



REPORT

**Results of the 2022 Groundwater Monitoring Program,
ADEC File Number 1526.38.005**

White Pass & Yukon Route, Railroad Maintenance Yard, Skagway Alaska

Submitted to:

White Pass & Yukon Route Railroad

PO Box 435
Skagway, Alaska
USA 99840

Submitted by:

WSP Canada Inc.

#13 - 151 Industrial Road Calcite Business Centre, Whitehorse, Yukon Territory, Y1A 2V3, Canada

+1 867 633 6076

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Executive Summary

This Environmental Monitoring report was prepared by WSP Canada Inc. (WSP) on behalf of White Pass & Yukon Route (WP&YR) and describes the results of the groundwater monitoring program completed by WSP in November 2022 at the White Pass Maintenance Yard in Skagway, Alaska, henceforth referred to as the Site. This work was conducted in response to the recommendations outlined in WSP Golder's 2022 report entitled, "*Results of the 2021 Groundwater Monitoring Program, ADEC File Number 1526.38.005, White Pass & Yukon Route Railroad Maintenance Yard, Skagway, Alaska*" (WSP Golder 2022) and as per Golder's (Golder Associates Ltd., now known as WSP) 2018 work plan entitled, "White Pass & Yukon Route Rail Yard and Maintenance Yard, 2018 Environmental Monitoring Work Plan" (Golder 2018) that was approved by ADEC as per email communication received on 26 June 2018.

The 2022 groundwater monitoring program consisted of the collection of groundwater elevation data, analytical samples, and field parameters at four monitoring wells in November 2022. One monitoring well (MW00-35) contained insufficient water to collect a sample. MW13-1D and MW97-7R S were not sampled because an older version of the 2018 Workplan was mistakenly followed which did not include these wells.

Of the successfully sampled monitoring wells, two locations (MW97-3 and MW97-5R) located adjacent to the north and west sides of the Shops building, respectively, contained concentrations of DRO (MW97-3 only) and RRO greater than the DEC Cleanup Levels. In general, concentrations of DRO at MW97-3 have been decreasing since the removal of LNAPL at this location, as presented in Figure 6. Concentrations of RRO at MW97-3 have been decreasing since 2018 but remain above the DEC Cleanup Level. Concentrations of PCE have decreased at MW97-3 since 1997 and remained below the DEC Cleanup level in 2022.

Concentrations of RRO increased to above the DEC Cleanup Level at MW97-5R for the first time in 2022. Ensuring monitoring is completed at the further downgradient monitoring well, MW97-7R in 2023, as per the approved 2018 Workplan, will provide further information on migration of the hydrocarbon plume.

The remaining two groundwater monitoring wells sampled during the 2022 monitoring event had concentrations less than the DEC Cleanup Levels for all analyzed parameters.

Based on the results of the 2022 groundwater program at the Site, WSP recommends that annual groundwater monitoring be continued in accordance with the approved 2018 Groundwater Monitoring Work Plan. Monitoring well MW13-1D should be located by field staff familiar with its location on-site. The monitoring program should be re-evaluated if MW13-1D is no longer available for sampling.

Study Limitations

This report has been prepared for White Pass & Yukon Route Railroad and Alaska Department of Environmental Conservation, and is intended to provide an indication of groundwater quality at the Site. This report may not be relied upon by any other person(s) or entity without the express written consent of WSP Canada Inc. and the White Pass & Yukon Route Railroad. The inferences concerning the conditions of the Site contained in this report are based on information obtained during the environmental sampling program conducted by WSP Canada Inc. personnel and are based solely on conditions at the time of the sampling. Therefore, the potential remains for the presence of unknown, unidentified or unforeseen contamination in areas not inspected as part of this study.

Any uses that a third party makes of this report, or any reliance on decisions to be made based on it, are the responsibility of such third parties. WSP Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The findings and conclusions documented in this report have been prepared for the specific application to this project, the services performed as described in this report were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

The content of this report is based on information collected during our environmental sampling, our present understanding of the Site, and our professional judgment in light of such information available at the time of this report. This report provides a professional opinion, and therefore no warranty is either expressed, implied or made as to the conclusions, advice and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change.

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LIST OF ACRONYMS

ADEC	Alaska Department of Environmental Conservation
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
DF	Difference Factor
DNAPL	Dense Non-Aqueous Phase Liquids
DRO	Diesel Range Organics
FD/FDA	Field Duplicate/Field Duplicate Available
GRO	Gasoline Range Organics
HDPE	High Density Polyethylene
LNAPL	Light Non-Aqueous Phase Liquids
MDL	Method Detection Limit
MW	Monitoring Well
PAHs	Polycyclic Aromatic Hydrocarbons
PCE	Tetrachloroethene
PID	Photoionization Detector
QA/QC	Quality Assurance/ Quality Control
RRO	Residual Range Organics
RPD	Relative Percent Difference
TCE	Trichloroethene
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

This Environmental Monitoring report was prepared by WSP Canada Inc. (WSP) on behalf of White Pass & Yukon Route (WP&YR) and describes the results of the groundwater monitoring program completed by WSP in November 2022 at the White Pass Maintenance Yard in Skagway, Alaska, henceforth referred to as the Site. The location of the Site is shown on Figure 1 – Site Location Plan. This work was conducted in response to the recommendations outlined in WSP Golder’s 2022 report entitled, “*Results of the 2021 Groundwater Monitoring Program, ADEC File Number 1526.38.005, White Pass & Yukon Route Railroad Maintenance Yard, Skagway, Alaska*” (WSP Golder 2022) and as per Golder’s (Golder Associates Ltd., now known as WSP) 2018 work plan entitled, “*White Pass & Yukon Route Rail Yard and Maintenance Yard, 2018 Environmental Monitoring Work Plan*” (Golder 2018) that was approved by ADEC as per email communication received on 26 June 2018.

2.0 SCOPE OF WORK

WSP conducted the following scope of work:

- Monitoring and collection of groundwater samples from five monitoring wells in November 2022. Due to an older version of the 2018 workplan being referenced during field planning two wells that should have been monitored were not included in the program (MW13-1D and MW97-7R).
- Summarizing the 2022 sampling data in this groundwater monitoring report.

3.0 SITE DESCRIPTION

3.1 Site Setting and Background

The Site is located north of 23rd Avenue in Skagway, Alaska (Figures 1 and 2). A detailed description of the Site setting and background was provided in the Site Characterization Work Plan (Golder 2013). No new buildings have been constructed on-site since 2013, nor has the use of existing buildings changed. Groundwater monitoring well locations and Site features are shown on Figure 3.

Based on the Site history outlined in the 2016 Monitoring Report (Golder 2016) and associated sources of groundwater contamination on-site, the contaminants of concern (COCs) at the Site consist of petroleum hydrocarbons (diesel range organics [DRO], residual range organics [RRO], gasoline range organics [GRO]), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and lead (dissolved). Based on the groundwater monitoring results at Site conducted to date compared to the DEC groundwater Cleanup Levels (DEC 2023) PCP, creosote, and metals are no longer considered COCs for the Site.

Historically, trichloroethene (TCE) has been the primary contaminant of concern in groundwater at the Site with TCE concentrations greater than the DEC Cleanup Levels historically measured at several monitoring well locations. A smaller hydrocarbon plume originating from north of the main Shops building at MW97-3 and to the southwest (MW97-6) has also been observed.

3.2 Geology

Skagway is located in Southeast Alaska at the head of Taiya Inlet. Elongated lakes, U-shaped valley, and linear fjords resulting from extensive glaciation during the Pleistocene epoch characterize the area. The region was covered at one time by about 5,000 feet (ft) of ice. The Skagway area lies within a very rugged part of an extensive one thousand mile long linear belt of plutonic intrusive and metamorphic rocks consisting chiefly of quartz diorite and granodiorite of Mesozoic age. These plutonic rocks have been locally intruded by several small igneous dikes of Quaternary age. The terrain in the Skagway area is steep and rocky, restricting most of the infrastructure to the Skagway River floodplain. Vegetation of the slopes consists of healthy spruce-birch forest cover with a very thin organic mat of moss, leaves, and spruce needles. The Site is relatively flat and free of any significant vegetation. The ground surface is generally covered with sand and gravel. Similarly, subsurface soils consist of various sands and gravels. Permafrost is not present at the Site or within Skagway.

3.3 Hydrogeology

Groundwater elevations have been measured by Golder/WSP biannually at the Site since 1996. A review of historical groundwater elevation data suggest that groundwater levels encountered in the fall are typically higher than in the spring. The groundwater flow direction is inferred to be generally to the south-southwest parallel to the Skagway River.

During the December 2010 monitoring event, the horizontal hydraulic gradient in the shallow aquifer was estimated to be approximately 0.006 feet per foot (ft/ft) (Golder 2012). Assuming an effective porosity of 0.3, and an average hydraulic conductivity of 3.0×10^{-3} feet per second (ft/sec) (based on the average hydraulic conductivity measured in shallow wells MW-2HC and MW98-1 in 2007), the average linear groundwater seepage velocity is estimated to be approximately 5 feet per day (ft/day). The vertical hydraulic gradient, as measured at a monitoring well pair during the December 2010 monitoring event, is approximately 0.032 ft/ft. downward.

Groundwater levels were measured at 22 on-site and off-site monitoring wells in June 2018 in order to confirm the groundwater flow across the Site. Groundwater elevations calculated in 2018 were generally similar to previous groundwater elevations at the Site during summer monitoring. A review of historical groundwater elevation data suggest that water levels encountered in the fall are typically higher than in the spring. The shallow groundwater flow direction is generally to the south-southwest on the north side of the Site, trending to the south on the south side of the Site, as shown on Figure 4, with a horizontal hydraulic gradient in June 2018 of 0.007 ft/ft. Assuming an effective porosity of 0.3, and an average hydraulic conductivity of 3.0×10^{-3} ft/sec (based on the average hydraulic conductivity measured in monitoring wells MW-2HC and MW98-1), the average linear groundwater seepage velocity is estimated to be approximately 6.0 ft/day.

Groundwater levels were measured at five monitoring wells on 2 November 2022. The results of the groundwater level measurements are provided in Table 1.

4.0 REGULATORY

WSP understands that the community of Skagway has a Class A (community) water system. As stated in the Skagway Drinking Water Protection Plan (Gladden and Hann 2014), the system consists of three wells within downtown Skagway: Well #1 located on the corner of 15th Avenue and Main; Wells #2 and #3 located on the corner of 15th Avenue and Alaska Street. The depths of the three wells are between 70 and 80 ft below grade within a semi-confined aquifer consisting of gravel and fine to coarse sand. The static water levels in the wells are approximately 10 ft below ground surface. A fourth well (Well #4) was installed in 2017 along Alaska St between 15th Avenue and 18th Avenue to a depth of 85 ft with a static water level of 10.5 ft.

In addition, the Alaska well database known as WELTS (Well Log Tracking System, administered by the Alaska Department of Natural Resources) was reviewed by WSP. A search for wells in Skagway, AK resulted in eight wells listed on the WELTS database, including the four community wells (Well #1, Well #2, Well #3 and Well #4) described above, with the remaining four being of private ownership or registered to the City of Skagway approximately 0.2 to 1.6 miles from the Site and across the Skagway River.

Based on the location of the municipal drinking water wells located approximately 0.3 to 0.4 miles in the inferred down-gradient direction from the Site, it is possible that groundwater from the Site would be within the zone of contribution or recharge area for the active public or private drinking water systems. The DEC groundwater Cleanup Levels provided in Table C of 18 AAC 75 Oil and Other Hazardous Substances Pollution Control, updated to 05 February 2023 (ADEC 2023) are considered applicable if groundwater at the Site is considered a current or future drinking water source. Based on the criteria outlined in Section 75.350 of 18 AAC and the evaluation of current and future groundwater use provided above, the DEC groundwater Cleanup Levels provided in Table C would apply to this Site.

As outlined in the DEC regulation 18 AEC 75.333, Emily Henkemans, a Qualified Environmental Professional (QEP) conducted the field work, while Tamra Reynolds, also a QEP reviewed the work.

5.0 METHODOLOGY

The sections below detail the scope of work and methods used for the investigation and monitoring program.

5.1 Groundwater Monitoring Program

Groundwater monitoring of the seven wells included in the 2018 Workplan (Golder 2018) was deemed sufficient to continue tracking the rate of natural attenuation of contaminated groundwater at the Site. The majority of wells are screened across the water table to capture concentrations of LNAPL contaminants. MW13-7 and MW13-1D were included to continue monitoring natural attenuation of TCE. Mid depth and deep well locations were selected as they were screened at a confining layer in order to characterize potential DNAPL contamination at mid or deep depth intervals to capture the potential for deeper groundwater contamination due to downward hydraulic gradients.

Groundwater samples were collected using standard WSP operating procedures, which have been employed for the duration of monitoring at the Site. These procedures are generally consistent with the DEC guidance documents. One field duplicate groundwater sample, one trip blank and one field blank were also collected and analyzed for quality control purposes.

Monitoring wells were gauged using a water level probe for depth to water and depth to bottom in order to calculate the water volume and monitor the groundwater level during groundwater purging activities. A peristaltic pump set at a low speed was used to remove water from each well with ¼ inch diameter high density polyethylene (HDPE) dedicated tubing lowered to the approximate midpoint of each well screen. Up to three well volumes were removed with the pump until water quality parameters were considered stable. Groundwater quality parameters were considered stable when a minimum of three (minimum of four, if using temperature as an indicator) parameters listed below had three successive readings, collected three to five minutes apart, within:

- ± 3 percent for temperature (minimum of ± 0.2°C)
- ± 0.1 for pH
- ± 3 percent for conductivity
- ± 10 mv for redox potential
- ± 10 percent for dissolved oxygen (DO)

Samples were then collected using the peristaltic pump set at the lowest speed into pre-cleaned containers supplied by SGS Laboratory of Anchorage, Alaska. All groundwater samples were analyzed for diesel range organics (DRO), residual range organics (RRO), gasoline range organics (GRO), benzene, toluene, ethylbenzene, xylene, styrene (BTEXS), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and polycyclic aromatic hydrocarbons (PAHs).

5.2 Quality Assurance / Quality Control

Standard WSP and industry established field procedures were used throughout the field investigation to assess the accuracy, precision and reproducibility of results. The samples were stored in chilled coolers prior to submission to the analytical laboratory and appropriately completed Chain-of-Custody forms accompanied the sample submissions.

The relative percent difference (RPD; the absolute difference between the two values, divided by the mean) of duplicate analyses was used to evaluate the sample result variability. As per ADEC sampling guidance document, an RPD value of less than 30% for water is considered an indication of acceptable sample variability, and therefore represented a good correlation between the sample and its duplicate. Where the concentration of a given parameter was less than five times the MDL, the results are less precise and a higher RPD value is generally considered acceptable.

5.3 Waste Disposal

During the November 2022 sampling program, purged groundwater was returned to the ground near the well locations for wells that did not exceed ADEC cleanup levels during the 2021 sampling event. Based on the 2018 Workplan (Golder 2018), purge water from MW97-3 was disposed of in the oil-water separator on-site due to prior exceedances of the ADEC cleanup levels at this well. No free product was noted in the wells. Sampling related garbage such as nitrile gloves or broken tubing, was disposed of on-site in waste bins.

6.0 GROUNDWATER MONITORING RESULTS

During the 2022 monitoring program, a single groundwater monitoring event was conducted on 02 November 2022. In summary, groundwater levels and headspace measurements were obtained from four of the seven monitoring wells across the Site (locations shown on Figure 3) that were outlined in the approved 2018 work plan:

- On-site shallow wells: MW97-3, MW97-5R, MW00-33R
- On-site mid depth well: MW13-7

The remaining monitoring wells were not sampled for the following reasons:

- MW00-35 was not sampled because it was dry, which is consistent with previous monitoring events.
- MW13-1D and MW97-7R S were not sampled because an older version of the 2018 Workplan was mistakenly followed which did not include these wells. MW13-1D is a flushmount well and was not located during the 2021 monitoring program. It was assumed to have been buried as the ground in the area appeared to have been recently leveled by heavy machinery.

The collected samples were stored in coolers with ice and shipped to the SGS analytical laboratory in Anchorage, AK. Samples were shipped under standard WSP Chain-of-Custody procedures. Copies of the monitoring well sampling forms are provided in Appendix A.

The analytical results of the 2022 groundwater sampling program are shown in Table 2A (Petroleum Hydrocarbons, VOCs and metals) and 2B (semi-volatile VOCs) alongside historical data. Table 3 presents only the 2022 results for Petroleum Hydrocarbons, VOC and metals. The results were compared to DEC groundwater Cleanup Levels provided in Table C of 18 AAC 75 Oil and Other Hazardous Substances Pollution Control, updated to 05 February 2023. Monitoring wells analyzed prior to 2018 are no longer included in report tables and can be referenced in Golder's previous groundwater monitoring reports. The laboratory report and corresponding Chain-of-Custody form is provided in Appendix B.

The concentrations of parameters exceeding the ADEC Clean-up Levels in groundwater are summarized below and shown on Figure 5:

- At monitoring well MW97-3, the DRO concentration of 6.07 mg/L exceeded the DEC Cleanup Level of 1.5 mg/L.
- At monitoring well MW97-3, the RRO concentration of 2.72 mg/L exceeded the DEC Cleanup Level of 1.1 mg/L.
- At monitoring well MW97-5R, the DRO concentration of 2.91 mg/L (3.25 mg/L in field duplicate) exceeded the DEC Cleanup Level of 1.5 mg/L.

The groundwater samples from the other two monitoring wells contained concentrations of analyzed parameters less than the applicable DEC Cleanup Levels.

7.0 QUALITY ASSURANCE / QUALITY CONTROL RESULTS

As part of the November 2022 groundwater monitoring program, a duplicate groundwater sample was collected from monitoring well MW97-5R for quality assurance and quality control (QA/QC) purposes. The results of the duplicate sample pair analyses are shown in Table 4 along with the calculated RPDs. The QA/QC results for the groundwater samples were less than the RPD targets of 30%.

In addition to the duplicate sample analysis, one field blank and one trip blank were analyzed as part of the November 2022 sampling event. Deionized water was purchased locally in Skagway and used for the field blank. The trip blank was prepared by SGS in Anchorage and shipped in a cooler along with the sample containers. All of the parameters analyzed from the blank samples were below the laboratory MDLs.

In addition to the quality assurance procedures carried out during the groundwater sampling program, the analytical laboratory also instituted internal quality assurance procedures. These procedures included sample handling and record-keeping protocols, equipment maintenance and calibration, and the analysis of blanks, duplicates and/or standard reference materials. A review of the laboratory data determined that the laboratory generally met its own internal standards and targets.

Concerns identified through the laboratory data review have been detailed in the DEC Laboratory Data Review Checklists for November 2022 included in Appendix C. No quality assurance issues were identified by the laboratory and the data is considered reliable for this investigation.

8.0 DISCUSSION

With the exception of MW97-3 (DRO and RRO) and MW97-5R (DRO), the wells sampled in 2022 did not exceed DEC Cleanup Levels for the parameters analyzed (BTEXS, DRO, GRO, RRO, VOCs, PAHs).

The discussion and figures included in the 2022 report focuses on the on-site wells that are still being actively monitored and on contaminants that have currently (DRO and RRO) or historically (PCE and TCE) exceeded the ADEC Cleanup Levels.

8.1 DRO

The historical change of DRO concentrations in groundwater at on-site wells is shown on Figure 6. A record of DRO concentrations for MW97-3 between 1997 and 2012 is not included on Figure 6 because this well historically contained free product and was not sampled between these years. The source of petroleum hydrocarbon contamination at MW97-3 and MW97-5R is not specifically known. MW97-3 is located on the north side of the Shops building, between the boiler (located in the building), and the fuel storage tank for the boiler (located to the north of MW97-3). MW97-5R is located on the west side of the Shops building. The contamination is thought to be from leaks or spills from the original tank, as the current tank is doubled walled and within secondary containment. A product recovery program was implemented in 2012 and 2013 at MW97-3 that consisted of the collection of free product from the well using an absorbent sock. Consequently, free product has not been detected at this location since the 2013 monitoring program however from 2017 to 2019 the water was observed to have a slight hydrocarbon sheen and a strong hydrocarbon odor; however, this observation was not made in 2021 or 2022. As shown on Figure 6, the concentration of DRO at MW97-3 shows some seasonal variation with higher concentrations of DRO measured during the spring/summer sampling events. The concentration of DRO at

MW97-3 decreased from the concentrations measured between 2013 and 2021. Concentrations of DRO at MW97-5R increased to above the ADEC Cleanup Level in 2022 for the first time since 2000. There is no apparent seasonal variation in concentrations measured at MW97-5R.

8.2 RRO

As shown in Figure 7, concentrations of RRO have been variable at monitoring well MW97-3. MW97-3 is the only remaining location with a concentration of RRO greater than the DEC Cleanup Level. It should be noted that sampling results less the laboratory MDL are reported as 0 mg/L on Figure 7 while the laboratory MDLs have improved over the sampling duration. RRO has recently been measured due to the improved detection limits. The concentration of RRO in the November 2022 sample from MW97-3 is within the range of historical concentrations. Concentrations of RRO have decreased at MW97-3 since 2018 but have increased at MW97-5/MW97-5R, where they are now approaching the ADEC Cleanup Level. The remaining wells sampled in 2022 were not analyzed for DRO or RRO as historically concentrations at these wells have been below the detection limits.

8.3 PCE

As shown in Figure 8A and 8B, the concentration of PCE in groundwater samples has generally decreased over time. In 2022, the concentration of PCE at MW97-3 was less than the DEC Cleanup Level of 0.041 mg/L. Similar results were observed in 2021, suggesting a possible decreasing trend. Additional data at MW97-3 is needed to confirm that PCE concentrations are below the DEC Cleanup Level (0.0401 mg/L). In 2022, concentrations of PCE at MW13-7 and MW97-5R increased in 2022 compared to results between 2016 and 2019 but remained over an order of magnitude lower than the DEC Cleanup Level (Figure 8B). Concentrations of TCE remained below the DEC Cleanup Level in all wells sampled in 2022 (Table 2A and Table 3).

9.0 CONCLUSIONS AND RECOMMENDATIONS

In summary, four groundwater samples were collected during the 2022 sampling program. One monitoring well (MW00-35) contained insufficient water to collect a sample. MW13-1D and MW97-7R S were not sampled because an older version of the 2018 Workplan was mistakenly followed which did not include these wells.

Of the successfully sampled monitoring wells, two locations (MW97-3 and MW97-5R) located adjacent to the north and west sides of the Shops building, respectively, contained concentrations of DRO and RRO (MW97-3 only) greater than the DEC Cleanup Levels. In general, concentrations of DRO at MW97-3 have been decreasing since the removal of LNAPL at this location, as presented in Figure 6. Concentrations of RRO at MW97-3 have been decreasing since 2018 but remain above the DEC Cleanup Level. Concentrations of PCE have decreased at MW97-3 since 1997 and remained below the DEC Cleanup level in 2022.

Concentrations of DRO increased to above the DEC Cleanup Level at MW97-5R for the first time since the year 2000. Completing the monitoring at the further downgradient monitoring well MW97-7R in 2023, as per the approved 2018 Workplan, will provide further information on the extent of the DRO plume.

The remaining two groundwater monitoring wells sampled during the 2022 monitoring event had concentrations less than the DEC Cleanup Levels for all analyzed parameters.

Based on the results of the 2022 groundwater program at the Site, WSP recommends that annual groundwater monitoring be continued in accordance with the approved 2018 Groundwater Monitoring Work Plan. Monitoring well MW13-1D should be located by field staff familiar with its location on-site. The monitoring program should be re-evaluated if MW13-1D is no longer available for sampling.

10.0 CLOSURE

We trust that this report provides you with the information you require at this time. Should you have any further questions or concerns, please do not hesitate to contact Tamra Reynolds at 867-633-6076.

WSP Canada Inc.



Emily Henkemans, PhD
Hydrogeologist



Tamra Reynolds, MSc, PGeo
Principal Hydrogeologist

EH/TR/jts

11.0 REFERENCES

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- Gladden T, Hahn S. 2014. *Skagway Drinking Water System Public Water System (PWS) – Drinking Water Source Protection Plan PWSID #110601*. 2 March 2014. pp. 9.
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TABLE 1
Water Table Elevations
Maintenance Yard Shops, Skagway, AK
White Pass Yukon Route

Monitoring Well Location	Date Measured	TOC ¹ Elevation (ft)	Depth to Water ² (ft)	Water Table Elevation ³ (ft)	Well Headspace ⁴ (ppm)
MW97-3	02-Nov-23	75.34	7.04	68.30	4.7
MW97-5R	02-Nov-23	74.90	7.89	67.01	0.0
MW00-33R	02-Nov-23	83.65	13.55	70.10	0.0
MW00-35	02-Nov-23	77.10	10.45	66.65	0.0
MW13-7	02-Nov-23	82.70	15.76	66.94	0.0

Notes:

1. TOC = Top of Well Casing (measurements are approximate)
 2. Depth to Water measured from TOC
 3. Water Table Elevation = TOC minus Depth to Water
 4. Well headspace recorded by Photoionization Detector (MiniRae PID)
- = Not measured

TABLE 2A
Historical Groundwater Analytical Results
Hydrocarbons, Volatile Organic Compounds and Metals
Maintenance Yard Shops, Skagway, AK
White Pass and Yukon Route

Location	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-3	MW97-5	MW97-5	MW97-5	MW97-5	MW97-5	MW97-5R			
Lab ID	A709046-03	24103-12	24299-02	11317-05	11317-06	7507-01	7507-02	7633-08	7681-03	7681-04	7685-03	7685-04	7796-12	7689-01	10001-11	580-78476-7	580-86209-6	580-86209-7	1213395002	1213395003	1226736005	A709046-05	A9800524-8	A9900271-6	A9900854-15	P005200-08	24300-05		
SCN																					10241-05								
Date	06-Sep-97	09-Sep-13	16-Jun-14	27-Sep-14	27-Sep-16	05-May-15	05-May-15	06-Oct-15	15-Jun-16	15-Jun-16	21-Sep-16	21-Sep-16	17-May-17	17-May-17	17-Oct-17	27-Jun-18	15-May-19	15-May-19	15-Jun-21	15-Jun-21	02-Nov-22	06-Sep-97	30-Jul-98	15-Jun-99	02-Nov-99	05-May-00	18-Jun-14		
QA/QC				FDA	FD	FDA	FD		FDA	FD	FDA	FD	FDA	FD															
BTEX³																													
Benzene	0.0046	<0.00006	<0.00006	<0.001	<0.001	<0.00042	<0.00042	<0.00042	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.000030	<0.000030	<0.000030	<0.00025	<0.00025	<0.00025			0.22	0.36	<0.001		0.00078	
Ethylbenzene	0.015	<0.0005	<0.0001	<0.0025	<0.0025	<0.00051	<0.00051	<0.00051	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.000030	<0.000050	<0.000050	<0.0005	<0.0005	<0.0005			0.29	0.44	<0.001		<0.0005	
Toluene	1.1	<0.0005	<0.0011	<0.0025	<0.0025	<0.00044	<0.00044	<0.00044	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.000050	<0.000030	<0.000030	<0.0005	<0.0005	<0.0005					0.23	0.3	<0.001	
Xylenes (total)	0.19	<0.001	<0.00033	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00015	<0.00015	<0.00015	<0.0015	<0.0015	<0.0015			1.4	2.4	<0.001		<0.001	
Xylenes (m,p)																													
o-Xylene																													
Styrene	1.2	<0.003	<0.0005	<0.0005	<0.0025	<0.0025	<0.00062	<0.00062	<0.00062	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00019	<0.00019	<0.00019	<0.0005	<0.0005	<0.0005			0.27	<0.01	<0.05	<0.0005	<0.01	<0.0005
Petroleum Hydrocarbons																													
Diesel Range Organics (DRO C ₁₀ -C ₂₅)	1.5	3.1	14	64	31	32	40	37	30	42	41	23 ⁽²⁾	25 ⁽²⁾	52	58	13	29	21	21	15.4	16.7	6.07	13.0	8.2	1.69	6	1.56	0.62	
Gasoline Range Organics (GRO C ₆ -C ₁₀)	2.2	-	0.13	<0.13	<0.4	<0.4	0.082	0.085	0.063	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.10	<0.10	0.0413	0.0410	<0.0500	-	6.5	7.1	0.142	3.43	<0.08	
Residual Range Organics (RRO C ₂₅ -C ₃₆)	1.1	-	0.43	3.4	1.9	1.9	8.4	7.6	8.3	6.0	7.0	4.9 ⁽²⁾	5.7 ⁽²⁾	3.8	4.9	1.9	10	8	8.8	5.35	5.89	2.72	-	-	<1	54	<0.5	<0.48	
Volatile Organic Compounds (VOCs)																													
1,1-Dichloroethane	0.028	<0.005	0.0003	<0.005	0.00073	0.00072	<0.00044	<0.00044	0.00083	<0.0005	<0.0005	0.00051	0.00051	<0.0005	<0.0005	<0.0005	0.00019	0.00027	0.00031	<0.0005	<0.0005	<0.0005	<0.025	<0.01	<0.05	<0.0005	<0.01	<0.005	
1,1-Dichloroethene	0.28	<0.005	<0.0005	<0.005	<0.0025	<0.0025	<0.00033	<0.00033	<0.00033	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00010	<0.00010	<0.00010	<0.0005	<0.0005	<0.0005	<0.025	<0.01	<0.05	<0.0005	<0.01	<0.005	
cis-1,2-Dichloroethane	0.036	<0.003	0.00084	<0.005	<0.0025	<0.0025	<0.00021	<0.00021	0.00097	<0.0005	<0.0005	0.00083	0.00083	<0.0005	<0.0005	<0.0005	<0.00055	<0.00055	<0.00055	<0.0005	<0.0005	<0.0005	0.024	0.045	0.053	0.0009	0.0321	0.00095	
trans-1,2-Dichloroethane	0.36	<0.003	<0.0005	<0.005	<0.0025	<0.0025	<0.00024	<0.00024	<0.00024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.000089	<0.000089	<0.000089	<0.0005	<0.0005	<0.0005	<0.003	<0.001	<0.0005	<0.0005	<0.01	<0.005	
1,4-Dioxane	0.046	-	<0.00088	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (Ethylene Dibromide)	0.00075	-	<0.00001	-	-	-	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.000025	<0.000025	<0.000025	<0.0000375	<0.0000375	<0.0000375	-	-	-	-	-	-	-	
1-Methylnaphthalene	0.11	-	-	-	-	0.0023	0.0030	-	-	-	-	-	-	-	-	0.011	<0.000099	<0.0001	<0.000025	<0.000025	<0.000025	-	-	-	-	-	-	-	
2-Methylnaphthalene	0.036	-	<0.0003	<0.038	-	-	<0.00011	<0.00011	-	<0.000023	<0.000022	<0.000022	<0.000022	<0.00023	0.0002	<0.000034	0.00012	<0.0002	<0.00021	<0.000025	<0.000025	<0.000025	-	-	-	-	-	<0.0038	
3 & 4 Methylphenol		-	<0.00025	<0.096	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0096
Methylene Chloride	0.11	0.012	<0.0005	<0.005	<0.025	<0.025	<0.0013	<0.0013	<0.0013	-	-	-	-	-	-	<0.002	<0.0017	<0.00074	<0.00074	<0.005	<0.005	<0.005	0.037	<0.02	<0.1	<0.001	<0.05	<0.005	
Pentachlorophenol (PCP)	0.0041	-	<0.02	<0.48	-	-	-	-	-	-	-	-	-	-	-	-	0.00051	<0.00094	<0.00095	-	-	-	-	-	-	-	-	-	<0.048
Tetrachloroethene (PCE)	0.041	0.083	0.043	0.043	0.041	0.039	0.040	0.039	0.051	0.050	0.043	0.039	0.039	0.04	0.043	0.043	0.043	0.052	0.046	0.0325	0.0337	0.0197	<0.015	<0.01	<0.05	0.001	<0.01	0.001	
1,1,1-Trichloroethane	8	0.063	<0.0005	<0.0005	<0.0025	<0.0025	0.00063	0.00066	0.00066	<0.0005	<0.0005	0.00056	0.00056	0.00082	0.00076	<0.0005	0.00048	0.00023	0.00024	0.000354	0.000365	<0.0005	<0.025	<0.01	<0.05	<0.0005	<0.01	<0.0005	
Trichloroethene (TCE)	0.0028	0.019	0.0006	0.0004	<0.0067	<0.0025	<0.00051	<0.00051	<0.00051	0.00081	0.00088	0.00057	0.00055	0.0012	0.0011	0.00081	0.00035	0.00043	0.00041	<0.0005	<0.0005	<0.0005	<0.015	<0.01	<0.05	0.0006	<0.01	0.0010	
Vinyl chloride (Chloroethane)	0.00019	<0.002	<0.0005	<0.0005	<0.0025	<0.0025	<0.00022	<0.00022	<0.00022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00013	<0.000013	<0.000013	<0.000075	<0.000075	<0.000075	<0.01	<0.01	<0.05	<0.0005	<0.01	<0.0005		
Polycyclic Aromatic Hydrocarbons (PAHs)																													
Acenaphthene	0.53	-	<0.0003	<0.038	<0.00072	<0.00072	<0.00011	<0.00011	<0.00064	<0.000023	<0.000022	0.00063	0.00098	<0.00023	0.0001	<0.000034	<0.000030	<0.000073	<0.000074	<0.000025	<0.000025	<0.000025	-	-	-	-	-	<0.0038	
Acenaphthylene	0.26	-	<0.0005	<0.038	<0.00048	<0.00048	<0.00011	0.00021	<0.00032	<0.00023	<0.00022	0.00017	<0.000079	<0.00023	0.00065	<0.000034	<0.000015	<0.000047	<0.000048	<0.000025	<0.000025	<0.000025	-	-	-	-	-	<0.0038	
Anthracene	0.043	-	<0.0004	<0.038	<0.00048	<0.00048	<0.00011	<0.00011	<0.00021	<0.00023	<0.00022	<0.00011	<0.000079	<0.00023	<0.000041	<0.000034	<0.000010	<0.00011	<0.00012	<0.000025	<0.000025	0.0000196	-	-	-	-	-	<0.0038	
Benzo[a]anthracene	0.0003	-	<0.00035	<0.038	<0.00048	<0.00048	<0.00011	<0.00011	<0.00064	<0.000023	<0.000022	<0.00011	<0.000079	<0.000046	0.000044	<0.000034	<0.000030	<0.000073	<0.000074	<0.000025	<0.000025	<0.000025	-	-	-	-	-	<0.0038	
Benzo[b]fluoranthene	0.0025	-	<0.0005	<0.038	<0.00048	<0.00048	<0.00011	<0.00011	<0.00064	<0.000023	<0.000022	<0.00011	<0.000079	0.00005	<0.000041	<0.000034	<0.000030	<0.000057	<0.000058	<0.000025	<0.000025	<0.000025	-	-	-	-	-	<0.0038	
Benzo[k]fluoranthene	0.																												

TABLE 2A
Historical Groundwater Analytical Results
Hydrocarbons, Volatile Organic Compounds and Metals
Maintenance Yard Shops, Skagway, AK
White Pass and Yukon Route

Table with columns for Location, Lab ID, Date, QA/QC, ADEC Groundwater Cleanup Level (2023)1, and various monitoring wells (MW97-5R, MW97-7S, etc.) for different chemical groups like BTEX, Petroleum Hydrocarbons, Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), and Metals.

Notes:
All concentrations are in milligrams per litre (mg/L); SCN = sample control number
QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/field duplicate
Italics indicate method detection limit was greater than the applicable ADEC Clean-up Level.
1. Alaska Department of Environmental Conservation (ADEC), Table C of "18 AAC 75, Articles 3 and 9, Oil and Other Hazardous Substances Pollution Control", regulations revised as of 5 February 2023.
2. Method reporting limit raised for this sample due to dilution of the sample by the lab prior to analysis.
3. BTEX results reported from analytical method AK101. When BTEX results were also reported from analytical method SW8260D, results are comparable and below standards.
* Sample result for RRO during the October 2007 monitoring event is suspected to be result of cross-contamination that occurred during analysis.
Sample collected using bladder pump during the September 2013 monitoring event
***Surrogate compounds failed low or were inadvertently omitted during the extraction process for DRO analysis at MW97-7R S and 98-2 in Sept. 2014 and re-extraction was performed outside of the method defined holding-time.
The greater of the two results has been reported.
Concentration Exceeds ADEC Groundwater Cleanup Level (updated 2023)
Results reported greater than the MDL but less than reporting limit and are an estimate

TABLE 2A
Historical Groundwater Analytical Results
Hydrocarbons, Volatile Organic Compounds and Metals
Maintenance Yard Shops, Skagway, AK
White Pass and Yukon Route

Location	MW00-33R	MW00-33R	MW00-33R	MW00-33R	MW00-33R	MW00-33R	MW00-33R	MW00-33R	MW00-33R	MW00-35	MW00-35	MW00-35	MW00-35	MW00-35	MW00-35	MW00-35	MW00-35	MW00-35	MW13-1D	MW13-1D	MW13-1D	MW13-1D	MW13-1D	MW13-1D	MW13-1D	MW13-1D	MW13-1D			
Lab ID	7632-04	7632-05	7680-06	7685-01	7688-07	10002-02	580-78476-4	580-86209-4	1226736002	POK0452-18	0862-08	0886-04	10841-01	10841-02	11012-11	12176-09	12176-10	PSJ0126-12	24300-02	23465-01	7506-05	7632-06	7681-01	7681-02	7685-09	7688-08	10002-12			
SCN																														
Date	06-Oct-15	06-Oct-15	15-Jun-16	20-Sep-16	16-May-17	16-Oct-17	27-Jun-18	15-May-19	02-Nov-22	14-Nov-00	29-Jun-01	11-Oct-01	21-May-05	21-May-05	27-Oct-05	16-Jul-06	16-Jul-06	02-Oct-09	18-Jun-14	03-Oct-14	04-May-15	06-Oct-15	15-Jun-16	15-Jun-16	21-Sep-16	16-May-17	17-Oct-17			
QA/QC		FD											FDA	FD		FDA	FD					FDA	FD	FD						
ADEC Groundwater Cleanup Level (2023) ¹																														
BTEX³																														
Benzene	0.0046	<0.00042	<0.00042	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00030	0.0779	0.0335	0.0268	0.0092	0.00904	0.0104	0.00985	-	0.00642	<0.0002	<0.0002	<0.00042	<0.00042	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Ethylbenzene	0.015	<0.00051	<0.00051	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00030	0.0611	0.106	0.09	0.021	0.0191	0.0281	0.0242	-	0.00710	<0.0005	<0.0005	<0.00051	<0.00051	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Toluene	1.1	<0.00044	<0.00044	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00030	0.19	0.0247	0.0227	0.0034	0.00316	0.00356	0.0015	-	<0.001	<0.0005	<0.0005	<0.00044	<0.00044	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Xylenes (total)	0.19	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.00015	<0.00015	0.761	0.222	0.335	0.02599	0.02363	0.0366	<0.00926	-	<0.005	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Xylenes (m,p)	-	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005		
o-Xylene	-	-	-	-	-	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005		
Styrene	1.2	<0.00062	<0.00062	<0.0005	<0.0005	<0.0005	<0.0005	<0.00019	<0.00019	<0.005	<0.002	<0.000308	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.0005	<0.0005	<0.00062	<0.00062	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Petroleum Hydrocarbons																														
Diesel Range Organics (DRO C ₁₀ -C ₂₅)	1.5	0.061	0.042	<0.86	<0.75	0.029	<0.7	-	-	5.15	3.25	3.49	3.83	3.67	-	4.48	4.73	7.81	<0.095	<0.39	0.065	0.057	<0.76	<0.77	<0.77	0.025	<0.7			
Gasoline Range Organics (GRO C ₇ -C ₁₆)	2.2	<0.015	<0.015	<0.1	<0.1	<0.1	<0.1	-	-	5.34	2.06	4.07	0.52	0.533	-	0.469	-	0.146	<0.08	<0.08	<0.022	<0.015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Residual Range Organics (RRO C ₂₅ -C ₃₆)	1.1	0.039	0.056	<0.54	<0.47	0.04	<0.44	-	-	-	-	-	<0.545	<0.429	-	<0.5	<0.5	<0.5	<0.47	<0.39	<0.061	<0.032	<0.47	<0.48	<0.48	0.035	<0.44	<0.44		
Volatile Organic Compounds (VOCs)																														
1,1-Dichloroethane	0.028	<0.00044	<0.00044	<0.0005	<0.0005	<0.0005	<0.0005	<0.00025	<0.00025	<0.005	<0.002	<0.000428	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.005	<0.0005	<0.00044	<0.00044	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
1,1-Dichloroethene	0.28	<0.00033	<0.00033	<0.0005	<0.0005	<0.0005	<0.0005	<0.00010	<0.00010	<0.005	<0.002	<0.000302	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.005	<0.0005	<0.00033	<0.00033	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
cis-1,2-Dichloroethene	0.036	0.00027	0.00028	<0.0005	<0.0005	<0.0005	<0.0005	<0.00055	<0.00055	0.00655	0.0137	0.0073	0.00536	0.00524	0.00565	0.00454	-	0.00430	0.0015	0.0027	0.0048	0.0041	0.0028	0.0028	0.0028	0.0021	0.0017	0.0021	0.0021	
trans-1,2-Dichloroethene	0.36	<0.00024	<0.00024	<0.0005	<0.0005	<0.0005	<0.0005	<0.00089	<0.00089	<0.005	<0.001	<0.000388	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.005	<0.0005	<0.00024	<0.00024	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
1,4-Dioxane	0.046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (Ethylene Dibromide)	0.000075	-	-	<0.002	<0.002	<0.002	<0.002	<0.00025	<0.00025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Methylnaphthalene	0.11	-	-	-	-	-	-	<0.00048	<0.00048	-	-	-	-	-	-	-	-	-	-	-	<0.000057	-	-	-	-	-	-	-	-	
2-Methylnaphthalene	0.036	-	-	<0.000022	<0.000022	<0.000041	<0.00004	0.000062	<0.000041	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 & 4 Methylphenol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00038	<0.00038	0.0000077	<0.000019	<0.000021	<0.000022	-	<0.000045	<0.00004	
Methylene Chloride	0.11	<0.0013	<0.0013	-	-	-	<0.002	<0.0017	<0.00074	<0.025	<0.01	<0.004	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.0013	<0.0013	-	-	-	-	-	<0.002	<0.002	
Pentachlorophenol (PCP)	0.0041	-	-	-	-	-	-	0.00005	<0.00019	-	-	-	-	-	-	-	-	-	-	-	<0.00096	<0.00096	-	-	-	-	-	-	-	-
Tetrachloroethene (PCE)	0.041	0.0017	0.0019	0.0013	0.0014	0.00071	0.0028	0.00054	0.00071	<0.005	<0.002	<0.00054	<0.001	<0.001	<0.001	<0.001	-	<0.001	0.000	0.000	<0.00075	<0.00075	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,1,1-Trichloroethane	8	<0.00058	<0.00058	<0.0005	<0.0005	<0.0005	<0.0005	<0.00025	<0.00025	<0.005	<0.002	<0.0002	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.0005	<0.0005	<0.00058	<0.00058	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Trichloroethene (TCE)	0.0028	<0.00051	<0.00051	<0.0005	<0.0005	<0.0005	<0.0005	0.000099	0.00016	<0.005	0.0028	<0.000718	0.0012	0.0011	<0.001	0.0014	-	0.0012	<0.0005	<0.0005	0.0034	0.0053	0.0070	0.0038	0.0040	0.0049	0.0032	0.0045	0.0045	
Vinyl chloride (Chloroethane)	0.00019	<0.00022	<0.00022	<0.0005	<0.0005	<0.0005	<0.0005	<0.00013	<0.00013	0.0052	0.00778	0.00392	0.00229	0.00217	0.00252	0.00126	-	<0.001	<0.0005	<0.0005	<0.00022	<0.00022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Polycyclic Aromatic Hydrocarbons (PAHs)																														
Acenaphthene	0.53	<0.000062	<0.000062	<0.000022	<0.000022	<0.000041	<0.00004	<0.000060	<0.000015	-	-	-	-	-	-	-	-	-	-	<0.0038	<0.0038	<0.000057	<0.000061	<0.000021	<0.000022	<0.000022	<0.000022	<0.000045	<0.00004	
Acenaphthylene	0.26	<0.000031	<0.000031	<0.000022	<0.000022	<0.000041	<0.00004	0.000005	<0.000095	-	-	-	-	-	-	-	-	-	-	<0.0038	<0.0038	<0.000057	<0.000061	<0.000021	<0.000022	<0.000022	<0.000022	<0.000045	<0.00004	
Anthracene	0.043	<0.000021	<0.000021	<0.000022	<0.000022	<0.000041	<0.00004	0.000014	<0.000025	-	-	-	-	-	-	-	-	-	-	<0.0038	<0.0038	<0.000057	<0.000061	<0.000021	<0.000022	<0.000022	<0.000022	<0.000045	<0.00004	
Benzo[a]anthracene	0.0003	<0.000062	<0.000062	<0.000022	<0.000022	<0.000041	<0.00004	0.000014	<0.000025	-	-	-	-	-	-	-	-	-	-	<0.0038	<0.0038	<0.000057	<0.000061	<0.000021	<0.000022	<0.000022	<0.000022	<0.000045	<0.00004	
Benzo[b]fluoranthene	0.0025	<0.000062	<0.000062	<0.000022	<0.000022	0.000021	<0.00004	0.000053	<0.000025	-	-	-	-	-	-	-	-	-	-	<0.0038	<0.0038	<0.000057								

TABLE 2A
Historical Groundwater Analytical Results
Hydrocarbons, Volatile Organic Compounds and Metals
Maintenance Yard Shops, Skagway, AK
White Pass and Yukon Route

Table with columns for Location, Lab ID, Date, and various monitoring wells (MW13-1D, MW13-7, etc.). Rows include categories like BTEXS, Petroleum Hydrocarbons, Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), and Metals. Each row contains numerical values representing concentrations or detection limits.

Notes:
All concentrations are in milligrams per litre (mg/L); SCN = sample control number
QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/field duplicate
Italics indicate method detection limit was greater than the applicable ADEC Clean-up Level.
1. Alaska Department of Environmental Conservation (ADEC), Table C of "18 AAC 75, Articles 3 and 9, Oil and Other Hazardous Substances Pollution Control", regulations revised as of 5 February 2023.
2. Method reporting limit raised for this sample due to dilution of the sample by the lab prior to analysis.
3. BTEX results reported from analytical method AK101. When BTEX results were also reported from analytical method SW8260D, results are comparable and below standards.
* Sample result for RRO during the October 2007 monitoring event is suspected to be result of cross-contamination that occurred during analysis.
Sample collected using bladder pump during the September 2013 monitoring event.
***Surrogate compounds failed low or were inadvertently omitted during the extraction process for DRO analysis at MW97-7R S and 98-2 in Sept. 2014 and re-extraction was performed outside of the method defined holding-time.
The greater of the two results has been reported.
Concentration Exceeds ADEC Groundwater Cleanup Level (updated 2023)
Results reported greater than the MDL but less than reporting limit and are an estimate

TABLE 2B
Historical Groundwater Analytical Results
Semivolatile Organic Compounds
Maintenance Yard Shops, Skagway, AK
White Pass and Yukon Route

Table with columns: Location, Lab ID, SCN, Date, QA/QC, ADEC Groundwater Cleanup Level (2023)¹, and 15 monitoring wells (MW97-5R, MW97-5R, MW97-5R, MW97-7R S, MW97-7R S, MW97-7R S, MW97-7R S, MW97-5R, MW97-5R, MW00-33R, MW00-33R, MW00-33R, MW00-33R, MW00-33R). Rows list various Semivolatile Organic Compounds such as Acetone, n-Butylbenzene, sec-Butylbenzene, etc., with their respective concentrations and detection limits.

Notes:
All concentrations are in milligrams per litre (mg/L); SCN = sample control number
QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/ field duplicate
Italics indicate method detection limit was greater than the applicable ADEC Clean-up Level.
1. Alaska Department of Environmental Conservation (ADEC), Table C of "18 AAC 75, Articles 3 and 9, Oil and Other Hazardous Substances Pollution Control", regulations revised as of 5 February 2023.
** Sample collected using bladder pump during the September 2013 monitoring event.
Concentration Exceeds ADEC Groundwater Cleanup Level (updated to 5 February 2023) XX
Results reported greater than the MDL but less than reporting limit and are an estimate XX

TABLE 3
Groundwater Analytical Results
Contaminants of Concern and Field Parameters, November 2022
Maintenance Yard Shops, Skagway, AK
White Pass and Yukon Route

Location		MW97-5R		MW97-3	MW13-7	MW00-33R
Lab ID	ADEC Groundwater Cleanup Level (2023)¹	1226736003	1226736004	1226736005	1226736001	1226736002
SCN		10241-03	10241-04	10241-05	10241-01	10241-02
Date		02-Nov-22	02-Nov-22	02-Nov-22	02-Nov-22	02-Nov-22
QA/QC		FDA	FD			
Field Parameters						
Temperaure (°F)		49.8	49.8	48.7	45.1	44.8
pH		6.28	6.28	6.45	6.48	6.61
Specific Conductivity (µS/cm)		267.4	267.4	288	321.3	366.8
Oxidation Reduction Potential (mV)		114.2	114.2	132.1	164.8	67.4
Dissolved Oxygen (mg/L)		1.07	1.07	1.31	2.98	4.58
BTEXS						
Benzene	0.0046	0.00202	0.00223	<0.00025	-	-
Ethylbenzene	0.015	0.00092	0.00098	<0.0005	-	-
Toluene	1.1	<0.0005	<0.0005	<0.0005	-	-
Xylenes (total)	0.19	0.0315	0.0317	<0.0015	-	-
Styrene	1.2	0.00074	<0.0005	<0.0005	<0.0005	<0.0005
Petroleum Hydrocarbons						
Diesel Range Organics (DRO C ₁₀ -C ₂₅)	1.5	2.91	3.25	6.07	-	-
Gasoline Range Organics (GRO C ₆ -C ₁₀)	2.2	0.119	0.121	< 0.0500	-	-
Residual Range Organics (RRO C ₂₅ -C ₃₆)	1.1	0.849	0.886	2.72	-	-
Volatile Organic Compounds (VOCs)						
1,1-Dichloroethane	0.028	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,1-Dichloroethene	0.28	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
cis-1,2-Dichloroethene	0.036	0.00339	0.00297	<0.0005	0.00038	<0.0005
trans-1,2-Dichloroethene	0.36	0.00038	0.00035	<0.0005	<0.0005	<0.0005
1,2-Dibromoethane (Ethylene Dibromide)	0.000075	<0.0000375	<0.0000375	<0.0000375	<0.0000375	<0.0000375
1-Methylnaphthalene	0.011	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
2-Methylnaphthalene	0.036	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Methylene Chloride	0.11	<0.005	<0.005	<0.005	<0.005	<0.005
Pentachlorophenol (PCP)	0.00041	-	-	-	-	-
Tetrachloroethene (PCE)	0.041	0.00148	0.00146	0.0197	0.00105	0.00083
1,1,1-Trichloroethane	8	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Trichloroethene (TCE)	0.0028	0.00066	0.00060	<0.0005	0.00122	<0.0005
Vinyl chloride (Chloroethane)	0.00019	<0.000075	<0.000075	<0.000075	<0.000075	<0.000075
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	0.53	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Acenaphthylene	0.26	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Anthracene	0.043	<0.0000261	<0.0000266	<0.0000266	0.0000196	0.0000162
Benzo[a]anthracene	0.0003	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Benzo[b]fluoranthene	0.0025	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Benzo[k]fluoranthene	0.0008	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Benzo[a]pyrene	0.00025	<0.0000104	<0.0000107	<0.0000107	<0.0000102	<0.0000102
Benzo[g,h,i]perylene	0.00026	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Dibenz(a,h)anthracene	0.00025	<0.0000104	<0.0000107	<0.0000107	<0.0000102	<0.0000102
Indeno[1,2,3-cd]pyrene	0.00019	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Chrysene	0.002	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Fluorene	0.29	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Fluoranthene	0.26	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255
Naphthalene	0.0017	<0.000052	<0.000053	<0.000053	<0.000051	<0.000051
Phenanthrene	0.17	<0.000052	<0.000053	<0.000053	<0.000051	<0.000051
Pyrene	0.12	<0.0000261	<0.0000266	<0.0000266	<0.0000255	<0.0000255

Notes:

All concentrations are in milligrams per litre (mg/L)
 * indicates parameter with detectable concentrations in field and/or trip blanks.

- : Not analysed

QA/QC = quality assurance/quality control; FDA/FD = field duplicate available/
 field duplicate

Italics indicate method detection limit was greater than the applicable ADEC
 Clean-up Level.

1. Alaska Department of Environmental Conservation (ADEC), Table C of "18
 AAC 75, Articles 3 and 9, Oil and Other Hazardous Substances Pollution
 Control", regulations revised as of 5 February 2023.

Concentration Exceeds ADEC Groundwater Cleanup Level (updated 5 February 2023)	XX
Results reported greater than the MDL but less than reporting limit and are an estimate	XX

TABLE 4
QA/QC Results for Groundwater Analysis
Hydrocarbons and Volatile Organic Compounds
Maintenance Yard Shops, Skagway, AK
White Pass and Yukon Route

Location		MW97-5R	MW DUP A			
Lab ID		1226736003	1226736004			
Date		2-Nov-22	2-Nov-22			
QA/QC	Method Detection Limit ¹	FDA	FD	Mean	Relative Percent Difference	Difference Factor
BTEXS						
Benzene	0.00025	0.00202	0.00223	0.00213	9.9	NC
Ethylbenzene	0.0005	0.00092	0.00098	0.00095	NC	0.12
Toluene	0.0005	<0.0005	<0.0005	NC	NC	NC
Xylenes (total)	0.0015	0.0315	0.0317	0.03160	0.6	NC
Styrene	0.0005	0.00074	<0.0005	NC	NC	NC
Petroleum Hydrocarbons						
Diesel Range Organics (DRO C ₁₀ -C ₂₅)	0.2	2.91	3.25	3.1	11.0	NC
Gasoline Range Organics (GRO C ₆ -C ₁₀)	0.05	0.119	0.121	0.12000	NC	0.0400
Residual Range Organics (RRO C ₂₅ -C ₃₆)	0.2	0.849	0.886	0.9	NC	0.19
Volatile Organic Compounds (VOCs)						
1,1-Dichloroethane	0.0005	<0.0005	<0.0005	NC	NC	NC
1,1-Dichloroethene	0.0005	<0.0005	<0.0005	NC	NC	NC
cis-1,2-Dichloroethene	0.00038	0.00339	0.00297	0.00318	13.2	NC
trans-1,2-Dichloroethene	0.0005	0.00038	0.00035	0.00037	NC	0.06
1,2-Dibromoethane (Ethylene Dibromide)	0.0000375	<0.0000375	<0.0000375	NC	NC	NC
1-Methylnaphthalene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
2-Methylnaphthalene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Methylene Chloride	0.005	<0.005	<0.005	NC	NC	NC
Tetrachloroethene (PCE)	0.0005	0.00148	0.00146	0.00147	NC	0.04
1,1,1-Trichloroethane	0.0005	<0.0005	<0.0005	NC	NC	NC
Trichloroethene (TCE)	0.0005	0.00066	0.00060	0.00063	NC	0.12
Vinyl chloride (Chloroethane)	0.0005	<0.000075	<0.000075	NC	NC	NC
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Acenaphthylene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Anthracene	0.0000261	<0.0000261	<0.0000266	NC	NC	NC
Benzo[a]anthracene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Benzo[b]fluoranthene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Benzo[k]fluoranthene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Benzo[a]pyrene	0.0000102	<0.0000104	<0.0000107	NC	NC	NC
Benzo[g,h,i]perylene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Dibenz(a,h)anthracene	0.00001020	<0.0000104	<0.0000107	NC	NC	NC
Indeno[1,2,3-cd]pyrene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Chrysene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Fluorene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Fluoranthene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC
Naphthalene	0.000051	<0.000052	<0.000053	NC	NC	NC
Phenanthrene	0.0000510	<0.000052	<0.000053	NC	NC	NC
Pyrene	0.0000255	<0.0000261	<0.0000266	NC	NC	NC

Notes:

All concentrations are in milligrams per litre (mg/L.)
 QA/QC = quality assurance/quality control
 FDA = field duplicate available; FD = field duplicate
 1. Detection limits provided are for typical samples and may not reflect the detection limit obtained by the lab due to interference or sample dilution
 Method Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
 Mean indicates the mean or average value calculated of a field duplicate pair.
 five times the method detection limit; ADEC's recommended QA/QC target is less than 30%.
 Difference Factor (DF) is calculated when the mean value is within five times the method detection limit; WSP's internal QA/QC target is less than 2.
 NC = not calculated
 - = not analyzed
 Results reported greater than the MDL but less than reporting limit and are an estimate

XX

TABLE 5
Results for Field Blank and Field Duplicate Samples
Hydrocarbons and Volatile Organic Compounds
Maintenance Yard Shops, Skagway, AK
White Pass and Yukon Route

Location			Field Blank	Trip Blank
Lab ID	ADEC Groundwater Cleanup	Method	1226736006	1226736007
Date	Level (2018)¹	Detection Limit²	02-Nov-22	02-Nov-22
BTEXS				
Benzene	0.0046	0.00025	<0.00025	<0.00025
Ethylbenzene	0.015	0.0005	<0.0005	<0.0005
Toluene	1.1	0.0005	<0.0005	<0.0005
Xylenes (total)	0.19	0.0015	<0.0015	<0.0015
Styrene	1.2	0.0005	<0.0005	<0.0005
Petroleum Hydrocarbons				
Diesel Range Organics (DRO C ₁₀ -C ₂₅)	1.5	0.2	-	-
Gasoline Range Organics (GRO C ₆ -C ₁₀)	2.2	0.05	< 0.0500	< 0.0500
Residual Range Organics (RRO C ₂₅ -C ₃₆)	1.1	0.2	-	-
Volatile Organic Compounds (VOCs)				
1,1-Dichloroethane	0.028	0.0005	<0.0005	<0.0005
1,1-Dichloroethene	0.28	0.0005	<0.0005	<0.0005
cis-1,2-Dichloroethene	0.036	0.00038	<0.0005	<0.0005
trans-1,2-Dichloroethene	0.36	0.0005	<0.0005	<0.0005
1,2-Dibromoethane (Ethylene Dibromide)	0.000075	0.0000375	<0.0000375	<0.0000375
1-Methylnaphthalene	0.011	0.000255	-	-
2-Methylnaphthalene	0.036	0.000255	-	-
Methylene Chloride	0.11	0.005	<0.005	<0.005
Pentachlorophenol (PCP)	0.00041	-	-	-
Tetrachloroethene (PCE)	0.041	0.000500	<0.0005	<0.0005
1,1,1-Trichloroethane	8	0.000500	<0.0005	<0.0005
Trichloroethene (TCE)	0.028	0.000500	<0.0005	<0.0005
Vinyl chloride (Chloroethane)	0.00019	0.000500	<0.000075	<0.000075
Polycyclic Aromatic Hydrocarbons (PAHs)				
Acenaphthene	0.53	0.0000255	-	-
Acenaphthylene	0.26	0.0000255	-	-
Anthracene	0.043	0.0000261	-	-
Benzo[a]anthracene	0.0003	0.0000255	-	-
Benzo[b]fluoranthene	0.0025	0.0000255	-	-
Benzo[k]fluoranthene	0.0008	0.0000255	-	-
Benzo[a]pyrene	0.00025	0.0000102	-	-
Benzo[g,h,i]perylene	0.00026	0.0000255	-	-
Dibenz(a,h)anthracene	0.00025	0.0000102	-	-
Indeno[1,2,3-cd]pyrene	0.00019	0.0000255	-	-
Chrysene	0.002	0.0000255	-	-
Fluorene	0.29	0.0000255	-	-
Fluoranthene	0.26	0.0000255	-	-
Naphthalene	0.0017	0.0000510	-	-
Phenanthrene	0.17	0.000051	-	-
Pyrene	0.12	0.0000255	-	-

Notes:

All concentrations are in milligrams per litre (mg/L.)

QA/QC = quality assurance/quality control

1. Alaska Department of Environmental Conservation (ADEC), Table C of "18 AAC 75, Articles 3 and 9, Oil and Other Hazardous Substances Pollution Control", regulations revised as of 5 February 2023

2. Method Detection limits provided are for typical samples and may not reflect the detection limit obtained by the lab due to interference or sample dilution for a specific sample

- = not analyzed

BOLD font indicates the parameter analysed is above the Method Detection Limit.

Results reported greater than the MDL but less than reporting limit and are an

XX

TABLE 5
Results for Field Blank and Field Duplicate Samples
Hydrocarbons and Volatile Organic Compounds
Maintenance Yard Shops, Skagway, AK
White Pass and Yukon Route

Location			Field Blank	Trip Blank
Lab ID	ADEC Groundwater Cleanup	Method	1226736006	1226736007
Date	Level (2018)¹	Detection Limit²	02-Nov-22	02-Nov-22
Semi Volatile Organic Compounds (SVOCs)				
Acetone	14	-	-	-
n-Butylbenzene	1	0.0005	<0.0005	<0.0005
sec-Butylbenzene	2	0.0005	<0.0005	<0.0005
tert-Butylbenzene	0.69	0.0005	<0.0005	<0.0005
Bromobenzene	0.062	0.0005	<0.0005	<0.0005
Bromochloromethane		0.0005	<0.0005	<0.0005
Bromodichloromethane	0.0013	0.00025	<0.00025	<0.00025
Bromoform	0.033	0.0005	<0.0005	<0.0005
Carbon disulfide	0.81	0.005	<0.005	<0.005
Carbon tetrachloride	0.0046	0.0005	<0.0005	<0.0005
Chlorobenzene	0.078	0.00025	<0.00025	<0.00025
Chloroethane		0.0005	<0.0005	<0.0005
Chloroform	0.0022	0.0005	<0.0005	<0.0005
Methyl bromide (Bromomethane)	0.0075	0.003	<0.0005	<0.0005
Methyl ethyl ketone (MEK)	5.6	0.005	<0.0005	<0.0005
Methyl chloride (Chloromethane)	0.19	0.0005	<0.0005	<0.0005
2-Chlorotoluene		0.0005	<0.0005	<0.0005
4-Chlorotoluene		0.0005	<0.0005	<0.0005
1,2-Dibromo-3-Chloropropane (DBCP)		0.005	<0.005	<0.005
Chlorodibromomethane (Dibromochloromethane)	0.0087	0.00025	<0.00025	<0.00025
Dibromomethane	0.0083	0.0005	<0.0005	<0.0005
1,2-Dichloroethane	0.0017	0.00025	<0.00025	<0.00025
1,2-Dichlorobenzene	0.3	0.0005	<0.0005	<0.0005
1,3-Dichlorobenzene	0.3	0.0005	<0.0005	<0.0005
1,4-Dichlorobenzene	0.0048	0.00025	<0.00025	<0.00025
Dichlorodifluoromethane	0.2	0.0005	<0.0005	<0.0005
1,2-Dichloropropane	0.0082	0.0005	<0.0005	<0.0005
cis-1,3-Dichloropropene		0.00025	<0.00025	<0.00025
trans-1,3-Dichloropropene		0.0005	<0.0005	<0.0005
2,2-Dichloropropane		0.0005	<0.0005	<0.0005
1,1-Dichloropropene		0.0005	<0.0005	<0.0005
Hexachlorobutadiene	0.0014	0.0005	<0.0005	<0.0005
2-Hexanone	0.038	0.005	<0.005	<0.005
Isopropylbenzene (Cumene)	0.45	0.0005	<0.0005	<0.0005
Methyl isobutyl ketone (MIBK)	6.3	0.005	<0.0005	<0.0005
Methyl tert-butyl ether (MTBE)	0.14	-	-	-
n-Propylbenzene	0.66	0.0005	<0.0005	<0.0005
1,1,1,2-Tetrachloroethane	0.0057	0.00025	<0.00025	<0.00025
1,1,2,2-Tetrachloroethane	0.00076	0.00025	<0.00025	<0.00025
1,2,3-Trichlorobenzene	0.007	0.0005	<0.0005	<0.0005
1,2,4-Trichlorobenzene	0.004	0.0005	<0.0005	<0.0005
1,1,2-Trichloroethane	0.00041	0.0002	<0.0002	<0.0002
Trichlorofluoromethane (Freon-11)	5.2	-	-	-
1,2,3-Trichloropropane	0.0000075	0.0005	<0.0005	<0.0005
1,2,4-Trimethylbenzene	0.056	0.0005	<0.0005	<0.0005
1,3,5-Trimethylbenzene	0.06	0.0005	<0.0005	<0.0005
1,3-Dichloropropane		0.00025	<0.00025	<0.00025
4-Isopropyltoluene		0.0005	<0.0005	<0.0005

Notes:

All concentrations are in milligrams per litre (mg/L.)

QA/QC = quality assurance/quality control

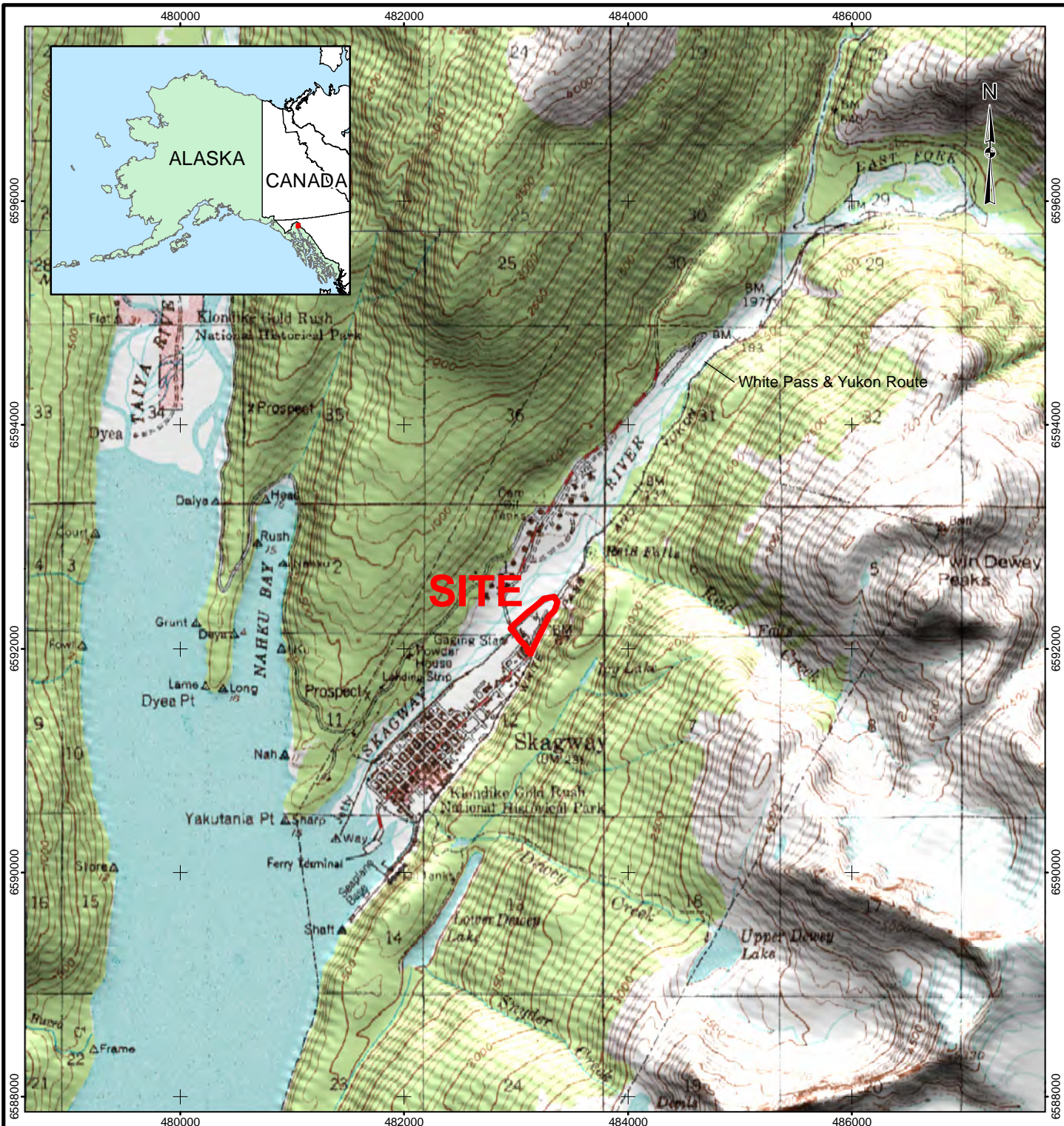
1. Alaska Department of Environmental Conservation (ADEC), Table C of "18 AAC 75, Articles 3 and 9, Oil and Other Hazardous Substances Pollution Control", regulations revised as of 5 February 2023

2. Method Detection limits provided are for typical samples and may not reflect the detection limit obtained by the lab due to interference or sample dilution for a specific sample
 - = not analyzed

BOLD font indicates the parameter analysed is above the Method Detection Limit.

Results reported greater than the MDL but less than reporting limit and are an estimate

XX



LEGEND

 PROJECT SITE



REFERENCE

TOPOGRAPHY OBTAINED FROM THE STATEWIDE DIGITAL MAPPING INITIATIVE IN THE STATE OF ALASKA.
 INSET DATA OBTAINED FROM E.S.R.I.
 DATUM: NAD83 PROJECTION: UTM ZONE 8

PROJECT WHITE PASS & YUKON ROUTE SHOPS
 RESULTS OF THE 2022 GROUNDWATER MONITORING PROGRAM, ADEC
 FILE NUMBER 1526.38.005. WHITE PASS & YUKON ROUTE, RAILROAD
 MAINTENANCE YARD, SKAGWAY ALASKA.

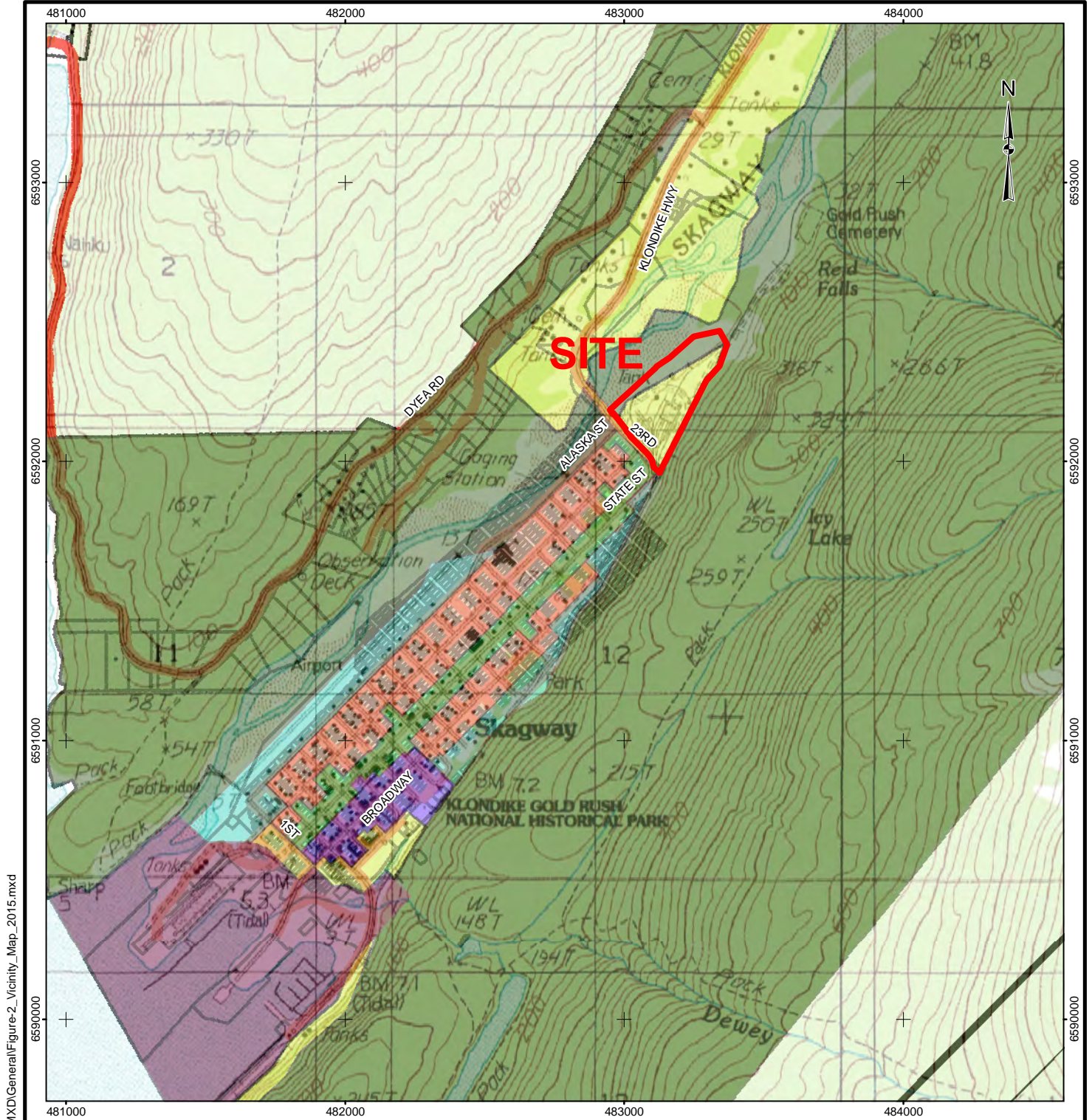
TITLE

SITE LOCATION MAP



PROJECT 22522552			FILE No	
DESIGN	EH	2023-04-13	SCALE	AS SHOWN
GIS	RTJ	2023-04-13	FIGURE	
CHECK	EH	2023-04-13	FIGURE 1	
REVIEW	TR	2023-04-13		

N:\Bur_Graphics\Projects\1996\1412\96-1412-853B\GIS\Mapping\MXD\General\Figure-1_Site_Location_2015.mxd



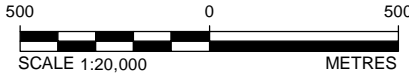
N:\Bur_Graphics\Projects\1996\1412\96-1412-853B\GIS\Mapping\MXD\General\Figure-2_Vicinity_Map_2015.mxd

LEGEND

- ▭ PROJECT SITE
- ▭ BUSINESS - SKAGWAY HISTORIC DISTRICT
- ▭ INDUSTRIAL - LIGHT DISTRICT
- ▭ INDUSTRIAL DISTRICT
- ▭ RESIDENTIAL - CONSERVATION DISTRICT
- ▭ RESIDENTIAL - GENERAL DISTRICT
- ▭ WATERFRONT DISTRICT
- ROAD
- CADASTRAL OUTLINE

REFERENCE

DATA OBTAINED FROM THE MUNICIPALITY OF SKAGWAY
 TOPOGRAPHY OBTAINED FROM THE STATEWIDE DIGITAL MAPPING INITIATIVE
 IN THE STATE OF ALASKA.
 DATUM: NAD83 PROJECTION: UTM ZONE 8



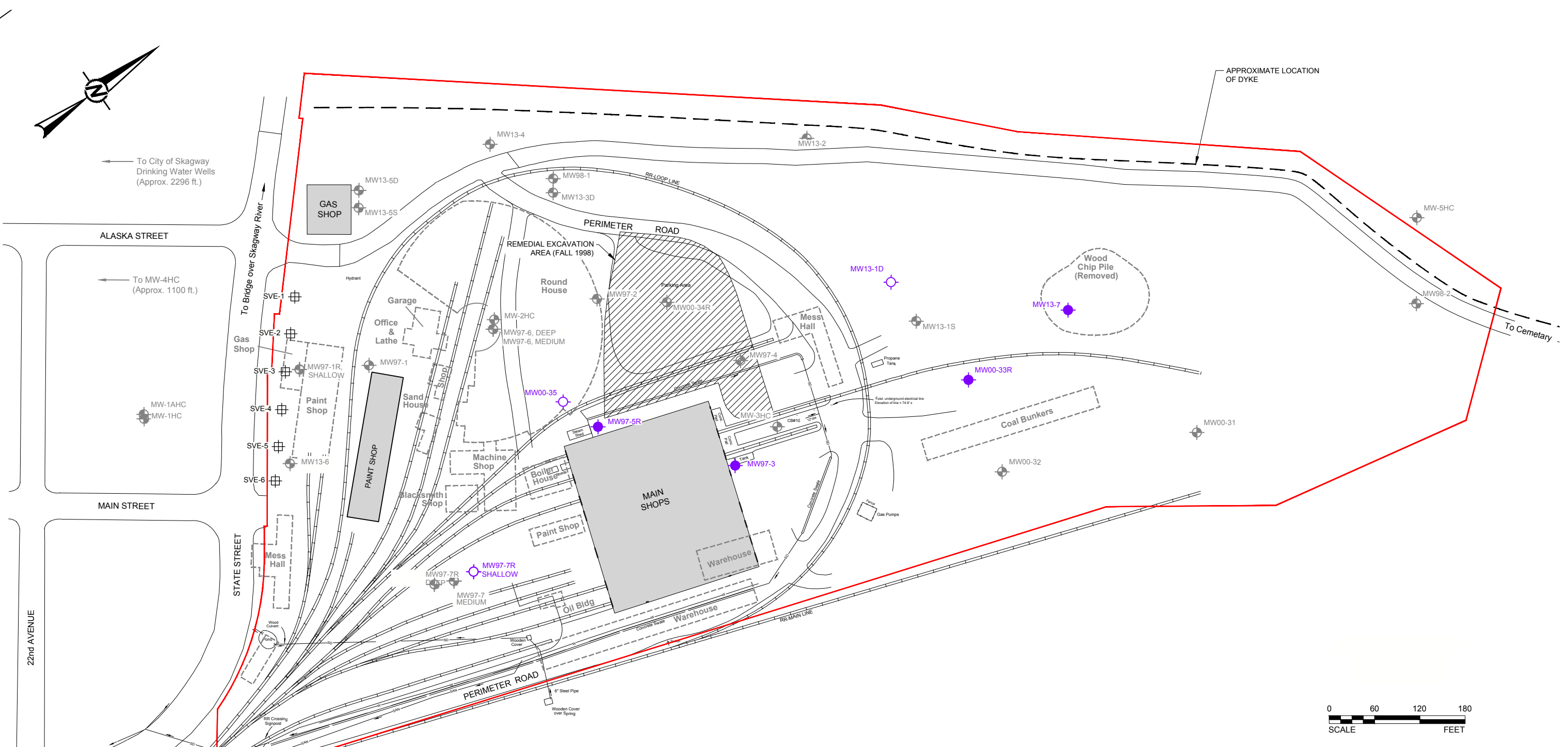
PROJECT WHITE PASS & YUKON ROUTE SHOPS
 RESULTS OF THE 2022 GROUNDWATER MONITORING PROGRAM, ADEC
 FILE NUMBER 1526.38.005. WHITE PASS & YUKON ROUTE, RAILROAD
 MAINTENANCE YARD, SKAGWAY ALASKA.

TITLE

SITE VICINITY MAP

	PROJECT 22522552		FILE No
	DESIGN	KB	2023-04-13
	GIS	RTJ	2023-04-13
	CHECK	EH	2023-04-13
	REVIEW	TR	2023-04-13
			SCALE AS SHOWN
			FIGURE 2

Path: \\polder.gds\gal\kelowna\CAD\GIS\Client\White Pass & Yukon Route\White Pass & Yukon Route Shops, Skagway AK\99_PROJECTS\25225521\1000\NA\2022 Monitoring\02_PRODUCION\DWG | File Name: 25225521_1000_01 - Site Plan and Results.dwg | Last Edited By: njames Date: 2023-04-13 Time: 2:59:15 PM | Printed By: RJJames Date: 2023-04-13 Time: 3:09:14 PM



LEGEND

- PROPERTY LINE
- MONITORING WELL - SAMPLED IN 2022
- MONITORING WELL - NOT SAMPLED IN 2022
- ⊕ MONITORING WELL - NO LONGER INCLUDED IN THE MONITORING PROGRAM
- ⊕ SOIL VAPOUR EXTRACTION WELL LOCATION
- FOOTPRINT OF HISTORICAL FEATURE
- REMEDIAL EXCAVATION (FALL 1998)

NOTES

1. BASEMAP FROM "SITE PLAN WHITE PASS YARD SKAGWAY, ALASKA" BY UNDERHILL GEOMATICS LTD. NOVEMBER, 2000.

CLIENT
WHITE PASS & YUKON ROUTE SHOPS

PROJECT
RESULTS OF THE 2022 GROUNDWATER MONITORING PROGRAM, ADEC FILE NUMBER 1526.38.005. WHITE PASS & YUKON ROUTE, RAILROAD MAINTENANCE YARD, SKAGWAY ALASKA.

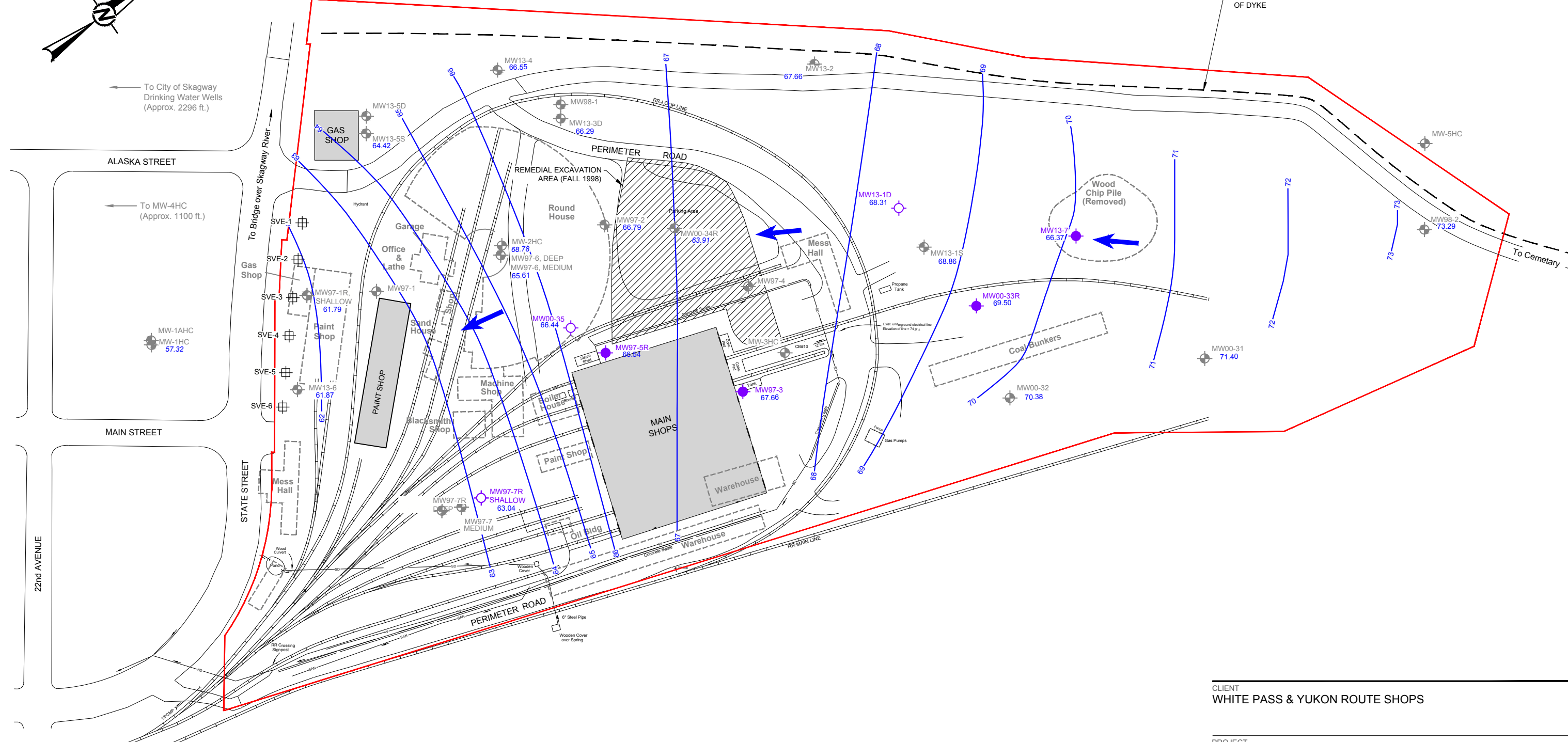
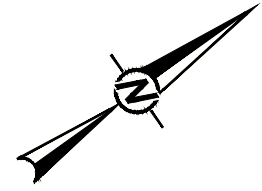
TITLE
SITE PLAN

CONSULTANT	YYYY-MM-DD	2023-04-13
	DESIGNED	EH
	PREPARED	RTJ
	REVIEWED	TR
	APPROVED	TR

PROJECT NO. 22522552	PHASE 1000	REV. 0	FIGURE 3
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

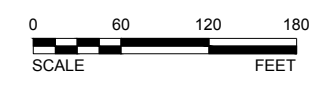
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LEGEND	
	PROPERTY LINE
	MONITORING WELL - SAMPLED IN 2022
	MONITORING WELL - NOT SAMPLED IN 2022
	MONITORING WELL - NO LONGER INCLUDED IN THE MONITORING PROGRAM
	SOIL VAPOUR EXTRACTION WELL LOCATION
	REMEDIAL EXCAVATION (FALL 1998)
	WATER TABLE ELEVATION (FT) JUNE 2018
	WATER TABLE ELEVATION (FT) NOT USED TO INTERPRET GROUNDWATER CONTOURS
	INFERRED GROUNDWATER FLOW DIRECTION
	GROUNDWATER CONTOUR

NOTES

- BASEMAP FROM "SITE PLAN WHITE PASS YARD SKAGWAY, ALASKA" BY UNDERHILL GEOMATICS LTD. NOVEMBER, 2000.



CLIENT
 WHITE PASS & YUKON ROUTE SHOPS

PROJECT
 RESULTS OF THE 2022 GROUNDWATER MONITORING PROGRAM, ADEC FILE NUMBER 1526.38.005. WHITE PASS & YUKON ROUTE, RAILROAD MAINTENANCE YARD, SKAGWAY ALASKA.

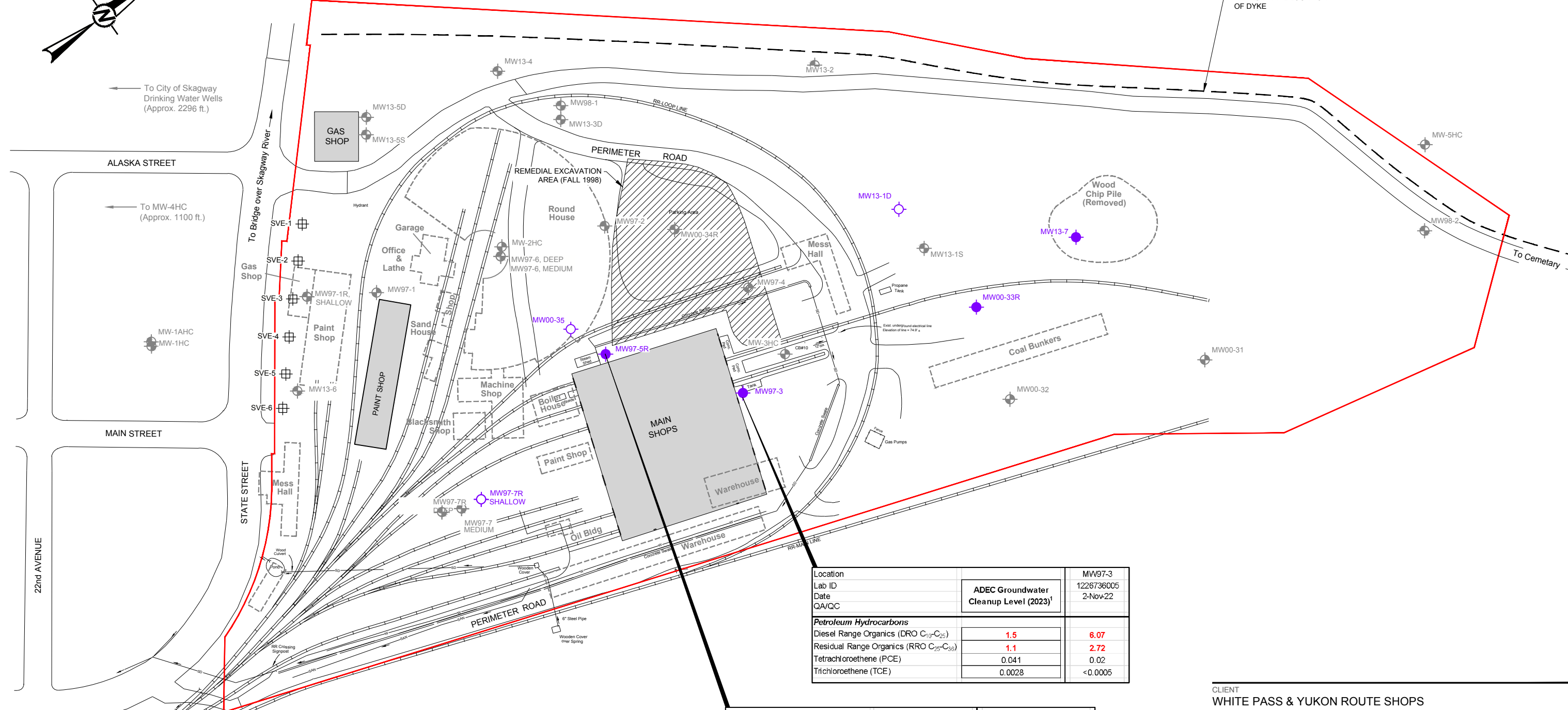
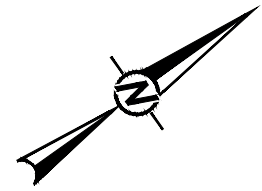
TITLE
WATER TABLE ELEVATIONS AND CONTOURS, JUNE 2018

CONSULTANT	YYYY-MM-DD	DATE
	DESIGNED	2023-04-13
	PREPARED	EH
	REVIEWED	RTJ
	APPROVED	TR
	APPROVED	TR

PROJECT NO. 22522552 PHASE 1000 REV. 0 FIGURE 4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

Path: \\golder\gis\gait\alaska\CAD\GIS\Client\White Pass & Yukon Route\White Pass & Yukon Route Shops, Skagway AK\99\PROJECTS\2522552\1000\NA\2022 Monitoring\02_PRODUCTION\DWG | File Name: 2522552_1000_01 - Site Plan and Results.dwg | Last Edited By: rjames Date: 2023-04-13 Time: 2:59:15 PM | Printed By: rjames Date: 2023-04-13 Time: 3:04:14 PM

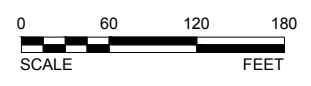


- LEGEND**
- PROPERTY LINE
 - MONITORING WELL - SAMPLED IN 2022
 - MONITORING WELL - NOT SAMPLED IN 2022
 - MONITORING WELL - NO LONGER INCLUDED IN THE MONITORING PROGRAM
 - + SOIL VAPOUR EXTRACTION WELL LOCATION
 - / REMEDIAL EXCAVATION (FALL 1998)

- NOTES**
1. BASEMAP FROM "SITE PLAN WHITE PASS YARD SKAGWAY, ALASKA" BY UNDERHILL GEOMATICS LTD. NOVEMBER, 2000.
 2. ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION (ADEC) GROUNDWATER STANDARDS (TABLE C) REVISED AS OF FEBRUARY 5, 2023 CONCENTRATIONS ABOVE ADEC STANDARD IN RED BOLD TEXT.
 3. RESULTS REPORTED GREATER THAN THE MDL BUT LESS THAN REPORTING LIMIT AND ARE AN ESTIMATE
- ABBREVIATIONS**
- | | |
|--------------------------------------|---|
| SCN | SAMPLE CONTROL NUMBER |
| QA/QC | QUALITY ASSURANCE/QUALITY CONTROL |
| FDA/FD | FIELD DUPLICATE AVAILABLE/FIELD DUPLICATE |
| DRO C ₁₀ -C ₂₅ | DIESEL RANGE ORGANICS |
| RRO C ₂₅ -C ₃₆ | RESIDUAL RANGE ORGANICS |
| PCE | TETRACHLOROETHENE |

Location		MW97-3
Lab ID		1226736005
Date		2-Nov-22
QA/QC		
	ADEC Groundwater Cleanup Level (2023)¹	
Petroleum Hydrocarbons		
Diesel Range Organics (DRO C ₁₀ -C ₂₅)	1.5	6.07
Residual Range Organics (RRO C ₂₅ -C ₃₆)	1.1	2.72
Tetrachloroethene (PCE)	0.041	0.02
Trichloroethene (TCE)	0.0028	<0.0005

Location		MW97-5R	
Lab ID		1226736003	1226736004
Date		2-Nov-22	2-Nov-22
QA/QC		FDA	FD
	ADEC Groundwater Cleanup Level (2023)¹		
Petroleum Hydrocarbons			
Diesel Range Organics (DRO C ₁₀ -C ₂₅)	1.5	2.91	3.25
Residual Range Organics (RRO C ₂₅ -C ₃₆)	1.1	0.849	0.886
Tetrachloroethene (PCE)	0.041	0.00148	0.00146
Trichloroethene (TCE)	0.0028	0.00066 ²	0.00060 ²



CLIENT
WHITE PASS & YUKON ROUTE SHOPS

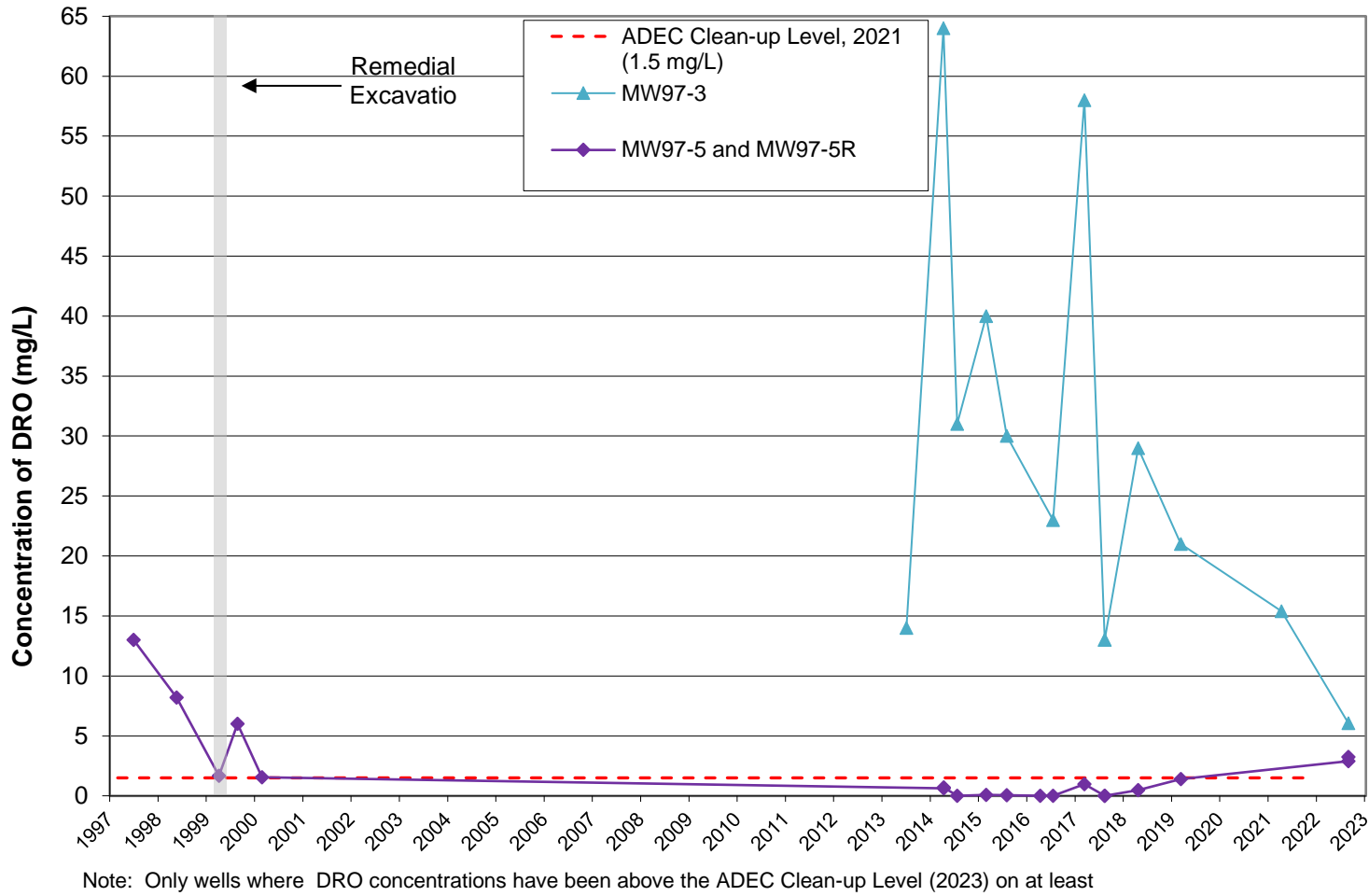
PROJECT
RESULTS OF THE 2022 GROUNDWATER MONITORING PROGRAM, ADEC FILE NUMBER 1526.38.005. WHITE PASS & YUKON ROUTE, RAILROAD MAINTENANCE YARD, SKAGWAY ALASKA.

TITLE
CHEMICAL EXCEEDANCES IN GROUNDWATER, 2022

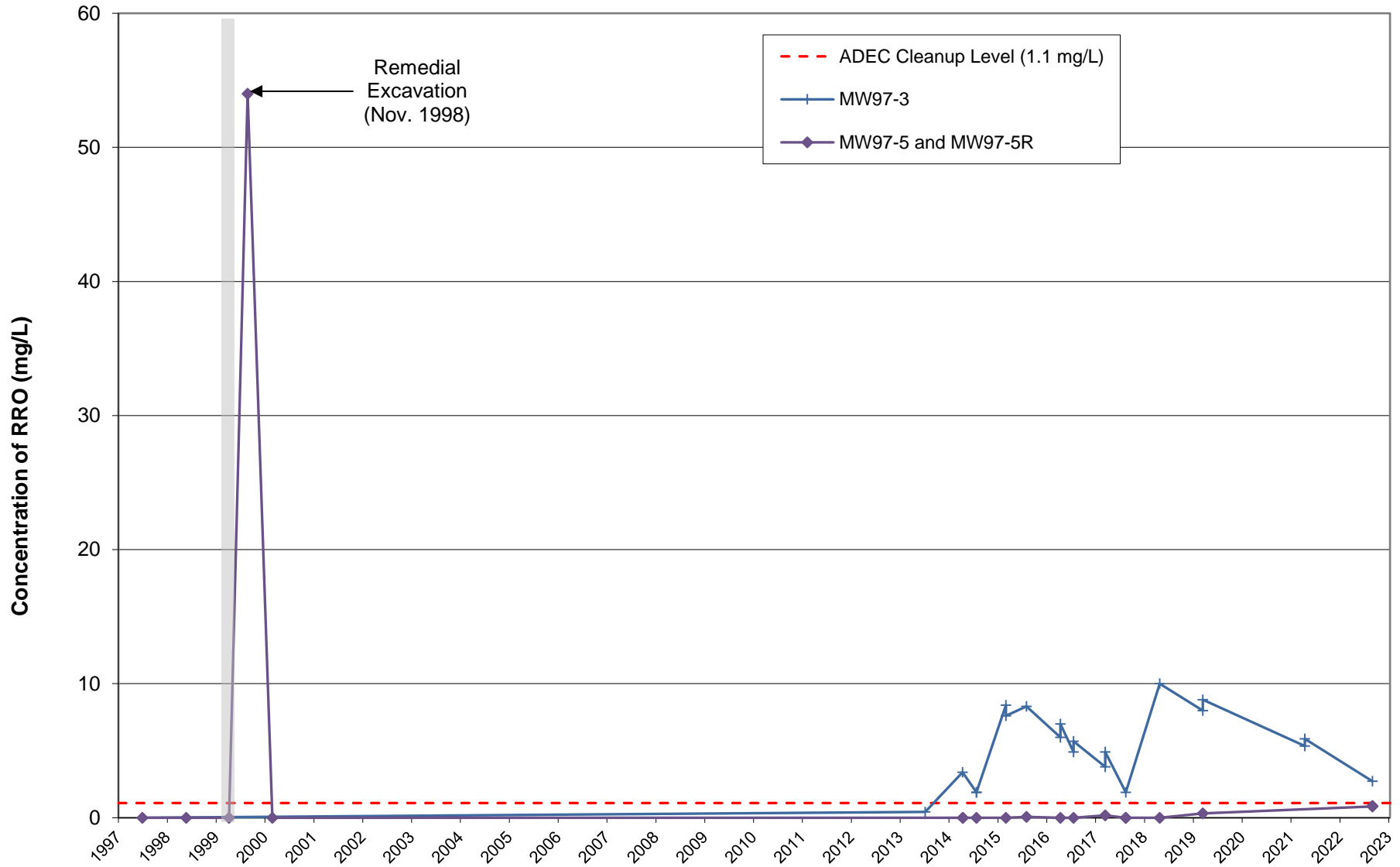
CONSULTANT	YYYY-MM-DD	2023-04-13
	DESIGNED	EH
	PREPARED	RTJ
	REVIEWED	TR
	APPROVED	TR

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

FIGURE 6
Concentration of DRO in Groundwater over Time

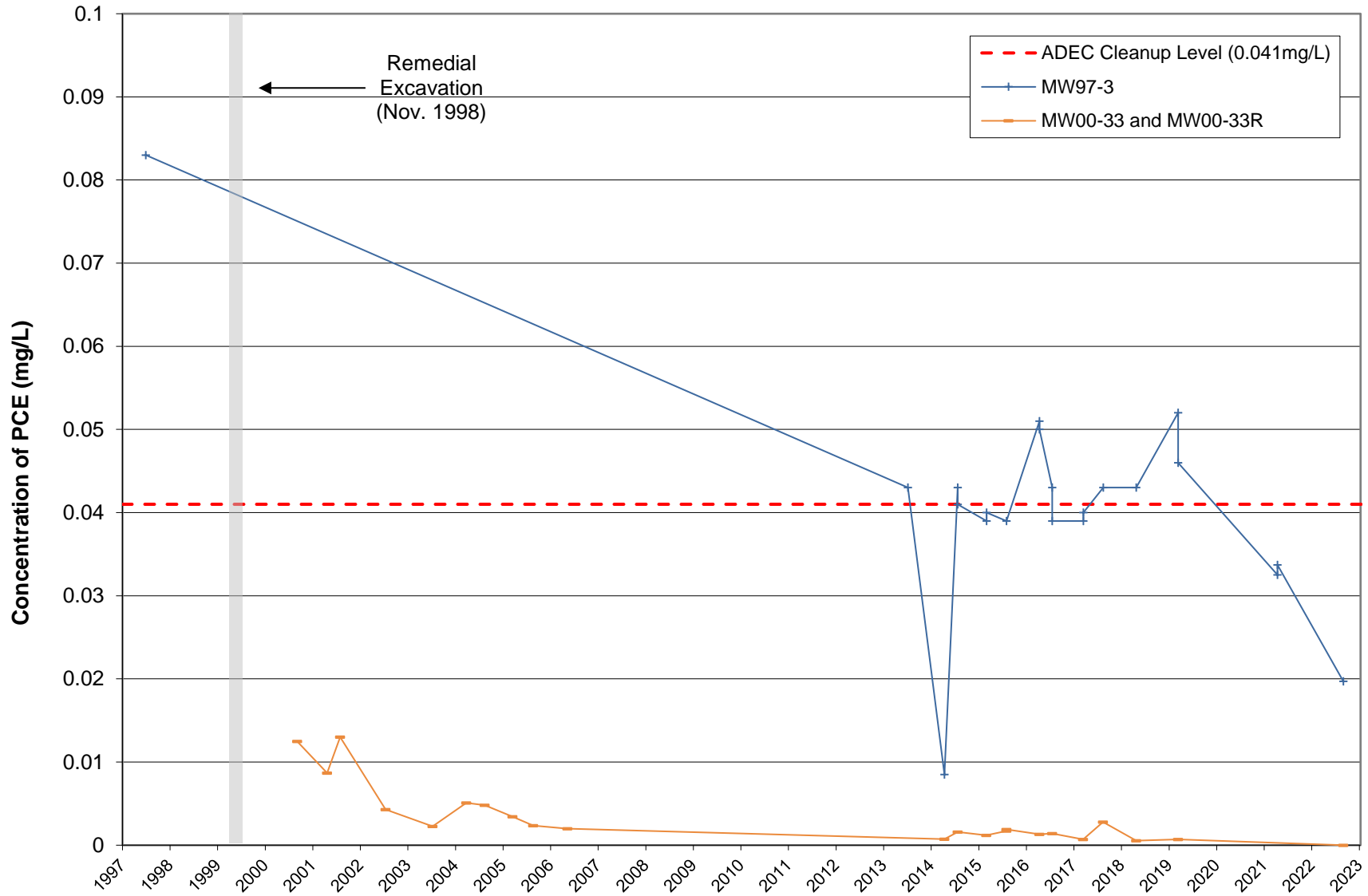


Concentration of RRO in Groundwater over Time (Concentrations greater than 5 mg/L)



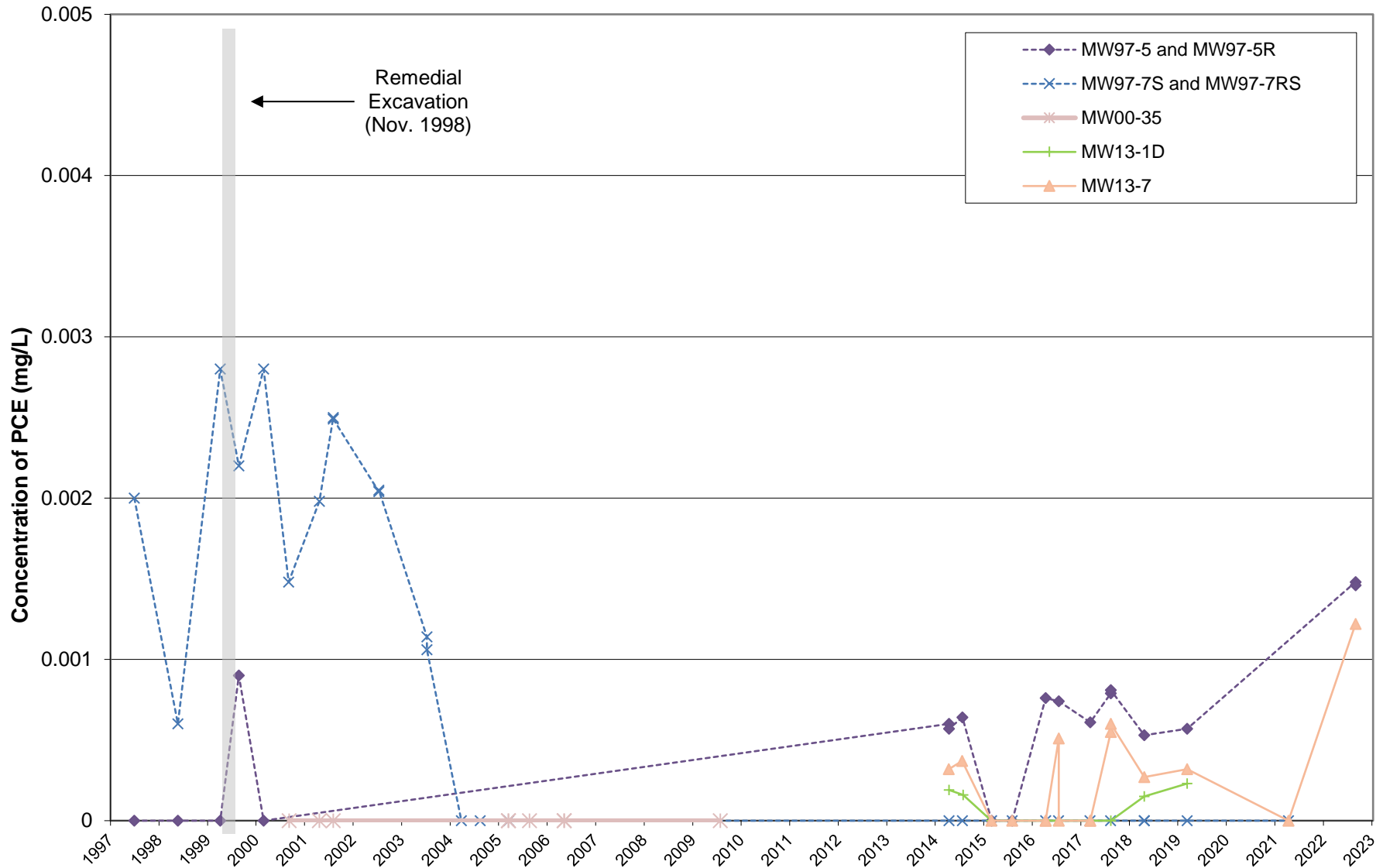
Note: Only wells where RRO concentrations have been greater than 5 mg/L on at least one sampling event are shown. Values below detection limit are shown as 0 mg/L.

Concentration of PCE in Groundwater over Time (Concentrations greater than 0.01 mg/L)



Note: Only wells with PCE concentrations exceeding 0.01 mg/L during at least one sampling event are shown. Values below detection limit are shown as 0 mg/L.

Concentration of PCE in Groundwater over Time (Concentrations less than 0.01 mg/L)



Note: Only wells where PCE concentrations have been detected at least once but have never exceeded 0.01 mg/L are shown. Values below detection limit are shown as 0 mg/L. ADEC Cleanup Level is 0.041 mg/L.

APPENDIX A

Groundwater Sampling Field Forms



GROUNDWATER DEVELOPMENT AND SAMPLING DATA

- Development
- Purging/Sampling

Well No.: MW 97-3

Project Name: WPYR
 Location: Skagway, Alaska
 Weather: cloudy Temperature: 0°C
 GPS Coordinates: _____

Project No.: 22522552
 Date: 02 NOV 2022
 Completed By: EH
 Reviewed By: _____

MONITORING WELL INFORMATION

Time of Measurement: 11:30
 Depth to Product: _____ m Product Thickness: _____ m
 Depth to Water (A): 2.145 m below TOP
 Depth to Bottom of Well (B): 3.80 m below TOP
 Diameter of Standpipe: 51 mm
 Well Condition: okay
 Tidally Influenced: Yes No
 Pressurized: Yes No
 Well Headspace: 9.7 ppm
 One Well Volume:
 (B-A)*2.0 = 3.3 Litres - for a 51 mm (2.0 inch) diameter well
 (B-A)*1.1 = _____ Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump Waterra Hydrolift Bailer (Type: _____) Peristaltic Submersible Bladder
 Multimeter pH/Temp Meter Conductivity Meter Dissolved Oxygen Meter ORP (Redex) Meter Organic Vapour Meter D.O. Ampoule
 Model: YSI Pro Plus _____
 Model: _____
 Model: _____
 Model: _____
 Model: _____
 Model: _____
 Rental Equipment:
 Field Bump pH4 _____ pH7 _____
 pH10 _____
 1413 us/cm _____
 Field Calibration field notebook

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 = 10 litres Start: 11:36 Finish: _____
 Avg. Flow Rate: _____ L/min. Sample intake depth: _____

Time	Volume Removed (L)	Temp (°C)	pH (Units)	<input type="checkbox"/> Cond. <input checked="" type="checkbox"/> Specific Cond. µS/cm or mS/cm (circle one)	Redox (mV)	Diss. O ₂ * (mg/L)	Water Level (m)	Remarks
1140	2	8.7	6.51	<u>286.2</u>	129.6	2.81		clear
1144	4	9.1	6.47	<u>288.5</u>	130.5	2.07		clear
1148	6	9.1	6.49	<u>287.1</u>	131.5	1.66		
1152	8	9.3	6.45	<u>291.9</u>	132.0	1.37		
1156	10	9.3	6.45	<u>289.0</u>	132.1	1.31		stable due to sample

* Record DO in Mg/L, not percentage

Comments:

Odour: Yes No If yes _____
 Sheen: Yes No If yes Hydrocarbon-like OR Metallic-like
 Turbidity: Clear Very Silty

Analysis	Type	Container Size							Filtered		Preservatives
		40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
GRO/BTEX	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Glass	3							<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>Hel</u>
DRO/RRO	<input type="checkbox"/> Plastic <input checked="" type="checkbox"/> Glass			<u>2</u>		<u>10</u>			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>Hel</u>
PAH	<input type="checkbox"/> Plastic <input checked="" type="checkbox"/> Glass			<u>2</u>		<u>10</u>			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>Hel</u>
VOC	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Glass	3							<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<u>Hel</u>
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

SCN No. 10241-05 Consumables: Waterra Tubing HDPE/Teflon Tubing Groundwater Filter
 Field Dup. _____ Silicon Tubing 6" D.O. Ampoules _____ Footvalve

*field blank
 mw00-99
 10241-06 @ 1215
 6x vials*

sample line 1200





GROUNDWATER DEVELOPMENT AND SAMPLING DATA

- Development
 Purging/Sampling

Well No.: MW13-7

Project Name: WPYR
Location: Skagway, Alaska
Weather: part cloudy **Temperature:** -3°C
GPS Coordinates: _____

Project No.: 22522552
Date: 02 Nov 22
Completed By: EH
Reviewed By: _____

MONITORING WELL INFORMATION

Time of Measurement: 8:30
Depth to Product: _____ m **Product Thickness:** _____ m
Depth to Water (A): 4.805 m below TOP
Depth to Bottom of Well (B): 6.18 m below TOP
Diameter of Standpipe: 51 mm
Well Condition: okay
Tidally Influenced: Yes No
Pressurized: Yes No
Well Headspace: 0.0 ppm
One Well Volume:
(B-A)*2.0 = 2.9 Litres - for a 51 mm (2.0 inch) diameter well
(B-A)*1.1 = _____ Litres - for a 38 mm (1.5 inch) diameter well

6.18
4.81
1.37

EQUIPMENT LIST

Pump Waterra Hydrolift Bailer (Type: _____) Peristaltic Submersible Bladder
Multimeter pH/Temp Meter Conductivity Meter Dissolved Oxygen Meter ORP (Redex) Meter Organic Vapour Meter D.O. Ampoule
Model: YSI Pro Plus _____
Rental Equipment: Field Bump pH4 _____ pH7 _____ pH10 _____ 1413 us/cm
Pump Details: Gespump Field Calibration Field manual

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X 3 = 9 litres
Start: 8:42 **Finish:** _____
Aug. Flow Rate: _____ L/min. **Sample intake depth:** _____

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	<input type="checkbox"/> Cond. <input checked="" type="checkbox"/> Specific Cond. μS/cm or mS/cm (circle one)	Redox (mV)	Diss O ₂ * (mg/L)	Water Level (m)	Remarks
8:48	2	6.8	6.43	223.3	165.1	3.68		clear
8:53	4	7.0	6.46	322.5	163.9	3.31		"
8:57	6	7.2	6.46	321.3	164.6	3.10		"
9:02	8	7.2	6.48	322.2	164.5	3.64		
9:04	9	7.3	6.48	321.3	164.8	2.98		stable - ok to sample

* Record DO in Mg/L, not percentage

Comments:

Odour: Yes No If yes _____
Sheen: Yes No If yes _____ Hydrocarbon-like OR Metallic-like
Turbidity: Clear ||||| Very Silty

Analysis	Type	Container Size						Filtered	Preservatives
		40 mL	120 mL	250 mL	500 mL	1 L	2 L		
GRO/BTEX	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Glass							<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
DRO/RRO	<input type="checkbox"/> Plastic <input checked="" type="checkbox"/> Glass							<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
PAH	<input type="checkbox"/> Plastic <input checked="" type="checkbox"/> Glass				2			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
VOC	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Glass	3						<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	HCl
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass							<input type="checkbox"/> Yes <input type="checkbox"/> No	
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass							<input type="checkbox"/> Yes <input type="checkbox"/> No	
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass							<input type="checkbox"/> Yes <input type="checkbox"/> No	

SCN No. 10241-01 **Consumables:** Waterra Tubing HDPE/Teflon Tubing Groundwater Filter
Field Dup. _____ Silicon Tubing 6" D.O. Ampoules _____ Footvalve

sample time 9:10



GROUNDWATER DEVELOPMENT AND SAMPLING DATA

 Development
 Purging/Sampling

 Well No.: MW00-33K

Project Name: WPYR Shops
Location: Skagway, Alaska
Weather: cloudy **Temperature:** -20C
GPS Coordinates: _____
Project No.: 22522552
Date: 02 Nov 2022
Completed By: EH
Reviewed By: _____

MONITORING WELL INFORMATION

Time of Measurement: 9:21
 Depth to Product: _____ m Product Thickness: _____ m Tidally Influenced: Yes No
 Depth to Water (A): 4.130 m below TOP Pressurized: Yes No
 Depth to Bottom of Well (B): 5.61 m below TOP Well Headspace: 0.0 ppm
 Diameter of Standpipe: 51 mm One Well Volume:
 Well Condition: okay, minimum bent but ok (B-A)*2.0 = 3 Litres - for a 51 mm (2.0 inch) diameter well
 (B-A)*1.1 = _____ Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump Waterra Hydrolift Bailer (Type: _____) Peristaltic Submersible Bladder
Multimeter pH/Temp Meter Conductivity Meter Dissolved Oxygen Meter ORP (Redex) Meter Organic Vapour Meter D.O. Ampoule
Model: YSI Pro Plus Rental Equipment:
Model: _____ Field Bump pH4 _____ pH7 _____
Model: _____ pH10 _____
Model: _____ 1413 us/cm
Pump Details: Geopump Field Calibration Add notebook

WELL DEVELOPMENT/PURGING

Purge Volume: Well Vol. X 3 = 9 litres Start: 9:26 Finish: _____
 Avg. Flow Rate: _____ L/min. Sample intake depth: _____

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	<input type="checkbox"/> Cond. <input checked="" type="checkbox"/> Specific Cond.	Redox (mV)	Diss. O ₂ * (mg/L)	Water Level (m)	Remarks
				<small>µS/cm or mS/cm (circle one)</small>				
9:31	2	6.9	6.65	<u>371.6</u>	24.9	5.70		clear
9:36	4	7.1	6.61	<u>372.3</u>	44.2	4.93		clear
9:41	6	7.2	6.60	<u>370.3</u>	57.3	4.60	4.135	
9:46	8	7.1	6.60	<u>366.1</u>	66.1	4.53		clear
9:49	9	7.1	6.61	<u>366.8</u>	67.4	4.58		

* Record DO in Mg/L, not percentage

Comments:

Odour: Yes No If yes _____
 Sheen: Yes No If yes _____ Hydrocarbon-like OR Metallic-like
 Turbidity: Clear ||| Very Silty

Analysis	Type	Container Size							Filtered		Preservatives
		40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
GRO/BTEX	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
DRO/RRO	<input type="checkbox"/> Plastic <input checked="" type="checkbox"/> Glass								<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
PAH	<input type="checkbox"/> Plastic <input checked="" type="checkbox"/> Glass			<u>2</u>					<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<u>NONE</u>
VOC	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Glass	<u>3</u>							<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<u>HEX</u>
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes	<input type="checkbox"/> No	

SCN No. 10241-02 Consumables: Waterra Tubing HDPE/Teflon Tubing Groundwater Filter
 Field Dup. _____ Silicon Tubing 6"l D.O. Ampoules _____ Footvalve

sample time 950





GROUNDWATER DEVELOPMENT AND SAMPLING DATA

- Development
 Purging/Sampling

Well No.: YW00-35

Project Name: WPYR
Location: Skagway, Alaska
Weather: _____ **Temperature:** _____
GPS Coordinates: _____

Project No.: 22522552
Date: 07 Nov 2022
Completed By: EH
Reviewed By: _____

MONITORING WELL INFORMATION

Time of Measurement: 10:05
Depth to Product: _____ m
Depth to Water (A): 3.185 m below TOP
Depth to Bottom of Well (B): 3.28 m below TOP
Diameter of Standpipe: 51 mm
Well Condition: okay

Product Thickness: _____ m
Tidally Influenced: Yes No
Pressurized: Yes No
Well Headspace: 0.0 ppm
One Well Volume:
 (B-A)*2.0 = _____ Litres - for a 51 mm (2.0 inch) diameter well
 (B-A)*1.1 = _____ Litres - for a 38 mm (1.5 inch) diameter well

EQUIPMENT LIST

Pump Waterra Hydrolift Bailer (Type: _____) Peristaltic Submersible Bladder
Multimeter pH/Temp Meter Conductivity Meter Dissolved Oxygen Meter ORP (Redex) Meter Organic Vapour Meter D.O. Ampoule
Model: YSI Pro Plus _____
Rental Equipment: Field Bump pH4 _____ pH7 _____
 pH10 _____
 1413 us/cm _____
 Field Calibration _____
Pump Details: Good pump

WELL DEVELOPMENT/PURGING

Purge Volume: Well. Vol. X _____ = _____ litres
Start: _____ **Finish:** _____
Aug. Flow Rate: _____ L/min. **Sample intake depth:** _____

Time	Volume Removed (L)	Temp. (°C)	pH (Units)	<input type="checkbox"/> Cond. <input checked="" type="checkbox"/> Specific Cond. μS/cm or mS/cm (circle one)	Redox (mV)	Diss. O ₂ * (mg/L)	Water Level (m)	Remarks
<u>attempted pump</u>	<u>11</u>	<u>11</u>	<u>-</u>	<u>NO water came up</u>				
<u>insufficient water</u>								

* Record DO in Mg/L, not percentage

Comments:
Odour: Yes No If yes _____
Sheen: Yes No If yes Hydrocarbon-like OR Metallic-like
Turbidity: Clear ||||| Very Silty

Analysis	Type	Container Size							Filtered		Preservatives
		40 mL	120 mL	250 mL	500 mL	1 L	2 L	4 L	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
GRO/BTEX	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
DRO/RRO	<input type="checkbox"/> Plastic <input checked="" type="checkbox"/> Glass								<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
PAH	<input type="checkbox"/> Plastic <input checked="" type="checkbox"/> Glass								<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
VOC	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
	<input type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	<input type="checkbox"/> Plastic <input checked="" type="checkbox"/> Glass								<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	<input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Glass								<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

insufficient water

SCN No. 10241- **Consumables:** Waterra Tubing HDPE/Teflon Tubing Groundwater Filter
 Silicon Tubing D.O. Ampoules Footvalve

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APPENDIX B

Laboratory Certificate of Analysis,
Chain of Custody Form and Data
Review Checklist – November 2022



Laboratory Report of Analysis

To: Golder Associates Ltd. (Canada)
Calcite Business Center 13-151 Industrial Rd
Whitehorse, Y1A2V3

Report Number: 1226736

Client Project: WPYR SHOPS

Dear Emily Henkemans,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Justin Nelson

2022.11.23

14:46:06 -09'00'

Justin Nelson
Project Manager
Justin.Nelson@sgs.com

Date

Print Date: 11/23/2022 2:42:28PM

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Member of SGS Group

APPENDIX C

**ADEC Data Review Checklist –
November 2022**

ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By:	Gabe Mahamad	CS Site Name:	White Pass & Yukon Route Railway, Skagway, Alaska	Lab Name:	SGS North America Inc. Anchorage
Title:	Environmental Engineer in Training	ADEC File No.:	1526.38.005	Lab Report No.:	1226736
Consulting Firm:	WSP Canada Inc. (formerly known as Golder Associates Ltd.)	Hazard ID No.:	400	Lab Report Date:	23 November 2022

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

- a. Did an ADEC Contaminated Sites Laboratory Approval Program (CS-LAP) approved laboratory receive and perform all of the submitted sample analyses?
Yes No N/A

Comments: A certification summary identified laboratory authority in Alaska (identification # 17-021)

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses CS-LAP approved?
Yes No N/A

Comments: Samples were not transferred to another facility

2. Chain of Custody (CoC)

- a. Is the CoC information completed, signed, and dated (including released/received by)?
Yes No N/A

Comments: Included within laboratory report

- b. Were the correct analyses requested?

Yes No N/A

Analyses requested: Click or tap here to enter text.

Comments: Correct analyses were conducted as requested

3. Laboratory Sample Receipt Documentation

- a. Is the sample/cooler temperature documented and within range at receipt (0° to 6° C)?
Yes No N/A
Cooler temperature(s): Click or tap here to enter text.
Sample temperature(s): Click or tap here to enter text.
Comments: Click or tap here to enter text.
- b. Is the sample preservation acceptable – acidified waters, methanol preserved soil (GRO, BTEX, VOCs, etc.)?
Yes No N/A
Comments: Properly preserved and on ice
- c. Is the sample condition documented – broken, leaking, zero headspace (VOA vials); canister vacuum/pressure checked and no open valves, etc.?
Yes No N/A
Comments: The samples arrived in good condition
- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum, etc.?
Yes No N/A
Comments: Click or tap here to enter text.
- e. Is the data quality or usability affected?
Yes No N/A
Comments: Click or tap here to enter text.

4. Case Narrative

- a. Is the case narrative present and understandable?
Yes No N/A
Comments: Case narrative was provided
- b. Are there discrepancies, errors, or QC failures identified by the lab?
Yes No N/A
Comments: Click or tap here to enter text.
- c. Were all the corrective actions documented?
Yes No N/A
Comments: Refer to corresponding numbered sections below and laboratory report Case Narrative.

- d. What is the effect on data quality/usability according to the case narrative?
Comments: According to the case narrative data quality is not affected.

5. Sample Results

- a. Are the correct analyses performed/reported as requested on CoC?
Yes No N/A
Comments: Click or tap here to enter text.
- b. Are all applicable holding times met?
Yes No N/A
Comments: Click or tap here to enter text.
- c. Are all soils reported on a dry weight basis?
Yes No N/A
Comments: Results are for groundwater analysis.
- d. Are the reported limits of quantitation (LoQ) or limits of detections (LOD), or reporting limits (RL) less than the Cleanup Level or the action level for the project?
Yes No N/A
Comments: LOQ reported. All LOQ values less than the Cleanup Levels
- e. Is the data quality or usability affected?
Yes No N/A
Comments: Click or tap here to enter text.

6. QC Samples

- a. Method Blank
- i. Was one method blank reported per matrix, analysis, and 20 samples?
Yes No N/A
Comments: Click or tap here to enter text.
- ii. Are all method blank results less than LOQ (or RL)?
Yes No
Comments: Click or tap here to enter text.
- iii. If above LoQ or RL, what samples are affected?
Comments: Click or tap here to enter text.
- iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes No N/A
Comments: No flags necessary

v. Data quality or usability affected?

Yes No N/A

Comments: Click or tap here to enter text.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – Are one LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes No N/A

Comments: Click or tap here to enter text.

ii. Metals/Inorganics – Are one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes No N/A

Comments: Not requested

iii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes No N/A

Comments: %R for LCS/LCSD were within acceptable ranges

iv. Precision – Are all relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? Was the RPD reported from LCS/LCSD, and or sample/sample duplicate? (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No N/A

Comments: The RPDs were reported less than method or laboratory limits.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments: N/A

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No N/A

Comments: The RPDs were reported less than method or laboratory limits.

vii. Is the data quality or usability affected?

Yes No N/A

Comments: Click or tap here to enter text.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

- i. Organics – Are one MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A

Comments: Methods did not require an MS/MSD.

- ii. Metals/Inorganics – Are one MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A

Comments: No metals or inorganics

- iii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes No N/A

Comments: No MS/MSD.

- iv. Precision – Are all relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes No N/A

Comments: No MS/MSD.

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments: N/A, no MS/MSD.

- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No N/A

Comments: No MS/MSD data.

- vii. Is the data quality or usability affected?

Yes No N/A

Comments: No MS/MSD data.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

- i. Are surrogate/IDA recoveries reported for organic analyses – field, QC, and laboratory samples?

Yes No N/A

Comments: Click or tap here to enter text.

- ii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK

CS Site Name: White Pass & Yukon Route Railway, Skagway, Alaska
Lab Report No.: 1226736

Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes No N/A

Comments: Click or tap here to enter text.

- iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes No N/A

Comments: No failed surrogates recoveries

- iv. Is the data quality or usability affected?

Yes No N/A

Comments: No failed surrogate recoveries

e. Trip Blanks

- i. Is one trip blank reported per matrix, analysis, and for each cooler containing volatile samples? Yes No N/A

Comments: One trip blank submitted for 6 samples (1 cooler of volatile samples).

- ii. Are all results less than LoQ or RL?

Yes No N/A

Comments: Click or tap here to enter text.

- iii. If above LoQ or RL, what samples are affected?

Comments: N/A, Results are less than MDLs

- iv. Is the data quality or usability affected?

Yes No N/A

Comments: Results are less than MDLs, data quality is not affected

f. Field Duplicate

- i. Are one field duplicate submitted per matrix, analysis, and 10 project samples?

Yes No N/A

Comments: One field duplicate was submitted for analysis for 7 total samples: (4 project samples, 1 field duplicate, 1 trip Blank, 1 field blank).

- ii. Was the duplicate submitted blind to lab?

Yes No N/A

Comments: The duplicate was identified by a discrete sample title.

- iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water or air, 50% soil)

$$RPD (\%) = \left| \frac{R_1 - R_2}{\left(\frac{R_1 + R_2}{2}\right)} \right| \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Is the data quality or usability affected? (Explain)

Yes No N/A

Comments: All Field RPDs were below 30%

- iv. Is the data quality or usability affected? (Explain)

Yes No N/A

Comments: Data quality was not affected

g. Decontamination or Equipment Blanks

- i. Were decontamination or equipment blanks collected?

Yes No N/A

Comments: Equipment blank was not submitted as there was no equipment used across sampling locations. Dedicated tubing used for each well.

- ii. Are all results less than LoQ or RL?

Yes No N/A

Comments: No equipment blank was submitted (see above)

- iii. If above LoQ or RL, specify what samples are affected.

Comments: No equipment blank was submitted (see above)

- iv. Are data quality or usability affected?

Yes No N/A

Comments: No equipment blank was submitted (see above)

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

- a. Are they defined and appropriate?

Yes No N/A

Comments: Click or tap here to enter text.

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