May 3, 2021

Elton Lee
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Re: Groundwater Treatment Injection Pilot Study Results and Updated Monitored Natural Attenuation Analysis
LMI – West Seattle Holdings, LLC, PPCD No. 13-2-27556-2
Facility ID #39196282, Cleanup ID #6015
Project No. 160328

Dear Mr. Lee:

Aspect Consulting, LLC (Aspect), on behalf of LMI – West Seattle Holdings, LLC (LMI), prepared this letter summarizing the results of a groundwater pilot test treatment program (pilot test) completed to determine the suitability of using existing wells for *in situ* chemical oxidation (ISCO) injections at the SKS Shell Station Site located at 3901 SW Alaska Street in Seattle, Washington (the Site). Remedial work at the Site is being completed under Prospective Purchaser Consent Decree (PPCD) #13-2-27556-2, entered on July 29, 2013.

To date, remedial actions include a remedial excavation that was completed concurrently with construction of the Whittaker Apartments building in 2015 and post-excavation compliance groundwater monitoring. Compliance groundwater monitoring continues to be completed quarterly at the Site in accordance with the PPCD and Washington Administrative Code (WAC) Chapter 173-340. As of the most recent quarterly monitoring event (December 2020), gasoline- and diesel-range petroleum hydrocarbons (TPH) and benzene continue to be present in groundwater beneath the Fauntleroy Way SW right-of-way (ROW) at concentrations that fluctuate above and below the Washington State Model Toxics Control Act (MTCA) Method A cleanup levels. This fluctuation of hydrocarbon concentrations is most notable in the large-diameter dewatering wells that were installed to facilitate dewatering during remedial excavation and repurposed as compliance monitoring wells upon completion of dewatering activities.

A contingency ISCO injection program was outlined in the Cleanup Action Plan[1] (CAP) and Cleanup Action Report[2] (CAR) as an additional component of the overall remedial action to be considered after a minimum of eight post-excavation quarterly monitoring events showed persistent concentrations of contaminants of concern (COCs). The study described in this letter was conducted to evaluate the implementability and likely effectiveness of pursuing an ISCO injection

[1] SoundEarth Strategies, Inc. (SoundEarth), 2014, Cleanup Action Plan, SKS Shell Property, 3901 Southwest Alaska Street, Seattle, Washington, June 16, 2014.

[2] SoundEarth Strategies, Inc. (SoundEarth), 2016, Cleanup Action Report, SKS Shell Property, 3901 Southwest Alaska Street, Seattle, Washington, October 20, 2016.

program, as originally proposed in the CAP and CAR, based on the current Site conditions and monitoring data collected to date.

The pilot test described in this letter was conducted in accordance with the *Preliminary Monitored Natural Attenuation Analysis and Groundwater Treatment Injections Pilot Study Work Plan* (Work Plan) dated October 27, 2020, which included a preliminary analysis of natural attenuation at the Site. The Work Plan was approved by the Washington State Department of Ecology (Ecology) on October 13, 2020, and the pilot test was implemented January 5 through February 9, 2021.

The results of the pilot study demonstrated that injections utilizing the existing large-diameter wells result in injection fluid entering the Whittaker building drainage system. This was demonstrated during the pilot study by the appearance of dye from RW05 injections in the subgrade building sump within 48 hours of the completion of the injection program, and persistence in the sump at detectable concentrations for at least 28 days post-injections. In accordance with the implementability evaluation in the approved Work Plan, the presence of dye in the sump disqualifies the injection well system from use for ISCO injections.

The Monitored Natural Attenuation Analysis (MNAA) provided in the Work Plan was reevaluated and expanded because of the observations made during the pilot study. We reevaluated 20 quarters of geochemical parameters collected during compliance groundwater monitoring. The updated MNAA summarized in this report takes into account a possibility that the large diameter wells are acting as a "sink" for residual hydrocarbons and may not be representative of groundwater quality at this Site.

This letter details the scope and results of the pilot test, an updated natural attenuation analysis, and recommended next steps for remedial action at the Site.

Background

COCs for the cleanup action—gasoline- , diesel-, and oil-range total petroleum hydrocarbons (TPH), and benzene, toluene, ethylbenzene, and total xylenes (BTEX)—have been persistently observed at concentrations greater than MTCA cleanup levels during particular seasons in three of the 11 wells that have been used for compliance groundwater monitoring (RW03, RW04, and MW104; Figure 1). Concentrations of gasoline- and diesel-range TPH and benzene were detected above the MTCA cleanup levels in soil samples obtained from the limits of the construction and remedial excavation along the property boundary at Fauntleroy Way SW, suggesting that contaminated soil remains below the ROW (SoundEarth, 2014 and 2016).

The groundwater flow directions at the Site are variable, ranging from west to south during past quarterly monitoring events; groundwater elevation is generally lower than prior to construction of the Whittaker building. The local variability in groundwater flow direction and elevation is attributed to dewatering effects of the subslab building drainage system and sump below the northeast corner of the Whittaker building (Figure 1).

Localized CSM for Fauntleroy Way ROW Area

Overall Site groundwater quality has improved across all Site compliance wells; however, concentrations of gasoline- and diesel-range hydrocarbons in RW04 increase during the wet season (aka, Q1 and Q4) monitoring events (Table 1 and Figure 6). Monitoring data reviewed collectively for post-construction conditions indicate that construction of the Whittaker building has resulted in

a change of groundwater conditions as described in the following localized conceptual site model (CSM) pertaining to groundwater impacts in the vicinity of RW04.

The CSM for Site conditions prior to construction of the Whittaker building indicated that COCs from the SKS Shell Station had migrated with groundwater toward the east to northeast, impacting soil and groundwater quality in the Fauntleroy Way SW ROW. Groundwater flow direction prior to construction was consistently from the Site to the northeast (into the ROW). Since the initiation of the stormwater system in the Whittaker building, which includes sump dewatering and footing drains, localized groundwater flow has been reversed in the vicinity of RW04 and has since been consistently toward the west-southwest. The apparent rebound in COCs concentrations at RW04 was observed after 11 quarters of consistent reversed groundwater flow to the west-southwest.

Groundwater Treatment Injections Pilot Study

Aspect's proposed pilot study for ISCO injections (the pilot study) was developed to evaluate the implementability and potential effectiveness of ISCO injections at existing large diameter wells located in the Fauntleroy Way SW sidewalk (Figure 1) to address residual concentrations of COCs in groundwater. The pilot study was designed with the following three objectives:

1. ***Evaluate Injection Area of Influence, Volume of Injection Solution, and Surrounding Geologic Formation:*** This objective was evaluated based on the geology and each wells' ability to accept planned injection volumes; to understand potential migration to the building's subslab drainage system; and to evaluate substantive changes, if any, in water level elevation and/or detectable tracer dye in nearby wells.
2. ***Evaluate Injection Solution Interaction with Whittaker Building Drainage System:*** This objective was to simulate whether a future injected ISCO solution would migrate to the Whittaker building drainage system, potentially resulting in releases of oxidants into the stormwater system, or to migrate so quickly to the stormwater system to have little resonance time and effect in treating contaminated groundwater.
3. ***Evaluate Injection Solution Chemical Interaction with Vapor Barrier:*** This analysis was to be completed if the pilot study determined that ISCO is implementable at the Site. Based on the negative study results, this task will not be completed.

The pilot study was conducted in accordance with Aspect's Work Plan following approval by Ecology on October 13, 2020. The following sections present a summary of the field activities and observations, deviations from the Work Plan, and pilot study results.

Deviations from the Work Plan

The pilot study was initially planned at RW01, RW03, and RW04; upon set up, however, dewatering equipment was discovered in RW01 that could not be removed to allow for injections to occur. Well RW01 was originally chosen due to its close proximity to the footing drains and its position directly adjacent to MW104, which contained intermittent concentrations of Site COCs above MTCA Method A cleanup levels until Fourth Quarter 2019. To fulfill the objectives of the injection pilot study, RW05 was substituted for RW01 in the pilot study as the next-closest injection well to this area.

Two field monitoring points were added to the monitoring plan. Additional water level and fluorescence measurements were collected at wells MW109 and MW110, which lie upgradient

from the stormwater sump and are installed to depths of approximately elevations 235 and 236 feet NAVD88,[3] respectively, through the foundation slab of the Whittaker building, corresponding to approximately 35 feet below ground surface (bgs) of Fauntleroy Way SW. A pressure transducer was used for water level measurements in MW110, and manual water level elevations were collected at MW109 due to its smaller diameter.

The work plan specified that the field fluorometer used would be a Cyclops 7F Optical Dye Tracer. Upon inspection prior to field mobilization, the rental equipment was found to be malfunctioning, so a Turner Designs Aquafluor handheld fluorometer was used in its place.

Field Activities

Clean Water Injections

The pilot study was completed between January 5 and February 9, 2021. Active injections were completed between January 5 and 12, 2021, and follow-up sampling was completed following injections on January 14, 2021 (48 hours after completion), January 19, 2021 (7 days after completion), and February 9, 2021 (28 days after completion).

Gravity-fed injections of approximately 1,100 gallons per well of potable water that followed a slug of fluorescent dye were completed at wells RW03, RW04, and RW05 (Figure 2). Each injection took approximately 9 hours over the course of 2 days to complete with flow rates ranging between 2 and 3 gallons per minute (gpm). The flow rate at wells RW03 and RW04 were maintained between 2 and 2.5 gpm, in accordance with the Work Plan. At RW05, flow rates were increased during the second half of the injection to determine whether the formation could maintain injection rates above those used at the first two wells, while keeping the water level in the injection well below 5 feet bgs. The maximum steady flow rate that could be maintained during injections at RW05 was approximately 3 gpm, which was maintained for approximately 2.5 hours at the end of the injection period.

A unique fluorescent dye was used at each well in the pilot study, each with a unique visible color to allow for interpretation of the source of dye observed at monitoring points. The amount of the dye used at each well was determined in concert with Ozark Underground Laboratories, an analytical laboratory that specializes in tracer dye studies and detection. Based on the lithology and the distance of each well from the Whittaker building footing drain and stormwater sump, Ozark recommended dye quantities for each well (see Table A, below), and provided each dye in liquid form to be applied to the well as a slug.

Table A. Dye Slug Weight and Concentration for Injection Wells

Injection Well	Dye Used	Dye Weight Applied	Average Dye Concentration in 1,100-Gallon Injection Volume (ppb[1])
RW03	Rhodamine WT	200 grams	48,000
RW04	Fluorescein	50 grams	12,000
RW05	Eosine	100 grams	24,000

Notes: [1] ppb = parts per billion

[3] North American Vertical Datum of 1988

The dye used at RW03, rhodamine WT, was the least persistent,[4] so was applied to the well closest to the stormwater sump. The two other dyes used were very conservative—fluorescein slightly more so than eosine—and so were applied in smaller slugs to their respective wells.

Injection Field Monitoring

On-Site monitoring activities during the pilot study injections included intervals of fluorescence field testing, water level measurements, turbidity measurements, and visual screening of water in the Whittaker building footing drains and sump, and in wells adjoining each injection well.

Fluorescence monitoring was conducted using a field fluorometer with separate calibration for each dye.[5] Water levels were recorded using an electronic water level indicator tape to the nearest 0.01 of a foot. Well transducers recorded water level elevations to 0.01 of a foot and were compensated for barometric pressure, as measured in a free-hanging transducer in a vented well. Turbidity was measured using a Hach handheld turbidimeter. Visual screening of water was completed by filling a clear 4-ounce glass jar using a peristaltic pump with dedicated, disposable tubing. All reusable sampling equipment was decontaminated between wells and drainage system monitoring points.

Water level, turbidity, and field fluorescence measurements were collected and recorded at the stormwater sump prior to the initiation of each injection and then on 15- to 30-minute intervals once the injection had begun. Visual observation of water in the sump was completed every 10 minutes. At each injection well, transducers were installed in adjacent wells to collect continuous water level data, and the water level in the injection well was monitored to ensure that it stayed below 5 feet bgs at all times during injection. During injections at RW04 and RW05, adjacent wells were also measured for fluorescence to determine whether the radius of influence of the injected fluid extended to these adjacent wells situated approximately 12 to 15 feet away.

Injection Fluid Sampling and Analysis

Carbon samplers were placed in the stormwater sump to capture concentrations of dye that were not detectable using visual or field fluorescent monitoring. Carbon samplers were weighted and secured below the minimum water depth in the stormwater sump[6] and left in place for the sampling duration, as follows:

- ***Prior to injections*.** A carbon sampler was placed in the stormwater sump in the days leading up to the study (December 29, 2020, to January 5, 2021) to detect any background concentrations of the dyes used in the study and account for any other products in the system that may show up as interference in monitoring equipment (e.g., common everyday products, including antifreeze, would show up in monitoring equipment in a similar pattern to fluorescein dye).

[4] For tracer dyes, "persistent" refers to a dye's stability and tendency to sorb to soil particles. The most persistent dyes are stable and do not sorb.

[5] Calibration standards were developed based on each dye's respective concentration at which it is just visible to the naked eye, as outlined in the Work Plan.

[6] The sump was observed to dewater when the level in the sump reaches approximately elevation 237 feet NAVD88.

- ***During injections*.** A new carbon sampler was placed in the stormwater sump during each injection and replaced when each new subsequent injection began.
- ***Following completion of injections*.** Once injections were completed, carbon samplers were placed in the sump to monitor each of the post-injection periods: 0 to 48 hours, 48 hours to 7 days, and 7 days to 28 days after injections.

Following collection, carbon samplers were shipped to Ozark Underground Laboratory, Inc, located in Protem, Missouri, for analysis of rhodamine WT, fluorescein, and eosine.

Groundwater grab samples were collected during retrieval of each post-injection carbon sampler to help refine arrival times and establish discrete concentrations for comparison to the time-averaged carbon sampler concentrations. Grab samples were collected in laboratory-provided bottleware using a peristaltic pump with dedicated disposable tubing and shipped to Ozark Underground Laboratory, Inc, located in Protem, Missouri, for analysis of rhodamine WT, fluorescein, and eosine.

Results

Field Fluorescence Monitoring

At the sump, there were no visual detections of fluorescence (of any of the three dyes) and no variations in field fluorometer background measurements suggesting the presence of injection fluid at any point in the pilot study; however, concentrations of dye that are below the visible concentration were detected by the carbon samplers (discussed further below). The sump records, showing field fluorescence, turbidity, and sump water levels, are included as Appendix B.

Beneath the Whittaker building garage, fluorescence was detected at MW110 during two of the three injections (RW03 and RW05) at concentrations above background and was not detected in MW109. Concentrations detected in MW110 during injections were low relative to the injected concentration, suggesting that the fluorescence detected in MW110 was either representative of the front or upper portion of the dye plume. Tables 2 through 4 show field fluorescence measurements at MW109 and MW110.

At wells adjacent to RW04 and RW05, fluorescence was not detected significantly above background concentrations or visually observed during each wells' respective injections, indicating that the injection radius of influence was less than 12 to 14 feet (the approximate distance between these wells; Table 5).

Sampling Results

Carbon sampling and grab sample results are presented in Table 6. The laboratory reports from sump sampling are included in Appendix C.

In carbon samplers deployed prior to and during injections, dye concentrations were not detected above laboratory reporting limits. This includes the background sampler, placed in the sump during the week prior to injections, and the three samplers that were in the sump during each of the three injections.

In all post-injection carbon samplers, concentrations of eosine, the dye used at RW05 (Table 5), were detected above laboratory detection limits. The time-averaged concentrations of eosine in the sampler retrieved at 7 days post-injection (278 ppb) is higher than the time-averaged concentration

detected in the sampler retrieved at 48 hours post-injection (61 ppb) and at 28 days post-injection (59 ppb). This suggests that the front edge of the dye plume from RW05 arrived in the first 48 hours after injections were completed and continued to migrate toward the sump, with the most concentrated portion of the plume arriving during days 3 through 7.

Grab sample results corroborate the presence of eosine in the sump, as indicated by the carbon sampler results. Grab samples showed the highest eosine concentration at 28 days post-injections (31.5 ppb) and the lowest concentration at 7 days post-injection (18.4 ppb); this deviation from the pattern exhibited by the carbon samplers is likely due to shorter-term (daily or hourly) variability of sump water dilution from stormwater entering the system during rain events, but supports the conclusion that there was ongoing source of tracer dye to the stormwater drainage system throughout the monitoring period.

Water Level Monitoring

Water level monitoring in the sump did not indicate evidence of injection influence. Water levels in the sump varied depending on the amount of precipitation occurring at any given time during the pilot study (precipitation measured during the pilot study is shown on Figure 3). Observation and monitoring at the sump indicated that it dewaters when the water elevation in the sump reaches approximately elevation 237 feet NAVD88, about 35 feet bgs at Fauntleroy Way SW.

During injections, water levels in wells adjacent to the injection wells showed a relatively uniform pattern: water levels would increase by approximately 1 foot during active injections, then would return to pre-injection levels within 24 hours. This pattern is shown graphically on Figure 3 for water levels at RW04, where the effect of injections at both RW03 and RW05 on water levels was observed. These changes in water levels indicate that localized mounding occurred during injections.

Water level elevations in the two wells in the parking garage, MW109 and MW110, remained generally unchanged during injections, suggesting that formation mounding caused by injections did not affect groundwater elevation in areas beneath the parking garage.

Pilot Study Conclusions

Based on the results of the pilot study presented above, Aspect concludes the following with respect to the pilot study objectives outlined in the Work Plan:

1. ***Evaluate Injection Area of Influence, Volume of Injection Solution, and Surrounding Formation:*** The pilot study determined that the minimum injection flow rates (2 gpm) could be maintained over the course of the study, and that the formation was capable of accepting the full injection volume over a 2-day injection time period. The maximum injection flow rate was 3 gpm. The injection area of influence was determined to be less than 12 feet from the injection wells.

2. ***Evaluate Injection Solution Interaction with Whittaker Building Drainage System:*** The pilot study determined that the minimum flow rate could not be maintained without breakthrough to the Whittaker building drainage system (as evidenced by the presence of dye detected in the sump within 48 hours of the injection at RW05) and remained in the system until at least 28 days thereafter. During a theoretical full scale ISCO program at this well network, injections could result in oxidants entering the Whittaker building drainage

system and then being discharged to the municipal system. This outcome was considered an offramp for the injections pilot program, as injectate would not be contained within the groundwater system during an ISCO injection program. In addition, migration of injected solution via preferential pathways to the drainage system would reduce the amount of time that oxidant would be present in groundwater thereby significantly limiting the efficacy of any injection program.

3. ***Evaluate Injection Solution Chemical Interaction with Vapor Barrier:*** During the pilot study, the level of injected solution was below the vapor barrier elevation, based on water level measurements at surrounding wells. Per the Work Plan, this objective was not further evaluated because of short circuiting to the drainage system.

The relatively rapid migration of dye from RW05 to the stormwater sump indicates preferential flow pathways between the injection wells and the sump. Based on the geologic cross section (Figure 2), it appears that water levels during injection are above the native-fill contact and that permeable fill beneath the building foundation likely acts as a conduit to any injection solution.

Monitored Natural Attenuation Analysis

An MNAA has been completed to evaluate the nature and effect of naturally occurring biodegradation on plume stability of petroleum-contaminated groundwater at the Site and to support the pilot study results evaluation. The analysis conducted for this study expands on the preliminary MNAA presented in the Work Plan by incorporating supplemental geochemical data collected during Fourth Quarter 2020. The following section presents the refined findings of the updated MNAA, highlighting key findings relied upon for evaluation of the pilot study results presented in subsequent sections of this letter.

This analysis was conducted in accordance with Ecology's *Guidance for Remediation of Petroleum-Contaminated Groundwater by Natural Attenuation* (Ecology, 2005a[7]), and includes consideration of multiple lines of evidence, including trends in the analytical data, statistical analysis of analytical data over time, and groundwater conditions as evidenced by field parameters and geochemical natural attenuation parameters. Each of these lines of evidence are described in the following sections.

Groundwater Data Evaluation

Chemical Analytical Data

The MNAA included evaluation of historical analytical data from a total of up to 11 compliance groundwater wells, collected over 20 quarterly monitoring events that have been completed at the Site since March 2016 (after remedial excavation was completed and the Whittaker building was constructed). Concentrations of COCs over the monitoring period were reviewed for evidence of trends and changes in the groundwater plume over time. Groundwater analytical results are summarized in Table 1.

Updated trend graphs for wells where concentrations of COCs remain are attached in Figures 4 through 6. These trend graphs show that fluctuations of water levels and COCs (gasoline- and

[7] Washington State Department of Ecology (Ecology), 2005a, Guidance on Remediation of Petroleum-Contaminated Ground Water by Natural Attenuation, Washington State Department of Ecology, Publication No. 05-09-091, July 2005.

diesel-range TPH) in groundwater over the monitoring period appear to be seasonally influenced and affected by changes in small-scale flow directions attributable to dewatering effects on the immediate Site area. Notably, concentrations of TPH in RW03, which are historically highest during the Fourth Quarter groundwater monitoring event, were below MTCA Method A cleanup levels during Fourth Quarter 2020 for the first time since compliance groundwater monitoring began. This result suggests that COC concentrations in RW03 are exhibiting less seasonal extremity and is potential evidence for natural attenuation.

Seasonal fluctuations in contaminant concentrations seem to be most pronounced and common in the larger-diameter wells (RW03 and RW04) with lesser fluctuations in the smaller-diameter monitoring well MW104—this is suspected to be associated with the difference in construction type and the former use of the larger-diameter wells for dewatering of contaminated groundwater. The larger-diameter wells RW01 to RW05 (including the wells used for injections during this study, RW03, RW04, and RW05) were originally constructed as part of the construction dewatering network and used to remove petroleum-contaminated groundwater from the excavation. After mass excavation, the dewatering equipment was removed and the wells were used for compliance groundwater monitoring. Adjacent well MW104 was originally constructed as a compliance groundwater monitoring well with standard construction. Immediately post-construction, MW104 contained concentrations of Site contaminants at similar levels to those detected in the RW wells but has since shown a consistent overall downward trend of Site COCs.

While the trendlines show an overall downward trend when evaluated collectively for the entire monitoring period, an exception is visible in RW04, which shows a slight expanding trend for both gasoline- and diesel-range TPH. This trend has been apparent since the First Quarter 2020 groundwater sampling event, when concentrations of COCs exceeded MTCA Method A cleanup levels for the first time since Fourth Quarter 2018. Average water elevations have been slowly dropping across the Site due to local dewatering, so the contact with remaining contamination in soil at RW04 is an unlikely source for the elevated concentrations recently present in RW04. As indicated above, the non-standard construction and past use of RW04 for dewatering of contaminated groundwater is likely affecting groundwater samples collected from the RW wells.

Statistical Evaluation of Plume Stability

In accordance with Ecology's guidance (Ecology, 2005a), the status of a groundwater plume was evaluated using nonparametric statistical testing to evaluate the relationship of data variability and overall trends, and to screen specific wells for statistically significant shrinking, stable, or expanding groundwater plume conditions. Plume stability was evaluated using the Mann-Kendall Trend Test (Gilbert, 1987[8]) and the Mann-Whitney U Trend Test (Mann and Whitney, 1947[9]). Each test was conducted using benzene and gasoline- and diesel-range TPH quarterly groundwater analytical data for wells RW03, RW04, and MW104, in which groundwater samples have shown detected concentrations of COCs above MTCA Method A cleanup levels over the full 20-quarter compliance monitoring period. Calculations for each test were conducted in general accordance with Ecology's guidance document (Ecology, 2005a) and the associated tool package (Ecology,

[8] Gilbert, R.O., 1987, Statistical Methods for Environmental Pollution Monitoring, John Wiley & Sons, February 1987.

[9] Mann, H.B. and Whitney, D.R., 1947, On a test of whether one of two random variables is stochastically larger than the other, Analysis of Mathematical Statistics, Vol. 18, March 1987.

2005b[10]). Worksheets showing the calculation parameters used and the results of each test are included as Appendix A. These analyses have been expanded from the preliminary MNAA to include the most recent quarters of groundwater monitoring data.

Statistical evaluation at MW104 is in agreement with the trend graphs shown in Figure 4, which show a generally downward trend for all COCs at MW104. Both statistical trend tests determined that the diesel-range TPH plume measured at MW104 is shrinking. Neither benzene nor gasoline-range TPH has been detected and diesel-range TPH has not exceeded MTCA Method A cleanup levels at MW104 in the last 5 quarters of compliance groundwater sampling. Despite some seasonal fluctuation in concentrations of diesel-range TPH, concentrations consistently remain below MTCA Method A cleanup levels in MW104.

RW03 remains the well with the highest concentrations of COCs in groundwater, as it has been historically. However, the results of the Mann-Kendall Trend Test indicate that the benzene and gasoline- and diesel-range TPH plumes at RW03 are shrinking, in agreement with the trend graphs presented in Figure 5. Results of the Mann-Whitney U Trend Test are undetermined for RW03, likely due to the smaller number of results used as inputs to the model (the Mann-Kendall Trend Test is completed using the 16 most recent groundwater sampling events, and the Mann-Whitney U Trend Test uses only 8, which may inadequately represent seasonal variability within the model).

Statistical analysis at RW04 during the preliminary MNAA determined that the plume stability was either undetermined or stable for benzene and gasoline- and diesel-range TPH. With the addition of two more quarters of data to the analysis at RW04, the statistical models suggest that the diesel-range TPH plume at RW04 is expanding (concentrations were above MTCA Method A cleanup levels in three of the last four quarters), and the gasoline-range TPH plume is either stable or expanding (concentrations were above MTCA Method A cleanup levels for the first time during compliance monitoring in the first two quarters of 2020).

Results of the statistical modeling and evaluation are inconsistent between the three wells evaluated (MW104, RW03, and RW04), likely due to limitations in the statistical model(s) to account for reversal in groundwater flow direction, and variability in construction style and past use of the wells (the RW wells were originally designed and used for dewatering of contaminated groundwater). These results support the conclusion above, stating that the construction and past use of the RW wells for dewatering of contaminated groundwater is likely resulting in groundwater samples that are not representative of actual groundwater quality.

Geochemical and Field Parameters

To supplement historical monitoring data, five wells (RW03 to RW05, MW105, and MW111) were selected for supplemental laboratory sampling and analysis of geochemical natural attenuation parameters during the Second and Fourth Quarter 2020 groundwater monitoring events, as follows:

- Alkalinity by Environmental Protection Agency (EPA) Method MS-2320—elevated alkalinity is supporting evidence of biodegradation

[10] Washington State Department of Ecology (Ecology), 2005b, User's Manual: Natural Attenuation Analysis Tool Package for Petroleum-Contaminated Ground Water, Washington State Department of Ecology, Publication No. 05-09-091A, July 2005.

- Dissolved iron (Fe) and manganese (Mn) by EPA Method 6020B—elevated iron and manganese are supporting evidence of biodegradation
- Nitrate, nitrite, and sulfate by EPA Method 300.0—depressed nitrate, nitrite, and sulfate are supporting evidence of biodegradation
- Methane by RSK-175—elevated methane is supporting evidence of biodegradation.

Analysis of geochemical parameters above was conducted by Friedman & Bruya, Inc., of Seattle, Washington; laboratory reports are included as Appendix C. The full rationale for the wells chosen for the MNAA is included in the Work Plan.

Field parameters were also recorded during sampling (temperature, pH, electrical conductivity, dissolved oxygen, and oxidation-reduction potential) for evaluation alongside geochemical parameters. Geochemical and field parameters are summarized in Table 7, where results indicative of natural attenuation relative to background wells have been shaded. Key results are summarized below:

- Dissolved oxygen, oxidation-reduction potential, nitrate, and sulfate concentrations in monitoring wells with detections of COCs in groundwater (RW03 through RW05) are generally less than concentrations in background wells (MW105 and MW111).
- Alkalinity, manganese, dissolved iron, and methane concentrations in wells with detections of COCs in groundwater (RW03 through RW05) are generally higher than concentrations in background wells (MW105 and MW111).

The above-listed conditions occur under reducing groundwater conditions and indicate evidence that biodegradation is occurring within the plume extent at the Site.

MNAA Findings

When reviewed collectively, the results of the MNAA indicate the following:

- Overall, the contaminated groundwater plume observed at the RW wells in the Fauntleroy Way SW ROW appears to be shrinking, despite periodic seasonal fluctuations in concentrations of COCs observed during quarterly monitoring events.
- Natural attenuation mechanisms, resulting in a shrinking plume, appear to be at least partially due to naturally occurring biodegradation of COCs in groundwater.

Updated trend graphs for wells where concentrations of COCs remain are attached (Figures 4 through 6). Groundwater analytical results are summarized in Table 1. Geochemical and field parameters are summarized in Table 7, where results indicative of natural attenuation relative to background wells have been shaded. Geochemical data will continue to be collected on a biannual basis during 2021 to aid future MNAA.

Summary and Recommendations

Full scale ISCO implementation using the existing large-diameter wells is not feasible at the Site in post-construction conditions. The pilot study has demonstrated that injections utilizing the existing large-diameter wells result in injection fluid entering the Whittaker building drainage system, exhibited during the pilot study by the appearance of dye from RW05 injections in the

sump within 48 hours of the completion of the injection program, and persistence in the sump at detectable concentrations for at least 28 days post-injections. In accordance with the Work Plan, the presence of dye in the sump disqualifies the injection well system from use for ISCO injections.

Because RW05 is located approximately 100 feet from the stormwater sump, the presence of RW05 injection fluid in the sump likely indicates preferential flow pathway conditions between the large-diameter RW wells and the Whittaker building drainage system. It is anticipated that during a full scale ISCO injection program implementation, which may require volumes in excess of those used in the pilot study, preferential flow paths affecting the pilot study would have similar or greater effect on ISCO injections.

This study concludes that the RW wells should not be utilized for ISCO injections, per the logic outlined in the decision tree in the Ecology-approved Work Plan.[11] Further, the RW wells are likely not yielding compliance groundwater analytical results that are representative of groundwater quality due to their history as dewatering wells. Aspect recommends decommissioning the RW wells and replacing them with one properly constructed compliance groundwater monitoring well in Fauntleroy Way for future compliance groundwater monitoring.

Biodegradation and natural attenuation is occurring at the Site. The MNAA indicates that biodegradation appears to be occurring in well MW104, RW03, and RW04, and is contributing to overall reduced contaminant concentrations and smaller seasonal fluctuation of COCs in Site wells.

Aspect recommends continuing compliance groundwater monitoring at the Site, including monitoring of geochemical parameters to inform an ongoing MNAA, following installation of the new Fauntleroy Way well that will replace the RW wells. The compliance sampling frequency will be determined based on the first sampling event after installation:

- If contaminants of concern exceed the MTCA Method A cleanup levels in any sample collected during the first sampling event following installation of the new Fauntleroy Way well, Aspect recommends reducing the sampling frequency to biannual sampling of all wells in the compliance well network (including monitoring geotechnical parameters) and continuing long term monitored attenuation analysis.
- If COCs are below cleanup levels in the first event, Aspect recommends proceeding with quarterly sampling to pursue four consecutive quarters of data showing Site COCs below cleanup levels, and then moving forward toward Site closure.

[11] Aspect Consulting, LLC (Aspect), 2020, Preliminary Monitored Natural Attenuation Analysis and Groundwater Treatment Injections Pilot Study Work Plan, dated October 27, 2020.

Limitations

Work for this project was performed for the LMI – West Seattle Holdings, LLC (Client), and this letter was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This letter does not represent a legal opinion. No other warranty, expressed or implied, is made.

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Please refer to Appendix D titled "Report Limitations and Guidelines for Use" for additional information governing the use of this report.

Sincerely,

Aspect consulting, LLC

State of Washington 346 Licensed Geologist

5/1/2021

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Attachments: Table 1 – Summary of Compliance Groundwater Monitoring Results
Table 2 – Fluorescence in Parking Garage Wells: RW03 Dye
Table 3 – Fluorescence in Parking Garage Wells: RW04 Dye
Table 4 – Fluorescence in Parking Garage Wells: RW05 Dye
Table 5 – Fluorescence in Adjacent Wells During Injections
Table 6 – Sump Dye Concentrations
Table 7 – Summary of Geochemical Parameters

Figure 1 – Pilot Study Layout
Figure 2 – Cross Section A-A'
Figure 3 – RW04 Hydrograph
Figure 4 – MW104 Postconstruction Data
Figure 5 – RW03 Postconstruction Data
Figure 6 – RW04 Postconstruction Data

Appendix A – MNAA Worksheets
Appendix B – Sump Monitoring Records
Appendix C – Laboratory Reports
Appendix D – Report Limitations and Guidelines for Use

cc: William Joyce, Joyce Ziker Partners

V:\160328 GID – The Whittaker Environmental Review\Deliverables\2021-03 Pilot Study Results Report\2021 Pilot Study Results and MNA Analysis_Final.docx

TABLES

Table 1. Summary of Compliance Groundwater Monitoring Results

Project No. 160328, SKS Shell Station Site, Seattle, Washington

				BTEX				Total Petroleum Hydrocarbons (TPH)			TPH with Silica Gel	
			Analytes	Benzene	Toluene	Ethylbenzene	Total Xylenes	Gasoline-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics
			Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
			MTCA Method A Cleanup Level	5	1000	700	1000	1000 / 800	500	500	500	500
Sample Location[1]	Sample Date	Depth to Water (ft. BTOC)	Groundwater Elevation (ft. NAVD88)									
MW104	03/17/2016	26.41	242.94	**1.2**	**1.8**	**2.2**	**5.7**	**480**	**1200 X**	< 300 U	--	--
	06/24/2016	25.16	244.19	**2.5**	**2**	**3**	**9.5**	**940**	**3200**	< 250 U	--	--
	09/28/2016	25.55	243.80	**7.2**	< 1 U	**3.7**	**7.4**	**940**	**4000 X**	**340 X**	--	--
	12/23/2016	27.28	242.07	**2.1**	**2.1**	**17**	**27**	**2000**	**16000**	**380 X**	**180**	< 250 U
	03/17/2017	27.55	241.80	< 1 U	< 1 U	**8.5**	**10**	**1400**	**7900**	< 400 U	**290 X**	< 400 U
	06/15/2017	27.92	241.45	< 1 U	< 1 U	**4**	**3.1**	**700**	**3000**	< 300 U	**370**	< 250 U
	9/14/2017	28.21	241.16	< 1 U	< 1 U	**1.3**	< 3 U	**460**	**2200**	< 300 U	**230 X**	< 250 U
	12/12/2017	28.86	240.51	< 1 U	**1.1**	**1.3**	< 3 U	**340**	**780 X**	< 350 U	--	--
	3/22/2018	28.88	240.49	< 1 U	< 1 U	< 1 U	< 3 U	**220**	**590 X**	< 250 U	--	--
	06/21/2018	28.96	240.41	< 1 U	< 1 U	< 1 U	< 3 U	**130**	**720**	< 350 U	--	--
	09/17/2018	29.27	240.10	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**480**	< 350 U	--	--
	12/18/2018	29.02	240.35	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**390**	< 250 U	--	--
	03/14/2019	29.25	240.12	< 1 U	< 1 U	< 1 U	< 3 U	**170**	**690 X**	< 300 U	--	--
	06/06/2019	29.32	240.05	< 1 U	< 1 U	< 1 U	< 3 U	**210**	**750 X**	**290**	--	--
	09/12/19	Dry	--	Insufficient water for sampling								
	12/19/2019	29.01	240.36	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**310 X**	**300 X**	--	--
	04/22/2020	28.78	240.59	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**200 X**	< 250 U	--	--
	06/30/2020	29.50	239.87	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**210 X**	< 250 U	--	--
	9/22/2020	29.14	240.23	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**380 X**	< 300 U	--	--
	12/15/2020	29.16	240.21	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**140 X**	< 320 U	--	--
MW105	06/13/2017	27.36	241.94	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	9/13/2017	27.96	241.34	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 60 U	< 300 U	--	--
	12/12/2017	28.41	240.89	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	3/22/2018	28.45	240.85	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 65 U	< 320 U	--	--
	06/21/2018	28.56	240.74	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	09/17/2018	28.96	240.34	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	12/18/2018	28.9	240.40	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	03/14/2019	28.66	240.64	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	06/06/2019	29.06	240.24	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**96 X**	< 250 U	--	--
	09/12/2019	29.37	239.93	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	12/18/2019	28.97	240.33	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	04/21/2020	28.25	241.05	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	06/29/2020	28.36	240.94	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	9/21/2020	28.77	240.53	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	12/14/2020	28.82	240.48	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 65 U	< 320 U	--	--

Table 1. Summary of Compliance Groundwater Monitoring Results

Project No. 160328, SKS Shell Station Site, Seattle, Washington

				BTEX				Total Petroleum Hydrocarbons (TPH)			TPH with Silica Gel	
			Analytes	Benzene	Toluene	Ethylbenzene	Total Xylenes	Gasoline-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics
			Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
			MTCA Method A Cleanup Level	5	1000	700	1000	1000 / 800	500	500	500	500
Sample Location[1]	Sample Date	Depth to Water (ft. BTOC)	Groundwater Elevation (ft. NAVD88)									
MW108	03/17/2016	5.52	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**93 X**	< 300 U	--	--
	06/24/2016	3.33	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	09/28/2016	3.85	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 60 U	< 300 U	--	--
	12/23/2016	6.56	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**94 X**	< 350 U	< 70 U	< 350 U
	03/03/2017	6.64	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 80 U	< 400 U	< 80 U	< 400 U
	06/14/2017	7.06	240.77	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**140 X**	< 250 U	--	--
	9/14/2017	6.69	241.14	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**160 X**	< 250 U	--	--
	12/12/2017	7.7	240.13	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	03/23/2018	7.44	240.39	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**71 X**	< 250 U	--	--
	06/21/2018	7.75	240.08	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**150 X**	< 450 U	--	--
	09/17/2018	7.83	240.00	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**110**	< 480 U	--	--
	12/18/2018	7.98	239.85	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	03/14/2019	7.78	240.05	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**680 X**	< 350 U	--	--
	06/06/2019	7.87	239.96	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**590 X**	< 250 U	--	--
	09/12/2019	8.28	239.55	< 1 U	< 1 U	< 1 U	< 3 U	**100**	**1200 X**	< 320 U	--	--
	12/18/2019	7.88	239.95	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**280**	< 250 U	--	--
	04/22/2020	7.58	240.25	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**160 X**	< 250 U	--	--
	06/30/2020	11.00	236.83	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**120 X**	< 250 U	--	--
	9/22/2020	8.06	239.77	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**280 X**	< 300 U	--	--
	12/15/2020	8.13	239.7	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**350 X**	< 250 U	--	--
MW109	03/17/2016	5.42	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**97 X**	< 250 U	--	--
	06/24/2016	3.35	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**160 X**	< 250 U	--	--
	09/28/2016	3.96	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**260 X**	< 250 U	--	--
	12/23/2016	6.59	--	< 1 U	< 1 U	< 1 U	< 3 U	**250**	**430 X**	< 250 U	< 50 U	< 250 U
	03/03/2017	6.7	--	< 1 U	< 1 U	**1.2**	< 3 U	**370**	**490 X**	< 250 U	**55 X**	< 250 U
	06/14/2017	6.87	241.05	< 1 U	< 1 U	< 1 U	< 3 U	**220**	**330**	< 250 U	--	--
	09/14/2017	6.84	241.08	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**140 X**	< 250 U	--	--
	12/12/2017	7.69	240.23	< 1 U	**1.1**	< 1 U	< 3 U	**150**	< 50 U	< 250 U	--	--
	03/23/2018	7.75	240.17	< 1 U	< 1 U	**1.3**	< 3 U	**190**	**110 X**	< 250 U	--	--
	06/21/2018	7.87	240.05	< 1 U	**1.2**	< 1 U	< 3 U	**190**	**200**	< 250 U	--	--
	09/17/2018	8.05	239.87	< 1 U	< 1 U	**1.8**	< 3 U	**150**	**110 X**	< 250 U	--	--
	12/18/2018	7.61	240.31	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**61 X**	< 250 U	--	--
	03/14/2019	7.94	239.98	< 1 U	< 1 U	< 1 U	< 3 U	**140**	< 60 U	< 300 U	--	--
	06/06/2019	8.1	239.82	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**140 X**	< 250 U	--	--
	09/12/2019	8.39	239.53	< 1 U	< 1 U	< 1 U	< 3 U	**110**	**110 X**	< 250 U	--	--
	12/18/2019	7.67	240.25	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	04/22/2020	7.84	240.08	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**100 X**	< 250 U	--	--
	06/30/2020	7.38	240.54	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	9/22/2020	7.89	240.03	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**70 X**	< 250 U	--	--
	12/15/2020	8.03	239.89	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**69 X**	< 260 U	--	--

Table 1. Summary of Compliance Groundwater Monitoring Results

Project No. 160328, SKS Shell Station Site, Seattle, Washington

				BTEX				Total Petroleum Hydrocarbons (TPH)			TPH with Silica Gel	
			Analytes	Benzene	Toluene	Ethylbenzene	Total Xylenes	Gasoline-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics
			Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
			MTCA Method A Cleanup Level	5	1000	700	1000	1000 / 800	500	500	500	500
Sample Location[1]	Sample Date	Depth to Water (ft. BTOC)	Groundwater Elevation (ft. NAVD88)									
MW110	03/17/2016	5.7	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	06/24/2016	3.56	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**100 X**	< 250 U	--	--
	09/28/2016	4.19	--	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**590 X**	**440**	--	--
	12/23/2016	6.96	--	**2.3**	< 1 U	**9.7**	**18**	**500**	**1200**	< 300 U	**68 X**	< 300 U
	03/03/2017	7.57	--	**2.1**	< 1 U	**9.3**	**4.7**	**570**	**1000 X**	< 250 U	**110 X**	< 250 U
	06/14/2017	7.78	240.43	< 1 U	< 1 U	**2**	< 3 U	**260**	**520**	< 250 U	--	--
	9/14/2017	7.44	240.77	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**150 X**	< 250 U	--	--
	12/12/2017	8.02	240.19	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**99 X**	< 250 U	--	--
	03/23/2018	8.05	240.16	--	--	--	--	--	**73 X**	< 250 U	--	--
	06/21/2018	8.15	240.06	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**96 X**	< 250 U	--	--
	09/17/2018	8.4	239.81	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	12/18/2018	7.98	240.23	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	03/14/2019	8.2	240.01	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**74 X**	< 300 U	--	--
	06/06/2019	8.3	239.91	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**91 X**	< 250 U	--	--
	09/12/2019	9.03	239.18	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**73 X**	< 180 U	--	--
	12/18/2019	7.68	240.53	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	04/22/2020	8.15	240.06	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**250 X**	< 250 U	--	--
	06/30/2020	7.52	240.69	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	9/22/2020	8.26	239.95	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	12/15/2020	8.35	239.86	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**51 X**	< 250 U	--	--
MW111	10/09/2018	30.51	240.11	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**55 X**	< 250 U	--	--
	12/18/2018	29.9	240.72	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	03/14/2019	30.15	240.47	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**83 X**	< 250 U	--	--
	06/06/2019	30.5	240.12	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**84 X**	< 250 U	--	--
	09/13/2019	30.72	239.9	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	12/18/2019	30.26	240.36	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**94 X**	< 280 U	--	--
	04/22/2020	30.11	240.51	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	06/30/2020	30.09	240.53	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	9/22/2020	30.32	240.3	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**54 X**	< 250 U	--	--
	12/15/2020	30.37	240.25	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**< 50 U**	< 250 U	--	--
MW112	03/14/2019	28.88	240.44	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**58 X**	< 250 U	--	--
	06/06/2019	29.15	240.17	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**59 X**	< 250 U	--	--
	09/12/2019	29.44	239.88	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	12/18/2019	28.65	240.67	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**58 X**	< 250 U	--	--
	04/21/2020	28.78	240.54	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	06/29/2020	28.63	240.69	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--

Table 1. Summary of Compliance Groundwater Monitoring Results

Project No. 160328, SKS Shell Station Site, Seattle, Washington

				BTEX				Total Petroleum Hydrocarbons (TPH)			TPH with Silica Gel	
			Analytes	Benzene	Toluene	Ethylbenzene	Total Xylenes	Gasoline-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics
			Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
			MTCA Method A Cleanup Level	5	1000	700	1000	1000 / 800	500	500	500	500
Sample Location[1]	Sample Date	Depth to Water (ft. BTOC)	Groundwater Elevation (ft. NAVD88)									
MW113	03/23/2018	7.68	240.38	--	--	--	--	--	**93 X**	< 250 U	--	--
	06/21/2018	7.81	240.25	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**71 X**	< 250 U	--	--
	09/17/2018	8.05	240.01	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	12/18/2018	7.58	240.48	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**100 X**	< 250 U	--	--
	03/14/2019	7.98	240.08	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**79 X**	< 250 U	--	--
	06/06/2019	8.13	239.93	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**89 X**	< 250 U	--	--
	09/12/2019	8.31	239.75	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**87 X**	< 250 U	--	--
	12/18/2019	8.04	240.02	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**80 X**	< 250 U	--	--
	04/21/2020	7.94	240.12	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	< 50 U	< 250 U	--	--
	06/30/2020	7.86	240.2	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**58 X**	< 250 U	--	--
RW03	03/17/2016	26.23	--	**41**	**6.9**	**51**	**260**	**2300**	**1400 X**	< 250 U	--	--
	06/24/2016	25.4	--	**27**	**4.4**	**27**	**59**	**1600**	**3600**	< 250 U	--	--
	09/28/2016	25.71	--	**6.7**	< 1 U	**20**	**45**	**1100**	**2400 X**	< 300 U	--	--
	12/23/2016	26.77	--	**470**	**16**	**380**	**750**	**9000**	**11000**	< 300 U	**720 X**	< 300 U
	03/02/2017	27.22	--	**150**	< 10 U	**220**	**190**	**4900**	**11000 X**	< 250 U	**880 X**	< 250 U
	06/14/2017	27.91	241.59	**7**	< 1 U	**32**	**11**	**1300**	**1500**	< 250 U	**320 X**	< 250 U
	09/14/2017	28.3	241.2	**2.8**	**1.3**	**15**	**4.5**	**560**	**690 X**	< 300 U	**140 X**	< 300 U
	12/12/2017	28.82	240.68	**8.8**	**17**	**39**	**170**	**2500**	**1000 X**	< 300 U	--	--
	03/23/2018	28.85	240.65	**3**	**5.2**	**29**	**140**	**2100**	**760 X**	< 250 U	--	--
	06/22/2018	28.94	240.56	< 1 U	**2.3**	**31**	**34**	**730**	**740 X**	< 250 U	--	--
	09/17/2018	29.28	240.22	< 1 U	< 1 U	**11**	**15**	**370**	**430**	< 250 U	--	--
	12/18/2018	29.05	240.45	**6.5**	**5**	**75**	**250**	**2800**	**1600**	< 250 U	--	--
	03/15/2019	29.05	240.45	**1.9**	**1.7**	**46**	**140**	**1700**	**730 X**	< 250 U	--	--
	06/07/2019	29.35	240.15	< 1 U	< 1 U	**14**	**4.3**	**410**	**680 X**	< 250 U	--	--
	09/13/2019	29.81	239.69	< 1 U	< 1 U	**1.4**	**3**	**270**	**360 X**	< 250 U	--	--
	12/19/2019	29.13	240.37	**2.4**	< 1 U	**36**	**100**	**2200**	**1400 X**	< 250 U	--	--
	04/22/2020	28.58	240.92	< 1 U	< 1 U	**77**	**78**	**1400**	**700 X**	< 250 U	--	--
	06/29/2020	28.46	241.04	**1.7**	**1.3**	**75**	**41**	**930**	**1200 X**	< 250 U	--	--
	9/21/2020	29.13	240.37	< 1 U	**1.2**	**30**	**4.3**	**800**	**780 X**	< 250 U	--	--
	12/14/2020	29.25	240.25	< 1 U	**1.5**	**36**	**11**	**680**	**560 X**	< 250 U	--	--

Table 1. Summary of Compliance Groundwater Monitoring Results

Project No. 160328, SKS Shell Station Site, Seattle, Washington

				BTEX				Total Petroleum Hydrocarbons (TPH)			TPH with Silica Gel	
			Analytes	Benzene	Toluene	Ethylbenzene	Total Xylenes	Gasoline-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics	Diesel-Range Organics	Motor Oil-Range Organics
			Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
			MTCA Method A Cleanup Level	5	1000	700	1000	1000 / 800	500	500	500	500
Sample Location[1]	Sample Date	Depth to Water (ft. BTOC)	Groundwater Elevation (ft. NAVD88)									
RW04	06/14/2017	27.62	241.6	**2.5**	< 1 U	**16**	< 3 U	**790**	**400**	< 250 U	--	--
	09/14/2017	27.93	241.29	**6.4**	< 1 U	**26**	**21**	**400**	**330 X**	< 250 U	--	--
	12/12/2017	28.55	240.67	**3**	**1.1**	**12**	**5.2**	**360**	**200 X**	< 300 U	--	--
	03/22/2018	28.57	240.65	**1.5**	< 1 U	**14**	< 3 U	**450**	**500 X**	< 250 U	--	--
	06/21/2018	28.6	240.62	< 1 U	**2.6**	**4.8**	**4.5**	**360**	**400 X**	< 250 U	--	--
	09/17/2018	29.08	240.14	< 1 U	< 1 U	**1.5**	< 3 U	**130**	**120**	< 250 U	--	--
	12/18/2018	28.74	240.48	< 1 U	< 1 U	**1.1**	< 3 U	**160**	**510**	< 250 U	--	--
	03/15/2019	28.76	240.46	< 1 U	< 1 U	**1.9**	< 3 U	**300**	**310 X**	< 250 U	--	--
	06/07/2019	29.05	240.17	< 1 U	< 1 U	< 1 U	< 3 U	**240**	**470 X**	< 250 U	--	--
	09/13/2019	29.44	239.78	< 1 U	< 1 U	< 1 U	< 3 U	**180**	**290 X**	< 250 U	--	--
	12/18/2019	28.86	240.36	< 1 U	< 1 U	< 1 U	< 3 U	**160**	**250 X**	< 250 U	--	--
	04/22/2020	28.34	240.88	**2.9**	**1.2**	**83**	**36**	**1400**	**700 X**	< 250 U	--	--
	06/29/2020	28.3	240.92	**1.5**	< 1 U	**34**	< 3 U	**900**	**730 X**	< 250 U	--	--
	9/21/2020	28.85	240.37	< 1 U	< 1 U	**4.9**	< 3 U	**420**	**340 X**	< 250 U	--	--
	12/14/2020	28.96	240.26	< 1 U	1.7	**3.2**	< 3 U	**420**	**750 X**	< 250 U	--	--
RW05	06/14/2017	27.64	241.45	< 1 U	< 1 U	**4.4**	< 3 U	**400**	**470**	< 250 U	--	--
	09/14/2017	27.91	241.18	< 1 U	**1.2**	**1.5**	< 3 U	**280**	**300 X**	< 300 U	--	--
	12/12/2017	28.54	240.55	< 1 U	**1.3**	**1.5**	< 3 U	**230**	**170 X**	< 300 U	--	--
	03/22/2018	28.56	240.53	< 1 U	< 1 U	**1.4**	< 3 U	**180**	**140 X**	< 260 U	--	--
	06/21/2018	28.63	240.46	< 1 U	**1.4**	**1.4**	< 3 U	**140**	**180 X**	< 250 U	--	--
	09/17/2018	28.96	240.13	< 1 U	< 1 U	**2.1**	< 3 U	**140**	**140**	< 250 U	--	--
	12/18/2018	28.75	240.34	< 1 U	< 1 U	**1.4**	< 3 U	**110**	**160 X**	< 250 U	--	--
	03/14/2019	28.74	240.35	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**120 X**	< 250 U	--	--
	06/06/2019	29.00	240.09	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**99 X**	< 250 U	--	--
	09/12/2019	29.33	239.76	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**190 X**	< 250 U	--	--
	12/19/2019	28.75	240.34	< 1 U	< 1 U	< 1 U	< 3 U	< 100 U	**130 X**	< 250 U	--	--
	04/21/2020	28.43	240.66	< 1 U	< 1 U	< 1 U	< 3 U	**140**	**420 X**	< 250 U	--	--
	06/30/2020	28.48	240.61	< 1 U	< 1 U	**1.5**	< 3 U	**160**	**230 X**	< 250 U	--	--
	9/21/2020	28.8	240.29	< 1 U	< 1 U	< 1 U	< 3 U	**100**	**150 X**	< 250 U	--	--
	12/14/2020	28.9	240.19	< 1 U	< 1 U	1.3	< 3 U	**130**	**190 X**	< 250 U	--	--

Notes

Bold = indicates concentrations of the analyte detected above the reporting limits.

Purple shaded = indicates concentration of the analyte detected above the Model Toxics Control Act (MTCA) Method A Cleanup Level

[1]This table is not an all-inclusive list of all monitoring wells located at the Site historically. Only compliance monitoring wells that are currently being accessed for quarterly compliance groundwater sampling are included in this table. Further, Table 2 only presents data from the post-cleanup compliance monitoring events for each well shown. Refer to the Cleanup Action Report (SES, 2016) and the Fourth Quarter 2019 Compliance Groundwater Monitoring Report (SES, 2019) for a full list of all historical Site wells and groundwater analytical data from samples collected prior to the start of compliance monitoring.

U = Indicates analyte not detected at or above reporting limit shown.

J = Indicates that the reported or calculated concentration is an estimate.

X = Chromatographic pattern does not match fuel standard used for quantitation.

E = Result exceeded calibration range. Result usable for qualitative analysis of analyte presence, but numeric value should not be included in quantitative analysis.

ft = feet

BTOC = below top of casing (north)

NAVD88 = North American Vertical Datum 1988

ug/L = micrograms per liter

Table 2. Fluorescence in Parking Garage Wells: RW03 Dye

Project No. 160328, SKS Shell Station Site, Seattle, Washington

Date/Time	MW 109 FLUORESCENCE (RWT ppb[1])	MW 110 FLUORESCENCE (RWT[1] ppb)	Notes
January 6, 2021			
1/6/2021 9:40	*0.97*	*1.21*	*Background concentration*
1/6/2021 10:45	0.77	0.88	Injection began at 0945
1/6/2021 11:45	0.52	0.92	
1/6/2021 12:45	0.61	1.02	
1/6/2021 13:45	1.03	2.65	Injection ended for the day
January 7, 2021			
1/7/2021 10:00	45.4	141.6	Pre-injection concentration
1/7/2021 14:00	1.73	221.3	Injection began at 09:45
1/7/2021 14:30	1.32	229.6	
1/7/2021 15:00	10.8	213.9	
1/7/2021 15:30	11.6	235.1	Injection ended for the day
January 8, 2021			
1/8/2021 9:40	10.9	170.4	Pre-injection concentration
1/8/2021 10:30	28.5	212.9	Injection began at 10:00
1/8/2021 11:00	9.0	218.0	
1/8/2021 11:30	8.3	193.1	
1/8/2021 12:00	18.3	221.2	
1/8/2021 12:30	9.2	224.2	
1/8/2021 13:00	10.5	8.9	
1/8/2021 13:30	8.4	146.1	Injection ended for the day

Notes:

RWT = Rhodamine WT, dye used at RW03

ppb = parts per billion

[1] Concentrations measured using field tools and not obtained using analytical methods.

Table 3. Fluorescence in Parking Garage Wells: RW04 Dye

Project No. 160328, SKS Shell Station Site, Seattle, Washington

Date/Time	MW 109 FLUORESCENCE (FL ppb[1])	MW 110 FLUORESCENCE (FL ppb[1])	Notes
January 7, 2021			
1/7/2021 12:00	*0.219*	*7.739*	*Background concentration*
1/7/2021 13:00	0.761	9.223	Injection began at 09:45
1/7/2021 14:00	0.662	8.063	
1/7/2021 14:30	0.891	7.832	
1/7/2021 15:00	0.805	7.435	
1/7/2021 15:30	0.597	7.561	Injection ended for the day
January 8, 2021			
1/8/2021 9:40	0.78	7.74	Pre-injection concentration
1/8/2021 10:30	1.498	7.292	Injection began at 10:00
1/8/2021 11:00	0.371	7.221	
1/8/2021 11:30	0.688	6.305	
1/8/2021 12:00	1.065	7.093	
1/8/2021 12:30	1.115	7.029	
1/8/2021 13:00	1.255	7.212	
1/8/2021 13:30	0.205	5.614	Injection ended for the day
January 11, 2021			
1/11/2021 9:30	1.011	1.036	Pre-injection concentration
1/11/2021 10:15	0.262	1.293	Injection began at 09:45
1/11/2021 10:45	0.922	1.056	
1/11/2021 11:15	0.976	1.154	
1/11/2021 11:45	0.333	4.844	
1/11/2021 12:15	0.599	6.611	
1/11/2021 12:45	0.912	6.419	
1/11/2021 13:15	0.987	4.939	
1/11/2021 13:45	0.509	6.079	
1/11/2021 14:15	0.436	5.903	
1/11/2021 14:45	0.688	6.018	
1/11/2021 15:15	0.272	6.533	
1/11/2021 15:45	0.777	5.993	
1/11/2021 16:15	0.659	5.311	Injection ended for the day
January 12, 2021			
1/12/2021 9:30	0.462	3.147	Pre-injection concentration
1/12/2021 10:00	0.235	2.096	Injection began at 09:45
1/12/2021 10:30	0.144	--	
1/12/2021 11:00	0.033	1.803	
1/12/2021 11:30	1.788	1.976	
1/12/2021 12:00	1.236	2.112	Injection ended for the day

Notes:

FL = Fluorescein, dye used at RW04

ppb = parts per billion

[1] Concentrations measured using field tools and not obtained using analytical methods.

Table 4. Fluorescence in Parking Garage Wells: RW05 Dye

Project No. 160328, SKS Shell Station Site, Seattle, Washington

Date/Time	MW 109 FLUORESCENCE (EO ppb[1])	MW 110 FLUORESCENCE (EO ppb[1])	Notes
January 11, 2021			
1/11/2021 9:30	*115.2*	*168.3*	*Background concentration*
1/11/2021 10:15	105.6	176.4	Injection began at 10:00
1/11/2021 10:45	101.3	170.1	
1/11/2021 11:15	110.9	166.2	
1/11/2021 11:45	51.75	1096	
1/11/2021 12:15	114.7	1827	
1/11/2021 12:45	87.9	1768	
1/11/2021 13:15	120.7	1087	
1/11/2021 13:45	134.4	1453	
1/11/2021 14:15	89.45	1427	
1/11/2021 14:45	118.3	1568	
1/11/2021 15:15	80.32	1863	
1/11/2021 15:45	77.42	1353	
1/11/2021 16:15	96.9	1257	Injection ended for the day
January 12, 2021			
1/12/2021 9:30	160	572.1	Pre-injection concentration
1/12/2021 10:00	47.56	301.6	Injection began at 09:45
1/12/2021 10:30	57.88	--	MW110 inaccessible
1/12/2021 11:00	24.29	312.5	
1/12/2021 11:30	45.2	310.71	
1/12/2021 12:00	36.33	313.7	Injection ended for the day

Notes:

EO = Eosine, dye used at RW05

ppb = parts per billion

[1] Concentrations measured using field tools and not obtained using analytical methods.

Table 5. Fluorescence in Adjacent Wells During Injections

Project No. 160328, SKS Shell Station Site, Seattle, Washington

	South Adjacent Well	*North Adjacent Well*	
Injection at RW04 (Fluorscein)			
	RW03 Concentration (ppb[1])	*RW05 Concentration (ppb[1])*	*Sump Concentration[2] (ppb)*
1/8/2021 9:15	2.808	2.697	0.887
1/8/2021 12:00	2.718	0.779	1.002
During Injection at RW05 (Eosine)			
	RW04 Concentration (ppb[1])	*MW104 Concentration (ppb[1])*	*Sump Concentration[2] (ppb)*
1/11/2021 13:15	200.1	51.22	93.28

Notes:

ppb = parts per billion

[1] Sump concentrations provided as a representative value for background concentration of the dye in question

[2] Concentrations measured using field tools and not obtained using analytical methods.

Table 6. Sump Dye Concentrations

Project No. 160328, SKS Shell Station Site, Seattle, Washington

Sample Timeframe	Sampler Collection Date and Time	RW03 Dye Concentration[1] (Rhodamine WT; ppb)		RW04 Dye Concentration[1] (Fluorescein; ppb)		RW05 Dye Concentration[1] (Eosine; ppb)		
		Carbon Sampler	Grab Sample	Carbon Sampler	Grab Sample	Carbon Sampler	Grab Sample	Time Averaged (per day)
Background Sample	1/5/2021 11:20	ND	--	ND	--	ND	--	--
During RW03 Injection	1/7/2021 10:50	ND	--	ND	--	ND	--	--
During RW04 Injection	1/11/2021 10:40	ND	--	ND	--	ND	--	--
During RW05 Injection	1/12/2021 13:30	ND	--	ND	--	ND	--	--
48 hours post injection	1/14/2021 12:35	ND	--	ND	--	122	21.8	61
7 Days post injection	1/19/2021 11:10	ND	--	ND	--	1390	18.4	278
28 days post injection	2/9/2021 11:00	ND	--	ND	--	1240	31.5	59
Detection Limit (ppb)		*0.17*		*0.025*		*0.05*		

Notes

ND = dye not detected above laboratory reporting limit

-- = sample not run, due to non-detection of dye in the carbon sampler

ppb = parts per billion

[1] The Whittaker building sump is located approximately 82 feet from RW03, 96 feet from RW04, and 110 feet from RW05

Table 7. Summary of Geochemical Parameters

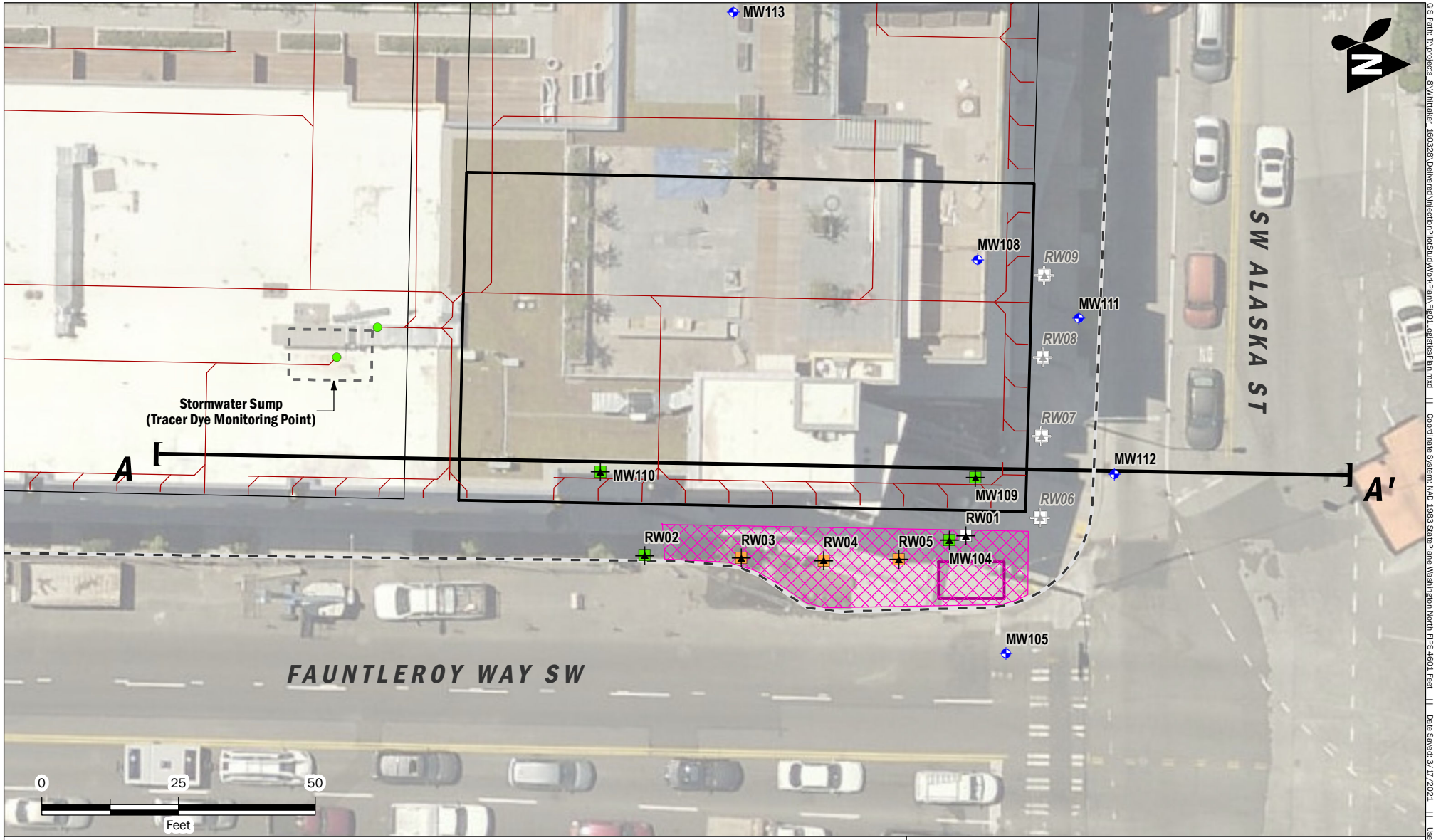
Project No. 160328, SKS Shell Station Site, Seattle, Washington

Analyte Group			Conventionals					Dissolved Gases	Metals								
Analyte			Alkalinity	Nitrate as Nitrogen	Nitrite as Nitrogen	Sulfate	Sulfide	Methane	Iron	Iron	Manganese	Manganese	Specific Conductance	Dissolved Oxygen	pH	Oxidation Reduction Potential	Turbidity
Fraction			Total	Total	Total	Total	Total	Total	Dissolved	Total	Dissolved	Total	N/A	N/A	N/A	N/A	N/A
Unit			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	uS/cm	mg/L	pH units	mV	NTU
Location	**Sample**	**Date**															
RW03	RW03-062920	06/29/2020	332	< 0.1 UJ	< 0.1 UJ	23.6	1.8	0.0242	3600	3520	2580	2530	730	0.36	6.66	2.7	2
	RW03-121420	12/14/2020	279	< 0.200 U	< 0.200 U	20.6	< 0.500 U	0.0597	2560	3330	2860	2720	581.6	2.62	6.5	17.5	1.5
RW04	RW04-062920	06/29/2020	492	< 0.1 UJ	< 0.1 UJ	56.3	1.4	0.0805	5260	6730	8810	9220	1075	0.31	6.91	-16	27.4
	RW04-121420	12/14/2020	426	< 0.200 U	< 0.200 U	64.2	< 0.500 U	0.0299	404	2230	8420	8390	753	0.95	6.8	2	6.4
RW05	RW05-063020	06/30/2020	341	< 0.100 U	< 0.100 U	12.7	1.20	< 0.00863 U	1020	3930	3480	3320	813	0.39	6.46	44.2	55.5
	RW05-121420	12/14/2020	289	< 0.200 U	< 0.200 U	36.7	< 0.500 U	< 0.00863 U	241	3380	3480	3310	520.9	0.75	6.7	-13.3	24.1
Background Wells for MNA Analysis																	
MW105	MW105-062920	06/29/2020	210	4.48 J	< 0.1 UJ	70.3	1	< 0.00863 U	308	161	1850	1780	854	0.64	6.78	-32.4	7.43
	MW105-121420	12/14/2020	202	3.33	0.274	53.9	< 0.500 U	< 0.00863 U	159	854	2090	2450	500.4	4.74	6.6	96	11.3
MW111	MW111-063020	06/30/2020	146	1.02	< 0.200 U	14.9	1.20	< 0.00863 U	206	184	632	301	700	1.45	6.53	12.1	5.72
	MW111-121520	12/15/2020	154	0.830 J	0.435 J	16.4	< 0.500 U	0.00232 J	206	215	491	1060	599	1.17	6.5	85.8	17.3

Notes:

Green shaded cells indicate that results are elevated relative to the background wells MW105 and MW111 for that sampling event.
U - indicates analyte not detected at or above reporting limit shown.
J - indicates that the reported or calculated concentration is an estimate.
mg/L - milligrams per liter
ug/L - micrograms per liter
deg C - degrees Celsius
uS/cm - microsiemens per centimeter
mV - millivolts
NTU - Nephelometric Turbidity Units

FIGURES



- Monitoring Points in the Sump/Drain System
- Compliance Groundwater Monitoring Well
- Decommissioned Remediation Well
- Remediation Well
- Remediation Well For Use In Pilot Study
- Well used for monitoring during injections
- Cross Section
- SKS Shell Property
- Injection Solution Tank Storage Area
- ROW Closure Area
- King County Parcel (2020)
- Footing Drain
- Sidewalk Edge

Note:
- All features shown are approximate

Pilot Study Layout

Pilot Study Results
SKS Shell Station Site
Seattle, Washington

Aspect Consulting	MAR-2021	BY: EAC / KB	FIGURE NO. 1
	PROJECT NO. 160328-003	REVISED BY: SBM	

Basemap Layer Credits || King County

A
SOUTH

A'
NORTH

PROPERTY LINE

PRE-CONSTRUCTION GROUND SURFACE

PROPERTY LINE

SW ALASKA STREET

RW02 (8' E)
RW03 (8' E)
RW04 (8' E)
RW05 (8' E)
MW104 (7' E)
RW01 (8' E)

ELECTRIC UTILIDOR

SEWER LINE

WHITTAKER BUILDING BASEMENT

BUILDING FOUNDATION

VAPOR BARRIER

FOOTING DRAIN

FILL

(MAXIMUM WATER LEVEL IN STORMWATER SUMP)

EXTENT OF SHORING WALL, OVER-EXCAVATION, AND STRUCTURAL BACKFILL

SUMP
(LOCATION OF MONITORING FOR BREAKTHROUGH DETECTION)

ML

SM

?

ELEVATION IN FEET (NAVD88)

270'
260'
250'
240'
230'
220'

LEGEND

MW109 (13' W) — Exploration ID, Offset Distance & Direction

- Well Screen
- Historical High Groundwater
- Water Level on September 21, 2020
- Location of Well Packer
- Estimated Soil Contact

- Fill
- SM — Silty Sand
- ML — Silt

Notes:

1. Wells shown in Orange are Pilot Test Injection Wells.
2. Building features are based on the *SoundEarth Strategies Cleanup Action Report, 2016.*
3. All features shown are approximate.

0 20 40 Feet

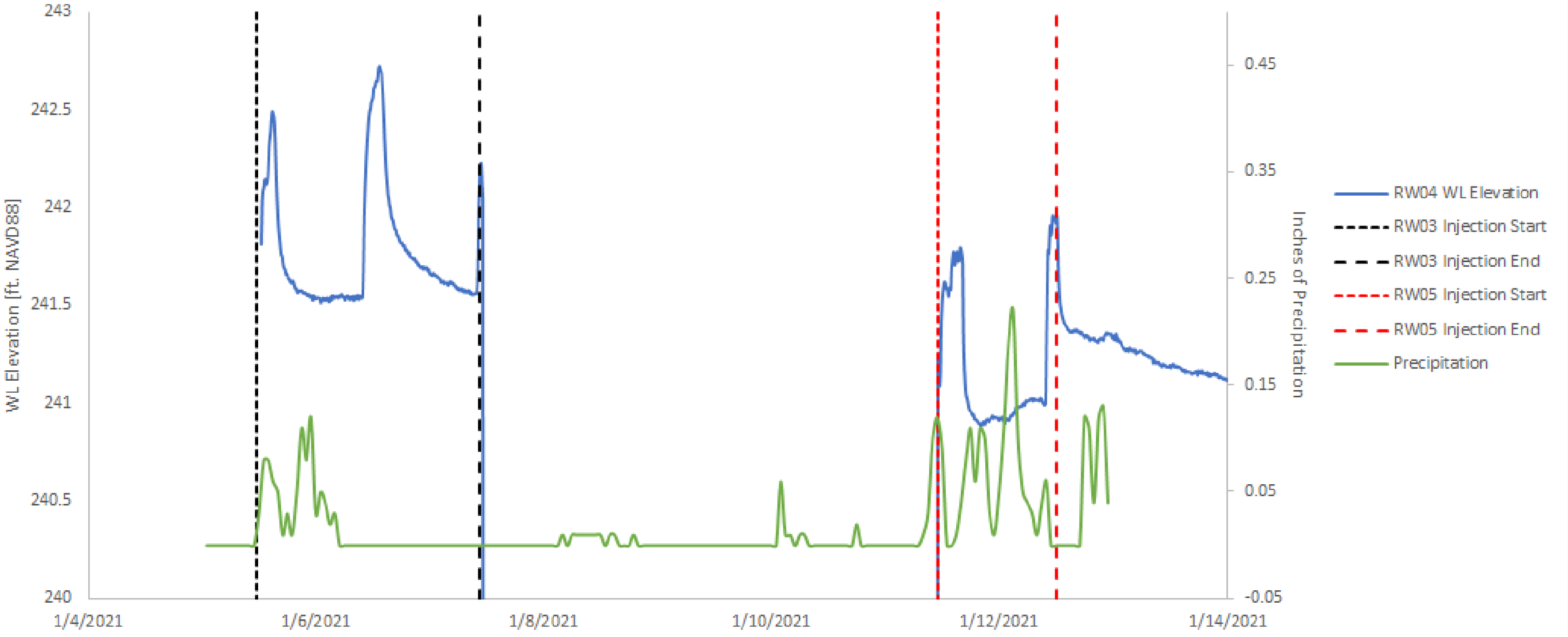
Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 6.67'
Vertical Exaggeration 3x

Cross Section A-A'

MNA Analysis and Pilot Study Results
SKS Shell Station Site
3901 Southwest Alaska Street
Seattle, Washington

Aspect Consulting	Mar-2021	BY: KB/CMV	FIGURE NO. 2
	PROJECT NO. 160328-006	REVISED BY: SCC	

CAD Path: Q:\Whittaker Environmental Review\2021-03 MNA Analysis and Pilot Study Results\160328-02.dwg 06 Cross Section A-A' | | Date Saved: Mar 19, 2021 2:35pm | | User: scudd



RW04 Hydrograph

Pilot Study Results
SKS Shell Station Site
Seattle, Washington

Aspect CONSULTING	MAR-2021	BY: KB	FIGURE NO. 3
	PROJECT NO. 160328	REVISED BY: ---	

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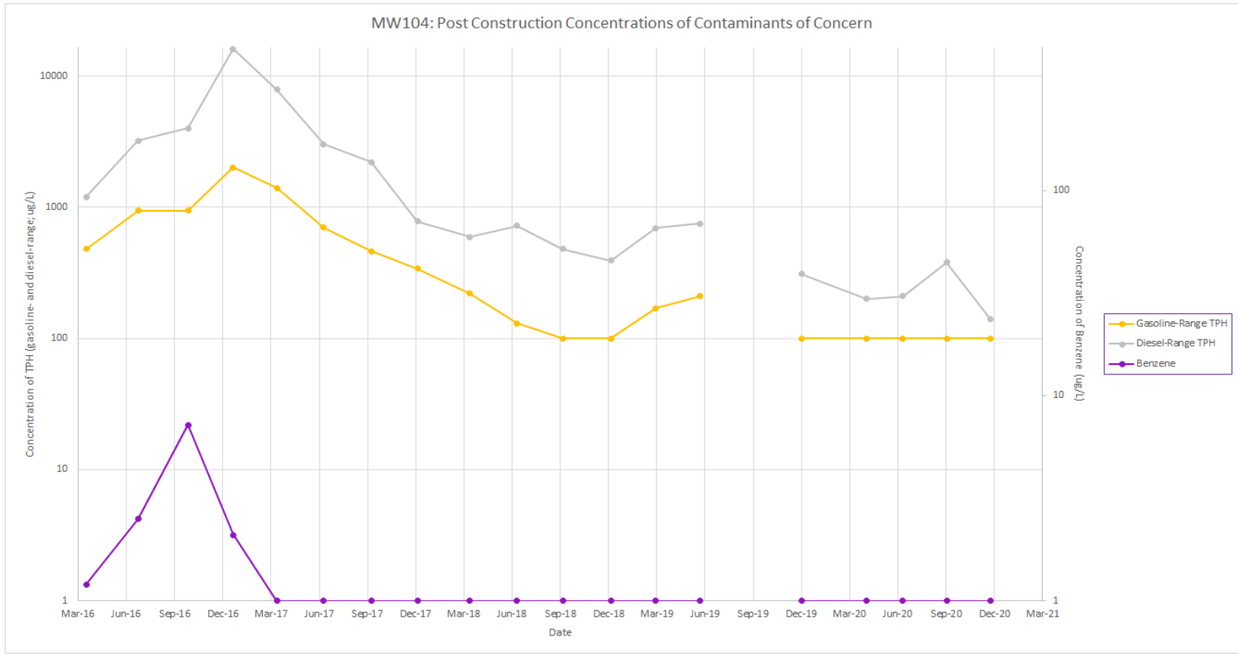
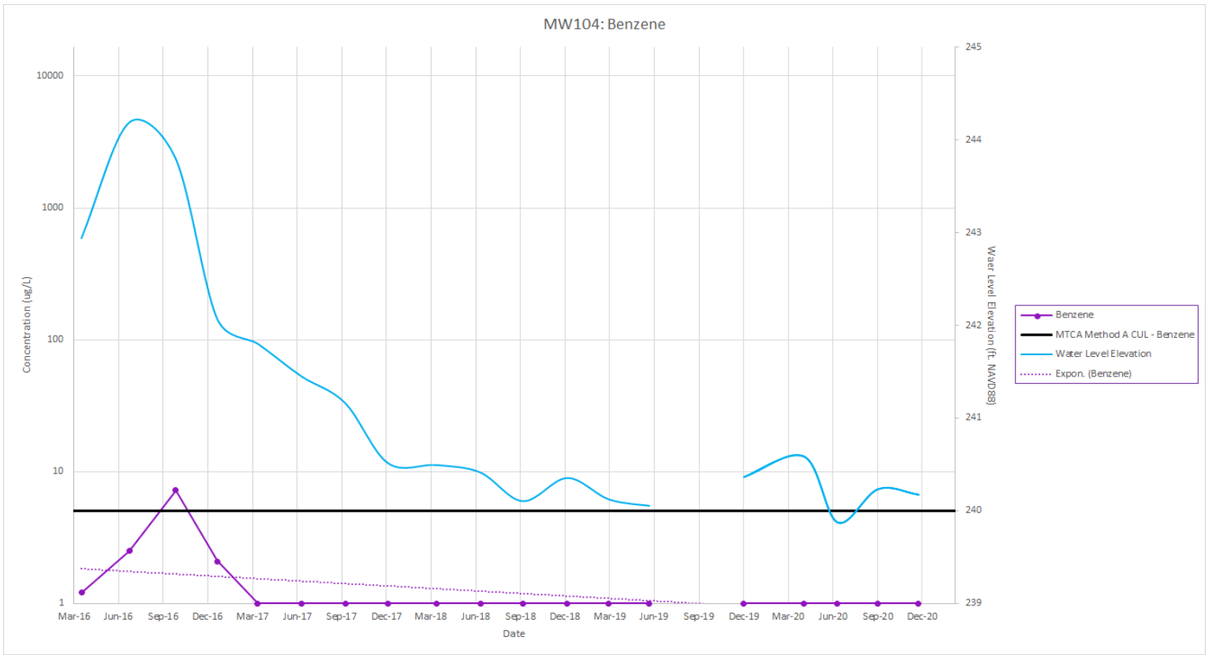
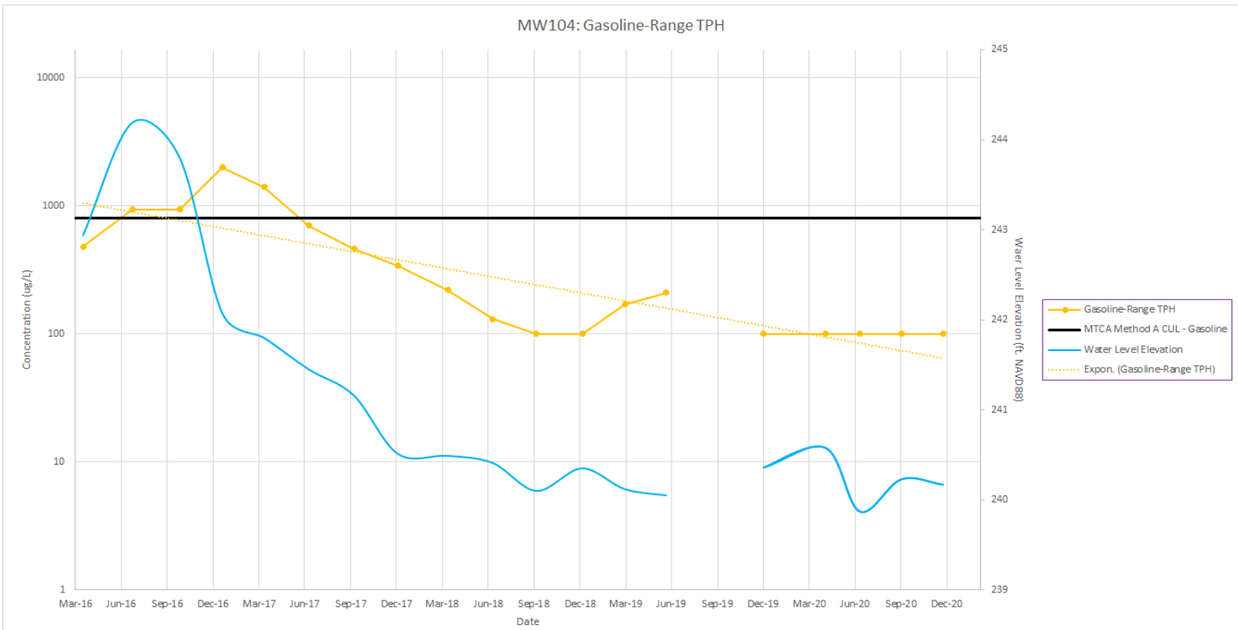
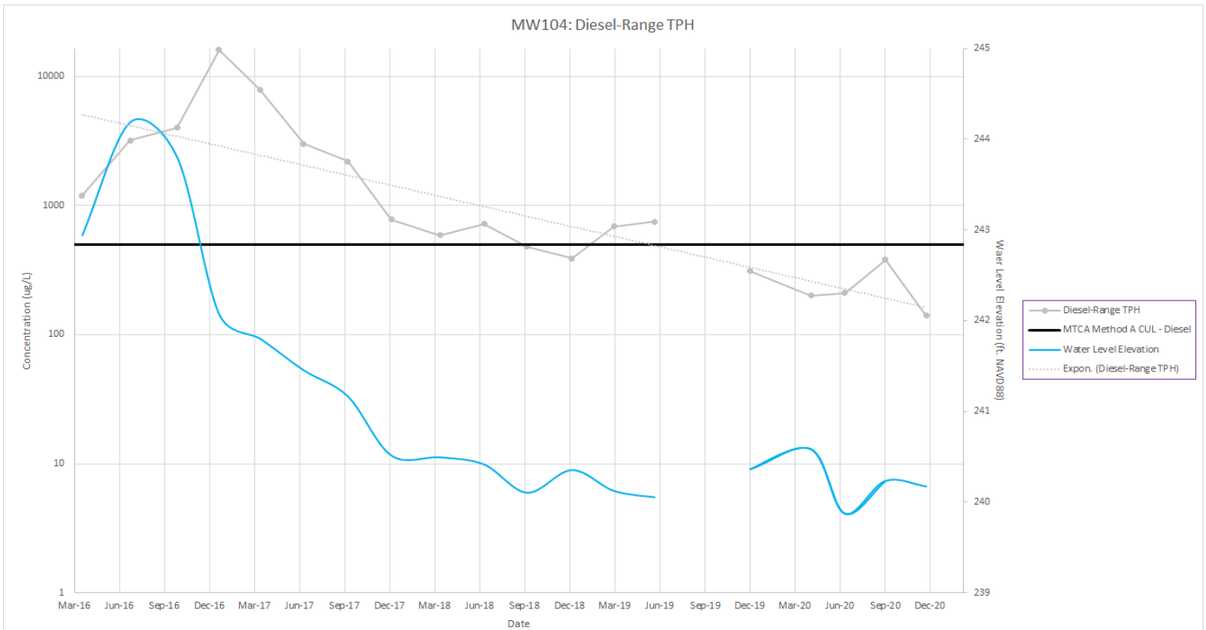






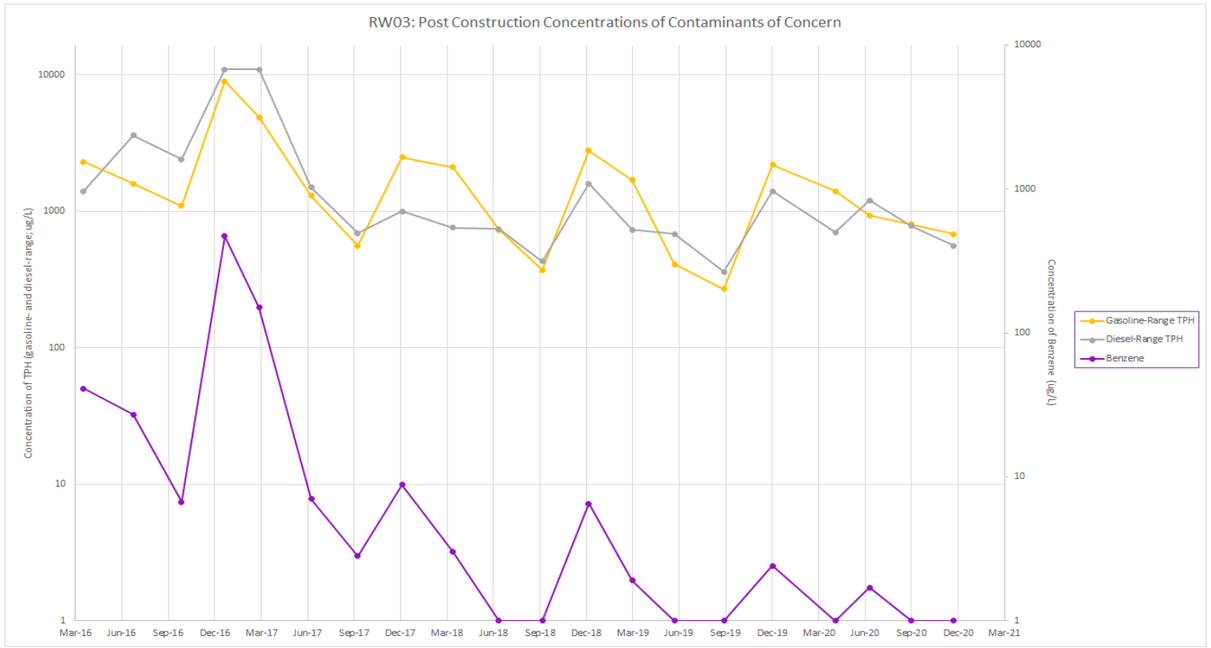


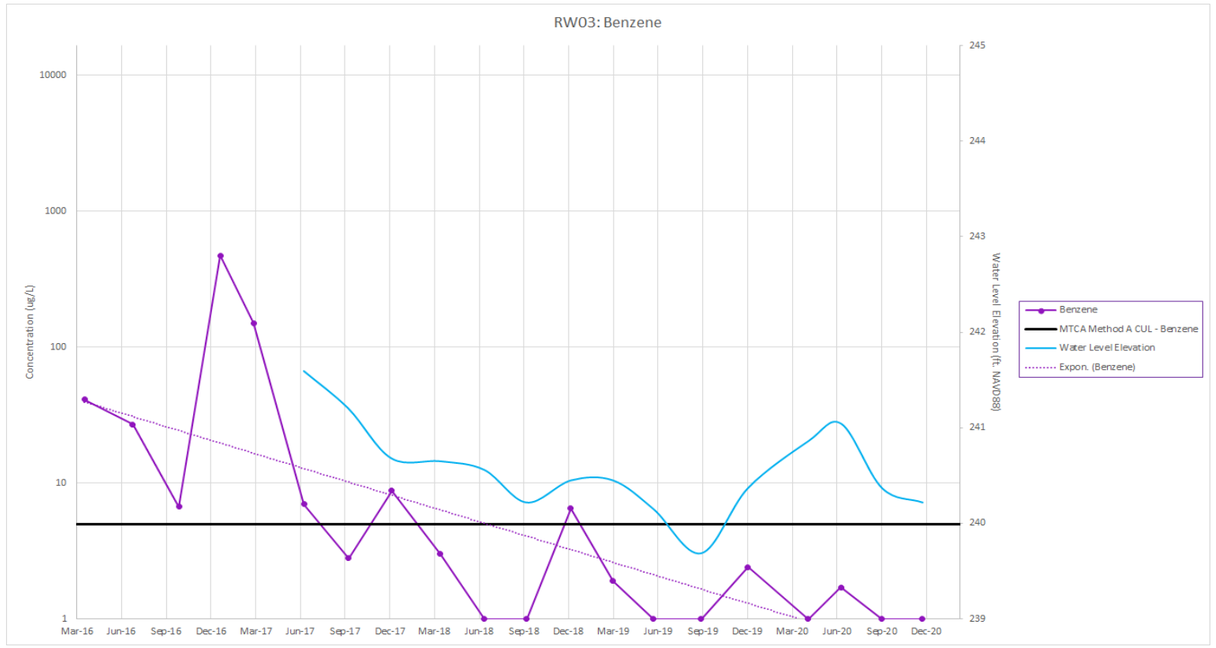
Notes:
-Laboratory reporting limit for benzene is 1 ug/L
-Laboratory reporting limit for gasoline-range TPH is 100 ug/L
-Laboratory reporting limit for diesel-range TPH is 50 ug/L

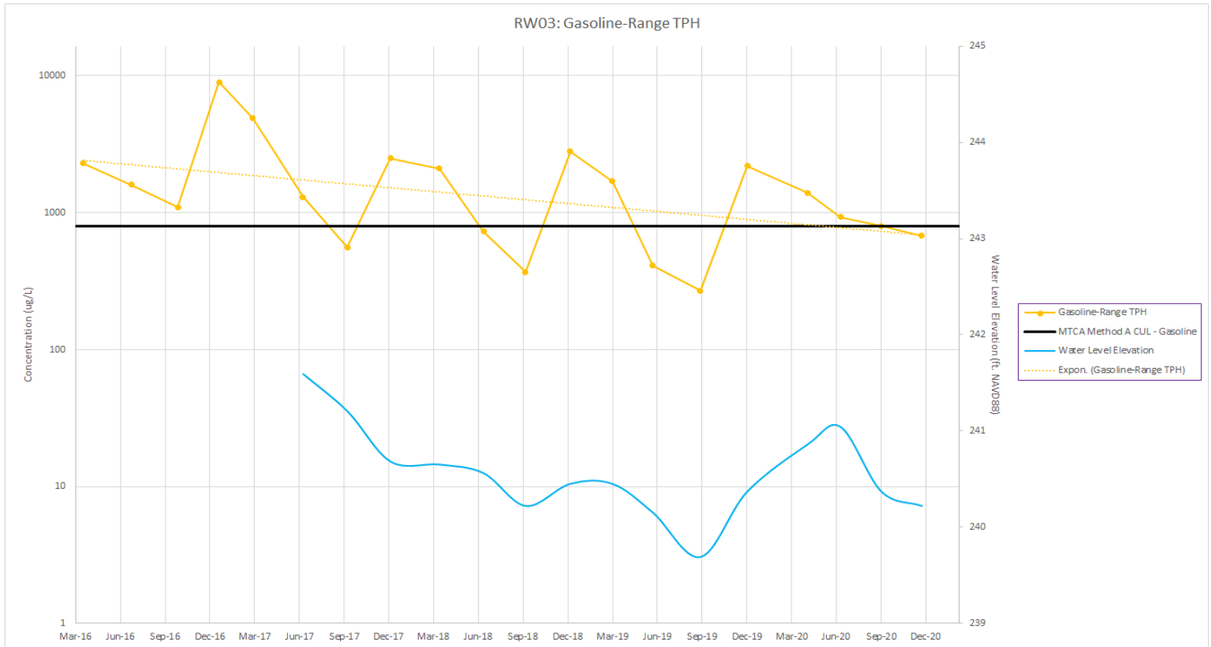
MW104 Postconstruction Data

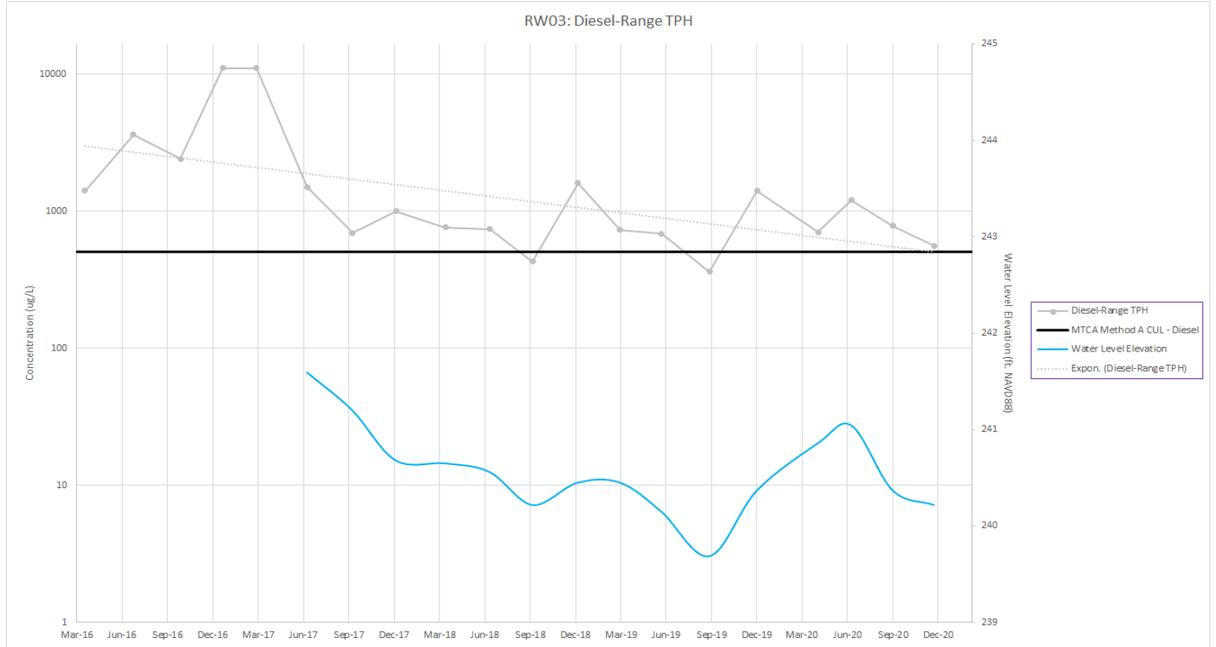
MNA Analysis and Pilot Study Results
SKS Shell Station Site
Seattle, Washington

Aspect Consulting	DEC-2020	BY: BBC	FIGURE NO. 4
	PROJECT NO. 160328	REVISED BY: ---	







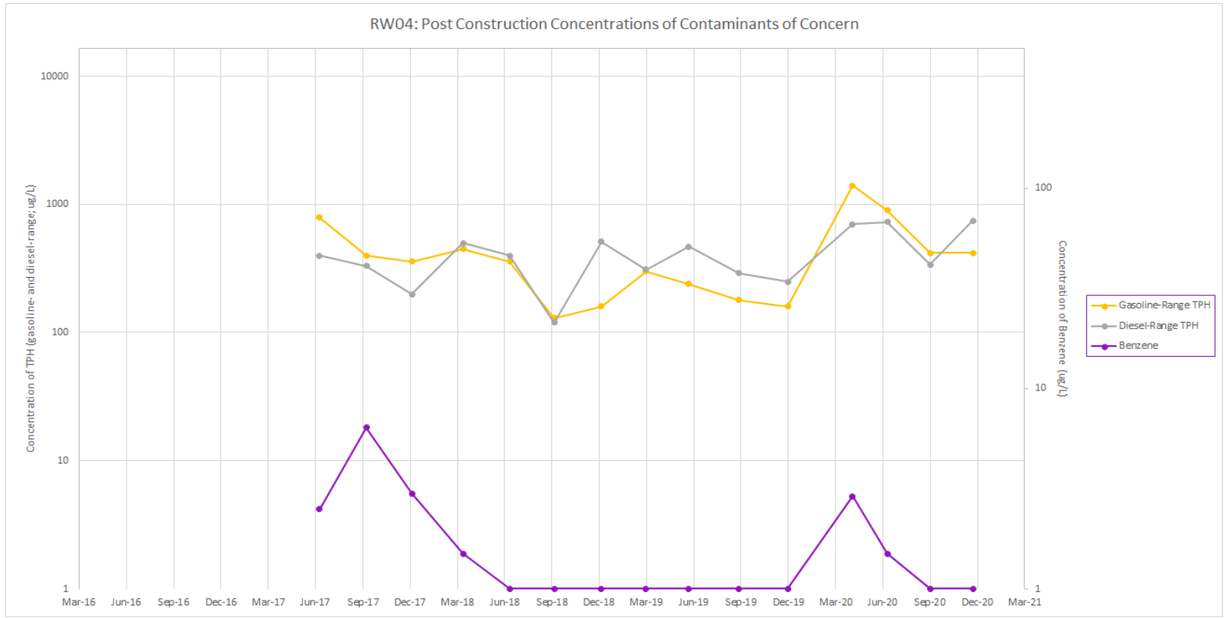


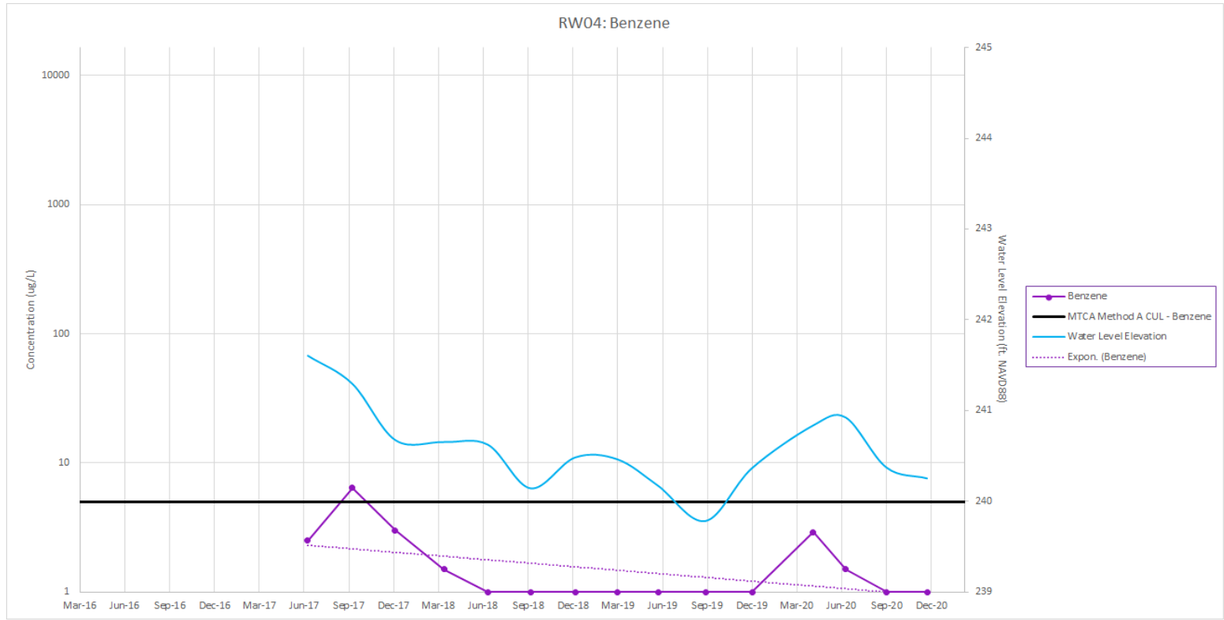
Notes:
-Laboratory reporting limit for benzene is 1 ug/L
-Laboratory reporting limit for gasoline-range TPH is 100 ug/L
-Laboratory reporting limit for diesel-range TPH is 50 ug/L

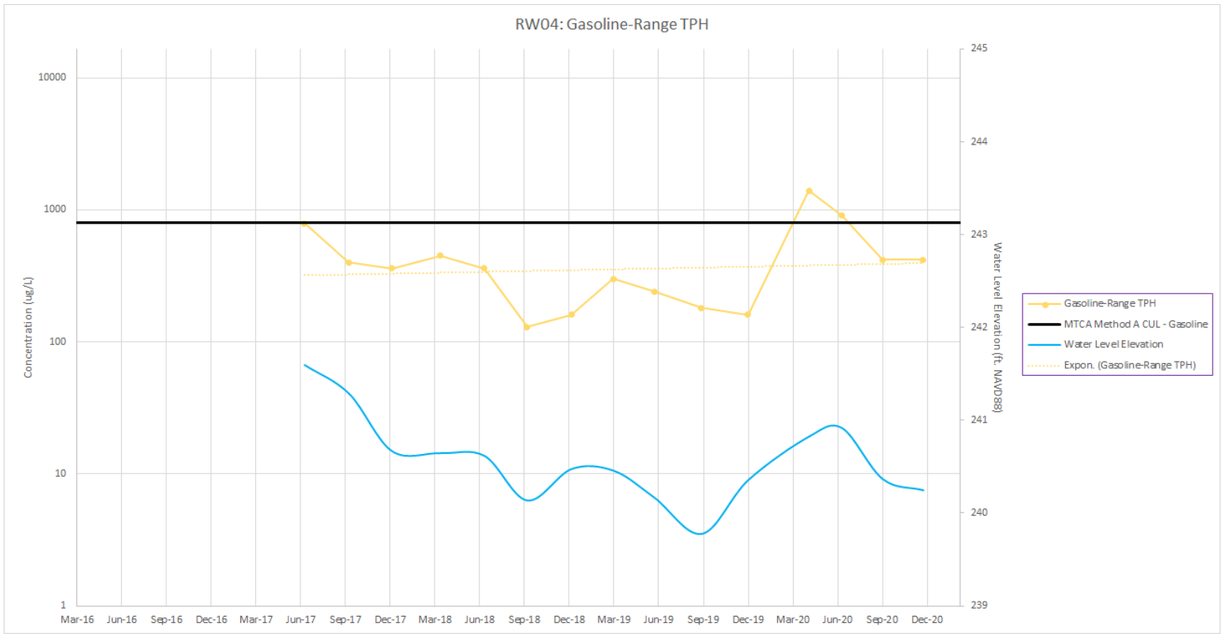
RW03 Postconstruction Data

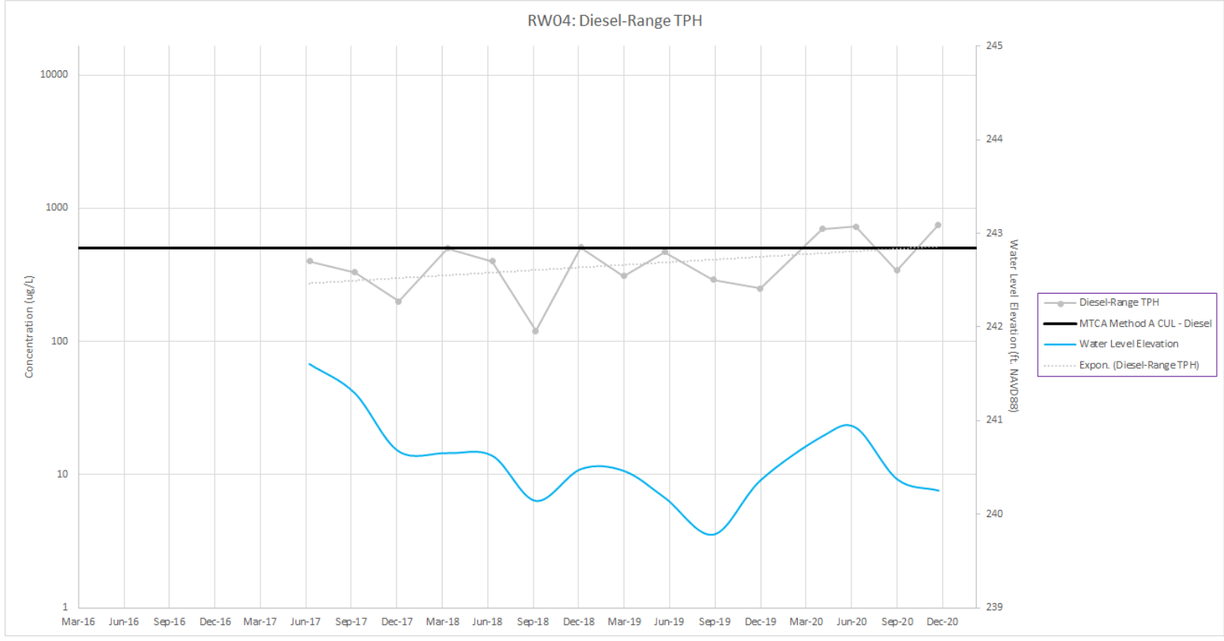
MNA Analysis and Pilot Study Results
SKS Shell Station Site
Seattle, Washington

Aspect Consulting	DEC-2020	BY: BBC	FIGURE NO. 5
	PROJECT NO. 160328	REVISED BY: ---	









Notes:
-Laboratory reporting limit for benzene is 1 ug/L
-Laboratory reporting limit for gasoline-range TPH is 100 ug/L
-Laboratory reporting limit for diesel-range TPH is 50 ug/L

RW04 Postconstruction Data

MNA Analysis and Pilot Study Results
SKS Shell Station Site
Seattle, Washington

Aspect Consulting	DEC-2020	BY: BBC	FIGURE NO. 6
	PROJECT NO. 160328	REVISED BY: ---	

APPENDIX A

MNAA Worksheets

Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)

Site Name:	*SKS Shell Station*
Site Address:	*3901 SW Alaska St*
Additional Description:	

Well (Sampling) Location?	**MW104**
Level of Confidence (Decision Criteria)?	**85%**

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

		Hazardous Substances (unit is ug/L)					
Sampling Event	Date Sampled	Benzene	Diesel-Range TPH	Gasoline-Range TPH			
#1	3/17/2017	1	7900	1400			
#2	6/15/2017	1	3000	700			
#3	9/14/2017	1	2200	460			
#4	12/12/2017	1	780	340			
#5	3/22/2018	1	590	220			
#6	6/21/2018	1	720	130			
#7	9/17/2018	1	480	100			
#8	12/18/2018	1	390	100			
#9	3/14/2019	1	690	170			
#10	6/6/2019	1	750	210			
#11	9/12/2019						
#12	12/19/2019	1	310	100			
#13	4/22/2020	1	200	100			
#14	6/30/2020	1	210	100			
#15	9/22/2020	1	380	100			
#16	12/15/2020	1	140	100			

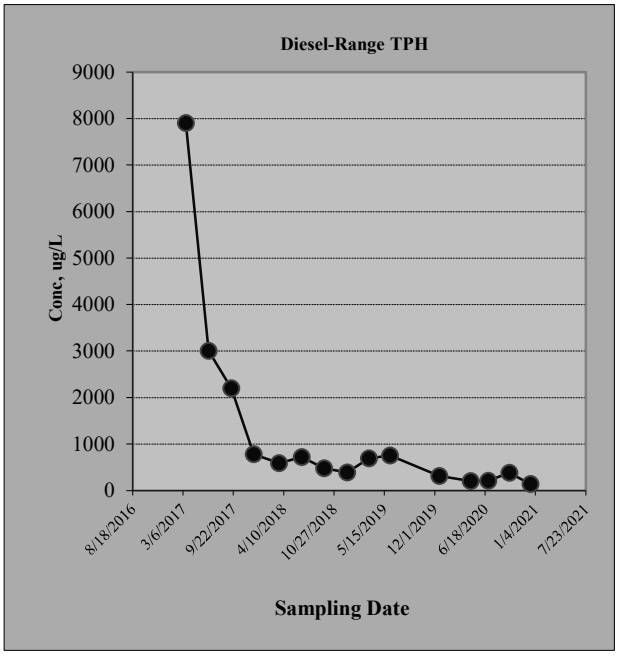
2. Mann-Kendall Non-parametric Statistical Test Results

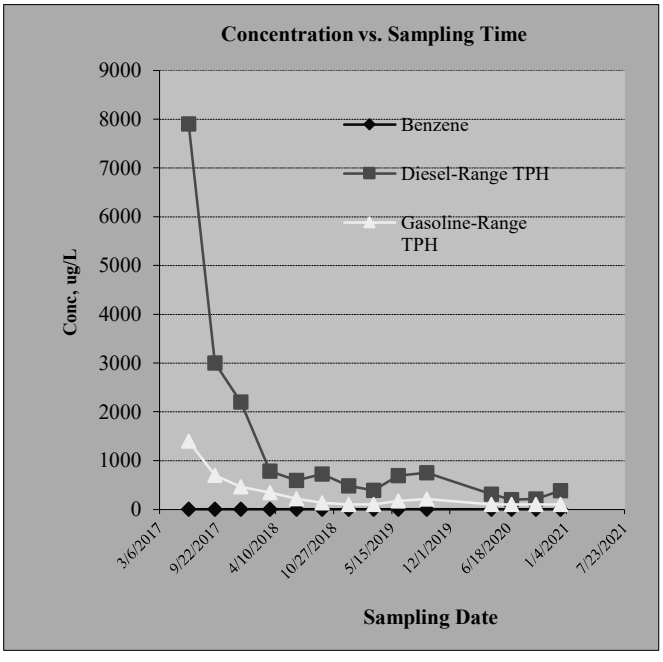
Hazardous Substance?	**Benzene**	**Diesel-Range TPH**	**Gasoline-Range TPH**			
Confidence Level Calculated?	-1400.00%	100.00%	100.00%	NA	NA	NA
Plume Stability?	Stable	Shrinking	Shrinking	NA	NA	NA
Coefficient of Variation?	CV <= 1			n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	0	-79	-70	0	0	0
Number of Sampling Rounds?	15	15	15	0	0	0
Average Concentration?	1.00	1249.33	288.67	NA	NA	NA
Standard Deviation?	0.00	2001.39	352.09	NA	NA	NA
Coefficient of Variation?	0.00	1.60	1.22	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **Diesel-Range TPH**

Plume Stability? **Shrinking**





Module 1: Mann-Whitney U Trend Test for Plume Stability: Non-parametric Statistical Test

(Wilcoxon Rank Sum Test)

Site Name: *SKS Shell Station*
Site Address: *3901 SW Alaska St., Seattle, WA*
Additional Description:

Well (Sampling) Location MW104

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

			Contaminant of Concern (unit is ug/L)					
Sampling Event	$D_n - D_{n-1}$	Date Sampled	Benzene	Gasoline	Diesel			
1		12/18/2018	1.00	100.00	390.00			
2	86	3/14/2019	1.00	170.00	690.00			
3	84	6/6/2019	1.00	210.00	750.00			
4	196	12/19/2019	1.00	100.00	310.00			
5	125	4/22/2020	1.00	100.00	200.00			
6	69	6/30/2020	1.00	100.00	210.00			
7	84	9/22/2020	1.00	100.00	380.00			
8	84	12/15/2020	1.00	100.00	140.00			

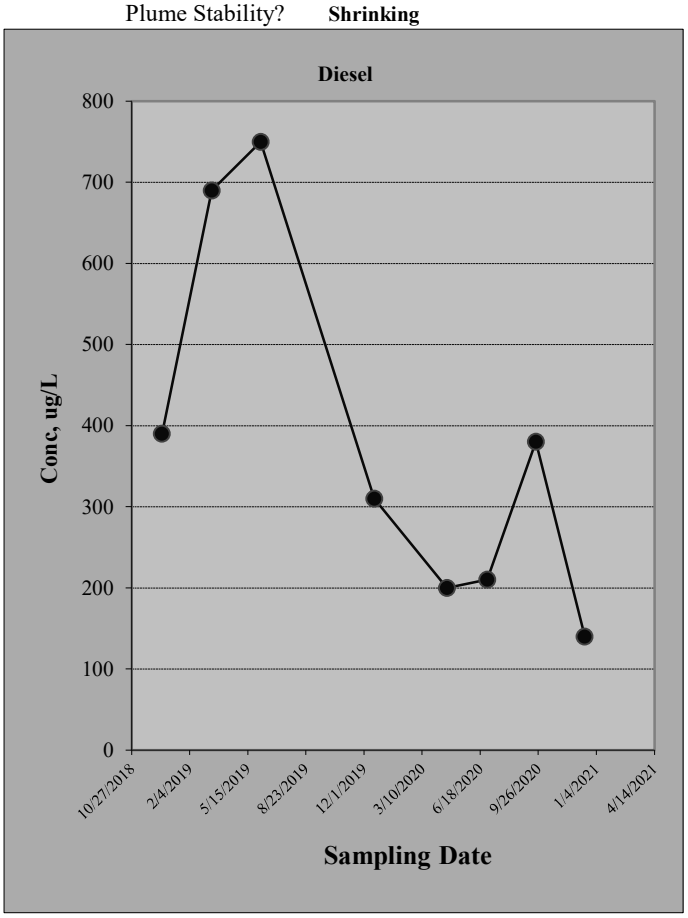
2. Mann-Whitney U Non-parametric Statistical Test Results (@ 90% Confidence Level pre-determined)

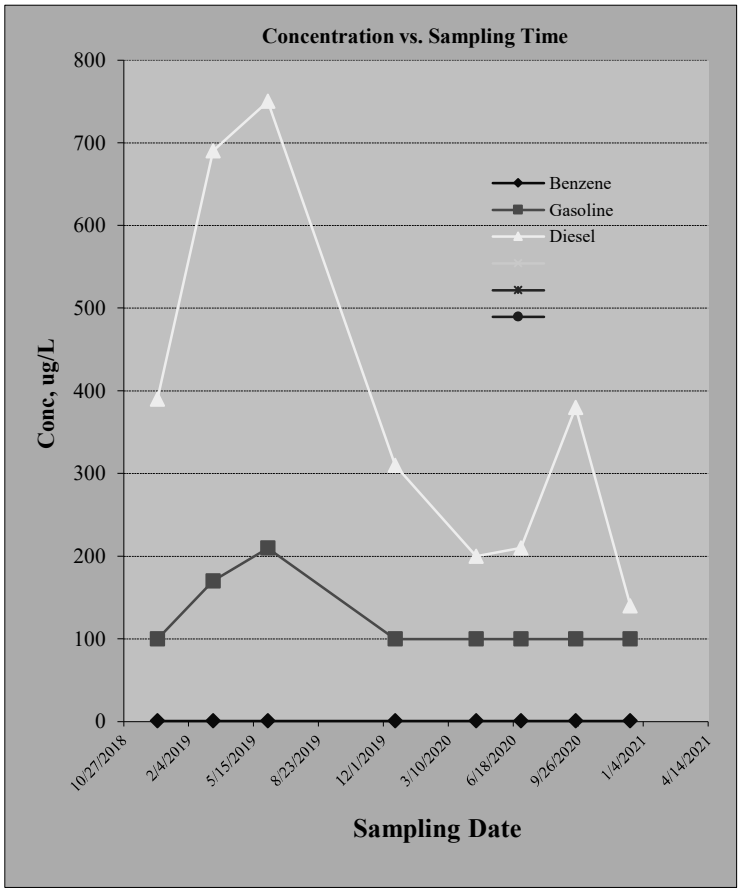
U Statistic?	8	4	1	n<8	n<8	n<8
Plume Stability?	Undetermined	Undetermined	Shrinking	n<8	n<8	n<8
Blank If No Errors found				n<8	n<8	n<8
		DATA IS NEITHER QUARTERLY OR SEMI-ANNUAL				

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **Diesel**

Plume Stability? **Shrinking**





Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)

Site Name:	*SKS Shell Station*
Site Address:	*3901 SW Alaska St*
Additional Description:	

Well (Sampling) Location?	**RW03**
Level of Confidence (Decision Criteria)?	**85%**

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

		Hazardous Substances (unit is ug/L)					
Sampling Event	Date Sampled	Benzene	Diesel-Range TPH	Gasoline-Range TPH			
#1	3/17/2017	150	11000	4900			
#2	6/15/2017	7	1500	1300			
#3	9/14/2017	2.8	690	560			
#4	12/12/2017	8.8	1000	2500			
#5	3/22/2018	3	760	2100			
#6	6/21/2018	1	740	730			
#7	9/17/2018	1	430	370			
#8	12/18/2018	6.5	1600	2800			
#9	3/14/2019	1.9	730	1700			
#10	6/6/2019	1	680	410			
#11	9/12/2019	1	360	270			
#12	12/19/2019	2.4	1400	2200			
#13	4/22/2020	1	700	1400			
#14	6/30/2020	1.7	1200	930			
#15	9/22/2020	1	780	800			
#16	12/15/2020	1	560	680			

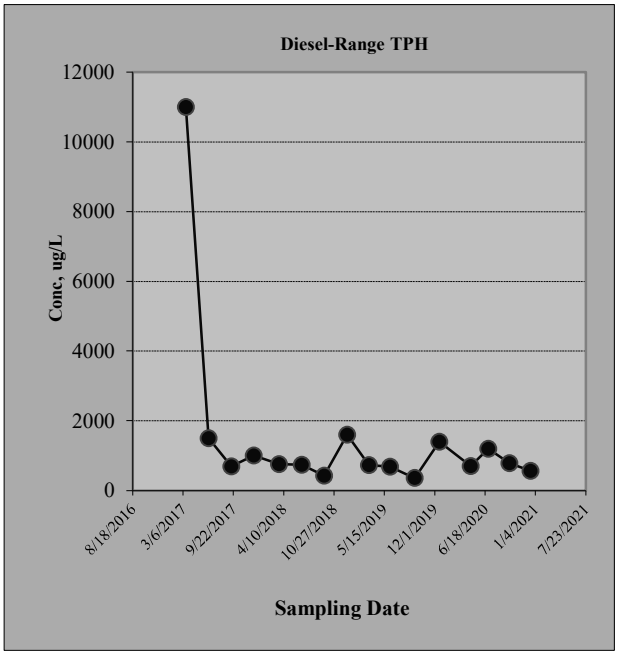
2. Mann-Kendall Non-parametric Statistical Test Results

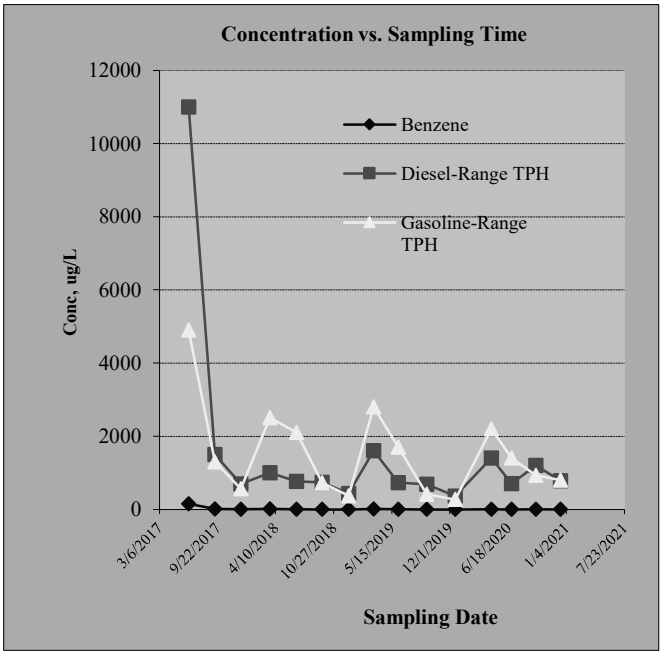
Hazardous Substance?	**Benzene**	**Diesel-Range TPH**	**Gasoline-Range TPH**			
Confidence Level Calculated?	99.70%	93.00%	91.70%	NA	NA	NA
Plume Stability?	Shrinking	Shrinking	Shrinking	NA	NA	NA
Coefficient of Variation?				n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	-61	-34	-32	0	0	0
Number of Sampling Rounds?	16	16	16	0	0	0
Average Concentration?	11.94	1508.13	1478.13	NA	NA	NA
Standard Deviation?	36.90	2557.89	1214.47	NA	NA	NA
Coefficient of Variation?	3.09	1.70	0.82	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **Diesel-Range TPH**

Plume Stability? **Shrinking**





Module 1: Mann-Whitney U Trend Test for Plume Stability: Non-parametric Statistical Test

(Wilcoxon Rank Sum Test)

Site Name: *SKS Shell Station*
Site Address: *3901 SW Alaska St., Seattle, WA*
Additional Description:

Well (Sampling) Location RW03

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

			Contaminant of Concern (unit is ug/L)					
Sampling Event	$D_n - D_{n-1}$	Date Sampled	Benzene	Gasoline	Diesel			
1st Yr, 1st Qtr		3/15/2019	1.90	1,700.00	730.00			
1st Yr, 2nd Qtr	99	6/22/2019	1.00	410.00	680.00			
1st Yr, 3rd Qtr	83	9/13/2019	1.00	270.00	360.00			
1st Yr, 4th Qtr	97	12/19/2019	2.40	2,200.00	1,400.00			
2nd Yr, 1st Qtr	125	4/22/2020	1.00	1,400.00	700.00			
2nd Yr, 2nd Qtr	69	6/30/2020	1.70	930.00	1,200.00			
2nd Yr, 3rd Qtr	84	9/22/2020	1.00	800.00	780.00			
2nd Yr, 4th Qtr	83	12/14/2020	1.00	680.00	560.00			

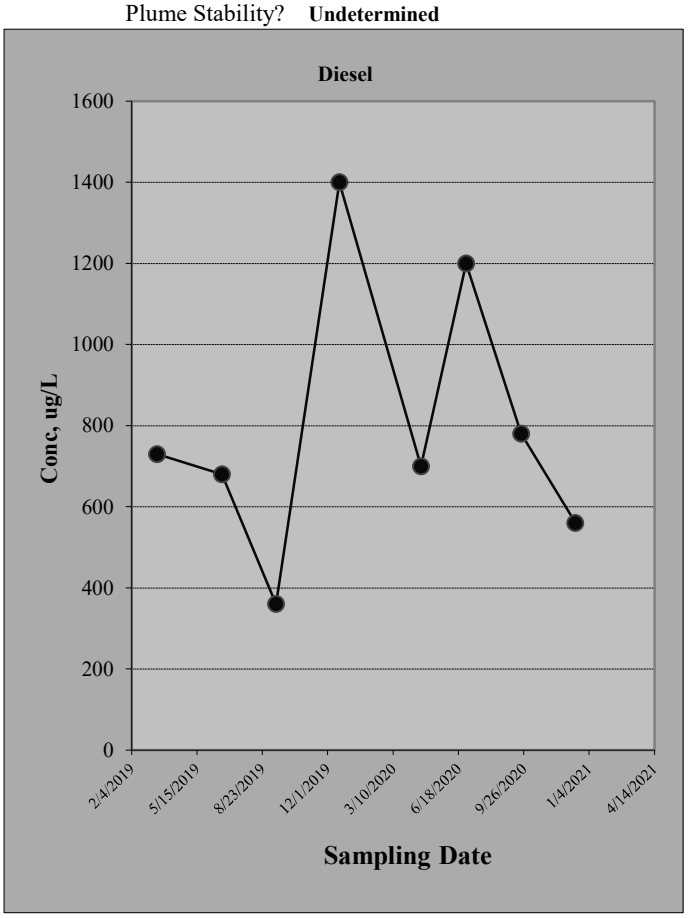
2. Mann-Whitney U Non-parametric Statistical Test Results (@ 90% Confidence Level pre-determined)

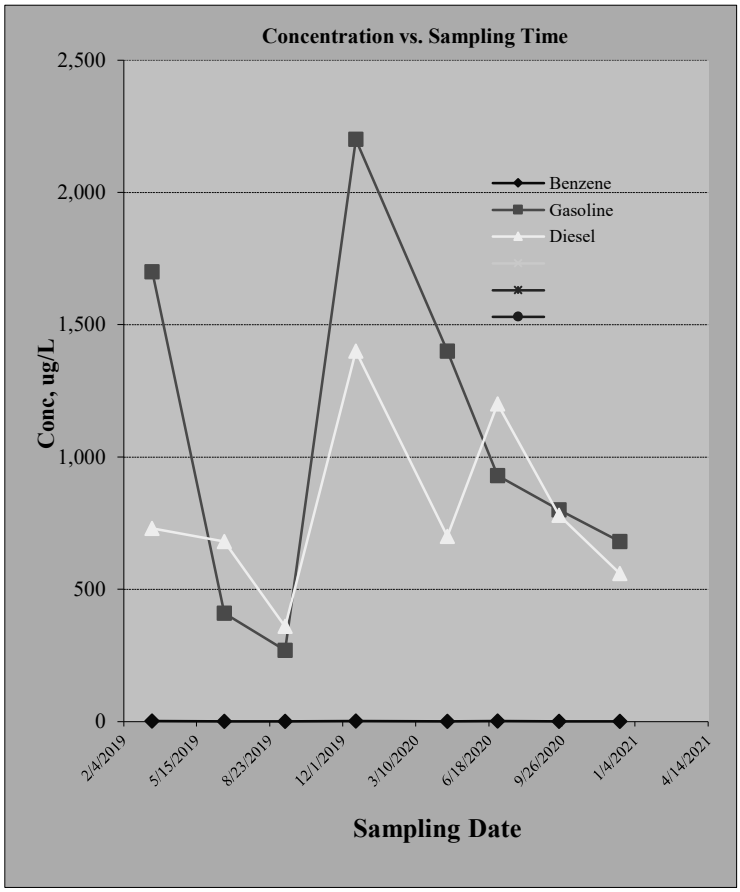
U Statistic?	5	8	9	n<8	n<8	n<8
Plume Stability?	Undetermined	Undetermined	Undetermined	n<8	n<8	n<8
Blank If No Errors found				n<8	n<8	n<8
DATA FROM QUARTERLY SAMPLING						

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **Diesel**

Plume Stability? **Undetermined**





Module1: Mann-Kendall Trend Test for Plume Stability (Non-parametric Statistical Test)

Site Name:	*SKS Shell Station*
Site Address:	*3901 SW Alaska St*
Additional Description:	

Well (Sampling) Location?	**RW04**
Level of Confidence (Decision Criteria)?	**85%**

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

		Hazardous Substances (unit is ug/L)					
Sampling Event	Date Sampled	Benzene	Diesel-Range TPH	Gasoline-Range TPH			
#1							
#2	6/15/2017	2.5	400	790			
#3	9/14/2017	6.4	330	400			
#4	12/12/2017	3	200	360			
#5	3/22/2018	1.5	500	450			
#6	6/21/2018	1	400	360			
#7	9/17/2018	1	120	130			
#8	12/18/2018	1	510	160			
#9	3/14/2019	1	310	300			
#10	6/6/2019	1	470	240			
#11	9/12/2019	1	290	180			
#12	12/19/2019	1	250	160			
#13	4/22/2020	2.9	700	1400			
#14	6/30/2020	1.5	730	900			
#15	9/22/2020	1	340	420			
#16	12/15/2020	1	750	420			

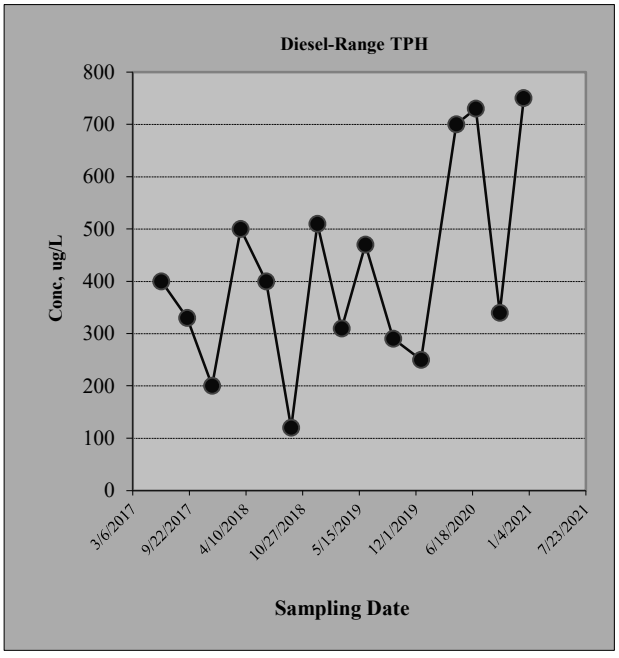
2. Mann-Kendall Non-parametric Statistical Test Results

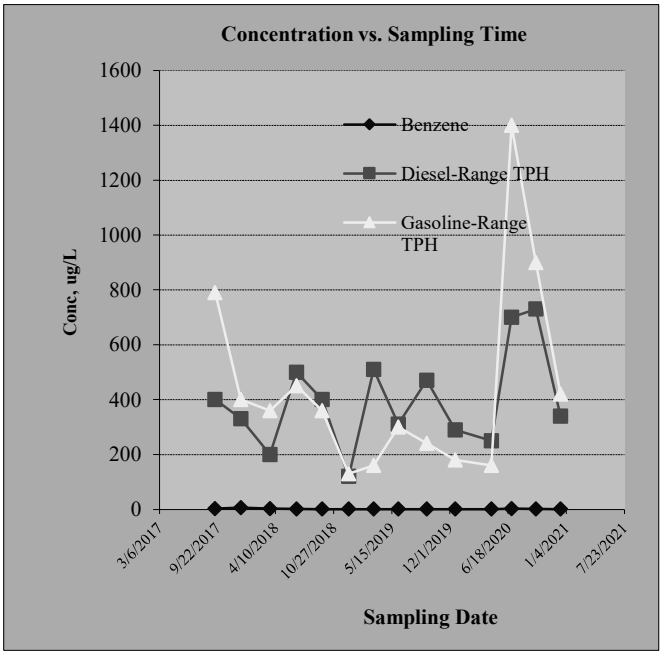
Hazardous Substance?	**Benzene**	**Diesel-Range TPH**	**Gasoline-Range TPH**			
Confidence Level Calculated?	93.00%	89.90%	50.00%	NA	NA	NA
Plume Stability?	Shrinking	***Expanding***	Stable	NA	NA	NA
Coefficient of Variation?			CV <= 1	n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	-32	28	-2	0	0	0
Number of Sampling Rounds?	15	15	15	0	0	0
Average Concentration?	1.79	420.00	444.67	NA	NA	NA
Standard Deviation?	1.47	191.24	343.38	NA	NA	NA
Coefficient of Variation?	0.82	0.46	0.77	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **Diesel-Range TPH**

Plume Stability? **Expanding**





Module 1: Mann-Whitney U Trend Test for Plume Stability: Non-parametric Statistical Test

(Wilcoxon Rank Sum Test)

Site Name: *SKS Shell Station*
Site Address: *3901 SW Alaska St., Seattle, WA*
Additional Description:

Well (Sampling) Location RW04

1. Monitoring Well Information: Contaminant Concentration at a well: Quarterly sampling recommended.

			Contaminant of Concern (unit is ug/L)					
Sampling Event	$D_n - D_{n-1}$	Date Sampled	Benzene	Gasoline	Diesel			
1st Yr, 1st Qtr		3/15/2019	1.00	300.00	310.00			
1st Yr, 2nd Qtr	99	6/22/2019	1.00	240.00	470.00			
1st Yr, 3rd Qtr	83	9/13/2019	1.00	180.00	290.00			
1st Yr, 4th Qtr	97	12/19/2019	1.00	160.00	250.00			
2nd Yr, 1st Qtr	125	4/22/2020	2.90	1,400.00	700.00			
2nd Yr, 2nd Qtr	69	6/30/2020	1.50	900.00	730.00			
2nd Yr, 3rd Qtr	84	9/22/2020	1.00	420.00	340.00			
2nd Yr, 4th Qtr	83	12/14/2020	1.00	420.00	750.00			

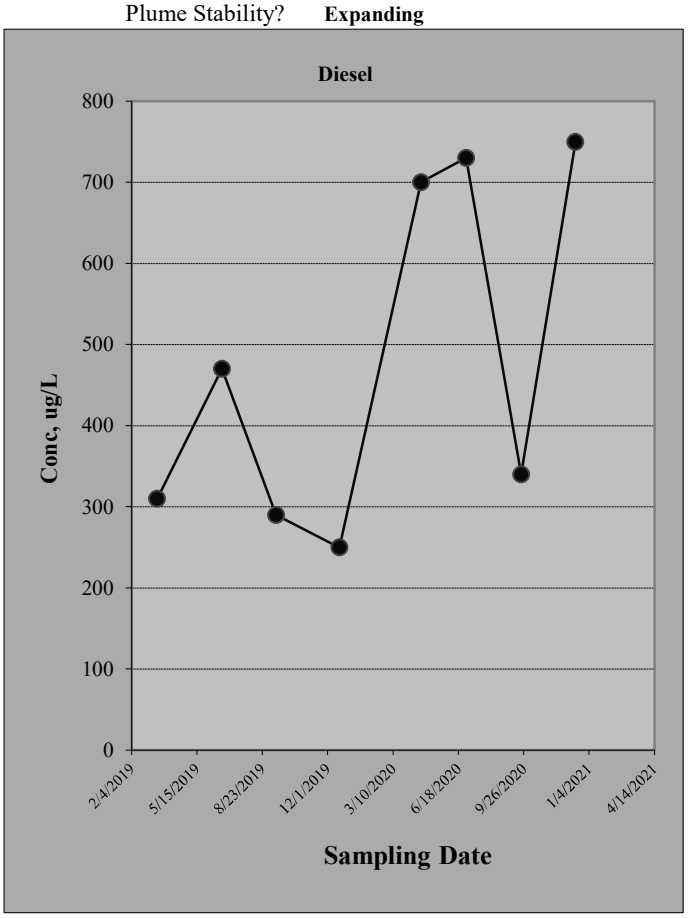
2. Mann-Whitney U Non-parametric Statistical Test Results (@ 90% Confidence Level pre-determined)

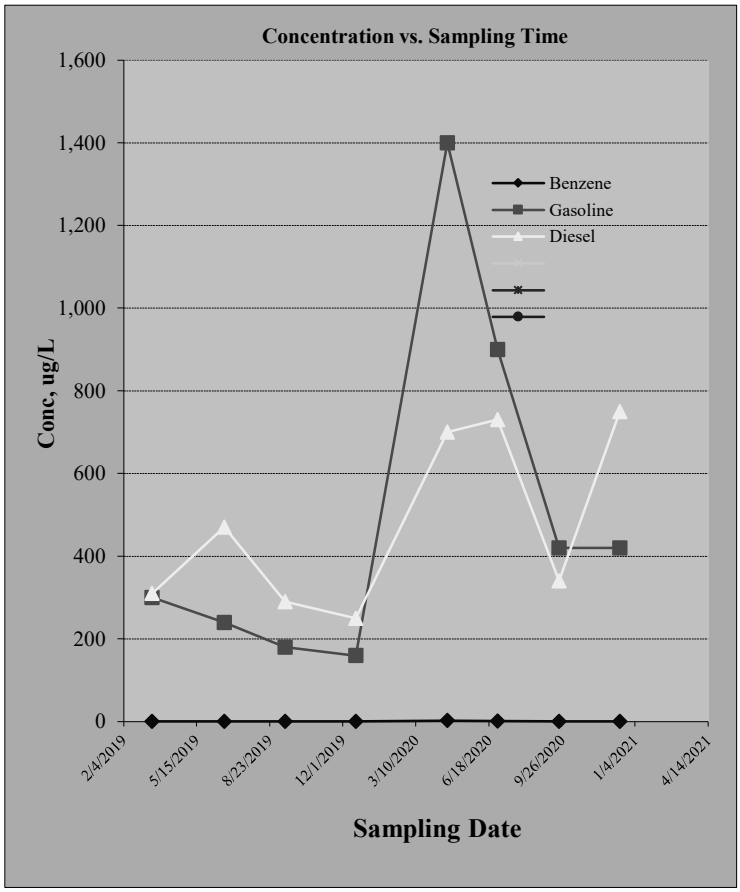
U Statistic?	12	16	15	n<8	n<8	n<8
Plume Stability?	Undetermined	***Expanding***	***Expanding***	n<8	n<8	n<8
Blank If No Errors found				n<8	n<8	n<8
DATA FROM QUARTERLY SAMPLING						

3. Temporal Trend: Plot of Concentration vs. Sampling Time

Hazardous substance? **Diesel**

Plume Stability? **Expanding**





APPENDIX B

Sump Monitoring Records

Table B1. Sump Results at RW03

Project No. 160328, SKS Shell Station Site, Seattle, Washington

Date/Time	Fluorescence (ppb Rhodamine WT)	Turbidity (NTU)	Depth to Water in Sump	Water Level Elevation in Sump (ft NAVD88)	Precipitation (inches)	Precipitation (daily cumulative inches)
1/5/2021 11:00	-0.672	2.56	10.82	237.18	0	0
1/5/2021 11:30	0.065	3.21	10.82	237.18	0	0
1/5/2021 12:00	0.514	2.98	12.44	235.56	0.03	0.03
1/5/2021 12:30	-0.066	6.19	13.65	234.35	0.04	0.07
1/5/2021 13:00	0.399	7.95	11.04	236.96	0.04	0.11
1/5/2021 13:30	0.5	8.09	13.50	234.5	0.05	0.16
1/5/2021 14:00	0.997	6.02	11.12	236.88	0.03	0.19
1/5/2021 14:30	-0.89	5.83	14.23	233.77	0.04	0.23
1/5/2021 15:00	0.083	5.04	11.58	236.42	0.02	0.25
1/5/2021 15:30	0.371	6.05	11.74	236.26	0.03	0.28
1/6/2021 9:40	1.005	2.81	13.27	234.73	0	0
1/6/2021 10:15	2.142	2.65	12.88	235.12	0	0
1/6/2021 10:45	1.335	6.41	12.60	235.4	0	0
1/6/2021 11:15	0.532	4.65	12.34	235.66	0	0
1/6/2021 11:45	1.462	2.73	12.10	235.9	0	0
1/6/2021 12:15	0.922	3.73	11.81	236.19	0	0
1/6/2021 12:45	2.34	3.97	11.67	236.33	0	0
1/6/2021 13:15	2.119	4.1	11.41	236.59	0	0
1/6/2021 13:45	1.075	3.96	11.22	236.78	0	0
1/6/2021 14:15	0.991	2.92	11.15	236.85	0	0
1/6/2021 14:45	2.332	3.9	11.10	236.9	0	0
1/7/2021 9:30	3.892	4.94	11.20	236.8	0	0
1/7/2021 9:45	3.282	1.6	11.14	236.86	0	0
1/7/2021 10:00	2.27	1.66	11.11	236.89	0	0
1/7/2021 10:15	3.252	2.18	11.08	236.92	0	0
1/7/2021 10:30	2.898	1.68	11.03	236.97	0	0
1/7/2021 10:45	3.242	1.99	11.00	237	0	0
1/7/2021 13:45	1.16	3.27	13.16	234.84	0	0
1/7/2021 14:00	2.962	5.85	13.08	234.92	0	0
1/7/2021 14:15	1.688	4.85	12.89	235.11	0	0
1/7/2021 14:30	2.37	1.88	12.89	235.11	0	0

Table B1. Sump Results at RW03

Project No. 160328, SKS Shell Station Site, Seattle, Washington

Date/Time	Fluorescence (ppb Rhodamine WT)	Turbidity (NTU)	Depth to Water in Sump	Water Level Elevation in Sump (ft NAVD88)	Precipitation (inches)	Precipitation (daily cumulative inches)
1/7/2021 14:45	3.145	4.94	12.75	235.25	0	0
1/7/2021 15:00	4.633	3.72	12.68	235.32	0	0
1/7/2021 15:15	1.836	4.13	12.60	235.4	0	0
1/7/2021 15:30	1.324	2.67	12.52	235.48	0	0
1/8/2021 9:40	3.73	7.88	11.10	236.9	0	0
1/8/2021 10:15	3.602	6.54	14.54	233.46	0.01	0.01
1/8/2021 10:30	5.04	7.31	13.88	234.12	0	0.01
1/8/2021 10:45	2.361	5.39	13.23	234.77	0	0.01
1/8/2021 11:00	3.189	5.88	13.04	234.96	0	0.01
1/8/2021 11:15	7.475	6.61	12.84	235.16	0	0.01
1/8/2021 11:30	0.211	5.82	12.60	235.4	0	0.01
1/8/2021 11:45	3.176	5.52	12.48	235.52	0	0.01
1/8/2021 12:00	8.18	5.15	12.30	235.7	0.01	0.02
1/8/2021 12:15	2.613	4.37	12.20	235.8	0	0.02
1/8/2021 12:30	2.239	4.39	12.11	235.89	0	0.02
1/8/2021 12:45	5.77	4.31	12.01	235.99	0	0.02
1/8/2021 13:00	4.117	4.59	11.92	236.08	0	0.02
1/8/2021 13:15	1.56	4.31	11.81	236.19	0	0.02
1/8/2021 13:30	2.208	3.59	11.76	236.24	0	0.02
1/9/2021 12:15	6.245	2.18	11.31	236.69	0	0

Table B2. Sump Results at RW04

Project No. 160328, SKS Shell Station Site, Seattle, Washington

Date/Time	Fluorescence (ppb Fluorescein)	Turbidity (NTU)	Depth to Water in Sump (ft)	Water Level Elevation in Sump (ft NAVD88)
1/7/2021 11:45	9.128	4.61	10.89	237.11
1/7/2021 12:30	10.028	5.51	14.23	233.77
1/7/2021 12:45	9.144	4.62	14	234
1/7/2021 13:00	7.83	3.2	13.66	234.34
1/7/2021 13:15	8.841	4.11	13.41	234.59
1/7/2021 13:30	6.804	4.65	13.28	234.72
1/7/2021 13:45	9.3	3.21	13.16	234.84
1/7/2021 14:00	7.232	5.85	13.08	234.92
1/7/2021 14:15	9.106	4.85	12.89	235.11
1/7/2021 14:30	9.543	1.88	12.89	235.11
1/7/2021 14:45	7.155	4.94	12.89	235.11
1/7/2021 15:00	5.381	3.72	12.68	235.32
1/7/2021 15:15	9.552	4.13	12.6	235.4
1/7/2021 15:30	6.048	2.67	12.52	235.48
1/8/2021 9:40	1.468	7.88	11.1	236.9
1/8/2021 10:15	1.474	6.54	14.54	233.46
1/8/2021 10:30	1.486	7.31	13.88	234.12
1/8/2021 10:45	1.641	5.39	13.23	234.77
1/8/2021 11:00	2.18	5.88	13.04	234.96
1/8/2021 11:15	3.43	6.61	12.84	235.16
1/8/2021 11:30	1.371	5.82	12.6	235.4
1/8/2021 11:45	1.602	5.52	12.48	235.52
1/8/2021 12:00	2.331	5.15	12.3	235.7
1/8/2021 12:15	1.796	4.37	12.2	235.8
1/8/2021 12:30	1.844	4.39	12.11	235.89
1/8/2021 12:45	1.733	4.31	12.01	235.99
1/8/2021 13:00	1.598	4.59	11.92	236.08
1/8/2021 13:15	1.852	4.31	11.81	236.19
1/8/2021 13:30	1.899	3.59	11.76	236.24
1/9/2021 12:15	3.332	2.18	11.31	236.69
1/11/2021 9:30	0.887	17	12.99	235.01
1/11/2021 10:00	0.453	16.5	14.4	233.6
1/11/2021 10:15	0.888	11.7	11.59	236.41
1/11/2021 10:30	0.408	11.1	13.11	234.89
1/11/2021 11:10	1.195	7.58	12.2	235.8
1/11/2021 11:30	0.652	8.54	14.26	233.74
1/11/2021 11:45	1.341	5.97	13.91	234.09
1/11/2021 12:00	1.022	5.84	13.96	234.04
1/11/2021 12:15	0.61	6.44	14.41	233.59
1/11/2021 12:30	0.838	5.72	12.26	235.74
1/11/2021 12:45	0.91	5.84	10.95	237.05
1/11/2021 13:00	0.929	5.39	13.5	234.5
1/11/2021 13:15	1.071	3.95	14.7	233.3
1/11/2021 13:30	1.714	5.66	12.61	235.39
1/11/2021 13:45	1.151	5.28	11.29	236.71
1/11/2021 14:00	1.144	4.53	14.15	233.85

Table B2. Sump Results at RW04

Project No. 160328, SKS Shell Station Site, Seattle, Washington

Date/Time	Fluorescence (ppb Fluorescein)	Turbidity (NTU)	Depth to Water in Sump (ft)	Water Level Elevation in Sump (ft NAVD88)
1/11/2021 14:15	1.423	5.48	12.8	235.2
1/11/2021 14:30	1.024	5.37	12.25	235.75
1/11/2021 14:45	1.785	3.72	11.75	236.25
1/11/2021 15:00	1.68	3.53	11.11	236.89
1/11/2021 15:15	1.753	4.9	14.34	233.66
1/11/2021 15:30	1.796	8.86	11.98	236.02
1/11/2021 15:45	1.223	7.73	10.9	237.1
1/11/2021 16:00	1.675	6.09	13.91	234.09
1/12/2021 9:15	7.904	3.23	12.87	235.13
1/12/2021 9:30	4.642	5.55	13.23	234.77
1/12/2021 9:45	4.339	4.24	12.42	235.58
1/12/2021 10:00	4.557	4.81	13.85	234.15
1/12/2021 10:15	4.333	4.87	11.67	236.33
1/12/2021 10:30	4.582	4.51	11.02	236.98
1/12/2021 10:45	5.277	2.06	12.25	235.75
1/12/2021 11:00	4.108	4.61	12.34	235.66
1/12/2021 11:15	4.652	5.93	12.5	235.5
1/12/2021 11:30	4.836	4.88	11.25	236.75
1/12/2021 11:45	4.76	6.11	11.24	236.76
1/12/2021 12:00	5.597	6.62	12.11	235.89

Table B3. Sump Results at RW05

Project No. 160328, SKS Shell Station Site, Seattle, Washington

Date/Time	Fluorescence (ppb Eosine)	Turbidity (NTU)	Depth to Water in Sump (ft)	Water Level Elevation in Sump (ft NAVD88)
1/11/2021 9:30	46.51	17	12.99	235.01
1/11/2021 10:00	110.1	16.5	14.4	233.6
1/11/2021 10:15	60.64	11.7	11.59	236.41
1/11/2021 10:30	46.22	11.1	13.11	234.89
1/11/2021 11:10	131.1	7.58	12.2	235.8
1/11/2021 11:30	67.48	8.54	14.26	233.74
1/11/2021 11:45	136.4	5.97	13.91	234.09
1/11/2021 12:00	119.9	5.84	13.96	234.04
1/11/2021 12:15	69.43	6.44	14.41	233.59
1/11/2021 12:30	70.78	5.72	12.26	235.74
1/11/2021 12:45	66.91	5.84	10.95	237.05
1/11/2021 13:00	72.26	5.39	13.5	234.5
1/11/2021 13:15	93.28	3.95	14.7	233.3
1/11/2021 13:30	133.9	5.66	12.61	235.39
1/11/2021 13:45	75.45	5.28	11.29	236.71
1/11/2021 14:00	103.8	4.53	14.15	233.85
1/11/2021 14:15	58.52	5.48	12.8	235.2
1/11/2021 14:30	66.91	5.37	12.25	235.75
1/11/2021 14:45	84.17	3.72	11.75	236.25
1/11/2021 15:00	66.9	3.53	11.11	236.89
1/11/2021 15:15	62.9	4.9	14.34	233.66
1/11/2021 15:30	75.43	8.86	11.98	236.02
1/11/2021 15:45	61.1	7.73	10.9	237.1
1/11/2021 16:00	75.41	6.09	13.91	234.09
1/12/2021 9:15	37.89	3.23	12.87	235.13
1/12/2021 9:30	75.82	5.55	13.23	234.77
1/12/2021 9:45	45.42	4.24	12.42	235.58
1/12/2021 10:00	77.88	4.81	13.85	234.15
1/12/2021 10:15	68.75	4.87	11.67	236.33
1/12/2021 10:30	71.95	4.51	11.02	236.98
1/12/2021 10:45	36.51	2.06	12.25	235.75
1/12/2021 11:00	58.25	4.61	12.34	235.66
1/12/2021 11:15	88.18	5.93	12.5	235.5
1/12/2021 11:30	69.03	4.88	11.25	236.75
1/12/2021 11:45	82.44	6.11	11.24	236.76
1/12/2021 12:00	66.65	6.62	12.11	235.89

APPENDIX C

Laboratory Reports

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 012224
Work Order Number 2012252

December 22, 2020

Attention Michael Erdahl:

Fremont Analytical, Inc. received 4 sample(s) on 12/15/2020 for the analyses presented in the following report.

Dissolved Gases by RSK-175
Ion Chromatography by EPA Method 300.0
Sulfide by SM 4500-S2-F
Total Alkalinity by SM 2320B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/22/2020*

CLIENT: Friedman & Bruya
Project: 012224
Work Order: 2012252

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2012252-001	MW105-121420	12/14/2020 10:40 AM	12/15/2020 12:49 PM
2012252-002	RW03-121420	12/14/2020 12:25 PM	12/15/2020 12:49 PM
2012252-003	RW04-121420	12/14/2020 1:25 PM	12/15/2020 12:49 PM
2012252-004	RW05-121420	12/14/2020 2:20 PM	12/15/2020 12:49 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2012252**
Date: **12/22/2020**

CLIENT: Friedman & Bruya
Project: 012224

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2012252**
Date Reported: **12/22/2020**

Client: Friedman & Bruya
Collection Date: 12/14/2020 10:40:00 A
Project 012224
Lab ID: 2012252-001
Matrix: Water
Client Sample ID: **MW105-121420**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R64178		Analyst MS
Methane	ND	0.00863		mg/L	1	12/21/2020 12:55:00 PM
Ion Chromatography by EPA Method 300.0				Batch ID: 30738		Analyst SS
Nitrite (as N)	0.274	0.200	D	mg/L	2	12/15/2020 11:55:00 PM
Nitrate (as N)	3.33	0.200	D	mg/L	2	12/15/2020 11:55:00 PM
Sulfate	53.9	1.50	D	mg/L	5	12/16/2020 9:56:00 AM
Total Alkalinity by SM 2320B				Batch ID: R64198		Analyst TN
Alkalinity, Total (As CaCO3)	202	2.50		mg/L	1	12/22/2020 12:33:23 PM
Sulfide by SM 4500-S2-F				Batch ID: R64180		Analyst SS
Sulfide	ND	0.500		mg/L	1	12/21/2020 3:00:00 PM

Analytical Report

Work Order: **2012252**
Date Reported: **12/22/2020**

Client: Friedman & Bruya
Collection Date: 12/14/2020 12:25:00 P
Project 012224
Lab ID: 2012252-002
Matrix: Water
Client Sample ID: **RW03-121420**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R64178		Analyst MS
Methane	0.0597	0.00863		mg/L	1	12/21/2020 12:59:00 PM
Ion Chromatography by EPA Method 300.0				Batch ID: 30738		Analyst SS
Nitrite (as N)	ND	0.200	D	mg/L	2	12/16/2020 12:18:00 AM
Nitrate (as N)	ND	0.200	D	mg/L	2	12/16/2020 12:18:00 AM
Sulfate	20.6	0.600	D	mg/L	2	12/16/2020 12:18:00 AM
NOTES: Diluted due to matrix.						
Total Alkalinity by SM 2320B				Batch ID: R64198		Analyst TN
Alkalinity, Total (As CaCO3)	279	2.50		mg/L	1	12/22/2020 12:33:23 PM
Sulfide by SM 4500-S2-F				Batch ID: R64180		Analyst SS
Sulfide	ND	0.500		mg/L	1	12/21/2020 3:00:00 PM

Analytical Report

Work Order: **2012252**
Date Reported: **12/22/2020**

Client: Friedman & Bruya
Collection Date: 12/14/2020 1:25:00 PM
Project 012224
Lab ID: 2012252-003
Matrix: Water
Client Sample ID: **RW04-121420**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R64178		Analyst MS
Methane	0.0299	0.00863		mg/L	1	12/21/2020 1:02:00 PM
Ion Chromatography by EPA Method 300.0				Batch ID: 30738		Analyst SS
Nitrite (as N)	ND	0.200	D	mg/L	2	12/16/2020 12:41:00 AM
Nitrate (as N)	ND	0.200	D	mg/L	2	12/16/2020 12:41:00 AM
Sulfate	64.2	1.50	D	mg/L	5	12/16/2020 10:19:00 AM
NOTES: Diluted due to matrix.						
Total Alkalinity by SM 2320B				Batch ID: R64198		Analyst TN
Alkalinity, Total (As CaCO3)	426	2.50		mg/L	1	12/22/2020 12:33:23 PM
Sulfide by SM 4500-S2-F				Batch ID: R64180		Analyst SS
Sulfide	ND	0.500		mg/L	1	12/21/2020 3:00:00 PM

Analytical Report

Work Order: **2012252**
Date Reported: **12/22/2020**

Client: Friedman & Bruya
Collection Date: 12/14/2020 2:20:00 PM
Project 012224
Lab ID: 2012252-004
Matrix: Water
Client Sample ID: **RW05-121420**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R64178		Analyst MS
Methane	ND	0.00863		mg/L	1	12/21/2020 1:05:00 PM
Ion Chromatography by EPA Method 300.0				Batch ID: 30738		Analyst SS
Nitrite (as N)	ND	0.200	D	mg/L	2	12/16/2020 1:04:00 AM
Nitrate (as N)	ND	0.200	D	mg/L	2	12/16/2020 1:04:00 AM
Sulfate	36.7	1.50	D	mg/L	5	12/16/2020 10:42:00 AM
NOTES: Diluted due to matrix.						
Total Alkalinity by SM 2320B				Batch ID: R64198		Analyst TN
Alkalinity, Total (As CaCO3)	289	2.50		mg/L	1	12/22/2020 12:33:23 PM
Sulfide by SM 4500-S2-F				Batch ID: R64180		Analyst SS
Sulfide	ND	0.500		mg/L	1	12/21/2020 3:00:00 PM

Work Order: 2012252
CLIENT: Friedman & Bruya
Project: 012224

QC SUMMARY REPORT

Total Alkalinity by SM 2320B

Sample ID **MB-R64198**	SampType: **MBLK**			Units **mg/L**		Prep Date: **12/22/2020**		RunNo: **64198**		
Client ID: **MBLKW**	Batch ID: **R64198**					Analysis Date: **12/22/2020**		SeqNo: **1289969**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	2.50									

Sample ID **LCS-R64198**	SampType: **LCS**			Units **mg/L**		Prep Date: **12/22/2020**		RunNo: **64198**		
Client ID: **LCSW**	Batch ID: **R64198**					Analysis Date: **12/22/2020**		SeqNo: **1289970**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	106	2.50	100.0	0	106	99.6	108				

Sample ID **2012233-003BDUP**	SampType: **DUP**			Units **mg/L**		Prep Date: **12/22/2020**		RunNo: **64198**		
Client ID: **BATCH**	Batch ID: **R64198**					Analysis Date: **12/22/2020**		SeqNo: **1289974**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	544	2.50						543.9	0	20	

Work Order: 2012252
CLIENT: Friedman & Bruya
Project: 012224

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID	**MB-30738**	SampType:	**MBLK**	Units	**mg/L**	Prep Date:	**12/15/2020**	RunNo:	**64072**
Client ID:	**MBLKW**	Batch ID:	**30738**			Analysis Date:	**12/15/2020**	SeqNo:	**1287456**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.100									
Nitrate (as N)	ND	0.100									
Sulfate	ND	0.300									

Sample ID	**LCS-30738**	SampType:	**LCS**	Units	**mg/L**	Prep Date:	**12/15/2020**	RunNo:	**64072**
Client ID:	**LCSW**	Batch ID:	**30738**			Analysis Date:	**12/15/2020**	SeqNo:	**1287457**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.699	0.100	0.7500	0	93.2	90	110				
Nitrate (as N)	0.707	0.100	0.7500	0	94.3	90	110				
Sulfate	3.49	0.300	3.750	0	93.1	90	110				

Sample ID	**2012150-001ADUP**	SampType:	**DUP**	Units	**mg/L**	Prep Date:	**12/15/2020**	RunNo:	**64072**
Client ID:	**BATCH**	Batch ID:	**30738**			Analysis Date:	**12/15/2020**	SeqNo:	**1287459**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.100						0		20	H
Nitrate (as N)	ND	0.100						0		20	H
Sulfate	0.389	0.300						0.3900	0.257	20	

Sample ID	**2012150-001AMS**	SampType:	**MS**	Units	**mg/L**	Prep Date:	**12/15/2020**	RunNo:	**64072**
Client ID:	**BATCH**	Batch ID:	**30738**			Analysis Date:	**12/15/2020**	SeqNo:	**1287460**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.704	0.100	0.7500	0	93.9	80	120				H
Nitrate (as N)	0.712	0.100	0.7500	0	94.9	80	120				H
Sulfate	3.66	0.300	3.750	0.3900	87.3	80	120				

Work Order: 2012252
CLIENT: Friedman & Bruya
Project: 012224

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID **2012150-001AMSD** SampType: **MSD** Units **mg/L** Prep Date: **12/15/2020** RunNo: **64072**
Client ID: **BATCH** Batch ID: **30738** Analysis Date: **12/15/2020** SeqNo: **1287461**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.693	0.100	0.7500	0	92.4	80	120	0.7040	1.57	20	H
Nitrate (as N)	0.705	0.100	0.7500	0	94.0	80	120	0.7120	0.988	20	H
Sulfate	3.63	0.300	3.750	0.3900	86.4	80	120	3.663	0.905	20	

Sample ID **2012169-001BDUP** SampType: **DUP** Units **mg/L** Prep Date: **12/15/2020** RunNo: **64072**
Client ID: **BATCH** Batch ID: **30738** Analysis Date: **12/15/2020** SeqNo: **1287470**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.100						0		20	H
Nitrate (as N)	0.207	0.100						0.2080	0.482	20	H
Sulfate	2.10	0.300						2.109	0.475	20	

Sample ID **2012169-001BMS** SampType: **MS** Units **mg/L** Prep Date: **12/15/2020** RunNo: **64072**
Client ID: **BATCH** Batch ID: **30738** Analysis Date: **12/15/2020** SeqNo: **1287471**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.705	0.100	0.7500	0	94.0	80	120				H
Nitrate (as N)	0.895	0.100	0.7500	0.2080	91.6	80	120				H
Sulfate	5.90	0.300	3.750	2.109	101	80	120				

Work Order: 2012252
CLIENT: Friedman & Bruya
Project: 012224

QC SUMMARY REPORT

Sulfide by SM 4500-S2-F

Sample ID	**MB-R64180**	SampType:	**MBLK**		Units	**mg/L**	Prep Date:	**12/21/2020**	RunNo:	**64180**
Client ID:	**MBLKW**	Batch ID:	**R64180**				Analysis Date:	**12/21/2020**	SeqNo:	**1289621**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.500									

Sample ID	**LCS-R64180**	SampType:	**LCS**		Units	**mg/L**	Prep Date:	**12/21/2020**	RunNo:	**64180**
Client ID:	**LCSW**	Batch ID:	**R64180**				Analysis Date:	**12/21/2020**	SeqNo:	**1289622**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	1.60	0.500	2.000	0	80.0	74.9	118				

Sample ID	**LCSD-R64180**	SampType:	**LCSD**		Units	**mg/L**	Prep Date:	**12/21/2020**	RunNo:	**64180**
Client ID:	**LCSW02**	Batch ID:	**R64180**				Analysis Date:	**12/21/2020**	SeqNo:	**1289623**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	1.80	0.500	2.000	0	90.0	65	135	1.600	11.8	20	

Sample ID	**2012252-001BDUP**	SampType:	**DUP**		Units	**mg/L**	Prep Date:	**12/21/2020**	RunNo:	**64180**
Client ID:	**MW105-121420**	Batch ID:	**R64180**				Analysis Date:	**12/21/2020**	SeqNo:	**1289625**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.500						0		30	

Work Order: 2012252
CLIENT: Friedman & Bruya
Project: 012224

QC SUMMARY REPORT

Dissolved Gases by RSK-175

Sample ID	**LCS-R64178**	SampType:	**LCS**			Units	**mg/L**		Prep Date:	**12/21/2020**		RunNo:	**64178**	
Client ID:	**LCSW**	Batch ID:	**R64178**						Analysis Date:	**12/21/2020**		SeqNo:	**1289591**	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Methane		1,090	0.00863	1,000	0	109	70	130						

Sample ID	**MB-R64178**	SampType:	**MBLK**			Units	**mg/L**		Prep Date:	**12/21/2020**		RunNo:	**64178**	
Client ID:	**MBLKW**	Batch ID:	**R64178**						Analysis Date:	**12/21/2020**		SeqNo:	**1289592**	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Methane		ND	0.00863											

Sample ID	**2012252-001CREP**	SampType:	**REP**			Units	**mg/L**		Prep Date:	**12/21/2020**		RunNo:	**64178**	
Client ID:	**MW105-121420**	Batch ID:	**R64178**						Analysis Date:	**12/21/2020**		SeqNo:	**1289582**	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual		
Methane		ND	0.00863						0		30			

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**2012252**
Logged by:	**Gabrielle Coeuille**	Date Received:	**12/15/2020 12:49:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	N	☐	Not Present ☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☑	N	☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes	☑	N	☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☐	N	☐	Not Present ☑
6.	Was an attempt made to cool the samples?	Yes	☑	N	☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes	☑	N	☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes	☑	N	☐	
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	N	☐	
10.	Are samples properly preserved?	Yes	☑	N	☐	
11.	Was preservative added to bottles?	Yes	☐	N	☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes	☐	N	☑	NA ☐
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	N	☐	
14.	Does paperwork match bottle labels?	Yes	☑	N	☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	N	☐	
16.	Is it clear what analyses were requested?	Yes	☑	N	☐	
17.	Were all holding times able to be met?	Yes	☑	N	☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No	☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phon ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample 1	0.3

Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

20/225 2

Page # 1 of 1

Send Report To: Michael Erdahl
Company: Friedman & Bruya Inc.
Address: 3012 16th Ave W, Seattle WA 98119
Phone #:(206) 285-8282
Email:merdahl@friedmanandbruya.com

SUBCONTRACTOR Fremont
PROJECT NUMBER: 012224
PO # A488
REMARKS: Email Results

TURNAROUND TIME
~~X~~ 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	Matrix	# of jars	ANALYSES REQUESTED: Total Organic Carbon (TOC)	COD	BOD	Chloride	Sulfate	Sulfide	Methane, ~~Ethane, Ethene~~	Nitrite Nitrate, Alkalinity	Fe 2+	Cr VI	Notes
MW105-121420		12/14/20	1040	water	7					x	x	x	x			
RW03-121420			1225							x	x	x	x			
RW04-121420			1325							x	x	x	x			
RW05-121420			1420							x	x	x	x			

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

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Ann Webber-Bruya	Friedman and Bruya	12/15/20	0500
Received by:		Carter Johnson	FAI	12/15/20	1249
Relinquished by:					
Received by:					

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 012249
Work Order Number: 2012266

December 23, 2020

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 12/16/2020 for the analyses presented in the following report.

Dissolved Gases by RSK-175
Ion Chromatography by EPA Method 300.0
Sulfide by SM 4500-S2-F
Total Alkalinity by SM 2320B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/23/2020*

CLIENT: Friedman & Bruya
Project: 012249
Work Order: 2012266

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2012266-001	MW111-121520	12/15/2020 9:50 AM	12/16/2020 12:15 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2012266**
Date: **12/23/2020**

CLIENT: Friedman & Bruya
Project: 012249

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2012266**
Date Reported: **12/23/2020**

Client: Friedman & Bruya
Collection Date: 12/15/2020 9:50:00 AM
Project: 012249
Lab ID: 2012266-001
Matrix: Water
Client Sample ID: MW111-121520

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R64217		Analyst: MS
Methane	0.00232	0.00863	J	mg/L	1	12/22/2020 12:37:00 PM
Ion Chromatography by EPA Method 300.0				Batch ID: 30775		Analyst: TN
Nitrite (as N)	0.435	0.500	DJH	mg/L	5	12/20/2020 5:44:00 AM
Nitrate (as N)	0.830	0.500	DH	mg/L	5	12/19/2020 12:32:00 AM
Sulfate	16.4	1.50	D	mg/L	5	12/19/2020 12:32:00 AM
NOTES: Diluted due to matrix.						
Total Alkalinity by SM 2320B				Batch ID: R64198		Analyst: TN
Alkalinity, Total (As CaCO3)	154	2.50		mg/L	1	12/22/2020 12:33:23 PM
Sulfide by SM 4500-S2-F				Batch ID: R64180		Analyst: SS
Sulfide	ND	0.500		mg/L	1	12/21/2020 3:00:00 PM

Work Order: 2012266
CLIENT: Friedman & Bruya
Project: 012249

QC SUMMARY REPORT

Total Alkalinity by SM 2320B

Sample ID: **MB-R64198**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **12/22/2020**	RunNo: **64198**
Client ID: **MBLKW**	Batch ID: **R64198**		Analysis Date: **12/22/2020**	SeqNo: **1289969**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	ND	2.50									

Sample ID: **LCS-R64198**	SampType: **LCS**	Units: **mg/L**	Prep Date: **12/22/2020**	RunNo: **64198**
Client ID: **LCSW**	Batch ID: **R64198**		Analysis Date: **12/22/2020**	SeqNo: **1289970**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	106	2.50	100.0	0	106	99.6	108				

Sample ID: **2012233-003BDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **12/22/2020**	RunNo: **64198**
Client ID: **BATCH**	Batch ID: **R64198**		Analysis Date: **12/22/2020**	SeqNo: **1289974**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	544	2.50						543.9	0	20	

Work Order: 2012266
CLIENT: Friedman & Bruya
Project: 012249

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **MB-30771**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **12/18/2020**	RunNo: **64148**
Client ID: **MBLKW**	Batch ID: **30771**		Analysis Date: **12/18/2020**	SeqNo: **1289085**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	ND	0.100									
Sulfate	ND	0.300									

Sample ID: **LCS-30771**	SampType: **LCS**	Units: **mg/L**	Prep Date: **12/18/2020**	RunNo: **64148**
Client ID: **LCSW**	Batch ID: **30771**		Analysis Date: **12/18/2020**	SeqNo: **1289086**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	0.698	0.100	0.7500	0	93.1	90	110				
Sulfate	3.54	0.300	3.750	0	94.5	90	110				

Sample ID: **2012325-001ADUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **12/18/2020**	RunNo: **64148**
Client ID: **BATCH**	Batch ID: **30771**		Analysis Date: **12/18/2020**	SeqNo: **1289088**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	0.340	0.100						0.3400	0	20	
Sulfate	12.6	0.300						12.61	0.245	20	

Sample ID: **2012325-001AMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **12/18/2020**	RunNo: **64148**
Client ID: **BATCH**	Batch ID: **30771**		Analysis Date: **12/18/2020**	SeqNo: **1289089**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	1.10	0.100	0.7500	0.3400	101	80	120				
Sulfate	17.0	0.300	3.750	12.61	117	80	120				E

NOTES:
E - Estimated value. The amount exceeds the linear working range of the instrument.

Work Order: 2012266
CLIENT: Friedman & Bruya
Project: 012249

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **2012325-001AMSD** SampType: **MSD** Units: **mg/L** Prep Date: **12/18/2020** RunNo: **64148**
Client ID: **BATCH** Batch ID: **30771** Analysis Date: **12/18/2020** SeqNo: **1289090**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	1.11	0.100	0.7500	0.3400	103	80	120	1.100	0.815	20	
Sulfate	17.1	0.300	3.750	12.61	120	80	120	17.00	0.545	20	E

NOTES:
E - Estimated value. The amount exceeds the linear working range of the instrument.

Sample ID: **2012266-001ADUP** SampType: **DUP** Units: **mg/L** Prep Date: **12/18/2020** RunNo: **64148**
Client ID: **MW111-121520** Batch ID: **30771** Analysis Date: **12/19/2020** SeqNo: **1289103**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	0.830	0.500						0.8300	0	20	DH
Sulfate	16.4	1.50						16.36	0.0306	20	D

Sample ID: **2012266-001AMS** SampType: **MS** Units: **mg/L** Prep Date: **12/18/2020** RunNo: **64148**
Client ID: **MW111-121520** Batch ID: **30771** Analysis Date: **12/19/2020** SeqNo: **1289104**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrate (as N)	3.70	0.500	3.750	0.8300	76.5	80	120				DSH
Sulfate	36.5	1.50	18.75	16.36	107	80	120				D

NOTES:
S - Outlying spike recovery(ies) observed.

Sample ID: **LCS-30775** SampType: **LCS** Units: **mg/L** Prep Date: **12/19/2020** RunNo: **64153**
Client ID: **LCSW** Batch ID: **30775** Analysis Date: **12/19/2020** SeqNo: **1289321**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.789	0.100	0.7500	0	105	90	110				

Work Order: 2012266
CLIENT: Friedman & Bruya
Project: 012249

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **MB-30775**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **12/19/2020**		RunNo: **64153**			
Client ID: **MBLKW**	Batch ID: **30775**					Analysis Date: **12/19/2020**		SeqNo: **1289322**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.100									

Sample ID: **2012230-001ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **12/19/2020**		RunNo: **64153**			
Client ID: **BATCH**	Batch ID: **30775**					Analysis Date: **12/19/2020**		SeqNo: **1289215**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.100						0	0	20	H

Sample ID: **2012230-001AMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **12/19/2020**		RunNo: **64153**			
Client ID: **BATCH**	Batch ID: **30775**					Analysis Date: **12/19/2020**		SeqNo: **1289216**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.714	0.100	0.7500	0	95.2	80	120				H

Sample ID: **2012230-001AMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **12/19/2020**		RunNo: **64153**			
Client ID: **BATCH**	Batch ID: **30775**					Analysis Date: **12/19/2020**		SeqNo: **1289217**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.731	0.100	0.7500	0	97.5	80	120	0.7140	2.35	20	H

Sample ID: **2012231-002ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **12/19/2020**		RunNo: **64153**			
Client ID: **BATCH**	Batch ID: **30775**					Analysis Date: **12/20/2020**		SeqNo: **1289225**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.200						0	0	20	DH

Date: *12/23/2020*

Work Order: 2012266
CLIENT: Friedman & Bruya
Project: 012249

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **2012231-002AMS** SampType: **MS** Units: **mg/L** Prep Date: **12/19/2020** RunNo: **64153**
Client ID: **BATCH** Batch ID: **30775** Analysis Date: **12/20/2020** SeqNo: **1289226**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.496	0.200	1.500	0	33.1	80	120				DSH

NOTES:
S - Outlying spike recovery(ies) observed.

Work Order: 2012266
CLIENT: Friedman & Bruya
Project: 012249

QC SUMMARY REPORT

Sulfide by SM 4500-S2-F

Sample ID: **MB-R64180**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **12/21/2020**	RunNo: **64180**
Client ID: **MBLKW**	Batch ID: **R64180**		Analysis Date: **12/21/2020**	SeqNo: **1289621**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.500									

Sample ID: **LCS-R64180**	SampType: **LCS**	Units: **mg/L**	Prep Date: **12/21/2020**	RunNo: **64180**
Client ID: **LCSW**	Batch ID: **R64180**		Analysis Date: **12/21/2020**	SeqNo: **1289622**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	1.60	0.500	2.000	0	80.0	74.9	118				

Sample ID: **LCSD-R64180**	SampType: **LCSD**	Units: **mg/L**	Prep Date: **12/21/2020**	RunNo: **64180**
Client ID: **LCSW02**	Batch ID: **R64180**		Analysis Date: **12/21/2020**	SeqNo: **1289623**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	1.80	0.500	2.000	0	90.0	65	135	1.600	11.8	20	

Sample ID: **2012252-001BDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **12/21/2020**	RunNo: **64180**
Client ID: **BATCH**	Batch ID: **R64180**		Analysis Date: **12/21/2020**	SeqNo: **1289625**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sulfide	ND	0.500						0	0	30	

Work Order: 2012266
CLIENT: Friedman & Bruya
Project: 012249

QC SUMMARY REPORT

Dissolved Gases by RSK-175

Sample ID: **LCS-R64217**	SampType: **LCS**	Units: **mg/L**	Prep Date: **12/22/2020**	RunNo: **64217**
Client ID: **LCSW**	Batch ID: **R64217**		Analysis Date: **12/22/2020**	SeqNo: **1290376**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	1,170	0.00863	1,000	0	117	70	130				

Sample ID: **MB-R64217**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **12/22/2020**	RunNo: **64217**
Client ID: **MBLKW**	Batch ID: **R64217**		Analysis Date: **12/22/2020**	SeqNo: **1290377**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	ND	0.00863									

Sample ID: **2012266-001BREP**	SampType: **REP**	Units: **mg/L**	Prep Date: **12/22/2020**	RunNo: **64217**
Client ID: **MW111-121520**	Batch ID: **R64217**		Analysis Date: **12/22/2020**	SeqNo: **1290373**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	0.00156	0.00863						0.002323	39.6	30	J

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**2012266**
Logged by:	**Carissa True**	Date Received:	**12/16/2020 12:15:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☑	NA ☐
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☐	No ☑	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample 1	0.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

20122668

Page # 1 of 1

Send Report To: Michael Erdahl
Company: Friedman & Bruya Inc.
Address: 3012 16th Ave W, Seattle WA 98119
Phone #:(206) 285-8282
Email:merdahl@friedmanandbruya.com

SUBCONTRACTOR: Fremont
PROJECT NUMBER: 012249
PO # 498 A-~~488~~
REMARKS: Email Results Aspect EDD

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	Matrix	# of jars	ANALYSES REQUESTED: Total Organic Carbon (TOC)	COD	BOD	Chloride	Sulfate	Sulfide	Methane, ~~Ethane~~, ~~Ethene~~	Nitrite Nitrate, Alkalinity	Fe 2+	Cr VI	Notes
MW111-121520		12/15/20	0950	Water						X	X	X	X			

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Ann Webber-Bruya	Friedman and Bruya	12/16	
Received by:	Carter Johnson	FAI	12/16/20	1215
Relinquished by:				
Received by:				

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

Ozark UNDERGROUND LABORATORY 1572 Aley Lane • Protem, MO 65733 • (417) 785-4289 • fax (417) 785-4290 • contact@ozarkundergroundlab.com

Certificate of Analysis

Date of certificate: January 21, 2021
Client: Aspect Consulting
710 Second Avenue, Suite 550
Seattle, WA
Project name: Whittaker SKS Shell Station
Project number: 160328
Contact person: Kristen Beck (kbeck@aspectconsulting.com)

Samples collected by: Baxter Call, Aspect Consulting
Date samples shipped: January 13, 2021
Date samples rec'd at OUL: January 14, 2021
Date analyzed by OUL: January 15, 2021
Included with certificate of analysis:
Table of results, copy of sample collection data sheet and discrepancy sheet

Results for charcoal samplers analyzed for the presence of fluorescein, eosine and rhodamine WT (RWT) dyes.

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

OUL Number	Station Number	Station Name	Date/Time Placed	Date/Time Collected	Fluorescein		Eosine		RWT	
					Peak (nm)	Conc. (ppb)	Peak (nm)	Conc. (ppb)	Peak (nm)	Conc. (ppb)
E9981	South	Background-2-122920	12/29/20 1320	1/5/21 1120	ND		ND		ND	
E9982	South	RW03-2-010521	1/5/21 1120	1/7/21 1050	ND		ND		ND	
E9983	South	RW04-2-010721	1/7/21 1050	1/11/21 1040	ND		ND		ND	
E9984	South	RW05-2-011121	1/11/21 1040	1/12/21 1330	ND		ND		ND	

Note: Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

Footnotes:

ND = No dye detected

Thomas J. Aley, PHG and RG

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project Whittaker SKS Shell Station **Week No:** 1-2 **Samples Collected By:** Baxter Call, Aspect Consulting

Samples Shipped By: Baxter Call, Aspect Consulting **Samples Received By:** R DEAN/OUL

Date Samples Shipped: 1/13/20 PER SHIPPING LABEL RD **Date Samples Received:** 1/14/21 **Time Samples Received:** 1630 **Return Cooler?** Yes ☐ No ☒

Bill to: Aspect Consulting, Accounts Payable **Send Results to:** Kristin Beck, kbeck@aspectconsulting.com

Analyze for: ☒ Fluorescein ☒ Eosine ☒ Rhodamine WT ☐ Other **Ship cooler to:**

OUL use only			*Please indicate stations where dye was visible in the field* for field technician use - use black ink only					OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED		COLLECTED		# WATER REC'D
				DATE	TIME	DATE	TIME	
1		North	Background-1-122920 HOLD	12/29/20	13:20	1/5/21	11:20	
1	E9981	South	Background-2-122920	12/29/20	13:20	1/5/21	11:20	0
0		~~North~~ South	Background-2-122920-G HOLD	--	--	1/5/21	11:20	1
1		North	RW03-1-010521 HOLD	1/5/21	11:20	1/7/21	10:55	0
1	E9982	South	RW03-2-010521	1/5/21	11:20	1/7/21	10:55	0
0		South	RW03-2-010521-G HOLD	--	--	1/7/21	10:55	1
1		North	RW04-1-010721 HOLD	1/7/21	10:50	1/11/21	10:40	0
1	E9983	South	RW04-2-010721 1	1/7/21	10:50	1/11/21	10:40	0
0		South	RW04-2-010721-G HOLD	—	—	1/11/21	10:40	1
1		North	~~RW05-1-010721~~ RW05-1-011121 HOLD	1/11/21	10:40	1/12/21	13:30	0
1	E9984	South	RW05-2-011121	1/11/21	10:40	1/12/21	13:30	0
0		South	RW05-2-011121-G HOLD	—	—	1/12/21	13:30	1

COMMENTS Hold analysis on all samples except: Background-2-122920, RW03-2-010521, RW04-2-010721, RW05-2-011120.

This sheet filled out by OUL staff? Yes (No) **Charts for samples on this page proofed by OUL:** AC/OUL

OUL Project No. 1877 **Date Analyzed:** 1/15/21 **Analyzed By:** RD/OUL

OZARK UNDERGROUND LABORATORY, INC.

DISCREPANCIES BETWEEN CHAIN-OF-CUSTODY SHEETS AND ACTUAL SAMPLES RECEIVED Page 1 of 1

Company & Project Name: ASPECT CONSULTING / WHITTAKER SKS SHELL STATION **Date Rec'd by OUL:** 1/14/21 **Wk #:** _____

Lab #	Sta #	Station Name AS ON COC	Date Pulled	Problem	Solution
	SOUTH	BACKGROUND-2-122920-G	1/5/21	WATER VIAL BODY LABELED	.
			1120	BACK-1-123120 160328.	
				LABEL ON BAG CONTAINING	
				VIAL MATCHES COC.	
	SOUTH	RW03-2-010521-G	1/7/21	NO DATA RECORDED ON	OUL LAB TECH TRANSFERRED
			1050	WATER VIAL. LABEL ON	DATA FROM BAG TO
				BAG CONTAINING VIAL	VIAL BODY.
				MATCHES COC.	
	SOUTH	RW04-2-010721-G	1/11/21	NO DATA RECORDED ON	OUL LAB TECH TRANSFERRED
			1040	WATER VIAL. LABEL ON	DATA FROM BAG TO
				BAG CONTAINING VIAL	VIAL BODY.
				MATCHES COC.	
	SOUTH	RW05-2-011121-G	1/12/21	NO DATA RECORDED ON WATER	OUL LAB TECH TRANSFERRED
			1330	VIAL. LABEL ON BAG CONTAINING	DATA FROM BAG TO VIAL
				VIAL MATCHES COC.	BODY

Comments:

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rev. 12/28/99

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Certificate of Analysis

Date of certificate: January 27, 2021
Client: Aspect Consulting
710 Second Avenue, Suite 550
Seattle, WA
Project name: Whittaker SKS Shell Station
Project number: 160328
Contact person: Kristen Beck (kbeck@aspectconsulting.com)

Samples collected by: Baxter Call, Aspect Consulting
Date samples shipped: January 19, 2021
Date samples rec'd at OUL: January 21, 2021
Date analyzed by OUL: January 26, 2021
Included with certificate of analysis:
Table of results, copies of sample collection data sheet and discrepancy sheet

Results for charcoal and water samples analyzed for the presence of fluorescein, eosine and rhodamine WT (RWT) dyes.
Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).
All results are for charcoal unless otherwise indicated.

OUL Number	Station Number	Station Name	Date/Time Placed	Date/Time Collected	Fluorescein		Eosine		RWT	
					Peak (nm)	Conc. (ppb)	Peak (nm)	Conc. (ppb)	Peak (nm)	Conc. (ppb)
F0031	South	Post 2-2-011421	1/12/21 1330	1/14/21 1235	ND		541.0	122	ND	
F0032	South	Post 7-2-011921	1/14/21 1250	1/19/21 1110	ND		541.3	1,390	ND	
F0194	South	Post 2-2-011421-G	**Water**	1/14/21 1235	ND		534.1	21.8	ND	
F0195	South	Post 7-2-011921-G	**Water**	1/19/21 1110	ND		534.1	18.4	ND	

Note: Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

Footnotes:
ND = No dye detected

Thomas J. Aley, PHG and RG

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project Whittaker SKS Shell Station **Week No:** 2-3 **Samples Collected By:** Baxter Call, Aspect Consulting

Samples Shipped By: Baxter Call, Aspect Consulting **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 1/19/21 **Date Samples Received:** 1-21-21 **Time Samples Received:** 1530 **Return Cooler?** Yes ☐ No ☒

Bill to: Aspect Consulting, Accounts Payable **Send Results to:** Kristin Beek, kbeek@aspectconsulting.com

Analyze for: ☑ Fluorescein ☒ Eosine ☒ Rhodamine WT ☐ Other _____ **Ship cooler to:** _____

OUL use only		Please indicate stations where dye was visible in the field — for field technician use - use black ink only						OUL use only
# CHAR REC'D	LAB NUMBER (Charcoal)	STATION NUMBER	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
1		North	Post 2-1-01142 ~~X~~ 1 (*) Hold	1/12/21	1330	1/14/21	1235	0
1	F0031	South	Post 2-2-01142 ~~X~~ 1	1/12/21	1330	1/19/21	1235	0
0		South	Post 2-2-01142 ~~X~~ -G	-	-	1/14/21	1235	1
1		North	Post 7-1-01192 ~~X~~ 1	1/14/21	1250	1/19/21	1110	0
1	F0032	South	Post 7-2-01192 ~~X~~ 1	1/14/21	1250	1/19/21	1110	0
0		South	Post 7-2-01192 ~~X~~ -G 1	-	-	1/19/21	1110	1

COMMENTS Hold analysis on all samples. (*) See discrepancy sheet

This sheet filled out by OUL staff? Yes (No) **Charts for samples on this page proofed by OUL:** CA

OUL Project No. 1877 **Date Analyzed:** 1/26/21 **Analyzed By:** AC/OUL

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project Whittaker SKS Shell Station Week No: 2 - 3 Samples Collected By: Baxter Call, Aspect Consulting

Samples Shipped By: Baxter Call, Aspect Consulting Samples Received By: C. Aley / OUL

Date Samples Shipped: 1/19/21 Date Samples Received: 1-21-21 Time Samples Received: 1530 Return Cooler? Yes ☐ No ☒

Bill to: Aspect Consulting, Accounts Payable Send Results to: Kristin Beek, kbeek@aspectconsulting.com

Analyze for: ☑ Fluorescein ☒ Eosine ☒ Rhodamine WT ☐ Other _____ Ship cooler to: _____

OUL use only			*Please indicate stations where dye was visible in the field* for field technician use - use black ink only					OUL use only
# CHAR REC'D	LAB NUMBER	STATION NUMBER	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
	Water							
1		North	Post 2 - 1 - 01142 ~~0~~ 1 (*) Hold	1/12/21	1330	1/14/21	1235	0
1		South	Post 2 - 2 - 01142 ~~0~~ 1	1/12/21	1330	1/14/21	1235	0
0	F0194	South	Post 2 - 2 - 01142 ~~0~~ 1-G	-	-	1/14/21	1235	1
1		North	Post 7 - 1 - 01192 ~~0~~ 1	1/14/21	1250	1/19/21	1110	0
1		South	Post 7 - 2 - 01192 ~~0~~ 1	1/14/21	1250	1/19/21	1110	0
0	F0195	South	Post 7 - 2 - 01192 ~~0~~ 1-G	-	-	1/19/21	1110	1

COMMENTS Hold analysis on all samples. (*) See discrepancy sheet

This sheet filled out by OUL staff? Yes (No) Charts for samples on this page proofed by OUL: CA

OUL Project No. 1877 Date Analyzed: 1/26/21 Analyzed By: AC/OUL

OZARK UNDERGROUND LABORATORY, INC.

DISCREPANCIES BETWEEN CHAIN-OF-CUSTODY SHEETS AND ACTUAL SAMPLES RECEIVED Page 1 of 1

Company & Project Name: Aspect Consulting Whittaker SK3 Shell Station **Date Rec'd by OUL:** 1-21-21 **Wk #** 2-3

Lab #	Sta #	Station Name	Date Pulled	Problem	Solution

Comments: 2 water vials were in whirl-pak bag with charcoal, not labeled with station info, transferred the info to vials. All station names have the date as 20, not 21, the date is 2021, should the station name be changed to 21? Per K. Beck, change to 21.

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Certificate of Analysis

Date of certificate: February 19, 2021
Client: Aspect Consulting
710 Second Avenue, Suite 550
Seattle, WA
Project name: Whittaker SKS Shell Station
Project number: 160328
Contact person: Kristen Beck (kbeck@aspectconsulting.com)

Samples collected by: Baxter Call, Aspect Consulting
Date samples shipped: February 9, 2021
Date samples rec'd at OUL: February 12, 2021
Date analyzed by OUL: February 18, 2021
Included with certificate of analysis:
Table of results, copies of sample collection data sheet

Results for charcoal and water samples analyzed for the presence of fluorescein, eosine and rhodamine WT (RWT) dyes.

Peak wavelengths are reported in nanometers (nm); dye concentrations are reported in parts per billion (ppb).

All results are for charcoal unless otherwise indicated.

OUL Number	Station Number	Station Name	Date/Time Placed	Date/Time Collected	Fluorescein		Eosine		RWT	
					Peak (nm)	Conc. (ppb)	Peak (nm)	Conc. (ppb)	Peak (nm)	Conc. (ppb)
F0535	South	Post 28-2-020921	1/19/21 1125	2/9/21 1100	ND		541.6	1,240	ND	
F0536	South	Post 28-2-020921-G	**Water**	2/9/21 1100	ND		534.4	31.5	ND	

Note: Dye concentrations are based upon standards used at the OUL. The standard concentrations are based upon the as sold weight of the dye that the OUL uses. If the client is not using OUL dyes, the client should provide the OUL with a sample of the dye to compare to the OUL dyes.

Footnotes:

ND = No dye detected

Thomas J. Aley, PHG and RG

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project Whittaker SKS Shell Station **Week No:** 7 **Samples Collected By:** Baxter Call, Aspect Consulting

Samples Shipped By: Baxter Call, Aspect Consulting **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 2/9/21 **Date Samples Received:** 2-12-21 **Time Samples Received:** 1600 **Return Cooler? Yes** ☐ **No** ☒

Bill to: Aspect Consulting, Accounts Payable **Send Results to:** Kristin Beede, kbeede@aspectconsulting.com

Analyze for: ☒ **Fluorescein** ☒ **Eosine** ☒ **Rhodamine WT** ☐ **Other** _____ **Ship cooler to:** _____

OUL use only		*Please indicate stations where dye was visible in the field* *for field technician use - use black ink only*						*OUL use only*
# CHAR REC'D	LAB NUMBER Charcoal	STATION NUMBER	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
1		North	Post 28 - 1 - 020921 Hold	1/19/21	1125	2/9/21	1100	0
1	F0535	South	Post 28 - 2 - 020921	1/19/21	1125	2/9/21	1100	0
0		South	Post 28 - 2 - 020921 - G	—	—	2/9/21	1100	1

COMMENTS _____

This sheet filled out by OUL staff? Yes (No) **Charts for samples on this page proofed by OUL:** CA

OUL Project No. 1877 **Date Analyzed:** 2/18/21 **Analyzed By:** AC/CM

OZARK UNDERGROUND LABORATORY, INC.

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SAMPLE COLLECTION DATA SHEET for FLUORESCENCE ANALYSIS

Project Whittaker SKS Shell Station **Week No:** 7 **Samples Collected By:** Baxter Cal, Aspect Consulting

Samples Shipped By: Baxter Cal, Aspect Consulting **Samples Received By:** C. Aley / OUL

Date Samples Shipped: 2/9/21 **Date Samples Received:** 2-12-21 **Time Samples Received:** 1600 **Return Cooler?** Yes ☐ No ☒

Bill to: Aspect Consulting, Accounts Payable **Send Results to:** Kristin Beebe, kbeebe@aspectconsulting.com

Analyze for: ☒ Fluorescein ☒ Eosine ☒ Rhodamine WT ☐ Other _____ **Ship cooler to:** _____

OUL use only		*Please indicate stations where dye was visible in the field* for field technician use - use black ink only						*OUL use only*
# CHAR REC'D	LAB NUMBER Water	STATION NUMBER	STATION NAME	PLACED DATE	PLACED TIME	COLLECTED DATE	COLLECTED TIME	# WATER REC'D
1		NorthL	Post 28-1-020921 Hold	1/19/21	1125	2/9/21	1100	0
1		SouthL	Post 28-2-020921	1/19/21	1125	2/9/21	1100	0
0	F0536	SouthL	Post 28-2-020921-G	—	—	2/9/21	1100	1

COMMENTS _____

This sheet filled out by OUL staff? Yes (No) **Charts for samples on this page proofed by OUL:** CC

OUL Project No. 1877 **Date Analyzed:** 2/18/21 **Analyzed By:** AC/OUL

APPENDIX D

Report Limitations and Guidelines for Use

REPORT LIMITATIONS AND USE GUIDELINES

Reliance Conditions for Third Parties

This report was prepared for the exclusive use of the Client. No other party may rely on this report or the product of our services without the express written consent of Aspect Consulting, LLC (Aspect). This limitation is to provide our firm with reasonable protection against liability claims by third parties with whom there would otherwise be no contractual conditions or limitations and guidelines governing their use of the report. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and recognized standards of professionals in the same locality and involving similar conditions.

Services for Specific Purposes, Persons and Projects

Aspect has performed the services in general accordance with the scope and limitations of our Agreement. This report has been prepared for the exclusive use of the Client and their authorized third parties, approved in writing by Aspect. This report is not intended for use by others, and the information contained herein is not applicable to other properties.

This report is not, and should not, be construed as a warranty or guarantee regarding the presence or absence of hazardous substances or petroleum products that may affect the subject property. The report is not intended to make any representation concerning title or ownership to the subject property. If real property records were reviewed, they were reviewed for the sole purpose of determining the subject property's historical uses. All findings, conclusions, and recommendations stated in this report are based on the data and information provided to Aspect, current use of the subject property, and observations and conditions that existed on the date and time of the report.

Aspect structures its services to meet the specific needs of our clients. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and subject property. This report should not be applied for any purpose or project except the purpose described in the Agreement.

This Report Is Project-Specific

Aspect considered a number of unique, project-specific factors when establishing the Scope of Work for this project and report. You should not rely on this report if it was:

- Not prepared for you
- Not prepared for the specific purpose identified in the Agreement
- Not prepared for the specific real property assessed
- Completed before important changes occurred concerning the subject property, project or governmental regulatory actions

If changes are made to the project or subject property after the date of this report, Aspect should be retained to assess the impact of the changes with respect to the conclusions contained in the report.

Geoscience Interpretations

The geoscience practices (geotechnical engineering, geology, and environmental science) require interpretation of spatial information that can make them less exact than other engineering and natural science disciplines. It is important to recognize this limitation in evaluating the content of the report. If you are unclear how these "Report Limitations and Use Guidelines" apply to your project or site, you should contact Aspect.

Discipline-Specific Reports Are Not Interchangeable

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually address any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding the subject property.

Environmental Regulations Are Not Static

Some hazardous substances or petroleum products may be present near the subject property in quantities or under conditions that may have led, or may lead, to contamination of the subject property, but are not included in current local, state or federal regulatory definitions of hazardous substances or petroleum products or do not otherwise present potential liability. Changes may occur in the standards for appropriate inquiry or regulatory definitions of hazardous substance and petroleum products; therefore, this report has a limited useful life.

Property Conditions Change Over Time

This report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time (for example, Phase I ESA reports are applicable for 180 days), by events such as a change in property use or occupancy, or by natural events, such as floods, earthquakes, slope failure or groundwater fluctuations. If more than six months have passed since issuance of our report, or if any of the described events may have occurred following the issuance of the report, you should contact Aspect so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

Phase I ESAs – Uncertainty Remains After Completion

Aspect has performed the services in general accordance with the scope and limitations of our Agreement and the current version of the “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process”, ASTM E1527, and U.S. Environmental Protection Agency (EPA)'s Federal Standard 40 CFR Part 312 "Innocent Landowners, Standards for Conducting All Appropriate Inquiries".

No ESA can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with subject property. Performance of an ESA study is intended to reduce, but not eliminate, uncertainty regarding the potential for environmental conditions affecting the subject property. There is always a potential that areas with contamination that were not identified during this ESA exist at the subject property or in the study area. Further evaluation of such potential would require additional research, subsurface exploration, sampling and/or testing.

Historical Information Provided by Others

Aspect has relied upon information provided by others in our description of historical conditions and in our review of regulatory databases and files. The available data does not provide definitive information with regard to all past uses, operations or incidents affecting the subject property or adjacent properties. Aspect makes no warranties or guarantees regarding the accuracy or completeness of information provided or compiled by others.

Exclusion of Mold, Fungus, Radon, Lead, and HBM

Aspect’s services do not include the investigation, detection, prevention or assessment of the presence of molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detection, assessment, prevention or abatement of molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts. Aspect’s services also do not include the investigation or assessment of hazardous building materials (HBM) such as asbestos, polychlorinated biphenyls (PCBs) in light ballasts, lead based paint, asbestos-containing building materials, urea-formaldehyde insulation in on-site structures or debris or any other HBMs. Aspect’s services do not include an evaluation of radon or lead in drinking water, unless specifically requested.