29 March 2025

Technical Memorandum

To: Mr. Dale Myers, Washington State Department of Ecology

From: Ryan Hultgren, Cayla Whiteside

Site: Circle K 1461, 2350 24th Avenue East, Seattle, Washington

Subject: Environmental Remediation System Installation: Unknown Utilities and Shallow Soil Impacts Encountered
KJ 2196008*00

Background

The Circle K 1461 Site (site) is a former gasoline service station that operated from 1968 to 1990. The site is located at 2350 24th Avenue East in Seattle, Washington (Figure 1), on the southeastern corner of the intersection of 24th Avenue East and East McGraw Street. Four gasoline underground storage tanks (USTs), one pump island, one waste oil UST, and one heating oil UST were formerly located at the site (Figure 2). The site was redeveloped in 1990 and 1991, and two businesses currently operate at the site. The USTs were removed during redevelopment, and additional remedial and investigation actions were conducted at the site between 1989 and 2017. Residual petroleum hydrocarbons are present at the site in soil and groundwater. The primary contaminants of concern (COCs) in soil and groundwater are gasoline range organics (GRO) and benzene, toluene, ethylbenzene, and xylenes (BTEX), based on reported concentrations above Model Toxics Control Act (MTCA) Method A cleanup levels (CULs).

In April 1992, Washington State Department of Ecology (Ecology) entered into Consent Decree No. 82-2-08095-8 (CD) with Mr. Kuk Jin Choung and Ms. Kathy-Kyung D. Choung, owners of the property, to conduct a remedial investigation and feasibility study (RI/FS) and develop a cleanup action plan (CAP) for the site. After completion of the RI/FS and CAP, the CD requires performance of the cleanup action to protect human health and the environment in accordance with MTCA regulations. The RI/FS and CAP were finalized in December 2017 [Kennedy/Jenks Consultants, Inc. (Kennedy Jenks) 2017a and 2017b, respectively]. Implementation of the CAP is continuing under the CD with Ecology oversight, under Ecology contract number C2100069.

In 2021, Kennedy Jenks completed an Engineering Design Report (EDR) describing the design requirements for implementing the selected remedial action (a multi-phase extraction system [“remediation system”]) at the site. Kennedy Jenks completed the 100% design documents for the remediation system installation in December 2022. Glacier Environmental Services, Inc. (Glacier) was selected as the construction contractor (Contractor) in the first quarter 2023.

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Glacier obtained the required permits in the first and second quarters 2024 and began system construction in the second quarter 2024. System construction was permitted under the City of Seattle Construction permit 6996584-CN.

This technical memorandum summarizes unknown utilities and petroleum hydrocarbon impacts in shallow soil encountered during construction and describes how the installed remediation system will address these impacts.

Nature and Extent of Contamination

Below is a summary of the nature and extent of contamination as summarized in the RI/FS (Kennedy Jenks 2017a) and EDR (Kennedy Jenks 2021).

Based on laboratory analytical results and field observations made through 2016, the vertical extent of GRO concentrations exceeding the soil MTCA Method A CUL appeared to be generally limited to the zone from 8 to greater than 20 feet below ground surface (bgs). The horizontal extent of GRO-impacted soil (approximately 5,300 square feet) is generally located beneath the onsite parking lot and may extend beneath the onsite building and into the roadways to the north and west of the property as shown on Figure 3. The lateral and vertical extents of benzene, toluene, ethylbenzene, and xylenes concentrations that exceed the soil CUL appear to coincide with the distribution of GRO; therefore, targeting the zone in which GRO concentrations exceed soil CULs for remediation will also address cleanup of the aromatic gasoline constituents.

The depth to shallow groundwater at the site ranges from 3 to 12 feet bgs, based on water levels measured from April to December 2016. The extent of GRO- and benzene-impacted groundwater at the site is shown on Figure 3. Petroleum hydrocarbons in groundwater at the site are limited to dissolved-phase impacts; LNAPL was not observed in any of the monitoring wells during RI groundwater monitoring events. The extent of dissolved-phase petroleum hydrocarbons (approximately 10,900 square feet) and related compounds is bounded on the north side of East McGraw Street and generally extends beneath the onsite parking lot. Dissolved-phase impacts may also extend beneath the onsite building and to the west beneath 24th Avenue East, though groundwater impacts are bounded along the western side of the street.

Unknown Utilities

Glacier completed trenching at the site for underground installation of piping between the remediation system building manifolds and the wells between 30 May and 9 July 2024. During

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trenching along the west side of the property buildings, Glacier encountered unexpected utilities that had not been identified during surveying or utility locates completed prior to start of construction. The utilities consist of approximately 22 small diameter steel pipes. The approximate locations of these pipes are shown on Figure 4. The pipes are assumed to be associated with the former pump island and USTs. Glacier left encountered pipes in place, unless otherwise noted (see Figure 4), and adjusted trenching depths and locations as needed to complete system installation.

Field Observations and Samples

Kennedy Jenks field staff olfactorily observed petroleum odors and stained soil in areas to the north and south of the former pump island during trenching. Field staff collected photo-ionization detector (PID) readings to confirm these observations. After discussion with Ecology, Glacier collected soil samples from sidewalls and bottom of trenches in three locations, labeled as North Trench, South Trench, and West Trench (refer to Figure 4). In each location, the Contractor collected three samples: one from the bottom of the trench, and one from each trench side wall, for nine samples total. Trenches extended to a maximum of 5 feet below ground surface. Collected samples were analyzed for Gasoline Range Organics (GRO) by Ecology Method NWTPH-Gx, Diesel Range Organics (DRO) and Motor Oil Range Organics (ORO) by NWTPH-Dx without silica gel cleanup (SGC), and BTEX by United States Environmental Protection Agency (EPA) Method 8021. Sample results were compared to CULs established for the site. CULs for the site are the MTCA Method A values for unrestricted land use (Table 740-1).

Analytical results and comparison to the CULs are included in Table 2. Laboratory reports are included in Attachment A. A summary of results is as follows:

- GRO: concentrations in 5 of 9 samples were reported above the CUL of 30 milligrams per kilogram (mg/kg). Concentrations were highest in samples collected from the east sidewall and bottom of the South Trench sampling area.

- Benzene: concentrations in 7 of 9 samples were reported above the CUL of 0.03 mg/kg. Concentrations were highest in samples collected from the east sidewall and bottom of the South Trench sampling area and the south sidewall of the West Trench sampling area.

- Ethylbenzene: reported at a concentration above the CUL of 6 mg/kg in one sample from the bottom of the South Trench sampling area.

- Results of other constituents (DRO, ORO, toluene, and total xylenes) were below CULs.

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Odor observations and/or soil sample results indicated potential shallow petroleum impacts from approximately 2 to 3 feet bgs in the North and West Trench areas and from 3 to 5 feet bgs in the South Trench area. Field staff also observed petroleum odors at approximately 1-foot bgs during excavation of soil for installation of concrete footings for the remediation system building.

Glacier removed, characterized, and disposed of impacted soil as applicable from the trenches and for installation of the footings in accordance with Glacier's Soil & Waste Management Plan (Glacier 2024).

Extent of Shallow Impacts

Kennedy Jenks completed a review of well construction and soil boring logs to assess historical soil impacts. This review was consolidated with the field observations and analytical results described above. Based on field observations, analytical results, and well and soil boring logs, shallow petroleum hydrocarbon impacts have been observed at the site between 1 and 10 feet bgs, with deeper impacts to below 20 feet bgs. These observed impacts are shallower than the 8 to greater than 20 feet bgs impacted zone estimated in the RI/FS. Figure 4 shows the estimated lateral extent of soil with shallowest impacts observed at or less than 5 feet bgs (within trenches and RW-6 (5 feet), MW-13 (4 feet), and RW-10 (5 feet)) and shallowest impacts observed from 5 to 10 feet bgs (other wells and soil borings). The approximate extent of GRO and benzene impacts in soil based on the RI/FS (e.g., Figure 3) is shown for reference in Figure 4. Except for the area near the southern footings of the remediation system building, the petroleum hydrocarbon impacts observed between 2 and 10 feet bgs in soil borings and during remediation system installation trenching activities are within the previously approximated extent of soil impacts.

Evaluation of MPE System

The selected remedial action involves installation of a multiphase extraction (MPE) and groundwater recirculation system and groundwater and soil compliance monitoring. As described in the EDR (Kennedy Jenks 2021), MPE has been shown to be effective at removing petroleum hydrocarbons in historical case studies, scientific literature, and through past activities at the site including a pilot study conducted in 2005. The MPE system was designed to address residual petroleum hydrocarbon contamination of the vadose zone and to mitigate vapor intrusion (VI) by petroleum hydrocarbons. The MPE system will also be utilized to extract impacted groundwater, which will be treated with reagents and reinjected via a groundwater recirculation system for additional groundwater treatment.

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The remediation system includes three (3) new vertical wells and three (3) new slant wells along with seven (7) existing wells in a single extraction/injection system for a total of 13 remediation wells. Each well within the network of remediation wells is individually connected to both the extraction and injection manifolds in the remediation system building located on site. Wells are organized into four (4) banks of either three (3) or four (4) remediation wells (see Table 1). The vapor and water extracted from the wells is piped to the treatment system. The treatment train splits at a vapor-liquid separator to a water treatment train and a vapor treatment train.

The water treatment train consists of a bag filter, two pairs of granular activated carbon (GAC) vessels plumbed in series, a mixing tank in which surfactants, bacteria, and/or nutrients can be added, and an oxygen generator. Water can be discharged to the City of Seattle (City) sanitary sewer system before the mixing tank or reinjected to the wells through the injection manifold.

The vapor treatment train consists of a temporary catalytic oxidizer to be used at system startup and a pair of vapor GAC vessels piped in series to be used once vapor contaminant concentrations are low enough for their use. Treated air is discharged through an exhaust pipe.

The system is designed to operate continuously, except for shutdowns for maintenance, replacement of media, or as-needed monitoring.

The 13 remediation well locations (existing and new wells) for the remediation system were chosen such that the extraction radius of influence (ROI) of the wells would spatially encompass the majority of the impacted soil or groundwater area. The EDR included an estimated ROI of 20 feet for vapor extraction and 30 feet for groundwater extraction. Well locations and construction design were also selected to address the vertical extent of impacts. Eleven of the 13 wells included as part of the remediation system are screened from 5 to 20 feet bgs[1]. Well MW-4 is screened from 4 to 18.8 feet bgs and well RW-10 is screened from 25 to 30 feet bgs. When under vacuum during system operation, soil vapor will be extracted from the shallow well screen interval (except well RW-10) and up to the impervious ground surface (concrete and asphalt pavement and buildings).

Calculated ROI

Kennedy Jenks calculated the estimated vapor extraction ROI for each well using field measurements collected during October 2024 system startup activities. Glacier operated the remediation system in extraction mode for approximately 30 minutes per remediation well. An extraction step test was conducted at each well, testing three extraction vacuums for

[1] Slanted wells SW-1, SW-2, and SW-3 were installed at a 30-degree angle. The screened interval for these wells is 6 to 21 feet bgs, expressed as the measured depth within the well casing.

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approximately 10 minutes per vacuum step. At each step, Kennedy Jenks field staff measured the induced vacuum at the manifold and wellhead for the test well, and at the wellheads for several nearby wells and used the data to estimate the vapor extraction ROI at each test well. The extraction ROI was calculated by plotting the log of the measured induced vacuums at the wellheads versus the distance from the extraction well. The ROI is the distance at which the curve intersects a vacuum of 0.1 inches of water.

Table 3 shows the tested vacuum range for each remediation well and the corresponding calculated vapor extraction ROI range. Under normal operating conditions, the vapor extraction ROI of the wells is anticipated to range from 18 to 46 feet, with an average of 31 feet, consistent with the values presented in the EDR. During system operation, the effective extraction extent of influence resulting from more than one remediation well operating at a time can be estimated from induced vacuums at site monitoring wells.

The vapor extraction ROIs of the wells encompass the estimated lateral extent of shallow soil impacts described above. Operation of the MPE system will include extraction of soil vapor from within the remediation well screen intervals up to the impervious surfaces (e.g., 0 to 5 feet bgs), including the vertical interval of shallow soil impacts. Therefore, operation of the MPE remediation system is expected to be effective in addressing the observed shallow soil petroleum hydrocarbon impacts under normal operating conditions.

The vapor sampling scope of work for the Public Works Operations and Maintenance Contractor includes periodic measurements with a PID for total VOCs at the manifold locations for the 13 individual remediation extraction wells. Decreasing total VOCs measurements over time will be used as a line of evidence to indicate that shallow soil petroleum hydrocarbon impacts are being remediated by the MPE system. Based on the information presented above, no changes to the remedial action are recommended at this time.

Attachments:
Table 1: Multi-Phase Extraction System Well Details
Table 2: Trench Soil Sample Analytical Results
Table 3: Field Measurements and Estimated ROI
Figure 1: Site Location and Vicinity Map
Figure 2: Historical Site Features, Monitoring Wells and Soil Boring Locations
Figure 3: Approximate Extents of GRO and Benzene Impacts to Soil and Groundwater
Figure 4: Differing Site Conditions
Attachment A: Laboratory Reports

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References:

Glacier Environmental Services, Inc. 2024. Soil & Waste Management Plan Project: Circle K Site 1461. Prepared for WA Department of Ecology. November 2023. Revised January 30, 2024.

Kennedy/Jenks Consultants, Inc. 2017a. Remedial Investigation/Feasibility Study Report, Former Circle K Site. Prepared for State of Washington Department of Ecology. 14 December 2017.

Kennedy/Jenks Consultants, Inc. 2017b. Cleanup Action Plan, Former Circle K Site. Prepared for State of Washington Department of Ecology. 18 December 2017.

Kennedy/Jenks Consultants, Inc. 2021. Engineering Design Report Former Circle K Site 1461, Seattle, Washington. Prepared for State of Washington Department of Ecology. 10 December 2021.

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Tables

Table 1: Multi-Phase Extraction System Well Details

	Well Bank #	Screened Interval (ft bgs)	Sand Interval (ft bgs)	Applied Vacuum (in.w.c.)	Casing Diameter (in)	Pipe Diameter (in)	Pipe Run[(a)] (ft)
Existing Monitoring/Remediation Wells							
MW-4	4	4-18.8	5-22	28	2	1	160
RW-2	4	5-20	5-22	28	4	1	110
RW-3	1	5-20	5-22	28	4	1	100
RW-4	2	5-20	5-22	28	4	1	90
RW-5	3	5-20	5-22	28	4	1	70
RW-6	4	5-20	5-22	28	4	1	130
RW-7	1	5-20	5-22	28	4	1	70
New Remediation Wells							
SW-1	2	6-21[(b)]	4-21[(b)]	28	4	1	110
SW-2	3	6-21[(b)]	4-21[(b)]	28	4	1	80
SW-3	1	6-21[(b)]	4-21[(b)]	28	4	1	80
RW-8	2	5-20	5-22	28	4	1	100
RW-9	1	5-20	5-22	28	4	1	50
RW-10	3	25-30	5-22	28	4	1	80

Note and Abbreviations:

(a) Pipe run approximated from Construction Drawings.

(b) Depth expressed as measured depth within well casing. Well drilled at 30 degree angle.

ft bgs = feet below ground surface.

in.w.c. = vacuum or pressure in inches water column.

in = inches

Table 2: Trench Soil Sample Analytical Results

		Sample Name		NW Trench	NB Trench	NE Trench	SW Trench	SB Trench	SE Trench	WS Trench	WB Trench	WN Trench
		Sample Date		06/12/2024	06/12/2024	06/12/2024	06/12/2024	06/12/2024	06/12/2024	6/21/2024	6/21/2024	6/21/2024
Constituent	**CAS #**	**Units**	**CUL**									
Gasoline Range Organics		mg/kg	30	**78**	**74**	**5.7**	**73**	**1,200**	**520**	**28**	< 3.0	**3.6**
Benzene	71-43-2	mg/kg	0.03	**0.059**	**0.041**	< 0.030	**0.053**	**0.67**	**0.46**	**0.38**	< 0.030	**0.04**
Toluene	108-88-3	mg/kg	7	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Ethylbenzene	100-41-4	mg/kg	6	< 0.050	**0.26**	< 0.050	**0.58**	**12**	**4.1**	**0.12**	< 0.050	< 0.050
Total Xylenes	1330-20-7	mg/kg	9	**0.23**	**0.74**	< 0.20	**0.33**	**5.2**	< 0.20	< 0.20	< 0.20	< 0.20
Diesel Range Organics		mg/kg	2000	< 25	< 25	< 25	**30**	**37**	< 25	< 25	< 25	< 25
Motor Oil	PHCMO	mg/kg	2000	**63**	< 50	< 50	< 50	< 50	< 50	**79**	< 50	< 50

Notes, Abbreviations, and Symbols:

78	Detected concentrations above the cleanup level are shaded orange and bolded.
30	Detected concentrations at or above the laboratory reporting limit are shown in bold.
< 0.10	Non-detect values are shown in gray font.

mg/kg = milligrams per kilogram

CUL = Model Toxics Control Act (MTCA) Method A values for unrestricted land use (Table 740-1) (Method A) based on Washington State Administrative Code (WAC) 173-340-740.

Sample naming:

NW, NB, NE Trench: Samples collected from west sidewall, bottom, and east sidewall of southern portion of north-south trench where impacts were noted.

SW, SB, SE Trench: Samples collected from west sidewall, bottom, and east sidewall of southern portion of north-south trench where impacts were noted.

WS, WB, WN Trench: Samples collected from south sidewall, bottom, and north sidewall of east-west trench where impacts were noted.

Table 3: Field Measurements and Estimated ROI

			Baseline Measurements (prior to Startup)				During Startup[(d)]	
Bank	Well	Screen Interval	Vacuum / Pressure (in WC)[(a)]	VOCs (ppm)[(b,c)]	O_2 (%)[(b,c)]	CO_2 (%)[(b,c)]	Tested Vacuum Range (in WC)	Calculated ROI Range (feet)
1	MW-4	4-18.8	-3.0	584.0	7.6	14.8	37 - 67	35 - 43
	RW-6	5-20	-0.003	743.0	7.1	16.7	70 - 76	27 - 28
	RW-2	5-20	-0.003	758.0	7.4	15.1	34 - 74	43
2	RW-10	25-30	-0.89	18.8	20.7	0.3	39 - 140	23 - 24
	RW-5	5-20	-0.003	22.7	20.7	0.3	12 - 20	40 - 45
	SW-2	6-21[(e)]	-0.003	5.0	20.1	1.0	14 - 90	21 - 25
3	SW-1	6-21[(e)]	-0.023	65.0	16.0	4.0	25 - 85	24 - 27
	RW-8	5-20	+0.006	227.0	16.9	2.8	34 - 100	18
	RW-4	5-20	+0.013	247.5	15.8	2.5	22 - 120	24 - 30
4	RW-7	5-20	-0.003	890.0	9.7	5.0	45 - 123	40 - 49
	SW-3	6-21[(e)]	-0.037	87.7	20.7	0.2	30 - 80	22 - 27
	RW-3	5-20	+0.006	42.0	20.7	0.2	40 - 93	28 - 31
	RW-9	5-20	-0.033	395.0	19.3	1.1	20 - 125	30-35
							Average ROI	**31**

Notes and Abbreviations:

ROI = radius of influence

in WC = inches water column

VOCs = volatile organic compounds

ppm = parts per million

O_2 = oxygen

CO_2 = carbon dioxide

(a) Vacuum / pressure measured at wellhead.

(b) VOCs, O_2, CO_2 measured at treatment system manifold.

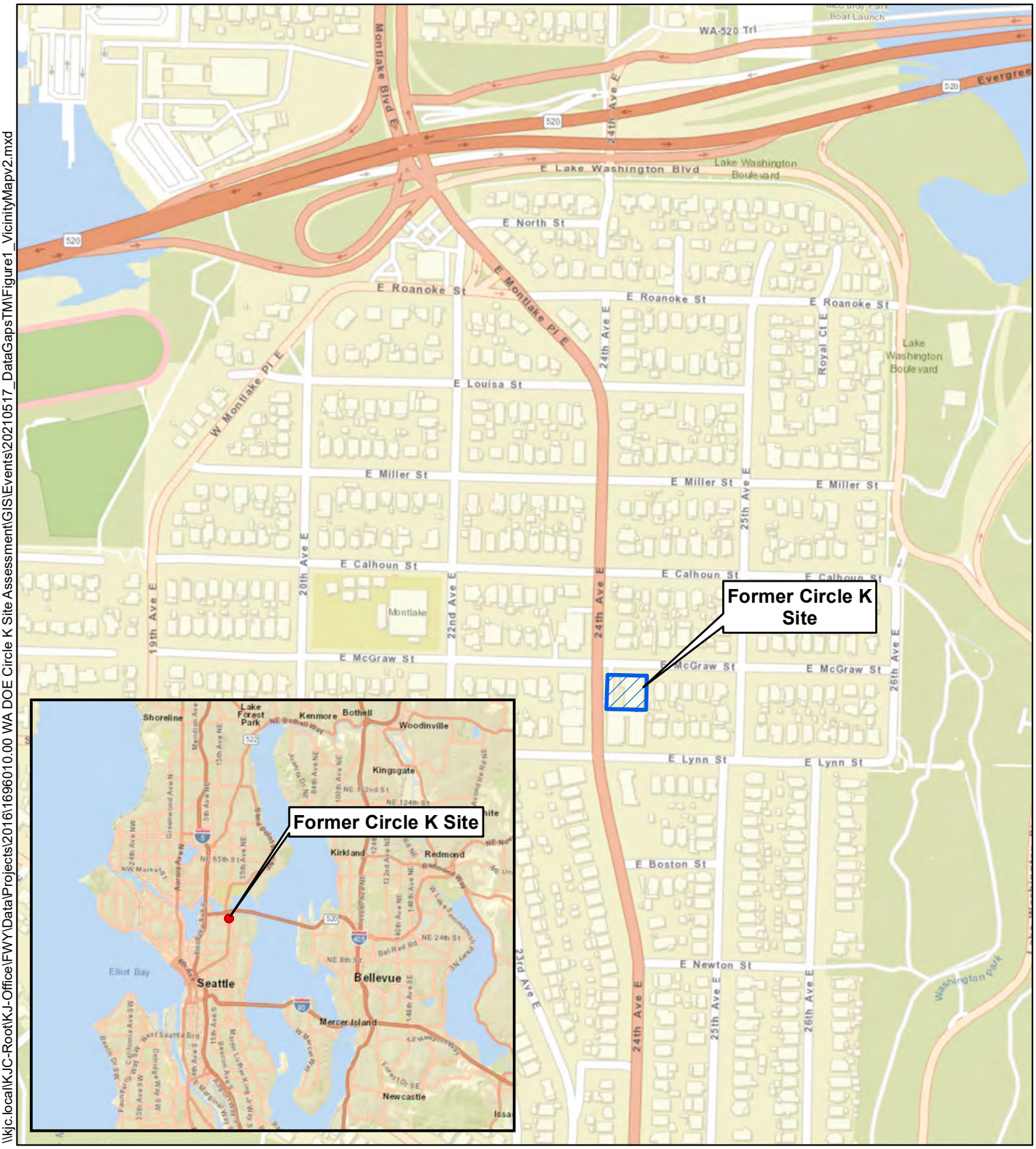
(c) VOCs, O_2, CO_2 measured using photo-ionization detection meter and 5-gas meter.

(d) System operated for approximately 30 minutes with valves open 100% except for sub-slab depressurization wells. Individual wells isolated from vacuum by closing valves while system was still running to allow for sampling.

(e) Depth expressed as measured depth within well casing. Well drilled at 30 degree angle.

(f) Measurements taken and recorded by Kennedy Jenks on October 31, 2024.

Figures



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Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors,

Legend

Site Location

N

0 200 400

Scale: Feet

Note:
1. All locations are approximate.

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Former Circle K Site
Seattle, Washington

Site Location and Vicinity Map

K/J 2196008*00

Figure 1

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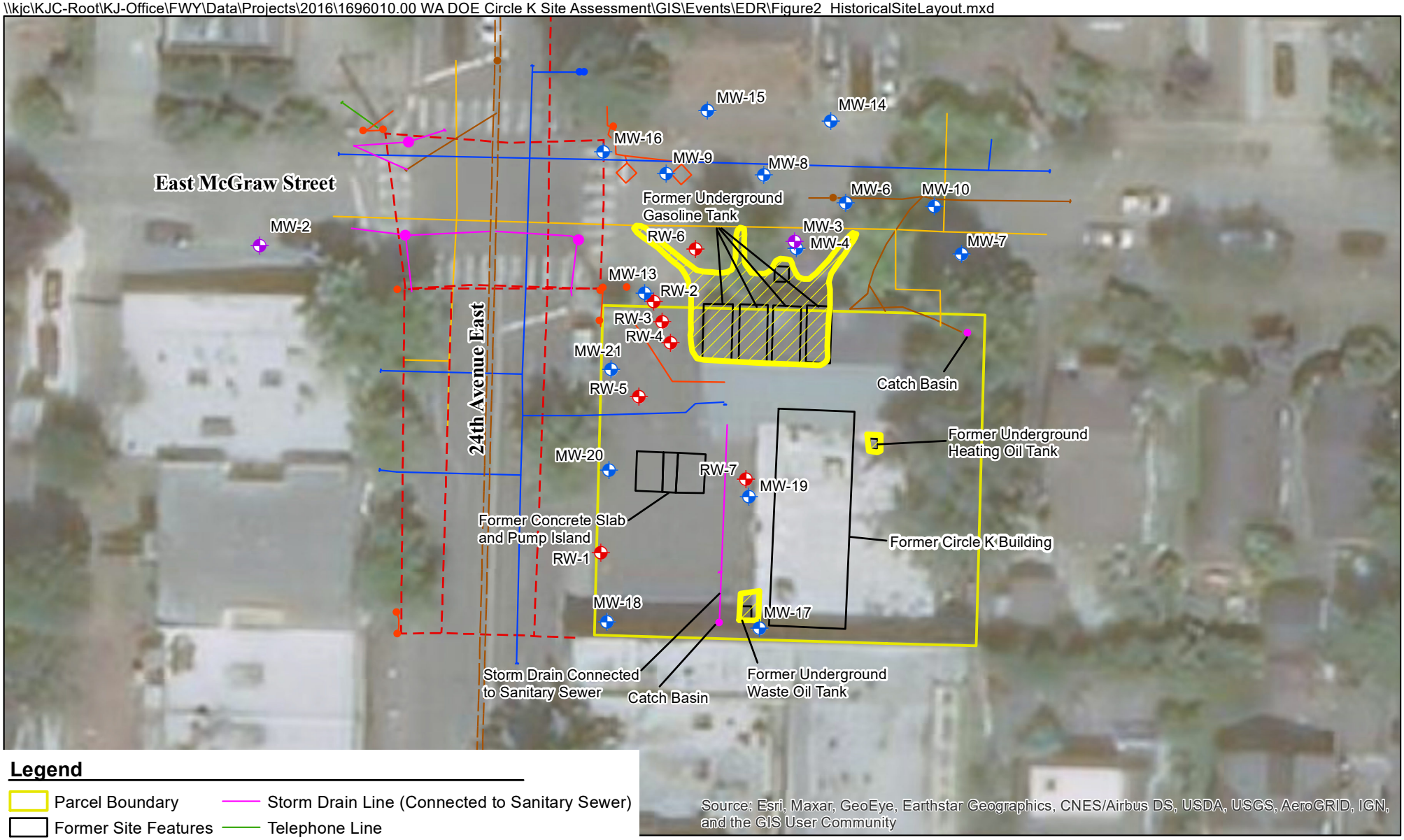

Legend

- Parcel Boundary
- Former Site Features
- Previous Excavations
- Monitoring Well
- Landau Well
- Multipurpose Wells
- Storm Drain Line (Connected to Sanitary Sewer)
- Telephone Line
- Power Line
- Gas Line
- Overhead Power Line
- Sanitary Sewer Line
- Water Line
- 90" RCP Sanitary Sewer Line

Notes:

1. All locations are approximate.
2. Sewer and water line locations are based on available site information and not appropriate for construction purposes.
3. Former feature locations georeferenced from *Report of Geotechnical Services Subsurface Contamination Study and Remedial Action Monitoring Circle K Facility 1461 Seattle, Washington*, dated 6 March 1990 by GeoEngineers.

N

0 20 40

Scale: Feet

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Former Circle K Site
Seattle, Washington

Historical Site Features, Monitoring Wells and Soil Boring Locations

K/J 2196008*00

Figure 2

Path: H:\GIS_CloudProjects\WA.DOE\Circle K\SAP\Figure3_ExtentofImpact.mxd ©2022 Kennedy/Jenks Consultants

Legend

- Existing Well
- Existing Well to be Used for Extraction/Injection
- New Extraction/Injection Well
- New Slant Well
- New Vapor Monitoring Pin
- Parcel Boundary
- Approximate Extent of Gasoline-Range Organics and/or Benzene in Groundwater above MTCA Method A Cleanup Levels
- Approximate Extent of Gasoline-Range Organics and/or Benzene in Soil above MTCA Method A Cleanup Levels

Notes:
1. All locations are approximate.
2. GRO = gasoline range organics
3. CUL = clean up levels

N

0 15 30

Scale: Feet

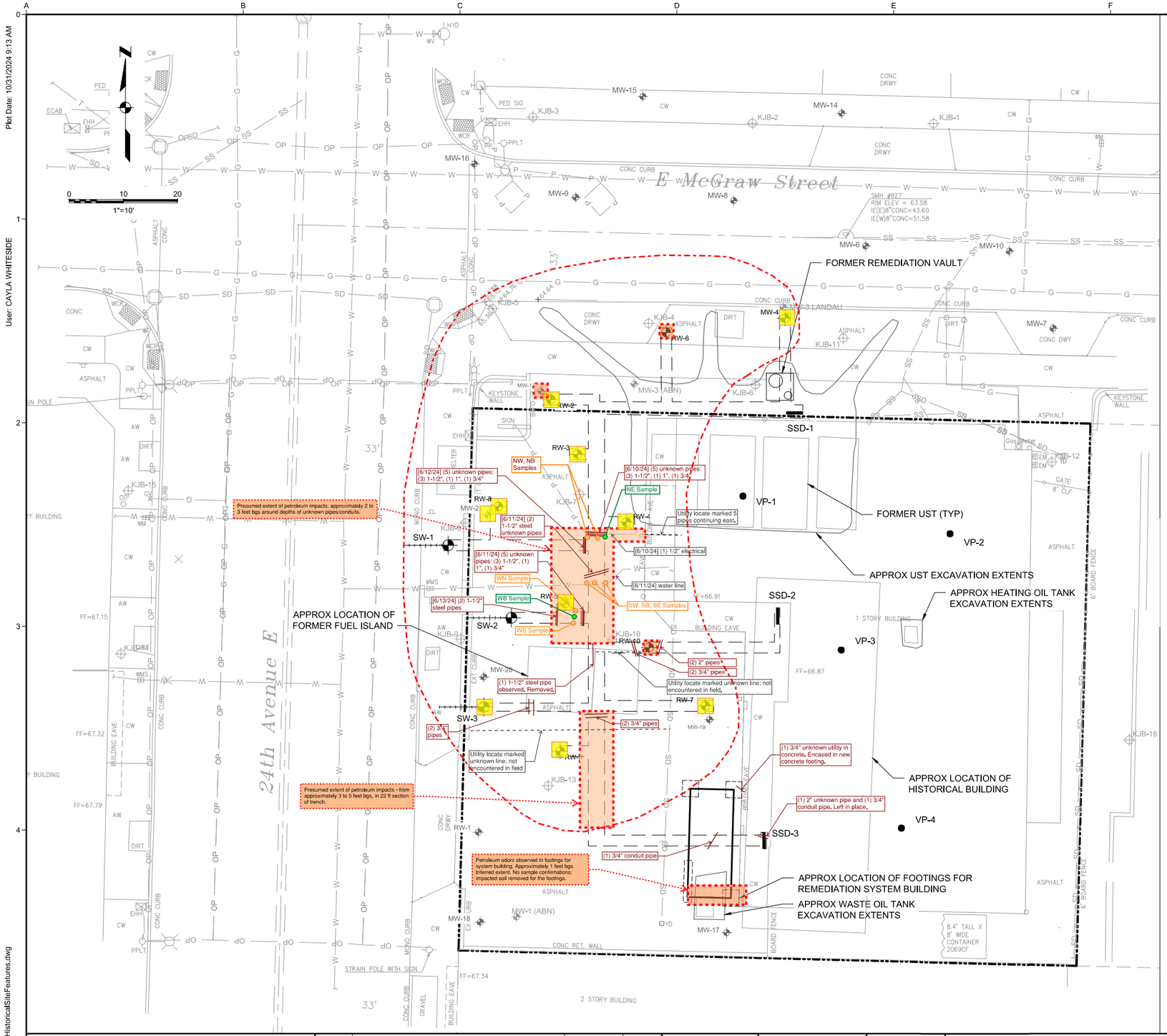
Kennedy Jenks

Former Circle K Site
Seattle, Washington

Approximate Extents of GRO and Benzene Impacts to Soil and Groundwater

K/J 2196008*00

Figure 3



NOTES

1. WELL AND BORING TERMINOLOGY:
   - 1A. MW = EXISTING MONITORING WELL
   - 1B. RW = REMEDIATION WELL (EITHER EXISTING OR TO BE INSTALLED)
   - 1C. VP = VAPOR MONITORING PIN TO BE INSTALLED
   - 1D. SW = SLANT WELL TO BE INSTALLED
   - 1F. SSD = SUB-SLAB DEPRESSURIZATION WELL
   - 1G. KJB = BORING DRILLED BY KENNEDY JENKS
   - 1H. LANDAU = WELL DRILLED BY LANDAU ASSOCIATES
   - 1I. ABN = ABANDONED WELL
2. ALL LOCATIONS ARE APPROXIMATE.

LEGEND

- Trench soil sample with at least one constituent reported at concentrations above MTCA Method A CULs (refer to Table 2).
- Trench soil sample with constituents reported at concentrations below MTCA Method A CULs (refer to Table 2).
- Shallowest soil TPH impacts observed less than 5 ft bgs in trench or boring.
- Shallowest soil TPH impacts observed at 5-10 ft bgs in boring.
- Approximate extents of GRO and/or Benzene in Soil above MTCA Method A CULs (from RI/FS 2017)
- Utility marked during utility locate but not encountered during construction.
- Unknown/unmarked utility encountered during trenching.

- WELL TO BE USED FOR EXTRACTION/INJECTION (NEW AND EXISTING)
- EXISTING WELL NOT USED FOR EXTRACTION/INJECTION
- NEW SLANT WELL
- HISTORICAL SOIL BORING LOCATION
- SUB-SLAB DEPRESSURIZATION WELL
- APPROXIMATE EXTENT OF TRENCH
- APPROXIMATE EXTENT OF CONCRETE FOOTINGS FOR REMEDIATION SYSTEM BUILDING
- VAPOR MONITORING PIN
- G — EXISTING GAS LINE
- W — EXISTING WATER LINE
- OP — EXISTING OVERHEAD POWER LINE
- SS — EXISTING SANITARY SEWER LINE
- P — EXISTING UNDERGROUND ELECTRICAL LINE
- SD — EXISTING STORM DRAIN
- PROPERTY BOUNDARY

NO	REVISION	DATE	BY

SCALES 0 10"

DESIGNED

DRAWN

CHECKED

WASHINGTON STATE DEPARTMENT OF ECOLOGY
BELLEVUE, WASHINGTON

CIRCLE K SITE 1461 ENVIRONMENTAL REMEDIATION SYSTEM INSTALLATION
SEATTLE, WASHINGTON

Kennedy Jenks

DIFFERING SITE CONDITIONS

SCALE 1:10

JOB NO 2196008.00

DATE FEBRUARY 2025

FIGURE 4

Plot Date: 10/31/2024 9:13 AM

User: CAYLA WHITESIDE

File: C:\bms\kje-pw\d0181576\HistoricalSiteFeatures.dwg

Attachment A

Laboratory Reports

June 14, 2024

Ms. Lauren Golembiewski
Glacier Environmental Services, Inc.
7509 - 212th St SW
Edmonds, WA 98026

Dear Ms. Golembiewski,

On June 12th, 6 samples were received by our laboratory and assigned our laboratory project number EV24060109. The project was identified as your 23-008. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rob Greer
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

Environmental www.alsglobal.com
RIGHT SOLUTIONS RIGHT PARTNER

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE: ALS JOB#: ALS SAMPLE#:	6/14/2024 EV24060109 EV24060109-01
CLIENT CONTACT:	Lauren Golembiewski	DATE RECEIVED:	06/12/2024
CLIENT PROJECT:	23-008	COLLECTION DATE:	6/12/2024 7:50:00 AM
CLIENT SAMPLE ID	NW Trench	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	**78**	3.0	1	MG/KG	06/13/2024	MNC
Benzene	EPA-8021	**0.059**	0.030	1	MG/KG	06/13/2024	MNC
Toluene	EPA-8021	U	0.050	1	MG/KG	06/13/2024	MNC
Ethylbenzene	EPA-8021	U	0.050	1	MG/KG	06/13/2024	MNC
Xylenes	EPA-8021	**0.23**	0.20	1	MG/KG	06/13/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	06/13/2024	DHM
TPH-Oil Range	NWTPH-DX	**63**	50	1	MG/KG	06/13/2024	DHM

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	**100**	06/13/2024	MNC
TFT	EPA-8021	**105**	06/13/2024	MNC
C25	NWTPH-DX	**92.2**	06/13/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline and an unidentified oil range product.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE: ALS JOB#: ALS SAMPLE#:	6/14/2024 EV24060109 EV24060109-02
CLIENT CONTACT:	Lauren Golembiewski	DATE RECEIVED:	06/12/2024
CLIENT PROJECT:	23-008	COLLECTION DATE:	6/12/2024 7:50:00 AM
CLIENT SAMPLE ID	NB Trench	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	**74**	3.0	1	MG/KG	06/13/2024	MNC
Benzene	EPA-8021	**0.041**	0.030	1	MG/KG	06/13/2024	MNC
Toluene	EPA-8021	U	0.050	1	MG/KG	06/13/2024	MNC
Ethylbenzene	EPA-8021	**0.26**	0.050	1	MG/KG	06/13/2024	MNC
Xylenes	EPA-8021	**0.74**	0.20	1	MG/KG	06/13/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	06/13/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	06/13/2024	DHM

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	**80.9**	06/13/2024	MNC
TFT	EPA-8021	**91.4**	06/13/2024	MNC
C25	NWTPH-DX	**92.2**	06/13/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE: ALS JOB#: ALS SAMPLE#:	6/14/2024 EV24060109 EV24060109-03
CLIENT CONTACT:	Lauren Golembiewski	DATE RECEIVED:	06/12/2024
CLIENT PROJECT:	23-008	COLLECTION DATE:	6/12/2024 7:50:00 AM
CLIENT SAMPLE ID	NE Trench	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	**5.7**	3.0	1	MG/KG	06/13/2024	MNC
Benzene	EPA-8021	U	0.030	1	MG/KG	06/13/2024	MNC
Toluene	EPA-8021	U	0.050	1	MG/KG	06/13/2024	MNC
Ethylbenzene	EPA-8021	U	0.050	1	MG/KG	06/13/2024	MNC
Xylenes	EPA-8021	U	0.20	1	MG/KG	06/13/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	06/13/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	06/13/2024	DHM

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	**62.4**	06/13/2024	MNC
TFT	EPA-8021	**72.4**	06/13/2024	MNC
C25	NWTPH-DX	**96.8**	06/13/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE: ALS JOB#: ALS SAMPLE#:	6/14/2024 EV24060109 EV24060109-04
CLIENT CONTACT:	Lauren Golembiewski	DATE RECEIVED:	06/12/2024
CLIENT PROJECT:	23-008	COLLECTION DATE:	6/12/2024 8:15:00 AM
CLIENT SAMPLE ID	SW Trench	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	**73**	3.0	1	MG/KG	06/13/2024	MNC
Benzene	EPA-8021	**0.053**	0.030	1	MG/KG	06/13/2024	MNC
Toluene	EPA-8021	U	0.050	1	MG/KG	06/13/2024	MNC
Ethylbenzene	EPA-8021	**0.58**	0.050	1	MG/KG	06/13/2024	MNC
Xylenes	EPA-8021	**0.33**	0.20	1	MG/KG	06/13/2024	MNC
TPH-Diesel Range	NWTPH-DX	**30**	25	1	MG/KG	06/13/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	06/13/2024	DHM

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	**76.4**	06/13/2024	MNC
TFT	EPA-8021	**85.2**	06/13/2024	MNC
C25	NWTPH-DX	**93.8**	06/13/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline and an unidentified diesel range product.
Diesel range product results biased high due to gasoline range product overlap.

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE: ALS JOB#: ALS SAMPLE#:	6/14/2024 EV24060109 EV24060109-05
CLIENT CONTACT:	Lauren Golembiewski	DATE RECEIVED:	06/12/2024
CLIENT PROJECT:	23-008	COLLECTION DATE:	6/12/2024 8:15:00 AM
CLIENT SAMPLE ID	SB Trench	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	**1200**	300	100	MG/KG	06/14/2024	MNC
Benzene	EPA-8021	**0.67**	0.030	1	MG/KG	06/13/2024	MNC
Toluene	EPA-8021	U	0.050	1	MG/KG	06/13/2024	MNC
Ethylbenzene	EPA-8021	**12**	5.0	100	MG/KG	06/14/2024	MNC
Xylenes	EPA-8021	**5.2**	0.20	1	MG/KG	06/13/2024	MNC
TPH-Diesel Range	NWTPH-DX	**37**	25	1	MG/KG	06/13/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	06/13/2024	DHM

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 100X Dilution	NWTPH-GX	U, SUR07	06/14/2024	MNC
TFT	EPA-8021	**204 SUR12**	06/13/2024	MNC
TFT 100X Dilution	EPA-8021	U, SUR07	06/14/2024	MNC
C25	NWTPH-DX	**94.1**	06/13/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.
SUR12 -Surrogate recoveries were outside of the control limits due to matrix interference.
SUR07 -The surrogate recovery could not be determined due to dilution below the calibration range.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline and an unidentified diesel range product.
Diesel range product results biased high due to gasoline range product overlap.

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE: ALS JOB#: ALS SAMPLE#:	6/14/2024 EV24060109 EV24060109-06
CLIENT CONTACT:	Lauren Golembiewski	DATE RECEIVED:	06/12/2024
CLIENT PROJECT:	23-008	COLLECTION DATE:	6/12/2024 8:15:00 AM
CLIENT SAMPLE ID	SE Trench	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	**520**	30	10	MG/KG	06/14/2024	MNC
Benzene	EPA-8021	**0.46**	0.030	1	MG/KG	06/13/2024	MNC
Toluene	EPA-8021	U	0.050	1	MG/KG	06/13/2024	MNC
Ethylbenzene	EPA-8021	**4.1**	0.050	1	MG/KG	06/13/2024	MNC
Xylenes	EPA-8021	U	0.20	1	MG/KG	06/13/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	06/13/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	06/13/2024	DHM

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT 10X Dilution	NWTPH-GX	**102**	06/14/2024	MNC
TFT	EPA-8021	**138**	06/13/2024	MNC
C25	NWTPH-DX	**94.6**	06/13/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE:	6/14/2024
		ALS SDG#:	EV24060109
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Lauren Golembiewski		
CLIENT PROJECT:	23-008		

LABORATORY BLANK RESULTS

MBG-061224S - Batch 213560 - Soil by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	MG/KG	3.0	06/13/2024	MNC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-061224S - Batch 213560 - Soil by EPA-8021

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Benzene	EPA-8021	U	MG/KG	0.030	06/13/2024	MNC
Toluene	EPA-8021	U	MG/KG	0.050	06/13/2024	MNC
Ethylbenzene	EPA-8021	U	MG/KG	0.050	06/13/2024	MNC
Xylenes	EPA-8021	U	MG/KG	0.20	06/13/2024	MNC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-061324S - Batch 213522 - Soil by NWTPH-DX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range	NWTPH-DX	U	MG/KG	25	06/13/2024	DHM
TPH-Oil Range	NWTPH-DX	U	MG/KG	50	06/13/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE:	6/14/2024
		ALS SDG#:	EV24060109
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Lauren Golembiewski		
CLIENT PROJECT:	23-008		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 213560 - Soil by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range - BS	NWTPH-GX	**84.5**			66.5	122.7	06/13/2024	MNC
TPH-Volatile Range - BSD	NWTPH-GX	**95.7**	**12**		66.5	122.7	06/13/2024	MNC

ALS Test Batch ID: 213560 - Soil by EPA-8021

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Benzene - BS	EPA-8021	**95.7**			67.7	124	06/13/2024	MNC
Benzene - BSD	EPA-8021	**95.2**	**1**		67.7	124	06/13/2024	MNC
Toluene - BS	EPA-8021	**91.5**			71	123	06/13/2024	MNC
Toluene - BSD	EPA-8021	**90.9**	**1**		71	123	06/13/2024	MNC
Ethylbenzene - BS	EPA-8021	**94.3**			69.8	120	06/13/2024	MNC
Ethylbenzene - BSD	EPA-8021	**94.2**	**0**		69.8	120	06/13/2024	MNC
Xylenes - BS	EPA-8021	**92.3**			70	120	06/13/2024	MNC
Xylenes - BSD	EPA-8021	**89.3**	**3**		70	120	06/13/2024	MNC

ALS Test Batch ID: 213522 - Soil by NWTPH-DX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range - BS	NWTPH-DX	**107**			75.5	122.1	06/13/2024	DHM
TPH-Diesel Range - BSD	NWTPH-DX	**111**	**4**		75.5	122.1	06/13/2024	DHM

APPROVED BY

Rob Greer
Laboratory Director

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Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Only): EV24060109

Date 6/12/24 Page 1 Of 1

PROJECT ID: 23-008
REPORT TO COMPANY: Glacier Environmental
PROJECT MANAGER: Lauren Golembiewski
ADDRESS: 7509 212TH ST SW
EDMONDS WA 98026
PHONE: 425-355-2826 P.O. #:
E-MAIL: LMiles@glacierenviro.com
INVOICE TO COMPANY: Glacier Environmental
ATTENTION: Lauren
ADDRESS: 7509 212TH ST SW
EDMONDS WA 98026

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021 ☒ / BTEX by EPA 8260 ☐	MTBE by EPA 8021 ☐ / MTBE by EPA 8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 ☐ / Pesticides by EPA 8081 ☐	Metals-MTCA-5 ☐ / RCRA-8 ☐ / Pri Pol ☐ / TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ / VOA ☐ / Semi-Vol ☐ / Pest ☐ / Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. NW Trench	6-12-24	7:50	Soil	1		X	X	X														
2. NB Trench	6-12-24	7:50	Soil	2		X	X	X														
3. NE Trench	6-12-24	7:50	Soil	3		X	X	X														
4. SW Trench	6-12-24	8:15	Soil	4		X	X	X														
5. SB Trench	6-12-24	8:15	Soil	5		X	X	X														
6. SE Trench	6-12-24	8:15	Soil	6		X	X	X														
7.																						
8.																						
9.																						
10.																						

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: [signature] 6-12-24 2:55
Received By: [signature] Julia ALS 6/12/24 1455
2. Relinquished By:
Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis
10 (Standard) | 5 | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis
5 (Standard) | 3 | 1 ☑ | SAME DAY

OTHER:
Specify: 8021 and GX = 1 day
DX = 2 day

*Turnaround request less than standard may incur Rush Charges

ALS ENVIRONMENTAL

Sample Receiving Checklist

Client: Glacier Environmental ALS Job#: EV2406O109

Project: 23-008

Login Date: 6/12/24 Login Time: 1455 Login By: AV

Type of Shipping Container: Cooler ✓ Box ___ Other ___

Shipped via: FedEx Ground ___ UPS ___ Courier ___ Hand Delivered ✓ ALS Courier ___
FedEx Express ___

	Yes	No	N/A
Were custody seals on outside of shipping container? If yes, how many? ___ Where? ___ Custody seal date: ___ Seal name: ___	___	___	✓
Was Chain of Custody properly filled out (ink, signed, dated, etc.)?	✓	___	___
Did all bottles have labels?	✓	___	___
Did all bottle labels and tags agree with Chain of Custody?	✓	___	___
Were samples received within hold time?	✓	___	___
Did all bottles arrive in good condition (unbroken, etc.)?	✓	___	___
Was sufficient amount of sample sent for the tests indicated?	✓	___	___
Was correct preservation added to samples?	✓	___	___
Subcontract test containers added to Subcontract Bin?	___	___	✓
Wetchem test containers marked with required Tests?	___	___	✓
Short hold time test containers delivered to analysts?	___	___	✓
Were VOA vials checked for absence of air bubbles?	___	___	✓
Bubbles present in sample #: ___			
5035A kits received? # Low Kits: ___ # High Kits: 6	✓	___	___
5035A kits returned? # Low Kits: ___ # High Kits: ___			
Temperature of cooler upon receipt: 12.5°C On ice?	___	✓	___

Explain any discrepancies:

Client wanted a 1 day rush for all tests. Dx, I mentioned to aim for 1 day but if not, it will be 2 day.

Was client contacted? ___ Who was called? ___ By whom? ___ Date: ___

Outcome of call:

June 24, 2024

Ms. Lauren Golembiewski
Glacier Environmental Services, Inc.
7509 - 212th St SW
Edmonds, WA 98026

Dear Ms. Golembiewski,

On June 21st, 3 samples were received by our laboratory and assigned our laboratory project number EV24060182. The project was identified as your 23-008. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rob Greer
Laboratory Director

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ALS Group USA, Corp dba ALS Environmental

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE: ALS JOB#: ALS SAMPLE#:	6/24/2024 EV24060182 EV24060182-01
CLIENT CONTACT:	Lauren Golembiewski	DATE RECEIVED:	06/21/2024
CLIENT PROJECT:	23-008	COLLECTION DATE:	6/21/2024 10:15:00 AM
CLIENT SAMPLE ID	WS Trench	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	**28**	3.0	1	MG/KG	06/24/2024	MNC
Benzene	EPA-8021	**0.38**	0.030	1	MG/KG	06/24/2024	MNC
Toluene	EPA-8021	U	0.050	1	MG/KG	06/24/2024	MNC
Ethylbenzene	EPA-8021	**0.12**	0.050	1	MG/KG	06/24/2024	MNC
Xylenes	EPA-8021	U	0.20	1	MG/KG	06/24/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	06/24/2024	DHM
TPH-Oil Range	NWTPH-DX	**79**	50	1	MG/KG	06/24/2024	DHM

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	**99.1**	06/24/2024	MNC
TFT	EPA-8021	**114**	06/24/2024	MNC
C25	NWTPH-DX	**106**	06/24/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline and an unidentified oil range product.

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE: ALS JOB#: ALS SAMPLE#:	6/24/2024 EV24060182 EV24060182-02
CLIENT CONTACT:	Lauren Golembiewski	DATE RECEIVED:	06/21/2024
CLIENT PROJECT:	23-008	COLLECTION DATE:	6/21/2024 10:15:00 AM
CLIENT SAMPLE ID	WB Trench	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	06/24/2024	MNC
Benzene	EPA-8021	U	0.030	1	MG/KG	06/24/2024	MNC
Toluene	EPA-8021	U	0.050	1	MG/KG	06/24/2024	MNC
Ethylbenzene	EPA-8021	U	0.050	1	MG/KG	06/24/2024	MNC
Xylenes	EPA-8021	U	0.20	1	MG/KG	06/24/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	06/24/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	06/24/2024	DHM

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	**86.6**	06/24/2024	MNC
TFT	EPA-8021	**101**	06/24/2024	MNC
C25	NWTPH-DX	**105**	06/24/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE: ALS JOB#: ALS SAMPLE#:	6/24/2024 EV24060182 EV24060182-03
CLIENT CONTACT:	Lauren Golembiewski	DATE RECEIVED:	06/21/2024
CLIENT PROJECT:	23-008	COLLECTION DATE:	6/21/2024 10:15:00 AM
CLIENT SAMPLE ID	WN Trench	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	**3.6**	3.0	1	MG/KG	06/24/2024	MNC
Benzene	EPA-8021	**0.040**	0.030	1	MG/KG	06/24/2024	MNC
Toluene	EPA-8021	U	0.050	1	MG/KG	06/24/2024	MNC
Ethylbenzene	EPA-8021	U	0.050	1	MG/KG	06/24/2024	MNC
Xylenes	EPA-8021	U	0.20	1	MG/KG	06/24/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	06/24/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	06/24/2024	DHM

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	**92.5**	06/24/2024	MNC
TFT	EPA-8021	**106**	06/24/2024	MNC
C25	NWTPH-DX	**106**	06/24/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 98208 | PHONE 425-356-2600 | FAX 425-356-2626
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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE:	6/24/2024
		ALS SDG#:	EV24060182
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Lauren Golembiewski		
CLIENT PROJECT:	23-008		

LABORATORY BLANK RESULTS

MBG-062424S - Batch 214018 - Soil by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	MG/KG	3.0	06/24/2024	MNC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-062424S - Batch 214018 - Soil by EPA-8021

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Benzene	EPA-8021	U	MG/KG	0.030	06/24/2024	MNC
Toluene	EPA-8021	U	MG/KG	0.050	06/24/2024	MNC
Ethylbenzene	EPA-8021	U	MG/KG	0.050	06/24/2024	MNC
Xylenes	EPA-8021	U	MG/KG	0.20	06/24/2024	MNC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-062324S - Batch 214011 - Soil by NWTPH-DX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range	NWTPH-DX	U	MG/KG	25	06/24/2024	DHM
TPH-Oil Range	NWTPH-DX	U	MG/KG	50	06/24/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Glacier Environmental Services, Inc. 7509 - 212th St SW Edmonds, WA 98026	DATE:	6/24/2024
		ALS SDG#:	EV24060182
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Lauren Golembiewski		
CLIENT PROJECT:	23-008		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 214018 - Soil by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range - BS	NWTPH-GX	**112**			66.5	122.7	06/24/2024	MNC
TPH-Volatile Range - BSD	NWTPH-GX	**114**	**2**		66.5	122.7	06/24/2024	MNC

ALS Test Batch ID: 214018 - Soil by EPA-8021

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Benzene - BS	EPA-8021	**120**			67.7	124	06/24/2024	MNC
Benzene - BSD	EPA-8021	**121**	**1**		67.7	124	06/24/2024	MNC
Toluene - BS	EPA-8021	**114**			71	123	06/24/2024	MNC
Toluene - BSD	EPA-8021	**116**	**1**		71	123	06/24/2024	MNC
Ethylbenzene - BS	EPA-8021	**116**			69.8	120	06/24/2024	MNC
Ethylbenzene - BSD	EPA-8021	**117**	**1**		69.8	120	06/24/2024	MNC
Xylenes - BS	EPA-8021	**113**			70	120	06/24/2024	MNC
Xylenes - BSD	EPA-8021	**113**	**0**		70	120	06/24/2024	MNC

ALS Test Batch ID: 214011 - Soil by NWTPH-DX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range - BS	NWTPH-DX	**105**			75.5	122.1	06/24/2024	DHM
TPH-Diesel Range - BSD	NWTPH-DX	**102**	**3**		75.5	122.1	06/24/2024	DHM

APPROVED BY

Rob Greer
Laboratory Director

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ALS Environmental
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Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV24060182

Date 6-21-24 Page 1 Of 1

PROJECT ID: 23-008
REPORT TO COMPANY: Glacier Environmental
PROJECT MANAGER: Lauren Golembiewski
ADDRESS: 7509 212TH S SW
EDMONDS WA 98026
PHONE: 425 355 2826 P.O. #:
E-MAIL: LMiles@glacierenvIRO.com
INVOICE TO COMPANY:
ATTENTION: — SAME —
ADDRESS:

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA 8021 ☑	BTEX by EPA 8260 ☐	MTBE by EPA 8021 ☐	MTBE by EPA 8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	PCB by EPA 8082 ☐ Pesticides by EPA 8081 ☐	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. WS Trench	6/21/24	10:15	S	1		X	X	X																
2. WB Trench	6/21/24	10:13	"	2		X	X	X																
3. WN Trench	6/21/24	10:15	"	3		X	X	X																
4.																								
5.																								
6.																								
7.																								
8.																								
9.																								
10.																								

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: [signature] 1410 6-21-24
   Received By: [signature] ALS 6/21/24 1410
2. Relinquished By: [signature]
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis
10 Standard | 5 | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis
5 Standard | 3 | 1 | SAME DAY

OTHER:
Specify:

*Turnaround request less than standard may incur Rush Charges

ALS ENVIRONMENTAL

Sample Receiving Checklist

Client: Glacier Environmental ALS Job#: EV24060182

Project: 23-008

Login Date: 6/21/24 Login Time: 1410 Login By: AV

Type of Shipping Container: Cooler ✓ Box ___ Other ___

Shipped via: FedEx Ground ___ UPS ___ Courier ___ Hand Delivered ✓ ALS Courier ___
FedEx Express ___

	Yes	No	N/A
Were custody seals on outside of shipping container? If yes, how many? ___ Where? ___ Custody seal date: ___ Seal name: ___	___	___	✓
Was Chain of Custody properly filled out (ink, signed, dated, etc.)?	✓	___	___
Did all bottles have labels?	✓	___	___
Did all bottle labels and tags agree with Chain of Custody?	✓	___	___
Were samples received within hold time?	✓	___	___
Did all bottles arrive in good condition (unbroken, etc.)?	✓	___	___
Was sufficient amount of sample sent for the tests indicated?	✓	___	___
Was correct preservation added to samples?	✓	___	___
Subcontract test containers added to Subcontract Bin?	___	___	✓
Wetchem test containers marked with required Tests?	___	___	✓
Short hold time test containers delivered to analysts?	___	___	✓
Were VOA vials checked for absence of air bubbles?	___	___	✓
Bubbles present in sample #: ___			
5035A kits received? AV # Low Kits: 3 # High Kits: 3	✓	___	___
5035A kits returned? # Low Kits: ___ # High Kits: ___			
Temperature of cooler upon receipt: 11.3 °C On ice?	✓	___	___

Explain any discrepancies:

Was client contacted? ___ Who was called? ___ By whom? ___ Date: ___

Outcome of call: