene	5,600	222,000	21,000	1,300,000	220	40
Toluene	NV	>SOL	NV	>SOL	92	<5
Ethylbenzene	>SOL	>SOL	>SOL	>SOL	2.4	<5
Xylenes	>SOL	>SOL	>SOL	>SOL	19	<5
MTBE	NV	>SOL	NV	>SOL	7,520	3,200

Notes-

* Maximum concentration reported at site in either grab or monitoring well groundwater sample

** Groundwater data from May 2005 groundwater sample event

>SOL - RBSL exceeds solubility of chemical in water

ug/l - micrograms per liter

NV - No value. Compound not a known carcinogen.

Table 5
Tier 3 SSTL Comparison Table
Groundwater to Indoor Air
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial		Actual Concentrations	
	Carcinogenic (ug/l)	Hazard (ug/l)	Carcinogenic (ug/l)	Hazard (ug/l)	*Maximum Concentration (ug/l)	**Most Current Concentration in MW-3 (ug/l)
Benzene	5,400	18,000	87,000	530,000	220	40
Toluene	NV	>SOL	NV	>SOL	92	<5
Ethylbenzene	NV	>SOL	NV	>SOL	2.4	<5
Xylenes	NV	>SOL	NV	>SOL	19	<5
MTBE	NV	34,000,000	NV	>SOL	7,520	3,200

Table 5A
Tier 3 SSTL Comparison Table
Groundwater to Outdoor Air
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial		Actual Concentrations	
	Carcinogenic (ug/l)	Hazard (ug/l)	Carcinogenic (ug/l)	Hazard (ug/l)	*Maximum Concentration (ug/l)	**Most Current Concentration in MW-3 (ug/l)
Benzene	>SOL	>SOL	>SOL	>SOL	220	40
Toluene	NV	>SOL	NV	>SOL	92	<5
Ethylbenzene	NV	>SOL	NV	>SOL	2.4	<5
Xylenes	NV	>SOL	NV	>SOL	19	<5
MTBE	NV	>SOL	NV	>SOL	7,520	3,200

Notes-

* Maximum concentration reported at site in either grab or monitoring well groundwater sample

** Groundwater data from May 2005 groundwater sample event

>SOL - RBSL exceeds solubility of chemical in water.

ug/l - micrograms per liter

NV - No value. Compound not a known carcinogen.

Table 6
Tier 1 RBSL Comparison Table
Soil to Indoor Air
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial / Industrial		95% UCL Concentration (ug/kg)	95% UCL Concentration (without CAL-OAK-UNL-N) (ug/kg)
	Carcinogenic (ug/kg)	Hazard (ug/kg)	Carcinogenic (ug/kg)	Hazard (ug/kg)		
Benzene	62	2,300	1,100	66,000	809	41
Toluene	NV	360,000	NV	SAT	5,778	2.4
Ethylbenzene	NV	SAT	NV	SAT	3,918	6.0
Xylenes	NV	SAT	NV	SAT	23,804	2.5
MTBE	NV	SAT	NV	SAT	4,497	239

Table 6A
Tier 1 RBSL Comparison Table
Soil to Outdoor Air
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial / Industrial		95% UCL Concentration (ug/kg)	95% UCL Concentration (without CAL-OAK-UNL-N) (ug/kg)
	Carcinogenic (ug/kg)	Hazard (ug/kg)	Carcinogenic (ug/kg)	Hazard (ug/kg)		
Benzene	190	7,600	730	44,000	809	41
Toluene	NV	SAT	NV	SAT	5,778	2.4
Ethylbenzene	NV	SAT	NV	SAT	3,918	6.0
Xylenes	NV	SAT	NV	SAT	23,804	2.5
MTBE	NV	44,000,000	NV	SAT	4,497	239

Notes-

UCL - Upper confidence limit.

ug/kg - micrograms per kilogram

SAT - RBSL exceeds saturated soil concentration of compound

NV - No value. Compound not a known carcinogen.

Table 7
Tier 3 SSTL Comparison Table
Soil to Indoor Air
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial / Industrial		95% UCL Concentration (ug/kg)	95% UCL Concentration (without CAL-OAK-UNL-N) (ug/kg)
	Carcinogenic (ug/kg)	Hazard (ug/kg)	Carcinogenic (ug/kg)	Hazard (ug/kg)		
Benzene	1,900	6,500	31,000	190,000	809	41
Toluene	NV	970,000	NV	SAT	5,778	2.4
Ethylbenzene	NV	SAT	NV	SAT	3,918	6.0
Xylenes	NV	SAT	NV	SAT	23,804	2.5
MTBE	NV	15,000,000	NV	SAT	4,497	239

Table 7A
Tier 3 SSTL Comparison Table
Soil to Outdoor Air
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial / Industrial		95% UCL Concentration (ug/kg)	95% UCL Concentration (without CAL-OAK-UNL-N) (ug/kg)
	Carcinogenic (ug/kg)	Hazard (ug/kg)	Carcinogenic (ug/kg)	Hazard (ug/kg)		
Benzene	200,000	790,000	750,000	SAT	809	41
Toluene	NV	SAT	NV	SAT	5,778	2.4
Ethylbenzene	NV	SAT	NV	SAT	3,918	6.0
Xylenes	NV	SAT	NV	SAT	23,804	2.5
MTBE	NV	SAT	NV	SAT	4,497	239

Notes-

UCL - Upper confidence limit.

ug/kg - micrograms per kilogram

SAT - RBSL exceeds saturated soil concentration of compound

NV - No value. Compound not a known carcinogen.

Table 8
Tier 1 RBSL Comparison Table
Direct Exposure to Soil
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial		95% UCL Soil Concentration (ug/kg)
	Carcinogenic (ug/kg)	Hazard (ug/kg)	Carcinogenic (ug/kg)	Hazard (ug/kg)	
Benzene	2,700	81,000	8,500	510,000	809
Toluene	NV	9,000,000	NV	56,000,000	5,778
Ethylbenzene	NV	5,100,000	NV	33,000,000	3,918
Xylenes	NV	54,000,000	NV	300,000,000	23,804
MTBE	NV	260,000	NV	1,700,000	4,497

Table 9
Tier 3 SSTL Comparison Table
Direct Exposure to Soil
Caltrans South Oakland Maintenance Station
Oakland, California

Contaminant	Residential		Commercial		95% UCL Soil Concentration (ug/kg)
	Carcinogenic (ug/kg)	Hazard (ug/kg)	Carcinogenic (ug/kg)	Hazard (ug/kg)	
Benzene	19,000	63,000	49,000	300,000	809
Toluene	NV	7,100,000	NV	34,000,000	5,778
Ethylbenzene	NV	3,900,000	NV	18,000,000	3,918
Xylenes	NV	53,000,000	NV	260,000,000	23,804
MTBE	NV	200,000	NV	930,000	4,497

Notes-
UCL - Upper confidence limit.
ug/kg - micrograms per kilogram
NV - No value. Compound not a known carcinogen.

APPENDIX

A

SOIL BORING LOG

BORING NO: B1
SHEET 1 OF 2

PROJECT NAME:	Caltrans: South Oakland Maintenance Station	
PROJECT NUMBER:	575-9G014	DATE: 4/6/99
NORTHINGS:	EASTINGS:	
DRILLING COMPANY:	Fisch Environmental	
DRILLING METHOD:	Direct Push (Geoprobe)	
BORING DIAMETER:	2 inch	DEPTH: 36 feet
GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS
4/6/99	initial	32
4/7/99	stabilized	6.9

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Silty Clay, low plasticity, brown, damp, no odor.		CL	Asphalt Surface
2								
3								
4								
5		16				0		
6								
7								
8								
9								
10		14			Clayey Silt, brown, low plasticity, damp, no odor.	0	ML	
11								
12								
13								
14								moisture increase.
15		18				0		
16								
17								
18								
19								
20		20			Log continues downward.	0		

REVIEWED BY: Tim O'Brien

LOGGED BY: Scott Bowers

SOIL BORING LOG

BORING NO: B1
SHEET 2 OF 2

PROJECT NAME: Caltrans: South Oakland Maintenance Station
 PROJECT NUMBER: 575-9G014 DATE: 4/6/99
 NORTHINGS: EASTINGS:
 DRILLING COMPANY: Fisch Environmental
 DRILLING METHOD: Direct Push (Geoprobe)
 BORING DIAMETER: 2 inch DEPTH: 36 feet

GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
21					Clayey Silt as described above.		ML	
22								
23								
24								
25		17			Silty Clay, low to medium plasticity, damp, no odor	0	CL	
26								
27								
28								
29								
30		12				0		moisture increase.
31								
32								
33								
34								
35		20			Silty Sandy Gravel, coarse sand, fine gravel, tan, wet, no odor.	0	GW	
36								
37								Total Depth = 36 feet
38								Boring drilled to sufficient depth for investigation
39								Groundwater stabilized at 6.9 feet bgs.
40								Boring converted to temporary groundwater monitoring well.
								Well grouted by removing casing and tremie placement of neat cement.

REVIEWED BY: Tim O'Brien LOGGED BY: Scott A. Bowers

SOIL BORING LOG

BORING NO:	B2
SHEET 1	OF 1

PROJECT NAME:	Caltrans: South Oakland Maintenance Station		
PROJECT NUMBER:	575-9G014	DATE:	4/6/99
NORTHINGS:	EASTINGS:		
DRILLING COMPANY:	Fisch Environmental		
DRILLING METHOD:	Direct Push (Geoprobe)		
BORING DIAMETER:	2 inch	DEPTH:	20 feet
GROUNDWATER LEVELS			
DATE	COMMENTS	DEPTH BGS	
4/6/99	initial	19	
4/6/99	stabilized	5	

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Silty Clay with some fine grained gravel, low to medium plasticity, brown, damp, no odor.		CL	Asphalt surface
2								
3								
4								
5		17				0		
6								
7								
8								
9								
10		12				0		
11								
12								
13								
14								
15								
16								
17		21				0		
18								
19								Groundwater encountered at 19 feet bgs.
20								Total Depth = 20 feet
21								Boring drilled to sufficient depth for investigation
22								Groundwater stabilized at 5 feet bgs.
23								Boring converted to temporary groundwater monitoring well.
24								Well grouted by removing casing and tremie placement of neat cement.
25						0		

REVIEWED BY: Tim O'Brien

LOGGED BY: Scott Bowers

SOIL BORING LOG

BORING NO: B3

SHEET 1 OF 1

PROJECT NAME: Caltrans: South Oakland Maintenance Station

PROJECT NUMBER: 575-9G014 DATE: 4/6/99

NORTHINGS: EASTINGS:

DRILLING COMPANY: Fisch Environmental

DRILLING METHOD: Direct Push (Geoprobe)

BORING DIAMETER: 2 inch DEPTH: 20 feet

GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
4/6/99	initial	10
4/6/99	stabilized	5

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Silty Clay with some gravel, fine grained gravel, low to medium plasticity, brown, damp, no odor.		CL	Concrete surface
2								
3								
4								
5		20				0		
6								
7								
8								
9								
10		21				0		Groundwater encountered.
11								
12								
13								
14								
15		24				0		
16								
17								
18								
19								
20		23				0		

Total Depth = 20 feet
 Boring drilled to sufficient depth for investigation
 Groundwater stabilized at 5 feet bgs.
 Boring converted to temporary groundwater monitoring well.
 Well grouted by removing casing and tremie placement of neat cement.

REVIEWED BY: Tim O'Brien

LOGGED BY: Scott Bowers

SOIL BORING LOG

BORING NO: B4

SHEET 1 OF 1

PROJECT NAME: Caltrans: South Oakland Maintenance Station

PROJECT NUMBER: 575-9G014 DATE: 4/6/99

NORTHINGS: EASTINGS:

DRILLING COMPANY: Fisch Environmental

DRILLING METHOD: Direct Push (Geoprobe)

BORING DIAMETER: 2 inch DEPTH: 20 feet

GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
4/6/99	initial	9.5
4/6/99	stabilized	9.5

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Silty Clay with some gravel, fine grained gravel, low to medium plasticity, brown, damp, no odor.		CL	Asphalt surface
2								
3								
4								
5		10				0		
6								
7								
8								
9								
10		20				0		Groundwater encountered.
11								
12								
13								
14								
15		24				0		
16								
17								
18								
19								
20		24				0		

Total Depth = 20 feet
 Boring drilled to sufficient depth for investigation
 Groundwater stabilized at 5 feet bgs.
 Boring converted to temporary groundwater monitoring well.
 Well grouted by removing casing and tremie placement of neat cement.

REVIEWED BY: Tim O'Brien

LOGGED BY: Scott Bowers

SOIL BORING LOG

BORING NO: B5

SHEET 1 OF 1

PROJECT NAME: Caltrans: South Oakland Maintenance Station

PROJECT NUMBER: 575-9G014 DATE: 4/7/99

NORTHINGS: EASTINGS:

DRILLING COMPANY: Fisch Environmental

DRILLING METHOD: Direct Push (Geoprobe)

BORING DIAMETER: 2 inch DEPTH: 20 feet

GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
4/7/99	initial	5
4/7/99	stabilized	5

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Silty Clay with some gravel, fine grained gravel, low to medium plasticity, brown, damp, no odor.		CL	Asphalt surface
2								
3								
4								
5		17				0		Groundwater encountered.
6								
7								
8								
9								
10		12				0		
11								
12								
13								
14								
15		21				0		
16								
17								
18								
19								
20		22				0		

Total Depth = 20 feet
 Boring drilled to sufficient depth for investigation
 Groundwater stabilized at 5 feet bgs.
 Boring converted to temporary groundwater monitoring well.
 Well grouted by removing casing and tremie placement of neat cement.

REVIEWED BY: Tim O'Brien

LOGGED BY: Scott Bowers

SOIL BORING LOG

BORING NO:	B6	
SHEET	1 OF 1	
PROJECT NAME:	Caltrans: South Oakland Maintenance Station	
PROJECT NUMBER:	575-9G014	
DATE:	4/7/99	
NORTHINGS:	EASTINGS:	
DRILLING COMPANY:	Fisch Environmental	
DRILLING METHOD:	Direct Push (Geoprobe)	
BORING DIAMETER:	2 inch	
DEPTH:	20 feet	
GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS
4/7/99	initial	8
4/7/99	stabilized	8

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Silty Clay with some fine grained gravel, low to medium plasticity, brown, damp, no odor.		CL	Asphalt surface
2								
3								
4								
5		17				0		
6								
7								
8								Groundwater encountered.
9								
10		12				17.5		
11								
12								
13								
14								
15		21				0		
16								
17								
18								
19								
20		22				0		

Total Depth = 20 feet
 Boring drilled to sufficient depth for investigation
 Groundwater stabilized at 8 feet bgs.
 Boring converted to temporary groundwater monitoring well.
 Well grouted by removing casing and tremie placement of neat cement.

REVIEWED BY: Tim O'Brien LOGGED BY: Scott Bowers

SOIL BORING LOG

BORING NO: **B7**
 SHEET 1 OF 2

PROJECT NAME: Caltrans: South Oakland Maintenance Station
 PROJECT NUMBER: 575-9G014 DATE: 8/13/99
 NORTHINGS: EASTINGS:
 DRILLING COMPANY: Fisch Environmental
 DRILLING METHOD: Direct Push (Geoprobe)
 BORING DIAMETER: 2 inch DEPTH: 25 feet

GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
8/13/99	initial	none encountered
8/16/99	stabilized	15

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Poorly Graded Silty Sand with Gravel, fine gravel, brown, moist, low plasticity fines.		SM	Asphalt surface (6")
2								
3								Brick debris
4								
5	87-5				Silty Clay, dark brown, moist, medium plasticity.	0	CL	
6		20						
7								
8								
9								
10	87-10				Silty Clay, stiff, brown, moist, low plasticity	0		
11		16						
12								
13								
14								
15	87-15					0		
16		21						
17								
18								moisture increase to very moist.
19								
20	87-20				log continues downward.	0		

REVIEWED BY: Tim O'Brien

LOGGED BY: Scott Bowers

SOIL BORING LOG

BORING NO:	B8	
SHEET	1 OF 1	
PROJECT NAME:	Caltrans: South Oakland Maintenance Station	
PROJECT NUMBER:	575-9G014	
DATE:	8/13/99	
NORTHINGS:	EASTINGS:	
DRILLING COMPANY:	V & W Drilling	
DRILLING METHOD:	Direct Push (Geoprobe)	
BORING DIAMETER:	2 inch	
DEPTH:	20 feet	
GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS
8/13/99	initial	none encountered
8/13/99	stabilized	14.5

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Well graded Silty Sand, fine to coarse sand, brown, low plasticity fines.		SM	Concrete surface (7")
2								
3					Silty Clay, dark brown, moist, medium plasticity.		CL	
4								
5	B8-5					0		
6		12						
7								
8								
9								
10	B8-10				Gravelly Silty Sand, fine gravel, fine to coarse sand, brown, moist, low plasticity fines.	0	SM	
11		18						
12								
13								
14								
15	B8-15					0		
16		21						
17								
18								
19								
20	B8-20				Silty Clay with Gravel, fine gravel, brown, moist, medium plasticity.	0	CL	Total Depth = 20 feet Boring drilled to sufficient depth for investigation Groundwater stabilized at 14.5 feet bgs Boring grouted with neat cement.

REVIEWED BY: Tim O'Brien

LOGGED BY: Scott Bowers

SOIL BORING LOG

BORING NO: **B9**
 SHEET **1** OF **1**

PROJECT NAME: Caltrans: South Oakland Maintenance Station
 PROJECT NUMBER: 575-9G014 DATE: 8/13/99
 NORTHINGS: EASTINGS:
 DRILLING COMPANY: V & W Drilling
 DRILLING METHOD: Direct Push (Geoprobe)
 BORING DIAMETER: 2 inch DEPTH: 15 feet

GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
8/13/99	initial	11.5

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Well graded Silty Sand, fine to coarse sand, brown, low plasticity fines.		SM	Concrete surface (1") Asphalt (3")
2								
3					Silty Clay, dark brown, moist, medium plasticity.		CL	
4								
5	B9-5					0		
6		14						
7								
8								
9								
10	B9-10				Gravelly Silty Sand, fine gravel, fine to coarse sand, brown, moist, low plasticity fines.	0	SM	
11		20						
12								
13								
14								
15	B9-15							
16		22				0		Total Depth = 15 feet Boring drilled to sufficient depth for investigation Groundwater stabilized at 11.5 feet bgs Boring grouted with neat cement.
17								
18								
19								
20	B9-20							

REVIEWED BY: Tim O'Brien

LOGGED BY: Scott Bowers

OIL BORING LOG

BORING NO: B10
 SHEET 1 OF 1

PROJECT NAME: CALTRANS SOUTH OAKLAND
 PROJECT NUMBER: 1G026 DATE: 8/24/01

DRILLING COMPANY: V&W
 DRILLING METHOD: DP
 BORING DIAMETER: 2" DEPTH: 28 FEET

GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS
8/24/01	GROUNDWATER ENCOUNTERED	15.5 FEET

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
0								
2								
4	B10-5.0				SANDY CLAY: WELLGRADED MEDIUM SAND WITH CLAY. BROWN, MOIST			TRACE COARSE FRACTION
6								
8	B10-10.0				CLAYEYGRAVELLY SAND: WELL GRADED FINE TO COARSE SAND WITH FINE GRAVEL & CLAY. BROWN MATRIX MULTICOLORED GRAVEL.			DEBRIS & BRICK IN SAMPLE.
10								
12								
14	B10-15.0				CLAYEY SILT: BROWN, MOIST			CLAY LESSENS DOWN SAMPLE.
16								0845-H2O LEVEL, RISING RAPIDLY.
18								
20					CLAYEY SANDY GRAVEL: WELL GRADED FINE TO COARSE SAND AND FINE GRAVEL WITH CLAY, MOIST, GRADING TO SLIGHT MOIST, BROWN.			CLAY IN TOP HALF

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OIL BORING LOG

BORING NO: B10
 SHEET 2 OF 2

PROJECT NAME: CALTRANS SOUTH OAKLAND
 PROJECT NUMBER: 1G026 DATE: 8/24/01
 DRILLING COMPANY: V&W
 DRILLING METHOD: DP
 BORING DIAMETER: 2" DEPTH: 28 FEET

GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS
8/24/01	GROUNDWATER ENCOUNTERED	15.5 FEET

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					SEE SHEET 1			
2								
3								
4					SAND: WELL GRADED FINE TO MEDIUM			TRACE COARSE POOR H2O ZONE. HYDRO PUNCHING TO ~28'
5					SAND BROWN, WET, SOME CLAY			
6					SOME GRAVEL.			
7								
8								
9								GROUNDWATER OBTAINED.
10								TOTAL DEPTH 28 FEET.
11								BORING COMPLETED TO DEPTH
12								SUFFICIENT FOR INVESTIGATION.
13								BORING GROUTED WITH NEAT CEMENT.
14								
15								
16								
17								
18								
19								
20								

Reviewed By:

LOGGED BY:

OIL BORING LOG

BORING NO: B11
 SHEET 1 OF 1

PROJECT NAME: CALTRANS SOUTH OAKLAND
 PROJECT NUMBER: 1G026 DATE: 8/24/01
 DRILLING COMPANY: V&W
 DRILLING METHOD: DP
 BORING DIAMETER: 2" DEPTH:

GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS
8/24/01	GROUNDWATER ENCOUNTERED	-15 FEET

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
2								
4	B11-5.0				SANDY CLAY: WELL GRADED <-M SAND W/CLAY. BROWN MOIST		CL	TRACE COARSE SAND OCCASIONAL GRAVEL
9	B11-10				CLAYEY GRAVELLY SAND: WELL GRADED FINE TO COARSE SAND WITH GRAVEL AND CLAY, BROWN, MOIST.			
15	B11-15				AS ABOVE		SC	H2O @1034.
17								HYDROPUNCHED TO 24. GROUNDWATER OBTAINED. BORING COMPLETED TO DEPTH SUFFICIENT FOR INVESTIGATION. BORING GROUTED WITH NEAT CEMENT.
20								

Reviewed By:

LOGGED BY: CHRIS MERRITT

OIL BORING LOG

BORING NO: B12
 SHEET 1 OF 1

PROJECT NAME: CALTRANS SOUTH OAKLAND
 PROJECT NUMBER: 1G026 DATE: 8/24/01
 DRILLING COMPANY: V&W
 DRILLING METHOD: DP
 BORING DIAMETER: 2" DEPTH:

GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS
8/24/01	GROUNDWATER ENCOUNTERED	~15 FEET

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1								1 IN AC
2								
3								
4								
5	B12-5.0				SILTY GRAVELLY SAND: WELL GRADED FINE TO MEDIUM SAND WITH FINE GRAVEL AND CLAY BROWN, MOIST.			ALSO SOME CLAY
6								
7								
8								
9								
10	B12-10.0				SANDY SILT: SILT WITH POORLY GRADED FINE SAND, BROWN, MOIST, TRACE MEDIUM COARSE, CLAY			
11								
12								
13								
14								
15	B12-15.0				SANDY GRAVEL: WELL GRADED FINE COARSE GRAVEL FINE COARSE SAND			APPROXIMATE FIRST WET AREA.
16								
17								HYDROPUNCHED TO 24. GROUNDWATER OBTAINED. BORING COMPLETED TO DEPTH SUFFICIENT FOR INVESTIGATION. BORING GROUTED WITH NEAT CEMENT.
18								
19								
20								

viewed By: _____ LOGGED BY: _____

SOIL BORING LOG

BORING NO: B1MW1

SHEET 1 OF 2

PROJECT NAME: CALTRANS SOUTH OAKLAND

PROJECT NUMBER: 0G019

DATE: 6/8/00

DRILLING COMPANY: V&W

DRILLING METHOD: HSA

BORING DIAMETER: 8 INCHES DEPTH:

GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
6/8/00	INITIAL GROUNDWATER	~15 FEET

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Silty Sandy Gravel: Well graded fine to coarse gravel with fine to coarse sand and silt, mottled dark brown to black, damp.	0	GM	4 inches Asphalt Slight diesel odor, no OVM response
2								
3								
4								
5	B1-5.0			6	Clayey Sand: Poorly graded fine sand with clay, brown, damp.		SC	
6				8				
				16				
7								
8								
9								
10	B1-10.0			6	Clayey Sand: As above	0		
11				14				
				17				
12								
13								
14								
15	B1-15.0			4	Sandy Clay: Poorly graded fine sand with clay, brown, damp with saturated voids and channels.			Approximate first water by void contents.
16				4				
				8				
17								
18								
19								
20	B1-20.0			8	Gravelly Sandy Clay: Clay with well graded fine to coarse		GC	

Reviewed By:

LOGGED BY: CHRIS MERRITT

SOIL BORING LOG

BORING NO:	B1\MW1		
SHEET	2	OF	2
PROJECT NAME:	CALTRANS SOUTH OAKLAND		
PROJECT NUMBER:	0G019	DATE:	6/8/00
DRILLING COMPANY:	V&W		
DRILLING METHOD:	HSA		
BORING DIAMETER:	8 INCHES	DEPTH:	25 FEET
GROUNDWATER LEVELS			
DATE	COMMENTS	DEPTH BGS	
6/8/00	INITIAL GROUNDWATER	~15 FEET	

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1				11	gravel and poorly graded fine sand, light tan, damp.		GC	
				18				
2								
3								
4								
25	B1-25.0			8	Sandy Clay: Clay with poorly graded fine sand, brown, damp.		CL	
6				15				
				25				
7								Total depth 25 feet + sample.
8								Screen 25-5 feet.
9								Sand 25-3 feet.
30								Chips 3-2 feet
								Grout\Box 2-0 feet
1								
2								
3								
4								
35								
6								
7								
8								
9								
40								

Reviewed By: _____ LOGGED BY: CHRIS MERRITT

SOIL BORING LOG

BORING NO: **B2MW2**
 SHEET 1 OF 1

PROJECT NAME: CALTRANS SOUTH OAKLAND
 PROJECT NUMBER: 0G019 DATE: 6/8/00
 NORTHINGS: EASTINGS:
 DRILLING COMPANY: V&W
 DRILLING METHOD: HSA
 BORING DIAMETER: 8 INCHES DEPTH: 20 FEET

GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS
6/8/00	INITIAL WATER	13 FEET

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
0								4 inches asphalt.
2					Silty Sandy Gravel: Well graded fine to coarse gravel with fine to coarse sand and silt, mottled dark brown to black, damp.	0	GM	
4								
6								
6-5.0				6	Clayey Sand: Poorly graded fine sand with clay, brown, damp.		SC	Trace fine gravel.
7				7				
12				12				
9								
10								
10-10.0				9	Clayey Silty Sand: Poorly graded fine sand with silt and clay, mottled brown, damp.		SM	
14				14				
17				17				
13								First water.
15								
15				8	Clay: Brown, damp.			
14				14				
18				18				
17								Lost sampler, overdrilled to 20 feet.
18								Total depth 20 feet.
19								Screened 20-5 feet.
20								Sand 20-3 feet.
								Chips 3-2 feet
								Grout\Box 2-0 feet.

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SOIL BORING LOG

BORING NO: B3-MW3

SHEET 1 OF 1

PROJECT NAME:	CALTRANS SOUTH OAKLAND	
PROJECT NUMBER:	0G019	DATE: 6/8/00
NORTHINGS:	EASTINGS:	
DRILLING COMPANY:	V&W	
DRILLING METHOD:	HSA	
BORING DIAMETER:	8 INCHES	DEPTH: 20 FEET
GROUNDWATER LEVELS		
DATE	COMMENTS	DEPTH BGS
6/8/00	INITIAL WATER	13 FEET

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
0								4 inches asphalt.
2					Silty Sandy Gravel: Well graded fine to coarse gravel with fine to coarse sand and silt, mottled dark brown to black, damp.	0	GM	
4								
6	B3-5.0			6	Clayey Sand: Poorly graded fine sand with clay, brown, damp.	0	SC	Trace fine gravel.
7				7				
9				12				
11	B3-10.0			9	Sandy Clay: Clay with poorly graded fine sand, brown, damp.		CL	
12				12				
13				12				
15	B3-15.0			10	Sandy Clay: As above, light gray			
16				16				
18				18				
20								First water
22								
24	B3-20.0			9				Total depth 20 feet + sample.
25				15				Screened 20-5 feet.
				25				Sand 20-3 feet.
								Chips 3-2 feet.
								Grout Box 2-0 feet.

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OIL BORING LOG

BORING NO: **B4MW4**
 SHEET **1** OF **2**

PROJECT NAME: **CALTRANS SOUTH OAKLAND**
 PROJECT NUMBER: **0G019** DATE: **6/8/00**
 DRILLING COMPANY: **V&W**
 DRILLING METHOD: **HSA**
 BORING DIAMETER: **8 INCHES** DEPTH: **25 FEET**
GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
6/8/00	INITIAL WATER	12.5 FEET

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
0								4 inches Asphalt
1					Silty Sandy Gravel: Well graded fine to coarse gravel with fine to coarse sand and silt, mottled dark brown to black, damp.	0	GM	
2								
3								
4								
5	B4-5.0			6	Clayey Sand: Poorly graded fine sand with clay, brown, damp.	0	SC	
6				8				
7				16				
8								
9								
10	B4-10.0			6	Clayey Sand: As above	0		
11				14				
12				17				
13								First water.
14								
15	B4-15.0			10	Sandy Gravel: Well graded fine to coarse gravel with poorly		GW	2-3 inch zone
16				12	graded medium sand, brown, wet.			
17				15	Sand: Poorly graded medium sand, brown, wet.		SP	
18								
19								
20	B4-20.0			9	Clay: Light tan, wet.		CL	

Reviewed By: _____ LOGGED BY: **CHRIS MERRITT**

SOIL BORING LOG

BORING NO:	B4\MW4		
SHEET	2	OF	2
PROJECT NAME:	CALTRANS SOUTH OAKLAND		
PROJECT NUMBER:	0G019	DATE:	6/8/00
DRILLING COMPANY:	V&W		
DRILLING METHOD:	HSA		
BORING DIAMETER:	8 INCHES	DEPTH:	25 FEET
GROUNDWATER LEVELS			
DATE	COMMENTS	DEPTH BGS	
6/8/00	INITIAL WATER	12.5 FEET	

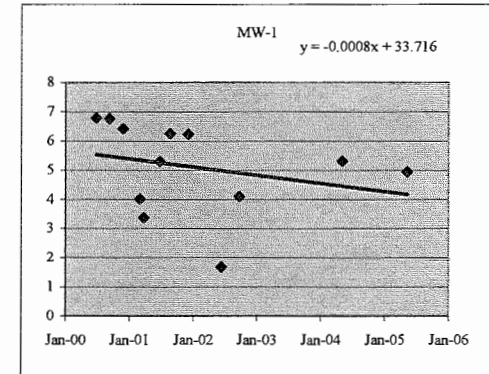
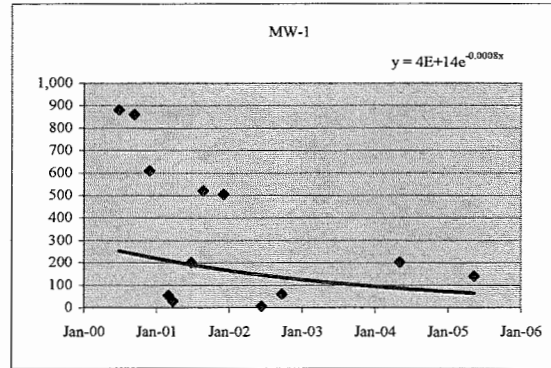
DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1				6	Clay: Light tan, wet.		CL	
				10				
2								
3								
4								
5	B4-25.0			8	Sandy Clay: Clay with poorly graded fine sand, brown, damp.		CL	
6				12				
				21				
7								
8								Total depth 25 feet + sample.
9								Screen 25-5 feet.
10								Sand 25-3 feet.
11								Chips 3-2 feet
12								Grout\Box 2-0 feet
13								
14								
15								
16								
17								
18								
19								
20								

Reviewed By: _____ LOGGED BY: CHRIS MERRITT

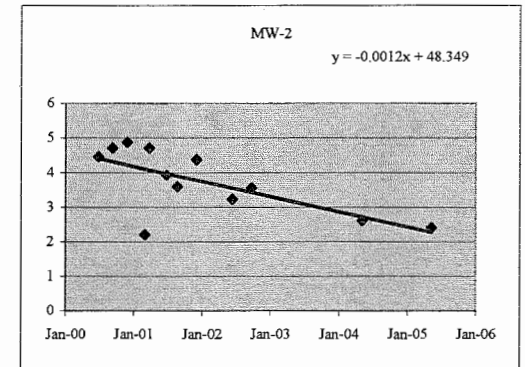
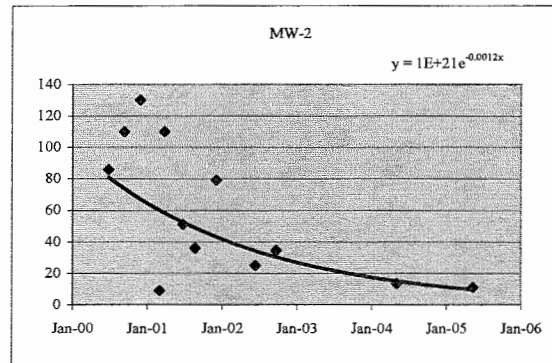
APPENDIX

B

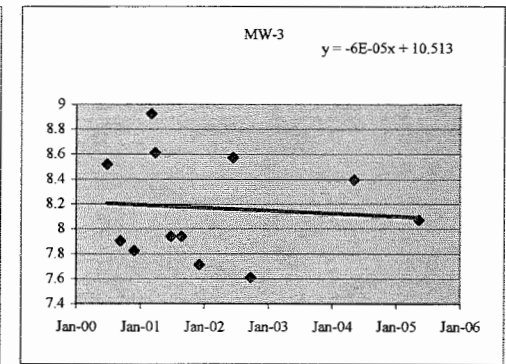
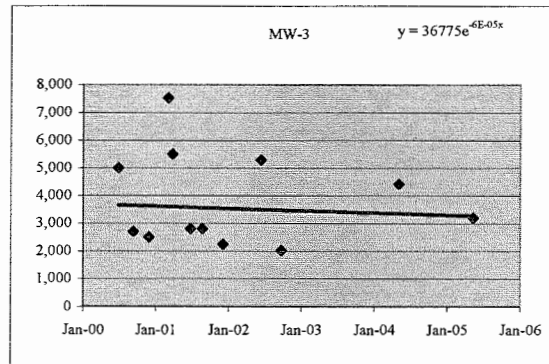
Well	Date	MTBE (ug/l)	MTBE (ug/l)	ln (MTBE) (ug/l)
MW-1	27-Jun-00	880	880	6.779921907
	11-Sep-00	860	860	6.756932389
	28-Nov-00	610	610	6.413458957
	27-Mar-01	29	29	3.36729583
	26-Jun-01	200	200	5.298317367
	24-Aug-01	520	520	6.253828812
	05-Dec-01	505	505	6.224558429
	04-Mar-01	55	55	4.007333185
	14-Jun-02	5.3	5.3	1.667706821
	24-Sep-02	60.0	60.0	4.094344562
	05-May-04	201	201	5.303304908
	12-May-05	140	140	4.941642423



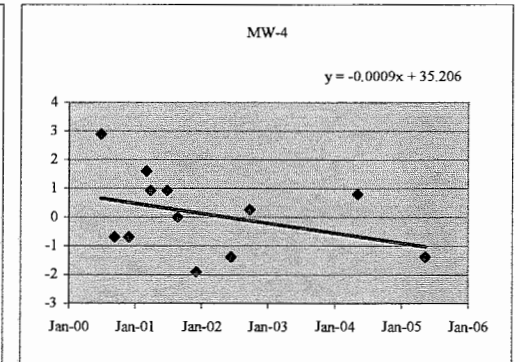
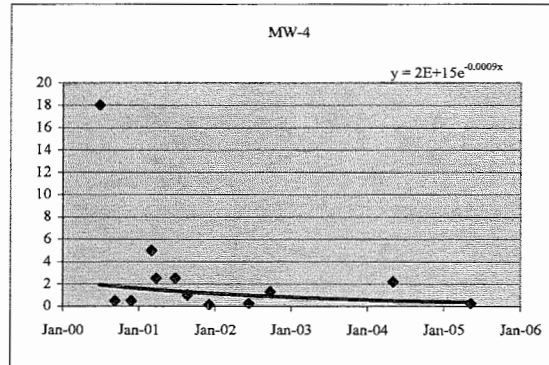
Well	Date	MTBE (ug/l)	MTBE (ug/l)	ln (MTBE) (ug/l)
MW-2	27-Jun-00	86	86	4.454347296
	11-Sep-00	110	110	4.700480366
	28-Nov-00	130	130	4.86753445
	27-Mar-01	110	110	4.700480366
	26-Jun-01	51	51	3.931825633
	24-Aug-01	36	36	3.583518938
	05-Dec-01	79	79	4.369447852
	04-Mar-01	9	9	2.197224577
	14-Jun-02	25.0	25.0	3.218875825
	24-Sep-02	34.6	34.6	3.543853682
	05-May-04	13.5	13.5	2.602689685
	12-May-05	11	11	2.397895273



Well	Date	MTBE (ug/l)	MTBE (ug/l)	ln (MTBE) (ug/l)
MW-3	27-Jun-00	5,000	5,000	8.517193191
	11-Sep-00	2,700	2,700	7.901007052
	28-Nov-00	2,500	2,500	7.824046011
	27-Mar-01	5,500	5,500	8.612503371
	26-Jun-01	2,800	2,800	7.937374696
	24-Aug-01	2,800	2,800	7.937374696
	05-Dec-01	2,240	2,240	7.714231145
	04-Mar-01	7,520	7,520	8.925321417
	14-Jun-02	5,290	5,290	8.573573525
	24-Sep-02	2,020	2,020	7.61085279
	05-May-04	4,420	4,420	8.393894975
	12-May-05	3,200	3,200	8.070906089



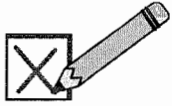
Well	Date	MTBE (ug/l)	MTBE (ug/l)	ln (MTBE) (ug/l)
MW-4	27-Jun-00	18	18	2.890371758
	11-Sep-00	< 1.0	0.50	-0.693147181
	28-Nov-00	< 1.0	0.50	-0.693147181
	27-Mar-01	< 5.0	2.50	0.916290732
	26-Jun-01	< 5.0	2.50	0.916290732
	24-Aug-01	<2	1.00	1E-09
	05-Dec-01	<0.3	0.15	-1.897119985
	04-Mar-01	5.00	5.00	1.609437912
	14-Jun-02	<0.5	0.25	-1.386294361
	24-Sep-02	1.3	1.3	0.262364264
	05-May-04	2.2	2.2	0.78845736
	12-May-05	<0.50	0.3	-1.386294361



APPENDIX

C

Oakland RBCA Eligibility Checklist



The Oakland Tier 1 RBSLs and Tier 2 SSTLs are intended to address human health concerns at the majority of sites in Oakland where commonly-found contaminants are present. Complicated sites—especially those with continuing releases, ecological concerns or unusual subsurface conditions—will likely require a Tier 3 analysis. The following checklist is designed to assist you in determining your site’s eligibility for the Oakland RBCA levels.

CRITERIA	YES	NO
1. Is there a continuing, <i>primary</i> source of a chemical of concern, such as a leaking container, tank or pipe? (This does <i>not</i> include residual sources.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Is there any mobile or potentially-mobile free product?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Are there more than five chemicals of concern at the site at a concentration greater than the lowest applicable Oakland RBCA level?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Are there any preferential vapor migration pathways—such as gravel channels or utility corridors—that are potential conduits for the migration, on-site or off-site, of a volatilized chemical of concern?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Do both of the following conditions exist? (a) Groundwater is at depths less than 300 cm (10 feet) (b) Inhalation of volatilized chemicals of concern from groundwater in indoor or outdoor air is a pathway of concern but groundwater ingestion is <i>not</i> *	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Are there any existing on-site or off-site structures intended for future use where exposure to indoor air vapors from either soil or groundwater is of concern <i>and</i> one of the following three conditions is present? (a) A slab-on-grade foundation that is less than 15 cm (6 inches) thick (b) An enclosed, below-grade space (e.g., a basement) that has floors or walls less than 15 cm (6 inches) thick (c) A crawl space that is not ventilated	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Are there any immediate, acute health risks to humans associated with contamination at the site, including explosive levels of a chemical?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Are there any complete exposure pathways to nearby ecological receptors, such as endangered species, wildlife refuge areas, wetlands, surface water bodies or other protected areas?	<input type="checkbox"/>	<input checked="" type="checkbox"/>

*If groundwater ingestion *is* a pathway of concern, the associated Oakland RBCA levels will be more stringent than those for any groundwater-related inhalation scenario, rendering depth to groundwater irrelevant in the risk analysis.

If you answer “no” to all questions, your site is eligible for the Oakland RBCA levels. If you answer “yes” to any of the questions, your site is *not* eligible for the Oakland RBCA levels at this time.

Tier 1 Default Inputs

		Residential		Commercial/ Industrial
Input Parameters	Units	Child	Adult	Worker
Soil-Specific Parameters				
Capillary fringe thickness	cm	=adult residential	5	=adult residential
Capillary fringe air content	cm ³ /cm ³		0.038	
Capillary fringe water content	cm ³ /cm ³		0.342	
Fraction organic carbon (FOC*)	g oc/g soil		0.01	
Groundwater Darcy velocity	cm/yr		6	
Groundwater mixing zone thickness	cm		1524	
Infiltration rate through the vadose zone	cm/yr		3	
Soil bulk density	g/cm ³		1.70	
Soil to skin adherence factor	mg/cm ²	0.5	0.5	0.5
Total soil porosity	cm ³ /cm ³	=adult residential	0.38	=adult residential
Vadose zone air content	cm ³ /cm ³		0.26	
Vadose zone water content	cm ³ /cm ³		0.12	
Vadose zone thickness	cm		295	
Structural and Climatic Parameters				
Areal fraction of cracks in building foundation	cm ² /cm ²	=adult residential	0.001	0.001
Foundation air content	cm ³ /cm ³		0.26	=adult residential
Foundation water content	cm ³ /cm ³		0.12	
Foundation thickness	cm		15	15
Lower depth of surficial soil zone	cm		100.0	=adult residential
Depth to subsurface soil sources	cm		100	
Depth to groundwater	cm		300	
Width of source area parallel to wind or groundwater flow direction	cm		1500	
Outdoor air mixing zone height	cm		200	
Particulate emission rate	g/cm ² -s		1.38E-11	1.38E-11
Wind speed above ground surface in outdoor air mixing zone	cm/s		322	=adult residential

Tier 1 Default Inputs

Input Parameters	Units	Residential		Commercial/ Industrial
		Child	Adult	Worker
Exposure Parameters				
Averaging time for carcinogens	yr	=adult residential	70	=adult residential
Averaging time for non-carcinogens	yr	6	24	25
Averaging time for vapor flux	s	=adult residential	9.46E+08	7.88E+08
Body weight	kg	15	70	70
Building air volume/floor area	cm ³ /cm ²	=adult residential	229	305
Exposure duration	yr	6	24	25
Exposure frequency	d/yr	350	350	250
Exposure frequency to water used for recreation	d/yr	120	120	0
Exposure time to indoor air	hr/d	24	24	9
Exposure time to outdoor air	hr/d	16	16	9
Exposure time to water used for recreation	hr/d	2	1.0	0
Groundwater ingestion rate	L/d	1	2	1
Indoor air exchange rate	1/s	=adult residential	5.60E-04	1.40E-03
Indoor inhalation rate	m ³ /d	10	15	20
Ingestion rate of water used for recreation	L/hr	0.05	0.05	0
Outdoor inhalation rate	m ³ /d	10	20	20
Skin surface area exposed to soil	cm ²	2000	5000	5000
Skin surface area exposed to water used for recreation	cm ²	8000	20000	0
Soil ingestion rate	mg/d	200	100	50
TARGET RISK LEVELS				
Individual Excess Lifetime Cancer Risk	unitless	=adult residential	1.0E-06	1.0E-06
Hazard quotient	unitless		1.0	1.0

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Beryllium	Bis(2-ethylhexyl)-phthalate	Butyl benzyl phthalate	Cadmium	Carbon Disulfide
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	2.5E-01		2.5E-01	4.5E+03	3.6E+01		2.1E+03	
			Hazard		2.1E+02		3.7E+02	1.0E+03	1.0E+04	3.7E+01	1.2E+03
		Commercial/ Industrial	Carcinogenic	7.9E-01		7.9E-01	1.7E+04	1.1E+02		7.9E+03	
			Hazard		1.4E+03		6.8E+03	6.8E+03	6.8E+04	6.8E+02	6.4E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			1.1E+00	
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			3.3E+01	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			3.8E+00	
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			2.2E+01	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	2.1E+00		2.1E+00	9.6E+00	3.7E+03		1.1E+00	
			Hazard		SAT		9.6E+00	SAT	SAT	1.1E+00	2.9E+00
		Commercial/ Industrial	Carcinogenic	8.9E+00		8.9E+00	9.6E+00	1.6E+04		1.1E+00	
			Hazard		SAT		9.6E+00	SAT	SAT	1.1E+00	1.9E+01
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			2.1E+00	
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			6.2E+01	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			1.7E+02	
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			9.6E+02	
	Ingestion of Groundwater	Residential	Carcinogenic	5.6E-05		5.6E-05	4.0E-03	8.0E-03		5.0E-03	
			Hazard		>SOL		4.0E-03	3.1E-01	>SOL	5.0E-03	1.6E+00
		Commercial/ Industrial	Carcinogenic	2.4E-04		2.4E-04	4.0E-03	3.4E-02		5.0E-03	
			Hazard		>SOL		4.0E-03	>SOL	>SOL	5.0E-03	1.0E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-05		1.2E-05		5.1E-02			
			Hazard		>SOL		2.0E+00	>SOL	>SOL	2.0E-01	9.4E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaphthene	Acenaphthylene	Acetone	Anthracene	Arsenic	Barium	Benz(a)-anthracene	Benzene	Benzo(a)-pyrene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					3.2E-01		2.5E-01	2.7E+00	2.5E-02	
			Hazard	3.1E+03	3.1E+03	4.8E+03	1.6E+04	2.0E+01	5.2E+03		8.1E+01		
		Commercial/ Industrial	Carcinogenic					1.5E+00		7.9E-01	8.5E+00	7.9E-02	
			Hazard	2.0E+04	2.0E+04	3.0E+04	1.0E+05	2.5E+02	9.4E+04		5.1E+02		
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	6.9E-02	SAT	
			Hazard	SAT	SAT	1.5E+03	SAT				2.3E+00		
		Commercial/ Industrial	Carcinogenic							SAT	1.1E+00	SAT	
			Hazard	SAT	SAT	4.4E+04	SAT				6.6E+01		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	1.9E-01	SAT	
			Hazard	SAT	SAT	5.0E+03	SAT				7.6E+00		
		Commercial/ Industrial	Carcinogenic							SAT	7.3E-01	SAT	
			Hazard	SAT	SAT	2.9E+04	SAT				4.4E+01		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic						4.4E+00	1.2E+02	6.8E-01	2.1E-03	6.2E+00
			Hazard	2.0E+02	1.4E+02	3.6E-01	SAT	4.4E+00	1.2E+02		2.1E-03	6.2E+00	
		Commercial/ Industrial	Carcinogenic					4.4E+00	1.2E+02	2.9E+00	2.1E-03	6.2E+00	
			Hazard	SAT	SAT	2.4E+00	SAT	4.4E+00	1.2E+02		2.1E-03	6.2E+00	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	1.1E-01	>SOL	
			Hazard	>SOL	>SOL	2.0E+04	>SOL				3.7E+00		
		Commercial/ Industrial	Carcinogenic							>SOL	1.8E+00	>SOL	
			Hazard	>SOL	>SOL	5.8E+05	>SOL				1.1E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	5.6E+00	>SOL	
			Hazard	>SOL	>SOL	2.1E+05	>SOL				2.2E+02		
		Commercial/ Industrial	Carcinogenic							>SOL	2.1E+01	>SOL	
			Hazard	>SOL	>SOL	>SOL	>SOL				1.3E+03		
	Ingestion of Groundwater	Residential	Carcinogenic						5.0E-02	1.0E+00	5.6E-05	1.0E-03	2.0E-04
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
		Commercial/ Industrial	Carcinogenic					5.0E-02	1.0E+00	2.4E-04	1.0E-03	2.0E-04	
			Hazard	>SOL	>SOL	1.0E+01	>SOL	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-03		1.6E-05	6.3E-03	1.1E-06	
			Hazard	1.1E+00	1.7E+00	4.2E+01	>SOL	1.2E-01	2.8E+01		1.8E-01		

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Carbon Tetrachloride	Chloro-benzene	Chloroform	Chromium (III)	Chromium (VI)	Chrysene	Copper	Cresol(-m)	Cresol(-o)	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.8E+00		9.1E+00		1.3E+00	2.5E+00				
			Hazard	3.3E+01	7.9E+02	4.8E+02	7.4E+04	3.7E+02		2.8E+03	2.6E+03	2.6E+03	
		Commercial/ Industrial	Carcinogenic	5.6E+00		2.9E+01		8.7E+00	7.9E+00				
			Hazard	2.1E+02	4.7E+03	3.0E+03	1.4E+06	6.8E+03		5.0E+04	1.7E+04	1.7E+04	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	2.7E-02		3.3E-01			SAT				
			Hazard	4.6E-01	6.2E-01	1.2E+01				SAT	SAT		
		Commercial/ Industrial	Carcinogenic	4.3E-01		5.2E+00			SAT				
			Hazard	1.3E+01	1.8E+01	3.5E+02				SAT	SAT		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	7.6E-02		9.2E-01			SAT				
			Hazard	1.5E+00	2.1E+00	4.1E+01				SAT	SAT		
		Commercial/ Industrial	Carcinogenic	2.9E-01		3.5E+00			SAT				
			Hazard	8.8E+00	1.2E+01	2.4E+02				SAT	SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	3.0E-03	6.6E-02	1.5E-01		2.9E+00	SAT	2.8E-01			
			Hazard	3.0E-03	6.6E-02	1.5E-01	8.5E+07	2.9E+00		2.8E-01	2.2E+00	2.3E+00	
		Commercial/ Industrial	Carcinogenic	3.0E-03	6.6E-02	1.5E-01		2.9E+00	SAT	2.8E-01			
			Hazard	3.0E-03	6.6E-02	1.5E-01	5.6E+08	2.9E+00		2.8E-01	1.5E+01	1.5E+01	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.6E-02		7.5E-01			>SOL				
			Hazard	2.7E-01	2.4E+00	2.8E+01				>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	2.6E-01		1.2E+01			>SOL				
			Hazard	7.8E+00	6.9E+01	8.0E+02				>SOL	>SOL		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.1E+00		3.4E+01			>SOL				
			Hazard	2.2E+01	2.0E+02	1.5E+03				>SOL	>SOL		
		Commercial/ Industrial	Carcinogenic	4.2E+00		1.3E+02			>SOL				
			Hazard	1.3E+02	>SOL	>SOL				>SOL	>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic	5.0E-04	7.0E-02	1.0E-01		5.0E-02	5.6E-04	1.3E+00			
			Hazard	5.0E-04	7.0E-02	1.0E-01	1.6E+01	5.0E-02		1.3E+00	7.8E-01	7.8E-01	
		Commercial/ Industrial	Carcinogenic	5.0E-04	7.0E-02	1.0E-01		5.0E-02	>SOL	1.3E+00			
			Hazard	5.0E-04	7.0E-02	1.0E-01	1.0E+02	5.0E-02		1.3E+00	5.1E+00	5.1E+00	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.1E-03		3.9E-02		6.8E-03	1.6E-04				
			Hazard	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00		1.5E+01	6.7E+00	6.4E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene	Dichloro ethane (1,1-)	Dichloro ethane (1,2-) (EDC)	Dichloro ethylene (1,1-)	Dichloro ethylene (cis 1,2-)	Dichloro ethene (trans 1,2)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			7.4E-02	4.7E+01	3.9E+00	4.9E-01		
			Hazard	2.6E+02	3.0E+03		4.9E+03	1.4E+02	4.3E+02	4.8E+02	9.5E+02
		Commercial/ Industrial	Carcinogenic			2.3E-01	1.5E+02	1.2E+01	1.5E+00		
			Hazard	1.7E+03	5.5E+04		3.1E+04	8.8E+02	2.7E+03	3.0E+03	6.1E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	8.6E-01	1.7E-01	9.4E-03		
			Hazard	SAT			1.3E+02	6.8E+00	3.0E+00	1.4E+01	1.9E+01
		Commercial/ Industrial	Carcinogenic			SAT	1.4E+01	2.7E+00	1.5E-01		
			Hazard	SAT			SAT	2.0E+02	8.7E+01	4.1E+02	5.4E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	2.4E+00	4.8E-01	2.6E-02		
			Hazard	SAT			4.5E+02	2.3E+01	9.9E+00	4.7E+01	6.2E+01
		Commercial/ Industrial	Carcinogenic			SAT	9.1E+00	1.8E+00	1.0E-01		
			Hazard	SAT			SAT	1.3E+02	5.8E+01	2.8E+02	3.6E+02
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		6.0E+00	1.9E+00	6.4E-03	3.8E-04	1.5E-02	8.2E-03	2.0E-02
			Hazard	2.1E-01	6.0E+00		6.4E-03	3.8E-04	1.5E-02	8.2E-03	2.0E-02
		Commercial/ Industrial	Carcinogenic		6.0E+00	8.0E+00	6.4E-03	3.8E-04	1.5E-02	8.2E-03	2.0E-02
			Hazard	1.4E+00	6.0E+00		6.4E-03	3.8E-04	1.5E-02	8.2E-03	2.0E-02
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>SOL	2.3E+00	7.2E-01	1.4E-02		
			Hazard	>SOL			3.6E+02	2.9E+01	4.3E+00	3.5E+01	3.2E+01
		Commercial/ Industrial	Carcinogenic			>SOL	3.6E+01	1.1E+01	2.2E-01		
			Hazard	>SOL			>SOL	8.3E+02	1.2E+02	1.0E+03	9.4E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL	1.1E+02	1.8E+01	9.3E-01		
			Hazard	>SOL			>SOL	8.6E+02	3.5E+02	1.6E+03	2.0E+03
		Commercial/ Industrial	Carcinogenic			>SOL	4.0E+02	6.9E+01	3.5E+00		
			Hazard	>SOL			>SOL	5.0E+03	2.0E+03	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		2.0E-01	1.6E-05	5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
			Hazard	7.8E-02	2.0E-01		5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
		Commercial/ Industrial	Carcinogenic		2.0E-01	7.0E-05	5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
			Hazard	5.1E-01	2.0E-01		5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			1.4E-06	2.1E-01	2.4E-02	1.3E-03		
			Hazard	5.9E-01	7.0E+00		1.9E+01	7.2E-01	1.2E+00	1.8E+00	3.5E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-benza(a) anthracene (7,12)	Dimethyl phenol (2,4)	di-n-Butyl-phthalate	di-n-octyl phthalate	Dinitro toluene (2,4)	Dioxane (1,4)	Ethyl-benzene	Ethylene Dibromide	Flouran-thene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					9.7E-01	1.0E+01		8.4E-02		
			Hazard	1.6E+03	1.0E+03	5.2E+03	1.0E+03			5.1E+03	2.7E+00	2.1E+03	
		Commercial/ Industrial	Carcinogenic					3.0E+00	3.1E+01			2.6E-01	
			Hazard	1.0E+04	6.7E+03	3.4E+04	6.8E+03				3.3E+04	1.7E+01	1.4E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic					SAT	SAT		2.8E-01		
			Hazard		SAT	SAT	SAT			SAT	7.8E-01	SAT	
		Commercial/ Industrial	Carcinogenic					SAT	SAT			4.5E+00	
			Hazard		SAT	SAT	SAT			SAT	2.3E+01	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic					SAT	SAT		7.9E-01		
			Hazard		SAT	SAT	SAT			SAT	2.6E+00	SAT	
		Commercial/ Industrial	Carcinogenic					SAT	SAT			3.0E+00	
			Hazard		SAT	SAT	SAT			SAT	1.5E+01	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic						6.7E-04	1.8E-03	8.0E+00	7.8E-05	
			Hazard	SAT	2.0E+00	3.9E+06	SAT			8.0E+00	7.8E-05	SAT	
		Commercial/ Industrial	Carcinogenic					2.9E-03	SAT	8.0E+00	7.8E-05		
			Hazard	SAT	1.3E+01	SAT	SAT			8.0E+00	7.8E-05	SAT	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic					>SOL	>SOL		5.7E-01		
			Hazard		>SOL	>SOL	>SOL			>SOL	1.6E+00	>SOL	
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL			9.0E+00	
			Hazard		>SOL	>SOL	>SOL			>SOL	4.6E+01	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic						>SOL	>SOL		8.7E+00	
			Hazard		>SOL	>SOL	>SOL			>SOL	2.9E+01	>SOL	
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL			3.3E+01	
			Hazard		>SOL	>SOL	>SOL			>SOL	1.7E+02	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic						2.2E-04	2.5E-03	7.0E-01	5.0E-05	
			Hazard	>SOL	3.1E-01	1.6E+00	>SOL			7.0E-01	5.0E-05	>SOL	
		Commercial/ Industrial	Carcinogenic					9.2E-04	1.1E-02	7.0E-01	5.0E-05		
			Hazard	>SOL	2.0E+00	1.0E+01	>SOL			7.0E-01	5.0E-05	>SOL	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					6.4E-03	>SOL		5.9E-04		
			Hazard	>SOL	2.7E+00	7.3E+00	2.1E-03			3.6E+00	1.7E-02	>SOL	

*Italicized concentrations based on California MCLs
 SAT = RBSL exceeds saturated soil concentration of chemical
 >SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Fluorene	Indeno-(1,2,3-CD) pyrene	Mercury	Methanol	Methyl ethyl ketone	Methylene Chloride	Methyl-naphthalene (2-)	MTBE	Naphthalene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		2.5E-01				2.1E+01				
			Hazard	2.1E+03		4.7E+00	2.4E+04	2.6E+04	3.1E+03	2.0E+03	2.6E+02	2.0E+03	
		Commercial/ Industrial	Carcinogenic		7.9E-01					6.6E+01			
			Hazard	1.4E+04		3.0E+01	1.5E+05	1.6E+05	2.0E+04	1.3E+04	1.7E+03	1.3E+04	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT				1.3E+00				
			Hazard	SAT		1.2E+01	4.5E+04	6.9E+03	7.4E+02	SAT	4.4E+03	SAT	
		Commercial/ Industrial	Carcinogenic		SAT					2.0E+01			
			Hazard	SAT		SAT	SAT	SAT	SAT	SAT	SAT	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT					3.5E+00			
			Hazard	SAT		4.0E+01	SAT	2.3E+04	2.5E+03	SAT	SAT	SAT	
		Commercial/ Industrial	Carcinogenic		SAT					1.3E+01			
			Hazard	SAT		2.3E+02	SAT	SAT	SAT	SAT	SAT	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		SAT	3.2E-01				3.1E-03		7.6E-03	1.2E+00
			Hazard	2.6E+02		3.2E-01	1.7E+00	3.3E+00	3.1E-03	1.6E+02	7.6E-03	1.2E+00	
		Commercial/ Industrial	Carcinogenic		SAT	3.2E-01				3.1E-03		7.6E-03	1.2E+00
			Hazard	SAT		3.2E-01	1.1E+01	2.2E+01	3.1E-03	1.1E+03	7.6E-03	1.2E+00	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL				6.7E+00				
			Hazard	>SOL		2.6E-01	6.5E+05	6.0E+04	4.0E+03	>SOL	2.4E+04	>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL					1.1E+02			
			Hazard	>SOL		7.6E+00	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL					2.3E+02			
			Hazard	>SOL		1.6E+01	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL					8.7E+02			
			Hazard	>SOL		9.5E+01	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic		>SOL	2.0E-03				5.0E-03		1.3E-02	2.0E-02
			Hazard	6.3E-01		2.0E-03	7.8E+00	9.4E+00	5.0E-03	6.3E-01	1.3E-02	2.0E-02	
		Commercial/ Industrial	Carcinogenic		>SOL	2.0E-03				5.0E-03		1.3E-02	2.0E-02
			Hazard	>SOL		2.0E-03	5.1E+01	6.1E+01	5.0E-03	4.1E+00	1.3E-02	2.0E-02	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		7.0E-06				1.3E-01				
			Hazard	3.1E-01		3.6E-02	2.2E+02	1.5E+02	1.6E+01	6.1E-01	1.5E+00	1.5E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier I RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Nickel	Nitro benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium	Silver	Stryene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	3.4E+04	5.5E+02	5.0E-02				2.8E+02				
			Hazard	1.5E+03		1.2E+00	1.6E+04	3.1E+04	1.6E+03		3.7E+02	3.7E+02	9.8E+03	
		Commercial/ Industrial	Carcinogenic	1.3E+05	1.7E+03	1.8E-01				8.9E+02				
			Hazard	2.7E+04		1.0E+01	1.0E+05	2.0E+05	1.0E+04		6.8E+03	6.8E+03	6.3E+04	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT	6.9E+01				2.9E+03				
			Hazard			SAT	SAT	SAT	SAT				SAT	
		Commercial/ Industrial	Carcinogenic		SAT	1.1E+03				4.6E+04				
			Hazard			SAT	SAT	SAT	SAT					SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT	1.9E+02				8.1E+03				
			Hazard			SAT	SAT	SAT	SAT					SAT
		Commercial/ Industrial	Carcinogenic		SAT	7.3E+02				3.1E+04				
			Hazard			SAT	SAT	SAT	SAT					SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	2.0E+01	2.9E-01	4.7E+00				1.2E-01	7.7E-01	2.5E+00	2.4E+00	
			Hazard	2.0E+01		4.7E+00	SAT	1.0E+01	SAT		7.7E-01	2.5E+00	2.4E+00	
		Commercial/ Industrial	Carcinogenic	2.0E+01	1.2E+00	4.7E+00				5.3E-01	7.7E-01	2.5E+00	2.4E+00	
			Hazard	2.0E+01		4.7E+00	SAT	6.7E+01	SAT		7.7E-01	2.5E+00	2.4E+00	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL	2.3E-02				4.8E+03				
			Hazard			>SOL	>SOL	>SOL	>SOL				>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL	3.6E-01				7.7E+04				
			Hazard			>SOL	>SOL	>SOL	>SOL					>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL	3.2E-01				4.1E+04				
			Hazard			>SOL	>SOL	>SOL	>SOL					>SOL
		Commercial/ Industrial	Carcinogenic		>SOL	>SOL				1.5E+05				
			Hazard			>SOL	>SOL	>SOL	>SOL					>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	1.0E-01	1.3E-01	5.0E-04				6.7E-02	5.0E-02	1.0E-01	1.0E-01	
			Hazard	1.0E-01		5.0E-04	>SOL	9.4E+00	>SOL		5.0E-02	1.0E-01	1.0E-01	
		Commercial/ Industrial	Carcinogenic	1.0E-01	5.7E-01	5.0E-04				2.9E-01	5.0E-02	1.0E-01	1.0E-01	
			Hazard	1.0E-01		5.0E-04	>SOL	6.1E+01	>SOL		5.0E-02	1.0E-01	1.0E-01	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		2.8E+00	1.6E-06				2.6E+00				
			Hazard	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL		2.0E+00	2.1E+00	9.3E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Tetrachloroethane (1,1,2,2-)	Tetrachloroethylene (PCE)	Tetraethyl Lead	Toluene	Trichloroethane (1,1,1-)	Trichloroethane (1,1,2-)	Trichloroethylene (TCE)	Vanadium	Vinyl Chloride	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.0E+00	5.7E+00					3.8E+00	1.9E+01	5.0E-01	
			Hazard	1.2E+03	4.8E+02	5.2E-03	9.0E+03	1.8E+03	1.9E+02	2.9E+02	5.2E+02		
		Commercial/ Industrial	Carcinogenic	3.1E+00	1.8E+01					1.2E+01	5.9E+01		1.6E+00
			Hazard	7.9E+03	3.0E+03	3.4E-02	5.6E+04	1.2E+04	1.2E+03	1.8E+03	9.5E+03		
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.4E-01	3.0E-01					5.4E-01	1.1E+00	1.3E-03	
			Hazard	1.0E+03	1.2E+01		3.6E+02	2.6E+02	3.1E+01	1.3E+01			
		Commercial/ Industrial	Carcinogenic	1.2E+01	4.8E+00					8.7E+00	1.7E+01		2.1E-02
			Hazard	SAT	SAT		SAT	SAT	8.9E+02	3.6E+02			
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	2.1E+00	8.4E-01					1.5E+00	3.0E+00		3.7E-03
			Hazard	SAT	4.1E+01		SAT	8.7E+02	1.0E+02	4.2E+01			
		Commercial/ Industrial	Carcinogenic	7.8E+00	3.2E+00					5.8E+00	1.1E+01		1.4E-02
			Hazard	SAT	2.4E+02		SAT	SAT	5.9E+02	2.4E+02			
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	3.0E-03	2.6E-02	2.4E+00	8.8E-01	7.8E-01	8.8E-03	2.7E-02			6.5E-04
			Hazard	3.0E-03	2.6E-02	2.4E+00	8.8E-01	7.8E-01	8.8E-03	2.7E-02	3.3E+02		6.5E-04
		Commercial/ Industrial	Carcinogenic	3.0E-03	2.6E-02	2.4E+00	8.8E-01	7.8E-01	8.8E-03	2.7E-02			6.5E-04
			Hazard	3.0E-03	2.6E-02	2.4E+00	8.8E-01	7.8E-01	8.8E-03	2.7E-02	2.2E+03		6.5E-04
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.5E-01	2.0E-01					9.9E-01	6.9E-01	3.7E-03	
			Hazard	1.0E+03	8.4E+00		2.1E+02	2.4E+02	5.6E+01	8.1E+00			
		Commercial/ Industrial	Carcinogenic	1.2E+01	3.3E+00					1.6E+01	1.1E+01		5.9E-02
			Hazard	>SOL	>SOL		>SOL	>SOL	1.6E+03	2.3E+02			
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.1E+01	1.3E+01					2.2E+01	4.1E+01		2.5E-01
			Hazard	>SOL	>SOL		>SOL	>SOL	1.5E+03	5.7E+02			
		Commercial/ Industrial	Carcinogenic	4.1E+01	5.1E+01					8.4E+01	1.5E+02		9.6E-01
			Hazard	>SOL	>SOL		>SOL	>SOL	>SOL	>SOL			
	Ingestion of Groundwater	Residential	Carcinogenic	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03			5.0E-04
			Hazard	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03	1.1E-01		5.0E-04
		Commercial/ Industrial	Carcinogenic	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03			5.0E-04
			Hazard	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03	7.2E-01		5.0E-04
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.5E-03	6.0E-03				1.8E-02	4.6E-03		2.6E-03	
			Hazard	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01	7.2E-02	2.8E+00		

*Italicized concentrations based on California MCLs
 SAT = RBSL exceeds saturated soil concentration of chemical
 >SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		
			Hazard	5.4E+04	2.2E+04
		Commercial/ Industrial	Carcinogenic		
			Hazard	3.0E+05	4.1E+05
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	<i>1.3E+01</i>	
			Hazard	<i>1.3E+01</i>	8.8E+02
		Commercial/ Industrial	Carcinogenic	<i>1.3E+01</i>	
			Hazard	<i>1.3E+01</i>	5.8E+03
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	<i>1.8E+00</i>	
			Hazard	<i>1.8E+00</i>	4.7E+00
		Commercial/ Industrial	Carcinogenic	<i>1.8E+00</i>	
			Hazard	<i>1.8E+00</i>	3.1E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		
			Hazard	6.6E+01	1.2E+02

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Tier 3
Clayey Silts Default Parameters (modified)

Input Parameters	Units	Residential		Commercial/ Industrial
		Child	Adult	Worker
Soil-Specific Parameters				
Capillary fringe thickness	cm	=adult residential	152	=adult residential
Capillary fringe air content	cm ³ /cm ³		0.010	
Capillary fringe water content	cm ³ /cm ³		0.49	
Fraction organic carbon (FOC*)	g oc/g soil		0.02	
Groundwater Darcy velocity	cm/yr		6	
Groundwater mixing zone thickness	cm		1524	
Infiltration rate through the vadose zone	cm/yr		3	
Soil bulk density	g/cm ³		1.33	
Soil to skin adherence factor	mg/cm ²	1	1	1
Total soil porosity	cm ³ /cm ³	=adult residential	0.5	=adult residential
Vadose zone air content	cm ³ /cm ³		0.1	
Vadose zone water content	cm ³ /cm ³		0.4	
Vadose zone thickness	cm		81	
Structural and Climatic Parameters				
Areal fraction of cracks in building foundation	cm ² /cm ²	=adult residential	0.001	0.001
Foundation air content	cm ³ /cm ³		0.26	=adult residential
Foundation water content	cm ³ /cm ³		0.12	
Foundation thickness	cm		15	15
Lower depth of surficial soil zone	cm		100.0	=adult residential
Depth to subsurface soil sources	cm		121	
Depth to groundwater	cm		233	
Width of source area parallel to wind or groundwater flow direction	cm		1500	
Outdoor air mixing zone height	cm		200	
Particulate emission rate	g/cm ² -s		1.38E-11	1.38E-11
Wind speed above ground surface in outdoor air mixing zone	cm/s		322	=adult residential

Tier 3
Clayey Silts Default Parameters (modified)

Input Parameters	Units	Residential		Commercial/ Industrial
		Child	Adult	Worker
Exposure Parameters				
Averaging time for carcinogens	yr	=adult residential	70	=adult residential
Averaging time for non-carcinogens	yr	6	24	25
Averaging time for vapor flux	s	=adult residential	9.46E+08	7.88E+08
Body weight	kg	15	70	70
Building air volume/floor area	cm ³ /cm ²	=adult residential	229	305
Exposure duration	yr	6	24	25
Exposure frequency	d/yr	350	350	250
Exposure frequency to water used for recreation	d/yr	120	120	0
Exposure time to indoor air	hr/d	24	24	9
Exposure time to outdoor air	hr/d	16	16	9
Exposure time to water used for recreation	hr/d	2	1.0	0
Groundwater ingestion rate	L/d	1	2	1
Indoor air exchange rate	1/s	=adult residential	5.60E-04	1.40E-03
Indoor inhalation rate	m ³ /d	10	15	20
Ingestion rate of water used for recreation	L/hr	0.05	0.05	0
Outdoor inhalation rate	m ³ /d	10	20	20
Skin surface area exposed to soil	cm ²	2000	5000	5000
Skin surface area exposed to water used for recreation	cm ²	8000	20000	0
Soil ingestion rate	mg/d	200	100	50
TARGET RISK LEVELS				
Individual Excess Lifetime Cancer Risk	unitless	=adult residential	1.0E-05	1.0E-05
Hazard quotient	unitless		1.0	1.0

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaphthene	Acenaphthylene	Acetone	Anthracene	Arsenic	Barium	Benz(a)-anthracene	Benzene	Benzo(a)-pyrene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					2.6E+00		1.7E+00	1.9E+01	1.7E-01	
			Hazard	2.3E+03	2.3E+03	3.7E+03	1.2E+04	1.8E+01	5.0E+03		6.3E+01		
		Commercial/ Industrial	Carcinogenic					9.5E+00		4.3E+00	4.9E+01	4.3E-01	
			Hazard	1.1E+04	1.1E+04	1.8E+04	5.6E+04	1.5E+02	7.1E+04		3.0E+02		
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	1.9E+00	SAT	
			Hazard	SAT	SAT	6.4E+03	SAT				6.5E+00		
		Commercial/ Industrial	Carcinogenic							SAT	3.1E+01	SAT	
			Hazard	SAT	SAT	1.9E+05	SAT				1.9E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	2.0E+02	SAT	
			Hazard	SAT	SAT	1.5E+05	SAT				7.9E+02		
		Commercial/ Industrial	Carcinogenic							SAT	7.5E+02	SAT	
			Hazard	SAT	SAT	SAT	SAT				SAT		
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic						4.4E+00	1.3E+02	1.4E+01	4.5E-03	1.2E+01
			Hazard	4.0E+02	2.7E+02	1.5E+00	SAT	4.4E+00	1.3E+02		4.5E-03	1.2E+01	
		Commercial/ Industrial	Carcinogenic					4.4E+00	1.3E+02	5.8E+01	4.5E-03	1.2E+01	
			Hazard	SAT	SAT	9.7E+00	SAT	4.4E+00	1.3E+02		4.5E-03	1.2E+01	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	5.4E+00	>SOL	
			Hazard	>SOL	>SOL	2.1E+04	>SOL				1.8E+01		
		Commercial/ Industrial	Carcinogenic							>SOL	8.7E+01	>SOL	
			Hazard	>SOL	>SOL	6.0E+05	>SOL				5.3E+02		
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	>SOL	>SOL	
			Hazard	>SOL	>SOL	6.8E+05	>SOL				>SOL		
		Commercial/ Industrial	Carcinogenic							>SOL	>SOL	>SOL	
			Hazard	>SOL	>SOL	>SOL	>SOL				>SOL		
	Ingestion of Groundwater	Residential	Carcinogenic						5.0E-02	1.0E+00	5.6E-04	1.0E-03	2.0E-04
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
		Commercial/ Industrial	Carcinogenic					5.0E-02	1.0E+00	2.4E-03	1.0E-03	2.0E-04	
			Hazard	>SOL	>SOL	1.0E+01	>SOL	5.0E-02	1.0E+00		1.0E-03	2.0E-04	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-02		1.6E-04	6.3E-02	1.1E-05	
			Hazard	1.1E+00	1.7E+00	4.2E+01	>SOL	1.2E-01	2.8E+01		1.8E-01		

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Benzo(b)-fluoranthene	Benzo(g,h,i)-perylene	Benzo(k)-fluoranthene	Beryllium	Bis(2-ethylhexyl)-phthalate	Butyl benzyl phthalate	Cadmium	Carbon Disulfide
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.7E+00		1.7E+00	4.5E+04	2.4E+02		2.1E+04	
			Hazard		1.6E+02		3.6E+02	7.8E+02	7.8E+03	3.6E+01	1.4E+03
		Commercial/ Industrial	Carcinogenic	4.3E+00		4.3E+00	1.7E+05	6.2E+02		7.9E+04	
			Hazard		7.4E+02		5.1E+03	3.7E+03	3.7E+04	5.1E+02	6.5E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			3.0E+00	
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			8.8E+01	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			3.8E+02	
		Commercial/ Industrial	Carcinogenic	SAT		SAT		SAT			
			Hazard		SAT		SAT			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	SAT		SAT	9.6E+00	7.3E+04		1.1E+00	
			Hazard		SAT		9.6E+00	SAT	SAT	1.1E+00	6.0E+00
		Commercial/ Industrial	Carcinogenic	SAT		SAT	9.6E+00	SAT		1.1E+00	
			Hazard		SAT		9.6E+00	SAT	SAT	1.1E+00	3.9E+01
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			2.6E+01	
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			7.4E+02	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			>SOL	
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL		>SOL			
			Hazard		>SOL		>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	5.6E-04		5.6E-04	4.0E-03	8.0E-02		5.0E-03	
			Hazard		>SOL		4.0E-03	3.1E-01	>SOL	5.0E-03	1.6E+00
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL	4.0E-03	>SOL		5.0E-03	
			Hazard		>SOL		4.0E-03	>SOL	>SOL	5.0E-03	1.0E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	1.1E-04		1.2E-04		>SOL			
			Hazard		>SOL		2.0E+00	>SOL	>SOL	2.0E-01	9.4E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Carbon Tetrachloride	Chlorobenzene	Chloroform	Chromium (III)	Chromium (VI)	Chrysene	Copper	Cresol(-m)	Cresol(-o)	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	1.2E+01		6.2E+01		1.2E+01	1.7E+01				
			Hazard	2.6E+01	6.6E+02	3.7E+02	7.1E+04	3.6E+02		2.6E+03	1.9E+03	1.9E+03	
		Commercial/ Industrial	Carcinogenic	3.3E+01		1.6E+02		6.6E+01	4.3E+01				
			Hazard	1.2E+02	3.1E+03	1.8E+03	1.0E+06	5.1E+03		3.8E+04	9.2E+03	9.2E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	7.0E-01		9.7E+00			SAT				
			Hazard	1.2E+00	2.0E+00	3.6E+01					SAT	SAT	
		Commercial/ Industrial	Carcinogenic	1.1E+01		1.5E+02				SAT			
			Hazard	3.4E+01	5.7E+01	1.0E+03						SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	7.4E+01		9.8E+02			SAT				
			Hazard	1.5E+02	2.5E+02	4.3E+03						SAT	SAT
		Commercial/ Industrial	Carcinogenic	2.8E+02		3.7E+03				SAT			
			Hazard	8.5E+02	SAT	SAT						SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	5.9E-03	1.6E-01	3.4E-01		2.9E+00	SAT	1.2E+00			
			Hazard	5.9E-03	1.6E-01	3.4E-01	8.5E+07	2.9E+00		1.2E+00	4.8E+00	5.0E+00	
		Commercial/ Industrial	Carcinogenic	5.9E-03	1.6E-01	3.4E-01		2.9E+00	SAT	1.2E+00			
			Hazard	5.9E-03	1.6E-01	3.4E-01	5.6E+08	2.9E+00		1.2E+00	3.2E+01	3.3E+01	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	3.3E+00		3.0E+01			>SOL				
			Hazard	5.5E+00	5.5E+01	1.1E+02					>SOL	>SOL	
		Commercial/ Industrial	Carcinogenic	5.2E+01		4.8E+02				>SOL			
			Hazard	1.6E+02	>SOL	3.2E+03						>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	>SOL		>SOL			>SOL				
			Hazard	>SOL	>SOL	>SOL						>SOL	>SOL
		Commercial/ Industrial	Carcinogenic	>SOL		>SOL			>SOL				
			Hazard	>SOL	>SOL	>SOL						>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	5.0E-04	7.0E-02	1.0E-01		5.0E-02	>SOL	1.3E+00			
			Hazard	5.0E-04	7.0E-02	1.0E-01	1.6E+01	5.0E-02		1.3E+00	7.8E-01	7.8E-01	
		Commercial/ Industrial	Carcinogenic	5.0E-04	7.0E-02	1.0E-01		5.0E-02	>SOL	1.3E+00			
			Hazard	5.0E-04	7.0E-02	1.0E-01	1.0E+02	5.0E-02		1.3E+00	5.1E+00	5.1E+00	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.1E-02		3.9E-01		6.8E-02	>SOL				
			Hazard	7.1E-02	1.2E+00	1.9E+00	3.8E+02	1.9E+00		1.5E+01	6.7E+00	6.4E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Cresol(-p)	Cyanide	Dibenz(a,h)-anthracene	Dichloro ethane (1,1-)	Dichloro ethane (1,2-) (EDC)	Dichloro ethylene (1,1-)	Dichloro ethylene (cis 1,2-)	Dichloro ethene (trans 1,2)
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			4.9E-01	3.3E+02	2.7E+01	3.3E+00		
			Hazard	1.9E+02	2.8E+03		3.8E+03	1.1E+02	3.3E+02	3.7E+02	7.4E+02
		Commercial/ Industrial	Carcinogenic			1.3E+00	8.7E+02	7.1E+01	8.5E+00		
			Hazard	9.2E+02	4.1E+04		1.8E+04	5.1E+02	1.6E+03	1.8E+03	3.5E+03
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			SAT	2.5E+01	5.6E+00	2.4E-01		
			Hazard	SAT			4.0E+02	2.2E+01	7.5E+00	4.2E+01	5.2E+01
		Commercial/ Industrial	Carcinogenic			SAT	4.0E+02	8.9E+01	3.8E+00		
			Hazard	SAT			SAT	6.4E+02	2.2E+02	1.2E+03	1.5E+03
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			SAT	2.6E+03	5.0E+02	2.5E+01		
			Hazard	6.2E+04			SAT	2.4E+03	9.4E+02	SAT	6.3E+03
		Commercial/ Industrial	Carcinogenic			SAT	SAT	1.9E+03	9.4E+01		
			Hazard	SAT			SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		6.2E+00	3.8E+01	1.4E-02	9.9E-04	2.8E-02	1.9E-02	4.2E-02
			Hazard	4.6E-01	6.2E+00		1.4E-02	9.9E-04	2.8E-02	1.9E-02	4.2E-02
		Commercial/ Industrial	Carcinogenic		6.2E+00	1.6E+02	1.4E-02	9.9E-04	2.8E-02	1.9E-02	4.2E-02
			Hazard	3.0E+00	6.2E+00		1.4E-02	9.9E-04	2.8E-02	1.9E-02	4.2E-02
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			>SOL	9.4E+01	1.4E+01	2.3E+00		
			Hazard	>SOL			1.5E+03	5.6E+01	7.4E+01	1.1E+02	1.7E+02
		Commercial/ Industrial	Carcinogenic			>SOL	1.5E+03	2.2E+02	3.7E+01		
			Hazard	>SOL			>SOL	1.6E+03	2.1E+03	3.2E+03	5.0E+03
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			>SOL	>SOL	3.1E+03	9.4E+02		
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic			>SOL	>SOL	>SOL	>SOL		
			Hazard	>SOL			>SOL	>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		2.0E-01	1.6E-04	5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
			Hazard	7.8E-02	2.0E-01		5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
		Commercial/ Industrial	Carcinogenic		2.0E-01	7.0E-04	5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
			Hazard	5.1E-01	2.0E-01		5.0E-03	5.0E-04	6.0E-03	6.0E-03	1.0E-02
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic			1.4E-05	2.1E+00	2.4E-01	1.3E-02		
			Hazard	5.9E-01	7.0E+00		1.9E+01	7.2E-01	1.2E+00	1.8E+00	3.5E+00

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-benza(a) anthracene (7,12)	Dimethyl phenol (2,4)	di-n-Butyl-phthalate	di-n-octyl phthalate	Dinitro toluene (2,4)	Dioxane (1,4)	Ethyl-benzene	Ethylene Dibromide	Flouran-thene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					6.3E+00	7.0E+01		5.5E-01	
			Hazard	1.2E+03	7.7E+02	3.9E+03	7.8E+02		3.9E+03	2.2E+00	1.6E+03	
		Commercial/ Industrial	Carcinogenic					1.7E+01	1.8E+02		1.4E+00	
			Hazard	5.6E+03	3.7E+03	1.9E+04	3.7E+03		1.8E+04	1.0E+01	7.4E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic					SAT	SAT		7.7E+00	
			Hazard		SAT	SAT	SAT		SAT	2.1E+00	SAT	
		Commercial/ Industrial	Carcinogenic					SAT	SAT		1.2E+02	
			Hazard		SAT	SAT	SAT		SAT	6.2E+01	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic					SAT	SAT		5.5E+02	
			Hazard		SAT	SAT	SAT		SAT	1.8E+02	SAT	
		Commercial/ Industrial	Carcinogenic					SAT	SAT		2.1E+03	
			Hazard		SAT	SAT	SAT		SAT	1.1E+03	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					1.5E-02	SAT	1.6E+01	1.8E-04	
			Hazard	SAT	4.3E+00	7.9E+06	SAT		1.6E+01	1.8E-04	SAT	
		Commercial/ Industrial	Carcinogenic					6.2E-02	SAT	1.6E+01	1.8E-04	
			Hazard	SAT	2.8E+01	SAT	SAT		1.6E+01	1.8E-04	SAT	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic					>SOL	>SOL		7.9E+00	
			Hazard		>SOL	>SOL	>SOL		>SOL	2.2E+00	>SOL	
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL		1.3E+02	
			Hazard		>SOL	>SOL	>SOL		>SOL	6.4E+01	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic					>SOL	>SOL		1.0E+03	
			Hazard		>SOL	>SOL	>SOL		>SOL	3.5E+02	>SOL	
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL		4.0E+03	
			Hazard		>SOL	>SOL	>SOL		>SOL	2.0E+03	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic					2.2E-03	>SOL	7.0E-01	5.0E-05	
			Hazard	>SOL	3.1E-01	1.6E+00	>SOL		7.0E-01	5.0E-05	>SOL	
		Commercial/ Industrial	Carcinogenic					9.2E-03	>SOL	7.0E-01	5.0E-05	
			Hazard	>SOL	2.0E+00	1.0E+01	>SOL		7.0E-01	5.0E-05	>SOL	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic					6.4E-02	>SOL		5.9E-03	
			Hazard	>SOL	2.7E+00	7.3E+00	2.1E-03		3.6E+00	1.7E-02	>SOL	

*Italicized concentrations based on California MCLs
 SAT = RBSL exceeds saturated soil concentration of chemical
 >SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Fluorene	Indeno-(1,2,3-CD) pyrene	Mercury	Methanol	Methyl ethyl ketone	Methylene Chloride	Methyl-naphthalene (2-)	MTBE	Naphthalene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		1.7E+00				1.4E+02				
			Hazard	1.6E+03		3.9E+00	1.9E+04	2.2E+04	2.3E+03	1.6E+03	2.0E+02	1.6E+03	
		Commercial/ Industrial	Carcinogenic		4.3E+00					3.7E+02			
			Hazard	7.4E+03		1.8E+01	8.9E+04	1.0E+05	1.1E+04	7.4E+03	9.3E+02	7.4E+03	
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT				4.4E+01				
			Hazard	SAT		1.6E+01	1.9E+05	2.4E+04	2.6E+03	SAT	1.5E+04	SAT	
		Commercial/ Industrial	Carcinogenic		SAT					6.9E+02			
			Hazard	SAT			SAT	SAT	SAT	SAT	SAT	SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT					4.2E+03			
			Hazard	SAT		2.0E+03	SAT	SAT	SAT	SAT	SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic		SAT					SAT			
			Hazard	SAT		1.1E+04	SAT	SAT	SAT	SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic		SAT	3.2E-01				8.2E-03		2.1E-02	2.4E+00
			Hazard	5.2E+02		3.2E-01	7.1E+00	1.1E+01	8.2E-03	3.2E+02	2.1E-02	2.4E+00	
		Commercial/ Industrial	Carcinogenic		SAT	3.2E-01				8.2E-03		2.1E-02	2.4E+00
			Hazard	SAT		3.2E-01	4.7E+01	7.3E+01	8.2E-03	2.1E+03	2.1E-02	2.4E+00	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL				1.8E+02				
			Hazard	>SOL		1.4E+00	6.4E+05	6.4E+04	1.0E+04	>SOL	3.4E+04	>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL					2.8E+03			
			Hazard	>SOL		4.0E+01	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL					>SOL			
			Hazard	>SOL		5.8E+02	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic		>SOL					>SOL			
			Hazard	>SOL		3.4E+03	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic		>SOL	2.0E-03				5.0E-03		1.3E-02	2.0E-02
			Hazard	6.3E-01		2.0E-03	7.8E+00	9.4E+00	5.0E-03	6.3E-01	1.3E-02	2.0E-02	
		Commercial/ Industrial	Carcinogenic		>SOL	2.0E-03				5.0E-03		1.3E-02	2.0E-02
			Hazard	>SOL		2.0E-03	5.1E+01	6.1E+01	5.0E-03	4.1E+00	1.3E-02	2.0E-02	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		>SOL				1.3E+00				
			Hazard	3.1E-01		3.6E-02	2.2E+02	1.5E+02	1.6E+01	6.1E-01	1.5E+00	1.5E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Nickel	Nitro benzene	PCBs	Phenan-threne	Phenol	Pyrene	Pyridine	Selenium	Silver	Stryene	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	3.4E+05	3.7E+03	3.6E-01				2.0E+03				
			Hazard	1.4E+03		9.8E-01	1.2E+04	2.3E+04	1.2E+03		3.6E+02	3.6E+02	7.7E+03	
		Commercial/ Industrial	Carcinogenic	1.3E+06	9.9E+03	1.1E+00				5.1E+03				
			Hazard	2.0E+04		5.8E+00	5.6E+04	1.1E+05	5.6E+03		5.1E+03	5.1E+03	5.1E+03	3.7E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		SAT	1.6E+03				6.6E+04				
			Hazard			SAT	SAT	SAT	SAT				SAT	
		Commercial/ Industrial	Carcinogenic		SAT	SAT				1.1E+06				
			Hazard			SAT	SAT	SAT	SAT					SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		SAT	SAT				4.8E+05				
			Hazard			SAT	SAT	SAT	SAT					SAT
		Commercial/ Industrial	Carcinogenic		SAT	SAT				SAT				
			Hazard			SAT	SAT	SAT	SAT					SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	<i>2.0E+01</i>	6.5E+00	<i>9.4E+00</i>				2.8E+00	<i>8.0E-01</i>	<i>2.6E+00</i>	<i>4.8E+00</i>	
			Hazard	<i>2.0E+01</i>		<i>9.4E+00</i>	SAT	2.5E+01	SAT		<i>8.0E-01</i>	<i>2.6E+00</i>	<i>4.8E+00</i>	
		Commercial/ Industrial	Carcinogenic	<i>2.0E+01</i>	2.8E+01	<i>9.4E+00</i>				1.2E+01	<i>8.0E-01</i>	<i>2.6E+00</i>	<i>4.8E+00</i>	
			Hazard	<i>2.0E+01</i>		<i>9.4E+00</i>	SAT	1.6E+02	SAT		<i>8.0E-01</i>	<i>2.6E+00</i>	<i>4.8E+00</i>	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		>SOL	3.0E-01				4.8E+04				
			Hazard			>SOL	>SOL	>SOL	>SOL				>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL	>SOL				7.7E+05				
			Hazard			>SOL	>SOL	>SOL	>SOL					>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		>SOL	>SOL				4.6E+05				
			Hazard			>SOL	>SOL	>SOL	>SOL				>SOL	
		Commercial/ Industrial	Carcinogenic		>SOL	>SOL				>SOL				
			Hazard			>SOL	>SOL	>SOL	>SOL					>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	<i>1.0E-01</i>	1.3E+00	<i>5.0E-04</i>				6.7E-01	<i>5.0E-02</i>	<i>1.0E-01</i>	<i>1.0E-01</i>	
			Hazard	<i>1.0E-01</i>		<i>5.0E-04</i>	>SOL	9.4E+00	>SOL		<i>5.0E-02</i>	<i>1.0E-01</i>	<i>1.0E-01</i>	
		Commercial/ Industrial	Carcinogenic	<i>1.0E-01</i>	5.7E+00	<i>5.0E-04</i>				2.9E+00	<i>5.0E-02</i>	<i>1.0E-01</i>	<i>1.0E-01</i>	
			Hazard	<i>1.0E-01</i>		<i>5.0E-04</i>	>SOL	6.1E+01	>SOL		<i>5.0E-02</i>	<i>1.0E-01</i>	<i>1.0E-01</i>	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		2.8E+01	1.6E-05				2.6E+01				
			Hazard	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL		2.0E+00	2.1E+00	9.3E+00	

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Tetrachloroethane (1,1,2,2-)	Tetrachloroethylene (PCE)	Tetraethyl Lead	Toluene	Trichloroethane (1,1,1-)	Trichloroethane (1,1,2-)	Trichloroethylene (TCE)	Vanadium	Vinyl Chloride	
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic	7.2E+00	3.8E+01					2.7E+01	1.3E+02	3.5E+00	
			Hazard	1.0E+03	3.7E+02	3.9E-03	7.1E+03	1.4E+03	1.5E+02	2.2E+02	5.0E+02		
		Commercial/ Industrial	Carcinogenic	1.9E+01	1.0E+02					7.0E+01	3.3E+02		9.1E+00
			Hazard	4.7E+03	1.8E+03	1.9E-02	3.4E+04	6.5E+03	7.2E+02	1.1E+03	7.2E+03		
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.9E+01	7.9E+00					1.5E+01	2.9E+01	3.1E-02	
			Hazard	2.6E+03	3.3E+01		9.7E+02	6.9E+02	8.7E+01	3.4E+01			
		Commercial/ Industrial	Carcinogenic	3.0E+02	1.3E+02					2.4E+02	4.6E+02		5.0E-01
			Hazard	SAT	SAT		SAT	SAT	2.5E+03	9.8E+02			
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.2E+03	SAT				1.3E+03	3.0E+03		3.3E+00	
			Hazard	SAT	SAT		SAT	SAT	SAT	SAT			
		Commercial/ Industrial	Carcinogenic	4.7E+03	SAT				5.0E+03	SAT		1.2E+01	
			Hazard	SAT	SAT		SAT	SAT	SAT	SAT			
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	6.6E-03	5.2E-02	4.6E+00	1.8E+00	1.5E+00	2.0E-02	5.5E-02		1.1E-03	
			Hazard	6.6E-03	5.2E-02	4.6E+00	1.8E+00	1.5E+00	2.0E-02	5.5E-02	3.3E+02	1.1E-03	
		Commercial/ Industrial	Carcinogenic	6.6E-03	5.2E-02	4.6E+00	1.8E+00	1.5E+00	2.0E-02	5.5E-02		1.1E-03	
			Hazard	6.6E-03	5.2E-02	4.6E+00	1.8E+00	1.5E+00	2.0E-02	5.5E-02	2.2E+03	1.1E-03	
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic	1.0E+01	2.6E+01				1.8E+01	5.3E+01		6.5E-01	
			Hazard	1.4E+03	1.1E+02		>SOL	>SOL	9.9E+01	6.2E+01			
		Commercial/ Industrial	Carcinogenic	1.6E+02	>SOL				2.8E+02	8.4E+02		1.0E+01	
			Hazard	>SOL	>SOL		>SOL	>SOL	2.9E+03	>SOL			
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic	1.2E+03	>SOL				3.5E+03	>SOL		2.6E+02	
			Hazard	>SOL	>SOL		>SOL	>SOL	>SOL	>SOL			
		Commercial/ Industrial	Carcinogenic	>SOL	>SOL				>SOL	>SOL		1.0E+03	
			Hazard	>SOL	>SOL		>SOL	>SOL	>SOL	>SOL			
	Ingestion of Groundwater	Residential	Carcinogenic	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03		5.0E-04	
			Hazard	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03	1.1E-01	5.0E-04	
		Commercial/ Industrial	Carcinogenic	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03		5.0E-04	
			Hazard	1.0E-03	5.0E-03	1.5E-02	1.5E-01	2.0E-01	5.0E-03	5.0E-03	7.2E-01	5.0E-04	
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic	4.5E-02	6.0E-02				1.8E-01	4.6E-02		2.6E-02	
			Hazard	4.9E+00	5.3E-01	6.7E-06	1.1E+01	4.3E+00	7.8E-01	7.2E-02	2.8E+00		

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

Oakland Tier 3 SSTLs

Medium	Exposure Pathway	Land Use	Type of Risk	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic		
			Hazard	5.3E+04	2.1E+04
		Commercial/ Industrial	Carcinogenic		
			Hazard	2.6E+05	3.1E+05
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	SAT	
		Commercial/ Industrial	Carcinogenic		
			Hazard	SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	<i>2.7E+01</i>	
			Hazard	<i>2.7E+01</i>	8.9E+02
		Commercial/ Industrial	Carcinogenic	<i>2.7E+01</i>	
			Hazard	<i>2.7E+01</i>	5.8E+03
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic		
			Hazard	>SOL	
		Commercial/ Industrial	Carcinogenic		
			Hazard	>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	<i>1.8E+00</i>	
			Hazard	<i>1.8E+00</i>	4.7E+00
		Commercial/ Industrial	Carcinogenic	<i>1.8E+00</i>	
			Hazard	<i>1.8E+00</i>	3.1E+01
Water Used for Recreation [mg/l]	Ingestion/ Dermal	Residential	Carcinogenic		
			Hazard	6.6E+01	1.2E+02

*Italicized concentrations based on California MCLs

SAT = RBSL exceeds saturated soil concentration of chemical

>SOL = RBSL exceeds solubility of chemical in water

APPENDIX

D

General Statistics

Data File		Variable: Benzene(S)	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	11	Shapiro-Wilk Test Statistic	0.367097
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.85
Minimum	0.5	Data not normal at 5% significance level	
Maximum	1650	95% UCL (Assuming Normal Distribution)	
Mean	157.5909	Student's-t UCL	428.3569
Median	0.5	Gamma Distribution Test	
Standard Deviation	495.4751	A-D Test Statistic	2.472627
Variance	245495.5	A-D 5% Critical Value	0.868519
Coefficient of Variation	3.144059	K-S Test Statistic	0.434038
Skewness	3.304685	K-S 5% Critical Value	0.282971
Gamma Statistics		Data do not follow gamma distribution at 5% significance level	
k hat	0.175855	95% UCLs (Assuming Gamma Distribution)	
k star (bias corrected)	0.1885	Approximate Gamma UCL	837.5202
Theta hat	896.1429	Adjusted Gamma UCL	1133.284
Theta star	836.0244	Lognormal Distribution Test	
nu hat	3.868803	Shapiro-Wilk Test Statistic	0.643684
nu star	4.147008	Shapiro-Wilk 5% Critical Value	0.85
Approx. Chi Square Value (.05)	0.780316	Data not lognormal at 5% significance level	
Adjusted Level of Significance	0.02783	95% UCLs (Assuming Lognormal Distribution)	
Adjusted Chi Square Value	0.57667	95% H-UCL	24340.29
Log-transformed Statistics		95% Chebyshev (MVUE) UCL	144.557
Minimum of log data	-0.693147	97.5% Chebyshev (MVUE) UCL	193.0646
Maximum of log data	7.408531	99% Chebyshev (MVUE) UCL	288.3485
Mean of log data	0.791506	95% Non-parametric UCLs	
Standard Deviation of log data	2.677276	CLT UCL	403.3178
Variance of log data	7.167807	Adj-CLT UCL (Adjusted for skewness)	562.37
		Mod-t UCL (Adjusted for skewness)	453.1658
		Jackknife UCL	428.3569
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	808.7727
		97.5% Chebyshev (Mean, Sd) UCL	1090.54
		99% Chebyshev (Mean, Sd) UCL	1644.016

General Statistics

Data File		Variable:	Toluene(S)
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	11	Shapiro-Wilk Test Statistic	0.345264
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.85
Minimum	0.5	Data not normal at 5% significance level	
Maximum	11860		
Mean	1079.182	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	3033.163
Standard Deviation	3575.593		
Variance	12784865	Gamma Distribution Test	
Coefficient of Variation	3.313244	A-D Test Statistic	3.255914
Skewness	3.316624	A-D 5% Critical Value	0.886353
		K-S Test Statistic	0.524984
Gamma Statistics		K-S 5% Critical Value	0.285152
k hat	0.124769	Data do not follow gamma distribution	
k star (bias corrected)	0.151347	at 5% significance level	
Theta hat	8649.45		
Theta star	7130.512	95% UCLs (Assuming Gamma Distribution)	
nu hat	2.744914	Approximate Gamma UCL	7545.604
nu star	3.329635	Adjusted Gamma UCL	10622.17
Approx. Chi Square Value (.05)	0.476209		
Adjusted Level of Significance	0.02783	Lognormal Distribution Test	
Adjusted Chi Square Value	0.338281	Shapiro-Wilk Test Statistic	0.51454
		Shapiro-Wilk 5% Critical Value	0.85
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.693147		
Maximum of log data	9.380927	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.661615	95% H-UCL	195670.1
Standard Deviation of log data	2.984437	95% Chebyshev (MVUE) UCL	229.6955
Variance of log data	8.906864	97.5% Chebyshev (MVUE) UCL	307.8365
		99% Chebyshev (MVUE) UCL	461.3295
		95% Non-parametric UCLs	
		CLT UCL	2852.469
		Adj-CLT UCL (Adjusted for skewness)	4004.415
		Mod-t UCL (Adjusted for skewness)	3212.844
		Jackknife UCL	3033.163
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5778.432
		97.5% Chebyshev (Mean, Sd) UCL	7811.801
		99% Chebyshev (Mean, Sd) UCL	11805.96

General Statistics

Data File		Variable:	Ethylbenzene(S)
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	11	Shapiro-Wilk Test Statistic	0.345795
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.85
Minimum	0.5	Data not normal at 5% significance level	
Maximum	8040		
Mean	732.5909	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	2057.031
Standard Deviation	2423.595		
Variance	5873813	Gamma Distribution Test	
Coefficient of Variation	3.308252	A-D Test Statistic	3.01081
Skewness	3.316617	A-D 5% Critical Value	0.883239
		K-S Test Statistic	0.45066
Gamma Statistics		K-S 5% Critical Value	0.284771
k hat	0.133689	Data do not follow gamma distribution	
k star (bias corrected)	0.157835	at 5% significance level	
Theta hat	5479.799		
Theta star	4641.507	95% UCLs (Assuming Gamma Distribution)	
nu hat	2.941166	Approximate Gamma UCL	4846.45
nu star	3.472364	Adjusted Gamma UCL	6777.454
Approx. Chi Square Value (.05)	0.524884		
Adjusted Level of Significance	0.02783	Lognormal Distribution Test	
Adjusted Chi Square Value	0.375336	Shapiro-Wilk Test Statistic	0.578525
		Shapiro-Wilk 5% Critical Value	0.85
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.693147		
Maximum of log data	8.992184	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.752302	95% H-UCL	127245.2
Standard Deviation of log data	2.9151	95% Chebyshev (MVUE) UCL	219.6712
Variance of log data	8.497809	97.5% Chebyshev (MVUE) UCL	294.1999
		99% Chebyshev (MVUE) UCL	440.597
		95% Non-parametric UCLs	
		CLT UCL	1934.554
		Adj-CLT UCL (Adjusted for skewness)	2715.359
		Mod-t UCL (Adjusted for skewness)	2178.821
		Jackknife UCL	2057.031
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	3917.819
		97.5% Chebyshev (Mean, Sd) UCL	5296.07
		99% Chebyshev (Mean, Sd) UCL	8003.376

General Statistics

Data File		Variable: Xylenes(S)	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	11	Shapiro-Wilk Test Statistic	0.345105
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.85
Minimum	1.5	Data not normal at 5% significance level	
Maximum	48860	95% UCL (Assuming Normal Distribution)	
Mean	4443.455	Student's-t UCL	12493.78
Median	1.5		
Standard Deviation	14731.3	Gamma Distribution Test	
Variance	2.2E+008	A-D Test Statistic	3.637777
Coefficient of Variation	3.315281	A-D 5% Critical Value	0.889633
Skewness	3.316625	K-S Test Statistic	0.561347
Gamma Statistics		K-S 5% Critical Value	0.285553
k hat	0.115375	Data do not follow gamma distribution	
k star (bias corrected)	0.144515	at 5% significance level	
Theta hat	38513.1	95% UCLs (Assuming Gamma Distribution)	
Theta star	30747.3	Approximate Gamma UCL	33063.58
nu hat	2.538253	Adjusted Gamma UCL	46837.94
nu star	3.179336		
Approx. Chi Square Value (.05)	0.427275	Lognormal Distribution Test	
Adjusted Level of Significance	0.02783	Shapiro-Wilk Test Statistic	0.398251
Adjusted Chi Square Value	0.301619	Shapiro-Wilk 5% Critical Value	0.85
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.405465	95% UCLs (Assuming Lognormal Distribution)	
Maximum of log data	10.79671	95% H-UCL	1059607
Mean of log data	1.48944	95% Chebyshev (MVUE) UCL	654.2538
Standard Deviation of log data	3.095737	97.5% Chebyshev (MVUE) UCL	877.7073
Variance of log data	9.583587	99% Chebyshev (MVUE) UCL	1316.638
		95% Non-parametric UCLs	
		CLT UCL	11749.33
		Adj-CLT UCL (Adjusted for skewness)	16495.3
		Mod-t UCL (Adjusted for skewness)	13234.06
		Jackknife UCL	12493.78
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Can't recommend Hall's Bootstrap UCL*		95% Chebyshev (Mean, Sd) UCL	23804.18
		97.5% Chebyshev (Mean, Sd) UCL	32181.58
		99% Chebyshev (Mean, Sd) UCL	48637.36

General Statistics

Data File		Variable: MTBE(S)	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	11	Shapiro-Wilk Test Statistic	0.374537
Number of Unique Samples	6	Shapiro-Wilk 5% Critical Value	0.85
Minimum	2.5	Data not normal at 5% significance level	
Maximum	9150	95% UCL (Assuming Normal Distribution)	
Mean	896.1818	Student's-t UCL	2393.493
Median	2.5		
Standard Deviation	2739.931	Gamma Distribution Test	
Variance	7507220	A-D Test Statistic	1.591768
Coefficient of Variation	3.057338	A-D 5% Critical Value	0.860442
Skewness	3.305935	K-S Test Statistic	0.300508
Gamma Statistics		K-S 5% Critical Value	0.281983
k hat	0.198991	Data do not follow gamma distribution	
k star (bias corrected)	0.205327	at 5% significance level	
Theta hat	4503.626	95% UCLs (Assuming Gamma Distribution)	
Theta star	4364.659	Approximate Gamma UCL	4326.481
nu hat	4.377805	Adjusted Gamma UCL	5757.529
nu star	4.517192		
Approx. Chi Square Value (.05)	0.935685	Lognormal Distribution Test	
Adjusted Level of Significance	0.02783	Shapiro-Wilk Test Statistic	0.789449
Adjusted Chi Square Value	0.703118	Shapiro-Wilk 5% Critical Value	0.85
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Maximum of log data	9.121509	95% H-UCL	689359.4
Mean of log data	3.09697	95% Chebyshev (MVUE) UCL	1925.937
Standard Deviation of log data	2.825489	97.5% Chebyshev (MVUE) UCL	2576.868
Variance of log data	7.983388	99% Chebyshev (MVUE) UCL	3855.496
		95% Non-parametric UCLs	
		CLT UCL	2255.029
		Adj-CLT UCL (Adjusted for skewness)	3134.905
		Mod-t UCL (Adjusted for skewness)	2530.735
		Jackknife UCL	2393.493
		Standard Bootstrap UCL	2151.25
		Bootstrap-t UCL	44361.83
RECOMMENDATION		Hall's Bootstrap UCL	29388.61
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	2535.091
		BCA Bootstrap UCL	3387.455
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	4497.156
		97.5% Chebyshev (Mean, Sd) UCL	6055.301
		99% Chebyshev (Mean, Sd) UCL	9115.974

General Statistics

Data File		Variable: Benzene(S)	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statistic	0.388933
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.5	Data not normal at 5% significance level	
Maximum	75	95% UCL (Assuming Normal Distribution)	
Mean	8.35	Student's-t UCL	21.93377
Median	0.5		
Standard Deviation	23.43318	Gamma Distribution Test	
Variance	549.1139	A-D Test Statistic	2.417911
Coefficient of Variation	2.806369	A-D 5% Critical Value	0.806437
Skewness	3.15489	K-S Test Statistic	0.40268
Gamma Statistics		K-S 5% Critical Value	0.286469
k hat	0.339217	Data do not follow gamma distribution	
k star (bias corrected)	0.304119	at 5% significance level	
Theta hat	24.61552	95% UCLs (Assuming Gamma Distribution)	
Theta star	27.4564	Approximate Gamma UCL	30.2021
nu hat	6.784339	Adjusted Gamma UCL	38.69911
nu star	6.082371		
Approx. Chi Square Value (.05)	1.681598	Lognormal Distribution Test	
Adjusted Level of Significance	0.0267	Shapiro-Wilk Test Statistic	0.597986
Adjusted Chi Square Value	1.312376	Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.693147	95% UCLs (Assuming Lognormal Distribution)	
Maximum of log data	4.317488	95% H-UCL	46.9485
Mean of log data	0.129804	95% Chebyshev (MVUE) UCL	11.14235
Standard Deviation of log data	1.616394	97.5% Chebyshev (MVUE) UCL	14.52236
Variance of log data	2.612729	99% Chebyshev (MVUE) UCL	21.16175
		95% Non-parametric UCLs	
		CLT UCL	20.53873
		Adj-CLT UCL (Adjusted for skewness)	28.43816
		Mod-t UCL (Adjusted for skewness)	23.16592
		Jackknife UCL	21.93377
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	40.65041
		97.5% Chebyshev (Mean, Sd) UCL	54.62682
		99% Chebyshev (Mean, Sd) UCL	82.08078
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

General Statistics

Data File		Variable:	Toluene(S)
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statistic	0.594244
Number of Unique Samples	2	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.5	Data not normal at 5% significance level	
Maximum	2.5		
Mean	1.1	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	1.660025
Standard Deviation	0.966092		
Variance	0.933333	Gamma Distribution Test	
Coefficient of Variation	0.878265	A-D Test Statistic	2.183894
Skewness	1.035098	A-D 5% Critical Value	0.737153
		K-S Test Statistic	0.447544
Gamma Statistics		K-S 5% Critical Value	0.270375
k hat	1.78454	Data do not follow gamma distribution	
k star (bias corrected)	1.315844	at 5% significance level	
Theta hat	0.616405		
Theta star	0.835965	95% UCLs (Assuming Gamma Distribution)	
nu hat	35.69079	Approximate Gamma UCL	1.853094
nu star	26.31689	Adjusted Gamma UCL	2.037591
Approx. Chi Square Value (.05)	15.62176		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	14.20726	Shapiro-Wilk Test Statistic	0.594244
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.693147		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.210316	95% H-UCL	2.188986
Standard Deviation of log data	0.777432	95% Chebyshev (MVUE) UCL	2.230152
Variance of log data	0.604401	97.5% Chebyshev (MVUE) UCL	2.737842
		99% Chebyshev (MVUE) UCL	3.7351
		95% Non-parametric UCLs	
		CLT UCL	1.602511
		Adj-CLT UCL (Adjusted for skewness)	1.709363
		Mod-t UCL (Adjusted for skewness)	1.676692
		Jackknife UCL	1.660025
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/A
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 95% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	2.431666
		97.5% Chebyshev (Mean, Sd) UCL	3.007878
		99% Chebyshev (Mean, Sd) UCL	4.139737

General Statistics

Data File		Variable: Ethylbenzene(S)	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statistic	0.534225
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.842
Minimum	0.5	Data not normal at 5% significance level	
Maximum	10		
Mean	1.85	95% UCL (Assuming Normal Distribution)	
Median	0.5	Student's-t UCL	3.578545
Standard Deviation	2.98189		
Variance	8.891667	Gamma Distribution Test	
Coefficient of Variation	1.611832	A-D Test Statistic	1.820635
Skewness	2.748394	A-D 5% Critical Value	0.753266
		K-S Test Statistic	0.428519
Gamma Statistics		K-S 5% Critical Value	0.27503
k hat	0.856449	Data do not follow gamma distribution	
k star (bias corrected)	0.666181	at 5% significance level	
Theta hat	2.160082		
Theta star	2.777023	95% UCLs (Assuming Gamma Distribution)	
nu hat	17.12898	Approximate Gamma UCL	4.034232
nu star	13.32362	Adjusted Gamma UCL	4.664063
Approx. Chi Square Value (.05)	6.109886		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	5.284812	Shapiro-Wilk Test Statistic	0.653485
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.693147		
Maximum of log data	2.302585	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	-0.071686	95% H-UCL	5.246777
Standard Deviation of log data	1.069416	95% Chebyshev (MVUE) UCL	3.885526
Variance of log data	1.143651	97.5% Chebyshev (MVUE) UCL	4.907501
		99% Chebyshev (MVUE) UCL	6.914974
		95% Non-parametric UCLs	
		CLT UCL	3.401025
		Adj-CLT UCL (Adjusted for skewness)	4.276716
		Mod-t UCL (Adjusted for skewness)	3.715135
		Jackknife UCL	3.578545
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/R
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	5.960251
		97.5% Chebyshev (Mean, Sd) UCL	7.73876
		99% Chebyshev (Mean, Sd) UCL	11.2323
Recommended UCL exceeds the maximum observation			
Consider using 95% or 97.5% Chebyshev (Mean, Sd) UCL			

General Statistics

Data File		Variable: Xylenes(S)	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statistic	0.594244
Number of Unique Samples	2	Shapiro-Wilk 5% Critical Value	0.842
Minimum	1.5	Data not normal at 5% significance level	
Maximum	2.5		
Mean	1.8	95% UCL (Assuming Normal Distribution)	
Median	1.5	Student's-t UCL	2.080013
Standard Deviation	0.483046		
Variance	0.233333	Gamma Distribution Test	
Coefficient of Variation	0.268359	A-D Test Statistic	2.183748
Skewness	1.035098	A-D 5% Critical Value	0.724685
		K-S Test Statistic	0.444099
Gamma Statistics		K-S 5% Critical Value	0.266291
k hat	17.3626	Data do not follow gamma distribution	
k star (bias corrected)	12.22049	at 5% significance level	
Theta hat	0.103671		
Theta star	0.147294	95% UCLs (Assuming Gamma Distribution)	
nu hat	347.252	Approximate Gamma UCL	2.10287
nu star	244.4097	Adjusted Gamma UCL	2.161376
Approx. Chi Square Value (.05)	209.2081		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	203.5451	Shapiro-Wilk Test Statistic	0.594244
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.405465		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.558713	95% H-UCL	2.111476
Standard Deviation of log data	0.246752	95% Chebyshev (MVUE) UCL	2.410971
Variance of log data	0.060887	97.5% Chebyshev (MVUE) UCL	2.676694
		99% Chebyshev (MVUE) UCL	3.198657
		95% Non-parametric UCLs	
		CLT UCL	2.051256
		Adj-CLT UCL (Adjusted for skewness)	2.104681
		Mod-t UCL (Adjusted for skewness)	2.088346
		Jackknife UCL	2.080013
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
RECOMMENDATION		Hall's Bootstrap UCL	N/A
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Student's-t UCL		95% Chebyshev (Mean, Sd) UCL	2.465833
or Modified-t UCL		97.5% Chebyshev (Mean, Sd) UCL	2.753939
		99% Chebyshev (Mean, Sd) UCL	3.319868

General Statistics

Data File		Variable: MTBE(S)	
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	10	Shapiro-Wilk Test Statistic	0.656001
Number of Unique Samples	5	Shapiro-Wilk 5% Critical Value	0.842
Minimum	2.5	Data not normal at 5% significance level	
Maximum	380		
Mean	70.8	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student's-t UCL	141.5686
Standard Deviation	122.082		
Variance	14904.01	Gamma Distribution Test	
Coefficient of Variation	1.724322	A-D Test Statistic	1.235724
Skewness	2.168049	A-D 5% Critical Value	0.799622
		K-S Test Statistic	0.379564
Gamma Statistics		K-S 5% Critical Value	0.285169
k hat	0.37643	Data do not follow gamma distribution	
k star (bias corrected)	0.330168	at 5% significance level	
Theta hat	188.0827		
Theta star	214.4364	95% UCLs (Assuming Gamma Distribution)	
nu hat	7.528605	Approximate Gamma UCL	239.1368
nu star	6.603357	Adjusted Gamma UCL	302.1455
Approx. Chi Square Value (.05)	1.955022		
Adjusted Level of Significance	0.0267	Lognormal Distribution Test	
Adjusted Chi Square Value	1.547326	Shapiro-Wilk Test Statistic	0.732914
		Shapiro-Wilk 5% Critical Value	0.842
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	0.916291		
Maximum of log data	5.940171	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	2.494516	95% H-UCL	5880.879
Standard Deviation of log data	2.105794	95% Chebyshev (MVUE) UCL	270.9007
Variance of log data	4.434367	97.5% Chebyshev (MVUE) UCL	358.4731
		99% Chebyshev (MVUE) UCL	530.4922
		95% Non-parametric UCLs	
		CLT UCL	134.3007
		Adj-CLT UCL (Adjusted for skewness)	162.5822
		Mod-t UCL (Adjusted for skewness)	145.98
		Jackknife UCL	141.5686
		Standard Bootstrap UCL	132.1236
		Bootstrap-t UCL	240.5411
RECOMMENDATION		Hall's Bootstrap UCL	335.7906
Data are Non-parametric (0.05)		Percentile Bootstrap UCL	137.65
		BCA Bootstrap UCL	157.25
Use 99% Chebyshev (Mean, Sd) UCL		95% Chebyshev (Mean, Sd) UCL	239.0784
		97.5% Chebyshev (Mean, Sd) UCL	311.8926
		99% Chebyshev (Mean, Sd) UCL	454.922
Recommended UCL exceeds the maximum observation			