FEASIBILITY STUDY ADDENDUM
WEST OF 4TH - SITE UNIT 2
SEATTLE, WASHINGTON

For:
West of Fourth Joint Agreed Order
Blaser Die Casting
Capital Industries
Burlington Environmental, LLC
Seattle, Washington

Submitted by:
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ACRONYMS AND ABBREVIATIONS

ABP	Art Brass Plating, Inc.
Agreed Order	Agreed Order No. DE 10402 dated April 2014 entered into by Art Brass Plating, Inc.; Blaser Die Casting Co.; Capital Industries, Inc.; and Burlington Environmental, LLC, and the Washington State Department of Ecology
Aspect	Aspect Consulting, LLC
BDC	Blaser Die Casting Co.
BE	Burlington Environmental, LLC
bgs	below ground surface
CAP	cleanup action plan
CI	Capital Industries, Inc.
COCs	constituents of concern
CVOCs	chlorinated volatile organic compounds
DCA	disproportionate cost analysis
dCAP	draft Cleanup Action Plan
DCE	dichloroethene
EAnB	enhanced anaerobic biodegradation
Ecology	Washington State Department of Ecology
Farallon	Farallon Consulting, L.L.C.
First Amendment	First Amendment to Agreed Order No. DE 10402 dated November 20, 2017
FS	Feasibility Study
ISCO	in-situ chemical oxidation
ISCR	in-situ chemical reduction

KMnO4	potassium permanganate
MM	Mott MacDonald
MNA	monitored natural attenuation
MTCA	Washington State Model Toxics Control Act Cleanup Regulation
Pacific Crest	Pacific Crest Environmental, L.L.C.
PCE	tetrachloroethene or perchloroethylene
PCULs	preliminary cleanup levels
PGG	Pacific Groundwater Group
PLPs	potentially liable persons
RAO	remedial action objective
RI	remedial investigation
SCM	site conceptual model
SDR	source decay rate
Site	the Site Unit 2 portion of the West of 4th Site
SU1	Site Unit 1
SU2	Site Unit 2
SU2 FS	*West of Fourth Site Unit 2 Feasibility Study, Seattle, Washington* dated August 11, 2016 prepared by Pacific Groundwater Group
SU2 FS Addendum	West of 4th Site Unit 2 Draft Feasibility Study Addendum, Seattle, Washington dated December 29, 2020 prepared by Farallon Consulting, L.L.C. and Pacific Groundwater Group for the West of Fourth Joint Agreed Order, Blaser Die Casting, Capital Industries, and Burlington Environmental, LLC, Seattle, Washington (this document)
SVE	soil vapor extraction
TCE	trichloroethene

µg/l	micrograms per liter
VC	vinyl chloride
VI	vapor intrusion
VIAMM	Technical Memorandum Regarding Revised Vapor Intrusion Assessment, Monitoring, and Mitigation Plan, W4 Joint Deliverable, Seattle, Washington dated February 2, 2015 from Farallon Consulting, L.L.C. to Ed Jones of the Washington State Department of Ecology
W4	West of 4th
W4 Group	Art Brass Plating, Inc.; Blaser Die Casting Co.; Capital Industries, Inc.; and Burlington Environmental, LLC
W4 Site	Site Unit 1 and Site Unit 2
WAC	Washington Administrative Code
Waterway	Lower Duwamish Waterway

EXECUTIVE SUMMARY

This West of 4th (W4) Site Unit 2 (SU2) Draft Feasibility Study (FS) Addendum (SU2 FS Addendum) has been prepared as an addendum to the West of Fourth Site Unit 2 Feasibility Study dated August 11, 2016 prepared by Pacific Groundwater Group (PGG) (SU2 FS). The SU2 FS and the SU2 FS Addendum have been prepared in accordance with the requirements of Agreed Order No. DE 10402 dated April 2014 entered into by Art Brass Plating, Inc. (ABP); Blaser Die Casting Co. (BDC); Capital Industries, Inc. (CI); and Burlington Environmental, LLC (BE), (collectively referred to herein as the W4 Group), and the Washington State Department of Ecology (Ecology); the First Amendment to Agreed Order No. DE 10402 dated November 20, 2017 (First Amendment); and the Washington State Model Toxics Control Act Cleanup Regulation (MTCA), as established in Chapter 173-340 of the Washington Administrative Code (WAC 173-340).

The SU2 FS Addendum has been prepared on behalf of the W4 Group. For the purposes of the FS, the Site has been divided into two site units, Site Unit 1 (SU1; ABP and BE) and Site Unit 2 (SU2; BDC, CI, and BE).

This SU2 FS Addendum is an addendum to the SU2 FS specific to SU2, prepared by Farallon Consulting, L.L.C. on behalf of CI and by Mott MacDonald/PGG[1] on behalf of BDC, with input from Pacific Crest Environmental, L.L.C. on behalf of BE and Aspect Consulting, LLC on behalf of ABP. ABP prepared a separate SU1 FS and an SU1 FS Addendum specific to SU1. The SU1 and SU2 FS documents and FS Addenda comprise the final FS for the W4 Site, and provide the basis for the draft Cleanup Action Plan.

The purpose of the SU2 FS Addendum is to select a final preferred remedial alternative and complete the FS process in a manner that meets requirements set forth under WAC 173-340-350 through 173-340-370. The SU2 FS Addendum addresses Ecology comments on the SU2 FS, presents the results from additional investigation work conducted between 2016 and March 2022, and incorporates the results from pilot studies of select remedial technologies presented in the SU2 FS. These actions were completed to facilitate selection of a preferred remedial alternative. This Executive Summary provides an overview of the key elements of the SU2 FS Addendum, including identification of the preferred remedial alternative.

Activities conducted by the W4 Group after preparation of the SU1 and SU2 FS documents that are relevant to the SU2 FS Addendum include the following:

- Pilot studies of enhanced anaerobic biodegradation (EAnB) and in-situ chemical reduction (ISCR) in SU1;
- Pilot studies of in-situ chemical oxidation (ISCO) and soil vapor extraction (SVE) in SU2;
- A porewater and groundwater sampling event in SU1;

[1] PGG is now a division of Mott MacDonald.

- A Groundwater Elevation Data Collection Study in SU1 and SU2;
- Vapor intrusion monitoring and mitigation in SU1 and SU2; and
- Groundwater monitoring in SU1 and SU2.

Pilot studies and additional investigation work were conducted by the W4 Group to evaluate whether technologies proposed in the FS Addenda for a remedial alternative would be technically feasible, and to refine the remedial alternative evaluation criteria presented in the original SU1 and SU2 FS documents.

The results from the pilot study and additional investigation work indicate:

- ISCO is not technically feasible for treatment of shallow soil at CI Plant 4.
- SVE is technically feasible for cleanup of shallow soil at CI Plant 4, and can be implemented in a manner that will also mitigate vapor intrusion at the east-adjacent Pacific Food Systems building.
- EAnB and ISCR are technically feasible cleanup technologies for groundwater treatment, and can be used as primary or contingency actions. However, ISCR appears to have limitations regarding treatment of vinyl chloride.
- The Groundwater Elevation Data Collection Study has provided a better understanding of groundwater flow dynamics at and up-gradient of the CG-141 well cluster area, where elevated vinyl chloride concentrations are present in the Shallow and Intermediate Intervals. The results refined the understanding of fate and transport of the vinyl chloride, and how EAnB and ISCR injection-based technology can be applied most efficiently.
- Vapor intrusion monitoring and mitigation measures continue to be required at select properties in SU2. Improvements in groundwater quality have allowed mitigation measures to be eliminated at select properties.
- Groundwater data continue to confirm monitored natural attenuation (MNA) as a viable remedial alternative component. Furthermore, based on the overall decreasing VC trends documented since 2002 as demonstrated by the historical VC data, particularly at CG-141-40 (Appendix B), and the reduction of source material mass due to active cleanup of the historical sources of TCE, biodegradation along the flow pathways is expected to continue in a manner that reduces VC concentrations approaching the Waterway in the shallow and intermediate zones.
- The SU1 porewater study provided a basis for developing remediation levels protective of porewater at the Lower Duwamish Waterway. These remediation levels can be applied to SU2 to evaluate the need for contingency actions to protect surface water and porewater.

The SU2 FS identified and evaluated six remedial alternatives that provided a broad range of treatment and containment options. In accordance with the First Amendment and based on

comments received from Ecology, this SU2 FS Addendum includes the selected alternative, which is a modification of the preferred remedial alternative selected in the FS.

The remedial alternative evaluated in this SU2 FS Addendum and its primary components are as follows:

- Alternative 1R:
    - MNA for SU2-wide groundwater;
    - SVE treatment for shallow soil at CI Plant 4;
    - Institutional and engineered controls; and
    - Contingency actions that included active groundwater remediation at the Lower Duwamish Waterway.

Alternative 1R was modified to include SVE treatment rather than ISCO at CI Plant 4 due to pilot testing results that indicated ISCO was not a feasible remediation technology at CI Plant 4. SVE was originally a component of Alternative 4. Alternative 1R also includes performance monitoring to evaluate whether natural attenuation continues to be sufficiently protective of the Lower Duwamish Waterway and associated receptors or whether implementing a contingency action is necessary in the future.

Alternative 1R was selected based on discussions with Ecology in April 2022. Ecology concurred that the revisions to Alternative 1, which included substitution of SVE at CI Plant 4 and a more comprehensive contingency action for active treatment at the Lower Duwamish Waterway if natural attenuation processes were not adequately protective of human health or the environment, made Alternative 1R an acceptable preferred remedial alternative.

Alternative 1R was not re-evaluated to compare the cost to benefit ranking scores with the other five remedial alternatives from the SU2 FS. Alternative 1 had the lowest cost to benefit ranking score at 2.8 and therefore was selected as the remedial alternative for SU2. The change from ISCO to SVE at CI Plant 4 does not substantively affect the costs and benefits for Alternative 1R in a manner that could result in the cost to benefit ranking score exceeding the next lowest remedial alternative ranking score of 3.9 for Alternative 4. With the incorporation of SVE into Alternative 1R, this alternative remains the lowest cost to benefit ranking of the remedial alternatives and is an appropriate selection as the preferred remedial alternative for SU2.

Alternative 1R was evaluated in accordance with MTCA requirements (WAC 173-340-360) and meets the MTCA threshold requirements of protection of human health and the environment, complying with cleanup standards, complying with applicable state and federal laws, and providing for compliance monitoring.

1.0 INTRODUCTION

This West of 4th (W4) Site Unit 2 (SU2) Draft Feasibility Study (FS) Addendum (SU2 FS Addendum) has been prepared as an addendum to the *West of Fourth Site Unit 2 Feasibility Study* dated August 11, 2016 prepared by Pacific Groundwater Group ([PGG] 2016). (SU2 FS). The SU2 FS and the SU2 FS Addendum have been prepared in accordance with the requirements of Agreed Order No. DE 10402 dated April 2014 entered into by Art Brass Plating, Inc. (ABP); Blaser Die Casting Co. (BDC); Capital Industries, Inc. (CI); and Burlington Environmental, LLC (BE), (collectively referred to herein as the W4 Group), and the Washington State Department of Ecology (Ecology) (Agreed Order); the First Amendment to Agreed Order No. DE 10402 dated November 20, 2017 (First Amendment); and the Washington State Model Toxics Control Act Cleanup Regulation (MTCA), as established in Chapter 173-340 of the Washington Administrative Code(WAC 173-340).

The SU2 FS Addendum has been prepared on behalf of the W4 Group. The W4 Group comprises the potentially liable persons (PLPs) for the W4 Site, which consist of Site Unit 1 (SU1) and SU2, depicted on Figure 1. The ABP property is located within SU1. The CI and BDC properties are located within SU2. The "Site" used herein refers to the SU2 portion of the W4 Site.

This SU2 FS Addendum is an addendum to the SU2 FS specific to SU2, prepared by Farallon Consulting, L.L.C. (Farallon) on behalf of CI, by PGG on behalf of BDC, and by Pacific Crest Environmental, L.L.C. (Pacific Crest) on behalf of BE. ABP and BE prepared a separate SU1 FS (Aspect Consulting, LLC [Aspect] 2016) and an SU1 FS Addendum (Aspect 2022) specific to SU1. The SU1 and SU2 FS documents and FS Addenda comprise the final FS for the W4 Site, and provide the basis for the draft Cleanup Action Plan (dCAP). The SU2 and SU2 FS Addendum work meets the requirements of WAC 173-340-350 through 173-340-370 and the intent of the First Amendment.

1.1 PURPOSE

The purpose of the SU2 FS Addendum is to present the final preferred remedial alternative, and to complete the FS process in a manner that meets the requirements set forth under WAC 173-340-350 through 173-340-370. The SU2 FS Addendum addresses Ecology (2016) comments on the SU2 FS, incorporates the outcomes of discussions between the W4 Group and Ecology in meetings conducted in February and April 2022, presents the results from additional investigation work conducted between 2016 and March 2022, and incorporates the results from pilot studies of select remedial technologies presented in the SU2 FS. These actions were completed to facilitate selection of a preferred remedial alternative.

This FS Addendum is an extension and part of the SU2 FS. Therefore, information that was presented in the SU2 FS and other documents submitted to Ecology regarding work conducted since submittal of the SU2 FS is not repeated in this document unless the additional information is necessary to support the evaluation of the remedial alternative presented herein. The SU2 FS and other documents used in the development of the SU2 FS and this FS Addendum are available

for reference at the W4 website, West of 4th // Document and Data Maintenance (aspectconsulting.com).

1.2 ORGANIZATION

This FS Addendum has been organized into the following sections:

- **Section 2, Background**, summarizes the environmental setting, the constituents of concern (COCs), and interim actions conducted at SU2.
- **Section 3**, **Activities Since Preparation of the W4 Feasibility Study,** describes the activities conducted by the W4 Group after preparation of the SU2 FS that are relevant to the FS Addendum. The activities described consist of in-situ chemical oxidation (ISCO) and soil vapor extraction (SVE) pilot studies, a groundwater elevation study and groundwater monitoring, and vapor intrusion monitoring and mitigation.
- **Section 4, Monitored Natural Attenuation Evaluations,** describes the natural attenuation processes used to evaluate whether MNA is appropriate as a primary component of the proposed remedial alternative, and an evaluation of the evidence (e.g., plume stability, source decay rates, and centerline plume trends) that natural attenuation is occurring throughout SU2, and is sufficiently protective of the Waterway, the primary receptor for affected groundwater.
- **Section 5, Site Conceptual Model,** presents the site conceptual model (SCM) as updated based on the results of activities completed since the SU2 FS and the current site conditions and includes summaries of the environmental setting, preliminary cleanup levels (PCULs), source areas of COCs, the nature and extent of contamination, and exposure pathways and receptors.
- **Section 6, Remedial Alternative,** describes the preferred remedial alternative evaluated in this SU2 FS Addendum.
- **Section 7, Focused Evaluation,** presents a targeted evaluation of the remedial alternative herein with respect to MTCA threshold criteria .
- **Section 8, Contingency Actions,** discusses potential contingency actions.
- **Section 9, Conclusions,** presents the key conclusions of the SU2 FS Addendum.
- **Section 10, References,** presents a list of documents cited in this SU2 FS Addendum.

2.0 BACKGROUND

This section presents a summary of the environmental setting, the COCs, and interim actions completed at SU2.

2.1 ENVIRONMENTAL SETTING

The environmental setting for the Site was discussed in detail in remedial investigation (RI) reports prepared by ABP (Aspect 2012), BDC (PGG 2012), CI (Farallon 2012), and BE (PSC Environmental Services, LLC 2003). This section provides a brief overview.

The lithologic units encountered in borings completed at the Site consist of a Younger Alluvium and an Older Alluvium unit. The upper portion of the Younger Alluvium unit has been modified, and is referred to as the Fill Unit. The lithologic units correspond to the hydrogeologic units encountered at the Site.

The W4 Group uses the following standardized nomenclature for groundwater monitoring and sampling intervals:

- Water Table Interval: includes monitoring wells screened above 20 feet below ground surface (bgs) and reconnaissance groundwater samples collected above 20 feet bgs.
- Shallow Interval: includes monitoring wells screened below 20 feet bgs and above 40 feet bgs, and reconnaissance groundwater samples collected between 21 and 40 feet bgs.
- Intermediate Interval: includes monitoring wells and reconnaissance groundwater samples screened below 40 feet bgs.

SU2 is divided into six sub-areas, consisting of the following:

- Three source areas: BDC facility, CI Plant 2, and CI Plant 4;
- Two down-gradient groundwater plume areas:
    - The BDC/CI commingled plume comprising groundwater impacted with trichloroethene (TCE) and degradation products extending southwest from the BDC and CI Plant 2 facilities; and
    - The CI Plant 4 PCE/TCE plume comprising groundwater impacted with tetrachloroethene or perchloroethylene (PCE) and TCE extending southwest from CI Plant 4; and
- Groundwater impacted with vinyl chloride (VC) in the area and down-gradient of the CG-141 well cluster.

Source areas are locations with releases to soil and/or groundwater. Down-gradient areas include groundwater plumes that are downgradient from source areas. VC in the Shallow and Intermediate Intervals is commingled from up-gradient sources.

2.2 CONSTITUENTS OF CONCERN

The COCs for SU2 were defined in the RI Reports for BDC, CI, and/or BE facility and subsequently revised based on changes in groundwater cleanup levels and groundwater concentrations as discussed below. The COCs for SU2 are:

- PCE;
- TCE;
- cis-1,2-Dichloroethene (DCE), trans-1,2-DCE, and 1,1-DCE;
- VC; and
- Manganese.

Manganese is categorized as naturally occurring, and is not targeted for cleanup in the alternative presented.

Ecology initially identified 1,4-dioxane as a groundwater COC for the W4 Site in the Agreed Order and iron as a groundwater COC during the RI; based on updates to the PCULs, Ecology has eliminated these compounds as COCs. The concentrations of 1,4-dioxane in groundwater samples collected in the W4 Site are significantly less than the PCUL for 1,4-dioxane of 20,000 µg/l. Previously, freshwater criteria were listed for iron; however, as the Waterway is a tidally influenced marine environment, freshwater criteria are not applicable. Iron does not have criteria for marine waters.

2.3 INTERIM ACTIONS

Several interim actions have been completed or are underway in source areas contributing to groundwater contamination in the W4 area and down-gradient locations with vapor intrusion (VI) concerns in the W4 areas. These interim actions consist of:

- An interim excavation action in the BDC Source Area (PGG 2012);
- Excavation at CI Plant 2 following a 2004 fire (Farallon 2012);
- Installation of subslab depressurization systems in multiple structures throughout the W4 Site, in both SU1 and SU2 (Farallon and PGG 2015);
- A hydraulic control interim measure and other cleanup actions implemented by BE at its facility located east of 4th Avenue; and
- An air sparge/SVE system installed by ABP and operated at its facility in SU1 (Aspect 2016).

3.0 ACTIVITIES SINCE PREPARATION OF THE W4 FEASIBILITY STUDY

This section describes activities conducted by the W4 Group after preparation of the SU2 FS that are relevant to this SU2 FS Addendum. These activities consist of the following:

- A pilot study of enhanced anaerobic biodegradation (EAnB) and in-situ chemical reduction (ISCR) in SU1;
- Pilot studies of ISCO and SVE in SU2;
- A porewater and groundwater sampling event in SU1;
- The Groundwater Elevation Data Collection Study in SU1 and SU2;
- VI monitoring and mitigation in SU1 and SU2; and
- Groundwater monitoring in SU1 and SU2.

Pilot studies and additional investigation work were conducted by the W4 Group to evaluate whether technologies proposed in the FS Addenda for a remedial alternative would be technically feasible, and to refine the remedial alternative evaluation criteria presented in the original SU1 and SU2 FS documents. If a tested technology proved technically feasible and the evaluation criteria supported its use versus an alternative technology, the results would be used also as the basis for application of the technology, and will be presented in the dCAP upon Ecology concurrence. Although the pilot studies and additional investigation work were conducted at either SU1 or SU2, the results will be used for the W4 Site.

Details of other activities conducted in SU1 cited above are provided in the SU1 FS Addendum (Aspect 2022). The EAnB and ISCR pilot study results provided a basis for the technical feasibility of applying the combination of EAnB and ISCR for the contingency actions described in Section 8.

3.1 PILOT STUDIES

3.1.1 ISCO Pilot Study

ISCO was the preferred technology presented as a component of SU2 Alternative 1 for treatment of PCE and TCE source areas in soil and for groundwater treatment at CI Plant 4. ISCO is a process that relies on direct contact of the injected oxidant with the COC to react with and destroy the COC. The First Amendment allows for evaluation of the technology prior to full-scale implementation as an interim action, or selection as a final remediation technology in the SU2 FS Addendum and the dCAP.

In 2018 on behalf of CI, Farallon (2018) conducted ISCO injections and associated process and performance monitoring in accordance with the Final Revised Capital Industries Plant 4 Stage 1 Field Implementation Work Plan. The ISCO technology that was used consisted of direct injection of potassium permanganate ($KMnO_4$) into the subsurface to treat shallow soil and groundwater within the Water Table Interval (depths of 0 to 20 feet bgs).

The results from the ISCO pilot study were presented in the Final Capital Industries Plant 4 Interim Action - Stage 1 In-Situ Chemical Oxidation Report dated February 22, 2019 prepared by Farallon (2019a). The ISCO pilot study results indicated that ISCO or other injection-based technologies are not appropriate for cleanup of shallow soil.

The additional groundwater data collected from temporary observation wells during the ISCO pilot study indicated that CVOC concentrations in the Water Table Interval at CI Plant 4 were less than the preliminary cleanup levels (PCULs). In subsequent discussions of the ICSO pilot study, Ecology agreed that treatment of groundwater at CI Plant 4 would not be a requirement of the dCAP, provided that an alternative technology could be applied to treat soil contamination that represented current and future risk to groundwater.

3.1.2 SVE Pilot Study

Because ISCO was determined not to be technically feasible for soil treatment, SVE (the next-preferred cleanup technology) was selected for a pilot study at CI Plant 4. SVE is the process of inducing a pressure and concentration gradient to the subsurface to cause volatile organic compounds such as CVOCs to desorb from the soil, and flow with the vapor stream to a common collection point for discharge or treatment.

As applicable, the SVE remedy objectives included:

- Reducing concentrations of CVOCs in soil beneath CI Plant 4 to less than the CULs that will be established in the dCAP;
- Reducing concentrations of CVOCs in the Water Table Interval by removing CVOC sources in soil with the potential to continue impacting groundwater, or to impact groundwater in the future; and
- Eliminating the need for ongoing VI mitigation at the east-adjacent Pacific Food Systems North Building.

The SVE pilot study was implemented in general accordance with the details presented in the *Final Capital Industries Plant 4 Soil Vapor Extraction Pilot Study Work Plan, West of 4th Group Site, Capital Industries, Inc., 5801 3rd Avenue South, Seattle, Washington* dated April 5, 2019 prepared by Farallon (2019b). The results from the SVE pilot study were presented to Ecology during meetings in September and October 2019; summary tables and figures are provided in Appendix A.

The SVE pilot study consisted of a stepped- and constant-rate SVE test procedure. The stepped-rate test was conducted first to evaluate the optimal vacuum required to achieve an airflow rate that could be applied specific to subsurface conditions at CI Plant 4. The constant-rate test was conducted over an approximately 24-hour period to evaluate steady-state PCE and TCE emissions concentrations, and Site-specific SVE operational airflow and vacuum to facilitate full-scale SVE system design.

Results from the SVE pilot study indicated that the applied vacuum was observed in observation wells as far as 30 feet from the pilot test well with the maximum applied vacuum of 39 inches of water. The airflow rates at the pilot study extraction well indicated that subsurface conditions were conducive to extraction of CVOCs in soil using SVE. The SVE pilot study results indicated that an SVE design based on an extraction well network with a radius of influence of 15 to 20 feet from each extraction well location was appropriate for full-scale implementation of the technology.

The SVE pilot study results also demonstrated that PCE and TCE were present in SVE extraction well effluent throughout the testing. The overall results were sufficient to calculate an estimated PCE and TCE removal rate and projected annual discharge to facilitate full-scale SVE system design.

The results from the SVE pilot study indicated that SVE is a technically feasible technology for remediation of CVOCs in shallow soil at CI Plant 4. An SVE system can be designed using either horizontal or vertical extraction wells or a combination. An SVE system could be designed also to capture CVOCs beneath the Pacific Food Systems North Building, thereby eliminating the need for ongoing VI mitigation measures.

Due to complications regarding evaluation of SVE and designing/installing the system as an interim action, Ecology agreed to postpone the interim action component of the First Amendment, and to incorporate SVE as the preferred remediation technology for CI Plant 4 for evaluation of Alternative 1R.

3.2 GROUNDWATER ELEVATION DATA COLLECTION STUDY

The Groundwater Elevation Data Collection Study was conducted by the W4 Group at SU1 and SU2 between February 2018 and February 2019 (Pacific Crest 2020). The purpose of the groundwater flow direction study was to improve the understanding of the fate and transport of CVOCs in the study area where tidal influence may affect groundwater flow directions. The refined understanding will support design of active remediation if natural attenuation of elevated VC in groundwater proximate to the 1st Avenue South and South Fidalgo Street is inadequate to protect the Waterway.

The study included transducer deployment in 30 wells with measurements recorded every 5 minutes. Groundwater level measurements were calibrated with manual water level measurements, corrected for barometric pressure variations, and suspect measurements, such as those associated with transducers out of the well during downloads, removed from the dataset.

The Groundwater Elevation Data Collection Study results indicate that:

- In the portions of the study area that are tidally influenced, groundwater flow direction and gradient change on an almost continuous short-term, small-scale basis that is implicitly incorporated into the groundwater flow directions determined and the resulting plume configurations observed.

- Tidally induced changes in groundwater flow direction and groundwater gradient combine to result in a particle flow direction that is relatively insensitive to precipitation events and tidal fluctuations. The particle tracks are consistent with the gradient-weighted groundwater flow directions. The particle flow triangulated from well sets also appears to remain stable for extended time periods.
- The particle track graphs for the study area also indicate that the groundwater flow direction in each data set changed at the approximate time that dewatering began for construction of the Georgetown Wet Weather Treatment Station. The Georgetown Wet Weather Treatment Station is located south of the W4 Site at 4th Avenue South and South Michigan Street. Based on the change in groundwater flow direction, the Georgetown Wet Weather Treatment Station construction dewatering affected groundwater flow directions during the study period; however, the net southward contaminant transport in the study area associated with this change was likely not significant.
- The study results provide improved understanding of hydrogeologic complexity in the study area, in particular the stable flow direction over time, and reduce the uncertainty about contaminant fate and transport and degradation rates in the study area. The improved understanding of the study area hydrogeologic parameters and, by extension, degradation rates, provides further support for MNA as a cleanup action element for both site areas.
- The design of cut-off walls in a stable environment can be targeted to a specific area with a higher degree of confidence rather than cut-off walls in a more variable groundwater flow environment. The study results indicate a more stable environment than previously assumed.

3.3 GROUNDWATER MONITORING

The SU2 groundwater monitoring program continued after the FS was submitted in 2016. Groundwater monitoring activities were conducted semiannually between March 2016 and March 2022 in general accordance with the *Revised West of 4th Groundwater Monitoring Program Plan, W4 Joint Deliverable, Agreed Order No. DE 10402* dated December 23, 2014, prepared by PGG (2014), and the Technical Memorandum regarding FINAL West of 4th Groundwater Monitoring Program Plan 2017 through Draft Cleanup Action Plan, W4 Joint Deliverable Agreed Order No. DE 10402 dated March 21, 2017, from Janet Knox of PGG to Ed Jones of Ecology (PGG 2017).

Groundwater monitoring was conducted to satisfy the requirements of the *Revised Vapor Intrusion Assessment, Monitoring, and Mitigation Plan, W4 Joint Deliverable, Agreed Order No. DE 10402* dated February 2, 2015, prepared by Farallon (2015a) (VIAMM). The results that are relevant to the VI evaluation are discussed in Section 3.4.

The results of groundwater monitoring that are relevant to the ongoing evaluation of the efficacy of MNA are discussed below in Section 4. Results of the groundwater monitoring data that are relevant to the distribution of contamination and the SCM are discussed in Section 5. Groundwater data is summarized in Table 1 and presented in Appendix B. Additional details on historical

groundwater data are available in the SU2 Remedial Investigation documents for each facility and the SU2 FS.

3.4 VAPOR INTRUSION MONITORING AND MITIGATION

VI conditions continued to be assessed in general accordance with the VIAMM at buildings over and adjacent to the SU2 CVOC groundwater plumes in the Water Table Interval. CVOC concentrations for groundwater in the Water Table Interval are compared to the preliminary cleanup levels for protection of air. These data are used to assess whether buildings overlying groundwater with CVOC concentrations exceeding the preliminary groundwater cleanups protective of air require VI assessment measures.

At present, the extent of the groundwater plumes has remained stable with CVOC concentrations continuing to naturally attenuate. Properties with potential VI risk have been previously assessed, and where necessary, mitigation measures have been implemented. Groundwater conditions from 2016 to 2022 have not triggered a requirement for further VI assessment.

The VI work also included routine monitoring and maintaining of existing mitigation systems. VI work details are provided in routine Quarterly Progress Reports provided to Ecology and available for public review on each of the W4 Group PLP websites.

Decommissioning of VI mitigation measures were also appropriate at select structures overlying the CVOC plume proximate to the BDC facility. Prior source cleanup activities have reduced CVOC concentrations in the Water Table Interval in a manner that has allowed VI mitigation measures to be eliminated. BDC conducted a supplemental investigation of groundwater quality summarized in the PGG (2019) Technical Memorandum regarding Tier 5 Vapor Intrusion System Shutdown dated December 20, 2019. Ecology concurred the collective groundwater data warranted contacting the six building owners and residents regarding shutdown of the VI mitigation systems. BDC contacted the building owners and residents and has received signed consent forms from four of six residents and two of four owners. The remaining five systems continue to operate.

Semiannual monitoring of VI mitigation systems at two non-residential facilities, Pacific Food Systems North Building and the 5900 1st Avenue Property[2] (Figure 2) has consisted of routine operation and maintenance of each system and collecting air samples inside each building, outside each building, and a system effluent sample. The VI mitigation system monitoring results between 2016 and 2022 have indicated that the mitigation systems continue to operate in a manner that will mitigate a VI condition. However, anomalous air sampling data and ongoing evaluation data associated with the VI mitigation systems prompted CI to conduct additional VI assessment work at both buildings as discussed below.

[2] The 5900 1st Avenue Property at 5900 1st Avenue South in Seattle, Washington was previously known as the Natus Medical Facility and Olympic Medical Facility

Due to persistent low-level detections of TCE in indoor air samples at the Pacific Food Systems North Building, CI completed chemical inventory in conjunction with 2021 semiannual air monitoring in order to determine whether a product containing TCE was present at the facility and contributing to TCE concentrations detected in indoor air samples. A lubricant containing TCE was identified during the chemical inventory. CI requested that the TCE-containing product be removed from the Pacific Food Systems North Building prior to the first semiannual operation and maintenance event in March 2022. The analytical results of the indoor air samples collected in March 2022 indicate an order of magnitude reduction in indoor air concentrations of TCE compared to previous air monitoring events. The decrease in TCE concentrations appears to be the result of removal of some of the background source containers of the TCE-containing product. CI will continue to evaluate indoor air concentrations of TCE at the Pacific Food Systems North Building following complete removal of the TCE-containing product. CI will be submitting the results of the ongoing operations and maintenance activities and semiannual sampling for Ecology review in 2022.

During operation and maintenance events conducted at the 5900 1st Avenue Property, TCE was detected in indoor air samples at concentrations two orders of magnitude greater than TCE concentrations in subslab soil gas samples (Landau 2022). Natus Medical, the former tenant at the 5900 1st Avenue Property, closed its operation at the facility and vacated the building in 2020. Following cessation of operations by Natus Medical, TCE has not been detected in indoor air samples collected during operations and maintenance events.

Based on the discrepancy between indoor air and subslab soil gas results (e.g., indoor air concentrations typically higher than soil gas results) during active system operation and absence of TCE in indoor air samples following the cessation of Natus Medical's operations, operation of the VI mitigation system was discontinued, and confirmation sampling was conducted to verify that vapor intrusion is not causing unacceptable indoor air concentrations. CI will be submitting the results of the VI mitigation system shutdown and confirmation sampling at the 5900 1st Avenue Property to Ecology for review in 2022.VI evaluation measures will continue in accordance with the VIAMM using future groundwater monitoring data to evaluate whether further action is necessary. VI mitigation measures also will continue at buildings where mitigation systems exist pending the completion of additional VI assessment activities and approval from Ecology to cease VI mitigation system operations. Ongoing evaluation of the necessity to operate the VI mitigation systems will continue to be evaluated. The CAP will include criteria for ongoing VI evaluation criteria, mitigation system operations, and shutdown evaluation criteria transitioning from the VIAMM.

4.0 MONITORED NATURAL ATTENUATION EVALUATION

This section describes the natural attenuation processes used to evaluate whether MNA is appropriate as a primary component of the proposed remedial alternative, and an evaluation of the evidence (e.g., plume stability, source decay rates, and centerline plume trends) that natural attenuation is occurring throughout SU2, and is sufficiently protective of the Waterway, the primary receptor for affected groundwater.

The groundwater data discussed herein are presented in Table 1 and Appendix B.

4.1 NATURAL ATTENUATION PROCESSES

Natural attenuation consists of physical, chemical, and microbial biodegradation processes that reduce COC concentrations in the subsurface. Physical processes include dispersion and dilution of the COCs associated with advective transport via groundwater and are non-destructive. Sorption also is a non-destructive physical process, and is associated with the capacity of native subsurface media to sorb and retard migration of COCs. Chemical processes such as chemical reduction result in the abiotic destruction of organic COCs. Biodegradation processes involve the breakdown of COCs by native bacteria to nontoxic end products. The biodegradation process related to destruction of PCE and TCE is known as reductive dechlorination.

Reductive dechlorination occurs under anaerobic conditions. During the reductive dechlorination process, bacteria use chlorinated ethenes as electron receptors (the energy source), and the chlorine atom subsequently is replaced with a hydrogen atom. This process, also termed halorespiration, provides anaerobic bacteria with energy for metabolic growth.

In addition to the energy source described above, bacteria also require a food source. The food source is termed the electron donor, which is a source of carbon that is metabolized by various bacteria in groundwater to generate the hydrogen needed to fuel the reductive dechlorination process. Electron donors consist of small, simplistic molecules such as sugars, organic acids, alcohols, organic compounds such as edible oils and chitin, man-made organic compounds such as aromatic hydrocarbons, and naturally occurring organic carbon such as peat. In most clean groundwater systems, various bacterial communities, including the bacteria known to biodegrade chlorinated solvents, aggressively compete for the available electron donor. The EAnB/ISCR pilot test included injection of an electron donor to enhance the rate of reductive dechlorination.

Bacteria typically can use multiple electron donors, but are limited to one or two electron receptors. Therefore, bacterial strains that can use chlorinated ethenes as an electron receptor must be present for natural attenuation via biodegradation to be a viable remedial alternative. The electron receptors commonly present (listed in the order preferred by most bacteria) are oxygen, nitrate, manganese (IV), ferric iron (Fe III), sulfate, carbon dioxide, and CVOCs. The evaluation of bacterial activity and degree of reducing conditions at SU2 was conducted at select locations by examining electron receptor trends.

Along with energy and food, bacteria also require shelter to thrive. The shelter for bacteria is the soil matrix, as the soil particles provide a surface for bacterial growth. In most groundwater systems, bacteria typically are well protected in the pore spaces of the soil matrix, and can readily multiply in the presence of adequate supplies of electron donor and acceptors.

PCE and TCE degrade by biodegradation processes under anaerobic conditions only. The subsurface environment typically must be nitrate- to manganese-reducing to be sufficiently anaerobic to promote growth of the beneficial strains of bacteria for biodegradation of PCE- and TCE-related compounds. Because sulfate-reducing to methanogenic conditions are the most-reducing/anaerobic environments, they are ideal for complete biodegradation of PCE and TCE. Results from evaluation of groundwater conditions in the Water Table, Shallow, and Intermediate Intervals have indicated that all conditions are sufficiently reducing to promote biodegradation of PCE and TCE.

Under anaerobic conditions, the rate of biodegradation typically decreases with each step of dechlorination. PCE will rapidly biodegrade to TCE, which will rapidly biodegrade to one or more of the DCE isomers. The most-common DCE isomer produced typically is cis-1,2-DCE, followed by trans-1,2-DCE. Production of 1,1-DCE typically is the least common. The biodegradation of the DCE isomers to VC typically is the slowest process, and occurs under sulfate-reducing to methanogenic conditions. The biodegradation of VC to ethene also is a relatively slow process that occurs under sulfate-reducing to methanogenic conditions. Historical groundwater conditions data indicated that the Shallow and Intermediate Intervals are more-reducing/anaerobic than the Water Table Interval, which is supported by the presence of VC and, at some locations, ethene.

The presence of the complete suite of PCE/TCE through VC and ethene is evidence that groundwater conditions are sufficiently reducing to support reductive dechlorination, and potentially other abiotic chemical reduction processes with the ability to eliminate CVOCs in groundwater. These processes are more prevalent in the deeper groundwater intervals, which are less susceptible to influx of aerobic groundwater from precipitation events.

4.1.1.1 CG-141 Monitoring Well Cluster VC

Natural attenuation via reductive chlorination is demonstrably occurring within the VC plume associated with CG-141 area monitoring wells as discussed below and shown on Charts B1 through B5 in Appendix B.

As detailed below, the concentration trends of VC at upgradient shallow and intermediate interval monitoring wells CG-141-40 and CG-141-50, lower concentrations with stable trends at down-gradient monitoring wells, and presence of non-toxic by-products ethene and ethane at locations with the greatest concentrations of VC are indicative that conditions within the plume area are highly conducive to accelerated rates of biodegradation.

VC concentrations at shallow interval monitoring well CG-141-40 have decreased significantly over the monitoring period from 2002 to March 2022 from concentrations of 362 to 66 micrograms per liter (µg/l). The current preliminary cleanup level for VC that is protective of surface water is 0.18 µg/l. While the overall trend of ethene concentrations at

CG-141-40 is decreasing, elevated ethene concentrations have generally occurred following decreases in VC concentrations. Ethane concentrations at monitoring well CG-141-40 have increased over the monitoring period and exhibit an overall increasing trend. Electron receptors oxygen and nitrate are depleted while sulfate is present and decreasing at monitoring well CG-141-40.

VC concentrations at downgradient shallow monitoring wells CG-140-40 and CI-19-30 and mid-plume edge shallow monitoring well CI-15-40 are significantly less than those at CG-141-40 and generally stable.

VC concentrations at intermediate interval monitoring well CG-141-50 have generally increased over the monitoring period beginning in 2002. The slightly expanding trend at CG-141-50 coupled with the decreasing trend at CG-141-40 suggests possible transport associated with the downward vertical gradient. When combined, the overall trend of the CG-141-40 and CG-141-50 data is stable. This is not unexpected based on the overall distribution pattern of COCs throughout the W4 Site. Ethene and ethane also have increased over the monitoring period with peaks generally following increases in VC concentrations. Electron receptors oxygen and nitrate are generally depleted while sulfate is present and decreasing at monitoring well CG-141-50.

VC concentrations at mid-plume edge intermediate monitoring well CI-15-60 are less than those at CG-141-50 and generally decreasing over the monitoring period beginning in 2013. VC concentrations down-gradient of CI-15-60 at intermediate well CI-12-60 are non-detect. Decreasing COC concentrations with depth, particularly at the distal and down-gradient edges of the W4 Site COC plumes, is a characteristic that was demonstrated during the RI work and subsequent groundwater monitoring work through 2022.

4.2 PLUME STABILITY

Plume stability is included in evaluation of MNA as a component of the remedial alternative. Plume stability is defined by the plume geometry and CVOC trends in groundwater throughout the plume area. The rate of biodegradation along the flow path of the plumes must be sufficient to reduce CVOC concentrations along the flow path in a manner that is protective of the potential receptors for all three groundwater intervals.

The primary receptor of concern for consideration of MNA as the sole technology for groundwater cleanup is surface water at the Waterway, which includes Slip 2 for the TCE plume originating from the BDC facility and the CI Plant 2 and CI Plant 4 facilities. This receptor also includes the Waterway itself proximate to the western portions of the CertainTeed Gypsum Inc. and the Kapstone Container Corporation (Figure 2), which is the likely discharge location for diffuse VC in the Shallow and Intermediate Intervals associated with the CG-141 area, based on Groundwater Elevation Data Collection Study results (Pacific Crest 2020).

The plume areas evaluated that are subject to this SU2 FS Addendum are:

- The TCE plume associated with the BDC and CI Plant 2 sources, including the commingled diffuse VC plume in the Shallow and Intermediate Intervals associated with the BDC, CI Plant 2, and BE sources;
- The PCE and TCE plume associated with CI Plant 4; and
- The VC plume associated with the Shallow and Intermediate Intervals at CG-141, extending to the Waterway.

The plume stability and source decay rates presented in the SU2 FS were sufficient for Ecology to accept MNA as a component of Alternative 1. Ecology requested that the groundwater data collected through March 2022 be used to continue to evaluate plume stability as a component of the continued evaluation of Alternative 1R in the SU2 FS Addendum.

Plume stability as it relates to CVOC data was evaluated using Ecology (2005) Mann-Kendall statistical worksheets for key monitoring wells associated with the plume areas. The worksheets are provided in Appendix B. The worksheets were developed for analysis of natural attenuation of petroleum compounds that do not have parent-daughter relationships as CVOC degradation does. To reconcile this effect, trends were calculated for a molar concentration (the sum of CVOCs, expressed as micromoles per liter) as a measure of total CVOCs to supplement the trend analyses for individual CVOC compounds, including PCE, TCE, cis-1,2 DCE, and VC.

Plume stability trend results and the groundwater data for the monitoring wells used in the evaluation process are summarized in Appendix B Table B1. Figures 3, 4A through 4C, and 5A through 5C depict the monitoring wells located along the centerlines of the plumes, at the lateral edges, and down-gradient of the estimated plume limits, as defined by the current PCULs.

4.2.1.1 BDC and CI Plant 2 TCE Plume

The monitoring wells used to evaluate plume stability for the TCE plume associated with the BDC and CI Plant 2 sources, including the commingled diffuse VC plume in the Shallow and Intermediate Intervals associated with the BDC, CI Plant 2, and BE sources, are those located along the centerline, at the peripheral edges, and down-gradient, proximate to Slip 2:

- Water Table Interval: wells BDC-3-WT, BDC-6-WT, BDC-11-WT, PSC-CG-36-WT, CI-MW-1-WT, CG-37-WT, CI-10-WT, CI-12-WT, CI-13-WT, CI-14-WT, CI-17-WT, and CI-18-WT;
- Shallow Interval: wells: BDC-3-40, BDC-13-40, BDC-6-30, CG-136-40, CG-137-40, CI-MW-1-40, CI-10-35, CI-12-30/CI-12-35, CI-13-30, CI-14-35, CI-15-40, CI-16-30, CI-17-30, and CI-18-30; and
- Intermediate Interval: wells BDC-3-60, BDC-6-60, BDC-11-60, CG-137-50, CI-MW-1-60, CI-10-65, CI-12-60, CI-13-60, CI-14-70, and CI-16-60.

CVOC concentration trends for monitoring wells in the Water Table Interval indicate historical shrinking or stable trends, with the exception of monitoring well CI-14-WT. The molar concentration trend at monitoring well CI-14-WT is undetermined due to variability in CVOC concentrations that likely are associated with ongoing influx of CVOCs from up-gradient of this monitoring well. Results for monitoring wells down-gradient of well CI-14-WT continue to support that the rate of natural attenuation in the Water Table Interval is protective of Slip 2. CVOC concentrations at all monitoring wells down-gradient of monitoring well CI-14-WT have consistently been less than current PCULs for surface water protection. The historical exception has been monitoring well CI-17-WT, located proximate to Slip 2 on the Cal Portland property. This location included an unidentified source of PCE that is not associated with the SU2 PLPs, but has continued to attenuate to concentrations less than current PCULs.

CVOC concentration trends for monitoring wells in the Shallow Interval indicate an overall shrinking to stable trend, with the exception of monitoring wells CI-13-30 and CI-14-35, which have expanding trends associated with fluctuations in either TCE or cis-1,2-DCE. The concentration fluctuations are minor in nature overall, and are not indicative of a significant influx of CVOCs that ongoing natural attenuation processes would not be expected to reduce to concentrations protective of surface water.

CVOC concentration trends for monitoring wells in the Intermediate Interval indicate that the CVOCs present consist predominantly of VC, with some cis-1,2-DCE. The VC concentrations at monitoring well CI-13-60, the monitoring well closest to Slip 2, continue to fluctuate but have been generally less than the current PCULs.

Regardless of minor fluctuations in individual CVOC concentrations, overall plume geometries in the groundwater intervals have not changed significantly since 2016. MNA therefore remains an appropriate component of remedial Alternative 1R.

4.2.1.2 CI Plant 4 PCE and TCE Plume

The monitoring wells used to evaluate plume stability for the PCE and TCE plume associated with the CI Plant 4 source, including the commingled diffuse VC plume in the Shallow and Intermediate Intervals associated with the BE source include those located along the centerline, peripheral edges, and downgradient of CI Plant 4. The historical groundwater analytical data have indicated that the PCE and TCE plume is limited in lateral and vertical extent and the monitoring wells used to evaluate plume stability are limited as indicated below:

- Water Table Interval: wells MW-6, MW-7, and CI-9-WT;
- Shallow Interval: wells CI-7-40 CI-8-40, and CI-9-40; and
- Intermediate Interval: wells CI-7-60, CI-8-60, and CI-9-70.

Analysis of CVOC concentration trends for monitoring wells within the in the Water Table Interval indicate overall stable to shrinking conditions. As previously discussed, the results of the ISCO pilot study indicated that concentrations of CVOCs in groundwater directly beneath CI Plant 4 are in compliance with the current PCULs indicating CVOC mass loading to groundwater associated with the sources of PCE and TCE at CI Plant 4 have historically been diminishing and that the proposed treatment using SVE will eliminate the future risk to groundwater.

Analysis of CVOC concentration trends for monitoring wells within the Shallow Interval indicate an overall stable to slightly expanding trend associated with either cis-1,2-DCE or VC. The upgradient monitoring well CI-8-40 continues to have higher concentrations of these CVOCs associated with east of 4th Avenue source(s) which are continuing to be a source of CVOCs.

Analysis of CVOC concentration trends for monitoring wells within the Intermediate Interval indicate an overall stable to shrinking trend. VC is the sole CVOC present in the Intermediate Interval.

The historical CVOC trends, and proposed SVE source treatment at CI Plant 4 indicate that MNA remains an appropriate component of remedial Alternative 1R. No active treatment of groundwater at CI Plant 4 or downgradient are required.

4.2.1.3 CG-141 Monitoring Well Cluster VC

The monitoring wells used to evaluate plume stability for the VC plume associated with the area proximate to and downgradient of the CG-141 monitoring well cluster include:

- Water Table Interval: wells CG-141-WT, CI-12-WT, CG-140-WT, and CI-19-WT;
- Shallow Interval: wells CG-141-40, CI-12-30, CI-12-35, CI-15-40, CG-140-40, and CI-19-30; and
- Intermediate Interval: wells CG-141-50, CI-12-60, CI-15-60, CG-140-70, and CI-20-80.

Analysis of CVOC concentration trends for monitoring wells within the in the Water Table Interval indicates that all CVOCs are less than the current PCULs. The absence of CVOCs in the Water Table Interval suggest the source of VC is upgradient of the CG-141 monitoring well cluster.

Analysis of CVOC concentration trends for monitoring wells within the Shallow Interval indicates an overall stable to slightly expanding trend. Geochemical data indicate that this area is conducive to complete reductive dechlorination of CVOCs, supported by the presence of the highest concentrations of ethene and ethane observed in SU2. Reductive dechlorination is further exhibited in wells proximal to the CG-141 area near 1st Avenue South (CI-10-35, CI-12-35, CI-14-35) where cis-DCE has an expanding trend, indicative

of biodegradation of TCE, and VC is stable or shrinking, indicating VC is biodegrading along the groundwater flow pathways. Further downgradient proximate to the Waterway, well CI-19-30 has a slightly expanding trend, but short-term trends have been variable, and most recently have been declining. (Figure 2).

VC concentrations had been historically stable to decreasing at monitoring well CI-19-30 and had decreased to concentrations as low as 0.97µg/l in 2016 (Table 1). Between March 2017 and March 2020 VC concentrations ranged from 6.3 to 19 µg/l. VC concentrations began to decline again through 2022 with the lowest concentration at 2.0 µg/l. Temporal variations in the rates of biodegradation and lateral/vertical dispersion of VC are expected over relatively short time frames. Based on the overall decreasing VC trends documented since 2002 as demonstrated by the historical VC data, particularly at CG-141-40 (Appendix B), and the reduction of source material mass due to active cleanup of the historical sources of TCE, biodegradation along the flow pathways is expected to continue in a manner that reduces VC concentrations approaching the Waterway in the shallow and intermediate zones. In 2022, the W4 Group added a contingency measure to Alternative 1R in the event that VC concentrations in groundwater between the Lower Duwamish Waterway and CG-141-40 increase to concentrations resulting in a porewater remediation level exceedance.

Analysis of CVOC concentration trends for monitoring wells within the Intermediate Interval indicates an overall stable to slightly expanding trend. As discussed in Section 4.1.1.1, the slightly expanding trend is associated with monitoring well CG-141-50 where VC concentrations have been fluctuating. The slightly expanding trend at CG-141-50 coupled with the decreasing trend at CG-141-40 suggests possible vertical transport from Shallow to Intermediate Intervals, which is not unexpected given the limited separation in the screened intervals for these wells as opposed to other Intermediate Interval wells that are screened at depths greater than 60 feet bgs. When combined, the overall trend of the CG-141-40 and CG-141-50 data is stable. Elevated ethene and ethane concentrations support that VC is not accumulating and being biodegraded to non-toxic end products. However, the biodegradation rates at areas where lower concentrations of COCs are present are also typically lower since the bacteria associated with VC biodegradation have less VC available to thrive compared to bacteria competing for electron donor material.

4.3 SOURCE DECAY RATES

The source decay rate (SDR) calculations from the SU2 FS were revised to include post-2016 groundwater monitoring data (Appendix B, Table B2). These empirical calculations assume a first order (natural log) decay rate and project a best fit of the monitoring data to a PCUL. The calculations conservatively assume that the combined CVOC molar mass is converted to VC. The remediation time is calculated as the time for the best fit line (and 90 percent upper and lower SDR fits) to reach the VC PCUL.

A comparison of the updated SDR values with the SDR values from the SU2 FS is presented in Appendix B Table B3 along with analytical estimates of the remediation time. The revised SDR

values are generally similar to the prior results. Results for three wells (BDC-3-40, BDC-3-60, and CI-MW-7) had low correlation coefficients between the fit lines and observations, therefore have low confidence in the estimated SDR values and remediation times.

Remediation times from the revised SDR values ranged from 5 to 51 years and are similar to the estimated range or remediation time frame presented in the SU2 FS. The SU2 FS should be referenced for a more comprehensive evaluation of remediation times. As the updated SDR estimates are closely similar to prior results, the analyses presented in the SU2 FS provide appropriate estimates of remediation time frames within the limits of the respective methods. Consequently, remediation time frames were not changed for the purpose of evaluating remedial alternative in this SU2 FS Addendum.

4.4 CENTERLINE PLUME TRENDS

Centerline CVOC concentration trend plots for the TCE plume associated with the BDC and CI Plant 2 sources, including the commingled diffuse VC plume in the Shallow and Intermediate Intervals associated with the BDC, CI Plant 2, and BE sources by groundwater interval are included in Appendix B as Figures B-16 through B-20. The plots extend from Slip 2 to Mead Street. Figures 3, 4A, through 4C, and 5A through 5C depict the monitoring well locations located along the centerlines of the plumes

The centerline plots (Appendix B as Figures B-16 through B-20) provide a simplified depiction of concentration changes with transport distance. The plots use the most recent data point for each well and are plotted at the linear distance from Slip 2 (as opposed to a curved flowline distance). Screening levels are plotted at the zero position (at Slip 2) for a visual reference. Molar concentrations are calculated as a measure of combined TCE, DCE isomers, and VC CVOC mass to simplify the complicating effects of parent-daughter compound transformations.

The plots generally show a decreasing trend approaching Slip 2 with some along-axis variations that may be due to contributions from secondary sources (monitoring well CI-17-WT at the Cal Portland facility, for example) or natural attenuation processes generating daughter products such as cis-1,2-DCE. From the centerline trend plots, CVOC concentrations appear to be near or less than PCULs as they approach Slip 2, which is consistent with the data presented in Table 1 and on Appendix B figures.

4.5 SUMMARY

The CVOC results continue to support that the historical BE, BDC and CI source control measures have stabilized the transfer of PCE and/or TCE to groundwater. The proposed soil cleanup action at CI Plant 4 under Alternative 1R also is anticipated to eliminate current and future CVOC loading to the Water Table Interval. The results of groundwater monitoring completed following submittal of the SU2 FS indicate that natural attenuation processes, including biodegradation, continue to be active in SU2 for all groundwater intervals.

The groundwater data also continues to support that the deeper Shallow and Intermediate Intervals are more conducive to ongoing natural attenuation processes that result in complete reductive dechlorination of CVOCs. The geochemical evaluation continues to indicate that the PCE and/or TCE is being biodegraded to non-toxic end products based on the presence of ethene and ethane. The CG-141 well cluster area includes the highest ethene and ethane concentrations observed in SU2 for both the Shallow and Intermediate Intervals suggesting conditions there are highly conducive to accelerated rates of biodegradation.

The plume stability trends for the TCE plume associated with the BDC and CI Plant 2 sources, including the commingled diffuse VC plume in the Shallow and Intermediate Intervals associated with the BDC, CI Plant 2, and BE sources indicate that the plume geometries in each groundwater interval have remained in an overall stable to shrinking state, supporting that EAnB and/or ISCR treatment within the plume area is not required but will be retained as a contingency action that could be applied closer to Slip 2 if future performance groundwater monitoring indicate that surface water is at risk.

The CI Plant 4 PCE/TCE plume is limited to the Water Table Interval and is a limited source mass plume that presents minimal risk for lateral and vertical transport at concentrations that would present a risk to the Waterway or Slip 2. The stable to decreasing CVOC trends at monitoring wells within the plume area further support that natural attenuation processes are occurring. Source removal at CI Plant 4 would be expected to further accelerate the cleanup time frame at and immediately down-gradient of CI Plant 4.

The CVOC data for the VC plume emanating from the CG-141 well cluster area indicate that the natural attenuation processes are mitigating downgradient transport. The geochemical data for the CG-141 well cluster area continues to indicate that this area is highly conducive to reductive dechlorination in the Shallow and Intermediate Intervals where VC is present. The data for monitoring well CI-19-30, MW-23-30, and MW-23-50, proximate to the Waterway will continue to be monitored to evaluate the potential need for implementing a contingency action for protection of the Waterway (see Section 8).

The historical CVOC data for monitoring well CI-19-30 indicate that the molar CVOC concentrations are an order of magnitude less than upgradient CVOC concentrations in both SU1 and SU2. The recent porewater evaluation assessment work conducted in SU1 cited in the SU1 FS Addendum (Aspect 2022) support that VC concentrations at monitoring CI-19-30 would not result in an exceedance of the porewater remediation level of 0.82 µg/l at the Waterway. The VC trends will continue to be monitored to evaluate whether natural attenuation continues to be sufficiently protective of the Waterway and associated receptors or whether implementing a contingency action is necessary in the future.

SDR estimates are similar to the estimates provided in the SU2 FS, with estimated time frames to achieving the current PCULS ranging from approximately 5 to 50 years depending on location within the plume and groundwater interval. This is not unexpected due to the plume lengths and depths that span variable and complex subsurface geology with corresponding variability in

geochemical conditions that are either more, or less, amenable to biodegradation of the CVOCs present.

5.0 SITE CONCEPTUAL MODEL DISCUSSION

This section presents the SCM as updated based on the results of activities completed since the SU2 FS and the current site conditions and includes summaries of the environmental setting, PCULs, source areas of COCs, the nature and extent of contamination, and exposure pathways and receptors. This section provides updates to the SCM developed during the RI/FS process (Aspect 2014). The SCM presented in the SU2 FS is generally supported by the groundwater data collected between 2016 and March 2022.

5.1 ENVIRONMENTAL SETTING

The environmental setting for SU2 has been discussed in detail in the RI reports prepared by BDC (PGG 2012), CI (Farallon 2012), and BE (PSC 2003) and the previous SCM (Aspect 2014) and summarized above in Section 2.1. Updated information with changes to the overall SCM is summarized below.

The groundwater flow direction and tidal variability for SU2 has been refined based on the results of the Groundwater Elevation Data Collection Study, described in Section 3.2. The general findings were that groundwater flow direction and gradient are relatively insensitive to precipitation and tidal influence and the groundwater flow direction is relatively stable over time, a conclusion that is consistent with the observed CVOC plume geometries.

5.2 PRELIMINARY CLEANUP LEVELS

The W4 joint deliverable, Revised Preliminary Site Cleanup Standards outlined the preliminary cleanup standards for the Site (Farallon 2014). Since 2014, surface water criteria for protection of human health have been updated[3]. Groundwater and air criteria for the protection of indoor air have been updated in accordance with Washington State's Guidance for Evaluation of Soil Vapor Intrusion in Washington State (Ecology 2022) and Ecology's Cleanup Level and Risk Calculation (CLARC) database. Table 2 reflects updates to these criteria. Updated PCULs are presented in Table 2, where applicable.

5.3 SOURCE AREAS OF CONTAMINANTS OF CONCERN

The source areas of COCs present in the SU2 area are summarized herein, including details regarding changes in the SCM presented in the SU2 FS.

[3] On May 13, 2020, EPA published the final rule in the Federal Register to withdraw the federal water quality standards for certain human health criteria in Washington (40 CFR 131.45). The final rule went into effect on June 12, 2020. Federal criteria for arsenic, methylmercury, and bis (2-chloro-1-methylethyl) ether remain in place for Washington. All other human health criteria in place for Washington are listed in WAC 173-201A-240.

5.3.1 BDC and CI Plant 2

TCE and associated degradation compounds comprise a groundwater plume that originates at source areas located at the southwestern corner of BDC and below CI Plant 2 (PGG 2012; Farallon 2012). Groundwater monitoring data collected between 2016 and March 2022 has not indicated that changes in the SCM presented in the SU2 FS require modification. Results continue to support the existing SCM for the sources at BDC and CI Plant 2.

5.3.2 CI Plant 4

The ISCO pilot study soil performance sampling was conducted to evaluate the effectiveness of that technology for cleanup of the source areas confirmed at CI Plant 4. The soil sampling results continue to indicate that CVOC releases at Plant 4 persist at concentrations exceeding the PCULs for soil. The CVOC releases at CI Plant 4 are a source of groundwater and VI impacts at and proximate to CI Plant 4 that require further action for protection of human health and the environment. However, the additional soil data collected during the ISCO pilot study did not yield results that alter the existing SCM previously documented in the SU2 FS.

Supplemental groundwater sampling data collected during the ISCO pilot study provided additional data regarding the CVOC distribution at CI Plant 4. The supplemental groundwater data confirmed that CVOC concentrations in the Water Table Interval directly beneath CI Plant 4 are less than the PCULs for groundwater, indicating that the CVOCs in soil are having a limited impact on groundwater quality at CI Plant 4 and supporting the results that following source control measures such as MNA for the residual down-gradient CVOC plume, as proposed in the SU2 FS, continues to be an appropriate remedial alternative.

5.4 NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination within SU2 has been discussed in detail in the Remedial Investigation reports prepared by BDC (PGG 2012), CI (Farallon 2012), and BE (PSC 2003) and the previous SCM (Aspect 2014). The sections below provide a summary of current conditions.

5.4.1 Soil

The nature and extent of soil contamination has not changed since the preparation of the previous SCM (Aspect 2014). Soil sampling was completed at CI Plant 4 for the RI data gap investigation in 2015 (Farallon 2016) and during the ISCO pilot study in 2018. These soil sampling events did not yield results that alter the SCM previously documented in the CI RI (Farallon 2012), SCM (Aspect 2014), and SU2 FS, but the 2018 ISCO soil sampling work did detect higher concentrations of TCE in soil than prior investigations, confirming the need for further action to mitigate VI risk and future risk to groundwater.

5.4.2 Groundwater

Groundwater monitoring conducted between 2016 and March 2022 generally supports the previous SCM findings regarding nature and extent of groundwater contamination. PCE, TCE, and

vinyl chloride in groundwater persist at concentrations exceeding the PCULs for the protection of surface water (Table 1; Appendix B). In the source areas and down-gradient areas of the plume(s), PCE and TCE continue to naturally attenuate via reductive dechlorination, resulting in less mass of chlorinated ethenes, including DCE isomers, VC, and ethene. However, as previously cited, the source decay rates have not changed in manner that indicates that the rate of natural attenuation has changed since preparation of the SU2 FS.

5.4.2.1 CG-141 Area

The Groundwater Elevation Data Collection Study presented in Section 3.2 included the area proximate to and up-gradient of the CG-141 monitoring well cluster location where anomalously elevated VC concentrations in groundwater have been detected in the Shallow and Intermediate Intervals consistently throughout the RI/FS work for the W4 Group. The study provided a better understanding of the groundwater flow dynamics at and upgradient of the CG-141 monitoring well cluster area. The groundwater flow data was also used to evaluate the potential pathway of VC to the Waterway. Figure 7 depicts the details of the groundwater flow variability identified in the Groundwater Elevation Data Collection Study.

Groundwater monitoring data collected from 2016 through March 2022 have indicated that VC concentrations remain relatively stable and that the area at and proximate to the CG-141 monitoring well cluster is highly conducive to anaerobic biodegradation of the VC present. Down-gradient monitoring wells continue to indicate that the VC plumes in the Shallow and Intermediate Intervals are relatively stable.

The SCM cannot be revised further for the CGI-141 monitoring well cluster area regarding source(s); however, the Groundwater Elevation Data Collection Study groundwater flow direction evaluation was able to be used to refine the understanding of the potential flow path of the VC toward the Waterway. This information also can be used to better evaluate potential future contingency actions if the ongoing performance groundwater sampling indicates that the rate of natural attenuation of VC at and downgradient of the CG-141 monitoring well cluster is insufficient to meet the final CULs and remediation levels established in the dCAP.

5.5 EXPOSURE PATHWAYS AND RECEPTORS

The identified receptors and complete exposure pathways presented in the SCM (Aspect 2014) are summarized below. Refinements to the SCM discussed above have not resulted in any change to the exposure pathways from the previous SCM:

- Temporary construction workers via the following exposure pathways:
    - Exposure to impacted soil at source areas via inhalation, ingestion, dermal contact, and vapor inhalation due to volatilization;

- Exposure to impacted groundwater at source areas via vapor inhalation due to volatilization; and
- Exposure to impacted soil and groundwater off the property via vapor inhalation due to volatilization.

- Office workers and industrial workers via the following exposure pathways:
  - Exposure to impacted off-property soil and groundwater via vapor inhalation due to volatilization. Exposure to vapor inhalation is currently mitigated through VIAMM measures as described above.
- Residents via the following exposure pathways:
  - Exposure to impacted soil and groundwater at source areas and off the property via vapor inhalation due to volatilization. Exposure to vapor inhalation is currently mitigated through VIAMM measures as described above.

There were not any identified ecological receptors with complete exposure pathways for SU2. The exposure routes of ingestion and dermal contact via surface water for aquatica biota and ingestion via ingestion of aquatic biota for terrestrial receptors were identified as potentially complete exposure pathways in the future.

6.0 REMEDIAL ALTERNATIVE

This section describes the preferred remedial alternative agreed upon between Ecology and the W4 Group for this SU2 FS Addendum. The SU2 FS identified and evaluated six remedial alternatives that provided a broad range of treatment and containment options. In accordance with the First Amendment, this SU2 FS Addendum evaluates the preferred alternative identified in the SU2 FS (FS Alternative 1), which has been modified based on the results of the pilot studies, monitoring conducted following the FS through 2022, and discussions with Ecology. FS Alternative 1 was modified as Alternative 1R to include treatment of soil at CI Plant 4 with SVE in lieu of soil and groundwater treatment with ISCO, based on the results of the ISCO and SVE pilot studies described above in Sections 3.1.1 and 3.1.2, respectively[4] and a refined contingency action approach at the Waterway for VC associated with the CG-141 area.

The remedial alternative evaluated in this SU2 FS Addendum and its primary components are as follows:

- Alternative 1R:
    - MNA for SU2-wide groundwater;
    - SVE treatment for shallow soil at CI Plant 4; and
    - Institutional and engineered controls.

The selected remedial alternative is described below, including how remedial action objectives (RAOs) will be achieved, implementation strategies, and an estimated cost of implementation. Cost estimates have been updated based on the results of the pilot studies and conceptual design criteria. Restoration time frame estimates have not been updated from the SU2 FS, because incorporation of recently collected data is not expected to significantly change those estimates. Table 3 summarizes the selected remedial alternative. Refer to Section 8 for a detailed discussion of the contingency actions included in this alternative.

6.1 ALTERNATIVE 1R

Alternative 1R comprises MNA of COCs in SU2 groundwater, targeted soil remediation at CI Plant 4 by SVE, and engineered and institutional controls (Table 3). Alternative 1R has been revised from the Alternative 1 presented in the SU2 FS to replace soil and groundwater treatment via ISCO at CI Plant 4 with shallow soil treatment via SVE at CI Plant 4. The details of Alternative 1R are provided below and a conceptual SVE design layout at CI Plant 4 is illustrated on Figure 6.

[4] Ecology identified an additional remedial alternative (Alternative 1E) in its letter commenting on the SU1 and SU2 FS reports (Ecology 2016); however, in a meeting between the W4 Group and Ecology on April 28, 2022, Ecology agreed that the technical basis for Alternative 1E was not supported by the data and granted permission to the W4 Group to exclude Alternative 1E from further evaluation.

Under Alternative 1R, the (RAOs (as defined in the SU2 FS) for groundwater will be met by the permanent destruction of CVOCs through ongoing natural attenuation processes demonstrated to be occurring in all groundwater intervals. MNA will be conducted to continue to evaluate plume stability and determine if continency actions are necessary to protect receptors. Institutional and engineered controls also will be used to eliminate direct-contact risk with groundwater.

Soil RAOs will be met through interim VI mitigation measures (as described above in Section 2.3), active treatment of shallow soil at CI Plant 4 using SVE, and institutional and engineered controls where CVOC concentrations in soil exceed the final CULs that will be presented in the dCAP.

Air RAOs will be met through interim VI mitigation measures (as described above in Section 2.3), active treatment of shallow soil at CI Plant 4 using SVE, and reduction of groundwater contaminants via ongoing natural attenuation processes in other areas. Existing interim VI assessment, monitoring, and mitigation measures presented in the Revised Vapor Intrusion Assessment, Monitoring, and Mitigation Plan (Farallon 2015a) are expected to remain in force through implementation of the CAP. Final VI assessment, monitoring, and mitigation measures will be integrated into the dCAP.

Alternative 1R includes an assumed 60 years of groundwater monitoring with 2 years of semi-annual monitoring, followed by 10 years of annual monitoring, and then biennial monitoring. The monitoring program would be concluded with quarterly compliance monitoring for 1 year to demonstrate compliance with final groundwater cleanup levels that will be established in the dCAP.

The groundwater remediation time frames provided under Alternative 1R are the same as in the SU2 FS and remain appropriate based on the discussion of ongoing natural attenuation processes in Section 4. The SU2 FS should be referenced for a detailed discussion of the remediation time frames.

The application of Alternative 1R within SU2 is described in greater detail in the following sections.

6.1.1 Blaser Die Casting

Alternative 1R will achieve RAOs for affected media at the BDC facility as described below. The approach herein to achieve RAOs remains consistent with that presented in the SU2 FS.

Soil RAOs were largely met through the interim removal action (PGG 2008). Remaining impacted soil that was inaccessible during the interim action will be addressed through implementation of institutional controls and maintenance of hard impermeable surfaces over the remaining soil area. Remaining impacted soil is currently underneath a concrete slab and asphalt paving. These surfaces will serve as engineered controls to meet the direct contact criteria for soil RAOs. An Environmental Covenant is not expected for the BDC property because CVOC concentrations in soil do not exceed direct contact criteria.

Groundwater RAOs will be met through reductions in CVOCs concentrations in groundwater by ongoing natural attenuation processes. Implementation of MNA in the BDC source area will include groundwater monitoring to confirm the natural attenuation of CVOCs and refine cleanup time frame estimates. Interim actions conducted in 2008 have the source area CVOC concentrations affecting the Water Table Interval by more than 95 percent (PGG 2016).

Groundwater concentrations in Water Table Interval wells at the source area (BDC-3-WT and BDC-2-WT) are continuing to decline at rates higher than the site-wide average (Appendix B). The higher SDR in these Water Table Interval wells likely reflects both relatively low concentrations entering the source area from up-gradient areas and the removal of sorbed source mass that would consume more of the assimilative capacity of the groundwater influx. Down-gradient Water Table Interval monitoring wells north of Mead Street have SDRs similar to the SU2-wide average, consistent with a mid-plume position. SDRs are unlikely to significantly increase at these wells absent a plume cutoff and increased assimilative capacity in this area.

Groundwater monitoring will provide data regarding the continued effects of the interim action in the Water Table Interval and continued degradation of CVOCs through natural attenuation mechanisms in the Water Table, Shallow, and Intermediate Intervals.

Air RAOs will be met through interim mitigation measures and reduction of groundwater contaminants via natural attenuation of CVOCs. BDC will continue to conduct evaluation and mitigation measures to ensure that air RAOs are met throughout the cleanup action.

6.1.2 Capital Industries Plant 2

Alternative 1R will achieve RAOs for affected media at the CI Plant 2 facility as described below. The approach herein to achieve RAOs remains consistent with that presented in the SU2 FS.

Soil RAOs at CI plant 2 were met through excavation of soil for the foundation and utility trenches for reconstruction of CI Plant 2 in 2004 following the destruction of the building by a fire. The fire, soil excavation, and reconstruction activities appear to have remediated soil with the potential for impacting groundwater. Residual concentrations of COCs in soil, if present, are expected to attenuate with time. Soil sampling was conducted during the CI Remedial Investigation (Farallon 2012) and supplemental Remedial Investigation Data Gap work (Farallon 2016) in areas of CI Plant 2 where historical information indicated the potential for sources of CVOCs or utilities that could convey CVOCs beneath the plant existed. The results of the soil sampling indicated that CVOCs were detected at concentrations less than all PCULs and no further remedial actions are necessary for soil cleanup at CI Plant 2.

Groundwater RAOs will be met through reductions in CVOCs concentrations in groundwater through ongoing natural attenuation processes. Implementation of MNA in the CI Plant 2 source area will include groundwater monitoring to confirm the decline of CVOCs and refine cleanup time frame estimates.

In the Water Table Interval at CI Plant 2, TCE was detected at concentrations that exceed the PCUL for groundwater. CVOC concentration trends in groundwater monitoring wells screened within the Water Table Interval, including MW-2, MW-4, and CI-137-WT (Appendix B), have generally been decreasing or stable since BDC completed an interim action in 2008. The 2008 interim action removed the majority of the Water Table Interval source mass feeding groundwater impacts that migrated from BDC down-gradient of CI Plant 2 and commingled with impacted groundwater beneath CI Plant 2 that is associated with the former CI Plant 2 source(s).

VC was detected at concentrations exceeding PCULs in the Shallow and Intermediate Intervals at CI Plant 2. Groundwater sampling results indicate that VC concentrations at CI Plant 2 have been decreasing. Evaluations of natural attenuation potential have included BIOCHLOR modeling and collecting geochemical parameters during semiannual groundwater sampling events. Both the modeling and groundwater sampling data, including data collected following the SU2 FS, confirm that natural attenuation is occurring in all groundwater intervals, including a biodegradation component that is supported by the presence of ethene concentrations in groundwater and other geochemical indicators of biodegradation processes (Table 1).

Institutional and engineered controls to mitigate direct contact with groundwater will also be implemented at and down-gradient of CI Plant 2 and would remain until PCULs are achieved. These controls include but are not limited to maintaining the CI building and other hard surfaces at the CI property to mitigate contact with groundwater; placing an environmental covenant on the CI property; notifying utility providers of the presence of contaminated media locations and depths; and notifying landowners within the contaminated Water Table Interval plume area. Notification procedures will be presented to and approved by Ecology.

Historical VI air sampling data has indicated that residual CVOCs in soil and groundwater within the Water Table Interval are not a risk to indoor air quality at CI Plant 2 under current site use. Active remediation of soil and groundwater is therefore unnecessary for protection of air quality at CI Plant 2. VI monitoring and mitigation measures are currently being performed at the Natus Medical Building (formerly Olympic Medical Building) down-gradient of the commingled Water Table Interval plumes. However, as cited in Section 3.4, recent monitoring results following the building being vacated had indicated a likely use of TCE that had been biasing the indoor air results and a request to cease mitigation measures has been issued to Ecology.

Institutional and engineered controls to mitigate potential exposure to vapors from groundwater will also be implemented at and down-gradient of CI Plant 2 and would remain until PCULs are achieved. These controls include but are not limited to maintaining the CI building and other hard surfaces at the CI property to mitigate VI; placing an environmental covenant on the CI property; notifying utility providers of the presence of contaminated media locations and depths; and notifying landowners within the contaminated Water Table Interval plume area. Notification procedures will be presented to and approved by Ecology.

6.1.3 Capital Industries Plant 4

Alternative 1R will achieve RAOs for affected media at the CI Plant 4 facility as described below. The approach herein to achieve RAOs remains consistent with that presented in the SU2 FS.

Soil RAOs at CI Plant 4 will be met through application of SVE at Plant 4. The results of the soil sampling conducted during the CI Remedial Investigation (Farallon 2012) and supplemental Remedial Investigation Data Gap work (Farallon 2016) in areas of CI Plant 4 indicated that concentrations of PCE and TCE exceeding PCULs for protection of air and/or groundwater protective of surface water exist at depths between approximately 1 and 6 feet bgs.

Results of historical groundwater sampling and VI investigation work at CI Plant 4 and the east-adjacent Pacific Food Systems buildings have indicated the potential for an additional source of PCE and/or TCE to exist east of CI Plant 4 that is contributing to groundwater contamination and air quality impacts at the Pacific Food Systems buildings (Farallon 2016). However, the soil investigation work completed to evaluate the nature and extent of CVOCs at CI Plant 4 (Farallon 2016) were inconclusive regarding whether a contributing source of PCE and/or TCE east of CI Plant 4 exists. Soil sampling has not been conducted at the Pacific Food Systems property to evaluate whether a source of PCE and TCE exists and is not planned at this time. Currently, a VI subslab depressurization system is operating at the Pacific Food Systems North Building to mitigate CVOCs in soil and groundwater from affecting air quality. However, as cited in Section 3.4, use of TCE-containing products has been confirmed and the ongoing need for mitigation measures is being evaluated.

Alternative 1R includes a preliminary conceptual design that includes SVE wells screened within the vadose zone to achieve the cleanup objectives. Where practicable, SVE wells would be installed near walls and permanent features inside of CI Plant 4 to minimize trenching and adversely impacting CI operations. Conveyance piping would be installed on walls and columns within the building and placed in steel pipe guards to protect from forklifts and other operations in Plant 4. Conveyance piping from each well would be connected to a common header mounted to the ceiling of CI Plant 4. The SVE equipment may be placed on the roof of CI Plant 4. Mechanical equipment like the blower can create sound levels that are a nuisance to neighboring properties; therefore, the blower would likely be placed in a sound dampening enclosure. As a contingency, treatment of SVE discharge is included. Discharge from the SVE system would travel through two steels vessels containing granular activated carbon that may be placed on the northern portion of CI Plant 4.

Results from the CI Plant 4 SVE pilot study indicated a conservative radius of influence of 17 feet. The pilot study indicated that building subsurface features (e.g., foundations, sewer pipes) would potentially inhibit or short-circuit vacuum gradients. The SVE pilot study indicated low vacuum gradient was distributed along the subslab of the building at a radius of influence of greater than 30 feet from the pilot study extraction well.

The conceptual SVE design includes three SVE wells placed in CI Plant 4 along the border with the Pacific Food Systems North Building to provide subslab depressurization of the neighboring

building in lieu of the existing mitigation system currently installed and operating. The SVE pilot study indicated subslab vacuum gradients could be established at greater than 30 feet from the extraction well, at a relatively low vacuum (15 inches of water column). This vacuum may be sufficient to depressurize the area beneath the building slab and allow the existing VI mitigation measures to be eliminated.

Once installed, the SVE system is estimated to require 1 to 5 years to meet RAOs for soil. The estimated time frame would be refined based on monitoring results of the SVE effluent concentrations. A source of PCE and/or TCE at Pacific Food Systems could influence the performance sampling results and prolong the cleanup time frame. Individual SVE wells will be sampled during SVE operations to evaluate whether a potential source of PCE and/or TCE is likely present beneath the Pacific Food Systems North Building. The existing subslab monitoring points at Pacific Food Systems will also be evaluated to confirm that the SVE system is depressurizing the building slab area.

Soil remediation via SVE will ultimately reduce the risk of recontamination of groundwater and reduce or eliminate VI risk associated with CVOCs in soil at and down-gradient of CI Plant 4 and at the east-adjacent Pacific Food Systems buildings.

Groundwater RAOs will be met through reductions in CVOCs concentrations in groundwater through ongoing natural attenuation processes. Implementation of MNA in the CI Plant 4 source area will include groundwater monitoring to confirm the decline of CVOCs and refine cleanup time frame estimates. PCE and TCE were detected at concentrations exceeding PCULs in the Water Table Intervals at CI Plant 4 and downgradient locations. Groundwater sampling results indicate that PCE and TCE concentrations associated with CI Plant 4 have been decreasing.

Groundwater sampling results indicate that VC concentrations detected at concentrations exceeding PCULs in the Shallow and Intermediate Intervals at and/or downgradient of CI Plant 4 have remained relatively stable. Evaluations of natural attenuation potential have included BIOCHLOR modeling and collecting geochemical parameters during semiannual groundwater sampling events. Both the modeling and groundwater sampling data, including data collected following the SU2 FS, confirm that natural attenuation is occurring in all groundwater intervals, including a biodegradation component that is supported by the presence of ethene concentrations in groundwater and other geochemical indicators of biodegradation processes (Table 1).

Institutional and engineered controls to mitigate direct contact with groundwater will also be implemented at and down-gradient of CI Plant 2 and would remain until PCULs are achieved. These controls include but are not limited to maintaining the CI building and other hard surfaces at the CI property to mitigate contact with groundwater; placing an environmental covenant on the CI property; notifying utility providers of the presence of contaminated media locations and depths; and notifying landowners within the contaminated Water Table Interval plume area. Notification procedures will be presented to and approved by Ecology.

6.1.4 CG-141 Area

Alternative 1R will achieve RAOs for groundwater in the CG-141 well cluster areas as described below. The approach herein to achieve RAOs remains consistent with that presented in the SU2 FS.

Groundwater RAOs will be met through reductions in CVOCs concentrations in groundwater through ongoing natural attenuation processes. Groundwater monitoring data collected from 2016 through March 2022 has indicated that VC concentrations remain relatively stable and that the area at and proximate to the CG-141 monitoring well cluster is highly conducive to anaerobic biodegradation of the VC present. Monitoring data for CG-141-40 from 2002 through 2022 support that biological, chemical, and physical natural attenuation processes have effectively reduced CVOC concentrations over time while the more recent evaluation of biodegradation potential indicates that there is a significant biological component of natural attenuation occurring in the CG-141 and CI-15 areas that effectively reduces CVOC mass migrating toward the Waterway.

Down-gradient monitoring wells continue to indicate that the VC plumes in the Shallow and Intermediate Intervals are relatively stable as discussed previously herein. Further, the SU1 porewater study and remediation level analysis has indicated that there is not an unacceptable current, or likely future risk to the Waterway. Implementation of MNA in the CG-141 area will include groundwater monitoring to confirm the decline of CVOCs and refine cleanup time frame estimates. The ongoing performance monitoring data also provides a basis for evaluation of plume stability and whether contingency actions are necessary to protect the Waterway.

6.1.5 Remediation Time Frames

Estimates of remediation time frames for Alternative 1R indicate that PCULs will be achieved at different rates in different portions of the Site ranging from approximately 5 to 50 years, as previously discussed in the SU2 FS and supported by the update to the natural attenuation evaluation presented above in Section 4. Additional refinement of remediation time estimates and appropriate contingency actions would be included in the dCAP for the selected alternative.

6.1.6 Cost Estimate

The combined cost estimate for implementation of Alternative 1R is $2,680,000 (Table 4 and Appendix C). This cost estimate includes up to 60 years of compliance monitoring (Table C3), with documentation, including reporting, treatability studies, and implementation of source area actions with a 25 percent contingency on implementation costs. This cost estimate does not include costs for implementation of contingency actions undertaken in the event of partial remedy failure or discovery of additional contamination. Contingency remedial actions and estimated scenario costs are discussed in Section 8.

7.0 FOCUSED EVALUATION

This section presents a concise evaluation of the remedial alternative described in Section 6.

7.1 MTCA THRESHOLD CRITERIA

Cleanup actions selected under MTCA must meet four "threshold" requirements identified in WAC 173-340-360(2)(a) to be accepted by Ecology. All cleanup actions must:

- Protect human health and the environment
- Comply with cleanup standards
- Comply with applicable state and federal laws
- Provide for compliance monitoring

The SU2 FS included evaluation of six alternatives that met the threshold requirements above. The final ranking scores based on the cost to benefit ratio analysis ranged from 2.8 to 13.9. Alternative 1 was selected based on it having the lowest overall cost to benefit ranking score of 2.8. Alternative 1R was not re-evaluated to compare the cost to benefit ranking scores with the other five remedial alternatives from the SU2 FS. Alternative 1 had the lowest cost to benefit ranking score at 2.8 and therefore was selected as the remedial alternative for SU2. The change from ISCO to SVE at CI Plant 4 does not substantively affect the costs and benefits for Alternative 1R in a manner that could result in the cost to benefit ranking score exceeding the next lowest remedial alternative ranking score of 3.9 for Alternative 4. With the incorporation of SVE into Alternative 1R, and the addition of a more comprehensive contingency action program, this alternative remains the lowest cost to benefit ranking of the remedial alternatives and is an appropriate selection as the preferred remedial alternative for SU2.

In addition to threshold requirements, MTCA also requires that selected actions will:

- Use permanent solutions to the maximum extent practicable;
- Consider public concerns; and
- Provide for a reasonable restoration time frame.

These requirements are discussed below in the following sections.

7.1.1 Use Permanent Solutions to the Maximum Extent Practicable

Alternative 1R includes permanent remedies to the maximum extent practicable. Groundwater remedies focus on the degradation and destruction of CVOCs. Soil remedies focus on removal/destruction where technically feasible and use permanent containment remedies meeting the requirements of WAC 173-340-740 (6)(f) where treatment is not practicable. The remedial actions for soil and groundwater consequently result in removal and destruction of the sources with the potential to affect air and surface water.

7.1.2 Consider Public Concerns

Alternative 1R considers public concerns, including VI and the potential use of groundwater as a drinking water source. Site reports and documents are available for public review, and potential impacts on off-site/down-gradient receptors have been incorporated into consideration of remedial actions.

7.1.3 Provide for a Reasonable Restoration Time Frame

This section describes the criteria for determining if a remedy provides a reasonable restoration time frame. In general, shorter restoration time frames are required for sites with imminent threats to human health or the environment while longer time frames may be appropriate or allowed at sites with lower risk and where it is consistent and practical with future site use and ability to monitor. Specific factors to be considered include:

- **Potential risks:** Potential risks in SU2 are generally low, or are currently mitigated as in the case of VI. SU2 groundwater conditions are protective of human health and the environment for soil and groundwater under current site use and implemented VI mitigation measures.
- **Practicability of achieving a shorter time frame:** Because source control measures either have been or will be completed at the SU2 facilities under each alternative, the primary control on remediation time is the groundwater flushing time between accessible potential treatment areas or natural attenuation rates.
- **Current and potential future site use:** The SU2 area is currently mixed commercial, industrial, and residential. While this use type is not expected to significantly change, changes in land use would likely be associated with construction of new buildings that would likely be less susceptible to VI due to modern vapor barrier construction, and construction may include VI specific elements further improving effectiveness. The demolition of the former Mobile Crane facility, south of CI Plant 2 and construction of the new Genesco, Inc. facility is an example where the new construction included a more robust vapor barrier technology. Therefore, future land uses within SU2 are not expected to adversely impact work included under Alternative 1R.
- **Availability of alternate water supplies:** All drinking/potable water in the SU2 area is supplied by Seattle Public Utilities and installation of wells for private use is not allowed. W4 groundwater potability is discussed in Appendix C of the SU2 FS.
- **Ability to control and monitor migration:** An extensive monitoring well network is in place across SU2 that will facilitate monitoring CVOCs in groundwater and assess if contingency measures are required. Historical interim actions at BDC and CI Plant 2, and the proposed SVE treatment at CI Plant 4 have controlled mass loading to groundwater and therefore migration potential. Institutional controls for residual soil impacts are likely to be effective based on the historical reductions in CVOC mass loading to groundwater and because the remaining areas of soil contamination are difficult to access due to the

configuration of buildings and pavement, and management of soil with contamination can be tied to potential future lease agreements.

- **Toxicity of the hazardous substances:** Sites with highly toxic compounds or high concentrations of COCs can be reasonably expected to adopt a faster remedial action to reduce risk to potential receptors. While SU2 CVOC concentrations do exceed PCULs based on protection of VI and surface water receptors, CVOC concentrations do not indicate the presence of nonaqueous-phase liquids, and receptor pathways are largely incomplete under current site conditions. Further, historical and proposed source remediation and CVOC mass reduction in groundwater associated with ongoing natural attenuation has supported that future risks associated with CVOCs are acceptably addressed.
- **Natural processes that reduce concentrations at the Site:** Biodegradation of CVOCs is demonstrated by presence of associated degradation compounds, groundwater geochemical indicators of biodegradation, and decreasing CVOC mass in source and down-gradient areas. The time for natural processes to reduce concentrations varies by source area and groundwater interval as cited in Appendix A of the SU2 FS.

Assessment of a reasonable time frame includes consideration of the relative rate at which alternatives can achieve RAOs, and if the selected alternatives as a group are reasonable within what is technically feasible with available technologies and site conditions. Similarly, alternatives with longer remediation times are not preferred when reasonable and practicable alternatives with shorter remediation times are available. Longer time frames may be adopted if a remedial alternative has a greater degree of long-term effectiveness than non-destructive alternatives such as landfill disposal or containment technologies.

Alternative 1R is within the acceptable criteria for a reasonable time frame. Prior and planned source control measures will continue to reduce restoration time frames for groundwater. Alternative 1R includes measures to: monitor the effectiveness of the alternative; refine the estimate of the restoration time frame; evaluate potential changes in risks to various receptors; and implement contingency actions. The criteria set forth under WAC 173-340-360(4) are therefore met for Alternative 1R.

8.0 CONTINGENCY ACTIONS

A contingency action may be necessary to protect human or ecologic receptors if an unexpected condition occurs resulting in the potential for exposure or impending impact to a medium currently unaffected (e.g., surface water, sediment, air quality). The contingency action outlined in this section focuses on protection of surface water either near the Waterway, proximal to monitoring well CI-19-30; or proximal to Slip 2. Potential contingency action addressing the indoor air exposure pathway are addressed in the SU2 FS Report (PGG 2016).

The contingency action technology that is currently anticipated to be most applicable involves injection-based treatment of the CVOCs using EAnB and/or ISCR. These technologies were selected based on the results of pilot testing these technologies at SU1 (Aspect 2022). However, application results in SU1 will continue to be evaluated and the evolution of alternative technologies will be monitored to confirm that an appropriate technology capable of achieving the desired result is selected prior to implementing a contingency action. The triggers for enacting a contingency action are discussed below and mimic the processes currently being implemented in SU1.

Implementing a contingency action for groundwater treatment would be based on aggregate groundwater monitoring trends at monitoring wells proximate to Slip 2 (BDC/CI TCE plume) and the Waterway (CG-141 area), including:

- Monitoring wells CI-19-30, MW-23-30, and MW-23-50, located in SU1 on the CertainTeed Gypsum property proximate to the Waterway and down-gradient of the flow path for VC from the CG-141 well cluster area; and
- Monitoring wells CI-13-WT, CI-13-30, and CI-13-60 proximate to Slip 2, which are down-gradient of the flow path for the commingled BDC/CI TCE Plume.

The monitoring wells identified above are highlighted on Figure 7.

Performance monitoring data from monitoring wells identified above will be used to evaluate CVOC trends to determine whether a contingency action may be necessary to evaluate whether treatment is recommended. Performance monitoring data will be reviewed within the context of the on-going MNA assessment included under Alternative 1R. The evaluation and implementation of contingency actions will occur as follows:

- Review groundwater performance monitoring trends at the selected monitoring wells; and
- Use the groundwater performance monitoring data to evaluate current temporal trends and determine if a statistically significant increasing trend is occurring that may pose an unacceptable risk to the surface water receptor. An increasing trend/risk evaluation will include a review of monitoring data and conceptual model including attenuation to assess the origin of the increase and if the increase is likely to be sustained or transient.

If the performance monitoring data indicates that a statistically significant increasing trend in CVOC concentrations is occurring, sustained, and concentrations of CVOCs pose a risk, then a phased contingency action approach will be conducted as follows:

Phase 1: Porewater Investigation. Ecology would be presented with a work plan for conducting porewater evaluation work. Upon Ecology approval of the work plan, the porewater sampling would be conducted and the results evaluated to determine if Phase 2 Treatment is required. Collection and analysis of porewater samples will be conducted in the groundwater plume discharge area. Surface area-weighted average concentrations of porewater within the groundwater discharge area will be calculated as described in Appendix D of the SU1 FS Addendum in accordance with Ecology guidance (Ecology 2015). If the calculated surface area-weighted average concentration in the site groundwater discharge area is less than the porewater remediation level for VC of 0.82,[5] protection of human health is indicated, and no further action will be taken. If the surface area-weighted average porewater concentration in the site groundwater discharge area exceeds the porewater remediation level and the investigation is considered accurate and complete, Phase 2 of the contingency plan will be implemented.

Phase 2: Shoreline Investigation and Treatment. A shoreline investigation will be conducted to refine the lateral and vertical extent of a treatment area that would be targeted to assess and maximize effectiveness of the applicable treatment technology. Contingent on private property access, the investigation would be as close to the shoreline as practicable, upgradient of the porewater results exceeding remediation levels as defined in Phase 1. The treatment area would be informed from the investigation results. Ecology would be presented with work plans for both the additional investigation work for refining treatment design, applying the selected remediation technology, and conducting subsequent performance monitoring work. Upon Ecology concurrence, a contingency action would be implemented and monitored for effectiveness.

The estimated cost for contingency actions for Alternative 1R, based on the current approach of implementing EAnB/ISCR injection, is rounded to the nearest ten thousand dollars are presented in Table 4 with supporting details included in Appendix C. The estimated contingency cost for Alternative 1R is $1.7 million.

[5] Remediation levels for porewater in SU1 are presented in the SU1 FS Addendum (Aspect 2022).

9.0 CONCLUSIONS

Alternative 1R is the selected remedial alternative for cleanup action for SU2 based on discussions with Ecology in April 2022, the analysis and considerations presented in this SU2 FS Addendum, and the cost to benefit ranking analysis associated with the SU2 FS that indicated that this alternative had and will continue to have the lowest overall ranking score for the six alternatives evaluated. Alternative 1R consists of a modified version of Alternative 1 presented in the SU2 FS, with SVE treatment replacing ISCO for soil at CI Plant 4. This modification was warranted based on the results from the pilot study conducted at CI Plant 4, which indicated that ISCO was not technically feasible for treatment of shallow soil, but SVE was a feasible technology. The pilot study results further indicated that groundwater treatment at CI Plant 4 was not necessary because supplemental groundwater data collected from beneath Plant 4 indicated that CVOCs were compliant with PCULs at CI Plant 4 for protection of surface water, natural attenuation down-gradient of CI Plant 4 is ongoing, and SVE treatment of the source beneath CI Plant 4 would eliminate the potential for further CVOC mass transfer to groundwater. The substitution of SVE for ISCO at CI Plant 4 will not alter the cost to benefit ranking analysis in a manner that changes the outcome of the remedial alternative selection process. Therefore, further ranking analysis is not necessary and Alternative 1R is an appropriate selection for the preferred remedial alternative for SU2.

The SU2 FS and SU2 FS Addendum evaluation and selection of potential remedial alternatives meets the requirements set forth under WAC 173-340-350 through 173-340-370. Alternative 1R satisfies the MTCA requirement to be permanent to the maximum extent practicable and will achieve the applicable cleanup levels at the designated points of compliance within a reasonable restoration time frame. This alternative is protective of human health and the environment.

The SU2 FS and SU2 FS Addendum will be submitted for public comment prior to being finalized. Following addressing comments that Ecology concurs must be addressed, the SU2 FS and SU2 FS Addendum will be finalized and collectively represent the final FS for SU2. Upon receipt of Ecology concurrence, a dCAP presenting the details regarding implementation of Alternative 1R, including a proposed schedule for key elements of the cleanup action and associated compliance monitoring, will be prepared. The dCAP will be submitted to Ecology within 120 days of Ecology concurrence.

10.0 REFERENCES

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FIGURES

WEST OF FOURTH SITE UNIT 2
FEASIBILITY STUDY ADDENDUM
West of Fourth Joint Agreed Order
Seattle, Washington

Farallon PN: 457-010

SOUTH DAWSON STREET
SOUTH BENNETT STREET
SOUTH BRANDON STREET
UTAH AVENUE SOUTH
DENVER AVENUE SOUTH
AIRPORT WAY SOUTH
I-5 FREEWAY
BURLINGTON ENVIRONMENTAL, LLC
ART BRASS PLATING, INC.
SOUTH FINDLAY STREET
SOUTH LUCILE STREET
I-5 FWY
OHIO AVENUE SOUTH
2ND AVENUE SOUTH
3RD AVENUE SOUTH
SITE UNIT 1 (SU1)
BLASER DIE CASTING CO.
SOUTH MEAD STREET
CAPITAL INDUSTRIES, INC.
SOUTH FIDALGO STREET
WEST MARGINAL WAY SOUTHWEST
DUWAMISH RIVER
EAST MARGINAL WAY SOUTH
1ST AVENUE SOUTH
SITE UNIT 2 (SU2)
6TH AVENUE SOUTH
SOUTH ORCAS STREET
SOUTH HOMER STREET
SOUTH DORIS STREET
SOUTH NEBRASKA STREET
SOUTH VALE STREET
SOUTH FRONT STREET
TERMINAL 115
SLIP #2
SR 99
4TH AVENUE SOUTH
5TH AVENUE SOUTH
7TH AVENUE SOUTH
SOUTH MICHIGAN STREET
CORSON AVENUE SOUTH
CARLETON AVENUE SOUTH
FLORA AVENUE SOUTH
DRAFT

LEGEND

- ART BRASS PLATING, INC.
- BLASER DIE CASTING CO.
- CAPITAL INDUSTRIES, INC.
- BURLINGTON ENVIRONMENTAL, LLC
- SITE UNIT BOUNDARY

N

0 250 500

SCALE IN FEET

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FIGURE 1

SITE VICINITY
WEST OF 4th GROUP SITE
SEATTLE, WASHINGTON

FARALLON PN: 457-010

Drawn By: tperrin Checked By: AM Date: 12/11/2020 Disc Reference:
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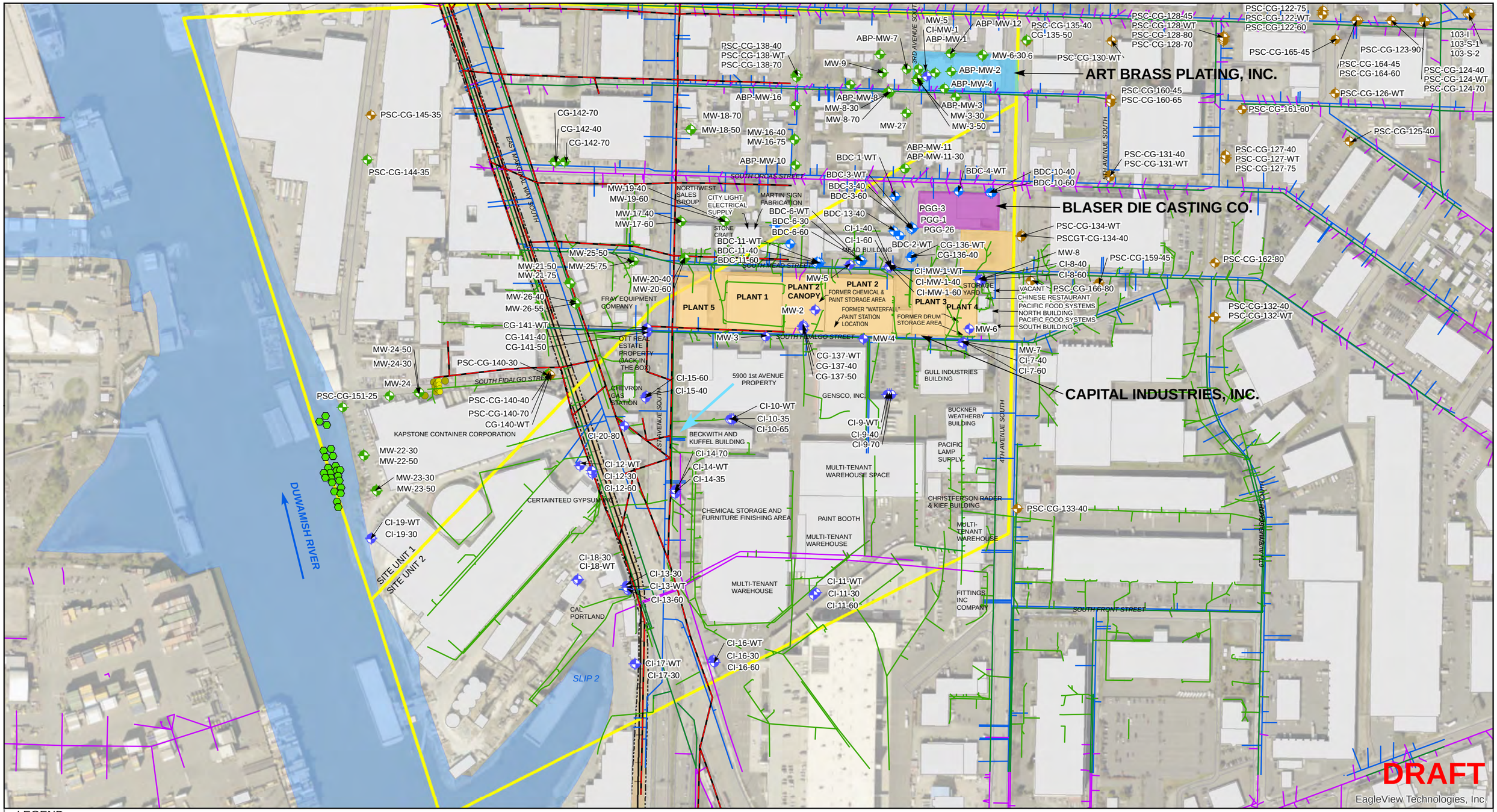

LEGEND

- ART BRASS PLATING MONITORING WELL
- BLASER DIE CASTING MONITORING WELL
- CAPITAL INDUSTRIES MONITORING WELL
- CLEAN EARTH, INC. MONITORING WELL
- SITE UNIT 1 (SU1) POREWATER SAMPLE POINT (2020)
- SU1 CVOC PILOT STUDY MONITORING POINT
- RAILWAY TRACKS
- WATER SERVICE LINE
- SANITARY SEWER MAIN LINE
- SANITARY SEWER LATERAL
- STORMWATER LINE
- OVERHEAD POWER LINES NEAR 1ST AVE OR EAST MARGINAL WAY
- SU1 CVOC PILOT STUDY INJECTION TRANSECT (2019)
- SITE UNIT BOUNDARY
- RAILWAY RIGHT OF WAY
- APPROXIMATE AVERAGE DIRECTION OF GROUNDWATER FLOW
- DUWAMISH RIVER FLOW DIRECTION

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FIGURE 2

SITE PLAN
WEST OF 4TH GROUP SITE UNIT 2
SEATTLE, WASHINGTON

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Drawn By: aguse | Checked By: JK | Date: 11/21/2022 | Disc Reference:

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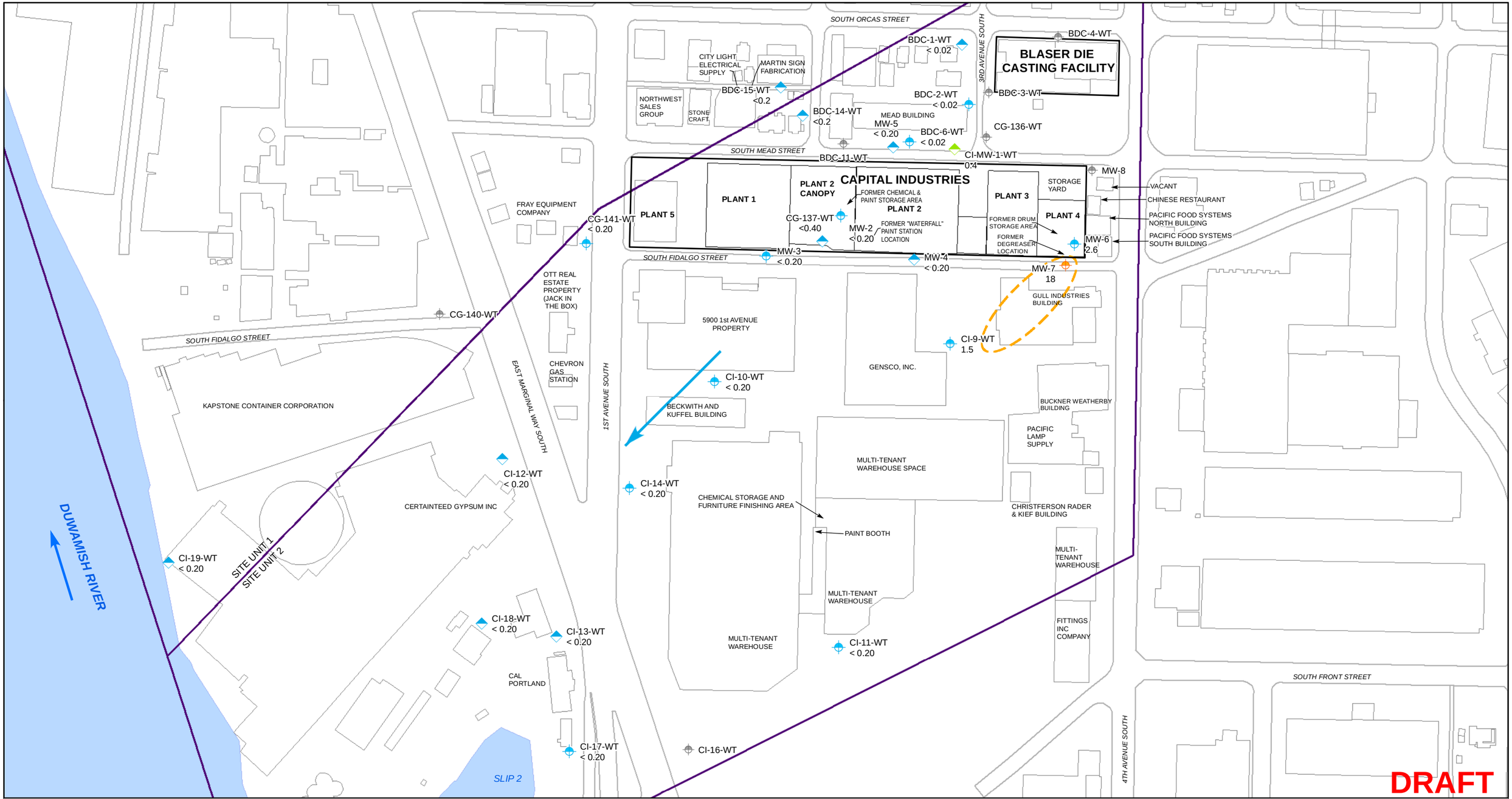

WATER TABLE INTERVAL MONITORING WELL PCE EXCEEDANCE FACTOR

- SAMPLE NOT DETECTED ABOVE LABORATORY REPORTING LIMITS
- SAMPLE IS DETECTED AT CONCENTRATIONS LESS THAN PCUL PROTECTIVE OF SURFACE
- SAMPLE EXCEEDS PCUL PROTECTIVE OF SURFACE WATER
- NOT SAMPLED IN 2020, 2021, OR 2022

SAMPLE RESULTS DISPLAYED ARE FROM THE MARCH 2022 SAMPLING EVENT. WELLS THAT WERE NOT SAMPLED IN MARCH 2022 DISPLAY RESULTS OF THE MOST RECENT SAMPLING EVENT AFTER 2016.

LEGEND

WATER TABLE INTERVAL MONITORING WELL SAMPLE DATE

- 2020/2021
- 2022

ESTIMATED EXTENT OF PCE EXCEEDING PCUL PROTECTIVE OF SURFACE WATER OF 2.9 MICROGRAMS PER LITER

APPROXIMATE AVERAGE DIRECTION OF GROUNDWATER

DUWAMISH RIVER FLOW DIRECTION

NOTES:

< = ANALYTE NOT DETECTED AT OR EXCEEDING THE REPORTING LIMIT LISTED
PCE = TETRACHLOROETHENE
PCUL = PRELIMINARY CLEANUP LEVEL
< 0.20 = CONCENTRATION OF PCE IN MICROGRAMS PER LITER

GROUNDWATER DATA INDICATES THAT THERE ARE NO EXCEEDANCES OF THE PCUL FOR PROTECTION OF AIR QUALITY OF 25 MICROGRAMS PER LITER.

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2. FIGURES WERE PRODUCED IN COLOR. GRAYSCALE COPIES MAY NOT REPRODUCE ALL ORIGINAL INFORMATION.

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FIGURE 3

CURRENT GROUNDWATER PCE RESULTS FOR WATER TABLE INTERVAL
WEST OF 4th SITE UNIT 2
SEATTLE, WASHINGTON

FARALLON PN: 457-010

Drawn By: lmurock Checked By: AM Date: 10/28/2022 Disc Reference:
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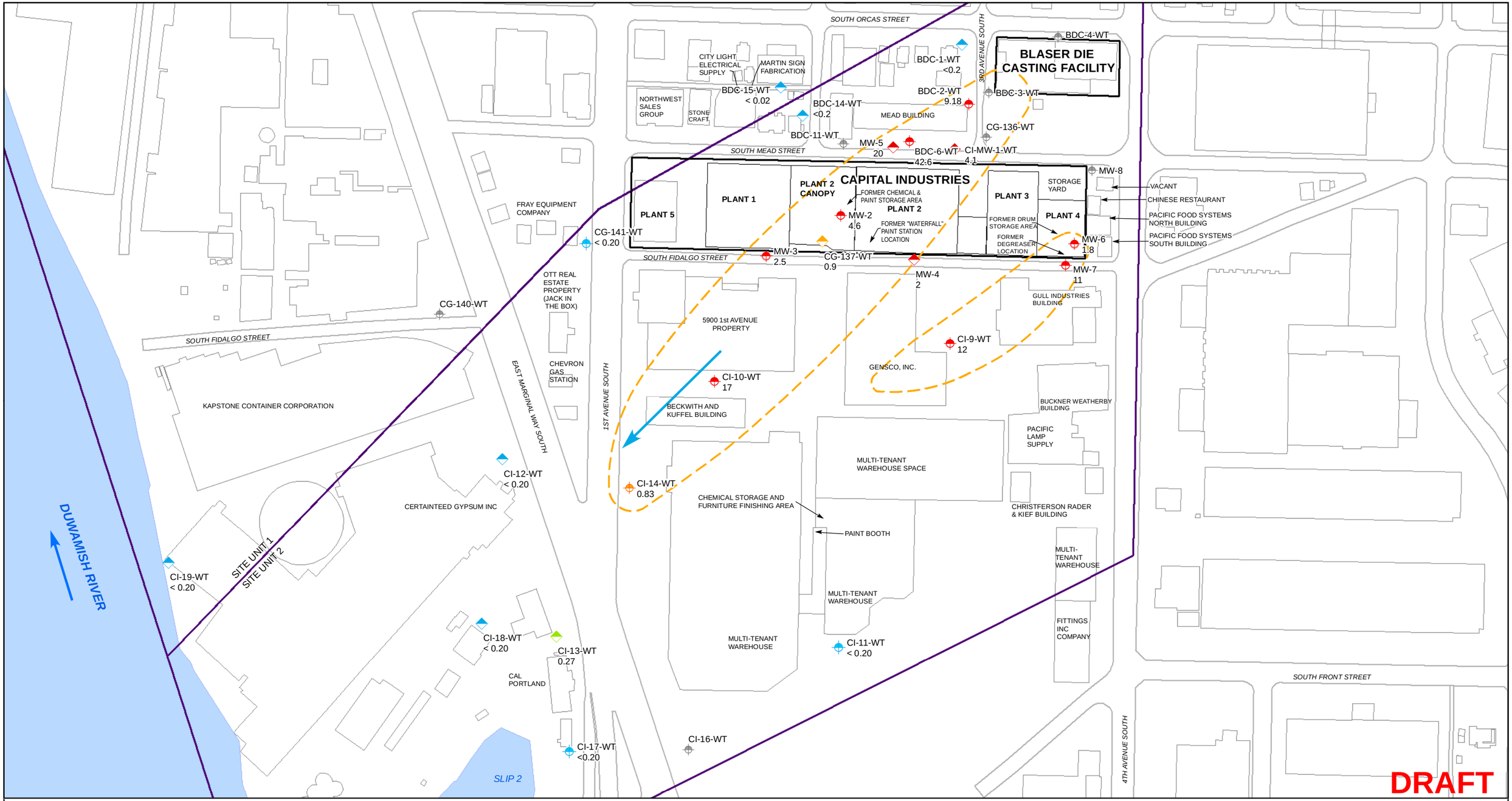

WATER TABLE INTERVAL MONITORING WELL TCE EXCEEDANCE FACTOR

- SAMPLE NOT DETECTED ABOVE LABORATORY REPORTING LIMITS
- SAMPLE IS DETECTED AT CONCENTRATIONS BELOW PCULs
- SAMPLE EXCEEDS PCUL PROTECTIVE OF SURFACE WATER
- SAMPLE EXCEEDS PCULS PROTECTIVE OF AIR QUALITY AND SURFACE WATER
- NOT SAMPLED IN 2020, 2021, OR 2022

LEGEND

WATER TABLE INTERVAL MONITORING WELL SAMPLE DATE

- 2020/2021
- 2022

ESTIMATED EXTENT OF TCE EXCEEDING PCUL PROTECTIVE OF SURFACE WATER OF 0.7 MICROGRAMS PER LITER

SAMPLE RESULTS DISPLAYED ARE FROM THE MARCH 2022 SAMPLING EVENT. WELLS THAT WERE NOT SAMPLED IN MARCH 2022 DISPLAY RESULTS OF THE MOST RECENT SAMPLING EVENT AFTER 2016.

APPROXIMATE AVERAGE DIRECTION OF GROUNDWATER

DUWAMISH RIVER FLOW DIRECTION

NOTES:

< = ANALYTE NOT DETECTED AT OR EXCEEDING THE REPORTING LIMIT LISTED
TCE = TRICHLOROETHENE
PCUL = PRELIMINARY CLEANUP LEVEL
< 0.20 = CONCENTRATION OF TCE IN MICROGRAMS PER LITER

PCUL FOR PROTECTION OF AIR QUALITY = 1.4 MICROGRAMS PER LITER

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FIGURE 4A

CURRENT GROUNDWATER TCE RESULTS FOR WATER TABLE INTERVAL WEST OF 4th SITE UNIT 2 SEATTLE, WASHINGTON

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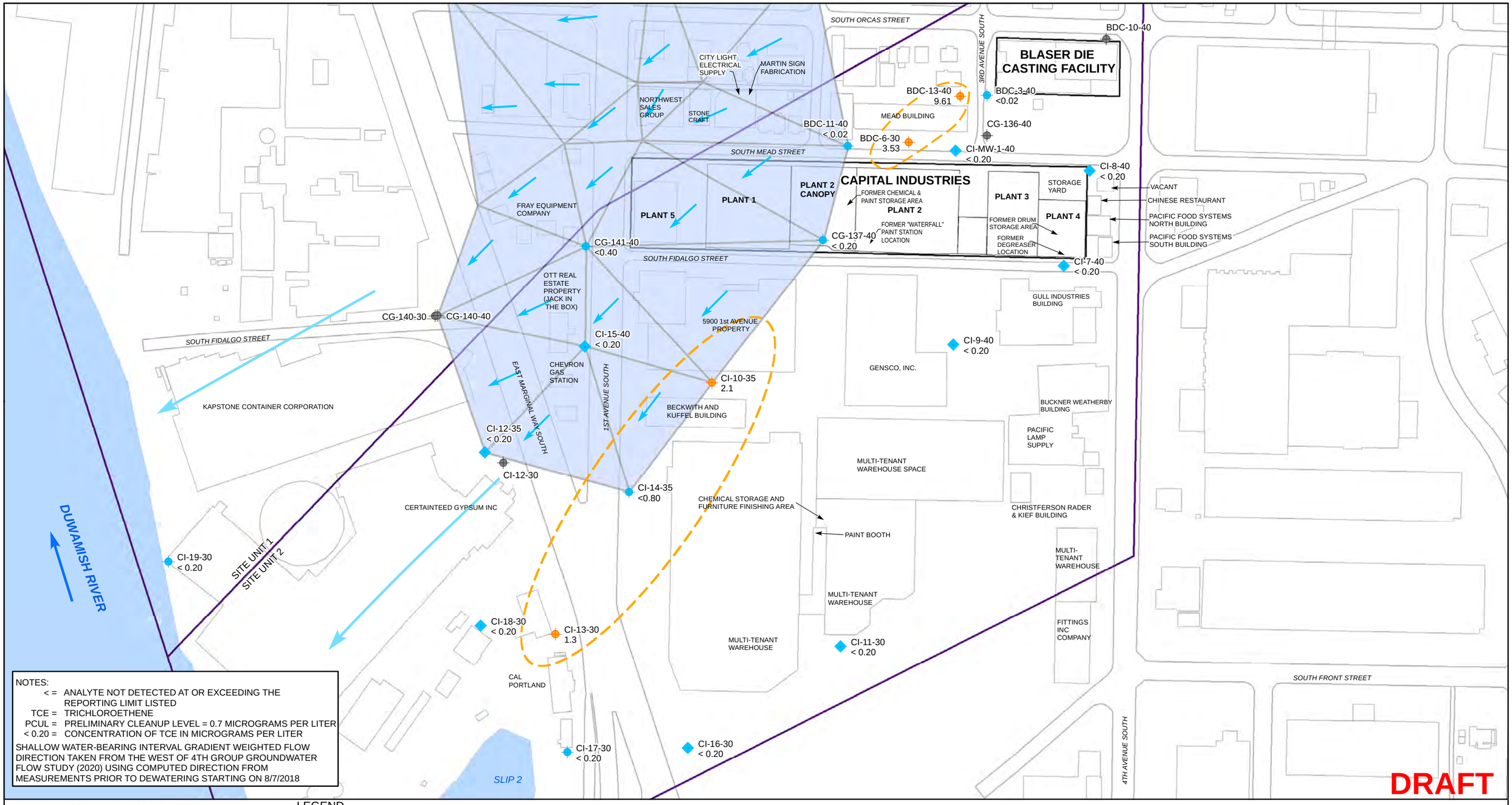

NOTES:
< = ANALYTE NOT DETECTED AT OR EXCEEDING THE REPORTING LIMIT LISTED
TCE = TRICHLOROETHENE
PCUL = PRELIMINARY CLEANUP LEVEL = 0.7 MICROGRAMS PER LITER
< 0.20 = CONCENTRATION OF TCE IN MICROGRAMS PER LITER

SHALLOW WATER-BEARING INTERVAL GRADIENT WEIGHTED FLOW DIRECTION TAKEN FROM THE WEST OF 4TH GROUP GROUNDWATER FLOW STUDY (2020) USING COMPUTED DIRECTION FROM MEASUREMENTS PRIOR TO DEWATERING STARTING ON 8/7/2018

SHALLOW INTERVAL MONITORING WELL TCE EXCEEDANCE FACTOR

- SAMPLE NOT DETECTED ABOVE LABORATORY REPORTING LIMITS
- SAMPLE EXCEEDS PCUL PROTECTIVE OF SURFACE WATER
- NOT SAMPLED IN 2020, 2021, OR 2022

SAMPLE RESULTS DISPLAYED ARE FROM THE MARCH 2022 SAMPLING EVENT. WELLS THAT WERE NOT SAMPLED IN MARCH 2022 DISPLAY RESULTS OF THE MOST RECENT SAMPLING EVENT AFTER 2016.

LEGEND

WATER TABLE INTERVAL MONITORING WELL SAMPLE DATE
- 2020/2021
- 2022

ESTIMATED EXTENT OF TCE EXCEEDING PCUL PROTECTIVE OF SURFACE WATER OF 0.7 MICROGRAMS PER LITER

GROUNDWATER FLOW DATA UNIT (PACIFIC CREST 2020)

INTERPRETED GROUNDWATER FLOW DIRECTION
SHALLOW WATER-BEARING ZONE GRADIENT WEIGHTED FLOW DIRECTION PRE 8/7/2018 (PACIFIC CREST 2020)

DUWAMISH RIVER FLOW DIRECTION

N

0 100 200
SCALE IN FEET

1. ALL LOCATIONS ARE APPROXIMATE
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FIGURE 4B

CURRENT GROUNDWATER TCE RESULTS FOR SHALLOW INTERVAL
WEST OF 4th SITE UNIT 2
SEATTLE, WASHINGTON

FARALLON PN: 457-010

Drawn By: aguse
Checked By: JK
Date: 11/21/2022
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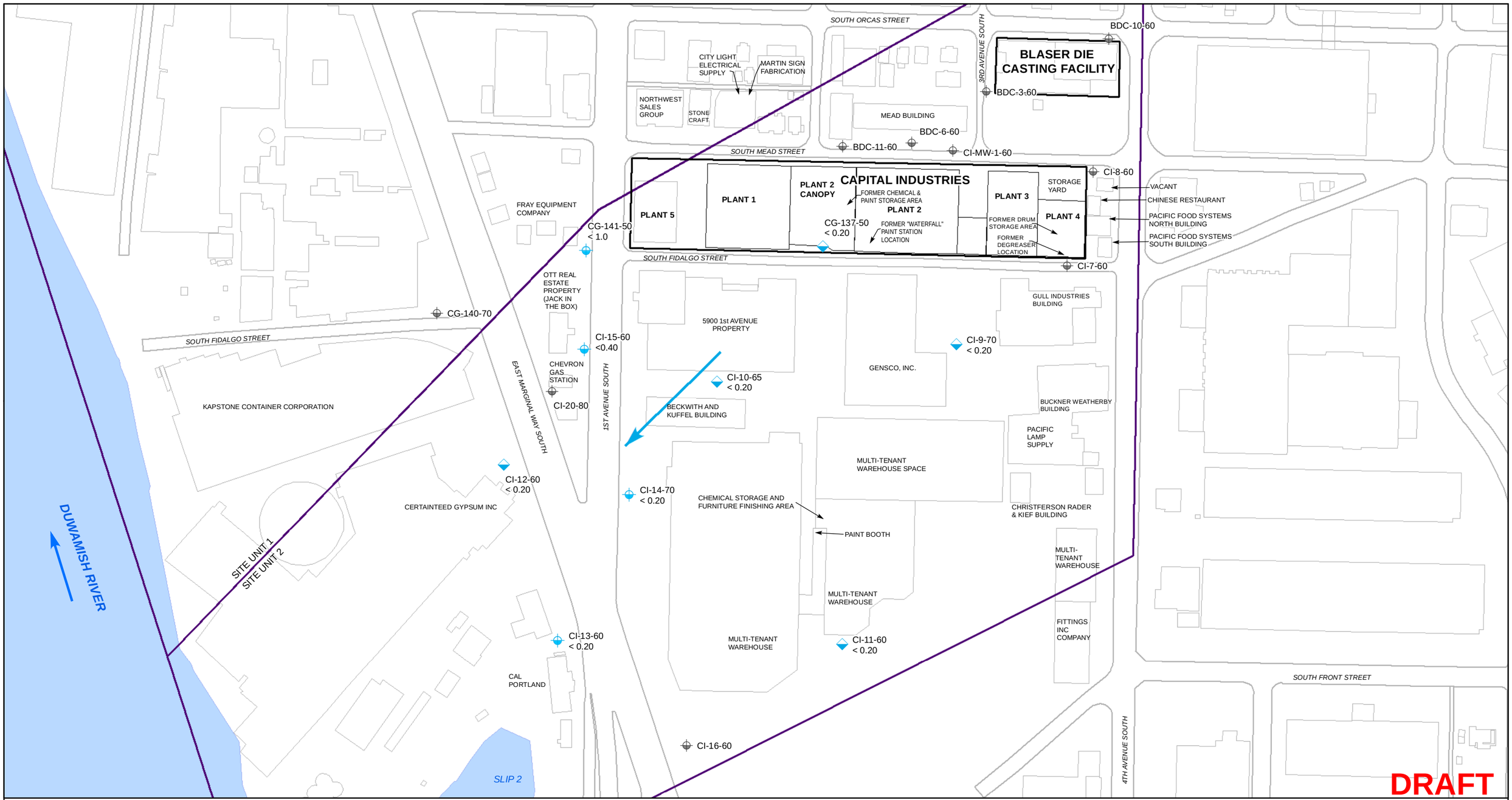

LEGEND

TCE EXCEEDANCE FACTOR

- SAMPLE NOT DETECTED ABOVE LABORATORY REPORTING LIMITS
- NOT SAMPLED IN 2020, 2021, OR 2022

SAMPLE RESULTS DISPLAYED ARE FROM THE MARCH 2022 SAMPLING EVENT. WELLS THAT WERE NOT SAMPLED IN MARCH 2022 DISPLAY RESULTS OF THE MOST RECENT SAMPLING EVENT AFTER 2016.

WATER TABLE INTERVAL MONITORING WELL SAMPLE DATE

- 2020/2021
- 2022

- APPROXIMATE AVERAGE DIRECTION OF GROUNDWATER
- DUWAMISH RIVER FLOW DIRECTION

NOTES:

< = ANALYTE NOT DETECTED AT OR EXCEEDING THE REPORTING LIMIT LISTED
TCE = TRICHLOROETHENE
PCUL = PRELIMINARY CLEANUP LEVEL
< 0.20 = CONCENTRATION OF TCE IN MICROGRAMS PER LITER

PCUL FOR PROTECTION OF SURFACE WATER = 0.7 MICROGRAMS PER LITER

N

0 100 200
SCALE IN FEET

1. ALL LOCATIONS ARE APPROXIMATE
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FIGURE 4C

CURRENT GROUNDWATER TCE RESULTS
FOR INTERMEDIATE INTERVAL
WEST OF 4th SITE UNIT 2
SEATTLE, WASHINGTON

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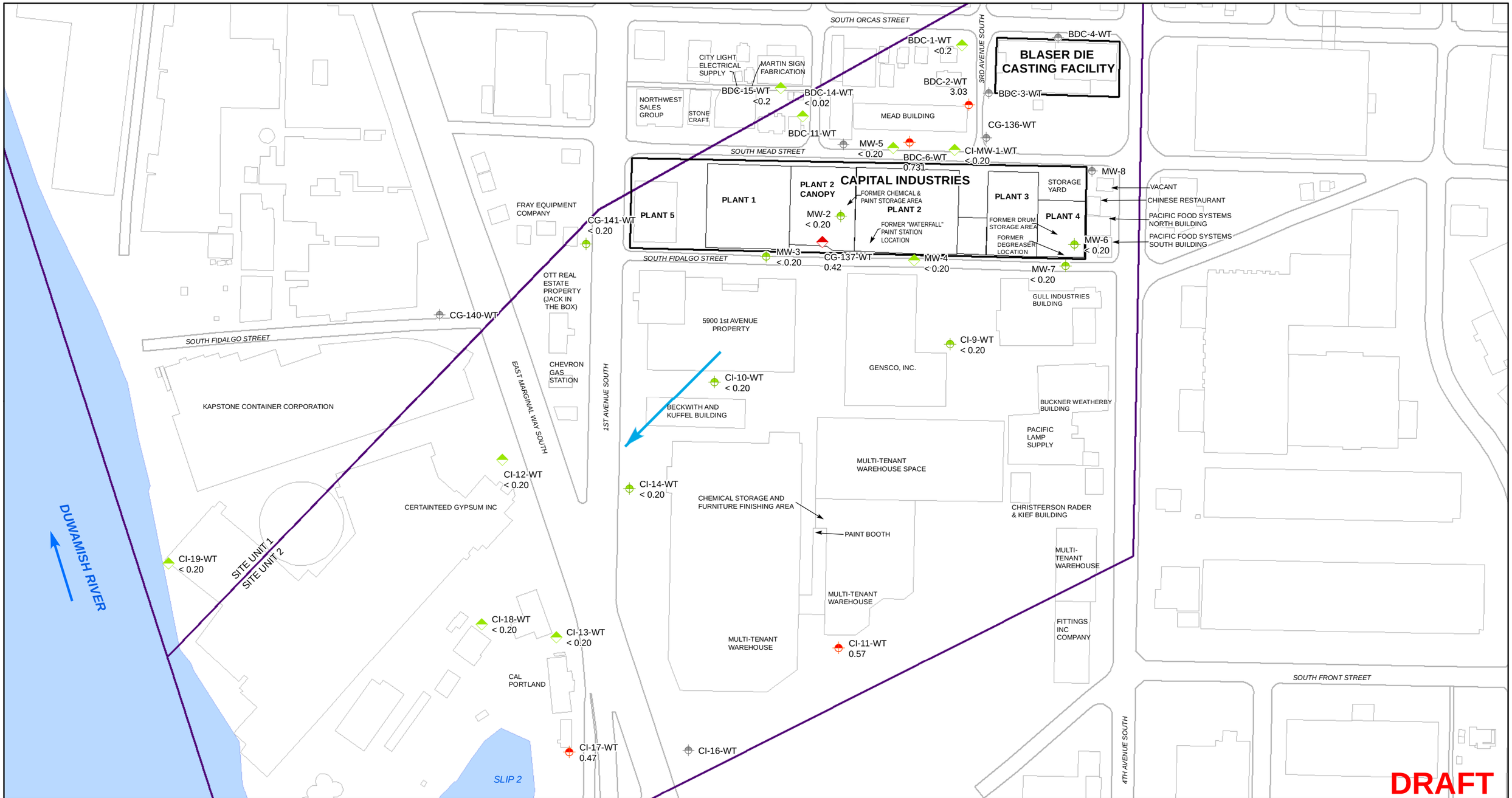

WATER TABLE INTERVAL MONITORING WELL VC EXCEEDANCE FACTOR

- SAMPLE IS DETECTED AT CONCENTRATIONS BELOW PCULs
- SAMPLE EXCEEDS PCULS PROTECTIVE OF AIR QUALITY AND SURFACE WATER
- NOT SAMPLED IN 2020, 2021, OR 2022

SAMPLE RESULTS DISPLAYED ARE FROM THE MARCH 2022 SAMPLING EVENT. WELLS THAT WERE NOT SAMPLED IN MARCH 2022 DISPLAY RESULTS OF THE MOST RECENT SAMPLING EVENT AFTER 2016.

LEGEND

WATER TABLE INTERVAL MONITORING WELL SAMPLE DATE

- 2020/2021
- 2022

PLUME LIMITS FOR VC NOT ADDED DUE TO LIMITED DISTRIBUTION OF VC IN WATER TABLE INTERVAL

- APPROXIMATE AVERAGE DIRECTION OF GROUNDWATER
- DUWAMISH RIVER FLOW DIRECTION

NOTES:

< = ANALYTE NOT DETECTED AT OR EXCEEDING THE REPORTING LIMIT LISTED
VC = VINYL CHLORIDE
PCUL = PRELIMINARY CLEANUP LEVEL
< 0.20 = CONCENTRATION OF VC IN MICROGRAMS PER LITER

PCUL FOR PROTECTION OF AIR QUALITY = 0.33 MICROGRAMS PER LITER AND PCUL FOR PROTECTION OF SURFACE WATER = 0.18 MICROGRAMS PER LITER

1. ALL LOCATIONS ARE APPROXIMATE
2. FIGURES WERE PRODUCED IN COLOR. GRAYSCALE COPIES MAY NOT REPRODUCE ALL ORIGINAL INFORMATION.

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FIGURE 5A

CURRENT GROUNDWATER VC RESULTS FOR WATER TABLE INTERVAL WEST OF 4th SITE UNIT 2 SEATTLE, WASHINGTON

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Drawn By: lmurock | Checked By: AM | Date: 10/28/2022 | Disc Reference:

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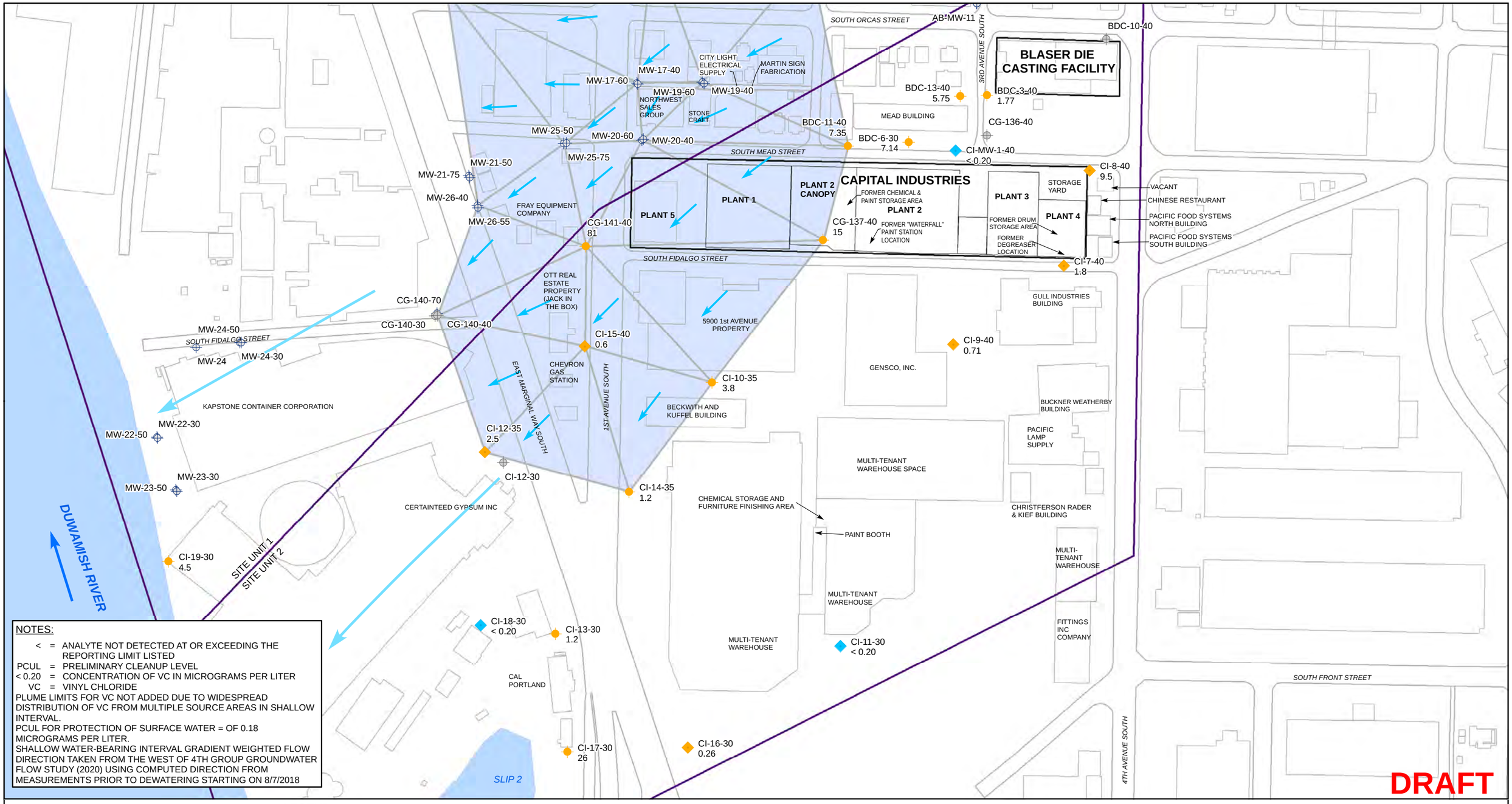

NOTES:

< = ANALYTE NOT DETECTED AT OR EXCEEDING THE REPORTING LIMIT LISTED
PCUL = PRELIMINARY CLEANUP LEVEL
< 0.20 = CONCENTRATION OF VC IN MICROGRAMS PER LITER
VC = VINYL CHLORIDE

PLUME LIMITS FOR VC NOT ADDED DUE TO WIDESPREAD DISTRIBUTION OF VC FROM MULTIPLE SOURCE AREAS IN SHALLOW INTERVAL.
PCUL FOR PROTECTION OF SURFACE WATER = OF 0.18 MICROGRAMS PER LITER.
SHALLOW WATER-BEARING INTERVAL GRADIENT WEIGHTED FLOW DIRECTION TAKEN FROM THE WEST OF 4TH GROUP GROUNDWATER FLOW STUDY (2020) USING COMPUTED DIRECTION FROM MEASUREMENTS PRIOR TO DEWATERING STARTING ON 8/7/2018

SHALLOW INTERVAL MONITORING WELL VC EXCEEDANCE FACTOR

- SAMPLE NOT DETECTED ABOVE LABORATORY REPORTING LIMITS
- SAMPLE EXCEEDS PCUL PROTECTIVE OF SURFACE WATER
- NOT SAMPLED IN 2020, 2021, OR 2022

SAMPLE RESULTS DISPLAYED ARE FROM THE MARCH 2022 SAMPLING EVENT. WELLS THAT WERE NOT SAMPLED IN MARCH 2022 DISPLAY RESULTS OF THE MOST RECENT SAMPLING EVENT AFTER 2016.

LEGEND

WATER TABLE INTERVAL MONITORING WELL SAMPLE DATE
- 2020/2021
- 2022

INTERPRETED GROUNDWATER FLOW DIRECTION

SHALLOW WATER-BEARING ZONE GRADIENT WEIGHTED FLOW DIRECTION PRE 8/7/2018 (PACIFIC CREST 2020)

DUWAMISH RIVER FLOW DIRECTION

GROUNDWATER FLOW DATA UNIT (PACIFIC CREST 2020)

N

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FIGURE 5B

CURRENT GROUNDWATER VC RESULTS
FOR SHALLOW INTERVAL
WEST OF 4th SITE UNIT 2
SEATTLE, WASHINGTON

FARALLON PN: 457-010

Drawn By: aguse | Checked By: JK | Date: 11/21/2022 | Disc Reference:
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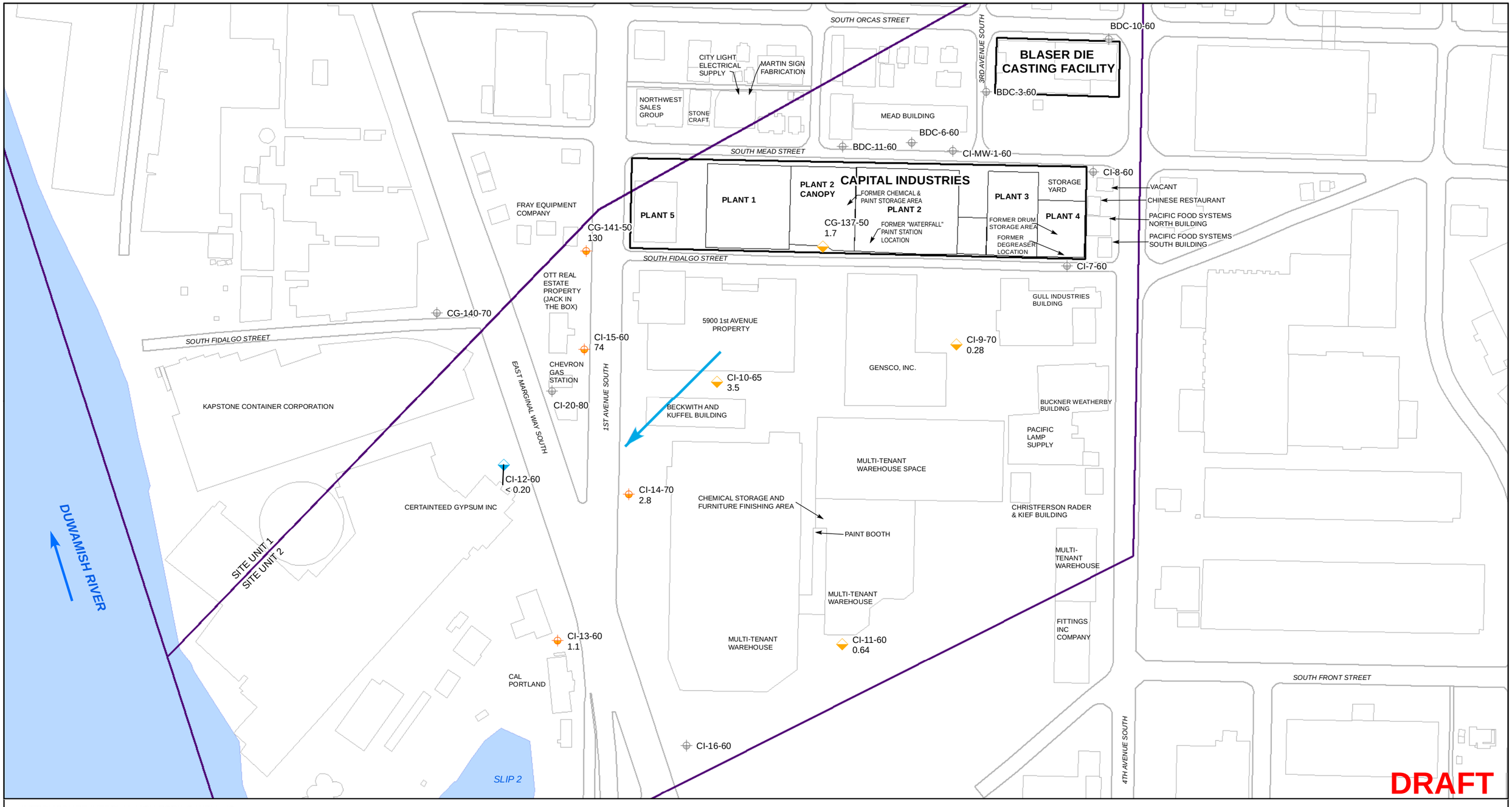

INTERMEDIATE INTERVAL MONITORING WELL VC EXCEEDANCE FACTOR

- SAMPLE NOT DETECTED ABOVE LABORATORY REPORTING LIMITS
- SAMPLE EXCEEDS PCUL PROTECTIVE OF SURFACE WATER
- NOT SAMPLED IN 2020, 2021, OR 2022

SAMPLE RESULTS DISPLAYED ARE FROM THE MARCH 2022 SAMPLING EVENT. WELLS THAT WERE NOT SAMPLED IN MARCH 2022 DISPLAY RESULTS OF THE MOST RECENT SAMPLING EVENT AFTER 2016.

LEGEND

WATER TABLE INTERVAL
MONITORING WELL SAMPLE DATE

- 2020/2021
- 2022

PLUME LIMITS FOR VC NOT ADDED DUE TO LIMITED DISTRIBUTION OF VC IN INTERMEDIATE INTERVAL

- APPROXIMATE AVERAGE DIRECTION OF GROUNDWATER
- DUWAMISH RIVER FLOW DIRECTION

NOTES:

< = ANALYTE NOT DETECTED AT OR EXCEEDING THE REPORTING LIMIT LISTED
TCE = TRICHLOROETHENE
PCUL = PRELIMINARY CLEANUP LEVEL
VC = VINYL CHLORIDE
< 0.20 = CONCENTRATION OF VC IN MICROGRAMS PER LITER

PCUL FOR PROTECTION OF SURFACE WATER = 0.18 MICROGRAMS PER LITER

1. ALL LOCATIONS ARE APPROXIMATE
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FIGURE 5C

CURRENT GROUNDWATER VC RESULTS
FOR INTERMEDIATE INTERVAL
WEST OF 4th SITE UNIT 2
SEATTLE, WASHINGTON

FARALLON PN: 457-010

Drawn By: lmurock
Checked By: AM
Date: 10/28/2022
Disc Reference:
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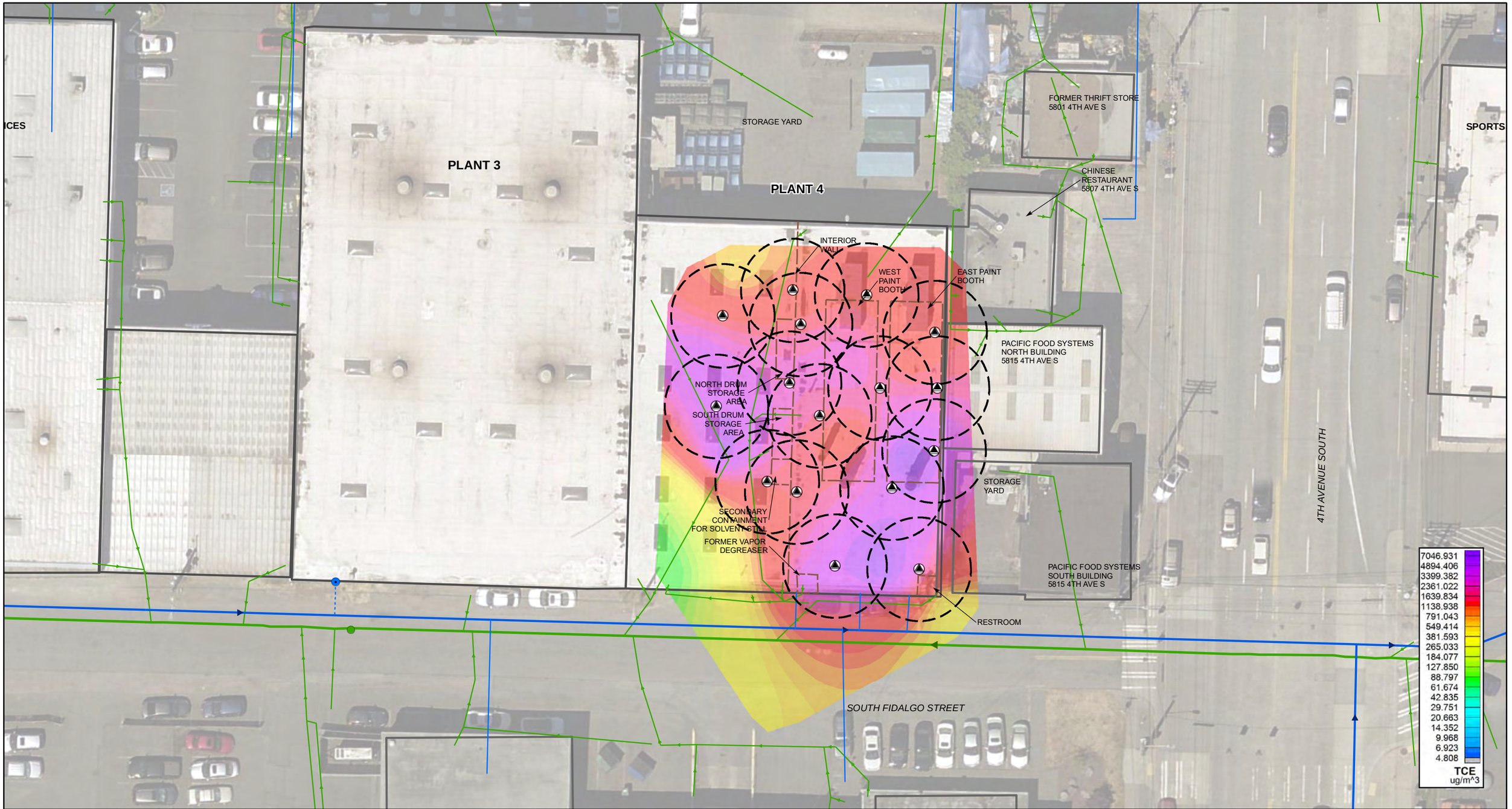

LEGEND

- 4-INCH DIAMETER VERTICAL SOIL VAPOR EXTRACTION (SVE) WELL
- SOIL VAPOR EXTRACTION RADIUS OF INFLUENCE
- HYDRANT
- DISTRIBUTION MAIN
- HYDRANT LATERAL
- WATER SERVICE LINE
- PLANT 4 INTERIOR FEATURE
- COMBINED SANITARY SEWER/ STORMWATER MANHOLE
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION

ALL LOCATIONS ARE APPROXIMATE. FIGURES WERE PRODUCED IN COLOR. GRAYSCALE COPIES MAY NOT REPRODUCE ALL ORIGINAL INFORMATION.

DRAFT

NOTES:
SOIL GAS RESULTS ARE IN MICROGRAMS PER CUBIC METER (µg/m^3)

CI = CAPITAL INDUSTRIES
ISCO = IN SITU CHEMICAL OXIDATION
TCE = TRICHLOROETHENE

N

0 30
SCALE IN FEET

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Oregon
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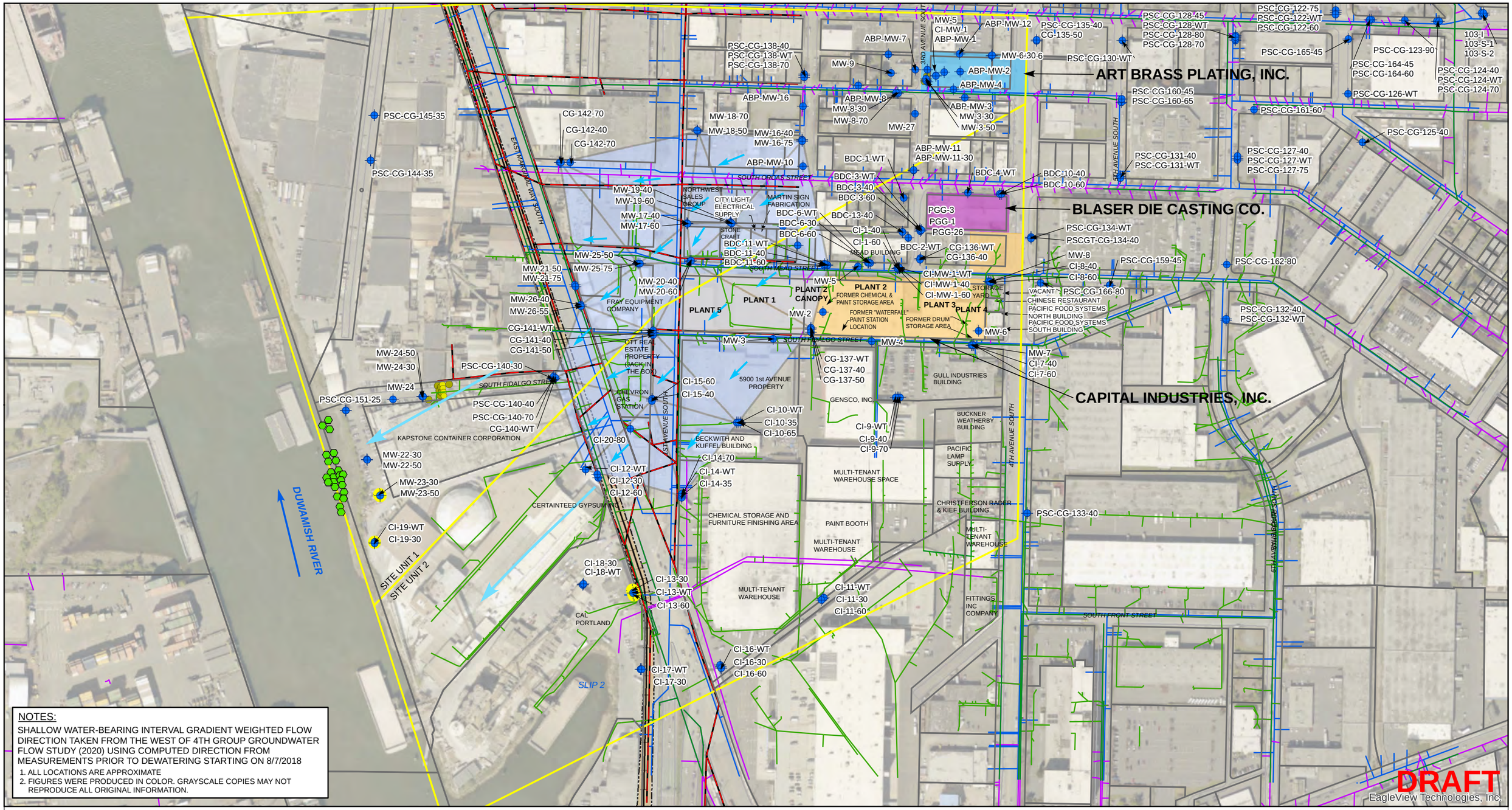
Oakland | Folsom | Irvine

FIGURE 6

ALTERNATIVE 1R CONCEPTUAL
VERTICAL SVE WELL LAYOUT
WEST OF 4TH GROUP SITE UNIT 2
SEATTLE, WASHINGTON

FARALLON PN: 457-010

Drawn By: jjones
Checked By: AM
Date: 12/28/2020
Disc Reference:
Path: Q:\Projects\457 CapitalIndust\010 Westof4th\Mapfiles\005 2020Nov\Figure-06_Concept_SVE_TCE_Plant4.mxd



NOTES:

SHALLOW WATER-BEARING INTERVAL GRADIENT WEIGHTED FLOW DIRECTION TAKEN FROM THE WEST OF 4TH GROUP GROUNDWATER FLOW STUDY (2020) USING COMPUTED DIRECTION FROM MEASUREMENTS PRIOR TO DEWATERING STARTING ON 8/7/2018

1. ALL LOCATIONS ARE APPROXIMATE
2. FIGURES WERE PRODUCED IN COLOR. GRAYSCALE COPIES MAY NOT REPRODUCE ALL ORIGINAL INFORMATION.

DRAFT

EagleView Technologies, Inc.

LEGEND

- MONITORING WELL
- MONITORING WELL PROPOSED TO DETERMINE WHETHER FUTURE CONTINGENCY ACTION EVALUATION AND IMPLEMENTATION IS NECESSARY
- SITE UNIT 1 (SU1) POREWATER SAMPLE POINT (2020)
- SU1 CVOC PILOT STUDY MONITORING POINT
- RAILWAY TRACKS
- WATER SERVICE LINE
- SANITARY SEWER MAIN LINE
- SANITARY SEWER LATERAL
- STORMWATER LINE
- OVERHEAD POWER LINES NEAR 1ST AVE OR EAST MARGINAL WAY
- SU1 CVOC PILOT STUDY INJECTION TRANSECT (2019)
- SITE UNIT BOUNDARY
- GROUNDWATER FLOW DATA UNIT (PACIFIC CREST 2020)
- KING COUNTY PARCEL BOUNDARY
- RAILWAY RIGHT OF WAY
- INTERPRETED GROUNDWATER
- SHALLOW WATER-BEARING ZONE GRADIENT WEIGHTED FLOW DIRECTION
- DUWAMISH RIVER FLOW DIRECTION

N

0 150 300

SCALE IN FEET

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FIGURE 7

CONTINGENCY ACTION EVALUATION
MONITORING WELLS
WEST OF 4th SITE UNIT 2
SEATTLE, WASHINGTON

FARALLON PN: 457-010

Drawn By: aguse | Checked By: JK | Date: 11/18/2022 | Disc Reference:

Path: O:\Projects\457 CapitalIndust\010 Westof4th\Mapfiles\005_2022_10\Figure-07_Contingency_Action_Evaluation_300x_v2.mxd

TABLES

WEST OF FOURTH SITE UNIT 2
FEASIBILITY STUDY ADDENDUM
West of Fourth Joint Agreed Order
Seattle, Washington

Farallon PN: 457-010

Table 1
Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Sample Location	Sample Identification	Date	Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
			PCE[1] (µg/l)	TCE[1] (µg/l)	cis-1,2-DCE[1] (µg/l)	trans-1,2-DCE[1] (µg/l)	1,1-DCE[1] (µg/l)	Vinyl Chloride[1] (µg/l)	1,4-Dioxane[1] (µg/l)	Ethane[2] (µg/l)	Ethene[2] (µg/l)	Ferrous Iron[3] (mg/l)	Methane[2] (µg/l)	Dissolved Oxygen[4] (µg/l)	Nitrate[5] (µg/l)	Sulfate[6] (µg/l)	Total Iron[7] (µg/l)	Total Manganese[3] (µg/l)	ORP[4] (mV)	pH[4]
Water Table Interval																				
Capital Industries																				
CG-137-WT	CG-137-WT-032316	3/23/2016	< 0.40	**7.2**	86	9.0	0.55	**2.3**	---	< 2.2	0.56	2.0	94	3	< 0.050	13	3,800	130	-24.5	6.46
	CG-137-WT-092116	9/21/2016	< 0.40	**7.5**	98	10	0.61	**0.67**	---	< 0.50	< 0.50	4.0	14	1.68	< 0.050	35	6,200	240	-67.1	6.44
	CG-137-WT-031920	3/19/2020	< 0.20	**1.5**	53	4.2	---	**1.3**	---	---	---	---	---	0.16	---	---	---	---	-28.8	6.67
	CG-137-WT-090821	9/8/2021	< 0.40	0.90	53	3.1	---	**0.42**	---	---	---	---	---	1.13	---	---	---	---	IE	6.87
CG-141-WT	CG-141-WT-092518	9/25/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	1.04	---	---	---	---	IE	6.32
	CG-141-WT-032219	3/22/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	0.5	---	IE	---	---	---	---	IE	7.69
	CG-141-WT-092519	9/25/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.10	---	---	---	0.5	---	2.64	---	---	---	---	-169.2	6.27
	CG-141-WT-092220	9/22/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.46	---	---	---	---	-4.2	6.39
	CG-141-WT-031621	3/16/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.79	---	---	---	---	146.8	6.37
	CG-141-WT-031622	3/16/2022	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	1.87	---	---	---	---	-8	6.34
CI-9-WT	CI-9-WT-032316	3/23/2016	2.7	**19**	3.0	< 0.20	< 0.20	< 0.20	---	< 0.74	< 0.50	< 0.2	24	0.07	2.8	29	1,300	140	40.8	6.03
	CI-9-WT-092016	9/20/2016	3.8	**24**	3.1	< 0.20	< 0.20	< 0.20	---	< 1.5	< 0.50	0.5	49	0.40	4.5	32	6,300	180	68.5	6.14
	CI-9-WT-032917	3/29/2017	9.6	**34**	3.4	< 0.20	---	< 0.20	---	---	---	---	---	0.29	---	---	---	---	135.8	5.88
	CI-9-WT-032118	3/21/2018	4.5	**21**	2.1	< 0.20	---	< 0.20	---	---	---	---	---	1.09	---	---	---	---	142.7	6.06
	CI-9-WT-032219	3/22/2019	2.6	**16**	1.8	< 0.20	---	< 0.20	---	---	---	0.5	---	IE	---	---	---	---	IE	6.48
	CI-9-WT-031820	3/18/2020	1.4	**12**	2.0	< 0.20	---	< 0.20	---	---	---	---	---	0.44	---	---	---	---	85.3	6.15
	CI-9-WT-031521	3/15/2021	1.8	**13**	1.1	< 0.20	⋯	< 0.20	---	---	---	---	---	1.07	---	---	---	---	182.6	6.24
	CI-9-WT-090821	9/8/2021	1.2	**9.7**	2.1	< 0.20	⋯	< 0.20	---	---	---	---	---	0.88	---	---	---	---	IE	6.12
	CI-9-WT-031722	3/17/2022	1.5	**12**	2.2	< 0.20	⋯	< 0.20	---	---	---	---	---	0.99	---	---	---	---	326.8	6.11
CI-10-WT	CI-10-WT-032416	3/24/2016	< 0.20	**23**	12	0.42	0.25	< 0.20	---	< 0.50	< 0.50	< 0.2	3.8	0.75	4.2	33	550	110	112.0	6.15
	CI-10-WT-092116	9/21/2016	< 0.40	**31**	81	2.3	0.45	< 0.40	---	1.5	< 0.50	< 0.2	27	0.28	1.1	43	4,400	610	102.5	6.22
	CI-10-WT-032917	3/29/2017	< 0.20	**24**	34	1.2	---	0.23	---	---	---	---	---	3.91	---	---	---	---	187.6	6.16
	CI-10-WT-032018	3/20/2018	< 0.40	**29**	52	1.6	---	< 0.40	---	---	---	---	---	1.01	---	---	---	---	33.6	6.17
	CI-10-WT-032019	3/20/2019	< 0.20	**26**	40	1.5	---	< 0.20	---	---	---	0.5	---	IE	---	---	---	---	IE	6.41
	CI-10-WT-031820	3/18/2020	< 0.20	**18**	36	1.4	---	< 0.20	---	---	---	---	---	0.44	---	---	---	---	66.6	6.36
	CI-10-WT-040521	4/5/2021	< 0.20	**17**	24	1.3	⋯	< 0.20	---	---	---	---	---	3.05	---	---	---	---	107.0	6.33
	CI-10-WT-090921	9/9/2021	< 0.40	**15**	50	1.3	⋯	< 0.40	---	---	---	---	---	2.82	---	---	---	---	IE	6.59
	CI-10-WT-031522	3/15/2022	< 0.20	**17**	8.1	0.76	⋯	< 0.20	---	---	---	---	---	2.75	---	---	---	---	-20.2	6.31
CI-11-WT	CI-11-WT-032316	3/23/2016	< 0.20	< 0.20	0.22	< 0.20	< 0.20	**0.61**	---	---	---	1.5	---	0.31	---	---	---	---	-115.4	6.42
	CI-11-WT-092519	9/25/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.10	---	---	---	---	---	7.09	---	---	---	---	25.3	6.47
	CI-11-WT-031622	3/16/2022	< 0.20	< 0.20	< 0.20	< 0.20	---	**0.57**	---	---	---	---	---	1.95	---	---	---	---	-123.8	6.56
CI-12-WT	CI-12-WT-092617	9/26/2017	< 0.20	0.21	< 0.20	< 0.20	---	< 0.20	---	---	---	1.5	---	0.32	---	---	---	---	61.4	6.30
	CI-12-WT-032018	3/20/2018	< 0.20	0.62	0.32	< 0.20	---	< 0.20	---	---	---	---	---	0.77	---	---	---	---	7.3	6.33
	CI-12-WT-092518	9/25/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	0.5	---	2.22	---	---	---	---	46.7	6.46
	CI-12-WT-031919	3/19/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	2.5	---	IE	---	---	---	---	IE	7.01
	CI-12-WT-092519	9/25/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.10	---	---	---	---	---	6.56	---	---	---	---	182.6	6.15
	CI-12-WT-031720	3/17/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	1.91	---	---	---	---	18.8	6.29
	CI-12-WT-092120	9/21/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	4.53	---	---	---	---	9.1	6.50
	CI-12-WT-040521	4/5/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	7.00	---	---	---	---	108.1	6.59
CI-13-WT	CI-13-WT-092016	9/20/2016	< 0.20	0.21	1.3	< 0.20	< 0.20	< 0.20	---	< 0.50	< 0.50	< 0.2	< 0.50	1.01	0.74	77	2,100	14	163.0	6.29
	DUP-1-092016	9/20/2016	< 0.20	< 0.20	1.1	< 0.20	< 0.20	< 0.20	---	---	---	---	---	---	---	---	---	---	---	---
	CI-13-WT-032817	3/28/2017	< 0.20	< 0.20	1.3	< 0.20	---	< 0.20	---	---	---	< 0.2	---	1.01	---	---	---	---	148.2	6.31
	CI-13-WT-032018	3/20/2018	< 0.20	< 0.20	0.34	< 0.20	---	< 0.20	---	---	---	---	---	1.44	---	---	---	---	79.7	6.40
	CI-13-WT-031919	3/19/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	0.5	---	IE	---	---	---	---	IE	6.92
	CI-13-WT-031720	3/17/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	5.83	---	---	---	---	40.5	6.62
	CI-13-WT-031621	3/16/2021	< 0.20	0.27	0.52	< 0.20	---	< 0.20	---	---	---	---	---	2.17	---	---	---	---	164.4	6.42

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Table 1
Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

			Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
Sample Location	**Sample Identification**	**Date**	**PCE[1]** (µg/l)	**TCE[1]** (µg/l)	**cis-1,2-DCE[1]** (µg/l)	**trans-1,2-DCE[1]** (µg/l)	**1,1-DCE[1]** (µg/l)	**Vinyl Chloride[1]** (µg/l)	**1,4-Dioxane[1]** (µg/l)	**Ethane[2]** (µg/l)	**Ethene[2]** (µg/l)	**Ferrous Iron[3]** (mg/l)	**Methane[2]** (µg/l)	**Dissolved Oxygen[4]** (µg/l)	**Nitrate[5]** (µg/l)	**Sulfate[6]** (µg/l)	**Total Iron[7]** (µg/l)	**Total Manganese[3]** (µg/l)	**ORP[4]** (mV)	**pH[4]**
CI-14-WT	CI-14-WT-032316	3/23/2016	< 0.20	**2.8**	4.1	0.21	< 0.20	< 0.20	---	< 0.50	< 0.50	0.20	3.5	2.17	3.6	31	290	63	-7.7	6.22
	CI-14-WT-092016	9/20/2016	< 0.20	**4.1**	13	0.5	0.35	< 0.20	---	< 0.50	< 0.50	0.5	2.6	2.86	6.3	29	4,000	400	1.6	6.21
	CI-14-WT-032817	3/28/2017	< 0.20	**3.0**	8.2	0.38	---	< 0.20	---	< 0.50	< 0.50	---	2.4	0.73	5.0	27	---	---	157.4	6.08
	CI-14-WT-032018	3/20/2018	< 0.20	**8.2**	13	0.57	---	< 0.20	---	< 0.50	< 0.50	< 0.2	1.5	2.39	4.0	39	---	---	149.1	6.23
	CI-14-WT-032019	3/20/2019	< 0.20	**4.2**	5.5	0.46	---	< 0.20	---	< 0.50	< 0.50	0.5	< 1.0	IE	5.7	39	---	---	IE	6.81
	CI-14-WT-031820	3/18/2020	< 0.20	**1.7**	2.2	< 0.20	---	< 0.20	---	---	---	---	---	3.85	---	---	---	---	59.2	6.43
	CI-14-WT-031621	3/16/2021	< 0.20	0.28	< 0.20	< 0.20	---	< 0.20	---	---	---	0	---	1.15	1.6	21	---	0	125.1	6.19
	CI-14-WT-090821	9/8/2021	< 0.20	0.90	0.24	< 0.20	---	< 0.20	---	---	---	---	---	0.73	---	---	---	---	IE	6.06
	CI-14-WT-031622	3/16/2022	< 0.20	0.83	0.55	< 0.20	---	< 0.20	---	<0.22	<0.29	---	1.7	2.55	3.7	38	---	---	-11.9	6.22
CI-16-WT	CI-16-WT-032316	3/23/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	2.3	---	8.69	---	---	---	---	-85.9	5.71
Preliminary Cleanup Levels-Water Table Interval			**25[8]**	**1.4[8]**	**NR[10]**	**77[8]**	**130[8]**	**0.33[8]**	**4,700[8]**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

Table 1
Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Sample Location	Sample Identification	Date	Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
			PCE[1] (µg/l)	TCE[1] (µg/l)	cis-1,2-DCE[1] (µg/l)	trans-1,2-DCE[1] (µg/l)	1,1-DCE[1] (µg/l)	Vinyl Chloride[1] (µg/l)	1,4-Dioxane[1] (µg/l)	Ethane[2] (µg/l)	Ethene[2] (µg/l)	Ferrous Iron[3] (mg/l)	Methane[2] (µg/l)	Dissolved Oxygen[4] (µg/l)	Nitrate[5] (µg/l)	Sulfate[6] (µg/l)	Total Iron[7] (µg/l)	Total Manganese[3] (µg/l)	ORP[4] (mV)	pH[4]
Water Table Interval (continued)																				
Capital Industries (continued)																				
CI-17-WT	CI-17-WT-032216	3/22/2016	7.1	**4.0**	2.7	< 0.20	< 0.20	**0.95**	---	< 250	< 0.68	1.75	270	7.33	< 0.050	86	4,300	310	-93.3	6.58
	CI-17-WT-092016	9/20/2016	< 0.20	0.24	2.1	< 0.20	< 0.20	**0.67**	---	< 66	< 5.4	2.0	7,700	0.43	2.0	< 5.0	35,000	460	-102.9	6.81
	CI-17-WT-032817	3/28/2017	9.1	**2.1**	2.5	< 0.20	---	**0.94**	---	---	---	---	---	0.16	---	---	---	---	-2.9	6.68
	CI-17-WT-032018	3/20/2018	0.21	1.3	1.9	< 0.20	---	**0.56**	---	---	---	---	---	0.66	---	---	---	---	-116.3	6.83
	CI-17-WT-032019	3/20/2019	< 0.20	0.96	2.7	< 0.20	---	**0.39**	---	---	---	3.5	---	IE	---	---	---	---	IE	6.70
	CI-17-WT-031720	3/17/2020	< 0.20	0.40	0.97	< 0.20	---	**0.76**	---	---	---	---	---	1.42	---	---	---	---	-75.8	6.9
	CI-17-WT-031521	3/15/2021	< 0.20	1.1	2.1	< 0.20	---	**0.34**	---	---	---	---	---	0.21	---	---	---	---	-81.2	6.63
	CI-17-WT-090821	9/8/2021	< 0.20	< 0.20	2.4	< 0.20	---	**0.90**	---	---	---	---	---	5.89	---	---	---	---	IE	7.11
	CI-17-WT-031622	3/16/2022	< 0.20	< 0.20	1.5	< 0.20	---	**0.47**	---	---	---	---	---	2.00	---	---	---	---	-150.7	6.88
CI-18-WT	CI-18-WT-032216	3/22/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	< 0.2	---	3.34	---	---	---	---	-87.6	6.05
	CI-18-WT-032817	3/28/2017	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	3.26	---	---	---	---	178.1	6.23
	CI-18-WT-032018	3/20/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	3.12	---	---	---	---	156.9	6.45
	CI-18-WT-032019	3/20/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	1.0	---	IE	---	---	---	---	IE	7.68
	CI-18-WT-031720	3/17/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	5.79	---	---	---	---	39.2	6.51
	CI-18-WT-031521	3/15/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	3.5	---	---	---	---	165.3	6.47
CI-19-WT	CI-19-WT-032216	3/22/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	0.3	---	0.19	---	---	---	---	-280.6	6.47
	CI-19-WT-033017	3/30/2017	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.15	---	---	---	---	-318.8	6.77
	CI-19-WT-032018	3/20/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	1.25	---	---	---	---	-201.6	6.81
	CI-19-WT-031919	3/19/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	0.5	---	IE	---	---	---	---	IE	6.64
	CI-19-WT-031720	3/17/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	1.74	---	---	---	---	-239.5	6.96
	CI-19-WT-031521	3/15/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.15	---	---	---	---	-279.6	7.03
CI-MW-1-WT	CI-MW-1-WT-092016	9/20/2016	0.171	**5.27**	18.6	0.292	0.041	0.0334	---	---	---	---	---	---	---	---	---	---	23	6.46
	CI-MW-1-WT-031920	3/19/2020	0.40	**4.1**	1.2	< 0.20	---	< 0.20	---	---	---	---	---	0.42	---	---	---	---	25.1	6.49
MW-2	MW-2-032316	3/23/2016	< 1.0	**12**	110	5.9	1.2	**1.5**	---	---	---	3.0	---	0.86	---	---	---	---	-19.3	6.27
	MW-2-092216	9/22/2016	< 1.0	< 1.0	92	4.4	< 0.20	**1.1**	---	---	---	1.5	---	0.30	---	---	---	---	-27.5	6.41
	MW-2-032917	3/29/2017	< 0.20	**26**	24	4.4	0.68	< 0.20	---	---	---	---	---	2.49	---	---	---	---	35.3	6.32
	CI-MW-2-032118	3/21/2018	< 0.40	**13**	49	5.4	0.6	**0.52**	---	---	---	---	---	1.18	---	---	---	---	5.8	6.41
	MW-2-032219	3/22/2019	< 0.20	**18**	19	6.3	---	< 0.20	---	---	---	0.5	---	IE	---	---	---	---	IE	7.11
	MW-2-031920	3/19/2020	< 0.20	**7.8**	21	2.6	---	< 0.20	---	---	---	---	---	3.80	---	---	---	---	34.2	6.65
	CI-MW-2-031621	3/16/2021	< 0.20	**5.9**	33	2.8	---	< 0.20	---	---	---	---	---	4.94	---	---	---	---	155.5	6.57
	MW-2-090821	9/8/2021	< 0.20	**5.1**	28	2.7	---	< 0.20	---	---	---	---	---	0.76	---	---	---	---	IE	6.51
	MW-2-031722	3/17/2022	< 0.20	**4.6**	32	2.2	---	< 0.20	---	---	---	---	---	5.4	---	---	---	---	-32.9	6.59
MW-3	MW-3-032316	3/23/2016	< 0.20	**5.4**	22	0.38	0.53	0.25	---	3.6	< 0.50	0.20	42	1.12	0.085	40	13,000	230	-65.3	6.27
	MW-3-032917	3/29/2017	< 0.20	**3.2**	6.0	< 0.20	< 0.20	< 0.20	---	---	---	---	---	0.73	---	---	---	---	37.2	6.25
	MW-3-032118	3/21/2018	< 0.20	**6.6**	15	0.24	< 0.20	< 0.20	---	---	---	---	---	1.51	---	---	---	---	48.2	6.16
	MW-3-032119	3/21/2019	< 0.20	**4.3**	15	< 0.20	---	< 0.20	---	---	---	1.0	---	IE	---	---	---	---	IE	6.53
	MW-3-031620	3/16/2020	< 0.20	**4.0**	7.0	< 0.20	---	< 0.20	---	---	---	---	---	0.76	---	---	---	---	48.3	6.25
	MW-3-092120	9/21/2020	< 0.20	**3.6**	8.8	< 0.20	---	< 0.20	---	---	---	---	---	3.03	---	---	---	---	-17.7	6.37
	MW-3-092120	9/21/2020	< 0.20	**3.6**	8.8	< 0.20	---	< 0.20	---	---	---	---	---	0.76	---	---	---	---	161.3	6.37
	MW-3-031521	3/15/2021	< 0.20	**3.4**	11	< 0.20	---	< 0.20	---	---	---	---	---	2.03	---	---	---	---	IE	6.5
	CI-MW-3-031522	3/15/2022	< 0.20	**2.5**	11	< 0.20	---	< 0.20	---	---	---	---	---	0.74	---	---	---	---	239.9	6.22
MW-4	MW-4-032416	3/24/2016	< 0.20	0.97	0.68	< 0.20	< 0.20	< 0.20	---	< 0.50	< 0.50	< 0.2	1.3	4.12	2.1	41	670	560	75.3	5.90
	MW-4-092216	9/22/2016	< 0.20	0.97	0.61	< 0.20	< 0.20	< 0.20	---	0.59	< 0.50	0.5	5.4	0.40	0.66	86	520	970	180.7	6.28
	MW-4-031920	3/19/2020	< 0.20	**1.5**	1.1	< 0.20	---	< 0.20	---	---	---	---	---	1.97	---	---	---	---	27.8	6.61
	MW-4-092220	9/22/2020	< 0.20	**2**	2.6	< 0.20	---	< 0.20	---	---	---	---	---	1.92	---	---	---	---	-15	6.3

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Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

			Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
Sample Location	**Sample Identification**	**Date**	**PCE[1]** (µg/l)	**TCE[1]** (µg/l)	**cis-1,2-DCE[1]** (µg/l)	**trans-1,2-DCE[1]** (µg/l)	**1,1-DCE[1]** (µg/l)	**Vinyl Chloride[1]** (µg/l)	**1,4-Dioxane[1]** (µg/l)	**Ethane[2]** (µg/l)	**Ethene[2]** (µg/l)	**Ferrous Iron[3]** (mg/l)	**Methane[2]** (µg/l)	**Dissolved Oxygen[4]** (µg/l)	**Nitrate[5]** (µg/l)	**Sulfate[6]** (µg/l)	**Total Iron[7]** (µg/l)	**Total Manganese[3]** (µg/l)	**ORP[4]** (mV)	**pH[4]**
MW-5	MW-5-032216	3/22/2016	< 0.40	**45**	24	0.66	< 1.0	**0.88**	---	5.2	< 0.50	2.0	96	2.20	< 0.050	35	5,700	510	33.7	6.28
	MW-5-092116	9/21/2016	---	---	---	---	---	---	---	1.5	< 0.50	4.0	28	0.22	< 0.050	50	20,000	560	-31.9	6.34
	MW-5-031820	3/18/2020	< 0.20	**20**	7.2	0.43	---	< 0.20	---	---	---	---	---	0.32	---	---	---	---	5.3	6.49
MW-6	MW-6-032216	3/22/2016	6.1	**1.9**	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	1.0	---	0.38	---	---	---	---	85.2	5.98
	MW-6-033017	3/30/2017	5.3	**2.6**	0.29	< 0.20	< 0.20	< 0.20	---	---	---	---	---	0.56	---	---	---	---	136.3	6.12
	MW-6-032118	3/21/2018	5.0	**2.6**	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	---	---	0.64	---	---	---	---	125.3	6.04
	MW-6-091818	9/18/2018	8.5	**5.5**	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.78	---	---	3,300	9,500	IE	6.96
	MW60-091818	9/18/2018	8.3	**5.1**	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	---	---	---	---	---	---	---
	MW-6-032219	3/22/2019	1.7	**2.1**	< 0.20	< 0.20	---	< 0.20	---	---	---	0.5	---	IE	---	---	---	---	IE	7.39
	MW-6-031920	3/19/2020	4.1	**2.2**	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.55	---	---	---	---	-7.3	7.14
	MW-6-031621	3/16/2021	3.6	**1.7**	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.30	---	---	---	---	111.6	6.22
	MW-6-031722	3/17/2022	2.6	**1.8**	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	2.04	---	---	---	---	-52.1	6.43
Preliminary Cleanup Levels-Water Table Interval			**25[8]**	**1.4[8]**	**NR[10]**	**77[8]**	**130[8]**	**0.33[8]**	**4,700[8]**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

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Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Sample Location	Sample Identification	Date	Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
			PCE[1] (µg/l)	TCE[1] (µg/l)	cis-1,2-DCE[1] (µg/l)	trans-1,2-DCE[1] (µg/l)	1,1-DCE[1] (µg/l)	Vinyl Chloride[1] (µg/l)	1,4-Dioxane[1] (µg/l)	Ethane[2] (µg/l)	Ethene[2] (µg/l)	Ferrous Iron[3] (mg/l)	Methane[2] (µg/l)	Dissolved Oxygen[4] (µg/l)	Nitrate[5] (µg/l)	Sulfate[6] (µg/l)	Total Iron[7] (µg/l)	Total Manganese[3] (µg/l)	ORP[4] (mV)	pH[4]
Water Table Interval (continued)																				
Capital Industries (continued)																				
MW-7	MW-7-032216	3/22/2016	30	**20**	1.4	< 0.20	< 0.20	< 0.20	---	0.99	< 0.50	1.0	9.2	2.94	2.1	36	8,000	68	74.4	5.92
	MW-7-092016	9/20/2016	8.8	**4.7**	2.4	< 0.20	0.39	0.23	---	8.0	< 0.50	2.0	60	0.38	6.3	48	70,000	210	17.8	6.06
	CI-MW-7-032917	3/29/2017	15	**10**	1.5	< 0.20	< 0.20	< 0.20	---	---	---	---	---	2.36	---	---	---	---	67.1	6.06
	MW-7-092617	9/26/2017	9.9	**5.7**	2.6	< 0.20	0.33	**0.55**	---	---	---	5.0	---	2.32	---	---	---	---	33.7	6.17
	CI-MW-7-032118	3/21/2018	14	**10**	1.4	< 0.20	< 0.20	< 0.20	---	---	---	---	---	2.15	---	---	---	---	90.4	6.11
	MW-7-092418	9/24/2018	5.9	**5.0**	3.9	< 0.20	---	**0.53**	---	---	---	5.5	---	1.15	---	---	---	---	IE	6.44
	MW-7-032119	3/21/2019	11	**8.3**	2.2	< 0.20	---	< 0.20	---	---	---	2.75	---	IE	---	---	---	---	IE	8.65
	DUP-1-032119	3/21/2019	10	**8.2**	2.3	< 0.20	---	< 0.20	---	---	---	---	---	---	---	---	---	---	---	---	---
	MW-7-092619	9/26/2019	5.9	**5.3**	0.80	< 0.20	---	< 0.10	---	---	---	---	---	6.60	---	---	---	---	50.7	6.73
	MW-7-031620	3/16/2020	17	**12**	0.64	< 0.20	---	< 0.20	---	---	---	---	---	3.04	---	---	---	---	41.2	6.55
	MW-7-092120	9/21/2020	14	**8.7**	0.53	< 0.20	---	< 0.20	---	---	---	---	---	3.26	---	---	---	---	-34	6.63
	MW-7-031521	3/15/2021	21	**14**	0.22	< 0.20	---	< 0.20	---	---	---	---	---	4.00	---	---	---	---	187.2	6.62
	MW-7-090721	9/7/2021	13	**7.1**	0.30	< 0.20	---	< 0.20	---	---	---	---	---	4.30	---	---	---	---	IE	6.7
	CI-MW-7-031522	3/15/2022	18	**11**	0.26	< 0.20	---	< 0.20	---	---	---	---	---	3.72	---	---	---	---	322.1	6.42
MW-8	MW-8-032216	3/22/2016	---	**---**	---	---	---	---	---	< 0.50	< 0.50	< 0.2	1.4	0.61	3.4	88	490	150	66.1	5.89
	MW-8-092016	9/20/2016	---	**---**	---	---	---	---	---	< 0.50	< 0.50	1.5	5.5	0.23	0.30	59	15,000	340	68.4	5.91
Blaser Die Casting																				
BDC-1-WT	BDC-1-WT-092116	9/21/2016	< 0.02	0.0212	0.0744	< 0.02	< 0.02	< 0.02	---	---	---	---	---	---	---	---	---	---	95	6.45
	BDC-1-WT-032819	3/28/2019	< 0.02	< 0.02	0.0265	< 0.02	< 0.02	< 0.02	---	---	---	---	---	0.4	---	---	---	---	89.1	6.19
	BDC-1-WT-090619	9/6/2019	< 0.02	< 0.02	0.0478	< 0.02	< 0.02	< 0.02	---	---	---	---	---	1.18	---	---	---	---	-9.4	5.68
	BDC-1-WT-042121	4/21/2021	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	---	---	---	---	---	---	---	---	---	---	---	---
BDC-2-WT	BDC-2-WT-032416	3/24/2016	< 0.02	**9.3**	6.4	0.68	0.14	**2.4**	---	---	---	---	---	---	---	---	---	---	15	6.63
	BDC-2-WT-091916B	9/19/2016	< 0.02	**11.8**	2.81	0.552	0.137	0.0641	---	---	---	---	---	---	---	---	---	---	39	6.54
	BDC-2-WT-032317	3/23/2017	< 0.02	**14.2**	16.3	1.31	0.217	**2.65**	---	---	---	---	---	0.45	---	---	---	---	39.4	6.28
	BDC-2-WT-031618	3/16/2018	< 0.02	**12.2 B**	5.29 B	1.01	0.152	0.16 M	---	---	---	---	---	0.51	---	---	---	---	116.1	5.69
	BDC-2-WT-032819	3/28/2019	< 0.02	**11**	10.8	1.42	0.156	**1.4**	---	---	---	---	---	0.08	---	---	---	---	-38.9	6.68
	BDC-2-WT-090619	9/6/2019	< 0.02	**7.94**	7.77	0.987	0.143	0.74	---	---	---	---	---	0.21	---	---	---	---	-7.8	5.92
	BDC-2-WT-042121	4/21/2021	< 0.02	**12.7**	14.3	1.21	0.211	**1.56**	---	---	---	---	---	---	---	---	---	---	---	---
	BDC-2-WT-032522	3/25/2022	< 0.02	**9.18**	15.3	1.03	0.125	**3.03**	---	---	---	---	---	---	---	---	---	---	---	---
BDC-3-WT	BDC-3-WT-032416	3/24/2016	< 0.02	**15**	17	2	0.15	**1.7**	---	---	---	---	---	---	---	---	---	---	-17	6.64
	BDC-3-WT-092016	9/20/2016	< 0.02	**17**	24.7	3.4	0.168	**0.432**	---	---	---	---	---	---	---	---	---	---	-16	6.6
BDC-4-WT	BDC-4-WT-032416	3/24/2016	< 0.02	< 0.02	0.036	< 0.02	< 0.02	< 0.02	---	---	---	---	---	---	---	---	---	---	36	6.14
	BDC-4-WT-092016	9/20/2016	< 0.02	0.0305	0.0624	< 0.02	< 0.02	< 0.02	---	---	---	---	---	---	---	---	---	---	18	6.33
BDC-6-WT	BDC-6-WT-032516	3/25/2016	< 0.02	**97**	42	3.9	1.0	**2.2**	---	---	---	---	---	---	---	---	---	---	7	6.57
	BDC-6-WT-092116	9/21/2016	< 0.02	**86.6**	35.3	4.37	1.55	**0.799**	---	---	---	---	---	---	---	---	---	---	37	6.42
	BDC-6-WT-032317	3/23/2017	< 0.02	**70.1**	40.1	3.32	1.35	1.06	---	---	---	---	---	0.19	---	---	---	---	46.6	6.15
	BDC-6-WT-031618	3/16/2018	< 0.02	**54.4 B**	33.4 B	3.42	0.807	**1.48**	---	---	---	---	---	0.66	---	---	---	---	115.9	5.68
	BDC-6-WT-032819	3/28/2019	< 0.02	**72.8**	44.4	5.35	1.24	**1.35**	---	---	---	---	---	0.2	---	---	---	---	171.1	3.51
	BDC-6-WT-042621	4/26/2021	0.0236	**50.5**	27.9	3.58	1.08	0.651	---	---	---	---	---	---	---	---	---	---	---	---
	BDC-6-WT-032522	3/25/2022	<0.02	**42.6**	23.7	2.41	0.748	0.731	---	---	---	---	---	---	---	---	---	---	---	---
BDC-11-WT	BDC-11-WT-032416	3/24/2016	< 0.02	< 0.02	0.071	< 0.02	< 0.02	< 0.02	---	---	---	---	---	---	---	---	---	---	6	6.48
	BDC-11-WT-091916B	9/19/2016	< 0.02	0.0613	0.176	< 0.02	< 0.02	< 0.02	---	---	---	---	---	---	---	---	---	---	-39	6.29
BDC-14-WT	BDC-14-WT-022519	2/25/2019	< 0.02	< 0.02	0.0238	< 0.02	< 0.02	< 0.02	---	---	---	---	---	1	---	---	---	---	21.1	6.34
	BDC-14-WT-092719	9/27/2019	< 0.02	< 0.02	0.0352	< 0.02	< 0.02	< 0.02	---	---	---	---	---	3.63	---	---	---	---	32	6.26

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			Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
Sample Location	**Sample Identification**	**Date**	**PCE[1]** (µg/l)	**TCE[1]** (µg/l)	**cis-1,2-DCE[1]** (µg/l)	**trans-1,2-DCE[1]** (µg/l)	**1,1-DCE[1]** (µg/l)	**Vinyl Chloride[1]** (µg/l)	**1,4-Dioxane[1]** (µg/l)	**Ethane[2]** (µg/l)	**Ethene[2]** (µg/l)	**Ferrous Iron[3]** (mg/l)	**Methane[2]** (µg/l)	**Dissolved Oxygen[4]** (µg/l)	**Nitrate[5]** (µg/l)	**Sulfate[6]** (µg/l)	**Total Iron[7]** (µg/l)	**Total Manganese[3]** (µg/l)	**ORP[4]** (mV)	**pH[4]**
BDC-15-WT	BDC-15-WT-022519	2/25/2019	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	---	---	---	---	---	2	---	---	---	---	12.2	6.53
	BDC-15-WT-092719	9/27/2019	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	---	---	---	---	---	1.52	---	---	---	---	77.7	6.25
CG-136-WT	CG-136-WT-091916B	9/19/2016	0.614	**8.12**	19.7	0.575	0.0425	0.0285	---	---	---	---	---	---	---	---	---	---	127	6.3
Preliminary Cleanup Levels-Water Table Interval			**25[8]**	**1.4[8]**	**NR[10]**	**77[8]**	**130[8]**	**0.33[8]**	**4,700[8]**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

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Farallon PN: 457-010

Sample Location	Sample Identification	Date	Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
			PCE[1] (µg/l)	TCE[1] (µg/l)	cis-1,2-DCE[1] (µg/l)	trans-1,2-DCE[1] (µg/l)	1,1-DCE[1] (µg/l)	Vinyl Chloride[1] (µg/l)	1,4-Dioxane[1] (µg/l)	Ethane[2] (µg/l)	Ethene[2] (µg/l)	Ferrous Iron[3] (mg/l)	Methane[2] (µg/l)	Dissolved Oxygen[4] (µg/l)	Nitrate[5] (µg/l)	Sulfate[6] (µg/l)	Total Iron[7] (µg/l)	Total Manganese[3] (µg/l)	ORP[4] (mV)	pH[4]
Shallow Interval																				
Capital Industries																				
CG-137-40	CG-137-40-032316	3/23/2016	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	**50**	---	250	18	2.0	1,700	3.72	< 0.050	< 5.0	6,700	500	-48.1	6.51
	CG-137-40-092216	9/22/2016	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	**34**	---	65	21	2.5	2,000	0.40	< 0.050	< 5.0	9,100	540	-47.5	6.60
	CG-137-40-031920	3/19/2020	< 0.20	< 0.20	0.21	< 0.20	---	**29**	---	---	---	---	---	0.31	---	---	---	---	-64.2	6.77
	CG-137-40-031521	3/15/2021	< 0.20	< 0.20	0.29	< 0.20	---	**17**	---	---	---	---	---	0.72	---	---	---	---	64.1	6.69
	CG-137-40-090821	9/8/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	**20**	---	---	---	---	---	1.64	---	---	---	---	IE	6.87
	CG-137-40-031722	3/17/2022	< 0.20	< 0.20	0.53	< 0.20	---	**15**	---	---	---	---	---	0.35	---	---	---	---	29.7	6.6
CG-141-40	CG-141-40-032416	3/24/2016	< 0.20	< 0.20	0.35	< 0.20	< 0.20	**20**	---	< 20	17	2.0	2300	9.05	< 0.050	53	17,000	850	-29.4	5.97
	CG-141-40-092116	9/21/2016	< 1.0	< 1.0	2.1	< 1.0	< 1.0	**150**	---	< 120	180	2.0	8,000	0.19	< 0.050	42	23,000	870	-53.4	6.43
	CG-141-40-032917	3/29/2017	< 1.0	< 1.0	1.6	< 1.0	---	**130**	---	---	---	---	---	0.07	---	---	---	---	-54.6	6.19
	CG-141-40-092617	9/26/2017	< 1.0	< 1.0	1.5	< 1.0	---	**130**	---	< 500	120	1.75	3,800	0.22	< 0.050	35	---	---	-54.9	6.19
	CG-141-40-032118	3/21/2018	< 1.0	< 1.0	1.7	< 1.0	---	**130**	---	< 500	80	5.5	4,400	0.39	0.090	27	---	---	-52.7	6.46
	CG-141-40-092518	9/25/2018	< 1.0	< 1.0	1.9	< 1.0	---	**100**	---	< 130	57	2.5	2,200	1.14	< 0.050	27	---	---	-38.1	6.46
	CG-141-40-032219	3/22/2019	< 1.0	< 1.0	1.7	< 1.0	---	**120**	---	120	< 500	2.5	8,100	IE	0.084	20	---	---	IE	6.63
	CG-141-40-092519	9/25/2019	< 1.0	< 1.0	1.8	< 1.0	---	**97**	---	< 250	50	2.0	2,800	2.69	0.079	19	---	---	-191.4	6.52
	CG-141-40-031820	3/18/2020	< 1.0	< 1.0	2.4	< 1.0	---	**120**	---	120	48	3.0	4,200	0.21	0.098	17	---	---	-55.7	6.56
	CG-141-40-092220	9/22/2020	< 1.0	< 1.0	2.5	< 1.0	---	**89**	---	160	120	4.0	6,200	0.35	< 0.050	16	---	---	-68.8	6.43
	CG-141-40-031621	3/16/2021	< 0.80	< 0.80	3.8	< 0.80	---	**85**	---	37	8.0	2.0	2,600	0.76	< 0.050	11	---	---	11	6.50
	CG-141-40-090821	9/8/2021	< 0.40	< 0.40	2.8	< 0.40	---	**66**	---	58	8.8	3.0	1,600	1.90	0.070	12	---	---	12	6.70
	CG-141-40-031622	3/16/2022	< 0.40	< 0.40	5.0	< 0.40	---	**81**	---	180	17	2.0	4,700	1.10	< 0.050	8.6	---	---	8.6	6.44
CI-7-40	CI-7-40-032216	3/22/2016	< 0.20	< 0.20	1.2	< 0.20	< 0.20	**0.96**	---	---	---	5.0	---	IE	---	---	---	---	-50.4	6.47
	CI-7-40-092016	9/20/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	**0.78**	---	---	---	---	---	0.23	---	---	---	---	-75.0	6.64
	CI-7-40-031620	3/16/2020	< 0.20	< 0.20	1.6	< 0.20	---	**1.8**	---	---	---	---	---	0.39	---	---	---	---	-72.1	6.75
CI-8-40	CI-8-40-032216	3/22/2016	< 0.20	< 0.20	20	< 0.20	0.43	**10**	---	480	2.0	2.0	4100	0.21	< 0.050	< 25	21,000	900	-56.2	6.43
	CI-8-40-092016	9/20/2016	---	---	---	---	---	---	---	360	1.3	4.0	6,700	0.21	< 0.050	< 10	37	1	-73.1	6.62
	CI-8-40-031820	3/18/2020	< 0.20	< 0.20	27	< 0.20	---	**9.5**	---	---	---	---	---	0.40	---	---	---	---	-64.6	6.67
CI-9-40	CI-9-40-032316	3/23/2016	< 0.20	< 0.20	5.6	< 0.20	< 0.20	**0.55**	---	< 13	< 1.2	3.5	590	0.85	< 0.050	15	12,000	390	-59.5	6.34
	CI-9-40-092016	9/20/2016	---	---	---	---	---	---	---	< 9.1	< 1.6	3.5	990	0.29	< 0.050	5.6	15,000	390	-73.5	6.60
	CI-9-40-031820	3/18/2020	< 0.20	< 0.20	5.9	< 0.20	---	**0.71**	---	---	---	---	---	0.36	---	---	---	---	-45.7	6.51
CI-10-35	CI-10-35-032416	3/24/2016	< 0.20	**21**	5.4	0.48	< 0.20	**8.0**	---	---	---	5.0	---	0.65	---	---	---	---	-17.8	6.30
	CI-10-35-092116	9/21/2016	< 0.20	**17**	5.5	0.45	< 0.20	**11**	---	---	---	---	---	0.46	---	---	---	---	-54.0	6.40
	CI-10-35-032917	3/29/2017	< 0.20	**23**	10	0.54	---	**5.9**	---	---	---	---	---	0.26	---	---	---	---	-56.5	6.34
	CI-10-35-032018	3/20/2018	< 0.20	**22**	15	0.50	---	**7.3**	---	---	---	---	---	0.63	---	---	---	---	-66.7	6.32
	CI-10-35-032019	3/20/2019	< 0.20	**16**	29	0.56	---	**6.3**	---	---	---	2.5	---	IE	---	---	---	---	IE	6.35
	CI-10-35-031820	3/18/2020	< 0.40	**7.9**	50	0.55	---	**6.0**	---	---	---	---	---	1.44	---	---	---	---	-34.5	6.44
	CI-10-35-040521	4/5/2021	< 0.40	**3.8**	63	0.55	---	**3.3**	---	---	---	---	---	1.29	---	---	---	---	-7.1	6.45
	CI-10-35-090921	9/9/2021	< 0.40	**2.0**	47	< 0.40	---	**4.0**	---	---	---	---	---	3.84	---	---	---	---	IE	6.61
	CI-10-35-031522	3/15/2022	< 0.40	**2.1**	51	0.44	---	**3.8**	---	---	---	---	---	5.01	---	---	---	---	-61.4	6.50
CI-11-30	CI-11-30-032316	3/23/2016	< 0.20	< 0.20	0.28	< 0.20	< 0.20	**1.0**	---	< 100	< 12	1.8	7400	7.90	< 0.050	< 25	46,000	840	-124.3	6.40
	CI-11-30-092116	9/21/2016	---	---	---	---	---	---	---	< 110	< 12	2.0	7,000	0.45	< 0.050	< 25	43,000	800	-99.2	6.58
	CI-11-30-031820	3/18/2020	< 0.20	< 0.20	0.22	< 0.20	---	< 0.20	---	---	---	---	---	4.18	---	---	---	---	-92.4	6.81
CI-12-30	CI-12-30-032216	3/22/2016	< 0.20	< 0.20	0.34	< 0.20	< 0.20	**1.3**	---	< 50	< 0.50	3.0	220	0.11	0.063	83	13,000	390	-225.6	6.47
	CI-12-30-092016	9/20/2016	< 0.20	< 0.20	1.0	< 0.20	< 0.20	**1.7**	---	5	< 0.50	3.5	130	2.92	< 0.050	28	25,000	730	-57.0	6.41

Table 1
Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

			Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
Sample Location	**Sample Identification**	**Date**	**PCE[1]** (µg/l)	**TCE[1]** (µg/l)	**cis-1,2-DCE[1]** (µg/l)	**trans-1,2-DCE[1]** (µg/l)	**1,1-DCE[1]** (µg/l)	**Vinyl Chloride[1]** (µg/l)	**1,4-Dioxane[1]** (µg/l)	**Ethane[2]** (µg/l)	**Ethene[2]** (µg/l)	**Ferrous Iron[3]** (mg/l)	**Methane[2]** (µg/l)	**Dissolved Oxygen[4]** (µg/l)	**Nitrate[5]** (µg/l)	**Sulfate[6]** (µg/l)	**Total Iron[7]** (µg/l)	**Total Manganese[3]** (µg/l)	**ORP[4]** (mV)	**pH[4]**
CI-12-35	CI-12-35-032718	3/27/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	**4.7**	---	---	---	---	---	11.25	---	---	---	---	-33.5	6.89
	CI-12-35-092518	9/25/2018	< 0.20	< 0.20	0.30	< 0.20	---	**6.9**	---	---	---	4.5	---	1.49	---	---	---	---	-46.5	6.43
	CI-12-35-031919	3/19/2019	< 0.20	< 0.20	0.22	< 0.20	---	**3.2**	---	---	---	2.0	---	IE	---	---	---	---	IE	6.90
	CI-12-35-092519	9/25/2019	< 0.20	< 0.20	0.25	< 0.20	---	**0.84**	---	---	---	---	---	5.95	---	---	---	---	-35.2	6.44
	CI-12-35-031720	3/17/2020	< 0.20	< 0.20	0.27	< 0.20	---	**2.1**	---	---	---	---	---	0.46	---	---	---	---	-72.5	6.61
	CI-12-35-092120	9/21/2020	< 0.20	< 0.20	0.26	< 0.20	---	**1.3**	---	---	---	---	---	0.4	---	---	---	---	-67.9	6.49
	CI-12-35-031621	3/16/2021	< 0.20	< 0.20	0.24	< 0.20	---	**4.7**	---	---	---	---	---	0.59	---	---	---	---	60.9	6.47
	CI-12-35-090921	9/9/2021	< 0.20	< 0.20	0.24	< 0.20	---	**2.5**	---	---	---	---	---	1.23	---	---	---	---	IE	6.49
CI-13-30	CI-13-30-032216	3/22/2016	< 0.40	**1.4**	69	0.49	0.93	**0.64**	---	---	---	< 0.2	---	8.07	---	---	---	---	-120.1	6.35
	DUP-1-032216	3/22/2016	< 0.40	**1.4**	68	0.49	0.90	**0.65**	---	---	---	---	---	---	---	---	---	---	---	---
	CI-13-30-032817	3/28/2017	< 0.40	**1.4**	54	0.50	---	**0.70**	---	< 3.9	< 0.68	2.5	140	0.22	< 0.050	33	---	---	-23.8	6.35
	CI-13-30-032018	3/20/2018	< 0.40	**2.1**	60	0.51	---	**0.49**	---	< 5.0	< 5.0	1.75	63	0.39	0.19	57	---	---	-18.5	6.40
	CI-13-30-031919	3/19/2019	< 0.20	**1.6**	60	0.59	---	**0.56**	---	< 3.0	< 3.0	3.5	64	IE	< 0.050	51	---	---	IE	6.71
	CI-13-30-031720	3/17/2020	< 0.20	**1.1**	25	0.33	---	**0.46**	---	---	---	---	---	2.30	---	---	---	---	-21.0	6.57
	CI-13-30-031621	3/16/2021	< 0.20	**1.6**	27	0.36	---	**0.60**	---	< 0.22	< 0.29	4.6	5.2	0.88	< 0.050	70	---	---	90.9	6.51
	CI-13-30-090821	9/8/2021	< 0.20	**1.4**	22	0.27	---	**0.96**	---	< 0.22	< 0.29	2.3	6.8	1.32	< 0.050	41	---	---	IE	6.44
	CI-13-30-031622	3/16/2022	< 0.20	**1.3**	31	0.39	---	**1.2**	---	< 0.22	< 0.29	2.5	27	1.91	0.060	59	---	---	123.4	6.44
Preliminary Cleanup Levels-Shallow Interval			**2.9[9]**	**0.7[9]**	**NR[10]**	**1,000[9]**	**4,000[9]**	**0.18[9]**	**78[9]**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

Table 1
Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Sample Location	Sample Identification	Date	Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
			PCE[1] (µg/l)	TCE[1] (µg/l)	cis-1,2-DCE[1] (µg/l)	trans-1,2-DCE[1] (µg/l)	1,1-DCE[1] (µg/l)	Vinyl Chloride[1] (µg/l)	1,4-Dioxane[1] (µg/l)	Ethane[2] (µg/l)	Ethene[2] (µg/l)	Ferrous Iron[3] (mg/l)	Methane[2] (µg/l)	Dissolved Oxygen[4] (µg/l)	Nitrate[5] (µg/l)	Sulfate[6] (µg/l)	Total Iron[7] (µg/l)	Total Manganese[3] (µg/l)	ORP[4] (mV)	pH[4]
Shallow Interval (continued)																				
Capital Industries (continued)																				
CI-14-35	CI-14-35-032316	3/23/2016	< 0.40	**14**	68	1.0	< 0.40	**1.2**	---	9.0	< 0.50	3.0	110	0.48	1.1	31	19,000	390	-76.4	6.36
	CI-14-35-092116	9/21/2016	< 0.20	0.52	22	< 0.20	< 0.20	< 0.20	---	8.7	< 0.50	2.0	74	0.71	< 0.050	28	21,000	350	-59.1	6.41
	CI-14-35-032817	3/28/2017	< 0.40	**13**	67	1.1	---	**1.2**	---	18	< 0.57	2.0	120	0.64	< 0.050	31	---	---	-37.6	6.32
	CI-14-35-092617	9/26/2017	< 1.0	**4.1**	110	1.3	---	**1.3**	---	---	---	---	---	0.11	---	---	---	---	-47.8	6.17
	CI-14-35-032018	3/20/2018	< 0.20	**2.3**	150	1.1	---	**1.2**	---	11	< 7.5	2.5	92	1.96	0.23	28	---	---	-32.7	6.42
	CI-14-35-092518	9/25/2018	< 1.0	**2.5**	160	1.3	---	**1.5**	---	---	---	---	---	0.60	---	---	---	---	IE	6.03
	CI-14-35-032019	3/20/2019	< 1.0	**2.5**	98	1.1	---	**1.0**	---	< 15	< 15	1.75	230	IE	0.094	28	---	---	IE	6.43
	CI-14-35-092519	9/25/2019	< 0.40	**2.2**	87	0.84	---	**1.6**	---	---	---	4.5	---	2.34	---	---	---	---	-175.6	6.49
	DUP-1-092519	9/25/2019	< 0.40	**2.4**	88	0.90	---	**1.7**	---	---	---	---	---	---	---	---	---	---	---	---	---
	CI-14-35-031820	3/18/2020	< 1.0	**1.1**	95	< 1.0	---	**1.5**	---	---	---	---	---	4.20	---	---	---	---	-29.7	6.56
	CI-14-35-092220	9/22/2020	< 1.0	< 1.0	120	1.1	---	**1.0**	---	---	---	---	---	1.47	---	---	---	---	-50.3	6.42
	CI-14-35-031621	3/16/2021	< 0.40	0.52	76	0.68	---	**0.89**	---	1.8	0.30	4.0	0.0	0.98	0.052	27	---	---	-31.6	6.37
	CI-14-35-090821	9/8/2021	< 0.80	< 0.80	120	0.86	---	**0.92**	---	0.84	< 0.29	3.5	0.0	3.67	0.060	48	---	---	IE	6.70
	CI-14-35-031622	3/16/2022	< 0.80	< 0.80	110	0.82	---	**1.2**	---	6.8	< 0.29	1.5	0.0	0.75	< 0.050	36	---	---	5.6	6.37
CI-15-40	CI-15-40-032416	3/24/2016	< 0.20	< 0.20	2.9	< 0.20	< 0.20	**0.91**	---	---	---	4.0	---	0.10	---	---	---	---	-36.9	6.17
	DUP-3-032416	3/24/2016	< 0.20	< 0.20	2.9	< 0.20	< 0.20	**0.96**	---	---	---	---	---	---	---	---	---	---	---	---
	CI-15-40-092116	9/21/2016	< 0.20	< 0.20	5.8	< 0.20	< 0.20	**0.81**	---	---	---	1.5	---	0.87	---	---	---	---	-29.2	6.37
	CI-15-40-031820	3/18/2020	< 0.20	< 0.20	8.4	< 0.20	---	**2.6**	---	26	< 0.29	2.5	470	3.95	0.15	49	---	---	-39.8	6.57
	CI-15-40-090821	9/8/2021	< 0.20	< 0.20	8.0	< 0.20	---	**0.60**	---	---	---	---	---	1.38	---	---	---	---	IE	6.51
CI-16-30	CI-16-30-032316	3/23/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	2.5	---	0.29	---	---	---	---	-108.5	6.35
	CI-16-30-031820	3/18/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	**0.26**	---	---	---	---	---	1.81	---	---	---	---	-76.4	6.57
CI-17-30	CI-17-30-032216	3/22/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	**0.38**	---	---	---	2.0	---	4.37	---	---	---	---	-135.3	6.62
	DUP-2-032216	3/22/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	**0.36**	---	---	---	---	---	---	---	---	---	---	---	---
	CI-17-30-032817	3/28/2017	< 0.20	< 0.20	< 0.20	< 0.20	---	**0.72**	---	---	---	---	---	0.14	---	---	---	---	-148.6	6.69
	CI-17-30-032018	3/20/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	**0.50**	---	---	---	---	---	0.41	---	---	---	---	-124.3	6.71
	CI-17-30-032019	3/20/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	**0.86**	---	---	---	1.5	---	IE	---	---	---	---	IE	6.95
	CI-17-30-031820	3/18/2020	< 0.20	< 0.20	13	< 0.20	---	**7.5**	---	---	---	---	---	2.80	---	---	---	---	-110.6	6.79
	CI-17-30-031521	3/15/2021	< 0.20	< 0.20	29	0.24	---	**17**	---	---	---	---	---	0.20	---	---	---	---	-157.1	6.73
	CI-17-30-090821	9/8/2021	< 0.20	< 0.20	35	0.27	---	**13**	---	---	---	---	---	1.00	---	---	---	---	IE	7.11
	CI-17-30-031622	3/16/2022	< 0.20	< 0.20	34	0.36	---	**26**	---	---	---	---	---	0.94	---	---	---	---	-62.1	6.71
CI-18-30	CI-18-30-032216	3/22/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	< 5.0	< 0.50	1.5	59	0.26	< 0.050	85	2,600	140	-121.3	6.25
	CI-18-30-092016	9/20/2016	---	---	---	---	---	---	---	< 68	< 4.9	2.5	5,100	1.79	< 0.050	59	51,000	450	22.5	6.47
	CI-18-30-032817	3/28/2017	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.15	---	---	---	---	45.4	6.15
	CI-18-30-032018	3/20/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.39	---	---	---	---	54.1	6.36
	CI-18-30-032019	3/20/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	0.5	---	IE	---	---	---	---	IE	6.49
	CI-18-30-031720	3/17/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	6.95	---	---	---	---	6.7	6.62
	CI-18-30-031521	3/15/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.20	---	---	---	---	28.8	6.39

Table 1
Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

			Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
Sample Location	**Sample Identification**	**Date**	**PCE[1]** (µg/l)	**TCE[1]** (µg/l)	**cis-1,2-DCE[1]** (µg/l)	**trans-1,2-DCE[1]** (µg/l)	**1,1-DCE[1]** (µg/l)	**Vinyl Chloride[1]** (µg/l)	**1,4-Dioxane[1]** (µg/l)	**Ethane[2]** (µg/l)	**Ethene[2]** (µg/l)	**Ferrous Iron[3]** (mg/l)	**Methane[2]** (µg/l)	**Dissolved Oxygen[4]** (µg/l)	**Nitrate[5]** (µg/l)	**Sulfate[6]** (µg/l)	**Total Iron[7]** (µg/l)	**Total Manganese[3]** (µg/l)	**ORP[4]** (mV)	**pH[4]**
CI-19-30	CI-19-30-032216	3/22/2016	< 0.20	< 0.20	1.9	< 0.20	< 0.20	**1.1**	---	< 130	< 2.1	1.5	1,200	1.53	< 0.050	30	2,000	310	-177.8	6.15
	CI-19-30-092016	9/20/2016	< 0.20	< 0.20	1.7	< 0.20	< 0.20	**0.97**	---	< 20	< 1.7	0.5	1,200	1.47	< 0.050	30	12,000	380	-35.4	6.62
	DUP-2-092016	9/20/2016	< 0.20	< 0.20	1.6	< 0.20	---	**0.91**	---	---	---	---	---	---	---	---	---	---	---	---
	CI-19-30-033017	3/30/2017	< 0.20	< 0.20	1.5	< 0.20	---	**6.3**	---	---	---	---	---	0.09	---	---	---	---	-277.6	7.01
	CI-19-30-092617	9/26/2017	< 0.20	< 0.20	1.8	< 0.20	---	**8.5**	---	---	---	1.0	---	0.13	---	---	---	---	-58.0	6.73
	CI-19-30-032018	3/20/2018	< 0.20	< 0.20	1.3	< 0.20	---	**13**	---	---	---	---	---	0.74	---	---	---	---	-66.9	6.68
	CI-19-30-092418	9/24/2018	< 0.20	< 0.20	1.6	< 0.20	---	**10**	---	---	---	0.5	---	1.00	---	---	---	---	-29.5	6.71
	CI-19-30-031919	3/19/2019	< 0.20	< 0.20	1.2	< 0.20	---	**10**	---	---	---	0.5	---	IE	---	---	---	---	IE	7.10
	CI-19-30-092519	9/25/2019	< 0.20	< 0.20	1.1	< 0.20	---	**19**	---	---	---	---	---	5.22	---	---	---	---	25.4	6.76
	CI-19-30-031720	3/17/2020	< 0.20	< 0.20	0.80	< 0.20	---	**15**	---	---	---	---	---	1.37	---	---	---	---	-12.0	6.96
	CI-19-30-092220	9/22/2020	< 0.20	< 0.20	0.88	< 0.20	---	**3.6**	---	---	---	---	---	0.62	---	---	---	---	-57.2	6.78
	CI-19-30-031521	3/15/2021	< 0.20	< 0.20	0.86	< 0.20	---	**6.6**	---	---	---	---	---	0.62	---	---	---	---	123.5	6.77
	CI-19-30-090921	9/9/2021	< 0.20	< 0.20	0.88	< 0.20	---	**2.0**	---	< 0.22	< 0.29	---	170	2.73	< 0.050	73	---	---	IE	7.07
	CI-19-30-031722	3/17/2022	< 0.20	< 0.20	0.93	< 0.20	---	**4.6**	---	---	---	---	---	1.06	---	---	---	---	236.3	6.68
CI-MW-1-40	CI-MW-1-40-092016	9/20/2016	< 0.02	0.0412	0.0423	< 0.02	< 0.02	**0.266**	---	---	---	---	---	---	---	---	---	---	-57	7.13
	CI-MW-1-40-031920	3/19/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	3.94	---	---	---	---	-99.6	7.06
Preliminary Cleanup Levels-Shallow Interval			**2.9[9]**	**0.7[9]**	**NR[10]**	**1,000[9]**	**4,000[9]**	**0.18[9]**	**78[9]**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

Table 1
Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Sample Location	Sample Identification	Date	Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
			PCE[1] (µg/l)	TCE[1] (µg/l)	cis-1,2-DCE[1] (µg/l)	trans-1,2-DCE[1] (µg/l)	1,1-DCE[1] (µg/l)	Vinyl Chloride[1] (µg/l)	1,4-Dioxane[1] (µg/l)	Ethane[2] (µg/l)	Ethene[2] (µg/l)	Ferrous Iron[3] (mg/l)	Methane[2] (µg/l)	Dissolved Oxygen[4] (µg/l)	Nitrate[5] (µg/l)	Sulfate[6] (µg/l)	Total Iron[7] (µg/l)	Total Manganese[3] (µg/l)	ORP[4] (mV)	pH[4]
Shallow Interval (continued)																				
Blaser Die Casting																				
BDC-3-40	BDC-3-40-032416	3/24/2016	< 0.02	< 0.02	17	0.036	0.13	**4.7**	---	---	---	---	---	---	---	---	---	---	-56	6.68
	BDC-3-40-092016	9/20/2016	< 0.02	0.0482	17.5	0.0484	0.148	**6.63**	---	---	---	---	---	---	---	---	---	---	-57	6.67
	BDC-3-40-031618	3/16/2018	< 0.02	0.0341 B	12.9 B	0.0496	0.148	**5.31**	---	---	---	---	---	0.66	---	---	---	---	57.1	6.11
	BDC-3-40-042621	4/26/2021	< 0.02	0.13	12.3	< 0.02	0.123	**2.95**	---	---	---	---	---	---	---	---	---	---	---	---
	BDC-3-40-032522	3/25/2022	< 0.02	<0.02	11.1	< 0.02	<0.02	**1.77**	---	---	---	---	---	---	---	---	---	---	---	---
BDC-6-30	BDC-6-30-032516	3/25/2016	< 0.02	**4.3**	5.1	0.11	0.096	**1.7**	---	---	---	---	---	---	---	---	---	---	-9	6.55
	BDC-6-30-092116	9/21/2016	< 0.02	**2.54**	3.56	0.19	0.175	**1.1**	---	---	---	---	---	---	---	---	---	---	-4	6.53
	BDC-6-30-031618	3/16/2018	< 0.02	**6.72 B**	3.97 B	0.142	0.052	**0.58**	---	---	---	---	---	2.32	---	---	---	---	90.4	5.91
	BDC-6-30-042621	4/26/2021	< 0.02	**3.58**	3.67	0.134	<0.02	**0.241**	---	---	---	---	---	---	---	---	---	---	---	---
	BDC-6-30-032522	3/25/2022	< 0.02	**3.53**	23.5	0.0418	0.166	**7.14**	---	---	---	---	---	---	---	---	---	---	---	---
BDC-10-40	BDC-10-40-092016	9/20/2016	< 0.02	< 0.02	15.7	0.179	0.396	**9.08**	---	---	---	---	---	---	---	---	---	---	-42	6.77
BDC-11-40	BDC-11-40-032416	3/24/2016	< 0.02	< 0.02	16	0.079	0.14	**14**	---	---	---	---	---	---	---	---	---	---	-24	6.65
	BDC-11-40-091916B	9/19/2016	< 0.02	< 0.02	3.41	< 0.02	0.0267	**33.6**	---	---	---	---	---	---	---	---	---	---	-54	6.64
	BDC-11-40-032317	3/23/2017	< 0.02	0.064	20.3	0.174	0.232	**10**	---	---	---	---	---	0.23	---	---	---	---	5.6	6.17
	BDC-11-40-031618	3/16/2018	< 0.02	0.11 B	11.4 B	0.0814	0.108	**15.1**	---	---	---	---	---	1.04	---	---	---	---	87.4	5.82
	BDC-11-40-032819	3/28/2019	< 0.02	< 0.02	14	0.0866	0.121	**11.9**	---	---	---	---	---	0.28	---	---	---	---	102.4	3.26
	BDC-11-40-042621	4/26/2021	< 0.02	0.0893	16	0.157	0.155	**6.93**	---	---	---	---	---	---	---	---	---	---	---	---
	BDC-11-40-032522	3/25/2022	< 0.02	<0.02	14.7	0.0878	0.149	**7.35**	---	---	---	---	---	---	---	---	---	---	---	---
BDC-13-40	BDC-13-40-091916B	9/19/2016	< 0.02	< 0.2	28.8	0.0468	0.202	**7.45**	---	---	---	---	---	---	---	---	---	---	-63	6.63
	BDC-13-40-032317	3/23/2017	< 0.02	0.164	28.8	0.0687	0.242	**9.21**	---	---	---	---	---	0.17	---	---	---	---	21.5	6.22
	BDC-13-40-031618	3/16/2018	< 0.02	0.0508 B	22.4 B	0.047	0.22	**6.18**	---	---	---	---	---	0.69	---	---	---	---	30.8	6.1
	BDC-13-40-032819	3/28/2019	< 0.02	0.0428	25	0.0437	0.184	**6.09**	---	---	---	---	---	0.19	---	---	---	---	28	6.32
	BDC-13-40-042621	4/26/2021	< 0.02	0.0893	16	0.157	0.177	**6.93**	---	---	---	---	---	---	---	---	---	---	---	---
	BDC-13-40-032522	3/25/2022	< 0.02	9.61	21.7	0.887	0.162	**5.75**	---	---	---	---	---	---	---	---	---	---	---	---
CG-136-40	CG-136-40-092016	9/20/2016	< 0.02	< 0.02	9.57	< 0.02	0.174	**5.82**	---	---	---	---	---	---	---	---	---	---	-53	6.69
Preliminary Cleanup Levels-Shallow Interval			**2.9[9]**	**0.7[9]**	**NR[10]**	**1,000[9]**	**4,000[9]**	**0.18[9]**	**78[9]**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Intermediate Interval																				
Capital Industries																				
CG-137-50	CG-137-50-032316	3/23/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	**1.6**	---	< 140	190	2.0	5000	0.24	< 0.050	< 5.0	5,200	830	-91.8	6.98
	CG-137-50-092116	9/21/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	**3.1**	---	< 79	170	4.0	5,600	0.20	< 0.050	< 5.0	7,000	810	-119.3	7.05
	CI-137-50-031620	3/16/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	**1.0**	---	---	---	---	---	0.85	---	---	---	---	-84.7	7.11
	CG-137-50-092220	9/22/2020	< 0.20	< 0.20	0.42	< 0.20	---	**1.9**	---	---	---	---	---	0.873	---	---	---	---	-108.4	6.9
	CG-137-50-090821	9/8/2021	< 0.20	< 0.20	0.35	< 0.20	---	**1.7**	---	---	---	---	---	2.72	---	---	---	---	IE	7.18

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West of 4th Avenue Group Site Unit 2
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Farallon PN: 457-010

			Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
Sample Location	**Sample Identification**	**Date**	**PCE[1]** (µg/l)	**TCE[1]** (µg/l)	**cis-1,2-DCE[1]** (µg/l)	**trans-1,2-DCE[1]** (µg/l)	**1,1-DCE[1]** (µg/l)	**Vinyl Chloride[1]** (µg/l)	**1,4-Dioxane[1]** (µg/l)	**Ethane[2]** (µg/l)	**Ethene[2]** (µg/l)	**Ferrous Iron[3]** (mg/l)	**Methane[2]** (µg/l)	**Dissolved Oxygen[4]** (µg/l)	**Nitrate[5]** (µg/l)	**Sulfate[6]** (µg/l)	**Total Iron[7]** (µg/l)	**Total Manganese[3]** (µg/l)	**ORP[4]** (mV)	**pH[4]**
CG-141-50	CG-141-50-032416	3/24/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**160**	---	< 73	290	2.0	3,700	0.62	0.077	28	5,500	860	-85.7	6.50
	CG-141-50-092116	9/21/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**140**	---	< 75	180	1.5	2,900	0.18	< 0.050	25	4,900	820	-67.7	6.79
	CG-141-50-032917	3/29/2017	< 1.0	< 1.0	< 1.0	< 1.0	---	**140**	---	---	---	---	---	0.22	---	---	---	---	-67.4	6.53
	DUP-1-032917	3/29/2017	< 1.0	< 1.0	< 1.0	< 1.0	---	**150**	---	---	---	---	---	---	---	---	---	---	---	---
	CG-141-50-092617	9/26/2017	< 1.0	< 1.0	< 1.0	< 1.0	---	**170**	---	< 500	140	1.75	3,000	0.33	< 0.050	25	---	---	-66.5	6.50
	CG-141-50-032118	3/21/2018	< 2.0	< 2.0	< 2.0	< 2.0	---	**180**	---	< 500	190	3.5	3,700	0.51	< 0.050	21	---	---	-62.5	6.75
	CG-141-50-092518	9/25/2018	< 2.0	< 2.0	< 2.0	< 2.0	---	**190**	---	< 130	160	3.0	1,800	1.85	< 0.050	22	---	---	-36.8	6.69
	CG-141-50-032219	3/22/2019	< 1.0	< 1.0	< 1.0	< 1.0	---	**160**	---	170	< 500	2	3,900	IE	< 0.050	19	---	---	IE	6.64
	CG-141-50-092519	9/25/2019	< 1.0	< 1.0	< 1.0	< 1.0	---	**180**	---	< 250	250	2.5	3,700	2.26	< 0.050	19	---	---	-217.6	6.78
	CG-141-50-031820	3/18/2020	< 1.0	< 1.0	< 1.0	< 1.0	---	**200**	---	39	150	2.5	4,400	1.3	0.087	19	---	---	-25.2	6.73
	CG-141-50-092220	9/22/2020	< 1.0	< 1.0	< 1.0	< 1.0	---	**120**	---	27	140	3.5	2,600	2.77	0.16	22	---	---	-26.8	6.67
	CG-141-50-031621	3/16/2021	< 1.0	< 1.0	< 1.0	< 1.0	---	**180**	---	17	63	3.5	1,600	0.45	< 0.050	18	---	---	-49.7	6.66
	CG-141-50-090821	9/8/2021	< 0.80	< 0.80	< 0.80	< 0.80	---	**150**	---	12	34	2.4	750	2.21	0.067	16	---	---	IE	6.61
	CG-141-50-031622	3/16/2022	< 1.0	< 1.0	< 1.0	< 1.0	---	**130**	---	57	96	NA	3,300	4.45	0.15	16	---	---	-52.3	6.67
CI-7-60	CI-7-60-032216	3/22/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	< 250	1.0	2.0	4,800	1.14	< 0.050	< 5.0	8,700	670	-65.6	6.63
CI-8-60	CI-8-60-032216	3/22/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	2.0	---	0.23	---	---	---	---	-89.1	6.97
CI-9-70	CI-9-70-032316	3/23/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	**0.25**	---	---	---	2.0	---	0.12	---	---	---	---	-73.5	6.42
	CI-9-70-031820	3/18/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	**0.28**	---	---	---	---	---	0.40	---	---	---	---	-60.3	6.68
CI-10-65	CI-10-65-032416	3/24/2016	< 0.20	< 0.20	0.60	< 0.20	< 0.20	**1.9**	---	< 100	< 7.8	2.5	6700	0.09	< 0.050	< 5.0	3,200	380	-105.0	6.97
	CI-10-65-092116	9/21/2016	---	---	---	---	---	---	---	< 110	< 7.3	2.0	9,100	0.21	< 0.050	< 5.0	4,400	420	-120.3	7.12
	CI-10-65-031820	3/18/2020	< 0.20	< 0.20	1.3	< 0.20	---	**3.9**	---	---	---	---	---	1.57	---	---	---	---	-102.1	7.19
	CI-10-65-090921	9/9/2021	< 0.20	< 0.20	1.8	< 0.20	---	**3.5**	---	---	---	---	---	2.10	---	---	---	---	IE	7.14
CI-11-60	CI-11-60-032316	3/23/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	**0.67**	---	< 330	< 22	1.5	13,000	0.20	< 0.050	< 5.0	6,700	480	-118.4	6.84
	CI-11-60-031620	3/16/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	**1.0**	---	---	---	---	---	3.8	---	---	---	---	-41.7	7.06
	CI-11-60-090921	9/9/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	**0.64**	---	---	---	---	---	0.88	---	---	---	---	IE	6.72
Preliminary Cleanup Levels-Intermediate Interval			**2.9[9]**	**0.7[9]**	**NR[10]**	**1,000[9]**	**4,000[9]**	**0.18[9]**	**78[9]**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

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Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Sample Location	Sample Identification	Date	Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
			PCE[1] (µg/l)	TCE[1] (µg/l)	cis-1,2-DCE[1] (µg/l)	trans-1,2-DCE[1] (µg/l)	1,1-DCE[1] (µg/l)	Vinyl Chloride[1] (µg/l)	1,4-Dioxane[1] (µg/l)	Ethane[2] (µg/l)	Ethene[2] (µg/l)	Ferrous Iron[3] (mg/l)	Methane[2] (µg/l)	Dissolved Oxygen[4] (µg/l)	Nitrate[5] (µg/l)	Sulfate[6] (µg/l)	Total Iron[7] (µg/l)	Total Manganese[3] (µg/l)	ORP[4] (mV)	pH[4]
Intermediate Interval (continued)																				
Capital Industries (continued)																				
CI-12-60	CI-12-60-092617	9/26/2017	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	1.0	---	0.23	---	---	---	---	-153.3	7.60
	CI-12-60-032018	3/20/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.66	---	---	---	---	-167.2	7.40
	CI-12-60-092518	9/25/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	1.0	---	2.07	---	---	---	---	-95.4	7.32
	CI-12-60-031919	3/19/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	2.5	---	IE	---	---	---	---	IE	7.39
	CI-12-60-092519	9/25/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.10	---	---	---	---	---	7.04	---	---	---	---	-40.7	7.52
	CI-12-60-031720	3/17/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	4.44	---	---	---	---	-96.8	7.54
	CI-12-60-092120	9/21/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	0.26	---	---	---	---	-168.9	7.63
	CI-12-60-040521	4/5/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	---	---	---	---	6.75	---	---	---	---	31.8	7.54
CI-13-60	CI-13-60-032216	3/22/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	0.5	---	0.21	---	---	---	---	-174.2	7.86
	CI-13-60-032817	3/28/2017	< 0.20	< 0.20	< 0.20	< 0.20	---	< 0.20	---	< 280	< 34	2.0	15,000	0.39	< 0.050	< 5.0	---	---	-113.6	7.78
	CI-13-60-032018	3/20/2018	< 0.20	< 0.20	< 0.20	< 0.20	---	**0.43**	---	< 1,500	< 1,500	2.75	14,000	0.27	0.20	< 5.0	---	---	-129	7.86
	CI-13-60-031919	3/19/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	**2.2**	---	< 500	< 500	0.5	7,700	IE	< 0.050	< 5.0	---	---	IE	7.55
	CI-13-60-031720	3/17/2020	< 0.20	< 0.20	0.33	< 0.20	---	**1.0**	---	---	---	---	---	4.80	---	---	---	---	-117.5	7.66
	CI-13-60-031621	3/16/2021	< 0.20	< 0.20	0.21	< 0.20	---	**1.7**	---	< 22	< 29	1.4	4,400	0.31	< 0.050	< 5.0	---	---	-122.0	7.50
	CI-13-60-090921	9/9/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	**0.49**	---	< 0.22	< 0.29	0.5	9,900	1.86	< 0.050	< 5.0	---	---	IE	7.72
	CI-13-60-031622	3/16/2022	< 0.20	< 0.20	< 0.20	< 0.20	---	**1.1**	---	< 0.22	< 0.29	---	14,000	2.16	< 0.050	< 5.0	---	---	-167.3	7.01
CI-14-70	CI-14-70-032316	3/23/2016	< 0.20	< 0.20	0.77	< 0.20	< 0.20	**0.34**	---	---	---	< 0.2	---	0.30	---	---	---	---	-127.2	6.98
	CI-14-70-032817	3/28/2017	< 0.20	< 0.20	2.2	< 0.20	---	**0.76**	---	< 110	< 17	2.0	4,400	0.21	< 0.050	< 5.0	---	---	-111.8	6.73
	CI-14-70-092617	9/26/2017	< 0.20	< 0.20	3.5	< 0.20	---	**1.0**	---	---	---	---	---	0.14	---	---	---	---	-115.4	6.80
	CI-14-70-032018	3/20/2018	< 0.20	< 0.20	4.0	< 0.20	---	**1.3**	---	< 500	< 500	1.25	5,200	0.37	0.21	< 5.0	---	---	-113.8	7.06
	CI-14-70-092518	9/25/2018	< 0.20	< 0.20	6.1	< 0.20	---	**1.5**	---	---	---	---	---	0.57	---	---	---	---	IE	6.96
	CI-14-70-032019	3/20/2019	< 0.20	< 0.20	4.4	< 0.20	---	**1.2**	---	< 500	< 500	1.5	7,600	IE	< 0.050	< 5.0	---	---	IE	6.98
	CI-14-70-092519	9/25/2019	< 0.20	< 0.20	4.3	< 0.20	---	**1.0**	---	---	---	---	---	5.42	---	---	---	---	-91.2	7.20
	CI-14-70-031820	3/18/2020	< 0.20	< 0.20	7.4	< 0.20	---	**2.3**	---	---	---	---	---	5.70	---	---	---	---	-71.8	7.11
	CI-14-70-092220	9/22/2020	< 0.20	< 0.20	7.5	< 0.20	---	**1.9**	---	---	---	---	---	0.47	---	---	---	---	-98	6.97
	CI-14-70-031621	3/16/2021	< 0.20	< 0.20	8.1	< 0.20	---	**1.5**	---	< 6.7	< 8.7	2.0	1,600	0.63	< 0.050	< 5.0	---	---	-1.6	7.12
	CI-14-70-090821	9/8/2021	< 0.20	< 0.20	5.2	< 0.20	---	**1.3**	---	< 0.22	< 0.29	2.8	740	5.24	< 0.050	< 5.0	---	---	IE	7.42
	CI-14-70-031622	3/16/2022	< 0.20	< 0.20	14	< 0.20	---	**2.8**	---	< 0.22	< 0.29	1.5	4,800	0.65	< 0.050	< 5.0	---	---	-33.5	7.00
CI-15-60	CI-15-60-032416	3/24/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**99**	---	< 89	330	1.2	3500	1.44	< 0.050	< 5.0	7,100	720	-89.3	6.63
	CI-15-60-092116	9/21/2016	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**100**	---	< 120	150	1.0	3,100	1.05	< 0.050	6.1	8,400	660	-57.7	6.71
	CI-15-60-032917	3/29/2017	< 0.40	< 0.40	< 0.40	< 0.40	---	**63**	---	---	---	---	---	0.33	---	---	---	---	-77.3	6.61
	DUP-2-032917	3/29/2017	< 0.40	< 0.40	< 0.40	< 0.40	---	**65**	---	---	---	---	---	---	---	---	---	---	---	---
	CI-15-60-092617	9/26/2017	< 1.0	< 1.0	< 1.0	< 1.0	---	**73**	---	< 500	290	---	4,100	0.12	< 0.050	< 5.0	---	---	-86.9	6.51
	CI-15-60-032118	3/21/2018	< 1.0	< 1.0	< 1.0	< 1.0	---	**66**	---	< 500	290	2.5	4,900	0.77	< 0.050	< 5.0	---	---	-65.5	6.68
	CI-15-60-092518	9/25/2018	< 1.0	< 1.0	< 1.0	< 1.0	---	**65**	---	< 250	310	5.5	3,800	0.70	< 0.050	5.1	---	---	IE	6.65
	CI-15-60-032219	3/22/2019	< 0.40	< 0.40	< 0.40	< 0.40	---	**47**	---	180	< 250	1.5	3,800	IE	< 0.050	< 5.0	---	---	IE	6.82
	DUP-2-032219	3/22/2019	< 0.40	< 0.40	< 0.40	< 0.40	---	**45**	---	---	---	---	---	---	---	---	---	---	---	---
	CI-15-60-092519	9/25/2019	< 0.20	< 0.20	< 0.20	< 0.20	---	**40**	---	< 250	300	2.0	4,100	2.06	< 0.050	< 5.0	---	---	-238.4	6.89
	CI-15-60-031820	3/18/2020	< 0.20	< 0.20	< 0.20	< 0.20	---	**40**	---	14	71	2.0	1,900	7.40	< 0.050	< 5.0	---	---	-63.6	6.94
	CI-15-60-092220	9/22/2020	< 0.40	< 0.40	< 0.40	< 0.40	---	**58**	---	37	180	3.0	4,500	5.52	0.084	< 5.0	---	---	-49.2	6.82
	CI-15-60-031621	3/16/2021	< 0.40	< 0.40	< 0.40	< 0.40	---	**52**	---	8.3	50	2.3	1,500	0.31	< 0.050	5.3	---	---	-60.4	6.62
	CG-15-60-090821	9/8/2021	< 0.20	< 0.20	< 0.20	< 0.20	---	**47**	---	8.2	34	3.0	800	5.32	0.20	5.8	---	---	IE	7.07
	CI-15-60-031622	3/16/2022	< 0.40	< 0.40	< 0.40	< 0.40	---	**74**	---	33	140	3.0	4,900	0.21	< 0.050	6.7	---	---	-15.4	6.68

Table 1
Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

			Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
Sample Location	**Sample Identification**	**Date**	**PCE[1]** (µg/l)	**TCE[1]** (µg/l)	**cis-1,2-DCE[1]** (µg/l)	**trans-1,2-DCE[1]** (µg/l)	**1,1-DCE[1]** (µg/l)	**Vinyl Chloride[1]** (µg/l)	**1,4-Dioxane[1]** (µg/l)	**Ethane[2]** (µg/l)	**Ethene[2]** (µg/l)	**Ferrous Iron[3]** (mg/l)	**Methane[2]** (µg/l)	**Dissolved Oxygen[4]** (µg/l)	**Nitrate[5]** (µg/l)	**Sulfate[6]** (µg/l)	**Total Iron[7]** (µg/l)	**Total Manganese[3]** (µg/l)	**ORP[4]** (mV)	**pH[4]**
CI-16-60	CI-16-60-032316	3/23/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	2.0	---	4.11	---	---	---	---	-161.4	7.74
CI-20-80	CI-20-80-032316	3/23/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	1.0	---	1.02	---	---	---	---	-134.7	7.29
	CI-20-80-062816	6/28/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	0.25	---	0.76	---	---	---	---	-129	7.61
	CI-20-80-092116	9/21/2016	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	---	---	---	0.5	---	0.67	---	---	---	---	-98.2	7.39
CI-MW-1-60	CI-MW-1-60-021716	2/17/2016	---	---	---	---	---	---	**150**	---	---	---	---	---	---	---	---	---	---	---
	CI-MW-1-60-092016	9/20/2016	< 0.02	0.0278	0.0475	< 0.02	< 0.02	**0.668**	---	---	---	---	---	---	---	---	---	---	-50	6.76
Preliminary Cleanup Levels-Intermediate Interval			**2.9[9]**	**0.7[9]**	**NR[10]**	**1,000[9]**	**4,000[9]**	**0.18[9]**	**78[9]**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

Table 1
Summary of Groundwater Analytical Results and Water Quality Parameters
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Sample Location	Sample Identification	Date	Volatile Organic Compounds							Metabolic Byproducts				Electron Acceptors					Water Quality Parameters	
			PCE[1] (µg/l)	TCE[1] (µg/l)	cis-1,2-DCE[1] (µg/l)	trans-1,2-DCE[1] (µg/l)	1,1-DCE[1] (µg/l)	Vinyl Chloride[1] (µg/l)	1,4-Dioxane[1] (µg/l)	Ethane[2] (µg/l)	Ethene[2] (µg/l)	Ferrous Iron[3] (mg/l)	Methane[2] (µg/l)	Dissolved Oxygen[4] (µg/l)	Nitrate[5] (µg/l)	Sulfate[6] (µg/l)	Total Iron[7] (µg/l)	Total Manganese[3] (µg/l)	ORP[4] (mV)	pH[4]
Intermediate Interval (continued)																				
Blaser Die Casting																				
BDC-3-60	BDC-3-60-032416	3/24/2016	< 0.02	< 0.02	0.16	< 0.02	< 0.02	**0.77**	---	---	---	---	---	---	---	---	---	---	-67	6.83
	BDC-3-60-092016	9/20/2016	< 0.02	0.0325	3.0	< 0.02	0.0222	**4.54**	---	---	---	---	---	---	---	---	---	---	-51	6.77
BDC-6-60	BDC-6-60-032516	3/25/2016	< 0.02	< 0.02	0.15	< 0.02	< 0.02	**1.4**	---	---	---	---	---	---	---	---	---	---	-53	7.02
	BDC-6-60-092116	9/21/2016	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**0.428**	---	---	---	---	---	---	---	---	---	---	-44	6.79
BDC-10-60	BDC-10-60-092016	9/20/2016	< 0.02	< 0.02	1.7	0.134	0.125	**4.9**	---	---	---	---	---	---	---	---	---	---	-53	6.76
BDC-11-60	BDC-11-60-091916B	9/19/2016	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	**1.44**	---	---	---	---	---	---	---	---	---	---	-70	7.05
Preliminary Cleanup Levels-Intermediate Interval			**2.9[9]**	**0.7[9]**	**NR[10]**	**1,000[9]**	**4,000[9]**	**0.18[9]**	**78[9]**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**

NOTES:
Results in **bold** denote concentrations exceeding applicable cleanup levels.
< denotes analyte not detected at or exceeding the laboratory reporting limit listed.

[1]Analyzed by U.S. Environmental Protection Agency (EPA) Method 8260B, 8260C, or 8260D.

[2]Analyzed by EPA Method RSK-175.

[3]Measured in the field using conventional chemistry parameters by EPA/American Public Health Association (APHA) Methods.

[4]Collected using a Yellow Springs Instrument multimeter with flow-through cell.

[5]Analyzed by EPA Method 353.2.

[6]Analyzed by ASTM Method D516-02, D516-07, or D516-11.

[7]Analyzed by EPA Method 6010C.

[8]Groundwater cleanup levels protective of the air pathway for unrestricted land use (residential and commercial sites) and industrial land use were derived using the following equation: Gwcul =

[9]Preliminary Cleanup Level based on November 15, 2016 U.S. Environmental Protection Agency letter regarding EPA's Partial Approval/Partial Disapproval of Washington's Human Health Water Quality Criteria and Implementation Tools

[10]NR denotes "not researched," which indicates that no regulatory standards or toxicity information are available for the constituent of concern to derive a cleanup level for the medium of potential concern.

µg/l = micrograms per liter
B = analyte was detected in associated blank
DCE = dichlorothene
IE = instrument error
J = result is an estimate
metabolic byproducts = compounds that result from biodegradation processes
mg/l = milligrams per liter
mS/cm = milliSiemens per centimeter specific conductance units
mV = millivolt units for measurement of oxidation-reduction potential (ORP)
NE = not established
ORP = oxidation reduction potential
PCE = tetrachloroethene
TCE = trichloroethene
Water Table Interval = Groundwater collected from the first encountered groundwater to 20 feet below ground surface.
Shallow Interval = Groundwater collected from 20 to 40 feet below ground surface.
Intermediate Interval = Groundwater collected from 40 to 70 feet below ground surface.

Table 2
Summary of Preliminary Cleanup Levels
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

		Preliminary Cleanup Levels											
		Soil			Groundwater				Air		Surface Water		Sediment
Constituent of Concern	Carcinogen or Non-Carcinogen	Puget Sound Background Concentrations for Metals[1]	Soil Cleanup Level Protective of Direct Contact Pathway (Unrestricted Land Use)[2]	Soil Cleanup Level Protective of Groundwater concentrations, Protective of Surface Water Quality (Vadose Zone) [4]	Groundwater Screening Level Protective of Air Quality Water Table Zone (Unrestricted Land Use)[5]	Groundwater Screening Level Protective of Air Quality Water Table Zone (Commercial Worker)[5]	Groundwater Cleanup Level Protective of Surface Water[6]	Groundwater Cleanup Level Protective of Sediment[7]	Air Cleanup Level Protective of Inhalation Pathway (Unrestricted Land Use)[5]	Air Cleanup Level Protective of Inhalation Pathway (Industrial Land Use)[5]	Surface Water Cleanup Level Protective of Human Health[8]	Surface Water Cleanup Level Protective of Aquatic Life	Sediment Cleanup Level[9]
		(Milligrams/kilogram)			(Micrograms/liter)				(Micrograms/cubic meter)		(Micrograms/liter)		(Milligrams/kilogram)
Tetrachloroethene	Carcinogen	--	480	0.03	25	120	2.9	250,000	9.6	40	2.9	--	190
Trichloroethene	Carcinogen	--	12	0.004	1.4	12	0.7	5,200	0.33	2	0.7	194 [12]	8,950
cis-1,2-Dichloroethene	Non-Carcinogen	--	160	--	--	--	--	360,000	--	--	--	--	--
trans-1,2-Dichloroethene	Non-Carcinogen	--	1,600	5	77	650	1,000	3,700,000	18	40	1,000	--	--
1,1-Dichloroethene	Non-Carcinogen	--	4,000	26	130	1,100	4,000	6,600,000	91	200	4,000	--	--
Vinyl chloride	Carcinogen	--	0.67	0.001	0.33	1.6	0.18	1,900	0.28	2.8	0.18	210 [12]	202
1,4-Dioxane	Carcinogen	--	10	0.32	4,700	22,000	--	20,000	0.5	5	--	--	--
Arsenic	Carcinogen	**7.3**	24	0.082	Not Applicable	Not Applicable	8 [10]	220	Not Applicable	Not Applicable	0.14	36 [13]	7
Barium	Non-Carcinogen	--	16,000	**165**	Not Applicable	Not Applicable	--	930,000	Not Applicable	Not Applicable	--	200 [12]	--
Cadmium	Non-Carcinogen	0.77	80	**1.2**	Not Applicable	Not Applicable	7.9	1.2	Not Applicable	Not Applicable	--	7.9 [13]	5.1
Copper	Non-Carcinogen	**36**	3,200	1.4	Not Applicable	Not Applicable	3.1	14	Not Applicable	Not Applicable	--	3.1 [13]	390
Iron	Non-Carcinogen	36,100	56,000	--	Not Applicable	Not Applicable	--	--	Not Applicable	Not Applicable	--	--	--
Manganese	Non-Carcinogen	1,200	3,700	1.3	Not Applicable	Not Applicable	100	--	Not Applicable	Not Applicable	100 [11]	--	--
Nickel	Non-Carcinogen	48	1,600	11	Not Applicable	Not Applicable	8.2	2,600	Not Applicable	Not Applicable	100	8.2 [13]	15.9
Zinc	Non-Carcinogen	85	24,000	101	Not Applicable	Not Applicable	81	770	Not Applicable	Not Applicable	1,000	81 [8]	410

NOTES:

Preliminary cleanup levels presented represent the most stringent cleanup levels for the constituent of concern listed in the media indicated.

-- indicates no value is available. In the case of ARARs, the reference sources do not publish values for the noted chemicals. In the case of calculated values, one or more input parameters are not available.

"Not Applicable" is used where the constituent of concern will not affect the media of potential concern due to an incomplete pathway.

[1] Background metals values from Ecology Publication No. 94-115, Natural Background Soil Metals Concentrations in Washington State. Updated for arsenic, cadmium, and iron provided by Ecology 5/25/2022 for inclusion in this table .

[2] Cleanup level is based on standard Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method B (unrestricted land use) or Method C (industrial land use) values from the Cleanup and Risk Calculations tables (CLARC).

[3] Cleanup levels for protection of air quality are calculated using MTCA Equation 747-1 where the potable Method B groundwater cleanup level was used as Cw. Concentrations of hazardous substances in soil that meet the potable groundwater protection standard currently are considered sufficiently protective of the air pathway for unrestricted and industrial

[4] Soil cleanup levels for protection of surface water quality are based on vadose conditions. Achievement of soil cleanup levels protective of groundwater would be evaluated via groundwater monitoring for empirical demonstration. Values are calculated using Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Equation 747-1 where the groundwater cleanup level protective of surface water in this table was used as Cw.

[5] Cleanup levels protective of the air pathway for unrestricted land use (residential and commercial sites) based on Guidance for Evaluating Vapor Intrusion in Washington State: Investigation and Remedial Action (Ecology, 2009) and listed in Cleanup and Risk Calculations tables (CLARC; database dated July 2022). Commercial worker assumes 10 hour

[6] Human health and marine aquatic ecologic receptors were considered. Refer to the Surface Water Cleanup Levels Protective of Human Health and Aquatic Life in this table. The more stringent value of the two receptors has been listed for the Groundwater Cleanup Level Protective of Surface Water.

[7] Groundwater screening levels based on the transfer of contaminants from groundwater to sediment were calculated by dividing the sediment screening level by the associated partition coefficients. Updated values provided by Ecology 5/25/2022 for inclusion in this table.

[8] Criteria in this column are based on EPA's Partial Approval/Partial Disapproval of Washington's Human Health Water Quality Criteria and Implementation Tools (November 15, 2016), unless otherwise noted below.

[9] Sediment has not been confirmed to be affected by groundwater discharge to surface water. Sediment cleanup levels were derived from the Lower Duwamish Waterway Superfund Site Record of Decisions (EPA, 2014), which does not contain values for nickel, TCE, PCE, or vinyl chloride. These constituents are not listed in the Sediment Management

[10] Arsenic Cleanup level of 8 ug/L based on background concentrations for Puget Sound Basin (Ecology Publication Number 14-09-044).

[11] CWA Section 304, National Recommended Water Quality Criteria, Human Health based on consumption of organisms. Provided by Ecology 5/25/2022 for inclusion in this table.

[12] Aquatic Life, literature value provided by Ecology 5/25/2022 for inclusion in this table

[13] National Recommended Water Quality Criteria published by EPA under 304 of the Federal Clean Water Act - Aquatic Life Criteria Table

Table updated August 14, 2015 based on revisions to AWQC; July 20, 2016 based on Ecology comments on the Draft FS Reports for SU1 and SU2 (clarify footnotes, add sediment values, add surface water CULs protective of aquatic life); October 10, 2020 based on revisions to surface water criteria for protection of human health and updates to CLARC for protection of air pathway (CLARC dated August 2020); August 2022, based on comments from Ecology dated 5/25/2022.

Table 3
Summary of Selected Remedial Alternative
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Target Interval	Target Media	Target Constituents of Concern	Remedial Technology Group	Remedial Technologies	Alternative 1R
Blaser Die Casting Source Area					
Vadose Zone/Water Table	Soil/Groundwater/ Air	TCE and Vinyl Chloride	Mitigation	Capping	Protection from Direct Contact
				Institutional Controls	Protection from Direct Contact, Ingestion of Groundwater, and/or Inhalation of Vapor
				Sub-Slab and Sub-Membrane Depressurization	Protection from Vapor Intrusion
			In Situ	Monitored Natural Attenuation[1]	Compliance Monitoring of Affected Media
			Ex Situ	Excavation & Off-Site Disposal	Completed as Interim Action
Shallow	Groundwater	TCE and Vinyl Chloride	In Situ	Monitored Natural Attenuation[1]	Compliance Monitoring of Affected Media
Intermediate	Groundwater	Vinyl Chloride	In Situ	Monitored Natural Attenuation[1]	Compliance Monitoring of Affected Media
Capital Industries Plant 2 Source Area					
Vadose Zone/Water Table	Soil and Groundwater	TCE and Vinyl Chloride	Mitigation	Capping	Protection from Direct Contact
				Institutional Controls	Protection from Direct Contact, Ingestion of Groundwater, and/or Inhalation of Vapor
			In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
			Ex Situ	Excavation & Off-Site Disposal	Completed During Reconstruction
Shallow	Groundwater	TCE and Vinyl Chloride	In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
Intermediate	Groundwater	Vinyl Chloride	In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media

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Table 3
Summary of Selected Remedial Alternative
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Target Interval	Target Media	Target Constituents of Concern	Remedial Technology Group	Remedial Technologies	Alternative 1R
Capital Industries Plant 4 Source Area					
Vadose Zone/Water Table	Soil/Air	PCE and TCE	Mitigation	Capping	Protection from Direct Contact
				Institutional Controls	Protection from Direct Contact, Ingestion of Groundwater, and/or Inhalation of Vapor
				Sub-Slab and Sub-Membrane Depressurization	Protection from Vapor Intrusion
			In Situ	Monitored Natural Attenuation[1]	Compliance Monitoring of Affected Media
				Soil Vapor Extraction	Treatment of Soil for Protection of Groundwater, Surface Water, and/or Vapor Intrusion Pathways
Shallow	Groundwater	Vinyl Chloride	In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
Intermediate	Groundwater	Vinyl Chloride	In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
Blaser Die Casting/Capital Industries/Burlington Environmental Down-Gradient Areas (TCE Plume and CG-141 Area)					
Vadose Zone/Water Table	Groundwater/Air	TCE and Vinyl Chloride	Mitigation	Capping	Protection from Direct Contact
				Institutional Controls	Protection from Direct Contact, Ingestion of Groundwater, and/or Inhalation of Vapor
			In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
Shallow	Groundwater	TCE and Vinyl Chloride	In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
Intermediate	Groundwater	Vinyl Chloride	In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
Capital Industries Plant 4 Down-Gradient Area					
Vadose Zone/Water Table	Soil and Groundwater	PCE and TCE	Mitigation	Capping	Protection from Direct Contact
				Institutional Controls	Protection from Direct Contact, Ingestion of Groundwater, and/or Inhalation of Vapor
			In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
Shallow	Groundwater	Vinyl Chloride	In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
Intermediate	Groundwater	Vinyl Chloride	In Situ	Monitored Natural Attenuation	Compliance Monitoring of Affected Media
				Summary of Total Costs	**$2,640,000**
				Cost in Millions of Dollars	**$2.6**
				Supporting Cost Table	Table C1

Table 3
Summary of Selected Remedial Alternative
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Target Interval	Target Media	Target Constituents of Concern	Remedial Technology Group	Remedial Technologies	Alternative 1R
Potential Contingency Remedial Action TCE Plume [1]					
Water Table	Groundwater	TCE	In Situ	Enhanced Anaerobic Biodegradation and/or In-Situ Chemical Reduction	Treatment of Groundwater at Select Areas
Shallow	Groundwater	TCE and Vinyl Chloride	In Situ	Enhanced Anaerobic Biodegradation and/or In-Situ Chemical Reduction	Treatment of Groundwater at Select Areas
				Summary of Total Costs	**$788,000**
				Cost in Millions of Dollars	**$0.8**
				Supporting Cost Table	Table C1
Potential Contingency Remedial Action CG-141 Area [1]					
Shallow	Groundwater	Vinyl Chloride	In Situ	Enhanced Anaerobic Biodegradation and/or In-Situ Chemical Reduction	Treatment of Groundwater at Select Areas
				Summary of Total Costs	**$899,000**
				Cost in Millions of Dollars	**$0.9**
				Supporting Cost Table	Table C1

Notes

Modified from PGG (2016) and Farallon (2020)

Remedial technologies presented include those presented in the Revised Technology Screening Memorandum dated April 27, 2015. Only those technologies included in the alternatives being considered for the FS Addendum are presented.

PCE = Tetrachloroethene

TCE = Trichloroethene

[1] Potential contingency remedial actions would be implemented in the event of remedy failure in a portion of the site. Values are estimates of a conceptual implementation, and would likely be significantly revised in the event of implementation.

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APPENDIX A
PLANT 4 DOCUMENTATION

WEST OF FOURTH SITE UNIT 2
FEASIBILITY STUDY ADDENDUM
West of Fourth Joint Agreed Order
Seattle, Washington

Farallon PN: 457-010

FARALLON CONSULTING

Washington
Issaquah | Bellingham | Seattle
Oregon
Portland | Bend | Baker City
California
Oakland | Folsom | Irvine

FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN

West of 4th Group Site
Capital Industries, Inc.
5801 3rd Avenue South
Seattle, Washington

Submitted by:
Farallon Consulting, L.L.C.
975 5th Avenue Northwest
Issaquah, Washington 98027

Farallon PN: 457-008

For:
West of 4th Avenue Group
Site Unit 2 Joint Deliverable
Capital Industries, Inc.
Blaser Die Casting Co.
Stericycle Environmental Solutions, Inc.
Seattle, Washington

May 21, 2019

Prepared by:

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Principal Geologist

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CI	Capital Industries, Inc.
cis-1,2-DCE	cis-1,2-dichloroethene
COCs	constituents of concern
CVOCs	chlorinated volatile organic compounds
Ecology	Washington State Department of Ecology
Farallon	Farallon Consulting, L.L.C.
HASP	Health and Safety Plan
ISCO	in-situ chemical oxidation
PCE	tetrachloroethene
PCULs	preliminary cleanup levels
RCW	Revised Code of Washington
RI	Remedial Investigation
RI Report	*Revised Draft Remedial Investigation Report, Capital Industries, Inc., 5801 3rd Avenue South, Seattle, Washington, Agreed Order No. DE 5348* dated October 2012, prepared by Farallon Consulting, L.L.C.
Site	The West of 4th Group Site consisting of Site Unit 1 and Site Unit 2
SU2	Site Unit 2
SU2 FS Report	*West of 4th Site Unit 2 Feasibility Study, Seattle, Washington* dated August 11, 2016, prepared by West of Fourth Group and Pacific Groundwater Group
SVE	soil vapor extraction
TCE	trichloroethene

WAC	Washington Administrative Code
West of 4th Group	Art Brass Plating, Inc.; Blaser Die Casting Co.; Capital Industries, Inc.; and PSC Environmental Services, LLC
Work Plan	*Final Capital Industries Plant 4 Soil Vapor Extraction Pilot Study Work Plan, West of 4th Group Site, Capital Industries, Inc., 5801 3rd Avenue South, Seattle, Washington* dated April 5, 2019, prepared by Farallon Consulting, L.L.C. (this document)

1.0 INTRODUCTION

Farallon Consulting, L.L.C. (Farallon) has prepared this Final Capital Industries Plant 4 Soil Vapor Extraction (SVE) Pilot Study Work Plan (Work Plan) on behalf of Art Brass Plating, Inc.; Blaser Die Casting Co.; Capital Industries, Inc. (CI); and Burlington Environmental, LLC[1] (collectively referred to herein as the West of 4th Group), which are the potentially liable parties at the West of 4th Group Site (herein referred to as the Site). The Site consists of Site Unit 1 and Site Unit 2 (SU2) as depicted on Figure 1. The Art Brass Plating, Inc. property is located at Site Unit 1. The CI and Blaser Die Casting Co. properties are located at SU2. The CI property comprises five buildings identified as Plants 1 through 5 (Figure 2). This Work Plan was prepared as a part of an interim action at CI Plant 4 that is being conducted on behalf of CI.

This Work Plan has been prepared in accordance with the requirements of Agreed Order No. DE 10402 entered into by the West of 4th Group and the Washington State Department of Ecology (Ecology) in April 2014; the First Amendment to Agreed Order No. DE 10402 dated November 20, 2017; and the Washington State Model Toxics Control Act Cleanup Regulation as established in Chapter 173-340 of the Washington Administrative Code (WAC 173-340).

1.1 OBJECTIVES

The purpose of the Work Plan is to provide the details for implementation of the SVE pilot study as a part of an interim action at CI Plant 4 (Figure 2) in SU2 as discussed in the *West of 4th Site Unit 2 Feasibility Study, Seattle, Washington* dated August 11, 2016, prepared by West of Fourth Group and Pacific Groundwater Group (SU2 FS Report); and in the letter regarding Capital Industries Plant 4 Interim Action Soil Vapor Extraction Pilot Test Schedule, Capital Industries, Inc., 5801 Third Avenue South, Seattle, Washington dated February 22, 2019, from Ms. Jennifer L. Moore and Mr. Jeffrey Kaspar of Farallon to Mr. Ed Jones of Ecology. Feasible cleanup technologies were evaluated based on the existing data for the Site. A previous in-situ chemical oxidation (ISCO) pilot study using potassium permanganate demonstrated that ISCO at CI Plant 4 was not a viable technology for the interim action (Farallon 2019a). CI has selected SVE as the next most-viable cleanup technology for further evaluation and pilot testing. SVE is a proven technology used to remediate unsaturated soil impacted by volatile organic compounds. SVE is the process of inducing a pressure and concentration gradient to the subsurface to cause volatile organic compounds such as chlorinated volatile organic compounds (CVOCs) to desorb from the soil and flow with the vapor stream to a common collection point for discharge or treatment.

[1] Burlington Environmental, LLC, is a wholly owned subsidiary of PSC Environmental Services, LLC, which is a wholly owned subsidiary of Stericycle Environmental Solutions, Inc.

The interim action objectives are tied to the remedial action objectives for the Site as described in the SU2 FS Report, and include:

- Reducing concentrations of CVOCs in soil beneath CI Plant 4 to concentrations less than the preliminary cleanup levels (PCULs) for the Site to reduce inhalation risks to acceptable levels (Table 1); and
- Reducing concentrations of CVOCs in shallow groundwater that allegedly originated from CI Plant 4 to concentrations less than the PCULs for the Site.

1.2 ORGANIZATION

This Work Plan summarizes pertinent background information and provides details for implementation of the SVE pilot study at SU2. This Work Plan is organized into the following sections:

- **Section 1**, **Introduction**, presents an overview of the Site, and the objectives and organization of the Work Plan;
- **Section 2**, **Background**, presents background information, including a summary of relevant investigations and a description of the constituents of concern (COCs) that will be targeted during the interim action;
- **Section 3**, **Preliminary Cleanup Levels**, presents the revised PCULs for the Site;
- **Section 4**, **Conceptual Site Model**, presents a description of the Site features, geology, and hydrogeology; the nature and extent of contamination; and groundwater geochemistry;
- **Section 5**, **Interim Action**, presents a description of the interim action, including a discussion of the cleanup technology, applicable permits, health and safety, utility clearance, SVE well installation, pilot study equipment, and pilot study procedures;
- **Section 6**, **Interim Action Documentation**, presents a description of documents that will be generated during the interim action activities;
- **Section 7**, **Schedule and Reporting**, summarizes the schedule for implementation of the interim action and associated reporting deliverables that will be submitted to Ecology; and
- **Section 8**, **References**, lists the documents cited in this Work Plan.

2.0 BACKGROUND

The following section presents background information, including a summary of relevant investigations and a description of the COCs that will be targeted during the interim action.

2.1 PREVIOUS INVESTIGATIONS AT CI PLANT 4

Former operations at the CI property allegedly have resulted in releases of tetrachloroethene (PCE) and/or trichloroethene (TCE) to soil and groundwater. Details of historical CI operations and the results from prior environmental investigations, including a Remedial Investigation (RI) conducted by Farallon, are presented in the *Revised Draft Remedial Investigation Report, Capital Industries, Inc., 5801 3rd Avenue South, Seattle, Washington, Agreed Order No. DE 5348* dated October 2012, prepared by Farallon (2012) (RI Report). A hot solvent degreaser historically was present in the south-central portion of CI Plant 4/Plant 4 canopy (Figure 2). The hot solvent degreaser was used in CI Plant 4 from approximately 1987 to 1992 and was removed in 1993. Prior to 1987, manual degreasing was conducted at CI Plant 4. CI reportedly stored TCE at the CI Plant 4 canopy area and the solvent was manually applied to the metal surfaces of fabricated products prior to painting at the CI Plant 4 paint booths. Two drum storage areas were present in the west-central portion of the CI Plant 4 canopy area (Figure 2). The southernmost drum storage area was constructed in 1978, was in use until 1985, and currently is used as the paint storage area. The northernmost drum storage area was constructed in 1978 and currently is still in use.

During subsurface investigations conducted by Farallon (2012) at CI Plant 4 during the RI, neither TCE nor PCE was detected in soil samples collected from the boring/monitoring well locations at concentrations that accounted for the impacts to groundwater quality that occurred at and down-gradient of CI Plant 4. Concentrations of CVOCs detected in groundwater samples collected from the Water Table and/or Shallow Intervals (i.e., at depths of from 0 to 20 feet below ground surface [bgs] and from 20 to 40 feet bgs, respectively) near the suspected source areas previously identified at the CI property suggest there may be areas where concentrations of CVOCs in soil are greater than those detected during the RI. Therefore, Ecology required that additional investigation be conducted at CI Plant 4.

Farallon (2016) conducted passive soil gas and bulk soil sampling at CI Plant 4 and in the South Fidalgo Street right-of-way to assess the lateral and vertical distribution of PCE and TCE in soil beneath CI Plant 4 to resolve data gaps associated with the RI of the Site previously described in the revised data gap memorandum for SU 2 (Farallon 2015).

The soil gas survey results indicated that the highest concentrations of PCE in soil gas were present in an area extending from the east-central portion to the south-southwestern portion of CI Plant 4 (Figure 3A). High concentrations of TCE in soil gas were observed in correlation with the areas with the highest concentrations of PCE in soil gas. Elevated concentrations of TCE also were detected in the west-central portion of CI Plant 4 proximate to the current and former drum storage areas (Figure 3B). The highest concentrations of cis-1,2-dichloroethene (cis-1,2-DCE) in soil gas

were detected in the east-central portion of CI Plant 4 and correlate with the locations of the PCE and TCE soil gas plumes observed in this area (Figure 3C).

The PCE, TCE, and cis-1,2-DCE soil gas data indicated potential releases proximate to the current and former drum storage areas in the west-central portion of CI Plant 4, where manual degreasing occurred; at the former degreaser unit area in the south-central portion of CI Plant 4; and in the east-central portion of CI Plant 4. Soil sampling at these locations was conducted on October 17, 2015 to supplement existing soil data from the RI and further evaluate the nature and extent of COCs in soil. Based on the results, concentrations of PCE, TCE, and cis-1,2-DCE detected in soil gas in the east-central portion of CI Plant 4 could be the result of a release on the east-adjacent Pacific Food Systems property or encroachment of contamination from CI Plant 4. The specific source of CVOCs in soil gas on the Pacific Food Systems property is undetermined.

PCE was detected at concentrations exceeding the PCUL for air quality protection and/or the revised PCUL[2] for surface water quality protection in soil samples collected from borings P4-B6, P4-B7, P4-B8, and P4-B11 (Table 2; Figure 3A). TCE was detected at concentrations exceeding the PCUL for air quality protection and/or the revised PCUL for surface water quality protection in soil samples collected from borings P4-B1, P4-B3 through P4-B9, and P4-B14 (Table 2; Figure 3B). Cis-1,2-DCE, trans-1,2-dichloroethene, and vinyl chloride were not detected at concentrations exceeding the applicable PCULs in the soil samples collected at and proximate to CI Plant 4 (Table 2; Figures 3A through 3C).

TCE concentrations ranging from 0.082 to 2.4 milligrams per kilogram were detected in soil samples collected at a depth of approximately 2 feet bgs in performance borings B3-01, B3-02, and B3-03 during the ISCO pilot study, proximate to the current drum storage area in the northwestern portion of CI Plant 4 (Table 2; Figure 4). These TCE concentrations are higher than TCE concentrations previously detected at CI Plant 4 (Table 2; Figures 3A through 3C).

Four additional borings, P4-15 through P4-18, were advanced during a second round of performance borings for the ISCO pilot study to further assess the lateral and vertical distribution of TCE discovered during the first round of performance borings. TCE concentrations were only detected in a soil sample collected from boring P4-16 at a depth of approximately 1 foot bgs (Table 2; Figure 4), indicating that the lateral and vertical limits of TCE-affected soil proximate to the current and former drum storage areas could be estimated using the collective soil analytical results obtained in 2015 and during the ISCO pilot study.

The soil analytical results indicate that the highest concentrations of CVOCs are present in shallow soil beneath the building slab and attenuate with depth. PCE and TCE were detected at relatively low concentrations at CI Plant 4, which confirms that there was not a significant or extensive release of PCE or TCE at CI Plant 4. The groundwater data from the RI Report, post-RI sampling,

[2] Certain PCULs were revised in January 2017 to accommodate U.S. Environmental Protection Agency (EPA) revisions to surface water quality criteria.

and baseline and performance monitoring for the ISCO pilot study also support the conclusions drawn from the soil data. Current concentrations of COCs in the Water Table Interval are not indicative of a major residual source of PCE or TCE in the vadose zone below CI Plant 4 (Table 3; Figure 5). PCE and TCE were not detected in the Shallow or Intermediate Groundwater Intervals (i.e., at depths of 20 to 40 feet bgs and greater than 40 feet bgs, respectively), indicating the release(s) of PCE and TCE that did occur were of insufficient mass and/or volume to affect deeper groundwater. However, PCE, TCE, and vinyl chloride are present at concentrations exceeding the PCULs for protection of surface water quality in monitoring and observation wells inside and immediately down-gradient of CI Plant 4. Groundwater modeling documented in the SU2 FS Report indicated that CVOC concentrations in groundwater associated with the CI Plant 4 area will attenuate to concentrations less than the PCULs protective of surface water quality prior to reaching a surface water receptor.

Sufficient data were collected at CI Plant 4 to evaluate potential cleanup technologies for soil and groundwater in the SU2 FS Report. The potential active cleanup technologies evaluated and the media potentially remediated included:

- ISCO (soil and groundwater);
- Soil excavation and off-Site disposal (soil);
- SVE/air sparging (soil and groundwater);
- Enhanced anaerobic biodegradation (groundwater); and
- In-situ chemical reduction (groundwater).

ISCO was the preferred cleanup technology for soil and groundwater due to the ability to implement the technology with minimal interference with operations at CI Plant 4, and ISCO's ability to rapidly treat the low levels of CVOCs in soil and groundwater (West of Fourth Group and Pacific Groundwater Group 2016). An ISCO pilot study was conducted in the third quarter of 2018, the results of which indicated that ISCO was not a viable technology for the interim action due to oxidant distribution issues and high natural oxidant demand.

SVE has been selected as the next cleanup technology to be pilot tested for the interim action at CI Plant 4. Of the remaining cleanup alternatives evaluated, SVE will have the least impact on operations for CI and has a high probability of meeting the interim action objectives, and the cost is most likely proportional to the benefit of implementing the technology. Air sparging will not be conducted as a part of the pilot study based on the 2018 groundwater data from the CI Plant 4 ISCO pilot study and groundwater modeling documented in the SU2 FS Report, which indicate that active groundwater treatment likely will not be a component of the final cleanup action.

2.2 CONSTITUENTS OF CONCERN FOR INTERIM ACTION

The COCs for soil are PCE and TCE. These COCs are a current and future risk to the soil-to-groundwater and soil-to-indoor air pathways.

3.0 PRELIMINARY CLEANUP LEVELS

The PCULs for the Site are based on potential exposure pathways and were established in the technical memorandum regarding Revised Preliminary Cleanup Standards, W4 Joint Deliverable, Seattle, Washington dated September 12, 2014, from Farallon to Mr. Jones of Ecology (Farallon 2014). The PCULs were updated on January 17, 2017 to reflect updates to human health criteria in the Clean Water Act promulgated by EPA on November 15, 2016.

The current PCULs for the Site are summarized in Table 1 of this Work Plan.

4.0 CONCEPTUAL SITE MODEL

The following section presents a summary of the conceptual site model elements pertinent to the SVE pilot study discussed herein.

4.1 GEOLOGY

Soil conditions at CI Plant 4 consisted of approximately 1 foot of silty sand underlain by silt with sand to depths ranging from approximately 6 to 7.5 feet bgs, underlain by fine sand with trace silt to the maximum depth explored of 18 feet bgs. Groundwater generally was encountered at a depth of between 8 to 9 feet bgs. The silty sand layer near the ground surface pinches out in the South Fidalgo Street right-of-way.

4.2 HYDROGEOLOGY

The hydrogeologic units at the Site are:

- Water Table Interval: The Water Table Interval extends to a depth of up to 20 feet bgs.
- Shallow Interval: The Shallow Interval ranges in depth from 20 to 40 feet bgs.
- Intermediate Interval: The Intermediate Interval includes groundwater monitored at the Site at depths below 40 feet bgs.

Groundwater in these three hydrogeologic units flows to the west and southwest toward the Duwamish River with little seasonal fluctuation. A downward vertical gradient is present between the Water Table and Shallow Intervals. The vertical gradients between the Shallow and Intermediate Intervals fluctuate between upward and downward in monitoring well clusters east of East Marginal Way. The vertical gradient between the Shallow and Intermediate Intervals in monitoring well clusters west of East Marginal Way, proximate to the Duwamish River, generally is upward.

Tidal studies were documented in the RI reports prepared for Art Brass Plating, Inc. (Aspect Consulting 2012) and CI (Farallon 2012). Water levels in the western portions of the Site are tidally influenced by Puget Sound. This tidal influence is demonstrated in localized, transient flow reversals similar to those observed at other sites near the Duwamish River. Tidal flow reversals diminish to 0.5 foot or less, 800 feet east-northeast of the Duwamish River.

4.3 NATURE AND EXTENT OF CONTAMINATION

The following subsections present the nature and extent of contamination observed in soil gas, soil, and groundwater.

4.3.1 Soil Gas

PCE and TCE were present in soil gas in an area extending from the east-central portion to the south-southwestern portion of CI Plant 4 (Figures 3A through 3C). Another area of TCE contamination in soil gas is present in the west-central portion of CI Plant 4, proximate to the current and former drum storage areas. The highest concentration of cis-1,2-DCE in soil gas was detected in the east-central portion of CI Plant 4 and correlates with the locations of some of the highest concentrations of PCE and TCE (Figure 3C).

4.3.2 Soil

The highest concentrations of PCE and TCE observed in the borings advanced at and proximate to CI Plant 4 occurred at depths ranging between 1 and 4 feet bgs. Additional soil samples with concentrations of PCE and TCE exceeding the PCULs were collected in the silty material at borings P4-B1, P4-B4 through P4-B8, and P4-B14, which are predominately in the southeastern portion of CI Plant 4 and the northern right-of-way of South Fidalgo Street. The vertical extent of soil contamination exceeding the PCULs appears to be less than 10 feet bgs (Table 2; Figures 3A through 3C and 4).

4.3.3 Groundwater

PCE and TCE in the Water Table Interval allegedly originated from a former degreaser unit that was present in the southern portion of CI Plant 4. CVOCs in groundwater within the Water Table, Shallow, and Intermediate Intervals, including PCE, TCE, and vinyl chloride, migrate to the southwest in SU2, toward Slip 2 at the Lower Duwamish Waterway (Aspect Consulting 2014). Groundwater is not included in the interim action because the 2018 groundwater data from the CI Plant 4 ISCO pilot study and groundwater modeling documented in the SU2 FS Report indicate that active groundwater treatment likely will not be a component of the final cleanup action.

5.0 INTERIM ACTION

This section presents a description of the SVE pilot study, including a discussion of the cleanup technology, permitting, health and safety, utility clearance, pilot study approach, SVE well installation, and pilot test activities.

5.1 CLEANUP TECHNOLOGY

SVE was selected as a viable cleanup technology and retained for further evaluation for removal of CVOCs from soil and soil gas beneath CI Plant 4. SVE is the process of inducing a pressure and concentration gradient to the subsurface to cause volatile organic compounds such as CVOCs to desorb from the soil and flow with the vapor stream to a common collection point for discharge or treatment.

A pilot study is necessary to evaluate the feasibility and effectiveness of SVE as a cleanup technology. The pilot test will also provide information required for full-scale design, including the anticipated radius of influence, optimum vacuum and airflow rate, SVE blower sizing, and whether treatment of the SVE effluent will be necessary to comply with local air agency regulations. The pilot study area selected is proximate to boring B3-04, where the highest TCE concentration of 13 milligrams per kilogram was detected in the soil sample collected at a depth of 4 feet bgs. The SVE extraction well and corresponding observation wells will be placed proximate to boring B3-04 (Figure 4). Specific details are presented in Section 5.5, SVE Extraction Well Installation.

5.2 PERMITTING

If the pilot study is successful, a public comment period and State Environmental Policy Act checklist will be needed for this new interim action technology. Farallon will prepare a State Environmental Policy Act checklist for submittal to Ecology prior to submittal of the SVE System Design and Implementation Work Plan.

Discharge of CVOC emissions to the atmosphere for this pilot study is regulated by Puget Sound Clean Air Agency for new emissions sources under the Notice of Construction permitting process. For groundwater and soil remediation projects, Notice of Construction is not required for sites that emit less than 15 pounds of vinyl chloride, 500 pounds of PCE, and 1,000 pounds of toxic air contaminants per year in accordance with Puget Sound Clean Air Agency Regulation 6.03.c.(94). Based on the short duration of the SVE pilot study, low extraction flow rate, and anticipated extracted vapor concentration, a Notice of Construction is not required for the pilot study. The pilot study results will be used to determine whether a Notice of Construction is required for a full-scale implementation of SVE.

The SVE pilot test equipment is portable and temporary; therefore, no construction or electrical permits are anticipated for the pilot study activities.

5.3 HEALTH AND SAFETY

A Health and Safety Plan (HASP) is required for all field activities (WAC 173-340-810). Farallon and all subcontractors, if any, will be required to provide HASPs for their own employees that are appropriate to their role in the interim action and in accordance with the laws under which their work is regulated. Farallon's HASP will comply with the requirements of the Occupational Safety and Health Act of 1970 and the Washington Industrial Safety and Health Act (Chapter 49.17 of the Revised Code of Washington [49.17 RCW]). Farallon's draft project-specific HASP is provided as Appendix A of this Work Plan. Ecology approval of the HASP is not required.

Farallon and subcontractor personnel will be required to have 40-Hour Hazardous Waste Operations and Emergency Response training as hazardous waste operators in accordance with Part 1910.120 of Title 29 of the Code of Federal Regulations.

5.4 UTILITY CLEARANCE

Public and private utility locate services were employed prior to the ISCO pilot study and the subsurface utilities beneath CI Plant 4 were mapped. The SVE extraction well will be advanced in a location that has already been cleared for subsurface utilities.

5.5 SVE EXTRACTION AND OBSERVATION WELL INSTALLATION

One extraction well (SVE-1) and five observation wells (OP-1 through OP-5) will be installed in CI Plant 4 (Figure 4). The extraction and observation wells will be installed 1 to 2 weeks before the SVE pilot study begins. Farallon will contract with a drilling company to install extraction well SVE-1 and observation wells OP-1 through OP-5 to a depth of 4.5 feet bgs using a vacuum excavator. A vacuum excavator will be used because the depth required for the extraction and observation wells is shallow and the borings typically are cleared for subsurface utilities using a vacuum excavator or hand tools to a minimum depth of 5 feet bgs prior to drilling. The screened interval for extraction well SVE-1 targets the less-permeable soil matrix with the highest concentrations of TCE in soil, reducing possible preferential airflow pathways through the more-permeable soil from 5 feet bgs to the top of the Water Table Interval with concentrations of PCE and TCE less than PCULs.

Extraction well SVE-1 will be constructed using 4-inch-diameter Schedule 40 polyvinyl chloride and screened from 2.5 to 4.5 feet bgs with a 0.010-inch slotted screen in accordance with the Minimum Standards for Construction and Maintenance of Wells as established in WAC 173-160. A silica sand pack will be placed in the boring annulus space from the bottom of the boring to a depth of 2 feet bgs, followed by a 0.5-foot section of hydrated bentonite chips to form a seal. The remaining annulus space will be backfilled with concrete to the ground surface. The extraction well will be set in a 12-inch flush-mounted monument (Figure 6).

Five semi-permanent observation wells, OP-1 through OP-5, will be constructed in a similar manner to extraction well SVE-1; however, the well casing will be 1 inch in diameter (Figure 6).

The observation wells will be spaced around extraction well SVE-1, approximately 10, 15, 20, 25, and 30 feet in different directions, as feasible pending building or tenant use constraints within the CI Plant 4 permit (Figure 4).

Soil cuttings generated during installation of the proposed SVE extraction and observation wells will be placed in a labeled U.S. Department of Transportation-approved steel drum and stored at CI Plant 4 pending disposal.

5.6 PILOT TEST EQUIPMENT

The SVE pilot study equipment will consist of the following:

- A 1-horsepower skid-mounted regenerative blower at a minimum (equivalent to a Rotron DR 404) capable of 50 inches of water-column vacuum and flow rates of up to 105 standard cubic feet per minute;
- A moisture separator with a vacuum indicator, vacuum relief valve, and drain valve;
- A manifold consisting of a series of valves, vacuum indicators, and a flowmeter capable of monitoring extraction airflow rates ranging from 0.66 to 100 standard cubic feet per minute and vacuum ranging from 0.1 to 80 inches of water column; and
- Rubberized flexible couplers, flexible hosing, and/or Schedule 40 polyvinyl chloride fittings to connect equipment from the SVE extraction well to a vapor discharge point outside CI Plant 4.

The observation wells will have vacuum-tight fittings terminating in a ball valve for connection to a vacuum gauge to monitor observed vacuum throughout the pilot study activities. A process and instrumentation diagram is provided on Figure 6.

In accordance with the minimal requirements of ASTM Standard E2121-13, the temporary SVE vent stack will be placed in the north parking lot of CI Plant 4, at a height of 15 feet above the ground surface and at least 10 feet from any building opening, to mitigate impacts to potential receptors (Figure 4). The roof of CI Plant 4 is over 25 feet above the ground surface, so it is impracticable to design the test equipment for the SVE pilot study so that the temporary SVE vent stack would be above the roof line. There are no other buildings immediately downwind of the area where the temporary vent stack will be installed.

5.7 SVE PILOT STUDY PROCEDURES

The SVE pilot study will consist of an initial SVE step test to evaluate the optimal vacuum pressure required to achieve an airflow rate that will be used in the longer-duration constant vacuum test. The pilot study will consist of two pilot test components conducted over a 2-day period. On the afternoon prior to the SVE pilot study, Farallon Engineers will set up the temporary SVE equipment and conduct preliminary testing of the equipment to ensure satisfactory operation.

The pilot study work schedule is as follows:

- **Day 1.** SVE step test.
- **Day 2.** SVE constant vacuum test and breakdown of equipment and SVE pilot test materials.

Prior to implementing the SVE step test, baseline vacuum readings will be collected from observations wells. The SVE step test will be conducted during the first day of pilot testing. The SVE step test is conducted by incrementally increasing the vacuum applied to the SVE extraction well. The maximum amount of vacuum that can be applied to the SVE extraction well is based on the distance from the top of the exposed well screen to the top of the groundwater table, or the available equipment. Based on the blower curve for a 1-horsepower regenerative blower, the anticipated maximum vacuum applied to the SVE extraction well will be 50 inches of water column. The incremental steps will be applied at 30, 70, and 100 percent of the maximum vacuum rating for the blower. During each stage of the step test, the following parameters will be monitored on 15-minute intervals, at a minimum, until criteria stabilize (less than 5 percent difference between events) or for a maximum duration of 2 to 3 hours at each vacuum step:

- Vacuum applied to the SVE extraction well;
- Extraction flow rate from the SVE extraction well;
- Extracted vapor temperature;
- Extracted vapor stream volatile organic compound measurements with a photoionization detector; and
- Vacuum at the observation wells.

Vacuum readings will be recorded as gauge pressure readings.

Based on the results of the SVE step test, Farallon will determine the ideal vacuum and extraction flow rate to complete the SVE constant vacuum test, which is the second component of the SVE pilot study. Optimum vacuum and flow rate will be determined from the observed vacuum and flow rates from the extraction well, CVOC vapor recovery, response observed at observation wells, and influence on groundwater levels. Optimum flow rate also will be determined from the radius-of-influence determined in the step-test.

The SVE constant vacuum test will occur immediately following the step test and operate for approximately 24 hours (Days 1 and 2). The monitored test parameters cited above for the step test will also be monitored and recorded at 15-minute intervals during the SVE constant vacuum test. The monitoring time interval may be modified during the pilot test based on field observations. The longer-duration SVE constant vacuum test will help evaluate steady-state emissions concentrations and site-specific SVE operational airflow and vacuum.

Vapor samples will be collected in Summa canisters and/or Tedlar bags during the pilot study and sent to the Fremont Analytical of Seattle, Washington for laboratory analysis. Vapor samples will

be collected at the end of each step test, at peak concentration of extraction vapor as measured with the photoionization detector, and at the end of the SVE constant vacuum test. Samples will be analyzed for PCE and TCE by EPA Method TO-15 (Summa canisters) or 8260C (Tedlar bags).

Condensate water collected in the moisture separator will be transferred to a labeled U.S. Department of Transportation-approved steel drum and stored at CI Plant 4, where it can be secured pending receipt of the waste-profiling results. A water sample will be collected from the drum for waste profiling. The analytical results of the water sample will be used to develop a waste profile for disposal.

6.0 INTERIM ACTION DOCUMENTATION

This section summarizes the interim action documents that will be generated during the interim action activities.

6.1 PROJECT DOCUMENTS AND REPORTING

6.1.1 Health and Safety Plan

This Work Plan includes a draft HASP for the field activities in accordance with WAC 173-340-810. The HASP complies with the requirements of the Occupational Safety and Health Act of 1970 and the Washington Industrial Safety and Health Act (49.17 RCW).

6.1.2 SVE Pilot Study Work Plan

The Work Plan provides details regarding the design and implementation of the SVE pilot study for the interim action at CI Plant 4 in SU2. The SVE pilot study will be focused on vadose zone soil with concentrations of CVOCs that exceed PCULs.

6.1.3 SVE Pilot Study Completion Report

The SVE Pilot Study Completion Report will provide the laboratory analytical data and field observations resulting from the SVE pilot study and a recommendation regarding future implementation of a full-scale SVE system. Based on the results of the meeting between Farallon and Ecology that will follow the SVE pilot study, this report may be incorporated into the SVE System Design and Implementation Work Plan as an appendix.

6.1.4 SVE System Design and Implementation Work Plan

The SVE System Design and Implementation Work Plan will provide details regarding full-scale implementation of the SVE interim action if the pilot study is successful. The SVE System Design and Implementation Work Plan will include the final SVE engineering design details and system layout, performance and confirmation monitoring plan, criteria for evaluating effectiveness of the interim action, and reporting requirements. The SVE System Design and Implementation Work Plan will include updated copies of the following supporting documents.

6.1.5 Quarterly Status Reports

Quarterly status reports will be submitted to Ecology in the standard Quarterly Progress Reports prepared by CI. The Quarterly Progress Reports will include a summary of the interim action activities conducted. If necessary, more-frequent progress reporting via email messages or meetings with Ecology will be conducted to refine the scope of work based on performance monitoring data for the interim action.

6.1.6 Interim Action Completion Report

An Interim Action Completion Report will be submitted to Ecology once the performance monitoring data indicate that the interim action objectives are achieved during operation of the full-scale SVE system. The Interim Action Completion Report will include a summary of the overall interim action results and conclusions. The Interim Action Completion Report will summarize:

- Interim action objectives;
- Background information relevant to the successful completion of the interim action;
- SVE pilot study design and implementation activities;
- Results of the SVE pilot study;
- Final design of the full-scale SVE system based on the results of the SVE pilot study;
- Performance and confirmation monitoring data; and
- Conclusions regarding the effectiveness of SVE in reducing COC concentrations in vadose zone soil and whether further action is required during the cleanup action.

7.0 SCHEDULE AND REPORTING

This section summarizes the schedule for implementation of the interim action and associated reporting deliverables that will be produced. The anticipated interim action schedule is presented as a timeline in Appendix B. The milestones associated with implementation of the interim action and the potential schedule to achieve those milestones are provided below.

Milestones	**Anticipated Schedule**
Submittal of Draft SVE Pilot Study Work Plan	Within 45 Days of Ecology authorization to proceed with a pilot test of the SVE cleanup technology.
Submittal of Final SVE Pilot Study Work Plan	Within 15 days of receipt of Ecology comments on the Draft SVE Pilot Study Work Plan, assuming Ecology comments are minimal.
Completion of SVE Pilot Study	Within 30 days of Ecology approval of the Final SVE Pilot Study Work Plan, which includes time required to obtain laboratory analytical data.
Data Submittal and Ecology Meeting	Analytical data, pressures, and flow rates will be submitted to Ecology within 15 days of receipt of the final laboratory analytical data. A subsequent meeting will be scheduled to discuss the results of the SVE pilot study.
State Environmental Policy Act Checklist and Public Comment Period	Initiated upon Ecology approval of the use of SVE technology for the interim action.
Submittal of Draft SVE Pilot Study Completion Report	Within 45 days following receipt of the final laboratory analytical data. This document may be generated as an appendix to the Draft SVE System Design and Implementation Work Plan based on the results of the meeting with Ecology
Submittal of Final SVE Pilot Study Completion Report	Within 15 days of receipt of Ecology comments on the Draft SVE Pilot Study Completion Report, assuming Ecology comments are minimal.
Submittal of Draft SVE System Design and Implementation Work Plan	Within 60 days of Ecology approval to proceed with SVE implementation.

Submittal of Final SVE System Design and Implementation Work Plan	Within 30 days of receipt of Ecology comments on the Draft SVE System Design and Implementation Work Plan, assuming Ecology comments are minimal.

If the SVE technology is technically feasible, the remaining details regarding the construction and start-up schedule will be provided based on the SVE system design details and discussions with CI regarding an implementation schedule that can be completed without significant impacts to CI Plant 4 operations. The implementation schedule for the full-scale SVE system will be provided in the SVE System Design and Implementation Work Plan.

8.0 REFERENCES

Aspect Consulting. 2012. *Remedial Investigation Report, Art Brass Plating*. Prepared for Art Brass Plating, Inc. September 27.

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Farallon Consulting, L.L.C. (Farallon). 2012. *Revised Draft Remedial Investigation Report, Capital Industries, Inc., 5801 3rd Avenue South, Seattle, Washington, Agreed Order No. E 5348.* Prepared for Capital Industries, Inc. October.

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———. 2015. Technical Memorandum Regarding Revised Data Gap Memorandum for Site Unit 2, W4 Joint Deliverable, Seattle, Washington. To Ed Jones, Washington State Department of Ecology. March 2.

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_____. 2019a. *Final Capital Industries Plant 4 Interim Action – Stage 1 In-Situ Chemical Oxidation Report, West of 4th Group Site, Capital Industries, Inc., 5801 3rd Avenue South, Seattle, Washington*. Prepared for the West of 4th Avenue Group. February 22.

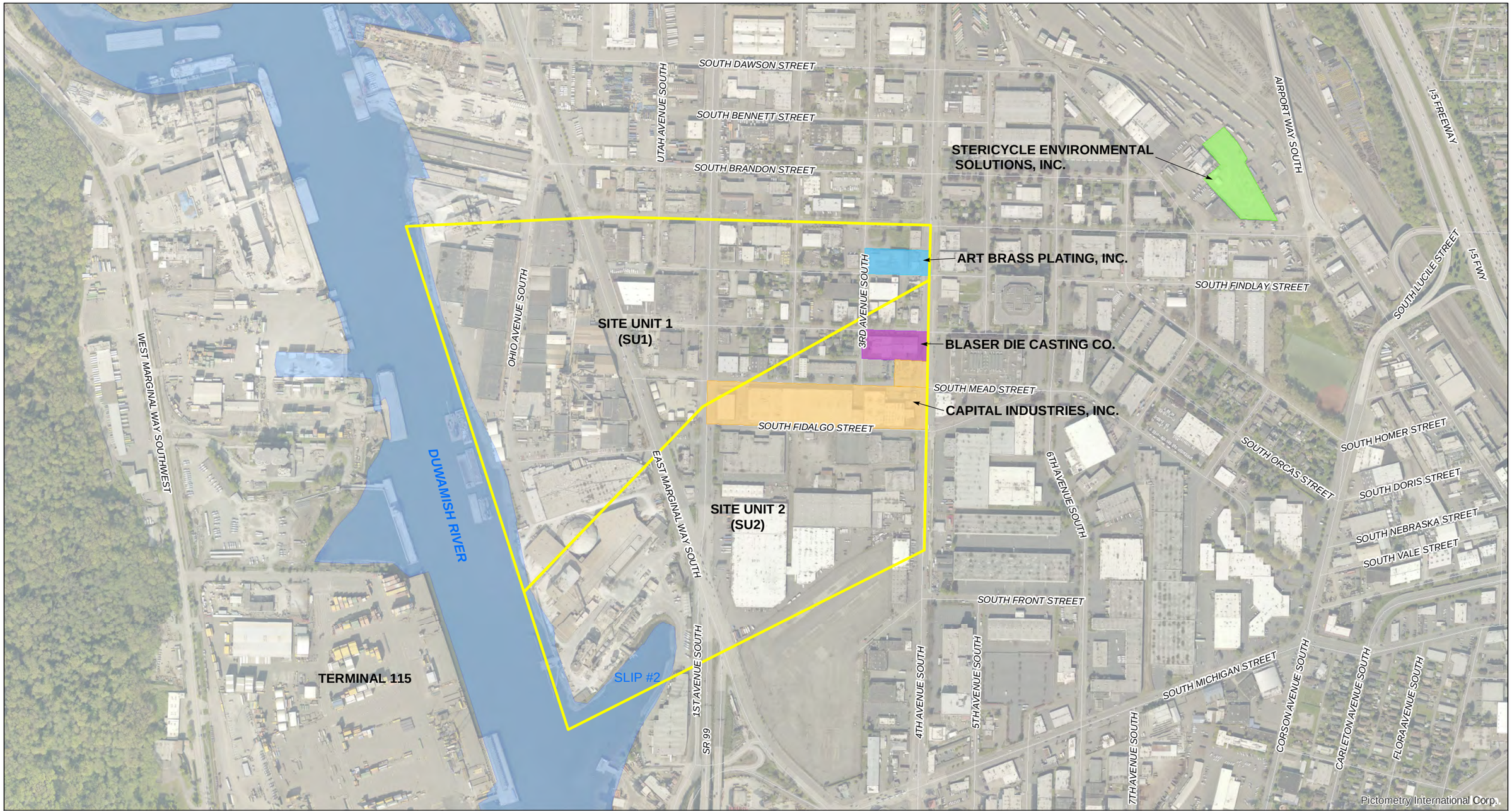
_____. 2019b. Letter Regarding Capital Industries Plant 4 Interim Action Soil Vapor Extraction Pilot Test Schedule, Capital Industries, Inc., 5801 Third Avenue South, Seattle, Washington. From Jennifer L. Moore and Jeffrey Kaspar. To Ed Jones, Washington State Department of Ecology. February 22.

West of Fourth Group and Pacific Groundwater Group. 2016. *West of 4th Site Unit 2 Feasibility Study, Seattle, Washington*. August 11.

FIGURES

FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN
West of 4th Group Site
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-008



LEGEND

- ART BRASS PLATING, INC.
- BLASER DIE CASTING CO.
- CAPITAL INDUSTRIES, INC.
- STERICYCLE ENVIRONMENTAL SOLUTIONS, INC.
- SITE UNIT BOUNDARY

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Portland | Bend | Baker City

California
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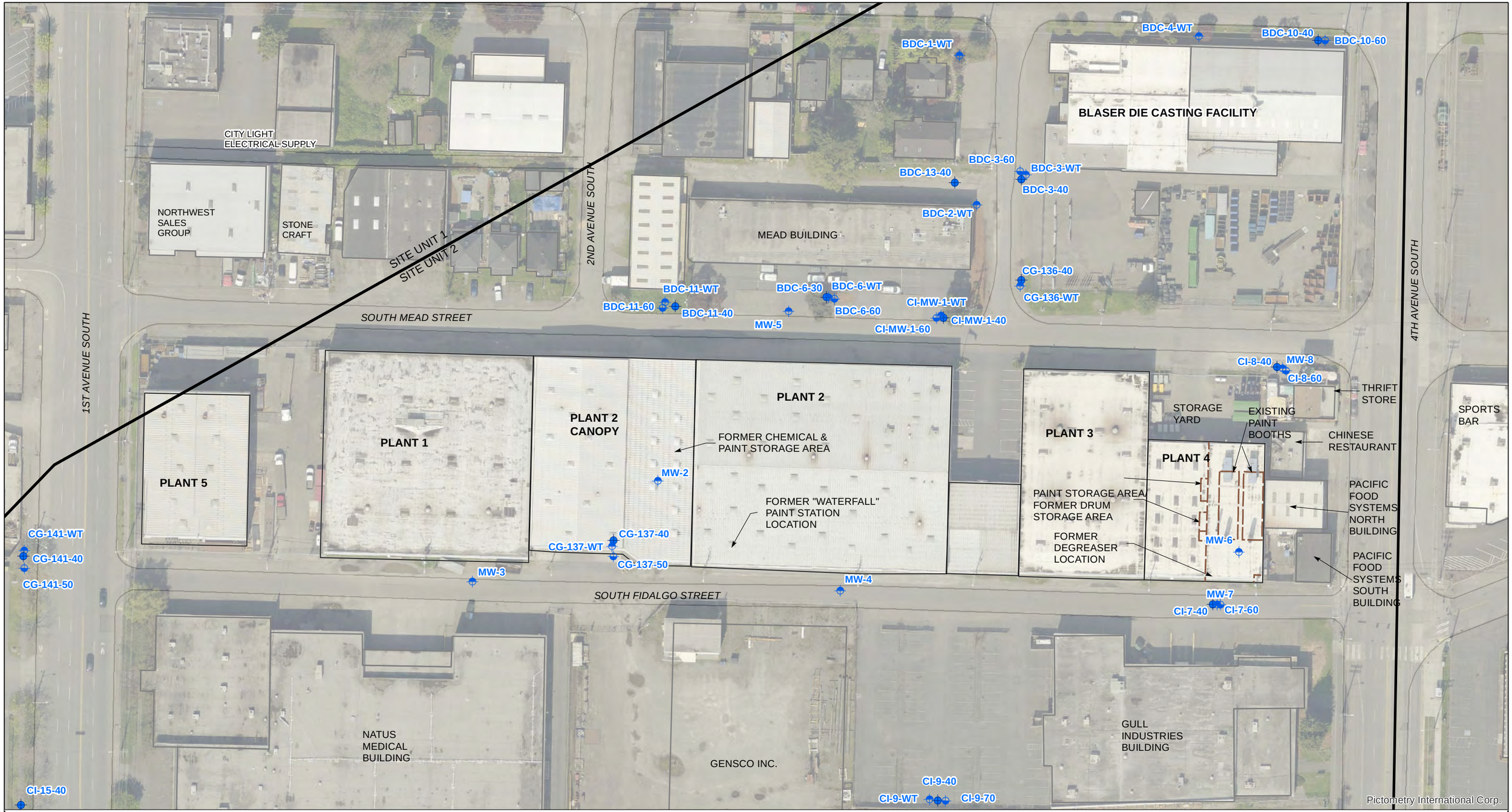
FIGURE 1

SITE DIAGRAM
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin | Checked By: JK | Date: 5/7/2018 | Disc Reference:

Document Path: Q:\Projects\457 CapitalIndust\008 PilotStudy\InterimWorkPlan\Revision_20180507\Figure1_Sitemap.mxd



LEGEND

- WATER TABLE INTERVAL MONITORING WELL
- SHALLOW INTERVAL MONITORING WELL
- INTERMEDIATE INTERVAL MONITORING WELL
- PLANT 4 CURRENT INTERIOR FEATURE
- SITE UNIT BOUNDARY
- BUILDING

NOTES:
1. ALL LOCATIONS ARE APPROXIMATE.
2. FIGURES WERE PRODUCED IN COLOR. GRAYSCALE COPIES MAY NOT REPRODUCE ALL ORIGINAL INFORMATION.

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FIGURE 2

PROPERTY DIAGRAM
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin | Checked By: JK | Date: 3/13/2019 | Disc Reference:

Document Path: Q:\Projects\457 CapitalIndust\008 PilotStudy\Mapfiles\InterimWorkPlan\Revisions_201903\Figure2_PropertyDiagram.mxd

PLANT 3

POWER LINE TO PLANT 4 CONTROL ROOM

STORAGE YARD

ELECTRICAL CONTROL ROOM

FORMER THRIFT STORE 5801 4TH AVE S

4TH AVENUE SOUTH

SPORTS BAR

CHINESE RESTAURANT 5807 4TH AVE S

EXISTING PAINT BOOTHS

INTERIOR WALL

PLANT 4

DRUM STORAGE AREA

PAINT STORAGE AREA/ FORMER DRUM STORAGE AREA

SECONDARY CONTAINMENT FOR SOLVENT STILL

STORAGE YARD

OVERHEAD GAS LINE

RESTROOM

SOUTH FIDALGO STREET

PACIFIC FOOD SYSTEMS NORTH BUILDING 5815 4TH AVE S

PACIFIC FOOD SYSTEMS SOUTH BUILDING 5815 4TH AVE S

P4-1 P4-2 P4-3 P4-4 P4-5 P4-6 P4-7 P4-8 P4-9 P4-10 P4-11 P4-12 P4-13 P4-14

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-4	1.0	0.0010 U	**0.060**	0.0022	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0090	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0010 U	0.010	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-2	1.0	0.00099 U	0.0039	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00096 U	0.002	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-3	1.0	0.00089 U	0.0069	0.00089 U	0.00089 U	0.00089 U
	3.0	0.0010 U	0.0028	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0011 U	0.0028	0.0011 U	0.0011 U	0.0011 U
	6.3	0.0012 U	0.0053	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-1	1.0	0.0085	**0.045**	0.00098 U	0.00098 U	0.00098 U
	3.0	0.0013	0.0068	0.00099 U	0.00099 U	0.00099 U
	5.0	0.0031	0.015	0.0010 U	0.0010 U	0.0010 U
	7.8	0.0036	0.0068	0.0016 U	0.0016 U	0.0016 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-5	1.0	0.012	0.013	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0087	0.010	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.016	0.0010 U	0.0010 U	0.0010 U
	6.0	0.023	0.023	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0094	0.0074	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-13	1.0	0.0029	0.004	0.0010 U	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U
	8.0	0.0016	0.0018	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-14	1.0	0.018	0.0095	0.0011 U	0.0011 U	0.0011 U
	3.0	0.0095	0.0069	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.0092	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0076	0.0040	0.0014 U	0.0014 U	0.0014 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-12	1.0	0.028	0.0028	0.0012 U	0.0012 U	0.0012 U
	2.8	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0089	0.0011	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0014	0.0011 U	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-9	1.0	0.021	0.020	0.0010 U	0.0010 U	0.0010 U
	2.0	0.0098	0.0059	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0036	0.0028	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-7	1.0	**0.26**	**0.48**	0.0055	0.0013	0.00094 U
	3.0	0.0073	0.019	0.0010 U	0.0010 U	0.0010 U
	5.0	0.026	**0.057**	0.0013	0.0010 U	0.0010 U
	6.9	0.0010 U	0.0017	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0059	0.0094	0.0012 U	0.0012 U	0.0012 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-8	1.0	**0.33**	**0.36**	0.0081	0.0015	0.00094 U
	3.0	0.035	**0.076**	0.0053	0.0011 U	0.0011 U
	5.0	0.050	**0.12**	0.0088	0.00098 U	0.00098 U
	8.0	0.025	0.022	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-6	1.0	**0.64**	**0.32**	0.0010 U	0.0010 U	0.0010 U
	3.0	0.040	**0.036**	0.0010 U	0.0010 U	0.0010 U
	5.7	0.066	**0.044**	0.00096 U	0.00096 U	0.00096 U
	8.0	0.015	0.0055	0.0014 U	0.0014 U	0.0014 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-10	1.0	0.019	0.00094 U	0.00094 U	0.00094 U	0.00094 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0015	0.00099 U	0.00099 U	0.00099 U	0.00099 U
	8.0	0.0031	0.0015 U	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-11	1.0	0.054	0.0031	0.0010 U	0.0010 U	0.0010 U
	3.0	0.005	0.0010 U	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	8.0	0.0039	0.0010 U	0.0010 U	0.0010 U	0.0010 U

PCE ug/m^3
3396.253
2252.423
1493.826
990.718
657.052
435.763
289.001
191.668
127.116
84.304
55.911
37.081
24.592
16.310
10.817
7.174
4.758
3.155
2.093
1.388
0.920

LEGEND

- DIRECT-PUSH SOIL BORING
- PLANT 4 CURRENT INTERIOR FEATURE
- HYDRANT
- WATER DISTRIBUTION MAIN
- WATER SERVICE LINE
- HYDRANT LATERAL
- COMBINED SANITARY SEWER/ STORMWATER MANHOLE
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

NOTES:
SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM

BOLD = INDICATES CONCENTRATIONS EXCEED WEST OF 4th GROUP SOIL INVESTIGATION PRELIMINARY CLEANUP LEVELS
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
CI = CAPITAL INDUSTRIES
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

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Portland | Bend | Baker City

California
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FIGURE 3A

CI PLANT 4 SOIL ANALYTICAL RESULTS AND TETRACHLOROETHENE SOIL GAS RESULTS WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin | Checked By: JK | Date: 3/13/2019 | Disc Reference:
Path: Q:\Projects\457 CapitalIndust\008 PilotStudy\Mapfiles\InterimWorkPlan\Revisions 201903\Figure3A_Plant4SoilGas.mxd

PLANT 3

PLANT 4

POWER LINE TO PLANT 4 CONTROL ROOM

STORAGE YARD

ELECTRICAL CONTROL ROOM

FORMER THRIFT STORE 5801 4TH AVE S

4TH AVENUE SOUTH

SPORTS BAR

CHINESE RESTAURANT 5807 4TH AVE S

EXISTING PAINT BOOTHS

INTERIOR WALL

DRUM STORAGE AREA

PAINT STORAGE AREA/ FORMER DRUM STORAGE AREA

SECONDARY CONTAINMENT FOR SOLVENT STILL

STORAGE YARD

OVERHEAD GAS LINE

RESTROOM

PACIFIC FOOD SYSTEMS NORTH BUILDING 5815 4TH AVE S

PACIFIC FOOD SYSTEMS SOUTH BUILDING 5815 4TH AVE S

SOUTH FIDALGO STREET

P4-1 P4-2 P4-3 P4-4 P4-5 P4-6 P4-7 P4-8 P4-9 P4-10 P4-11 P4-12 P4-13 P4-14

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-4	1.0	0.0010 U	**0.060**	0.0022	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0090	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0010 U	0.010	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-2	1.0	0.00099 U	0.0039	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00096 U	0.002	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-3	1.0	0.00089 U	0.0069	0.00089 U	0.00089 U	0.00089 U
	3.0	0.0010 U	0.0028	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0011 U	0.0028	0.0011 U	0.0011 U	0.0011 U
	6.3	0.0012 U	0.0053	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-1	1.0	0.0085	**0.045**	0.00098 U	0.00098 U	0.00098 U
	3.0	0.0013	0.0068	0.00099 U	0.00099 U	0.00099 U
	5.0	0.0031	0.015	0.0010 U	0.0010 U	0.0010 U
	7.8	0.0036	0.0068	0.0016 U	0.0016 U	0.0016 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-5	1.0	0.012	0.013	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0087	0.010	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.016	0.0010 U	0.0010 U	0.0010 U
	6.0	0.023	0.023	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0094	0.0074	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-13	1.0	0.0029	0.004	0.0010 U	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U
	8.0	0.0016	0.0018	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-14	1.0	0.018	0.0095	0.0011 U	0.0011 U	0.0011 U
	3.0	0.0095	0.0069	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.0092	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0076	0.0040	0.0014 U	0.0014 U	0.0014 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-12	1.0	0.028	0.0028	0.0012 U	0.0012 U	0.0012 U
	2.8	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0089	0.0011	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0014	0.0011 U	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-9	1.0	0.021	0.020	0.0010 U	0.0010 U	0.0010 U
	2.0	0.0098	0.0059	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0036	0.0028	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-7	1.0	**0.26**	**0.48**	0.0055	0.0013	0.00094 U
	3.0	0.0073	0.019	0.0010 U	0.0010 U	0.0010 U
	5.0	0.026	**0.057**	0.0013	0.0010 U	0.0010 U
	6.9	0.0010 U	0.0017	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0059	0.0094	0.0012 U	0.0012 U	0.0012 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-8	1.0	**0.33**	**0.36**	0.0081	0.0015	0.00094 U
	3.0	0.035	**0.076**	0.0053	0.0011 U	0.0011 U
	5.0	0.050	**0.12**	0.0088	0.00098 U	0.00098 U
	8.0	0.025	0.022	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-6	1.0	**0.64**	**0.32**	0.0010 U	0.0010 U	0.0010 U
	3.0	0.040	**0.036**	0.0010 U	0.0010 U	0.0010 U
	5.7	0.066	**0.044**	0.00096 U	0.00096 U	0.00096 U
	8.0	0.015	0.0055	0.0014 U	0.0014 U	0.0014 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-10	1.0	0.019	0.00094 U	0.00094 U	0.00094 U	0.00094 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0015	0.00099 U	0.00099 U	0.00099 U	0.00099 U
	8.0	0.0031	0.0015 U	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-11	1.0	0.054	0.0031	0.0010 U	0.0010 U	0.0010 U
	3.0	0.005	0.0010 U	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	8.0	0.0039	0.0010 U	0.0010 U	0.0010 U	0.0010 U

7046.931
4894.406
3399.382
2361.022
1639.834
1138.938
791.043
549.414
381.593
265.033
184.077
127.850
88.797
61.674
42.835
29.751
20.663
14.352
9.968
6.923
4.808
TCE ug/m^3

LEGEND

- DIRECT-PUSH SOIL BORING
- PLANT 4 CURRENT INTERIOR FEATURE
- HYDRANT
- WATER DISTRIBUTION MAIN
- WATER SERVICE LINE
- HYDRANT LATERAL
- COMBINED SANITARY SEWER/ STORMWATER MANHOLE
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM

BOLD = INDICATES CONCENTRATIONS EXCEED WEST OF 4th GROUP SOIL INVESTIGATION PRELIMINARY CLEANUP LEVELS
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
CI = CAPITAL INDUSTRIES
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

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FIGURE 3B

CI PLANT 4 SOIL ANALYTICAL RESULTS AND TRICHLOROETHENE SOIL GAS RESULTS
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin | Checked By: JK | Date: 3/13/2019 | Disc Reference:
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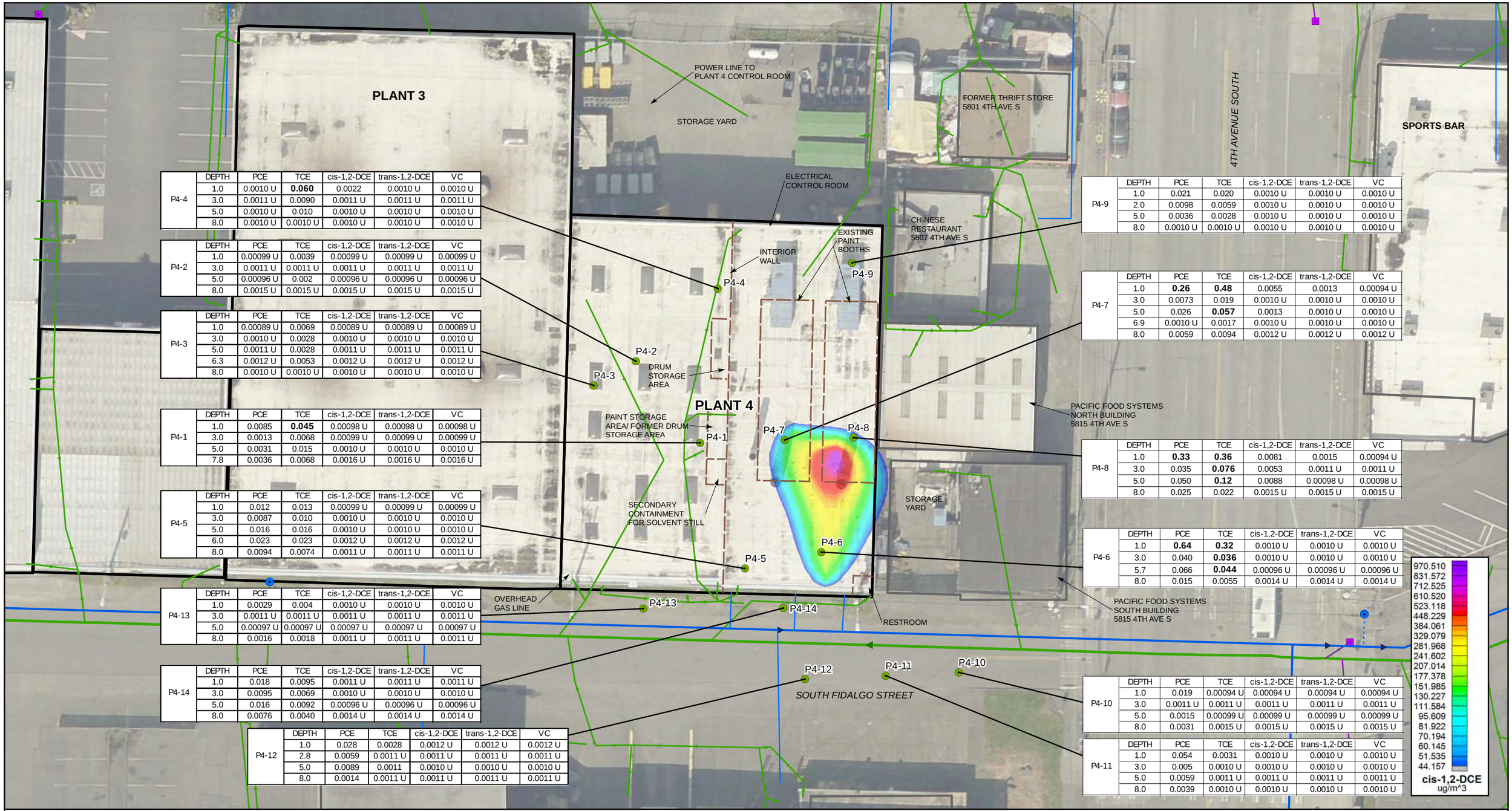

P4-4	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.0010 U	**0.060**	0.0022	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0090	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0010 U	0.010	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

P4-2	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.00099 U	0.0039	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00096 U	0.002	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U

P4-3	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.00089 U	0.0069	0.00089 U	0.00089 U	0.00089 U
	3.0	0.0010 U	0.0028	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0011 U	0.0028	0.0011 U	0.0011 U	0.0011 U
	6.3	0.0012 U	0.0053	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

P4-1	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.0085	**0.045**	0.00098 U	0.00098 U	0.00098 U
	3.0	0.0013	0.0068	0.00099 U	0.00099 U	0.00099 U
	5.0	0.0031	0.015	0.0010 U	0.0010 U	0.0010 U
	7.8	0.0036	0.0068	0.0016 U	0.0016 U	0.0016 U

P4-5	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.012	0.013	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0087	0.010	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.016	0.0010 U	0.0010 U	0.0010 U
	6.0	0.023	0.023	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0094	0.0074	0.0011 U	0.0011 U	0.0011 U

P4-13	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.0029	0.004	0.0010 U	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U
	8.0	0.0016	0.0018	0.0011 U	0.0011 U	0.0011 U

P4-14	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.018	0.0095	0.0011 U	0.0011 U	0.0011 U
	3.0	0.0095	0.0069	0.0010 U	0.0010 U	0.0010 U
	5.0	0.016	0.0092	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0076	0.0040	0.0014 U	0.0014 U	0.0014 U

P4-12	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.028	0.0028	0.0012 U	0.0012 U	0.0012 U
	2.8	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0089	0.0011	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0014	0.0011 U	0.0011 U	0.0011 U	0.0011 U

P4-9	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.021	0.020	0.0010 U	0.0010 U	0.0010 U
	2.0	0.0098	0.0059	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0036	0.0028	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

P4-7	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	**0.26**	**0.48**	0.0055	0.0013	0.00094 U
	3.0	0.0073	0.019	0.0010 U	0.0010 U	0.0010 U
	5.0	0.026	**0.057**	0.0013	0.0010 U	0.0010 U
	6.9	0.0010 U	0.0017	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0059	0.0094	0.0012 U	0.0012 U	0.0012 U

P4-8	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	**0.33**	**0.36**	0.0081	0.0015	0.00094 U
	3.0	0.035	**0.076**	0.0053	0.0011 U	0.0011 U
	5.0	0.050	**0.12**	0.0088	0.00098 U	0.00098 U
	8.0	0.025	0.022	0.0015 U	0.0015 U	0.0015 U

P4-6	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	**0.64**	**0.32**	0.0010 U	0.0010 U	0.0010 U
	3.0	0.040	**0.036**	0.0010 U	0.0010 U	0.0010 U
	5.7	0.066	**0.044**	0.00096 U	0.00096 U	0.00096 U
	8.0	0.015	0.0055	0.0014 U	0.0014 U	0.0014 U

P4-10	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.019	0.00094 U	0.00094 U	0.00094 U	0.00094 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0015	0.00099 U	0.00099 U	0.00099 U	0.00099 U
	8.0	0.0031	0.0015 U	0.0015 U	0.0015 U	0.0015 U

P4-11	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	1.0	0.054	0.0031	0.0010 U	0.0010 U	0.0010 U
	3.0	0.005	0.0010 U	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0059	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	8.0	0.0039	0.0010 U	0.0010 U	0.0010 U	0.0010 U

LEGEND

- DIRECT-PUSH SOIL BORING
- PLANT 4 CURRENT INTERIOR FEATURE
- HYDRANT
- WATER DISTRIBUTION MAIN
- WATER SERVICE LINE
- HYDRANT LATERAL
- COMBINED SANITARY SEWER/ STORMWATER MANHOLE
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

NOTES:
SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM

BOLD = INDICATES CONCENTRATIONS EXCEED WEST OF 4th GROUP SOIL INVESTIGATION PRELIMINARY CLEANUP LEVELS
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
CI = CAPITAL INDUSTRIES
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

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FIGURE 3C

CI PLANT 4 SOIL ANALYTICAL RESULTS AND CIS-1,2,DICHLOROETHENE SOIL GAS RESULTS WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin
Checked By: JK
Date: 3/13/2019
Disc Reference:
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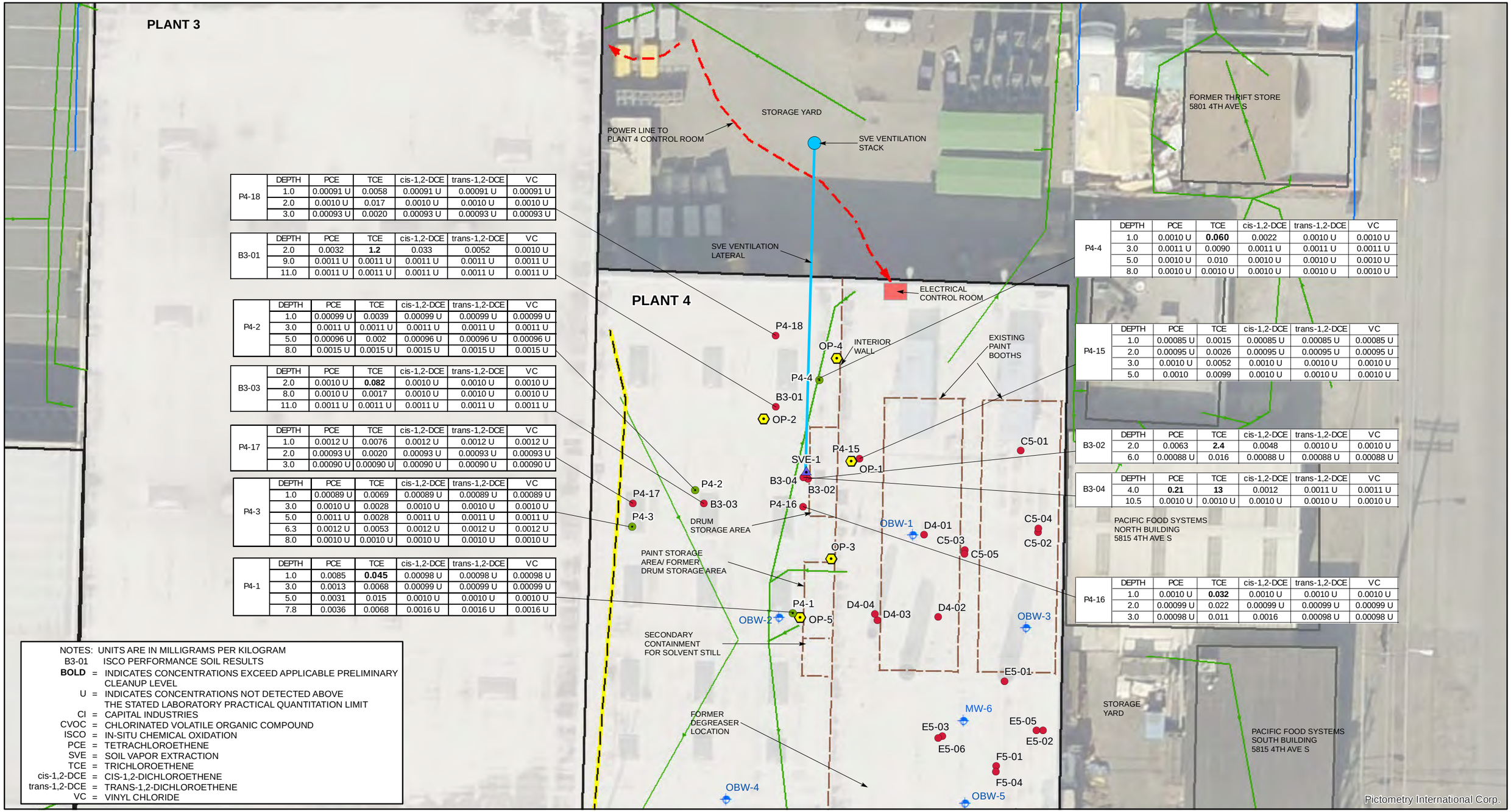

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-18	1.0	0.00091 U	0.0058	0.00091 U	0.00091 U	0.00091 U
	2.0	0.0010 U	0.017	0.0010 U	0.0010 U	0.0010 U
	3.0	0.00093 U	0.0020	0.00093 U	0.00093 U	0.00093 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
B3-01	2.0	0.0032	**1.2**	0.033	0.0052	0.0010 U
	9.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	11.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-2	1.0	0.00099 U	0.0039	0.00099 U	0.00099 U	0.00099 U
	3.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
	5.0	0.00096 U	0.002	0.00096 U	0.00096 U	0.00096 U
	8.0	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
B3-03	2.0	0.0010 U	**0.082**	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0017	0.0010 U	0.0010 U	0.0010 U
	11.0	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-17	1.0	0.0012 U	0.0076	0.0012 U	0.0012 U	0.0012 U
	2.0	0.00093 U	0.0020	0.00093 U	0.00093 U	0.00093 U
	3.0	0.00090 U	0.00090 U	0.00090 U	0.00090 U	0.00090 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-3	1.0	0.00089 U	0.0069	0.00089 U	0.00089 U	0.00089 U
	3.0	0.0010 U	0.0028	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0011 U	0.0028	0.0011 U	0.0011 U	0.0011 U
	6.3	0.0012 U	0.0053	0.0012 U	0.0012 U	0.0012 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-1	1.0	0.0085	**0.045**	0.00098 U	0.00098 U	0.00098 U
	3.0	0.0013	0.0068	0.00099 U	0.00099 U	0.00099 U
	5.0	0.0031	0.015	0.0010 U	0.0010 U	0.0010 U
	7.8	0.0036	0.0068	0.0016 U	0.0016 U	0.0016 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-4	1.0	0.0010 U	**0.060**	0.0022	0.0010 U	0.0010 U
	3.0	0.0011 U	0.0090	0.0011 U	0.0011 U	0.0011 U
	5.0	0.0010 U	0.010	0.0010 U	0.0010 U	0.0010 U
	8.0	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-15	1.0	0.00085 U	0.0015	0.00085 U	0.00085 U	0.00085 U
	2.0	0.00095 U	0.0026	0.00095 U	0.00095 U	0.00095 U
	3.0	0.0010 U	0.0052	0.0010 U	0.0010 U	0.0010 U
	5.0	0.0010	0.0099	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
B3-02	2.0	0.0063	**2.4**	0.0048	0.0010 U	0.0010 U
	6.0	0.00088 U	0.016	0.00088 U	0.00088 U	0.00088 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
B3-04	4.0	**0.21**	**13**	0.0012	0.0011 U	0.0011 U
	10.5	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U

	DEPTH	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
P4-16	1.0	0.0010 U	**0.032**	0.0010 U	0.0010 U	0.0010 U
	2.0	0.00099 U	0.022	0.00099 U	0.00099 U	0.00099 U
	3.0	0.00098 U	0.011	0.0016	0.00098 U	0.00098 U

NOTES: UNITS ARE IN MILLIGRAMS PER KILOGRAM
B3-01 ISCO PERFORMANCE SOIL RESULTS
BOLD = INDICATES CONCENTRATIONS EXCEED APPLICABLE PRELIMINARY CLEANUP LEVEL
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
CI = CAPITAL INDUSTRIES
CVOC = CHLORINATED VOLATILE ORGANIC COMPOUND
ISCO = IN-SITU CHEMICAL OXIDATION
PCE = TETRACHLOROETHENE
SVE = SOIL VAPOR EXTRACTION
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

LEGEND

- DIRECT-PUSH SOIL BORING
- ISCO PERFORMANCE BORING
- PROPOSED SVE EXTRACTION WELL
- PROPOSED OBSERVATION WELL
- WATER TABLE INTERVAL MONITORING WELL
- SHALLOW INTERVAL MONITORING WELL
- INTERMEDIATE INTERVAL MONITORING WELL
- SVE VENTILATION LATERAL AND STACK
- ELECTRICAL LINE
- OVERHEAD GAS LINE
- PLANT 4 CURRENT INTERIOR FEATURES
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

NOTES:
ALL LOCATIONS ARE APPROXIMATE. FIGURES WERE PRODUCED IN COLOR. GRAYSCALE COPIES MAY NOT REPRODUCE ALL ORIGINAL INFORMATION.

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FIGURE 4

TCE DELINEATION AND SVE PILOT TEST PLAN
FOR CI PLANT 4
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: tperrin
Checked By: JM
Date: 5/14/2019
Disc Reference:
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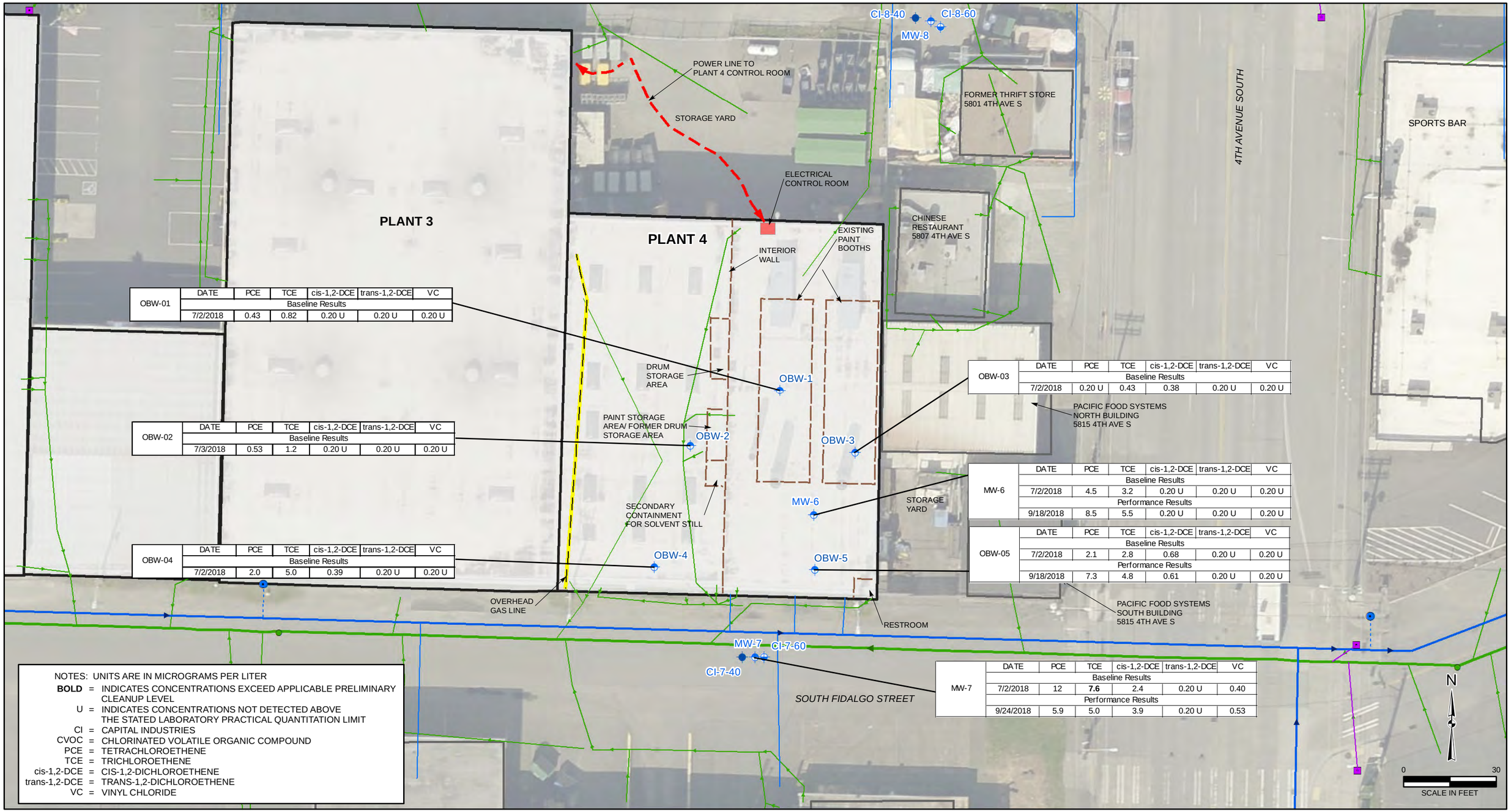

OBW-01	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	0.43	0.82	0.20 U	0.20 U	0.20 U

OBW-02	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/3/2018	0.53	1.2	0.20 U	0.20 U	0.20 U

OBW-04	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	2.0	5.0	0.39	0.20 U	0.20 U

OBW-03	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	0.20 U	0.43	0.38	0.20 U	0.20 U

MW-6	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	4.5	3.2	0.20 U	0.20 U	0.20 U
	Performance Results					
	9/18/2018	8.5	5.5	0.20 U	0.20 U	0.20 U

OBW-05	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	2.1	2.8	0.68	0.20 U	0.20 U
	Performance Results					
	9/18/2018	7.3	4.8	0.61	0.20 U	0.20 U

MW-7	DATE	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
	Baseline Results					
	7/2/2018	12	**7.6**	2.4	0.20 U	0.40
	Performance Results					
	9/24/2018	5.9	5.0	3.9	0.20 U	0.53

NOTES: UNITS ARE IN MICROGRAMS PER LITER
BOLD = INDICATES CONCENTRATIONS EXCEED APPLICABLE PRELIMINARY CLEANUP LEVEL
U = INDICATES CONCENTRATIONS NOT DETECTED ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT
CI = CAPITAL INDUSTRIES
CVOC = CHLORINATED VOLATILE ORGANIC COMPOUND
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHENE
cis-1,2-DCE = CIS-1,2-DICHLOROETHENE
trans-1,2-DCE = TRANS-1,2-DICHLOROETHENE
VC = VINYL CHLORIDE

LEGEND

- WATER TABLE INTERVAL MONITORING WELL
- SHALLOW INTERVAL MONITORING WELL
- INTERMEDIATE INTERVAL MONITORING WELL
- ELECTRICAL LINE
- OVERHEAD GAS LINE
- PLANT 4 CURRENT INTERIOR FEATURE
- HYDRANT
- WATER DISTRIBUTION MAIN
- WATER SERVICE LINE
- HYDRANT LATERAL
- COMBINED SANITARY SEWER/ STORMWATER MANHOLE
- COMBINED SANITARY SEWER/STORMWATER MAIN LINE AND FLOW DIRECTION
- SANITARY SEWER LATERAL AND FLOW DIRECTION
- STORMWATER CATCH BASIN
- STORMWATER SIDE SEWER/LATERAL

NOTES:
ALL LOCATIONS ARE APPROXIMATE.
FIGURES WERE PRODUCED IN COLOR.
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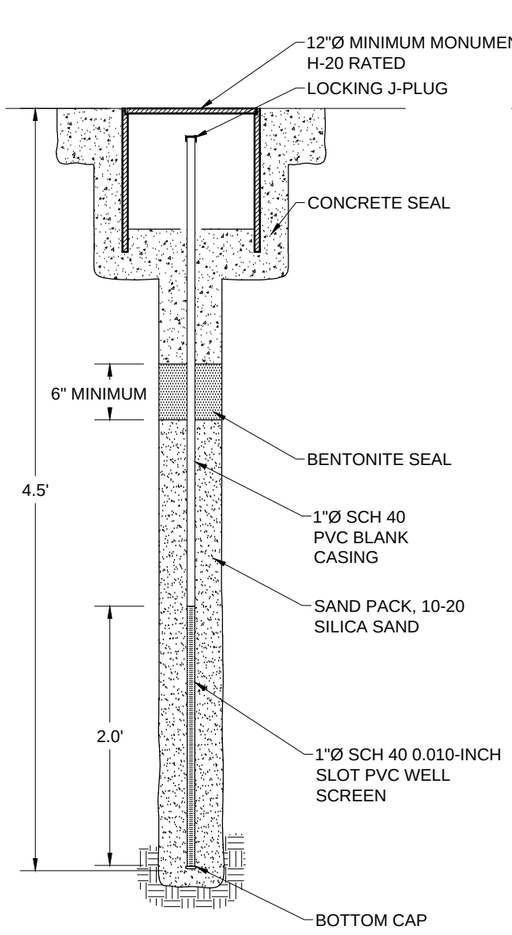
FIGURE 5

2018 CI PLANT 4 GROUNDWATER CVOC RESULTS
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

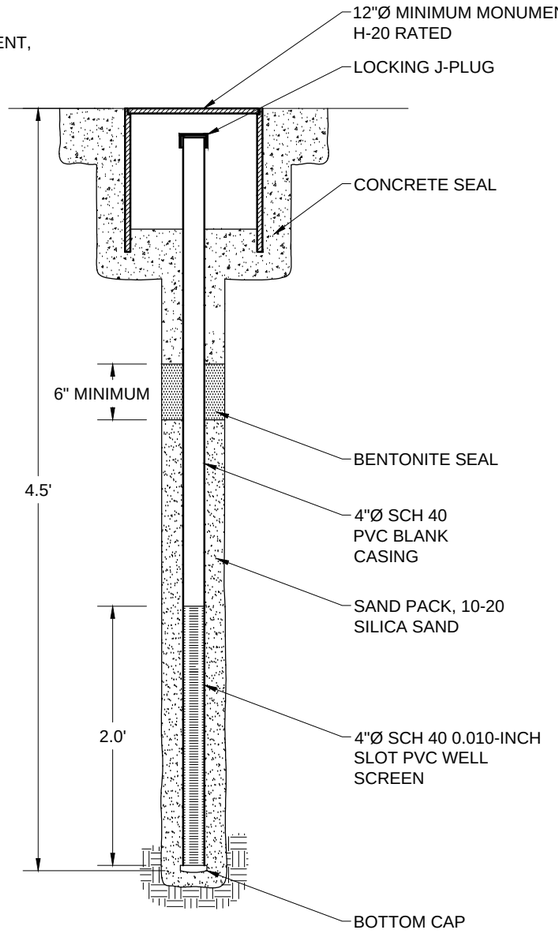
FARALLON PN: 457-008

Drawn By: tperrin
Checked By: JM
Date: 4/1/2019
Disc Reference:
Path: Q:\Projects\457 CapitalIndust\008 PilotStudy\Mapfiles\InterimWorkPlan\Revisions_201903\Figure-05_CVOC_Monitoring_GW.mxd



OBSERVATION WELL

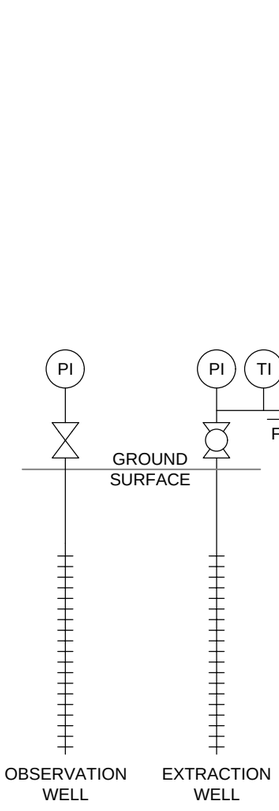
NOT TO SCALE



NOTES:
PVC = POLYVINYL CHLORIDE
SCH = SCHEDULE

EXTRACTION WELL

NOT TO SCALE



LEGEND:

- PI — PRESSURE INDICATOR
- VRV — VACUUM RELIEF VALVE
- TI — TEMPERATURE INDICATOR
- PID — PHOTOIONIZATION DETECTOR
- SP — SAMPLING PORT
- AF — AIR FILTER
- GATE VALVE
- BALL VALVE
- FLOWMETER (ROTAMETER)

PROCESS AND INSTRUMENTATION DIAGRAM

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FIGURE 6

PROCESS AND INSTRUMENTATION DIAGRAM
WEST OF 4TH GROUP SITE
CAPITAL INDUSTRIES, INC.
5801 3RD AVENUE SOUTH
SEATTLE, WASHINGTON

FARALLON PN: 457-008

Drawn By: ROL Checked By: SS Date: 05/15/2019 Disk Reference: 457-008 SVE PT

P:\Projects\457-008\CAD\Figures\CI Plant 4 SVE PT WOA\457-008 SVEPT.dwg, 5/15/2019 1:30:50 PM

TABLES

FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN
West of 4th Group Site
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-008

Table 1
Summary of Preliminary Cleanup Levels Updated January 17, 2017
West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Constituent of Concern	Carcinogen or Non-Carcinogen	Preliminary Cleanup Levels													
		Soil					Groundwater				Air		Surface Water		Sediment
		Puget Sound Background Concentrations for Metals[1]	Soil Cleanup Level Protective of Direct Contact Pathway (Unrestricted Land Use)[2]	Soil Cleanup Level Protective of Direct Contact Pathway (Industrial Land Use)[2]	Soil Cleanup Level Protective of Air Quality Based on Protection of Groundwater as Potable Drinking Water[3]	Soil Cleanup Level Protective of Groundwater Concentrations Protective of Surface Water Quality[4]	Groundwater Cleanup Level Protective of Air Quality Water Table Zone (Unrestricted Land Use)[5]	Groundwater Cleanup Level Protective of Air Quality Water Table Zone (Industrial Land Use)[5]	Groundwater Cleanup Level Protective of Surface Water[6]	Groundwater Cleanup Level Protective of Sediment[7]	Air Cleanup Level Protective of Inhalation Pathway (Unrestricted Land Use)[2]	Air Cleanup Level Protective of Inhalation Pathway (Industrial Land Use)[2]	Surface Water Cleanup Level Protective of Human Health[8]	Surface Water Cleanup Level Protective of Aquatic Life	Sediment Cleanup Level[9]
		(milligrams/kilogram)					(micrograms/liter)				(micrograms/cubic meter)		(micrograms/liter)		(milligrams/kilogram)
Tetrachloroethene	Carcinogen	--	476	21,000	0.08	0.044	116	482	2.9	36,000	9.6	40	2.9	--	190
Trichloroethene	Carcinogen	--	12	1,750	0.03	0.006	6.9	37	0.7	4,760,000	0.37	2	0.7	194 [12]	8,950
cis-1,2-dichloroethene	Non-Carcinogen	--	160	7,000	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-dichloroethene	Non-Carcinogen	--	1,600	70,000	0.59	6	559	1,224	1,000	--	27.4	60	1,000	--	--
1,1-dichloroethene	Non-Carcinogen	--	4,000	175,000	0.055	0.025	538	1,176	3.2	--	91.4	200	3.2	--	--
Vinyl chloride	Carcinogen	--	0.67	87.5	0.002	0.001	1.3	12.7	0.18	543,000	0.28	2.8	0.18	210 [13]	202
1,4-dioxane	Carcinogen	--	10	1,310	0.004	0.32	2,551	25,510	78	--	0.5	5	78	--	--
Arsenic	Carcinogen	20	20	87.5	Not Applicable	0.082	Not Applicable	Not Applicable	0.14 / 5 [10]	241	Not Applicable	Not Applicable	0.14 / 5 [10]	36 [14]	7
Barium	Non-Carcinogen	--	16,000	700,000	Not Applicable	824	Not Applicable	Not Applicable	--	--	Not Applicable	Not Applicable	--	--	--
Cadmium	Non-Carcinogen	1	80	3,500	Not Applicable	1.2	Not Applicable	Not Applicable	8.8	760	Not Applicable	Not Applicable	--	8.8 [15]	5.1
Copper	Non-Carcinogen	36	3,200	140,000	Not Applicable	1.1	Not Applicable	Not Applicable	3.1 [11]	18,000	Not Applicable	Not Applicable	--	3.1 [15]	390
Iron	Non-Carcinogen	58,700	58,700	2,450,000	Not Applicable	--	Not Applicable	Not Applicable	--	--	Not Applicable	Not Applicable	1,000	--	--
Manganese	Non-Carcinogen	1,200	11,200	490,000	Not Applicable	--	Not Applicable	Not Applicable	100	--	Not Applicable	Not Applicable	100	--	--
Nickel	Non-Carcinogen	48	1,600	70,000	Not Applicable	11	Not Applicable	Not Applicable	8.2	2,200	Not Applicable	Not Applicable	100	8.2 [15]	15.9
Zinc	Non-Carcinogen	85	24,000	1,050,000	Not Applicable	101	Not Applicable	Not Applicable	81	6,600	Not Applicable	Not Applicable	1,000	81 [15]	410

NOTES:

Preliminary cleanup levels presented represent the most-stringent cleanup levels for the constituent of concern listed in the media indicated.

-- denotes no value is available. In the case of applicable or relevant and appropriate requirements (ARARs), the reference sources do not publish values for the noted chemicals. In the case of calculated values, one or more input parameters are not available.

Not Applicable denotes the constituent of concern will not affect the medium of potential concern due to an incomplete pathway.

[1] Background metals concentrations from *Natural Background Soil Metals Concentrations in Washington State* dated October 1994, Washington State Department of Ecology (Ecology) Publication No. 94-115. Arsenic background from Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Table 740-1, *Method A Soil Cleanup Levels for Unrestricted Land Uses.*

[2] Cleanup level is based on standard MTCA Method B (unrestricted land use) or Method C (industrial land use) values from the Cleanup and Risk Calculations tables (CLARC).

[3] Soil cleanup levels for protection of air quality are calculated using MTCA Equation 747-1, where the potable Method B groundwater cleanup level was used as C_w. Concentrations of hazardous substances in soil that meet the potable groundwater protection standard currently are considered sufficiently protective of the air pathway for unrestricted and industrial land uses.

[4] Soil cleanup levels for protection of surface water quality are calculated using MTCA Equation 747-1, where the groundwater cleanup level protective of surface water in this table was used as C_w.

[5] Groundwater cleanup levels protective of the air pathway for unrestricted land use (residential and commercial sites) and industrial land use were derived using the following equation: Gwcul = Aircul/GIVF.

[6] Human health and marine aquatic ecologic receptors were considered. See Surface Water Cleanup Levels Protective of Human Health and Aquatic Life (Columns N and O) in this table. The more-stringent value of the two receptors has been listed for the Groundwater Cleanup Level Protective of Surface Water.

[7] Groundwater screening levels based on the transfer of contaminants from groundwater to sediment were calculated by dividing the sediment screening level by the associated partition coefficients. Koc and Kd values are from MTCA. Fraction of carbon assumed at 0.02 based on Lower Duwamish Waterway Feasibility Study (AECOM 2012).

[8] The most-stringent exposure pathway for human health receptors is for consumption of fish. Listed values are based on ARARs contained in CLARC, with the following exceptions: (1) 1,4-dioxane is derived from MTCA Method B default values; (2) PCE, TCE, trans-1,2-DCE, vinyl chloride, nickel, and zinc are based on the U.S. Environmental Protection Agency (EPA) revised CWA [Clean Water Act]-Human *Health Criteria Applicable to Washington* dated November 15, 2016, "Organisms Only."

[9] Sediment has not been confirmed to be affected by groundwater discharge to surface water. Sediment cleanup levels were derived from the Lower Duwamish Waterway Superfund Site Record of Decisions (EPA 2014), which does not contain values for nickel, TCE, PCE, or vinyl chloride. These constituents also are not listed in the Sediment Management Standards (Chapter 173-204 of the Washington Administrative Code [WAC 173-204]). EPA Region III BTAG [Biological Technical Assistance Group] Marine Sediment Screening Benchmarks dated July 2006 have been listed for nickel, TCE, and PCE. EPA Region III has no value listed for vinyl chloride; therefore, the older Region 5 benchmarks were used (EPA 2003).

[10] Arsenic cleanup level of 5 micrograms per liter (µg/l) based on background concentrations for the State of Washington (MTCA Table 720-1).

[11] The surface water cleanup level for copper previously had been tabulated as 2.4 µg/l; however, this value is based on an approach using a site-specific water-effects ratio that has not been determined. This value was replaced with 3.1 µg/l from the National Recommended Water Quality Criteria - Aquatic Life Criteria Table published by EPA under Section 304 of the CWA.

[12] Based on the Oak Ridge National Laboratory Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota.

[13] DeRooij, C. et al. 2004. *Euro Chlor Risk Assessment for the Marine Environment Osparcom Region: North Sea – Environmental Monitoring and Assessment.*

[14] WAC 173-201A-240.

[15] National Recommended Water Quality Criteria - Aquatic Life Criteria Table published by EPA under Section 304 of the CWA.

Table updated on August 14, 2015 based on revisions to EPA Aquatic Water Quality Criteria; on July 20, 2016 based on Ecology comments on the Draft FS Reports for SU1 and SU2 (i.e., footnotes clarified, sediment values, and surface water CULs protective of aquatic life added); and January 17, 2017 based on EPA revisions to the CWA Human Health criteria dated November 15, 2016.

Kd = distribution coefficient
Koc = soil organic carbon-water partition coefficient
PCE = tetrachloroethene
t-1,2-DCE = trans-1,2-dichloroethene
TCE = trichloroethene

Table 2
Summary of Soil Analytical Results for CVOCs for CI Plant 4
West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Sample Location	Sample Identification	Sampled By	Sample Date	Sample Depth (feet)[1]	Analytical Results (milligrams per kilogram)[2]				
					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
P4-1	P4-B1-1.0	Farallon	10/17/2015	1.0	0.0085	**0.045**	< 0.00098	< 0.00098	< 0.00098
	P4-B1-3.0	Farallon	10/17/2015	3.0	0.0013	0.0068	< 0.00099	< 0.00099	< 0.00099
	P4-B1-5.0	Farallon	10/17/2015	5.0	0.0031	0.015	< 0.0010	< 0.0010	< 0.0010
	P4-B1-7.8	Farallon	10/17/2015	7.8	0.0036	0.0068	< 0.0016	< 0.0016	< 0.0016
P4-2	P4-B2-1.0	Farallon	10/17/2015	1.0	< 0.00099	0.0039	< 0.00099	< 0.00099	< 0.00099
	P4-B2-3.0	Farallon	10/17/2015	3.0	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B2-5.0	Farallon	10/17/2015	5.0	< 0.00096	0.0020	< 0.00096	< 0.00096	< 0.00096
	P4-B2-8.0	Farallon	10/17/2015	8.0	< 0.0015	< 0.0015	< 0.0015	< 0.0015	< 0.0015
P4-3	P4-B3-1.0	Farallon	10/17/2015	1.0	< 0.00089	0.0069	< 0.00089	< 0.00089	< 0.00089
	P4-B3-3.0	Farallon	10/17/2015	3.0	< 0.0010	0.0028	< 0.0010	< 0.0010	< 0.0010
	P4-B3-5.0	Farallon	10/17/2015	5.0	< 0.0011	0.0028	< 0.0011	< 0.0011	< 0.0011
	P4-B3-6.3	Farallon	10/17/2015	6.3	< 0.0012	0.0053	< 0.0012	< 0.0012	< 0.0012
	P4-B3-8.0	Farallon	10/17/2015	8.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
P4-4	P4-B4-1.0	Farallon	10/17/2015	1.0	< 0.0010	**0.060**	0.0022	< 0.0010	< 0.0010
	P4-B4-3.0	Farallon	10/17/2015	3.0	< 0.0011	0.0090	< 0.0011	< 0.0011	< 0.0011
	P4-B4-5.0	Farallon	10/17/2015	5.0	< 0.0010	0.010	< 0.0010	< 0.0010	< 0.0010
	P4-B4-8.0	Farallon	10/17/2015	8.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
P4-5	P4-B5-1.0	Farallon	10/17/2015	1.0	0.012	0.013	< 0.00099	< 0.00099	< 0.00099
	P4-B5-3.0	Farallon	10/17/2015	3.0	0.0087	0.010	< 0.0010	< 0.0010	< 0.0010
	P4-B5-5.0	Farallon	10/17/2015	5.0	0.016	0.016	< 0.0010	< 0.0010	< 0.0010
	P4-B5-6.0	Farallon	10/17/2015	6.0	0.023	0.023	< 0.0012	< 0.0012	< 0.0012
	P4-B5-8.0	Farallon	10/17/2015	8.0	0.0094	0.0074	< 0.0011	< 0.0011	< 0.0011
Preliminary Cleanup Levels for Soil					**0.08[3]/0.044[4]**	**0.03[3]/0.006[4]**	**160[5]**	**0.59[3]/6[4]**	**0.002[3]/0.001[4]**

Table 2
Summary of Soil Analytical Results for CVOCs for CI Plant 4
West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Sample Location	Sample Identification	Sampled By	Sample Date	Sample Depth (feet)[1]	Analytical Results (milligrams per kilogram)[2]				
					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
P4-6	P4-B6-1.0	Farallon	10/17/2015	1.0	**0.64**	**0.32**	< 0.0010	< 0.0010	< 0.0010
	P4-B6-3.0	Farallon	10/17/2015	3.0	0.040	**0.036**	< 0.0010	< 0.0010	< 0.0010
	P4-B6-5.7	Farallon	10/17/2015	5.7	0.066	**0.044**	< 0.00096	< 0.00096	< 0.00096
	P4-B6-8.0	Farallon	10/17/2015	8.0	0.015	0.0055	< 0.0014	< 0.0014	< 0.0014
P4-7	P4-B7-1.0	Farallon	10/17/2015	1.0	**0.26**	**0.48**	0.0055	0.0013	< 0.00094
	P4-B7-3.0	Farallon	10/17/2015	3.0	0.0073	0.019	< 0.0010	< 0.0010	< 0.0010
	P4-B7-5.0	Farallon	10/17/2015	5.0	0.026	**0.057**	0.0013	< 0.0010	< 0.0010
	P4-B7-6.9	Farallon	10/17/2015	6.9	< 0.0010	0.0017	< 0.0010	< 0.0010	< 0.0010
	P4-B7-8.0	Farallon	10/17/2015	8.0	0.0059	0.0094	< 0.0012	< 0.0012	< 0.0012
P4-8	P4-B8-1.0	Farallon	10/17/2015	1.0	**0.33**	**0.36**	0.0081	0.0015	< 0.00094
	P4-B8-3.0	Farallon	10/17/2015	3.0	0.035	**0.076**	0.0053	< 0.0011	< 0.0011
	P4-B8-5.0	Farallon	10/17/2015	5.0	0.050	**0.12**	0.0088	< 0.00098	< 0.00098
	P4-B8-8.0	Farallon	10/17/2015	8.0	0.025	0.022	< 0.0015	< 0.0015	< 0.0015
P4-9	P4-B9-1.0	Farallon	10/17/2015	1.0	0.021	0.020	< 0.0010	< 0.0010	< 0.0010
	P4-B9-2.0	Farallon	10/17/2015	2.0	0.0098	0.0059	< 0.0010	< 0.0010	< 0.0010
	P4-B9-5.0	Farallon	10/17/2015	5.0	0.0036	0.0028	< 0.0010	< 0.0010	< 0.0010
	P4-B9-8.0	Farallon	10/17/2015	8.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
P4-10	P4-B10-1.0	Farallon	10/17/2015	1.0	0.019	< 0.00094	< 0.00094	< 0.00094	< 0.00094
	P4-B10-3.0	Farallon	10/17/2015	3.0	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B10-5.0	Farallon	10/17/2015	5.0	0.0015	< 0.00099	< 0.00099	< 0.00099	< 0.00099
	P4-B10-8.0	Farallon	10/17/2015	8.0	0.0031	< 0.0015	< 0.0015	< 0.0015	< 0.0015
Preliminary Cleanup Levels for Soil					**0.08[3]/0.044[4]**	**0.03[3]/0.006[4]**	**160[5]**	**0.59[3]/6[4]**	**0.002[3]/0.001[4]**

Table 2
Summary of Soil Analytical Results for CVOCs for CI Plant 4
West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Sample Location	Sample Identification	Sampled By	Sample Date	Sample Depth (feet)[1]	Analytical Results (milligrams per kilogram)[2]				
					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
P4-11	P4-B11-1.0	Farallon	10/17/2015	1.0	0.054	0.0031	< 0.0010	< 0.0010	< 0.0010
	P4-B11-3.0	Farallon	10/17/2015	3.0	0.0050	< 0.0010	< 0.0010	< 0.0010	< 0.0010
	P4-B11-5.0	Farallon	10/17/2015	5.0	0.0059	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B11-8.0	Farallon	10/17/2015	8.0	0.0039	< 0.0010	< 0.0010	< 0.0010	< 0.0010
P4-12	P4-B12-1.0	Farallon	10/17/2015	1.0	0.028	0.0028	< 0.0012	< 0.0012	< 0.0012
	P4-B12-2.8	Farallon	10/17/2015	2.8	0.0059	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B12-5.0	Farallon	10/17/2015	5.0	0.0089	0.0011	< 0.0010	< 0.0010	< 0.0010
	P4-B12-8.0	Farallon	10/17/2015	8.0	0.0014	< 0.0011	< 0.0011	< 0.0011	< 0.0011
P4-13	P4-B13-1.0	Farallon	10/17/2015	1.0	0.0029	0.0040	< 0.0010	< 0.0010	< 0.0010
	P4-B13-3.0	Farallon	10/17/2015	3.0	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
	P4-B13-5.0	Farallon	10/17/2015	5.0	< 0.00097	< 0.00097	< 0.00097	< 0.00097	< 0.00097
	P4-B13-8.0	Farallon	10/17/2015	8.0	0.0016	0.0018	< 0.0011	< 0.0011	< 0.0011
P4-14	P4-B14-1.0	Farallon	10/17/2015	1.0	0.018	0.0095	< 0.0011	< 0.0011	< 0.0011
	P4-B14-3.0	Farallon	10/17/2015	3.0	0.0095	0.0069	< 0.0010	< 0.0010	< 0.0010
	P4-B14-5.0	Farallon	10/17/2015	5.0	0.016	0.0092	< 0.00096	< 0.00096	< 0.00096
	P4-B14-8.0	Farallon	10/17/2015	8.0	0.0076	0.0040	< 0.0014	< 0.0014	< 0.0014
P4-15	P4-15-1.0-092018	Farallon	9/20/2018	1.0	< 0.00085	0.0015	< 0.00085	< 0.00085	< 0.00085
	P4-15-2.0-092018	Farallon	9/20/2018	2.0	< 0.00095	0.0026	< 0.00095	< 0.00095	< 0.00095
	P4-15-3.0-092018	Farallon	9/20/2018	3.0	< 0.0010	0.0052	< 0.0010	< 0.0010	< 0.0010
	P4-15-5.0-092018	Farallon	9/20/2018	5.0	0.0010	0.0099	< 0.0010	< 0.0010	< 0.0010
P4-16	P4-16-1.0-091918	Farallon	9/19/2018	1.0	< 0.0010	**0.032**	< 0.0010	< 0.0010	< 0.0010
	P4-16-2.0-091918	Farallon	9/19/2018	2.0	< 0.00099	0.022	< 0.00099	< 0.00099	< 0.00099
	P4-16-3.0-091918	Farallon	9/19/2018	3.0	< 0.00098	0.011	0.0016	< 0.00098	< 0.00098
Preliminary Cleanup Levels for Soil					**0.08[3]/0.044[4]**	**0.03[3]/0.006[4]**	**160[5]**	**0.59[3]/6[4]**	**0.002[3]/0.001[4]**

Table 2
Summary of Soil Analytical Results for CVOCs for CI Plant 4
West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Sample Location	Sample Identification	Sampled By	Sample Date	Sample Depth (feet)[1]	Analytical Results (milligrams per kilogram)[2]				
					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
P4-17	P4-17-1.0-091918	Farallon	9/19/2018	1.0	< 0.0012	0.0076	< 0.0012	< 0.0012	< 0.0012
	P4-17-2.0-091918	Farallon	9/19/2018	2.0	< 0.00093	0.0020	< 0.00093	< 0.00093	< 0.00093
	P4-17-3.0-091918	Farallon	9/19/2018	3.0	< 0.00090	< 0.00090	< 0.00090	< 0.00090	< 0.00090
P4-18	P4-18-1.0-091918	Farallon	9/19/2018	1.0	< 0.00091	0.0058	< 0.00091	< 0.00091	< 0.00091
	P4-18-2.0-091918	Farallon	9/19/2018	2.0	< 0.0010	0.017	< 0.0010	< 0.0010	< 0.0010
	P4-18-3.0-091918	Farallon	9/19/2018	3.0	< 0.00093	0.0020	< 0.00093	< 0.00093	< 0.00093
B3-02	B3-02-2.0-082318	Farallon	8/23/2018	2.0	0.0063	**2.4**	0.0048	< 0.0010	< 0.0010
	B3-02-6.0-082318	Farallon	8/23/2018	6.0	< 0.00088	0.016	< 0.00088	< 0.00088	< 0.00088
B3-04	B3-04-4.0-091918	Farallon	9/19/2018	4.0	**0.21**	**13**	0.0012	< 0.0011	< 0.0011
	B3-04-10.5-091918	Farallon	9/19/2018	10.5	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Preliminary Cleanup Levels for Soil					**0.08[3]/0.044[4]**	**0.03[3]/0.006[4]**	**160[5]**	**0.59[3]/6[4]**	**0.002[3]/0.001[4]**

NOTES:

Results in **bold** denote reporting limits that exceed the most conservative preliminary cleanup level protective of indoor air.

< denotes analyte not detected at or exceeding the laboratory reporting limit listed.

[1]Depth in feet below ground surface.

[2]Analyzed by U.S. Environmental Protection Agency Method 8260B.

[3]Soil cleanup levels for protection of air quality. These are preliminary values only. Values calculated using Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Equation 747-1 where the potable Method B groundwater cleanup level was used as C_w. Concentrations of hazardous substances in soil that meet the potable groundwater protection standard currently are considered sufficiently protective of the air pathway for unrestricted and industrial land uses.

[4]Soil cleanup levels for protection of surface water quality. These are preliminary values only. Values are calculated using MTCA Equation 747-1 where the groundwater cleanup level protective of surface water in this table was used as C_w.

[5]Cleanup level is based on standard MTCA Method B (unrestricted land use) values from the Cleanup and Risk Calculation tables, <https://fortress.wa.gov/ecy/clarc/Reporting/ChemicalQuery.aspx>

PCE = tetrachloroethene

TCE = trichloroethene

CVOCs = chlorinated volatile organic compounds

Table 3
Summary of Groundwater Analytical Results for CI Plant 4
West of 4th Group Site
Seattle, Washington
Farallon PN: 457-008

Sample Location	Sample Date	Sample Identification	Analytical Results (micrograms per liter)[1]				
			PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl Chloride
Baseline Groundwater Results							
OBW-01	7/2/2018	OBW-01-070218	0.43	0.82	< 0.20	< 0.20	< 0.20
OBW-02	7/3/2018	OBW-02-070218	0.53	1.2	< 0.20	< 0.20	< 0.20
OBW-03	7/2/2018	OBW-03-070218	< 0.20	0.43	0.38	< 0.20	< 0.20
OBW-04	7/2/2018	OBW-04-070218	2.0	5.0	0.39	< 0.20	< 0.20
OBW-05	7/2/2018	OBW-05-070218	2.1	2.8	0.68	< 0.20	< 0.20
MW-6	7/2/2018	MW-06-070218	4.5	3.2	< 0.20	< 0.20	< 0.20
MW-7	7/2/2018	MW-07-070218	12	**7.6**	2.4	< 0.20	0.40
Performance Groundwater Results							
OBW-05	9/18/2018	OBW-5-091818	7.3	4.8	0.61	< 0.20	< 0.20
MW-6	9/18/2018	MW6-091818	8.5	5.5	< 0.20	< 0.20	< 0.20
	9/18/2018	MW60-091818	8.3	5.1	< 0.20	< 0.20	< 0.20
MW-7	9/24/2018	MW-7-092418	5.9	5.0	3.9	< 0.20	0.53
Preliminary Cleanup Levels-Water Table Zone			**116[2]**	**6.9[2]**	**NR[3]**	**559[2]**	**1.3[2]**

NOTES:

Results in **bold** denote concentrations exceeding applicable cleanup levels.

< denotes analyte not detected at or exceeding the reporting limit listed.

[1]Analyzed by U.S. Environmental Protection Agency Method 8260C.

[2]Groundwater cleanup levels protective of the air pathway for unrestricted land use (residential and commercial sites) and industrial land use were derived using the following equation: Gwcul = Aircul/GIVF.

[3]NR denotes "not researched," which indicates that no regulatory standards or toxicity information are available for the constituent of concern to derive a cleanup level for the medium of potential concern.

PCE = tetrachloroethene

TCE = trichloroethene

CVOCs = chlorinated volatile organic compounds

APPENDIX A
HEALTH AND SAFETY PLAN

FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN
West of 4th Group Site
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-008

APPENDIX B
ANTICIPATED INTERIM ACTION SCHEDULE

FINAL CAPITAL INDUSTRIES PLANT 4
SOIL VAPOR EXTRACTION PILOT STUDY WORK PLAN
West of 4th Group Site
5801 3rd Avenue South
Seattle, Washington

Farallon PN: 457-008

Anticipated Interim Action Schedule
Capital Industries Plant 4
Seattle, Washington
Farallon PN: 457-008

Week Beginning	Q1 2019						Q2 2019							Q3 2019						Q4 2019							Q1 2020						Q2 2020							Q3 2020						Q4 2020					
	12-Jan-19	26-Jan-19	9-Feb-19	23-Feb-19	9-Mar-19	23-Mar-19	6-Apr-19	20-Apr-19	4-May-19	18-May-19	1-Jun-19	15-Jun-19	29-Jun-19	13-Jul-19	27-Jul-19	10-Aug-19	24-Aug-19	7-Sep-19	21-Sep-19	5-Oct-19	19-Oct-19	2-Nov-19	16-Nov-19	30-Nov-19	14-Dec-19	28-Dec-19	11-Jan-20	25-Jan-20	8-Feb-20	22-Feb-20	7-Mar-20	21-Mar-20	4-Apr-20	18-Apr-20	2-May-20	16-May-20	30-May-20	13-Jun-20	27-Jun-20	11-Jul-20	25-Jul-20	8-Aug-20	22-Aug-20	5-Sep-20	19-Sep-20	3-Oct-20	17-Oct-20	31-Oct-20	14-Nov-20	28-Nov-20	12-Dec-20
Project Management																																																	
Project Management																																																	
SVE Pilot Study Work Plan																																																	
Draft Work Plan							*																																										
Ecology Review																																																	
Final Work Plan										*																																							
Ecology Review																																																	
SVE Pilot Study																																																	
Implementation of SVE Pilot Study																																																	
SVE Pilot Study Completion Report																																																	
Data Submittal and Ecology Meeting															*																																		
Draft SVE Pilot Study Completion Report																	*																																	
Ecology Review																																																	
Final SVE Pilot Study Completion Report																			*																															
Ecology Review																																																	
SVE System Design and Implementation Work Plan																																																	
State Environmental Policy Act Checklist and Public Comment Period																		*																															
Draft SVE System Design and Implementation Work Plan																			*																															
Ecology Review																																																	
Final SVE System Design and Implementation Work Plan																																																	
Ecology Review																																																	
Quarterly Progress Reports																																																
Quarterly Progress Report																																																

NOTES:

* denotes project milestone

APPENDIX B
SUPPORTING GROUNDWATER AND NATURAL ATTENUATION DATA

WEST OF FOURTH SITE UNIT 2
FEASIBILITY STUDY ADDENDUM
West of Fourth Joint Agreed Order
Seattle, Washington

Farallon PN: 457-010

Chart B1
CG-141 Area Shallow Interval Vinyl Chloride Concentrations Over Time

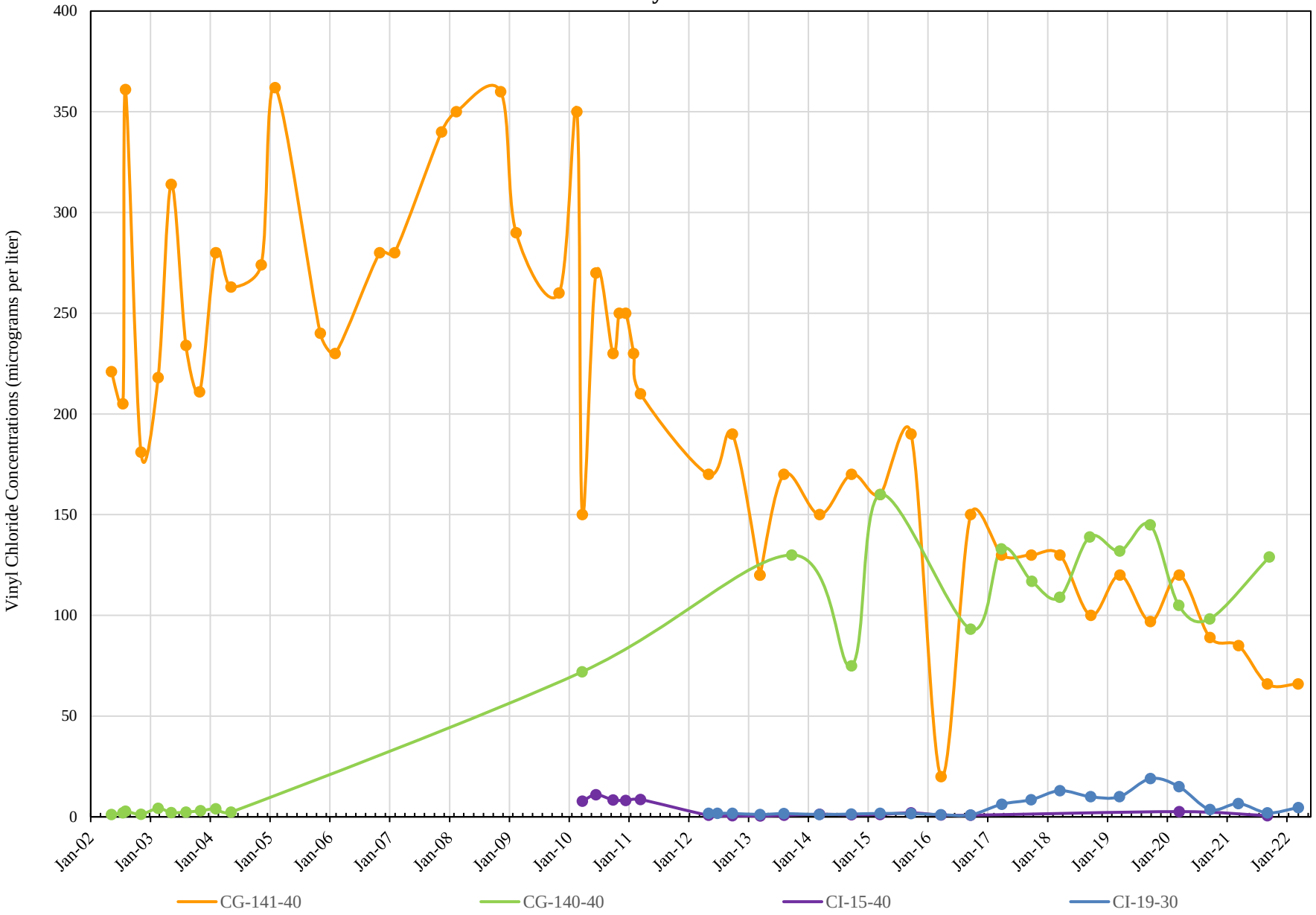


Chart B2
Monitoring Well CG-141-40 VC, Ethene, and Ethane Concentrations Over Time

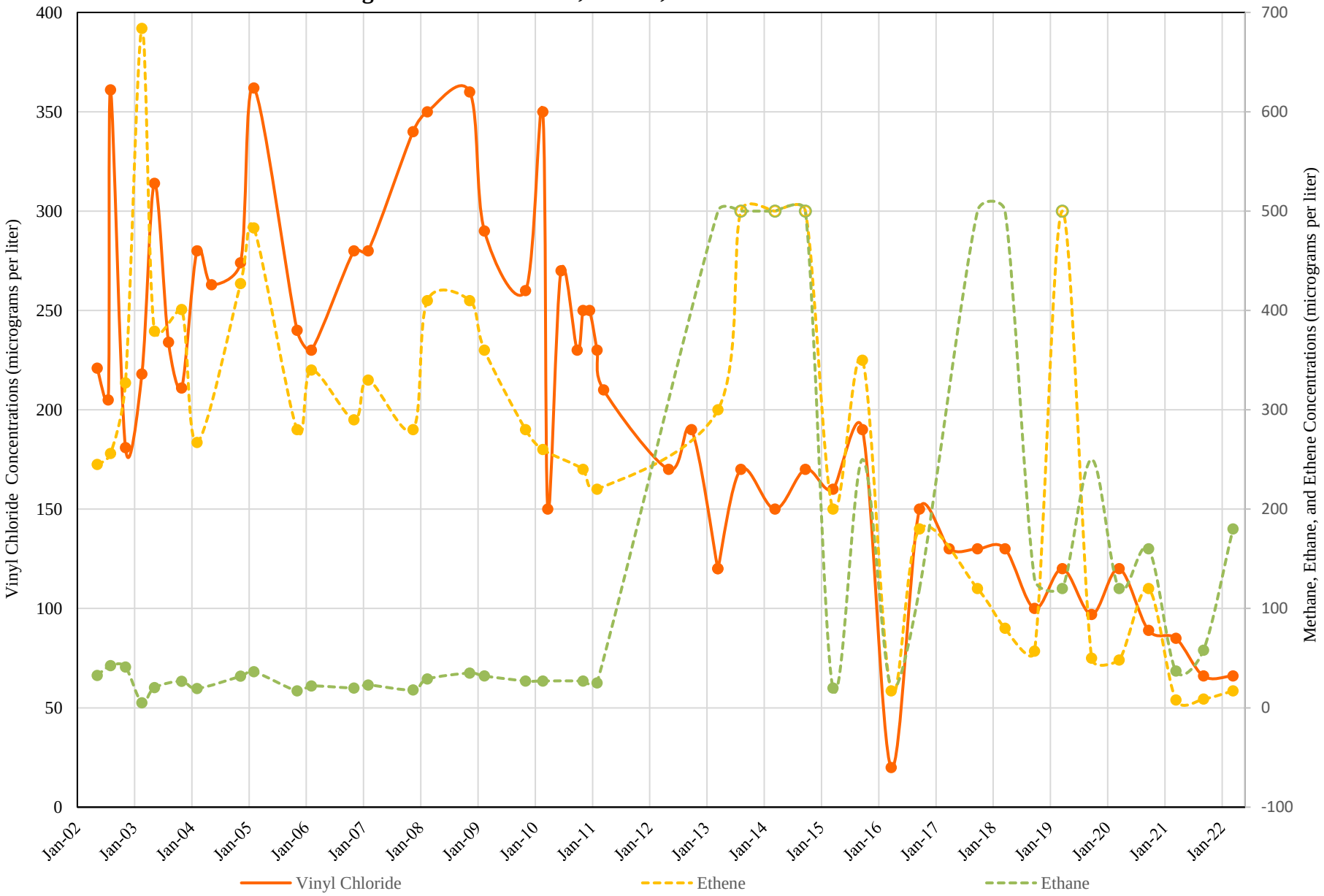


Chart B3
Monitoring Well CI-19-30 VC, Ethene, and Ethane Concentrations Over Time

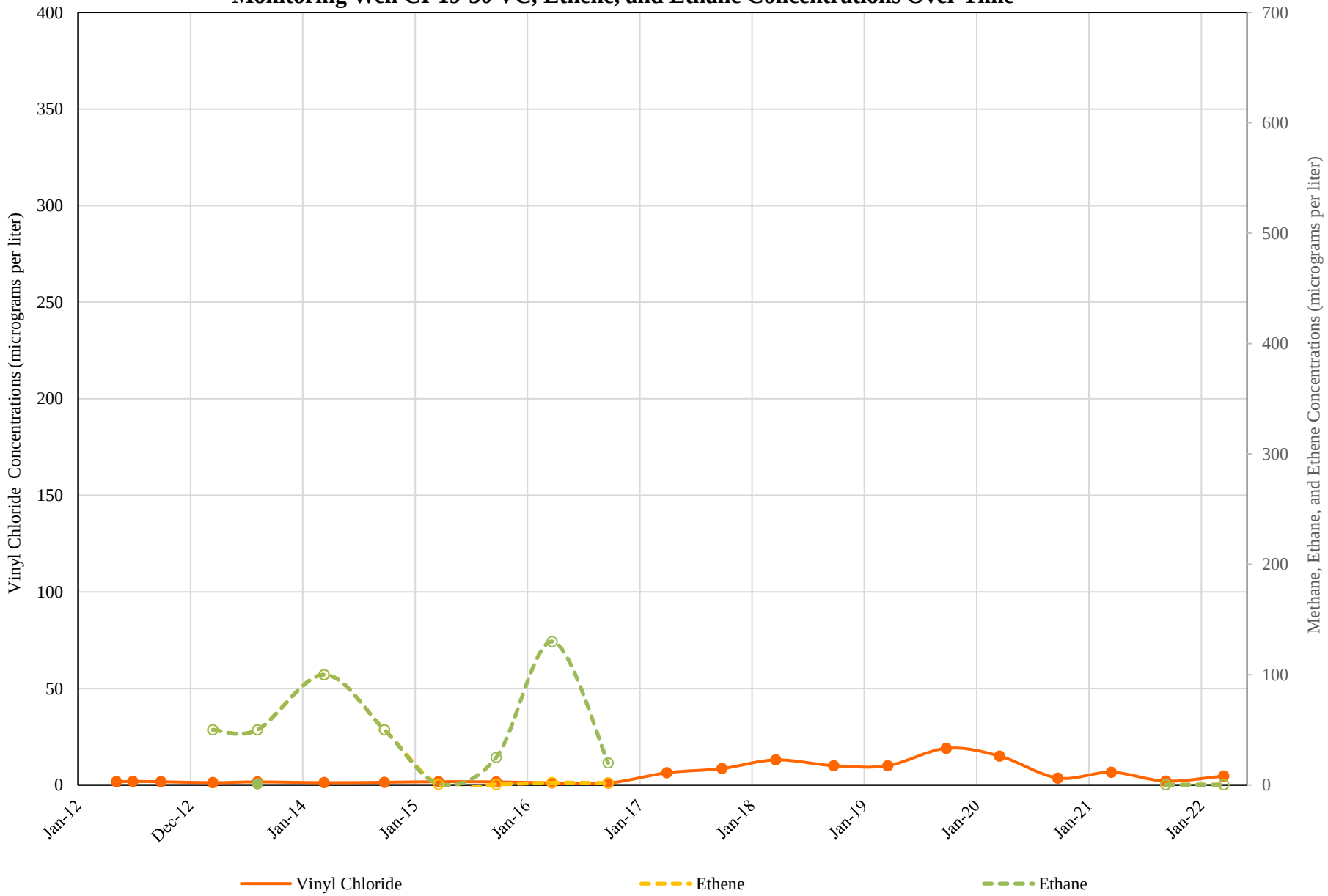


Chart B4
CG-141 Area Intermediate Interval Vinyl Chloride Concentrations Over Time

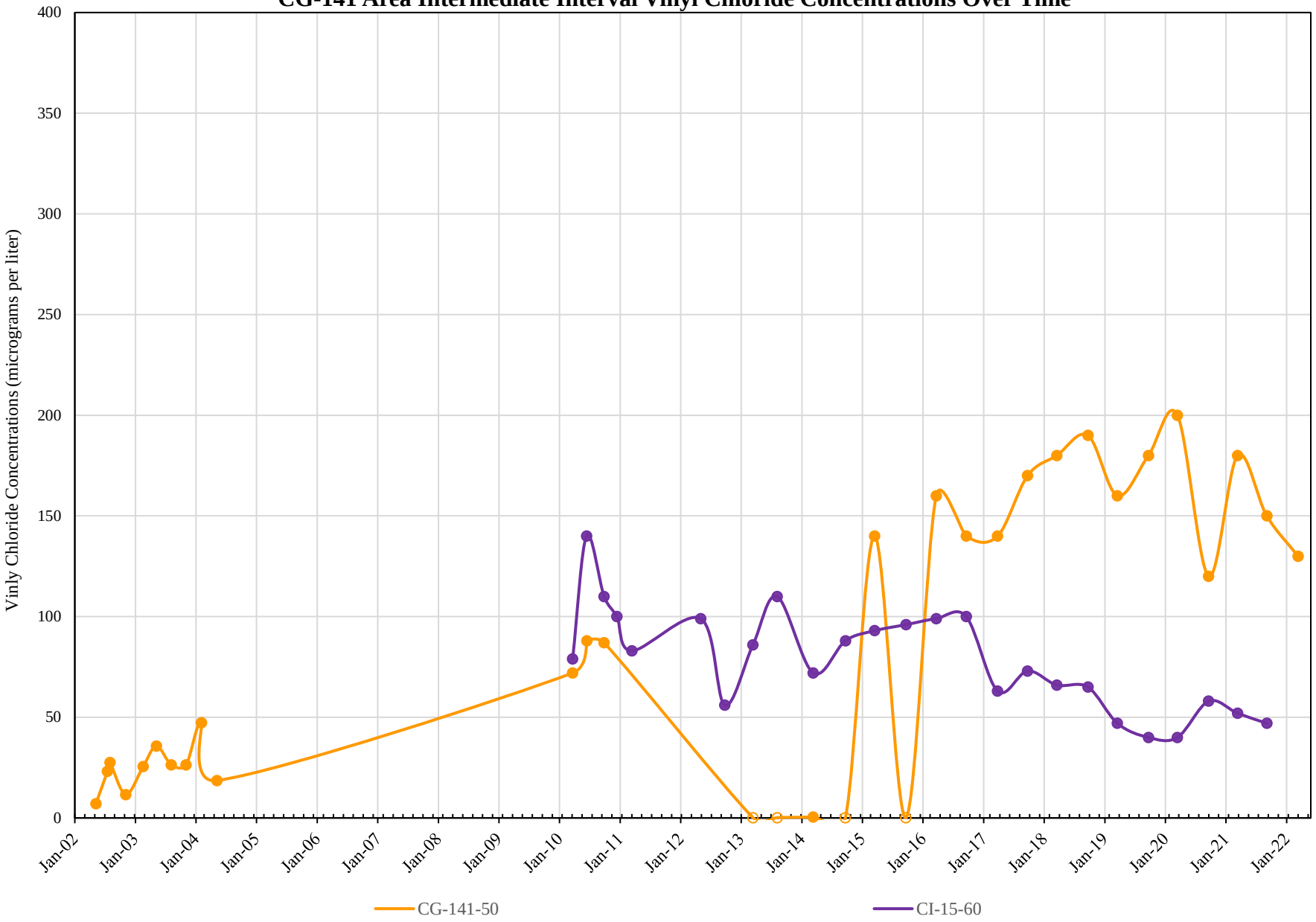


Chart B5

Monitoring Well CG-141-50 VC, Ethene, and Ethane Concentrations Over Time

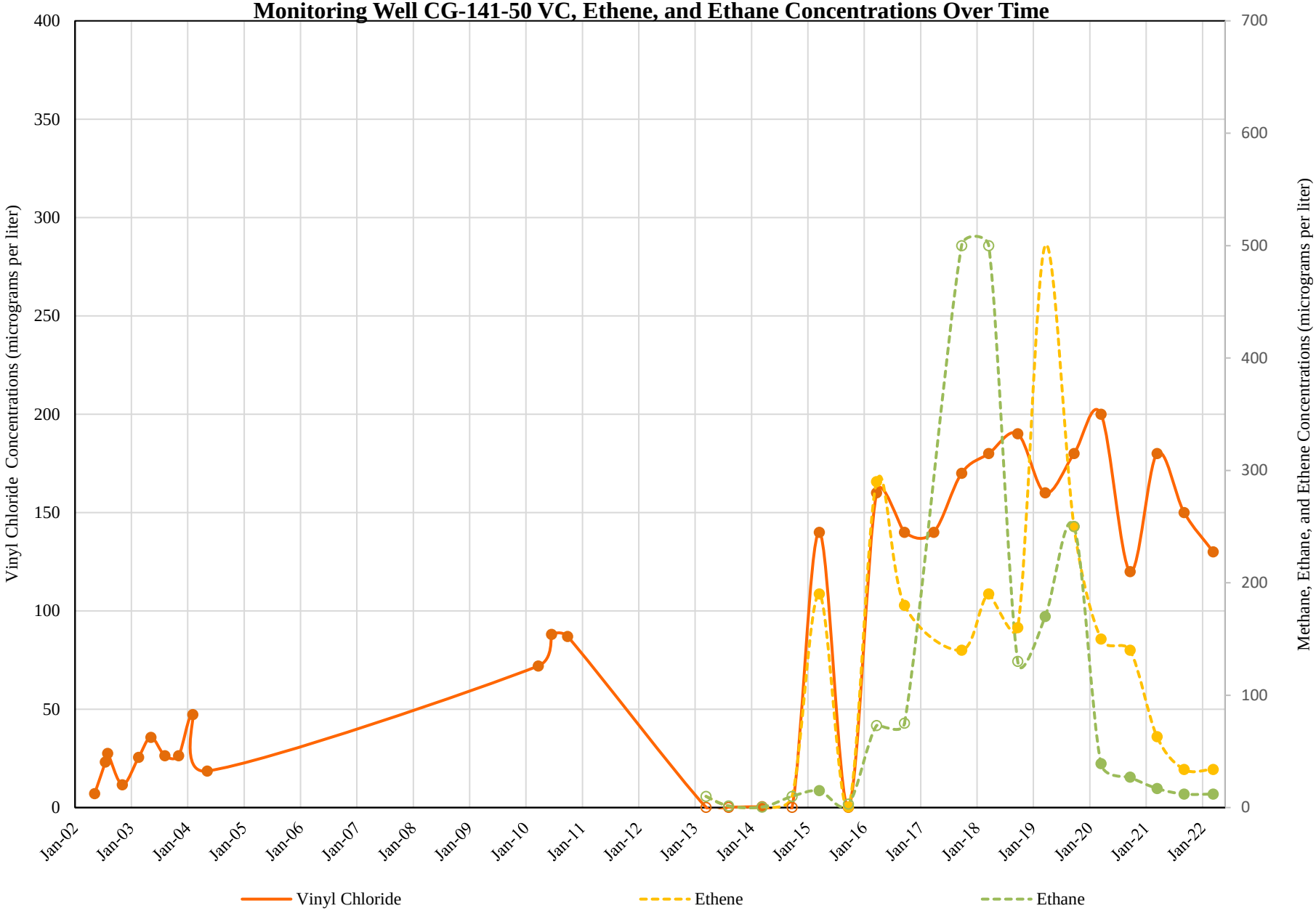


Table B1
Mann-Kendall Non-Parametric Statistical Test Results
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

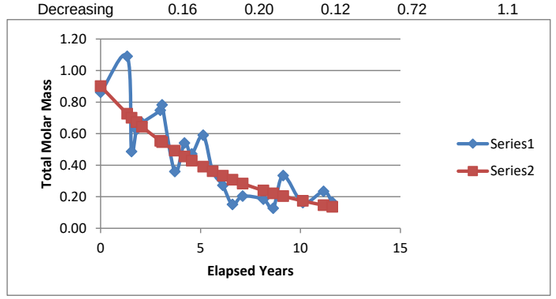
	Trend Stability Analyses					*Most Recent Data*				
Well	**TCE**	**cis 1,2-DCE**	**Vinyl Chloride**	**Molar Concentration**	**Last Sample Date**	**PCE**	**TCE**	**cis 1,2-DCE**	**Vinyl Chloride**	**Comment**
Water Table Wells										
BDC-6-WT	Shrinking	Shrinking	Shrinking	Shrinking	3/28/2019	0.02U	72.8	44.4	1.35	Between BDC and CI
CI-MW-1-WT	Shrinking	Shrinking	Shrinking	Shrinking	3/19/2020	0.4	4.1	1.2	0.2U	Between BDC and CI
CG-137-WT	Shrinking	Stable	Shrinking	Shrinking	3/19/2020	0.2U	1.5	53	1.3	Downgradient CI Plant 2
CI-14-WT	Expanding	Undetermined	Undetermined	Undetermined	3/18/2020	0.2U	1.7	2.2	0.2U	Downgradient CI Plant 2; Variable data
CI-19-WT	Non-Detect				3/18/2020	0.2 U	0.2 U	0.2 U	0.2 U	SU1 Waterfront
CG-141-WT	Non-Detect					0.2 U	0.2 U	0.2 U	0.1 U	CG-141 Area
CI-13-WT	Non-Detect	Undetermined	Non-Detect	Non-Detect	3/17/2020	0.2U	0.2U	0.2U	0.2U	Downgradient CI Plant 2; Non-detect
CI-MW-3	Shrinking	Shrinking	Shrinking	Shrinking	3/16/2020	0.2U	4	7	0.2U	Upgradient Olympic/Natus Medical
CI-MW-7	Stable	Shrinking	Stable	Stable	3/16/2020	17	12	0.64	0.2U	CI Plant 4
CI-9-WT	Shrinking	Shrinking	Stable	Shrinking	3/18/2020	1.4	12	2	0.2U	Downgradient CI Plant 4
Shallow Interval Wells										
BDC-6-30	Shrinking	Shrinking	Undetermined	Shrinking	3/16/2018	0.02U	6.72	3.97	0.58	Between BDC and CI
CG-137-40	Non-Detect	Expanding	Shrinking	Shrinking	3/19/2020	0.2U	0.2U	0.21	29	Downgradient Plant 2
CG-141-40	Non-Detect	Expanding	Shrinking	Shrinking	3/18/2020	1U	1U	2.4	120	CG-141 Area
CI-10-35	Shrinking	Expanding	Stable	Stable	3/18/2020	0.4U	7.9	50	6	Dowgradient Olympic/Natus Medical
CI-12-35	Non-Detect	Expanding	Shrinking	Shrinking	9/20/2016	0.2U	0.2U	1	1.7	
CI-13-30	Expanding	Expanding	Shrinking	Expanding	3/17/2020	0.2U	1.1	25	0.46	Variable data
CI-15-40	Non-Detect	Expanding	Shrinking	Stable	3/18/2020	0.2U	0.2U	8.4	2.6	
CI-19-30	Non-Detect	Shrinking	Expanding	Expanding	9/22/2020	0.2U	0.2U	0.88	3.6	SU1 Waterfront
CI-14-35	Shrinking	Expanding	Stable	Expanding	3/18/2020	1U	1.1	95	1.5	Downgradient CI Plant 2; Peak DCE 2017/2018
CI-7-40	Stable	Stable	Stable	Stable	3/16/2020	0.2U	0.2U	1.6	1.8	CI Plant 4
CI-9-40	Stable	Expanding	Shrinking	Expanding	3/18/2020	0.2U	0.2U	5.9	0.71	Downgradient CI Plant 4
Intermediate Interval Wells										
CI-15-60	Stable	Stable	Shrinking	Shrinking	3/18/2020	0.2U	0.2U	0.2U	40	
CG-141-50	Non-Detect	Non-Detect	Expanding	Expanding	3/18/2020	1 U	1 U	1 U	200	CG-141 Area
CI-12-60	Non-Detect				3/17/2020	0.2U	0.2U	0.2U	0.2U	
CG-137-50	Non-Detect	Non-Detect	Stable	Stable	9/1/2016	0.2U	0.2U	0.2U	3.1	Downgradient Plant 2
CI-14-70	Non-Detect	Expanding	Expanding	Expanding	3/18/2020	0.2U	0.2U	7.4	2.3	Downgradient CI Plant 2
CI-10-65	Non-Detect	Expanding	Expanding	Expanding	3/15/2020	0.2U	0.2U	1.3	3.9	Dowgradient Olympic/Natus Medical

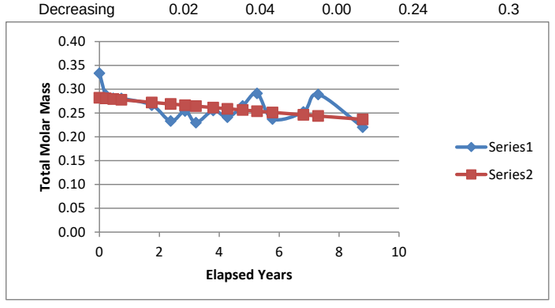
Notes:

Plume stability calculated from Ecology MNA toolbox worksheets.
Non-detect indicates that there were insufficient detections for a valid Mann-Kendall analysis.
-- indicates non available or not reported.
PCE: tetrachloroethene
TCE: trichloroethene
DCE: dichloroethene
PCL: Lower Duwamish Waterway preliminary cleanup level.

Table B2. Source Decay Estimates - Based on Total Moles CVOC
West of Fourth, Seattle, Washington

Well	BIOCHLOR Source Area	Date	Elapsed Years	1,1-DCE	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	VC	Total Molar Mass	Trend	best-fit	SDR, k_s (/year) 90% upper	SDR, k_s (/year) 90% lower	R^2 (SDR, k_s)	Maximum Concentration
			g/mol ->	*96.95*	*96.95*	*165.83*	*96.95*	*131.4*	*62.498*	umol/L	*Max*	*0.50*	*0.62*	*0.37*	*0.87*	*4.61*
											Min	*-0.01*	*0.01*	*-0.03*	*0.02*	*0.22*
				ug/L	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*		*Mean*	*0.15*	*0.20*	*0.10*	*0.58*	*1.52*
BDC-2-WT	BDC	2/1/2008	0.00	0.7	15	0.1	3.7	86	0.4	0.86	Decreasing	0.16	0.20	0.12	0.72	1.1
BDC-2-WT	BDC	6/1/2009	1.33	2	36	0.1	5.5	81	1.5	1.09						
BDC-2-WT	BDC	8/18/2009	1.54	0.88	13	0.01	3.2	40	0.38	0.49						
BDC-2-WT	BDC	11/17/2009	1.79	0.72	13	0.01	3.9	58	0.14	0.63						
BDC-2-WT	BDC	2/24/2010	2.06	1.1	23	0.1	3.5	45	2.5	0.67						
BDC-2-WT	BDC	1/27/2011	2.99	0.97	26	0.01	3.2	51	3	0.75						
BDC-2-WT	BDC	3/1/2011	3.08	1.1	27	0.01	3.5	53	3.3	0.78						
BDC-2-WT	BDC	10/18/2011	3.71	0.29	6.6	0.01	2	35	0.098	0.36						
BDC-2-WT	BDC	4/11/2012	4.19	0.43	14	0.01	2.5	39	4.3	0.54						
BDC-2-WT	BDC	8/22/2012	4.56	0.49	12	0.01	3.6	39	0.49	0.47						
BDC-2-WT	BDC	3/20/2013	5.13	0.57	22	0.01	2.7	33	4.9	0.59						
BDC-2-WT	BDC	9/9/2013	5.60	0.28	8.7	0.01	2.2	32	0.2	0.36						
BDC-2-WT	BDC	3/14/2014	6.11	0.27	6.3	0.01	1.8	24	0.18	0.27						
BDC-2-WT	BDC	9/5/2014	6.59	0.11	2.5	0.01	0.64	15	0.17	0.15						
BDC-2-WT	BDC	3/12/2015	7.11	0.17	4.8	0.01	1.1	18	0.23	0.20						
BDC-2-WT	BDC	3/24/2016	8.14	0.14	6.4	0.01	0.68	9.3	2.4	0.18						
BDC-2-WT	BDC	9/20/2016	8.63	0.137	2.81	0.01	0.552	11.8	0.0641	0.13						
BDC-2-WT	BDC	3/23/2017	9.14	0.217	16.3	0.01	1.31	14.2	2.65	0.33						
BDC-2-WT	BDC	3/16/2018	10.12	0.152	5.29	0.01	1.01	12.2	0.16	0.16						
BDC-2-WT	BDC	3/28/2019	11.15	0.156	10.8	0.01	1.42	11	1.4	0.23						
BDC-2-WT	BDC	9/6/2019	11.59	0.143	7.77	0.01	0.987	7.94	0.74	0.16						
BDC-3-40	BDC	6/1/2009	0.00	0.16	21	0.01	0.01	0.01	7.2	0.33	Decreasing	0.02	0.04	0.00	0.24	0.3
BDC-3-40	BDC	8/18/2009	0.21	0.17	17	0.01	0.01	0.01	6.9	0.29						
BDC-3-40	BDC	11/17/2009	0.46	0.15	19	0.01	0.01	0.01	5.2	0.28						
BDC-3-40	BDC	2/24/2010	0.73	0.14	20	0.01	0.062	0.01	4.5	0.28						
BDC-3-40	BDC	3/1/2011	1.75	0.24	22	0.01	0.025	0.01	2.3	0.27						
BDC-3-40	BDC	10/18/2011	2.38	0.16	19	0.01	0.01	0.01	2.2	0.23						
BDC-3-40	BDC	4/11/2012	2.86	0.18	21	0.01	0.025	0.01	2.2	0.25						
BDC-3-40	BDC	8/22/2012	3.22	0.21	18	0.01	0.026	0.01	2.6	0.23						
BDC-3-40	BDC	3/20/2013	3.80	0.2	20	0.01	0.029	0.01	2.9	0.26						
BDC-3-40	BDC	9/9/2013	4.27	0.17	19	0.01	0.026	0.01	2.7	0.24						
BDC-3-40	BDC	3/14/2014	4.78	0.21	20	0.01	0.038	0.01	3.5	0.26						
BDC-3-40	BDC	9/5/2014	5.26	0.15	22	0.01	0.028	0.01	3.9	0.29						
BDC-3-40	BDC	3/12/2015	5.78	0.14	16	0.01	0.034	0.01	4.4	0.24						
BDC-3-40	BDC	3/24/2016	6.81	0.13	17	0.01	0.036	0.01	4.7	0.25						
BDC-3-40	BDC	9/20/2016	7.30	0.148	17.5	0.01	0.0484	0.0482	6.63	0.29						
BDC-3-40	BDC	3/16/2018	8.79	0.148	12.9	0.01	0.0496	0.0341	5.31	0.22						
BDC-3-60	BDC	6/1/2009	0.00	0.01	1.8	0.01	0.01	0.01	9.8	0.18	Decreasing	0.13	0.28	-0.03	0.14	0.2
BDC-3-60	BDC	8/18/2009	0.21	0.01	2.3	0.01	0.01	0.01	12	0.22						
BDC-3-60	BDC	11/17/2009	0.46	0.01	0.5	0.01	0.01	0.01	4.2	0.07						
BDC-3-60	BDC	2/24/2010	0.73	0.01	0.32	0.01	0.01	0.01	2.7	0.05						
BDC-3-60	BDC	3/1/2011	1.75	0.01	0.32	0.01	0.01	0.01	2	0.04						
BDC-3-60	BDC	10/18/2011	2.38	0.01	3	0.01	0.01	0.01	5.3	0.12						
BDC-3-60	BDC	4/11/2012	2.86	0.01	0.58	0.01	0.01	0.01	2.2	0.04						
BDC-3-60	BDC	8/22/2012	3.22	0.03	4.2	0.01	0.01	0.01	4.9	0.12						
BDC-3-60	BDC	3/20/2013	3.80	0.01	0.94	0.01	0.01	0.01	1.3	0.03						
BDC-3-60	BDC	9/9/2013	4.27	0.021	3.4	0.01	0.01	0.01	4.9	0.11						
BDC-3-60	BDC	3/14/2014	4.78	0.01	0.17	0.01	0.01	0.01	1.2	0.02						
BDC-3-60	BDC	9/5/2014	5.26	0.01	2.9	0.01	0.01	0.01	5.9	0.12						
BDC-3-60	BDC	3/12/2015	5.78	0.01	1.6	0.01	0.01	0.01	2.2	0.05						
BDC-3-60	BDC	3/24/2016	6.81	0.01	0.16	0.01	0.01	0.01	0.77	0.01						
BDC-3-60	BDC	9/20/2016	7.30	0.0222	3	0.01	0.01	0.0325	4.54	0.10						





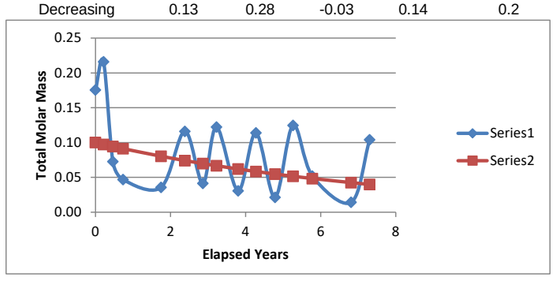
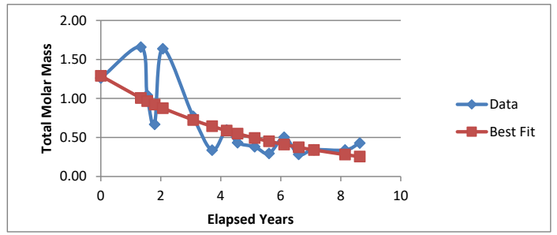
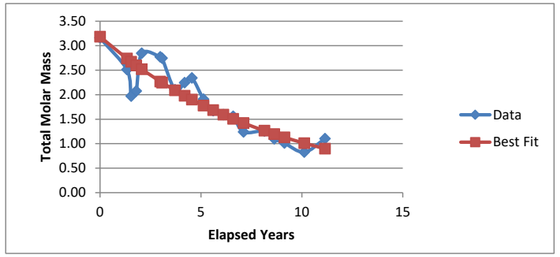


Table B2. Source Decay Estimates - Based on Total Moles CVOC
West of Fourth, Seattle, Washington

Well	BIOCHLOR Source Area	Date	Elapsed Years	1,1-DCE	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	VC	Total Molar Mass	Trend	SDR, k_s (/year) best-fit	SDR, k_s (/year) 90% upper	SDR, k_s (/year) 90% lower	R^2 (SDR, k_s)	Maximum Concentration umol-L
			g/mol ->	*96.95*	*96.95*	*165.83*	*96.95*	*131.4*	*62.498*	umol/L	*Max*	*0.50*	*0.62*	*0.37*	*0.87*	*4.61*
											Min	*-0.01*	*0.01*	*-0.03*	*0.02*	*0.22*
				ug/L	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*		*Mean*	*0.15*	*0.20*	*0.10*	*0.58*	*1.52*
BDC-3-WT	BDC	2/1/2008	0.00	1.2	52		6	75	5	1.26	Decreasing	0.19	0.25	0.12	0.65	1.7
BDC-3-WT	BDC	6/1/2009	1.33	2	59	0.1	13	110	3.6	1.66						
BDC-3-WT	BDC	8/18/2009	1.54	0.4	27	0.1	9.1	87	0.2	1.04						
BDC-3-WT	BDC	11/17/2009	1.79	0.34	17	0.01	5.2	57	0.11	0.67						
BDC-3-WT	BDC	2/24/2010	2.06	2	60	0.1	8.6	100	9.2	1.64						
BDC-3-WT	BDC	3/1/2011	3.08	0.72	29	0.01	4.2	48	3.4	0.77						
BDC-3-WT	BDC	10/18/2011	3.71	0.13	9.8	0.01	2.8	27	0.063	0.34						
BDC-3-WT	BDC	4/11/2012	4.19	0.45	25	0.01	3.7	32	3.2	0.60						
BDC-3-WT	BDC	8/22/2012	4.56	0.2	17	0.01	3.9	28	0.11	0.43						
BDC-3-WT	BDC	3/20/2013	5.13	0.26	15	0.01	2.5	21	2.4	0.38						
BDC-3-WT	BDC	9/9/2013	5.60	0.12	11	0.01	2.5	20	0.11	0.29						
BDC-3-WT	BDC	3/14/2014	6.11	0.3	22	0.01	3.9	21	4.6	0.50						
BDC-3-WT	BDC	9/5/2014	6.59	0.11	14	0.01	2	15	0.17	0.28						
BDC-3-WT	BDC	3/12/2015	7.11	0.13	17	0.01	2.9	17	0.44	0.34						
BDC-3-WT	BDC	3/24/2016	8.14	0.15	17	0.01	2	15	1.7	0.34						
BDC-3-WT	BDC	9/20/2016	8.63	0.17	24.7	0.01	3.4	17	0.432	0.43						
BDC-6-WT	BDC	2/1/2008	0.00	7	110		6.4	230	8.5	3.16	Decreasing	0.11	0.13	0.09	0.85	3.2
BDC-6-WT	BDC	6/1/2009	1.33	3.5	69	0.1	4.8	200	12	2.51						
BDC-6-WT	BDC	8/18/2009	1.54	2.7	43	0.1	3.4	150	20	1.97						
BDC-6-WT	BDC	11/17/2009	1.79	3.6	56	0.5	4.5	160	12	2.07						
BDC-6-WT	BDC	2/24/2010	2.06	5.7	110	0.1	7	180	13	2.84						
BDC-6-WT	BDC	1/27/2011	2.99	6.4	130	0.5	7.3	160	4.3	2.77						
BDC-6-WT	BDC	3/1/2011	3.08	5.8	120	0.1	7.8	170	4.6	2.75						
BDC-6-WT	BDC	10/18/2011	3.71	3.5	83	0.05	5.5	140	5.3	2.10						
BDC-6-WT	BDC	4/11/2012	4.19	3.7	92	0.01	6.5	140	7.7	2.24						
BDC-6-WT	BDC	8/22/2012	4.56	2.9	92	1	6.4	150	9.2	2.34						
BDC-6-WT	BDC	3/20/2013	5.13	2.6	71	0.02	4.9	130	6.6	1.90						
BDC-6-WT	BDC	9/9/2013	5.60	2	56	0.01	5.4	120	6.7	1.67						
BDC-6-WT	BDC	3/14/2014	6.11	2.4	59	0.01	4.8	110	4.5	1.59						
BDC-6-WT	BDC	9/5/2014	6.59	1.6	52	0.01	3.9	120	3.2	1.56						
BDC-6-WT	BDC	3/12/2015	7.11	1.4	40	0.01	3.6	98	1.7	1.24						
BDC-6-WT	BDC	3/24/2016	8.14	1	42	0.01	3.9	97	2.2	1.26						
BDC-6-WT	BDC	9/20/2016	8.63	1.55	35.3	0.01	4.37	86.6	0.799	1.10						
BDC-6-WT	BDC	3/23/2017	9.14	1.35	40.1	0.01	3.32	70.1	1.06	1.01						
BDC-6-WT	BDC	3/16/2018	10.12	0.807	33.4	0.01	3.42	54.4	1.48	0.83						
BDC-6-WT	BDC	3/28/2019	11.15	1.24	44.4	0.01	5.35	72.8	1.35	1.10						
BDC-6-30	BDC	2/1/2008	0.00	0.9	20		0.4	16	6.6	0.45	Decreasing	0.17	0.22	0.13	0.76	0.5
BDC-6-30	BDC	6/1/2009	1.33	0.7	19	0.01	0.25	12	9.8	0.45						
BDC-6-30	BDC	8/18/2009	1.54	0.4	8.9	0.01	0.13	5.1	15	0.38						
BDC-6-30	BDC	11/17/2009	1.79	0.45	13	0.01	0.16	7.9	7.3	0.32						
BDC-6-30	BDC	2/24/2010	2.06	0.49	14	0.01	0.17	6.1	3.3	0.25						
BDC-6-30	BDC	3/1/2011	3.08	0.52	14	0.01	0.28	6.6	0.68	0.21						
BDC-6-30	BDC	10/18/2011	3.71	0.29	8.8	0.01	0.18	3.2	0.29	0.12						
BDC-6-30	BDC	4/11/2012	4.19	0.21	9.8	0.01	0.17	6.3	0.84	0.17						
BDC-6-30	BDC	8/22/2012	4.56	0.19	6	0.01	0.11	3	0.47	0.10						
BDC-6-30	BDC	3/20/2013	5.13	0.12	6.7	0.01	0.12	5	1.2	0.13						
BDC-6-30	BDC	9/9/2013	5.60	0.13	6.4	0.01	0.11	3.3	0.49	0.10						
BDC-6-30	BDC	3/14/2014	6.11	0.11	5.5	0.01	0.12	5.4	0.87	0.11						
BDC-6-30	BDC	9/5/2014	6.59	0.15	6.5	0.01	0.16	4.4	1.4	0.13						
BDC-6-30	BDC	3/12/2015	7.11	0.077	4.8	0.01	0.11	4.5	1.7	0.11						
BDC-6-30	BDC	3/24/2016	8.14	0.096	5.1	0.01	0.11	4.3	1.7	0.11						
BDC-6-30	BDC	9/20/2016	8.63	0.175	3.56	0.01	0.19	2.54	1.1	0.08						
BDC-6-30	BDC	3/16/2018	10.12	0.052	3.97	0.01	0.142	6.72	0.58	0.10						





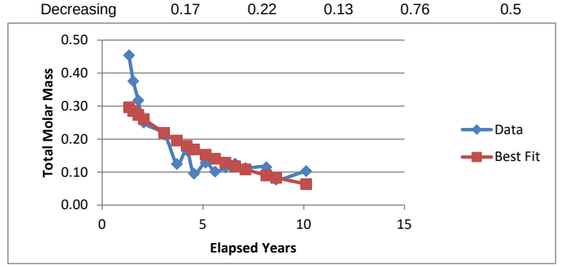
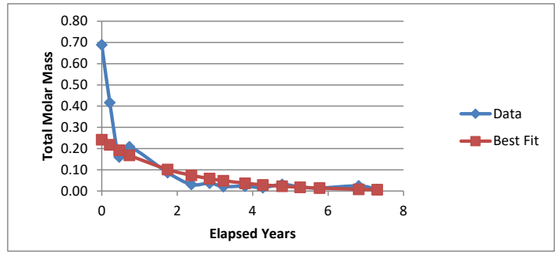


Table B2. Source Decay Estimates - Based on Total Moles CVOC
West of Fourth, Seattle, Washington

Well	BIOCHLOR Source Area	Date	Elapsed Years	1,1-DCE	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	VC	Total Molar Mass	Trend	SDR, k_s (/year) best-fit	SDR, k_s (/year) 90% upper	SDR, k_s (/year) 90% lower	R^2 (SDR, k_s)	Maximum Concentration umol-L
			g/mol ->	96.95	96.95	165.83	96.95	131.4	62.498	umol/L	Max	0.50	0.62	0.37	0.87	4.61
											Min	-0.01	0.01	-0.03	0.02	0.22
				ug/L	ug/L	ug/L	ug/L	ug/L	ug/L		Mean	0.15	0.20	0.10	0.58	1.52
BDC-6-60	BDC	6/1/2009	0.00	0.01	0.034	0.01	0.01	0.024	43	0.69	Decreasing	0.50	0.62	0.37	0.79	0.7
BDC-6-60	BDC	8/18/2009	0.21	0.01	0.01	0.01	0.01	0.01	26	0.42						
BDC-6-60	BDC	11/17/2009	0.46	0.01	0.01	0.01	0.01	0.01	10	0.16						
BDC-6-60	BDC	2/24/2010	0.73	0.01	0.031	0.01	0.01	0.01	13	0.21						
BDC-6-60	BDC	3/1/2011	1.75	0.01	0.026	0.01	0.01	0.01	5.4	0.09						
BDC-6-60	BDC	10/18/2011	2.38	0.01	0.01	0.01	0.01	0.01	1.9	0.03						
BDC-6-60	BDC	4/11/2012	2.86	0.01	0.022	0.01	0.01	0.01	2.3	0.04						
BDC-6-60	BDC	8/22/2012	3.22	0.01	0.01	0.01	0.01	0.01	1.3	0.02						
BDC-6-60	BDC	3/20/2013	3.80	0.01	0.01	0.01	0.01	0.01	1.4	0.02						
BDC-6-60	BDC	9/9/2013	4.27	0.01	0.01	0.01	0.01	0.01	0.97	0.02						
BDC-6-60	BDC	3/14/2014	4.78	0.01	0.063	0.01	0.01	0.01	1.9	0.03						
BDC-6-60	BDC	9/5/2014	5.26	0.1	0.1	0.1	0.01	0.01	0.99	0.02						
BDC-6-60	BDC	3/12/2015	5.78	0.01	0.042	0.01	0.01	0.01	0.84	0.01						
BDC-6-60	BDC	3/24/2016	6.81	0.01	0.15	0.01	0.01	0.01	1.4	0.02						
BDC-6-60	BDC	9/20/2016	7.30	0.01	0.01	0.01	0.01	0.01	0.428	0.01						
CG-137-WT	C2	5/8/2002	0.00	2.77	80.9	0.5	5.28	479	2.45	4.61	Decreasing	0.11	0.12	0.10	0.87	4.6
CG-137-WT	C2	7/17/2002	0.19	2.87	74	0.5	5.48	472	3.79	4.51						
CG-137-WT	C2	11/4/2002	0.49	1.48	42.2	0.025	3.3	283	2.7	2.68						
CG-137-WT	C2	2/17/2003	0.78	1.72	48.4	0.5	4.08	312	2.72	2.98						
CG-137-WT	C2	5/8/2003	1.00	2.12	63.1	0.5	5.46	329	2.07	3.27						
CG-137-WT	C2	8/6/2003	1.25	1.92	55.7	0.5	5.09	355	1.66	3.38						
CG-137-WT	C2	10/29/2003	1.48	2.5	44.2	2.5	2.5	244	2.5	2.42						
CG-137-WT	C2	2/4/2004	1.74	2.58	57.4	0.025	5.3	386	2.59	3.65						
CG-137-WT	C2	5/7/2004	2.00	2.16	47.3	0.025	5.38	308	1.48	2.93						
CG-137-WT	C2	11/8/2004	2.50	1.28	36.5	0.025	5	223	1.67	2.17						
CG-137-WT	C2	2/1/2005	2.74	1.54	44	0.5	4.42	269	2.02	2.60						
CG-137-WT	C2	11/4/2005	3.49	1.2	38	0.25	3.6	230	0.77	2.21						
CG-137-WT	C2	2/3/2006	3.74	1.9	75	0.25	12	260	1.8	2.93						
CG-137-WT	C2	11/2/2006	4.49	1.7	54	0.25	8.7	210	1.1	2.28						
CG-137-WT	C2	1/31/2007	4.73	2.1	65	0.25	15	250	2.6	2.79						
CG-137-WT	C2	11/14/2007	5.52	1.1	66	0.065	11	250	0.31	2.71						
CG-137-WT	C2	2/13/2008	5.77	1.6	63	0.065	11	210	1.8	2.41						
CG-137-WT	C2	11/10/2008	6.51	1.4	56	0.0385	10	200	1.3	2.24						
CG-137-WT	C2	2/12/2009	6.77	1.3	60	0.0385	10	150	2.1	1.91						
CG-137-WT	C2	11/2/2009	7.49	1.2	63	0.033	11	120	2.1	1.72						
CG-137-WT	C2	2/19/2010	7.79	1.7	53	0.16	10	130	5.3	1.74						
CG-137-WT	C2	3/24/2010	7.88	1.1	49	0.2	9.8	98	3.3	1.42						
CG-137-WT	C2	6/16/2010	8.11	0.63	50	0.2	7.7	98	0.92	1.36						
CG-137-WT	C2	9/28/2010	8.39	0.74	50	0.2	9.7	92	1.4	1.35						
CG-137-WT	C2	11/4/2010	8.49	0.94	64	0.0495	10	96	1.5	1.53						
CG-137-WT	C2	12/15/2010	8.60	1.1	48	0.5	9.4	93	4.2	1.38						
CG-137-WT	C2	2/9/2011	8.76	1.2	61	0.0495	11	92	2.7	1.50						
CG-137-WT	C2	3/15/2011	8.85	0.5	47	0.5	8.6	82	2	1.24						
CG-137-WT	C2	5/4/2012	9.99	0	46	0	8.7	62	0.83	1.05						
CG-137-WT	C2	9/26/2012	10.39	0	38	0	8.7	64	1	0.98						
CG-137-WT	C2	3/15/2013	10.85	0	40	0	7.2	39	0.49	0.79						
CG-137-WT	C2	8/8/2013	11.25	0	38	0	9.2	38	0.77	0.79						
CG-137-WT	C2	3/13/2014	11.85	0	48	0	9	31	0.86	0.84						
CG-137-WT	C2	9/24/2014	12.38	0	54	0	9.2	28	0.73	0.88						
CG-137-WT	C2	3/1/2016	13.81	0.55	86	0.2	9	7.2	2.3	1.08						
CG-137-WT	C2	9/1/2016	14.32	0.61	98	0.2	10	7.5	0.67	1.19						
CG-137-WT	C2	3/18/2020	17.86		53	0.2	4.2	1.5	1.3	0.62						



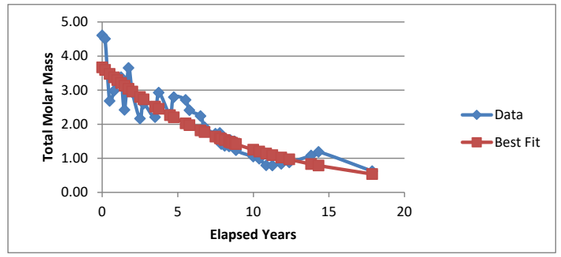
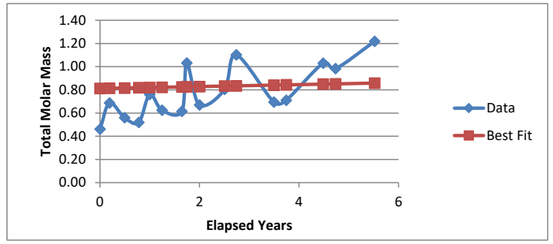
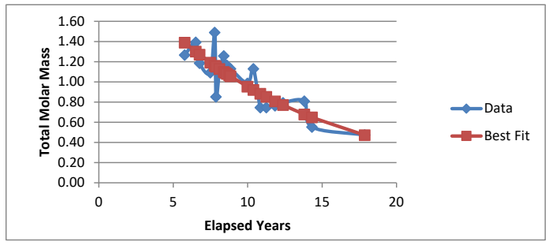


Table B2. Source Decay Estimates - Based on Total Moles CVOC
West of Fourth, Seattle, Washington

Well	BIOCHLOR Source Area	Date	Elapsed Years	1,1-DCE	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	VC	Total Molar Mass	Trend	SDR, k_s (/year) best-fit	SDR, k_s (/year) 90% upper	SDR, k_s (/year) 90% lower	R^2 (SDR, k_s)	Maximum Concentration
			g/mol ->	*96.95*	*96.95*	*165.83*	*96.95*	*131.4*	*62.498*	umol/L	*Max*	*0.50*	*0.62*	*0.37*	*0.87*	*4.61*
											Min	*-0.01*	*0.01*	*-0.03*	*0.02*	*0.22*
				ug/L	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*		*Mean*	*0.15*	*0.20*	*0.10*	*0.58*	*1.52*
CG-137-40	C2	5/8/2002	0.00	0.5	0.5	0.5	0.5	0.5	27.4	0.46	Increasing/Flat	-0.01	0.01	-0.03	0.02	1.5
CG-137-40	C2	7/17/2002	0.19	0.025	0.5	0.025	0.5	0.028	42.3	0.69						
CG-137-40	C2	11/4/2002	0.49	0.025	0.5	0.025	0.5	0.01	34.3	0.56						
CG-137-40	C2	2/17/2003	0.78	0.025	0.5	0.025	0.5	0.01	31.8	0.52						
CG-137-40	C2	5/8/2003	1.00	0.025	0.5	0.025	0.5	0.028	46.9	0.76						
CG-137-40	C2	8/6/2003	1.25	0.025	0.5	0.025	0.5	0.025	38.3	0.62						
CG-137-40	C2	12/30/2003	1.65	0.025	0.5	0.025	0.5	0.01	37.8	0.62						
CG-137-40	C2	2/4/2004	1.74	0.025	0.5	0.025	0.5	0.01	63.8	1.03						
CG-137-40	C2	5/7/2004	2.00	0.025	0.5	0.025	0.5	0.55	40.9	0.67						
CG-137-40	C2	11/8/2004	2.50	0.025	0.5	0.025	0.5	0.025	49.6	0.80						
CG-137-40	C2	2/1/2005	2.74	0.025	0.5	0.025	0.5	0.025	68.2	1.10						
CG-137-40	C2	11/4/2005	3.49	0.01	0.25	0.25	0.25	0.013	43	0.69						
CG-137-40	C2	2/3/2006	3.74	0.01	0.25	0.25	0.25	0.054	44	0.71						
CG-137-40	C2	11/2/2006	4.49	0.01	0.25	0.25	0.25	0.021	64	1.03						
CG-137-40	C2	1/31/2007	4.73	0.01	0.25	0.25	0.25	0.035	61	0.98						
CG-137-40	C2	11/14/2007	5.52	0.00305	0.06	0.065	0.075	0.022	76	1.22						
CG-137-40	C2	2/13/2008	5.77	0.00305	0.06	0.065	0.075	0.022	79	1.27	*Increasing/Flat*	*0.09*	*0.11*	*0.07*	*0.79*	*1.5*
CG-137-40	C2	11/10/2008	6.51	0.00475	0.0225	0.0385	0.024	0.012	87	1.39						
CG-137-40	C2	2/12/2009	6.77	0.00475	0.0225	0.0385	0.024	0.019	74	1.18						
CG-137-40	C2	11/2/2009	7.49	0.00475	0.17	0.033	0.0455	0.00455	68	1.09						
CG-137-40	C2	2/19/2010	7.79	0.00475	0.09	0.033	0.0455	0.017	93	1.49						
CG-137-40	C2	3/24/2010	7.88	0.1	0.1	0.1	0.1	0.1	53	0.85						
CG-137-40	C2	6/16/2010	8.11	0.2	0.2	0.2	0.2	0.2	68	1.10						
CG-137-40	C2	9/28/2010	8.39	0.2	0.2	0.2	0.2	0.2	78	1.26						
CG-137-40	C2	11/4/2010	8.49	0.00475	0.0335	0.0495	0.0455	0.00455	68	1.09						
CG-137-40	C2	12/15/2010	8.60	0.2	1.4	0.2	0.2	0.98	71	1.16						
CG-137-40	C2	2/9/2011	8.76	0.00295	0.0335	0.0495	0.0285	0.0019	70	1.12						
CG-137-40	C2	3/15/2011	8.85	0.2	0.2	0.2	0.2	0.2	70	1.13						
CG-137-40	C2	5/4/2012	9.99	0.2	0.2	0.2	0.2	0.2	61	0.98						
CG-137-40	C2	9/26/2012	10.39	0.2	0.2	0.2	0.2	0.2	70	1.13						
CG-137-40	C2	3/15/2013	10.85	0.2	0.2	0.2	0.2	0.2	46	0.74						
CG-137-40	C2	8/8/2013	11.25	0.2	0.2	0.2	0.2	0.2	46	0.74						
CG-137-40	C2	3/13/2014	11.85	0.1	0.61	0.1	0.1	0.38	47	0.76						
CG-137-40	C2	9/24/2014	12.38	0.2	0.2	0.2	0.2	0.2	49	0.79						
CG-137-40	C2	3/1/2016	13.81	0.2	0.2	0.2	0.2	0.2	50	0.81						
CG-137-40	C2	9/1/2016	14.32	0.2	0.2	0.2	0.2	0.2	34	0.55						
CG-137-40	C2	3/18/2020	17.86	0.2	0.21	0.2	0.2	0.2	29	0.47						
CI-137-50	C2	3/24/2010	0.00	0.1	0.1	0.1	0.1	0.1	11	0.18	Decreasing	0.33	0.42	0.24	0.82	0.31
CI-137-50	C2	6/16/2010	0.23	0.1	0.1	0.1	0.1	0.1	15	0.24						
CI-137-50	C2	9/28/2010	0.52	0.1	0.1	0.1	0.1	0.1	16	0.26						
CI-137-50	C2	12/15/2010	0.73	0.1	0.1	0.1	0.1	0.1	19	0.31						
CI-137-50	C2	3/15/2011	0.98	0.1	0.1	0.1	0.1	0.1	17	0.28						
CI-137-50	C2	5/4/2012	2.12	0.1	0.1	0.1	0.1	0.1	12	0.20						
CI-137-50	C2	9/26/2012	2.51	0.1	0.1	0.1	0.1	0.1	6.5	0.11						
CI-137-50	C2	3/14/2013	2.98	0.1	0.1	0.1	0.1	0.1	4.1	0.07						
CI-137-50	C2	8/8/2013	3.38	0.1	0.1	0.1	0.1	0.1	3.9	0.07						
CI-137-50	C2	3/13/2014	3.97	0.1	0.1	0.1	0.1	0.1	3.1	0.05						
CI-137-50	C2	3/1/2016	5.94	0.1	0.1	0.1	0.1	0.1	1.6	0.03						
CI-137-50	C2	9/1/2016	6.45	0.1	0.1	0.1	0.1	0.1	3.1	0.05						

**Values in italics are for well CG-137-40 from 2008 to 2014 and exclude an earlier increasing trend in the data series.*





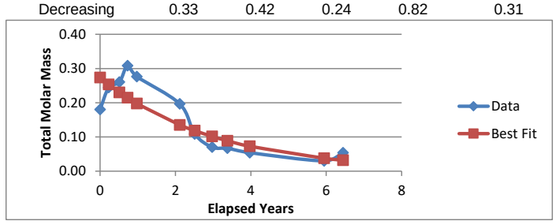
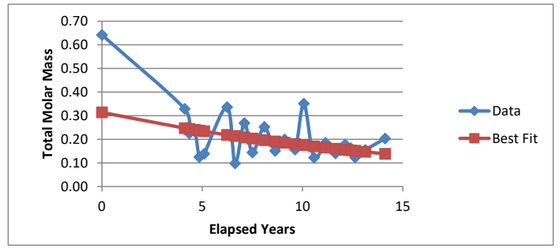


Table B2. Source Decay Estimates - Based on Total Moles CVOC
West of Fourth, Seattle, Washington

Well	BIOCHLOR Source Area	Date	Elapsed Years	1,1-DCE	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	VC	Total Molar Mass	Trend	SDR, k_s (/year) best-fit	SDR, k_s (/year) 90% upper	SDR, k_s (/year) 90% lower	R^2 (SDR, k_s)	Maximum Concentration umol-L
			g/mol ->	*96.95*	*96.95*	*165.83*	*96.95*	*131.4*	*62.498*	umol/L	*Max*	*0.50*	*0.62*	*0.37*	*0.87*	*4.61*
											Min	*-0.01*	*0.01*	*-0.03*	*0.02*	*0.22*
				ug/L	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*		*Mean*	*0.15*	*0.20*	*0.10*	*0.58*	*1.52*
CI-MW-7	C4	2/9/2006	0.00	0.36	6.7	46	0.1	38	0.1	0.64	Decreasing	0.06	0.10	0.02	0.23	0.64
CI-MW-7	C4	3/24/2010	4.12	0.3	5.9	22	0.1	17	0.1	0.33						
CI-MW-7	C4	6/16/2010	4.35	0.44	6.2	13	0.1	9.3	0.38	0.22						
CI-MW-7	C4	9/28/2010	4.64	0.35	3.8	18	0.1	9.6	0.45	0.23						
CI-MW-7	C4	12/15/2010	4.85	0.63	4.3	2.4	0.1	6.5	0.57	0.12						
CI-MW-7	C4	3/15/2011	5.10	0.5	3.5	5.3	0.1	7.9	0.28	0.14						
CI-MW-7	C4	5/4/2012	6.24	0.2	2.9	26	0.1	19	0.1	0.34						
CI-MW-7	C4	9/26/2012	6.63	0.45	3.2	3.6	0.1	4.7	0.1	0.10						
CI-MW-7	C4	3/13/2013	7.09	0.3	2.9	21	0.1	14	0.1	0.27						
CI-MW-7	C4	8/8/2013	7.50	0.58	4.7	8.6	0.1	4.6	0.1	0.14						
CI-MW-7	C4	3/12/2014	8.09	0.29	2.8	21	0.1	12	0.1	0.25						
CI-MW-7	C4	9/23/2014	8.63	0.43	3.3	11	0.1	5.5	0.2	0.15						
CI-MW-7	C4	3/17/2015	9.10	0.54	4.3	13	0.1	8.7	0.25	0.20						
CI-MW-7	C4	9/23/2015	9.63	0.41	3.1	12	0.1	4.6	0.74	0.16						
CI-MW-8	C5	3/1/2016	10.06	0.1	1.4	30	0.1	20	0.1	0.35						
CI-MW-7	C4	9/1/2016	10.57	0.39	2.4	8.8	0.1	4.7	0.23	0.12						
CI-MW-7	C4	3/28/2017	11.14		1.5	15	0.1	10	0.1	0.18						
CI-MW-7	C4	9/26/2017	11.64		2.6	9.9	0.1	5.7	0.55	0.14						
CI-MW-7	C4	3/20/2018	12.12		1.4	14	0.1	10	0.1	0.18						
CI-MW-7	C4	7/2/2018	12.40		2.4	12	0.1	7.6	0.4	0.16						
CI-MW-7	C4	9/18/2018	12.61		3.9	5.9	0.1	5	0.53	0.12						
CI-MW-7	C4	3/22/2019	13.12		2.2	11	0.1	8.3	0.1	0.15						
CI-MW-7	C4	3/18/2020	14.11		0.64	17	0.1	12	0.1	0.20						



Notes:
Non-detect result values included at half the reporting limit

Table B3. Comparison of Source Decay Estimates

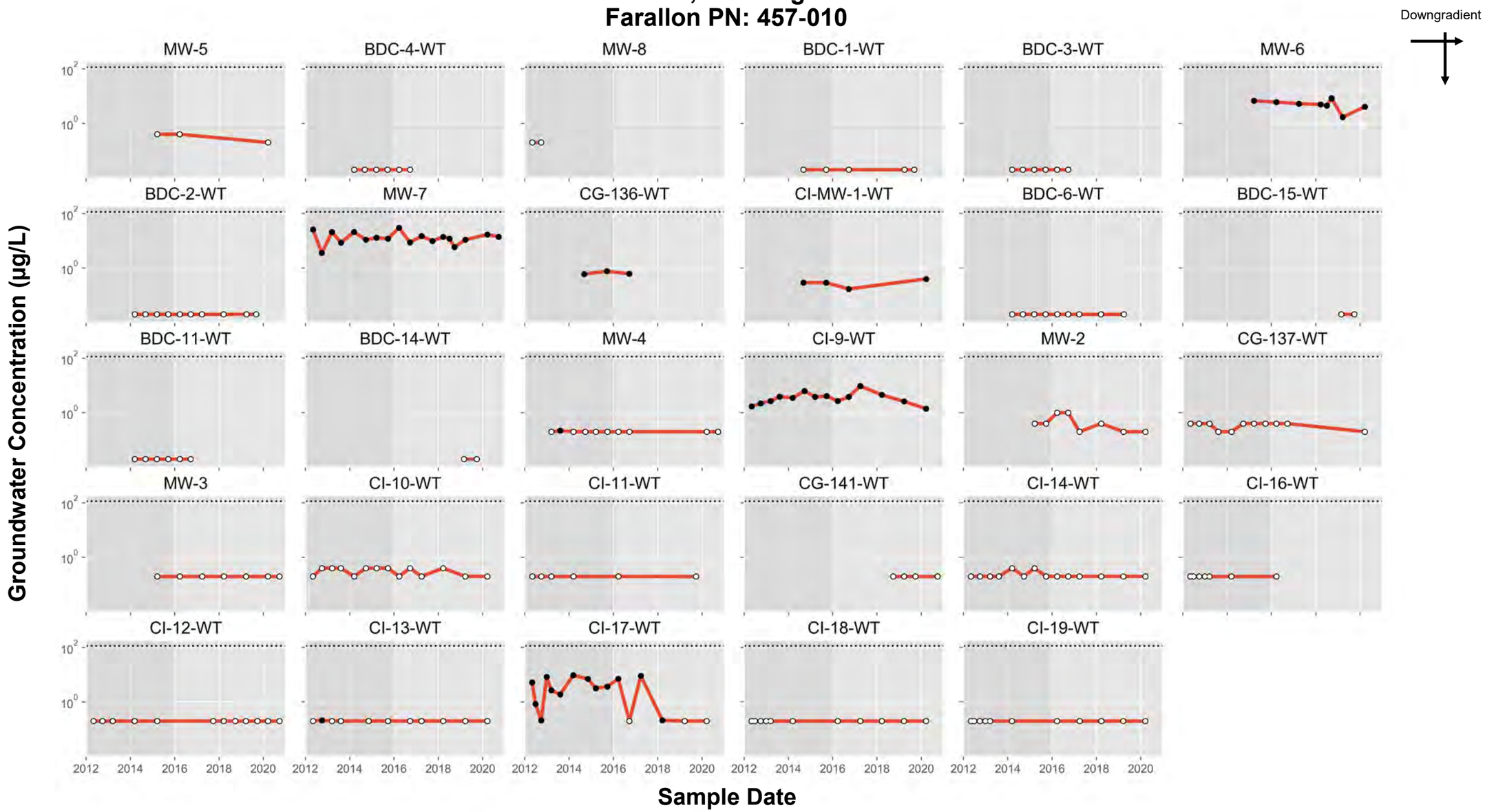
West of Fourth, Seattle, Washington

Well			BDC-2-WT	BDC-3-40	BDC-3-60	BDC-3-WT	BDC-6-30	BDC-6-60	BDC-6-WT	CG-137-40	CG-137-WT	CI-137-50	CI-MW-7
Source Area			BDC	BDC	BDC	BDC	BDC	BDC	BDC	C2	C2	C2	C4
Estimated Source Decay Estimate (2016 FS)													
SDR based on 2006 and later data, as available *(Table 3a, 2016 FS Report)*	SDR: ks (/year)	best-fit	0.21	0.03	0.12	0.24	0.23	0.60	0.10	0.09	0.12	0.42	0.11
		90% upper	0.29	0.05	0.31	0.32	0.29	0.75	0.14	0.12	0.14	0.55	0.19
		90% lower	0.14	0.01	-0.06	0.16	0.18	0.46	0.07	0.06	0.11	0.28	0.03
		R2 (ks)	0.69	0.30	0.12	0.72	0.82	0.84	0.67	0.61	0.89	0.81	0.32
	Maximum Concentration	umol-L	1.09	0.33	0.22	1.66	0.45	0.69	3.16	1.49	4.61	0.31	0.64
Estimated Source Decay Estimate (revised to include post-2016 data)													
SDR based on 2006 trhough 2020 data, as available *(Table 3, revised in this report)*	SDR: ks (/year)	best-fit	0.16	0.02	0.13	0.19	0.17	0.50	0.11	0.09	0.11	0.33	0.06
		90% upper	0.20	0.04	0.28	0.25	0.22	0.62	0.13	0.11	0.12	0.42	0.10
		90% lower	0.12	0.00	-0.03	0.12	0.13	0.37	0.09	0.07	0.10	0.24	0.02
		R2 (ks)	0.72	0.24	0.14	0.65	0.76	0.79	0.85	0.79	0.87	0.82	0.23
	Maximum Concentration	umol-L	1.09	0.33	0.22	1.66	0.45	0.69	3.16	1.49	4.61	0.31	0.64
Analytical Estimate of Remediation Times (including post-2016 data)													
Well-specific time to reach screening levels (t ks)	t ks: bset-fit SDR		21	108	14	20	14	6	39	41	44	6	49
	t ks: 90% upper SDR		16	59	6	15	11	5	33	34	40	5	29
	t ks: 90% lower SDR		27	656	-66	31	19	8	47	51	50	9	159

Notes:

t ks values with R2 less than 0.5 are gray reflecting low confidence in value range.

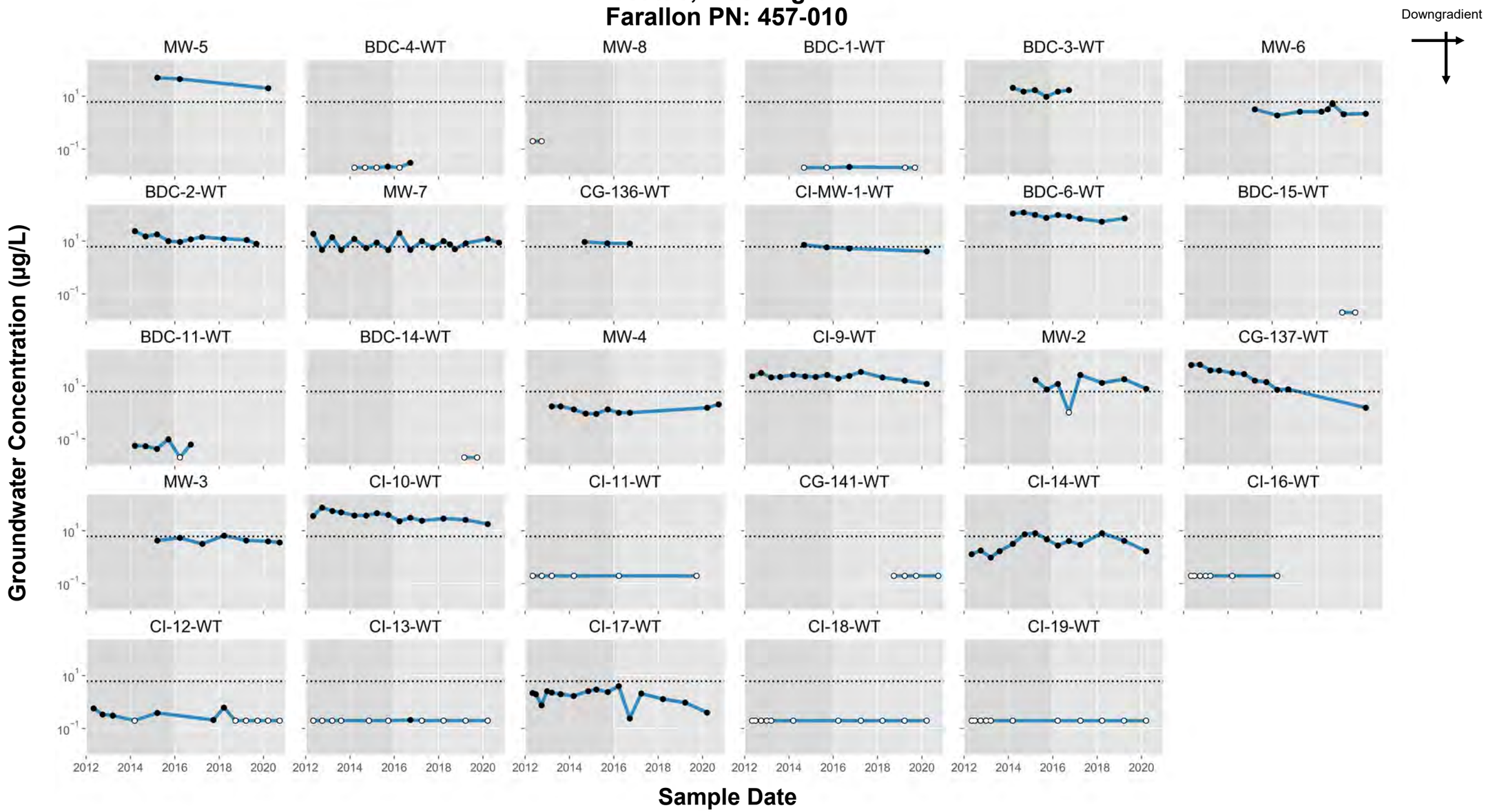
Figure B-1
Groundwater PCE Concentrations - Water Table Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
PCE = Tetrachloroethene
µg/L = micrograms per liter

PCE Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

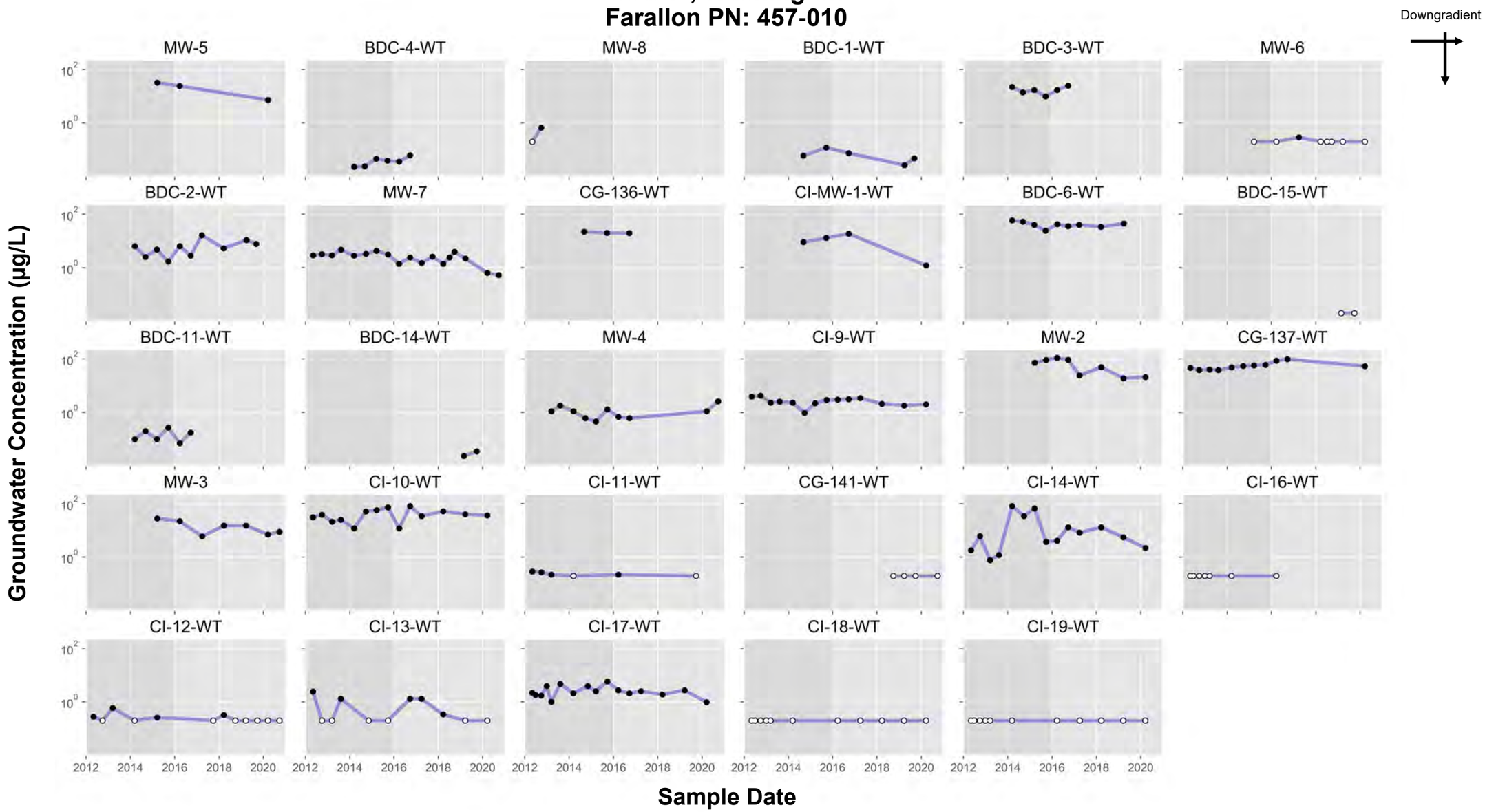
Figure B-2
Groundwater TCE Concentrations - Water Table Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
TCE = Trichloroethene
µg/L= micrograms per liter

TCE Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

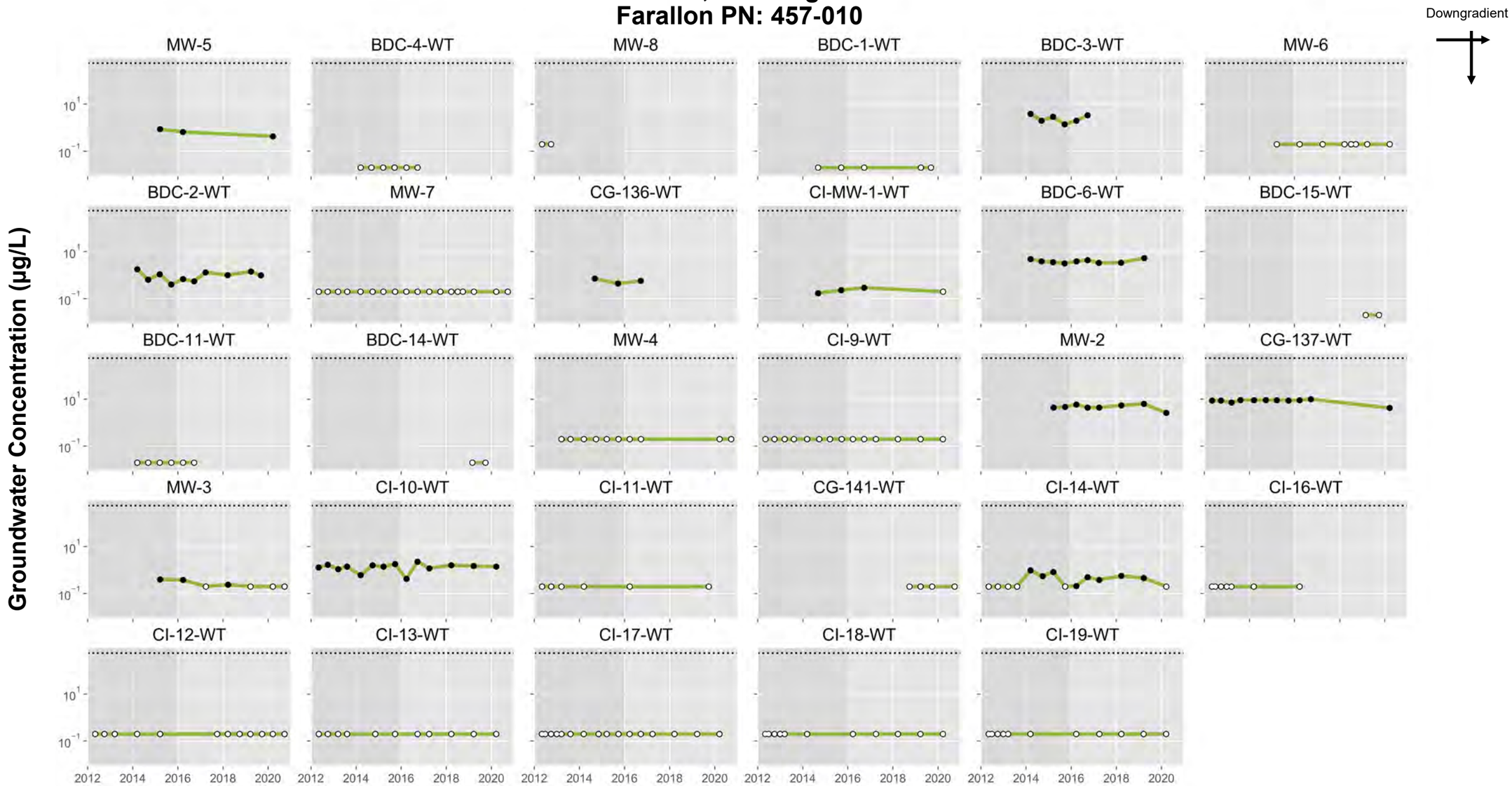
Figure B-3
Groundwater cis-1,2-DCE Concentrations - Water Table Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
DCE = Dichloroethene
µg/L = micrograms per liter

cis-1,2-DCE Concentration
Before 2016
Detected Result
Not Detected Result

Figure B-4
Groundwater trans-1,2-DCE Concentrations - Water Table Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
DCE = Dichloroethene
µg/L = micrograms per cubic meter

trans-1,2-DCE Concentration

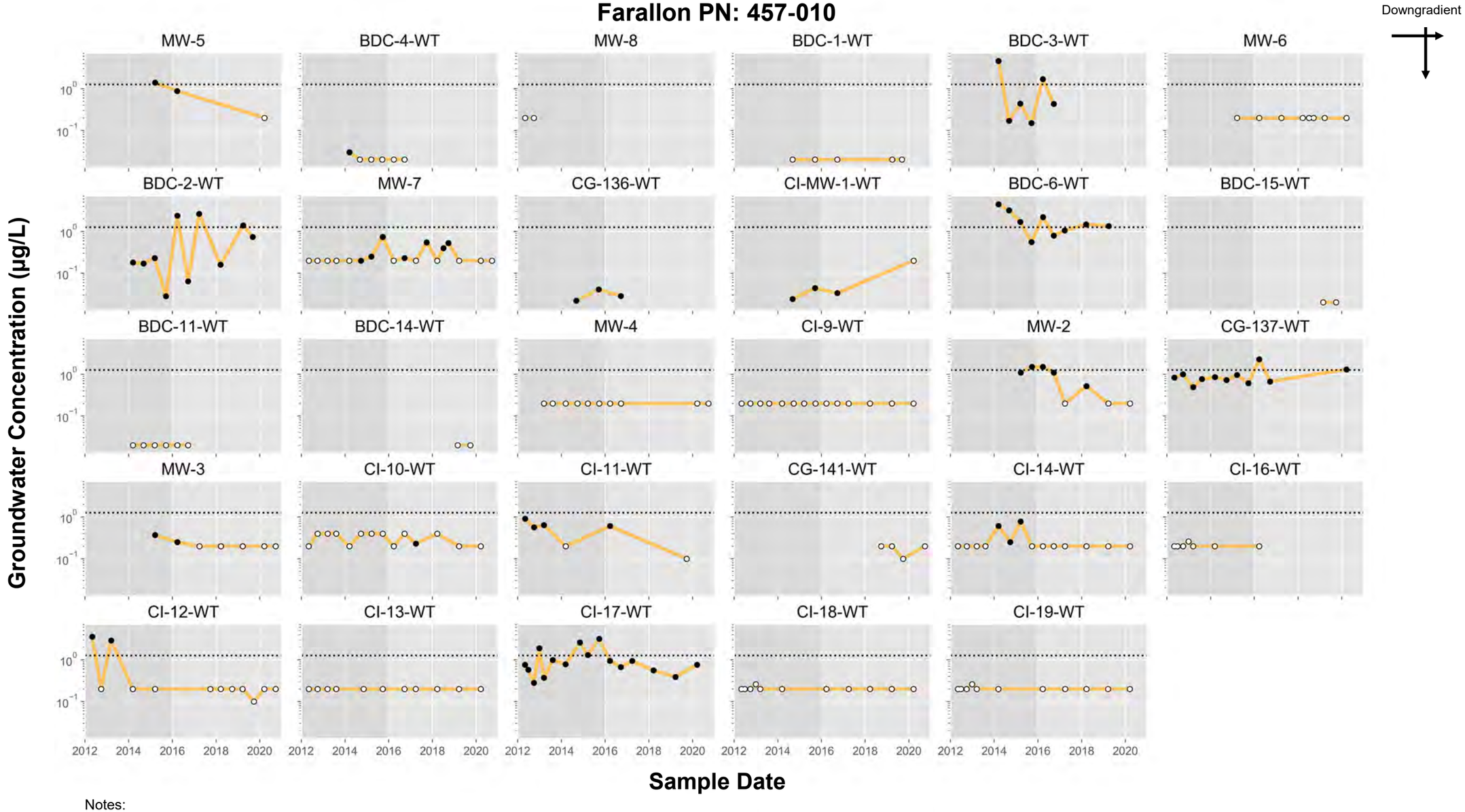
Preliminary Cleanup Level

Before 2016

Detected Result

Not Detected Result

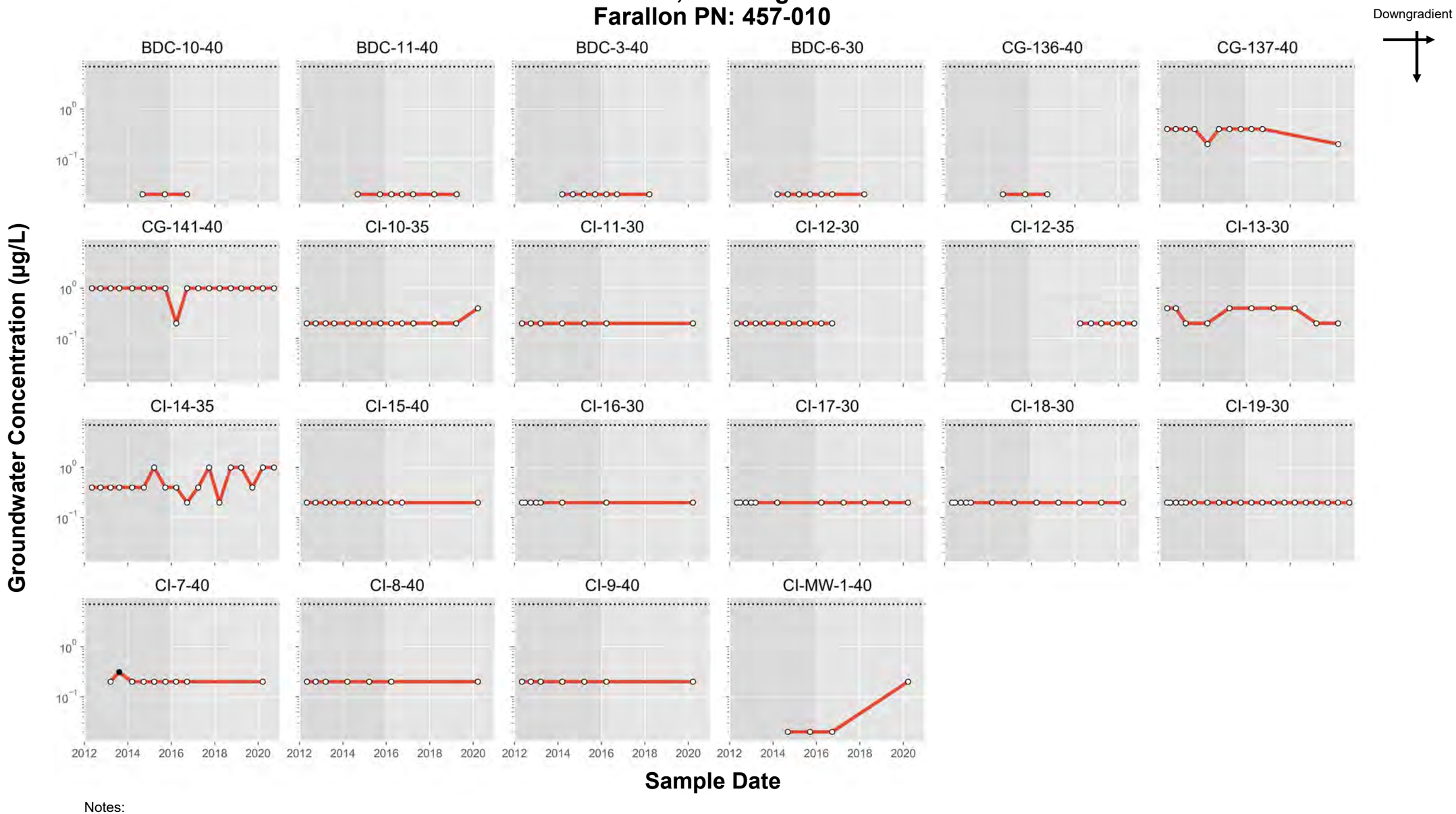
Figure B-5
Groundwater Vinyl Chloride Concentrations - Water Table Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
µg/L = micrograms per liter

Vinyl Chloride Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

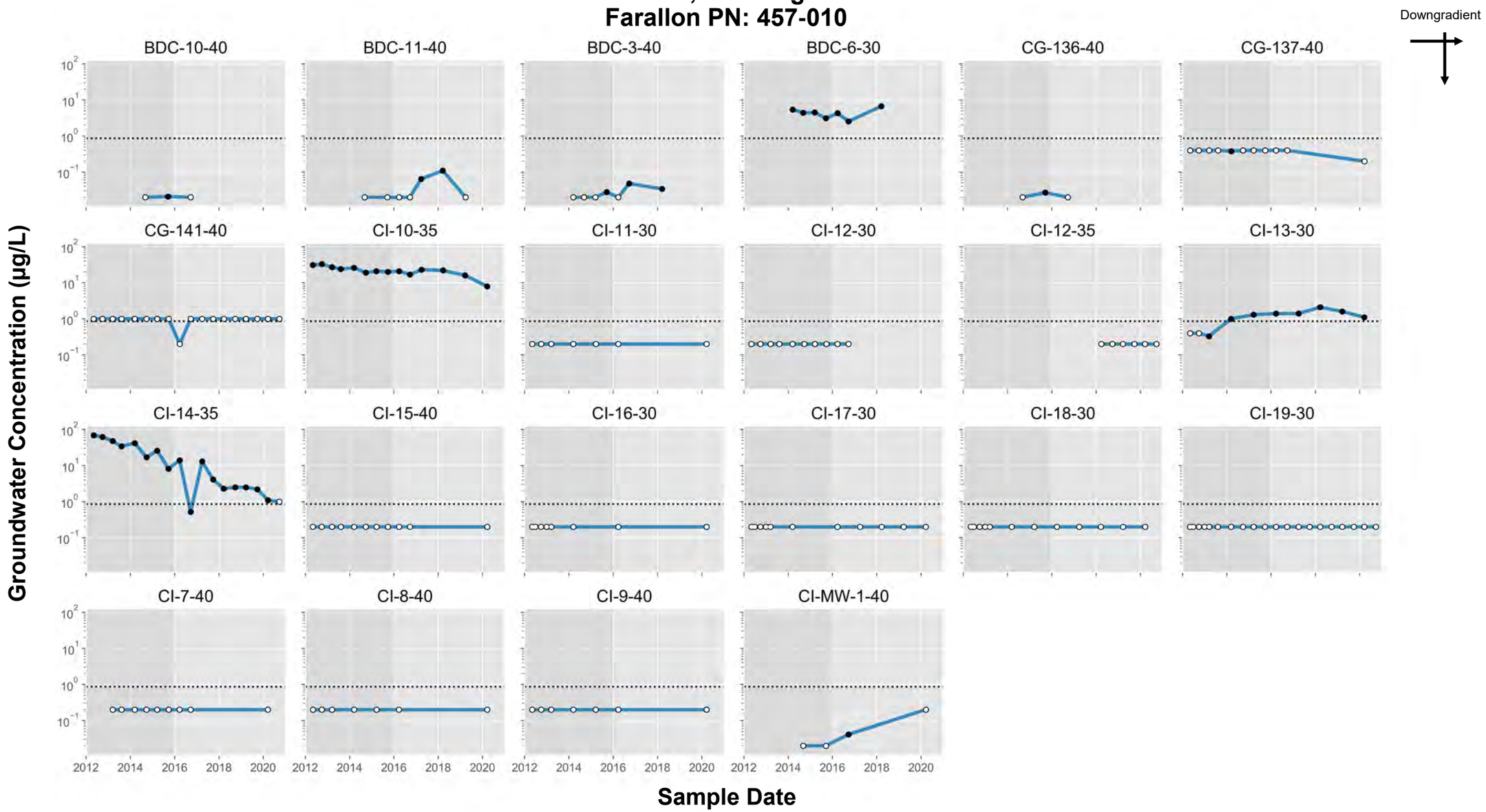
Figure B-6
Groundwater PCE Concentrations - Shallow Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
PCE = Tetrachloroethene
µg/L = micrograms per liter

PCE Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

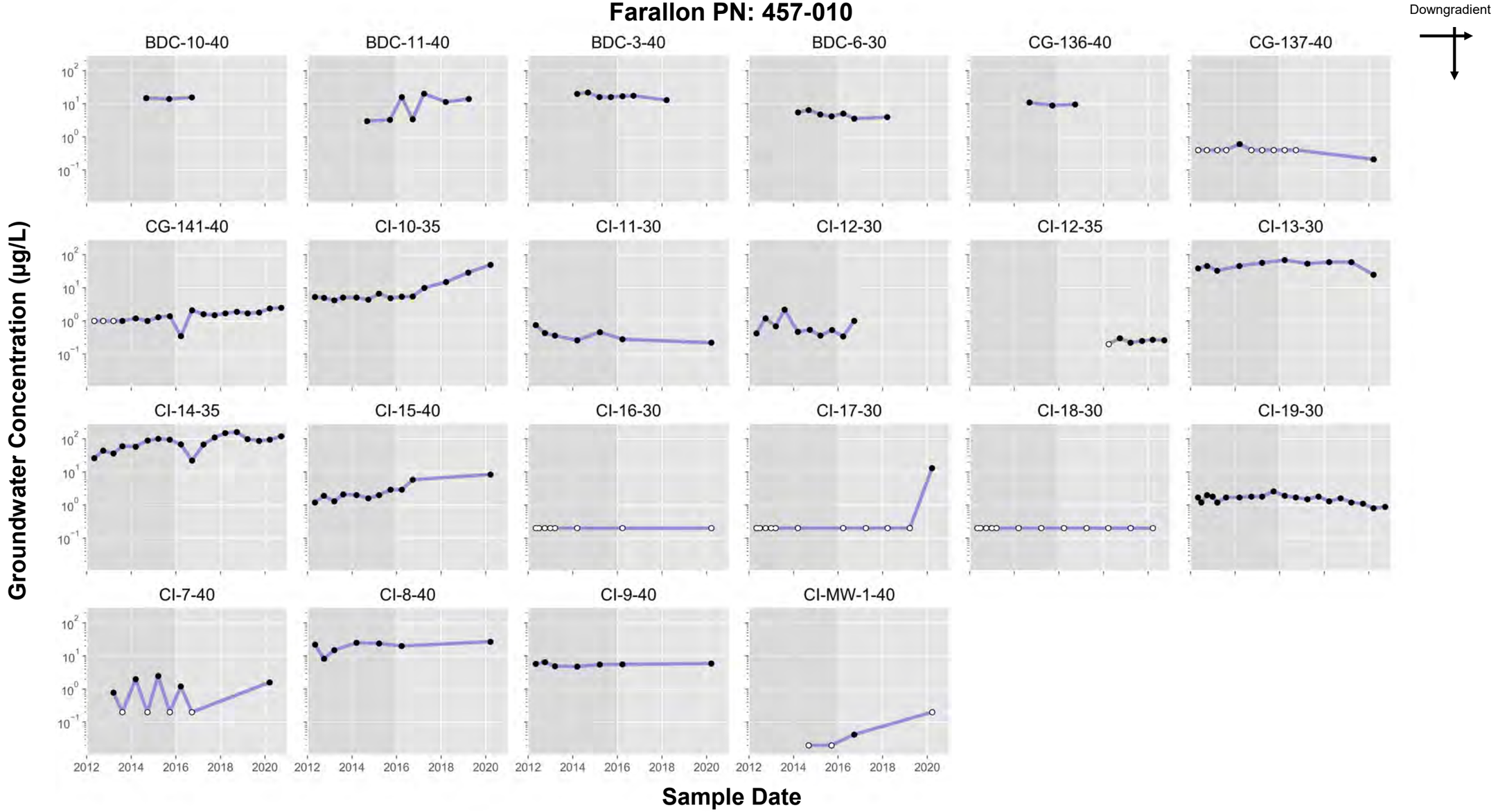
Figure B-7
Groundwater TCE Concentrations - Shallow Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
TCE = Trichloroethene
µg/L= micrograms per liter

TCE Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

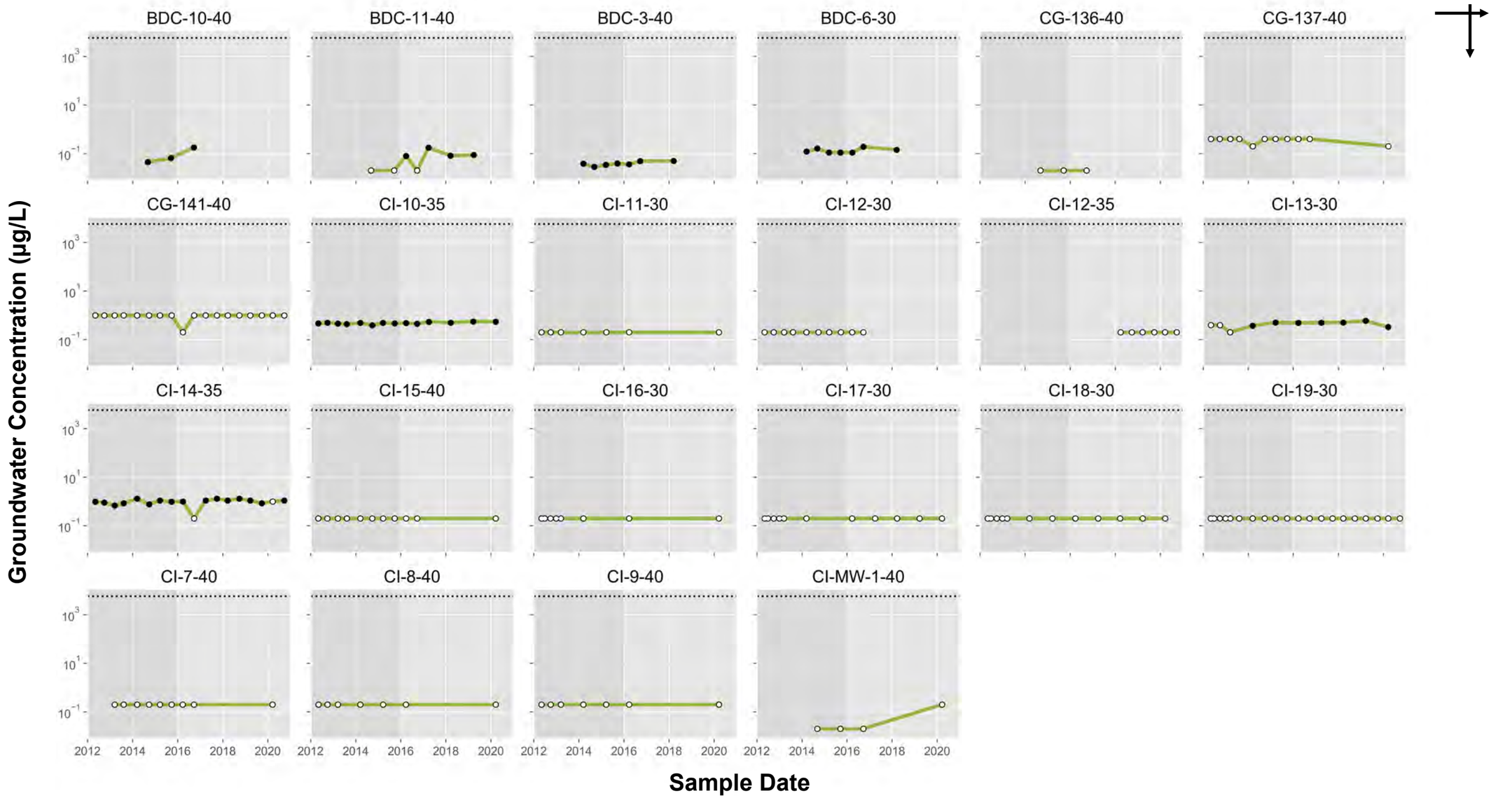
Figure B-8
Groundwater cis-1,2-DCE Concentrations - Shallow Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
DCE = Dichloroethene
µg/L = micrograms per liter

cis-1,2-DCE Concentration
Before 2016
Detected Result
Not Detected Result

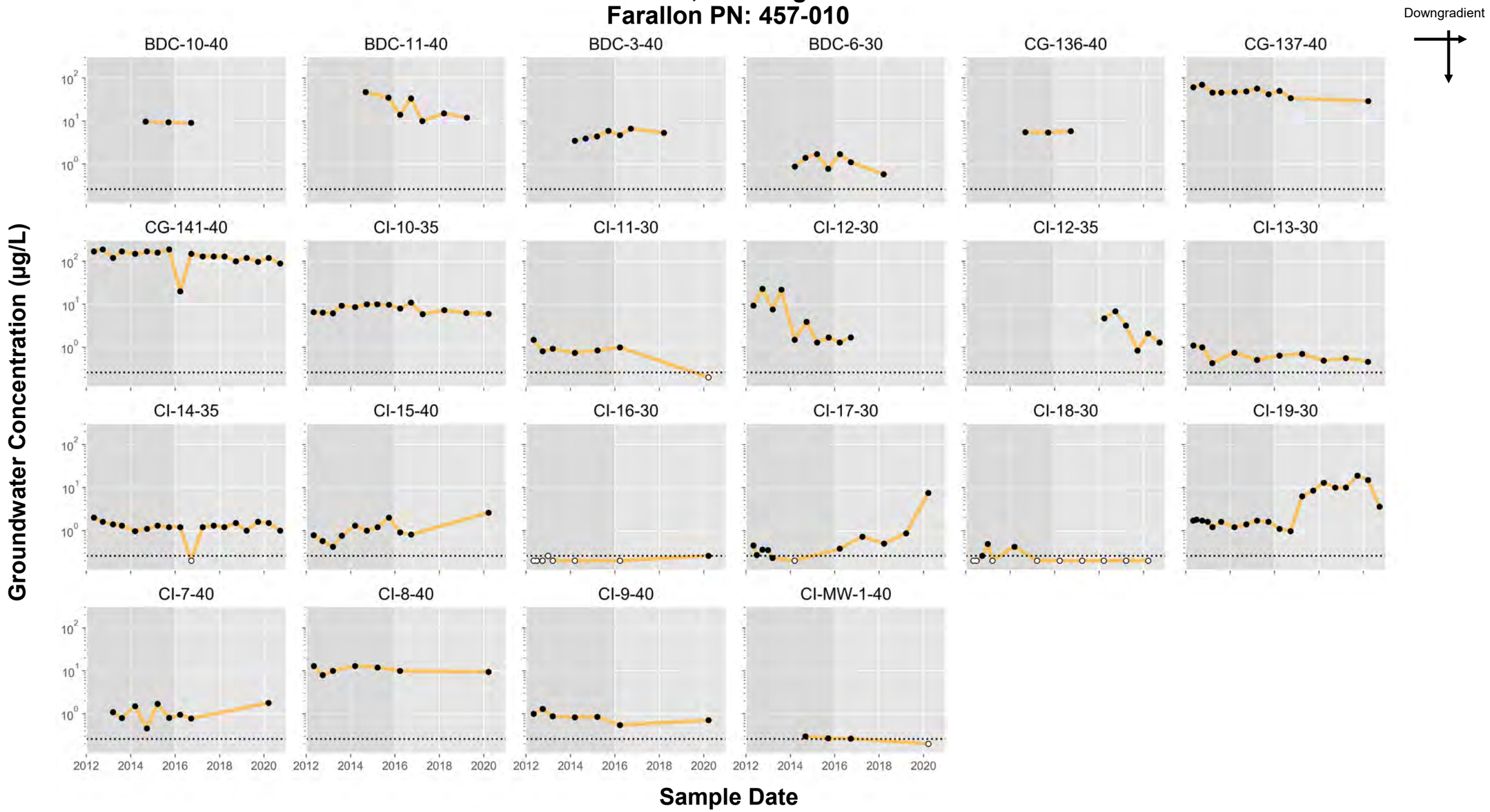
Figure B-9
Groundwater trans-1,2-DCE Concentrations - Shallow Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
DCE = Dichloroethene
µg/L = micrograms per cubic meter

trans-1,2-DCE Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

Figure B-10
Groundwater Vinyl Chloride Concentrations - Shallow Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010

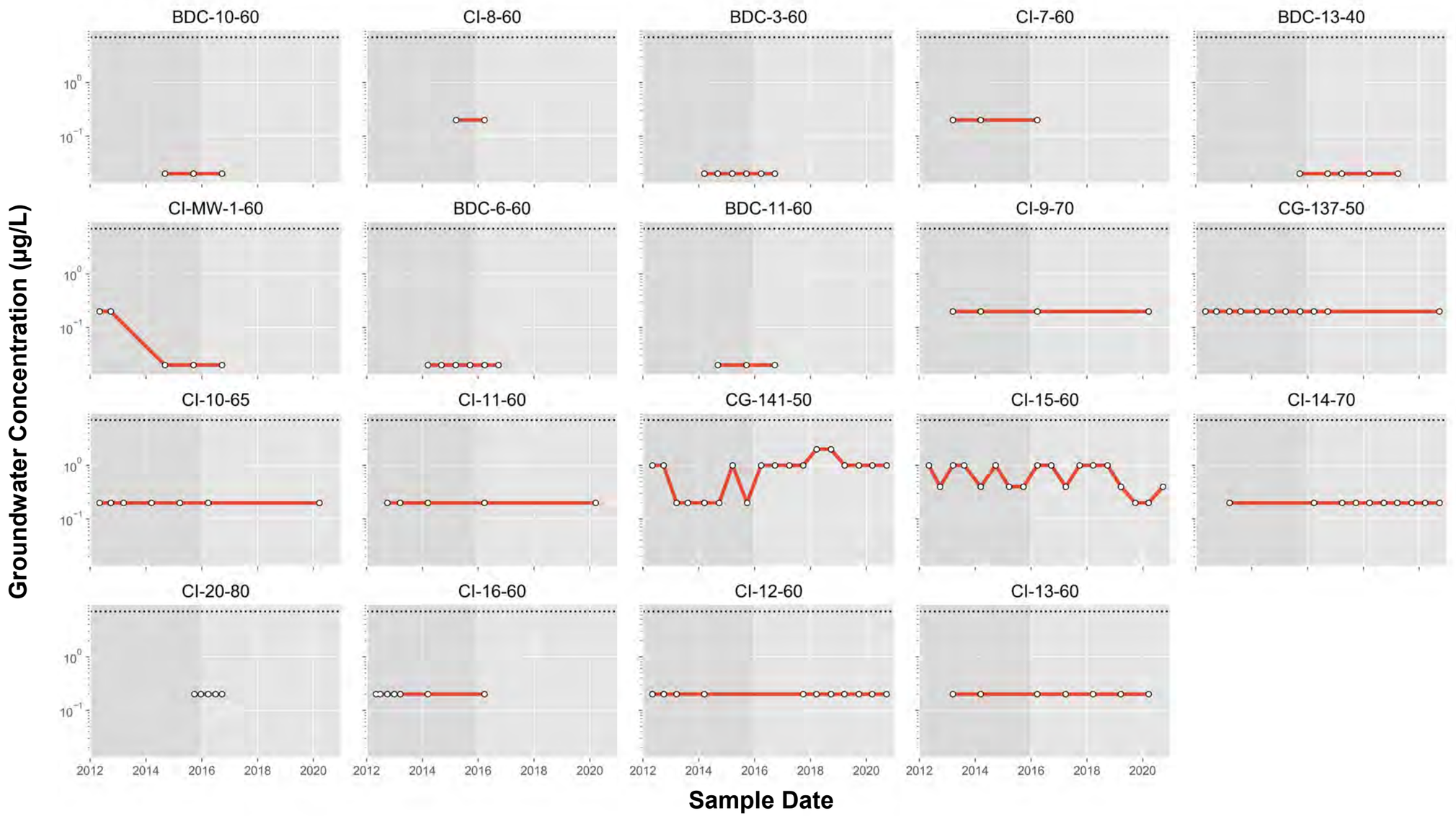


Notes:
µg/L = micrograms per liter

Vinyl Chloride Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

Figure B-11
Groundwater PCE Concentrations - Intermediate Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010

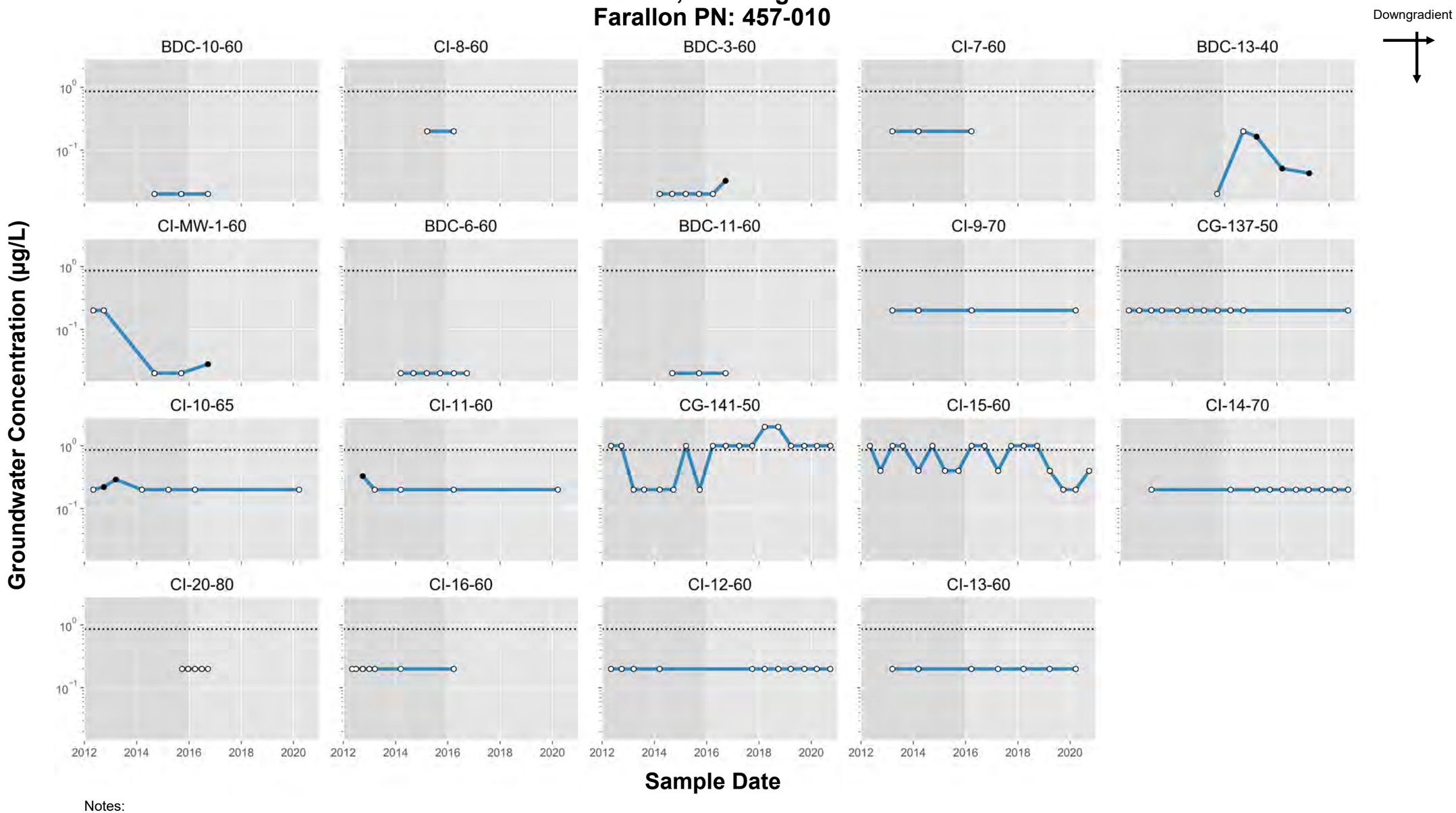
Downgradient



Notes:
PCE = Tetrachloroethene
µg/L = micrograms per liter

PCE Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

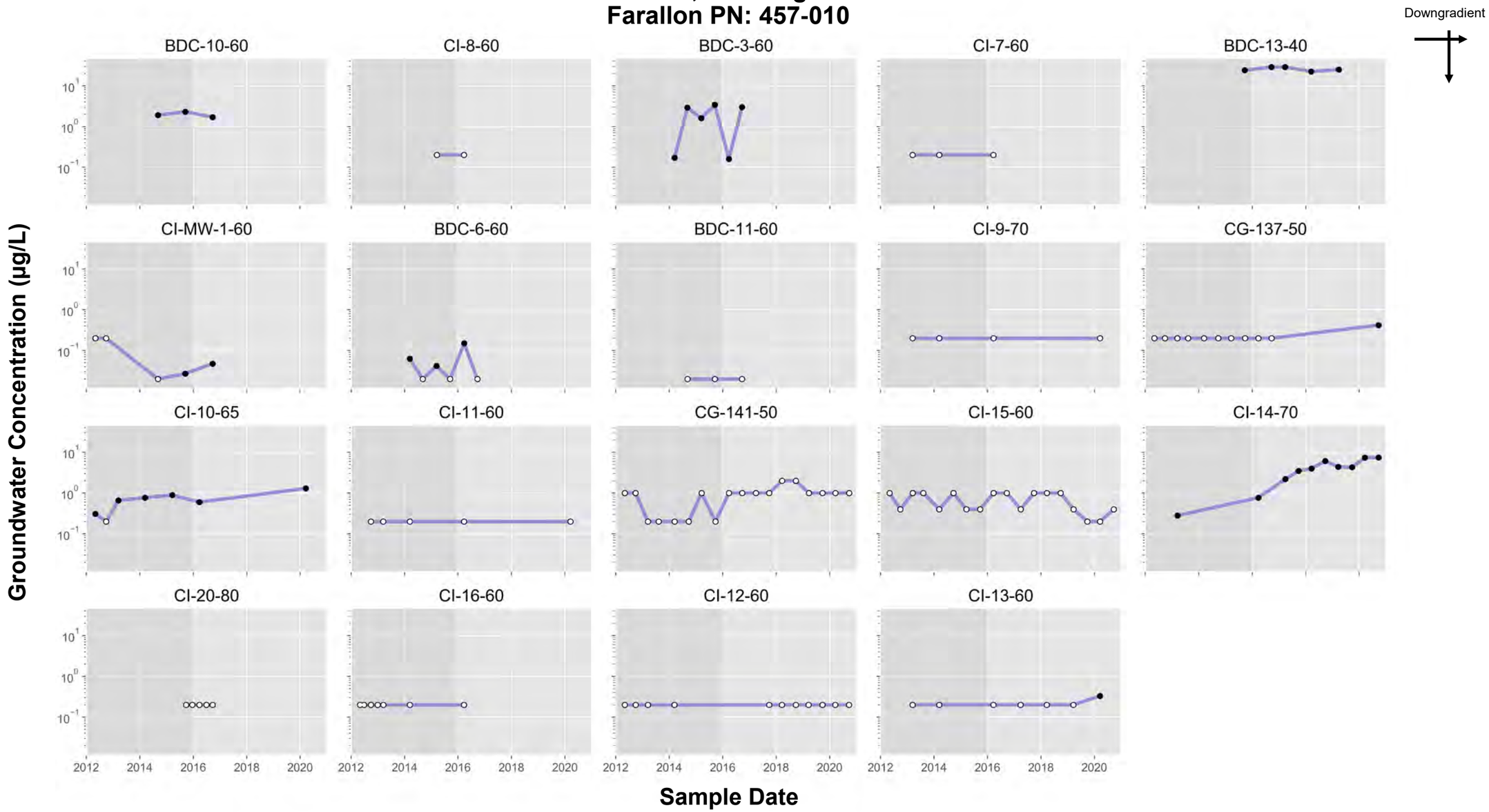
Figure B-12
Groundwater TCE Concentrations - Intermediate Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
TCE = Trichloroethene
µg/L= micrograms per liter

TCE Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

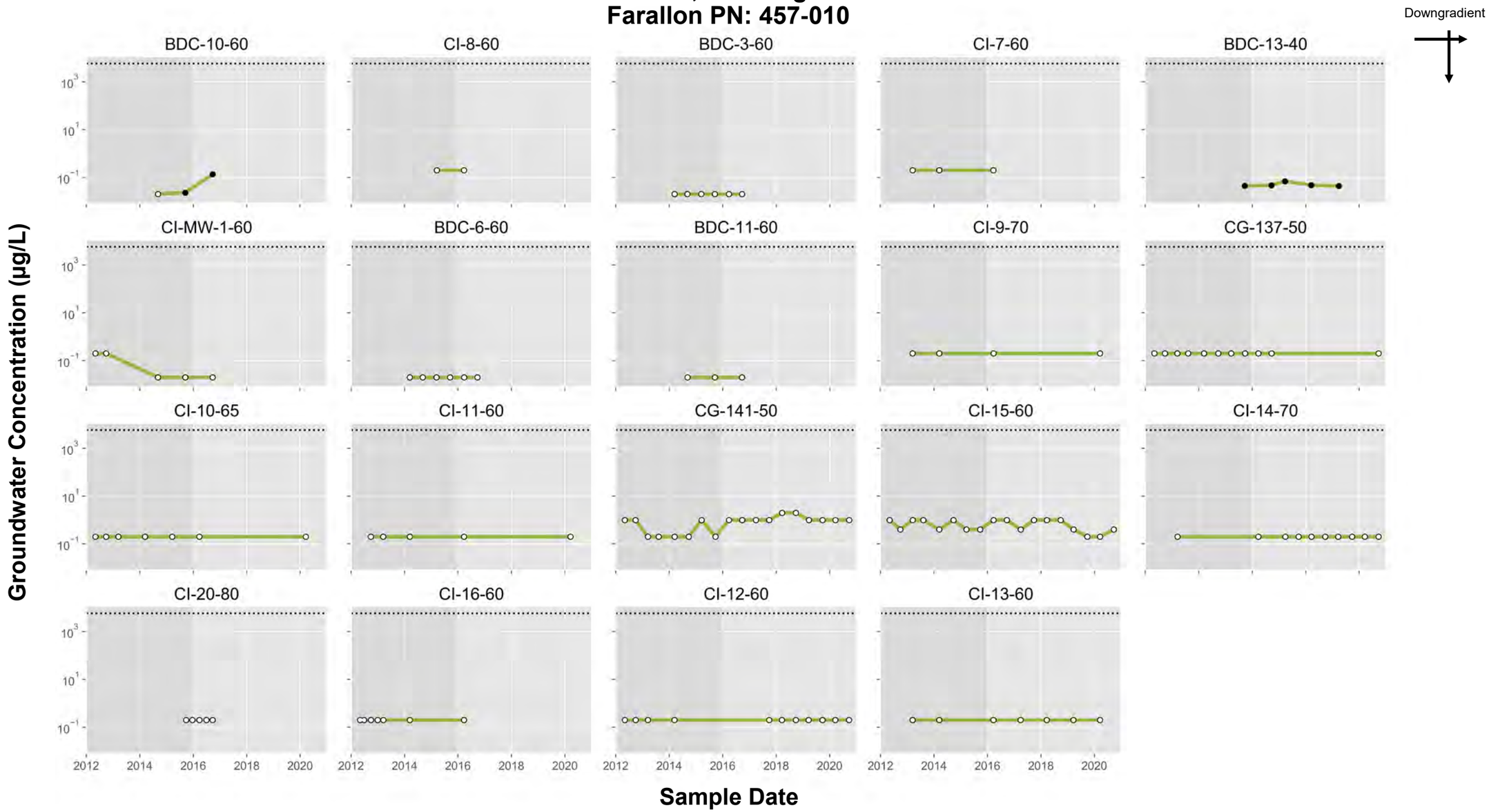
Figure B-13
Groundwater cis-1,2-DCE Concentrations - Intermediate Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
DCE = Dichloroethene
µg/L = micrograms per liter

cis-1,2-DCE Concentration
Before 2016
Detected Result
Not Detected Result

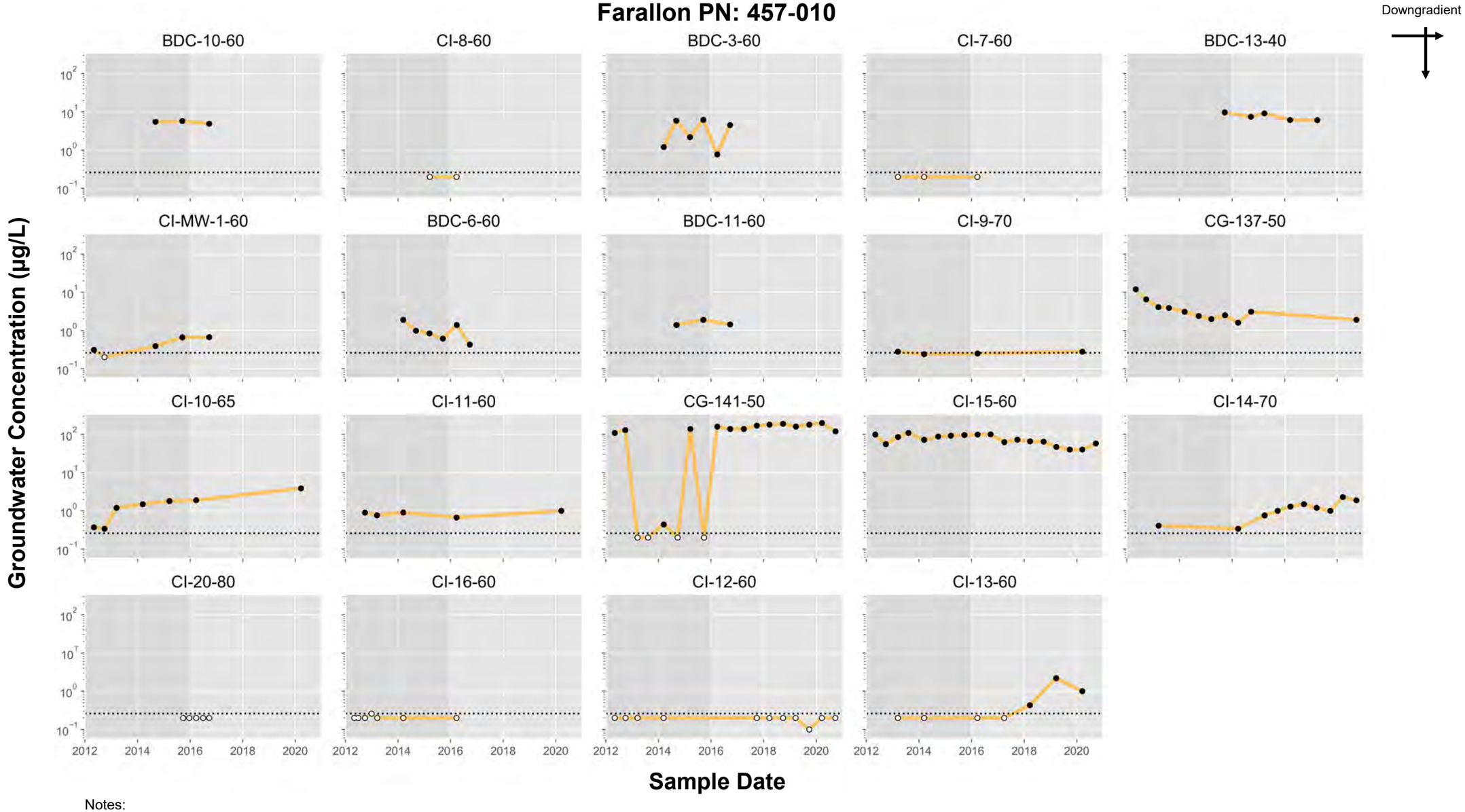
Figure B-14
Groundwater trans-1,2-DCE Concentrations - Intermediate Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
DCE = Dichloroethene
µg/L = micrograms per cubic meter

trans-1,2-DCE Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

Figure B-15
Groundwater Vinyl Chloride Concentrations - Intermediate Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Notes:
µg/L = micrograms per liter

Vinyl Chloride Concentration
Preliminary Cleanup Level
Before 2016
Detected Result
Not Detected Result

Figure B-16
Centerline CVOC Concentration Trends - Water Table Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010

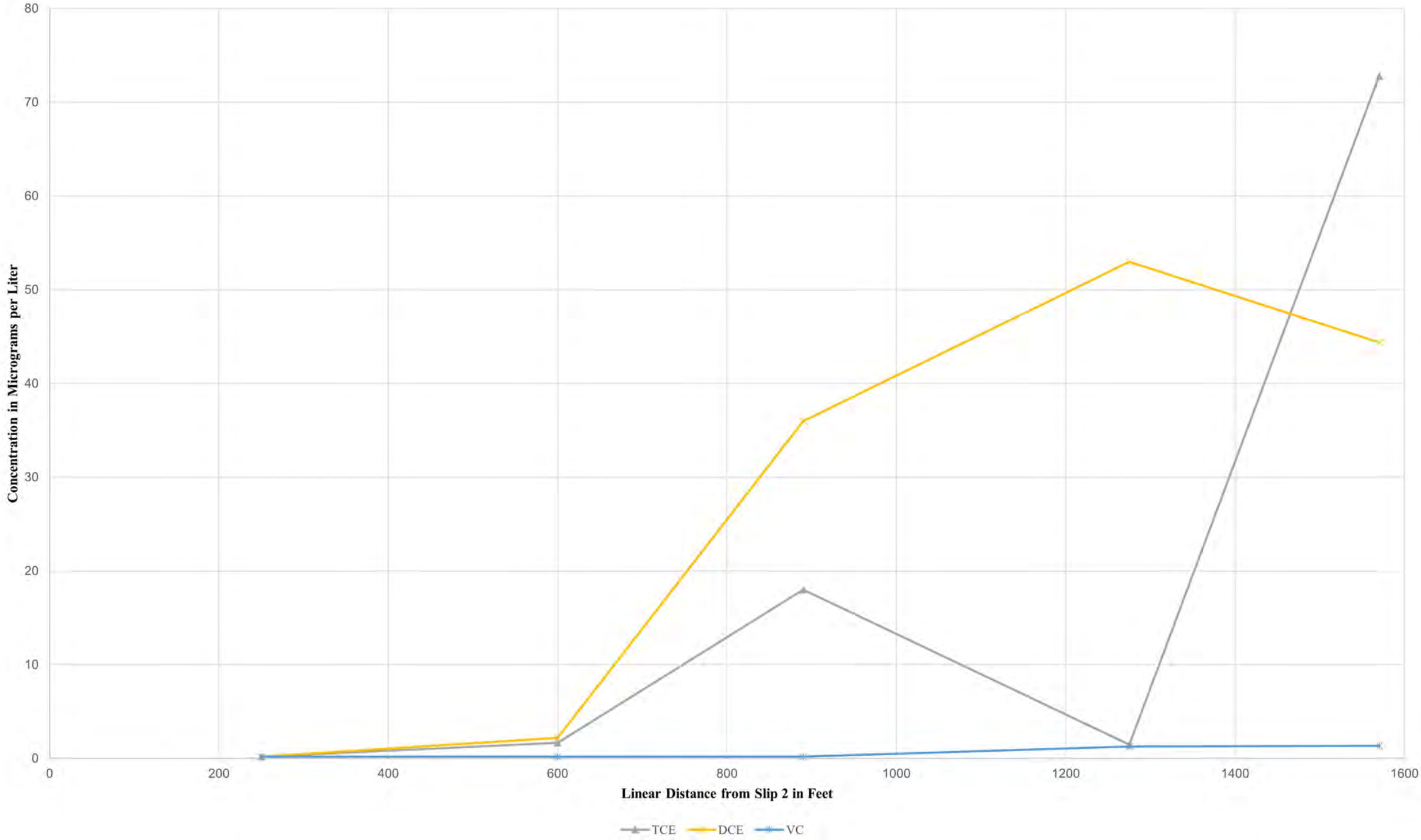


Figure B-17
Centerline CVOC Concentration Trends - Shallow Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010

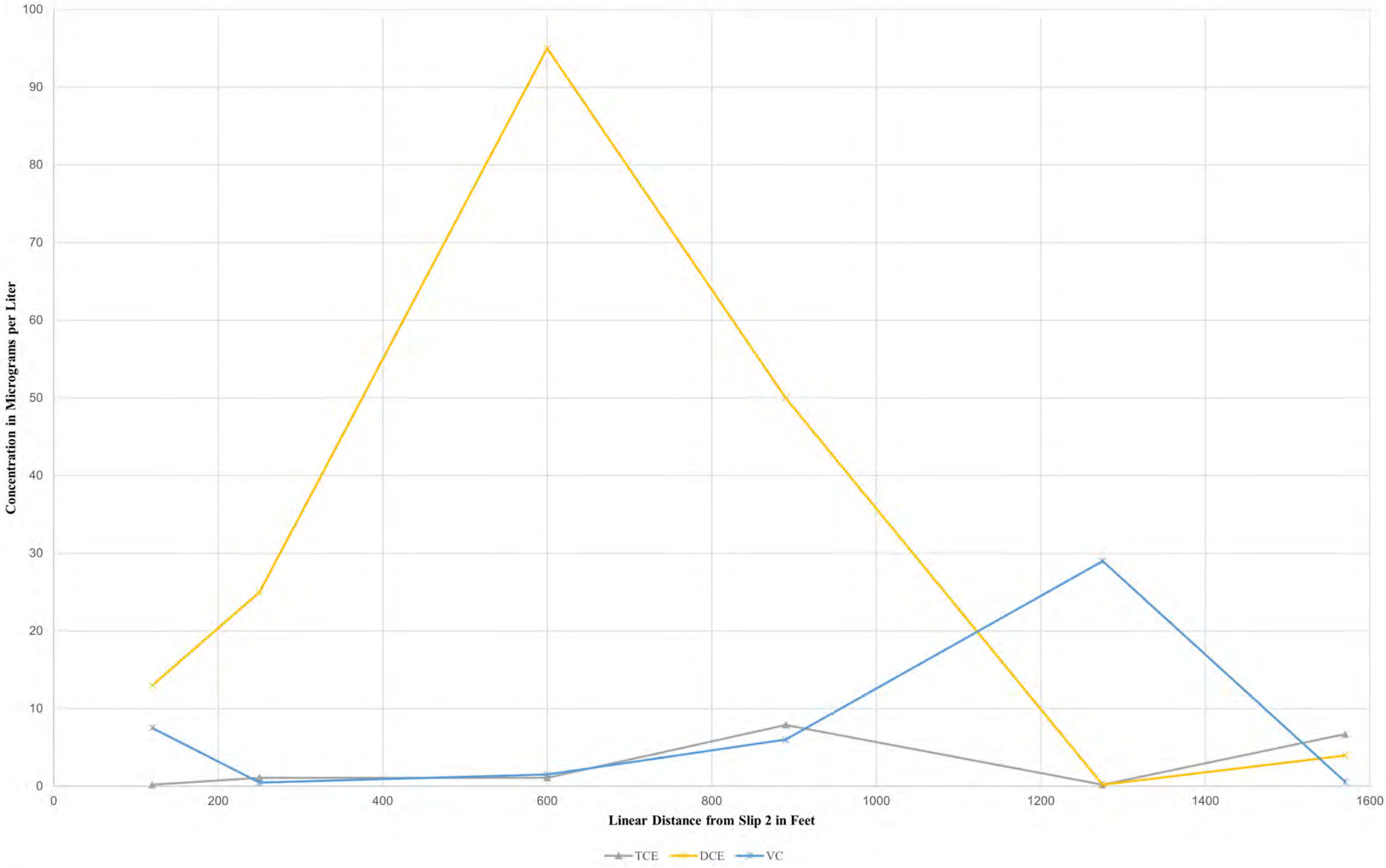


Figure B-18
Centerline CVOC Concentration Trends - Intermediate Interval
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010

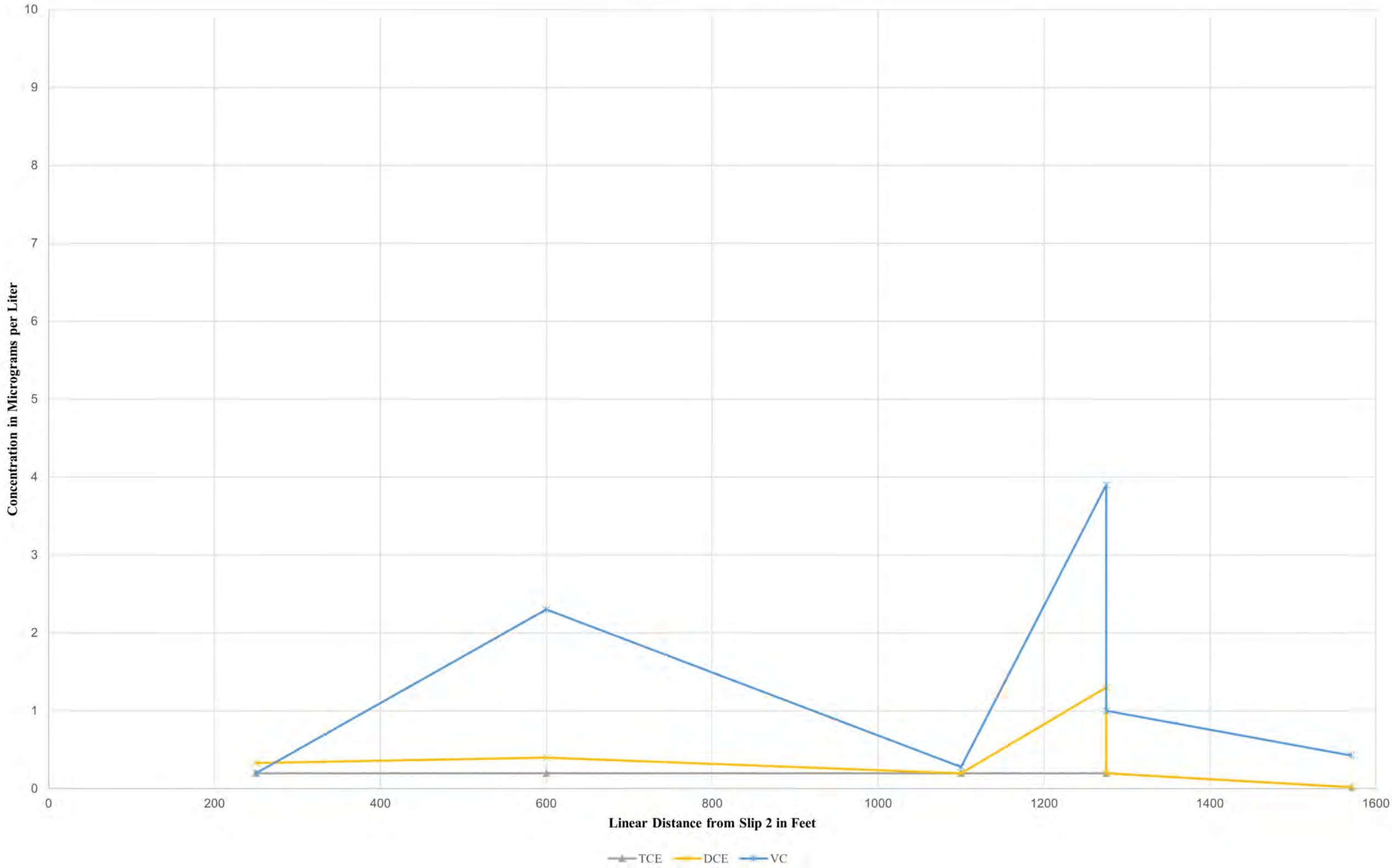


Figure B-19
Centerline CVOC Concentration Trends - Vinyl Chloride
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010

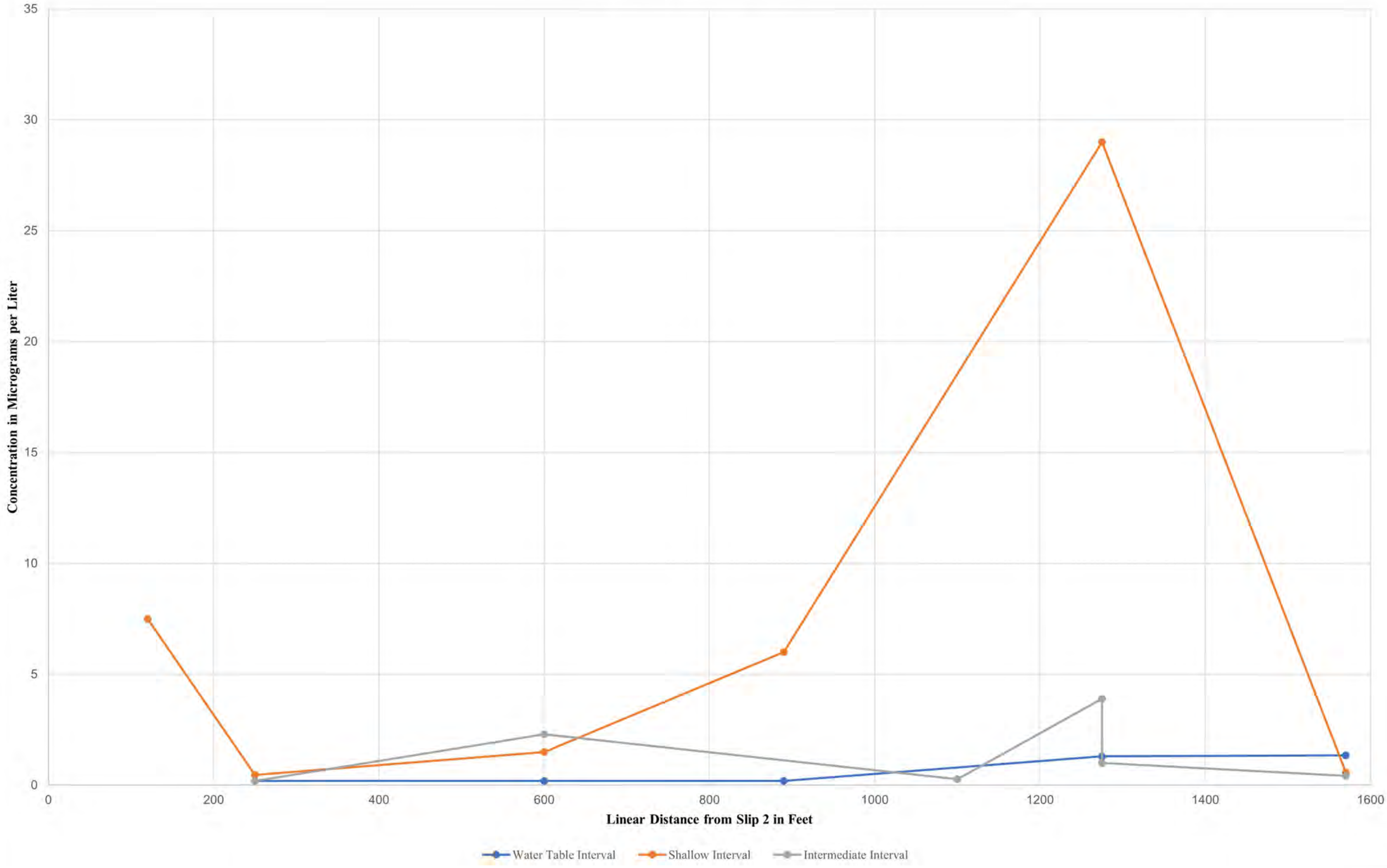
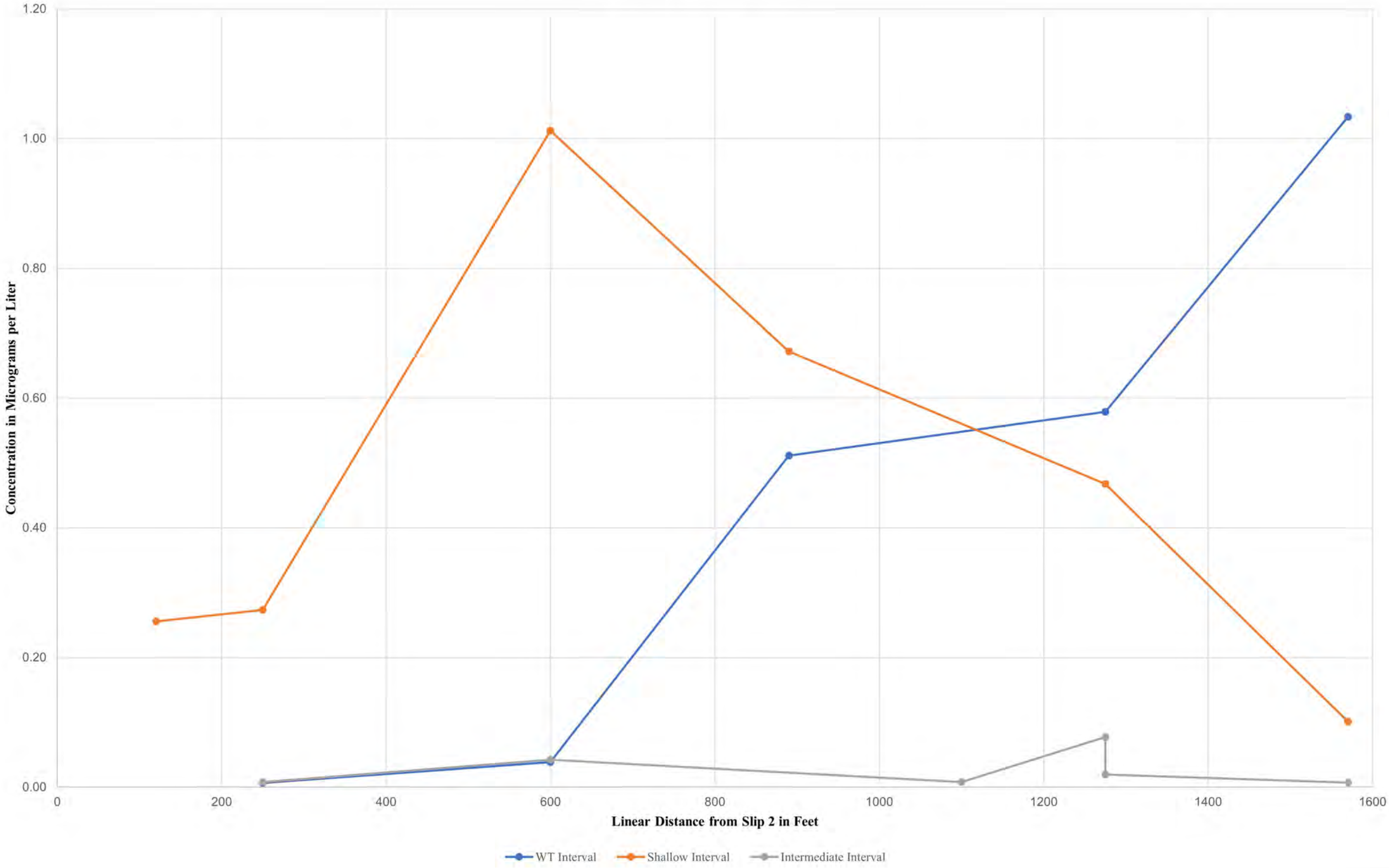


Figure B-20
Centerline CVOC Concentration Trends - Molar Concentration
West of 4th Avenue Group - Site Unit 2
Seattle, Washington
Farallon PN: 457-010



Monitoring Well Locations

- Water Table Aquifer
- Shallow Aquifer
- Intermediate Aquifer
- Site Unit Boundary

Notes:
- All concentrations are in ug/L
- -- Denotes sample not analyzed
- Only data collected 2016 and later is included

0 Feet 200

N

Site Unit 1
Site Unit 2

S Findlay St
S Orcas St
S Mead St
S Fidalgo St
Ohio Ave S
2nd Ave S
3rd Ave S
4th Ave S
5th Ave S
6th Ave S
1st Ave S
East Marginal Way S
Sr 99
Blaser Die Casting
Capital Industries

ABP-MW-08-70
ABP-MW-16-75
ABP-MW-17-60
ABP-MW-19-60
ABP-MW-25-50
ABP-MW-25-75
ABP-MW-20-60
ABP-MW-21-75
ABP-MW-26-55
ABP-MW-22-50
ABP-MW-23-50
BDC-11-60
BDC-6-60
BDC-10-60
BDC-3-60
CI-MW-1-60
CI-8-60
CI-7-60
CI-137-50
CI-9-70
CI-10-65
CI-14-70
CI-11-60
CI-16-60
CI-12-60
CI-13-60
CG-141-50
CG-140-70
CI-15-60

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-6-60	3/25/2016	0.02U	0.02U	0.15	0.02U	0.02U	1.4
	9/21/2016	0.02U	0.02U	0.02U	0.02U	0.02U	0.428

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-11-60	9/19/2016	0.02U	0.02U	0.02U	0.02U	0.02U	1.44

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CG-141-50	3/24/2016	1U	1U	1U	1U	1U	160	73U	290
	9/21/2016	1U	1U	1U	1U	1U	140	75U	180
	3/29/2017	1U	1U	1U	1U	--	150	--	--
	9/26/2017	1U	1U	1U	1U	--	170	500U	140
	3/21/2018	2U	2U	2U	2U	--	180	500U	190
	9/25/2018	2U	2U	2U	2U	--	190	130U	160
	3/22/2019	1U	1U	1U	1U	--	160	170	500U
	9/25/2019	1U	1U	1U	1U	--	180	250U	250
	3/18/2020	1U	1U	1U	1U	--	200	39	150

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-10-60	9/20/2016	0.02U	0.02U	1.7	0.134	0.125	4.9

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-3-60	3/24/2016	0.02U	0.02U	0.16	0.02U	0.02U	0.77
	9/20/2016	0.02U	0.0325	3	0.02U	0.0222	4.54

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-MW-1-60	9/20/2016	0.02U	0.0278	0.0475	0.02U	0.02U	0.668

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-8-60	3/22/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-7-60	3/22/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	250U	1

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-137-50	3/16/2020	0.2U	0.2U	0.2U	0.2U	0.2U	1

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-9-70	3/23/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.25
	3/18/2020	0.2U	0.2U	0.2U	0.2U	--	0.28

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-10-65	3/24/2016	0.2U	0.2U	0.6	0.2U	0.2U	1.9	100U	7.8U
	3/18/2020	0.2U	0.2U	1.3	0.2U	--	3.9	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-14-70	3/23/2016	0.2U	0.2U	0.77	0.2U	0.2U	0.34	--	--
	3/28/2017	0.2U	0.2U	2.2	0.2U	--	0.76	110U	17U
	9/26/2017	0.2U	0.2U	3.5	0.2U	--	1	--	--
	3/20/2018	0.2U	0.2U	4	0.2U	--	1.3	500U	500U
	9/25/2018	0.2U	0.2U	6.1	0.2U	--	1.5	--	--
	3/20/2019	0.2U	0.2U	4.4	0.2U	--	1.2	500U	500U
	9/25/2019	0.2U	0.2U	4.3	0.2U	--	1	--	--
	3/18/2020	0.2U	0.2U	7.4	0.2U	--	2.3	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-11-60	3/23/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.67	330U	22U
	3/16/2020	0.2U	0.2U	0.2U	0.2U	--	1	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-16-60	3/23/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CG-140-70	3/16/2020	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U		

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-15-60	3/24/2016	1U	1U	1U	1U	1U	99	89U	330
	9/21/2016	1U	1U	1U	1U	1U	100	120U	150
	3/29/2017	0.4U	0.4U	0.4U	0.4U	--	65	--	--
	9/26/2017	1U	1U	1U	1U	--	73	500U	290
	3/21/2018	1U	1U	1U	1U	--	66	500U	290
	9/25/2018	1U	1U	1U	1U	--	65	250U	310
	3/22/2019	0.4U	0.4U	0.4U	0.4U	--	47	180	250U
	9/25/2019	0.2U	0.2U	0.2U	0.2U	--	40	250U	300
	3/18/2020	0.2U	0.2U	0.2U	0.2U	--	40	14	71

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
ABP-MW-22-50	9/25/2017	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
	3/16/2020	0.2U	0.2U	0.09	0.2U	0.2U	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
ABP-MW-23-50	9/25/2017	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	VC
CI-12-60	9/26/2017	0.2U	0.2U	0.2U	0.2U	0.2U
	3/20/2018	0.2U	0.2U	0.2U	0.2U	0.2U
	9/25/2018	0.2U	0.2U	0.2U	0.2U	0.2U
	3/19/2019	0.2U	0.2U	0.2U	0.2U	0.2U
	9/25/2019	0.2U	0.2U	0.2U	0.2U	0.1U
	3/17/2020	0.2U	0.2U	0.2U	0.2U	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-13-60	3/22/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	--	--
	3/28/2017	0.2U	0.2U	0.2U	0.2U	--	0.2U	280U	34U
	3/20/2018	0.2U	0.2U	0.2U	0.2U	--	0.43	1500U	1500U
	3/19/2019	0.2U	0.2U	0.2U	0.2U	--	2.2	500U	500U
	3/17/2020	0.2U	0.2U	0.33	0.2U	--	1	--	--

Figure B-23
Intermediate Interval Groundwater Data

W4 SU2 FS Addendum

PgG

K:\JANET\JK0504 BlaserDieCasting\GIS\mxds\wl_W4_SU2_FS_Addendum_10_Int.mxd 5/18/2020

Monitoring Well Locations

- Water Table Aquifer
- Shallow Aquifer
- Intermediate Aquifer
- Site Unit Boundary

Notes:
- All concentrations are in ug/L
- -- Denotes sample not analyzed
- Only data collected 2016 and later is included

0 Feet 200

K:\JANET_K\0504 BlaserDieCasting\GIS\mxds\wl_W4_SU2_FS_Addendum_10_Shallow.mxd 5/18/2020

S Findlay St
S Orcas St
S Hudson St
S Mead St
S Hidalgo St
Ohio Ave S
2nd Ave S
3rd Ave S
4th Ave S
5th Ave S
6th Ave S
1st Ave S
East Marginal Way S
Sr 99
Site Unit 1
Site Unit 2
Blaser Die Casting
Capital Industries

ABP-MW-03-30
ABP-MW-08-30
ABP-MW-16
ABP-MW-17-40
ABP-MW-19-40
ABP-MW-20-40
ABP-MW-22-30
ABP-MW-23-30
ABP-MW-26-40
BDC-10-40
BDC-11-40
BDC-13-40
BDC-3-40
BDC-6-30
CG-131-40
CG-136-40
CG-137-40
CG-140-40
CG-141-40
CI-MW-1-40
CI-8-40
CI-7-40
CI-9-40
CI-10-35
CI-11-30
CI-12-35
CI-13-30
CI-14-35
CI-15-40
CI-16-30
CI-17-30
CI-18-30
CI-19-30

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-6-30	3/25/2016	0.02U	4.3	5.1	0.11	0.096	1.7
	9/21/2016	0.02U	2.54	3.56	0.19	0.175	1.1
	3/16/2018	0.02U	6.72	3.97	0.142	0.052	0.58

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-11-40	3/24/2016	0.02U	0.02U	16	0.079	0.14	14
	9/19/2016	0.02U	0.02U	3.41	0.02U	0.0267	33.6
	3/23/2017	0.02U	0.064	20.3	0.174	0.232	10
	3/16/2018	0.02U	0.11	11.4	0.0814	0.108	15.1
	3/28/2019	0.02U	0.02U	14	0.0866	0.121	11.9

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CG-141-40	3/24/2016	0.2U	0.2U	0.35	0.2U	0.2U	20	20U	17
	9/21/2016	1U	1U	2.1	1U	1U	150	120U	180
	3/29/2017	1U	1U	1.6	1U	--	130	--	--
	9/26/2017	1U	1U	1.5	1U	--	130	500U	120
	3/21/2018	1U	1U	1.7	1U	--	130	500U	80
	9/25/2018	1U	1U	1.9	1U	--	100	130U	57
	3/22/2019	1U	1U	1.7	1U	--	120	120	500U
	9/25/2019	1U	1U	1.8	1U	--	97	250U	50
	3/18/2020	1U	1U	2.4	1U	--	120	120	48

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CG-140-40	9/20/2016	0.2U	0.2U	0.2U	0.2U	0.2U	93.2
	3/28/2017	1U	1U	1U	1U	1U	133
	9/29/2017	0.6U	0.6U	0.6U	0.6U	0.6U	117
	3/19/2018	0.4U	0.4U	0.4U	0.4U	0.4U	109
	9/18/2018	0.2U	0.35	0.2U	0.2U	0.2U	139
	3/21/2019	1U	1U	1U	1U	1U	132
	9/23/2019	1U	1U	1U	1U	1U	145
	3/16/2020	0.2U	0.2U	0.2U	0.2U	0.2U	105

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
ABP-MW-22-30	3/23/2016	2U	14	510	4.2	2U	66	--	--
	9/20/2016	0.2U	12.2	554	3.5	1.36	58.4	--	--
	3/28/2017	2U	9.78	647	2.99	2U	41.3	--	--
	9/25/2017	1U	5.55	307	2.1	0.47	119	--	--
	3/19/2018	2U	3.21	249	2.04	2U	97.5	--	--
	9/17/2018	0.2U	3.18	230	1.59	0.2	138	--	--
	3/21/2019	1U	4.38	664	4.28	0.85	166	--	--
	9/24/2019	1U	0.45	315	1.7	1U	154	--	--
	12/19/2019	1U	1U	273	0.98	1U	51	1.23U	1.14U
	3/16/2020	0.2U	0.08	237	2.11	0.11	140	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-12-35	3/27/2018	0.2U	0.2U	0.2U	0.2U		4.7
	9/25/2018	0.2U	0.2U	0.3	0.2U		6.9
	3/19/2019	0.2U	0.2U	0.22	0.2U		3.2
	9/25/2019	0.2U	0.2U	0.25	0.2U		0.84
	3/17/2020	0.2U	0.2U	0.27	0.2U		2.1

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-19-30	3/22/2016	0.2U	0.2U	1.9	0.2U	0.2U	1.1	130U	2.1U
	9/20/2016	0.2U	0.2U	1.7	0.2U	0.2U	0.97	20U	1.7U
	3/30/2017	0.2U	0.2U	1.5	0.2U	--	6.3	--	--
	9/26/2017	0.2U	0.2U	1.8	0.2U	--	8.5	--	--
	3/20/2018	0.2U	0.2U	1.3	0.2U	--	13	--	--
	9/24/2018	0.2U	0.2U	1.6	0.2U	--	10	--	--
	3/19/2019	0.2U	0.2U	1.2	0.2U	--	10	--	--
	9/25/2019	0.2U	0.2U	1.1	0.2U	--	19	--	--
	3/17/2020	0.2U	0.2U	0.8	0.2U	--	15	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-18-30	3/22/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	5U	0.5U
	3/28/2017	0.2U	0.2U	0.2U	0.2U	--	0.2U	--	--
	3/20/2018	0.2U	0.2U	0.2U	0.2U	--	0.2U	--	--
	3/20/2019	0.2U	0.2U	0.2U	0.2U	--	0.2U	--	--
	3/17/2020	0.2U	0.2U	0.2U	0.2U	--	0.2U	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-17-30	3/22/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.38
	3/28/2017	0.2U	0.2U	0.2U	0.2U	--	0.72
	3/20/2018	0.2U	0.2U	0.2U	0.2U	--	0.5
	3/20/2019	0.2U	0.2U	0.2U	0.2U	--	0.86
	3/18/2020	0.2U	0.2U	13	0.2U	--	7.5

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-15-40	3/24/2016	0.2U	0.2U	2.9	0.2U	0.2U	0.91	--	--
	9/21/2016	0.2U	0.2U	5.8	0.2U	0.2U	0.81	--	--
	3/18/2020	0.2U	0.2U	8.4	0.2U	--	2.6	26	0.29U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-13-30	3/22/2016	0.4U	1.4	69	0.49	0.93	0.64	--	--
	3/28/2017	0.4U	1.4	54	0.5	--	0.7	3.9U	0.68U
	3/20/2018	0.4U	2.1	60	0.51	--	0.49	5U	5U
	3/19/2019	0.2U	1.6	60	0.59	--	0.56	3U	3U
	3/17/2020	0.2U	1.1	25	0.33	--	0.46	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-10-35	3/24/2016	0.2U	21	5.4	0.48	0.2U	8
	9/21/2016	0.2U	17	5.5	0.45	0.2U	11
	3/29/2017	0.2U	23	10	0.54	--	5.9
	3/20/2018	0.2U	22	15	0.5	--	7.3
	3/20/2019	0.2U	16	29	0.56	--	6.3
	3/18/2020	0.4U	7.9	50	0.55	--	6

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-14-35	3/23/2016	0.4U	14	68	1	0.4U	1.2	9	0.5U
	9/21/2016	0.2U	0.52	22	0.2U	0.2U	0.2U	8.7	0.5U
	3/28/2017	0.4U	13	67	1.1	--	1.2	18	0.57U
	9/26/2017	1U	4.1	110	1.3	--	1.3	--	--
	3/20/2018	0.2U	2.3	150	1.1	--	1.2	11	7.5U
	9/25/2018	1U	2.5	160	1.3	--	1.5	--	--
	3/20/2019	1U	2.5	98	1.1	--	1	15U	15U
	9/25/2019	0.4U	2.4	88	0.9	--	1.7	--	--
	3/18/2020	1U	1.1	95	1U	--	1.5	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-11-30	3/23/2016	0.2U	0.2U	0.28	0.2U	0.2U	1	100U	12U
	3/18/2020	0.2U	0.2U	0.22	0.2U	--	0.2U	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-16-30	3/23/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
	3/18/2020	0.2U	0.2U	0.2U	0.2U	--	0.26

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-13-40	9/19/2016	0.02U	0.2U	28.8	0.0468	0.202	7.45
	3/23/2017	0.02U	0.164	28.8	0.0687	0.242	9.21
	3/16/2018	0.02U	0.0508	22.4	0.047	0.22	6.18
	3/28/2019	0.02U	0.0428	25	0.0437	0.184	6.09

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-10-40	9/20/2016	0.02U	0.02U	15.7	0.179	0.396	9.08

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-3-40	3/24/2016	0.02U	0.02U	17	0.036	0.13	4.7
	9/20/2016	0.02U	0.02U	0.0482	17.5	0.0484	0.148	6.63
	3/16/2018	0.02U	0.0341	12.9	0.0496	0.148	5.31

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CG-136-40	9/20/2016	0.02U	0.02U	9.57	0.02U	0.174	5.82

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-MW-1-40	9/20/2016	0.02U	0.0412	0.0423	0.02U	0.02U	0.266
	3/19/2020	0.2U	0.2U	0.2U	0.2U	--	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-8-40	3/22/2016	0.2U	0.2U	20	0.2U	0.43	10	480	2
	3/18/2020	0.2U	0.2U	27	0.2U	--	9.5	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-7-40	3/22/2016	0.2U	0.2U	1.2	0.2U	0.2U	0.96
	9/20/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.78
	3/16/2020	0.2U	0.2U	1.6	0.2U	--	1.8

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CG-137-40	3/23/2016	0.4U	0.4U	0.4U	0.4U	0.4U	50	250	18
	9/22/2016	0.4U	0.4U	0.4U	0.4U	0.4U	34	65	21
	3/19/2020	0.2U	0.2U	0.21	0.2U	--	29	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-9-40	3/23/2016	0.2U	0.2U	5.6	0.2U	0.2U	0.55	13U	1.2U
	3/18/2020	0.2U	0.2U	5.9	0.2U	--	0.71	--	--

Figure B-22
Shallow Interval Groundwater Data

W4 SU2 FS Addendum

PgG

Monitoring Well Locations

- Water Table Aquifer
- Shallow Aquifer
- Intermediate Aquifer
- Site Unit Boundary

Notes:
- All concentrations are in ug/L
- -- Denotes sample not analyzed
- Only data collected 2016 and later is included

0 Feet 200

N

Site Unit 1
Site Unit 2

S Findlay St
S Orcas St
S Mead St
S Fidalgo St
Sr 99
East Marginal Way S
1st Ave S
2nd Ave S
3rd Ave S
4th Ave S
5th Ave S
6th Ave S
Ohio Ave S

Blaser Die Casting

Capital Industries

ABP-MW-15
ABP-MW-08
ABP-MW-04
ABP-MW-14
ABP-MW-27
ABP-MW-11
ABP-MW-24
CG-151-25
CG-131-WT
CG-136-WT
CG-132-WT
CG-137-WT
CG-141-WT
CG-140-WT
BDC-1-WT
BDC-4-WT
BDC-15-WT
BDC-3-WT
BDC-2-WT
BDC-14-WT
BDC-11-WT
BDC-6-WT
CI-MW-5
CI-MW-1-WT
CI-MW-2
CI-MW-3
CI-MW-4
CI-MW-6
CI-MW-7
CI-9-WT
CI-10-WT
CI-12-WT
CI-14-WT
CI-19-WT
CI-18-WT
CI-13-WT
CI-17-WT
CI-16-WT
CI-11-WT

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
ABP-MW-11	9/21/2016	0.2U	0.42	0.77	0.2U	0.2U	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-1-WT	9/21/2016	0.02U	0.0212	0.0744	0.02U	0.02U	0.02U
	3/28/2019	0.02U	0.02U	0.0265	0.02U	0.02U	0.02U
	9/6/2019	0.02U	0.02U	0.0478	0.02U	0.02U	0.02U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-6-WT	3/25/2016	0.02U	97	42	3.9	1	2.2
	9/21/2016	0.02U	86.6	35.3	4.37	1.55	0.799
	3/23/2017	0.02U	70.1	40.1	3.32	1.35	1.06
	3/16/2018	0.02U	54.4	33.4	3.42	0.807	1.48
	3/28/2019	0.02U	72.8	44.4	5.35	1.24	1.35

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-14-WT	2/25/2019	0.02U	0.02U	0.0238	0.02U	0.02U	0.02U
	9/27/2019	0.02U	0.02U	0.0352	0.02U	0.02U	0.02U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-11-WT	3/24/2016	0.02U	0.02U	0.071	0.02U	0.02U	0.02U
	9/19/2016	0.02U	0.0613	0.176	0.02U	0.02U	0.02U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-MW-2	3/23/2016	1U	12	110	5.9	1.2	1.5
	9/22/2016	1U	1U	92	4.4	1U	1.1
	3/29/2017	0.2U	26	24	4.4	--	0.2U
	3/21/2018	0.4U	13	49	5.4	--	0.52
	3/22/2019	0.2U	18	19	6.3	--	0.2U
	3/19/2020	0.2U	7.8	21	2.6	--	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CG-137-WT	3/23/2016	0.4U	7.2	86	9	0.55	2.3	2.2U	0.56
	9/21/2016	0.4U	7.5	98	10	0.61	0.67	0.5U	0.5U
	3/19/2020	0.2U	1.5	53	4.2	--	1.3	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-MW-5	3/22/2016	0.4U	45	24	0.66	0.56	0.88	5.2	0.5U
	3/18/2020	0.2U	20	7.2	0.43	--	0.2U	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CG-141-WT	9/25/2018	0.2U	0.2U	0.2U	0.2U	0.2U	
	3/22/2019	0.2U	0.2U	0.2U	0.2U	0.2U	
	9/25/2019	0.2U	0.2U	0.2U	0.2U	0.1U	

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CG-140-WT	9/29/2017	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-MW-3	3/23/2016	0.2U	5.4	22	0.38	0.53	0.25	3.6	0.5U
	3/29/2017	0.2U	3.2	6	0.2U	--	0.2U	--	--
	3/21/2018	0.2U	6.6	15	0.24	--	0.2U	--	--
	3/21/2019	0.2U	4.3	15	0.2U	--	0.2U	--	--
	3/16/2020	0.2U	4	7	0.2U	--	0.2U	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	VC
CI-12-WT	9/26/2017	0.2U	0.21	0.2U	0.2U	0.2U
	3/20/2018	0.2U	0.62	0.32	0.2U	0.2U
	9/25/2018	0.2U	0.2U	0.2U	0.2U	0.2U
	3/19/2019	0.2U	0.2U	0.2U	0.2U	0.2U
	9/25/2019	0.2U	0.2U	0.2U	0.2U	0.1U
	3/17/2020	0.2U	0.2U	0.2U	0.2U	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-10-WT	3/24/2016	0.2U	23	12	0.42	0.25	0.2U	0.5U	0.5U
	9/21/2016	0.4U	31	81	2.3	0.45	0.4U	1.5	0.5U
	3/29/2017	0.2U	24	34	1.2	--	0.23	--	--
	3/20/2018	0.4U	29	52	1.6	--	0.4U	--	--
	3/20/2019	0.2U	26	40	1.5	--	0.2U	--	--
	3/18/2020	0.2U	18	36	1.4	--	0.2U	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-14-WT	3/23/2016	0.2U	2.8	4.1	0.21	0.2U	0.2U	0.5U	0.5U
	9/20/2016	0.2U	4.1	13	0.5	0.35	0.2U	0.5U	0.5U
	3/28/2017	0.2U	3	8.2	0.38	--	0.2U	0.5U	0.5U
	3/20/2018	0.2U	8.2	13	0.57	--	0.2U	0.5U	0.5U
	3/20/2019	0.2U	4.2	5.5	0.46	--	0.2U	0.5U	0.5U
	3/18/2020	0.2U	1.7	2.2	0.2U	--	0.2U	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-19-WT	3/22/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
	3/30/2017	0.2U	0.2U	0.2U	0.2U	--	0.2U
	3/20/2018	0.2U	0.2U	0.2U	0.2U	--	0.2U
	3/19/2019	0.2U	0.2U	0.2U	0.2U	--	0.2U
	3/17/2020	0.2U	0.2U	0.2U	0.2U	--	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-18-WT	3/22/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
	3/28/2017	0.2U	0.2U	0.2U	0.2U	--	0.2U
	3/20/2018	0.2U	0.2U	0.2U	0.2U	--	0.2U
	3/20/2019	0.2U	0.2U	0.2U	0.2U	--	0.2U
	3/17/2020	0.2U	0.2U	0.2U	0.2U	--	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-13-WT	9/20/2016	0.2U	0.21	1.3	0.2U	0.2U	0.2U	0.5U	0.5U
	3/28/2017	0.2U	0.2U	1.3	0.2U	--	0.2U	--	--
	3/20/2018	0.2U	0.2U	0.34	0.2U	--	0.2U	--	--
	3/19/2019	0.2U	0.2U	0.2U	0.2U	--	0.2U	--	--
	3/17/2020	0.2U	0.2U	0.2U	0.2U	--	0.2U	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-17-WT	3/22/2016	7.1	4	2.7	0.2U	0.2U	0.95	250U	0.68U
	9/20/2016	0.2U	0.24	2.1	0.2U	0.2U	0.67	66U	5.4U
	3/28/2017	9.1	2.1	2.5	0.2U	--	0.94	--	--
	3/20/2018	0.21	1.3	1.9	0.2U	--	0.56	--	--
	3/20/2019	0.2U	0.96	2.7	0.2U	--	0.39	--	--
	3/17/2020	0.2U	0.4	0.97	0.2U	--	0.76	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-16-WT	3/23/2016	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-11-WT	3/23/2016	0.2U	0.2U	0.22	0.2U	0.2U	0.61
	9/25/2019	0.2U	0.2U	0.2U	0.2U	--	0.1U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-4-WT	3/24/2016	0.02U	0.02U	0.036	0.02U	0.02U	0.02U
	9/20/2016	0.02U	0.0305	0.0624	0.02U	0.02U	0.02U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-3-WT	3/24/2016	0.02U	15	17	2	0.15	1.7
	9/20/2016	0.02U	17	24.7	3.4	0.168	0.432

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
BDC-2-WT	3/24/2016	0.02U	9.3	6.4	0.68	0.14	2.4
	9/19/2016	0.02U	11.8	2.81	0.552	0.137	0.0641
	3/23/2017	0.02U	14.2	16.3	1.31	0.217	2.65
	3/16/2018	0.02U	12.2	5.29	1.01	0.152	0.16
	3/28/2019	0.02U	11	10.8	1.42	0.156	1.4
	9/6/2019	0.02U	7.94	7.77	0.987	0.143	0.74

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CG-136-WT	9/19/2016	0.614	8.12	19.7	0.575	0.0425	0.0285

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-MW-1-WT	9/20/2016	0.171	5.27	18.6	0.292	0.041	0.0334
	3/19/2020	0.4	4.1	1.2	0.2U	--	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC
CI-MW-6	3/22/2016	6.1	1.9	0.2U	0.2U	0.2U	0.2U
	3/30/2017	5.3	2.6	0.29	0.2U	--	0.2U
	3/21/2018	5	2.6	0.2U	0.2U	--	0.2U
	7/2/2018	4.5	3.2	0.2U	0.2U	--	0.2U
	9/18/2018	8.5	5.5	0.2U	0.2U	--	0.2U
	3/22/2019	1.7	2.1	0.2U	0.2U	--	0.2U
	3/19/2020	4.1	2.2	0.2U	0.2U	--	0.2U

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-MW-7	3/22/2016	30	20	1.4	0.2U	0.2U	0.2U	0.99	0.5U
	9/20/2016	8.8	4.7	2.4	0.2U	0.39	0.23	8	0.5U
	3/29/2017	15	10	1.5	0.2U	--	0.2U	--	--
	9/26/2017	9.9	5.7	2.6	0.2U	--	0.55	--	--
	3/21/2018	14	10	1.4	0.2U	--	0.2U	--	--
	7/2/2018	12	7.6	2.4	0.2U	--	0.4	--	--
	9/24/2018	5.9	5	3.9	0.2U	--	0.53	--	--
	3/21/2019	11	8.3	2.2	0.2U	--	0.2U	--	--
	3/16/2020	17	12	0.64	0.2U	--	0.2U	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-MW-4	3/24/2016	0.2U	0.97	0.68	0.2U	0.2U	0.2U	0.5U	0.5U
	9/22/2016	0.2U	0.97	0.61	0.2U	0.2U	0.2U	0.59	0.5U
	3/19/2020	0.2U	1.5	1.1	0.2U	--	0.2U	--	--

Station	Date	PCE	TCE	cis-DCE	trans-DCE	1,1-DCE	VC	Ethane	Ethene
CI-9-WT	3/23/2016	2.7	19	3	0.2U	0.2U	0.2U	0.74U	0.5U
	9/20/2016	3.8	24	3.1	0.2U	0.2U	0.2U	1.5U	0.5U
	3/29/2017	9.6	34	3.4	0.2U	--	0.2U	--	--
	3/21/2018	4.5	21	2.1	0.2U	--	0.2U	--	--
	3/22/2019	2.6	16	1.8	0.2U	--	0.2U	--	--
	3/18/2020	1.4	12	2	0.2U	--	0.2U	--	--

Figure B-21

Water Table Interval Groundwater Data

W4 SU2 FS Addendum

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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **BDC-6-WT**
Level of Confidence (Decision Criteria)? **85%**

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

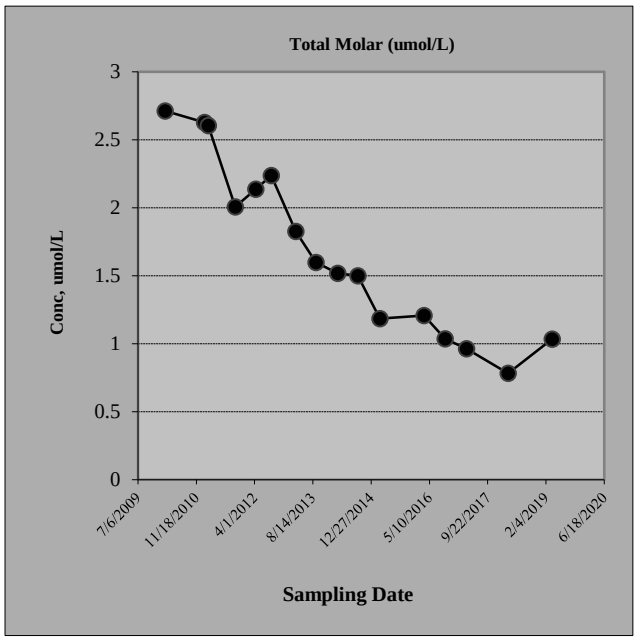
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	2/24/2010	180	110	13	2.71		
#2	1/27/2011	160	130	4.3	2.63		
#3	3/1/2011	170	120	4.6	2.61		
#4	10/18/2011	140	83	5.3	2.01		
#5	4/11/2012	140	92	7.7	2.14		
#6	8/22/2012	150	92	9.2	2.24		
#7	3/20/2013	130	71	6.6	1.83		
#8	9/9/2013	120	56	6.7	1.60		
#9	3/14/2014	110	59	4.5	1.52		
#10	9/5/2014	120	52	3.2	1.50		
#11	3/12/2015	98	40	1.7	1.19		
#12	3/24/2016	97	42	2.2	1.21		
#13	9/20/2016	86.6	35.3	0.799	1.04		
#14	3/23/2017	70.1	40.1	1.06	0.96		
#15	3/16/2018	54.4	33.4	1.48	0.78		
#16	3/28/2019	72.8	44.4	1.35	1.03		

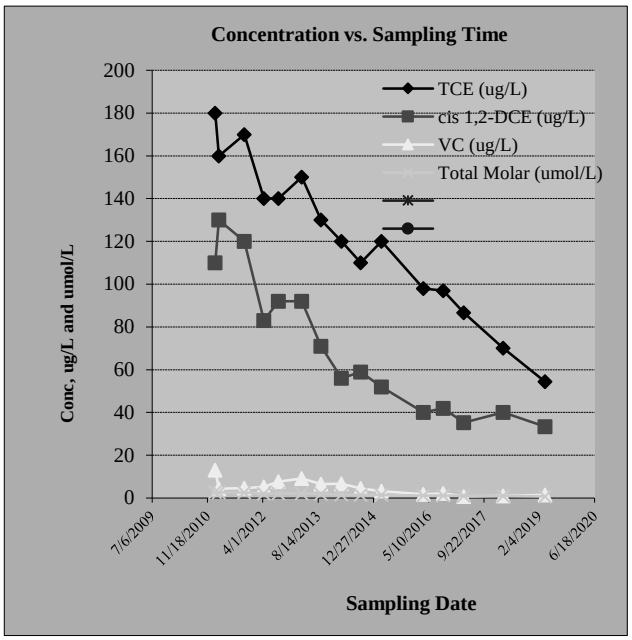
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	100.00%	100.00%	99.90%	100.00%	NA	NA
Plume Stability?	Shrinking	Shrinking	Shrinking	Shrinking	NA	NA
Coefficient of Variation?					n<4	n<4
Mann-Kendall Statistic "S" value?	-106	-93	-72	-108	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	118.68	68.76	4.61	1.69	NA	NA
Standard Deviation?	37.17	31.87	3.40	0.64	NA	NA
Coefficient of Variation?	0.31	0.46	0.74	0.38	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Shrinking**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-MW-1-WT**
Level of Confidence (Decision Criteria)? **85%**

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

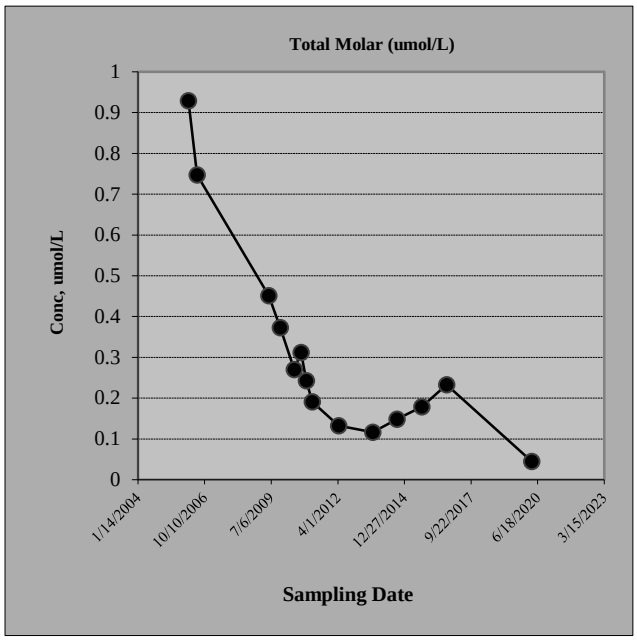
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	2/9/2006	16	78	0.2	0.93		
#2	6/19/2006	14	62	0.1	0.75		
#3	6/1/2009	13	34	0.12	0.45		
#4	11/17/2009	11	28	0.045	0.37		
#5	6/16/2010	9.5	19	0.1	0.27		
#6	9/28/2010	11	22	0.1	0.31		
#7	12/15/2010	10	16	0.1	0.24		
#8	3/15/2011	10	11	0.1	0.19		
#9	4/11/2012	8.4	6.6	0.01	0.13		
#10	9/9/2013	5	7.6	0.01	0.12		
#11	9/5/2014	7.2	9	0.024	0.15		
#12	9/15/2015	5.8	13	0.044	0.18		
#13	9/20/2016	5.27	18.6	0.0334	0.23		
#14	3/18/2020	4.1	1.2	0.1	0.05		
#15							
#16							

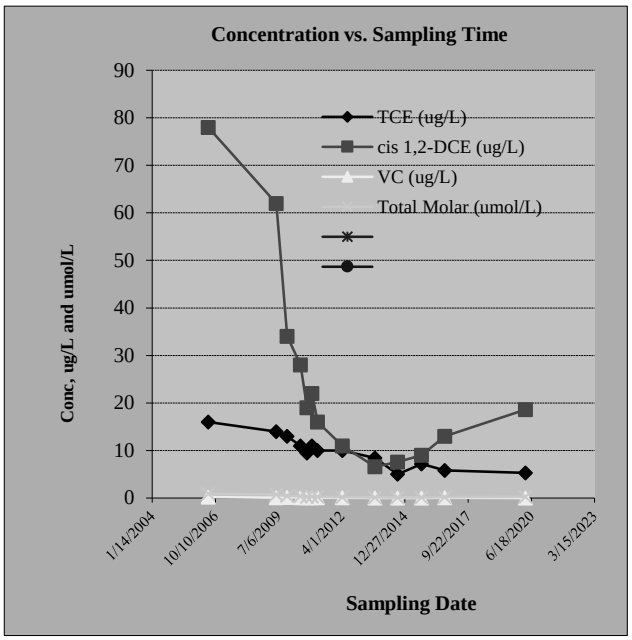
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	100.00%	100.00%	97.60%	100.00%	NA	NA
Plume Stability?	Shrinking	Shrinking	Shrinking	Shrinking	NA	NA
Coefficient of Variation?					n<4	n<4
Mann-Kendall Statistic "S" value?	-77	-63	-37	-69	0	0
Number of Sampling Rounds?	14	14	14	14	0	0
Average Concentration?	9.31	23.29	0.08	0.31	NA	NA
Standard Deviation?	3.58	21.83	0.05	0.25	NA	NA
Coefficient of Variation?	0.38	0.94	0.68	0.80	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Shrinking**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CG-137-WT**
Level of Confidence (Decision Criteria)? **85%**

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

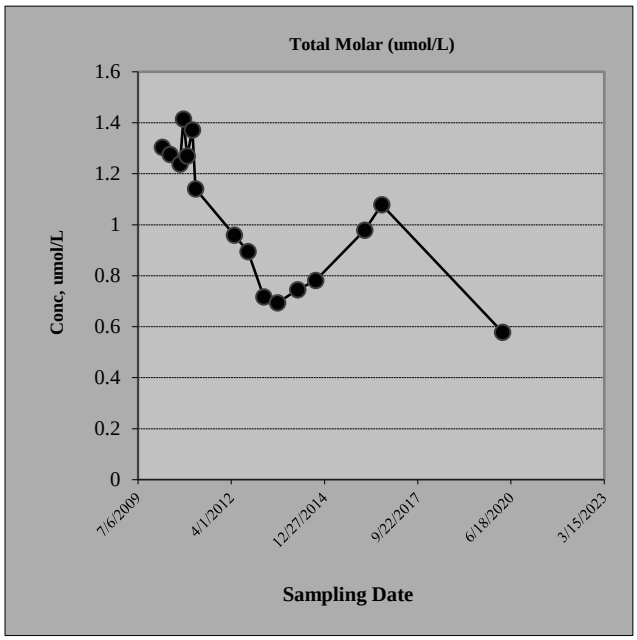
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	3/24/2010	98	49	3.3	1.30		
#2	6/16/2010	98	50	0.92	1.28		
#3	9/28/2010	92	50	1.4	1.24		
#4	11/4/2010	96	64	1.5	1.41		
#5	12/15/2010	93	48	4.2	1.27		
#6	2/9/2011	92	61	2.7	1.37		
#7	3/15/2011	82	47	2	1.14		
#8	5/4/2012	62	46	0.83	0.96		
#9	9/26/2012	64	38	1	0.90		
#10	3/15/2013	39	40	0.49	0.72		
#11	8/8/2013	38	38	0.77	0.69		
#12	3/13/2014	31	48	0.86	0.74		
#13	9/24/2014	28	54	0.73	0.78		
#14	3/1/2016	7.2	86	2.3	0.98		
#15	9/1/2016	7.5	98	0.67	1.08		
#16	3/18/2020	1.5	53	1.3	0.58		

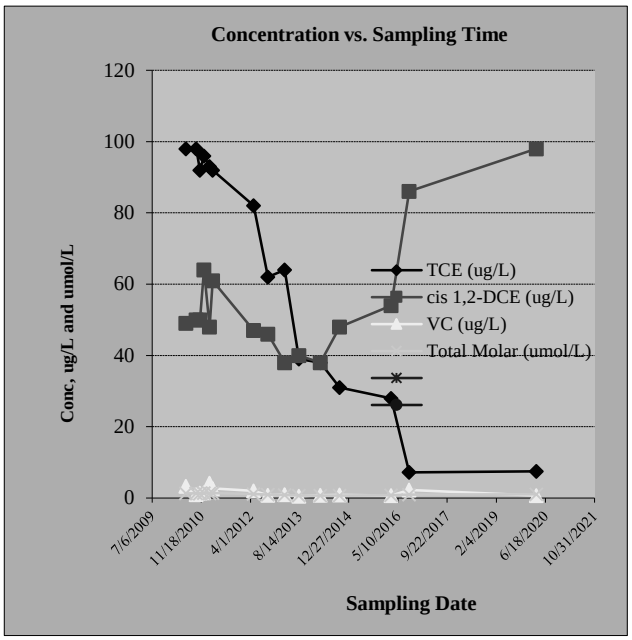
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	100.00%	58.80%	96.80%	99.90%	NA	NA
Plume Stability?	Shrinking	Stable	Shrinking	Shrinking	NA	NA
Coefficient of Variation?		CV <= 1			n<4	n<4
Mann-Kendall Statistic "S" value?	-110	7	-42	-68	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	58.08	54.38	1.56	1.03	NA	NA
Standard Deviation?	36.08	16.45	1.07	0.27	NA	NA
Coefficient of Variation?	0.62	0.30	0.68	0.26	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Shrinking**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-14-WT**
Level of Confidence (Decision Criteria)? **85%**

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

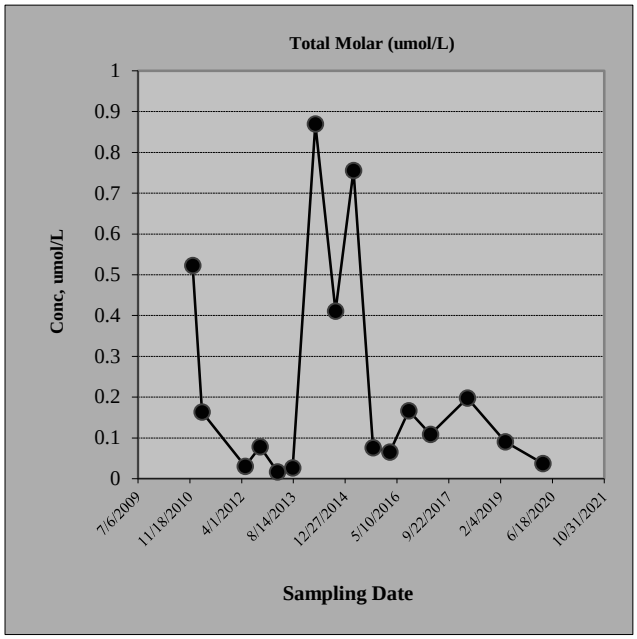
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	12/15/2010	0.46	48	1.5	0.52		
#2	3/15/2011	0.99	15	0.1	0.16		
#3	5/4/2012	1.3	1.8	0.1	0.03		
#4	9/26/2012	1.8	6.1	0.1	0.08		
#5	3/13/2013	0.98	0.77	0.1	0.02		
#6	8/8/2013	1.7	1.2	0.1	0.03		
#7	3/13/2014	3.2	81	0.61	0.87		
#8	9/23/2014	7.4	34	0.25	0.41		
#9	3/18/2015	8.2	66	0.78	0.76		
#10	9/23/2015	4.8	3.7	0.1	0.08		
#11	3/1/2016	2.8	4.1	0.1	0.07		
#12	9/1/2016	4.1	13	0.1	0.17		
#13	3/28/2017	3	8.2	0.1	0.11		
#14	3/20/2018	8.2	13	0.1	0.20		
#15	3/22/2019	4.2	5.5	0.1	0.09		
#16	3/18/2020	1.7	2.2	0.1	0.04		

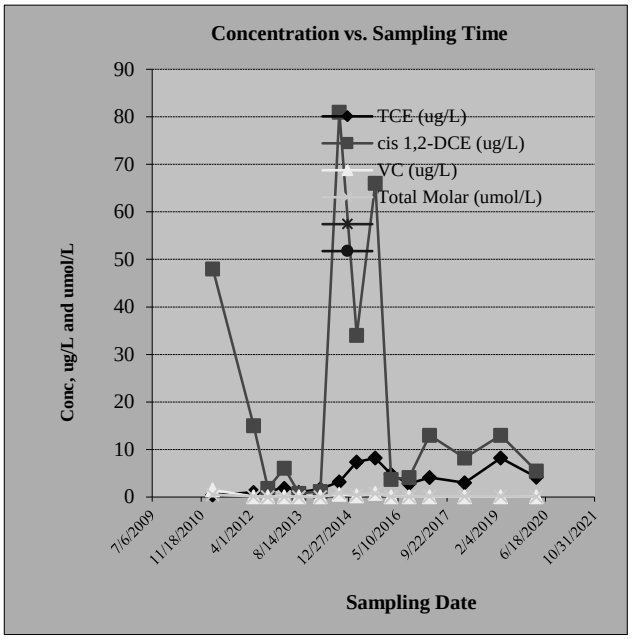
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	99.20%	65.50%	80.10%	58.80%	NA	NA
Plume Stability?	***Expanding***	Undetermined	Undetermined	Undetermined	NA	NA
Coefficient of Variation?		CV > 1	CV > 1	CV > 1	n<4	n<4
Mann-Kendall Statistic "S" value?	54	-11	-20	-6	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	3.43	18.97	0.27	0.23	NA	NA
Standard Deviation?	2.57	24.97	0.39	0.27	NA	NA
Coefficient of Variation?	0.75	1.32	1.42	1.19	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Undetermined**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-19-WT**
Level of Confidence (Decision Criteria)? **85%**

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

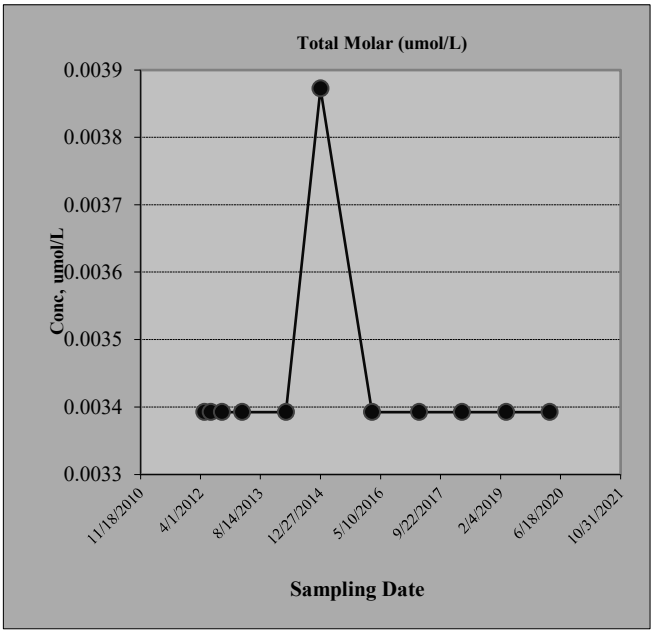
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	5/4/2012	0.1	0.1	0.1	0.003392546		
#2	6/27/2012	0.1	0.1	0.1	0.003392546		
#3	9/26/2012	0.1	0.1	0.1	0.003392546		
#4	3/13/2013	0.1	0.1	0.1	0.003392546		
#5	3/13/2014	0.1	0.1	0.1	0.003392546		
#6	12/27/2014	0.1	0.1	0.13	0.003872561		
#7	3/1/2016	0.1	0.1	0.1	0.003392546		
#8	3/28/2017	0.1	0.1	0.1	0.003392546		
#9	3/20/2018	0.1	0.1	0.1	0.003392546		
#10	3/22/2019	0.1	0.1	0.1	0.003392546		
#11	3/18/2020	0.1	0.1	0.1	0.003392546		
#12							
#13							
#14							
#15							
#16							

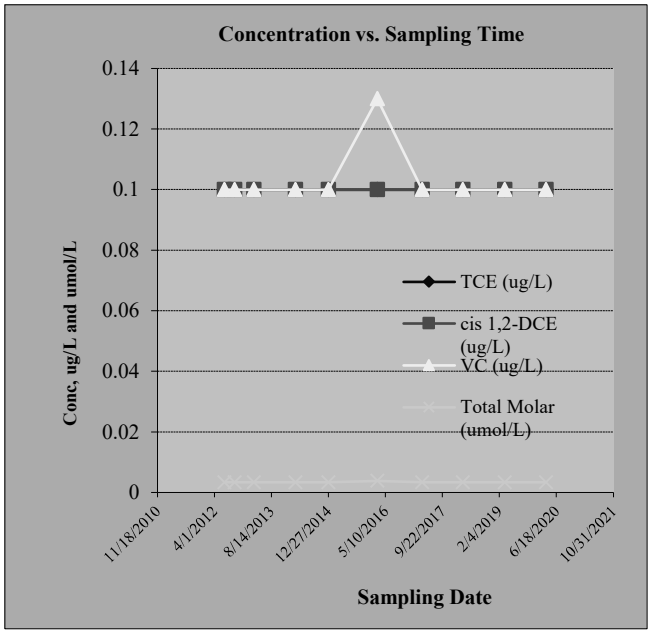
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	-1000.00%	-1000.00%	-1000.00%	-1000.00%	NA	NA
Plume Stability?	Stable	Stable	Stable	Stable	NA	NA
Coefficient of Variation?	CV <= 1	CV <= 1	CV <= 1	CV <= 1	n<4	n<4
Mann-Kendall Statistic "S" value?	0	0	0	0	0	0
Number of Sampling Rounds?	11	11	11	11	0	0
Average Concentration?	0.10	0.10	0.10	0.00	NA	NA
Standard Deviation?	0.00	0.00	0.01	0.00	NA	NA
Coefficient of Variation?	0.00	0.00	0.09	0.04	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Stable**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CG-141-WT**

Level of Confidence (Decision Criteria)? **85%**

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

		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	11/8/2004	0.051	0.5	0.01	0.005705431		
#2	11/4/2005	0.01	0.25	0.21	0.00601486		
#3	11/2/2006	0.0074	0.25	0.045	0.003354988		
#4	11/14/2007	0.00335	0.06	0.00175	0.000672371		
#5	11/10/2008	0.00455	0.0225	0.0066	0.000372309		
#6	11/2/2009	0.00455	0.0335	0.0042	0.000447368		
#7	3/24/2010	0.1	0.1	0.1	0.003392546		
#8	6/16/2010	0.1	0.1	0.1	0.003392546		
#9	9/28/2010	0.1	0.1	0.1	0.003392546		
#10	11/4/2010	0.00455	0.0335	0.0042	0.000447368		
#11	12/15/2010	0.1	0.1	0.1	0.003392546		
#12	3/15/2011	0.1	0.1	0.1	0.003392546		
#13	9/18/2018	0.1	0.1	0.1	0.003392546		
#14	3/22/2019	0.1	0.1	0.1	0.003392546		
#15	9/25/2019	0.1	0.1	0.05	0.00259252		
#16							

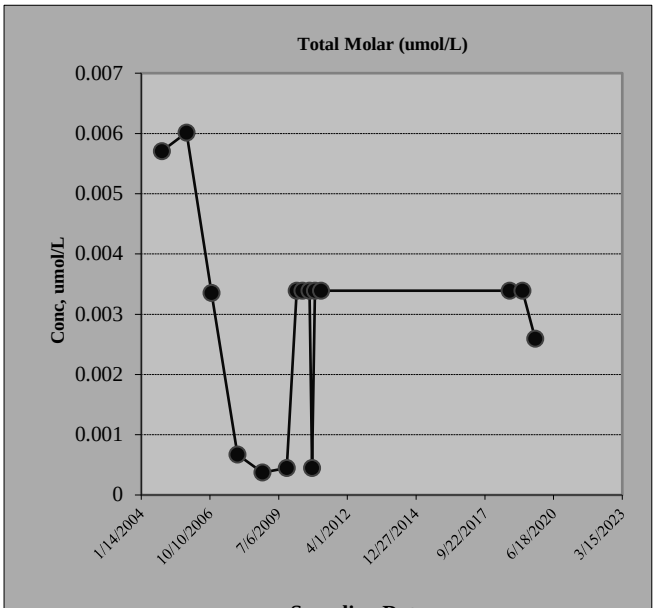
2. Mann-Kendall Non-parametric Statistical Test Results

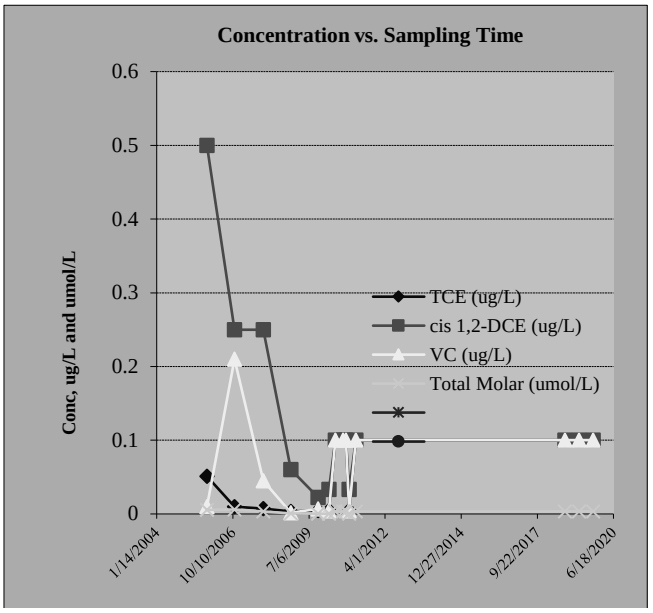
Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	96.30%	72.10%	78.20%	57.70%	NA	NA
Plume Stability?	***Expanding***	Stable	Stable	Stable	NA	NA
Coefficient of Variation?		CV <= 1	CV <= 1	CV <= 1	n<4	n<4
Mann-Kendall Statistic "S" value?	38	-13	17	-5	0	0
Number of Sampling Rounds?	15	15	15	15	0	0
Average Concentration?	0.06	0.13	0.07	0.00	NA	NA
Standard Deviation?	0.05	0.12	0.06	0.00	NA	NA
Coefficient of Variation?	0.79	0.94	0.85	0.61	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**

Plume Stability? **Stable**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-13-WT**
Level of Confidence (Decision Criteria)? **85%**

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

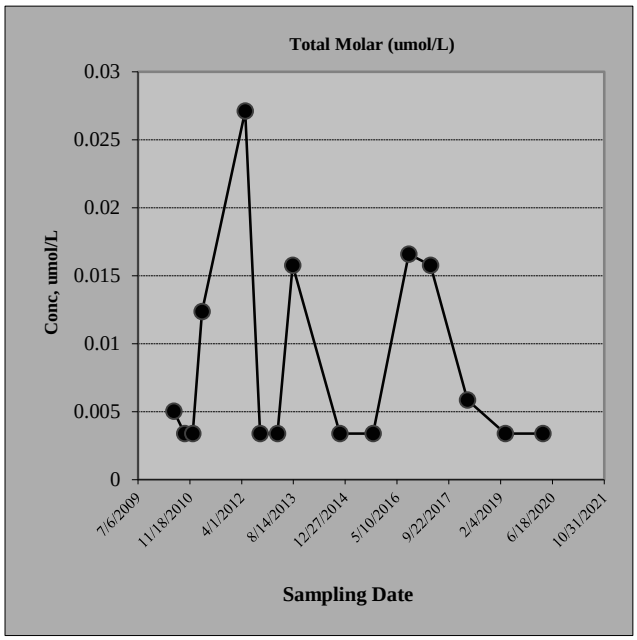
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	6/16/2010	0.1	0.26	0.1	0.01		
#2	9/28/2010	0.1	0.1	0.1	0.00		
#3	12/15/2010	0.1	0.1	0.1	0.00		
#4	3/15/2011	0.1	0.97	0.1	0.01		
#5	5/4/2012	0.1	2.4	0.1	0.03		
#6	9/26/2012	0.1	0.1	0.1	0.00		
#7	3/13/2013	0.1	0.1	0.1	0.00		
#8	8/8/2013	0.1	1.3	0.1	0.02		
#9	11/5/2014	0.1	0.1	0.1	0.00		
#10	9/23/2015	0.1	0.1	0.1	0.00		
#11	9/1/2016	0.21	1.3	0.1	0.02		
#12	3/28/2017	0.1	1.3	0.1	0.02		
#13	3/20/2018	0.1	0.34	0.1	0.01		
#14	3/22/2019	0.1	0.1	0.1	0.00		
#15	3/18/2020	0.1	0.1	0.1	0.00		
#16							

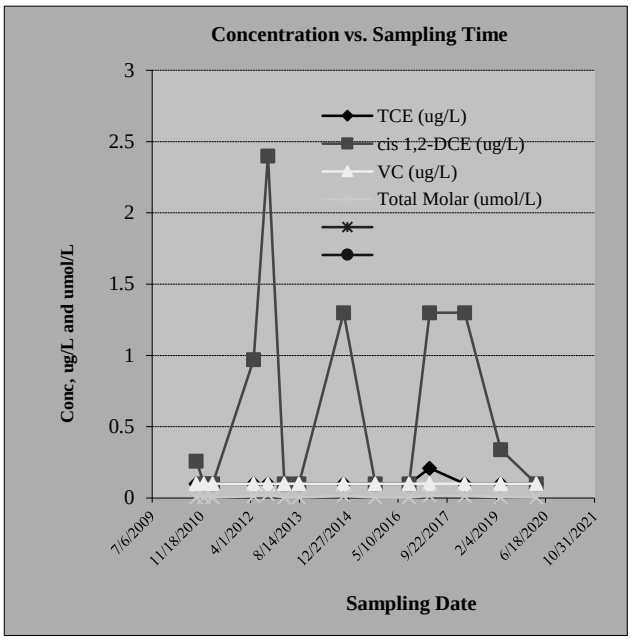
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	57.70%	50.00%	-1400.00%	50.00%	NA	NA
Plume Stability?	Stable	Undetermined	Stable	Stable	NA	NA
Coefficient of Variation?	CV <= 1	CV > 1	CV <= 1	CV <= 1	n<4	n<4
Mann-Kendall Statistic "S" value?	6	-2	0	-2	0	0
Number of Sampling Rounds?	15	15	15	15	0	0
Average Concentration?	0.11	0.58	0.10	0.01	NA	NA
Standard Deviation?	0.03	0.71	0.00	0.01	NA	NA
Coefficient of Variation?	0.26	1.23	0.00	0.88	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Stable**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-MW-3**
Level of Confidence (Decision Criteria)? **85%**

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

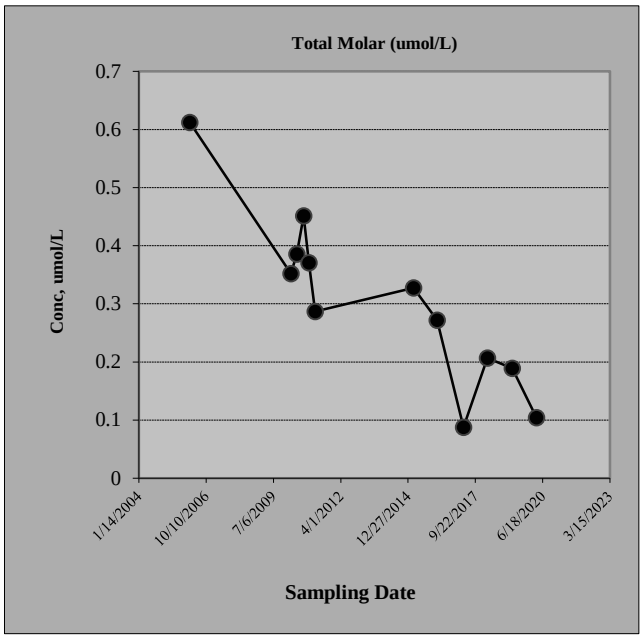
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	2/9/2006	5.6	49	4	0.61		
#2	3/24/2010	4.5	30	0.51	0.35		
#3	6/16/2010	4.6	33	0.65	0.39		
#4	9/28/2010	5.1	39	0.65	0.45		
#5	12/15/2010	4.3	32	0.48	0.37		
#6	3/15/2011	4.6	24	0.28	0.29		
#7	3/18/2015	4.3	28	0.37	0.33		
#8	3/1/2016	5.4	22	0.25	0.27		
#9	3/28/2017	3.2	6	0.1	0.09		
#10	3/20/2018	6.6	15	0.1	0.21		
#11	3/22/2019	4.3	15	0.1	0.19		
#12	3/18/2020	4	7	0.1	0.10		
#13							
#14							
#15							
#16							

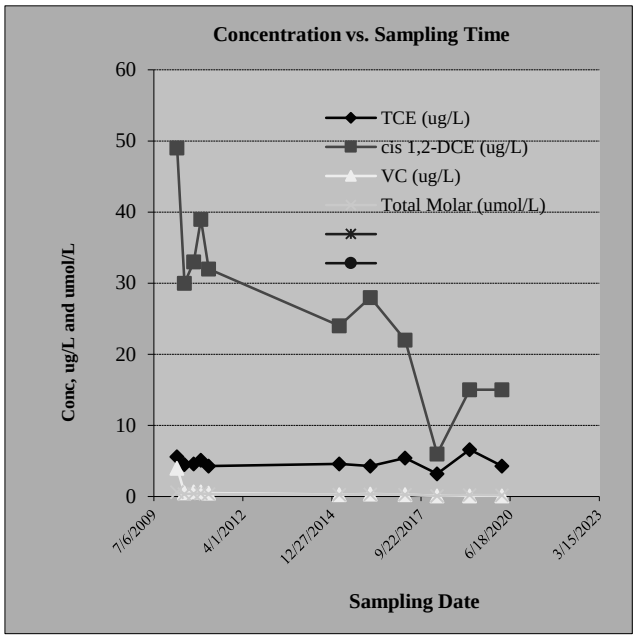
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	87.50%	100.00%	100.00%	100.00%	NA	NA
Plume Stability?	Shrinking	Shrinking	Shrinking	Shrinking	NA	NA
Coefficient of Variation?					n<4	n<4
Mann-Kendall Statistic "S" value?	-18	-49	-53	-50	0	0
Number of Sampling Rounds?	12	12	12	12	0	0
Average Concentration?	4.71	25.00	0.63	0.30	NA	NA
Standard Deviation?	0.87	12.84	1.08	0.15	NA	NA
Coefficient of Variation?	0.19	0.51	1.71	0.49	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Shrinking**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, Washington*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **MW-7**
Level of Confidence (Decision Criteria)? **85%**

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

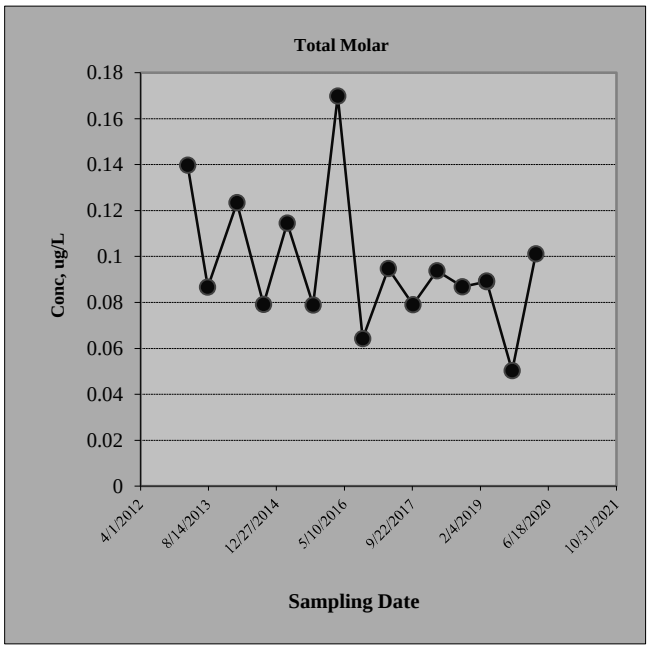
		Hazardous Substances					
Sampling Event	Date Sampled	TCE	cis-1,2 DCE	VC	Total Molar		
#1	3/13/2013	14	2.9	0.2	0.139657329		
#2	8/8/2013	4.6	4.7	0.2	0.08668631		
#3	3/12/2014	12	2.8	0.2	0.12340517		
#4	9/23/2014	5.5	3.3	0.2	0.079095192		
#5	3/17/2015	8.7	4.3	0.25	0.114562933		
#6	9/23/2015	4.6	3.1	0.74	0.078823234		
#7	3/22/2016	20	1.4	0.2	0.169847537		
#8	9/20/2016	4.7	2.4	0.23	0.064203791		
#9	3/29/2017	10	1.5	0.2	0.094775496		
#10	9/26/2017	5.7	2.6	0.55	0.078997224		
#11	3/21/2018	10	1.4	0.2	0.093744036		
#12	9/24/2018	5	3.9	0.53	0.086758943		
#13	3/21/2019	8.3	2.2	0.2	0.089058117		
#14	3/21/2019	8.2	2.3	0.2	0.089328542		
#15	9/26/2019	5.3	0.8	0.1	0.050186583		
#16	3/16/2020	12	0.64	0.2	0.101125644		

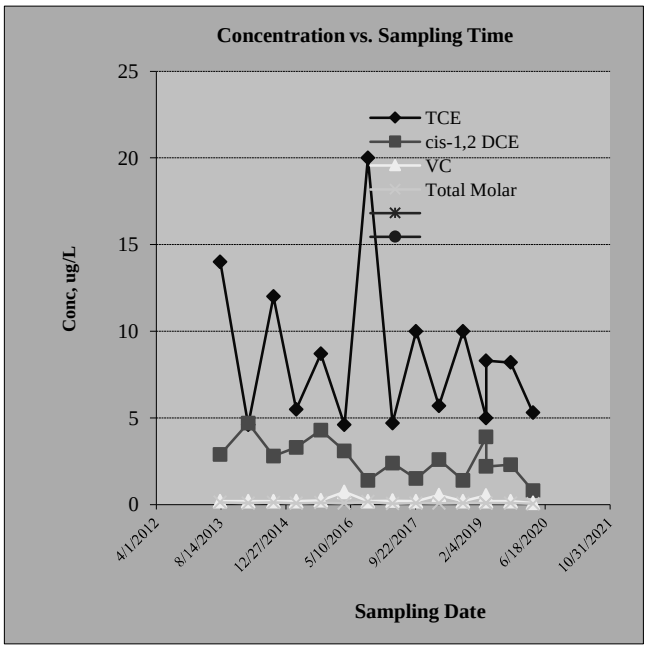
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE**	**cis-1,2 DCE**	**VC**	**Total Molar**		
Confidence Level Calculated?	48.20%	99.70%	65.50%	82.50%	NA	NA
Plume Stability?	Stable	Shrinking	Stable	Stable	NA	NA
Coefficient of Variation?	CV <= 1		CV <= 1	CV <= 1	n<4	n<4
Mann-Kendall Statistic "S" value?	-1	-61	-11	-22	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	8.66	2.52	0.28	0.10	NA	NA
Standard Deviation?	4.29	1.19	0.17	0.03	NA	NA
Coefficient of Variation?	0.49	0.47	0.63	0.30	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar**
Plume Stability? **Stable**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, Washington*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-9-WT**
Level of Confidence (Decision Criteria)? **85%**

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

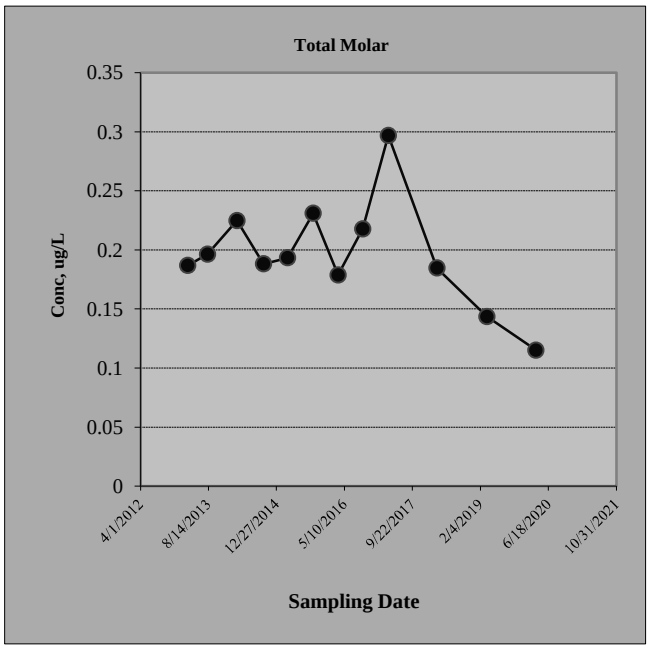
		Hazardous Substances					
Sampling Event	Date Sampled	TCE	cis-1,2 DCE	VC	Total Molar		
#1	3/13/2013	21	2.3	0.2	0.186741023		
#2	8/7/2013	22	2.5	0.2	0.196414292		
#3	3/12/2014	26	2.3	0.2	0.224792773		
#4	9/23/2014	23	0.96	0.2	0.188140165		
#5	3/17/2015	22	2.2	0.2	0.193319913		
#6	9/23/2015	26	2.9	0.2	0.23098153		
#7	3/23/2016	19	3	0.2	0.178740539		
#8	9/20/2016	24	3.1	0.2	0.217823749		
#9	3/29/2017	34	3.4	0.2	0.297021629		
#10	3/21/2018	21	2.1	0.2	0.184678104		
#11	3/22/2019	16	1.8	0.2	0.143531975		
#12	3/18/2020	12	2	0.2	0.115153494		
#13							
#14							
#15							
#16							

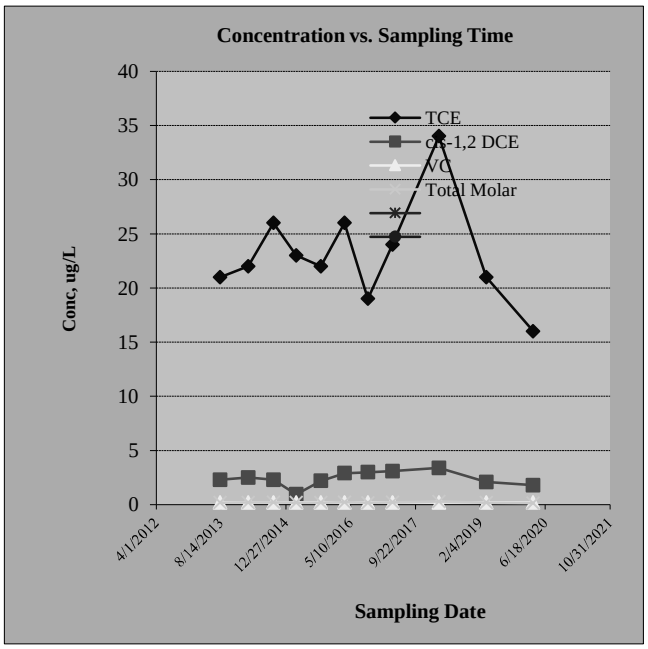
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE**	**cis-1,2 DCE**	**VC**	**Total Molar**		
Confidence Level Calculated?	81.00%	47.30%	47.30%	84.50%	NA	NA
Plume Stability?	Stable	Stable	Stable	Stable	NA	NA
Coefficient of Variation?	CV <= 1	CV <= 1	CV <= 1	CV <= 1	n<4	n<4
Mann-Kendall Statistic "S" value?	-15	-1	0	-16	0	0
Number of Sampling Rounds?	12	12	12	12	0	0
Average Concentration?	22.17	2.38	0.20	0.20	NA	NA
Standard Deviation?	5.46	0.66	0.00	0.05	NA	NA
Coefficient of Variation?	0.25	0.28	0.00	0.23	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar**
Plume Stability? **Stable**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **BDC-6-30**
Level of Confidence (Decision Criteria)? **85%**

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

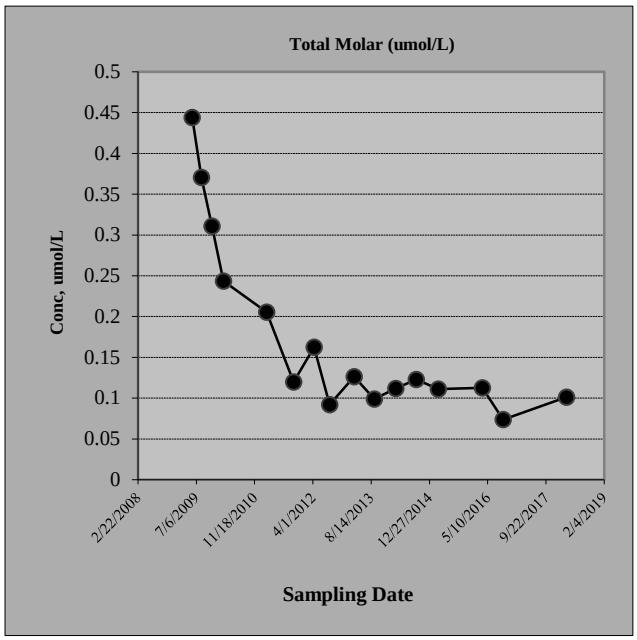
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	6/1/2009	12	19	9.8	0.44		
#2	8/18/2009	5.1	8.9	15	0.37		
#3	11/17/2009	7.9	13	7.3	0.31		
#4	2/24/2010	6.1	14	3.3	0.24		
#5	3/1/2011	6.6	14	0.68	0.21		
#6	10/18/2011	3.2	8.8	0.29	0.12		
#7	4/11/2012	6.3	9.8	0.84	0.16		
#8	8/22/2012	3	6	0.47	0.09		
#9	3/20/2013	5	6.7	1.2	0.13		
#10	9/9/2013	3.3	6.4	0.49	0.10		
#11	3/14/2014	5.4	5.5	0.87	0.11		
#12	9/5/2014	4.4	6.5	1.4	0.12		
#13	3/12/2015	4.5	4.8	1.7	0.11		
#14	3/24/2016	4.3	5.1	1.7	0.11		
#15	9/20/2016	2.54	3.56	1.1	0.07		
#16	3/16/2018	6.72	3.97	0.58	0.10		

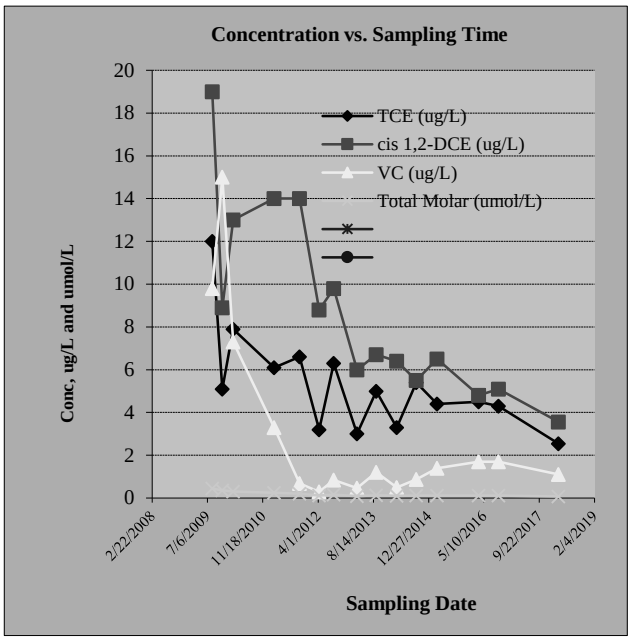
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	96.80%	100.00%	84.70%	100.00%	NA	NA
Plume Stability?	Shrinking	Shrinking	Undetermined	Shrinking	NA	NA
Coefficient of Variation?			CV > 1		n<4	n<4
Mann-Kendall Statistic "S" value?	-42	-91	-25	-82	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	5.40	8.50	2.92	0.18	NA	NA
Standard Deviation?	2.32	4.40	4.18	0.11	NA	NA
Coefficient of Variation?	0.43	0.52	1.43	0.63	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Shrinking**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CG-137-40**
Level of Confidence (Decision Criteria)? **85%**

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

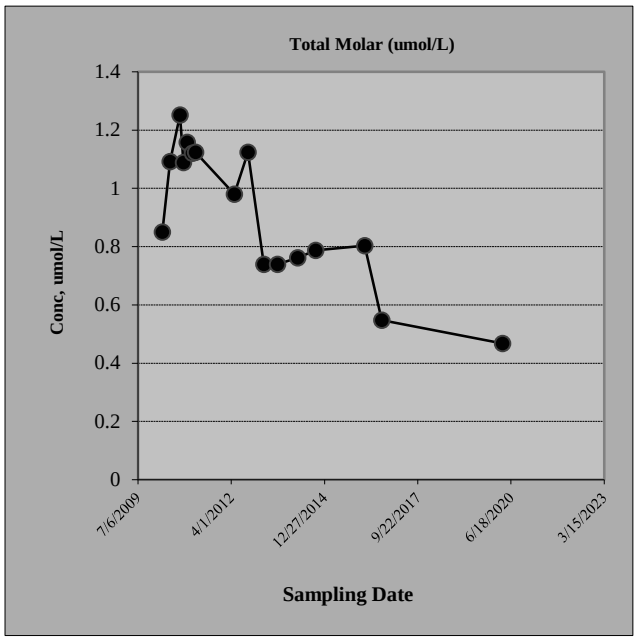
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	3/24/2010	0.1	0.1	53	0.85		
#2	6/16/2010	0.2	0.2	68	1.09		
#3	9/28/2010	0.2	0.2	78	1.25		
#4	11/4/2010	0.00455	0.0335	68	1.09		
#5	12/15/2010	0.98	1.4	71	1.16		
#6	2/9/2011	0.0019	0.0335	70	1.12		
#7	3/15/2011	0.2	0.2	70	1.12		
#8	5/4/2012	0.2	0.2	61	0.98		
#9	9/26/2012	0.2	0.2	70	1.12		
#10	3/15/2013	0.2	0.2	46	0.74		
#11	8/8/2013	0.2	0.2	46	0.74		
#12	3/13/2014	0.38	0.61	47	0.76		
#13	9/24/2014	0.2	0.2	49	0.79		
#14	3/1/2016	0.2	0.2	50	0.80		
#15	9/1/2016	0.2	0.2	34	0.55		
#16	3/18/2020	0.2	0.21	29	0.47		

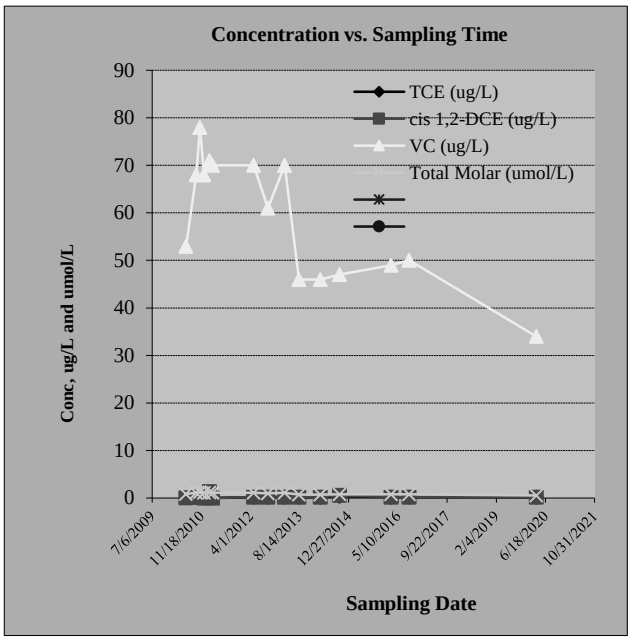
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	80.10%	91.70%	99.70%	99.70%	NA	NA
Plume Stability?	Stable	***Expanding***	Shrinking	Shrinking	NA	NA
Coefficient of Variation?	CV <= 1				n<4	n<4
Mann-Kendall Statistic "S" value?	21	32	-61	-60	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	0.23	0.27	56.88	0.91	NA	NA
Standard Deviation?	0.22	0.33	14.57	0.23	NA	NA
Coefficient of Variation?	0.95	1.19	0.26	0.26	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Shrinking**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CG-141-40**
Level of Confidence (Decision Criteria)? **85%**

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

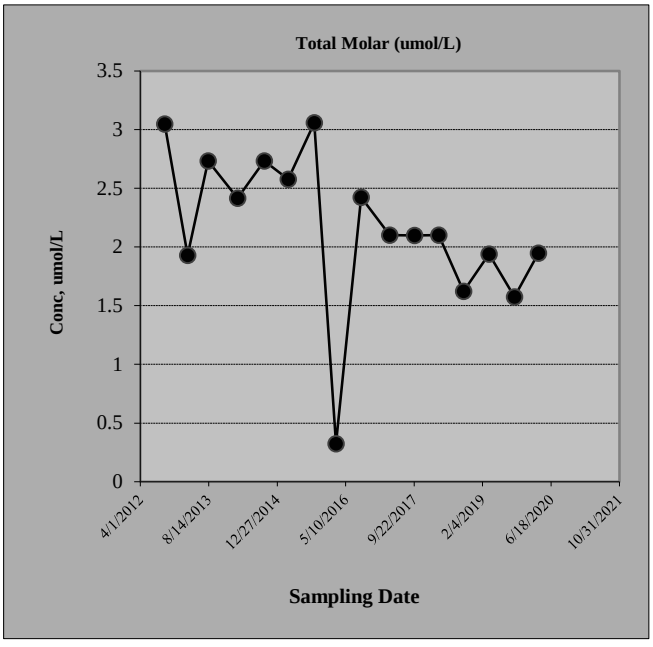
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	9/26/2012	0.5	0.5	190	3.05		
#2	3/13/2013	0.5	0.5	120	1.93		
#3	8/8/2013	0.5	1	170	2.73		
#4	3/13/2014	0.5	1.2	150	2.42		
#5	9/23/2014	0.5	1	170	2.73		
#6	3/18/2015	0.5	1.3	160	2.58		
#7	9/23/2015	0.5	1.4	190	3.06		
#8	3/1/2016	0.1	0.35	20	0.32		
#9	9/1/2016	0.5	2.1	150	2.43		
#10	3/28/2017	0.5	1.6	130	2.10		
#11	9/26/2017	0.5	1.5	130	2.10		
#12	3/20/2018	0.5	1.7	130	2.10		
#13	9/18/2018	0.5	1.9	100	1.62		
#14	3/22/2019	0.5	1.7	120	1.94		
#15	9/25/2019	0.5	1.8	97	1.57		
#16	3/18/2020	0.5	2.4	120	1.95		

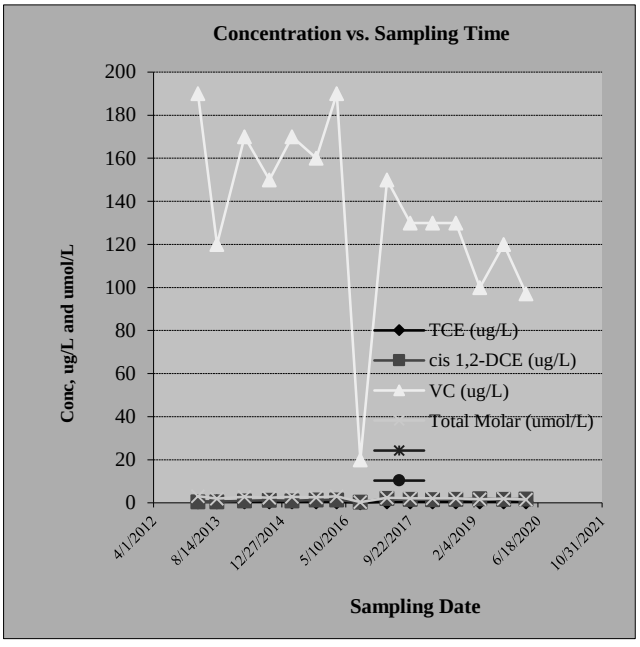
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	48.20%	100.00%	99.60%	99.00%	NA	NA
Plume Stability?	Stable	***Expanding***	Shrinking	Shrinking	NA	NA
Coefficient of Variation?	CV <= 1				n<4	n<4
Mann-Kendall Statistic "S" value?	1	83	-59	-53	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	0.48	1.37	134.19	2.16	NA	NA
Standard Deviation?	0.10	0.59	41.80	0.67	NA	NA
Coefficient of Variation?	0.21	0.43	0.31	0.31	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Shrinking**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-10-35**
Level of Confidence (Decision Criteria)? **85%**

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

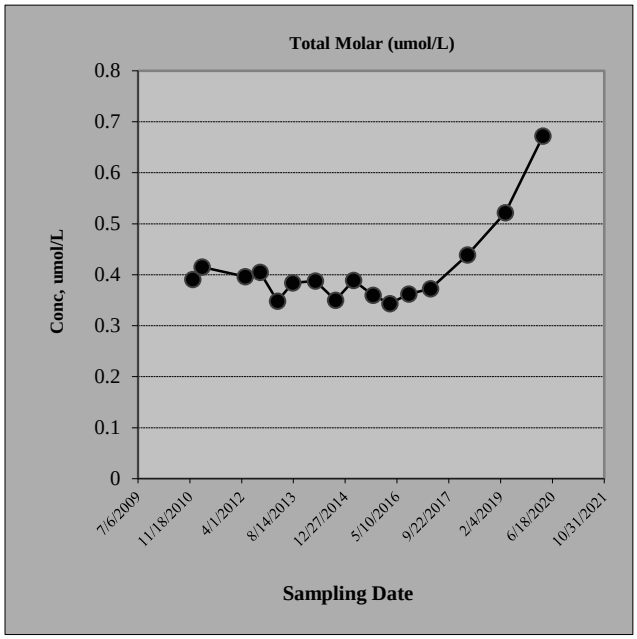
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	12/15/2010	19	3.7	13	0.39		
#2	3/15/2011	34	4.8	6.7	0.42		
#3	5/4/2012	31	5.3	6.6	0.40		
#4	9/26/2012	33	5	6.4	0.41		
#5	3/13/2013	27	4.2	6.2	0.35		
#6	8/8/2013	24	5.1	9.3	0.38		
#7	3/13/2014	26	5.1	8.6	0.39		
#8	9/23/2014	19	4.4	10	0.35		
#9	3/18/2015	21	6.7	10	0.39		
#10	9/23/2015	20	4.9	9.8	0.36		
#11	3/1/2016	21	5.4	8	0.34		
#12	9/1/2016	17	5.5	11	0.36		
#13	3/28/2017	23	10	5.9	0.37		
#14	3/20/2018	22	15	7.3	0.44		
#15	3/22/2019	16	29	6.3	0.52		
#16	3/18/2020	7.9	50	6	0.67		

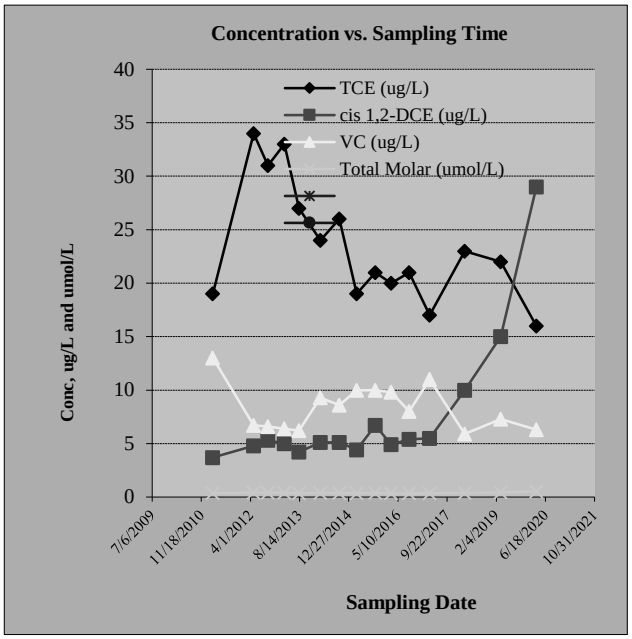
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	99.90%	100.00%	82.50%	65.50%	NA	NA
Plume Stability?	Shrinking	***Expanding***	Stable	Stable	NA	NA
Coefficient of Variation?			CV <= 1	CV <= 1	n<4	n<4
Mann-Kendall Statistic "S" value?	-64	83	-23	10	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	22.56	10.26	8.19	0.41	NA	NA
Standard Deviation?	6.69	12.36	2.13	0.08	NA	NA
Coefficient of Variation?	0.30	1.20	0.26	0.20	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Stable**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-12-30**
Level of Confidence (Decision Criteria)? **85%**

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

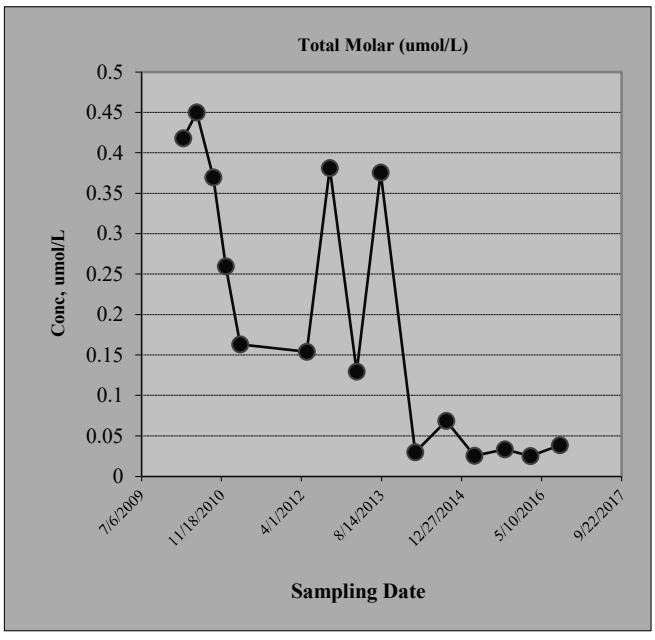
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	3/24/2010	0.1	0.1	26	0.417805807		
#2	6/16/2010	0.1	0.1	28	0.449806831		
#3	9/28/2010	0.1	0.1	23	0.369804271		
#4	12/15/2010	0.1	0.28	16	0.259657314		
#5	3/15/2011	0.1	0.21	10	0.16293222		
#6	5/4/2012	0.1	0.42	9.3	0.153897927		
#7	9/26/2012	0.1	1.2	23	0.381150326		
#8	3/13/2013	0.1	0.69	7.6	0.129481997		
#9	8/8/2013	0.1	2.2	22	0.375464409		
#10	3/13/2014	0.1	0.47	1.5	0.029609663		
#11	9/23/2014	0.1	0.54	3.9	0.068732913		
#12	3/18/2015	0.1	0.36	1.3	0.025274955		
#13	9/23/2015	0.1	0.53	1.7	0.033428641		
#14	3/1/2016	0.1	0.34	1.3	0.025068663		
#15	9/1/2016	0.1	1	1.7	0.038276501		
#16							

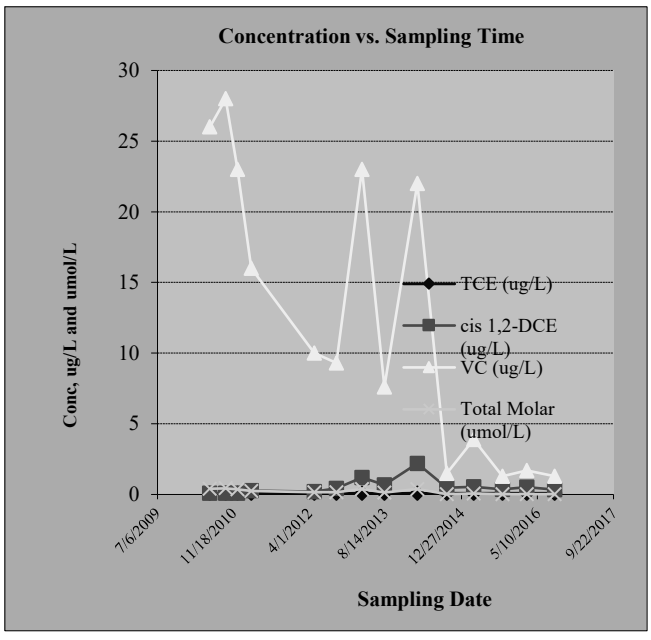
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	-1400.00%	98.60%	100.00%	100.00%	NA	NA
Plume Stability?	Stable	***Expanding***	Shrinking	Shrinking	NA	NA
Coefficient of Variation?	CV <= 1				n<4	n<4
Mann-Kendall Statistic "S" value?	0	46	-74	-71	0	0
Number of Sampling Rounds?	15	15	15	15	0	0
Average Concentration?	0.10	0.57	11.75	0.19	NA	NA
Standard Deviation?	0.00	0.55	10.20	0.16	NA	NA
Coefficient of Variation?	0.00	0.97	0.87	0.84	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Shrinking**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-13-30**
Level of Confidence (Decision Criteria)? **85%**

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

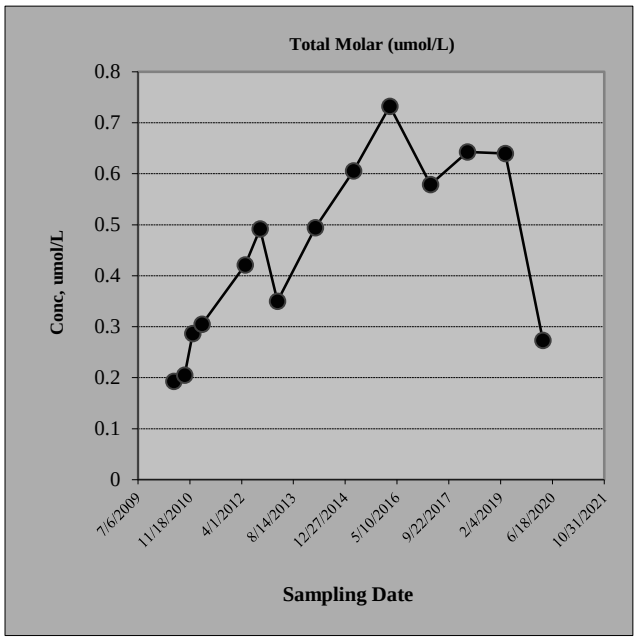
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	6/16/2010	0.1	16	1.7	0.19		
#2	9/28/2010	0.1	17	1.8	0.20		
#3	12/15/2010	0.1	24	2.4	0.29		
#4	3/15/2011	0.1	27	1.6	0.30		
#5	5/4/2012	0.2	39	1.1	0.42		
#6	9/26/2012	0.2	46	1	0.49		
#7	3/13/2013	0.33	33	0.43	0.35		
#8	3/13/2014	1	46	0.75	0.49		
#9	3/18/2015	1.3	57	0.51	0.61		
#10	3/1/2016	1.4	69	0.64	0.73		
#11	3/28/2017	1.4	54	0.7	0.58		
#12	3/20/2018	2.1	60	0.49	0.64		
#13	3/22/2019	1.6	60	0.56	0.64		
#14	3/18/2020	1.1	25	0.46	0.27		
#15							
#16							

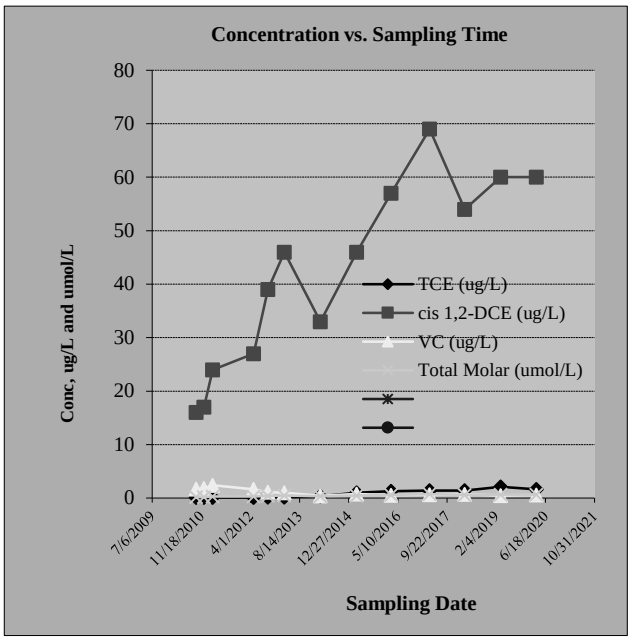
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	100.00%	99.90%	100.00%	99.90%	NA	NA
Plume Stability?	***Expanding***	***Expanding***	Shrinking	***Expanding***	NA	NA
Coefficient of Variation?					n<4	n<4
Mann-Kendall Statistic "S" value?	71	57	-61	55	0	0
Number of Sampling Rounds?	14	14	14	14	0	0
Average Concentration?	0.79	40.93	1.01	0.44	NA	NA
Standard Deviation?	0.70	17.52	0.62	0.18	NA	NA
Coefficient of Variation?	0.89	0.43	0.62	0.40	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Expanding**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-15-40**
Level of Confidence (Decision Criteria)? **85%**

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

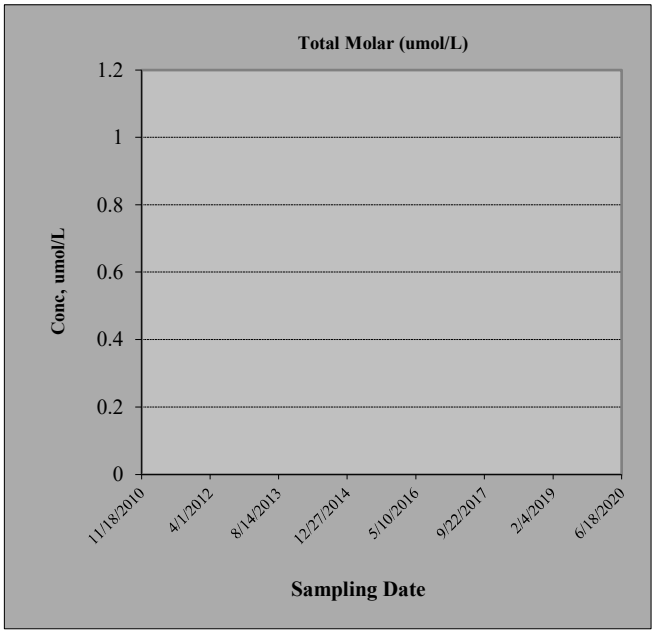
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	5/4/2012	0.5	0.5	99			
#2	9/26/2012	0.2	0.2	56			
#3	3/13/2013	0.5	0.5	86			
#4	8/8/2013	0.5	0.5	110			
#5	3/13/2014	0.2	0.2	72			
#6	9/23/2014	0.5	0.5	88			
#7	3/18/2015	0.2	0.2	93			
#8	9/23/2015	0.2	0.2	96			
#9	3/1/2016	0.5	0.5	99			
#10	9/1/2016	0.5	0.5	100			
#11	3/28/2017	0.2	0.2	65			
#12	9/26/2017	0.5	0.5	73			
#13	3/20/2018	0.5	0.5	66			
#14	9/18/2018	0.5	0.5	65			
#15	3/22/2019	0.2	0.2	47			
#16	9/25/2019	0.1	0.1	40			

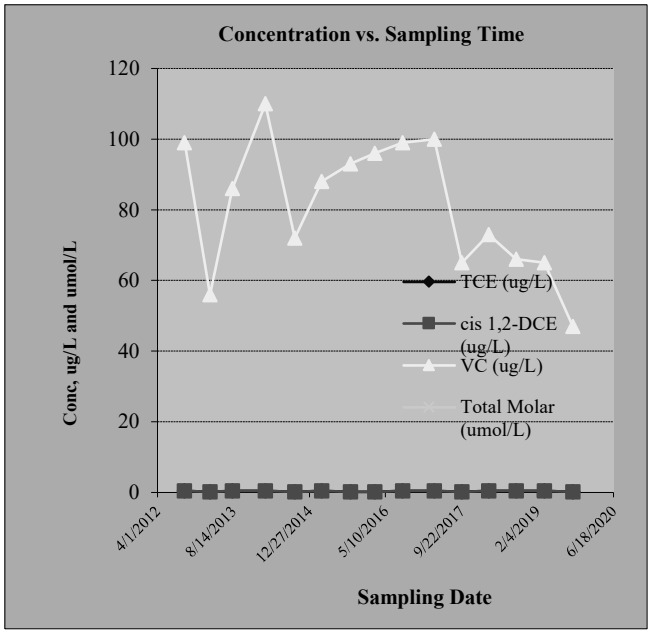
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	71.80%	71.80%	96.80%	NA	NA	NA
Plume Stability?	Stable	Stable	Shrinking	NA	NA	NA
Coefficient of Variation?	CV <= 1	CV <= 1		n<4	n<4	n<4
Mann-Kendall Statistic "S" value?	-15	-15	-42	0	0	0
Number of Sampling Rounds?	16	16	16	0	0	0
Average Concentration?	0.36	0.36	78.44	NA	NA	NA
Standard Deviation?	0.16	0.16	20.87	NA	NA	NA
Coefficient of Variation?	0.45	0.45	0.27	NA	NA	NA
Blank if No Errors found				n<4	n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **NA**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-19-30**
Level of Confidence (Decision Criteria)? **85%**

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

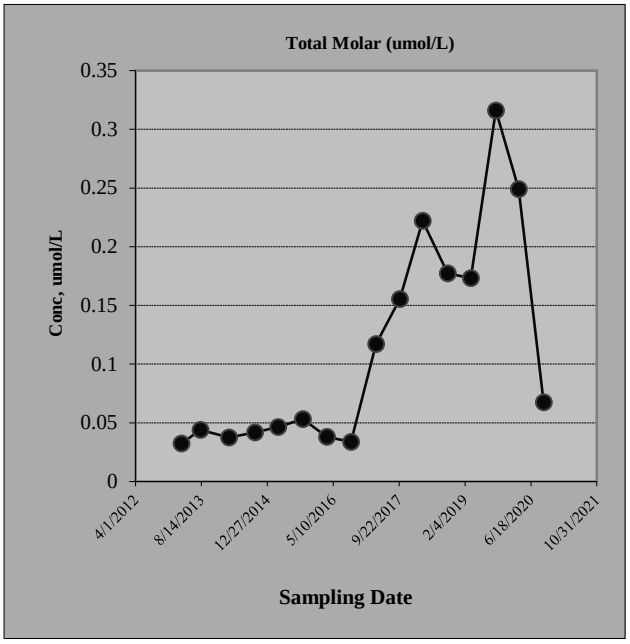
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	3/14/2013	0.1	1.2	1.2	0.032339164		
#2	8/6/2013	0.1	1.7	1.6	0.043896666		
#3	3/11/2014	0.1	1.7	1.2	0.037496461		
#4	9/23/2014	0.1	1.8	1.4	0.041728023		
#5	3/18/2015	0.1	1.8	1.7	0.046528177		
#6	9/22/2015	0.1	2.6	1.6	0.053179802		
#7	3/22/2016	0.1	1.9	1.1	0.037959329		
#8	9/20/2016	0.1	1.7	0.97	0.033816343		
#9	3/30/2017	0.1	1.5	6.3	0.117036153		
#10	9/26/2017	0.1	1.8	8.5	0.155331658		
#11	3/20/2018	0.1	1.3	13	0.222176665		
#12	9/24/2018	0.1	1.6	10	0.177269507		
#13	3/19/2019	0.1	1.2	10	0.173143669		
#14	9/25/2019	0.1	1.1	19	0.316116818		
#15	3/17/2020	0.1	0.8	15	0.249020391		
#16	9/22/2020	0.1	0.88	3.6	0.067439722		

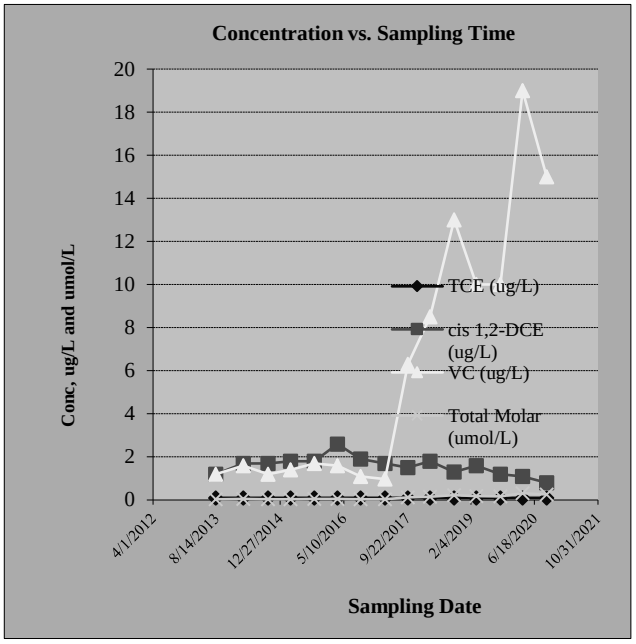
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	48.20%	99.00%	99.90%	100.00%	NA	NA
Plume Stability?	Stable	Shrinking	***Expanding***	***Expanding***	NA	NA
Coefficient of Variation?	CV <= 1				n<4	n<4
Mann-Kendall Statistic "S" value?	0	-53	65	74	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	0.10	1.54	6.01	0.11	NA	NA
Standard Deviation?	0.00	0.45	5.87	0.09	NA	NA
Coefficient of Variation?	0.00	0.29	0.98	0.81	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Expanding**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-14-35**
Level of Confidence (Decision Criteria)? **85%**

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

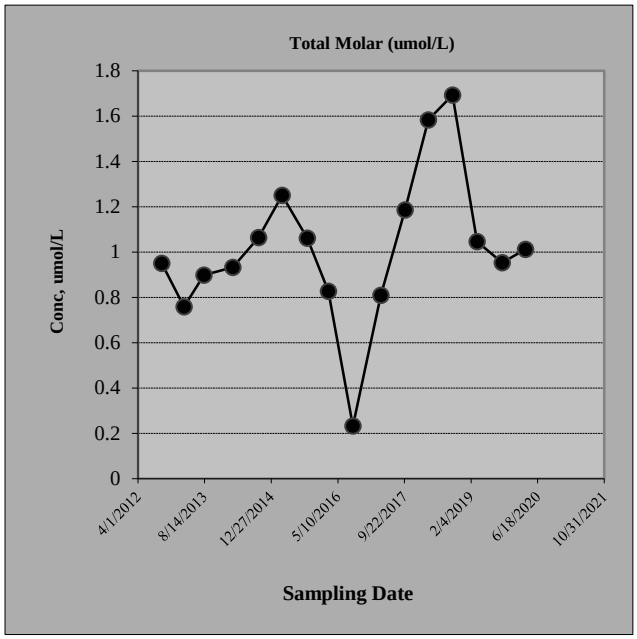
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	9/26/2012	62	44	1.6	0.95		
#2	3/13/2013	48	36	1.4	0.76		
#3	8/8/2013	34	60	1.3	0.90		
#4	3/13/2014	42	58	0.97	0.93		
#5	9/23/2014	17	89	1.1	1.06		
#6	3/18/2015	26	100	1.3	1.25		
#7	9/23/2015	8.2	95	1.2	1.06		
#8	3/1/2016	14	68	1.2	0.83		
#9	9/1/2016	0.52	22	0.1	0.23		
#10	3/28/2017	13	67	1.2	0.81		
#11	9/26/2017	4.1	110	1.3	1.19		
#12	3/20/2018	2.3	150	1.2	1.58		
#13	9/18/2018	2.5	160	1.5	1.69		
#14	3/22/2019	2.5	98	1	1.05		
#15	9/25/2019	2.4	88	1.7	0.95		
#16	3/18/2020	1.1	95	1.5	1.01		

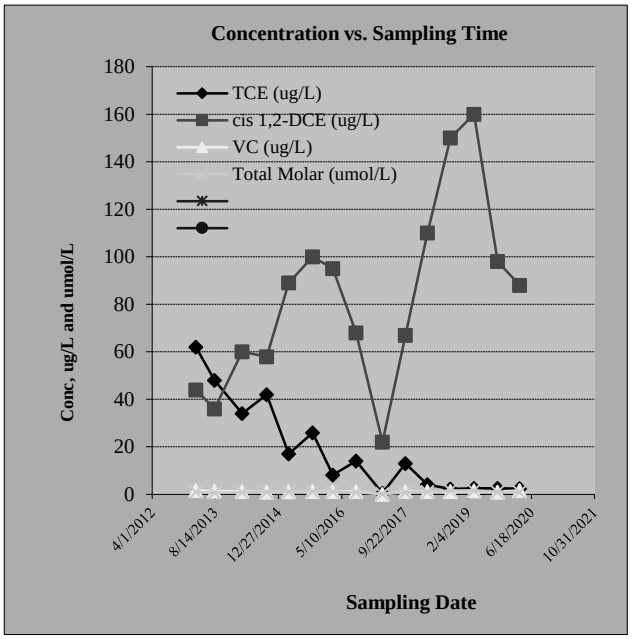
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	100.00%	98.70%	58.80%	86.70%	NA	NA
Plume Stability?	Shrinking	***Expanding***	Stable	***Expanding***	NA	NA
Coefficient of Variation?			CV <= 1		n<4	n<4
Mann-Kendall Statistic "S" value?	-91	51	6	26	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	17.48	83.75	1.22	1.02	NA	NA
Standard Deviation?	19.36	37.49	0.36	0.33	NA	NA
Coefficient of Variation?	1.11	0.45	0.30	0.33	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Expanding**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, Washington*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-7-40**
Level of Confidence (Decision Criteria)? **85%**

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

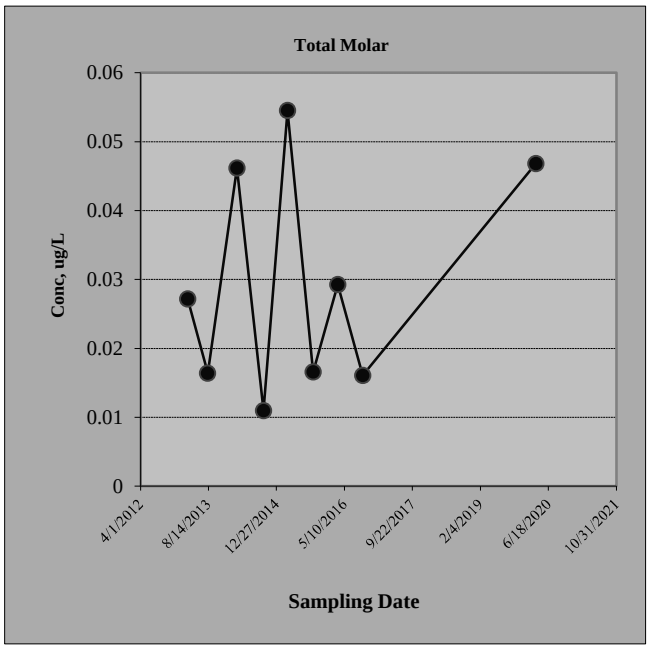
		Hazardous Substances					
Sampling Event	Date Sampled	TCE	cis-1,2 DCE	VC	Total Molar		
#1	3/13/2013	0.2	0.78	1.1	0.027168017		
#2	8/8/2013	0.2	0.2	0.8	0.016385399		
#3	3/12/2014	0.2	2	1.5	0.046152028		
#4	9/23/2014	0.2	0.2	0.46	0.010945225		
#5	3/17/2015	0.2	2.5	1.7	0.054509428		
#6	9/23/2015	0.2	0.2	0.81	0.016545404		
#7	3/22/2016	0.2	1.2	0.96	0.029260076		
#8	9/20/2016	0.2	0.2	0.78	0.016065388		
#9	3/16/2020	0.2	1.6	1.8	0.046826344		
#10							
#11							
#12							
#13							
#14							
#15							
#16							

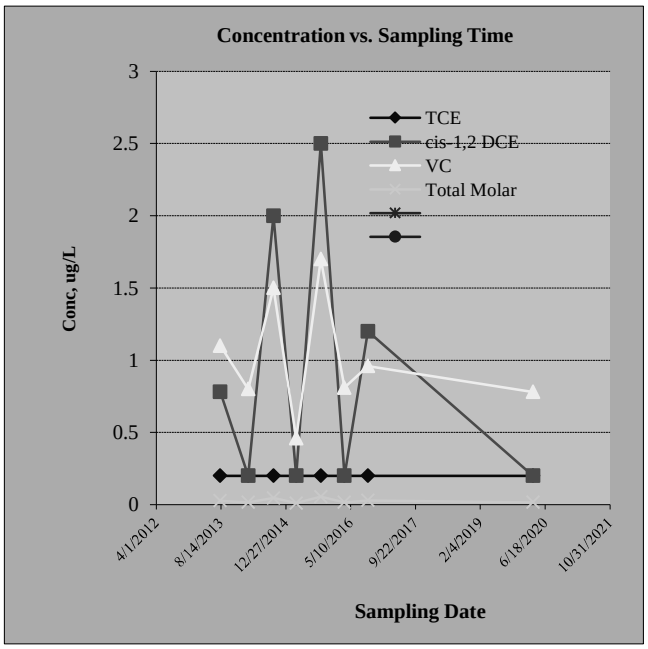
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE**	**cis-1,2 DCE**	**VC**	**Total Molar**		
Confidence Level Calculated?	46.00%	54.00%	61.90%	61.90%	NA	NA
Plume Stability?	Stable	Stable	Stable	Stable	NA	NA
Coefficient of Variation?	CV <= 1	CV <= 1	CV <= 1	CV <= 1	n<4	n<4
Mann-Kendall Statistic "S" value?	0	2	4	4	0	0
Number of Sampling Rounds?	9	9	9	9	0	0
Average Concentration?	0.20	0.99	1.10	0.03	NA	NA
Standard Deviation?	0.00	0.88	0.46	0.02	NA	NA
Coefficient of Variation?	0.00	0.90	0.42	0.55	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar**
Plume Stability? **Stable**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, Washington*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-9-40**
Level of Confidence (Decision Criteria)? **85%**

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

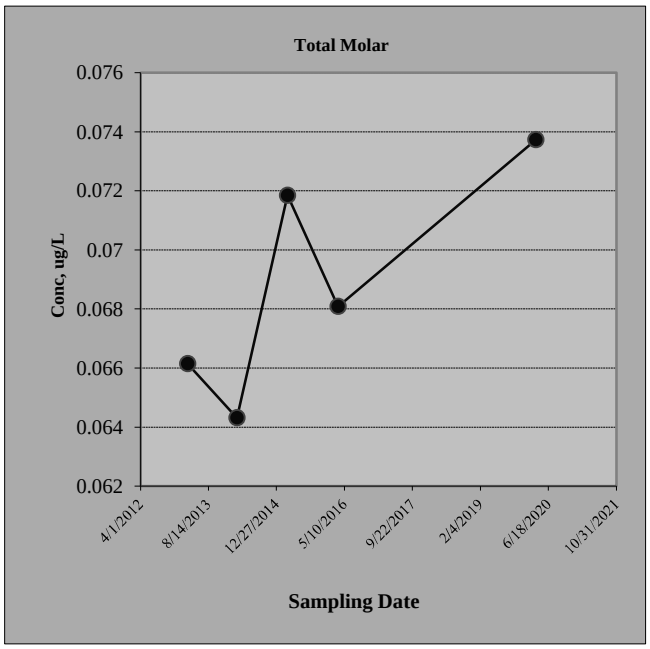
		Hazardous Substances					
Sampling Event	Date Sampled	TCE	cis-1,2 DCE	VC	Total Molar		
#1	3/13/2013	0.2	4.9	0.88	0.066144037		
#2	3/12/2014	0.2	4.8	0.83	0.064312552		
#3	3/17/2015	0.2	5.5	0.85	0.071852779		
#4	3/23/2016	0.2	5.6	0.55	0.068084084		
#5	3/18/2020	0.2	5.9	0.71	0.073738545		
#6							
#7							
#8							
#9							
#10							
#11							
#12							
#13							
#14							
#15							
#16							

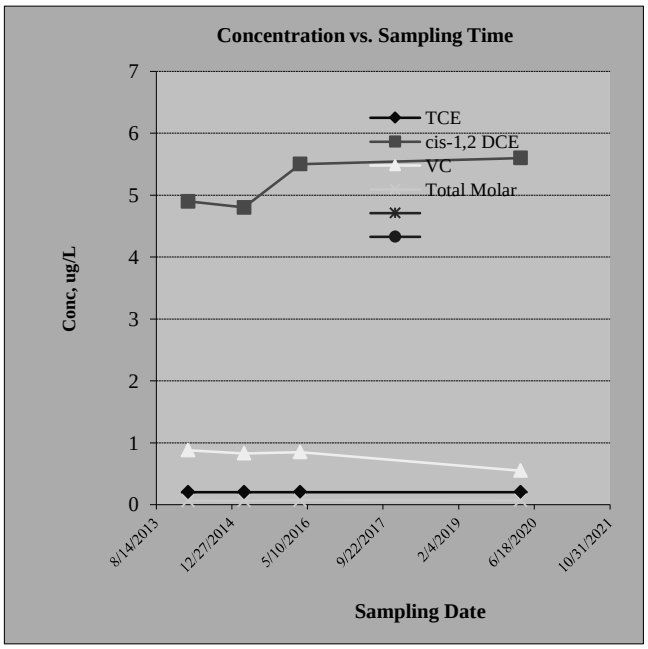
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE**	**cis-1,2 DCE**	**VC**	**Total Molar**		
Confidence Level Calculated?	40.80%	95.80%	88.30%	88.30%	NA	NA
Plume Stability?	Stable	***Expanding***	Shrinking	***Expanding***	NA	NA
Coefficient of Variation?	CV <= 1				n<4	n<4
Mann-Kendall Statistic "S" value?	0	8	-6	6	0	0
Number of Sampling Rounds?	5	5	5	5	0	0
Average Concentration?	0.20	5.34	0.76	0.07	NA	NA
Standard Deviation?	0.00	0.47	0.14	0.00	NA	NA
Coefficient of Variation?	0.00	0.09	0.18	0.06	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar**
Plume Stability? **Expanding**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location?	**CI-15-40**
Level of Confidence (Decision Criteria)?	**85%**

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

		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	3/24/2010	0.1	2.9	7.8	0.155477355		
#2	6/16/2010	0.1	2.8	11	0.205647534		
#3	9/28/2010	0.1	2.4	8.4	0.159920364		
#4	12/15/2010	0.1	1.8	8.2	0.150531505		
#5	3/15/2011	0.1	3.2	8.6	0.171372143		
#6	5/4/2012	0.1	1.2	0.78	0.025618949		
#7	9/26/2012	0.1	1.9	0.57	0.029479058		
#8	3/13/2013	0.1	1.3	0.42	0.020890224		
#9	8/8/2013	0.1	2.1	0.76	0.034582074		
#10	3/13/2014	0.1	2	1.3	0.042190891		
#11	9/23/2014	0.1	1.6	1	0.033264899		
#12	3/18/2015	0.1	2	1.2	0.04059084		
#13	9/23/2015	0.1	2.9	2	0.062674385		
#14	3/1/2016	0.1	2.9	0.91	0.045233827		
#15	9/1/2016	0.1	5.8	0.81	0.073546102		
#16	3/18/2020	0.1	8.4	2.6	0.129004966		

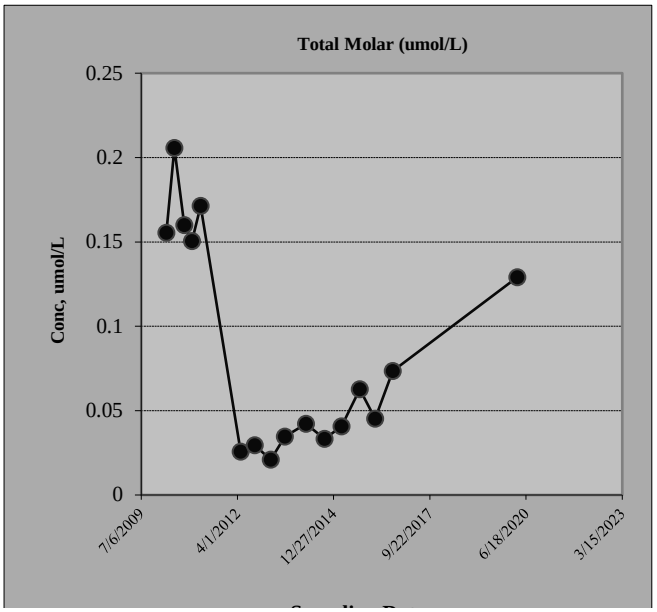
2. Mann-Kendall Non-parametric Statistical Test Results

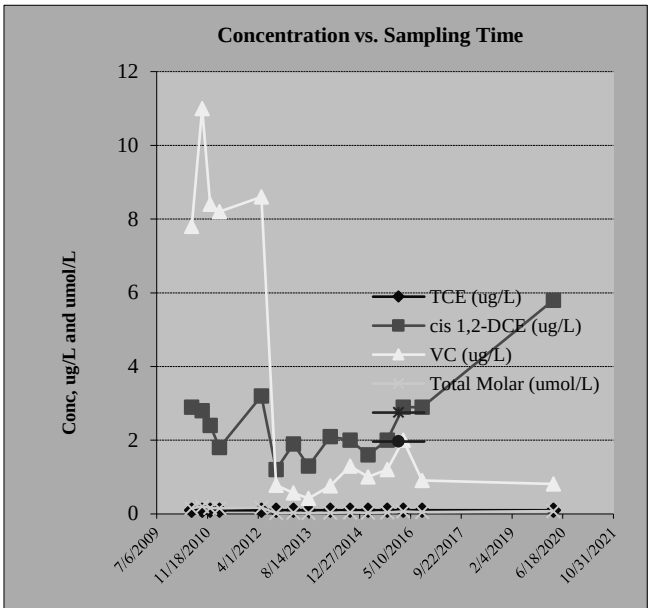
Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	48.20%	86.70%	88.60%	68.70%	NA	NA
Plume Stability?	Stable	***Expanding***	Shrinking	Stable	NA	NA
Coefficient of Variation?	CV <= 1			CV <= 1	n<4	n<4
Mann-Kendall Statistic "S" value?	0	26	-28	-12	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	0.10	2.83	3.52	0.09	NA	NA
Standard Deviation?	0.00	1.84	3.77	0.06	NA	NA
Coefficient of Variation?	0.00	0.65	1.07	0.74	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**

Plume Stability? **Stable**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CG-141-50**
Level of Confidence (Decision Criteria)? **85%**

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

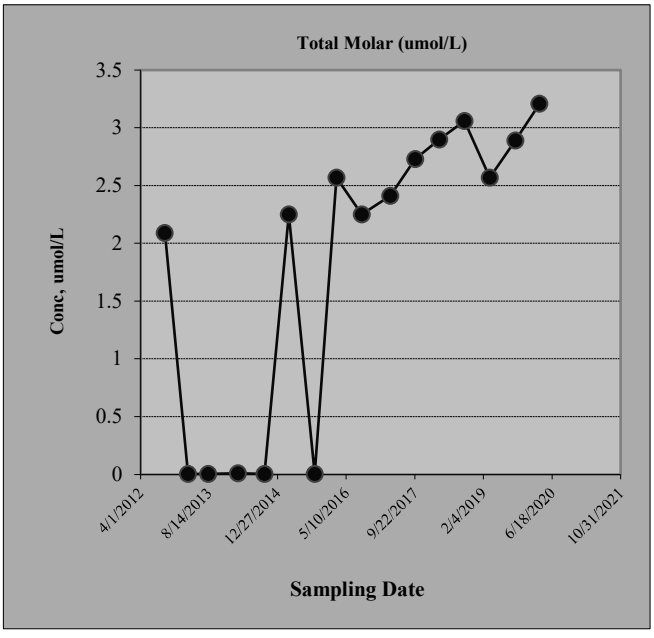
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	9/26/2012	0.5	0.5	130	2.089029035		
#2	3/13/2013	0.1	0.1	0.1	0.003392546		
#3	8/8/2013	0.1	0.1	0.1	0.003392546		
#4	3/13/2014	0.1	0.1	0.44	0.00883272		
#5	9/23/2014	0.1	0.1	0.1	0.003392546		
#6	3/18/2015	0.5	0.5	140	2.249034155		
#7	9/23/2015	0.1	0.1	0.1	0.003392546		
#8	3/1/2016	0.5	0.5	160	2.569044395		
#9	9/1/2016	0.5	0.5	140	2.249034155		
#10	3/28/2017	0.5	0.5	150	2.409039275		
#11	9/26/2017	0.5	0.5	170	2.729049515		
#12	3/20/2018	1	1	180	2.898017108		
#13	9/18/2018	1	1	190	3.058022228		
#14	3/22/2019	0.5	0.5	160	2.569044395		
#15	9/25/2019	0.5	0.5	180	2.889054636		
#16	3/18/2020	0.5	0.5	200	3.209064876		

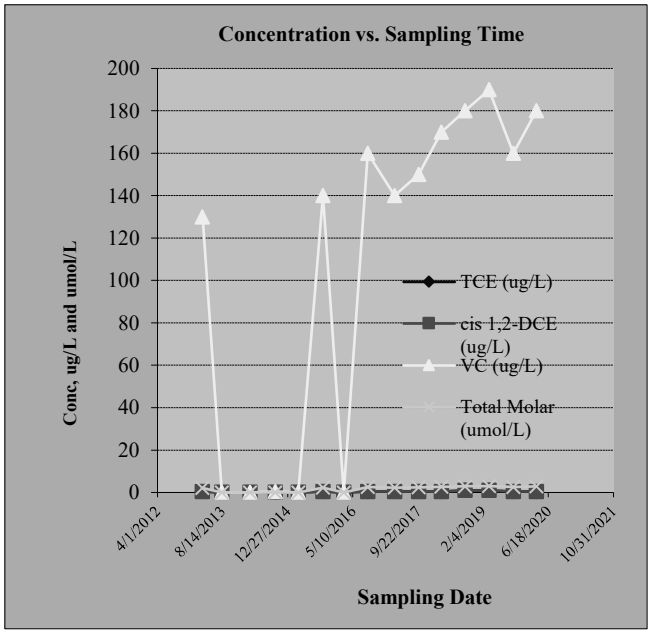
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	98.40%	98.40%	100.00%	100.00%	NA	NA
Plume Stability?	***Expanding***	***Expanding***	***Expanding***	***Expanding***	NA	NA
Coefficient of Variation?					n<4	n<4
Mann-Kendall Statistic "S" value?	49	49	83	82	0	0
Number of Sampling Rounds?	16	16	16	16	0	0
Average Concentration?	0.44	0.44	112.55	1.81	NA	NA
Standard Deviation?	0.29	0.29	80.38	1.29	NA	NA
Coefficient of Variation?	0.66	0.66	0.71	0.71	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Expanding**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-14-70**
Level of Confidence (Decision Criteria)? **85%**

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

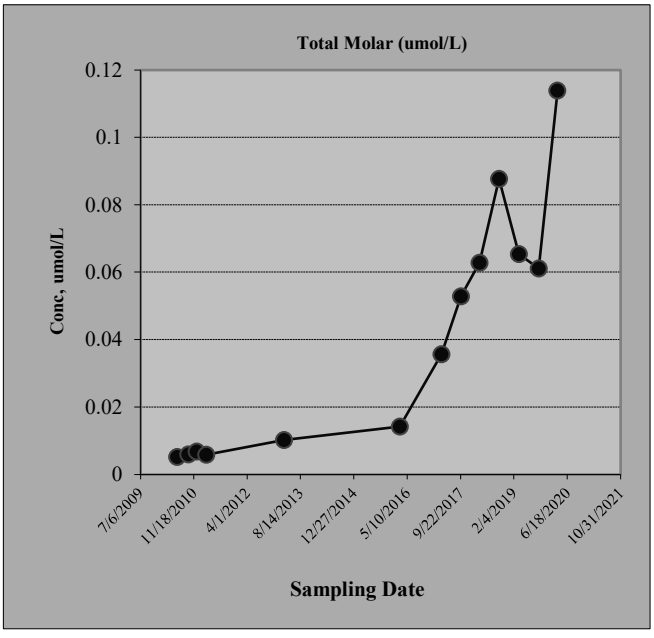
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	6/16/2010	0.1	0.1	0.21	0.005152602		
#2	9/28/2010	0.1	0.1	0.26	0.005952628		
#3	12/15/2010	0.1	0.1	0.31	0.006752653		
#4	3/15/2011	0.1	0.1	0.25	0.005792623		
#5	3/13/2013	0.1	0.28	0.41	0.010209332		
#6	3/1/2016	0.1	0.77	0.34	0.014143447		
#7	3/28/2017	0.1	2.2	0.76	0.035613533		
#8	9/26/2017	0.1	3.5	1	0.05286263		
#9	3/20/2018	0.1	4	1.3	0.062820081		
#10	9/18/2018	0.1	6.1	1.5	0.087680833		
#11	3/22/2019	0.1	4.4	1.2	0.065345868		
#12	9/25/2019	0.1	4.3	1	0.061114306		
#13	3/18/2020	0.1	7.4	2.3	0.113890217		
#14							
#15							
#16							

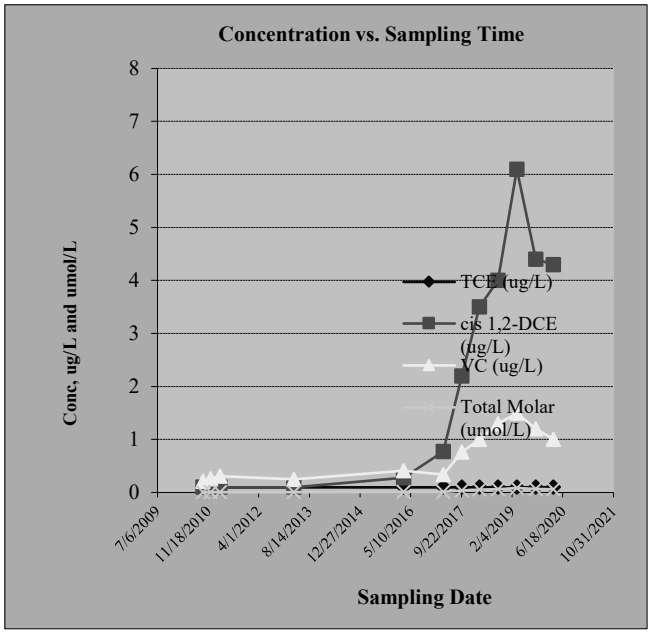
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	47.60%	100.00%	100.00%	100.00%	NA	NA
Plume Stability?	Stable	***Expanding***	***Expanding***	***Expanding***	NA	NA
Coefficient of Variation?	CV <= 1				n<4	n<4
Mann-Kendall Statistic "S" value?	0	66	61	66	0	0
Number of Sampling Rounds?	13	13	13	13	0	0
Average Concentration?	0.10	2.57	0.83	0.04	NA	NA
Standard Deviation?	0.00	2.55	0.63	0.04	NA	NA
Coefficient of Variation?	0.00	0.99	0.76	0.89	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Expanding**





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

Site Name:	*W4 SU2*
Site Address:	*Seattle, WA*
Additional Description:	*SU2 FS Addendum*

Well (Sampling) Location? **CI-10-65**
Level of Confidence (Decision Criteria)? **85%**

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

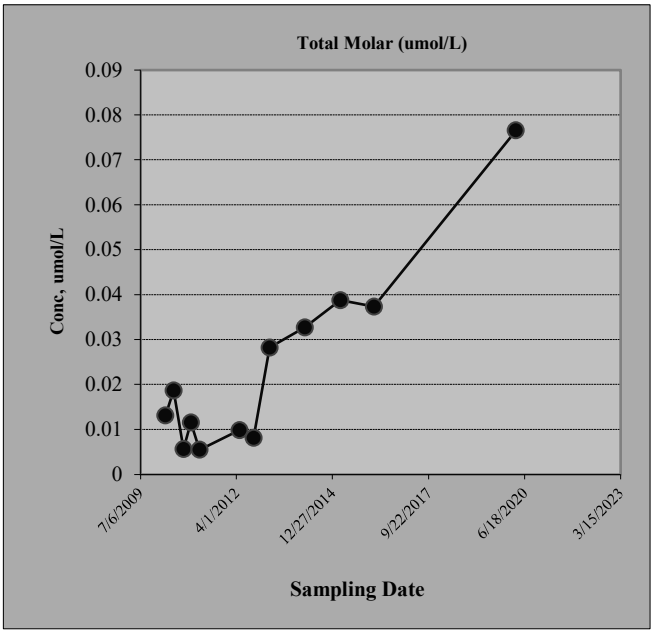
		Hazardous Substances					
Sampling Event	Date Sampled	TCE (ug/L)	cis 1,2-DCE (ug/L)	VC (ug/L)	Total Molar (umol/L)		
#1	3/24/2010	0.1	0.1	0.71	0.013152858		
#2	6/16/2010	0.1	0.26	0.95	0.018643316		
#3	9/28/2010	0.1	0.1	0.24	0.005632617		
#4	12/15/2010	0.1	0.1	0.61	0.011552807		
#5	3/15/2011	0.1	0.1	0.23	0.005472612		
#6	5/4/2012	0.1	0.31	0.37	0.009878749		
#7	9/26/2012	0.22	0.1	0.34	0.008145911		
#8	3/13/2013	0.29	0.66	1.2	0.028215249		
#9	3/13/2014	0.1	0.77	1.5	0.032704041		
#10	3/18/2015	0.1	0.89	1.8	0.038741946		
#11	3/1/2016	0.1	0.6	1.9	0.037350765		
#12	3/18/2020	0.1	1.3	3.9	0.076572006		
#13							
#14							
#15							
#16							

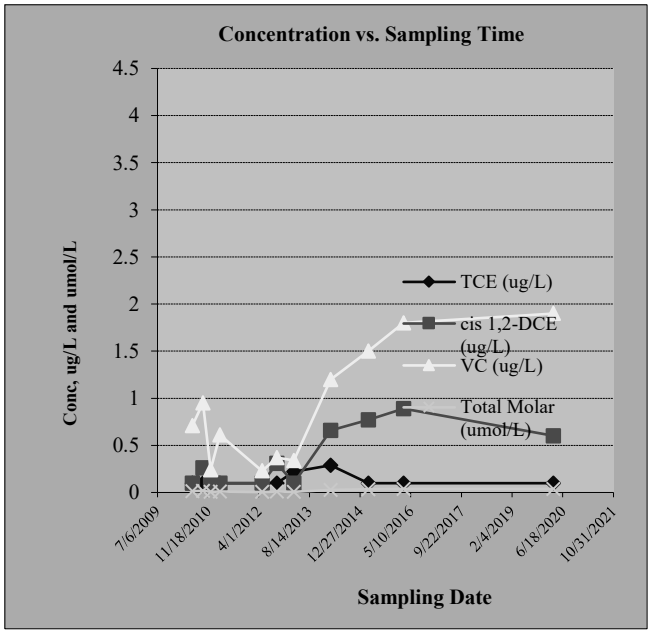
2. Mann-Kendall Non-parametric Statistical Test Results

Hazardous Substance?	**TCE (ug/L)**	**cis 1,2-DCE (ug/L)**	**VC (ug/L)**	**Total Molar (umol/L)**		
Confidence Level Calculated?	58.00%	99.70%	99.30%	99.00%	NA	NA
Plume Stability?	Stable	***Expanding***	***Expanding***	***Expanding***	NA	NA
Coefficient of Variation?	CV <= 1				n<4	n<4
Mann-Kendall Statistic "S" value?	5	40	36	34	0	0
Number of Sampling Rounds?	12	12	12	12	0	0
Average Concentration?	0.13	0.44	1.15	0.02	NA	NA
Standard Deviation?	0.06	0.40	1.05	0.02	NA	NA
Coefficient of Variation?	0.49	0.91	0.92	0.87	NA	NA
Blank if No Errors found					n<4	n<4

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

Hazardous substance? **Total Molar (umol/L)**
Plume Stability? **Expanding**





APPENDIX C
COST BASIS TABLES

WEST OF FOURTH SITE UNIT 2
FEASIBILITY STUDY ADDENDUM
West of Fourth Joint Agreed Order
Seattle, Washington

Farallon PN: 457-010

Table C1
Alternative 1R Cost Basis
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Alternative 1R Cost

Reporting

Description	Unit	Value	Details
Compliance Monitoring Plan	lump	$23,000	Describes Groundwater Monitoring Plan
Engineering Design Report	lump	$50,000	Plans and specifications for system installation
Remedial Action Completion Report	lump	$46,000	Documentation of remedial actions
Groundwater Monitoring Reports	lump	--	Included in groundwater monitoring costs, Table C3
Total Reporting Costs		**$119,000**	

Groundwater Monitoring

Description	Unit	Value	Details
Monitoring Well Replacements			
Well Replacement Cost	lump	$7,000	Minimum cost to replace 1 well in 2015 dollars
Number of Assumed Replacements	#	25	
Total Well Costs		**$175,000**	
Groundwater Monitoring Costs			
60 Years of Monitoring	lump	**$1,275,455**	From Table C3; includes NPV adjustment

Groundwater Treatment

Description	Unit	Value	Details
			Natural Attenuation, see Groundwater Monitoring

Soil Treatment

Description	Unit	Value	Details
Capital Industries Plant 4 (Includes Groundwater)			*SVE: vadose zone and WT Interval*
Soil Vapor Extraction			
Treatment Area Length	ft	100	See Figure4
Treatment Area Width	ft	115	
Treatment Area	sqft	11,500	
Area per SVE well	sqft	710	Assume about a 17 ft radius of influence with 20% overlap
Number of SVE Wells	#	16	
Cost Per SVE/Well	$/well	$5,250	
SVE Well Installation	lump	$84,000	Installation of 16 SVE wells
Mechanical & Installation	lump	$157,000	Blower assemblies, connections, installation costs
Emission Treatment (GAC)	lump	$35,700	Contingent carbon vapor treatment for emmission
5 Year O&M	lump	$195,500	20 hrs/month and $500 for electricity, carbon, parts
SVE Mechanical Sub Total		$472,200	Base cost for moderate sized AS/SVE not including wells
Site Specific Logistical Costs	lump	$17,000	See note 1
Construction Mangement	lump	$33,000	Oversite of SVE well and equipement installation
Total Cost	**$**	**$522,200**	Includes mechanical, installation, and O&M

Vapor Intrusion Mitigation

Description	Unit	Value	Details
Vapor Intrusion Mitigation and Monitoring			
Vapor Intrusion Mitigation and Monitoring	lump	$0	From Table C4 at 5 years; NPV adjusted.

Institutional Controls

Description	Unit	Value	Details
Institutional Controls			
Draft and File Environmental Covenant	lump	$17,250	Assumes covenant per source area.
Amend Lease Language	lump	$1,150	For tenants in Blaser facility
Sum of Institutional Controls		**$18,400**	

Cost Summary

Description	Unit	Value	Details
Sum of Direct Expenses	$	$2,110,055	
Contingency	%	25%	Contingency applies to uncertainty in costs above and does not include contingency for additional remedial action
Contingency Amount	$	$527,514	
Total Estimated Alternative Cost	**$**	**$2,640,000**	Rounded to nearest ten thousand dollars

Notes:

1 Indirect logistics costs associated with moving equipment, building modifications, etc. to accommodate the remedial action. Includes access costs for areas not located on PLP property.

2 https://frtr.gov/matrix2/section4/4-2.html

NPV: Net Present Value. See Table C3.

cy: cubic yard

Table C1
Alternative 1R Cost Basis
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Contingency Costs

Blaser Die Casting / Capital Industries / Burlington Environmental Down Gradient Area

Assessment and Reporting

Description	Unit	Value	Details
Contingency Assessment Investigation	lump	$50,000	Investigates requirement for implementing contingency
Contingency Assessment Report	lump	$23,000	Assesses need for contingency and proposed approach
Engineering Design Report	lump	$28,750	Targeted design report building on previous EDR.
Remedial Action Report	lump	$23,000	Describes implemenation of the contingency action
Total Reporting Costs		**$124,750**	

Groundwater Treatment

Description	Unit	Value	Details
Enhanced Anaerobic Biodegradation/In Situ Chemical Reduction General Costs			
Typical Cost per Cubic Yard	$/cy	$188	FRTR Range is 20 to 80 $/cy [2]; final value selected for consistency with 2016 SU1 FS cost estimates and multiplied 1.25x consistent with inflation between 2016 and 2022.
In Situ Chemical Reduction General Costs			
Materials Cost per Cubic Yard	$/cy	$115	0.5% by mass at $25/pound ZVI; 15.1 lbs ZVI per cy aquifer.
Installation Cost per Cubic Yard	$/cy	$173	Assumes 30 cy/day injection at $3,000/day incl. observation
Cost per Cubic Yard	$/cy	$288	Assumes multiple applications
BDC/CI/BE Downgradient Area (Adjacent to Slip 2)			
Treatment Area Length	ft	100	Line Length
Treatment Area Depth (thickness)	ft	20	Vertical Treatment Interval (assume 20-40 ft bgs)
Treatment Area Width	ft	15	Flow-path thickness of treatment zone
Treatment Volume	cy	1,111	
Site Specific Logistical Costs	lump	$11,500	See note 1
Cost Per Event	**$**	**$331,500**	
Total Cost	**$**	**$663,000**	**Assumes 2 events**

Assumed Contingency Placeholder Blaser Die Casting / Capital Industries / Burlington Environmental Down Gradient Area	**$788,000**	Rounded to nearest thousand dollars

Alternative 1R Contingency Costs (continued)

CG-141 Down Gradient Area

Assessment and Reporting

Description	Unit	Value	Details
Contingency Assessment Investigation	lump	$75,000	Investigates requirement for implementing contingency
Contingency Assessment Report	lump	$20,000	Assesses need for contingency and proposed approach
Engineering Design Report	lump	$25,000	Targeted design report building on previous EDR.
Remedial Action Report	lump	$20,000	Describes implemenation of the contingency action
Total Reporting Costs		**$140,000**	

Groundwater Treatment

Description	Unit	Value	Details
Enhanced Anaerobic Biodegradation/In Situ Chemical Reduction General Costs			
Typical Cost per Cubic Yard	$/cy	$188	FRTR Range is 20 to 80 $/cy [2]; final value selected for consistency with 2016 SU1 FS cost estimates and multiplied 1.25x consistent with inflation between 2016 and 2022.
CG-141 Area Downgradient Area			
Treatment Area Length	ft	175	Water Table and Shallow Intervals
Treatment Area Depth (thickness)	ft	20	Shallow and Intermediate Intervals
Treatment Area Width	ft	15	
Treatment Volume	cy	1,944	
Logistics	lump	$15,000	Access and see note 1
Cost Per Event	**$**	**$379,583**	
Total Cost	**$**	**$759,167**	**Assumes 2 events**

Assumed Contingency Placeholder CG-141 Down Gradient Area	**$899,000**	Rounded to nearest thousand dollars

Table C1
Alternative 1R Cost Basis
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Alternative 1R Cost

Reporting

Description	Unit	Value	Details
Compliance Monitoring Plan	lump	$23,000	Describes Groundwater Monitoring Plan
Engineering Design Report	lump	$50,000	Plans and specifications for system installation
Remedial Action Completion Report	lump	$46,000	Documentation of remedial actions
Groundwater Monitoring Reports	lump	--	Included in groundwater monitoring costs, Table C3
Total Reporting Costs		**$119,000**	

Groundwater Monitoring

Description	Unit	Value	Details
Monitoring Well Replacements			
Well Replacement Cost	lump	$7,000	Minimum cost to replace 1 well in 2015 dollars
Number of Assumed Replacements	#	25	
Total Well Costs		**$175,000**	
Groundwater Monitoring Costs			
60 Years of Monitoring	lump	**$1,275,455**	From Table C3; includes NPV adjustment

Groundwater Treatment

Description	Unit	Value	Details
			Natural Attenuation, see Groundwater Monitoring

Soil Treatment

Description	Unit	Value	Details
Capital Industries Plant 4 (Includes Groundwater)			*SVE: vadose zone and WT Interval*
Soil Vapor Extraction			
Treatment Area Length	ft	100	See Figure4
Treatment Area Width	ft	115	
Treatment Area	sqft	11,500	
Area per SVE well	sqft	710	Assume about a 17 ft radius of influence with 20% overlap
Number of SVE Wells	#	16	
Cost Per SVE/Well	$/well	$5,250	
SVE Well Installation	lump	$84,000	Installation of 16 SVE wells
Mechanical & Installation	lump	$157,000	Blower assemblies, connections, installation costs
Emission Treatment (GAC)	lump	$35,700	Contingent carbon vapor treatment for emmission
5 Year O&M	lump	$195,500	20 hrs/month and $500 for electricity, carbon, parts
SVE Mechanical Sub Total		$472,200	Base cost for moderate sized AS/SVE not including wells
Site Specific Logistical Costs	lump	$17,000	See note 1
Construction Mangement	lump	$33,000	Oversite of SVE well and equipement installation
Total Cost	**$**	**$522,200**	Includes mechanical, installation, and O&M

Vapor Intrusion Mitigation

Description	Unit	Value	Details
Vapor Intrusion Mitigation and Monitoring			
Vapor Intrusion Mitigation and Monitoring	lump	$0	From Table C4 at 5 years; NPV adjusted.

Institutional Controls

Description	Unit	Value	Details
Institutional Controls			
Draft and File Environmental Covenant	lump	$17,250	Assumes covenant per source area.
Amend Lease Language	lump	$1,150	For tenants in Blaser facility
Sum of Institutional Controls		**$18,400**	

Cost Summary

Description	Unit	Value	Details
Sum of Direct Expenses	$	$2,110,055	
Contingency	%	25%	Contingency applies to uncertainty in costs above and does not include contingency for additional remedial action
Contingency Amount	$	$527,514	
Total Estimated Alternative Cost	**$**	**$2,640,000**	Rounded to nearest ten thousand dollars

Notes:

1 Indirect logistics costs associated with moving equipment, building modifications, etc. to accommodate the remedial action. Includes access costs for areas not located on PLP property.

2 https://frtr.gov/matrix2/section4/4-2.html

NPV: Net Present Value. See Table C3.

cy: cubic yard

Table C1
Alternative 1R Cost Basis
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Contingency Costs

Blaser Die Casting / Capital Industries / Burlington Environmental Down Gradient Area

Assessment and Reporting

Description	Unit	Value	Details
Contingency Assessment Investigation	lump	$50,000	Investigates requirement for implementing contingency
Contingency Assessment Report	lump	$23,000	Assesses need for contingency and proposed approach
Engineering Design Report	lump	$28,750	Targeted design report building on previous EDR.
Remedial Action Report	lump	$23,000	Describes implemenation of the contingency action
Total Reporting Costs		**$124,750**	

Groundwater Treatment

Description	Unit	Value	Details
Enhanced Anaerobic Biodegradation/In Situ Chemical Reduction General Costs			
Typical Cost per Cubic Yard	$/cy	$188	FRTR Range is 20 to 80 $/cy [2]; final value selected for consistency with 2016 SU1 FS cost estimates and multiplied 1.25x consistent with inflation between 2016 and 2022.
In Situ Chemical Reduction General Costs			
Materials Cost per Cubic Yard	$/cy	$115	0.5% by mass at $25/pound ZVI; 15.1 lbs ZVI per cy aquifer.
Installation Cost per Cubic Yard	$/cy	$173	Assumes 30 cy/day injection at $3,000/day incl. observation
Cost per Cubic Yard	$/cy	$288	Assumes multiple applications
BDC/CI/BE Downgradient Area (Adjacent to Slip 2)			
Treatment Area Length	ft	100	Line Length
Treatment Area Depth (thickness)	ft	20	Vertical Treatment Interval (assume 20-40 ft bgs)
Treatment Area Width	ft	15	Flow-path thickness of treatment zone
Treatment Volume	cy	1,111	
Site Specific Logistical Costs	lump	$11,500	See note 1
Cost Per Event	**$**	**$331,500**	
Total Cost	**$**	**$663,000**	**Assumes 2 events**

Assumed Contingency Placeholder Blaser Die Casting / Capital Industries / Burlington Environmental Down Gradient Area	**$788,000**	Rounded to nearest thousand dollars

Alternative 1R Contingency Costs (continued)

CG-141 Down Gradient Area

Assessment and Reporting

Description	Unit	Value	Details
Contingency Assessment Investigation	lump	$75,000	Investigates requirement for implementing contingency
Contingency Assessment Report	lump	$20,000	Assesses need for contingency and proposed approach
Engineering Design Report	lump	$25,000	Targeted design report building on previous EDR.
Remedial Action Report	lump	$20,000	Describes implemenation of the contingency action
Total Reporting Costs		**$140,000**	

Groundwater Treatment

Description	Unit	Value	Details
Enhanced Anaerobic Biodegradation/In Situ Chemical Reduction General Costs			
Typical Cost per Cubic Yard	$/cy	$188	FRTR Range is 20 to 80 $/cy [2]; final value selected for consistency with 2016 SU1 FS cost estimates and multiplied 1.25x consistent with inflation between 2016 and 2022.
CG-141 Area Downgradient Area			
Treatment Area Length	ft	175	Water Table and Shallow Intervals
Treatment Area Depth (thickness)	ft	20	Shallow and Intermediate Intervals
Treatment Area Width	ft	15	
Treatment Volume	cy	1,944	
Logistics	lump	$15,000	Access and see note 1
Cost Per Event	**$**	**$379,583**	
Total Cost	**$**	**$759,167**	**Assumes 2 events**

Assumed Contingency Placeholder CG-141 Down Gradient Area	**$899,000**	Rounded to nearest thousand dollars

Table C1
Alternative 1R Cost Basis
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Alternative 1R Cost

Reporting

Description	Unit	Value	Details
Compliance Monitoring Plan	lump	$23,000	Describes Groundwater Monitoring Plan
Engineering Design Report	lump	$50,000	Plans and specifications for system installation
Remedial Action Completion Report	lump	$46,000	Documentation of remedial actions
Groundwater Monitoring Reports	lump	--	Included in groundwater monitoring costs, Table C3
Total Reporting Costs		**$119,000**	

Groundwater Monitoring

Description	Unit	Value	Details
Monitoring Well Replacements			
Well Replacement Cost	lump	$7,000	Minimum cost to replace 1 well in 2015 dollars
Number of Assumed Replacements	#	25	
Total Well Costs		**$175,000**	
Groundwater Monitoring Costs			
60 Years of Monitoring	lump	**$1,275,455**	From Table C3; includes NPV adjustment

Groundwater Treatment

Description	Unit	Value	Details
			Natural Attenuation, see Groundwater Monitoring

Soil Treatment

Description	Unit	Value	Details
Capital Industries Plant 4 (Includes Groundwater)			*SVE: vadose zone and WT Interval*
Soil Vapor Extraction			
Treatment Area Length	ft	100	See Figure4
Treatment Area Width	ft	115	
Treatment Area	sqft	11,500	
Area per SVE well	sqft	710	Assume about a 17 ft radius of influence with 20% overlap
Number of SVE Wells	#	16	
Cost Per SVE/Well	$/well	$5,250	
SVE Well Installation	lump	$84,000	Installation of 16 SVE wells
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SVE Mechanical Sub Total		$472,200	Base cost for moderate sized AS/SVE not including wells
Site Specific Logistical Costs	lump	$17,000	See note 1
Construction Mangement	lump	$33,000	Oversite of SVE well and equipement installation
Total Cost	**$**	**$522,200**	Includes mechanical, installation, and O&M

Vapor Intrusion Mitigation

Description	Unit	Value	Details
Vapor Intrusion Mitigation and Monitoring			
Vapor Intrusion Mitigation and Monitoring	lump	$0	From Table C4 at 5 years; NPV adjusted.

Institutional Controls

Description	Unit	Value	Details
Institutional Controls			
Draft and File Environmental Covenant	lump	$17,250	Assumes covenant per source area.
Amend Lease Language	lump	$1,150	For tenants in Blaser facility
Sum of Institutional Controls		**$18,400**	

Cost Summary

Description	Unit	Value	Details
Sum of Direct Expenses	$	$2,110,055	
Contingency	%	25%	Contingency applies to uncertainty in costs above and does not include contingency for additional remedial action
Contingency Amount	$	$527,514	
Total Estimated Alternative Cost	**$**	**$2,640,000**	Rounded to nearest ten thousand dollars

Notes:

1 Indirect logistics costs associated with moving equipment, building modifications, etc. to accommodate the remedial action. Includes access costs for areas not located on PLP property.

2 https://frtr.gov/matrix2/section4/4-2.html

NPV: Net Present Value. See Table C3.

cy: cubic yard

Table C1
Alternative 1R Cost Basis
West of 4th Avenue Group Site Unit 2
Seattle, Washington
Farallon PN: 457-010

Contingency Costs

Blaser Die Casting / Capital Industries / Burlington Environmental Down Gradient Area

Assessment and Reporting

Description	Unit	Value	Details
Contingency Assessment Investigation	lump	$50,000	Investigates requirement for implementing contingency
Contingency Assessment Report	lump	$23,000	Assesses need for contingency and proposed approach
Engineering Design Report	lump	$28,750	Targeted design report building on previous EDR.
Remedial Action Report	lump	$23,000	Describes implemenation of the contingency action
Total Reporting Costs		**$124,750**	

Groundwater Treatment

Description	Unit	Value	Details
Enhanced Anaerobic Biodegradation/In Situ Chemical Reduction General Costs			
Typical Cost per Cubic Yard	$/cy	$188	FRTR Range is 20 to 80 $/cy [2]; final value selected for consistency with 2016 SU1 FS cost estimates and multiplied 1.25x consistent with inflation between 2016 and 2022.
In Situ Chemical Reduction General Costs			
Materials Cost per Cubic Yard	$/cy	$115	0.5% by mass at $25/pound ZVI; 15.1 lbs ZVI per cy aquifer.
Installation Cost per Cubic Yard	$/cy	$173	Assumes 30 cy/day injection at $3,000/day incl. observation
Cost per Cubic Yard	$/cy	$288	Assumes multiple applications
BDC/CI/BE Downgradient Area (Adjacent to Slip 2)			
Treatment Area Length	ft	100	Line Length
Treatment Area Depth (thickness)	ft	20	Vertical Treatment Interval (assume 20-40 ft bgs)
Treatment Area Width	ft	15	Flow-path thickness of treatment zone
Treatment Volume	cy	1,111	
Site Specific Logistical Costs	lump	$11,500	See note 1
Cost Per Event	**$**	**$331,500**	
Total Cost	**$**	**$663,000**	**Assumes 2 events**

Assumed Contingency Placeholder Blaser Die Casting / Capital Industries / Burlington Environmental Down Gradient Area	**$788,000**	Rounded to nearest thousand dollars

Alternative 1R Contingency Costs (continued)

CG-141 Down Gradient Area

Assessment and Reporting

Description	Unit	Value	Details
Contingency Assessment Investigation	lump	$75,000	Investigates requirement for implementing contingency
Contingency Assessment Report	lump	$20,000	Assesses need for contingency and proposed approach
Engineering Design Report	lump	$25,000	Targeted design report building on previous EDR.
Remedial Action Report	lump	$20,000	Describes implemenation of the contingency action
Total Reporting Costs		**$140,000**	

Groundwater Treatment

Description	Unit	Value	Details
Enhanced Anaerobic Biodegradation/In Situ Chemical Reduction General Costs			
Typical Cost per Cubic Yard	$/cy	$188	FRTR Range is 20 to 80 $/cy [2]; final value selected for consistency with 2016 SU1 FS cost estimates and multiplied 1.25x consistent with inflation between 2016 and 2022.
CG-141 Area Downgradient Area			
Treatment Area Length	ft	175	Water Table and Shallow Intervals
Treatment Area Depth (thickness)	ft	20	Shallow and Intermediate Intervals
Treatment Area Width	ft	15	
Treatment Volume	cy	1,944	
Logistics	lump	$15,000	Access and see note 1
Cost Per Event	**$**	**$379,583**	
Total Cost	**$**	**$759,167**	**Assumes 2 events**

Assumed Contingency Placeholder CG-141 Down Gradient Area	**$899,000**	Rounded to nearest thousand dollars