WP_R_2003-5-8

May 8, 2003

Mr. Scott O. Seery, CHMM
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Service, Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: **Work Plan for Soil and Water Investigation**
Sunol Tree Gas Service Station
3004 Andrade Road, Sunol, California 94586

Dear Mr. Seery:

This letter transmits to the Alameda County Health Care Services Agency (ACHCSA) the Work Plan for Soil and Water Investigation for activities to be completed to assess the extent of the petroleum release detected at the Sunol Tree Gas Service Station, 3004 Andrade Road in Sunol, California (site).

Respectfully Submitted,

Murray Kelsoe
Owner, Sunol Tree Gas Service Station
3004 Andrade Road
Sunol, CA 94586

CLEARWATER
GROUP
Environmental Services

May 8, 2003

Mr. Scott O. Seery, CHMM
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Environmental Health Service, Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

REJECTED
06/13/03

Re: **Work Plan for Soil and Water Investigation**
Sunol Tree Gas Service Station
3004 Andrade Road, Sunol, California 94586
Project # CB021C, Fuel Leak Case No. R02448

Dear Mr. Seery:

Clearwater Group, Inc. (Clearwater), on behalf of Mr. Murray Kelsoe, Owner, Sunol Tree Gas Service Station, is pleased to submit this work plan to the Alameda County Health Care Services Agency (ACHCSA) regarding the upcoming activities to assess the extent of the petroleum release in the surrounding soils and groundwater detected at Sunol Tree Gas Service Station, 3004 Andrade Road in Sunol, Alameda County, California (site).

BACKGROUND

A letter from Ms. Donna Drogos, ACHCSA Local Oversight Program (LOP) Program Manager to Mr. Murray Kelsoe, dated March 20, 2003 requested Mr. Kelsoe to complete a soil and groundwater investigation at the site. This Soil and Water Investigation (SWI) Work Plan is in response to the seven areas of concern:

1. Well Sampling
2. Underground Storage Tank (UST) Excavation Spoils Pile
3. Site Conceptual Model (SCM)
4. Site Characterization and Monitoring

229 Tewksbury Avenue ◆ Point Richmond, California 94801 ◆ Telephone: 510-307-9943 ◆ Fax: 510-232-2823

5. Preferential Pathway Study
6. Video Survey of Impacted Water Supply Well 4S/1E-20-G2
7. Finalize data into SWI Report

SITE DESCRIPTION

The site contains a single one-story building used as a service station and mini-mart. It is located at 3004 Andrade Road, in the City of Sunol, County of Alameda, California. The site is bounded on the west by Andrade Road. A pasture lies west of Andrade Road. A golf driving range lies to the south. Adjacent land to the north and east is used for boarding horses, horse trailers and general outdoor storage. Interstate Highway 680 is northwest of the site by about 200 feet (Figure 1).

CHRONOLOGY OF EVENTS

Five 15,000-gallon gasoline USTs of fiberglass and associated piping were removed from the site and disposed of at Ecology Control Industries in Richmond, California, on April 12, 2002. Environmental Bio-System, Inc. (EBS) of Mill Valley, California observed the tanks to be in good condition with no observable damage on their outer surfaces. EBS noted staining and hydrocarbon odor in the excavated stockpiled soil (EBS, 2002).

In April 2002, Superior Underground Tank Service (SUTS) of San Ramon, California performed an Interim Soil Remediation. Approximately 4,000 cubic yards of soil were excavated from above and around the USTs. Excavated overburden soil was stockpiled adjacent to the existing building. The stockpile was placed and covered with visqueen plastic to prevent run-off and degassing.

As a maintenance activity, Clearwater provides labor to recover the soil pile with visqueen and sand bags to keep the soil piles intact approximately once a month or after each storm event.

Also in April 2002, SUTS performed an Interim Groundwater Remediation. Approximately 160,000 gallons of hydrocarbon and methyl tertiary butyl ether (MTBE) impacted water was pumped from the excavation and stored on site in eight 20,000-gallon storage tanks. The water was properly disposed of in September and October 2002.

Clearwater sampled the onsite well on August 20, 2002. All analyses returned below reporting limits or non-detected (Clearwater, Preliminary Site Assessment, PSA, 2003).

On November 27, 2002, as part of the PSA, Clearwater subcontracted FAST-TEK Engineering Support Services (FAST-TEK) of Point Richmond, California to advance five soil borings These initial borings were advanced in the vicinity of the Diesel Dispenser (DSP7), pipe trenches PT1 and PT2, soil sample location S6 (south end of a newly installed UST tank 3), and tank pit at WS-1 (north end of newly installed UST tank 4) to 15 to 20 feet below ground surface (bgs) (Clearwater, PSA, 2003, Figure 2).

The PSA confirmed the presence of low levels of petroleum products in soils and elevated levels of petroleum products in groundwater in areas suspected to be impacted based on the EBS *"UST Removal and Interim Soil and Groundwater Remediation Report"* dated May 9, 2002.

Low concentrations of petroleum products were detected in five of the five borings sampled (B-1 through B-5) on November 27, 2002. The highest concentrations of MTBE and TPHg in soil samples were reported in B-3 (near pipe trench PT2) as 1.2 milligrams per kilogram (mg/kg) MTBE and 250 mg/kg TPHg at 12 feet bgs (Clearwater, PSA, 2003).

Elevated concentrations of petroleum products were detected in grab groundwater samples collected from four of the five borings (B-1 through B-4) on November 27,

2002; petroleum products were not detected in grab groundwater samples collected from boring B-5 nor in the onsite domestic water well. The highest onsite concentrations of MTBE and TPHg in groundwater samples were reported in B-3 (near pipe trench PT2) as 43 ug/L MTBE and in B-4 (southwest of the store) as 17,000 ug/L TPHg (Table 3, Appendix F). These unconfirmed analytical results imply the presence of a dissolved-phase petroleum plume in the vicinity of B-1 through B-4 (Clearwater, PSA, 2003).

On December 11, 2002, Clearwater provided oversight to Gregg Drilling of Concord California, as the well driller disassembled the submersible pump from the 10-inch diameter steel well on site. The depth to water was approximately 20 feet bgs with a total depth measured at 154.6 feet bgs. The 3-inch diameter submersible pump was attached to a 3-inch diameter flexible hose that ran from the surface to approximately 100 feet bgs and produced about 15 gallons a minute.

On December 12, 2002, Clearwater provided oversight to WellSpy Water Well Surveyors (WellSpy), Fresno, California, to inspect the well with a downhole video camera. Static water level was measured at 19 feet bgs. The first evidence of Mill's knife perforation was at 60 feet. Water movement was noted at perforations at 62, 67, 101, and 103 feet bgs. The report lists the bottom of the well to be 153 feet bgs (Clearwater, PSA, 2003).

On March 14, 2003, Clearwater Group presented to ACHCSA its findings and data collected in the *Preliminary Site Assessment Report.*

GEOLOGY

According to the Geologic Map of California (U.S. Geological Survey and California Division of Mines and Geology, 1966, Miscellaneous Geological Investigations, MAP I-512, scale 1:250,000,000), the site is regionally located between the Hayward Fault to the west and the Calaveras Fault to the east, on Late Mesozoic slope and sedimentary rocks, Cenozoic marine sedimentary rocks, and Cenozoic non-marine (continental) sedimentary

rocks and alluvial deposits in the California Coast Ranges geologic province. Based on soil boring logs for B-1 through B-5, and SP-1 and SP-2, the onsite soils generally consist of sandy gravel fill to approximately 5 feet bgs, underlain by clay, silty clay, silt, sandy silt, and gravelly silt with fine sands and small to medium gravel to approximately 25 feet bgs. The site is located in a generally flat area at approximately 275 feet above mean sea level, based on the U.S. Geological Survey 7.5-minute Niles, California, topographic map (Photo-revised 1980, scale 1:24000).

HYDROGEOLOGY

The site generally drains naturally to the northeast towards the modified intermittent northeastern headwaters of Sheridan Creek approximately 2000 feet to the east of the site, based on the U.S. Geological Survey 7.5-minute Niles, California, topographic map (Photo-revised 1980, scale 1:24,000). According to this topographic map, there are no water bodies adjacent to the site; however, there are two intermittent creeks within 0.5 miles of the site, including the Alameda Creek intermediate tributaries to the northwest, north, and northeast, and the Sheridan Creek tributary to the northeast, east, and south. The site appears to be divided between the Alameda Creek drainage basin to the north and the Sheridan Creek drainage basin to the south, according to the topographic map. A natural drainage lies about 50 feet south of the site.

Shallow groundwater was encountered in sandy and gravelly silt in onsite soil borings B-1 through B-5 at 15.8 to 18.2 feet bgs on November 27, 2002. In addition, WellSpy Water Well Surveys reported that an onsite 10-inch diameter steel, 153-foot deep well was observed to have static water at 19 feet bgs on December 12, 2002. WellSpy conducted a video survey of this well and reported that the well had Mills knife perforations at 60, 62, 67, 101, and 103 feet bgs.

WORK PLAN TASKS

The following seven work plan tasks are proposed for this scope of work:

Task 1 Water Supply Well Sampling

Task 2 UST Excavation Spoils Pile

Task 3 Site Conceptual Model

Task 4 Site Characterization and Monitoring

Task 5 Preferential Pathway Study

Task 6 Video Survey of Impacted Water Supply Well 4S/1E-20-G2

Task 7 Soil and Water Investigation Report

Task 1 WATER SUPPLY WELL SAMPLING

Clearwater provided the findings and data related to these field activities in a Well Sampling Report dated May 6, 2003.

Task 2 UST EXCAVATIONS SPOILS PILE

As a maintenance activity, Clearwater will continue to provide labor to recover the soil pile with visqueen and sand bags to keep the soil piles intact approximately once a month or after storm events. Due to higher priority directives and budget constraints, the removal of the soil pile will be addressed at a later date.

Task 3 SITE CONCEPTUAL MODEL

Clearwater will develop a Site Conceptual Model (SCM) for the site. As noted in the letter dated March 20, 2003 from Ms. Donna Drogos, to Mr. Kelsoe, an SCM is a set of working hypotheses pertaining to the contaminant release, including site geology, hydrogeology, release history, residual and dissolved contamination, attenuation mechanisms, pathways to nearby receptors, and likely magnitude of potential impacts to receptors. The SCM is used to identify data gaps that are subsequently filled as the investigation proceeds. As the data gaps are filled, the working hypotheses are modified,

and the overall SCM is refined and strengthened. Subsurface investigations continue until the SCM no longer changes as new data are collected. At this point, the SCM is said to be "validated." The validated SCM then forms the foundation for developing the most cost-effective corrective action plan to protect existing and potential receptors.

At this point in the investigation, the age, source, and extent of MTBE in shallow groundwater are not clear. Records review of onsite and nearby offsite activities, including activities at the T-Bear Ranch, Berkeley Ready Mix, and Country Drives Golf Center needs to be performed to identify possible off-site sources, as well as the assumed onsite source at the Sunol Tree Gas Service Station. Onsite soil borings and clustered monitoring wells to provide a network of subsurface information needs to be established to confirm the presence and horizontal and vertical distribution of MTBE, and direction of groundwater flow from the site.

SITE CONCEPTUAL HYPOTHESES

Clearwater proposes the following four hypotheses to evaluate the Soil and Water Investigation.

Hypothesis I

The unauthorized hydrocarbon leak(s) at Sunol Tree Gas Service Station contributed to the hydrocarbon impact at the T-Bear Ranch well. Further study including completing a set of piezometers and a monitoring well network will either confirm or deny this hypothesis.

Hypothesis II

The source of contamination may be from the operations of the T-Bear horse ranch located at 3000 Andrade Road. Some possibilities may include unreported underground storage tanks used for powering generators or pumps on site. Clearwater anticipates

confirming or denying this hypothesis by completing a visual inspection of the horse ranch, along with a file review at the ACHCSA files.

Hypothesis III

The source of contamination may be from the operations of the Berkeley Ready Mix business located at 7999 Athenour Way. Some possibilities may include underground storage tanks used for everyday operations or powering generators and/or pumps on site. Clearwater anticipates confirming or denying this hypothesis by completing a visual inspection of the horse ranch, along with a file review at the ACHCSA files.

Hypothesis IV

The source of contamination may be from the operations of the Country Drives Golf Center located at 3200 Andrade Road. Some possibilities may include underground storage tanks used for everyday operations or powering generators and/or pumps on site. Clearwater anticipates confirming or denying this hypothesis by completing a visual inspection of the horse ranch, along with a file review at the ACHCSA files.

Task 4 SITE CHARACTERIZATION MONITORING

Clearwater will install five temporary piezometers to a total depth of 60 feet bgs, to estimate groundwater gradient. Clearwater suggests one upgradient (T4/MW4, Figure 2) and two downgradient (T1/MW1, T5/MW5) and two apparent hydrocarbon impacted (T2/MW2, T3/MW2) temporary piezometers, leaving these for a couple of days to take equilibrated groundwater measurements. Groundwater measurements will be collected daily for a 4-day period from each temporary piezometer to estimate groundwater gradient. This shall confirm groundwater gradient and will help further the investigation for completing a network of monitoring wells.

Proposed Methods

Soil Borings Using a Geoprobe™ Direct-Push Drill Rig

Prior to drilling, Clearwater will prepare site specific Health and Safety Plan for drilling activities. Prior to drilling and sampling, Underground Service Alert will mark the site to identify utilities leading to the site. Another private utility location service may be employed to distinguish utilities for on site features. Appropriate drilling and encroachment permits will be obtained prior to the start of fieldwork. Fieldwork will be conducted in accordance with Clearwater's Field Protocols (Appendix A).

Soil borings will be advanced using a Geoprobe™ drill-rig. Borings will be continuously cored and samples will be retained every 4 feet. Portions of each soil sample will be retained for a visual description by a Clearwater geologist using the Unified Soil Classification System and screening for organic vapors using a photo-ionizing organic vapor meter. Soil samples retained for laboratory analysis will be covered with Teflon lined end caps, labeled, documented on a chain-of-custody form, and placed on ice in a cooler for transport to the project laboratory. Direct Push Drilling Investigation Procedures are presented in Appendix B. Approximately 10 soil samples will be submitted for analysis from each borehole to be analyzed for TPHg, BTEX, MTBE, TAME, ETBE, DIPE, TBA, and Ethanol by U.S. EPA method 8260B, and TPHd by U.S. EPA method 8015M on an expedited turn around time of 72hours. It is anticipated that boring depths will not exceed 60 feet bgs.

Once each soil boring is completed, temporary wells will be created by advancing one-inch diameter schedule 40 PVC with 0.010-inch machine slotted screen down to 5 feet below observed groundwater level. Following the completion of the temporary wells, Clearwater will measure the water levels. A grab groundwater sample will be collected directly through the shaft with either a stainless steel or a disposable polyethylene bailer. As the boring progresses, Clearwater will collect three discreet water samples in the different aquifer zones using a one-time direct push water sampling tool. Samples will be

transferred to laboratory supplied sample bottles, labeled, documented on a chain-of-custody form, and placed on ice in a cooler for transport to the project laboratory. The samples will be analyzed for TPHg, BTEX, MTBE, TAME, ETBE, DIPE, TBA, and Ethanol by U.S.EPA method 8260B, and TPHd by U.S. EPA method 8015M on an expedited turn around time of 72 hours. Groundwater measurements will be collected every day for a four-day period from each temporary piezometer to establish groundwater gradient.

Drill-pipe and sampling devices will be cleaned by steam cleaning or in an Alconox® wash followed by double rinse in clean tap water to prevent cross-contamination.

Nested Monitoring Well Network and Well Construction

After completing the initial phase of temporary well points, Clearwater will access the gradient data. Clearwater will install a monitoring well transect with nested discreet monitoring wells within the temporary well locations. Prior to installing the monitoring wells, Clearwater will obtain drilling permits from the Zone 7 Water Agency and pertinent access agreements from the property owners. Prior to the initiation of drilling activities, Clearwater and its drilling subcontractor will review and sign a Site Safety Plan. Based on observed depth to water on site from the temporary wells, it is anticipated that five sets of 3 nested 2-inch diameter monitoring wells will be installed at a total depth of 60 feet bgs(Figure 3) The tentative screened intervals for the monitoring wells will be based on the previous drilling and field conditions found to be present on the site. Screened intervals will consist of 0.01-inch perforated casing and a filter pack of Lonestar #2 sand. The filter pack of each well will be sealed by a 2-foot layer of hydrated bentonite. The remaining annular space of each well will be filled with cement and a tamper-resistant box will be cemented in place over the well head. Naturally, final well construction will be dependent on hydrogeologic conditions observed at the time of drilling. Each well will be constructed in accordance with local and state standards.

Proposed well locations are shown on Figure 2. Proposed well construction details are shown on Figure 3.

Augers and samplers will be decontaminated between use by either steam cleaning or an Alconox® wash followed by double rinse in clean tap water to prevent cross-contamination. Soil cuttings and auger/sampler rinsate will be stored on-site in labeled 55-gallon drums pending future removal and disposal.

Development and Survey of Monitoring Wells

Following well installation and construction, the wells will be developed by surging and bailing. Development will involve the removal of water from each well until such time that it is relatively free of sediment, and pH, temperature, and conductivity parameters have stabilized. It is anticipated this will not exceed ten saturated casing volumes.

Clearwater will survey the top of casing elevations relative to existing wells. Survey measurements will be accurate to within ±0.01 feet. Wells will be surveyed for geographic positioning system locations and eventually entered into the state of California Geotracker database.

Groundwater Gauging, Sampling, and Analysis

The new monitoring wells will be monitored and sampled following installation. An electronic water level indicator will be used to gauge depth to water accurate to within ±0.01 foot. The wells will be checked for the presence of light non-aqueous phase liquid (LNAPL) prior to purging. The wells without measurable thicknesses of LNAPL will be purged of groundwater until sampling parameters (temperature, pH, and conductivity) have stabilized. Development of the new wells will serve as purging prior to sampling. Groundwater monitoring and well purging information will be presented on Gauge Data/Purge Calculations and Purge Data sheets, which will be included in the investigation report.

Following recovery of water levels to at least 80% of their static levels, or after passage of two hours (if designated recovery levels have not occurred), groundwater samples will

be collected from the monitoring wells using dedicated polyethylene bailers. Samples will be labeled, documented on a chain-of-custody form, and placed on ice in a cooler for transport to the project laboratory. Groundwater samples from the site will be analyzed by a State-certified laboratory for the following compounds:

- TPHd, by US Environmental Protection Agency (EPA) Method 8015 Modified.
- TPHg, BTEX by EPA Method 8260B.
- Five Fuel Oxygenates and Ethanol by EPA Method 8260B: MTBE, TAME, TBA, DIPE, ETBE, and Ethanol.

Purging devices will be decontaminated between uses by an Alconox® wash followed by double rinse in clean tap water to prevent cross-contamination. Rinsate will be stored on-site in labeled 55-gallon drums pending future removal and disposal.

Task 5 PREFERENTIAL PATHWAY STUDY

The Preferential Pathway Study will detail the potential migration pathways and potential conduits for horizontal and vertical migration that may be present in the vicinity of the site. The purpose of the preferential pathway study is to locate potential migration pathways and conduits and determine the probability of the plume encountering preferential pathways and conduits that could spread contamination. Clearwater will accomplish the Preferential Pathway Study by completing a comprehensive utility study, and a well survey, which would include identifying abandoned and/or improperly destroyed wells.

Clearwater will complete an evaluation of all utility lines, storm drains, sanitary sewers, pipelines, and trenches within and near the site and plume areas. Clearwater will submit this information on maps showing the location and depth of all utility lines and trenches.

Clearwater will complete a detailed well survey of wells within a one-half mile radius of the site. Clearwater will finish this task with a background study of historical land use and properties in the vicinity. Clearwater will review well log records from California State Department of Water Resources and Zone 7 Water Agency, as well as historical Sanborn maps and aerial photos (stereo pairs). Clearwater may contract the services of Environmental Data Resources, Inc. Other sources of information could possibly be used will be of the following: Contact University of California Berkeley Library; Natural Resources Conservation Service; Pacific Aerial Surveys for maps and aerial photographs that might show information relevant to the site. Clearwater will complete a file review at the ACHCSA to aid in acquiring necessary data to fill current data gaps.

Task 6 VIDEO SURVEY OF IMPACTED WATER SUPPLY WELL 4S/1E-20-G2

Clearwater will conduct a records search for the construction details of well 4S/1E-20-G2 located at 3000 Andrade Road. The record search will consist of the following activities: 1) Obtain any drillers reports from the California State Department of Water Resources or other sources (i.e. Zone 7 Water Agency). 2) If the record search described produces very little information, Clearwater proposes to complete a video log survey of the well, and provide ACHSA a copy of the video log with a written transcription of the activity

Task 7 SOIL AND WATER INVESTIGATION REPORT

Upon approval of this SWI work plan, Clearwater will present to ACHCSA the findings and data acquired during this phase of work in a SWI Report within 120 days of work plan approval. The following deliverables will be included in the SWI Report:

- A summary of the background, site description, chronology of events, geology, and hydrology of the site.

- Results of the Water Supply Well Sampling
- A revised SCM will reflect the findings and data related to this soil and water investigation.
- The results of site characterization and monitoring including boring and well construction activities, soil sampling, groundwater gradient direction and groundwater monitoring.
- The distribution and magnitude of residual contaminants in soil and groundwater, and if possible, the mass of residual contaminants will be calculated. Assessment data will be provided in tabular and graphical forms.
- The preferential pathway study, including the utility survey and a completed well survey.
- A discussion related to the video survey of the impacted water supply well 4S/1E-20-G2.
- Conclusions

Please call Mr. Brian Pierskalla at (510) 307-9943 if you have any questions regarding this SWI Work Plan.

ATTACHMENTS

FIGURES

1. **Site Location Map**
2. **Site Plan**
3. **Proposed Well Locations**
4. **Proposed Well Construction Schematic**

APPENDICIES

A. **Clearwater Group Field Protocols for Sampling**
B. **Soil Borehole Drilling, Monitoring Well Installation and Development, and Groundwater Sampling Field Procedures**

Cc: Mr. Murray Kelsoe, Owner, Sunol Tree Gas (2 copies), 3004 Andrade Road, Sunol, CA 94586
Mr. Jeffrey Lawson, Silicon Valley Law Group, 152 North Third Street, Suite 900, San Jose, CA 95112
Mr. Roy Tovani, T-Bear Ranch, 3000 Andrade Road, Sunol, CA 94586
Mr. Mort Calvert, Berkeley Ready Mix, 7587 Athenour Way, Sunol, CA 94586
Mr. John Franco, Country Drive Golf Center, 3220 Andrade Road, Sunol, CA 94586
Ms. Betty Graham, SFRWQCB (2 copies), 1515 Clay Street, Suite 1400, Oakland, CA 94612
Mr. Matt Katen, Zone 7 Water Agency, 5997 Parkside Drive, Pleasanton, CA 94588-5217
Ms. Susan Torrence, Esq., Alameda County District Attorneys' Office, 7677 Oakport Suite 650, Oakland, CA 94621
Mr. Scott Haggerty, Alameda County Board of Supervisors, 1221 Oak Street, Suite 536, Oakland, CA 94612
Ms. Shari Knieriem, SWRCB UST Fund, P.O. Box 94421, Sacramento, CA 94244-2120

REFERENCES

Alameda County Health Care Services Agency, (ACHCSA), Drogos, D., Letter dated March 20, 2003, Subject: Fuel Leak Case No. R02448, Sunol Tree Gas Station, 3004 Andrade Road, Sunol, CA.

ACHCSA, Seery, S. Letter dated April 7, 2003, Re: Fuel Leak Case No. RO2488, Sunol Tree Gas, 3004 Andrade Road, Sunol.

Clearwater Group (Clearwater), *Preliminary Site Assessment Report (PSA), Sunol Tree Gas Service, 3004 Andrade Road, Sunol, California 94586*, March 14, 2003.

Environmental Bio-Systems, Inc. (EBS), *UST Removal and Interim Soil and Groundwater Remediation Report, Project #586*, May 9, 2002.

State Water Resources Control Board, *Guidelines for Investigation and Cleanup of MTBE and Other Ether-Based Oxygenates, Appendix C*, March 27, 2000.

United States Environmental Protection Agency, *Expedited Site Assessment Tools for Underground Storage Tank Sites: A Guide for Regulators*, (EPA 510-B-97-001), March, 1997.

United States Geological Survey (USGS) and California Division of Mines and Geology, *Miscellaneous Geological Investigations, MAP I-512*, scale 1:250,000,000, 1966.

USGS, *7.5-minute Niles, California Topographic Map*, scale 1:24,000, (Photo-revised, 1980).

REFERENCES (continued)

WellSpy Water Well Surveyors, Fresno, California, Video Cassette Recording of well located at 3004 Andrade Road, Written Description of the findings on the video cassette, December, 2002.

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Certification

This work plan was prepared under the supervision of a professional Registered Geologist in the State of California. All statements, conclusions and recommendations are based solely upon published results from previous consultants, field observations by Clearwater and laboratory analysis performed by a California State certified laboratory related to the work performed by Clearwater.

Information and interpretations presented herein are for the sole use of the client and regulating agency. The information and interpretation contained in this document should not be relied upon by a third party.

The service provided by Clearwater has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

Clearwater Group,

Prepared by:

Brian A. Pierskalla
Project Manager

Reviewed by:

Barney P. Popkin, R.G., No. 5585
Principal Geologist

REGISTERED GEOLOGIST
BARNEY P. POPKIN
No.5585
Exp 4/30/2005
STATE OF CALIFORNIA

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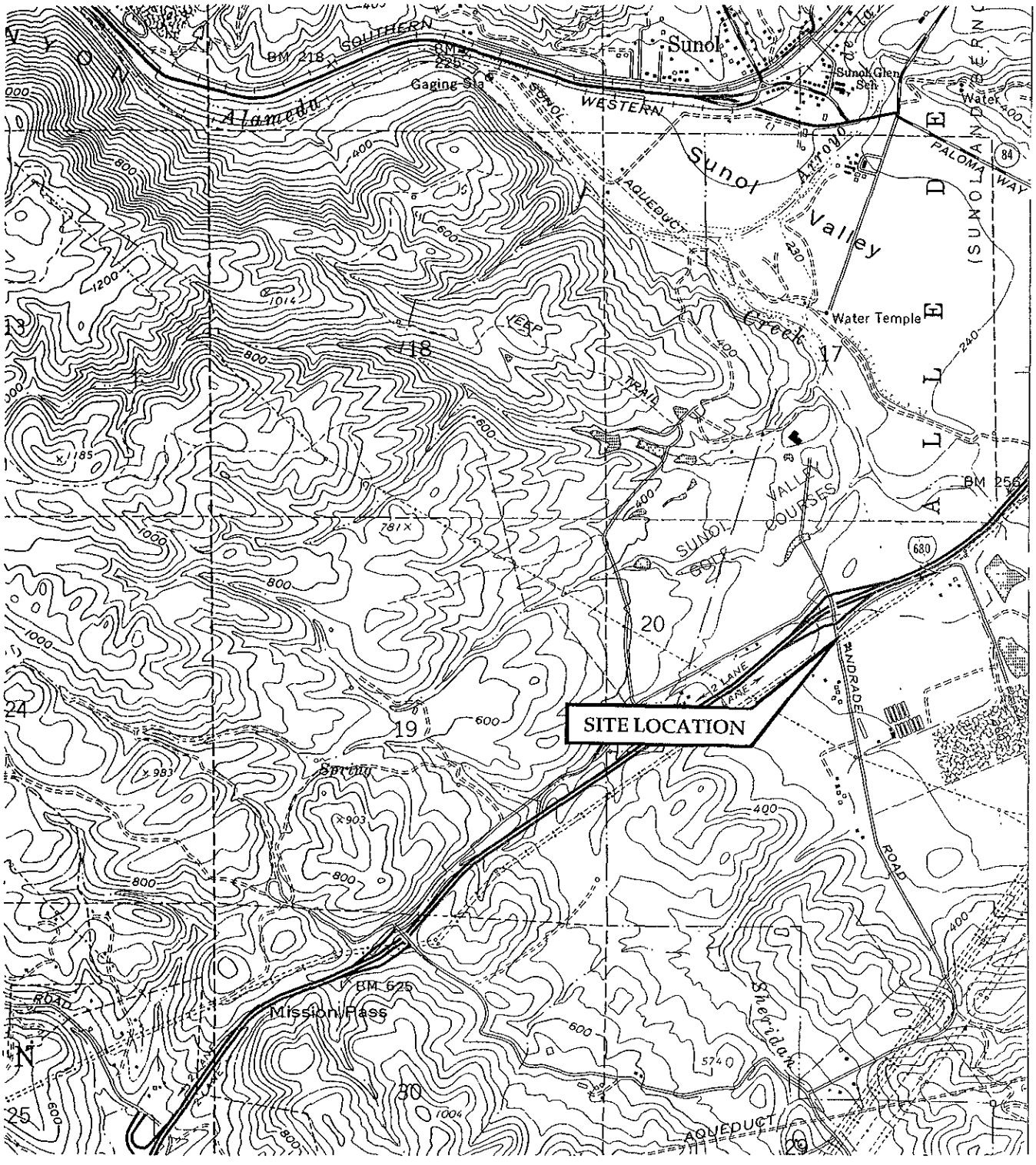
GROUP
Environmental Services

FIGURES

1. Site Location Map
2. Site Plan and Proposed Well Locations
3. Proposed Well Construction Schematic



0 2000 4000

APPROXIMATE SCALE IN FEET

SOURCE USGS 7.5 MINUTE TOPOGRAPHIC MAPS
NILES, CALIFORNIA, 1961, PHOTOREVISED 1980

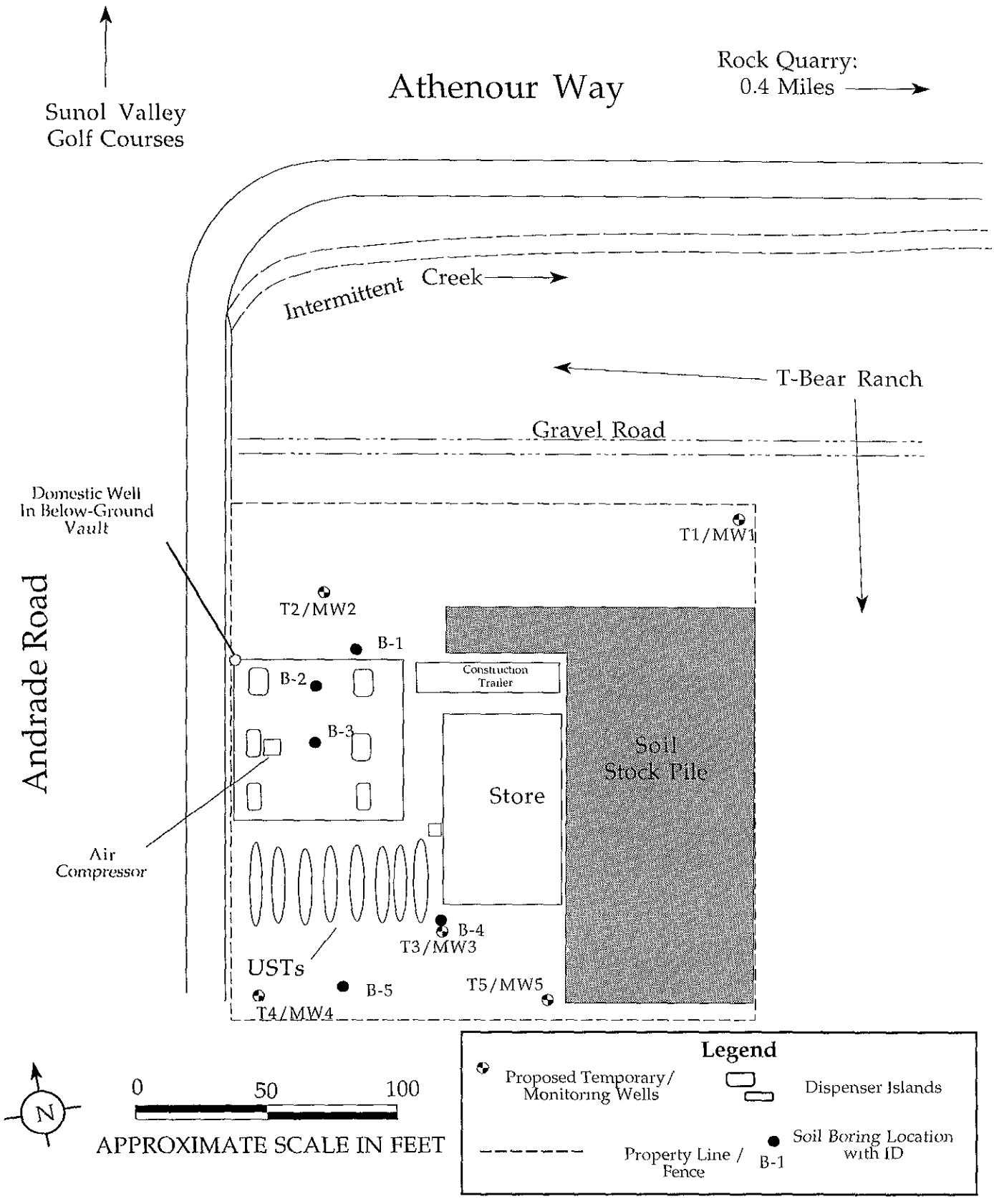
N

SITE LOCATION MAP

Sunol Tree Gas Service Station
3400 Andrade Road,
Sunol, California

CLEARWATER GROUP, INC.

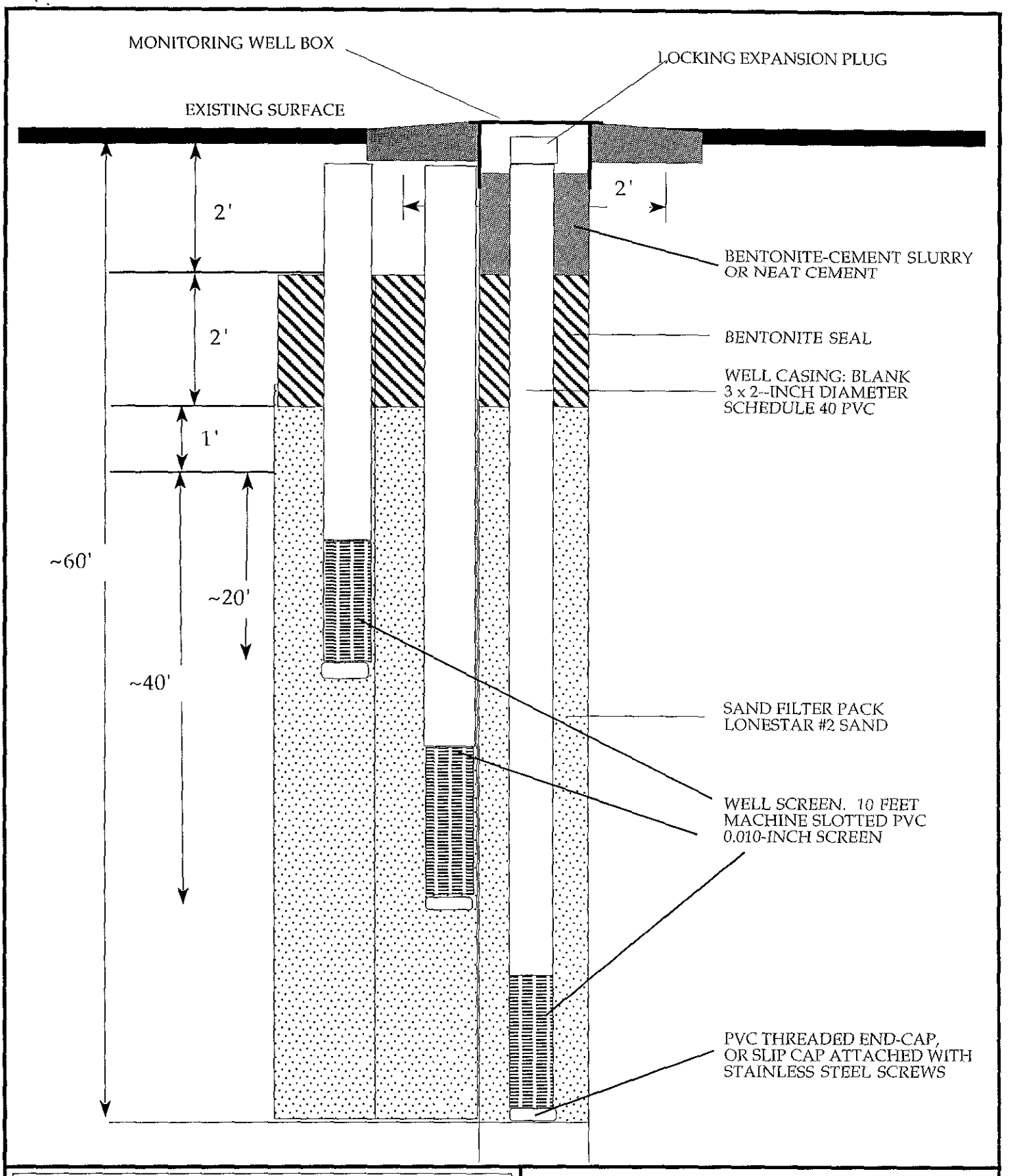
Project No.	Figure Date	Figure
CB021C	5/03	1



SITE PLAN AND PROPOSED WELL LOCATIONS
Sunol Tree Gas Service Station
3004 Andrade Road
Sunol, CA 94586

CLEARWATER GROUP

Project No.	Figure Date	Figure
CB021C	**5/03**	**2**



PROPOSED WELL CONSTRUCTION SCHEMATIC

Sunol Tree Gas Service Station
3004 Andrade Road,
Sunol, California

CLEARWATER GROUP

Project No.	Date	Figure
CB021C	**5/03**	**3**

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APPENDIX A

Soil Borehole Drilling, Monitoring Well Installation and Development, and Groundwater Sampling Field Procedures

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Soil Borehole Drilling, Monitoring Well Installation and Development, and Groundwater Sampling Field Procedures

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Drilling and Soil Sampling

Permits, Site Safety Plan, Utility Clearance

Clearwater Group obtains all the required permits, unless otherwise contractually directed. Clearwater prepares a site specific Site Safety Plan detailing site hazards, site safety and control, decontamination procedures, and emergency response procedures to be employed throughout the defined phase of work. At least 48 hours prior to drilling, Underground Service Alert (USA) or an equivalent agency is notified of the planned work. Clearwater, attempts to locate all underground and above ground utilities by site inspection (in conjunction with its subcontractors and knowledgeable site managers, if available), and review of site as-built drawings. Clearwater may employ a private, professional utility locator to refine the site utility inspection.

Drilling Equipment

All soil borings are drilled using a truck-mounted hollow-stem auger drill rig, unless site conditions warrant a different drilling method. Subsurface conditions permitting, the first five feet of each boring is advanced using a hand-auger or post-hole digger. All drilling equipment is inspected daily and maintained in safe working condition by the operator. All down-hole drilling equipment is steam cleaned prior to arriving on site. Working components of the drill rig near the borehole, as well as augers and drill rods are thoroughly steam cleaned between each boring location. All CLEARWATER drilling and sampling methods are consistent with ASTM Method D-1452-80, and local, state and federal regulations.

Soil Sampling and Lithologic Description

Whenever possible, the first Clearwater boring to be drilled at a site is continuously cored to obtain a complete lithologic description. Otherwise, soil samples are typically collected every 5 feet to the total depth explored, using brass tubes fitted in a California-modified split spoon sampler. If copper or zinc contamination is the subject of the investigation, stainless steel liners are used instead of brass. Additional soil samples may be collected based upon significant changes in lithology or in areas of obvious soil contamination. During soil sample collection, the split spoon sampler is driven 18 to 24 inches past the lead auger by a 140-pound hammer falling a minimum of 30 inches. The number of blows necessary to drive the sampler and the amount of soil recovered is recorded on the Field Exploratory Soil Boring Log. The soil sampler and liners are cleaned with an Alconox® solution and rinsed with tap water prior to each sampling event. New liners are used whenever a soil sample may be retained for laboratory analysis.

Soil samples selected for laboratory analysis are sealed on both ends with Teflon tape and plastic end caps. The samples are labeled, documented on a chain-of-custody form and placed in a cooler for transport to a state certified analytical laboratory. Soil contained in remaining liners is removed for lithologic descriptions (according to the Unified Soil Classification System). Additional soil is screened for organic vapors by placing approximately 30 grams of soil in a sealed plastic bag or a glass jar sealed with aluminum foil. The bag or jar is left undisturbed for approximately 15 minutes, in the sun if possible. The head space in the bag is accessed in a manner to minimize entry of outside air, and is tested for total organic vapor using a calibrated organic vapor meter (OVM). The results of the field screening are noted with the lithologic descriptions on the Field Exploratory Soil Boring Log.

On encountering an impermeable (clayey) layer three feet or more in thickness below a saturated permeable layer, where the impermeable layer is considered to be a possible confining layer for an underlying aquifer,

drilling is halted until a decision to proceed is obtained from the project manager. This process minimizes the chance of introducing contamination to an underlying, clean aquifer.

Soil Waste Management
Soil cuttings are stockpiled on and covered with plastic sheeting to control runoff, or contained in 55-gallon D.O.T.-approved drums on site. Waste soil is sampled to chemically profile it for disposable, and hauled by a licensed waste hauler to an appropriate landfill. All waste stored on site is properly labeled at the time of production.

Soil Boring Abandonment
Soil borings which are not to be converted into monitoring wells are sealed to the ground surface using neat cement or sand-cement slurry in accordance with federal, state and local regulations. Native soil may be used to fill the top two to three feet for cosmetic purposes, as permitted.

Monitoring Well Installation

Well Casing, Screen and Filter Pack Construction
All well construction is performed in accordance with Department of Water Resources "California Well Standards" and all requirements of local oversight agencies. Soil borings to be converted into single-cased monitoring wells are a minimum of eight inches in diameter for 2-inch diameter wells and a minimum of ten inches in diameter for 4-inch diameter wells. Monitoring wells are constructed with schedule 40, threaded, polyvinyl chloride (PVC) casing unless site geochemistry or contamination necessitates an alternative material. The wells are constructed with factory-slotted screen and threaded end caps.

The screened interval is placed such that it extends approximately ten feet into the water bearing zone, and at least five feet above the expected maximum water level. The screened interval may extend less than five feet above the maximum water level, only to prevent intersection of the screened interval with the top of the confining layer of a confined aquifer, or where the water table is too shallow to allow this construction.

A graded sand filter pack is placed in the annular space across the screened interval and extended approximately one to two feet above the screen, as site conditions permit, so as to prevent extension of the sand pack into an overlying water-bearing unit. The well screen slot size is the maximum size capable of retaining 90% of the filter pack. Typically, 0.010-inch screen is used where the formation is predominantly clay and/or silt or poorly-graded fine sand. 0.020-inch screen is used where the formation is predominantly well-graded or medium to coarse sand and/or gravel.

The filter pack grade (mean grain size) is selected according to native sediment type as follows: a) for poorly graded fine sand or silt/clay - 4 times the 70% retained grain size of the formation b) for medium to coarse sand, gravel or well graded sediments - 6 times the 70% retained grain size. Since results of particle size analysis are not always available, Clearwater often selects screen size and filter pack on the basis of general site stratigraphy, and specifically the finest significantly thick layer of sediment to be screened. Commonly selected grades are Lone Star® 3, 2/12 or 2/16 (or equivalent) with 0.020-inch slotted screen and Lone Star® 1/20 with 0.010-inch slotted screen.

Well Seal and Completion
A minimum two foot seal of bentonite is placed above the sand pack. The bentonite seal is hydrated by either formation water or potable water. Neat cement or a cement/bentonite grout mixture seals the remaining annular space to the surface. If bentonite is used in the grout mixture, it does not exceed 5% by weight. The grout is placed using a tremie pipe, if the top of the bentonite is more than 20 feet below grade, or if water is present in the boring above the bentonite seal. A watertight locking cap and protective traffic-rated vault box is installed on top of each well. Well construction details are presented on the Field Exploratory Soil Boring Log. Following completion of a well, Clearwater completes and submits, or ensures that the driller has sufficient information to complete and submit, the state-required Well Completion Report or equivalent document.

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Well Development

All newly installed wells are developed prior to sampling to remove fine grained sediments from the well and stabilize the filter pack and the disturbed aquifer materials. Development takes place prior to or at least 24 hours after setting the seal on the well, unless otherwise directed by a local oversight agency. Well development consists of surging with a surge block and removing water from the well with either a pump or bailer, until the well is free of sediment, or until at least 10 well casing volumes have been removed. Depth to bottom is measured to determine casing volume. If the well is sampled immediately following development, temperature, pH, specific conductance and turbidity (qualitative) are monitored during well development (see section "Groundwater Sampling"). All development equipment is cleaned prior to use and between wells with an Alconox® solution, then rinsed in potable water. All data collected during development are recorded on the Well Development Data Sheet and, if necessary, the Purging Data Sheet.

Well Surveying

All well elevations are surveyed at the north side of the top of casing to the nearest ±0.01 foot. The exact survey point (at the center of the survey rod or, if the casing stub is uneven, the point of contact between casing and rod) is clearly marked and maintained on the casing rim. Elevations are referenced either to mean sea level or to a project datum. A project datum is typically chosen so as to minimize the possibility of its' later disturbance. For instance, fire hydrants are commonly selected. Where required, the wells are surveyed by a licensed land surveyor, relative to mean sea level.

Groundwater Sampling

Groundwater Monitoring
Prior to beginning, a decontamination area is established. Decontamination procedures consist of scrubbing downhole equipment in an Alconox® solution wash (wash solution is pumped through any purging pumps used), and rinsing in a first rinse of potable water and a second rinse of potable water or deionized water if the latter is required. Any non-dedicated down hole equipment is decontaminated prior to use.

Prior to purging and sampling a well, the static water level is measured to the nearest 0.01 feet with an electronic water sounder. Depth to bottom is typically measured once per year, at the request of the project manager, and during Clearwater's first visit to a site. If historical analytical data are not available, with which to establish a reliable order of increasing well contamination, the water sounder and tape will be decontaminated between each well. If floating separate-phase hydrocarbons (SPH) are suspected or observed, SPH is collected using a clear, open-ended product bailer, and the thickness is measured to the nearest 0.01 feet in the bailer. SPH may alternatively be measured with an electronic interface probe. Any monitoring well containing a measurable thickness of SPH before or during purging is not additionally purged and no sample is collected from that well. Wells containing hydrocarbon sheen are sampled unless otherwise specified by the project manager. Field observations such as well integrity as well as water level measurements and floating product thicknesses are noted on the Gauging Data/Purge Calculations form.

Well Purging
Each monitoring well to be sampled is purged using either a PVC bailer or a submersible pump. Physical parameters (pH, temperature and conductivity) of the purge water are monitored during purging activities to assess if the water sample collected is representative of the aquifer. If required, parameters such as dissolved oxygen, turbidity, salinity etc. are also measured. Samples are considered representative if parameter stability is achieved. Stability is defined as a change of less than 0.25 pH units, less than 10% change in conductivity in micro mhos, and less than 1.0 degree centigrade (1.8 degrees Fahrenheit) change in temperature. Parameters are measured in a discreet sample decanted from the bailer separately from the rest of the purge water. Parameters are measured at least four times during purging; initially, and at volume intervals of one well volume. Purging continues until three well casing volumes have been removed or until the well completely dewaters. Wells which dewater or demonstrate a slow recharge may be sampled

after fewer than three well volumes have been removed. Well purging information is recorded on the Purge Data sheet. All meters used to measure parameters are calibrated daily. Purge water is sealed, labeled, and stored on site in D.O.T.-approved 55-gallon drums. After being chemically profiled, the water is removed to an appropriate disposal facility by a licensed waste hauler.

Groundwater Sample Collection

Groundwater samples are collected immediately after purging or, if purging rate exceeds well recharge rate, when the well has recharged to at least 80% of its static water level. If recharge is extremely slow, the well is allowed to recharge for at least two hours, if practicable, or until sufficient volume has accumulated for sampling. The well is sampled within 24 hours of purging or repurged. Samples are collected using polyethylene bailers, either disposable or dedicated to the well. Samples being analyzed for compounds most sensitive to volatilization are collected first. Water samples are placed in appropriate laboratory-supplied containers, labeled, documented on a chain of custody form and placed on ice in a cooler for transport to a state-certified analytical laboratory. Analytical detection limits match or surpass standards required by relevant local or regional guidelines.

Quality Assurance Procedures

To prevent contamination of the samples, Clearwater personnel adhere to the following procedures in the field:

- A new, clean pair of latex gloves are put on prior to sampling each well.
- Wells are gauged, purged and groundwater samples are collected in the expected order of increasing degree of contamination based on historical analytical results.
- All purging equipment will be thoroughly decontaminated between each well, using the procedures previously described at the beginning of this section.
- During sample collection for volatile organic analysis, the amount of air passing through the sample is minimized. This helps prevent the air from stripping the volatiles from the water. Sample bottles are filled by slowly running the sample down the side of the bottle until there is a convex meniscus over the mouth of the bottle. The lid is carefully screwed onto the bottle such that no air bubbles are present within the bottle. If a bubble is present, the cap is removed and additional water is added to the sample container. After resealing the sample container, if bubbles still are present inside, the sample container is discarded and the procedure is repeated with a new container.

Laboratory and field handling procedures may be monitored, if required by the client or regulators, by including quality control (QC) samples for analysis with the groundwater samples. Examples of different types of QC samples are as follows:

- Trip blanks are prepared at the analytical laboratory by laboratory personnel to check field handling procedures. Trip blanks are transported to the project site in the same manner as the laboratory-supplied sample containers to be filled. They are not opened, and are returned to the laboratory with the samples collected. Trip blanks are analyzed for purgeable organic compounds.
- Equipment blanks are prepared in the field to determine if decontamination of field sampling equipment has been effective. The sampling equipment used to collect the groundwater samples is rinsed with distilled water which is then decanted into laboratory-supplied containers. The equipment blanks are transported to the laboratory, and are analyzed for the same chemical constituents as the samples collected at the site.
- Duplicates are collected at the same time that the standard groundwater samples are being collected and are analyzed for the same compounds in order to check the reproducibility of laboratory data.

They are typically only collected from one well per sampling event. The duplicate is assigned an identification number that will not associate it with the source well.

Generally, trip blanks and field blanks check field handling and transportation procedures. Duplicates check laboratory procedures. The configuration of QC samples is determined by Clearwater depending on site conditions and regulatory requirements.

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APPENDIX B

Direct Push Drilling Investigation Procedures

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Direct-Push Drilling Investigation Procedures

The direct push method of soil boring has several advantages over hollow-stem auger drill rigs. The direct push method produce no drill cuttings, is capable of 150 to 200 feet of boring or well installation per work day. Direct push can be used for soil gas surveys, soil sampling, groundwater sampling, installation of small-diameter monitoring wells, and components of remediation systems such as air sparge points. The equipment required to perform direct push work is varied ranging from a roto-hammer and operator to a pickup truck-mounted rig capable of substantial static downward force combined with percussion force. This method allows subsurface investigation work to be performed in areas inaccessible to conventional drill rigs such as in basements, beneath canopies, or below power lines. Direct push equipment is ideal at sites with unconsolidated soil or overburden, and sampling depths of less than 30 feet. This method is not appropriate for boring through bedrock or gravelly soils.

Permitting and Site Preparation
Prior to direct push boring work, Clearwater Group will obtain all necessary permits and locate all underground and above ground utilities through Underground Service Alert (USA) and a thorough site inspection. All drilling equipment will be inspected daily and will be maintained in safe operating condition. All down-hole drilling equipment will be cleaned prior to arriving on-site. Working components of the rig near the borehole, as well as driven casing and sampling equipment will be thoroughly decontaminated between each boring location by either steam cleaning or washing with an Alconox solution. All drilling and sampling methods will be consistent with ASTM Method D-1452-80 and county, state and federal regulations.

Boring Installation and Soil Sampling
Direct push uses a 1.5-inch outer barrel with an inner rod held in place during pushing. Soil samples are collected by penetrating to the desired depth, retracting the inner rod and attaching a spoon sampler. The sampler is then thrust beyond the outer barrel into native soil. Soil samples are recovered in brass or stainless containers lining the spoon.

Soil removed from the upper tube section is used for lithologic descriptions (according to the unified soil classification system) and for organic vapor field analysis. If organic vapors will be analyzed in the field, a portion of each soil sample will be placed in a plastic zip-lock bag. The bag will be sealed and warmed for approximately 10 minutes to allow vapors to be released from the soil sample and diffuse into the head space of the bag. The bag is then pierced with the probe of a calibrated organic vapor detector. The results of the field testing will be noted with the lithologic descriptions on field exploratory soil boring log. Soil samples selected for laboratory analysis will be covered on both ends with Teflon™ tape and plastic end caps. The samples will then be labeled, documented on a chain-of-custody form and placed in a cooler for transport to a state certified analytical laboratory.

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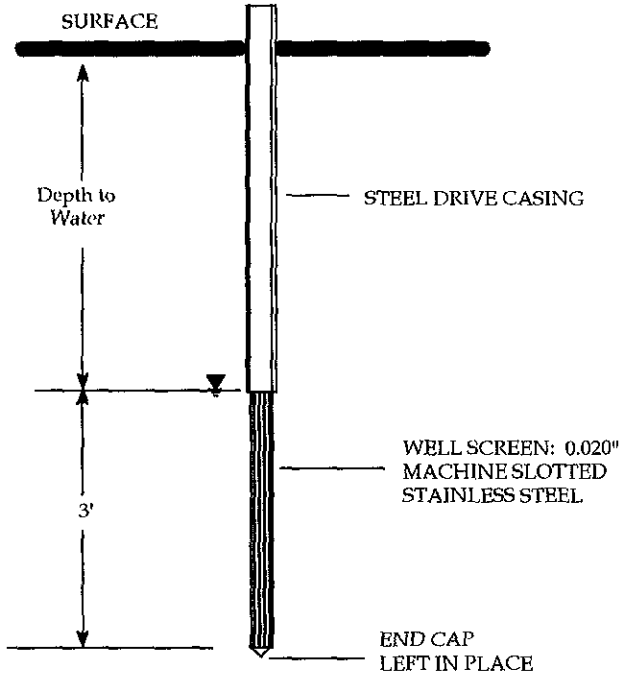
Temporary Well Installation and Groundwater Sampling



Groundwater samples are collected by removing the inner rod and attaching a 4 foot stainless steel screen with a drive point at the end (above figure). The screen and rod is then inserted in the outer barrel and driven to the desired depth where the outer rod is retracted to expose the screen. If the stainless well screen does not produce enough water for sampling a 1-inch PVC screen can be installed in the boring and the outer rod retracted to leave a temporary well point for collecting groundwater samples or water levels.

Monitoring Well Installation and Development

Permanent small-diameter monitoring wells are installed by driving the outer barrel and inner rod as described above. Upon reaching the desired depth the system is removed and 2-inch OD (1/2-inch ID) pre-packed PCV piping is installed. The well plug is created using granular bentonite. The well seal is constructed of cement and sealed at the surface with a conventional "Christy Box" or similar vault. Monitoring wells are developed by surging the well with a small diameter bailer and removing 3 to 5 volumes until the produced water is clear.

Groundwater Sample Collection and Water Level Measurement

Prior to collecting groundwater from the wells the water levels are measured in all wells using an electronic water level gauge. Monitoring wells are prepared for sampling by purging three well bore volumes. Water is removed using small diameter bailers, a peristaltic pump, or manually using tubing with a check valve at the bottom. Once during removal of each volume the temperature, pH and conductivity are checked and noted on the field sampling form. Successive well volumes are removed until the parameters have stabilized or the well has gone dry. Prior to sampling the well is allowed to recover to within 90% of the stabilized water levels.

Groundwater samples[1] are collected using small diameter bailers. Groundwater samples are decanted into laboratory supplied containers labeled, noted on a chain-of-custody form and placed on ice for transport to a laboratory.

[1] Small diameter wells often produce small quantity samples and are appropriate for analysis of volatile and aromatic compounds using VOA vials and dissolved metals analysis. Obtaining liter samples can be difficult and time consuming. Monitoring wells installed by the direct push method are most effective at sites where the subsurface soils are coarser than silt, gasoline components are the key contaminants of concern, and water levels are not more than 25 feet below ground surface.