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February 24, 2017

Mr. David Pollart
P.O. Box 1096
Mercer Island, WA 98040-1096

Re: September and December 2016 Groundwater Sampling Report – Twentieth and Twenty-First Rounds
Estes West Express Trucking Facility
2102 West Valley Highway North
Auburn, Washington
VCP No. NW 2532

EPI Project No. 61901.1

Dear Mr. Pollart:

Environmental Partners, Inc. (EPI) is pleased to present this *September and December 2016 Groundwater Sampling Report – Twentieth and Twenty-First Rounds* for the Estes West Express Trucking Facility located at 2102 West Valley Highway North in Auburn, Washington (the Site). The general location of the Site is shown on Figure 1.

EPI understands that the Site owner is seeking a No Further Action (NFA) determination from the Washington State Department of Ecology (Ecology). The objective of the groundwater sampling is to monitor groundwater geochemical conditions and petroleum hydrocarbon concentrations in samples from the on-site monitoring wells to track and document groundwater remediation system progress toward achieving a full NFA determination for the Site.

BACKGROUND

Soil and groundwater at the Site were impacted by petroleum hydrocarbon releases from a 550-gallon waste oil underground storage tank (UST) located near the northwest corner of the existing truck maintenance building. The UST and approximately 350 cubic yards of petroleum-contaminated soil (PCS) were removed and four monitoring wells, designated MW-1, MW-2, MW-3, and MW-4, were installed in December 1998. The locations of the former UST and monitoring wells relative to the truck maintenance building are shown on Figure 2.

Ecology issued a conditional NFA determination for the Site in January 2000. The NFA contained the condition that quarterly groundwater monitoring and reporting be continued until "this site demonstrates sustained, continuous compliance with Model Toxics Control Act (MTCA) Groundwater Cleanup Levels (CULs) for at least one year." The NFA letter also stipulated that analytical results for groundwater compliance "shall include BTEX (benzene, toluene, ethylbenzene, and xylene), diesel, and heavy oils." Available records indicate that the monitoring wells were sampled approximately every quarter from December 1998 until October 2002.

In November 2002, the Site owner petitioned for a full NFA determination based on 3 years of data demonstrating that the benzene in groundwater at concentrations greater than MTCA Method A CULs was confined to samples from the area on the north side of the maintenance building around MW-2. At that time, the sample from MW-2 had a gasoline-range petroleum hydrocarbon (GRPH) concentration of 180 micrograms per liter (µg/L) and a benzene concentration of 12.0 µg/L. The GRPH concentration was less than its MTCA Method A CUL of 800 µg/L; however, the benzene concentration exceeded the MTCA Method A CUL of 5 µg/L. No other BTEX compounds, diesel-range petroleum hydrocarbons (DRPH), or higher-range petroleum hydrocarbons (HRPH) were detected in the sample from MW-2 and none of the samples from the other monitoring wells had concentrations exceeding MTCA Method A CULs.

Groundwater sampling was discontinued in late 2002 and the Site did not receive a full NFA determination due to the benzene concentration exceeding its MTCA Method A CUL in samples from MW-2. Records indicate that the Site was subsequently dropped from Ecology's Voluntary Cleanup Program (VCP) due to inactivity.

The Site re-entered the VCP in August 2011 and was assigned VCP No. NW 2532. Quarterly groundwater sampling of the four on-site wells under the VCP resumed in August 2011. On March 26, 2012, Ecology notified the Site owner that the January 2000 conditional NFA determination was being rescinded because the benzene concentrations in groundwater samples from well MW-2 remained greater than the MTCA CUL and the previous groundwater remedy (excavation of petroleum impacted soils followed by groundwater monitoring) did not achieve and maintain compliance with the applicable MTCA Method A CULs.

On November 28, 2012, a 12,000-gallon diesel fuel UST was removed from south side of the truck maintenance building. The location of the former 12,000-gallon diesel UST is shown in Figure 2. Available information indicates that the UST was pumped and taken out of service in 1998 when the 550-gallon waste oil UST was removed. The UST had reportedly not been used between 1998 and 2012. EPI personnel oversaw the UST decommissioning activities and collected nine soil samples and one sample of water at the bottom of the UST excavation. EPI prepared the *Underground Storage Tank Site Assessment Report,* dated January 4, 2013, for submittal to Ecology's Underground Storage Tank Division. The reviewer is referred to that report for additional details regarding the decommissioning activities and soil and groundwater sampling results.

Ecology requested installation of two additional wells designated MW-5 and MW-6. Well MW-5 was installed at the southwest corner of the truck maintenance building to monitor groundwater downgradient of MW-1. Well MW-6 was installed at the southeast corner of the former 12,000-gallon diesel UST excavation to evaluate groundwater quality based petroleum hydrocarbon detections in a groundwater sample from the bottom of the UST excavation during decommissioning activities.

REMEDIATION SYSTEM INSTALLATION AND OPERATION

Despite successful source removal of impacted soil in 1998, analytical data for groundwater samples from the Site indicate that MW-1 has the greatest and most consistently detected concentrations of diesel range petroleum hydrocarbons (DRPH) and heavier range petroleum hydrocarbons (HRPH). The data indicate that natural attenuation of the residual DRPH and HRPH impacts was not occurring at a rate that would result in a reasonable restoration timeframe; therefore, an active groundwater remediation system was designed, installed, and operated for the area around MW-1 as described in the following paragraphs.

In May 2014, EPI installed three shallow air injection wells at locations upgradient of MW-1 as shown in Figure 2. The purpose of the air injection wells and system is to add dissolved oxygen (DO) to the groundwater. The increased DO concentrations in groundwater due to system operation stimulates population growth and increases the activity of aerobic bacteria and provides the oxygen necessary for those bacteria to metabolize dissolved petroleum hydrocarbons in groundwater.

Each of the shallow air injection wells is equipped with a 1-ft. length Kerfoot Technologies C-Sparger® screen set in a sand filter pack and fully submerged in groundwater at approximately 14 to 15-ft bgs. Pressurized air pumped through the C-Sparger® screens forces air, containing oxygen, into groundwater as microbubbles, greatly increasing the surface area of the bubbles for more efficient oxygenation of the groundwater. The remaining well annulus was sealed using hydrated bentonite chips and the surface was completed in 8-inch diameter flush completion steel monuments set in concrete.

An appropriately-sized rotary vane air compressor was installed in the fenced area at the north end of the truck maintenance building to provide air to the shallow air injection wells. The shallow air injection wells are connected to the compressor using 1-inch diameter PVC piping installed below the ground surface through the side of each of the well monuments. PVC air supply lines were installed in trenches that were appropriately backfilled and patched with asphalt at the surface to match the surrounding pavement grade.

The remediation system was started and tested on May 15, 2014 after the 12th round of quarterly sampling was completed. An electrical issue with the compressor motor caused the air injection remediation system to shut down in August 2014. Analytical results from the August 2014 (13th round) sampling event indicated that DRPH and HRPH concentrations were non-detect in the sample from MW-1. Based on the favorable result the remediation system has remained off at MW-1 since August 2014 so that follow-on groundwater data could be collected to demonstrate that groundwater was remediated to concentrations below MTCA Method A Groundwater CULs.

The success of the air injection remediation system at MW-1 demonstrated that warranted expansion to remediate impacted groundwater at MW-6 was warranted. In January 2015 EPI installed three additional shallow air injection wells at locations upgradient of MW-6 at the locations shown in Figure 2. The three wells are constructed like the air injection wells at MW-1 and are equipped with 1-ft lengths of Kerfoot Technologies C-Sparger® screen set in a sand filter pack and fully submerged in groundwater at approximately 14 to 15-ft bgs.

The expanded air injection remediation system at MW-6 was first turned on and tested on April 3, 2015. The expanded system at MW-6 ran from April 3, 2015 until sometime in June 2015 when an electrical issue with the compressor motor caused the air injection remediation system to shut down, requiring replacement. In addition, the air distribution manifold serving the air injection wells near MW-6 was damaged by the tenant and was repaired and restored to operation.

The electrical issue has been identified as low voltage, measured at 208 volts, in the area, which causes the compressor motor to over-amp and eventually overheat. On November 16, 2016, a new compressor rated for continuous operation under low voltage power supplies was installed, tested, and returned to continuous operation.

AUGUST 2016 SOIL BORINGS AND CONDITIONAL POINT OF COMPLIANCE WELL INSTALLATION

On August 26, 2016, EPI oversaw the drilling and sampling of two soil borings, designated BH-1 and BH-2; and the installation of two conditional point of compliance (POC) monitoring wells, designated MW-7 and MW-8. BH-1 and BH-2 were drilled east of the former diesel UST to evaluate subsurface conditions immediately downgradient of the former UST. POC well MW-7 was installed southeast and downgradient of the former 12,000-gallon diesel UST and existing well MW-6. Well MW-8 was installed northeast of MW-7, also downgradient of the former 12,000-gallon diesel UST and existing well MW-6. The purpose of the POC monitoring wells is to monitor groundwater conditions downgradient of the former 12,000-gallon diesel UST, which is a source area for diesel impacts to groundwater at the Site. Figure 2 shows the locations of borings and monitoring wells relative to Site features.

Geology

The surface of the Site was generally covered with asphalt with compacted gravel subgrade to a depth of approximately 6 inches. Groundwater was encountered at all four soil borings at depths from 6.1 to 7.5 feet bgs. Subsurface geologic conditions consisted of the following:

- Sandy Silt with Gravel (ML) from approximately 6 inches to 6 to 10 feet below ground surface (bgs) in BH-1 and BH-2, respectively. The Sandy Silt with Gravel (ML) is underlain by Poorly-Graded Sand with Silt (SP-SM) to 15 ft. bgs, which was the maximum depth of exploration at these locations.

- Boring logs for MW-7 and MW-8 indicate the Sandy Silt with Gravel (ML) extends to approximately 6 ft. bgs at both locations and is underlain by Silt with Sand (ML) that extended to 12 to 14 feet bgs at MW-7 and MW-8, respectively. At MW-7, the Silt with Sand (ML) was underlain by Poorly-Graded Sand with Silt (SP-SM) from 12 feet to 14 feet bgs, the maximum depth of exploration.

Boring logs for the soil borings BH-1 and BH-2 and as-built diagrams for POC wells MW-7 and MW-8 are included in Attachment A.

Well Construction

New POC wells MW-7 and MW-8 are screened with a 2-inch diameter Schedule 40 PVC screen with 0.010-inch, machine-cut slots installed from 4 to 14 feet bgs. A sand filter pack was installed from the bottom of the boring (14 ft. bgs) to 1 foot above the top of the screened interval using 10-20 silica sand. The remainder of the well was sealed with hydrated bentonite chips and topped with a traffic-rated steel protective monument set in concrete. Each of the well casings was sealed with locking watertight caps, as required by Ecology resource protection well construction regulations. The as-built well diagrams are shown on the borelogs, which are included as Attachment A.

Well Development

Following installation, EPI developed the two new monitoring wells to remove fine material from the filter pack and well casing, which allows the wells to produce less turbid, more representative groundwater samples. The wells were developed with a decontaminated 12-volt submersible pump using a combination of surging and pumping. EPI field staff periodically measured and recorded field parameters during well development. Field-measured well development data are presented in Attachment B.

Well development was performed until purged water became visually clear and measured turbidity of less than 5 nephelometric turbidity units (NTUs) was achieved. In total, 25 gallons of water were purged out of MW-7 and 20 gallons of water were purged out of MW-8. Water development water was retained at the Site in 55-gallon steel drums, and will be profiled, as required, for proper handling and disposal.

Well Surveying

EPI field staff surveyed measuring point elevations for the two new monitoring wells at the Site. Consistent with the survey datum used previously, EPI field staff used the top of the bollard at the northwest corner of the maintenance building as a 100-foot elevation site-specific datum for the property. Measuring point elevations for the monitoring wells at the Site are summarized in Table 1.

SOIL SAMPLING

As part of the well installation, EPI staff collected soil samples from approximately 5.5 to 7.0 feet bgs at MW-7 and MW-8, which corresponds with the top of the water table at those locations. In addition, soil samples were collected at 5-foot intervals (5-, 10-, and 15-ft. bgs) at BH-1 and BH-2. Samples were collected using a 1.5-foot long split-spoon sampler, which was decontaminated between samples. The samples were screened in the field using a photoionization detector (PID) and the sample material with the greatest PID reading, if any, was collected for laboratory analysis. Drill cuttings were placed into steel drums, which are temporarily stored onsite pending profiling for disposal.

Soil samples from all four borings were collected for DRPH and HRPH analyses using the Northwest Petroleum Hydrocarbons as Diesel (NWTPH-Dx extended to include oil-range hydrocarbons). Immediately upon collection, filled soil sample containers were placed in a cooler with sufficient ice to maintain an internal temperature of 4^{o}C or less pending submittal to the analytical laboratory. Samples

were transported under standard Chain-of-Custody protocols to Friedman & Bruya, Inc. in Seattle, Washington. The Chain-of-Custody form is included in Attachment C.

Soil sample data are summarized in Table 2. None of the soil samples collected at the BH-1 and BH-2 boring locations or well MW-7 and MW-8 locations had detections of petroleum constituents at the listed reporting limits.

RECONNISANCE GROUNDWATER SAMPLING

EPI staff collected groundwater samples from BH-1 and BH-2 using a temporary PVC well screen. The temporary wells were screened from 5 to 15 feet bgs at both locations. Temporary wells were purged prior to sampling to reduce turbidity but stabilization parameters were not measured.

Groundwater samples from both borings were collected for DRPH and HRPH analyses using the Northwest Petroleum Hydrocarbons as Diesel (NWTPH-Dx extended to include oil-range hydrocarbons). Immediately upon collection, filled groundwater sample containers were placed in a cooler with sufficient ice to maintain an internal temperature of 4^{o}C or less pending submittal to the analytical laboratory. The samples were transported under standard Chain-of-Custody protocols to Friedman & Bruya, Inc. in Seattle, Washington. The Chain-of-Custody form is included in Attachment C.

Reconnaissance groundwater sample data are summarized in Table 2. Samples from both borings were non-detect for HRPH. Samples from BH-1 and BH-2 had detections of DRPH at concentrations of 490 and 1,000 μg/L, respectively. The DRPH detected in the sample from BH-2 at 1,000 μg/L exceeds its MTCA Method A CUL of 500 μg/L.

GROUNDWATER SAMPLING PROCEDURES

On September 16, 2016 and on December 20, 2016 EPI sampled all eight monitoring wells at the Site as part of the quarterly groundwater sampling program. EPI measured the depth to water and total depths of all monitoring wells using an electronic water level meter. To ensure reproducibility and consistency of the depth to water data, all measurements were made to the north side of the top surface of the PVC well casing. September groundwater elevations ranged from 89.05 feet Site Datum (EPI 2013 and EPI 2016 surveyed elevations) in MW-8 to 89.47 feet in MW-1. December groundwater elevations ranged from 89.01 feet Site Datum in MW-7 to 90.81 feet in MW-2. Groundwater elevations are presented in Table 1.

Groundwater elevation contours indicate that groundwater flow was generally from northwest to southeast at the time of the September and December sampling events as shown in Figures 3 and 4, respectively. These groundwater contours and flow directions are generally consistent with historical data.

The air injection system was not in operation at the time of the September 2016 site visit and onsite workers indicated that it had been off since June 2016 as noted in the section titled **Remediation System Installation and Operation**. Therefore, groundwater levels were not affected by system operation during

the September monitoring event. The air injection system was repaired and restarted in November 2016 and the December 2016 groundwater level measurements were obtained with the system running so they are affected by ongoing air injection operations.

Prior to sampling, EPI purged the monitoring wells using a peristaltic sampling pump and following low flow, low impact well purging techniques. Purge water was measured for stabilization of the key field parameters; temperature, pH, specific conductance, DO, and oxidation-reduction potential (ORP) approximately every three to five minutes. Samples were collected into appropriate pre-labeled containers upon attainment of field parameter stabilization criteria. Field parameter measurements for stabilized parameters are presented in Table 1. Field notes are included in Attachment C.

Purge water was transferred to a 55-gallon drum stored near the northwest corner of the maintenance building pending disposal characterization.

Groundwater samples from all eight wells were collected for DRPH and HRPH analyses using the NWTPH-Dx analytical method. As requested by Ecology, additional sample volumes from MW-6, MW-7, and MW-8 were collected for naphthalene analysis using Method 8260C. Immediately upon collection, filled groundwater sample containers were placed in a cooler with sufficient ice to maintain an internal temperature of 4^{o}C or less pending submittal to the analytical laboratory. The samples were transported under standard Chain-of-Custody protocols to Friedman & Bruya, Inc. in Seattle, Washington. The Chain-of-Custody form and analytical report is included in Attachment D.

MW-4 AND MW-8 RE-SAMPLE

Initial analytical results from MW-4 and MW-8 indicated detected concentrations of petroleum hydrocarbons that appeared to be anomalous. In the case of data from MW-4, the concentrations of 750 μg/L and 1,700 μg/L for DRPH and HRPH, respectively, were significantly greater than the range of historical concentrations for samples from that well. For MW-8, the concentrations of 1,100 μg/L and 590 μg/L for DRPH and HRPH, respectively, were unexpected based on its distance from the source area near MW-6 (see Table 3).

Field staff noted that during the September sampling event both wells had loose-fitting well caps. It appeared that the loose caps might have allowed small volumes of surface water, potentially contaminated with DRPH and HRPH from the paved parking area, to enter groundwater affecting sample integrity. Within a few days of receiving the September analytical data EPI re-developed and resampled wells MW-4 and MW-8 and replaced the well caps. These tasks were performed to evaluate if the apparently anomalous detections were representative of groundwater conditions.

Groundwater samples (re-samples) from MW-8 and MW-4 were collected for DRPH and HRPH analyses on September 29, 2016 and October 3, 2016, respectively. Prior to the resampling event, approximately 5 gallons were purged from each well before sampling to remove potential surface water contamination, and the suspected leaky well caps were replaced with new watertight caps.

Analytical results from the MW-4 resample are within historical limits. DRPH was detected at a concentration of 68 μg/L, which is significantly less than the MTCA Method A CUL of 500 μg/L. HRHP was not detected in the resample, which is consistent with historical data from this well. Analytical results from the MW-8 resample indicate DRPH was detected at 290 μg/L, which does not exceed the MTCA Method A CUL of 500 μg/L. HRHP was not detected in the resample from MW-8.

The resample results from both MW-4 and MW-8 are consistent with the December sampling results for both wells confirming that the initial samples from September were anomalous and should not be considered representative of groundwater conditions. Therefore, the anomalous values from September 2016 in samples from MW-4 and MW-8 will be presented in Table 3 of this report but will not be presented in future reports. The anomalous data from MW-4 and MW-8 will not be included in time series graphs for the wells.

GROUNDWATER ANALYTICAL RESULTS

The following findings are based on a review of the September and December 2016 field parameter measurements presented in Table 1 and the analytical data presented in Table 3. Full laboratory data reports for both sampling events and the resampling data for MW-4 and MW-8 are presented in Attachment D.

Dissolved Oxygen

- September DO measurements range from 0.10 milligrams per liter (mg/L) in purge water from MW-5 to 0.64 mg/L in purge water from MW-4.

- December DO measurements range from 0.72 mg/L in purge water from MW-7 to 7.69 in purge water from MW-1.

- December DO measurements are greater than September DO measurements at all locations, most notably MW-1. This is likely due to renewed operation of the air injection system.

ORP

- September ORP measurements ranged from -62.3 millivolts (mV) in purge water from MW-6 to 95.5 mV in purge water from MW-1.

- December ORP measurements ranged from -46.1 mV in purge water from MW-6 to 12.6 mV in purge water from MW-2.

- Negative ORP measurements indicate anaerobic (reducing) geochemical conditions in groundwater. Positive ORP measurements indicate more aerobic geochemical conditions, likely resulting from renewed operation of the air injection system.

pH

- Field-measured pH values for September in purge water from the wells ranged from 5.94 in purge water from MW-1 to 6.40 in purge water from MW-4.

- December pH values ranged from 5.79 in purge water from MW-2 to 6.65 in purge water from MW-1.

- The low pH value measured at well MW-1 in September is likely due to generation of carbon dioxide by enhanced bacterial decomposition of organics, including petroleum hydrocarbons. The carbon dioxide generated by this naturally occurring process will form carbonic acid in the localized groundwater near the air injection system. This low pH groundwater appears to have migrated to MW-2, which is approximately 25 feet downgradient of MW-1 (see Figure 3).

HRPH

- In September HRPH was detected in the samples from MW-1, MW-4, and MW-8 at concentrations of 420 μg/L, 1,700 μg/L, and 590 μg/L, respectively. The HRPH concentration in the sample from MW-1 is less than the MTCA Method A CUL of 500 μg/L.

- The HRPH results in the samples from MW-4 and MW-8 were anomalous and were non-detect at a reporting limit 250 μg/L when the wells were re-sampled shortly after receiving the September data.

- In December HRPH was non-detect in samples from all 8 monitoring wells.

DRPH

- In September DRPH was detected in samples from seven of the eight wells at concentrations that ranged from 68 μg/L to 1,100 μg/L in samples from MW-4 and MW-8, respectively. The DRPH concentration in the sample from MW-1 was 580 μg/L, which exceeds the MTCA Method A CUL of 500 μg/L.

- The September 16, 2016 DRPH results in the samples from MW-4 and MW-8 were anomalous and were 68 μg/L and 290 μg/L when the wells were re-sampled shortly after receiving the September data.

- In December DRPH was detected in samples from six of the eight wells at concentrations that ranged from 78 μg/L in samples from MW-4 and MW-7 to 190 μg/L in the sample from MW-1. All December DRPH concentrations were less than the MTCA Method A CUL of 500 μg/L.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are supported by data presented and evaluated in this groundwater monitoring report.

- Low DO and negative ORP measurements in September purge water from MW-3, MW-5, and MW-6 indicate that the air injection system had not yet established aerobic geochemical conditions at those locations. Naturally-occurring low DO and negative ORP measurements noted in purge water from MW-7 and MW-8 are expected based on their distance from the active remediation system.

- December DO measurements were greater than September DO measurements in all 8 wells. This indicates that renewed operation of the air injection system, which was repaired and re-started in November, is creating more aerobic geochemical conditions, most notably at MW-1.

- In September, HRPH was detected in the sample from MW-1 at a concentration less than the MTCA Method A CUL. Re-sample results for MW-4 and MW-8 were non-detect for HRPH. The re-sample data demonstrate the original September 16th sample results for MW-4 and MW-8 were anomalous. HRPH was not detected in any samples collected during the December sampling event.

- In September, DRPH was detected in samples from seven of the eight wells sampled. Only the sample from MW-1 exceeded the MTCA Method A CUL. Re-sample results for MW-4 and MW-8 were less than the MTCA Method A CUL. The re-sample data demonstrate the original September 16th sample results for MW-4 and MW-8 were anomalous. In December, DRPH was detected in samples from six of the eight wells sampled. Only the sample from MW-6 exceeded the MTCA Method A CUL

- The historical DRPH impacts in samples from MW-1, first observed in November 2011, might have been due to short-term truck parking and outdoor storage of oily engine parts outside of the northwest corner of the truck maintenance building by the tenant. These practices were in violation of the lease agreement and were discontinued by the tenant upon direction from the property owner.

- DRPH concentrations in samples from MW-2, MW-3, MW-4, and MW-5 have been consistently less than the MTCA Method A Groundwater CUL for every quarterly sampling event since August 2011 (June 2013 for MW-5).

- Samples from MW-3, MW-4, and MW-5 have never exceeded MTCA Method A CULs for DRPH or HRPH. In addition, there has only been one sample from MW-2 with a MTCA Method A CUL exceedance (HRPH at 730 µg/L in August 2012). The consistent long-term compliance with the MTCA Method A CUL for DRPH and the single isolated historical exceedance of the MTCA Method A CUL for HRPH suggests that a less frequent sampling schedule is warranted for MW-2, MW-3, MW-4, and MW-5. We therefore recommend a semiannual sampling schedule for these four wells with quarterly sampling retained at MW-1, MW-6, MW-7, and MW-8.

EPI expanded the shallow air injection system to remediate groundwater near MW-6. The air injection system at MW-6 was designed like the original air injection system near MW-1 and is operated in a similar manner. In November 2016, shallow air injections near MW-1 and MW-6 were resumed using a compressor that is able to operate under low voltage conditions to address the MTCA Method A CUL exceedances for DRPH in samples from both wells.

Analytical and field data from MW-1 demonstrate that the air injection technology used at the site creates aerobic geochemical conditions and promotes increased biodegradation of the DRPH and HRPH in groundwater. Air injection system operation near MW-6 has not been sustained for a sufficiently long period to make a valid assessment of whether the expanded system is capable of similar success at that location.

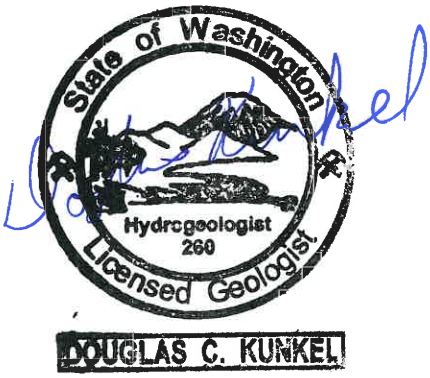
Sustained operation of the air injection system has been problematic at the site as demonstrated by several inoperable blowers caused by overheating. The likely problem is that the site, and the surrounding area, has 208-volt electrical power, which can cause 220-230 volt electrical motors to overheat due to the increased amperage required to make up for the low voltage. EPI has purchased and installed a blower that is rated for continuous operation at 208 volts, or lower, for the air injection system.

EPI appreciates the opportunity to be of assistance on this project. If you have any questions or comments, please do not hesitate to contact me at (425) 395-0016.

Sincerely,

Douglas Kunkel

Douglas Kunkel, L.G., L.H.G.
Principal Hydrogeologist



cc: Mr. Eugene Freeman, WDOE-Northwest Regional Office

ENCLOSURES

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Table 2	Boring and Well Installation Analytical Results
Table 3	Quarterly Groundwater Monitoring Analytical Results in µg/L

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Figure 1	General Vicinity Map
Figure 2	Air Injection Remediation System Layout
Figure 3	September 16, 2016 Groundwater Elevations and Flow Directions
Figure 4	December 20, 2016 Groundwater Elevations and Flow Directions

Attachments

Attachment A	Boring Logs
Attachment B	Well Development Forms
Attachment C	Sampling Field Notes and Forms
Attachment D	Analytical Laboratory Reports

Tables

Table 1: Summary of Groundwater Stabilization Parameters
Estes West Express Facility
2102 West Valley Highway North, Auburn, Washington

Well ID	Date Sampled	Depth to Water (ft.)	Top of Casing Elevation (ft.)	Groundwater Elevation	pH	Specific Cond. (mS/cm^2)	Dissolved Oxygen (mg/L)	Temp. (^{o}C)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
September 16, 2016										
MW-1	09/16/16	5.99	95.46	89.47	5.94	0.451	0.16	18.83	95.5	NM
MW-2	09/16/16	6.13	95.52	89.39	6.11	0.451	0.15	17.20	59.8	NM
MW-3	09/16/16	6.09	95.47	89.38	6.33	0.600	0.11	18.28	-47.8	NM
MW-4	09/29/16	6.40	95.61	89.21	6.40	0.731	0.64	16.59	29.4	NM
MW-5	09/16/16	6.11	95.58	89.47	6.25	0.550	0.10	17.48	-32.8	NM
MW-6	09/16/16	6.01	95.44	89.43	6.25	0.509	0.33	18.91	-62.3	NM
MW-7	09/16/16	5.15	94.28	89.13	6.23	0.776	0.57	18.74	-58.7	NM
MW-8	10/03/16	5.09	94.14	89.05	6.24	1.235	0.52	19.95	-26.4	NM
December 20, 2016										
MW-1	12/20/16	4.92	95.46	90.54	6.65	0.132	7.69	12.85	-7.4	NM
MW-2	12/20/16	4.71	95.52	90.81	5.79	0.264	0.87	12.02	12.6	NM
MW-3	12/20/16	5.38	95.47	90.09	6.37	0.590	1.94	14.36	-41	NM
MW-4	12/20/16	6.32	95.61	89.29	6.33	0.602	0.75	13.84	-23.6	NM
MW-5	12/20/16	5.16	95.58	90.42	6.28	0.530	1.09	14.00	-18.8	NM
MW-6	12/20/16	5.14	95.44	90.30	6.36	0.531	1.30	15.44	-46.1	NM
MW-7	12/20/16	5.27	94.28	89.01	6.32	0.69	0.72	13.95	-39.5	NM
MW-8	12/20/16	4.62	94.14	89.52	6.40	1.15	1.29	14.19	-40.5	NM

Notes:

NM = Not Measured

Table 2
Boring and Well Installation Analytical Results
September 2016 Groundwater Sampling Report -- Twentieth Round
Estes West Express Trucking Facility
2102 West Valley Highway North - Auburn, WA

Soil Sample ID	Sample Depth (feet bgs)	Sample Date	DRPH[a] (mg/kg)	HRPH[a] (mg/kg)
MW-7-S-5.5	5.5	8/26/16	<50	<250
MW-8-S-5.5	5.5	8/26/16	<50	<250
BH-1-S-5	5	8/26/16	<50	<250
BH-1-S-10	10	8/26/16	<50	<250
BH-1-S-15	15	8/26/16	<50	<250
BH-2-S-5	5	8/26/16	<50	<250
BH-2-S-10	10	8/26/16	<50	<250
BH-2-S-15	15	8/26/16	<50	<250
MTCA Method A Soil Cleanup Level (mg/kg)			**2000**	**2000**

Groundwater Sample ID	Screened Interval (feet bgs)	Sample Date	DRPH[a] (µg/L)	HRPH[a] (µg/L)
BH-1-W-6.5	5-15	8/26/16	**490**	<250
BH-2-W-6.8	5-15	8/26/16	**1,000**	<250
MTCA Method A Groundwater Cleanup Level (µg/L)			**500**	**500**

Notes:

Bold Bold results indicate that the compound was detected.

Shaded cells indicate that the compound was detected at a concentration greater than the cleanup level.

a Analyzed for diesel (DRPH) and higher-range hydrocarbons (HRPH) using Ecology Method NWTPH-Dx

Table 3: Quarterly Groundwater Monitoring Analytical Results in µg/L
Estes West Express Trucking Facility
2102 West Valley Highway North - Auburn, WA

Well ID	Date Sampled	GRPH[a]	DRPH[b]	HRPH[b]	Benzene[c]	Toluene[c]	Ethylbenzene[c]	Total Xylenes[c]
MW-1	8/12/11	<100	<250	<500	<1	<1	<1	<3
	11/11/11	<100	**1,500**	**300**	<1	<1	<1	<3
	2/10/12	<100	**690**	<250	<1	<1	<1	<3
	5/17/12	<100	**1,100**	**480**	<1	<1	<1	<3
	8/28/12	<100	**1,200**	**820**	<1	<1	<1	<3
	11/15/12	<100	**2,700**	**1,200**	<1	<1	<1	<3
	2/14/13	<100	**1,600**	**510**	<1	<1	<1	<3
	5/16/13	<100	**1,500**	**340**	<1	<1	<1	<3
	8/14/13	<100	**1,100**	**290**	<1	<1	<1	<3
	11/25/13	NA	**1,400**	**400**	NA			
	2/20/14	NA	**700**	**280**	NA			
	5/15/14	NA	**940**	<250	NA			
	8/14/14	NA	<50	<250	NA			
	11/24/14	NA	**220**	<250	NA			
	3/31/15	NA	**340**	<250	NA			
	6/29/15	NA	**240**	<250	NA			
	9/28/15	NA	**700**	**290**	NA			
	3/3/16	NA	**220**	<250	NA			
	6/21/16	NA	**160**	<250	NA			
	9/16/16	NA	**580**	**420**	NA			
	12/20/16	NA	**190**	<250	NA			
MW-2	8/12/11	<100	<250	<500	<1	<1	<1	<3
	11/11/11	<100	**500**	<250	<1	<1	<1	<3
	2/10/12	<100	<50	<250	<1	<1	<1	<3
	5/17/12	<100	<50	<250	<1	<1	<1	<3
	8/28/12	<100	**470**	**730**	<1	<1	<1	<3
	11/15/12	<100	**140**	<260	<1	<1	<1	<3
	2/14/13	<100	**94**	**260**	<1	<1	<1	<3
	5/16/13	<100	**77**	<250	<1	<1	<1	<3
	8/14/13	<100	**280**	<250	<1	<1	<1	<3
	11/25/13	NA	**53**	<250	NA			
	2/20/14	NA	<50	<250	NA			
	5/15/14	NA	<50	<250	NA			
	8/14/14	NA	**100**	<250	NA			
	11/24/14	NA	<50	<250	NA			
	3/31/15	NA	**57**	<250	NA			
	6/29/15	NA	**97**	<250	NA			
	9/28/15	NA	**150**	<250	NA			
	3/3/16	NA	<50	<250	NA			
	6/21/16	NA	**86**	<250	NA			
	9/16/16	NA	**95**	<250	NA			
	12/20/16	NA	<50	<250	NA			
MW-3	8/12/11	<100	<250	<500	<1	<1	<1	<3
	11/11/11	<100	**65**	<250	<1	<1	<1	<3
	2/10/12	<100	**100**	<250	<1	<1	<1	<3
	5/17/12	<100	**53**	<250	<1	<1	<1	<3
	8/28/12	<100	**130**	<250	<1	<1	<1	<3
	11/15/12	<100	**120**	<280	<1	<1	<1	<3
	2/14/13	<100	**150**	<250	<1	<1	<1	<3
	5/16/13	<100	**200**	<250	<1	<1	<1	<3
	8/14/13	<100	**140**	<250	<1	<1	<1	<3
	11/25/13	NA	**170**	<250	NA			
	2/20/14	NA	**160**	<250	NA			
	5/15/14	NA	**120**	<250	NA			
	8/14/14	NA	**140**	<250	NA			
	11/24/14	NA	**130**	<250	NA			
	3/31/15	NA	**220**	<250	NA			
	6/29/15	NA	**130**	<250	NA			
	9/28/15	NA	**110**	<250	NA			
	3/3/16	NA	**92**	<250	NA			
	6/21/16	NA	**85**	<250	NA			
	9/16/16	NA	**100**	<250	NA			
	12/20/16	NA	**99**	<250	NA			

Table 3: Quarterly Groundwater Monitoring Analytical Results in µg/L
Estes West Express Trucking Facility
2102 West Valley Highway North - Auburn, WA

Well ID	Date Sampled	GRPH[a]	DRPH[b]	HRPH[b]	Benzene[c]	Toluene[c]	Ethylbenzene[c]	Total Xylenes[c]
MW-4	8/12/11	<100	<250	<500	<1	<1	<1	<3
	11/11/11	<100	**72**	<250	<1	<1	<1	<3
	2/10/12	<100	**150**	<250	<1	<1	<1	<3
	5/17/12	<100	**160**	<250	<1	<1	<1	<3
	8/28/12	<100	**200**	<250	<1	<1	<1	<3
	11/15/12	<100	**220**	<250	<1	<1	<1	<3
	2/14/13	<100	**220**	<250	<1	<1	<1	<3
	5/16/13	<100	**210**	<250	<1	<1	<1	<3
	8/14/13	<100	**200**	<250	<1	<1	<1	<3
	2/20/14	NA	**140**	<250	NA			
	5/15/14	NA	**140**	<250	NA			
	8/14/14	NA	**290**	<250	NA			
	11/24/14	NA	**290**	<250	NA			
	3/31/15	NA	**320**	<250	NA			
	6/29/15	NA	**240**	<250	NA			
	9/28/15	NA	**220**	<250	NA			
	3/3/16	NA	**130**	<250	NA			
	6/21/16	NA	**63**	<250	NA			
	9/16/16	NA	*750*[e]	*1700*[e]	NA			
	9/29/16	NA	**68**	<250	NA			
	12/20/16	NA	**78**	<250	NA			
MW-5	6/5/13	<100	**160**	<250	<1	<1	<1	<3
	8/14/13	<100	**56**	<250	<1	<1	<1	<3
	11/24/14	<100	<50	<250	NA			
	3/31/15	NA	**52**	<250	NA			
	6/29/15	NA	<50	<250	NA			
	9/28/15	NA	<50	<250	NA			
	3/3/16	NA	<50	<250	NA			
	6/21/16	NA	<50	<250	NA			
	9/16/16	NA	<50	<250	NA			
	12/20/16	NA	<50	<250	NA			
MW-6	6/5/13	<100	**680**	<250	<1	<1	<1	<3
	8/14/13	<100	**790**	<250	<1	<1	<1	<3
	2/20/14	NA	**740**	<250	NA			
	5/15/14	NA	**950**	<250	NA			
	8/14/14	NA	**1,200**	<250	NA			
	11/24/14	NA	**680**	<250	NA			
	3/31/15	NA	**750**	<250	NA			
	6/29/15	NA	**750**	<250	NA			
	9/28/15	NA	**610**	<250	NA			
	3/3/16	NA	**1,100**	**390**	NA			
	6/21/16	NA	**650**	<250	NA			
	9/16/16	NA	**340**	<250	NA			
	12/20/16	NA	**640**	<250	NA			
MW-7	9/16/16	NA	**140**	<250	NA			
	12/20/16	NA	**78**	<250	NA			
MW-8	9/16/16	NA	*1100*[e]	*590*[e]	NA			
	10/3/16	NA	**290**	<250	NA			
	12/20/16	NA	**140**	<250	NA			
MTCA Method A Groundwater Cleanup Level (in µg/L)		**800/1,000[d]**	**500**	**500**	**5**	**1,000**	**700**	**1,000**

[a] Analyzed for gasoline-range petroleum hydrocarbons (GRPH) using Ecology Method NWTPH-Gx

[b] Analyzed for diesel (DRPH) and higher-range hydrocarbons (HRPH) using Ecology Method NWTPH-Dx

[c] Analyzed using EPA Method 8021B

[d] Cleanup level is 800 µg/L when benzene is present in groundwater and 1,000 µg/L when benzene is not present

[e] Anomalous data, well re-development and re-sampling confirm these data are anomalous.

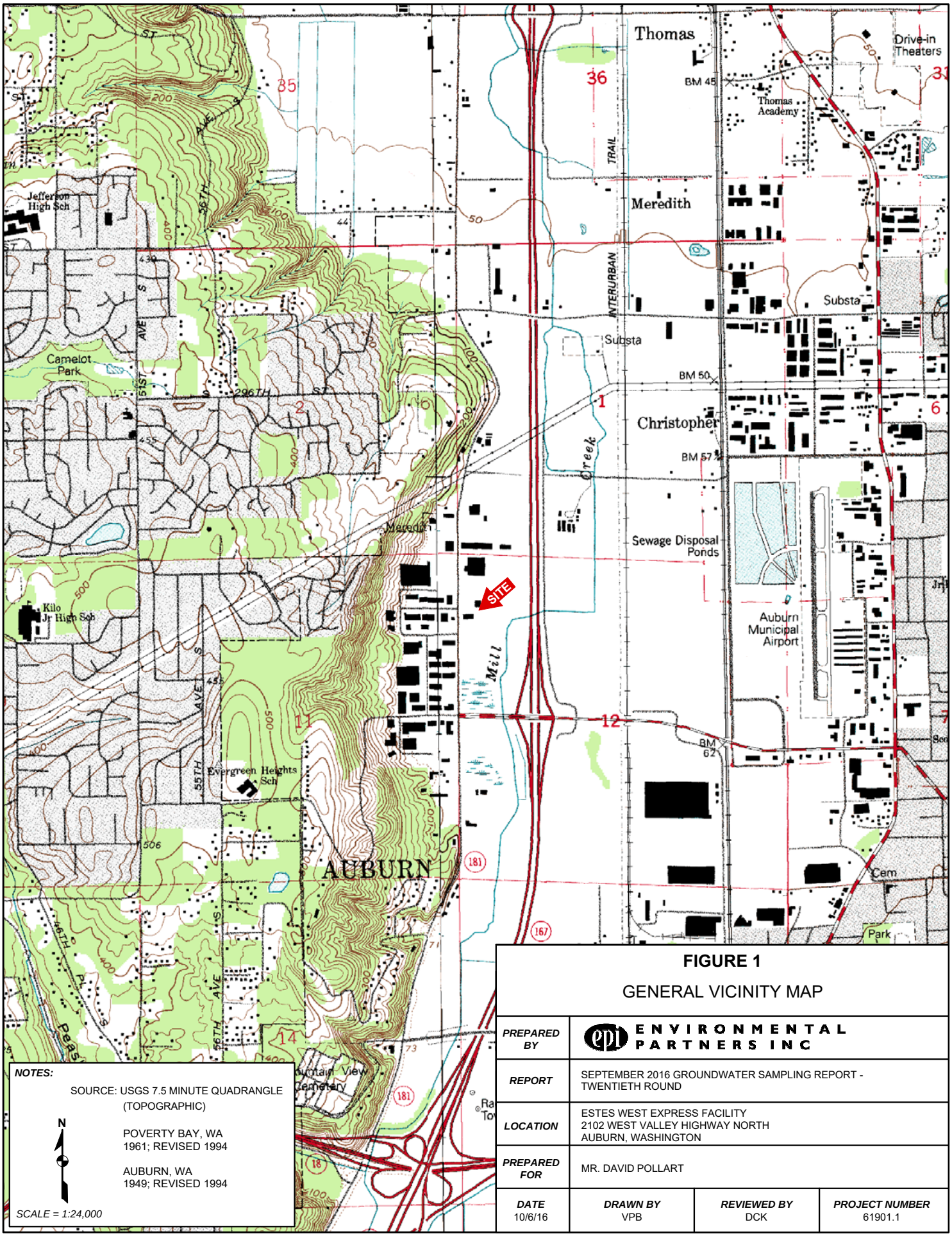
NA - Not analyzed

µg/L = micrograms per liter

Bold = Concentration detected, but less than MTCA Method A Groundwater Cleanup Level

= Concentration is greater than MTCA Method A Groundwater Cleanup Level

Figures



NOTES:

SOURCE: USGS 7.5 MINUTE QUADRANGLE (TOPOGRAPHIC)

POVERTY BAY, WA
1961; REVISED 1994

AUBURN, WA
1949; REVISED 1994

N

SCALE = 1:24,000

FIGURE 1

GENERAL VICINITY MAP

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	SEPTEMBER 2016 GROUNDWATER SAMPLING REPORT - TWENTIETH ROUND		
LOCATION	ESTES WEST EXPRESS FACILITY 2102 WEST VALLEY HIGHWAY NORTH AUBURN, WASHINGTON		
PREPARED FOR	MR. DAVID POLLART		
DATE 10/6/16	***DRAWN BY*** VPB	***REVIEWED BY*** DCK	***PROJECT NUMBER*** 61901.1

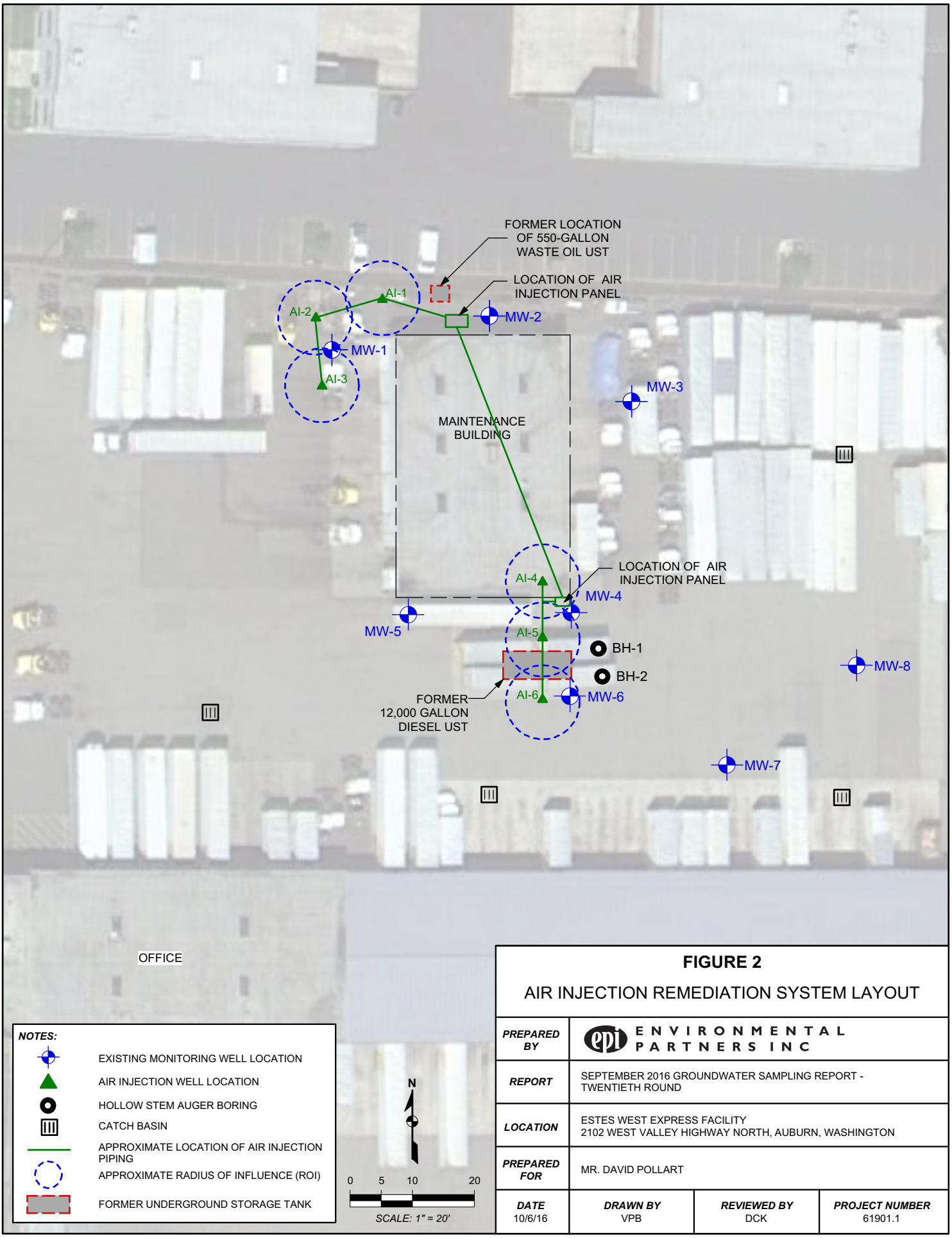
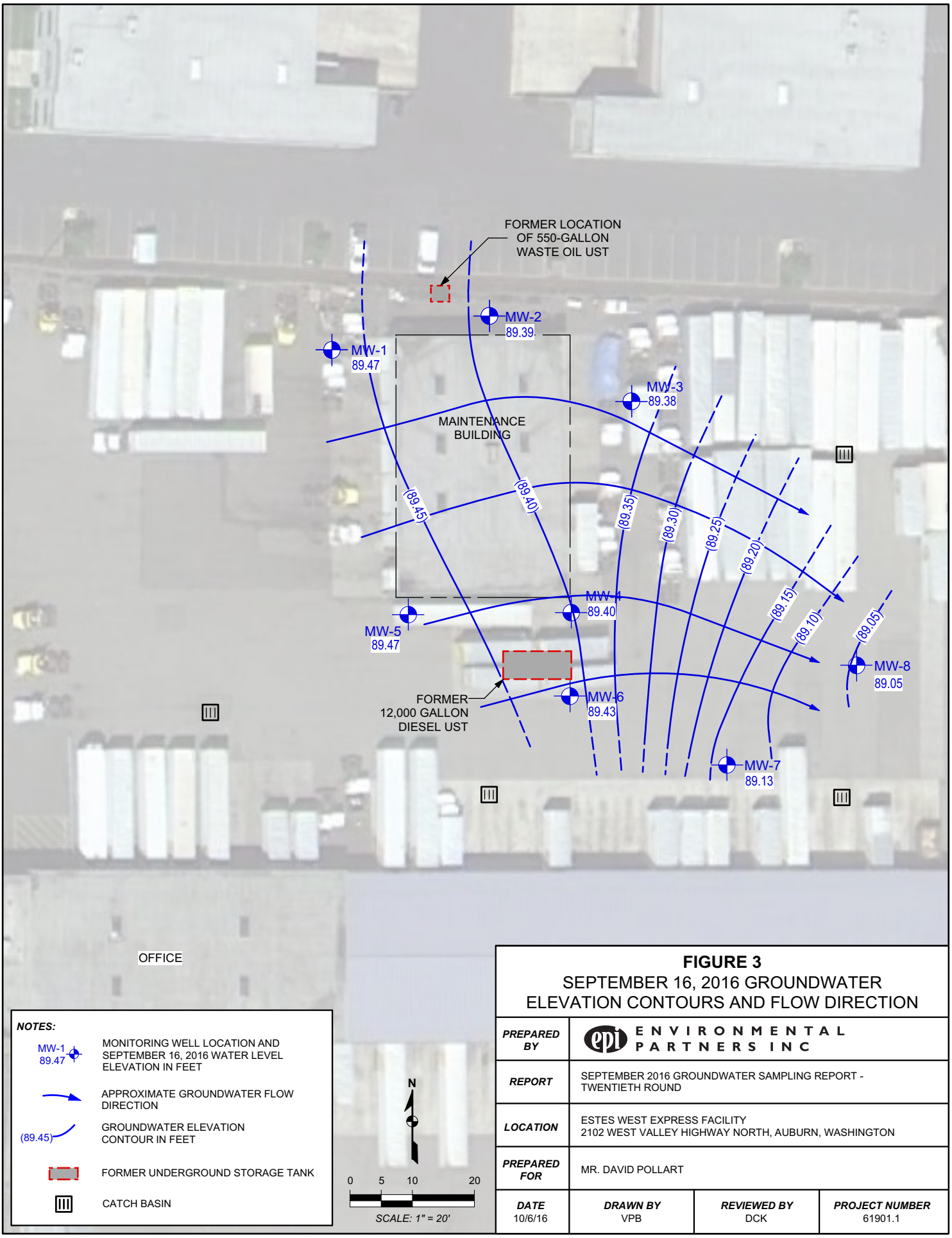


FIGURE 2

AIR INJECTION REMEDIATION SYSTEM LAYOUT

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	SEPTEMBER 2016 GROUNDWATER SAMPLING REPORT - TWENTIETH ROUND		
LOCATION	ESTES WEST EXPRESS FACILITY 2102 WEST VALLEY HIGHWAY NORTH, AUBURN, WASHINGTON		
PREPARED FOR	MR. DAVID POLLART		
DATE 10/6/16	***DRAWN BY*** VPB	***REVIEWED BY*** DCK	***PROJECT NUMBER*** 61901.1

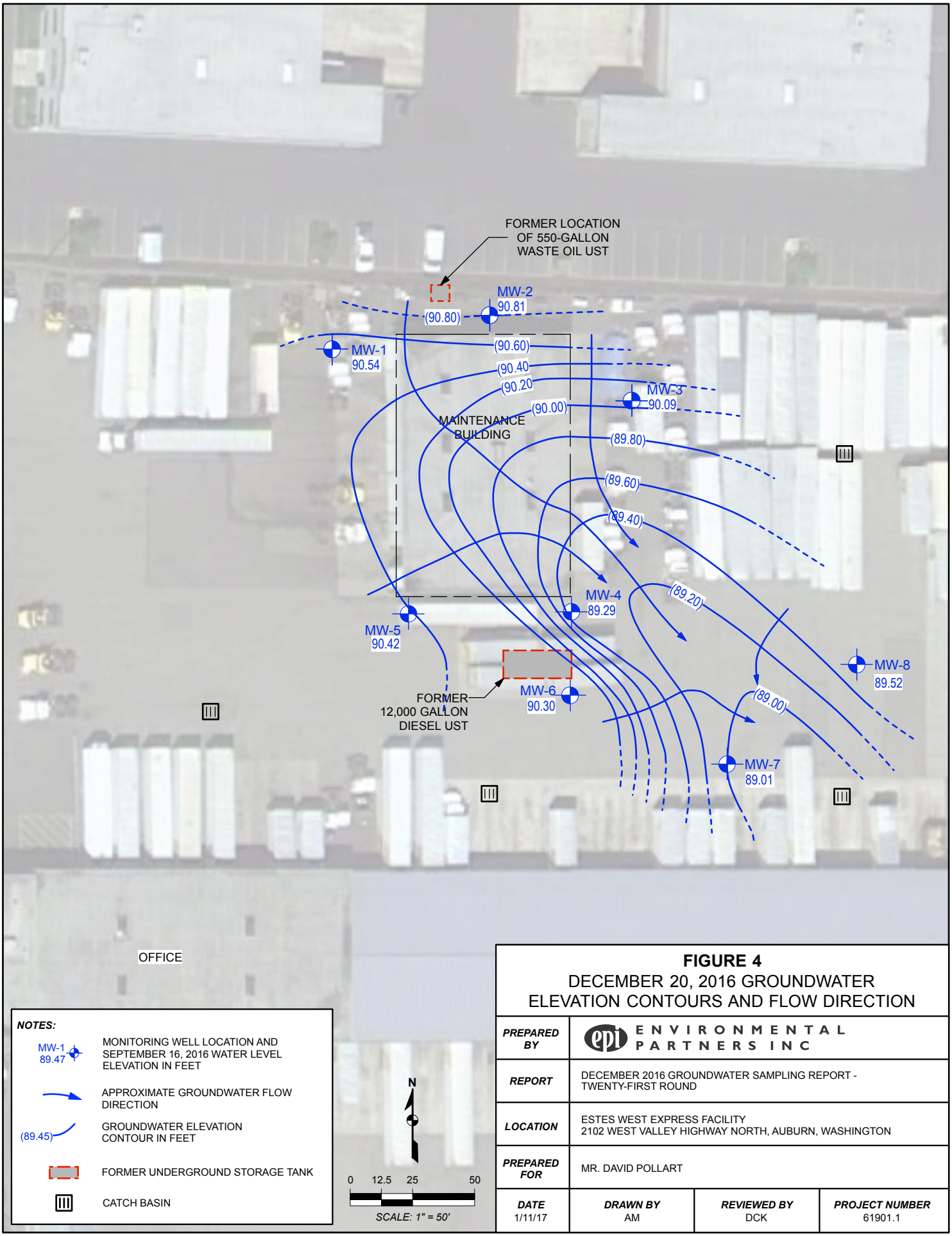


NOTES:

- MW-1 89.47 — MONITORING WELL LOCATION AND SEPTEMBER 16, 2016 WATER LEVEL ELEVATION IN FEET
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- (89.45) — GROUNDWATER ELEVATION CONTOUR IN FEET
- FORMER UNDERGROUND STORAGE TANK
- CATCH BASIN

FIGURE 3
SEPTEMBER 16, 2016 GROUNDWATER ELEVATION CONTOURS AND FLOW DIRECTION

PREPARED BY	epi ENVIRONMENTAL PARTNERS INC		
REPORT	SEPTEMBER 2016 GROUNDWATER SAMPLING REPORT - TWENTIETH ROUND		
LOCATION	ESTES WEST EXPRESS FACILITY 2102 WEST VALLEY HIGHWAY NORTH, AUBURN, WASHINGTON		
PREPARED FOR	MR. DAVID POLLART		
DATE 10/6/16	***DRAWN BY*** VPB	***REVIEWED BY*** DCK	***PROJECT NUMBER*** 61901.1



NOTES:

MW-1 89.47 — MONITORING WELL LOCATION AND SEPTEMBER 16, 2016 WATER LEVEL ELEVATION IN FEET

APPROXIMATE GROUNDWATER FLOW DIRECTION

(89.45) — GROUNDWATER ELEVATION CONTOUR IN FEET

FORMER UNDERGROUND STORAGE TANK

CATCH BASIN

N

0 12.5 25 50

SCALE: 1" = 50'

FIGURE 4
DECEMBER 20, 2016 GROUNDWATER ELEVATION CONTOURS AND FLOW DIRECTION

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	DECEMBER 2016 GROUNDWATER SAMPLING REPORT - TWENTY-FIRST ROUND		
LOCATION	ESTES WEST EXPRESS FACILITY 2102 WEST VALLEY HIGHWAY NORTH, AUBURN, WASHINGTON		
PREPARED FOR	MR. DAVID POLLART		
DATE 1/11/17	**DRAWN BY** AM	**REVIEWED BY** DCK	**PROJECT NUMBER** 61901.1

Attachment A
Boring Logs

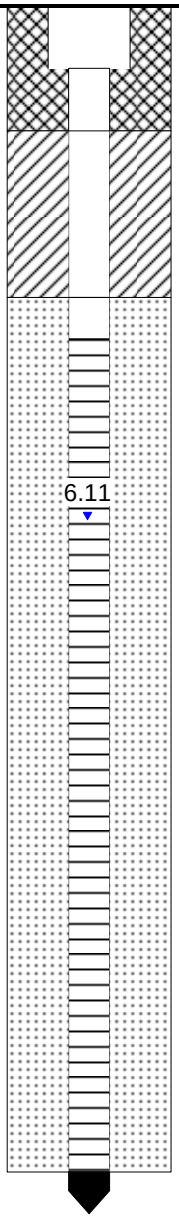
ENVIRONMENTAL PARTNERS INC

BORING ID: MW-7

SITE ADDRESS	CLIENT:	CASING MATERIAL AND SIZE:
2012 West Valley Highway North	**David Pollart**	**2" Sch 40 PVC**
DRILLING CONTRACTOR:	PROJECT #:	SCREEN SIZE:
Holt Services	**61901**	**0.010**
DRILLING EQUIPMENT:	DATE:	SCREEN INTERVAL:
Mobile Drill B-59	**8/26/16**	**4 - 14 ft BGS**
DRILLING METHOD:	GROUND SURFACE ELEV. FT AMSL:	FILTER PACK:
HSA	**Not Measured**	**Silica Sand**
LOGGED BY: / BOREHOLE SIZE:	TOTAL DEPTH:	FILTER PACK INTERVAL:
J. Sherrod / **2 inch**	**14 ft**	**3.5 - 14 ft BGS**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Blows per 6"	Sample	PID (ppm)
0		Asphalt and Gravel Sub-Base				
1	ML	SANDY SILT WITH GRAVEL; gray-brown; damp; hard; mostly silt with some sand and gravel; no odor				
3			60	8,17,19		0.4
4		Moist				
5						
6	ML	SILT WITH SAND; dark gray; wet; stiff, becoming medium stiff at 8.5 ft. bgs; mostly silt with some sand; no odor	40	8,10,4	MW-7-S-5.5	0.2
8						
9			100	1,5,4		0.1
10						
11						
12	SW	POORLY-GRADED SAND WITH SILT; gray; wet; medium stiff; mostly sand with some silt				
13			100	4,3,4		
14		End of Borehole				
15						

Well Construction



NOTES: Ecology Well Tag ID: BJX 397

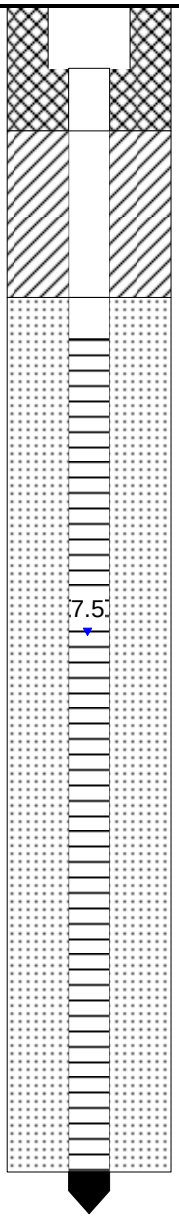
ENVIRONMENTAL PARTNERS INC

BORING ID: MW-8

SITE ADDRESS	CLIENT:	CASING MATERIAL AND SIZE:
2012 West Valley Highway North	**David Pollart**	**2" Sch 40 PVC**
DRILLING CONTRACTOR:	PROJECT #:	SCREEN SIZE:
Holt Services	**61901**	**0.010**
DRILLING EQUIPMENT:	DATE:	SCREEN INTERVAL:
Mobile Drill B-59	**8/26/16**	**4 - 14 ft BGS**
DRILLING METHOD:	GROUND SURFACE ELEV. FT AMSL:	FILTER PACK:
HSA	**Not Measured**	**Silica Sand**
LOGGED BY: / BOREHOLE SIZE:	TOTAL DEPTH:	FILTER PACK INTERVAL:
J. Sherrod / **2 inch**	**14 ft**	**3.5 - 14 ft BGS**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Blows per 6"	Sample	PID (ppm)
0		Asphalt and Gravel Sub-Base				
1						
2	ML	SANDY SILT WITH GRAVEL; gray; damp-moist; hard; mostly silt with some sand; no odor				
3			40	11,18,19		0.4
4						
5		Increasing gravel content; wet			MW-8-S-5.5	0.3
6			30	10,6,1		
7		SILT WITH SAND; gray; moist-wet; soft; mostly silt with some sand; no odor				
8						
9			80	3,1,2		0.3
10	ML					
11						
12		Increasing sand content; color change to dark brown/black; becomming stiffer with depth				
13			90	3,5,5		
14		End of Borehole				
15						

Well Construction



NOTES: Ecology Well Tag ID: BJX 396

ENVIRONMENTAL PARTNERS INC

BORING ID: BH-1

SITE ADDRESS: **2012 West Valley Highway North**	CLIENT: **David Pollart**
DRILLING CONTRACTOR: **Holt Services**	PROJECT #: **61901**
DRILLING EQUIPMENT: **Mobile Drill B-59**	DATE: **8/26/16**
DRILLING METHOD: **HSA**	GROUND SURFACE ELEV. FT AMSL: **Not Measured**
LOGGED BY: **J. Sherrod**	TOTAL DEPTH: **15 ft**

DECOMMISSIONING MATERIAL: **Bentonite**

BOREHOLE SIZE: **9 inch**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Blows per 6"	Sample	PID (ppm)	Comments
0		Asphalt and Gravel Sub-Base					
1	ML	SANDY SILT WITH GRAVEL; gray; damp-moist; very stiff; mostly silt with some sand and gravel; no odor					
5					BH-1-S-5	1	
6			100	8,23,14			
6	SW	POORLY-GRADED SAND WITH SILT; dark gray; wet; stiff; mostly sand with some silt; no odor			Recon Water Sample BH-1-W-6.5	6.5	Temporary PVC well screen installed for water sample
10					BH-1-S-10	0.2	
10			100	4,11,12			
14			100	7,8,12			
15		End of Borehole			BH-1-S-15	0.7	
16							

NOTES: Backfilled with bentonite and patched with asphalt

ENVIRONMENTAL PARTNERS INC

BORING ID: BH-2

SITE ADDRESS: **2012 West Valley Highway North**	CLIENT: **David Pollart**
DRILLING CONTRACTOR: **Holt Services**	PROJECT #: **61901**
DRILLING EQUIPMENT: **Mobile Drill B-59**	DATE: **8/26/16**
DRILLING METHOD: **HSA**	GROUND SURFACE ELEV. FT AMSL: **Not Measured**
LOGGED BY: **J. Sherrod**	TOTAL DEPTH: **15 ft**
DECOMMISSIONING MATERIAL: **Bentonite**	BOREHOLE SIZE: **9 inch**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Blows per 6"	Sample	PID (ppm)	Comments
0		Asphalt and Gravel Sub-Base					
1	ML	SANDY SILT WITH GRAVEL; gray; damp; very stiff; mostly silt with some sand and gravel; no odor					
5			50	8,16,10	BH-2-S-5	0.7	
7					Recon Water Sample BH-2-W-6.8		Temporary PVC well screen installed for water sample
10	SW	POORLY-GRADED SAND WITH SILT; dark gray; wet; very stiff; mostly sand with few silt; no odor		11,15,16	BH-2-S-10	0.4	
14				7,12,13			
15		End of Borehole			BH-2-S-15	0.2	
16							

NOTES: Backfilled with bentonite and patched with asphalt

Attachment B
Well Development Forms

Field Measurements Record

Job Name/Location: Estes West

Job Number: 61901

Date: 3/26/16

Well #: MW-7

Page Number: 1 of 1

Time	Depth to Water (ft.)	Depth of Well (ft.)	Volume Purged (gal.)	pH	Cond.	Turbidity (NTU)	Temp. (oC)	Visual Observations
1315	6.11	14'	10 gallons	7.77	0.542	19.21	21.12	purge 10 gallons
1325	←							Surge well
1335	"	"	15 gallons					purge 5 gallons
1350	6.08	14'	25 gallons	7.56	0.544	2.11	21.19	water clear, well developed

Field Measurements Record

Job Name/Location: 61901
Job Number: Estes West
Date: 8/26/16

Well #: MW-8
Page Number: 1 of 1

Time	Depth to Water (ft.)	Depth of Well (ft.)	Volume Purged (gal.)	pH	Cond.	Turbidity (NTU)	Temp. (oC)	Visual Observations
1116	7.5'	14'	5 gallons	6.78	1.161	71.7	21.46	
1124	—	—	10 gallons	—	—	—		well begins surged
1130	—	—	13 gallons	—	—	—	—	Purging water, clearing up
1135			15 gallons					Stop purging, Letting well set
1155	6.5'	14'	20 gallons	6.77	0.726	2.4	22.91	Water is pumping clear

Attachment C
Sampling Field Notes and Forms

Overcast : 60°F

6/2/16 Scope: Groundwater monitoring

1200 J. Sherrod on-site, compressor not working, appears to have failed mechanically

Well ID	DTW
MW-2	5.95'
MW-1	5.82'
MW-5	5.96'
MW-6	5.91'
MW-4	6.11'
MW-3	5.93'

1245 Calibrate YSI

1410 After speaking with on-site personnel, the pump was last seen working friday 5/27/16. The pump was not working 5/31/16. Compressor shows ~~compress~~ breaker with shop compressor.

1500 New drum used, existing drum was full, 6 gallons of water was purged this event.

1520 J. Sherrod off-site

Sunny. 60°F

9/16/16 Scope: Survey + well sampling

0645 J. Sherrod + LWB on-site, open all well heads.

0715 Begin well survey

0830 Complete well survey, collect DTW.

Well	DTW
MW-8	5.09'
MW-7	5.15'
MW-6	6.01'
MW-4	6.21'
MW-3	6.09'
MW-5	6.11'
MW-1	5.99'
MW-2	6.13'

0850 Calibrate YSI's

0930 J. Sherrod + LWB Begin sampling, see stabilization sheets for well specific notes.

1300 J. Sherrod + LWB off-site

EPI Groundwater Sampling Field Data

Project Name:

Project Number: 61901

Well ID:	~~MW-2~~ MW-2	Date	9/16/16
Sample ID:	MW-2	Field Team: (Initials)	EWB, JS
Field Conditions	Cool, cloudy, calm		

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / ~~Peristaltic Pump~~ / Other: :

Start Time	928
End Time	1001
Total Gallons Purged	1.7

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
931	0.1	6.14	0.483	0.70	15.99	49.5		Strong odor petrol
934	0.2	6.13	0.477	0.51	16.19	48.4		
937	0.4	6.11	0.463	0.37	16.46	45.5		
940	0.6	6.10	0.450	0.37	16.57	60.5		
943	0.7	6.09	0.437	0.28	16.75	72.4		
946	0.9	6.09	0.430	0.25	16.95	71.8		
949	1.0	6.09	0.431	0.18	17.08	72.4		
952	1.2	6.09	0.438	0.17	17.15	68.5		
955	1.3	6.10	0.444	0.16	17.19	65.3		
958	1.5	6.10	0.445	0.17	17.24	60.1		
1001	1.7	6.11	0.451	0.15	17.20	59.8		

Sample Information

Sample Method(s) : Peristaltic pump / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
ORP	1002			

End Time

Comments / Exceptions:

Presence of floating product? YES / NO Presence of sinking product? YES / NO

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: ~~0100~~ 61901

Well ID:	MW-6	Date	9/16/16
Sample ID:	MW-6	Field Team: (Initials)	JS
Field Conditions	Cloudy - 60°F		

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / (Peristaltic Pump) / Other: :

Start Time	0942
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
0944	0.1	6.37	0.530	1.95	18.60	147.0	—	clear
0947	0.3	6.28	0.530	0.80	18.66	11.0	—	clear
0950	0.5	6.27	0.528	0.67	18.75	5.4	—	clear
0953	0.7	6.26	0.523	0.57	18.87	-24.4	—	clear
0956	0.9	6.26	0.517	0.53	18.83	-40.0	—	clear
0959	1.1	6.25	0.514	0.44	18.89	-48.1	—	clear
1002	1.3	6.25	0.513	0.45	18.89	-54.3	—	clear
1005	1.5	6.25	0.510	0.40	18.90	-59.3	—	clear
1008	1.7	6.25	0.509	0.33	18.91	-62.3	—	clear

Sample Information

Sample Method(s) : (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
ORO + DRO	1009	1/2 L Amber	HCl	
Naphthalenes	1009	3 VOA	HCl	

End Time

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: 61901

Well ID:	MW-7	Date	9/16/16
Sample ID:	MW-7	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / Peristaltic Pump / Other: :

Start Time	1017
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1023	0.1	6.22	0.773	3.02	18.37	-32.6	—	clear
1026	0.3	6.19	0.782	0.79	18.40	-39.9	—	clear
1029	0.5	6.18	0.784	0.83	18.44	-44.3	—	clear
1032	0.7	6.19	0.783	0.79	18.52	-50.8	—	clear
1035	0.9	6.20	0.781	0.88	18.59	-55.6	—	clear
1038	1.1	6.21	0.780	0.72	18.66	-58.1	—	clear
1041	1.3	6.22	0.777	0.57	18.75	-59.6	—	clear
1044	1.5	6.23	0.776	0.57	18.74	-58.7	—	clear

Sample Information

Sample Method(s) : Peristaltic pump / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO+ORO	1045	1/2L+VOAs	N/A	
Naphthalene	1045	3x VOA	HCL	

End Time

Comments / Exceptions:

Presence of floating product? YES / NO Presence of sinking product? YES / NO

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name:
Project Number: 61901
Well ID: MW-1
Sample ID: MW-1
Field Conditions: Cool, cloudy, calm
Date: 9/16/16
Field Team: (Initials): EwB, JS

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / (Peristaltic Pump) / Other: :

Start Time	1015
End Time	1055
Total Gallons Purged	1.7

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1018	0.1	6.25	0.677	1.40	17.91	5.0		clear, strong petrol odor
1021	0.2	6.11	0.539	0.30	15.08	17.3		
1024	0.4	6.08	0.493	0.28	18.22	29.9		
1027	0.5	6.03	0.475	0.28	18.36	48.0		
1030	0.6	6.02	0.457	0.25	18.44	55.4		
1033	0.7	6.01	0.445	0.22	18.57	57.4		
1036	0.9	6.00	0.436	0.19	18.60	69.7		
1039	1.1	5.99	0.432	0.24	18.65	73.3		
1042	1.2	5.97	0.424	0.21	18.82	74.2		
1045	1.4	5.96	0.429	0.26	18.84	79.7		
1048	1.5	5.95	0.435	0.19	18.84	90.3		
1051	1.6	5.94	0.442	0.17	18.85	92.9		
1054	1.7	5.94	0.451	0.16	18.83	95.5		

Sample Information

Sample Method(s) : (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
	1056			

End Time:

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: 61901

Well ID:	MW-8	Date	9/16/16
Sample ID:	MW-8	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / (Peristaltic Pump) / Other: :

Start Time	1056
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1102	0.1	6.32	1.262	2.32	20.26	-46.6	—	clear
1105	0.3	6.28	1.262	1.89	20.33	-57.3	—	clear
1108	0.5	6.27	1.261	1.81	20.45	-64.0	—	clear
1101	0.7	6.28	1.260	1.99	20.62	-70.1	—	clear
1114	0.9	6.28	1.259	2.22	20.78	-74.1	—	clear
1117	1.1	6.28	1.254	1.90	20.94	-77.8	—	clear
1120	1.3	6.29	1.248	1.82	20.93	-79.6	—	clear
1123	1.5	6.29	1.243		21.02	-82.3	—	clear

Sample Information

Sample Method(s) : (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO+ORO	1124	1/2 L Amb	NA	
Naphthalene	1124	3 X VOA	HCL	

End Time

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name:

Project Number: 61901

Well ID:	MW-5	Date	9/16/16
Sample ID:	MW-5	Field Team: (Initials)	EWS, JS
Field Conditions	Cool, pt cloudy, calm		

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / Peristaltic Pump / Other: :

Start Time	1113
End Time	1152
Total Gallons Purged	1.9

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1117	0.1	6.25	0.616	1.31	17.61	-23.9		clear, petrol odor
1120	0.2	6.24	0.615	0.39	17.55	-27.0		
1123	0.3	6.24	0.615	0.37	17.57	-28.1		
1126	0.4	6.25	0.614	0.28	17.61	-26.3		
1129	0.6	6.25	0.614	0.25	17.60	-26.4		
1131	0.7	6.25	0.609	0.26	17.59	-29.1		
1134	0.9	6.25	0.599	0.25	17.59	-30.0		
1137	1.0	6.25	0.590	0.20	17.56	-27.8		
1140	1.1	6.25	0.575	0.15	17.53	-30.0		
1143	1.3	6.25	0.570	0.13	17.47	-31.6		
1146	1.5	6.25	0.562	0.14	17.50	-30.2		
1149	1.7	6.25	0.558	0.14	17.51	-30.6		
1152	1.9	6.25	0.550	0.10	17.48	-32.5		

Sample Information

Sample Method(s) : Peristaltic pump / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
	1153			

End Time

Comments / Exceptions:

Presence of floating product? YES / NO Presence of sinking product? YES / NO

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: 61901

Well ID:	MW-4	Date	9/16/16
Sample ID:	MW-4	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / Peristaltic Pump / Other:

Start Time	1147
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1150	0.1	7.09	0.956	5.60	17.72	-30.5	—	clear
1153	0.4	6.57	0.920	2.32	17.52	-27.0	—	clear
1156	0.6	6.36	0.887	1.73	17.46	-32.2	—	clear
1159	0.8	6.28	0.877	1.69	17.40	-37.8	—	clear
1202	1.0	6.23	0.857	1.54	17.26	-43.1	—	clear
1205	1.2	6.21	0.848	1.54	17.27	-45.1	—	clear
1208	1.4	6.18	0.828	1.58	17.28	-50.1	—	clear
1211	1.6	6.18	0.820	1.68	17.29	-52.4	—	clear

Sample Information

Sample Method(s) : Peristaltic pump / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO + ORO	1212	½ Ltr Amber	N/A	

End Time

Comments / Exceptions:

Presence of floating product? YES / NO Presence of sinking product? YES / NO

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name:

Project Number: 61901

Well ID: MW-3

Sample ID: MW-3

Date: 9/16/16

Field Team: (Initials): EWB, JS

Field Conditions: Warm, clear, calm

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / ~~Peristaltic Pump~~ / Other: :

Start Time	1210
End Time	1240
Total Gallons Purged	1.6

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1213	0.1	6.31	0.826	1.09	17.88	-39.4		Clear, slight
1216	0.3	6.32	0.807	0.30	17.90	-41.3		odor
1219	0.4	6.33	0.775	0.29	18.00	-43.4		
1222	0.5	6.33	0.723	0.19	18.07	-45.7		
1225	0.7	6.33	0.691	0.14	18.11	-45.8		
1228	0.9	6.34	0.645	0.12	18.22	-49.1		
1231	1.1	6.33	0.636	0.12	18.21	-48.8		
1234	1.3	6.33	0.618	0.13	18.23	-49.2		
1237	1.4	6.33	0.610	0.14	18.23	-48.6		
1240	1.6	6.33	0.600	0.11	18.28	-47.8		
1243								

Sample Information

Sample Method(s) : ~~Peristaltic pump~~ / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
	1241	amber		

End Time:

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

61901, 12-20-16

0630 J Sherrod on-site

0640 Open all well heads and prepare to take DTW. System on while DTW / sampling performed.

well	DTW
MW-7	5.27'
MW-8	4.62'
MW-6	5.14'
MW-4	6.32'
MW-3	5.38'
MW-5	5.16'
MW-1	4.92'
MW-2	4.71'

0715 Calibrate YSI

0740 Begin Groundwater sampling, see stabilization sheets for well specific notes

1300 Finish Groundwater sampling, take parameters from AS System

At Blower

1: 9 PSI, 0 SCFM
10 PSI, .75 SCFM

2: 9 PSI, 3.5 SCFM
8.5 PSI, 1.75 SCFM

3: 10 PSI, 7.5 SCFM
10 PSI, 1.75 SCFM

4: 11 PSI, 0 SCFM (not working?)
12 PSI, 1 SCFM

5: 18.5 PSI, 0 SCFM (not working?)
19 PSI, 1 SCFM

6: 15.5 PSI, 0 SCFM (not working?)
16.5 PSI, 0 SCFM

EPI Groundwater Sampling Field Data

Project Name: Estes West, Auburn, WA
Project Number: 01901

Well ID:	MW-8	Date	12-20-16
Sample ID:	MW-8	Field Team: (Initials)	JS
Field Conditions	windy ~ 48°F		

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / (Peristaltic Pump) / Other: :

Start Time	0749
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
0751	0.1	6.90	1.147	6.91	13.29	26.8	—	clear / brown
0754	0.3	6.70	1.146	4.53	13.83	11.5	—	clearing
0757	0.5	6.55	1.147	2.64	14.07	-14.5	—	clear
0800	0.7	6.48	1.148	1.93	14.13	-28.9	—	clear
0803	0.9	6.45	1.148	1.60	14.19	-35.7	—	clear
0806	1.2	6.42	1.148	1.36	14.26	-42.3	—	clear
0809	1.4	6.41	1.148	1.32	14.24	-46.3	—	clear
0812	1.6	6.40	1.150	1.29	14.19	-48.5	—	clear

Sample Information

Sample Method(s) : (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO + ORO	0813	1/2 L Amb	None	

End Time

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: 61901

Well ID:	MW-7	Date	12-20-16
Sample ID:	MW-7	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	
(2"=0.163 x depth)	
(4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / (Peristaltic Pump) / Other: :

Start Time	0823
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
0825	0.1	6.66	0.734	5.85	13.141	-51.1	—	cleariky
0828	0.3	6.47	0.723	1.16	13.65	-48.5	—	clear
0831	0.5	6.41	0.703	0.91	13.87	-42.5	—	clear
0834	0.7	6.36	0.697	0.84	13.94	-40.2	—	clear
0837	0.9	6.32	0.692	0.80	13.94	-39.4	—	clear
0840	1.2	6.32	0.690	0.72	13.95	-39.5	—	clear

Sample Information

Sample Method(s): (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO+ ORO	0841	1/2 L-Amb	None	

End Time

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: 61901

Well ID:	MW-6	Date	12-20-16
Sample ID:	MW-6	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	
(2"=0.163 x depth)	
(4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / (Peristaltic Pump) / Other: :

Start Time	0853
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
0854	0.1	6.56	0.536	6.71	14.18	-39.8	—	clear
0857	0.3	6.50	0.536	6.15	14.71	-40.6	—	clear
0900	0.5	6.44	0.534	2.65	15.07	-40.9	—	clear
0903	0.7	6.42	0.533	2.18	15.18	-40.6	—	clear
0906	0.9	6.39	0.531	1.64	15.33	-41.0	—	clear
0909	1.1	6.39	0.531	1.36	15.39	-42.7	—	clear
0912	1.3	6.38	0.532	1.21	15.34	-45.0	—	clear
0915	1.5	6.36	0.531	1.30	15.44	-46.1	—	clear

Sample Information

Sample Method(s) : (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO + ORO	0916	1/2 Lt Amb	None	

End Time

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Slight sheen in bucket.

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Eakes West
Project Number: 61901

Well ID:	MW-3	Date	12-20-16
Sample ID:	MW-3	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / (Peristaltic Pump) / Other: :

Start Time	0930
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
0931	0.1	6.47	0.628	5.30	13.91	-46.8	—	clear
0934	0.3	6.47	0.627	2.98	14.17	-47.4	—	clear
0937	0.5	6.46	0.621	2.55	14.29	-46.8	—	clear
0940	0.7	6.41	0.610	2.14	14.32	-44.2	—	clear
0943	0.9	6.39	0.599	2.07	14.37	-43.0	—	clear
0946	1.1	6.37	0.590	1.94	14.36	-41.0	—	clear

Sample Information

Sample Method(s) : (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO + ORO	0947	½ L Amb	none	

End Time

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: 6 1901

Well ID:	MW-4	Date	12-20-16
Sample ID:	MW-4	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	
(2"=0.163 x depth)	
(4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / (Peristaltic Pump) / Other: :

Start Time	1025
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1027	0.1	6.59	0.576	4.77	13.24	-31.8	—	clear
1030	0.3	6.53	0.582	1.20	13.75	-30.7	—	clear
1033	0.5	6.45	0.586	0.85	13.87	-28.1	—	clear
1036	0.7	6.55	0.592	0.97	13.45	-33.2	—	clear
1039	0.9	6.46	0.594	0.92	13.88	-29.3	—	clear
1042	1.1	6.46	0.595	1.16	13.87	-26.1	—	clear
1045	1.3	6.37	0.599	0.81	13.77	-24.8	—	clear
1048	1.5	6.34	0.600	0.79	13.87	-24.1	—	clear
1051	1.7	6.33	0.602	0.75	13.84	-23.6	—	clear

Sample Information

Sample Method(s) : (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO+ORO	1052	1/2 Ltr Amb	None	

End Time

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: 61901

Well ID:	MW-5	Date	12-20-16
Sample ID:	MW-5	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	
(2"=0.163 x depth)	
(4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / (Peristaltic Pump) / Other: :

Start Time	1101
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1103	0.1	6.43	0.522	4.42	13.84	-19.6	—	clear
1106	0.3	6.34	0.523	4.98	13.95	-23.1	—	clear
1109	0.5	6.34	0.526	1.24	13.99	-22.2	—	clear
1112	0.7	6.32	0.528	1.28	13.96	-16.9	—	clear
1115	0.9	6.28	0.530	1.09	13.00	-18.8	—	clear

Sample Information

Sample Method(s) : (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO + ORO	1116	1/2 Ltr Amb.	none	

End Time

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: 61901

Well ID:	MW-2	Date	12-20-16
Sample ID:	MW-2	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / ~~Peristaltic Pump~~ / ~~Other:~~

Start Time	1127
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1129	0.1	6.49	0.252	5.93	12.15	-6.5	—	cloudy
1132	0.3	6.16	0.254	1.81	12.25	4.2	—	cloudy
1135	0.5	5.98	0.251	1.05	12.27	6.6	—	clear
1138	0.7	6.01	0.251	1.00	12.15	3.9	—	clear
1141	0.9	5.85	0.252	0.92	12.08	11.1	—	clear
1144	1.1	5.79	0.252	0.84	12.06	12.8	—	clear
1147	1.3	5.80	0.255	0.86	12.04	12.5	—	clear
1150	1.5	5.79	0.264	0.87	12.02	12.6	—	clear

Sample Information

Sample Method(s) : (Peristaltic pump) / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO + ORO	1151	1/2 Ltr Amb	None	

End Time

Comments / Exceptions:

Presence of floating product? YES / (NO) Presence of sinking product? YES / (NO)

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

EPI Groundwater Sampling Field Data

Project Name: Estes West
Project Number: 61401

Well ID:	MW-1	Date	12-20-16
Sample ID:	MW-1	Field Team: (Initials)	JS
Field Conditions			

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume (2"=0.163 x depth) (4"=0.653 x depth)	

Purge Method : Submersible pump / Bladder Pump / ~~Peristaltic Pump~~ / Other: :

Start Time	1159
End Time	
Total Gallons Purged	

Time	Volume Gallons	pH	Conductivity ms/cm²	DO mg/L	Temp. °C	ORP mV	Turbidity NTU	Appearance/Notes
1200	0.1	6.57	0.135	8.37	12.84	-14.5	—	clear
1203	0.3	6.53	0.134	8.34	12.72	-8.6	—	clear
1206	0.5	6.57	0.131	7.87	13.22	-10.8	—	clear
1209	0.7	6.65	0.134	7.90	12.88	-16.0	—	clear
1212	0.9	6.68	0.132	7.79	12.93	-16.5	—	clear
1215	1.1	6.67	0.132	7.72	12.81	-14.1	—	clear
1218	1.3	6.65	0.132	7.69	12.85	-7.4	—	clear

Sample Information

Sample Method(s) : Peristaltic pump / Submersible pump / Bladder Pump / Bailer / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
DRO + ORO	1219	1/2 Ltr Amb	None	

End Time

Comments / Exceptions:

Presence of floating product? YES / NO Presence of sinking product? YES / NO

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

Attachment D
Analytical Laboratory Reports

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 7, 2016

Doug Kunkel, Project Manager
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

RE: 61901, F&BI 608534

Dear Mr Kunkel:

Included are the results from the testing of material submitted on August 29, 2016 from the 61901, F&BI 608534 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Cynthia Moon
EPI0907R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on August 29, 2016 by Friedman & Bruya, Inc. from the Environmental Partners 61901, F&BI 608534 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Environmental Partners
608534-01	MW-8-S-5.5
608534-02	MW-7-S-5.5
608534-03	BH-1-S-5
608534-04	BH-1-S-10
608534-05	BH-1-S-15
608534-06	BH-1-W-6.5
608534-07	BH-2-S-5
608534-08	BH-2-S-10
608534-09	BH-2-S-15
608534-10	BH-2-W-6.8

All quality control requirements were acceptable.

Date of Report: 09/07/16
Date Received: 08/29/16
Project: 61901, F&BI 608534
Date Extracted: 08/31/16
Date Analyzed: 08/31/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
MW-8-S-5.5 608534-01	<50	<250	100
MW-7-S-5.5 608534-02	<50	<250	101
BH-1-S-5 608534-03	<50	<250	97
BH-1-S-10 608534-04	<50	<250	97
BH-1-S-15 608534-05	<50	<250	98
BH-2-S-5 608534-07	<50	<250	96
BH-2-S-10 608534-08	<50	<250	100
BH-2-S-15 608534-09	<50	<250	98
Method Blank 06-1794 MB	<50	<250	102

Date of Report: 09/07/16
Date Received: 08/29/16
Project: 61901, F&BI 608534
Date Extracted: 08/31/16
Date Analyzed: 08/31/16

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
BH-1-W-6.5 608534-06	490 x	<250	70
BH-2-W-6.8 608534-10	1,000 x	<250	69
Method Blank 06-1789 MB	<50	<250	107

Date of Report: 09/07/16
Date Received: 08/29/16
Project: 61901, F&BI 608534

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 608526-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	110	106	73-135	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	106	74-139

Date of Report: 09/07/16
Date Received: 08/29/16
Project: 61901, F&BI 608534

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	77	79	63-142	3

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

608534

SAMPLE CHAIN OF COUSTODY

ME 08-29-16 A03

Report To Doug Kunkel

Company Environmental Partners Inc.

Address 1180 NW Maple St.

City, State, ZIP Issaquah, WA 98038

Phone 425-395-0010 Email Dougk@epi-wa.com

SAMPLERS (signature)

Page # 1 of

PROJECT NAME	PO #
61901	
REMARKS	INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	DRO (NWTPH-Dx)	ORO (NWTPH-Dx)			Notes
MW-8-S-5.5	01 A-B	8/26/16	0815	Soil	2								↓	↓			
MW-7-S-5.5	02	↓	1031	↓									↓	↓			
BH-1-S-5	03	↓	1203	↓									↓	↓			
BH-1-S-10	04	↓	1222	↓									↓	↓			
BH-1-S-15	05	↓	1230	↓									↓	↓			
BH-1-W-6.5	06	↓	1242	Water									↓	↓			
BH-2-S-5	07 A-B	↓	1350	↓									↓	↓			
BH-2-S-10	08	↓	1404	↓									↓	↓			
BH-2-S-15	09	↓	1419	↓									↓	↓			Samples received at 3.0 °C
BH-2-W-6.8	10	↓	1435	Water									↓	↓			

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Joe Sherrod	EPI	8/29/16	0730
Received by:	Jared Underdown	Fedex	8-29-16	9:03 AM
Relinquished by:				
Received by:	Nhan Phan	FeBI	8/29/16	10:00

Friedman & Bruya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 5, 2016

Doug Kunkel, Project Manager
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

RE: 61901, F&BI 609517

Dear Mr Kunkel:

Included are the results from the testing of material submitted on September 29, 2016 from the 61901, F&BI 609517 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Cynthia Moon
EPI1005R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on September 29, 2016 by Friedman & Bruya, Inc. from the Environmental Partners 61901, F&BI 609517project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Environmental Partners
609517 -01	MW-4

All quality control requirements were acceptable.

Date of Report: 10/05/16
Date Received: 09/29/16
Project: 61901, F&BI 609517
Date Extracted: 09/30/16
Date Analyzed: 09/30/16

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
MW-4 609517-01	68	<250	103
Method Blank 06-2038 MB	<50	<250	78

Date of Report: 10/05/16
Date Received: 09/29/16
Project: 61901, F&BI 609517

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	91	92	63-142	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

609517

SAMPLE CHAIN OF CUSTODY

ME 09/29/16 COC

Page # 1 of 1

Send Report To Doug Kunkel

Company Environmental Partners, Inc

Address 1180 NW Maple St Suite 310

City, State, ZIP Issaquah, WA 98027

Phone # (425) 395-0010 Fax # (425) 395-0011

SAMPLERS (signature)

PROJECT NAME/NO. 61901

PO#

REMARKS

TURNAROUND TIME
- ☑ Standard (2 Weeks)
- ☐ RUSH
- Rush charges authorized by

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS	by NWTPH-Dx Diesel						Notes
MW-4	01	9/29/16	1124	Water	1							X						
																		4
																		Samples received at ____ °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Joe Shemd	EPT	9/29/16	1530
Received by:	Michael Erdahl	FCR	9/29/16	1643
Relinquished by:				
Received by:		Samples received at 4 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 7, 2016

Doug Kunkel, Project Manager
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

RE: 61901, F&BI 610039

Dear Mr Kunkel:

Included are the results from the testing of material submitted on October 4, 2016 from the 61901, F&BI 610039 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Cynthia Moon
EPI1007R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 4, 2016 by Friedman & Bruya, Inc. from the Environmental Partners 61901, F&BI 610039 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Environmental Partners
610039 -01	MW-8

All quality control requirements were acceptable.

Date of Report: 10/07/16
Date Received: 10/04/16
Project: 61901, F&BI 610039
Date Extracted: 10/05/16
Date Analyzed: 10/06/16

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
MW-8 610039-01	290	<250	82
Method Blank 06-2067 MB2	<50	<250	73

Date of Report: 10/07/16
Date Received: 10/04/16
Project: 61901, F&BI 610039

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	86	84	61-133	2

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

610039

SAMPLE CHAIN OF CUSTODY

ME 10/4/16 DO3

Page # 1 of 1

Report To Doug Kunkel

Company EPI

Address 1180 NW Maple St.

City, State, ZIP Issaquah, WA 98027

Phone 425-395-0016 Email

SAMPLERS (*signature*)

PROJECT NAME: 61901

PO #

REMARKS

INVOICE TO

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	by NWTPH-Dx DRO + ORO				Notes
MW-8	01	10/3/16	0757	Water	1								X				

Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Joe Sherrod	EPI	10/4/16	~~1430~~ 0700
Received by: 543287	543287	Fedex SDC	10/4/16	10:36A
Relinquished by:				
Received by:	Nhan Phan	FCBI	10/4/16	1122

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

December 28, 2016

Doug Kunkel, Project Manager
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

RE: 61901, F&BI 612322

Dear Mr Kunkel:

Included are the results from the testing of material submitted on December 21, 2016 from the 61901, F&BI 612322 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Cynthia Moon
EPI1228R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 21, 2016 by Friedman & Bruya, Inc. from the Environmental Partners 61901, F&BI 612322 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Environmental Partners
612322 -01	MW-8
612322 -02	MW-7
612322 -03	MW-6
612322 -04	MW-3
612322 -05	MW-4
612322 -06	MW-5
612322 -07	MW-2
612322 -08	MW-1

All quality control requirements were acceptable.

Date of Report: 12/28/16
Date Received: 12/21/16
Project: 61901, F&BI 612322
Date Extracted: 12/22/16
Date Analyzed: 12/22/16

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
MW-8 612322-01	140 x	<250	85
MW-7 612322-02	78 x	<250	83
MW-6 612322-03	640 x	<250	94
MW-3 612322-04	99 x	<250	86
MW-4 612322-05	78 x	<250	68
MW-5 612322-06	<50	<250	93
MW-2 612322-07	<50	<250	77
MW-1 612322-08	190 x	<250	89
Method Blank 06-2668 MB	<50	<250	86

Date of Report: 12/28/16
Date Received: 12/21/16
Project: 61901, F&BI 612322

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	112	99	61-133	12

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

612322

SAMPLE CHAIN OF CUSTODY

ME 12/21/16 DO4

Page # 1 of 1

Report To Doug Kunkel

Company 1180 NW Maple St

Address EPI

City, State, ZIP Issaquah, WA 98027

Phone 425-395-0110 Email dougk@epi-wa.com

SAMPLERS (*signature*)

PROJECT NAME: 61901

PO #:

REMARKS:

INVOICE TO: EPI

TURNAROUND TIME
- ☑ Standard Turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	DRO + ORO				Notes
						ANALYSES REQUESTED											
MW-8	01	12-20-16	0813	water	1								X				
MW-7	02		0841														
MW-6	03		0916														
MW-3	04		0947														
MW-4	05		1052														
MW-5	06		1116														
~~ID~~ MW-2	07		1151														
MW-1	08	↓	1219	↓	↓								↓				

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Joe Shemet	EPI	12-21-16	0630
Received by:	Michael Edell	FBrya	1	1
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282