Work Plan for Additional Investigation at the Asphalt Plant Hanson Aggregates Mission Valley Rock Facility 7999 Athenour Way Sunol, Alameda County, California

January 17, 2006
001-09480-00

Prepared for
Hanson Aggregates Mid-Pacific Inc.
3555 Vineyard Avenue
Oxnard, California 93030

Prepared by
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January 17, 2006 001-09480-00

Mr. Jerry Wickham
Alameda County Health Care Services
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: Work Plan for Additional Investigation at the Asphalt Plant, Hanson Aggregates Mission Valley Rock Facility, 7999 Athenour Way, Sunol, Alameda County, California

Dear Mr. Wickham:

This investigation Work Plan was prepared by LFR Inc. (LFR) on behalf of Hanson Aggregates Mid-Pacific Inc. ("Hanson") for the Asphalt Plant Site at the Mission Valley Rock Facility, located at 7999 Athenour Way in Sunol, Alameda County, California ("the Site").

This Work Plan was prepared in substantial response to your comment letter to Mr. Calvert of Mission Valley Rock Company, entitled "Fuel Leak Case No. RO0000207, Mission Valley Rock and Asphalt, 7999 Athenour Way, Sunol, CA," and dated November 3, 2005.

The purpose of this Work Plan is to outline the scope of work proposed to help further delineate the lateral and vertical extent of affected groundwater beneath the asphalt plant, and to provide information to aid in making a decision about any further action, if any, that may be necessary. As you requested, an initial detailed Site Conceptual Model was prepared and is submitted as part of this Work Plan.

Please note the following. An electronic submittal of this Work Plan to the GeoTracker website will be made as soon as the Regional Water Quality Control Board confirms LFR's request to be an authorized representative for uploads. The requested cross sections are not included in this Work Plan, but will be included in a summary report following the investigative work. We look forward to discussing the proposed work with you following your review of the Site Conceptual Model and Work Plan.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report are true and correct to the best of my knowledge.

If you have any questions or comments concerning this Work Plan, please call Steve Zacks at (805) 985-2191 or Bill Carson at (510) 652-4500.

Sincerely,

Steve Zacks
Environmental Manager
Hanson Aggregates Mid-Pacific Inc.

Attachment

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CERTIFICATIONS

LFR Inc. has prepared this Asphalt Plant Area Investigation Work Plan on behalf of Hanson Aggregates Mid-Pacific Inc. in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and environmental scientists. This investigation work plan was prepared under the technical direction of the undersigned California Professional Engineer and California Professional Geologist.

1/17/06

William L. Carson, P.E. Date
Principal Engineer
California Professional Engineer No. C60735

1/17/06

Katrin M. Schliewen, P.G. Date
Senior Project Hydrogeologist
California Professional Geologist No. 7808

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1.0 INTRODUCTION

LFR Inc. (LFR) has prepared this Work Plan for Additional Investigation at the Asphalt Plant ("Work Plan") on behalf of Hanson Aggregates Mid-Pacific Inc. ("Hanson") for the facility located at 7999 Athenour Way in Sunol, Alameda County, California (Figure 1). The Work Plan has been prepared to meet the requirements of the Alameda County Environmental Health (ACEH) letter to Mission Valley Rock Company ("Mission Valley"), dated November 3, 2005. The Asphalt Plant is located within the approximately 588-acre property ("the Site") owned and operated by Mission Valley since the 1950s, and recently purchased by Hanson.

The Site is operated as a sand and gravel quarry with an asphalt manufacturing facility and ready mix concrete plant. Additionally, various areas throughout the Site are leased for industrial, agricultural, and storage purposes. The Site was acquired by Hanson from Mission Valley in early 2005. The Asphalt Plant has been in operation at the Site since approximately 1980. From 1980 to 1996 the Asphalt Plant was fueled by two 10,000-gallon diesel fuel underground storage tanks (USTs), and a 2,000-gallon gasoline UST with fuel dispenser was used to fuel company vehicles. During the removal of these three USTs in June 1996, an impact to soil and groundwater was found. Several investigations have been completed by multiple consultants from 1996 through 2005 in the vicinity of the Asphalt Plant.

Tait Environmental Management, Inc. ("Tait") conducted a Site Assessment (SA) in December 2002 and has conducted Quarterly Groundwater Monitoring and Reporting (QMR) at the Site under the oversight of the ACEH. The existing groundwater monitoring wells and grab groundwater collection point locations are shown on Figure 2. Results of the SA and QMR have revealed the presence of petroleum hydrocarbons (gasoline and diesel); volatile organic compounds (VOCs), including benzene, toluene, ethylbenzene, and xylenes (BTEX); and methyl tertiary-butyl ether (MtBE) at the Asphalt Plant in the vicinity of three former USTs.

1.1 Investigation Objectives

Based on the ACEH comment letter and the most recently available analytical data (through third quarter 2005), the objectives of this investigation are to better define the lateral and vertical extent of affected groundwater in the vicinity of the Asphalt Plant and to evaluate the groundwater flow conditions. LFR proposes to conduct an additional investigation at the Asphalt Plant, consisting of the installation of four new triple-nested groundwater monitoring wells (MW-9 through MW-12) and collecting groundwater samples. The scope of work proposed to meet these objectives is detailed below, and the proposed monitoring well locations are shown on Figure 2.

In addition, at the request of the ACEH, a detailed initial Site Conceptual Model (SCM) was developed and is included in Appendix B of this Work Plan. The SCM will be modified and refined in the report summarizing the result of this work.

2.0 SUBSURFACE IMPACTS AND AGENCY DETERMINATION

LFR obtained information on prior assessments at the Asphalt Plant from a review of various documents, including the following reports:

- Geotechnical and Geologic Investigation issued by Treadwell & Rollo, entitled "Geotechnical and Geologic Investigation, North Quarry, Sunol, California," dated August 9, 1991.
- Site Assessment Report, issued by Tank Protect Engineering (TPE), entitled "Preliminary Site Assessment Report, Mission Valley Rock, 7999 Athenour Way, Sunol, California," dated October 30, 1998.
- Site Assessment and Groundwater Monitoring Report, issued by Tait, entitled "Site Assessment and 4Q 2002 GW monitoring Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California," dated March 23, 2003.
- Groundwater Monitoring Report, issued by Tait, entitled "Fourth Quarter 2005 Groundwater Monitoring Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California," dated February 15, 2004.
- Work Plan, issued by Tait, entitled "Workplan to Perform Additional Subsurface Site Assessment for the Mission Valley Rock Company Facility Located at 7999 Athenour Way, Sunol, California" dated September 30, 2004.
- Site Assessment and Groundwater Monitoring Report, issued by Tait, entitled "Site Assessment and First Quarter 2005 Groundwater Monitoring and Sampling Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California," dated April 1, 2005.
- Groundwater Monitoring Report, issued by Tait, entitled "Second Quarter 2005 Groundwater Monitoring and Sampling Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California," dated July 29, 2005.
- Groundwater Monitoring Report, issued by Tait, entitled "Third Quarter 2005 Groundwater Monitoring and Sampling Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California," dated October 14, 2005.

2.1 Prior Soil and Groundwater Assessments and Current Impact

2.1.1 Removal of USTs

Three USTs, including two 10,000-gallon diesel USTS and one 2,000-gallon gasoline UST, and associated pump island, piping, and appurtenances were removed in 1996

(TPE 1996). A fourth 10,000-gallon diesel UST removed earlier is not believed to have released significant quantities of petroleum hydrocarbons to the environment. The USTs reportedly were in good condition with no holes evident, however a hole was observed in a fuel line. The approximate locations of the former USTs are shown on Figure 2.

As further described in the SCM (Appendix B), incidental releases of diesel fuel and gasoline (including gasoline containing MtBE) likely occurred at the Site and have impacted the subsurface beneath the Asphalt Plant.

2.1.2 Groundwater Monitoring

Groundwater monitoring of monitoring wells MW-1 through MW-3 was performed approximately quarterly from June 1998 through December 2003. Groundwater monitoring at the Asphalt Plant resumed in January 2005, at which time monitoring well MW-2 was abandoned and replaced with monitoring wells MW-2S/2M/2D, and monitoring wells MW-4 through MW-8 were installed as multiple-completion monitoring wells (except monitoring well MW-8, which was installed as a single-completion monitoring well). In addition, grab groundwater samples were collected from 10 soil boring locations in December 2002 (Tait 2003). A summary of historical analytical data from the routine groundwater monitoring and from the grab groundwater sampling conducted by Tait is included in Appendix A.

2.1.3 Impacts to Groundwater

Based on prior soil and groundwater assessments, the groundwater beneath the Asphalt Plant is affected by elevated dissolved concentrations of total petroleum hydrocarbons (TPH) as gasoline (TPHg), TPH as diesel (TPHd), BTEX, and MtBE (Appendix A). As further described in the SCM, the TPHg and MtBE concentrations are associated with the former gasoline UST, while the TPHd is associated with the two former diesel USTs. Free product was measured in former monitoring well MW-2 beginning in June 1998 through June 2002, and sheen and/or odor were observed in monitoring wells MW-1 and MW-3 during 1999 and 2000. The presence of free product has not been observed since September 2002. Historically, the highest TPHg and TPHd concentrations have been detected in former monitoring well MW-2, in conjunction with the free product observed. More recently, the highest TPHg and TPHd concentrations by far have been detected in monitoring wells MW-7S and MW-7D. MtBE has been detected in each monitoring well except MW-4 and MW-8.

The extent of impact to groundwater has not been fully delineated in lateral or vertical directions. As further described in the SCM, the petroleum hydrocarbons and associated compounds being detected in groundwater samples likely were carried in a number of directions by the changing groundwater gradients across the Site. Residual free product (source material) left in the site subsurface is likely trapped in isolated pockets.

2.2 Agency Determination

The lead agency overseeing the site cleanup is the ACEH (Fuel Leak Case No. RO0000207). On November 3, 2005, the ACEH issued a comment letter based on its review of Tait's first and second quarter 2005 groundwater monitoring reports (Tait 2005a and 2005b). In this letter, the ACEH requested additional investigative work on the Site to help delineate the lateral and vertical extent of affected groundwater in the Asphalt Plant area. In addition, the ACEH requested that an initial SCM be developed to better understand the site conditions and fate and transport of the petroleum hydrocarbons and associated MtBE detected in groundwater beneath the Asphalt Plant. The analytical results from groundwater samples collected during the additional investigative work will provide information that will be used to refine the SCM and to aid in making a decision about any further action that may be necessary to address the groundwater contamination.

3.0 SITE CONCEPTUAL MODEL

As requested by the ACEH, an SCM has been prepared for the former fuel dispensing facility at the Hanson sand and gravel quarry (Appendix B). The former fuel dispensing facility was located in the Asphalt Plant area of the quarry (Figure 2). The purpose of the SCM is to provide a framework for understanding site conditions with respect to the fate and transport of chemicals of potential concern (COPCs). The SCM will be refined as additional subsurface information is collected, including information from the work proposed in this Work Plan.

The detailed SCM is presented in Appendix B of the Work Plan. A brief summary of the SCM is provided below.

As is described in detail in Appendix B, incidental releases of gasoline (some containing MtBE) and diesel fuel during fueling and tank filling operations over a 17-year period released petroleum hydrocarbons into the site subsurface. The subsurface consists of 10 to 20 feet of relatively less pervious silts, clays, and clayey gravels overlying an unknown depth (but likely 20 to 30 feet) of clean gravels that are the main water-bearing stratum in the Sunol groundwater basin. The Livermore Formation, which underlies the main water-bearing stratum, is relatively impervious compared to the overlying strata.

The groundwater flow regime in the vicinity of the former USTs is affected by the presence of former gravel pits, now filled with low permeability silts, which act both as groundwater barriers and also concentrate surface-water recharge into areas of the Site that have not been mined (causing groundwater mounding in native soil areas that are adjacent to filled pits).

Historically, groundwater gradients were probably influenced by the presence of open gravel pits, which would have acted as groundwater sinks. During the 10 years since

the USTs were removed from the Site, the high flux of groundwater in the main water-bearing stratum would likely have flushed most of the released petroleum that reached the stratum out of the vicinity of the tanks. This flushing and biological degradation of the released chemicals has likely attenuated the petroleum concentrations in the main water-bearing stratum outside the immediate vicinity of the tanks to levels that would not be detectable using current analytical methods. The remaining residual petroleum has likely been smeared across the upper 20 feet of the site subsurface where some of it remains in discontinuous pockets of free product.

4.0 PROPOSED INVESTIGATION IMPLEMENTATION

4.1 Pre-Field Activities

4.1.1 Permitting

LFR will apply for the required well permits with the County of Alameda Public Works Agency for installation of the monitoring wells. Based on the proposed locations of the monitoring wells, the procurement of any encroachment permits with the City of Sunol does not appear to be required.

4.1.2 Subsurface Utility Clearance

Prior to intrusive fieldwork, subsurface utility clearance will be obtained by utilizing geophysical resources, Underground Service Alert, and historical utility records. LFR will hire a qualified subsurface utility locating contractor to identify possible subsurface obstructions and utilities, using a combination of ground penetrating radar and an appropriate pipe/cable locating system. If utilities are located, the monitoring well will be relocated and the clearance procedure will be repeated for the new location. A copy of the applicable clearance forms will be maintained in the field during the implementation activities.

In addition, LFR will install the monitoring wells in an area that will not interfere with plant operations, an area that will protect the integrity of the wells (for example, not in a topographically low spot or in a high traffic area).

4.1.3 Health and Safety Plan

A Health and Safety Plan (HSP) was prepared for the proposed work and is included as Appendix C. The HSP documents the potential hazards to worker health and safety at the Site during the proposed field activities and specifies the appropriate means to mitigate or control these hazards. The HSP addresses the potential for exposure to hazardous constituents and describes general safety procedures. A health and safety meeting will be conducted before beginning fieldwork, and fieldwork will be monitored

according to the HSP to ensure that appropriate health and safety procedures are followed.

4.2 Proposed Groundwater Monitoring Well Installation

4.2.1 Proposed Monitoring Well Locations

The proposed monitoring well locations shown on Figure 2 were strategically selected to further define the lateral and vertical extent of soil and groundwater contamination. A total of four multiple-completion monitoring well clusters will be installed in specific locations to fill data gaps, in concurrence with the ACEH letter dated November 3, 2005. Each monitoring well cluster will contain three individual wells screened from 8 to 13 feet below ground surface (bgs), 25 to 30 feet bgs, and 45 to 50 feet bgs, respectively. These screen intervals were chosen to further delineate the vertical extent on contamination in the shallow, deep, and Livermore Formation (LF), respectively.

Proposed monitoring wells MW-9S/9D/9LF will be installed northwest of existing monitoring wells MW7S/7D to further define the extent of TPHg and BTEX in soil and groundwater in the area. Proposed monitoring wells MW-10S/10D/10LF will be installed northeast of the former 2,000-gallon gasoline UST and the location of former soil boring TB-1 to evaluate the extent of contamination. The results from a grab groundwater sample collected from soil boring TB-1 in 2002 indicate that TPHg, TPHd, and benzene were below reporting limits, and only low concentrations of MtBE were detected. Proposed monitoring wells MW-11S/11D/11LF will be installed southwest of the location of former soil boring TB-5 to further define the vertical extent of contamination in the area. Proposed monitoring wells MW-12S/12D/12LF will be installed south of MW-6S/6D to further define the vertical and lateral extent of contamination. Monitoring well cluster MW-12 will also help to evaluate dissolved-phase contamination southwest of MW2S/2M/2D and abandoned monitoring well MW-2.

4.2.2 Monitoring Well Construction Details

The proposed monitoring well clusters will be completed to total depths of approximately 50 feet bgs. The anticipated screens for the three completions will be from 8 to 13 feet bgs, from 25 to 30 feet bgs, and from 45 to 50 feet bgs. Screened intervals are proposed and may be adjusted based on lithologic conditions encountered at the time of drilling. The deep-zone wells will be installed a minimum of 10 feet into the Livermore Formation.

A licensed drilling contractor will use air rotary or best available technologies, based on subsurface geology, to install the new monitoring well clusters. Each monitoring well casing will be 2-inch-diameter Schedule 40 polyvinyl chloride (PVC) and the screen sections will be machine-slotted Schedule 40 PVC, with a slot size appropriate for the soil grain size and filter size selected. For each monitoring well cluster, a filter

pack (sand or pea gravel) will be placed in the borehole annular space around the screen interval and extended to approximately 2 feet above the top of the screen. A bentonite seal of approximately 2 to 3 feet in thickness will be placed above the sand pack. The annular space above the bentonite seal will be sealed with cement grout to just below the screen interval of the upper well. The shallow-zone well will be sealed as described above, with the cement grout extending to ground surface. Each monitoring well cluster will be equipped with locking well caps and completed in a subsurface vault equipped with a traffic-rated access manhole. Due to the relatively shallow depth of the wells, no transition sand will be used between the bentonite seal and the filter pack.

4.2.3 Lithologic Logging Procedures

Lithologic logging will be conducted in the proposed boring locations by collecting soil samples at least every 5 feet of drilling. An LFR field geologist will classify the soil samples using American Society for Testing and Materials (ASTM) D 2488-93, which is based on the Unified Soil Classification System. Lithologic descriptions will be recorded on field boring logs that will be reviewed, edited, and signed by a California Professional Geologist. The lithologic evaluation will be used to determine the appropriate screen intervals for each of the proposed monitoring wells.

4.2.4 Well Development Procedures

Following installation, each new monitoring well will be developed to remove fine materials from the well and maximize the hydraulic efficiency. Development will be performed using surge blocks and/or pumping. Collected water from drilling and development activities will be contained on site in drums or a temporary holding tank for subsequent characterization and appropriate disposal.

4.2.5 Soil and Groundwater Sampling and Analysis

Continuous soil samples will be collected from each borehole for logging and lithologic evaluation. Soil cores also will be field screened using a photoionization detector (PID) or similar.

Groundwater samples will be collected in accordance with the quarterly monitoring program for the Site. Groundwater samples will be collected from each of the shallow, deep, and Livermore Formation wells within each cluster for laboratory analysis for TPHg and TPHd by EPA Method 8015m; and BTEX, Fuel Oxygenates, and lead scavengers by EPA Method 8260.

The laboratory analysis sample matrix is presented as Table 3.

4.2.6 Well Survey

The proposed monitoring wells on site will be surveyed by a licensed California surveyor in accordance with new GeoTracker surveying guidelines. The horizontal locations will be surveyed using NAD83, and the vertical elevations will be surveyed using NAVD 88. Surveying will be performed with respect to the northern point of the well casing identified by a mark placed on the top of the well casing. The new well casing elevation data will be used to determine groundwater elevations for the Site. Survey data will be uploaded to the GeoTracker website.

4.2.7 Equipment Decontamination Procedures

Drilling and sampling equipment will be properly decontaminated before each use and between each location. The down-hole drilling equipment, such as augers, drill rods, or drill bits, will be decontaminated by steam cleaning at a designated wash pad or within a portable containment unit. Well completion materials, such as well casing, screen, couplings, and caps, also will be steam cleaned. Soil sampling equipment and down well development equipment will be decontaminated by washing in nonphosphate detergent solution, deionized (DI) water rinse, and final DI water rinse before each use. Groundwater samples will be collected using either dedicated or single-use disposable sampling devices such as bailers or tubing.

4.2.8 Waste Characterization, Handling, and Disposal

The anticipated investigative derived waste (IDW) that will be generated during the remedial action implementation includes soil cuttings, well development and purge water, equipment decontamination fluids, and used personal protective equipment (PPE). Soil cuttings from drilling operations will be containerized in clean Department of Transportation- (DOT-) approved 55-gallon drums or metals bins with covers. Similarly, well development/purge water and decontamination rinse water will be containerized in DOT-approved 55-gallon drums or larger appropriate holding tanks with covers. Samples of the soil cuttings and fluids will be collected to evaluate appropriate disposal options. Used PPE and disposable sampling equipment will be placed in double plastic bags in drums or in an industrial disposal bin. The containers storing the generated wastes will be temporarily stored at a centralized location until the waste characterization results are received. An adhesive label will be affixed to each container, noting the following information: container number, waste type, location that the IDW was generated, and date of waste generation.

4.2.9 Field Documentation

Field activities will be appropriately documented using the following forms as appropriate: field log of boring, well completion details, well development form, borehole clearance record, sample label, chain-of-custody form, groundwater sampling form, cooler receipt form, waste management label, and hazardous waste labels. The

purpose of the standardized field documentation and sampling procedures is to maintain integrity of field documentation and field samples throughout the investigative process. These forms will be kept on file at LFR and will be available upon request.

4.3 PREPARATION OF INVESTIGATION REPORT

LFR will prepare a report describing the well installation procedures and the results of the overall investigation for submittal to the ACEH. The report will include site background and environmental setting information, field procedures, boring logs, laboratory certified analytical reports, and summary tables of new well construction details and analytical results.

The report and supporting documentation, including new well survey data, a revised site plan showing new well locations, and laboratory analytical results, will be uploaded to the GeoTracker system in accordance with Regional Water Quality Control Board and ACEH requirements.

The results of the investigation will be used to refine the initial SCM, and a revised SCM will be presented in the report. Finally, in accordance with the primary objective of the new well installations, the report will discuss the lateral and vertical extent of impact to groundwater beneath the Asphalt Plant.

5.0 REFERENCES

Alameda County Environmental Health (ACEH). 2005. Letter to Mr. W.M. Calvert, Mission Valley Rock Company from Jerry Wickham. November 3.

Tait Environmental Management, Inc. (Tait). 2003. Site Assessment and Fourth Quarter 2002 Groundwater Monitoring Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California. March 23.

———. 2004a. Fourth Quarter 2005 Groundwater Monitoring Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California. February 15.

———. 2004b. Workplan to Perform Additional Subsurface Site Assessment for the Mission Valley Rock Company Facility Located at 7999 Athenour Way, Sunol, California. September 30.

———. 2005a. Site Assessment and First Quarter 2005 Groundwater Monitoring and Sampling Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California. April 1.

———. 2005b. Second Quarter 2005 Groundwater Monitoring and Sampling Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California. July 29.

———. 2005c. Third Quarter 2005 Groundwater Monitoring and Sampling Report, Mission Valley Rock Company, 7999 Athenour Way, Sunol, California. October 14.

Tank Protect Engineering (TPE). 1996. Tank Closure Report, Mission Valley Rock. August 12.

———. 1998. Preliminary Site Assessment Report, Mission Valley Rock, 7999 Athenour Way, Sunol, California. October 30.

Treadwell & Rollo. 1991. Geotechnical and Geologic Investigation, North Quarry, Sunol, California. August 9.

Table 1
Sample Location Rationale
Mission Valley Rock and Asphalt
7999 Athenour Way, Sunol, California

Proposed Sample Identification	Location Type	Approximate Location	Sample Location Rationale
MW-9S/D/LF	triple-completion permanent monitoring wells	north-northwest of existing well MW-7S/D	Proposed MW-9S and MW-9D will help define the lateral extent of contamination to the northwest of MW-7S/D.
			Proposed MW-9LF will help define the vertical extent of contamination by monitoring groundwater deeper than the deepest completion of well MW-7.
			TPHg and benzene concentrations detected in wells MW-7S/D to date have been anomalously high compared to concentrations detected in other nearby wells. Proposed wells MW-9S/D/LF will help evaluate the integrity of well MW-7S/D, which appears to have been damaged at the ground surface.
MW-10S/D/LF	triple-completion permanent monitoring wells	northeast of the former gasoline UST	Proposed wells MW-10S/D/LF will fill the data gap to the northeast of the former gasoline UST where no routine groundwater monitoring is being conducted. The results from a grab groundwater sample collected from soil boring TB-1 in 2002 indicate that TPHg, TPHd, and benzene were below reporting limits; only a low concentration of MtBE was detected.
MW-11S/D/LF	triple-completion permanent monitoring wells	south of existing well MW-2S/M/D	Proposed wells MW-11S and MW-11D will help define the lateral extent of contamination to the south of wells MW-2S/M/D and MW-6S/D, soil boring TB-5, and former well MW-2.
			Proposed MW-11LF will help define the vertical extent of contamination by monitoring groundwater deeper than the deepest completion of wells MW-2 and MW-6.
MW-12S/D/LF	triple-completion permanent monitoring wells	south-southeast of existing well MW-6S/D and MW-3	Proposed wells MW-12S and MW-12D will help define the lateral extent of contamination to the south-southeast of wells MW-6S/D and MW-3.
			Proposed MW-12LF will help define the vertical extent of contamination by monitoring groundwater deeper than the deepest completion of wells MW-6D and MW-3.

Notes:
S/M/D = shallow, middle, or deep well completions
TPHg = total petroleum hydrocarbons as gasoline
TPHd = total petroleum hydrocarbons as diesel
BTEX = benzene, toluene, ethylbenzene, and total xylenes
MtBE = methyl tertiary-butyl ether
UST = underground storage tank
LF = Livermore Formation

Table 2
Proposed Well Contruction Details
Mission Valley Rock and Asphalt
7999 Athenour Way, Sunol, California

Well ID	Casing Diameter (inches)	Proposed Depth (feet bgs)	Proposed Screened Interval* (feet bgs)
MW-9S	2	8	8.0-13.0
MW-9D	2	20	25.0-30.0
MW-9LF	2	45	45.0-50.0
MW-10S	2	8	8.0-13.0
MW-10D	2	20	25.0-30.0
MW-10LF	2	45	45.0-50.0
MW-11S	2	8	8.0-13.0
MW-11D	2	20	25.0-30.0
MW-11LF	2	45	45.0-50.0
MW-12S	2	8	8.0-13.0
MW-12D	2	20	25.0-30.0
MW-12LF	2	45	45.0-50.0

Notes:
* Screened intervals are proposed and may be adjusted based on lithologic conditions encountered at the time of drilling. The deep-zone wells (LF) will be installed a minimum of 10 feet into the Livermore Formation.

bgs = below ground surface

Table 3
Laboratory Analyses Sample Matrix
Mission Valley Rock and Asphalt
7999 Athenour Way, Sunol, California

Proposed Sample Identification	Matrix	TPH as Gasoline	TPH as Diesel	BTEX	Fuel Oxygenates (including MtBE)	EDB	EDC
MW-9S	water	x	x	x	x	x	x
MW-9D	water	x	x	x	x	x	x
MW-9LF	water	x	x	x	x	x	x
MW-10S	water	x	x	x	x	x	x
MW-10D	water	x	x	x	x	x	x
MW-10LF	water	x	x	x	x	x	x
MW-11S	water	x	x	x	x	x	x
MW-11D	water	x	x	x	x	x	x
MW-11LF	water	x	x	x	x	x	x
MW-12S	water	x	x	x	x	x	x
MW-12D	water	x	x	x	x	x	x
MW-12LF	water	x	x	x	x	x	x

Notes:
TPH = total petroleum hydrocarbons
BTEX = benzene, toluene, ethylbenzene, and total xylenes
MtBE = methyl tertiary-butyl ether
EDB = ethylene dibromide
EDC = 1,2-dichloroethane
S/D/LF = shallow/deep/Livermore Formation

Site Map

Hanson Aggregates, 7999 Athenour Way, Sunol, CA

LFR LEVINE • FRICKE

Figure 1

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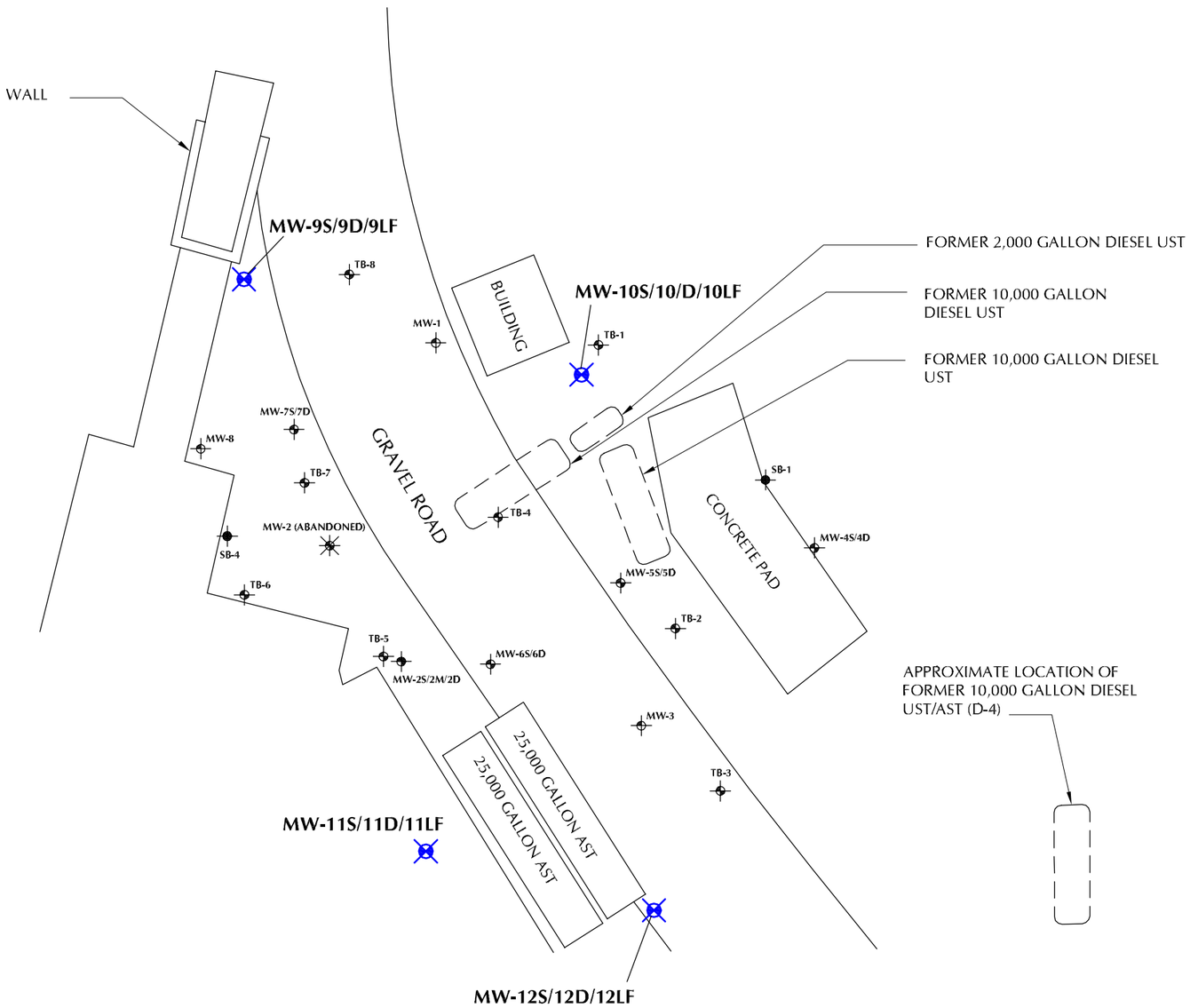

LEGEND

MW-10S/10/D/10LF (Livermore Formation) — Approximate Location of Proposed Nested Wells

MW-1 — Existing Groundwater Monitoring Well - Single Completion

MW-7S/7D — Existing Groundwater Monitoring Well - Dual Nested

MW-2S/SM/2D — Existing Groundwater Monitoring Well - Triple Nested

TB-1 — Existing Grab Groundwater Sample Location

MW-2 — Abandoned Groundwater Monitoring Well

SB-1 — Existing Soil Boring

ATS = Aboveground Storage Tank

UTS = Underground Storage Tank

N

0 30 FEET

APPROXIMATE SCALE

Site Plan Showing Existing and Proposed Nested Well Locations

Hanson Aggregates, Sunol, California

LFR

Figure 2

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APPENDIX A

Selected Tables from Site Assessment and Quarterly Groundwater Monitoring Reports by Tait Environmental Management, Inc. (Tait 2003 and 2005a)

Table 1
Well Construction Details and Groundwater Elevation Data
Third Quarter 2005
Mission Valley Rock Company
Sunol, California

Well ID	Casing Diameter (inches)	Depth to Water (feet below TOC)	Total Depth (feet below TOC)	Screened Interval (feet bgs)	Measuring Point Elevation (feet MSL)	Groundwater Elevation (feet MSL)
MW-1	2	4.52	17.45	5.0 - 20.0	258.68	254.16
MW-2S	2	5.46	8.48	3.0-8.0	258.84	253.38
MW-2M	2	5.77	18.70	14.0-19.0	258.99	253.22
MW-2D	2	5.90	29.60	25.0-30.0	258.91	253.01
MW-3	2	6.01	14.50	5.0-20.0	259.08	253.07
MW-4S	2	3.45	8.71	3.0-8.0	259.14	255.69
MW-4D	2	5.60	23.15	17.0-22.0	259.22	253.62
MW-5S	2	5.30	8.00	3.0-8.0	259.43	254.13
MW-5D	2	5.60	22.65	17.0-22.0	259.40	253.80
MW-6S	2	5.17	14.75	5.0-15.0	258.75	253.58
MW-6D	2	6.30	28.90	24.5-29.5	259.27	252.97
MW-7S	2	4.80	8.35	5.0-8.0	258.82	254.02
MW-7D	2	4.70	22.55	20.0-25.0	258.07	253.37
MW-8	2	4.92	15.05	5.0-15.0	258.84	253.92

Screened intervals are approximated. Screened interval in wells is lower than the measured total depth due to silting in the bottom of wells
The measurement point for the above three wells is the north side of the top of casing.
Depth to water and total depth measurements taken by Tait Environmental Management, Inc. personnel on August 11, 2005.
Total depth and depth to water measurements taken by Tait Environmental Management from designated measurement point.
groundwater elevation = Measurement Point Elevation - Depth to Water.
TOC = Top of Casing
bgs = Below Ground Surface
MSL = Mean Sea Level

Table 2
Historical Groundwater Gauging Data
Mission Valley Rock Company
Sunol, California

Well	Top of Casing Elevation (Feet)	Date	Depth to Water (feet below TOC)	Groundwater Elevation (feet MSL)	LPH Thickness (feet)
MW-1	256.51	Jun-98	1.32	255.19	ND
		Jan-99	2.28	254.23	ND
		Mar-99	1.88	254.63	ND
		Jun-99	3.35	253.16	ND
		Sep-99	3.66	252.85	ND
		Dec-99	2.94	253.57	ND
		Mar-00	2.72	253.79	Odor
		Jun-00	4.01	252.50	Slight Odor
		Sep-00	5.11	251.40	Slight Odor
		Dec-00	4.95	251.56	ND
		Mar-01	2.28	254.23	ND
		Jun-01	3.60	252.91	ND
		Sep-01	6.50	250.01	ND
		Dec-01	1.29	255.22	ND
		Mar-02	2.91	253.60	ND
		Jun-02	3.95	252.56	ND
		Sep-02	5.18	251.33	ND
		Dec-02	3.90	252.61	ND
		Mar-03	1.40	255.11	ND
		Jun-03	2.65	253.86	ND
		Sep-03	4.67	251.84	ND
		Dec-03	4.60	251.91	ND
	258.68	Jan-05	3.41	255.27	ND
		May-05	1.20	257.48	
		Aug-05	4.52	254.16	
MW-2	256.7	Jun-98	1.72	254.98	0.005
		Jan-99	2.69	254.01	4.00
		Mar-99	2.50	254.20	ND
		Jun-99	4.00	252.70	Sheen
		Sep-99	4.54	252.16	0.50
		Dec-99	3.85	252.85	0.13
		Mar-00	3.20	253.50	0.03
		Jun-00	4.62	252.08	0.02
		Sep-00	5.95	250.75	>0.01
		Dec-00	5.65	251.05	0.07
		Mar-01	3.21	253.49	0.10
		Jun-01	3.31	253.39	0.06
		Sep-01	7.08	249.62	0.34
		Dec-01	2.18	254.52	0.26
		Mar-02	3.40	253.30	0.90
		Jun-02	4.35	252.35	0.08
		Sep-02	5.54	251.16	ND
		Dec-02	4.30	252.40	ND
		Mar-03	1.78	254.92	ND
		Jun-03	3.10	253.60	ND
		Sep-03	5.02	251.68	ND
		Dec-03	NM	NM	NM
		1/5/05	Abandoned		
MW-2S	258.84	1/17/05	4.25	254.59	ND
		5/4/05	1.98	256.86	
		8/12/05	5.46	253.38	
MW-2M	258.99	1/17/05	4.68	254.16	ND
		5/4/05	2.32	256.52	
		8/12/05	5.77	253.07	
MW-2D	258.91	1/17/05	4.75	254.09	
		5/4/05	2.38	256.46	
		8/12/05	5.90	252.94	

Table 2
Historical Groundwater Gauging Data
Mission Valley Rock Company
Sunol, California

Well	Top of Casing Elevation (Feet)	Date	Depth to Water (feet below TOC)	Groundwater Elevation (feet MSL)	LPH Thickness (feet)
MW-3	256.72	Jun-98	2.66	254.06	ND
		Jan-99	4.47	252.25	Slight Odor
		Mar-99	3.96	252.76	Sheen
		Jun-99	5.54	251.18	ND
		Sep-99	6.18	250.54	Sheen
		Dec-99	5.52	251.20	Odor
		Mar-00	4.61	252.11	Odor
		Jun-00	6.35	250.37	Very Slight Odor
		Sep-00	7.30	249.42	Very Slight Odor
		Dec-00	7.29	249.43	ND
		Mar-01	4.73	251.99	ND
		Jun-01	NM	NM	NM
		Sep-01	7.89	248.83	ND
		Dec-01	3.77	252.95	ND
		Mar-02	5.12	251.60	ND
		Jun-02	6.52	250.20	ND
		Sep-02	7.28	249.44	ND
		Dec-02	6.40	250.32	ND
		Mar-03	4.01	252.71	ND
		Jun-03	5.13	251.59	ND
		Sep-03	5.13	251.59	ND
		Dec-03	7.2	249.52	ND
	259.08	Jan-05	5.81	253.27	ND
		May-05	3.50	255.58	
		Aug-05	6.01	253.07	
MW-4S	259.14	1/17/05	4.62	254.52	ND
		5/4/05	3.73	255.41	
		8/12/05	3.45	255.69	
MW-4D	259.22	1/17/05	5.96	253.26	ND
		5/4/05	3.93	255.29	
		8/12/05	5.60	253.62	
MW-5S	259.43	1/17/05	4.57	254.86	ND
		5/4/05	2.50	256.93	
		8/12/05	5.30	254.13	
MW-5D	259.40	1/17/05	5.15	254.25	ND
		5/4/05	2.75	256.65	
		8/12/05	5.60	253.80	
MW-6S	258.75	1/17/05	4.30	254.45	ND
		5/4/05	1.96	256.79	
		8/12/05	5.17	253.58	
MW-6D	259.27	1/17/05	5.17	254.10	ND
		5/4/05	2.80	256.47	
		8/12/05	6.30	252.97	
MW-7S	258.82	1/17/05	3.42	255.40	ND
		5/4/05	1.44	257.38	
		8/12/05	4.80	254.02	
MW-7D	258.07	1/17/05	5.50	252.57	ND
		5/4/05	1.45	256.62	
		8/12/05	4.70	253.37	
MW-8	258.84	1/17/05	3.45	255.39	ND
		5/4/05	1.25	257.59	
		8/12/05	4.92	253.92	

Depth to water and liquid phase hydrocarbon (LPH) thickness reported in feet below measurement point.
Groundwater elevations reported in feet above mean sea level (msl).
Adjusted groundwater elevation = Measurement Point Elevation - Depth to Water + (LPH Thickness x 0.75)
NM = Not Measured
ND = Not Detected
TOC = Top of Casing
MSL = Mean Sea Level
LPH = Liquid-Phase Hydrocarbon

Table 3
Groundwater Analytical Results
Third Quarter 2005
Mission Valley Rock Company
Sunol, California

Well	Date	TPHd (ug/L)	TPHg (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	MTBE (ug/L)	TBA (ug/L)
MW-1	8/12/2005	ND<50	410	ND<0.50	ND<0.50	2.4	ND<0.50	ND<1.0	ND<10
MW-2S	8/12/2005	6.1	120	ND<0.50	ND<0.50	ND<0.50	ND<0.50	77	ND<10
MW-2M	8/12/2005	ND<50	460	ND<0.50	ND<0.50	2.5	1.2	56	ND<10
MW-2D	8/12/2005	ND<50	ND<50	ND<0.50	ND<0.50	2.8	1.1	51	ND<10
MW-3	8/11/2005	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	110	ND<10
MW-4S	8/12/2005	ND<50	ND<50	ND<0.50	ND<0.50	2.2	5.8	ND<1.0	ND<10
MW-4D	8/12/2005	ND<50	410	ND<0.50	2.2	10	25.5	ND<1.0	ND<10
MW-5S	8/11/2005	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	5.8	ND<10
MW-5D	8/11/2005	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	6.4	ND<10
MW-6S	8/12/2005	1.3	1100	ND<0.50	ND<0.50	ND<0.50	ND<0.50	410	ND<10
MW-6D	8/12/2005	ND<50	480	2.0	ND<0.50	ND<0.50	ND<0.50	270	ND<10
MW-7S	8/12/2005	ND<50	660	ND<0.50	ND<0.50	5.5	ND<0.50	ND<1.0	ND<10
MW-7D	8/12/2005	37	83000	550	2200	4400	10600	ND<10	ND<100
MW-8	8/12/2005	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	160

Notes:
Analyses for Total Petroleum Hydrocarbons as Gasoline and Diesel (TPHg and TPHd, respectively) were performed using EPA Method No. 8015M.
Analyses for benzene, toluene, ethylbenzene, total xylenes, methyl-tert-butyl ether (MTBE), and Tert-butyl alcolhol (TBA) were performed using EPA Method No. 8260B.
Tert-amyl methyl ether (TAME), Di-isoproppyl ether (DIPE), and Ethyl tert-butyl ther (ETBE) were not detected above laboratory detection limits.
Total xylene concentrations were determined by adding m,p-xylene and o-xylene from laboratory report.
NM = Not Measured
mg/L = Milligrams per Liter
ug/L = Micrograms per Liter
ND = Non-detect at or above corresponding laboratory reporting limit.
Monitoring wells MW-3, MW-5S, and MW-5D were sampled on August 11, 2005

Table 4
Historical Groundwater Analytical Results
Mission Valley Rock Company
Sunol, California

Well	Date	TPHd (ug/L)	TPHg (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	MTBE (ug/L)
MW-1	Jun-98	0.1	3,100	19	2.3	91	48	110
	Oct-98	0.1	2,300	3.1	4.2	5.0	15	ND<0.50
	Dec-98	350	ND<50	12	7.5	20	6.2	ND<5.0
	Mar-99	190	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Jun-99	210	1,800	1.2	0.9	1.5	4.6	ND<0.5
	Sep-99	62	180	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.5
	Dec-99	290	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Mar-00	86	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Jun-00	70	450	2.1	ND<0.5	2.1	1.4	7.6
	Sep-00	ND<50	850	5.4	ND<0.50	9.4	2.6	9.8
	Dec-00	ND<1,000	370	5.3	ND<1.0	2.7	ND<3.0	55
	Mar-01	ND<1,000	700	ND<1.0	ND<1.0	1.4	ND<1.0	ND<1.0
	Jun-01	ND<1,000	170	ND<1.0	ND<1.0	1.2	ND<1.0	ND<1.0
	Sep-01	ND<1,000	730	1.4	ND<1.0	7.6	1.2	ND<1.0
	Dec-01	1000	500	15	ND<1.0	27	5.5	ND<1.0
	Mar-02	12000	29000	50	ND<25	960	290	ND<25
	Jun-02	ND<1,000	1400	3.5	ND<1.0	42	7.9	ND<1.0
	Sep-02	1400	760	ND<1.0	ND<1.0	4.3	1.1	ND<1.0
	Dec-02	ND<1,000	1600	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0
	Mar-03	ND<1,000	620	1.2	ND<1.0	12	ND<1.0	ND<1.0
	Jun-03	ND<1,000	0.61	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0
	Sep-03	ND<1,000	1.2	ND<1.0	ND<1.0	6.4	ND<1.0	ND<1.0
	Dec-03	ND<1,000	0.49	ND<1.0	ND<1.0	3.0	ND<1.0	ND<1.0
	1/17/05	ND<50	63	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0
	5/4/05	ND<50	1200	ND<0.5	ND<0.5	8.5	1.2	ND<1.0
	8/12/05	ND<50	410	ND<0.5	ND<0.5	2.4	ND<0.5	ND<1.0
MW-2	Jun-98	12,000	2,500	0.68	ND<0.50	1.2	0.57	14
	Oct-98	4,300	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50
	Dec-98	38,000	ND<5,000	ND<50	ND<50	51	190	ND<500
	Mar-99	580	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Jun-99	4,500	24,000	38	27	41	98	ND<0.5
	Sep-99	24,000	1,400	ND<0.50	ND<0.50	ND<0.50	ND<0.50	27
	Dec-99	2,300	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Mar-00	620	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Jun-00	1,700	270	ND<0.5	ND<0.5	ND<0.5	ND<0.5	17
	Sep-00	5,800	130	ND<0.50	ND<0.50	ND<0.50	0.94	12
	Dec-00	19,000	1700	ND<50	ND<50	ND<50	ND<150	ND<250
	Mar-01	610000	3300	ND<1.0	ND<1.0	ND<1.0	ND<1.0	9.0
	Jun-01	8800	1800	ND<1.0	ND<1.0	ND<1.0	ND<1.0	6.7
	Sep-01	530000	7000	ND<50	ND<50	ND<50	ND<50	ND<50
	Dec-01	27000	310	ND<1.0	ND<1.0	ND<1.0	ND<1.0	62
	Mar-02	65000	130	ND<1.0	ND<1.0	ND<1.0	ND<1.0	30
	Jun-02	130000	460	ND<1.0	ND<1.0	ND<1.0	ND<1.0	24
	Sep-02	480000	290	ND<1.0	ND<1.0	ND<1.0	ND<1.0	16
	Dec-02	61000	1800	ND<1.0	ND<1.0	ND<1.0	ND<1.0	10
	Mar-03	5000	ND<100	ND<1.0	ND<1.0	ND<1.0	ND<1.0	14
	Jun-03	8.1	360	ND<1.0	ND<1.0	ND<1.0	ND<1.0	20
	Sep-03	85	12	ND<1.0	ND<1.0	ND<1.0	ND<1.0	15
	Dec-03	NM	NM	NM	NM	NM	NM	NM
	1/17/05	Abandoned						
MW-2S	1/17/05	1100	730	ND<0.50	ND<0.50	1.0	3.5	50
	5/4/05	8200	190	ND<0.5	ND<0.5	ND<0.5	ND<0.5	44
	8/12/05	6100	120	ND<0.5	ND<0.5	ND<0.5	ND<0.5	77
MW-2M	1/17/05	4100	3300	6.5	1.7	89	82.2	38
	5/4/05	ND<50	610	ND<0.5	ND<0.5	16	10.6	32
	8/12/05	ND<50	460	ND<0.5	ND<0.5	2.5	1.2	56
MW-2D	1/17/05	1800	1000	6.5	ND<0.50	80	71	62
	5/4/05	ND<50	250	ND<0.5	ND<0.5	4.6	1.6	72
	8/12/05	ND<50	ND<50	ND<0.5	ND<0.5	2.8	1.1	51
MW-3	Jun-98	12,000	300	0.80	ND<0.50	ND<0.50	ND<0.50	150
	Oct-98	6400	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50
	Dec-98	5,600	ND<100	1.6	1.4	ND<1.0	ND<1.0	110
	Mar-99	150	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Jun-99	620	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Sep-99	1,500	230		ND<0.50	ND<0.50	ND<0.50	89

Table 4
Historical Groundwater Analytical Results
Mission Valley Rock Company
Sunol, California

Well	Date	TPHd (ug/L)	TPHg (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	MTBE (ug/L)
	Dec-99	58	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Mar-00	94	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	Jun-00	240	170	ND<0.5	0.52	ND<0.5	ND<0.5	100
	Sep-00	850	170	0.81	ND<0.50	ND<0.50	ND<0.50	68
	Dec-00	1600	230	ND<1.0	ND<1.0	ND<1.0	ND<3.0	80
	Mar-01	1100	140	ND<1.0	ND<1.0	ND<1.0	ND<1.0	83
	Jun-01	NS	NS	NS	NS	NS	NS	NS
	Sep-01	3800	ND<100	ND<1.0	ND<1.0	ND<1.0	ND<1.0	45
	Dec-01	3100	340	1.4	1.1	10	3.8	45
	Mar-02	1500	ND<100	ND<1.0	ND<1.0	ND<1.0	ND<1.0	50
	Jun-02	ND<1000	160	ND<1.0	ND<1.0	ND<1.0	ND<1.0	36
	Sep-02	ND<1000	ND<1000	ND<1.0	ND<1.0	ND<1.0	ND<1.0	43
	Dec-02	ND<1000	ND<100	ND<1.0	ND<1.0	ND<1.0	ND<1.0	41
	Mar-03	ND<1000	ND<100	ND<2.5	ND<2.5	ND<2.5	ND<2.5	92
	Jun-03	1200.0	ND<100	ND<2.0	ND<2.0	ND<2.0	ND<2.0	93
	Sep-03	ND<1000	ND<100	ND<2.0	ND<2.0	ND<2.0	ND<2.0	65
	Dec-03	5700	190	ND<2.0	ND<2.0	ND<2.0	ND<2.0	56
	1/17/05	ND<50	590	ND<0.50	ND<0.50	ND<0.50	ND<0.50	47
	5/4/05	ND<50	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	190
	8/11/05	ND<50	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	110
MW-4S	1/17/05	ND<50	65	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0
	5/4/05	ND<50	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1.0
	8/12/05	ND<50	ND<50	ND<0.5	ND<0.5	2.2	5.8	ND<1.0
MW-4D	1/17/05	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0
	5/4/05	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0
	8/12/05	ND<50	410	ND<0.5	2.20	10.0	25.5	ND<1.0
MW-5S	1/17/05	ND<50	ND<50	ND<0.50	4.5	ND<0.50	ND<0.50	ND<1.0
	5/4/05	ND<50	ND<50	ND<0.50	ND<0.5	ND<0.50	ND<0.50	ND<1.0
	8/11/05	ND<50	ND<50	ND<0.50	ND<0.5	ND<0.50	ND<0.50	6
MW-5D	1/17/05	ND<50	210	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0
	5/4/05	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	10
	8/11/05	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	6
MW-6S	1/17/05	2800	1600	6.1	ND<0.50	3.6	2.3	160
	5/4/05	ND<50	750	ND<0.5	ND<0.5	3.0	ND<0.5	160
	8/12/05	1300	1100	ND<0.50	ND<0.50	ND<0.50	ND<0.50	410
MW-6D	1/17/05	2100	1200	10	ND<0.50	1.6	2.2	180
	5/4/05	ND<50	360	2	ND<0.5	ND<0.5	ND<0.5	360
	8/12/05	ND<50	480	2	ND<0.5	ND<0.5	ND<0.5	270
MW-7S	1/17/05	ND<50	12000	10	89	590	1670	ND<1.0
	5/4/05	520	1600	ND<0.5	ND<0.5	31	18.4	1600
	8/12/05	ND<50	660	ND<0.5	ND<0.5	5.5	ND<0.5	ND<1.0
MW-7D	1/17/05	ND<50	23000	350	1000	1800	5200	ND<1.0
	5/4/05	NA						
	8/12/05	37	83000	550	2200	4400	10600	ND<10
MW-8	1/17/05	ND<50	120	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0
	5/4/05	ND<50	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0
	8/12/05	ND<50	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<1.0

Concentrations reported in micrograms per Liter (ug/L).

MTBE = Methyl-tert-Butyl Ether

Tert-butyl alcohol (TBA) was detected in MW-8 at a concentration of 160 micrograms per liter (ug/L)

ND = Not Detected at or above corresponding reporting limit

NS = Not Sampled

TPHd = Total Petroleum Hydrocarbons as Diesel

TPHd = Total Petroleum Hydrocarbons as Gasoline

NM: Not Measured

GROUNDWATER SAMPLE ANALYTICAL SUMMARY
(DECEMBER 2002)

MISSION VALLEY ROCK COMPANY
7999 ATHENOUR WAY
SUNOL, CALIFORNIA

Sample ID	Date Sampled	Total Petroleum Hydrocarbons as Gasoline (TPHg) and Diesel (TPHd) in mg/L		Volatile Organic Compounds (VOC's) in ug/L														Semi-Volatile Organi Compounds (SVOC's) ug/L		
		TPHd	TPHg	Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Ethylbenzene	Isopropylbenzene	Methyl tert-butyl ether (MTBE)	Napthalene	n-Propylbenzene	Toluene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	m-Xylene & p-Xylene	o-Xylene	bis (2-Ethylhexyl)phthalate	2-Methylnapthalene	Naphtalene
TB-1	12/03/2002	<1.3	<0.10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<10	<10	<1
TB-2	12/03/2002	1.6	0.83	22	<1.0	28	20	<1.0	10	26	<1.0	26	97	3.8	<1.0	1.5	3.8	1.5	<13	<13	<1
TB-3	12/04/2002	<2.8	<0.10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	26	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<22	<22	<2
TB-4	12/03/2002	<1.0	1.1	<50	49	6.9	<5.0	<5.0	52	8.6	180	19	26	<5.0	35	14	32	7.1	<10	13	1
TB-5	12/04/2002	28	35	<100	<10	140	81	<10	180	99	150	65	400	<10	16	<10	<10	<10	<330	91	5
TB-6	12/04/2002	32	27	<50	<5.0	28	16	<5.0	<5.0	5.4	13	<5.0	15	29	<5.0	<5.0	13	5.5	<29	50	<2
TB-7	12/04/2002	28	43	<50	<5.0	53	<5.0	<5.0	<5.0	19	<5.0	80	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<24	<24	<2
TB-8	12/03/2002	.28	44	<500	190	140	63	<50	2,800	270	<50	750	830	<50	1,200	320	570	<50	<40	380	48
MW-1	12/04/2002	<1.0	1.6	<10	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	3.0	<1.0	<1.0	<1.0	17	<10	<1
MW-2	12/04/2002	61	1.8	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	520	<50	<5
MW-3	12/04/2002	<1.0	<0.10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	41	2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	19	<10	<1

Notes:
EPA National Primary Drinking Water Standards (NPDWS) are for Maximum Contaminant Levels (MCL's) - March 2001.
Only the compounds detected at or above the labortatory reporting limit are shown.
mg/L = milligrams per Liter (parts per million)
ug/L = micrograms per Liter (parts per billion)

APPENDIX B

Detailed Site Conceptual Model

CONTENTS

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

This Appendix contains a Site Conceptual Model (SCM) for the former fuel dispensing facility located at the Asphalt Plant ("the Site") of the Hanson Aggregates Mid-Pacific Inc. gravel quarry ("the Facility"). Development of this SCM is a required element of the Work Plan, as described in the Alameda County Environmental Health (ACEH) comment letter dated November 3, 2005. The purpose of the SCM is to provide a framework for understanding site conditions with respect to the fate and transport of chemicals of potential concern (COPCs). The SCM is a working hypothetical model of the Site that reflects what is known about the site geology (including the potential presence of preferential pathways), the site hydrogeology, the release history at the Site, the time history of concentration of COPCs in the site groundwater and soils, potential attenuation mechanisms, and the transport mechanisms, which can impact the movement of chemicals released to the subsurface at the Site. The SCM can be used to evaluate the potential for various ecological or human receptors to be impacted by site releases and to estimate the impact of these releases on potential receptors. The SCM provides a mechanism to determine if additional data are required to further refine the SCM (to fill data gaps) and to assure that any additional data to be gathered are required for making a remedial decision.

2.0 HISTORY OF QUARRY OPERATIONS

Operations at the facility began in the early 1950s (Saia 2006). A series of gravel pits were dug across the Facility along a north-south axis parallel to Alameda Creek. Many of these pits were subsequently used as desilting basins and in this process were filled with silt. The active pit at the time the underground storage tanks (USTs) were first installed was located west of the former UST location. The pit directly north of (and almost adjacent to) the USTs had been filled with silt by the time the USTs were installed. The asphalt plant began operations on a portion of the Facility approximately in the early 1980s. During the late 1980s or early 1990s, gravel mining operations in the active pit west of the USTs and the Asphalt Plant were ended and the pit was converted to a holding pond for wash water. Operations were then begun in a gravel pit located east of the former UST location.

3.0 GEOLOGY

Based on the borings installed at the former UST site and asphalt plant by Tait Environmental Management, Inc. (Tait 2005), the subsurface at the location of the former USTs consists of 10 to 20 feet of relatively less pervious silts, clays, and clayey gravels overlying an unknown depth (likely 20 to 30 feet) of clean gravels that are the main water-bearing stratum in the Sunol groundwater basin. The Livermore Formation, which underlies the main water-bearing stratum, is relatively impervious compared to

the overlying strata. No borings near the asphalt plant have penetrated through the main water-bearing formation, but it is believed to transition to the Livermore Formation approximately 40 feet below ground surface (bgs; Saia 2006). The 40-foot depth of the bottom of the water-bearing formation is based on observation of leakage into the active gravel pits that have existed on all sides of the former UST location. Water was observed to infiltrate from the top 40 feet of the pits, but not from deeper strata. The relative lack of water below 40 feet is supported by the deep borings installed by Treadwell & Rollo (1991) as part of the North Quarry project. Treadwell & Rollo found that the alluvium overlying the Livermore Formation was much more permeable than the Livermore Formation. Perched groundwater was locally present in the Livermore Formation, but generally the soils are described as moist or dry on the boring logs.

4.0 HYDROGEOLOGY

4.1 Regional Hydrogeology

Regional groundwater flow in the vicinity of the former USTs is to the north-northwest paralleling Alameda Creek (DWR 2002). The majority of groundwater transport takes place in the alluvium overlying the Livermore Formation (Treadwell & Rollo 1991).

4.2 Local Hydrogeology

4.2.1 Impact of Quarry Operations on Groundwater Flow

Local groundwater transport in the vicinity of the former USTs is affected by past quarry operations. The location of the former USTs has not been mined, but this area is surrounded on all four sides by former gravel pits. The gravel pits were excavated deeply into the Livermore Formation, far below the bottom of the main water-bearing unit beneath the Facility. Subsequently, the pits directly north and east of the former USTs were used as desilting basins and are now filled with silt. These silts are likely characterized as having a hydraulic conductivity orders of magnitude lower than the gravel of the main water-bearing formation. Hence, the former gravel pits north and east of the former USTs effectively act as groundwater flow barriers. The northern pit had been filled with silt by the time the USTs were installed in 1980. The eastern pit was filled during the 1990s.

According to a review of aerial photographs (Attachment 1), the pit located directly to the west of the former USTs (currently the wash water pit) was excavated between 1982 and 1993. During the operation of the pit, the groundwater gradient in the vicinity of the USTs was likely to the west, controlled primarily by dewatering at the pit. By 1993, this pit was being used to store wash water and would no longer have drawn groundwater to it. The surface of the wash water pond is thought to represent the

current groundwater surface (Saia 2006) and likely is not a significant groundwater recharge source.

The former gravel pit located directly north of the former UST location is probably causing a groundwater mound to form along its entire western and southern boundary. The mounding is likely caused by a combination of surface water flowing off of the relatively impervious surface of the former pits and into the relatively more pervious native soils and also by the damming effect of the silt-filled pits on groundwater flow. The vertical gradient at the nested well pairs installed in January 2005 is uniformly down, supporting the hypothesis that the upper alluvium is recharging the water-bearing formation beneath it (Tait 2005).

4.2.2 Recent Apparent Change in Groundwater Flow Direction

Recent groundwater monitoring reports have shown a shift in groundwater flow direction from easterly to southeasterly. The apparent change in groundwater flow direction is probably an artifact; the groundwater flow direction has not changed. The apparent change in groundwater flow direction is because wells screened in the main water-bearing formation were contoured with wells screened in the upper 20 feet of the Site. If water elevation data from monitoring well MW-1 is removed from the groundwater elevation contour map (MW-1 is screened between 5 and 20 feet bgs), the groundwater flow direction was to the east during the second quarter of 2005 and flat during the third quarter of 2005 (rather than to the southeast).

Current and previous groundwater data can be compared by contouring 2005 groundwater elevation data from the two previously existing wells (MW-1 and MW-3) with the shallow well that replaced MW-2 (MW-2S). If this is done, there is no apparent change in groundwater flow direction between 2005 and previous years. Groundwater flows to the east.

4.2.3 Change in Groundwater Table Elevation

The groundwater table elevation has varied over the history of the Site, sometimes with great rapidity (the groundwater table rose 5.2 feet between September and December 2001 at MW-1). When the excavation for the UST removal was first opened, the groundwater table was located 10 feet below the ground surface (Tank Protect Engineering [TPE] 1996). Recently (August 11, 2005), the groundwater table was 4 to 6 feet bgs (Tait 2005) and has been as close as 1.5 feet to the ground surface (MW-1, May 2005). The current groundwater fluctuations likely are seasonal, resulting from rainfall infiltration.

4.2.4 Probable Groundwater Flow Directions during the 1980s and Early 1990s

Groundwater flow directions during the period prior to the installation of groundwater monitoring wells at the Site cannot be precisely determined. During the early 1980s and 1990s, while the USTs were still in operation and there was an open gravel pit to the west, there would likely have been a groundwater gradient to the west as groundwater was diverted into the open gravel pit. Later, after the gravel pit to the west was closed and new mining operations began to the east, the direction of groundwater flow would likely have shifted to the east (where it is today).

4.2.5 Summary of Local Hydrogeology

In summary, groundwater flow conditions in the vicinity of the former USTs are likely controlled by low permeability barriers (former gravel pits that have been used as desilting basins). Groundwater mounds against the former pits in the overlying, more clayey, formation between the surface and approximately 20 feet bgs. Groundwater then percolates into the main water-bearing formation and moves in an easterly direction from the former UST location toward Alameda Creek. Eventually, the groundwater joins the main aquifer flow along the course of Alameda Creek to the north.

During the early period of UST operations, 1979 to 1990, groundwater in the vicinity of the USTs likely flowed to the west toward the open gravel pit.

The rapid rising and falling of the groundwater table may have spread released petroleum products across the local area. Pockets of free products likely remain in the vadose zone, and within the aquifer in locations where lenses of product can be trapped beneath low-permeability soil lenses.

5.0 HISTORY OF UST OPERATIONS

5.1 Installation

Four USTs were installed at the Site (Groundwater Resource Consultants [GRC] 1986). Their approximate locations are shown on Figure 2 of the Work Plan. The first 10,000-gallon diesel UST (UST D4) was installed at the Site in 1973. Two additional 10,000-gallon USTs were installed in 1979 and 1980. A 2,000-gallon gasoline UST was installed in 1980. These last three tanks are the source of the petroleum hydrocarbons currently being investigated at the Site. At the time of GRC's site investigation in 1985, the four tanks were reported to be in good condition with no evidence of releases.

Tank D4, a half aboveground, half below ground 10,000-gallon diesel tank, was removed from the Site in 1995. The tank had formerly been used in plant operations, not for fueling vehicles. Hence, the number of incidental petroleum releases from this

tank would have been limited. Exploratory trenches were dug across the former tank location. The diesel-range organic compound concentrations detected in soil samples collected from the trench ranged from non-detect to 58 ppm (TPE 1997).

5.2 Condition at Closure

At the time of tank closure in June 1996, the three USTs removed from the asphalt plant area were found to be in good condition with no holes (TPE 1996). A hole one-quarter inch in diameter was detected in a fuel line. UST D4 had been removed from nearby, southeast of the Site, at an earlier date and is not thought to have released significant quantities of diesel fuel to the environment.

5.3 Expected Types of Releases

Based on the report by TPE at the time of the tank closure, it appears that the main sources of petroleum products released to the site vadose zone likely were incidental spills during fueling operations and tank refilling. It is unknown when the hole in the fuel line occurred. While significant quantities of petroleum hydrocarbons could have been released through the hole, the releases would have occurred only during fueling operations and would not have resulted in the release of the entire tank contents.

Figure B-1 shows a graphical representation of the release SCM and the transport mechanisms that could be affecting the movement of the released petroleum products at the Site.

6.0 CURRENT UNDERSTANDING OF THE NATURE AND EXTENT OF CONTAMINATION

6.1 Nature

Incidental releases of diesel fuel and gasoline (including gasoline containing methyl tertiary-butyl ether [MtBE]) occurred at the Site. These products were likely carried in a number of directions by the changing groundwater gradients across the Site. Any residual free product (source material) left in the site subsurface is likely trapped in isolated pockets.

6.2 Horizontal Extent

The highest concentrations of petroleum products, almost entirely gasoline-range hydrocarbons, are currently being detected in groundwater samples collected from groundwater monitoring well MW-7D. This well is located approximately 40 feet west of the former USTs. The petroleum hydrocarbons in the gasoline range (TPHg) detected in groundwater samples collected from MW-7 likely migrated to this area

during gravel mining operations in the current wash water pond when the groundwater gradient would have been strongly to the west from the former UST location. An indication of the relative age of this TPHg is that no MtBE has been detected in groundwater samples collected from MW-7D. Hence, the location of MW-7 and the type of contamination detected in groundwater samples collected at MW-7 are consistent with a groundwater gradient to the west.

While the concentrations of total TPHg detected in groundwater samples collected from this well are relatively higher (83 parts per million [ppm]), there does not appear to be a significant plume of TPHg located downgradient (southeast) from the monitoring well location. It is likely that the relatively higher TPHg concentrations detected in groundwater samples from this well represent a pocket of residual petroleum products that were intersected by the well boring into which monitoring well MW-7D was installed and they do not represent a significant continuing source of contamination to the aquifer. The extent of the TPHg is bounded to the west by MW-8, to the south by MW-2D, and to the east by MW-5D and MW-1. There is no bounding groundwater monitoring well to the north of MW-7D.

The extent of MtBE in the site groundwater appears to be localized around groundwater monitoring wells MW-6S/D. The extent of MtBE in the site groundwater is bounded to the north, east, and west, but not to the south.

6.3 Vertical Extent

The deepest groundwater samples have been collected from wells screened to 30 feet bgs. While the extent of the aquifer is believed to be limited to 40 feet bgs, no borings have been installed to this depth to verify the depth of the water-bearing unit.

6.4 Time History of Petroleum Hydrocarbon Concentrations

Diesel-range total petroleum hydrocarbon (TPHd) concentrations were once as high as 480 ppm, but are now only being detected sporadically in groundwater samples collected at the Site. The only significant TPHd concentrations currently being detected are in groundwater samples collected from monitoring well MW-7S (0.66 ppm).

TPHg concentrations are more persistent. But in wells installed in 1998, TPHg concentrations detected in samples of groundwater have fallen from a maximum of 29 ppm to 0.41 ppm in MW-1; 24 ppm to 0.012 ppm in MW-2; and 0.59 ppm to undetected (less than 0.05 ppm) in MW-3. This is consistent with a widely scattered, discontinuous distribution of petroleum products remaining from releases that took place in the early 1990s rather than a single significant pool of hydrocarbons steadily discharging to site groundwater.

7.0 RECEPTORS/PATHWAYS

Figure B-2 is a schematic showing the complete exposure pathways due to the petroleum releases at the Site. A complete exposure pathway includes a source, a media through which the contamination is moved, and a receptor that comes into contact with the media. For this Site, the source is believed to be incidental releases of petroleum products (including MtBE) and the affected media are soil, groundwater, air, and, potentially, surface water. Potential receptors are site workers and site visitors and, potentially, if the site use were to change, the public through consumption of affected groundwater or surface water.

It is not clear if a complete pathway exists between the site release and surface water. It is not clear if there are sufficient quantities of petroleum products in the groundwater that they could migrate to a groundwater receptor.

7.1 Well Survey

In a partial response to a request by the ACEH for a detailed well survey (ACEH 2005), included as Attachment 2 to the SCM is a map showing wells located within approximately 0.5 mile from the Asphalt Plant. This initial well survey was provided upon request from the Zone 7 Alameda County Water Agency. The map shows the group of monitoring wells (red diamond symbol) located at the Asphalt Plant near the center of the figure, nearby existing water supply wells (blue triangle symbol), and nearby existing cathodic protection wells. The current status of the water supply wells is not known, and additional investigation would be required to confirm the current condition of nearby water supply wells.

8.0 TRANSPORT MECHANISMS

The primary mechanisms affecting the petroleum hydrocarbons in site groundwater are probably dilution and attenuation. A typical hydraulic conductivity for clean gravels is 10 centimeters per second (Holtz and Kovacs 1981, page 210). A typical effective porosity for gravels is 19 percent (U.S. EPA 1989, pages 3-11]. The average hydraulic gradient in the main water-bearing formation in the second and third quarters of 2005 was approximately 0.005 feet per feet to the east. Hence, the average groundwater velocity was approximately 750 feet per day. If the Site is 200 feet wide and 20 feet deep, approximately 1.5 billion gallons of water flow through the Site every year.

While some biological activity is likely taking place at the Site, the rapid dilution that takes place downgradient from the former USTs likely dilutes the petroleum products to a level far below where biological activity can take place. Biological activity in the upper 20 feet of the subsurface is probably more pronounced and may account for the disappearance of TPHd range hydrocarbons from the Site.

A water line is shown crossing the Site in past reports. This water line could be providing a preferential pathway for petroleum migration at the Site. The boring log for MW-2, which contained free product upon installation, indicates that the boring may have intersected utility trench backfill material.

9.0 DATA GAPS

The following data gaps have been identified:

- The horizontal hydraulic gradient in the main water-bearing unit is not well-defined.
- Extent of MtBE in groundwater to the south of groundwater monitoring wells MW-6S/D.
- Extent of TPHg in groundwater to the northwest of MW-7D.
- Extent of TPHg and MtBE in soil and groundwater to the southwest of MW-2.
- The vertical extent of MtBE and TPHg.
- Evaluation of the presence of lead scavengers (ethylene dibromide or 1,2-dichloroethane) in site groundwater.
- The capacity of the site aquifer to retard petroleum transport and degrade petroleum hydrocarbons.

10.0 REFERENCES

Alameda County Environmental Health (ACEH). 2005. Letter to Mr. W.M. Calvert, Mission Valley Rock Company from Mr. Jerry Wickham. November 3.

California Department of Water Resources (DWR). 1980. Bulletin No. 118-80, Ground Water Basins in California, Sunol Ground Water Basin description. Revised May 2.

Groundwater Resource Consultants (GRC). 1986. Hazardous Materials Management Plan. February 27.

Holtz, Robert, and William Kovacs. 1981. An introduction to Geotechnical Engineering, Prentice Hall, New York.

Saia, Robert. 2006. Hanson Operations Manager, Personal Communication, January 10.

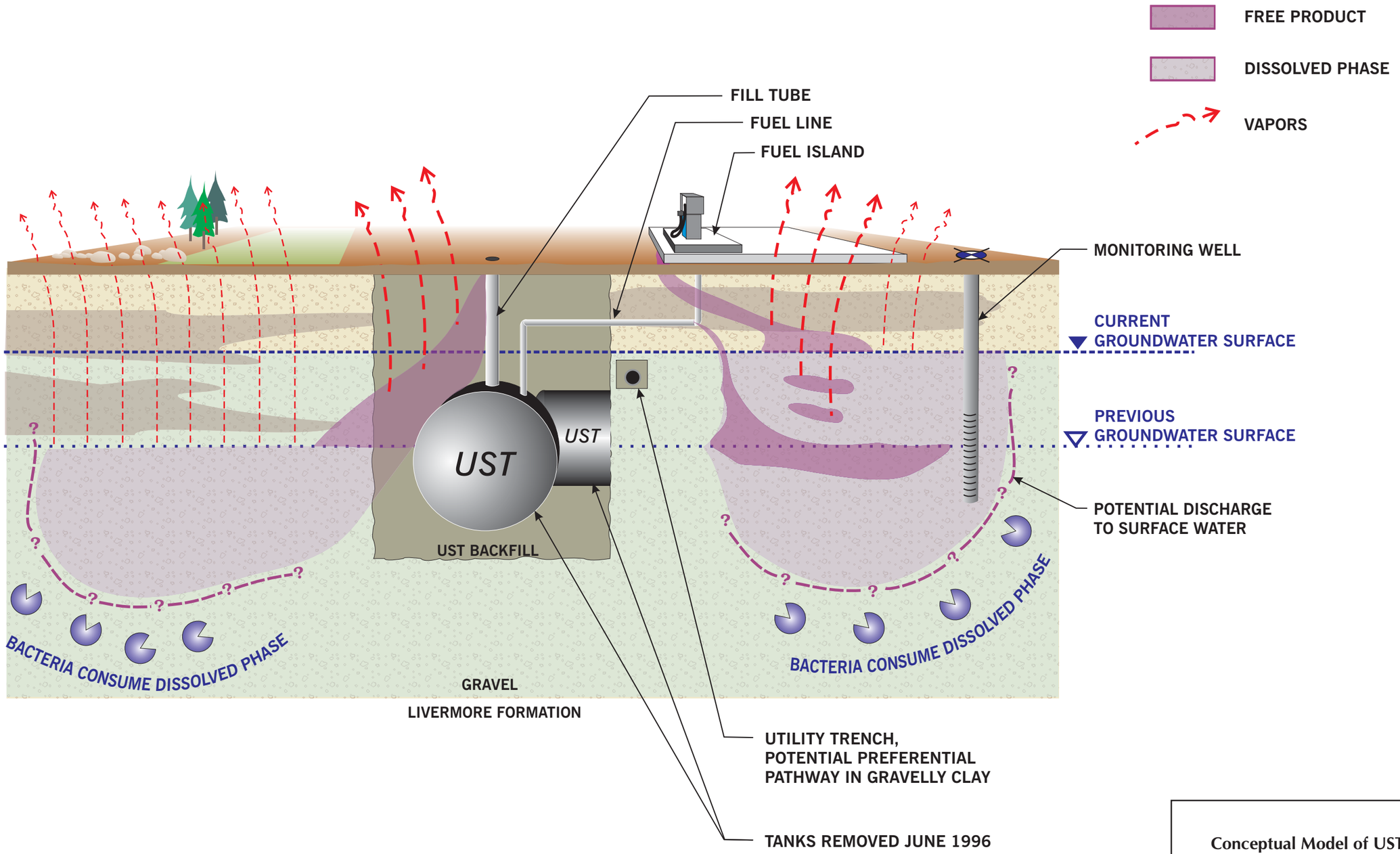
Tait Environmental Management, Inc. (Tait). 2005. Third Quarter 2005 Groundwater Monitoring and Sampling Report, Mission Valley Rock Company. October 14.

Tank Protect Engineering (TPE). 1996. Tank Closure Report, Mission Valley Rock. August 12.

———. 1997. Stockpile Soil Remediation and Exploratory Trenching Report. October 20.

Treadwell & Rollo. 1991. Geotechnical and Geologic Investigation, North Quarry, Sunol, California, Mission Valley Rock Company. August.

U.S. Environmental Protection Agency (U.S. EPA). 1989. Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance, PG89-151047.April.



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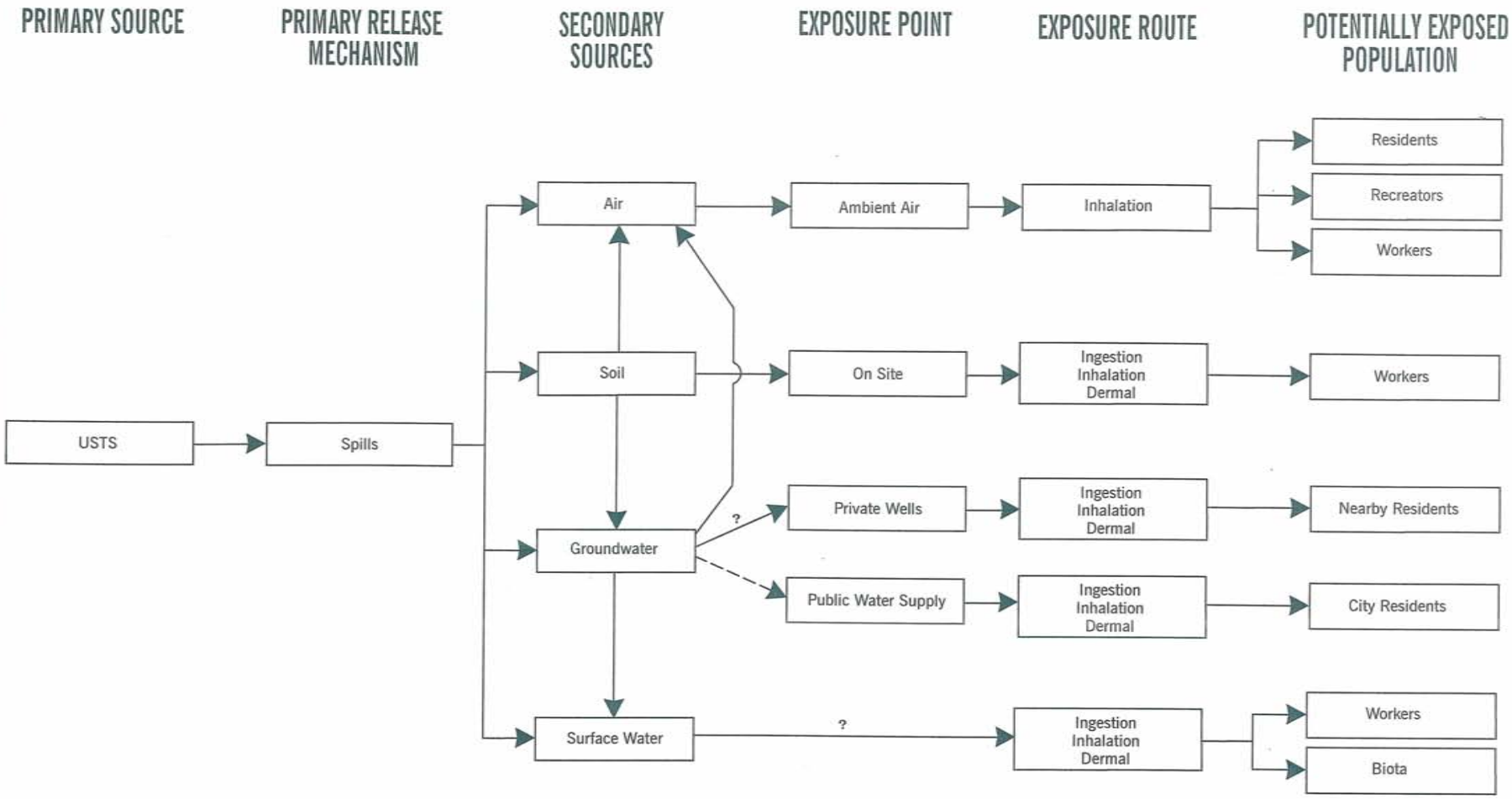
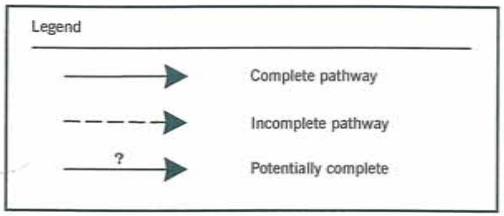
Conceptual Model of UST Fuel Leakage

Hanson Aggregates, Sunol, California

LFR

Figure B-1





Conceptual Site Model for Complete Exposure Pathways

Hanson Aggregates, Sunol, California

LFR LEVINE•FRICKE

Figure B-2

DESIGN\001\09480\00\09480_Conceptual Site Model.ai

ATTACHMENT A

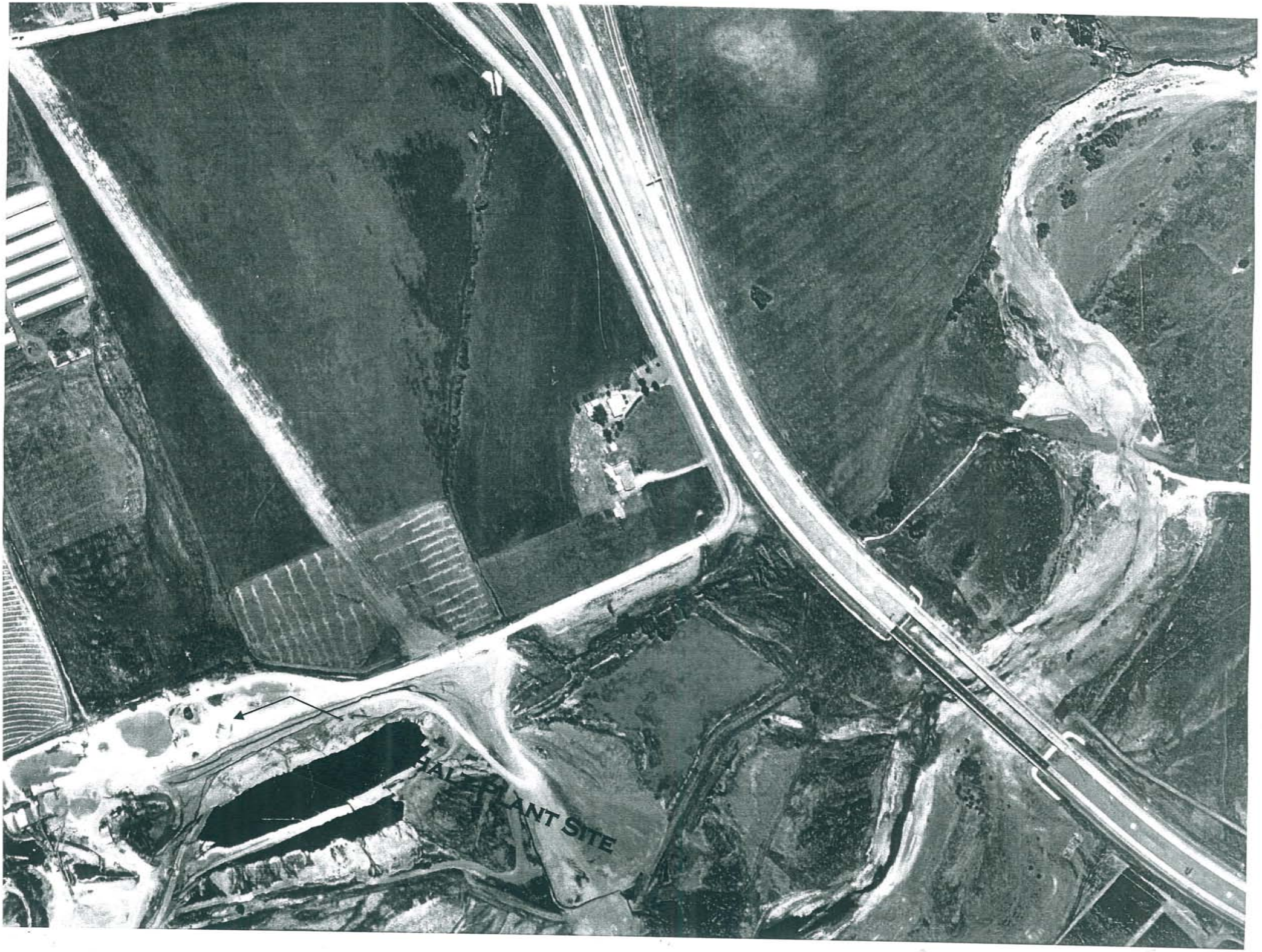
Aerial Photographs


ASPHALT PLANT SITE

Inquiry# 1381909.14
Year: 1939
Flyer: Fairchild
Scale: 1"=555'


ASPHALT PLANT SITE

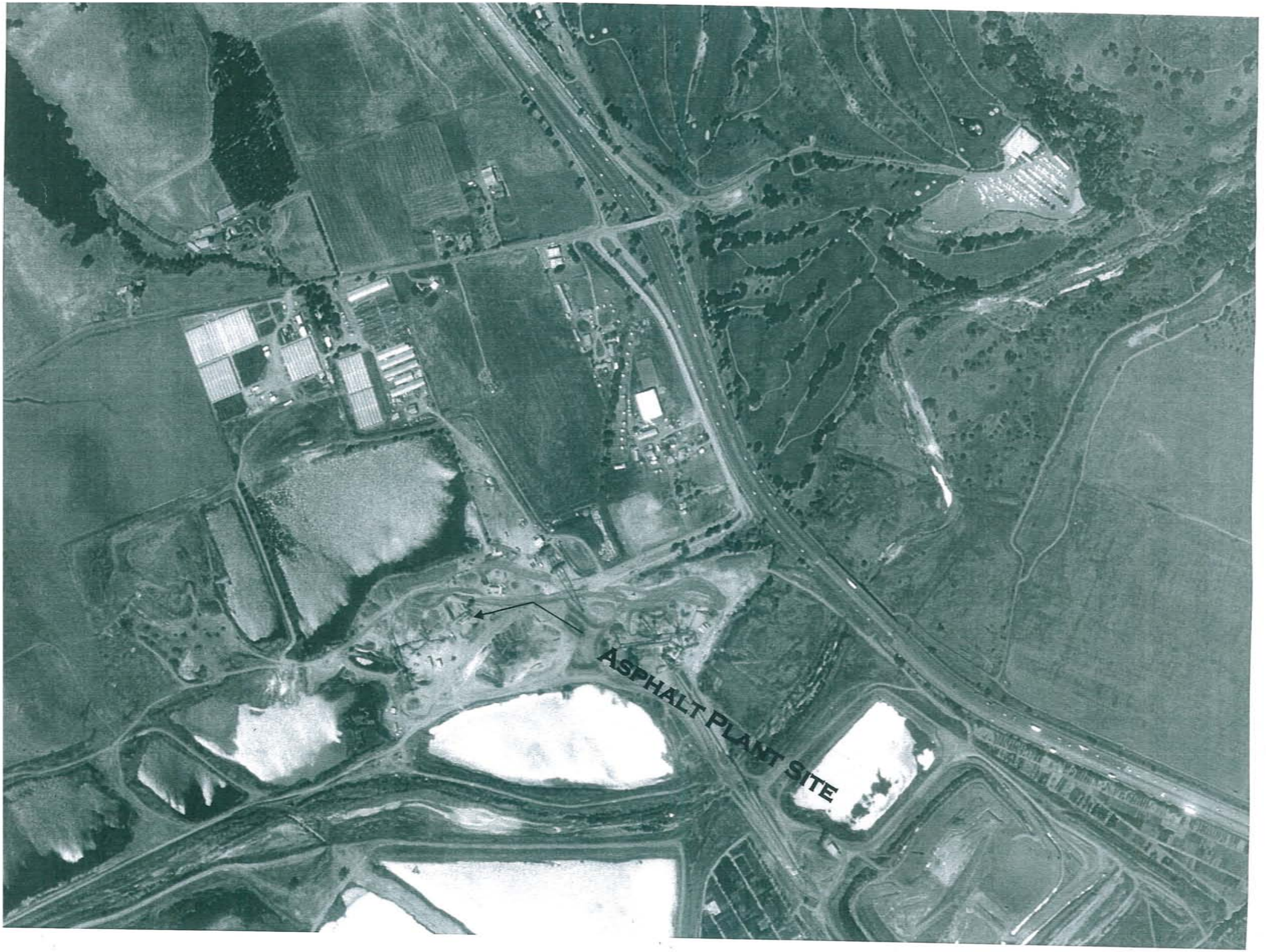
Inquiry# 1381409.14
Year: 1958
Flyer: CARTWRIGHT
Scale: 1"=555'


PLANT SITE

Inquiry# 1381409.14
Year: 1965
Flyer: Cartwright
Scale: 1"=333'


ASPHALT PLANT SITE

Inquiry# 13814 09.14
Year: 1982
Flyer: WSA
Scale: 1"=690'


ASPHALT PLANT SITE

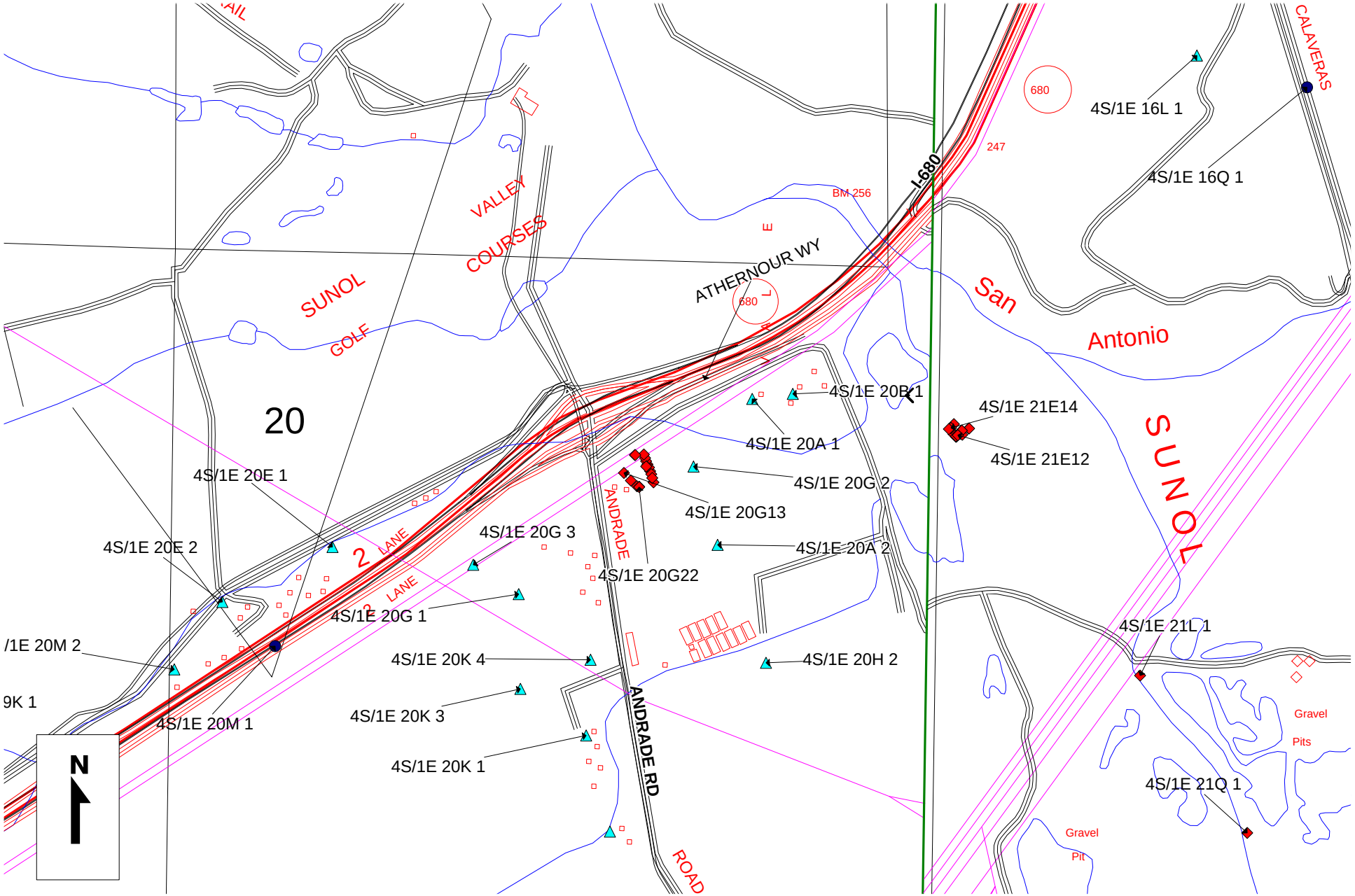
Inquiry# 13814O9.14
Year: 1993
Flyer: USGS
Scale: 1"=666'


ASPHALT PLANT SITE

Inquiry# 13814709.14
Year: 1998
Flyer: USGS
Scale: 1"=666'

ATTACHMENT B

Well Survey Map from the Alameda County Zone 7 Water Agency



	ZONE 7 WATER AGENCY **100 NORTH CANYONS PARKWAY** **LIVERMORE, CA 94551**	**WELL LOCATION MAP**	**SCALE: 1"= 1000 ft** **DATE: 1/13/06** **7999 ATHENOUR WAY** **H:\FLOOD\REFERALLS\REFERALLS.WOR**

APPENDIX C

Health and Safety Plan

Health and Safety Plan
for Additional Investigation at the Asphalt Plant
Activities at
Hanson Aggregates
Mission Valley Rock Facility
7999 ATHENOUR WAY, SUNOL, CALIFORNIA

January 12, 2006
001-09480-00-001

Prepared for
Hanson Aggregates Mid-Pacific Inc.
3555 Vineyard Avenue
Oxnard, California 93030

CONTENTS

1.0 GENERAL

LFR Inc. (LFR) has prepared this Health and Safety Plan (HSP) for use during the soil and groundwater investigation activities to be conducted at the Asphalt Plant Site at the Hanson Aggregates Mission Valley Rock Facility located at 7999 Athenour Way in Sunol, California ("the Site"). Activities conducted under LFR's direction at the Site will be in compliance with applicable Occupational Safety and Health Administration (OSHA) regulations, particularly those in Title 8 California Code of Regulations (CCR) 5192, and other applicable federal, state, and local laws, regulations, and statutes. A copy of this HSP will be kept on site during scheduled field activities.

This HSP addresses the potential hazards associated with planned field activities at the Site. It presents the minimum health and safety requirements for establishing and maintaining a safe working environment during the course of work. In the event of conflicting requirements, the procedures or practices that provide the highest degree of personnel protection will be implemented. If work plan specifications change or if site conditions encountered during the course of the work are found to differ substantially from those anticipated, the Director of Health and Safety must be informed immediately upon discovery, and appropriate changes will be made to this HSP.

It is the Project Manager's responsibility to ensure that health and safety procedures are enforced at the Site. Project personnel, including subcontractors, shall receive a copy of this HSP and sign the form to indicate acceptance before on-site project activities begin.

LFR's health and safety programs and procedures, including medical monitoring, respiratory protection, injury and illness prevention, hazard communication, and personal protective equipment (PPE), are documented in the LFR Corporate Health and Safety Manual. These health and safety procedures are incorporated herein by reference, and LFR employees will adhere to the procedures specified in the manual.

When specified in contract documents, this HSP may cover the activities of LFR subcontractors. However, this HSP may not address hazards associated with tasks and equipment that are specialties of the subcontractor (e.g., operation of a drill rig). Subcontractors are responsible for developing, maintaining, and implementing their own health and safety programs, policies, and procedures.

LFR is responsible for the safety of its employees and subcontractors under its control, but assumes no responsibility for the activities of other contractors or their subcontractors who may be working concurrently at the general project location. LFR will use a reasonable degree of care when marking potentially hazardous areas within its project work site and restricting access as appropriate. LFR will not be responsible for others outside its control who disregard such marked hazards or restricted access. This HSP has been prepared specifically for this project and is intended to address health and safety issues solely with respect to LFR's work. All references, therefore, to

the site, the work, activities, site personnel, workers, persons, or subcontractors in this HSP are with respect to LFR work only.

2.0 SITE DESCRIPTION AND BACKGROUND

The entire Mission Valley Rock Facility comprises approximately 588 acres of non-continuous parcels owned by Hanson Aggregates Mid-Pacific Inc. that are located at 7999 Athenour Way in the City of Sunol, County of Alameda, California.

The Facility consists of irregularly shaped non-contiguous parcels partially bisected by Highway 680. The Site is further described as leased and owner-occupied areas. Hanson Aggregates operates the non-leased acreage. The leased area represents approximately 262 acres of the Facility and are operations of the leased property occur in the southernmost portion of the facility. The Hanson Asphalt Plant operates in the middle portion of the Site. The Asphalt Plant has been in operation since approximately 1980 and was operated by Mission Valley Rock from 1980 into 2005. Three underground storage tanks (USTs), including two 10,000-gallon diesel USTs and one 2,000-gallon gasoline UST were removed in 1996. Soil from around the USTs was excavated and remediation was conducted in the UST excavation for six months before the excavation was backfilled. Several site assessments and investigations have resulted in the installation of more than 10 monitoring wells and the initiation of a quarterly groundwater monitoring program. The depth to groundwater is approximately 5 feet below ground surface and varies a few feet seasonally. The groundwater flow direction has been determined to be due south.

3.0 PLANNED SITE ACTIVITIES

Scheduled work will consist of the following activities:

- Soil borings
- Monitoring Well Installation
- Well Development
- Groundwater Sampling
- Surveying

Work is anticipated to begin during February 2006 and is expected to last approximately two weeks.

4.0 KEY PROJECT PERSONNEL AND RESPONSIBILITIES

Project Manager	William L. Carson, P.E.
Site Safety Officer	C. Lee McIlvaine, P.G.
Corporate Director, Health and Safety	David McElwain

The responsibilities of key project personnel are outlined below.

4.1 Project Manager

The Project Manager has the ultimate responsibility for the health and safety of LFR personnel at the Site. The Project Manager is responsible for:

- ensuring that project personnel review and understand the requirements of this HSP
- keeping the Director of Health and Safety informed of project developments
- keeping on-site personnel, including subcontractors, informed of the expected hazards and appropriate protective measures at the Site
- providing resources necessary for maintaining a safe and healthy work environment for LFR personnel

4.2 Director of Health and Safety

The Director of Health and Safety is responsible for the review, interpretation, and modification of this HSP. Modifications to this HSP that may result in less stringent precautions cannot be undertaken by the Project Manager or Site Safety Officer (SSO) without the approval of the Director of Health and Safety. In addition, he has the following responsibilities:

- advising the Project Manager and SSO on matters relating to health and safety on this project
- recommending appropriate safeguards and procedures
- modifying this HSP, when necessary
- approving changes in health and safety procedures employed at the Site

4.3 Site Safety Officer

The SSO is responsible for enforcing the requirements of this HSP once site work begins. The SSO has the authority to immediately correct situations where noncompliance with this HSP is noted and to immediately stop work in cases where an

immediate danger to site workers or the environment is perceived. Responsibilities of the SSO also include:

- obtaining and distributing personal protective equipment (PPE) and air monitoring equipment necessary for this project
- limiting access at the Site to authorized personnel
- communicating unusual or unforeseen conditions at the Site to the Project Manager
- supervising and monitoring the safety performance of site personnel to evaluate the effectiveness of health and safety procedures and correct deficiencies
- conducting daily tailgate safety meetings before each day's activities begin
- conducting a site safety inspection prior to the commencement of each day's field activities

4.4 Subcontractor Personnel

Subcontractor personnel are expected to comply with the minimum requirements specified in this HSP. Failure to do so may result in the removal of the subcontractor or any of the subcontractor's workers from the job site. Subcontractors may employ health and safety procedures that afford them a greater measure of personal protection than those specified in this plan so long as they do not pose additional hazards to themselves, the environment, or others working in the area.

5.0 HAZARDS OF KNOWN OR EXPECTED CHEMICALS OF CONCERN

Several previous site investigations and assessments have been conducted at the Asphalt Plant Site and a quarterly groundwater monitoring program continues. The investigations have not fully delineated the lateral and vertical extent of impact to groundwater following the removal of three USTs including two 10,000-gallon diesel fuel tanks and one 2,000 gallon gasoline tank in June 1996. Groundwater from one monitoring well (MW-7D) provides many of the highest known concentrations listed in the table below.

Known Compounds	Source (soil/water/drum, etc.)	Known Concentration Range (ppm, mg/kg, mg/l)	
		Lowest	Highest
Gasoline	Soil & Groundwater	ND	83 mg/l
Diesel	Soil & Groundwater	ND	610 mg/l
Benzene	Soil & Groundwater	ND	0.55 mg/l
Toluene	Soil & Groundwater	ND	2.2 mg/l
Ethylbenzene	Soil & Groundwater	ND	4.4 mg/l
Total Xylenes	Soil & Groundwater	ND	10.6 mg/l
MTBE	Soil & Groundwater	ND	1.6 mg/l

Exposure pathways of concern for chemical compounds that may be present at the Site are inhalation of airborne contaminants, direct skin contact with contaminated materials, and incidental ingestion of affected media. Wearing protective equipment and following decontamination procedures listed in Section 9 can minimize dermal contact and incidental ingestion. To minimize inhalation hazards, dust or vapor control measures will be implemented, where necessary, and action levels will be observed during scheduled activities. Site-specific action levels are presented in Section 10. Chemical descriptions of chemicals of concern, including health effects and exposure limits, are located in Appendix A.

In accordance with the Hazard Communication standard, material safety data sheets (MSDSs) will be maintained on site for chemical products used by LFR personnel at the Site. In addition, containers will be clearly labeled in English to indicate their contents and appropriate hazard warnings.

5.1 Air Monitoring

Real-time air monitoring devices will be used to analyze airborne contaminant concentrations every 30 minutes in the workers' breathing zones while workers are in the designated Exclusion Zone. If elevated concentrations are indicated, the monitoring frequency will be increased, as appropriate. The equipment will be calibrated daily, and the results will be recorded on LFR's Air Monitoring form or project log book. The results of air monitoring will be recorded on an LFR Air Monitoring Form or project log book and will be retained in the project files following completion of field activities. A copy of the Air Monitoring Form is located in Appendix B.

On-site worker exposure to airborne contaminants will be monitored during intrusive site activities. A calibrated photoionization detector (PID) with a lamp strength of 10.6 eV or flame ionization detector (FID) will be used to monitor changes in exposure to

volatile organic compounds (VOCs). Personnel will perform routine monitoring during site operations to evaluate concentrations of VOCs in employee breathing zones. If VOCs are detected above predetermined action levels specified in Section 10, the procedures found in Section 7 of this HSP will be followed.

6.0 PHYSICAL HAZARDS

The following potential physical hazards may be encountered during scheduled activities at the Site:

- slips, trips, and falls
- heavy equipment
- heat stress
- cold stress
- noise
- electrical sources
- excavations
- underground and overhead utilities
- materials and equipment handling
- confined space entry
- biological hazards
- elevated work platforms
- fire/explosion
- lightning/electrical storms
- traffic

6.1 General Safe Work Practices

- Workers will thoroughly clean their hands, faces, and other potentially contaminated areas before smoking, eating, or leaving the Site.
- Respiratory devices may not be worn with beards or long sideburns, or under other conditions that prevent a proper seal.
- Accidents and/or injuries associated with work at the Site will be immediately reported to the SSO. If necessary, an incident report will be initiated by the SSO.
- Periodic safety briefings will be held to discuss current site conditions, field tasks being performed, planned modifications, and work concerns.

- Site conditions may include uneven, unstable, or slippery work surfaces. Substantial care and personal observation is required on the part of each employee to prevent injuries from slips, trips, and falls.
- Workers will maintain good housekeeping practices during field activities to maintain a safe working environment. The work site will be kept free of debris, waste, and trash.
- The "buddy system" will be used whenever appropriate.
- To prevent head injury, ANSI-approved hard hats will be worn at all times while the worker is in an area where overhead obstructions or falling objects may be encountered.
- To prevent eye injuries, workers must wear ANSI-approved safety glasses during field activities.

6.2 Heavy Equipment

Equipment, including earth-moving equipment, drill rigs, or other heavy machinery, will be operated in compliance with the manufacturer's instructions, specifications, and limitations, as well as any applicable regulations. The operator is responsible for inspecting the equipment daily to verify that it is functioning properly and safely.

Operation of equipment at the Site for the activities outlined in Section 3 poses potential physical hazards. The following precautions should be observed whenever heavy equipment is in use:

- PPE, including steel-toed boots, safety glasses, and hard hats, must be worn.
- Personnel must be aware of the location and operation of heavy equipment and take precautions to avoid getting in the way of its operation. Workers must never assume that the equipment operator sees them; eye contact and hand signals should be used to inform the operator of intent.
- Traffic safety vests are required for personnel working near mobile heavy equipment or near high traffic areas.
- Personnel should not walk directly in back of, or to the side of, heavy equipment without the operator's knowledge.
- Nonessential personnel will be kept out of the work area.

6.3 Heat Stress

Adverse climate conditions, primarily heat, are important considerations in planning and conducting site operations. Heat-related illnesses range from heat fatigue to heat stroke, with heat stroke being the most serious condition. The effects of ambient temperature can cause physical discomfort, loss of efficiency, and personal injury, and

can increase the probability of accidents. In particular, protective clothing that decreases the body's ventilation can be an important factor leading to heat-related illnesses.

To reduce the possibility of heat-related illness, workers should drink plenty of fluids and establish a work schedule that will provide sufficient rest periods for cooling down. Personnel shall maintain an adequate supply of non-caffeinated drinking fluids on site for personal hydration. Workers should be aware of signs and symptoms of heat-related illnesses, as well as first aid for these conditions. These are summarized in the table below.

Condition	Signs	Symptoms	Response
Heat Rash or Prickly Heat	Red rash on skin.	Intense itching and inflammation.	Increase fluid intake and observe affected worker.
Heat Cramps	Heavy sweating, lack of muscle coordination.	Muscle spasms, and pain in hands, feet, or abdomen.	Increase fluid uptake and rest periods. Closely observe affected worker for more serious symptoms.
Heat Exhaustion	Heavy sweating; pale, cool, moist skin; lack of coordination; fainting.	Weakness, headache, dizziness, nausea.	Remove worker to a cool, shady area. Administer fluids and allow worker to rest until fully recovered. Increase rest periods and closely observe worker for additional signs of heat exhaustion. If symptoms of heat exhaustion recur, treat as above and release worker from the day's activities after he/she has fully recovered.

Condition	Signs	Symptoms	Response
Heat Stroke	Red, hot, dry skin; disorientation; unconsciousness	Lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse.	Immediately contact emergency medical services by dialing 911. Remove the victim to a cool, shady location and observe for signs of shock. Attempt to comfort and cool the victim by administering small amounts of cool water (if conscious), loosening clothing, and placing cool compresses at locations where major arteries occur close to the body's surface (neck, underarms, and groin areas). Carefully follow instructions given by emergency medical services until help arrives.

6.4 Cold Stress

Workers performing activities during winter and spring months may encounter extremely cold temperatures, as well as conditions of snow and ice, making activities in the field difficult. Adequate cold weather gear, especially head and foot wear, is required under these conditions. Workers should be aware of signs and symptoms of hypothermia and frostbite, as well as first aid for these conditions. These are summarized in the table below.

Condition	Signs	Symptoms	Response
Hypothermia	Confusion, slurred speech, slow movement.	Sleepiness, confusion, warm feeling.	Remove subject to warm area, such as truck cab; give warm fluids; warm body core as rapidly as possible; remove outer clothing and wrap torso in blankets with hot water bottle or other heat source. Get medical attention immediately.
Frostbite	Reddish area on skin, frozen skin.	Numbness or lack of feeling on exposed skin.	Place affected extremity in warm, not hot, water, or wrap in warm towels. Get medical attention.

6.5 Noise

Noise may result primarily from the operation of drill rigs and mechanical equipment. The use of heavy equipment may generate noise above the Cal/OSHA permissible exposure limit for noise of 90 dBA for an 8-hour time-weighted average. Workers will wear appropriate hearing protection when operating or working near heavy equipment. If loud noise is present or normal conversation becomes difficult, hearing protection in the form of ear plugs, or equivalent, will be required.

6.6 Electric Shock

Electrical equipment to be used during field activities will be suitably grounded and insulated. Ground fault circuit interrupters (GFCI), or equivalent, will be used with electrical equipment to reduce the potential for electrical shock.

Lockout/tagout procedures in accordance with 8 CCR 3314 will be conducted before activities begin on or near energized or mechanical equipment that may pose a hazard to site personnel. Workers conducting the operation will positively isolate the piece of equipment, lock/tag the energy source, and verify effectiveness of the isolation. Only employees who perform the lockout/tagout procedure may remove their own tags/locks. Employees will be thoroughly trained before initiating this procedure.

6.7 Excavations

A Cal/OSHA Excavation Permit (per 8 CCR 341) will be obtained by the Project Manager prior to the construction of any excavation greater than 5 feet in depth into which an LFR employee is required to descend. **Each** subcontractor whose employees will enter such an excavation is responsible for obtaining a permit from Cal/OSHA for its operations.

A competent person who is capable of identifying existing and predictable hazards in the surroundings, or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them, will be present during excavation activities.

The atmosphere will be tested in excavations greater than 4 feet in depth where oxygen deficiency or toxic or flammable gases are likely to be present before employees are permitted to enter and begin work. The atmosphere should be ventilated and re-tested until flammable gas concentrations less than 10 percent of the lower explosive limit (LEL) are obtained. Worker entry will not be allowed if the oxygen concentration is less than 19.5 percent.

Workers will not enter excavations greater than 5 feet in depth without appropriate protective systems such as benching, sloping, or shoring. Side slopes will not be steeper than 1½:1 without a written report from a qualified civil or geotechnical engineer.

Excavations will be constructed in accordance with the Cal/OSHA Excavation Safety Standard, 8 CCR 1541.

The competent person will inspect excavations daily. If there is evidence that a cave-in or slide is possible, work will cease until the necessary safeguards have been taken. Excavated material will be placed far enough from the edge of the excavation (a minimum of 2 feet) so that it does not fall back into the opening. At the end of each day's activities, open excavations will be clearly marked and secured to prevent nearby workers or unauthorized personnel from entering them. Remote sampling techniques will be the preferred method of sample collection in excavations.

6.8 Underground and Overhead Utilities

Reasonable efforts will be made to identify the location(s) of underground utilities (e.g., pipes, electrical conductors, fuel lines, and water and sewer lines) before mechanized soil intrusive work is performed. The state underground utility notification authority (e.g., USA, Dig Alert, Blue Stake) will be contacted prior to the start of intrusive field activities in accordance with local notification requirements. In areas not evaluated by the underground utility notification authority, and a reasonable potential for underground utilities exists, one or more of the following techniques will be employed to determine the location of subsurface structures:

- contracting the services of a qualified private utility locator
- having a survey of the subject area conducted by staff trained in the use of subsurface utility locating equipment
- subsurface testing (i.e., potholing) to the expected depth of probable utilities (not less than 5 feet)

If utilities cannot be located or if unlocated utilities are suspected to be present, subsurface activities (i.e., borings, excavation) should not be conducted before the location(s) or absence of underground utilities is confirmed.

Equipment with articulated upright booms or masts shall not be permitted to pass within 20 feet of an overhead utility line (less than 50 kV) while the boom is in the upright position. For transmission lines in excess of 50 kV, an additional distance of 4 inches for each 10 kV over 50 kV will be used.

6.9 Materials and Equipment Handling Procedures

The movement and handling of equipment and materials on the Site pose a risk to workers in the form of muscle strains and minor injuries. These injuries can be avoided by using safe handling practices, proper lifting techniques, and proper personal safety equipment such as steel-toed boots and sturdy work gloves. Where practical, mechanical devices will be utilized to assist in the movement of equipment and

materials. Workers will not attempt to move heavy objects by themselves without using appropriate mechanical aids such as drum dollies or hydraulic lift gates.

6.10 Confined Space Entry

Entry into confined spaces will be conducted in strict accordance with 8 CCR 5157. Before workers may enter a permit-required confined space, an entry permit must be completed and approved by the Director of Health and Safety and all requirements for entry must be met. Confined spaces may be described as having, but not being limited to, the following characteristics:

- is large enough to permit an employee to enter and perform work
- has limited or restricted means of entry and exit
- is not equipped, designed, or intended for continuous human occupancy

In addition, one or more of the following conditions may be present in a permit-required confined space:

- contains or has the potential to contain a hazardous atmosphere
- contains or has the potential to contain a material with the potential to engulf or entrap an employee
- is so configured that an employee may become trapped, disoriented, or asphyxiated by wall configurations or smaller cross sections
- contains any other established safety or health hazards, such as energized equipment or moving parts

All fluid, electrical, and steam lines and other sources of energy into confined spaces must be completely isolated before entry. The following conditions must be met before entry is permissible (air monitoring may be necessary to verify these conditions):

- Flammable vapor must be at a concentration less than 10 percent of the lower explosive limit (LEL).
- Oxygen must be at a concentration greater than 19.5 percent and less than 23.5 percent.
- Toxic substances must be at a concentration less than their respective permissible exposure limits.

In addition, the following roles must be designated before entry into permit-required confined spaces is allowed: Entry Supervisor; Attendant; and Authorized Entrant(s). Only trained and properly equipped personnel may conduct permit-required confined space operations.

6.11 Biological Hazards

Biological hazards that may be encountered at the Site include possible exposure to:

- **Sanitary Waste**. Some work activities (i.e., sewer video surveys or source sampling) may potentially expose site workers to sanitary waste streams. A variety of chemicals and microbial pathogens are generally associated with sanitary waste. Persons handling sewage-affected materials will employ Universal Precautions and will wear prescribed PPE (latex in lieu of nitrile gloves). Potentially exposed personnel will be offered the opportunity to receive hepatitis B (HbB) vaccinations prior the start of activities. Whenever possible, LFR personnel should avoid contact with sewage or sewage-affected equipment.
- **Fur-bearing animals**. Animals may potentially carry the rabies virus or ticks that may transmit Lyme disease to humans. Avoid contact. Do not attempt to feed or touch.
- **Poisonous reptiles**. Primarily snakes (rattlesnake, water moccasin, copperhead). Avoid contact and areas that may harbor snake populations including high grass, shrubs, and crevices.
- **Poisonous insects**. Common examples include bees and wasps. Avoid contact with insects and their hives.
- **Spiders**. The black widow and brown recluse spiders are the most venomous. Avoid contact with spiders and areas where they may hide.
- **Poisonous plants**. Common examples include poison ivy and poison oak. Avoid contact. Long-sleeved shirts and pants will allow some protection against inadvertent contact.

If any biological hazards are identified at the Site, workers in the area will immediately notify the SSO and other site personnel.

6.12 Elevated Work Platforms

When working at heights that expose employees to falls greater than 6 feet, especially on sloping roofs and elevated platforms, the requirements of 8 CCR 1670 shall be observed. In such instances, a safety harness shall be worn and the lanyard secured at a level not lower than the employee's waist, limiting the fall distance to a maximum of 4 feet.

Elevated work platforms shall be constructed, used, and maintained in accordance with Articles 21 and 22 of the Cal/OSHA Construction Safety Orders. Scaffolds and hoisting lines shall be inspected daily by a competent person to verify the integrity of the components. If a material is determined to be defective, it may not be used for any purpose and will be replaced immediately.

6.13 Fire/Explosion

Site workers should have an increased awareness concerning fire and explosion hazards whenever working with or near flammable materials, especially when performing any activity that may generate sparks, flame, or other source of ignition. Intrinsically safe equipment is required when working in or near environments with the potential for an explosive atmosphere. The SSO will verify facility requirements for a "hot work" permit before activities that may serve as a source of ignition are conducted.

Flammable materials will be kept away from sources of ignition. In the event of fire, work will cease, the area will be evacuated, and the local fire response team will be notified immediately. Only trained, experienced fire fighters should attempt to extinguish substantial fires at the Site. Site personnel should not attempt to fight fires, unless properly trained and equipped to do so. A fully charged ABC dry chemical fire extinguisher will be readily available for use during all scheduled activities at the Site.

6.14 Lightning/Electrical Storms

Lightning can be unpredictable and may strike many miles in front of, or behind, a thunderstorm. Workers will therefore cease field operations at the **first** sign of a thunderstorm and suspend activities until at least 30 minutes after the last observed occurrence of lightning or thunder. For purposes of this HSP, signs of a thunderstorm will include any visible lightning or audible thunder.

In the event of a thunderstorm, workers will take the following actions:

- Get inside a permanent building structure (not a shed or canopy) or fully enclosed metal vehicle (not a convertible or camper shell) with the windows fully up.
- Stay away from tall isolated objects, such as trees, drill rigs, telephone poles, or flag poles.
- Avoid large open areas, such as fields or parking lots, where a person is the relatively highest object.
- Stay away from lakes, ponds, railroad tracks, fences, and other objects that could transmit current from a distant lightning strike.

6.15 Traffic

Vehicular traffic presents opportunities for serious injury to persons or property. Traffic may consist of street traffic or motor vehicles operated by facility employees or visitors to the Site. Workers and other pedestrians are clearly at risk during periods of heavy traffic. Risk from motor vehicle operations may be minimized by good operating practices and alertness, and care on the part of workers and pedestrians.

Site personnel will wear high-visibility safety vests whenever activities are conducted in areas of heavy traffic. Work vehicles will be arranged to be used as a barrier between site workers and nearby traffic. If required by local ordinances or site location, a traffic control plan will be developed implemented.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The purpose of PPE is to protect employees from hazards and potential hazards they are likely to encounter during site activities. The amount and type of PPE used will be based on the nature of the hazard encountered of anticipated. Respiratory protection will be utilized when an airborne hazard has been identified using real-time air monitoring devices, or as a precautionary measure in areas designated by the Director of Health and Safety or SSO.

Dermal protection, primarily in the form of chemical-resistant gloves and coveralls, will be worn whenever contact with chemically affected materials (e.g., soil, groundwater, sludge) is anticipated, without regard to the level of respiratory protection required.

LFR personnel will be provided with appropriate personal safety equipment and protective clothing. The SSO is to inform each worker about necessary protection and must provide proper training in the use of the safety equipment. The required PPE to be worn is described below.

7.1 Conditions Requiring Level D Protection

In general, site activities will commence in Level D PPE unless otherwise specified, or if the SSO determines on site that a higher level of PPE is required. Air monitoring of employee breathing zones will be routinely conducted using real-time air monitoring devices to determine if upgrading to Level C PPE is necessary. Level D PPE will be permitted as long as air monitoring data indicate that airborne concentrations of chemicals of concern are maintained below the site-specific action levels defined in Section 10.

It is important to note that dermal protection is required whenever contact with chemically affected soils or groundwater is anticipated. The following equipment is specified as the minimum PPE required to conduct activities at the Site:

- work shirt and long pants
- ANSI-approved steel-toed boots or safety shoes
- ANSI-approved safety glasses
- ANSI-approved hard hat

Other personal protection readily available for use, if necessary, includes the following:

- outer nitrile gloves and inner nitrile surgical gloves when direct contact with chemically affected soils or groundwater is anticipated (nitrile surgical gloves may be used for collecting or classifying samples as long as they are removed and disposed of immediately after each sampling event)
- chemical-resistant clothing (e.g., Tyvek or polycoated Tyvek coveralls) when contact with chemically affected soils or groundwater is anticipated
- safety shoes/boots with protective overboots or knee-high PVC polyblend boots when direct contact with chemically affected soils is anticipated
- hearing protection
- sturdy work gloves

7.2 Conditions Requiring Level C Protection

If air monitoring indicates that the site-specific action levels defined in Section 10 are exceeded, workers in the affected area(s) will upgrade PPE to Level C. In addition to the protective equipment specified for Level D, Level C also includes the following:

- NIOSH-approved half- or full-face air-purifying respirator (APR) equipped with filter cartridges as specified in Section 10.0. Note: safety glasses are not required when wearing a full-face APR.
- chemical-resistant clothing (e.g., Tyvek, polycoated Tyvek, or Saranex coveralls) when contact with chemically affected soils or groundwater is anticipated
- outer nitrile gloves and inner nitrile surgical gloves when direct contact with chemically affected soils or groundwater is anticipated (nitrile surgical gloves may be used for collecting or classifying samples as long as they are removed and disposed of immediately after each sampling event)
- safety shoes/boots with protective overboots or knee-high PVC polyblend boots when direct contact with chemically affected soils is anticipated

Respirators will be stored in clean containers (i.e., self-sealing bag) when not in use. Respirator cartridges will be replaced in accordance with the following change-out schedule.

Type of Cartridge	Cartridge Change-out Schedule
Particulate (i.e., HEPA)	At least weekly or whenever the employee detects an increase in breathing resistance. This will occur as the filter becomes loaded with particulate matter.
Sorbent (i.e., organic vapor)	At the end of each day's use or whenever the employee detects an abnormal odor or other indicator.

Personnel who wear air-purifying respirators will be trained in their use and must have successfully passed a qualitative respiratory fit test in accordance with and 8 CCR 5144 within the last 12 months.

7.3 Conditions Requiring Stoppage of Work

If air monitoring indicates that the site-specific action levels defined in Section 10 are exceeded, activities must cease, and personnel must evacuate the Exclusion Zone (see Section 9). The Project Manager and Director of Health and Safety will be contacted immediately.

8.0 SAFETY PROCEDURES AND SITE REQUIREMENTS

A daily morning briefing to cover safety procedures and contingency plans in the event of an emergency is to be included with a discussion of the day's activities. These daily meetings will be recorded on LFR Daily Tailgate Safety Meeting Forms. A debriefing to cover the activities is to be held upon completion of the work. A copy of the Daily Tailgate Safety Meeting Form is included in Appendix B.

The SSO will conduct a safety inspection of the work site before each day's activities begin to verify compliance with the requirements of the HSP. Results of the first day's inspection will be documented on an LFR Site Safety Checklist. A copy of the checklist is included in Appendix B.

Minimum emergency equipment maintained on site will include a fully charged 20-pound ABC dry chemical fire extinguisher, an adequately stocked first aid kit, and an emergency eyewash station (when corrosive chemicals are present).

8.1 Training Requirements

Site personnel, including subcontractors and visitors conducting work in controlled areas of the Site, must have completed the appropriate training as required by 8 CCR 5192. Further site-specific training will be conducted by the SSO prior to the initiation of project activities. This training will include, but will not necessarily be limited to, emergency procedures, site control, personnel responsibilities, and the provisions of this HSP.

General site workers (such as equipment operators, general laborers, and supervisory personnel) engaged in hazardous substance removal or other activities that could expose them to hazardous substances must have successfully completed an initial 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course. In addition, each employee must have attended an eight-hour annual HAZWOPER refresher training course within the past 12 months if their initial 40-hour HAZWOPER training course was completed more than 12 months prior.

8.2 Medical Surveillance Requirements

Site personnel, including subcontractors and site visitors, who will or may work in an area designated as an exclusion zone must have fulfilled the appropriate medical monitoring requirements in accordance with 8 CCR 5192(f). Each individual entering an exclusion zone must have completed an annual surveillance examination and/or an initial baseline examination within the last 12 months.

9.0 SITE CONTROL MEASURES

Procedures must be followed to maintain site control so that persons who may be unaware of site conditions are not exposed to hazards. The work area will be barricaded by tape, warning signs, or other appropriate means. Pertinent equipment or machinery will be secured and stored safely.

Access inside the specified work area will be limited to authorized personnel. Only LFR employees and designated LFR subcontracted personnel, as well as designated employees of the client, will be admitted to the work site. Personnel entering the work area are required to sign the signature page of this HSP, indicating they have read and accepted the health and safety practices outlined in this plan.

9.1 Establishing Work Zones

In some instances it may be necessary to define established work zones: an Exclusion Zone, a Contamination Reduction Zone, and a Support Zone. Work zones may be established based on the extent of anticipated contamination, projected work activities, and the presence or absence of non-project personnel. The physical dimensions and applicability of work zones will be determined for each area based on the nature of job activity and hazards present. Within these zones, prescribed operations will occur using appropriate PPE. Movement between zones will be controlled at checkpoints.

Considerable judgment is needed to maintain a safe working area for each zone, balanced against practical work considerations. Physical and topographical barriers may constrain ideal locations. Field measurements combined with climatic conditions may, in part, determine the control zone distances. Even when work is performed in an area that does not require the use of chemical-resistant clothing, work zone procedures may still be necessary to limit the movement of personnel and retain adequate site control.

Personnel entering the designated Exclusion Zone should exit at the same location. There must be an alternate exit established for emergency situations. In all instances, worker safety will take precedence over decontamination procedures. If decontamination of personnel is necessary, exiting the Site will include the decontamination procedures described below.

9.2 Decontamination Procedures

Despite protective procedures, personnel may come in contact with potentially hazardous compounds while performing work tasks. If so, decontamination needs to take place using an Alconox or TSP wash, followed by a rinse with clean water. Standard decontamination procedures for levels C and D are as follows:

- equipment drop
- boot cover and outer glove wash and rinse
- boot cover and outer glove removal
- suit wash and rinse
- suit removal
- safety boot wash and rinse
- inner glove wash and rinse
- respirator removal
- inner glove removal
- field wash of hands and face

Workers should employ only applicable steps in accordance with level of PPE worn and extent of contamination present. The SSO shall maintain adequate quantities of clean water to be used for personal decontamination (i.e., field wash of hands and face) whenever a suitable washing facility is not located in the immediate vicinity of the work area. Disposable items will be disposed of in an appropriate container. Wash and rinse water generated from decontamination activities will be handled and disposed of properly. Non-disposable items may need to be sanitized before reuse. Each site worker is responsible for the maintenance, decontamination, and sanitizing of his/her own PPE.

Used equipment may be decontaminated as follows:

- An Alconox or TSP and water solution will be used to wash the equipment.
- The equipment will then be rinsed with clean water.

Each person must follow these procedures to reduce the potential for transferring chemically affected materials off site.

10.0 ACTION LEVELS

The following action levels were developed for exposure monitoring with real-time air monitoring instruments as specified in Section 5.1. Air monitoring data will determine the required respiratory protection levels at the Site during scheduled intrusive

activities. The action levels are based on sustained readings indicated by the instrument(s). Air monitoring will be performed and recorded at up to 30-minute intervals.

If elevated concentrations are indicated, the monitoring frequency will be increased, as appropriate. If during this time, sustained measurements are observed, the following actions will be instituted, and the Project Manager and Director of Health and Safety will be notified. For purposes of this HSP, sustained readings are defined as the average airborne concentration maintained for a period of one (1) minute.

Activity	Action Level	Level of Respiratory Protection
Boring and Monitoring Well Installation	< 5 ppm above background	Level D: No respiratory protection required.
	5 to 25 ppm	Level C: Half- or full-face air-purifying respirator fitted with organic vapor filter cartridges.
	> 25 ppm	Cease operations and evacuate work area. Contact Director of Health and Safety and Project Manager immediately.

11.0 CONTINGENCY PROCEDURES

In the event of an emergency, site personnel will signal distress with three blasts of a horn (a vehicle horn will be sufficient), or other predetermined signal. Communication signals, such as hand signals, must be established where communication equipment is not feasible or in areas of loud noise.

It is the SSO's duty to evaluate the seriousness of the situation and to notify appropriate authorities. Section 12 of this plan contains emergency telephone numbers as well as directions to the hospital. Nearby telephone access must be identified and available to communicate with local authorities. If a nearby telephone is not available, a cellular telephone will be maintained on site during work activities.

Personnel should contact local emergency services in the event of an emergency (see Section 12). After emergency services are notified, the Project Manager and Director of Health and Safety will be notified of the situation as soon as possible. If personal injury, property damage, or equipment damage occurs, the Project Manager and LFR Corporate Administration will be contacted as soon as practicable. An Incident Report form will be completed within 24 hours by the SSO or another designated person. A copy of the LFR Incident Report form is included in Appendix B.

11.1 Injury/Illness

If an exposure or injury occurs, work will be temporarily halted until an assessment can be made of whether it is safe to continue work. The SSO, in consultation with the Director of Health and Safety, will make the decision regarding the safety of continuing work. The SSO will conduct an investigation to determine the cause of the incident and steps to be taken to prevent recurrence.

In the event of an injury, the extent and nature of the victim's injuries will be assessed and first aid will be rendered as appropriate. If necessary, the individual may be transported to the nearby medical center. The mode of transportation and the eventual destination will be based on the nature and extent of the injury. A hospital route map is presented in Appendix C.

In the event of a life-threatening emergency, the injured person will be given immediate first aid and emergency medical services will be contacted by dialing the number listed in Section 12. The individual rendering first aid will follow directions given by emergency medical personnel via telephone. When working in areas where medical services are not readily available, a person trained in first aid/CPR techniques will be present during field activities.

11.2 Fire

In the event of fire, personnel should contact the local fire department immediately by dialing 911. When representatives of the fire department arrive, the SSO, or designated representative, will advise the commanding officer of the location, nature, and identification of hazardous materials on site. Only trained, experienced fire fighters should attempt to extinguish substantial fires at the Site. Site personnel should not attempt to fight fires, unless properly trained and equipped to do so.

Smoking is not permitted in controlled areas (i.e., exclusion or contamination reduction zones), near flammable or combustible materials, or in areas designated by the facility as non-smoking areas.

11.3 Underground Utilities

In the event that an underground conduit is damaged during excavation or drilling, mechanized equipment will immediately be shut off until the nature of the piping can be determined. Depending on the nature of the broken conduit (e.g., natural gas, water, or electricity), the appropriate local utility will be contacted.

11.4 Evacuation

The SSO will designate evacuation routes and refuge areas to be used in the event of an emergency. Site personnel will stay upwind from vapors or smoke and upgradient from spills. If workers are in an Exclusion or Contamination Reduction Zone at the start of an emergency, they should exit through the established decontamination areas whenever possible. If evacuation cannot be done through an established decontamination area, site personnel will go to the nearest safe location and remove contaminated clothing there or, if possible, leave it near the Exclusion Zone. Personnel will assemble at the predetermined refuge following evacuation and decontamination. The SSO, or designated representative, will count and identify site personnel to verify that all have been evacuated safely.

11.5 Hazardous Material Spill

If a hazardous material spill occurs, site personnel should locate the source of the spill and determine the hazard to the health and safety of site workers and the public. Attempt to stop or reduce the flow if it can be done without risk to personnel. Isolate the spill area and do not allow entry by unauthorized personnel. De-energize sources of ignition within 100 feet of the spill, including vehicle engines. Should a spill be of the nature or extent that it cannot be safely contained, or poses an imminent threat to human health or the environment, an emergency cleanup contractor will be called out as soon as possible. Spill containment measures listed below are examples of responses to spills.

- Right or rotate containers to stop the flow of liquids. This step may be accomplished as soon as the spill or leak occurs, providing it is safe to do so.
- Sorbent pads, booms, or adjacent soil may be used to dike or berm materials, subject to flow, and to solidify liquids.
- Sorbent pads, soil, or booms, if used, shall be placed in appropriate containers after use, pending disposal.
- Contaminated tools and equipment shall be collected for subsequent cleaning or disposal.

12.0 EMERGENCY CONTACTS

Emergency Services (Police/Fire Department/Ambulance):	911
National Response Center:	(800) 424-8802
Poison Control Center:	(800) 876-4766 or (800) 222-1222
CHEMTREC:	(800) 424-9300
LFR Director of Health and Safety (Costa Mesa, CA):	(714) 755-7237
Cell Phone:	(714) 474-1020
LFR Corporate Administration contact (Lori Clark; Emeryville, CA):	(510) 596-9604
LFR Project Manager:	(510) 596-9671
Cell Phone:	(510) 816-6467
LFR Emeryville office:	(510) 652-4500
Client Contact (Mort Calvert):	(925) 862-0229
Alt Client Contact (Bob Saia)	(925) 862-2236

Nearby Hospital: **(925) 275-9200**

SAN RAMON VALLEY REGIONAL HOSPITAL
6001 NORRIS CANYON ROAD
SAN RAMON, CALIFORNIA 94583

Directions to Hospital:

Summary: 17.2 miles (22 minutes)

Time	Mile	Instruction	For	Toward
9:00 AM	**0.0**	**Depart Mission Valley Rock Facility [7999 Athenour Way, Sunol, CA 94586] on Athenour Way (West)**	**0.3 mi**	
9:01 AM	0.3	Turn RIGHT (North) onto Andrade Rd, then immediately turn RIGHT (North-East) onto Ramp	0.2 mi	
9:01 AM	0.5	Merge onto I-680 [Sinclair Fwy]	15.4 mi	
9:18 AM	16.0	Turn RIGHT onto Ramp	0.3 mi	Crow Canyon Road / San Ramon
9:19 AM	16.2	Turn RIGHT (East) onto Crow Canyon Rd	0.6 mi	
9:20	16.8	Turn RIGHT (South) onto Alcosta Blvd	0.4	

AM			mi
9:22 AM	17.2	Turn LEFT (North-East) onto Norris Canyon Rd	10 yds
9:22 AM	**17.2**	**Arrive San Ramon Regional Medical Center [6001 Norris Canyon Rd, San Ramon, CA 94583]**	

SUMMARY

Driving distance: 17.2 miles
Trip duration: 22 minutes
Driving time: 22 minutes
Cost: $1.68

A hospital route map is presented in Appendix C.

13.0 LFR APPROVALS

This HSP has been prepared for the following project:

Additional Investigation at the Asphalt Plant
Hanson Aggregates Mid-Pacific Inc.
Mission Valley Rock Facility
7999 Athenour Way
Sunol, California

LFR Project Number: 001-09480-00 Phase 001

This HSP has been reviewed and approved by the following LFR personnel:

C. Lee McIlvaine, P.G. Date
Site Safety Officer

William L. Carson, P.E. Date
Project Manager

David McElwain Date
Corporate Director, Health and Safety

SIGNATURE PAGE

The following signatures indicate that this Health and Safety Plan has been read and accepted by LFR personnel as well as subcontractors and their personnel.

NAME	COMPANY	SIGNATURE	DATE

Important notice to subcontractor(s):

This Health and Safety Plan has been prepared solely for the use of LFR personnel. It is supplied to you for informational purposes only and may not be relied upon for protection of your employees. The Subcontractor is responsible for providing, at its cost, all personal protective clothing and equipment required for its employees to perform their work in a safe manner and in compliance with all applicable state and federal OSHA regulations. Subcontractor is responsible for ensuring that such equipment is in good condition and is properly inspected and maintained. Subcontractor must, at a minimum, use the equipment and follow the procedures described in this HSP. Failure to do so may result in immediate termination of Subcontractor's services. This does not relieve Subcontractor of the responsibility to provide equipment and institute procedures affording a greater degree of protection than those specified in this HSP should Subcontractor determine such measures are necessary to protect the health and welfare of its employees, second-tier subcontractors, or others under its control or direction.

APPENDIX A

CHEMICAL DESCRIPTIONS

CHEMICAL DESCRIPTIONS

The following chemical descriptions are presented for chemicals that may be present at the Site. Each chemical description includes physical and odor recognition characteristics, health effects associated with exposure, and exposure limits expressed as an eight-hour time weighted average (TWA). Provided are federal OSHA ("OSHA") permissible exposure limits (PELs; located in 29 CFR 1910.1000); California OSHA ("Cal/OSHA") PELs (located in 8 CCR 5155); and American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).

CHEMICAL DESCRIPTIONS

The following chemical descriptions are to be used for chemicals that may be present at the Site. Each chemical description includes physical and odor recognition characteristics, the health effects associated with exposure, and exposure limits expressed as an 8-hour time-weighted average (TWA). Provided are federal OSHA (OSHA) permissible exposure limits (PELs; located in 29 CFR 1910.1000); California OSHA (Cal/OSHA) PELs (located in 8 CCR 5155); and the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLVs).

BENZENE

Benzene is a clear, volatile liquid. It is colorless, highly flammable, and toxic, with a characteristic odor. It is a severe eye and moderate skin irritant. Human effects by inhalation and ingestion include euphoria, changes in sleep and motor activity, nausea and vomiting, other blood effects, dermatitis, and fever. In industry, inhalation is the primary route of chronic benzene poisoning. If the liquid is aspirated into the lung it may cause pulmonary edema. Poisoning by skin contact has also been reported. Exposure to high concentrations (3,000 ppm) may result in acute poisoning, which is characterized by the narcotic action of benzene on the central nervous system. Chronic poisoning occurs most commonly through inhalation and dermal absorption. Benzene is a known human carcinogen that can cause leukemia.

- The OSHA PEL is listed as 1 ppm.
- The Cal/OSHA PEL is listed as 1 ppm.
- The TLV is listed as 0.5 ppm.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

WARNING: This chemical is known to the State of California to cause cancer.

WARNING: This chemical is known to the State of California to cause birth defects or other reproductive harm.

DIESEL FUEL

Diesel fuel is a gas oil fraction available in various grades as required by different engines. Composition of diesel varies in ratios of predominantly aliphatic, olefinic, cycloparaffinic, aromatic hydrocarbons, and additives.

It is a severe skin irritant and ingestion of diesel can lead to systemic effects such as gastrointestinal irritation, vomiting, diarrhea, and, in severe cases, drowsiness and central nervous system depression, progressing to coma and death. Absorption of diesel fuel can cause hemorrhaging and pulmonary edema, progressing to pneumonitis and renal involvement. It is combustible when exposed to heat or flame, and can react with strong oxidizing materials.

- No OSHA PEL or Cal/OSHA PEL is listed for diesel.
- The TLV is listed as 100 mg/m^3 as total hydrocarbons (vapor and aerosol).

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

WARNING: The exhaust from this chemical is known to the State of California to cause cancer.

ETHYLBENZENE

Ethylbenzene is a clear, colorless liquid. It is mildly toxic by inhalation and skin contact. Inhalation can cause eye, sleep, and pulmonary changes. It is an eye and skin irritant at levels as low as 0.1% (1,000 ppm) of the vapor in air. At higher concentrations, it is extremely irritating at first, then can cause dizziness, irritation of the nose and throat, and a sense of constriction in the chest. Exposure to high concentrations of ethylbenzene vapor may result in irritation of the skin and mucous membranes, dizziness, irritation of the nose and throat, and a sense of constriction of the chest.

- The OSHA PEL is listed as 100 ppm.
- The Cal/OSHA PEL is listed as 100 ppm.
- The TLV is listed as 100 ppm.

GASOLINE

Gasoline is produced from the light distillates during petroleum fractionation. Its major components include paraffins, olefins, naphthenes, aromatics, and recently ethanol. Gasoline also contains various functional additives as required for different uses, such as antiknock fluids, antioxidants, metal deactivators, corrosion inhibitors, anti-icing agents, preignition preventers, upper-cylinder lubricants, dyes, and decolorizers. Lead additives in particular were widely used in gasoline until the introduction of vehicle catalytic converters.

Mild cases of gasoline ingestion can cause inebriation, vomiting, vertigo, drowsiness, confusion, and fever. Aspiration into the lungs and secondary pneumonia may occur unless prevented. Gasoline can cause hyperemia of the conjunctiva and other eye disturbances. Gasoline is a skin irritant and a possible allergen. Repeated or chronic dermal contact can result in drying of the skin, lesions, and other dermatologic conditions.

- No OSHA PEL is listed for gasoline.
- The Cal/OSHA PEL is listed as 300 ppm.
- The TLV is listed as 300 ppm.

WARNING: The exhaust from this chemical is known to the State of California to cause cancer.

METHYL TERTIARY-BUTYL ETHER (MTBE)

MTBE is a clear liquid with a distinct ether-like odor. It is primarily used in the formulation of gasoline as an octane enhancer and oxygenator. Little exposure data are available for MTBE, but it has been reported to cause headaches, nausea, dizziness, and irritation of the nose, throat, and eyes. Current carcinogenicity data indicate that it is a possible weak carcinogen at most.

- No OSHA PEL is listed for MTBE.
- The Cal/OSHA PEL is listed as 40 ppm.
- The TLV is currently listed as 50 ppm.

NAPHTHALENE

Naphthalene is a colorless to brown solid with an odor of mothballs. Poisoning may occur by inhalation, ingestion, or skin absorption. Naphthalene can cause nausea, headache, fever, anemia, liver damage, vomiting, convulsions, and coma. It is an experimental teratogen and a questionable carcinogen.

Naphthalene is flammable when exposed to heat or flame and reacts with oxidizing materials. It is explosive in the form of vapor or dust when exposed to heat or flame. When heated to decomposition, it emits acrid smoke and irritating fumes.

- The OSHA PEL is listed as 10 ppm.
- The Cal/OSHA PEL is listed as 10 ppm.
- The TLV is listed as 10 ppm.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

PETROLEUM HYDROCARBONS

Petroleum distillates (naphtha) are mildly toxic by inhalation. They can cause unconsciousness, dyspnea, and a bluish tint to the skin. Recovery follows after removal from exposure. In mild form, intoxication resembles drunkenness. On a chronic basis, no true poisoning occurs; however, effects may include headache, lack of appetite, dizziness, sleeplessness, indigestion, and nausea. It is combustible when exposed to heat or flame and can react with oxidizing materials.

- The OSHA PEL is listed as 500 ppm (as petroleum distillates).
- The Cal/OSHA PEL is listed as 300 ppm (as VM&P naphtha), 100 ppm (as stoddard solvent), and 300 ppm (as gasoline).
- The TLV is listed as 300 ppm (as VM&P naphtha), 100 ppm (as stoddard solvent), and 300 ppm (as gasoline).

TOLUENE

Toluene is a colorless liquid with a benzol-like odor. Human systemic effects of exposure to toluene include central nervous system changes, hallucinations or distorted perceptions, motor activity changes, psychophysiological changes, and bone marrow changes. It is a severe eye irritant and an experimental teratogen. Inhalation of high vapor concentrations may cause impairment of coordination and reaction time, headaches, nausea, eye irritation, loss of appetite, a bad taste in the mouth, and lassitude.

- The OSHA PEL is listed as 200 ppm.
- The Cal/OSHA PEL is listed as 50 ppm.
- The TLV is listed as 50 ppm.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

WARNING: This chemical is known to the State of California to cause birth defects or other reproductive harm.

XYLENE

Xylene is a clear, colorless liquid. It exhibits the general chlorinated hydrocarbon central nervous system effects, olfactory (smell) changes, eye irritation and pulmonary changes. It is a severe skin irritant. There are three isomers: ortho, meta, and para. Exposure to high concentrations of xylene vapor may result in eye and skin irritation. Eye irritation may occur at concentrations of about 200 ppm.

- The OSHA PEL is listed as 100 ppm.
- The Cal/OSHA PEL is listed as 100 ppm.
- The TLV is listed as 100 ppm.

APPENDIX B

LFR FORMS

LFR
LEVINE • FRICKE

AIR MONITORING FORM

Date _____ *LFR Project No.* _____

Project Name _____ *Type of Activities* _____

Type of PID/FID _____ *Serial No.* _____

Initial Calibration Reading _____ *End-of-Use Calibration Check* _____

Calibration Standard/Concentration _____

Mini-RAM Serial No. _____ *Zeroed in Z-Bag?* ☐ Yes ☐ No

Time	Activity/Location	PID/FID (ppm)	Mini-RAM (mg/m^3)

Name (print) _____ *Signature* _____

LFR
LEVINE • FRICKE

SITE SAFETY CHECKLIST

Project Name _____ *LFR Project No.* _____

Project Activities _____

	YES	NO	N/A
Written Health and Safety Plan (HSP) is on site	☐	☐	☐
Addenda to the HSP are documented on site	☐	☐	☐
Information in the HSP matches conditions and activities at the site	☐	☐	☐
HSP has been read and signed by all site personnel, including visitors	☐	☐	☐
Daily tailgate safety meetings have been held and documented	☐	☐	☐
Site personnel have appropriate training and medical clearance	☐	☐	☐
Air monitoring is performed and documented as described in the HSP	☐	☐	☐
Air monitoring equipment has been calibrated daily	☐	☐	☐
Site zones are set up and observed where appropriate	☐	☐	☐
Access to the work area limited to authorized personnel	☐	☐	☐
Decontamination procedures are followed and match the requirements of the HSP	☐	☐	☐
Decontamination stations (including hand/face wash) are set up and used	☐	☐	☐
Personal protective equipment used matches HSP requirements	☐	☐	☐
Hearing protection used where appropriate	☐	☐	☐
Respirators are properly cleaned and stored	☐	☐	☐
Utility locator has cleared subject locations	☐	☐	☐
Overhead utilities do not present a hazard to field equipment/personnel	☐	☐	☐
Traffic control measures have been implemented	☐	☐	☐
Trenches and excavations are in compliance with federal, state, and local safety requirements before worker entry	☐	☐	☐
Spoils are placed no closer than 2 feet from the edge of an excavation	☐	☐	☐
Emergency and first aid equipment is on site as described in the HSP	☐	☐	☐
Drinking water is readily available	☐	☐	☐
Accessible phone is readily available for emergency use	☐	☐	☐
Proper drum and material handling techniques are used	☐	☐	☐
Drums and waste containers are labeled appropriately	☐	☐	☐
Extension cords are grounded and protected from water and vehicle traffic	☐	☐	☐
Tools and equipment are in good working order	☐	☐	☐

Notes (All "no" answers must be addressed and corrected immediately. Note additional health and safety observations here): _____

_____

_____

_____

_____

_____

Conducted By: _____ *Signature:* _____ *Date:* _____

LFR
LEVINE • FRICKE

DAILY TAILGATE SAFETY MEETING FORM

Date _____ *Time* _____ *LFR Project No.* _____

Project Name _____ *Specific Location* _____

Type of Work _____

Chemicals Present _____

SAFETY TOPICS DISCUSSED

Protective Clothing/Equipment _____

_____

Hazards of Chemicals Present _____

_____

Physical Hazards _____

_____

Special Hazards _____

_____

Other Topics _____

_____

ATTENDEES

Name (please print) ***Signature***

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

LFR
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INCIDENT REPORT FORM

INSTRUCTIONS: Complete, obtain Ops. Mgr.'s signature and route original to your Administrative Manager within 3 days of the Incident.

Office:	Department:	Supervisor:
Name:	Occupation:	
Exact Location Incident Occurred: (Street Address, City, State)	Project No.:	Project Name:
Date and Time of Occurrence:	Time Began Work on Day Injury Occurred:	
Date and to Whom Initially Reported:		
Nature of Incident: (e.g. strain, contusion, laceration, abrasion)		
Parts of Body Affected:		
Type of Activity Engaged in and Equipment Being Used When Incident Occurred: (e.g. water/soil/air sampling, site assessment, hand augering)		
Person with Most Control of Object/Equipment/Substance:		
Witness:		

Describe clearly how the incident occurred: _____

_____

_____

Were Safety Equipment/Safeguards Required for this Particular Job/Activity? ☐ Yes ☐ No If yes, were they used?

Indicate by an "x" if in your opinion the incident was caused by:

Physical Causes

- ❑ Defective Equipment
- ❑ Hazardous Equipment
- ❑ Improper Dress
- ❑ Improper Guarding
- ❑ Improper Ventilation
- ❑ Other _____

Unsafe Acts

- ❑ Operating Without Authority
- ❑ Failure to Wear Protective Equipment
- ❑ Horseplay
- ❑ Failure to Secure or Warn
- ❑ Took Unsafe Position
- ❑ Used Unsafe Equipment or Hands Instead of Equipment
- ❑ Worked on Moving/Energized Equipment
- ❑ Unsafe Equipment
- ❑ Unsafe Loading

Do you require medical attention at this time? ☐ No ☐ Yes Treated in an emergency room? ☐ No ☐ Yes

Hospital Name & Address: _____

Physician Name & Address: _____

What actions will be taken to prevent reoccurrence?

_____

Employee Signature:	Group Manager Signature:
Date:	Print Name:
Phone No.:	Date:

APPENDIX C

HOSPITAL ROUTE MAP

Mission Valley Rock Facility to San Ramon Regional Medical Center