Supplemental Remedial Investigation
Data Summary Report Fall 2012 to Fall 2013
Boeing Auburn Facility
Auburn, Washington

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Prepared for

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TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

AOC	Areas of Concern
BGS	Below Ground Surface
Boeing	The Boeing Company
cis-1,2-DCE	Cis-1,2-Dichloroethene
CMT	Continuous Multi-channel Tubing
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid
Ecology	Washington State Department of Ecology
ft	Feet/Foot
GSA	General Services Administration
MTCA	Model Control Toxics Act
Order	Agreed Order No. DE 01HWTRNR-3345
PSE	Puget Sound Energy
RI	Remedial Investigation
ROW	Right-of-Way
SIM	Selected Ion Monitoring
SR	State Route
SW	Southwest
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
VOC	Volatile Organic Compound
VC	Vinyl Chloride
WAC	Washington Administrative Code
DOH	Washington State Department of Health
µg/L	Micrograms per Liter

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1.0 INTRODUCTION

The Boeing Company (Boeing) is currently undergoing corrective action at their Auburn Fabrication Division facility (facility) located at 700 15th Street Southwest (SW) in Auburn, Washington. Corrective action requirements are documented in an Agreed Order (Order; No. DE 01HWTRNR-3345) dated August 14, 2002 and the First Amended Agreed Order dated February 21, 2006, both with Washington State Department of Ecology (Ecology). The Order includes a requirement to conduct a remedial investigation (RI) of facility contamination impacts both within the facility (on Boeing property) and at downgradient properties (off Boeing property). The RI has been conducted in phases since 2004. This report documents the RI activities performed from fall 2012 to fall 2013 (herein referred to as the Fall 2012 RI). The Boeing property[1] location and vicinity map are shown on Figure 1.

1.1 PRIOR REMEDIAL INVESTIGATION

Between 2004 and 2008, Boeing completed a series of RIs and actions on Boeing property that were summarized in the *2nd Revised Ecology Review Draft, Remedial Investigation Report* (Landau Associates 2009a). This report addressed all identified solid waste management units (SWMUs) and areas of concern (AOC). Ecology's June 19, 2009 comments on the 2nd Revised RI Report identified an off Boeing property groundwater quality data gap, which led to additional investigation.

Between summer 2009 and summer 2011, Boeing completed a series of RI activities to address the off Boeing property data gap (Landau Associates 2009b, 2010, 2012a,b). These activities defined two low-concentration volatile organic compound (VOC) groundwater plumes that extended from the facility off Boeing property toward the north and northwest. These plumes consist of trichloroethene (TCE) and its breakdown components; cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC). One plume occurs predominantly north of the former 17-05 Building, which was also called Area 1; this plume is referred to as the Area 1 plume (also called Plume 1). The source of the Area 1 plume has been identified as the former TCE degreaser (SWMU S-12b) and the former metal bond tank line (AOC A-08; Landau Associates 2009a). The source was remediated through interim actions in 2004 and 2005 (Landau Associates 2009a) prior to sale of the Area 1 property to AMB Property Corporation, Inc. and subsequent redevelopment. AMB has since been sold to Prologis Inc, so the property is now referred to as the Prologis property. The second plume occurs predominantly north and northwest of Building 17-07 and the wastewater pretreatment plant; this plume is referred to as the western plume (also called Plume 2).

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[1] The facility as defined in the First Amended Agreed Order consists of the Boeing Property and the Prologis property directly north of the Boeing property.

The most recent reports documenting characterization of off Boeing property groundwater quality and related RI activities are the *Draft Spring 2011 Remedial Investigation Report* (Landau Associates 2012a) and the *Draft Fall 2011 Remedial Investigation Report* (Landau Associates 2012b). Both 2011 RI reports conclude that the offsite boundaries of the two plumes were not fully defined.

Consequently, the Fall 2012 RI was initiated consistent with the *Fall 2012 Additional Remedial Investigation Work Plan* (Fall 2012 Work Plan; Landau Associates 2012c). The Fall 2012 Work Plan incorporated comments and modifications from Ecology provided in an approval letter dated November 20, 2012 (Ecology 2012).

1.2 INVESTIGATION SCOPE AND OBJECTIVES

The scope and objectives of the Fall 2012 RI are presented in the Fall 2012 Work Plan and are summarized below:

- Goal #1: Complete the RI characterization of the full nature and extent of VOC contamination in groundwater
- Goal #2: Conclude the western plume (Plume 2) source investigation
- Goal #3: Determine if VOC concentrations in deeper shallow zone wells are representative of VOC concentrations at the water table surface and determine if VOC concentrations at the water table surface indicate a need for additional vapor intrusion assessments.

The Fall 2012 RI included installation of 18 new wells both on and off Boeing property to address these goals. The locations of these new wells are shown on Figure 2. Well installation and groundwater sampling field investigations are presented in Section 3.0; associated groundwater quality results are presented in Section 4.0. Investigation scope related to each goal is described below.

Fourteen wells (AGW222, AGW223, AGW227, AGW228, and AGW230 through AGW239) were installed to address Goal #1. Two conventional wells (AGW222 and AGW223) were installed on Boeing property. Eleven conventional wells and one multi-level well were installed off Boeing property. The groundwater quality data from these wells further refined the nature and extent of VOC contamination and is discussed in Section 4.1.

The specific objectives of Goal #2 were to: 1) complete a final review of previous investigations pertaining to the western plume source and 2) complete final review of historical documents and operations pertaining to the vicinity of the western plume source (Landau Associates 2012c). The results of this review will be submitted in a separate technical memorandum later in 2014.

Four water table wells (AGW224, AGW225, AGW226, and AGW229) were installed to address Goal #3. These wells provided groundwater quality data collected at the water table surface as required for vapor intrusion screening based on Ecology's draft vapor intrusion guidance document (Ecology

2009). The comparison of water table well data to typical shallow zone groundwater[2] well data will help determine if existing shallow wells (screened below the water table) can be used to reliably screen for risk of vapor intrusion to indoor air. This comparison of water table well data to typical shallow zone groundwater well data is described in Section 4.2.

Another important objective of this report is to provide an update to the conceptual site model (CSM). The preliminary CSM was presented in the 2009 2nd Revised RI Report (Landau Associates 2009). During a weekly conference call in 2013, Ecology requested an update to the CSM as part of the Fall 2012 RI Report. The updated CSM is presented in Section 5.0.

1.3 CONCURRENT SUPPLEMENTAL INVESTIGATIONS

During implementation of the Fall 2012 Work Plan scope, a number of concurrent supplemental site investigations were conducted to address immediate concerns related to surface water and vapor intrusion. These parallel investigations include surface water, direct-push, and vapor intrusion field activities. Results from these investigations have been documented in separate technical memoranda to Ecology. Data from the investigations are also used in this report to define the nature and extent of contamination and to update the CSM for the Boeing Auburn site.

1.3.1 SURFACE WATER INVESTIGATIONS

Initial surface water investigation activities were conducted in June 2012 and included sampling of 11 locations in Auburn and Algona, Washington. Results from this initial investigation were presented in the Surface Water Investigation technical memorandum (Landau Associates 2012d). These initial investigation activities led to additional sampling activities at four locations along the Chicago Avenue ditch in September 2012. The September Chicago Avenue ditch sampling results were presented in the third quarter 2012 Status Report (Landau Associates 2012e). Based on the Auburn results from June 2012, six new locations in Auburn were sampled in July 2013. Results from this investigation were presented in the July 2013 Surface Water Investigation technical memorandum (Landau Associates 2014a). Additional surface water activities in both Auburn and Algona will continue in 2014 and are described in the 2014 Surface Water work plan (Landau Associates 2014b).

Surface water sampling activities have also been completed for yards and ditches in the northern residential area of Algona. Roadside ditch sampling occurred on November 25 and 26, 2013. The results of this sampling were presented in the Algona Ditch Sampling technical memorandum (Landau

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[2] Shallow zone groundwater wells are typically screened below the water table surface in the range of 20 to 30 feet (ft) below ground surface (BGS).

Associates 2014c. Yard sampling was completed from January to March 2014 and results were presented in the Algona Yard Sampling technical memorandum (Landau Associates 2014d).

1.3.2 DIRECT-PUSH INVESTIGATION

Results from three Algona neighborhood water table wells (AGW224, AGW225, and AGW226) installed as part of the field investigation for this report (Fall 2012 RI) led to additional investigation of VOCs in shallow groundwater. Results from the three wells indicated that VOC impacts to groundwater extend west from the facility to the northeast corner of the Algona residential neighborhood. Based on these results, a direct-push groundwater investigation was initiated to further characterize the westerly extent of shallow groundwater contamination in this area and to further evaluate the potential for vapor intrusion in the Algona neighborhood. The direct-push investigation included sampling 49 direct-push borings. Water samples were either collected at a single depth (5 ft BGS or just below the water table) or multiple depths (just below the water table, 15 ft BGS, and 25 ft BGS). Results from this investigation were presented in the Algona Direct-Push Boring Investigation technical memorandum (Landau Associates 2014e).

1.3.3 VAPOR INTRUSION INVESTIGATIONS

Boeing is implementing a tiered approach to vapor intrusion assessments as recommended by Ecology's Vapor Intrusion Assessment Guidance (Ecology 2009). In 2011 and 2012, Boeing conducted vapor intrusion assessments on the Boeing property (Buildings 17-07 and 17-12) and off the Boeing property at four commercial buildings (Landau Associates 2012a,e). In 2013, Boeing collected confirmation samples at Building 17-07 and these results were presented in the second quarter 2013 status report (Landau Associates 2013a). The vapor intrusion pathway was found to be incomplete at all locations (Landau Associates 2012a,f, and 2013a).

In 2013, Boeing prepared a draft Vapor Intrusion Evaluation and Assessment Approach report (draft vapor intrusion approach; Landau Associates 2013b) that presents the approach to investigating vapor intrusion both on and off Boeing property to be used for the duration of the project. The document identified areas on and off Boeing property in Auburn and Algona where the potential for vapor intrusion may need to be evaluated based on shallow groundwater concentrations of VOCs.

As identified in the draft vapor intrusion approach, Algona water table wells were discovered to have VOC concentrations above the approved residential vapor intrusion groundwater screening levels, indicating the potential for vapor intrusion in the northern residential area of Algona. The direct-push investigation described in Section 2.3.2 helped to identify areas where VOC concentrations at the water table surface in Algona exceeded applicable vapor intrusion screening criteria. The results from the direct-push investigation were used to determine which residences should be evaluated for vapor intrusion. The work plan for the residential vapor intrusion sampling is presented in the Algona Residential Neighborhood Vapor Intrusion Assessment (Landau Associates 2013c). Residential vapor intrusion investigations in northern Algona included summer and winter sampling. The summer sampling was initiated in July 2013 and was completed in October 2013. Winter sampling was started in January 2014 and completed in April 2014. A summary of the results was presented in a separate report (Landau Associates 2014f).

2.0 SITE BACKGROUND

A summary of project geology and hydrogeology is provided below. More extensive background documentation can be found in the 2009 RI Report (Landau Associates 2009a) and additional supplemental RI reports from 2009 through 2011 (Landau Associates 2009b, 2010, 2012a,b).

2.1 GEOLOGY

The Boeing facility is located within the Auburn Valley near a point where the Green and White Rivers enter the valley from the east and diverge to the north and south, with the Green River continuing northward and the White River flowing south. Following the recession of the last Puget Sound glaciations about 8,000 to 10,000 years ago, the Auburn Valley was part of an embayment of Puget Sound that extended south from present day Elliot Bay. Approximately 5,000 years ago, a major debris and mudflow occurred on Mt. Rainier. Deposits associated with this event, termed the Osceola Mudflow, diverted the White River from its channel south of Puyallup to its current channel near the Boeing facility, and inundated the valley. The Osceola Mudflow deposits in the Auburn area thicken across the valley from east to west, with a thickness of approximately 10 ft near the eastern edge of the valley and reach thicknesses of over 40 ft near the west side of the valley before pinching out along the western edge of the valley (Dragovich et al. 1994).

During the RI, fine-grained deposits encountered at about 100 ft BGS are identified as Osceola Mudflow deposits. RI observations indicate the Osceola Mudflow is at least 55 ft thick in the western portion of the Boeing property (observed at AGW034). Coarse-grained deposits that overlie the fine-grained Osceola Mudflow deposits are identified as alluvial deposits and reworked portions of the Osceola Mudflow deposit and termed Modern Alluvium. Finer-grained deposits near the ground surface are recent alluvium of the Green or White Rivers.

2.2 HYDROGEOLOGY

The uppermost aquifer in the Auburn Valley consists of saturated portions of Modern Alluvium and recent alluvium. The Osceola Mudflow serves as a regional aquitard between the uppermost aquifer and deeper aquifers. Locally, beneath the Boeing property and off Boeing property to the north, the uppermost aquifer is about 90 ft thick and for the purpose of the RI, has been subdivided into three groundwater zones by depth:

- A shallow zone, from approximately the ground surface to 30 ft BGS
- An intermediate zone, from approximately 40 to 60 ft BGS
- A deep zone, from about 80 to 100 ft BGS.

Groundwater flow in the Auburn Valley is generally northward, parallel to the valley sidewalls (Pacific Groundwater Group 1999). However, in the vicinity of the northern portion of the Boeing facility, there is a northwestern component to groundwater flow. This northwestern component of flow is most pronounced in the shallow zone, which is in direct hydraulic connection with surface water features in the western portion of the valley.

3.0 FIELD INVESTIGATION ACTIVITIES

The scope of the Fall 2012 RI field investigation activities is presented in the Fall 2012 Work Plan (Landau Associates 2012c). Field activities included the installation and sampling of one continuous multi-channel tubing (CMT) multi-level well and 17 conventional monitoring wells (including four water table wells) from December 2012 to October 2013. Wells were installed at two locations on Boeing property and on six other properties. Drilling and well installation took place in three phases due to the timing of obtaining site access agreements or permits. Well installation at locations on General Services Administration (GSA) property east of the Boeing property are planned to be completed as part of the next phase of RI drilling. An access agreement with GSA has been difficult to complete for a variety of reasons. Consequently, this work has been delayed.

Borehole samples were collected during drilling at select well locations as proposed in the Fall 2012 Work Plan. Additional water table borehole samples were collected during drilling of shallow wells at properties owned by The Outlet Collection[3], Coastal Farm and Ranch,[4] and Auburn School District warehouse property. All new wells (and all multi-level screens) were sampled approximately 1 week after well installation and development were completed. Well locations and elevations were surveyed by Duane Hartman & Associates in January, June, and October 2013. Survey and borehole sample information for Fall 2012 RI wells AGW222 through AGW239 are presented in Table 1. Following the initial sampling, each well was incorporated into the site groundwater monitoring plan (Phase V groundwater monitoring plan; Landau Associates 2011).

3.1 WELL INSTALLATION

All conventional monitoring wells were installed in accordance with the *Minimum Standards for Construction and Maintenance of Wells* [Washington Administrative Code (WAC) 173-160]. The multi-level well was installed in accordance with the *Minimum Standards for Construction and Maintenance of Wells* (WAC 173-160) and the well variance (Ecology 2013) granted by Ecology that provides exception to specific sections of WAC 173-160. All wells were installed using a rotosonic (sonic) drilling rig. New well locations and the current monitoring well network are presented on Figure 2.

With the exception of water table wells, conventional well screens are 10 ft long and were placed by aquifer zone (shallow, intermediate, and deep). Water table well screens are 15 ft long. Multi-level screens are approximately ½ ft long. Wells were installed as described in Table 1. Based on available

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[3] The Outlet Collection was formerly the SuperMall.

[4] Water table borehole sampling locations at The Outlet Collection and Coastal Farm and Ranch were proposed to Ecology on May 13, 2013 (Landau Associates 2013d).

data and review of well installation logs and well development logs, all wells appear to be functioning as intended. Monitoring well logs are presented in Appendix A.

3.1.1 PHASE I: DECEMBER 2012

Phase I consisted of the installation of wells AGW222 through AGW230. These wells are located on Boeing property, City of Auburn right-of-way (ROW), and City of Algona ROW. ROW permits were obtained from the City of Auburn on November 20, 2012 and from the City of Algona on December 3, 2012.

Drilling took place between December 2 and 10, 2012. Wells installed on the Boeing property are AGW222 (intermediate) and AGW223 (deep). During drilling, borehole water quality samples were collected and analyzed for VOCs at AGW222 (shallow zone) and AGW223 (shallow, intermediate, and deep zones). The TCE concentration in the deep zone borehole sample was below 0.5 micrograms per liter (µg/L); therefore, the contingent upgradient deep zone well was not installed. Wells installed on the City of Auburn ROW included AGW224 (water table), AGW227 (intermediate), AGW228 (shallow), and AGW230 (deep). Wells installed on the City of Algona ROW were all water table wells and included AGW225, AGW226, and AGW229. All wells were subsequently developed and initial groundwater samples were collected on December 26 and 27, 2012.

3.1.2 PHASE II: MAY 2013

Phase II consisted of installing wells AGW231 through AGW236. These wells are located on Puget Sound Energy (PSE) property, Glimcher property, and Coastal Farm and Ranch property. PSE access was granted in the form of a permit amendment on February 26, 2013; Glimcher access was granted in the form of a limited use permit amendment on April 2, 2013; and Coastal Farm and Ranch access was granted in the form of a limited use permit on May 14, 2013.

Drilling and well development was completed between May 19 and 31, 2013. The well installed on the PSE Interurban Trail is AGW233 (deep). Wells installed on Glimcher property are AGW231 (shallow), AGW232 (shallow), AGW234 (deep), and AGW235 (multi-level). The well installed at Coastal Farm and Ranch is AGW236 (shallow). During drilling, water table borehole samples were collected at AGW231, AGW232, and AGW236. Initial groundwater samples were collected as part of the June annual groundwater sampling event between June 3 and June 12, 2013.

3.1.3 PHASE III: SEPTEMBER 2013

Phase III consisted of installation of wells AGW237 through AGW239 located on Auburn School District Warehouse property. Auburn School District Warehouse property access was granted in the form of an access agreement on September 19, 2013. Monitoring wells were located west of the originally proposed locations as requested by representatives of the Auburn School District Warehouse.

Drilling and well development was completed between September 23 and 27, 2013. Wells installed on the Auburn School District Warehouse property included AGW237 (deep), AGW238 (intermediate), and AGW239 (shallow). During drilling, a water table borehole sample was collected at AGW239. Initial groundwater samples were collected on October 3, 2013.

3.2 GROUNDWATER SAMPLING

Initial groundwater samples[5] were collected at the time of drilling from temporary wells (i.e., borehole samples) or at least 5 days after final well development for permanent wells. Groundwater sampling was conducted using a peristaltic pump and dedicated tubing. Temporary wells were purged for 30 minutes or until the water was clear. Permanent wells were sampled utilizing low-flow procedures. During purging, groundwater was monitored for field parameters (pH, conductivity, dissolved oxygen, temperature, oxidation reduction potential, and turbidity).

All water samples were analyzed for VOCs using U.S. Environmental Protection Agency Methods 8260c and 8260c selected ion monitoring (SIM) by Eurofins Lancaster Laboratories, Inc. of Lancaster, Pennsylvania. SIM analysis was performed for tetrachloroethene and VC in order to achieve reporting limits below site screening levels. The deep zone borehole sample from AGW223 was analyzed on an expedited basis in order to evaluate the need for the proposed contingent upgradient well. All other samples were analyzed on the standard 2-week turnaround time. Groundwater sampling results are discussed in Section 5.0.

3.3 GROUNDWATER LEVEL MONITORING

Synoptic groundwater level monitoring is completed approximately twice a year. The most recent synoptic groundwater level monitoring, including all newly installed wells, was completed on January 14 and 15, 2014. Groundwater level data is discussed in Section 4.0.

[5] Initial groundwater samples are defined as samples collected after well installation but before the following scheduled quarterly groundwater sampling event. Initial groundwater samples from Phase II well installations were collected during the scheduled quarterly sampling event.

4.0 GROUNDWATER LEVEL DATA

Groundwater level data discussed below includes groundwater elevation contours and an analysis of vertical hydraulic gradients. These groundwater level data reflect minor refinements to the hydrogeologic conceptual model. These data and refinements are discussed below.

4.1 GROUNDWATER ELEVATION

Groundwater elevation data was collected in January 2014 from all wells in the groundwater monitoring program (including those installed as part of the Fall 2012 RI investigation). Groundwater elevation data was consistent with the previous interpretations of groundwater flow. Groundwater level contours are presented on Figures 3 through 5. Groundwater level data is presented on Table 2.

4.2 VERTICAL HYDRAULIC GRADIENTS

Vertical hydraulic gradients were calculated at select well pairs within the project area. Gradients were calculated between shallow and intermediate or intermediate and deep wells clustered at the same location (typically within 20 ft). Vertical gradients were also calculated at multi-level wells. The gradient calculation represents the difference in water level divided by the difference in elevation between the midpoints of the corresponding screens[6]. Vertical gradients were calculated for January 2014 at 16 shallow/intermediate well pairs and 16 intermediate/deep well pairs. Multi-level wells and well clusters were selected to provide geographic coverage of the project area. January 2014 was chosen because a complete round of synoptic water level data was available throughout the entire monitoring well network.

The maximum downward vertical gradient (0.0217) was calculated between the shallow and intermediate zone at multi-level well AGW212; this well is located near the northeast corner of the YMCA/Junior Achievement property. The maximum upward vertical gradient (-0.0474) was calculated between the intermediate deep zone at well cluster AGW238/AGW237; this well cluster is located north of State Route (SR) 18. A relatively strong upward vertical gradient (-0.0355) was also calculated between the shallow and intermediate zone at multi-level well AGW235; this well is located near the Auburn 400 North Pond adjacent to SR 167. Vertical gradients calculated at all other locations were appreciably lower in magnitude falling within the interval of -0.0110 to 0.0084. Vertical gradient calculations between the shallow and intermediate zones are presented on Table 3; gradients are shown spatially on Figure 6. Vertical gradient calculations between the intermediate and deep zones are presented on Table 4; gradients are shown spatially on Figure 7.

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[6] By convention, negative gradients are upward; positive gradients are downward. Gradients are dimensionless because they are foot per foot and are shown without units.

Shallow to intermediate vertical gradients in January 2014 are generally downward on the Boeing property. As groundwater flows northward, gradients transition from downward to upward. There are two primary exceptions to this spatial trend. A moderate upward vertical gradient (-0.003) was calculated at the AGW100/AGW101 well pair at the south end of the property. An upward vertical gradient at this location may be caused by shallow groundwater discharge to the adjacent wetland. A strong downward vertical gradient (0.0217) was calculated north of the Boeing property at the AGW212 multi-level well. This well location is relatively close to the location of shallow groundwater mounding observed at well AGW068 (Landau Associates 2009a). Consequently, there may be an undefined source of recharge that affects vertical gradients at this well and causes mounding near well AGW068.

Intermediate to deep vertical gradients in January 2014 do not exhibit the relatively clear spatial pattern observed for shallow and intermediate zone vertical gradients. Intermediate to deep gradients tend to be downward on the Boeing property and relatively strong upward vertical gradients (i.e., -0.0103 at AGW198/AGW197; -0.0484 at AGW238/AGW237) develop to the north near SR 18. However, between SR 18 and the Boeing property, vertical gradients are both upward and downward. It should be noted that the downward gradients calculated at multi-level wells AGW212, AGW210, and AGW235 are between 0.0005 and 0.0016. These vertical gradients are relatively small and only represent between 0.02 ft and 0.05 ft difference in water level between the intermediate and deep well screens.

Vertical gradients develop in response to groundwater recharge and discharge. Downward gradients define a groundwater recharge area; upward gradients define a groundwater discharge area. The Boeing property is situated between significant recharge and discharge areas. Groundwater recharge occurs southeast of the property from a losing reach of the White River. Groundwater discharge occurs northwest of the property to a relatively complex network of ditches, stormwater features, and wetlands, as well as Mill Creek. Groundwater discharge to surface water has been observed year-round at the Chicago Avenue ditch and the Auburn 400 north flood storage pond[7].

The observed spatial trend in vertical gradients observed in January 2014 between the shallow and intermediate zone is generally consistent with the understanding of groundwater recharge and discharge. Vertical gradients are predominantly downward in the southern portion of the project area nearer to the White River; vertical gradients are predominantly upward to the northwest of the project

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[7] Water level observation work for the Chicago Avenue ditch and the Auburn 400 north flood storage pond are described in the 2014 surface water work plan (Landau Associates 2014b). This work has been completed and results will be documented in a separate report due in the first quarter of 2015. Surface water and groundwater elevations were measured over the course of almost a year at both locations. In both cases, measured elevations indicated groundwater discharge was occurring during every measurement. Although groundwater and surface water measurements were not collected directly from Mill Creek, the creek likely exhibits similar discharge characteristics to the Auburn 400 ponds. The Auburn 400 ponds have a direct hydraulic connection to a channelized portion of the wetland west of the pond, termed the east branch of Mill Creek, which forms a portion of the headwaters of Mill Creek. Additionally, the wetlands surrounding the creek appear to be primarily fed by groundwater, further indicating that the Mill Creek system appears to be gaining along its upper reaches.

area where groundwater discharge occurs to Mill Creek and related stormwater features. The more variable spatial pattern in vertical gradient direction between the intermediate and deep zone may be due to a combination of factors related to seasonal variations in recharge, aquifer heterogeneity, and the complex nature of groundwater/surface water interactions.

An initial evaluation at the project site indicates that vertical gradients generally reflect the conceptual understanding of recharge and discharge patterns. There are exceptions to the overall spatial trend of expected vertical gradients. The observed variation is likely a reflection of the relatively complex hydrologic and geologic setting.

5.0 GROUNDWATER QUALITY DATA

Groundwater quality data from new wells and ongoing groundwater monitoring help to refine the extent of VOC groundwater contamination at and downgradient of the Boeing property. The three primary VOCs of concern based on toxicity, frequency of detection, and maximum concentrations are TCE, cis-1,2-DCE, and VC. The most recent (i.e., December 2013) TCE, cis-1,2-DCE, and VC data from the entire monitoring well network are presented for the shallow, intermediate, and deep aquifer zones on Figures 8 through 16. The maximum and most recent VOC groundwater results for these three primary VOCs at all monitoring wells are presented in Appendix B (Table B-1). VOC groundwater results for these three primary VOCs at all well borehole sampling locations are also presented in Appendix B (Table B-2).

5.1 NATURE AND EXTENT OF VOLATILE ORGANIC COMPOUND PLUMES

There are two VOC plumes that originate on the Boeing facility: the Area 1 plume (Plume 1) and the western plume (Plume 2). The horizontal extent of these plumes appears to define a relatively complicated pattern that is attributed to a number of factors including: source history, biodegradation of TCE to cis-1,2-DCE and VC, and the proximity of the plumes to stormwater and surface water features. Both plumes are relatively dilute with the bulk of the plume at concentrations less than 5 µg/L and current concentrations not exceeding 13 µg/L for any constituent. TCE occurs at the highest concentrations and is the most widespread of the three primary VOCs. VC occurs at the lowest concentrations and is the least widespread.

5.1.1 SHALLOW ZONE

The western plume occurs over a large area downgradient of the off Boeing property in shallow zone. The source of the western plume is believed to be Building 17-07 on the Boeing property. The plume extends about 7,000 ft north-northwest from Building 17-07. Some characteristics of the western TCE plume are:

- The plume is relatively narrow near the source but appears to widen significantly downgradient toward the northwest.
- The orientation of the plume varies from north to northwest with distance downgradient from the Boeing property
- TCE concentrations are lower near the source and higher downgradient.

One anomaly occurs within the western TCE plume at AGW224; TCE concentrations at this water table well are non-detect, while some surrounding shallow zone wells have concentrations exceeding 5 µg/L of TCE. A boring, (ASB0225) conducted on April 29, 2013, confirmed the results at AGW224. One explanation for the results at AGW224 is that it is adjacent to a wetland that contributes to favorable conditions for microbial degradation of TCE. Wetland environments typically have high inputs of organic carbon and anaerobic groundwater conditionswhich are key components for microbial degradation of TCE. Also, this well is installed as a water table well, and water table concentrations are typically lower than concentrations deeper in the shallow zone.

In contrast to the western TCE plume, the Area 1 plume impacts only a small portion of the shallow groundwater zone on Boeing property, near the source area (former Boeing Building 17-05, now the Prologis building). The highest TCE concentrations (i.e., currently 9.7 µg/L) now occur downgradient of the former source area, near the north end of the Prologis warehouse. The Area 1 shallow zone TCE plume is contained within the former Boeing facility [i.e., the Boeing property and former Boeing properties (Prologis, YMCA, and Junior Achievement) to the north]. The current distribution of the shallow zone TCE plumes are shown on Figure 8.

The cis-1,2-DCE and VC shallow zone plumes occur in the same general area as the TCE plumes. However, in some places, these two VOC constituents extend slightly beyond the area where TCE has been detected, particularly off Boeing property. Spatial concentration trends of both cis-1,2-DCE and VC are irregular and exhibit localized areas of higher concentrations. These higher concentration areas are interpreted to correspond to areas where the shallow zone aquifer exhibits reducing conditions that facilitate the breakdown of TCE to daughter products through microbial degradation. Cis-1,2-DCE occurs at higher concentrations in the northeast corner of the Algona residential neighborhood, along 15th Street SW (north of the Fana buildings), and north of SR 18 in Auburn. The maximum shallow zone cis-1,2-DCE concentrations in this area is 8.4 µg/L detected at boring ASB0188 in the northeast corner of the Algona residential neighborhood. VC occurs at locally higher concentrations in the vicinity of Building 17-07 on the Boeing property, in the northeast corner of the Algona residential neighborhood, and beneath The Outlet Collection property in Auburn. The maximum shallow zone VC concentration is 6.1 µg/L detected at borehole sample AGW164-29, which is located in the vicinity of Building 17-07. The current distribution of the cis-1,2-DCE and VC shallow zone plumes are shown on Figures 9 and 10, respectively.

5.1.2 INTERMEDIATE ZONE

The western intermediate zone TCE plume extends about 6,000 ft downgradient from the source area. The orientation of the plume core (i.e., concentrations greater than 5 µg/L) appears to change from northerly near the plume source to northwesterly near the plume leading edge in the vicinity of SR 167. In contrast to the shallow zone, the core of the western intermediate zone TCE plume appears to be more long and narrow. A similar feature of the western shallow zone and intermediate zone TCE plumes is the lack of a significant decrease in TCE concentrations with distance downgradient from the source area. For example, the TCE concentration near the source is 6.3 µg/L (at well AGW201-5) and at the downgradient end of the plume the concentration is 5.6 µg/L (at well AGW235-4).

The Area 1 TCE plume has a more complex spatial pattern compared to the western plume. A portion of the Area 1 plume core (i.e., concentrations greater than 5 µg/L) has similar attributes and orientation (e.g., concentration range, spatial trends) to the western plume. However, near the downgradient (northwestern) extent, the Area 1 plume orientation diverges from the northerly flow indicated by current intermediate zone groundwater elevation contours (Figure 4) and becomes north-northeasterly. A low concentration portion of the Area 1 plume also appears to extend eastward, almost to C Street SW, up to 2,500 ft east (i.e., crossgradient) from the core of the plume. The current distribution of the TCE plume in the intermediate zone is presented on Figure 11.

The characteristics of the cis-1,2-DCE and VC plumes in the intermediate zone are similar to patterns observed in the shallow zone, though concentrations are typically lower and less widespread. The highest cis-1,2-DCE occurs at a well downgradient of Building 17-07 on the Boeing property (i.e., 9.8 µg/L at well AGW156). VC also occurs at the highest concentration (i.e., 5.1 µg/L at AGW155) in the vicinity of Building 17-07 on the Boeing property and has detections above 0.5 µg/L at two locations beneath The Outlet Collection property in Auburn. The current distribution of the cis-1,2-DCE and VC intermediate zone plumes are shown on Figures 12 and 13, respectively.

5.1.3 DEEP ZONE

The deep zone western TCE plume extends approximately 7,000 ft downgradient in a north-northwestern direction from the source area. The plume is oriented more consistently in a northwesterly direction compared with the plume in the shallow or intermediate zones. However, north of Algona, the deep zone plume appears to widen significantly, almost as wide as it is long. Similar to the intermediate zone TCE plume, the deep zone plume extends almost to C Street SW, significantly crossgradient from the core of the plume. The apparent widening of the plume transverse to the horizontal groundwater flow direction is probably due in part to the coalescing of the western and Area 1 plumes. The Area 1 plume is not present in the deep zone near its source but may migrate vertically downward into the deep zone north of the Boeing property boundary. Similar to the shallow and intermediate zone TCE plumes, there does not appear to be a significant decrease in TCE concentrations within the core (i.e., concentrations > 5 µg/L) of the deep zone plume with distance downgradient from the source area. For example, the TCE concentration near the source (north of Building 17-07) is 8.5 µg/L (at well AGW201-6) and the highest concentration of 9.9 μg/L occurs at a downgradient end of the plume (at well AGW197). The current distribution of the TCE plume in the deep zone is presented on Figure 14.

Cis-1,2-DCE and VC occur in the deep zone associated with the western TCE plume. Concentrations are highest near the source area near Building 17-07, but both constituents also are detected at the furthest downgradient monitoring well (AGW237). Concentrations of both constituents are lower and more narrowly distributed in the deep zone than in the shallow and intermediate zone. The source of cis-1,2-DCE and VC is attributed to reductive dechlorination of TCE. Lower concentrations of these constituents may be due to less reducing conditions in the deep zone relative to the shallow and intermediate zones. Less reducing conditions will result in lower rates of reductive dechlorination of TCE to cis-1,2-DCE and VC. The maximum cis-1,2-DCE concentration is 5.5 μg/L detected at wells AGW200-6 and AGW201-6. The maximum VC concentration is 1.2 μg/L detected at well AGW200-6. The current distribution of the cis-1,2-DCE and VC deep zone plumes are shown on Figures 15 and 16, respectively.

5.1.4 DISCUSSION OF CONTAMINANT DISTRIBUTION

Characterization of the western and Area 1 plumes provides information on VOC sources and contaminant migration. The plume shape in all three aquifer zones tends to be narrow near the source and become wider downgradient. Spreading of plumes perpendicular to the groundwater flow direction can occur due to transverse dispersion, though this process is typically weak in sand and gravel aquifers (Pankow and Cherry 1996). Advection (i.e., movement of contamination with groundwater flow) can also cause a plume to spread if groundwater flow is variable (i.e., groundwater flow directions vary with time). The site has relatively complex hydrogeologic setting that could cause variations in groundwater flow directions that in turn could cause the plumes to spread through advection.

Another cause of apparent plume spreading may be related to multiple sources of contamination. There is a suspected source of TCE contamination at a site known as McKesson/DS Waters near the leading edge of the plume in the vicinity of Lund Road and just north of SR 18 (G-Logics 2009a,b)[8].

The very low concentration of VOCs detected in eastern portions of the intermediate and deep zones near C Street SW appear to be related to a TCE source east of the Boeing property. Groundwater flow direction in the area is to the north and west, with almost no component of easterly flow. Numerical groundwater flow modeling was used to simulate advective contaminant migrations. Based on the modeling, contamination in the vicinity of C Street SW would originate appreciably east of the Boeing Property (Ecology 2014, Boeing 2014). Modeling results are presented on Figure 17.

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[8] Data collected from this site in 1997, 2007, and 2009 are not represented on shallow zone plume maps in this report.

The TCE results from wells along the eastern limits of the monitoring well network (AGW186, AGW189, AGW184, and AGW230) range from approximately 0.5 µg/L to 1.5 µg/L. The concentrations in an upgradient water supply well for the Auburn Mobile Home Park are consistent with the concentrations in the eastern boundary wells, ranging from 0.9 µg/L to 1.7 µg/L between 2008 and 2010. The South Auburn Water Association also has a water supply well upgradient of the Auburn Mobile Home Park; TCE is not currently detected in that well, but historical concentrations ranged from 0.7 to 2.6 µg/L between 1991 and 2000.

Based on the model particle tracking results, the South Auburn Water Association and Auburn Mobile Home Park supply wells are directly upgradient of the contamination in the vicinity of the eastern boundary wells in the vicinity of C Street SW. The alignment of these wells along a similar groundwater flow path is an explanation for the similar contaminant concentrations in the monitoring network wells and the water system pumping wells.

5.2 ENHANCED UNDERSTANDING OF NATURE AND EXTENT

Goals of the Fall 2012 RI were to further define the nature and extent of groundwater contamination and to further investigate possible source areas of the western plume. Achievement of these goals is discussed below. Discussion of nature and extent of groundwater contamination is separated for the shallow, intermediate, and deep zones.

Five shallow zone wells (AGW228, AGW231, AGW232, AGW236, and AGW239) and one multi-level well (AGW235) were installed to define the west and northwest extent of the shallow zone plume. Cis-1,2-DCE and VC were detected at all six of these locations and TCE was detected at AGW228, AGW231, and AGW235-2. These detections indicate that the shallow zone plumes may extend beyond the current groundwater monitoring network. The shallow zone TCE plume may extend further west than AGW228; however, borehole samples collected from ASB0203 during the Algona direct-push drilling bound the plume west of AGW228. At AGW235, there are no detections of TCE in shallow zone channels 1 (9 ft BGS) and 2 (19 ft BGS); however, channel 3 (29 ft BGS) has detections of TCE from 2.5 µg/L to 3.3 µg/L, indicating that the TCE plume may extend northwest of AGW235 in the deeper portion of the shallow zone. The shallow zone TCE plume is also bounded to the north of AGW231 by shallow zone borehole samples (AGW213-28 and AGW215-29) and to the northwest by AGW239.

Two intermediate zone wells (AGW227 and AGW238) and one multi-level well (AGW235) were installed to define the west and northwest extent of the intermediate zone plume. An intermediate borehole sample was also collected at AGW234(D) for the same purpose. TCE detections at AGW234-

57 (5.8 µg/L) and AGW235-4 (5.6 µg/L)[9] indicate that the intermediate zone plume extends beyond the current groundwater monitoring network to the west-northwest beneath SR 167. However, TCE was not detected at AGW238, effectively bounding the plume in this area. TCE was also detected at AGW227 (2.6 µg/L) located along the Algona/Auburn city boundary. The detection at this location indicates that the intermediate zone plume extends further west in this area. Cis-1,2-DCE and VC were also detected at the same new monitoring locations where TCE was detected.

Two deep zone wells (AGW234 and AGW237) and one multi-level well (AGW235) were installed to define the west and northwest extent of the plume. TCE was detected at AGW234 (7.0 µg/L) and AGW237 (4.1 µg/L[10]). These wells are located at the north-northwest extent of the western plume suggesting that the deep zone plume extends beyond the monitoring well network to the north-northwest. However, the multi-level screen well AGW235-7 did not detect any VOCs and appears to effectively bound the western extent of the deep zone plume in this area. Two deep zone wells (AGW230 and AGW233) were installed to define the northeast boundary of the plume. TCE was detected at AGW230. The wells that are planned to be installed at the GSA property[11] are upgradient of AGW230 will allow further characterization of the northeastern boundary of the plume. Cis-1,2-DCE and VC were also detected at the same new monitoring locations where TCE was detected except at AGW230, where neither was detected.

Another goal of the Fall 2012 RI was to further investigate possible source(s) of the western plume. Two wells were installed near Building 17-07, the likely source. Deep zone well AGW223 was installed directly south of the building, with borehole samples collected in the shallow and intermediate zones. Intermediate zone well AGW222 was installed east of the building in the northeast portion of Building 17-06; a borehole sample was collected in the shallow zone. The sampling results from these wells, and associated borehole samples, confirm that the source area is near the vicinity of Building 17-07, as follows:

- AGW223: In the deep zone, where source area concentrations are highest, VOCs were not detected at this well located upgradient of the building. Consequently, this well bounds the southern extent of the deep zone plume. TCE and cis-1,2-DCE were detected at low concentrations in the shallow and intermediate zone borehole samples; concentrations of both were less than 1.8 µg/L in the shallow zone and less than 0.7 µg/L in the intermediate zone.
- AGW222: VOC concentrations at this well were lower than concentrations detected at Building 17-07. TCE concentration in the shallow borehole sample was 1.3 µg/L and was 0.6 µg/L in the intermediate zone well sample. Cis-1,2-DCE and VC were not detected in either

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[9] TCE was also detected at AGW235-5, but was not detected at AGW235-6 in the intermediate zones.

[10] The borehole sample at this location had a TCE detection of 12 µg/L. The next sample collected at this location had a lower detection of 4.1 µg/L.

[11] A permit for drilling the wells at the GSA property has not been received; consequently these wells will be installed in the next phase of RI work.

to shallow zone borehole sample or in the intermediate zone well. Consequently, there does not appear to be an upgradient VOC source at this location.

These data are consistent with previous shallow and intermediate zone results that indicate the presence of a very dilute shallow zone VOC plume over a relatively broad area beneath Buildings 17-06, 17-07, and the northern portion of 17-10 (Landau Associates 2009a). Concentrations are low and therefore, not indicative of an obvious VOC source. However, concentration trends in all three zones indicate that the most likely VOC source is beneath the central and northern portion of Building 17-07 where VOC concentrations tend to be highest.

The spatial trend observed in the western plume suggests that dense non-aqueous phase liquid (DNAPL) is not currently the primary cause of groundwater VOC contamination at Building 17-07. A characteristic of many chlorinated VOC plumes is that the highest concentration occurs at the source and decreases downgradient due to dispersion, sorption, and degradation (Fetter 1999). This type of distribution is often associated with DNAPL release that causes an ongoing source of VOCs to groundwater (Pankow and Cherry 1996).

The western plume does not show a declining spatial trend in VOC concentrations with distance from the source area near Building 17-07. This suggests that the VOC source was relatively dilute (i.e., not DNAPL) or was associated with a DNAPL release that is now at a late stage in the source zone lifecycle. Later stages of a DNAPL source zone are characterized by complete DNAPL dissolution (Kueper et al. 2014). DNAPL dissolution can happen relatively quickly (i.e., a period of years) for small volume releases in very high permeability soil. Another factor that may confound the source zone evaluation is that releases may have occurred over time and at multiple locations as manufacturing practices and plant infrastructure was modified in the vicinity of Building 17-07, making it more difficult to isolate a specific source or sources.

5.3 VERTICAL DISTRIBUTION OF VOLATILE ORGANIC COMPOUNDS IN THE SHALLOW ZONE

Another goal of the Fall 2012 RI was to evaluate the vertical distribution of primary VOCs in the shallow zone to determine if VOC concentrations in shallow zone wells screened below the water table are representative of VOC concentrations at or near the water table surface. This evaluation is needed to support vapor intrusion assessment work being performed in residential Algona. This goal was addressed by collecting additional data during the Fall 2012 RI (e.g., installation of water table wells) and evaluating data collected during more recent RI investigations (e.g., multi-level wells and Algona direct-push sampling).

5.3.1 ALGONA DIRECT-PUSH DATA AT MULTIPLE DEPTHS

During the direct-push probe investigation conducted in Algona in April 2013, groundwater samples were collected from 49 locations at the water table (typically about 5 ft BGS). At 15 of the 49 locations, groundwater samples were also collected at deeper intervals within the shallow zone, typically at 15 ft BGS, and 25 ft BGS. The results of the direct-push investigation were originally presented in the Algona Direct-Push Boeing Investigation technical memorandum (Landau Associates 2014e). A primary conclusion of the investigation was that the extent of the shallow zone VOC plume in Algona was limited to the northeast corner of the residential neighborhood.

The direct-push investigation also provided data to assess the vertical distribution of VOCs within the shallow zone at the 15 locations where shallow groundwater samples were collected at multiple depths. At 11 of the 15 locations, VOCs were detected at least once; at the other four locations the three primary VOCs were not detected at any depth. At the 11 locations where VOCs were detected, there was not a single instance in which the maximum TCE concentration was detected at the water table sample; instead, maximum TCE concentrations occurred in 15 ft or 25 ft samples. The maximum cis-1,2-DCE concentration was detected at the water table in only one (ASB0202) out of 11 samples. Maximum VC was detected at the water table only three times (ASB0182, ASB0184, and ASB0202) out of 11 samples. This direct-push data is summarized on Figure 18.

5.3.2 BOREHOLE WATER TABLE DATA COLLECTED AT CONVENTIONAL WELLS

During the Fall 2012 RI, conventional shallow zone wells were installed at four locations (AGW231, AGW232, AGW236, and AGW239) in Auburn with borehole groundwater samples collected at the water table (9 to 14 ft BGS) during drilling. Conventional shallow zone wells have 10-ft well screens typically installed from about 20 ft to 30 ft BGS; which puts the top of the screen below the water table at locations downgradient of the Boeing property. Borehole water table samples were collected for comparison with the initial sample result collected near the center of the deeper shallow zone well screen. Results are as follows:

- At the two locations (AGW231 and AGW236) where TCE was detected in the deeper sample from the well, the borehole water table sample result was non-detect for TCE.
- At the two other locations (AGW232 and AGW239), TCE was not detected in the borehole sample or the conventional well sample, so a comparison of TCE results is not possible.
- Cis-1,2-DCE and VC were detected at all four well locations. Of the four locations, the higher cis-1,2-DCE concentration always occurred in the well sample and VC was detected at a higher concentration in the borehole water table sample only once (AGW236).

These shallow zone conventional well locations are shown on Figure 19. A data comparison of the borehole water table and conventional well screen sample data is presented on Table 5.

5.3.3 WATER TABLE WELL DATA COMPARED TO NEARBY BOREHOLE DATA

During the fall 2012 RI, water table wells were installed at four locations; two locations in the residential neighborhood in Algona (AGW225, and AGW226), one location near the O Street wetland in Auburn (AGW224), and one location near the Fana buildings in Auburn (AGW229). Each water table well was installed with a 15-ft well screen from about 2.5 ft to 17.5 ft BGS. Screens were set as shallow as possible while remaining in compliance with Ecology well construction regulations that require an adequate surface seal, no less than about 2.5 ft BGS. At some locations, the water table is shallower than 2.5 ft BGS during the winter and spring months, meaning the water table is above the screen during part of the year. Samples were collected at these wells from a peristaltic pump with the pump inlet set at about 1 ft below the water table. Results from the water table well samples were compared to VOC data from borehole groundwater samples that were collected during drilling of nearby wells from a shallow zone depth below the water table. At the water table well AGW229, cis-1,2-DCE was detected at a higher concentration compared to nearby borehole sample results. At the water table well AGW226, VC was detected at a higher concentration in the water table well compared to nearby borehole sample results. In all other instances, the maximum concentration of TCE, cis-1,2-DCE, and VC was detected in the deeper borehole sample in comparison to the nearby water table well. These water table well locations and the borehole sample locations used for comparison are shown on Figure 19. A data comparison of water table well and nearby borehole samples is presented in Table 6.

5.3.4 MULTI-LEVEL WELL SCREENS AT MULTIPLE SHALLOW ZONE DEPTHS

Multi-level screened wells were installed at 11 locations (using the Solinst® CMT[12] system). These CMT wells have ½-ft long screens located at multiple depths within a single borehole. Two or three screens at each location are located in the shallow zone (within about 30 ft BGS). The upper screen at each well is screened within 10 ft below the water table; the deeper screen(s) is located between 10 and 20 ft below the shallowest screen. Each of the 2 or 3 shallow zone screens at these 11 wells have been sampled during two sampling events. For each event, data from the shallowest well screen was compared with data from the deeper one or two screens at each location. There were a total of 22 shallow zone comparisons (11 CMT well locations, two sampling events) for each primary VOC constituent. Results were as follows:

- The TCE concentration was only higher in the shallowest well screen twice out of 22 comparisons, while the concentration was higher in a deeper screen 11 times out of 22

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[12] A groundwater well system designed specifically to monitor multiple discrete zones within a single borehole.

comparisons. The TCE concentration was the same (usually non-detect) in the shallow and deep intervals for the other nine comparisons.

- The cis-1,2-DCE concentration was higher in the shallowest well screen 6 times out of 22 comparisons, while the concentration was higher in a deeper screen 8 times.
- The VC concentration was higher in the shallowest well screen seven times while the concentration was higher in a deeper screen six times.

The CMT well data indicate that TCE concentrations show a strong tendency to decline near the water table. Cis-1,2-DCE and VC concentration trends with depth are more variable but still are more often lower at the water table surface than they are deeper in the shallow zone. Multi-level well locations are shown on Figure 19. Data comparisons are presented in Table 7.

5.3.5 CONCLUSION

Various data comparisons conducted between multiple depth monitoring locations within the shallow zone indicate that VOC concentrations are lower at the water table in comparison to deeper portions of the shallow zone. TCE was rarely detected at a higher concentration near the water table while the TCE breakdown products were more variable, but more often had lower concentrations near the water table surface. Variability in breakdown products at the water table surface may be the result of a tendency for higher aquifer organic material (needed for reductive dechlorination) to occur more frequently in the upper portion of the shallow aquifer as a result of low energy fluvial processes. Lower VOC concentrations at the water table are consistent with a number of mechanisms, including:

- Dilution due to infiltrating precipitation at the water table
- Increased dispersion and adsorption of VOCs along a flow path as groundwater discharges vertically upward to surface water
- Increased reductive dechlorination near the water table surface is a result of higher aquifer organic content; soils near the water table surface exhibit a tendency for higher organic material as a result of fluvial low energy depositional patterns.

6.0 UPDATED CONCEPTUAL SITE MODEL

The Model Toxics Control Act (MTCA) defines human health risk assessment procedures. A conceptual site model (CSM) is used to identify when individuals may be exposed to hazardous substances through more than one exposure pathway [Washington Administrative Code (WAC) 173-340-708(3)(e)]. The preliminary CSM was described in the RI Work Plan (Geomatrix 2003) and updated in the 2009 RI Report (Landau Associates 2009a).

The preliminary CSM identified potential sources of hazardous substances, affected media, and potential migration and exposure pathways for human and ecological receptors. Since the 2009 RI Report, additional RI activities have defined off Boeing property groundwater plumes and the presence of VOCs in surface water (Landau Associates 2012d,e, 2014a,c,d) and soil vapor (Landau Associates 2012a,f, 2013a,b, 2014f). Consequently additional exposure pathways and receptors have been identified making it appropriate to update the CSM.

An exposure pathway consists of four main parts (WAC 173-340-200), as follows:

- Source of contamination (e.g., primary sources, such as spills and leaks, and secondary sources, such as impacted soil or groundwater)
- Transport or exposure medium (e.g., a solute moving with groundwater flow and contamination present in soil)
- Point of exposure (e.g., an open excavation)
- Route of exposure (e.g., inhalation and dermal contact).

When all of these parts are present, connecting the source of contamination to a human or ecological receptor, the exposure pathway is considered complete; otherwise, the pathway is incomplete and exposure does not occur. It is also possible to have a potentially complete exposure pathway without health risk due to non-detection of chemicals or chemical concentrations within an acceptable range of health risk. For example, conservative vapor intrusion models suggest that migration from soil vapor to indoor air is potentially a complete pathway; however, indoor air sampling has shown either no VOCs or detections below health screening levels and demonstrates that the vapor intrusion pathway, while potentially complete, does not represent a health risk. The RI is ongoing with further evaluation underway to assess whether complete exposure pathways result in unacceptable risk. Complete pathways are currently identified as potentially complete, pending additional assessment meaning that one or more of the parts are under investigation. These pathways are identified in the CSM figures 21 and 22.

Potential human and ecological receptors were identified for the site based on current and reasonable future land use. Land uses within the plume footprint include industrial, commercial, and residential. It is anticipated that the Boeing Auburn facility will retain its industrial character and that future land uses will be consistent with current zoning and land use regulations. Current land use in the vicinity of the Boeing property is shown on Figure 20. The on Boeing property CSM is summarized in Figure 21. The off Boeing property CSM is summarized in Figure 22.

6.1 ON BOEING PROPERTY CONCEPTUAL SITE MODEL

Potentially complete exposure pathways exist on Boeing property. Potential sources at the Auburn facility include manufacturing processes historically associated with the SWMUs and AOCs. Spills and leaks from containment structures associated with each SWMU or AOC are the primary release mechanism by which constituents of concern may be transferred from the primary source to the secondary sources, which on Boeing property, consist of soil and groundwater. Transport mechanisms on Boeing property consist of leaching and infiltration from soil into groundwater and volatilization of groundwater VOCs into soil vapor. Contaminants in soil vapor could potentially migrate to indoor or ambient air. Exposure pathways through which human receptors could be exposed on Boeing property includes:

- Ingestion of or dermal contact with soil or inhalation of soil particulates,
- Ingestion of or dermal contact with groundwater, and
- Inhalation of ambient/trench air (e.g. in an open trench) or indoor air.

Sources, transport mechanisms, and exposure pathways for industrial workers and temporary construction workers on Boeing property are presented in Figure 21.

Exposure pathways for temporary construction workers are potentially complete, but are not a health concern due to low concentrations and the use of personal protective equipment while completing construction work. Temporary construction workers may be exposed to soil, groundwater, and trench/ambient air when working in excavations below the ground surface. Exposure pathways for industrial workers are potentially complete for indoor air but are likely not a health concern based on indoor air data collected to date. VOCs in indoor air samples from Building 17-07 were all below the reporting limits (Landau Associates 2012f), in addition, sub-slab results from Building 17-12 were below levels that would be expected to pose a potential health risk in indoor air (Landau Associates 2012a). Indoor air testing at Building 17-70 is currently planned to further assess this pathway.

Although MTCA requires consideration of terrestrial plants and animals that may potentially be exposed to hazardous substances, the Boeing property is expected to qualify for exclusion from further terrestrial ecological evaluation under WAC 173-340-7491. Consequently, there are no aquatic or terrestrial exposure pathways on Boeing property.

6.2 OFF BOEING PROPERTY CONCEPTUAL SITE MODEL

Off Boeing property, the two VOC groundwater plumes (western plume and Area 1 plume) represent a secondary source of contamination due to contaminant migration from primary sources located on Boeing property. Off Boeing property transport mechanisms include discharge of groundwater to surface water and volatilization of VOCs from groundwater into soil vapor. Potential exposure media include groundwater, surface water, ambient/trench air (e.g., in an open trench) and indoor air. Exposure pathways through which human receptors could be exposed off Boeing property includes:

- Ingestion of or dermal contact with groundwater (either incidentally or using a private well),
- Ingestion of or dermal contact with surface water, and
- Inhalation of ambient/trench air (e.g., in an open trench) and indoor air.

Sources, transport mechanisms, and exposure pathways for both human and ecological receptors off Boeing property are presented in Figure 22. Human receptors off Boeing property include temporary construction workers, commercial workers and visitors to commercial buildings, and residents. Ecological receptors include aquatic and terrestrial animals and plants.

Exposure pathways are complete for temporary construction workers. Exposure to groundwater and ambient/trench air are complete, but these pathways do not present a health concern for temporary construction workers due to low concentrations of TCE and VC in air and in water near ground surface and the use of personal protective equipment when working in excavations below the ground surface. Exposure to surface water is also a complete pathway for temporary construction workers working in surface water bodies. The surface water pathway is likely of less concern due to current detected VOC concentrations being below screening levels in stormwater ditches (Landau Associates 2014c). However, the surface water pathway is under further investigation (Landau Associates 2014b).

Workers and visitors at commercial properties may be exposed to contaminants via inhalation of indoor air impacted by vapor intrusion. This pathway has been investigated at a number of commercial buildings and investigation at additional buildings is planned. At all commercial properties that have completed indoor air testing (Fana buildings, Junior Achievement building, YMCA building) VOC concentrations have been below the indoor air screening criteria protective of human health; therefore, inhalation via the vapor intrusion is not a pathway of concern in buildings that have undergone indoor air testing. However, inhalation is a pathway of potential concern in buildings that have not yet been tested and overlie portions of the shallow groundwater plume that exceed groundwater vapor intrusion screening criteria.

Residents may be exposed to contaminants via inhalation of indoor air impacted by vapor intrusion. This pathway has been investigated at select residences in Algona. Both summer and winter indoor air sampling has been completed and results were presented in the Algona Residential Vapor Intrusion Assessment Summary Report (Landau Associates 2014f). This pathway is currently considered not of concern because all indoor air detections, except one sample where vapor intrusion was not the source of the detection, were below long-term exposure screening levels.

Residents may be exposed to surface water in stormwater ditches where VOCs have been detected. However, the VOC detections in stormwater ditches in residential Algona are below screening levels and Washington State Department of Health (DOH) has reported that the levels of VOCs are not likely to cause health problems for people who come into contact with the water (DOH 2013). Therefore, this pathway is currently considered not of concern.

Exposure to groundwater contaminants through consumption of drinking water is an incomplete pathway because Auburn and Algona are supplied with drinking water through municipal service, with water supply wells located in a separate aquifer from the VOC plumes. DOH has reported that people are not using or drinking from the groundwater in the area where VOCs are found; therefore, the VOCs in the groundwater will not harm people's health (DOH 2012) through this pathway. However, DOH suggested a survey of unidentified private wells in the plume area, and Boeing is in the process of completing this private well survey.

Terrestrial and aquatic plants and animals are not exposed to contaminated soil and groundwater off Boeing property. The only exposure of aquatic and terrestrial plants and animals is to surface water or potentially to ambient/trench air (due to soil vapor) for burrowing animals. The surface water exposure pathway is complete for ingestion and dermal exposure to surface water for both aquatic and terrestrial receptors since VOCs have been detected in surface water ditches, the Auburn 400 flood storage ponds, and the east branch of Mill Creek (Landau Associates 2014a). The surface water pathway is under further investigation, and additional work is needed to determine if there is significant risk for ecological receptors.

7.0 SUMMARY

The Fall 2012 RI focused on characterizing the nature and extent of groundwater contamination both in the western plume source area and at the downgradient end of the plumes through the installation of additional monitoring wells and collection of borehole water samples. Results from this phase of investigation did not fully accomplish all goals of the investigation and some data gaps still remain. Key findings and remaining data gaps related to specific goals are identified below. In addition to providing information related to specific goals outlined in the work plan, data from this investigation has also been used to refine the hydrogeologic conceptual model and update the site conceptual model.

Goal #1 (characterization of the nature and extent of VOC contamination in groundwater):

- Groundwater data from new wells has helped to define the extent of the shallow zone groundwater plume to the north of SR 18 and northwest of The Outlet Collection.
- Additional well data helped to define the extent of the intermediate zone groundwater plume to the northwest of The Outlet Collection.
- Additional well data defined the extent of the deep zone groundwater plume west of the Auburn 400 south pond, northeast of The Outlet Collection, and south of Building 17-07.
- Several data gaps related to defining the western and northwestern extent of the plume remain. In order to complete the investigation of the plume boundaries, additional monitoring wells are proposed at locations in Auburn west of SR 167. These additional monitoring wells will be proposed in a separate work plan. Remaining data gaps that will be addressed by the additional work include:
  - The western extent of the shallow zone plume west of the Auburn 400 ponds has not been defined.
  - The western extent of the intermediate zone plume between Boundary Boulevard and SR 18 has not been defined.
  - The northwestern extent of the deep zone plume northwest of the SR 167/SR 18 interchange has not been defined.

Goal #2 (complete the western plume source evaluation):

- Deep and intermediate wells upgradient and crossgradient of Building 17-07 have helped define the western plume source area to a smaller area in the vicinity of Building 17-07
- A complete history and summary of the Building 17-07 source area evaluation is still needed and is being prepared as a separate document.

Goal #3 (identify vertical concentration trends in shallow groundwater):

- Water table wells helped to identify concentration trends in shallow zone
- Evaluation of data from water table wells, borehole samples and CMT wells indicate that VOC concentrations are typically lower at the water table and shallower portions of the shallow groundwater zone than in deeper portions of the shallow groundwater zone.

8.0 USE OF THIS REPORT

This report has been prepared for the exclusive use of The Boeing Company for specific application to the Auburn Fabrication Division RI. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following environmental key staff.

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Eric F. Weber, L.Hg., CWRE
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SEF/EFW/jrc

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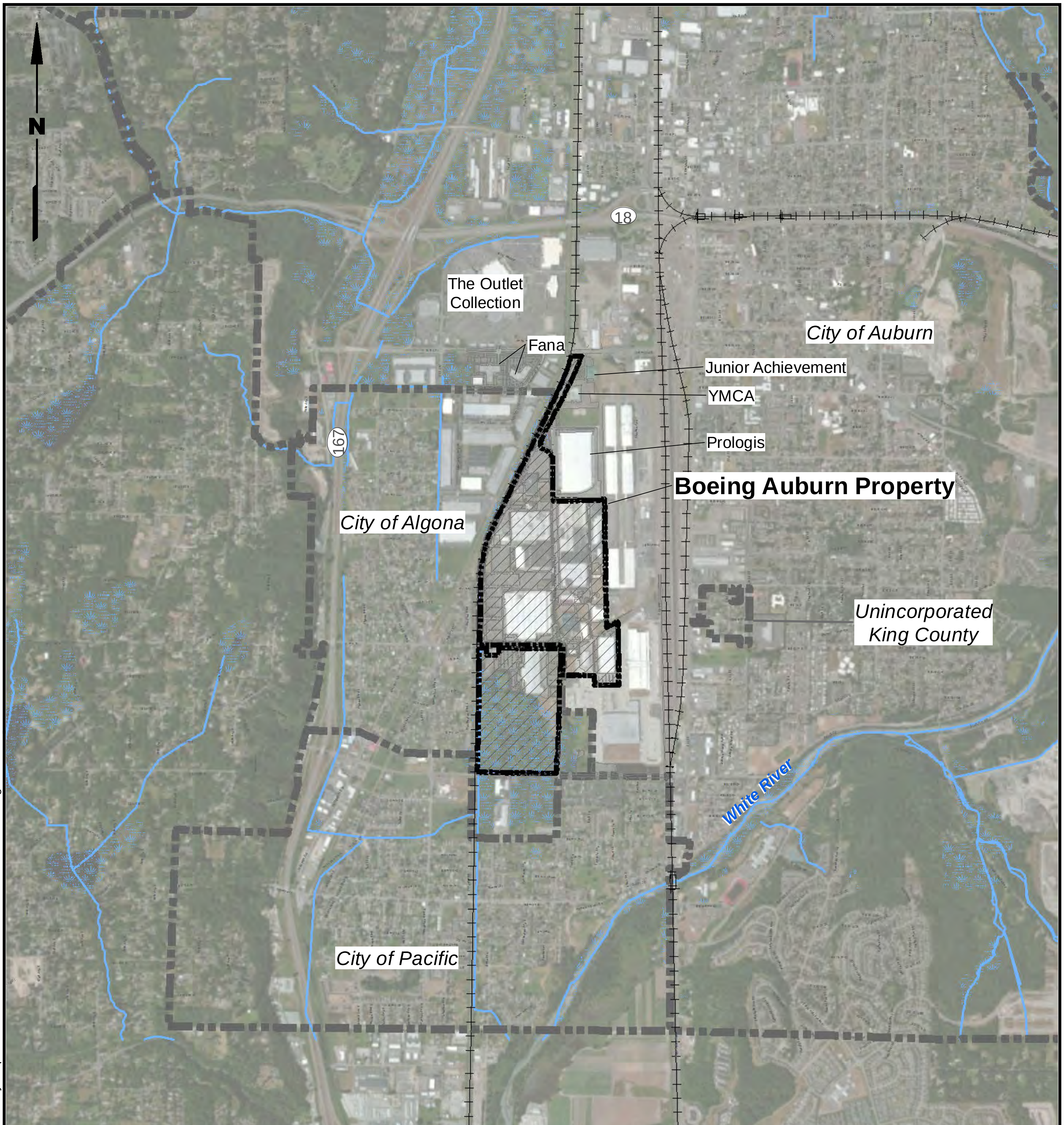
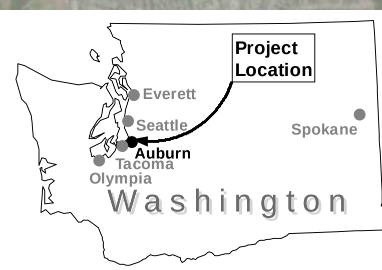


Legend

- Waterways
- Wetland Areas
- City Limits
- Boeing Property

0 3,000 6,000

Feet

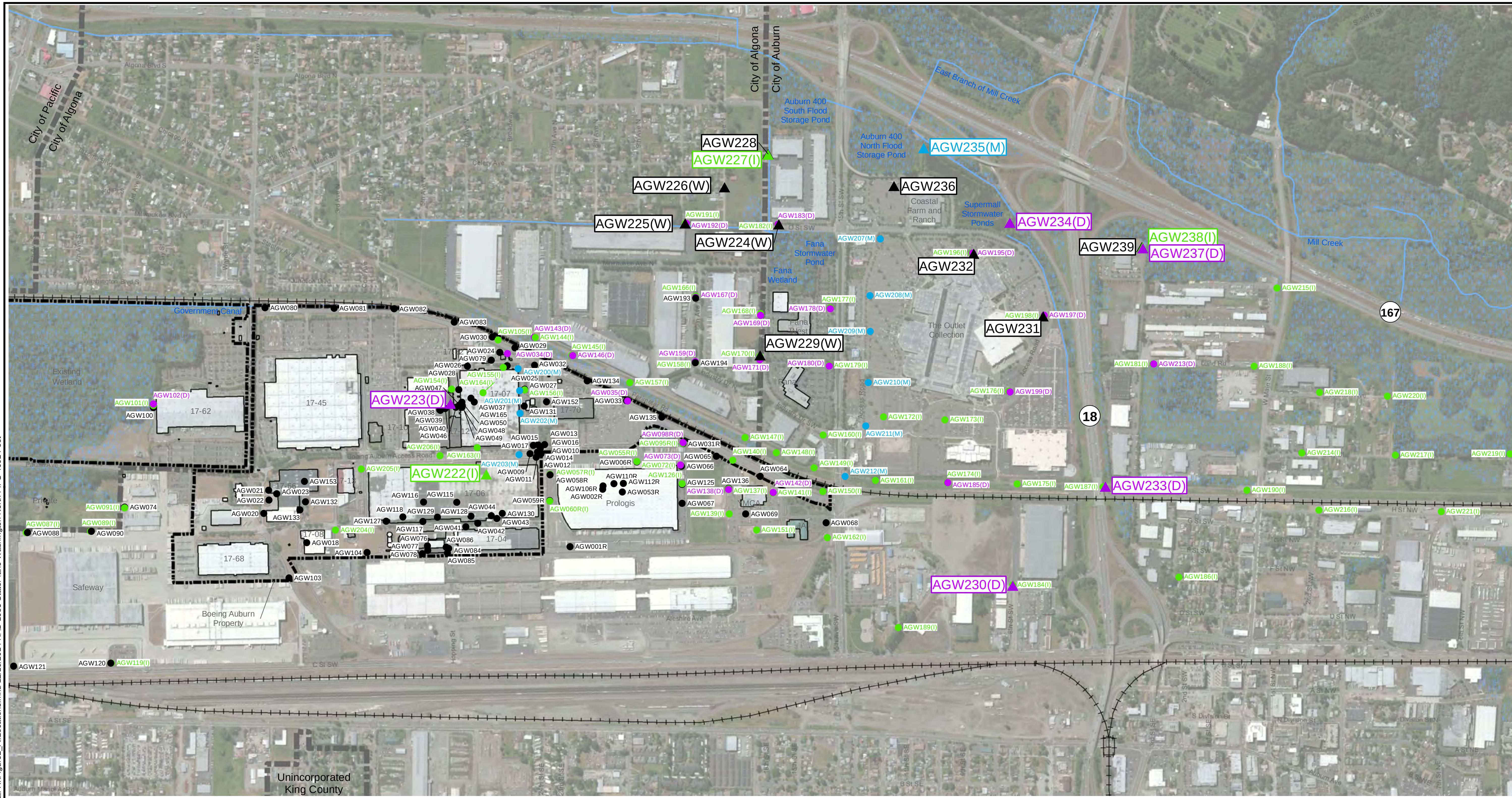


Base map source: Geometrix 2003; Aerial Photo Source: ESRI World Imagery; Parcel Data Source: King County GIS 2012

G:\Projects\025\164\110\111\2012 Fall RI\Figure1 Vicinity Map.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

LANDAU ASSOCIATES

Boeing Auburn Auburn, Washington	**Vicinity Map**	Figure 1



G:\Projects\025\164\110\111\2012 Fall RI\Figure2_AllLocations.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- ▲ New Shallow Monitoring Well (10 to 30 ft BGS)
- (W) ▲ New Shallow Water Table Well (2 to 18 ft BGS)
- (I) ▲ New Intermediate Monitoring Well (40 to 60 ft BGS)
- (D) ▲ New Deep Monitoring Well (80 to 100 ft BGS)
- (M) ▲ New Multi-Level Well
- ● Shallow Monitoring Well (10 to 30 ft BGS)
- (I) ● Intermediate Monitoring Well (40 to 60 ft BGS)
- (D) ● Deep Monitoring Well (80 to 100 ft BGS)
- (M) ● Multi-Level Well

N

0 1,000 2,000

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: ESRI World Imagery; Parcel Data Source: King County GIS 2012

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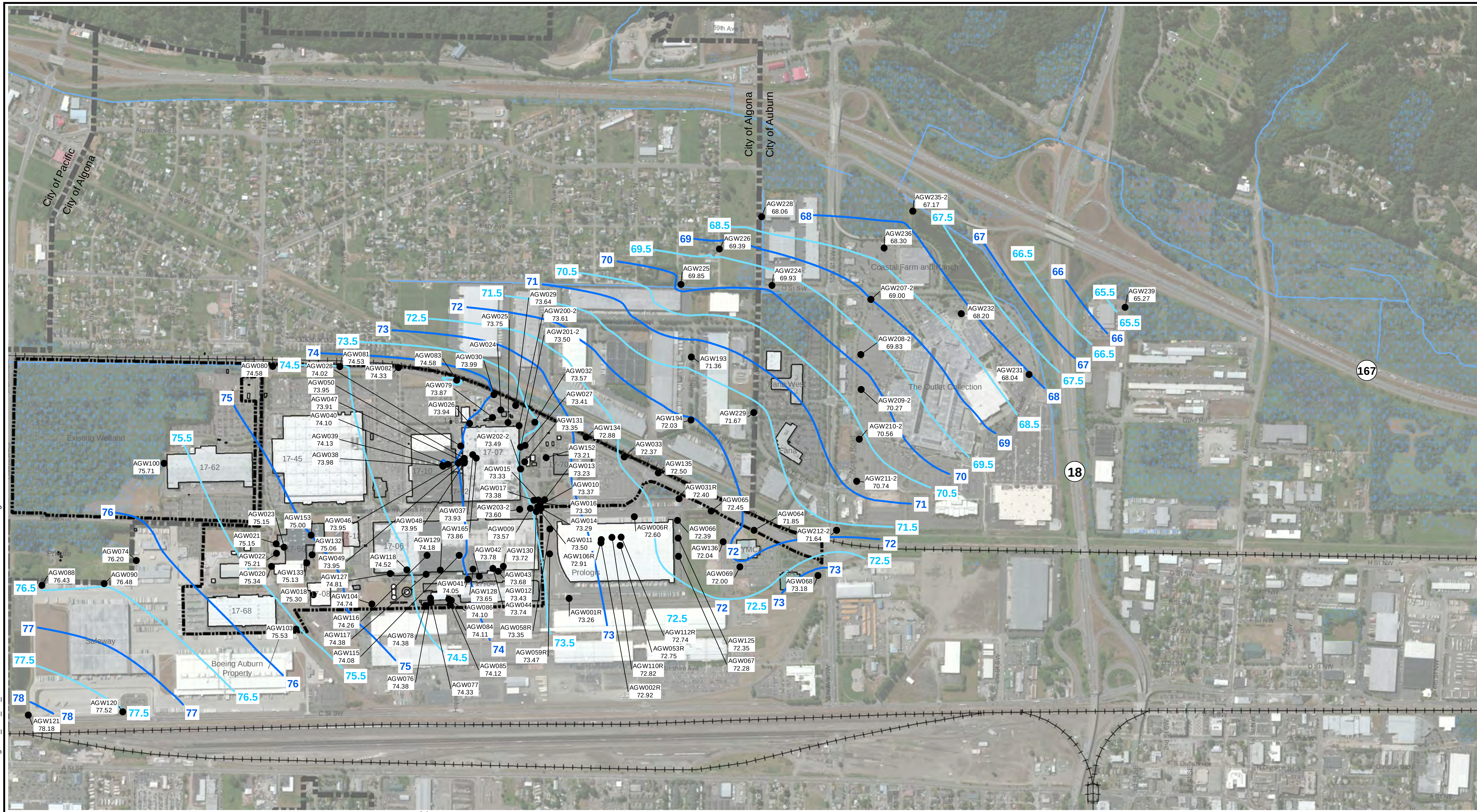
Boeing Auburn Auburn, Washington	**New Well Locations and Current Monitoring Well Network**	Figure 2



Legend

- ● AGW021 75.83 — Monitoring Well Designation / Groundwater Elevation (ft, MSL)
- 72 / 72.5 — Groundwater Contours
- Boeing Property
- Waterway
- Wetland Area
- Surface Waterbody
- Parcel Boundary
- City Limits

Notes

1. All water level data in ft, MSL. Data collected in January 2014.
2. Wells without a water level had anomalous data and were removed from the contour map.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

N

0 1,000 2,000

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

G:\Projects\025\164\110\111\2012 Fall RI\Figure3_GW_SZ_Jan14.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

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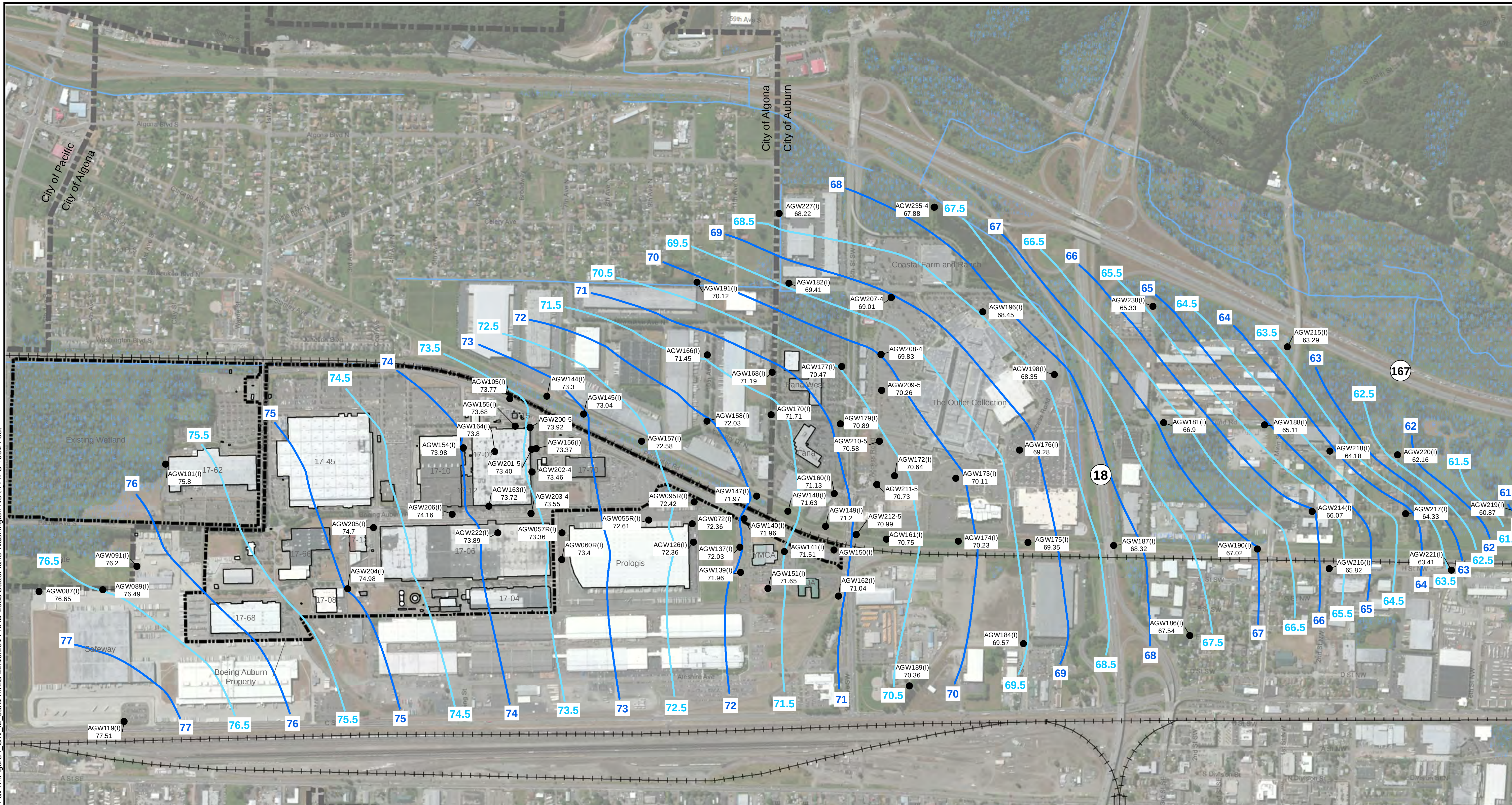
Boeing Auburn
Auburn, Washington

Shallow Zone Groundwater Contours January 2014

Figure 3



Legend

- ● AGW136(I) 74.27 — Monitoring Well Designation / Groundwater Elevation (ft, MSL)
- 72 / 72.5 — Groundwater Contours
- Boeing Property
- Waterway
- Wetland Area
- Surface Waterbody
- Parcel Boundary
- City Limits

Notes

1. All water level data in ft, MSL. Data collected in January 2014.
2. Wells without a water level had anomalous data and were removed from the contour map.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

N

0 1,000 2,000

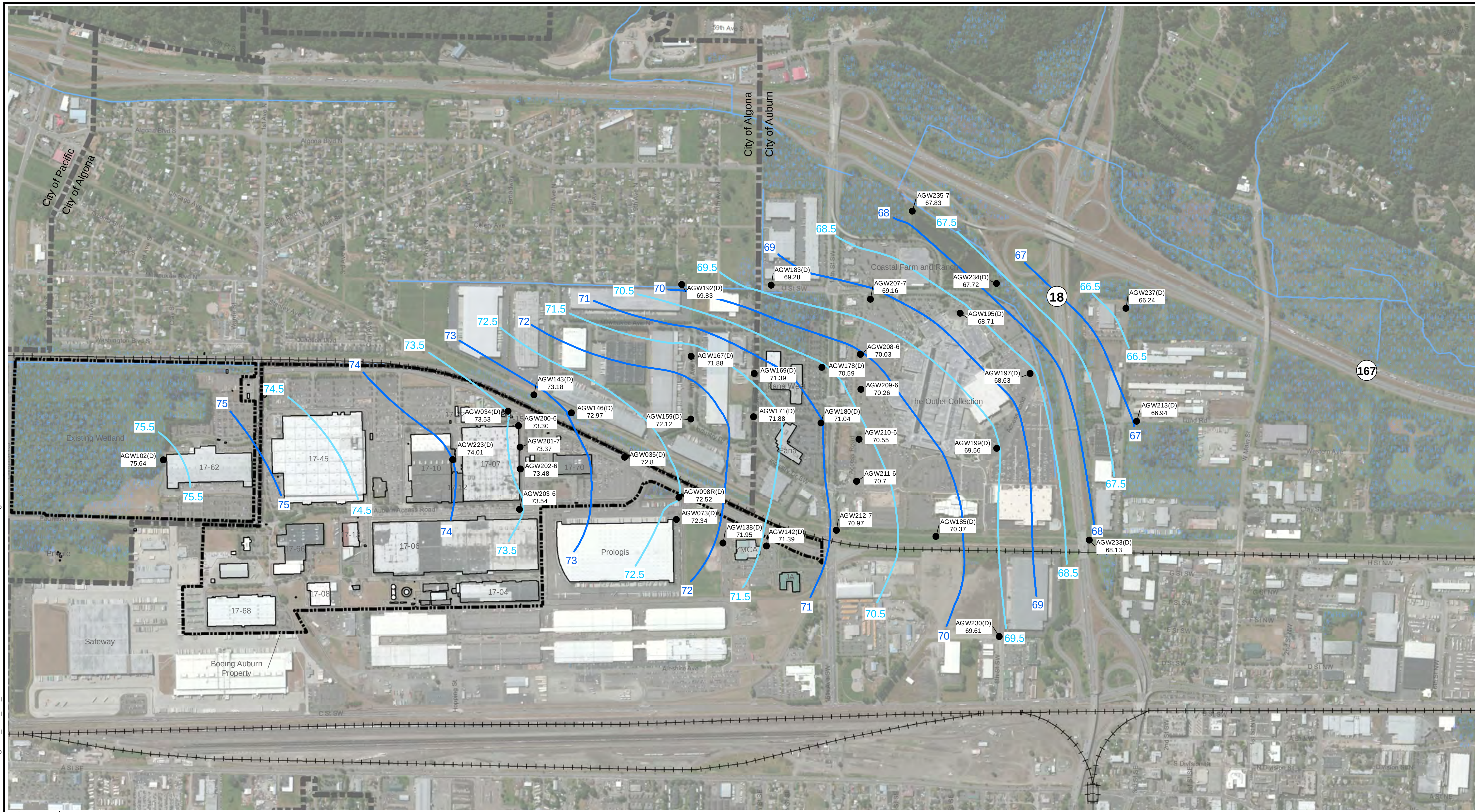
Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

G:\Projects\025\164\110\11\2012 Fall RI\Figure4_GW_IZ_Jan14.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Landau Associates

Boeing Auburn Auburn, Washington	**Intermediate Zone Groundwater Contours January 2014**	Figure 4



Legend
- AGW223(D) 74.81 — Monitoring Well Designation, Groundwater Elevation (ft, MSL)
- 72 / 72.5 — Groundwater Contours
- Boeing Property
- Waterway
- Wetland Area
- Surface Waterbody
- Parcel Boundary
- City Limits

Notes
1. All water level data in ft, MSL. Data collected in January 2014.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 1,000 2,000
Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

G:\Projects\025\164\110\111\2012 Fall RI\Figure5_GW_DZ_Jan14.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

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Boeing Auburn
Auburn, Washington

Deep Zone Groundwater Contours January 2014

Figure 5

G:\Projects\025\164\110\111\2012 Fall RI\Figure6VerticalHydraulicGradientShallowIntermediateZone.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes
1. Water levels collected on January 14-15, 2014.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend
- Neutral Hydraulic Gradient
- Upward Hydraulic Gradient
- Downward Hydraulic Gradient
- Wetland Areas
- Water Bodies
- Waterways

N

0 750 1,500
Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: ESRI World Imagery; Parcel Data Source: King County GIS 2012

Landau Associates

Boeing Auburn
Auburn, Washington

Vertical Hydraulic Gradient Shallow Zone to Intermediate Zone

Figure 6

G:\Projects\025\164\110\111\2012 Fall RI\Figure7VerticalHydraulicGradientIntermediateDeepZone.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes

1. Water levels collected on January 14-15, 2014.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Upward Hydraulic Gradient
- Downward Hydraulic Gradient
- Wetland Areas
- Water Bodies
- Waterways

N

Scale in Feet: 0 — 750 — 1,500

Base map source: Geometrix 2003; Aerial Photo Source: ESRI World Imagery; Parcel Data Source: King County GIS 2012

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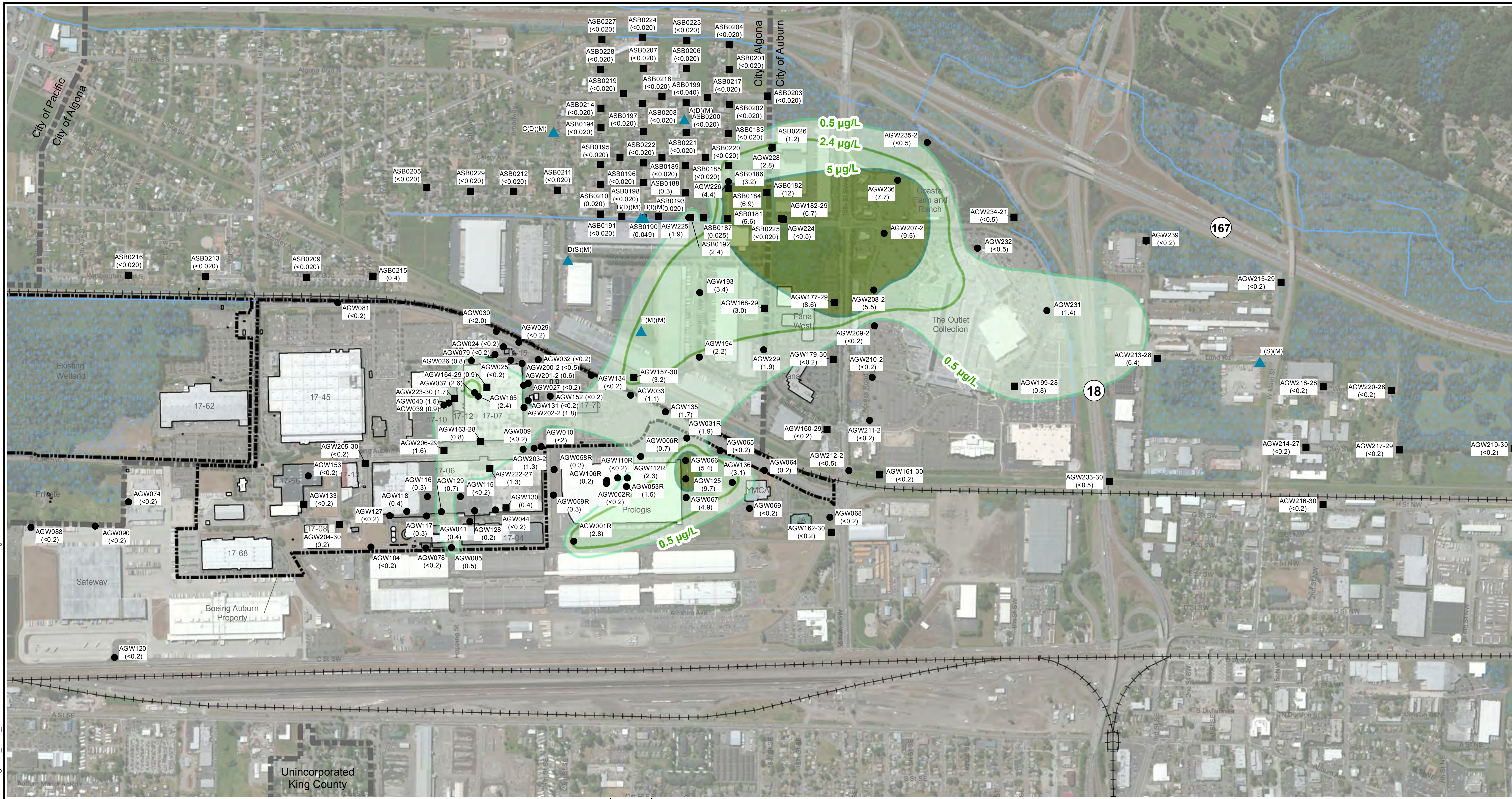
Boeing Auburn
Auburn, Washington

Vertical Hydraulic Gradient Intermediate Zone to Deep Zone

Figure 7



Notes

1. All concentrations shown in µg/L.
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent (December 2013). Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-1). Channels 1 and 2 are in the shallow aquifer zone.
5. Direct-Push data collected at multiple depths. Only the hightest concentration is represented.
6. Groundwater monitoring wells are identified by the AGW prefix. Soil borings from the April 2013 Direct-Push investigation are identified by the ASB prefix.
7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- ▲ Proposed Well Location
- ● Monitoring Well Location
- ■ Borehole Grab Sample Location
- TCE Contour = > 5.0 µg/L
- TCE Contour = > 2.4 µg/L
- TCE Contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Boeing Property
- City Limits

N

0 1,000 2,000

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

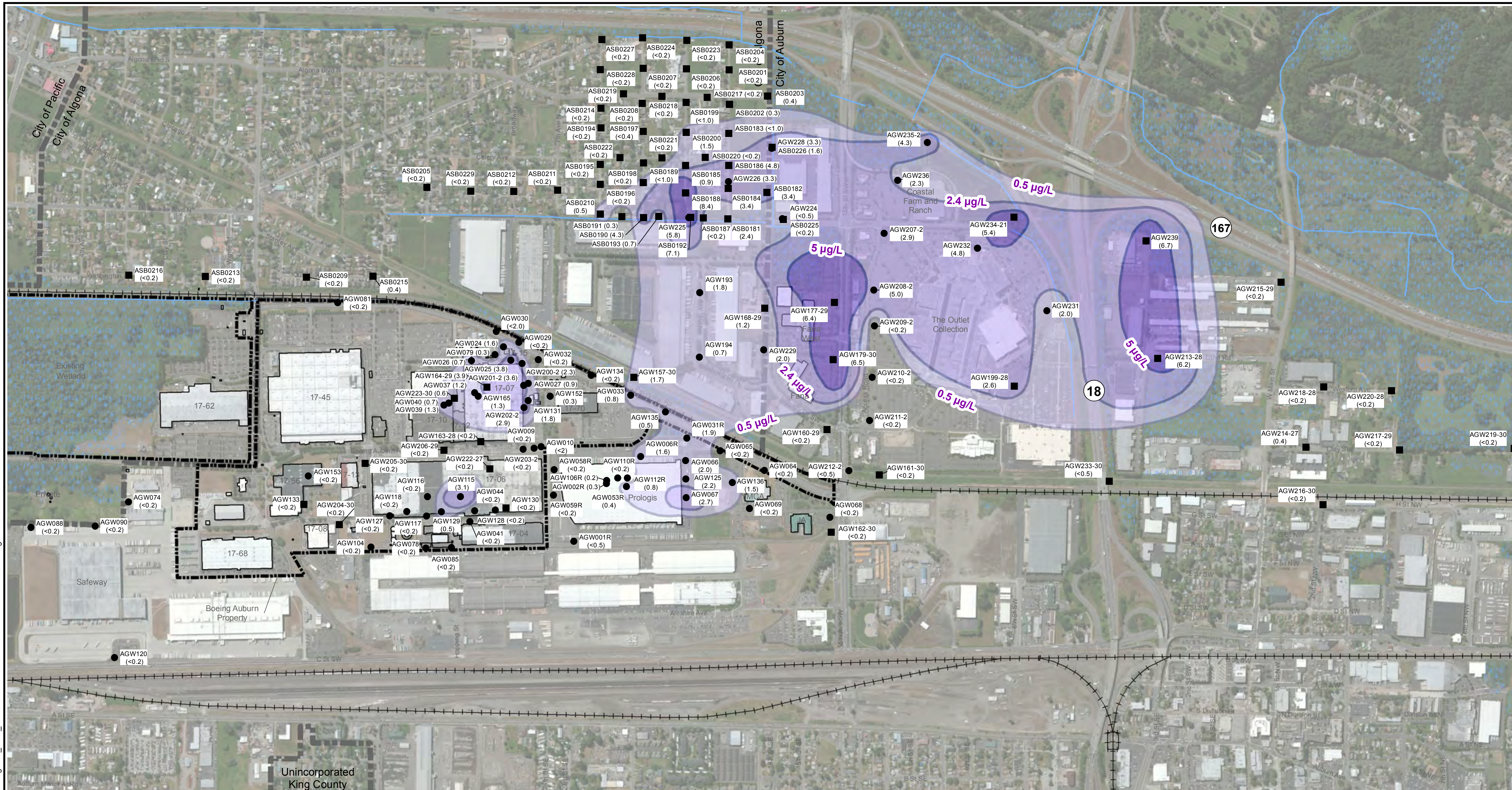
Boeing Auburn
Auburn, Washington

Shallow Zone (0-30 ft)
TCE Concentrations
Most Recent

Figure
8

LANDAU ASSOCIATES

G:\Projects\025\164\110\111\2012 Fall RI\Figure8_TCE_SZ.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet



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Notes

1. All concentrations shown in µg/L.
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent (December 2013). Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-1). Channels 1 and 2 are in the shallow aquifer zone.
5. Direct-Push data collected at multiple depths. Only the hightest concentration is represented.
6. Groundwater monitoring wells are identified by the AGW prefix. Soil borings from the April 2013 Direct-Push investigation are identified by the ASB prefix.
7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- ● Monitoring Well Location
- ■ Borehole Grab Sample Location
- cis-1,2-DCE Contour = > 5.0 µg/L
- cis-1,2-DCE Contour = > 2.4 µg/L
- cis-1,2-DCE Contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Boeing Property
- City Limits

N

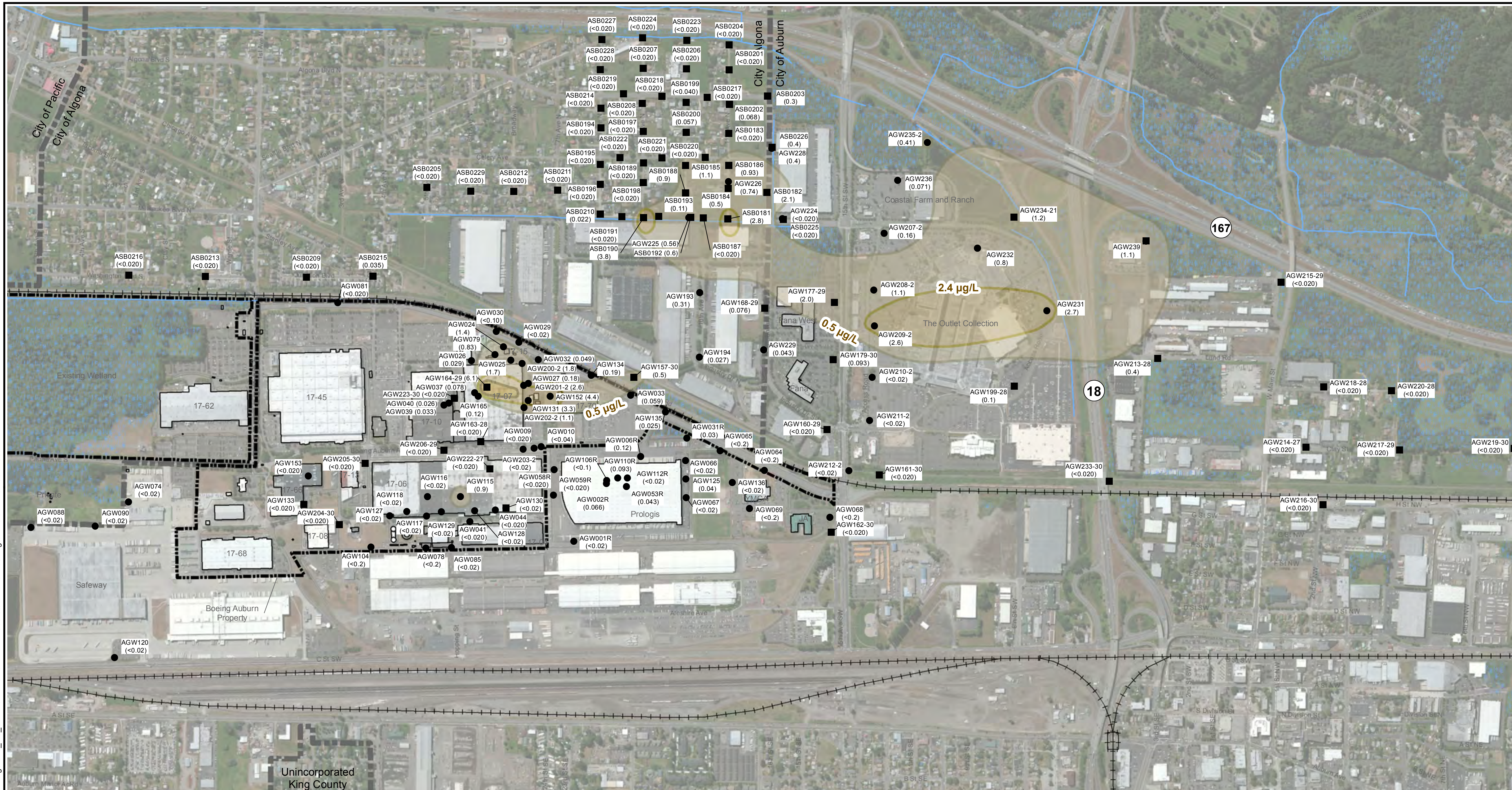
0 1,000 2,000

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

LANDAU ASSOCIATES

Boeing Auburn Auburn, Washington	Shallow Zone (0-30 ft) cis-1,2-DCE Concentrations Most Recent	Figure 9



G:\Projects\025\164\110\111\2012 Fall RI\Figure10_VC_SZ.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes

1. All concentrations shown in µg/L.
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent (December 2013). Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-1). Channels 1 and 2 are in the shallow aquifer zone.
5. Direct-Push data collected at multiple depths. Only the hightest concentration is represented.
6. Groundwater monitoring wells are identified by the AGW prefix. Soil borings from the April 2013 Direct-Push investigation are identified by the ASB prefix.
7. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Borehole Grab Sample Location
- Vinyl Chloride Contour = > 5.0 µg/L
- Vinyl Chloride Contour = > 2.4 µg/L
- Vinyl Chloride Contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Boeing Property
- City Limits

N

0 1,000 2,000

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

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Boeing Auburn
Auburn, Washington

Shallow Zone (0-30 ft) Vinyl Chloride Concentrations Most Recent

Figure 10

G:\Projects\025\164\110\111\2012 Fall RI\Figure11_TCE_IZ.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes

1. All concentrations shown in µg/L.
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent (December 2013). Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-5). Channels 3, 4 and 5 are in the intermediate aquifer zone. For well AGW235 Channels 4,5 & 6 are in the intermediate aquifer zone.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- ● Monitoring Well Location
- ■ Borehole Grab Sample Location
- TCE Contour = > 5.0 µg/L
- TCE Contour = > 2.4 µg/L
- TCE Contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Boeing Property
- City Limits

N

0 1,000 2,000

Scale in Feet

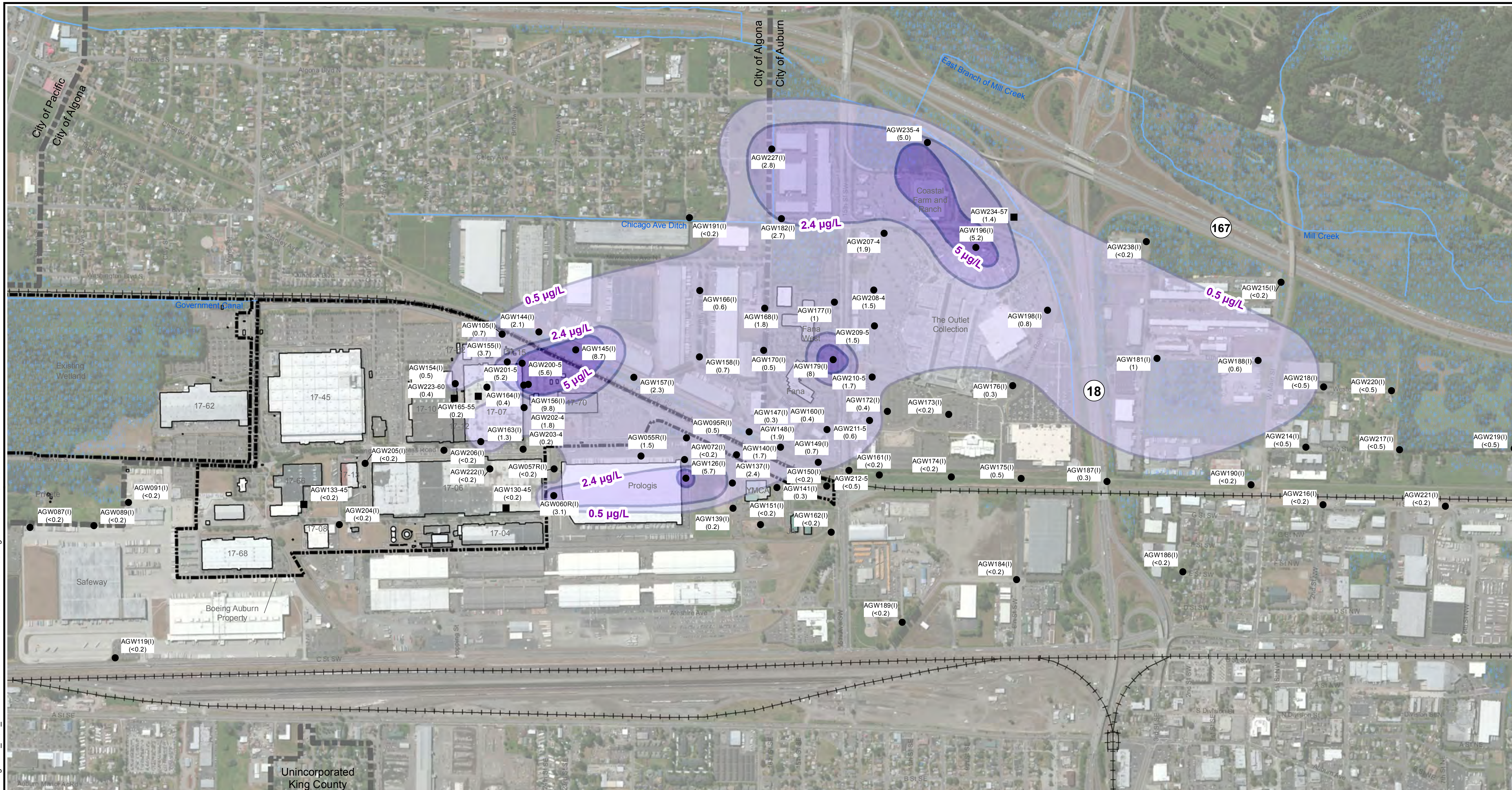
Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Intermediate Zone (40-60 ft)
TCE Concentrations
Most Recent

Figure
11



G:\Projects\025\164\110\111\2012 Fall RI\Figure12_DCE_IZ.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes

1. All concentrations shown in µg/L.
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent (December 2013). Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-5). Channels 3, 4 and 5 are in the intermediate aquifer zone. For well AGW235 Channels 4,5 & 6 are in the intermediate aquifer zone.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- ● Monitoring Well Location
- ■ Borehole Grab Sample Location
- cis-1,2-DCE Contour = > 5.0 µg/L
- cis-1,2-DCE Contour = > 2.4 µg/L
- cis-1,2-DCE Contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Boeing Property
- City Limits

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

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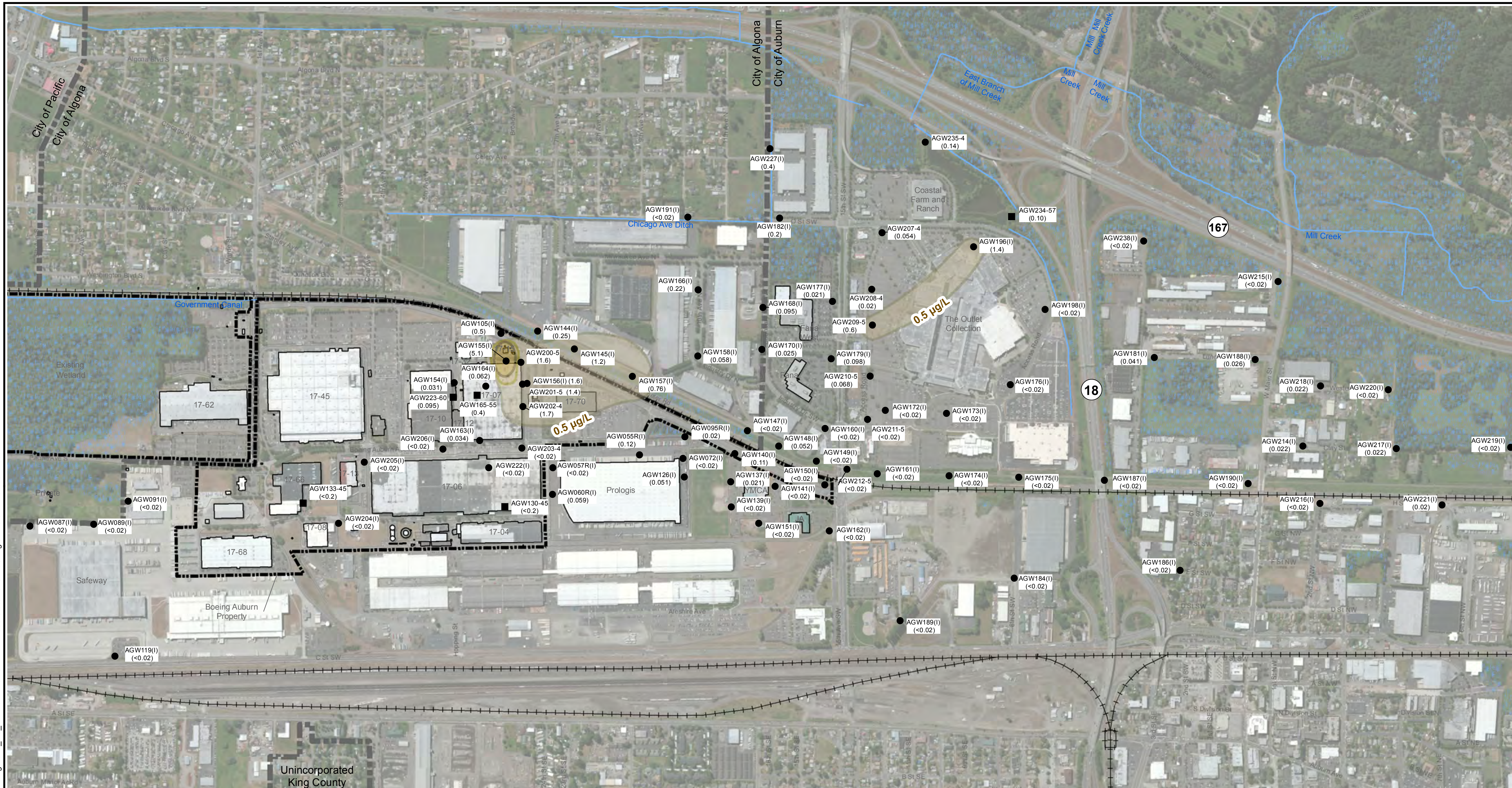
Boeing Auburn Auburn, Washington	**Intermediate Zone (40-60 ft) cis-1,2-DCE Concentrations Most Recent**	Figure 12



G:\Projects\025\164\110\111\2012 Fall RI\Figure13_VC_IZ.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes

1. All concentrations shown in µg/L.
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent (December 2013). Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-5). Channels 3, 4 and 5 are in the intermediate aquifer zone. For well AGW235 Channels 4,5 & 6 are in the intermediate aquifer zone.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Borehole Grab Sample Location
- Vinyl Chloride Contour = > 5.0 µg/L
- Vinyl Chloride Contour = > 2.4 µg/L
- Vinyl Chloride Contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Boeing Property
- City Limits

N

0 1,000 2,000

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Intermediate Zone (40-60 ft)
Vinyl Chloride Concentrations
Most Recent

Figure 13

G:\Projects\025\164\110\111\2012 Fall RI\Figure14_TCE_DZ.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes

1. All concentrations shown in µg/L.
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent (December 2013). Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-6). Channels 6 and 7 are in the deep aquifer zone. For well AGW235 Channel 7 is in the deep aquifer zone.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- ● Monitoring Well Location
- ■ Borehole Grab Sample Location
- TCE Contour = > 5.0 µg/L
- TCE Contour = > 2.4 µg/L
- TCE Contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Boeing Property
- City Limits

N

0 1,000 2,000

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

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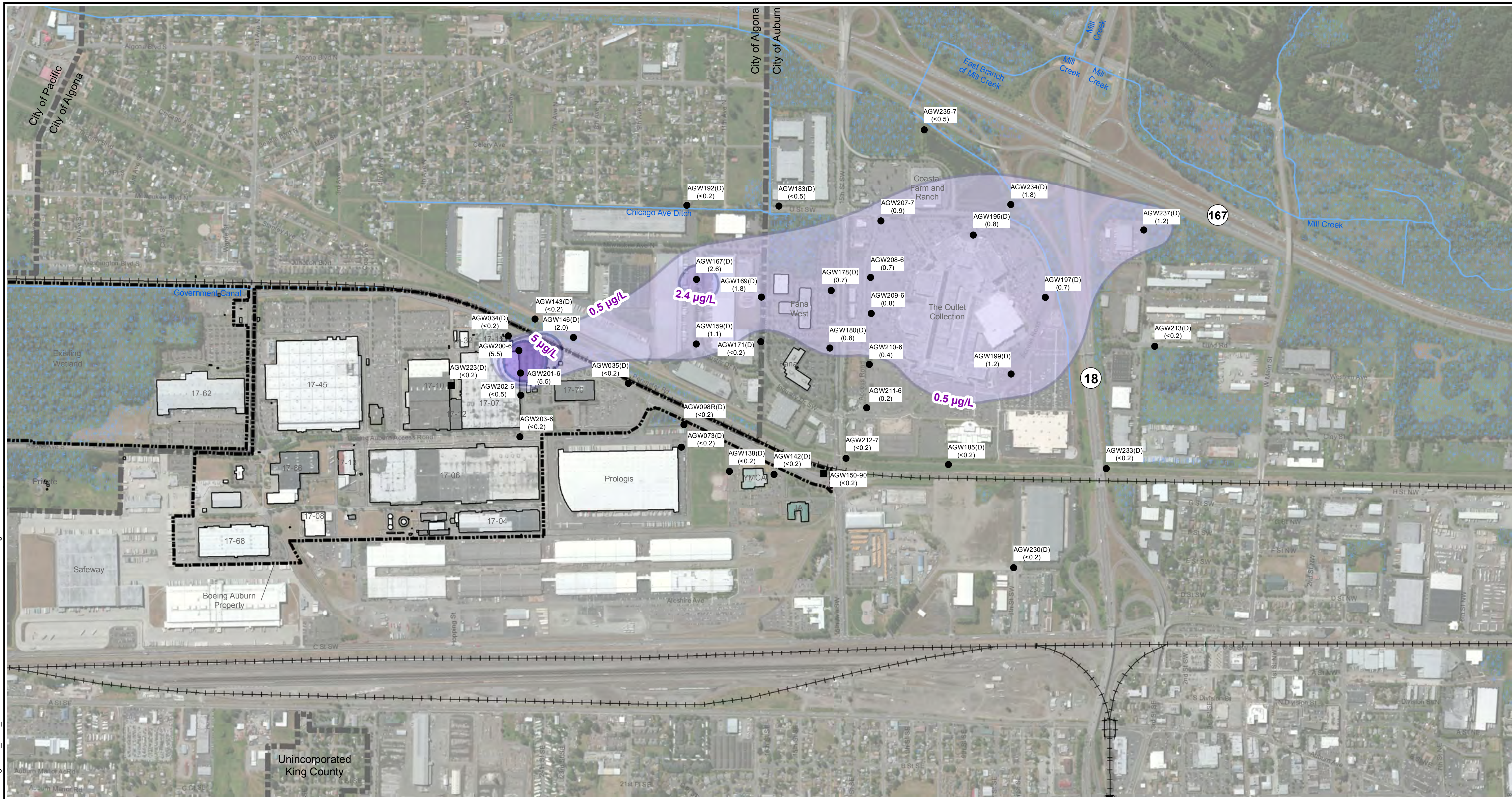
Boeing Auburn Auburn, Washington	**Deep Zone (80-100 ft) TCE Concentrations Most Recent**	Figure 14



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Notes

1. All concentrations shown in µg/L.
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent (December 2013). Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-5). Channels 3, 4 and 5 are in the intermediate aquifer zone. For well AGW235 Channels 4,5 & 6 are in the intermediate aquifer zone.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well Location
- Borehole Grab Sample Location
- cis-1,2-DCE Contour = > 5.0 µg/L
- cis-1,2-DCE Contour = > 2.4 µg/L
- cis-1,2-DCE Contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Boeing Property
- City Limits

N

0 1,000 2,000

Scale in Feet

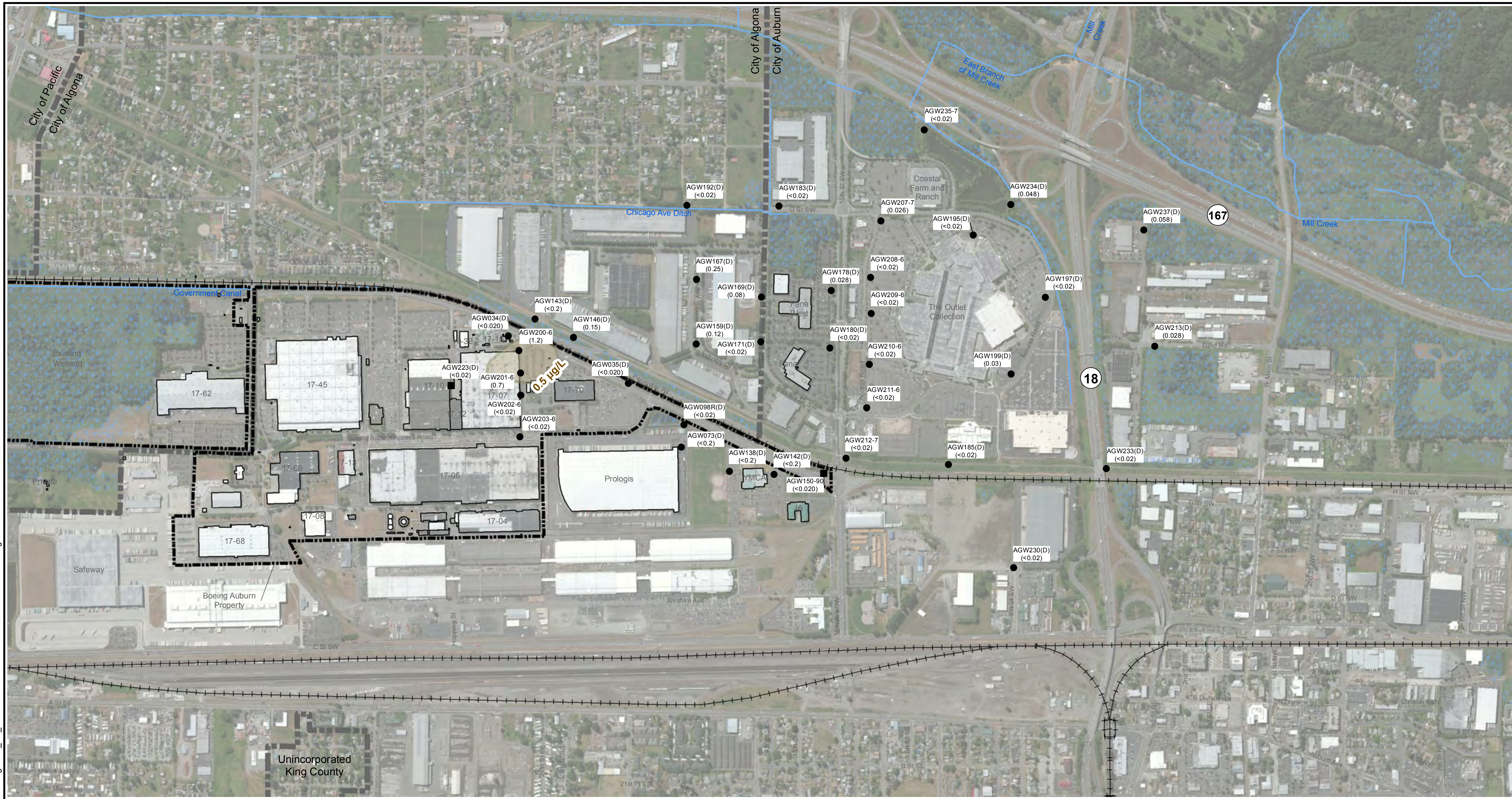
Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Deep Zone (80-100 ft)
cis-1,2-DCE Concentrations
Most Recent

Figure 15



Notes

1. All concentrations shown in µg/L.
2. <0.2 = Compound not detected at indicated reporting limit.
3. Monitoring well results are the most recent (December 2013). Direct-Push borehole sample results are from April 2013. Borehole grab samples from monitoring wells were collected at time of drilling.
4. Multilevel wells have seven well channels. Channel designations are included in the well ID (ex: AGW208-6). Channels 6 and 7 are in the deep aquifer zone. For well AGW235 Channel 7 is in the deep aquifer zone.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to interpretation.

Legend

- ● Monitoring Well Location
- ■ Borehole Grab Sample Location
- Vinyl Chloride Contour = > 5.0 µg/L
- Vinyl Chloride Contour = > 2.4 µg/L
- Vinyl Chloride Contour = ≥ 0.5 µg/L
- Waterways
- Wetland Areas
- Boeing Property
- City Limits

N

0 1,000 2,000

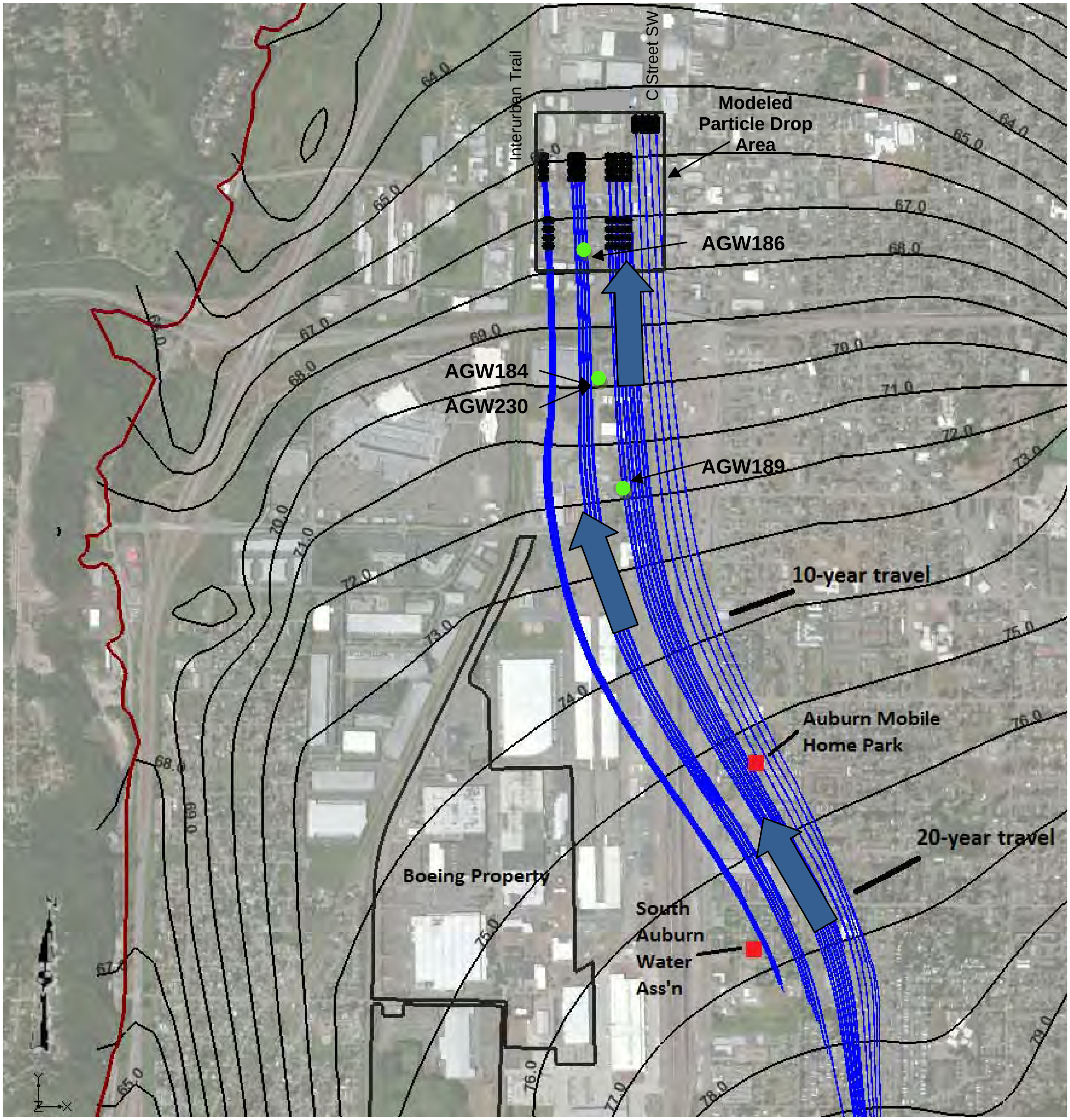
Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: Esri World Imagery; Parcel Data Source: King County GIS 2013

G:\Projects\025\164\010\111\2012 Fall RI\Figure16_VC_DZ.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Landau Associates

Boeing Auburn Auburn, Washington	**Deep Zone (80-100 ft) Vinyl Chloride Concentrations Most Recent**	Figure 16



Legend
- Model Boundary
- Modeled Groundwater Level Contours
- Groundwater Particle Tracking Flow Paths
- Drinking Water Groundwater Well
- Monitoring Well
- Groundwater Flow Direction

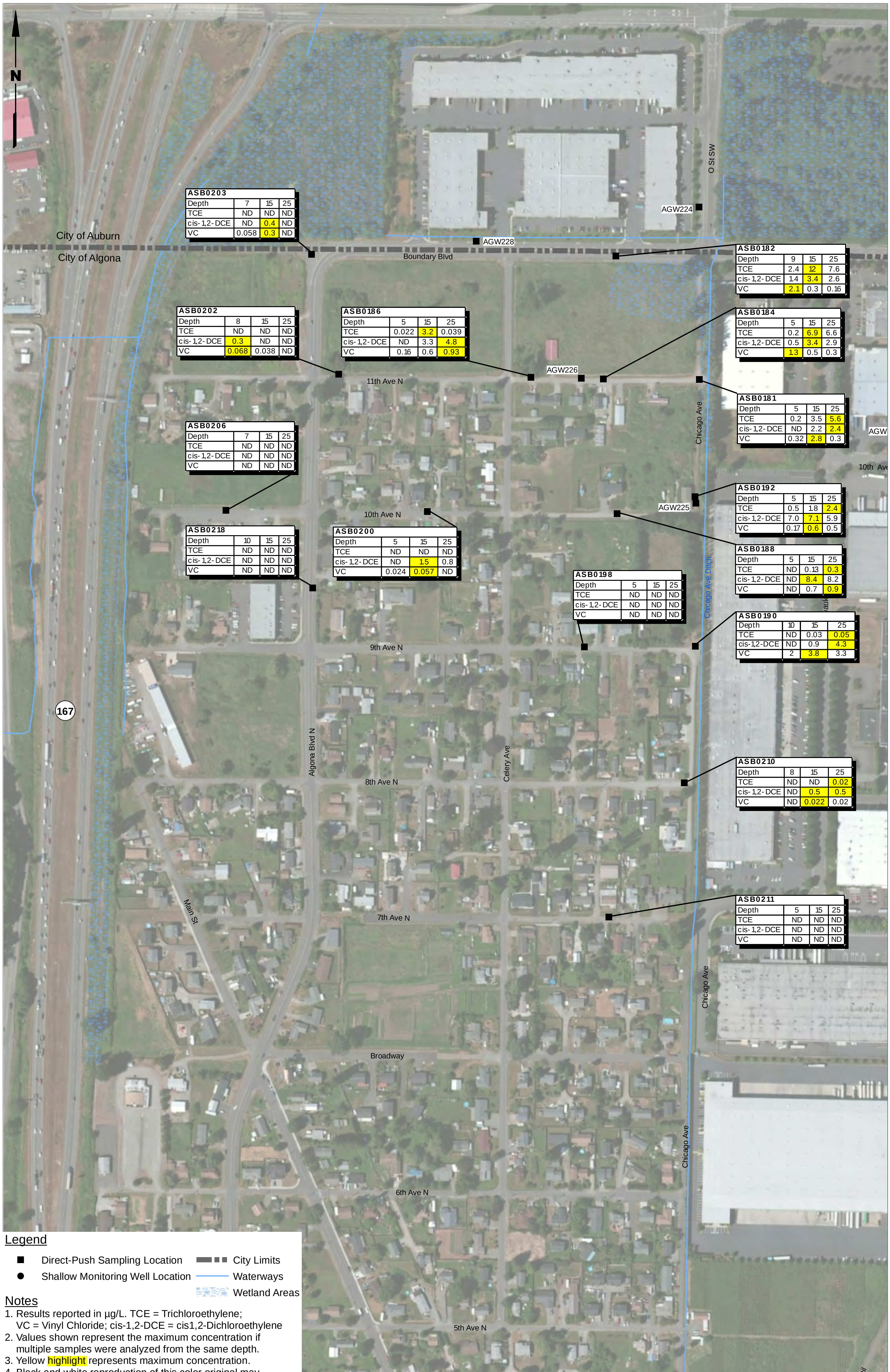
Notes
1. Groundwater contours are from a draft regional numerical MODFLOW groundwater model.
2. Particles were placed in the modeled intermediate depth zone and are shown tracked in reverse.

Source: T:\025\164\T\Modeling\BOA_Modeling\Areas 1 and 2_9-16-14

12/19/14 Fig 1 – Area 1 Particle Tracking

LANDAU ASSOCIATES

Boeing Auburn Auburn, Washington	**Modeled Groundwater Flow Using Reverse Particle Tracking**	Figure 17



Legend
- ■ Direct-Push Sampling Location
- ● Shallow Monitoring Well Location
- City Limits
- Waterways
- Wetland Areas

Notes
1. Results reported in µg/L. TCE = Trichloroethylene; VC = Vinyl Chloride; cis-1,2-DCE = cis1,2-Dichloroethylene
2. Values shown represent the maximum concentration if multiple samples were analyzed from the same depth.
3. Yellow highlight represents maximum concentration.
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Base map source: Geometrix 2003; Aerial Photo Source: ESRI World Imagery; Parcel Data Source: King County GIS 2012

0 300 600
Scale in Feet

LANDAU ASSOCIATES

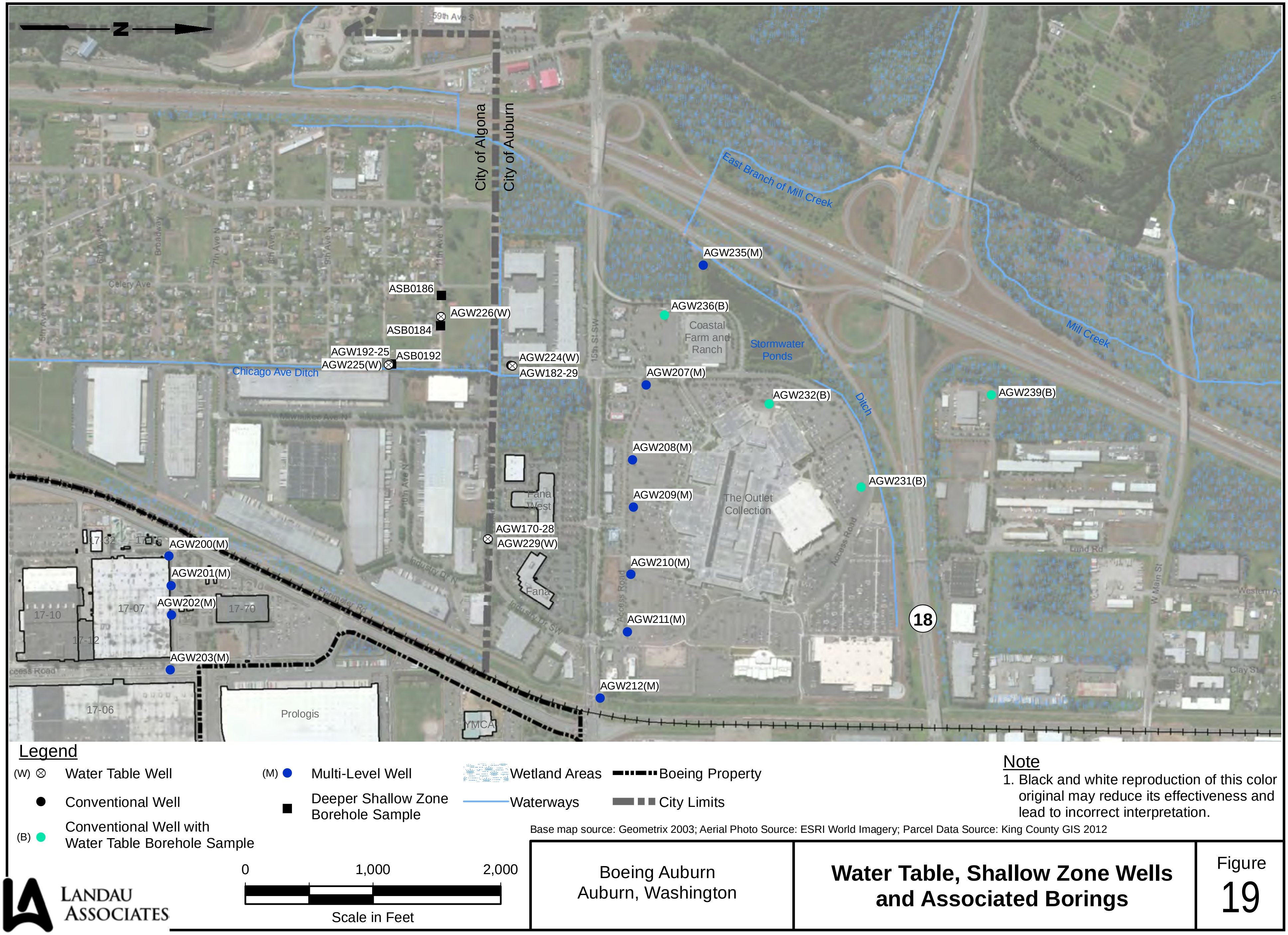
Boeing Auburn
Auburn, Washington

Direct-Push Drilling Results For Multi-Depth Direct-Push Sampling Locations - Algona

Figure 18

G:\Projects\025\164\110\111\2012 Fall RI\Figure18_North_Results.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

G:\Projects\025\164\110\111\2012 Fall RI\Figure19_MWNetwork.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet



Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

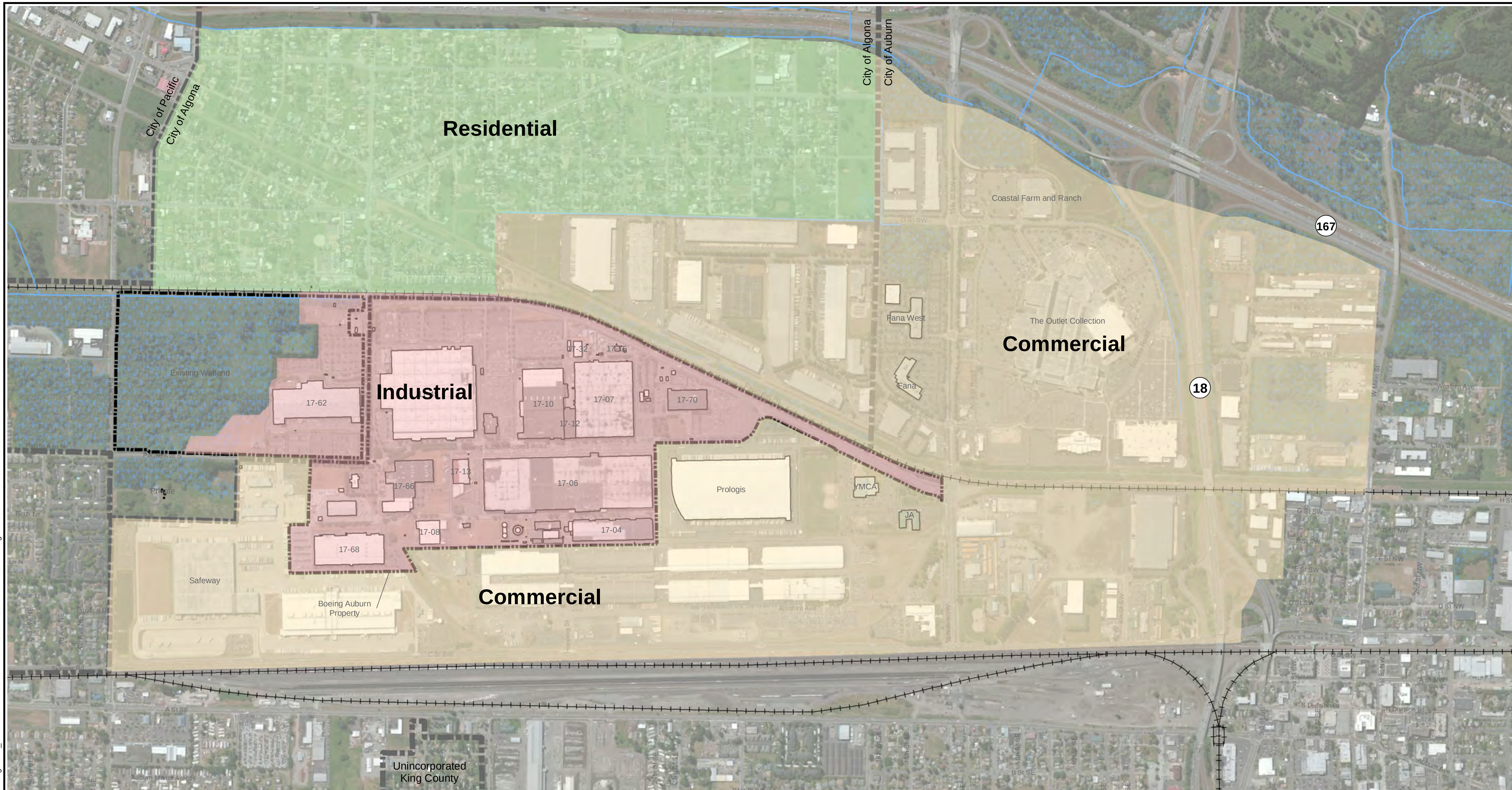
Base map source: Geometrix 2003; Aerial Photo Source: ESRI World Imagery; Parcel Data Source: King County GIS 2012

Landau Associates

Boeing Auburn
Auburn, Washington

Water Table, Shallow Zone Wells and Associated Borings

Figure 19



G:\Projects\025\164\110\111\2012 Fall RI\Figure20_LandUse.mxd 12/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Note

1. The land use areas delineated here represent those land use areas near or at which shallow groundwater is impacted by trichloroethene and vinyl chloride.

2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Commercial Land Use Area
- Industrial Land Use Area
- Residential Land Use Area

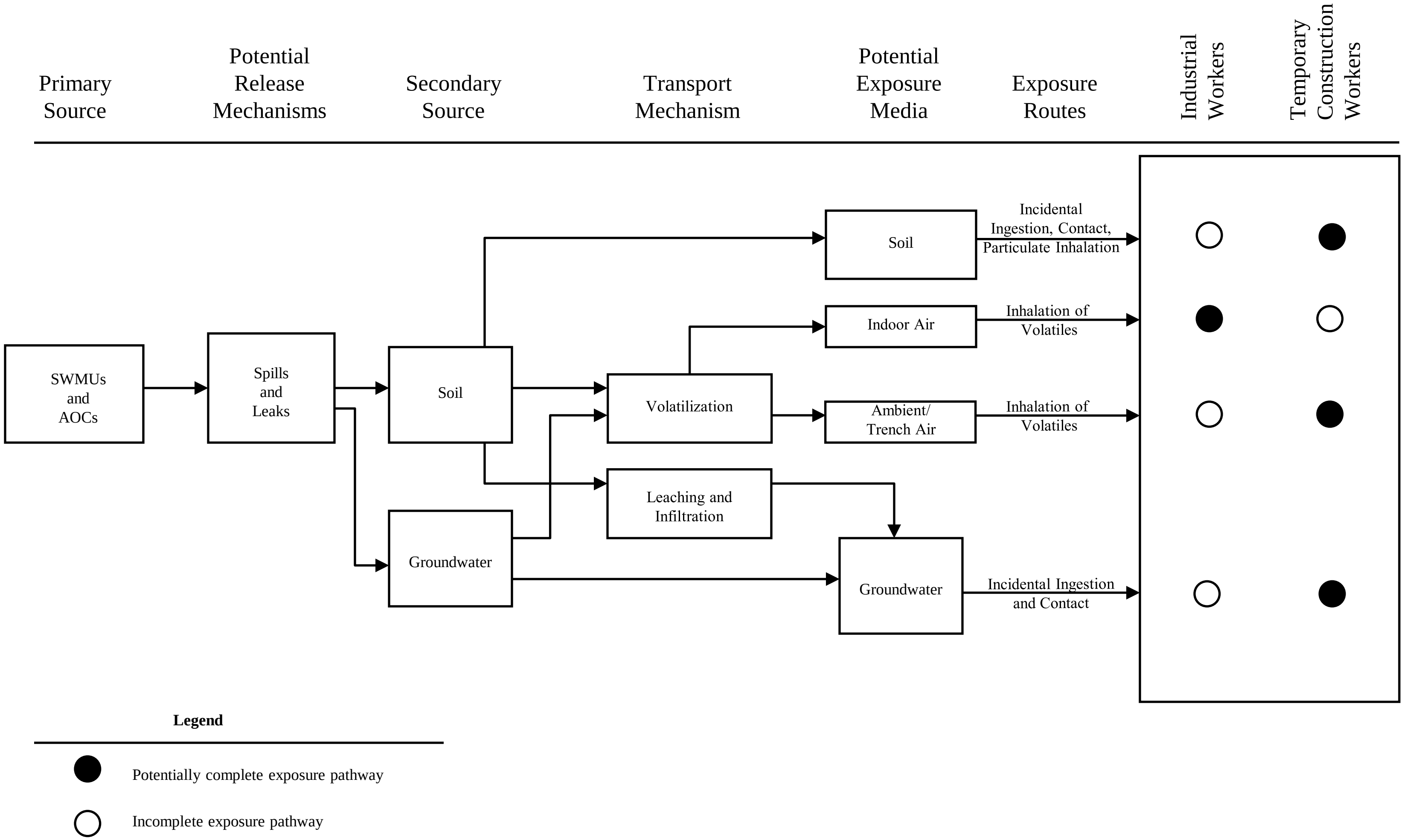
0 1,000 2,000

Scale in Feet

Base map source: Geometrix 2003; Aerial Photo Source: ESRI World Imagery; Parcel Data Source: King County GIS 2012

Landau Associates

Boeing Auburn Auburn, Washington	Land Use Areas	Figure 20

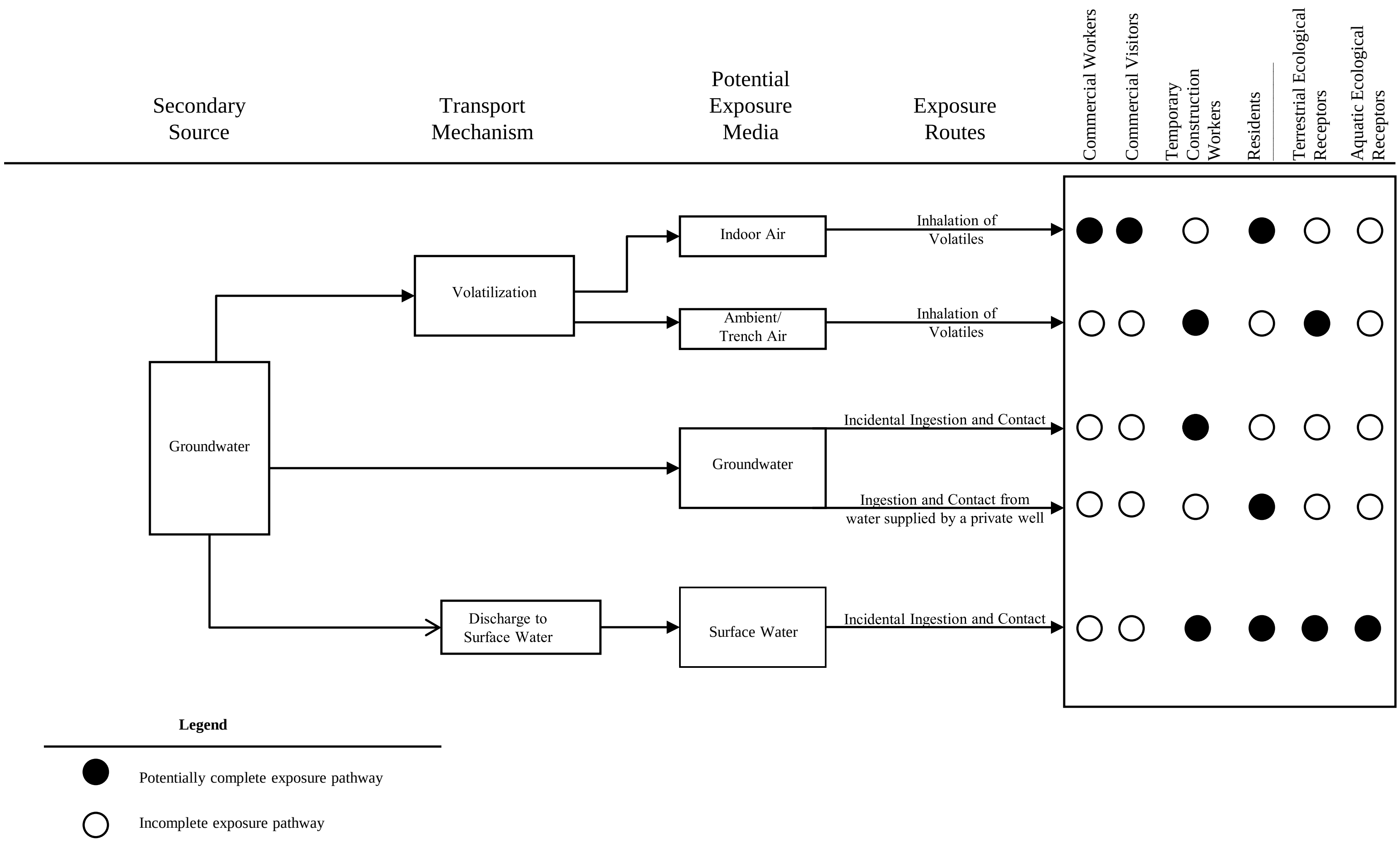


LANDAU ASSOCIATES

Boeing
Auburn Facility
Auburn, WA

Conceptual Site Model
For On Boeing Property

Figure
21



LANDAU ASSOCIATES

Boeing
Auburn Facility
Auburn, WA

Conceptual Site Model For Off Boeing Property

Figure 22

TABLE 1
DRILLING AND WELL INSTALLATION MATRIX
BOEING AUBURN
AUBURN, WASHINGTON

Well ID	Well Type	Coordinates		Top of Casing Elevation (ft)	Date of Installation	Aquifer	Well Permanent Screen Depth BGS (bottom) (ft)	Number of Borehole Samples	Borehole Sample depth ATD	Notes
		Northing	Easting							
AGW222	Conventional	107331.3	1291536.8	86.39	12/2/2012	I	59.4	1	27	
AGW223	Conventional	107086.5	1290710.5	86.15	12/4/2012	D	91.4	3	30, 60, 90	
AGW224	Water Table	110475.9	1288858.2	72.70	12/5/2012	S (WT)	17.1	0	NA	
AGW225	Water Table	109507.7	1288848.1	71.90	12/5/2012	S (WT)	18	0	NA	
AGW226	Water Table	109916.3	1288473.2	69.75	12/5/2012	S (WT)	17.5	0	NA	
AGW227	Conventional	110364.7	1288137.0	71.52	12/6/2012	I	50	0	NA	
AGW228	Conventional	110364.6	1288129.3	71.79	12/6/2012	S	28	0	NA	
AGW229	Water Table	110281.7	1290211.5	79.94	12/7/2012	S (WT)	17.5	0	NA	
AGW230	Conventional	112891.9	1292589.8	77.45	12/10/2012	D	84	0	NA	
AGW231	Conventional	113205.2	1289807.5	73.1	5/19/2013	S	30	1	9	
AGW232	Conventional	112488.0	1289159.8	78.0	5/20/2013	S	30.6	1	14	
AGW233	Conventional	113849.1	1291566.9	71.6	5/21/2013	D	82.9	1	30	
AGW234	Conventional	112863.7	1288840.0	69.6	5/22/2013	D	83.8	2	21, 57	
AGW235	Multi-level	111970.8	1288070.6		5/24/2013	S, I, D	73	0	NA	
AGW235-1				69.94		S	9			Channel 1 of AGW235
AGW235-2				69.94		S	19			Channel 2 of AGW235
AGW235-3				69.94		S	29			Channel 3 of AGW235
AGW235-4				69.95		I	39			Channel 4 of AGW235
AGW235-5				69.95		I	49			Channel 5 of AGW235
AGW235-6				69.95		I	59			Channel 6 of AGW235
AGW235-7				69.95		D	71.1			Channel 7 of AGW235
AGW236	Conventional	111665.9	1288460.4	74.9	5/28/2013	S	30	1	14	
AGW237	Conventional	114236.6	1289103.2	70.5	9/23/2013	D	80.3	0	NA	
AGW238	Conventional	114232.1	1289095.3	70.3	9/24/2013	I	61	0	NA	
AGW239	Conventional	114227.1	1289089.0	70.8	9/25/2013	S	30.6	1	8.5	

ATD = At time of drilling
BGS = Below ground surface
Conventional = Well with a single screen located in either the shallow, intermediate, or deep zone.
D = Deep
ft = Feet
I = Intermediate
Multilevel = Well with up to seven separate screens, which are located in the shallow, intermediate, and deep zones.
NA = Not applicable
S = Shallow Zone

Notes:
Coordinate System and Zone: Washington State Plane, North Zone Coordinates
Horizontal Datum: North American Datum of 1983 (91), North Zone, U.S. Feet.
Vertical Datum: National Geodetic Vertical Datum of 1929, U.S. Feet.
To convert elevations shown hereon to North American Vertical Datum of 1988 elevations please add 3.49 feet.

TABLE 2
WATER LEVELS: JUNE 2013
BOEING AUBURN
AUBURN, WASHINGTON

Well	Depth to Water (ft)	Date	Aquifer Zone	Groundwater Elevation (ft. MSL)
AGW001R	13.89	1/14/2014	S	73.26
AGW002R	18.03	1/15/2014	S	72.92
AGW006R	13.86	1/14/2014	S	72.60
AGW009	12.80	1/15/2014	S	73.57
AGW010	12.88	1/14/2014	S	73.37
AGW011	12.78	1/15/2014	S	73.50
AGW012	12.82	1/14/2014	S	73.43
AGW013	12.62	1/14/2014	S	73.23
AGW014	12.62	1/14/2014	S	73.29
AGW015	12.38	1/15/2014	S	73.33
AGW016	12.46	1/14/2014	S	73.30
AGW017	12.72	1/14/2014	S	73.38
AGW018	12.36	1/15/2014	S	75.30
AGW020	14.45	1/14/2014	S	75.34
AGW021	14.56	1/15/2014	S	75.15
AGW022	14.73	1/14/2014	S	75.21
AGW023	13.25	1/15/2014	S	75.15
AGW024	12.77	1/14/2014	S	71.79
AGW025	12.14	1/14/2014	S	73.75
AGW026	11.93	1/14/2014	S	73.94
AGW027	14.60	1/14/2014	S	73.41
AGW028	14.16	1/15/2014	S	74.02
AGW029	13.38	1/15/2014	S	73.64
AGW030	12.70	1/15/2014	S	73.99
AGW031R	13.56	1/14/2014	S	72.40
AGW032	14.63	1/15/2014	S	73.57
AGW033	14.82	1/15/2014	S	72.37
AGW034	11.41	1/14/2014	D	73.53
AGW035	14.49	1/15/2014	D	72.80
AGW037	12.60	1/14/2014	S	73.93
AGW038	12.42	1/14/2014	S	73.98
AGW039	12.30	1/14/2014	S	74.13
AGW040	12.35	1/14/2014	S	74.10
AGW041	12.40	1/15/2014	S	74.05
AGW042	12.12	1/15/2014	S	73.78
AGW043	12.76	1/15/2014	S	73.68
AGW044	12.78	1/14/2014	S	73.74
AGW046	11.98	1/14/2014	S	73.95
AGW047	12.28	1/14/2014	S	73.91
AGW048	12.32	1/14/2014	S	73.95
AGW049	12.44	1/14/2014	S	73.95
AGW050	12.25	1/14/2014	S	73.95
AGW053R	18.23	1/15/2014	S	72.75
AGW055R	13.70	1/14/2014	I	72.61
AGW057R	16.28	1/14/2014	I	73.36
AGW058R	16.57	1/14/2014	S	73.35
AGW059R	15.76	1/14/2014	S	73.47
AGW060R	15.71	1/14/2014	I	73.40
AGW064	16.54	1/14/2014	S	71.85
AGW065	13.57	1/14/2014	S	72.45
AGW066	17.19	1/14/2014	S	72.39
AGW067	17.23	1/14/2014	S	72.28
AGW068	13.86	1/14/2014	S	73.18
AGW069	15.53	1/15/2014	S	72.00
AGW072	17.27	1/14/2014	I	72.36
AGW073	17.22	1/14/2014	D	72.34
AGW074	11.43	1/14/2014	S	76.20
AGW076	11.96	1/15/2014	S	74.38
AGW077	12.40	1/14/2014	S	74.33

TABLE 2
WATER LEVELS: JUNE 2013
BOEING AUBURN
AUBURN, WASHINGTON

Well	Depth to Water (ft)	Date	Aquifer Zone	Groundwater Elevation (ft. MSL)
AGW078	12.90	1/14/2014	S	74.38
AGW079	10.82	1/14/2014	S	73.87
AGW080	7.63	1/15/2014	S	74.58
AGW081	7.84	1/15/2014	S	74.53
AGW082	9.50	1/15/2014	S	74.33
AGW083	11.86	1/15/2014	S	74.58
AGW084	12.09	1/14/2014	S	74.11
AGW085	12.30	1/14/2014	S	74.12
AGW086	12.64	1/14/2014	S	74.10
AGW087	9.14	1/14/2014	I	76.65
AGW088	9.42	1/14/2014	S	76.43
AGW089	10.31	1/14/2014	I	76.49
AGW090	10.02	1/14/2014	S	76.48
AGW091	11.12	1/14/2014	I	76.20
AGW095R	13.11	1/14/2014	I	72.42
AGW098R	13.29	1/14/2014	D	72.52
AGW100	9.69	1/14/2014	S	75.71
AGW101	9.70	1/14/2014	I	75.80
AGW102	9.83	1/14/2014	D	75.64
AGW103	13.85	1/14/2014	S	75.53
AGW104	14.24	1/14/2014	S	74.74
AGW105	13.56	1/15/2014	I	73.77
AGW106R	18.06	1/15/2014	S	72.91
AGW110R	18.24	1/15/2014	S	72.82
AGW112R	18.22	1/15/2014	S	72.74
AGW115	12.45	1/14/2014	S	74.08
AGW116	12.43	1/14/2014	S	74.26
AGW117	12.11	1/15/2014	S	74.38
AGW118	12.26	1/14/2014	S	74.52
AGW119	16.75	1/15/2014	I	77.51
AGW120	16.72	1/15/2014	S	77.52
AGW121	13.09	1/14/2014	S	78.18
AGW125	16.50	1/14/2014	S	72.35
AGW126	16.52	1/14/2014	I	72.36
AGW127	11.73	1/15/2014	S	74.81
AGW128	12.99	1/14/2014	S	73.65
AGW129	12.48	1/14/2014	S	74.18
AGW130	12.92	1/14/2014	S	73.72
AGW131	12.63	1/14/2014	S	73.35
AGW132	11.90	1/14/2014	S	75.06
AGW133	12.98	1/14/2014	S	75.13
AGW134	10.77	1/15/2014	S	72.88
AGW135	12.04	1/15/2014	S	72.50
AGW136	14.56	1/15/2014	S	72.04
AGW137	14.41	1/15/2014	I	72.03
AGW138	14.69	1/15/2014	D	71.95
AGW139	14.72	1/15/2014	I	71.96
AGW140	13.96	1/14/2014	I	71.96
AGW141	14.86	1/15/2014	I	71.51
AGW142	15.12	1/15/2014	D	71.39
AGW143	5.80	1/14/2014	D	73.18
AGW144	5.75	1/14/2014	I	73.30
AGW145	5.10	1/14/2014	I	73.04
AGW146	5.72	1/14/2014	D	72.97
AGW147	12.52	1/14/2014	I	71.97
AGW148	12.17	1/14/2014	I	71.63
AGW149	13.53	1/14/2014	I	71.20
AGW150	13.39	1/15/2014	I	70.15
AGW151	14.61	1/15/2014	I	71.65
AGW152	11.18	1/14/2014	S	73.21

TABLE 2
WATER LEVELS: JUNE 2013
BOEING AUBURN
AUBURN, WASHINGTON

Well	Depth to Water (ft)	Date	Aquifer Zone	Groundwater Elevation (ft, MSL)
AGW153	13.52	1/15/2014	S	75.00
AGW154	12.08	1/15/2014	I	73.98
AGW155	12.44	1/14/2014	I	73.68
AGW156	15.08	1/14/2014	I	73.37
AGW157	8.62	1/14/2014	I	72.58
AGW158	10.12	1/14/2014	I	72.03
AGW159	9.91	1/14/2014	D	72.12
AGW160	13.47	1/14/2014	I	71.13
AGW161	10.93	1/14/2014	I	70.75
AGW162	14.27	1/14/2014	I	71.04
AGW163	12.68	1/15/2014	I	73.72
AGW164	12.72	1/14/2014	I	73.80
AGW165	12.64	1/14/2014	S	73.86
AGW166	6.16	1/14/2014	I	71.45
AGW167	6.23	1/14/2014	D	71.88
AGW168	6.76	1/14/2014	I	71.19
AGW169	6.73	1/14/2014	D	71.39
AGW170	8.50	1/14/2014	I	71.71
AGW171	8.55	1/14/2014	D	71.88
AGW172	13.61	1/15/2014	I	70.64
AGW173	15.57	1/15/2014	I	70.11
AGW174	7.80	1/14/2014	I	70.23
AGW175	5.81	1/14/2014	I	69.35
AGW176	11.20	1/15/2014	I	69.28
AGW177	7.29	1/14/2014	I	70.47
AGW178	7.15	1/14/2014	D	70.59
AGW179	8.33	1/14/2014	I	70.89
AGW180	7.96	1/14/2014	D	71.04
AGW181	3.24	1/14/2014	I	66.90
AGW182	3.75	1/14/2014	I	69.41
AGW183	3.73	1/14/2014	D	69.28
AGW184	7.69	1/14/2014	I	69.57
AGW185	7.02	1/14/2014	D	70.37
AGW186	5.46	1/14/2014	I	67.54
AGW187	3.89	1/14/2014	I	68.32
AGW188*	1.79	1/14/2014	I	65.11
AGW189	14.51	1/14/2014	I	70.36
AGW190	2.66	1/14/2014	I	67.02
AGW191	2.18	1/14/2014	I	70.12
AGW192	2.56	1/14/2014	D	69.83
AGW193	6.97	1/14/2014	S	71.36
AGW194	10.26	1/14/2014	S	72.03
AGW195	9.47	1/15/2014	D	68.71
AGW196	9.64	1/15/2014	I	68.45
AGW197	4.62	1/15/2014	D	68.63
AGW198	5.04	1/15/2014	I	68.35
AGW199	10.96	1/15/2014	D	69.56
AGW200-1	12.66	1/14/2014	S	73.61
AGW200-2	12.66	1/14/2014	S	73.61
AGW200-3	12.69	1/14/2014	I	73.57
AGW200-4	12.76	1/14/2014	I	73.51
AGW200-5	12.85	1/14/2014	I	73.42
AGW200-6	12.94	1/14/2014	D	73.30
AGW200-7	12.95	1/14/2014	D	73.32
AGW201-1	12.85	1/14/2014	S	73.49
AGW201-2	12.86	1/14/2014	S	73.50
AGW201-3	12.84	1/14/2014	I	73.50
AGW201-4	12.89	1/14/2014	I	73.45
AGW201-5	12.90	1/14/2014	I	73.40
AGW201-6	12.94	1/14/2014	D	73.37

TABLE 2
WATER LEVELS: JUNE 2013
BOEING AUBURN
AUBURN, WASHINGTON

Well	Depth to Water (ft)	Date	Aquifer Zone	Groundwater Elevation (ft, MSL)
AGW201-7	12.95	1/14/2014	D	73.39
AGW202-1	12.78	1/14/2014	S	73.49
AGW202-2	12.77	1/14/2014	S	73.49
AGW202-3	12.76	1/14/2014	I	73.51
AGW202-4	12.80	1/14/2014	I	73.46
AGW202-5	12.82	1/14/2014	I	73.45
AGW202-6	12.81	1/14/2014	D	73.48
AGW202-7	12.86	1/14/2014	D	73.41
AGW203-1	12.93	1/14/2014	S	73.59
AGW203-2	12.93	1/14/2014	S	73.60
AGW203-3	12.92	1/14/2014	I	73.60
AGW203-4	12.94	1/14/2014	I	73.55
AGW203-5	12.94	1/14/2014	I	73.58
AGW203-6	12.97	1/14/2014	D	73.54
AGW204	12.36	1/14/2014	I	74.98
AGW205	11.32	1/14/2014	I	74.70
AGW206	12.06	1/15/2014	I	74.16
AGW207-1	7.21	1/15/2014	S	69.00
AGW207-2	7.21	1/15/2014	S	69.00
AGW207-3	7.19	1/15/2014	I	69.02
AGW207-4	7.20	1/15/2014	I	69.01
AGW207-5	7.17	1/15/2014	I	69.04
AGW207-7	7.05	1/15/2014	D	69.16
AGW208-1	5.60	1/15/2014	S	69.83
AGW208-2	5.58	1/15/2014	S	69.83
AGW208-3	5.58	1/15/2014	I	69.85
AGW208-4	5.59	1/15/2014	I	69.83
AGW208-5	5.38	1/15/2014	I	70.05
AGW208-6	5.39	1/15/2014	D	70.03
AGW208-7	5.38	1/15/2014	D	70.05
AGW209-1	8.21	1/15/2014	S	70.27
AGW209-2	8.21	1/15/2014	S	70.27
AGW209-3	8.21	1/15/2014	I	70.27
AGW209-4	8.21	1/15/2014	I	70.27
AGW209-5	8.22	1/15/2014	I	70.26
AGW209-6	8.22	1/15/2014	D	70.26
AGW209-7	8.23	1/15/2014	D	70.25
AGW210-1	9.63	1/15/2014	S	70.59
AGW210-2	9.65	1/15/2014	S	70.56
AGW210-3	9.64	1/15/2014	I	70.58
AGW210-4	9.64	1/15/2014	I	70.58
AGW210-5	9.64	1/15/2014	I	70.58
AGW210-6	9.66	1/15/2014	D	70.55
AGW210-7	9.93	1/15/2014	D	70.29
AGW211-1	11.35	1/15/2014	S	70.73
AGW211-2	11.32	1/15/2014	S	70.74
AGW211-3	11.34	1/15/2014	I	70.74
AGW211-4	11.33	1/15/2014	I	70.75
AGW211-5	11.33	1/15/2014	I	70.73
AGW211-6	11.35	1/15/2014	D	70.70
AGW211-7	11.39	1/15/2014	D	70.69
AGW212-1	11.34	1/15/2014	S	71.60
AGW212-2	11.30	1/15/2014	S	71.64
AGW212-3	11.95	1/15/2014	I	70.99
AGW212-5	11.95	1/15/2014	I	70.99
AGW212-6	11.97	1/15/2014	D	70.97
AGW212-7	11.97	1/15/2014	D	70.97
AGW213	3.04	1/14/2014	D	66.94
AGW214*	2.94	1/14/2014	I	66.07
AGW215*	1.93	1/14/2014	I	63.29

TABLE 2
WATER LEVELS: JUNE 2013
BOEING AUBURN
AUBURN, WASHINGTON

Well	Depth to Water (ft)	Date	Aquifer Zone	Groundwater Elevation (ft, MSL)
AGW216*	1.81	1/14/2014	I	65.82
AGW217*	2.83	1/14/2014	I	64.33
AGW218*	1.01	1/14/2014	I	64.18
AGW219	0.76	1/14/2014	I	60.87
AGW220*	1.08	1/14/2014	I	62.16
AGW221*	1.47	1/14/2014	I	63.41
AGW222	12.50	1/14/2014	I	73.89
AGW223	12.14	1/14/2014	D	74.01
AGW224	2.77	1/14/2014	S	69.93
AGW225	2.05	1/14/2014	S	69.85
AGW226	0.36	1/14/2014	S	69.39
AGW227	3.30	1/14/2014	S	68.22
AGW228	3.73	1/14/2014	I	68.06
AGW229	8.27	1/14/2014	S	71.67
AGW230	7.84	1/14/2014	D	69.61
AGW231	5.06	1/15/2014	S	68.04
AGW232	9.76	1/15/2014	S	68.20
AGW233	3.43	1/14/2014	D	68.13
AGW234	2.06	1/15/2014	D	67.72
AGW235-1	2.75	1/15/2014	S	67.19
AGW235-2	2.77	1/15/2014	S	67.17
AGW235-3	2.07	1/15/2014	S	67.87
AGW235-4	2.07	1/15/2014	I	67.88
AGW235-5	2.06	1/15/2014	I	67.89
AGW235-6	2.09	1/15/2014	I	67.86
AGW235-7	2.12	1/15/2014	D	67.83
AGW236	6.55	1/15/2014	S	68.30
AGW237	4.25	1/14/2014	D	66.24
AGW238	4.93	1/14/2014	I	65.33
AGW239	5.51	1/14/2014	S	65.27

* Well exhibited artesian conditions
-- = Was not able to access well
D = Deep Zone
ft = foot
I = Intermediate Zone
MSL = Mean Sea Level (National Geodetic Vertical Datum of 1929)
S = Shallow Zone
Note:
Groundwater elevations for multi-level wells and wells exhibiting artesian conditions are only accurate to the 1/10th of a ft.

TABLE 3
VERTICAL HYDRAULIC GRADIENT
SHALLOW ZONE TO INTERMEDIATE ZONE JANUARY 2014
BOEING AUBURN
AUBURN, WASHINGTON

Well Cluster	Aquifer Zone	Groundwater Elevation (ft, MSL)	Ground Surface Elevation (ft, MSL)	Center of Screen (BGS)	Center of Screen Elevation (ft, MSL)	Water Level Difference (ft)	Screen Elevation Difference (ft)	Vertical Hydraulic Gradient	
AGW100	Shallow	75.71	85.72	20.00	65.72	-0.09	29.92	-0.0030	Upward
AGW101(I)	Intermediate	75.80	85.80	50.00	35.80				
AGW200-2	Shallow	73.61	86.72	29.50	57.22	0.19	30.00	0.0063	Downward
AGW200-5	Intermediate	73.42	86.72	59.50	27.22				
AGW201-2	Shallow	73.50	86.65	29.50	57.15	0.10	30.00	0.0033	Downward
AGW201-5	Intermediate	73.40	86.65	59.50	27.15				
AGW202-2	Shallow	73.49	86.72	30.50	56.22	0.03	20.00	0.0015	Downward
AGW202-4	Intermediate	73.46	86.72	50.50	36.22				
AGW203-2	Shallow	73.60	86.86	29.50	57.36	0.05	19.00	0.0026	Downward
AGW203-4	Intermediate	73.55	86.86	48.50	38.36				
AGW031R	Shallow	72.40	86.22	23.00	63.22	-0.02	27.28	-0.0007	Upward
AGW095R	Intermediate	72.42	85.94	50.00	35.94				
AGW194	Shallow	72.03	82.52	24.50	58.02	0.00	19.97	0.0000	Neutral
AGW158(I)	Intermediate	72.03	82.55	44.50	38.05				
AGW225	Shallow	69.85	72.71	9.00	63.71	-0.27	45.99	-0.0059	Upward
AGW191	Intermediate	70.12	72.72	55.00	17.72				
AGW212-2	Shallow	71.64	83.32	29.75	53.57	0.65	30.00	0.0217	Downward
AGW212-5	Intermediate	70.99	83.32	59.75	23.57				
AGW210-2	Shallow	70.56	80.63	30.00	50.63	-0.02	30.00	-0.0007	Upward
AGW210-5	Intermediate	70.58	80.63	60.00	20.63				
AGW208-2	Shallow	69.83	75.80	29.30	46.50	0.00	20.00	0.0000	Neutral
AGW208-4	Intermediate	69.83	75.80	49.30	26.50				
AGW207-2	Shallow	69.00	76.83	29.75	47.08	-0.01	20.00	-0.0005	Upward
AGW207-4	Intermediate	69.01	76.83	49.75	27.08				
AGW235-2	Shallow	67.17	70.23	18.75	51.48	-0.71	20.00	-0.0355	Upward
AGW235-4	Intermediate	67.88	70.23	38.75	31.48				
AGW232	Shallow	68.20	78.26	25.50	52.76	-0.25	24.67	-0.0101	Upward
AGW196	Intermediate	68.45	78.09	50.00	28.09				
AGW231	Shallow	68.04	73.50	25.00	48.50	-0.31	28.11	-0.0110	Upward
AGW198	Intermediate	68.35	73.39	53.00	20.39				
AGW239	Shallow	65.27	71.16	25.50	45.66	-0.06	30.66	-0.0020	Upward
AGW238	Intermediate	65.33	71.00	56.00	15.00				

TABLE 4
VERTICAL HYDRAULIC GRADIENT
INTERMEDIATE ZONE TO DEEP ZONE JANUARY 2014
BOEING AUBURN
AUBURN, WASHINGTON

Well Cluster	Aquifer Zone	Groundwater Elevation (ft, MSL)	Ground Surface Elevation (ft, MSL)	Center of Screen (BGS)	Center of Screen Elevation (ft, MSL)	Water Level Difference (ft)	Screen Elevation Difference (ft)	Vertical Hydraulic Gradient	
AGW101(I)	Intermediate	75.80	85.80	50.00	35.80	0.16	32.91	0.0049	Downward
AGW102(D)	Deep	75.64	85.89	83.00	2.89				
AGW200-5	Intermediate	73.42	86.72	59.50	27.22	0.12	20.00	0.0060	Downward
AGW200-6	Deep	73.30	86.72	79.50	7.22				
AGW201-5	Intermediate	73.40	86.65	59.50	27.15	0.03	20.00	0.0015	Downward
AGW201-6	Deep	73.37	86.65	79.50	7.15				
AGW202-4	Intermediate	73.46	86.72	50.50	36.22	-0.02	30.00	-0.0007	Upward
AGW202-6	Deep	73.48	86.72	80.50	6.22				
AGW203-4	Intermediate	73.55	86.86	48.50	38.36	0.01	29.00	0.0003	Downward
AGW203-6	Deep	73.54	88.86	79.50	9.36				
AGW095R	Intermediate	72.42	85.94	50.00	35.94	-0.10	35.39	-0.0028	Upward
AGW098R	Deep	72.52	86.05	85.50	0.55				
AGW158(I)	Intermediate	72.03	82.55	44.50	38.05	-0.09	40.41	-0.0022	Upward
AGW159(D)	Deep	72.12	82.64	85.00	-2.36				
AGW191	Intermediate	70.12	72.72	55.00	17.72	0.29	34.51	0.0084	Downward
AGW192	Deep	69.83	72.71	89.50	-16.79				
AGW212-5	Intermediate	70.99	83.32	59.75	23.57	0.02	39.90	0.0005	Downward
AGW212-7	Deep	70.97	83.32	99.65	-16.33				
AGW210-5	Intermediate	70.58	80.63	60.00	20.63	0.03	20.00	0.0015	Downward
AGW210-6	Deep	70.55	80.63	80.00	0.63				
AGW208-4	Intermediate	69.83	75.80	49.30	26.50	-0.20	30.00	-0.0067	Upward
AGW208-6	Deep	70.03	75.80	79.30	-3.50				
AGW207-4	Intermediate	69.01	76.83	49.75	27.08	-0.15	30.25	-0.0050	Upward
AGW207-7	Deep	69.16	76.83	80.00	-3.17				
AGW235-4	Intermediate	67.88	70.23	38.75	31.48	0.05	32.25	0.0016	Downward
AGW235-7	Deep	67.83	70.23	71.00	-0.77				
AGW196	Intermediate	68.45	78.09	50.00	28.09	-0.26	34.91	-0.0074	Upward
AGW195	Deep	68.71	78.18	85.00	-6.82				
AGW198	Intermediate	68.35	73.39	53.00	20.39	-0.28	27.14	-0.0103	Upward
AGW197	Deep	68.63	73.25	80.00	-6.75				
AGW238	Intermediate	65.33	71.00	56.00	15.00	-0.91	19.18	-0.0474	Upward
AGW237	Deep	66.24	70.82	75.00	-4.18				

TABLE 5
SHALLOW ZONE GROUNDWATER ANALYTICAL RESULTS
WATER TABLE BOREHOLE VERSUS DEEPER SHALLOW ZONE: NEWLY INSTALLED WELLS
BOEING AUBURN
AUBURN, WASHINGTON

Location	Type of Sample	Well ID	Date	Depth (ft)	TCE	cis-1,2-DCE	VC
AGW231	Borehole	AGW231-9	05/19/13	9	<0.2	**2**	2.2
	Conventional Well	AGW231	03/04/14	25	**1.4**	**2.1**	**2.7**
AGW232	Borehole	AGW232-14	05/20/13	14	<0.2	<0.2	<0.020
	Conventional Well	AGW232	03/04/14	25	<0.2	**4.8**	**0.94**
AGW236	Borehole	AGW236-14	05/28/13	14	<0.2	0.3	**0.12**
	Conventional Well	AGW236	03/04/14	25	**8.7**	**2.5**	0.074
AGW239	Borehole	AGW239-8.5	09/25/13	8.5	<0.2	<0.2	<0.020
	Conventional Well	AGW239	03/04/14	25	<0.2	**11**	**1.2**

ft = Feet
cis-1,2-DCE = cis-1,2-dichloroethene
TCE = trichloroethene
VC = vinyl chloride

Notes:
Concentrations for wells are most recent. Borehole and direct-push samples were collected at time of drilling.
Deeper Shallow Zone data is shaded gray.
Concentrations inmicrograms per liter
Depth: Conventional wells = midpoint of screen. Direct push/borehole = sample depth

TABLE 6
SHALLOW ZONE GROUNDWATER ANALYTICAL RESULTS
WATER TABLE VERSUS DEEPER SHALLOW ZONE
BOEING AUBURN
AUBURN, WASHINGTON

Location	Type of Sample	Well ID	Date	Depth (ft)	TCE	cis-1,2-DCE	VC	Distance from Water Table Well (ft)
AGW224	Water Table Well	AGW224	03/05/14	2.33	<0.2	<0.2	<0.020	--
	Borehole	AGW182-29	04/29/11	29	**6.7**	**2.4**	**0.3**	12
AGW225	Water Table Well	AGW225	03/05/14	1.87	2.1	6.4	0.6	--
	Borehole	AGW192-25	08/30/11	25	1.2	**6.6**	0.6	13
	Direct Push	ASB0192-25	04/11/13	25	**2.4**	5.9	0.5	21
AGW226	Water Table Well	AGW226	03/05/14	0.22	4.6	3.6	**0.61**	--
	Direct Push	ASB0184	04/05/13	15	**12**	**3.4**	0.3	72
	Direct Push		04/05/13	25	7.6	2.6	0.16	72
AGW229	Water Table Well	AGW229	03/05/14	6.27	1.8	**2.4**	0.045	--
	Borehole	AGW170-28	11/10/12	28	**3.6**	1.9	**0.069**	8

-- = not applicable
ft = Feet
cis-1,2-DCE = cis-1,2-dichloroethene
TCE = trichloroethene
VC = vinyl chloride

Notes:
Concentrations for wells are most recent. Borehole and direct-push samples were collected at time of drilling.
Deeper shallow zone sample locations shaded in gray
Concentrations in micrograms per liter
Depth: Conventional wells = midpoint of screen. Water table wells = depth to water table at time of sampling. Direct push/borehole = sample depth

TABLE 7
SHALLOW ZONE GROUNDWATER ANALYTICAL RESULTS
MULTI-LEVEL WELL SCREENS
BOEING AUBURN
AUBURN, WASHINGTON

				VOLATILES (µg/L)		
Location	**Well Screen**	**Date**	**Depth (ft)**	**Trichloroethene**	**cis-1,2-DCE**	**Vinyl Chloride**
AGW200	AGW200-1	11/18/2011	19.75	0.2	1.7	1.4
	AGW200-2	11/18/2011	29.75	**0.3**	**2.4**	**2.3**
	AGW200-1	4/26/2012	19.75	0.2 U	1.3	**1.8**
	AGW200-2	4/26/2012	29.75	**0.3**	**2.6**	1.7
AGW201	AGW201-1	11/21/2011	19.75	**0.8**	3.8	1.6
	AGW201-2	11/21/2011	29.75	0.6	**4.2**	**1.8**
	AGW201-1	4/27/2012	19.75	0.6	4.1	2.5
	AGW201-2	4/27/2012	29.75	**0.7**	**4.2**	**2.5**
AGW202	AGW202-1	11/22/2011	20.75	0.2 U	0.3	**2.9**
	AGW202-2	11/22/2011	30.75	**1.5**	**2.7**	1.1
	AGW202-1	4/27/2012	20.75	0.2 U	0.8	**4**
	AGW202-2	4/27/2012	30.75	**2.3**	**1.6**	0.22
AGW203	AGW203-1	11/23/2011	19.75	**1.3**	**0.3**	0.02 U
	AGW203-2	11/23/2011	29.75	1.1	0.2 U	0.02 U
	AGW203-1	4/30/2012	19.75	1.5	**0.4**	0.02 U
	AGW203-2	4/30/2012	29.75	1.5	0.2 U	0.02 U
AGW207	AGW207-1	12/8/2011	20	8.8	**4.5**	**0.9**
	AGW207-2	12/8/2011	30	**10**	3.1	0.21
	AGW207-1	4/23/2012	20	9.1	**7.8**	**1.3**
	AGW207-2	4/23/2012	30	**10**	3	0.16
AGW208	AGW208-1	12/8/2011	21.55	1.6	**8.6**	**0.67**
	AGW208-2	12/8/2011	29.55	**5.5**	5	0.6
	AGW208-1	4/23/2012	21.55	2.5	**8.4**	0.98
	AGW208-2	4/23/2012	29.55	**4.4**	6.1	0.98
AGW209	AGW209-1	12/12/2011	19.75	0.2 U	0.2 U	**2.4**
	AGW209-2	12/12/2011	29.75	0.2 U	0.2 U	1.3
	AGW209-1	4/24/2012	19.75	0.2 U	0.2 U	2.2
	AGW209-2	4/24/2012	29.75	0.2 U	0.2 U	**2.7**
AGW210	AGW210-1	12/12/2011	21.75	0.2 U	0.2 U	0.02 U
	AGW210-2	12/12/2011	30.25	0.2 U	0.2 U	0.02 U
	AGW210-1	4/24/2012	21.75	0.2 U	0.2 U	0.02 U
	AGW210-2	4/25/2012	30.25	0.2 U	0.2 U	0.02 U
AGW211	AGW211-1	12/13/2011	20	0.2 U	0.2 U	0.02 U
	AGW211-2	12/13/2011	30	0.2 UJ	0.2 UJ	0.02 U
	AGW211-1	4/25/2012	20	0.2 U	0.2 U	0.02 U
	AGW211-2	4/25/2012	30	0.2 U	0.2 U	0.02 U
AGW212	AGW212-1	12/13/2011	21	0.2 U	0.2 U	0.02 U
	AGW212-2	12/13/2011	30	0.2 U	0.2 U	0.02 U
	AGW212-1	4/26/2012	21	0.2 U	0.2 U	0.02 U
	AGW212-2	4/26/2012	30	0.2 U	0.2 U	0.02 U
AGW235	AGW235-1	6/12/2013	9	0.2 U	1.2	0.099
	AGW235-2	6/12/2013	19	0.2 U	**3.9**	**0.5**
	AGW235-3	6/12/2013	29	**3.3**	3.4	0.3
	AGW235-1	9/6/2013	9	0.2 U	1.8	0.14
	AGW235-2	9/6/2013	19	0.2 U	**4**	**0.5**
	AGW235-3	9/6/2013	29	**2.5**	3.6	0.3

cis-1,2-DCE = cis-1,2-dichloroethene
ft = feet
U = Indicates the compound was not detected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
µg/L = micrograms per liter

Notes:
Bold = Depth interval with highest concentration..
Deeper Shallow Zone data is shaded gray.

APPENDIX A

Monitoring Well Logs: AGW222 through AGW239

Soil Classification System

MAJOR DIVISIONS			GRAPHIC SYMBOL	USCS LETTER SYMBOL[(1)]	TYPICAL DESCRIPTIONS [(2)(3)]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50%	"GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50%	"very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30%	"gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15%	"with gravel," "with sand," "with silt," etc.
	≤ 5%	"with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

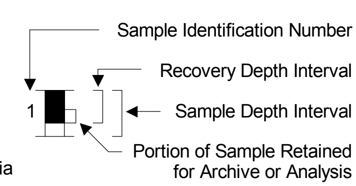
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽ Approximate water level at time of drilling (ATD)

▼ Approximate water level at time other than ATD

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Auburn, Washington

Soil Classification System and Key

Figure A-1

AGW222

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

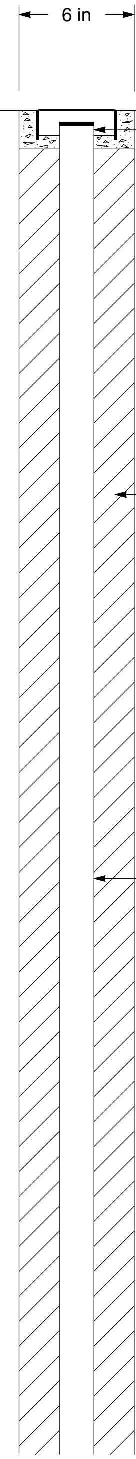
Drilling Method: Rotosonic
Ground Elevation (ft): 86.85
Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)
0					
	85				
5					
		Run 1	d4		
	80	S-1	i4		
		Run 2	i4		
		Run 3	i4		
10					
	75	Run 4	i4		
		S-2	d4		
15					
		S-3	d4		
	70	Run 5	i4		
		S-4	d4		
20					
	65	S-5	d4		
25		Run 6	i4		
	60	S-6	d4		
30					
	55	S-7	d4		
		Run 7	i4		
35					

USCS Symbol	Description
PC	Portland concrete cement
	Not Sampled - Air vacuumed for utilities
GP	Brown, sandy GRAVEL (loose, damp) **(ALLUVIUM)**
	- grades with cobble
	- grades dense
	- grades wet
	- grades cobbly and with sand
SP	Brownish-black, fine SAND with trace silt (medium dense, wet)
GP	Brownish-black, sandy GRAVEL with cobble (medium dense, wet)
	- grades sandy
	- grades orange and with trace silt
	- grades brownish-black
SP	Brownish-black, fine to medium SAND (medium dense, wet)
GP	**Groundwater Sample Collected: AGW222-27-20121202**
	Brown, sandy GRAVEL (medium dense, wet)
	- grades very sandy and with silt
	- grades sandy
	- grades with sand

Water Level: ATD (approx. 13 ft)

Monitoring Well Detail (DOE#: BHS653)



Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS653**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

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Auburn, Washington

Log of Monitoring Well AGW222

Figure A-2 (1 of 2)

AGW222

SAMPLE DATA | SOIL PROFILE | GROUNDWATER

Drilling Method: Rotosonic

Ground Elevation (ft): 86.85

Drilled By: Cascade Drilling Inc.

Monitoring Well Detail
(DOE#: BHS653)

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
35						GP	- grades sandy
							Brown, sandy GRAVEL (medium dense, wet)
	50	Run 8	i4				- grades with sand and cobble
		S-8	d4				
40						ML	Grayish-orange mottled SILT (hard, wet)
						GP	Brown GRAVEL with sand (medium dense, wet)
	45	S-9	d4			GP-GM	Brown, sandy GRAVEL with silt (medium dense, wet)
		S-10	d4				- grades very sandy
						ML	Grayish-orange mottled SILT with sand (hard, wet)
45		Run 9	i4			SP-SM	Brown, gravelly, fine to medium SAND with silt (medium dense, wet)
	40	S-11	d4				- with silt clasts
						GP	Brown, very sandy GRAVEL with cobble (medium dense, wet)
50							- grades cobbly and with sand
	35						
		S-12	d4			SP-SM	Grayish-orange mottled, laminated, fine SAND with silt and SILT; laminations 3 to 10 mm (medium dense, wet)
55		Run 10	i4			GP	Brownish-black, very sandy GRAVEL (medium dense, wet)
		S-13	d4				
	30					SP	Brownish-black, fine to medium SAND with gravel (medium dense, wet)
							- grades with gravel
							- grades gravelly
60							- grades with gravel
65							
70							

Water Level

Well construction:
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 2/12 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 12/02/12
Total Depth of Boring = 60.0 ft.

Monitoring Well Completed 12/02/12
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 86.39 ft.
Total Depth of Monitoring Well = 59.4 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS653**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

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Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW222

Figure A-2 (2 of 2)

AGW223

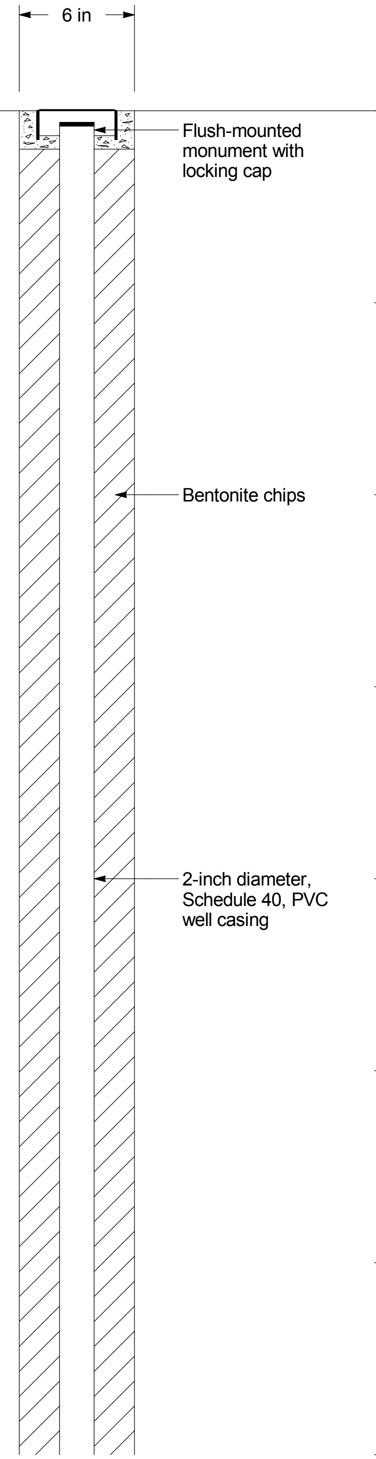
SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic
Ground Elevation (ft): 86.55
Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
0						AC	Asphalt concrete pavement
	85						Not Sampled - Air vacuumed for utilities
5	80						
		Run 1 S-1	i4 d4			SM	Dark gray, very silty, fine SAND (loose, damp) **(ALLUVIUM)**
10	75	S-2 Run 2	d4 i4			GP-GM	Gray, very sandy GRAVEL with silt (medium dense, moist)
						WD	WOOD (wet)
15	70					SP-SM	Dark gray, fine to medium SAND with silt and gravel (medium dense, wet)
		S-3	d4				
20	65	Run 3	i4				
25	60	S-4 Run 4	d4 i4				- grades gravelly **Groundwater Sample Collected: AGW223-30-20121203**
30	55					GP-GM	Gray, very sandy GRAVEL with silt (medium dense, wet)
		S-5	d4				
35							

Water Level: ATD (approx. 14 ft)

Monitoring Well Detail (DOE#: BHS654)



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS654**

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Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW223

Figure A-3 (1 of 4)

AGW223

SAMPLE DATA						SOIL PROFILE			GROUNDWATER	
Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Drilling Method: Rotosonic Ground Elevation (ft): 86.55 Drilled By: Cascade Drilling Inc.	Water Level	Monitoring Well Detail (DOE#: BHS654)
35		Run 5	i4				GP-GM	Gray, very sandy GRAVEL with silt (medium dense, wet)		
	50									
		S-6	d4							
40							SM	Brownish-gray, very silty, fine SAND (medium dense, wet)		
	45									
		S-7	d4							
45		Run 6	i4							Bentonite chips
	40									
		S-8	d4							
50							GP	Gray, very sandy GRAVEL (medium dense, wet)		
	35									
		S-9	d4							
							GP-GM	Brown, sandy GRAVEL with silt (medium dense, wet)		
55		Run 7	i4							2-inch diameter, Schedule 40, PVC well casing
	30									
		S-10	d4					**Groundwater Sample Collected: AGW223-60-20121204**		
60							SP-SM	Brownish-black, fine to medium SAND with silt (medium dense, wet)		
	25	S-11	d4							
							GP	Grayish-brown, very sandy GRAVEL (medium dense, wet)		
65		Run 8	i4							
	20	S-12	d4							
70										

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS654**

AGW223

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

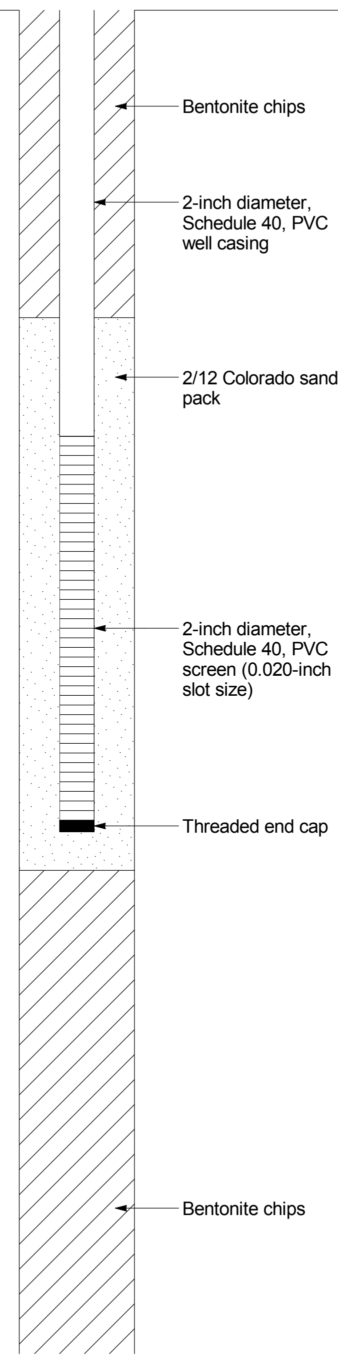
Drilling Method: Rotosonic

Ground Elevation (ft): 86.55

Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description	Water Level
70						SM	Dark gray, silty, fine SAND (medium dense, wet)	
	15	S-13	d4			SP	Grayish-brown, fine to medium SAND (medium dense, wet)	
						SM	Dark gray, silty, fine SAND (medium dense, wet)	
75		Run 9	i4					
		S-14	d4			GP	Dark gray, very sandy GRAVEL with wood (medium dense, wet)	
						SP	Dark gray, fine to coarse SAND with gravel (medium dense, wet)	
	10	S-15	d4			SM	Dark gray, very silty, fine SAND (medium dense, wet)	
		S-16	d4			GP	Dark gray, sandy GRAVEL (medium dense, wet)	
		S-17	d4			SM	Dark gray, very silty, fine SAND with wood (medium dense, wet)	
80						SM	Dark gray, silty, fine SAND (medium dense, wet)	
	5	S-18	d4					
85		Run 10	i4					
	0						**Groundwater Sample Collected: AGW223-90-20121204**	
90						SM	Dark gray, silty, fine SAND (medium dense, wet)	
	-5	Run 11	i4					
		S-19	d4					
95								
	-10	Run 12	i4					
100		S-20	d4			ML	Dark gray, very sandy SILT with trace organics, wood fragments (hard, wet) **(OCEOLA MUD FLOW)**	
						SM	Gray, gravelly, very silty, fine to coarse SAND (dense, wet)	
	-15	Run 13	i4					
		S-21	d4					
105								

Monitoring Well Detail
(DOE#: BHS654)



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS654**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

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Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW223

Figure
A-3
(3 of 4)

AGW223

SAMPLE DATA						SOIL PROFILE			GROUNDWATER	
Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Drilling Method: Rotosonic Ground Elevation (ft): 86.55 Drilled By: Cascade Drilling Inc.	Water Level	Monitoring Well Detail (DOE#: BHS654)
105	-20	Run 14 S-22	i4 d4				SM	Gray, gravelly, very silty, fine to coarse SAND (dense, wet)		
110										

Boring Completed 12/04/12
Total Depth of Boring = 110.0 ft.

Monitoring Well Completed 12/04/12
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 86.15 ft.
Total Depth of Monitoring Well = 91.4 ft.

115

120

125

130

135

140

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS654**

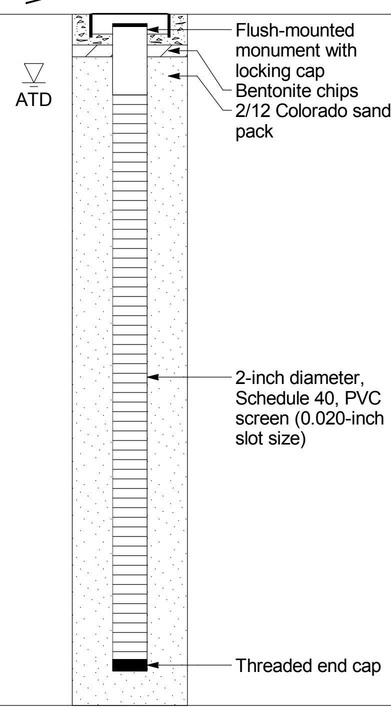
AGW224

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic
Ground Elevation (ft): 73.25
Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BHS656)

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
0							Not Sampled - Air vacuumed for utilities
	70						
5		S-1	d4			GP	Brown, sandy GRAVEL with asphalt pieces (medium dense, wet) **(FILL)**
		Run 1	i4				
	65						
10						GP	Brown GRAVEL with sand (medium dense, wet)
		S-2	d4				
	60						
		Run 2	i4			SM	Brownish-gray, silty, fine SAND (medium dense, wet) **(ALLUVIUM)**
15		S-3	d4				
		S-4	d4			SP-SM	Dark gray, fine SAND with silt (medium dense, wet)



Boring Completed 12/05/12
Total Depth of Boring = 18.0 ft.

Monitoring Well Completed 12/05/12
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 72.70 ft.
Total Depth of Monitoring Well = 17.1 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS655**

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Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW224

Figure A-4

AGW225

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic

Ground Elevation (ft): 72.71

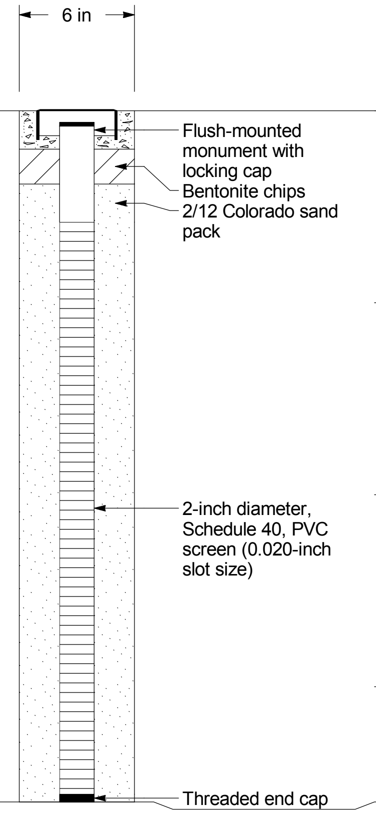
Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
0–5	70						Not Sampled - Air vacuumed for utilities
5–11	65	S-1	d4			ML	Brownish-gray SILT with sand (soft, wet) **(ALLUVIUM)**
10		Run 1	i4				
11–17	60	S-2	d4			SP-SM	Gray, fine SAND with silt (medium dense, wet)
~16.5		Run 2	i4				- grades gravelly
17–18	55	S-3	d4			GP	Dark gray GRAVEL with sand (medium dense, wet)

Boring Completed 12/05/12
Total Depth of Boring = 18.0 ft.

Water Level: ATD

Monitoring Well Detail (DOE#: BHS656)



Monitoring Well Completed 12/05/12
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 71.90 ft.
Total Depth of Monitoring Well = 18.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS656**

AGW226

SAMPLE DATA | SOIL PROFILE | GROUNDWATER

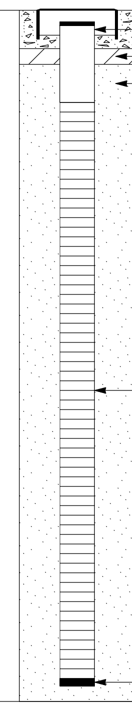
Drilling Method: Rotosonic

Ground Elevation (ft): 70.37

Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description	Water Level
0	70						Not Sampled - Air vacuumed for utilities	ATD
5	65	S-1	d4			SM	Dark brown, silty, gravelly, fine to coarse SAND (loose, wet) **(ALLUVIUM)**	
		Run 1	i4			SM	Brownish-gray, very silty, fine SAND (loose, wet)	
		S-2	d4					
10	60					GP	Dark gray, sandy GRAVEL (medium dense, wet)	
		S-3	d4					
		Run 2	i4				6-inch layer of WOOD	
15	55	S-4	d4					
							6-inch layer of WOOD	

Monitoring Well Detail (DOE#: BHS657)



Boring Completed 12/05/12
Total Depth of Boring = 18.0 ft.

Monitoring Well Completed 12/05/12
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 69.75 ft.
Total Depth of Monitoring Well = 17.5 ft.

Depth scale: 20, 25, 30, 35

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS657**

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW226

Figure A-6

AGW227

SAMPLE DATA | **SOIL PROFILE** | **GROUNDWATER**

Drilling Method: Rotosonic
Ground Elevation (ft): 72.00
Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
0						GP	Brown, sandy GRAVEL with trace silt (medium dense, moist) **(FILL)**
	70	S-1 / Run 1	d4 / i4				
5		S-2	d4			SM	Dark brown, organic SILT with sand (loose, moist) **BURIED TOPSOIL HORIZON**
						SM	Grayish-brown, silty, fine SAND with trace organics (loose, wet) **(ALLUVIUM)**
	65	S-3	d4				
		Run 2 / S-4	i4 / d4				
10						ML	Grayish-brown, sandy SILT (soft, wet)
	60	S-5	d4			SP-SM	Dark brownish-gray, fine SAND with silt (loose, wet)
15						SP	Dark gray, fine SAND (medium dense, wet)
		S-6	d4				
	55						
		Run 3	i4				- grades fine to medium SAND
20		S-7	d4				
	50						
25		S-8	d4			ML	Brownish-gray SILT (hard, wet)
	45					SP	Dark gray, fine to medium SAND (medium dense, wet)
		Run 4 / S-9	i4 / d4				
30							
	40						
35							

Water Level: 12/12/12

Monitoring Well Detail (DOE#: BHS658)

6 in

- Flush-mounted monument with locking cap
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS658**

AGW227

SAMPLE DATA						SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Drilling Method: Rotosonic Ground Elevation (ft): 72.00 Drilled By: Cascade Drilling Inc.	Water Level / Monitoring Well Detail (DOE#: BHS658)
35							SP	Dark gray, fine to medium SAND (medium dense, wet)	
		S-10	d4						
	35								Bentonite chips
		Run 5	i4						2/12 Colorado sand pack; 2-inch diameter, Schedule 40, PVC well casing
40									
		S-11	d4				GP	Dark gray GRAVEL with sand (dense, wet)	
	30								
							SP	Dark gray, fine to medium SAND (medium dense, wet)	2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
45									
							GP	Dark gray GRAVEL with sand (dense, wet)	
	25	S-12	d4						
50							ML	Dark gray SILT (medium stiff, wet)	Threaded end cap
	20	Run 6 S-13	i4 d4						
55									Bentonite chips
		S-14	d4						
	15								
60									

Boring Completed 12/06/12
Total Depth of Boring = 60.0 ft.

Monitoring Well Completed 12/06/12
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 71.52 ft.
Total Depth of Monitoring Well = 50.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS658**

AGW228

SAMPLE DATA

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)
0					
	70	S-1	d4		
		Run 1	i4		
5					
		S-2	d4		
	65				
		Run 2	i4		
		S-3	d4		
10					
		S-4	d4		
	60				
		S-5	d4		
		Run 3	i4		
15					
	55				
20					
		Run 4	i4		
	50				
25		S-6	d4		
	45	S-7	d4		
30					
35					

Boring Completed 12/06/12
Total Depth of Boring = 30.0 ft.

SOIL PROFILE

Drilling Method: Rotosonic

Ground Elevation (ft): 72.10

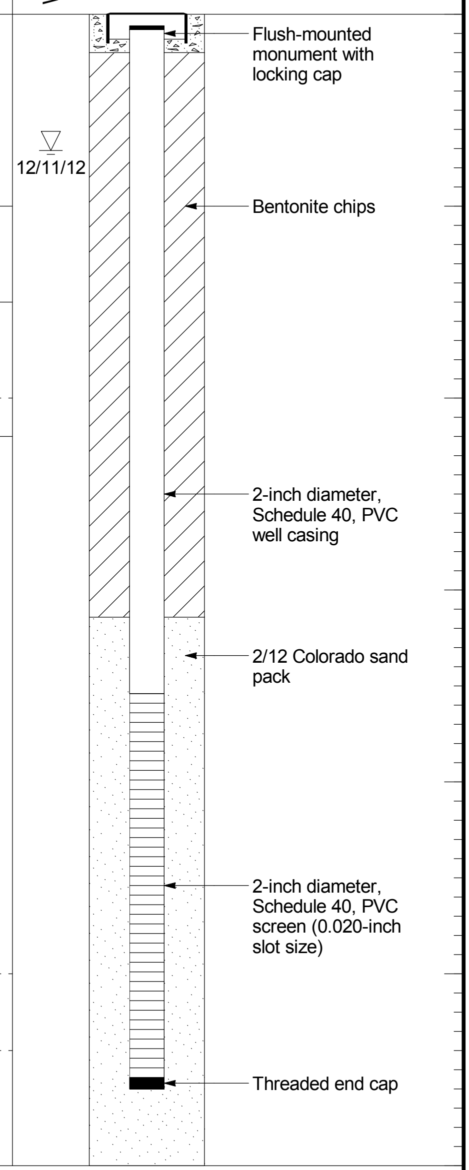
Drilled By: Cascade Drilling Inc.

USCS Symbol	Description
GP	Brown, sandy GRAVEL (medium dense, damp) **(FILL)**
OH	Dark brown, organic SILT (soft, moist) **BURIED TOPSOIL HORIZON**
SM	Dark brownish-gray, silty, fine SAND (medium dense, moist) **(ALLUVIUM)**
ML	Dark brownish-gray SILT (very stiff, wet)
SP	Dark gray, fine to medium SAND (medium dense, wet)
ML	Grayish-brown SILT (medium stiff, wet)
SP-SM	Dark gray, fine SAND with silt (medium dense, wet)

GROUNDWATER

Water Level

Monitoring Well Detail
(DOE#: BHS782)



Monitoring Well Completed 12/06/12
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 71.79 ft.
Total Depth of Monitoring Well = 28.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS782**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

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Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW228

Figure
A-8

AGW229

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic

Ground Elevation (ft): 80.45

Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BHS783)

6 in

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Description	Water Level
0	80							Not Sampled - Air vacuumed for utilities	
5	75	S-1	d4				GP-GM	Brown, very sandy GRAVEL with silt (medium dense, wet) **(FILL)**	
		Run 1	i4				SP-SM	Brown, fine to medium SAND with silt (medium dense, wet) **(ALLUVIUM)**	ATD
		S-2	d4						
10	70								
		S-3	d4						
		Run 2	i4						
15	65								
		S-4	d4				GP	Brown GRAVEL with sand (medium dense, wet)	
20									
25									
30									
35									

Well construction:
- Flush-mounted monument with locking cap
- Bentonite chips
- 2/12 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 12/07/12
Total Depth of Boring = 18.0 ft.

Monitoring Well Completed 12/07/12
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 79.94 ft.
Total Depth of Monitoring Well = 17.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS783**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW229

Figure A-9

AGW230

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic

Ground Elevation (ft): 77.75

Drilled By: Cascade Drilling Inc.

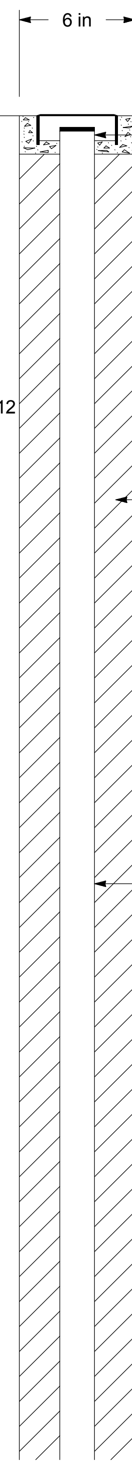
Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)
	S-1	d4		
75	Run 1	i4		
70	S-2	d4		
	S-3	d4		
	Run 2	i4		
65	S-4	d4		
60	S-5	d4		
55	S-6	d4		
	S-7	d4		
	Run 3	i4		
50	S-8	d4		
	S-9	d4		
45				

Depth (ft): 0, 5, 10, 15, 20, 25, 30, 35

USCS Symbol	Description
AC	Asphalt concrete pavement
GM	Dark gray, silty, very sandy GRAVEL (loose, damp) **(FILL)**
SM	Grayish-brown, very silty, fine SAND with organics (loose, wet) **(ALLUVIUM)**
SP	Gray, fine to medium SAND (loose, wet)
SM	Gray, silty, fine SAND (loose, wet)
SM	Dark grayish-brown, very silty, fine SAND with organics (loose, wet)
SP-SM	Dark gray, fine to medium SAND with silt (medium dense, wet)
SM	Dark gray, silty, fine SAND (medium dense, wet)
SM	Brownish-gray, very silty, fine SAND (medium dense, wet)
GP	Dark gray GRAVEL with sand (medium dense, wet)

Water Level: 12/14/12

Monitoring Well Detail (DOE#: BHS792)



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS792**

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW230

AGW230

SAMPLE DATA | SOIL PROFILE | GROUNDWATER

Drilling Method: Rotosonic

Ground Elevation (ft): 77.75

Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BHS792)

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description	Water Level	Monitoring Well Detail
35						GP	Dark gray GRAVEL with sand (medium dense, wet)		
	40	S-10	d4			GP	Brown, sandy GRAVEL; rock in shoe (dense, wet)		
40									
	35								
45									Bentonite chips
		Run 4	i4						
	30								
50									
	25								
55									2-inch diameter, Schedule 40, PVC well casing
	20	S-11	d4			SP	Brown, gravelly, fine to coarse SAND; rock in shoe (dense, wet)		
60									
	15								
65									
		Run 5	i4						
	10								
70									

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS792**

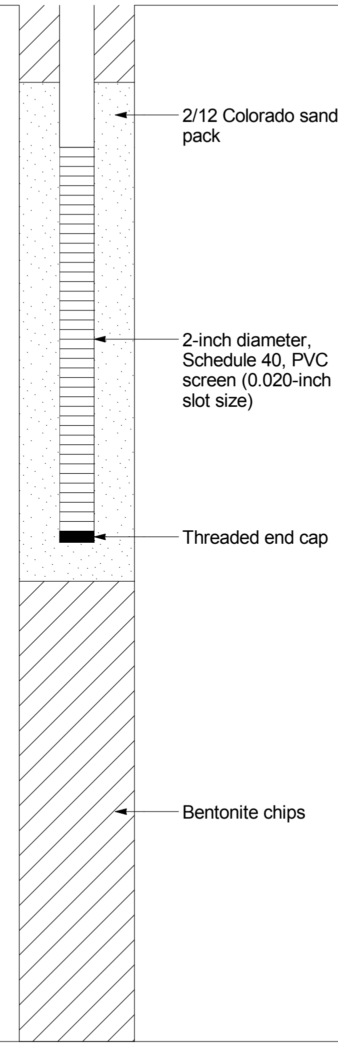
AGW230

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic
Ground Elevation (ft): 77.75
Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BHS792)

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
70						SP	Brown, gravelly, fine to coarse SAND; rock in shoe (dense, wet)
	5						
75							
	0	S-12	d4			SP-SM	Dark gray, gravelly, fine to coarse SAND with silt (medium dense, wet)
80		S-13	d4			SM	Dark brownish-gray, very silty, fine SAND (medium dense, wet)
		Run 6	i4			ML	Dark brownish-gray, sandy SILT (hard, wet) **(OCEOLA MUD FLOW)**
	-5	S-14	d4				
85		S-15	d4				
	-10					SM	Gray, gravelly, very silty, fine to coarse SAND with clay and trace organics; gravel is sub-rounded to sub-angular (dense, wet)
90		S-16 Run 7	d4 i4				
	-15						
95		S-17 Run 8	d4 i4				



Boring Completed 12/10/12
Total Depth of Boring = 97.0 ft.

Monitoring Well Completed 12/10/12
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 77.45 ft.
Total Depth of Monitoring Well = 84.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BHS792**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

Landau Associates

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW230

Figure A-10 (3 of 3)

AGW231

SAMPLE DATA

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)
0					
	70	Run 1	i4		
		S-1	d		
5		S-2	d		
		Run 2	i4		
		S-3	d		
	65	Run 3	i4		
10					
		Run 4	i4		
	60	S-4	d		
15		S-5	d		
		Run 5	i4		
	55	S-6	d		
20					
		S-7	d		
	50				
25		Run 6	i4		
		S-8	d		
	45				
30					
35					

SOIL PROFILE

Drilling Method: Rotosonic

Ground Elevation (ft): 73.50

Drilled By: Cascade Drilling Inc.

USCS Symbol	Description
AC	6-inches asphalt concrete pavement
GP-GM	Brown and gray mottled, sandy GRAVEL with silt (loose, moist) **(FILL)**
SP-SM	Brown and gray mottled, very gravelly, fine to coarse SAND with silt (loose, damp)
GM	Brown and gray mottled, silty, sandy GRAVEL (medium dense, damp)
PT	Dark brown PEAT with silt; fibrous and with twigs (soft, wet) **(ALLUVIUM)** - 6-inch silt lense
SP-SM	Dark gray, fine to medium SAND with silt and trace organics (loose, wet)
GP	Dark gray, sandy GRAVEL (loose, wet)
ML	Gray, sandy SILT (medium stiff, wet)
SP	Dark gray, fine to medium SAND with trace organics (loose, wet) - grades fine to coarse SAND

Groundwater sample: AGW231-9-20130519; bottom of screen at 13 ft BGS

GROUNDWATER

Water Level: ATD (at 10 ft)

Monitoring Well Detail (DOE#: BIC451)

6 in

- Flush-mounted monument with locking cap
- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 10/20 Colorado sand pack
- 2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
- Threaded end cap

Boring Completed 05/19/13
Total Depth of Boring = 30.0 ft.

Monitoring Well Completed 05/19/13
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 73.10 ft.
Total Depth of Monitoring Well = 30.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC451**

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW231

Figure A-11

AGW232

SAMPLE DATA

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)
0					
	75	S-1	d		
5		Run 1	i4		
		S-2	d		
	70				
10					
		Run 2	i4		
	65	S-3	d		
		S-4	d		
15					
		S-5	d		
		Run 3	i4		
	60				
20					
	55	S-6	d		
25		Run 4	i4		
		S-7	d		
	50				
30					
35					

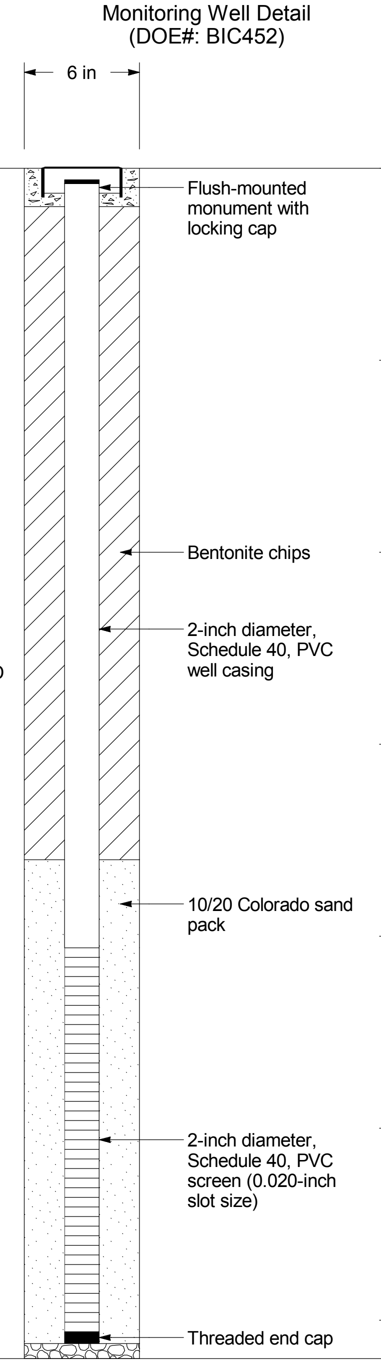
SOIL PROFILE

Drilling Method: Rotosonic
Ground Elevation (ft): 78.26
Drilled By: Cascade Drilling Inc.

USCS Symbol	Description
AC	6-inches asphalt concrete pavement
SM	Brown and gray mottled, gravelly, silty, fine to coarse SAND (medium dense, damp) **(FILL)** - grades moist
PT/OH	Dark brown PEAT with silt and fine sand; interbedded with brown, organic SILT with sand and trace root fibers (medium dense, wet) **(ALLUVIUM)**
SP-SM	
ML	Gray, fine SAND with silt and trace organics (loose, moist) **Groundwater sample: AGW232-14-20130520; bottom of screen at 15 ft BGS** Brownish-gray SILT with trace organics (soft, wet) - grades with sand
SP-SM	Brownish-gray, fine SAND with silt (loose, wet)
GP	Gray, sandy GRAVEL (loose, wet) - grades cobbly, with sand and organics

GROUNDWATER

Water Level: ATD



Boring Completed 05/20/13
Total Depth of Boring = 31.0 ft.

Monitoring Well Completed 05/20/13
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 77.96 ft.
Total Depth of Monitoring Well = 30.6 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC452**

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW232

Figure
A-12

AGW233

SAMPLE DATA | SOIL PROFILE | GROUNDWATER

Drilling Method: Rotosonic

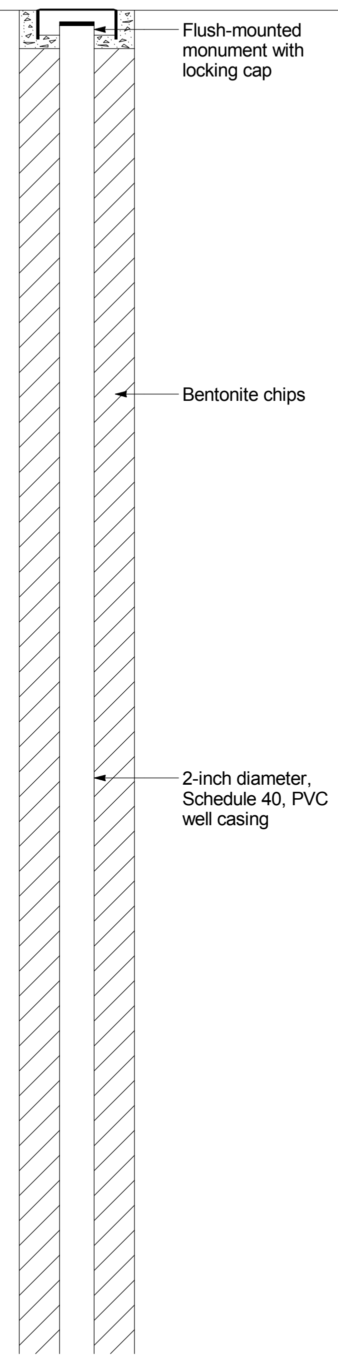
Ground Elevation (ft): 72.09

Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BIC453)

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
0							Not Sampled - Air vacuumed for utilities
	70						
5		S-1	d			ML	Dark brown, sandy SILT with organics (soft, wet) **(ALLUVIUM)**
		S-2	d			PT	Dark brown PEAT (soft, wet)
	65	Run 1	i4			SM	Dark grayish-brown, silty, fine SAND (loose, wet) - grades brown with trace gravel and organics
10		S-3	d			ML	Grayish-brown, SILT with trace organics (soft, wet)
		S-4	d			SM	Grayish-brown, silty, fine SAND (medium dense, wet) - grades very silty
	60						
15		Run 2	i4			SP	Dark gray, fine to medium SAND (medium dense, wet)
		S-5	d				
		S-6	d			SP-SM	Gray, fine to medium SAND with silt (medium dense, wet)
	55						
20		S-7	d			SP-SM	Grayish-brown, fine SAND with silt (medium dense, wet)
	50	S-8	d			SM	Grayish-brown, silty, fine to medium SAND (medium dense, wet)
25		Run 3	i4				
		S-9	d			PT	Dark brown PEAT (stiff, wet)
	45	S-10	d			SM	Gray, silty, fine to medium SAND (medium dense, wet)
		S-14					
		S-11	d			PT	Dark brown PEAT (stiff, wet)
						ML	Gray SILT with organics (stiff, wet)
30		S-12	d			SP-SM	**Groundwater sample: AGW233-30-20130521** Dark gray, fine to medium SAND with silt (medium dense, wet)
	40						
35							

Water Level: ATD (approx. 12 ft)



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC453**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW233

Figure A-13 (1 of 3)

AGW233

SAMPLE DATA | SOIL PROFILE | GROUNDWATER

Drilling Method: Rotosonic

Ground Elevation (ft): 72.09

Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BIC453)

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description	Water Level	Well Detail
35									
		S-13	d			SP-SM	Dark gray, fine to medium SAND with silt (medium dense, wet)		
	35		d			SM	Dark gray, silty, fine SAND with trace wood (medium dense, wet)		
40		Run 4	i4				- grades brown and iron oxide mottled		
		S-15	d			GP	Brown GRAVEL with sand and trace cobble (dense, wet)		
	30								
		S-16	d				- grades with cobble and very dense		
45									Bentonite chips
	25								
50		S-17	d			SP	Brown, fine to coarse SAND (medium dense, wet)		
	20								
		S-18	d			GP	Brown GRAVEL with sand and trace cobble (dense, wet)		
55									2-inch diameter, Schedule 40, PVC well casing
	15								
		S-19	d			SM	Dark gray, silty, fine SAND (medium dense, wet)		
60		Run 5	i4						
	10								
65									
		S-20	d			ML	Dark gray, sandy SILT (medium stiff, wet)		
	5								
70									

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC453**

Landau Associates

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW233

Figure A-13

AGW233

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic

Ground Elevation (ft): 72.09

Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BIC453)

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
70		S-21	d			SP	Dark gray, fine to medium SAND (medium dense, wet)
	0	S-22	d			ML	Brownish-gray SILT with sand and clay (hard, wet)
		S-23	d			SP-SM	Dark gray, fine to medium SAND with silt (medium dense, wet)
		S-24	d			ML	Brownish-gray, sandy SILT (medium stiff, wet)
75							
	-5	S-25	d			SM	Gray, very silty, fine SAND with organics (medium dense, wet)
		Run 6	i4				
		S-26	d			ML	Brownish-gray SILT with sand and organics (medium stiff, wet)
80							
	-10						
		S-27	d			SM	Brownish-gray, black and iron oxide mottled, very silty, fine to medium SAND with clay and organics (medium dense, wet) **(OCEOLA MUD FLOW)**
85		S-28	d			SP	Dark gray, fine to medium SAND (medium dense, wet)
						SM	Gray, silty, fine to coarse SAND with trace gravel, clay and wood (medium dense, wet)
	-15	Run 7	i4				
90		S-29	d				- grades very silty and without gravel and wood
	-20	Run 8	i4				
95							

Well detail: 10/20 Colorado sand pack; 2-inch diameter, Schedule 40, PVC screen (0.010-inch slot size); Threaded end cap; Bentonite chips

Boring Completed 05/21/13
Total Depth of Boring = 95.0 ft.

Monitoring Well Completed 05/21/13
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 71.56 ft.
Total Depth of Monitoring Well = 82.9 ft.

100

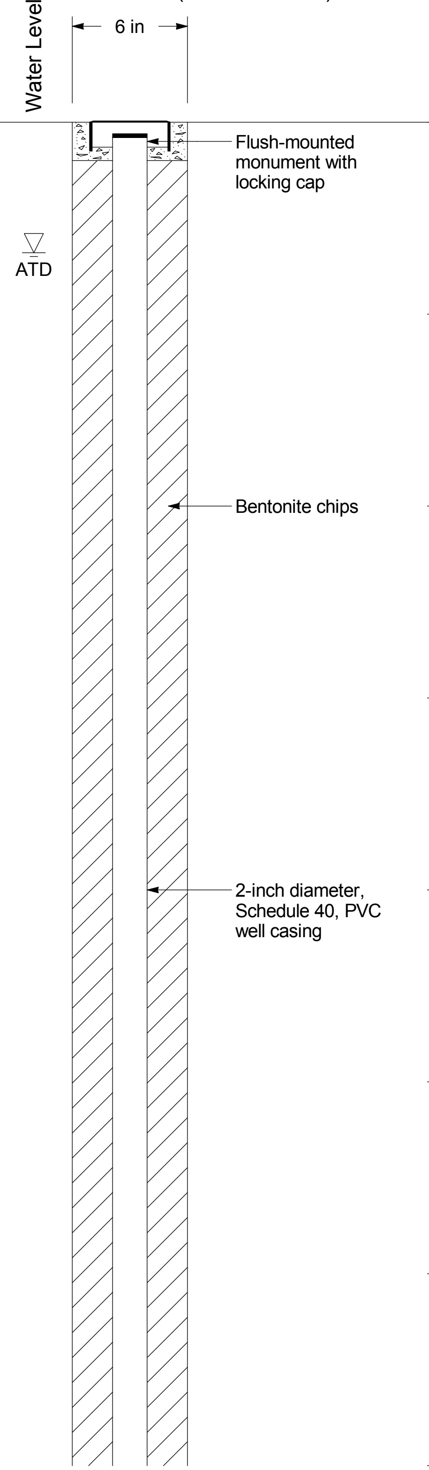
105

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC453**

AGW234

SAMPLE DATA						SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Drilling Method: Rotosonic Ground Elevation (ft): 70.21 Drilled By: Cascade Drilling Inc.	Water Level
0	70	S-1	d				GM	Brown iron oxide stained, silty, sandy GRAVEL (medium dense, moist) **(FILL)**	
									ATD
5	65	Run 1	i4						
10	60	S-2	d				SM	Brownish-gray, silty, fine SAND (medium dense, wet) **(ALLUVIUM)**	
		S-3	d				SP-SM	Dark gray, fine to medium SAND with silt (medium dense, wet)	
15	55	Run 2	i4						
		S-4	d				SP-SM	Brownish-gray, fine SAND with silt (medium dense, wet)	
20	50	S-5	d				SM	Gray, silty, fine SAND (medium dense, wet) **Groundwater sample: AGW234-21-20130522**	
25	45	Run 3 S-6	i4 d				SP	Dark gray, fine to medium SAND (medium dense, wet)	
30	40	S-7	d						
35									

Monitoring Well Detail
(DOE#: BIC454)



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC454**

AGW234

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic
Ground Elevation (ft): 70.21
Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BIC454)

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)
35	35	S-8	d		
40	30	S-9	d		
45	25	Run 4	i4		
		S-10	d		
		S-11	d		
50	20	S-12	d		
		S-13	d		
		S-14	d		
		S-15	d		
55	15	S-16	d		
		S-17	d		
60	10	S-18	d		
65	5	S-19	d		
		S-20	d		
		S-21	d		
70					

USCS Symbol	Description
SP	Dark gray, fine to medium SAND (medium dense, wet)
GP	Gray, very sandy GRAVEL (medium dense, wet)
GP	Gray, sandy GRAVEL (medium dense, wet)
SP	Dark gray, fine to medium SAND (medium dense, wet)
PT	Dark brown PEAT (soft, wet)
SM	Gray, silty, gravelly, fine to coarse SAND (medium dense, wet)
SP-SM	Gray, fine SAND with silt (medium dense, wet)
ML	Light gray SILT (medium stiff, wet)
GP	Gray, sandy GRAVEL (medium dense, wet) **Groundwater sample: AGW234-57-20130522**
SP	Dark gray, fine to medium SAND (medium dense, wet)
SP	Dark gray, gravelly, fine to coarse SAND; predominantly coarse (medium dense, wet) - grades fine to coarse SAND
GP	Grayish-brown, sandy GRAVEL (dense, wet)

Water Level	Monitoring Well Detail
	Bentonite chips
	2-inch diameter, Schedule 40, PVC well casing

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC454**

AGW234

SAMPLE DATA						SOIL PROFILE			GROUNDWATER	
Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Drilling Method: Rotosonic Ground Elevation (ft): 70.21 Drilled By: Cascade Drilling Inc.	Water Level	Monitoring Well Detail (DOE#: BIC454)
70	0	S-22	d				GP	Grayish-brown, sandy GRAVEL (dense, wet)		
		Run 5	i4							10/20 Colorado sand pack
75	-5									
		S-23	d				SP	Dark gray, gravelly, fine to coarse SAND (dense, wet)		
							GP	Brown, sandy GRAVEL (dense, wet)		2-inch diameter, Schedule 40, PVC screen (0.020-inch slot size)
80	-10	S-24	d							
										Threaded end cap
85	-15	S-25	d				SM	Gray, silty, very gravelly, fine to coarse SAND with clay and trace wood; gravels are subangular to angular (medium dense, wet) **(OCEOLA MUD FLOW)**		
		Run 6	i4							
90	-20	S-26	d							Bentonite chips
		Run 7	i4							
95										

Boring Completed 05/22/13
Total Depth of Boring = 95.0 ft.

Monitoring Well Completed 05/22/13
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 69.62 ft.
Total Depth of Monitoring Well = 83.8 ft.

100

105

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC454**

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW234

Figure A-14

AGW235

SAMPLE DATA

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)
0	70	S-1	d		
		S-2	d		
5	65	Run 1	i4		
10	60	S-3	d		
		S-4	d		
		S-5	d		
15	55				
		S-6	d		
20	50				
		S-7	d		
		S-8	d		
25	45	Run 2	i4		
		S-9	d		
30	40	S-10	d		
35					

SOIL PROFILE

Drilling Method: Rotosonic

Ground Elevation (ft): 70.23

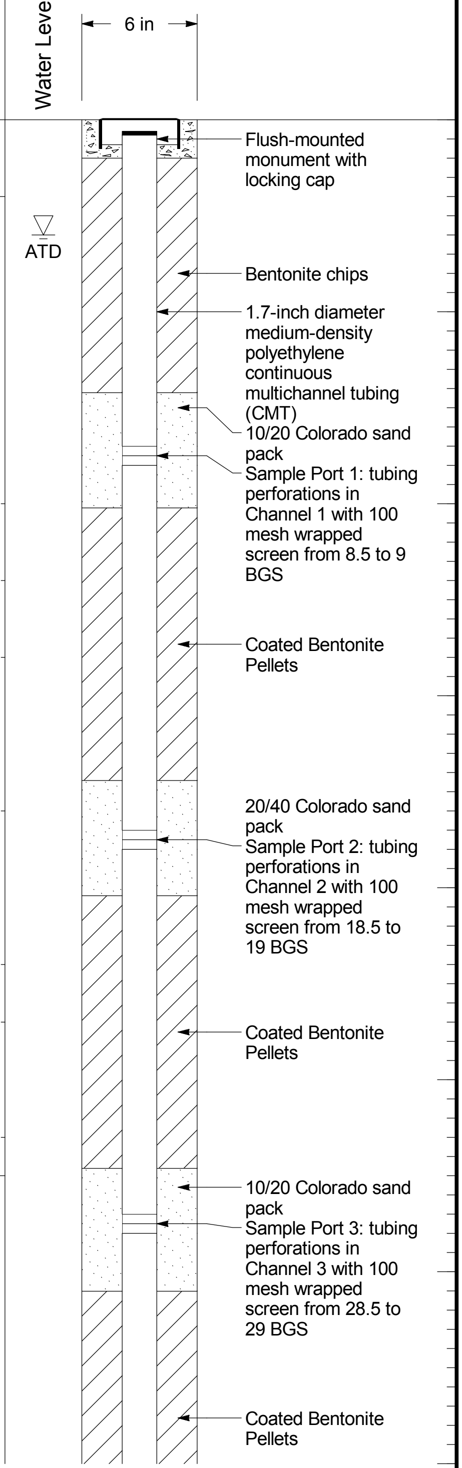
Drilled By: Cascade Drilling Inc.

USCS Symbol	Description
GP	Brown GRAVEL with sand (medium dense, moist) **(FILL)**
SM	Gray, silty, gravelly, fine to coarse SAND with trace organics (medium dense, wet) **(ALLUVIUM)**
ML	Brownish-gray, sandy SILT (medium stiff, wet)
SP	Dark gray, fine to medium SAND (medium dense, wet)
SP-SM	Brownish-gray, fine SAND with silt (medium dense, wet)
SM	Brownish-gray, silty, fine SAND (medium dense, wet)
GP	Dark gray, very sandy GRAVEL (medium dense, wet)
SP-SM	Brownish-gray, fine to medium SAND with silt and trace wood (medium dense, wet)
SP	Dark gray, gravelly, fine to coarse SAND (medium dense, wet)
SP	Dark gray, fine to medium SAND (medium dense, wet)

GROUNDWATER

Water Level: ATD

Monitoring Well Detail (DOE#: BIC455)



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC455**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

Landau Associates

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW235

Figure A-15 (1 of 3)

AGW235

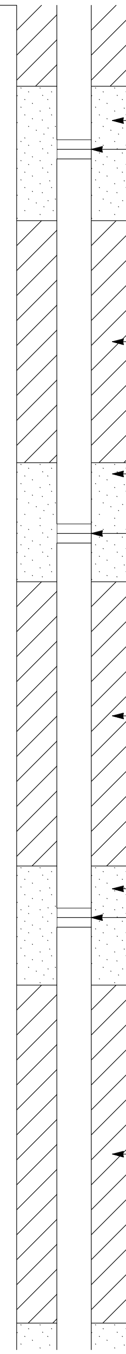
SAMPLE DATA | SOIL PROFILE | GROUNDWATER

Drilling Method: Rotosonic
Ground Elevation (ft): 70.23
Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
35	35					SP	Dark gray, fine to medium SAND (medium dense, wet)
40	30	S-11	d				- grades with trace gravel
45	25	S-12	d				
		S-13	d			GP	Dark gray GRAVEL with sand (medium dense, wet)
50	20	Run 3	i4				
		S-14	d			ML	Gray, gravelly, very sandy SILT (soft, wet)
		S-15	d			ML	Gray SILT (soft, wet)
						ML	Gray, sandy SILT (medium stiff, wet)
55	15	S-16	d				
60	10	S-17	d				
		S-18	d			SP-SM	Gray, fine SAND with silt (medium dense, wet)
						SM	Gray, silty, fine SAND with trace wood (medium dense, wet)
65	5	S-19	d				
70							

Water Level

Monitoring Well Detail
(DOE#: BIC455)



Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC455**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW235

Figure A-15 (2 of 3)

AGW235

SAMPLE DATA | SOIL PROFILE | GROUNDWATER

Drilling Method: Rotosonic

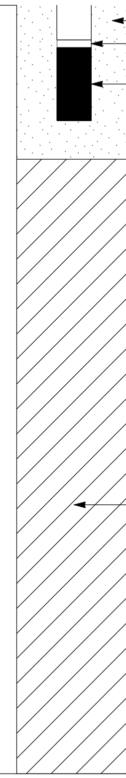
Ground Elevation (ft): 70.23

Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
70	0	S-20	d			SP	Dark gray, fine SAND (medium dense, wet)
		S-21	d			SP-SM	Dark gray, fine to medium SAND with silt (medium dense, wet)
		S-22	d				
		S-23	d			ML	Gray SILT with sand (stiff, wet)
		S-24	d			SM	Gray, silty, fine SAND (medium dense, wet)
75	-5	Run 4	i4			ML	
		S-25	d			ML	Gray SILT (stiff, wet)
		S-26	d			SM	Brown SILT with abundant organics (stiff, wet)
						SM	Gray, silty, fine to coarse SAND with gravel (medium dense, wet)
80	-10	S-27	d				Gray, gravelly, very silty, fine to coarse SAND with clay; gravels are subangular to angular (medium dense, wet) **(OCEOLA MUD FLOW)**
85	-15	S-28	d				
90							

Monitoring Well Detail
(DOE#: BIC455)

Water Level



Boring Completed 05/23/13
Total Depth of Boring = 90.0 ft.

Monitoring Well Completed 05/24/13
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 69.94 ft.
Total Depth of Monitoring Well = 73.0 ft.

95

100

105

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC455**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW235

Figure A-15

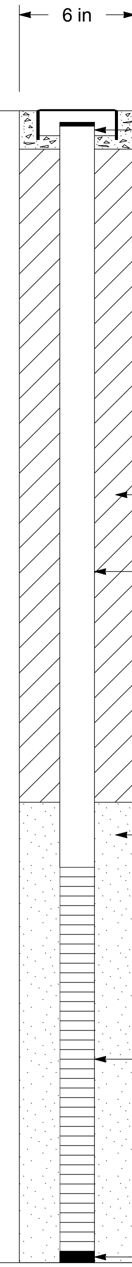
AGW236

SAMPLE DATA | SOIL PROFILE | GROUNDWATER

Drilling Method: Rotosonic
Ground Elevation (ft): 75.23
Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description	Water Level
0	75					AC	4-inches asphalt concrete pavement	
		S-1	d			SM	Gray, silty, very gravelly, fine to coarse SAND (very dense, damp) **(FILL)**	
		Run 1	i4					
5	70						- grades brown	
		Run 2	i4					
		S-2	d			ML	Brown SILT (hard, wet) **(ALLUVIUM)**	ATD
		S-3	d			SM		
		S-4	d			ML		
10	65	S-5	d			SP	Gray, silty, fine to coarse SAND (dense, wet)	
		S-6	d			ML	Brown SILT with sand (stiff, wet)	
		Run 3	i4			SP	Dark gray, fine to medium SAND (medium dense, wet)	
							Gray SILT with organics (medium stiff, wet)	
15	60						Dark gray, fine to medium SAND (medium dense, wet) **Groundwater sample: AGW236-14-20130528**	
		S-7	d			SM	Dark gray, silty, fine SAND (medium dense, wet)	
20	55	S-8	d				- grades brownish-gray and very silty	
		S-9	d			ML	Brownish-gray SILT with organics (medium stiff, wet)	
		Run 4	i4					
						WD	WOOD	
25	50	S-10	d			SP	Dark gray, fine to medium SAND (medium dense, wet)	
30								
35								

Monitoring Well Detail
(DOE#: BIC456)



Boring Completed 05/28/13
Total Depth of Boring = 30.0 ft.

Monitoring Well Completed 05/28/13
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 74.85 ft.
Total Depth of Monitoring Well = 30.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC456**

LANDAU ASSOCIATES | Boeing Auburn, Auburn, Washington | Log of Monitoring Well AGW236 | Figure A-16

AGW237

SAMPLE DATA

Columns: Depth (ft) | Elevation | Sample Number & Interval | Sampler Type | Blows/Foot | PID (ppm)

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35
Elevation scale: 70, 65, 60, 55, 50, 45, 40

Sample Number & Interval	Sampler Type
S-1	d
S-2	d
Run 1	i4
S-3	d
S-4	d
S-5	d
Run 2	i4
S-6	d
S-7	d
S-8	d
S-9	d
S-10	d
S-11	d
S-12	d
Run 3	i4
S-13	d
S-14	d

SOIL PROFILE

Drilling Method: Rotosonic

Ground Elevation (ft): 70.82

Drilled By: Cascade Drilling Inc.

USCS Symbol	Description
	Not Sampled - Hand cleared for utilities
SM	Brown, silty, gravelly, fine to coarse SAND (medium dense, moist) **(FILL)**
GM	Gray, silty, very sandy GRAVEL (medium dense, moist)
PT	Dark brown PEAT (soft, wet) **(ALLUVIUM)**
ML	Brown SILT with organics (soft, wet)
SM	Brown, silty, fine SAND (medium dense, wet)
SM	Gray, silty, fine SAND (medium dense, wet)
ML	Gray SILT (medium stiff, wet)
SP	Dark gray, fine to medium SAND (medium dense, wet)
SM	Brown, very silty, gravelly, fine to coarse SAND (medium dense, wet)
SP	Dark gray, fine to coarse SAND with gravel (medium dense, wet)
GP	Dark gray GRAVEL with sand (medium dense, wet)
GP-GM	Dark gray GRAVEL with sand and silt (medium dense, wet)
GP	Dark gray, sandy GRAVEL (medium dense, wet) - grades with trace sand

GROUNDWATER

Water Level: 9/26/13

Monitoring Well Detail (DOE#: BIC813)

6 in

Flush-mounted monument with locking cap

Bentonite chips

2-inch diameter, Schedule 40, PVC well casing

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC813**

AGW237

SAMPLE DATA | SOIL PROFILE | GROUNDWATER

Drilling Method: Rotosonic

Ground Elevation (ft): 70.82

Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BIC813)

Depth (ft): 35, 40, 45, 50, 55, 60, 65, 70

Elevation: 35, 30, 25, 20, 15, 10, 5

Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)
S-15	d		
S-16	d		
S-17	d		
Run 4	i4		
S-18	d		
S-19	d		
S-20	d		
S-21	d		
S-22	d		
S-23	d		
S-24	d		
Run 5	i4		
S-25	d		

USCS Symbol	Description
GP	
SP	Dark gray, fine to medium SAND with trace gravel and organics (medium dense, wet)
SP-SM	Brown, fine to medium SAND with silt and wood (medium dense, wet)
ML	Gray SILT with sand (stiff, wet)
SP-SM	Gray, fine SAND with silt (medium dense, wet)
ML	Gray, sandy SILT (medium stiff, wet)
ML	Gray SILT with sand (medium stiff, wet)
SP	Gray, fine SAND (medium dense, wet)
SM	Gray, silty, fine SAND (medium dense, wet)
ML	Gray SILT with sand (medium stiff, wet)
SP	Gray, fine SAND (medium dense, wet)
SM	Gray, silty, fine SAND (medium dense, wet)
ML	Brownish-gray SILT with organics (stiff, wet)
ML	Gray, sandy SILT (medium stiff, wet)
SP	

Monitoring well detail:

- Bentonite chips
- 2-inch diameter, Schedule 40, PVC well casing
- 10/20 Colorado sand pack

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC813**

AGW237

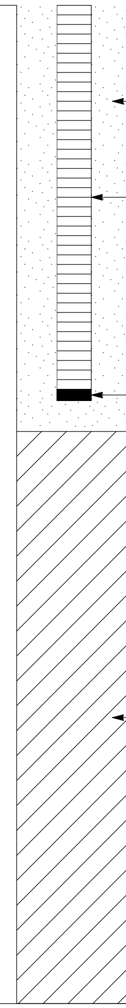
SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic
Ground Elevation (ft): 70.82
Drilled By: Cascade Drilling Inc.

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
70	0	S-26	d			SP	Gray, fine SAND (medium dense, wet)
		S-27	d			GP	Gray GRAVEL with sand (medium dense, wet)
75	-5	S-28	d			SP	Dark gray, fine to medium SAND (medium dense, wet)
		S-29	d			GP	Brown GRAVEL with sand (medium dense, wet)
80		S-30	d			GM	Grayish-brown, silty, sandy GRAVEL (medium dense, wet)
	-10	S-31	d			ML	Grayish-brown, clayey SILT with organics and trace sand (stiff, wet) **(OCEOLA MUD FLOW)**
		S-32	d			SM	Grayish-brown, very silty, fine to coarse SAND with gravel (loose, wet)
85	-15	Run 6	i4				
		S-33	d				
90	-20						
		S-34	d				
95	-25						
100							
105							

Water Level

Monitoring Well Detail
(DOE#: BIC813)



Boring Completed 09/23/13
Total Depth of Boring = 96.0 ft.

Monitoring Well Completed 09/23/13
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 70.49 ft.
Total Depth of Monitoring Well = 80.3 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC813**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW237

Figure A-17 (3 of 3)

AGW238

SAMPLE DATA

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)
0					
	70				
		S-1	d		
		Run 1	i4		
5					
	65	S-2	d		
		S-3	d		
		S-4	d		
		S-5	d		
10		Run 2	i4		
	60				
15		S-6	d		
	55				
		S-7	d		
		S-8	d		
20		Run 3	i4		
	50				
25		S-9	d		
	45				
		S-10	d		
		S-11	d		
30		Run 4	i4		
	40				
35					

SOIL PROFILE

Drilling Method: Rotosonic

Ground Elevation (ft): 71.00

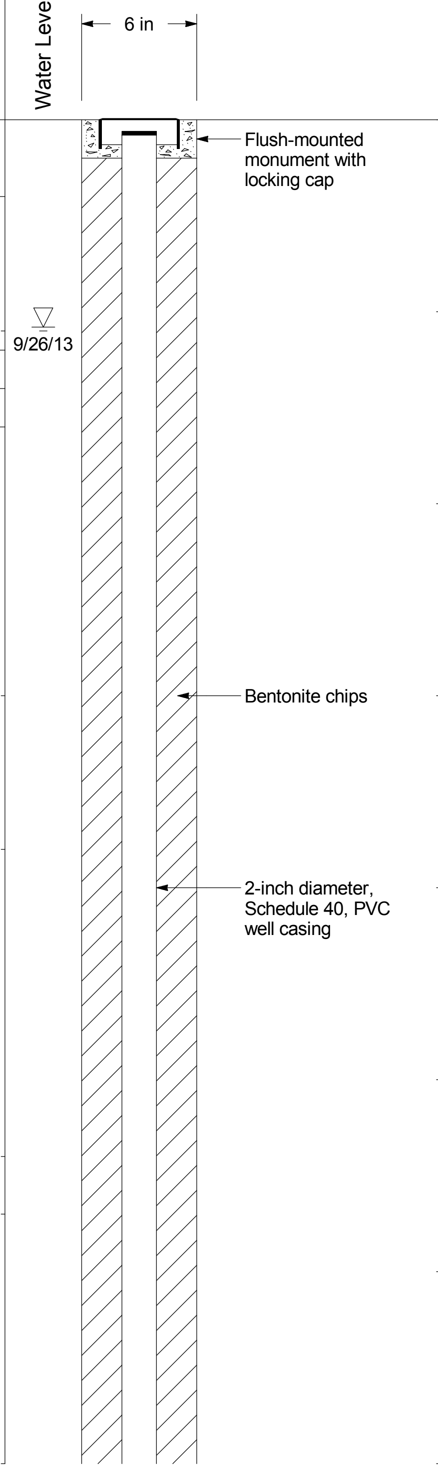
Drilled By: Cascade Drilling Inc.

Graphic Symbol	USCS Symbol	Description
		Not Sampled - Hand cleared for utilities
	GM	Dark gray, silty, very sandy GRAVEL (medium dense, moist) **(FILL)**
	SM	Brown, silty, fine SAND (medium dense, wet)
	SM	Gray, silty SAND with gravel (medium dense, wet)
	PT	Brown PEAT (soft, wet) **(ALLUVIUM)**
	ML	Grayish-brown SILT with organics (very soft, wet)
	SP	Grayish-brown, fine to medium SAND (medium dense, wet) - grades dark gray and with gravel
	GP	Dark gray GRAVEL with sand (medium dense, wet)
	SP-SM	Dark gray, fine to medium SAND with gravel and silt (medium dense, wet)
	GP	Dark gray GRAVEL (medium dense, wet)

GROUNDWATER

Water Level: 9/26/13

Monitoring Well Detail (DOE#: BIC814)



Notes: 1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. DOE Unique Well Number: BIC814

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW238

Figure A-18 (1 of 2)

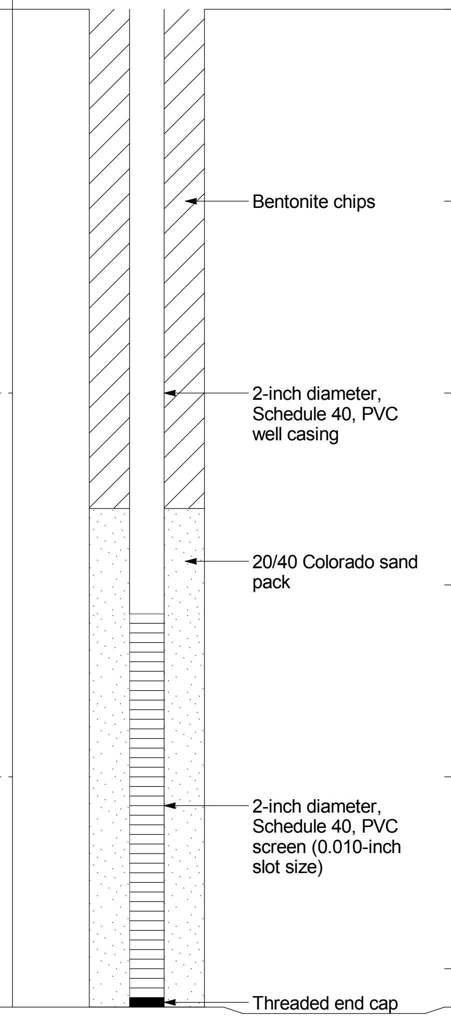
AGW238

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic
Ground Elevation (ft): 71.00
Drilled By: Cascade Drilling Inc.

Monitoring Well Detail (DOE#: BIC814)

Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	USCS Symbol	Description
35		S-12	d			SP	Dark gray, fine to medium SAND (medium dense, wet)
	35						- grades with trace gravel and silt pockets
40		Run 5	i4				
	30						
45		S-13	d			ML	Dark gray, sandy SILT (very soft, wet)
	25	S-14	d				- grades with gravel
50		Run 6	i4				
	20						
55		S-15	d			SM	Dark gray, silty, fine SAND (medium dense, wet)
	15	S-16	d				- grades very silty
		Run 7	i4				
			d				- grades silty
60							
	10						
65							
		S-17					
70							



Boring Completed 09/24/13
Total Depth of Boring = 61.0 ft.

Monitoring Well Completed 09/24/13
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 70.26 ft.
Total Depth of Monitoring Well = 61.0 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC814**

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW238

Figure A-18 (2 of 2)

AGW239

SAMPLE DATA / SOIL PROFILE / GROUNDWATER

Drilling Method: Rotosonic

Ground Elevation (ft): 71.16

Drilled By: Cascade Drilling Inc.

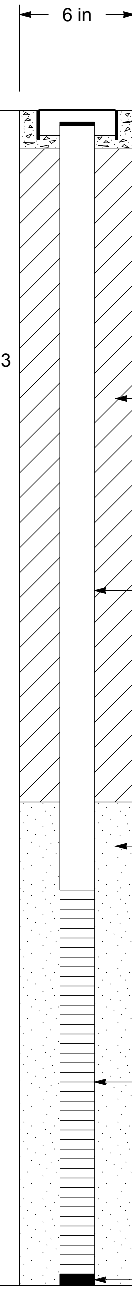
Columns: Depth (ft) | Elevation | Sample Number & Interval | Sampler Type | Blows/Foot | PID (ppm) | Graphic Symbol | USCS Symbol | Description | Water Level

Sample Number	Sampler Type
S-1	d
Run 1	i4
S-2	d
S-3	d
Run 2	i4
S-4	d
Run 3	i4
S-5	d
S-6	d
Run 4	i4
S-7	d
S-8	d
S-9	d
Run 5	i4
S-10	d
Run 6	i4

USCS Symbol	Description
	Not Sampled - Hand cleared for utilities
SM	Brown to gray, silty, gravelly, fine to coarse SAND (medium dense, moist) **(FILL)**
SM	Gray with brown mottling, silty, fine SAND with gravel (medium dense, moist)
GM	Brown to gray, silty, sandy GRAVEL (medium dense, wet)
PT	Brown PEAT (soft, wet) **(ALLUVIUM)** **Groundwater Sample: AGW239-8.5-20130925**
ML	Brownish-gray SILT with abundant organics (medium stiff, wet) - grades dark gray and with trace organics
SP	Dark gray, gravelly, fine to coarse SAND (medium dense, wet) - grades gravelly
GP	Dark gray GRAVEL with sand (medium dense, wet) - grades very sandy - grades sandy
SP	Dark gray, fine to coarse SAND (medium dense, wet)

Water Level: 9/27/13

Monitoring Well Detail (DOE#: BIC815)



Boring Completed 09/25/13
Total Depth of Boring = 30.6 ft.

Monitoring Well Completed 09/25/13
Elevation at Top of Protective Casing = Not measured
Elevation at Top of Monitoring Well Casing = 70.78 ft.
Total Depth of Monitoring Well = 30.6 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. **DOE Unique Well Number: BIC815**

025164. 1/29/14 N:\PROJECTS\025164 - MASTER FILE.GPJ WELL LOG W/ ELEVATION

LANDAU ASSOCIATES

Boeing Auburn
Auburn, Washington

Log of Monitoring Well AGW239

Figure A-19

APPENDIX B

Groundwater Volatile Organic Compound Sampling Result Summaries

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW001R	Shallow	cis-1,2-Dichloroethene	12/9/2013	0.5 U	12/20/2011	0.2 U
		Trichloroethene		2.8	6/3/2008	4.9
		Vinyl Chloride		0.02 U	6/20/2011	0.02 U
AGW002R	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.3	10/2/2006	2.6
		Trichloroethene		0.2 U	10/2/2006	3.6
		Vinyl Chloride		0.066	4/3/2007	0.62
AGW006R	Shallow	cis-1,2-Dichloroethene	12/6/2013	1.6	12/7/2012	1.6
		Trichloroethene		0.7	12/12/2007	2.0
		Vinyl Chloride		0.12	4/2/2007	0.16
AGW009	Shallow	cis-1,2-Dichloroethene	6/3/2013	0.2 U	8/8/1991	1.3
		Trichloroethene		0.2 U	10/11/1991	12
		Vinyl Chloride		0.02 U	6/13/2011	0.02 U
AGW010	Shallow	cis-1,2-Dichloroethene	12/10/2013	2.0 U	2/15/1994	5.4
		Trichloroethene		2.0 U	2/15/1994	7.0
		Vinyl Chloride		0.04 U	6/12/2012	0.085
AGW024	Shallow	cis-1,2-Dichloroethene	12/5/2013	1.6	10/19/1992	3.2
		Trichloroethene		0.2 U	12/6/2011	0.2 U
		Vinyl Chloride		1.4	10/19/1992	29
AGW025	Shallow	cis-1,2-Dichloroethene	12/5/2013	3.8	9/14/1993	11
		Trichloroethene		0.2 U	6/3/2008	0.2
		Vinyl Chloride		1.7	2/9/1994	16
AGW026	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.7	9/19/1992	3.4
		Trichloroethene		0.8	9/19/1992	4.4
		Vinyl Chloride		0.029	12/8/2008	0.14
AGW027	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.9	11/24/1992	17
		Trichloroethene		0.2 U	11/24/1992	3.7
		Vinyl Chloride		0.18	11/24/1992	13
AGW029	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.2 U	12/6/2011	0.2 U
		Trichloroethene		0.2 U	12/6/2011	0.2 U
		Vinyl Chloride		0.02 U	12/5/2005	0.5
AGW030	Shallow	cis-1,2-Dichloroethene	6/4/2013	2.0 U	6/14/2011	0.2 U
		Trichloroethene		2.0 U	6/14/2011	0.2 U
		Vinyl Chloride		0.1 U	11/2/2001	0.4
AGW031R	Shallow	cis-1,2-Dichloroethene	12/6/2013	1.9	12/12/2007	7.2
		Trichloroethene		1.9	12/2/2009	3.5
		Vinyl Chloride		0.03 U	4/3/2007	0.06
AGW032	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.2 U	9/9/1997	3.3
		Trichloroethene		0.2 U	9/9/1997	0.7
		Vinyl Chloride		0.049	8/30/1999	5.2
AGW033	Shallow	cis-1,2-Dichloroethene	12/6/2013	0.8	12/5/2005	4.5
		Trichloroethene		1.1	12/12/1995	8.7
		Vinyl Chloride		0.059	11/25/2002	1.6
AGW034	Deep	cis-1,2-Dichloroethene	6/4/2013	0.2 U	3/19/1998	0.9
		Trichloroethene		0.4	3/19/1998	2.6
		Vinyl Chloride		0.02 U	6/8/2004	0.026
AGW035	Deep	cis-1,2-Dichloroethene	6/4/2013	0.2 U	9/3/1998	0.6
		Trichloroethene		1.7	3/19/1998	5.7
		Vinyl Chloride		0.02 U	6/14/2011	0.02 U

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW037	Shallow	cis-1,2-Dichloroethene	12/9/2013	1.2	3/29/1996	2.6
		Trichloroethene		2.6	12/13/1996	5.3
		Vinyl Chloride		0.078	12/15/2008	0.13
AGW039	Shallow	cis-1,2-Dichloroethene	6/13/2013	1.3	3/19/1997	2.1
		Trichloroethene		0.9	12/13/1996	2.0
		Vinyl Chloride		0.033	6/10/2009	0.06
AGW040	Shallow	cis-1,2-Dichloroethene	6/13/2013	0.7	12/13/1996	1.3
		Trichloroethene		1.5	12/13/1996	4.0
		Vinyl Chloride		0.026	6/10/2009	0.039
AGW041	Shallow	cis-1,2-Dichloroethene	6/13/2013	0.2 U	6/21/2011	0.2 U
		Trichloroethene		0.4	12/18/1996	2.0
		Vinyl Chloride		0.02 U	6/21/2011	0.2 U
AGW044	Shallow	cis-1,2-Dichloroethene	6/12/2013	0.2 U	12/13/2007	0.6
		Trichloroethene		0.2 U	12/7/2005	0.2
		Vinyl Chloride		0.02 U	6/22/2011	0.02 U
AGW048	Shallow	cis-1,2-Dichloroethene	9/29/2010	0.5	3/19/1997	1.6
		Trichloroethene		1.1	3/19/1997	4.9
		Vinyl Chloride		0.02 U	9/29/2010	0.02 U
AGW049	Shallow	cis-1,2-Dichloroethene	9/29/2010	0.7	9/29/2010	0.7
		Trichloroethene		1.6	9/29/2010	1.6
		Vinyl Chloride		0.02 U	9/29/2010	0.02 U
AGW050	Shallow	cis-1,2-Dichloroethene	9/29/2010	0.2	3/19/1997	1.3
		Trichloroethene		1.1	3/19/1997	3.2
		Vinyl Chloride		0.02 U	9/29/2010	0.02 U
AGW053R	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.4	12/11/2007	1.5
		Trichloroethene		1.5	10/2/2006	4.0
		Vinyl Chloride		0.043	6/12/2007	0.3
AGW055R	Intermediate	cis-1,2-Dichloroethene	12/6/2013	1.5	6/11/2007	3.0
		Trichloroethene		0.7	6/11/2007	2.5
		Vinyl Chloride		0.12	3/10/2009	0.34
AGW057R	Intermediate	cis-1,2-Dichloroethene	12/9/2013	0.2 U	12/20/2011	0.2 U
		Trichloroethene		1.7	6/11/2007	3.0
		Vinyl Chloride		0.02 U	6/2/2009	0.021
AGW058R	Shallow	cis-1,2-Dichloroethene	6/7/2013	0.2 U	6/20/2011	0.2 U
		Trichloroethene		0.3	12/12/2007	1.5
		Vinyl Chloride		0.02 U	6/20/2011	0.02 U
AGW059R	Shallow	cis-1,2-Dichloroethene	6/7/2013	0.2 U	6/20/2011	0.2 U
		Trichloroethene		0.3	9/11/2007	0.8
		Vinyl Chloride		0.02 U	6/20/2011	0.02 U
AGW060R	Intermediate	cis-1,2-Dichloroethene	12/9/2013	3.1	9/11/2007	4.0
		Trichloroethene		0.9	9/11/2007	2.1
		Vinyl Chloride		0.059	6/2/2009	0.14
AGW064	Shallow	cis-1,2-Dichloroethene	12/9/2013	0.2 U	12/5/2006	0.6
		Trichloroethene		0.2	6/2/2008	0.5
		Vinyl Chloride		0.2 U	6/24/2011	0.02 U
AGW065	Shallow	cis-1,2-Dichloroethene	12/9/2013	0.2 U	11/1/2001	3.2
		Trichloroethene		0.2 U	11/1/2001	4.7
		Vinyl Chloride		0.2 U	6/23/2011	0.02 U

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW066	Shallow	cis-1,2-Dichloroethene	12/6/2013	2.0	9/9/1997	11
		Trichloroethene		5.4	9/1/1998	23
		Vinyl Chloride		0.02 U	6/6/2006	0.067
AGW067	Shallow	cis-1,2-Dichloroethene	12/6/2013	2.7	9/1/1998	10
		Trichloroethene		4.9	3/24/1998	18
		Vinyl Chloride		0.02 U	4/2/2007	0.055
AGW068	Shallow	cis-1,2-Dichloroethene	12/3/2013	0.2 U	12/16/2011	0.2 U
		Trichloroethene		0.2 U	12/16/2011	0.2 U
		Vinyl Chloride		0.2 U	12/16/2011	0.02 U
AGW069	Shallow	cis-1,2-Dichloroethene	12/3/2013	0.2 U	12/15/2011	0.2 U
		Trichloroethene		0.2 U	12/15/2011	0.2 U
		Vinyl Chloride		0.2 U	12/15/2011	0.02 U
AGW072	Intermediate	cis-1,2-Dichloroethene	12/6/2013	0.2 U	12/3/2004	0.8
		Trichloroethene		1.6	5/19/2003	4.8
		Vinyl Chloride		0.02 U	12/19/2011	0.02 U
AGW073	Deep	cis-1,2-Dichloroethene	12/6/2013	0.2 U	12/19/2011	0.2 U
		Trichloroethene		0.3	11/24/2002	0.9
		Vinyl Chloride		0.2 U	12/19/2011	0.02 U
AGW074	Shallow	cis-1,2-Dichloroethene	12/12/2013	0.2 U	12/9/2011	0.2 U
		Trichloroethene		0.2 U	12/9/2011	0.2 U
		Vinyl Chloride		0.02 U	12/9/2011	0.02 U
AGW078	Shallow	cis-1,2-Dichloroethene	12/4/2013	0.2 U	12/9/2011	0.2 U
		Trichloroethene		0.2 U	8/31/1998	1.5
		Vinyl Chloride		0.2 U	12/9/2011	0.02 U
AGW079	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.3	12/8/2008	3.0
		Trichloroethene		0.2 U	12/6/2011	0.2 U
		Vinyl Chloride		0.83	6/2/2009	2.1
AGW081	Shallow	cis-1,2-Dichloroethene	6/4/2013	0.2 U	9/11/1997	0.6
		Trichloroethene		0.2 U	9/11/1997	0.5
		Vinyl Chloride		0.02 U	6/4/2007	0.055
AGW085	Shallow	cis-1,2-Dichloroethene	12/4/2013	0.2 U	12/9/2011	0.2 U
		Trichloroethene		0.5	11/8/2000	2.7
		Vinyl Chloride		0.02 U	12/9/2011	0.02 U
AGW087	Intermediate	cis-1,2-Dichloroethene	12/12/2013	0.2 U	12/9/2011	0.2 U
		Trichloroethene		0.2 U	12/9/2011	0.2 U
		Vinyl Chloride		0.02 U	12/9/2011	0.02 U
AGW088	Shallow	cis-1,2-Dichloroethene	12/12/2013	0.2 U	12/9/2011	0.2 U
		Trichloroethene		0.2 U	12/9/2011	0.2 U
		Vinyl Chloride		0.02 U	12/9/2011	0.02 U
AGW089	Intermediate	cis-1,2-Dichloroethene	12/12/2013	0.2 U	12/9/2011	0.2 U
		Trichloroethene		0.2 U	6/21/2004	0.2
		Vinyl Chloride		0.02 U	12/9/2011	0.02 U
AGW090	Shallow	cis-1,2-Dichloroethene	12/12/2013	0.2 U	12/9/2011	0.2 U
		Trichloroethene		0.2 U	12/9/2011	0.2 U
		Vinyl Chloride		0.02 U	12/9/2011	0.02 U
AGW091	Intermediate	cis-1,2-Dichloroethene	12/12/2013	0.2 U	12/9/2011	0.2 U
		Trichloroethene		0.2 U	12/9/2011	0.2 U
		Vinyl Chloride		0.02 U	12/9/2011	0.02 U

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW095R	Intermediate	cis-1,2-Dichloroethene	12/6/2013	0.5	6/3/2009	0.9
		Trichloroethene		1.2	6/11/2007	3.3
		Vinyl Chloride		0.02	6/8/2010	0.063
AGW098R	Deep	cis-1,2-Dichloroethene	12/6/2013	0.2 U	12/19/2011	0.2 U
		Trichloroethene		0.6	9/11/2007	1.6
		Vinyl Chloride		0.02 U	12/19/2011	0.02 U
AGW104	Shallow	cis-1,2-Dichloroethene	12/4/2013	0.2 U	12/9/2011	0.2 U
		Trichloroethene		0.2 U	12/6/2004	0.6
		Vinyl Chloride		0.2 U	12/9/2011	0.02 U
AGW105	Intermediate	cis-1,2-Dichloroethene	12/6/2013	0.7	6/5/2006	1.1
		Trichloroethene		0.9	6/14/2012	1.2
		Vinyl Chloride		0.5	12/1/2004	1.8
AGW106R	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.2 J	3/11/2009	0.6
		Trichloroethene		0.2	6/3/2008	0.4
		Vinyl Chloride		0.1 U	4/3/2007	0.046
AGW110R	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.2 U	4/3/2007	0.4
		Trichloroethene		0.2 U	10/2/2006	0.5
		Vinyl Chloride		0.093	1/23/2007	0.4
AGW112R	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.8	12/14/2011	1.4
		Trichloroethene		2.3	12/14/2011	4.6
		Vinyl Chloride		0.02 U	12/1/2009	0.073
AGW115	Shallow	cis-1,2-Dichloroethene	12/11/2013	3.1	12/7/2005	9.3
		Trichloroethene		0.2 U	6/6/2007	0.6
		Vinyl Chloride		0.9	6/12/2013	1.0
AGW116	Shallow	cis-1,2-Dichloroethene	12/11/2013	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.3	6/11/2009	0.5
		Vinyl Chloride		0.02 U	6/11/2009	0.022
AGW117	Shallow	cis-1,2-Dichloroethene	12/10/2013	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.3	12/7/2005	0.8
		Vinyl Chloride		0.02 U	6/6/2007	0.041 J
AGW118	Shallow	cis-1,2-Dichloroethene	12/11/2013	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.4	12/7/2005	0.8
		Vinyl Chloride		0.02 U	6/11/2009	0.028
AGW119	Intermediate	cis-1,2-Dichloroethene	12/10/2013	0.2 U	12/8/2011	0.2 U
		Trichloroethene		0.2 U	12/8/2011	0.2 U
		Vinyl Chloride		0.02 U	6/21/2011	0.02 U
AGW120	Shallow	cis-1,2-Dichloroethene	12/10/2013	0.2 U	12/8/2011	0.2 U
		Trichloroethene		0.2 U	12/8/2011	0.2 U
		Vinyl Chloride		0.02 U	12/8/2011	0.02 U
AGW125	Shallow	cis-1,2-Dichloroethene	12/6/2013	2.2	9/3/2008	3.8
		Trichloroethene		9.7	3/13/2008	16
		Vinyl Chloride		0.04	4/2/2007	0.054
AGW126	Intermediate	cis-1,2-Dichloroethene	12/6/2013	5.7	12/11/2007	7.7
		Trichloroethene		11	6/11/2007	21
		Vinyl Chloride		0.051	12/14/2011	0.17
AGW127	Shallow	cis-1,2-Dichloroethene	12/10/2013	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	10/1/2008	0.3
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW128	Shallow	cis-1,2-Dichloroethene	12/11/2013	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.2	10/1/2008	0.5
		Vinyl Chloride		0.02 U	6/12/2013	0.34
AGW129	Shallow	cis-1,2-Dichloroethene	12/11/2013	0.5	12/11/2008	1.2
		Trichloroethene		0.7	12/11/2008	1.7
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW130	Shallow	cis-1,2-Dichloroethene	12/11/2013	0.2 U	10/1/2008	0.5
		Trichloroethene		0.4	6/11/2009	0.6
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW131	Shallow	cis-1,2-Dichloroethene	12/5/2013	1.8	12/8/2009	2.9
		Trichloroethene		0.2 U	10/1/2008	0.7
		Vinyl Chloride		3.3	12/8/2009	7.5
AGW133	Shallow	cis-1,2-Dichloroethene	6/5/2013	0.2 U	6/15/2011	0.2 U
		Trichloroethene		0.2 U	6/15/2011	0.2 U
		Vinyl Chloride		0.02 U	6/9/2009	0.13
AGW134	Shallow	cis-1,2-Dichloroethene	12/6/2013	0.2 U	12/8/2011	0.2 U
		Trichloroethene		0.2 U	12/8/2011	0.2 U
		Vinyl Chloride		0.19	6/3/2009	0.28
AGW135	Shallow	cis-1,2-Dichloroethene	12/6/2013	0.5	12/3/2008	2.5
		Trichloroethene		1.7	12/3/2008	3.1
		Vinyl Chloride		0.025	12/3/2008	0.16
AGW136	Shallow	cis-1,2-Dichloroethene	12/5/2013	1.5	9/9/2008	3.8
		Trichloroethene		3.1	9/9/2008	5.7
		Vinyl Chloride		0.02 U	6/4/2009	0.029
AGW137	Intermediate	cis-1,2-Dichloroethene	12/5/2013	2.4	12/10/2008	3.4
		Trichloroethene		4.1	10/30/2008	7.3
		Vinyl Chloride		0.021	6/11/2013	0.027
AGW138	Deep	cis-1,2-Dichloroethene	12/5/2013	0.2 U	12/15/2011	0.2 U
		Trichloroethene		0.7	6/4/2009	1.0
		Vinyl Chloride		0.2 U	6/21/2011	0.02 U
AGW139	Intermediate	cis-1,2-Dichloroethene	12/5/2013	0.2	6/23/2011	0.8
		Trichloroethene		3.9	6/4/2009	6.1
		Vinyl Chloride		0.02 U	12/15/2011	0.02 U
AGW140	Intermediate	cis-1,2-Dichloroethene	12/9/2013	1.7	12/3/2009	5.2
		Trichloroethene		4.7	12/3/2009	8.3
		Vinyl Chloride		0.11	12/3/2009	1.0
AGW141	Intermediate	cis-1,2-Dichloroethene	12/5/2013	0.3	12/2/2009	0.6
		Trichloroethene		2.7	3/12/2009	3.6
		Vinyl Chloride		0.02 U	12/15/2011	0.02 U
AGW142	Deep	cis-1,2-Dichloroethene	12/5/2013	0.2 U	12/15/2011	0.2 U
		Trichloroethene		0.4	12/2/2009	1.2
		Vinyl Chloride		0.2 U	6/24/2011	0.02 U
AGW143	Deep	cis-1,2-Dichloroethene	12/6/2013	0.2 U	12/20/2011	0.2 U
		Trichloroethene		0.2 U	12/20/2011	0.2 U
		Vinyl Chloride		0.2 U	6/20/2011	0.02 U
AGW144	Intermediate	cis-1,2-Dichloroethene	12/6/2013	2.1	6/14/2012	2.3
		Trichloroethene		1.1	6/6/2013	1.1
		Vinyl Chloride		0.25	6/20/2011	0.34

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW145	Intermediate	cis-1,2-Dichloroethene	12/6/2013	8.7	3/14/2011	12
		Trichloroethene		14	12/7/2009	15
		Vinyl Chloride		1.2	6/20/2011	1.8
AGW146	Deep	cis-1,2-Dichloroethene	12/6/2013	2.0	12/7/2009	2.5
		Trichloroethene		4.6	6/20/2011	4.8
		Vinyl Chloride		0.15	9/1/2010	0.3
AGW147	Intermediate	cis-1,2-Dichloroethene	12/6/2013	0.3	3/9/2010	6.6
		Trichloroethene		0.2 U	12/20/2011	0.2 U
		Vinyl Chloride		0.02 U	3/9/2010	0.18
AGW148	Intermediate	cis-1,2-Dichloroethene	12/6/2013	1.9	10/28/2009	2.7
		Trichloroethene		4.9	12/2/2009	6.4
		Vinyl Chloride		0.052	10/28/2009	0.13
AGW149	Intermediate	cis-1,2-Dichloroethene	12/6/2013	0.7	6/10/2010	1.0
		Trichloroethene		5.1	6/23/2011	5.5
		Vinyl Chloride		0.02 U	6/10/2010	0.025
AGW150	Intermediate	cis-1,2-Dichloroethene	12/4/2013	0.2 U	10/28/2009	0.4
		Trichloroethene		1.6	10/28/2009	3.6
		Vinyl Chloride		0.02 U	12/16/2011	0.02 U
AGW151	Intermediate	cis-1,2-Dichloroethene	12/3/2013	0.2 U	12/15/2011	0.2 U
		Trichloroethene		0.5	10/28/2009	1.2
		Vinyl Chloride		0.02 U	12/15/2011	0.02 U
AGW152	Shallow	cis-1,2-Dichloroethene	12/5/2013	0.3	10/29/2009	1.4
		Trichloroethene		0.2 U	12/5/2011	0.2 U
		Vinyl Chloride		4.4	12/8/2009	6.8
AGW153	Shallow	cis-1,2-Dichloroethene	6/5/2013	0.2 U	6/15/2011	0.2 U
		Trichloroethene		0.2 U	6/15/2011	0.2 U
		Vinyl Chloride		0.02 U	10/29/2009	0.17
AGW154	Intermediate	cis-1,2-Dichloroethene	12/4/2013	0.5	6/3/2010	0.7
		Trichloroethene		0.5	6/3/2010	0.6
		Vinyl Chloride		0.031	3/14/2011	0.045
AGW155	Intermediate	cis-1,2-Dichloroethene	12/5/2013	3.7	3/15/2010	8.6
		Trichloroethene		0.2 U	6/2/2010	0.6
		Vinyl Chloride		5.1	6/13/2011	9.4
AGW156	Intermediate	cis-1,2-Dichloroethene	12/5/2013	9.8	12/1/2010	13
		Trichloroethene		1.0	6/2/2010	7.4
		Vinyl Chloride		1.6	12/5/2011	2.1
AGW157	Intermediate	cis-1,2-Dichloroethene	12/6/2013	2.3	6/8/2010	3.0
		Trichloroethene		3.6	6/20/2011	5.4
		Vinyl Chloride		0.76	6/8/2010	2.0
AGW158	Intermediate	cis-1,2-Dichloroethene	12/4/2013	0.7	3/9/2010	1.4
		Trichloroethene		3.1	12/15/2010	4.3
		Vinyl Chloride		0.058	3/9/2010	0.3
AGW159	Deep	cis-1,2-Dichloroethene	12/4/2013	1.1	12/15/2010	1.8
		Trichloroethene		5.3	12/15/2010	5.7
		Vinyl Chloride		0.12	12/15/2010	0.3
AGW160	Intermediate	cis-1,2-Dichloroethene	12/4/2013	0.4	3/9/2010	0.8
		Trichloroethene		4.3	12/15/2010	5.4
		Vinyl Chloride		0.02 U	3/9/2010	0.03

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW161	Intermediate	cis-1,2-Dichloroethene	12/3/2013	0.2 U	3/9/2010	0.2
		Trichloroethene		1.9	12/14/2010	3.3
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW162	Intermediate	cis-1,2-Dichloroethene	12/4/2013	0.2 U	12/16/2011	0.2 U
		Trichloroethene		0.8	6/9/2010	1.2
		Vinyl Chloride		0.02 U	12/16/2011	0.02 U
AGW163	Intermediate	cis-1,2-Dichloroethene	3/3/2014	1.3	12/7/2010	1.4
		Trichloroethene		4.9	12/4/2012	5.0
		Vinyl Chloride		0.02 U	9/15/2010	0.039
AGW164	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.3	8/24/2010	3.9
		Trichloroethene		1.4	12/6/2012	1.8
		Vinyl Chloride		0.057	9/15/2010	0.54
AGW165	Shallow	cis-1,2-Dichloroethene	3/3/2014	1.3	4/24/2012	1.4
		Trichloroethene		2.5	9/3/2013	2.6
		Vinyl Chloride		0.16	6/20/2011	0.27
AGW166	Intermediate	cis-1,2-Dichloroethene	3/5/2014	0.6	10/26/2010	2.5
		Trichloroethene		0.2 U	10/26/2010	3.4
		Vinyl Chloride		0.22	10/26/2010	0.6
AGW167	Deep	cis-1,2-Dichloroethene	3/5/2014	2.7	12/5/2012	2.9
		Trichloroethene		6.1	3/5/2014	6.1
		Vinyl Chloride		0.23	4/23/2012	0.4
AGW168	Intermediate	cis-1,2-Dichloroethene	3/5/2014	1.8	6/12/2012	2.1
		Trichloroethene		5.2	4/23/2012	5.6
		Vinyl Chloride		0.086	6/22/2011	0.24
AGW169	Deep	cis-1,2-Dichloroethene	3/5/2014	1.8	12/14/2010	2.3
		Trichloroethene		6.1	9/4/2013	6.4
		Vinyl Chloride		0.076	12/14/2010	0.2
AGW170	Intermediate	cis-1,2-Dichloroethene	3/5/2014	0.5	11/1/2010	1.9
		Trichloroethene		3.0	12/14/2010	4.1
		Vinyl Chloride		0.02 U	11/1/2010	0.069
AGW171	Deep	cis-1,2-Dichloroethene	3/5/2014	0.2 U	12/15/2010	0.5
		Trichloroethene		2.3	12/15/2010	3.4
		Vinyl Chloride		0.02 U	12/15/2010	0.027
AGW172	Intermediate	cis-1,2-Dichloroethene	3/4/2014	0.5	6/24/2011	0.6
		Trichloroethene		6.2	4/23/2012	6.8
		Vinyl Chloride		0.02 U	3/8/2011	0.02
AGW173	Intermediate	cis-1,2-Dichloroethene	3/4/2014	0.3	6/24/2011	0.4
		Trichloroethene		3.3	6/13/2012	4.7
		Vinyl Chloride		0.021	6/24/2011	0.025
AGW174	Intermediate	cis-1,2-Dichloroethene	3/5/2014	0.2 U	12/13/2011	0.2 U
		Trichloroethene		2.4	12/14/2010	3.9
		Vinyl Chloride		0.02 U	12/13/2011	0.2 U
AGW175	Intermediate	cis-1,2-Dichloroethene	3/5/2014	0.4	12/14/2010	0.8
		Trichloroethene		3.2	12/14/2010	4.3
		Vinyl Chloride		0.02 U	12/13/2011	0.2 U
AGW176	Intermediate	cis-1,2-Dichloroethene	3/4/2014	0.4	12/15/2010	0.7
		Trichloroethene		4.7	12/15/2010	5.6
		Vinyl Chloride		0.02 U	12/15/2010	0.021

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW177	Intermediate	cis-1,2-Dichloroethene	3/4/2014	1.1	9/21/2010	6.4
		Trichloroethene		6.3	9/21/2010	8.6
		Vinyl Chloride		0.026	9/21/2010	2.0
AGW178	Deep	cis-1,2-Dichloroethene	3/4/2014	0.7	12/15/2010	1.2
		Trichloroethene		5.4	6/12/2012	6.1
		Vinyl Chloride		0.023	9/29/2010	0.088
AGW179	Intermediate	cis-1,2-Dichloroethene	3/4/2014	7.4	12/15/2010	8.3
		Trichloroethene		0.2 U	9/29/2010	1.2
		Vinyl Chloride		0.095	6/22/2011	0.13
AGW180	Deep	cis-1,2-Dichloroethene	3/4/2014	0.7	12/15/2010	1.2
		Trichloroethene		5.2	12/15/2010	6.3
		Vinyl Chloride		0.02 U	12/19/2011	0.02 U
AGW181	Intermediate	cis-1,2-Dichloroethene	3/3/2014	1.1	3/3/2014	1.1
		Trichloroethene		5.9	5/23/2011	6.1
		Vinyl Chloride		0.038	12/4/2012	0.05
AGW182	Intermediate	cis-1,2-Dichloroethene	3/5/2014	2.7	4/24/2012	2.9
		Trichloroethene		2.5	4/29/2011	6.7
		Vinyl Chloride		0.23	12/16/2011	0.4
AGW183	Deep	cis-1,2-Dichloroethene	3/5/2014	0.2 U	12/16/2011	0.2 U
		Trichloroethene		0.2 U	12/16/2011	0.2 U
		Vinyl Chloride		0.02 U	9/7/2011	0.044
AGW184	Intermediate	cis-1,2-Dichloroethene	3/5/2014	0.2 U	12/20/2011	0.2 U
		Trichloroethene		0.6	5/23/2011	0.9
		Vinyl Chloride		0.02 U	12/20/2011	0.02 U
AGW185	Deep	cis-1,2-Dichloroethene	3/5/2014	0.2 U	12/13/2011	0.2 U
		Trichloroethene		3.8	12/3/2012	4.4
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW186	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.9	6/24/2011	1.2
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U
AGW187	Intermediate	cis-1,2-Dichloroethene	3/5/2014	0.2	12/13/2011	0.4
		Trichloroethene		2.1	12/13/2011	2.9
		Vinyl Chloride		0.02 U	4/25/2012	0.022
AGW188	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.6	9/4/2012	0.7
		Trichloroethene		5.0	9/4/2012	5.6
		Vinyl Chloride		0.026	9/8/2011	0.035
AGW189	Intermediate	cis-1,2-Dichloroethene	3/5/2014	0.2 U	12/20/2011	0.2 U
		Trichloroethene		1.1	6/24/2011	1.5
		Vinyl Chloride		0.02 U	12/20/2011	0.02 U
AGW190	Intermediate	cis-1,2-Dichloroethene	3/5/2014	0.2 U	12/13/2011	0.2
		Trichloroethene		1.6	12/13/2011	1.9
		Vinyl Chloride		0.02 U	9/5/2012	0.021
AGW191	Intermediate	cis-1,2-Dichloroethene	3/5/2014	0.2 U	12/19/2011	0.2 U
		Trichloroethene		0.2 U	12/19/2011	0.2 U
		Vinyl Chloride		0.02 U	12/19/2011	0.02 U
AGW192	Deep	cis-1,2-Dichloroethene	3/5/2014	0.2 U	8/30/2011	6.6
		Trichloroethene		0.2 U	8/30/2011	1.2
		Vinyl Chloride		0.02 U	9/8/2011	0.13

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW193	Shallow	cis-1,2-Dichloroethene	3/5/2014	2.0	4/23/2012	2.2
		Trichloroethene		3.8	6/12/2012	3.8
		Vinyl Chloride		0.32	12/16/2011	0.4
AGW194	Shallow	cis-1,2-Dichloroethene	3/5/2014	0.9	6/12/2012	1.1
		Trichloroethene		2.5	4/23/2012	2.9
		Vinyl Chloride		0.036	9/8/2011	0.059
AGW195	Deep	cis-1,2-Dichloroethene	3/4/2014	0.9	10/2/2011	5.0
		Trichloroethene		8.0	4/25/2012	9.4
		Vinyl Chloride		0.02 U	10/2/2011	0.32
AGW196	Intermediate	cis-1,2-Dichloroethene	3/4/2014	5.0	4/25/2012	7.5
		Trichloroethene		0.2 U	12/8/2011	0.2 U
		Vinyl Chloride		1.4	3/4/2014	1.4
AGW197	Deep	cis-1,2-Dichloroethene	3/4/2014	0.5	10/3/2011	2.6
		Trichloroethene		8.3	9/6/2012	14
		Vinyl Chloride		0.02 U	10/3/2011	0.71
AGW198	Intermediate	cis-1,2-Dichloroethene	3/4/2014	0.8	12/8/2011	0.9
		Trichloroethene		9.1	6/13/2012	10
		Vinyl Chloride		0.02 U	12/10/2012	0.027
AGW199	Deep	cis-1,2-Dichloroethene	3/4/2014	1.2	12/10/2012	3.0
		Trichloroethene		5.1	9/6/2013	8.1
		Vinyl Chloride		0.027	10/19/2011	0.039
AGW200-1	Shallow	cis-1,2-Dichloroethene	4/26/2012	1.3	11/18/2011	1.7
		Trichloroethene		0.2 U	11/18/2011	0.2
		Vinyl Chloride		1.8	4/26/2012	1.8
AGW200-2	Shallow	cis-1,2-Dichloroethene	3/4/2014	2.1	9/5/2012	3.1
		Trichloroethene		0.2	6/21/2012	0.4
		Vinyl Chloride		2.3	11/18/2011	2.3
AGW200-3	Intermediate	cis-1,2-Dichloroethene	4/26/2012	2.4	11/18/2011	3.0
		Trichloroethene		0.2 U	11/18/2011	0.2
		Vinyl Chloride		2.0	4/26/2012	2.0
AGW200-4	Intermediate	cis-1,2-Dichloroethene	4/26/2012	0.4	11/18/2011	0.8
		Trichloroethene		0.2 U	11/18/2011	0.2 U
		Vinyl Chloride		0.5	11/18/2011	1.2
AGW200-5	Intermediate	cis-1,2-Dichloroethene	3/4/2014	6.3	11/18/2011	6.9
		Trichloroethene		2.3	11/18/2011	2.5
		Vinyl Chloride		1.7	12/4/2012	1.9
AGW200-6	Deep	cis-1,2-Dichloroethene	3/4/2014	5.7	4/26/2012	8.4
		Trichloroethene		1.2	9/5/2012	1.9
		Vinyl Chloride		1.2	12/4/2012	2.0
AGW200-7	Deep	cis-1,2-Dichloroethene	4/26/2012	1.6	4/26/2012	1.6
		Trichloroethene		0.9	11/18/2011	1.0
		Vinyl Chloride		0.05	4/26/2012	0.05
AGW201-1	Shallow	cis-1,2-Dichloroethene	4/27/2012	4.1	4/27/2012	4.1
		Trichloroethene		0.6	11/21/2011	0.8
		Vinyl Chloride		2.5	4/27/2012	2.5
AGW201-2	Shallow	cis-1,2-Dichloroethene	3/4/2014	4.0	12/7/2012	4.4
		Trichloroethene		0.6	6/21/2012	0.8
		Vinyl Chloride		2.4	4/27/2012	2.4

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW201-3	Intermediate	cis-1,2-Dichloroethene	4/27/2012	9.3	4/27/2012	9.3
		Trichloroethene		0.9	4/27/2012	0.9
		Vinyl Chloride		3.1	4/27/2012	3.1
AGW201-4	Intermediate	cis-1,2-Dichloroethene	4/27/2012	1.2	11/21/2011	2.4
		Trichloroethene		0.5	11/21/2011	1.3
		Vinyl Chloride		0.6	11/21/2011	0.7
AGW201-5	Intermediate	cis-1,2-Dichloroethene	3/4/2014	5.3	9/5/2012	5.7
		Trichloroethene		6.7	6/21/2012	6.9
		Vinyl Chloride		1.4	9/5/2012	1.4
AGW201-6	Deep	cis-1,2-Dichloroethene	3/4/2014	5.7	6/21/2012	6.2
		Trichloroethene		9.2	6/21/2012	11
		Vinyl Chloride		0.6	9/5/2012	0.95
AGW201-7	Deep	cis-1,2-Dichloroethene	4/27/2012	0.3	11/21/2011	0.4
		Trichloroethene		2.0	11/21/2011	2.4
		Vinyl Chloride		0.024	4/27/2012	0.024
AGW202-1	Shallow	cis-1,2-Dichloroethene	4/27/2012	0.8	4/27/2012	0.8
		Trichloroethene		0.2 U	11/22/2011	0.2 U
		Vinyl Chloride		4.0	4/27/2012	4.0
AGW202-2	Shallow	cis-1,2-Dichloroethene	3/4/2014	2.3	12/7/2012	2.8
		Trichloroethene		2.1	4/27/2012	2.3
		Vinyl Chloride		0.59	12/7/2012	1.2
AGW202-3	Intermediate	cis-1,2-Dichloroethene	4/27/2012	3.7	4/27/2012	3.7
		Trichloroethene		3.6	11/22/2011	3.9
		Vinyl Chloride		0.56	4/27/2012	0.56
AGW202-4	Intermediate	cis-1,2-Dichloroethene	3/4/2014	1.7	12/7/2012	2.2
		Trichloroethene		4.3	4/27/2012	5.5
		Vinyl Chloride		0.71	9/5/2013	3.9
AGW202-5	Intermediate	cis-1,2-Dichloroethene	4/27/2012	1.1	4/27/2012	1.1
		Trichloroethene		4.5	4/27/2012	4.5
		Vinyl Chloride		0.12	4/27/2012	0.12
AGW202-6	Deep	cis-1,2-Dichloroethene	3/4/2014	0.4	6/22/2012	0.4
		Trichloroethene		1.2	6/22/2012	1.3
		Vinyl Chloride		0.02 U	11/22/2011	0.02 U
AGW202-7	Deep	cis-1,2-Dichloroethene	4/27/2012	0.2 U	11/22/2011	0.2 U
		Trichloroethene		0.2	11/22/2011	0.2
		Vinyl Chloride		0.02 U	11/22/2011	0.02 U
AGW203-1	Shallow	cis-1,2-Dichloroethene	4/30/2012	0.4	4/30/2012	0.4
		Trichloroethene		1.5	4/30/2012	1.5
		Vinyl Chloride		0.02 U	11/23/2011	0.02 U
AGW203-2	Shallow	cis-1,2-Dichloroethene	3/4/2014	0.2 U	11/23/2011	0.2 U
		Trichloroethene		1.3	6/22/2012	1.7
		Vinyl Chloride		0.02 U	11/23/2011	0.02 U
AGW203-3	Intermediate	cis-1,2-Dichloroethene	4/30/2012	0.2 U	11/23/2011	0.2 U
		Trichloroethene		1.1	4/30/2012	1.1
		Vinyl Chloride		0.02 U	11/23/2011	0.02 U
AGW203-4	Intermediate	cis-1,2-Dichloroethene	3/4/2014	0.2	6/22/2012	0.3
		Trichloroethene		4.2	6/22/2012	5.3
		Vinyl Chloride		0.02 U	11/23/2011	0.02 U

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW203-5	Intermediate	cis-1,2-Dichloroethene	4/30/2012	0.2 U	11/22/2011	0.2 U
		Trichloroethene		0.6	11/22/2011	0.6
		Vinyl Chloride		0.02 U	11/22/2011	0.02 U
AGW203-6	Deep	cis-1,2-Dichloroethene	3/4/2014	0.2 U	11/22/2011	0.2 U
		Trichloroethene		0.2	11/22/2011	0.4
		Vinyl Chloride		0.02 U	11/22/2011	0.02 U
AGW204	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.2 U	12/13/2011	0.2 U
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW205	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.2 U	12/13/2011	0.2 U
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW206	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/6/2011	0.2 U
		Trichloroethene		0.6	10/28/2011	1.6
		Vinyl Chloride		0.02 U	12/6/2011	0.02 U
AGW207-1	Shallow	cis-1,2-Dichloroethene	4/23/2012	7.8	4/23/2012	7.8
		Trichloroethene		9.1	4/23/2012	9.1
		Vinyl Chloride		1.3	4/23/2012	1.3
AGW207-2	Shallow	cis-1,2-Dichloroethene	3/3/2014	2.9	9/4/2012	3.2
		Trichloroethene		8.4	12/8/2011	10
		Vinyl Chloride		0.16	12/8/2011	0.21
AGW207-3	Intermediate	cis-1,2-Dichloroethene	4/23/2012	2.5	4/23/2012	2.5
		Trichloroethene		8.9	4/23/2012	8.9
		Vinyl Chloride		0.092	4/23/2012	0.092
AGW207-4	Intermediate	cis-1,2-Dichloroethene	3/3/2014	2.1	4/23/2012	2.3
		Trichloroethene		7.5	4/23/2012	8.5
		Vinyl Chloride		0.062	9/4/2012	0.09
AGW207-5	Intermediate	cis-1,2-Dichloroethene	4/23/2012	1.2	12/8/2011	1.3
		Trichloroethene		7.5	4/23/2012	7.5
		Vinyl Chloride		0.047	4/23/2012	0.047
AGW207-7	Deep	cis-1,2-Dichloroethene	3/3/2014	0.9	12/8/2011	1.1
		Trichloroethene		6.9	12/4/2012	7.6
		Vinyl Chloride		0.025	4/23/2012	0.052
AGW208-1	Shallow	cis-1,2-Dichloroethene	4/23/2012	8.4	12/8/2011	8.6
		Trichloroethene		2.5	4/23/2012	2.5
		Vinyl Chloride		0.98	4/23/2012	0.98
AGW208-2	Shallow	cis-1,2-Dichloroethene	3/3/2014	4.7	6/21/2012	6.1
		Trichloroethene		4.7	12/3/2012	5.7
		Vinyl Chloride		1.2	6/21/2012	1.5
AGW208-3	Intermediate	cis-1,2-Dichloroethene	4/23/2012	4.6	12/8/2011	4.8
		Trichloroethene		4.5	12/8/2011	5.4
		Vinyl Chloride		0.23	12/8/2011	0.53
AGW208-4	Intermediate	cis-1,2-Dichloroethene	3/3/2014	1.1	12/3/2012	2.1
		Trichloroethene		5.0	4/24/2012	6.0
		Vinyl Chloride		0.02 U	12/8/2011	0.024
AGW208-5	Intermediate	cis-1,2-Dichloroethene	4/24/2012	0.9	12/9/2011	0.9
		Trichloroethene		7.0	4/24/2012	7.0
		Vinyl Chloride		0.028	4/24/2012	0.028

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW208-6	Deep	cis-1,2-Dichloroethene	3/3/2014	0.7	12/9/2011	1.0
		Trichloroethene		6.4	6/21/2012	7.5
		Vinyl Chloride		0.02 U	12/9/2011	0.032
AGW208-7	Deep	cis-1,2-Dichloroethene	4/24/2012	2.2	4/24/2012	2.2
		Trichloroethene		4.2	4/24/2012	4.2
		Vinyl Chloride		0.046	4/24/2012	0.046
AGW209-1	Shallow	cis-1,2-Dichloroethene	4/24/2012	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	12/12/2011	0.2 U
		Vinyl Chloride		2.2	12/12/2011	2.4
AGW209-2	Shallow	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	12/12/2011	0.2 U
		Vinyl Chloride		2.8	3/3/2014	2.8
AGW209-3	Intermediate	cis-1,2-Dichloroethene	4/24/2012	1.2	4/24/2012	1.2
		Trichloroethene		0.2 U	12/9/2011	0.3
		Vinyl Chloride		4.9	4/24/2012	4.9
AGW209-4	Intermediate	cis-1,2-Dichloroethene	4/24/2012	0.9	12/9/2011	1.7
		Trichloroethene		0.2 U	12/9/2011	0.2 U
		Vinyl Chloride		4.8	4/24/2012	4.8
AGW209-5	Intermediate	cis-1,2-Dichloroethene	3/3/2014	1.6	9/3/2013	1.6
		Trichloroethene		2.4	3/3/2014	2.4
		Vinyl Chloride		0.71	3/3/2014	0.71
AGW209-6	Deep	cis-1,2-Dichloroethene	3/3/2014	0.9	6/21/2012	1.1
		Trichloroethene		6.5	6/21/2012	7.4
		Vinyl Chloride		0.02	6/21/2012	0.024
AGW209-7	Deep	cis-1,2-Dichloroethene	4/24/2012	1.0	12/9/2011	1.0
		Trichloroethene		7.4	4/24/2012	7.4
		Vinyl Chloride		0.023	4/24/2012	0.023
AGW210-1	Shallow	cis-1,2-Dichloroethene	4/24/2012	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	12/12/2011	0.2 U
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U
AGW210-2	Shallow	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	12/12/2011	0.2 U
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U
AGW210-3	Intermediate	cis-1,2-Dichloroethene	4/25/2012	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	12/12/2011	0.2 U
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U
AGW210-4	Intermediate	cis-1,2-Dichloroethene	4/25/2012	1.3	12/12/2011	1.9
		Trichloroethene		1.6	4/25/2012	1.6
		Vinyl Chloride		0.071	4/25/2012	0.071
AGW210-5	Intermediate	cis-1,2-Dichloroethene	3/3/2014	1.2	12/3/2012	2.2
		Trichloroethene		2.5	6/21/2012	3.1
		Vinyl Chloride		0.069	4/25/2012	0.083
AGW210-6	Deep	cis-1,2-Dichloroethene	3/3/2014	0.4	12/12/2011	0.5
		Trichloroethene		5.5	6/21/2012	6.5
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U
AGW210-7	Deep	cis-1,2-Dichloroethene	4/25/2012	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	12/12/2011	0.2 U
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW211-1	Shallow	cis-1,2-Dichloroethene	4/25/2012	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.2 U	12/13/2011	0.2 U
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW211-2	Shallow	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.2 U	12/13/2011	0.2 U
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW211-3	Intermediate	cis-1,2-Dichloroethene	4/25/2012	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.2 U	12/13/2011	0.2 U
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW211-4	Intermediate	cis-1,2-Dichloroethene	4/25/2012	0.6	4/25/2012	0.6
		Trichloroethene		6.3	4/25/2012	6.3
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW211-5	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.7	9/3/2013	0.7
		Trichloroethene		5.7	6/20/2012	6.0
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW211-6	Deep	cis-1,2-Dichloroethene	3/3/2014	0.2	12/3/2012	0.3
		Trichloroethene		4.1	6/20/2012	4.9
		Vinyl Chloride		0.02 U	9/4/2012	0.21
AGW211-7	Deep	cis-1,2-Dichloroethene	4/26/2012	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.2 U	12/13/2011	0.2 U
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW212-1	Shallow	cis-1,2-Dichloroethene	4/26/2012	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.2 U	12/13/2011	0.2 U
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW212-2	Shallow	cis-1,2-Dichloroethene	3/4/2014	0.2 U	12/13/2011	0.2 U
		Trichloroethene		0.2 U	12/13/2011	0.2 U
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW212-3	Intermediate	cis-1,2-Dichloroethene	4/26/2012	0.2 U	12/13/2011	0.3
		Trichloroethene		0.2 U	12/13/2011	0.4
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW212-5	Intermediate	cis-1,2-Dichloroethene	3/4/2014	0.2 U	12/13/2011	0.2
		Trichloroethene		2.2	12/13/2011	3.3
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW212-6	Deep	cis-1,2-Dichloroethene	4/26/2012	0.2 U	12/13/2011	0.2 U
		Trichloroethene		2.6	12/13/2011	2.8
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW212-7	Deep	cis-1,2-Dichloroethene	3/4/2014	0.2 U	12/13/2011	0.2 U
		Trichloroethene		4.7	6/18/2012	5.3
		Vinyl Chloride		0.02 U	12/13/2011	0.02 U
AGW213	Deep	cis-1,2-Dichloroethene	3/3/2014	0.2 U	11/14/2011	6.2
		Trichloroethene		0.2 U	11/14/2011	0.4
		Vinyl Chloride		0.028	11/14/2011	0.4
AGW214	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.4	12/6/2012	0.6
		Trichloroethene		3.4	4/27/2012	3.9
		Vinyl Chloride		0.021	9/4/2012	0.022
AGW215	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	12/12/2011	0.2 U
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW216	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/12/2011	0.2
		Trichloroethene		1.2	12/6/2012	1.3
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U
AGW217	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.3	12/12/2011	0.3
		Trichloroethene		2.1	6/18/2012	2.1
		Vinyl Chloride		0.022	4/27/2012	0.028
AGW218	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.5	4/26/2012	0.6
		Trichloroethene		4.3	4/26/2012	4.7
		Vinyl Chloride		0.023	9/4/2012	0.025
AGW219	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	12/12/2011	0.2 U
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U
AGW220	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2	12/12/2011	0.2 U
		Trichloroethene		0.5	4/26/2012	0.5
		Vinyl Chloride		0.02 U	12/12/2011	0.02 U
AGW221	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/12/2011	0.2 U
		Trichloroethene		0.2 U	12/12/2011	0.2 U
		Vinyl Chloride		0.02 U	9/4/2012	0.022
AGW222	Intermediate	cis-1,2-Dichloroethene	3/3/2014	0.2 U	9/3/2013	0.2 U
		Trichloroethene		0.6	12/2/2012	1.3
		Vinyl Chloride		0.02 U	9/3/2013	0.02 U
AGW223	Deep	cis-1,2-Dichloroethene	3/3/2014	0.2 U	12/3/2012	0.6
		Trichloroethene		0.2 U	12/3/2012	1.7
		Vinyl Chloride		0.02 U	12/4/2012	0.095
AGW224	Shallow	cis-1,2-Dichloroethene	3/5/2014	0.2 U	9/5/2013	0.2 U
		Trichloroethene		0.2 U	9/5/2013	0.2 U
		Vinyl Chloride		0.02 U	9/5/2013	0.02 U
AGW225	Water Table	cis-1,2-Dichloroethene	3/5/2014	6.4	12/26/2012	7.1
		Trichloroethene		2.1	3/5/2014	2.1
		Vinyl Chloride		0.6	9/4/2013	0.6
AGW226	Water Table	cis-1,2-Dichloroethene	3/5/2014	3.6	1/14/2013	3.9
		Trichloroethene		4.6	1/14/2013	4.6
		Vinyl Chloride		0.61	1/14/2013	0.71
AGW227	Intermediate	cis-1,2-Dichloroethene	3/5/2014	2.7	12/27/2012	3.0
		Trichloroethene		2.8	6/5/2013	3.1
		Vinyl Chloride		0.34	3/8/2013	0.4
AGW228	Shallow	cis-1,2-Dichloroethene	3/5/2014	3.0	1/14/2013	3.6
		Trichloroethene		2.6	6/5/2013	2.7
		Vinyl Chloride		0.34	6/5/2013	0.41
AGW229	Water Table	cis-1,2-Dichloroethene	3/5/2014	2.4	3/6/2013	2.7
		Trichloroethene		1.8	3/6/2013	2.3
		Vinyl Chloride		0.045	3/5/2014	0.045
AGW230	Deep	cis-1,2-Dichloroethene	3/5/2014	0.2 U	9/5/2013	0.2 U
		Trichloroethene		1.4	3/5/2014	1.4
		Vinyl Chloride		0.02 U	9/5/2013	0.02 U
AGW231	Shallow	cis-1,2-Dichloroethene	3/4/2014	2.1	6/11/2013	2.5
		Trichloroethene		1.4	6/11/2013	1.5
		Vinyl Chloride		2.7	9/6/2013	3.4

TABLE B-1
GROUNDWATER SAMPLES FROM WELLS
MAXIMUM AND MOST RECENT PRIMARY VOLATILE ORGANIC COMPOUND CONCENTRATION
BOEING AUBURN
AUBURN, WASHINGTON

Sample Location	Aquifer Depth	Parameter	Most Recent Sample Date	Most Recent Concentration (µg/L)	Maximum Sample Date	Maximum Concentration (µg/L)
AGW232	Shallow	cis-1,2-Dichloroethene	3/4/2014	4.8	6/11/2013	5.1
		Trichloroethene		0.2 U	9/5/2013	0.2 U
		Vinyl Chloride		0.94	6/11/2013	1.1
AGW233	Deep	cis-1,2-Dichloroethene	3/5/2014	0.2 U	9/6/2013	0.2 U
		Trichloroethene		0.2 U	9/6/2013	0.2 U
		Vinyl Chloride		0.02 U	9/6/2013	0.02 U
AGW234	Deep	cis-1,2-Dichloroethene	3/6/2014	2.0	5/22/2013	5.4
		Trichloroethene		6.9	3/6/2014	6.9
		Vinyl Chloride		0.077	5/22/2013	1.2
AGW235-1	Shallow	cis-1,2-Dichloroethene	9/6/2013	1.8	9/6/2013	1.8
		Trichloroethene		0.2 U	9/6/2013	0.2 U
		Vinyl Chloride		0.14	9/6/2013	0.14
AGW235-2	Shallow	cis-1,2-Dichloroethene	3/6/2014	3.7	9/6/2013	4.0
		Trichloroethene		0.2 U	9/6/2013	0.2 U
		Vinyl Chloride		0.8	3/6/2014	0.8
AGW235-3	Shallow	cis-1,2-Dichloroethene	9/6/2013	3.6	9/6/2013	3.6
		Trichloroethene		2.5	6/12/2013	3.3
		Vinyl Chloride		0.3	9/6/2013	0.3
AGW235-4	Intermediate	cis-1,2-Dichloroethene	3/6/2014	6.2	3/6/2014	6.2
		Trichloroethene		5.6	6/12/2013	6.2
		Vinyl Chloride		0.15	6/12/2013	0.2
AGW235-5	Intermediate	cis-1,2-Dichloroethene	9/6/2013	2.2	6/12/2013	2.4
		Trichloroethene		5.0	9/6/2013	5.0
		Vinyl Chloride		0.11	9/6/2013	0.11
AGW235-6	Intermediate	cis-1,2-Dichloroethene	9/6/2013	0.2 U	9/6/2013	0.2 U
		Trichloroethene		0.2 U	9/6/2013	0.2 U
		Vinyl Chloride		0.02 U	9/6/2013	0.02 U
AGW235-7	Deep	cis-1,2-Dichloroethene	3/6/2014	0.2 U	9/6/2013	0.2 U
		Trichloroethene		0.2 U	9/6/2013	0.2 U
		Vinyl Chloride		0.02 U	9/6/2013	0.02 U
AGW236	Shallow	cis-1,2-Dichloroethene	3/4/2014	2.5	3/4/2014	2.5
		Trichloroethene		8.7	3/4/2014	8.7
		Vinyl Chloride		0.074	3/4/2014	0.074
AGW237	Deep	cis-1,2-Dichloroethene	3/4/2014	1.1	10/3/2013	2.7
		Trichloroethene		3.8	10/3/2013	12
		Vinyl Chloride		0.052	10/3/2013	0.096
AGW238	Intermediate	cis-1,2-Dichloroethene	3/4/2014	0.2 U	10/3/2013	0.2 U
		Trichloroethene		0.2 U	10/3/2013	0.2 U
		Vinyl Chloride		0.02 U	10/3/2013	0.02 U
AGW239	Shallow	cis-1,2-Dichloroethene	3/4/2014	11	3/4/2014	11
		Trichloroethene		0.2 U	10/3/2013	0.2 U
		Vinyl Chloride		1.2	10/3/2013	1.2

U = Indicates the compound was not detected at the reported concentration.

J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

µg/L = micrograms per liter.

Laboratory EPA Method SW8260C was used to analyze for Trichloroethene and cis-1,2-Dichloroethene.

Laboratory Method 8260C and 8260C SIM were used to analyze for Vinyl Chloride.

TABLE B-2
GROUNDWATER SAMPLES FROM BOREHOLES
PRIMARY VOLATILE ORGANIC COMPOUNDS
BOEING AUBURN
AUBURN, WASHINGTON

	AGW130-45 NO86C 9/11/2008	AGW133-45 NO14C 9/9/2008	AGW136-45 NO14E 9/9/2008	AGW150-90 PR65A 10/5/2009	AGW157 QM17B 3/1/2010	AGW158 QL71B 2/24/2010	AGW160 QL71D 2/25/2010	AGW161 QM17C 3/2/2010
VOLATILES (µg/L)								
METHOD SW8260/8260-SIM								
Trichloroethene	**0.5**	0.2 U	**5.7**	**0.3**	**3.2**	**2.1**	0.2 U	0.2 U
cis-1,2-Dichloroethene	0.2 U	0.2 U	**3.8**	0.2 U	**1.7**	**0.7**	0.2 U	0.2 U
Vinyl Chloride	0.2 U	0.2 U	0.2 U	0.02 U	**0.5**	**0.078**	0.02 U	0.02 U

	AGW179-30 RO29B 9/22/2010	AGW182-29 SU78A 4/29/2011	AGW192-25 TK52A 8/30/2011	AGW199-28 TQ26A 10/6/2011	AGW204-30 TU11A 10/27/2011	AGW205-30 TU11B 10/27/2011	AGW206-29 TU51B 10/28/2011	AGW213-28 TX09A 11/14/2011
VOLATILES (µg/L)								
METHOD SW8260/8260-SIM								
Trichloroethene	0.2 U	**6.7**	**1.2**	**0.8**	**0.2**	0.2 U	**1.6**	**0.4**
cis-1,2-Dichloroethene	**6.5**	**2.4**	**6.6**	**2.6**	0.2 U	0.2 U	0.2 U	**6.2**
Vinyl Chloride	**0.093**	**0.3**	**0.6**	**0.1**	0.02 U	0.02 U	0.02 U	**0.4**

	AGW162 QL71C 2/24/2010	AGW163-28 RK90C 8/26/2010	AGW164-29 RK90A 8/24/2010	AGW165-55 RK90B 8/25/2010	AGW166-30 RT87A 10/26/2010	AGW168-29 RT87B 10/28/2010	AGW170-28.5 RU39A 11/1/2010	AGW177-29 RO29A 9/21/2010
VOLATILES (µg/L)								
METHOD SW8260/8260-SIM								
Trichloroethene	0.2 U	**0.8**	**0.9**	**0.6**	**3.4**	**3**	**3.6**	**8.6**
cis-1,2-Dichloroethene	0.2 U	0.2 U	**3.9**	**0.2**	**2.5**	**1.2**	**1.9**	**6.4**
Vinyl Chloride	0.02 U	0.02 U	**6.1** E	**0.4** J	**0.6**	**0.076**	**0.069**	**2**

	AGW214-27 TX24A 11/15/2011	AGW215-29 TX50A 11/16/2011	AGW216-30 TX89B 11/17/2011	AGW217-29 TY23B 11/18/2011	AGW218-28 TY48B 11/21/2011	AGW219-30 TY79B 11/22/2011	AGW220-28 TZ20B 11/28/2011	AGW222-27 6885052 12/2/2012
VOLATILES (µg/L)								
METHOD SW8260/8260-SIM								
Trichloroethene	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**1.3**
cis-1,2-Dichloroethene	**0.4**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U