



# SITE CHARACTERIZATION REPORT

## Bethel Youth Facility

Alaska Department of Health and Social Services, FMS  
Facilities  
3601 C Street  
Anchorage, Alaska 99503

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## **ABBREVIATIONS AND ACRONYMS**

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes (total)
BYF	Bethel Youth Facility
cm/sec	Centimeters per second
COPC	Contaminants of Potential Concern
DD	Decision Document
DHSS	Department of Health and Social Services
DRO	Diesel Range Organics
GRO	Gasoline Range Organics
HASP	Health and Safety Plan
Hazmat	Hazardous Materials
MeOH	Methanol
µg/Kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
mg/Kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
MSDS	Material Safety Data Sheet
PID	Photo-ionization Detector
PAH	Polyaromatic Hydrocarbon (Occasional Synonym for SVOC)
PPMV	Parts Per Million by Volume
RRO	Residual Range Organics
RSE	Restoration Science & Engineering, LLC
SIM	Selected Ion Monitoring
SVOC	Semi-Volatile Organic Compound
TAH	Total Aromatic Hydrocarbons
TAqH	Total Aqueous Hydrocarbons
UAF	University of Alaska Fairbanks
USGS	United States Geological Survey
WELTS	Well Log Tracking System (ADNR)
YKCC	Yukon Kuskokwim Correctional Center
YKHC	Yukon Kuskokwim Health Corporation

## EXECUTIVE SUMMARY

Restoration Science & Engineering, LLC (RSE) has prepared this report detailing results of site characterization activities at the Alaska Department of Health and Social Services (DHSS) Bethel Youth Facility (BYF) located at 950 State Highway in Bethel, Alaska. The purpose of this project is to characterize the vertical and horizontal extents of hydrocarbon contamination remaining at the site in the area surrounding the former location of a heating oil underground storage tank (UST). The UST was removed along with approximately 50 cubic yards of hydrocarbon impacted soil in summer 2015. For this site characterization effort, RSE provided qualified sampling services and conducted field screening and environmental sampling of soil and groundwater at the site. Characterization activities included installation of nine (9) soil borings with four (4) of the soil borings completed as groundwater monitoring wells surrounding the former UST location (Figure 2, Appendix A).

Soil samples were collected from the soil borings and included collection of 71 samples that were field screened with a photo-ionization detector (PID), and collection of 13 soil samples (and two blind duplicates) submitted for laboratory analyses. Soil samples were analyzed for gasoline range organics (GRO) by Method AK 101; diesel range organics (DRO) by Method AK 102; benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021B; with select samples analyzed for semi-volatile organic compounds (SVOCs) by EPA Method 8270D. Groundwater samples were collected from the four installed monitoring wells and were analyzed for GRO, DRO, and BTEX, with select samples analyzed for SVOCs. The nearby drinking water well located approximately 180 feet south of the former UST location on the adjacent Yukon Kuskokwim Correctional Center property was sampled in summer 2015.

All groundwater and drinking water sample results were below Table C ADEC groundwater cleanup concentrations. The majority of the soil sample laboratory data indicated low (below ADEC cleanup levels) or non-detect concentrations of hydrocarbons and SVOCs in soil. Samples collected from borings installed in the immediate vicinity (Borings B-4, B-5, and B-9) of the former UST location exhibited elevated levels of DRO, GRO, BTEX constituents, and the SVOC 2-Methylnaphthalene above ADEC Method 2 Migration to Groundwater Soil Cleanup Levels. PID and laboratory data suggests that elevated concentrations exist in these three borings from between approximately 9 and 16 feet below ground surface (bgs). None of the samples collected from soil borings installed outside of the immediate vicinity of the former UST location exhibited results above ADEC cleanup levels. Data suggests that COPC impacts have not migrated outside of the immediate vicinity of the former UST location and all impacts are overlain by approximately nine feet of clean silty sandy fill.

Based on the findings in this report and the conceptual site model, RSE, on behalf of the DHSS requests ADEC consider Cleanup Complete with Institutional Controls status for this site.

## 1.0 INTRODUCTION

### 1.1 SITE LOCATION

The Bethel Youth Facility (BYF) is operated by the Alaska Department of Health and Social Services (DHSS) and is identified as Lots 4A2 and 4A1 of YKHC Receiving Home Subdivision in Bethel, Alaska. The BYF is located at 950 State Highway (also denoted Chief Eddie Hoffman Highway), in Bethel, Alaska (Figure 1 and Figure 2, Appendix A). The property is located in the NE ¼ of the NW ¼ of Section 17, Township 08N, Range 71W, Seward Meridian, Alaska. The geodetic position of the parcel is Latitude: 60.786778° North, Longitude: 161.787109° West (WGS 84 Datum) and is at an approximate 35 feet mean sea level (MSL) elevation.

The subject property consists of approximately 2.6 acres of land situated in the “Bethel Institutional District” near a number of facilities associated with the delivery of regional health and social services including the YKHC Hospital. Site access is located on the north and southeast sides of the property from Chief Eddie Hoffman Highway (Figure 2, Appendix A).

The property consists of a single building that covers an approximate 20,000 square foot footprint that contains a Youth Detention Unit and a Youth Treatment Unit; a 2,200 square foot outdoor recreation deck; and three gravel-surfaced parking areas located on the north, east and south sides of the building. The BYF building is constructed on an elevated piling foundation. The parking areas and access driveways are gravel-surfaced silty sandy fill pads constructed over the native tundra.

The southern parking area pad (location of the former UST) is built up approximately 6.5 feet above the ground surface beneath the BYF building and has a 2:1 side slope down toward the base of the building piling foundation. Potable water for the Yukon Kuskokwim Correctional Center (YKCC) and BYF is provided by a 131 foot deep water well (YKCC well) located about 180 feet south of the former UST location.

### 1.2 SITE GEOLOGY AND HYDROGEOLOGY

Bethel lies on the Kuskokwim River’s alluvial plain at the southern extent of continuous permafrost in Alaska. Major surficial deposits surrounding Bethel are Quaternary-age alluvium consisting of mud, silt, sand, gravel, and boulders intermixed with wood, peat, and other organic matter. The alluvial plain is bounded on the west by a terrace escarpment of older silt and sandy silt Y-K delta deposits (Dorova and Hogan, 1995). Undisturbed native soils in Bethel commonly include a layer of peat overlain by tundra vegetation. Underneath the peat layer are typically stratified soils which include: organic-rich silty sand; silty sand; and sandy silt. Soil stratification is highly variable in the Bethel vicinity.

RSE has had multiple opportunities to evaluate the Bethel groundwater drinking water supplies during past projects. Groundwater in the Bethel area occurs in shallow thawed silty sands perched on top of permafrost (suprapermafrost) and also in a deep groundwater aquifer that is confined by a generally 300 foot to 400 foot thick layer of permafrost. A review of area groundwater well logs

identified two wells in the Bethel Area that do not use the confined groundwater system. These wells are installed in local thaw bulbs, one of which supplies water to both the YKCC and BYF (Well 23873, Regional Jail). The other is near Brown's Slough, more than one mile east of the subject property. To RSE's knowledge, all other wells are completed in the subpermafrost aquifer and are protected by the thick permafrost confining unit.

The YKCC well is situated in a thaw bulb that based on the water well log extends to a depth of at least 131 feet bgs. The site characterization encountered shallow groundwater from approximately between 14 and 18 feet bgs depending on the ground surface elevation in the location. The geotechnical report from the 2015 building upgrade project indicated unconfined groundwater conditions occurring in thawed saturated silty sand at depths to at least 70 feet bgs.

### 1.3 UST RELEASE

In June 2015, a 2,000-gallon arctic diesel UST used for the BYF heating system was decommissioned and hydrocarbon-impacted soil was encountered. A *Report of Regulated UST Closure and Site Assessment/Release Investigation* dated August 10, 2015 was submitted to ADEC describing UST and soil removal, and soil sampling results (Montauk E/E, 2015). The report identified contaminated soil which was ascribed to release due to overfilling or a spill during fuel transfer. Diesel contaminated soil was identified on the northern end of the UST near the fill pipe and extending around the UST excavation limits.

The UST removal excavation was extended through site fill soil to approximately ten feet bgs where geotechnical borings indicated original ground surface and organic soils would typically be encountered. Excavation surface dimensions were approximately 12-feet by 15-feet, and approximately 50 cubic yards of diesel-impacted soil were removed for off-site treatment. Laboratory soil sample results showed that diesel range organics (DRO), gasoline range organics (GRO), benzene, toluene, ethylbenzene, and 2-methylnaphthalene soil impacts exceeded ADEC Method 2 Soil Migration to Groundwater and remain at the UST excavation limit sidewall and bottom.

UST removal site investigation sampling identified remaining diesel range organics (DRO) levels of up to 18,000 mg/Kg, gasoline range organics (GRO) up to 1,100 mg/Kg, benzene up to 0.53 mg/Kg, toluene up to 8.2 mg/Kg, ethylbenzene results up to 9.6 mg/Kg, and the semi volatile organic compound (SVOC) 2-methylnaphthalene up to 7.0 mg/Kg. In general, the contaminant distribution appeared to be centered on the former location of the UST fill port with highest concentrations detected in soil at 4.5 feet to 6.9 feet bgs. DRO concentrations at the bottom of the excavation at 10 feet bgs ranged from 910 mg/Kg to 5,200 mg/Kg with elevated photo-ionization detector (PID) screening values noted throughout. Since the time of this investigation, RSE understands the parking area elevation was raised through placement of additional fill.

The UST release is identified as the Alaska Department of Environmental Conservation (ADEC) UST database and contaminated sites database as Facility ID 3594. A letter from ADEC dated October 8, 2015, to DHSS notifying that DHSS as the responsible party.

#### 1.4 CONTAMINANTS OF POTENTIAL CONCERN

Table 1 and 2 below list contaminants of potential concern (COPC) and is based on the analytical requirements for arctic diesel found in the 2010 ADEC Draft Field Sampling Guidance. ADEC Method 2 Soil Migration to Groundwater cleanup levels are presented in Table 1, and Table C groundwater cleanup standards are presented in Table 2.

**Table 1 – Contaminants of Potential Concern ADEC Method 2 Soil Migration to Groundwater Cleanup Levels (18 AAC 75)**

COPC	COPC Abbreviation	ADEC-Approved Lab Method	ADEC Method 2 Cleanup Level
<b>SOIL</b>			
Gasoline Range Organics	GRO	AK 101	300 mg/Kg
Diesel Range Organics	DRO	AK 102	250 mg/Kg
Benzene	Collectively referred to as BTEX	EPA 8021B	0.025 mg/Kg
Toluene			6.5 mg/Kg
Ethylbenzene			6.9 mg/Kg
Total Xylenes			63 mg/Kg
Semi-Volatile Organic Compounds	SVOCs	EPA 8270D	Varies, See Table B1

**Notes:** 1) Soil cleanup levels from 18 AAC 75.341 Tables B1 and B2 (Method 2, Migration to Groundwater for the Under 40 inch Zone)

**Table 2 – Contaminants of Potential Concern ADEC Groundwater Cleanup Levels (18 AAC 75)**

COPC	COPC Abbreviation	ADEC-Approved Lab Method	ADEC Table C Cleanup Level
<b>WATER</b>			
Gasoline Range Organics	GRO	AK 101	2.2 mg/L
Diesel Range Organics	DRO	AK 102	1.5 mg/L
Benzene	Collectively referred to as BTEX	EPA 8021B	0.005 mg/L
Toluene			1.0 mg/L
Ethylbenzene			0.7 mg/L
Total Xylenes			10 mg/L
Semi-Volatile Organic Compounds	SVOCs	EPA 8270D	Varies, See Table C

**Notes:** 1) Groundwater cleanup standards from 18 AAC 75.341 Table C.

## 2.0 SITE CHARACTERIZATION METHODS

### 2.1 FIELD METHODS

RSE site characterization activities occurred between January 26 and 29, 2016 with qualified environmental professionals Neil Waggoner, PE and Colette Brandt performing environmental sampling during the installation of nine (9) soil borings at the BYF. Four (4) of the nine (9) soil borings were completed as groundwater monitoring wells. Soil boring and monitoring well samples were collected in general accordance with an ADEC-approved workplan (RSE, 2016).

Soil borings and groundwater monitoring wells were installed by Salzbrun Services using a CME-45 drill rig with a hollow stem auger and split-spoon drive sampler. Soil borings were generally installed and sampled to between 20 and 25 feet below ground surface with monitoring wells installed generally to approximately five feet below the groundwater interface. Soil samples were collected directly from a 1.25-inch diameter split-spoon sampler. Soil field screening samples were generally analyzed at two-foot to four-foot intervals with a minimum of one laboratory sample collected from each boring. In the location of the former UST, soil borings were laterally ‘stepped out’ to delineate the extent of hydrocarbon impacts. Groundwater monitoring wells were located and installed to determine groundwater flow direction surrounding the former UST.

Soil borings/monitoring wells were horizontally located via use of electronic distance measuring equipment or using swing ties to site features. Soil boring and monitoring well locations are shown on Figure 3, Appendix A. Figures 3 through 5 display the location of soil borings and monitoring wells, as well as site groundwater contours. Soil borehole logs are presented in Appendix B.

#### 2.1.1 SOIL FIELD SCREENING AND SAMPLE COLLECTION METHODS

RSE personnel field screened soil collected from the soil borings in general accordance with an ADEC-approved workplan submitted January 12, 2016 and the 2010 ADEC Draft Field Sampling Guidance. Field screening was conducted using a PID calibrated with 100 parts per million by volume (ppmv) isobutylene. Soil was collected using new nitrile gloves or clean stainless steel spoons, placed into individual quart-sized sealable plastic bags, warmed to approximately 60°F, and agitated for approximately 5 seconds prior to collecting a reading. The PID probe was carefully inserted into the plastic bag and precautions were taken to avoid water droplets from condensation within the bag or direct contact with soil particles. Headspace measurements were recorded for each field screening sample. A total of 71 PID screening samples were collected from the nine borings.

In the hydrocarbon impacted area surrounding the former UST location, soil borings were ‘stepped out’ where practicable to delineate the extent of hydrocarbon contamination at the site. Figure 2 in Appendix A displays soil boring locations. Table C1 shows the PID field screening values for all site characterization collected screening samples (Appendix C).

Soil sample collection locations were based on PID field screening sample results, visual observations, and work plan objectives. RSE collected 13 soil samples from the nine (9) soil boring locations. Soil samples were generally analyzed for DRO, GRO, and BTEX, with additional analysis of SVOCs (PAH SIMS) at 10% frequency. Blind duplicate soil samples were



collected and submitted for each analytical method at a minimum 10% frequency. A minimum of one soil sample for laboratory analysis was collected from each soil boring. Additional samples were collected for laboratory analysis from soil borings that exhibited elevated PID headspace readings to delineate vertical extent of impacts in these borings.

Each soil sample was collected using a clean stainless-steel spoon and placed into method-specific containers, stored in a clean sample cooler chilled to between 2 and 6 °C, and transported under chain-of-custody to SGS North America, Inc. (SGS), an ADEC-approved laboratory. Soil was field screened and sampled in general accordance with ADEC Draft Field Sampling Guidance (ADEC, May 2010). All soil boring locations were located via use of electronic distance measuring equipment or using swing tie measurements to site features with the sample collection depth also recorded. Tables C2 and C3 present all site characterization soil sample laboratory results (Appendix C).

### **2.1.2 MONITORING WELL GROUNDWATER SAMPLE COLLECTION METHODS**

Groundwater monitoring wells were installed in four (4) of the soil boring locations. Monitoring wells were completed at depths between 19 and 23 feet below ground surface and equipped with ten feet of well screen. Monitoring wells were installed in accordance with ADEC Monitoring Well Guidance (ADEC, November 2011). Well construction methods consisted of a commercially manufactured 0.010-slot well screen surrounded by a 10-20 silica sand pack. The sand pack extends approximately two feet above the well screen and the annular space above the sand pack was sealed with bentonite clay. In general, the well screens were placed transecting the water table, with at least a portion of the screen above the water table and generally four feet of well screen within the water column. Well construction details were recorded in the field notebook and are presented in boring/monitoring well logs in Appendix B.

Wells were provided with flush-mount protective casing, and equipped with a locking cap. Monitoring well casing and water level elevations were recorded relative to a temporary benchmark or reference point for use in establishing well measuring point elevations for generating a groundwater gradient map (Figure 5, Appendix A).

Wells were developed prior to sampling. Well development was performed in general accordance with ADEC Monitoring Well Guidance, and consisted of pumping with a peristaltic pump. Pumping continued until turbidity decreased.

Water samples were collected using a variable speed peristaltic pump set to a low flow rate during purging and sampling. Prior to purging, the depth to water was measured with a water level indicator. To monitor the stabilization of groundwater within the wells, RSE collected field parameters with a YSI 566 water quality meter during purging. These parameters included temperature, conductivity, specific conductance, salinity, and pH. The following stabilization parameter objectives were used to establish an adequate purge volume has been removed from each well: 0.1 units for pH, 3% for conductivity, and 10% for temperature and salinity. A minimum of three times the volume of water contained within the well casing was purged prior to sampling.

Groundwater samples were collected and analyzed for DRO, GRO, and BTEX, with SVOCs additionally analyzed from monitoring well 4 (MW4). Each water sample was collected using new, dedicated tubing. The water level indicator and other non-disposable or non-dedicated equipment was decontaminated with distilled water and Alconox wash followed by double distilled water rinse before re-use. The tubing inlet was placed in the middle of the screened section, midway between the static water level and the bottom of the well. As water samples were collected, care was taken to minimize volatile loss from excessive turbulence or air mixing. Field personnel took care to avoid spilling or over-diluting acid sample preservatives. Water samples were placed directly into method-specific containers and stored in a clean sample cooler chilled between 2 and 6 °C. Water samples were maintained in a separate cooler from the soil samples. Coolers were transported under chain-of-custody to SGS, an ADEC-approved laboratory. Groundwater field parameters and groundwater sample laboratory results are provided in Tables D1 through D3 (Appendix D).

### **3.0 SITE CHARACTERIZATION RESULTS AND FINDINGS**

Site characterization activities occurred between January 26 and 29, 2016 and included the installation of nine (9) soil borings identified as B-1 through B-9 with four (4) of the borings completed as groundwater monitoring wells. Comprehensive field screening and laboratory results collected during the site characterization activities are provided in Tables C1 through C3 and Tables D1 through D3 in Appendices C and D.

#### **3.1 SOIL SAMPLE RESULTS**

Each of the nine soil borings was installed through the saturated zone and completion depths ranged from 20 to 26 feet bgs. A total of 71 PID field screening samples and 13 soil samples for laboratory analysis were collected from the borings, with a minimum of one sample for laboratory analysis collected from each soil boring. In borings that exhibited elevated PID readings, soil samples were collected from the depth interval yielding the highest PID result, as well as from an additional depth interval to delineate the vertical extent of impacts. In borings that did not exhibit elevated PID readings, samples were generally collected at or near the groundwater interface. Soil samples were variously analyzed for DRO, GRO, and BTEX, with select samples analyzed for SVOCs.

Soil borings B-1, B-2, B-3, B-6, B-7, and B-8 exhibited low PID readings and all soil analytical sample results for DRO, GRO, and BTEX constituents were not detected. All analyte detection limits for soil samples were less than their respective ADEC method 2 cleanup levels. Complete results for soil boring laboratory samples are compared to the ADEC Method 2 Migration to Groundwater soil cleanup levels, as well as Direct Contact/Ingestion, and Outdoor Inhalation in Tables C2 and C3 in Appendix C.

Samples collected from borings installed in the immediate vicinity of the former UST location (borings B-4, B-5, and B-9) variously exhibited elevated levels above ADEC Method 2 Migration to Groundwater Soil cleanup levels of DRO, GRO, BTEX constituents, and the SVOC 2-

Methylnaphthalene. DRO results above the ADEC Method 2 cleanup level of 250 mg/Kg ranged from 6,780 mg/Kg (sample 9-10) to 22,100 mg/Kg (sample 5-16)

Soil boring B-4, sample 4-16 collected from the 16 foot depth interval exhibited elevated levels of DRO (17,600 mg/Kg), and benzene (173 ug/Kg) above ADEC Method 2 Soil Migration to Groundwater cleanup levels. All other COPC analytes were below ADEC Method 2 cleanup levels at the 16 foot bgs depth interval of boring B-4. Laboratory data from the 19 foot bgs depth interval of boring B-4 (sample 4-19) indicated all tested COPC analytes were below ADEC Method 2 cleanup levels. PID readings were elevated for the 11.5 foot, 14 foot, and 16 foot bgs depth intervals of boring B-4, while PID readings from all other depth intervals of boring B-4 represent background conditions.

Soil boring B-5, sample 5-16 collected from the 16 foot bgs depth interval exhibited elevated levels of DRO, GRO, BTEX constituents, and the SVOC 2-Methylnaphthalene above ADEC Method 2 Soil Migration to Groundwater cleanup levels. Data indicates all other COPC analytes were below ADEC Method 2 cleanup levels in the 16 foot bgs depth interval of boring B-5. Laboratory data from the 19 foot bgs depth interval of boring B-5 indicated all tested COPC analytes were below ADEC Method 2 cleanup levels. PID readings were elevated for the 9 foot, 11 foot, 14 foot, and 16 foot bgs depth intervals of boring B-5.

Soil boring B-9, sample 9-10 collected from the 10 foot bgs depth interval exhibited an elevated concentration of DRO (6,780 mg/Kg) above the ADEC Method 2 Soil Migration to Groundwater cleanup level. Data indicates all other tested COPC analytes were below ADEC Method 2 cleanup levels at the 10 foot bgs depth interval of boring B-9. Laboratory data from the 20 foot depth interval of boring B-9 indicated all tested COPC analytes were below ADEC Method 2 cleanup levels. PID readings from the collected samples were elevated at only the 10 foot bgs interval of Boring B-9.

PID and laboratory data suggests hydrocarbon impacts remain in boring B-4 from between 11.5 feet and 16 feet bgs, in boring B-5 from between 9 feet and 16 feet bgs, and at the 10 foot depth interval of boring B-9. None of the samples collected from soil borings installed outside of the immediate vicinity of the former UST location exhibited results above ADEC cleanup levels. Data suggests that COPC impacts have not migrated outside of the immediate vicinity of the former UST location. Full tabulated soil field screening and analytical results are provided in Tables C1 through C3 in Appendix C.

### **3.2 GROUNDWATER SAMPLE RESULTS**

Groundwater samples were collected from the four (4) installed monitoring wells (identified as MW 1, MW 3, MW 4, and MW 8) and analyzed for DRO, GRO, and BTEX, with the sample from MW 4 analyzed for SVOCs. All groundwater and drinking water sample results were either non-detect or below ADEC Table C groundwater cleanup concentrations. Full tabulated groundwater sample results are provided in Tables D1 through D3 in Appendix D.

### **3.3 DISCUSSION OF SITE TOPOGRAPHY AND GROUNDWATER GRADIENT**

The former UST location is along the north edge of the parking area fill pad located south of the Bethel Youth Facility. The north edge of the parking area fill pad is approximately six (6) vertical feet above and slopes down to the ground surface elevation beneath the BYF. The fill pad also slopes gently to the south towards the YKCC. An elevation survey of each groundwater monitoring well top of casing (TOC) relative to temporary benchmarks was conducted, and depth to groundwater measurements were collected for each monitoring well. Groundwater depths below monitoring well top of casing ranged from 14.81 to 19.21 feet TOC, and groundwater elevations ranged from 13.72 to 14.04 feet local mean tide level. The groundwater flow direction appears to be east towards the Kuskokwim River. Groundwater contours are shown on Figure 5 in Appendix A.

### **3.4 YKCC DRINKING WATER WELL**

The YKCC drinking water well located approximately 180 feet south of the former UST location and completed to 131 feet bgs was sampled in June 2015 by others and analyzed for GRO, DRO, residual range organics (RRO), and BTEX. Results indicated all analyzed compounds were not detected at the method detection limit. Sample results are included in Appendix F.

## **4.0 WASTE MANAGEMENT**

Soil derived during site characterization efforts from soil boring installation was generally placed back into the borehole of origination. Excess soil was generated from the soil borings that were completed as groundwater monitoring wells. Excess soil from boring B-4 was placed in four (4) labeled 5-gallon buckets and stockpiled at the site (analytical data shows this soil has DRO and Benzene levels above ADEC Method 2 Migration to Groundwater Cleanup Levels). Excess soil (approximately 1/3 cubic yard) from borings B-1, B-3, and B-8 was placed into a labeled super sack and stored at the site (analytical data shows COPC analytes in this soil are below ADEC Method 2 Migration to Groundwater Cleanup levels). RSE has submitted a request for approval to dispose of soil generated during the site characterization.

Groundwater monitoring well purge water was placed into labeled 5-gallon buckets and is currently on-site (analytical results indicated groundwater from all monitoring wells was below ADEC Groundwater and Surface Water Cleanup Levels). RSE has submitted a request for approval to dispose of groundwater generated during the site characterization. Upon receipt of ADEC approval the water will be discharged on site in a manner that does not runoff to surface water or erode the surrounding surface soil.

All recyclable or waste materials were managed in accordance with applicable local, state and federal regulations.

## **5.0 DATA QUALITY CONTROL**

SGS North America, Inc. located in Anchorage, Alaska was the contract laboratory and provided all testing services during this project. Analytical results were furnished based on normal

turnaround schedules. SGS is certified and approved by ADEC to provide all of the analytical testing services which were required during this project.

Samples were collected and analyzed in accordance with ADEC 18 AAC 75 and 78, and in accordance with the ADEC approved workplan. Duplicate samples for quality assurance purposes were generally collected at a frequency of 10% and duplicate relative percent difference (RPD) calculations are provided within the ADEC Laboratory Review Checklists (Appendix F). All site characterization tasks were conducted by RSE’s on-site qualified environmental professionals.

All field documentation was reviewed to verify that it was complete and accurate. RSE reviewed laboratory data deliverable packages to determine acceptability of method and laboratory instrument performance and determine if further sample extraction was necessary. Procedural or method deviations are documented in the attached ADEC Laboratory Data Review Checklist, which RSE has completed for each laboratory work order (Appendix F). This review validated site data for use in assessing site contamination for comparison of in situ soil and groundwater hydrocarbon concentrations against applicable ADEC Method 2 Soil and Table C Groundwater Cleanup Levels under 18 AAC 75. All sample chain-of-custodies and copies of laboratory analytical results are provided in Appendix F. RSE and the contract laboratory will maintain a complete set of data deliverables, which are assembled to meet the criteria established in 18 AAC 75.

## 6.0 CONCEPTUAL SITE MODEL AND CLEANUP LEVELS

Based on soil boring sample results, the horizontal and vertical extent of hydrocarbon impacted soil appears to be defined. Soil sample results show remaining impacted soil above ADEC cleanup levels is overlain by nine feet of clean soil, and remaining impacts do not extend into the depth where static water level was observed in the monitoring wells. The monitoring wells yielded results for all COPCs below the ADEC groundwater cleanup levels, confirming that groundwater is not currently an exposure pathway for the COPCs. This data supports the conclusion that the petroleum hydrocarbon impacted soil left in place at the site is not a danger to human health or the environment and is *insignificant* in nature. RSE is providing the following evaluation of exposure pathways for this site which indicates the site holds no risk to receptors.

**Table 3: Exposure Pathway Evaluation**

Pathway	Evaluation Result	Notes
Surface Soil Contact	Incomplete for Current and Future	Surface soil is clean silty sand fill. Remaining impacts to soil are below 9 feet bgs. All surface soil encountered on site is less than the ADEC Method 2 standard for direct contact.

Pathway	Evaluation Result	Notes
Sub-Surface Soil  Direct Contact	Insignificant for Current and Future	Sub-surface soil at the sixteen foot depth interval of 2 boring locations within the immediate vicinity of the former UST location yielded DRO results greater than Method 2 cleanup levels for ingestion and direct contact. Hydrocarbon impacted soil was observed from approximately 9 to 16 feet below ground surface. Risk via this pathway is considered complete, however insignificant with regard to current and future receptors respectively due to the location of the risk approximately nine feet below a parking pad.
Inhalation – Outdoor Air	Insignificant for Current and Future	Sub-surface soil from the 16 foot bgs depth interval of boring B-5 exhibited Total Xylenes results greater than Method 2 cleanup levels for outdoor inhalation. Volatile organic compounds were detected in three soil borings, all below ten feet bgs. PID readings and sample data indicated hydrocarbon impacted soil is present in three borings from approximately 9 to 16 feet below ground surface. Risk via this pathway is considered complete, however, current and future pathways are considered insignificant due to the location of the risk approximately nine feet below a parking pad.
Inhalation – Indoor Air	Insignificant for Current and Future	Volatiles remain in site soil via this pathway. However, insignificant to pose a risk to receptors via this pathway because the BYF building is constructed on pilings where air flow is not restricted.
Ground Water Ingestion	Insignificant for Current and Future	Contaminants were detected in one (MW 4) of the four installed groundwater wells, while the other three wells were non detect for all COPCs. Results from MW 4, installed in the former UST location were well below (all well less than 1/10 <sup>th</sup> ) ADEC Table C Groundwater Cleanup and EPA MCL drinking water levels. Groundwater flow direction is to the east and pollutant extents have been determined. The YKCC drinking water well is located 180 feet south of the former UST location, and is completed at 131 feet bgs. In 2015, a single drinking water sample was collected from the YKCC well, and measured for DRO, GRO, and VOC compounds all of which were non-detect. Risk via this pathway is considered complete, but insignificant due to the low (<1/10 <sup>th</sup> cleanup levels) contaminant concentrations.
Surface Water Ingestion	Current: Incomplete  Future: Incomplete	Surface water was not observed at the site. A small pond is visible in aerial photographs approximately 950 feet WNW of the site, and the Kuskokwim River is approximately 1,900 feet ESE. Contaminant levels are low in groundwater and unlikely to appear in surface water if any is nearby. Depth to water measurements indicate groundwater flow direction is to east. The exposure pathway for surface water ingestion is incomplete.

Pathway	Evaluation Result	Notes
Wild Foods Ingestion	Current: Incomplete Future: Incomplete	Contaminants are present below the top 9 feet of soil and located within a parking pad at the BYF. The site is situated in the “Bethel Institutional District” near a number of facilities associated with the delivery of regional health and social services including the YKHC Hospital. The location of the site could not reasonably be used for subsistence activities, nor are site contaminants located where they could be taken up into biota. The exposure pathway is incomplete.
Ecological Receptors	Current: Incomplete Future: Incomplete	Hydrocarbon impacts in soil at this site do not include surface water bodies or shallow soils. The remaining impacts are capped by silty sand fill. Ecological receptors are not exposed to impacted soil at the site. The exposure pathway for ecological receptors is considered incomplete.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

This Site Characterization report documents current environmental conditions surrounding the former UST location at the Bethel Youth Facility, located in Bethel, Alaska. This report presents information from the site characterization efforts including collecting field screening and laboratory soil samples from soil borings, and collection of groundwater samples for laboratory analysis from monitoring wells.

The majority of the soil sample laboratory data indicated low (below ADEC cleanup levels) or non-detect concentrations of hydrocarbons or SVOCs in soil. Samples collected from borings installed in the immediate vicinity (Borings B-4, B-5, and B-9) of the former UST location exhibited elevated levels of DRO, GRO, BTEX constituents, and the SVOC 2-Methylnaphthalene above ADEC Method 2 Migration to Groundwater Soil Cleanup Levels. PID and laboratory data suggests that elevated concentrations exist in these three borings from between approximately 9 and 16 feet bgs. None of the samples collected from soil borings installed outside of the immediate vicinity of the former UST location exhibited results above ADEC cleanup levels. RSE estimates 30 cubic yards of soil with impacts above ADEC Method 2 Migration to Groundwater Cleanup levels remains at the site. Data suggests that COPC impacts have not migrated outside of the immediate vicinity of the former UST location and all impacts are overlain by approximately nine feet of clean silty sandy fill.

All groundwater and drinking water sample results were below Table C ADEC groundwater cleanup concentrations. While low contaminant concentrations (well below ADEC Table C levels) were detected in MW-4 (installed in the former UST location), the groundwater flow direction is easterly, and RSE does not consider the YKCC drinking water well (180 feet south) to be at risk. Sample data from a sample from the drinking water well was non-detect for all analytes.

Given the current and likely future uses of the site, remaining impacts do not present a risk to human health or the environment. Based on the findings in this report and the conceptual site model, RSE, on behalf of the DHSS requests ADEC consider Cleanup Complete with Institutional Controls status for this site.

This report is based on RSE's field work and is representative of conditions observed during early 2016. This report is for the sole use of our client, Alaska DHSS, and ADEC, and was produced for the purpose of documenting conditions at the Bethel Youth Facility, and providing information to allow State regulators to make a determination regarding the regulatory status of the site. Any use of this report by entities other than those listed above or for purposes which have not been documented above is at the sole risk of the user.

## 8.0 REFERENCES

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# **APPENDIX A**

**FIGURES**

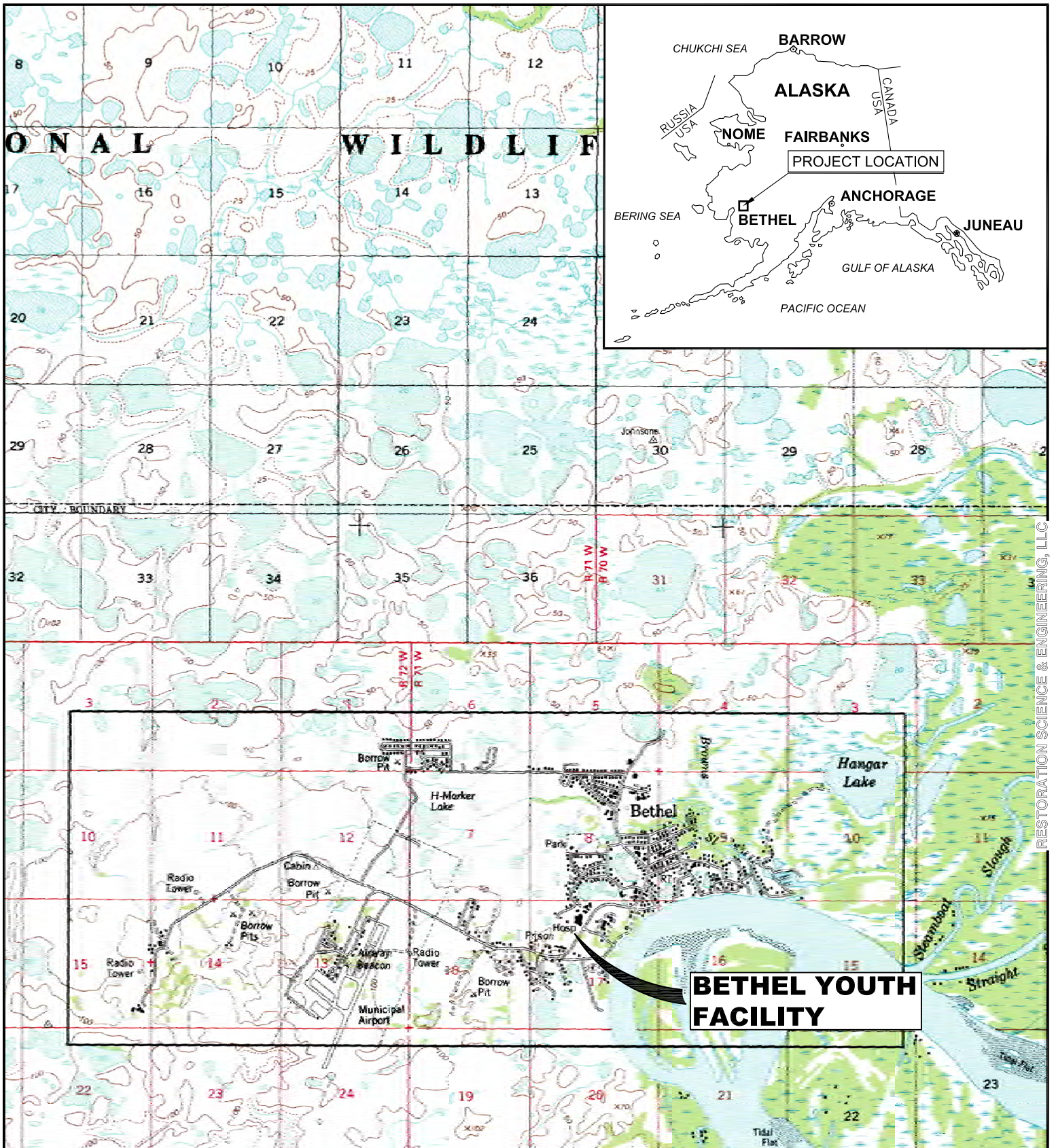


IMAGE REFERENCE: USGS BETHEL D-7 & D-8 TOPOGRAPHIC MAPS



**ALASKA DEPARTMENT OF HEALTH AND SOCIAL SERVICES  
BETHEL YOUTH FACILITY  
SITE CHARACTERIZATION REPORT**

VICINITY MAP

BETHEL, ALASKA

**RESTORATION**  
Science & Engineering, LLC

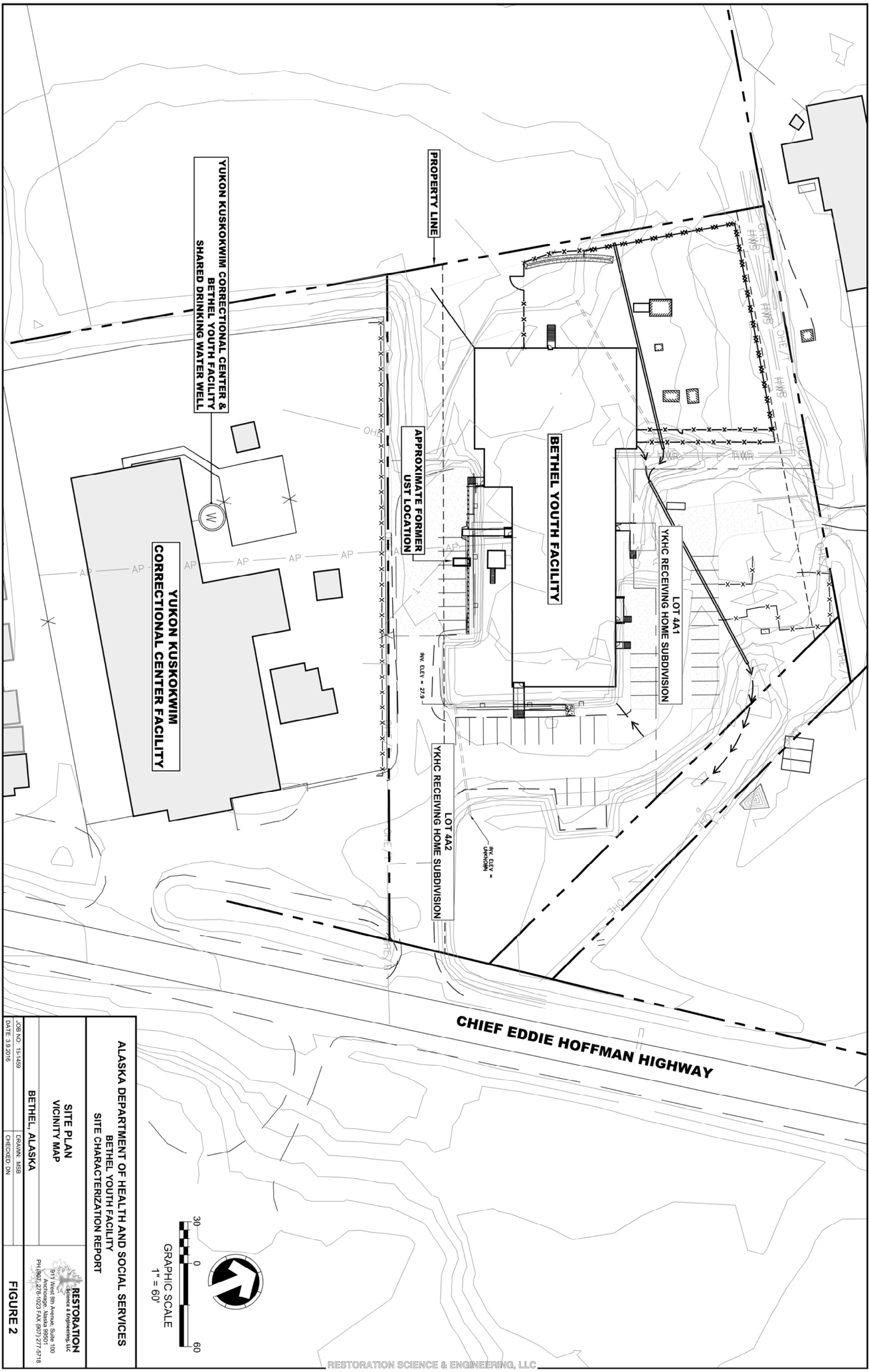
911 West 8th Avenue, Suite 100  
Anchorage, Alaska 99501  
PH (907) 278-1023 FAX (907) 277-5718

JOB NO: 15-1459  
DATE: 3.7.2016

DRAWN: MSB  
CHECKED: DN

**FIGURE 1**

RESTORATION SCIENCE & ENGINEERING, LLC



**ALASKA DEPARTMENT OF HEALTH AND SOCIAL SERVICES**  
**BETHEL YOUTH FACILITY**  
**SITE CHARACTERIZATION REPORT**

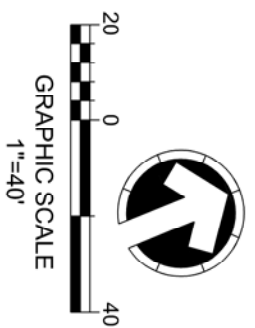
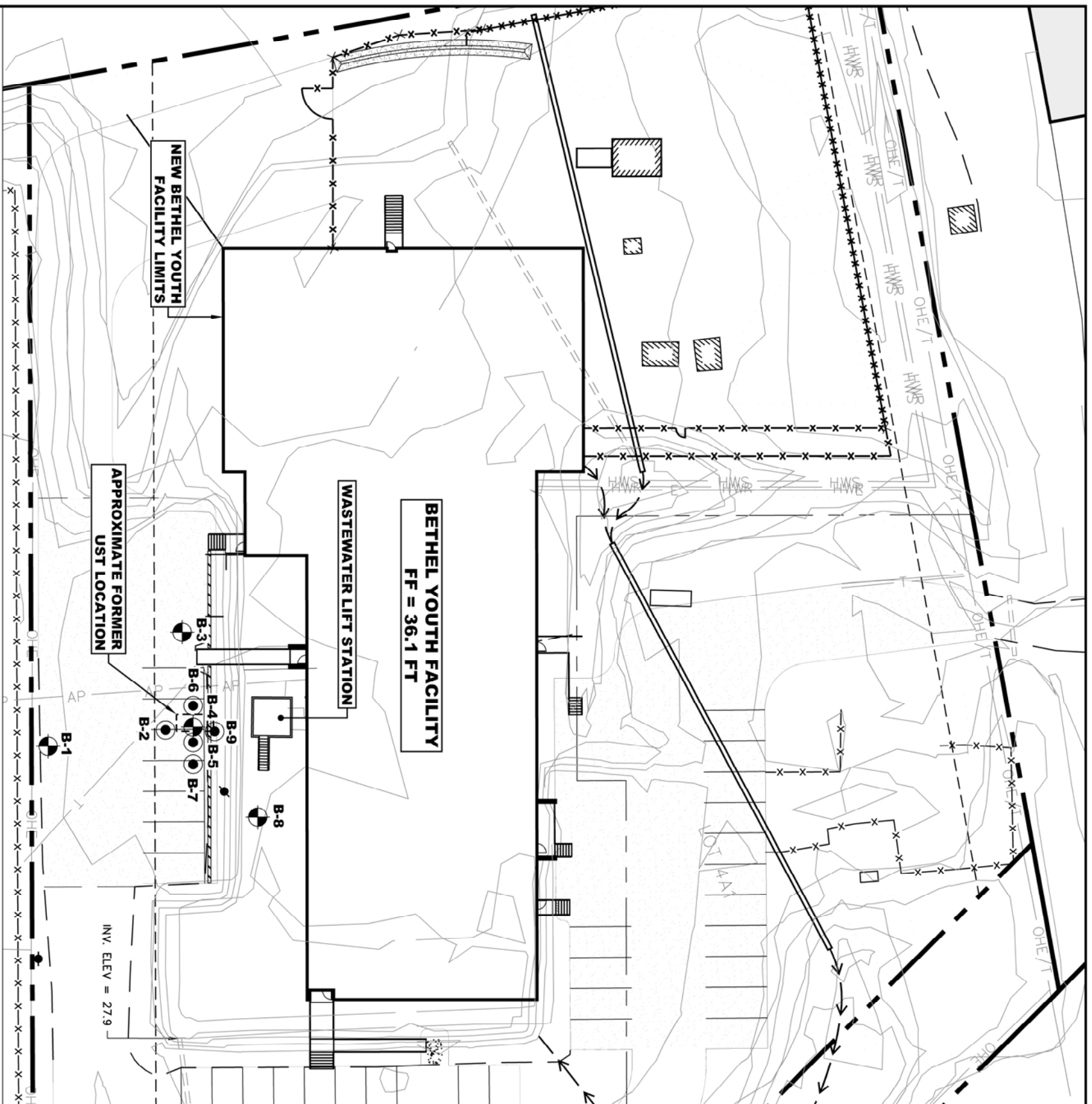
**SITE PLAN**  
**VICINITY MAP**

**BETHEL, ALASKA**

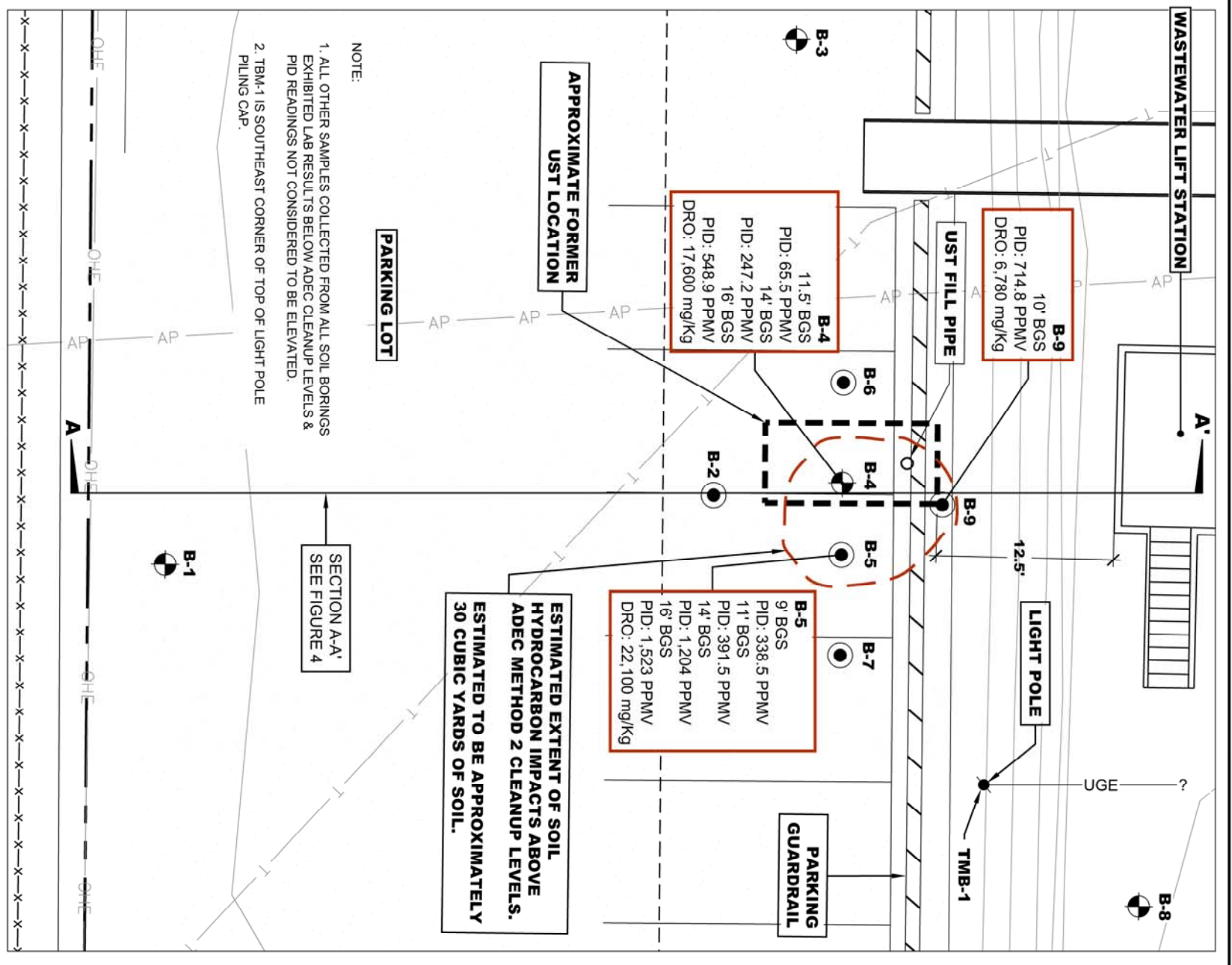
JOB NO. 15-1459  
 DATE 3.9.2016  
 DRAWN: MSB  
 CHECKED: DN

**RESTORATION**  
 Science & Engineering, LLC  
 917 West 5th Avenue, Suite 100  
 Anchorage, Alaska 99501  
 PH (907) 278-1023 FAX (907) 277-5718

**FIGURE 2**



- LEGEND**
- SOIL BORING & MONITORING WELL LOCATION
  - SOIL BORING LOCATION



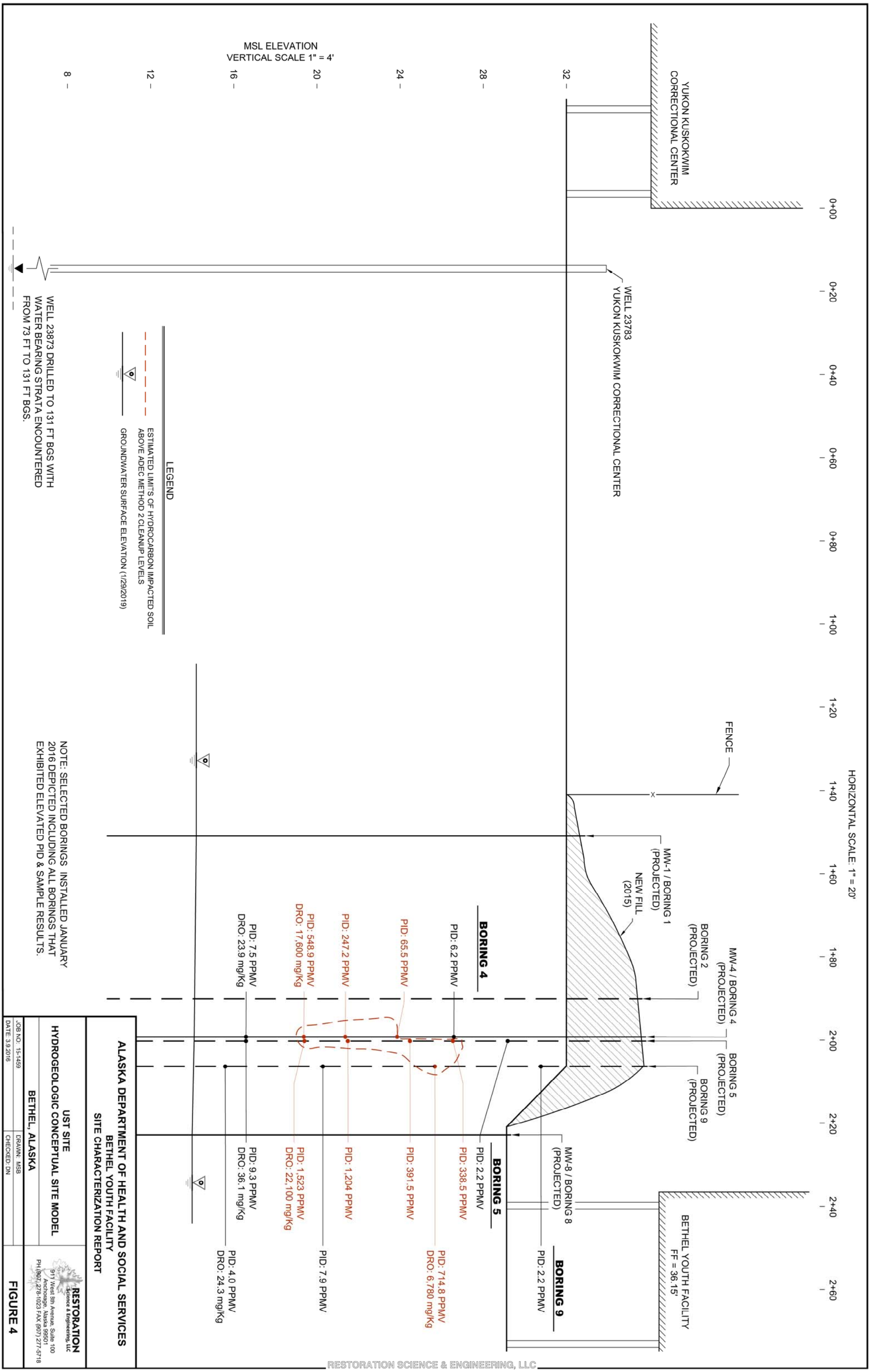
**ALASKA DEPARTMENT OF HEALTH AND SOCIAL SERVICES**  
BETHEL YOUTH FACILITY  
SITE CHARACTERIZATION REPORT

**RESTORATION SCIENCE & ENGINEERING, LLC**  
917 West 5th Avenue, Suite 100  
Anchorage, Alaska 99501  
PH: (907) 278-1023 FAX: (907) 277-5718

**SOIL BORING & MONITORING WELL LOCATION MAP SHOWING ELEVATED PID AND DRO RESULTS**  
BETHEL, ALASKA

JOB NO.: 15-1459  
DRAWN: MSB  
DATE: 3.8.2016  
CHECKED: DN

**FIGURE 3**



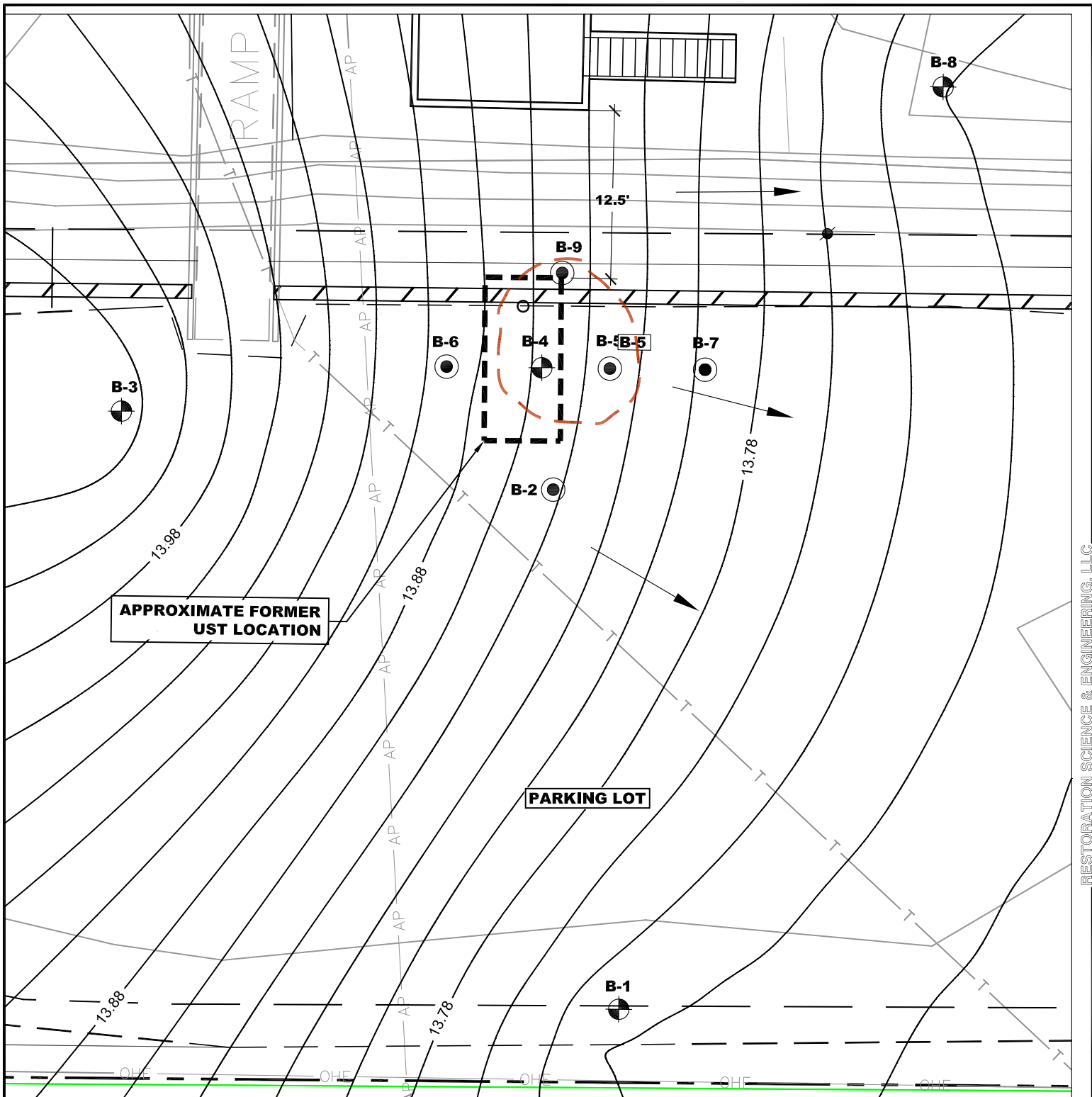
ALASKA DEPARTMENT OF HEALTH AND SOCIAL SERVICES  
BETHEL YOUTH FACILITY  
SITE CHARACTERIZATION REPORT

UST SITE  
HYDROGEOLOGIC CONCEPTUAL SITE MODEL  
BETHEL, ALASKA

JOB NO.: 15-1459  
DRAWN: MSB  
DATE: 3.9.2016  
CHECKED: DN




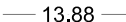

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Science & Engineering, LLC  
917 West 5th Avenue, Suite 100  
Anchorage, Alaska 99501  
PH: (907) 278-1023 FAX: (907) 277-5718

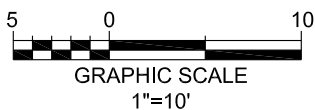
FIGURE 4




RESTORATION SCIENCE & ENGINEERING, LLC

**LEGEND**

-  SOIL BORING & MONITORING WELL LOCATION
-  SOIL BORING LOCATION
-  GROUNDWATER FLOW DIRECTION
-  13.88 APPROX GROUNDWATER ELEVATION JANUARY 2016
-  ESTIMATED LIMITS OF DRO IMPACTED SOIL ABOVE ADEC METHOD 2 CLEANUP LEVELS



<b>ALASKA DEPARTMENT OF HEALTH AND SOCIAL SERVICES BETHEL YOUTH FACILITY SITE CHARACTERIZATION REPORT</b>	
<b>GROUNDWATER GRADIENT MAP</b>	
<b>BETHEL, ALASKA</b>	
JOB NO: 15-1459	DRAWN: MSB
DATE: 3.9.2016	CHECKED: DN
 <p><b>RESTORATION</b> Science &amp; Engineering, LLC 911 West 8th Avenue, Suite 100 Anchorage, Alaska 99501 PH (907) 278-1023 FAX (907) 277-5718</p>	
<b>FIGURE 5</b>	

# **APPENDIX B**

Borehole Logs and  
Monitoring Well Construction Diagram







BOREHOLE NO.: B-2

TOTAL DEPTH: 21'

**PROJECT INFORMATION**

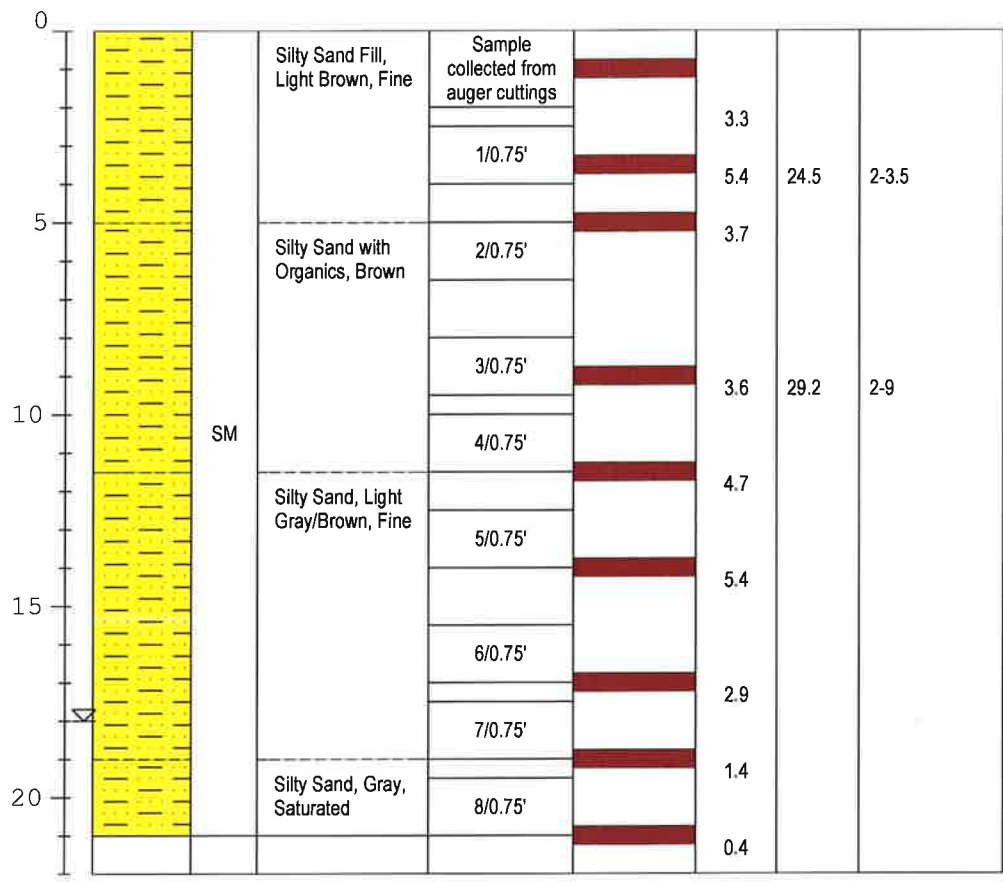
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PROJECT: **BYF Site Characterization**  
 SITE LOCATION: **Bethel**  
 JOB NO.: **15-1459**  
 LOGGED BY: **N.Waggoner, P.E. / C. Brandt**  
 PROJECT MANAGER: **D. Nyman, P.E.**  
 DATES DRILLED: **1.26.2016**

DRILLING CO.: **Salzbrun Drilling Services**  
 DRILLER: **Mike Salzbrun**  
 RIG TYPE: **CME-45**  
 METHOD OF DRILLING: **3-1/4" O.D. HSA**  
 SAMPLING METHODS: **1-1/4" I.D. Split Spoon**  
 HAMMER WT./DROP: **140 lbs**  
 WEATHER: **Overcast, 30 F**

∞ Water level during drilling

DEPTH	SOIL SYMBOL	USCS	SOIL DESCRIPTION	CORE NO. / RECOVERY (ft)	SCREENING DEPTH (red)	PID (ppmv)	DRO (mg/Kg)	SAMPLE NAME
-------	-------------	------	------------------	--------------------------	-----------------------	------------	-------------	-------------



NOTES:



**BOREHOLE LOG**

BOREHOLE NO.: B-3

TOTAL DEPTH: 25'

**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: **BYF Site Characterization**  
 SITE LOCATION: **Bethel**  
 JOB NO.: **15-1459**  
 LOGGED BY: **N. Waggoner, P.E. / C. Brandt**  
 PROJECT MANAGER: **David Nyman, P.E.**  
 DATES DRILLED: **1.26.2016**

DRILLING CO.: **Salzbrun Drilling Services**  
 DRILLER: **Mike Salzbrun**  
 RIG TYPE: **CME-45**  
 METHOD OF DRILLING: **3-1/4" O.D. HSA**  
 SAMPLING METHODS: **1-1/4" I.D. Split Spoon**  
 HAMMER WT./DROP: **140 lbs**  
 WEATHER: **Overcast, 30 F**

☞ Water level during drilling      ☛ Water level in completed well

DEPTH	SOIL SYMBOL	USCS	SOIL DESCRIPTION	CORE NO. / RECOVERY (ft)	SCREENING DEPTH (red)	PID (ppmv)	DRO (mg/Kg)	SAMPLE NAME	WELL COMPLETION	DESCRIPTION
0			Silty Sand Fill, Light Brown, Fine, Frozen	Sample collected from auger cuttings		5.0				
				1/0.75'		3.2				
5			Silty Sand, " Recovery - Not enough for sample	2/0.75'		2.9				
				3/0.75'		4.4				
10		SM	Silty Sand, Gray, Saturated							
				4/0.75'		3.7				
15				5/0.75'		3.6	24.0 23.9	3-19 3-X		
20										
25										

NOTES: Frost Ends at 7' BGS



**BOREHOLE LOG**

BOREHOLE NO.: **B-4**

TOTAL DEPTH: **25'**

**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: **BYF Site Characterization**  
 SITE LOCATION: **Bethel**  
 JOB NO.: **15-1459**  
 LOGGED BY: **N.Waggoner P.E. / C. Brandt**  
 PROJECT MANAGER: **David Nyman, P.E.**  
 DATES DRILLED: **1.26.2016**

DRILLING CO.: **Salzbrun Drilling Services**  
 DRILLER: **Mike Salzbrun**  
 RIG TYPE: **CME-45**  
 METHOD OF DRILLING: **3-1/4" O.D. HSA**  
 SAMPLING METHODS: **1-1/4" I.D. Split Spoon**  
 HAMMER WT./DROP: **140 lbs**  
 WEATHER: **Overcast, 21 F**

↖ Water level during drilling      ↘ Water level in completed well

DEPTH	SOIL SYMBOL	USCS	SOIL DESCRIPTION	CORE NO. / RECOVERY (ft)	SCREENING DEPTH (red)	PID (ppmv)	DRO (mg/Kg)	SAMPLE NAME	WELL COMPLETION	DESCRIPTION
0			Silty Sand Fill, Light Brown, Fine, Frozen	Sample collected from auger cuttings						Well Cap
				1/0.75'		1.5				Protective Casing
										SM
5			Silty Sand Fill, Light Brown, Fine	2/0.75'		0.6				
										Bentonite Seal
										PVC Casing
			Silt Sand, 2" Recovery - No Sample			1.3				
10			Silt Sand, 1" Recovery - No Sample	3/0.75'		6.2				
				4/0.75'		65.5				
		SM	Silty Sand with Organics, Brown	5/0.75'		247.2				SM
15			Silt Sand, Gray, Fine	6/0.75'		548.9	17,600	4-16		
				7/0.75'		7.5	23.9	4-19		Sand Pack
20				8/0.75'		5.4				Well Screen
				9/0.75'						End Cap
25						12				SM

NOTES: Frost Endgs at 7' BGS



**BOREHOLE LOG**

BOREHOLE NO.: **B-5**

TOTAL DEPTH: **26'**

**PROJECT INFORMATION**

**DRILLING INFORMATION**

PROJECT: **BYF Site Characterization**  
 SITE LOCATION: **Bethel**  
 JOB NO.: **15-1459**  
 LOGGED BY: **N. Waggoner, P.E. / C. Brandt**  
 PROJECT MANAGER: **D. Nyman, P.E.**  
 DATES DRILLED: **1.27.2016**

DRILLING CO.: **Salzbrun Drilling Services**  
 DRILLER: **Mike Salzbrun**  
 RIG TYPE: **CME-45**  
 METHOD OF DRILLING: **3-1/4" O.D. HSA**  
 SAMPLING METHODS: **1-1/4" I.D. Split Spoon**  
 HAMMER WT./DROP: **140 lbs**  
 WEATHER: **Overcast, 21 F**

∞ Water level during drilling

DEPTH	SOIL SYMBOL	USCS	SOIL DESCRIPTION	CORE NO. / RECOVERY (ft)	SCREENING DEPTH (red)	PID (ppmv)	DRO (mg/Kg)	SAMPLE NAME	
0	SM		Silty Sand Fill, Light Brown, Fine	Sample collected from auger cuttings					
				1/0.75'		4.3			
						2.7			
5					2/0.75'		2.3		
					3/0.75'		338.5		
					4/0.75'		391.5		
					5/0.75'		1,204		
15					6/0.75'		1,523	22,100 17,400	5-16 5-X
			Silty Sand, Gray, Fine						
				7/0.75'		9.3	36.1	5-19	
				8/0.75'		15.1			
				9/0.75'		3.7			
25				10/0.75'		5.3			

NOTES: Frost ends at 7' BGS



# RESTORATION

Science & Engineering, LLC

## BOREHOLE LOG

BOREHOLE NO.: B-6

TOTAL DEPTH: 21'

### PROJECT INFORMATION

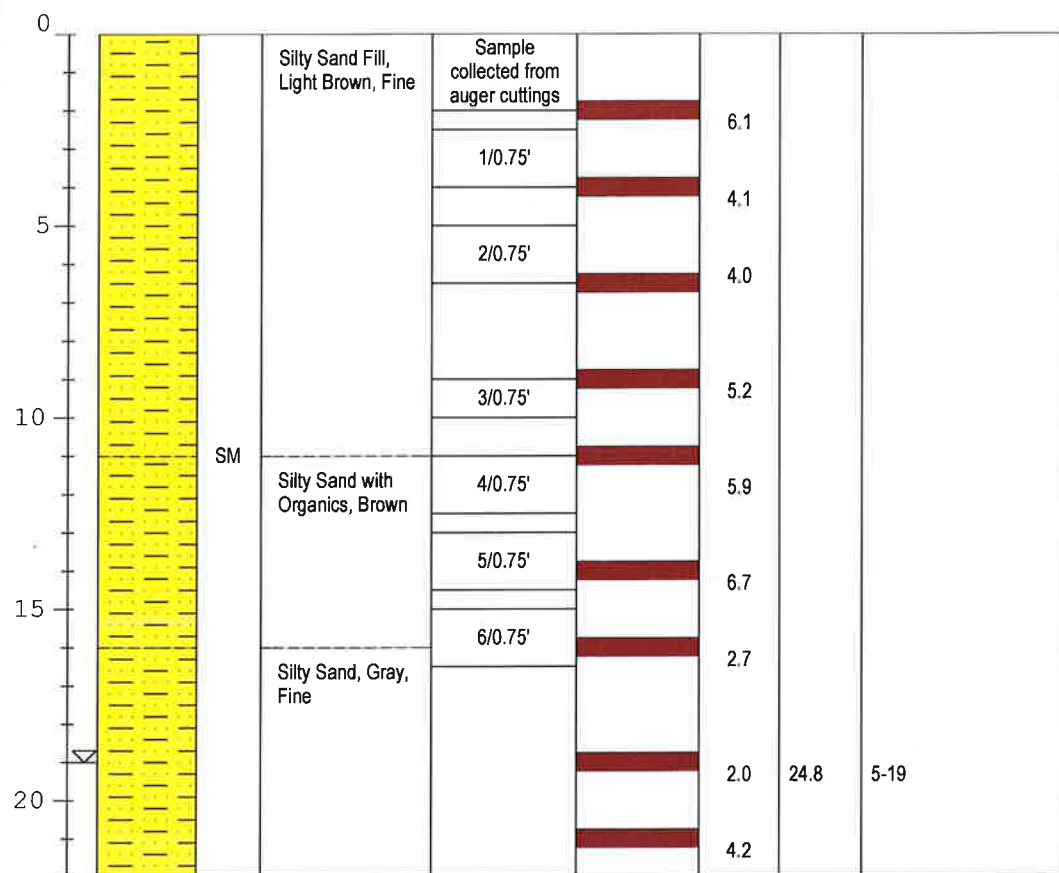
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PROJECT: **BYF Site Characterization**  
 SITE LOCATION: **Bethel**  
 JOB NO.: **15-1459**  
 LOGGED BY: **N.Waggoner, P.E. / C. Brandt**  
 PROJECT MANAGER: **D. Nyman, P.E.**  
 DATES DRILLED: **1.27.2016**

DRILLING CO.: **Salzbrun Drilling Services**  
 DRILLER: **Mike Salzbrun**  
 RIG TYPE: **CME-45**  
 METHOD OF DRILLING: **3-1/4" O.D. HSA**  
 SAMPLING METHODS: **1-1/4" I.D. Split Spoon**  
 HAMMER WT./DROP: **140 lbs**  
 WEATHER: **Overcast, 21 F**

∞ Water level during drilling

DEPTH	SOIL SYMBOL	USCS	SOIL DESCRIPTION	CORE NO. / RECOVERY (ft)	SCREENING DEPTH (red)	PID (ppmv)	DRO (mg/Kg)	SAMPLE NAME
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NOTES: Frost ends at 7' BGS



**BOREHOLE LOG**

BOREHOLE NO.: B-7

TOTAL DEPTH: 19'

**PROJECT INFORMATION**

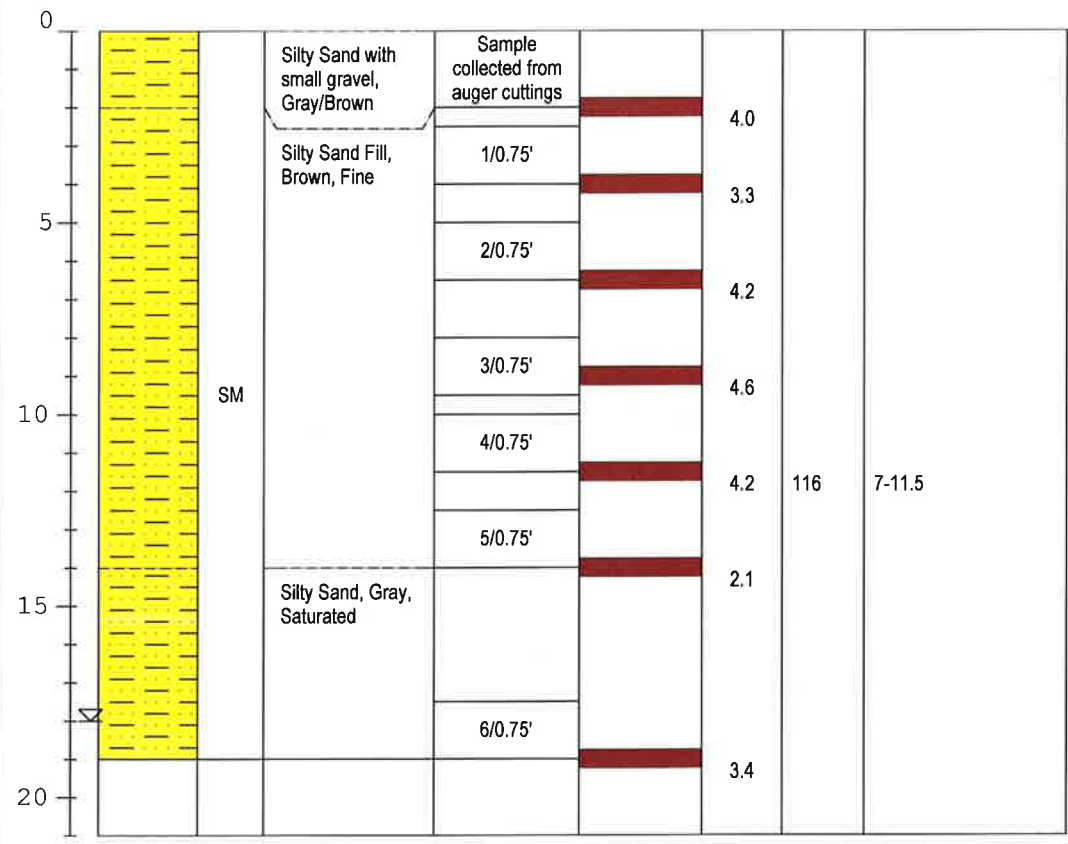
**DRILLING INFORMATION**

PROJECT: **BYF Site Characterization**  
 SITE LOCATION: **Bethel**  
 JOB NO.: **15-1459**  
 LOGGED BY: **N.Waggoner, P.E. / C. Brandt**  
 PROJECT MANAGER: **D. Nyman, P.E.**  
 DATES DRILLED: **1.27.2016**

DRILLING CO.: **Salzbrun Drilling Services**  
 DRILLER: **Mike Salzbrun**  
 RIG TYPE: **CME-45**  
 METHOD OF DRILLING: **3-1/4" O.D. HSA**  
 SAMPLING METHODS: **1-1/4" I.D. Split Spoon**  
 HAMMER WT./DROP: **140 lbs**  
 WEATHER: **Overcast, 21 F**

∞ Water level during drilling

DEPTH	SOIL SYMBOL	USCS	SOIL DESCRIPTION	CORE NO. / RECOVERY (ft)	SCREENING DEPTH (red)	PID (ppmv)	DRO (mg/Kg)	SAMPLE NAME
-------	-------------	------	------------------	--------------------------	-----------------------	------------	-------------	-------------



NOTES: Frost ends at 7' BGS



**BOREHOLE LOG**

BOREHOLE NO.: **B-8**

TOTAL DEPTH: **19'**

**PROJECT INFORMATION**

PROJECT: **BYF Site Characterization**  
 SITE LOCATION: **Bethel**  
 JOB NO.: **15-1459**  
 LOGGED BY: **N. Waggoner, P.E. / C. Brandt**  
 PROJECT MANAGER: **David Nyman, P.E.**  
 DATES DRILLED: **1.28.2016**

**DRILLING INFORMATION**

DRILLING CO.: **Salzbrun Drilling Services**  
 DRILLER: **Mike Salzbrun**  
 RIG TYPE: **CME-45**  
 METHOD OF DRILLING: **3-1/4" O.D. HSA**  
 SAMPLING METHODS: **1-1/4" I.D. Split Spoon**  
 HAMMER WT./DROP: **140 lbs**  
 WEATHER: **Overcast, 30 F**

↘ Water level during drilling      ↙ Water level in completed well

DEPTH	SOIL SYMBOL	USCS	SOIL DESCRIPTION	CORE NO. / RECOVERY (ft)	SCREENING DEPTH (red)	PID (ppmv)	DRO (mg/Kg)	SAMPLE NAME	WELL COMPLETION	DESCRIPTION
0			Silty Sand Fill, Light Brown, Fine	Sample collected from auger cuttings						Well Cap
				1/0.75'						SM
				2/0.75'						Protective Casing
5			Silty Sand with Organics, Brown	3/0.75'						Bentonite Seal
				4/0.75'						PVC Casing
		SM	Silty Sand, Saturated	5/0.75'						
				6/0.75'						SM
				7/0.75'						
15						23.6	8-14			Sand Pack
										Well Screen
20										End Cap
										SM

NOTES: Frost Ends at 7' BGS





**BOREHOLE LOG**

BOREHOLE NO.: **B-9**

TOTAL DEPTH: **20'**

**PROJECT INFORMATION**

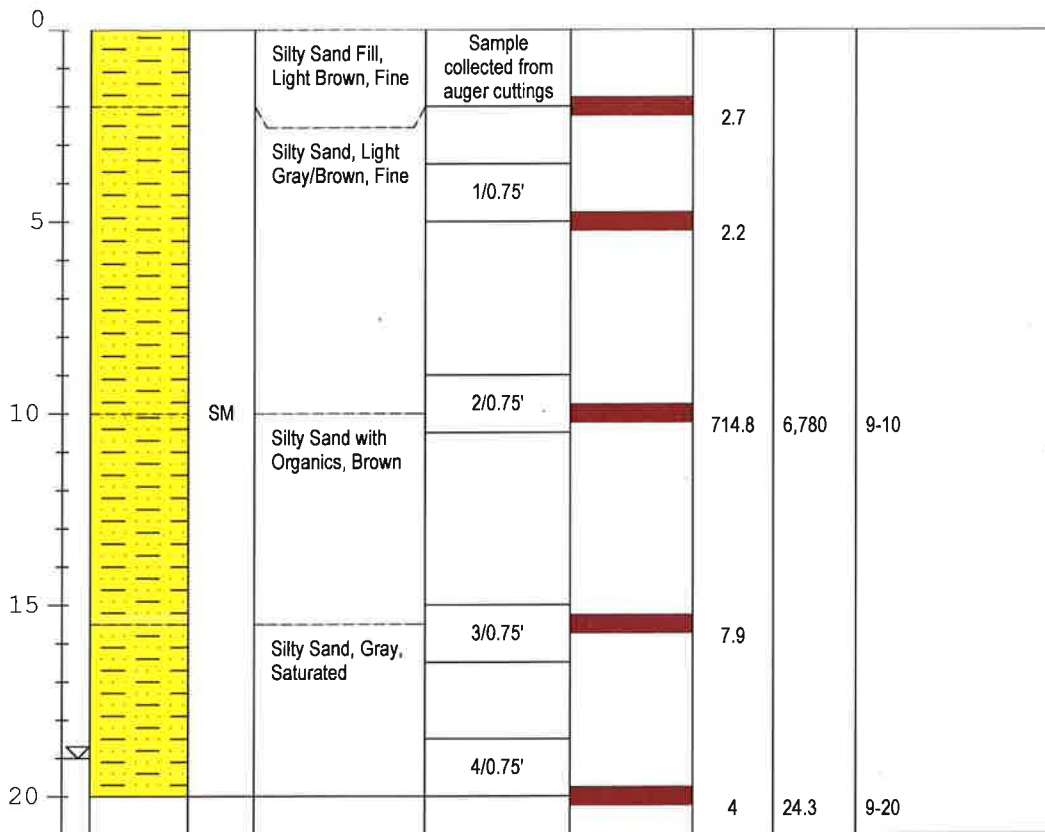
**DRILLING INFORMATION**

PROJECT: **BYF Site Characterization**  
 SITE LOCATION: **Bethel**  
 JOB NO.: **15-1459**  
 LOGGED BY: **N.Waggoner, P.E. / C. Brandt**  
 PROJECT MANAGER: **D. Nyman, P.E.**  
 DATES DRILLED: **1.28.2016**

DRILLING CO.: **Salzbrun Drilling Services**  
 DRILLER: **Mike Salzbrun**  
 RIG TYPE: **CME-45**  
 METHOD OF DRILLING: **3-1/4" O.D. HSA**  
 SAMPLING METHODS: **1-1/4" I.D. Split Spoon**  
 HAMMER WT./DROP: **140 lbs**  
 WEATHER: **Overcast, 30 F**

≍ Water level during drilling

DEPTH	SOIL SYMBOL	USCS	SOIL DESCRIPTION	CORE NO. / RECOVERY (ft)	SCREENING DEPTH (red)	PID (ppmv)	DRO (mg/Kg)	SAMPLE NAME
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NOTES: Frost ends at 7' BGS

# **APPENDIX C**

Soil Sample Results

**TABLE C1 - HEADSPACE CONCENTRATIONS IN SOIL  
BETHEL YOUTH FACILITY  
SITE CHARACTERIZATION**

HEADSPACE CONCENTRATIONS IN SOIL					
Soil Boring	SAMPLE ID	DATE	DEPTH (feet)	PID (ppmv)	Soil Description and Notes
B-1	1-1	1/26/2016	1	4.3	Silty Sand Fill, light brown, fine
	1-3.5	1/26/2016	3.5	3.0	Silty Sand Fill, light brown, fine
	1-6.5	1/26/2016	6.5	3.0	Silty Sand Fill, light brown, fine
	1-9.5	1/26/2016	9.5	1.4	Silty Sand with organics, brown, moist
	1-13	1/26/2016	13	2.7	Sand, light brown, fine
	1-15	1/26/2016	15	3.0	Sand, light brown, fine
	1-17	1/26/2016	17	3.5	Silty Sand, gray, fine, saturated
	1-20	1/26/2016	20	3.7	Silty Sand, gray, fine, saturated
B-2	2-2	1/26/2016	2	3.3	Silty Sand Fill, light brown, fine
	2-3.5	1/26/2016	3.5	5.4	Silty Sand Fill, light brown, fine
	2-5	1/26/2016	5	3.7	Silty Sand Fill, light brown, fine
	2-9	1/26/2016	9	3.6	Silty Sand with organics, brown
	2-11.5	1/26/2016	11.5	4.7	Silty Sand with organics, brown
	2-14	1/26/2016	14	5.4	Silty Sand, light gray/brown, fine
	2-17	1/26/2016	17	2.9	Silty Sand, light gray/brown, fine
	2-19	1/26/2016	19	1.4	Silty Sand, saturated
	2-21	1/26/2016	21	0.4	Silty Sand, saturated
B-3	3-1	1/26/2016	1	5.0	Silty Sand Fill, light brown, fine
	3-4	1/26/2016	4	3.2	Silty Sand Fill, light brown, fine
	3-5.5	1/26/2016	5.5	2.9	Silty Sand Fill, light brown, fine
	3-10	1/26/2016	10	4.4	Silty Sand, 2" recovery - not enough for sample
	3-15.5	1/26/2016	15.5	3.7	Silty Sand, gray, saturated
	3-19	1/27/2016	19	3.6	Silty Sand, gray, saturated
B-4	4-2	1/27/2016	2	1.5	Silty Sand Fill, light brown, fine
	4-4	1/27/2016	4	0.6	Silty Sand Fill, light brown, fine
	4-6.5	1/27/2016	6.5	1.3	Silty Sand Fill, light brown, fine
	4-9	1/27/2016	9	6.2	Silty Sand, 2" recovery - not enough for sample
	4-11.5	1/27/2016	11.5	65.5	Silty Sand, 1" recovery - not enough for sample
	4-14	1/27/2016	14	247.2	Silty Sand with organics, brown
	4-16	1/27/2016	16	548.9	Silty Sand, gray, fine
	4-19	1/27/2016	19	7.5	Silty Sand, gray, fine, saturated
	4-21	1/27/2016	21	5.4	Silty Sand, gray, fine, saturated
4-24	1/27/2016	24	12.0	Silty Sand, gray, fine, saturated	
B-5	5-2	1/27/2016	2	4.3	Silty Sand Fill, light brown, fine
	5-4	1/27/2016	4	2.7	Silty Sand Fill, light brown, fine
	5-6.5	1/27/2016	6.5	2.3	Silty Sand Fill, light brown, fine
	5-9	1/27/2016	9	338.5	Silty Sand Fill, light brown, fine
	5-11	1/27/2016	11	391.5	Silty Sand Fill, light brown, fine
	5-14	1/27/2016	14	1,204	Silty Sand with organics, brown
	5-16	1/27/2016	16	1,523	Silty Sand with organics, brown
	5-19	1/27/2016	19	9.3	Silty Sand, gray, fine
	5-21	1/27/2016	21	15.1	Silty Sand, gray, fine, saturated
	5-24	1/27/2016	24	3.7	Silty Sand, gray, fine, saturated
5-26	1/27/2016	26	5.3	Silty Sand, gray, fine, saturated	

**NOTES:**

- 1) All samples field-screened using MiniRae Lite Photo-ionization detector calibrated with 100 parts per million by volume (ppmv) isobutylene.
- 2) Samples collected for laboratory analysis from boring locations are highlighted in light orange.
- 3) Samples were analyzed for diesel range organics (DRO), gasoline range organics (GRO), BTEX, and select samples (10%) for semi-volatile organic compounds (SVOCs).

**TABLE C1 - HEADSPACE CONCENTRATIONS IN SOIL  
BETHEL YOUTH FACILITY  
SITE CHARACTERIZATION**

HEADSPACE CONCENTRATIONS IN SOIL					
Soil Boring	SAMPLE ID	DATE	DEPTH (feet)	PID (ppmv)	Soil Description and Notes
B-6	6-2	1/27/2016	2	6.1	Silty Sand Fill, light gray/brown, fine
	6-4	1/27/2016	4	4.1	Silty Sand Fill, light gray/brown, fine
	6-6	1/27/2016	6	4.0	Silty Sand Fill, light gray/brown, fine
	6-9	1/27/2016	9	5.2	Silty sand
	6-11.5	1/27/2016	11.5	5.9	Silty Sand with organics, brown
	6-14	1/27/2016	14	6.7	Silty Sand Fill, brown, fine
	6-16	1/27/2016	16	2.7	Silty Sand Fill, brown, fine
	6-19	1/27/2016	19	2.0	Silty Sand, gray, saturated
	6-21	1/27/2016	21	4.2	Silty Sand, gray, saturated
B-7	7-2	1/27/2016	2	4.0	Silty Sand with small gravel, gray/brown
	7-4	1/27/2016	4	3.3	Silty Sand Fill, brown, fine
	7-6.5	1/27/2016	6.5	4.2	Silty Sand Fill, brown, fine
	7-9	1/27/2016	9	4.6	Silty Sand Fill, brown, fine
	7-11.5	1/27/2016	11.5	4.2	Silty Sand Fill, brown, fine
	7-14	1/27/2016	14	2.1	Silty Sand Fill, brown, fine
	7-19	1/27/2016	19	3.4	Silty Sand, gray, saturated
B-8	8-1.5	1/28/2016	1.5	4.5	Silty Sand Fill, light brown, fine
	8-4	1/28/2016	4	2.1	Silty Sand Fill, light brown, fine
	8-6	1/28/2016	6	1.4	Silty Sand Fill, light brown, fine
	8-9	1/28/2016	9	1.4	Silty Sand with organics, brown
	8-11.5	1/28/2016	11.5	1.3	Silty Sand with organics, brown
	8-14	1/28/2016	14	4.2	Silty Sand, saturated
	8-16	1/28/2016	16	3.5	Silty Sand, saturated
	8-19	1/28/2016	19	3.9	Silty Sand, saturated
B-9	9-2	1/28/2016	2	2.7	Silty Sand Fill, light brown, fine
	9-5	1/28/2016	5	2.2	Silty Sand, light gray/brown, fine
	9-10	1/28/2016	10	714.8	Silty Sand, light gray/brown, fine
	9-15.5	1/28/2016	15.5	7.9	Silty Sand with organics, brown
	9-20	1/28/2016	20	4	Silty Sand, gray, saturated

**NOTES:**

- 1) All samples field-screened using MiniRae Lite Photo-ionization detector calibrated with 100 parts per million by volume (ppmv) isobutylene.
- 2) Samples collected for laboratory analysis from boring locations are highlighted in light orange.
- 3) Samples were analyzed for diesel range organics (DRO), gasoline range organics (GRO), BTEX, and select samples (10%) for semi-volatile organic compounds (SVOCs).

**TABLE C2 - HYDROCARBON CONCENTRATIONS IN SOIL  
 BETHEL YOUTH FACILITY  
 SITE CHARACTERIZATION  
 SOIL BORING ANALYTICAL RESULTS**

HYDROCARBON AND LEAD CONCENTRATIONS IN SOIL												
Soil Boring ID	SAMPLE ID	DATE	SGS LABORATORY REPORT NUMBER	DEPTH BELOW GROUND SURFACE (ft)	PID RESULTS	PERCENT SOLIDS	DIESEL RANGE ORGANICS	GASOLINE RANGE ORGANICS	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES
					(ppmv)	%	(mg/Kg)	(mg/Kg)	(µg/Kg)	(µg/Kg)	(µg/Kg)	(µg/Kg)
B-1	1-9.5	1/26/2015	1160407	9.5	1.4	62.8	127 U	8.93 U	44.6 U	89.3 U	89.3 U	268.3 U
B-2	2-9	1/26/2015	1160407	9.0	3.6	68.5	29.2 U	6.65 U	33.3 U	66.5 U	66.5 U	199.5 U
	2-19	1/26/2015	1160407	3.5	1.4	81.6	24.5 U	2.83 U	14.1 U	28.3 U	28.3 U	84.8 U
B-3	3-19	1/26/2015	1160407	19	3.6	83.2	24.0 U	3.46 U	17.3 U	34.6 U	34.6 U	103.7 U
	3-X	1/26/2015	1160407	19	--	82.9	23.9 U	3.46 U	17.3 U	34.6 U	34.6 U	103.8 U
B-4	4-16	1/27/2015	1160407	16	548.9	85.6	17,600	247	173	3150	3520	29,600
	4-19	1/27/2015	1160407	19	7.5	83.3	23.9 U	2.58 U	12.9 U	25.8 U	25.8 U	81.3
B-5	5-16	1/27/2015	1160407	16	1,523	86.0	22,100	422	444	6,670	7,560	47,000
	5-X	1/27/2015	1160407	16	--	86.3	17,400	749	355	6,930	7,320	73,700
	5-19	1/27/2015	1160407	19	9.3	80.8	36.1	2.75 U	13.8 U	27.5 U	35.2	188.3
B-6	6-19	1/27/2015	1160407	19	2.0	80.3	24.8 U	2.79 U	13.9 U	27.9 U	27.9 U	83.7 U
B-7	7-11.5	1/27/2015	1160407	11.5	4.2	68.6	116 U	7.93 U	39.6 U	79.3 U	79.3 U	238.3 U
	8-14	1/27/2015	1160407	14	4.2	84.3	23.6 U	2.71 U	13.5 U	27.1 U	27.1 U	81.3 U
B-9	9-10	1/28/2015	1160407	10	714.8	89.4	6,780	233	29.3 U	153	586	9,170
	9-20	1/28/2015	1160407	20	4.0	81.9	24.3 U	5.43	20.2 U	40.5 U	40.5 U	129.6
Migration to Groundwater							250	300	25	6,500	6,900	63,000
ADEC Method 2 soil cleanup levels							10,250	1,400	150,000	10,100,000	8,100,000	20,300,000
Direct Contact/Ingestion							10,250	1,400	150,000	10,100,000	8,100,000	20,300,000
Outdoor Inhalation							12,500	1,400	11,000	110,000	220,000	63,000

**NOTES:**

- 1) Diesel range organics analyses by method AK 102, Gasoline range organics analyses by method AK 101, BTEX analyses by method EPA SW8021B
- 2) Bold font indicates that concentrations were detected above the Detection Limit (DL)
- 3) Bolded values with a J flag indicates that the result is an estimated value
- 4) Italicized values with a U flag indicates that the analyte measured non-detectable at the DL, the value given is the Limit of Detection (LOD = 1/2 LOQ)
- 5) Yellow highlighting indicates analyte measured above Method 2 soil cleanup levels for Migration to Groundwater  
 Orange highlighting indicates analyte measured above Method 2 soil cleanup levels for Direct Contact/Ingestion and/or Outdoor Inhalation
- 6) LOQ = limit of quantitation, µg/Kg = micrograms per kilogram, mg/Kg = milligrams per kilogram, ppmv = parts per million by volume.
- 7) Sample 3-X is a blind duplicate of 3-19 and Sample 5-X is a blind duplicate of 5-16

**TABLE C3 - SEMI-VOLATILE ORGANIC COMPOUNDS IN SOIL  
 BETHEL YOUTH FACILITY  
 SITE CHARACTERIZATION  
 RESTORATION SCIENCE & ENGINEERING SOIL BORING ANALYTICAL RESULTS**

SEMI-VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN SOIL						
Soil Boring ID	B-4	B-5		ADEC Method 2 Soil Cleanup Level		
SAMPLE ID	4-16	5-16	5-X			
DATE	1/27/2016	1/27/2016	1/27/2016	Migration to Groundwater (µg/Kg)	Direct Contact/Ingestion (µg/Kg)	Outdoor Inhalation (µg/Kg)
UNITS	(µg/Kg)	(µg/Kg)	(µg/Kg)			
PERCENT SOLIDS	85.6	86.0	86.3			
1-Methylnaphthalene	<b>3,260</b>	<b>5,640</b>	<b>5,190</b>	6,200	280,000	760,000
2-Methylnaphthalene	<b>4,040</b>	<b>7,030</b>	<b>6,380</b>	6,100	280,000	750,000
Acenaphthene	574 U	571 U	577 U	180,000	2,800,000	--
Acenaphthylene	574 U	571 U	577 U	180,000	2,800,001	--
Anthracene	574 U	571 U	577 U	3,000,000	20,600,000	--
Benzo(a)Anthracene	57.4 U	57.1 U	57.7 U	3,600	4,900	--
Benzo(a)pyrene	57.4 U	57.1 U	57.7 U	2,100	490	--
Benzo[b]Fluoranthene	<b>61.2</b>	<b>80.5</b>	<b>72.1</b>	12,000	4,900	--
Benzo[g,h,i]perylene	57.4 U	57.1 U	57.7 U	38,700,000	1,400,000	--
Benzo[k]fluoranthene	57.4 U	57.1 U	57.7 U	120,000	49,000	--
Chrysene	57.4 U	57.1 U	57.7 U	360,000	490,000	--
Dibenzo[a,h]anthracene	57.4 U	57.1 U	57.7 U	4,000	490	--
Fluoranthene	<b>127</b>	<b>179</b>	<b>165</b>	1,400,000	1,900,000	--
Fluorene	574 U	571 U	577 U	220,000	2,300,000	--
Indeno[1,2,3-c,d] pyrene	57.4 U	57.1 U	57.7 U	41,000	4,900	--
Naphthalene	<b>2,800</b>	<b>4,810</b>	<b>4,400</b>	20,000	1,400,000	28,000
Phenanthrene	574 U	571 U	577 U	3,000,000	20,600,000	--
Pyrene	<b>127</b>	<b>180</b>	<b>171</b>	1,000,000	1,400,000	--

**NOTES:**

- 1) Semi-Volatile organic compounds (SVOC) analyses by Method EPA 8270 SIMs
- 2) Bold font indicates that concentrations were detected above the Detection Limit (DL)
- 3) Italicized values with a U flag indicates that the analyte measured non-detectable at the DL, the value given is the Limit of Detection (LOD = 1/2 LOQ)
- 4) Bolded values with a J flag indicates that the result is an estimated value
- 5) Light blue highlighting indicates analyte measured non-detect at a DL above Method 2 soil cleanup levels. (Note: the LOD presented with the U flag is equal to 1/2 LOQ)
- 6) Light yellow highlighting indicates analyte measured above Method 2 soil cleanup levels
- 7) LOQ = limit of quantitation, µg/Kg = micrograms per kilogram
- 8) Sample 5-X is a blind duplicate of 5-16

# **APPENDIX D**

Groundwater Sample Results

**TABLE D1 - GROUNDWATER QUALITY MEASUREMENTS  
 BETHEL YOUTH FACILITY  
 SITE CHARACTERIZATION**

GROUNDWATER QUALITY MEASUREMENTS											
LOCATION	Depth To Water (TOC) (feet)	Depth to Bottom (TOC) (feet)	Water Column Depth in Well (feet)	MW Elevation (TOC) (feet)	GW Elevation (feet)	Volume Purged (gallons)	Temperature (°C)	pH (pH Units)	Conductivity (mS/cm)	Specific Conductance (µS/cm)	Salinity (ppt)
MW 1	18.32	22.41	4.09	32.04	13.72	1	1.25	5.09	0.387	210	0.18
						2	0.97	5.25	0.256	138	0.12
						3	0.95	5.28	0.255	138	0.12
MW 3	19.21	23.08	3.87	33.25	14.04	1	0.68	5.57	0.243	130	0.11
						2	0.67	5.56	0.221	118	0.10
						3	0.70	5.61	0.218	117	0.10
MW 4	19.08	23.08	4.00	32.94	13.86	1	1.13	5.86	0.467	254	0.22
						2	1.10	5.77	0.450	245	0.21
						3	1.07	5.77	0.444	241	0.21
MW 8	14.81	19.17	4.36	28.53	13.72	1	0.93	5.71	0.283	153	0.13
						2	0.94	5.72	0.263	142	0.12
						3	0.95	5.78	0.262	141	0.12

**NOTES:**

- 1) Water quality measurements performed using a YSI Model 63 Water Quality Meter
- 2) mS/cm<sup>3</sup> = millisemens per centimeter cubed, µS/cm = millisemens per centimeter , ppt - parts per thousand
- 3) TOC = Top of Casing
- 4) Temporary bench mark (TBM) is located on the southwest corner of the concrete foundation of the light pole near B-8



**TABLE D2 - HYDROCARBON CONCENTRATIONS IN WATER  
 BETHEL YOUTH FACILITY  
 SITE CHARACTERIZATION  
 GROUNDWATER MW ANALYTICAL RESULTS**

HYDROCARBON CONCENTRATIONS IN GROUNDWATER								
SAMPLE ID	DATE	SGS LABORATORY REPORT #	DIESEL RANGE ORGANICS  (mg/L)	GASOLINE RANGE ORGANICS  (mg/L)	BENZENE  (ug/L)	TOLUENE  (ug/L)	ETHYL- BENZENE  (ug/L)	TOTAL XYLENES  (ug/L)
MW 1	01/28/16	1160406	0.577 U	0.100 U	0.400 U	1.00 U	1.00 U	3.00 U
MW X	01/28/16	1160406	0.577 U	0.100 U	0.400 U	1.00 U	1.00 U	3.00 U
MW 3	01/28/16	1160406	0.588 U	0.100 U	0.400 U	1.00 U	1.00 U	3.00 U
MW 4	01/28/16	1160406	0.566 U	<b>0.136</b>	0.400 U	<b>2.04</b>	<b>1.26</b>	<b>13.4</b>
MW 8	01/28/16	1160406	0.577 U	0.100 U	0.400 U	1.00 U	1.00 U	3.00 U
<b>ADEC TABLE C GROUNDWATER CLEANUP LEVELS</b>			<b>1.5</b>	<b>2.2</b>	<b>5.0</b>	<b>1,000</b>	<b>700</b>	<b>10,000</b>

**NOTES:**

- 1) Diesel range organics analyses by Method AK 102, Gasoline range organics analyses by Method AK 101, BTEX by Method EPA 8260B
- 2) Light yellow highlighting indicates analyte measured above ADEC Table C groundwater cleanup levels
- 3) Bold font indicates that concentrations were detected above the Detection Limit (DL)
- 4) Italicized values with a U flag indicates that the analyte measured non-detectable at the DL, the value given is the Limit of Detection (LOD = 1/2 LOQ)
- 5) Bolded values with a J flag indicates that the result is an estimated value
- 6) mg/L = milligrams per Liter, ug/L micrograms per Liter, NT = not tested
- 7) LOQ is the limit of quantitation which is the reporting or practical quantitation limit
- 8) MW X is a duplicate of MW 1

**TABLE D3 - SEMI-VOLATILE ORGANIC COMPOUNDS IN WATER  
 BETHEL YOUTH FACILITY  
 SITE CHARACTERIZATION  
 GROUNDWATER MW ANALYTICAL RESULTS**

<b>Semi-Volatile Organic Compound Concentrations in Groundwater</b>		
<b>SAMPLE ID</b>	<b>MW 4</b>	<b>ADEC Table C Groundwater Cleanup Level (ug/L)</b>
<b>SGS LABORATORY REPORT #</b>	<b>1160406</b>	
<b>DATE</b>	<b>01/28/16</b>	
<b>UNITS</b>	<b>ug/L</b>	
1-Methylnaphthalene	10.3 U	150
2-Methylnaphthalene	10.3 U	150
Acenaphthene	10.3 U	2,200
Acenaphthylene	10.3 U	2,200
Anthracene	10.3 U	11,000
Benzo(a)Anthracene	10.3 U	1.2
Benzo[a]pyrene	10.3 U	0.2
Benzo[b]Fluoranthene	10.3 U	1.2
Benzo[g,h,i]perylene	10.3 U	1,100
Benzo[k]fluoranthene	10.3 U	12
Chrysene	10.3 U	120
Dibenzo[a,h]anthracene	10.3 U	0.12
Fluoranthene	10.3 U	1,500
Fluorene	10.3 U	1,500
Indeno[1,2,3-c,d] pyrene	10.3 U	1.2
Naphthalene	10.3 U	730
Phenanthrene	10.3 U	11,000
Pyrene	10.3 U	1,100

**NOTES:**

- 1) Semi-volatile organic compounds in Monitoring wells by Method EPA 8270
- 2) Bold font indicates that concentrations were detected above the Detection Limit (DL)
- 3) Bolded values with a J flag indicates that the result is an estimated value
- 4) Italicized values with a U flag indicates that the analyte measured non-detectable at the DL, the value given is the Limit of Detection (LOD = 1/2 LOQ)
- 5) LOQ is the limit of quantitation which is the reporting or practical quantitation limit
- 6) Light blue highlight indicates the analyte was not detected at the DL, but the LOD is higher than the Table C Groundwater Cleanup Level

# **APPENDIX E**

ADEC Conceptual Site Model Form

# Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

**Site Name:**

**File Number:**

**Completed by:**

### Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

*General Instructions: Follow the italicized instructions in each section below.*

### 1. General Information:

**Sources** (*check potential sources at the site*)

- USTs
- ASTs
- Dispensers/fuel loading racks
- Drums
- Vehicles
- Landfills
- Transformers
- Other:

**Release Mechanisms** (*check potential release mechanisms at the site*)

- Spills
- Leaks
- Direct discharge
- Burning
- Other:

**Impacted Media** (*check potentially-impacted media at the site*)

- Surface soil (0-2 feet bgs\*)
- Subsurface soil (>2 feet bgs)
- Air
- Sediment
- Groundwater
- Surface water
- Biota
- Other:

**Receptors** (*check receptors that could be affected by contamination at the site*)

- Residents (adult or child)
- Commercial or industrial worker
- Construction worker
- Subsistence harvester (i.e. gathers wild foods)
- Subsistence consumer (i.e. eats wild foods)
- Site visitor
- Trespasser
- Recreational user
- Farmer
- Other:

\* bgs - below ground surface

**2. Exposure Pathways:** *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -


1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.)

*If the box is checked, label this pathway complete:*

Complete

Comments:

Site data indicates impacts remain at depths below nine feet bgs, including contaminant concentrations above ADEC Method 2 Cleanup Levels. Risk of direct contact is considered unlikely due to depth of impacted soil unless excavation is conducted. Impacted soil is overlain by nine feet of clean silty sandy fill. 

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.)

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)?

*If both boxes are checked, label this pathway complete:*

Complete

Comments:

Site data indicates impacts remain at depths below nine feet bgs, including contaminant concentrations above ADEC Method 2 Cleanup Levels. Risk of direct contact is considered unlikely due to depth of impacted soil unless excavation is conducted. Impacted soil is overlain by nine feet of clean silty sandy fill.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future?

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350.

*If both boxes are checked, label this pathway complete:*

Complete

Comments:

Contaminants were detected in one of the four installed monitoring wells (MW4), although levels were less than 1/10th of Table C cleanup levels. Measurements indicate groundwater flow direction is easterly. YKCC drinking water well (completed to 131 feet bgs) is located 180 feet south of impact area. Most Bethel wells are completed through 300-400 foot thick permafrost layer.

## 2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future?

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities).

*If both boxes are checked, label this pathway complete:*

Incomplete

Comments:

Surface water not observed at the site. A small pond is visible in aerial photos ~950 WNW of site, and Kuskokwim River is approximately 1,900 feet ESE. Exposure pathway incomplete.

## 3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods?

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)?

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.)

*If all of the boxes are checked, label this pathway complete:*

Incomplete

Comments:

Exposure pathway incomplete.

### c) Inhalation-

#### 1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.)

Are the contaminants in soil volatile (see Appendix D in the guidance document)?

*If both boxes are checked, label this pathway complete:*

Complete

Comments:

Detected impacts are overlain by approximately 9 feet of clean soil. Risk is considered insignificant.

## 2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminated soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures)



Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)?



*If both boxes are checked, label this pathway complete:*

Complete

### Comments:

Detected impacts are overlain by approximately 9 feet of clean soil. Building is elevated on pilings with free air flow beneath the building. Risk is considered insignificant.

**3. Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

**Dermal Exposure to Contaminants in Groundwater and Surface Water**

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

*Check the box if further evaluation of this pathway is needed:*

Comments:

**Inhalation of Volatile Compounds in Tap Water**

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

*Check the box if further evaluation of this pathway is needed:*

Comments:



## Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM<sub>10</sub>). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.
- Chromium is present in soil that can be dispersed as dust particles of any size.

Generally, DEC direct contact soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because it is assumed most dust particles are incidentally ingested instead of inhaled to the lower lungs. The inhalation pathway only needs to be evaluated when very small dust particles are present (e.g., along a dirt roadway or where dusts are a nuisance). This is not true in the case of chromium. Site specific cleanup levels will need to be calculated in the event that inhalation of dust containing chromium is a complete pathway at a site.

*Check the box if further evaluation of this pathway is needed:*

Comments:

## Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

*Check the box if further evaluation of this pathway is needed:*

Comments:

**4. Other Comments** (*Provide other comments as necessary to support the information provided in this form.*)

# HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Bethel Youth Facility  
ADEC File No. 2407.26.016

Completed By: Colette Brandt, RSE  
 Date Completed: February 29, 2016

**Instructions:** Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.

(1) Check the media that could be directly affected by the release.	(2) For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.
Media	Transport Mechanisms
<input type="checkbox"/> Surface Soil (0-2 ft bgs)	<input checked="" type="checkbox"/> Direct release to surface soil <i>check soil</i> <input type="checkbox"/> Migration to subsurface <i>check soil</i> <input type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Runoff or erosion <i>check surface water</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input checked="" type="checkbox"/> Subsurface Soil (2-15 ft bgs)	<input checked="" type="checkbox"/> Direct release to subsurface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input checked="" type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Ground-water	<input type="checkbox"/> Direct release to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Flow to surface water body <i>check surface water</i> <input type="checkbox"/> Flow to sediment <i>check sediment</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Surface Water	<input type="checkbox"/> Direct release to surface water <i>check surface water</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Sedimentation <i>check sediment</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Sediment	<input type="checkbox"/> Direct release to sediment <i>check sediment</i> <input type="checkbox"/> Resuspension, runoff, or erosion <i>check surface water</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____

(3) Check all exposure media identified in (2).	(4) Check all pathways that could be complete. The pathways identified in this column must agree with Sections 2 and 3 of the Human Health CSM Scoping Form.	(5) Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.																					
Exposure Media	Exposure Pathway/Route	Current & Future Receptors																					
		Residents (adults or children) Commercial or Industrial workers Site visitors, trespassers, or recreational users Construction workers Farmers or subsistence harvesters Subsistence consumers Other																					
<input checked="" type="checkbox"/> soil	<input checked="" type="checkbox"/> Incidental Soil Ingestion <input checked="" type="checkbox"/> Dermal Absorption of Contaminants from Soil <input type="checkbox"/> Inhalation of Fugitive Dust	<table border="1"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																					
<input checked="" type="checkbox"/> groundwater	<input checked="" type="checkbox"/> Ingestion of Groundwater <input type="checkbox"/> Dermal Absorption of Contaminants in Groundwater <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water	<table border="1"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																					
<input checked="" type="checkbox"/> air	<input checked="" type="checkbox"/> Inhalation of Outdoor Air <input checked="" type="checkbox"/> Inhalation of Indoor Air <input type="checkbox"/> Inhalation of Fugitive Dust	<table border="1"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																					
<input type="checkbox"/> surface water	<input type="checkbox"/> Ingestion of Surface Water <input type="checkbox"/> Dermal Absorption of Contaminants in Surface Water <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water	<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																					
<input type="checkbox"/> sediment	<input type="checkbox"/> Direct Contact with Sediment	<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																					
<input type="checkbox"/> biota	<input type="checkbox"/> Ingestion of Wild or Farmed Foods	<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																					

# **APPENDIX F**

Laboratory Reports

ADEC Data Review Checklists



## Laboratory Report of Analysis

To: Restoration Science & Eng  
911 W. 8th Ave  
Anchorage, AK 99501  
(907)278-1023

Report Number: **1160406**

Client Project: **BYF Site Characterization**

Dear Colette Brandt,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Chuck at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

---

Chuck Homestead  
Project Manager  
Charles.Homestead@sgs.com

Date

Print Date: 02/17/2016 11:19:12AM

## Case Narrative

SGS Client: **Restoration Science & Eng**  
SGS Project: **1160406**  
Project Name/Site: **BYF Site Characterization**  
Project Contact: **Colette Brandt**

Refer to sample receipt form for information on sample condition.

### **MW 4 (1160406001) PS**

8270D - LCSD recovery for benzoic acid (15.9%) does not meet QC criteria.

### **LCSD for HBN 1727720 [XXX/3487 (1311677) LCSD**

8270D - LCSD recovery for benzoic acid (15.9%) does not meet QC criteria.

8270D - LCS/LCSD RPD for benzoic acid (26.9%) does not meet QC criteria. The associated sample concentrations for this analyte are less than the LOQ.

### **LCSD for HBN 1727929 [VXX/2847 (1311889) LCSD**

8260B - LCS/LCSD RPD for Chloroethane does not meet QC criteria. This analyte was not detected above the LOQ in the associated samples.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

Print Date: 02/17/2016 11:19:13AM

### Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
<b>SW8270D</b>				
1311676	LCS for HBN 1727720 [XXX/34874	XMS9166	1-Chloronaphthalene	RSP
1311676	LCS for HBN 1727720 [XXX/34874	XMS9166	2-Chloronaphthalene	RSP
1311677	LCSD for HBN 1727720 [XXX/3487	XMS9166	1-Chloronaphthalene	RSP
1311677	LCSD for HBN 1727720 [XXX/3487	XMS9166	2-Chloronaphthalene	RSP

#### Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

**Note:** Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.



### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
MW 4	1160406001	01/28/2016	01/29/2016	Water (Surface, Eff., Ground)
MW 8	1160406002	01/28/2016	01/29/2016	Water (Surface, Eff., Ground)
Trip Blank	1160406003	01/28/2016	01/29/2016	Water (Surface, Eff., Ground)
MW 1	1160406004	01/28/2016	01/29/2016	Water (Surface, Eff., Ground)
MW 3	1160406005	01/28/2016	01/29/2016	Water (Surface, Eff., Ground)
MW X	1160406006	01/28/2016	01/29/2016	Water (Surface, Eff., Ground)
Trip Blank	1160406007	01/28/2016	01/29/2016	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
AK102	DRO Low Volume (W)
AK101	Gasoline Range Organics (W)
SW8270D	SW846-8270 SVOC by GC/MS (W) Liq/Liq ext
SW8260B	Volatile Organic Compounds (W) FULL

Print Date: 02/17/2016 11:19:15AM

## Detectable Results Summary

Client Sample ID: **MW 4**  
Lab Sample ID: 1160406001

**Volatile Fuels**  
**Volatile GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	0.136	mg/L
Ethylbenzene	1.26	ug/L
o-Xylene	5.38	ug/L
P & M -Xylene	7.97	ug/L
Toluene	2.04	ug/L
Xylenes (total)	13.4	ug/L

Print Date: 02/17/2016 11:19:16AM



### Results of MW 4

Client Sample ID: **MW 4**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406001  
Lab Project ID: 1160406

Collection Date: 01/28/16 16:30  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.566 U	0.566	0.170	mg/L	1		02/11/16 20:33
<b>Surrogates</b>							
5a Androstane (surr)	71.3	50-150		%	1		02/11/16 20:33

### Batch Information

Analytical Batch: XFC12275  
Analytical Method: AK102  
Analyst: S.G  
Analytical Date/Time: 02/11/16 20:33  
Container ID: 1160406001-G

Prep Batch: XXX34892  
Prep Method: SW3520C  
Prep Date/Time: 02/10/16 10:11  
Prep Initial Wt./Vol.: 265 mL  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:16AM



Results of MW 4

Client Sample ID: MW 4
Client Project ID: BYF Site Characterization
Lab Sample ID: 1160406001
Lab Project ID: 1160406

Collection Date: 01/28/16 16:30
Received Date: 01/29/16 16:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various chemical compounds and their detection results.

Print Date: 02/17/2016 11:19:16AM



Results of MW 4

Client Sample ID: MW 4
Client Project ID: BYF Site Characterization
Lab Sample ID: 1160406001
Lab Project ID: 1160406

Collection Date: 01/28/16 16:30
Received Date: 01/29/16 16:04
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by Semivolatile Organics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various organic compounds and their detection results.

Surrogates

Print Date: 02/17/2016 11:19:16AM



### Results of MW 4

Client Sample ID: **MW 4**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406001  
Lab Project ID: 1160406

Collection Date: 01/28/16 16:30  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Semivolatile Organics GC/MS

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
2,4,6-Tribromophenol (surr)	74.1		43-140		%	1		02/03/16 23:05
2-Fluorobiphenyl (surr)	57.9		44-119		%	1		02/03/16 23:05
2-Fluorophenol (surr)	47		19-119		%	1		02/03/16 23:05
Nitrobenzene-d5 (surr)	54.2		44-120		%	1		02/03/16 23:05
Phenol-d6 (surr)	49.3		10-115		%	1		02/03/16 23:05
Terphenyl-d14 (surr)	107		50-134		%	1		02/03/16 23:05

### Batch Information

Analytical Batch: XMS9166  
Analytical Method: SW8270D  
Analyst: DSH  
Analytical Date/Time: 02/03/16 23:05  
Container ID: 1160406001-I

Prep Batch: XXX34874  
Prep Method: SW3520C  
Prep Date/Time: 02/03/16 10:13  
Prep Initial Wt./Vol.: 970 mL  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW 4

Client Sample ID: **MW 4**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406001  
Lab Project ID: 1160406

Collection Date: 01/28/16 16:30  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile Fuels

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.136		0.100	0.0310	mg/L	1		02/01/16 12:44
<b>Surrogates</b>								
4-Bromofluorobenzene (surr)	116		50-150		%	1		02/01/16 12:44

### Batch Information

Analytical Batch: VFC12889  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/01/16 12:44  
Container ID: 1160406001-A

Prep Batch: VXX28459  
Prep Method: SW5030B  
Prep Date/Time: 02/01/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW 4

Client Sample ID: **MW 4**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406001  
Lab Project ID: 1160406

Collection Date: 01/28/16 16:30  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	0.400 U	0.400	0.120	ug/L	1		02/04/16 23:04
Ethylbenzene	1.26	1.00	0.310	ug/L	1		02/04/16 23:04
o-Xylene	5.38	1.00	0.310	ug/L	1		02/04/16 23:04
P & M -Xylene	7.97	2.00	0.620	ug/L	1		02/04/16 23:04
Toluene	2.04	1.00	0.310	ug/L	1		02/04/16 23:04
Xylenes (total)	13.4	3.00	1.00	ug/L	1		02/04/16 23:04
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	99.3	81-118		%	1		02/04/16 23:04
4-Bromofluorobenzene (surr)	104	85-114		%	1		02/04/16 23:04
Toluene-d8 (surr)	99.8	89-112		%	1		02/04/16 23:04

### Batch Information

Analytical Batch: VMS15558  
Analytical Method: SW8260B  
Analyst: ST  
Analytical Date/Time: 02/04/16 23:04  
Container ID: 1160406001-D

Prep Batch: VXX28473  
Prep Method: SW5030B  
Prep Date/Time: 02/04/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM





### Results of MW 8

Client Sample ID: **MW 8**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406002  
Lab Project ID: 1160406

Collection Date: 01/28/16 15:35  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.577 U	0.577	0.173	mg/L	1		02/11/16 20:54
<b>Surrogates</b>							
5a Androstane (surr)	74.9	50-150		%	1		02/11/16 20:54

### Batch Information

Analytical Batch: XFC12275  
Analytical Method: AK102  
Analyst: S.G  
Analytical Date/Time: 02/11/16 20:54  
Container ID: 1160406002-G

Prep Batch: XXX34892  
Prep Method: SW3520C  
Prep Date/Time: 02/10/16 10:11  
Prep Initial Wt./Vol.: 260 mL  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW 8

Client Sample ID: **MW 8**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406002  
Lab Project ID: 1160406

Collection Date: 01/28/16 15:35  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.100 U	0.100	0.0310	mg/L	1		02/01/16 13:03
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	105	50-150		%	1		02/01/16 13:03

### Batch Information

Analytical Batch: VFC12889  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/01/16 13:03  
Container ID: 1160406002-A

Prep Batch: VXX28459  
Prep Method: SW5030B  
Prep Date/Time: 02/01/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW 8

Client Sample ID: **MW 8**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406002  
Lab Project ID: 1160406

Collection Date: 01/28/16 15:35  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	0.400 U	0.400	0.120	ug/L	1		02/03/16 22:15
Ethylbenzene	1.00 U	1.00	0.310	ug/L	1		02/03/16 22:15
o-Xylene	1.00 U	1.00	0.310	ug/L	1		02/03/16 22:15
P & M -Xylene	2.00 U	2.00	0.620	ug/L	1		02/03/16 22:15
Toluene	1.00 U	1.00	0.310	ug/L	1		02/03/16 22:15
Xylenes (total)	3.00 U	3.00	1.00	ug/L	1		02/03/16 22:15
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	102	81-118		%	1		02/03/16 22:15
4-Bromofluorobenzene (surr)	101	85-114		%	1		02/03/16 22:15
Toluene-d8 (surr)	96.8	89-112		%	1		02/03/16 22:15

### Batch Information

Analytical Batch: VMS15556  
Analytical Method: SW8260B  
Analyst: ST  
Analytical Date/Time: 02/03/16 22:15  
Container ID: 1160406002-D

Prep Batch: VXX28471  
Prep Method: SW5030B  
Prep Date/Time: 02/03/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of Trip Blank

Client Sample ID: **Trip Blank**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406003  
Lab Project ID: 1160406

Collection Date: 01/28/16 15:35  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.100 U	0.100	0.0310	mg/L	1		02/01/16 13:22
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	101	50-150		%	1		02/01/16 13:22

### Batch Information

Analytical Batch: VFC12889  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/01/16 13:22  
Container ID: 1160406003-A

Prep Batch: VXX28459  
Prep Method: SW5030B  
Prep Date/Time: 02/01/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of Trip Blank

Client Sample ID: **Trip Blank**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406003  
Lab Project ID: 1160406

Collection Date: 01/28/16 15:35  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	0.400 U	0.400	0.120	ug/L	1		02/03/16 18:57
Ethylbenzene	1.00 U	1.00	0.310	ug/L	1		02/03/16 18:57
o-Xylene	1.00 U	1.00	0.310	ug/L	1		02/03/16 18:57
P & M -Xylene	2.00 U	2.00	0.620	ug/L	1		02/03/16 18:57
Toluene	1.00 U	1.00	0.310	ug/L	1		02/03/16 18:57
Xylenes (total)	3.00 U	3.00	1.00	ug/L	1		02/03/16 18:57
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	106	81-118		%	1		02/03/16 18:57
4-Bromofluorobenzene (surr)	99.8	85-114		%	1		02/03/16 18:57
Toluene-d8 (surr)	98.1	89-112		%	1		02/03/16 18:57

### Batch Information

Analytical Batch: VMS15556  
Analytical Method: SW8260B  
Analyst: ST  
Analytical Date/Time: 02/03/16 18:57  
Container ID: 1160406003-B

Prep Batch: VXX28471  
Prep Method: SW5030B  
Prep Date/Time: 02/03/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW 1

Client Sample ID: **MW 1**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406004  
Lab Project ID: 1160406

Collection Date: 01/28/16 12:30  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.577 U	0.577	0.173	mg/L	1		02/11/16 21:15
<b>Surrogates</b>							
5a Androstane (surr)	69.6	50-150		%	1		02/11/16 21:15

### Batch Information

Analytical Batch: XFC12275  
Analytical Method: AK102  
Analyst: S.G  
Analytical Date/Time: 02/11/16 21:15  
Container ID: 1160406004-G

Prep Batch: XXX34892  
Prep Method: SW3520C  
Prep Date/Time: 02/10/16 10:11  
Prep Initial Wt./Vol.: 260 mL  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW 1

Client Sample ID: **MW 1**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406004  
Lab Project ID: 1160406

Collection Date: 01/28/16 12:30  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.100 U	0.100	0.0310	mg/L	1		02/01/16 13:41
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	97.8	50-150		%	1		02/01/16 13:41

### Batch Information

Analytical Batch: VFC12889  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/01/16 13:41  
Container ID: 1160406004-A

Prep Batch: VXX28459  
Prep Method: SW5030B  
Prep Date/Time: 02/01/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW 1

Client Sample ID: **MW 1**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406004  
Lab Project ID: 1160406

Collection Date: 01/28/16 12:30  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	0.400 U	0.400	0.120	ug/L	1		02/03/16 23:04
Ethylbenzene	1.00 U	1.00	0.310	ug/L	1		02/03/16 23:04
o-Xylene	1.00 U	1.00	0.310	ug/L	1		02/03/16 23:04
P & M -Xylene	2.00 U	2.00	0.620	ug/L	1		02/03/16 23:04
Toluene	1.00 U	1.00	0.310	ug/L	1		02/03/16 23:04
Xylenes (total)	3.00 U	3.00	1.00	ug/L	1		02/03/16 23:04
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	99.6	81-118		%	1		02/03/16 23:04
4-Bromofluorobenzene (surr)	101	85-114		%	1		02/03/16 23:04
Toluene-d8 (surr)	101	89-112		%	1		02/03/16 23:04

### Batch Information

Analytical Batch: VMS15556  
Analytical Method: SW8260B  
Analyst: ST  
Analytical Date/Time: 02/03/16 23:04  
Container ID: 1160406004-D

Prep Batch: VXX28471  
Prep Method: SW5030B  
Prep Date/Time: 02/03/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM





### Results of MW 3

Client Sample ID: **MW 3**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406005  
Lab Project ID: 1160406

Collection Date: 01/28/16 14:34  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.588 U	0.588	0.176	mg/L	1		02/11/16 21:35
<b>Surrogates</b>							
5a Androstane (surr)	76.1	50-150		%	1		02/11/16 21:35

### Batch Information

Analytical Batch: XFC12275  
Analytical Method: AK102  
Analyst: S.G  
Analytical Date/Time: 02/11/16 21:35  
Container ID: 1160406005-G

Prep Batch: XXX34892  
Prep Method: SW3520C  
Prep Date/Time: 02/10/16 10:11  
Prep Initial Wt./Vol.: 255 mL  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW 3

Client Sample ID: **MW 3**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406005  
Lab Project ID: 1160406

Collection Date: 01/28/16 14:34  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.100 U	0.100	0.0310	mg/L	1		02/01/16 14:00
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	100	50-150		%	1		02/01/16 14:00

### Batch Information

Analytical Batch: VFC12889  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/01/16 14:00  
Container ID: 1160406005-A

Prep Batch: VXX28459  
Prep Method: SW5030B  
Prep Date/Time: 02/01/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW 3

Client Sample ID: **MW 3**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406005  
Lab Project ID: 1160406

Collection Date: 01/28/16 14:34  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	0.400 U	0.400	0.120	ug/L	1		02/03/16 22:48
Ethylbenzene	1.00 U	1.00	0.310	ug/L	1		02/03/16 22:48
o-Xylene	1.00 U	1.00	0.310	ug/L	1		02/03/16 22:48
P & M -Xylene	2.00 U	2.00	0.620	ug/L	1		02/03/16 22:48
Toluene	1.00 U	1.00	0.310	ug/L	1		02/03/16 22:48
Xylenes (total)	3.00 U	3.00	1.00	ug/L	1		02/03/16 22:48
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	104	81-118		%	1		02/03/16 22:48
4-Bromofluorobenzene (surr)	102	85-114		%	1		02/03/16 22:48
Toluene-d8 (surr)	99.7	89-112		%	1		02/03/16 22:48

### Batch Information

Analytical Batch: VMS15556  
Analytical Method: SW8260B  
Analyst: ST  
Analytical Date/Time: 02/03/16 22:48  
Container ID: 1160406005-D

Prep Batch: VXX28471  
Prep Method: SW5030B  
Prep Date/Time: 02/03/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW X

Client Sample ID: **MW X**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406006  
Lab Project ID: 1160406

Collection Date: 01/28/16 06:00  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	0.577 U	0.577	0.173	mg/L	1		02/11/16 21:56
<b>Surrogates</b>							
5a Androstane (surr)	70.2	50-150		%	1		02/11/16 21:56

### Batch Information

Analytical Batch: XFC12275  
Analytical Method: AK102  
Analyst: S.G  
Analytical Date/Time: 02/11/16 21:56  
Container ID: 1160406006-G

Prep Batch: XXX34892  
Prep Method: SW3520C  
Prep Date/Time: 02/10/16 10:11  
Prep Initial Wt./Vol.: 260 mL  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW X

Client Sample ID: **MW X**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406006  
Lab Project ID: 1160406

Collection Date: 01/28/16 06:00  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.100 U	0.100	0.0310	mg/L	1		02/01/16 14:19
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	97.9	50-150		%	1		02/01/16 14:19

### Batch Information

Analytical Batch: VFC12889  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/01/16 14:19  
Container ID: 1160406006-A

Prep Batch: VXX28459  
Prep Method: SW5030B  
Prep Date/Time: 02/01/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of MW X

Client Sample ID: **MW X**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406006  
Lab Project ID: 1160406

Collection Date: 01/28/16 06:00  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	0.400 U	0.400	0.120	ug/L	1		02/03/16 22:31
Ethylbenzene	1.00 U	1.00	0.310	ug/L	1		02/03/16 22:31
o-Xylene	1.00 U	1.00	0.310	ug/L	1		02/03/16 22:31
P & M -Xylene	2.00 U	2.00	0.620	ug/L	1		02/03/16 22:31
Toluene	1.00 U	1.00	0.310	ug/L	1		02/03/16 22:31
Xylenes (total)	3.00 U	3.00	1.00	ug/L	1		02/03/16 22:31
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	105	81-118		%	1		02/03/16 22:31
4-Bromofluorobenzene (surr)	99.5	85-114		%	1		02/03/16 22:31
Toluene-d8 (surr)	99.2	89-112		%	1		02/03/16 22:31

### Batch Information

Analytical Batch: VMS15556  
Analytical Method: SW8260B  
Analyst: ST  
Analytical Date/Time: 02/03/16 22:31  
Container ID: 1160406006-D

Prep Batch: VXX28471  
Prep Method: SW5030B  
Prep Date/Time: 02/03/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of Trip Blank

Client Sample ID: **Trip Blank**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406007  
Lab Project ID: 1160406

Collection Date: 01/28/16 06:00  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	0.100 U	0.100	0.0310	mg/L	1		02/01/16 12:06
<b>Surrogates</b>							
4-Bromofluorobenzene (surr)	110	50-150		%	1		02/01/16 12:06

### Batch Information

Analytical Batch: VFC12889  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/01/16 12:06  
Container ID: 1160406007-A

Prep Batch: VXX28459  
Prep Method: SW5030B  
Prep Date/Time: 02/01/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM



### Results of Trip Blank

Client Sample ID: **Trip Blank**  
Client Project ID: **BYF Site Characterization**  
Lab Sample ID: 1160406007  
Lab Project ID: 1160406

Collection Date: 01/28/16 06:00  
Received Date: 01/29/16 16:04  
Matrix: Water (Surface, Eff., Ground)  
Solids (%):  
Location:

### Results by Volatile GC/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	0.400 U	0.400	0.120	ug/L	1		02/03/16 18:41
Ethylbenzene	1.00 U	1.00	0.310	ug/L	1		02/03/16 18:41
o-Xylene	1.00 U	1.00	0.310	ug/L	1		02/03/16 18:41
P & M -Xylene	2.00 U	2.00	0.620	ug/L	1		02/03/16 18:41
Toluene	1.00 U	1.00	0.310	ug/L	1		02/03/16 18:41
Xylenes (total)	3.00 U	3.00	1.00	ug/L	1		02/03/16 18:41
<b>Surrogates</b>							
1,2-Dichloroethane-D4 (surr)	104	81-118		%	1		02/03/16 18:41
4-Bromofluorobenzene (surr)	97.3	85-114		%	1		02/03/16 18:41
Toluene-d8 (surr)	99.3	89-112		%	1		02/03/16 18:41

### Batch Information

Analytical Batch: VMS15556  
Analytical Method: SW8260B  
Analyst: ST  
Analytical Date/Time: 02/03/16 18:41  
Container ID: 1160406007-B

Prep Batch: VXX28471  
Prep Method: SW5030B  
Prep Date/Time: 02/03/16 08:00  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:16AM





### Method Blank

Blank ID: MB for HBN 1727691 [VXX/28459]  
Blank Lab ID: 1311604

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1160406001, 1160406002, 1160406003, 1160406004, 1160406005, 1160406006, 1160406007

### Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	0.0500U	0.100	0.0310	mg/L
<b>Surrogates</b>				
4-Bromofluorobenzene (surr)	110	50-150		%

### Batch Information

Analytical Batch: VFC12889  
Analytical Method: AK101  
Instrument: Agilent 7890 PID/FID  
Analyst: S.P  
Analytical Date/Time: 2/1/2016 10:31:00AM

Prep Batch: VXX28459  
Prep Method: SW5030B  
Prep Date/Time: 2/1/2016 8:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:18AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160406 [VXX28459]  
Blank Spike Lab ID: 1311607  
Date Analyzed: 02/01/2016 11:28

Spike Duplicate ID: LCSD for HBN 1160406 [VXX28459]  
Spike Duplicate Lab ID: 1311608  
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1160406001, 1160406002, 1160406003, 1160406004, 1160406005, 1160406006, 1160406007

### Results by AK101

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	1.00	0.920	92	1.00	0.903	90	( 60-120 )	1.90	(< 20 )

### Surrogates

4-Bromofluorobenzene (surr)	0.0500	109	109	0.0500	104	104	( 50-150 )	5.00	
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### Batch Information

Analytical Batch: VFC12889  
Analytical Method: AK101  
Instrument: Agilent 7890 PID/FID  
Analyst: S.P

Prep Batch: VXX28459  
Prep Method: SW5030B  
Prep Date/Time: 02/01/2016 08:00  
Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL  
Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:20AM



### Method Blank

Blank ID: MB for HBN 1727929 [VXX/28471]  
Blank Lab ID: 1311887

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1160406002, 1160406003, 1160406004, 1160406005, 1160406006, 1160406007

### Results by SW8260B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
<b>Surrogates</b>				
1,2-Dichloroethane-D4 (surr)	103	81-118		%
4-Bromofluorobenzene (surr)	102	85-114		%
Toluene-d8 (surr)	101	89-112		%

### Batch Information

Analytical Batch: VMS15556  
Analytical Method: SW8260B  
Instrument: HP 5890 Series II MS3 VNA  
Analyst: ST  
Analytical Date/Time: 2/3/2016 4:00:00PM

Prep Batch: VXX28471  
Prep Method: SW5030B  
Prep Date/Time: 2/3/2016 8:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:21AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160406 [VXX28471]  
 Blank Spike Lab ID: 1311888  
 Date Analyzed: 02/03/2016 16:45

Spike Duplicate ID: LCSD for HBN 1160406 [VXX28471]  
 Spike Duplicate Lab ID: 1311889  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1160406002, 1160406003, 1160406004, 1160406005, 1160406006, 1160406007

### Results by SW8260B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	30	30.5	102	30	29.5	98	( 79-120 )	3.50	(< 20 )
Ethylbenzene	30	30.8	103	30	30.6	102	( 79-121 )	0.88	(< 20 )
o-Xylene	30	27.8	93	30	27.3	91	( 78-122 )	1.60	(< 20 )
P & M -Xylene	60	61.2	102	60	59.6	99	( 80-121 )	2.60	(< 20 )
Toluene	30	28.6	95	30	28.5	95	( 80-121 )	0.28	(< 20 )
Xylenes (total)	90	88.9	99	90	86.9	97	( 79-121 )	2.30	(< 20 )
<b>Surrogates</b>									
1,2-Dichloroethane-D4 (surr)	30	98.5	99	30	96	96	( 81-118 )	2.60	
4-Bromofluorobenzene (surr)	30	98.8	99	30	100	100	( 85-114 )	1.30	
Toluene-d8 (surr)	30	99.5	100	30	100	100	( 89-112 )	0.87	

### Batch Information

Analytical Batch: VMS15556  
 Analytical Method: SW8260B  
 Instrument: HP 5890 Series II MS3 VNA  
 Analyst: ST

Prep Batch: VXX28471  
 Prep Method: SW5030B  
 Prep Date/Time: 02/03/2016 08:00  
 Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL  
 Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:22AM



### Method Blank

Blank ID: MB for HBN 1727941 [VXX/28473]

Blank Lab ID: 1311947

QC for Samples:

1160406001, 1160406002

Matrix: Water (Surface, Eff., Ground)

### Results by SW8260B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	0.200U	0.400	0.120	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
Toluene	0.500U	1.00	0.310	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
<b>Surrogates</b>				
1,2-Dichloroethane-D4 (surr)	102	81-118		%
4-Bromofluorobenzene (surr)	101	85-114		%
Toluene-d8 (surr)	98	89-112		%

### Batch Information

Analytical Batch: VMS15558  
Analytical Method: SW8260B  
Instrument: HP 5890 Series II MS3 VNA  
Analyst: ST  
Analytical Date/Time: 2/4/2016 4:34:00PM

Prep Batch: VXX28473  
Prep Method: SW5030B  
Prep Date/Time: 2/4/2016 8:00:00AM  
Prep Initial Wt./Vol.: 5 mL  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:23AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160406 [VXX28473]  
Blank Spike Lab ID: 1311948  
Date Analyzed: 02/04/2016 16:59

Spike Duplicate ID: LCSD for HBN 1160406 [VXX28473]  
Spike Duplicate Lab ID: 1311949  
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1160406001, 1160406002

### Results by SW8260B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	30	30.7	102	30	31.3	104	( 79-120 )	2.10	(< 20 )
Ethylbenzene	30	31.8	106	30	31.4	105	( 79-121 )	1.10	(< 20 )
o-Xylene	30	28.4	95	30	28.7	96	( 78-122 )	1.20	(< 20 )
P & M -Xylene	60	63.4	106	60	63.0	105	( 80-121 )	0.52	(< 20 )
Toluene	30	29.9	100	30	29.0	97	( 80-121 )	3.00	(< 20 )
Xylenes (total)	90	91.7	102	90	91.7	102	( 79-121 )	0.02	(< 20 )
<b>Surrogates</b>									
1,2-Dichloroethane-D4 (surr)	30	95.9	96	30	98.5	99	( 81-118 )	2.70	
4-Bromofluorobenzene (surr)	30	99.3	99	30	98.2	98	( 85-114 )	1.10	
Toluene-d8 (surr)	30	102	102	30	99.6	100	( 89-112 )	2.30	

### Batch Information

Analytical Batch: VMS15558  
Analytical Method: SW8260B  
Instrument: HP 5890 Series II MS3 VNA  
Analyst: ST

Prep Batch: VXX28473  
Prep Method: SW5030B  
Prep Date/Time: 02/04/2016 08:00  
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL  
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Print Date: 02/17/2016 11:19:25AM



### Method Blank

Blank ID: MB for HBN 1727720 [XXX/34874]

Blank Lab ID: 1311675

QC for Samples:

1160406001

Matrix: Water (Surface, Eff., Ground)

### Results by SW8270D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1,2,4-Trichlorobenzene	0.00500U	0.0100	0.00310	mg/L
1,2-Dichlorobenzene	0.00500U	0.0100	0.00310	mg/L
1,3-Dichlorobenzene	0.00500U	0.0100	0.00310	mg/L
1,4-Dichlorobenzene	0.00500U	0.0100	0.00310	mg/L
1-Chloronaphthalene	0.00500U	0.0100	0.00310	mg/L
1-Methylnaphthalene	0.00500U	0.0100	0.00310	mg/L
2,4,5-Trichlorophenol	0.00500U	0.0100	0.00310	mg/L
2,4,6-Trichlorophenol	0.00500U	0.0100	0.00310	mg/L
2,4-Dichlorophenol	0.00500U	0.0100	0.00310	mg/L
2,4-Dimethylphenol	0.00500U	0.0100	0.00310	mg/L
2,4-Dinitrophenol	0.0250U	0.0500	0.0150	mg/L
2,4-Dinitrotoluene	0.00500U	0.0100	0.00310	mg/L
2,6-Dichlorophenol	0.00500U	0.0100	0.00310	mg/L
2,6-Dinitrotoluene	0.00500U	0.0100	0.00310	mg/L
2-Chloronaphthalene	0.00500U	0.0100	0.00310	mg/L
2-Chlorophenol	0.00500U	0.0100	0.00310	mg/L
2-Methyl-4,6-dinitrophenol	0.0250U	0.0500	0.0150	mg/L
2-Methylnaphthalene	0.00500U	0.0100	0.00310	mg/L
2-Methylphenol (o-Cresol)	0.00500U	0.0100	0.00310	mg/L
2-Nitroaniline	0.00500U	0.0100	0.00310	mg/L
2-Nitrophenol	0.00500U	0.0100	0.00310	mg/L
3&4-Methylphenol (p&m-Cresol)	0.0100U	0.0200	0.00620	mg/L
3,3-Dichlorobenzidine	0.00500U	0.0100	0.00310	mg/L
3-Nitroaniline	0.00500U	0.0100	0.00310	mg/L
4-Bromophenyl-phenylether	0.00500U	0.0100	0.00310	mg/L
4-Chloro-3-methylphenol	0.00500U	0.0100	0.00310	mg/L
4-Chloroaniline	0.00500U	0.0100	0.00310	mg/L
4-Chlorophenyl-phenylether	0.00500U	0.0100	0.00310	mg/L
4-Nitroaniline	0.00500U	0.0100	0.00310	mg/L
4-Nitrophenol	0.0250U	0.0500	0.0150	mg/L
Acenaphthene	0.00500U	0.0100	0.00310	mg/L
Acenaphthylene	0.00500U	0.0100	0.00310	mg/L
Aniline	0.0250U	0.0500	0.0150	mg/L
Anthracene	0.00500U	0.0100	0.00310	mg/L
Azobenzene	0.00500U	0.0100	0.00310	mg/L
Benzo(a)Anthracene	0.00500U	0.0100	0.00310	mg/L
Benzo[a]pyrene	0.00500U	0.0100	0.00310	mg/L
Benzo[b]Fluoranthene	0.00500U	0.0100	0.00310	mg/L

Print Date: 02/17/2016 11:19:26AM



### Method Blank

Blank ID: MB for HBN 1727720 [XXX/34874]

Blank Lab ID: 1311675

QC for Samples:

1160406001

Matrix: Water (Surface, Eff., Ground)

### Results by SW8270D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzo[g,h,i]perylene	0.00500U	0.0100	0.00310	mg/L
Benzo[k]fluoranthene	0.00500U	0.0100	0.00310	mg/L
Benzoic acid	0.0250U	0.0500	0.0150	mg/L
Benzyl alcohol	0.00500U	0.0100	0.00310	mg/L
Bis(2chloro1methylethyl)Ether	0.00500U	0.0100	0.00310	mg/L
Bis(2-Chloroethoxy)methane	0.00500U	0.0100	0.00310	mg/L
Bis(2-Chloroethyl)ether	0.00500U	0.0100	0.00310	mg/L
bis(2-Ethylhexyl)phthalate	0.00500U	0.0100	0.00310	mg/L
Butylbenzylphthalate	0.00500U	0.0100	0.00310	mg/L
Carbazole	0.00500U	0.0100	0.00310	mg/L
Chrysene	0.00500U	0.0100	0.00310	mg/L
Dibenzo[a,h]anthracene	0.00500U	0.0100	0.00310	mg/L
Dibenzofuran	0.00500U	0.0100	0.00310	mg/L
Diethylphthalate	0.00500U	0.0100	0.00310	mg/L
Dimethylphthalate	0.00500U	0.0100	0.00310	mg/L
Di-n-butylphthalate	0.00500U	0.0100	0.00310	mg/L
di-n-Octylphthalate	0.00500U	0.0100	0.00310	mg/L
Fluoranthene	0.00500U	0.0100	0.00310	mg/L
Fluorene	0.00500U	0.0100	0.00310	mg/L
Hexachlorobenzene	0.00500U	0.0100	0.00310	mg/L
Hexachlorobutadiene	0.00500U	0.0100	0.00310	mg/L
Hexachlorocyclopentadiene	0.0150U	0.0300	0.00940	mg/L
Hexachloroethane	0.00500U	0.0100	0.00310	mg/L
Indeno[1,2,3-c,d] pyrene	0.00500U	0.0100	0.00310	mg/L
Isophorone	0.00500U	0.0100	0.00310	mg/L
Naphthalene	0.00500U	0.0100	0.00310	mg/L
Nitrobenzene	0.00500U	0.0100	0.00310	mg/L
N-Nitrosodimethylamine	0.00500U	0.0100	0.00310	mg/L
N-Nitroso-di-n-propylamine	0.00500U	0.0100	0.00310	mg/L
N-Nitrosodiphenylamine	0.00500U	0.0100	0.00310	mg/L
Pentachlorophenol	0.0250U	0.0500	0.0150	mg/L
Phenanthrene	0.00500U	0.0100	0.00310	mg/L
Phenol	0.00500U	0.0100	0.00310	mg/L
Pyrene	0.00500U	0.0100	0.00310	mg/L
<b>Surrogates</b>				
2,4,6-Tribromophenol (surr)	92.6	43-140		%
2-Fluorobiphenyl (surr)	83.2	44-119		%
2-Fluorophenol (surr)	65.3	19-119		%

Print Date: 02/17/2016 11:19:26AM





### Method Blank

Blank ID: MB for HBN 1727720 [XXX/34874]  
Blank Lab ID: 1311675

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1160406001

### Results by SW8270D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Nitrobenzene-d5 (surr)	76.1	44-120		%
Phenol-d6 (surr)	73.7	10-115		%
Terphenyl-d14 (surr)	114	50-134		%

### Batch Information

Analytical Batch: XMS9166  
Analytical Method: SW8270D  
Instrument: HP 6890/5973 SSA  
Analyst: DSH  
Analytical Date/Time: 2/3/2016 9:57:00PM

Prep Batch: XXX34874  
Prep Method: SW3520C  
Prep Date/Time: 2/3/2016 10:13:47AM  
Prep Initial Wt./Vol.: 1000 mL  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:26AM



### Leaching Blank

Blank ID: LB for HBN 1727720 [XXX/34874]  
Blank Lab ID: 1311678

Matrix: Solid/Soil (Wet Weight)

QC for Samples:  
1160406001

### Results by SW8270D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
2,4,5-Trichlorophenol	0.00505U	0.0101	0.00313	mg/L
2,4,6-Trichlorophenol	0.00505U	0.0101	0.00313	mg/L
2,4-Dinitrotoluene	0.00505U	0.0101	0.00313	mg/L
2-Methylphenol (o-Cresol)	0.00505U	0.0101	0.00313	mg/L
3&4-Methylphenol (p&m-Cresol)	0.0101U	0.0202	0.00626	mg/L
Hexachlorobenzene	0.00505U	0.0101	0.00313	mg/L
Hexachlorobutadiene	0.00505U	0.0101	0.00313	mg/L
Hexachloroethane	0.00505U	0.0101	0.00313	mg/L
Nitrobenzene	0.00505U	0.0101	0.00313	mg/L
Pentachlorophenol	0.0253U	0.0505	0.0152	mg/L
<b>Surrogates</b>				
2,4,6-Tribromophenol (surr)	78.1	43-140		%
2-Fluorobiphenyl (surr)	57	44-119		%
2-Fluorophenol (surr)	44.3	19-119		%
Nitrobenzene-d5 (surr)	53	44-120		%
Phenol-d6 (surr)	46.9	10-115		%
Terphenyl-d14 (surr)	113	50-134		%

### Batch Information

Analytical Batch: XMS9166  
Analytical Method: SW8270D  
Instrument: HP 6890/5973 SSA  
Analyst: DSH  
Analytical Date/Time: 2/3/2016 9:40:00PM

Prep Batch: XXX34874  
Prep Method: SW3520C  
Prep Date/Time: 2/3/2016 10:13:47AM  
Prep Initial Wt./Vol.: 990 mL  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:26AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160406 [XXX34874]  
 Blank Spike Lab ID: 1311676  
 Date Analyzed: 02/03/2016 22:31

Spike Duplicate ID: LCSD for HBN 1160406  
 [XXX34874]  
 Spike Duplicate Lab ID: 1311677  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1160406001

### Results by SW8270D

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1,2,4-Trichlorobenzene	0.1	0.0685	69	0.1	0.0633	63	( 29-116 )	7.80	(< 20 )
1,2-Dichlorobenzene	0.1	0.0627	63	0.1	0.0585	59	( 32-111 )	6.90	(< 20 )
1,3-Dichlorobenzene	0.1	0.0628	63	0.1	0.0582	58	( 28-110 )	7.50	(< 20 )
1,4-Dichlorobenzene	0.1	0.0634	63	0.1	0.0582	58	( 29-112 )	8.60	(< 20 )
1-Chloronaphthalene	0.04	0.0290	73	0.04	0.0284	71	( 58-111 )	2.30	(< 20 )
1-Methylnaphthalene	0.1	0.0754	75	0.1	0.0708	71	( 41-119 )	6.40	(< 20 )
2,4,5-Trichlorophenol	0.1	0.0901	90	0.1	0.0882	88	( 53-123 )	2.10	(< 20 )
2,4,6-Trichlorophenol	0.1	0.0837	84	0.1	0.0812	81	( 50-125 )	3.00	(< 20 )
2,4-Dichlorophenol	0.1	0.0722	72	0.1	0.0683	68	( 47-121 )	5.60	(< 20 )
2,4-Dimethylphenol	0.1	0.0611	61	0.1	0.0544	54	( 31-124 )	11.50	(< 20 )
2,4-Dinitrophenol	0.18	0.181	100	0.18	0.176	98	( 23-143 )	2.60	(< 20 )
2,4-Dinitrotoluene	0.1	0.100	100	0.1	0.0989	99	( 57-128 )	1.30	(< 20 )
2,6-Dichlorophenol	0.04	0.0293	73	0.04	0.0276	69	( 50-118 )	5.80	(< 20 )
2,6-Dinitrotoluene	0.1	0.0977	98	0.1	0.0963	96	( 57-124 )	1.50	(< 20 )
2-Chloronaphthalene	0.1	0.0793	79	0.1	0.0752	75	( 40-116 )	5.30	(< 20 )
2-Chlorophenol	0.1	0.0618	62	0.1	0.0591	59	( 38-117 )	4.60	(< 20 )
2-Methyl-4,6-dinitrophenol	0.18	0.193	107	0.18	0.191	106	( 44-137 )	0.98	(< 20 )
2-Methylnaphthalene	0.1	0.0724	72	0.1	0.0667	67	( 40-121 )	8.30	(< 20 )
2-Methylphenol (o-Cresol)	0.1	0.0633	63	0.1	0.0606	61	( 30-117 )	4.50	(< 20 )
2-Nitroaniline	0.1	0.0974	97	0.1	0.0971	97	( 55-117 )	0.30	(< 20 )
2-Nitrophenol	0.1	0.0744	74	0.1	0.0694	69	( 47-123 )	7.00	(< 20 )
3&4-Methylphenol (p&m-Cresol)	0.14	0.106	75	0.14	0.0992	71	( 29-110 )	6.20	(< 20 )
3,3-Dichlorobenzidine	0.1	0.0843	84	0.1	0.0864	86	( 27-129 )	2.40	(< 20 )
3-Nitroaniline	0.1	0.0922	92	0.1	0.0937	94	( 41-128 )	1.70	(< 20 )
4-Bromophenyl-phenylether	0.1	0.0929	93	0.1	0.0932	93	( 55-124 )	0.31	(< 20 )
4-Chloro-3-methylphenol	0.1	0.0832	83	0.1	0.0801	80	( 52-119 )	3.80	(< 20 )
4-Chloroaniline	0.1	0.0662	66	0.1	0.0659	66	( 33-117 )	0.33	(< 20 )
4-Chlorophenyl-phenylether	0.1	0.0909	91	0.1	0.0894	89	( 53-121 )	1.70	(< 20 )
4-Nitroaniline	0.1	0.102	102	0.1	0.101	101	( 74-118 )	0.84	(< 20 )
4-Nitrophenol	0.14	0.128	92	0.14	0.126	90	( 52-111 )	1.50	(< 20 )
Acenaphthene	0.1	0.0852	85	0.1	0.0829	83	( 47-122 )	2.80	(< 20 )
Acenaphthylene	0.1	0.0852	85	0.1	0.0833	83	( 41-130 )	2.30	(< 20 )
Aniline	0.1	0.0561	56	0.1	0.0572	57	( 10-87 )	1.90	(< 20 )
Anthracene	0.1	0.0954	95	0.1	0.0942	94	( 57-123 )	1.30	(< 20 )

Print Date: 02/17/2016 11:19:27AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160406 [XXX34874]  
 Blank Spike Lab ID: 1311676  
 Date Analyzed: 02/03/2016 22:31

Spike Duplicate ID: LCSD for HBN 1160406  
 [XXX34874]  
 Spike Duplicate Lab ID: 1311677  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1160406001

### Results by SW8270D

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Azobenzene	0.1	0.0951	95	0.1	0.0948	95	( 61-116 )	0.39	(< 20 )
Benzo(a)Anthracene	0.1	0.104	104	0.1	0.103	103	( 58-125 )	1.20	(< 20 )
Benzo[a]pyrene	0.1	0.102	102	0.1	0.104	104	( 54-128 )	1.50	(< 20 )
Benzo[b]Fluoranthene	0.1	0.111	111	0.1	0.109	109	( 53-131 )	1.90	(< 20 )
Benzo[g,h,i]perylene	0.1	0.106	106	0.1	0.108	108	( 50-134 )	1.80	(< 20 )
Benzo[k]fluoranthene	0.1	0.104	104	0.1	0.106	106	( 57-129 )	1.10	(< 20 )
Benzoic acid	0.14	0.0292J	21	* 0.14	0.0223J	16	* ( 21-107 )	26.90	* (< 20 )
Benzyl alcohol	0.1	0.0684	68	0.1	0.0651	65	( 31-112 )	4.80	(< 20 )
Bis(2chloro1methylethyl)Ether	0.1	0.0687	69	0.1	0.0637	64	( 37-130 )	7.60	(< 20 )
Bis(2-Chloroethoxy)methane	0.1	0.0759	76	0.1	0.0712	71	( 48-120 )	6.40	(< 20 )
Bis(2-Chloroethyl)ether	0.1	0.0617	62	0.1	0.0571	57	( 43-118 )	7.80	(< 20 )
bis(2-Ethylhexyl)phthalate	0.1	0.105	105	0.1	0.101	101	( 55-135 )	3.90	(< 20 )
Butylbenzylphthalate	0.1	0.106	106	0.1	0.102	102	( 53-134 )	3.50	(< 20 )
Carbazole	0.1	0.108	108	0.1	0.106	106	( 60-122 )	1.40	(< 20 )
Chrysene	0.1	0.108	108	0.1	0.107	107	( 59-123 )	1.00	(< 20 )
Dibenzo[a,h]anthracene	0.1	0.109	109	0.1	0.111	111	( 51-134 )	1.80	(< 20 )
Dibenzofuran	0.1	0.0853	85	0.1	0.0844	84	( 53-118 )	1.00	(< 20 )
Diethylphthalate	0.1	0.101	101	0.1	0.0996	100	( 56-125 )	1.40	(< 20 )
Dimethylphthalate	0.1	0.0957	96	0.1	0.0954	95	( 45-127 )	0.36	(< 20 )
Di-n-butylphthalate	0.1	0.108	108	0.1	0.106	106	( 59-127 )	1.70	(< 20 )
di-n-Octylphthalate	0.1	0.104	104	0.1	0.104	104	( 51-140 )	0.14	(< 20 )
Fluoranthene	0.1	0.102	102	0.1	0.102	102	( 57-128 )	0.30	(< 20 )
Fluorene	0.1	0.0897	90	0.1	0.0892	89	( 52-124 )	0.63	(< 20 )
Hexachlorobenzene	0.1	0.0981	98	0.1	0.0984	98	( 53-125 )	0.31	(< 20 )
Hexachlorobutadiene	0.1	0.0725	73	0.1	0.0676	68	( 22-124 )	7.00	(< 20 )
Hexachlorocyclopentadiene	0.1	0.0463	46	0.1	0.0388	39	( 10-93 )	17.70	(< 20 )
Hexachloroethane	0.1	0.0608	61	0.1	0.0559	56	( 21-115 )	8.50	(< 20 )
Indeno[1,2,3-c,d] pyrene	0.1	0.101	101	0.1	0.103	103	( 52-134 )	1.70	(< 20 )
Isophorone	0.1	0.0759	76	0.1	0.0720	72	( 42-124 )	5.30	(< 20 )
Naphthalene	0.1	0.0684	68	0.1	0.0648	65	( 40-121 )	5.30	(< 20 )
Nitrobenzene	0.1	0.0693	69	0.1	0.0648	65	( 45-121 )	6.70	(< 20 )
N-Nitrosodimethylamine	0.1	0.0544	54	0.1	0.0512	51	( 41-117 )	6.00	(< 20 )
N-Nitroso-di-n-propylamine	0.1	0.0770	77	0.1	0.0724	72	( 49-119 )	6.10	(< 20 )
N-Nitrosodiphenylamine	0.1	0.0779	78	0.1	0.0781	78	( 51-123 )	0.33	(< 20 )

Print Date: 02/17/2016 11:19:27AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160406 [XXX34874]  
 Blank Spike Lab ID: 1311676  
 Date Analyzed: 02/03/2016 22:31

Spike Duplicate ID: LCSD for HBN 1160406  
 [XXX34874]  
 Spike Duplicate Lab ID: 1311677  
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1160406001

### Results by SW8270D

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Pentachlorophenol	0.14	0.150	107	0.14	0.152	109	( 35-138 )	1.30	(< 20 )
Phenanthrene	0.1	0.0963	96	0.1	0.0965	97	( 59-120 )	0.24	(< 20 )
Phenol	0.1	0.0589	59	0.1	0.0567	57	( 39-84 )	3.80	(< 20 )
Pyrene	0.1	0.102	102	0.1	0.0973	97	( 57-126 )	4.40	(< 20 )
<b>Surrogates</b>									
2,4,6-Tribromophenol (surr)	0.2	97.5	98	0.2	96.4	96	( 43-140 )	1.20	
2-Fluorobiphenyl (surr)	0.1	74.2	74	0.1	71.2	71	( 44-119 )	4.10	
2-Fluorophenol (surr)	0.2	51.6	52	0.2	50.2	50	( 19-119 )	2.70	
Nitrobenzene-d5 (surr)	0.1	66.4	66	0.1	62.8	63	( 44-120 )	5.50	
Phenol-d6 (surr)	0.2	58.8	59	0.2	56.8	57	( 10-115 )	3.50	
Terphenyl-d14 (surr)	0.1	105	105	0.1	102	102	( 50-134 )	3.10	

### Batch Information

Analytical Batch: XMS9166  
 Analytical Method: SW8270D  
 Instrument: HP 6890/5973 SSA  
 Analyst: DSH

Prep Batch: XXX34874  
 Prep Method: SW3520C  
 Prep Date/Time: 02/03/2016 10:13  
 Spike Init Wt./Vol.: 0.1 mg/L Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 0.1 mg/L Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:27AM



### Method Blank

Blank ID: MB for HBN 1728415 [XXX/34892]  
Blank Lab ID: 1312362

Matrix: Water (Surface, Eff., Ground)

QC for Samples:  
1160406001, 1160406002, 1160406004, 1160406005, 1160406006

### Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	0.300U	0.600	0.180	mg/L
<b>Surrogates</b>				
5a Androstane (surr)	74.6	60-120		%

### Batch Information

Analytical Batch: XFC12275  
Analytical Method: AK102  
Instrument: HP 7890A FID SV E F  
Analyst: S.G  
Analytical Date/Time: 2/11/2016 7:31:00PM

Prep Batch: XXX34892  
Prep Method: SW3520C  
Prep Date/Time: 2/10/2016 10:11:47AM  
Prep Initial Wt./Vol.: 250 mL  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:29AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160406 [XXX34892]  
Blank Spike Lab ID: 1312363  
Date Analyzed: 02/11/2016 19:51

Spike Duplicate ID: LCSD for HBN 1160406  
[XXX34892]  
Spike Duplicate Lab ID: 1312364  
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1160406001, 1160406002, 1160406004, 1160406005, 1160406006

### Results by AK102

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Diesel Range Organics	20	16.7	84	20	16.8	84	( 75-125 )	0.15	(< 20 )
<b>Surrogates</b>									
5a Androstane (surr)	0.4	87.1	87	0.4	88.7	89	( 60-120 )	1.80	

### Batch Information

Analytical Batch: **XFC12275**  
Analytical Method: **AK102**  
Instrument: **HP 7890A FID SV E F**  
Analyst: **S.G**

Prep Batch: **XXX34892**  
Prep Method: **SW3520C**  
Prep Date/Time: **02/10/2016 10:11**  
Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL  
Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

Print Date: 02/17/2016 11:19:30AM

## Homestead, Charles (Anchorage)

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**From:** Colette Brandt [cbrandt@restorsci.com]  
**Sent:** Wednesday, February 03, 2016 11:52 AM  
**To:** Homestead, Charles (Anchorage)  
**Subject:** RE: Sample Analysis Additions for Work Order 1160407  
**Attachments:** 1893\_001.pdf

Hi Chuck,

For work order 1160406 (the water samples for the BYF project) have a few revisions to the COCs. If we could switch the VOCs analysis to BTEX and SVOCs to PAH SIM. Let me know if you have any questions.

Thanks

### Colette Brandt

*Environmental Scientist*  
Restoration Science & Engineering, LLC  
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[cbrandt@restorsci.com](mailto:cbrandt@restorsci.com)  
907.278.1023 ext. 104  
907.231.5523 (cell)

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**From:** Homestead, Charles (Anchorage) [<mailto:Charles.Homestead@sgs.com>]  
**Sent:** Wednesday, February 03, 2016 9:07 AM  
**To:** Colette Brandt <[cbrandt@restorsci.com](mailto:cbrandt@restorsci.com)>  
**Subject:** RE: Sample Analysis Additions for Work Order 1160407

That is correct. We will proceed with PAH SIM. Thanks and have a good day! CGH

---

**From:** Colette Brandt [<mailto:cbrandt@restorsci.com>]  
**Sent:** Wednesday, February 03, 2016 8:53 AM  
**To:** Homestead, Charles (Anchorage)  
**Subject:** RE: Sample Analysis Additions for Work Order 1160407

Morning Chuck,

I think we'll go with PAH SIMs since they have a lower detection limit right? Thanks

### Colette Brandt

*Environmental Scientist*  
Restoration Science & Engineering, LLC  
911 West 8th Avenue, Suite 100  
Anchorage, Alaska 99501  
[cbrandt@restorsci.com](mailto:cbrandt@restorsci.com)  
907.278.1023 ext. 104  
907.231.5523 (cell)

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**From:** Homestead, Charles (Anchorage) [<mailto:Charles.Homestead@sgs.com>]  
**Sent:** Wednesday, February 03, 2016 8:48 AM  
**To:** Colette Brandt <[cbrandt@restorsci.com](mailto:cbrandt@restorsci.com)>  
**Subject:** RE: Sample Analysis Additions for Work Order 1160407



Hi – Clarification, do you want SVOC or PAH SIM added to these samples? Thanks, CGH

---

**From:** Colette Brandt [<mailto:cbrandt@restorsci.com>]  
**Sent:** Monday, February 01, 2016 9:07 AM  
**To:** Homestead, Charles (Anchorage)  
**Cc:** David Nyman  
**Subject:** Sample Analysis Additions for Work Order 1160407

Good Morning Chuck,

I submitted some soil samples Friday evening (work order 1160407) and would like to add the SVOCs (EPA 8270 SIMs) to three (3) of the samples (Sample IDs: 4-16, 5-16, & 5-X). Attached is the COC with the three samples checked off for SVOCs and highlighted. Please let me know if you need anything else or have any questions.

Thank you,

**Colette Brandt**

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SGS NORTH AMERICA INC. CHAIN OF CUSTODY RECORD

1160406



CLIENT: <b>Restoration Science &amp; Eng. LLC</b>				INSTRUCTIONS: SECTIONS 1-5 MUST BE FILLED. OMISSIONS MAY DELAY THE ONSET OF ANALYSIS.																	
CONTACT: <b>C. Bruneau</b>		PHONE #: <b>907 278 1023</b>		SECTION 3			PRESERVATIVE														
SECTION 1	PROJECT NAME: <b>BYF Site Remediation</b>		PROJECT/ PWSID/ PERMIT #:		#	CONTAINERS	SAMPLE TYPE: <b>Grab</b>	MI (Multi-incremental)	<b>Metals</b>	<b>NOVOC</b>	<b>SVOCs</b>	<b>VOCs</b>									REMARKS/ LOC ID
	REPORTS TO: <b>RSE</b>		E-MAIL: <b>cbruneau@restsci.com</b>																		
	INVOICE TO: <b>RSE</b>		QUOTE #: <b>15-1489</b>																		
			P.O. #: <b>15-1489</b>																		
SECTION 2	RESERVED FOR LAB USE	SAMPLE IDENTIFICATION	DATE MM/DD/YY	TIME HH:MM	MATRIX/MATRIX CODE																
	<b>① AJ</b>	<b>MW4</b>	<b>01/28/16</b>	<b>1630</b>	<b>W</b>	<b>10</b>	<b>G</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>										
	<b>② AJ</b>	<b>MW8</b>	<b>01/28/16</b>	<b>1535</b>	<b>W</b>	<b>10</b>	<b>G</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>										
	<b>③ A-C</b>	<b>Trip Blank</b>																			
SECTION 5	RELINQUISHED BY: (1) <i>[Signature]</i>		DATE	TIME	RECEIVED BY:		SECTION 4 DOD Project?				DATA DELIVERABLE REQUIREMENTS:										
			<b>1/29/16</b>	<b>1604</b>			COC ID:														
	RELINQUISHED BY: (2)		DATE	TIME	RECEIVED BY:		REQUESTED TURNAROUND TIME AND/OR SPECIAL INSTRUCTIONS														
							<b>CRD 1/29/16</b>														
RELINQUISHED BY: (3)		DATE	TIME	RECEIVED BY:		TEMP BLANK °C:				CHAIN OF CUSTODY SEAL: (CIRCLE)											
						<b>20# 1.4#07</b>				<b>INTACT</b> <input type="checkbox"/> <b>BROKEN</b> <input type="checkbox"/> <b>ABSENT</b> <input checked="" type="checkbox"/>											
RELINQUISHED BY: (4)		DATE	TIME	RECEIVED FOR LABORATORY BY:		OR AMBIENT [ ]															
		<b>1/29/16</b>	<b>16:04</b>	<i>[Signature]</i>		(See attached Sample Receipt Form)				(See attached Sample Receipt Form)											

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SGS NORTH AMERICA INC. CHAIN OF CUSTODY RECORD

1160406



<b>SECTION 1</b> CLIENT: <u>Restoration Science &amp; Eng. LLC</u> CONTACT: <u>C Brandt</u> PHONE #: <u>(907) 278 1023</u>		INSTRUCTIONS: SECTIONS 1-5 MUST BE FILLED OUT. OMISSIONS MAY DELAY THE ONSET OF ANALYSIS.											
PROJECT NAME: <u>BYF site Characterization</u> REPORTS TO: <u>Colette</u> INVOICE TO: <u>RSE</u>		PROJECT/ PWSID/ SITE: <u></u> E-MAIL: <u>cbrandt@rstsci.com</u> QUOTE #: <u></u> P.O. #: <u>15-1459</u>		<b>SECTION 3</b> # CONTAINERS SAMPLE TYPE: <input checked="" type="checkbox"/> Method <input checked="" type="checkbox"/> Grab <input type="checkbox"/> MI (Multi-Incremental)		PRESERVATIVE <input checked="" type="checkbox"/> PRO <input checked="" type="checkbox"/> GPD <input checked="" type="checkbox"/> VOCs <input checked="" type="checkbox"/> SVOCs							
<b>SECTION 2</b> RESERVED FOR LAB USE	SAMPLE IDENTIFICATION	DATE MM/DD/YY	TIME HH:MM	MATRIX/MATRIX CODE	# CONTAINERS	SAMPLE TYPE					REMARKS/LOC ID		
④ AJ	MW1	1/28/16	1230	W	10	G	X	X	X				
⑤ AJ	MW3	1/28/16	1434	W	10	G	X	X	X				
⑥ AS	MWX	1/28/16	0600	W	10	G	X	X	X				
⑦ DAC	Trip Blank												
<b>SECTION 5</b> RELINQUISHED BY: (1) <u>[Signature]</u> DATE <u>1/29/16</u> TIME <u>1404</u>		RELINQUISHED BY: (2) _____ DATE _____ TIME _____		RELINQUISHED BY: (3) _____ DATE _____ TIME _____		RELINQUISHED BY: (4) _____ DATE <u>1/29/16</u> TIME <u>16:04</u>		RECEIVED BY: _____		RECEIVED FOR LABORATORY BY: <u>[Signature]</u>		<b>SECTION 4</b> DOD Project? _____ DATA DELIVERABLE REQUIREMENTS: _____ COC ID: _____ Cooler ID: _____ REQUESTED TURNAROUND TIME AND/OR SPECIAL INSTRUCTIONS: _____	
						TEMP BLANK °C: <u>3.6 # D12</u> OR AMBIENT [ ]		CHAIN OF CUSTODY SEAL: (CIRCLE) INTACT <input type="checkbox"/> BROKEN <input type="checkbox"/> <u>ABSENT</u>					
						(See attached Sample Receipt Form)		(See attached Sample Receipt Form)					



1160406



1 1 6 0 4 0 6

SAMPLE RECEIPT FORM

Review Criteria:	Yes	N/A	No	Comments/Action Taken:
Were <b>custody seals</b> intact? Note # & location, if applicable. COC accompanied samples?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Exemption permitted if sampler hand carries/delivers.</i>
<b>Temperature blank</b> compliant* (i.e., 0-6°C after CF)? <i>If &gt;6°C, were samples collected &lt;8 hours ago?</i> <i>If &lt;0°C, were all sample containers ice free?</i> Cooler ID: <u>1</u> @ <u>1.4</u> w/ Therm.ID: <u>D7</u> Cooler ID: <u>2</u> @ <u>3.6</u> w/ Therm.ID: <u>D12</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled."	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Exemption permitted if chilled &amp; collected &lt;8 hrs ago.</i>  <i>Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.</i>
Delivery method (specify all that apply): <input checked="" type="checkbox"/> Client (hand carried) <input type="checkbox"/> USPS <input type="checkbox"/> Lynden <input type="checkbox"/> AK Air <input type="checkbox"/> Alert Courier <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> RAVN <input type="checkbox"/> C&D Delivery <input type="checkbox"/> Carlife <input type="checkbox"/> Pen Air <input type="checkbox"/> Warp Speed <input type="checkbox"/> Other: _____ → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Yes	N/A	No	
Were samples received within hold time? Do samples <b>match COC*</b> (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Note: Refer to form F-083 "Sample Guide" for hold times.</i> <i>Note: If times differ &lt;1hr, record details and login per COC.</i>
Were samples in <b>good condition</b> (no leaks/cracks/breakage)? Packing material used (specify all that apply): <input checked="" type="checkbox"/> Bubble Wrap <input type="checkbox"/> Separate plastic bags <input type="checkbox"/> Vermiculite <input type="checkbox"/> Other:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were <b>proper containers</b> (type/mass/volume/preservative*) used? Were <b>Trip Blanks</b> (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials <b>free of headspace</b> (i.e., bubbles ≤6 mm)? Were all soil VOAs <b>field extracted</b> with MeOH+BFB?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <i>Exemption permitted for metals (e.g., 200.8/6020A).</i>
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was <b>pH verified and compliant</b> ? If pH was adjusted, were bottles flagged (i.e., stickers)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For <b>special handling</b> (e.g., "MI" soils, foreign soils, lab filter for dissolved..., lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For <b>RUSH/SHORT Hold Time</b> , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For <b>SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP</b> , were containers / paperwork flagged accordingly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>For any question answered "No,"</b> has the PM been notified and the problem resolved (or paperwork put in their bin)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SRF Completed by: KMW 1/29/16 PM notified:
Was <b>PEER REVIEW</b> of <i>sample numbering/labeling completed</i> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Peer Reviewed by:
Additional notes (if applicable):				

Note to Client: Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.



## Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1160406001-A	HCL to pH < 2	OK	1160406005-J	No Preservative Required	OK
1160406001-B	HCL to pH < 2	OK	1160406006-A	HCL to pH < 2	OK
1160406001-C	HCL to pH < 2	OK	1160406006-B	HCL to pH < 2	OK
1160406001-D	HCL to pH < 2	OK	1160406006-C	HCL to pH < 2	OK
1160406001-E	HCL to pH < 2	OK	1160406006-D	HCL to pH < 2	OK
1160406001-F	HCL to pH < 2	OK	1160406006-E	HCL to pH < 2	OK
1160406001-G	HCL to pH < 2	OK	1160406006-F	HCL to pH < 2	OK
1160406001-H	HCL to pH < 2	OK	1160406006-G	HCL to pH < 2	OK
1160406001-I	No Preservative Required	OK	1160406006-H	HCL to pH < 2	OK
1160406001-J	No Preservative Required	OK	1160406006-I	No Preservative Required	OK
1160406002-A	HCL to pH < 2	OK	1160406006-J	No Preservative Required	OK
1160406002-B	HCL to pH < 2	OK	1160406007-A	HCL to pH < 2	OK
1160406002-C	HCL to pH < 2	OK	1160406007-B	HCL to pH < 2	OK
1160406002-D	HCL to pH < 2	OK	1160406007-C	HCL to pH < 2	OK
1160406002-E	HCL to pH < 2	OK			
1160406002-F	HCL to pH < 2	OK			
1160406002-G	HCL to pH < 2	OK			
1160406002-H	HCL to pH < 2	OK			
1160406002-I	No Preservative Required	OK			
1160406002-J	No Preservative Required	OK			
1160406003-A	HCL to pH < 2	OK			
1160406003-B	HCL to pH < 2	OK			
1160406003-C	HCL to pH < 2	OK			
1160406004-A	HCL to pH < 2	OK			
1160406004-B	HCL to pH < 2	OK			
1160406004-C	HCL to pH < 2	OK			
1160406004-D	HCL to pH < 2	OK			
1160406004-E	HCL to pH < 2	OK			
1160406004-F	HCL to pH < 2	OK			
1160406004-G	HCL to pH < 2	OK			
1160406004-H	HCL to pH < 2	OK			
1160406004-I	No Preservative Required	OK			
1160406004-J	No Preservative Required	OK			
1160406005-A	HCL to pH < 2	OK			
1160406005-B	HCL to pH < 2	OK			
1160406005-C	HCL to pH < 2	OK			
1160406005-D	HCL to pH < 2	OK			
1160406005-E	HCL to pH < 2	OK			
1160406005-F	HCL to pH < 2	OK			
1160406005-G	HCL to pH < 2	OK			
1160406005-H	HCL to pH < 2	OK			
1160406005-I	No Preservative Required	OK			

Container Id      Preservative

Container  
Condition

Container Id

Preservative

Container  
Condition

#### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM- The container was received damaged.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

## Laboratory Data Review Checklist

Completed by:

Title:  Date:

CS Report Name:  Report Date:

Consultant Firm:

Laboratory Name:  Laboratory Report Number:

ADEC File Number:  ADEC RecKey Number:

### 1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?  
 Yes    No    NA (Please explain.)                      Comments:

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?  
 Yes     No     NA (Please explain.)                      Comments:

### 2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?  
 Yes    No    NA (Please explain.)                      Comments:

- b. Correct analyses requested?  
 Yes    No    NA (Please explain.)                      Comments:

### 3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?  
 Yes     No    NA (Please explain.)                      Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

Yes  No  NA (Please explain.)                      Comments:

Samples submitted for GRO/BTEX and SVOCs analysis were preserved with HCL.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes  No  NA (Please explain.)                      Comments:

Review of the sample receipt form indicated the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes  No  NA (Please explain.)                      Comments:

- e. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability was not affected.

#### 4. Case Narrative

- a. Present and understandable?

Yes  No  NA (Please explain.)                      Comments:

The case narrative is present and understandable on page 2 of the lab report.

- b. Discrepancies, errors or QC failures identified by the lab?

Yes  No  NA (Please explain.)                      Comments:

The case narrative notes that multiple surrogate recoveries and LCSs did not meet QC goals. Corrective actions for these are noted in the case narrative and described subsequently in this document.

- c. Were all corrective actions documented?

Yes  No  NA (Please explain.)                      Comments:

No Corrective actions were required.

- d. What is the effect on data quality/usability according to the case narrative?

Comments:

There is no effect on data quality and usability.



5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes    No    NA (Please explain.)                      Comments:

The correct analyses were performed and reported as requested on the COC.

b. All applicable holding times met?

Yes     No     NA (Please explain.)                      Comments:

Holding times were met for all samples according to the lab method.

c. All soils reported on a dry weight basis?

Yes     No     NA (Please explain.)                      Comments:

Sample weights are reported on a dry weight basis on each page of the report describing the target sample.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

Yes     No     NA (Please explain.)                      Comments:

SGS refers to the PQL as the LOQ and reports data below the PQL but above the detection limit (DL) as estimated results with a "J". Constituents that were analyzed for but not detected are reported as a value equal to 2 times the DL and flagged with a "U". All PQLs were below the cleanup level.

e. Data quality or usability affected?

Comments:

There is no effect on data quality or usability.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes     No     NA (Please explain.)                      Comments:

There is one method blank for each requested analyses.

ii. All method blank results less than PQL?

Yes     No     NA (Please explain.)                      Comments:

All method blank results are less than the LOQ (PQL).

iii. If above PQL, what samples are affected?

No method blank samples were reported above the LOQ (PQL).

Comments:

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

Yes  No  NA (Please explain.)

Comments:

No method blank samples were reported above the LOQ (PQL).

v. Data quality or usability affected? (Please explain.)

Data quality or usability was not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes  No  NA (Please explain.)

Comments:

LCS and LCSDs were performed for AK 101, AK 102, and 8260B, analyses. LCS was performed for 8270D analysis associated with samples MW4, but not LCSD

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes  No  NA (Please explain.)

Comments:

Metals analysis was not performed

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes  No  NA (Please explain.)

Comments:

LCSD recovery for benzoic acid did not meet QC criteria for MW4

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes  No  NA (Please explain.)

Comments:

LCS/LCSD RPD for benzoic acid and Chloroethane did not meet QC criteria.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Associated sample results for benzoic acid and Chloroethane analytes were less than the LOQ.

Comments:

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes  No  NA (Please explain.)

Comments:

Data flags are clearly defined and noted in the case narrative.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality or usability was not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

Yes  No NA (Please explain.)

Comments:

Surrogate recoveries are reported for all organic analyses.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes  No  NA (Please explain.)

Comments:

All percent recoveries (%R) reported and within method or laboratory limits.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes  No  NA (Please explain.)

Comments:

All percent recoveries (%R) reported and within method or laboratory limits.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

Data quality or usability not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes  No NA (Please explain.)

Comments:

A trip blank for samples was included.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes  No  NA (Please explain.)

Comments:

Trip blank was noted on COC.

iii. All results less than PQL?

All trip blank results were less than the PQL.

Yes  No  NA (Please explain.)                      Comments:

iv. If above PQL, what samples are affected?

Comments:

No affected samples.

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes  No  NA (Please explain.)                      Comments:

One field duplicates was collected. Sample MW X is a field duplicate of MW 1.

ii. Submitted blind to lab?

Yes  No  NA (Please explain.)                      Comments:

The field duplicates was submitted to the lab as a blind duplicate.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

Yes  No  NA (Please explain.)                      Comments:

All results for samples MW 1 and MW X were undetected.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability was not affected.

f. Decontamination or Equipment Blank (If not used explain why).

Yes  No  NA (Please explain.)                      Comments:

All equipment used in sampling was dedicated and disposable, or was cleaned inalconox solution and rinsed with Deionized water prior to sampling. Equipment was not re-used during the sampling event. Based on previous experience, and equipment blank was not determined necessary.

i. All results less than PQL?

Yes No  NA (Please explain.)

Comments:

There are no decontamination or equipment blanks

ii. If above PQL, what samples are affected?

Comments:

There are no decontamination equipment blanks

iii. Data quality or usability affected? (Please explain.)

Data quality or usability was not affected.

Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes No NA (Please explain.)

Comments:

Data flags and qualifiers are defined appropriately. Page 4 of the lab report describes the qualifiers used.



## Laboratory Report of Analysis

To: Restoration Science & Eng  
911 W. 8th Ave  
Anchorage, AK 99501  
(907)278-1023

Report Number: **1160407**

Client Project: **BYF Site Charaterization**

Dear Colette Brandt,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Chuck at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,  
SGS North America Inc.

---

Chuck Homestead  
Project Manager  
Charles.Homestead@sgs.com

Date

Print Date: 02/17/2016 11:11:32AM

### Case Narrative

SGS Client: **Restoration Science & Eng**  
SGS Project: **1160407**  
Project Name/Site: **BYF Site Characterization**  
Project Contact: **Colette Brandt**

Refer to sample receipt form for information on sample condition.

#### 4-16 (1160407008) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (1150%) does not meet QC criteria due to matrix interference.  
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (690%) does not meet QC criteria due to sample dilution (100X).  
AK102 - Surrogate recoveries for 5a-androstane (0%) do not meet QC criteria due to sample dilution (40X).  
8270D SIM - PAH LCS recovery for benzo[a]pyrene (0%) does not meet QC criteria. Sample was re-extracted outside of hold time with LCS recovery for benzo[a]pyrene (35.8%) outside QC criteria. MS/MSD recoveries for this analyte was within QC criteria on both extractions. Sample result for benzo[a]pyrene on both extractions were less than the LOQ.

#### 5-16 (1160407011) PS

AK102 - Surrogate recovery for 5a-androstane (0%) does not meet QC criteria due to sample dilution (10X).  
AK101 - Surrogate recovery for 4-bromofluorobenzene (2030%) does not meet QC criteria due to matrix interference.  
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (1110%) does not meet QC criteria due to sample dilution (100X).  
8270D SIM - PAH LCS recovery for benzo[a]pyrene (0%) does not meet QC criteria. Sample was re-extracted outside of hold time with LCS recovery for benzo[a]pyrene (35.8%) outside QC criteria. MS/MSD recoveries for this analyte was within QC criteria on both extractions. Sample result for benzo[a]pyrene on both extractions were less than the LOQ.

#### 5-X (1160407012) PS

AK102 - Surrogate recovery for 5a-androstane (0%) does not meet QC criteria due to sample dilution (10X).  
AK101 - Surrogate recovery for 4-bromofluorobenzene (2270%) does not meet QC criteria due to matrix interference.  
8270D SIM - PAH surrogate recovery for 2-fluorobiphenyl (992%) does not meet QC criteria due to sample dilution (100X).  
8270D SIM - PAH LCS recovery for benzo[a]pyrene (0%) does not meet QC criteria. Sample was re-extracted outside of hold time with LCS recovery for benzo[a]pyrene (35.8%) outside QC criteria. MS/MSD recoveries for this analyte was within QC criteria on both extractions. Sample result for benzo[a]pyrene on both extractions were less than the LOQ.

#### 9-10 (1160407019) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene (618%) does not meet QC criteria due to matrix interference.

#### LCS for HBN 1728217 [XXX/34885 (1312075) LCS

8270D SIM - PAH LCS recovery for benzo[a]pyrene (0%) does not meet QC criteria.

\*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

### Report of Manual Integrations

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Analytical Batch</u>	<u>Analyte</u>	<u>Reason</u>
<b>8270D SIMS (PAH)</b>				
1160407008	4-16	XMS9174	Chrysene	BLC
1312077	1167582002MSD	XMS9174	Benzo[k]fluoranthene	BLC

#### Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 02/17/2016 11:11:34AM



## Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
D	The analyte concentration is the result of a dilution.
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
F	Indicates value that is greater than or equal to the DL
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
JL	The analyte was positively identified, but the quantitation is a low estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
M	A matrix effect was present.
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
Q	QC parameter out of acceptance range.
R	Rejected
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

### Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
1-9.5	1160407001	01/26/2016	01/29/2016	Soil/Solid (dry weight)
2-9	1160407002	01/26/2016	01/29/2016	Soil/Solid (dry weight)
2-19	1160407003	01/26/2016	01/29/2016	Soil/Solid (dry weight)
3-5.5	1160407004	01/26/2016	01/29/2016	Soil/Solid (dry weight)
3-X	1160407005	01/26/2016	01/29/2016	Soil/Solid (dry weight)
3-19	1160407006	01/26/2016	01/29/2016	Soil/Solid (dry weight)
4-14	1160407007	01/27/2016	01/29/2016	Soil/Solid (dry weight)
4-16	1160407008	01/27/2016	01/29/2016	Soil/Solid (dry weight)
4-19	1160407009	01/27/2016	01/29/2016	Soil/Solid (dry weight)
5-9	1160407010	01/27/2016	01/29/2016	Soil/Solid (dry weight)
5-16	1160407011	01/27/2016	01/29/2016	Soil/Solid (dry weight)
5-X	1160407012	01/27/2016	01/29/2016	Soil/Solid (dry weight)
5-19	1160407013	01/27/2016	01/29/2016	Soil/Solid (dry weight)
5-21	1160407014	01/27/2016	01/29/2016	Soil/Solid (dry weight)
6-14	1160407015	01/27/2016	01/29/2016	Soil/Solid (dry weight)
6-19	1160407016	01/27/2016	01/29/2016	Soil/Solid (dry weight)
7-11.5	1160407017	01/27/2016	01/29/2016	Soil/Solid (dry weight)
8-14	1160407018	01/28/2016	01/29/2016	Soil/Solid (dry weight)
9-10	1160407019	01/28/2016	01/29/2016	Soil/Solid (dry weight)
9-15.5	1160407020	01/28/2016	01/29/2016	Soil/Solid (dry weight)
9-20	1160407021	01/28/2016	01/29/2016	Soil/Solid (dry weight)
SS	1160407022	01/28/2016	01/29/2016	Soil/Solid (dry weight)
BKT	1160407023	01/28/2016	01/29/2016	Soil/Solid (dry weight)
Trip Blank	1160407024	01/28/2016	01/29/2016	Soil/Solid (dry weight)

<u>Method</u>	<u>Method Description</u>
8270D SIMS (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
AK102	Diesel Range Organics (S)
SM21 2540G	Percent Solids SM2540G

### Detectable Results Summary

Client Sample ID: **4-16**

Lab Sample ID: 1160407008

**Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
1-Methylnaphthalene	3260	ug/Kg
2-Methylnaphthalene	4040	ug/Kg
Benzo[b]Fluoranthene	61.2	ug/Kg
Fluoranthene	127	ug/Kg
Naphthalene	2800	ug/Kg
Pyrene	127	ug/Kg
Diesel Range Organics	17600	mg/Kg

**Semivolatile Organic Fuels**

**Volatile Fuels**

Benzene	173	ug/Kg
Ethylbenzene	3520	ug/Kg
Gasoline Range Organics	247	mg/Kg
o-Xylene	11500	ug/Kg
P & M -Xylene	18100	ug/Kg
Toluene	3150	ug/Kg

Client Sample ID: **4-19**

Lab Sample ID: 1160407009

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
o-Xylene	29.7	ug/Kg

Client Sample ID: **5-16**

Lab Sample ID: 1160407011

**Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
1-Methylnaphthalene	5640	ug/Kg
2-Methylnaphthalene	7030	ug/Kg
Benzo[b]Fluoranthene	80.5	ug/Kg
Fluoranthene	179	ug/Kg
Naphthalene	4810	ug/Kg
Pyrene	180	ug/Kg
Diesel Range Organics	22100	mg/Kg

**Semivolatile Organic Fuels**

**Volatile Fuels**

Benzene	444	ug/Kg
Ethylbenzene	7560	ug/Kg
Gasoline Range Organics	422	mg/Kg
o-Xylene	18600	ug/Kg
P & M -Xylene	28400	ug/Kg
Toluene	6670	ug/Kg

### Detectable Results Summary

Client Sample ID: **5-X**

Lab Sample ID: 1160407012

**Polynuclear Aromatics GC/MS**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
1-Methylnaphthalene	5190	ug/Kg
2-Methylnaphthalene	6380	ug/Kg
Benzo[b]Fluoranthene	72.1	ug/Kg
Fluoranthene	165	ug/Kg
Naphthalene	4400	ug/Kg
Pyrene	171	ug/Kg
Diesel Range Organics	17400	mg/Kg
Benzene	355	ug/Kg
Ethylbenzene	7320	ug/Kg
Gasoline Range Organics	749	mg/Kg
o-Xylene	31300	ug/Kg
P & M -Xylene	42400	ug/Kg
Toluene	6930	ug/Kg

Client Sample ID: **5-19**

Lab Sample ID: 1160407013

**Semivolatile Organic Fuels**

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	36.1	mg/Kg
Ethylbenzene	35.2	ug/Kg
o-Xylene	80.3	ug/Kg
P & M -Xylene	108	ug/Kg

Client Sample ID: **9-10**

Lab Sample ID: 1160407019

**Semivolatile Organic Fuels**

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Diesel Range Organics	6780	mg/Kg
Ethylbenzene	586	ug/Kg
Gasoline Range Organics	233	mg/Kg
o-Xylene	7360	ug/Kg
P & M -Xylene	1310	ug/Kg
Toluene	153	ug/Kg

Client Sample ID: **9-20**

Lab Sample ID: 1160407021

**Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Gasoline Range Organics	5.43	mg/Kg
o-Xylene	47.8	ug/Kg
P & M -Xylene	81.8	ug/Kg



### Results of 1-9.5

Client Sample ID: **1-9.5**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407001  
Lab Project ID: 1160407

Collection Date: 01/26/16 11:10  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):62.8  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	127 U	127	39.4	mg/Kg	4		02/16/16 00:51
<b>Surrogates</b>							
5a Androstane (surr)	92.4	50-150		%	4		02/16/16 00:51

### Batch Information

Analytical Batch: XFC12277  
Analytical Method: AK102  
Analyst: S.G  
Analytical Date/Time: 02/16/16 00:51  
Container ID: 1160407001-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.078 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of 1-9.5

Client Sample ID: 1-9.5
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407001
Lab Project ID: 1160407

Collection Date: 01/26/16 11:10
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):62.8
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Gasoline Range Organics and Surrogates (4-Bromofluorobenzene).

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 18:57
Container ID: 1160407001-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/26/16 11:10
Prep Initial Wt./Vol.: 33.415 g
Prep Extract Vol: 37.4416 mL

Analytical Batch: VFC12895
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/03/16 15:25
Container ID:

Prep Batch: VXX28481
Prep Method: SW5035A
Prep Date/Time: 01/26/16 11:10
Prep Initial Wt./Vol.: 33.415 g
Prep Extract Vol: 37.4416 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene, and Surrogates (1,4-Difluorobenzene).

Print Date: 02/17/2016 11:11:38AM



**Results of 1-9.5**

Client Sample ID: **1-9.5**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407001  
Lab Project ID: 1160407

Collection Date: 01/26/16 11:10  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):62.8  
Location:

**Results by Volatile Fuels**

**Batch Information**

Analytical Batch: VFC12891  
Analytical Method: SW8021B  
Analyst: S.P  
Analytical Date/Time: 02/02/16 18:57  
Container ID: 1160407001-B

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 01/26/16 11:10  
Prep Initial Wt./Vol.: 33.415 g  
Prep Extract Vol: 37.4416 mL

Analytical Batch: VFC12895  
Analytical Method: SW8021B  
Analyst: S.P  
Analytical Date/Time: 02/03/16 15:25  
Container ID:

Prep Batch: VXX28481  
Prep Method: SW5035A  
Prep Date/Time: 01/26/16 11:10  
Prep Initial Wt./Vol.: 33.415 g  
Prep Extract Vol: 37.4416 mL

Print Date: 02/17/2016 11:11:38AM



### Results of 2-9

Client Sample ID: **2-9**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407002  
Lab Project ID: 1160407

Collection Date: 01/26/16 14:10  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):68.5  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	29.2 U	29.2	9.04	mg/Kg	1		02/04/16 17:37
<b>Surrogates</b>							
5a Androstane (surr)	70.9	50-150		%	1		02/04/16 17:37

### Batch Information

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 17:37  
Container ID: 1160407002-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.042 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM





Results of 2-9

Client Sample ID: 2-9
Client Project ID: BYF Site Characterization
Lab Sample ID: 1160407002
Lab Project ID: 1160407

Collection Date: 01/26/16 14:10
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):68.5
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row 1: Gasoline Range Organics, 6.65 U, 6.65, 2.00, mg/Kg, 1, 02/02/16 19:16

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row 1: 4-Bromofluorobenzene (surr), 83.4, 50-150, %, 1, 02/02/16 19:16

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 19:16
Container ID: 1160407002-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/26/16 14:10
Prep Initial Wt./Vol.: 41.966 g
Prep Extract Vol: 38.2262 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row 1: 1,4-Difluorobenzene (surr), 88.4, 72-119, %, 1, 02/02/16 19:16

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 19:16
Container ID: 1160407002-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/26/16 14:10
Prep Initial Wt./Vol.: 41.966 g
Prep Extract Vol: 38.2262 mL

Print Date: 02/17/2016 11:11:38AM



**Results of 2-19**

Client Sample ID: **2-19**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407003  
Lab Project ID: 1160407

Collection Date: 01/26/16 14:15  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):81.6  
Location:

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	24.5 U	24.5	7.59	mg/Kg	1		02/04/16 17:57
<b>Surrogates</b>							
5a Androstane (surr)	84.1	50-150		%	1		02/04/16 17:57

**Batch Information**

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 17:57  
Container ID: 1160407003-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.016 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of 2-19

Client Sample ID: 2-19
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407003
Lab Project ID: 1160407

Collection Date: 01/26/16 14:15
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):81.6
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 2.83 U, 2.83, 0.848, mg/Kg, 1, 02/02/16 19:35

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 95.5, 50-150, %, 1, 02/02/16 19:35

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 19:35
Container ID: 1160407003-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/26/16 14:15
Prep Initial Wt./Vol.: 90.088 g
Prep Extract Vol: 41.5624 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 89.2, 72-119, %, 1, 02/02/16 19:35

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 19:35
Container ID: 1160407003-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/26/16 14:15
Prep Initial Wt./Vol.: 90.088 g
Prep Extract Vol: 41.5624 mL

Print Date: 02/17/2016 11:11:38AM



### Results of 3-X

Client Sample ID: **3-X**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407005  
Lab Project ID: 1160407

Collection Date: 01/26/16 12:00  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):82.9  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	23.9 U	23.9	7.40	mg/Kg	1		02/04/16 18:18
<b>Surrogates</b>							
5a Androstane (surr)	62.6	50-150		%	1		02/04/16 18:18

### Batch Information

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 18:18  
Container ID: 1160407005-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.313 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of 3-X

Client Sample ID: 3-X
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407005
Lab Project ID: 1160407

Collection Date: 01/26/16 12:00
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):82.9
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 3.46 U, 3.46, 1.04, mg/Kg, 1, 02/02/16 19:54

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 99.7, 50-150, %, 1, 02/02/16 19:54

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 19:54
Container ID: 1160407005-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/26/16 12:00
Prep Initial Wt./Vol.: 62.009 g
Prep Extract Vol: 35.5821 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 88.9, 72-119, %, 1, 02/02/16 19:54

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 19:54
Container ID: 1160407005-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/26/16 12:00
Prep Initial Wt./Vol.: 62.009 g
Prep Extract Vol: 35.5821 mL

Print Date: 02/17/2016 11:11:38AM



**Results of 3-19**

Client Sample ID: **3-19**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407006  
Lab Project ID: 1160407

Collection Date: 01/26/16 15:15  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):83.2  
Location:

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	24.0 U	24.0	7.44	mg/Kg	1		02/04/16 18:39
<b>Surrogates</b>							
5a Androstane (surr)	75.4	50-150		%	1		02/04/16 18:39

**Batch Information**

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 18:39  
Container ID: 1160407006-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.049 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of 3-19

Client Sample ID: 3-19
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407006
Lab Project ID: 1160407

Collection Date: 01/26/16 15:15
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.2
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 3.46 U, 3.46, 1.04, mg/Kg, 1, 02/02/16 20:13

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 87.7, 50-150, %, 1, 02/02/16 20:13

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 20:13
Container ID: 1160407006-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/26/16 15:15
Prep Initial Wt./Vol.: 61.336 g
Prep Extract Vol: 35.2885 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 88.3, 72-119, %, 1, 02/02/16 20:13

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 20:13
Container ID: 1160407006-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/26/16 15:15
Prep Initial Wt./Vol.: 61.336 g
Prep Extract Vol: 35.2885 mL

Print Date: 02/17/2016 11:11:38AM



Results of 4-16

Client Sample ID: 4-16
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407008
Lab Project ID: 1160407

Collection Date: 01/27/16 10:20
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):85.6
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their detection results.

Batch Information

Analytical Batch: XMS9174
Analytical Method: 8270D SIMS (PAH)
Analyst: DSH
Analytical Date/Time: 02/10/16 05:04
Container ID: 1160407008-A

Prep Batch: XXX34885
Prep Method: SW3550C
Prep Date/Time: 02/08/16 10:16
Prep Initial Wt./Vol.: 22.873 g
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM





**Results of 4-16**

Client Sample ID: **4-16**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407008  
Lab Project ID: 1160407

Collection Date: 01/27/16 10:20  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):85.6  
Location:

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	17600		933	289	mg/Kg	40		02/16/16 01:12
<b>Surrogates</b>								
5a Androstane (surr)	0	*	50-150		%	40		02/16/16 01:12

**Batch Information**

Analytical Batch: XFC12277  
Analytical Method: AK102  
Analyst: S.G  
Analytical Date/Time: 02/16/16 01:12  
Container ID: 1160407008-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.049 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of 4-16

Client Sample ID: 4-16
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407008
Lab Project ID: 1160407

Collection Date: 01/27/16 10:20
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):85.6
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result, Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Gasoline Range Organics and 4-Bromofluorobenzene (surr).

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 20:32
Container ID: 1160407008-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/27/16 10:20
Prep Initial Wt./Vol.: 65.186 g
Prep Extract Vol: 34.3733 mL

Table with 8 columns: Parameter, Result, Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, and Toluene.

Surrogates

Table with 8 columns: Parameter, Result, Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows include 1,4-Difluorobenzene (surr).

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 20:32
Container ID: 1160407008-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/27/16 10:20
Prep Initial Wt./Vol.: 65.186 g
Prep Extract Vol: 34.3733 mL

Analytical Batch: VFC12895
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/03/16 16:41
Container ID:

Prep Batch: VXX28481
Prep Method: SW5035A
Prep Date/Time: 01/27/16 10:20
Prep Initial Wt./Vol.: 65.186 g
Prep Extract Vol: 34.3733 mL

Print Date: 02/17/2016 11:11:38AM



**Results of 4-19**

Client Sample ID: **4-19**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407009  
Lab Project ID: 1160407

Collection Date: 01/27/16 10:10  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):83.3  
Location:

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	23.9 U	23.9	7.40	mg/Kg	1		02/04/16 19:21
<b>Surrogates</b>							
5a Androstane (surr)	71.2	50-150		%	1		02/04/16 19:21

**Batch Information**

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 19:21  
Container ID: 1160407009-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.179 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of 4-19

Client Sample ID: 4-19
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407009
Lab Project ID: 1160407

Collection Date: 01/27/16 10:10
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):83.3
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row 1: Gasoline Range Organics, 2.58 U, 2.58, 0.774, mg/Kg, 1, 02/02/16 20:51

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row 1: 4-Bromofluorobenzene (surr), 108, 50-150, %, 1, 02/02/16 20:51

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 20:51
Container ID: 1160407009-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/27/16 10:10
Prep Initial Wt./Vol.: 95.267 g
Prep Extract Vol: 40.948 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row 1: 1,4-Difluorobenzene (surr), 87.1, 72-119, %, 1, 02/02/16 20:51

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 20:51
Container ID: 1160407009-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/27/16 10:10
Prep Initial Wt./Vol.: 95.267 g
Prep Extract Vol: 40.948 mL

Print Date: 02/17/2016 11:11:38AM



Results of 5-16

Client Sample ID: 5-16
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407011
Lab Project ID: 1160407

Collection Date: 01/27/16 12:50
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):86.0
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their detection results.

Batch Information

Analytical Batch: XMS9174
Analytical Method: 8270D SIMS (PAH)
Analyst: DSH
Analytical Date/Time: 02/10/16 05:21
Container ID: 1160407011-A

Prep Batch: XXX34885
Prep Method: SW3550C
Prep Date/Time: 02/08/16 10:16
Prep Initial Wt./Vol.: 22.916 g
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



**Results of 5-16**

Client Sample ID: **5-16**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407011  
Lab Project ID: 1160407

Collection Date: 01/27/16 12:50  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):86.0  
Location:

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	22100		1160	360	mg/Kg	10		02/04/16 19:41
<b>Surrogates</b>								
5a Androstane (surr)	0	*	50-150		%	10		02/04/16 19:41

**Batch Information**

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 19:41  
Container ID: 1160407011-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.078 g  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:11:38AM



**Results of 5-16**

Client Sample ID: **5-16**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407011  
Lab Project ID: 1160407

Collection Date: 01/27/16 12:50  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):86.0  
Location:

**Results by Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	422		43.2	12.9	mg/Kg	10		02/02/16 21:47

**Surrogates**

4-Bromofluorobenzene (surr)	2030	*	50-150		%	10		02/02/16 21:47
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**Batch Information**

Analytical Batch: VFC12891  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/02/16 21:47  
Container ID: 1160407011-B

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 01/27/16 12:50  
Prep Initial Wt./Vol.: 41.541 g  
Prep Extract Vol: 30.8243 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	444		21.6	6.90	ug/Kg	1		02/03/16 17:18
Ethylbenzene	7560		432	135	ug/Kg	10		02/02/16 21:47
o-Xylene	18600		432	135	ug/Kg	10		02/02/16 21:47
P & M -Xylene	28400		863	259	ug/Kg	10		02/02/16 21:47
Toluene	6670		432	135	ug/Kg	10		02/02/16 21:47

**Surrogates**

1,4-Difluorobenzene (surr)	92		72-119		%	10		02/02/16 21:47
1,4-Difluorobenzene (surr)	81.9		72-119		%	1		02/03/16 17:18

**Batch Information**

Analytical Batch: VFC12891  
Analytical Method: SW8021B  
Analyst: S.P  
Analytical Date/Time: 02/02/16 21:47  
Container ID: 1160407011-B

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 01/27/16 12:50  
Prep Initial Wt./Vol.: 41.541 g  
Prep Extract Vol: 30.8243 mL

Analytical Batch: VFC12895  
Analytical Method: SW8021B  
Analyst: S.P  
Analytical Date/Time: 02/03/16 17:18  
Container ID:

Prep Batch: VXX28481  
Prep Method: SW5035A  
Prep Date/Time: 01/27/16 12:50  
Prep Initial Wt./Vol.: 41.541 g  
Prep Extract Vol: 30.8243 mL

Print Date: 02/17/2016 11:11:38AM



Results of 5-X

Client Sample ID: 5-X
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407012
Lab Project ID: 1160407

Collection Date: 01/27/16 08:00
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):86.3
Location:

Results by Polynuclear Aromatics GC/MS

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Lists various polynuclear aromatic hydrocarbons and their detection results.

Batch Information

Analytical Batch: XMS9174
Analytical Method: 8270D SIMS (PAH)
Analyst: DSH
Analytical Date/Time: 02/10/16 05:39
Container ID: 1160407012-A

Prep Batch: XXX34885
Prep Method: SW3550C
Prep Date/Time: 02/08/16 10:16
Prep Initial Wt./Vol.: 22.607 g
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM





### Results of 5-X

Client Sample ID: **5-X**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407012  
Lab Project ID: 1160407

Collection Date: 01/27/16 08:00  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):86.3  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	17400		1140	355	mg/Kg	10		02/04/16 20:02
<b>Surrogates</b>								
5a Androstane (surr)	0	*	50-150		%	10		02/04/16 20:02

### Batch Information

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 20:02  
Container ID: 1160407012-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.38 g  
Prep Extract Vol: 5 mL

Print Date: 02/17/2016 11:11:38AM



**Results of 5-X**

Client Sample ID: **5-X**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407012  
Lab Project ID: 1160407

Collection Date: 01/27/16 08:00  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):86.3  
Location:

**Results by Volatile Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Gasoline Range Organics	749		23.0	6.91	mg/Kg	5		02/03/16 16:22
<b>Surrogates</b>								
4-Bromofluorobenzene (surr)	1950	*	50-150		%	1		02/02/16 18:38
4-Bromofluorobenzene (surr)	2270	*	50-150		%	5		02/03/16 16:22

**Batch Information**

Analytical Batch: VFC12891  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/02/16 18:38  
Container ID: 1160407012-B

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 01/27/16 08:00  
Prep Initial Wt./Vol.: 38.038 g  
Prep Extract Vol: 30.2239 mL

Analytical Batch: VFC12895  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/03/16 16:22  
Container ID:

Prep Batch: VXX28481  
Prep Method: SW5035A  
Prep Date/Time: 01/27/16 08:00  
Prep Initial Wt./Vol.: 38.038 g  
Prep Extract Vol: 30.2239 mL

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Benzene	355		23.0	7.37	ug/Kg	1		02/02/16 18:38
Ethylbenzene	7320		46.1	14.4	ug/Kg	1		02/02/16 18:38
o-Xylene	31300		230	71.8	ug/Kg	5		02/03/16 16:22
P & M -Xylene	42400		461	138	ug/Kg	5		02/03/16 16:22
Toluene	6930		46.1	14.4	ug/Kg	1		02/02/16 18:38
<b>Surrogates</b>								
1,4-Difluorobenzene (surr)	87.7		72-119		%	5		02/03/16 16:22
1,4-Difluorobenzene (surr)	91.1		72-119		%	1		02/02/16 18:38

Print Date: 02/17/2016 11:11:38AM



### Results of 5-X

Client Sample ID: **5-X**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407012  
Lab Project ID: 1160407

Collection Date: 01/27/16 08:00  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):86.3  
Location:

### Results by Volatile Fuels

#### Batch Information

Analytical Batch: VFC12891  
Analytical Method: SW8021B  
Analyst: S.P  
Analytical Date/Time: 02/02/16 18:38  
Container ID: 1160407012-B

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 01/27/16 08:00  
Prep Initial Wt./Vol.: 38.038 g  
Prep Extract Vol: 30.2239 mL

Analytical Batch: VFC12895  
Analytical Method: SW8021B  
Analyst: S.P  
Analytical Date/Time: 02/03/16 16:22  
Container ID:

Prep Batch: VXX28481  
Prep Method: SW5035A  
Prep Date/Time: 01/27/16 08:00  
Prep Initial Wt./Vol.: 38.038 g  
Prep Extract Vol: 30.2239 mL

Print Date: 02/17/2016 11:11:38AM



### Results of 5-19

Client Sample ID: **5-19**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407013  
Lab Project ID: 1160407

Collection Date: 01/27/16 12:40  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):80.8  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	36.1		24.7	7.64	mg/Kg	1		02/04/16 20:23
<b>Surrogates</b>								
5a Androstane (surr)	81.9		50-150		%	1		02/04/16 20:23

### Batch Information

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 20:23  
Container ID: 1160407013-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.115 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of 5-19

Client Sample ID: 5-19
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407013
Lab Project ID: 1160407

Collection Date: 01/27/16 12:40
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):80.8
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 2.75 U, 2.75, 0.825, mg/Kg, 1, 02/02/16 22:06

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 133, 50-150, %, 1, 02/02/16 22:06

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 22:06
Container ID: 1160407013-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/27/16 12:40
Prep Initial Wt./Vol.: 98.897 g
Prep Extract Vol: 43.9636 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 88.8, 72-119, %, 1, 02/02/16 22:06

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 22:06
Container ID: 1160407013-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/27/16 12:40
Prep Initial Wt./Vol.: 98.897 g
Prep Extract Vol: 43.9636 mL

Print Date: 02/17/2016 11:11:38AM



**Results of 6-19**

Client Sample ID: **6-19**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407016  
Lab Project ID: 1160407

Collection Date: 01/27/16 15:25  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):80.3  
Location:

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	24.8 U	24.8	7.69	mg/Kg	1		02/04/16 21:04
<b>Surrogates</b>							
5a Androstane (surr)	80.3	50-150		%	1		02/04/16 21:04

**Batch Information**

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 21:04  
Container ID: 1160407016-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.128 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of **6-19**

Client Sample ID: **6-19**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407016  
Lab Project ID: 1160407

Collection Date: 01/27/16 15:25  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):80.3  
Location:

Results by **Volatile Fuels**

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.79 U	2.79	0.837	mg/Kg	1		02/02/16 22:25

**Surrogates**

4-Bromofluorobenzene (surr)	115	50-150		%	1		02/02/16 22:25
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**Batch Information**

Analytical Batch: VFC12891  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/02/16 22:25  
Container ID: 1160407016-B

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 01/27/16 15:25  
Prep Initial Wt./Vol.: 99.801 g  
Prep Extract Vol: 44.6886 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	13.9 U	13.9	4.46	ug/Kg	1		02/02/16 22:25
Ethylbenzene	27.9 U	27.9	8.70	ug/Kg	1		02/02/16 22:25
o-Xylene	27.9 U	27.9	8.70	ug/Kg	1		02/02/16 22:25
P & M -Xylene	55.8 U	55.8	16.7	ug/Kg	1		02/02/16 22:25
Toluene	27.9 U	27.9	8.70	ug/Kg	1		02/02/16 22:25

**Surrogates**

1,4-Difluorobenzene (surr)	88.4	72-119		%	1		02/02/16 22:25
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**Batch Information**

Analytical Batch: VFC12891  
Analytical Method: SW8021B  
Analyst: S.P  
Analytical Date/Time: 02/02/16 22:25  
Container ID: 1160407016-B

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 01/27/16 15:25  
Prep Initial Wt./Vol.: 99.801 g  
Prep Extract Vol: 44.6886 mL

Print Date: 02/17/2016 11:11:38AM



**Results of 7-11.5**

Client Sample ID: **7-11.5**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407017  
Lab Project ID: 1160407

Collection Date: 01/27/16 16:25  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):68.6  
Location:

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	116 U	116	36.1	mg/Kg	4		02/04/16 21:25
<b>Surrogates</b>							
5a Androstane (surr)	77.5	50-150		%	4		02/04/16 21:25

**Batch Information**

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 21:25  
Container ID: 1160407017-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.063 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM





Results of 7-11.5

Client Sample ID: 7-11.5
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407017
Lab Project ID: 1160407

Collection Date: 01/27/16 16:25
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):68.6
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 7.93 U, 7.93, 2.38, mg/Kg, 1, 02/02/16 22:44

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 91.3, 50-150, %, 1, 02/02/16 22:44

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 22:44
Container ID: 1160407017-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/27/16 16:25
Prep Initial Wt./Vol.: 32.283 g
Prep Extract Vol: 35.1251 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 87.6, 72-119, %, 1, 02/02/16 22:44

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 22:44
Container ID: 1160407017-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/27/16 16:25
Prep Initial Wt./Vol.: 32.283 g
Prep Extract Vol: 35.1251 mL

Print Date: 02/17/2016 11:11:38AM



**Results of 8-14**

Client Sample ID: **8-14**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407018  
Lab Project ID: 1160407

Collection Date: 01/28/16 09:20  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):84.3  
Location:

**Results by Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	23.6 U	23.6	7.33	mg/Kg	1		02/04/16 21:46
<b>Surrogates</b>							
5a Androstane (surr)	82.7	50-150		%	1		02/04/16 21:46

**Batch Information**

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 21:46  
Container ID: 1160407018-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.103 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of 8-14

Client Sample ID: 8-14
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407018
Lab Project ID: 1160407

Collection Date: 01/28/16 09:20
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):84.3
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 2.71 U, 2.71, 0.813, mg/Kg, 1, 02/02/16 23:03

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 106, 50-150, %, 1, 02/02/16 23:03

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 23:03
Container ID: 1160407018-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/28/16 09:20
Prep Initial Wt./Vol.: 83.318 g
Prep Extract Vol: 38.0689 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 89.5, 72-119, %, 1, 02/02/16 23:03

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 23:03
Container ID: 1160407018-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/28/16 09:20
Prep Initial Wt./Vol.: 83.318 g
Prep Extract Vol: 38.0689 mL

Print Date: 02/17/2016 11:11:38AM



### Results of 9-10

Client Sample ID: **9-10**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407019  
Lab Project ID: 1160407

Collection Date: 01/28/16 10:45  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):89.4  
Location:

### Results by Semivolatile Organic Fuels

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	6780		222	68.9	mg/Kg	10		02/04/16 22:07
<b>Surrogates</b>								
5a Androstane (surr)	90.6		50-150		%	10		02/04/16 22:07

### Batch Information

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 22:07  
Container ID: 1160407019-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.199 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of 9-10

Client Sample ID: 9-10
Client Project ID: BYF Site Charaterization
Lab Sample ID: 1160407019
Lab Project ID: 1160407

Collection Date: 01/28/16 10:45
Received Date: 01/29/16 16:04
Matrix: Soil/Solid (dry weight)
Solids (%):89.4
Location:

Results by Volatile Fuels

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: Gasoline Range Organics, 233, 5.87, 1.76, mg/Kg, 1, 02/02/16 23:22

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 4-Bromofluorobenzene (surr), 618, \*, 50-150, %, 1, 02/02/16 23:22

Batch Information

Analytical Batch: VFC12891
Analytical Method: AK101
Analyst: S.P
Analytical Date/Time: 02/02/16 23:22
Container ID: 1160407019-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/28/16 10:45
Prep Initial Wt./Vol.: 26.539 g
Prep Extract Vol: 27.8262 mL

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Rows: Benzene, Ethylbenzene, o-Xylene, P & M -Xylene, Toluene

Surrogates

Table with 8 columns: Parameter, Result Qual, LOQ/CL, DL, Units, DF, Allowable Limits, Date Analyzed. Row: 1,4-Difluorobenzene (surr), 92.7, 72-119, %, 1, 02/02/16 23:22

Batch Information

Analytical Batch: VFC12891
Analytical Method: SW8021B
Analyst: S.P
Analytical Date/Time: 02/02/16 23:22
Container ID: 1160407019-B

Prep Batch: VXX28464
Prep Method: SW5035A
Prep Date/Time: 01/28/16 10:45
Prep Initial Wt./Vol.: 26.539 g
Prep Extract Vol: 27.8262 mL

Print Date: 02/17/2016 11:11:38AM



Results of **9-20**

Client Sample ID: **9-20**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407021  
Lab Project ID: 1160407

Collection Date: 01/28/16 11:35  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):81.9  
Location:

Results by **Semivolatile Organic Fuels**

<u>Parameter</u>	<u>Result</u>	<u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Diesel Range Organics	24.3	U	24.3	7.54	mg/Kg	1		02/04/16 22:28
<b>Surrogates</b>								
5a Androstane (surr)	79.5		50-150		%	1		02/04/16 22:28

**Batch Information**

Analytical Batch: XFC12272  
Analytical Method: AK102  
Analyst: CJSW  
Analytical Date/Time: 02/04/16 22:28  
Container ID: 1160407021-A

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 02/04/16 09:18  
Prep Initial Wt./Vol.: 30.146 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:11:38AM



Results of **9-20**

Client Sample ID: **9-20**  
Client Project ID: **BYF Site Charaterization**  
Lab Sample ID: 1160407021  
Lab Project ID: 1160407

Collection Date: 01/28/16 11:35  
Received Date: 01/29/16 16:04  
Matrix: Soil/Solid (dry weight)  
Solids (%):81.9  
Location:

Results by **Volatile Fuels**

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	5.43	4.05	1.21	mg/Kg	1		02/02/16 23:41

**Surrogates**

4-Bromofluorobenzene (surr)	140	50-150		%	1		02/02/16 23:41
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**Batch Information**

Analytical Batch: VFC12891  
Analytical Method: AK101  
Analyst: S.P  
Analytical Date/Time: 02/02/16 23:41  
Container ID: 1160407021-B

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 01/28/16 11:35  
Prep Initial Wt./Vol.: 51.948 g  
Prep Extract Vol: 34.4241 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	20.2 U	20.2	6.48	ug/Kg	1		02/02/16 23:41
Ethylbenzene	40.5 U	40.5	12.6	ug/Kg	1		02/02/16 23:41
o-Xylene	47.8	40.5	12.6	ug/Kg	1		02/02/16 23:41
P & M -Xylene	81.8	81.0	24.3	ug/Kg	1		02/02/16 23:41
Toluene	40.5 U	40.5	12.6	ug/Kg	1		02/02/16 23:41

**Surrogates**

1,4-Difluorobenzene (surr)	87.4	72-119		%	1		02/02/16 23:41
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**Batch Information**

Analytical Batch: VFC12891  
Analytical Method: SW8021B  
Analyst: S.P  
Analytical Date/Time: 02/02/16 23:41  
Container ID: 1160407021-B

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 01/28/16 11:35  
Prep Initial Wt./Vol.: 51.948 g  
Prep Extract Vol: 34.4241 mL

Print Date: 02/17/2016 11:11:38AM



### Results of Trip Blank

Client Sample ID: **Trip Blank**  
 Client Project ID: **BYF Site Charaterization**  
 Lab Sample ID: 1160407024  
 Lab Project ID: 1160407

Collection Date: 01/28/16 14:00  
 Received Date: 01/29/16 16:04  
 Matrix: Soil/Solid (dry weight)  
 Solids (%):  
 Location:

### Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.47 U	2.47	0.740	mg/Kg	1		02/02/16 17:04

#### Surrogates

4-Bromofluorobenzene (surr)	88.5	50-150		%	1		02/02/16 17:04
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### Batch Information

Analytical Batch: VFC12891  
 Analytical Method: AK101  
 Analyst: S.P  
 Analytical Date/Time: 02/02/16 17:04  
 Container ID: 1160407024-A

Prep Batch: VXX28464  
 Prep Method: SW5035A  
 Prep Date/Time: 01/28/16 14:00  
 Prep Initial Wt./Vol.: 50.656 g  
 Prep Extract Vol: 25 mL

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	12.3 U	12.3	3.95	ug/Kg	1		02/02/16 17:04
Ethylbenzene	24.7 U	24.7	7.70	ug/Kg	1		02/02/16 17:04
o-Xylene	24.7 U	24.7	7.70	ug/Kg	1		02/02/16 17:04
P & M -Xylene	49.4 U	49.4	14.8	ug/Kg	1		02/02/16 17:04
Toluene	24.7 U	24.7	7.70	ug/Kg	1		02/02/16 17:04

#### Surrogates

1,4-Difluorobenzene (surr)	88.3	72-119		%	1		02/02/16 17:04
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### Batch Information

Analytical Batch: VFC12891  
 Analytical Method: SW8021B  
 Analyst: S.P  
 Analytical Date/Time: 02/02/16 17:04  
 Container ID: 1160407024-A

Prep Batch: VXX28464  
 Prep Method: SW5035A  
 Prep Date/Time: 01/28/16 14:00  
 Prep Initial Wt./Vol.: 50.656 g  
 Prep Extract Vol: 25 mL

Print Date: 02/17/2016 11:11:38AM





### Method Blank

Blank ID: MB for HBN 1727820 [SPT/9829]

Matrix: Soil/Solid (dry weight)

Blank Lab ID: 1311791

QC for Samples:

1160407001, 1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021

### Results by SM21 2540G

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Solids	100			%

### Batch Information

Analytical Batch: SPT9829

Analytical Method: SM21 2540G

Instrument:

Analyst: MEV

Analytical Date/Time: 2/3/2016 4:55:00PM

Print Date: 02/17/2016 11:11:41AM



### Duplicate Sample Summary

Original Sample ID: 1160407001

Duplicate Sample ID: 1311792

Analysis Date: 02/03/2016 16:55

Matrix: Soil/Solid (dry weight)

QC for Samples:

1160407001, 1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021

### Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	62.8	64.5	%	2.60	(< 15 )

### Batch Information

Analytical Batch: SPT9829

Analytical Method: SM21 2540G

Instrument:

Analyst: MEV

Print Date: 02/17/2016 11:11:42AM



### Duplicate Sample Summary

Original Sample ID: 1160430009

Duplicate Sample ID: 1311793

Analysis Date: 02/03/2016 16:55

Matrix: Soil/Solid (dry weight)

QC for Samples:

1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021

### Results by SM21 2540G

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Solids	94.6	94.5	%	0.20	(< 15 )

### Batch Information

Analytical Batch: SPT9829

Analytical Method: SM21 2540G

Instrument:

Analyst: MEV

Print Date: 02/17/2016 11:11:42AM



### Method Blank

Blank ID: MB for HBN 1727733 [VXX/28464]  
Blank Lab ID: 1311717

Matrix: Soil/Solid (dry weight)

#### QC for Samples:

1160407001, 1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021, 1160407024

### Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
<b>Surrogates</b>				
4-Bromofluorobenzene (surr)	73.1	50-150		%

### Batch Information

Analytical Batch: VFC12891  
Analytical Method: AK101  
Instrument: Agilent 7890A PID/FID  
Analyst: S.P  
Analytical Date/Time: 2/2/2016 1:55:00PM

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 2/2/2016 8:00:00AM  
Prep Initial Wt./Vol.: 50 g  
Prep Extract Vol: 25 mL

Print Date: 02/17/2016 11:11:57AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160407 [VXX28464]  
 Blank Spike Lab ID: 1311718  
 Date Analyzed: 02/02/2016 14:14

Spike Duplicate ID: LCSD for HBN 1160407 [VXX28464]  
 Spike Duplicate Lab ID: 1311719  
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1160407001, 1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021, 1160407024

### Results by AK101

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	12.5	11.3	90	12.5	11.1	89	( 60-120 )	1.60	(< 20 )

### Surrogates

4-Bromofluorobenzene (surr)	1.25	83.9	84	1.25	84.9	85	( 50-150 )	1.20	
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### Batch Information

Analytical Batch: VFC12891  
 Analytical Method: AK101  
 Instrument: Agilent 7890A PID/FID  
 Analyst: S.P

Prep Batch: VXX28464  
 Prep Method: SW5035A  
 Prep Date/Time: 02/02/2016 08:00  
 Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL  
 Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

Print Date: 02/17/2016 11:11:59AM



### Method Blank

Blank ID: MB for HBN 1727733 [VXX/28464]  
Blank Lab ID: 1311717

Matrix: Soil/Solid (dry weight)

#### QC for Samples:

1160407001, 1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021, 1160407024

### Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
Toluene	10.5J	25.0	7.80	ug/Kg
<b>Surrogates</b>				
1,4-Difluorobenzene (surr)	87.3	72-119		%

### Batch Information

Analytical Batch: VFC12891  
Analytical Method: SW8021B  
Instrument: Agilent 7890A PID/FID  
Analyst: S.P  
Analytical Date/Time: 2/2/2016 1:55:00PM

Prep Batch: VXX28464  
Prep Method: SW5035A  
Prep Date/Time: 2/2/2016 8:00:00AM  
Prep Initial Wt./Vol.: 50 g  
Prep Extract Vol: 25 mL

Print Date: 02/17/2016 11:12:01AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160407 [VXX28464]  
 Blank Spike Lab ID: 1311720  
 Date Analyzed: 02/02/2016 14:52

Spike Duplicate ID: LCSD for HBN 1160407 [VXX28464]  
 Spike Duplicate Lab ID: 1311721  
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1160407001, 1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021, 1160407024

### Results by SW8021B

Parameter	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	1250	1420	114	1250	1430	114	( 75-125 )	0.42	(< 20 )
Ethylbenzene	1250	1300	104	1250	1370	109	( 75-125 )	4.90	(< 20 )
o-Xylene	1250	1240	99	1250	1320	105	( 75-125 )	5.80	(< 20 )
P & M -Xylene	2500	2550	102	2500	2710	108	( 80-125 )	6.10	(< 20 )
Toluene	1250	1380	110	1250	1420	114	( 70-125 )	2.80	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene (surr)	1250	89.6	90	1250	86.7	87	( 72-119 )	3.20	

### Batch Information

Analytical Batch: VFC12891  
 Analytical Method: SW8021B  
 Instrument: Agilent 7890A PID/FID  
 Analyst: S.P

Prep Batch: VXX28464  
 Prep Method: SW5035A  
 Prep Date/Time: 02/02/2016 08:00  
 Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL  
 Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

Print Date: 02/17/2016 11:12:02AM



### Matrix Spike Summary

Original Sample ID: 1312164  
MS Sample ID: 1312096 MS  
MSD Sample ID: 1312097 MSD

Analysis Date: 02/02/2016 17:23  
Analysis Date: 02/02/2016 17:42  
Analysis Date: 02/02/2016 18:01  
Matrix: Soil/Solid (dry weight)

QC for Samples: 1160407001, 1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021, 1160407024

### Results by SW8021B

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	5.85U	1870	2080	111	1870	2100	112	75-125	1.10	(< 20 )
Ethylbenzene	11.4J	1870	1900	101	1870	2010	107	75-125	5.80	(< 20 )
o-Xylene	13.3J	1870	1890	100	1870	2060	110	75-125	8.90	(< 20 )
P & M -Xylene	22.6J	3740	3730	99	3740	4090	109	80-125	9.30	(< 20 )
Toluene	11.7U	1870	2020	108	1870	2070	111	70-125	2.70	(< 20 )
<b>Surrogates</b>										
1,4-Difluorobenzene (surr)		1870	1760	94	1870	1730	93	72-119	1.70	

### Batch Information

Analytical Batch: VFC12891  
Analytical Method: SW8021B  
Instrument: Agilent 7890A PID/FID  
Analyst: S.P  
Analytical Date/Time: 2/2/2016 5:42:00PM

Prep Batch: VXX28464  
Prep Method: AK101 Extraction (S)  
Prep Date/Time: 2/2/2016 8:00:00AM  
Prep Initial Wt./Vol.: 33.42g  
Prep Extract Vol: 25.00mL

Print Date: 02/17/2016 11:12:04AM





### Method Blank

Blank ID: MB for HBN 1728319 [VXX/28481]  
Blank Lab ID: 1312224

Matrix: Soil/Solid (dry weight)

QC for Samples:  
1160407001, 1160407008, 1160407011, 1160407012

### Results by AK101

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
<b>Surrogates</b>				
4-Bromofluorobenzene (surr)	97.3	50-150		%

### Batch Information

Analytical Batch: VFC12895  
Analytical Method: AK101  
Instrument: Agilent 7890 PID/FID  
Analyst: S.P  
Analytical Date/Time: 2/3/2016 11:42:00AM

Prep Batch: VXX28481  
Prep Method: SW5035A  
Prep Date/Time: 2/3/2016 8:00:00AM  
Prep Initial Wt./Vol.: 50 g  
Prep Extract Vol: 25 mL

Print Date: 02/17/2016 11:12:04AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160407 [VXX28481]  
Blank Spike Lab ID: 1312225  
Date Analyzed: 02/03/2016 12:01

Spike Duplicate ID: LCSD for HBN 1160407 [VXX28481]  
Spike Duplicate Lab ID: 1312226  
Matrix: Soil/Solid (dry weight)

QC for Samples: 1160407001, 1160407008, 1160407011, 1160407012

### Results by AK101

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Gasoline Range Organics	12.5	11.2	90	12.5	11.6	93	( 60-120 )	2.80	(< 20 )

### Surrogates

4-Bromofluorobenzene (surr)	1.25	101	101	1.25	102	102	( 50-150 )	1.50	
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### Batch Information

Analytical Batch: VFC12895  
Analytical Method: AK101  
Instrument: Agilent 7890 PID/FID  
Analyst: S.P

Prep Batch: VXX28481  
Prep Method: SW5035A  
Prep Date/Time: 02/03/2016 08:00  
Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL  
Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

Print Date: 02/17/2016 11:12:06AM



### Method Blank

Blank ID: MB for HBN 1728319 [VXX/28481]  
Blank Lab ID: 1312224

Matrix: Soil/Solid (dry weight)

QC for Samples:  
1160407001, 1160407008, 1160407011, 1160407012

### Results by SW8021B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Benzene	6.25U	12.5	4.00	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
<b>Surrogates</b>				
1,4-Difluorobenzene (surr)	81.7	72-119		%

### Batch Information

Analytical Batch: VFC12895  
Analytical Method: SW8021B  
Instrument: Agilent 7890 PID/FID  
Analyst: S.P  
Analytical Date/Time: 2/3/2016 11:42:00AM

Prep Batch: VXX28481  
Prep Method: SW5035A  
Prep Date/Time: 2/3/2016 8:00:00AM  
Prep Initial Wt./Vol.: 50 g  
Prep Extract Vol: 25 mL

Print Date: 02/17/2016 11:12:08AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160407 [VXX28481]  
Blank Spike Lab ID: 1312227  
Date Analyzed: 02/03/2016 14:33

Spike Duplicate ID: LCSD for HBN 1160407 [VXX28481]  
Spike Duplicate Lab ID: 1312228  
Matrix: Soil/Solid (dry weight)

QC for Samples: 1160407001, 1160407008, 1160407011, 1160407012

### Results by SW8021B

Parameter	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	1250	1550	124	1250	1470	117	( 75-125 )	5.40	(< 20 )
o-Xylene	1250	1420	114	1250	1370	109	( 75-125 )	4.00	(< 20 )
P & M -Xylene	2500	2950	118	2500	2820	113	( 80-125 )	4.20	(< 20 )
<b>Surrogates</b>									
1,4-Difluorobenzene (surr)	1250	93.2	93	1250	92.4	92	( 72-119 )	0.78	

### Batch Information

Analytical Batch: **VFC12895**  
Analytical Method: **SW8021B**  
Instrument: **Agilent 7890 PID/FID**  
Analyst: **S.P**

Prep Batch: **VXX28481**  
Prep Method: **SW5035A**  
Prep Date/Time: **02/03/2016 08:00**  
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL  
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

Print Date: 02/17/2016 11:12:10AM



### Matrix Spike Summary

Original Sample ID: 1312335  
MS Sample ID: 1312229 MS  
MSD Sample ID: 1312230 MSD

Analysis Date: 02/03/2016 15:25  
Analysis Date: 02/03/2016 15:44  
Analysis Date: 02/03/2016 16:03  
Matrix: Soil/Solid (dry weight)

QC for Samples: 1160407001, 1160407008, 1160407011, 1160407012

### Results by SW8021B

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Benzene	9.35U	1870	2300	123	1870	2290	122	75-125	0.42	(< 20 )
o-Xylene	18.7U	1870	2090	112	1870	2070	111	75-125	0.74	(< 20 )
P & M -Xylene	37.4U	3740	4300	115	3740	4270	114	80-125	0.73	(< 20 )
<b>Surrogates</b>										
1,4-Difluorobenzene (surr)		1870	1760	94	1870	1760	94	72-119	0.15	

### Batch Information

Analytical Batch: VFC12895  
Analytical Method: SW8021B  
Instrument: Agilent 7890 PID/FID  
Analyst: S.P  
Analytical Date/Time: 2/3/2016 3:44:00PM

Prep Batch: VXX28481  
Prep Method: AK101 Extraction (S)  
Prep Date/Time: 2/3/2016 8:00:00AM  
Prep Initial Wt./Vol.: 33.42g  
Prep Extract Vol: 25.00mL

Print Date: 02/17/2016 11:12:11AM



### Method Blank

Blank ID: MB for HBN 1727818 [XXX/34878]  
Blank Lab ID: 1311784

Matrix: Soil/Solid (dry weight)

#### QC for Samples:

1160407001, 1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021

### Results by AK102

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
<b>Surrogates</b>				
5a Androstane (surr)	78	60-120		%

### Batch Information

Analytical Batch: XFC12272  
Analytical Method: AK102  
Instrument: HP 7890A FID SV E F  
Analyst: CJSW  
Analytical Date/Time: 2/4/2016 4:34:00PM

Prep Batch: XXX34878  
Prep Method: SW3550C  
Prep Date/Time: 2/4/2016 9:18:57AM  
Prep Initial Wt./Vol.: 30 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:12:12AM



### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160407 [XXX34878]  
 Blank Spike Lab ID: 1311785  
 Date Analyzed: 02/04/2016 16:55

Spike Duplicate ID: LCSD for HBN 1160407 [XXX34878]  
 Spike Duplicate Lab ID: 1311786  
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1160407001, 1160407002, 1160407003, 1160407005, 1160407006, 1160407008, 1160407009, 1160407011, 1160407012, 1160407013, 1160407016, 1160407017, 1160407018, 1160407019, 1160407021

### Results by AK102

Parameter	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Diesel Range Organics	167	145	87	167	143	86	( 75-125 )	1.00	(< 20 )

### Surrogates

5a Androstane (surr)	3.33	90.4	90	3.33	91.5	92	( 60-120 )	1.30	
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### Batch Information

Analytical Batch: **XFC12272**  
 Analytical Method: **AK102**  
 Instrument: **HP 7890A FID SV E F**  
 Analyst: **CJSW**

Prep Batch: **XXX34878**  
 Prep Method: **SW3550C**  
 Prep Date/Time: **02/04/2016 09:18**  
 Spike Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL  
 Dupe Init Wt./Vol.: 167 mg/Kg Extract Vol: 1 mL

Print Date: 02/17/2016 11:12:13AM



### Method Blank

Blank ID: MB for HBN 1728217 [XXX/34885]  
Blank Lab ID: 1312074

Matrix: Soil/Solid (dry weight)

QC for Samples:  
1160407008, 1160407011, 1160407012

### Results by 8270D SIMS (PAH)

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
1-Methylnaphthalene	2.50U	5.00	1.50	ug/Kg
2-Methylnaphthalene	2.50U	5.00	1.50	ug/Kg
Acenaphthene	2.50U	5.00	1.50	ug/Kg
Acenaphthylene	2.50U	5.00	1.50	ug/Kg
Anthracene	2.50U	5.00	1.50	ug/Kg
Benzo(a)Anthracene	2.50U	5.00	1.50	ug/Kg
Benzo[a]pyrene	2.50U	5.00	1.50	ug/Kg
Benzo[b]Fluoranthene	2.50U	5.00	1.50	ug/Kg
Benzo[g,h,i]perylene	2.50U	5.00	1.50	ug/Kg
Benzo[k]fluoranthene	2.50U	5.00	1.50	ug/Kg
Chrysene	2.50U	5.00	1.50	ug/Kg
Dibenzo[a,h]anthracene	2.50U	5.00	1.50	ug/Kg
Fluoranthene	2.50U	5.00	1.50	ug/Kg
Fluorene	2.50U	5.00	1.50	ug/Kg
Indeno[1,2,3-c,d] pyrene	2.50U	5.00	1.50	ug/Kg
Naphthalene	2.50U	5.00	1.50	ug/Kg
Phenanthrene	2.50U	5.00	1.50	ug/Kg
Pyrene	2.50U	5.00	1.50	ug/Kg
<b>Surrogates</b>				
2-Fluorobiphenyl (surr)	97.1	46-115		%
Terphenyl-d14 (surr)	108	58-133		%

### Batch Information

Analytical Batch: XMS9174  
Analytical Method: 8270D SIMS (PAH)  
Instrument: HP 6890/5973 MS SVQA  
Analyst: DSH  
Analytical Date/Time: 2/10/2016 1:16:00AM

Prep Batch: XXX34885  
Prep Method: SW3550C  
Prep Date/Time: 2/8/2016 10:16:46AM  
Prep Initial Wt./Vol.: 22.5 g  
Prep Extract Vol: 1 mL

Print Date: 02/17/2016 11:12:15AM





### Blank Spike Summary

Blank Spike ID: LCS for HBN 1160407 [XXX34885]

Blank Spike Lab ID: 1312075

Date Analyzed: 02/10/2016 01:51

Matrix: Soil/Solid (dry weight)

QC for Samples: 1160407008, 1160407011, 1160407012

### Results by 8270D SIMS (PAH)

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)	CL
1-Methylnaphthalene	22.2	21.2	96	( 43-111 )
2-Methylnaphthalene	22.2	21.2	95	( 39-114 )
Acenaphthene	22.2	20.8	94	( 44-111 )
Acenaphthylene	22.2	13.7	62	( 39-116 )
Anthracene	22.2	18.3	82	( 50-114 )
Benzo(a)Anthracene	22.2	20.7	93	( 54-122 )
Benzo[a]pyrene	22.2		0 *	( 50-125 )
Benzo[b]Fluoranthene	22.2	19.4	87	( 53-128 )
Benzo[g,h,i]perylene	22.2	18.6	84	( 49-127 )
Benzo[k]fluoranthene	22.2	21.3	96	( 56-123 )
Chrysene	22.2	22.2	100	( 57-118 )
Dibenzo[a,h]anthracene	22.2	21.2	95	( 50-129 )
Fluoranthene	22.2	20.8	94	( 55-119 )
Fluorene	22.2	21.4	97	( 47-114 )
Indeno[1,2,3-c,d] pyrene	22.2	20.3	92	( 49-130 )
Naphthalene	22.2	19.9	90	( 38-111 )
Phenanthrene	22.2	22.2	100	( 49-113 )
Pyrene	22.2	21.3	96	( 55-117 )
<b>Surrogates</b>				
2-Fluorobiphenyl (surr)	22.2	96.8	97	( 46-115 )
Terphenyl-d14 (surr)	22.2	96.1	96	( 58-133 )

### Batch Information

Analytical Batch: XMS9174

Analytical Method: 8270D SIMS (PAH)

Instrument: HP 6890/5973 MS SVQA

Analyst: DSH

Prep Batch: XXX34885

Prep Method: SW3550C

Prep Date/Time: 02/08/2016 10:16

Spike Init Wt./Vol.: 22.2 ug/Kg Extract Vol: 1 mL

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 02/17/2016 11:12:16AM



### Matrix Spike Summary

Original Sample ID: 1167582002  
 MS Sample ID: 1312076 MS  
 MSD Sample ID: 1312077 MSD

Analysis Date: 02/10/2016 7:24  
 Analysis Date: 02/10/2016 7:41  
 Analysis Date: 02/10/2016 7:59  
 Matrix: Soil/Solid (dry weight)

QC for Samples: 1160407008, 1160407011, 1160407012

### Results by 8270D SIMS (PAH)

Parameter	Sample	Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
1-Methylnaphthalene	2.91U	25.8	21.0	81	25.7	19.8	77	43-111	5.20	(< 20 )
2-Methylnaphthalene	2.91U	25.8	20.3	79	25.7	19.6	76	39-114	3.90	(< 20 )
Acenaphthene	2.91U	25.8	21.1	82	25.7	20.5	80	44-111	2.60	(< 20 )
Acenaphthylene	2.91U	25.8	21.8	84	25.7	21.1	82	39-116	3.50	(< 20 )
Anthracene	2.91U	25.8	21.9	85	25.7	21.9	85	50-114	0.14	(< 20 )
Benzo(a)Anthracene	2.91U	25.8	23.3	90	25.7	23.2	90	54-122	0.44	(< 20 )
Benzo[b]Fluoranthene	2.91U	25.8	18.7	72	25.7	18.5	72	53-128	1.20	(< 20 )
Benzo[g,h,i]perylene	2.91U	25.8	15.7	61	25.7	15.1	59	49-127	3.50	(< 20 )
Benzo[k]fluoranthene	2.91U	25.8	20.0	78	25.7	19.3	75	56-123	3.30	(< 20 )
Chrysene	2.91U	25.8	23.4	91	25.7	23.6	92	57-118	1.00	(< 20 )
Dibenzo[a,h]anthracene	2.91U	25.8	15.9	62	25.7	16.2	63	50-129	1.10	(< 20 )
Fluoranthene	2.91U	25.8	23.9	92	25.7	23.9	93	55-119	0.23	(< 20 )
Fluorene	2.91U	25.8	22.2	86	25.7	21.8	85	47-114	2.40	(< 20 )
Indeno[1,2,3-c,d] pyrene	2.91U	25.8	15.4	60	25.7	14.9	58	49-130	3.50	(< 20 )
Naphthalene	2.91U	25.8	19.9	77	25.7	19.2	75	38-111	3.40	(< 20 )
Phenanthrene	2.91U	25.8	23.3	90	25.7	22.7	88	49-113	2.50	(< 20 )
Pyrene	2.91U	25.8	24.8	96	25.7	24.6	96	55-117	0.80	(< 20 )

### Surrogates

2-Fluorobiphenyl (surr)		25.8	22.1	86	25.7	21.4	83	46-115	3.60	
Terphenyl-d14 (surr)		25.8	24.7	96	25.7	24.7	96	58-133	0.30	

### Batch Information

Analytical Batch: XMS9174  
 Analytical Method: 8270D SIMS (PAH)  
 Instrument: HP 6890/5973 MS SVQA  
 Analyst: DSH  
 Analytical Date/Time: 2/10/2016 7:41:00AM

Prep Batch: XXX34885  
 Prep Method: Sonication Extraction Soil 8270 PAH SIM  
 Prep Date/Time: 2/8/2016 10:16:46AM  
 Prep Initial Wt./Vol.: 22.56g  
 Prep Extract Vol: 1.00mL

Print Date: 02/17/2016 11:12:17AM

## Homestead, Charles (Anchorage)

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**From:** Colette Brandt [cbrandt@restorsci.com]  
**Sent:** Monday, February 01, 2016 9:07 AM  
**To:** Homestead, Charles (Anchorage)  
**Cc:** David Nyman  
**Subject:** Sample Analysis Additions for Work Order 1160407  
**Attachments:** 1879\_001.pdf

Good Morning Chuck,

I submitted some soil samples Friday evening (work order 1160407) and would like to add the SVOCs (EPA 8270 SIMs) to three (3) of the samples (Sample IDs: 4-16, 5-16, & 5-X). Attached is the COC with the three samples checked off for SVOCs and highlighted. Please let me know if you need anything else or have any questions.

Thank you,

**Colette Brandt**

*Environmental Scientist*

Restoration Science & Engineering, LLC

911 West 8th Avenue, Suite 100

Anchorage, Alaska 99501

[cbrandt@restorsci.com](mailto:cbrandt@restorsci.com)

907.278.1023 ext. 104

907.231.5523 (cell)

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## Homestead, Charles (Anchorage)

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**From:** Homestead, Charles (Anchorage)  
**Sent:** Wednesday, February 03, 2016 9:03 AM  
**To:** Homestead, Charles (Anchorage)  
**Subject:** FW: Sample Analysis Additions for Work Order 1160407

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**From:** Colette Brandt [<mailto:cbrandt@restorsci.com>]  
**Sent:** Wednesday, February 03, 2016 8:53 AM  
**To:** Homestead, Charles (Anchorage)  
**Subject:** RE: Sample Analysis Additions for Work Order 1160407

Morning Chuck,

I think we'll go with PAH SIMs since they have a lower detection limit right? Thanks

**Colette Brandt**  
*Environmental Scientist*  
Restoration Science & Engineering, LLC  
911 West 8th Avenue, Suite 100  
Anchorage, Alaska 99501  
[cbrandt@restorsci.com](mailto:cbrandt@restorsci.com)  
907.278.1023 ext. 104  
907.231.5523 (cell)



<b>CLIENT:</b> Restoration Science & Eng. LLC <b>CONTACT:</b> Collette Brandt <b>PHONE NO:</b> (907) 278-1023 <b>PROJECT PWSID/ PERMIT#:</b> <b>NAME:</b> BYF Silt Characterization <b>REPORTS TO:</b> Collette Brandt <b>E-MAIL:</b> cbrandt@restosci.com <b>INVOICE TO:</b> RSE, L. Gamble <b>QUOTE #:</b> 15-1459 <b>P.O. #:</b>		<b>Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.</b>		Page <u>1</u> of <u>8</u>	
<b>Section 1</b> RESERVED for lab use		<b>Section 3</b> Type C = COMP G = GRAB MI = Multi-Incremental Soils		Preservative	
<b>Section 2</b> CONTAINERS		#		Section 4	
SAMPLE IDENTIFICATION		DATE mm/dd/yy		DOD Project? Yes No	
TIME HH:MM		MATRIX/MATRIX CODE		Data Deliverable Requirements:	
1-9.5		01/26/16 1110 SOIL		Cooler ID:	
2-9		01/26/16 1410 SOIL		Requested Turnaround Time and/or Special Instructions: Will call about which ones will do SVOCS	
3-19		01/26/16 1415 SOIL		Temp Blank °C: 2.5 #D 8 or Ambient [ ]	
3-5.5		01/26/16 1510 SOIL		Chain of Custody Seal: (Circle) INTACT <b>BROKEN</b> <b>ABSENT</b>	
3-X		01/26/16 1200 SOIL		(See attached Sample Receipt Form)	
3-19		01/26/16 1515 SOIL		Section 4	
4-14		01/27/16 1015 SOIL		DOD Project? Yes No	
4-16		01/27/16 1020 SOIL		Data Deliverable Requirements:	
4-19		01/27/16 1010 SOIL		Cooler ID:	
5-9		01/27/16 1235 SOIL		Requested Turnaround Time and/or Special Instructions: Will call about which ones will do SVOCS	
Relinquished By: (1) [Signature]		Date 1/29/16 1604		Section 5	
Relinquished By: (2)		Date		Data Deliverable Requirements:	
Relinquished By: (3)		Date		Cooler ID:	
Relinquished By: (4)		Date 1/29/16 16:04		Requested Turnaround Time and/or Special Instructions: Will call about which ones will do SVOCS	
Received For Laboratory By: [Signature]		Date 1/29/16 16:04		Temp Blank °C: 2.5 #D 8 or Ambient [ ]	
Received By:		Time		Chain of Custody Seal: (Circle) INTACT <b>BROKEN</b> <b>ABSENT</b>	
Received By:		Time		(See attached Sample Receipt Form)	
Received By:		Time		Section 4	
Received By:		Time		DOD Project? Yes No	
Received By:		Time		Data Deliverable Requirements:	



**CLIENT:** Restoration Science & Eng. LLC

**CONTACT:** Collette Boravolt **PHONE NO:** (907) 278-1023

**PROJECT PWSID/ PERMIT#:**

**NAME:** BYF SIK CHANG IDENTIFICATION

**REPORTS TO:** Collette Boravolt **E-MAIL:** cboravolt@restorsci.com

**INVOICE TO:** RSE, L. Gamba **QUOTE #:** 15-1459 **P.O. #:**

**Section 1**

**Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.**

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/MATRIX CODE	Section 3		Preservative				REMARKS/LOC ID	
					#	Type C = COMP G = GRAB M = Multi I = Incre- mental S = Soils	4°C	4°C	4°C	4°C		4°C
11 A-B	5-16	01/27/16	1250	SOIL	2	G	X	X	X	X		
12 A-B	5-X	01/27/16	0800	SOIL	2	G	X	X	X	X		
13 A-B	5-19	01/27/16	1240	SOIL	2	G	X	X	X	X		
14 A-B	5-21	01/27/16	1245	SOIL	2	G	X	X	X	X		
15 A-B	6-14		1520		2	G	X	X	X	X		HOLD
16 A-B	6-19		1525		2	G	X	X	X	X		HOLD
17 A-B	7-11.5		1625		2	G	X	X	X	X		
18 A-B	8-14	11/28/16	0920	SOIL	2	G	X	X	X	X		
19 A-B	9-10	11/28/16	1045	SOIL	2	G	X	X	X	X		
20 A-B	9-15.5	11/28/16	1050	SOIL	2	G	X	X	X	X		HOLD
21 A-B	9-20	11/28/16	1135	SOIL	2	G	X	X	X	X		

**Section 2**

Relinquished By: (1) ~ 20  
TLOP BORAVOLT

**Section 3**

Relinquished By: (2)  
C Boravolt

Relinquished By: (3)

Relinquished By: (4)  
L Gamba

**Section 4**

Section 4 DOD Project? Yes No

Cooler ID: Will call on Monday about which ones need SVOCs

Data Deliverable Requirements:

Temp Blank °C: or Ambient [ ]

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

(See attached Sample Receipt Form) (See attached Sample Receipt Form)

**Section 5**

Requested Turnaround Time and/or Special Instructions:





1160407



1 1 6 0 4 0 7

SAMPLE RECEIPT FORM

Review Criteria:	Yes	N/A	No	Comments/Action Taken:
Were <b>custody seals</b> intact? Note # & location, if applicable. COC accompanied samples?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Exemption permitted if sampler hand carries/delivers.</i>
<b>Temperature blank</b> compliant* (i.e., 0-6°C after CF)? <i>If &gt;6°C, were samples collected &lt;8 hours ago?</i> <i>If &lt;0°C, were all sample containers ice free?</i> Cooler ID: <u>1</u> @ <u>2.5</u> w/ Therm.ID: <u>D8</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled."	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Exemption permitted if chilled &amp; collected &lt;8 hrs ago.</i>  <i>Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.</i>
Delivery method (specify all that apply): <input checked="" type="checkbox"/> Client (hand carried) <input type="checkbox"/> USPS <input type="checkbox"/> Lynden <input type="checkbox"/> AK Air <input type="checkbox"/> Alert Courier <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> RAVN <input type="checkbox"/> C&D Delivery <input type="checkbox"/> Carlife <input type="checkbox"/> Pen Air <input type="checkbox"/> Warp Speed <input type="checkbox"/> Other: _____ → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Yes	N/A	No	
Were samples received within hold time? Do samples <b>match COC*</b> (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<i>Note: Refer to form F-083 "Sample Guide" for hold times.</i> <i>Note: If times differ &lt;1hr, record details and login per COC.</i>
Were samples in <b>good condition</b> (no leaks/cracks/breakage)? Packing material used (specify all that apply): <input checked="" type="checkbox"/> Bubble Wrap <input type="checkbox"/> Separate plastic bags <input type="checkbox"/> Vermiculite <input type="checkbox"/> Other:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were <b>proper containers</b> (type/mass/volume/preservative*) used? Were <b>Trip Blanks</b> (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials <b>free of headspace</b> (i.e., bubbles ≤6 mm)? Were all soil VOAs <b>field extracted</b> with MeOH+BFB?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <i>Exemption permitted for metals (e.g., 200.8/6020A).</i>
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was <b>pH verified and compliant</b> ? If pH was adjusted, were bottles flagged (i.e., stickers)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For <b>special handling</b> (e.g., "MI" soils, foreign soils, lab filter for dissolved..., lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For <b>RUSH/SHORT Hold Time</b> , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For <b>SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP</b> , were containers / paperwork flagged accordingly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>For any question answered "No,"</b> has the PM been notified and the problem resolved (or paperwork put in their bin)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SRF Completed by: KMW 1/29/16 PM notified:
Was <b>PEER REVIEW</b> of <i>sample numbering/labeling completed</i> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Peer Reviewed by:
Additional notes (if applicable):				

Note to Client: Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.





### Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1160407001-A	No Preservative Required	OK	1160407022-A	No Preservative Required	OK
1160407001-B	Methanol field pres. 4 C	OK	1160407022-B	Methanol field pres. 4 C	OK
1160407002-A	No Preservative Required	OK	1160407023-A	No Preservative Required	OK
1160407002-B	Methanol field pres. 4 C	OK	1160407023-B	Methanol field pres. 4 C	OK
1160407003-A	No Preservative Required	OK	1160407024-A	Methanol field pres. 4 C	OK
1160407003-B	Methanol field pres. 4 C	OK	1160407024-B	Methanol field pres. 4 C	OK
1160407004-A	No Preservative Required	OK			
1160407004-B	Methanol field pres. 4 C	OK			
1160407005-A	No Preservative Required	OK			
1160407005-B	Methanol field pres. 4 C	OK			
1160407006-A	No Preservative Required	OK			
1160407006-B	Methanol field pres. 4 C	OK			
1160407007-A	No Preservative Required	OK			
1160407007-B	Methanol field pres. 4 C	OK			
1160407008-A	No Preservative Required	OK			
1160407008-B	Methanol field pres. 4 C	OK			
1160407009-A	No Preservative Required	OK			
1160407009-B	Methanol field pres. 4 C	OK			
1160407010-A	No Preservative Required	OK			
1160407010-B	Methanol field pres. 4 C	OK			
1160407011-A	No Preservative Required	OK			
1160407011-B	Methanol field pres. 4 C	OK			
1160407012-A	No Preservative Required	OK			
1160407012-B	Methanol field pres. 4 C	OK			
1160407013-A	No Preservative Required	OK			
1160407013-B	Methanol field pres. 4 C	OK			
1160407014-A	No Preservative Required	OK			
1160407014-B	Methanol field pres. 4 C	OK			
1160407015-A	No Preservative Required	OK			
1160407015-B	Methanol field pres. 4 C	OK			
1160407016-A	No Preservative Required	OK			
1160407016-B	Methanol field pres. 4 C	OK			
1160407017-A	No Preservative Required	OK			
1160407017-B	Methanol field pres. 4 C	OK			
1160407018-A	No Preservative Required	OK			
1160407018-B	Methanol field pres. 4 C	OK			
1160407019-A	No Preservative Required	OK			
1160407019-B	Methanol field pres. 4 C	OK			
1160407020-A	No Preservative Required	OK			
1160407020-B	Methanol field pres. 4 C	OK			
1160407021-A	No Preservative Required	OK			
1160407021-B	Methanol field pres. 4 C	OK			

Container Id

Preservative

Container  
Condition

Container Id

Preservative

Container  
Condition

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates that an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

BU - The container was received with headspace greater than 6mm.

DM- The container was received damaged.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

## Laboratory Data Review Checklist

Completed by:

Title:  Date:

CS Report Name:  Report Date:

Consultant Firm:

Laboratory Name:  Laboratory Report Number:

ADEC File Number:  ADEC RecKey Number:

### 1. Laboratory

- a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?  
 Yes    No    NA (Please explain.)                      Comments:

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?  
 Yes     No     NA (Please explain.)                      Comments:

### 2. Chain of Custody (COC)

- a. COC information completed, signed, and dated (including released/received by)?  
 Yes    No    NA (Please explain.)                      Comments:

- b. Correct analyses requested?  
 Yes    No    NA (Please explain.)                      Comments:

### 3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt ( $4^{\circ} \pm 2^{\circ} \text{C}$ )?  
 Yes     No    NA (Please explain.)                      Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?  
 Yes     No     NA (Please explain.)                      Comments:

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?  
 Yes    No    NA (Please explain.)                      Comments:

Review of the sample receipt form indicated the samples were received in good condition.

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?  
 Yes     No     NA (Please explain.)                      Comments:

- e. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability was not affected.

#### 4. Case Narrative

- a. Present and understandable?

Yes    No     NA (Please explain.)                      Comments:

The case narrative is present and understandable on page 2 of the lab report.

- b. Discrepancies, errors or QC failures identified by the lab?

Yes     No     NA (Please explain.)                      Comments:

The case narrative notes that multiple surrogate recoveries and LCSs did not meet QC goals. Corrective actions for these are noted in the case narrative and described subsequently in this document.

- c. Were all corrective actions documented?

Yes     No     NA (Please explain.)                      Comments:

No Corrective actions were required.

- d. What is the effect on data quality/usability according to the case narrative?

Comments:

There is no effect on data quality and usability.

#### 5. Samples Results

- a. Correct analyses performed/reported as requested on COC?

Yes    No    NA (Please explain.)                      Comments:

The correct analyses were performed and reported as requested on the COC. SVOC analyses were initially requested as SVOC method EPA 8270 SIMs, but was clarified and analyzed as PAH SIMs.

b. All applicable holding times met?

Yes  No  NA (Please explain.)

Comments:

Holding times were met for all samples according to the lab method.

c. All soils reported on a dry weight basis?

Yes  No  NA (Please explain.)

Comments:

Sample weights are reported on a dry weight basis on each page of the report describing the target sample.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

Yes  No  NA (Please explain.)

Comments:

SGS refers to the PQL as the LOQ and reports data below the PQL but above the detection limit (DL) as estimated results with a "J". Constituents that were analyzed for but not detected are reported as a value equal to 2 times the DL and flagged with a "U". All PQLs were below the cleanup level.

e. Data quality or usability affected?

Comments:

There is no effect on data quality or usability.

## 6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes  No  NA (Please explain.)

Comments:

There is one method blank for each requested analyses.

ii. All method blank results less than PQL?

Yes  No  NA (Please explain.)

Comments:

All method blank results are less than the LOQ (PQL).

iii. If above PQL, what samples are affected?

Comments:

No method blank samples were reported above the LOQ (PQL).

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

Yes  No  NA (Please explain.)

Comments:

No method blank samples were reported above the LOQ (PQL).

v. Data quality or usability affected? (Please explain.)

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes  No  NA (Please explain.)                      Comments:

LCS and LCSDs were performed for AK 101, AK 102, and 8021B, analyses. LCS was performed for 8270D SIMS (PAH) analysis associated with samples 4-16, 5-16, and 5-X, but not LCSD

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes  No  NA (Please explain.)                      Comments:

Metals analysis was not performed

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes  No  NA (Please explain.)                      Comments:

PAH LCS recovery for benzo[a]pyrene (0%) did not meet QC criteria.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes  No  NA (Please explain.)                      Comments:

PAH LCS recovery for benzo[a]pyrene (0%) did not meet QC criteria. The Sample was re-extracted outside of hold time with LCS recovery for (35.8%) outside QC criteria. MS/MSD recoveries for this analyte was within QC criteria on both extractions.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Samples analyzed for PAH SIMs were affected (Samples 4-16, 5-16, & 5-X). Sample results for benzo[a]pyrene on both extractions were less than the LOQ.

Comments:

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes  No  NA (Please explain.)                      Comments:

Data flags are clearly defined and noted in the case narrative.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality or usability was not affected.

c. Surrogates – Organics Only

- i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?  
 Yes  No NA (Please explain.) Comments:

Surrogate recoveries are reported for all organic analyses.

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)  
 Yes  No  NA (Please explain.) Comments:

There were multiple surrogate recoveries that did not meet QC criteria and are noted in the case narrative on page 2 of the report.

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?  
 Yes  No  NA (Please explain.) Comments:

Samples with failed surrogate recoveries are noted in the case narrative and data flags are clearly defined.

- iv. Data quality or usability affected? (Use the comment box to explain.)  
Comments:

Data quality or usability not affected.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)  
 Yes  No NA (Please explain.) Comments:

A trip blank for samples was included.

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)  
 Yes  No  NA (Please explain.) Comments:

Trip blank was noted on COC.

- iii. All results less than PQL?  
 Yes  No  NA (Please explain.) Comments:

All trip blank results were less than the PQL.

- iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes  No  NA (Please explain.)

Comments:

Two field duplicates were collected. Sample 3-X is a field duplicate of 3-19 and sample 5-X is a field duplicate of 5-16.

ii. Submitted blind to lab?

Yes  No  NA (Please explain.)

Comments:

Field duplicates were submitted to the lab as blind duplicates.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

$$RPD (\%) = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2) / 2)} \times 100$$

Where R<sub>1</sub> = Sample Concentration

R<sub>2</sub> = Field Duplicate Concentration

Yes  No  NA (Please explain.)

Comments:

All results for samples 3-19 and 3-X were undetected. All RPDs for sample 5-16 and its duplicate 5-X were less than the specified DQOs except for GRO which had an RPD of 55.8%

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability was not affected.

f. Decontamination or Equipment Blank (If not used explain why).

Yes  No  NA (Please explain.)

Comments:

All equipment used in sampling was dedicated and disposable, or was cleaned inalconox solution and rinsed with Deionized water prior to sampling. Equipment was not re-used during the sampling event. Based on previous experience, and equipment blank was not determined necessary.

i. All results less than PQL?

Yes  No  NA (Please explain.)

Comments:

There are no decontamination or equipment blanks



ii. If above PQL, what samples are affected?

Comments:

There are no decontamination equipment blanks

iii. Data quality or usability affected? (Please explain.)

Data quality or usability was not affected.

Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes   No   NA (Please explain.)

Comments:

Data flags and qualifiers are defined appropriately. Page 4 of the lab report describes the qualifiers used.

Scott Nichols  
 AK Dept of Corrections-Facilities Mgmt  
 550 W. 7th Ave Suite 601  
 Anchorage, AK 99501

**Work Order:** 1153022  
 YKCC Waterwell

**Client:** AK Dept of Corrections-Facilities Mgmt

**Report Date:** July 11, 2015

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. If you have any questions regarding this report, or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO 17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260B, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

- \* The analyte has exceeded allowable regulatory or control limits.
- ! Surrogate out of control limits.
- B Indicates the analyte is found in a blank associated with the sample.
- CCV Continuing Calibration Verification
- CCCV Closing Continuing Calibration Verification
- CL Control Limit
- D The analyte concentration is the result of a dilution.
- DF Dilution Factor
- DL Detection Limit (i.e., maximum method detection limit)
- E The analyte result is above the calibrated range.
- F Indicates value that is greater than or equal to the DL
- GT Greater Than
- ICV Initial Calibration Verification
- J The quantitation is an estimation.
- JL The analyte was positively identified, but the quantitation is a low estimation.
- LCS(D) Laboratory Control Spike (Duplicate)
- LOD Limit of Detection (i.e., 1/2 of the LOQ)
- LOQ Limit of Quantitation (i.e., reporting or practical quantitation limit)
- LT Less Than
- M A matrix effect was present.
- MB Method Blank
- MS(D) Matrix Spike (Duplicate)
- ND Indicates the analyte is not detected.
- Q QC parameter out of acceptance range.
- R Rejected
- RPD Relative Percent Difference
- U Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content.  
 All DRO/RRO analyses are integrated per SOP.



SGS Ref.# 1153022001  
Client Name AK Dept of Corrections-Facilities Mgmt  
Project Name/# YKCC Waterwell  
Client Sample ID Well Supply  
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 07/11/2015 11:11  
Collected Date/Time 06/22/2015 10:00  
Received Date/Time 06/23/2015 8:42  
Technical Director Stephen C. Ede

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<b><u>Volatile Fuels Department</u></b>									
Benzene	ND	0.500	ug/L	SW8021B	A		06/25/15	06/25/15	CRD
Ethylbenzene	ND	1.00	ug/L	SW8021B	A		06/25/15	06/25/15	CRD
Gasoline Range Organics	ND	0.100	mg/L	AK101	A		06/25/15	06/25/15	CRD
o-Xylene	ND	1.00	ug/L	SW8021B	A		06/25/15	06/25/15	CRD
P & M -Xylene	ND	2.00	ug/L	SW8021B	A		06/25/15	06/25/15	CRD
Toluene	ND	1.00	ug/L	SW8021B	A		06/25/15	06/25/15	CRD
<b><u>Surrogates</u></b>									
1,4-Difluorobenzene (surr)	82.4		%	SW8021B	A	77-115	06/25/15	06/25/15	CRD
4-Bromofluorobenzene (surr)	93.1		%	AK101	A	50-150	06/25/15	06/25/15	CRD
<b><u>Semivolatile Organic Fuels Department</u></b>									
Diesel Range Organics	ND	0.645	mg/L	AK102	G		07/04/15	07/06/15	KJO
Residual Range Organics	ND	0.538	mg/L	AK103	G		07/04/15	07/06/15	KJO
<b><u>Surrogates</u></b>									
5a Androstane (surr)	92.9		%	AK102	G	50-150	07/04/15	07/06/15	KJO
n-Triacontane-d62 (surr)	85.9		%	AK103	G	50-150	07/04/15	07/06/15	KJO



**CLIENT:** Department of Corrections  
**CONTACT:** Scott Nichols  
**PHONE #:** 269-7391  
**PROJECT NAME:** YKCC WATER WELL  
**REPORTS TO:** Scott Nichols  
**INVOICE TO:** Scott Nichols  
**E-MAIL:** Scott.Nichols@alaska.gov  
**QUOTE #:**  
**P.O. #:**  
**Department of Corrections**

**Section 1**

**Section 2**

#	C O N T A I N E R S	Pres: Type: Comp Grab MI (Multi-Incre-mental)	DRO/RRO	GRO/BTEX	HCl	HCl	Preservative		REMARKS/ LOC ID
4	G		✓						NO TRIP BENCH
6	G		✓						

**Section 3**

**Section 4**

**Section 5**

**Relinquished By: (1)** Jenny Mortenson  
**Relinquished By: (2)** Scott Nichols  
**Relinquished By: (3)** [Signature]  
**Relinquished By: (4)** [Signature]

**Date** 6-22-15  
**Date** 6/23/15  
**Date** 6/23/15  
**Date** 6/23/15

**Time** 10:00  
**Time** 10:00  
**Time** 08:42  
**Time** 08:59

**Received By:** Scott Nichols  
**Received By:** Scott Nichols  
**Received By:** [Signature]  
**Received For Laboratory By:** [Signature]

**Matrix/Matrix Code**

**Relinquished By: (1)** Jenny Mortenson  
**Relinquished By: (2)** Scott Nichols  
**Relinquished By: (3)** [Signature]  
**Relinquished By: (4)** [Signature]

**Date** 6-22-15  
**Date** 6/23/15  
**Date** 6/23/15  
**Date** 6/23/15

**Time** 10:00  
**Time** 10:00  
**Time** 08:42  
**Time** 08:59

**Received By:** Scott Nichols  
**Received By:** Scott Nichols  
**Received By:** [Signature]  
**Received For Laboratory By:** [Signature]

**Matrix/Matrix Code**

**Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.**



1153022



SAMPLE RECEIPT FORM

Review Criteria:	Yes	N/A	No	Comments/Action Taken:
Were <b>custody seals</b> intact? Note # & location, if applicable. COC accompanied samples?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Exemption permitted if sampler hand carries/delivers.</i>
<b>Temperature blank</b> compliant* (i.e., 0-6°C after CF)? <i>If &gt;6°C, were samples collected &lt;8 hours ago?</i> <i>If &lt;0°C, were all sample containers ice free?</i> Cooler ID: <u>1</u> @ <u>1.7</u> w/ Therm.ID: <u>240</u> Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ Cooler ID: _____ @ _____ w/ Therm.ID: _____ If samples are received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank <u>nor</u> cooler temp can be obtained, note "ambient" or "chilled."	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Exemption permitted if chilled &amp; collected &lt;8 hrs ago.</i>  <i>Note: Identify containers received at non-compliant temperature. Use form FS-0029 if more space is needed.</i>
Delivery method (specify all that apply): <input checked="" type="checkbox"/> Client (hand carried) <input type="checkbox"/> USPS <input type="checkbox"/> Lynden <input type="checkbox"/> AK Air <input type="checkbox"/> Alert Courier <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> RAVN <input type="checkbox"/> C&D Delivery <input type="checkbox"/> Carfile <input type="checkbox"/> Pen Air <input type="checkbox"/> Warp Speed <input type="checkbox"/> Other: _____ → For WO# with airbills, was the WO# & airbill info recorded in the Front Counter eLog?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Yes	N/A	No	
Were samples received within hold time? Do samples <b>match COC*</b> (i.e., sample IDs, dates/times collected)? Were analyses requested unambiguous?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<i>Note: Refer to form F-083 "Sample Guide" for hold times.</i> <i>Note: If times differ &lt;1hr, record details and login per COC.</i> <b>All containers are treated as one sample per PM.</b>
Were samples in <b>good condition</b> (no leaks/cracks/breakage)? Packing material used (specify all that apply): <input checked="" type="checkbox"/> Bubble Wrap <input type="checkbox"/> Separate plastic bags <input type="checkbox"/> Vermiculite <input type="checkbox"/> Other:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were <b>proper containers</b> (type/mass/volume/preservative*) used? Were <b>Trip Blanks</b> (i.e., VOAs, LL-Hg) in cooler with samples? Were all VOA vials <b>free of headspace</b> (i.e., bubbles ≤6 mm)? Were all soil VOAs <b>field extracted</b> with MeOH+BFB?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> <i>Exemption permitted for metals (e.g., 200.8/6020A).</i> <b>Trip Blanks are not run per client's request.</b>
For preserved waters (other than VOA vials, LL-Mercury or microbiological analyses), was <b>pH verified and compliant</b> ? If pH was adjusted, were bottles flagged (i.e., stickers)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For <b>special handling</b> (e.g., "MI" soils, foreign soils, lab filter for dissolved..., lab extract for volatiles, Ref Lab, limited volume), were bottles/paperwork flagged (e.g., sticker)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For <b>RUSH/SHORT Hold Time</b> , were COC/Bottles flagged accordingly? Was Rush/Short HT email sent, if applicable?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
For <b>SITE-SPECIFIC QC, e.g. BMS/BMSD/BDUP</b> , were containers / paperwork flagged accordingly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>For any question answered "No,"</b> has the PM been notified and the problem resolved (or paperwork put in their bin)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SRF Completed by: D. C06/23/2015 PM notified: FT
Was <b>PEER REVIEW</b> of <i>sample numbering/labeling completed</i> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Peer Reviewed by: EDJ
Additional notes (if applicable):				

Note to Client: Any "no" answer above indicates non-compliance with standard procedures and may impact data quality.



## Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1153022001-A	HCL to pH < 2	OK			
1153022001-B	HCL to pH < 2	OK			
1153022001-C	HCL to pH < 2	OK			
1153022001-D	HCL to pH < 2	OK			
1153022001-E	HCL to pH < 2	OK			
1153022001-F	HCL to pH < 2	OK			
1153022001-G	No Preservative Required	OK			
1153022001-H	No Preservative Required	OK			
1153022001-I	No Preservative Required	OK			
1153022001-J	No Preservative Required	OK			

### Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates that an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.

PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

BU - The container was received with headspace greater than 6mm.

# **APPENDIX G**

Select Site Photographs



Installation of MW-1



Soil Sampling at Soil Boring Location B-4



Soil Sampling at Soil Boring Location B-6



Soil Sampling at Soil Boring Location B-8





Soil Sample from B-8



Soil Sampling at Soil Boring Location B-9



MW Sampling Activities

INCH

Outdoor writing products®  
for Outdoor writing people



This cover contains  
post-consumer  
recycled material

**Rite in the Rain**

A patented, environmentally  
responsible, all-weather writing paper  
that sheds water and enables you to  
write anywhere, in any weather.

Using a pencil or all-weather pen,  
*Rite in the Rain* ensures that your  
notes survive the rigors of the field,  
regardless of the conditions.

JL DARLING LLC  
Tacoma, WA 98424-1017 USA  
[www.RiteintheRain.com](http://www.RiteintheRain.com)

Item No. 353N  
ISBN: 978-1-932149-90-6

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US Pat No. 6,863,940



6 32281 35321 8

RESTORATION SFE



*Rite in the Rain*®

ALL-WEATHER

**FIELD**

Nº 353N

15-1459  
Bethel YOUTH  
FACILITY

JAN 2016

Name Restoration Sci & Eng

Address 911 W 8th Ave STE 100  
ANCH. AK 99501

Phone (907) 278-1023

Project 15-1459 - BYE Site Charact

JAN 2010

*Rite in the Rain* — A patented, environmentally responsible, all-weather writing paper that sheds water and enables you to write anywhere, in any weather. Using a pencil or all-weather pen, *Rite in the Rain* ensures that your notes survive the rigors of the field, regardless of the conditions.

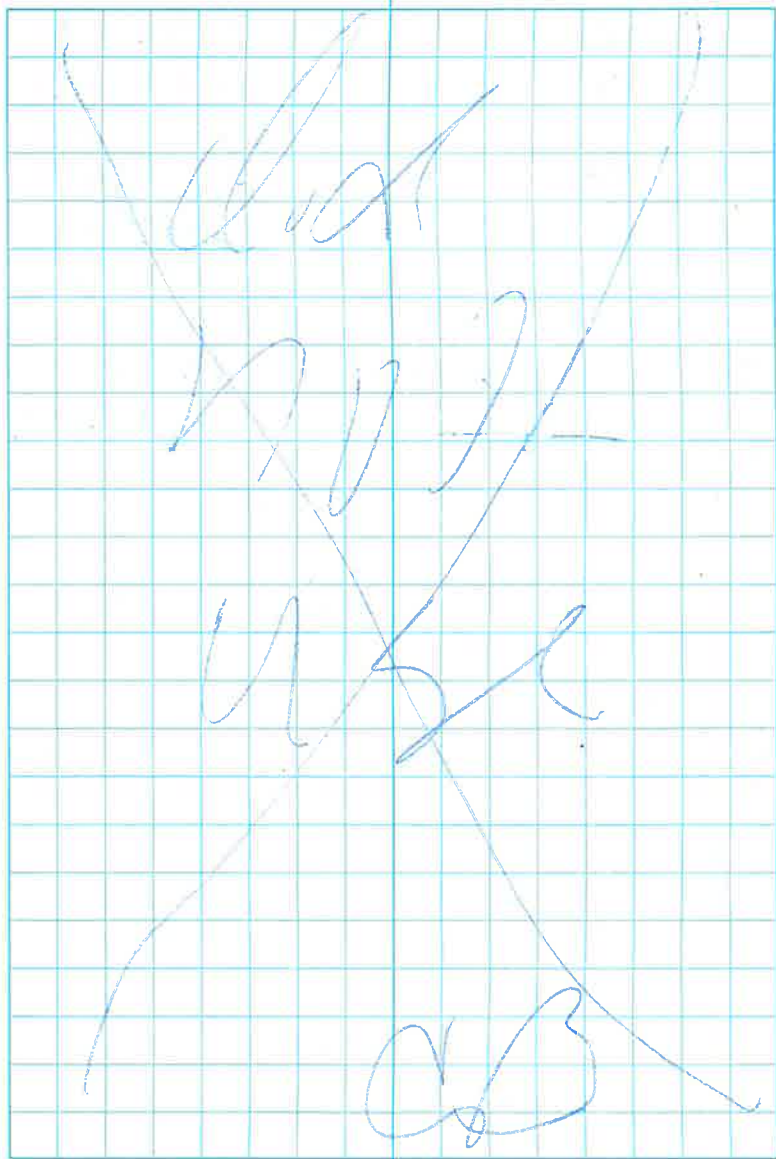
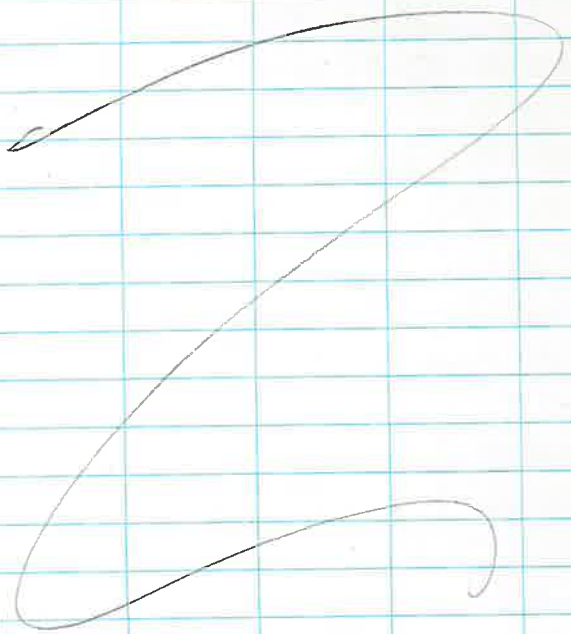


1/26/16 BYF

1300- BEGIN BORING 2. (Labeled BORING 7 ON WORKPLAN MAP

- FIRST LINE @ 7' <sup>1365</sup> IN BORING 2  
GW @ 18' 865

1420- BEGIN DRILLING BORING B-3 (Labeled B-2 ON WORKPLAN FIG)



1/26/11 BYF

PID: 0.0 ppmv

ID	DEPTH	PID	NOTES
1-1	1'	4.3	<del>NOT FINE SAND &amp; SILT</del>
<del>1-3.5</del>	<del>3.5'</del>		<del>"</del>
<del>1-6.5</del>	<del>6.5'</del>		<del>"</del>
1-3.5	3.5	3.0	FINE SAND & SILT
1-6.5	6.5	3.0	FINE SAND & SILT
1-9.5	9.5	1.4	SILTY PEAT MOIST DEBRAS
1-13	13'	2.7	FINE TAN SAND
1-15	15'	3.0	FINE SAND
1-17	17'	3.5	FINE SAND - GREY
1-20	20'	3.7	FINE SAND - GREY

PID: 0.0 ppmv

Collected 1-9.5 For LAB SAMPLE @ 1110

2-2	2'	3.3	FINE SILTY SAND
2-3.5	3.5'	5.4	" "
2-5	5'	3.7	" "
2-9	9'	3.6	SILTY SAND w/OB
2-11.5	11.5'	4.7	" " "
2-14	14'	5.4	fine silty sand grey/brown
2-17	17'	2.9	" " "
2-19	19'	1.4	Wet Silty Sand
2-21	21'	0.4	" " "

Collected 2-9 @ 1410

2-19 @ 1415



Rite in the Rain.

6

1/26/16

BYE CHARACTERIZATION

ID	DEPTH	PID	NOTES
3-1'	1'	5.0	FINE SILTY SAND FREN
3-4	4'	3.2	" " "
3-5.5	5.5'	2.9	" " "
3-10.0	10'	3.4.4	FINE SILTY SAND 2" RECOVERY - NOT ENOUGH FOR A SAMPLE
3-15.5	15.5'	3.7	SATURATED DARK RED/BROWN FINE SANDY SILT
3-19	19'	3.6	FINE SILTY SAND WET

BLIND DUG 3-X

3-5.5 - Collected @ 1510

3-19 @ 1515

3-X (3-19) @ 1200

MW installed at B-3 (B-2 in up pump)

to 25', 10' of screen

sand up to 12'

2 bags of sand, 2 bags of bent.

left site @ 1600

meeting Mike @ 800 tomorrow

CB

1/27/16 BYE

overcast

~21°F feels like 7°  
NNE 20MPH

ONSITE @ 800 discuss next SOB location  
B-4 up against the bull rail as close as possible

START DRILLING B-4 @ 830 SAME W/LOC AS WORK PLAN

SPRINGS @ 9 & 11.5 had low recovery  
only enough for PID (2" x 1")

Installed MW @ B4

depth of well to 25', 10' screen

Sound up to ~12' bgs

2-bgs of sand

2-bgs of bent.

Mike & Walt left site @ 1015

to clean/decontaminate auger & pipe

Neil finished well & we RAN to Gold Street to pick up Mag Lee

ONSITE @ 1100 - moving ~5' NE OF B4

B5 IS NB6 on work plan map

Rite in the Rain

1/27/16 BYF

ID	DEPTH	PID	NOTES
4-2	2'	1.5	Silty sand
4-4	4'	0.6	Fine sand w/ silty silt
4-6.5	6.5'	1.3	Silty sand
4-9	9'	0.2	Fine silty sand only 2" recovery not enough for sample
4-11.5	11.5'	0.5	only 1" of recovery for sample
4-14	14'	247.2	silty sand w/ silt
4-16	16'	548.9	Fine sand w/ silt
4-19	19'	7.5	Fine sand w/ silt
4-21	21'	5.4	" " "
4-24	24'	12.0	" " "

Installing MW @ B4

2 bgs of sand

B 4-14 @ 1015

4-16 @ 1020

4-19 @ 1010

Mike & Walt left to decontaminate  
equipment. meeting back after lunch

1/27/16 BYF

ID	DEPTH	PID	NOTES
5-2	2'	4.3	Fine silty sand
5-4	4'	2.7	Fine silty sand
5-6.5	6.5'	2.3	Fine silty sand
5-9	9'	338.8	
5-11	11'	391.5	
5-14	14'	1204	DEK RED/BEN Fine sand w/ silt
5-16	16'	1523	" " " " " "
5-19	19'	9.3	grey fine sand w/ silt
5-21	21'	15.1	" " " "
5-24	24'	3.7	grey fine sand w/ silt
			→ ambient 3.8 ppm 3.6 ppm, 1.2 ppm
5-26	26'	5.3	grey fine sand w/ silt

5-9 @ 1235

5-16 @ 1250

5-X (dup of 5-16) @ 0800

5-19 @ 1246

5-21 @ 1245 \* make sample



1/27/16 BYF

onsite again at 91400

drawing B-6 (BB on WP Map)

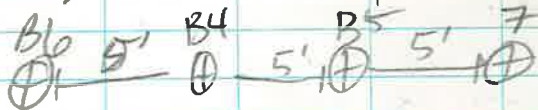
5 ft SW of B4

PID Ambient: 0.8 ppm

ID	DEPTH	PID	NOTES
6-2	2'	6.1	Silty Sand Bed
6-4	4'	4.1	Silty Sand grey/ben
6-6	6'	4.0	" " "
6-9	9'	5.2	Silty sand
6-11.5	11.5'	5.9	Silty sand w/ great <sup>dec red</sup> brown <sup>ben</sup> SILTY FINE SAND
6-14	14'	6.7	Brown " "
6-16	16'	2.7	" " "
6-19	19'	2.0	SILTY/FINE SAND <sup>wet</sup>
6-21	21'	4.2	SATURATED SILTY FINE SAND

PID Ambient 0.4 ppm

B-7 → 5' NE FROM B5



1/27/16 BYF

Ambient: 0.3 ppm

ID	DEPTH	PID	NOTES
7-2	2'	4.0	Silty sand w/ small gravel <sup>some</sup>
7-4	4'	3.3	FINE BRN SILTY SAND
7-6.5	6.5'	4.2	" " "
7-9	9'	4.6	" " "
7-11.5	11.5'	4.2	" " "
7-14	14'	2.1	" " "
7-19	19'	3.4	wet grey silty sand

7-

Sample 7-11.5 collected @ 1625

Filled boring back in and finished for day.

Meeting Mike @ 800 tomorrow

Going to possibly shut w/ B-5 in the WP map 1st.

left site @ 1650

Rate in the Rain

1/28/16

W: 30°F  
OVERCAST

- ⑩10 - ARRIVE ONSITE  
 - PREP TO DRILL B-8  
 @ LOWER ELEVATION OFF  
 GRAVEL PARKING AREA  
 EAST OF WW LIFT STATION

## ⑩15 - BEGIN DRILLING

ID	DEPTH	PID	NOTES
B-1.5	1.5	4.5	FINE SAND & SILT
B-4	4'	2.1	" " LIGHT BRN
B-6	6'	1.4	" " "
B-9	9'	1.4	SILTY PEAT BRN
B-11.5	11.5	1.3	SILT W/ OG BRN
B-14	14	4.2	FINE SILTY SAND DRY
B-16	16	3.5	" " WET
B-19	19	3.9	" " "

Collected sample B-14  
 @ 0920

1/28/16 BYF

GW @ ~15' IN BORING B-8

MW installed @ B8 to 22'  
 with 10' of screen  
 sand up to 8' (2 bags of  
 sand)  
 bent. up to 3' (1 bag)

945 moved to Drill N side of  
 Blue RAIL B-9

Ambient: 0.0 ppm

ID	DEPTH	PID	NOTES
9-2	2'	2.7	BRN DEPT - silty sand
9-5	5'	2.2	BRN DEPT - silty sand
9-10	10'	74.8	" " " "
9-15.5	15.5'	7.9	SILT W/ PEAT BROWN
9-20	20'	4.0	Submerged fine silty sand

Collected Samples

9-10 @ 1045

9-15.5 @ 1050

9-20 @ 1135

Rite in the Rain

1/28/16

1145 - SETUP TO PURGE & SAMPLE  
WELL MW1 (BORING B1)

MW1 collected @ 1230

MWx (duplicate of MW1 @ 0100)

1400 - SET UP TO PURGE &  
SAMPLE MW3

1414 - BEGIN PUMPING

1300 - SETUP ON MW8

1309 - BEGIN PUMPING MW8

1603 - SETUP ON MW4

Collected MW4 @ 1630

Packed up gear and moved  
Supersale to fence near buckets  
& purge water.

Headed to NAC @ 1700

CB

1/29/16

WX: 30°F  
SNOWING

ONSITE @ 0830

REVIEWING maps to figure out locations  
to set benchmarks

- PREP TO START ELEVATIONS  
OF MONITORING WELLS

1050 - LEAVE SITE TO CHECK  
IN FOR FLIGHT.

1/29/16

STA	+	-	HI	ELEV
LIGHT POLE ADJ TO WW LIFT				100
	3.47	<del>3.47</del>	103.47	
MW 1		5.34		98.13
MW 3		4.13		99.34
MW 4		4.45		99.02
MW B		8.86		94.61
METAL GRATE @ S-ENTRANCE		1.27		102.2
SE CORNER WALKWAY		3.31		100.16
LIGHT POLE ADJ TO WW LIFT STA		3.47		100

STA	+	-	HI	ELEV
LIGHT POLE				100
	4.45		104.45	
MW 1		5.92		98.53
MW 3		4.76		99.74
MW 4		5.03		99.42
MW B		9.43		95.02
METAL GRATE @ S-ENTRANCE		1.88		102.57
SE CORN. WALKWAY		3.90		100.55
LIGHT POLE		4.45		100

3RD SET

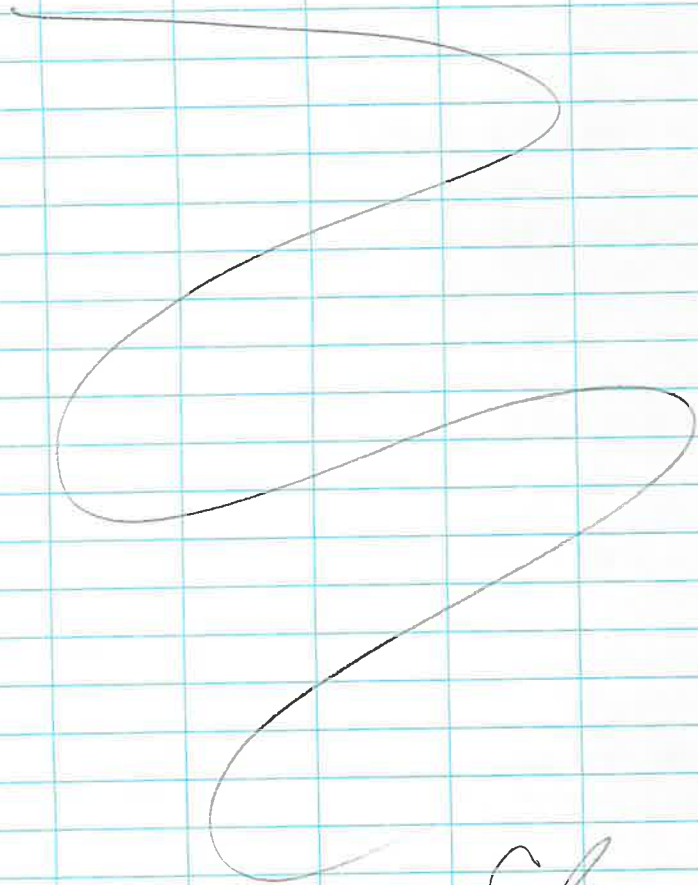
STA	+	-	HI	ELEV
LIGHT POLE	4.00		104.00	100
	<del>3.40</del>	<del>3.40</del>	<del>103.40</del>	
MW 1		5.86		98.14
MW 3		4.66		99.34
MW 4		4.97		99.03
MW B		9.38		94.62
METAL GRATE SE		1.82		102.18
SE COR WALKWAY		3.86		100.14
LIGHT POLE		4.00		100

4TH SET

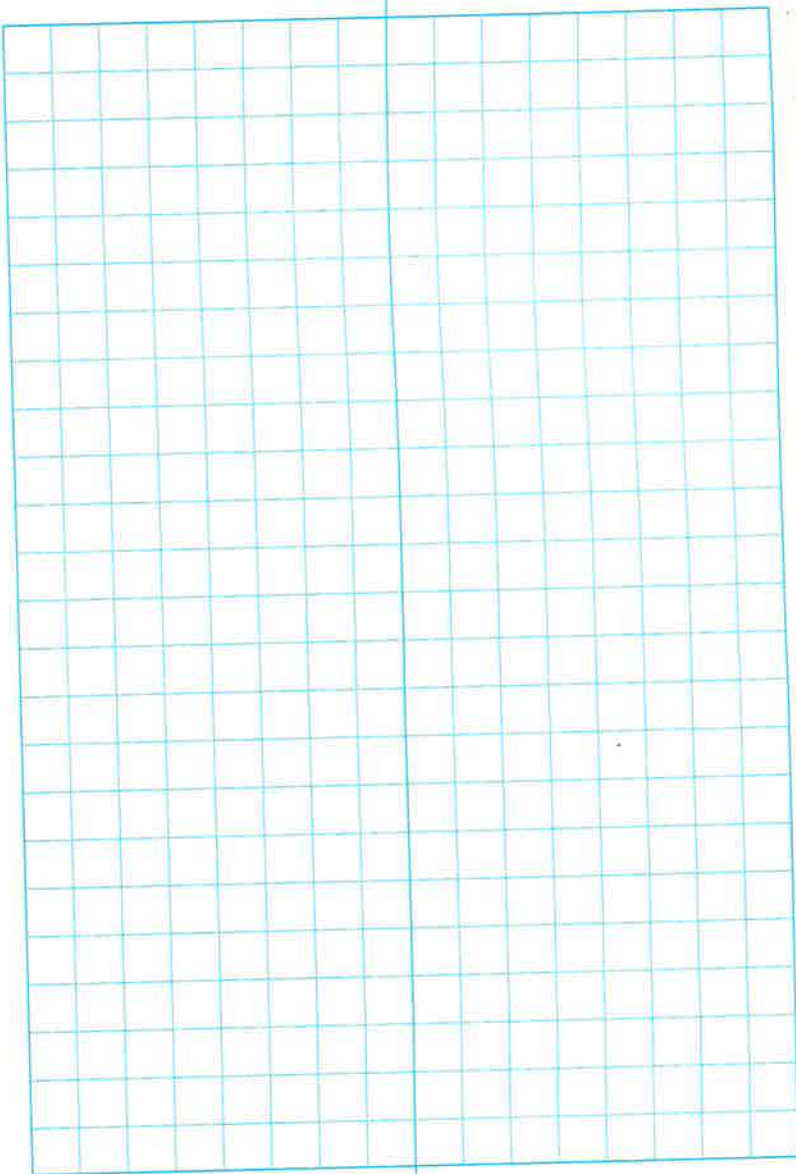
STA	+	-	HI	ELEV
LIGHT POLE				100
	3.95		103.95	
MW 1		5.82		98.13
MW 3		4.61		99.34
MW 4		4.92		99.03
MW B		9.33		94.62
METAL GRATE S. ENT		1.76		102.19
SE COR WALKWAY		3.81		100.14
LIGHT POLE		3.95		100

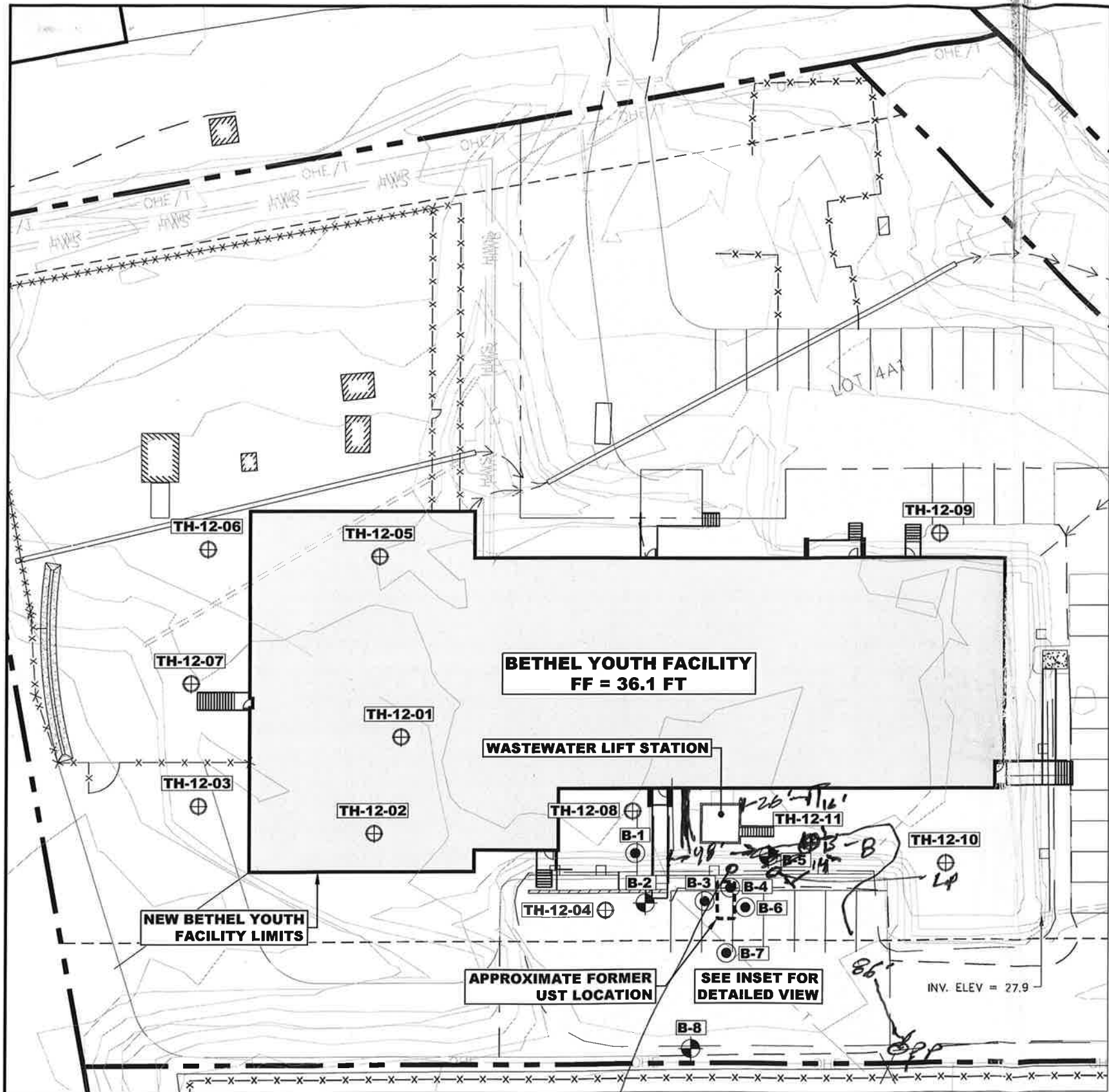
1/29/16 BYF

← LIGHT POLE TBM IS ON SE COR  
 OF PILING CAP THAT LIGHT  
 POLE SITS ON (POLE CLOSEST  
 TO LW LIFT STA)



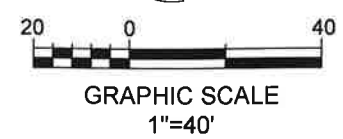
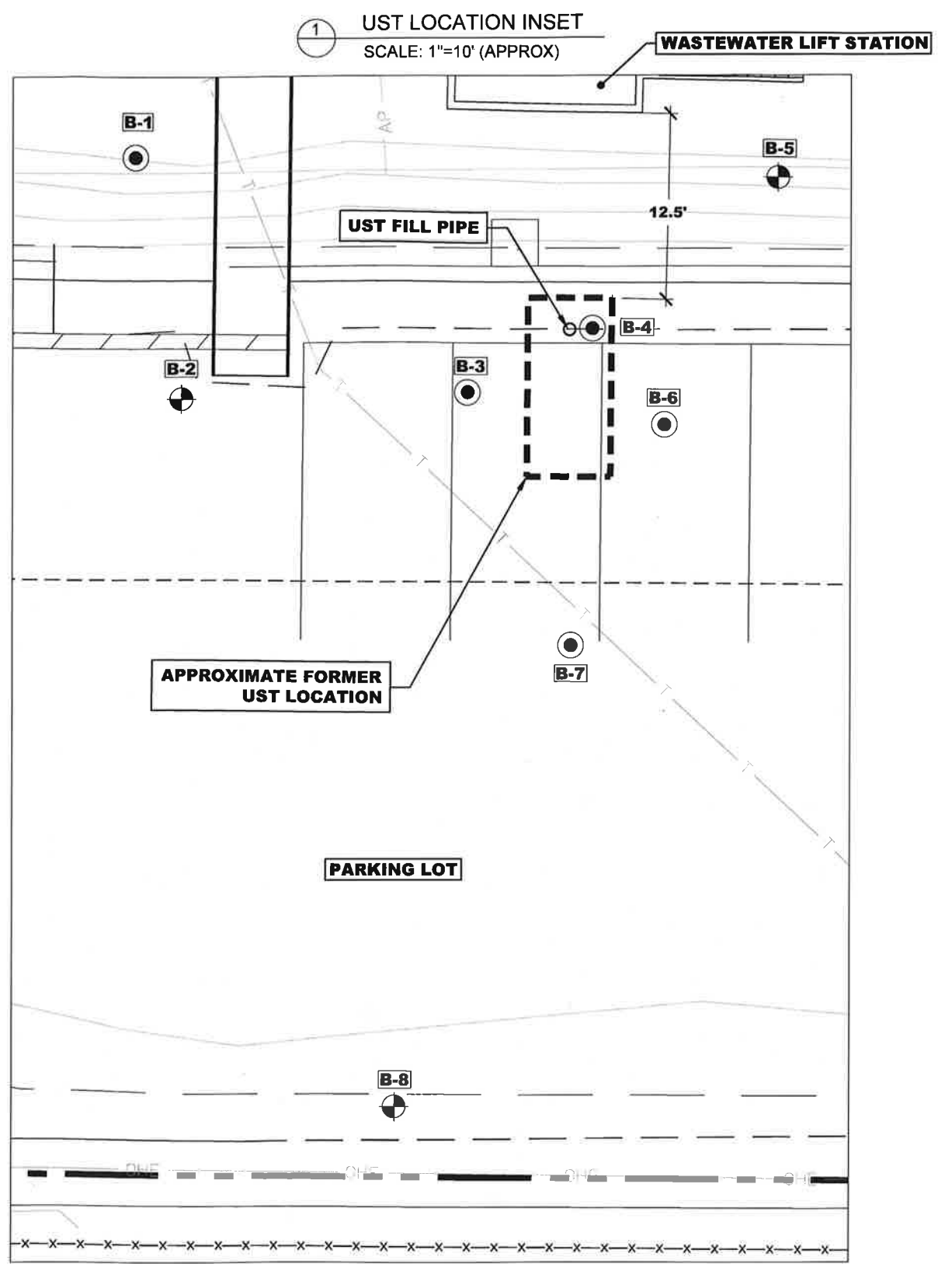
GB





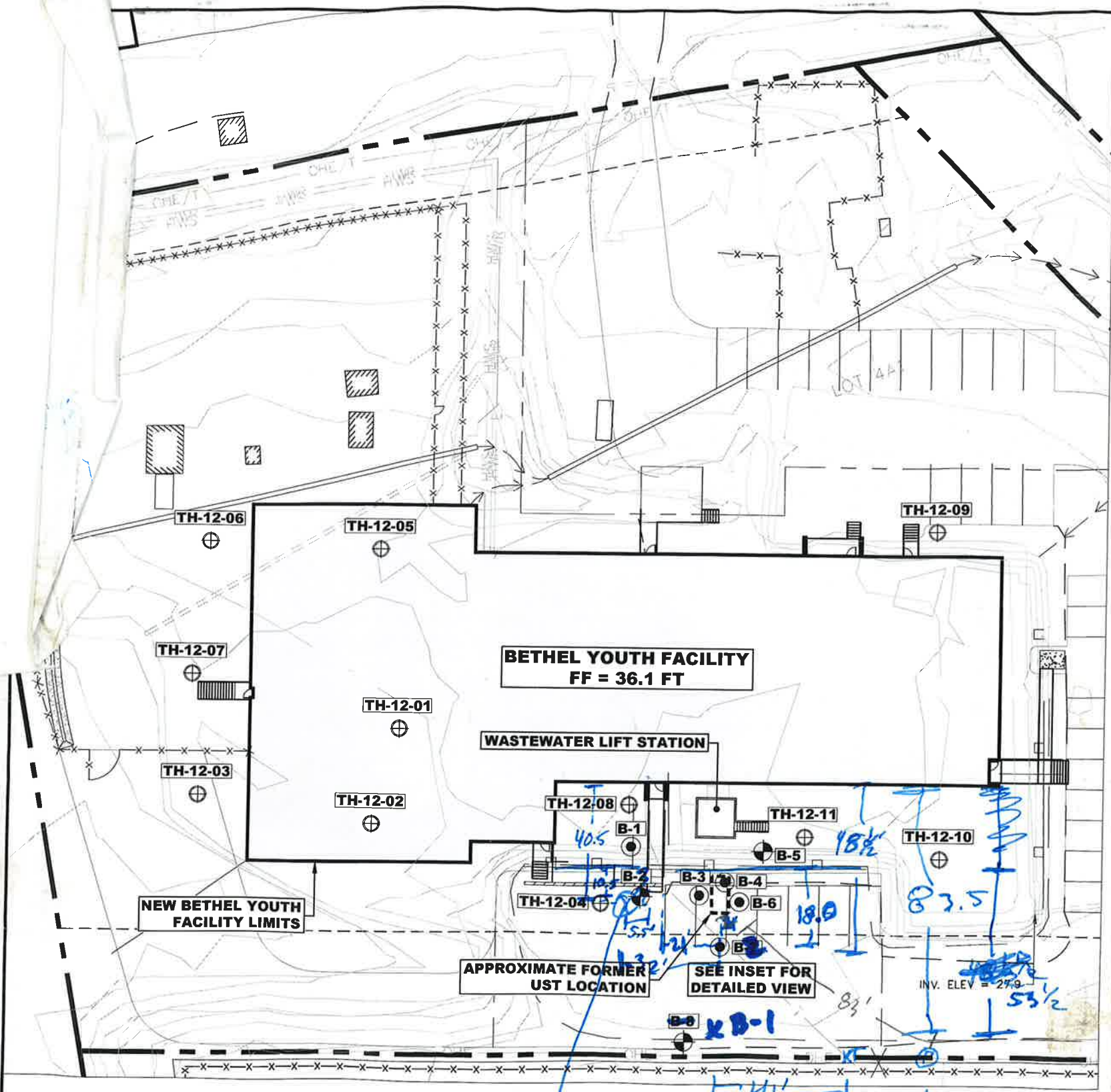
*B9*  
 12' S W W LFT,  
 19.5' W LP,  
 93' FROM FF  
 22' @ WALKWAY

- LEGEND**
- PROPOSED SOIL BORING & MONITORING WELL LOCATION
  - PROPOSED SOIL BORING LOCATION
  - TEST HOLE LOCATIONS PER R & M CONSULTANTS FINAL GEOTECH REPORT DATED APRIL 30TH, 2013

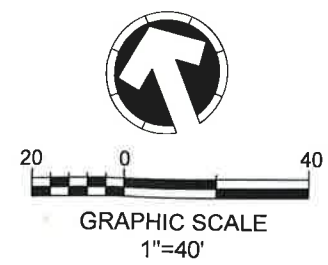
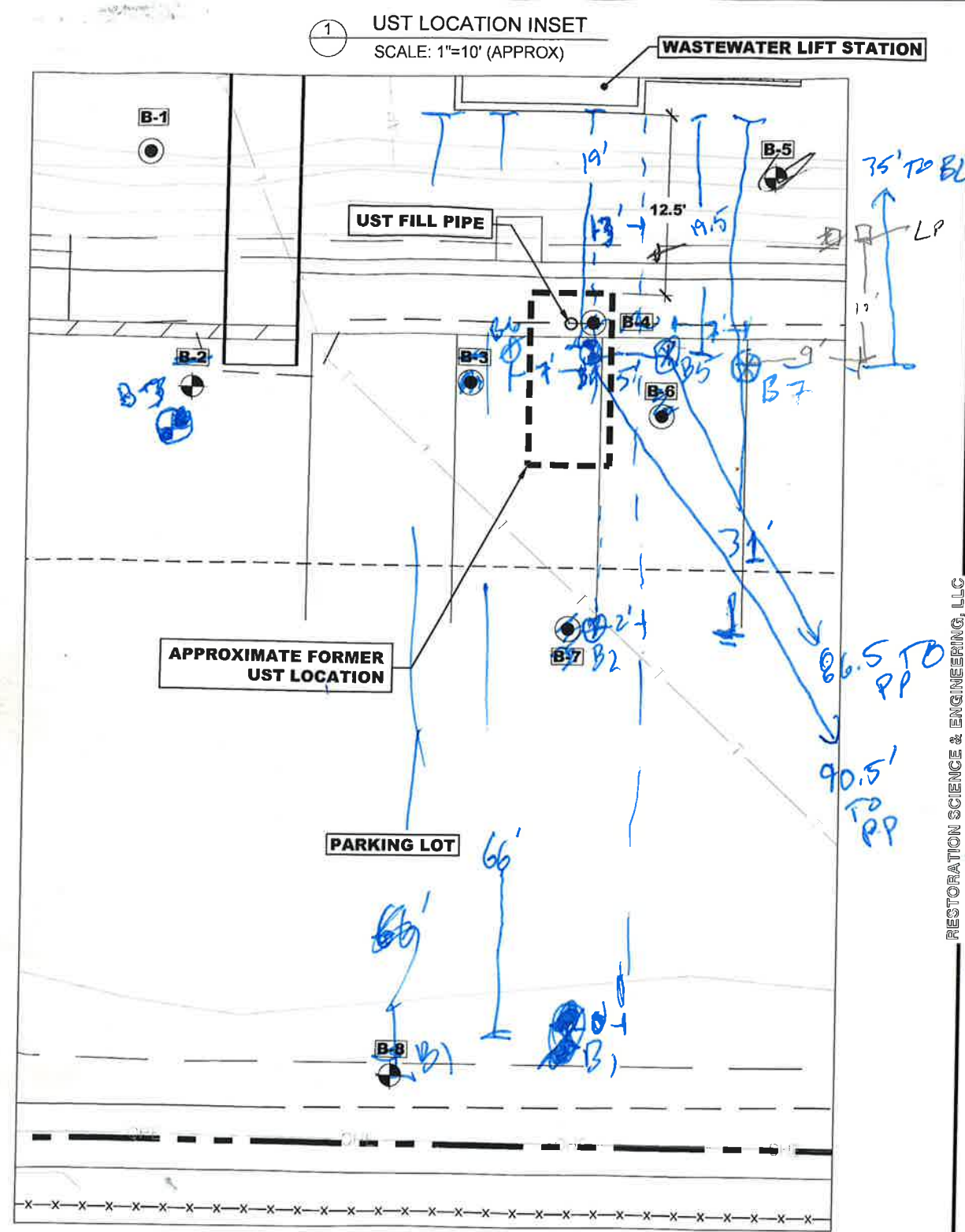


<b>ALASKA DEPARTMENT OF HEALTH AND SOCIAL SERVICES BETHEL YOUTH FACILITY SITE CHARACTERIZATION WORKPLAN</b>		<b>RESTORATION</b> Science & Engineering, LLC <small>911 West 8th Avenue, Suite 100 Anchorage, Alaska 99501 PH (907) 278-1023 FAX (907) 277-5718</small>
<b>SITE PLAN SOIL BORING &amp; MONITORING WELL LOCATION MAP</b>		
<b>BETHEL, ALASKA</b>		
<small>JOB NO: 15-1459</small>	<small>DRAWN: MSB</small>	<b>FIGURE 3</b>
<small>DATE: 1.8.2016</small>	<small>CHECKED: DN</small>	

RESTORATION SCIENCE & ENGINEERING, LLC



- LEGEND**
- ⊕ PROPOSED SOIL BORING & MONITORING WELL LOCATION
  - PROPOSED SOIL BORING LOCATION
  - ⊕ TEST HOLE LOCATIONS PER R & M CONSULTANTS FINAL GEOTECH REPORT DATED APRIL 30TH, 2013



<b>ALASKA DEPARTMENT OF HEALTH AND SOCIAL SERVICES</b> <b>BETHEL YOUTH FACILITY</b> <b>SITE CHARACTERIZATION WORKPLAN</b>		 <b>RESTORATION</b> Science & Engineering, LLC 911 West 8th Avenue, Suite 100 Anchorage, Alaska 99501 PH (907) 278-1023 FAX (907) 277-5718
<b>SITE PLAN</b> <b>SOIL BORING &amp; MONITORING WELL</b> <b>LOCATION MAP</b>		
<b>BETHEL, ALASKA</b>		<b>FIGURE 3</b>
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