GROUNDWATER MONITOR WELL INSTALLATIONS AND SAMPLING

Former Round The Clock Deli

722 South Lincoln Street, Port Angeles, WA

WA DOE Facility ID: 63427274
VCP Project No. SW0962

Prepared for:

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Contents

TABLES

FIGURES

APPENDICES

1 PROJECT DESCRIPTION

1.1 Location

The Site is located at 722 South Lincoln Street, Port Angeles, Clallam County, Washington (Figure 1). The Site was most recently occupied by Around The Clock Deli which operated as a food and gasoline fuel business. The Site is listed by the Washington Department of Ecology (DOE) as Facility 63427274, a Hazardous Waste Generator and a LUST facility. The Site is listed with the DOE Voluntary Cleanup Program as Project No. SW0962 to perform independent remedial activities related to known petroleum hydrocarbon contamination.

The Site is located at the southeast corner of South Lincoln Street (Highway 101) and Southeast 8th Street. South Lincoln is oriented northeast-southwest and Southeast 8th Street is oriented northwest-southeast. The Site is located in Section 1, Township 36N, and Range 6W. The Site is Clallam County tax assessor ID number 58030 encompassing about 16,900 square feet. The elevation of the Site is approximately 120 feet above MSL.

The Site is underlain by glacial outwash consisting of sand, pebbly sand, and interbedded silt as shown on the Geologic Map (Figure 2).

1.2 Purpose

GeoPro Environmental Services LLC (GeoPro) was requested by Blue Mountain Environmental Consultants (BMEC), Waitsburg, WA to review the contaminant history of the site, prepare a Work Plan for review and approval by the Washington Department of Ecology (DOE), and perform the field investigation and prepare a report for DOE review. Discussions were held with DOE regarding GeoPro's November 7, 2014 Work Plan which was subsequently approved.

The purpose of this work is to install and sample five groundwater monitor wells within the Site for long-term monitoring. The Site is adjacent to an area for which previous groundwater investigations by GeoPro and others have concluded that petroleum contaminated groundwater plumes are co-mingled from near the intersection of Southeast 8th Street and South Lincoln Street, and northeasterly along South Lincoln Street. Therefore, some of the onsite detected contamination in groundwater may be from offsite sources which have migrated onto the Site.

2 FIELD INVESTIGATION

2.1 Objectives

The objectives of this investigation include:

- Install five new monitor wells at the perimeter of the Site.
- Collect and analyze groundwater samples for gasoline, benzene, toluene, ethylbenze, xylenes (BTEX) and total lead from the five wells.
- Collect and analyze soil samples for gasoline and BTEX from the five wells.
- Evaluate previous investigations including groundwater analytical results of co-mingled plumes.
- Decommission two small diameter monitor wells previously installed at the Site.

2.2 Monitor Well Locations

Plan maps from previous work by GeoPro on Rite-Aid properties were used as a guide for monitor well placement because Rite-Aid properties are developed with similar property layouts. Monitor wells were sited based on anticipated future site uses within parking areas and away from border landscaping. GeoPro located the monitor wells approximately 23-feet from the existing sidewalk and the existing building on the adjacent property to the northeast. The groundwater monitor well locations are shown in Figure 3.

- Monitor wells GES-1 and GES-2 are located upgradient adjacent to Southeast 8th Street.
- Monitor well GES-3 is located side-gradient adjacent to South Lincoln Street.
- Monitor well GES-4 is located side and downgradient along South Lincoln Street, south of the existing building on the adjacent property.
- Monitor well GES-5 is located downgradient, and south of the existing building on the adjacent property.

During drilling, a continuous geologic log was prepared describing the subsurface materials encountered, depth to groundwater, presence of saturated zones, and any other pertinent geologic or environmental observations. Geologic Logs are presented in Appendix A.

2.3 Well Installation

Borings were drilled and well installations were completed by ESN Northwest, Olympia, Washington in accordance with Chapter 173-160 WAC. The screen and blank well casings are constructed of two-inch diameter Schedule 40, polyvinyl chloride (PVC) flush coupled, threaded pipe. The screens are slotted with machine cuts of 0.010-inch width. The filter packs consist of clean graded Colorado silica #10-20 sand. The well casing consists of a

threaded end cap on a 10-foot or 15-foot section of screen, which is threaded fit into blank casing. Upon drilling to total depth, the well casing was lowered into the boring.

The filter pack was placed to approximately one-foot above the well screen. An aquifer seal of bentonite pellets was placed from above the filter pack to 0.5-feet depth. A surface seal of Portland Type II cement was placed from about 0.5-feet to the surface. A water tight well plug was installed over the casing and a vault traffic box was cemented around the well at the surface. The final well construction is depicted on the Geologic Logs (Appendix A). Each well top of collar will be surveyed accurate in the future.

Each monitor well was developed after installation using a peristaltic pump until the discharge was clear or very low turbidity. All soil and water generated from drilling, development and sampling activities was stored on-site in 55-gallon barrels for disposal by the landowner. Appropriate decontamination procedures were followed to prevent cross contamination of the drilling equipment between drill holes by pressure washing. All non-disposable sampling equipment was triple rinsed between usages.

2.4 Chemicals of Concern and Analytical Methods

Site Chemicals Of Potential Concern (COPCs) include gasoline-related constituents BTEX and lead. These chemicals were detected during previous investigations and remedial measures. The following chemical analyses shown in Table 1 were completed on groundwater and soil samples from the five monitor wells installed during this investigation and reported at method detection limit goals at or below MTCA Method A unrestricted land use cleanup levels.

Table 1 – Analytical Methods

Groundwater	Gasoline Method EPA 8021B	BTEX Method EPA 8021B	Total Lead Method EPA 6010C
Soil	Gasoline Method EPA 8021B	BTEX Method EPA 8021B	Not analyzed

Lead in soil was not analyzed because lead in soil has been sufficiently characterized by previous investigations. A hydrocarbon fuel scan (PIANO) including potential detection of organic manganese additive in groundwater was planned if sufficient free product was collected. This analysis was not conducted because of insufficient time during field work for a re-accumulation of free product.

2.5 Sampling Procedures

2.5.1 Groundwater Sampling Procedures

Samples of groundwater were collected according to standard field methods and prepared in accordance with protocol established by the analytical laboratory for containers, preserving, storage and transport to the laboratory. A chain of custody was prepared for all samples.

Groundwater sampling was conducted with a peristaltic pump and new tubing using low-flow purge sampling techniques. During sampling, new tubing was lowered down the well casing. The tubing was positioned at the approximate middle of the well screen. The wells were purged until measured groundwater quality parameters were reasonably stable.

During purging, water quality parameters including temperature, pH, and conductivity were measured. Turbidity was monitored and recorded but was not be used as an indication of stabilization. After stabilization was reached, a groundwater sample was collected. Groundwater samples were prepared according to protocol established by the analytical laboratory. The samples were placed in an iced cooler along with the chain of custody and shipped to Onsite environmental laboratory, Redmond, Washington. The groundwater sample field logs are included in Appendix B.

2.5.2 Soil Sampling Procedures

Subsurface soil samples for analysis were collected when potential contamination was visible. Soil samples were collected and preserved in accordance with EPA Method 5035 for volatile organic compounds in laboratory furnished containers. The samples were placed in an iced cooler along with the chain of custody and shipped to Onsite environmental laboratory, Redmond, Washington.

2.6 Well Decommissions

Two ¾-inch diameter monitor wells, KMW-1 and KMW-2, were decommissioned during this investigation. The analysis of groundwater samples from KMW-1 since 2008 have resulted in no detections of gasoline or gasoline constituents, or detections below MTCA Method A groundwater cleanup levels. Monitoring at the KMW-2 location will be performed with the new larger diameter monitor well GES-4.

2.7 Field Photographs

The following field photographs were taken on April 6-7, 2015 by GeoPro and are included in Appendix D.

- 01: GES-2 Core marked at 10 and 15 feet bgs.
- 02: GES-2 Location
- 03: GES-2 Sheen Test
- 04: GES-2 Sheen Test Bubbles and Foam
- 05: GES-3 Location
- 06: GES-4 Saturated sand at 14 feet bgs
- 07: GES-5 Saturated fine-coarse sand at 14 feet bgs
- 08: Stockpile

3 DATA EVALUATION

3.1 Groundwater Analytical Results

The following Table 2 is a summary of groundwater sample analyses from the five new monitor wells. All of the groundwater samples contain constituents which exceed DOE MTCA Method A for Unlimited Land Use cleanup levels and are consistent with historical data of the Site. The PIANO analysis was not conducted on these initial groundwater samples because of insufficient time for accumulation of free product.

The laboratory analytical reports are included in Appendix C. The detection of benzene above MTCA cleanup levels in the groundwater sample from GES-1 may be due to the higher water solubility of benzene, and therefore relative mobility. Although hydrocarbon odors were detected in GES-1 soil samples, the analyses resulted in non-detection of gasoline and BTEX in the soil samples. Therefore, the detection of benzene in the GES-1 groundwater sample may indicate a horizontal migration of the plumes from the southeast to GES-1 rather than a vertical migration downward from the soil. Further evaluation is necessary to define the plume dimensions beneath the Site.

Table 2 – Groundwater Analytical Results

		Units: µg/L				
Monitor Well	**Gasoline**	**Benzene**	**Toluene**	**Ethylbenzene**	**Total Xylenes**	**Lead**
GES-1	600	120	140	25	78	24
GES-2	83000	8800	14000	2900	12500	ND<1.1
GES-3	190000	2900	42000	4600	22200	15
GES-4	95000	2700	6200	4000	18200	1.4
GES-5	110000	10000	22000	3300	14600	2.1
MTCA Method A Cleanup Level Unrestricted Land Use	800 if benzene present; 1000 if no benzene	5	1000	700	1000	15

Notes:
Yellow highlight indicates concentration is above MTCA Method A Cleanup Levels.

3.2 Soil Analytical Results

The following Table 3 is a summary of soil sample analyses from the boreholes for the five new monitor wells. Gasoline and BTEX results from GES-1 did not exceed DOE MTCA Method A cleanup levels. All other samples contain at least one constituent which exceeds MTCA Method A cleanup levels. The laboratory report is included in Appendix C.

The soil analytical results indicate, along with soil descriptions, that soil at the new monitor well locations (except GES-1) is generally contaminated with gasoline and BTEX in a zone approximately 12 feet thick above the saturated zone. The high concentrations of gasoline and BTEX are consistent with previous investigations in the area.

Table 3 – Soil Analytical Results

		Units: mg/kg				
Monitor Well	**Sample/ Depth bgs**	**Gasoline**	**Benzene**	**Toluene**	**Ethylbenzene**	**Total Xylenes**
GES-1	S1/9 ft	ND<4.3	ND<0.020	ND<0.043	ND<0.043	ND<0.043
GES-1	S2/16 ft	ND<6.4	ND<0.020	ND<0.064	ND<0.064	ND<0.064
GES-2	1/9 ft	9000	73	560	240	1170
GES-2	2/17 ft	36	0.28	0.43	0.65	2.12
GES-3	1/13 ft	2100	7.9	34	44	191
GES-3	2/18.5 ft	430	7.1	30	9.3	44
GES-4	1/14 ft	620	0.55	ND<0.15	9.4	11
GES-4	2/16.5 ft	960	1.1	ND<0.22	4.9	5.3
GES-5	1B/14 ft	28	0.055	ND<0.068	ND<0.068	0.095
GES-5	2/18.5 ft	8700	18	220	240	1120
MTCA Method A Cleanup Level Unrestricted Land Use		30 if benzene present; 100 if no benzene	0.03	7	6	9

Notes:
Yellow highlight indicates concentration is above MTCA Method A Cleanup Levels.

3.3 Time Derivation Historic BTEX Data

An evaluation was made of BTEX changes over time using groundwater analytical data from investigations by Kane (2008, 2009, 2012), GeoPro (2012) and GeoEngineers (2013). The purpose is to evaluate if historic data could be used to possibly estimate relative ages of BTEX as a ratio in groundwater samples and indicate when the product was released.

Averages of the ratio (B+T)/(E+X) from the investigations were plotted on an exponentially derived graph by Kaplan et al, 1996, who developed the graph for a study in which groundwater was sampled near a source of instantaneous release (Figure 5). The average (B+T)/(E+X) ratios from downgradient wells KMW-7 and KMW-8 plotted on the graph with the highest number of years (T) since a release. Average ratios from side/upgradient wells KMW-5 and KMW-12 plotted approximately with mid-range years on the graph. Average ratios from wells KMW-2 (Site), KMW-19 (side-gradient) and KMW-20 (downgradient) plotted with lower number of years, with the average ratio for KMW-6 (downgradient) plotting with the youngest number of years. The plots could indicate that higher groundwater flow rates appear as ages due to possible higher hydraulic conductivity within the buried historic drainage channel. Although there is uncertainty in evaluating the plots, the graph may be supportive in future forensic investigations and plume differentiation.

4 PREVIOUS INVESTIGATIONS

The following is a summary of historical Site occupations and investigations from available reports by Kane (2008, 2009, 2012), GeoEngineers (2013), and GeoPro (2012, 2014).

The potential sources of contamination within the Site were likely associated with leaks from several USTs and associated dispensers and pipelines. Historic data indicates gasoline and BTEX have been detected onsite above MTCA cleanup levels.

- The Site has been a petroleum service station since about 1924, with at least 3 building and UST configurations (Kane reports).
    - 1924 – the Sanborn Map shows a gas station exists onsite.
    - 1939-1947 – Historical directories list Raymond J. Lain gas station onsite.
    - 1949 – The Lain gas station replaced by larger gas station but site listed as vacant in 1956.
    - 1964 - Sanborn Map shows onsite gas station configuration similar to present day [2008] without canopies.
- 1985 – Aerial photo depicts gas station with two canopies (apparently dispenser islands). (Kane report)
- 1993 – Petroleum Construction and Environment, Chehalis, WA decommissioned three USTs in October within the northeast area of the site and lined the excavation with visqueen, leaving contaminated soil in-place. One UST was decommissioned in-place by filling with cement. The decommissioning could have been in response to a DOE soil gas survey in June 1993 which concluded the Site could be one of the sources of petroleum contamination migrating into the basement of the Lincoln Apartments in the early 1980's. (Kane report)
- 2007 – Kane completes Phase I and Limited Phase II Environmental Site Assessments. A heating oil underground storage tank was located adjacent to the northwest side of the Round The Clock Deli building.
- 2008 – Kane completes a remedial investigation including sampling of soil and groundwater in 16 borings and 28 groundwater monitoring wells in the vicinity of the Site and identified potential areas of co-mingled plumes.
- 2008 – Round The Clock Deli business is not operational.
- 2009 – Kane completes remedial excavations.
- 2012 - GeoPro completes forensic groundwater sampling of co-mingled plumes and developed the following conclusions.
    - A co-mingled plume of gasoline contaminated groundwater extends from approximately the northern boundary of the ARCO property on Southeast

8th Street for at least 400 feet under South Lincoln Street, and is approximately 300 feet wide (northwest to southeast).
    - Gasoline contaminated groundwater is migrating north-northeasterly in a distribution pattern probably influenced by a historic drainage channel now buried beneath South Lincoln Street.
    - Up and/or side gradient offsite sources contributing to the area contaminated groundwater plumes may be, or have been, service station or auto repair facilities located to the east and south across South Lincoln and Southeast 8th Streets.
- 2013 – GeoEngineers completed an investigation to sample on and offsite soil and groundwater and conduct slug tests.

The upgradient (southwest) property across Southeast 8th Street, a business UPS currently operates, was the site of Irwin's Auto Repair listed between 1959 and 1969. (Kane report).

4.1 Kane Remedial Investigation

The following are relevant excerpts from the Remedial Investigation Report completed by Kane (Kane 2008, pp. 18-19).

> **Flow Direction**
> *"The January 2008 groundwater flow direction calculations show groundwater in the vicinity of the Property as flowing to the north and then to the northeast."*
>
> **Sources of Contamination**
> *It appears that there are potentially two or three sources of TPH-groundwater contamination. One source of contamination likely originated from the Property's use as a gasoline station between the mid 1920's until the early 1990's. The property to the southeast of the Property on Lincoln St. has contained a gas station since at least 1947 and currently contains an Arco Am/Pm gas station. Based on analytical data collected from monitoring well KMW-12, a confirmed release has been discovered in connection with this property. It is also possible that a third source may be attributed to the east adjacent property. According to Sanborn Maps, the east adjacent property contained a gas station and automobile repair related businesses between 1924 and the mid 1960's. The east adjacent property is cross-slope relative to the Property.*
>
> **Extent of Contamination**
> *Based on the analytical data from the June 2007, August 2007 and January 2008 Phase II assessments, the vertical extent of TPH-contaminated soil extends between 5-7 feet bgs to the soil/water interface between 15-20 feet bgs on the Property. The western extent of soil contamination appears to be located between KSB-18 and KMW-1.*

The results of the January 16-18, 2008 scope of work revealed that TPH-concentrations are migrating in northerly direction and also appear to be following the pathway of the historic gulch, depicted in brown on [Figure 6], and possibly underground utilities."

4.2 Kane Interim Remedial Action Report

The following are relevant excerpts from the Interim Remedial Action Report by Kane (2009).

Building Demolition

"Approximately two days prior to Kane Environmental's arrival on-site to perform the remedial activities, the former gas station building and associated service island canopy at the Property were demolished by Bruch & Bruch Construction of Port Angeles, Washington." (p.7)

Heating Oil Tank Decommission

"On January 26, 2009, a five and one-half (5.5) feet long by three (3) feet in diameter, 300-gallon capacity heating oil UST was removed from the northwest side of the former gasoline service station (Figure 4, Heating Oil UST). The top of the UST was located approximately 4.5 feet bgs. The UST was empty when Kane Environmental was onsite on January 26, 2009. According to Bruch & Bruch personnel, approximately 2 gallons of oil and 8 gallons of mud had been pumped out of the UST prior to Kane Environmental's arrival. Upon removal of the UST, extensive corrosion and rust was visible and numerous small holes were observed on the sides and bottom of the UST. Soil directly below the UST was gray and had a strong petroleum odor." (p.7)

Gasoline Underground Storage Tank Decommission

"On January 28, 2009 a former gasoline UST was removed from the Property that had been previously left in-place, according to the Petroleum Construction and Environment, Inc. report. The location of this UST is shown on [Figure 4]. The gasoline UST was filled with concrete and appeared to have been previously cut open and welded shut. Due to the weight of the concrete, the UST could not be removed without cutting open the UST and removing the concrete. No liquid was observed in the UST. The UST was approximately seventeen (17) feet long by six (6) feet in diameter with a capacity of approximately 4,000 gallons. The surface of the tank was corroded and rusty, however no holes were observed. The soil beneath the UST and adjacent to the south side of the UST was gray and had a strong petroleum odor." (p.7)

Contaminated Soil Disposal

"A total of 2,057.89 tons of TPH-Gasoline contaminated soil was removed from the Property and transported by truck to the Olympic View Transfer Station in Port Orchard, Washington during the course of the IRA." (p.8) *… Soil removal was not possible near the intersection of South Lincoln Street and East 8th Street due to concerns regarding the structural integrity of the underground utilities, fire hydrant, roadway and sidewalk."* (p.9)

Existing Waste Pile

"During the course of the excavation, approximately 120 tons of Class 2 (treated or untreated soils which contain detectable levels of petroleum contaminants below the MTCA Method A cleanup standards) soil was stockpiled on plastic on the Property. Approximately 400 pounds of ORC Advanced® was mixed with water at a 1:2 ratio and applied to the stockpile. The ORC Advanced® mixture was applied in approximately fifty pounds increments, with the stockpile mixed in between applications. In addition, approximately 125 pounds of dry ORC Advanced® was applied to the stockpile." (p. 11). See photograph 08 in Appendix D.

Excavation Chemically Treated

"Kane Environmental installed four vertical pipes with slotted horizontal laterals for use as injection points for bioremediation compounds and/or bioventing wells. The pipes were installed in the northern and southern ends of the gasoline dispenser excavation … As part of the IRA, exposed soil left in-place was treated with ORC Advanced® and/or RegenOxTM in order to facilitate the breakdown of petroleum contaminants. The RegenOxTM and ORC Advanced® may also enhance the natural degradation of TPH-Gasoline concentrations in groundwater on the Property" (p. 11). [Note: some of the injection piping currently exists on the Site and extends above ground. A portion of the original excavation backfill had collapsed and was backfilled in 2014 by BMEC. The integrity of the underground injection slotted pipe in the excavation is unknown.]

4.3 Kane Remediation Injection Report

A report titled "Remediation Product Injection & Groundwater Performance Monitoring" was completed by Kane in 2012. The report summarizes the effectiveness of the chemical treatments and additional remedial product injected into vertical and slotted horizontal PVC pipe previously placed within the excavation. Groundwater was sampled and compared to previous results which concluded that groundwater on and offsite continued to exceed DOE MTCA cleanup levels.

4.4 GeoPro Groundwater Forensic Evaluation

GeoPro sampled groundwater from six on and offsite existing monitor wells in 2012. Samples from 3 wells, KMW-2 (onsite), KMW-5 (offsite), and KMW-7 (offsite) contained free product. Gasoline contaminated groundwater is migrating north-northeasterly in a distribution pattern apparently enhanced by a now filled-in drainage channel (Figure 4).

The 2012 groundwater analytical results are shown below in Table 4.

Table 4 – 2012 Groundwater Analyses

	µg/L					
Monitor Well	**Gasoline**	**Benzene**	**Toluene**	**Ethylbenzene**	**Total Xylenes**	**Comment**
KMW-2	9500	330	2400	3600	21800	Product but insufficient amount for forensic analysis
KMW-5	51000	4000	2600	1600	7200	Product
KMW-6	6300	1400	19	54	460	No product
KMW-7	64000	23	590	1300	5000	Product but insufficient amount for forensic analysis
KMW-12	4800	920	27	540	560	No product
KMW-15	5900	230	14	780	71.6	No product

Note: well locations shown in Figure 6.

A forensic evaluation was completed by Friedman & Bruya, Inc. (2012) on product collected by GeoPro from KMW-5. The organic manganese additive to gasoline MMT (Methylcyclopentadienyl manganese tricarbonyl) was introduced in 1958 and generally phased out by January 1996. The organic manganese (MMT) detected in the free product sample from KMW-5 suggests manufacturing of the gasoline between 1958 and early 1996. A gas station ('former Union Oil", GeoEngineers, 2012) was active on the property southeast of KMW-5 from 1924 to sometime between 1955 and 1964. This gas station could have been active during the period when MMT was allowed as a gasoline additive.

Friedman and Bruya conclude*: "Comparison of the GC/FID traces generated shows that significant differences exist between the chemical composition of the gasoline present in the sample MW-2* (KMW-2) *and that present in the sample MW-5 (Product)"* (KMW-5)*.*

4.5 GeoEngineers Draft Soil and Groundwater Graphics

GeoEngineers collected groundwater samples from 16 existing onsite and offsite monitor wells in 2013. In addition, soil samples were collected from 14 new borings onsite. Draft sampling location maps and tables summarizing the analytical results generally confirm the location of contaminated soil within the Site and generally confirm groundwater contamination on and offsite. Free product was observed by GeoEngineers in KW-5 and KMW-7, the same monitor wells where GeoPro found product in 2012. In addition, free product was observed by GeoEngineers in KMW-19, side-gradient and adjacent to the Site within South Lincoln Street.

4.6 GeoPro Groundwater Trend Review

A review was made by GeoPro in 2014 of previous groundwater analyses to evaluate trends in contaminant concentrations. Results from monitor wells KMW-1, KMW-2, KMW-4, KMW-8, KMW-14, KMW-19, and KMW-20 were reviewed, although all the wells were not sampled during the same period. The wells are located in close proximity to the Site (Figure 6). The following Table 5 summarizes the trends in contaminant concentrations.

Table 5 – 2014 Gasoline and BTEX Trends

Monitor Well	Gasoline	BTEX
KMW-1	samples non-detect	samples non-detect
KMW-2	Downward trend	Upward trend
KMW-4	Detected concentrations below MTCA cleanup levels	Detected concentrations below MTCA cleanup levels
KMW-8	Upward trend	Upward trend
KMW-14	Downward trend from below MTCA cleanup levels to non-detect	Downward trend from below MTCA cleanup levels to non-detect
KMW-19	Downward trend	Upward trend
KMW-20	Upward trend	Upward trend

5 CONCLUSIONS

Five groundwater monitor wells were installed at the Site as long term monitoring sampling points within an area proposed for asphalt parking development. The wells are located in the upgradient, side-gradient, and downgradient groundwater flow directions relative to the Site.

The analyses of groundwater samples from each of the installed five monitor wells exceed DOE MTCA Method A Unlimited Land Use cleanup levels.

The analyses of soil samples from each of the installed five monitor wells, except monitor well GES-1, exceed DOE MTCA Method A Unlimited Land Use cleanup levels.

The analysis of groundwater from upgradient monitor wells GES-1 and GES-2 indicate an offsite source of contamination.

BTEX concentrations in groundwater sampled beneath South Lincoln Street is trending upward in existing monitor wells KMW-8, KMW-19 and KMW-20.

The highest hydraulic conductivities calculated in 2013 by GeoEngineers (Draft) were in monitor wells KMW-7 and KMW-20, which appear to be located within the historic drainage channel beneath South Lincoln Street.

The side-gradient offsite KMW-5 free product sample was determined to be from a different source than gasoline analyzed from previous onsite monitor well KMW-2 (GeoPro 2012). The different sources are consistent with conclusions made in reports on previous investigations. The rate of natural attenuation has not been evaluated. The offsite source(s) of gasoline contamination is unknown.

6 RECOMMENDATIONS

The following are recommendations based on the results of this investigation.

- Maintain the five new monitor wells as a minimum number of sampling points within the Site without compromising the ability to monitor the onsite impact of offsite contamination. These points include upgradient, side-gradient, and downgradient groundwater flow directions.
- Maintain a forensic sampling program that will allow comparison of Site groundwater and free product analyses to offsite analyses with the objective of estimating co-mingled contaminant plume migration characteristics, such as, flow rates, directions, volumes and plume differentiation ratios.
- Any free product from Site or offsite wells should be considered for forensic analysis to evaluate age and migration differentiation within the co-mingled contaminant plumes. Such forensic evaluation could include PIANO analyses and the distribution of these hydrocarbon classes which usually span the range C_3 to C_{12}. Additional forensic analysis can be used to provide estimates gasoline grades, possible different biodegradation among the co-mingled plumes, and rates of migration.
- Maintain a frequency of sampling by collecting groundwater samples annually during the season with the declining highest head levels. Too frequent sampling may not allow sufficient free product to collect within the wells and could compromise forensic analysis.
- Continue to collect and evaluate groundwater samples in accordance with DOE MTCA standards and regulations and discussions with DOE.

7 REFERENCES

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8 LIMITATIONS

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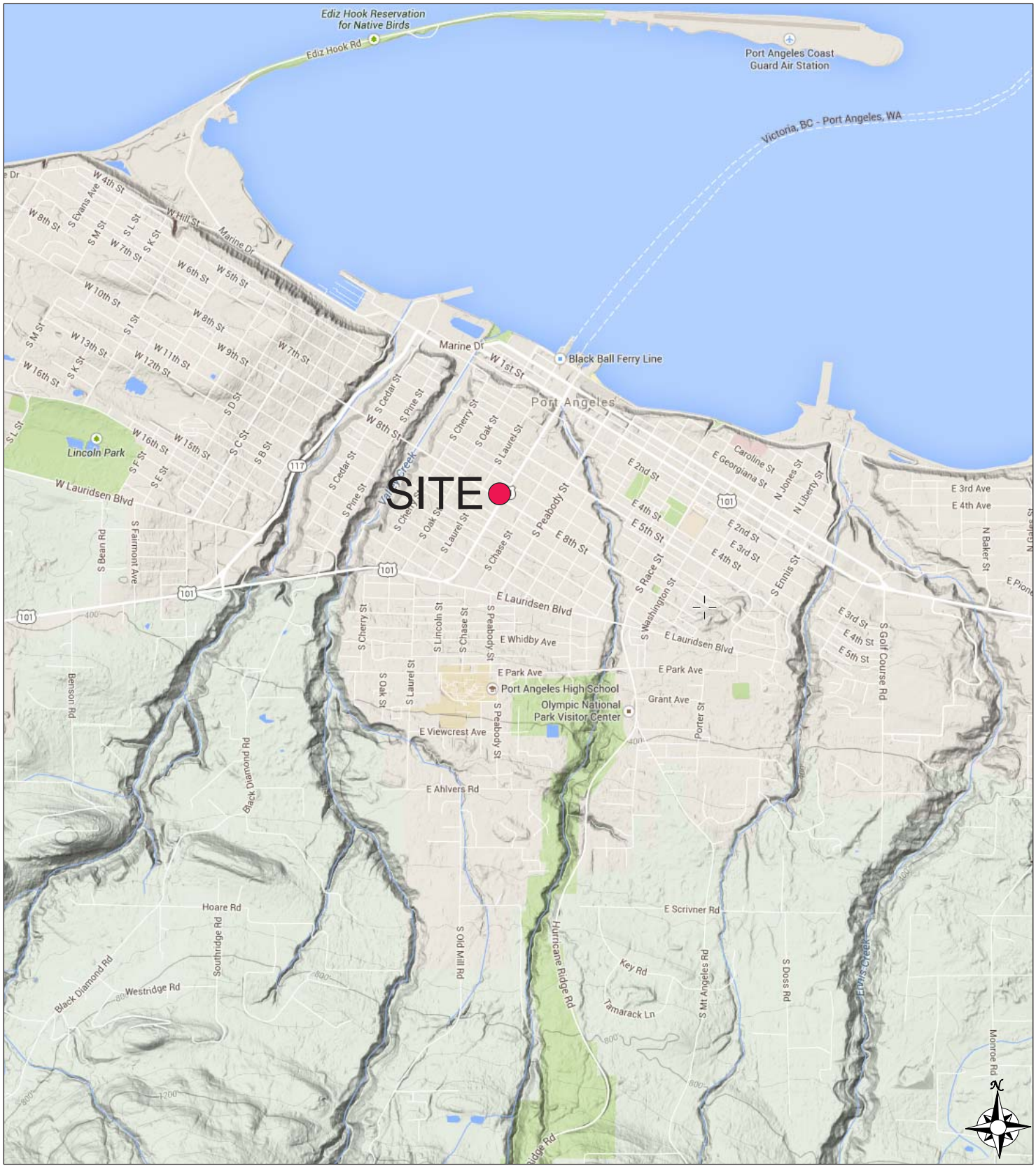
Conclusions and findings apply only to present conditions, and opinions expressed are subject to revision when additional or new information is presented and reviewed. This warranty is in lieu of all other warranties, either expressed or implied. It is possible that explorations failed to reveal the presence of hazardous materials at areas where hazardous materials were assumed, suspected or expected to exist (hazardous as used herein shall also mean contaminated and polluted). Through use of this report it is understand that failure to sample soil or water, or install groundwater monitor wells at locations through appropriate and mutually agreed-upon techniques does not guarantee that hazardous materials have, or will be, detected at such locations. Similarly, areas which in fact are unaffected by hazardous materials at the time of this report, may later, due to natural causes or human intervention, become contaminated. GeoPro LLC is not responsible for failing to locate hazardous materials which have not been discovered at the time of this report or in the future. In the event of changes in future development plans as understood at the time of this report, the conclusions and recommendations made herein shall be invalid until GeoPro LLC is given the opportunity to review and modify this report in writing. Portions of an Agreement to perform professional services may or may not be disclosed in this report.

Richard C. Kent, L.G.

Cc: BMEC



Source: Clallam County GIS

Prepared by **GeoPro LLC** PO Box 26 Battle Ground, WA 98604 geopro@comcast.net	**Former Round The Clock Deli** 722 South Lincoln St., Port Angeles, WA WA DOE Facility ID 63427274 April 2015	**LOCATION MAP**	**Figure 1**

image: SIO, NOAA, US Navy, NGA, GEBCO: compiled by Google Earth

no scale

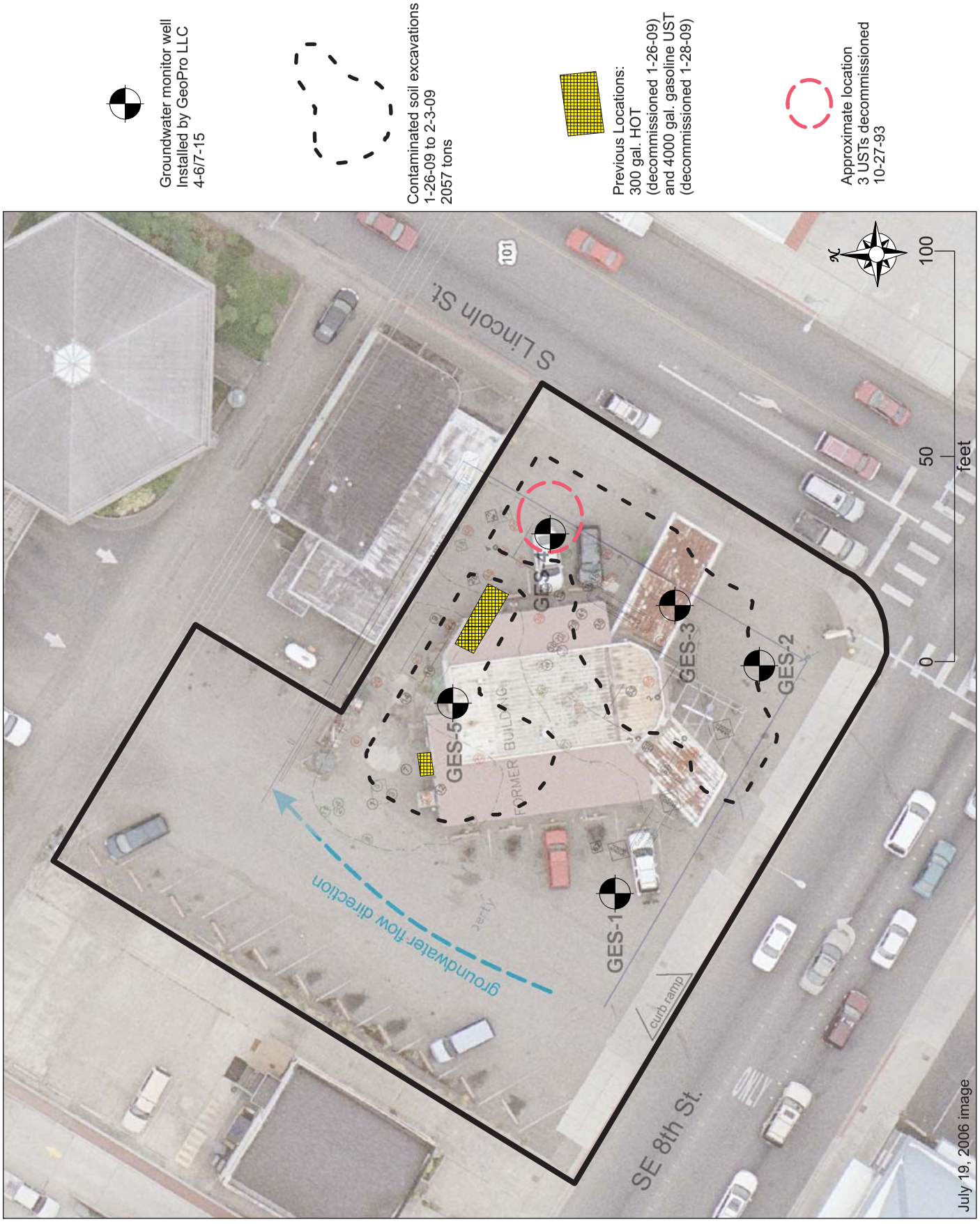
Geologic Map: WA Div. of Geology and Earth Resources Open File Report 2003-6

Qgos: Vashon recessional outwash sand (Pleistocene)—Proglacial sand, pebbly sand, and interbedded silt; thin to medium bedded. May have been deposited in a deltaic environment during a period of higher sea level during the late Pleistocene.

Qgd: Vashon Drift, undivided (Pleistocene)—Glacial deposits of Vashon age consisting of mixtures of sand and gravel, lodgment till, sandy ablation(?) till, and lacustrine(?) silts; commonly characterized by hummocky topography.

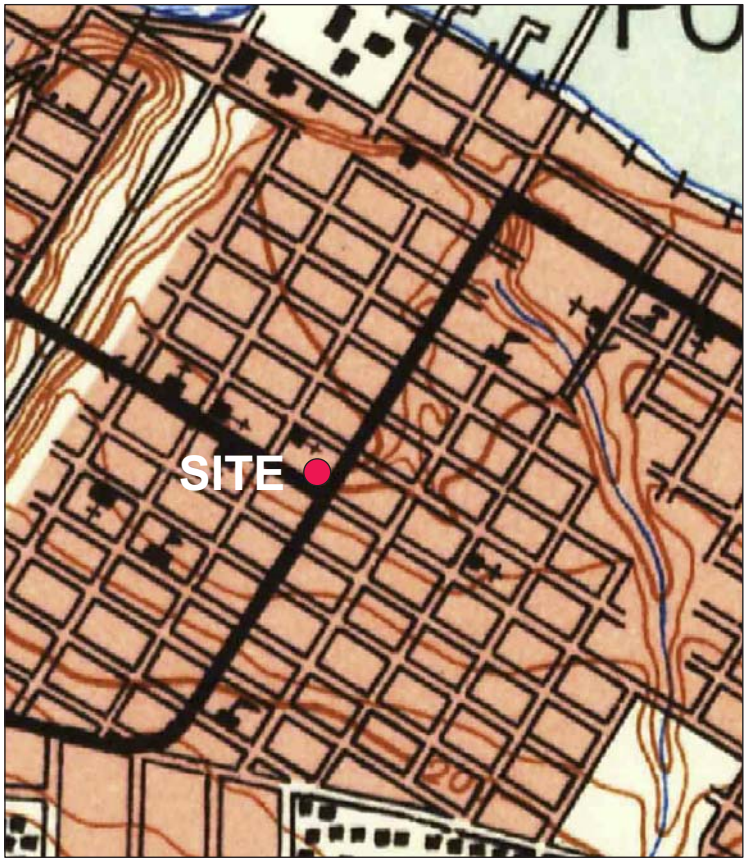
Qguc: Undifferentiated surficial deposits (Holocene–Pleistocene)—Clay, silt, sand, gravel, till, diamicton, and peat.

Prepared by **GeoPro LLC** PO Box 26 Battle Ground, WA 98604 geopro@comcast.net	**Former Round The Clock Deli** 722 South Lincoln St., Port Angeles, WA WA DOE Facility ID 63427274 April 2015	**GEOLOGIC MAP**	**Figure 2**



Prepared by **GeoPro LLC** PO Box 26 Battle Ground, WA 98604 geopro@comcast.net	**Former Round The Clock Deli** 722 South Lincoln St., Port Angeles, WA WA DOE Facility ID 63427274 April 2015	**SITE MAP WITH MONITOR WELL LOCATIONS**	**Figure 3**

1918 Topographic Map



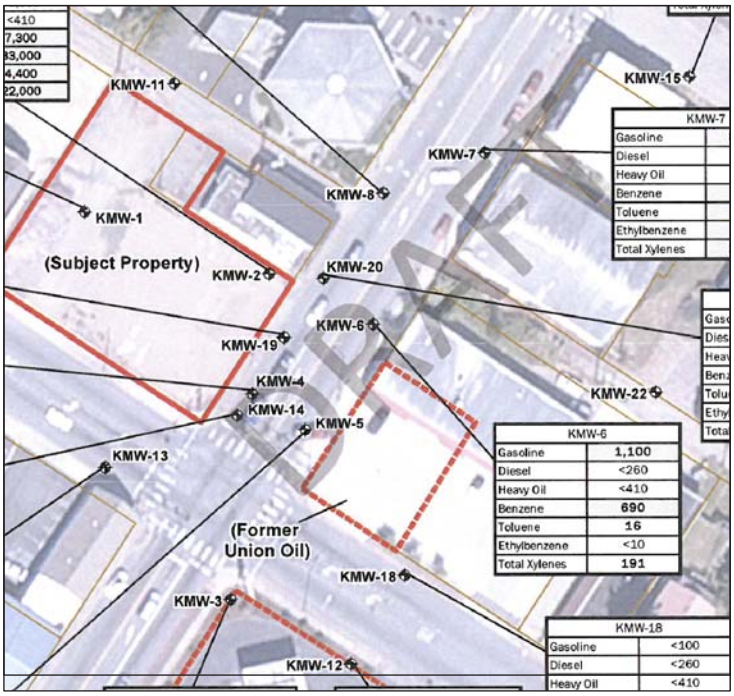
1941 Topographic Map

Site at head of drainage
as shown in historic topographic maps.

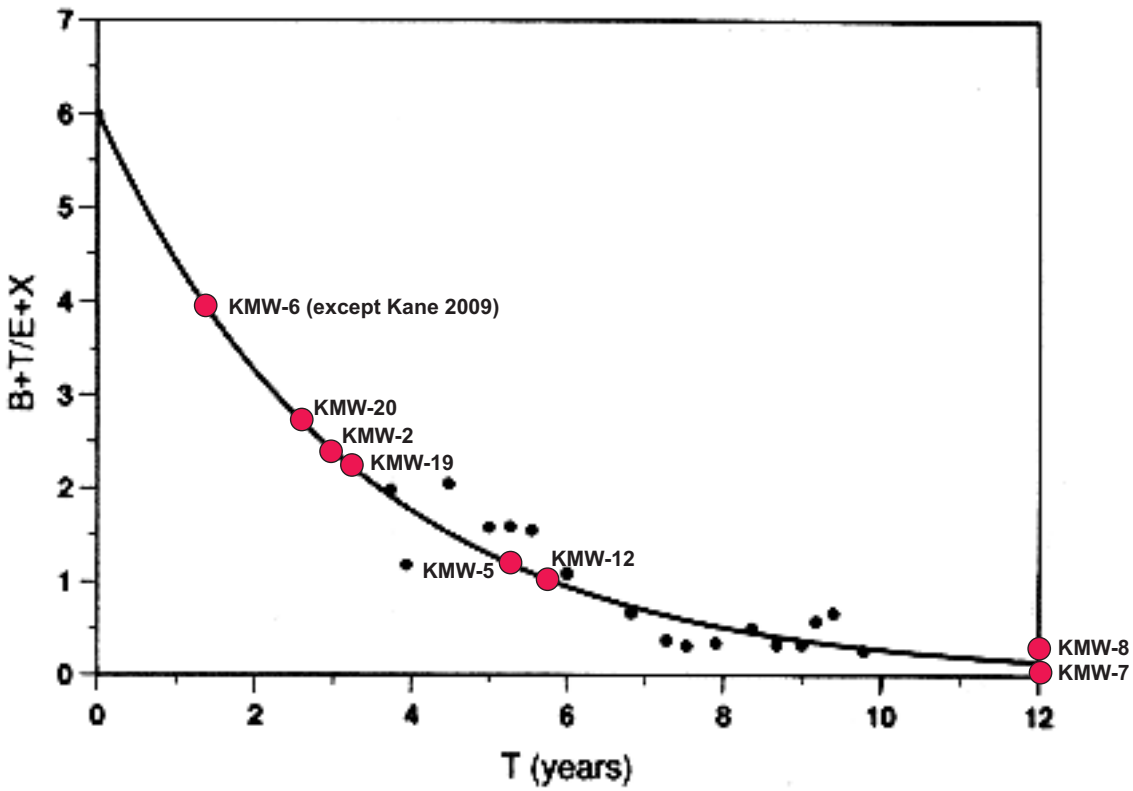
Blue drainage added onto 1918 map to emphasize topography.

Prepared by **GeoPro LLC** PO Box 26 Battle Ground, WA 98604 geopro@comcast.net	**Former Round The Clock Deli** 722 South Lincoln St., Port Angeles, WA WA DOE Facility ID 63427274 April 2015	**HISTORIC DRAINAGE TOPOGRAPHIC MAPS**	**Figure 4**

Groundwater Monitor Well Locations



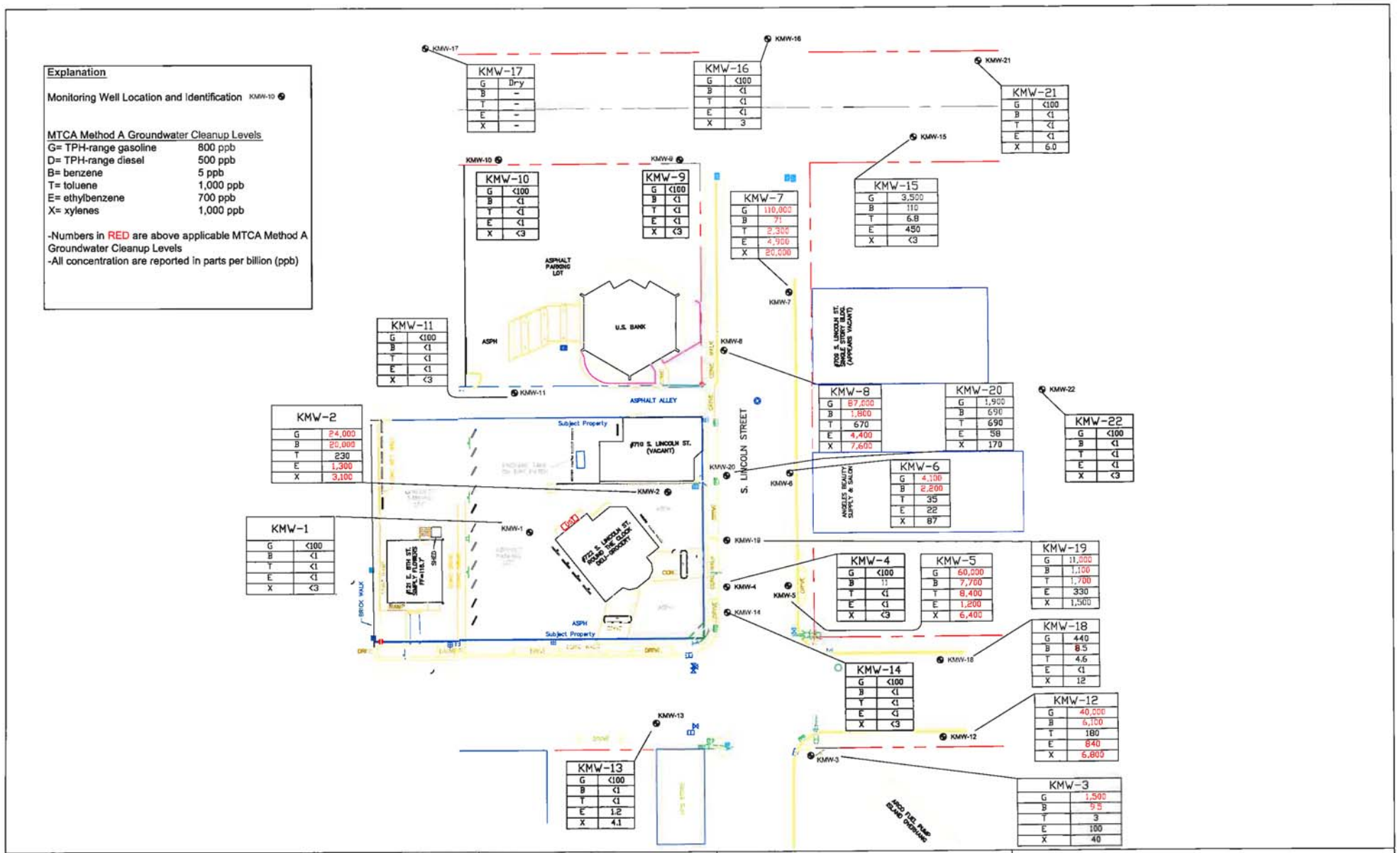
Source: GeoEngineers Draft 2013, Map "Groundwater Analytical Results".



Source of graph: Kaplan, I. R., Galperin, Y., Alimi, H., Lee, R. P. and Lu, S. T. (1996), "Patterns of chemical changes during environmental alteration of hydrocarbon fuels." Groundwater Monitoring and Remediation16 (4), 113-124. Reprinted by PaceLabs.

Plots (red) of the average ratio (B+T)/(E+X) from groundwater analyses by Kane (2008, 2009, 2012), GeoPro (2012) and GeoEngineers (2013). The time derivation graph plots have not taken into account weathering, hydrogeologic characteristics, pathway evaporation, or water washing, and therefore, have some uncertainty .

Prepared by **GeoPro LLC** PO Box 26 Battle Ground, WA 98604 geopro@comcast.net	**Former Round The Clock Deli** 722 South Lincoln St., Port Angeles, WA WA DOE Facility ID 63427274 April 2015	**TIME DERIVATION HISTORIC BTEX DATA**	**Figure 5**



KANE ENVIRONMENTAL INC

Remedial Excavation
722 S. Lincoln St.
Port Angeles, Washington

Figure 3
Groundwater TPH Concentrations
October 2008

Prepared by
GeoPro LLC
PO Box 26
Battle Ground, WA 98604
geopro@comcast.net

Former Round The Clock Deli
722 South Lincoln St., Port Angeles, WA
WA DOE Facility ID 63427274
April 2015

Groundwater Monitor Well Locations Map

Figure 6

Appendix A
GEOLOGIC LOGS

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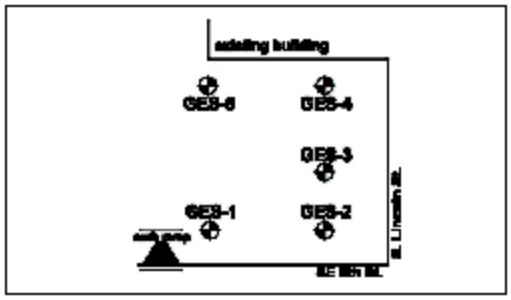
GEOLOGIC LOG

DRILL HOLE NO.: GES-1

Location Sketch



Project No.: **150320** Project Name: **Round The Clock**
Project Location: **722 S. Lincoln St., Port Angeles, WA**
Client: **Rite Aid/BMEC**

Drilling Co.: **ESN Northwest Inc, Olympia, WA** Driller: **Brian**
Drilling Method and Rig Model: **Geoprobe 7800**
Sampling Method(s): **Dual tube, Peristaltic low-flow**

Start Date and Time: **4-6-15: 0930** End Date and Time: **4-6-15: 1130**
Surface Conditions: **Gravel fill** Surface Elevation: **Est.114 ft MSL**
Depth 1st Groundwater Encounter: **16 ft bgs** Total Depth: **20 ft bgs**
Laboratory: **Onsite, Redmond, WA** COC: Logged By: **R Kent**

DEPTH (FT)	GRAPHIC	SWL	DESCRIPTION	USCS	SAMPLE SOIL	SAMPLE WATER	PID (ppm)	SPT/6"	WELL DESCRIPTION
0–3			fill: poorly graded sand and gravel, damp	na					Surface Monument; cement; Seal - bentonite; PVC blank
3–9			Sand and Silt: poorly graded fn-med sand with gravel and <5% silt; mod brn 5YR4/4, moist, no HC odor	SM					
9					S1				
9–11			Sand: fn sand, minor silt, olive gray 5Y4/1, moist to wet, strong HC odor	SW-SM					
11–13			Sand: fn sand, minor silt, dk greenish gray 5GY4/1, moist, slight HC odor						Pack 10-20 silica sand; PVC 0.020 Screen 5'-20'
13–16			Sand: cse well graded sand, olive gray 5Y4/1, moist, strong HC odor	SW					
16		▼			S2				
16–17			Clay: clay, mod plastic, damp-moist, mod yellowish brn 10YR5/4, v slight HC odor	CL					
17–20			Sand: cse well graded sand, olive gray 5Y4/1, saturated, strong HC odor	SW		W			

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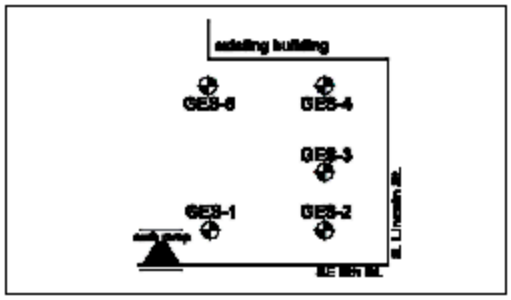
GEOLOGIC LOG

DRILL HOLE NO.: GES-2

Location Sketch



Project No.: **150320** Project Name: **Round The Clock**
Project Location: **722 S. Lincoln St., Port Angeles, WA**
Client: **Rite Aid/BMEC**

Drilling Co.: **ESN Northwest Inc, Olympia, WA** Driller: **Brian**
Drilling Method and Rig Model: **Geoprobe 7800**
Sampling Method(s): **Dual tube, Peristaltic low-flow**

Start Date and Time: **4-6-15: 1135** End Date and Time: **4-6-15: 1230**
Surface Conditions: **Gravel fill** Surface Elevation: **Est.114 ft MSL**
Depth 1st Groundwater Encounter: **14 ft bgs** Total Depth: **20 ft bgs**
Laboratory: **Onsite, Redmond, WA** COC: Logged By: **R Kent**

DEPTH (FT)	GRAPHIC	SWL	DESCRIPTION	USCS	SAMPLE SOIL	SAMPLE WATER	PID (ppm)	SPT/6"	WELL DESCRIPTION
0–4			fill: poorly graded sand and gravel, lt gray N7, damp	na					Surface Monument; cement; Seal - bentonite; PVC blank
4–9			Sand and Silt: poorly graded fn-med with gravel and silt; mod brn 5YR4/4, moist, strong HC odor at 5 ft	SP					
9–14			Sand: fn, minor silt, dk greenish gray 5GY4/1, moist, strong HC odor	SM	S1				Pack 10-20 silica sand; PVC 0.020 Screen 5'-20'
14–15		▼	Clay: mod plastic, wet, yellowish brn 10YR6/2, strong HC odor	CL					
15–20			Sand: med-cse, mod sorted, dk greenish gray 5GY4/1, saturated, strong HC odor, water sheen test 17 ft foamy, bubbling and visible sheen	SM	S2	W			

This geologic log and related information depict subsurface conditions only at a specific location and time. Geologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in geologic and hydrogeologic conditions and engineering properties at this location.

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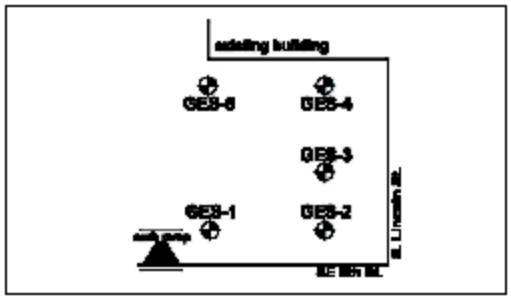
GEOLOGIC LOG

DRILL HOLE NO.: GES-3

Location Sketch



Project No.: **150320** Project Name: **Round The Clock**
Project Location: **722 S. Lincoln St., Port Angeles, WA**
Client: **Rite Aid/BMEC**

Drilling Co.: **ESN Northwest Inc, Olympia, WA** Driller: **Brian**
Drilling Method and Rig Model: **Geoprobe 7800**
Sampling Method(s): **Dual tube, Peristaltic low-flow**

Start Date and Time: **4-6-15: 1250** End Date and Time: **4-6-15: 1545**
Surface Conditions: **Gravel fill** Surface Elevation: **Est.114 ft MSL**
Depth 1st Groundwater Encounter: **15 ft bgs** Total Depth: **20 ft bgs**
Laboratory: **Onsite, Redmond, WA** COC: Logged By: **R Kent**

DEPTH (FT)	GRAPHIC	SWL	DESCRIPTION	USCS	SAMPLE SOIL	SAMPLE WATER	PID (ppm)	SPT/6"	WELL DESCRIPTION
0–10			fill: poorly graded sand and gravel, lt gray N7, damp	na					Surface Monument; cement; Seal - bentonite; PVC blank
10–11			Clay: dk greenish gray 5GY4/1, slight HC odor, damp	CL					
11–14			Sand: med-cse, dk greenish gray 5GY4/1, wet, mod HC odor	SM	S1				Pack 10-20 silica sand; PVC 0.020 Screen 5'-20'
14–15			Clay: mod plastic, damp, dk yellowish brn 10YR4/2, mod HC odor	CL					
15–20			Sand: med-cse, mod sorted, dk greenish gray 5GY4/1, saturated, strong HC odor	SM	S2	W			

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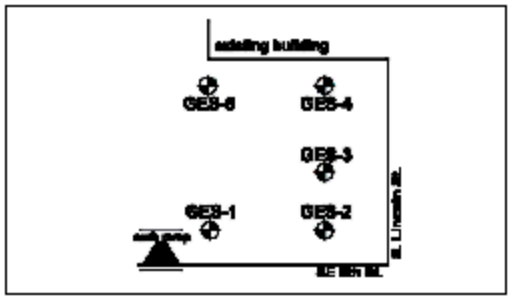
GEOLOGIC LOG

DRILL HOLE NO.: GES-4

Location Sketch



Project No.: **150320** Project Name: **Round The Clock**
Project Location: **722 S. Lincoln St., Port Angeles, WA**
Client: **Rite Aid/BMEC**

Drilling Co.: **ESN Northwest Inc, Olympia, WA** Driller: **Brian**
Drilling Method and Rig Model: **Geoprobe 7800**
Sampling Method(s): **Dual tube, Peristaltic low-flow**

Start Date and Time: **4-7-15: 0900** End Date and Time: **4-7-15: 0930**
Surface Conditions: **Gravel fill** Surface Elevation: **Est.114 ft MSL**
Depth 1st Groundwater Encounter: **15 ft bgs** Total Depth: **20 ft bgs**
Laboratory: **Onsite, Redmond, WA** COC: Logged By: **R Kent**

DEPTH (FT)	GRAPHIC	SWL	DESCRIPTION	USCS	SAMPLE SOIL	SAMPLE WATER	PID (ppm)	SPT/6"	WELL DESCRIPTION
0–14			fill: poorly graded sand and gravel, lt gray N7, damp	na					Surface Monument; cement; Seal - bentonite; PVC blank
14–20		▼	Sand: fn-med, slightly silty, olive gray, 5Y4/1, strong HC odor, saturated, sheen test foaming, gas bubbles on water surface, no HC odor 19.5 ft.	SM	S1; S2	W			Pack 10-20 silica sand; PVC 0.020 Screen 10'-20'

This geologic log and related information depict subsurface conditions only at a specific location and time. Geologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in geologic and hydrogeologic conditions and engineering properties at this location.

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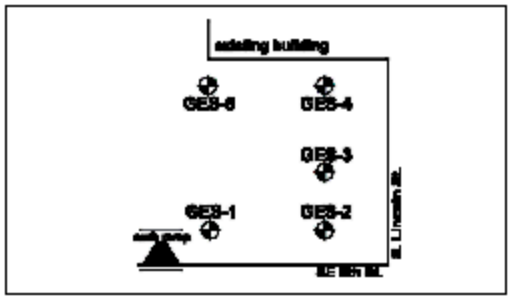
GEOLOGIC LOG

DRILL HOLE NO.: GES-5

Location Sketch



Project No.: **150320** Project Name: **Round The Clock**
Project Location: **722 S. Lincoln St., Port Angeles, WA**
Client: **Rite Aid/BMEC**

Drilling Co.: **ESN Northwest Inc, Olympia, WA** Driller: **Brian**
Drilling Method and Rig Model: **Geoprobe 7800**
Sampling Method(s): **Dual tube, Peristaltic low-flow**

Start Date and Time: **4-7-15: 1030** End Date and Time: **4-7-15: 1050**
Surface Conditions: **Gravel fill** Surface Elevation: **Est.114 ft MSL**
Depth 1st Groundwater Encounter: **16 ft bgs** Total Depth: **20 ft bgs**
Laboratory: **Onsite, Redmond, WA** COC: Logged By: **R Kent**

DEPTH (FT)	GRAPHIC	SWL	DESCRIPTION	USCS	SAMPLE SOIL	SAMPLE WATER	PID (ppm)	SPT/6"	WELL DESCRIPTION
0–4			fill: poorly graded sand and gravel, pale yellow brn to lt gray, damp	na					Surface Monument; cement
4–14			Sand: fn, silty, gravelly, mod brn 5YR4/4, damp, moist at 8 ft, no HC odor	SW-SC					Seal - bentonite; PVC blank
14–19		▼ 15.5 ft	Sand: fn-cse, inc silt 16-17 ft, inc clay 19 ft, dk greenish gray 5GY4/1, strong HC odor, saturated at 15.5 ft	SW-SM	S1; S2	W			Pack 10-20 silica sand; PVC 0.020 Screen 10'-20'
19–20			Sand: fn, clayey	SC					

This geologic log and related information depict subsurface conditions only at a specific location and time. Geologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in geologic and hydrogeologic conditions and engineering properties at this location.

Appendix B
GROUNDWATER SAMPLE FIELD LOGS

GeoPro LLC
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GROUNDWATER SAMPLE FIELD LOG

DAY/DATE: Tues. 4-7-15	SHEET 1 of 1
PROJECT NAME: Round The Clock	PROJECT NO.: 150320
PROJECT LOCATION: 722 S. Lincoln St., Port Angeles, WA	
Weather: ☒Fair ☐Overcast ☐Fog ☐Rain ☐Snow Temp.: ☐<0 ☐0-32 ☒33-54 ☐55-79 ☐>80 Humidity %: ☐<25 ☐26-49 ☒50-74 ☐>75	Wind: ☒Calm ☐Light ☐Moderate ☐Strong Wind from:☐N ☐NE ☐E ☐SE ☐S ☐SW ☐W ☐NW Precip.: ☒None ☐Mist ☐Light ☐Moderate ☐Heavy

WELL NO. (or Boring, Location): GES-1	**SAMPLE NUMBER: GES1-W**
Well depth: 20 ft Screen length: 15 ft	Laboratory: Onsite, Redmond WA
Well install date: 4-6-15	COC and/or RFA Number:
Pre-purge SWL: 17.28 ft TOC	Casing diameter: 2 inch
Time Sample Collected: 0925	SWL at sample time: 17.3 ft TOC
Sample Turbidity: 401 ppm	Sample Conductance: 802 µS
Sample Color: clear	Sample pH: 7.23
Sample Temperature: 53.3 °F	Sample Odor: none

Field Data

Time 24 Hr	Temp °F	Conductivity µS	pH	Pump Rate or Bail No.	Turbidity ppm	Other Odor, etc.
0908	54.3	814	7.15	<1 gpm	407	none
0915	53.4	816	7.20	<1 gpm	408	none
0920	53.3	802	7.23	<1 gpm	401	none

Sample Collection Method:

The monitor well was purged:

☒of stagnant water in the casing and filter by slowly setting a pump or intake tubing within the approximate middle of the screened interval or slightly above the middle until the until the temperature, conductivity and pH stabilized. OR,

☐ of stagnant water in the casing and filter by slowly setting a pump or intake tubing at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized. OR,

☐ by hand bailing until temperature, conductivity and pH stabilized.

Samples were collected:

☒by setting a pump, or tubing attached to a pump, within the approximate middle of the screened interval until the temperature, conductivity and pH stabilized.

☐ by setting a pump, or tubing attached to a pump, at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized.

☐ with disposable bailers until the temperature, conductivity and pH stabilized.

Sample Shipment:

Water samples were placed in appropriate containers suitable for analyses requested. As necessary, the containers were prepared by the lab. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested: (per laboratory protocols)

☐ NWTPH-HCID; ☐ NWTPH-Gx; ☐ NWTPH-Dx; ☒NWTPH-Gx/BTEX; ☐ VOC; ☐ HVOC;

☐ SemiVOC; ☐ PAH; ☐ PCB; ☐ Pesticides; (☐8, ☐10, ☐13) Metals; ☐ TCLP; ☐ MTBE;

☒OTHER: total lead

SIGNATURE:

PRINT NAME: P Kent

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

This groundwater sample field log and related information depict subsurface conditions only at a specific location and time. Hydrogeologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in original well construction, geologic and hydrogeologic conditions and engineering properties at this location.

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GROUNDWATER SAMPLE FIELD LOG

DAY/DATE: Tues. 4-7-15	SHEET 1 of 1
PROJECT NAME: Round The Clock	PROJECT NO.: 150320
PROJECT LOCATION: 722 S. Lincoln St., Port Angeles, WA	
Weather: ☒Fair ☐Overcast ☐Fog ☐Rain ☐Snow Temp.: ☐<0 ☐0-32 ☒33-54 ☐55-79 ☐>80 Humidity %: ☐<25 ☐26-49 ☒50-74 ☐>75	Wind: ☒Calm ☐Light ☐Moderate ☐Strong Wind from:☐N ☐NE ☐E ☐SE ☐S ☐SW ☐W ☐NW Precip.: ☒None ☐Mist ☐Light ☐Moderate ☐Heavy

WELL NO. (or Boring, Location): GES-2	**SAMPLE NUMBER: GES2-W**
Well depth: 20 ft Screen length: 15 ft	Laboratory: Onsite, Redmond WA
Well install date: 4-6-15	COC and/or RFA Number:
Pre-purge SWL: 14.89 ft TOC	Casing diameter: 2 inch
Time Sample Collected: 1030	SWL at sample time: 14.9 ft TOC
Sample Turbidity: 466 ppm	Sample Conductance: 980 µS
Sample Color: clear	Sample pH: 6.96
Sample Temperature: 53.8 °F	Sample Odor: strong

Field Data

Time 24 Hr	Temp °F	Conductivity µS	pH	Pump Rate or Bail No.	Turbidity ppm	Other Odor, etc.
1020	56.6	957	7.08	<1 gpm	478	Strong HC
1025	53.9	925	7.11	<1 gpm	464	Strong HC
1030	53.8	980	6.96	<1 gpm	466	Strong HC

Sample Collection Method:

The monitor well was purged:

☒of stagnant water in the casing and filter by slowly setting a pump or intake tubing within the approximate middle of the screened interval or slightly above the middle until the until the temperature, conductivity and pH stabilized. OR,

☐ of stagnant water in the casing and filter by slowly setting a pump or intake tubing at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized. OR,

☐ by hand bailing until temperature, conductivity and pH stabilized.

Samples were collected:

☒by setting a pump, or tubing attached to a pump, within the approximate middle of the screened interval until the temperature, conductivity and pH stabilized.

☐ by setting a pump, or tubing attached to a pump, at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized.

☐ with disposable bailers until the temperature, conductivity and pH stabilized.

Sample Shipment:

Water samples were placed in appropriate containers suitable for analyses requested. As necessary, the containers were prepared by the lab. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested: (per laboratory protocols)

☐ NWTPH-HCID; ☐ NWTPH-Gx; ☐ NWTPH-Dx; ☒NWTPH-Gx/BTEX; ☐ VOC; ☐ HVOC;

☐ SemiVOC; ☐ PAH; ☐ PCB; ☐ Pesticides; (☐8, ☐10, ☐13) Metals; ☐ TCLP; ☐ MTBE;

☒OTHER: total lead

SIGNATURE: 

PRINT NAME: P Kent

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

This groundwater sample field log and related information depict subsurface conditions only at a specific location and time. Hydrogeologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in original well construction, geologic and hydrogeologic conditions and engineering properties at this location.

GeoPro LLC
Post Office Box 26
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GROUNDWATER SAMPLE FIELD LOG

DAY/DATE: Tues. 4-7-15	SHEET 1 of 1
PROJECT NAME: Round The Clock	PROJECT NO.: 150320
PROJECT LOCATION: 722 S. Lincoln St., Port Angeles, WA	
Weather: ☒Fair ☐Overcast ☐Fog ☐Rain ☐Snow Temp.: ☐<0 ☐0-32 ☒33-54 ☐55-79 ☐>80 Humidity %: ☐<25 ☐26-49 ☒50-74 ☐>75	Wind: ☒Calm ☐Light ☐Moderate ☐Strong Wind from:☐N ☐NE ☐E ☐SE ☐S ☐SW ☐W ☐NW Precip.: ☒None ☐Mist ☐Light ☐Moderate ☐Heavy

WELL NO. (or Boring, Location): GES-3	**SAMPLE NUMBER: GES3-W**
Well depth: 20 ft Screen length: 15 ft	Laboratory: Onsite, Redmond WA
Well install date: 4-6-15	COC and/or RFA Number:
Pre-purge SWL: 15.26 ft TOC	Casing diameter: 2 inch
Time Sample Collected: 1120	SWL at sample time: 15.1 ft TOC
Sample Turbidity: 380 ppm	Sample Conductance: 760 µS
Sample Color: pale yellow	Sample pH: 6.76
Sample Temperature: 56.7 °F	Sample Odor: strong

Field Data

Time 24 Hr	Temp °F	Conductivity µS	pH	Pump Rate or Bail No.	Turbidity ppm	Other Odor, etc.
1105	56.9	759	6.95	<1 gpm	380	Strong HC
1110	56.6	764	6.82	<1 gpm	379	Strong HC
1115	56.7	760	6.76	<1 gpm	380	Strong HC

Sample Collection Method:

The monitor well was purged:

☒of stagnant water in the casing and filter by slowly setting a pump or intake tubing within the approximate middle of the screened interval or slightly above the middle until the until the temperature, conductivity and pH stabilized. OR,

☐ of stagnant water in the casing and filter by slowly setting a pump or intake tubing at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized. OR,

☐ by hand bailing until temperature, conductivity and pH stabilized.

Samples were collected:

☒by setting a pump, or tubing attached to a pump, within the approximate middle of the screened interval until the temperature, conductivity and pH stabilized.

☐ by setting a pump, or tubing attached to a pump, at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized.

☐ with disposable bailers until the temperature, conductivity and pH stabilized.

Sample Shipment:

Water samples were placed in appropriate containers suitable for analyses requested. As necessary, the containers were prepared by the lab. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested: (per laboratory protocols)

☐ NWTPH-HCID; ☐ NWTPH-Gx; ☐ NWTPH-Dx; ☒NWTPH-Gx/BTEX; ☐ VOC; ☐ HVOC;

☐ SemiVOC; ☐ PAH; ☐ PCB; ☐ Pesticides; (☐8, ☐10, ☐13) Metals; ☐ TCLP; ☐ MTBE;

☒OTHER: total lead

SIGNATURE:

PRINT NAME: P Kent

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

This groundwater sample field log and related information depict subsurface conditions only at a specific location and time. Hydrogeologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in original well construction, geologic and hydrogeologic conditions and engineering properties at this location.

GeoPro LLC
Post Office Box 26
Battle Ground, WA 98604
(360) 666-1465

GROUNDWATER SAMPLE FIELD LOG

DAY/DATE: Tues. 4-7-15	SHEET 1 of 1
PROJECT NAME: Round The Clock	PROJECT NO.: 150320
PROJECT LOCATION: 722 S. Lincoln St., Port Angeles, WA	
Weather: ☒Fair ☐Overcast ☐Fog ☐Rain ☐Snow Temp.: ☐<0 ☐0-32 ☒33-54 ☐55-79 ☐>80 Humidity %: ☐<25 ☐26-49 ☒50-74 ☐>75	Wind: ☒Calm ☐Light ☐Moderate ☐Strong Wind from:☐N ☐NE ☐E ☐SE ☐S ☐SW ☐W ☐NW Precip.: ☒None ☐Mist ☐Light ☐Moderate ☐Heavy

WELL NO. (or Boring, Location): GES-4	**SAMPLE NUMBER: GES4-W**
Well depth: 20 ft Screen length: 15 ft	Laboratory: Onsite, Redmond WA
Well install date: 4-7-15	COC and/or RFA Number:
Pre-purge SWL: 15.27 ft TOC	Casing diameter: 2 inch
Time Sample Collected: 1205	SWL at sample time: 15.27 ft TOC
Sample Turbidity: 182 ppm	Sample Conductance: 362 µS
Sample Color: pale gray	Sample pH: 6.94
Sample Temperature: 57.8 °F	Sample Odor: moderate

Field Data

Time 24 Hr	Temp °F	Conductivity µS	pH	Pump Rate or Bail No.	Turbidity ppm	Other Odor, etc.
1155	57.3	369	6.91	<1 gpm	182	Strong HC
1200	57.8	362	6.94	<1 gpm	182	Strong HC

Sample Collection Method:

The monitor well was purged:

☒of stagnant water in the casing and filter by slowly setting a pump or intake tubing within the approximate middle of the screened interval or slightly above the middle until the until the temperature, conductivity and pH stabilized. OR,

☐ of stagnant water in the casing and filter by slowly setting a pump or intake tubing at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized. OR,

☐ by hand bailing until temperature, conductivity and pH stabilized.

Samples were collected:

☒by setting a pump, or tubing attached to a pump, within the approximate middle of the screened interval until the temperature, conductivity and pH stabilized.

☐ by setting a pump, or tubing attached to a pump, at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized.

☐ with disposable bailers until the temperature, conductivity and pH stabilized.

Sample Shipment:

Water samples were placed in appropriate containers suitable for analyses requested. As necessary, the containers were prepared by the lab. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested: (per laboratory protocols)

☐ NWTPH-HCID; ☐ NWTPH-Gx; ☐ NWTPH-Dx; ☒NWTPH-Gx/BTEX; ☐ VOC; ☐ HVOC;

☐ SemiVOC; ☐ PAH; ☐ PCB; ☐ Pesticides; (☐8, ☐10, ☐13) Metals; ☐ TCLP; ☐ MTBE;

☒OTHER: total lead

SIGNATURE: 

PRINT NAME: P Kent

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

This groundwater sample field log and related information depict subsurface conditions only at a specific location and time. Hydrogeologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in original well construction, geologic and hydrogeologic conditions and engineering properties at this location.

GeoPro LLC
Post Office Box 26
Battle Ground, WA 98604
(360) 666-1465

GROUNDWATER SAMPLE FIELD LOG

DAY/DATE: Tues. 4-7-15	SHEET 1 of 1
PROJECT NAME: Round The Clock	PROJECT NO.: 150320
PROJECT LOCATION: 722 S. Lincoln St., Port Angeles, WA	
Weather: ☒Fair ☐Overcast ☐Fog ☐Rain ☐Snow Temp.: ☐<0 ☐0-32 ☒33-54 ☐55-79 ☐>80 Humidity %: ☐<25 ☐26-49 ☒50-74 ☐>75	Wind: ☒Calm ☐Light ☐Moderate ☐Strong Wind from:☐N ☐NE ☐E ☐SE ☐S ☐SW ☐W ☐NW Precip.: ☒None ☐Mist ☐Light ☐Moderate ☐Heavy

WELL NO. (or Boring, Location): GES-5	**SAMPLE NUMBER: GES5-W**
Well depth: 20 ft Screen length: 15 ft	Laboratory: Onsite, Redmond WA
Well install date: 4-7-15	COC and/or RFA Number:
Pre-purge SWL: 15.68 ft TOC	Casing diameter: 2 inch
Time Sample Collected: 1340	SWL at sample time: 15.7 ft TOC
Sample Turbidity: 299 ppm	Sample Conductance: 595 µS
Sample Color: clear	Sample pH: 6.86
Sample Temperature: 60.4 °F	Sample Odor: strong

Field Data

Time 24 Hr	Temp °F	Conductivity µS	pH	Pump Rate or Bail No.	Turbidity ppm	Other Odor, etc.
1330	60.6	604	6.98	<1 gpm	302	Strong HC
1335	60.4	595	6.86	<1 gpm	299	Strong HC

Sample Collection Method:

The monitor well was purged:

☒of stagnant water in the casing and filter by slowly setting a pump or intake tubing within the approximate middle of the screened interval or slightly above the middle until the until the temperature, conductivity and pH stabilized. OR,

☐ of stagnant water in the casing and filter by slowly setting a pump or intake tubing at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized. OR,

☐ by hand bailing until temperature, conductivity and pH stabilized.

Samples were collected:

☒by setting a pump, or tubing attached to a pump, within the approximate middle of the screened interval until the temperature, conductivity and pH stabilized.

☐ by setting a pump, or tubing attached to a pump, at approximately _____ feet above the bottom of the casing until the temperature, conductivity and pH stabilized.

☐ with disposable bailers until the temperature, conductivity and pH stabilized.

Sample Shipment:

Water samples were placed in appropriate containers suitable for analyses requested. As necessary, the containers were prepared by the lab. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested: (per laboratory protocols)

☐ NWTPH-HCID; ☐ NWTPH-Gx; ☐ NWTPH-Dx; ☒NWTPH-Gx/BTEX; ☐ VOC; ☐ HVOC;

☐ SemiVOC; ☐ PAH; ☐ PCB; ☐ Pesticides; (☐8, ☐10, ☐13) Metals; ☐ TCLP; ☐ MTBE;

☒OTHER: total lead

SIGNATURE: 

PRINT NAME: P Kent

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

This groundwater sample field log and related information depict subsurface conditions only at a specific location and time. Hydrogeologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in original well construction, geologic and hydrogeologic conditions and engineering properties at this location.

Appendix C
LABORATORY REPORT APRIL 2015

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

April 16, 2015

Richard Kent
GeoPro, LLC
611 NW 5th Avenue
Battle Ground, WA 98604

Re: Analytical Data for Project 150320
Laboratory Reference No. 1504-069

Dear Rick:

Enclosed are the analytical results and associated quality control data for samples submitted on April 8, 2015.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

Case Narrative

Samples were collected on April 6 and 7, 2015 and received by the laboratory on April 8, 2015. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that all sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

NWTPH Gx/BTEX Analysis

Per EPA method 5035A, samples were received by the laboratory in pre-weighed 40 ml VOA vials preserved with either Methanol or Sodium Bisulfate.

4-ounce jars were not provided for dry weight analysis. Sample results are therefore based on wet weight.

Accurate surrogate recovery calculations are dependent on dry weight analysis. Since sample results are based on wet weight, all surrogate recovery values should be considered estimates.

The surrogate recovery is outside of the control limits for sample GES-S1. Since no additional sample was provided for re-analysis, it is impossible to determine if the surrogate recovery is low due to matrix effects or if it is simply due to the lack of dry weight correction.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

NWTPH-Gx/BTEX

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GES-S1**					
Laboratory ID:	04-069-01					
Benzene	**ND**	0.020	EPA 8021B	4-13-15	4-14-15	
Toluene	**ND**	0.043	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**ND**	0.043	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**ND**	0.043	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**ND**	0.043	EPA 8021B	4-13-15	4-14-15	
Gasoline	**ND**	4.3	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*61*	*68-123*				Q
Client ID:	**GES-S2**					
Laboratory ID:	04-069-02					
Benzene	**ND**	0.020	EPA 8021B	4-13-15	4-14-15	
Toluene	**ND**	0.064	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**ND**	0.064	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**ND**	0.064	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**ND**	0.064	EPA 8021B	4-13-15	4-14-15	
Gasoline	**ND**	6.4	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*76*	*68-123*				
Client ID:	**GES2-1**					
Laboratory ID:	04-069-03					
Benzene	**73**	2.3	EPA 8021B	4-13-15	4-14-15	
Toluene	**560**	12	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**240**	12	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**840**	12	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**330**	12	EPA 8021B	4-13-15	4-14-15	
Gasoline	**9000**	1200	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*---*	*68-123*				S

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

NWTPH-Gx/BTEX

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GES2-2**					
Laboratory ID:	04-069-04					
Benzene	**0.28**	0.020	EPA 8021B	4-13-15	4-14-15	
Toluene	**0.43**	0.044	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**0.65**	0.044	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**1.5**	0.044	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**0.62**	0.044	EPA 8021B	4-13-15	4-14-15	
Gasoline	**36**	4.4	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*77*	*68-123*				
Client ID:	**GES3-1**					
Laboratory ID:	04-069-05					
Benzene	**7.9**	0.45	EPA 8021B	4-13-15	4-14-15	
Toluene	**34**	2.2	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**44**	2.2	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**140**	2.2	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**51**	2.2	EPA 8021B	4-13-15	4-14-15	
Gasoline	**2100**	220	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	---	*68-123*				S
Client ID:	**GES3-2**					
Laboratory ID:	04-069-06					
Benzene	**7.1**	0.088	EPA 8021B	4-13-15	4-14-15	
Toluene	**30**	0.44	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**9.3**	0.44	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**32**	0.44	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**12**	0.44	EPA 8021B	4-13-15	4-14-15	
Gasoline	**430**	44	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*72*	*68-123*				

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

NWTPH-Gx/BTEX

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GES4-1**					
Laboratory ID:	04-069-07					
Benzene	**0.55**	0.031	EPA 8021B	4-13-15	4-14-15	
Toluene	**ND**	0.15	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**9.4**	0.15	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**11**	0.15	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**ND**	0.15	EPA 8021B	4-13-15	4-14-15	
Gasoline	**620**	15	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*94*	*68-123*				
Client ID:	**GES4-2**					
Laboratory ID:	04-069-08					
Benzene	**1.1**	0.044	EPA 8021B	4-13-15	4-14-15	
Toluene	**ND**	0.22	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**4.9**	0.22	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**5.3**	0.22	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**ND**	0.22	EPA 8021B	4-13-15	4-14-15	
Gasoline	**960**	22	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*68-123*				
Client ID:	**GES5-1B**					
Laboratory ID:	04-069-09					
Benzene	**0.055**	0.020	EPA 8021B	4-13-15	4-14-15	
Toluene	**ND**	0.068	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**ND**	0.068	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**0.095**	0.068	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**ND**	0.068	EPA 8021B	4-13-15	4-14-15	
Gasoline	**28**	6.8	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*86*	*68-123*				

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

NWTPH-Gx/BTEX

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GES5-2**					
Laboratory ID:	04-069-10					
Benzene	**18**	2.7	EPA 8021B	4-13-15	4-14-15	
Toluene	**220**	13	EPA 8021B	4-13-15	4-14-15	
Ethyl Benzene	**240**	13	EPA 8021B	4-13-15	4-14-15	
m,p-Xylene	**810**	13	EPA 8021B	4-13-15	4-14-15	
o-Xylene	**310**	13	EPA 8021B	4-13-15	4-14-15	
Gasoline	**8700**	1300	NWTPH-Gx	4-13-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	---	*68-123*				S

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0413S2					
Benzene	**ND**	0.020	EPA 8021B	4-13-15	4-13-15	
Toluene	**ND**	0.050	EPA 8021B	4-13-15	4-13-15	
Ethyl Benzene	**ND**	0.050	EPA 8021B	4-13-15	4-13-15	
m,p-Xylene	**ND**	0.050	EPA 8021B	4-13-15	4-13-15	
o-Xylene	**ND**	0.050	EPA 8021B	4-13-15	4-13-15	
Gasoline	**ND**	5.0	NWTPH-Gx	4-13-15	4-13-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*95*	*68-123*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-056-04										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*95*	*98*	*68-123*			
SPIKE BLANKS											
Laboratory ID:	SB0413S1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**0.936**	**0.946**	1.00	1.00		**94**	**95**	75-117	1	13	
Toluene	**0.947**	**0.952**	1.00	1.00		**95**	**95**	78-118	1	12	
Ethyl Benzene	**0.944**	**0.952**	1.00	1.00		**94**	**95**	78-118	1	12	
m,p-Xylene	**0.953**	**0.958**	1.00	1.00		**95**	**96**	78-121	1	13	
o-Xylene	**0.948**	**0.955**	1.00	1.00		**95**	**96**	77-119	1	13	
Surrogate:											
Fluorobenzene						*93*	*94*	*68-123*			

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GES1-W**					
Laboratory ID:	04-069-11					
Benzene	**120**	4.0	EPA 8021B	4-14-15	4-14-15	
Toluene	**140**	4.0	EPA 8021B	4-14-15	4-14-15	
Ethyl Benzene	**25**	4.0	EPA 8021B	4-14-15	4-14-15	
m,p-Xylene	**54**	4.0	EPA 8021B	4-14-15	4-14-15	
o-Xylene	**24**	4.0	EPA 8021B	4-14-15	4-14-15	
Gasoline	**600**	400	NWTPH-Gx	4-14-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*87*	*71-113*				
Client ID:	**GES2-W**					
Laboratory ID:	04-069-12					
Benzene	**8800**	250	EPA 8021B	4-14-15	4-14-15	
Toluene	**14000**	250	EPA 8021B	4-14-15	4-14-15	
Ethyl Benzene	**2900**	250	EPA 8021B	4-14-15	4-14-15	
m,p-Xylene	**8500**	250	EPA 8021B	4-14-15	4-14-15	
o-Xylene	**4000**	250	EPA 8021B	4-14-15	4-14-15	
Gasoline	**83000**	25000	NWTPH-Gx	4-14-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*71-113*				
Client ID:	**GES3-W**					
Laboratory ID:	04-069-13					
Benzene	**29000**	1000	EPA 8021B	4-14-15	4-14-15	
Toluene	**42000**	1000	EPA 8021B	4-14-15	4-14-15	
Ethyl Benzene	**4600**	250	EPA 8021B	4-14-15	4-14-15	
m,p-Xylene	**15000**	250	EPA 8021B	4-14-15	4-14-15	
o-Xylene	**7200**	250	EPA 8021B	4-14-15	4-14-15	
Gasoline	**190000**	25000	NWTPH-Gx	4-14-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*87*	*71-113*				

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GES4-W**					
Laboratory ID:	04-069-14					
Benzene	**2700**	250	EPA 8021B	4-14-15	4-14-15	
Toluene	**6200**	250	EPA 8021B	4-14-15	4-14-15	
Ethyl Benzene	**4000**	250	EPA 8021B	4-14-15	4-14-15	
m,p-Xylene	**13000**	250	EPA 8021B	4-14-15	4-14-15	
o-Xylene	**5100**	250	EPA 8021B	4-14-15	4-14-15	
Gasoline	**95000**	25000	NWTPH-Gx	4-14-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*71-113*				
Client ID:	**GES5-W**					
Laboratory ID:	04-069-15					
Benzene	**10000**	250	EPA 8021B	4-14-15	4-14-15	
Toluene	**22000**	250	EPA 8021B	4-14-15	4-14-15	
Ethyl Benzene	**3300**	250	EPA 8021B	4-14-15	4-14-15	
m,p-Xylene	**10000**	250	EPA 8021B	4-14-15	4-14-15	
o-Xylene	**4600**	250	EPA 8021B	4-14-15	4-14-15	
Gasoline	**110000**	25000	NWTPH-Gx	4-14-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*71-113*				

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0414W1					
Benzene	**ND**	1.0	EPA 8021B	4-14-15	4-14-15	
Toluene	**ND**	1.0	EPA 8021B	4-14-15	4-14-15	
Ethyl Benzene	**ND**	1.0	EPA 8021B	4-14-15	4-14-15	
m,p-Xylene	**ND**	1.0	EPA 8021B	4-14-15	4-14-15	
o-Xylene	**ND**	1.0	EPA 8021B	4-14-15	4-14-15	
Gasoline	**ND**	100	NWTPH-Gx	4-14-15	4-14-15	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*71-113*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-069-13										
	ORIG	DUP									
Benzene	**28800**	**26600**	NA	NA		NA		NA	8	30	
Toluene	**42000**	**39100**	NA	NA		NA		NA	7	30	
Ethyl Benzene	**4430**	**4160**	NA	NA		NA		NA	6	30	
m,p-Xylene	**15000**	**14000**	NA	NA		NA		NA	7	30	
o-Xylene	**7000**	**6650**	NA	NA		NA		NA	5	30	
Gasoline	**176000**	**160000**	NA	NA		NA		NA	10	30	
Surrogate:											
Fluorobenzene						*84*	*84*	*71-113*			
SPIKE BLANKS											
Laboratory ID:	SB0414W1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**49.9**	**47.3**	50.0	50.0		**100**	**95**	80-118	5	11	
Toluene	**50.9**	**47.6**	50.0	50.0		**102**	**95**	81-119	7	11	
Ethyl Benzene	**51.9**	**48.0**	50.0	50.0		**104**	**96**	80-121	8	12	
m,p-Xylene	**52.4**	**48.5**	50.0	50.0		**105**	**97**	81-121	8	12	
o-Xylene	**52.2**	**48.7**	50.0	50.0		**104**	**97**	81-119	7	12	
Surrogate:											
Fluorobenzene						*97*	*93*	*71-113*			

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

TOTAL LEAD
EPA 6010C

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	04-069-11					
Client ID:	**GES1-W**					
Lead	**24**	1.1	200.8	4-14-15	4-14-15	
Lab ID:	04-069-12					
Client ID:	**GES2-W**					
Lead	**ND**	1.1	200.8	4-14-15	4-14-15	
Lab ID:	04-069-13					
Client ID:	**GES3-W**					
Lead	**15**	1.1	200.8	4-14-15	4-14-15	
Lab ID:	04-069-14					
Client ID:	**GES4-W**					
Lead	**1.4**	1.1	200.8	4-14-15	4-14-15	
Lab ID:	04-069-15					
Client ID:	**GES5-W**					
Lead	**2.1**	1.1	200.8	4-14-15	4-14-15	

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

TOTAL LEAD
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	4-14-15
Date Analyzed:	4-14-15
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0414WM1

Analyte	Method	Result	PQL
Lead	200.8	**ND**	1.1

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

TOTAL LEAD
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 4-14-15
Date Analyzed: 4-14-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 04-105-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Lead	**ND**	**ND**	NA	1.1	

Date of Report: April 16, 2015
Samples Submitted: April 8, 2015
Laboratory Reference: 1504-069
Project: 150320

TOTAL LEAD
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 4-14-15
Date Analyzed: 4-14-15

Matrix: Water
Units: ug/L (ppb)

Lab ID: 04-105-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Lead	111	**113**	102	**113**	102	0	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: GeoPro LLC
Project Number: 150320
Project Name: Round the Clock, Port Angeles
Project Manager: RICK KENT
Sampled by: GeoPro LLC

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 04-069

Lab ID	Sample Identification		Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	TOTAL LEAD NO D/3				% Moisture
1	GES-S1	9 ft	4-6-15	0928	S	1		X															X				
2	GES-S2	16 ft	4-6-15	0937	S			X															X				
3	GES 2-1	9 ft	4-6-15	1144	S			X															X				
4	GES 2-2	17.5 ft	4-6-15	1201	S			X															X				
5	GES 3-1	13 ft	4-6-15	1317	S			X															X				
6	GES 3-2	18.5 ft	4-6-15	1325	S			X															X				
7	GES 4-1	15 ft	4-7-15	0900	S			X															X				
8	GES 4-2	16 ft	4-7-15	0906	S			X															X				
9	GES 5-1B	14.5 ft	4-7-15	1145	S			X			To ~~GES 5-1A~~												X				
10	GES 5-2	18.5 ft	4-7-15	1150	S			X																			

	Signature	Company	Date	Time
Relinquished		GeoPro LLC	4/7/15	1400
Received			4/8/15	1430
Relinquished				
Received				
Relinquished				
Received				

Comments/Special Instructions
SOIL GASOLINE >1,000 ppm
Send to Kurt Johnson, Cascadia Forensic for PIANO + Organome~~t~~als
INVOICE BLUE MTN.

Reviewed/Date

Reviewed/Date

Chromatograms with final report ☒

Data Package: Standard ☒ Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☐ _____

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: GeoPro LLC
Project Number: 150320
Project Name: Round the Clock, Port Angeles
Project Manager: RICK KENT
Sampled by: GeoPro LLC

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 04-069

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	TOTAL LEAD					% Moisture
11	GES1-W	4-7-15	0925	W	3		X															X					
12	GES2-W	4-7-15	1030	W			X															X					
13	GES3-W	4-7-15	1120	W			X															X					
14	GES4-W	4-7-15	1205	W			X															X					
15	GES5-W	4-7-15	1340	W			X															X					
16	GES5-1A	4/7/15	1145	S	1																						

	Signature	Company	Date	Time
Relinquished		GeoPro LLC	4/7/15	1400
Received		OSE	4/8/15	1430
Relinquished				
Received				
Relinquished				
Received				

Comments/Special Instructions
SOIL GASOLINE > 1,000 PPM send to Kurt Johnson, Cascadia Forensic for PIANO + Organometallic

INVOICE BLUE MOUNTAIN

Reviewed/Date

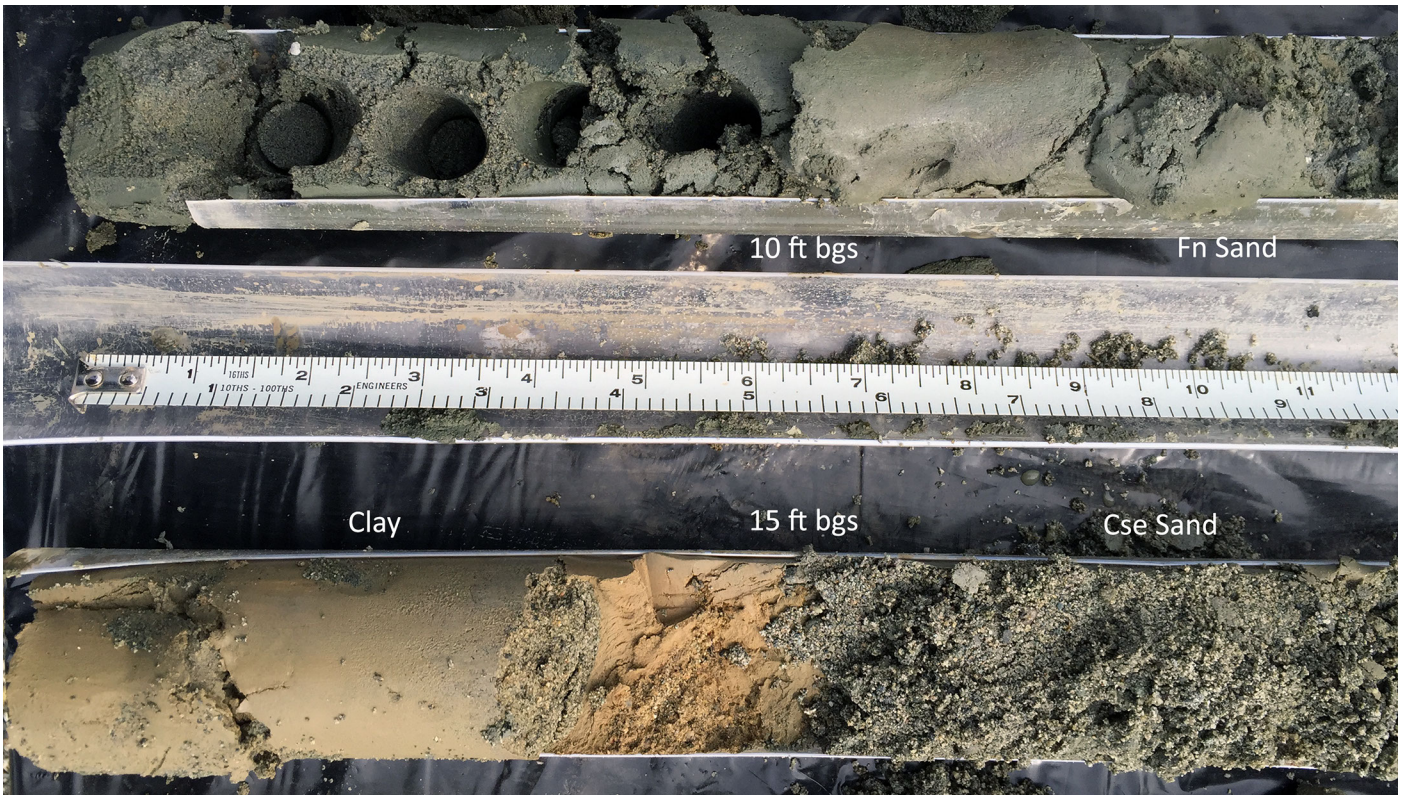
Reviewed/Date

Chromatograms with final report ☒

Data Package: Standard ☒ Level III ☐ Level IV ☐

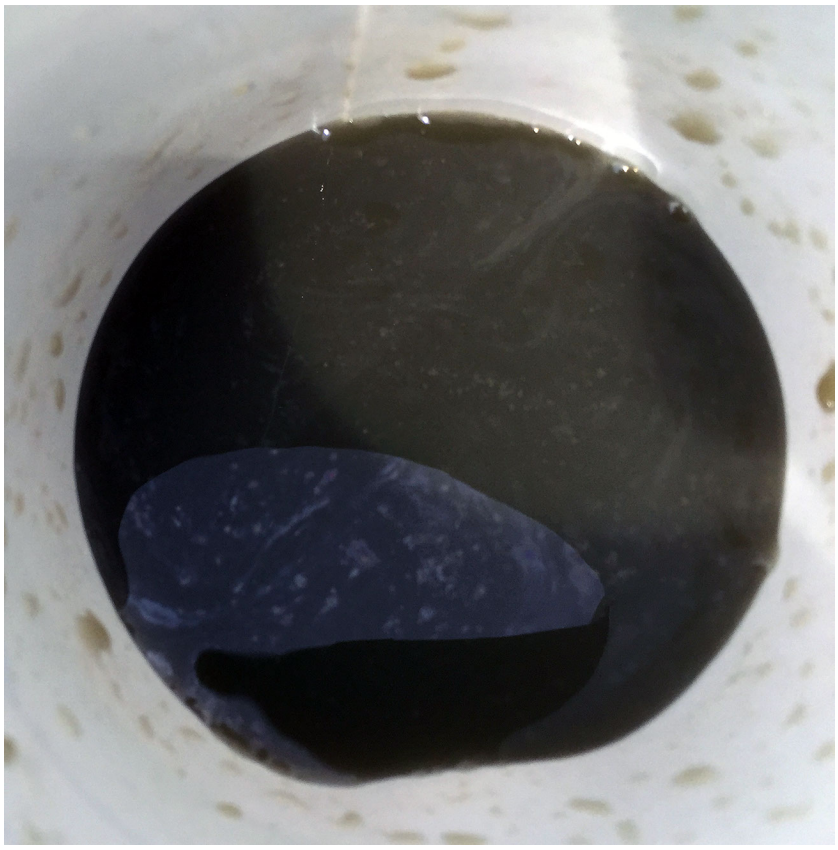
Electronic Data Deliverables (EDDs) ☐ _____

Appendix D
FIELD PHOTOGRAPHS
All photographs by GeoPro LLC



01 GES-2 Core 10 and 15 ft bgs

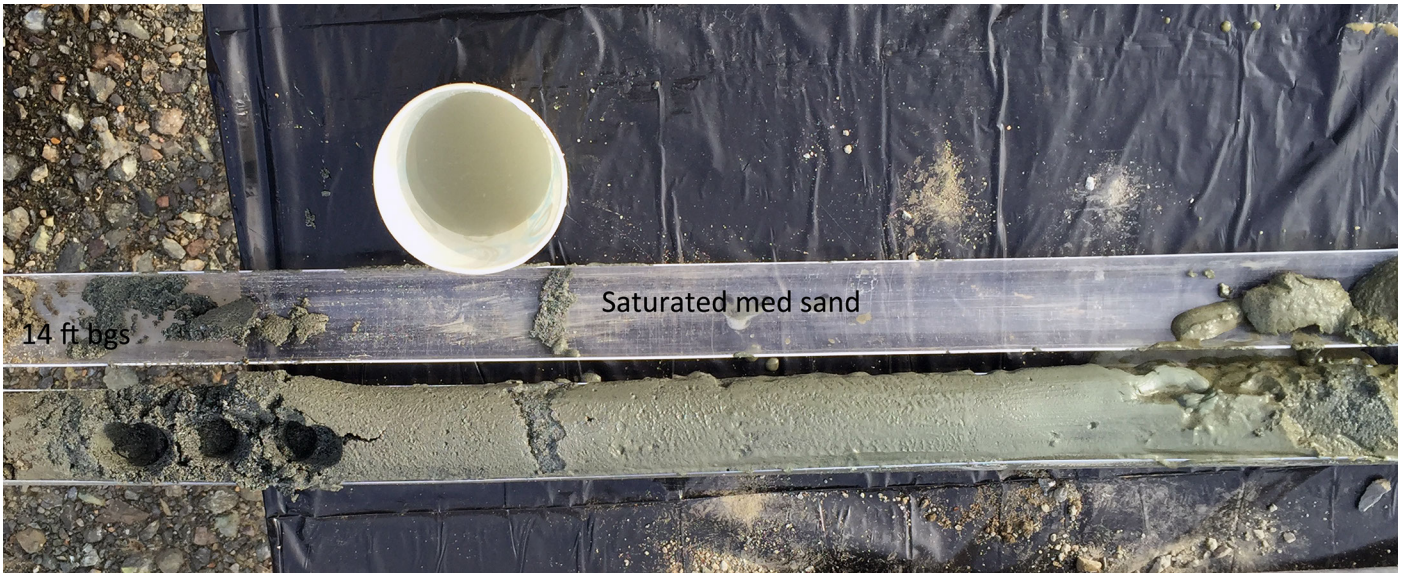
02 GES-2 Location



03 GES-2 Sheen Test

04 GES-2 Sheen Test Bubbles and Foam

05 GES-3 Location



06 GES-4 Saturated sand 14 ft bgs

07 GES-5 Saturated fn-cse sand 14 ft bgs

08 Stockpile