

## TECHNICAL MEMORANDUM

TO: Robert Williams, Oregon Department of Environmental Quality  
FROM: Christine Kimmel, L.G. <sup>CBK</sup>  
cc: Cindy Bartlett, R.G., Geosyntec Consultants  
DATE: July 21, 2015  
RE: **2015 MONITORING AND CONTINGENCY PLAN FOR PWB PUMPING EVENTS**

This technical memorandum has been prepared on behalf of The Boeing Company (Boeing) and Cascade Corporation (Cascade) for the Troutdale Sandstone Aquifer (TSA) Remedial Action, implemented under the Oregon Department of Environmental Quality's (DEQ's) Consent Order No. WMCSR-NWR-96-08 (DEQ 1997). This plan presents proposed changes to contingency groundwater monitoring during periods of groundwater pumping by the Portland Water Bureau (PWB) at the nearby Columbia South Shore Well Field. The PWB-operated well field wells located in the direct vicinity of the East Multnomah County remedy area are shown on Figure 1.

Contingency plan monitoring requirements for dissolved volatile organic compound (VOC) plume hydraulic control and well field protection were presented in the DEQ's Record of Decision (DEQ 1996) and the Consent Order for the TSA Remedial Action. The approved contingency monitoring plan was presented in the *Revised System Optimization and Performance Evaluation Plan* (Revised SOPEP; Landau Associates, Prowell Environmental, and Pegasus Geoscience 1998). The plan has been updated twice due to remedy progress:

- *Monitoring and Contingency Plan for PWB Pumping Events, TSA Remedy, East Multnomah County, Oregon* (Prowell Environmental and Landau Associates 2009).
- *2012 Monitoring and Contingency Plan for PWB Pumping Events, TSA Remedy, East Multnomah County, Oregon* (Prowell Environmental 2012).

Based on continued restoration progress and decreasing plume size, further proposed changes to the current contingency plan monitoring are presented in this technical memorandum.

### OBJECTIVES AND APPROACH

The objective of the contingency plan monitoring is to monitor plume control and remedy restoration progress during periods of both non-pumping and active pumping of the PWB well field. Under the current contingency plan (Prowell 2012), monitoring is implemented when the PWB operates production wells in the TSA, the Sand and Gravel Aquifer (SGA), and/or the Blue Lake Aquifer (BLA) for more than 30 days. Monitoring activities include water level measurements (manual and/or continuous) and groundwater chemical analysis from selected monitoring wells within the aquifers where

current remedy activities are being conducted. Generated data will be utilized to evaluate TSA remedy response to PWB pumping events.

## **RESPONSE MONITORING**

Under the 2012 contingency plan, selected monitoring wells for groundwater monitoring and chemical analysis included wells from the Upper and Lower TSA and from the SGA. Monitoring procedures were established for two different scenarios, pumping events lasting longer than 30 days (but less than 90 days) and pumping events lasting longer than 90 days. Trichloroethene (TCE) will continue to be utilized as the benchmark compound for the dissolved VOC plume. Below is a summary of the contingency monitoring for each scenario:

For PWB pumping events longer than 30 days, but less than 90 days, the contingency monitoring program will continue to include the following:

- Continuous water-level measurements at selected wells using dedicated electronic data logging equipment
- Groundwater chemical analysis at selected wells within 30 days of pumping start-up
- Groundwater chemical analysis at selected wells within 30 days of pumping cessation.

For PWB pumping events longer than 90 days, the monitoring program will continue to include the following:

- Manual water-level measurements at all remedy wells within one week of the end of pumping
- Continuous water-level measurements at selected wells using dedicated electronic data logging equipment
- Groundwater chemical analysis at selected wells (same set of wells as the pumping scenario discussed above):
  - within 30 days of pumping start-up 90 days from pumping start-up
  - every subsequent 90 days until pumping ends
  - within 30 days of pumping cessation.

## **PROPOSED MONITORING CHANGES**

Water-level monitoring and chemical analysis will continue in the Upper and Lower TSA Aquifer. Groundwater restoration has been completed in the SGA and the three SGA wells [BOP-44(usg), EMC-2(usg), and PWB-1(usg)] are potentially utilized for water level monitoring during PWB pumping scenarios (DEQ 2014). Based on continued restoration progress and decreasing dissolved VOC plume size, the following changes to the monitoring plan are proposed:

- Selected wells will be located closer to the current, smaller extent of the plume.
- **Upper TSA:** We propose to remove Upper TSA wells BOP-70(ds) and BOP-71(ds) from the PWB monitoring program and utilize wells located closer to the current extent of the plume. Instead, groundwater chemical analysis and water level monitoring will be conducted at wells BOP-20(ds), BOP-21(ds), and BOP-22R(ds). Monitoring well BOP-44(ds) is located farther

from the plume; therefore, only water level monitoring data will be collected at this location. The Upper TSA contingency monitoring wells are shown on Figure 2.

- **Lower TSA:** Groundwater monitoring wells BOP-20(dg), BOP-23(dg), BOP-60(dg), and MW-36(dg) will be selected for water-level monitoring and chemical analysis. Wells BOP-44(dg) and EMC-2(dg) are located farther north from the current extent of the plume; however, continuous water level data at these locations will be utilized to monitor the aquifer response to PWB pumping activities. The Lower TSA contingency monitoring locations are shown on Figure 3.
- **SGA:** Groundwater monitoring well BOP-44(usg) will be selected for water-level monitoring, as shown on Figure 4. Groundwater monitoring wells EMC-2(usg) and PWB-1(usg) will no longer be monitored.
- **BLA:** No contingency monitoring if PWB pumping is in the BLA only.

## RESPONSE REPORTING

Groundwater level data collected during pumping events will be used to evaluate the hydraulic effects of the PWB pumping on the Upper and Lower TSA and SGA. Groundwater chemical analysis will be used to determine if plume contaminants in the Upper and Lower TSA migrate away from the remedy area due to PWB pumping. The selected contingency plan wells will use a “threshold” TCE value of 5 micrograms per liter ( $\mu\text{g/L}$ ; cleanup level) to trigger the collection of a verification sample. If the verification sample results indicate TCE concentrations equal to or greater than  $5\mu\text{g/L}$ , the threshold will be considered as confirmed and contingency action consultation will be held with DEQ and the PWB to evaluate if further actions are required.

Upon PWB pumping cessation, a letter summarizing the water level response and analytical results will be submitted to both DEQ and PWB.

## REFERENCES

DEQ. 2014. E-mail message from Robert Williams, Oregon Department of Environmental Quality, to Cindy Bartlett, Geosyntec; Chris Kimmel, Landau Associates, Inc; Ken Chaput, The Boeing Company; Charles Andrews, SSPA; and John Cushing, Cascade Corporation. Re: *TSA Semi-Annual Performance Report for Spring 2014*. November 6.

DEQ. 1997. *DEQ Order on Consent No. WMCSR-NWR-96-08 In the Matter of The Boeing Company and Cascade Corporation*. Oregon Department of Environmental Quality. February 14.

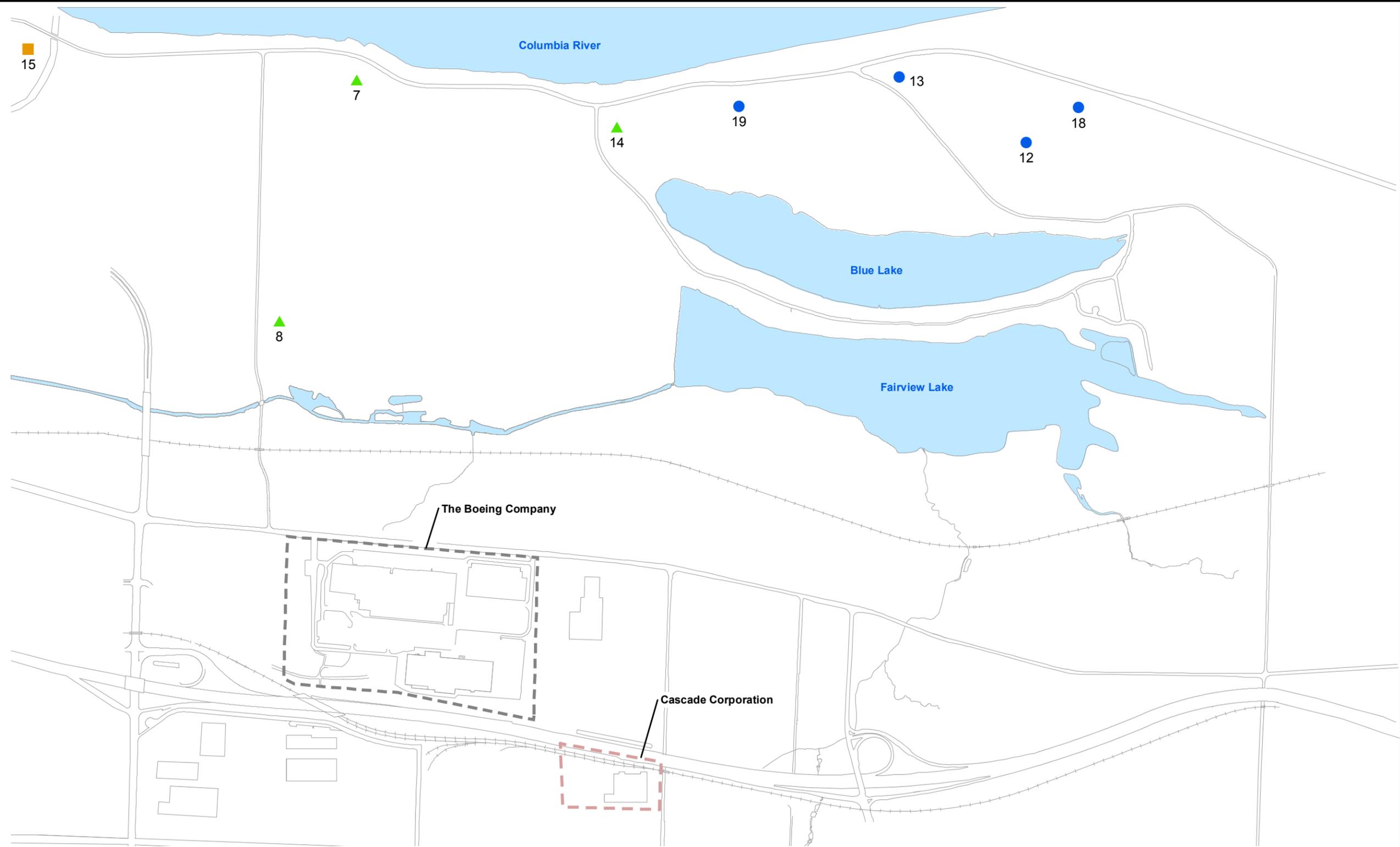
DEQ. 1996. *DEQ Remedial Action Record of Decision for the East Multnomah County Groundwater Contamination Site, Troutdale Sandstone Aquifer*. Oregon Department of Environmental Quality. December 31.

Landau Associates, Prowell Environmental, and Pegasus Geoscience. 1998. *Revised System Optimization and Performance Evaluation Plan, Troutdale Sandstone Aquifer, East Multnomah County, Oregon*. Prepared for The Boeing Company. March 31.

Prowell Environmental and Landau Associates. 2009. *Monitoring and Contingency Plan for PWB Pumping Events, TSA Remedy, East Multnomah County, Oregon*. July 2.

Prowell Environmental. 2012. *2012 Monitoring and Contingency Plan for PWB Pumping Events, TSA Remedy, East Multnomah County, Oregon*. July 26.

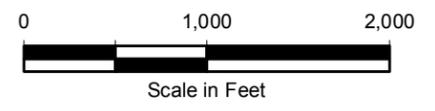
G:\Projects\0251161615680\F01\_PWBProductionWellLocations.mxd 7/9/2015 NAD\_1983\_HARN\_StatePlane\_Oregon\_North\_FIPS\_3601



**Legend**

- PWB BLA Production Well
- ▲ PWB SGA Production Well
- PWB TSA Production Well
- Boeing Property Boundary
- Cascade Corporation Property Boundary

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

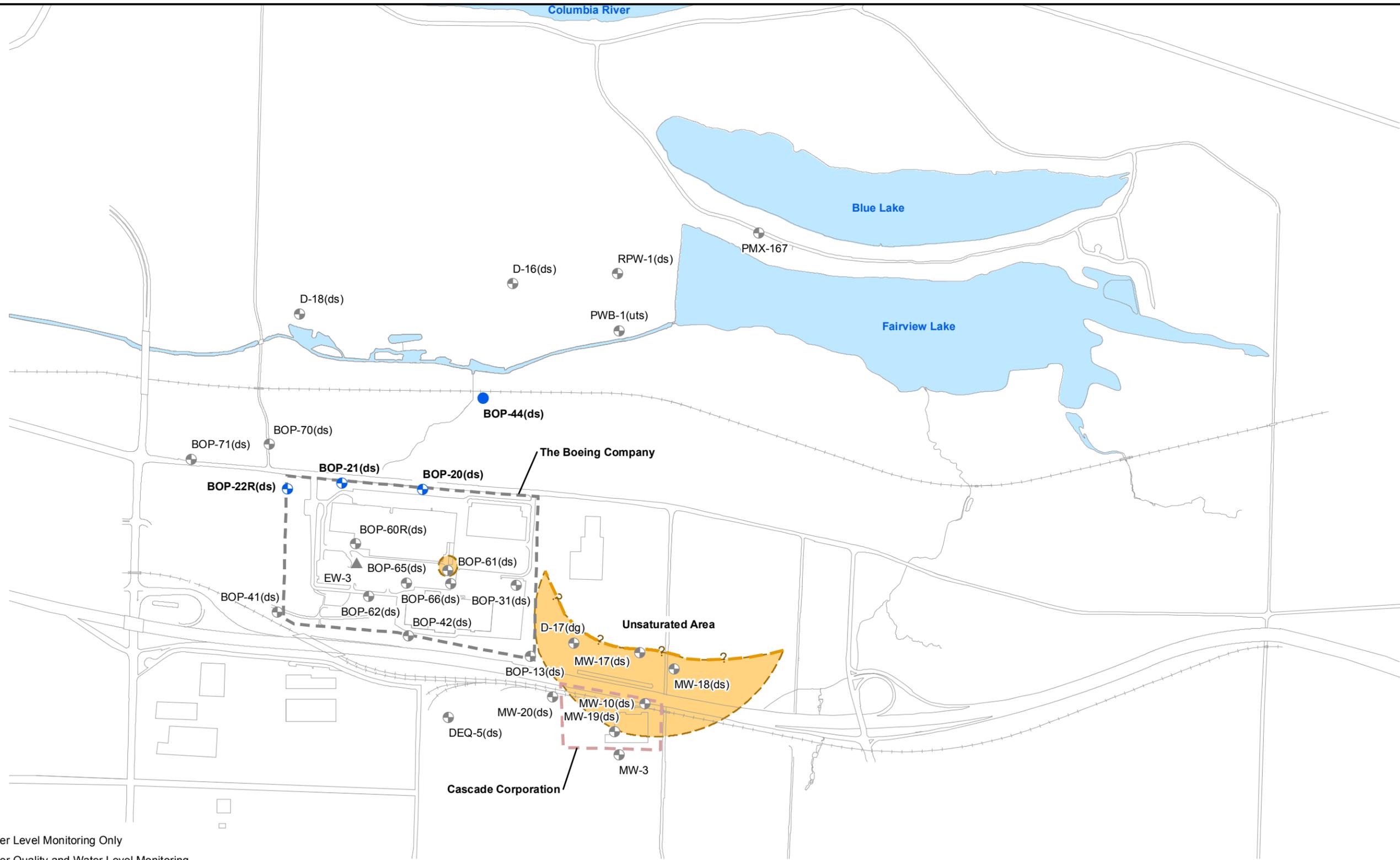


East Multnomah County  
 Cleanup Project

**PWB Production Well Locations**

Figure  
**1**

G:\Projects\025116615\680\F02\_UpperTSAMonitoringLocations.mxd 7/14/2015 NAD\_1983\_HARN\_StatePlane\_Oregon\_North FIPS 3601

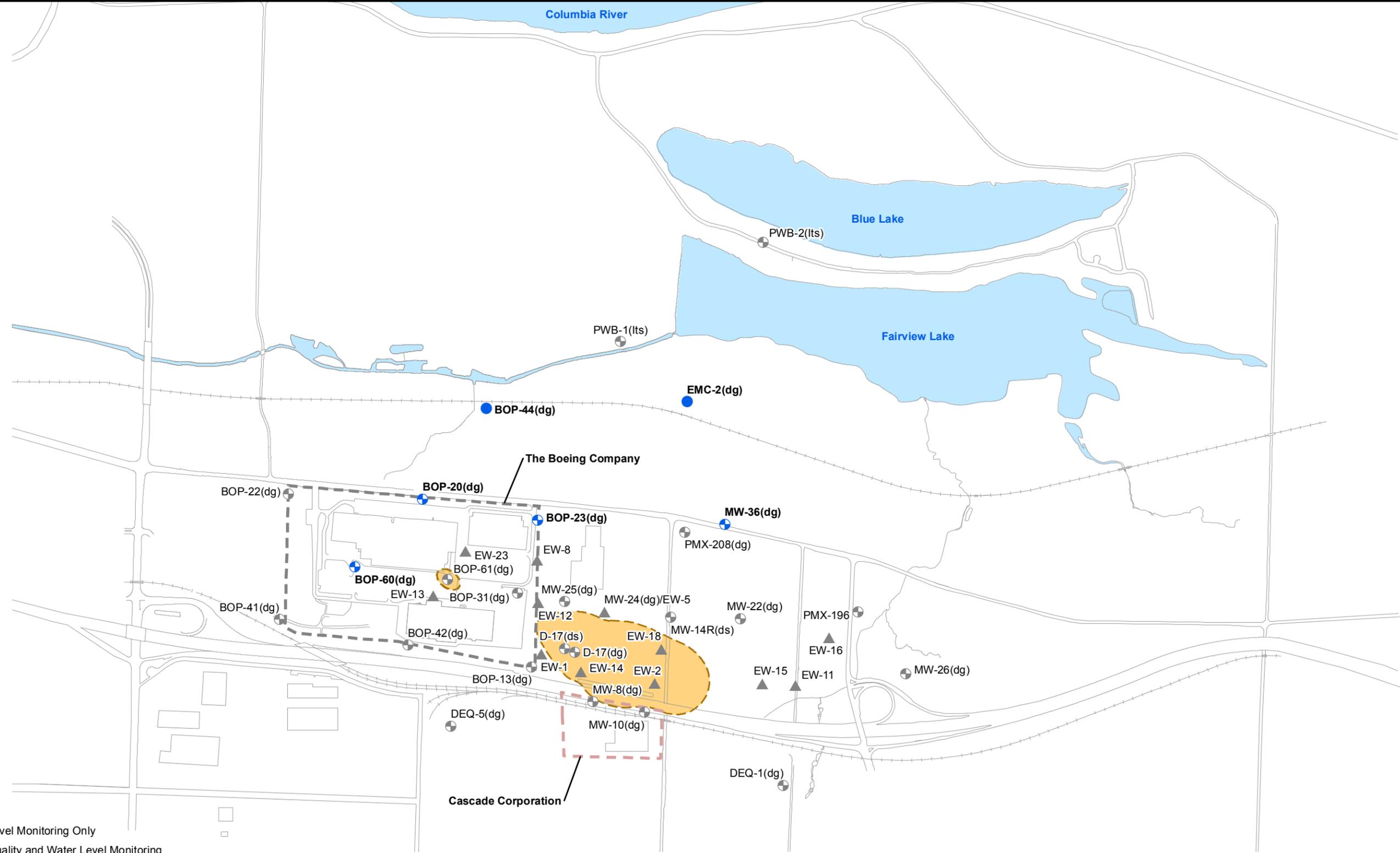


- Legend**
- Water Level Monitoring Only
  - ⊕ Water Quality and Water Level Monitoring
  - ⊕ Upper TSA Monitoring Locations
  - ▲ Extraction Well Location
  - Boeing Property Boundary
  - Cascade Corporation Property Boundary
  - August 2014 TCE Plume

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



G:\Projects\025116161\516680\F03 LowerTSAMonitoringLocations.mxd 7/9/2015 NAD 1983 HARN StatePlane Oregon North FIPS 3601

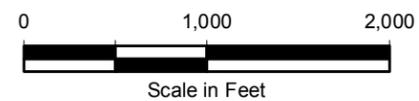


**Legend**

- Water Level Monitoring Only
- Water Quality and Water Level Monitoring
- Lower TSA Monitoring Locations
- Extraction Well Location
- Boeing Property Boundary
- Cascade Corporation Property Boundary
- August 2014 TCE Plume

**Notes**

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



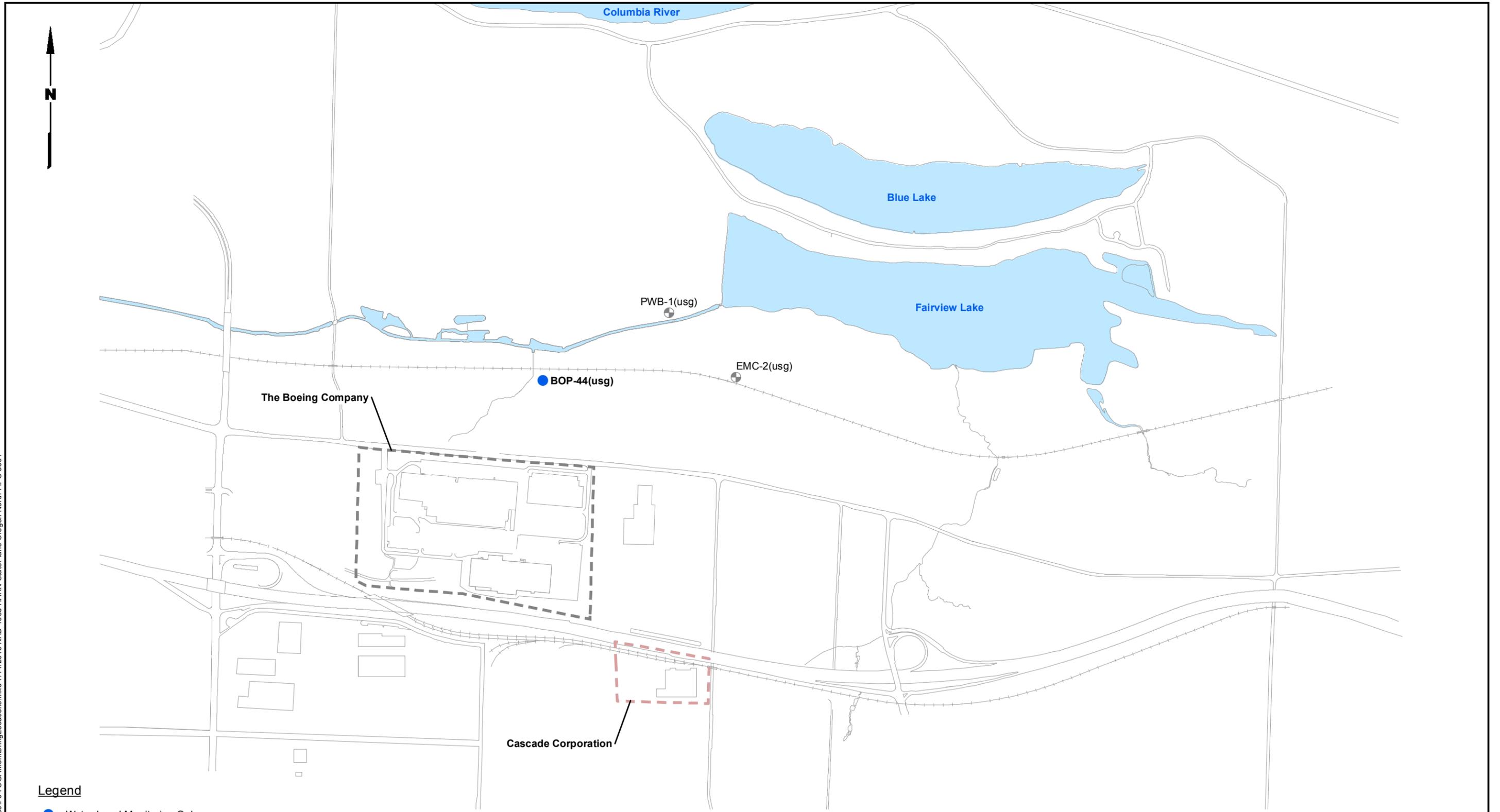
East Multnomah County  
Cleanup Project

**Lower TSA Monitoring Locations**

Figure  
**3**



G:\Projects\025116615\680\F04\_SGAMonitoringLocations.mxd 7/14/2015 NAD 1983 HARN StatePlane Oregon North FIPS 3601



**Legend**

- Water Level Monitoring Only
- SGA Monitoring Locations
- Boeing Property Boundary
- Cascade Corporation Property Boundary

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

