FOR CONTRACT NO: 04-1A2414

INFORMATION HANDOUT

SITE INVESTIGATION REPORT

COUNTY OF ALAMEDA
CALIFORNIA DEPARTMENT OF TRANSPORTATION
PLANTING STRIP PAVING PROJECT

ROUTE: 04-ALA-980,24,1.3/2.0, R1.8/R4.3

SITE INVESTIGATION REPORT

STATE ROUTE 980/24
PLANTING STRIP PAVING PROJECT
OAKLAND, CALIFORNIA

KILOPOST 2.1 TO 6.9

PREPARED FOR:
CALIFORNIA DEPARTMENT OF TRANSPORTATION
DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING
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CALTRANS CONTRACT 04A1862
TASK ORDER NO. 1
EA No. 04-1A2401

GEOCON PROJECT No. E8220-06-01

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REPORT LIMITATIONS

This report has been prepared exclusively for the State of California Department of Transportation (Caltrans) District 4. 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.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

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EXECUTIVE SUMMARY

The site consists of the State Route (SR) 980 median from Kilometer Post (KP) 2.1 (Post Mile [PM] 1.3) to the Route 24/580/980 Separation, and the SR 24 median from the Route 24/580/980 Separation to KP 6.9 (PM 4.29) in the city of Oakland, Alameda County, California. It is understood that Caltrans proposes to pave the median planting strips. The Site location is depicted on the Vicinity Map, Figure 1.

The primary objective of the scope of services was to evaluate whether impacts due to aerially-deposited lead (ADL), metals, total petroleum hydrocarbons as gasoline, diesel, and motor oil (TPHg, TPHd, and TPHmo), chlorinated herbicides, or organochlorine pesticides exist in the surface soil within the project boundaries. The information obtained from this investigation will be used by Caltrans to coordinate State Route 980/24 planting strip paving activities, determine soil disposal costs, and identify health and safety concerns during improvements.

The field investigation was performed on October 8 and 9, 2004. The following field activities were performed during soil sampling efforts.

- Advanced 43 soil borings using hand auger/hand trowel/slide hammer methods.
- Collected samples in pre-cleaned and unused glass jars or 6-inch metal sleeves.
- Transported samples to a California-certified environmental laboratory.

Soil/sediment samples were collected from 43 borings along the stated alignment of SR 980/24 as shown on the Site Plans, Figures 2 through 7. Boring locations were surveyed using Differential Global Positioning System (DGPS) equipment. Boring coordinates are presented in Table 1. Caltrans provided traffic control for field activities.

Soil borings were advanced to a depth of approximately 0.15 meter (0.5 foot) below ground surface (bgs) using hand augers, hand trowels, or slide hammers. Samples were collected at an approximate depth of 0 to 0.15 meter (0 to 0.5 foot). A total of 43 soil samples were collected. Completed soil boreholes were backfilled to surface with the soil cuttings.

Soil encountered during the field activities generally consisted of sandy silt. Groundwater was not encountered during the advancement of the boreholes.

The laboratory testing performed is summarized below:

- Forty-three soil samples were analyzed for total lead using EPA Test Method 6010B.
- Five soil samples (randomly selected by the laboratory) were analyzed for pH using EPA Test Method 9045C.

- Thirteen soil samples with total lead concentrations ranging between 150 milligrams per kilogram (mg/kg) and 4,400 mg/kg were further analyzed for soluble lead using the Toxicity Characteristic Leaching Procedure (TCLP). Those samples with total lead concentrations greater than 100 mg/kg were ordered from highest concentration to lowest, and every third sample was selected for TCLP analysis.
- Eight soil samples selected by the Caltrans Task Order Manager were further analyzed for soluble lead using the Waste Extraction Test procedure with deionized water as the extractant (WET-DI).

Geocon instructed the analytical laboratory to composite five four-part samples to be analyzed for the following:

- Title 22 (CAM17) metals using EPA Test Method 6010/7471B;
- TPHg, TPHd, and TPHmo using EPA Test Method 8015B(M);
- Chlorinated herbicides using EPA Test Method 8151A; and
- Organochlorine pesticides using EPA Test Method 8081A.

Laboratory analyses were performed under 48-hour turn-around-times. A summary of the analytical laboratory test results for lead and pH is presented as Table 2. Table 3 presents a summary of metals results. Table 4 presents a summary of TPHd, TPHg, and herbicides. Reproductions of the laboratory reports and chain-of-custody documentation are presented as Appendix A.

The laboratory analyses indicated the following:

- Lead was the only metal detected at total concentrations greater than 10 times the STLC value of 5.0 mg/l. Total lead concentrations ranged from 18 mg/kg to 4,400 mg/kg.
- Soil samples analyzed for soluble (TCLP) lead exhibited concentrations ranging from 0.26 mg/l to 9.8 mg/l.
- Soil samples analyzed using the WET-DI method exhibited concentrations ranging from <0.25 mg/l to 5.1 mg/l.
- Soil pH values ranged from 6.75 to 7.92.
- TPHg was not detected at or above the laboratory reporting limit of 1.0 mg/kg.
- TPHd concentrations ranged from 15 mg/kg to 110 mg/kg.
- TPHmo concentrations ranged from 39 mg/kg to 270 mg/kg.
- Chlorinated herbicides were not detected at or above their respective laboratory reporting limits.
- Organochlorine pesticides were reported in the composite soil samples. The pesticides detected included 4,4'-DDD (2.1 micrograms per kilogram [ug/kg] and 2.2 ug/kg), 4,4'-DDE (6.6 ug/kg to 27 ug/kg), 4,4'-DDT (3.6 ug/kg to 44 ug/kg), alpha Chlordane (3.6 ug/kg to 20 ug/kg), Chlordane (54 ug/kg to 300 ug/kg), Dieldrin (3.0 ug/kg), gamma Chlordane (4.2 ug/kg to 36 ug/kg), and Heptachlor epoxide (2.2 ug/kg).

Lead

Soil generated from excavations to 0.15 meter (0.5 foot) in depth would be classified as a California hazardous waste since the predicted total lead concentrations are greater than the lead Total Threshold Limit Concentration (TTLC) of 1,000 mg/kg. Offsite disposal must be at a Class I landfill. Based on the soluble (TCLP) results, excavated soil would not be classified as RCRA hazardous.

In accordance with the Department of Toxic Substances Control (DTSC) variance of September 22, 2000, as modified by the DTSC on December 13, 2002, soil generated from excavations to 0.15 meter (0.5 foot) in depth may be reused on site provided that the lead-impacted soil is placed a minimum of 1.5 meters (5 feet) above the maximum water table elevation and protected from infiltration by a pavement structure maintained by Caltrans.

Based on current and proposed use of the subject site and adjacent properties, it is appropriate to compare the analytical results to the San Francisco Bay Regional Water Quality Control Board (SF-RWQCB) Environmental Screening Levels (ESLs) for shallow soil under an industrial/commercial land use. ESLs are considered to be conservative and under most circumstances, concentrations below ESLs can be assumed to not pose a significant threat to human health and the environment. Concentrations above an ESL do not automatically require remediation. Exceeding an ESL generally indicates that additional evaluation of the potential risks that may be posed by site contaminants is appropriate.

The highest Upper Confidence Limit (UCL) of 1,561 mg/kg is greater than shallow soil Direct Exposure ESL of 750 mg/kg for lead in soil. Therefore, it is concluded that lead-impacted soil in the areas investigated may pose a risk to the health of workers performing the construction activities. Per the requirements of CCR Title 8, Section 1532.1, the "Lead in Construction" standard, the contractor(s) should prepare a project specific Lead Compliance Plan (LCP) to prevent or minimize worker exposure to ADL contaminated soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of ADL contaminated soil.

TPH

State or Federal waste classification thresholds have not been established for petroleum hydrocarbons. Therefore soil containing petroleum hydrocarbons is not considered hazardous and reuse is dependent on acceptance criteria established by the receiving site. Landfill disposal criteria are facility-specific based on permit conditions established by the regulatory agencies.

Based on the Direct Exposure ESL values for TPH, Geocon does not anticipate that the reported TPHd or TPHmo concentrations pose a significant risk to the health of workers performing construction activities. However, Geocon recommends that a Health and Safety Plan be prepared to

prevent or minimize worker exposure to TPHd and TPHmo contaminated soil. The Health and Safety plan should include a discussion of the constituents of concern, routes of exposure, permissible exposure limits, and personal protective measures. The health and safety plan should be reviewed and signed by the onsite construction workers prior to any field activities.

Herbicides

No chlorinated herbicide concentrations exceeded laboratory reporting limits. Soil excavated would not be classified as a California hazardous waste based on chlorinated herbicide concentrations. Consequently, there are no reuse restrictions for the soil based on the chlorinated herbicide content.

Pesticides

Based on the reported concentrations of organochlorine pesticides, soil excavated would not be classified as a California hazardous waste. Consequently, there are no reuse restrictions for the soil based on the organochlorine pesticide content.

Based on the Direct Exposure ESL values for the organochlorine pesticides detected, Geocon does not anticipate that the reported organochlorine pesticide concentrations pose a significant risk to the health of workers performing construction activities. However, Geocon recommends that a Health and Safety Plan be prepared to prevent or minimize worker exposure to organochlorine pesticide contaminated soil. The Health and Safety plan should include a discussion of the constituents of concern, routes of exposure, permissible exposure limits, and personal protective measures. The health and safety plan should be reviewed and signed by the onsite construction workers prior to any field activities.

1.0 INTRODUCTION

This Site Investigation Report was prepared for the State Route 980/24 Planting Strip Paving Project. This report documents the investigation sampling methods laboratory analytical data.

1.1 Site Description and Proposed Improvements

The site consists of the State Route (SR) 980 median from Kilometer Post (KP) 2.1 (post Mile [PM] 1.3) to the Route 24/580/980 Separation, and the SR 24 median from the Route 24/580/980 Separation to KP 6.9 (PM 4.29) in the city of Oakland, Alameda County, California. It is understood that Caltrans proposes to pave the median planting strips. The Site location is depicted on the Vicinity Map, Figure 1.

It is understood that Caltrans proposes to pave median planting strips.

1.2 Purpose

The primary objective of the scope of services was to evaluate whether impacts due to aerially-deposited lead (ADL), metals, total petroleum hydrocarbons as gasoline, diesel, and motor oil (TPHg, TPHd, and TPHmo), chlorinated herbicides, or organochlorine pesticides exist in the surface soil within the project boundaries. The information obtained from this investigation will be used by Caltrans to coordinate State Route 980/24 planting strip paving activities, determine soil disposal costs, and identify health and safety concerns during improvements.

2.0 BACKGROUND

2.1 Potential ADL Impacts

Testing by Caltrans has indicated that ADL exists along major freeway routes due to past emissions from vehicles powered by leaded gasoline. Caltrans reports that total lead concentrations in soil adjacent to the freeways have typically ranged between 50 and 3,000 milligrams per kilogram (mg/kg). The ADL is generally limited to the upper 0.6 meter of soil material within the unpaved median and shoulder areas.

2.2 Hazardous Waste Determination Criteria

Regulatory criteria to classify a waste as California hazardous for handling and disposal purposes are contained in the CCR, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as Resource, Conservation, and Recovery Act (RCRA) hazardous are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET). A waste has the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP).

State and Federal regulatory levels have also been established for other compounds such as total petroleum hydrocarbons, chlorinated herbicides, and organochlorine pesticides. Currently, regulatory criteria for the classification of wastes based solely on total petroleum hydrocarbon concentrations have not yet been promulgated.

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste. Per Section 25157.8 of the California Health and Safety Code, on or after January 1, 1999 until July 1, 2006, no person shall dispose waste

that contains total lead in excess of 350 mg/kg to land other than a Class I hazardous waste disposal facility.

Per HSC 25157.8 (c), the 350 ppm threshold for lead does not apply to wastes disposed of pursuant to a variance issued to a state or local agency by the Department of Toxic Substances Control (DTSC) for the disposal of lead contaminated soil if the disposal is only within the operating right-of-way of an existing highway. This exemption further specifies that the lead-contaminated soil must remain within the designated, contiguously contaminated corridor and within the same district for which the variance was issued.

2.3 DTSC Variance

The DTSC issued a variance on September 22, 2000 for Caltrans District 4 regarding the disposition of ADL-impacted soils within Caltrans projects. Review of the variance, as modified by DTSC on December 13, 2002, indicates the following conditions regarding reuse and management of aerially-deposited lead impacted soil as fill material for construction and maintenance operations in Caltrans right-of-way.

Category 1:

Soil exhibiting soluble lead concentrations less than or equal to 0.5 milligrams per liter (mg/l) [based on a modified waste extraction test using deionized water as the extractant (WET-DI)] and total lead concentrations of 1,411 mg/kg or less may be used as fill provided that the lead-impacted soil is placed a minimum of 1.5 meters (5 feet) above the maximum water table elevation and covered with at least 0.3 meter (1 foot) of clean soil.

Category 2:

Soil exhibiting soluble lead concentrations greater than 0.5 mg/l and less than 50 mg/l (based on the WET-DI) and total lead concentrations greater than 1,411 mg/kg and less than 3,397 mg/kg may be used as fill provided that the lead-impacted soil is placed a minimum of 1.5 meters (5 feet) above the maximum water table elevation and protected from infiltration by a pavement structure maintained by Caltrans.

Category 3:

Lead-impacted soil with a pH less than 5.0 shall only be used as fill material under the paved portion of the roadway.

If the excavated soil is not intended to be reused within the Caltrans right-of-way, then hazardous waste determination of the soil is based the criterion summarized in Section 2.2.

3.0 SCOPE OF SERVICES

The following scope of services was performed:

3.1 Pre-Field Activities

- Prepared a Workplan, dated October 29, 2004, to summarize the scope of services to be performed by Geocon.
- Prepared a Health and Safety Plan, dated October 29, 2004, to provide guidelines on the use of personal protective equipment (PPE) during the field activities. The Health and Safety Plan also provided guidelines on the use of onsite monitoring equipment and action levels for upgrades to higher PPE.
- Retained the services of a California-licensed laboratory to perform the soil analyses.

3.2 Field Activities

The field investigation was performed on October 8 and 9, 2004 by David Watts. Caltrans provided traffic control for field activities. The following field activities were performed during soil sampling efforts.

- Advanced 43 soil borings using hand auger/hand trowel/slide hammer methods.
- Collected samples in pre-cleaned and unused glass jars or 6-inch metal sleeves.
- Transported samples to a California-certified environmental laboratory.

4.0 INVESTIGATIVE METHODS

4.1 Sampling Procedures

Soil/sediment samples were collected from 43 borings along the stated alignment of SR 980/24 as shown on the Site Plans, Figures 2 through 7. Boring locations were surveyed using Differential Global Positioning System (DGPS) equipment. Boring coordinates are presented in Table 1.

Soil borings were advanced to a depth of approximately 0.15 meter (0.5 foot) below ground surface (bgs) using hand augers, hand trowels, or slide hammers. Samples were collected at an approximate depth of 0 to 0.15 meter (0 to 0.5 foot). A total of 43 soil samples were collected. Completed soil boreholes were backfilled to surface with the soil cuttings.

Soil encountered during the field activities generally consisted of sandy silt. Groundwater was not encountered during the advancement of the boreholes.

Geocon provided quality assurance/quality control (QA/QC) procedures during the field activities. These procedures included washing the sampling equipment with a Liqui-Nox® solution followed by a double rinse with deionized water. Decontamination water was disposed to the ground surface within Caltrans right-of-way in a manner not to create runoff, away from drain inlets or potential water bodies.

Sample containers were sealed, labeled, and transported in chilled containers to a Caltrans-approved, certified environmental laboratory using standard chain-of-custody documentation. A summary of samples and associated depths is presented in Tables 2 through 4.

4.2 Laboratory Analyses

Laboratory analyses were performed under 48-hour turn-around-times. Reproductions of the laboratory reports and chain-of-custody documentation are presented as Appendix A. The laboratory testing performed is summarized below:

- Forty-three soil samples were analyzed for total lead using EPA Test Method 6010B.
- Five soil samples (randomly selected by the laboratory) were analyzed for pH using EPA Test Method 9045C.
- Thirteen soil samples with total lead concentrations ranging between 150 mg/kg and 4,400 mg/kg were further analyzed for soluble (TCLP) lead. Those samples with total lead concentrations greater than 100 mg/kg were ordered from highest concentration to lowest, and every third sample was selected for TCLP analysis.
- Eight soil samples selected by the Caltrans Task Order Manager were further analyzed for soluble (WET-DI) lead.

Geocon instructed the analytical laboratory to composite five four-part samples to be analyzed for the following:

- Title 22 (CAM17) metals using EPA Test Method 6010/7471B;
- TPHg, TPHd, and TPHmo using EPA Test Method 8015B(M);
- Chlorinated herbicides using EPA Test Method 8151A; and
- Organochlorine pesticides using EPA Test Method 8081A.

4.3 Laboratory QA/QC

QA/QC procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. The laboratory QA/QC procedures included the following:

- One method blank for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix, whichever was more frequent, with spike made at ten times the detection limit or at the analyte level.

5.0 INVESTIGATIVE RESULTS

5.1 Laboratory Test Results

A summary of the analytical laboratory test results for lead and pH is presented as Table 2. Table 3 presents a summary of metals results. Table 4 presents a summary of TPHd, TPHg, and herbicides. The analytical laboratory reports and chain-of-custody documents are included as Appendix A.

The laboratory analyses indicated the following:

- Lead was the only metal detected at total concentrations greater than 10 times the STLC value of 5.0 mg/l. Total lead concentrations ranged from 18 to 4,400 mg/kg.
- Soil samples analyzed for soluble (TCLP) lead exhibited concentrations ranging from 0.26 mg/l to 9.8 mg/l.
- Soil samples analyzed using the WET-DI method exhibited concentrations ranging from <0.25 mg/l to 5.1 mg/l.
- Soil pH values ranged from 6.75 to 7.92.
- TPHg was not detected at or above the laboratory reporting limit of 1.0 mg/kg.
- TPHd concentrations ranged from 15 mg/kg to 110 mg/kg.
- TPHmo concentrations ranged from 39 mg/kg to 270 mg/kg.
- Chlorinated herbicides were not detected at or above their respective laboratory reporting limits.
- Organochlorine pesticides were reported in the composite soil samples. The pesticides detected included 4,4'-DDD (2.1 micrograms per kilogram [ug/kg] and 2.2 ug/kg), 4,4'-DDE (6.6 ug/kg to 27 ug/kg), 4,4'-DDT (3.6 ug/kg to 44 ug/kg), alpha Chlordane (3.6 ug/kg to 20 ug/kg), Chlordane (54 ug/kg to 300 ug/kg), Dieldrin (3.0 ug/kg), gamma Chlordane (4.2 ug/kg to 36 ug/kg), and Heptachlor epoxide (2.2 ug/kg).

The laboratory case narrative (see Appendix A) indicates that for Test Method 6010 (i.e., total lead analysis), the matrix spike (MS) and/or matrix spike duplicate (MSD) recoveries were outside QA/QC limits for four samples, possibly due to matrix interference, and that the relative percent difference (RPD) for sample duplicate was outside criteria for three samples. Additionally, the RPD for sample duplicate was outside criteria for one sample each for Test Methods 8015 and 8081. However, the analytical batch was validated by the laboratory control sample (LCS).

5.2 Statistical Evaluation for Lead Detected in Soil Samples

The non-parametric standard bootstrap method was applied to the total lead data to evaluate the upper confidence limits (UCLs) of the true means of the total lead concentrations for each sampling depth. The statistical methods used are discussed in a book entitled *Statistical Methods for Environmental Pollution Monitoring,* by Richard Gilbert; in an EPA *Technology Support Center Issue* document entitled, *The Lognormal Distribution in Environmental Applications,* by Ashok

Singh et. al., dated December 1997; and in a book entitled *An Introduction to the Bootstrap,* by Bradley Efron and Robert J. Tibshirani.

The 90% and 95% UCLs of the true mean are defined as the values that, when calculated repeatedly for randomly drawn subsets of site data, equal or exceed the true mean 90% and 95% of the time, respectively. Statistical confidence limits are the classical tool for addressing uncertainties of a distribution mean. 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.

UCLs were calculated using the non-parametric bootstrap method with 2,000 iterations. The calculated UCLs for each sample interval are:

Sample Interval	**90% UCL (mg/kg)**	**95% UCL (mg/kg)**
Westbound surface	1,028	1,099
Eastbound surface	1,485	1,556

Statistical results are included as Appendix B.

6.0 CONCLUSIONS

6.1 ADL

Summarized below are the total lead UCLs and the waste classification for soil generated for different excavation scenarios. In addition, soil reuse and disposal options are evaluated.

6.1.1 Offsite Disposal

Excavation Scenarios if Soil will be Disposed Offsite (95% UCLs applicable)

Excavation Scenario	95% UCL (mg/kg)	Waste Classification
Westbound Excavate top 0.15 m (0.5 ft)	1,099	**California-Hazardous**
Eastbound Excavate top 0.15 m (0.5 ft)	1,556	**California-Hazardous**

Soil generated from excavations to 0.15 meter (0.5 foot) in depth would be classified as a California hazardous waste since the predicted total lead concentrations are greater than the lead Total Threshold Limit Concentration (TTLC) of 1,000 mg/kg. Offsite disposal must be at a Class I landfill. Based on the soluble (TCLP) results, excavated soil would not be classified as RCRA hazardous (see Appendix B).

6.1.2 Onsite Reuse

Excavation Scenarios if Soil will be Reused Onsite (90% UCLs applicable)

Excavation Scenario	90% UCL (mg/kg)	Waste Classification
Westbound Excavate top 0.15 m (0.5 ft)	1,028	**California-Hazardous**
Eastbound Excavate top 0.15 m (0.5 ft)	1,485	**California-Hazardous**

In accordance with the DTSC variance of September 22, 2000, as modified by the DTSC on December 13, 2002, soil generated from excavations to 0.15 meter (0.5 foot) in depth may be reused on site provided that the lead-impacted soil is placed a minimum of 1.5 meters (5 feet) above the maximum water table elevation and protected from infiltration by a pavement structure maintained by Caltrans.

6.2 TPH

State or Federal waste classification thresholds have not been established for petroleum hydrocarbons. Therefore soil containing petroleum hydrocarbons is not considered hazardous and reuse is dependent on acceptance criteria established by the receiving site. Landfill disposal criteria are facility-specific based on permit conditions established by the regulatory agencies.

6.3 Herbicides

No chlorinated herbicide concentrations exceeded laboratory reporting limits. Soil excavated would not be classified as a California hazardous waste based on chlorinated herbicide concentrations. Consequently, there are no reuse restrictions for the soil based on the chlorinated herbicide content.

6.4 Pesticides

Based on the reported concentrations of organochlorine pesticides, soil excavated would not be classified as a California hazardous waste. Consequently, there are no reuse restrictions for the soil based on the organochlorine pesticide content.

6.5 Risk to Human Health

6.5.1 ADL

Based on current and proposed use of the subject site and adjacent properties, it is appropriate to compare the analytical results to the San Francisco Bay Regional Water Quality Control Board (SF-RWQCB) Environmental Screening Levels (ESLs) for shallow soil under an industrial/commercial land use. ESLs are considered to be conservative and under most circumstances, concentrations below ESLs can be assumed to not pose a significant threat to human health and the environment. Concentrations above an ESL do not automatically require remediation. Exceeding an ESL generally indicates that additional evaluation of the potential risks that may be posed by site contaminants is appropriate.

The highest UCL of 1,561 mg/kg is greater than shallow soil Direct Exposure ESL of 750 mg/kg for lead in shallow soil. Therefore, it is concluded that lead-impacted soil in the areas investigated may pose a risk to the health of workers performing the construction activities. Per the requirements of CCR Title 8, Section 1532.1, the "Lead in Construction" standard, the contractor(s) should prepare a project specific Lead Compliance Plan (LCP) to prevent or minimize worker exposure to ADL contaminated soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of ADL contaminated soil.

6.5.2 TPH

Based on the Direct Exposure ESL values for TPH, Geocon does not anticipate that the reported TPHd or TPHmo concentrations pose a significant risk to the health of workers performing construction activities. However, Geocon recommends that a Health and Safety Plan be prepared to prevent or minimize worker exposure to TPHd and TPHmo contaminated soil. The Health and Safety plan should include a discussion of the constituents of concern, routes of exposure, permissible exposure limits, and personal protective measures. The health and safety plan should be reviewed and signed by the onsite construction workers prior to any field activities.

6.5.3 Herbicides

No herbicide concentrations exceeded laboratory reporting limits. Therefore, it is concluded that herbicides in soil for the areas investigated do not pose a significant risk to the health of workers performing the construction activities.

6.5.4 Pesticides

Based on Direct Exposure ESL values for the organochlorine pesticides detected, Geocon does not anticipate that the reported organochlorine pesticide concentrations pose a significant risk to the health of workers performing construction activities. However, Geocon recommends that a Health and Safety Plan be prepared to prevent or minimize worker exposure to organochlorine pesticide contaminated soil. The Health and Safety plan should include a discussion of the constituents of concern, routes of exposure, permissible exposure limits, and personal protective measures. The health and safety plan should be reviewed and signed by the onsite construction workers prior to any field activities.

7.0 REPORT 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.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

TABLE 1
Boring Coordinates
State Route 980/24 in Oakland, CA

Boring	Northing	Easting	Elevation	Latitude	Longitude
980 E1	647,645.187	1,844,153.453	18.4	37.817082090	-122.270204027
980 E2	647,928.226	1,844,221.378	16.4	37.819643447	-122.269493454
980 E3	648,152.341	1,844,274.269	12.2	37.821671420	-122.268940918
980 E4	648,357.719	1,844,329.281	12.0	37.823530953	-122.268360245
24 E1	648,602.335	1,844,401.415	24.9	37.825746875	-122.267593502
24 E2	648,788.648	1,844,441.435	25.9	37.827432098	-122.267178949
24 E3	648,942.363	1,844,469.428	29.8	37.828821615	-122.266893987
24 E4	649,109.178	1,844,498.975	30.8	37.830329406	-122.266594160
24 E5	649,278.300	1,844,530.551	36.1	37.831858321	-122.266271777
24 E6	649,466.655	1,844,563.292	31.0	37.833560703	-122.265940279
24 E7	649,680.083	1,844,590.943	37.7	37.835488081	-122.265671945
24 E8	649,885.624	1,844,619.724	40.5	37.837344602	-122.265389078
24 E9	650,074.547	1,844,689.417	45.1	37.839058371	-122.264637907
24 E10	650,153.767	1,844,750.939	68.0	37.839782479	-122.263956025
24 E11	650,315.649	1,844,988.476	49.4	37.841281117	-122.261292355
24 E12	650,405.814	1,845,225.137	53.2	37.842133473	-122.258623210
24 E13	650,483.446	1,845,436.939	60.0	37.842868657	-122.256233742
24 E14	650,724.384	1,845,993.613	65.8	37.845133120	-122.249961157
24 E15	650,842.641	1,846,220.302	72.3	37.846236617	-122.247410997
24 E16	650,939.482	1,846,374.241	82.6	37.847134894	-122.245682698
24 E17	651,091.024	1,846,594.159	90.7	37.848537014	-122.243216378
24 E18	651,187.592	1,846,744.173	90.8	37.849432114	-122.241532509
24 W1	651,188.859	1,846,733.385	89.0	37.849441723	-122.241655341
24 W2	651,168.646	1,846,697.315	89.6	37.849253581	-122.242060855
24 W3	650,829.248	1,846,163.959	67.8	37.846106485	-122.248048229
24 W4	650,746.057	1,845,980.420	65.4	37.845326146	-122.250115636
24 W5	650,553.083	1,845,571.631	60.1	37.843518751	-122.254718483
24 W6	650,430.858	1,845,240.759	54.8	37.842361729	-122.258451092
24 W7	650,354.818	1,845,047.050	43.0	37.841643901	-122.260635347
24 W8	650,265.589	1,844,854.155	42.2	37.840807358	-122.262807473
24 W9	650,085.228	1,844,677.144	39.7	37.839152506	-122.264779602
24 W10	649,867.897	1,844,599.380	40.9	37.837181455	-122.265616364
24 W11	649,683.259	1,844,568.474	41.3	37.835512873	-122.265927848
24 W12	649,496.750	1,844,533.493	40.4	37.833826746	-122.266285204
24 W13	649,290.128	1,844,497.314	35.1	37.831959223	-122.266651826
24 W14	649,111.571	1,844,463.243	33.7	37.830344884	-122.267000521
24 W15	648,917.764	1,844,428.438	28.9	37.828593038	-122.267354256
24 W16	648,714.495	1,844,383.420	25.3	37.826754207	-122.267821943
24 W17	648,553.507	1,844,350.965	20.8	37.825298414	-122.268155999
980 W1	648,304.681	1,844,285.674	14.2	37.823045724	-122.268844097
980 W2	648,074.499	1,844,234.673	16.3	37.820963429	-122.269373878
980 W3	647,929.548	1,844,200.450	18.3	37.819651791	-122.269731403
980 W4	647,748.379	1,844,156.668	17.6	37.818012255	-122.270189683

Notes:

Northing and Easting shown in meters, NAD 83
Elevation shown in meters, MSL
Latitude and Longitude shown in decimal degrees

TABLE 2
Summary of Lead and pH Results
State Route 980/24 in Oakland, CA

Sample ID	Sample Depth (m)	Sample Depth (ft)	Total Lead (mg/kg)	WET-DI (mg/l)	TCLP (mg/l)	pH
980 E1	0	0	400	---	2.5	7.12
980 E2	0	0	260	---	---	---
980 E3	0	0	570	---	---	---
980 E4	0	0	910	---	---	---
24 E1	0	0	620	0.76	1.1	---
24 E2	0	0	2,000	---	---	---
24 E3	0	0	2,600	---	---	---
24 E4	0	0	890	---	0.52	---
24 E5	0	0	880	---	---	---
24 E6	0	0	2,300	5.1	9.8	---
24 E7	0	0	150	---	0.43	7.40
24 E8	0	0	95	---	---	---
24 E9	0	0	1,400	---	---	---
24 E10	0	0	1,600	1.4	1.8	---
24 E11	0	0	1,100	---	---	---
24 E12	0	0	820	---	---	---
24 E13	0	0	1,300	---	---	---
24 E14	0	0	320	---	---	---
24 E15	0	0	1,700	---	---	---
24 E16	0	0	51	---	---	---
24 E17	0	0	4,400	4.7	4.0	6.75
24 E18	0	0	2,100	---	---	---
24 W1	0	0	210	---	---	---
24 W2	0	0	200	0.28	0.26	---
24 W3	0	0	670	---	---	---
24 W4	0	0	1,100	---	1.6	---
24 W5	0	0	18	---	---	---
24 W6	0	0	970	---	---	---
24 W7	0	0	68	---	---	---
24 W8	0	0	160	---	---	---
24 W9	0	0	640	---	---	7.92
24 W10	0	0	1,500	---	---	---
24 W11	0	0	1,400	0.75	0.85	---
24 W12	0	0	1,700	---	---	---

TABLE 2
Summary of Lead and pH Results
State Route 980/24 in Oakland, CA

Sample ID	Sample Depth (m)	Sample Depth (ft)	Total Lead (mg/kg)	WET-DI (mg/l)	TCLP (mg/l)	pH
24 W13	0	0	530	---	---	---
24 W14	0	0	3,700	---	---	---
24 W15	0	0	130	---	---	---
24 W16	0	0	400	---	---	---
24 W17	0	0	22	---	---	---
980 W1	0	0	2,000	1.2	2.8	---
980 W2	0	0	680	<0.25	1.0	6.80
980 W3	0	0	160	---	---	---
980 W4	0	0	280	---	0.46	---
980 E1,2,3,4	0	0	650	---	---	---
24 E5,6,7,8	0	0	460	---	---	---
24 E14,15,16,17	0	0	2,100	---	---	---
24 W5,6,7,8	0	0	720	---	---	---
24 W14,15,16,17	0	0	220	---	---	---

m = meter
ft = foot
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
WET-DI = Waste Extraction Test procedure with deionized water as the extractant
TCLP = Toxicity Characteristic Leaching Procedure
--- = Not Analyzed
< = Not detected above the laboratory reporting limit

TABLE 2
Summary of Lead and pH Results
State Route 980/24 in Oakland, CA

Sample ID	Sample Depth (m)	Sample Depth (ft)	Total Lead (mg/kg)	WET-DI (mg/l)	TCLP (mg/l)	pH
980 E1	0	0	400	---	2.5	7.12
980 E2	0	0	260	---	---	---
980 E3	0	0	570	---	---	---
980 E4	0	0	910	---	---	---
24 E1	0	0	620	0.76	1.1	---
24 E2	0	0	2,000	---	---	---
24 E3	0	0	2,600	---	---	---
24 E4	0	0	890	---	0.52	---
24 E5	0	0	880	---	---	---
24 E6	0	0	2,300	5.1	9.8	---
24 E7	0	0	150	---	0.43	7.40
24 E8	0	0	95	---	---	---
24 E9	0	0	1,400	---	---	---
24 E10	0	0	1,600	1.4	1.8	---
24 E11	0	0	1,100	---	---	---
24 E12	0	0	820	---	---	---
24 E13	0	0	1,300	---	---	---
24 E14	0	0	320	---	---	---
24 E15	0	0	1,700	---	---	---
24 E16	0	0	51	---	---	---
24 E17	0	0	4,400	4.7	4.0	6.75
24 E18	0	0	2,100	---	---	---
24 W1	0	0	210	---	---	---
24 W2	0	0	200	0.28	0.26	---
24 W3	0	0	670	---	---	---
24 W4	0	0	1,100	---	1.6	---
24 W5	0	0	18	---	---	---
24 W6	0	0	970	---	---	---
24 W7	0	0	68	---	---	---
24 W8	0	0	160	---	---	---
24 W9	0	0	640	---	---	7.92
24 W10	0	0	1,500	---	---	---
24 W11	0	0	1,400	0.75	0.85	---
24 W12	0	0	1,700	---	---	---

TABLE 2
Summary of Lead and pH Results
State Route 980/24 in Oakland, CA

Sample ID	Sample Depth (m)	Sample Depth (ft)	Total Lead (mg/kg)	WET-DI (mg/l)	TCLP (mg/l)	pH
24 W13	0	0	530	---	---	---
24 W14	0	0	3,700	---	---	---
24 W15	0	0	130	---	---	---
24 W16	0	0	400	---	---	---
24 W17	0	0	22	---	---	---
980 W1	0	0	2,000	1.2	2.8	---
980 W2	0	0	680	---	1.0	6.80
980 W3	0	0	160	---	---	---
980 W4	0	0	280	<0.25	0.46	---
980 E1,2,3,4	0	0	650	---	---	---
24 E5,6,7,8	0	0	460	---	---	---
24 E14,15,16,17	0	0	2,100	---	---	---
24 W5,6,7,8	0	0	720	---	---	---
24 W14,15,16,17	0	0	220	---	---	---

m = meter
ft = foot
mg/kg = milligrams per kilogram
mg/l = milligrams per liter
WET-DI = Waste Extraction Test procedure with deionized water as the extractant
TCLP = Toxicity Characteristic Leaching Procedure
--- = Not Analyzed
< = Not detected above the laboratory reporting limit

TABLE 3
Summary of Metal Results
State Route 980/24 in Oakland, CA

Sample Location	Sample Depth (m)	Sample Depth (ft)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury
980 E1,2,3,4	0	0	<1.0	4.1	110	<1.0	1.3	37	5.6	52	650	1.2	27	1.7	<1.0	<1.0	23	310	0.19
24 E5,6,7,8	0	0	<1.0	4.9	130	<1.0	<1.0	39	9.7	30	460	<1.0	32	1.5	<1.0	<1.0	35	160	0.14
24 E14,15,16,17	0	0	<1.0	10	130	<1.0	1.1	43	8.7	49	2,100	1.3	35	2.1	<1.0	<1.0	30	330	0.13
24 W5,6,7,8	0	0	<1.0	5.9	220	<1.0	<1.0	40	7.1	21	720	<1.0	26	2.0	<1.0	<1.0	31	83	0.13
24 W14,15,16,17	0	0	<1.0	6.2	100	<1.0	<1.0	37	6.7	21	220	<1.0	26	2.2	<1.0	<1.0	27	89	<0.10

Notes:

m = meter

ft = foot

Results shown in miligrams per kilograms (mg/kg)

<= Not detected above the laboratory reporting limit

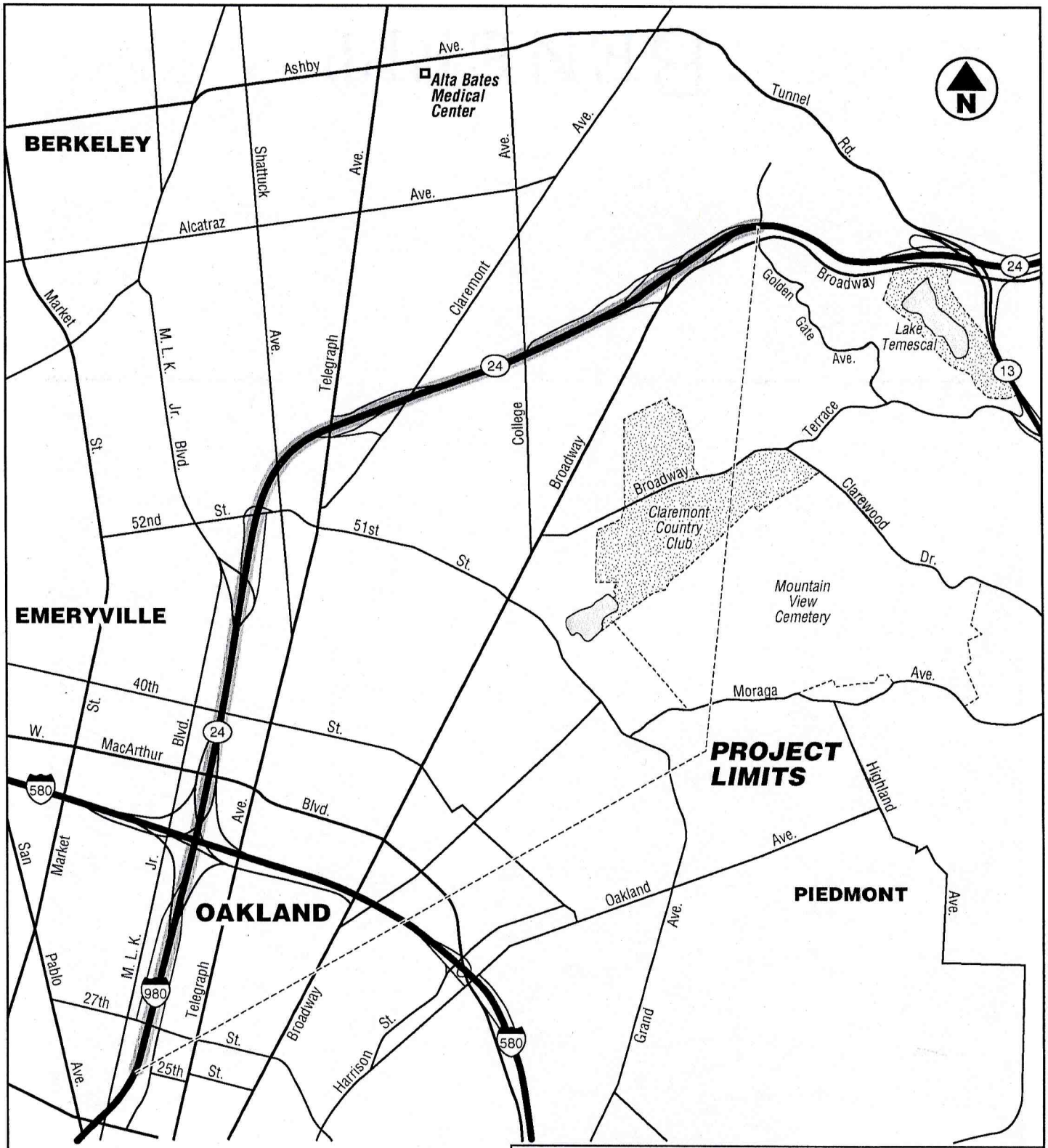
TABLE 4
Summary of Organic Results
State Route 980/24 in Oakland, CA

2005 TABLE A INDUSTRIAL ESL

Sample Location	Sample Depth (feet)	Sample Depth (meters)	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	Chlorinated Herbicides (ug/kg)	Organochlorine Pesticides (ug/kg)		
980 E1,2,3,4	0	0	<1.0	97	230	ND	4,4'-DDE=27	<	4000 ug/Kg
							4,4'-DDT=44	<	4000 ug/Kg
							alpha-Chlordane=20		
							Chlordane=300	<	1700 ug/Kg
							gamma-Chlordane=36		
24 E5,6,7,8	0	0	<1.0	21	53	ND	4,4'-DDD=2.2	<	9000 ug/Kg
							4,4'-DDE=6.6		
							4,4'-DDT=27		
							alpha-Chlordane=3.6		
							Chlordane=54		
							gamma-Chlordane=5.9		
24 E14,15,16,17	0	0	<1.0	110	270	ND	4,4'-DDE=25		
							4,4'-DDT=28		
							alpha-Chlordane=10		
							Chlordane=150		
							gamma-Chlordane=22		
24 W5,6,7,8	0	0	<1.0	15	39	ND	4,4'-DDT=3.6		
							alpha-Chlordane=13		
							Chlordane=78		
							Dieldrin=3.0	>	2.3 ug/Kg
							gamma-Chlordane=10		
							Heptachlor epoxide=2.2	<	15 ug/Kg
24 W14,15,16,17	0	0	<1.0	28	77	ND	4,4'-DDD=2.1		
							4,4'-DDE=11		
							4,4'-DDT=21		
							alpha-Chlordane=4.1		
							Chlordane=79		
							gamma-Chlordane=4.2		

Notes:

TPHg = Total Petroleum Hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHmo = Total Petroleum Hydrocarbons as motor oil
mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram
ND = not detected
< = not detected above laboratory reporting limit



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PHONE 925 371-5900 – FAX 925 371-5915

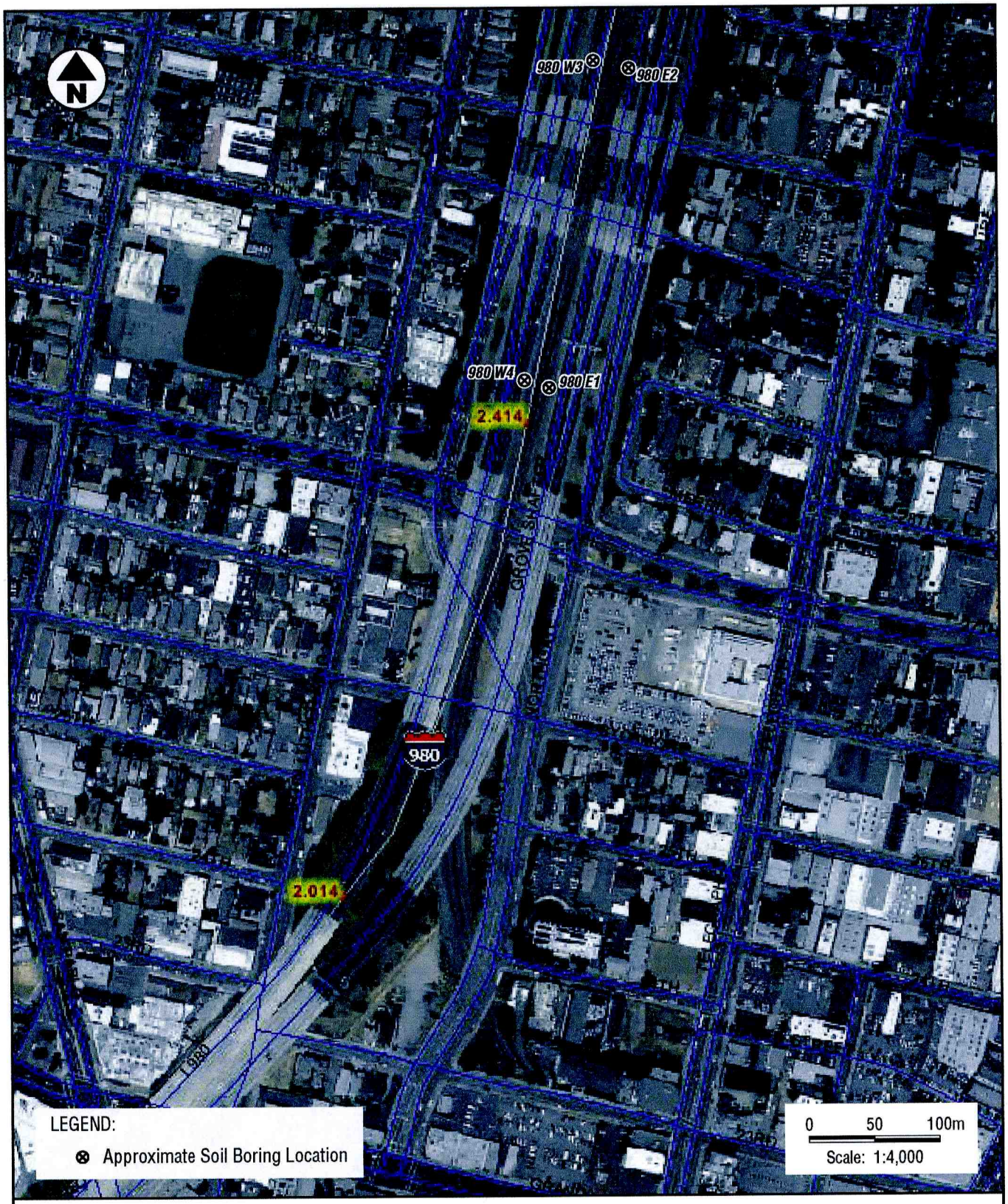
SR 980/24 Planting Strip Paving Project

Oakland, California

GEOCON Proj. No. E8220-06-01

VICINITY MAP

Task Order No. 04A1862-001 | September 2004 | Figure 1



SITE PLAN

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SR 980/24 Planting Strip Paving Project		
GEOCON Proj. No. E8220-06-01	Oakland, California	
Task Order No. 1	December 2004	Figure 2

SITE PLAN

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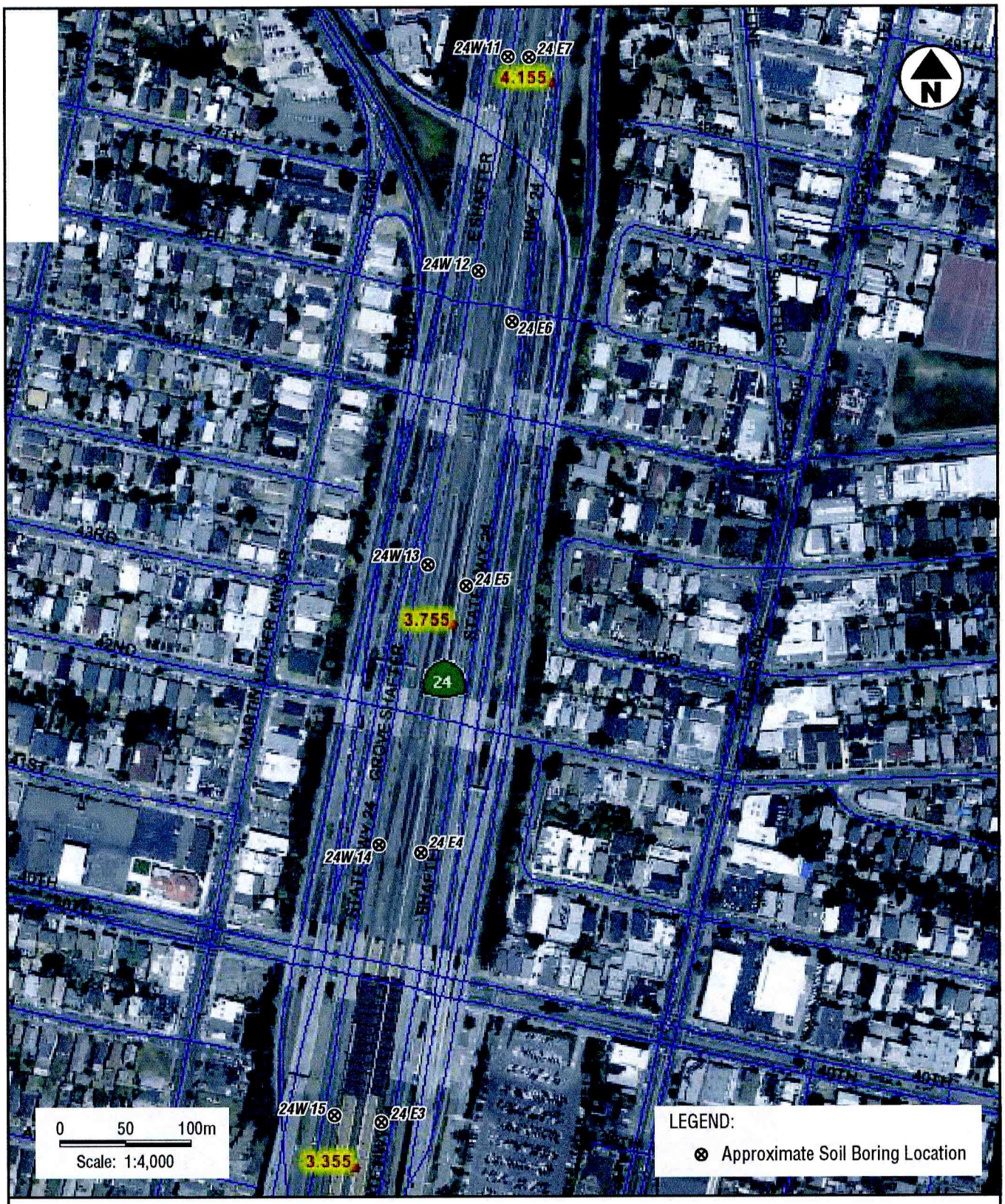
SR 980/24 Planting Strip Paving Project		
GEOCON Proj. No. E8220-06-01	Oakland, California	
Task Order No. 1	December 2004	Figure 3



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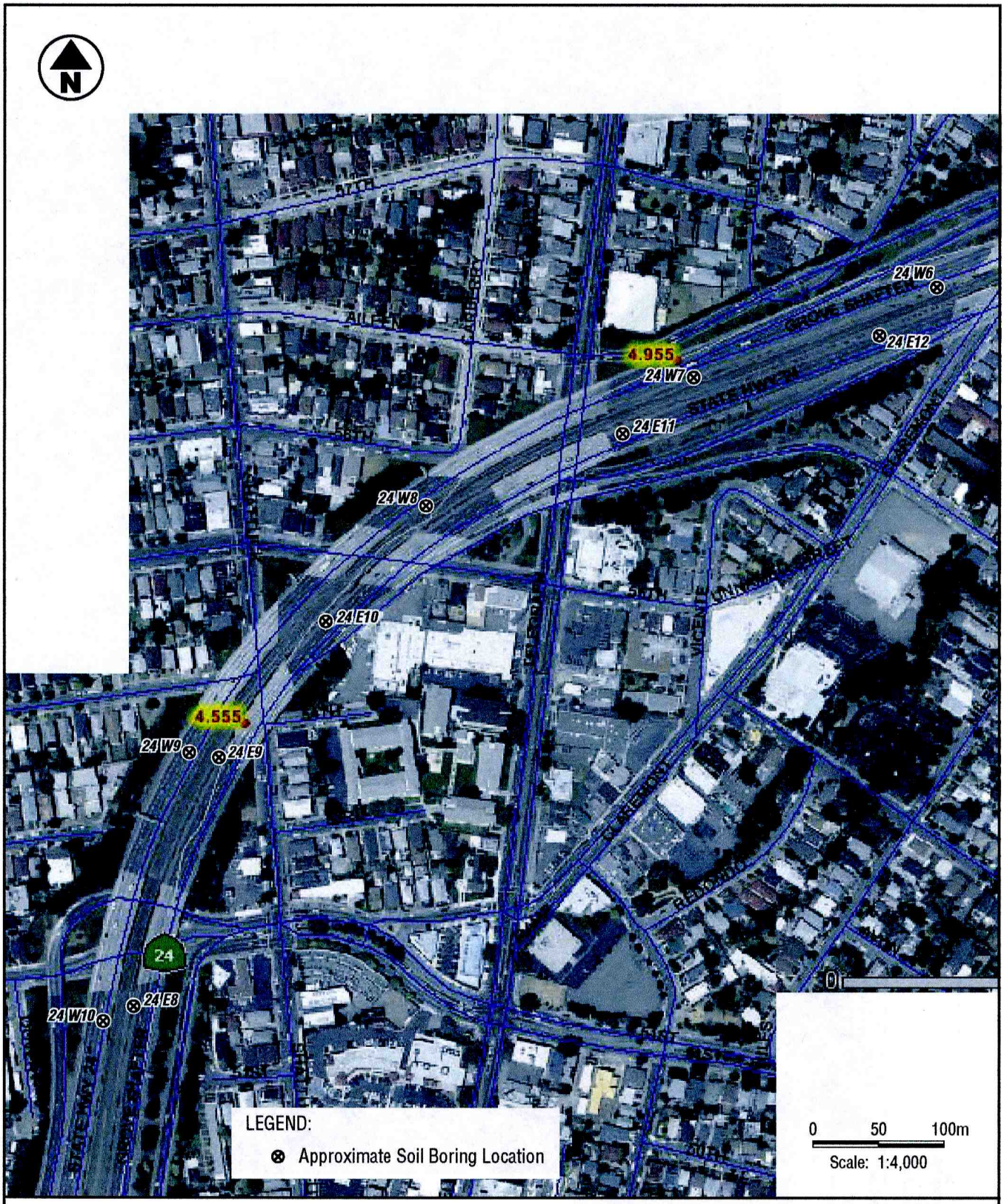
SR 980/24 Planting Strip Paving Project		
GEOCON Proj. No. E8220-06-01	Oakland, California	
Task Order No. 1	December 2004	Figure 4



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SR 980/24 Planting Strip Paving Project		
GEOCON Proj. No. E8220-06-01	Oakland, California	
Task Order No. 1	December 2004	Figure 5

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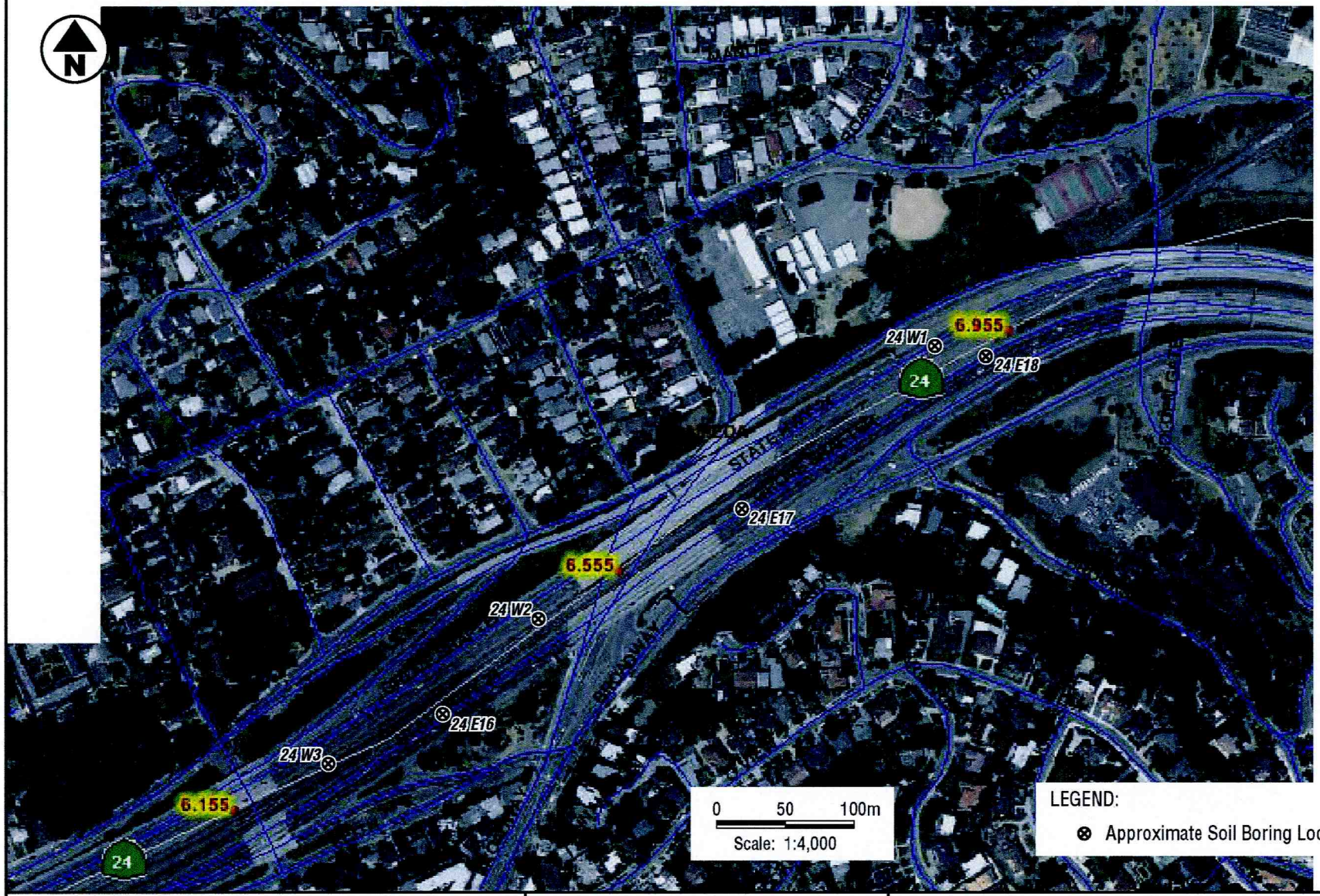
SITE PLAN

SR 980/24 Planting Strip Paving Project		
GEOCON Proj. No. E8220-06-01	Oakland, California	
Task Order No. 1	December 2004	Figure 6



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SITE PLAN

SR 980/24 Planting Strip Paving Project		
GEOCON Proj. No. E8220-06-01	Oakland, California	
Task Order No. 1	December 2004	Figure 7