ENVIRONMENTAL PARTNERS INC
1180 NW Maple Street, Suite 310 Issaquah, Washington 98027 ph 425.395.0010 fax 425.395.0011

October 3, 2017

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

Re: September 2017 Groundwater Sampling Report – Twenty-Fourth Round
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 2017 Groundwater Sampling Report – Twenty-Fourth Round* 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 rescinded because the benzene concentrations in groundwater samples from well MW-2 remained greater than the MTCA Method A 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. According to available information, the UST was pumped and taken out of service in 1998 when the 550-gallon waste oil UST was removed. The 12,000-gallon diesel UST was reportedly not 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. The water sample from the bottom of the excavation was rinse water containing diesel that spilled from the UST as it was removed from the excavation due to improper rigging and hoisting of the UST. 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 EPI's Phase II ESA report, dated December 9, 2013, for additional details regarding the Phase II ESA activities and soil and groundwater sampling results.

In 2013 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, near the onsite oil water separator, 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 very high petroleum hydrocarbon concentrations in a water sample from the bottom of the UST excavation. This water sample was collected immediately after the UST slipped from its rigging during removal, broke, and spilled rinse water into the excavation during decommissioning activities.

In October 2013 EPI performed a Phase II ESA of the Site at Ecology's request. The Phase II ESA included drilling and sampling nine direct push probe borings; five locations around MW-1 and four locations downgradient of MW-6. Sample results indicated that soil impacts around MW-1 were limited to location DP-3, which is immediately adjacent to the exterior wall of the NW corner of the Truck Maintenance Building. This result was anticipated because a small quantity of impacted soil was left in place immediately under the Truck Maintenance Building to maintain geotechnical stability during impacted soil excavation. None of the remaining soil samples had detections for petroleum hydrocarbons. The reviewer is referred to that report for additional details regarding the UST decommissioning activities and soil and groundwater sampling results.

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. POC 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.

Monitoring well MW-9 was installed by Holt Services on August 11, 2017 at a location near the northwest corner of the truck maintenance building as shown on Figure 2. This additional well was requested by Estes West as part of their environmental due diligence for a potential purchase of the property. Historical direct push probe data from this location indicated elevated concentrations of diesel range petroleum hydrocarbons (DRPH) and heavier range petroleum hydrocarbons (HRPH) in groundwater. Additional information regarding well MW-9, including the bore log and well development data, are provided in Attachment A.

**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 had the greatest and most consistently detected concentrations of DRPH and 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 compressor 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 12$^{th}$ 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 (13$^{th}$ 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 remained temporarily off at MW-1 from August 2014 to April 2015 so that follow-on groundwater data could be collected to demonstrate that groundwater was remediated to concentrations below MTCA Method A Groundwater CULs and to provide data intended to demonstrate that contaminant concentration rebound was not occurring.

The positive response to operation of the air injection remediation system at MW-1 demonstrated that 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 June 2015 when an electrical issue with the compressor motor caused the air injection remediation system to shut down, requiring replacement.

Repairs to the air injection system were completed and the remediation system was restarted on February 3, 2016. However, the system was not running during the June 21, 2016 groundwater sampling event and inspection revealed that the compressor motor was damaged beyond repair due to overheating. Upon questioning onsite workers, EPI was informed that the system had been off for several weeks prior to the sampling event. EPI has instructed the onsite workers to immediately inform EPI or the property owner in the event of a system shut down in the future should one occur.

EPI evaluated the potential reasons for the compressor motor overheating and the likely cause is low voltage power throughout the area, which was measured at 208 volts at the air injection system panel. This is significantly lower than the standard of 220-230 volts. Although the compressor motor was rated to operate down to 208 volts it is likely that during certain times of the day in the industrial area at and

near the site, voltage fluctuations below 208 volts caused high amperage of the motor, resulting in excessive heat that eventually seized the motor.

In November 2016, EPI installed a 1.5 horsepower, Republic Manufacturing, Model DRT-425 rotary vane compressor with a 208-volt-specific motor. The compressor was started up on November 16th, 2016 and flows to the air injection wells were established. The system was running before and after the December 20, 2016 groundwater sampling event. Sometime between the December 20, 2016 sampling event and a site visit by EPI personnel on March 20, 2017, the air injection system shut down. On March 20, 2017, EPI personnel inspected the compressor and determined that the vanes were destroyed and must be replaced. The compressor repair work was completed under warranty at the manufacturer's facility.

The repaired compressor was reconnected and returned to service on June 19, 2017. Both areas of the air injection system MW-1 and MW-6, were back in operation following the completion of groundwater sampling on June 19, 2017.

Since installation in 2015, air injection well AI-6, located near monitoring well MW-6, consistently had little to no air flow. EPI tested, evaluated, and attempted to increase air flow through this point with no measurable improvement and determined that the well was plugged and unrepairable. On June 26, 2017 Holocene Drilling, under EPI direction, decommissioned AI-6 per Ecology requirements and replaced it with air injection well AI-6R. Additional information regarding replacement air injection well AI-6R are provided in Attachment A.

**GROUNDWATER SAMPLING PROCEDURES**

During the September 5, 2017 sampling event groundwater sampling event samples were collected from all onsite wells, MW-1, MW-2, MW-3, MW-4, MW-6, MW-7, MW-8, and new well MW-9. Analytical tests for the quarterly monitoring events were previously reduced to DRPH and HRPH. GRPH and BTEX compounds were not detected in samples from any well during the first nine quarterly monitoring events and GRPH and BTEX analyses were discontinued after the August 2013 sampling event per Ecology's approval.

Prior to sampling EPI opened all onsite wells and allowed water levels to equilibrate then measured the depth to water and total depths 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. As noted in the section below, well measuring point elevations were surveyed to the North American Vertical Datum 1988 (NAVD88). Groundwater elevations ranged from 54.39 to 54.63 feet NAVD88 in wells MW-8 and MW-5, respectively.

Groundwater elevation contours indicate that groundwater flow was generally from northwest to southeast at the time of the sampling event as shown in Figure 3. These groundwater contours and flow directions are generally consistent with historical data. Groundwater levels were potentially affected by the air injection system operation during this monitoring event because the system had been operating continuously for several months prior to the September 2017 sampling event.

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 tested 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 for this sampling event are included in Attachment B.

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

Groundwater samples 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.

**WELL SURVEYING**

Monitoring well locations and elevations were surveyed by Pace Engineers on September 19, 2017. The measuring points and groundwater elevations provided in this report are relative to the North American Vertical Datum of 1988 (NAVD 88) rather than a property-specific datum that was used for previous reports. Horizontal coordinates for the surveyed wells and other onsite features (i.e., air injection wells, boreholes BH-1 and BH-2, and catch basins near the Site) are relative to the North American Datum of 1983 (NAD 83), Washington State Plane, North Zone. The survey report for the property is presented in Attachment D.

**FIELD MEASUREMENTS AND ANALYTICAL RESULTS**

The following findings are based on our review of the field parameter measurements presented in Table 1 and the analytical data relative to MTCA Method A Groundwater CULs presented in Table 2. Laboratory data reports are presented in Attachment C.

The following observations were noted for the field parameter data presented in Table 1.

- Depth to water measurements ranged from 5.31 ft. below top of casing (TOC) in MW-8 to 6.39 ft. below TOC in MW-4. The shallow depth to water and flat hydraulic gradient are consistent with historical water level data for the Site.

- Field-measured pH values for purge water from the wells ranged from 6.29 in purge water from MW-1 to 6.72 in purge water from MW-9. These pH measurements represent approximately neutral pH conditions and are consistent with historical pH measurements at the Site.

- DO measurements range from 0.21 milligrams per liter (mg/L) in purge water from MW-3 and MW-7 to 0.61 mg/L in purge water from MW-6.

- ORP measurements ranged from -85.4 millivolts (mV) in purge water from MW-8 to +69.3 mV in purge water from MW-1. Negative ORP measurements indicate anaerobic (reducing) geochemical conditions in groundwater, while positive ORP measurements indicate more aerobic geochemical conditions. The positive ORP measurements at MW-1 and MW-2 likely result from operation of the air injection system near MW-1 and MW-2.

The following observations were noted for the analytical data presented in Table 2.

- HRPH was detected in the groundwater sample from MW-1 at a concentration of 340 µg/L during this sampling event. The 340 µg/L HRPH concentration in the sample from MW-1 is less the MTCA Method A CUL of 500 µg/L. HRPH was not detected in samples from any of the remaining wells during this sampling event.

- DRPH was detected in samples collected from all 9 monitoring wells sampled during this event at concentrations ranging from 59 µg/L in the sample from MW-7 to 4,300 µg/L in the sample from new monitoring well MW-9. Concentrations of DRPH did not exceed the MTCA Method A CUL of 500 µg/L in samples from any of the wells except for the sample from MW-9. MW-9 is intentionally installed immediately adjacent to petroleum hydrocarbon-impacted soil remaining in place beneath the supporting exterior wall of the Truck Maintenance Building. This small volume of impacted soil could not be safely excavated due to geotechnical concerns with the stability of the building.

Time series plots of analytical data for groundwater samples from the nine onsite monitoring wells are presented in Attachment E. The time series plots include trend lines matched to the data indicating DRPH and HRPH concentration trends where applicable.

## CONCLUSIONS AND RECOMMENDATIONS

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

- Samples from MW-3, MW-4, MW-5, MW-7, and MW-8 have never had DRPH or HRPH concentrations greater than MTCA Method A CULs. Only one sample from MW-2, collected in August 2012, had a HRPH exceedance and HRPH has been non-detect in samples from MW-2 since February 2013.

- HRPH was detected in the groundwater sample collected at MW-1 during this sampling event at a concentration less than the MTCA Method A CUL. HRPH was not detected in samples from any of the remaining wells. Samples from MW-3, MW-4, MW-5, MW-7, and MW-8 have never had a detection for HRPH.

- Only the sample from newly-installed monitoring well MW-9 had a DRPH concertation that exceeded the MTCA Method A CUL. DRPH was detected in groundwater samples from the remaining well sampled at concentrations less than its MTCA Method A CUL.

- 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-1 and MW-6, which monitor groundwater in areas undergoing active remediation, were less than the Method A Groundwater CUL during this quarterly monitoring event. DRPH concentrations in samples from MW-1 and MW-6 continue to trend downward as shown in the time-series plots in Attachment E.

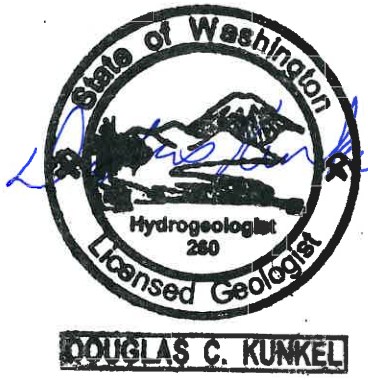
EPI appreciates the opportunity to be of assistance on this project. If you have any questions or comments, please do not hesitate to contact me at (425) 395-0016.

Sincerely,

Douglas Kunkel

Douglas Kunkel, LG, LHG
Principal Hydrogeologist

cc: Ms. Jing Song, LG - WDOE-Northwest Regional Office



## ENCLOSURES

### Tables

| | |
|---|---|
| Table 1 | Summary of Groundwater Stabilization Parameters |
| Table 2 | Quarterly Groundwater Monitoring Analytical Results in µg/L |

### Figures

| | |
|---|---|
| Figure 1 | General Vicinity Map |
| Figure 2 | Monitoring Well Locations and Air Injection Remediation System Layout |
| Figure 3 | September 5, 2017 Groundwater Elevation Contours and Flow Direction |

### Attachments

| | |
|---|---|
| Attachment A | Well Installation Bore Logs |
| Attachment B | Field Notes and Forms |
| Attachment C | Analytical Laboratory Report |
| Attachment D | Survey Report |
| Attachment E | Time Series Plots |

# 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. NAVD88) | Groundwater Elevation (ft. NAVD88) | pH | Specific Conductance ($mS/cm^2$) | Dissolved Oxygen (mg/L) | Temp. (°C) | Oxidation Reduction Potential (mV) | Turbidity (NTU) |
|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 09/05/17 | 6.17 | 60.77 | 54.60 | 6.29 | 0.288 | 0.49 | 20.2 | 69.3 | NM |
| MW-2 | 09/05/17 | 6.32 | 60.85 | 54.53 | 6.41 | 0.353 | 0.55 | 18.6 | 36.2 | NM |
| MW-3 | 09/05/17 | 6.30 | 60.80 | 54.50 | 6.66 | 0.610 | 0.21 | 18.9 | -58.9 | NM |
| MW-4 | 09/05/17 | 6.39 | 60.93 | 54.54 | 6.53 | 0.660 | 0.58 | 17.1 | -32.2 | NM |
| MW-5 | 09/05/17 | 6.27 | 60.90 | 54.63 | 6.54 | 0.563 | 0.51 | 17.7 | -44.6 | NM |
| MW-6 | 09/05/17 | 6.23 | 60.76 | 54.53 | 6.60 | 0.556 | 0.61 | 20.0 | -55.7 | NM |
| MW-7 | 09/05/17 | 5.43 | 59.87 | 54.44 | 6.57 | 0.526 | 0.21 | 18.5 | -61.6 | NM |
| MW-8 | 09/05/17 | 5.31 | 59.70 | 54.39 | 6.52 | 1.070 | 0.34 | 20.8 | -85.4 | NM |
| MW-9 | 09/05/17 | 6.33 | 60.91 | 54.58 | 6.72 | 0.600 | 0.38 | 19.8 | -77.3 | NM |

Notes:

NAVD88 = North American Vertical Datum, 1988

NM = Not Measured

**Table 2: Quarterly Groundwater Monitoring Analytical Results in µg/L**
**Estes West Express Trucking Facility**
**2102 West Valley Highway North - Auburn, WA**

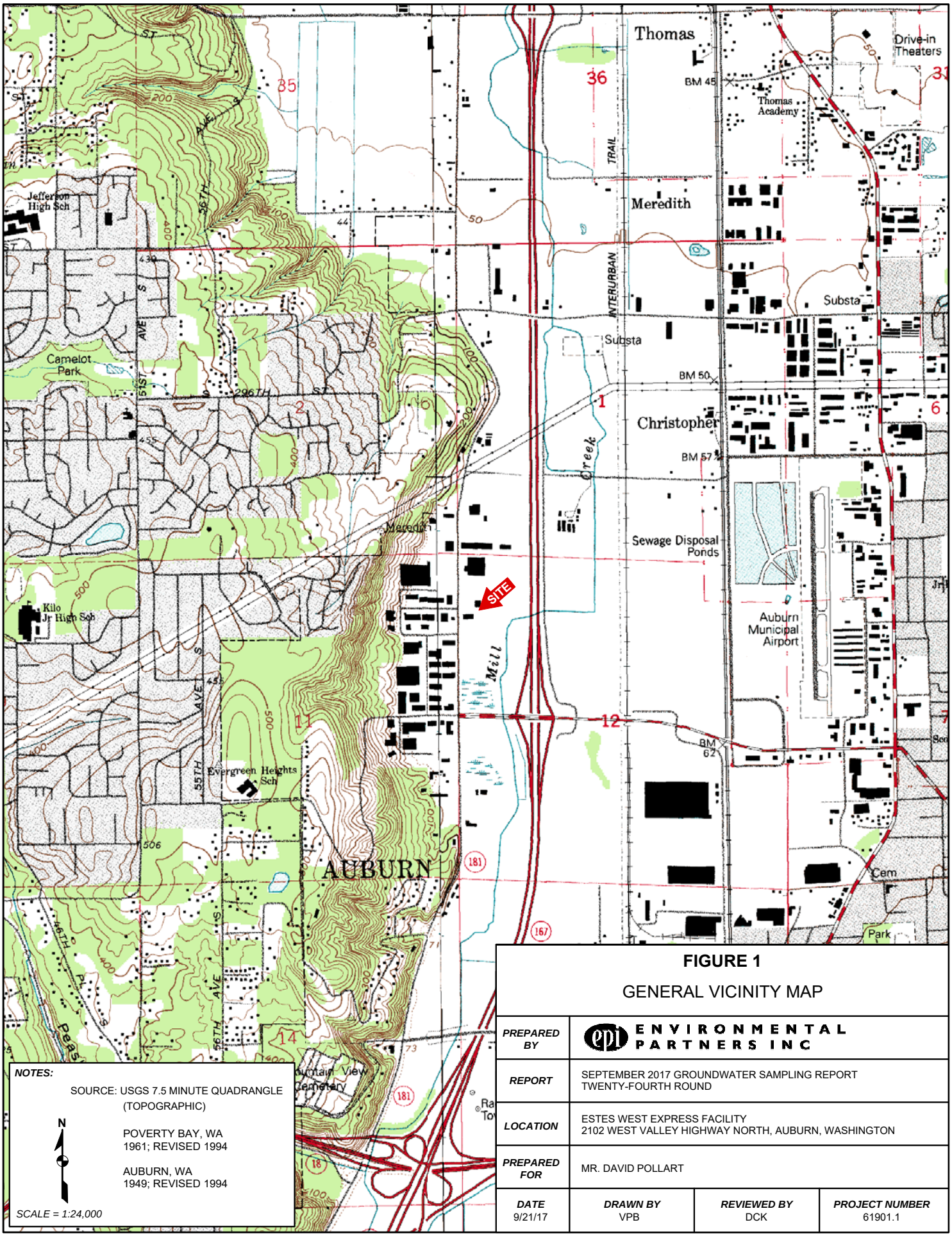
| Well ID | Date Sampled | DRPH[b] | HRPH[b] | Benzene[c] | Toluene[c] | Ethylbenzene[c] | Total Xylenes[c] |
|---|---|---|---|---|---|---|---|
| MW-1 | 8/12/11 | <250 | <500 | <1 | <1 | <1 | <3 |
| | 11/11/11 | **1,500** | **300** | <1 | <1 | <1 | <3 |
| | 2/10/12 | **690** | <250 | <1 | <1 | <1 | <3 |
| | 5/17/12 | **1,100** | **480** | <1 | <1 | <1 | <3 |
| | 8/28/12 | **1,200** | **820** | <1 | <1 | <1 | <3 |
| | 11/15/12 | **2,700** | **1,200** | <1 | <1 | <1 | <3 |
| | 2/14/13 | **1,600** | **510** | <1 | <1 | <1 | <3 |
| | 5/16/13 | **1,500** | **340** | <1 | <1 | <1 | <3 |
| | 8/14/13 | **1,100** | **290** | <1 | <1 | <1 | <3 |
| | 11/25/13 | **1,400** | **400** | NA | | | |
| | 2/20/14 | **700** | **280** | NA | | | |
| | 5/15/14 | **940** | <250 | NA | | | |
| | 8/14/14 | <50 | <250 | NA | | | |
| | 11/24/14 | **220** | <250 | NA | | | |
| | 3/31/15 | **340** | <250 | NA | | | |
| | 6/29/15 | **240** | <250 | NA | | | |
| | 9/28/15 | **700** | **290** | NA | | | |
| | 3/3/16 | **220** | <250 | NA | | | |
| | 6/21/16 | **160** | <250 | NA | | | |
| | 9/16/16 | **580** | **420** | NA | | | |
| | 12/20/16 | **190** | <250 | NA | | | |
| | 3/24/17 | **53** | <250 | NA | | | |
| | 6/19/17 | **310** | **560** | NA | | | |
| | 9/5/17 | **340** | **340** | NA | | | |
| MW-2 | 8/12/11 | <250 | <500 | <1 | <1 | <1 | <3 |
| | 11/11/11 | **500** | <250 | <1 | <1 | <1 | <3 |
| | 2/10/12 | <50 | <250 | <1 | <1 | <1 | <3 |
| | 5/17/12 | <50 | <250 | <1 | <1 | <1 | <3 |
| | 8/28/12 | **470** | **730** | <1 | <1 | <1 | <3 |
| | 11/15/12 | **140** | <260 | <1 | <1 | <1 | <3 |
| | 2/14/13 | **94** | **260** | <1 | <1 | <1 | <3 |
| | 5/16/13 | **77** | <250 | <1 | <1 | <1 | <3 |
| | 8/14/13 | **280** | <250 | <1 | <1 | <1 | <3 |
| | 11/25/13 | **53** | <250 | NA | | | |
| | 2/20/14 | <50 | <250 | NA | | | |
| | 5/15/14 | <50 | <250 | NA | | | |
| | 8/14/14 | **100** | <250 | NA | | | |
| | 11/24/14 | <50 | <250 | NA | | | |
| | 3/31/15 | **57** | <250 | NA | | | |
| | 6/29/15 | **97** | <250 | NA | | | |
| | 9/28/15 | **150** | <250 | NA | | | |
| | 3/3/16 | <50 | <250 | NA | | | |
| | 6/21/16 | **86** | <250 | NA | | | |
| | 9/16/16 | **95** | <250 | NA | | | |
| | 12/20/16 | <50 | <250 | NA | | | |
| | 6/19/17 | **61** | <250 | NA | | | |
| | 9/5/17 | **100** | <250 | NA | | | |
| MW-3 | 8/12/11 | <250 | <500 | <1 | <1 | <1 | <3 |
| | 11/11/11 | **65** | <250 | <1 | <1 | <1 | <3 |
| | 2/10/12 | **100** | <250 | <1 | <1 | <1 | <3 |
| | 5/17/12 | **53** | <250 | <1 | <1 | <1 | <3 |
| | 8/28/12 | **130** | <250 | <1 | <1 | <1 | <3 |
| | 11/15/12 | **120** | <280 | <1 | <1 | <1 | <3 |
| | 2/14/13 | **150** | <250 | <1 | <1 | <1 | <3 |
| | 5/16/13 | **200** | <250 | <1 | <1 | <1 | <3 |
| | 8/14/13 | **140** | <250 | <1 | <1 | <1 | <3 |
| | 11/25/13 | **170** | <250 | NA | | | |
| | 2/20/14 | **160** | <250 | NA | | | |
| | 5/15/14 | **120** | <250 | NA | | | |
| | 8/14/14 | **140** | <250 | NA | | | |
| | 11/24/14 | **130** | <250 | NA | | | |
| | 3/31/15 | **220** | <250 | NA | | | |
| | 6/29/15 | **130** | <250 | NA | | | |
| | 9/28/15 | **110** | <250 | NA | | | |
| | 3/3/16 | **92** | <250 | NA | | | |
| | 6/21/16 | **85** | <250 | NA | | | |
| | 9/16/16 | **100** | <250 | NA | | | |
| | 12/20/16 | **99** | <250 | NA | | | |
| | 6/19/17 | **310** | <250 | NA | | | |
| | 9/5/17 | **210** | <250 | NA | | | |

**Table 2: Quarterly Groundwater Monitoring Analytical Results in µg/L**
**Estes West Express Trucking Facility**
**2102 West Valley Highway North - Auburn, WA**

| Well ID | Date Sampled | DRPH[b] | HRPH[b] | Benzene[c] | Toluene[c] | Ethylbenzene[c] | Total Xylenes[c] |
|---|---|---|---|---|---|---|---|
| MW-4 | 8/12/11 | <250 | <500 | <1 | <1 | <1 | <3 |
| | 11/11/11 | **72** | <250 | <1 | <1 | <1 | <3 |
| | 2/10/12 | **150** | <250 | <1 | <1 | <1 | <3 |
| | 5/17/12 | **160** | <250 | <1 | <1 | <1 | <3 |
| | 8/28/12 | **200** | <250 | <1 | <1 | <1 | <3 |
| | 11/15/12 | **220** | <250 | <1 | <1 | <1 | <3 |
| | 2/14/13 | **220** | <250 | <1 | <1 | <1 | <3 |
| | 5/16/13 | **210** | <250 | <1 | <1 | <1 | <3 |
| | 8/14/13 | **200** | <250 | <1 | <1 | <1 | <3 |
| | 2/20/14 | **140** | <250 | NA | | | |
| | 5/15/14 | **140** | <250 | NA | | | |
| | 8/14/14 | **290** | <250 | NA | | | |
| | 11/24/14 | **290** | <250 | NA | | | |
| | 3/31/15 | **320** | <250 | NA | | | |
| | 6/29/15 | **240** | <250 | NA | | | |
| | 9/28/15 | **220** | <250 | NA | | | |
| | 3/3/16 | **130** | <250 | NA | | | |
| | 6/21/16 | **63** | <250 | NA | | | |
| | 9/29/16 | **68** | <250 | NA | | | |
| | 12/20/16 | **78** | <250 | NA | | | |
| | 3/24/17 | <50 | <250 | NA | | | |
| | 6/19/17 | **110** | <250 | NA | | | |
| | 9/5/17 | **150** | <250 | NA | | | |
| MW-5 | 6/5/13 | **160** | <250 | <1 | <1 | <1 | <3 |
| | 8/14/13 | **56** | <250 | <1 | <1 | <1 | <3 |
| | 11/24/14 | <50 | <250 | NA | | | |
| | 3/31/15 | **52** | <250 | NA | | | |
| | 6/29/15 | <50 | <250 | NA | | | |
| | 9/28/15 | <50 | <250 | NA | | | |
| | 3/3/16 | <50 | <250 | NA | | | |
| | 6/21/16 | <50 | <250 | NA | | | |
| | 9/16/16 | <50 | <250 | NA | | | |
| | 12/20/16 | <50 | <250 | NA | | | |
| | 6/19/17 | **55** | <250 | NA | | | |
| | 9/5/17 | **68** | <250 | NA | | | |
| MW-6 | 6/5/13 | **680** | <250 | <1 | <1 | <1 | <3 |
| | 8/14/13 | **790** | <250 | <1 | <1 | <1 | <3 |
| | 2/20/14 | **740** | <250 | NA | | | |
| | 5/15/14 | **950** | <250 | NA | | | |
| | 8/14/14 | **1,200** | <250 | NA | | | |
| | 11/24/14 | **680** | <250 | NA | | | |
| | 3/31/15 | **750** | <250 | NA | | | |
| | 6/29/15 | **750** | <250 | NA | | | |
| | 9/28/15 | **610** | <250 | NA | | | |
| | 3/3/16 | **1,100** | **390** | NA | | | |
| | 6/21/16 | **650** | <250 | NA | | | |
| | 9/16/16 | **340** | <250 | NA | | | |
| | 12/20/16 | **640** | <250 | NA | | | |
| | 3/24/17 | **580** | <250 | NA | | | |
| | 6/19/17 | **970** | **280** | NA | | | |
| | 9/5/17 | **320** | <250 | NA | | | |
| MW-7 | 9/16/16 | **140** | <250 | NA | | | |
| | 12/20/16 | **78** | <250 | NA | | | |
| | 3/24/17 | <50 | <250 | NA | | | |
| | 6/19/17 | **100** | <250 | NA | | | |
| | 9/5/17 | **59** | <250 | NA | | | |
| MW-8 | 10/3/16 | **290** | <250 | NA | | | |
| | 12/20/16 | **140** | <250 | NA | | | |
| | 3/24/17 | <50 | <250 | NA | | | |
| | 6/26/17 | **180** | <250 | NA | | | |
| | 9/5/17 | **160** | <250 | NA | | | |
| MW-9 | 9/5/17 | **4,300** | <250 | NA | | | |
| **MTCA Method A Groundwater Cleanup Level (in µg/L)** | | **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
[d] Cleanup level is 800 µg/L when benzene is present in groundwater and 1,000 µg/L when benzene is not present

# 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 2017 GROUNDWATER SAMPLING REPORT<br>TWENTY-FOURTH ROUND | | |
| ***LOCATION*** | ESTES WEST EXPRESS FACILITY<br>2102 WEST VALLEY HIGHWAY NORTH, AUBURN, WASHINGTON | | |
| ***PREPARED FOR*** | MR. DAVID POLLART | | |
| ***DATE***<br>9/21/17 | ***DRAWN BY***<br>VPB | ***REVIEWED BY***<br>DCK | ***PROJECT NUMBER***<br>61901.1 |

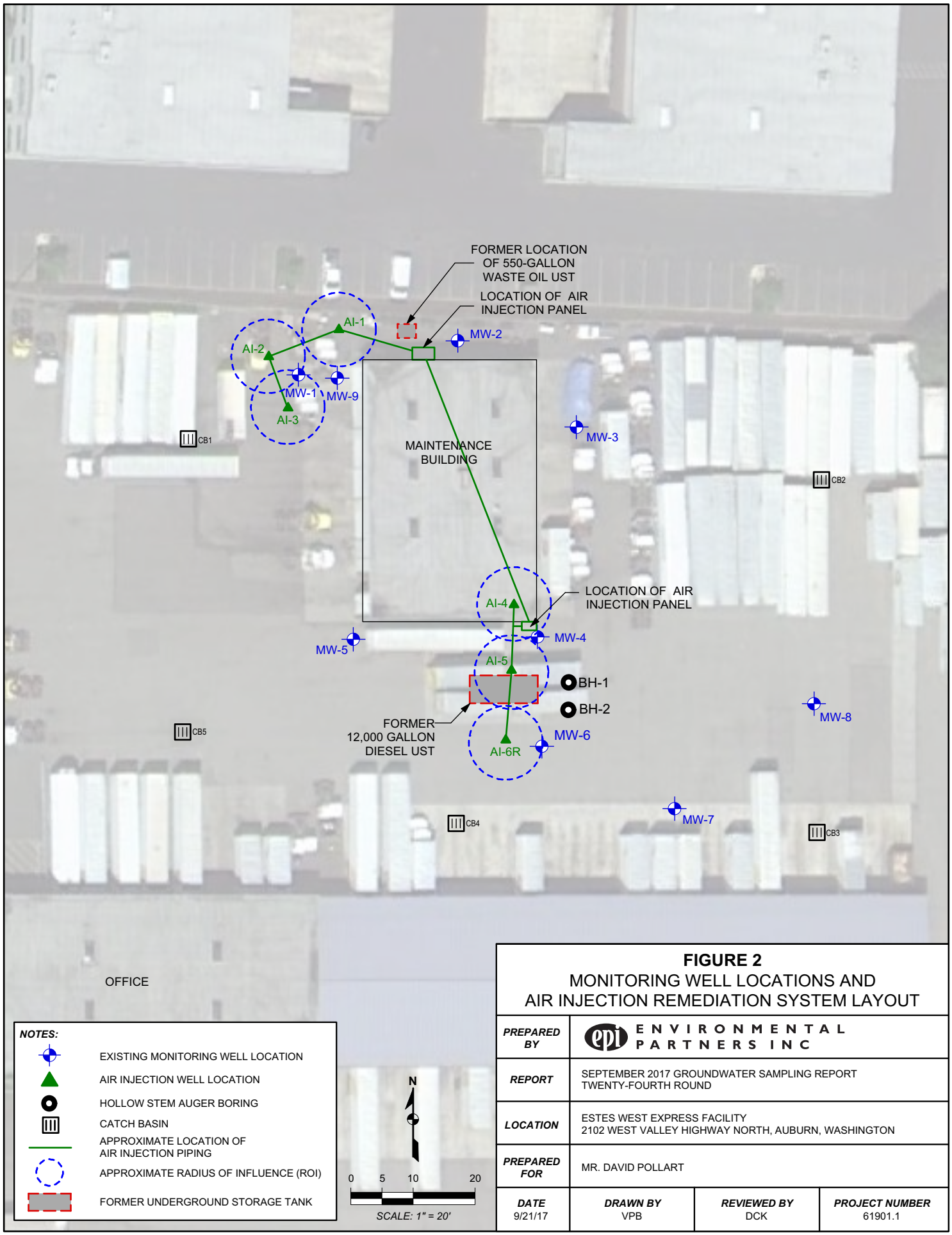
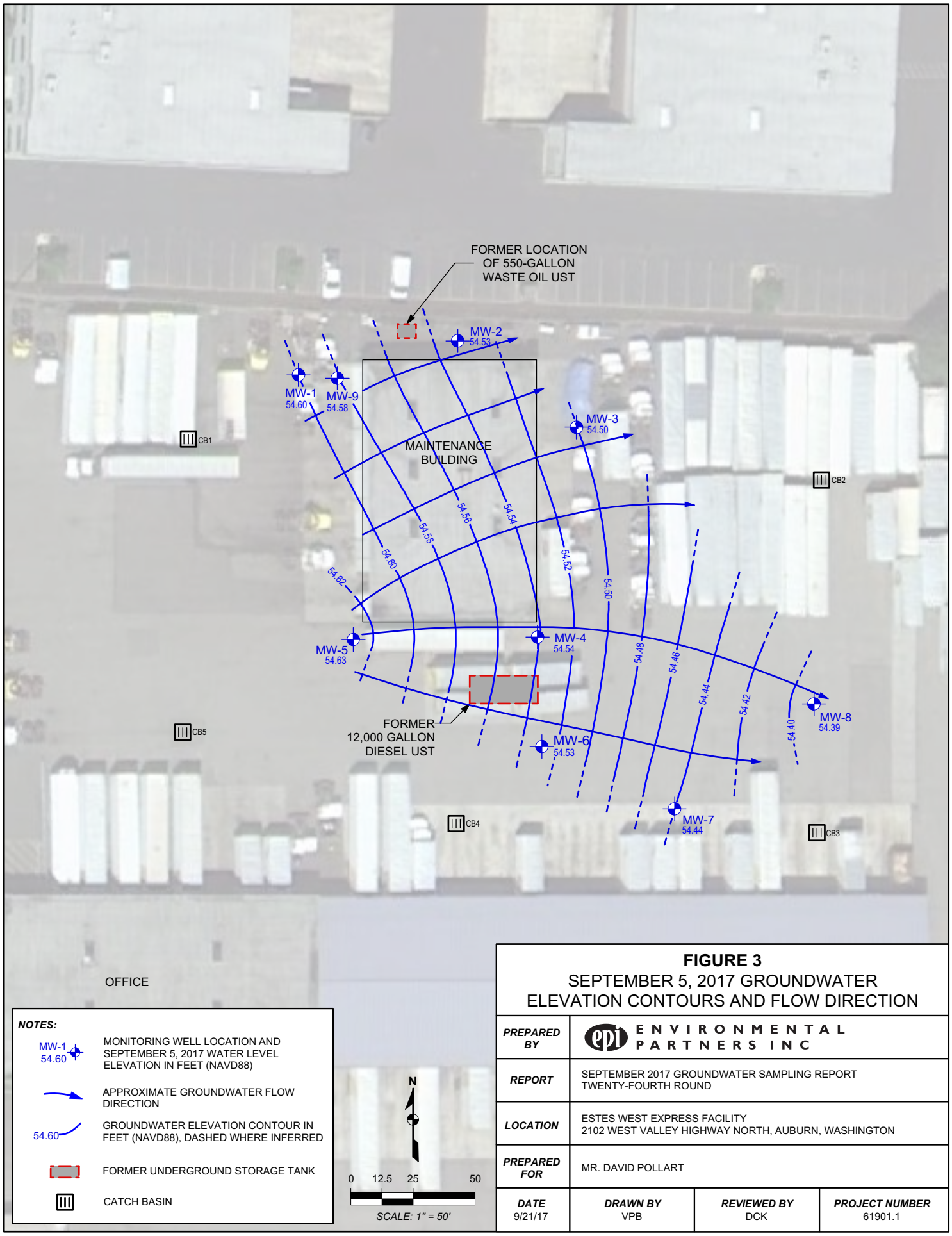



**FIGURE 2**
MONITORING WELL LOCATIONS AND
AIR INJECTION REMEDIATION SYSTEM LAYOUT

| | | | |
|---|---|---|---|
| ***PREPARED BY*** | ENVIRONMENTAL PARTNERS INC | | |
| ***REPORT*** | SEPTEMBER 2017 GROUNDWATER SAMPLING REPORT<br>TWENTY-FOURTH ROUND | | |
| ***LOCATION*** | ESTES WEST EXPRESS FACILITY<br>2102 WEST VALLEY HIGHWAY NORTH, AUBURN, WASHINGTON | | |
| ***PREPARED FOR*** | MR. DAVID POLLART | | |
| ***DATE***<br>9/21/17 | ***DRAWN BY***<br>VPB | ***REVIEWED BY***<br>DCK | ***PROJECT NUMBER***<br>61901.1 |




# FIGURE 3
## SEPTEMBER 5, 2017 GROUNDWATER ELEVATION CONTOURS AND FLOW DIRECTION

| | | | |
|---|---|---|---|
| ***PREPARED BY*** | ENVIRONMENTAL PARTNERS INC | | |
| ***REPORT*** | SEPTEMBER 2017 GROUNDWATER SAMPLING REPORT<br>TWENTY-FOURTH ROUND | | |
| ***LOCATION*** | ESTES WEST EXPRESS FACILITY<br>2102 WEST VALLEY HIGHWAY NORTH, AUBURN, WASHINGTON | | |
| ***PREPARED FOR*** | MR. DAVID POLLART | | |
| ***DATE***<br>9/21/17 | ***DRAWN BY***<br>VPB | ***REVIEWED BY***<br>DCK | ***PROJECT NUMBER***<br>61901.1 |

# Attachment A
# Well Installation Bore Logs

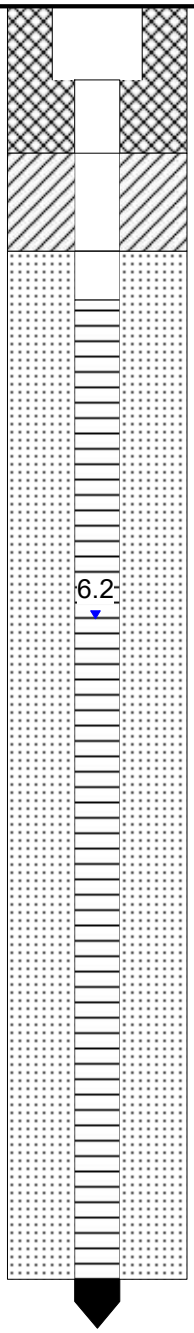
ENVIRONMENTAL PARTNERS INC

# BORING ID: MW-9

| | | |
|---|---|---|
| SITE ADDRESS<br>**2012 West Valley Highway North** | CLIENT:<br>**David Pollart** | CASING MATERIAL AND SIZE:<br>**2" Sch 40 PVC** |
| DRILLING CONTRACTOR:<br>**Holt Services** | PROJECT #:<br>**61901** | SCREEN SIZE:<br>**0.010** |
| DRILLING EQUIPMENT:<br>**Limited Access Track Rig** | DATE:<br>**8/11/17** | SCREEN INTERVAL:<br>**3 - 13 ft BGS** |
| DRILLING METHOD:<br>**HSA** | GROUND SURFACE ELEV. FT AMSL:<br>**Not Measured** | FILTER PACK:<br>**Silica Sand** |
| LOGGED BY:<br>**J. Sherrod** / BOREHOLE SIZE:<br>**9 inch** | TOTAL DEPTH:<br>**13 ft** | FILTER PACK INTERVAL:<br>**2.5 - 13 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 | | Concrete Surface | | | | |
| 1 | GP-GM | POORLY-GRADED GRAVEL WITH SILT AND SAND; brown; damp; loose; mostly gravel with some silt and few sand | | | | |
| 3 | | | 30 | 5,5,5 | | 0.0 |
| 4 | | -Moist, increasing silt content | | | | |
| 5 | | | 20 | 2,5,13 | | 0.6 |
| 6 | | -Moist, odor | 50 | 10,13,15 | MW-9:5.5 | 446.0 |
| 8 | ML | SILT WITH SAND; dark brown; wet; mostly silt with few sand; no odor | | | | |
| 9 | SP-SM | POORLY-GRADED SAND WITH SILT; dark gray; wet; mostly sand with some silt | | | | 7.3 |
| 13 | | End of Borehole | | | | 42.1 |
| 14 | | | | | | |

Well Construction




NOTES:

ENVIRONMENTAL PARTNERS INC

**BORING ID:** AI-GR

| | | |
|---|---|---|
| SITE ADDRESS: 2102 W Valley Hwy N Auburn WA | CLIENT: David Pollard | CASING MATERIAL AND SIZE: 3/4" Sch 40 PVC |
| DRILLING CONTRACTOR: Holocene Drilling | PROJECT #: 61901 | SCREEN SIZE: Kerr Foot |
| DRILLING EQUIPMENT: D50 | DATE: 6/26/17 | SCREEN INTERVAL: 1' |
| DRILLING METHOD: HSA | GROUND SURFACE ELEV. FT AMSL: NM | FILTER PACK: Silica Sand |
| LOGGED BY: J. Sherrod | TOTAL DEPTH: 16' | FILTER PACK INTERVAL: 12'-16' |

| Depth (feet) | USCS | Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other) | Interval & % Recovery | Blows per 6" | Sample | PID (ppm) | Well Construction | Comments |
|---|---|---|---|---|---|---|---|---|
| 0 | | 0-4" Concrete | | | | | | |
| 2 | GP-GM | 4"-5' Poorly-Graded gravel w/ silt and sand, brown, damp, mostly gravel w/ some silt and few sand. | | | | | | |
| 4 | | - moist | | | | | Blank 3/4" PVC | |
| 6 | | 5'-16' Poorly-Graded sand w/ silt, wet, dk gray, mostly sand w/ few silt. | | | | | | |
| 8 | | | | | | | Bentonite | |
| 10 | | | | | | | | |
| 12 | | | | | | | Sand | |
| 14 | | | | | | | Kerr-foot sampler | |
| 16 | | End of Borehole | | | | | Sand | |

NOTES: Hole drilled w/ wood plug, no samples collected.

HSA with well

# Attachment B
# Field Notes and Forms

9/5/17

Scope: Groundwater monitoring

Conditions: Cloudy - 70°F

0530 J. Sherrod on-site, open wells and prepare for DTW collection. System running on arrival.

| Well | DTW |
|---|---|
| MW-1 | 6.17 |
| MW-2 | 6.32 |
| MW-3 | 6.30 |
| MW-4 | 6.39 - Cap loose, possibly due to As pressure |
| MW-5 | 6.27 |
| MW-6 | 6.23 |
| MW-7 | 5.43 |
| MW-8 | 5.31 |
| MW-9 | 6.33 |

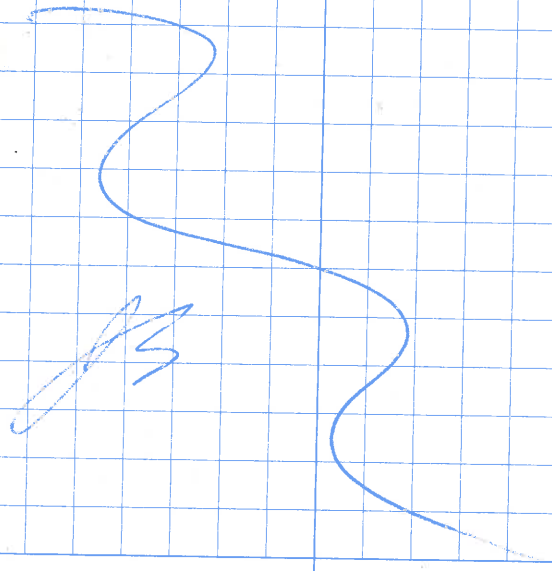
0700 EPI off-site

0900 EPI on-site, Begin sampling. Please see stabilization sheets for well specific info.

9/5/17

| Air Sparge Parameters | | |
|---|---|---|
| Well | Pres. | Flow |
| As-1 | 5 | 1 |
| As-2 | 7 | 1 |
| As-3 | 7 | 1 |
| As-4 | 7 | 1 |
| As-5 | 15 | 1 |
| As-6 | 11 | 5 |

1500 EPI off-site



# EPI Groundwater Sampling Field Data

**Project Name:** Estes West
**Project Number:** 61901

| | | | |
|---|---|---|---|
| Well ID: | MW-1 | Date | 9/5/17 |
| 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 | 1330 |
| End Time | |
| Total Gallons Purged | |

| Time | Volume Gallons | pH | Conductivity ms/cm² | DO mg/L | Temp. °C | ORP mV | Turbidity NTU | Appearance/Notes |
|---|---|---|---|---|---|---|---|---|
| 1334 | 0.2 | 6.42 | 0.292 | 0.81 | 19.7 | 69.7 | — | clear |
| 1337 | 0.3 | 6.26 | 0.288 | 0.57 | 20.1 | 73.7 | — | clear |
| 1340 | 0.4 | 6.27 | 0.288 | 0.57 | 20.1 | 73.3 | — | clear |
| 1343 | 0.5 | 6.28 | 0.288 | 0.57 | 20.2 | 71.4 | — | clear |
| 1346 | 0.6 | 6.29 | 0.288 | 0.54 | 20.3 | 70.4 | — | clear |
| 1349 | 0.7 | 6.29 | 0.288 | 0.51 | 20.2 | 69.4 | — | clear |
| 1352 | 0.8 | 6.29 | 0.288 | 0.49 | 20.2 | 69.3 | — | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Sample Information

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

| Analysis | Time | Bottle Type | Preservative/Filtration | Comments |
|---|---|---|---|---|
| DRO + ORO | 1353 | ½ Clear Amb | 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:** Estes West
**Project Number:** 61901

| | | | |
|---|---|---|---|
| Well ID: | MW-2 | Date | 4/5/17 |
| 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 | 1255 |
| End Time | |
| Total Gallons Purged | |

| Time | Volume Gallons | pH | Conductivity ms/cm² | DO mg/L | Temp. °C | ORP mV | Turbidity NTU | Appearance/Notes |
|---|---|---|---|---|---|---|---|---|
| 1259 | 0.2 | 6.53 | 0.360 | 1.30 | 18.2 | 15.2 | — | clear |
| 1302 | 0.3 | 6.35 | 0.356 | 5.11 | 17.6 | 29.8 | — | clear |
| 1305 | 0.4 | 6.36 | 0.350 | 0.73 | 17.6 | 30.4 | — | clear |
| 1308 | 0.5 | 6.39 | 0.350 | 0.57 | 17.8 | 31.0 | — | clear |
| 1311 | 0.6 | 6.41 | 0.348 | 0.57 | 18.1 | 32.4 | — | clear |
| 1314 | 0.7 | 6.41 | 0.349 | 0.57 | 18.2 | 34.4 | — | clear |
| 1317 | 0.8 | 6.41 | 0.353 | 0.55 | 18.6 | 36.2 | — | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Sample Information

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

| Analysis | Time | Bottle Type | Preservative/Filtration | Comments |
|---|---|---|---|---|
| DRO + ORO | 1318 | 1/2 Gr Amb | 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:** Estes West
**Project Number:** 6 1901

| | | | |
|---|---|---|---|
| Well ID: | MW-3 | Date | 9/5/17 |
| 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 | |
| End Time | |
| Total Gallons Purged | |

| Time | Volume Gallons | pH | Conductivity ms/cm² | DO mg/L | Temp. °C | ORP mV | Turbidity NTU | Appearance/Notes |
|---|---|---|---|---|---|---|---|---|
| 1031 | 0.1 | 6.97 | ~~0.412~~ | ~~0.412~~ | 19.5 | -14.9 | — | clear |
| 1034 | 0.2 | 6.62 | 0.79 | 0.83 | 19.1 | -29.8 | — | clear |
| 1037 | 0.3 | 6.64 | 0.78 | 0.74 | 19.2 | -36.6 | — | clear |
| 1040 | 0.4 | 6.65 | 0.77 | 0.70 | 19.1 | -43.8 | — | clear |
| 1043 | 0.5 | 6.66 | 0.69 | 0.49 | 19.1 | -52.1 | — | clear |
| 1046 | 0.6 | 6.66 | 0.65 | 0.36 | 19.1 | -55.1 | — | clear |
| 1049 | 0.7 | 6.66 | 0.61 | 0.21 | 18.9 | -58.9 | — | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Sample Information

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

| Analysis | Time | Bottle Type | Preservative/Filtration | Comments |
|---|---|---|---|---|
| DRO + ORO | 1050 | 1L 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-4 | Date | 9/5/17 |
| 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 | 1115 |
| End Time | |
| Total Gallons Purged | |

| Time | Volume Gallons | pH | Conductivity ms/cm² | DO mg/L | Temp. °C | ORP mV | Turbidity NTU | Appearance/Notes |
|---|---|---|---|---|---|---|---|---|
| 1118 | 0.1 | 6.66 | 0.69 | 3.12 | 17.3 | 12.0 | — | clear |
| 1121 | 0.2 | 6.58 | 0.69 | 1.68 | 17.3 | 4.8 | — | clear |
| 1124 | 0.3 | 6.54 | 0.68 | 0.80 | 17.0 | -15.8 | — | clear |
| 1127 | 0.4 | 6.55 | 0.68 | 0.67 | 17.2 | -22.4 | — | clear |
| 1130 | 0.5 | 6.55 | 0.67 | 0.60 | 17.1 | -29.5 | — | clear |
| 1133 | 0.6 | 6.53 | 0.66 | 0.58 | 17.1 | -32.3 | — | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Sample Information

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

| Analysis | Time | Bottle Type | Preservative/Filtration | Comments |
|---|---|---|---|---|
| DRO + ORO | 1134 | 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:** 61901

| | | | |
|---|---|---|---|
| Well ID: | MW-5 | Date | 9/5/17 |
| 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 | 1218 |
| End Time | |
| Total Gallons Purged | |

| Time | Volume Gallons | pH | Conductivity ms/cm² | DO mg/L | Temp. °C | ORP mV | Turbidity NTU | Appearance/Notes |
|---|---|---|---|---|---|---|---|---|
| 1220 | 0.1 | 6.62 | 0.59 | 1.37 | 18.2 | -34.2 | — | clear |
| 1223 | 0.2 | 6.53 | 0.58 | 0.63 | 17.8 | -31.5 | — | clear |
| 1226 | 0.3 | 6.49 | 0.574 | 0.54 | 18.1 | -34.0 | — | clear |
| 1229 | 0.4 | 6.52 | 0.564 | 0.56 | 17.8 | -38.9 | — | clear |
| 1232 | 0.5 | 6.54 | 0.564 | 0.54 | 17.5 | -42.4 | — | clear |
| 1235 | 0.6 | 6.54 | 0.563 | 0.51 | 17.7 | -44.6 | — | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Sample Information

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

| Analysis | Time | Bottle Type | Preservative/Filtration | Comments |
|---|---|---|---|---|
| | 1236 | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

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 | 9/5/17 |
| 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 | 1143 |
| End Time | |
| Total Gallons Purged | |

| Time | Volume Gallons | pH | Conductivity ms/cm² | DO mg/L | Temp. °C | ORP mV | Turbidity NTU | Appearance/Notes |
|---|---|---|---|---|---|---|---|---|
| 1145 | 0.1 | 6.63 | 0.57 | 1.35 | 19.7 | -20.6 | — | clear |
| 1148 | 0.2 | 6.60 | 0.55 | 0.69 | 19.9 | -29.6 | — | clear |
| 1151 | 0.3 | 6.59 | 0.56 | 0.60 | 19.9 | -38.5 | — | clear |
| 1154 | 0.4 | 6.60 | 0.55 | 0.62 | 20.0 | -44.5 | — | clear |
| 1157 | 0.5 | 6.67 | 0.56 | 0.52 | 20.2 | -56.7 | — | clear |
| 1200 | 0.6 | 6.65 | 0.55 | 0.85 | 20.2 | -54.5 | — | clear |
| 1203 | 0.7 | 6.60 | 0.55 | 0.72 | 20.3 | -53.6 | — | clear |
| 1206 | 0.8 | 6.60 | 0.556 | 0.61 | 20.0 | -55.7 | — | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Sample Information

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

| Analysis | Time | Bottle Type | Preservative/Filtration | Comments |
|---|---|---|---|---|
| DRO + ORO | 1207 | 1/2 Liter Amb | 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:** Estes West
**Project Number:** 61901

| | | | |
|---|---|---|---|
| Well ID: | MW-7 | Date | 9/05/17 |
| 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 | 0948 |
| End Time | |
| Total Gallons Purged | |

| Time | Volume Gallons | pH | Conductivity ms/cm² | DO mg/L | Temp. °C | ORP mV | Turbidity NTU | Appearance/Notes |
|---|---|---|---|---|---|---|---|---|
| 0948 | 0.1 | 6.69 | 0.555 | 1.39 | 17.5 | -41.9 | — | clear |
| 0951 | 0.2 | 6.51 | 0.523 | 0.72 | 17.6 | -37.9 | — | clear |
| 0954 | 0.3 | 6.50 | 0.518 | 0.64 | 17.7 | -40.5 | — | clear |
| 0957 | 0.4 | 6.54 | 0.516 | 0.41 | 17.9 | -47.6 | — | murky |
| 1000 | 0.5 | 6.56 | 0.514 | 0.62 | 18.0 | -51.6 | — | cleaning |
| 1003 | 0.7 | 6.56 | 0.518 | 0.27 | 18.3 | -55.4 | — | clear |
| 1006 | 0.8 | 6.57 | 0.521 | 0.26 | 18.2 | -57.8 | — | clear |
| 1009 | 0.9 | 6.57 | 0.523 | 0.23 | 18.4 | -59.8 | — | clear |
| 1012 | 1.0 | 6.57 | 0.526 | 0.21 | 18.5 | -61.6 | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Sample Information

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

| Analysis | Time | Bottle Type | Preservative/Filtration | Comments |
|---|---|---|---|---|
| DRO + ORO | 1013 | ½ Ltr Amb | 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:** Estes West
**Project Number:** 61901

| | | | |
|---|---|---|---|
| Well ID: | MW-8 | Date | 9/5/17 |
| 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 | 0913 |
| End Time | |
| Total Gallons Purged | |

| Time | Volume Gallons | pH | Conductivity ms/cm² | DO mg/L | Temp. °C | ORP mV | Turbidity NTU | Appearance/Notes |
|---|---|---|---|---|---|---|---|---|
| 0915 | 0.1 | 6.60 | 1.07 | 4.54 | 20.4 | 0.3 | — | clear |
| 0918 | 0.2 | 6.57 | 1.07 | 1.60 | 20.8 | -40.9 | — | clear |
| 0921 | 0.3 | 6.58 | 1.07 | 1.03 | 21.1 | -58.9 | — | clear |
| 0924 | 0.4 | 6.62 | 1.07 | 0.64 | 21.0 | -70.6 | — | clear |
| 0927 | 0.5 | 6.62 | 1.07 | 0.51 | 21.0 | -76.7 | — | clear |
| 0930 | 0.6 | 6.62 | 1.07 | 0.44 | 20.9 | -80.2 | — | clear |
| 0933 | 0.7 | 6.62 | 1.07 | 0.37 | 20.8 | -83.5 | — | clear |
| 0936 | 0.8 | 6.52 | 1.07 | 0.34 | 20.8 | -85.4 | — | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Sample Information

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

| Analysis | Time | Bottle Type | Preservative/Filtration | Comments |
|---|---|---|---|---|
| DRO +ORO | 0937 | ½ Lt Amb | 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:** Estes West
**Project Number:** 61401

| | | | |
|---|---|---|---|
| Well ID: | MW-9 | Date | 4/5/17 |
| Sample ID: | MW-9 | 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 | 1405 |
| End Time | |
| Total Gallons Purged | |

| Time | Volume Gallons | pH | Conductivity ms/cm² | DO mg/L | Temp. °C | ORP mV | Turbidity NTU | Appearance/Notes |
|---|---|---|---|---|---|---|---|---|
| 1408 | 0.1 | 6.64 | 0.62 | 0.66 | 19.4 | 44.3 | — | clear |
| 1411 | 0.2 | 6.61 | 0.62 | 0.48 | 19.6 | -19.6 | — | clear |
| 1414 | 0.3 | 6.64 | 0.62 | 0.43 | 19.7 | -36.9 | — | clear |
| 1417 | 0.4 | 6.67 | 0.61 | 0.44 | 19.7 | -50.1 | — | clear |
| 1420 | 0.5 | 6.69 | 0.61 | 0.43 | 19.8 | -58.9 | — | clear |
| 1423 | 0.6 | 6.71 | 0.61 | 0.42 | 19.6 | -67.6 | — | clear |
| 1426 | 0.7 | 6.72 | 0.60 | 0.40 | 19.7 | -73.4 | — | clear |
| 1429 | 0.8 | 6.72 | 0.60 | 0.38 | 19.8 | -77.3 | — | clear |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## Sample Information

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

| Analysis | Time | Bottle Type | Preservative/Filtration | Comments |
|---|---|---|---|---|
| DRO+ORO | 1430 | ½ L Amb | 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.

9/5/17

Scope: Groundwater monitoring

Conditions: Cloudy - 70°F

0530 J. Sherrod on-site, open wells and prepare for DTW collection. System running on arrival.

| Well | DTW |
|---|---|
| MW-1 | 6.17 |
| MW-2 | 6.32 |
| MW-3 | 6.30 |
| MW-4 | 6.39 - Cap loose, possibly due to As pressure |
| MW-5 | 6.27 |
| MW-6 | 6.23 |
| MW-7 | 5.43 |
| MW-8 | 5.31 |
| MW-9 | 6.33 |

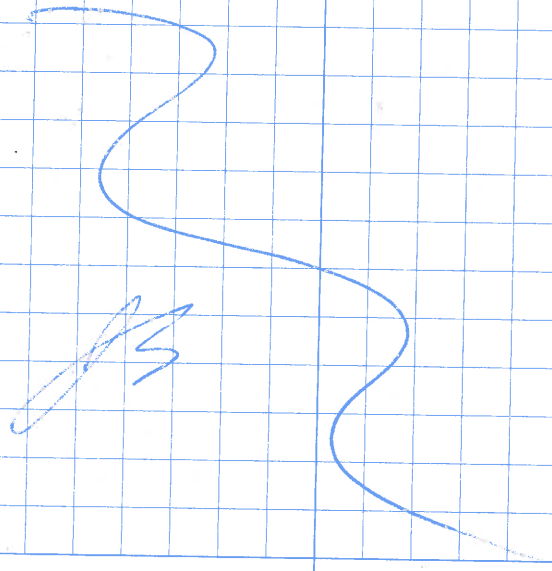
0700 EPI off-site

0900 EPI on-site, Begin sampling. Please see stabilization sheets for well specific info.

9/5/17

| Air Sparge Parameters | | |
|---|---|---|
| Well | Pres. | Flow |
| As-1 | 5 | 1 |
| As-2 | 7 | 1 |
| As-3 | 7 | 1 |
| As-4 | 7 | 1 |
| As-5 | 15 | 1 |
| As-6 | 11 | 5 |

1500 EPI off-site



# Attachment C
# Analytical Laboratory Report

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 14, 2017

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

RE: 61901

Dear Mr Kunkel:

Included are the results from the testing of material submitted on September 6, 2017 from the 61901, F&BI 709085 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
EPI0914R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on September 6, 2017 by Friedman & Bruya, Inc. from the Environmental Partners 61901 project. Samples were logged in under the laboratory ID's listed below.

| Laboratory ID | Environmental Partners |
|---|---|
| 709085 -01 | MW-8 |
| 709085 -02 | MW-7 |
| 709085 -03 | MW-3 |
| 709085 -04 | MW-4 |
| 709085 -05 | MW-6 |
| 709085 -06 | MW-5 |
| 709085 -07 | MW-2 |
| 709085 -08 | MW-1 |
| 709085 -09 | MW-9 |

All quality control requirements were acceptable.

Date of Report: 09/14/17
Date Received: 09/06/17
Project: 61901, F&BI 709085
Date Extracted: 09/11/17
Date Analyzed: 09/11/17

**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<br>Laboratory ID | Diesel Range<br>($C_{10}$-$C_{25}$) | Motor Oil Range<br>($C_{25}$-$C_{36}$) | Surrogate<br>(% Recovery)<br>(Limit 47-140) |
|---|---|---|---|
| MW-8<br>709085-01 | 160 x | <250 | 98 |
| MW-7<br>709085-02 | 59 x | <250 | 93 |
| MW-3<br>709085-03 | 210 x | <250 | 100 |
| MW-4<br>709085-04 | 150 x | <250 | 101 |
| MW-6<br>709085-05 | 320 x | <250 | 111 |
| MW-5<br>709085-06 | 68 x | <250 | 102 |
| MW-2<br>709085-07 | 100 x | <250 | 109 |
| MW-1<br>709085-08 | 340 x | 340 x | 106 |
| MW-9<br>709085-09 | 4,300 x | <250 | 88 |
| Method Blank<br>07-1985 MB | <50 | <250 | 98 |

Date of Report: 09/14/17
Date Received: 09/06/17
Project: 61901, F&BI 709085

## 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 | 92 | 88 | 61-133 | 4 |

# 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.

709085

# SAMPLE CHAIN OF CUSTODY

ME 09-06-17

Page 1 of 1 BOS

Report To Doug Konkel

Company Environmental Partners Inc

Address 1180 NW Maple St.

City, State, ZIP Issaquah, WA 98027

Phone 425-395-0610 Email dougk@ep-wa.com

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 | Dioxins | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ANALYSES REQUESTED | | | | | | | | | | | |
| MW-8 | 01 | 9/5/17 | 0937 | Water | 1 | | | | | | | | X | | | | |
| MW-7 | 02 | | 1013 | | | | | | | | | | | | | | |
| MW-3 | 03 | | 1050 | | | | | | | | | | | | | | |
| MW-4 | 04 | | 1134 | | | | | | | | | | | | | | |
| MW-6 | 05 | | 1207 | | | | | | | | | | | | | | |
| MW-5 | 06 | | 1236 | | | | | | | | | | | | | | |
| MW-2 | 07 | | 1318 | | | | | | | | | | | | | | |
| MW-1 | 08 | | 1353 | | | | | | | | | | | | | | |
| MW-9 | 09 | | 1430 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

Samples received at 3 °C

Samples received at 3 °C

| SIGNATURE | PRINT NAME | COMPANY | DATE | TIME |
|---|---|---|---|---|
| Relinquished by: | Joe Sherrod | EPI | 9/6/17 | 1342 |
| Received by: | Rob | Fedex (SDC) | 6 Sep 17 | 1342 |
| Relinquished by: | | | | |
| Received by: | Nhan Pham | FEBI | 9/6/17 | 1600 |

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

# Attachment D
# Survey Report

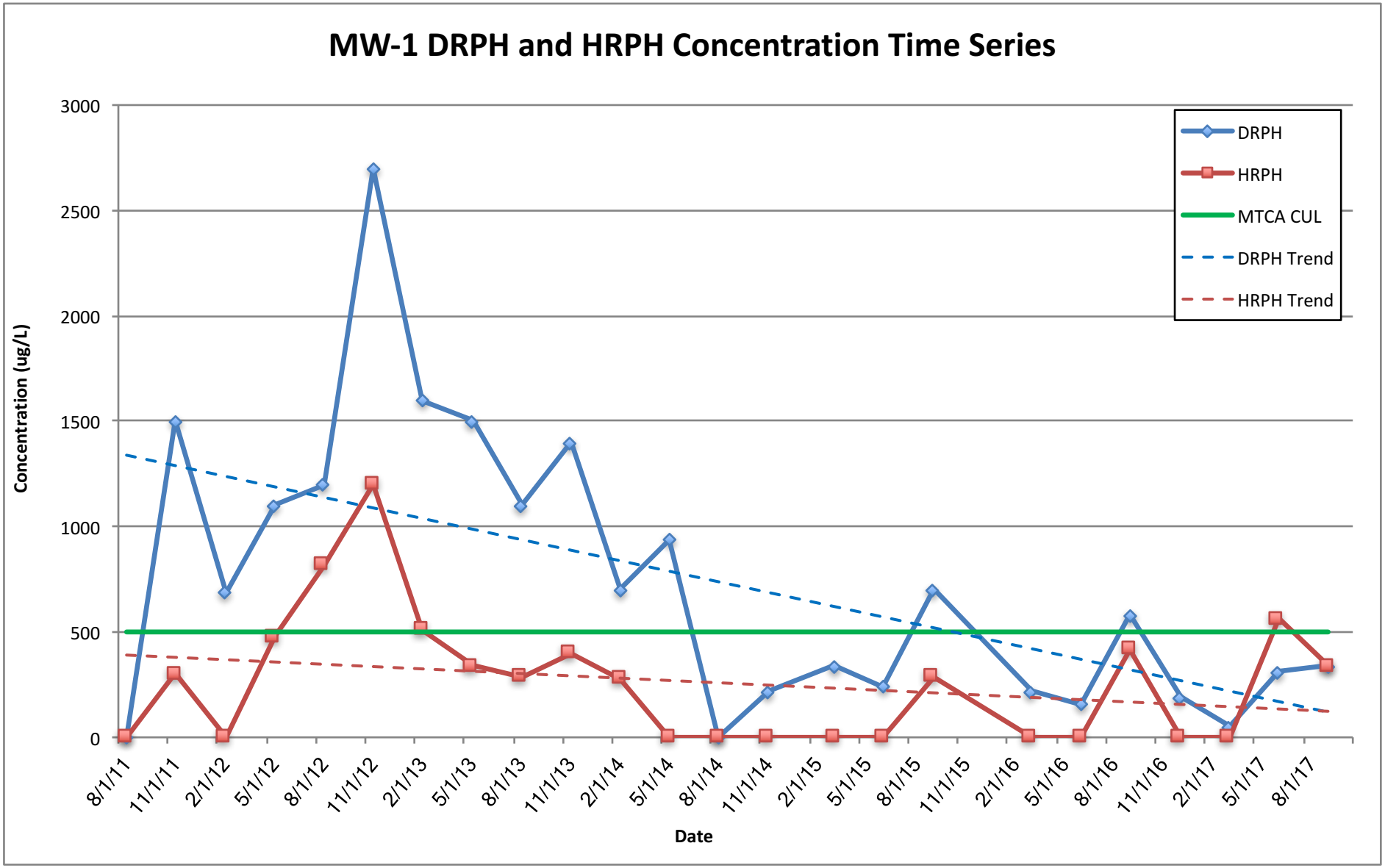
**Project Name** EPI Estes West Express Facility
**Site Address** 2102 West Valley Highway North
**City and State** Auburn, Washington

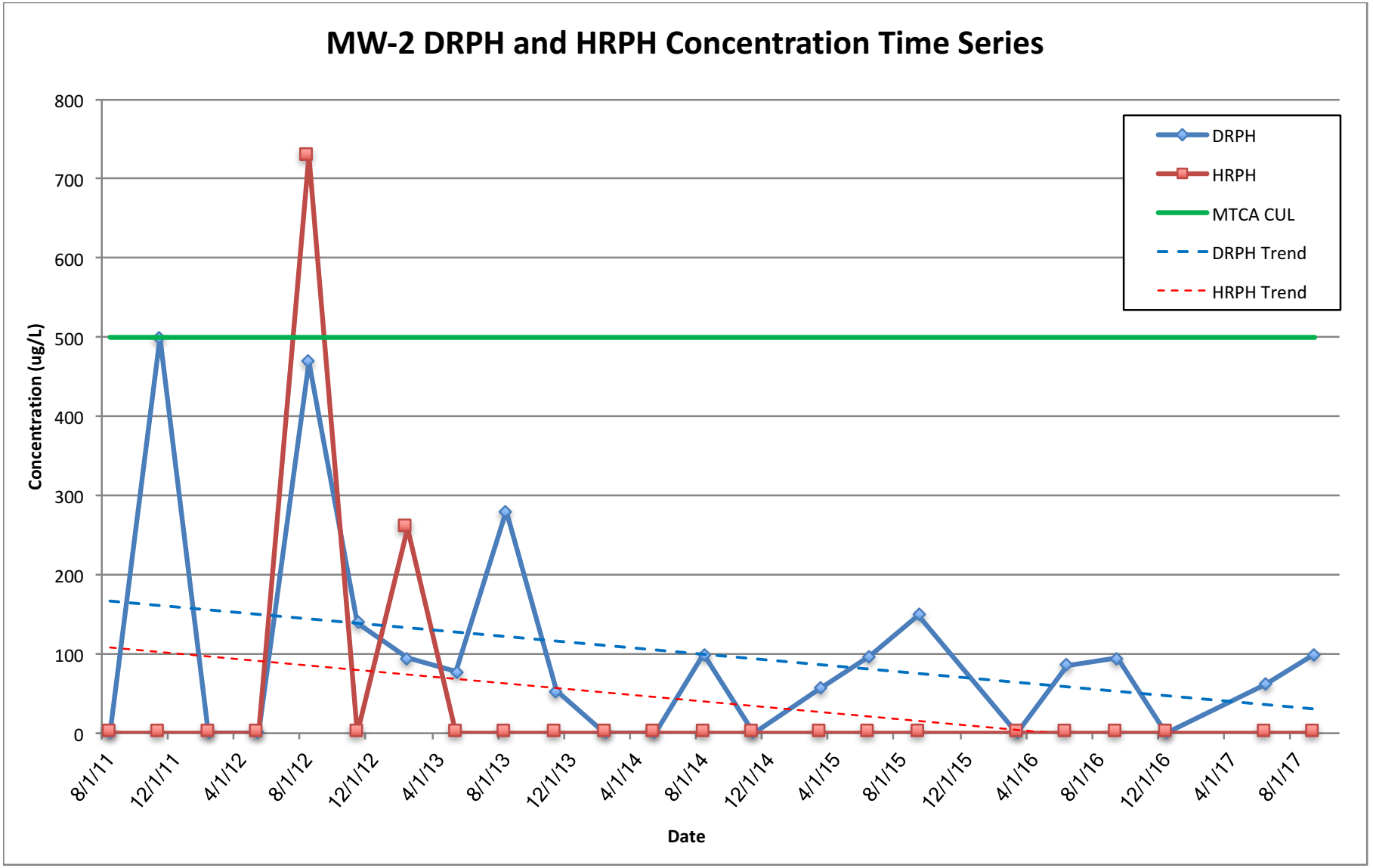
**EPI Project No.** 61901.1
**PACE Project No.** 17459.10

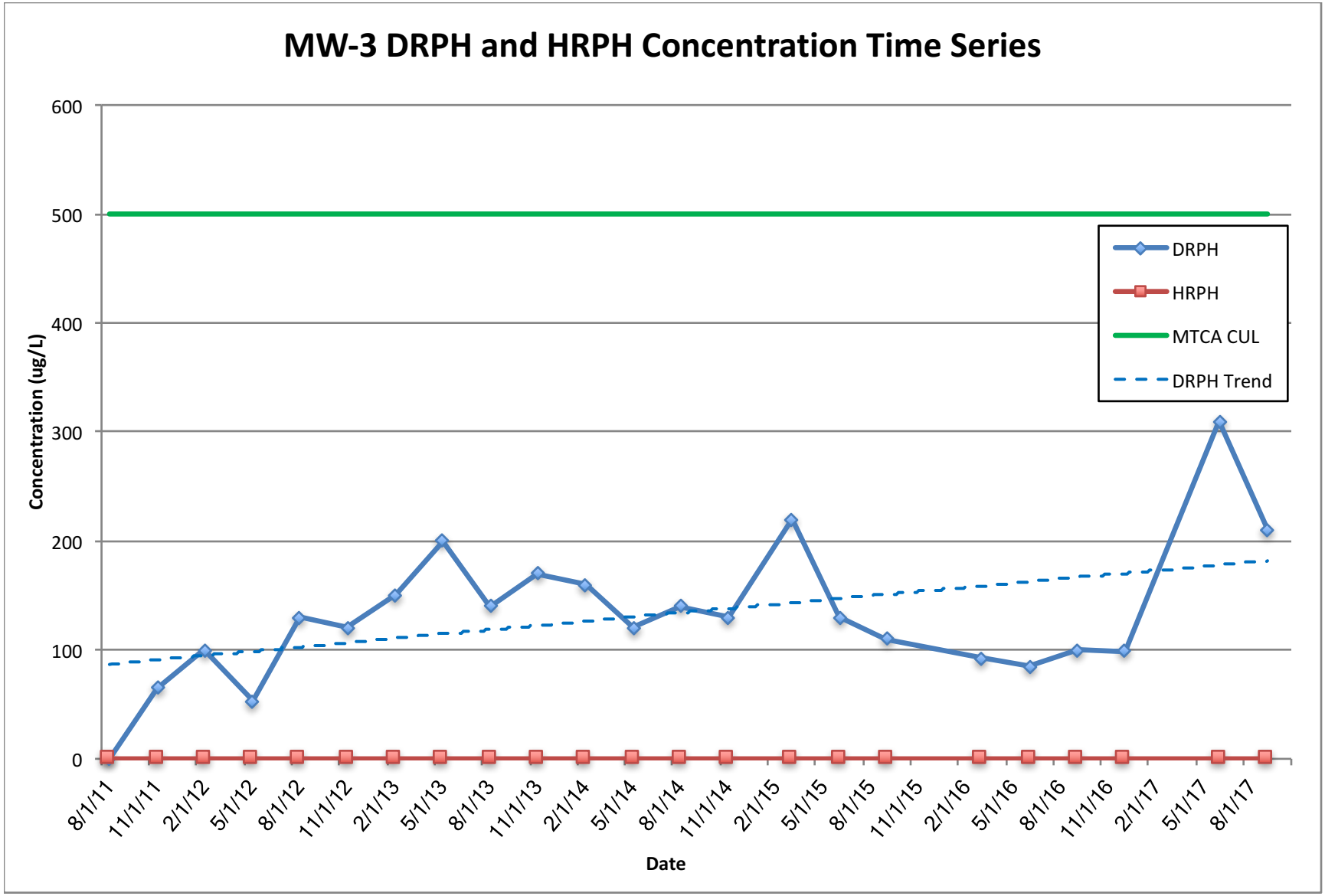
Horizontal Datum: NAD 83 (Washington State Plane, North Zone)
Vertical Datum: N.A.V.D. 88
Units: US survey feet

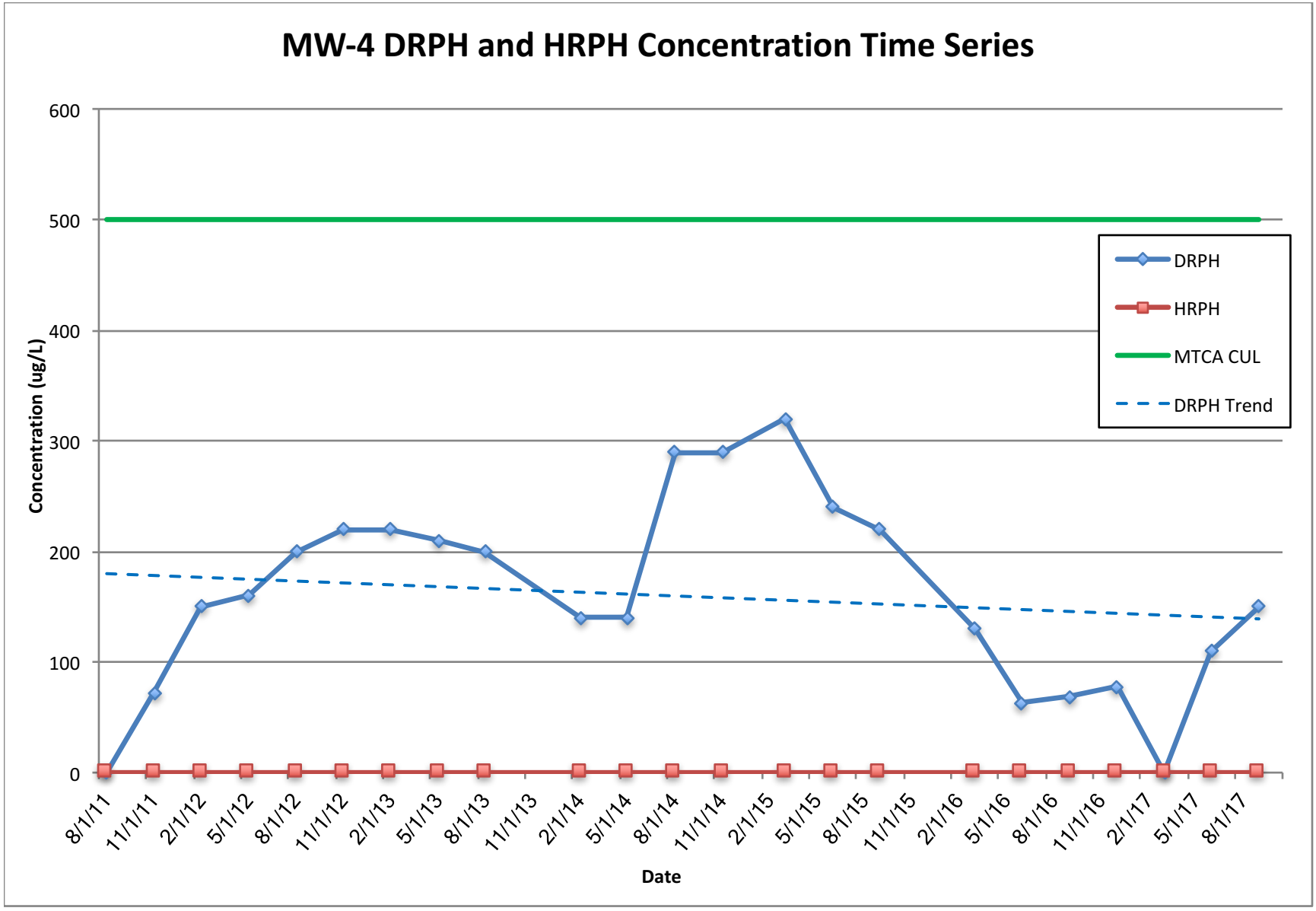
| Name | Northing | Easting | Top of Casing Elevation | Ground Surface Elevation |
|---|---|---|---|---|
| **Wells** | | | | |
| MW-1 | 122731.86 | 1289378.21 | 60.77 | 61.11 |
| MW-2 | 122745.70 | 1289442.90 | 60.85 | 61.29 |
| MW-3 | 122710.55 | 1289491.19 | 60.80 | 61.10 |
| MW-4 | 122628.15 | 1289476.76 | 60.93 | 61.25 |
| MW-5 | 122624.34 | 1289400.52 | 60.90 | 61.23 |
| MW-6 | 122580.81 | 1289477.11 | 60.76 | 61.11 |
| MW-7 | 122555.45 | 1289531.05 | 59.87 | 60.44 |
| MW-8 | 122598.09 | 1289587.73 | 59.70 | 60.19 |
| MW-9 | 122730.53 | 1289393.94 | 60.91 | 61.25 |
| **Catch Basins** | | | | |
| CB1 | 122705.72 | 1289333.39 | NA | 59.64 |
| CB2 | 122689.10 | 1289590.86 | NA | 59.67 |
| CB3 | 122545.78 | 1289588.95 | NA | 59.58 |
| CB4 | 122549.50 | 1289442.27 | NA | 59.60 |
| CB5 | 122586.68 | 1289331.15 | NA | 59.24 |
| **Air Injectiion Wells** | | | | |
| AI-1 | 122750.23 | 1289394.63 | NA | 61.2 |
| AI-2 | 122739.35 | 1289365.85 | NA | 60.7 |
| AI-3 | 122718.75 | 1289373.85 | NA | 61.0 |
| AI-4 | 122638.52 | 1289465.80 | NA | 61.4 |
| AI-5 | 122611.66 | 1289464.78 | NA | 61.0 |
| AI-6R | 122583.46 | 1289462.46 | NA | 61.2 |
| **Boreholes** | | | | |
| BH1 | 122606.78 | 1289487.99 | NA | 61.2 |
| BH2 | 122595.65 | 1289487.88 | NA | 61.1 |

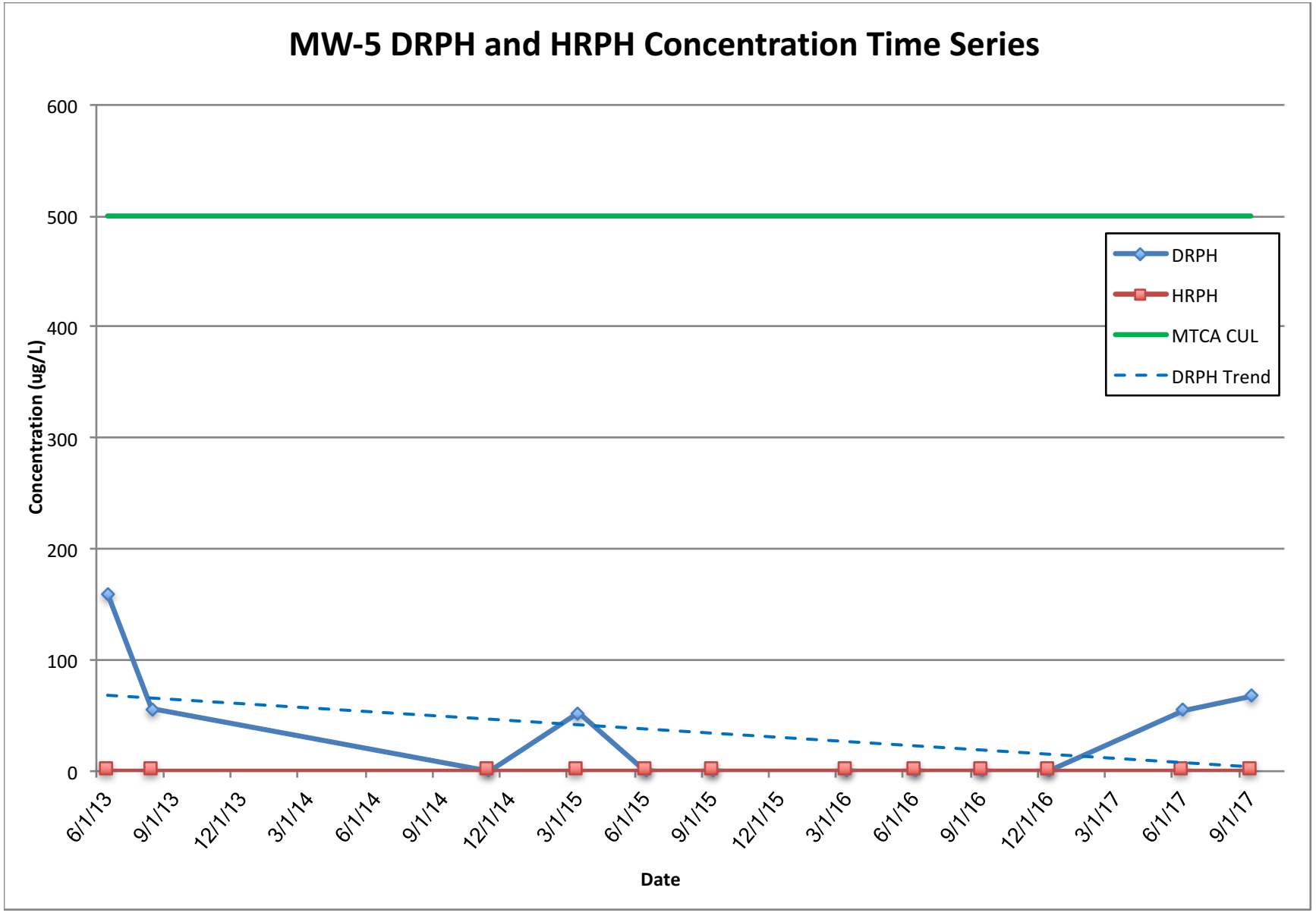
# Attachment E
# Time Series Plots

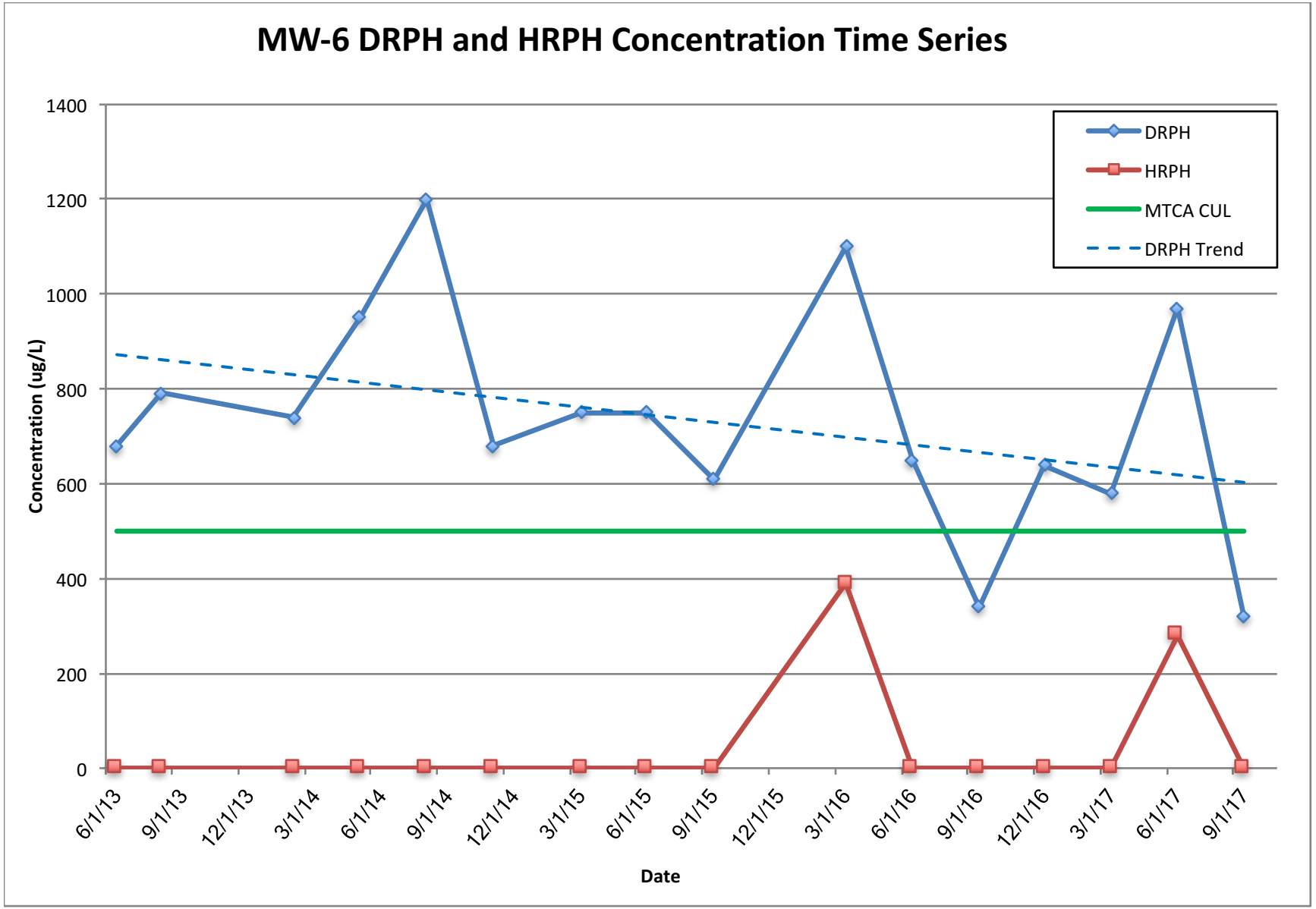

MW-1 DRPH and HRPH Concentration Time Series
Concentration (ug/L)
3000
2500
2000
1500
1000
500
0
8/1/11
11/1/11
2/1/12
5/1/12
8/1/12
11/1/12
2/1/13
5/1/13
8/1/13
11/1/13
2/1/14
5/1/14
8/1/14
11/1/14
2/1/15
5/1/15
8/1/15
11/1/15
2/1/16
5/1/16
8/1/16
11/1/16
2/1/17
5/1/17
8/1/17
Date
DRPH
HRPH
MTCA CUL
DRPH Trend
HRPH Trend

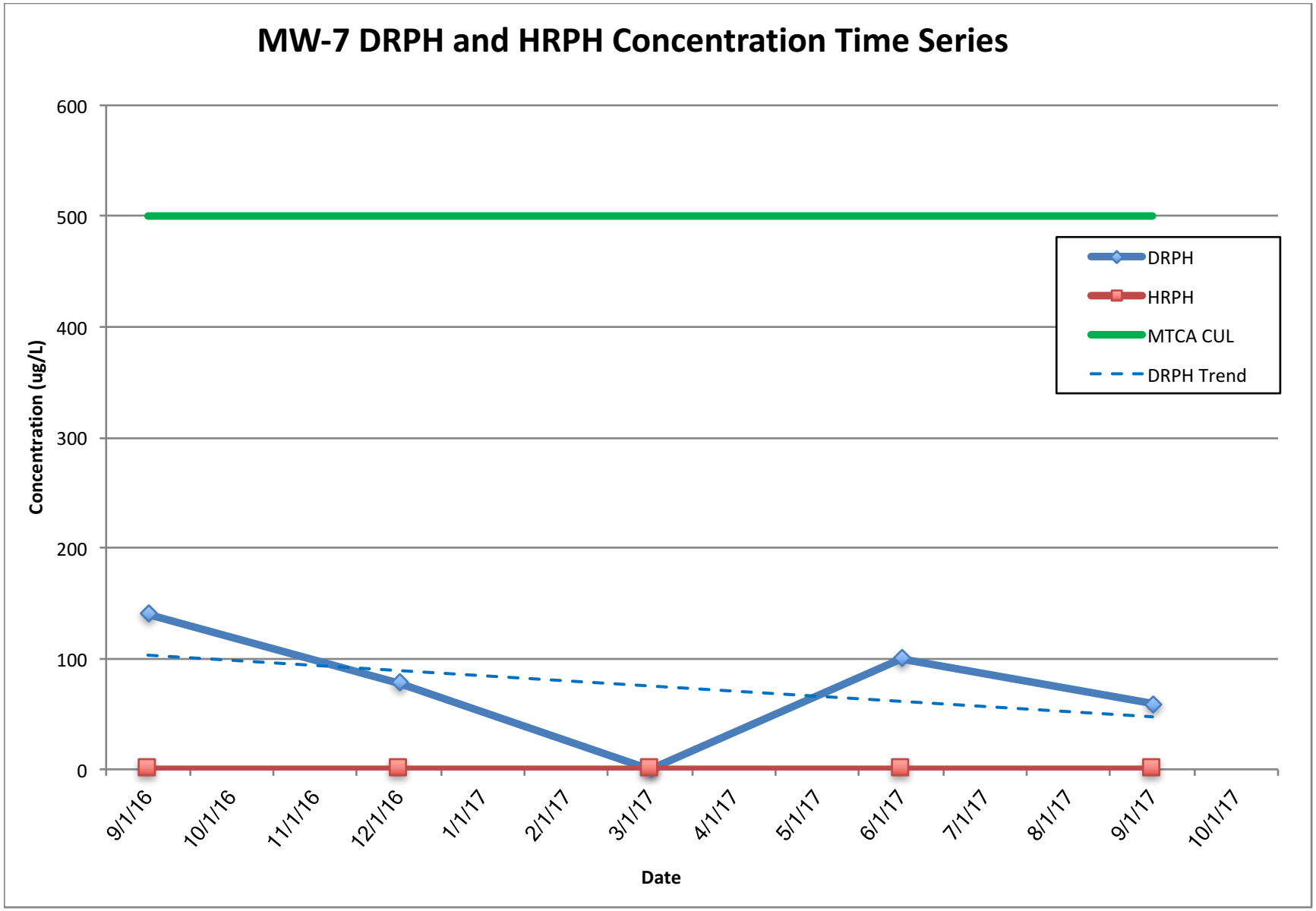

MW-2 DRPH and HRPH Concentration Time Series
Concentration (ug/L)
800
700
600
500
400
300
200
100
0
8/1/11
12/1/11
4/1/12
8/1/12
12/1/12
4/1/13
8/1/13
12/1/13
4/1/14
8/1/14
12/1/14
4/1/15
8/1/15
12/1/15
4/1/16
8/1/16
12/1/16
4/1/17
8/1/17
Date
DRPH
HRPH
MTCA CUL
DRPH Trend
HRPH Trend

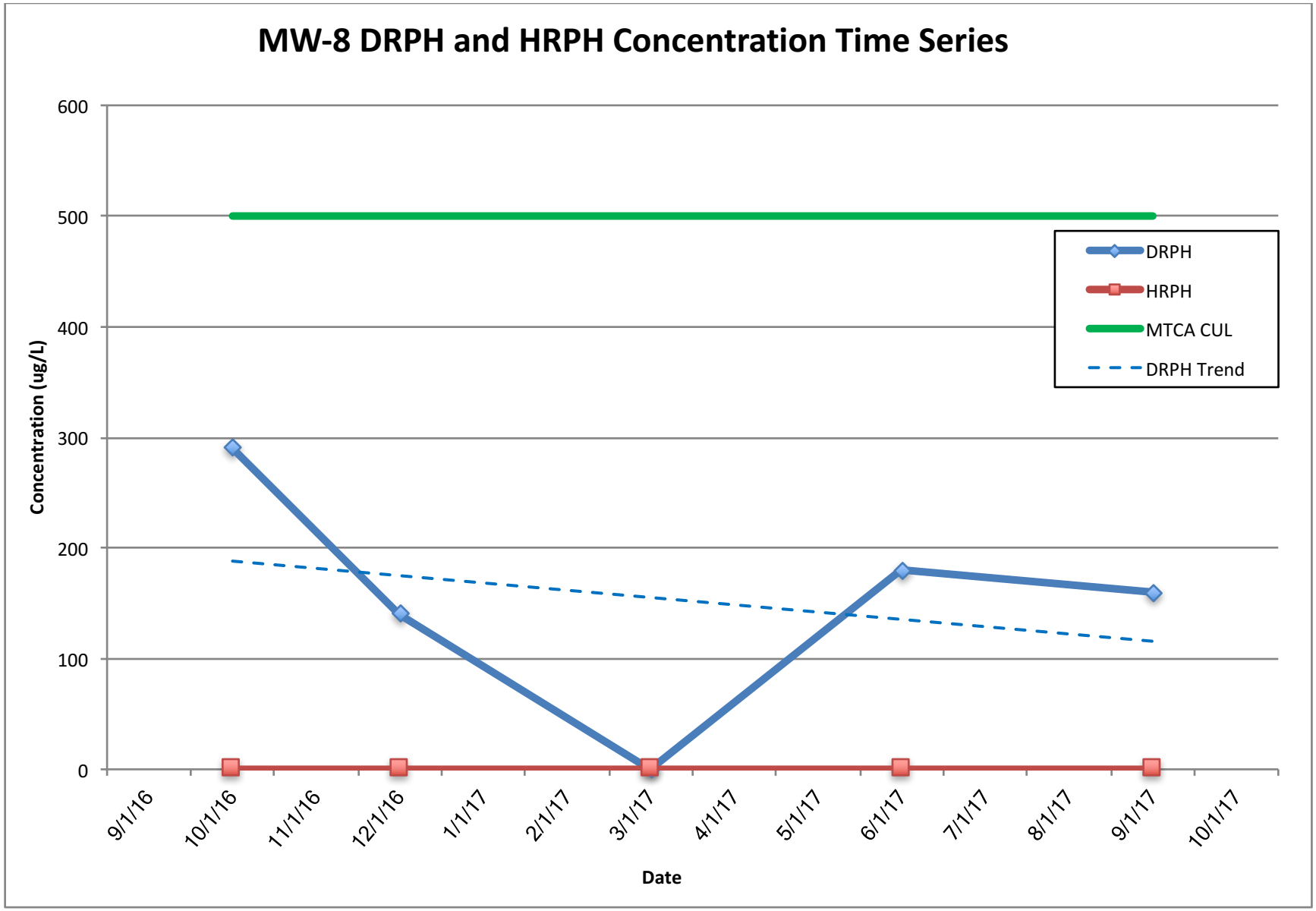

MW-3 DRPH and HRPH Concentration Time Series
600
500
400
300
200
100
0
Concentration (ug/L)
DRPH
HRPH
MTCA CUL
DRPH Trend
8/1/11
11/1/11
2/1/12
5/1/12
8/1/12
11/1/12
2/1/13
5/1/13
8/1/13
11/1/13
2/1/14
5/1/14
8/1/14
11/1/14
2/1/15
5/1/15
8/1/15
11/1/15
2/1/16
5/1/16
8/1/16
11/1/16
2/1/17
5/1/17
8/1/17
Date


MW-4 DRPH and HRPH Concentration Time Series
600
500
400
300
200
100
0
Concentration (ug/L)
DRPH
HRPH
MTCA CUL
DRPH Trend
8/1/11
11/1/11
2/1/12
5/1/12
8/1/12
11/1/12
2/1/13
5/1/13
8/1/13
11/1/13
2/1/14
5/1/14
8/1/14
11/1/14
2/1/15
5/1/15
8/1/15
11/1/15
2/1/16
5/1/16
8/1/16
11/1/16
2/1/17
5/1/17
8/1/17
Date


MW-5 DRPH and HRPH Concentration Time Series
600
500
400
300
200
100
0
Concentration (ug/L)
DRPH
HRPH
MTCA CUL
DRPH Trend
6/1/13
9/1/13
12/1/13
3/1/14
6/1/14
9/1/14
12/1/14
3/1/15
6/1/15
9/1/15
12/1/15
3/1/16
6/1/16
9/1/16
12/1/16
3/1/17
6/1/17
9/1/17
Date


MW-6 DRPH and HRPH Concentration Time Series
Concentration (ug/L)
1400
1200
1000
800
600
400
200
0
6/1/13
9/1/13
12/1/13
3/1/14
6/1/14
9/1/14
12/1/14
3/1/15
6/1/15
9/1/15
12/1/15
3/1/16
6/1/16
9/1/16
12/1/16
3/1/17
6/1/17
9/1/17
Date
DRPH
HRPH
MTCA CUL
DRPH Trend


MW-7 DRPH and HRPH Concentration Time Series
600
500
400
300
200
100
0
Concentration (ug/L)
DRPH
HRPH
MTCA CUL
DRPH Trend
9/1/16
10/1/16
11/1/16
12/1/16
1/1/17
2/1/17
3/1/17
4/1/17
5/1/17
6/1/17
7/1/17
8/1/17
9/1/17
10/1/17
Date


MW-8 DRPH and HRPH Concentration Time Series
600
500
400
300
200
100
0
Concentration (ug/L)
DRPH
HRPH
MTCA CUL
DRPH Trend
9/1/16
10/1/16
11/1/16
12/1/16
1/1/17
2/1/17
3/1/17
4/1/17
5/1/17
6/1/17
7/1/17
8/1/17
9/1/17
10/1/17
Date