



Periodic Review Frederickson Industrial Park

**18001 Canyon Road East, Puyallup, Pierce County
Facility Site ID: 1301, Cleanup Site ID: 3557**

Toxics Cleanup Program, Southwest Region

Washington State Department of Ecology
Lacey, Washington

May 22, 2025

Document Information

This document is available on the Department of Ecology's [Frederickson Industrial Park cleanup site page](#).¹

Related Information

- Facility Site ID: 1301
- Cleanup Site ID: 3557

Contact Information

Toxics Cleanup Program

Southwest Regional Office
Cam Penner-Ash, Formal Site Manager
300 Desmond Drive Southeast,
Lacey, WA 98503
Email: cam.penner-ash@ecy.wa.gov
Phone: 360-999-9590

Website: [Washington State Department of Ecology](#)²

ADA Accessibility

The Department of Ecology is committed to providing people with disabilities access to information and services by meeting or exceeding the requirements of the Americans with Disabilities Act (ADA), Section 504 and 508 of the Rehabilitation Act, and Washington State Policy #188.

To request an ADA accommodation, contact the Ecology ADA Coordinator by phone at 360-407-6831 or email at ecyadacoordinator@ecy.wa.gov. For Washington Relay Service or TTY call 711 or 877-833-6341. Visit [Ecology's website](#)³ for more information.

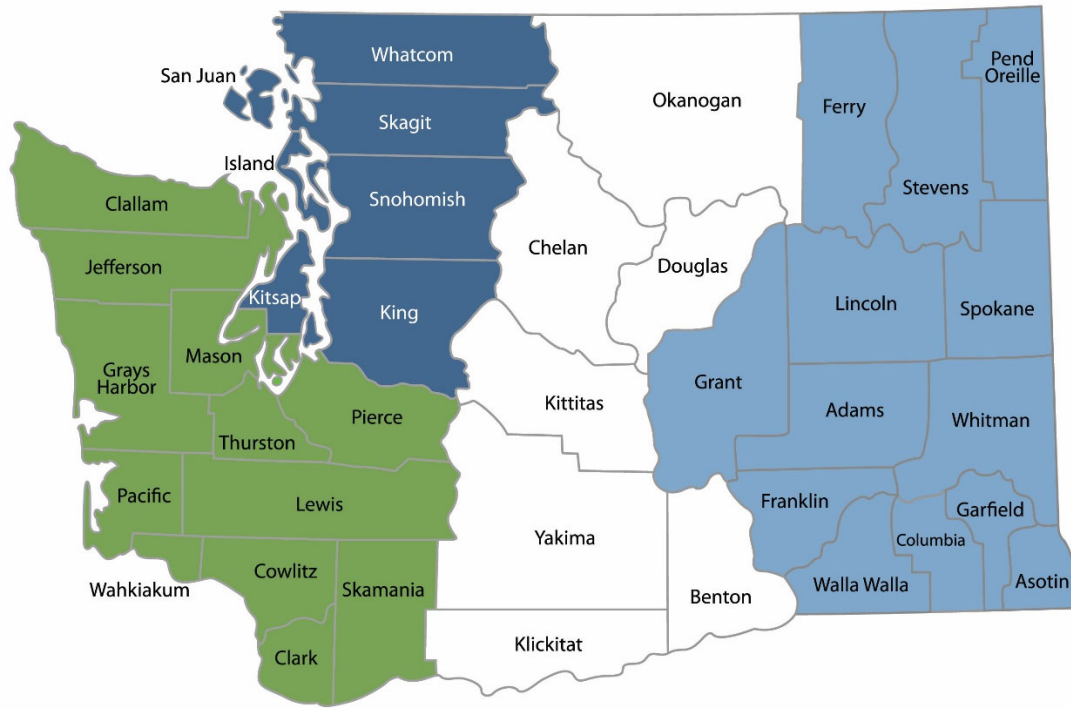
¹ <https://apps.ecology.wa.gov/cleanupsearch/site/3557>

² <https://ecology.wa.gov/About-us/Who-we-are/Our-Programs/Toxics-Cleanup>

³ <https://ecology.wa.gov/About-us/Accountability-transparency/Our-website/Accessibility>

Department of Ecology's Regional Offices

Map of Counties Served



Southwest Region 360-407-6300	Northwest Region 206-594-0000	Central Region 509-575-2490	Eastern Region 509-329-3400
----------------------------------	----------------------------------	--------------------------------	--------------------------------

Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

Table of Contents

Introduction.....	1
Summary of Site Conditions	2
Site description, property description and history	2
Site investigations	3
Cleanup actions	3
Groundwater monitoring.....	3
Cleanup standards	4
Environmental Covenant	4
Periodic Review	5
Effectiveness of completed cleanup actions	5
New scientific information for individual hazardous substances or mixtures present at the Site	7
New applicable state and federal laws for hazardous substances present at the Site.....	7
Current and projected Site and resource uses	7
Availability and practicability of more permanent remedies	7
Availability of improved analytical techniques to evaluate compliance with cleanup levels.....	7
Conclusions.....	8
Next review	8
References.....	9
Tables.....	10
Figures.....	14
Appendix A. Vicinity Map.....	15
Appendix B. Site Plan and Groundwater Levels.....	16
Appendix C. Site Plan and CTC Concentration	17
Appendix D. Photo Log.....	18
Photo 1: Monitoring Well MW-1 (facing west).....	18
Photo 2: Monitoring Well BMW-3 (facing west)	18
Photo 3: Monitoring Well HLA-1 (facing east)	19
Photo 4: Boeing Monitoring Wells Not Used for CTC Monitoring (facing south)	19
Photo 5: Monitoring Well BMW-18 (facing south)	20
Photo 6: Empty Field in Front of Boeing Facility (facing north)	20
Photo 7: Monitoring Well BMW-3 (facing southeast)	21
Photo 8: Monitoring Well BMW-18 (facing east)	21
Photo 9: Monitoring Well MW-1 (facing east).....	22
Photo 10: Monitoring Well 11-BL (facing northwest).....	22
Photo 11: Boeing Facility Entrance (facing north)	23
Photo 12: Boeing Gate F5, Road to Monitoring Well MW-4 (facing west).....	23
Photo 13: East of Boeing Gate F5, Grading Associated with New Warehouse Construction (facing east)	24

Photo 14: East of Boeing Gate F5, Grading Associated with New Warehouse Construction (facing southeast) ...	24
Photo 15: Monitoring Well MW-13 (facing southwest)	25
Photo 16: Monitoring Well P-2S, Located in Wooded Area (facing south)	25
Photo 17: Additional Grading Occurring on Recently Sold Boeing Parcels, Warehouse Construction (facing southwest, 70 th Ave E)	26
Photo 18: Eastern Construction Entrance for Warehouse Construction on Recently Sold Boeing Parcels (facing southwest)	26

Introduction

The Washington State Department of Ecology (Ecology) reviewed post-cleanup site conditions and monitoring data to ensure human health and the environment are being protected at the Frederickson Industrial Park cleanup site (Site). Site cleanup was implemented under the Model Toxics Control Act (MTCA) regulations, Chapter 173-340 Washington Administrative Code (WAC). This is the first periodic review conducted for this Site.

Cleanup activities at this Site were completed under an agreed order. Residual concentrations of carbon tetrachloride (CTC) that exceeded MTCA cleanup levels remain on the property. The MTCA cleanup levels for groundwater are established under [WAC 173-340-720](#)⁴.

Ecology determined institutional controls in the form of an environmental covenant (Covenant) and the Pierce County Urban Growth Area well installation restriction would be required as part of the cleanup action for the Site. [WAC 173-340-420\(2\)](#)⁵ requires Ecology to conduct a periodic review of certain sites every five years. For this Site, a periodic review is required because the department approved the cleanup action under an agreed order and institutional controls are required as part of the cleanup action.

When evaluating whether human health and the environment are being protected, Ecology must consider the following factors (WAC 173-340-420(4)):

- a) The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls in limiting exposure to hazardous substances remaining at the site
- b) New scientific information for individual hazardous substances or mixtures present at the site
- c) New applicable state and federal laws for hazardous substances present at the site
- d) Current and projected site and resource uses
- e) The availability and practicability of more permanent remedies
- f) The availability of improved analytical techniques to evaluate compliance with cleanup levels

For an ecology-conducted or an ecology-supervised review report in accordance with [WAC 173-340-600\(20\)](#)⁶, the department will provide public notice of a draft periodic review report in

⁴ <https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-720>

⁵ <https://app.leg.wa.gov/wac/default.aspx?cite=173-340-420>

⁶ <https://app.leg.wa.gov/wac/default.aspx?cite=173-340-600>

accordance with [WAC 173-340-600\(18\)](https://app.leg.wa.gov/wac/default.aspx?cite=173-340-600)⁷; and notify all potentially liable person known to the department of the results of the periodic review.

Summary of Site Conditions

Site description, property description and history

The Site is referred to as the Frederickson Industrial Park and is located south of Military Road East and east of Canyon Road East in the Frederickson area of Pierce County, Washington (Appendix A). The Site consists of a mixture of industrial, residential, and commercial properties. The Properties are generally referred to as the parcels which make up the Frederickson Industrial Center (Pierce County Tax Parcels 0419311023, 0419314026, 0418061018, 041806101, and 041931205 [Pierce County, 2025]). The Properties include the Boeing Frederickson Fabrication Division (BFFD) aircraft manufacturing plant and two parcels which are currently being redeveloped by Panattoni Development Company (Panattoni). The two parcels were sold to Panattoni in September of 2021 and were regraded in anticipation of warehouse construction. As of early 2025, satellite imaging indicates four large warehouses have been constructed on the Property surrounding the existing BFFD plant. While Boeing is the current owner of the BFFD property, Olin Corporation (Olin) and Mallicknrodt US Holdings LLC (Mallicknrodt) are the successors of the former owners of the Properties.

From 1936/1937 to 1976, the Site and surrounding properties operated as an explosives and propellants plant that manufactured trinitrotoluene (TNT), research department explosive (RDX), and nitrocellulose-based propellants (Vertex Companies, LLC [Vertex], 2022). All of which were used for small arms and artillery. Between approximately 1976 and 1986, the Site was operated as a sawmill. In 1987, Centrum Properties (Centrum) purchased the properties with the intent of developing the area into an industrial park. Centrum sold the properties to Boeing in 1990, but Boeing did not conduct any industrial operations at the Site. Although Boeing did not conduct any industrial activities on the properties formally owned by Centrum, in the early 1980s they developed the BFFD aircraft manufacturing plant on the adjacent property that the Site encircles (Vertex, 2022). Vertex produced a Phase I Environmental Site Assessment (ESA) Report, dated August 24, 2021, which includes a more detailed history of the Site and surrounding properties.

A vicinity map is included as Appendix A. Site plans are included as Appendices B and C.

⁷ <https://app.leg.wa.gov/wac/default.aspx?cite=173-340-600>

Site investigations

Numerous site investigations have been conducted at the Site since the initial Ecology site inspection in 1988. Over a dozen reports have been produced by various consultants over the years, outlining and describing site investigations at the Site. For more detailed site investigation information please refer to the Remedial Investigation/Feasibility Study (RI/FS), Frederickson Industrial Park, dated March 28, 2012 (Geosyntec, 2012) and the Draft Cleanup Action Plan (CAP), Frederickson Industrial Park, dated November 2013 (Geosyntec, 2013). Two remedial investigation documents were produced in this project's lifetime, a Phase 1 RI/FS and eventually a Phase 2 RI/FS (cited above). As more groundwater, soil and air data was collected at the Site, initial investigation phases were determined to be needed. In total, the remedial investigation phase of the project lasted from 1989 and was completed in 2013 with the finalization of the CAP.

Cleanup actions

A source for the CTC in groundwater was never fully understood during source area excavations and removals. Various excavations, treatments, and debris removals occurred throughout the years targeting multiple constituents, not specifically CTC, potentially abating any potential source for CTC and eliminating any other constituents. In a 2014 Agreed Order (DE 9514), Ecology and the Olin Corporation (Olin) and Mallinckrodt US LLC (the Companies) agreed to provide for the remediation of CTC in groundwater at and downgradient of the Properties. The Agreed Order and attached Cleanup Action Plan, outlined the Ecology-approved remedy of monitored natural attenuation (MNA) to address CTC in groundwater. The "Groundwater monitoring" section of this report outlines the MNA performance monitoring in more depth.

Groundwater monitoring

The Compliance Monitoring Work Plan (CMWP), dated September 2013, outlines requirements for MNA compliance monitoring. Compliance monitoring for the Site consists of performance monitoring to track MNA, followed by confirmation monitoring to confirm compliance with applicable cleanup standards (MTCA Method B). In accordance with WAC 173-340-720(9)(c)(iv) and the CMWP, the performance monitoring well network was reduced from 11 groundwater monitoring wells to eight groundwater monitoring wells. On April 6, 2018, Ecology (ECY) approved the use of passive diffusion bags (PDBs) based on information provided by the Potential Liable Party's (PLP's) consultant which demonstrated that PDBs were just as effective as traditional sampling methods. In 2022, ECY approved a reduction in frequency of monitoring at the Site, reducing the monitoring schedule from annual to every 18 months.

Current groundwater monitoring at the Site consists of sampling eight groundwater monitoring wells located throughout the Site. This periodic review will evaluate groundwater monitoring results collected during the most recent sampling event, which occurred in November of 2022. The November 2022 event was the first monitoring event to occur on the new reduced

monitoring schedule. The next groundwater monitoring event is currently planned for the second quarter of 2024.

Cleanup standards

Cleanup standards include cleanup levels, the location where these cleanup levels must be met (point of compliance), and any other regulatory requirements that apply to the Site.

[WAC 173-340-704](https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-704)⁸ states MTCA Method A may be used to establish cleanup levels at sites that have few hazardous substances, are undergoing a routine cleanup action, and where numerical standards are available for all indicator hazardous substances in the media for which the Method A cleanup level is being used. Method B may be used at any site and is the most common method for setting cleanup levels when sites are contaminated with substances not listed under Method A. Method C cleanup levels may be used to set soil and air cleanup levels at industrial sites.

MTCA Method B cleanup levels were determined to be appropriate for contaminants at this Site. The cleanup actions conducted at the Site were determined to be the most stringent applicable or relevant and appropriate requirement (ARAR) for CTC in groundwater.

Environmental Covenant

Ecology determined that institutional controls would be required as part of the cleanup action to document the remaining contamination, protect the cleanup action, and protect human health and the environment. On August 1, 2014, institutional controls in the form of an [Covenant](https://apps.ecology.wa.gov/cleanupsearch/document/29150)⁹ were recorded for the Site. Though some parcel boundaries have been altered since its creation, the Covenant encompasses portions of the BFFD parcel, portions of the southernmost Panattoni parcel, and all of the northwestern Panattoni parcel. The Covenant was noted and attached to the 2023 Bargain and Sale Deed provided by Boeing.

The Covenant recorded for the Site imposes the following limitations:

1. **Interference with Remedial Action.** The Grantor shall not engage in any activity on the Property that may impact or interfere with the remedial action and any operation, maintenance, inspection or monitoring of that remedial action without prior written approval from Ecology.
2. **Protection of Human Health and the Environment.** The Grantor shall not engage in any activity on the Property that may threaten continued protection of human health or the environment without prior written approval from Ecology. This includes, but is not limited to, any activity that results in the release of residual contamination that was contained as a part of the remedial action or that exacerbates or creates a new exposure to residual contamination remaining on the Property.

⁸ <https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-704>

⁹ <https://apps.ecology.wa.gov/cleanupsearch/document/29150>

3. **Continued Compliance Required.** Grantor shall not convey any interest in any portion of the Property without providing for the continued adequate and complete operation, maintenance and monitoring of remedial actions and continued compliance with this Covenant.
4. **Leases.** Grantor shall restrict any lease for any portion of the Property to uses and activities consistent with this Covenant and notify all lessees of the restrictions on the use of the Property.
5. **Amendment to the Covenant.** Grantor must notify and obtain approval from Ecology at least sixty (60) days in advance of any proposed activity or use of the Property in a manner that is inconsistent with this Covenant. Before approving any proposal, Ecology must issue a public notice and provide an opportunity for the public to comment on the proposal. If Ecology approves the proposal, the Covenant will be amended to reflect the change.
6. **Groundwater Use.** The groundwater beneath the Property remains contaminated and shall not be extracted for any purpose other than temporary construction dewatering, investigation, monitoring, or remediation. Drilling of a well for any water supply purpose is strictly prohibited. Groundwater extracted for any purpose shall be considered potentially contaminated and any discharge of this water shall be done in accordance with state and federal law.
7. **Monitoring.** Several groundwater monitoring wells are located on the Property to monitor the performance of the remedial action. The Granter shall maintain clear access to these devices and protect them from damage. The Grantor shall report to Ecology within forty-eight (48) hours of the discovery of any damage to any monitoring device. Unless Ecology approves of an alternative plan in writing, the Grantor shall promptly repair the damage and submit a report documenting this work to Ecology within thirty (30) days of completing the repairs.

Periodic Review

Effectiveness of completed cleanup actions

On November 28, 2023, Ecology conducted a Site visit with a Boeing representative, a member of Olin, and a member of Geosyntec Consultants (Geosyntec). The Site visit included a brief tour around accessible buildings, a visit to all wells currently being monitored, and other miscellaneous locations of interest. Some wells, which are currently monitored, were inaccessible due to fencing or vegetation. Monitoring wells are still successfully sampled each year. Due to BFFD's security requirements, no access to inside buildings was allowed. The main section of the Site is currently operating as one of Boeing's composite manufacturing facilities. The Boeing facility produces a variety of parts for their commercial airplane production. In late-2023, Boeing altered the property boundary of the parcels surrounding the main Boeing facility

and transferred the titles to two parcels adjacent to the BFFD facility to Panattoni Development Company, Inc. (Panattoni). As of early 2025, satellite imaging indicates four large warehouses have been constructed on the Property surrounding the existing BFFD plant. During the 2023 site visit, due to access constraints, photos of the regrading and warehouse construction were taken from outside the work zones. A photo log is attached as Appendix D.

Groundwater monitoring results

Eight groundwater monitoring wells were sampled on November 8th, 2022 using PDB sampling methods (Tables 3 and 4). This event is currently the most recent groundwater sampling event at the time of this report. All eight samples were analyzed for CTC by ALS Laboratories of Kelso, WA. CTC was detected in all eight wells at concentrations ranging from 0.17 to 3.0 ug/L. Of these results, five wells (11-CL, HLA-1, BMW-18, MW-1, and MW-13) exceeded CTC's MTCA Method B cleanup level of 0.63 ug/L. CTC concentrations declined in all eight wells indicating that MNA continues to effectively reduce CTC concentrations in groundwater.

Groundwater elevation data collected on November 8th, 2022, indicates that the shallow aquifer (Aquifer A) continues to maintain a north-northwest gradient towards Clover Creek (Table 2; Geosyntec, 2023). This observation is consistent with historical monitoring events at the Site.

Direct contact

The cleanup actions were intended to eliminate exposure to contaminated groundwater at the Site. In accordance with the Site's Covenant, groundwater beneath the Site remains contaminated and shall not be extracted for any purpose other than temporary construction dewatering, investigation, monitoring, or remediation. Drilling of a well for any water supply purpose is strictly prohibited at the Site. The Covenant appears to be successfully restricting unpermitted use of the Site's contaminated groundwater. Boeing and other operators at the Site have frequently and correctly updated Ecology when parcels have been transferred, ensuring that the environmental covenant has been transferred along with the associated deed.

Protection of groundwater

During the remedial investigation phase of the cleanup, it was determined that soils in the potential source areas were not acting as a source for CTC in groundwater. Using the highest soil gas detections observed in the potential source areas, it was estimated that soil concentrations of CTC would still be less than the most conservative soil screening levels available at the time (Geosyntec, 2012). At this time, no known soil remains at the Site with concentrations greater than the CTC cleanup level.

Institutional controls

Institutional controls in the form of a Covenant were implemented at the Site in 2014. The Covenant remains active and discoverable through the Pierce County Auditor's Office (Document#:201408010306). Ecology found no evidence a new instrument has been recorded

that limits the effectiveness or applicability of the Covenant. This Covenant prohibits activities that will result in the release of contaminants contained as part of the cleanup action and prohibits any use of the property that is inconsistent with the Covenant, unless approved by Ecology in advance. This Covenant ensures the long-term integrity of the cleanup action will be protected.

New scientific information for individual hazardous substances or mixtures present at the Site

There is no new relevant scientific information for the hazardous substances remaining at the Site.

New applicable state and federal laws for hazardous substances present at the Site

There are no new applicable or relevant state or federal laws for hazardous substances remaining at the Site.

Current and projected Site and resource uses

The Properties are used for commercial and industrial purposes. Though the Property's parcel boundaries have been adjusted and parcels sold, the anticipated use is still commercial and/or industrial. There have been no changes in current or projected future Site or resource uses. The current Site use is not likely to have a negative impact on the protectiveness of the cleanup action. The current Site boundaries still reside within a primarily industrial, mixed-use, and vacant wooded area.

Availability and practicability of more permanent remedies

The remedy implemented included MNA and the Covenant, and it continues to be protective of human health and the environment. While more permanent remedies may be available, they are still not practicable at this Site.

Availability of improved analytical techniques to evaluate compliance with cleanup levels

The analytical methods used at the time of the cleanup action were capable of detection below the selected MTCA cleanup levels. The presence of improved analytical techniques would not affect decisions or recommendations made for the Site.

Conclusions

- The cleanup actions completed at the Site appear to be protective of human health and the environment.
- Groundwater compliance monitoring at the Site indicates concentrations of CTC continue to decline (Table 4, Figure 1).
- The Covenant for the property is in place and is effective in protecting human health and the environment from exposure to hazardous substances and the integrity of the cleanup action.

Based on this periodic review, Ecology has determined the requirements of the Covenant and the Pierce County Urban Growth Area well installation restriction is being followed. No additional cleanup actions are required by the property owner currently. The property owner is responsible for continuing to inspect and monitor the Site to ensure the integrity of the cleanup action is maintained and monitored.

Next review

Ecology will schedule the next review for the Site five years from the date of this periodic review. If additional cleanup actions or institutional controls are required, the next periodic review will be scheduled five years after those activities are completed.

References

Conestoga-Rovers & Associates (CRA). "Task 5: Technical Memorandum No. 1." August 1, 1999.

CRA. "Technical Memorandum No. 2." February 2, 2000.

CRA. "Task 8: Groundwater Investigation (Update). March 27, 2001.

CRA. "Task 8: Groundwater Investigation (Update: Use of Existing Residential Wells as Long-Term Monitoring Points). February 1, 2002.

CRA. "Task 8: Groundwater Investigation (Update-Third Round Monitoring Program Results." April 23, 2003.

Crosby and Overton. "Report on Groundwater Sampling Study Done on Lot 9, Centrum Properties, Frederickson Area, Pierce County Washington." April 7, 1989.

Geosyntec Consultants (Geosyntec). "Remedial Investigation / Feasibility Study (RI/FS), Frederickson Industrial Park." March 28, 2012.

Geosyntec. "Draft Cleanup Action Plan, Frederickson Industrial Park." November 2013.

Geosyntec. "Ninth Compliance Groundwater Monitoring Report." April 10, 2023.

Landau Associates (Landau). "Work Plan RE22-2 Soil TPH Investigation, Boeing Frederickson Fabrication Facility." May 1, 2012.

Pierce County. Publicis: Tax Parcel Search. Accessed: August 30, 2023.

Vertex Companies, LLC. (Vertex). "Topsoil Characterization Report." August 5, 2022.

Vertex. "Phase I Environmental Site Assessment Report." August 24, 2022.

Washington State Department of Ecology (Ecology). Environmental Covenant. August 1, 2014.

Ecology. Site visit. November 28, 2023.

Tables

Table 1. Cleanup levels for groundwater contaminants

Contaminant	Groundwater cleanup level (µg/L)
Carbon Tetrachloride	0.63

Notes:

NA = not applicable

µg/L = micrograms per liter

Table 2. Performance Monitoring for 2022 Groundwater Sampling Event Water Level Data, Frederickson Industrial Park (Geosyntec, 2013)

Well	Ground Elevation (ft MSL)	Top of Casing Elevation (MSL)	Top of Screen (MSL)	Bottom of Screen (MSL)	Aquifer	Sample Date	Depth to Water (ft)	Water Level (MSL)
11-BL	395.5	396.08	331.5	321.5	Lower - Aquifer A	11/22/2022	42.99	353.09
11-CL	403.69	404.55	329.7	319.7	Lower - Aquifer A	11/22/2022	48.65	355.90
BMW-18	409.74	412.09	375.7	345.7	Upper - Aquifer A	11/22/2022	48.05	364.04
HLA-1	403.86	405.81	320.9	310.9	Lower - Aquifer A	11/22/2022	49.95	355.86
MW-1	413.27	415.79	324.8	314.8	Lower - Aquifer A	11/22/2022	48.35	367.44
MW-4	465.5	467.72	317.9	307.9	Aquifer A	11/22/2022	120.85	346.87
P2-S	340.55	343.6	320.6	310.6	Upper - Aquifer A	11/22/2022	16.45	327.15
MW-13	394.5	394.1	284.5	274.5	Aquifer A	11/22/2022	55.85	338.25

Notes:

ft = feet

MSL = Mean Sea Level

Table 3. Carbon Tetrachloride Results for 2022, Frederickson Industrial Park (Geosyntec, 2013)

Well	PDB Deployment Date	Sample Date	Result (µg/L)	Lab MRL	Lab MDL	Qualifiers	Depth to Water (ft)	Water Level (MSL)
11-BL	11/8/2022	11/22/2022	0.31	0.5	0.096	J	42.99	353.09
11-CL	11/8/2022	11/22/2022	3.0	0.5	0.096		48.65	355.90
BMW-18	11/8/2022	11/22/2022	2.4	0.5	0.096		48.05	364.04
HLA-1	11/8/2022	11/22/2022	3.0	0.5	0.096		49.95	355.86
MW-1	11/8/2022	11/22/2022	0.99	0.5	0.096		48.35	367.44
MW-4	11/8/2022	11/22/2022	0.46	0.5	0.096	J	120.85	346.87
P2-S	11/8/2022	11/22/2022	0.17	0.5	0.096	J	16.45	327.15
MW-13	11/8/2022	11/22/2022	1.3	0.5	0.096		55.85	338.25

Notes:

BOLD = Carbon Tetrachloride value above MTCA Method B groundwater cleanup level of 0.63 µg/L

µg/L = micrograms per liter

ft = feet

MRL = Method Reporting Limit

MDL = Method Detection Limit

MSL = Mean Sea Level

Laboratory Qualifiers:

J = Carbon Tetrachloride detected between the MDL and the MRL (MRL: 0.5 µg/L). The reported value is estimated.

Table 4. 2014-2022 Carbon Tetrachloride Groundwater Performance Monitoring Data, Frederickson Industrial Park (Geosyntec, 2013)

Wells¹	11-BL (µg/L)	11-CL (µg/L)	HLA-1 (µg/L)	BMW-3 (µg/L)	BMW-18 (µg/L)	MW-1 (µg/L)	MW-4 (µg/L)	MW-7 (µg/L)	P2-S (µg/L)	P2-I (µg/L)	MW-13 (µg/L)
May-14	0.97	5.4	5.0	<i>0.28</i>	5.5	1.8	0.82	2.3	0.76	0.72	2.3
Oct-14	0.95	4.4	4.6	<i>0.39</i>	4.8	1.4	0.66	ND	ND	ND	1.9
Mar-15	0.64	4.3	4.4	<i>0.19</i>	4.2	1.5	<i>0.62</i>	<i>0.22</i>	<i>0.29</i>	ND	1.9
Oct-15	0.72	3.8	3.9	<i>0.51</i>	3.8	1.2	<i>0.53</i>	<i>0.24</i>	<i>0.45</i>	ND	1.7
May-16	<i>0.50</i>	2.9	3.6	<i>0.27</i>	3.7	1.5	<i>0.51</i>	ND	<i>0.28</i>	ND	1.3
Jun-17	0.74	3.7	4.4	<i>0.43</i>	4.7	1.8	0.67	ND	<i>0.27</i>	ND	1.6
May-18	<i>0.51</i>	4.1	4.5	--	3.4	2.1	0.67	--	<i>0.36</i>	--	1.8
May-19	0.89	4.4	4.6	--	3.5	1.7	0.67	--	<i>0.37</i>	--	2.0
May-20	<i>0.38</i>	3.2	3.8	--	2.5	1.3	<i>0.58</i>	--	<i>0.36</i>	--	1.7
April-21	<i>0.33</i>	4.1	4.0	--	2.9	1.3	0.65	--	<i>0.35</i>	--	1.5
Nov-22	<i>0.31</i>	3.0	3.0	--	2.4	0.99	<i>0.46</i>	--	<i>0.17</i>	--	1.3
95% UCL ²	0.89	4.4	4.6	--	3.5	1.7	0.67	--	<i>0.37</i>	--	2.0

Notes:

1 = Groundwater sampling prior to 2018 was performed by low-flow method; use of passive diffusion bags for sampling began in 2018.

2 = 95% Upper Confidence Limit on true mean, using Ecology's Statistical Guidance for sample sets less than 20 (Example #15, page 97-98)

<https://fortress.wa.gov/ecy/publications/documents/9254.pdf>

µg/L = micrograms per liter

BOLD = Bold values are above the carbon tetrachloride cleanup level of 0.63 µg/L

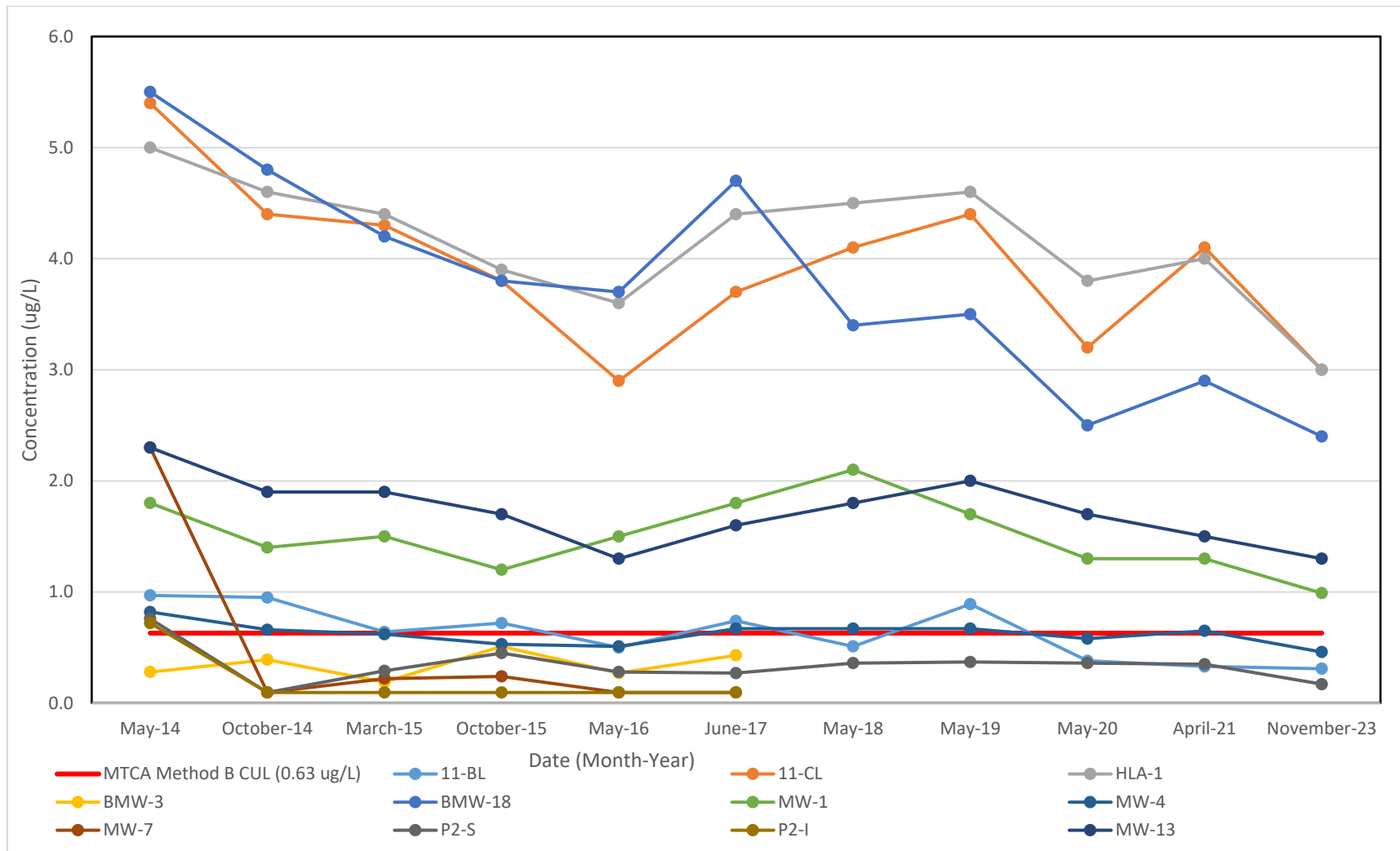
ITALICS = Italicized values are estimated values (i.e. concentrations greater than the method detection limit, but less than the method reporting limit).

ND = Non-detected (method detection limit – 0.096 µg/L)

-- = Monitoring well no longer requires performance monitoring. The Performance Monitoring Network was revised following the 2017 Annual Sampling Event in accordance with the criteria established in the Compliance Monitoring Work Plan and per Ecology approval dated 27 March 2018; BMW-3, MW-7, and P2-I were removed from the network and are no longer sampled as part of performance monitoring

Figures

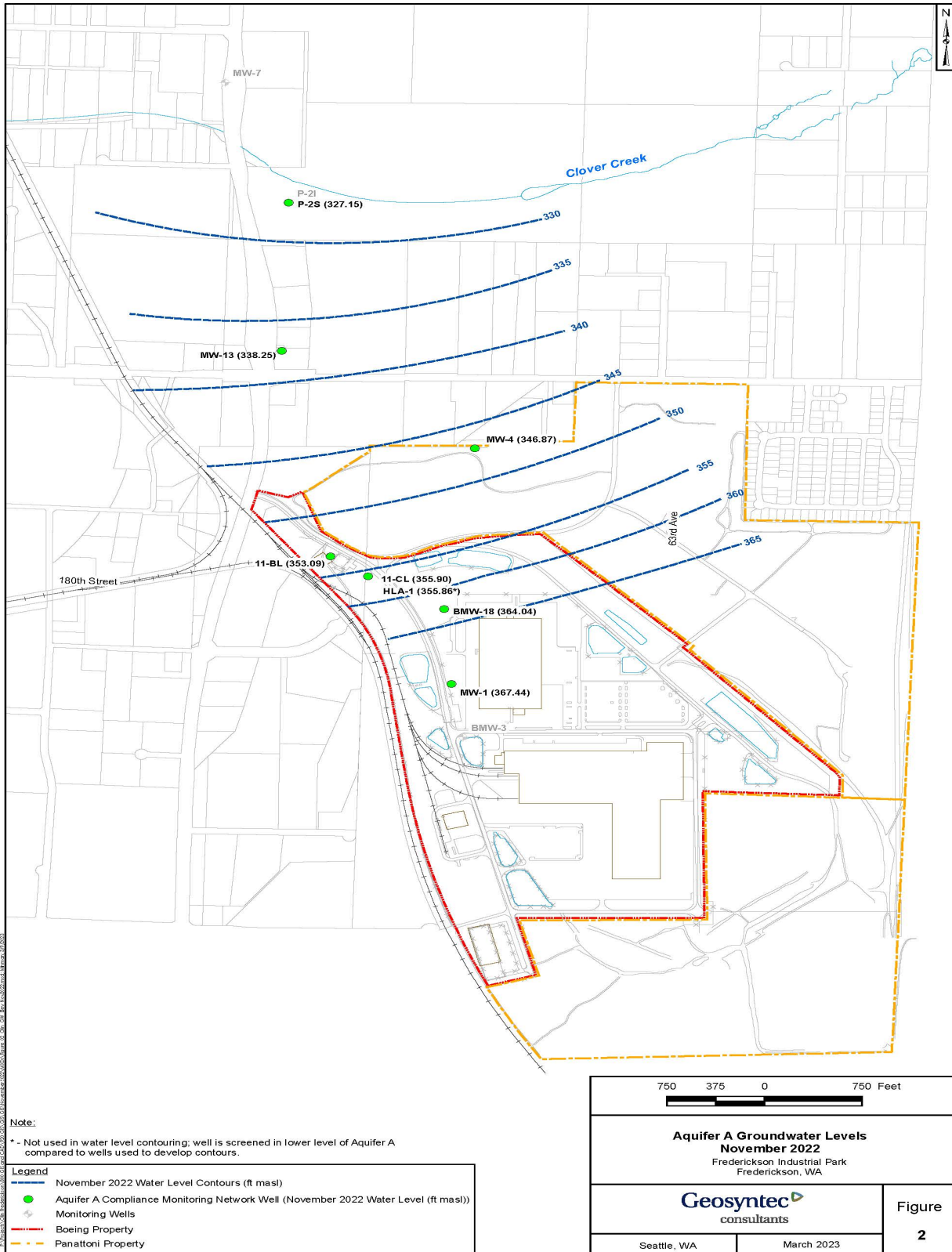
Figure 5. Groundwater Carbon Tetrachloride Concentrations – Past 11 Events (May 2014 to November 2023)



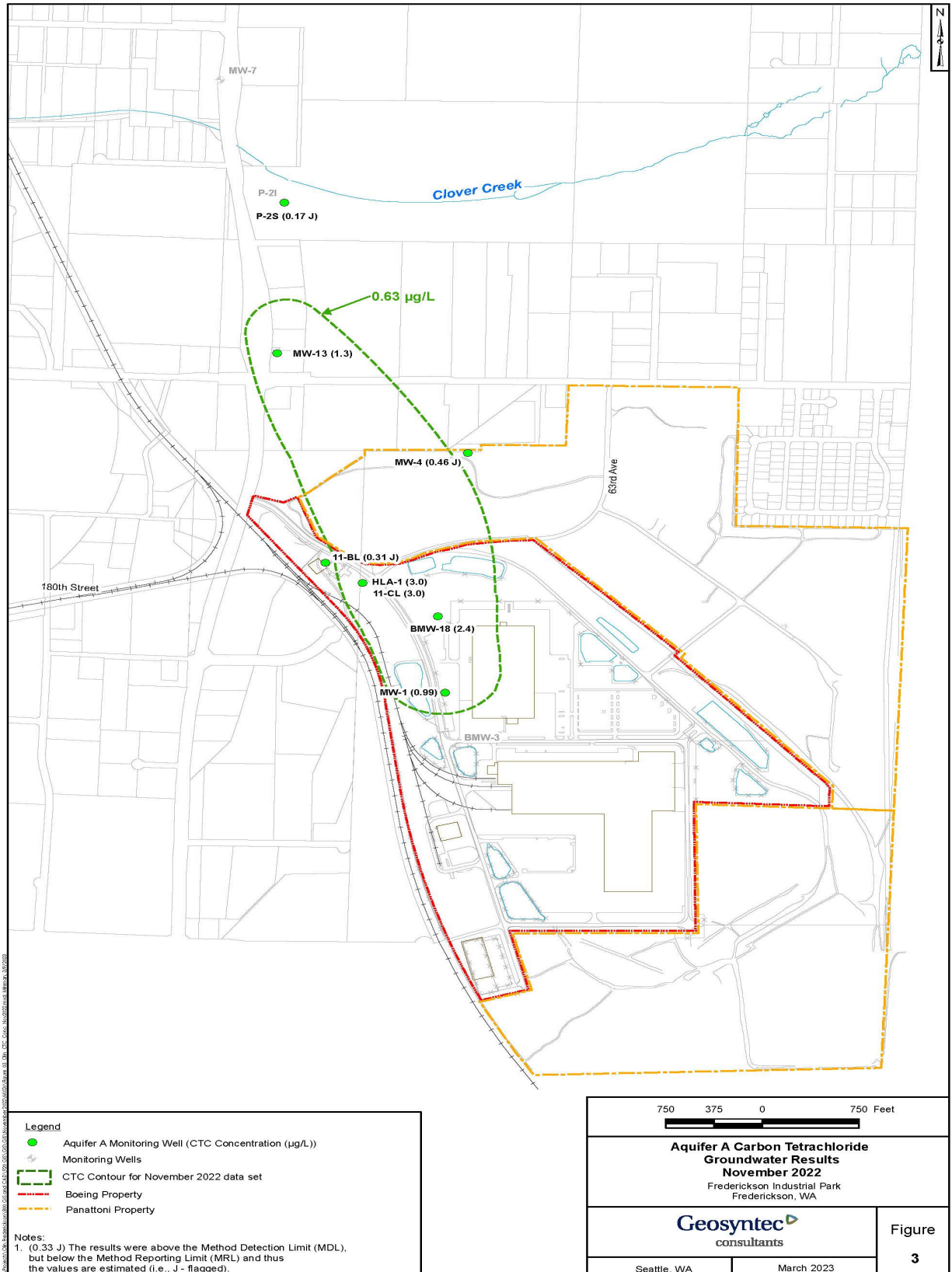
Appendix A. Vicinity Map



Appendix B. Site Plan and Groundwater Levels



Appendix C. Site Plan and CTC Concentration



Appendix D. Photo Log

Photo 1: Monitoring Well MW-1 (facing west)



Photo 2: Monitoring Well BMW-3 (facing west)



Photo 3: Monitoring Well HLA-1 (facing east)



Photo 4: Boeing Monitoring Wells Not Used for CTC Monitoring (facing south)



Photo 5: Monitoring Well BMW-18 (facing south)



Photo 6: Empty Field in Front of Boeing Facility (facing north)



Photo 7: Monitoring Well BMW-3 (facing southeast)



Photo 8: Monitoring Well BMW-18 (facing east)



Photo 9: Monitoring Well MW-1 (facing east)



Photo 10: Monitoring Well 11-BL (facing northwest)



Photo 11: Boeing Facility Entrance (facing north)



Photo 12: Boeing Gate F5, Road to Monitoring Well MW-4 (facing west)



Photo 13: East of Boeing Gate F5, Grading Associated with New Warehouse Construction (facing east)



Photo 14: East of Boeing Gate F5, Grading Associated with New Warehouse Construction (facing southeast)



Photo 15: Monitoring Well MW-13 (facing southwest)



Photo 16: Monitoring Well P-2S, Located in Wooded Area (facing south)



**Photo 17: Additional Grading Occurring on Recently Sold Boeing
Parcels, Warehouse Construction (facing southwest, 70th Ave E)**



**Photo 18: Eastern Construction Entrance for Warehouse
Construction on Recently Sold Boeing Parcels (facing southwest)**

