AMMENDED
WORK PLAN FOR
SITE CHARACTERIZATION INVESTIGATION
MITZI STOCKEL
3234 CASTRO VALLEY BLVD.
CASTRO VALLEY, CALIFORNIA

1.0 INTRODUCTION

The project site is located at 3234 Castro Valley Blvd. in the City of Castro Valley, in Alameda County, California. The site is the location of a former automotive repair facility (see Figure 1) and private residence. A 657 gallon underground leaded gasoline storage tank was located along the northern side of the automotive shop and was removed on March 8, 1990 by KTW & Associates. Soil samples obtained from the excavation by David C. Glick Associates personnel were submitted for analytical testing for Total Petroleum Hydrocarbons (TPH) as Gasoline and Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX). Discolored soils were observed in the excavation during the tank removal and strong hydrocarbon vapors were emitted from the removed and in-situ soils. Several small holes (1/2" - 1" diameter) were observed in the lower half of the tank at each end.

Subsequent to the tank removal and soil sampling, the excavation was continued to a depth of 9 feet below existing grade by KTW & Associates personnel to further remove existing fuel stained soils in the immediate vicinity of the former tank. Ground water seepage was encountered in the excavation at a depth of 6 feet with free flowing water at a depth of 8-1/2 feet. The ground water level subsequent stabilized at a depth of 6 feet. The excavated soil has been stockpiled on-site pending completion of the site characterization investigation, additional soil excavation, and initiation of on-site soil aeration for reduction of the hydrocarbon content.

The initial site characterization investigation included advancing 10 subsurface borings and installation of 3 ground water monitoring wells. Figure 1 indicates the locations of the soil borings and monitoring wells. Soil Borings 1-3 did not encounter visable evidence of hydrocarbon products and did not indicate significant volatile hydrocarbons detectable with the field monitoring equipment (photo-ionization detector). Borings 5-8 encountered discolored soils (fuel stained) which emmited moderate to strong hydrocarbon odors (380-543 parts per million) detectable with the monitoring equipment. Borings 9 and 10 did not encounter visable evidence of hydrocarbon products and did not exhibit detectable volatile hydrocarbons.

Base on observed field conditions, the gasoline products appear to have migrated from the gasolilne tank location in a southwesterly direction and extend beneath the existing garage/warehouse structure. Additional borings could not be advanced without demolition of the existing structure. Three ground water monitoring wells were installed at locations indicated on Figure 1. The wells were installed outside of field detecable limits of hydrocarbon products present in the subsurface soils. Ground water samples have not been collected from the monitoring wells at this time.

Supplemental subsurface borings and ground water monitoring wells are required to further characterize the site and to determine the lateral extent of soil impacted by gasoline product releases associated with the former underground storage tank. This ammended work plan addresses the proposed additional work and also addresses and incorporates the Alameda County Department of Environmental Health review comments on the initial work plan.

2.0 PROPOSED SCOPE OF WORK

To further characterize the impact to the surrounding soil and underlying ground water resources present at the site, the initial Site Characterization Work Plan is ammended as follows:

(1) Remove by demolition the existing garage and warehouse to provide drilling access;

(2) Advance 4-5 supplemental subsurface exploration borings to a depth of 7 feet in the accessible areas to define the subsurface conditions, obtain soil samples from the soil borings for analytical testing, and determine the lateral extent of soil impacted by the former underground storage tank;

and (3) Installation of 1-2 supplemental ground water monitoring wells to further define the ground water conditions at the site, to collect ground water samples for analytical testing, and to evaluate the impacts to the underlying ground water resources;

Conditions regarding evaluation and analysis of field and laboratory test data, evaluation of remedial alternatives, and report preparation presented in the initial Work Plan remain part of this ammended work plan by reference.

Specifics of the individual investigative phases are described in the following sections.

3.0 SUBSURFACE INVESTIGATION

3.1 Soil Borings

Supplemental soil borings would be advanced to a maximum depth of 7 feet below the ground surface or ground water, which ever is encountered first, using an eight (8) inch, nominal diameter, continuous flight hollow stem auger. The borings would be advanced to achieve maximum vertical and horizontal coverage of the site. The exploratory borings would terminate upon intercepting ground water. The proposed locations of the supplemental soil borings would be as indicated on Figure 1; however, the actual boring locations could be modified based on the findings of the investigation.

The soil borings have been, and will continue to be, drilled by Exploration Geoservices, State of California Licensed Drilling Contractor, C57 License No. 489288.

Soil samples would be obtained from the borings at depths of five feet and at the bottom of the borings (6-8 foot depth), at changes in lithology, and where obvious soil contamination exists. The soil samples would be obtained through the use of a 2 inch I.D. split-barrel sampler advanced into the undisturbed soil by a 140 pound hammer repeatedly falling 30 inches. Sand catchers would be used as necessary to retain the samples. A split-barrel, standard penetration sampler would be used should the 2 inch sampler prove ineffective at obtaining the samples.

Drilling and sampling equipment would be thoroughly steam cleaned before drilling begins on each boring to prevent the introduction of off-site contamination and cross contamination between borings. Sampling equipment would be cleaned between sample events to prevent cross contamination. Pre-cleaned brass liners would be placed in the sampler to retain the soil. The blow counts necessary to advance the sampler would be recorded for each 6-inch interval. The

borings would be logged under the supervision of a State of California Certified Engineering Geologist.

The drill cuttings and soil samples would be monitored in the field for evidence of hydrocarbon content through the use of a portable photo-ionization detector (PID), organic vapor meter (OVM), or similar device. The soil samples would be immediately sealed in the liners using aluminum foil and plastic caps and properly labeled including: the date, time, sample location, and project number. The samples would be placed on ice immediately for transport to the laboratory under chain-of-custody documentation.

Soil cuttings derived from the boring would be retained and stored on-site during the drilling and well construction pending results of the analytical testing. The soil borings would be backfilled with a cement slurry to existing grade.

3.2 Monitoring Well Installation

Following completion of the supplemental subsurface borings and further delineation of the extent of the hydrocarbon products, 1-2 supplemental open standpipe piezometer monitoring wells would be installed to assess the impact from the former underground storage tank. Tentative locations for the supplemetal Monitoring Wells are indicated on Figure 1. The actual locations of the proposed Monitoring Wells would be determined subsequent to completion of the subsurface exploration borings such as to optimize the location of the wells and to place one of the wells in a suspected "down-gradient direction" from the tank location. Based on dispersion of the hydrocarbon products in the soil, ground water flow appears to be towards the southwest; however, site specific ground water flow direction and gradient data would be determined as outlined later in this Ammended Work Plan.

The borings for the Monitoring Wells would be advanced to encounter ground water using an eight (8) inch, nominal diameter, continuous flight hollow stem auger. The borings would be advanced a minimum of 15 feet into the saturated zone (total depth of 20 feet). The drilling procedures used in the well installation would be consistent with the procedures previously specified for the Soil Borings. Soil samples would be obtained at five foot intervals, at changes in lithology, and where obvious soil contamination exists. The drill cuttings and soil samples obtained from the borings would be monitored during drilling to observe moisture changes in the soils and to determine the depth of the first saturated zone. It is intended that the borings would be advanced a minimum of 15 feet into the saturated zone unless a low permeable material is encountered prior to achieving this depth. Should a low permeable zone be encountered prior to achieving the 15 foot depth, the screened interval of the well would be reduced such that the low permeable zone is not penetrated to protect underlying aquifers.

The soil borings for the Monitoring Wells have been, and will continue to be, drilled by Exploration Geoservices, State of California Licensed Drilling Contractor, C57 License No. 489288.

3.3 Monitoring Well Construction

The monitoring wells would be constructed by installing 2-inch diameter polyvinyl chloride (PVC) flush-threaded casing and slotted pipe directly through the hollow stem auger. The slotted section of the PVC pipe installed through the saturated zone would have 0.020 inch factory perforations. Materials used in the well construction would be thoroughly cleaned prior to introduction into the boring.

The monitoring wells would be filter-packed with clean monterey silica sand throughout the screened interval. The filter material would be determined based on lithology encountered during drilling and would likely consist of No. 3 Monterey Sand or No. 2/12 Lonestar Sand. The filter-pack material would be installed in the annular spacing between the monitoring well pipe and the auger as the auger is removed and would extend a minimum of two feet above the top of the screened interval. To assure continuity and integrity of the filter material, and to prevent the bore hole from caving, no more than five foot of auger would be removed at a time.

The screened interval of the Monitoring Wells would be placed throughout an interval to account for estimated seasonal fluctuations of the ground water level.

A one foot thick layer of bentonite pellets would be placed above the filter material to provide an annular seal and the remainder of the boring would be filled with a cement slurry to within one foot of grade. The grouting would be performed under the direct observation of a representative from Zone 7 and/or the Alameda County Department of Environmental Health.

The well casings would have a locking cap and will be enclosed inside a watertight cast iron or aluminum traffic box installed in concrete flush with the surface. Figure 2 illustrates the construction of a typical monitoring well.

Water levels in the monitoring wells would be measured to determine the ground water gradient and direction of ground water flow. Should it be determined that one of the aforementioned wells is not in the down-gradient direction of the location of the former underground storage tanks, an additional monitoring well would be installed in the down-gradient direction. The additional well would be installed/constructed in accordance with the aforementioned well installation/construction procedures.

3.4 Well Development and Sampling

The initial well development would be through the use of a 1.7 inch Brainard-Killman mechanical lift hand pump. The wells would be developed until a minimum of three well volumes have been purged and the discharged water appears clear of sediment. Electrical conductivity, temperature, and pH of the ground water would be recorded throughout the development process. The well development would continue until the electrical conductivity, temperature, and pH of the discharged water have stabilized. Depth to water measurements would be recorded prior to and following the well development activities.

The wells would be allowed to recover for a minimum of 24 hours between development and sampling activities. Free product measurements would be obtained utilizing a product/ground water interface probe or through the use of an acrylic or teflon bailer lowered into the well to obtain a surface water sample. The teflon bailer would be used to collect a surface water sample to observe the presence of hydrocarbon odors, visible sheen, or free product. Depth to water measurements would be also be recorded at this time using an electronic water level probe.

Prior to sampling, a minimum of three well volumes would be purged from the well through the use of the mechanical lift hand pump or a positive displacement bladder pump. Electrical conductivity, temperature, and pH of the ground water would be recorded throughout the purging process. The purging activities would continue until the electrical conductivity, temperature, and pH of the discharged water have stabilized. Water samples for analytical testing would be obtained through the use of the bladder pump or teflon bailer.

The water developed from the monitoring wells would be contained on-site in labled 55-gallon containers pending receipt of the laboratory test results. Storage and disposal of the contained water remains the responsibility of the Client.

The water samples would be collected in sterilized glass vials with Teflon lined screw caps. The samples would be immediately sealed in the vials and properly labeled including: the date, time, sample location, project number, and indication of any preservatives added to the sample. The samples would be placed on ice immediately for transport to the laboratory under chain-of-custody documentation.

Travel blanks and "spiked" samples would be obtained from the analytical laboratory and carried to the field on each day of ground water sampling. The blanks and spiked samples would be chilled and transported to and from the field (in a sealed condition) in the same container used to chill and transport the water samples collected from the monitoring wells. Duplicate water samples would be collected to verify the accuracy of field sampling techniques. The travel blanks, spiked samples, and duplicate field samples would be trasported to the laboratory along with the water samples collected from the monitoring wells under chain-of-custody documentation for analysis.

3.5 Ground Water Depth and Gradient Measurements

The location and elevation of each Monitoring Well would be surveyed following completion of the well construction. Vertical control would be to the nearest 0.01 inch. Water levels in the wells would be measured using an electronic water level probe. The depth to water measurements would be consistently recorded from a scribed location on the top of the well casing. The depth to water measurements would be used to determine the direction of ground water flow and ground water gradient beneath the project site.

Should it be determined that one of the aforementioned wells is not in the down-gradient direction of the location of the former underground storage tank, an additional monitoring well would be installed in the down-gradient direction. The additional well would be installed/constructed in accordance with the aforementioned well installation/construction procedures.

3.6 Free Product Measurements

Free product measurements would be obtained for each Monitoring Well at the time of each sample acquisition utilizing a product/ground water interface probe or through the use of an acrylic or teflon bailer lowered into the well to obtain a surface water sample. The teflon bailer would be used to collect a surface water sample to observe the presence of hydrocarbon odors, visible sheen, or free product.

4.0 ANALYTICAL TESTING

Soil and ground water samples would be submitted to and tested by Anametrix Inc., a State of California, Department of Health Services certified testing laboratory. Analytical testing would be scheduled and performed in accordance with the State of California, Regional Water Quality Control Board (RWQCB) Guidelines. Soil samples would be tested for Total Petroleum Hydrocarbons as gasoline by RWQCB Method GCFID (5030) and Volatile Aromatics by EPA Method 8020. Ground water samples would be be tested for Total Petroleum Hydrocarbons as

gasoline by RWQCB Method GCFID (5030) and Volatile Aromatics by EPA Method 602.

The anticipated analytical detection/reporting limits are as follows: Total Petroleum Hydrocarbon as Gasoline, 1.0 ppm (soil) and 50 ppb (water) and Volatile Aromatics (BTXE), 0.005 ppm (soil) and 0.5 ppb (water); however, the actual reporting limits would be dependent on the concentration of product contained in soil/water samples.

5.0 REPORT

A report documenting the findings and observations of the investigation and the results of the analytical laboratory testing would be prepared to include: the findings and data logs for the subsurface investigation, well logs and well development records; analytical test data, chain-of-custody records, along with other pertinent information obtained throughout the investigative process. Conclusions would be presented, particularly with respect to the existence and extent of fuel contaminated soils remaining at the site, depth to ground water and local hydraulic gradient, ground water conditions and assessment of the impact from the former storage tanks. Proposed remedial action and/or monitoring alternatives would be presented.

6.0 SCHEDULE

It is anticipated that upon approval of this Ammended Work Plan by the Alameda County Department of Environmental Health, the work described herein would be initiated within one week of receipt of authorization to proceed. Installation of the suplemental ground water monitoring wells would be initiated following completion of the soil boring phase of work and upon receipt of well permits from Zone 7. It is anticipated that the field investigation would be completed within one week.

Standard analytical testing turnaround time of two (2) weeks is anticipated to be used unless directed otherwise. The final report would be submitted within three weeks following receipt of the analytical test data for the ground water samples.

7.0 KEY PERSONNEL

The names and addresses of personnel associated with this project are listed below:

Property Owner — Mitzi Stockel
3461 Almosta Road
Placerville, CA

Contractor/ Consultant — KTW & Associates
Kevin Krause, Tom Gregory
43289 Osgood Road
Fremont, CA 94539
(415) 623-0480

Geologic Consultant — David C. Glick Associates
David Glick
179 Eunice Ave,
Mountain View, CA 94040
(415) 962-1948 (415) 990-7456

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The following Figures are attached and complete this work plan:

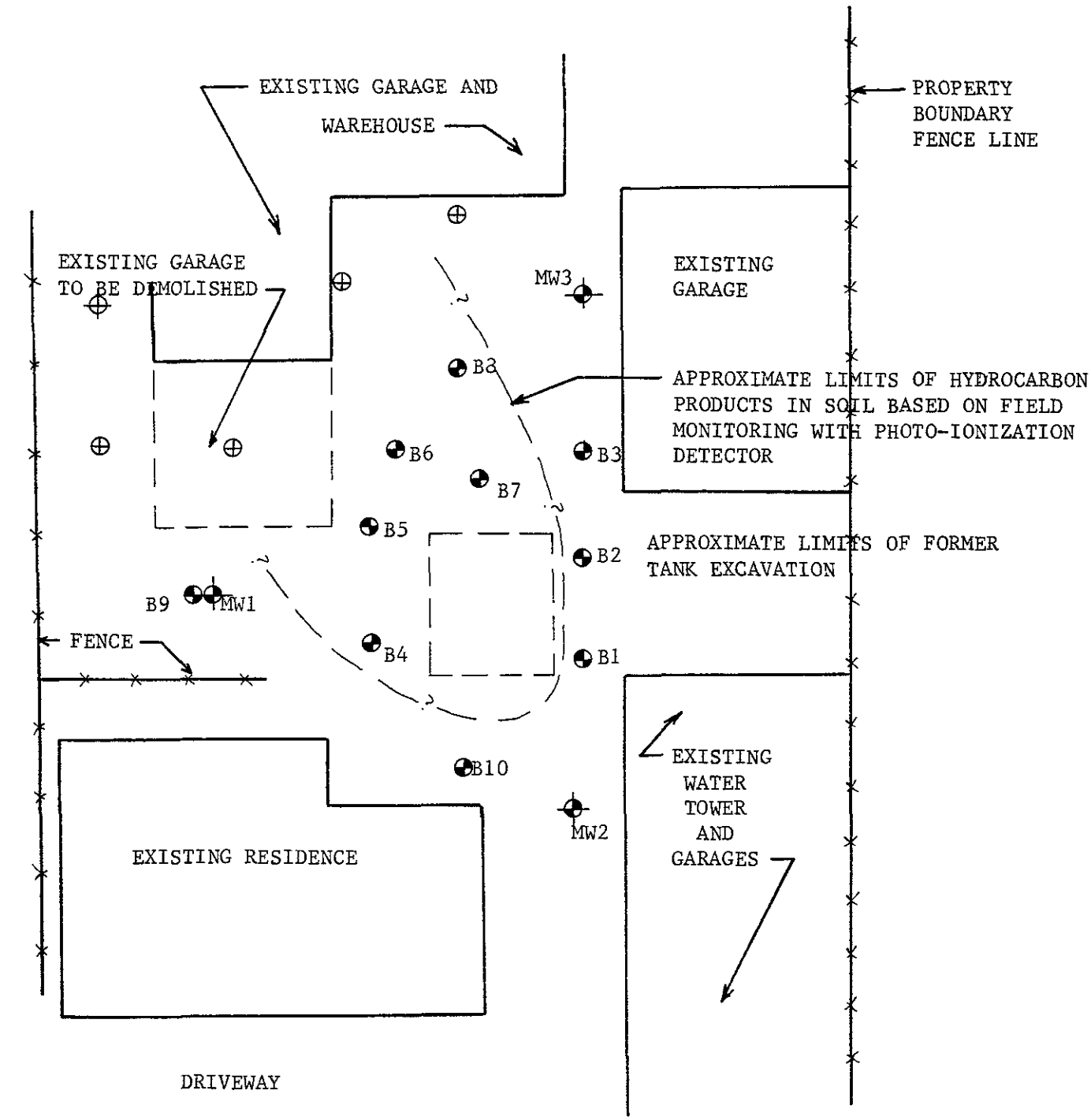
Figure 1 Site Plan
Figure 2 Typical Well Detail

Respectfully submitted,

David C. Glick
Certified Engineering Geologist #1338

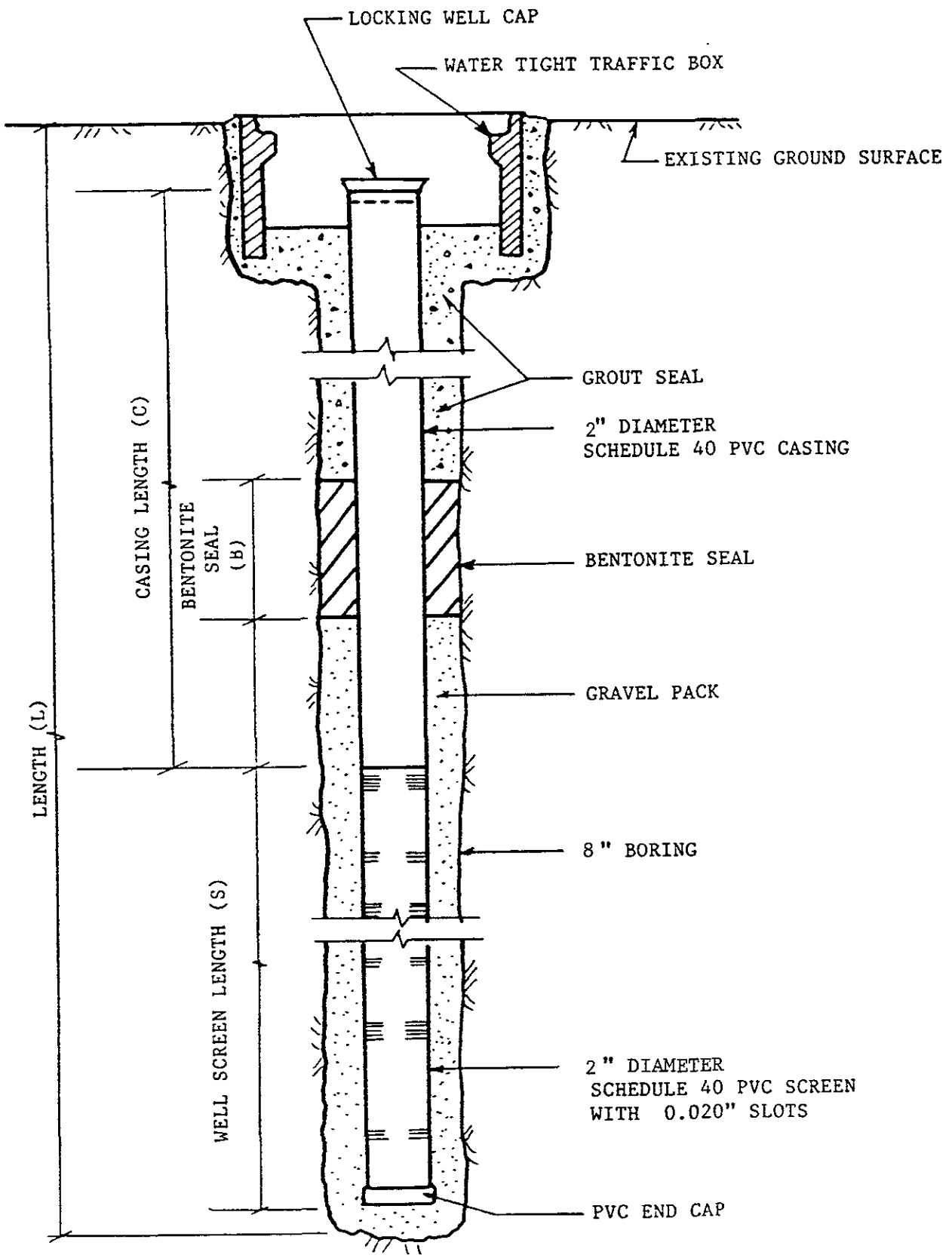
REGISTERED GEOLOGIST
DAVID C. GLICK
No. 1338
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

DCG:dg



- EXISTING SOIL BORING
- EXISTING MONITORING WELL
- PROPOSED SOIL BORING
- PROPOSED MONITORING WELL

AMMENDED WORK PLAN - SITE PLAN		
DATE 5-4-90	SCALE 1"=20'	DRAWN BY DCG
MITZI STOCKEL		
	Figure 1	



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AMMENDED WORK PLAN		
DATE 5-4-90	SCALE N A	DRAWN BY DCG
TYPICAL WELL DETAIL		
MITZI SCOCKEL	**Figure 2**	