DRAFT FINAL REMEDIAL ACTION PLAN
PETALUMA QUARRY PROPERTY
PETALUMA, CALIFORNIA

August 2, 2005

Prepared for:

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Kleinfelder Project No: 48912
August 2, 2005

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Important Information About Your

Geoenvironmental Report

Geoenvironmental studies are commissioned to gain information about environmental conditions on and beneath the surface of a site. The more comprehensive the study, the more reliable the assessment is likely to be. But remember: Any such assessment is to a greater or lesser extent based on professional opinions about conditions that cannot be seen or tested. Accordingly, no matter how many data are developed, risks created by unanticipated conditions will always remain. *Have realistic expectations.* Work with your geoenvironmental consultant to manage known and unknown risks. Part of that process should already have been accomplished, through the risk allocation provisions you and your geoenvironmental professional discussed and included in your contract's general terms and conditions. This document is intended to explain some of the concepts that may be included in your agreement, and to pass along information and suggestions to help you manage your risk.

Beware of Change; Keep Your Geoenvironmental Professional Advised

The design of a geoenvironmental study considers a variety of factors that are subject to change. Changes can undermine the applicability of a report's findings, conclusions, and recommendations. *Advise your geoenvironmental professional about any changes you become aware of.* Geoenvironmental professionals cannot accept responsibility or liability for problems that occur because a report fails to consider conditions that did not exist when the study was designed. Ask your geoenvironmental professional about the types of changes you should be particularly alert to. Some of the most common include:

- modification of the proposed development or ownership group,
- sale or other property transfer,
- replacement of or additions to the financing entity,
- amendment of existing regulations or introduction of new ones, or
- changes in the use or condition of adjacent property.

Should you become aware of any change, *do not rely on a geoenvironmental report.* Advise your geoenvironmental professional immediately; follow the professional's advice.

Recognize the Impact of Time

A geoenvironmental professional's findings, recommendations, and conclusions cannot remain valid indefinitely. The more time that passes, the more likely it is that important latent changes will occur. *Do not rely on a geoenvironmental report if too much time has elapsed since it was completed.* Ask your environmental professional to define "too much time." In the case of Phase I Environmental Site Assessments (ESAs), for example, more than 180 days after submission is generally considered "too much."

Prepare To Deal with Unanticipated Conditions

The findings, recommendations, and conclusions of a Phase I ESA report typically are based on a review of historical information, interviews, a site "walkover," and other forms of noninvasive research. When site subsurface conditions are not sampled in any way, the risk of unanticipated conditions is higher than it would otherwise be.

While borings, installation of monitoring wells, and similar invasive test methods can help reduce the risk of unanticipated conditions, *do not overvalue the effectiveness of testing.* Testing provides information about actual conditions only at the precise locations where samples are taken, and only when they are taken. Your geoenvironmental professional has applied that specific information to develop a general opinion about environmental conditions. *Actual conditions in areas not sampled may differ (sometimes sharply) from those predicted in a report.* For example, a site may contain an unregistered underground storage tank that shows no surface trace of its existence. *Even conditions in areas that were tested can change,* sometimes suddenly, due to any number of events, not the least of which include occurrences at

adjacent sites. Recognize, too, that *even some conditions in tested areas may go undiscovered,* because the tests or analytical methods used were designed to detect only those conditions assumed to exist.

Manage your risks by retaining your geoenvironmental professional to work with you as the project proceeds. Establish a contingency fund or other means to enable your geoenvironmental professional to respond rapidly, in order to limit the impact of unforeseen conditions. And to help prevent any misunderstanding, identify those empowered to authorize changes and the administrative procedures that should be followed.

Do Not Permit Any Other Party To Rely on the Report

Geoenvironmental professionals design their studies and prepare their reports to meet the specific needs of the clients who retain them, in light of the risk management methods that the client and geoenvironmental professional agree to, and the statutory, regulatory, or other requirements that apply. The study designed for a developer may differ sharply from one designed for a lender, insurer, public agency...or even another developer. *Unless the report specifically states otherwise, it was developed for you and only you.* Do not unilaterally permit any other party to rely on it. The report and the study underlying it may not be adequate for another party's needs, and you could be held liable for shortcomings your geoenvironmental professional was powerless to prevent or anticipate. Inform your geoenvironmental professional when you know or expect that someone else—a third-party—will want to use or rely on the report. *Do not permit third-party use or reliance until you first confer with the geoenvironmental professional who prepared the report.* Additional testing, analysis, or study may be required and, in any event, appropriate terms and conditions should be agreed to so both you and your geoenvironmental professional are protected from third-party risks. *Any party who relies on a geoenvironmental report without the express written permission of the professional who prepared it and the client for whom it was prepared may be solely liable for any problems that arise.*

Avoid Misinterpretation of the Report

Design professionals and other parties may want to rely on the report in developing plans and specifications. They need to be advised, in writing, that their needs may not have been considered when the study's scope was developed, and, even if their needs were considered, they might misinterpret geoenvironmental findings, conclusions, and recommendations. *Commission your geoenvironmental professional to explain pertinent elements of the report to others who are permitted to rely on it, and to review any plans, specifications or other instruments of professional service that incorporate any of the report's findings, conclusions, or recommendations.* Your geoenvironmental professional has the best understanding of the issues involved, including the fundamental assumptions that underpinned the study's scope.

Give Contractors Access to the Report

Reduce the risk of delays, claims, and disputes by giving contractors access to the full report, *providing that it is accompanied by a letter of transmittal that can protect you* by making it unquestionably clear that: 1) the study was not conducted and the report was not prepared for purposes of bid development, and 2) the findings, conclusions, and recommendations included in the report are based on a variety of opinions, inferences, and assumptions and are subject to interpretation. Use the letter to also advise contractors to consult with your geoenvironmental professional to obtain clarifications, interpretations, and guidance (a fee may be required for this service), and that—in any event—they should conduct additional studies to obtain the specific type and extent of information each prefers for preparing a bid or cost estimate. Providing access to the full report, with the appropriate caveats, helps prevent formation of adversarial attitudes and claims of concealed or differing conditions. If a contractor elects to ignore the warnings and advice in the letter of transmittal, it would do so at its own risk. Your geoenvironmental professional should be able to help you prepare an effective letter.

Do Not Separate Documentation from the Report

Geoenvironmental reports often include supplemental documentation, such as maps and copies of regulatory files, permits, registrations, citations, and correspondence with regulatory agencies. If subsurface explorations were performed, the report may contain final boring logs and copies of laboratory data. If remediation activities occurred on site, the report may include: copies of daily field reports; waste manifests; and information about the disturbance of subsurface materials, the type and thickness of any fill placed on site, and fill placement practices, among other types of documentation. *Do not separate supplemental documentation from the report. Do not, and do not permit any other party to redraw or modify any of the supplemental documentation for incorporation into other professionals' instruments of service.*

Understand the Role of Standards

Unless they are incorporated into statutes or regulations, standard practices and standard guides developed by the American Society for Testing and Materials (ASTM) and other recognized standards-developing organizations (SDOs) are little more than aspirational methods agreed to by a consensus of a committee. The committees that develop standards may not comprise those best-qualified to establish methods and, no matter what, no standard method can possibly consider the infinite client- and project-specific variables that fly in the face of the theoretical "standard conditions" to which standard practices and standard guides apply. In fact, these variables can be so pronounced that geoenvironmental professionals who comply with every directive of an ASTM or other standard procedure could run afoul of local custom and practice, thus violating the standard of care.

Accordingly, when geoenvironmental professionals indicate in their reports that they have performed a service "in general compliance" with one standard or another, it means they have applied professional judgement in creating and implementing a scope of service designed for the specific client and project involved, and which follows some of the general precepts laid out in the referenced standard. To the extent that a report indicates "general compliance" with a standard, you may wish to speak with your geoenvironmental professional to learn more about what was and was not done. *Do not assume a given standard was followed to the letter.* Research indicates that that seldom is the case.

Realize that Recommendations May Not Be Final

The technical recommendations included in a geoenvironmental report are based on assumptions about actual conditions, and so are preliminary or tentative. Final recommendations can be prepared only by observing actual conditions as they are exposed. For that reason, you should retain the geoenvironmental professional of record to observe construction and/or remediation activities on site, to permit rapid response to unanticipated conditions. *The geoenvironmental professional who prepared the report cannot assume responsibility or liability for the report's recommendations if that professional is not retained to observe relevant site operations.*

Understand That Geotechnical Issues Have Not Been Addressed

Unless geotechnical engineering was specifically included in the scope of professional service, a report is not likely to relate any findings, conclusions, or recommendations about the suitability of subsurface materials for construction purposes, especially when site remediation has been accomplished through the removal, replacement, encapsulation, or chemical treatment of on-site soils. The equipment, techniques, and testing used by geotechnical engineers differ markedly from those used by geoenvironmental professionals; their education, training, and experience are also significantly different. If you plan to build on the subject site, but have not yet had a geotechnical engineering study conducted, your geoenvironmental professional should be able to provide guidance about the next steps you should take. The same firm may provide the services you need.

Read Responsibility Provisions Closely

Geoenvironmental studies cannot be exact; they are based on professional judgement and opinion. Nonetheless, some clients, contractors, and others assume geoenvironmental reports are or certainly should be unerringly precise. Such assumptions have created unrealistic expectations that have led to wholly unwarranted claims and disputes. To help prevent such problems, geoenvironmental professionals have developed a number of report provisions and contract terms that explain who is responsible for what, and how risks are to be allocated. Some people mistake these for "exculpatory clauses," that is, provisions whose purpose is to transfer one party's rightful responsibilities and liabilities to someone else. Read the responsibility provisions included in a report and in the contract you and your geoenvironmental professional agreed to. *Responsibility provisions are not "boilerplate."* They are important.

Rely on Your Geoenvironmental Professional for Additional Assistance

Membership in ASFE exposes geoenvironmental professionals to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a geoenvironmental project. Confer with your ASFE-member geoenvironmental professional for more information.

ASFE

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1.0 INTRODUCTION

Kleinfelder Inc., (Kleinfelder) has prepared this draft final Remedial Action Plan (RAP) for the Petaluma Quarry Property, which is located at 1500 and 1600 Petaluma Boulevard South, Petaluma, California and referred to herein as the "Site" (Plate 1). The purpose of this RAP is to describe soil remediation and confirmation sampling proposed for the quarry portion of the Site. This plan is submitted on behalf of South Petaluma Partners, LLC who plans to redevelop the Site.

The preparation of the RAP follows three rounds of sampling and analysis of environmental conditions at the Site by Kleinfelder. Based on the results of these previous investigations, excavation of limited shallow soils impacted by petroleum hydrocarbons was identified as the remedial action required in the quarry portion of the Site. This RAP also discusses proposed soil removals along roadways at the Site and follow-up testing that will be performed in the vicinity of a test pit where an elevated nickel concentration was detected. Recommendations can then be made regarding whether soil excavation is required in the vicinity of the test pit.

The previous investigations also concluded that low concentrations of petroleum hydrocarbons in shallow groundwater at the Site were likely not related to Site operations (likely due to an off-site source based on flow directions and the distribution of detections) and are below levels of concern for residential development. No groundwater remediation is recommended or planned for the Site. However, the San Francisco Regional Water Quality Control Board (SFRWQCB) is requiring that a deed restriction be developed for the Site that prohibits the installation of domestic wells.

A Draft Final Risk Management Plan (Draft Final RMP) has been prepared for the quarry portion of the Site to identify general requirements and guidelines for the management and disposal of soil and groundwater with chemicals at concentrations above action levels that could potentially be encountered during construction activities. The Draft Final RMP will also address the possibility of encountering pollution during subsurface activities after development of the

quarry property. The deed restriction mention above references the RMP in the event that contaminants are discovered on the Site after remediation.

All contractors, subcontractors, vendors, suppliers, etc., shall be responsible for their own individual company Health and Safety Plans and shall perform their work in a safe and healthful manner in accordance with the requirements of their contract and all applicable health, safety, and environmental federal, state, and local regulations. A copy of Kleinfelder's Health and Safety Plan for the project is included in Appendix A.

2.0 SITE SETTING AND BACKGROUND

2.1 SITE DESCRIPTION

The Site is composed of two properties on either side of Petaluma Boulevard South. One property, called the quarry property, is approximately forty acres and located on the south side of Petaluma Boulevard at 1600 Petaluma Boulevard South. The other property, called the landing property, is approximately 3-1/2 acres and located on the north side of Petaluma Boulevard at 1500 Petaluma Boulevard South (Plate 1). The quarry property topography ranges from gently sloping to steeply sloping while the landing property is relatively flat. The Site is located in a commercial setting.

2.2 SITE HISTORY

The Site has been developed for use as a quarry since at least the early 1900s. According to historical records and title reports, San Rafael Rock Quarry purchased the Site from American Rock, Inc. sometime in the early 1990s. While rock mining operations ceased in about 1993, the Site currently supports aggregate storage, classification and sale, settling pond, and asphalt production activities. Offices, an asphalt plant, settling ponds, various above ground storage tanks (ASTs) associated with Site operations, and concrete recycle piles currently occupy the Site (Plate 1).

Historic Site features include a vehicle and equipment maintenance shop, wash plants, crushing plants, a brick plant, reduction plants, asphalt plants, concrete recycling plants and settling ponds (Plate 1). The principal locations where operations occurred moved over time as the quarry developed and grew.

2.3 PROPOSED REDEVELOPMENT

Redevelopment plans for the Site include residential units consisting of single-family homes, duplexes and town homes, live-work lofts, several parking lots, and appurtenant streets.

The redevelopment schedule has been very recently changed for the landing property. The asphalt batching plant will be relocated from the quarry to the landing property and will operate there for at least one year. As a beneficial result, the asphalt batch plant will be available to recycle the petroleum hydrocarbon-impacted soil proposed for remediation or encountered during construction activities on the quarry property. An RAP will be prepared for the landing property under separate cover when this area is developed in the future.

2.4 PREVIOUS INVESTIGATIONS

Phase I Environmental Site Assessment

Kleinfelder's Phase I Environmental Site Assessment (ESA) *(Phase I Environmental Site Assessment, Dutra Property, Petaluma, California. October 3, 2003)* revealed Recognized Environmental Conditions that included past surface releases of petroleum hydrocarbons, surface soil staining beneath and adjacent to petroleum hydrocarbon ASTs, and a leaking diesel fuel AST. Other potential concerns identified by the Phase I ESA included its historic industrial use, which involved the use of wash plants, crushing plants, a brick plant, reduction plants, asphalt plants, concrete recycling plants, and settling ponds.

Phase II ESA and Supplementary Soil Investigation

Based on the results of the Phase I ESA, Kleinfelder conducted a Phase II soil and groundwater investigation (Phase II Environmental Site Assessment, Dutra Properties, 1500 & 1600 Petaluma Blvd. South, Petaluma, California, February 18, 2004) to assess potential releases from historical operations at the Site. Fourteen soil borings (KB-1 through KB-14) and 33 test pits (TP-1 through TP-23, TP-23A, and TP-24 through TP-32) were completed during this investigation. The locations of the soil borings and test pits from which soil samples were collected are shown on Plate 1. Results of soil and grab groundwater samples collected during this investigation are presented on Tables 1 and 2, respectively. As shown on these tables and on Tables 3 and 4 discussed below, results are compared to SFRWQCB Environmental Screening Levels (ESLs). The justification for selecting the SFRWQCB ESLs as soil action levels for the Site is discussed in Section 3.0.

In March 2004, Kleinfelder conducted a follow-up investigation (Report of Supplementary Soil Characterization, Dutra Quarry Property, 1600 Petaluma Boulevard South, Petaluma, California, May 21, 2004) to the Phase II ESA to further define the vertical and horizontal extent of petroleum hydrocarbon contamination in soil at two adjacent areas on the quarry property. Twenty-one test pits (TP-40 through TP-60) were completed during this investigation (Plate 2). Results of soil samples collected during this investigation are presented on Table 3.

The Phase II ESA and Supplementary Soil Characterization investigations revealed the following:

1. An area where diesel fuel has impacted shallow soil just east of the asphalt plant where a dripping AST was observed. Concentrations of total petroleum hydrocarbons quantified as diesel (TPH-d) exceed 2,500 milligrams per kilogram (mg/kg).
2. Heavy-end hydrocarbons impact shallow soil around the asphalt plant. Concentrations of total petroleum hydrocarbons quantified as motor oil (TPH-mo) exceed 2,100 mg/kg.

The diesel fuel appears to affect soil within an area approximately 80-feet-long by 40-feet-wide (Plate 2). The release appears to be limited to a 5-foot depth where hard, coherent, impermeable bedrock is encountered. The heavy-end hydrocarbons appear to be restricted to the upper 2 feet of the soil profile within an area of approximately 80-feet-wide by 160-feet-long (Plate 2). These areas are slated for excavation and remediation.

Results of the *Phase II ESA* investigation also revealed four additional areas on the quarry property that have been impacted to a lesser extent by petroleum hydrocarbons:

- In the vicinity of the former concrete recycling plant (test pit TP-10) at a depth of approximately 5-feet.
- In the vicinity of the gasoline AST (test pit TP-18) at a depth of approximately 1 foot.
- In the vicinity of the waste and hydraulic oil ASTs (test pit TP-19) at a depth of approximately 1 foot.
- In the vicinity of the "release oil" AST (test pit TP-20) to a depth of at least 5 feet.

These areas have also been slated for excavation and remediation.

On the landing property, the *Phase II ESA* investigation revealed that near surface soil in the vicinity of test pits TP-11, TP-13, and TP-14 have also been impacted to a lesser extent by

petroleum hydrocarbons. However, a separate RAP will be prepared for the landing property when it is developed in the future.

The Phase II investigation concluded that metals' concentrations were at low levels indicative of background concentrations. However, one elevated nickel concentration (1,600 mg/kg) was detected in the near surface soil sample collected in the vicinity of the crushing plant (test pit TP-7; Plate 1). This area will be further tested to assess whether limited soil excavation is required near test pit TP-7, or if the previous results are anomalous. A second elevated nickel concentration (200 mg/kg) was detected in the near surface soil sample collected on the landing property in the vicinity of test pit TP-11 (Plate 1). As discussed above, petroleum hydrocarbons have also impacted the near surface in the vicinity of test pit TP-11 and a separate RAP for the landing property will be prepared in the future to address these issues.

The Phase II investigation also concluded that the low concentrations of TPH in shallow groundwater in the northwestern portion of the quarry property and on the landing property are not related to Site operations (likely due to an off-site source based on flow directions and the distribution of detections) and, regardless of source, are below levels of concern for residential development. No groundwater remediation is recommended or planned for the Site. However, the SFRWQCB is requiring that a deed restriction be developed for the Site that prohibits the installation of domestic wells.

Naturally Occurring Asbestos Assessment

On January 24, 2005, Kleinfelder collected 18 samples at the Site and analyzed them for naturally occurring asbestos (NOA) fibers. The purpose of this investigation was to evaluate whether NOA exists at the Site. Geologic environments targeted for sampling included Franciscan Complex rocks and adjacent soils including two serpentinite rock outcrops and the soil adjacent to these outcrops. The results of the investigation are presented in a report titled *Naturally Occurring Asbestos Assessment, Dutra Property, Petaluma, California*, and dated March 24, 2005.

The NOA samples were analyzed by California Air Resources Board (CARB) Method 435. Quantification of asbestos concentrations was obtained under polarizing light microscope (PLM) using the standard CARB Method 435 point count protocol. PLM analyses detected chrysotile asbestos in 1 of the 4 rock samples and in 1 of the 14 soil samples. Asbestos levels in the rock and soil sample were 1.95% and 0.98%, respectively.

The asbestos containing rock sample was collected from the serpentinite outcrop located on the southeastern slope of the central pit (see Plate 1 for the location of the central pit). This serpentinite outcrop extends from an elevation of approximately 35 to 75 feet mean sea level (msl). The asbestos containing soil sample was collected directly downslope of this outcrop. Development in this area will result in the burial of this serpentinite outcrop under approximately 25 (at the lowest elevation of the outcrop) to 65 feet (at the highest elevation of the outcrop) of fill.

Because of the potential for encountering NOA from serpentinite rock bodies during cut and fill operations, a Site-specific Asbestos Dust Mitigation Plan has been developed and approved by the Bay Area Air Quality Management District (BAAQMD) and Sonoma County Permit & Resource Management District (PRMD). The Plan has strict guidelines to control the emissions of dust during construction activities. The primary method of controlling dust will be through the application of water.

A Deed Restriction that will be prepared separately after remediation activities have been completed on the quarry property will prohibit excavation into the NOA-bearing serpentinite body.

Quarry Pit/Pond Water Sample

At the request of the SFRWQCB, a water sample was collected from the central pit (see Plate 1 for the location of the central pit) to evaluate whether hazardous materials may have been disposed there during past operations at the quarry. The sample was analyzed for TPH-d, TPH-mo, total petroleum hydrocarbons as gasoline (TPH-g), and volatile organic compounds (VOCs). None of these constituents were detected above the laboratory reporting limits.

Supplemental Soil Investigation

A supplemental soil investigation *(Supplemental Soil Investigation Results, Petaluma Quarry Property, 1600 Petaluma Boulevard South, Petaluma, California, May 11, 2005)* was conducted at the Site in April 2005 to acquire additional analytical data requested by the SFRWQCB including:

- Polynuclear aromatic hydrocarbons (PAHs or PNAs) data.
- Polychlorinated biphenyls (PCB) data.
- Arsenic data.
- Hexavalent chromium data, in particular, at those locations where elevated total chromium concentrations (that is, above the ESLs) were detected in previous investigations.

On April 27, 2005, Kleinfelder collected near surface soil samples at the 11 sample locations DG-1 through DG-11 shown on Plate 1. Areas targeted for sampling include former locations of the maintenance shop, settling ponds, asphalt plant, concrete recycling plant, concrete crushing plant, brick plant, and the current locations of the concrete piles and release oil above-ground storage tank.

Soil samples were collected just below the surface (i.e., at 2 to 8 inches below ground surface [bgs]) and at a depth of 1 to 1.5 feet bgs at each location. Each sample was analyzed for the following constituents:

- PAHs by United States Environmental Protection Agency (USEPA) Method 8310.
- PCBs by USEPA Method 8082A.
- Arsenic by USEPA Method 6020A.

In addition, the samples from locations DG-2 and DG-4 were analyzed for hexavalent chromium (by USEPA Method 218.6) because elevated total chromium concentrations were detected in these areas during previous investigations at the Site.

The results of the chemical analyses performed on the samples are summarized on Table 4. As indicated on the table, arsenic was the only constituent detected above the indicated reporting limits. The concentration of arsenic ranged from 1.2 (1 to 1.5 feet bgs sample from location DG-3) to 10 mg/kg (1 to 1.5 feet bgs sample from location DG-7). The average concentration of arsenic was 3.2 mg/kg, which is well below the ESL of 5.5 mg/kg. In addition, studies of background levels for metals indicated that arsenic can range from 5.29 to 23.7 mg/kg in a Bay Area marsh study (*Lee et al., 1992*), 1 to 50 mg/kg for various soils (*Lindsay, 1972*), and 2.87 to 10.9 in a 1988 USEPA study. Considering that only one out of 22 soil samples exceeded the ESL, the overall arsenic concentrations in soil at the Petaluma Quarry are unlikely to exceed action levels.

3.0 PROJECT CLEANUP GOALS

The objective of this remedial action is to remove petroleum hydrocarbon-impacted soils above concentrations that would cause concerns to human health or the environment, and in doing so, remediate the quarry property. The SFRWQCB has developed ESLs for common chemical contaminants to evaluate risk at sites where releases have occurred. These ESLs are conservative, and Kleinfelder will use these ESLs as remediation goals for the Site.

Residential land use ESLs presented on the SFRWQCB lookup Table B (see Appendix B) have been selected for use at the Site. The values on this lookup table are designed for shallow soils within 3 meters of ground surface at residential sites where groundwater is not considered a current or potential drinking water resource. Use of this table is considered appropriate because:

- Future plans for the Site include construction of single-family residential homes.
- It is Kleinfelder's opinion that only shallow soil has been impacted affected from Site operations.
- Groundwater in the vicinity of the northern portion of the Site adjacent to the Petaluma River is brackish and, therefore, not a current or potential drinking water resource. Sustained groundwater pumping would likely cause brackish water intrusion from the Petaluma River and would likely have total dissolved solids' levels in excess of the State drinking water standard of 3,000 milligrams per liter (mg/L).
- Groundwater in the southern portion of the Site is underlain by relatively impermeable bedrock so the is no real infiltration of groundwater occurring. Groundwater encountered in a boring drilled in the northern southern portion of the Site appears to occur as localized perched groundwater on bedrock. Therefore, for the larger southern portion of the Site, groundwater is likely not a sustainable resource.

Based on this ESL lookup table, soil from the impacted areas on the quarry property that contains constituents in excess of the indicated removal criteria require remediation:

TABLE 1: REMOVAL CRITERIA

Constituent	Target Concentrations
TPH – mo	500 mg/kg
TPH – d	100 mg/kg
TPH – g	100 mg/kg
Benzene	0.18 mg/kg
Toluene	9.3 mg/kg
Ethylbenzene	32 mg/kg
Total Xylenes	11 mg/kg

Kleinfelder will remediate the impacted areas to levels below the removal criteria by performing the soil excavation tasks in Section 4.0.

Kleinfelder will assess nickel concentrations in the vicinity of the former crushing plant (test pit TP-7). Nickel concentrations in a sample collected from test pit TP-7 were greater than the residential ESL (150 mg/kg). Kleinfelder will collect and analyze five soil samples from the area around test pit TP-7 to see if there is a widespread occurrence of high nickel concentrations, and, if so, will develop additional remediation recommendations. The additional nickel sampling and analyses are discussed in Section 6.0.

4.0 SOIL EXCAVATION

4.1 MOBILIZATION AND SITE PREPARATION

Kleinfelder will coordinate utility clearances and obtain excavation permits from the City of Petaluma prior to excavation activities. Known utilities will be clearly marked and protected to prevent damage. Barrier tape and appropriate warning signs will be installed around the immediate excavation area to control access. Temporary erosion and storm water controls will be installed as necessary to prevent contaminant migration during the excavation of the contaminated soils.

4.2 EXCAVATION ACTIVITIES

Kleinfelder will meet project cleanup goals by performing the following tasks:

- Excavate hydrocarbon-contaminated soil with concentrations above the ESLs in the three impacted areas shown on Plate 2.
- Excavate hydrocarbon-contaminated soil with concentrations above the ESLs in the three remaining areas (that is, in the vicinity of test pits TP-10, TP-18, and TP-19) impacted to a lesser extent by petroleum hydrocarbons.
- Collect and analyze sidewall and bottom samples to confirm removal of contaminated soil as discussed in Section 5.

Kleinfelder estimates the excavation of 600 cubic yards of diesel-impacted material in the AST release area, 700 cubic yards of shallow soil impacted with heavy-end hydrocarbons in the vicinity of the asphalt plant, and 100 cubic yards of diesel and motor oil-impacted soil in the vicinity of the release oil AST. The approximate extent of hydrocarbon-contaminated soil in these areas is shown on Plate 2. It is estimated that approximately 10 to 20 cubic yards of hydrocarbon-impacted soil will be removed from the three areas that have been impacted to a lesser extent by petroleum hydrocarbons.

If field observations indicate that hydrocarbon-contaminated soil extends beyond the boundary of the excavation areas shown on Plate 2 or in the three areas that have been impacted to a lesser extent by petroleum hydrocarbons, then the excavations will be extended until clean soil is encountered. Confirmation sidewall and bottom samples will be collected once clean soil has been reached. Excavation and confirmation sampling will continue until one of the following criteria is met:

- Analytical results document that soil exceeding the cleanup criteria has been removed.
- The excavation has reached refusal in bedrock.

Kleinfelder will coordinate with an appropriately licensed contractor to perform excavation activities. The excavated material will be immediately stockpiled in a plastic-lined area on-Site and covered with tarps or plastic to prevent migration from the stockpile. The disposal plan for the stockpiled soil is discussed in Section 9.0.

5.0 CONFIRMATION SAMPLING AND LABORATORY ANALYSIS

As portions of the excavation are complete, Kleinfelder will collect confirmation samples from the excavation sidewalls and bottom. One confirmation sample will be collected every 20 linear feet of sidewall and every 400 square feet of the floor of the excavation. A sample will be collected from each sidewall and from the floor of the excavation in the three areas impacted to a lesser extent by petroleum hydrocarbons. Samples will not be collected in coherent material that cannot be sampled using a standard impact sampler.

Each sample will be collected in a stainless steel sampling tube, covered with Teflon, end capped, and placed in refrigerated storage for submittal to the laboratory. Each sample will be given a unique identification number that will be logged onto a chain-of-custody form and Site map.

The samples will be transported to McCampbell Analytical for analysis on a standard seven-day turnaround time. The samples will be analyzed for the following constituents:

- TPH-d and TPH-mo, TPH-g by USEPA Method 8015.
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) by USEPA Method 8021B.
- PAHs by USEPA Method 8310.
- Arsenic by USEPA Method 6020A.

McCampbell is certified by the California Department of Health Services Environmental Laboratory Accreditation Program to conduct the required analyses.

6.0 ADDITIONAL SAMPLING

To evaluate the extent of elevated nickel in the vicinity of the crushing plant, soil samples will be collected next to test pit TP-7 and at three step-out points 15 feet away from test pit TP-7. Based on the results of the sampling, recommendations will be made regarding whether soil excavation in that area is required.

Two samples will be collected next to test pit TP-7, one at 1-foot bgs and the other at 2.5 feet bgs. The purpose of these samples is to confirm the reported presence of elevated nickel in this area and to assess its vertical extent, if confirmed. One sample will be collected at each of the three step-out points from 1-foot bgs. The purpose of these samples is to assess the horizontal extent of elevated nickel in the vicinity of test pit TP-7.

The samples will be collected using a hand trowel or slide hammer-driven sampling device. The soil samples will be collected in 2-inch diameter brass liners, covered with Teflon, end capped, and placed in refrigerated storage for submittal to the laboratory. Each sample will be given a unique identification number that will be logged onto a chain-of-custody form and Site map.

The samples will be transported to McCampbell Analytical for analysis on a standard seven-day turnaround time. The samples will be analyzed for nickel by USEPA Method 6010C. McCampbell is certified by the California Department of Health Services Environmental Laboratory Accreditation Program to conduct the required analysis.

7.0 BACKFILL AND COMPACTION

The excavations will be backfilled with clean material upon approval of the confirmation testing results by Kleinfelder's project manager. Compaction testing will not be required because the Site will be graded and compacted prior to development.

8.0 SOIL REMOVALS ALONG ROADWAYS

As requested by the SFRWQCB, the top few inches (that is, approximately two inches) of soil on all roadways will be scrapped off and either be reused in the production of asphalt or disposed at a permitted Class II or III landfill as discussed in Section 9.0. This will address minor pieces of asphalt and incidental oil spillage that may be present in roadways.

9.0 SOIL DISPOSAL

Excavated petroleum-affected soils will either be reused in the production of asphalt or disposed at a permitted Class II or III landfill. If landfilled, additional analytical testing of the stockpile may be conducted, as needed, to characterize the excavated material for disposal. As indicated in Section 4.0, the excavated material will be stockpiled on-Site in a plastic-lined area and covered with tarps or plastic.

As required, the composite samples will be collected from the stockpiles when excavation activities have been completed, and transported to McCampbell Analytical for analysis on a standard seven-day turnaround time. The analytical results will be approved by the selected permitted Class II or III landfill prior to disposal.

Qualified and licensed drivers will transport the stockpiled soil to the selected landfill once it has been accepted for disposal. All trucks will be covered with tarps before they are cleared to leave the Site.

10.0 REPORTING

Kleinfelder will prepare a short letter report documenting the results of the remedial and soil sampling activities. The report will include the following:

- Investigation methodology.
- The laboratory results.
- Site maps showing the locations of the excavations and sample points.
- The excavation stockpile locations, the waste disposal facility, and copies of the waste manifest forms.
- Summary, conclusions, and recommendations.

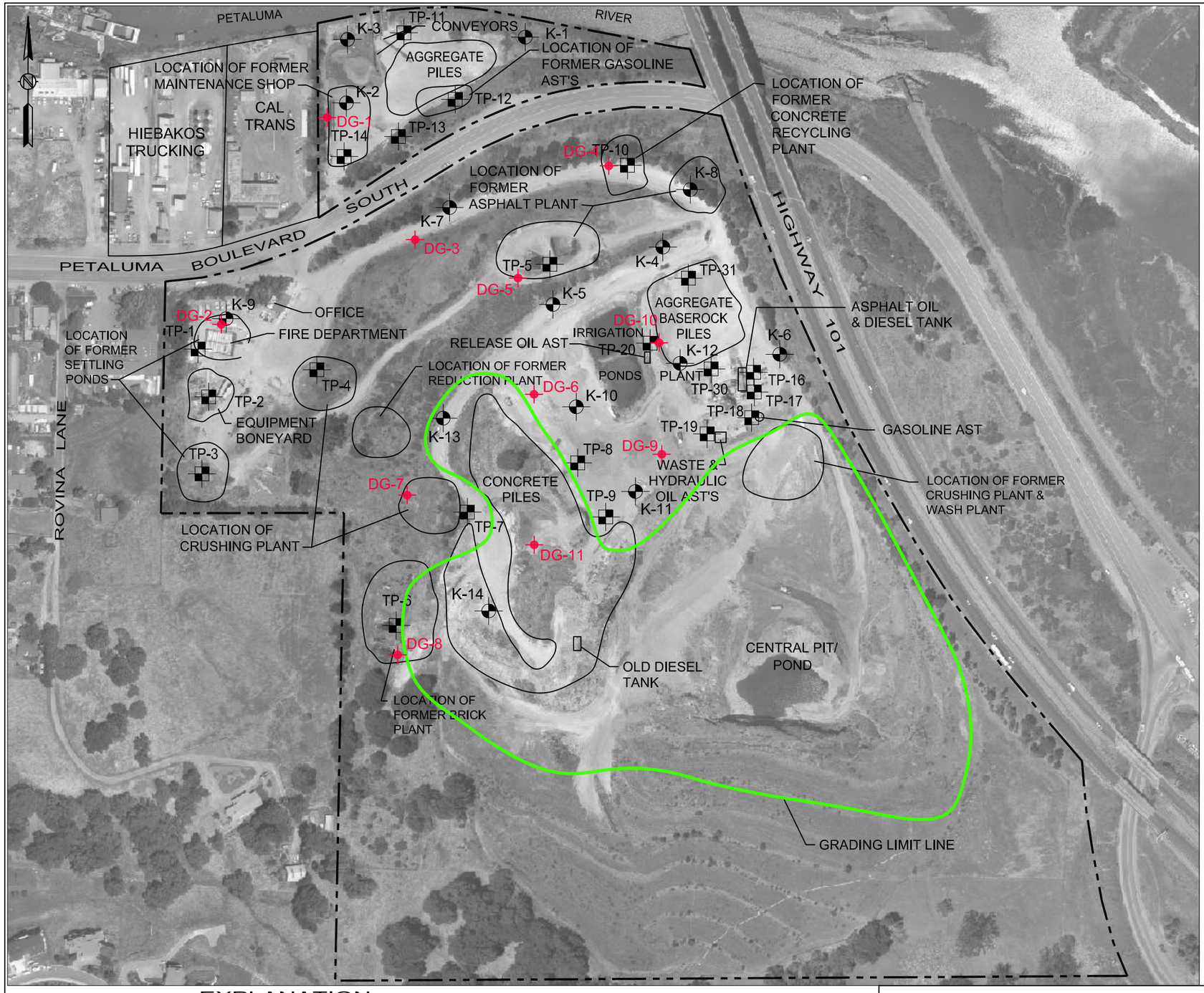
11.0 LIMITATIONS

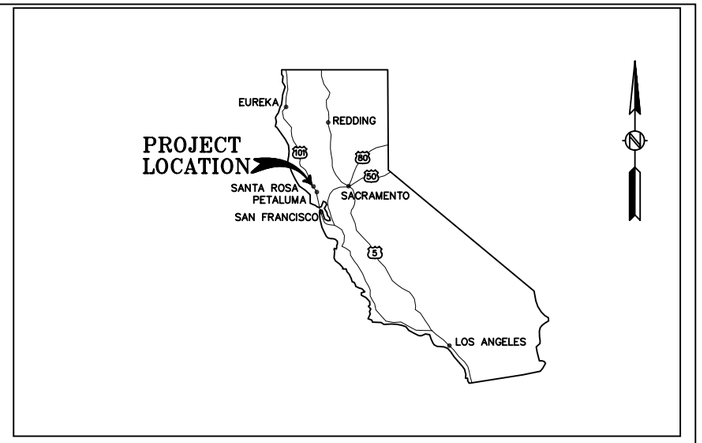
This report was prepared in general accordance with the accepted standard of practice that exists in Northern California at the time the investigation was performed. It should be recognized that definition and evaluation of environmental conditions are a difficult and inexact art. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the conditions present. More extensive studies, including additional environmental investigations, can tend to reduce the inherent uncertainties associated with such studies. If South Petaluma Partners, LLC wishes to reduce the uncertainty beyond the level associated with this study, Kleinfelder should be notified for additional consultation.

Our firm has prepared this report for the South Petaluma Partners, LLC exclusive use for this particular project and in accordance with generally accepted engineering practices within the area at the time of our investigation. No other representations, expressed or implied, and no warranty or guarantee is included or intended.

This report may be used only by the South Petaluma Partners, LLC and only for the purposes stated, within a reasonable time from its issuance, but in no event later than one year from the date of the report. Land or facility use, on- and off-site conditions, regulations or other factors may change over time and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else, will release Kleinfelder from any liability resulting from the use of this report by any authorized party and client agrees to defend, indemnify, and hold harmless Kleinfelder from any claim or liability associated with such unauthorized use or non-compliance.

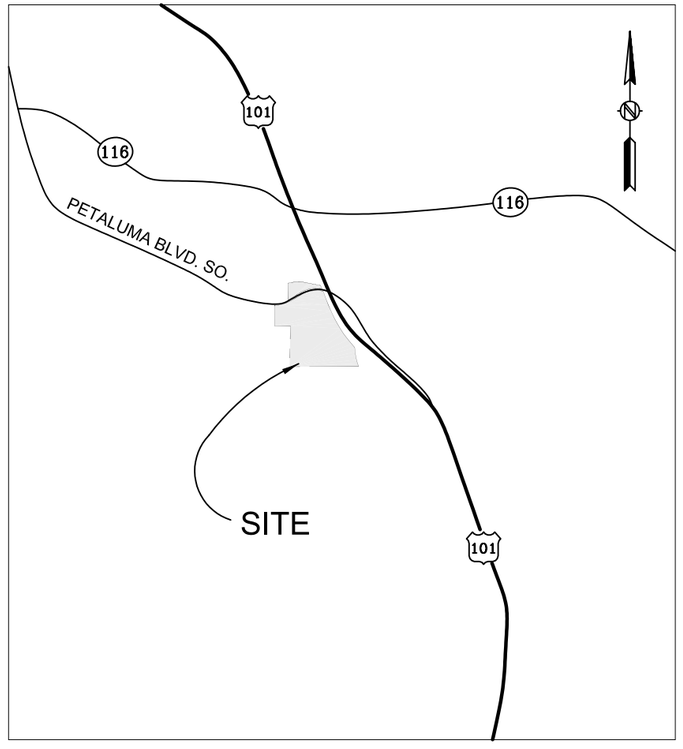
PLATES





SITE LOCATION MAP

NO SCALE



SITE VICINITY MAP

SCALE: 1" = 4000'

EXPLANATION

- Approximate Site Boundary
- Data Gap Sampling Location
- Test Pit/Trench Location
- Soil/Groundwater Boring Location

250 125 0 250
scale feet

KLEINFELDER

PROJECT NO. 48912-5 DATE APR 2005

SITE PLAN AND SAMPLING LOCATIONS

Dutra Quarry Property
1500 & 1600 Petaluma Blvd.
Petaluma, California

PLATE 1

60 30 0 60

scale feet

KLEINFELDER

PROJECT NO. 48912-4 DATE OCT 2004

PROPOSED EXCAVATION AREAS
Dutra Property
1600 S. Petaluma Blvd.
Petaluma, California

PLATE
2

TABLES

TABLE 1
SOIL ANALYTICAL RESULTS
PHASE II ENVIRONMENTAL SITE ASSESSMENT
PETALUMA QUARRY

Concentrations in mg/kg

		Petroleum Hydrocarbons							Metals					VOCs										
Sample Location	Sample Depth(ft)	TPH-mo	TPH-d	TPH-g	B	T	E	X	Cd	Cr	Pb	Ni	Zn	Acetone	MEK	Napthalene	T	1,2,4-Tri-methylbenzene	X	sec-Butyl benzene	E	Isopropyl benzene	n-Propyl benzene	1,3,5-Tri methylbenzene	n-Butyl benzene
K-1-1	1.5	**6.8**	**2.7**	ND	ND	ND	ND	ND	ND	**77**	21	**79**	**84**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-1-3	5.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K-1-5	10.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-1-7	15.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-1-9	20.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-1-11	25.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-1-13	30.5	ND	**2.2**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-2-1	1.5	**56**	**12**	ND	ND	ND	ND	ND	ND	**52**	**7.2**	**73**	**42**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-2-3	5.5	ND	**2.0**	**1.3**	ND	ND	ND	ND	NA	NA	NA	NA	NA	**0.22**	**0.1**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K-2-5	10.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-2-7	15.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-6-1	1.5	**69**	**12**	ND	ND	ND	ND	ND	ND	**73**	**9.1**	**57**	**48**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-6-3	5.5	**29**	**16**	**1.3**	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K-6-5	10.5	**170**	**180**	**33**	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-6-6	15	**30**	**26**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-6-7	20.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-7-1	2.5	ND	ND	ND	ND	ND	ND	ND	ND	**120**	**12**	**63**	**54**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-7-3	5.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K-7-5	10.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-7-6	15.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-7-7	21	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-7-9	30	ND	**6.0**	**1.9**	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-7-11	34	**16**	**18**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-8-1	2	**8.3**	**3.9**	ND	ND	ND	ND	ND	ND	**140**	**13**	**78**	**80**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-8-3	5.5	**24**	**3.0**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K-8-5	10.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-8-6	15.5	ND	**1.3**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-8-8	20.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-8-9	25	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-8-10	29	**12**	**2.5**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-9-1	1.5	ND	ND	ND	ND	ND	ND	ND	ND	**100**	**9.6**	**64**	**52**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-9-3	10.5	**17**	**5.2**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K-9-5	15.5	**24**	**14**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-9-7	20.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-9-9	25.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
K-9-11	30.5	ND	ND	ND	ND	**0.015**	ND	**0.017**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP1-1	10	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP1-2	5	**17**	**1.4**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP1-3	1	**46**	**6.0**	ND	ND	ND	ND	ND	ND	**69**	**9.5**	**56**	**53**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP2-1	8.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP2-2	5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP2-3	1	ND	ND	ND	ND	ND	ND	ND	ND	**110**	**12**	**79**	**59**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP3-1	10	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP3-2	5	**16**	**1.1**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP3-3	1	ND	ND	ND	ND	ND	ND	ND	ND	**63**	**ND**	**52**	**41**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP4-1	4	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP4-2	1	ND	ND	ND	ND	ND	ND	ND	ND	**33**	**11**	**110**	**80**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP5A		**63**	**78**	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP5-1	9	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP5-2	5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP5-3	1	ND	ND	ND	ND	ND	ND	ND	ND	**87**	**11**	**95**	**46**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP6-1	10	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP6-2	5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP6-3	1	**10**	**1.3**	ND	ND	ND	ND	ND	ND	**74**	**6.9**	**43**	**54**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP7-1	6	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP7-2	5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 1
SOIL ANALYTICAL RESULTS
PHASE II ENVIRONMENTAL SITE ASSESSMENT
PETALUMA QUARRY

Concentrations in mg/kg

Sample Location	Sample Depth(ft)	Petroleum Hydrocarbons							Metals					VOCs											
		TPH-mo	TPH-d	TPH-g	B	T	E	X	Cd	Cr	Pb	Ni	Zn	Acetone	MEK	Napthalene	T	1,2,4-Tri-methylbenzene	X	sec-Butyl benzene	E	Isopropyl benzene	n-Propyl benzene	1,3,5-Tri methylbenzene	n-Butyl benzene
TP7-3	1	ND	ND	ND	ND	ND	ND	ND	ND	75	5.5	1600	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP8-1	5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP8-2	1	220	31	ND	ND	ND	ND	ND	ND	48	12	61	91	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP9-1	10	410	240	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP9-2	5	78	9.7	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP9-3	1	79	13	ND	ND	ND	ND	ND	ND	64	10	64	48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP10-1	5	2200	1400	3.3	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP10-2	1	ND	1.3	ND	0.0052	0.086	0.015	0.1	ND	140	12	66	58	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP11-1	11	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP11-2	5	ND	1.2	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	0.091	0.027	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP11-3	1	2800	6200	ND	ND	ND	ND	ND	ND	190	11	200	51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP12-1	8.5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP12-2	5	ND	ND	2.3	ND	ND	ND	0.011	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP12-3	1	21	2.1	2.0	ND	ND	ND	ND	ND	24	14	39	47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP13-1	10	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP13-2	5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP13-3	1	850	120	1.7	ND	ND	ND	ND	ND	31	14	38	45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP14-1	10	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP14-2	5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	0.11	0.031	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP14-3	1	950	91	ND	ND	ND	ND	ND	ND	34	9.5	41	44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP16-1	6	54	83	2.5	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP16-2	5	2100	8700	2200	ND	2.0	4.4	18	NA	NA	NA	NA	NA	ND	ND	8.2	1.3	13	10	1.8	2.6	1.2	2.6	3.2	ND
TP16-3	1	3400	2300	79	0.017	0.018	0.53	0.61	ND	45	6.6	67	52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP17-1	5	32	24	5.3	ND	0.0089	ND	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP17-2	1	2200	4900	420	ND	0.8	0.54	2.5	ND	31	ND	33	29	ND	ND	0.85	0.32	1.1	0.68	0.05	0.14	0.062	0.14	0.26	0.11
TP18-1	5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP18-2	1	5900	4000	110	ND	0.42	0.28	1.5	ND	38	ND	53	38	ND	ND	0.54	0.088	0.17	0.2	ND	0.045	ND	0.023	0.048	0.03
TP19-1	9	ND	1.8	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP19-2	5	ND	2.8	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP19-3	1	1300	1300	9.2	ND	ND	ND	ND	ND	100	21	94	65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP20-1	5	1000	87	12	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP20-2	1	2300	5900	15	ND	ND	ND	ND	ND	58	7.3	62	54	ND	ND	0.048	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP30-1	1	22	4.8	ND	ND	ND	ND	ND	ND	58	6.4	76	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP30-5	5	ND	1.2	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP31-1	1	13	2.1	ND	ND	0.011	ND	0.013	ND	8.8	8.9	15	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TP31-5	5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ESL - R	*	500	100	100	0.18	9.3	32	11	1.7	58	150	150	600	0.5	13	0.46	9.3	*	11	*	32	*	*	*	*
ESL - I	*	1000	500	400	0.38	9.3	32	11	7.4	58	750	150	600	0.5	13	1.5	9.3	*	11	*	32	*	*	*	*

NOTES:
The outlined cells represent a result with a concentration greater than the comparison criteria.

TPH-mo - Total Petroleum Hydrocarbons as Motor Oil
TPH-d - Total Petroleum Hydrocarbons as Diesel
TPH-g - Total Petroleum Hydrocarbons as Gasoline
mg/kg - Milligrams per kilogram
VOCs - Volatile organic compounds
ESL - Environmental Screening Level for shallow soils that are less than or equal to 3 meters below ground surface where groundwater is not a current or potential drinking water source.
ESL R - Residential threshold
ESL I - Industrial or commercial threshold

* - Not Available
ND - Not Detected
NA - Not Analyzed

Cd - Cadmium
Cr - Chromium
Pb - Lead
Ni - Nickel
Zn - Zinc

B - Benzene
T - Toluene
E - Ethylbenzene
X - Xylene

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
PHASE II ENVIRONMENTAL SITE ASSESSMENT
PETALUMA QUARRY

Sample Location	Concentrations in ug/L								
	Petroleum Hydrocarbons							VOCs	
	TPH-mo	TPH-d	TPH-g	B	T	E	X	Toluene	Trichloroethene
K-1	**470**	**60**	ND	ND	**0.88**	ND	ND	**0.83**	ND
K-2	**480**	**130**	ND	ND	ND	ND	ND	ND	**0.64**
K-9	**540**	**330**	ND	ND	ND	ND	ND	ND	**0.59**
ESL	**640**	**640**	**500**	**46**	**130**	**290**	**100**	**130**	**360**

NOTES:

TPH-mo - Total Petroleum Hydrocarbons as Motor Oil

TPH-d - Total Petroleum Hydrocarbons as Diesel

TPH-g - Total Petroleum Hydrocarbons as Gasoline

ug/L - Micrograms per liter

ND - Not Detected

VOCs - Volatile organic compounds

B - Benzene

T - Toluene

E - Ethylbenzene

X - Xylene

TABLE 3
SOIL ANALYTICAL RESULTS
SUPPLEMENTARY SOIL CHARACTERIZATION
PETALUMA QUARRY

Sample Location	Sample Depth(ft)	Concentrations in mg/kg Petroleum Hydrocarbons TPH-mo	TPH-d	TPH-g	B	T	E	X
TP40-1	1	**2100**	**4800**	**51**	ND	ND	ND	ND
TP40-2	3	**70**	**150**	**3.7**	ND	ND	ND	**0.014**
TP41-1	1	NA	NA	NA	NA	NA	NA	NA
TP41-2	3	NA	NA	NA	NA	NA	NA	NA
TP41-3	5	ND	ND	NA	NA	NA	NA	NA
TP42-1	1	NA	NA	NA	NA	NA	NA	NA
TP42-2	3	ND	ND	NA	NA	NA	NA	NA
TP43-1	1	**17**	**4.5**	NA	NA	NA	NA	NA
TP43-2	3	ND	ND	NA	NA	NA	NA	NA
TP44-1	1	**8.1**	**2.2**	NA	NA	NA	NA	NA
TP45-1	1	NA	NA	NA	NA	NA	NA	NA
TP45-2	3	NA	NA	NA	NA	NA	NA	NA
TP46-1	1.5	ND	ND	NA	NA	NA	NA	NA
TP47-1	1	NA	NA	NA	NA	NA	NA	NA
TP47-2	3	NA	NA	NA	NA	NA	NA	NA
TP48-1	1	**250**	**390**	NA	NA	NA	NA	NA
TP48-2	2.5	ND	**1.3**	NA	NA	NA	NA	NA
TP49-1	0.5	NA	NA	NA	NA	NA	NA	NA
TP49-2	2.5	NA	NA	NA	NA	NA	NA	NA
TP50-1	1	NA	NA	NA	NA	NA	NA	NA
TP50-2	3	ND	**1.0**	NA	NA	NA	NA	NA
TP50-3	4.5	**1300**	**2500**	NA	NA	NA	NA	NA
TP51-1	1	**20**	**3.4**	ND	ND	ND	ND	ND
TP51-2	3	**12**	**3**	ND	ND	ND	ND	ND
TP52-1	1	NA	NA	NA	NA	NA	NA	NA
TP52-2	2	NA	NA	NA	NA	NA	NA	NA
TP52-3	3	NA	NA	NA	NA	NA	NA	NA
TP52-4	5	NA	NA	NA	NA	NA	NA	NA
TP53-1	1	**56**	**3**	NA	NA	NA	NA	NA
TP53-2	3	NA	NA	NA	NA	NA	NA	NA
TP53-3	5	NA	NA	NA	NA	NA	NA	NA
TP54-1	1	**5.4**	**1.2**	NA	NA	NA	NA	NA
TP54-2	3	ND	ND	NA	NA	NA	NA	NA
TP54-3	5	ND	ND	NA	NA	NA	NA	NA
TP55-1	0.5	NA	NA	NA	NA	NA	NA	NA
TP55-2	1.5	NA	NA	NA	NA	NA	NA	NA
TP56-1	0.5	NA	NA	NA	NA	NA	NA	NA
TP56-2	2	NA	NA	NA	NA	NA	NA	NA
TP56-3	3	NA	NA	NA	NA	NA	NA	NA
TP57-1	1.5	ND	**2.1**	NA	NA	NA	NA	NA
TP57-2	3	ND	ND	NA	NA	NA	NA	NA
TP58-1	1	NA	NA	NA	NA	NA	NA	NA
TP58-2	2	NA	NA	NA	NA	NA	NA	NA
TP59-1	2	NA	NA	NA	NA	NA	NA	NA
TP59-2	3	NA	NA	NA	NA	NA	NA	NA
TP60-1	1	NA	NA	NA	NA	NA	NA	NA
TP60-2	3	NA	NA	NA	NA	NA	NA	NA
TP60-3	5	NA	NA	NA	NA	NA	NA	NA
ESL - R	*	**500**	**100**	**100**	**0.18**	**9.3**	**32**	**11**
ESL - I	*	**1000**	**500**	**400**	**0.38**	**9.3**	**32**	**11**

NOTES:
The outlined cells represent a result with a concentration greater than the comparison criteria.
TPH-mo - Total Petroleum Hydrocarbons as Motor Oil
TPH-d - Total Petroleum Hydrocarbons as Diesel
TPH-g - Total Petroleum Hydrocarbons as Gasoline
mg/kg - Milligrams per kilogram
* - Not Applicable
ND - Not Detected
NA - Not Analyzed
ESL - Environmental Screening Level for shallow soils that are less than or equal to 3 meters below ground surface where groundwater is not a current or potential drinking water source.
ESL R - Residential threshold
ESL I - Industrial or commercial threshold

TABLE 4
SOIL ANALYTICAL RESULTS
SUPPLEMENTAL SOIL INVESTIGATION
PETALUMA QUARRY

Sample Location	Sample ID	Sample Date	Sample Depth (inches bgs)	Analytical Results (mg/kg)			
				PCBs	Total PAHs	Arsenic	Hexavalent Chromium
DG-1	DG-1-2"	04/27/05	2 to 8	ND (<0.025)	ND (<0.005)	**1.3**	-
	DG-1-1'	04/27/05	12 to 18	ND (<0.025)	ND (<0.010)	**1.9**	-
DG-2	DG-2-2"	04/27/05	2 to 8	ND (<0.50)	ND (<0.50)	**4.2**	ND (<0.8)
	DG-2-1'	04/27/05	12 to 18	ND (<0.025)	ND (<0.050)	**3.0**	ND (<0.8)
DG-3	DG-3-2"	04/27/05	2 to 8	ND (<0.025)	ND (<0.050)	**3.0**	-
	DG-3-1'	04/27/05	12 to 18	ND (<0.025)	ND (<0.005)	**1.2**	-
DG-4	DG-4-2"	04/27/05	2 to 8	ND (<0.025)	ND (<0.050)	**2.3**	ND (<0.8)
	DG-4-1'	04/27/05	12 to 18	ND (<0.025)	ND (<0.050)	**3.6**	ND (<0.8)
DG-5	DG-5-2"	04/27/05	2 to 8	ND (<0.025)	ND (<0.005)	**1.9**	-
	DG-5-1'	04/27/05	12 to 18	ND (<0.025)	ND (<0.005)	**1.4**	-
DG-6	DG-6-2"	04/27/05	2 to 8	ND (<0.25)	ND (<0.50)	**4.7**	-
	DG-6-1'	04/27/05	12 to 18	ND (<0.12)	ND (<0.50)	**5.5**	-
DG-7	DG-7-2"	04/27/05	2 to 8	ND (<0.025)	ND (<0.010)	**2.3**	-
	DG-7-1'	04/27/05	12 to 18	ND (<0.12)	ND (<0.050)	**10**	-
DG-8	DG-8-2"	04/27/05	2 to 8	ND (<0.025)	ND (<0.050)	**2.2**	-
	DG-8-1'	04/27/05	12 to 18	ND (<0.025)	ND (<0.005)	**1.8**	-
DG-9	DG-9-2"	04/27/05	2 to 8	ND (<0.50)	ND (<0.50)	**3.6**	-
	DG-9-1'	04/27/05	12 to 18	ND (<0.25)	ND (<0.50)	**3.9**	-
DG-10	DG-10-2"	04/27/05	2 to 8	ND (<0.025)	ND (<0.005)	**5.2**	-
	DG-10-1'	04/27/05	12 to 18	ND (<0.025)	ND (<0.005)	**3.3**	-
DG-11	DG-11-2"	04/27/05	2 to 8	ND (<0.50)	ND (<0.50)	**1.8**	-
	DG-11-1'	04/27/05	12 to 18	ND (<0.12)	ND (<0.50)	**1.4**	-
ESL-R	N/A	N/A	N/A	0.22	*	5.5	1.8

NOTES:

* Comparison criteria are only available for individual constituents.

The outlined cells represent a result with a concentration greater than the comparison criteria.

< = Symbol indicates not detected at or above laboratory reporting limit as noted.

- = Not Analyzed.

PAHs = Polynuclear aromatic hydrocarbons.

PCBs = Polychlorinated biphenyls.

bgs = Below ground surface.

mg/kg = Milligrams per kilogram.

N/A = Not applicable.

ND = Not detected.

Comparison Criteria

ESL-R - San Francisco Regional Water Quality Control Board Environmental Screening Level (ESL) for shallow soil less than or equal to three meters below ground surface in a residential land use setting where groundwater is not a current or potential drinking water source.

APPENDIX A

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Project No. 48912-4 **Date** December 13, 2004

Client South Petaluma Partners, LLC **Address** 305 North Harbor Blvd, Suite 303, Fullerton, California 92832

Site Contact Ryan Padgett **Site Phone No.** (707) 696-1921

Job Location 1500 and 1600 Petaluma Blvd. Petaluma, California

Work Objectives Excavate and dispose of petroleum-impacted soil, and obtain confirmation soil samples for analysis

Key Individuals: **Project Manager** Michael G. Burns

Site Health and Safety Ryan Padgett

Prepared by Ryan Padgett **Reviewer/Approver**

Hospital/Clinic Petaluma Valley Hospital

Phone No. (707) 778-2780

Address: 400 North McDowell Blvd.

Paramedic 911 **Fire Dept.** 911 **Police Dept.** 911

Emergency/Contingency Plans: Call 911, or drive to hospital

15 Minute Eyewash required **Fire Extinguisher** required **First Aid Kit** required

Site Control Measures: Barrier tape and appropriate warning signs will be installed around immediate excavation area to control Site access

Personal Decontamination Procedures: Soap and water

CHEMICAL HAZARDS

(also see attached list)

Chemical Name (CAS#)	Maximum Expected Concentration	Health Hazards
TPH-d (diesel)	Soil: 8,700 mg/kg Water: NA	Acute: skin, eye, and respiratory irritation; headache, dizziness. Chronic: n/a
TPH-mo (motor oil)	Soil: 5,900 mg/kg Water: NA	Acute: skin, eye, and respiratory irritation; headache, dizziness. Chronic: n/a

PHYSICAL HAZARDS

_____ Heat	__x__ Slip, Trip, Fall	__x__ Excavations/Trench
_____ Cold	_____ Electrical Hazards	__x__ Moving Equipment
_____ Wet	_____ Underground Hazards	_____ Confined Space
__x__ Noise	_____ Overhead Hazards	

_____ Other _____

PERSONAL PROTECTIVE EQUIPMENT

R = Required A = As Needed

__R__ Hard Hat	__R__	Safety Eyegear: glasses w/ side protection	
__R__ Safety Boots	__A__	Respirator (Type): Full-face	Half-face
__R__ Orange Vest	____	Filter Type: Organic vapor	Acid gas HEPA
__R__ Hearing Protection	__R__	Gloves (Type): Neoprene PVC	Nitrile
____ Tyvek Coveralls	__R__	Other Mobile phone	
____ 5 Minute Escape Respirator			

In general, if air monitoring readings in workers' breathing zone exceed 5 ppm for 60 seconds or longer, upgrade to Level C (respirator, etc.) or vacate the immediate area.

MONITORING EQUIPMENT

_____	Organic Vapor Analyzer (FID)	__x__	PID with lamp of 10.6 eV, (in PPM)
_____	Oxygen Meter	_____	Detector Tube (specify)_____
_____	Combustible Gas Meter	_____	Passive Dosimeter

COMMON CHEMICAL HAZARDS

Chemical Name	Maximum Expected Concentration	Health Hazards
Fuel Hydrocarbons (i.e. gasoline); TPH-gasoline	Soil: 2,200 mg/kg Water: NA	Acute: Headache, nausea, dizziness, skin/eye irritation, blurred vision, abdominal pains, vertigo, diarrhea, and convulsions. Chronic: n/a
Total Petroleum Hydrocarbons (Diesel and other petroleum hydrocarbons); TPD-diesel	Soil: 8,700 mg/kg Water: NA	Acute: skin, eye, and respiratory irritation; headache, dizziness. Chronic: n/a
Benzene	Soil: 0.017 mg/kg Water: NA	Acute: Abdominal pain, headache, dizziness. Chronic: **Carcinogen**, anemia, leukemia,
Toluene	Soil: 2.0 mg/kg Water: NA	Acute: Dermatitis (skin), respiratory irritant, headache, dizziness Chronic: n/a
Ethylbenzene	Soil: 4.4 mg/kg Water: NA	Acute: Skin/eye irritant, headache, dizziness Chronic: n/a
Xylenes	Soil: 18 mg/kg Water: NA	Acute: Skin/eye irritant, headache, dizziness, drowsy Chronic: n/a
Dichloroethane, 1,2- (1,2 DCA, ethylene dichloride)	Soil: NA Water: NA	Acute: Dermatitis (skin), respiratory and eye irritation, headache Chronic: Probable carcinogen, damage to liver and kidneys
Trichloroethene	Soil: NA Water: NA	Acute: dermatitis, headache, respiratory irritation, heart sensitizer Chronic: Carcinogen
Dichloroethylene, 1,2-	Soil: NA Water: NA	Acute: headache, dizziness, dermatitis, respiratory irritant Chronic: Damage lungs, liver, heart
Dichloroethane, 1,1-	Soil: NA Water: NA	Acute: headache, dizziness, dermatitis, respiratory irritant Chronic: n/a

Other Chemicals Not On List: Contact Health and Safety Manager

ONSITE SAFETY MEETING ATTENDEES

Signature	Name (Printed)/Title	Date

APPENDIX B

TABLE B: SHALLOW SOIL (≤3M BGS) - WATER IS NOT A CURRENT OR POTENTIAL SOURCE OF DRINKING WATER

Notes:

- Always compare final soil data for commercial/industrial sites to residential ESLs and evaluate need for formal land-use restrictions (see Section 2.10).
- Assumption that groundwater is not a current or potential source of drinking water should be approved by overseeing regulatory agency prior to use of this table (see Section 2.4).

TABLE B. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Shallow Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
ACENAPHTHENE	1.9E+01	1.9E+01	2.3E+01
ACENAPHTHYLENE	1.3E+01	1.3E+01	3.0E+01
ACETONE	5.0E-01	5.0E-01	1.5E+03
ALDRIN	3.2E-02	1.3E-01	1.3E-01
ANTHRACENE	2.8E+00	2.8E+00	7.3E-01
ANTIMONY	6.1E+00	4.0E+01	3.0E+01
ARSENIC	5.5E+00	5.5E+00	3.6E+01
BARIUM	7.5E+02	1.5E+03	1.0E+03
BENZENE	1.8E-01	3.8E-01	4.6E+01
BENZO(a)ANTHRACENE	3.8E-01	1.3E+00	2.7E-02
BENZO(b)FLUORANTHENE	3.8E-01	1.3E+00	2.9E-02
BENZO(k)FLUORANTHENE	3.8E-01	1.3E+00	4.0E-01
BENZO(g,h,i)PERYLENE	2.7E+01	2.7E+01	1.0E-01
BENZO(a)PYRENE	3.8E-02	1.3E-01	1.4E-02
BERYLLIUM	4.0E+00	8.0E+00	2.7E+00
BIPHENYL, 1,1-	6.5E+00	6.5E+00	5.0E+00
BIS(2-CHLOROETHYL)ETHER	3.7E-03	1.2E-02	6.1E+01
BIS(2-CHLOROISOPROPYL)ETHER	6.6E-01	6.6E-01	6.1E+01
BIS(2-ETHYLHEXYL)PHTHALATE	1.6E+02	5.3E+02	3.2E+01
BORON	1.6E+00	2.0E+00	1.6E+00
BROMODICHLOROMETHANE	1.4E-02	3.9E-02	1.7E+02
BROMOFORM	6.1E+01	6.9E+01	3.2E+03
BROMOMETHANE	2.2E-01	5.1E-01	1.6E+02
CADMIUM	1.7E+00	7.4E+00	1.1E+00
CARBON TETRACHLORIDE	1.2E-02	3.4E-02	9.3E+00
CHLORDANE	4.4E-01	1.7E+00	4.0E-03
CHLOROANILINE, p-	5.3E-02	5.3E-02	5.0E+00
CHLOROBENZENE	1.5E+00	1.5E+00	2.5E+01
CHLOROETHANE	6.3E-01	8.5E-01	1.2E+01
CHLOROFORM	8.8E-01	1.9E+00	3.3E+02
CHLOROMETHANE	7.0E-02	2.0E-01	4.1E+01
CHLOROPHENOL, 2-	1.2E-01	1.2E-01	1.8E+00
CHROMIUM (Total)	5.8E+01	5.8E+01	1.8E+02
CHROMIUM III	7.5E+02	7.5E+02	1.8E+02
CHROMIUM VI	1.8E+00	1.8E+00	1.1E+01
CHRYSENE	3.8E+00	1.3E+01	3.5E-01
COBALT	1.0E+01	1.0E+01	3.0E+00
COPPER	2.3E+02	2.3E+02	3.1E+00
CYANIDE (Free)	3.6E-03	3.6E-03	1.0E+00
DIBENZO(a,h)ANTHTRACENE	1.1E-01	3.8E-01	2.5E-01
DIBROMOCHLOROMETHANE	1.9E-02	5.4E-02	1.7E+02
1,2-DIBROMO-3-CHLOROPROPANE	4.5E-03	4.5E-03	2.0E-01
DIBROMOETHANE, 1,2-	7.3E-03	2.0E-02	1.5E+02
DICHLOROBENZENE, 1,2-	1.6E+00	1.6E+00	1.4E+01

TABLE B. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Shallow Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
DICHLOROBENZENE, 1,3-	7.4E+00	7.4E+00	6.5E+01
DICHLOROBENZENE, 1,4-	4.6E-02	1.3E-01	1.5E+01
DICHLOROBENZIDINE, 3,3-	4.0E-01	1.4E+00	2.5E+02
DICHLORODIPHENYLDICHLOROETHANE (DDD)	2.3E+00	9.0E+00	1.0E-03
DICHLORODIPHENYLDICHLOROETHYLENE (DDE)	1.6E+00	4.0E+00	1.0E-03
DICHLORODIPHENYLTRICHLOROETHANE (DDT)	1.6E+00	4.0E+00	1.0E-03
DICHLOROETHANE, 1,1-	3.2E-01	8.9E-01	4.7E+01
DICHLOROETHANE, 1,2-	2.5E-02	7.0E-02	2.0E+02
DICHLOROETHYLENE, 1,1-	4.3E+00	4.3E+00	2.5E+01
DICHLOROETHYLENE, Cis 1,2-	1.6E+00	3.6E+00	5.9E+02
DICHLOROETHYLENE, Trans 1,2-	3.1E+00	7.3E+00	5.9E+02
DICHLOROPHENOL, 2,4-	3.0E+00	3.0E+00	3.0E+00
DICHLOROPROPANE, 1,2-	5.1E-02	1.4E-01	1.0E+02
DICHLOROPROPENE, 1,3-	3.3E-02	9.3E-02	5.3E+01
DIELDRIN	2.3E-03	2.3E-03	1.9E-03
DIETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHENOL, 2,4-	7.4E-01	7.4E-01	1.1E+02
DINITROPHENOL, 2,4-	2.1E-01	2.1E-01	7.5E+01
DINITROTOLUENE, 2,4-	8.6E-01	8.6E-01	1.2E+02
1,4 DIOXANE	1.8E+01	3.0E+01	5.0E+04
DIOXIN (2,3,7,8-TCDD)	4.6E-06	1.9E-05	5.0E-06
ENDOSULFAN	4.6E-03	4.6E-03	8.7E-03
ENDRIN	6.5E-04	6.5E-04	2.3E-03
ETHANOL	4.5E+01	4.5E+01	5.0E+04
ETHYLBENZENE	3.2E+01	3.2E+01	2.9E+02
FLUORANTHENE	4.0E+01	4.0E+01	8.0E+00
FLUORENE	8.9E+00	8.9E+00	3.9E+00
HEPTACHLOR	1.4E-02	1.4E-02	3.8E-03
HEPTACHLOR EPOXIDE	1.5E-02	1.5E-02	3.8E-03
HEXACHLOROBENZENE	2.7E-01	9.6E-01	3.7E+00
HEXACHLOROBUTADIENE	3.7E+00	2.2E+01	4.7E+00
HEXACHLOROCYCLOHEXANE (gamma) LINDANE	4.9E-02	4.9E-02	8.0E-02
HEXACHLOROETHANE	1.2E+01	4.1E+01	1.2E+01
INDENO(1,2,3-cd)PYRENE	3.8E-01	1.3E+00	2.9E-02
LEAD	1.5E+02	7.5E+02	2.5E+00
MERCURY	3.7E+00	1.0E+01	1.2E-02
METHOXYCHLOR	1.9E+01	1.9E+01	1.9E-02
METHYLENE CHLORIDE	5.2E-01	1.5E+00	2.2E+03
METHYL ETHYL KETONE	1.3E+01	1.3E+01	1.4E+04
METHYL ISOBUTYL KETONE	3.9E+00	3.9E+00	1.7E+02
METHYL MERCURY	1.2E+00	1.0E+01	3.0E-03
METHYLNAPHTHALENE (total 1- & 2-)	2.5E-01	2.5E-01	2.1E+00
METHYL TERT BUTYL ETHER	2.0E+00	5.6E+00	1.8E+03

TABLE B. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

	[1]Shallow Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
MOLYBDENUM	4.0E+01	4.0E+01	2.4E+02
NAPHTHALENE	4.6E-01	1.5E+00	2.4E+01
NICKEL	1.5E+02	1.5E+02	8.2E+00
PENTACHLOROPHENOL	4.4E+00	5.0E+00	7.9E+00
PERCHLORATE	1.2E+00	1.2E+00	6.0E+02
PHENANTHRENE	1.1E+01	1.1E+01	4.6E+00
PHENOL	1.9E+01	1.9E+01	1.3E+03
POLYCHLORINATED BIPHENYLS (PCBs)	2.2E-01	7.4E-01	1.4E-02
PYRENE	8.5E+01	8.5E+01	2.0E+00
SELENIUM	1.0E+01	1.0E+01	5.0E+00
SILVER	2.0E+01	4.0E+01	1.9E-01
STYRENE	1.5E+01	1.5E+01	1.0E+02
tert-BUTYL ALCOHOL	5.7E+01	1.1E+02	1.8E+04
TETRACHLOROETHANE, 1,1,1,2-	3.0E+00	6.9E+00	9.3E+02
TETRACHLOROETHANE, 1,1,2,2-	9.1E-03	2.5E-02	1.9E+02
TETRACHLOROETHYLENE	8.7E-02	2.4E-01	1.2E+02
THALLIUM	1.0E+00	1.3E+01	2.0E+01
TOLUENE	9.3E+00	9.3E+00	1.3E+02
TOXAPHENE	4.2E-04	4.2E-04	2.0E-04
TPH (gasolines)	1.0E+02	4.0E+02	5.0E+02
TPH (middle distillates)	1.0E+02	5.0E+02	6.4E+02
TPH (residual fuels)	5.0E+02	1.0E+03	6.4E+02
TRICHLOROBENZENE, 1,2,4-	3.8E-01	1.0E+00	2.5E+01
TRICHLOROETHANE, 1,1,1-	7.8E+00	7.8E+00	6.2E+01
TRICHLOROETHANE, 1,1,2-	3.2E-02	8.9E-02	3.5E+02
TRICHLOROETHYLENE	2.6E-01	7.3E-01	3.6E+02
TRICHLOROPHENOL, 2,4,5-	1.8E-01	1.8E-01	1.1E+01
TRICHLOROPHENOL, 2,4,6-	6.9E+00	1.0E+01	4.9E+02
VANADIUM	1.1E+02	2.0E+02	1.9E+01

TABLE B. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS NOT a Current or Potential Source of Drinking Water

CHEMICAL PARAMETER	[1]Shallow Soil		[3]Groundwater (ug/L)
	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	
VINYL CHLORIDE	6.7E-03	1.9E-02	3.8E+00
XYLENES	1.1E+01	1.1E+01	1.0E+02
ZINC	6.0E+02	6.0E+02	8.1E+01
Electrical Conductivity (mS/cm, USEPA Method 120.1 MOD)	2.0	4.0	not applicable
Sodium Adsorption Ratio	5.0	12	not applicable

Red: Updated with respect to ESLs presented in July 2003 document.

Notes:

1. Shallow soils defined as soils less than or equal to 3 meters (approximately 10 feet) below ground surface.
2. Category "Residential Land Use" generally considered adequate for other sensitive uses (e.g., day-care centers, hospitals, etc.)
3. Assumes potential discharge of groundwater into marine or estuary surface water system.

Source of soil ESLs: Refer to Appendix 1, Tables A-1 and A-2.

Source of groundwater ESLs: Refer to Appendix 1, Table F-1b.

Soil data should be reported on dry-weight basis (see Appendix 1, Section 6.2).

Soil ESLs intended to address direct-exposure, groundwater protection, ecologic (urban areas) and nuisance concerns under noted land-use scenarios. **Soil gas data should be collected for additional evaluation of potential indoor-air impacts at at sites with significant areas of VOC-impacted soil. See Section 2.6 and Table E.**

Groundwater ESLs intended to address surface water, indoor-air and nuisance concerns. **Use in conjunction with soil gas screening levels to more closely evaluate potential impacts to indoor-air if groundwater screening levels for this concern approached or exceeded (refer to Section 2.6 and Appendix 1, Table F-1a).**

Aquatic habitat goals for bioaccumulation concerns not considered in selection of groundwater goals (refer to Section 2.7).

Refer to appendices for summary of ESL components.

Soil and water ESLs for ethanol based on gross contamination concerns (see Appendix 1, Chapter 5 and related tables).

TPH -Total Petroleum Hydrocarbons. TPH ESLs must be used in conjunction with ESLs for related chemicals (e.g., BTEX, PAHs, oxidizers, etc.). See Volume 1, Section 2.2 and Appendix 1, Chapter 5.