Groundwater Monitoring Well Installation / Corrective Action Work Plan

Airport Way Professional Building
1406 Kellum Street, Fairbanks, Alaska

August 8, 2016

Prepared for:

Airport Way Professional Building LLC

Prepared by:

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INTRODUCTION & PURPOSE

This Groundwater Monitoring Well Installation/ Corrective Action Work Plan was prepared on behalf of Airport Way Professional Building LLC, who has contracted with Alaska Resources & Environmental Services (ARES) to perform the groundwater monitoring well installation and groundwater investigation associated with the known UST release that occurred on the subject property. The ADEC file number for the site is 102.38.143.

The purpose of this Work Plan is to obtain ADEC approval to reinstall groundwater monitoring wells on the property and collect groundwater samples to determine if contaminants are present in groundwater above ADEC cleanup levels. The data and findings collected from the site investigation will be used to formulate recommendations specific to the site.

The Work Plan summarizes proposed activities to further characterize site conditions on the subject property to include the following specific activities:

- Reinstall three permanent groundwater monitoring wells. The wells will be installed by Drilling Company using hollow stem auger. Continuous soil sample borings will be completed from the surface to the groundwater interface at the location of each well installation. Soil sampling will include collection of PID field screen measurements and analytical samples from the soil borings;
- Develop groundwater monitoring wells and collection of analytical samples. Groundwater data will be used to determine if contaminants are present in groundwater above ADEC cleanup levels and if contaminants are migrating from the source area;
- A closed loop groundwater elevation survey will be completed to determine the groundwater flow direction; and
- Document field activities and prepare Final Report.

SITE BACKGROUND

Site Description

The Airport Way Professional Building parcel (subject property) is situated on an approximate 1-acre site located north of Airport Way at 1406 Kellum Street, Fairbanks, Alaska (Figure 1). The site is located in the U.S. Geological Survey (USGS) Fairbanks D-2 quadrangle. The legal description for the property is as follows: Tax Lots 2,3,4, & 8 Block 137, Weeks Field Subdivision.

History

ARES was authorized in July 2007 to perform a Site Characterization associated with the removal of two UST's located on the subject property. Tank #1 consisted of a 1,000-gallon UST and Tank # 2 consisted of a 300-gallon UST. Both tanks where used for the storage of # 2 diesel fuel for the purpose of heating structures located on the property.

While conducting the Site Assessment during removal and close-out of a Tank # 2, petroleum contaminated soils were encountered. Soils had a strong diesel odor, however, soils were not saturated and exhibited characteristics typical of older releases.

During excavation and removal of the 300-gallon UST (Tank # 2) approximately 80 cubic yards (77 tons) of petroleum-contaminated soils were removed and hauled off-site for thermal remediation. The remainder of the excavated contaminated soils (approximately 216 yds^3) was stockpiled on-site and landfarmed in accordance with ADEC approved Work Plan. Soil sample results for the 300-gallon UST site indicate that soils remain in place within the vadose zone (10' bgs) above ADEC cleanup levels for soil. Soil samples collected from the sidewalls and endwalls of the 300-gallon UST site were found to be below ADEC target cleanup levels.

Per agreement with ADEC as a condition to close out the site, a groundwater monitoring well (MW-1) was installed hydraulically down gradient from the source area and sampled on June 15, 2009 for BTEX by EPA method 8260B and DRO by method AK 102. Sample results indicate that benzene was found to be above ADEC target cleanup levels in groundwater at 82.8 ug/L. The cleanup level for benzene is 5 ug/L. Toluene, ethylbenzene, xylenes, and DRO (non-detect) were below ADC cleanup levels for groundwater.

Based on a groundwater sample results from MW-1, ARES recommended two additional monitoring wells be installed to determine if contaminants were migrating onto the property from an off-site source or if the contaminants were originating from the subject property. The two monitoring wells were installed on June 25, 2009. Monitoring well MW-2 was installed at the site of the former 300-gallonUST and monitoring well MW-3 was installed hydraulically up gradient on the east property boundary in order to determine the up-gradient conditions.

Analytical results detected DRO in groundwater in MW-2 above ADEC cleanup levels at 6.44 mg/L. The cleanup level for DRO in groundwater is 1.5 mg/L. All remaining constituents were below ADEC cleanup levels.

In 2009, the Airport Way Professional Building was constructed and during construction activities, the groundwater monitoring wells were inadvertently paved over with asphalt. ARES was unsuccessful in locating the wells upon a site visit conducted in July 2016.

Topography

The United States Geological Survey (USGS) Fairbanks Quadrangle (D-2) provides topographic map coverage of the site (Figure 1). Fairbanks is located in the northern part of the Tanana Basin, which is a relatively flat floodplain of the Tanana River. The subject property is situated approximately 2.5 miles north of the Tanana River and 0.5 miles south of the Chena River. Based upon the topographic map of the Fairbanks Quadrangle, the site elevation is approximately 446 feet above the mean sea level.

Regional Soils/Geology

Soils in the area are derived from the alluvial-plain deposits and generally consist of alternating layers and lenses of unconsolidated sandy gravels and gravely sands, overlain by silt. The well–drained Salchaket soils border the principle rivers in the area and are the most extensive soils of the alluvial plains. The site is underlain by Minto silt loam. The Minto soils consist of moderately well drained soils that have developed into micaceous silty material with many areas underlain at a depth of 6 feet or more by irregular, discontinuous masses of ice. Discontinuous permafrost underlies the floodplain area and can extend to depths of 200 feet or more. The hills to the north of the site area are part of a metamorphic system that forms the Yukon – Tanana upland. The basin uplands consist of fractured schist. Areas of discontinuous permafrost underlie north-facing slopes. Eolian silts of the Fairbanks loess and reworked silt deposits cover the flanks of bedrock uplands in the proximity of the Tanana River. These deposits vary in thickness and grade into alluvial-fan deposits and the Chena alluvium.

Regional Hydrology

The Tanana River is the dominant influence on ground-water flow in the subject area. Two discharge peaks characterize the Tanana River: spring snowmelt runoff and late summer precipitation. The stage of nearby water bodies such as the Chena River typically rise and fall in response to stage changes of the Tanana River. The depth to groundwater varies in response to these controlling factors. Based on interpretation of USGS data, regional groundwater flow direction is generally to the west-southwest. However, the direction of flow can vary depending upon the stage of the Tanana River.

Field Work Protocol

Fieldwork described in this Work Plan will be conducted in accordance with 18 AAC 75 *Oil and Other Hazardous Substances Pollution Control*, as amended through June 17, 2015. ADEC *Field Sampling Guidance* March, 2016, will used as a guide for standard sampling procedures. Site characterization requirements are provided by ADEC in 18 AAC 75, Articles 3 and 9 Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances and General Provisions as amended through June 17, 2015. Soil and Groundwater cleanup levels are also provided according to 18 AAC 75. Protocol for performing the release investigation is outlined by the ASTM standard ASTM E-1903-97 Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process.

Monitoring well requirements are provided in the following guidance documents:

- *ADEC Monitoring Well Guidance* September 2013
- 11 AAC 93.140, Alaska Department of Natural Resources, Water Wells.

Mr. Dustin Stahl, Project Manager/Environmental Specialist for ARES, will oversee drilling activities, installation and development of the groundwater monitoring wells, and soil and groundwater sampling activities. Mr. Stahl meets the qualifications of 'Qualified Environmental Professional' by the ADEC under 18 AAC 75 and has conducted numerous Release Investigations and Phase II ESAs. Mr. Stahl is the Project Manager for the project. The phone number for Mr. Stahl is 907-374-3226.

Field work Activities

Prior to drilling activities occurring at the site, a utilities locate will be completed. Monitoring well locations will be identified, flagged and plotted using GPS coordinates.

Field Screen Soil Sampling

Field screen soil samples which will be analyzed by PID using the headspace method. ARES will use a MiniRAE 3000 PID. The PID will be used for headspace screening of samples in accordance with ADEC field screening procedures. The PID will be calibrated prior to each period of use to 0 parts per million (ppm) free air and 100 ppm isobutylene calibration gas, using a response factor of 10. A soil field screen sample will be collected at every 2' interval.

Headspace screening will be conducted as follows: Soil samples will be transferred directly into a ziplock-type bag. Each bag will be filled one-third to one half full, then warmed for 15 to 20 minutes. Temperatures of the soil in the bag will then be warmed to at least 16ºC (60 ºF). Samples will be agitated at the beginning and end of the warming period inside the bag to enhance volatilization. The bags will be partially opened after the warming and the VOCs in the headspace above the soil and will be sampled by inserting the PID probe. The highest meter reading obtained will be recorded. Soils collected for field screen samples will not be used for collection of analytical samples.

In-Situ Soil Sampling (Subsurface)

During the process of borehole drilling, soil samples will be collected using a split spoon soil sample collector. Split spoon soil samples will be collected from the surface to approximately the location of the soil / groundwater interface; a depth of approximately 12-14 feet bgs in order to determine subsurface conditions of soils. Samples will be collected in 24" length split spoon sampling devices. Each sample will be classified and field screened using a photoionization detector (PID) to assess potential for contamination. Split spoon sampling devices will be decontaminated before each use in order to prevent any opportunity for cross-contamination with the sample.

The soil sample retrieval process will consist of interval sampling from the ground surface to the groundwater table. In interval sampling, the sample device is driven into the ground, starting at the beginning of the sampling interval, until the sampling device has been driven the entire length of the interval (24 inches). The drilling continues until the depth of the start of the next interval is reached, and the sampling process is repeated.

A total of (1) analytical sample will be collected from the interval having the highest PID reading with the core sample. If all PID readings register below 20.0 ppm on the PID only one analytical sample will be collected from the saturated soils just above the soil / groundwater interface.

Analytical soil samples will be collected directly from the split spoon sampling device. Soil samples will be collected in the order of volatility and analyzed as follows:

- BTEX compounds (benzene, toluene, ethyl-benzene, and total xylenes) by method EPA 8021B.
- Diesel range organics (DRO) by AK Method 102; and
- Polycyclic aromatic hydrocarbons (PAH) by EPA Method 8270D. One PAH sample will be collected from the interval correlating with the highest PID field screen reading within the three boreholes.

Analytical soil samples will include 10% blind field duplicate samples for QA/QC purposes.

Soil Sampling Protocol

Soil samples will be placed into certified clean glass jars provided by the analytical laboratory. Soil samples will be handled using disposable Nitrile gloves. To comply with the UST Procedures Manual for VOC samples, 25 milliliters of a methanol/ surrogate will be carefully added to the undisturbed soil in the partially filled pre-weighted sample jar so that the sample is completely submerged. A 40-milliliter sample jar of soil will also be collected from each soil boring in order to determine total percent solids. Sample jars will be properly labeled and placed into a pre-chilled cooler. The chilled temperature within the cooler will be maintained at approximately 4ºC using frozen gel packages during transportation to the laboratory. A signed Chain-of-Custody form will accompany the samples to the analytical laboratory. The analytical laboratory will be chosen from the list of approved ADEC laboratories.

Soil and Groundwater Cleanup Levels

Target soil cleanup levels for BTEX, DRO, and PAH will be used as found in 18 AAC 75.341 Table B1 and B2, Method 2, using the most stringent cleanup level listed for an under 40 inch zone.

Target groundwater cleanup levels for BTEX and DRO will be used as found in 18 AAC 75.345 Table C.

Groundwater Monitoring Well Installation

A total of three monitoring wells are proposed for installation on the subject site. Proposed monitoring well locations are shown in Figure 3.

Groundwater monitoring wells will be installed using 2-inch schedule 40-PVC well screens and risers. Well screens are 0.010 slot in screen size and come in 10-ft lengths. Wells will be installed by truck mounted drill rig utilizing a hollow stem drill auger. Well screens will be centered approximately at the soil/ groundwater interface. Silica sand will be used to secure the well screen and will be added to the boring hole upon placement of the well screen and casing. Silica sand will be added to a height of 2 vertical feet above the well screen. A total of two vertical feet of hydrated bentonite clay will be added on top of the sand. The remainder of the boring will be filled with concrete.

A steel flush-mount monument will be installed over the well casing with a concrete base. Wells will be capped and locked after installation.

A closed loop groundwater elevation survey will be completed following installation of the new groundwater monitoring wells.

Soil boring logs and field notes will document the bore-hole drilling/ well installation / site soils.

Monitoring Well Development

Groundwater monitoring wells will be developed following well construction / installation and setup of the concrete for the well monument. Wells will be surged with surge block, and then purged with a peristaltic pump. The cycle of surging and purging will repeat until purge water remains clear with no sediment remaining in the purge water.

Groundwater Monitoring Well Sampling and Analysis (General Procedure)

Wells will be sampled in order of least likely to be contaminated to most likely. New Nitrile gloves will be used for the sampling of each well.

Sample parameters will be collected in the following order:

- Well measurements (water/casing depth, presence of NAPL);
- Water parameters (Temp, pH, conductivity, dissolved oxygen, ORP, and salinity);
- Volatile Organic Compounds (BTEX); and
- Semi-volatiles organic compounds (DRO).

Water and casing depth measurements will be collected using a Solinst Model 101 P2 Water depth meter. Groundwater depth will be measured and recorded before and after sampling. The depth of the well casing will also be recorded.

A new Teflon® disposable bailer will be used to visually determine if a NAPL is present. The bailer will be lowered slowly into the well in a manner that will create minimum disturbance. The bailer will be used to extract the liquid from the top of the water column for visual observation. The thickness of the NAPL (if any) will be recorded. If a visible NAPL is present than, no water quality measurements will be collected and no water sample will be collected during this sampling event.

Water parameters will be recorded to include temperature, pH, conductivity, turbidity, dissolved oxygen, and salinity using a Horba Water Meter Model U-10. Redox potential will be measured using a Hanna OPR meter. Initial groundwater depth, casing depth, and final groundwater depth/recharge rate will be monitored during purging, and measured before and after sampling using a Heron Oil/Water Interface Probe.

Water parameters will be monitored until purging has been completed. Purging will continue until both of the following statements are true:

- A minimum of three casing volumes of water have been purged and;
- Water parameter measurements indicate that the well has stabilized.

Stabilization is considered to be achieved when three consecutive readings are within the following limits:

- Dissolved Oxygen (DO) (10% or ± 0.2 mg/L, whichever is greater);
- Specific Conductance (3%);
- Temperature (3%);
- pH (± 0.2 unit);
- Oxidation Reduction Potential (ORP) (± 20 millivolts).

If the recharge rate of the well is lower than the extraction rate capabilities of the pump and the well is essentially dewatered during purging, then the well should be samples as soon as the water level has recovered sufficiently (80%) to collect the appropriate volume needed for all anticipated samples. Samples may then be collected even though the indicator field parameters have not stabilized. Groundwater and duplicate samples will be collected using a low-flow, variable speed peristaltic pump and new polyethylene tubing.

Water samples collected will be immediately placed into laboratory supplied VOC viles/sampling containers. All bottles will be labeled and placed in a pre-chilled cooler (at approximately 4°C) and submitted to the analytical laboratory under signed chain of custody. Monitoring wells will be capped and locked after use.

Groundwater samples will be analyzed as follows:

- BTEX compounds by EPA Method 8021B; and
- Diesel range organics (DRO) by AK Method 102.

Location of proposed groundwater monitoring wells are shown in Figure 3.

Purge water collected during the sampling event will be placed in 5-gallon buckets and transferred to up to 30-gallon steel drums supplied by ARES. The drums will be labeled 1406 Kellum Street MW Sampling and will be temporarily stored off-site until status of water quality can be determined. Upon receipt of sample results, purge water and investigative waste water determined to be above ADEC groundwater cleanup levels will be disposed at OIT Inc., for disposal/processing.

Investigative Derived Waste (IDW)

Purge water collected during the sampling event will be placed in 5-gallon buckets and transferred to up to 30-gallon steel drums supplied by ARES. The drums will be labeled 1406 Kellum Street MW Sampling and will be temporarily stored off-site until status of water quality can be determined. Upon receipt of sample results, purge water and investigative waste water determined to be above ADEC groundwater cleanup levels will be disposed at OIT Inc., for disposal/processing.

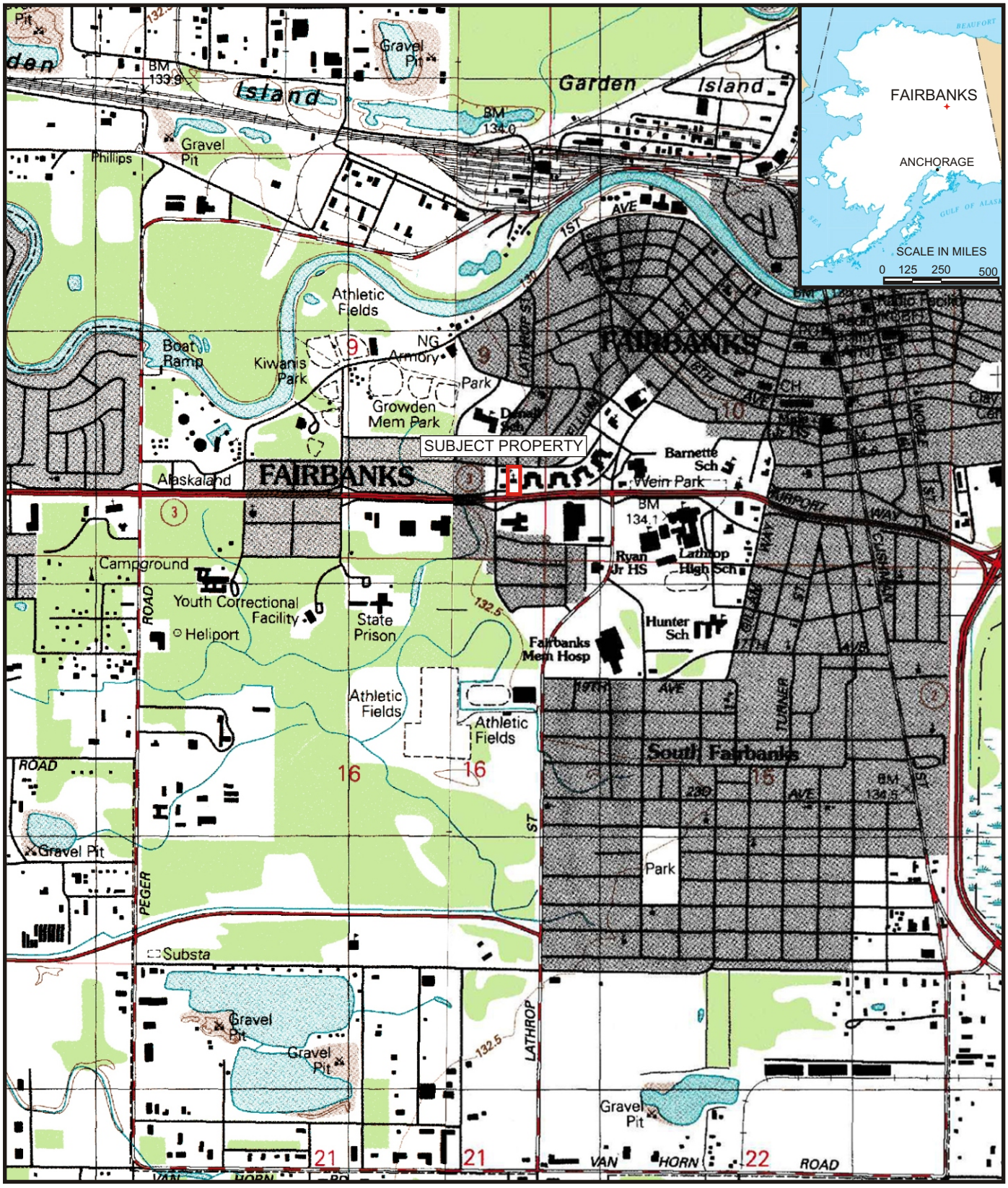
Schedule of Activities

Proposed activities are scheduled to begin as soon as scheduling permits. ARES will notify ADEC a minimum of 72 hours prior site activities commence.

Final Report

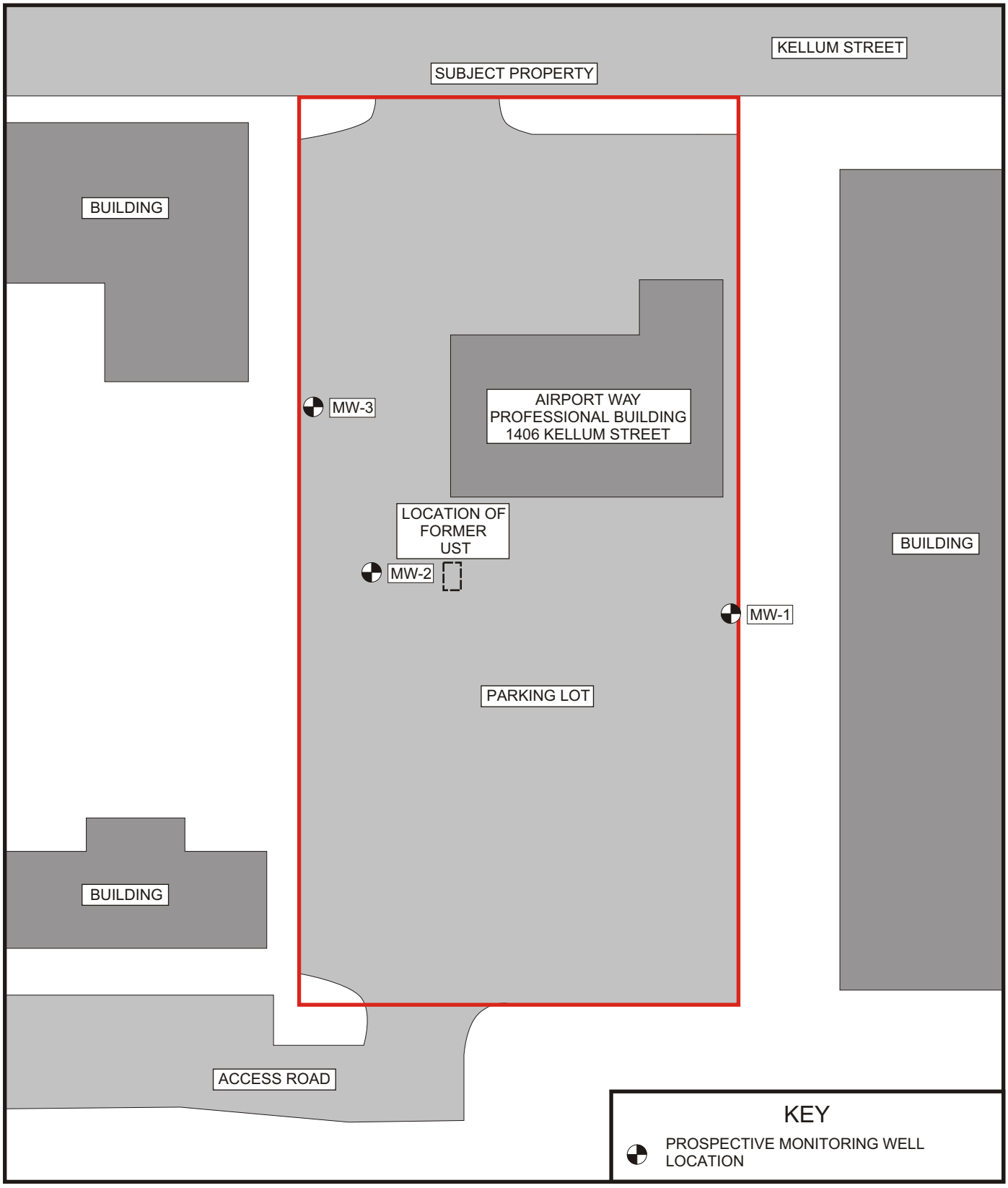
Following field activities and receipt of analytical results, a Final Report will be submitted to ADEC and Airport Way Professional Building LLC upon completion of the project. The Groundwater Installation & Sampling Report will include a documentation of field activities, soil and groundwater analytical results and disposal documentation for IDW.

APPENDIX A
Figures



1992 TOPOGRAPHICAL MAP FAIRBANKS, AK QUAD D-2	DATE: 08/08/2016	SCALE IN MILES: 0 ¼ ½		ALASKA RESOURCES AND ENVIRONMENTAL SERVICES, LLC PO BOX 83050 FAIRBANKS, AK 99708 PH. (907) 374-3226 FAX (907) 374-3219	FIGURE 1
	DRAWN: JDG				
	PROJECT: GROUNDWATER MONITORING WELL INSTALLATION WORKPLAN AIRPORT WAY PROFESSIONAL BUILDING 1406 KELLUM STREET, FAIRBANKS, AK		N W E S		

AERIAL PHOTOGRAPH SEPTEMBER 2015	DATE: 08/08/2016 DRAWN: JDG	SCALE IN FEET: 0 25 50 75 100	**ALASKA RESOURCES AND ENVIRONMENTAL SERVICES, LLC** **PO BOX 83050** **FAIRBANKS, AK 99708** **PH. (907) 374-3226** **FAX (907) 374-3219**	FIGURE 2
	PROJECT: GROUNDWATER MONITORING WELL INSTALLATION WORKPLAN AIRPORT WAY PROFESSIONAL BUILDING 1406 KELLUM STREET, FAIRBANKS, AK	N W E S		



WELL LOCATION MAP	DATE: 08/08/2016	SCALE IN FEET: 0 10 20 30 40	**ALASKA RESOURCES AND ENVIRONMENTAL SERVICES, LLC** **PO BOX 83050** **FAIRBANKS, AK 99708** **PH. (907) 374-3226** **FAX (907) 374-3219**	FIGURE 3
	DRAWN: JDG			
	PROJECT: GROUNDWATER MONITORING WELL INSTALLATION WORKPLAN AIRPORT WAY PROFESSIONAL BUILDING 1406 KELLUM STREET, FAIRBANKS, AK	N W E S		