10.0 VAPOR INTRUSION EVALUATION

As part of the Site-wide investigation of the nature and extent of contamination, the vapor intrusion pathway (i.e., movement of contaminated vapors from the subsurface [groundwater] into indoor air) for VOCs was evaluated. Several historical vapor intrusion investigations were completed prior to implementation of a more comprehensive Site-wide vapor intrusion investigation that was completed as part of the RI. A timeline presenting vapor intrusion activities is included in Section 2.2.

The primary VOCs of concern for the vapor intrusion pathway are TCE and the TCE breakdown product VC because these are the only constituents that exceed groundwater screening levels for vapor intrusion at the Site. This section presents a summary and evaluation of current Site conditions as they relate to the vapor intrusion pathway on Boeing property, commercial areas of Auburn and Algona, and residential areas of Algona. Results of the vapor intrusion investigations summarized in this section have been reported to Ecology in various documents as they were completed; these documents may be reviewed for more detailed information about the vapor intrusion investigations. Land use areas and locations where vapor intrusion investigations were completed are shown on Figure 10-1.

10.1 Historical Investigations

This section summarizes the Site conditions, approach, results, and conclusions of vapor intrusion investigations completed prior to 2009 when a more comprehensive Site-wide investigation was undertaken. Three separate investigations are summarized in Sections 10.1.1 through 10.1.3, including an evaluation of the YMCA/JA property and two evaluations of Area 1 where former Building 17-05 was located. Additional investigation was completed in these areas as part of the more comprehensive Site-wide investigation and is described in Section 10.2.2.

10.1.1 YMCA and Junior Achievement Properties

In 2003, Boeing transferred property north of Area 1 to the YMCA and JA for development of recreational and education facilities (see Figure 1-2). In response to concerns about the potential for vapor intrusion, Boeing collected soil gas and shallow groundwater data and used the Johnson-Ettinger model to evaluate the potential for VOCs in groundwater to adversely impact indoor air in future buildings. The evaluation concluded that VOC concentrations detected in groundwater would not result in exceedances of indoor air screening levels.

To evaluate potential indoor air impacts and health risks associated with vapor intrusion, conservative assumptions about future building use were made (URS 2003a). The following assumptions were used in the indoor air evaluation conducted by URS:

- A person spends 8 hours in the YMCA 5 days per week (either a worker or a child in day care).
- An adult works at the YMCA 250 days per year for a 25-year working lifetime.

- While at work, the worker breathes 1.3 cubic meters per hour (m^3/hour) of air (EPA 1997). At the time of the evaluation, EPA (1997)recommended an inhalation rate for adults engaged in light activities of 1 m^3/hour, a rate of 1.6 m^3/hour for those engaged in moderate activities, and a rate of 2.5 m^3/hour for those engaged in heavy activities outdoors. A breathing rate of 1.3 m^3/hour was selected to be representative of adult workers engaged in equal amounts of light and moderate activities.
- While at the day care, children, ages 0 to 6 years, breathe 1 m^3/hour of air (EPA 1997). This is EPA's recommended short-term rate for children engaged in light activities, as would be expected in an indoor setting (hobbies, general play activities, etc.).
- Assumes children spend 8 hours per day 250 days per year in the day care. This value is a conservative overestimate, since full-time childcare is not provided at either the JA or YMCA[115] facilities.

Based on these exposure assumptions, and existing groundwater and soil gas data, the modeling results indicated the hazard quotient for non-carcinogenic effects to be well below 1 and the carcinogenic risk to be well below $1x10^{-6}$ at the YMCA and JA properties. A summary of soil gas data collected by URS is presented on Figure 10-2.

10.1.2 Building 17-05 Indoor Air Evaluation

Prior to the Area 1 IRA (see Section 7.0), an indoor air evaluation was performed for former Building 17-05 using the Johnson-Ettinger model to calculate predicted concentrations of VOCs in indoor air based on shallow groundwater concentrations. An initial evaluation was presented in the Area 1 RI report (LAI 2004a) . A follow-up evaluation was presented in the supplemental Area 1 RI report (LAI 2004f). These evaluations were based on the Building 17-05 configuration and shallow VOC plume concentrations prior to the start of the IRA in 2004. For the purposes of these evaluations, it was assumed that an adult occupational receptor could be exposed to indoor air in Building 17-05 for an employment duration of 30 years with a work schedule of 250 days per year, 8 hours per day. The conclusion of these evaluations was that VOC groundwater concentrations did not pose an unacceptable risk to human health through inhalation of indoor air; the maximum estimated individual excess cancer risk value, the total excess cancer risk value, the maximum hazard quotient, and the hazard index were all less than the regulatory criteria. Since the time of the 2004 evaluation, VOC concentrations in Area 1 groundwater have dropped substantially due to implementation of the IRA (see Section 7.3) and resulting indoor air concentrations would also be expected to be lower.

10.1.3 Area 1 Property Transfer Indoor Air Evaluation

As part of the sale of Area 1, a separate indoor air evaluation was performed to assess potential impacts to indoor air associated with contaminated groundwater at a proposed new warehouse building (GeoEngineers 2005). The indoor air evaluation used the Johnson-Ettinger model to calculate predicted indoor air concentrations using the highest detected concentrations of VOCs in Area 1 groundwater at the time of the evaluation (i.e., 4.5 µg/L and 40 µg/L for TCE and VC, respectively,

[115] YMCA provides only short-term childcare while caregivers are using the facility.

detected in May 2005). Two scenarios were evaluated, a residential scenario and an industrial/occupational exposure scenario. The evaluation concluded that groundwater concentrations were not protective of indoor air (based on modeling) for the residential scenario, but were protective of indoor air for the industrial/occupational exposure scenario that was consistent with the proposed use of the future warehouse building. As indicated in the previous section, groundwater concentrations in Area 1 have decreased substantially since completion of the IRA and the warehouse indoor air evaluation.

Attachment 11 of the Agreed Order (Ecology 2006a, b) , effective February 21, 2006, included provisions that addressed re-development of Area 1 and defined a procedure for evaluation of indoor air in the warehouse. Per the Agreed Order, shallow groundwater concentrations at nine specific wells were compared to action levels (30 µg/L and 99 µg/L for TCE and VC, respectively). If action levels were exceeded, indoor air sampling would be triggered in the warehouse. The procedure required calculating the upper 95th percent confidence limit on the mean (UCL95) of TCE and VC data from the nine wells for each sampling event and comparing the UCL95 to the action level. Groundwater concentrations have not exceeded action levels since the new warehouse was constructed.

10.2 Site-Wide Vapor Intrusion Investigations

Following a 2012 Health Consultation (WDOH 2012), Ecology recommended Boeing conduct additional vapor intrusion investigations at several buildings on Boeing property and off Boeing property. Ecology's recommendations were based in part on groundwater concentration data but also on public perception of areas where indoor air could be impacted based on proximity to the Site and the sensitivity of receptors using the buildings. The buildings evaluated during this initial phase of work included the AMB (now Prologis) warehouse, YMCA, JA, Fana West, and Boeing Building 17-07. Results of the vapor intrusion investigations for these buildings are presented in Sections 10.2.1 and 10.2.2.

In 2013, upon discovering the groundwater plumes extended under a residential portion of Algona, Boeing worked with Ecology to develop a Site-wide approach to assess vapor intrusion risks near the shallow groundwater TCE and VC plumes both on Boeing property and off Boeing property (LAI 2016l). A tiered assessment process, comparable to the approach presented in Ecology's draft vapor intrusion guidance document (Ecology 2009a), was used to evaluate shallow groundwater across the Site, to determine if additional vapor intrusion studies were needed, and then conduct follow-on studies where needed. The assessment process consisted of two[116] stages:

1. Tier I Assessment: Focused on determining whether there was a potential vapor intrusion risk based on groundwater and soil gas data and the proximity of buildings to contaminated groundwater plumes. A Tier I assessment does not evaluate individual buildings.

[116] Ecology's guidance presents an additional stage of assessment called a "preliminary assessment". The preliminary assessment for the RI was completed in 2012 (LAI 2012g).

2. Tier II Assessment: If a potential vapor intrusion risk was identified in an area with overlying structures, a Tier II assessment focused on evaluating individual structures using additional building-specific sampling such as indoor air, ambient air, and sub-slab soil gas.

A preliminary vapor intrusion assessment (preliminary assessment) was conducted using existing groundwater water table data to determine areas where additional investigation was needed. TCE and VC concentrations in shallow groundwater were compared to groundwater screening levels (LAI 2012g). Where results of the preliminary assessment indicated that groundwater at the water table exceeded the groundwater screening levels protective of indoor air, additional Tier I and/or a Tier II assessment was completed.

Vapor intrusion is highly influenced by individual building locations and characteristics and has considerably more spatial variability than soil or groundwater. In addition, potential for exposure to affected indoor air is heavily influenced by the building's use characteristics. Developing screening levels based on a building's use scenario is a way to more accurately evaluate potential risk. To evaluate potential risk associated with vapor intrusion for various exposure scenarios, screening levels were developed based on three land use types: industrial, commercial, and residential. Areas with shallow groundwater contamination were evaluated based on screening levels specific to the area land use. In the case of industrial areas (Boeing property), results were also compared to commercial screening levels based on the use of some buildings. Air screening levels by land use are described in further detail in Section 5.3.3. The Site-wide vapor intrusion investigation is described in Sections 10.2.1 through 10.2.3 by land use type.

10.2.1 Industrial Investigations

This section summarizes the Site conditions, approach, results, and conclusions of the vapor intrusion assessment program for industrial areas (current Boeing property). Boeing evaluated both shallow groundwater VOC concentrations and soil gas results collected from below Building 17-07, which is the source area for the western plume, and Building 17-12. Shallow groundwater and soil gas results were compared to industrial vapor intrusion screening levels to determine whether buildings were at potential risk for vapor intrusion. Building 17-70 was evaluated based on commercial screening levels due to its use primarily as an office building (see section 10.2.2). A complete description of the industrial vapor intrusion investigation approach is presented in the Site-wide vapor intrusion evaluation and approach (LAI 2016l). The industrial land use area and buildings where vapor intrusion assessments were completed are shown on Figure 10-3. Soil gas data and air data for industrial areas are presented on Tables 10-1 and 10-2, respectively.

In 2011, sub-slab soil gas sampling was conducted as part of a source area investigation in Building 17-07, and the adjoining annex Building 17-12 (LAI 2012c). Results for the 39 samples collected during the sampling event indicated the presence of VOCs in soil gas beneath both buildings and exceedances of soil gas screening levels in several areas under Building 17-07. Sub-slab soil gas samples collected from 17-12 did not exceed screening levels. Sub-slab soil gas sample locations are shown on Figure 8-4.

Sub-slab soil gas results for Buildings 17-07 and 17-12 are presented on Table 10-1. Sub-slab sampling results are further discussed with respect to the source area investigation in Section 8.1.3.4.

Based on the detected concentrations of VOCs in sub-slab soil gas at Building 17-07, Boeing conducted follow up indoor air sampling. In 2012 and 2013, two separate indoor air sampling events were completed at Building 17-07 to evaluate whether vapor intrusion was occurring (LAI 2012g, 2013f). VOCs were not detected in indoor air during either sampling event. The indoor air sampling results supported a conclusion that air quality in Building 17-07 is not being affected by vapor intrusion. Air sampling results from Building 17-07 are presented on Table 10-2.

10.2.2 Commercial Investigations

This section summarizes the Site conditions, approach, results, and conclusions of the vapor intrusion investigation program in commercial areas of Auburn and Algona. The commercial land use area (commercial Auburn, commercial Algona, and Facility Building 17-70), buildings, and areas where vapor intrusion investigations were conducted are shown on Figure 10-4. This section is divided by sampling phase. Prologis, Fana West, YMCA, and JA investigations are summarized in Section 10.2.2.1; the commercial Auburn sewer air investigation is presented in Section 10.2.2.2; Tier I and Tier II commercial investigations are summarized in Sections 10.2.2.3 and 10.2.2.4, respectively. Commercial vapor intrusion investigation data are presented on Tables 10-3 through 10-11.

10.2.2.1 Prologis, Fana West, YMCA, and Junior Achievement Property Investigations

In February 2012, vapor intrusion investigations (equivalent to a Tier II investigation) were completed at four commercial properties: Prologis, Fana West, YMCA, and JA (LAI 2012g). The investigations included collection and analysis of indoor air, ambient air, and sub-slab soil gas samples to assess whether VOCs in shallow groundwater were migrating into buildings at concentrations that pose a threat to human health. The buildings included in the 2012 investigation were determined, in some cases, based on groundwater concentrations (Fana and Prologis), but in other cases were determined based on a perception of increased risk due to use by sensitive populations (JA and YMCA).

Results from the investigations at Prologis, YMCA, and JA indicated that indoor air or sub-slab soil gas concentrations were less than applicable screening levels, leading to the conclusion that vapor intrusion does not present an unacceptable risk at those buildings.

At the Fana West building, PCE was detected in one indoor air sample at a concentration that exceeded the indoor air screening level. The PCE detection was presumed to be related to a background source within the building because PCE concentrations in groundwater beneath the Fana West building are not sufficient to result in the concentration detected in the indoor air sample. Additional sampling was completed to further evaluate conditions at the Fana West Building. Follow-up indoor air and sub-slab soil gas sampling was completed at the same location in October 2012 (LAI 2012e), and VOCs were not detected. Sample results for the Prologis and Fana West buildings are presented on Table 10-3.

To address concerns by property owners and the public, indoor air samples were collected at the YMCA and JA in July 2013 (LAI 2013b, c). VOCs were not detected in the JA building. In the YMCA building, TCE was not detected in indoor air; however, VC was detected at concentrations below screening levels. Verification sampling conducted at YMCA in December 2013 included additional indoor air and sub-slab soil gas samples. Again, VC was detected in indoor air samples at concentrations below screening levels. However, VC was not detected in sub-slab soil gas collected at the same time. VC was also not detected in historical soil gas samples collected at the YMCA property in 2003 as part of the property transfer. In addition, VC has not been detected in shallow groundwater in monitoring wells near the YMCA building. Multiple lines of evidence from soil gas and groundwater concentrations suggest that the detected concentrations of VC in indoor air at YMCA are the result of a background source and not the result of vapor intrusion (LAI 2014f). Tables 10-4 and 10-5 present results from the YMCA and JA facilities, respectively.

10.2.2.2 Sewer Air Investigation

A sewer worker exposure investigation was conducted to evaluate human health risks associated with potential exposure of sewer workers to VOC vapors in sewer air during maintenance activities (LAI 2013e). In May 2013, Boeing collected air samples from five sewer manholes located north and northwest of the Facility. TCE and VC were detected in the sewer air samples; however, the detected concentrations were below applicable screening levels, which were calculated based on anticipated exposure scenarios for sewer workers (LAI 2013e). Consequently, the concentrations observed in the sewer air sampling event support the conclusion that existing conditions are protective of sewer workers. Table 10-6 presents results of the sewer air investigation.

10.2.2.3 Tier I Investigations: The Outlet Collection, Cities of Algona and Auburn

In 2013, Boeing completed a preliminary assessment of shallow groundwater data across the Site. The results of the preliminary assessment indicated that groundwater at the water table exceeded the groundwater screening levels protective of commercial indoor air in limited commercial areas of Algona and Auburn. The areas, identified as needing further investigation, included the area adjacent to and north of 15th Street near The Outlet Collection in Auburn, an area near the south end of Milwaukee Avenue in Algona, and Building 17-70 on Boeing property. Due to the limited shallow groundwater data available outside of Boeing property, an additional Tier I investigation was recommended (LAI 2016c), with the intent of narrowing the focus of a potential Tier II investigation. Additional Tier I soil gas investigation was conducted in the area adjacent to and north of 15th Street SW in Auburn and near the south end of Milwaukee Avenue in Algona. Figure 10-4 shows the locations where Tier I investigations were conducted in Algona and Auburn.

In commercial Algona along Milwaukee Avenue, Tier I investigations included collection of shallow soil gas and water table groundwater samples. Results from the Tier I investigation indicated that vapor intrusion was unlikely to adversely affect indoor air and as a result, Tier II investigation of specific

buildings was not recommended (LAI 2016c). Table 10-7 presents Tier I soil gas and groundwater data collected in Algona.

In commercial Auburn, a Tier I investigation included collection of shallow soil gas and water table groundwater samples. Of the 17 locations where samples were collected, only 1 location indicated the need for a building-specific Tier II investigation based on detected concentrations of VC in soil gas and groundwater. The sample with exceedances of soil gas and groundwater screening levels was located near the Los Cabos Restaurant building. Table 10-8 presents Tier I soil gas and groundwater data collected in Auburn.

10.2.2.4 Tier II Investigations: The Outlet Collection, Building 17-70, and Los Cabos Restaurant

The Tier I soil gas investigation resulted in additional investigation at one building, the Los Cabos Restaurant. Two other buildings in commercial Auburn (The Outlet Collection and Building 17-70[117]) were selected to proceed directly to Tier II evaluations based on the results of the preliminary assessment and access considerations (LAI 2016d).

The Outlet Collection

The Tier II investigation at The Outlet Collection was completed in two phases; initial sampling was completed on April 27 and 28, 2015 and repeat sampling was completed June 4, 2015. During the initial sampling, co-located indoor air and sub-slab soil gas samples were collected at three locations on the main floor and indoor air samples only[118] were collected from two locations, one in each of the east and west service tunnels. Ambient air samples were collected during each of the indoor air sampling events. During the repeat sampling, three additional indoor air samples were collected from the east service tunnel.

TCE was detected in one indoor air sample collected during the initial sampling event in the east service tunnel at The Outlet Collection. The tunnel is used intermittently for deliveries. Further investigation of the tunnel, including repeat indoor air sampling at the original location plus three additional locations, did not detect TCE. While the concentration of TCE in the original sample exceeded commercial indoor air screening levels based on a 10-hour work day, the concentration did not exceed a health-based action level based on a more typical intermittent exposure scenario for the tunnel (LAI 2016d). Table 10-9 presents Tier II vapor intrusion data collected at The Outlet Collection.

Building 17-70

The field investigation at Building 17-70 was completed April 20 and 21, 2015. Co-located indoor air and sub-slab soil gas samples were collected at two locations in the building and an ambient air sample was collected from the roof near the heating, ventilating, and air conditioning system intake.

[117] Although Boeing property is considered industrial, Building 17-70 primarily houses offices; therefore, data collected at Building 17-70 was evaluated using commercial screening levels.

[118] Sub-slab samples were not collected from the subgrade service tunnels due to the shallow groundwater table.

Constituents of concern were not detected at Building 17-70 either in indoor air or in sub-slab soil gas. Table 10-10 presents Tier II vapor intrusion data collected at Building 17-70.

Los Cabos Restaurant

The Tier II investigation at the Los Cabos Restaurant was completed on June 8 and 9, 2016 (LAI 2017a). Sampling consisted of two indoor air samples, two sub-slab soil gas samples and one ambient air sample. Sub-slab soil gas samples were analyzed for TCE and VC and indoor and ambient air samples were analyzed for VC; no VOCs were detected in any samples. Table 10-11 presents Tier II vapor intrusion data collected at The Los Cabos Restaurant.

10.2.3 Residential Investigations

Site conditions, approach, results, and conclusions of the vapor intrusion investigation program in residential Algona are summarized below. The residential land use area (northeast Algona) and buildings where vapor intrusion investigations have occurred are shown on Figures 10-5 and 10-6 along with the December 2015 water table TCE and VC concentrations, respectively. Residential air and soil gas data are presented and compared to residential indoor air and soil gas screening levels in Table 10-12.

A preliminary assessment of groundwater data was completed in the northeast Algona residential area in 2012 and 2013. Groundwater data collected from shallow zone monitoring wells and soil borings indicated a potential vapor intrusion risk in a limited area (LAI 2013g, 2014a). Based on the results of the preliminary assessment, Ecology and Boeing agreed to focus the vapor intrusion investigations on the 24 residences shown on Figures 10-5 and 10-6. Vapor intrusion investigations were conducted at participating residences[119] (15 residences) in accordance with the residential vapor intrusion work plan (LAI 2013a) and associated residence-specific work plan addenda.

Two phases of vapor intrusion sampling were conducted. Phase I (summer sampling) was representative of warm season conditions, when windows and doors are frequently open (allowing for exchange between indoor and outdoor air) and groundwater levels are typically lower. Phase I began in July 2013 and concluded in October 2013. Phase II (winter sampling) was representative of cool season conditions, when windows and doors are typically kept closed (limiting exchange between indoor and outdoor air), heating systems are operational, and groundwater levels are typically higher. Phase II began in February 2014 and concluded in April 2014. The residential vapor intrusion investigation included collection and analysis of ambient air, indoor air (24-hour and 21-day), and sub-slab soil gas samples.

Results from the Phase I and Phase II vapor intrusion sampling events indicated that vapor intrusion was not likely occurring at any of the residences; therefore, no further action was needed to assess

[119] Several attempts were made to contact occupants and owners of all 24 residences. Attempted contact was made via mail and door knocking. If contact information was available, contact was also made via phone and email. For the nine residences that were not sampled, owners or occupants either declined sampling or never responded to repeated requests.

conditions or reduce exposure in any of the residences (LAI 2014d). Constituents of concern were not detected in indoor air at 8 of the 15 residences. Of the five residences where TCE was detected in indoor air, knowledge of potential background sources and/or repeat sampling supported the conclusion that the TCE detected at four of the residences was associated with background conditions, and not with vapor intrusion. The source of TCE at one residence was unknown; however, TCE was not detected in the co-located sub-slab samples, which suggested that vapor intrusion was not the source of the detection. Additionally, the results indicated that expansion of the study area was not warranted.

In March 2013, WDOH recommended over-water air sampling in the Algona residential neighborhood to verify that contaminated surface water was not affecting ambient air quality (WDOH 2013). An over-water air investigation was completed at the Chicago Avenue ditch (LAI 2014e). The purpose of the investigation was to evaluate the air quality directly above the ditch (over-water air) to determine if VOCs were present at concentrations that could pose an inhalation risk to workers or children playing in the ditch[120]. For the investigation, air samples (over-water air and adjacent ambient air) and surface water samples (to determine whether TCE and VC were present in ditch surface water at the time of sampling) were collected. Three sampling events were completed during August 2014[121].

TCE and VC[122] were detected at concentrations below screening levels in surface water samples during all three sampling events. However, TCE and VC were not detected in the air samples (over-water air or ambient air) during any of the three sampling events. VOC concentrations detected in surface water at the Chicago Avenue ditch were consistent with previous surface water sample results at this location (Section 9.2.1). No additional over-water air testing was required. Results of the over-water air sampling are presented on Table 10-13.

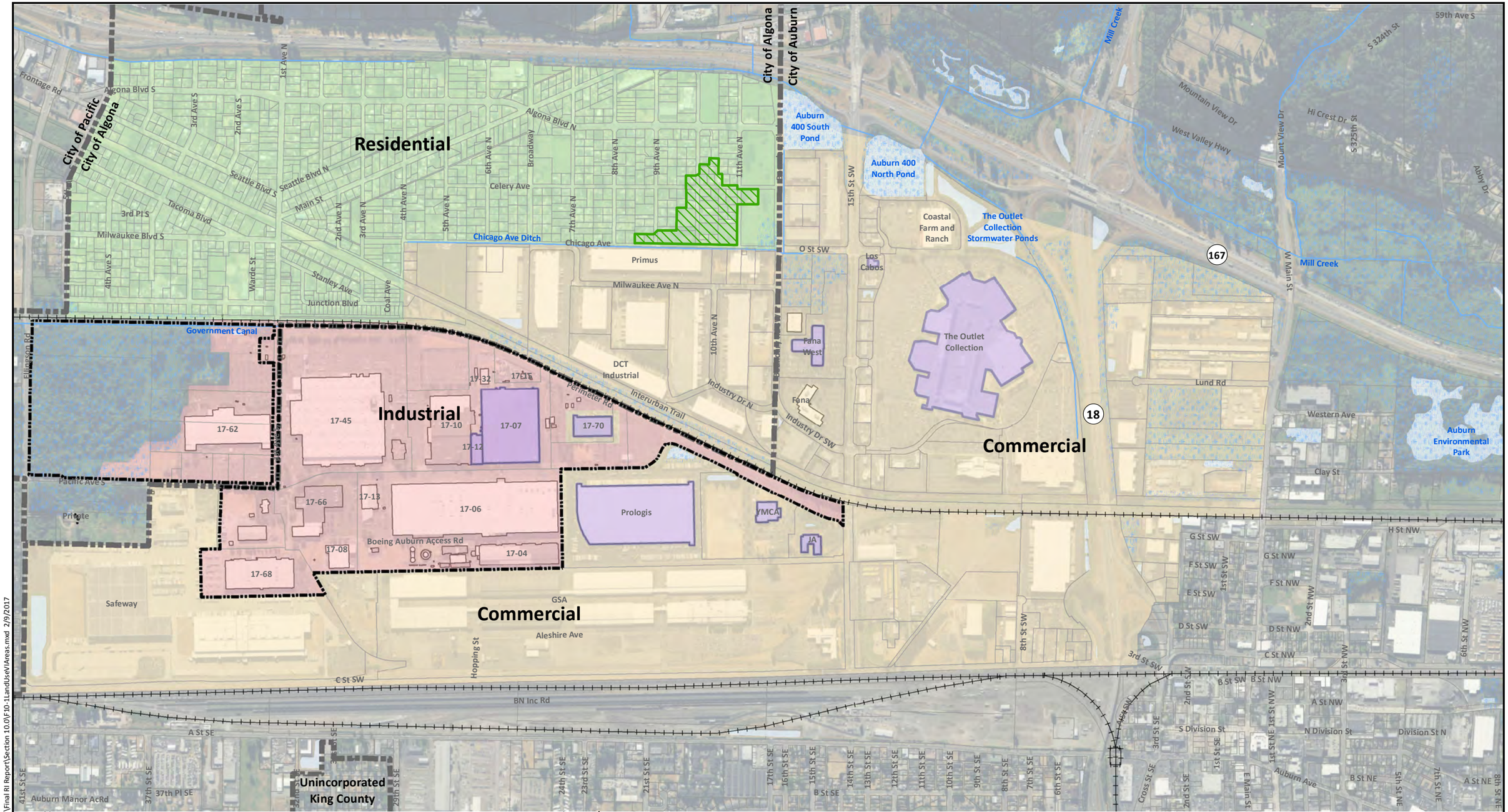
10.3 Summary

Industrial, commercial, and residential air quality have been evaluated at the Site since 2003. Based on the investigations completed to date, exposure to VOCs as a result of vapor intrusion does not appear to be a health concern in any are of the Site. No further indoor air evaluation is recommended at the Site and indoor air remediation will not be carried forward to the FS.

[120] Assessment of dermal contact with ditch water was conducted during the Algona ditch sampling and is reflected in the ditch water screening levels (Section 9.2.2).

[121] Favorable conditions as required by the work plan included no measureable rainfall for 5 days prior to sampling, predicted temperatures over 80 degrees Fahrenheit during sampling, and predicted wind speed of 10 miles per hour or less In the area, and calm winds observed at the time of sampling.

[122] CDCE was also detected in the surface water samples collected during all three sampling events. However, cDCE is not a constituent of concern in air because of its lower toxicity, so it was not discussed as part of the evaluation.



Notes

1. The industrial land use area consists of the Boeing Auburn property, which includes some commercial office buildings.
2. Commercial and industrial vapor intrusion assessments were conducted in 2012, 2013, 2015, and 2016. Residential vapor intrusion assessments were conducted in 2013 and 2014.
3. 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
- Building(s) Where Vapor Intrusion Assessments were Conducted (2012, 2013, 2015, and 2016)
- 2013/2014 Residential Vapor Intrusion Assessment Area
- Boeing Property
- City Limits
- Wetland Areas
- Water Bodies
- Waterways

0 1,000 2,000

Scale in Feet

N

Base Map Source: Geometrix 2003; Parcel Data Source: King County 2015; Aerial Photo Source: Esri World Imagery.

LANDAU ASSOCIATES

Boeing Auburn Remedial Investigation Auburn, Washington	**Land Use Areas and Vapor Intrusion Assessments Conducted**	Figure 10-1

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Notes

1. Results reported in µg/m3.
   TCE = Trichloroethene
   VC = Vinyl Chloride.
2. ND indicates analyte not detected at that location above reporting limits.

Legend

- AGW067 ● Groundwater Monitoring Well Location
- ASB0118 ◎ Soil Probe Location (By Others)
- ASB0114 ⊠ Abandoned Monitoring Well Location
- 17-05 Current Building and Number
- Property Boundary
- Prologis / YMCA Property Boundary

ASB0117		
Depth (ft)	5	12
TCE	17.8	34
VC	ND	ND

Sample ID
Sample depth (feet)
Constituent and sample value at sample depth

ASB0117		
Depth (ft)	5	12
TCE	17.8	34
VC	ND	ND

ASB0116		
Depth (ft)	5	12
TCE	ND	ND
VC	ND	ND

ASB0113		
Depth (ft)	5	12
TCE	ND	ND
VC	ND	ND

ASB0115		
Depth (ft)	5	12
TCE	ND	90
VC	ND	ND

ASB0114		
Depth (ft)	5	12
TCE	ND	ND
VC	ND	ND

AGW065
AGW140 (I)
AGW064
AGW072 (I)
AGW073 (D)
AGW075
AGW071
AGW070
AGW066
AGW126 (I)
AGW125
AGW136
AGW137 (I)
AGW138 (D)
ASB0118
AGW142 (D)
AGW141 (I)
AGW067
AGW139 (I)
AGW069
AGW151
AGW068
AGW096

Perimeter Road
15th Street SW
Prologis Warehouse
YMCA
Junior Achievement
Former Building 17-01
Former Building 17-23
Former Building 17-24
Former Building 17-02
Area 1

Area Shown
Boeing Auburn Plant Map

Source: Geomatrix 2003, URS 2003

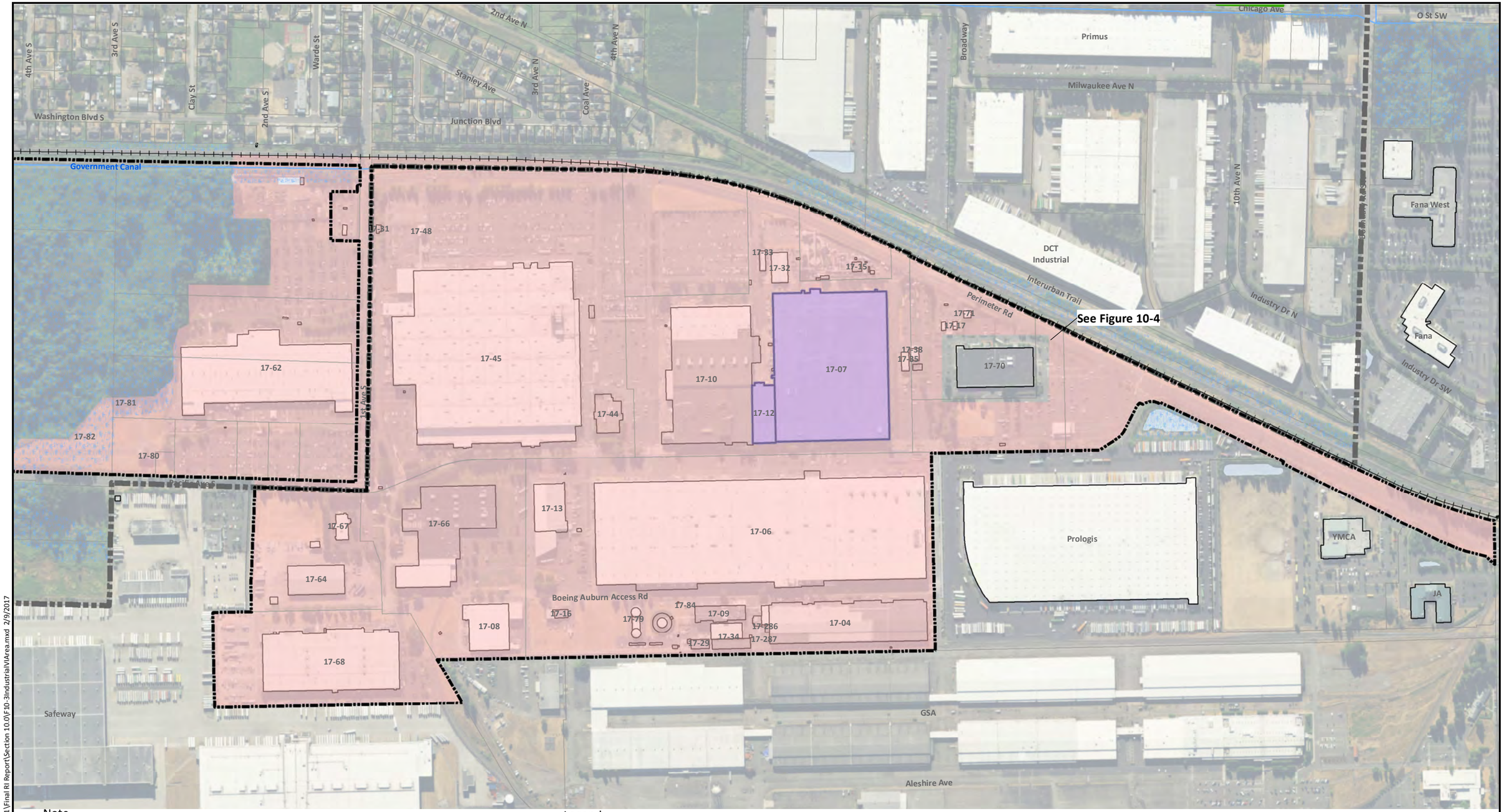
N

0 120 240
Scale in Feet

LANDAU ASSOCIATES

Boeing Auburn Remedial Investigation Auburn, Washington	**Historical TCE and VC Soil Gas Concentrations at YMCA and Junior Achievement**	Figure 10-2

Boeing\Remedial Investigation Report | G:\Projects\025\164\130\111\Final RI Report\Section 10.0\F10-2TCESoilGasAssessment.dwg (A) "Figure 10-2" 3/31/2016



Note

1. The industrial land use area consists of the Boeing Auburn property, which includes some commercial office buildings.
2. Commercial and industrial vapor intrusion assessments were conducted in 2012, 2013, and 2015.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Industrial Building(s) Where Vapor Intrusion Assessments were Conducted (2012-2013)
- Industrial Land Use Area
- Boeing Property
- City Limits
- Wetland Areas
- Water Bodies
- Waterways

0 500 1,000

Scale in Feet

N

Base Map Source: Geometrix 2003; Parcel Data Source: King County 2015; Aerial Photo Source: Esri World Imagery.

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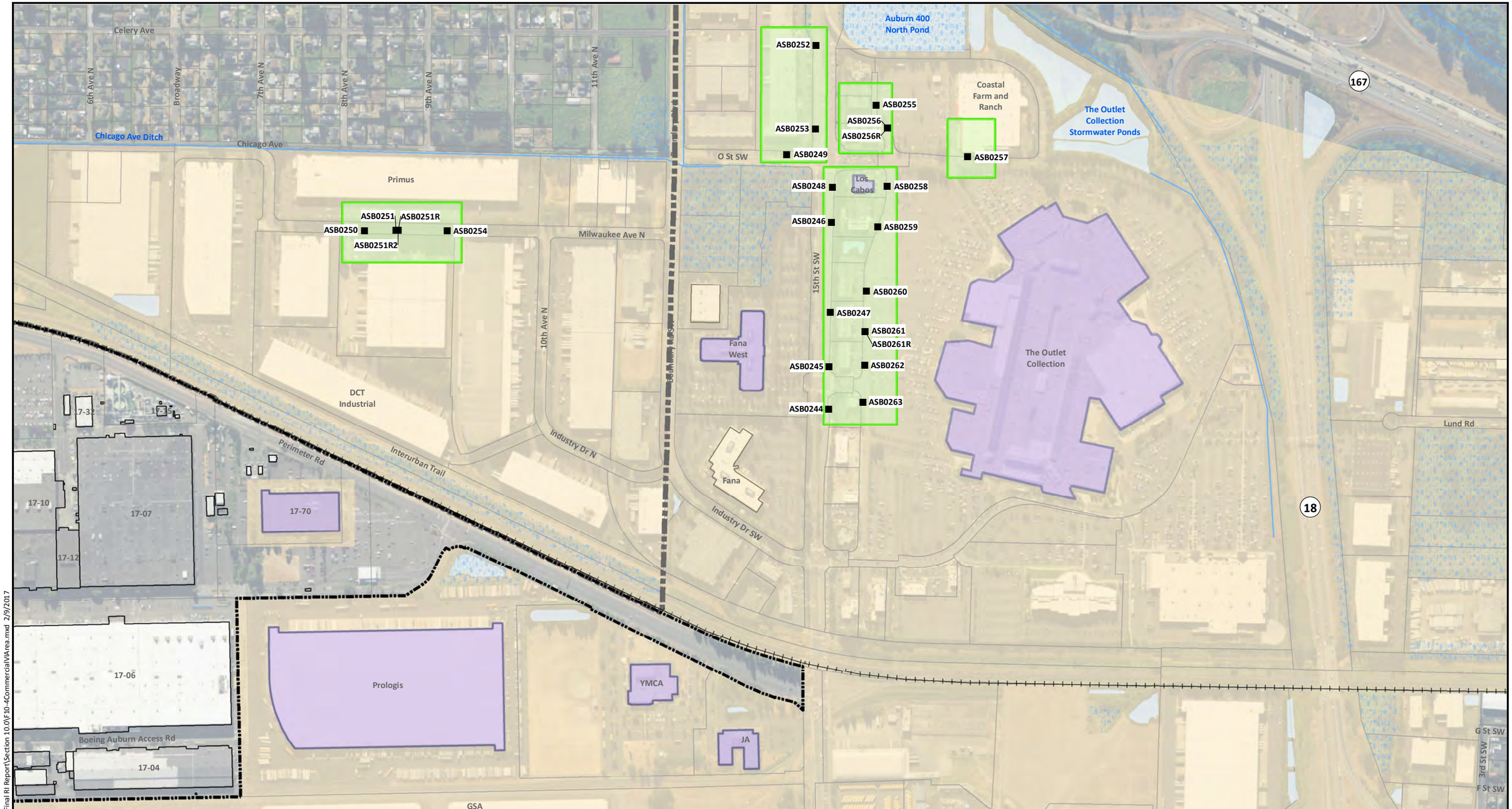
LANDAU ASSOCIATES

Boeing Auburn Remedial Investigation Auburn, Washington	**Industrial Vapor Intrusion Assessment Area**	Figure 10-3



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Notes

1. Commercial and industrial vapor intrusion assessments were conducted in 2012, 2013, 2015 and 2016.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Soil Gas Boring Location
- Commercial Building(s) Where Vapor Intrusion Assessments were Conducted (2012, 2013, 2015 and 2016)
- Additional Tier 1 Vapor Intrusion Assessment Area (2015)
- Commercial Land Use Area
- Boeing Property
- City Limits
- Wetland Areas
- Water Bodies
- Waterways

0 500 1,000

Scale in Feet

N

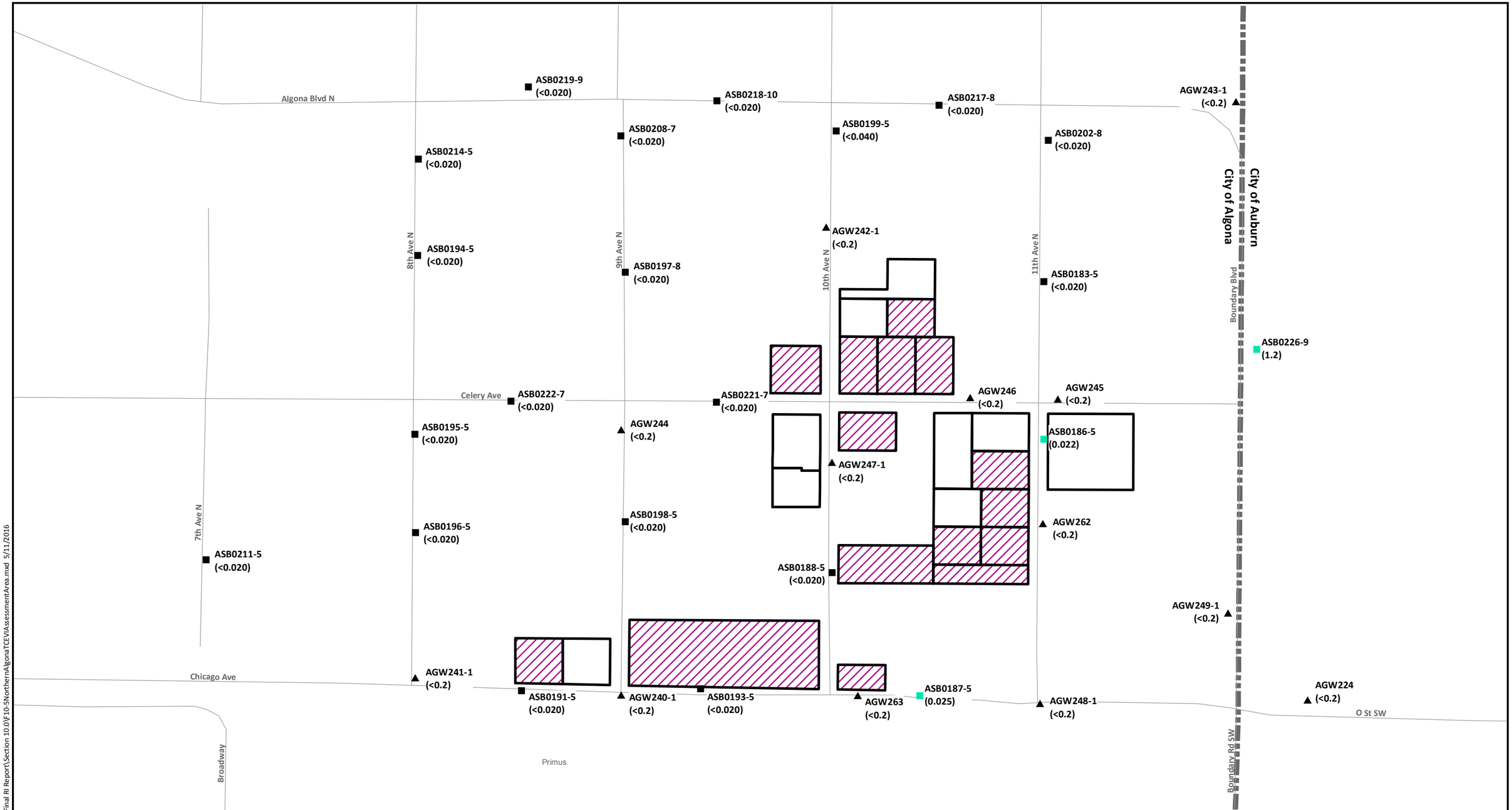
Base Map Source: Geometrix 2003; Parcel Data Source: King County 2015; Aerial Photo Source: Esri World Imagery.

LANDAU ASSOCIATES

Boeing Auburn
Remedial Investigation
Auburn, Washington

Commercial Vapor Intrusion Assessment Area

Figure
10-4



Legend

- Water Table Well Location
- Borehole Sample at Water Table
- TCE is Not Detected
- TCE is Detected (Below SL)
- Initial Vapor Intrusion Assessment Residences
- Participating Residence

Notes

1. All results shown are in µg/L
2. MTCA Method B air cleanup level derived groundwater screening level (SL): Trichloroethene (TCE) > 1.6 µg/L.
3. Multi-level wells have multiple channels, channel designations are included in the well ID (ex: AGW240-1). Channel 1 is screened at the water table.
4. Boring sample designations include the location name (ex: ASB0202) followed by the depth (feet, below ground surface) at which the sample was collected (ex: 6).
5. Monitoring well results are the most recent. Borehole samples were collected at time of drilling.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

N

0 200 400

Scale in Feet

Data Source: Data Source: King County GIS 2013.

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Northern Residential Algona Vapor Intrusion Assessment Area and TCE Water Table Data
Most Recent - December 2015

Figure
10-5

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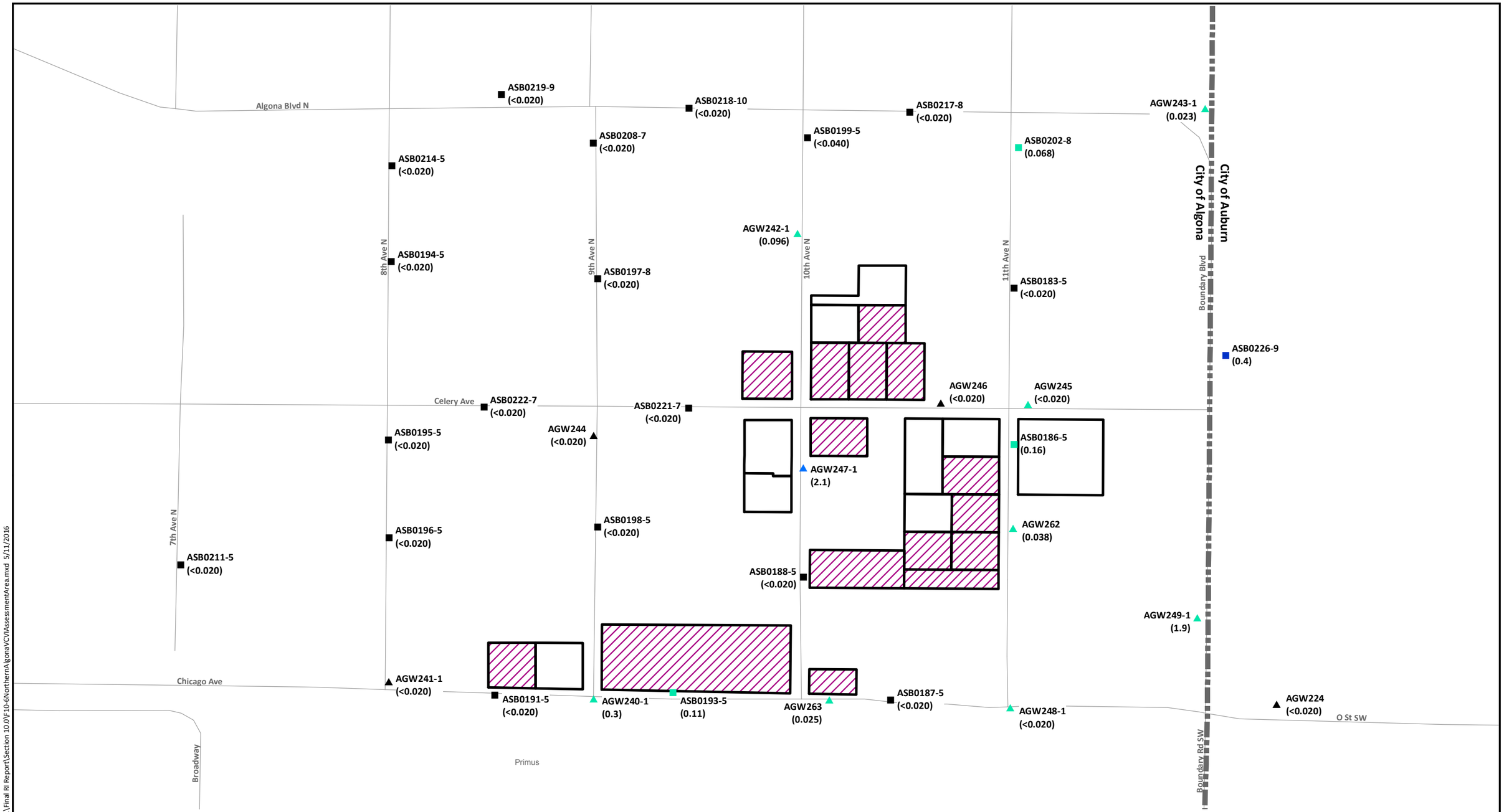

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Legend

- ▲ Water Table Well Location
- ■ Borehole Sample at Water Table
- ▲■ VC is Not Detected
- ▲■ VC is Detected (Below SL)
- ▲■ VC Exceeds SL
- Initial Vapor Intrusion Assessment Residences
- Participating Residence

Notes

1. All results shown are in µg/L
2. MTCA Method B air cleanup level derived groundwater screening level (SL): Vinyl Chloride (VC) > 0.35 µg/L.
3. Multi-level wells have multiple channels, channel designations are included in the well ID (ex: AGW240-1). Channel 1 is screened at the water table.
4. Boring sample designations include the location name (ex: ASB0202) followed by the depth (feet, below ground surface) at which the sample was collected (ex: 6).
5. Monitoring well results are the most recent. Borehole samples were collected at time of drilling.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Source: Data Source: King County GIS 2013.

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Remedial Investigation
Auburn, Washington

Northern Residential Algona Vapor Intrusion Assessment Area and VC Water Table Data
Most Recent - December 2015

Figure
10-6

Table 10-1
Industrial Soil Gas Analytical Data
Boeing Auburn Remedial Investigation
Auburn, Washington

Analyte	Sample Location: / Screening Level (a)	SSV01 Building 17-07 4/22/2011	SSV02 Building 17-07 4/22/2011	SSV03 Building 17-07 4/22/2011	SSV04 Building 17-07 10/6/2011
VOLATILES (µg/m^3)					
1,1,1-Trichloroethane	76190	3.6 U	3.6 U	3.6 U	1.7 U
1,1,2,2-Tetrachloroethane	1.4	4.5 U	4.5 U	4.5 U	--
1,1-Dichloroethane	520	2.7 U	2.7 U	2.7 U	1.3 U
1,1-Dichloroethene	3047	2.6 U	2.6 U	2.6 U	3.3 U
cis-1,2-Dichloroethene	NA	2.6 U	2.6 U	2.6 U	1.7 U
Tetrachloroethene	1300	**5.6**	4.5 U	4.5 U	2.9 U
trans-1,2-Dichloroethene	NA	**3.8**	2.6 U	2.6 U	1.7 U
Trichloroethene	67	3.6 U	3.6 U	3.6 U	2.3 U
Vinyl Chloride	95	1.7 U	1.7 U	1.7 U	0.54 U

Analyte	Sample Location: / Screening Level (a)	SSV05 Building 17-07 8/16/2011	SSV07 Building 17-07 10/6/2011	SSV08 Building 17-07 4/22/2011	SSV09 Building 17-07 4/22/2011
VOLATILES (µg/m^3)					
1,1,1-Trichloroethane	76190	**1.3 J**	2.5 U	8.8 U	5 U
1,1,2,2-Tetrachloroethane	1.4	--	--	11.2 U	6.4 U
1,1-Dichloroethane	520	0.26 U	**2.4**	6.6 U	3.8 U
1,1-Dichloroethene	3047	0.51 U	4.9 U	6.5 U	3.7 U
cis-1,2-Dichloroethene	NA	0.71 U	**30**	6.5 U	3.7 U
Tetrachloroethene	1300	**3.2 J**	4.2 U	**13.3**	**220**
trans-1,2-Dichloroethene	NA	**1.1 J**	2.4 U	6.5 U	**16**
Trichloroethene	67	**0.18 J**	**6.7**	8.8 U	**5**
Vinyl Chloride	95	0.16 U	0.79 U	4.2 U	2.4 U

Analyte	Sample Location: / Screening Level (a)	SSV10 Building 17-07 4/22/2011	SSV11 Building 17-07 4/22/2011	SSV12 Building 17-07 4/22/2011	SSV14 Building 17-07 4/22/2011
VOLATILES (µg/m^3)					
1,1,1-Trichloroethane	76190	3.6 U	4.1 U	**56.8 J**	**13.9**
1,1,2,2-Tetrachloroethane	1.4	4.5 U	5.2 U	7.6 UJ	8.5 U
1,1-Dichloroethane	520	2.7 U	3.1 U	**7.4 J**	5 U
1,1-Dichloroethene	3047	2.6 U	3 U	4.4 UJ	4.9 U
cis-1,2-Dichloroethene	NA	2.6 U	3 U	4.4 UJ	4.9 U
Tetrachloroethene	1300	**125**	5.2 U	7.6 UJ	8.5 U
trans-1,2-Dichloroethene	NA	**6.2**	**17.2**	4.4 UJ	4.9 U
Trichloroethene	67	3.6 U	4.1 U	6 UJ	6.7 U
Vinyl Chloride	95	1.7 U	1.9 U	2.8 UJ	3.1 U

Table 10-1
Industrial Soil Gas Analytical Data
Boeing Auburn Remedial Investigation
Auburn, Washington

Analyte	Sample Location: / Screening Level (a)	SSV15 Building 17-07 4/22/2011	SSV17 Building 17-07 10/6/2011	SSV18 Building 17-07 4/22/2011	SSV20 Building 17-07 4/22/2011
VOLATILES (µg/m^3)					
1,1,1-Trichloroethane	76190	**42.7**	2.1 U	6.9 U	**64.1**
1,1,2,2-Tetrachloroethane	1.4	4.5 U	--	8.8 U	2.7 U
1,1-Dichloroethane	520	2.7 U	**19**	5.1 U	1.6 U
1,1-Dichloroethene	3047	2.6 U	**45**	5.1 U	1.6 U
cis-1,2-Dichloroethene	NA	2.6 U	**310**	5.1 U	1.6 U
Tetrachloroethene	1300	**5**	**21**	8.8 U	**7.7**
trans-1,2-Dichloroethene	NA	2.6 U	**36**	5.1 U	**2.4**
Trichloroethene	67	3.6 U	**500**	6.9 U	2.1 U
Vinyl Chloride	95	1.7 U	**350**	3.3 U	1 U

Analyte	Sample Location: / Screening Level (a)	SSV21 Building 17-07 4/22/2011	SSV22 Building 17-07 10/6/2011	SSV23 Building 17-07 10/6/2011	SSV24 Building 17-07 4/22/2011
Volatiles (µg/m^3)					
1,1,1-Trichloroethane	76190	2 U	1.6 U	1.6 U	**6.6**
1,1,2,2-Tetrachloroethane	1.4	2.6 U	--	--	2.7 U
1,1-Dichloroethane	520	1.5 U	1.2 U	1.2 U	1.6 U
1,1-Dichloroethene	3047	1.5 U	3.2 U	3.2 U	1.6 U
cis-1,2-Dichloroethene	NA	1.5 U	1.6 U	**2.5**	1.6 U
Tetrachloroethene	1300	**4.7**	2.7 U	2.7 U	**7**
trans-1,2-Dichloroethene	NA	**4.7**	1.6 U	**2.2**	**13.7**
Trichloroethene	67	**4.9**	2.1 U	2.1 U	**24.2**
Vinyl Chloride	95	0.97 U	0.51 U	**3.8**	1 U

Analyte	Sample Location: / Screening Level (a)	SSV26 Building 17-07 4/22/2011	SSV27 Building 17-07 10/6/2011	SSV28 Building 17-07 10/6/2011	SSV29 Building 17-07 4/22/2011
VOLATILES (µg/m^3)					
1,1,1-Trichloroethane	76190	**14**	1.6 U	**9**	**216**
1,1,2,2-Tetrachloroethane	1.4	**5**	--	--	2.6 U
1,1-Dichloroethane	520	1.6 U	**7.2**	**20**	**185**
1,1-Dichloroethene	3047	1.6 U	**47**	**12**	1.5 U
cis-1,2-Dichloroethene	NA	1.6 U	**65**	**4.5**	**23.3**
Tetrachloroethene	1300	**9.3**	**7**	**160**	**5.1**
trans-1,2-Dichloroethene	NA	**13**	**12**	1.6 U	**9.6**
Trichloroethene	67	2.2 U	**72**	**190**	**1010**
Vinyl Chloride	95	1 U	**190**	0.51 U	0.97 U

Table 10-1
Industrial Soil Gas Analytical Data
Boeing Auburn Remedial Investigation
Auburn, Washington

Analyte	Sample Location: / Screening Level (a)	SSV30 Building 17-07 4/22/2011	SSV31 Building 17-07 4/22/2011	SSV32 Building 17-07 4/22/2011	SSV33 Building 17-07 4/22/2011
VOLATILES (µg/m^3)					
1,1,1-Trichloroethane	76190	**18.4**	**10.1**	**53.1**	2.1 U
1,1,2,2-Tetrachloroethane	1.4	2.2 U	1.3 U	1.2 U	1.3 U
1,1-Dichloroethane	520	2.6 U	**171**	**35.3**	1.6 U
1,1-Dichloroethene	3047	2.5 U	1.6 U	1.4 U	1.6 U
cis-1,2-Dichloroethene	NA	**3.7**	**40.4**	**26.8**	1.6 U
Tetrachloroethene	1300	2.2 U	1.3 U	1.2 U	**3.5**
trans-1,2-Dichloroethene	NA	**34.3**	**40.4**	**6**	**15**
Trichloroethene	67	**32.7**	**36.5**	**168**	1.1 U
Vinyl Chloride	95	0.81 U	0.5 U	0.45 U	0.5 U

Analyte	Sample Location: / Screening Level (a)	SSV34 Building 17-07 4/22/2011	SSV35 Building 17-07 4/22/2011	SSV36 Building 17-07 4/22/2011	SSV37 Building 17-12 4/22/2011
VOLATILES (µg/m^3)					
1,1,1-Trichloroethane	76190	**55.5**	**7.3**	**95.9**	**111**
1,1,2,2-Tetrachloroethane	1.4	2.7 U	**4.5**	2.7 U	2.5 U
1,1-Dichloroethane	520	1.6 U	1.6 U	**9.6**	**7.5**
1,1-Dichloroethene	3047	1.6 U	1.6 U	1.6 U	**7.1**
cis-1,2-Dichloroethene	NA	1.6 U	1.6 U	1.6 U	1.5 U
Tetrachloroethene	1300	2.7 U	**1.8**	**3.5**	2.5 U
trans-1,2-Dichloroethene	NA	**5.1**	**9.2**	**5.3**	**19**
Trichloroethene	67	**11**	**1.6**	2.1 U	2 U
Vinyl Chloride	95	1 U	0.5 U	1 U	0.94 U

Analyte	Sample Location: / Screening Level (a)	SSV38 Building 17-12 4/22/2011	SSV39 Building 17-12 4/22/2011	SSV40 Building 17-12 4/22/2011	SSV41 Building 17-12 8/16/2011
VOLATILES (µg/m^3)					
1,1,1-Trichloroethane	76190	**25.8**	**29.2**	**209**	**21**
1,1,2,2-Tetrachloroethane	1.4	2.5 U	2.8 U	2.7 U	--
1,1-Dichloroethane	520	1.5 U	1.6 U	**16.5**	0.27 U
1,1-Dichloroethene	3047	1.5 U	1.6 U	1.6 U	0.53 U
cis-1,2-Dichloroethene	NA	1.5 U	1.6 U	1.6 U	0.74 U
Tetrachloroethene	1300	2.5 U	2.8 U	2.7 U	**2.2**
trans-1,2-Dichloroethene	NA	**74.7**	1.6 U	**10.9**	**1.8**
Trichloroethene	67	2 U	2.2 U	**2.3**	**0.87**
Vinyl Chloride	95	0.94 U	1 U	1 U	0.17 U

Table 10-1
Industrial Soil Gas Analytical Data
Boeing Auburn Remedial Investigation
Auburn, Washington

Analyte	Sample Location: / Screening Level (a)	SSV42 Building 17-07 8/16/2011	SSV43 Building 17-07 8/16/2011	SSV44 Building 17-07 8/16/2011
VOLATILES (µg/m^3)				
1,1,1-Trichloroethane	76190	**50**	**160**	**0.5**
1,1,2,2-Tetrachloroethane	1.4	--	--	--
1,1-Dichloroethane	520	**0.26**	33 U	0.27 U
1,1-Dichloroethene	3047	0.51 U	32 U	0.53 U
cis-1,2-Dichloroethene	NA	0.71 U	32 U	0.74 U
Tetrachloroethene	1300	**5.6**	55 U	**2.1**
trans-1,2-Dichloroethene	NA	**0.57**	**180**	**1.1**
Trichloroethene	67	**1.1**	**49**	**1**
Vinyl Chloride	95	0.16 U	21 U	0.17 U

Notes:

1. **Bold** text indicates detected analyte.
2. Green shading indicates exceedance of screening level.
3. Sub-slab soil vapor sample locations are identified by the SSV prefix.
4. SSV-6, SSV-13, SSV-16, SSV-19, SSV-25 were never collected.

Abbreviation/Acronym:

µg/m^3 = micrograms per cubic meter

(a) Soil gas screening levels protective of MTCA Method C air cleanup levels. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

-- not analyzed

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

NA = Screening level not available

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.

Table 10-2
Industrial Indoor Air Analytical Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Analyte	Sample Location: / Screening Level (a)	AA02 Building 17-07 2/29/2012	AA06 Building 17-07 4/8/2013	IA03 Building 17-07 2/29/2012	IA04 Building 17-07 2/29/2012	IA05 Building 17-07 2/29/2012
VOLATILES (µg/m^3)						
cis-1,2-Dichloroethene	NA	0.198 U	0.13 U	0.198 U	0.198 U	0.198 U
Tetrachloroethene	40	0.339 U	0.22 U	0.339 U	0.339 U	0.339 U
Trichloroethene	2	0.269 U	0.18 U	0.269 U	0.269 U	0.269 U
Vinyl Chloride	2.8	0.128 U	0.042 U	0.128 U	0.128 U	0.128 U

Analyte	Sample Location: / Screening Level (a)	IA06 Building 17-07 2/29/2012	IA07 Building 17-07 2/29/2012	IA11 Building 17-07 4/8/2013	IA12 Building 17-07 4/8/2013
VOLATILES (µg/m^3)					
cis-1,2-Dichloroethene	NA	0.198 U	0.198 U	0.12 U	0.13 U
Tetrachloroethene	40	0.339 U	0.339 U	0.21 U	0.22 U
Trichloroethene	2	0.269 U	0.269 U	0.17 U	0.18 U
Vinyl Chloride	2.8	0.128 U	0.128 U	0.04 U	0.042 U

Notes:

1. Indoor air sample locations are identified by the IA prefix. Ambient air sample locations are identified by the AA prefix.

(a) MTCA Method C Air Cleanup Levels. The lower (i.e. more restrictive) value of carcinogenic and non-carcinogenic is shown.

Abbreviation/Acronym:

µg/m^3 = micrograms per cubic meter

NA = screening level not available

U = the compound was not detected at the reported concentration

Table 10-3
Commerical: Fana and Prologis Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Indoor and Ambient Air	Sample Location:	IA08	IA09	AA03 (b)	AA04 (c)	IA01
		Prologis	Prologis	Prologis	Prologis	Fana
Analyte	Screening Level (a)	2/29/2012	2/29/2012	2/29/2012	2/29/2012	2/28/2012
VOLATILES (µg/m^3)						
cis-1,2-Dichloroethene	NA	0.198 U	0.198 U	0.198 U	0.198 U	19.8 U
Tetrachloroethene	29	0.339 U	**0.372**	0.339 U	0.339 U	**918**
Trichloroethene	1.9	0.269 U	0.269 U	0.269 U	0.269 U	26.9 U
Vinyl Chloride	0.85	0.128 U	0.128 U	0.128 U	0.128 U	12.8 U

Indoor and Ambient Air	Sample Location:	IA02	IA10	AA01 (c)	AA05
		Fana	Fana	Fana	Fana
Analyte	Screening Level (a)	2/28/2012	8/23/2012	2/28/2012	8/26/2012
VOLATILES (µg/m^3)					
cis-1,2-Dichloroethene	NA	0.198 U	0.05 U	0.198 U	0.05 U
Tetrachloroethene	29	0.339 U	0.05 U	0.339 U	0.05 U
Trichloroethene	1.9	0.269 U	0.05 U	0.269 U	0.05 U
Vinyl Chloride	0.85	0.128 U	0.05 U	0.128 U	0.05 U

Sub-Slab Soil Vapor	Sample Location:	SSV49
		Fana
Analyte	Screening Level (a)	8/23/2012
VOLATILES (µg/m^3)		
cis-1,2-Dichloroethene	NA	2.0
Tetrachloroethene	960	3.4
Trichloroethene	63	2.7
Vinyl Chloride	28	1.3

Notes:

1. **Bold** text indicates detected analyte.
2. Green shading indicates exceedance of screening level.
3. Indoor air sample locations are identified by the IA prefix. Ambient air sample locations are identified by the AA prefix.
4. Sub-slab soil vapor sample locations are identified by the SSV prefix.

(a) The Model Toxics Control Act Method B air cleanup level was selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

(b) At Prologis, an extra background ambient air sample was collected from the breathing zone near ground level at the request of the building's manager.

(c) Rooftop samples were collected from a point near the HVAC system intake point at each of the buildings in which indoor air samples were collected. The rooftop samples represent background ambient air concentrations entering the building and not impacted by vapor intrusion.

Abbreviation/Acronym:

µg/m^3 = micrograms per cubic meter
NA = Screening level not available
U = Indicates the compound was undetected at the reported concentration.

Table 10-4
Commercial: YMCA Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Indoor Air Samples	Sample Location:	IA15 Main Office	IA060 Main Office	IA16 Total Health Room	IA061 Total Health Room
Analyte	Screening Level (a)	7/2/2013	12/17/2013	7/2/2013	12/17/2013
VOLATILES (µg/m^3)					
Trichloroethene	1.9	0.18 U	0.18 U	0.18 U	**0.22**
Vinyl Chloride	0.85	**0.32**	**0.053**	**0.38**	**0.072**

Ambient Air Samples	Sample Location:	AA07 YMCA South Parking Lot	AA025 YMCA Roof (b)
Analyte	Screening Level (a)	7/2/2013	12/17/2013
VOLATILES (µg/m^3)			
Trichloroethene	1.9	0.18 U	0.17 U
Vinyl Chloride	0.85	0.044 U	0.04 U

Sub-Slab Soil Vapor Samples	Sample Location:	SSV46 Crawlspace	SSV47 Storage Room	SSV48 Boiler Room	SSV062 Data Room
Analyte	Screening Level (a)	2/29/2012	2/29/2012	2/29/2012	12/18/2013
VOLATILES (µg/m^3)					
Trichloroethene	63	2.7 U	2.7 U	2.7 U	6 U
Vinyl Chloride	28	1.3 U	1.3 U	1.3 U	2.9 U

Notes:

1. **Bold** text indicates detected analyte.
2. Indoor air sample locations are identified by the IA prefix. Ambient air sample locations are identified by the AA prefix.
3. Sub-slab soil vapor sample locations are identified by the SSV prefix.

(a) The MTCA Method B air and soil gas cleanup levels were selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

(b) The rooftop sample was collected from a point near the HVAC system intake point. The rooftop sample represent background ambient air concentrations entering the building and not impacted by vapor intrusion.

Abbreviation/Acronym:

µg/m^3 = micrograms per cubic meter

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

Table 10-5
Commercial: Junior Achievement Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Indoor and Ambient Air	Sample Location:	AA07 YMCA South Parking Lot	IA13 Office Space	IA14 Mock Wells Fargo Bank
Analyte	Screening Level (a)	7/2/2013	7/2/2013	7/2/2013
VOLATILES (µg/m^3)				
Trichloroethene	1.9	0.18 U	0.18 U	0.18 U
Vinyl Chloride	0.85	0.044 U	0.042 U	0.043 U

Sub-Slab Soil Vapor Samples	Sample Location:	SSV45 Storage Room
Analyte	Screening Level (a)	2/29/2012
VOLATILES (µg/m^3)		
Trichloroethene	63	2.7 U
Vinyl Chloride	28	1.3 U

Notes:

1. Indoor air sample locations are identified by the IA prefix. Ambient air sample locations are identified by the AA prefix.

(a) The Model Toxics Control Act Method B air cleanup level was selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

Abbreviation/Acronym:

µg/m^3 = micrograms per cubic meter

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

Table 10-6
Sewer Manhole Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Analyte	Sample Location: / Screening Level (a)	SV-907-17 5/20/2013	SV-907-19 5/21/2013	SV-907-27 5/21/2013	SV-907-28 5/21/2013	SV-909-01 5/20/2013
VOLATILES (µg/m^3)						
Tetrachloroethene	390	5.5 U	5.4 U	5.7 U	5.8 U	5.7 U
Trichloroethene	25	4.4 U	4.3 U	**14**	**7.0**	4.5 U
Vinyl Chloride	11	2.1 U	2 U	**3.9**	2.2 U	2.1 U

Notes:

1. **Bold** text indicates detected analyte.

(a) Modified MTCA Method B cleanup levels were calculated specifically for the sewer worker exposure scenario.

Abbreviation/Acronym:

µg/m^3 = micrograms per cubic meter

U = Indicates the compound was undetected at the reported concentration.

Table 10-7
Algona Soil Gas and Groundwater Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Soil Gas	Sample Location:	ASG0250	ASG0251	ASG0251R	ASG0251R2	ASG0254
Analyte	Screening Level (a)	3/17/2015	3/18/2015	4/26/2015	6/25/2015	3/18/2015
VOLATILES (µg/m^3)						
cis-1,2-Dichloroethene	NA	4.0 U	4.0 U	4.0 U	4.0 U	**11**
Trichloroethene	63	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U
Vinyl chloride	28	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U

Groundwater	Sample Location:	ASB0250-7	ASB0251-7	ASB0251R-8	ASB0251R2-8	ASB0254-8
Analyte	Screening Level (b)	3/17/2015	3/18/2015	4/26/2015	6/25/2015	3/18/2015
VOLATILES (µg/L)						
cis-1,2-Dichloroethene	NA	0.2 U	**1.4**	**1.7**	**1.6**	0.2 U
Trichloroethene	7.9	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	1.0	**0.22**	**0.4**	**0.72**	**1.5**	0.020 U

Notes:

1. **Bold** text indicates detected analyte.
2. Green shading indicates exceedance of screening level.
3. Soil gas sampling locations are identified by the ASG prefix; co-located groundwater sample locations are identified by the ASB prefix.

(a) Soil gas screening level protective of Modified MTCA Method B air screening levels was selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

(b) Groundwater screening level protective of Modified MTCA Method B air screening levels was selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

NA = Screening level not available

Abbreviations/Acronyms

µg/L = micrograms per liter

µg/m^3 = micrograms per cubic meter

U = Indicates the compound was undetected at the reported concentration.

Table 10-8
Auburn Soil Gas and Groundwater Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Soil Gas	Sample Location:	ASG0244	ASG0245	ASG0246	ASG0247	ASG0248
Analyte	Screening Level (a)	3/16/2015	3/16/2015	3/16/2015	3/17/2015	3/17/2015
VOLATILES (µg/m^3)						
cis-1,2-Dichloroethene	NA	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Trichloroethene	63	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U
Vinyl chloride	28	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U

Soil Gas	Sample Location:	ASG0249	ASG0252	ASG0253	ASG0255	ASG0256
Analyte	Screening Level (a)	3/17/2015	3/18/2015	3/18/2015	4/26/2015	4/27/2015
VOLATILES (µg/m^3)						
cis-1,2-Dichloroethene	NA	4.0 U	4.0 U	4.0 U	4.0 U	**5.1**
Trichloroethene	63	5.5 U	5.5 U	5.5 U	5.5 U	**5.6**
Vinyl chloride	28	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U

Soil Gas	Sample Location:	ASG0256R	ASG0257	ASG0258	ASG0259	ASG0260
Analyte	Screening Level (a)	6/25/2015	4/27/2015	4/27/2015	4/28/2015	4/28/2015
VOLATILES (µg/m^3)						
cis-1,2-Dichloroethene	NA	4.0 U	4.0 U	4.0 U	**30**	4.0 U
Trichloroethene	63	5.5 U	5.5 U	5.5 U	**13**	5.5 U
Vinyl chloride	28	2.6 U	2.6 U	**30**	2.6 U	2.6 U

Soil Gas	Sample Location:	ASG0261	ASG0261R	ASG0262	ASG0263
Analyte	Screening Level (a)	4/28/2015	6/26/2015	4/29/2015	4/29/2015
VOLATILES (µg/m^3)					
cis-1,2-Dichloroethene	NA	4.0 U	4.0 U	4.0 U	4.0 U
Trichloroethene	63	**8.2**	5.5 U	5.5 U	5.5 U
Vinyl chloride	28	2.6 U	2.6 U	2.6 U	2.6 U

Groundwater	Sample Location:	ASB0244-9	ASB0245-10	ASB0246-10	ASB0247-7	ASB0248-7
Analyte	Screening Level (b)	3/16/2015	3/16/2015	3/16/2015	3/17/2015	3/17/2015
VOLATILES (µg/L)						
cis-1,2-Dichloroethene	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	7.9	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	1.0	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U

Groundwater	Sample Location:	ASB0249-7	ASB0252-8	ASB0253-8	ASB0255-10	ASB0256-12
Analyte	Screening Level (b)	3/17/2015	3/18/2015	3/18/2015	4/26/2015	4/27/2015
VOLATILES (µg/L)						
cis-1,2-Dichloroethene	NA	0.2 U	**0.2**	0.2 U	0.2 U	0.2 U
Trichloroethene	7.9	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	1.0	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U

Table 10-8
Auburn Soil Gas and Groundwater Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Groundwater Analyte	Sample Location: Screening Level (b)	ASB0256R-15 6/26/2015	ASB0257-15 4/27/2015	ASB0258-10 4/28/2015	ASB0259-10 4/28/2015	ASB0260-8 4/28/2015
VOLATILES (µg/L)						
cis-1,2-Dichloroethene	NA	0.2 U	0.2 U	**0.4**	**0.4**	0.2 U
Trichloroethene	7.9	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	1.0	**0.063**	0.020 U	**2.8**	**0.13**	0.020 U

Groundwater Analyte	Sample Location: Screening Level (b)	ASB0261-10 4/28/2015	ASB0261R-12 6/26/2015	ASB0262-10 4/29/2015	ASB0263-10 4/29/2015
VOLATILES (µg/L)					
cis-1,2-Dichloroethene	NA	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene	7.9	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	1.0	**0.024**	0.020 U	**0.43**	0.020 U

Notes:

1. **Bold** text indicates detected analyte.
2. Green shading indicates exceedance of screening level.
3. Soil gas sampling locations are identified by the ASG prefix; co-located groundwater sample locations are identified by the ASB prefix.

(a) Soil gas screening level protective of Modified MTCA Method B air screening levels was selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

(b) Groundwater screening level protective of Modified MTCA Method B Air screening levels was selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

NA = Screening level not available

Abbreviations/Acronyms:

µg/L = micrograms per liter

$\mu g/m^3$ = micrograms per cubic meter

U = Indicates the compound was undetected at the reported concentration.

Table 10-9
Commercial: The Outlet Collection Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Indoor and Ambient Air	Sample Location:	AA034	AA035	IA077	IA078	IA079
		Roof	Roof	Hallway	East Tunnel Sump	West Fire Room
Analyte	Screening Level (a)	4/27/2015	6/4/2015	4/27/2015	4/27/2015	4/27/2015
VOLATILES (µg/m^3)						
cis-1,2-Dichloroethene	NA	0.69 U	0.65 U	0.66 U	0.64 U	0.63 U
Trichloroethene	1.9	0.94 U	0.89 U	0.89 U	**11**	0.85 U
Vinyl chloride	0.85	0.45 U	0.42 U	0.42 U	0.41 U	0.41 U

Indoor and Ambient Air	Sample Location:	IA080	IA081	IA082	IA083	IA084
		West Tunnel Sump	South Fire Room	East Tunnel Hallway (b)	East Tunnel Sump	East Tunnel Sump (b)
Analyte	Screening Level (a)	4/27/2015	4/27/2015	6/4/2015	6/4/2015	6/4/2015
VOLATILES (µg/m^3)						
cis-1,2-Dichloroethene	NA	0.66 U	0.66 U	0.60 U	0.64 U	0.61 U
Trichloroethene	1.9	0.89 U	0.89 U	0.81 U	0.87 U	0.83 U
Vinyl chloride	0.85	0.42 U	0.42 U	0.38 U	0.41 U	0.40 U

Sub-Slab Soil Vapor	Sample Location:	SSV071	SSV072	SSV073
		South Fire Room	West Fire Room	Hallway
Analyte	Screening Level (a)	4/28/2015	4/28/2015	4/28/2015
VOLATILES (µg/m^3)				
cis-1,2-Dichloroethene	NA	3.9 U	3.9 U	3.9 U
Trichloroethene	63	5.3 U	5.2 U	5.2 U
Vinyl chloride	28	2.5 U	2.5 U	2.5 U

Notes:

1. **Bold** text indicates detected analyte.
2. Green shading indicates exceedance of screening level.
3. Indoor air sample locations are identified by the IA prefix. Ambient air sample locations are identified by the AA prefix.
4. Sub-slab soil vapor sample locations are identified by the SSV prefix.

(a) Soil gas screening level protective of Modified Model Toxics Control Act Method B air screening levels was selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

(b) Sample intake was placed at breathing zone height.

NA = Screening level not available

Abbreviation/Acronym:

µg/m^3 = micrograms per cubic meter

U = Indicates the compound was undetected at the reported concentration.

Table 10-10
Commercial: Building 17-70 Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Indoor and Ambient Air	Sample Location:	AA033	IA075	IA076
		Bldg 17-70 Roof	Bldg 17-70 Room 13A11	Bldg 17-70 Room W6
Analyte	Screening Level (a)	4/20/2015	4/20/2015	4/20/2015
VOLATILES (µg/m^3)				
cis-1,2-Dichloroethene	NA	0.69 U	0.66 U	0.59 U
Trichloroethene	1.9	0.94 U	0.90 U	0.81 U
Vinyl chloride	0.85	0.45 U	0.43 U	0.38 U

Sub-Slab Soil Vapor	Sample Location:	SSV069	SSV070
		Bldg 17-70 Room 13A11	Bldg 17-70 Room W6
Analyte	Screening Level (a)	4/21/2015	4/21/2015
VOLATILES (µg/m^3)			
cis-1,2-Dichloroethene	NA	4.1 U	4.1 U
Trichloroethene	63	5.5 U	5.6 U
Vinyl chloride	28	2.6 U	2.7 U

Notes:

1. Indoor air sample locations are identified by the IA prefix. Ambient air sample locations are identified by the AA prefix.
2. Sub-slab soil vapor sample locations are identified by the SSV prefix.
(a) Soil gas screening level protective of Modified MTCA Method B air screening levels was selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic is shown.

Abbreviation/Acronym:

µg/m^3 = micrograms per cubic meter
NA = Screening level not available
U = Indicates the compound was undetected at the reported concentration.

Table 10-11
Commercial: Los Cabos Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Indoor and Ambient Air	Sample Location:	AA036	IA085	IA086
Analyte	**Screening Level**	6/8/2016	6/8/2016	6/8/2016
VOLATILES (µg/m^3)				
Vinyl Chloride	0.85	0.39 U	0.40 U	0.41 U

Sub-Slab Soil Vapor	Sample Location:	SSV074	SSV075
Analyte	**Screening Level**	6/9/2016	6/9/2016
VOLATILES (µg/m^3)			
Trichloroethene	63	6.4 U	6.3 U
Vinyl Chloride	28	3.0 U	3.0 U

Notes:

1. **Bold** text indicates detected analyte.

Abbreviations/Acronyms:

AA = ambient air
ASTM = ASTM International
EPA = U.S. Environmental Protection Agency
IA = indoor air
µg/m^3 = micrograms per cubic meter
SSV = sub-slab soil vapor
U = Indicates the compound was not detected at the reported concentration.

Table 10-12
Residential Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Residence ID Number	Residence ID Number	Sample Type	Location Description	Sample Location	Sample Date (a)	TCE (µg/m^3)	cDCE (µg/m^3)	tDCE (µg/m^3)	VC (µg/m^3)	Radiello TCE (µg/m^3)
				Indoor Air Screening Level (b)		0.37	--	27	0.28	0.37
				Soil Gas Screening Level (b)		12	--	907	9.5	12
Foundation: Slab-on-Grade										
RES003	1	SSV	1st Floor TV Room	SSV050	8/13/2013	<0.16	<0.12	<0.60	<0.039	--
RES003	1	SSV	1st Floor Master Bedroom	SSV051	8/13/2013	<0.16	<0.12	<0.61	<0.039	--
RES003	1	IA	1st Floor TV Room	IA026	8/14/2013	<0.18	<0.13	<0.65	<0.042	<0.048
RES003	1	IA	1st Floor Master Bedroom	IA027	8/14/2013	<0.17	<0.13	<0.64	<0.041	<0.048
RES003	1	IA	1st Floor Office	IA028	8/14/2013	<0.15	<0.11	<0.57	<0.036	<0.048
RES003	1	AA	Outside	AA012	8/14/2013	<0.17	<0.12	<0.61	<0.040	--
RES006	1	SSV	1st Floor Hallway	SSV057	9/15/2013	<0.42	<0.31	<1.5	<0.099	--
RES006	1	IA	1st Floor TV Room	IA043	9/14/2013	<0.27	<0.20	<1.0	<0.064	--
RES006	1	IA	1st Floor Master Bedroom	IA044	9/14/2013	<0.19	<0.14	<0.69	<0.045	--
RES006	1	AA	Outside	AA018	9/14/2013	<0.20	<0.14	<0.72	<0.047	--
RES014	2	SSV	Garage	SSV063	1/29/2014	<0.16	<0.12	<0.59	<0.038	--
RES014	2	SSV	1st Floor Closet	SSV064	1/29/2014	**0.43**	<0.12	<0.59	<0.038	--
RES014	2	IA	1st Floor Room	IA062	1/27/2014	<0.15	<0.11	<0.56	<0.036	--
RES014	2	AA	Outside	AA026	1/27/2014	<0.20	<0.15	<0.74	<0.048	--
RES021	1	SSV	Garage	SSV054	8/27/2013	<0.16	<0.12	<0.61	<0.039	--
RES021	1	SSV	Garage	SSV055	8/27/2013	<0.82	<0.61	<3.0	<0.20	--
RES021	2	SSV	Garage	SSV066	3/7/2014	<0.16	<0.12	<0.59	<0.038	--
RES021	2	SSV	Garage	SSV067	3/7/2014	<0.16	<0.12	<0.61	<0.039	--
RES023	1	SSV	1st Floor Closet	SSV053	8/21/2013	<0.17	<0.12	<0.62	<0.040	--
RES023	1	IA	1st Floor Bedroom	IA032	8/19/2013	0.0 (c)	<0.32	<1.6	<0.10	--
RES023	1	IA	1st Floor Office/Storage Room	IA033	8/19/2013	0.0 (c)	<0.14	<0.70	<0.045	--
RES023	1	AA	Outside	AA014	8/19/2013	**1.1**	<0.13	<0.66	<0.042	--
RES023	1	AA	Outside	AA022	9/25/2013	<0.16	<0.12	<0.59	<0.038	--
Foundation: Slab-on-Grade and Crawlspace										
RES004	1	SSV	1st Floor Bedroom/TV Room	SSV052	8/13/2013	<0.17	<0.12	<0.63	<0.040	--
RES004	1	CS	Crawlspace	CSA003	8/15/2013	**0.19**	<0.13	<0.66	<0.042	<0.050
RES004	1	IA	1st Floor Bedroom/TV Room	IA029	8/15/2013	<0.18	<0.14	<0.68	<0.044	<0.050
RES004	1	IA	2nd Floor TV Room	IA030	8/15/2013	<0.19	<0.14	<0.72	<0.046	<0.050
RES004	1	IA	3rd Floor Bedroom	IA031	8/15/2013	<0.19	<0.14	<0.69	<0.044	<0.050
RES004	1	AA	Outside	AA013	8/15/2013	<0.18	<0.13	<0.65	<0.042	--
RES004	1	SSV	Garage	SSV059	10/16/2013	<0.15	<0.11	<0.57	<0.036	--
RES004	1	CS	Crawlspace	CSA009	10/15/2013	<0.17	<0.12	<0.61	<0.040	--
RES004	1	IA	1st Floor Bedroom/TV Room	IA047	10/15/2013	<0.18	<0.13	<0.65	<0.042	--
RES004	1	IA	2nd Floor TV Room	IA048	10/15/2013	<0.15	<0.11	<0.54	<0.035	--
RES004	1	IA	3rd Floor Bedroom	IA055	10/15/2013	<0.17	<0.12	<0.62	<0.040	--
RES004	1	AA	Outside	AA020	10/15/2013	<0.17	<0.12	<0.61	<0.040	--
RES004	2	SSV	Garage	SSV068	4/1/2014	<0.17	<0.12	<0.61	<0.040	--
RES004	2	CS	Crawlspace	CSA013	4/2/2014	NR (d)	NR (d)	NR (d)	NR (d)	<0.052
RES004	2	CS	Crawlspace	CSA014	4/10/2014	<0.17	<0.12	<0.62	<0.040	--
RES004	2	IA	1st Floor Bedroom/TV Room	IA072	4/2/2014	<0.17	<0.12	<0.63	<0.040	<0.052
RES004	2	IA	2nd Floor TV Room	IA073	4/2/2014	<0.18	<0.13	<0.65	<0.042	<0.052
RES004	2	IA	3rd Floor Bedroom	IA074	4/2/2014	<0.18	<0.14	<0.68	<0.044	<0.052
RES004	2	AA	Outside	AA031	4/2/2014	<0.17	<0.13	<0.64	<0.041	--
RES004	2	AA	Outside	AA032	4/10/2014	<0.16	<0.12	<0.60	<0.039	--
RES012	1	SSV	Garage	SSV058	9/24/2013	<0.34	<0.25	<1.2	<0.081	--
RES012	1	CS	Crawlspace	CSA007	9/25/2013	<0.16	<0.12	<0.59	<0.038	**0.055**
RES012	1	IA	1st Floor TV Room	IA046	9/25/2013	<0.16	<0.12	<0.58	<0.038	**0.18**
RES012	1	AA	Outside	AA019	9/25/2013	<0.16	<0.12	<0.59	<0.038	--
RES012	2	SSV	Garage	SSV065	2/25/2014	<0.17	<0.13	<0.63	<0.041	--
RES012	2	CS	Crawlspace	CSA011	2/26/2014	<0.16	<0.12	<0.58	<0.038	<0.052

Table 10-12
Residential Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Residence ID Number	Residence ID Number	Sample Type	Location Description	Sample Location	Sample Date (a)	TCE (µg/m^3)	cDCE (µg/m^3)	tDCE (µg/m^3)	VC (µg/m^3)	Radiello TCE (µg/m^3)
				Indoor Air Screening Level (b)		0.37	--	27	0.28	0.37
				Soil Gas Screening Level (b)		12	--	907	9.5	12
RES012	2	IA	1st Floor TV Room	IA069	2/26/2014	**0.32**	<0.14	<0.69	<0.044	**0.17**
RES012	2	AA	Outside	AA029	2/26/2014	<0.17	<0.13	<0.63	<0.041	--
RES018	1	SSV	Garage	SSV056	8/30/2013	<1.6	<1.2	<5.9	<0.38	--
RES018	1	CS	Crawlspace	CSA005	8/28/2013	<0.16	<0.12	<0.61	<0.039	--
RES018	1	IA	1st Floor Master Bedroom	IA036	8/28/2013	<0.19	<0.14	<0.70	<0.045	--
RES018	1	IA	1st Floor Bedroom	IA037	8/28/2013	<0.18	<0.13	<0.66	<0.043	--
RES018	1	IA	1st Floor TV Room/Dining Room	IA038	8/28/2013	<0.19	<0.14	<0.71	<0.046	--
RES018	1	AA	Outside	AA016	8/28/2013	<0.17	<0.12	<0.61	<0.040	--
Foundation: Crawlspace										
RES005	1	CS	Crawlspace	CSA002	8/5/2013	<0.20	<0.14	<0.72	<0.047	<0.048
RES005	1	IA	1st Floor TV Room	IA023	8/5/2013	<0.18	<0.13	<0.67	<0.043	<0.048
RES005	1	IA	1st Floor Bedroom	IA024	8/5/2013	<0.20	<0.14	<0.72	<0.043	<0.048
RES005	1	IA	2nd Floor Master Bedroom	IA025	8/5/2013	<0.19	<0.14	<0.69	<0.045	<0.048
RES005	1	AA	Outside	AA011	8/5/2013	<0.19	<0.14	<0.71	<0.046	--
RES009	1	CS	Crawlspace	CSA008	9/25/2013	<0.17	<0.13	<0.63	<0.041	<0.052
RES009	1	IA	1st Floor TV Room	IA049	9/25/2013	<0.17	<0.12	<0.62	<0.040	<0.052
RES009	1	IA	1st Floor Bedroom	IA050	9/25/2013	<0.19	<0.14	<0.70	<0.045	<0.052
RES009	1	IA	1st Floor Bedroom	IA051	9/25/2013	<0.17	<0.13	<0.64	<0.041	<0.052
RES009	1	AA	Outside	AA021	9/25/2013	<0.17	<0.12	<0.62	<0.040	--
RES011	1	CS	Crawlspace	CSA001	7/29/2013	<0.18	<0.13	<0.67	<0.043	--
RES011	1	IA	Garage Sump	IA017	7/29/2013	<0.18	<0.13	<0.67	<0.043	--
RES011	1	IA	1st Floor Master Bedroom	IA018	7/31/2013	<0.16	<0.12	<0.59	<0.038	--
RES011	1	IA	1st Floor TV Room	IA019	7/31/2013	**0.30**	<0.15	<0.77	<0.050	--
RES011	1	AA	Outside	AA008	7/29/2013	<0.16	<0.12	<0.61	<0.039	--
RES011	1	AA	Outside	AA010	7/31/2013	<0.17	<0.13	<0.63	<0.041	--
RES011	2	CS	Crawlspace	CSA010	2/3/2014	<0.14	<0.10	<0.53	<0.034	--
RES011	2	IA	Garage Sump	IA063	2/3/2014	<0.15	<0.11	<0.57	<0.036	--
RES011	2	IA	1st Floor Master Bedroom	IA064	2/3/2014	<0.17	<0.13	<0.63	<0.041	--
RES011	2	IA	1st Floor TV Room	IA065	2/3/2014	<0.18	<0.13	<0.66	<0.042	--
RES011	2	AA	Outside	AA027	2/3/2014	<0.15	<0.11	<0.55	<0.036	--
RES015	1	CS	Crawlspace	CSA006	9/11/2013	<0.17	<0.12	<0.63	<0.040	--
RES015	1	IA	1st Floor TV Room	IA039	9/11/2013	<0.19	<0.14	<0.70	<0.045	--
RES015	1	IA	1st Floor Bedroom	IA040	9/11/2013	<0.18	<0.14	<0.68	<0.044	--
RES015	1	IA	1st Floor Bedroom	IA041	9/11/2013	<0.17	<0.12	<0.63	<0.040	--
RES015	1	IA	1st Floor Bedroom	IA042	9/11/2013	<0.18	<0.13	<0.65	<0.042	--
RES015	1	AA	Outside	AA017	9/11/2013	<0.14	<0.11	<0.54	<0.034	--
RES016	1	CS	Crawlspace	CSA004	8/22/2013	<0.18	<0.13	<0.66	<0.042	--
RES016	1	IA	1st Floor TV Room	IA034	8/22/2013	<0.18	<0.13	<0.67	<0.043	--
RES016	1	IA	1st Floor Bedroom	IA035	8/22/2013	<0.18	<0.14	<0.68	<0.044	--
RES016	1	AA	Outside	AA015	8/22/2013	<0.21	<0.16	<0.78	<0.050	--
RES016	2	CS	Crawlspace	CSA012	3/25/2014	<0.16	<0.12	<0.59	<0.038	--
RES016	2	IA	1st Floor TV Room	IA070	3/25/2014	<0.17	<0.12	<0.63	<0.040	--
RES016	2	IA	1st Floor Bedroom	IA071	3/25/2014	<0.18	<0.14	<0.68	<0.044	--
RES016	2	AA	Outside	AA030	3/25/2014	<0.19	<0.14	<0.69	<0.045	--
Foundation: Slab-On-Grade and Basement										
RES010	1	SSV	Basement Storage Room	SSV060	10/17/2013	<0.33	<0.24	<1.2	<0.078	--
RES010	1	BM	Basement	IA052	9/30/2013	<0.17	<0.13	<0.63	<0.041	--
RES010	1	IA	2nd Floor Master Bedroom	IA053	9/30/2013	**1.2 (e)**	<0.12	<0.60	<0.039	--
RES010	1	IA	2nd Floor Bedroom	IA054	9/30/2013	<0.17	<0.13	<0.63	<0.041	--
RES010	1	AA	Outside	AA023	9/30/2013	<0.18	<0.13	<0.65	<0.042	--
RES010	1	SSV	Basement Storage Room	SSV061	10/30/2013	<0.16	<0.12	<0.59	<0.038	--

Table 10-12
Residential Air Results
Boeing Auburn Remedial Investigation
Auburn, Washington

Residence ID Number	Residence ID Number	Sample Type	Location Description	Sample Location	Sample Date (a)	TCE (µg/m^3)	cDCE (µg/m^3)	tDCE (µg/m^3)	VC (µg/m^3)	Radiello TCE (µg/m^3)
				Indoor Air Screening Level (b)		0.37	--	27	0.28	0.37
				Soil Gas Screening Level (b)		12	--	907	9.5	12
RES010	1	BM	Basement	IA056	10/29/2013	<0.17	<0.13	<0.63	<0.041	--
RES010	1	BM	Basement	IA057	10/29/2013	<0.16	<0.12	<0.6	<0.039	--
RES010	1	IA	2nd Floor Master Bedroom	IA058	10/29/2013	<0.18	<0.13	<0.65	<0.042	--
RES010	1	IA	2nd Floor Bedroom	IA059	10/29/2013	<0.19	<0.14	<0.71	<0.046	--
RES010	1	AA	Outside	AA024	10/29/2013	<0.15	<0.11	<0.56	<0.036	--
RES019	1	IA	Basement Bedroom	IA020	7/31/2013	<0.18	<0.13	<0.67	<0.043	--
RES019	1	IA	Basement Computer Room	IA021	7/31/2013	<0.18	<0.13	<0.65	<0.042	--
RES019	1	IA	Basement Sewer Pipe Access	IA022	7/31/2013	<0.18	<0.13	<0.66	<0.042	--
RES019	1	AA	Outside	AA009	7/31/2013	<0.18	<0.13	<0.65	<0.042	--
RES019	2	IA	Basement Bedroom	IA068	2/20/2014	0.17 J (f)	<0.13	<0.64	<0.041	--
RES019	2	IA	Basement Computer Room	IA066	2/20/2014	<0.18	<0.14	<0.68	<0.044	--
RES019	2	IA	Basement Sewer Pipe Access	IA067	2/20/2014	<0.17	<0.13	<0.63	<0.041	--
RES019	2	AA	Outside	AA028	2/20/2014	<0.15	<0.11	<0.57	<0.036	--

Notes:

1. **Bold** text indicates detected analyte.
2. Green shading indicates exceedance of screening level.
3. Phase I (summer sampling) of the residential vapor intrusion (VI) assessment began in summer 2013 and concluded in early fall of 2013. Phase II (winter sampling) of the residential VI assessment began in the first quarter of 2014 and concluded in early spring of 2014.

(a) Sample Date is the date samples were set up. The Summa canister sample period is 24 hours long, the Radiello sample period is 21 days long, and the sub-slab vapor sample period is approximately 30 minutes long.

(b) The MTCA Method B air cleanup level and soil gas screening level protective of MTCA Method B Air cleanup levels were selected. The lower (i.e., more restrictive) value of carcinogenic and non-carcinogenic are shown.

(c) If a constituent is detected in ambient air, the contribution of VI to indoor air concentrations is determined by subtracting the ambient air from the indoor air concentration(s). If the constituent is detected in ambient air at a higher concentration than in indoor air, the corrected value is a negative number and, therefore, is adjusted to zero. Detected concentrations of TCE in ambient air at RES023 was greater than all indoor air samples collected at RES023.

(d) The Summa canister that collected this sample malfunctioned. With approval from Ecology, the sample was recollected.

(e) TCE detection indoor air at RES010 was from a sample collected from the 2nd floor master bedroom; however, samples collected from the basement directly below were non-detect; therefore, the TCE detected was from a background source inside the home.

(f) This concentration was marked as an estimate by the laboratory. The estimated concentration is at or below the typical reporting limit and, therefore, is treated as a non-detect.

Abbreviations/Acronyms:

-- = Not applicable.
AA = ambient air
BM = basement
cDCE = cis-1,2-dichloroethene
CS = crawlspace
IA = indoor air
J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
µg/m3 = micrograms per cubic meter
NR = not reported
SSV = sub-slab vapor
TCE = trichloroethene
tDCE = trans-1,2-dichloroethene
VC = vinyl chloride