GROUNDWATER MONITORING REPORT

RCRA CORRECTIVE ACTION PROGRAM
BOEING RENTON FACILITY
PROJECT # PS20203450.2023

Prepared for:

THE BOEING COMPANY

Seattle, Washington

MAY 30, 2023

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Prepared for:

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µg/L	micrograms per liter
AOC	area of concern
Boeing	The Boeing Company
CAP	Cleanup Action Plan
cis-1,2-DCE	cis-1,2-dichloroethene
CMP	Compliance Monitoring Plan
COC	constituent of concern
CPOC	conditional point of compliance
CUL	cleanup level
DO	dissolved oxygen
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
ERD	enhanced reductive dechlorination
Facility	Boeing Renton facility
MA	monitored attenuation
MCL	maximum contaminant level
mg/L	milligrams per liter
MNA	monitored natural attenuation
MTCA	Model Toxics Control Act
Order	Agreed Order No. 8191
ORP	oxidation/reduction potential
PCE	tetrachloroethene
RCRA	Resource Conservation and Recovery Act
SVE	soil vapor extraction
SWMU	solid waste management unit
TCE	trichloroethene
TOC	total organic carbon
TPH	total petroleum hydrocarbons
VC	vinyl chloride
VOCs	volatile organic compounds

1 INTRODUCTION

This report provides progress reporting in conformance with Section VII.B.1 of Agreed Order No. 8191 (Order) and summarizes cleanup actions and monitoring conducted during the wet season of 2022 at The Boeing Company (Boeing) Renton facility (the Facility) (Figure 1). This work is required under the Resource Conservation and Recovery Act (RCRA) Corrective Action Program being performed at the Facility. Corrective action activities are performed for those solid waste management units (SWMUs), areas of concern (AOCs), and other areas where cleanup actions are ongoing. Monitoring, cleanup activities, and reporting are being conducted as part of the final remedy implementation described in the Engineering Design Report (EDR) (AMEC, 2014).

As approved by the Washington State Department of Ecology (Ecology) in a letter dated July 31, 2020, progress reporting is conducted on a semiannual basis in conjunction with monitoring, operations, and maintenance activities conducted pursuant to the Order and as outlined in the EDR.

The following documents summarize ongoing compliance activities conducted at the Facility:

- The original monitoring plan presented in Appendix D of the EDR (AMEC, 2014) was superseded by the Compliance Monitoring Plan (CMP) (Amec Foster Wheeler, 2016a), which was subsequently revised in the Addendum to the CMP (CMP Addendum #1) (Amec Foster Wheeler, 2017).
- The groundwater monitoring program was further revised in the second Addendum to the CMP (CMP Addendum #2) (Wood, 2019), which removed selected areas or wells from the sampling program. These changes were approved by Ecology.
- Boeing submitted a third Addendum to the CMP (CMP Addendum #3) (CALIBRE, 2020) to Ecology on June 30, 2020. This addendum recommended further modifications to the groundwater monitoring program at the Facility and was approved by Ecology in July 2020.

Groundwater monitoring and cleanup actions are being conducted at the following areas (the ongoing remedies for each of these areas are noted in parentheses):

- SWMU-168: (monitored natural attenuation [MNA]);
- SWMU-172 and SWMU-174: (bioremediation and monitored attenuation [MA]; the soil vapor extraction [SVE] system has been shut down pending approval for decommissioning from Ecology);
- Building 4-78/79 SWMU/AOC Group: (bioremediation and MA; SVE has been discontinued per Ecology's approval of the system decommissioning during the first quarter of 2019);
- Former Fuel Farm AOC Group: (MNA);
- AOC-001 and AOC-002 (to be determined after Apron R construction completion, estimated by mid to late 2023);
- AOC-003: (MA);
- AOC-004: (MA);
- AOC-060: (bioremediation and MA);
- AOC-090: (MA); and
- Apron A: (bioremediation and MA).

The background and investigation history for each affected unit or group of units is described in the Cleanup Action Plan (CAP) (AMEC, 2012) and/or EDR (AMEC, 2014).

Although Apron A was not included in the CAP or EDR, this report includes monitoring results for Apron A. Semiannual monitoring began in Apron A starting in the fourth quarter 2016 (Amec Foster Wheeler, 2016b).

The goals for cleanup of groundwater at the Facility, as described in the CAP, include protection of groundwater for drinking water beneficial use at all areas of the site, and demonstration of protection of surface water beneficial uses at the conditional points of compliance (CPOCs) for each SWMU and AOC. Cleanup goals and

comparison with specific criteria are discussed in this report for each SWMU and AOC. Concentrations for protection of groundwater for beneficial use for each constituent of concern (COC) are based on site-specific cleanup levels (CULs) specified in the CAP. Ecology has made multiple clarifications and changes to the CULs in the Model Toxics Control Act (MTCA) regulations since the draft CAP (AMEC, 2012) was prepared that are relevant to the Facility CULs. Boeing submitted proposed updates to the CULs (CALIBRE, 2021) to Ecology that are currently under review. The measured COC concentrations in groundwater presented in this report are compared to the CULs specified in the CAP.

This semiannual report:

- Describes work completed during the reporting period;
- Describes any deviations from corrective action tasks required under the Order and/or CAP;
- Describes revisions to the corrective action schedule;
- Describes work projected to occur during the next semiannual sampling event, including any planned deviation from the CAP;
- Discusses remediation operation and maintenance activities conducted at the Facility during the reporting period;
- Documents monitoring activities conducted during the reporting period;
- Describes and discusses trends in monitoring data;
- Assesses remediation at each area; and
- Assesses attainment of CULs at the CPOCs.

This report presents information based on monitoring activities conducted during the wet season 2023 for the period from November 1, 2022, through April 31, 2023. In accordance with the requirements of the Order, corrective action activities were conducted at the Facility as described in this report.

1.1 CHANGES IN KEY PERSONNEL

Wood Environment & Infrastructure Solutions, Inc (“Wood”) was acquired by WSP on September 21, 2022. Due to the acquisition, we have changed our name to WSP USA Environment & Infrastructure Inc. (“WSP”). No other aspects of our legal entity or capabilities have changed for this project. Beginning with this report, WSP will prepare semi-annual groundwater monitoring reports for the Boeing Renton Facility.

WSP has also been awarded the groundwater sampling work and will begin conducting the on-facility sampling for the dry season 2023 and future sampling events.

1.2 WORK COMPLETED IN THE WET SEASON OF 2023

The following work was completed during the wet season of 2023 (the period from November 2022 through April 2023):

- Boeing submitted the dry season 2022 Groundwater Monitoring Report to Ecology and City of Renton on November 30, 2022.
- Seven monitoring wells in the area of construction at Apron R (DWL-2, GW052, GW051, GW050, GW213, GW215, GW214) were decommissioned in November and December 2022. These wells were historically part of the AOC-001/002 monitoring network.
- Landau Associates completed the 2023 site-wide wet season sampling from February 6 through 9, 2023.
- Boeing submitted the Sub-Slab Vapor Sampling Plan for SWMU-172/174 (CALIBRE, 2022a) on December 2, 2022. Ecology approved the plan for implementation by email on February 8, 2023.

1.3 DEVIATIONS FROM REQUIRED TASKS

No deviations from tasks required in the Order occurred during this activity period.

1.4 DEVIATIONS FROM CAP

One deviation from the CMP Addendum #3 occurred during this monitoring event in AOC-003. Groundwater monitoring wells GW247S was not sampled because it could not be located. More details are provided in Section 3.6.2. No other deviations from the CAP or CMP occurred this period.

1.5 SCHEDULE OF MONITORING

Ecology approved the modifications to the monitoring plan in CMP Addendum #3 (CALIBRE, 2020) on July 31, 2020, changing to a sitewide semiannual sampling program with sampling events to occur during the wet and dry seasons (in February and August, respectively). The revised monitoring plan is detailed in Appendix A, Table A-1. This revised sampling schedule began in August 2020 and will continue until another CMP addendum is approved.

1.6 WORK PROJECTED FOR THE NEXT REPORTING PERIOD

The following work is projected for the upcoming 2023 dry season (May 1, 2023, to October 31, 2023):

- Boeing recommended discontinuation of the SVE system at SWMU 172/174 based on the discontinuation criteria in the EDR and CMP, and Ecology approved discontinuation of the SVE system subject to the results of sub-slab vapor verification sampling and other criteria. The sub-slab vapor sampling at SWMU-172/174 is anticipated to take place during May/June 2023. As requested, Ecology was notified in advance of this work.
- Apron R construction schedule delays were incurred due to a lengthy concrete workers strike. Based on the most current schedule provided by the Boeing Facilities Group, ongoing Apron R construction activities at the Boeing Renton site are planned for completion in summer 2023. Upon completion of this construction work, the Apron R wells that were a part of the CMP Addendum #1 sampling program area (AOC-001 and -002) will be replaced and sampled during summer 2023. Upon receipt of the sample results, Boeing will consult with Ecology to evaluate whether continued enhanced reductive dechlorination (ERD) treatment is needed for volatile organic compounds (VOCs) in groundwater in AOC 001/002.The Apron R well abandonment memo (Wood, 2021) provides more details and a comprehensive list of the plan of wells to be decommissioned and/or replaced.
- A technical memorandum recommending decommissioning of wells that are no longer required for investigative, bioremediation, or compliance monitoring purposes was submitted to Ecology on January 5, 2022 (CALIBRE, 2022b). Ecology approved the well decommissioning plan on January 18, 2022, and the decommissioning activities began in May 2022. A large set of wells approved for decommissioning within the Boeing Facility were closed by October 2022 (Phases 1 and 2, with 57 of 89 wells decommissioned). Wells in the City's Cedar River Trail Park and on the Renton Municipal Airport side of the Cedar River have not yet been closed due to delays completing the City of Renton License Agreement. The remaining wells (Phase 3) are planned to be decommissioned during June/July 2023.
- Based on evaluation of the semi-annual monitoring data in this report, the following areas are planned for continued ERD treatment of VOCs in groundwater: SWMU-172/174, Building 4-78/4-79 SWMU/AOC Group, AOC-90, and AOC-060. Pursuant to the CAP, AOC-003 is planned to transition from the ERD program to MA.
- Reporting will be completed in accordance with the Order, CAP, EDR, and changes approved by Ecology, including those modifications proposed in CMP Addendum #3 (CALIBRE, 2020).

2 GROUNDWATER SAMPLING METHODOLOGY

Groundwater was sampled and analyzed as described in Appendix A. These procedures are in accordance with the methods specified in the CMP (Amec Foster Wheeler, 2016a) and CMP Addendum #3 (CALIBRE, 2020). Table A-1 summarizes the current groundwater monitoring program and COCs specified in the CAP and revised in CMP Addendum #1 (Amec Foster Wheeler, 2017), CMP Addendum #2 (Wood, 2019) and CMP Addendum #3 (CALIBRE, 2020) for all Facility corrective action areas. Table A-2 summarizes the current groundwater monitoring program for the corrective action areas that include MNA or MA as part of the cleanup remedy specified in the CAP. Tables A-1 and A-2 also specify monitoring requirements for Apron A, which was not included in the CAP. Any changes or exceptions to the sampling or analytical methods cited in Appendix A during the event is described in the applicable subsections in Section 3. The field data sheets, which document the groundwater sample collection and field parameter monitoring for each well sampled during this event, are included in Appendix B.

The analytical methods, field duplicate, lab duplicate, and matrix spike/matrix spike duplicate frequencies are specified in the Quality Assurance Project Plan (Amec Foster Wheeler, 2016c). The full analytical reports provided by the laboratory are provided separately on a secure online storage application, OneDrive. The data validation memoranda are included in Appendix C.

3 CORRECTIVE ACTION ACTIVITIES COMPLETED DURING THE REPORTING PERIOD

This section describes the corrective action activities conducted at the Facility during the wet season of 2023. Operation of the SVE system at SWMU-172/174 was discontinued during the last dry season, as discussed in Section 3.2.1.2. Compliance monitoring was conducted in accordance with the CMP (Amec Foster Wheeler, 2016a) and CMP Addendum #3 (CALIBRE, 2020).

3.1 SWMU-168

This section describes corrective action activities conducted at this SWMU. Figure 2 shows the locations of the groundwater monitoring wells at SWMU-168 for which sampling was required under CMP Addendum #3 (CALIBRE, 2020) and the groundwater elevation at the remaining well measured during this monitoring event. The cleanup remedy for SWMU-168 is MNA; therefore, cleanup activities consist of monitoring only.

3.1.1 CLEANUP ACTION ACTIVITIES

No installation/construction activities were conducted for this cleanup action area during this monitoring period.

3.1.2 COMPLIANCE MONITORING PLAN DEVIATIONS

No deviations from the CMP occurred for this area during this monitoring period. The well monitored in this group and the COC remained the same.

3.1.3 WATER LEVELS

The groundwater elevation measured during this groundwater monitoring event at SWMU 168 is summarized in Table 1 and shown on Figure 2. Groundwater elevation contours are not shown since only one well, GW230I, is currently monitored in this group. The general direction of groundwater flow depicted on Figure 2 is based on historical information.

3.1.4 GROUNDWATER MONITORING RESULTS

Results for primary geochemical indicators are presented in Table 2; the result for the single SWMU-168 COC, vinyl chloride (VC), is presented in Table 3; and COC results for sampling events in recent years are presented in Appendix D.

3.1.4.1 Natural Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 2. Data from the CPOC area well indicate that conditions are conducive to natural attenuation of VC in this SWMU. The pH value measured was slightly acidic at 6.32. The CPOC well showed reducing conditions, with low dissolved oxygen (DO) and a low but positive oxidation/reduction potential (ORP) reading. Reducing conditions are present in well GW230I, indicating conditions favorable for dechlorination of VOCs.

3.1.4.2 COC Results for Source Area

Groundwater samples were not collected from the source area well, GW228S, for SWMU-168 per CMP Addendum #3 (CALIBRE, 2020).

3.1.4.3 COC Results for Conditional Point of Compliance Area

Table 3 lists the analytical result for the SWMU-168 area. The concentration of VC in the groundwater from CPOC area well GW230I was slightly above the CUL of 0.11 micrograms per liter (µg/L), at 0.146 µg/L; this detection is below the maximum contaminant level (MCL) for VC (2.0 µg/L) and the MTCA criterion for potable water supply (0.29 µg/L). The MTCA criteria for potable water supply values were proposed in the five-year review cleanup memo (CALIBRE, 2021), which is currently pending Ecology response. Historical trends for VC in GW230I are shown in Appendix D and depicted on Figure 3. VC concentrations show an apparent seasonal pattern with higher concentrations in the dry season; the recent wet season concentration decreased since the last monitoring event, in keeping with the trend.

3.2 SWMU-172 AND SWMU-174

This section describes corrective action activities conducted at these two SWMUs. The cleanup remedy for SWMU-172 and SWMU-174 is a combination of bioremediation and MA. SVE was used from 2015 through 2022. The SVE system has been shut down and is pending Ecology approval for decommissioning. Figure 4 shows the layout of the groundwater monitoring wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and the remediation system for these SWMUs.

3.2.1 CLEANUP ACTION ACTIVITIES

3.2.1.1 Installation/Construction Activities

No installation/construction activities were conducted for these SWMUs during this monitoring period.

3.2.1.2 Soil Vapor Extraction and Bioremediation Operations

The SVE system was in operation between April 17, 2015, and October 24, 2022. SVE was discontinued on October 24, 2022, as approved by Ecology (Valerie Cramer, personal communication). Permanent discontinuation and decommissioning is pending results of the sub slab vapor sampling, anticipated to take place during May/June 2023. The last bioremediation injection was completed in June 2022, including ERD treatments. All of the SVE system equipment and infrastructure has been retained pending future discussions with Ecology regarding permanent discontinuation and removal.

3.2.2 COMPLIANCE MONITORING PLAN DEVIATIONS

No deviations from the CMP occurred for this area during this monitoring period. The wells monitored in this group and the COCs remained the same.

3.2.3 WATER LEVELS

The groundwater elevations measured during this groundwater monitoring event at SWMU-172 and SWMU-174 are summarized in Table 4 and shown on Figure 4. The groundwater elevation data show a flow direction generally to the northeast, toward the Cedar River Waterway; however, the sheet pile wall to the east of this area prevents a direct groundwater connection to the river, as depicted by the groundwater contours on Figure 4.

3.2.4 GROUNDWATER MONITORING RESULTS

Groundwater at this area is monitored following the analysis protocol presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 5; results for the SWMU 172 and SWMU-174 area COCs are presented in Table 6.

3.2.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 5. Specific conductivity ranged between 142.6 and 809.0 microsiemens per centimeter across the area, which are normal observed values for the groundwater in this SWMU. pH was slightly acidic across SWMU-172 and SWMU-174. ORP was positive in wells GW153S, GW232S, and GW236S, and negative for all other wells; DO and ORP results indicate reducing conditions in the area and other natural attenuation parameter results were generally uniform across this area. Total organic carbon (TOC) concentrations ranged from 1.00 to 9.87 milligrams per liter (mg/L) for all SWMU-172 and SWMU-174 monitoring wells.

3.2.4.2 COC Results for Source and Downgradient Plume Areas

Table 6 lists the analytical results for the SWMU-172 and SWMU-174 COCs. Historical trend plots for tetrachloroethene (PCE), trichloroethene (TCE), VC, and cis-1,2-dichloroethene (cis-1,2-DCE) in source area wells GW152S and GW153S are shown on Figure 5, in downgradient plume area wells GW172S and GW173S on Figure 6, and in downgradient plume area well GW226S on Figure 7. Groundwater flows generally from the vicinity of source area well GW152S to downgradient plume area well GW172S; groundwater from source area well GW153S is also expected to generally flow toward the downgradient plume area. PCE and TCE are the chlorinated solvents that were used at the Facility, and cis-1,2-DCE and VC are breakdown products resulting from biodegradation processes.

As shown in Figures 5 through 7, the concentrations of VOCs in groundwater from source area wells and downgradient plume area wells have generally remained stable or decreased over time.

Arsenic was detected above the CUL in the groundwater from all source area and downgradient plume area wells in this SWMU area. As shown on Figure 8, the arsenic concentrations in groundwater from source and downgradient plume area wells have generally remained stable over the past two years, with the exception of source area well GW152S. The observed range of arsenic in groundwater is within the naturally occurring background arsenic range reported by Ecology for Washington State (Ecology 2022).

Source area groundwater CUL exceedances (Table 6) consisted of:

- GW152S: cis-1,2-DCE, PCE, TCE, VC, arsenic, copper, and lead; and
- GW153S: cis-1,2-DCE, VC, and arsenic.

Downgradient plume area groundwater site-specific CUL exceedances (Table 6) consisted of:

- GW172S: cis-1,2-DCE, VC, arsenic, copper, and lead;
- GW173S: cis-1,2-DCE, PCE, TCE, VC, and arsenic; and
- GW226S: cis-1,2-DCE and arsenic.

The detected concentrations of cis-1,2-DCE, PCE, and TCE are below both the MCLs and the MTCA criteria for potable water supply in both the source area and downgradient plume area. The detected concentrations of VC are below the MCL in all wells; however, they are above the MTCA criteria for potable water supply in GW172S and GW 232S.

3.2.4.3 COC Results for Conditional Point of Compliance Area

As shown in Table 6, cis-1,2-DCE was detected above the CUL in the groundwater from all CPOC area wells; TCE was detected above the CUL in the groundwater from GW235I; and VC was detected above the CUL in the groundwater from GW232S. VC was also detected in GW234S and GW235I, but below the CUL. Trend charts for cis-1,2-DCE, TCE, and VC for all CPOC area wells are presented in Figure 9. Figure 9 shows that the COCs in the CPOC

area have primarily decreased since the previous sampling event, in keeping with the historical patterns of higher concentrations detected during the dry season events.

Arsenic, copper, and lead were detected in the groundwater from all CPOC area wells. Arsenic concentrations exceeded the CUL in wells GW232S, GW234S, and GW236S. Copper concentrations exceeded the CUL in well GW234S. Lead concentrations exceeded the CUL in wells GW234S and GW236S. Figure10 shows arsenic, copper, and lead concentration trends in groundwater from the CPOC area wells since the beginning of compliance monitoring. As shown in Figure 10, these COCs have remained within a stable range or decreased since the last monitoring event, with the exception of GW234S, which showed an increase in all three metals since the dry season 2022 event.

3.3 BUILDING 4-78/79 SWMU/AOC GROUP

This section describes corrective action activities conducted at the Building 4-78/79 SWMU/AOC Group. The cleanup remedy for this SMWU/AOC group is bioremediation and MA as well as excavation of soils contaminated with total petroleum hydrocarbons (TPH); discontinuation of SVE was approved by Ecology on November 1, 2018, and the system was decommissioned during the first quarter of 2019. Figure 11 shows the location of the September 2021 TPH source area soil excavation, groundwater monitoring wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020), extraction wells, decommissioned wells, horizontal SVE wells, and bioremediation injection wells for this area.

3.3.1 CLEANUP ACTION ACTIVITIES

3.3.1.1 Installation/Construction Activities

No installation or construction activities were conducted in this area during this monitoring period.

3.3.1.2 Soil Vapor Extraction and Bioremediation Activities

SVE operations were discontinued in late 2018; the current remediation method is anaerobic biodegradation of benzene by nitrate/sulfate injections. Certain bioremediation injection wells are still sampled to monitor the status of COCs. Trend charts for cis-1,2-DCE and benzene in nitrate/sulfate injection wells are presented in Figure 12, and trend charts for TCE and VC in the injection wells are presented in Figure 13. No injections occurred during this monitoring period.

3.3.2 COMPLIANCE MONITORING PLAN DEVIATIONS

No deviations from the CMP occurred for this area during this monitoring period. The wells monitored in this group and the COCs remained the same.

3.3.3 WATER LEVELS

The groundwater elevations measured during this groundwater monitoring event at Building 4-78/79 SWMU/AOC group are summarized in Table 7 and shown on Figure 11. The observed direction of groundwater flow from the source area during August was generally radially toward Building 4-79 and a piezometric low area.

3.3.4 GROUNDWATER MONITORING RESULTS

Groundwater in this area is monitored following the analysis protocol presented in Tables A-1 and A-2 in Appendix A. Results for primary geochemical indicators are presented in Table 8; results for Building 4-78/79 SWMU/AOC Group COCs are presented in Table 9.

3.3.4.1 Natural Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 8. In general, source area and CPOC area wells had low levels of DO and moderate to high specific conductivity. The pH was slightly acidic, ranging between 6.27 and 6.63 standard units in all wells. ORP was negative in all wells except GW237S. The source area wells showed reducing conditions favorable for dechlorination of VOCs. Results for the other primary geochemical indicators were generally consistent in all wells. TOC concentrations in source area wells ranged from 8.35 to 14.9 mg/L.

3.3.4.2 COC Results for Source Area

Table 9 lists the analytical results for Building 4-78/79 SWMU/AOC Group COCs. Figures 14 and 15 are trend charts showing historical trends for COCs for the source area wells.

VC was detected above the CUL in all the source area wells. GW034S had CUL exceedances for benzene and cis-1,2-DCE. All cis-1,2-DCE detection are below both the MCLs and the MTCA criteria for potable water supply. TCE was not detected above the CUL in any of the source area wells. The detected concentrations of VC in the source area wells are below the MCL and MTCA criteria for potable water, with the exception of GW034S (which exceeds both MTCA and the MCL) and GW244S-R, which was above the MTCA criteria for potable water but below the MCL. TPH as gasoline was not detected above the CUL in any source area wells;. This shows a trend of consistently lower TPH levels since 2021, likely a result of the removal of TPH-contaminated soil which took place in September 2021.

Figure 14 shows trends for VOCs in source area wells GW031S and GW033S. COCs in GW031S appear to be stabilizing over the past three monitoring events, while in GW033S COC concentrations appear to be exhibiting a downward trend.

Figure 15 shows trends for VOCs in source area wells GW034S and GW244S. Concentrations of COCs in GW034S appear to be departing from the trend of general stability, with a significant increase in all COCs (except TCE) since the last monitoring event. Concentrations of COCs in GW244S appear to be stabilizing over the last four monitoring events for which samples were collected from this location (samples were not collected during wet season/February 2022).

3.3.4.3 COC Results for Conditional Point of Compliance Area

As shown in Table 9, benzene, VC, and TPH as gasoline were detected above their respective CULs in groundwater from GW237S. Other detections consisted of cis-1,2-DCE and VC, all are below CULs. Trend charts for CPOC area wells are shown in Figures 16 through 18.

Figure 16 shows that benzene and cis-1,2-DCE have been sporadically detected above the CUL in CPOC area wells GW237S and GW143S, respectively. Benzene was detected in GW237S above the CUL during this monitoring period, and cis-1,2-DCE was detected in GW143S below the CUL.

Figure 17 shows that TCE has not been detected in the CPOC area for four consecutive events, with the exception of GW143S during the wet season 2022 sampling event. VC was detected in all CPOC wells during this event, with a CUL exceedance in GW237S, which has shown the highest levels of VC of the three wells for the last several monitoring events. Figure 18 shows that TPH as gasoline has been detected only in GW237S since monitoring began and had been steadily decreasing before this monitoring event, when there was a detection slightly above the CUL for the first time in six monitoring events.

In the downgradient CPOC wells the measured concentrations of benzene, cis-1,2-DCE, TCE, and VC are below both the MCLs and MTCA criteria for potable water supply.

3.4 FORMER FUEL FARM AOC GROUP

This section describes corrective action activities conducted at the Former Fuel Farm AOC Group. Figure 19 shows the layout of the groundwater monitoring wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020). The final remedy for the Former Fuel Farm is MNA.

3.4.1 CLEANUP ACTION ACTIVITIES

No installation/construction activities were conducted for this cleanup action area during this monitoring period.

3.4.2 COMPLIANCE MONITORING PLAN DEVIATIONS

No deviations from the CMP occurred for this area during this monitoring period. The wells monitored and the COCs remained the same for this group.

3.4.3 WATER LEVELS

The groundwater elevations measured during this groundwater monitoring event at the Former Fuel Farm AOC group are summarized in Table 10 and shown on Figure 19. Groundwater elevation contours are not shown since only three wells are monitored in this group and data are too limited to produce accurate contours. Groundwater flow direction to the northeast is based on historical information from this AOC.

3.4.4 GROUNDWATER MONITORING RESULTS

Results for primary geochemical indicators are presented in Table 11; results for the Former Fuel Farm AOC Group COCs are presented in Table 12.

3.4.4.1 Monitored Natural Attenuation Indicators

The geochemical indicator results are presented in Table 11. Results in Table 11 indicate that geochemical conditions are generally consistent throughout the Former Fuel Farm AOC Group. Specific conductivity was moderate for groundwater. Slightly acidic pH was observed in CPOC area wells ranging from 6.02 to 6.41 standard units. Low to moderate DO and low ORP was observed in all monitored wells. The geochemical indicators indicate natural attenuation of the COCs for the Former Fuel Farm AOC Group is occurring.

3.4.4.2 COC Results for Source Area

The single source area well for this group was removed from the monitoring plan with Ecology's acceptance of CMP Addendum #3 (CALIBRE, 2020).

3.4.4.3 COC Results for Conditional Point of Compliance Area

Table 12 lists the analytical results for the Former Fuel Farm AOC group COCs. Figure 20 shows trend data for CPOC area wells GW211S, GW221S, and GW224S. Figure 20 shows that the wet season event results for these wells are consistent with the historical monitoring results since late 2013. Samples were analyzed for TPH as diesel, as motor oil, and Jet A. TPH as diesel was detected above the CUL in GW221S and GW224S (and its duplicate sample). TPH as motor oil was not detected above the CUL in any of the CPOC area wells. Jet A was detected above the CUL in GW221S, GW224S, and its associated duplicate sample. None of the COCs were detected above the CUL in GW211S. It is worth noting that both TPH-D and Jet-A have been below the CUL in GW211S for the previous ten monitoring events. COC concentrations in GW221S remain in a stable range with a slight increase this monitoring period. Concentrations of COCs in GW224S appear to be stabilizing for the past six monitoring events.

3.5 AOC-001/002

This section describes corrective action activities conducted at AOC-001/002. The monitoring and future/continued cleanup actions (if necessary) for this AOC will be determined after construction of Apron R, currently estimated for mid-late 2023. Figure 21 shows the layout of the groundwater monitoring wells. Per CMP Addendum #3 (CALIBRE, 2020), Apron R construction activities are in progress and many monitoring wells at AOC-001/002 were decommissioned. Only one monitoring well was sampled during this period to initiate assessment of area conditions as Apron R construction activities near completion. Monitoring wells are planned to be replaced

following Apron R construction completion during the dry season 2023. Wells to be replaced are GW185S, GW190S, GW191D, GW192S, GW193S, GW195S, GW196D, GW197S, GW213S, GW214S, GW215S, GW245S, and GW246S. The new wells will be developed following installation and sampled with the other wells at the facility for the dry season 2023 event. IPR1 and IPR2 are horizontal injection wells that will also be replaced.

3.5.1 CLEANUP ACTION ACTIVITIES

No installation/construction activities were conducted for this cleanup action area during this monitoring period. Fifteen monitoring wells in the area of construction at Apron R were decommissioned in November 2019, three wells were decommissioned in October 2022, and seven wells (DWL-2, GW052, GW051, GW050, GW213, GW215, GW214) were decommissioned during this period in November and December 2022. Horizontal injection wells IPR1 and IPR2 were decommissioned and replaced in May 2023. Fifteen wells are planned to be replaced by the end of 2023.

3.5.2 COMPLIANCE MONITORING PLAN DEVIATIONS

No deviations from the CMP occurred for this area during this monitoring period.

3.5.3 WATER LEVELS

The groundwater elevations measured during this groundwater monitoring event at AOC-001 and AOC-002 are summarized in Table 13.

3.5.4 GROUNDWATER MONITORING RESULTS

Results for geochemical indicators are presented in Table 14; results for the AOC-001 and 002 COCs are presented in Table 15.

3.5.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 14. High specific conductivity, negative ORP, and low DO were observed during this monitoring event, and pH readings were slightly acidic. TOC was measured at 6.08 mg/L. Based on the geochemical indicators, reducing conditions are occurring in this area.

3.5.4.2 COC Results for Source Area

Table 15 lists the analytical results for the AOC-001 and AOC-002 COCs. GW193S was the only well monitored in this group, exclusively for VC. VC was detected at 0.334 µg/L, which exceeds the CUL and MTCA criteria for potable water, but is below the MCL for potable water.

3.6 AOC-003

This section describes corrective action activities conducted at AOC-003. The cleanup remedy for this AOC is MA. Figure 22 shows the location of groundwater monitoring wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and bioremediation wells, as well as the groundwater elevations measured during this monitoring event.

3.6.1 CLEANUP ACTION ACTIVITIES

No installation/construction activities were conducted for this cleanup action area during this monitoring period.

3.6.2 COMPLIANCE MONITORING PLAN DEVIATIONS

One deviation from CMP Addendum #3 occurred during this monitoring event: GW247S was not sampled because it could not be located. Repaving activities related to the nearby construction in Apron R resulted in accidental destruction of GW247S. Reinstallation is schedule for July 2023. GW247S will be sampled in the dry season 2023 event. No other deviations from the CMP occurred this period.

3.6.3 WATER LEVELS

The groundwater elevations measured during this groundwater monitoring event at AOC-003 are summarized in Table 13 and shown on Figure 22. Groundwater elevations measured during this event are consistent with historical groundwater flow patterns to the northwest.

3.6.4 GROUNDWATER MONITORING RESULTS

Results for geochemical indicators are presented in Table 14; results for the AOC-003 COCs are presented in Table 15.

3.6.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 14. Results in Table 14 indicate that geochemical conditions are generally consistent throughout this AOC. High specific conductivity, negative ORP, and low to moderate DO were observed during this monitoring event, and pH readings were near neutral for all wells in this area. TOC concentrations ranged from 8.79 to 14.7 mg/L. Based on the geochemical indicators, reducing conditions are occurring in this area.

3.6.4.2 COC Results for Source Area and Downgradient Plume Area

Table 15 lists the analytical results for the AOC-003 COCs. Samples from wells in this group were analyzed for VC. VC was detected below CULs in both the source area and downgradient plume area wells. The VC levels detected were below the MCL and the MTCA criteria for potable water supply. Figure 23 shows the historical trends for VC in source area well GW249S and downgradient plume area well GW188S.

3.6.4.3 COC Results for Conditional Point of Compliance Area

VC was detected above the CUL in CPOC area well GW248I (Table 15). Figure 24 shows the historical trends for VC in CPOC area wells GW247S and GW248I. VC concentrations in GW248I appear to be increasing slightly, with annual fluctuations. The VC levels detected in CPOC wells were all below the MCL but remain above the MTCA criteria for potable water supply.

3.7 AOC-004

This section describes corrective action activities conducted at AOC-004. The cleanup remedy for this AOC is MA. Figure 25 shows the location of the groundwater monitoring well for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and bioremediation wells, as well as the groundwater elevation measured during this monitoring event.

3.7.1 CLEANUP ACTION ACTIVITIES

No installation/construction activities were conducted for this cleanup action area during this monitoring period.

3.7.2 COMPLIANCE MONITORING PLAN DEVIATIONS

No deviations from the CMP occurred for this area during this monitoring period and COCs remained the same for this AOC.

3.7.3 WATER LEVELS

The groundwater elevation measured during this groundwater monitoring event at AOC-004 is summarized in Table 16 and shown on Figure 25. Groundwater contouring and flow direction cannot be determined from the single groundwater elevation measurement, but a general direction of groundwater flow based on historical information is shown on Figure 25.

3.7.4 GROUNDWATER MONITORING RESULTS

Results for geochemical indicators are presented in Table 17; the result for the AOC-004 COC (lead) is presented in Table 18.

3.7.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 17. The pH reading was near neutral at 6.78 standard units. Moderate specific conductivity, negative ORP, and low DO readings were observed during this monitoring event.

3.7.4.2 COC Results for Source Area

Table 18 lists the analytical result for the AOC-004 COC. Lead was detected in the source area at 0.820 µg/L, below the CUL of 1 µg/L. Figure 26 shows the historical trend chart for lead in GW250S.

3.8 AOC-060

This section describes corrective action activities conducted at AOC-060. The cleanup remedy for this AOC is bioremediation and MA. Figure 27 shows the location of groundwater monitoring wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and bioremediation wells, as well as the groundwater elevations measured during this monitoring event.

3.8.1 CLEANUP ACTION ACTIVITIES

No installation/construction activities were conducted for this cleanup action area during this monitoring period.

3.8.2 COMPLIANCE MONITORING PLAN DEVIATIONS

No deviations from the CMP occurred for this area during this monitoring period. The well monitored and COC remained the same for this AOC.

3.8.3 WATER LEVELS

The groundwater elevations measured during this groundwater monitoring event at AOC-060 are summarized in Table 19 and shown on Figure 27. Groundwater flow direction is generally to the west-southwest, toward the Cedar River Waterway.

3.8.4 GROUNDWATER MONITORING RESULTS

Results for geochemical indicators are presented in Table 20; results for the AOC-060 COCs are presented in Table 21.

3.8.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 20. Results during this monitoring event are consistent across the area, with the exception of specific conductivity, which ranged from 204.2 to 1,274 µS/cm. The pH ranged between near neutral and somewhat acidic in this AOC, between 5.80 and 6.54 standard units. TOC results from all wells varied greatly, with a range from 3.82 to 43.1 mg/L.

3.8.4.2 COC Results for Source and Downgradient Plume Areas

Table 21 lists the analytical results for the AOC-060 COCs. Wells in this group were analyzed for cis-1,2-DCE, TCE, and VC. Groundwater from source area well GW009S and downgradient plume area well GW012S exceeded the CULs for all three COCs. TCE concentrations also exceeded the CUL in downgradient plume area wells GW014S (and its field duplicate) and GW147S. The detected concentrations of cis-1,2-DCE, TCE, and VC in the source and downgradient plume area wells are below the MCLs. Wells GW009S and GW012S were above the MTCA criteria for potable water supply for VC; all other detections were below their respective MTCA levels.

Figure 28 shows historical trends for COCs in source area well GW009S, which have been stable since monitoring began. Figures 28 and 29 show historical trends for COCs in downgradient plume area wells. COC results in GW014S have been generally stable since monitoring began, but GW012S and GW147S exhibit more fluctuation in COC concentrations, possibly due to seasonal groundwater flow variations. TCE in GW012S appears to have increasing fluctuation over the last four monitoring events, departing from its stabilization over the past several monitoring events, but concentrations remain within the historical range for TCE concentrations in this well.

3.8.4.3 COC Results for Conditional Point of Compliance Area

As shown in Table 21, cis-1,2-DCE exceeded the CUL in groundwater from both CPOC area wells. VC was detected in groundwater from both CPOC area wells but did not exceed the CUL. TCE was not detected in either well. The measured concentrations of cis-1,2-DCE, TCE, and VC in the CPOC area wells are below both the MCLs and MTCA criteria for potable water supply. Figure 30 shows historical trends for COCs in CPOC area wells GW150S and GW253I. Considerable fluctuation is still present for cis-1,2-DCE and VC, but TCE appears to be stabilizing in both CPOC area wells.

3.9 AOC-090

This section describes corrective action activities conducted at AOC-090. The cleanup remedy for this AOC is MA. Figure 31 shows the location of groundwater monitoring wells for which sampling is required under CMP Addendum #3 (CALIBRE, 2020) and bioremediation wells, as well as the groundwater elevations measured during this monitoring event.

3.9.1 CLEANUP ACTION ACTIVITIES

No installation/construction activities were conducted for this cleanup action area during this monitoring period.

3.9.2 COMPLIANCE MONITORING PLAN DEVIATIONS

No deviations from the CMP occurred for this area during this monitoring period. The wells monitored and COCs remained the same for this AOC.

3.9.3 WATER LEVELS

The groundwater elevations measured during this groundwater monitoring event at AOC-090 are summarized in Table 22 and shown on Figure 31. Groundwater flow direction is to the west, toward the Cedar River Waterway; however, the sheet pile wall to the west of this area prevents a direct groundwater connection to the river, as depicted by the contours.

3.9.4 GROUNDWATER MONITORING RESULTS

Results for geochemical indicators are presented in Table 23; results for the AOC-090 COCs are presented in Table 24.

3.9.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 23. Results showed moderate specific conductivity and low DO values across the area. The pH ranged from slightly acidic to moderately basic in this AOC, with all wells ranging between 6.16 and 8.33 standard units. TOC was measured at 2.56 mg/L in source area well GW189S. The trend plot for TOC in GW189S (Figure 32) shows TOC has decreased significantly since the last substrate injection in 2017.

3.9.4.2 COC Results for Source and Downgradient Plume Areas

Table 24 lists the analytical results for the AOC-090 COCs. Groundwater from source area well GW189S exceeded the CUL for TPH as diesel and TPH as motor oil. Historical trends for GW189S show chlorinated VOCs have been trending downward since the start of monitoring (Figure 32). Downgradient plume area well GW176S exceeded the CUL for VC. The measured concentrations of PCE and TCE in the source area and downgradient plume area wells are below both the MCLs and MTCA criteria for potable water supply. VC is below the MCL in all wells (source area, downgradient plume area, and CPOC wells) but remains above the MTCA criteria for potable water supply in well GW176S.

3.9.4.3 COC Results for Conditional Point of Compliance Area

VC was detected in two of the three CPOC area wells (GW178S and GW208S) and exceeded the CUL for VC in both (Table 24). The detected concentrations in wells GW178S and GW208S are above the MTCA criteria for potable water supply and below the MCL.

3.10 APRON A AREA

This section describes corrective action activities conducted at the Apron A area. The cleanup remedy proposed for the Apron A area is bioremediation and MA. Figure 33 shows the locations of the groundwater monitoring wells in the Apron A area for which sampling is required under CMP Addendum #3 (CALIBRE, 2020).

3.10.1 CLEANUP ACTION ACTIVITIES

No construction or operations work was conducted in the Apron A area during this monitoring period.

3.10.2 COMPLIANCE MONITORING PLAN DEVIATIONS

No deviations from the CMP occurred for this area during this monitoring period. The wells monitored in this group and COCs remained the same.

3.10.3 WATER LEVELS

The groundwater elevation measurement from this groundwater monitoring event at Apron A is in Table 25 and shown on Figure 33. Groundwater flow direction is estimated based on historical information and an expected flow east toward the Cedar River Waterway.

3.10.4 GROUNDWATER MONITORING RESULTS

Results for primary geochemical indicators presented in Table 26; results for the Apron A area COCs are presented in Table 27.

3.10.4.1 Monitored Attenuation/Geochemical Indicators

The geochemical indicator results are presented in Table 26. Observations included high specific conductivity, high DO, slightly acidic pH, and a low ORP reading. TOC was detected in GW264S at a concentration of 42.96 mg/L.

3.10.4.2 COC Results

Table 27 lists the analytical results for the Apron A area COCs (cis-1,2-DCE and VC) and both analytes are reported as non-detect (< 2.0 µg/L). Analytes from Apron A samples do not have established CULs because they were added to the monitoring program after the CMP (Amec Foster Wheeler, 2016a) was in place. Additional monitoring of the soil and groundwater in Apron A was completed in 2016 and included installation of the monitoring wells in this area (Amec Foster Wheeler, 2016b). Neither cis-1,2-DCE nor VC were detected in the groundwater from well GW264S. The trend plot for COCs in GW264S is shown in Figure 34. Cis-1,2-DCE has not been detected for five consecutive monitoring periods, but VC still appears to fluctuate with the current VC results (February 2023) as non-detect.

4 REFERENCES

AMEC Environment & Infrastructure, Inc. (AMEC), 2012, Draft Cleanup Action Plan, Boeing Renton Facility, Renton, Washington, Prepared for The Boeing Company, September.

———, 2014, Draft Engineering Design Report, Boeing Renton Cleanup Plan Implementation, Boeing Renton Facility, Renton, Washington, Prepared for The Boeing Company, July.

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016a, Compliance Monitoring Plan (CMP), Boeing Renton Facility, Renton, Washington, Prepared for The Boeing Company, February.

———, 2016b, Apron A Investigation Results, Renton Municipal Airport—Boeing Apron A, Renton, Washington, June.

———, 2016c, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington, Prepared for The Boeing Company, February.

———, 2017, Addendum to the Compliance Monitoring Plan, Boeing Renton Facility, Renton, Washington, Prepared for The Boeing Company, February.

CALIBRE Systems, Inc. (CALIBRE), 2020, Evaluation of Recent Groundwater Sampling at the Boeing Renton Facility, Recommendation for Modifications to Compliance Monitoring Plan as Addendum #3 to CMP, June 30.

———, 2021, Remedial Progress Review and Evaluation of Groundwater Cleanup Levels at the Boeing Renton Plant, May.

———, 2022a, Sub-Slab Soil Vapor Sampling Plan, SWMU 172/174, Boeing Renton Facility, Renton, Washington: Prepared for The Boeing Company, December 2.

———, 2022b, Boeing Renton Decommissioning of Groundwater Wells, Technical Memorandum, Rev.1, January 5.

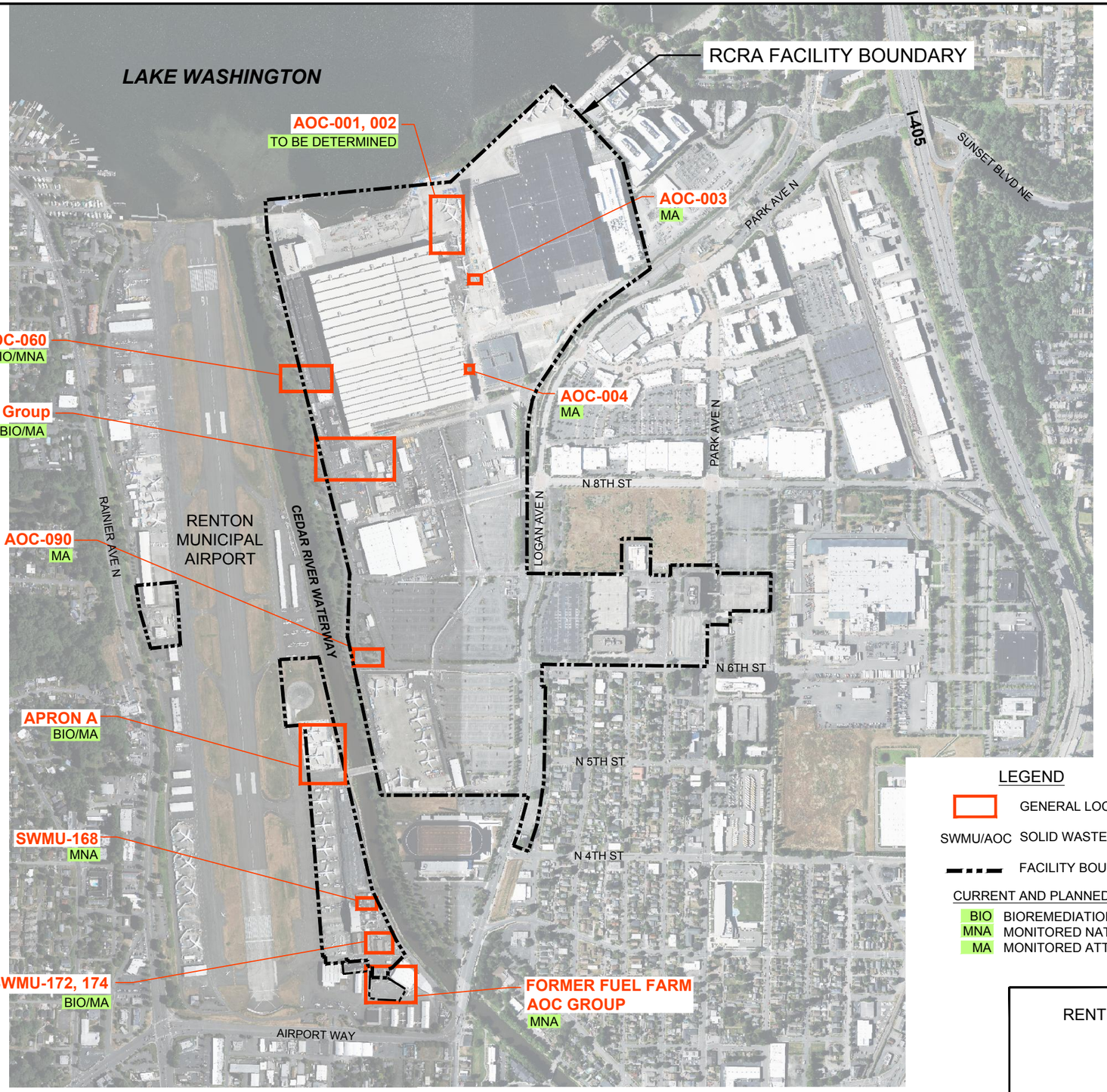
Cramer, Valerie, Environmental Engineer, Washington State Department of Ecology, email to Nick Garson, Remediation Project Manager, The Boeing Company, September 20, 2022.

Washington State Department of Ecology (Ecology), 2022, Natural Background Groundwater Arsenic Concentrations in WA State, Study Results, Publication No. 14-09-044, January.

Wood Environment & Infrastructure Solutions, Inc. (Wood), 2019, Addendum to the Compliance Monitoring Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, April.

———, 2021, Apron R Well Abandonment and Replacement: AOC-001 and AOC-002, Boeing Renton Corrective Action Program, Renton, Washington: Prepared for the Boeing Company, November 11.

FIGURES



LEGEND

- GENERAL LOCATION OF SWMUs AND AOCs
- SWMU/AOC SOLID WASTE MANAGEMENT UNIT/AREA OF CONCERN
- FACILITY BOUNDARY

CURRENT AND PLANNED CLEANUP REMEDIES:

- BIO BIOREMEDIATION
- MNA MONITORED NATURAL ATTENUATION
- MA MONITORED ATTENUATION

0 400 800

APPROXIMATE SCALE IN FEET

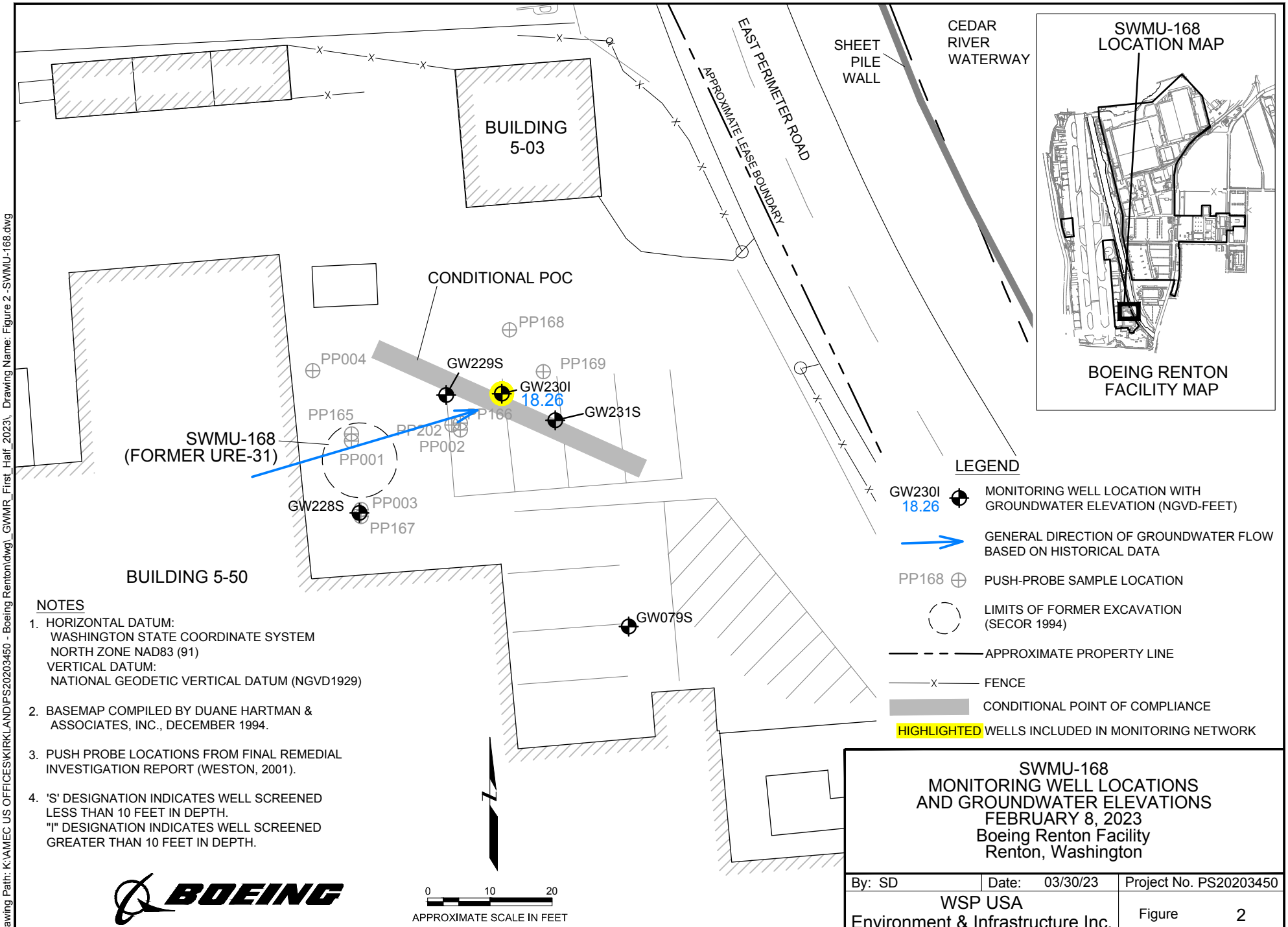
BOEING

RENTON SWMU AND AOC LOCATIONS

Boeing Renton Facility
Renton, Washington

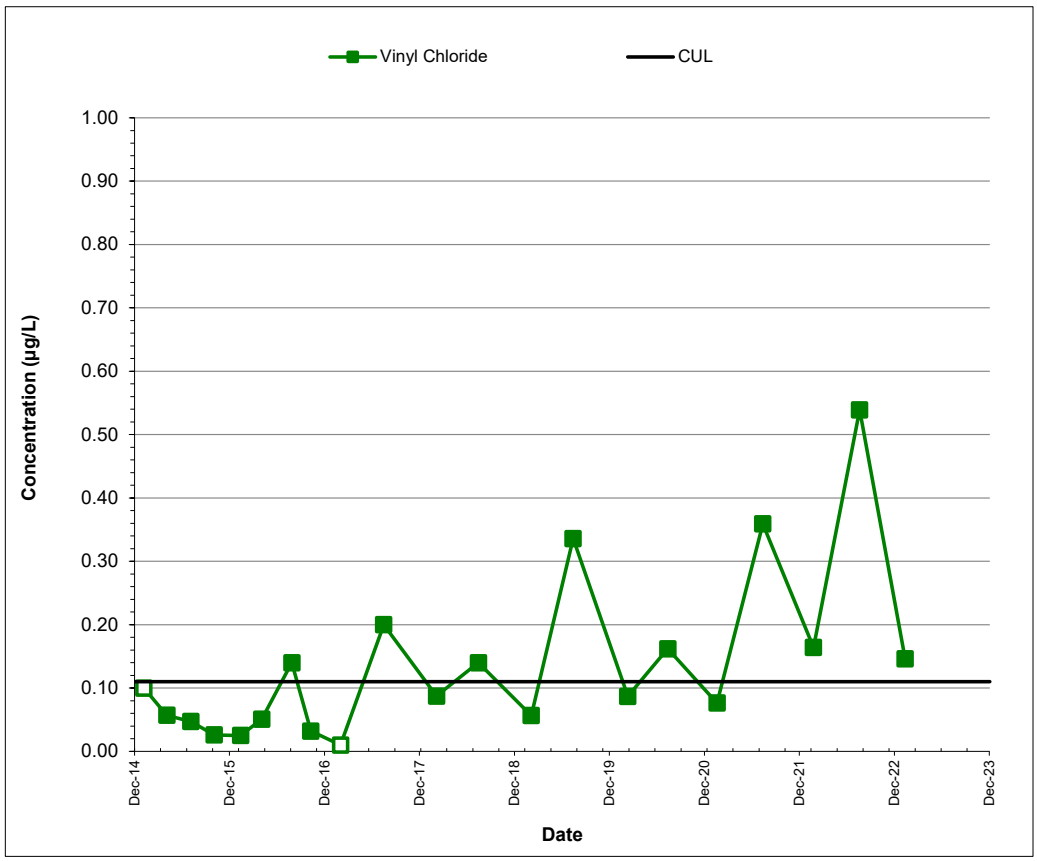
By: APS/SD	Date: 05/19/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.		Figure 1

Plot Date: 05/19/23 - 8:16am Plotted by: stephane.descombes
Drawing Path: K:\AMEC US OFFICES\KIRKLAND\PS20203450 - Boeing Renton\dwg_GWMR_First_Half_2023_Drawing Name: Figure 1 - Site Map.dwg



SWMU-168
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
FEBRUARY 8, 2023
Boeing Renton Facility
Renton, Washington

By: SD	Date: 03/30/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.	Figure	2

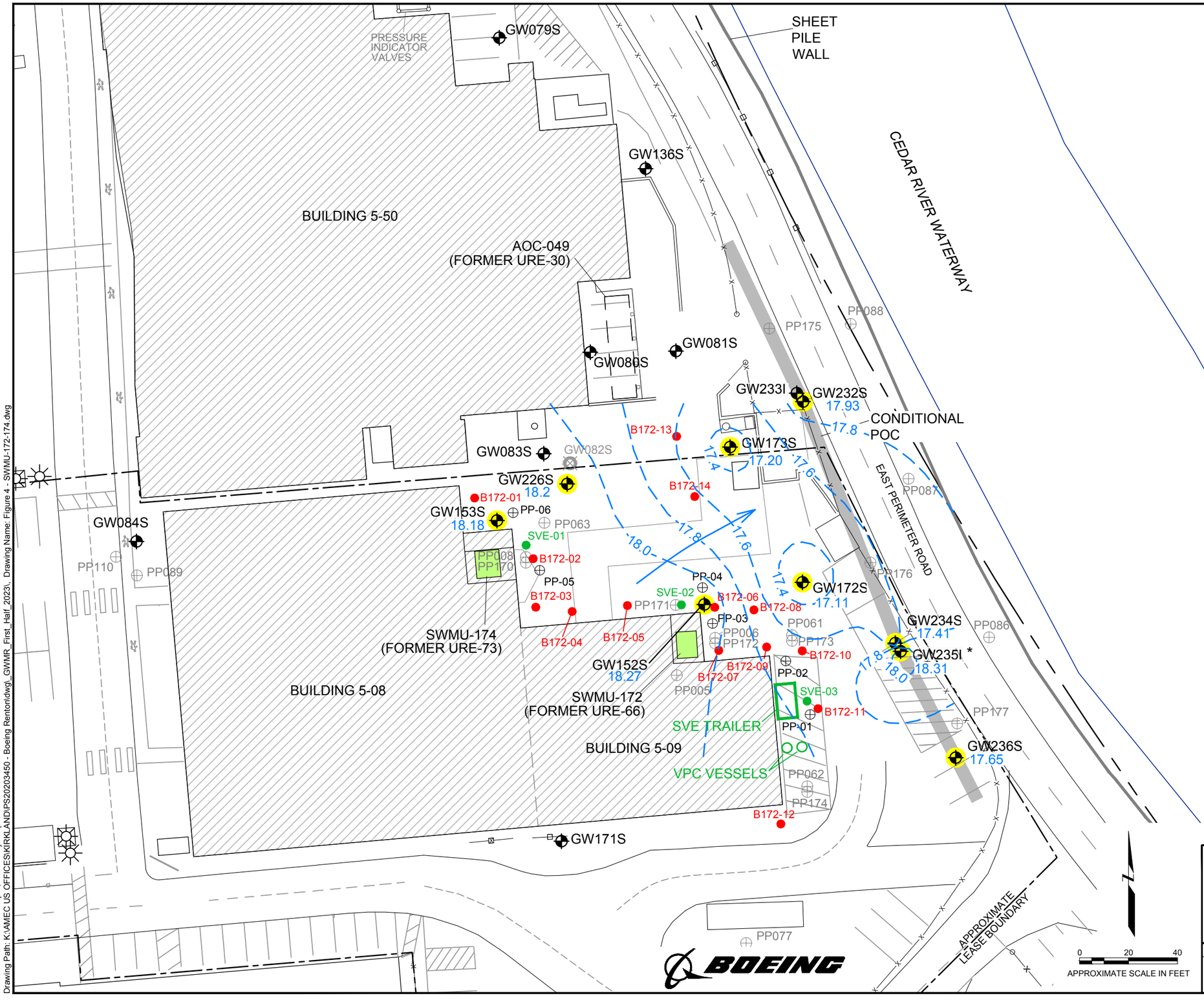


Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

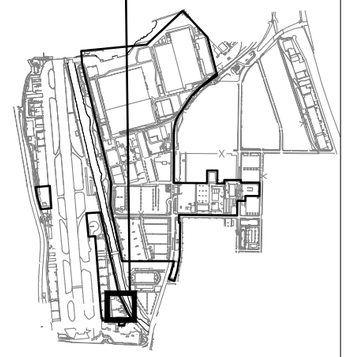
CPOC AREA WELL GW230I

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\[Boeing_Renton_Charts (3-34).xlsm]Figure 30

	SWMU-168 TREND PLOT FOR CPOC AREA WELL GW230I Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 3



SWMU-172 AND SWMU-174 LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

- GW173S 16.52 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- * — WELL SCREENED IN UPPER AND LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- 17.7 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- GW082S — DECOMMISSIONED MONITORING WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- SOLID WASTE MANAGEMENT UNIT (SWMU)
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK
- SVE-02 — SVE WELL
- B172-10 — BIOREMEDIATION INJECTION WELL
- PP171 — PUSH PROBE SAMPLING LOCATION
- PP-01 — PUSH PROBE SAMPLE LOCATION COMPLETED IN JUNE 2018

NOTES

1. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE NAD83 (91)
   VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED GREATER THAN 20 FEET IN DEPTH.

SWMU-172 AND SWMU-174 MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS FEBRUARY 8, 2023

Boeing Renton Facility
Renton, Washington

By: SD	Date: 03/30/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.		Figure 4

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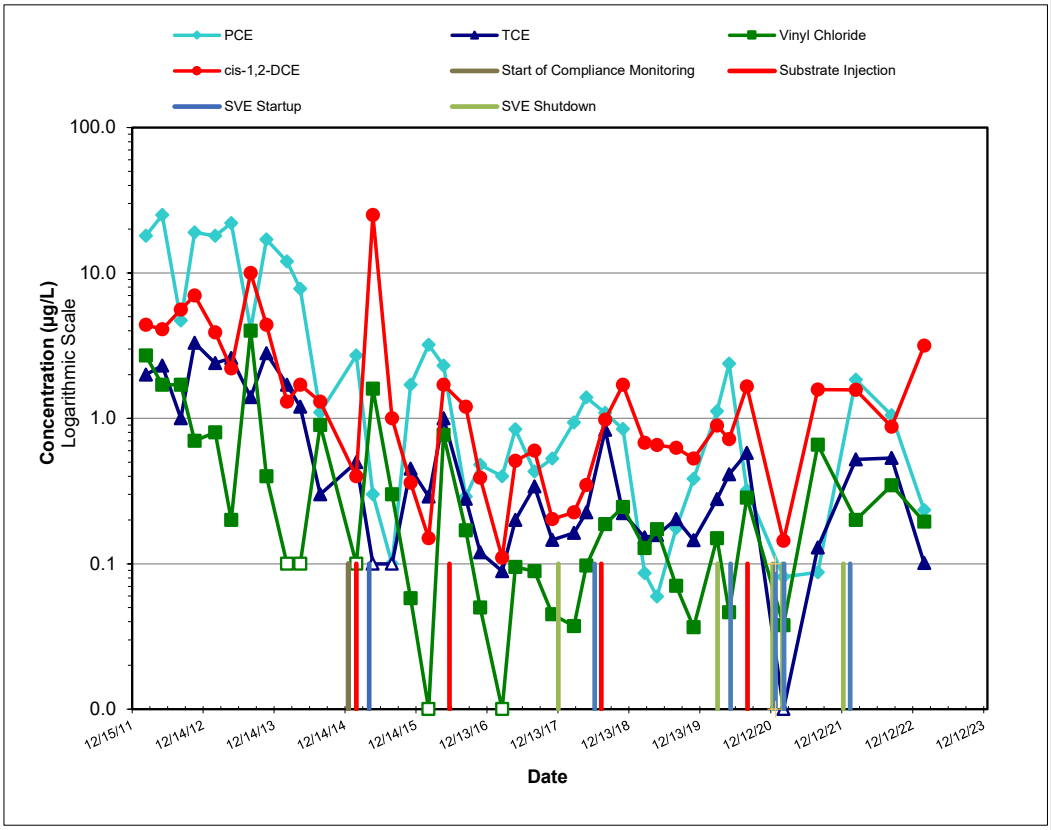
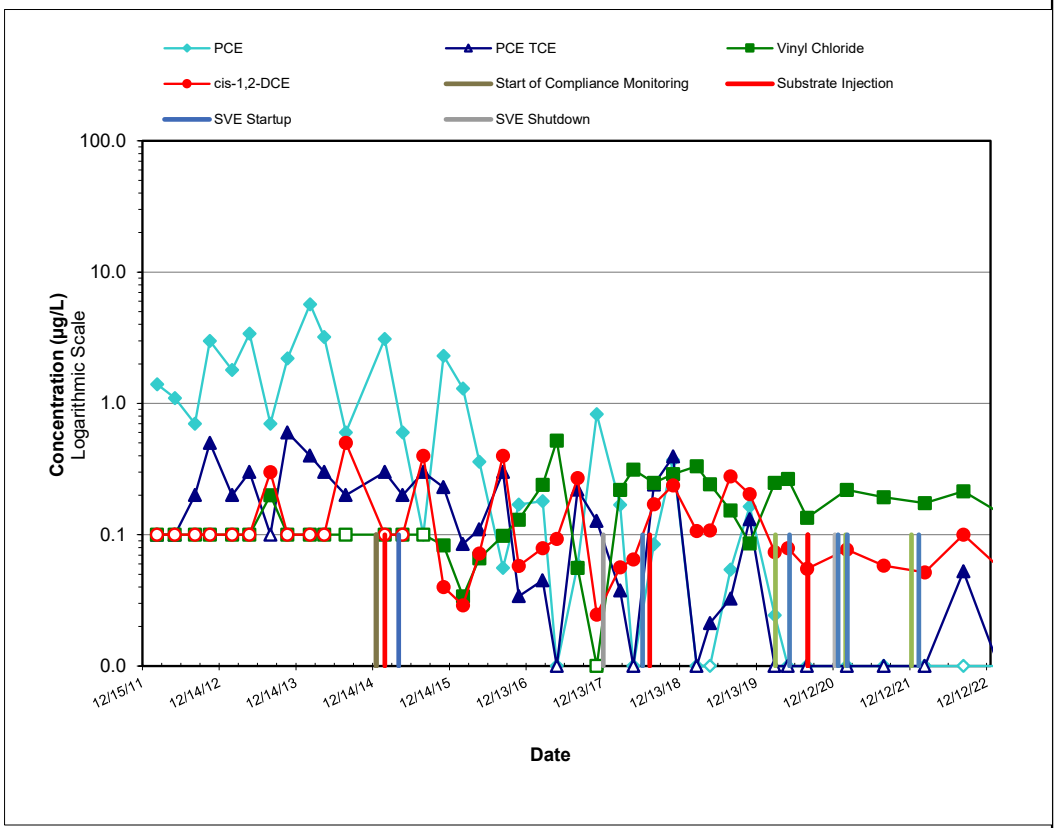


SOURCE AREA WELL GW152S

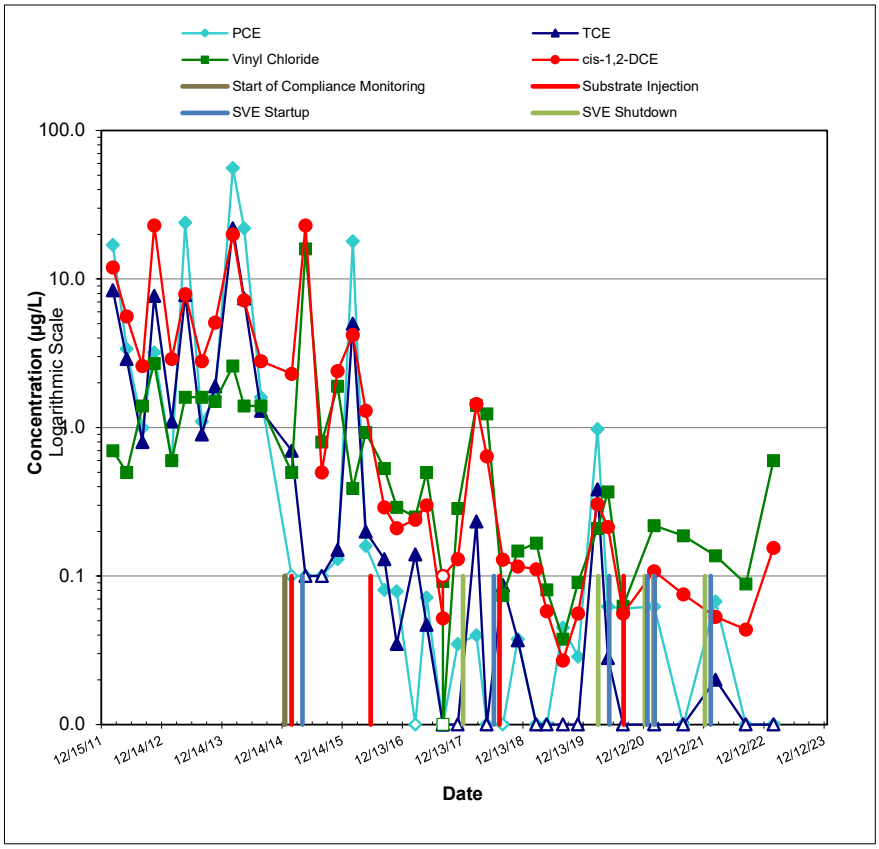


SOURCE AREA WELL GW153S

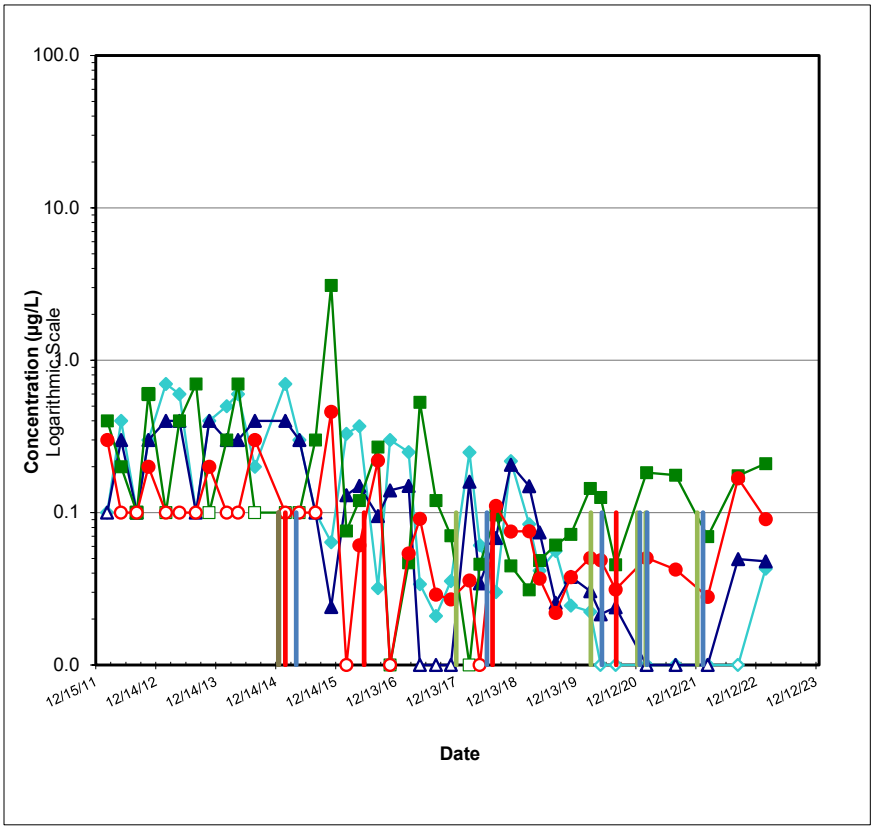
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

wsp	SWMU-172 AND SWMU-174 TREND PLOTS FOR SOURCE AREA WELLS GW152S AND GW153S Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 5

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\[Boeing_Renton_Charts (3-34).xlsm]Figure 30



DOWNGRADIENT PLUME AREA WELL GW172S

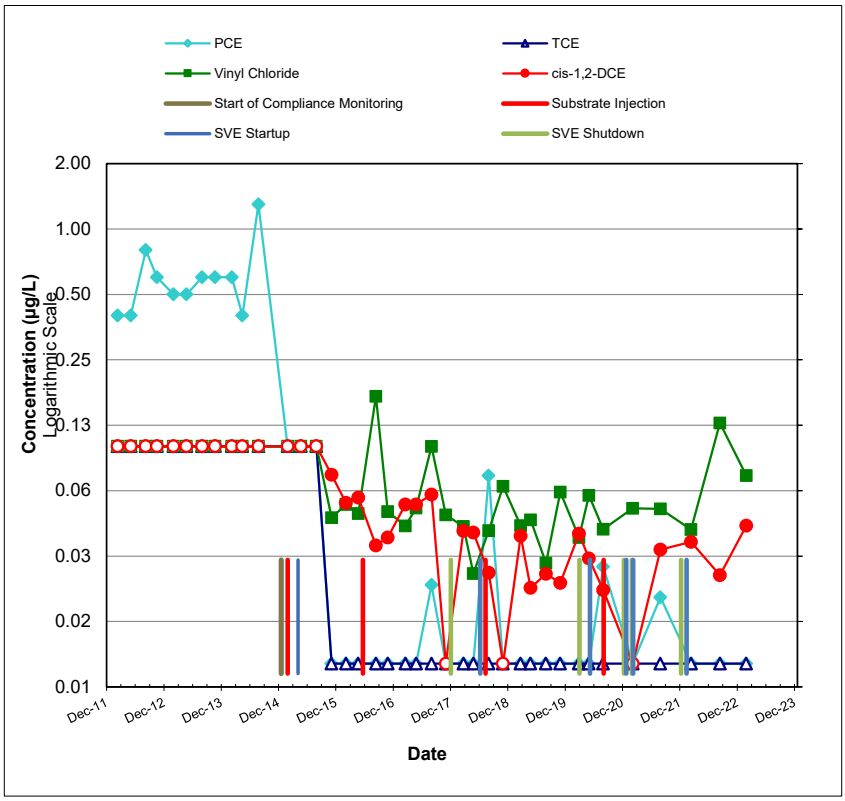


DOWNGRADIENT PLUME AREA WELL GW173S

Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

wsp	SWMU-172 AND SWMU-174 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW172S AND GW173S Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 6

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\[Boeing_Renton_Charts (3-34).xlsm]Figure 30

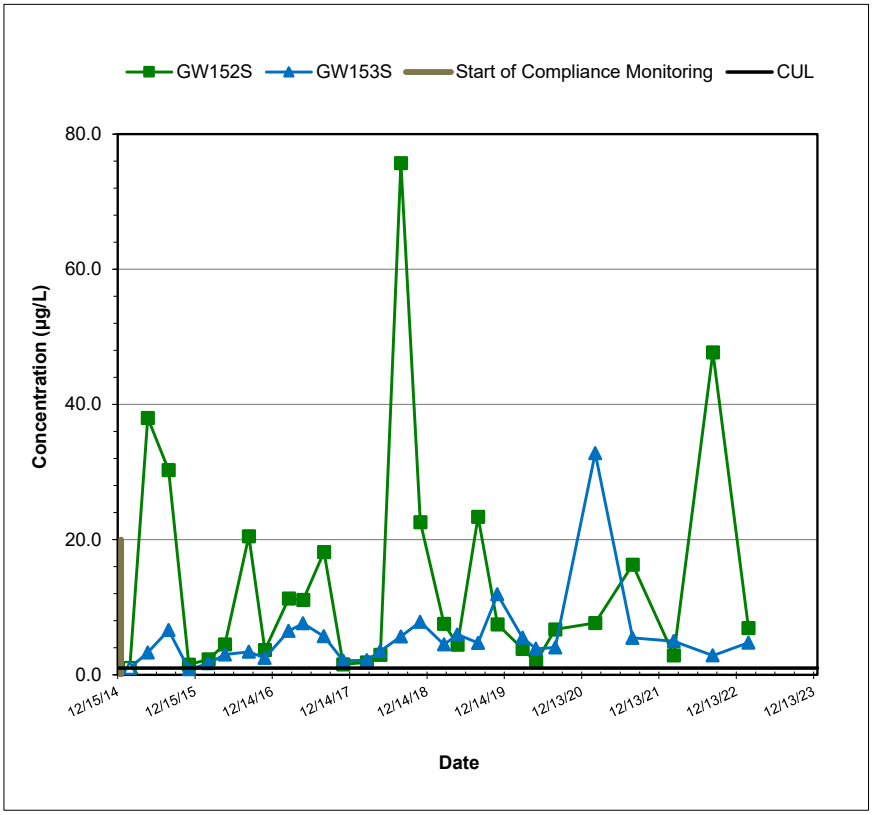


Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

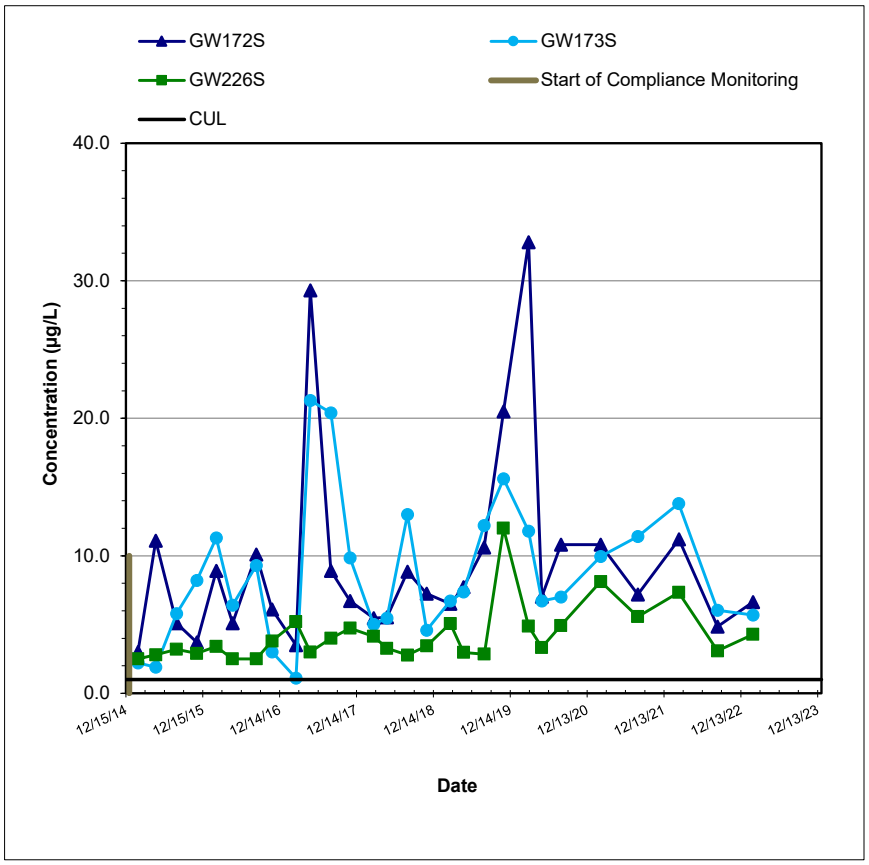
DOWNGRADIENT PLUME AREA WELL GW226S

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\[Boeing_Renton_Charts (3-34).xlsm]Figure 30

wsp	SWMU-172 AND SWMU-174 TREND PLOT FOR DOWNGRADIENT PLUME AREA WELL GW226S Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 7



TOTAL ARSENIC IN SOURCE AREA WELLS

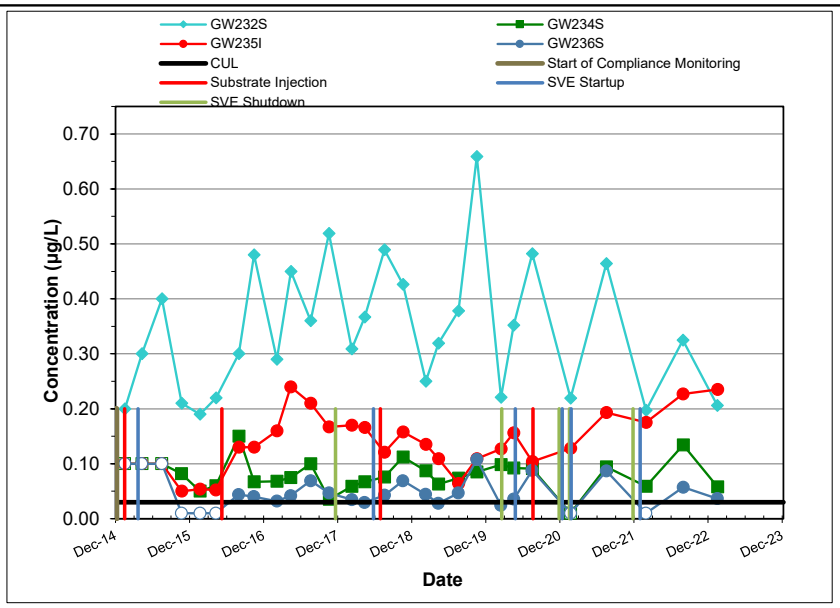


TOTAL ARSENIC IN DOWNGRADIENT PLUME AREA WELLS

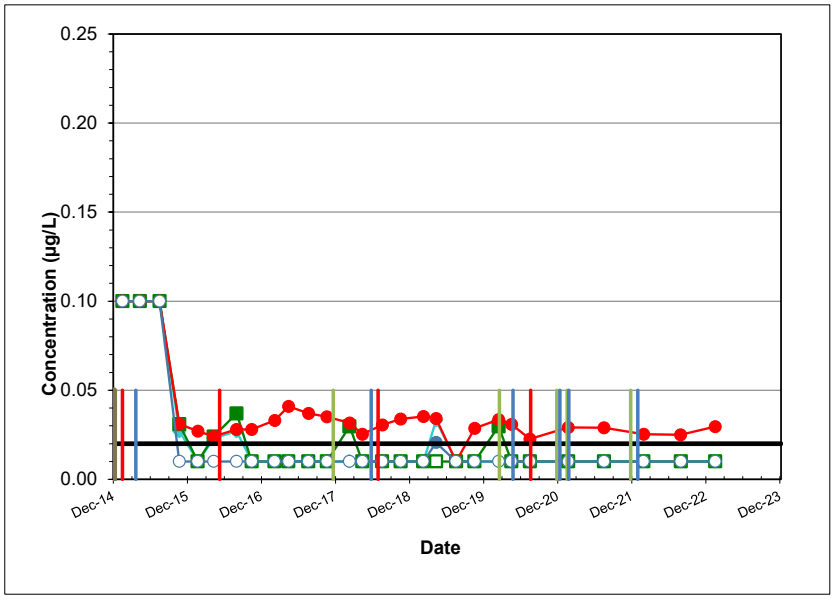
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

wsp	SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC IN SELECT SOURCE AREA AND DOWNGRADIENT PLUME AREA WELLS Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 8

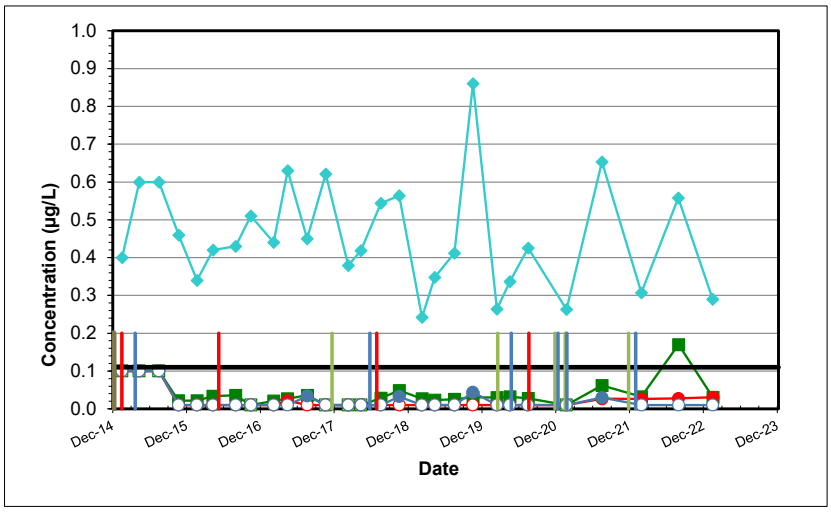
\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



cis-1,2-Dichloroethene



Trichloroethene



Vinyl Chloride

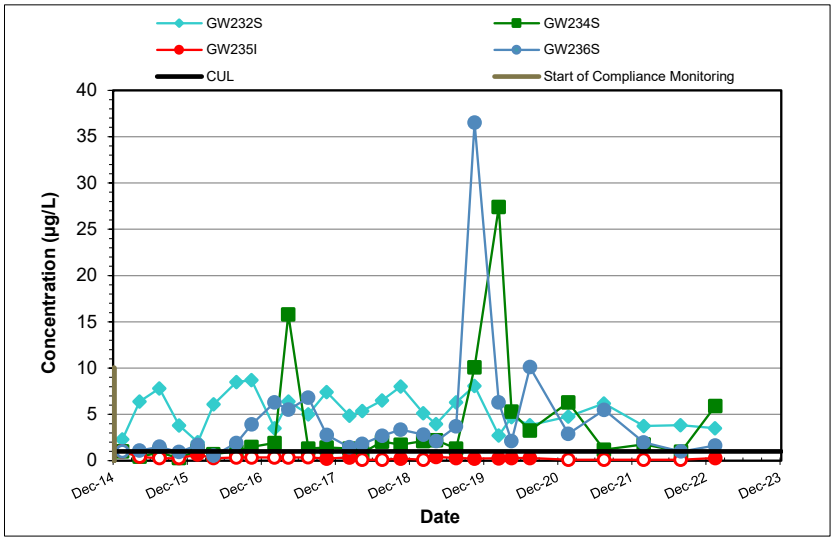
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

SWMU-172 AND SWMU-174 TREND PLOTS FOR CIS-1,2-DICHLROETHENE, TRICHLOROETHENE, AND VINYL CHLORIDE IN CPOC AREA WELLS
Boeing Renton Facility, Renton, Washington

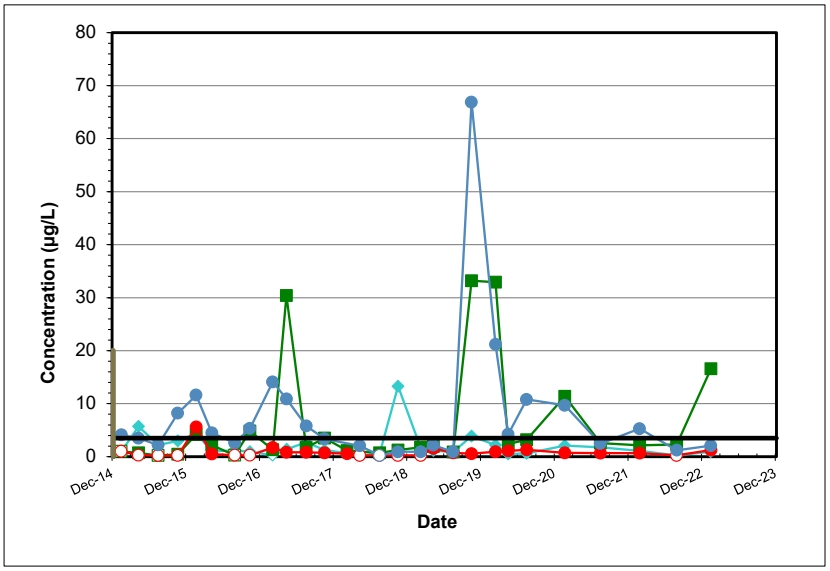
Project No. PS2020345 0

Figure 9

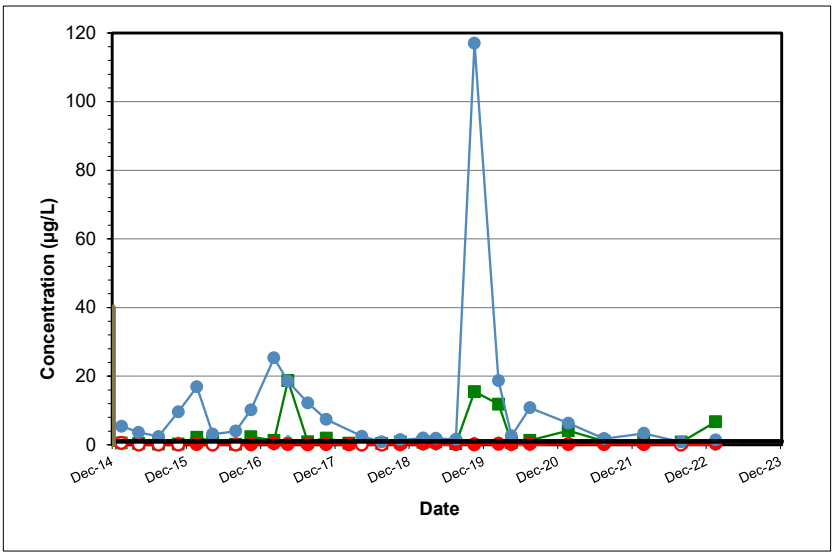
\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



Arsenic



Copper



Lead

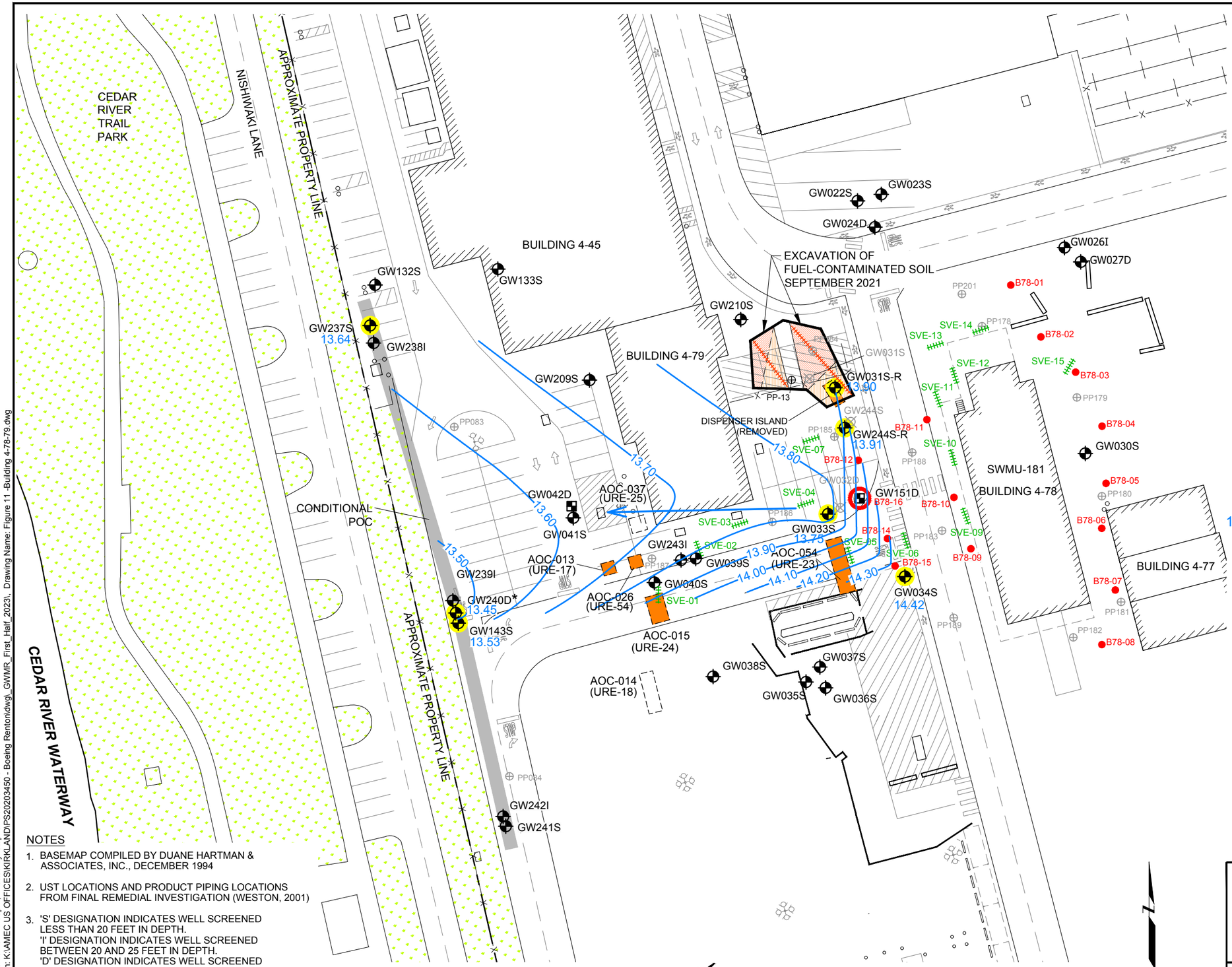
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

SWMU-172 AND SWMU-174 TREND PLOTS FOR ARSENIC, COPPER AND LEAD IN CPOC AREA WELLS
Boeing Renton Facility, Renton, Washington

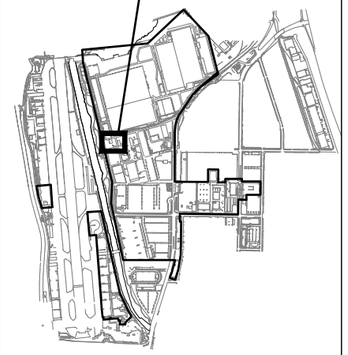
Project No. PS20203450

Figure 10

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



4-78/79 SWMU/AOC GROUP LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

- GW033S 14.20 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- NM — NOT MEASURED: SURVEY INFORMATION FOR REPLACEMENT WELLS NOT YET AVAILABLE.
- * — WELL SCREENED IN UPPER AND LOWER PORTION OF AQUIFER, SO WATER LEVEL IS NOT USED FOR CONTOURING.
- 14.30 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL GROUNDWATER FLOW DIRECTION
- GW042D — EXTRACTION WELL
- GW032D — DECOMMISSIONED MONITORING WELL
- SVE-15 — HORIZONTAL SVE WELL
- HORIZONTAL BIOREMEDIATION INJECTION WELL
- B78-12 — BIOREMEDIATION INJECTION WELL
- EXTRACTION WELL CONVERTED TO INJECTION WELL
- PP083 — PUSH-PROBE SAMPLE LOCATION
- FENCE
- APPROXIMATE FUEL AND NON-CHLORINATED VOC SOURCE AREAS
- REMOVED UST (WESTON, 2001)
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

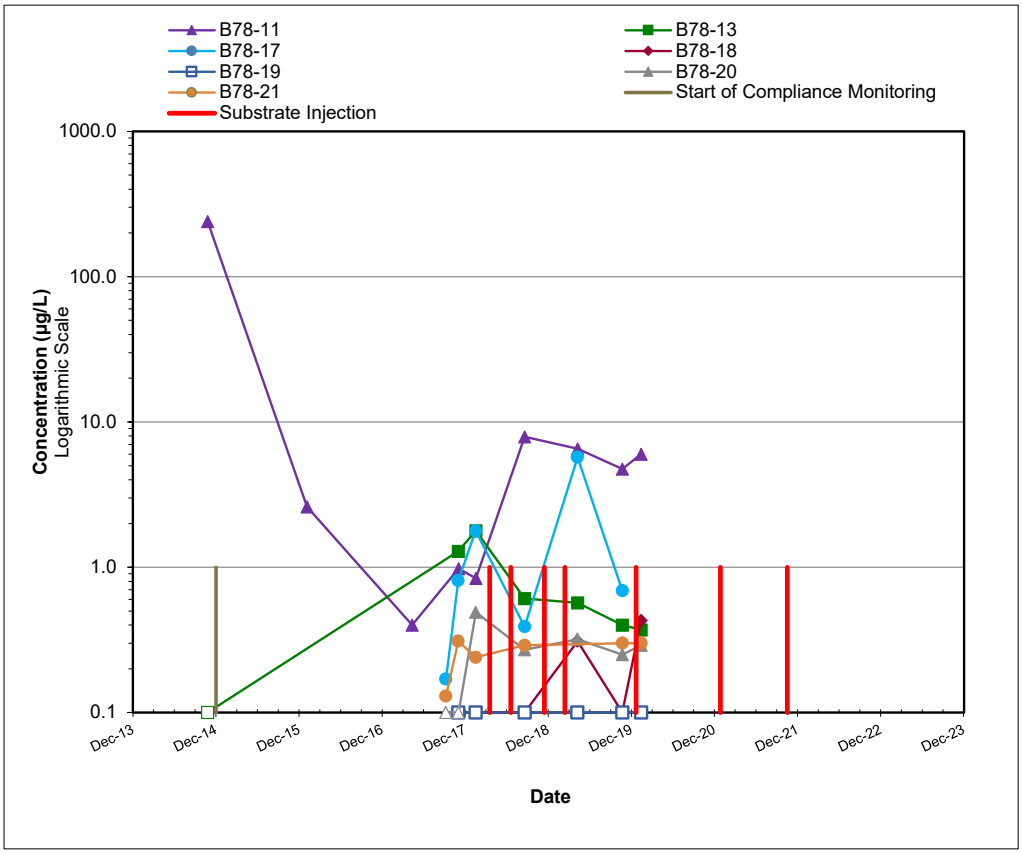
1. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994
2. UST LOCATIONS AND PRODUCT PIPING LOCATIONS FROM FINAL REMEDIAL INVESTIGATION (WESTON, 2001)
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED BETWEEN 20 AND 25 FEET IN DEPTH.
   'D' DESIGNATION INDICATES WELL SCREENED GREATER THAN 25 FEET IN DEPTH.
4. THE GROUNDWATER FLOW DIRECTION SHOWN IS BASED ON HISTORICAL GROUNDWATER DATA.

BOEING

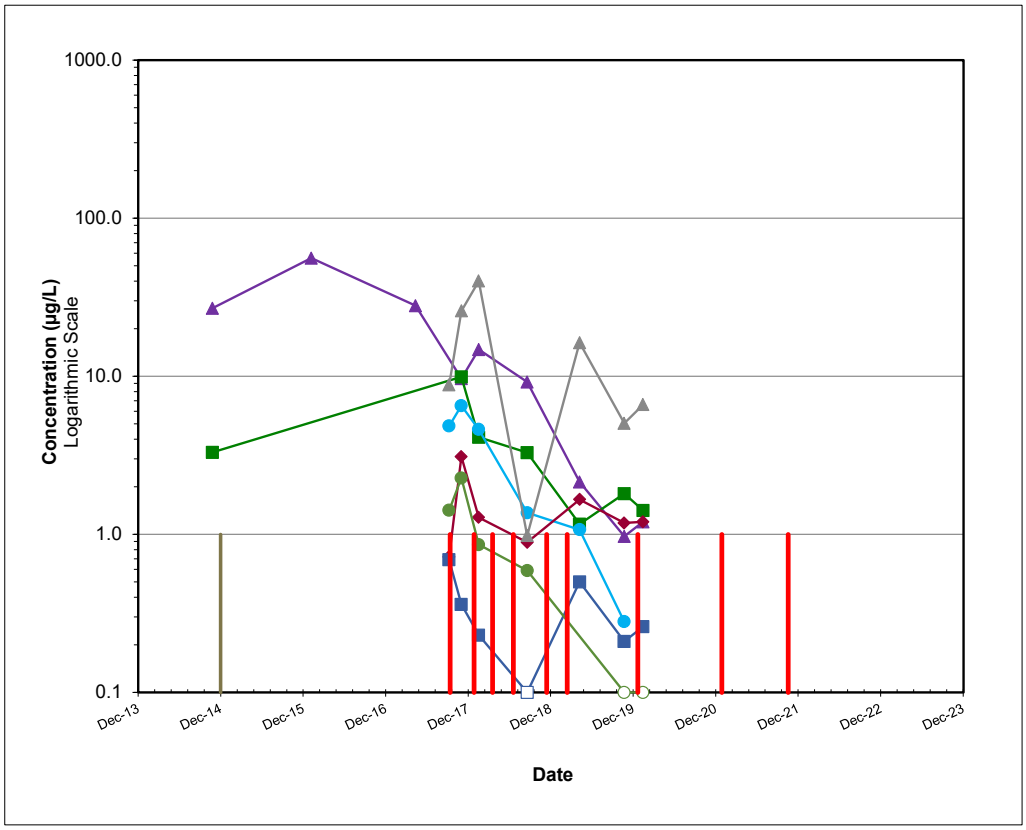
BUILDING 4-78/79 SWMU/AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS AUGUST 23, 2022 Boeing Renton Facility Renton, Washington

By: SD	Date: 05/23/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.		Figure 11

Plot Date: 05/23/23 - 12:59pm, Plotted by: stephane.descombes
Drawing Path: K:\AMEC US OFFICES\KIRKLAND\PS20203450 - Boeing Renton\dwg_GWMR_First_Half_2023\, Drawing Name: Figure 11 -Building 4-78-79.dwg



cis-1,2-Dichloroethene



Benzene

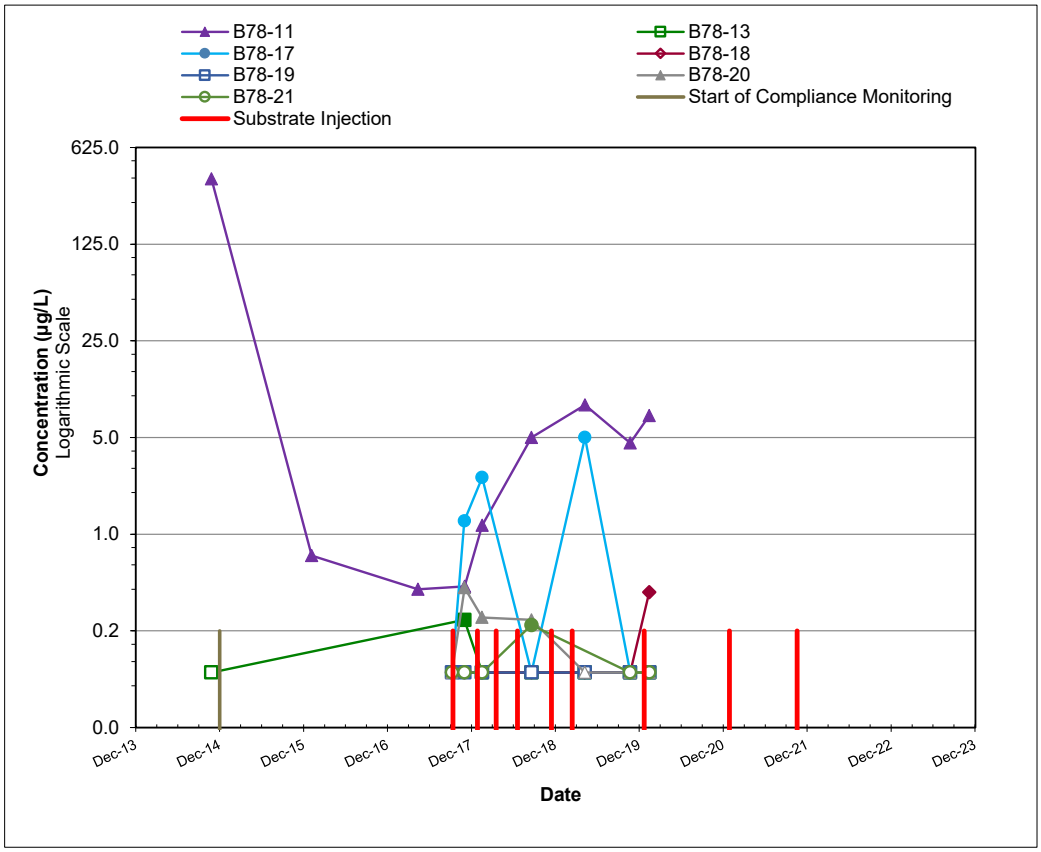
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR
CIS-1,2-DICHLOROETHENE AND BENZENE
IN INJECTION WELLS
Boeing Renton Facility, Renton, Washington

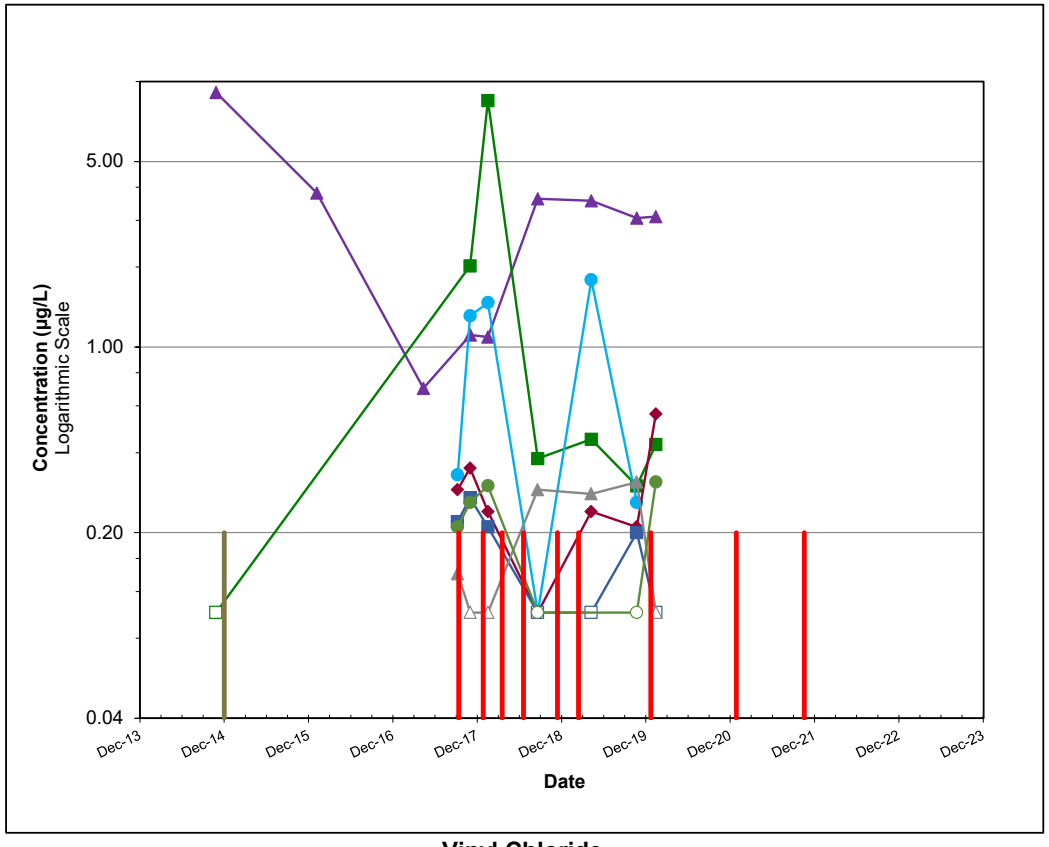
Project No.
PS20203450

Figure
12

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



Trichloroethene



Vinyl Chloride

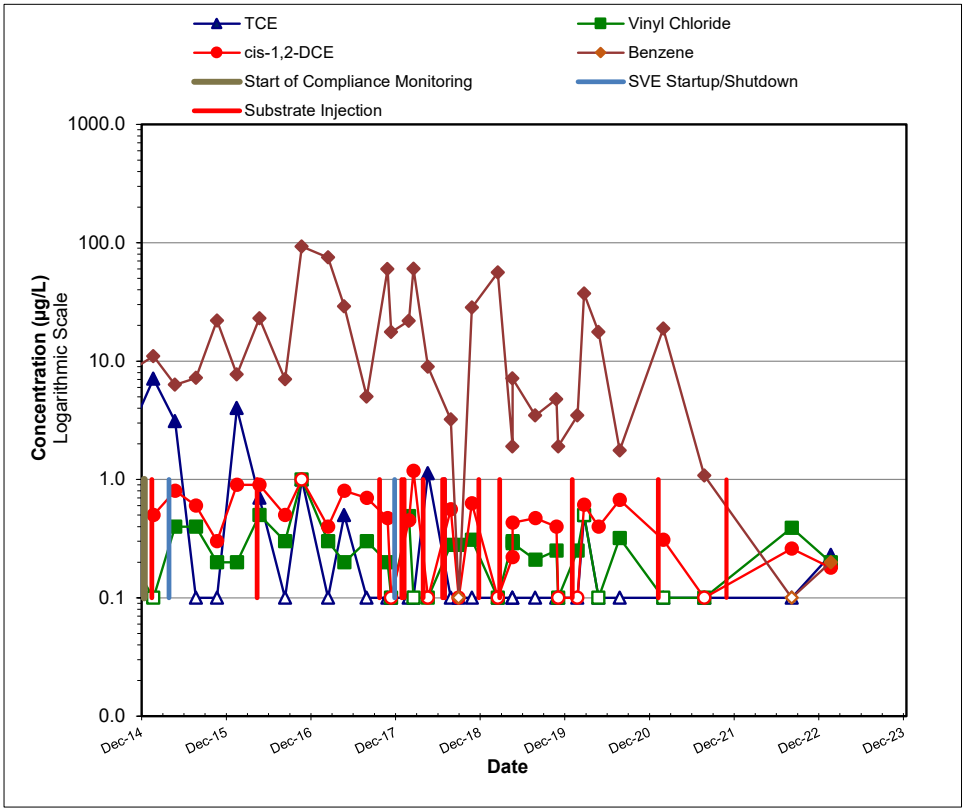
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR TRICHLOROETHENE AND VINYL CHLORIDE IN INJECTION WELLS
Boeing Renton Facility, Renton, Washington

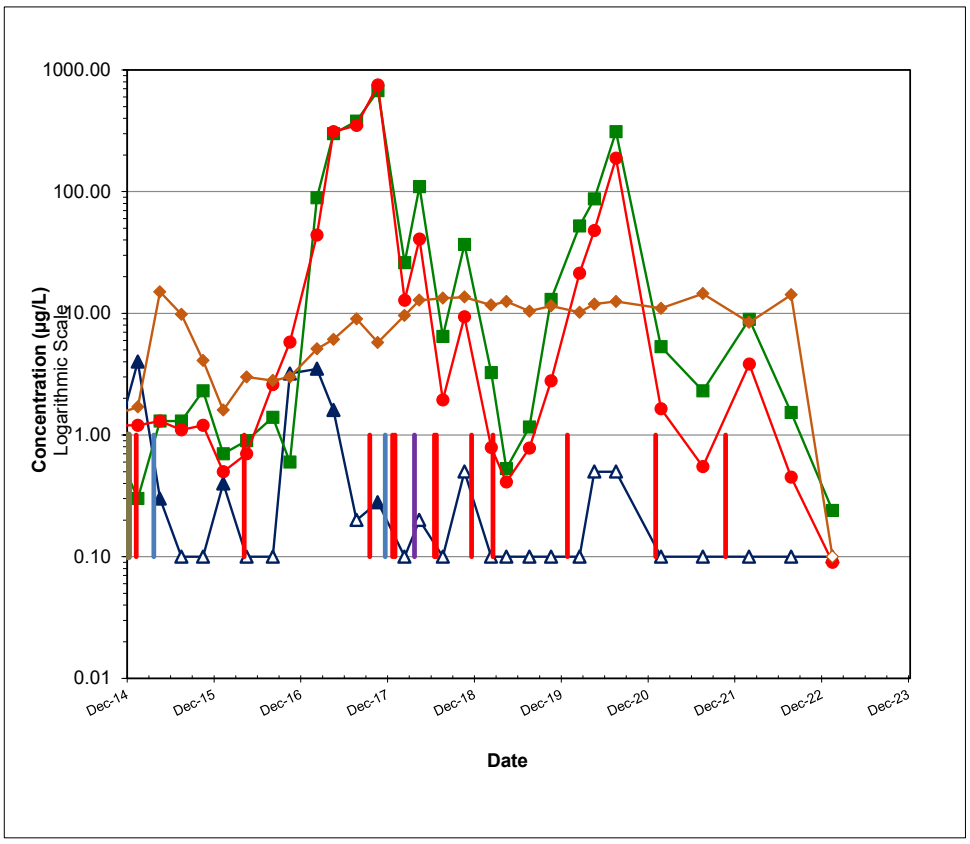
Project No. PS20203450

Figure 13

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



SOURCE AREA WELL GW031S

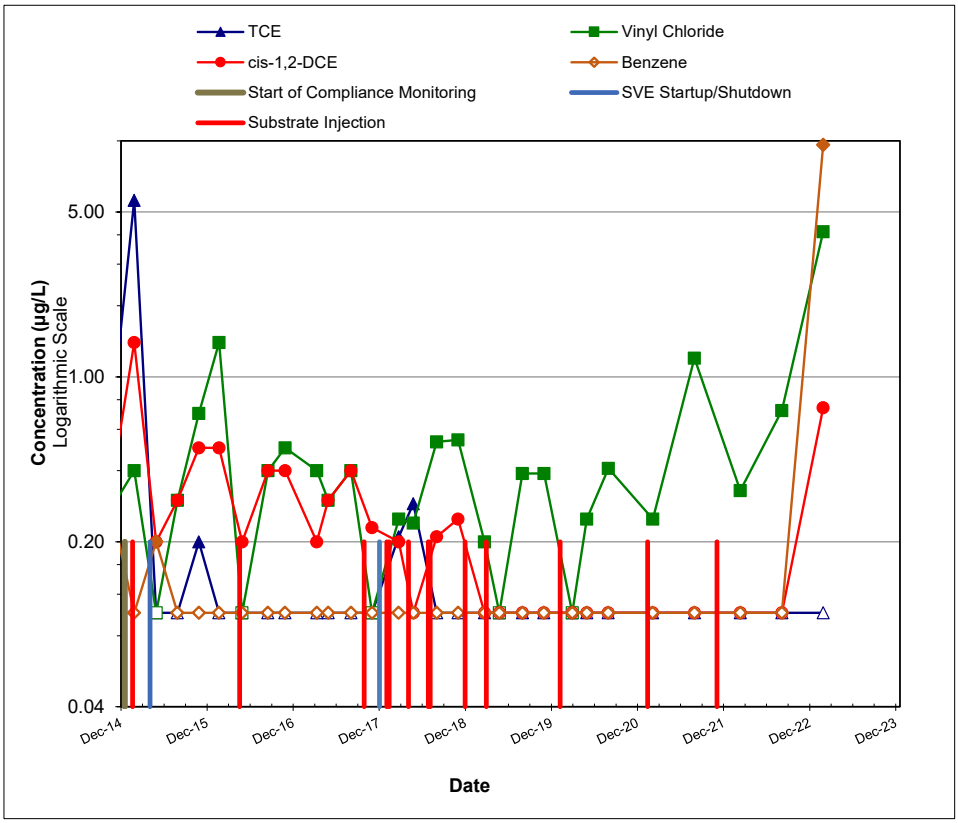


SOURCE AREA WELL GW033S

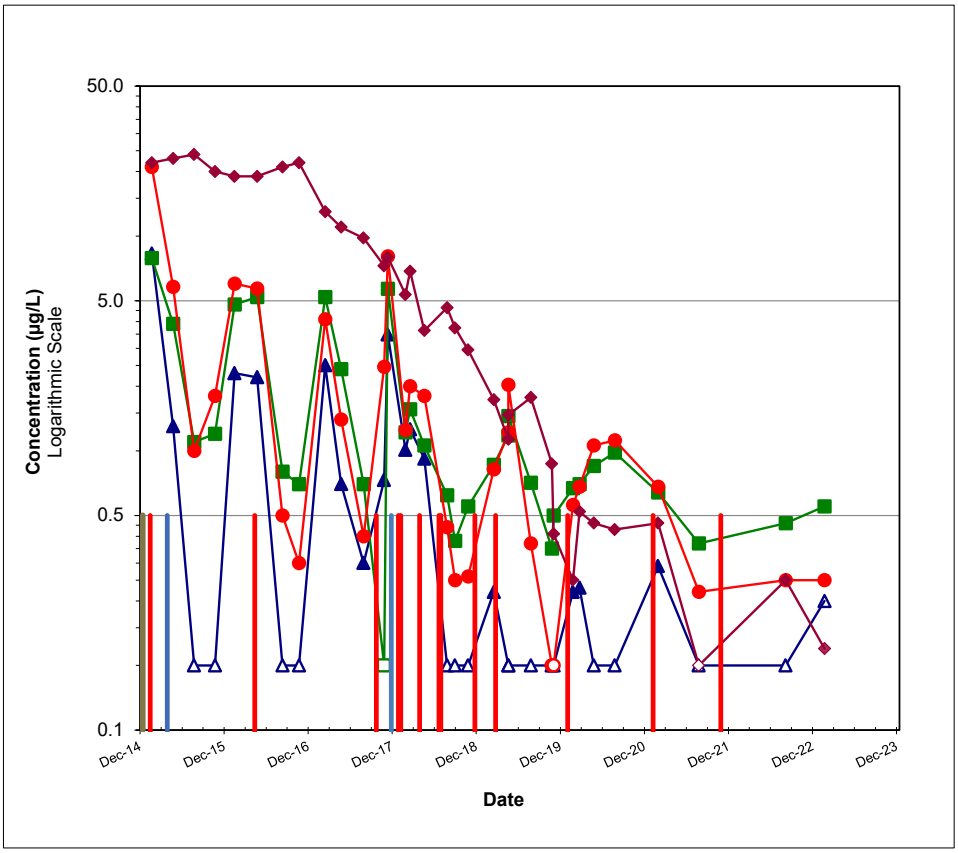
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

wsp	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELLS GW031S AND GW033S Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 14

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



SOURCE AREA WELL GW034S

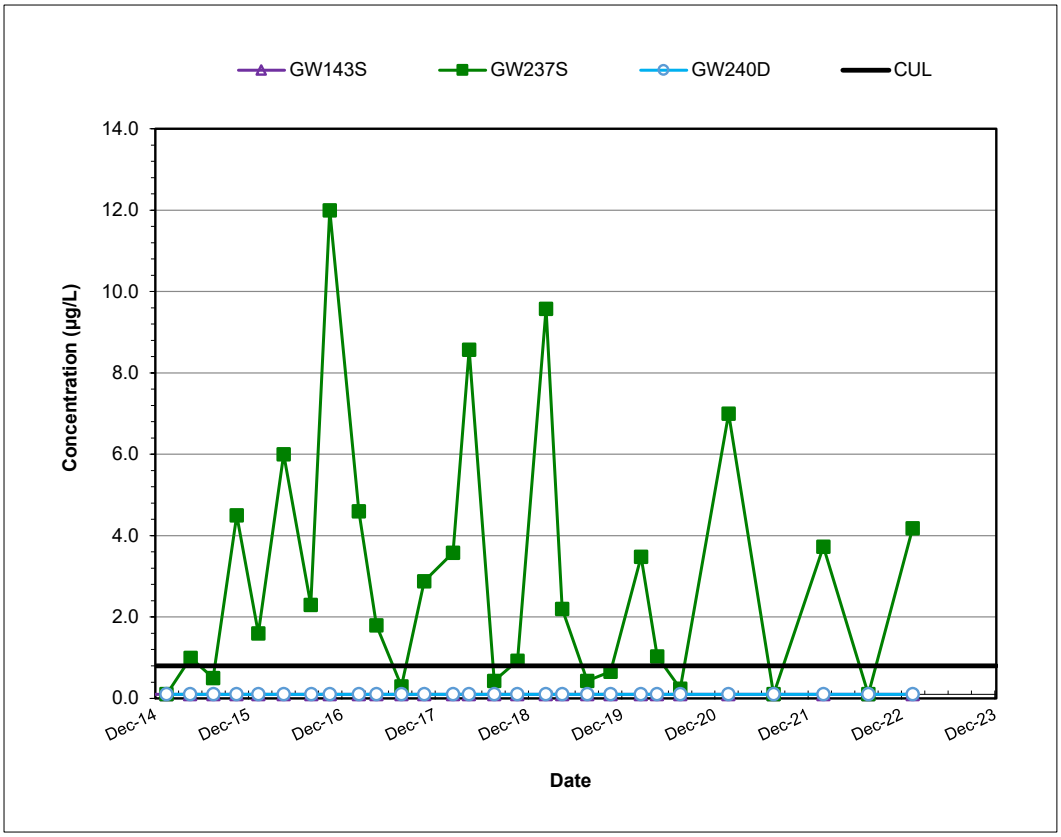


SOURCE AREA WELL GW244S

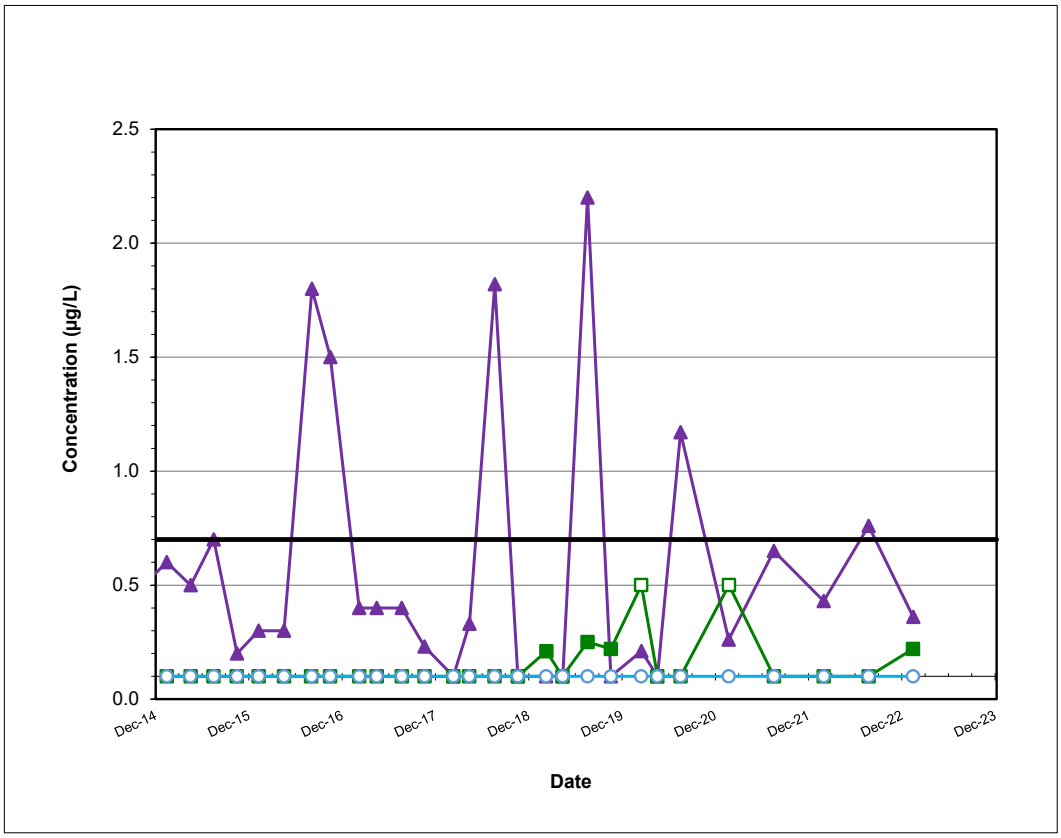
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

wsp	BLDG 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR SOURCE AREA WELLS GW034S AND GW244S Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 15

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



Benzene



cis-1,2-Dichloroethene

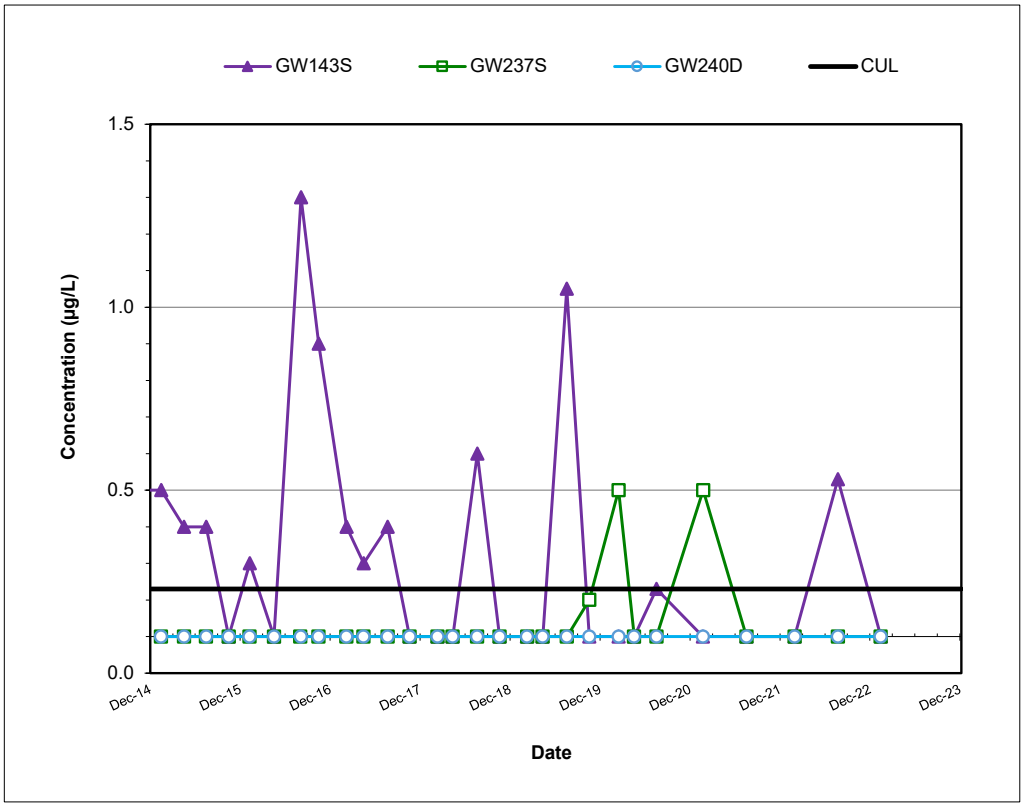
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR BENZENE AND CIS-1,2-DICHLOROETHENE IN CPOC AREA WELLS
Boeing Renton Facility, Renton, Washington

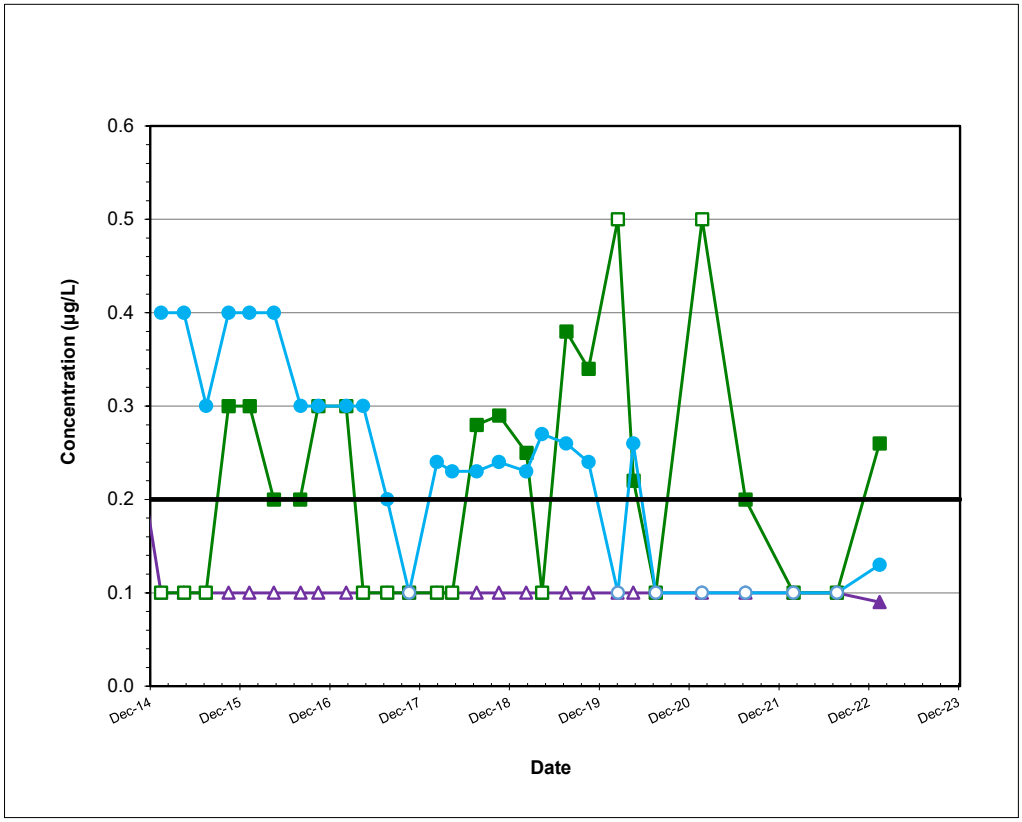
Project No. PS20203450

Figure 16

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



Trichloroethene



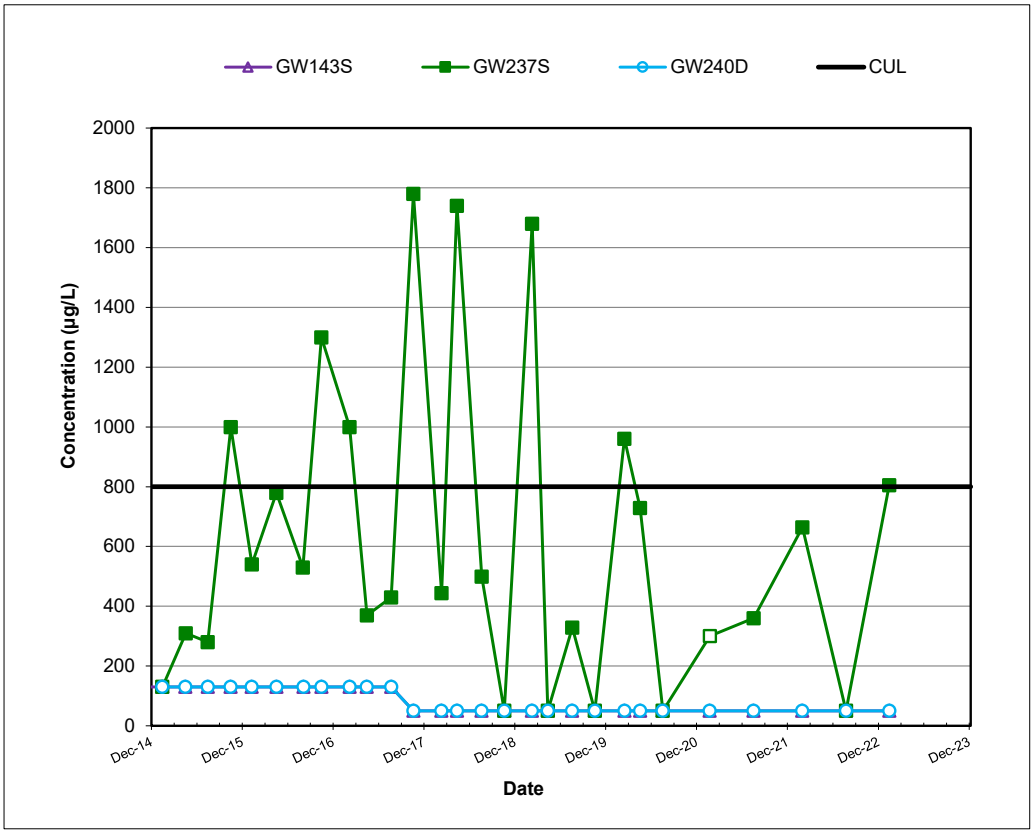
Vinyl Chloride

Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR TRICHLOROETHENE AND VINYL CHLORIDE IN CPOC AREA WELLS
Boeing Renton Facility, Renton, Washington

Project No. PS20203450

Figure 17



TPH as Gasoline

Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

	BUILDING 4-78/79 SWMU/AOC GROUP TREND PLOTS FOR TPH AS GASOLINE IN CPOC AREA WELLS Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 18

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm

CONDITIONAL POC

GW184S

GW225I

GW183S

GW258S

GW222S

SHEET PILE WALL

CEDAR RIVER WATERWAY

East Perimeter Road

GW221S
18.25

GW211S
18.21

BUILDING 5-02

HANGAR

PP077 PP078 PP079 PP200 PP201 PP202 PP203 PP204 PP205 PP206 PP207 PP208 PP209 PP210 PP211 PP212 PP213 PP214 PP215 PP216 PP217 PP218 PP219 PP226 PP227 PP403 PP404 PP405 PP406 PP407 PP411 PP412 PP413 PP414 PP415 PP416 PP417 PP418 PP419 PP420 PP421 PP422 PP423 PP424 PP425 PP426 PP427 PP428 PP429 PP430 PP431 PP432 PP433

AS-201 AS-203 AS-204 AS-205 AS-206 AS-207 AS-208 AS-209 AS-210 AS-211 AS-212 AS-213 AS-214 AS-215 AS-216 AS-217

BV101 BV103 BV104 BV105 BV106 BV107 BV108 BV109 BV110 BV111 BV112

EXISTING GASOLINE PUMP

UNDERGROUND GRAVITY SEPARATOR

PROPANE

UNDERGROUND OIL/WATER SEPARATOR

EXISTING UNDERGROUND GASOLINE TANK

GW101S GW102S GW212S GW219S GW220S GW223S GW255S GW256S GW257S

GW224S
17.64

FORMER BUILDING

NEW BUILDING

FORMER FUEL FARM

APPROXIMATE TANK CLOSURE EXCAVATION LIMITS (WESTON, 1994)

AOC-046 (FORMER URE-33)

AOC-047 (FORMER URE-34)

AOC-048 (FORMER URE-35)

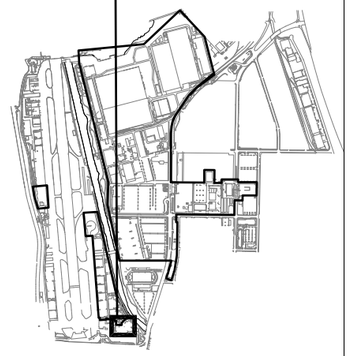
(FORMER URE-36)

FUEL FARM

FH

STRP

FORMER FUEL FARM AOC GROUP LOCATION MAP



BOEING RENTON FACILITY MAP

LEGEND

- GW224S 16.81 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- GENERAL DIRECTION OF GROUNDWATER FLOW BASED ON HISTORICAL DATA
- PP042 — PUSH PROBE LOCATION
- GW222S — DECOMMISSIONED GROUNDWATER MONITORING WELL
- AS-204 — FORMER UNDERGROUND AIR SPARGING WELL
- BV112 — FORMER UNDERGROUND BIOVENTING WELL
- FORMER UNDERGROUND BIOVENTING LINE
- FORMER UNDERGROUND AIR SPARGING LINE
- FENCE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM
   (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH-PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
4. PIPING LOCATIONS APPROXIMATE.
5. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED GREATER THAN 20 FEET IN DEPTH.
6. THE GROUNDWATER FLOW DIRECTION SHOWN IS BASED ON HISTORICAL GROUNDWATER DATA.

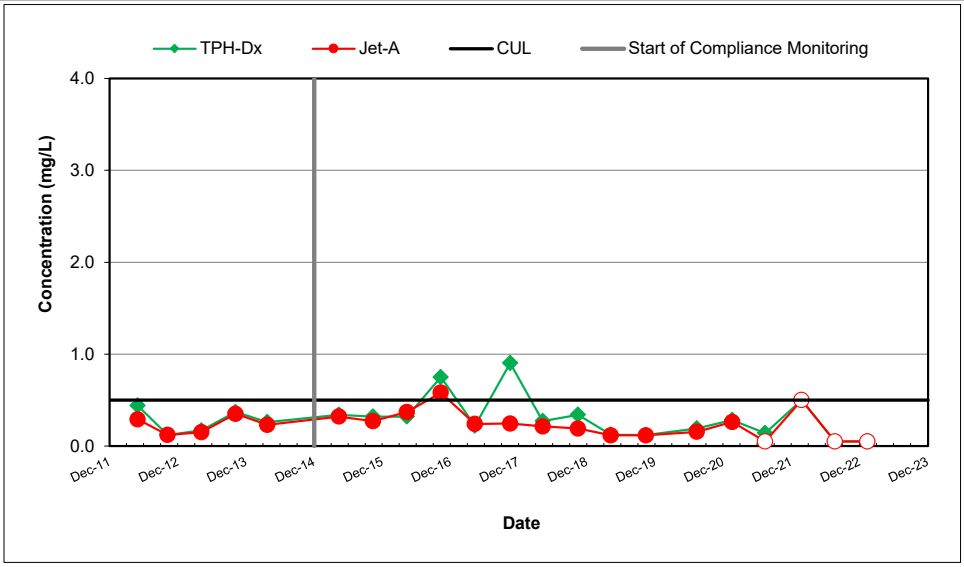
0 20 40
APPROXIMATE SCALE IN FEET

FORMER FUEL FARM AOC GROUP MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS FEBRUARY 9, 2023

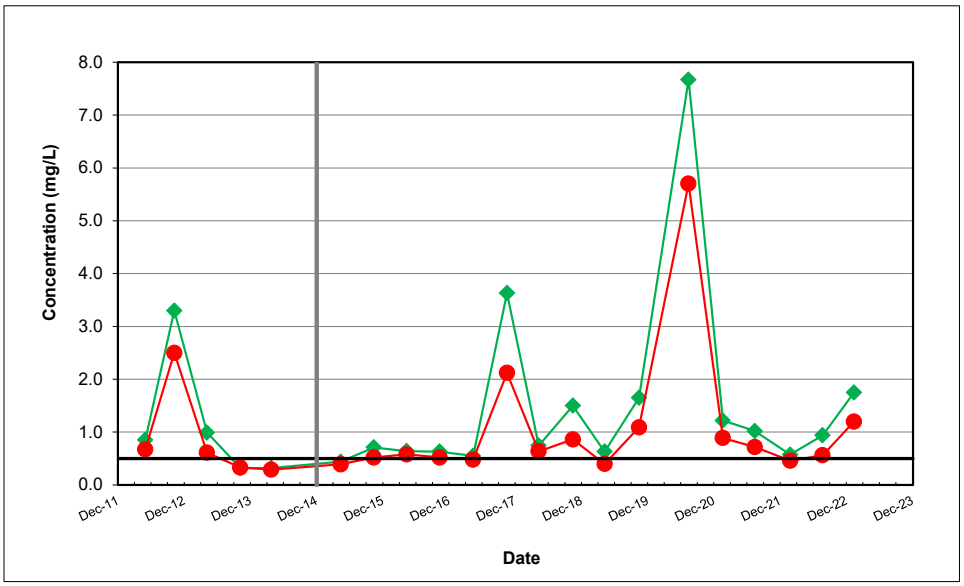
Boeing Renton Facility
Renton, Washington

By: SD	Date: 03/31/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.	Figure 19	

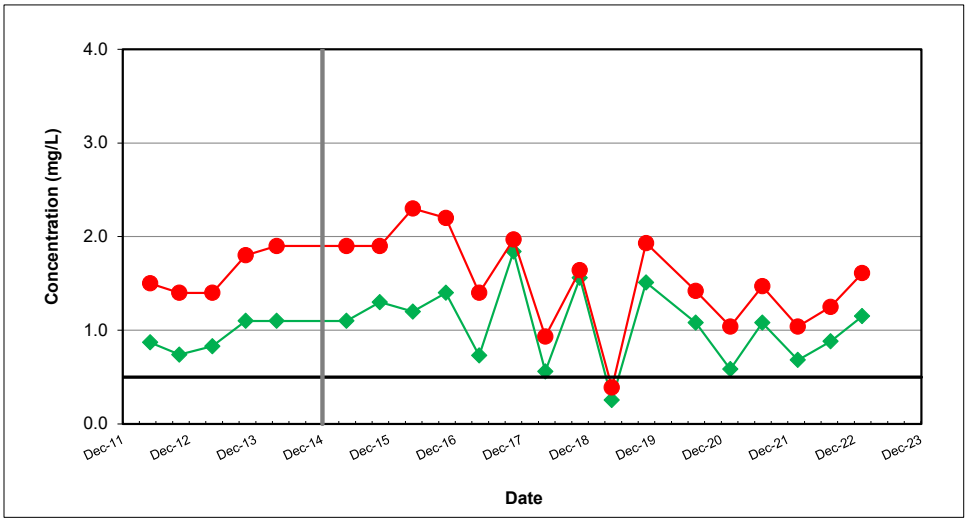
Plot Date: 03/31/23 - 7:55am Plotted by: stephane.descombes
Drawing Path: K:\AMEC US OFFICES\KIRKLAND\PS20203450 - Boeing Renton\dwg_GWMR_First_Half_2023_Drawing Name: Figure 19 - Former Fuel Farm.dwg



CPOC WELL GW211S



CPOC WELL GW221S

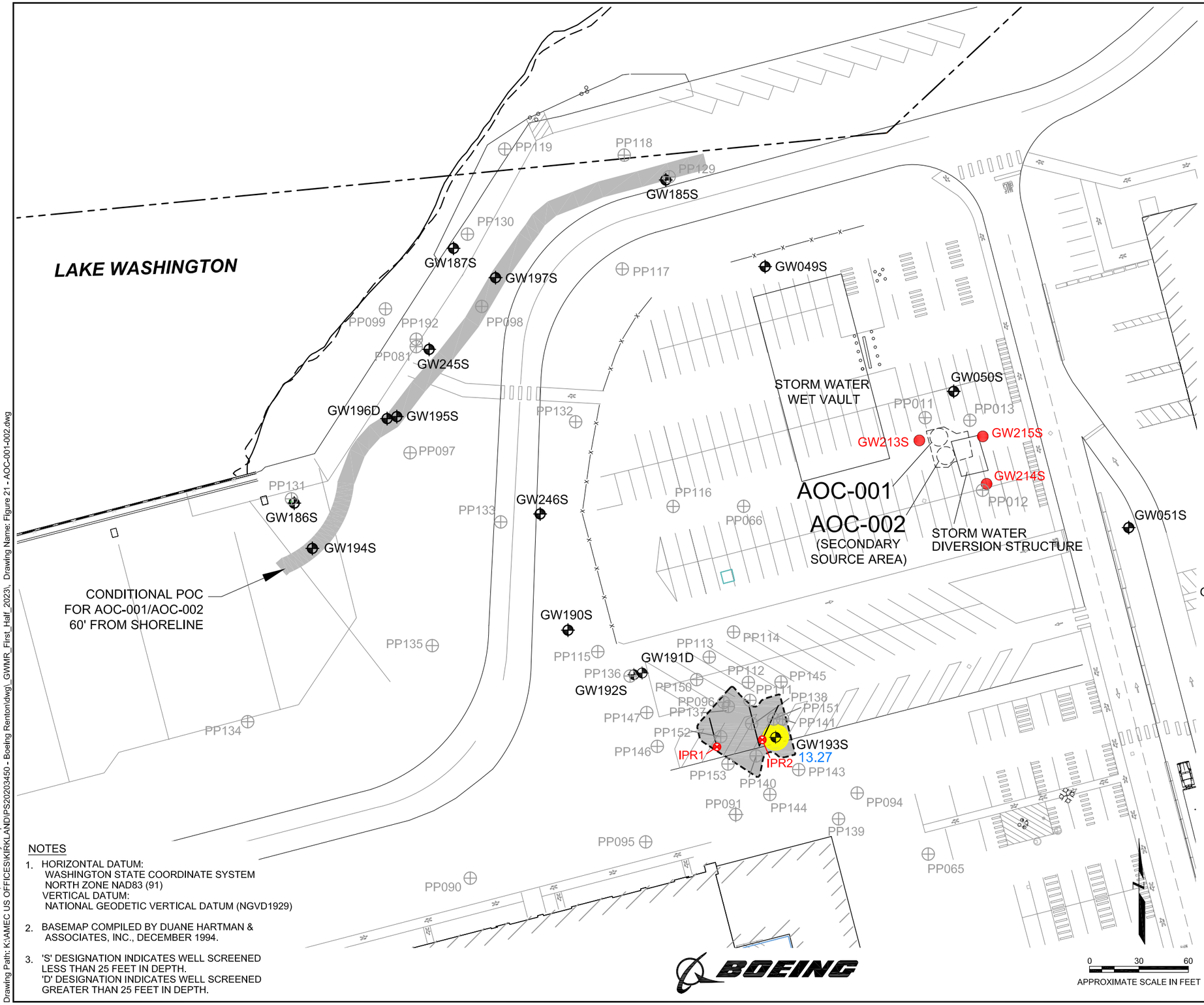


CPOC WELL GW224S

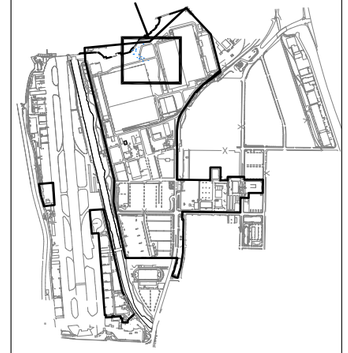
Note: Non-detected values shown at one-half the reporting limit and with an open symbol. Reporting limits were elevated for February 2022 results in GW211S.

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm

wsp	FORMER FUEL FARM AOC GROUP TREND PLOTS FOR CPOC AREA WELLS GW211S, GW221S, AND GW224S Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 20



AOC-001 AND AOC-002
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

- GW195S 13.92 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- GW227S — ABANDONED MONITORING WELL
- GW215S — EXISTING ELECTRON DONOR INJECTION WELL
- IPR1 — EXISTING INJECTION PIPE RISER
- PP011 — PUSH PROBE SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- FENCE LINE
- APPROXIMATE LIMIT OF NOVEMBER 2005 SOURCE AREA EXCAVATION
- AOC-001, AOC-002 CONDITIONAL POINT OF COMPLIANCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

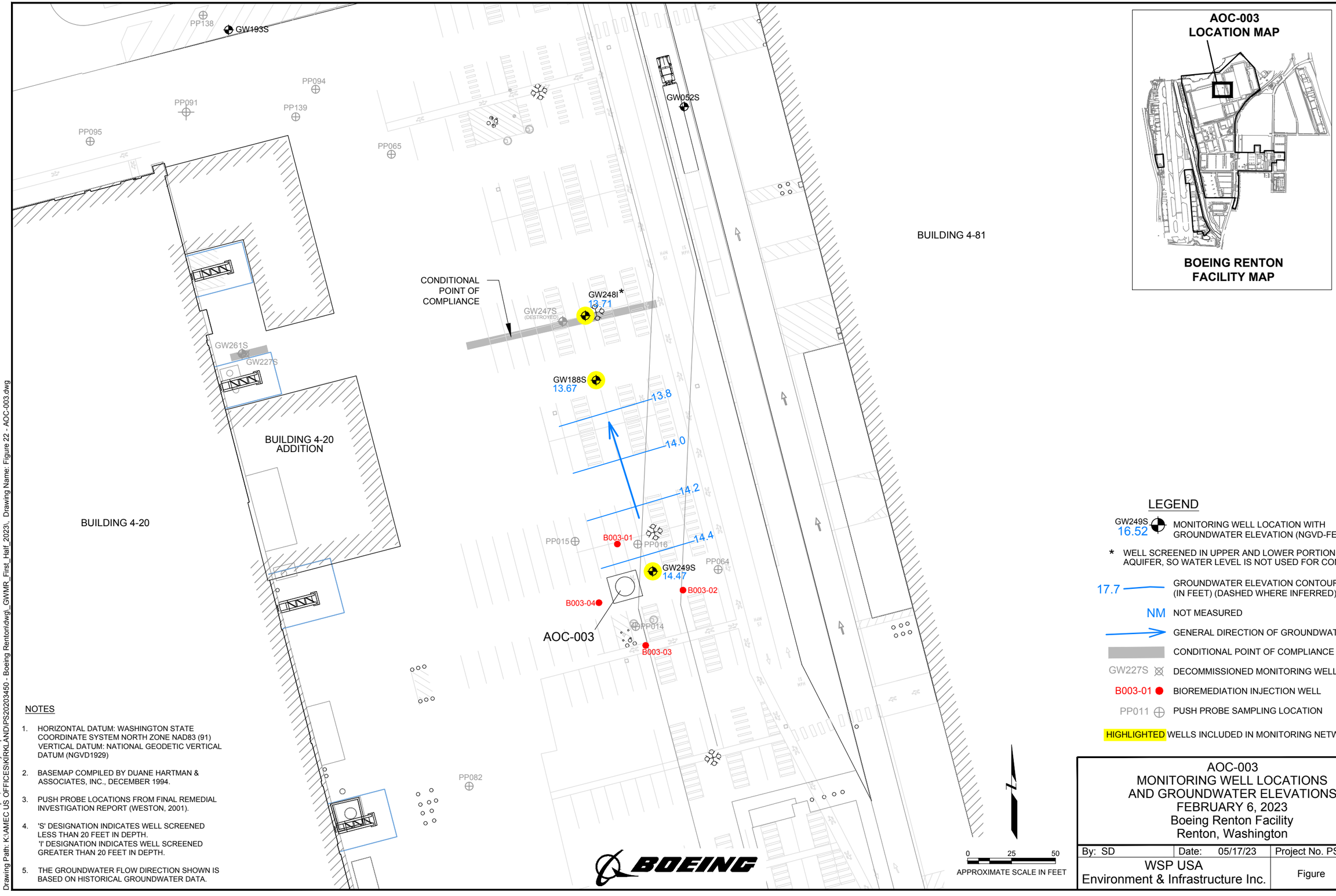
NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 25 FEET IN DEPTH.
   'D' DESIGNATION INDICATES WELL SCREENED GREATER THAN 25 FEET IN DEPTH.

AOC-001 AND AOC-002
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
FEBRUARY 9, 2023
Boeing Renton Facility
Renton, Washington

By: SD	Date: 03/31/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.		Figure 21

Plot Date: 03/31/23 - 10:40am, Plotted by: stephane.descombes
Drawing Path: K:\AWEC US OFFICES\KIRKLAND\PS20203450 - Boeing Renton\dwg_GWMR_First_Half_2023\, Drawing Name: Figure 21 - AOC-001-002.dwg



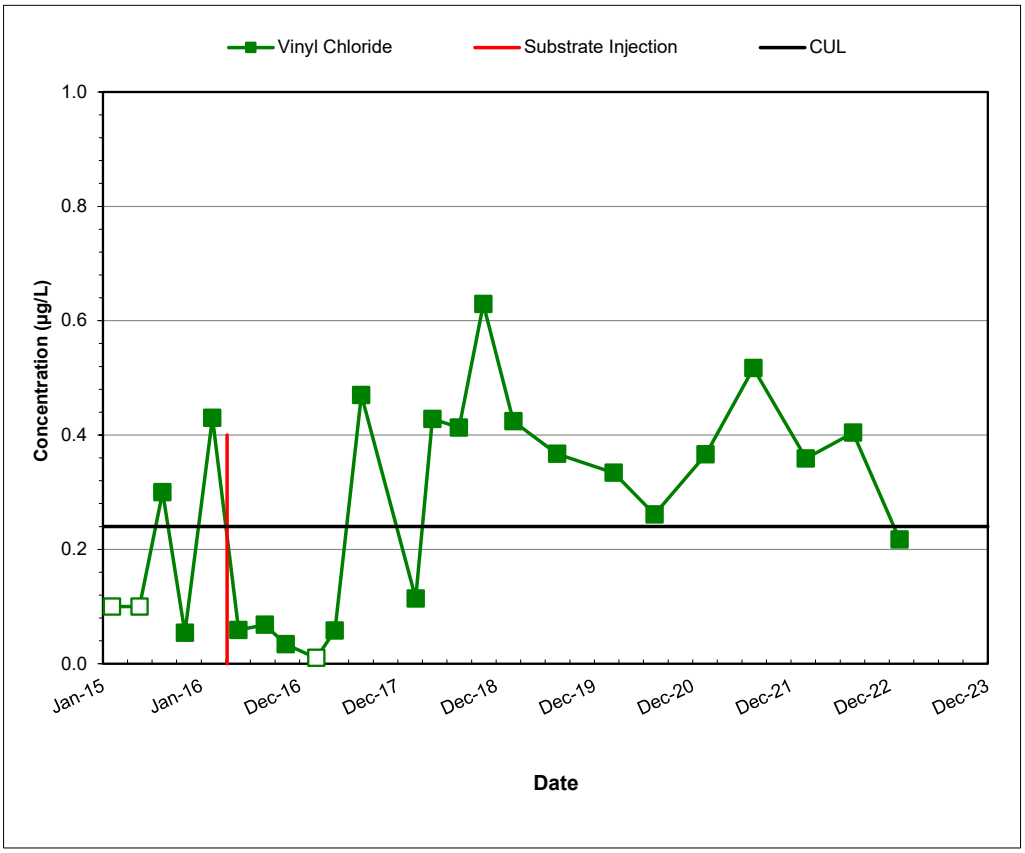
NOTES

1. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE NAD83 (91)
   VERTICAL DATUM: NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
4. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 20 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED GREATER THAN 20 FEET IN DEPTH.
5. THE GROUNDWATER FLOW DIRECTION SHOWN IS BASED ON HISTORICAL GROUNDWATER DATA.

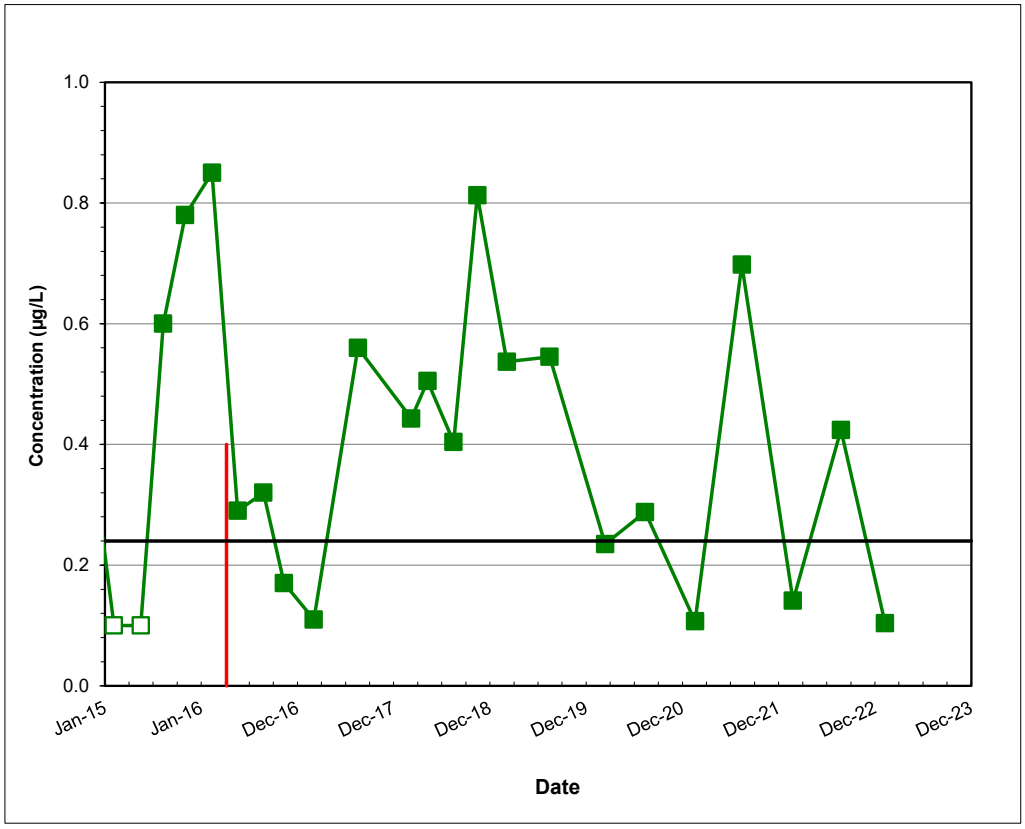
BOEING

AOC-003
MONITORING WELL LOCATIONS
AND GROUNDWATER ELEVATIONS
FEBRUARY 6, 2023
Boeing Renton Facility
Renton, Washington

By: SD	Date: 05/17/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.	Figure 22	



SOURCE AREA WELL GW249S



DOWNGRADIENT PLUME AREA WELL GW188S

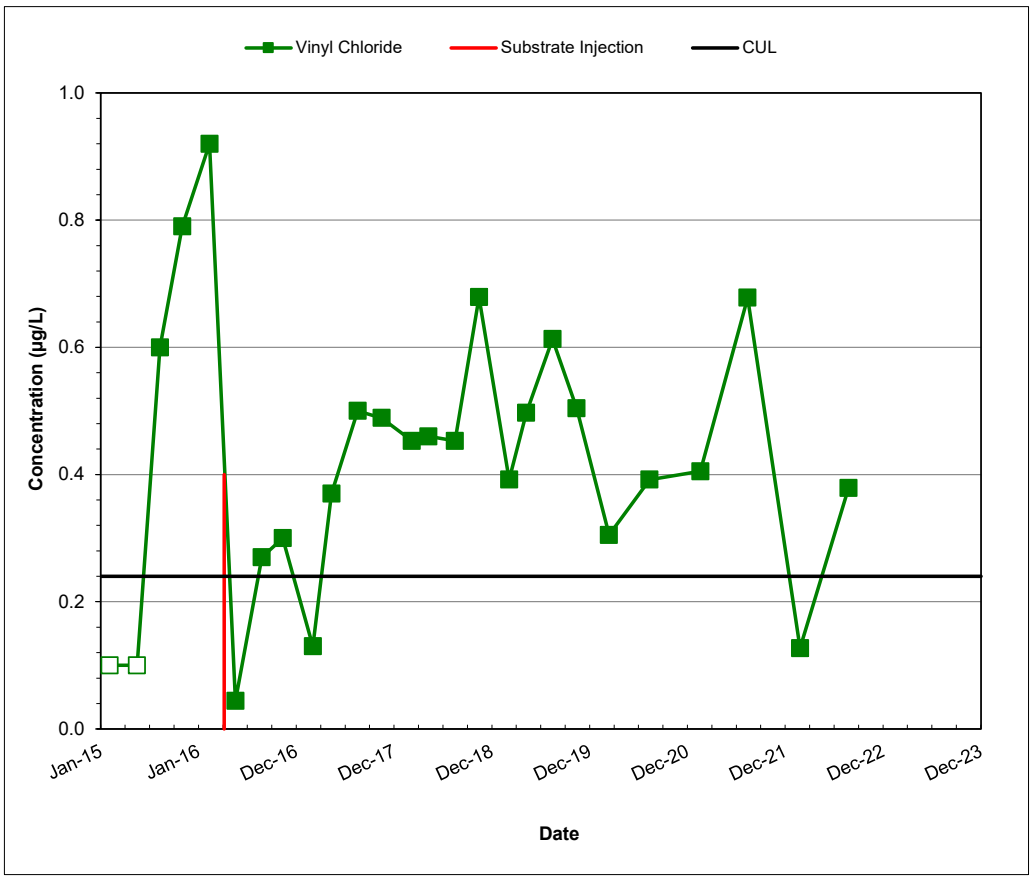
Note: Non-detected values shown at one-half the reporting limit and with an open symbol

AOC-003 TREND PLOTS FOR SOURCE AREA WELL GW249S
AND DOWNGRADIENT PLUME AREA WELL GW188S
Boeing Renton Facility, Renton, Washington

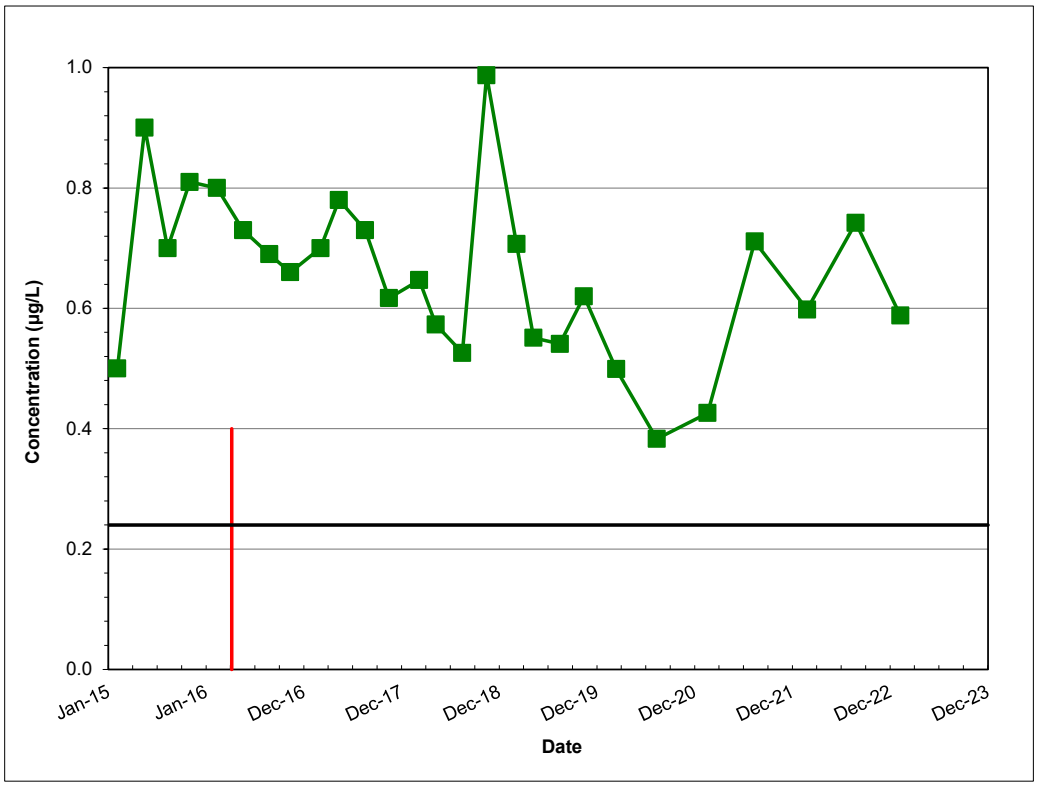
Project No.
PS20203450

Figure
23

P:\8888 - Boeing Renton\9.0 Field & Lab Data Mgmt\Grapher and Excel Figure Files\excel\2022 Update\Figure 22 to 25_AOC 003-4.xlsx



CPOC WELL GW247S



CPOC WELL GW248I

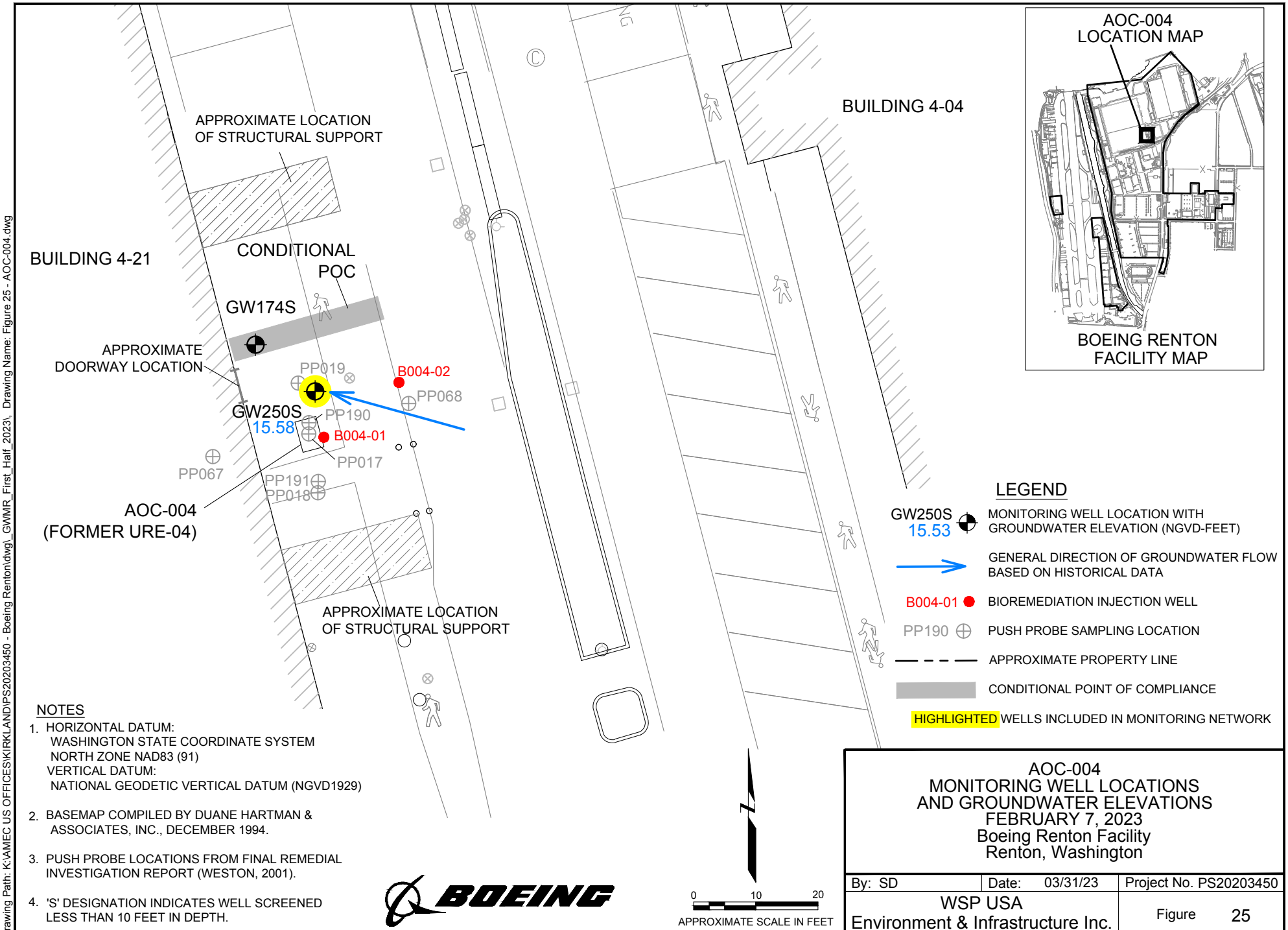
Note: Non-detected values shown at one-half the reporting limit and with an open symbol

AOC-003 TREND PLOTS FOR CPOC WELLS GW247S AND GW248I
Boeing Renton Facility, Renton, Washington

Project No.
PS20203450

Figure
24

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



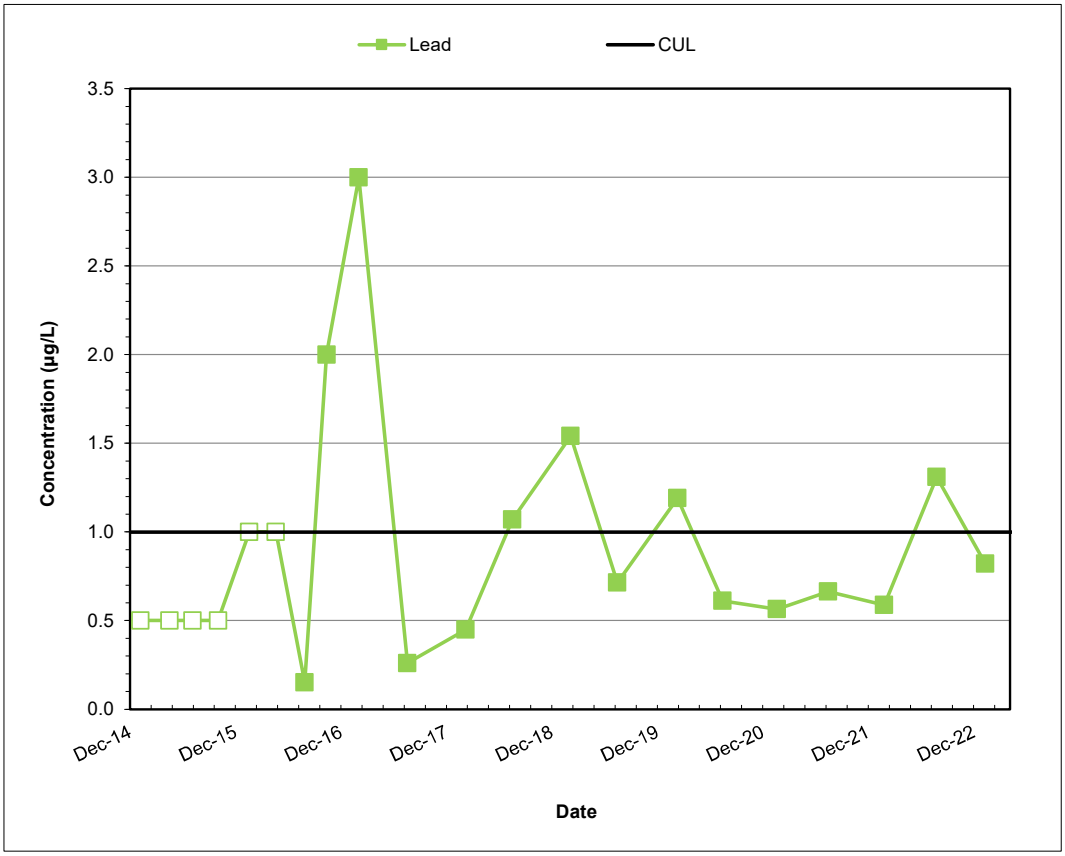
NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. PUSH PROBE LOCATIONS FROM FINAL REMEDIAL INVESTIGATION REPORT (WESTON, 2001).
4. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 10 FEET IN DEPTH.

BOEING

AOC-004
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
FEBRUARY 7, 2023
Boeing Renton Facility
Renton, Washington

By: SD	Date: 03/31/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.		Figure 25



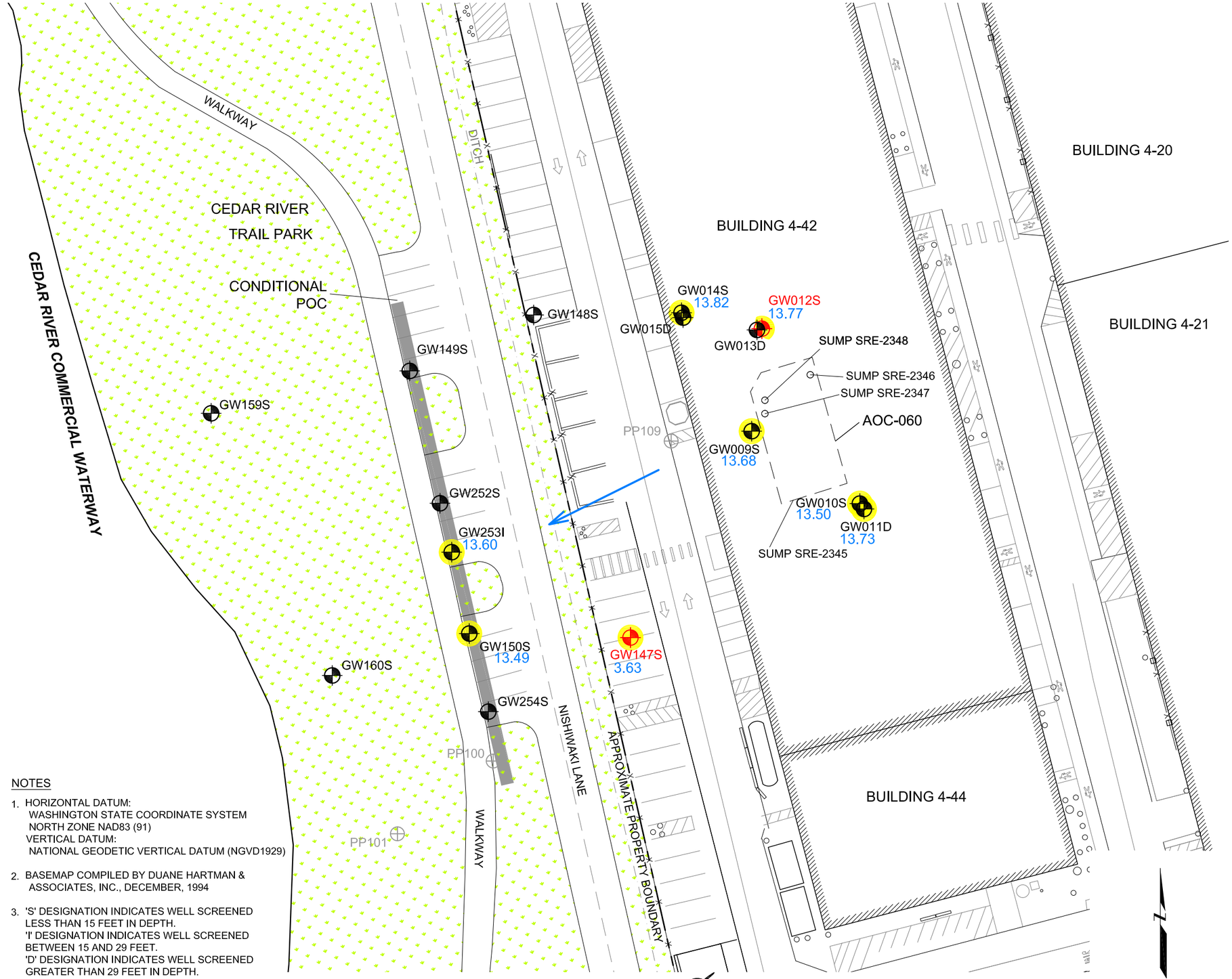
SOURCE AREA WELL GW250S

Note: Non-detected values shown at one-half the reporting limit and with an open symbol

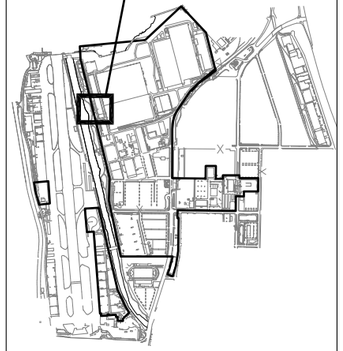
AOC-004 TREND PLOT FOR SOURCE AREA WELL GW250S
Boeing Renton Facility, Renton, Washington

Project No.
PS20203450

Figure
26



AOC-060
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

- GW150S 13.86 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- GW147S — BIOREMEDIATION INJECTION WELL AND MONITORING WELL
- GENERAL DIRECTION OF GROUNDWATER FLOW
- PP109 — PUSH PROBE SAMPLING LOCATION
- APPROXIMATE PROPERTY LINE
- FENCE LINE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

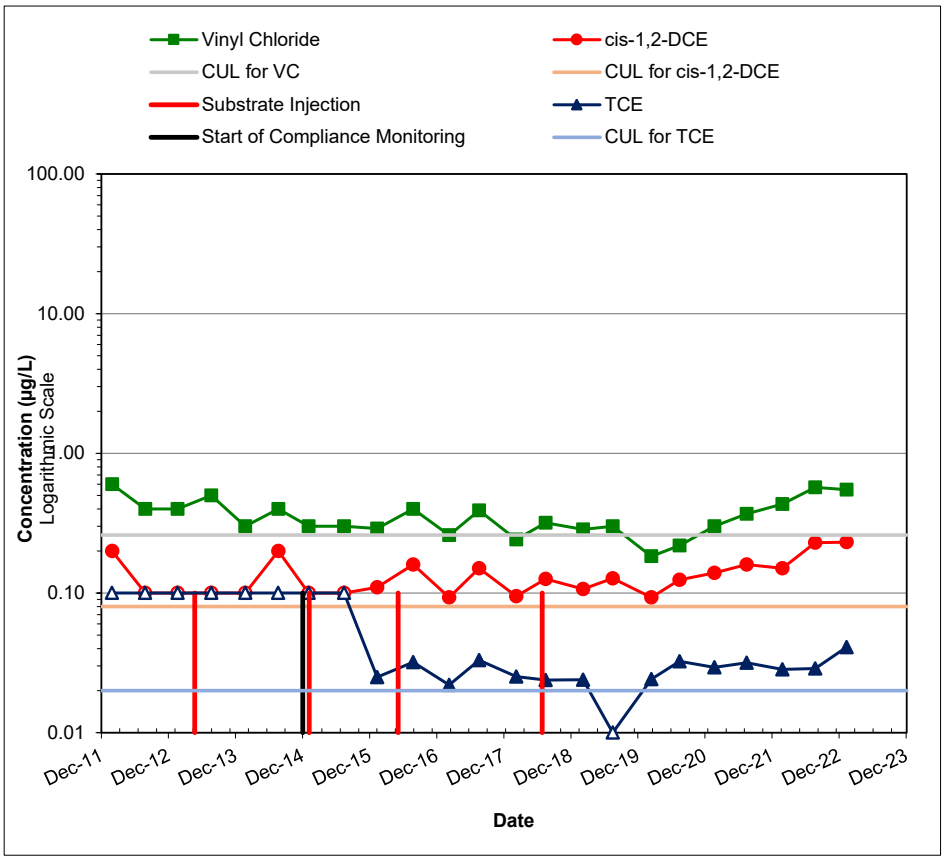
NOTES

1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER, 1994
3. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 15 FEET IN DEPTH.
   'I' DESIGNATION INDICATES WELL SCREENED BETWEEN 15 AND 29 FEET.
   'D' DESIGNATION INDICATES WELL SCREENED GREATER THAN 29 FEET IN DEPTH.
4. THE GROUNDWATER FLOW DIRECTION SHOWN IS BASED ON HISTORICAL GROUNDWATER DATA.

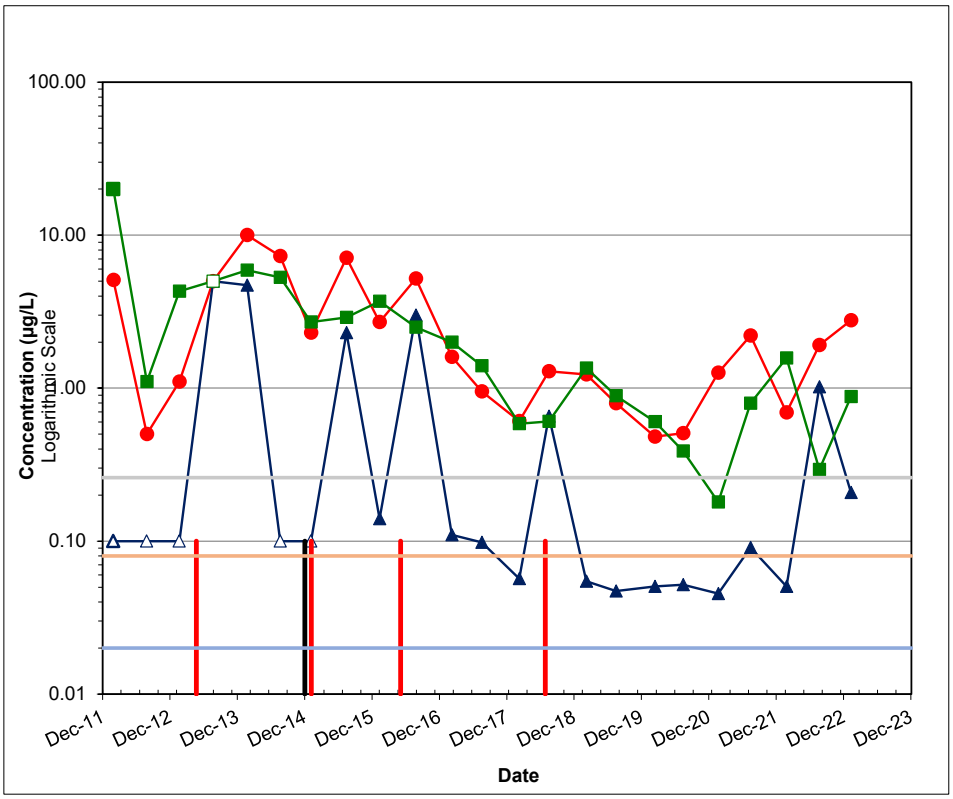
AOC-060
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
FEBRUARY 6, 2023
Boeing Renton Facility
Renton, Washington

By: SD	Date: 03/31/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.	Figure 27	

Plot Date: 03/31/23 - 11:40am Plotted by: stephane.descombes
Drawing Path: K:\AMEC US OFFICES\KIRKLAND\PS20203450 - Boeing Renton\dwg_GWMR_First_Half_2023\ Drawing Name: Figure 27 - AOC-060.dwg



SOURCE AREA WELL GW009S

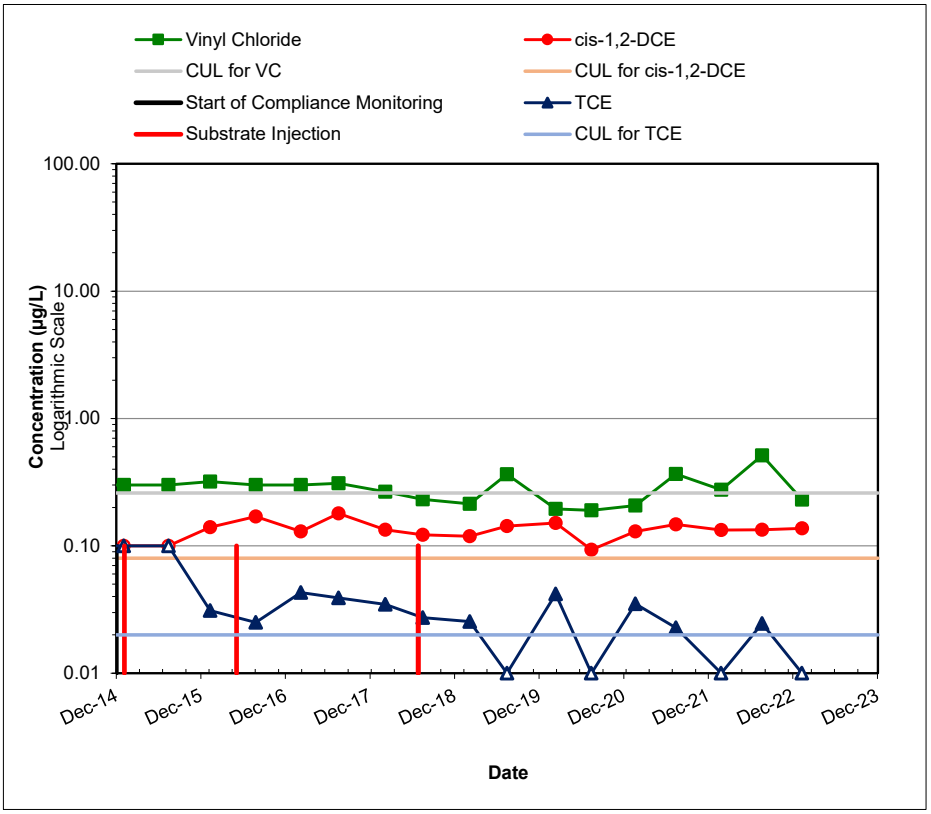


DOWNGRADIENT PLUME AREA WELL GW012S

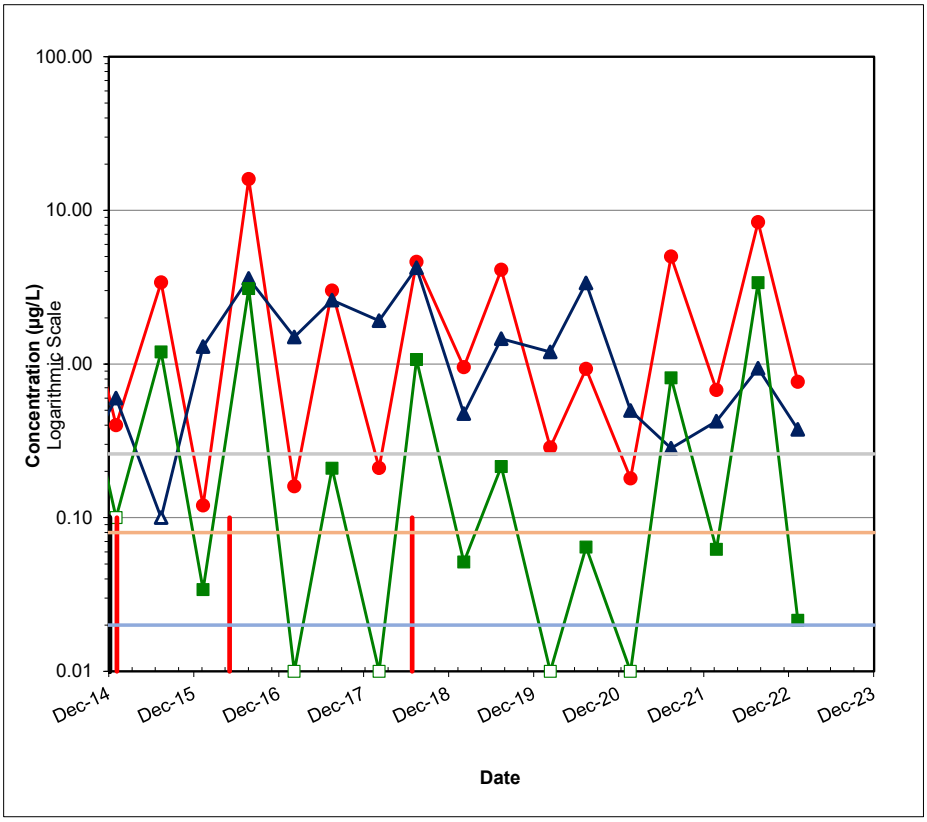
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

wsp	AOC-060 TREND PLOTS FOR SOURCE AREA WELL GW009S AND DOWNGRADIENT PLUME AREA WELL GW012S Boeing Renton Facility, Renton, Washington	Project No. PS2020345 Figure 28

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



DOWNGRADIENT PLUME AREA WELL GW014S



DOWNGRADIENT PLUME AREA WELL GW147S

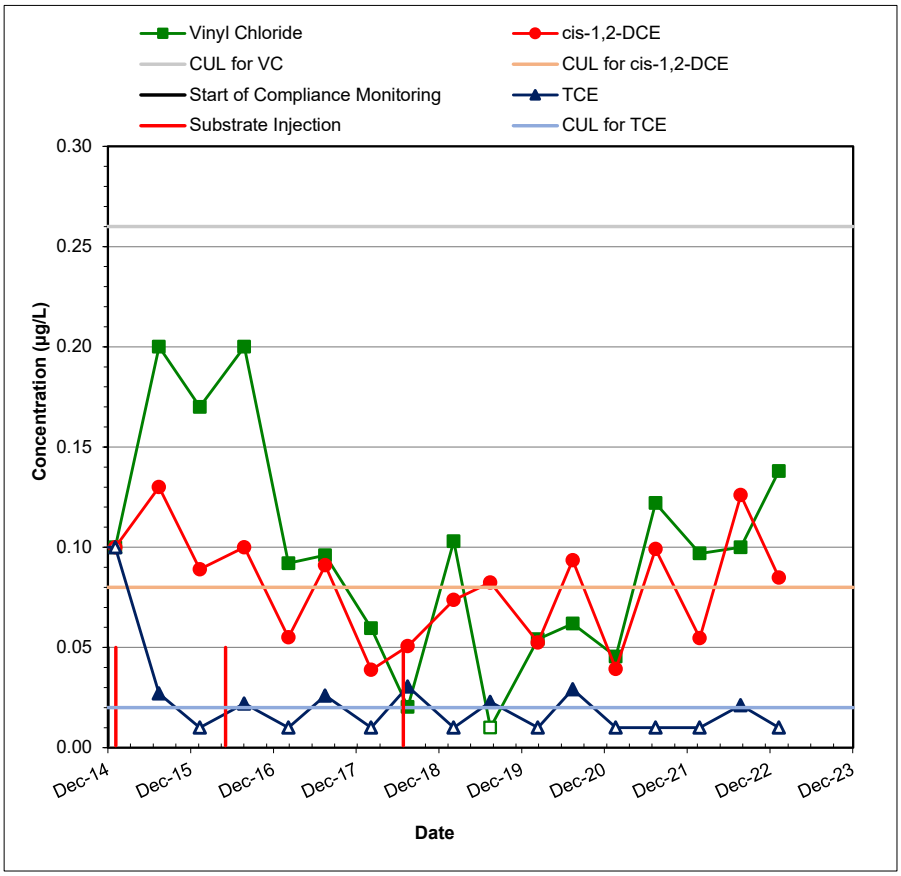
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

AOC-060 TREND PLOTS FOR DOWNGRADIENT PLUME AREA WELLS GW014S AND GW147S
Boeing Renton Facility, Renton, Washington

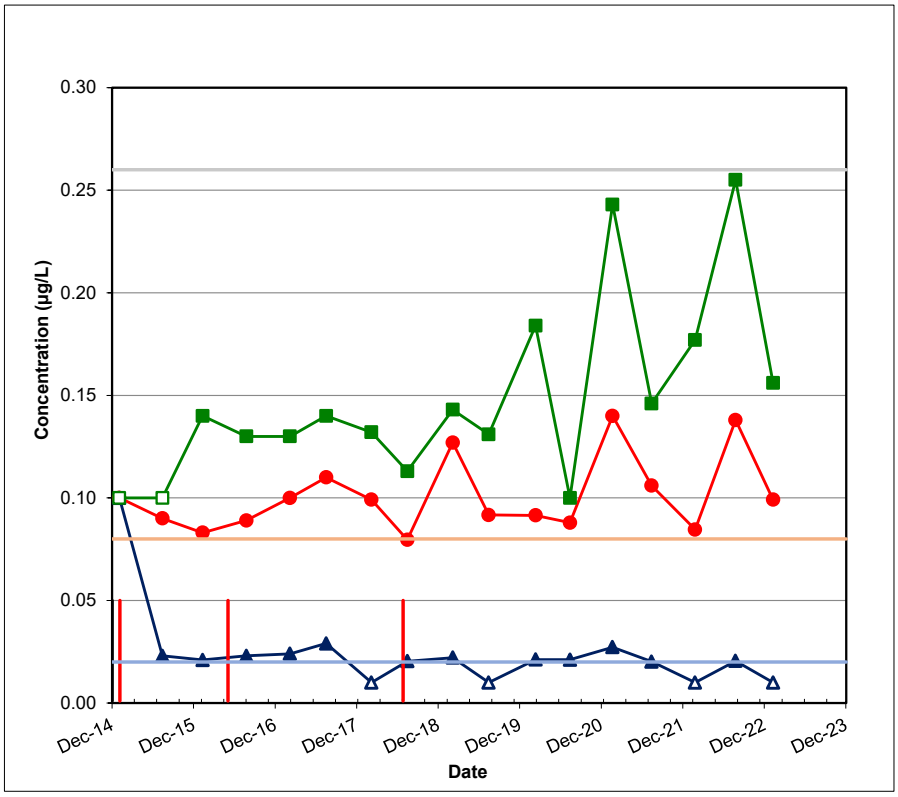
Project No. PS2020345

Figure 29

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



CPOC AREA WELL GW150S



CPOC AREA WELL GW253I

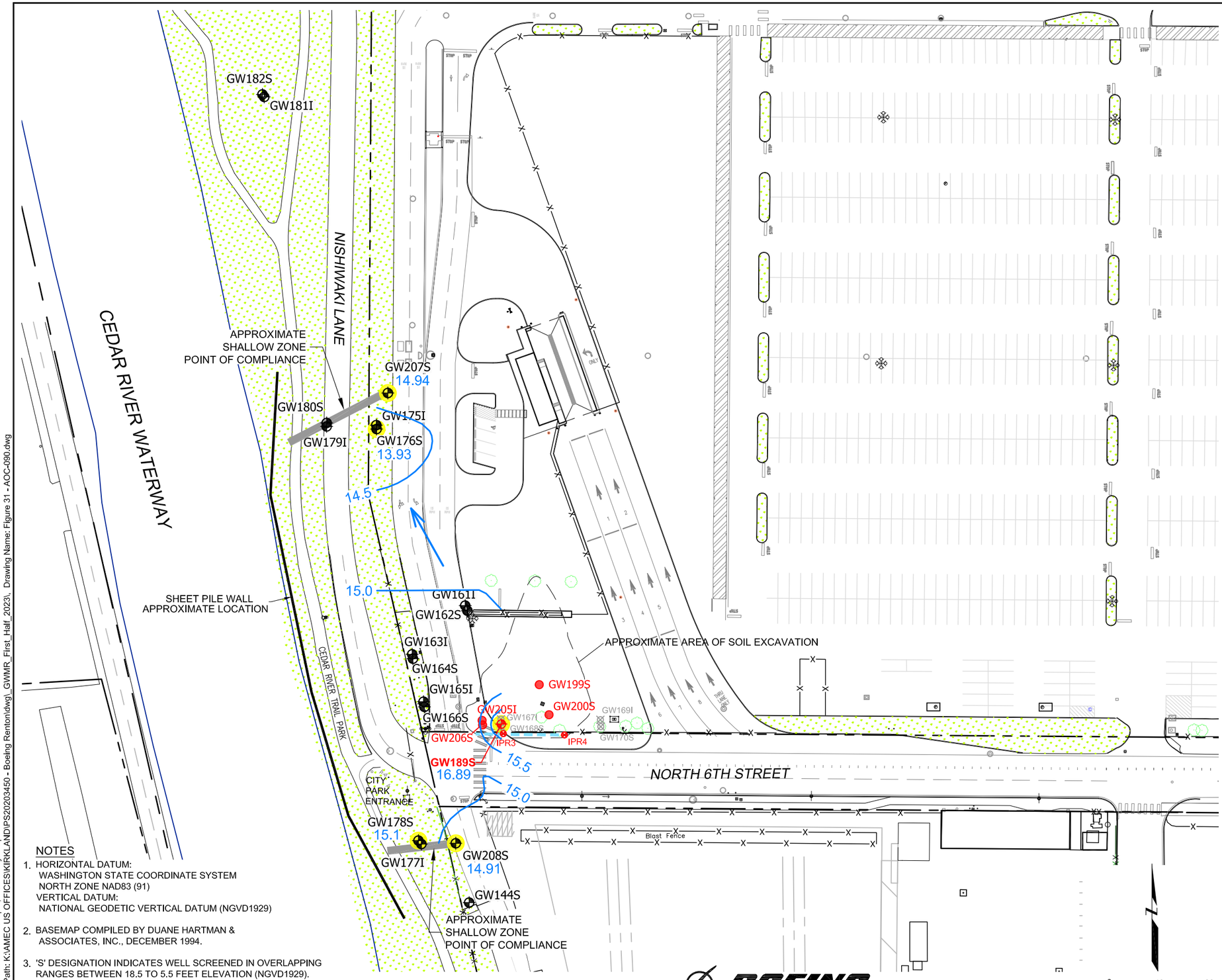
Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

AOC-060 TREND PLOTS FOR
CPOC AREA WELLS GW150S AND GW253I
Boeing Renton Facility, Renton, Washington

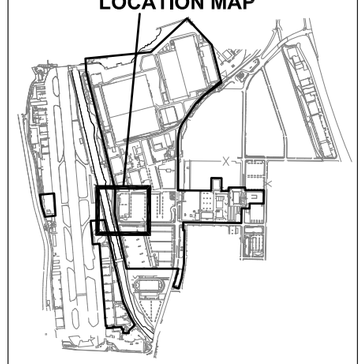
Project No.
PS2020345

Figure
30

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm



AOC-090
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

- GW178S / 15.07 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)
- 15.0 — GROUNDWATER ELEVATION CONTOUR (IN FEET) (DASHED WHERE INFERRED)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- GW201S — EXISTING BIOREMEDIATION SUBSTRATE INJECTION WELL
- GW189S / 15.62 — EXISTING BIOREMEDIATION SUBSTRATE INJECTION WELL AND MONITORING WELL GROUNDWATER ELEVATION (NGVD-FEET)
- IPR4 — EXISTING INJECTION PIPE RISER
- GW170S — DECOMMISSIONED MONITORING WELL
- APPROXIMATE PROPERTY LINE
- FENCE
- APPROXIMATE LOCATION OF 4-INCH DIAMETER PERFORATED PIPE
- CONDITIONAL POINT OF COMPLIANCE
- HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTES

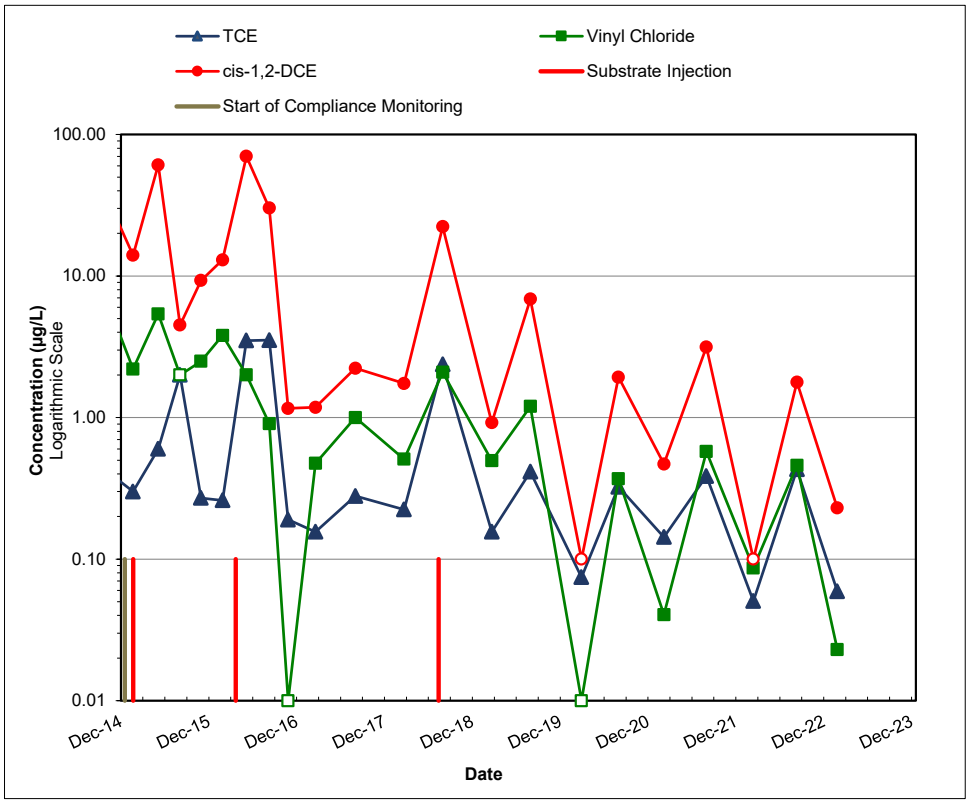
1. HORIZONTAL DATUM:
   WASHINGTON STATE COORDINATE SYSTEM
   NORTH ZONE NAD83 (91)
   VERTICAL DATUM:
   NATIONAL GEODETIC VERTICAL DATUM (NGVD1929)
2. BASEMAP COMPILED BY DUANE HARTMAN & ASSOCIATES, INC., DECEMBER 1994.
3. 'S' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 18.5 TO 5.5 FEET ELEVATION (NGVD1929).
   'I' DESIGNATION INDICATES WELL SCREENED IN OVERLAPPING RANGES BETWEEN 1.0 TO -13.7 FEET IN ELEVATION (NGVD1929).

BOEING

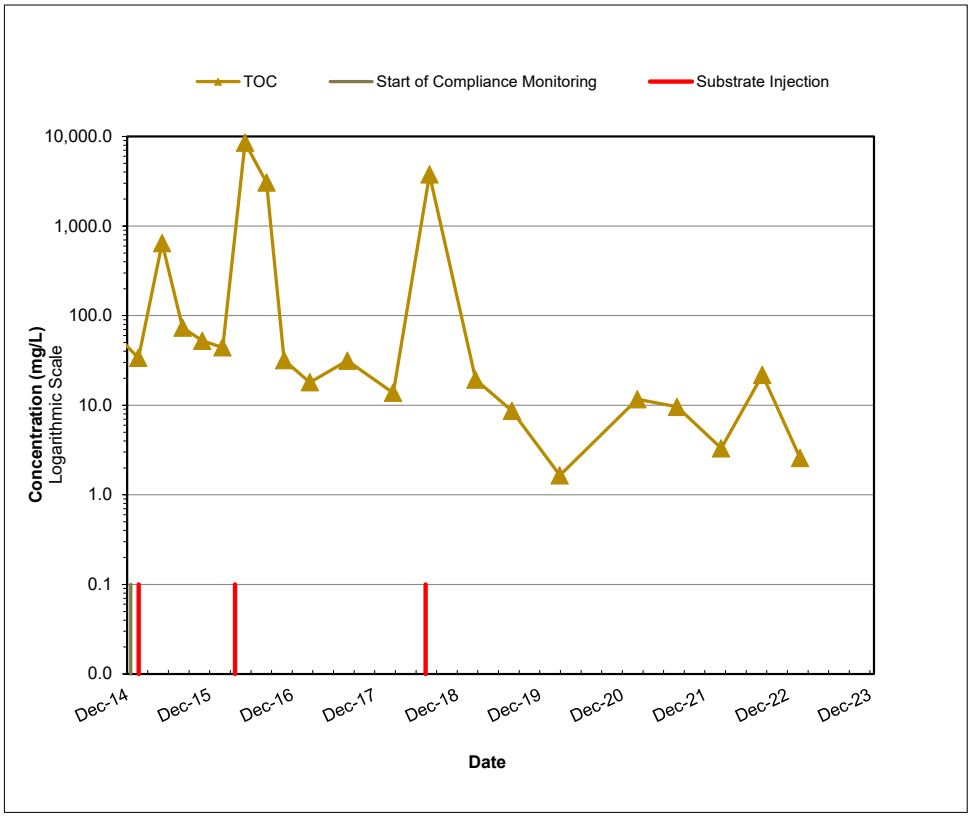
AOC-090
MONITORING WELL LOCATIONS AND GROUNDWATER ELEVATIONS
FEBRUARY 7, 2023
Boeing Renton Facility
Renton, Washington

By: SD	Date: 03/31/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.		Figure 31

Plot Date: 03/31/23 - 12:10pm, Plotted by: stephane.descombes
Drawing Path: K:\AMEC US OFFICES\KIRKLAND\PS2020345O - Boeing Renton\dwg_GWMR_First_Half_2023\, Drawing Name: Figure 31 - AOC-090.dwg



SOURCE AREA WELL GW189S



Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

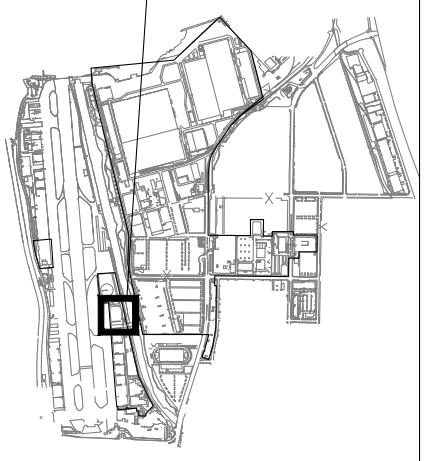
wsp	AOC-090 TREND PLOTS FOR SOURCE AREA WELL GW189S Boeing Renton Facility, Renton, Washington	Project No. PS20203450 Figure 32

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm

Plot Date: 05/23/23 - 1:02pm, Plotted by: stephane.descombes
Drawing Path: K:\AMEC US OFFICES\KIRKLAND\PS20203450 - Boeing Renton\dwg_GWMR_First_Half_2023\, Drawing Name: Figure 33 - APRON A.dwg

B-4
B-3
B-6
SHED
SHED
SHED
SHED
SHED
CB
B-10
B-12
B-2
B-9
B-8
B-7
CB
B-17
B-1
B-16
BUILDING
B-13
B-14
B-15
GW262S
(TO BE DECOMMISSIONED)
GW265S
(TO BE DECOMMISSIONED)
GW263S
(TO BE DECOMMISSIONED)
GW264S
16.45
APPROXIMATE AREA
OF TRENCH INJECTION
EAST PERIMETER ROAD
CEDAR RIVER WATERWAY

APRON A
LOCATION MAP



BOEING RENTON
FACILITY MAP

LEGEND

GW264S 16.45 — MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION (NGVD-FEET)

PRESUMED GENERAL DIRECTION OF GROUNDWATER FLOW

B-1 — SOIL SAMPLE LOCATION

APPROXIMATE PROPERTY LINE

FENCE

HIGHLIGHTED WELLS INCLUDED IN MONITORING NETWORK

NOTE:
1. 'S' DESIGNATION INDICATES WELL SCREENED LESS THAN 10 FEET IN DEPTH.

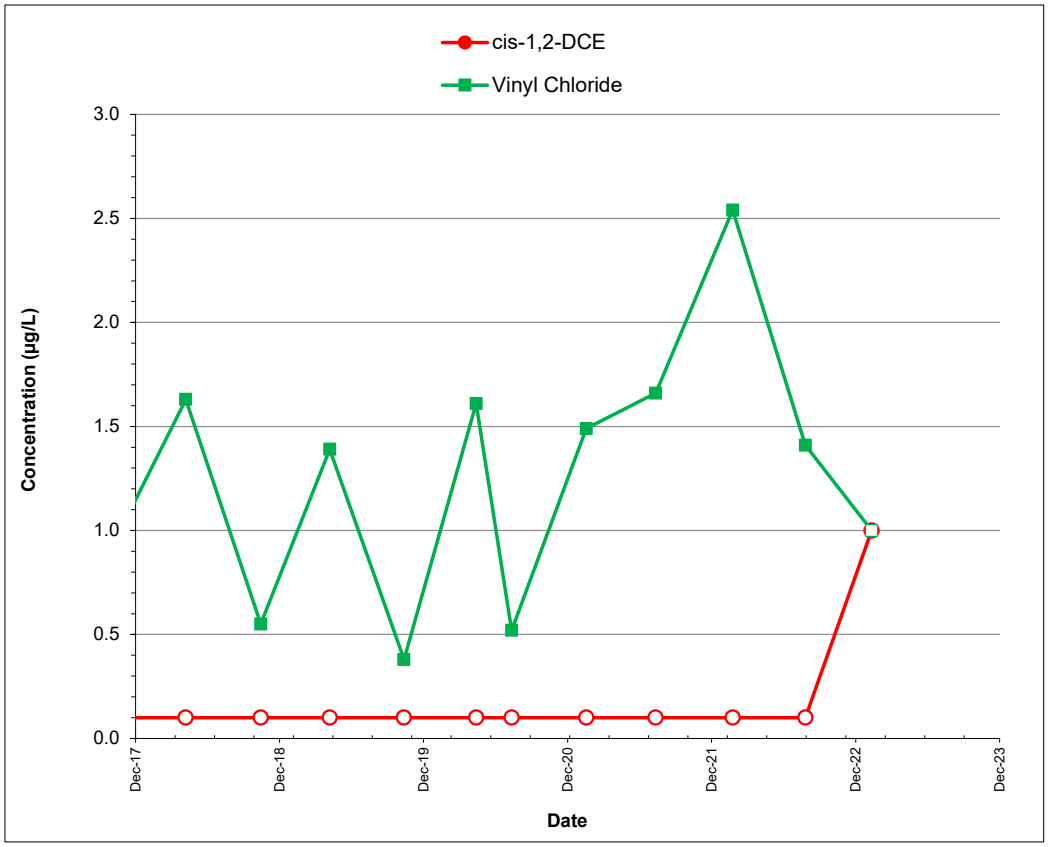
N

0 20 40
APPROXIMATE SCALE IN FEET

BOEING

APRON A AREA
MONITORING WELL LOCATIONS AND DEPTH TO GROUNDWATER
FEBRUARY 8, 2023
Boeing Renton Facility
Renton, Washington

By: SD	Date: 05/23/23	Project No. PS20203450
WSP USA Environment & Infrastructure Inc.		Figure 33



SOURCE AREA WELL GW264S

Note: Non-detected values shown at one-half the reporting limit and with an open symbol.

wsp	APRON A TREND PLOT FOR WELL GW264S Boeing Renton Facility Renton, Washington	Project No. PS20203450 Figure 34

\\woodplc.net\Wood\US\SEA\SEA2-FS1-Archive\8888.000 Boeing Renton\261\Figure\Boeing_Renton_Charts (3-34).xlsm

TABLES

Table 1: SWMU-168 Groundwater Elevation Data

Feburary 9, 2023

Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW230I	4 to 14	24.86	6.60	18.26

Notes:

1. I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations:

bgs = below ground surface

SWMU = solid waste management unit

TOC = top of casing

Table 2: SWMU-168 Primary Geochemical Indicators[1]
February 9, 2023
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]
	CPOC Area
	GW230I
Temperature (degrees C)	11.8
Specific Conductivity (µS/cm)	273.9
Dissolved Oxygen (mg/L)	0.37
pH (standard units)	6.32
Oxidation/Reduction Potential (mV)	22.8

Notes:
1. Primary geochemical indicators are measured in the field.
2. I = intermediate well.

Abbreviations:
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts
SWMU = solid waste management unit

Table 3: SWMU-168 Concentrations of Constituents of Concern[1, 2]
February 8, 2023
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [3]	Well ID [4] CPOC Area GW230I
Volatile Organic Compounds (µg/L)		
Vinyl Chloride	0.11	**0.146**

Notes:
1. Data qualifiers are as follows:
   J = the value is estimated.
2. **Bolded** values exceed the cleanup levels.
3. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.
4. I = intermediate well.

Abbreviations:
µg/L = micrograms per liter
CPOC = conditional point of compliance
SWMU = solid waste management unit

Table 4: SWMU-172 and SWMU-174 Group Groundwater Elevation Data
February 8, 2023
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[3]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[3]
GW152S	5 to 20[2]	26.98	8.71	18.27
GW153S	5 to 20[2]	27.47	9.29	18.18
GW172S	8 to 18[2]	26.44	9.33	17.11
GW173S	8 to 18[2]	26.51	9.31	17.20
GW226S	5 to 20[2]	26.86	8.66	18.2
GW232S	4 to 14	24.45	6.52	17.93
GW234S	3 to 13	24.95	7.54	17.41
GW235I	15 to 25	24.90	6.59	18.31
GW236S	5 to 15	24.36	6.71	17.65

Notes:
1. S = shallow well; I = intermediate well.
2. Screen intervals are approximate and based on database listings of the screen interval depths for these wells.
3. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations:
bgs = below ground surface
SWMU = solid waste management unit
TOC = top of casing

Table 5: SWMU-172 and SWMU-174 Group Primary Geochemical Indicators[1]
February 8 & 9, 2023
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]									
	Source Area			Downgradient Plume Area			CPOC Area			
	GW152S	GW152S (field dup.)	GW153S	GW172S	GW173S	GW226S	GW232S	GW234S	GW235I	GW236S
Temperature (degrees C)	9.9	NA	10.9	12.1	11.3	14.5	11.0	9.8	9.8	10.7
Specific Conductivity (µS/cm)	809.0	NA	211.9	257.9	266.8	260.3	365.7	164.1	142.6	245.5
Dissolved Oxygen (mg/L)	0.70	NA	1.13	1.90	3.63	3.82	4.22	3.53	0.45	3.62
pH (standard units)	6.55	NA	6.49	6.68	6.64	6.49	6.38	6.53	6.79	6.67
Oxidation/Reduction Potential (mV)	-50.5	NA	26.6	-47.0	-87.6	-81.1	2.0	-17.4	-8.1	4.6
Total Organic Carbon (mg/L)[3]	3.57 J	3.67 J	9.87 J	4.62 J	5.42 J	9.38 J	8.20 J	3.00 J	1.00 J	2.25 J

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well.
3. Data qualifiers are as follows:
   J = the value is estimated.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts
SWMU = solid waste management unit

Table 6: SWMU-172 and SWMU-174 Group Concentrations of Constituents of Concern[1, 2]
February 8 & 9, 2023
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [4]	Well ID [3]									
		Source Area			Downgradient Plume Area			CPOC Area			
		GW152S	GW152S (field dup.)	GW153S	GW172S	GW173S	GW226S	GW232S	GW234S	GW235I	GW236S
Volatile Organic Compounds (µg/L)											
cis -1,2-Dichloroethene	0.03	**3.16 J**	**3.27 J**	**0.0569 J**	**0.155 J**	**0.0909 J**	**0.0431 J**	**0.206 J**	**0.0581 J**	**0.235 J**	**0.0364 J**
Tetrachloroethene	0.02	**0.234 J**	**0.219 J**	0.0200 UJ	0.0200 UJ	**0.0429 J**	0.0200 UJ	0.0200 UJ	0.0200 UJ	0.0200 UJ	0.0200 UJ
Trichloroethene	0.02	**0.101 J**	**0.104 J**	0.0200 UJ	0.0200 UJ	**0.0479 J**	0.0200 UJ	0.0200 UJ	0.0200 UJ	**0.0296 J**	0.0200 UJ
Vinyl Chloride	0.11	**0.195 J**	**0.197 J**	**0.148 J**	**0.601 J**	**0.210 J**	0.0734 J	**0.290 J**	0.0304 J	0.0310 J	0.0200 UJ
Total Metals (µg/L)											
Arsenic	1.0	**6.92**	**7.02**	**4.76**	**6.64**	**5.69**	**4.28**	**3.51**	**5.90**	0.283	**1.64**
Copper	3.5	**6.61**	**5.82**	1.14	**6.17**	2.98	0.500 U	0.915	**16.6**	1.23	2.07
Lead	1.0	**4.24 J**	**3.06 J**	0.256	**3.80**	0.752	0.100 U	0.124	**6.75**	0.332	**1.38**

Notes:

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = the value is estimated.
   UJ = The analyte was not detected at the estimated reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations:

µg/L = micrograms per liter
CPOC = conditional point of compliance
SWMU = solid waste management unit

Table 7: Building 4-78/79 SWMU/AOC Group Groundwater Elevation Data
February 7, 2023
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW031S-R	5 to 25	19.59	5.69	13.90
GW033S	5 to 25	19.49	5.74	13.75
GW034S	5 to 25	19.65	5.67	14.42
GW143S	10 to 15	19.81	6.28	13.53
GW237S	5 to 15	18.85	5.21	13.64
GW240D	22 to 27	19.81	6.36	13.45
GW244S-R	5 to 15	19.42	5.51	13.91

Notes:
1. S = shallow well; D = deep well; R = replaced.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations:
AOC = area of concern
bgs = below ground surface
NA = not available
SWMU = solid waste management unit
TOC = top of casing

Table 8: Building 4-78/79 SWMU/AOC Group Primary Geochemical Indicators[1]
February 6–8, 2023
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]							
	Source Area					CPOC Area		
	GW031S-R	GW033S	GW033S (field dup.)	GW034S	GW244S-R	GW143S	GW237S	GW240D
Temperature (degrees C)	11.8	9.6	NA	13.5	13.2	9.6	9.4	9.6
Specific Conductivity (µS/cm)	290.6	258.5	NA	376.5	371.7	279.1	170.5	226.6
Dissolved Oxygen (mg/L)	2.82	1.17	NA	0.46	3.05	2.72	0.63	1.39
pH (standard units)	6.35	6.54	NA	6.27	6.41	6.48	6.36	6.63
Oxidation/Reduction Potential (mV)	-47.6	-59.7	NA	-17.8	-59.5	-31.3	29.3	-56.3
Total Organic Carbon (mg/L)[3]	12.0	8.35 J	8.72 J	12.9	14.9	10.1	10.0	5.35 J

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; D = deep well.
3. Data qualifiers are as follows:
   J = the value is estimated.

Abbreviations
µS/cm = microsiemens per centimeter
AOC = area of concern
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts
NA = not analyzed
SWMU = solid waste management unit

Table 9: Building 4-78/79 SWMU/AOC Group Concentrations of Constituents of Concern[1, 2]
February 6–8, 2023
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [4]	Well ID [3]							
		Source Area					CPOC Area		
		GW031S-R	GW033S	GW033S (field dup.)	GW034S	GW244S-R	GW143S	GW237S	GW240D
Volatile Organic Compounds (µg/L)									
Benzene	0.80	0.20 U	0.20 U	0.20 U	**9.62**	0.12 J	0.20 U	**4.18**	0.20 U
cis -1,2-Dichloroethene	0.70	0.18 J	0.09 J	0.20 U	**0.74**	0.25	0.36	0.22	0.20 U
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.10 J	0.20 U	0.20 U
Vinyl Chloride	0.20	**0.26**	**0.24**	**0.21**	**4.12**	**0.55**	0.09 J	**0.26**	0.13 J
Total Petroleum Hydrocarbons (µg/L)									
TPH-G (C7-C12)	800	100 U	100 U	100 U	350	100 U	100 U	**805**	100 U

Notes:
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = the value is estimated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; D = deep well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations:
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
field dup. = field duplicate
SWMU = solid waste management unit
TPH-G = total petroleum hydrocarbons as gasoline

Table 10: Former Fuel Farm Groundwater Elevation Data
February 9, 2023
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW211S	4.8 to 14.7	27.77	9.56	18.21
GW221S	5 to 15	27.93	9.68	18.25
GW224S	5 to 15	27.98	10.34	17.64

Notes
1. S = shallow well
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations
bgs = below ground surface
TOC = top of casing

Table 11: Former Fuel Farm Primary Geochemical Indicators[1]
February 9, 2023
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]		
	CPOC Area		
	GW211S	GW221S	GW224S
Temperature (degrees C)	10.1	8.1	11.5
Specific Conductivity (µS/cm)	128	158	143.6
Dissolved Oxygen (mg/L)	2.40	2.17	4.03
pH (standard units)	6.41	6.02	6.24
Oxidation/Reduction Potential (mV)	-43.4	54.5	22.0

Notes
1. Primary geochemical indicators are measured in the field.
2. S = shallow well.

Abbreviations
µS/cm = microsiemens per centimeter
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

Table 12: Former Fuel Farm Concentrations of Constituents of Concern[1, 2]
February 9, 2023
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [4]	Well ID[3]			
		CPOC Area			
		GW211S	GW221S	GW224S	GW224S (field dup.)
Total Petroleum Hydrocarbons (mg/L)					
TPH-D (C12-C24)	0.5	0.100 U	**1.75**	**1.15**	**1.11**
TPH-O (C24-C38)	NE	0.200 U	0.200 U	0.200 U	0.200 U
Jet A (C10-C18)	0.5	0.100 U	**1.20**	**1.61**	**1.36**

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations

CPOC = conditional point of compliance
field dup. = field duplicate
mg/L = milligrams per liter
NE = not established
TPH-D = total petroleum hydrocarbons as diesel
TPH-O = total petroleum hydrocarbons as motor oil

Table 13: AOC-001, -002 and -003 Groundwater Elevation Data
Feburary 6 & 9, 2023
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW188S	3.5 to 13.5	18.78	5.11	13.67
GW247S	4 to 14	18.91	NM	NA
GW248I	10 to 20	18.78	5.07	13.71
GW249S	4 to 14	18.85	4.38	14.47
GW193S	3 to 12.8	18.67	5.40	13.27

Notes:
1. S = shallow well; I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations:
AOC = area of concern
bgs = below ground surface
NA = not applicable
NM = not measured
TOC = top of casing

Table 14: AOC-001, -002, and -003 Primary Geochemical Indicators[1]
February 6, 2023
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]				
	AOC-001 / AOC-002	AOC-003 Source Area	AOC-003 Downgradient Plume Area	AOC-003 CPOC Area	
	GW193S	GW249S	GW188S	GW247S	GW248I
Temperature (degrees C)	10.8	12.1	10.3	NA	9.1
Specific Conductivity (µS/cm)	266.3	308.7	418	NA	377
Dissolved Oxygen (mg/L)	1.71	4.91	3.45	NA	1.16
pH (standard units)	6.33	6.32	6.51	NA	6.45
Oxidation/Reduction Potential (mV)	-18.3	-73.5	-64.5	NA	-46.8
Total Organic Carbon (mg/L)[3]	6.08 J	14.7	8.79 J	NA	13.8

Notes
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well.
3. Data qualifiers are as follows:
   J = the value is estimated.

Abbreviations
µS/cm = microsiemens per centimeter
AOC = area of concern
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts
NA = not analyzed

Table 15: AOC -001, -002, and -003 Concentrations of Constituents of Concern[1]
February 6, 2023
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [3]	Well ID [2]				
		AOC-001 / AOC-002	AOC-003 Source Area	AOC-003 Downgradient Plume Area	AOC-003 CPOC Area	
		GW193S	GW249S	GW188S	GW247S	GW248I
Volatile Organic Compounds (µg/L)						
Vinyl Chloride	0.24	**0.334**	0.217	0.104	NA	**0.588**

Notes:
1. **Bolded** values exceed the cleanup levels.
2. S = shallow well; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations:
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
NA = not analyzed

Table 16: AOC-004 Groundwater Elevation Data
Feburary 7, 2023
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW250S	4 to 14	19.31	3.73	15.58

Notes:
1. S = shallow well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations:
AOC = area of concern
bgs = below ground surface
TOC = top of casing

Table 17: AOC-004 Primary Geochemical Indicators[1]
February 7, 2023
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]
	Source Area
	GW250S
Temperature (degrees C)	11.9
Specific Conductivity (µS/cm)	112.8
Dissolved Oxygen (mg/L)	0.53
pH (standard units)	6.78
Oxidation/Reduction Potential (mV)	-26.3

Notes:
1. Primary geochemical indicators are measured in the field.
2. S = shallow well.

Abbreviations:
µS/cm = microsiemens per centimeter
AOC = area of concern
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

Table 18: AOC-004 Concentrations of Constituents of Concern
February 7, 2023
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Level [2]	Well ID [1] / Source Area / GW250S
Metals (µg/L)		
Lead	1	0.820

Notes:
1. S = shallow well.
2. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations:
AOC = area of concern
µg/L = micrograms per liter

Table 19: AOC-060 Groundwater Elevation Data
February 6, 2023
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW009S	4.5 to 14.5	19.36	5.68	13.68
GW010S	4.5 to 14.5	19.47	5.97	13.50
GW011D	29 to 39	19.49	5.76	13.73
GW012S	4.5 to 14.5	19.11	5.34	13.77
GW014S	4.5 to 14.5	19.24	5.42	13.82
GW147S	5 to 15	18.73	15.10	5.1
GW150S	5 to 15	19.10	5.61	13.49
GW253I	10 to 20	19.02	5.42	13.60

Notes:
1. S = shallow well; D = deep well; I = intermediate well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations:
AOC = area of concern
bgs = below ground surface
TOC = top of casing

Table 20: AOC-060 Primary Geochemical Indicators[1]
February 6, 2023
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]						
	Source Area	Downgradient Plume Area				CPOC Area	
	GW009S	GW012S	GW014S	GW014S (field dup.)	GW147S	GW150S	GW253I
Temperature (degrees C)	20.7	21.0	17.3	NA	11.0	9.8	10.7
Specific Conductivity (µS/cm)	291.5	1,274	468	NA	75.0	204.2	279.2
Dissolved Oxygen (mg/L)	0.28	0.28	1.19	NA	0.51	0.53	0.69
pH (standard units)	6.37	6.27	6.30	NA	5.80	6.54	6.47
Oxidation/Reduction Potential (mV)	-6.5	-76.2	20.9	NA	51.8	-10.4	-14.9
Total Organic Carbon (mg/L)	9.14	43.1	3.82	4.09	6.31	4.50	4.87

Notes:

1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well; I = intermediate well.

Abbreviations:

µS/cm = microsiemens per centimeter
AOC = area of concern
CPOC = conditional point of compliance
degrees C = degrees Celsius
field dup. = field duplicate
mg/L = milligrams per liter
mV = millivolts

Table 21: AOC-060 Concentrations of Constituents of Concern[1, 2]
February 6, 2023
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Levels [4]	Well ID [3]						
		Source Area	Downgradient Plume Area				CPOC Area	
		GW009S	GW012S	GW014S	GW014S (field dup.)	GW147S	GW150S	GW253I
Volatile Organic Compounds (µg/L)								
cis -1,2-Dichloroethene	0.08	**0.231**	**2.78**	**0.137**	**0.134**	**0.766**	**0.0849**	**0.0991**
Trichloroethene	0.02	**0.0409**	**0.208**	0.0200 U	0.0200 U	**0.376**	0.0200 U	0.0200 U
Vinyl Chloride	0.26	**0.550**	**0.881**	0.231	0.230	0.0215	0.138	0.156

Notes:
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.

Abbreviations:
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
field dup. = field duplicate

Table 22: AOC-090 Groundwater Elevation Data
February 7, 2023
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)[2]	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)[2]
GW176S	10 to 14.3	20.15	6.22	13.93
GW178S	11.2 to 15.5	22.73	7.63	15.1
GW189S	4 to 14	22.01	5.12	16.89
GW207S	7.3 to 12	21.12	6.18	14.94
GW208S	6.3 to 11	22.45	7.54	14.91

Notes:
1. S = shallow well.
2. Elevations in feet relative to National Geodetic Vertical Datum of 1929.

Abbreviations:
AOC = area of concern
bgs = below ground surface
TOC = top of casing

Table 23: AOC-090 Primary Geochemical Indicators[1]
February 7, 2023
Boeing Renton Facility, Renton, Washington

Parameter	Well ID [2]				
	Source Area	Downgradient Plume Area	Shallow Zone CPOC Area		
	GW189S [3]	GW176S	GW178S	GW207S	GW208S
Temperature (degrees C)	11.2	12.4	11.6	12.2	12.1
Specific Conductivity (µS/cm)	165.3	399.8	289.4	256.5	393.4
Dissolved Oxygen (mg/L)	1.92	0.35	0.31	0.39	0.71
pH (standard units)	6.16	7.18	7.77	8.33	7.47
Oxidation/Reduction Potential (mV)	-4.8	-22.9	-15.4	-24.2	-32.1
Total Organic Carbon (mg/L)	2.56	NA	NA	NA	NA

Notes:
1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well.
3. GW189S is the replacement well for GW168S.

Abbreviations:
µS/cm = microsiemens per centimeter
AOC = area of concern
CPOC = conditional point of compliance
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts
NA = not analyzed

Table 24: AOC-090 Concentrations of Constituents of Concern[1, 2]
February 7, 2023
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Levels [4]	Well ID [3]				
		Source Area	Downgradient Plume Area	Shallow Zone CPOC Area		
		GW189S [5]	GW176S	GW178S	GW207S	GW208S
Chlorinated Volatile Organic Compounds (µg/L)						
1,1,2,2-Tetrachloroethane	0.17	0.153	NA	NA	NA	NA
1,1,2-Trichloroethane	0.2	0.200 U	NA	NA	NA	NA
1,1-Dichloroethene	0.057	0.0200 U	NA	NA	NA	NA
Acetone	300	5.00 U	NA	NA	NA	NA
Benzene	0.8	0.200 U	NA	NA	NA	NA
Carbon Tetrachloride	0.23	0.200 U	NA	NA	NA	NA
Chloroform	2	0.200 U	NA	NA	NA	NA
cis-1,2-Dichloroethene	2.4	0.230	NA	NA	NA	NA
Methylene Chloride	2	1.00 U	NA	NA	NA	NA
Toluene	75	0.690 J	NA	NA	NA	NA
trans-1,2-Dichloroethene	53.9	0.200 U	NA	NA	NA	NA
Tetrachloroethene	0.05	0.0200 U	NA	NA	NA	NA
Trichloroethene	0.08	0.0593	NA	NA	NA	NA
Vinyl Chloride	0.13	0.0230	**0.349**	**0.531**	0.0200 U	**0.419**
Total Petroleum Hydrocarbons (µg/L)						
TPH-G (C7-C12)	800	246	NA	NA	NA	NA
TPH-D (C12-C24)	500	**648 J**	NA	NA	NA	NA
TPH-O (C24-C40)	500	**1,120**	NA	NA	NA	NA

Notes:
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = the value is estimated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well.
4. Cleanup levels obtained from Table 2 of the Cleanup Action Plan.
5. GW189S is the replacement well for GW168S.

Abbreviations:
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
NA = not analyzed
TPH-D = total petroleum hydrocarbons as diesel
TPH-G = total petroleum hydrocarbons as gasoline
TPH-O = total petroleum hydrocarbons as motor oil

Table 25: Apron A Groundwater Elevation Data
February 8, 2023
Boeing Renton Facility, Renton, Washington

Well ID[1]	Screen Interval Depth (feet bgs)	TOC Elevation (feet)	Depth to Groundwater (feet below TOC)	Groundwater Elevation (feet)
GW264S	8 to 18	21.55	5.10	16.45

Notes
1. S = shallow well.

Abbreviations
bgs = below ground surface
NA = not available
TOC = top of casing

Table 26: Apron A Primary Geochemical Indicators[1]
February 8, 2023
Boeing Renton Facility, Renton, Washington

Parameter	Well ID[2]
	Source Area
	GW264S
Temperature (degrees C)	12.7
Specific Conductivity (µS/cm)	1,065
Dissolved Oxygen (mg/L)	9.44
pH (standard units)	6.25
Oxidation/Reduction Potential (mV)	-73.4
Total Organic Carbon (mg/L)	42.96

Notes

1. Primary geochemical indicators are measured in the field, with the exception of total organic carbon, which is measured in the laboratory.
2. S = shallow well.

Abbreviations

µS/cm = microsiemens per centimeter
degrees C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts

Table 27: Apron A Concentrations of Constituents of Concern[1]
February 8, 2023
Boeing Renton Facility, Renton, Washington

Analyte	Cleanup Levels	Well ID[2] GW264S
Volatile Organic Compounds (µg/L)		
cis- 1,2-Dichloroethene	NE	2.00 U
Vinyl Chloride	NE	2.00 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. S = shallow well.

Abbreviations
µg/L = micrograms per liter
NE = not established

APPENDIX A

SUMMARY OF GROUNDWATER SAMPLING METHODOLOGY

TABLE A-1: GROUNDWATER COMPLIANCE MONITORING PLAN

Boeing Renton Facility, Renton, Washington

Cleanup Action Area	Monitoring Wells[1, 2]				Constituents of Concern[4]	Analyses[5]
	Source Area Wells	Downgradient Plume Wells	CPOC Wells	Additional Water Level Monitoring Wells[3]		
SWMU-168	NA	NA	GW230I	NA	VC	SW8260D SIM
SWMU-172/SWMU-174	GW152S and GW153S	GW172S, GW173S, and GW226S	GW232S, GW234S, GW235I, and GW236S	NA	*cis* -1,2-DCE, PCE, TCE, VC	SW8260D SIM[8]
					Arsenic, copper, and lead	EPA 6020A
Building 4-78/79 SWMU/AOC Group	GW031S, GW033S, GW034S, and GW244S	NA	GW143S, GW237S, and GW240D	NA	VC, TCE, *cis* -1,2-DCE, benzene	SW8260D
					TPH-gasoline	NWTPH-Gx
Former Fuel Farm SWMU/AOC Group	NA	NA	GW211S, GW221S, and GW224S	NA	TPH-jet fuel, TPH-diesel	NWTPH-Dx
AOC-001/AOC-002[6, 7]	All wells closed with the start of Apron R construction.				Benzene	SW8260D
					TCE, *cis* -1,2-DCE, 1,1-dichloroethene, VC	SW8260D SIM[8]
AOC-003	GW249S	GW188S	GW247S and GW248I	NA	VC	SW8260D
AOC-004	GW250S	NA	NA	NA	Lead	EPA 6020A
AOC-060	GW009S	GW012S, GW014S, and GW147S	GW150S and GW253I	GW010S and GW011D	VC, TCE, cis-1,2-DCE	SW8260D SIM[8]
AOC-090[9]	GW189S	GW176S	GW178S, GW207S, and GW208S	NA	1,1,2-Trichloroethane, acetone, benzene, toluene, carbon tetrachloride, chloroform, *cis* -1,2-DCE, *trans* -1,2-DCE, methylene chloride	SW8260D
					1,1-Dichloroethene, 1,1,2,2-tetrachloroethane, VC, PCE, TCE	SW8260D SIM[8]
					TPH-gasoline	NWPTH-Gx
					TPH-diesel, TPH-motor oil	NWTPH-Dx
Apron A	GW264S	NA	NA	GW263S	*cis* -1,2-DCE and VC	SW8260D

Notes:

1. The EDR presents the groundwater monitoring frequency for each SWMU/AOC. All sites are monitored on a semi-annual basis with sampling events occurring in February and August.
2. Groundwater monitoring wells are also monitored for groundwater levels.
3. Additional wells are monitored for groundwater levels only.
4. In addition to COCs, primary geochemical indicators will be monitored during each regular monitoring event. Geochemical indicators are listed in Table A-2.
5. Details of analytical methods are specified in the Quality Assurance Project Plan, which is Appendix E to the Cleanup Action Plan (AMEC, 2012).
6. Monitoring wells were abandoned on 11/25/2019 prior to Apron R construction and will be replaced upon completion of construction.
7. Groundwater monitoring and sampling will be suspended until completion of construction.
8. SIM methods will be used if the cleanup level is lower than the reporting limit achieved by the conventional 8021, 8260, or 8270 method. If cleanup levels become higher or if the conventional 8021, 8260, or 8270 methods are updated and able to achieve reporting limits below the cleanup levels, then the conventional method rather than the SIM method will be used.
9. GW189S will be sampled for CVOCs and TPH, all other wells will only be sampled for VC.

Abbreviations:

AOC = area of concern
cis -1,2-DCE = *cis* -1,2 dichloroethene
COCs = constituents of concern
CPOC = conditional point of compliance
CVOCs = chlorinated volatile organic compounds
EDR = Engineering Design Report
EPA = Environmental Protection Agency
NA = not applicable
PCE = tetrachloroethene
SIM = selected ion monitoring
SWMU = solid waste management unit
TCE = trichloroethene
TPH = total petroleum hydrocarbons
trans -1,2-DCE = *trans* -1,2 dichloroethene
VC = vinyl chloride

TABLE A-2: MONITORED NATURAL ATTENUATION/MONITORED ATTENUATION PLAN

Boeing Renton Facility, Renton, Washington

Cleanup Action Area	Groundwater Monitoring Wells				Primary Geochemical Parameters[1, 2]
	Cross-Gradient Wells	Source Area Wells	Downgradient Plume Wells	CPOC Wells	Indicators
SWMU-168	NA	NA	NA	GW230I	Dissolved oxygen, pH, ORP, temperature, specific conductance
SWMU-172/SWMU-174	NA	GW152S and GW153S	GW172S, GW173S, and GW226S	GW232S, GW234S, GW235I, and GW236S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC
Building 4-78/79 SWMU/AOC Group	NA	GW031S, GW033S, GW034S, and GW244S	NA	GW143S, GW237S, and GW240D	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC
Former Fuel Farm SWMU/AOC Group	NA	NA	NA	GW211S, GW221S, and GW224S	Dissolved oxygen, pH, ORP, temperature, specific conductance
AOC-001/AOC-002[3, 4]	NA	All wells closed with the start of Apron R construction.			
AOC-003	NA	GW249S	GW188S	GW247S and GW248I	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC
AOC-004	NA	GW250S	NA	NA	Dissolved oxygen, pH, ORP, temperature, specific conductance
AOC-060	GW012S and GW014S	GW009S	GW147S	GW150S and GW253I	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC
AOC-090	NA	GW189S	GW176S	GW178S, GW207S, and GW208S	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC[5]
Apron A	NA	GW264S	NA	NA	Dissolved oxygen, pH, ORP, temperature, specific conductance, TOC

Notes:

1. In addition to COCs listed in Table A-1, primary geochemical indicators will be monitored during each regular monitoring event.
2. All primary geochemical indicators except TOC are monitored in the field during sampling. TOC is analyzed in the laboratory following methods specified in the Quality Assurance Project Plan, which is Appendix E to the Cleanup Action Plan (AMEC, 2012).
   The primary geochemical indicators differ slightly depending on whether the site is a fuel-related site or a solvent-related site.
   At a fuel-related site, TOC is not necessary; at a solvent-related site, TOC is a measure of how much electron donor remains present.
   All MNA parameters are measured semiannually in all wells on a wet season/dry season basis.
3. Monitoring wells were abandoned on 11/25/2019 prior to Apron R construction and will be replaced upon completion of construction.
4. Groundwater monitoring and sampling will be suspended until completion of construction.
5. TOC will only be analyzed in the groundwater from the source area well (GW189S).

Abbreviations:

AOC = area of concern
COCs = constituents of concern
CPOC = conditional point of compliance
MNA = monitored natural attenuation
NA = not applicable
ORP = oxidation reduction potential
SWMU = solid waste management unit
TOC = total organic carbon

APPENDIX B

FIELD FORMS

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@ 1503

Sample Number: RGW009S- 230206 | Weather: indoor, overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft): 5.68 | Time: 1432 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 6 /2023 @ 1434 | End Purge: Date/Time: 2/ 6 /2023 @ 1457 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1437	20.4	348.0	0.46	6.38	-3.20		5.61		
1440	20.5	326.8	0.42	6.38	-5.00		5.59		
1443	20.5	311.4	0.38	6.37	-6.00		5.60		
1446	20.6	303.5	0.32	6.37	-6.60				
1449	20.6	298.6	0.31	6.37	-6.80				
1452	20.6	294.3	0.30	6.37	-7.20				
1455	20.7	291.5	0.28	6.37	-6.50				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	20.7	291.3	0.27	6.37	-6.50				
2	20.6	290.8	0.27	6.37	-6.40				
3	20.7	290.8	0.27	6.37	-6.30				
4	20.7	290.1	0.27	6.37	-6.20				
Average:	20.7	290.8	0.27	6.37	-6.35				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments: Mark Loranger Desk. As you walk into office space, take first right into cubicle isle and it is the last desk on the right under a square carpet cutou

Signature: Adam Torocsik | Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@

Sample Number: RGW010S- 230206 | Weather: indoor, overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft) 5.97 | Time: 1424 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ /2023 @ | End Purge: Date/Time: 2/ /2023 @ | Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1									
2									
3									
4									
Average:	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@

Sample Number: RGW011D- 230206 | Weather: indoor, overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) 5.76 Time: 1426 Flow through cell vol. GW Meter No.(s)

Begin Purge: Date/Time: 2/ /2023 @ End Purge: Date/Time: 2/ /2023 @ Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1									
2									
3									
4									
Average:	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@ 1349

Sample Number: RGW012S- 230206 | Weather: indoor, overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: flush

DTW Before Purging (ft) 5.34 Time: 1313 Flow through cell vol. GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 6 /2023 (1319 End Purge: Date/Time: 2/ 6 /2023 @ 1343 Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1322	20.5	2799	0.26	4.68	62.9		5.62		
1325	20.6	2275	0.28	4.90	53.6		5.61		
1328	20.8	1797	0.29	5.25	19.0		5.62		
1331	20.9	1543	0.30	5.80	-23.5				
1334	20.9	1411	0.30	6.02	-51.9				
1337	21.0	1316	0.28	6.19	-71.6				
1340	21.0	1274	0.28	6.27	-76.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): very faint yellow tint, tiny particles, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	21.0	1269	0.28	6.28	-76.2				
2	21.0	1265	0.28	6.28	-76.3				
3	21.0	1262	0.28	6.29	-78.6				
4	21.0	1259	0.28	6.29	-79.2				
Average:	21.0	1264	0.28	6.29	-77.6				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments: opened up well. Incredibly stinky smell.

Signature: Adam Torocsik Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@ 1259

Sample Number: RGW014S- 230206 | Weather: indoor, overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft) 5.42 | Time: 1226 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 6 /2023 (1233 | End Purge: Date/Time: 2/ 6 /2023 @ 1247 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1236	18.0	457.6	0.98	6.28	12.9		5.45		
1239	17.7	468.7	1.13	6.30	15.9		5.45		
1242	17.6	467.8	1.21	6.30	18.4		5.42		
1245	17.3	467.8	1.19	6.30	20.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, slight sulfuric odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.3	467.8	1.20	6.30	21.2				
2	17.3	467.8	1.20	6.30	21.2				
3	17.3	467.9	1.21	6.30	21.2				
4	17.3	468.1	1.22	6.30	21.3				
Average:	17.3	467.9	1.21	6.30	21.2				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate location (DUP4)

Comments:

Signature: Adam Torocsik | Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@ 1313

Sample Number: RGWDUP4 230206 | Weather: indoor, overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s)

Begin Purge: Date/Time: 2/ /2023 @ End Purge: Date/Time: 2/ /2023 @ Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW014S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, slight sulfuric odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	17.3	467.8	1.20	6.30	21.2				
2	17.3	467.8	1.21	6.30	21.2				
3	17.3	468.0	1.21	6.30	21.2				
4	17.3	468.1	1.22	6.30	21.3				
Average:	17.3	467.9	1.21	6.30	21.2				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate to RGW014S

Comments:

Signature: Adam Torocsik Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 7 /2023@ 1239

Sample Number: RGW031S- 230207 | Weather: rain, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft): 5.69 | Time: 1212 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 7 /2023 (1213 | End Purge: Date/Time: 2/ 7 /2023 @ 1236 | Gallons Purged: <2

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1216	12.9	300.3	0.10	6.33	1.50		5.69		
1219	12.6	297.7	0.15	6.32	-15.4		5.69		
1222	12.3	294.9	0.43	6.34	-26.3		5.67		
1225	12.1	292.7	1.35	6.35	-35.3				
1228	12.1	292.7	1.75	6.35	-40.4				
1231	11.9	291.1	2.32	6.35	-43.6				
1234	11.8	290.6	2.82	6.35	-47.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicasted peristaltic

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): colorless, medium turbidity, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.8	290.5	2.86	6.37	-47.9				
2	11.8	290.3	2.89	6.37	-48.2				
3	11.8	290.1	2.92	6.36	-48.4				
4	11.8	289.9	2.95	6.36	-48.7				
Average:	11.8	290.2	2.91	6.37	-48.3				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 7 /2023@ 1053

Sample Number: RGW033S- 230207 | Weather: rain, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft) 5.74 | Time: 1025 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 7 /2023 (1027 | End Purge: Date/Time: 2/ 7 /2023 @ 1050 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1030	11.0	249.9	0.33	6.53	-13.1		5.73		
1033	10.7	250.1	0.30	6.52	-31.4		5.72		
1036	10.5	249.5	0.32	6.52	-40.5		5.72		
1039	10.4	248.4	0.36	6.53	-47.4				
1042	9.90	251.9	0.60	6.52	-50.5				
1045	9.80	255.7	0.72	6.53	-55.5				
1048	9.60	258.5	1.17	6.54	-59.7				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.60	258.7	1.21	6.54	-60.0				
2	9.60	258.9	1.29	6.54	-60.5				
3	9.60	259.0	1.35	6.54	-61.0				
4	9.50	259.1	1.43	6.54	-61.6				
Average:	9.58	258.9	1.32	6.54	-60.8				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 7 /2023@ 1119

Sample Number: RGWDUP2 230207 | Weather: rain, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) Time: Flow through cell vol. GW Meter No.(s)

Begin Purge: Date/Time: 2/ /2023 @ End Purge: Date/Time: 2/ /2023 @ Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW033S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.60	258.8	1.25	6.54	-60.3				
2	9.60	258.9	1.31	6.54	-60.8				
3	9.60	259.1	1.40	6.54	-61.3				
4	9.50	259.1	1.47	6.54	-61.0				
Average:	9.58	259.0	1.36	6.54	-60.9				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate to RGW033S

Comments:

Signature: Adam Torocsik Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 8 /2023@ 937

Sample Number: RGW034S- 230208 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft) 5.67 | Time: 905 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 8 /2023 @ 909 | End Purge: Date/Time: 2/ 8 /2023 @ 932 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
912	13.4	396.1	0.69	6.20	4.20		5.71		
915	13.6	390.2	0.54	6.24	-5.10		5.69		
918	13.6	385.9	0.44	6.26	-12.8		5.69		
921	13.6	382.2	0.48	6.26	-13.8				
924	13.8	380.0	0.57	6.26	-15.8				
927	13.8	378.2	0.48	6.26	-17.0				
930	13.5	376.5	0.46	6.27	-17.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.4	375.4	0.48	6.26	-17.8				
2	13.4	374.8	0.48	6.27	-17.8				
3	13.3	374.1	0.48	6.26	-17.6				
4	13.2	373.4	0.48	6.26	-17.7				
Average:	13.3	374.4	0.48	6.26	-17.7				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 7 /2023@ 959

Sample Number: RGW143S- 230207 | Weather: rain, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft): 6.28 | Time: 930 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 7 /2023 @ 931 | End Purge: Date/Time: 2/ 7 /2023 @ 954 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
934	11.5	297.8	0.30	6.41	22.2		6.04		
937	10.3	291.8	0.30	6.40	12.6		6.05		
940	9.90	285.8	0.39	6.43	0.10		6.05		
943	9.60	282.2	0.86	6.44	-11.2				
946	9.50	280.2	1.65	6.46	-19.8				
949	9.50	279.3	2.28	6.47	-26.5				
952	9.60	279.1	2.72	6.48	-31.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): slightly yellow, small particles, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.60	279.1	2.75	6.47	-31.7				
2	9.60	279.1	2.79	6.47	-32.1				
3	9.60	279.1	2.83	6.48	-32.5				
4	9.60	279.1	2.87	6.48	-32.7				
Average:	9.60	279.1	2.81	6.48	-32.3				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@ 1159

Sample Number: RGW147S- 230206 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft): 15.1 | Time: 1131 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 6 /2023 @ 1133 | End Purge: Date/Time: 2/ 6 /2023 @ 1156 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1136	12.0	141.3	1.93	6.18	45.2		15.15		
1139	11.7	135.7	1.86	6.15	45.6		15.19		
1142	11.4	116.8	1.49	6.09	46.0		15.19		
1145	11.1	104.0	1.28	6.03	47.7				
1148	10.9	97.0	1.05	5.97	49.2				
1151	10.7	76.5	0.88	5.90	51.0				
1154	11.0	75.0	0.51	5.80	51.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): slightly yellow, many pulp looking particles, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.1	73.0	0.52	5.80	51.6				
2	11.2	70.8	0.48	5.79	51.4				
3	11.2	70.4	0.50	5.80	51.2				
4	11.2	67.8	0.51	5.79	50.9				
Average:	11.2	70.5	0.50	5.80	51.3				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@ 1059

Sample Number: RGW150S- 230206 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft): 5.61 | Time: 1031 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 6 /2023 @ 1033 | End Purge: Date/Time: 2/ 6 /2023 @ 1056 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1036	11.8	254.3	0.45	6.68	-14.6		5.55		
1039	11.8	243.9	0.41	6.68	-18.9		5.55		
1042	11.3	236.0	0.42	6.67	-19.9		5.55		
1045	10.8	223.3	0.47	6.65	-18.7				
1048	10.3	213.7	0.55	6.62	-5.9				
1051	10.0	207.9	0.56	6.58	-13.4				
1054	9.80	204.2	0.53	6.54	-10.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.80	203.8	0.53	6.54	-10.6				
2	9.80	203.9	0.54	6.54	-10.3				
3	9.80	203.6	0.53	6.54	-10.4				
4	9.80	203.6	0.53	6.54	-10.0				
Average:	9.8	203.7	0.53	6.54	-10.3				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 8 /2023@ 1131

Sample Number: RGW152S- 230208 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft) 8.71 | Time: 1102 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 8 /2023 (1104 | End Purge: Date/Time: 2/ 8 /2023 @ 1127 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1107	11.5	1240	0.77	6.53	-43.6		8.74		
1110	10.6	1186	0.68	6.58	-68.0		8.74		
1113	10.2	983	0.59	6.60	-70.9		8.74		
1116	10.4	989	0.59	6.59	-64.2				
1119	10.3	965	0.75	6.61	-69.1				
1122	10.0	889	0.80	6.58	-62.1				
1125	9.90	809	0.70	6.55	-50.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): medium turbidity, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.90	797	0.68	6.56	-49.8				
2	9.80	779	0.68	6.55	-48.8				
3	9.80	768	0.65	6.54	-48.4				
4	9.80	749	0.64	6.54	-47.2				
Average:	9.83	773.3	0.66	6.55	-48.6				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s): Duplicate Location (DUP1)

Comments: was very turbid initially, let purge for about 7 mins then it cleared up.

Signature: Adam Torocsik | Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 8 /2023@ 1149

Sample Number: RGWDUP1 230208 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:

DTW Before Purging (ft) | Time: | Flow through cell vol. | GW Meter No.(s)

Begin Purge: Date/Time: 2/ /2023 @ | End Purge: Date/Time: 2/ /2023 @ | Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW152S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): medium turbidity, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.80	786	0.68	6.56	-48.9				
2	9.80	774	0.66	6.55	-48.2				
3	9.90	757	0.65	6.54	-47.5				
4	9.80	743	0.64	6.55	-46.4				
Average:	9.83	765	0.66	6.55	-47.8				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate to RGW152S

Comments:

Signature: Adam Torocsik | Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 8 /2023@ 1303

Sample Number: RGW153S- 230208 | Weather: sunny, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft) 9.29 | Time: 1234 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 8 /2023 @ 1236 | End Purge: Date/Time: 2/ 8 /2023 @ 1259 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1239	12.7	177.6	2.88	6.56	46.0		9.29		
1242	12.4	179.5	2.55	6.48	42.9		9.29		
1245	12.0	184.2	2.58	6.45	41.0		9.23		
1248	11.7	193.9	2.18	6.44	39.3				
1251	11.4	205.1	1.65	6.44	35.8				
1254	11.1	211.0	1.29	6.46	30.7				
1257	10.9	211.9	1.13	6.49	26.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): slight yellow tint, low tubridity, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.9	211.9	1.13	6.49	26.3				
2	10.8	211.9	1.12	6.49	26.1				
3	10.9	211.9	1.10	6.49	25.9				
4	10.8	211.8	1.10	6.49	25.7				
Average:	10.9	211.9	1.11	6.49	26.0				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/08/2023 @ 1328

Sample Number: RGW172S- 230208 | Weather: PARTIALLY CLOUDY, 40S

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT

DTW Before Purging (ft) 9.33 Time: 1255 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/08/2023 @ 1257 End Purge: Date/Time: 2/078/2023 @ 1324 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1300	12.4	283.8	0.63	6.50	15.6		9.55		
1303	12.1	314.8	0.52	6.52	-21.7		9.55		
1306	12.1	319.6	0.33	6.66	-30.5		9.54		
1309	11.9	288.7	0.44	6.72	-38.1				
1312	12.0	273.2	0.70	6.73	-49.6				
1315	12.2	261.3	1.33	6.73	-53.8				
1318	12.0	253.8	1.63	6.70	-48.2				
1321	12.1	257.9	1.90	6.68	-47.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.2	247.3	1.96	6.68	-48.8				
2	12.3	247.3	1.99	6.68	-49.8				
3	12.3	247.6	2.02	6.68	-49.3				
4	12.3	247.3	2.06	6.68	49.3				
Average:	12.3	247.4	2.01	6.68	-24.7				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/08/2023 @ 1222

Sample Number: RGW173S- 230208 | Weather: PARTIALLY CLOUDY, 40S

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe:

DTW Before Purging (ft) 9.31 | Time: 1152 | Flow through cell vol. | GW Meter No.(s)

Begin Purge: Date/Time: 2/08/2023 @ 1153 | End Purge: Date/Time: 2/ 08/2023 @ 1219 | Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1156	12.7	280.8	0.43	6.65	-108.7		9.52		
1159	12.7	281.5	1.24	6.53	-99.3		9.47		
1202	12.7	282.0	1.67	6.54	-96.7		9.44		
1205	12.6	280.8	2.34	6.55	-92.9				
1208	12.7	280.5	2.71	6.61	-92.4				
1211	12.7	277.7	3.07	6.52	90.1				
1214	12.6	277.3	3.25	6.71	-89.8				
1217	11.3	266.8	3.63	6.64	-87.6				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, NO ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.3	266.4	3.62	6.66	-87.3				
2	11.3	266.0	3.55	6.62	-87.1				
3	11.8	266.4	3.50	6.63	-87.0				
4	11.8	266.7	3.49	6.62	-86.9				
Average:	11.6	266.4	3.54	6.63	-87.1				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
9	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
3	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
3	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: KVP | Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/07/2023 @ 1424

Sample Number: RGW176S- 230207 | Weather: PARTIALLY CLOUDY, 40S BREEZY

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNTIN DIRT

DTW Before Purging (ft) 6.22 Time: 1357 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/07/2023 @ 1358 End Purge: Date/Time: 2/07/2023 @ 1422 Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1359	12.4	NM	2.53	8.43	33.8		5.77		
1402	12.6	414.5	1.01	8.31	9.9		5.53		
1405	12.7	408.7	0.53	8.16	-8.4		5.47		
1408	12.5	404.6	0.50	8.18	-10.1				
1411	12.5	400.8	0.45	7.20	-12.4				
1414	12.5	400.5	0.40	7.23	-19.5				
1417	12.4	400.0	0.36	7.15	-21.5				
1420	12.4	399.8	0.35	7.18	-22.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, YELLOW TINT, CLIGHT SULFURIC ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.4	399.7	0.35	7.19	-23.8				
2	12.4	399.6	0.36	7.19	-23.9				
3	12.4	399.6	0.36	7.18	-23.9				
4	12.4	399.6	0.37	7.20	-23.9				
Average:	12.4	399.6	0.36	7.19	-23.9				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/07/2023 @

Sample Number: RGW178S- 230207 | Weather: RAINY, 40S, BREEZY 1118

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT

DTW Before Purging (ft) 7.63 Time: 1037 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/07/2023 @ 1039 End Purge: Date/Time: 2/07/2023 @ 1115 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1046	11.8	290.2	0.88	9.64	-7.1		7.65		
1049	11.8	289.4	1.03	12.95	-9.0		7.5		YSI ISSUES CORD
1058	11.2	283.9	0.05	8.68	-12.2		7.63		
1101	9.9	276.6	0.06	7.64	-11.6				
1104	10.8	282	0.06	7.88	-10.1				
1107	11.4	288.5	0.06	7.83	-13.8				
1110	11.6	290.7	0.10	7.77	-14.9				
1113	11.6	289.4	0.31	7.77	-15.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, SLIGHT SULFRIC ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.5	288.8	0.39	7.77	-15.4				
2	11.6	288.9	0.34	7.78	-15.6				
3	11.6	288.2	0.32	7.88	-15.5				
4	11.6	287.9	0.35	7.92	-15.5				
Average:	11.6	288.5	0.35	7.84	-15.5				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/6/2023 @ 1502

Sample Number: RGW188S- 230206 | Weather: WINDY, 40S, RAINY

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT AIRPLANE RATED LID

DTW Before Purging (ft) 5.11 Time: 1430 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/06/2023 @ 1434 End Purge: Date/Time: 2/ 06/2023 @ 1458 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1435	12.5	436.2	0.26	6.47	-3.4		5.32		
1438	11.8	435.6	0.21	6.47	-34.7		5.29		
1441	11.8	435.1	0.47	6.50	-46.4		5.32		
1444	11.8	434.3	1.20	6.50	-54.3				
1447	10.9	428.9	2.14	6.50	-59.4				
1450	10.7	424.1	2.56	6.51	-61.2				
1453	10.3	418.2	3.34	6.51	-64.1				
1456	10.3	418.0	3.45	6.51	-64.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): COLORLESS. CLEAR, NO ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.3	418.2	3.45	6.51	-64.7				
2	10.3	418.0	3.45	6.51	-64.8				
3	10.3	417.8	3.46	6.51	-64.8				
4	10.3	418.0	3.49	6.51	-65.0				
Average:	10.3	418.0	3.46	6.51	-64.8				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 7 /2023@ 1449

Sample Number: RGW189S- 230207 | Weather:

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: flush

DTW Before Purging (ft) 5.12 Time: 1421 Flow through cell vol. GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 7 /2023 (1422 End Purge: Date/Time: 2/ 7 /2023 @ 1445 Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1425	10.8	176.6	0.11	6.09	21.6		5.09		
1428	10.7	174.6	0.20	6.07	16.7		5.08		
1431	10.8	170.9	0.49	6.11	13.6		5.06		
1434	11.0	169.4	0.83	6.12	7.4				
1437	11.1	167.4	1.29	6.13	3.5				
1440	11.1	166.9	1.62	6.14	-0.7				
1443	11.2	165.3	1.92	6.16	-4.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.2	159.3	1.95	6.17	-5.1				
2	11.2	157.9	1.97	6.26	-4.8				
3	11.2	157.9	2.02	6.28	-5.7				
4	10.9	156.9	2.08	6.30	-6.2				
Average:	11.1	158.0	2.01	6.25	-5.5				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
14	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
6	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
3	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): MSMSD Location

Comments:

Signature: Adan Torocsik Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 06/2023@ 1648

Sample Number: RGW193S- 230206 | Weather: WINDY, CLOUDY, 40S

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MT AIRPLANE RATED LID

DTW Before Purging (ft) 5.4 Time: 1609 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/06/2023 @ 1610 End Purge: Date/Time: 2/06/2023 @ 1634 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1611	11.0	530.0	0.37	6.43	20.7		5.57		
1614	10.9	434.6	0.27	6.28	16.4		5.47		
1617	10.9	411.6	0.23	6.26	9.9		5.52		
1620	10.8	377.4	0.40	6.27	0.8				
1623	10.8	345.0	0.77	6.28	-4.6				
1626	10.8	319.3	1.17	6.30	-11.6				
1629	10.8	299.8	1.44	6.31	-15.4				
1632	10.8	266.3	1.71	6.33	-18.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, LOW TURB, SLIGHT ORGANIC ODOR, COLORLESS, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.7	263.3	1.77	6.33	-19.4				
2	10.7	263.4	1.78	6.33	-19.4				
3	10.7	258.4	1.83	6.33	-20.2				
4	10.7	258.1	1.84	6.34	-20.3				
Average:	10.7	260.8	1.81	6.33	-19.8				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/07/2023 @ 1330

Sample Number: RGW207S- 230207 | Weather: RAINY, 40S, WINDY

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT IN DIRT ON MEDIAN

DTW Before Purging (ft) 6.18 Time: 1304 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/07/2023 @ 1307 End Purge: Date/Time: 2/07/2023 @ 1327 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1309	12.7	265.4	0.83	8.61	-24		6.37		
1312	12.4	259.7	0.66	8.51	-24.6		6.27		
1315	12.1	256.9	0.56	8.40	-24.3		6.33		
1318	12.1	255.6	0.42	8.34	-24.1				
1321	12.2	256.4	0.39	8.27	-24.4				
1324	12.2	256.5	0.39	8.33	-24.2				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CELAR / COLORLESS / NO ODOR / NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.2	256.3	0.37	8.39	-24.2				
2	12.2	256.3	0.36	8.34	-24.0				
3	12.2	256.6	0.36	8.34	-24.1				
4	12.2	256.3	0.36	8.32	-24.0				
Average:	12.2	256.4	0.36	8.35	-24.1				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/07/2023 @ 1202

Sample Number: RGW208S- 230207 | Weather: CLOUDY, 40S, WET

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT BY GATE

DTW Before Purging (ft) 7.54 Time: 1140 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/ 07/2023 @ 1141 End Purge: Date/Time: 2/07/2023 @ 1159 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		
1143	12.1	390.7	1.65	7.46	0.6		7.64		
1146	12.0	396.3	1.00	7.51	-17.9		7.59		
1149	11.3	395.3	0.89	7.48	-27.7		7.67		
1152	12.0	402.4	0.73	7.53	-29.4				
1155	12.0	400.7	0.73	7.46	-30.6				
1158	12.1	393.4	0.71	7.47	-32.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, VERYSIGHT YELLOW TINT, NO ODOR, NO SHEEN, LOW TURB

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.1	391.8	0.71	7.40	-32.1				
2	12.1	391.6	0.71	7.34	-32.4				
3	12.1	389.0	0.70	7.37	-32.5				
4	12.1	388.8	0.70	7.43	-32.6				
Average:	12.1	390.3	0.71	7.39	-32.4				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments: BY GATE BRING CONES, 1" THICK AIRPLANE RATED MONUMENT

Signature: KVP Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/9/2023 @ 1158

Sample Number: RGW211S- 230209 | Weather: CLOUDY, 40S

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT ON RENTON AIRPORT SIDE

DTW Before Purging (ft) 9.56 Time: 1127 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/09/2023 @ 1130 End Purge: Date/Time: 2/09/2023 @ 1156 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1133	9.3	345.3	1.33	6.59	-101.4		9.82		
1136	9.6	323.5	2.55	6.63	-80.0		9.83		
1139	9.8	217.6	1.85	6.68	-70.5		9.90		
1142	9.9	159.0	0.72	6.62	-64.4				
1145	9.9	146.7	1.00	6.58	-60.7				
1148	10.0	135.1	1.52	6.51	-54.1				
1151	10.1	129.4	2.07	6.44	-49.9				
1154	10.1	128.0	2.40	6.41	-43.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): MED TURBIDITY, ORANGE-BROWN COLOR, VERY SLIGHT CHEMICAL/ PETROLEUM-LIKE

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.1	127.8	2.47	6.4	-42.1				
2	10.1	127.7	2.51	6.4	-41.6				
3	10.1	127.6	2.56	6.4	-40.9				
4	10.1	127.3	2.57	6.4	-40.3				
Average:	10.1	127.6	2.53	6.4	-41.2				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/9/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/09/2023 @ 938

Sample Number: RGW221S- 230209 | Weather: CLOUDY 40S

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT ON BOEING SIDE, NEAR DUMP

DTW Before Purging (ft) 9.68 Time: 905 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/09/2023 @ 909 End Purge: Date/Time: 2/09/2023 @ 936 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
913	10.5	151.0	18.23	5.96	71.7		9.69		
916	10.3	160.0	10.98	5.93	65.5		9.70		
919	10.0	160.8	7.17	5.93	63.0		9.73		
922	9.7	160.6	4.39	5.95	61.1				
925	9.1	160.5	3.25	5.97	59.2				
928	8.7	159.3	2.64	5.99	57.6				
931	8.2	158.2	2.25	6.01	55.0				
934	8.1	158.0	2.17	6.02	54.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, COLORLESS, SLIGHT SULFURIC ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	8.1	157.9	2.13	6.01	54.8				
2	8.1	157.9	2.08	6.01	54.5				
3	8.1	157.9	2.09	6.01	54.4				
4	8.1	157.9	2.04	6.01	54.2				
Average:	8.1	157.9	2.09	6.01	54.5				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments: CHSNGE MATRIX TO QED BLADDER, NOT NON DED.

Signature: KVP Date: 2/9/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 9 /2023@ 1113

Sample Number: RGW224S- 230209 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: Flush Mount

DTW Before Purging (ft) 10.34 Time: 1044 Flow through cell vol. GW Meter No.(s WLM 2

Begin Purge: Date/Time: 2/ 9 /2023 (1045 End Purge: Date/Time: 2/ 9 /2023 @ 1108 Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1048	11.2	108.2	1.62	6.08	48.7		10.38		
1051	10.7	114.8	1.29	6.03	45.4		10.31		
1054	10.3	120.4	1.73	5.99	41.6		10.29		
1057	10.0	131.1	2.95	6.02	38.7				
1100	10.5	134.7	3.05	6.18	32.0				
1103	11.5	140.7	3.55	6.23	25.5				
1106	11.5	143.6	4.03	6.24	22.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.5	143.6	4.07	6.24	21.7				
2	11.5	143.9	4.13	6.24	21.3				
3	11.5	144.0	4.19	6.23	20.9				
4	11.4	144.1	4.27	6.23	20.4				
Average:	11.5	143.9	4.17	6.24	21.1				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s): Duplicate Location (DUP3)

Comments:

Signature: Adam Torocsik Date: 2/9/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 9 /2023@ 1133

Sample Number: RGWDUP3 230209 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: Flush Mount

DTW Before Purging (ft) | Time: | Flow through cell vol. | GW Meter No.(s)

Begin Purge: Date/Time: 2/ /2023 @ | End Purge: Date/Time: 2/ /2023 @ | Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
Purge Goals: Stablization of Parameters for three consecutive readings within the following limits								**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

DUPLICATE TO RGW224S

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.5	143.8	4.10	6.24	21.5				
2	11.5	144	4.19	6.23	21.2				
3	11.4	144.1	4.24	6.24	20.7				
4	11.4	144.2	4.30	6.24	20.2				
Average:	11.5	144.0	4.21	6.24	20.9				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
2	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)	
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s): Duplicate to RGW224S

Comments:

Signature: Adam Torocsik | Date: 2/9/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/08/2023 @ 1134

Sample Number: RGW226S- 230208 | Weather: PARTIALLY CLOUDY, 40S

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT BY DOOR 2 OF 5-09

DTW Before Purging (ft) 8.66 Time: 1105 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/ 08/2023 @ 1108 End Purge: Date/Time: 2/ 08/2023 @ 1133 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1110	13.8	289.4	1.07	6.45	-41.2		8.69		
1113	14.1	278.2	0.64	6.47	-52.7		8.66		
1116	14.4	267.3	0.39	6.47	-62.3		8.62		
1119	14.5	264.1	0.91	6.49	-68.0				
1122	14.6	262.9	2.79	6.57	-73.4				
1125	14.5	262.4	3.31	6.57	-76.4				
1128	14.6	261.3	3.67	6.49	-79.6				
1131	14.5	260.3	3.82	6.49	-81.1				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, LOW TURBIDITY, NO ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	14.6	260.3	3.84	6.49	-81.3				
2	14.6	259.9	3.86	6.49	-81.5				
3	14.7	259.8	3.86	6.49	-81.8				
4	14.7	259.2	3.89	6.49	-81.8				
Average:	14.7	259.8	3.86	6.49	-81.6				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 8 /2023@ 1513

Sample Number: RGW230I- 230208 | Weather: sunny, 50s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft) 6.6 | Time: 1447 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 8 /2023 @ 1446 | End Purge: Date/Time: 2/ 8 /2023 @ 1509 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		
1449	11.6	274.4	1.19	6.25	49.1		6.67		
1452	10.6	270.6	0.90	6.27	44.2		6.69		
1455	11.2	267.9	0.57	6.25	40.6		6.71		
1458	11.8	274.6	0.45	6.31	30.7				
1501	11.8	274.6	0.41	6.32	26.2				
1504	11.8	273.9	0.37	6.32	22.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.8	273.9	0.37	6.33	22.4				
2	11.8	273.8	0.37	6.32	22.1				
3	11.8	273.9	0.37	6.33	21.9				
4	11.8	273.6	0.37	6.33	21.7				
Average:	11.8	273.8	0.37	6.33	22.0				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260C SIM VC) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
	(COD) (TOC SM5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/08/2023 @ 1544

Sample Number: RGW232S- 230208 | Weather: SUNNY, 40S

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT IN E. PERM. ROAD PULL OUT

DTW Before Purging (ft) 6.52 Time: 1507 Flow through cell vol. GW Meter No.(s SLOPE 2

Begin Purge: Date/Time: 2/08/2023 @ 1514 End Purge: Date/Time: 2/08/2023 @ 1540 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1517	12.5	385.8	0.66	6.34	65.4		7.35		pump slowed
1520	12.3	381.5	1.39	6.36	49.4		7.52		
1523	12.0	379.1	1.95	6.36	33.2		7.78		
1526	11.7	376.2	2.63	6.37	26.4		7.88		PUMP SLOWED
1529	11.5	373.6	3.14	6.37	13.6		7.94		
1532	10.9	367.6	3.86	6.37	6.6				
1535	10.9	365.8	4.10	6.37	4.2				
1538	11.0	365.7	4.22	6.38	2.0				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, NO ODOR, NO SHEEN, COLORLESS

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.0	365.8	4.29	6.38	0.7				
2	11.0	365.8	4.32	6.38	-0.1				
3	11.1	366.0	4.32	6.38	0.3				
4	11.0	366.3	4.42	6.38	-0.2				
Average:	11.0	366.0	4.34	6.38	0.2				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 9 /2023@ 1015

Sample Number: RGW234S- 230209 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: flush

DTW Before Purging (ft) 7.54 Time: 944 Flow through cell vol. GW Meter No.(s WLM 2

Begin Purge: Date/Time: 2/ 9 /2023 @ 946 End Purge: Date/Time: 2/ 9 /2023 @ 1009 Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
949	10.4	217.7	0.54	6.62	-5.90		7.49		
952	10.1	186.0	0.47	6.59	-15.5		7.45		
955	10.0	175.3	0.96	6.56	-17.0		7.44		
958	9.90	169.5	2.07	6.54	-17.5				
1001	9.80	167.1	2.67	6.54	-17.4				
1004	9.80	165.2	3.19	6.54	-17.4				
1007	9.80	164.1	3.53	6.53	-17.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): slight yellow tint, low turbidity, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.8	164.1	3.56	6.53	-17.5				
2	9.8	164.0	3.58	6.53	-17.5				
3	9.8	163.9	3.60	6.53	-17.5				
4	9.8	163.8	3.62	6.53	-17.5				
Average:	9.8	164.0	3.59	6.53	-17.5				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)		
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐	OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐	OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)		
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)		
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)		
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)		
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili		
	VOC (Boeing short list)		
	Methane Ethane Ethene Acetylene		
	others		

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik Date: 2/9/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 9 /2023@ 941

Sample Number: RGW235I- 230209 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft) 6.59 | Time: 910 | Flow through cell vol. | GW Meter No.(s WLM 2

Begin Purge: Date/Time: 2/ 9 /2023 @ 914 | End Purge: Date/Time: 2/ 9 /2023 @ 937 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
917	9.90	146.2	0.32	6.74	14.6		6.63		
920	9.80	147.9	0.32	6.69	12.5		6.63		
923	9.80	147.5	0.27	6.71	8.20		6.63		
926	9.60	145.6	0.22	6.73	3.50				
929	9.70	144.0	0.25	6.76	-1.90				
932	9.80	143.4	0.29	6.77	-5.30				
935	9.80	142.6	0.45	6.79	-8.10				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.9	142.5	0.49	6.79	-8.4				
2	9.9	142.6	0.51	6.79	-8.6				
3	9.9	142.6	0.54	6.79	-8.9				
4	9.9	142.5	0.57	6.79	-9.1				
Average:	9.9	142.6	0.53	6.79	-8.8				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/9/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 9 /2023@ 857

Sample Number: RGW236S- 230209 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft) 6.71 | Time: 827 | Flow through cell vol. | GW Meter No.(s WLM 2

Begin Purge: Date/Time: 2/ 9 /2023 @ 829 | End Purge: Date/Time: 2/ 9 /2023 @ 852 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
832	9.70	231.0	4.25	6.64	107.9		6.72		
835	9.50	246.3	3.26	6.65	99.5		6.73		
838	10.1	251.7	0.29	6.66	69.0		6.71		
841	10.5	253.6	0.68	6.69	38.0				
844	10.5	251.4	1.34	6.68	22.5				
847	10.6	248.6	2.96	6.67	10.9				
850	10.7	245.5	3.62	6.67	4.60				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): yellow, clear, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.7	245.6	3.66	6.67	4.20				
2	10.7	245.1	3.70	6.66	3.70				
3	10.7	245.2	3.74	6.67	3.40				
4	10.7	244.6	3.77	6.66	3.10				
Average:	10.7	245.1	3.72	6.67	3.60				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)	
3	(8260-SIM) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX)	WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease)	WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)	
1	(COD) (TOC5310C) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)	
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)	
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)	
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili	
	VOC (Boeing short list)	
	Methane Ethane Ethene Acetylene	
	others	

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/9/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@ 1613

Sample Number: RGW237S- 230206 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft): 5.21 | Time: 1544 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 6 /2023 @ 1546 | End Purge: Date/Time: 2/ 6 /2023 @ 1609 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1549	11.2	212.3	1.90	6.45	34.6		5.19		
1552	10.7	216.5	1.65	6.41	27.3		5.19		
1555	10.1	203.8	1.30	6.41	23.9		5.21		
1558	9.7	187.5	1.11	6.40	25.4				
1601	9.5	176.2	0.98	6.39	29.0				
1604	9.4	170.8	0.74	6.37	30.6				
1607	9.4	170.5	0.63	6.36	29.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): slightly yello, orange particles, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.50	170.3	0.62	6.36	29.1				
2	9.50	170.0	0.62	6.36	29.0				
3	9.50	170.4	0.62	6.36	28.9				
4	9.50	170.5	0.62	6.36	28.7				
Average:	9.5	170.3	0.62	6.36	28.9				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 7 /2023@ 901

Sample Number: RGW240D- 230207 | Weather: rainy, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: flush

DTW Before Purging (ft) 6.36 Time: 829 Flow through cell vol. GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 7 /2023 (834 End Purge: Date/Time: 2/ 7 /2023 @ 857 Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
837	11.9	244.5	1.99	6.56	10.6		6.61		
840	10.8	237.8	1.98	6.57	-19.8		6.52		
843	10.1	231.4	1.79	6.59	-35.2		5.52		
846	9.80	228.6	1.30	6.62	-49.1				
849	9.80	227.5	1.36	6.63	-53.7				
852	9.60	226.6	1.39	6.63	-56.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): colorless, low tubridity, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.60	226.3	1.38	6.63	-57.0				
2	9.60	226.4	1.39	6.63	-57.5				
3	9.60	226.2	1.39	6.64	-57.9				
4	9.60	225.9	1.41	6.64	-58.7				
Average:	9.60	226.2	1.39	6.64	-57.8				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 7 /2023@ 1319

Sample Number: RGW244S- 230207 | Weather: rain, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: flush

DTW Before Purging (ft) 5.51 Time: 1249 Flow through cell vol. GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 7 /2023 (1252 End Purge: Date/Time: 2/ 7 /2023 @ 1315 Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1255	12.4	360.1	0.67	6.39	-24.5		5.67		
1258	12.1	358.8	1.39	6.40	-36.1		5.69		
1301	11.9	357.3	1.92	6.40	-43.9		5.65		
1304	11.8	355.9	2.35	6.41	-48.0				
1307	11.6	354.2	2.82	6.41	-51.4				
1310	11.8	350.9	2.96	6.39	-53.8				
1313	13.2	371.7	3.05	6.41	-59.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated peristaltic

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	13.3	372.9	3.08	6.41	-59.8				
2	13.3	373.7	3.09	6.40	-60.1				
3	13.4	374.2	3.12	6.41	-60.4				
4	13.4	374.6	3.14	6.40	-60.7				
Average:	13.4	373.9	3.11	6.41	-60.3				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
5	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/6/2023 1344

Sample Number: RGW248I- 230206 | Weather: 40S WINDY, RAINY

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe:

DTW Before Purging (ft) 5.07 Time: 1315 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/06/2023 @ 1320 End Purge: Date/Time: 2/ /2023 @ 1339 Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1324	11.3	369.6	1.61	6.43	-4.8		5.24		
1327	10.4	385.2	1.39	6.45	-28.0		5.14		
1330	9.6	383.2	1.26	6.45	36.9		5.14		
1333	9.3	379.0	1.11	6.44	-42.2				
1336	9.1	376.8	1.16	6.45	-46.8				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDEWR

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, LOW TURB, SLIGHTLY YELLOW, NO ODOR, NO SHEEN, SLIGHTLY EFFERVESCENT

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	9.0	376.5	1.23	6.45	-49.2				
2	9.0	374.8	1.31	6.45	-49.9				
3	9.0	374.5	1.39	6.45	-50.2				
4	9.0	374.4	1.40	6.45	-50.5				
Average:	9.0	375.1	1.33	6.45	-50.0				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 06/2023@ 1150

Sample Number: RGW249S- 230206 | Weather: 40S, CLOUDY, VERY WINDY

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT

DTW Before Purging (ft) 4.28 Time: 1120 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/06 /2023 @ 1123 End Purge: Date/Time: 2/06/2023 @ 1148 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ☐ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1125	12.6	320.7	0.41	6.39	-61.3		4.29		
1128	12.4	317.6	0.70	6.34	-66.1		4.32		
1131	11.4	310.2	1.84	6.35	-67.4		4.29		
1134	11.7	308.0	2.80	6.32	-69.1				
1137	11.9	309.6	3.95	6.33	-71.0				
1140	12.0	309.6	4.42	6.34	-72.3				
1143	12.1	309.9	4.76	6.32	-73.0				
1146	12.1	308.7	4.91	6.32	-73.5				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, SLIGHT YELLOW TINT, NO ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.1	308.4	4.94	6.34	-73.4				
2	12.1	308.5	4.95	6.34	-73.5				
3	12.1	308.4	4.97	6.32	-73.6				
4	12.1	308.3	4.98	6.33	-73.6				
Average:	12.1	308.4	4.96	6.33	-73.5				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/07/2023 @ 944

Sample Number: RGW250S- 230207 | Weather: RAINY 40S, WINDY

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: FLUSH MOUNT 12"

DTW Before Purging (ft) 3.73 Time: 915 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/07/2023 @ End Purge: Date/Time: 2/07/2023 @ 942 Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
919	11.2	104.8	3.65	6.58	59.8		3.89		
922	11.8	113.3	1.69	6.60	28.6		3.98		
925	11.8	114.2	1.08	6.67	8.8		4.11		
928	11.6	114.6	0.86	6.71	-7.1				
931	10.7	109.6	0.88	6.75	-13.0				
934	10.7	110.1	0.71	6.65	-13.6				
937	11.7	112.7	0.60	6.77	-24.9				
940	11.9	112.8	0.53	6.78	-26.3				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): CLEAR, LOW - MED TURB, SLIGHT YELLOW TINT, NO ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	11.8	112.3	0.52	6.78	-26				
2	11.9	112.3	0.50	6.79	-25.4				
3	11.9	112.6	0.51	6.79	-25.4				
4	11.9	112.0	0.49	6.80	-25.9				
Average:	11.9	112.3	0.51	6.79	-25.7				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	(8260) (8010) (8021) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
1	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/7/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/ 6 /2023@ 1021

Sample Number: RGW253I- 230206 | Weather: overcast, 40s

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: flush

DTW Before Purging (ft): 5.42 | Time: 952 | Flow through cell vol. | GW Meter No.(s WLM 9

Begin Purge: Date/Time: 2/ 6 /2023 (956 | End Purge: Date/Time: 2/ 6 /2023 @ 1019 | Gallons Purged: <1

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
959	10.8	296.1	1.03	6.43	1.4		5.42		
1002	10.4	283.6	0.84	6.39	1.3		5.41		
1005	10.3	278.5	0.72	6.38	-0.4		5.41		
1008	10.3	277.6	0.67	6.38	-4.1				
1011	10.5	281.2	0.77	6.42	-8.9				
1014	10.6	279.5	0.75	6.44	-12.0				
1017	10.7	279.2	0.69	6.47	-14.9				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type dedicated bladder

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): clear, colorless, no odor, no sheen

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	10.8	278.8	0.67	6.47	-15.2				
2	10.9	279.1	0.66	6.48	-15.6				
3	10.8	279.0	0.66	6.48	-15.8				
4	10.8	278.9	0.65	6.48	-16.3				
Average:	10.8	279.0	0.66	6.48	-15.7				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: Adam Torocsik | Date: 2/6/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/08/2023 @ 1420

Sample Number: RGW263S- 230208 | Weather:

Landau Representative: KVP / AT

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) | Damaged (NO) | Describe: Flush Mount

DTW Before Purging (ft) 6.39 | Time: 1420 | Flow through cell vol. | GW Meter No.(s)

Begin Purge: Date/Time: 2/ /2023 @ | End Purge: Date/Time: 2/ /2023 @ | Gallons Purged:

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							**>/= 1 flow through cell**	
	+/- 3%	**+/- 3%**	**+/- 10%**	**+/- 0.1 units**	**+/- 10 mV**	**+/- 10%**	**< 0.3 ft**		

WATER LEVEL ONLY

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ☐ Pump/Pump Type

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.):

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1									
2									
3									
4									
Average:	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!			

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP | Date: 2/8/2023

LANDAU ASSOCIATES

Groundwater Low-Flow Sample Collection Form

Project Name: Boeing Renton | Project Number: 0025217.003.099.099

Event: Feb. 2023 | Date/Time: 2/08/2023 @ 1448

Sample Number: RGW264S- 230208 | Weather: PARTIALLY CLOUDY, 40S

Landau Representative: KVP

WATER LEVEL/WELL/PURGE DATA

Well Condition: Secure (YES) Damaged (NO) Describe: Flush Mount

DTW Before Purging (ft) 5.1 Time: 1417 Flow through cell vol. GW Meter No.(s SLOPE 11

Begin Purge: Date/Time: 2/08/2023 @ 1418 End Purge: Date/Time: 2/08/2023 @ 1445 Gallons Purged: 0.5

Purge water disposed to: ☐ 55-gal Drum ☐ Storage Tank ☐ Ground ■ Other SITE TREATMENT SYSTEM

Time	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Internal Purge Volume (gal)	Comments/ Observations
	Purge Goals: Stablization of Parameters for three consecutive readings within the following limits							>/= 1 flow through cell	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/- 10 mV	+/- 10%	< 0.3 ft		
1419	13.0	1079	0.58	6.20	17.5		5.53		
1422	12.9	1101	1.82	6.23	-14.0		5.68		
1425	12.9	1095	5.22	6.25	-43.1		5.96		
1428	12.8	1082	7.10	6.26	-56.1		6.07		
1431	12.8	1080	8.10	6.25	-62.4		6.15		
1434	12.8	1077	8.34	6.25	-67.2				
1437	12.7	1069	9.13	6.25	-70.1				
1440	12.7	1065	9.44	6.25	-73.4				

SAMPLE COLLECTION DATA

Sample Collected With: ☐ Bailer ■ Pump/Pump Type QED BLADDER

Made of: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ■ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ■ Dedicated

(By Numerical Order) ☐ Other

Sample Description (color, turbidity, odor, sheen, etc.): EFFERVESCENT, CLEAR, NO ODOR, NO SHEEN

Replicate	Temp (°F/°C)	Cond. (uS/cm)	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	DTW (ft)	Ferrous iron (Fe II)	Comments/ Observations
1	12.7	1060	9.51	6.25	-74.1				
2	12.7	1061	9.51	6.25	-74.1				
3	12.7	1061	9.53	6.25	-74.2				
4	12.7	1065	9.55	6.25	-74.3				
Average:	12.7	1062	9.53	6.25	-74.2				

QUANTITY	TYPICAL ANALYSIS ALLOWED PER BOTTLE TYPE (Circle applicable or write non-standard analysis below)
3	(8260) (8010) (8020) (NWTPH-G) (NWTPH-Gx) (BTEX) WA ☐ OR ☐
	(8270D) (PAH) (NWTPH-D) (NWTPH-Dx) (TPH-HCID) (8081) (8141) (Oil & Grease) WA ☐ OR ☐
	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
1	(COD) (TOC) (Total PO4) (Total Kiedahl Nitrogen) (NH3) (NO3/NO2)
	(Total Cyanide) (WAD Cyanide) (Free Cyanide)
	(Total Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
	(Dissolved Metals) (As) (Sb) (Ba) (Be) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Sili
	VOC (Boeing short list)
	Methane Ethane Ethene Acetylene
	others

Duplicate Sample No(s):

Comments:

Signature: KVP Date: 2/8/2023

APPENDIX C

DATA VALIDATION MEMOS

Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2023
From:	Caitlin Riechmann	c:	Project File
Tel:	(503) 639-3400		
Date:	March 22, 2023		

Re: Summary Data Quality Review
February 2023 Boeing Renton Groundwater Sampling
SWMU-168
ARI Work Order Number: 23B0219

This memo presents the summary data quality review of one primary groundwater sample and one trip blank sample collected on February 8, 2023. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for the volatile organic compound vinyl chloride by U.S. Environmental Protection Agency (EPA) Method 8260D with selected ion monitoring.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW230I-230208	23B0219-01	vinyl chloride
Tripblank9-230208	23B0219-02	vinyl chloride

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014).

ARI received the samples on February 9, 2023. The temperature of the cooler was recorded upon receipt and the cooler was less than the maximum acceptable temperature of 6 degrees Celsius.

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wsp.com

Organic analyses

Samples were analyzed for vinyl chloride. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.

6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable.

Overall assessment of data

The table below summarizes the data assessment. The completeness of ARI work order number 23B0219 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. No problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte
RGW230I-230208	none
Tripblank9-230208	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2023
From:	Caitlin Riechmann	c:	Project File
Tel:	(503) 639-3400		
Date:	March 22, 2023		

Re: **Summary Data Quality Review**
February 2023 Boeing Renton Groundwater Sampling
SWMU-172/174
ARI Work Order Number: 23B0226

This memo presents the summary data quality review of nine primary groundwater samples, one field duplicate, and one trip blank collected on February 8 and 9, 2023. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260D with selected ion monitoring;
- Total organic carbon (TOC) by Standard Method 5310B; and
- Total metals (arsenic, copper, and lead) by EPA Method 6020A.

The samples and the analyses conducted on the samples are listed below.

Sample ID[1]	Laboratory Sample ID	Requested Analyses
RGW152S-230208	23B0226-01	all
DUP1-230208	23B0226-02	all
RGW226S-230208	23B0226-03	all
RGW153S-230208	23B0226-04	all
RGW173S-230208	23B0226-05	all
RGW172S-230208	23B0226-06	all
RGW232S-230208	23B0226-07	all
RGW236S-230209	23B0226-08	all

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Sample ID[1]	Laboratory Sample ID	Requested Analyses
RGW235I-230209	23B0226-09	all
RGW234S-230209	23B0226-10	all
Tripblanks10-230209	23B0226-11	VOCs

Note:

1. Sample RGW234S was incorrectly logged as RGW2345 in the laboratory report. Based on associated sample naming from previous sampling events, the sample is referred to as RGW234S in this memo.

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014a and b).

ARI received the samples on February 9, 2023. The temperature of the coolers was recorded upon receipt and one of the coolers was above the maximum acceptable temperature of 6 degrees Celsius (˚C). The laboratory logged the samples with the time on the chain-of-custody (COC) and proceeded with analysis.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable except as noted:

   The temperature of one of the coolers upon receipt at ARI was greater than the maximum acceptable temperature, at 7.2˚C. Detected results from all samples are flagged with a "J" and non-detect results from all samples are qualified with a "UJ."

2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit. In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (ng/L)	Duplicate Result (ng/L)	Reporting Limit (ng/L)	RPD (%)
RGW152S-230208/ DUP1-230208	vinyl chloride	195	197	20.0	1
	cis-1,2-dichloroethene	3,160	3,270	20.0	3
	trichloroethene	101	104	20.0	3
	tetrachloroethene	234	219	20.0	7

Abbreviations

ng/L = nanograms per liter
RPD = relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable.

Inorganic analyses

Samples were analyzed for TOC and total metals. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable except as noted:

   The temperature of one of the coolers upon receipt at ARI was greater than the maximum acceptable temperature, at 7.2˚C. TOC results from all samples are flagged with a "J."

2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/MSD – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable except as noted:

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate RPDs is 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit. In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The RPD between lead results was high, at 32 percent. The detected lead results from sample RGW152S-230208 and its field duplicate DUP1-230208 are flagged with a "J."

Sample ID/ Field Duplicate ID	Analyte	Primary Result	Duplicate Result	Reporting Limit	RPD (%)
RGW152S-230208/ DUP1-230208	lead	4.24 µg/L	3.06 µg/L	0.100 µg/L	32
	arsenic	6.92 µg/L	7.02 µg/L	0.200 µg/L	1
	copper	6.61 µg/L	5.82 µg/L	0.500 µg/L	13
	TOC	3.57 mg/L	3.67 mg/L	0.50 mg/L	3

Abbreviations

µg/L = micrograms per liter
mg/L = milligrams per liter
RPD = relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 23B0226 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualifier Reason	Qualified Result[1]
RGW152S-230208	vinyl chloride	Elevated cooler temperature	195 J ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	3,160 J ng/L
	trichloroethene	Elevated cooler temperature	101 J ng/L
	tetrachloroethene	Elevated cooler temperature	234 J ng/L
	TOC	Elevated cooler temperature	3.57 J mg/L
	lead	High field duplicate RPD	4.24 J µg/L
DUP1-230208	vinyl chloride	Elevated cooler temperature	197 J ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	3,270 J ng/L
	trichloroethene	Elevated cooler temperature	104 J ng/L
	tetrachloroethene	Elevated cooler temperature	219 J ng/L
	TOC	Elevated cooler temperature	3.67 J mg/L
	lead	High field duplicate RPD	3.06 J µg/L
RGW226S-230208	vinyl chloride	Elevated cooler temperature	73.4 J ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	43.1 J ng/L
	trichloroethene	Elevated cooler temperature	20.0 UJ ng/L
	tetrachlorothene	Elevated cooler temperature	20.0 UJ ng/L
	TOC	Elevated cooler temperature	9.38 J mg/L

Sample ID	Qualified Analyte	Qualifier Reason	Qualified Result[1]
RGW153S-230208	vinyl chloride	Elevated cooler temperature	148 J ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	56.9 J ng/L
	trichloroethene	Elevated cooler temperature	20.0 UJ ng/L
	tetrachloroethene	Elevated cooler temperature	20.0 UJ ng/L
	TOC	Elevated cooler temperature	9.87 J mg/L
RGW173S-230208	vinyl chloride	Elevated cooler temperature	210 J ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	90.9 J ng/L
	trichloroethene	Elevated cooler temperature	47.9 J ng/L
	tetrachloroethene	Elevated cooler temperature	42.9 J ng/L
	TOC	Elevated cooler temperature	5.42 J mg/L
RGW172S-230208	vinyl chloride	Elevated cooler temperature	601 J ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	155 J ng/L
	trichloroethene	Elevated cooler temperature	20.0 UJ ng/L
	tetrachloroethene	Elevated cooler temperature	20.0 UJ ng/L
	TOC	Elevated cooler temperature	4.62 J mg/L
RGW232S-230208	vinyl chloride	Elevated cooler temperature	290 J ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	206 J ng/L
	trichloroethene	Elevated cooler temperature	20.0 UJ ng/L
	tetrachloroethene	Elevated cooler temperature	20.0 UJ ng/L
	TOC	Elevated cooler temperature	8.20 J mg/L
RGW236S-230209	vinyl chloride	Elevated cooler temperature	20.0 UJ ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	36.4 J ng/L
	trichloroethene	Elevated cooler temperature	20.0 UJ ng/L
	tetrachlorothene	Elevated cooler temperature	20.0 UJ ng/L
	TOC	Elevated cooler temperature	2.25 J mg/L
RGW235I-230209	vinyl chloride	Elevated cooler temperature	31.0 J ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	235 J ng/L
	trichloroethene	Elevated cooler temperature	29.6 J ng/L
	tetrachloroethene	Elevated cooler temperature	20.0 UJ ng/L
	TOC	Elevated cooler temperature	1.00 J mg/L

Sample ID	Qualified Analyte	Qualifier Reason	Qualified Result[1]
RGW234S-230209	vinyl chloride	Elevated cooler temperature	30.4 J ng/L
	cis-1,2-dichloroethene	Elevated cooler temperature	58.1 J ng/L
	trichloroethene	Elevated cooler temperature	20.0 UJ ng/L
	tetrachloroethene	Elevated cooler temperature	20.0 UJ ng/L
	TOC	Elevated cooler temperature	3.00 J mg/L
Tripblanks10-230209	none	NA	none

Notes:
1. Data qualifiers are as follows:
   J = The value is an estimate.
   UJ = The analyte was not detected at the estimated reporting limit indicated.

Abbreviations

µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
NA = not applicable
RPD = relative percent difference
TOC = total organic carbon

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2023
From:	Caitlin Riechmann	c:	Project File
Tel:	(503) 639-3400		
Date:	March 22, 2023		

Re: Summary Data Quality Review
February 2023 Boeing Renton Groundwater Sampling
Building 4-78/79 SWMU/AOC Group
ARI Work Order Number: 23B0203

This memo presents the summary data quality review of seven primary groundwater samples, one field duplicate, and one trip blank collected from February 6 to 8, 2023. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (limited suite: benzene, vinyl chloride, cis-1,2-dichloroethene, and trichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260D;
- Total petroleum hydrocarbons as gasoline (TPH-G) by Ecology Method NWTPH-Gx; and
- Total organic carbon (TOC) by Standard Methods For the Examination of Water and Wastewater 5310B.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW237S-230206	23B0203-01	all
RGW240D-230207	23B0203-02	all
RGW143S-230207	23B0203-03	all
RGW033S-230207	23B0203-04	all
DUP2-230207	23B0203-05	all
RGW031S-R-230207	23B0203-06	all
RGW244S-R-230207	23B0203-07	all

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Sample ID	Laboratory Sample ID	Requested Analyses
Tripblank2-230206	23B0203-08	VOCs
RGW034S-230208	23B0203-09	all

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014a and b).

ARI received the samples on February 8, 2023. The temperature of the coolers was recorded upon receipt and the coolers were below the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

Samples were analyzed for VOCs and TPH-G. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is less than 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit, as indicated on the table below by "NC." In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (µg/L)	Duplicate Result (µg/L)	Reporting Limit (µg/L)	RPD (%)
RGW033S-230207/ RGWDUP2-230207	vinyl chloride	0.24	0.21	0.20	NC
	cis-1,2-dichloroethene	0.09	ND	0.20	NC
	benzene	ND	ND	0.20	NC
	trichloroethene	ND	ND	0.20	NC
	tetrachloroethene	ND	ND	0.20	NC
	TPH-G	ND	ND	100	NC

Notes:

1. Data qualifiers are as follows:
   J = The value is an estimate.

Abbreviations-

µg/L = micrograms per liter
NC = not calculated
ND = not detected
RPD = relative percent difference
TPH-G = total petroleum hydrocarbons as gasoline

7. Reporting Limits and Laboratory Flags – Acceptable.

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable except as noted:

   TOC was detected at a concentration of 0.88 mg/L in the laboratory blank associated with the analysis of all the samples except Tripblank2-230206. The detected TOC results from samples RGW240D-230207, RGW033S-230207, and DUP2-230207 are qualified with a "J." TOC was detected in the remaining associated samples at concentrations greater than ten times the concentration detected in the laboratory blank and data usability is not adversely affected by the blank detection.
3. LCS – Acceptable
4. MS/MSD – Acceptable

   Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.
5. Laboratory Duplicates – Acceptable

   The laboratory did not perform duplicate analyses on the samples reviewed in this report.
6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is less than 30 percent for concentrations greater than five times the reporting limit. The RPD is not

calculated for results that are less than five times the reporting limit. In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW033S-230207/ RGWDUP2-230207	TOC	8.35	8.72	0.50	4

Abbreviations-

mg/L = milligrams per liter
RPD = relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 23B0203 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance documents identified in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte	Qualifier Reason	Qualified Result[1] (mg/L)
RGW237S-230206	none	NA	NA
RGW240D-230207	TOC	Method blank contamination	5.35 J
RGW143S-230207	none	NA	NA
RGW033S-230207	TOC	Method blank contamination	8.35 J
DUP2-230207	TOC	Method blank contamination	8.72 J
RGW031S-R-230207	none	NA	NA
RGW244S-R-230207	none	NA	NA
Tripblank2-230206	none	NA	NA
RGW034S-230208	none	NA	NA

Notes:
1. Data qualifiers are as follows:
J = The value is an estimate.

Abbreviations:

mg/L = milligrams per liter
NA = not applicable
TOC = total organic carbon

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2023
From:	Caitlin Riechmann	c:	Project File
Tel:	(503) 639-3400		
Date:	March 22, 2023		

Re: Summary Data Quality Review
February 2023 Boeing Renton Groundwater Sampling
Former Fuel Farm AOC Group
ARI Work Order Number: 23B0220

This memo presents the summary data quality review of three primary groundwater samples and one field duplicate collected on February 9, 2023. The samples were submitted to Analytical Resources Inc. (ARI), a Washington State Department of Ecology-accredited laboratory located in Tukwila, Washington. The samples were analyzed for total petroleum hydrocarbons as diesel (TPH-D), as motor oil (TPH-O) and as Jet A (TPH-Jet A) by Washington State Department of Ecology Method NWTPH-Dx.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW221S-230209	23B0220-01	all
RGW211S-230209	23B0220-02	all
RGW224S-230209	23B0220-03	all
DUP3-230209	23B0220-04	all

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014).

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ARI received the samples on February 9, 2023. The temperature of the cooler was recorded upon receipt and the cooler was above the maximum acceptable temperature of 6 degrees Celsius (˚C).

Organic analyses

Samples were analyzed for TPH-D plus TPH-O and TPH-Jet A. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable except as noted:

   The temperature of the cooler upon receipt at ARI was above the maximum acceptable temperature, at 7.2˚C. The samples were collected a few hours before they were received and were received on ice, and data usability is not adversely affected by the temperature exceedance. No data were qualified.

2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.

6. Field Duplicates – Acceptable:

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is less than 30 percent for concentrations greater than five times the reporting limit, as indicated on the table below by "NC." The RPD is not calculated for results that are less than five times the reporting limit. In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW224S-230209/ RGWDUP3-230209	TPH-D (C12–C24)	1.15	1.11	0.100	4
	TPH-O (C24–C38)	ND	ND	0.200	NC
	TPH-Jet A (C10–C18)	1.61	1.36	0.100	17

Abbreviations

mg/L = milligrams per liter
NC = not calculated
ND = not detected
RPD = relative percent difference
TPH-D = total petroleum hydrocarbons as diesel
TPH-Jet A = total petroleum hydrocarbons as Jet A
TPH-O = total petroleum hydrocarbons as motor oil

7. Reporting Limits and Laboratory Flags – Acceptable.

Overall assessment of data

The table below summarizes the data review. The completeness of ARI work order number 23B0220 is 100 percent. Evaluation of the usefulness of these data is based on EPA guidance

documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGW221S-230209	none
RGW211S-230209	none
RGW224S-230209	none
DUP3-230209	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2023
From:	Caitlin Riechmann	c:	Project File
Tel:	(503) 639-3400		
Date:	March 22, 2023		

Re: Summary Data Quality Review
February 2023 Boeing Renton Groundwater Sampling
AOC-001, -002, and -003
ARI Work Order Number: 23B0195

This memo presents the summary data quality review of four primary groundwater samples and two trip blanks collected on February 6, 2023. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were selectively analyzed for the following:

- Benzene (a volatile organic compound [VOC]) by U.S. Environmental Protection Agency (EPA) Method 8260D;
- VOCs (vinyl chloride, 1,1-dichloroethene, cis-1,2-dichloroethene, and trichloroethene) by EPA Method 8260D with selected ion monitoring; and
- Total organic carbon (TOC) by Standard Method 5310B-00.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW249S-230206	23B0195-01	vinyl chloride and TOC
RGW248I-230206	23B0195-02	vinyl chloride and TOC
RGW188S-230206	23B0195-03	vinyl chloride and TOC
RGW193S-230206	23B0195-04	all
Trip Blank 3	23B0195-05	benzene
Trip Blank 4	23B0195-06	VOCs

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Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014a and b).

ARI received the samples on February 9, 2023. The temperature of the coolers was recorded upon receipt and the coolers were below the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.
6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.
7. Reporting Limits and Laboratory Flags – Acceptable.

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable except as noted:

   TOC was detected at a concentration of 0.88 mg/L in the laboratory blank associated with the four primary groundwater samples. The detected TOC results from samples RGW188S-230206 and RGW193S-230206 are qualified with a "J." TOC was detected in the remaining associated samples at concentrations greater than ten times the concentration detected in the laboratory blank and data usability is not adversely affected by the blank detection.
3. LCS – Acceptable
4. MS/MSD – Acceptable

Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.

5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 23B0195 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits.

Sample ID	Qualified Analyte	Qualifier Reason	Qualified Result[1] (mg/L)
RGW249S-230206	none	NA	none
RGW248I-230206	none	NA	none
RGW188S-230206	TOC	Method blank contamination	8.79 J
RGW193S-230206	TOC	Method blank contamination	6.08 J
Trip Blank 3	none	NA	none
Trip Blank 4	none	NA	none

Notes:

1. Data qualifiers are as follows:
   J = The value is an estimate.

Abbreviations:

NA = not applicable
mg/L = milligrams per liter
TOC = total organic carbon

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2023
From:	Caitlin Riechmann	c:	Project File
Tel:	(503) 639-3400		
Date:	March 22, 2023		

Re: Summary Data Quality Review
February 2023 Boeing Renton Groundwater Sampling
AOC-004
ARI Work Order Number: 23B0189

This memo presents the summary data quality review of one primary groundwater sample collected on February 7, 2023. The sample was submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The sample was analyzed for total lead by U.S. Environmental Protection Agency (EPA) Method 6020A.

The sample and the analyses conducted on the sample are listed below.

Sample ID[1]	Laboratory Sample ID	Requested Analyses
RGW250S	23B0189-01	total lead

Note:

1. Sample RGW250S was incorrectly logged as RGW2505 in the laboratory report. Based on associated sample naming from previous sampling events, the sample is referred to as RGW250S in this memo.

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014).

ARI received the sample on February 8, 2023. The temperature of the coolers was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius (˚C).

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Inorganic analyses

Samples were analyzed for total lead. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/MSD – Acceptable

   Additional sample volume for MS/MSD analyses was not submitted with samples collected from this site. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.
5. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.
6. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 23B0189 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. No problems were identified, and analytical performance was within specified limits.

Sample ID	Qualified Analyte
RGW250S	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

EPA, 2014, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2023
From:	Caitlin Riechmann	c:	Project File
Tel:	(503) 639-3400		
Date:	March 22, 2023		

Re: Summary Data Quality Review
February 2023 Boeing Renton Groundwater Sampling
AOC-060
ARI Work Order Number: 23B0204

This memo presents the summary data quality review of six primary groundwater samples, one field duplicate, and one trip blank collected on February 6, 2023. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were selectively analyzed for the following:

- Volatile organic compounds (VOCs) (cis-1,2-dichloroethene, trichloroethene, and vinyl chloride) by U.S. Environmental Protection Agency (EPA) Method 8260D with selected ion monitoring; and
- Total organic carbon (TOC) by Standard Method 5310B-00.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW253I-230206	23B0204-01	all
RGW150S-230206	23B0204-02	all
RGW147S-230206	23B0204-03	all
RGW014S-230206	23B0204-04	all
DUP4-230206	23B0204-05	all
RGW012S-230206	23B0204-06	all
RGW009S-230206	23B0204-07	all
Trip blanks1-230206	23B0204-08	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The

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control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Hold times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014a and b).

Samples were received by ARI on February 8, 2023. The temperature of the cooler was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius (˚C). Samples were received in good condition.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is less than 30 percent for concentrations greater than five times the reporting limit, as indicated on the table below by "NC." The RPD is not calculated for results that are less than five times the reporting limit. In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate results were within control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (ng/L)	Duplicate Result (ng/L)	Reporting Limit (ng/L)	RPD (%)
RGW014S-230206/ RGWDUP4-230206	vinyl chloride	231	230	20.0	0
	cis-1,2-dichloroethene	137	134	20.0	2
	trichloroethene	ND	ND	20.0	NC

Abbreviations

ng/L = nanograms per liter
NC = not calculated
ND = not detected
RPD = relative percent difference

7. Reporting Limits and Laboratory Flags – Acceptable.

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/MSD – Acceptable

   Extra volume was not submitted for analysis of MS/MSD samples. The project frequency requirement was achieved with MS/MSD analysis conducted at other sites included in this sampling event.

5. Laboratory Duplicates – Acceptable

   The laboratory did not perform duplicate analyses on the samples reviewed in this report.

6. Field Duplicates – Acceptable

   One field duplicate was submitted for each analysis during this sampling event, meeting the project frequency requirement of five percent, or one for every 20 samples. Primary and duplicate results are summarized in the table below. The project-specific control limit for field duplicate relative percent differences (RPDs) is less than 30 percent for concentrations greater than five times the reporting limit. The RPD is not calculated for results that are less than five times the reporting limit. In these cases, the absolute value of the difference between the primary and duplicate result should not exceed the value of the reporting limit. The field duplicate RPDs were within control limits.

Sample ID/ Field Duplicate ID	Analyte	Primary Result (mg/L)	Duplicate Result (mg/L)	Reporting Limit (mg/L)	RPD (%)
RGW014S-230206/ RGWDUP4-230206	TOC	3.82	4.09	0.50	7

Abbreviations
mg/L = milligrams per lite
RPD= relative percent difference
TOC = total organic carbon

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

A summary of the data assessment is presented in the table below. The completeness of work order number 23B0204 is 100 percent. Evaluation of the usefulness of these data is based on the EPA guidance document listed in the introduction to this report. No problems were identified, and analytical performance was within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGW253I-230206	none
RGW150S-230206	none
RGW147S-230206	none

Sample ID	Qualified Analyte
RGW014S-230206	none
DUP4-230206	none
RGW012S-230206	none
RGW009S-230206	none
Trip blanks1-230206	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2023
From:	Caitlin Riechmann	c:	Project File
Tel:	(503) 639-3400		
Date:	March 22, 2023		

Re: Summary Data Quality Review
February 2023 Boeing Renton Groundwater Sampling
AOC-090
ARI Work Order Number: 23B0188

This memo summarizes the data quality review of five primary groundwater samples and four trip blanks collected on February 7, 2023. The samples were submitted to Analytical Resources, Inc. (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology (Ecology). The samples were selectively analyzed for the following:

- Volatile organic compounds (VOCs) (acetone, methylene chloride, trans-1,2-dichlorethene, cis-1,2-dichloroethene, chloroform, carbon tetrachloride, benzene, toluene, and 1,1,2-trichloroethane) by U.S. Environmental Protection Agency (EPA) Method 8260D);
- VOCs (vinyl chloride, 1,1-dichloroethene, trichloroethene, tetrachloroethene, and 1,1,2,2-tetrachloroethane) by EPA Method 8260D with selected ion monitoring;
- Total petroleum hydrocarbons in the gasoline range (TPH-G) by Ecology Method NWTPH Gx;
- Total petroleum hydrocarbons in the diesel and motor oil ranges (TPH-D and TPH-O) by Ecology Method NWTPH-Dx (with silica gel cleanup); and
- Total organic carbon (TOC) by Standard Method 5310B-00.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW178S-230207	23B0188-01	vinyl chloride
RGW208S-230207	23B0188-02	vinyl chloride
RGW207S-230207	23B0188-03	vinyl chloride
RGW176S-230207	23B0188-04	vinyl chloride
RGW189S-230207	23B0188-05	All

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Sample ID	Laboratory Sample ID	Requested Analyses
Trip Blank 5	23B0188-06	vinyl chloride
Trip Blank 6	23B0188-07	VOCs by EPA Method 8260D
Trip Blank 7	23B0188-08	VOCs by EPA Method 8260D with selected ion monitoring
Trip Blank 8	23B0188-09	TPH-G

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan Addendum (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS), laboratory duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in EPA guidelines (EPA, 2014a and b).

ARI received the samples on February 8, 2023. The temperature of the coolers was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

Samples were analyzed for VOCs and TPH. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable except as noted:

   ARI performed MS and MSD analyses on sample RGW-189S-230207.

   TPH-D recovery was high (175 percent) in the MSD performed on sample RGW-189S-230207. Additionally, the relative percent difference (RPD) between TPH-D results was high (58.5 percent). The TPH-D result from sample RGW-189S-230207 was qualified with a "J."

   Toluene recovery was low (79.4 percent) in the MS performed on sample RGW189S-230207. The toluene result from sample RGW189S-230207 was qualified with a "J."

   The RPD between MS and MSD results for methylene chloride was high (36 percent). Methylene chloride was not detected in the unspiked native sample and no data were qualified.

6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable.

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable
3. LCS – Acceptable
4. MS/MSD – Acceptable
5. Laboratory Duplicates – Acceptable
6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.
7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The completeness of ARI work order number 23B0188 is 100 percent. Evaluation of the usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

A summary of the data quality review is presented in the table below.

Sample ID	Qualified Analyte	Qualifier Reason	Qualified Result[1]
RGW178S-230207	none	NA	NA
RGW208S-230207	none	NA	NA
RGW207S-230207	none	NA	NA
RGW176S-230207	none	NA	NA
RGW189S-230207	toluene TPH-D	Low MS recovery High MS recovery/ High MS/MSD RPD	0.69 J µg/L 0.648 J mg/L
Trip Blank 5	none	NA	none
Trip Blank 6	none	NA	none
Trip Blank 7	none	NA	NA
Trip Blank 8	none	NA	NA

Notes:

1. Data qualifiers are as follows:
   J = The value is an estimate.

Abbreviations:

µg/L = micrograms per liter
mg/L = milligrams per liter
NA = not applicable

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

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Memo

To:	Kathleen Goodman, Project Manager	Project:	PS20203450.2023
From:	Caitlin Riechmann	c:	Project File
Tel:	(503) 639-3400		
Date:	March 22, 2023		

Re: Summary Data Quality Review
February 2023 Boeing Renton Groundwater Sampling
Apron A
ARI Work Order Number: 23B0222

This memo presents the summary data quality review of one primary groundwater sample and one trip blank collected on February 8, 2023. The samples were submitted to Analytical Resources, Inc., (ARI), located in Tukwila, Washington, a laboratory accredited by the Washington State Department of Ecology. The samples were analyzed for the following:

- Volatile organic compounds (VOCs) (vinyl chloride and cis-1,2-dichloroethene) by U.S. Environmental Protection Agency (EPA) Method 8260D; and
- Total organic carbon (TOC) by Standard Method 5310B.

The samples and the analyses conducted on the samples are listed below.

Sample ID	Laboratory Sample ID	Requested Analyses
RGW264S-230208	23B0222-01	all
Trip Blank 11	23B0222-02	VOCs

Data were reviewed in accordance with the appropriate method procedures and criteria documented in the Quality Assurance Project Plan (QAPP) (Amec Foster Wheeler, 2016). The control limits provided in the QAPP are advisory limits; therefore, the most current control limits provided by the laboratory were used to evaluate the quality control data. In cases where the laboratory did not track limits for an analyte, the limits in the QAPP were used.

Holding times, method/trip blanks, surrogate recoveries, laboratory control samples (LCS) and laboratory control sample duplicates (LCSD), matrix spike/matrix spike duplicates (MS/MSD), field duplicates, and reporting limits were reviewed where available to assess compliance with applicable methods. If qualification was required, data were qualified based on the definitions and use of qualifying flags outlined in the EPA guidance documents (EPA, 2014a and b).

WSP USA Environment & Infrastructure Inc.
15862 SW 72nd Ave., Suite 150
Portland, Oregon 97224
+1 (503) 639-3400
wsp.com

ARI received the samples on February 9, 2023. The temperature of the coolers was recorded upon receipt and was below the maximum acceptable temperature of 6 degrees Celsius.

Organic analyses

Samples were analyzed for VOCs. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable except as noted:

   Two sampling vials contained bubbles upon arrival at ARI. One vial was received without a bubble and WSP assumes that ARI used that vial for the VOC analysis. The data are not qualified for use.

2. Blanks – Acceptable
3. Surrogates – Acceptable
4. LCS/LCSD – Acceptable
5. MS/MSD – Acceptable

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted at other sites included in this sampling event.

6. Field Duplicates – Acceptable

   Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable

Inorganic analyses

Samples were analyzed for TOC. Laboratory data were evaluated for the following parameters:

1. Preservation and Holding Times – Acceptable
2. Blanks – Acceptable except as noted:

   TOC was detected at a concentration of 0.88 mg/L in the laboratory blank associated with sample RGW264S-230208. TOC was detected in sample RGW264S-230208 at a concentration greater than ten times the concentration detected in the blank and data usability is not adversely affected by the blank detection. No data were qualified for use.

3. LCS – Acceptable
4. MS/MSD – Acceptable

   Extra volume was not submitted for project specific MS/MSD analyses. Sample precision is evaluated based on LCS and LCSD recoveries. The MS/MSD project frequency requirement of one MS/MSD for every 20 samples was achieved with extra volume submitted at other sites included in this sampling event.

5. Laboratory Duplicates – Acceptable

   The laboratory did not perform duplicate analyses on the sample reviewed in this report.

6. Field Duplicates – Acceptable

Field duplicates were not collected at this site during this sampling event. The project frequency requirement of one field duplicate for every 20 samples was achieved with field duplicate samples collected at other sites included in this sampling event.

7. Reporting Limits and Laboratory Flags – Acceptable

Overall assessment of data

The table below summarizes the data assessment. The completeness of work order number 23B0222 is 100 percent. The usefulness of these data was evaluated based on EPA guidance documents listed in the introduction to this report. Few problems were identified, and analytical performance was generally within specified limits. The data meet the project's data quality objectives.

Sample ID	Qualified Analyte
RGW264S-230208	none
Trip Blank 11	none

References

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Quality Assurance Project Plan, Boeing Renton Facility, Renton, Washington: Prepared for the Boeing Company, February.

U.S. Environmental Protection Agency (EPA), 2014a, U.S. EPA National Functional Guidelines for Superfund Organic Methods Data Review: EPA 540-R-014-002, August.

EPA, 2014b, U.S. EPA National Functional Guidelines for Inorganic Superfund Data Review: EPA 540-R-013-001, August.

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APPENDIX D

HISTORICAL GROUNDWATER DATA TABLES

TABLE D-1: SWMU-168 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3] CPOC Area GW229S							
		11/7/2016	3/1/2017	8/14/2017	3/5/2018	8/13/2018	3/4/2019	8/12/2019	3/9/2020
Volatile Organic Compounds (µg/L)									
Vinyl Chloride	0.11	0.020 U	0.020 U	0.021	0.0273	0.020 U	0.0211	0.020 U	0.020 U

Analyte	Current Cleanup Level[4]	Well ID[3] CPOC Area GW230I								
		3/4/2019	8/12/2019	3/9/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/17/2022	2/9/2023
Volatile Organic Compounds (µg/L)										
Vinyl Chloride	0.11	0.0566	**0.336**	0.087	**0.162**	0.076	0.359 J	**0.164**	**0.539 J**	**0.146**

Analyte	Current Cleanup Level[4]	Well ID[3] CPOC Area GW231S							
		11/7/2016	3/1/2017	8/14/2017	3/5/2018	8/13/2018	3/4/2019	8/12/2019	3/9/2020
Volatile Organic Compounds (µg/L)									
Vinyl Chloride	0.11	0.020 U	0.020 U	0.020 U	0.0393	0.0326	0.0327	0.026	0.020 U

Notes:

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations:

µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
SWMU = solid waste management unit

TABLE D-2: SWMU-172 AND SWMU-174 GROUP HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3] / Source Area																		
		GW152S									GW153S									
		11/11/2019	3/9/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	2/21/2022	8/24/2022	2/8/2023	8/12/2019	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/24/2022	2/8/2023
Volatile Organic Compounds (µg/L)																				
cis-1,2-Dichloroethene	0.03	**0.530**	**0.892**	**1.66**	**0.144**	**1.330**	**1.57**	**1.59**	**0.877**	**3.16 J**	**0.278**	**0.204**	**0.0736**	**0.0789**	**0.0551**	**0.077**	**0.0582 J**	**0.0517**	0.100	0.0569 J
Tetrachloroethene	0.02	**0.384**	**1.12**	**0.319**	**0.081**	**0.0872**	**1.84**	**1.71**	**1.05**	**0.234 J**	**0.0544**	**0.164**	**0.024**	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U	0.0200 U	0.0200 UJ
Trichloroethene	0.02	**0.145**	**0.278**	**0.579**	0.020 U	**0.129**	**0.522**	**0.497**	**0.534**	**0.101 J**	**0.0326**	**0.131**	0.02 U	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U	0.0525	0.0200 UJ
Vinyl Chloride	0.11	0.0366	**0.15**	**0.284**	0.0378	**0.506**	**0.200**	**0.219**	**0.346**	**0.195 J**	**0.153**	0.0859	**0.249**	**0.266**	**0.135**	**0.220**	**0.193 J**	**0.174**	**0.214**	**0.148 J**
Total Metals (µg/L)																				
Arsenic	1.0	**7.48**	**3.84**	**6.72**	**7.67**	**16.3**	**2.88**	**2.34**	**47.7**	**6.92**	**4.72**	**11.9**	**5.48**	**3.85**	**4.05**	**32.8**	**32.8**	**4.98**	**2.85**	**4.76**
Copper	3.5	**16.6**	**8.03**	**7.45 J**	**17.2 J**	**9.08 J**	**5.07**	**3.88**	**9.17**	**6.61**	1.58	**10.2**	3.09	1.73	1.68	**33.9**	**33.9**	1.45	0.641	1.14
Lead	1.0	**12.1**	**6.13**	**3.89**	**12.5 J**	**5.38 J**	**2.78 J**	**1.90 J**	**5.75**	**4.24 J**	0.351	**2.76**	0.712	0.372	0.326	**5.80**	**5.80**	0.302	0.123	0.256

Analyte	Current Cleanup Level[4]	Well ID[3] / Downgradient Plume Area																		
		GW172S									GW173S									
		5/6/2019	8/12/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/24/2022	2/8/2023	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/24/2022	2/8/2023	
Volatile Organic Compounds (µg/L)																				
cis-1,2-Dichloroethene	0.03	**0.0581**	0.027	**0.214**	**0.0561**	**0.108**	**0.0746**	**0.0532**	**0.0436**	**0.155 J**	**0.0378**	**0.0504**	**0.0488**	**0.0313**	**0.0505**	**0.0424 J**	0.0280	0.168	**0.0909 J**	
Tetrachloroethene	0.02	0.020 U	**0.0451**	**0.0625**	**0.0603**	**0.0624**	0.020 U	**0.0677**	0.0200 U	0.0200 UJ	**0.0246**	**0.0224**	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U	0.0200 U	**0.0429 J**	
Trichloroethene	0.02	0.020 U	0.020 U	**0.028**	0.020 U	0.020 U	0.020 U	**0.0201**	0.0200 U	0.0200 UJ	**0.0379**	**0.0305**	**0.0215**	**0.0239**	0.020 U	0.020 UJ	0.0200 U	**0.0496**	**0.0479 J**	
Vinyl Chloride	0.11	0.0808	0.0376	**0.369**	0.0628	**0.219**	**0.155**	**0.137**	0.0887	**0.601 J**	0.072	0.144	0.126	0.0455	**0.183**	**0.176 J**	0.0696	**0.175**	**0.210 J**	
Total Metals (µg/L)																				
Arsenic	1.0	**7.71**	**10.6**	**7.03**	**10.8**	**10.8**	**7.18**	**11.2**	**4.86**	**6.64**	**15.6**	**11.8**	**6.72**	**7.00**	**9.94**	**11.4**	**13.8**	**6.04**	**5.69**	
Copper	3.5	2.13	**3.86**	**2.2**	**6.12**	**3.89**	**2.86**	2.86	1.52	**6.17**	**4.68**	1.51	0.875	3.19	3.11	**5.96**	2.58	1.54	2.98	
Lead	1.0	0.991	**1.02**	**1.07**	**2.58**	**1.98**	**1.33**	**1.37**	**1.32**	**3.80**	**1.36**	0.442	0.215	0.470	0.850	**1.65**	0.788	0.468	0.752	

Analyte	Current Cleanup Level[4]	Well ID[3] / Downgradient Plume Area									CPOC Area									
		GW226S									GW232S									
		5/6/2019	8/12/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/24/2022	2/8/2023	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/24/2022	2/8/2023	
Volatile Organic Compounds (µg/L)																				
cis-1,2-Dichloroethene	0.03	0.0223	0.0259	**0.0305**	0.0218	0.020 U	**0.0335 J**	**0.0363**	0.0255	**0.0431 J**	**0.659**	**0.221**	**0.352**	**0.482**	**0.219**	**0.464 J**	**0.197**	**0.325**	**0.206 J**	
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	**0.0279**	0.020 U	**0.0202 J**	0.0200 U	0.0200 U	0.0200 UJ	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U	0.0200 U	0.0200 UJ	
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U	0.0200 U	0.0200 UJ	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 UJ	0.0200 U	0.0200 U	0.0200 UJ	
Vinyl Chloride	0.11	0.0459	0.029	0.0594	0.0415	0.0519	0.0516 J	0.0414	**0.128**	0.0734 J	**0.860**	**0.264**	**0.337**	**0.425**	**0.263**	**0.653 J**	**0.307**	**0.558**	**0.290 J**	
Total Metals (µg/L)																				
Arsenic	1.0	**2.97**	**2.85**	**3.33**	**4.93**	**8.12**	**5.57**	**7.33**	**3.09**	**4.28**	**8.09**	**2.73**	**4.71**	**3.83**	**4.78**	**6.19**	**3.75**	**3.83**	**3.51**	
Copper	3.5	0.500 U	0.626	0.704	1.48	**3.92**	1.48	2.40	0.500 U	0.500 U	**3.85**	2.22	0.539	0.627	2.09	1.79	1.09	0.500 U	0.915	
Lead	1.0	0.100 U	0.100 U	0.190	0.136	0.513	0.124	0.237	0.100 U	0.100 U	0.378	0.354	0.100 U	0.100 U	0.318	0.262	0.234	0.122	0.124	

Analyte	Current Cleanup Level[4]	Well ID[3] / CPOC Area																		
		GW234S									GW235I									
		5/6/2019	8/12/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/24/2022	2/9/2023	11/11/2019	3/9/2020	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/24/2022	2/9/2023	
Volatile Organic Compounds (µg/L)																				
cis-1,2-Dichloroethene	0.03	**0.0630**	**0.0738**	**0.092**	**0.0914**	0.020 U	**0.0892**	**0.0591**	**0.134**	**0.0581 J**	**0.109**	**0.127**	**0.156**	**0.104**	**0.128**	**0.179**	**0.175**	**0.227**	**0.235 J**	
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0200 U	0.0200 U	0.0200 UJ	0.020 U	0.020 U	0.020 U	0.020 U	**0.0292**	0.020 U	0.0200 U	0.0200 U	0.0200 UJ	
Trichloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0200 U	0.0200 U	0.0200 UJ	**0.0287**	**0.0336**	**0.031**	**0.0227**	0.020 U	**0.0285**	**0.0253**	**0.0250**	**0.0296 J**	
Vinyl Chloride	0.11	0.0235	0.0252	0.032	0.0279	0.020 U	0.0497	0.0318	**0.170**	0.0304 J	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.24**	0.0259	0.0280	0.0310 J	
Total Metals (µg/L)																				
Arsenic	1.0	**2.22**	**1.31**	**5.31**	**3.26**	**6.29**	**1.18**	**1.76**	0.974	**5.90**	0.237	0.251	0.289	0.288	0.200 U	0.200 U	0.200 U	0.200 U	0.283	
Copper	3.5	1.93	0.869	2.43	3.21	**11.4**	2.58	2.13	2.31	**16.6**	0.573	0.935	1.08	1.30	0.727	0.689	0.687	0.500 U	1.23	
Lead	1.0	0.843	0.280	0.671	**1.25**	**4.13**	**1.01**	0.930	0.830	**6.75**	0.127	0.235	0.223	0.304	0.174	0.179	0.159	0.100 U	0.332	

TABLE D-2: SWMU-172 AND SWMU-174 GROUP HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID [3] CPOC Area GW236S								
		5/6/2019	8/12/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/24/2022	2/9/2023
Volatile Organic Compounds (µg/L)										
cis-1,2-Dichloroethene	0.03	0.0281	**0.0468**	**0.036**	**0.0881**	0.020 U	**0.0791**	0.0200 U	**0.0572**	**0.0364 J**
Tetrachloroethene	0.02	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	**0.0206**	0.0200 U	0.0200 UJ
Trichloroethene	0.02	**0.0206**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0200 U	0.0200 U	0.0200 UJ
Vinyl Chloride	0.11	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0223	0.0200 U	0.0200 U	0.0200 UJ
Total Metals (µg/L)										
Arsenic	1.0	**2.10**	**3.70**	**2.10**	**10.1**	**2.89**	**5.49**	**1.97**	**0.995**	**1.64**
Copper	3.5	2.17	0.893	**4.24**	**10.8**	**9.70**	2.47	**5.27**	1.22	2.07
Lead	1.0	**1.90**	**1.53**	**2.61**	**10.8**	**6.31**	**1.79**	**3.32**	**0.798**	**1.38**

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations

µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
SWMU = solid waste management unit

TABLE D-3: BUILDING 4-78/79 SWMU/AOC GROUP HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN [1, 2]
Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3] / Source Area: GW031S									GW033S								
		8/13/2019	11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021	8/23/2022	2/7/2023	3/11/2020	5/11/2020	8/11/2020	2/16/2021	8/11/2021	2/22/2022	2/22/2022	8/17/2022	2/7/2023
Volatile Organic Compounds (µg/L)																			
Benzene	0.80	**3.47**	**4.77**	**37.1**	**17.6**	**1.72 J**	**18.8 J**	**1.08**	0.20 U	0.20 U	**10.2**	**9.75**	**12.5**	**11.0**	**14.5**	**8.41**	**8.57**	**14.2 J**	0.20 U
cis-1,2-Dichloroethene	0.70	0.47	0.40	0.61	0.40 J	0.67 J	0.31 J	0.20 U	0.26	0.18 J	**21.4**	**39.5**	**188**	**1.64**	0.55	**3.82**	**4.04**	0.45 J	0.09 J
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.25**	0.20 U	0.20 U	0.200 U	0.200 U	0.20 U	0.20 U
Vinyl Chloride	0.20	**0.21**	**0.25**	0.20 U	0.20 U	**0.32 J**	0.20 UJ	0.20 U	**0.39**	**0.26**	**52.2**	**87.3**	**310**	**5.31**	**2.31**	**8.90**	**9.28**	**1.53 J**	**0.24**
Total Petroleum Hydrocarbons (µg/L)																			
TPH-G (C7-C12)	800	**1390**	**1540**	**2,980**	**1,880**	**1,160**	**2,340**	**1,540**	100 U	100 U	296	301	255	323	360	168	166	300 J	100 U

Analyte	Current Cleanup Level[4]	Well ID[3] / Source Area: GW034S									GW244S							
		11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021	2/22/2022	8/17/2022	2/8/2023		11/12/2019	3/11/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021	8/23/2022	2/7/2023
Volatile Organic Compounds (µg/L)																			
Benzene	0.80	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	**1.47**	**9.62**		**0.87**	0.52	0.46	0.43	0.46	0.20 U	0.25	0.12 J
cis-1,2-Dichloroethene	0.70	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	**2.03**	**0.74**		0.20 U	0.68	**1.06**	**1.12**	0.68	0.22	0.25	0.25
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U		0.20 U	0.23	0.20 U	0.20 U	**0.29**	0.20 U	0.20 U	0.20 U
Vinyl Chloride	0.20	**0.39**	0.20 U	**0.21**	**0.41**	**0.25**	**1.20**	**0.330**	**1.45**	**4.12**		**0.35**	**0.7**	**0.85**	**0.98**	**0.64**	**0.37**	**0.46**	**0.55**
Total Petroleum Hydrocarbons (µg/L)																			
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	350		100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U

Analyte	Current Cleanup Level[4]	Well ID[3] / CPOC Area: GW143S									GW237S								
		11/12/2019	3/10/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021	2/22/2022	8/17/2022	2/7/2023	11/12/2019	3/10/2020	5/11/2020	8/11/2020	2/16/2021	8/11/2021	2/22/2022	8/17/2022	2/6/2023
Volatile Organic Compounds (µg/L)																			
Benzene	0.80	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U	0.66	**3.48**	**1.03**	0.24	**6.79 J**	0.20 U	**3.73**	0.20 U	**4.18**
cis-1,2-Dichloroethene	0.70	0.20 U	0.21	0.20 U	**1.17**	0.26	0.65	0.430	**0.76 J**	0.36	0.22	**1.00 U**	0.20 U	0.20 U	0.20 UJ	0.20 U	0.200 U	0.20 U	0.22
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.23	0.20 U	0.20 U	0.200 U	**0.53 J**	0.10 J	0.20 U	**1.00 U**	0.20 U	0.20 U	0.20 UJ	0.20 U	0.200 U	0.20 U	0.20 U
Vinyl Chloride	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.09 J	**0.34**	**1.00 U**	0.20 U	0.20 U	**0.31 J**	0.20	0.200 U	0.20 U	**0.26**
Total Petroleum Hydrocarbons (µg/L)																			
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	**961**	729	100 U	100 UJ	360	664	100 U	**805**

Analyte	Current Cleanup Level[4]	Well ID[3] / CPOC Area: GW240D								
		11/12/2019	3/10/2020	5/11/2020	8/11/2020	2/15/2021	8/11/2021	2/22/2022	8/17/2022	2/7/2023
Volatile Organic Compounds (µg/L)										
Benzene	0.80	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U
cis-1,2-Dichloroethene	0.70	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U
Trichloroethene	0.23	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U
Vinyl Chloride	0.20	**0.24**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.13 J
Total Petroleum Hydrocarbons (µg/L)										
TPH-G (C7-C12)	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U

Notes
1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   UJ = The result is estimated and was not detected at the reporting limit indicated.
   J = The value is an estimate.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; D = deep well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
SWMU = solid waste management unit
TPH-G = total petroleum hydrocarbons as gasoline

TABLE D-4: FORMER FUEL FARM HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[3]	Well ID[2] CPOC Area																	
		GW211S									GW221S								
		5/7/2019	11/11/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/19/2022	2/9/2023	5/7/2019	11/11/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/19/2022	2/9/2023
Total Petroleum Hydrocarbons (mg/L)																			
TPH-D (C12-C24)	0.5	0.124	0.120	0.282	0.192	0.284	0.140	1.00 U	0.100 U	0.100 U	**0.630**	**1.65**	**1.58**	**7.67**	**1.22**	**1.02**	**0.575**	**0.940**	**1.75**
Jet A	0.5	0.117	0.117	0.267	0.155	0.262	0.100 U	1.00 U	0.100 U	0.100 U	**0.397**	**1.09**	**1.09**	**5.70**	**0.89**	**0.718**	0.460	**0.562**	**1.20**

Analyte	Current Cleanup Level[3]	Well ID[2] CPOC Area								
		GW224S								
		11/11/2019	5/11/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	2/21/2022	8/19/2022	2/9/2023
Total Petroleum Hydrocarbons (mg/L)										
TPH-D (C12-C24)	0.5	**1.46**	**0.675**	**1.08**	**0.584**	**1.08**	**0.682**	**1.01**	**0.881**	**1.15**
Jet A	0.5	**1.80**	**0.918 J**	**1.42**	**1.04**	**1.47**	**1.04**	**1.76**	**1.25**	**1.61**

Notes

1. **Bolded** values exceed the cleanup levels.
2. S = shallow well.
3. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations

AOC = area of concern
CPOC = conditional point of compliance
mg/L = milligrams per liter
SWMU = solid waste management unit
TPH-D = total petroleum hydrocarbons as diesel

TABLE D-5: AOC-003 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[4]	Well ID[3]																	
		Source Area									Downgradient Plume Area								
		GW249S									GW188S								
		3/5/2019	8/14/2019	3/12/2020	8/10/2020	2/16/2021	8/12/2021	2/23/2022	8/24/2022	2/6/2023	3/5/2019	8/14/2019	3/12/2020	8/10/2020	2/16/2021	8/12/2021	2/22/2022	8/23/2022	2/6/2023
Volatile Organic Compounds (µg/L)																			
cis-1,2-Dichloroethene	0.78	0.079	0.0526	0.0604	NA	NA	NA	NA	NA	NA	0.0493	0.0361	0.0362	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.02	0.0105	0.020 U	0.020 U	NA	NA	NA	NA	NA	NA	0.0107	0.020 U	0.0244	NA	NA	NA	NA	NA	NA
Trichloroethene	0.16	0.0157	0.020 U	0.020 U	NA	NA	NA	NA	NA	NA	0.0125	0.020 U	0.020 U	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.24	**0.424**	**0.367**	**0.334**	**0.261**	**0.366**	**0.517**	**0.359 J**	**0.404 J**	0.217	**0.537**	**0.545**	**0.235**	**0.288**	**0.107**	**0.698**	0.141 J	**0.404**	0.104

Analyte	Current Cleanup Level[4]	Well ID[3]																	
		CPOC Area																	
		GW247S									GW248I								
		11/12/2019	3/12/2020	5/13/2020	8/10/2020	2/16/2021	8/11/2021	2/23/2022	8/23/2022	2/6/2023	11/12/2019	3/12/2020	5/13/2020	8/10/2020	2/16/2021	8/11/2021	2/23/2022	8/23/2022	2/6/2023
Volatile Organic Compounds (µg/L)																			
cis-1,2-Dichloroethene	0.78	0.0635	0.039	0.584	NA	NA	NA	NA	NA	NA	0.020 U	0.02 U	0.020 U	NA	NA	NA	NA	NA	NA
Tetrachloroethene	0.02	0.020 U	0.02 U	0.020 U	NA	NA	NA	NA	NA	NA	0.020 U	0.020 U	0.020 U	NA	NA	NA	NA	NA	NA
Trichloroethene	0.16	0.148	0.02 U	0.020 U	NA	NA	NA	NA	NA	NA	0.0514	0.020 U	0.020 U	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.24	**0.504**	**0.305**	**0.409**	**0.392**	**0.405**	**0.678**	0.127 J	**0.379**	NA	**0.62**	**0.499**	**0.546**	**0.383**	**0.426**	**0.711**	**0.598 J**	**0.742**	**0.588**

Analyte	Current Cleanup Level[4]	Well ID[3]
		Source Area
		GW193S
		2/6/2023
Volatile Organic Compounds (µg/L)		
cis-1,2-Dichloroethene	0.78	NA
Tetrachloroethene	0.02	NA
Trichloroethene	0.16	NA
Vinyl Chloride	0.24	**0.334**

Notes

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations

µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
NA = not analyzed
SWMU = solid waste management unit

TABLE D-6: AOC-004 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Level[3]	Well ID[2] / Source Area / GW250S										
		3/6/2018	8/15/2018	3/5/2019	8/14/2019	3/9/2020	8/12/2020	2/16/2021	8/12/2021	2/22/2022	8/23/2022	2/7/2023
Metals (mg/L)												
Lead	0.001	0.000941	**0.00107**	**0.00154**	0.000714	**0.00119**	**0.000611**	**0.000564**	**0.000663**	0.000588	**0.00131**	0.000820

Notes

1. **Bolded** values exceed the cleanup levels.
2. S = shallow well.
3. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations

mg/L = milligrams per liter

AOC = area of concern

CPOC = conditional point of compliance

SWMU = solid waste management unit

TABLE D-7: AOC-060 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]

Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Levels[4]	Well ID[3]																	
		Source Area									Downgradient Plume Area								
		GW009S									GW012S								
		3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022	8/19/2022	2/6/2023	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022	8/18/2022	2/6/2023
Volatile Organic Compounds (µg/L)																			
cis -1,2-Dichloroethene	0.08	**0.107**	**0.127**	**0.093**	**0.124**	**0.139**	**0.368**	**0.15**	**0.229**	**0.231**	**1.23**	**0.798**	**0.482**	**0.508**	**1.260**	**2.210**	**0.693**	**1.91 J**	**2.78**
Trichloroethene	0.02	**0.0239**	0.020 U	**0.0242**	**0.0324**	**0.0294**	**0.0316**	**0.0284**	**0.0288**	**0.0409**	**0.0546**	**0.0471**	**0.0505**	**0.0518**	**0.0454**	**0.0908**	**0.0506**	**1.02 J**	**0.208**
Vinyl Chloride	0.26	**0.285**	**0.300**	0.183	0.219	**0.300**	0.160	**0.434**	**0.570**	**0.550**	**1.35**	**0.893**	**0.603**	**0.387**	0.180	**0.795**	**1.57**	**0.294 J**	**0.881**

Analyte	Current Cleanup Levels[4]	Well ID[3] Downgradient Plume Area																	
		GW014S									GW147S								
		3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022	8/18/2022	2/6/2023	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022	8/19/2022	2/6/2023
Volatile Organic Compounds (µg/L)																			
cis -1,2-Dichloroethene	0.08	**0.119**	**0.143**	**0.151**	**0.0932**	**0.130**	**0.147**	**0.133**	**0.134 J**	**0.137**	**0.955**	**4.11**	**0.287**	**0.931**	**0.180**	**0.180**	**0.679**	**8.37**	**0.766**
Trichloroethene	0.02	**0.0254**	0.020 U	**0.0419**	0.020 U	**0.035**	**0.0227**	0.020 U	**0.0246 J**	0.0200 U	**0.475**	**1.46**	**1.20**	**3.37**	**0.498**	**0.498**	**0.425**	**0.937**	**0.376**
Vinyl Chloride	0.26	0.214	**0.365**	0.195	0.190	0.207	**0.367**	**0.276**	**0.514 J**	0.231	0.0514	0.215	0.020 U	0.0643	0.020 U	0.020 U	**0.0623**	**3.39**	0.0215

Analyte	Current Cleanup Levels[4]	Well ID[3] CPOC Area																	
		GW150S									GW253I								
		3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022	8/22/2022	2/6/2023	3/5/2019	8/14/2019	3/10/2020	8/11/2020	2/17/2021	8/11/2021	2/22/2022	8/22/2022	2/6/2023
Volatile Organic Compounds (µg/L)																			
cis -1,2-Dichloroethene	0.08	0.0737	**0.0824**	0.0525	**0.0935**	0.0393	**0.0991**	**0.0547**	**0.126**	**0.0849**	**0.127**	**0.0917**	**0.0915**	**0.0879**	**0.140**	**0.106**	**0.0846**	**0.138**	**0.0991**
Trichloroethene	0.02	0.020 U	**0.0228**	0.02 U	**0.0291**	0.020 U	0.020 U	0.020 U	**0.0212**	0.0200 U	**0.0221**	0.020 U	**0.0212**	**0.0211**	**0.0272**	**0.0202**	0.020 U	**0.0205**	0.0200 U
Vinyl Chloride	0.26	0.103	0.020 U	0.0541	0.0619	0.0455	0.122	0.0969	0.100	0.138	0.143	0.131	0.184	0.100	0.243	0.146	0.177	0.255	0.156

Notes:

1. Data qualifiers are as follows:
   U = The analyte was not detected at the reporting limit indicated.
   J = The value is an estimate.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well; I = intermediate well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.

Abbreviations:

µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
SWMU = solid waste management unit

TABLE D-8: AOC-090 HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1, 2]
Boeing Renton Facility, Renton, Washington

Analyte	Current Cleanup Levels[4]	Well ID[3]																	
		Source Area									Downgradient Plume Area								
		GW189S[5]									GW176S								
		8/13/2018	3/5/2019	8/12/2019	8/12/2020	2/17/2021	8/12/2021	2/23/2022	8/24/2022	2/7/2023	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/17/2021	2/23/2022	8/23/2022	2/7/2023
Volatile Organic Compounds (µg/L)																			
1,1,2,2-Tetrachloroethane	0.17	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.24 U	0.158	0.153	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM
1,1,2-Trichloroethane	0.2	**2.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
1,1-Dichloroethene	0.057	0.020 U	0.020 U	0.020 U	0.0529	0.020 U	0.020 U	0.0200 U	0.0432	0.0200 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM
Acetone	300	70	5.00 U	5.0 U	5.00 U	10.6 J	5.00 U	5.00 U	6.28	5.00 U	5.00 U	5.0 U	5.0 U	NM	NM	NM	NM	NM	NM
Benzene	0.8	**2.42**	0.20	0.49	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
Carbon Tetrachloride	0.23	**2.00 U**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
Chloroform	2	**2.23**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
cis-1,2-Dichloroethene	2.4	**22.3**	0.92	**6.87**	1.93	0.47	**3.15**	0.20 U	1.78	0.230	0.25	0.27	0.25	NM	NM	NM	NM	NM	NM
Methylene Chloride	2	**10.9 UJ**	1.00 U	1.0 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.0 U	1.0 U	NM	NM	NM	NM	NM	NM
Tetrachloroethene	0.05	**0.20 U**	0.028	0.020 U	0.020 U	0.0283	0.020 U	0.0200 U	0.0206	0.200 U	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM
Toluene	75	21.7	4.96	3.11	1.05	5.21	2.42	0.47 J	43.7	0.690 J	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
trans-1,2-Dichloroethene	53.9	2.00 U	0.20 U	0.39	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.200 U	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
Trichloroethene	0.08	**2.38**	**0.156**	**0.414**	**0.324**	**0.143**	**0.386**	0.0505 UJ	**0.43**	0.0593	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM
Vinyl Chloride	0.13	**2.09 J**	**0.50**	**1.20**	**0.369**	0.0405	**0.575**	0.0867 J	**0.460**	0.0230	**0.294**	**0.301**	**0.207**	**0.232**	**0.138**	**0.431**	**0.311 J**	**0.364**	**0.349**
Total Petroleum Hydrocarbons (µg/L)																			
TPH-G (C7-C12)	800	**9,440**	**1,070**	**943**	699	507	504	370 J	555	246	100 U	100 U	100 U	NM	NM	NM	NM	NM	NM
TPH-D (C12-C24)	500	**4,120**	362	432	150	**2160**	390	192 J	521	**648 J**	100 UJ	100 U	100 U	NM	NM	NM	NM	NM	NM
TPH-O (C24-C40)	500	**2,000 U**	**522**	**853**	379	**3990**	**689**	263 J	586	**1,120**	200 UJ	200 U	200 U	NM	NM	NM	NM	NM	NM

Analyte	Current Cleanup Levels[4]	Well ID[3] Shallow Zone CPOC Area																								
		GW178S									GW207S								GW208S								
		8/13/2018	3/5/2019	8/12/2019	8/12/2020	2/17/2021	8/12/2021	2/23/2022	8/24/2022	2/7/2023	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/12/2021	2/23/2022	2/7/2023	8/23/2022	3/5/2019	8/12/2019	3/11/2020	8/12/2020	2/17/2021	8/12/2021	2/23/2022	8/24/2022	2/7/2023
Volatile Organic Compounds (µg/L)																											
1,1,2,2-Tetrachloroethane	0.17	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM
1,1,2-Trichloroethane	0.2	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
1,1-Dichloroethene	0.057	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM
Acetone	300	5.00 U	5.54	5.0 U	NM	NM	NM	NM	NM	NM	5.00 U	5.0 U	5.0 U	NM	NM	NM	NM	NM	NM	5.00 U	5.0 U	5.0 U	NM	NM	NM	NM	NM	NM
Benzene	0.8	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
Carbon Tetrachloride	0.23	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
Chloroform	2	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
cis-1,2-Dichloroethene	2.4	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.21	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
Methylene Chloride	2	1.00 U	1.00 U	1.00 U	NM	NM	NM	NM	NM	NM	1.00 U	1.00 U	1.00 U	NM	NM	NM	NM	NM	NM	1.00 U	1.0 U	1.0 U	NM	NM	NM	NM	NM	NM
Tetrachloroethene	0.05	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM	0.020 U	0.020 U	0.020 U	NM	NM	NM	NM	NM	NM
Toluene	75	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
trans-1,2-Dichloroethene	53.9	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM	0.20 U	0.20 U	0.20 U	NM	NM	NM	NM	NM	NM
Trichloroethene	0.08	0.0213	0.0213	0.020 U	NM	NM	NM	NM	NM	NM	0.020 U	0.0305	0.020 U	NM	NM	NM	NM	NM	NM	0.020 U	0.0293	0.020 U	NM	NM	NM	NM	NM	NM
Vinyl Chloride	0.13	**0.378**	**0.392**	**0.3840**	**0.141**	**0.224**	**0.182**	**0.361 J**	**0.390**	**0.531**	0.0692	0.020 U	0.020 U	**0.377**	0.066	**0.232**	**0.356 J**	0.0200 U	**0.326**	**0.437**	**0.245**	**0.419**	**0.343**	**0.349**	**0.313**	**0.404 J**	**0.400**	**0.419**
Total Petroleum Hydrocarbons (µg/L)																											
TPH-G (C7-C12)	800	100 U	100 U	100 U	NM	NM	NM	NM	NM	NM	100 U	100 U	100 U	NM	NM	NM	NM	NM	NM	100 U	100 U	100 U	NM	NM	NM	NM	NM	NM
TPH-D (C12-C24)	500	100 U	100 UJ	100 U	NM	NM	NM	NM	NM	NM	100 UJ	100 U	100 U	NM	NM	NM	NM	NM	NM	100 UJ	100 U	100 U	NM	NM	NM	NM	NM	NM
TPH-O (C24-C40)	500	200 U	200 UJ	200 U	NM	NM	NM	NM	NM	NM	200 UJ	200 U	200 U	NM	NM	NM	NM	NM	NM	200 UJ	200 U	200 U	NM	NM	NM	NM	NM	NM

Notes:
1. Data qualifiers are as follows:
U = The analyte was not detected at the reporting limit indicated.
J = The value is an estimate.
UJ = The analyte was not detected at the estimated reporting limit indicated.
2. **Bolded** values exceed the cleanup levels.
3. S = shallow well.
4. Current cleanup levels obtained from Table 2 of the Cleanup Action Plan and are based on each individual SWMU or AOC.
5. GW189S is the replacement well for GW168S.

Abbreviations:
µg/L = micrograms per liter
AOC = area of concern
CPOC = conditional point of compliance
NM = Analyte not measured
SWMU = solid waste management unit
TPH-D = total petroleum hydrocarbons as diesel
TPH-G = total petroleum hydrocarbons as gasoline
TPH-O = total petroleum hydrocarbons as oil

TABLE D-9: APRON A HISTORICAL CONCENTRATIONS OF CONSTITUENTS OF CONCERN[1]

Boeing Renton Facility, Renton, Washington

Analyte	Well ID[2] GW264S								
	5/7/2019	11/11/2019	5/12/2020	8/10/2020	2/15/2021	8/10/2021	2/21/2022	8/24/2022	2/8/2023
Volatile Organic Compounds (µg/L)									
cis-1,2-Dichloroethene	0.20 U	0.20 U	0.20 U	0.52	0.20 U	0.20 U	0.200 U	0.200 U	2.00 U
Vinyl Chloride	1.39	0.38	1.48	0.20 U	1.49	1.37	2.54	1.41	2.00 U

Notes:

1. Data qualifiers are as follows:

   U = The analyte was not detected at the reporting limit indicated.

2. S = shallow well

Abbreviations:

µg/L = micrograms per liter