SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

ALASKA
CALIFORNIA
COLORADO
FLORIDA
MISSOURI
OREGON
WASHINGTON

February 15, 2013

Mr. Robert Weimer
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501

RE: WORK PLAN FOR ADDITIONAL SITE CHARACTERIZATION, 3607 AND 3609 SPENARD ROAD, ANCHORAGE, ALASKA, *ADEC FILE NO. 2100.26.072*

We are pleased to submit herein our work plan to conduct additional site characterization at 3607 and 3609 Spenard Road in Anchorage, Alaska (the Property). The purpose of this project is to collect data that will enable refining cost estimates for remedial action, if warranted, to achieve progress towards Cleanup Complete with Institutional Controls (CCIC), and facilitate decisions regarding a potential property transfer. The objectives of this project are to perform a limited investigation of potential sources of soil and groundwater contamination, further evaluate contaminant exposure pathways due to the presence of petroleum and/or hazardous substance contaminated media, and resolve or clarify data gaps as a precursor to a potential Targeted Brownfield Assessment (TBA).

BACKGROUND

Olson Gas Services began operation as a fueling station in approximately 1964. At the time, nine underground storage tanks (USTs) ranging in capacity from 500 gallons to 12,000 gallons were used on the Property. The USTs reportedly contained diesel; unleaded, premium, and regular gasoline; and used oil. During construction in the summer of 1987, a citizen complained of gasoline odors near the Property, which at the time was operating as Tesoro – Olson Gas Services Store #1. In October 1988, the ADEC conducted a site inspection of the Property and noted that the Property was "messy" and could have leaking underground storage tanks (LUSTs) on site. Tank tightness tests conducted in November 1990 indicated that the tanks were not leaking. According to Alaska Department of Environmental Conservation (ADEC) database, on January 3, 1993, the service station was closed and the USTs were emptied. In June 1993, an Environmental Protection Agency (EPA) representative inspected the Property and found that five USTs were out of compliance due to dormancy.

A UST site assessment was conducted by Gilfilian Engineering & Environmental Testing, Inc. (GEET) in 1995, with the results presented in their October 17, 1995 report, *UST Site Assessment Report for Olson's Gas Service #1*. The purpose of the UST site assessment was to investigate the environmental impact from nine USTs and associated product piping and dispensers during removal.

5430 FAIRBANKS STREET, SUITE 3
ANCHORAGE, ALASKA 99518-1263
907-561-2120 FAX: 907-561-4483
TDD 1-800-833-6388
www.shannonwilson.com

The entire UST system consisting of nine USTs, eight dispensers, and product piping to fourteen dispenser locations was removed from September 13 to 19, 1995. The UST assessment report stated that the observed surface contamination is "likely due to someone dumping motor oil in the hole of the concrete pad." Analytical soil samples collected beneath each of the eight gasoline and diesel USTs and dispensers contained concentrations of petroleum hydrocarbons exceeding ADEC cleanup criteria. Approximately 100 tons of petroleum-impacted soil were excavated during the UST removal effort and were thermally treated at an off-site facility.

A release investigation was conducted by GEET with the results presented in their July 10, 1996 report, *Release Investigation: Installation of MW-1, MW-2, and MW-3, Olson's Gas Service #1*. The purpose of the release investigation was to determine if petroleum hydrocarbon contamination in the soil extended beyond the area of the former USTs and to determine if the groundwater had been impacted by the former USTs. Three groundwater monitoring wells, designated MW-1 through MW-3, were installed and sampled for the release investigation. Analytical soil samples were collected near the groundwater table interface at 11 feet below ground surface (bgs) in each monitoring well boring. The soil samples collected from MW-2 and MW-3 contained concentrations of petroleum hydrocarbons exceeding the ADEC cleanup levels. Groundwater samples from MW-2 and MW-3 contained up to 4.04 milligrams per liter (mg/L) extractable petroleum hydrocarbons (EPH), 231 mg/L volatile petroleum hydrocarbons (VPH), and 35.2 mg/L benzene. The groundwater sample from MW-1 did not contain detectable concentrations of VPH or benzene, toluene, ethylbenzene, and xylenes (BTEX) but contained 47.4 mg/L EPH. Results of the release investigation indicated the soil and/or groundwater is impacted at each of the three monitoring well locations.

An additional release investigation and limited corrective actions were conducted by GEET in 1997, with the results presented in their July 17, 1997 report, *Release Investigation and Corrective Action Plan Conducted at Olson's Gas Service #1*. The purpose of the release investigation was to further delineate the extent of soil and groundwater contamination associated with the former UST system. The release investigation included the installation and sampling of three additional groundwater monitoring wells, designated MW-4, MW-5, and MW-6. The soil samples did not contain concentrations of petroleum hydrocarbons exceeding the ADEC cleanup criteria. The three groundwater samples contained diesel range organics (DRO) concentrations ranging from 1.07 mg/L to 4.09 mg/L. The groundwater samples did not contain detectable concentrations of gasoline range organics (GRO). In addition, the sample from MW-5 was the only sample to contain a benzene concentration (0.00657 mg/L) exceeding the ADEC cleanup level. The limited corrective action activities focused on excavation of the shallow contaminated soil and installation of a passive bioventing system to treat petroleum hydrocarbon impacted soil remaining at the site.

Free product recovery was conducted by GEET in 1998, with the results presented in their April 9, 1998 letter report, *Free Product Recovery, Olson's Gas Service #1, ADEC UST Facility I.D. #2288*. Free product was observed for the first time in MW-3 during the February 1998 quarterly monitoring

event. The report indicates approximately 2.5 inches of product was recovered using disposable bailers.

A water well search was conducted by GEET in 2001, with the results presented in their June 1, 2001 report, *Well Search, Olson's Gas Service #1, 3607 Spenard Road, Anchorage, Alaska, ADEC UST Facility #2288*. The purpose of the well search was to identify probable drinking water wells located within a 500-foot radius of the Property. Five properties were identified with potential water supply wells within the search radius, including an on-Property water well. Private wells were identified at 3801 McCain Loop, 1204 Wilshire Avenue, 3704 Wilson Street and 3609 Spenard Road (the Property). In addition, a well serving two homes was identified at 3740 McCain Loop.

Additional contaminated soil excavation was conducted by GEET in 2001, with the results presented in their October 17, 2001 report, *Excavation of Contaminated soil, Olson's Gas Service #1, 3609 Spenard Road, Anchorage, Alaska, ADEC UST Facility #2288*. The purpose of the additional remedial activities was to remove as much of the contaminated soil as effectively possible and investigate the extent of remaining contamination. The investigation and remedial activities included the excavation and off-site treatment of 1,120 tons of contaminated soil, the installation and sampling of MW-7, and the installation of four access manholes and piping for future remediation wells. The former UST excavation was limited to the north due to the presence of the existing structure. Confirmation soil samples collected from the excavations indicate contaminated soil above ADEC cleanup levels remain on site in each of the excavation areas - primarily at the groundwater table interface and beneath the existing structure. Soil and groundwater samples collected from MW-7 did not contain concentrations of petroleum hydrocarbons exceeding the ADEC cleanup levels.

Additional release investigation and installation of an air sparge (AS) and soil vapor extraction (SVE) system were conducted by Montgomery Watson Harza Americas (MWH) in 2003, with the results presented in their May 2003 report, *March 2003 Release Investigation/Remediation System Installation and April 2003 Monitoring Event Report.* The purpose of the release investigation was to further evaluate the extent of soil contamination and groundwater quality at the site. The release investigation entailed installing and sampling two additional monitoring wells, MW-8 and MW-9, and sampling the existing site monitoring wells. Soil samples collected from the groundwater table interface at about 10 feet bgs from both borings did not contain detectable concentrations of petroleum hydrocarbon constituents. The sample collected from MW-9 contained 0.631 mg/L benzene which exceeds the ADEC cleanup level. Groundwater samples collected from MW-1 through MW-5 contained concentrations of benzene, toluene, ethylbenzene, xylenes, GRO and/or DRO exceeding the ADEC cleanup levels. Three combination AS and SVE wells, designated AS/SVE1 through AS/SVE3, were installed in 2002 as part of an air sparging pilot test. Three additional AS/SVE wells, designated AS/SVE4 through AS/SVE6, were installed during the 2003 release investigation efforts. Soil and groundwater samples were not collected from the AS/SVE

borings. The report states "obvious evidence of soil and ground water contamination was detected during the installation of the AS/SVE wells."

Groundwater monitoring for the second quarter of 2009 was conducted by Design Build Consulting, with the results presented in their July 26, 2009 report, *June 2009 Groundwater Monitoring Event Report for Olson's Gas Service #1 [Former], 3607 Spenard Road, Anchorage, Alaska, ADEC UST Facility #2288, ADEC File #2100.26.072*. The quarterly report summarizes the results of the June 2009 groundwater sampling and drinking water well event and discusses the status of the on-site remediation system operations. The nine groundwater monitoring wells, MW-1 through MW-9, were to be sampled for the June 2009 event. Samples were not collected from MW-1 due to the presence of a dumpster covering the well, MW-6 which was abandoned during construction of city sidewalks, and MW-8 which was buried beneath 12 inches of new gravel in a parking lot and could not be located. Concentrations of contaminants exceeding ADEC Table C cleanup levels were present in groundwater samples from MW-2 (0.007 mg/L benzene), MW-3 (0.126 mg/L benzene, 1.64 mg/L ethylbenzene, 49.0 mg/L GRO, and 3.85 mg/L DRO), MW-4 (0.470 mg/L benzene and 1.72 mg/L GRO) and MW-5 (0.173 mg/L benzene and 6.14 mg/L GRO). No target contaminants were detected at concentrations exceeding ADEC cleanup levels in MW-7 and MW-9. Drinking water samples were collected from two active water wells, one located on the Property and the other off site at 3801 McCain Loop. No detectable concentrations of contaminants were measured in the two drinking water well samples.

In January 2011, Braunstein Geological and Environmental Services, Inc. (BGES) conducted a limited site characterization at 3604 Spenard Road, located west of the subject property across Spenard Road. The results are discussed in the background of BGES's March 7, 2011 letter to Cook Inlet Housing Authority. The characterization included collecting advancing four borings, collecting screening-level water samples from the borings, and collecting one soil sample. The water samples collected from three borings along the eastern property boundary (Borings GRB-1, GRB-2, and GRB-4) each contained concentrations of benzene greater than the ADEC cleanup level, with results ranging from 0.0107 mg/L in Boring GRB-2 to 0.139 mg/L in Boring GRB-1. The locations of the January 2011 borings are shown on Figure 1. One soil sample (SS-1), collected from 9 to 12 feet bgs in Boring GRB-1, did not contain "contaminant concentrations" greater than the ADEC cleanup level, although the letter does not specify for which analysis the soil and groundwater samples were tested. A fourth boring (GRB-3) was advanced along the northern property boundary to assess potential on-site contaminant migration from another contaminated site to the north. The results of the screening-level water sample collected from Boring GRB-3 were less than the ADEC cleanup level. BGES concluded that the groundwater contamination was likely the result of on-site migration from the former Olson's Gas Services Store #1 site.

Shannon & Wilson completed the Phase I Environmental Site Assessment (ESA) with the results presented in our September 2012 report, *Phase I Environmental Site Assessment, Tesoro - Olson Gas Services Store #1, 3607 and 3609 Spenard Road, Anchorage, Alaska*. In addition to the former UST system that has been the subject of previous characterization and remedial actions, the Phase I ESA identified multiple potential sources of contamination including floor drains, abandoned/existing hydraulic lifts, vehicles, underground garage, fuel storage tanks, 55-gallons drums, and chemical containers. Impact to the Property's soil and groundwater from these potential sources has not been investigated.

PROJECT ACTIVITIES

The project activities will consist of advancing 6 soil borings and collecting soil samples; installing and developing 3 monitoring wells; sampling 3 new and 7 existing monitoring wells and 5 drinking water wells; and installing and sampling 6 soil gas points (3 sets of 2 nested points); and laboratory analyses of soil, groundwater, drinking water, and soil gas samples. We will also dispose of investigation derived waste at an appropriate treatment facility, evaluate on-site groundwater flow direction, revise the CSM, and prepare a report of our findings. The proposed tasks will be conducted in general accordance with 19 Alaska Administrative Code (AAC) 75 *Oil and Other Hazardous Substances Pollution Control* (April 2012), 18 AAC 78 *USTs* (July 2012) regulations, the ADEC's May 2010 *Draft Field Sampling Guidance*, and ADEC's October 2012 *Vapor Intrusion Guidance for Contaminated Sites.*

A Qualified Person as defined in 18 AAC 75.990 from Shannon & Wilson will perform the additional site characterization services for this project. At this time we anticipate that Jennifer Simmons will be available for this work. Jennifer has 4 years experience providing environmental consulting services in Alaska and has been the lead field representative on multiple site characterization projects. If Jennifer is not available to perform the site characterization services for this project, another Qualified Person from Shannon & Wilson will be chosen. In this event, we will provide you the name of the individual at least three days prior to commencing site work.

Task 1 – Soil and Groundwater Sampling

Task 1a – Soil Boring Advancement and Sampling

Six soil borings will be advanced at the site and three of the borings will be completed as monitoring wells at the approximate locations shown on Figure 1. One soil boring (PB1) will be advanced near the northeast corner of the Car Wash Structure to evaluate potential releases from the 55-gallon drum storage area, floor drains, chemical containers, above ground storage tank, and the underground garage. One soil boring (PB2) will be advanced on the west side of the 3607 Spenard Road maintenance shop to evaluate potential releases from abandoned/existing hydraulic lifts and floor

drain systems, vehicles, and 55-gallon drums. A third, deeper soil boring (PB3) will be advanced in the southwest corner of the Property to evaluate whether the documented gasoline releases in this area have penetrated the presumed silty clay confining layer and impacted a deeper groundwater aquifer. One monitoring well (PB4/MW) will be installed near the southeast corner of the Property to evaluate background soil and groundwater concentrations upgradient of the site with respect to the groundwater flow. Two monitoring wells (PB5/MW and PB6/MW) will be installed west of the Property on the 3608 Spenard Road parcel to help define the extent of downgradient soil and groundwater contamination.

At least three days prior to field activities, the utility locate center will be contacted to mark buried utilities within the project area and identify potential conflicts such that the proposed boring locations can be adjusted. Existing as-built plans will be used to avoid the on-site remediation system piping.

Discovery Drilling Inc. (Discovery) of Anchorage will provide a truck-mounted hollow-stem auger drill rig, with direct-push capabilities, and qualified field personnel to advance the borings and install the monitoring well. Borings PB1 and PB2 will be advanced to a maximum depth of approximately 15 feet bgs. Boring PB3 will be advanced into the clayey silt soil underlying the former UST system to a maximum depth of approximately 30 feet bgs. Borings PB4, PB5, and PB6 will be advanced to a depth of approximately 20 feet bgs, depending on observed groundwater contact. Drill cuttings will be used to backfill the borings when possible. Excess drill cuttings from Borings PB3, PB4, PB5, and PB6 will be containerized in labeled, 55-gallon drums and stored on site. Based on the analytical results, it may be necessary to transport the drill cuttings off-site for disposal, as discussed in Task 4.

Soil samples will be collected at 2.5 foot intervals from Borings PB1, PB2, PB4, PB5, and PB6 using a 2-foot split-spoon sampler driven into the bottom the boring. Borings PB1 and PB2 will be sampled to depths of about 6 inches below the groundwater contact and Borings PB4, PB5, and PB6 will be sampled to a depth of about 5 feet below the groundwater contact. Soil samples will be collected from the center of the split-spoon samplers. At the location of Boring PB3, Discovery will use hollow-stem auger and split-spoon sampling techniques to advance the boring to a depth of approximately 10 feet bgs. The objective of this boring is to collect representative soil samples from below the benzene contaminated water and determine the depth to which contamination extends into the underlying clayey silt soil. Discovery will use direct push methods and sealed drilling rods to advance the boring through the benzene contaminated water, anticipated to be encountered at about 12 feet bgs, and into the clayey silt soil, anticipated at a depth of approximately 16 feet bgs. Once the drill action indicates that the boring has been advanced about 2 feet into the clayey silt soil, the sealing pin will be removed from the drilling rods and soil samples will be collected using 5-foot long, 1.5-inch inner diameter (I.D.) steel samplers equipped with fitted plastic liners and driven with a hydraulic hammer. Headspace screening and analytical soil samples will be collected from the samplers. Soil samples will be "screened" for volatile organic compounds using a photoionization detector (PID) and ADEC-approved headspace screening techniques. For Boring PB3, drilling and

sampling will continue to a maximum depth of 30 feet bgs or until field screening samples are less than 20 parts per million (ppm), whichever is first. The lower portion of Boring PB3 will be backfilled with coated bentonite chips to provide a seal within the clayey silt soil.

Based on the results of the headspace screening and/or field observations, two analytical samples collected from each boring will be selected for laboratory testing. For Borings PB1, PB2, PB4, PB5, and PB6 the sample collected from within the first six inches above groundwater-saturated soil and a second sample from the interval exhibiting the highest screening result, or based on field observations, will be selected for analysis. In the absence of indicators of contamination, the second sample will be collected from within the top five feet of soil, where Resource Conservation and Recovery Act (RCRA) contaminants and polychlorinated biphenyls (PCBs) would likely be located. For Boring PB3, the sample with the highest screening result collected from the clayey silt soil at a depth less than 20 feet and the sample with the highest screening result collected from the clayey silt soil at a depth greater than 20 feet will be selected for analysis. In addition, one field duplicate soil sample will be collected for quality control measures.

Task 1b - Monitoring Well Installation and Groundwater Development

Borings PB4, PB5, and PB6 will be completed as groundwater monitoring wells. The monitoring wells will be installed through the hollow-stem casing. The monitoring well will be constructed of 2-inch nominal inside diameter schedule 40 PVC pipe with threaded connections. The lower portion of the well will consist of a 10-foot 0.010-inch slotted well screen. Assuming the depth of the groundwater contact is at 12 feet bgs, the screen will extend from the bottom of the boring at about 17 feet bgs to about 7 feet below the surface of the site. A sand pack of #20-#40 silica sand will be used to backfill around the well screen to about 1 foot above the screened section. Bentonite chips will be used to backfill around the PVC piping above the sand backfill to about 1 foot bgs. A flush-mount protective casing will be installed and embedded in cement around the monitoring well.

After 24 hours have elapsed since installation, the groundwater monitoring wells will be developed using a surge block and submersible pump. The development will consist of alternating 3- to 5-minute periods of surging and purging. Development will continue until water quality parameters (pH, temperature, turbidity, and conductivity) have stabilized and turbidity is less than 10 nephelometric turbidity units (NTU), 55 gallons of water is removed from the well, or 3 hours of effort is expended. Water quality parameters will be considered stabilized when three consecutive measurements indicate that: pH is within 0.1 unit, temperature is within three percent (minimum 0.2 degree Celsius). turbidity is within 10 percent or is less than 10 nephelometric turbidity units (NTU), and conductivity is within 3 percent. If a well purges dry during development, it will be allowed to recover to 80 percent of its pre-purge water column, then purged dry again. This process will be repeated three times to complete the development. If the well cannot be purged dry three times within 3 hours, approximately one well volume of clean potable water will be added to the well, the

well will be surged vigorously for ten minutes, then purged dry to complete the development process. The development water will be contained in 55-gallon drum(s) and stored on site pending receipt of analytical results.

Task 1c - Groundwater Sampling

Groundwater samples will be collected from the three new wells and from existing Monitoring Wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-7, and MW-9. Note that Monitoring Wells MW-6 and MW-8 were not found during the previous sampling event and are presumed to be destroyed. At least 24 hours after development of the newly installed monitoring wells, static water levels will be measured in the nine monitoring wells at the site and recorded for later evaluation of groundwater flow direction and gradient. Low-flow purging will be used to reduce the effects of stagnant well casing water on chemical concentrations, and to obtain groundwater samples that are representative of the surrounding water-bearing formation. The wells will be purged and sampled with a submersible pump and disposable polyethylene tubing. If the wells cannot be purged and sampled with a submersible pump, a disposable polyethylene bailer will be used. During the purging process, field personnel will monitor water quality parameters (pH, temperature, turbidity, oxidation reduction potential [ORP], and conductivity) and purge volume. When four of the five water quality parameters stabilize and purge volume requirements (at least 1 well volume) are met, a groundwater sample will be collected. Purging will be considered complete when the following stabilization criteria are met over three successive readings: pH is within 0.1 unit, temperature is within 3 percent (minimum 0.2 degree Celsius), conductivity is within 3 percent, ORP is within 10 millivolts (mV), and turbidity is within 10 percent or three consecutive readings of less than 10 NTUs. If water quality measurements do not stabilize within 1 hour, and at least three well volumes have been removed, purging will be stopped and the well will be sampled. If suspended solids are visible in the groundwater sample collected following purging, the well water will be allowed to stabilize, but no more than 24 hours, before collecting a water sample. If the well purges dry, the well will be allowed to recover to at least 80 percent of its pre-purge water column or overnight (but not greater than 24 hours) prior to being sampled.

Task 1d – Laboratory Analyses

Soil and groundwater samples will be delivered to SGS North America Inc. (SGS) of Anchorage, Alaska using chain-of-custody forms and tested on a standard 7 to 10 day turn-around-time. The four samples from Borings PB1 and PB2 will be analyzed for GRO by Alaska Method (AK) 101, DRO by AK 102, residual range organics (RRO) by AK 103, and volatile organic compounds (VOCs) by EPA 8260B. One sample each from Borings PB1 and PB2 will also be analyzed for polycyclic aromatic hydrocarbons (PAHs) Selective Ion Mode (SIM) by EPA 8270D, RCRA metals by EPA 6020, and PCBs by EPA 8082A. The eight samples from Borings PB3, PB4, PB5, and PB6, plus a duplicate, will be analyzed for GRO by AK 101, DRO by AK 102, and BTEX by EPA 8021B. A methanol trip

blank accompanying the sample cooler will be analyzed for GRO by AK 101 and VOCs by EPA 8260B.

The groundwater samples collected from new monitoring well PB4/MW and Wells MW-1, MW-3, and MW-4 will be tested for GRO by AK 101, DRO by AK 102, and VOCs by EPA 8260B. The groundwater samples collected from new monitoring wells PB5MW and PB6MW and Wells MW-2, MW-5, MW-7, and MW-9 will be tested for GRO by AK 101, DRO by AK 102, and BTEX by EPA 8021B. A field duplicate sample will also be analyzed for GRO by AK 101, DRO by AK 102, and VOCs by EPA 8260B. One trip blank accompanying the sample cooler will be analyzed for GRO by AK 101 and VOCs by EPA 8260B and a second trip blank will be analyzed for GRO by AK 101 and BTEX by EPA 8021B.

Task 1e – Determination of Groundwater Flow Direction

Prior to purging, static water levels will be measured in the monitoring wells and recorded for later evaluation of groundwater flow direction and gradient. A level-loop survey will be conducted to determine the relative elevations of the new and existing wells. The monitoring well locations will be surveyed to accuracies of +/- 0.1 foot horizontal and +/- 0.01 foot vertical, relative to an arbitrary benchmark. The localized groundwater flow direction will be established using water level measurements obtained from the monitoring wells.

Task 2 – Drinking Water Well Sampling

Drinking water samples will be collected from five drinking water wells. The wells are located at 3609 Spenard Road (the Property), 3740 McCain Loop, 3801 McCain Loop, 1204 Wilshire Avenue, and 3704 Wilson Street as shown on Figure 2. To prevent possible cross contamination, the well head for the five drinking water wells will not be opened during sampling. Instead, a faucet will be used to purge the water system and collect the drinking water well sample. Water treatment or aeration devices from the water systems, if present, will be disabled or by-passed prior to sample collection. The flow rate from the faucet will be less than 0.1 liter per minute to avoid aeration. The water will be allowed to run for approximately 15 minutes to purge the system before sampling. The purgewater will be discharged to the sanitary sewer system or to the ground surface. The drinking water well samples will be submitted to SGS for analysis using chain of procedures on a standard two-week turnaround time basis. Five water samples will be tested for GRO by AK 101, DRO by AK 102, and VOCs by EPA 524.2. A trip blank accompanying the sample cooler will also be analyzed for GRO by AK 101 and VOCs by EPA 524.2.

Task 3 – Soil Gas Point Installation and Vapor Sampling

Three borings will be completed as nested soil gas points and sampled in accordance with ADEC guidance. Discovery will provide the equipment and personnel to install the soil gas points. The soil

gas points will be installed using the drill rig and direct push and/or hollow-stem augers at the locations shown on Figure 1. Final locations will be based on utility locates, site access, and other relevant considerations.

For planning purposes, we assume that each nested pair will include two soil gas points – one each installed at 5 and 10 feet bgs. The soil gas point construction details are shown on Figure 3. Each soil gas point will consist of an air stone connected to Teflon-lined tubing. The air stones will be connected to drive point tips. Using a hollow drive rod, the drive point tips will be driven into the ground using the drill rig. The Teflon-lined tubing will extend through the drive rod while the drive point is advanced into the soil. The first soil gas probe of each pair will be driven to a depth of 10 feet bgs. Once the desired depth is obtained, the drive rod will be removed from the ground, leaving the drive tip and air stone approximately 10 feet bgs with the Teflon-line tubing extending to the ground surface. Approximately 1 foot of silica sand will be used to backfill around the air stone and 1 foot of hydrated bentonite chips will be placed above the sand to create a seal. A second sampling point will be installed in the same hole using a similar procedure. Drill cuttings will be will placed on top of the bentonite seal to approximately 1 foot bgs. Note that in the event that the hole does not remain open, the second probe will be advanced at a location within approximately 12 inches from the first drive point location. Excess drill cuttings will be containerized in labeled, 55-gallon drums and stored on site. A flush-mount protective monument will be installed around each nested soil gas point and embedded in asphalt or concrete to match the surrounding surface.

In accordance with ADEC guidance, the soil gas points will be allowed to equilibrate for 48 hours before sampling. The on-site vapor extraction system will be closed while sampling the soil gas points. Prior to removing 3 to 5 dead-space volumes, the leak detection hood will be set up over the nested soil gas point pair. One soil gas point will be connected through the leak detection hood to the pumping train. The soil gas point not sampled will remain capped/plugged. A leak test will then be initiated within the leak detection hood using a helium tracer. The leak detection test will continue for the duration of the pumping and sampling effort.

The soil gas sampling process will begin by purging 3 to 5 dead-space volumes from the sampling train with an air pump and flow meter. The dead space volume will be estimated be summing the internal volume of the tubing between the probe tip and the sampling devices, and annular space around the probe tip. Three to five dead-space volumes will be removed from the probe using a pump and regulated with a flow meter to determine when purging is complete. A tedlar bag will be connected to the purging assembly and used for field screening. The soil gas point sampling details are shown on Figure 3.

Following purging, soil gas samples will be obtained using the summa canister sampling assembly attached to the 3-way valve on the leak detection hood. The summa canister samples will be collected as follows:

1. Check that the summa canister valve is closed and remove the brass cap.

2. Attach the lab-provided gauge, open then close the valve quickly, and record the initial vacuum.

3. Attach flexible tubing extending from the leak detection hood to the summa canister sampling apparatus.

4. Set the flow regulator to a rate of 100 to 200 milliliters (mL) per minute.

5. Open the valve until the summa canister fills leaving a residual vacuum.

6. Close the summa canister valve.

7. Record the final vacuum and replace the brass cap.

8. Fill out the sample tag and place the summa canister in the shipping box.

Soil gas samples, including both tedlar bag and summa canister samples, will be collected from each soil gas point. Soil gas extracted from each location during the purging process will be collected in a tedlar bag and screened for VOCs using a flame ionization detector (FID). The analytical samples will be collected using summa canisters and dedicated ¼-inch diameter Teflon-lined tubing.

Six project vapor samples and one duplicate will be collected and submitted to Eurofins/Air Toxics, Ltd., of Folsom California, for laboratory analysis on a standard 7 to 10 business day turn-around-time. Each sample will be analyzed for VOCs by EPA Method TO-15 (15 Toxic Organics) Selective Ion Mode (SIM), Helium (to evaluate the effectiveness of the seal), Oxygen (to evaluate its presence in the subsurface) by American Society for Testing Materials D-1946 (ASTM D-1946) and Carbon Dioxin to evaluate the biodegradation of contaminants in the soil gas by ASTM D-1946.

Task 4 – Investigation Derived Waste Disposal

Investigation derived waste for this project will consist of drill cuttings, development water generated during well development, and purge water generated during groundwater sampling. The soil cuttings and development/purge water will be containerized in drums, labeled, and stored on site until sample results are available. If the samples are contaminated at concentrations greater than ADEC Method 2 (soil) and Table C (groundwater) cleanup levels, approval will be obtained from ADEC to transport and treat the wastes. Impacted soil and development/purge water will likely be transported by Emerald Alaska to an appropriate disposal facility. If the analytical results show no concentrations greater than applicable cleanup levels in the soil or development/purge water, the soil will be landspread on an unpaved portion of the property and the development/purge water will be discharged to the ground surface.

Task 5 –Reporting

A summary report will be prepared by Shannon & Wilson to document the results of the above tasks. The report will include a background section outlining previous assessment activities that have occurred at the Property; a description of field activities; a site plan; boring logs; monitoring well and soil gas point construction details; tabulated field measurements and analytical results; site photographs; field notes; an evaluation of groundwater flow direction; a revised CSM; conclusions regarding the soil, groundwater, and soil gas contamination at the site, as appropriate; and recommendations for filling data gaps as part of a future TBA. We will also prepare a quality assurance/quality control narrative and include the completed ADEC Laboratory Data Review Checklists for each data package. A hardcopy and one electronic copy of the final report will be provided.

SCHEDULE

We are available to start work on this project within one week following ADEC work plan approval. The field effort will tentatively be scheduled to begin during the week of February 25, 2013. Laboratory results should be available between March 22 and April 5, and our draft report will be submitted by April 25. Our final report will be submitted to you by June 30, 2013. Significant findings will be provided to you informally as soon as they are determined.

Sincerely,

SHANNON & WILSON, INC.

Timothy M. Terry, C.P.G.
Senior Associate

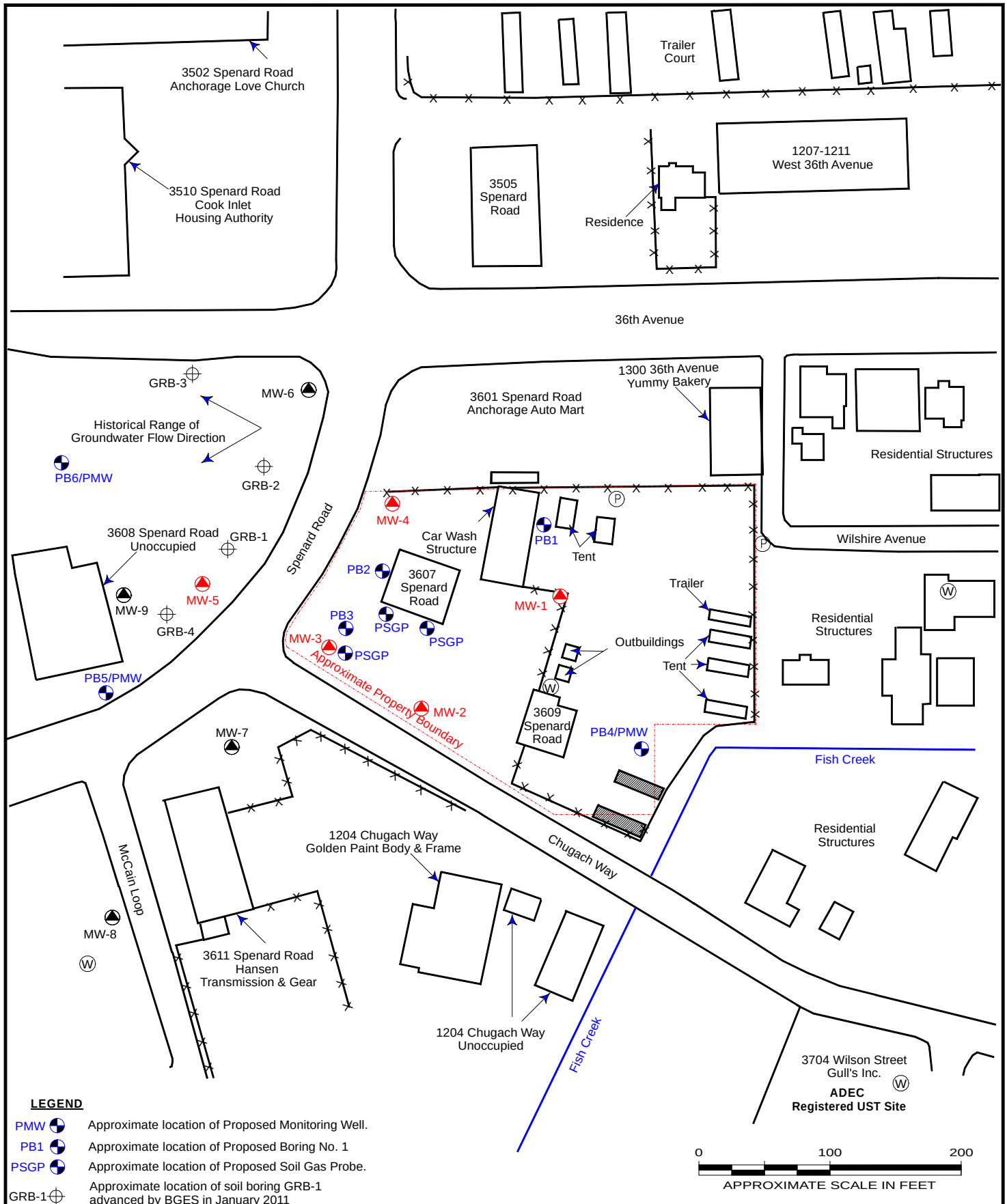
Encl: Figure 1 – Site Plan
Figure 2 – Drinking Water Well Locations
Figure 3 – Soil Gas Point Construction and Sampling Details

ACCEPTANCE

Please sign below as acceptance of this work plan for Additional Site Characterization at 3607 and 3609 Spenard Road, Anchorage, Alaska.

ADEC Representative Signature: _____

Printed Name: _____



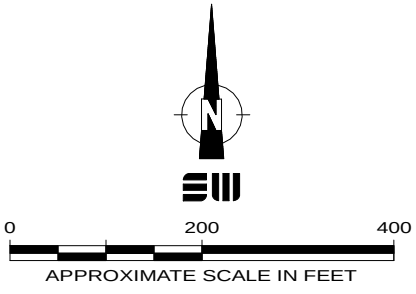
3607 and 3609 Spenard Road
Anchorage, Alaska

SITE PLAN

February 2013 32-2-17525-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 1



Map adapted from aerial imagery provided by Google Earth Pro, reproduced by permission granted by Google Earth (tm) Mapping Service

3607 and 3609 Spenard Road
Anchorage, Alaska

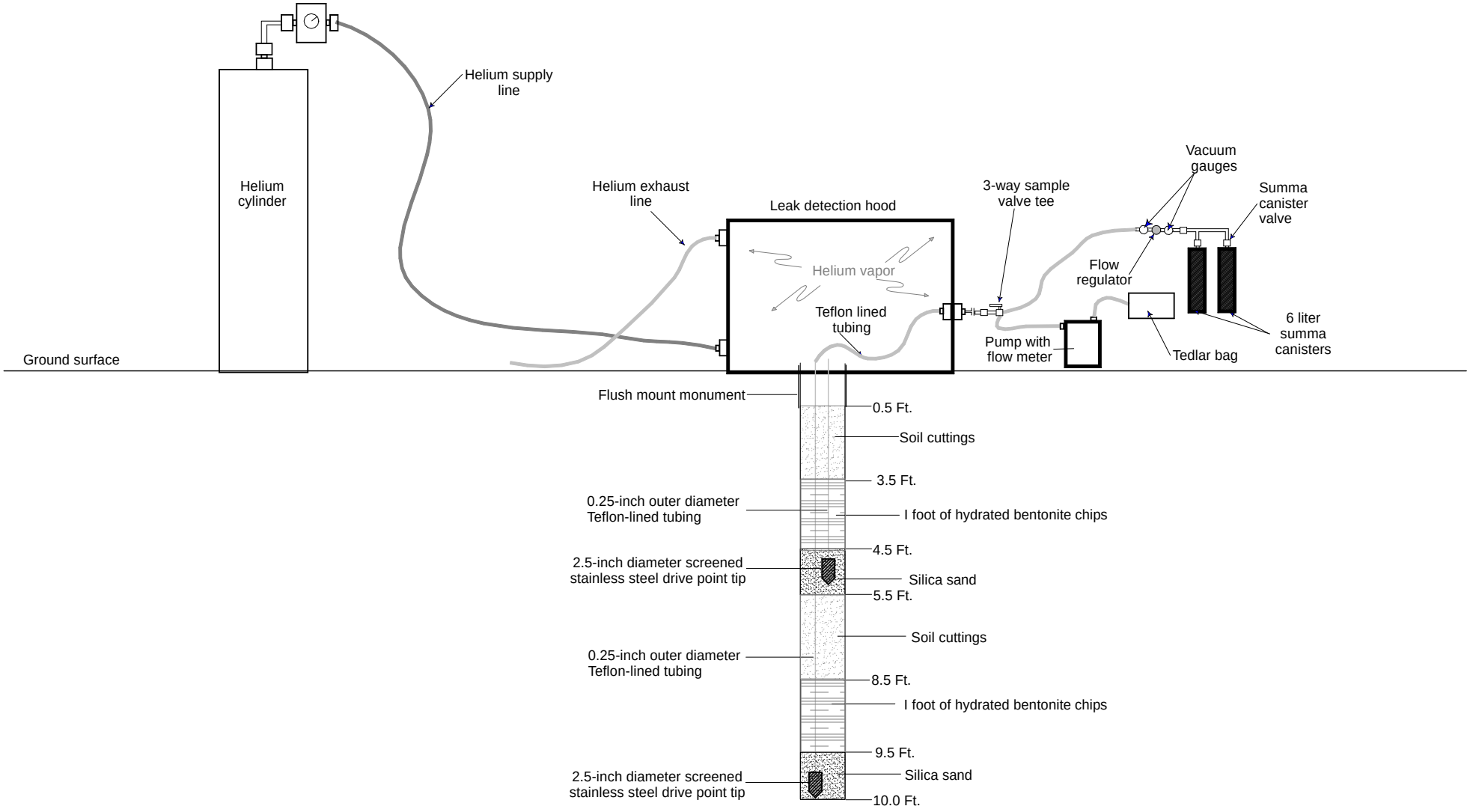
DRINKING WATER WELL LOCATIONS

February 2013

32-1-17525-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 2



3607 and 3609 Spenard Road
Anchorage, Alaska

SOIL GAS POINT CONSTRUCTION AND SAMPLING DETAILS

February 2013 32-1-17525-002

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 3