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February 24, 1993

Mr. Terrence A. Fox
Ultramar Inc.
525 West Third Street
Hanford, California 93230

Subject: Work Plan for Drilling and Well Installation
Beacon Station No. 604
1619 West First Street
Livermore, California
Delta Project No. 40-89-095

Dear Mr. Fox:

Delta Environmental Consultants, Inc. (Delta), has been authorized by Ultramar Inc. (Ultramar) to conduct a hydrogeologic investigation at Beacon Station No. 604, located at 1619 West First Street, Livermore, Alameda County, California (Figures 1 and 2). The investigation is intended to characterize the distribution of petroleum hydrocarbon constituents in soil and ground water (if encountered) beneath the site. This letter describes the [redacted] if deemed necessary. If warranted, the soil vapor extraction wells will be used for remediating soil beneath the site. If petroleum hydrocarbon constituents in soil are determined to extend to the ground water table, monitoring wells will be installed for recording the depth to the water table and collecting ground water samples. The methods used to drill and sample the soil borings are described in Enclosure A.

no! mw will determine if GW is impacted

Project Background Information

The site is currently operated as a retail gasoline service station with two double-walled fiberglass underground gasoline storage tanks installed in November 1992. The two tanks are 12,000 and 20,000-gallon (compartmental) capacity and contain regular unleaded, premium unleaded, and unleaded plus. Prior to November 1992, there were two 8,000 and one 10,000-gallon capacity single-walled steel underground storage tanks at the site which also contained regular unleaded, premium unleaded, and unleaded plus. The location of the underground tanks are illustrated in Figure 2.

During the November 1992 tank replacement activities, soil samples were collected from beneath the tanks and associated product distribution lines. Analytical results indicated that petroleum hydrocarbon constituents were present in soil beneath the west ends of the regular unleaded and unleaded plus gasoline tanks. This area was overexcavated to feasible limits and soil sampling results indicate that soil containing petroleum hydrocarbons had been removed from beneath the unleaded tank but soil containing petroleum hydrocarbons was still present beneath the regular unleaded tank at 27 feet below grade. The results of the soil sampling activities conducted during the tank replacements is included in the Delta report, *Tank Closure Report* dated January 26, 1993. Due to the presence of petroleum hydrocarbons remaining in the soil after the completion of the

overexcavation, Delta recommended that further on-site investigation be conducted to determine the distribution of petroleum hydrocarbons underlying the site. Based on information provided by Ultramar, the original tank system has not failed historical tank tightness testing; however, based on soil sample analytical results, an unauthorized release report has been filed.

On March 12, 1990, a 550-gallon waste oil tank was removed from the site (Figure 2). Delta submitted a report entitled, *Removal of Waste Oil Tank and Adjacent Soils* on July 2, 1990.

The site and the surrounding area are predominantly flat and paved with asphalt. The type of soil beneath the site has not been documented, although data reported on the regional geology indicates that soil is unconsolidated silt and sand material with some clay. Ground water beneath the site is estimated to be between 40 and 50 feet below grade.

Scope of Work

The proposed work includes advancing one soil boring through the conductor casing (Figure 2) to a depth that will be determined based on field screening results. The conductor casing is 18 inches in diameter and approximately 27 feet deep. Soil samples will be collected from the soil boring at 5-foot vertical intervals and will be field-analyzed for the presence of petroleum hydrocarbon vapors with a photoionization detector (PID) or similar device. The soil boring will be advanced until field screening indicates hydrocarbon concentrations are not present or until the ground water table is encountered. The boring will be completed as a 2-inch diameter vapor extraction well. The screen interval of the soil vapor extraction well will extend from the bottom of the conductor casing to a depth determined in the field by screening results.

The lateral extent of petroleum hydrocarbons in soil will be assessed by advancing three additional soil borings at locations shown in Figure 2. The depth of the soil borings will extend to the same depth above the water table as the first boring in the conductor casing or to just above the water table. If petroleum hydrocarbons are determined in the field to be present, these borings will be completed as soil vapor extraction wells (Enclosure B), except for the boring advanced in the street. The borings surrounding the tank basin will be grouted in the event that field screening indicates hydrocarbon concentrations are not present in soil samples.

see suggested SB location in site plan

If petroleum hydrocarbons in soil extend to the water table, three ground water monitoring wells will be installed at locations shown in Figure 2. The ground water monitoring wells will be completed similar to the specifications shown in Enclosure C. These wells will be completed with a screen interval that extends from 5 feet above to 15 feet below the ground water table.

confirmed D.G. MWRS required - other two may be piezometer well to be w/in 10' of pit

Selected soil samples will be submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes and total petroleum hydrocarbons as gasoline using methods approved by the U.S. Environmental Protection Agency and the California Department of Health Services.

Well construction permits will be filed with the Alameda County Water District.

If you have any questions regarding this project, please contact me at (916) 638-2085.

Sincerely,

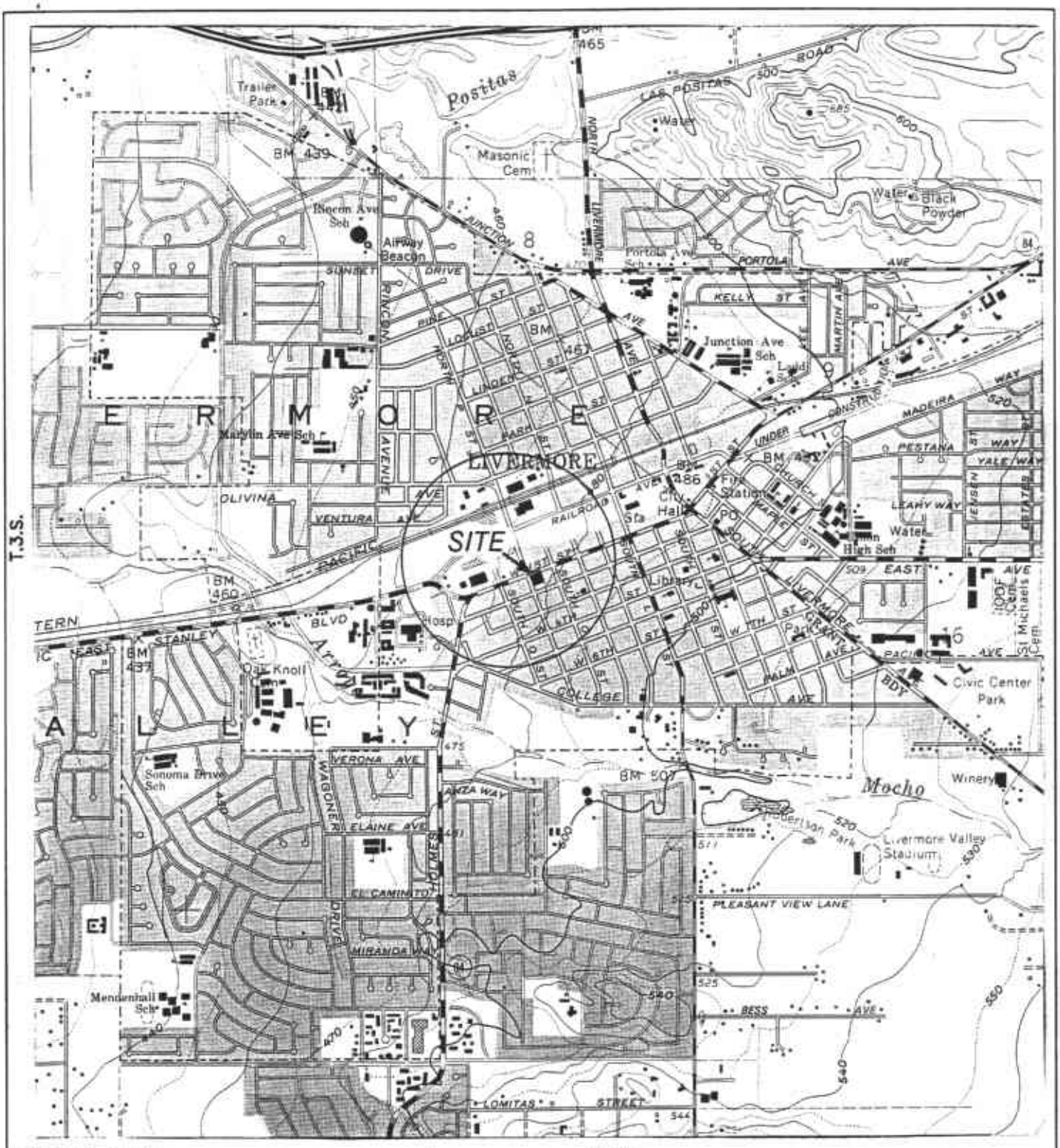
DELTA ENVIRONMENTAL CONSULTANTS, INC.

Charles Keoni Almeida
Project Hydrogeologist

Steven W. Gable, P.E.
Project Manager

James R. Brownell, R.G.
California Registered Geologist No. 5078

CKA (LRP146.TA)



GENERAL NOTES:
BASE MAP FROM U.S.G.S.
LIVERMORE, CA.
7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1980
CONTOUR INTERVAL = 20 FEET

North

0 2000 FT

SCALE 1 : 24,000

QUADRANGLE LOCATION

FIGURE 1
SITE LOCATION MAP
BEACON STATION NO. 604
1619 WEST FIRST AVENUE
LIVERMORE, CA.

PROJECT NO. 40-89-095	DRAWN BY SSG 4/27/90
FILE NO. —	PREPARED BY MSB 4/27/90
REVISION NO. 1	REVIEWED BY

Delta Environmental Consultants, Inc.

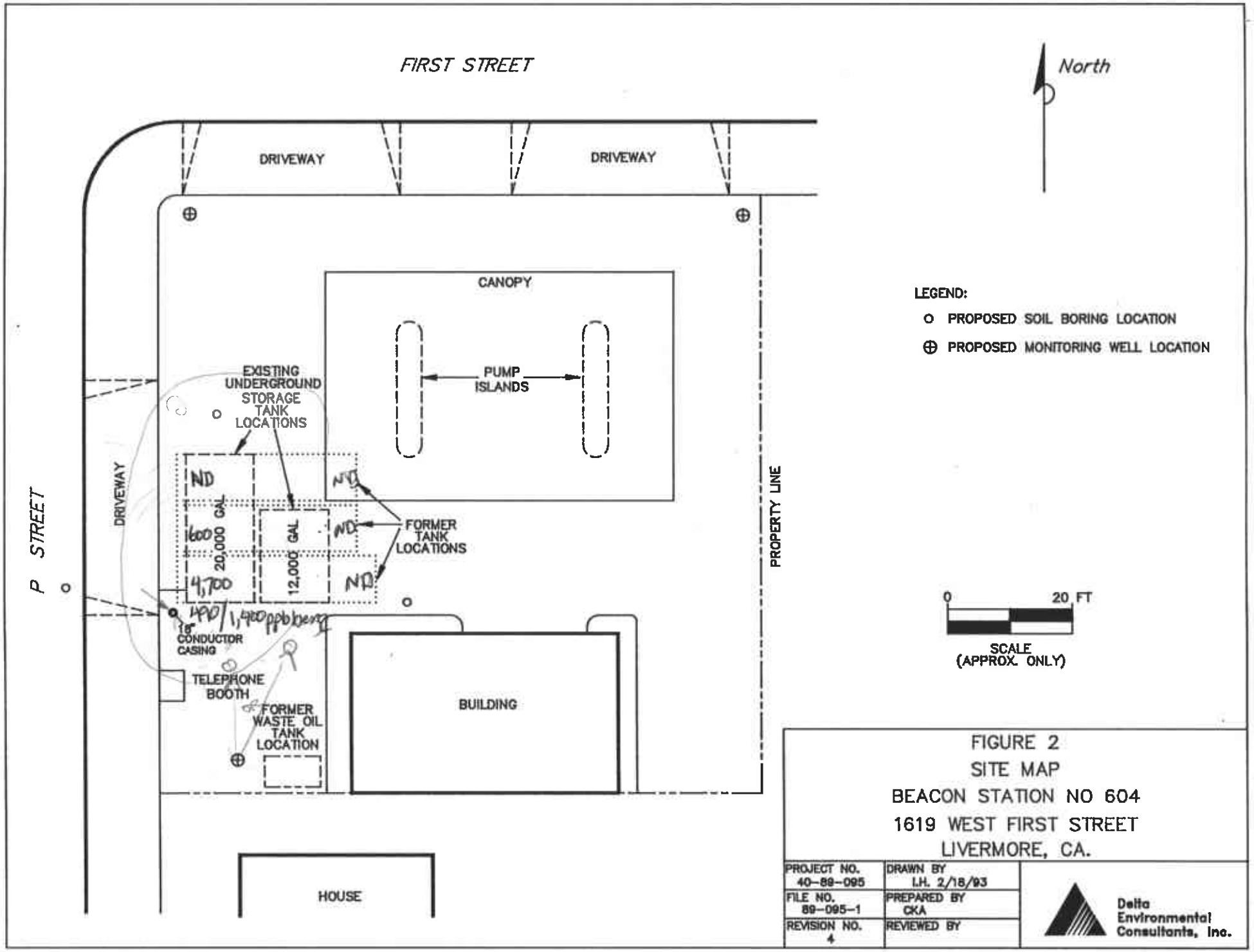


FIGURE 2
SITE MAP
BEACON STATION NO 604
1619 WEST FIRST STREET
LIVERMORE, CA.

PROJECT NO. 40-89-095	DRAWN BY I.H. 2/18/93
FILE NO. 89-095-1	PREPARED BY CKA
REVISION NO. 4	REVIEWED BY

Delta Environmental Consultants, Inc.

ENCLOSURE A

Methods, Analytical Procedures
and Quality Assurance Plan

1.0 METHODS AND PROCEDURES

1.1 Soil Sampling and Contamination Reduction

Soil borings and soil sampling will be performed under the direction of a Delta engineer or geologist. The soil borings will be advanced using a truck-mounted hollow-stem auger drill rig.

To reduce the chances of cross-contamination between boreholes, all downhole drilling equipment will be steam-cleaned between each boring. To reduce cross-contamination between samples, the split-barrel sampler is washed in a soap solution and double-rinsed between each sampling event.

Soil sampling will be done in accordance with ASTM 1586-84. Using this procedure, a 2-inch outside-diameter split-barrel sampler or a 2-inch inside-diameter California-type sampler is driven into the soil by a 140-pound weight falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler an additional 12 inches is known as penetration resistance or the "N" value. The N value is used as an empirical measure of the relative density of cohesionless soils and the consistency of cohesive soils.

Upon recovery, a portion of the soil sample will be placed into a ziplock bag and sealed for later screening with a photoionization detector. Another portion of the soil sample will be used for classification and description. That part of the soil sample collected in brass tubes within the California-type sampler will be stored at approximately 4°C for transport to the laboratory.

1.2 Soil Classification

As the samples were obtained in the field, they will be classified by the crew chief/geologist in accordance with the United Soil Classification System (USCS). Representative portions of the samples will be then retained for further examination and for verification of the field classification. Logs of the borings indicating the depth and identification of the various strata, the N value, and pertinent information regarding the method of maintaining and advancing the borehole will be made.

1.3 Soil Sample Screening/hNu Portable Photoionization Detector Method

After the soil sample ziplock bags have been brought to ambient temperature, the headspace vapors of the soil sample in the bag will be screened with a portable photoionization detector equipped with a 10.2 eV lamp. The sample corner of the bag will be opened and the detector probe immediately placed within the headspace. The highest observed reading will be recorded.

1.4 Monitoring Well Development

In the event that ground water monitoring wells are installed, each monitoring well will be developed after construction with a surge block and bailer until the water produced will be relatively sediment-free and until the conductivity, pH, and temperature stabilize. If the well will be pumped dry during the development process, recharge rates will be recorded. No water or chemicals will be introduced into the monitoring wells during well development. All developed water will be placed in drums on site for later disposal.

1.5 Ground Water Sampling

Three to five wetted casing volumes of liquid will be removed from each well by bailing with a clean disposable bailer. A liquid sample will then be collected from each well with a cleaned disposable bailer. Each sample will be appropriately labeled and stored on ice from the time of collection through the time of delivery to the laboratory. Ground water samples will be transported to the laboratory and analyzed within the EPA-specified holding times for the requested analyses.

1.6 Petroleum Product

If free petroleum product is present in a well, the thickness of the product layer will be measured by collecting a sample in a transparent disposable bailer with a check valve at the bottom, or by measurement using appropriate fluid-level sounding equipment.

2.0 ANALYTICAL PROCEDURES

Selected soil samples submitted to the laboratory will be analyzed for BTEX and TPH as gasoline using EPA Method 8015/8020. Ground water samples submitted to the laboratory will be analyzed for the same constituents as the soil samples.

3.0 QUALITY ASSURANCE PLAN

This section describes the field and analytical procedures to be followed throughout the investigation.

3.1 General Sample Collection and Handling Procedures

Proper collection and handling are essential to ensure the quality of a sample. Each sample will be collected in a suitable container, preserved correctly for the intended analysis, and stored prior to analysis

for no longer than the maximum allowable holding time. Details on the procedures for collection and handling of soil samples used on this project can be found in Section 1.0 (Methods).

3.2 Sample Identification and Chain-of-Custody Procedures

Sample identification and chain-of-custody procedures ensure sample integrity and document sample possession from the time of collection to its ultimate disposal. Each sample container submitted for analysis will have a label affixed to identify the job number, sampler, date and time of sample collection, and a sample number unique to that sample. This information, in addition to a description of the sample, field measurements made, sampling methodology, names of on-site personnel, and any other pertinent field observations, will be recorded on the borehole log or in the field records. Samples will be analyzed by a California-certified laboratory.

A chain-of-custody form will be used to record possession of the sample from time of collection to its arrival at the laboratory. When the samples will be shipped, the person in custody of them will relinquish the samples by signing the chain-of-custody form and noting the time. The sample-control officer at the laboratory would verify sample integrity and confirm that is will be collected in the proper container, preserved correctly, and that there is an adequate volume for analysis.

If these conditions are met, the sample will be assigned a unique log number for identification throughout analysis and reporting. The log number will be recorded on the chain-of-custody form and in the legally-required log book maintained by the laboratory in the laboratory. The sample description, date received, client's name, and other relevant information will also be recorded.

ENCLOSURE B

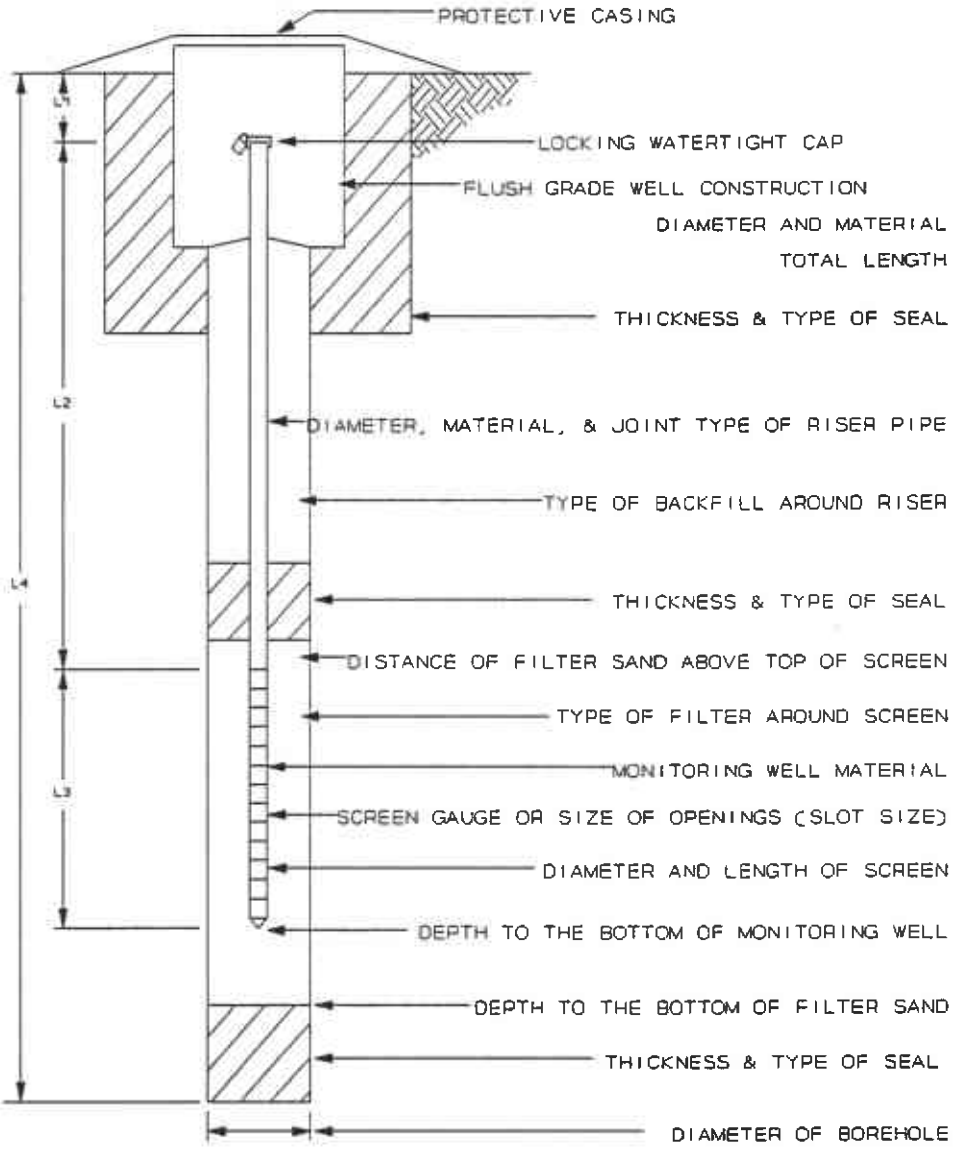
Proposed Vapor Extraction Well Construction Details

PROPOSED VAPOR EXTRACTION CONSTRUCTION DETAILS

Project: Beacon Station No. 604
1619 West First Street
Livermore, CA

Vapor Well No.: Pending

Delta No.: 40-89-095



DIAMETER AND MATERIAL	18-inch steel
TOTAL LENGTH	12 inches
THICKNESS & TYPE OF SEAL	2 feet concrete
DIAMETER, MATERIAL, & JOINT TYPE OF RISER PIPE	2-inch PVC SCH 40 flush thread
TYPE OF BACKFILL AROUND RISER	Cement grout with 5% bentonite
THICKNESS & TYPE OF SEAL	1 foot bentonite
DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN	1 foot
TYPE OF FILTER AROUND SCREEN	#3 Monterey
MONITORING WELL MATERIAL	SCH 40 PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT SIZE)	0.02 inch wire wrapped
DIAMETER AND LENGTH OF SCREEN	Pending
DEPTH TO THE BOTTOM OF MONITORING WELL	Pending
DEPTH TO THE BOTTOM OF FILTER SAND	Pending
THICKNESS & TYPE OF SEAL	NA
DIAMETER OF BOREHOLE	10 inches

L1 = 0.5 FT
L2 = Pending FT
L3 = Pending FT
L4 = Pending FT

Delta Environmental Consultants, Inc.

ENCLOSURE C

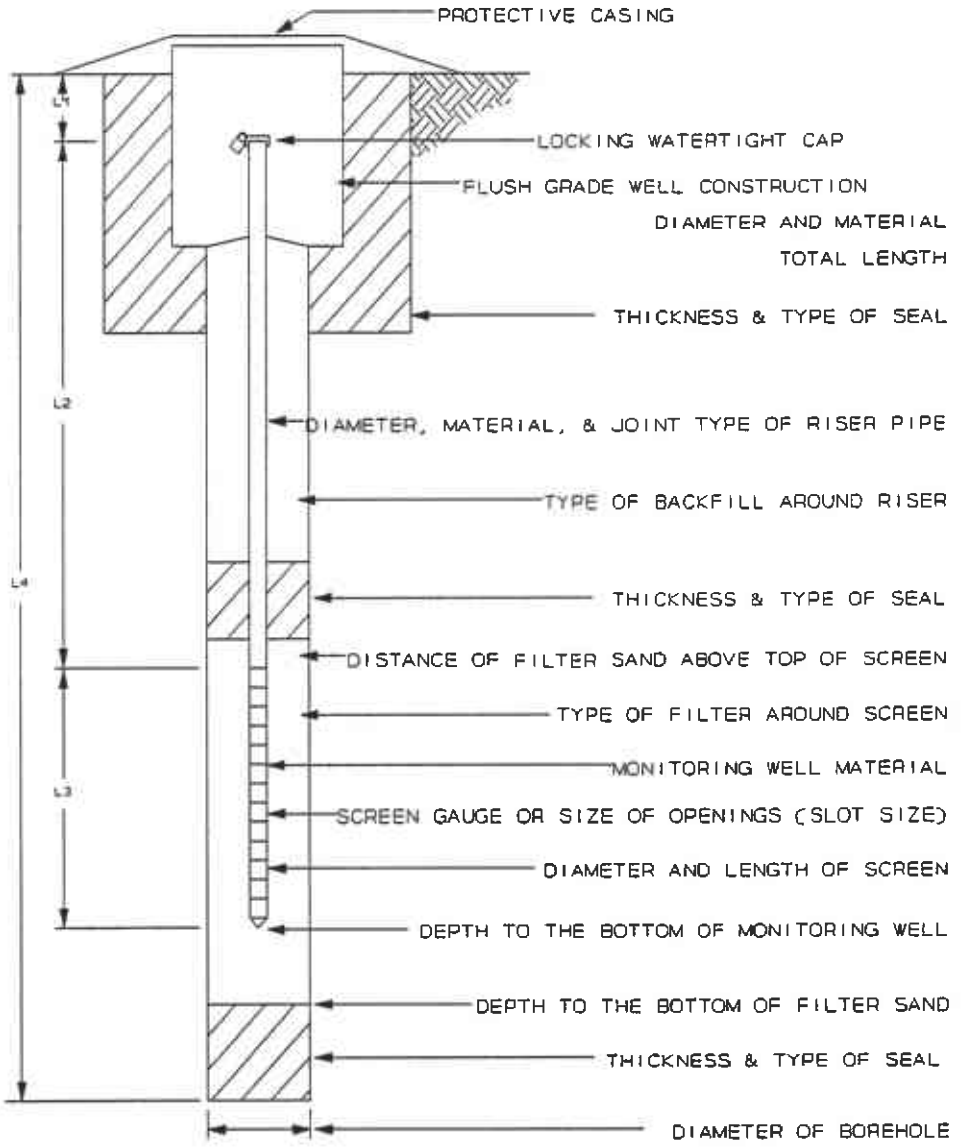
Proposed Ground Water Monitoring Well Construction Details

PROPOSED MONITORING WELL CONSTRUCTION DETAILS

Project: Beacon Station No. 604
1619 West First Street
Livermore, CA

Monitoring Well No.: Pending

Delta No.: 40-89-095



DIAMETER AND MATERIAL	12-inch steel
TOTAL LENGTH	12 inches
THICKNESS & TYPE OF SEAL	12 inches concrete
DIAMETER, MATERIAL, & JOINT TYPE OF RISER PIPE	4-inch Schedule 40 flush threaded
TYPE OF BACKFILL AROUND RISER	Cement grout with 5% bentonite
THICKNESS & TYPE OF SEAL	2 feet bentonite
DISTANCE OF FILTER SAND ABOVE TOP OF SCREEN	2 feet
TYPE OF FILTER AROUND SCREEN	#3 Lonestar
MONITORING WELL MATERIAL	Schedule 40 PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT SIZE)	0.020 inch
DIAMETER AND LENGTH OF SCREEN	Pending
DEPTH TO THE BOTTOM OF MONITORING WELL	Pending
DEPTH TO THE BOTTOM OF FILTER SAND	Pending
THICKNESS & TYPE OF SEAL	NA
DIAMETER OF BOREHOLE	10 inches

L1 = 0.5 FT
L2 = Pending FT
L3 = Pending FT
L4 = Pending FT

Delta Environmental Consultants, Inc.