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REMEDIAL INVESTIGATION WORK PLAN

FORMER TEXACO SERVICE STATION No. 211577
631 QUEEN ANNE AVENUE NORTH
SEATTLE, WASHINGTON

SEPTEMBER 5, 2002

AGENCY FINAL

Delta Environmental Consultants, Inc.

Inogen® Environmental Alliance

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1.0 INTRODUCTION

Delta Environmental Consultants, on behalf of ChevronTexaco, developed a Site Conceptual Model (SCM), Risk Assessment (RA) and supplemental investigation proposal for Former Texaco Station No. 211577 located at 631 Queen Anne Avenue North in Seattle, Washington (a site location map is included as **Figure 1**). The SCM/RI summarized activities and information collected at this location by several previous consultants and the Washington State Department of Ecology (WDOE) since 1986. This work plan defines the purpose, scope and methods to be used while conducting the RI. The purpose of this work plan is to further define the nature and extent of petroleum hydrocarbon impacts to soil and groundwater, which currently exist at both this and several adjacent down-gradient locations, and to evaluate the indoor air quality at the neighboring Monterey Apartments. Data gathered during this Work Plan will be used to fill data gaps necessary for the selection of a site-specific remedy.

2.0 BACKGROUND INFORMATION

2.1 Property Description

The former Texaco Queen Anne Service Station No. 211577 was located at 631 Queen Anne Avenue North, at the intersection of West Roy Street, in the City of Seattle, Washington. The property is located in a residential/commercial neighborhood in the Queen Anne District of northwest Seattle. Located within one city block east, west and south of the former facility location are several multi-story apartment buildings, a hotel, several retail and commercial shops and a former Union Oil Company 76 (Unocal) service station located at 700 Queen Anne Avenue North (**Figure 2**).

2.2 Property History

A gasoline service station has operated in various configurations at this location for approximately 66 years, ending in 1993. In early 1978, residents of the Monterey Apartments notified the Seattle Fire Department of the presence of hydrocarbon odors in the basement laundry room and lower apartments. The Fire Department investigation focused on the then active Texaco Service Station (also referred to as the Arnold Property) and a then-active Unocal gas station, located at 700 Queen Anne Avenue North (**Figure 2**).

After the odors apparently abated in March 1978, no complaints were documented until January 1984 when Monterey Apartments residents complained of gasoline odors. Investigation identified the presence of separate phase hydrocarbons (SPH) in a sump at the Monterey Apartments. The Arnold Property and Unocal station were suspected as the likely sources.

2.3 Previous Investigations

Since the first reported hydrocarbon vapor complaints at the Monterey Apartments in February 1978, various agencies, consultants and contractors have conducted a number of separate investigations and sampling events at the Monterey Apartments and the Arnold Property. Several remedial actions have also been performed with varying levels of success. Information from these investigations is summarized in the Conceptual Site Model, Risk Assessment and Supplemental Investigation Proposal, (Delta Environmental Consultants, May 2002). Currently, there are 20 groundwater monitoring wells in the vicinity, 5 of which are on the Arnold property and 15 of which are on adjacent properties.

2.4 Current Status

The subject property located at 631 Queen Anne Avenue North is currently owned by the Arnolds and is occupied by a deli/convenience store known as "Manhattan Express".

2.5 Regional and Area-Specific Geology and Hydrology

REGIONAL GEOLOGY

Regional geologic mapping of the Queen Anne area indicates that Vashon Till underlies the base of Queen Anne Hill with Older Sand units adjacent to the hill on the north side. The Vashon Till is a well-graded, consolidated mixture of clays and gravels and contains local lenses of sand and gravel. The till is very dense and typically has a very low hydraulic permeability. The Older Sand (i.e. Esperance Sand) underlies the Vashon Till and consists of a well graded, medium to course grained sand with silt stringers and interbeds. Underlying the Esperance Sand is the Lawton Clay described as an older mixture of clay, till, and gravel and contains both vertical and lateral variations. The Lawton Clay has a mostly low to medium hydraulic permeability.

Ecology and Environment, Inc. (E&E) interpreted the soil underlying the Property soils to be within a transitional zone of the Esperance Sand to the underlying Lawton Clay that are described as underlying the Vashon Till. Based on the regional geologic mapping, boring logs prepared by others, and previous aquifer tests, soil underlying the property indicated low permeability. Farallon Consulting (Farallon) concluded that the soil underlying the area consists of a transitional zone between the Vashon Till and Esperance Sand.

AREA-SPECIFIC GEOLOGY

GeoEngineers described soils underlying the investigation area as silty sand and gravel fill up to 11 feet below ground surface (bgs), native silty sand extending to 16 to 29 bgs, and a basal unit of gray, silty clay at the bottom of the borings. The depth to the top of the clay is deeper towards the southwest of the site where the bottom of the clay was not reached in any of the borings (**Figures 3 and 4**).

HYDROLOGY

Groundwater occurs a few feet above the Lawton Clay at depths ranging from 10 to 20 feet bgs. Based on a review of the available boring logs and descriptions from previous reports, the shallow groundwater in the area appears to be perched in discontinuous lenses and layers of fill, silty sand and sand that overlies the basal clay. Previous studies have indicated that the natural groundwater flow direction is towards the west-southwest (**Figure 5**).

The fill likely has a highly variable permeability that is more permeable than the underlying native soils. The native soils, which are saturated, may be of low permeability, as suggested by previous aquifer tests, well dewaterings, and the local presence of impermeable glacial till. The sands that are interbedded with glacial till, silts and clay, are relatively more permeable, and are expected to be laterally discontinuous and variable. Pathways in native soil of varying permeability are expected to exist in the subsurface. Farallon indicated that groundwater beneath the Arnold property may be comprised of multiple shallow water-bearing zones each with unique flow directions and rates.

3.0 OBJECTIVES

The primary objective of this Work Plan is to further assess and document the nature and extent of gasoline, diesel and oil range petroleum hydrocarbons and possibly chlorinated solvents in soil and groundwater beneath both the former service station property and beneath several adjoining properties including the Monterey Apartments. Additional objectives of this investigation include:

- Further assessment and documentation of the indoor air quality within the Monterey Apartments,
- Collection of site-specific soil physical data for modeling potential indoor air risks at other surrounding properties, and
- Determining if other soil, groundwater or vapor exposure pathways are present and/or need to be addressed as part of the final remedial solution for this site.

4.0 SCOPE OF WORK

The scope of work for this RI will include the following tasks:

- Collect groundwater samples from 19 monitoring wells,
- Analyze groundwater samples from these wells for Benzene, Toluene, Ethylbenzene and Xylenes (BTEX compounds), Total Petroleum Hydrocarbons (TPH) as gasoline, TPH-diesel and heavy oil range petroleum hydrocarbons and dissolved lead,
- Analyze 8-10 groundwater samples for Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Carcinogenic Poly Aromatic Hydrocarbons (cPAHs) and Resource Conservation and Recovery Act (RCRA) listed metals (including lead),
- Locate and mark any underground utilities present at 14 soil boring locations,
- Perform 11 soil borings each to a total depth of between 20 and 40-feet bgs,
- Collect soil samples at 2.5-foot or five-foot intervals from each of the borings (see page 10 for details),

- Complete 7 of the soil borings as groundwater monitoring wells by installing a 2-inch diameter PVC well casing in each soil boring,
- Collect soil by geoprobe at 6 locations on the Arnold property for chemical analysis,
- Analyze 20-25 soil samples from the borings and soil probes for BTEX, gasoline, diesel and heavy oil range petroleum hydrocarbons and total lead,
- Analyze 10-12 soil samples from the borings and soil probes for VOCs, SVOCs, cPAHs, RCRA listed metals (including lead) and Total Petroleum Hydrocarbon (TPH) fractions by Volatile Petroleum Hydrocarbon (VPH) and Extractable Petroleum Hydrocarbon (EPH) analyses,
- Collect soil samples from four of the soil borings for physical properties analyses,
- Analyze 7 groundwater samples from the newly installed wells for petroleum hydrocarbons and dissolved lead,
- Analyze groundwater samples from each of the newly installed wells for VOCs, SVOCs, cPAHs and RCRA metals (including lead). Additional analysis for gasoline oxygenates including MTBE and TAME and the detergent additives EDB and EDC will be performed on the two groundwater samples with the highest TPH-gasoline concentrations and for tetraethyl lead if dissolved lead is present,
- Re-sample and analyze groundwater from any of the previously installed wells which contained dissolved lead and 2-3 of those wells which contained the highest concentrations of TPH-Gx for seven of the most common gasoline oxygenates including MTBE and TAME, for two of the most common detergent additives EDB and EDC and for Tetraethlylead,
- Collect soil and groundwater samples from directly beneath the basement floor of the Monterey Apartments,
- Analyze one soil sample from each of the sampling locations beneath the basement of the Monterey Apartments for BTEX, gasoline, diesel and heavy oil range petroleum hydrocarbons VOCs, SVOCs, TPH fractions by VPH and EPH analyses and RCRA listed metals,
- Analyze one groundwater sample from each of the sampling locations beneath the basement of the Monterey Apartments for BTEX, gasoline, diesel and heavy oil range petroleum hydrocarbons,

- Install three vapor probes beneath the floor of the Monterey Apartments basement at each of the soil sampling locations,
- Collect soil vapor samples from each of the soil vapor probes and analyze these soil vapor samples for volatile hydrocarbons, and
- Prepare a report describing the work performed.

5.0 PROCEDURES

5.1 Groundwater Monitoring and Sampling

Eighteen monitoring wells (VP-1, VP-2, VP-3 [MW-2], VP-4, VP-5 [MW-5], VP-6, VP-7 [MW-3], VP-8 [MW-7], VP-9, MW-4, MW-6, MW-9, MW-10, MW-11, RW-2, RW-3, RW-4 and RW-5) will be gauged and sampled. These wells are located on the Arnold and Monterey Apartments properties and at the southeast corner of the 18 Mercer Street building (**Figure 6**). One additional un-designated well (MP-1) was observed near the northeast corner of the Alvena Vista Apartments, this well will also be sampled assuming it is constructed properly and in good condition.

Prior to purging and sampling these monitoring wells, the depth to water in each well will be measured with respect to the top of the well casing to the nearest 0.01-foot. Depth to water and SPH thickness (if present) will be determined using an electronic interface probe.

Due to the high concentrations of hydrocarbon constituents known to be present at this time in many of the monitoring wells, groundwater purging and sampling will be performed using disposable bailers. However, during future compliance monitoring events, low-flow purge and sampling techniques will be utilized. During this sampling event, each monitoring well will be purged with a disposable polyethylene bailer until a minimum of three bore volumes of groundwater has been removed from each well. In the event a monitoring well runs dry during purging, the groundwater level in the well will be allowed to recover to 75 percent of its original static level and purging will continue. If the well is again purged dry, it will be allowed to recover to 75 percent of its original static water level (if possible) at which point it will be considered sufficiently purged.

After purging is complete, groundwater samples will be collected by bailer for laboratory analysis. Groundwater samples collected for laboratory analysis will be collected in laboratory supplied sample containers and immediately placed in a pre-cooled ice chest for storage prior to transport to the analytical laboratory under standard chain of custody procedures. Groundwater samples collected for dissolved metals analyses will be placed in un-preserved containers and filtered by the analytical laboratory.

Groundwater samples will be analyzed for BTEX compounds by EPA Method 8021b, TPH-G by Northwest Method NWTPH-g, and for TPH-D Extended by Northwest Method NWTPH-d (ext.) with silica gel cleanup. A groundwater sample from each well sampled will also be analyzed for dissolved lead using EPA 6000/7000 series methods.

In addition to the analyses listed above, samples from select groundwater monitoring wells will be collected for the following analysis, most of which are required by MTCA and listed in Table 830-1.

- EPA Method 8260b – This analysis will be used to assess the presence and concentration of volatile compounds, solvents, fuel additives and blending compounds, naphthalene's, and several of the principle fuel oxygenates known to be present in gasoline distributed in Washington State. Groundwater samples for EPA 8260B analysis will be collected from wells MW-2/VP-3, MW-4, MW-5/VP-5, MW-10, MW-11 and RW-4.
- SVOCs and cPAHs will be quantified by EPA Method 8270c. Groundwater samples for EPA 8270C analysis will be collected from wells MW-3/VP-7, MW-4, MW-5/VP-5, MW-7/VP-8, MW-10, MW-11, VP-2 and RW-4.
- Select groundwater samples will be collected and submitted for analysis of the eight principle RCRA listed metals. This procedure is used to detect and quantify the concentration of the principle heavy metals known to constitute environmental concerns. Although this analysis is not specifically required by MTCA, several of the RCRA listed metals have previously been detected in groundwater from this site at concentrations exceeding MTCA Method A cleanup levels. For this reason, additional analyses will be performed to determine the nature and extent of these exceedences. Groundwater

samples for dissolved RCRA metals analysis will be collected from wells MW-3/VP-7, MW-4, MW-5/VP-5, MW-7/VP-8, MW-10, VP-9, RW-2 and RW-4.

5.2 Underground Utility Locating and Bore-hole Clearing

Prior to subsurface investigation activities, Delta will arrange for the location of underground utilities by 1) contacting the Utilities Underground Location Center, and 2) contracting with a private locating service to identify, locate, and mark utilities in the areas to be sampled.

Delta will also perform a site visit to determine if any overhead obstructions, concrete paving or other structures are present which could interfere will drilling activities. Street-use, sewer discharge and sidewalk closure permits will be acquired from the proper authorities. Delta will arrange for traffic control through a private subcontractor. Soil boring locations will be cleared by hand (where possible) to five-feet below grade (bg) prior to drilling and, if required due to the presence of adjacent underground utilities, a subcontractor using an air knife and vacuum hose will perform a safe-dig borehole clearing.

5.3 Soil Borings

Following the results from the groundwater sampling listed above, Delta Environmental Consultants will subcontract Cascade Drilling, Inc. (Cascade) of Woodinville, Washington to drill up to 11 soil borings (DB-1 through DB-11) and complete as many as 7 of these borings as groundwater monitoring wells (MW-12 through MW-18). See **Figure 7** for soil boring locations. Borings will be drilled to total depths between 20 and 40 feet bgs, terminating at the contact with the underlying Lawton clay layer using a truck mounted hollow-stem auger drill rig. Soil samples will be collected at 2.5-foot intervals beginning at five feet bg at soil boring locations DB-2, DB-3, DB-4 and DB-5. Soil samples will be collected at 5.0-foot intervals beginning at five feet bgs from soil borings DB-1 and DB-6 through DB-11. Soil samples will be collected by driving a split-spoon soil sampler ahead of the auger flights, recovering the sampler and then placing a plug at the terminus of the lead auger prior to advancing the auger flight to the next sampling depth. Soil samples collected for both physical and chemical analysis from borings DB-3, DB-4, DB-5 and DB-7 will be collected using brass rings placed within a Dames and Moore type sampler. Soil samples from the remaining seven locations will be collected using a modified California type split-spoon sampler without brass rings. Each soil boring will be logged by a Delta Environmental geologist in accordance with the Unified Soil Classification System

("USCS") Visual-Manual Procedure (American Society for Testing and Materials Method D2488). The soil classification will be recorded on a Boring and Well Construction Log (see example form in **Attachment A**).

Soil from each sampled interval will undergo both headspace vapor screening for the presence of hydrocarbons using a photo-ionization detector (PID) with a 10.0 electron volt (eV) lamp and sheen testing for the presence of non-volatile heavy range hydrocarbons and oils. The results of both headspace vapor screening and the sheen testing will be recorded on the soil boring logs and be used to select which samples will be submitted for laboratory chemical analysis. At a minimum, one soil sample from the capillary fringe or vadose zone will be collected and submitted for laboratory chemical analysis. Soil samples collected for laboratory chemical analysis will be retained in laboratory-supplied glass jars with Teflon® lined lids and placed on ice for transport to a ChevronTexaco approved laboratory. At a minimum, one soil sample from each boring location will be analyzed for BTEX compounds by EPA Method 8021b, TPH-G by Northwest Method NWTPH-g, and TPH-D by Northwest Method NWTPH-d with silica gel cleanup. A soil sample from the capillary fringe soils in each boring will also be analyzed for total lead using EPA 6000/7000 series methods.

Soil samples from eight locations (DB-1 through DB-8) will also be submitted for VOCs analysis by EPA Method 8260B. Soil samples from eight locations (DB-1 through DB-8) will be submitted for SVOC and cPAH analysis by EPA Method 8270C. Soil samples collected from five borings (DB-1, DB-2, DB-6, DB-7 and DB-8) will be submitted for EPH and VPH analysis using the WDOE interim TPH methods and hexane by EPA method 8260B. Soil samples from eight locations (DB-1 through DB-8) will also be submitted for RCRA metals analysis by EPA 6000/7000 series methods.

In addition to the analyses listed above, vadose and saturated zone soil samples will be collected for the following physical properties analysis from borings DB-3, DB-4, DB-5 and DB-7. These analyses will allow more accurate soil vapor intrusion modeling to be performed and soil and groundwater concentrations protective of indoor air to be determined.

Vadose Zone Samples and Analyses

- Fraction Organic Carbon (FOC) by ASTM D-2974
- Dry Soil Bulk density by ASTM D-2937
- Specific gravity by ASTM D-854
- Moisture content by ASTM D-2216
- Air permeability by SSSA 48 / ASTM D-4525
- Total porosity

Saturated Zone Samples and Analyses

- Total and effective porosity according to the method described in Freeze and Cherry, 1979 (Groundwater)
- Saturated hydraulic conductivity by one of the following methods – ASTM D-2434 or ASTM D-5084 (lab will determine which method used based on sample properties)
- Fraction Organic Carbon (FOC) by ASTM D-2974
- Specific gravity by ASTM D-854
- Bulk density by ASTM D-2937

5.4 Soil Headspace Vapor Screening

Headspace vapor screening consists of measuring the vapor content of a volume of air in the headspace surrounding a sealed sample of soil. At a minimum, one soil sample from each soil boring will be screened in the field using a portable gas analyzer equipped with a photoionization detector ("PID"). Headspace vapor screening will be performed on all the soil samples using a separate container than the samples to be sent to the laboratory.

The screening procedure involves first placing the soil in a re-sealable bag, leaving a small amount of open headspace in the bag for organic vapors, if present, to collect. The bag is then sealed and the headspace allowed to equilibrate with the soil sample for a few minutes at ambient air temperature prior to PID measurement. The bag is partially opened, the PID intake probe is inserted through opening into the headspace, and the concentration of organic vapor in the headspace of the bag is measured and recorded.

5.5 Sheen Testing

Sheen testing involves placing a small volume of soil in a "Dixie cup" to which an equal volume of distilled water is added. The sampler then notes the presence of sheen on the water surface within the cup. A qualitative estimate regarding the intensity of the sheen produced is then recorded in the field log i.e. light, moderate or heavy sheen. Sheen testing will be performed on all the soil samples following soil headspace screening using the same soil aliquot.

Soil samples will be selected for laboratory analysis based on headspace screening concentrations, sheen testing results and depth to groundwater. In general, soil samples from each soil boring representing the sampled interval with the greatest headspace vapor concentration and/or which produce a moderate to heavy sheen will be submitted for laboratory analysis. If headspace-screening concentrations do not exceed background levels and no sheen is observed then interface soil samples will be submitted for analysis. The Project Manager will decide if any additional samples will be analyzed based on the results of the headspace vapor screening, sheen testing, field observations and soil lithology.

5.6 Monitoring Well Installation

Seven of the exploratory soil borings will be completed as monitoring wells (MW-12 through MW-18) by the installation of a 2-inch diameter, schedule 40 PVC casing with 0.010-inch factory slotted screen. Ten to fifteen feet (depending on total depth and depth to groundwater) of well screen will be placed at the bottom of each boring in the saturated zone and extend to at least five feet above the static groundwater elevation at the time of installation. The annular space across the entire screened interval and extending approximately two feet above the screened interval will be filled with a graded 2x12 silica sand. The remaining annular space will then be sealed with hydrated bentonite chips to approximately three-feet bg. Two-feet of concrete will then be poured into the remaining annular space to provide a surface-seal at the well-head. The remaining blank well casing will then be cut at approximately 6 inches bg and a locking well plug installed. A traffic rated waterproof monitoring well monument set in concrete will be installed at each well location flush with the surrounding surface. The lid of each monitoring well monument will be bolted to the monument skirt with tamper-proof bolts to prevent unauthorized access.

5.7 Monitoring Well Development

Each new monitoring well (MW-12 through MW-18) will be developed by over pumping with an electric down-well pump (Wahl Pump). The development procedure consists of lowering the Wahl pump into the well until it strikes the surface of the water, and continuing to lower the pump to the bottom of the well. The pump is raised and lowered repeatedly to surge the groundwater within the well. Surging the well by raising and lowering the pump while it is running produces an outward surge of water that is forced from the borehole through the well screen and into the formation. This tends to break up any bridging that has developed within the formation. As the pump is repeatedly raised and lowered through the well, the surging action created in the borehole causes the particulate matter outside the well to flow into the well. During this process, water containing this particulate material is removed from the well by the pump. Pumping is continued until approximately 10 casing volumes of water have been removed.

Purged groundwater produced during well development will be contained in 55-gallon DOT approved salvage drums and placed in the equipment compound to allow fines and sediments to settle. The development water will be treated on-site by granular activated carbon filtration and then discharged to sewer under METRO permit.

5.8 Monitoring Well Purging and Sampling

Groundwater samples will be collected from each of the seven new monitoring wells (MW-12 through MW-18). However, prior to purging and sampling, each new well will be allowed to stabilized for at least 48 hours before being sampled following well development. And, prior to purging water from each monitoring well, depth to water will be measured with respect to the top of the well casing to the nearest 0.01-foot.

Each monitoring well will be purged with a disposable polyethylene bailer until a minimum of three bore volumes of groundwater has been removed from each well. In the event a monitoring well runs dry during purging, the groundwater level in the well will be allowed to recover to 75 percent of its original static level and purging will continue. If the well is again purged dry, it will be allowed to recover to 75 percent of its original static water level (if possible) at which point it will be considered sufficiently purged.

After purging is complete, groundwater samples will be collected by bailer for hydrocarbons analysis and by peristaltic pump for dissolved metals analysis. Groundwater samples collected for laboratory analysis will be collected in laboratory supplied sample containers and immediately placed in a pre-cooled ice chest for storage prior to transport to the analytical laboratory under standard chain of custody procedures. Groundwater samples collected for dissolved metals and tetraethyl lead analyses will be field filtered using an in-line disposable 0.45 micron groundwater filter capsule attached to the discharge side of the peristaltic pump and placed in pre-preserved containers provided by the analytical laboratory.

Groundwater samples will be analyzed for BTEX compounds by EPA Method 8021b, TPH-G by Northwest Method NWTPH-g, and for TPH-D by Northwest Method NWTPH-d with silica gel acid cleanup. A groundwater sample from each well sampled will also be analyzed for dissolved lead using EPA 6000/7000 series methods.

In addition to the analyses listed above, selected groundwater samples will also be collected for the following analysis, most of which are required by MTCA and listed in Table 830-1. Additional analyses may be performed based on the results of the synoptic groundwater sampling event.

- EPA Method 8260b – This analysis will be used to assess the presence and concentration of volatile compounds, solvents, fuel additives and blending compounds, naphthalene's, and several of the principle fuel oxygenates known to be present in gasoline distributed in Washington State. Groundwater samples for EPA 8260B analysis will be collected from wells MW-12 and MW-13.
- Groundwater samples from wells MW-12 through MW-15 will be collected for SVOC and cPAH analysis by EPA Method 8270c.
- Groundwater samples will be collected from well MW-12 through MW-15 and submitted for analysis of the eight principle RCRA listed metals.
- Additional samples will be collected from each newly installed well and held by the analytical laboratory for possible future analysis. Additional analysis for gasoline oxygenates including MTBE and TAME and the detergent additives EDB and EDC will

be performed on held samples from two locations where gasoline range hydrocarbons are present at the highest relative TPH-G concentration and for tetraethyl lead if dissolved lead is present.

- Groundwater samples will also be collected from any of the existing groundwater monitoring wells for tetraethyl lead based on the results of the synoptic sampling. Any existing groundwater monitoring well which was found to contain total or dissolved lead at concentrations exceeding MTCA method A cleanup levels will be re-sampled for tetraethyl lead.

Purged groundwater will be contained in 55-gallon DOT approved salvage drums and placed in the equipment compound to allow fines and sediments to settle. The purge water will be treated on-site by granular activated carbon filtration and then discharged to sewer under METRO permit.

5.9 Monitoring Well Survey

The elevation of each new and existing monitoring well will be surveyed to the nearest 0.01-foot with respect to the top of the well casing. The well casing elevations will be established with respect to City of Seattle Datum. A survey reference mark will be scribed on the lip of the new well casings for future groundwater elevation measurements. A sample survey field data sheet is presented in **Attachment A**. The location of each monitoring well installed will be determined with respect to existing buildings and/or site features. Well locations will be measured to the nearest 0.1-foot using a survey tape or rolling-wheel measuring device.

5.10 Geoprobing and Soil Sampling

Delta will subcontract Cascade Drilling, Inc. (Cascade) of Woodinville, Washington to perform geoprobing and collect soil samples at up to 7 locations (DP-1 through DP-7) where possible on the Arnold Property. See **Figure 7** for Geoprobing locations. Each Geoprobe will be pushed to a total depth between 30 and 40 feet below grade (bg), using a truck mounted probing rig. Soil samples will be collected continuously at each probe location by pushing a soil-sampling probe containing an acetate sample liner ahead of a hollow outer tube. The soil in each acetate liner will be logged by a Delta Environmental geologist in accordance with the Unified Soil Classification System ("USCS") Visual-Manual Procedure (American Society for Testing and Materials Method D2488). The soil classification will be recorded on a Boring Log (see example

form in **Attachment A**). If geoprobe sample collection is not possible due to subsurface conditions i.e. large gravel, cobbles, construction debrie or other impermeable lithology then Delta will re-mobilize with a limited access hollow-core auger drilling rig to complete sample collection at any location where the geoprobe was ineffective. Only locations where the limited access drilling rig can safely operate will be sampled, and Delta will reserve the right to relocate drilling locations if necessary.

Soil from each sampled interval will undergo headspace vapor screening for the presence of hydrocarbons using a photo-ionization detector (PID) with a 10.0 electron volt (eV) lamp and sheen testing for the presence of non-volatile heavy range petroleum hydrocarbons and oils. The results of both headspace vapor screening and the sheen testing will be recorded on the soil boring logs. At a minimum, one soil sample from the capillary fringe or vadose zone will be collected and submitted for laboratory chemical analysis. Soil samples collected for laboratory chemical analysis will be retained in the acetate sampling sleeve, capped at each end, sealed with tape and placed on ice for transport to a ChevronTexaco approved laboratory. At a minimum, one soil sample from each probing location will be analyzed for BTEX compounds by EPA Method 8021b, TPH-G by Northwest Method NWTPH-g, and for TPH-D by Northwest Method NWTPH-d with silica gel acid cleanup. A soil sample from the capillary fringe soils in each boring will also be analyzed for total lead using EPA 6000/7000 series methods.

Soil samples from four locations (DP-1 through DP-4) will also be submitted for VOCs analysis by EPA Method 8260B. Soil samples from two locations (DP-1 and DP-5) will be submitted for SVOC and cPAH analysis by EPA Method 8270C. A soil sample will be collected from DP-2 for EPH and VPH analysis using the WDOE TPH methods. Soil samples from four locations (DP-1, DP-3, DP-4 and DP-6) will also be submitted for RCRA metals analysis by EPA 6000/7000 series methods.

5.11 Indoor Air Assessment

Indoor air quality within the Monterey Apartments will be assessed by collecting soil and soil vapor from beneath the concrete slab of the basement level of the apartment building using the following methods.

Three soil samples from directly beneath the concrete slab floor of the basement level at the Monterey Apartments will be collected in the following manner:

1. A 6-inch diameter hole will be cored from the concrete slab of the basement floor.
2. Using a hand auger, soil from beneath the floor at each coring location will be collected for laboratory analysis.

Following soil sample collection, an electric jackhammer will be used to drive a geoprobe type groundwater sampling point to a depth approximately 18-24 inches below the static groundwater elevation for collection of groundwater samples. Groundwater samples from each sampling location will then be collected in the following manner:

1. A length of disposable polyethylene tubing will be placed into each groundwater sampling point and lowered to within 6 inches of the bottom of the screened section of the sampling point.
2. The polyethylene tubing will be connected to a short length of flexible tubing attached to a peristaltic sampling pump.
3. Approximately one liter of groundwater will be purged from each sampling point using the pump prior to sample collection.
4. Groundwater samples from each sampling point will be collected into laboratory supplied sample containers using the peristaltic pump.
5. The groundwater samples collected will be analyzed for BTEX compounds by EPA Method 8021b, TPH-G by Northwest Method NWTPH-g, and for TPH-D by Northwest Method NWTPH-d with silica gel acid cleanup.
6. Following groundwater sample collection each sampling point will be removed.

Once each sampling point has been removed, each sampling location will be converted to a permanent soil vapor sampling port in the following manner:

1. Each auger hole and any open soil area remaining following removal of the groundwater sampling point will be back-filled with silica sand and a vapor probe consisting of a

length of small diameter stainless steel tubing or pipe that has been crimped closed or capped and the side walls perforated or slotted will be inserted in to the sand.

2. The hole cored in the concrete slab will be sealed with concrete to within an inch or two of the bottom of the existing concrete floor.
3. The stainless steel tubing or pipe will be fitted with a removable screw-top cap such that the cap when installed will be approximately 1-inch below the level of the floor surface.
4. The remaining annulus of each 6-inch core will be fitted with a floor mounted electrical box set in concrete and finished level with or slightly below the existing concrete floor.
5. The vapor probe will enter this electrical box through a hole in the bottom of the box. The sampling port installed in the utility room will be completed with a brass cover, set flush with the concrete floor. This box will then be fitted with a removable brass cover plate to allow access to the vapor probe for sampling.
6. The two sampling ports installed in the carpeted hallway will be completed with the same electrical boxes previously described, but a brass carpet ring will be secured to the electrical box which, will seal down around a hole cut in the carpet at these locations. Each of these boxes will then be fitted with the same type of removable brass covers. A cross-sectional drawing of a typical soil vapor sampling point is included as **Figure 8**.

Soil and groundwater samples will be collected and soil vapor sampling ports installed at three locations beneath the apartment building which correspond to the eastern, central and western portions of the buildings footprint. Sampling and vapor probe locations are depicted in **Figure 9**.

One soil sample from each location will be analyzed for TPH-G by Northwest Method NWTPH-g, TPH-D by Northwest Method NWTPH-d with silica gel acid cleanup, VOCs analysis by EPA Method 8260B, SVOC and cPAH analysis by EPA Method 8270C, EPH and VPH analysis and for RCRA metals (including lead) by EPA 6000/7000 series methods.

One groundwater sample from each location will be analyzed for BTEX compounds by EPA Method 8015, TPH-G by Northwest Method NWTPH-g and TPH-D by Northwest Method NWTPH-d with silica gel acid cleanup.

Following the installation of the soil vapor sampling ports, soil vapor samples will be collected from each sampling port using lab supplied pre-evacuated 1-liter summa canisters fitted with

fixed orifice sample nozzles. The orifice size of the sampling nozzle will be set to collect the full volume of the summa canister over a 15-minute sampling period from the soil gas probes. To collect vapor samples from the sampling ports, a short length of small diameter stainless steel or Teflon® tubing will be used to connect the summa canisters to a fitting mounted on the sampling port. Soil vapor samples will be collected during a period of falling barometric pressure as reported by one or more of the following sources- National Oceanic and Atmospheric Administration (NOAA) www.noaa.gov, the National Weather Service (NWS) www.nws.gov or the Flight Information Center at Boeing Field. By collecting vapor samples during falling atmospheric pressure, the concentration of volatile organic vapors reaching the bottom of the concrete basement floor will be greater than during steady pressure conditions thus reflecting more conservative vapor intrusion conditions. Please note that due to the requirement that soil vapor samples be collected under conditions of falling barometric pressures, Delta cannot anticipate when vapor sampling will occur. Following sample collection, each canister will be transported under chain of custody to a Chevron approved analytical laboratory for VOCs analysis by EPA Test Method TO-14. A graphical representation of the barometric pressure proceeding, during and following the vapor sampling event will be obtained from one or both of the sources mentioned above and included in the final sampling report discussed in Section 9.5 of this Workplan.

Once the soil vapor samples have been collected, the differential pressure/vacuum between the soil surface beneath the basement floor and the interior building pressure will be measured. The differential pressure/vacuum will be determined by connecting one side of a magnahelic gauge calibrated for inches of water column pressure/vacuum to the sampling port and leaving the other side of the gauge open to the atmosphere inside the apartment building. Because of wind effects on the structure, stack effects due to heating of the interior air, and unbalanced mechanical ventilation, a negative pressure with respect to the soil surface is usually generated within the structure. If present, this pressure differential (ΔP) induces a flow of soil vapor through the soil matrix and into the structure through cracks, gaps, and openings in the foundation. Measurement of the ΔP (or vacuum if present) between the soil surface beneath the basement floor and the basement interior is critical for determining the flux rate of intruding vapors.

6.0 DATA QUALITY ASSURANCE

The following quality assurance and control procedures will be utilized during this investigation to ensure accurate and reproducible data reflective of true subsurface conditions.

6.1 Monitoring Equipment Calibration

The portable PID used for screening soil vapor head-space will be calibrated at the beginning of each day according to the manufactures recommended procedure using a laboratory certified isobutylene gas standard.

6.2 Decontamination Procedures

The split-spoon sampler and hand-auger will be cleaned by rinsing with clean tap water, scrubbing with phosphate-free detergent (alconox) and water and rinsed again with clean tap water followed by a final rinse with distilled water. All drilling equipment will be steam-cleaned between boring locations.

All decontamination water will be stored on-site in 55-gallon, DOT-approved drums to allow fine particulates to settle. Once the suspended particulate in the purged groundwater has settled (usually within 1-2 days), the purged groundwater will be treated on-site by activated carbon filtration and discharged to the sanitary sewer under METRO permit.

6.3 Sample Storage, Packing, and Shipment

All soil and groundwater samples will be stored in an ice chest while at the site and during transportation to the laboratory. Samples will be sub-packed by sample location in new zip-lock plastic bags and stored in the dark at 4° C. A temperature compliance vial will accompany each cooler to verify that proper holding temperatures were maintained during transport.

Soil vapor samples will be collected in stainless steel summa canisters and stored in a sample cooler while at the site and wrapped in packing foam during transportation to the laboratory.

6.4 Chain of Custody Procedures

A chain of custody (COC) form sealed in a plastic zip-lock bag will accompany each sample cooler or ice chest containing laboratory samples. The field personnel will retain a copy of the COC; the original will be sent with the samples to the laboratory.

6.5 Sample Quality Assurance/ Quality Control Procedures

Quality assurance/quality control ("QA/QC") samples will be collected, and include field blanks, trip blanks, source blanks, equipment rinsate blanks and duplicate soil and groundwater samples. Field blanks, trip blanks and duplicate samples will be labeled with unique sample numbers. The laboratory will have no indication that a sample is duplicate. One field blank and one duplicate sample will be collected for every ten soil and groundwater samples collected, and a trip blank will accompany each sample cooler containing soil or groundwater samples. One duplicate soil vapor sample will be collected during this investigation.

Quality assurance/quality control (QA/QC) samples are necessary to ensure the precision, accuracy, representativeness, completeness, and comparability of the data. Four types of QA/QC samples will be processed during sampling, three of which must be collected in the field: a source blank, a field duplicate, and an equipment rinsate. The contracting laboratory supplies one additional QA/QC sample, the trip blank.

Source blanks are collected and analyzed to determine if contamination is being introduced into the sample by water used for decontamination. A minimum of one blank from each source of water used shall be collected and analyzed for the same parameters as the related samples for each round of sampling.

One duplicate sample for every ten soil and groundwater samples (10 percent) and one duplicate soil vapor sample during this investigation shall be collected and submitted to the laboratory for analysis. The duplicate sample is designed to be identical to the original sample and submitted to gain precision information on the homogeneity of sampling, shipping, storage, preparation, and analysis. In general, the goal is to identify possible field variations. The duplicate sample will be collected at the same environmental location (sampled interval in the case of soil) and shall be collected when the environmental sample is collected. Duplicate

samples will be issued discrete sample identifiers to prevent the analytical laboratory from recognizing the sample as duplicate.

Equipment rinsates are the final analyte-free rinse water from equipment cleaning and are collected at the ratio of one per sampling event. The soil sampling beneath the Monterey Apartments will be considered a separate sampling event and a rinsate blank from the hand auger will be collected. The rinsate blanks will be analyzed to ensure that decontamination procedures are sufficient and that no cross-contamination has occurred. The results from the blanks will be used to flag or assess the concentration of analytes reported. The rinsates are analyzed for the same parameters as the related samples.

Trip blanks are samples of analyte-free water taken from the laboratory to the sampling site and returned to the laboratory with the samples. The analytical laboratory provides the trip blanks. One trip blank shall accompany each cooler containing soil or groundwater samples (no trip blanks will accompany the soil vapor samples). Trip blanks are analyzed to determine if contamination has been introduced into the samples during transport to the analytical laboratory.

The quality assurance procedures for this baseline investigation have been designed to ensure that chemical and physical data of known and acceptable quality are produced. To achieve this objective, all samples will be analyzed in accordance with EPA or equivalent protocols. An analytical laboratory certified and approved by the state of Washington will perform all analyses.

The quantification and quality control limits for soil and groundwater samples to be collected during this investigation will be consistent with updated EPA methods. Project quality assurance objectives are defined as follows:

Precision: Precision measures the reproducibility of measurements under a given set of conditions. Precision shall be expressed in terms of relative standard deviation (RSD) or relative percent difference (RPD).

Accuracy: Accuracy is a measure of the bias or error in a sampling program. Examples of bias include contamination and errors made in sample collection, preservation, handling, and analysis. Accuracy shall be assessed by the use of field/trip blanks and further verified in the laboratory by the use of known and unknown QC samples and matrix spikes. Accuracy shall be measured by the percent of recovery.

Representativeness: Representativeness is the degree to which the sample data accurately and precisely represents the environmental condition. Ensuring that sampling locations are selected and identified properly shall satisfy representativeness.

Completeness: Completeness is the percentage of measurements made that are judged to be valid. The completeness of the data ensures that all the required samples have been taken and requisite analyses performed. Completeness of the project will be equal to or greater than 95 percent.

Comparability: Comparability expresses the confidence with which one data set can be compared with another. The sampling methods employed, the chain of custody methods, and the analytical techniques implemented by the laboratories will all be performed in a uniform manner.

For QC, 100 percent documentation is required. A data review will be conducted to assure that all protocols were followed and to assess the QA objectives and overall usability of the data for the purposes intended.

7.0 LABORATORY ANALYSES

7.1 Soil

Soil samples collected for analysis will be retained in laboratory-supplied glass jars with Teflon® lined lids or in acetate sleeves. Once collected, soil samples will be placed on ice for transport and submittal to a Chevron approved contract laboratory for analyses. Each soil sample collected will be analyzed for BTEX compounds, TPH-G, TPH-D extended and total lead.

In addition to the above mention analyses, select soil samples (as defined in section 5.3) will also be submitted to the laboratory for one or more of the following analyses based on field screening results and compliance with analytical data required for petroleum hydrocarbon sites as outlines in Table 830-1 WAC 173-340-900. These additional analyses include HVOCs, SVOCs, cPAHs, TPH fractions by VPH and EPH and RCRA metals.

Additional samples for physical properties analyses will be collected from select locations and submitted for the analyses described in section 5.3.

7.2 Groundwater

Groundwater will be collected and retained in laboratory-supplied glass jars with Teflon® lined lids. Once collected, groundwater samples will be placed on ice for transport and submittal to a Chevron approved contract laboratory for analyses. Each groundwater sample collected will be analyzed for BTEX compounds, TPH-G, TPH-D extended and dissolved lead.

In addition to the above mention analyses, select groundwater samples (as defined in sections 5.1 and 5.9) will also be submitted to the laboratory for one or more of the following analyses for compliance with analytical data required for petroleum hydrocarbon sites as outlines in Table 830-1 WAC 173-340-900. These additional analyses include VOCs, SVOCs, cPAHs, RCRA listed metals, EDB, EDC, seven of the most common gasoline oxygenates including MTBE and TAME and for tetraethyl lead.

8.0 STORAGE AND DISPOSAL OF RESIDUALS

Residual soil from this investigation will be placed in 55-gallon drums. The drums will be sealed, labeled, and stored on the Arnold property while awaiting analysis. Following receipt of laboratory analytical data, Delta will arrange for the transport and off-site disposal of all sampling residuals.

All decontamination and purge water will be stored in the equipment compound on the Arnold property, treated on-site by activated carbon filtration and discharge to the sanitary sewer under METRO permit.

9.0 SCHEDULE

Pending approval of this Workplan by both Ecology and this projects stakeholders, Delta will proceed with field investigations and sampling actions in accordance with the following schedule.

9.1 Synoptic Groundwater Sampling

Delta expects to complete gauging and sampling of 19 existing monitoring wells at this site by mid August 2002. After the laboratory analysis reports have been received, tabulated groundwater sampling results will be distributed by e-mail to Ecology, Environmental Partners, Inc. and Sound Environmental Solutions, Inc. Delta will allow each of these parties 2-3 days for review and comment.

Based on comments received by Delta following this period, changes to the location of soil boring and monitoring well installation locations or the analysis to be performed will be considered and, if agreed to by ChevronTexaco, incorporated in the final scope of work.

9.2 Soil Sampling and Monitoring Well Installation

Delta will schedule fieldwork once the estimated date for receiving the groundwater data from the analytical laboratory is known. The anticipated schedule for implementation of this investigation is as follows:

- Contracting and scheduling of drillers – 3-4 weeks
- Underground utilities marking – 3 days
- Soil and groundwater sample collection – 7 days
- Laboratory analysis – 2 weeks

Data report will be submitted to WDOE within four weeks of obtaining laboratory results.

9.3 Soil and Soil Vapor Sampling

The anticipated schedule for collecting soil and soil vapor samples is as follows:

- Site visit and sample collection point assessment – Complete 6-25-02
- Soil sample collection and soil vapor sampling port installation – 2 days
- Soil vapor sample collection – ½ day (sampling will be performed under previously defined atmospheric conditions, therefore the sampling schedule cannot be defined (see section 5.7 for specifics)
- Laboratory analysis – 3 weeks

After the laboratory analysis reports have been received, a data report will be prepared summarizing the work performed and submitted to Ecology within four weeks of obtaining laboratory results.

9.4 Groundwater Sampling

Delta expects to complete gauging and sampling of the seven newly installed monitoring wells by early October 2002. Once the laboratory analysis reports have been received, Delta will prepare a data report summarizing the work performed.

Investigation Report

Following completion of all fieldwork, Delta will produce and distribute a comprehensive investigation report containing the following elements:

Synoptic Groundwater Sampling

Information regarding the Synoptic Groundwater Sampling event will be included in the investigation report and containing following elements:

- A brief description of the work performed
- Tables of laboratory analytical results
- A map of actual sampling locations with well numbers
- Laboratory analysis reports and chain of custody forms
- Groundwater purge and sample forms

Soil Sampling and Monitoring Well Installation

Information regarding the Soil Sampling and Monitoring Well Installation activities will be included in the investigation report and will contain the following elements:

- A brief description of the work performed
- Boring and well construction logs
- Tables of laboratory analytical results
- A map of actual sampling locations
- Laboratory analysis reports and chain of custody forms

Soil and Soil Vapor Sampling

Soil and Soil Vapor Sampling results will be included in the investigation report along with the following information:

- A brief description of the work performed
- Tables of laboratory analytical results
- A map of actual sampling locations
- Laboratory analysis reports and chain of custody forms

Groundwater Sampling

The Groundwater Sampling results from the newly installed monitoring wells, along with the following information, will be included in the investigation report:

- A brief description of the work performed
- Tables of laboratory analytical results
- A map of actual sampling locations with well numbers
- Laboratory analysis reports and chain of custody forms

Delta expects to distribute the investigation report to the Department of Ecology and this projects stakeholders by November 20, 2002 assuming soil vapor sample collection occurs on or before November 1, 2002.

FIGURES

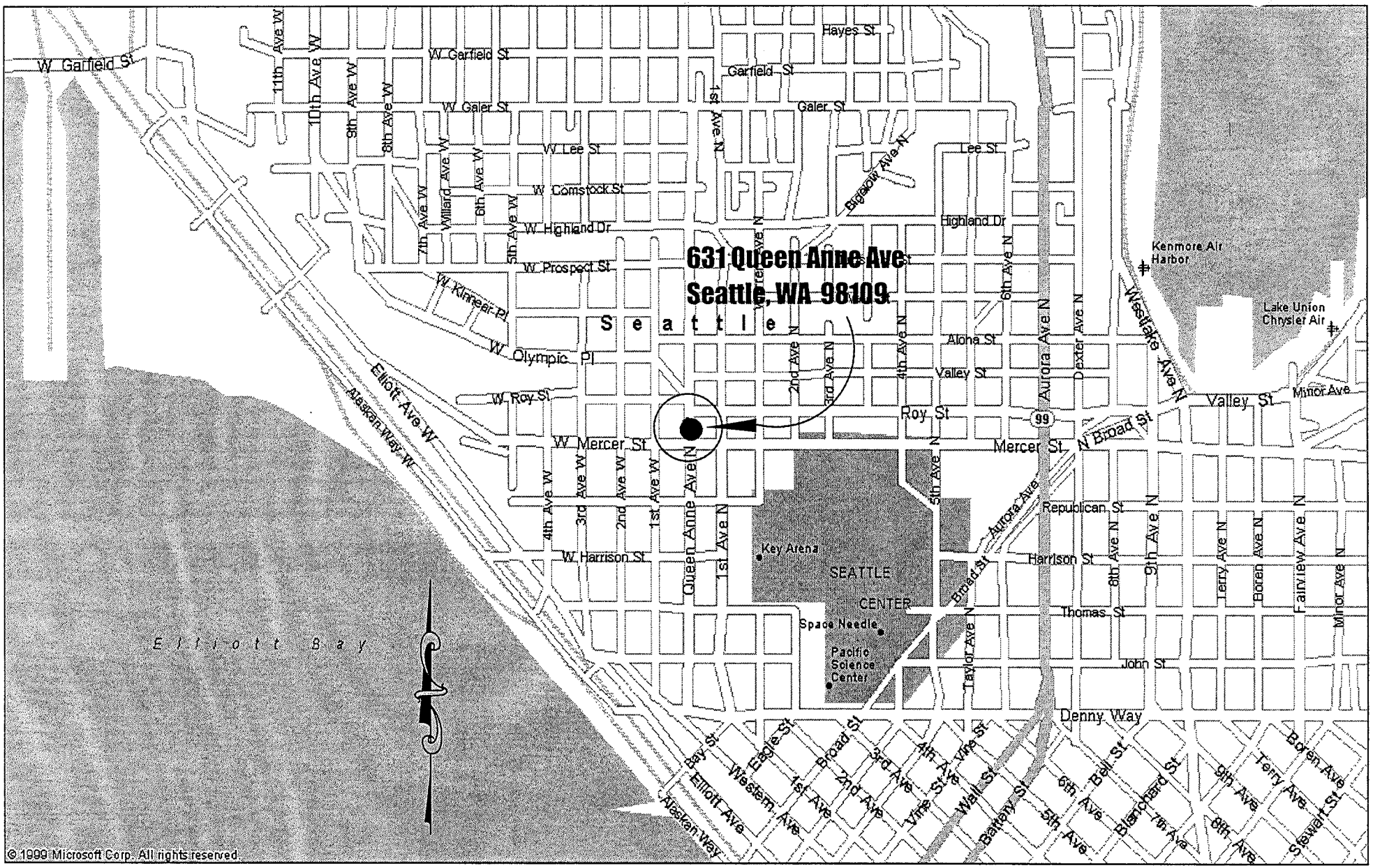


Figure 1

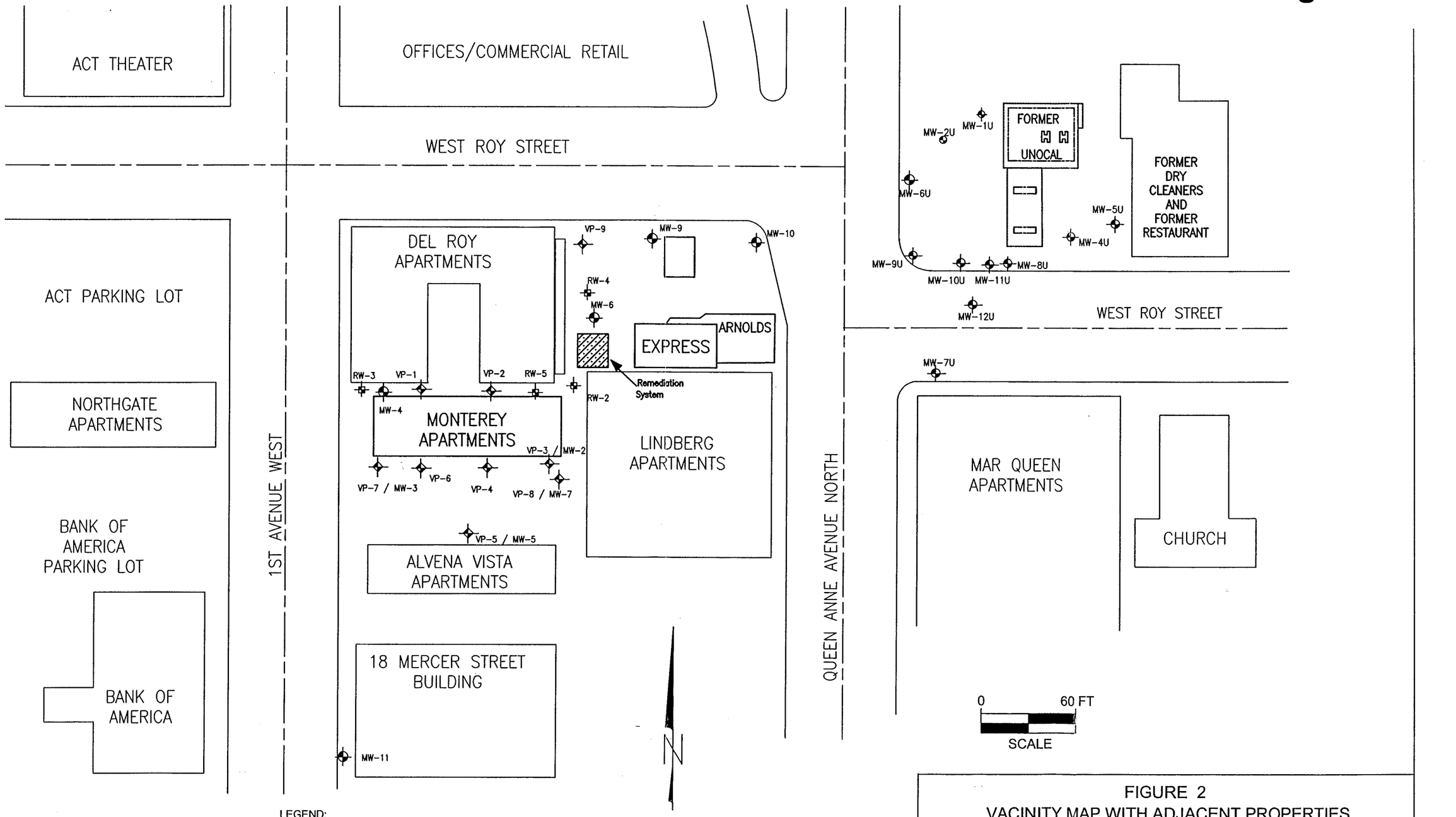
FORMER TEXACO STATION, NO. 21577
SEATTLE, WASHINGTON

PROPERTY LOCATION MAP

Delta Environmental Consultants, Inc.

DESIGNED BY:	CHECKED BY:	PROJECT #	FIGURE #
S. MADISON	S. MADISON	TW21577	1
DRAWN BY:	PROJECT MANAGER:	DATE:	SCALE:
S. MADISON	P.CATTERALL	5/17/2	NTS

Figure 2



LEGEND:

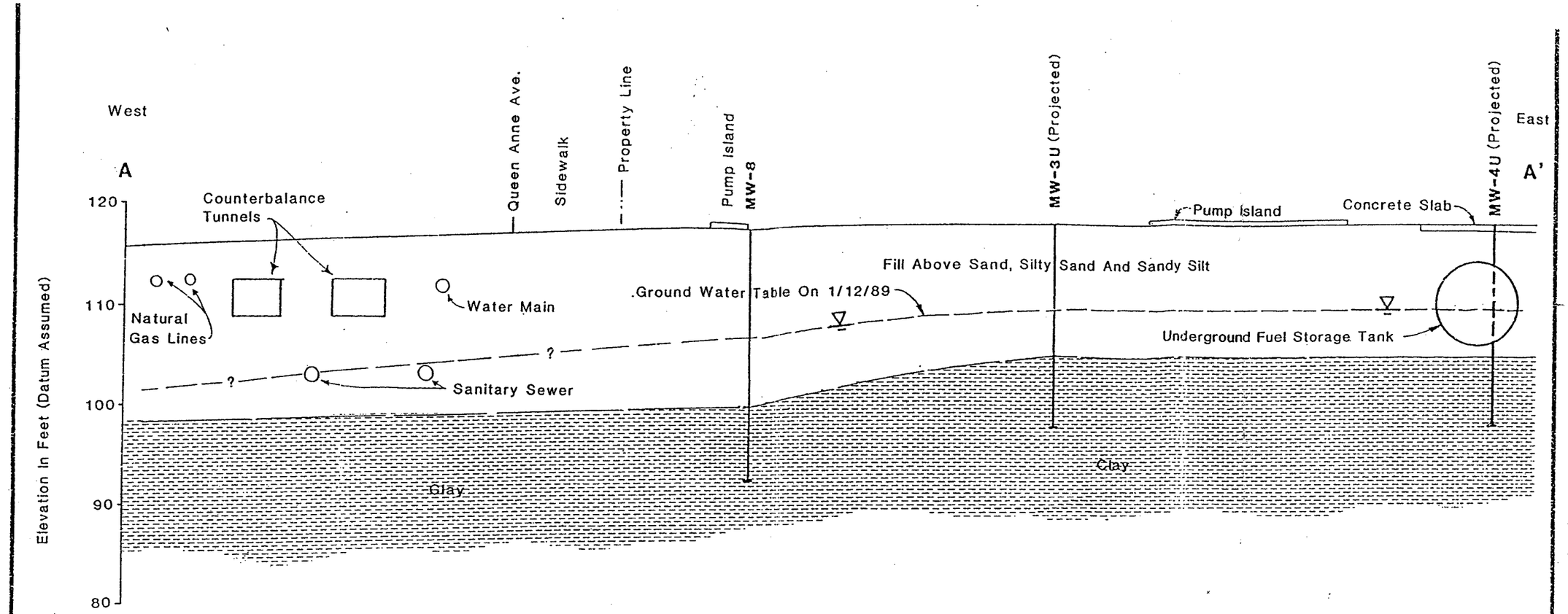
——·——·——	STREET CENTER LINE
MW-1	MONITORING WELL LOCATION AND DESIGNATION
VP-1	VAPOR WELL LOCATION AND DESIGNATION
RW-1	RECOVERY WELL LOCATION AND DESIGNATION

FIGURE 2
VACINITY MAP WITH ADJACENT PROPERTIES
QUEEN ANNE TEXACO
631 QUEEN ANNE NORTH SEATTLE, WASHINGTON

PROJECT NO. TW21-577	DRAWN BY M.S.M. 5/15/2
FILE NO. 21577	PREPARED BY M.S.M.
REVISION NO. 1	REVIEWED BY M.S.M.

Delta Environmental Consultants, Inc.

Figure 3



NOTE: THE SUBSURFACE CONDITIONS SHOWN ON THE SECTION ARE BASED ON INTERPOLATION BETWEEN WIDELY SPACED EXPLORATIONS, AND PREVIOUS STUDIES CONDUCTED FOR THE DEPARTMENT OF ECOLOGY. THEY SHOULD BE CONSIDERED TO BE APPROXIMATE.

HORIZONTAL SCALE: 1" = 10'

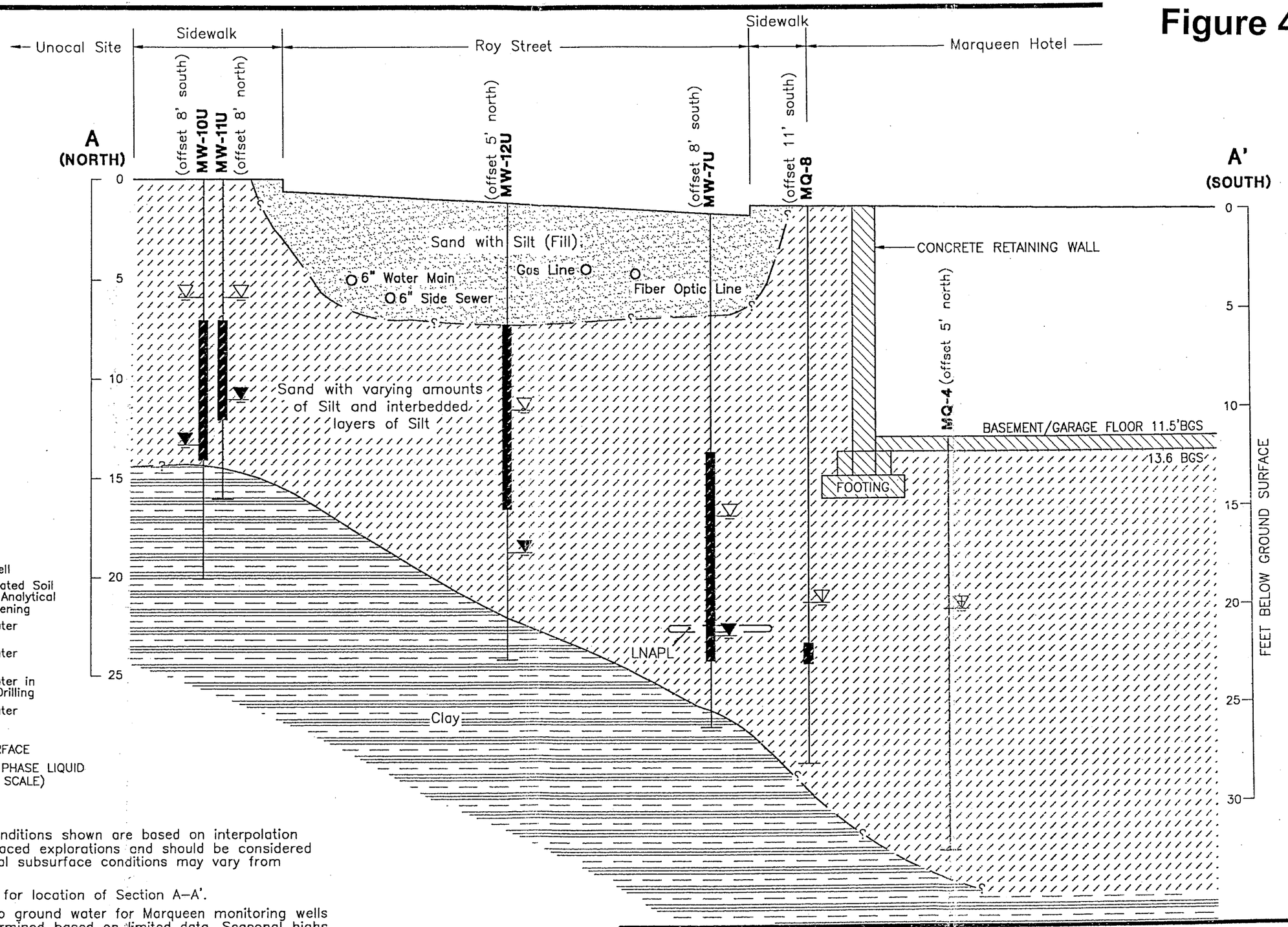
Geo Engineers

SUBSURFACE SECTION

0161-153-4 TTF:KKT 1-19-89

ARNOLD

Figure 4



EXPLANATION:

- MW-10U — Boring/Monitoring Well
- Petroleum-Contaminated Soil Based on Chemical Analytical Data and Field Screening
- Depth to Ground Water Seasonal High
- Depth to Ground Water Seasonal Low
- Depth to Ground Water in Sept. 2000 During Drilling
- Depth to Ground Water on 09/25/00

BGS — BELOW GROUND SURFACE

LNAPL — LIGHT NONAQUEOUS PHASE LIQUID (THICKNESS NOT TO SCALE)

Notes:
1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. Refer to Figure 2 for location of Section A-A'.
3. Seasonal depths to ground water for Marqueen monitoring wells could not be determined based on limited data. Seasonal highs and lows for the remaining wells are based on depth to ground water data from November 1999 to August 2000.
4. Backfill surrounding and beneath basement floor and retaining wall is not shown.

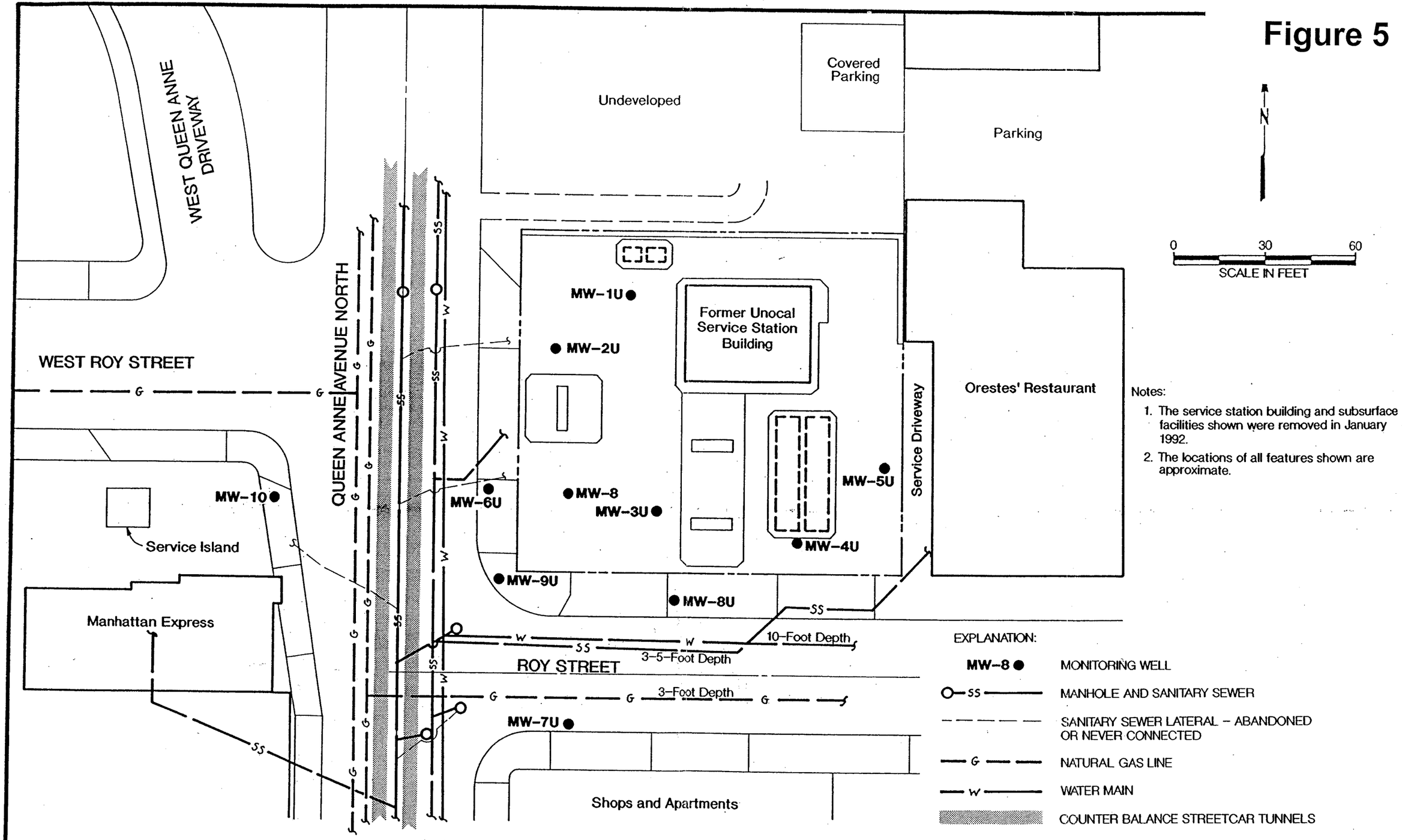
HORIZONTAL SCALE: 1" = 10'
VERTICAL SCALE: 1" = 5'

Geo Engineers

CROSS SECTION A-A'

02/02/01 P:\0161153\CAD\09\0161153O9C.DWG BPP:HLA

Figure 5



Notes:

1. The service station building and subsurface facilities shown were removed in January 1992.
2. The locations of all features shown are approximate.

Reference: Drawing entitled "Service Station No. 255 @ Queen Anne Avenue & Roy Street, Seattle, Wa.," provided by Union Oil Company of California, undated.

GeoEngineers

SUBSURFACE UTILITIES

0161-153.DGN DEN:JD 1/1/92 (8)
Rev. DEN:KKT 1-13-93

Figure 6

ACT THEATER

OFFICES/COMMERCIAL RETAIL

WEST ROY STREET

ACT PARKING LOT

NORTHGATE APARTMENTS

BANK OF AMERICA PARKING LOT

BANK OF AMERICA

1ST AVENUE WEST

DEL ROY APARTMENTS

VP-9

MW-9

MW-10

RW-4

MW-6

EXPRESS

ARNOLDS

Remediation System

RW-3

VP-1

VP-2

RW-5

RW-2

MW-4

MONTEREY APARTMENTS

VP-3 / MW-2

VP-7 / MW-3

VP-6

VP-4

VP-8 / MW-7

LINDBERG APARTMENTS

VP-5 / MW-5

MP-1

ALVENA VISTA APARTMENTS

18 MERCER STREET BUILDING

MW-11

QUEEN ANNE AVENUE NORTH

N

MW-2U

MW-1U

FORMER UNOCAL

FORMER DRY CLEANERS AND FORMER RESTAURANT

MW-6U

MW-5U

MW-4U

MW-9U

MW-8U

MW-10U

MW-11U

MW-12U

WEST ROY STREET

MW-7U

MAR QUEEN APARTMENTS

CHURCH

0 60 FT

SCALE

LEGEND:

—·—·— STREET CENTER LINE

MW-1 MONITORING WELL LOCATION AND DESIGNATION

VP-1 VAPOR WELL LOCATION AND DESIGNATION

RW-1 RECOVERY WELL LOCATION AND DESIGNATION

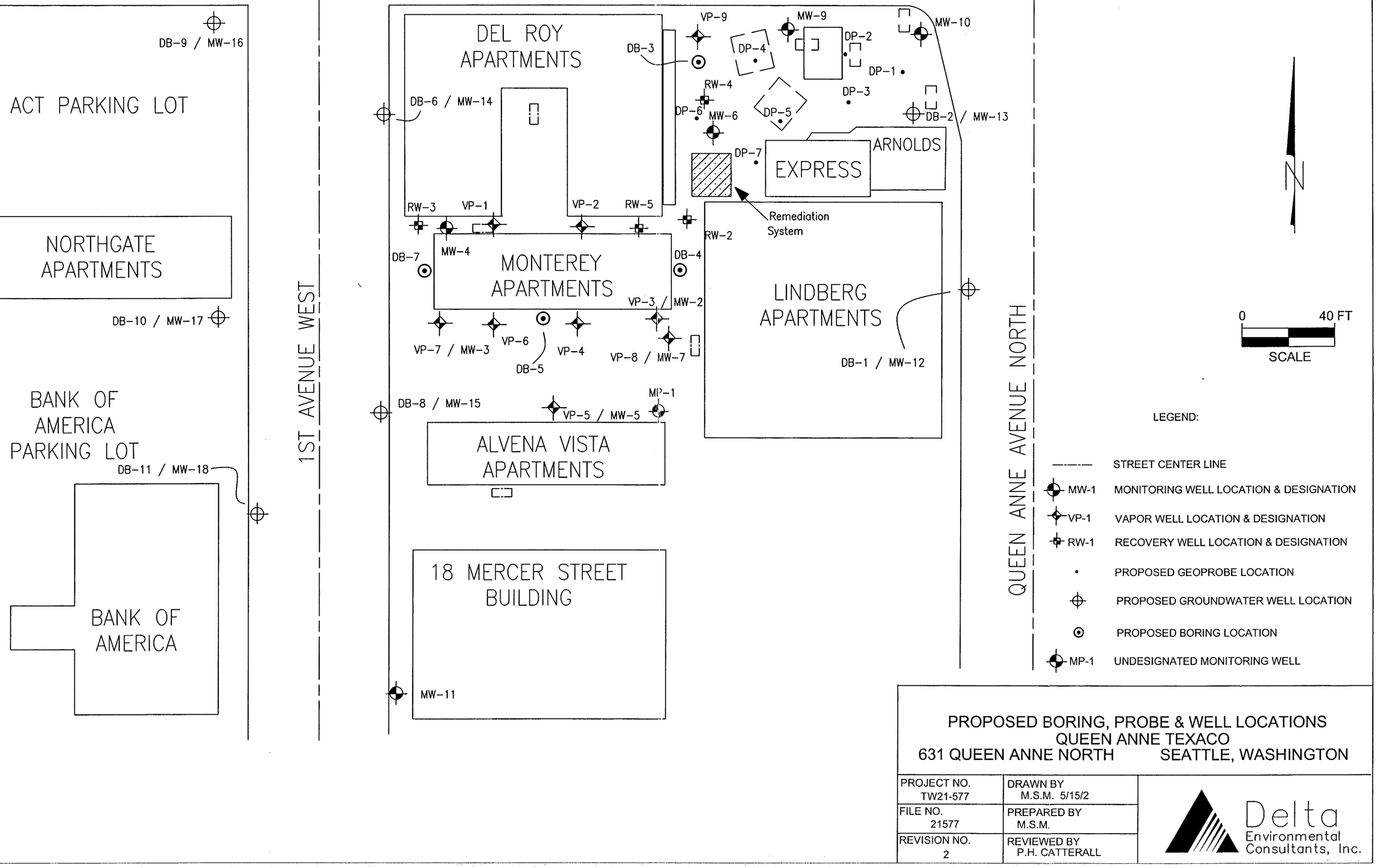
MP-1 UNDESIGNATED MONITORING WELL

EXISTING MONITORING WELL LOCATIONS
QUEEN ANNE TEXACO
631 QUEEN ANNE NORTH SEATTLE, WASHINGTON

PROJECT NO. TW21-577	DRAWN BY M.S.M. 5/15/2
FILE NO. 21577	PREPARED BY M.S.M.
REVISION NO. 2	REVIEWED BY P.H. CATTERALL

Delta Environmental Consultants, Inc.

Figure 7

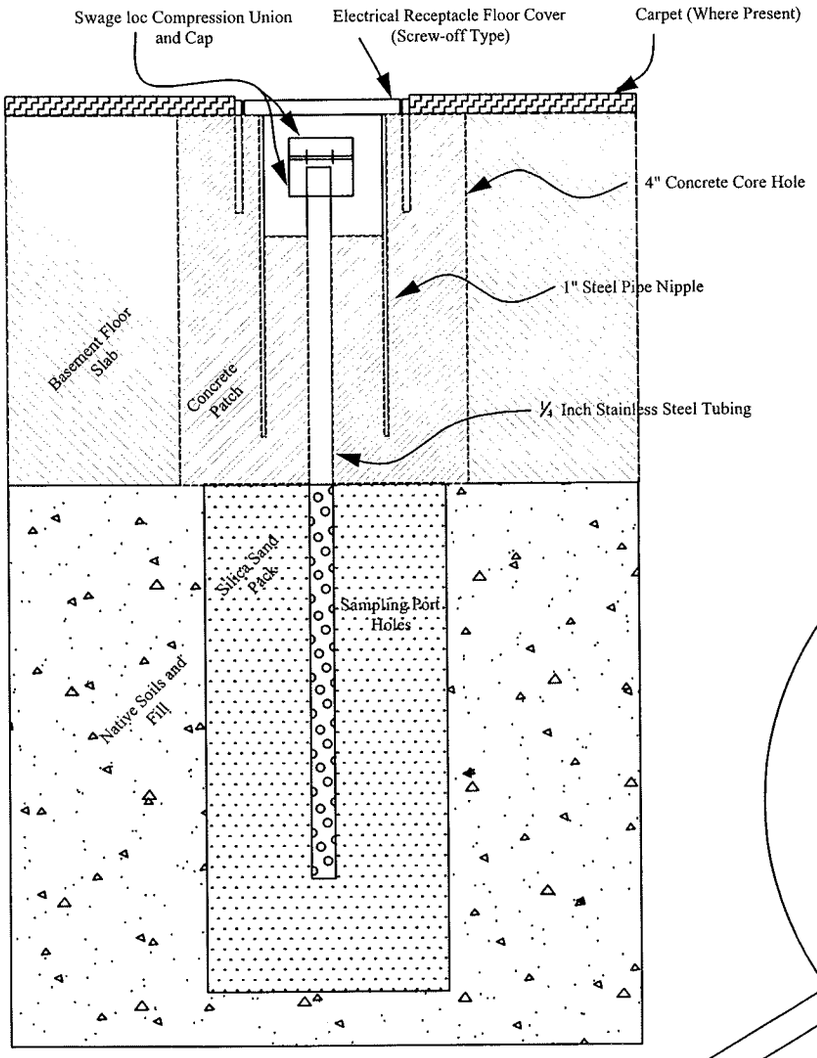


PROPOSED BORING, PROBE & WELL LOCATIONS
QUEEN ANNE TEXACO
631 QUEEN ANNE NORTH SEATTLE, WASHINGTON

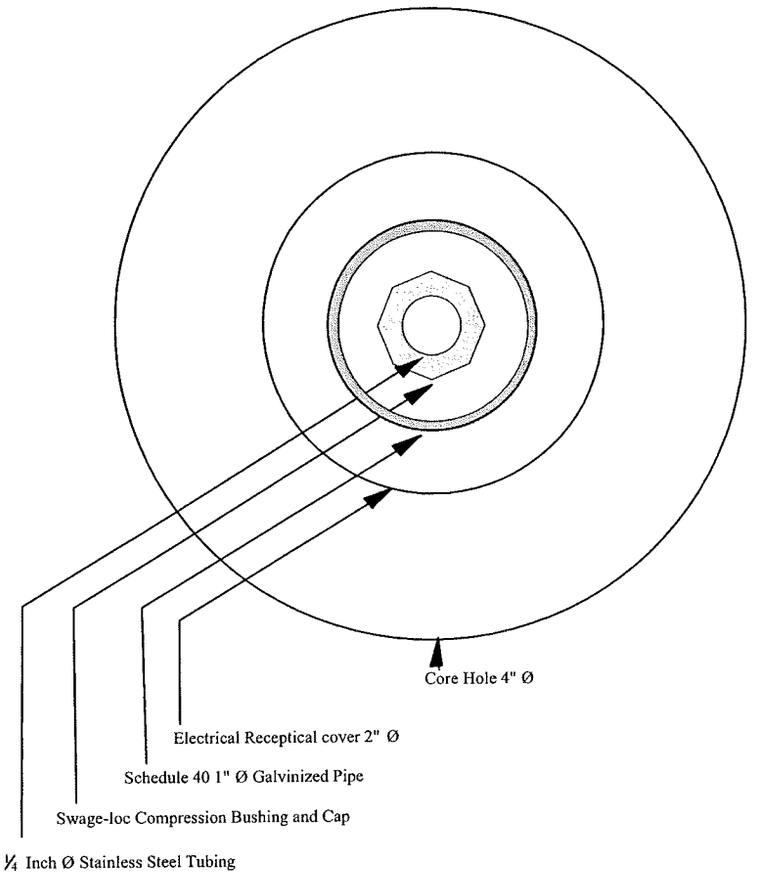
PROJECT NO. TW21-577	DRAWN BY M.S.M. 5/15/2
FILE NO. 21577	PREPARED BY M.S.M.
REVISION NO. 2	REVIEWED BY P.H. CATTERALL

Delta Environmental Consultants, Inc.

Figure 8



DRAWING NOT TO SCALE

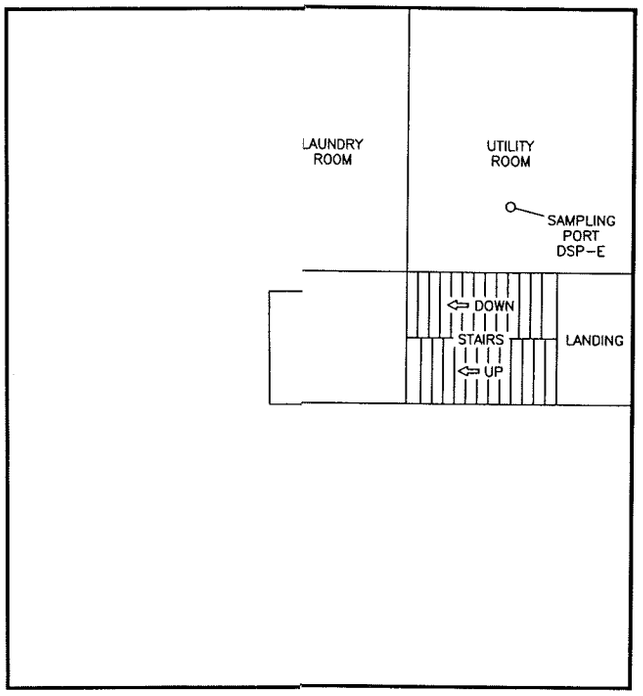


SAMPLING PORT
QUEEN ANNE TEXACO
631 QUEEN ANNE NORTH SEATTLE, WASHINGTON

PROJECT NO. TW21-577	DRAWN BY M.S.M. 5/15/2
FILE NO. 21577	PREPARED BY P.H. CATTERALL
REVISION NO.	REVIEWED BY P.H. CATTERALL

Delta Environmental Consultants, Inc.

Figure 9



PROPOSED LOCATIONS FOR
VAPOR SAMPLING PORTS
Interior Monterey Aparments
Basement Level with Sample Port Locations

ct No.	Prepared by	Drawn by
21-157		JMA
20/02	Reviewed by	Filename 21157S

Delta Environmental Consultants, Inc.

ATTACHMENT

WELL/BORING LOCATION MAP	**Delta Environmental Consultants, Inc.**	WELL/BORING:
	INSTALLATION DATE:	DRILLING METHOD:
	PROJECT:	SAMPLING METHOD:
	CLIENT:	BORING DIAMETER:
	LOCATION:	BORING DEPTH:
	CITY:	WELL CASING:
	STATE:	WELL SCREEN:
	DRILLER:	SAND PACK:

WELL/BORING COMPLETION	FIRST ▽	STABILIZED ▼	MOISTURE	PID (ppm)	DENSITY BLOWS / 6"	DEPTH (FEET)	RECOVERY	SAMPLE INTERVAL	USCS SYMBOL	GRAPHIC	CASING ELEVATION	
											SURVEY DATE:	
											DTW:	
											DESCRIPTION/LOGGED BY:	

MONITORING WELL SURVEY FORM

CHEVRON STATION NO. DELTA PROJECT NO.

ADDRESS FIELD PERSONNEL

DATE

**********ATTACH SITE PLAN TO THIS SHEET**********

LOCATION	ELEVATION	TOP	MIDDLE	BOTTOM	CHECK