

# Technical Memorandum

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**TO:** Steve Teel, LHG, Washington State Department of Ecology  
**CC:** John Felder, PE, Washington State Department of Natural Resources  
**FROM:** Sierra Mott and Eric Weber, LHG, CWRE  
**DATE:** November 9, 2017  
**RE:** **September 2017 Groundwater Monitoring Results  
Webster Nursery Site, Site ID 3380  
Tumwater, Washington  
LAI Project No. 0774006.031.031**

## Introduction

On behalf of Washington State Department of Natural Resources (DNR), Landau Associates, Inc. (LAI) is providing September 2017 groundwater monitoring results at DNR's Webster Nursery former pesticide storage warehouse (site). The site is associated with past releases of organochlorine pesticides to soil and groundwater. The constituents of concern at the site include the organochlorine pesticides heptachlor epoxide (HE; daughter product of heptachlor) and chlordane. Groundwater at the site was most recently sampled on September 2014 (LAI 2014). The site location is shown on Figure 1.

## Groundwater Monitoring Summary

Groundwater monitoring was completed by LAI on September 26, 2017. The six groundwater monitoring wells sampled include SW-9, SW-10, SW-11, SW-14, SW-15 and SW-16. Groundwater monitoring framework was established under an Agreed Order (No. DE 00TCP-SR295) dated January 8, 2001) with the Washington State Department of Ecology (Ecology). The scope of groundwater monitoring has changed since approval of the Agreed Order, specifically:

- Historically, monitored natural attenuation (MNA) parameters were collected at four of the six wells. DNR is no longer considering MNA as a long-term cleanup remedy at the site; therefore, MNA data collection was removed from the sampling program (Teel 2015).
- The monitoring frequency was adjusted from semi-annually (wet season and dry season) to annually (dry season). Historically, contaminant concentrations have shown consistent seasonality (Teel 2015).
- In order to meet stricter cleanup criteria for organochlorine pesticides<sup>1</sup>, analysis by a lower level method is required (LAI 2017). All samples for this 2017 sampling event were analyzed for organochlorine pesticides using US Environmental Protection Agency Method 8081A low-level at Analytical Resources, Inc. (ARI) located in Tukwila, Washington. Samples collected prior to 2017 were not sampled with the low-level method.

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<sup>1</sup> This will be finalized in the remedial action work plan (RAWP).

All groundwater samples were collected with a peristaltic pump and dedicated tubing using low-flow groundwater sampling techniques. Low-flow groundwater monitoring consists of measuring the depth to water with an electronic groundwater level indicator, monitoring field parameters using a YSI 554 multi-parameter probe, and measuring turbidity with a handheld meter. One duplicate sample (SW-99 at SW-9) and one matrix spike/matrix spike duplicate (at SW-15) were collected for quality control purposes.

In addition to collecting groundwater analytical samples at the six wells listed above, an additional three wells (SW-1, SW-12, and SW-13) were measured for depth to water. Groundwater elevation data were used to determine groundwater flow direction; further discussion is in the next section. The groundwater monitoring network is shown on Figure 2.

## Groundwater Monitoring Results

No organochlorine pesticides were detected above the laboratory-reporting limit at four (SW-9, SW-14, SW-15, and SW-16) of the six wells. HE and chlordane were detected at SW-10 and SW-11; consistent with past results. September 2017 organochlorine pesticide data are presented in Table 1 and the laboratory data package is provided in Attachment 1.

HE was detected at SW-10 and SW-11 at concentrations of 0.467 micrograms per liter ( $\mu\text{g/L}$ ) and 2.34  $\mu\text{g/L}$ , respectively. These concentrations exceed the Model Toxics Control Act (MTCA) Method B cleanup level of 0.00481  $\mu\text{g/L}$ . Time series of recent HE groundwater concentrations (dating back to January 2010) are presented on Figure 3.

Cis- and trans- chlordane (formerly referred to as alpha and gamma-chlordane) were detected above the laboratory-reporting limit at SW-10 and SW-11. The reported concentrations of cis-chlordane were 0.0280  $\mu\text{g/L}$  at SW-10 and 0.0670  $\mu\text{g/L}$  at SW-11. The concentrations of trans-chlordane were 0.0838  $\mu\text{g/L}$  at SW-10 and 0.207  $\mu\text{g/L}$  at SW-11. There are no MTCA Method B cleanup levels for cis- or trans-chlordane.

Groundwater elevations in September 2017 were similar to previous elevations measured in September 2014. Depth to groundwater ranged from 9.51 to 12.63 feet below top of PVC casing. Regionally, groundwater flow is likely to the south toward Salmon Creek<sup>2</sup>. Locally, groundwater flow elevation is more variable and is likely influenced by factors including runoff, infiltration, and possibly buried utilities. Depth to water and groundwater elevations data is presented in Table 2. Groundwater elevation contours are shown on Figure 2.

## Environmental Information Management Submittal

An Environmental Information Management submittal is required. This submittal will be completed in November 2017 after the transmittal of this technical memorandum to Ecology.

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<sup>2</sup> The location of Salmon Creek is shown on Figure 1.

LANDAU ASSOCIATES, INC.



Sierra Mott  
Project Scientist



Eric Weber, LHG, CWRE  
Principal

SMM/EFW/jrc  
[Y:\774\006.031\R\2017 GW MONITORING\_TM.DOCX]

## References

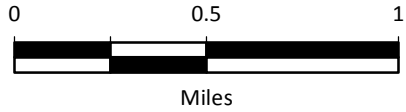
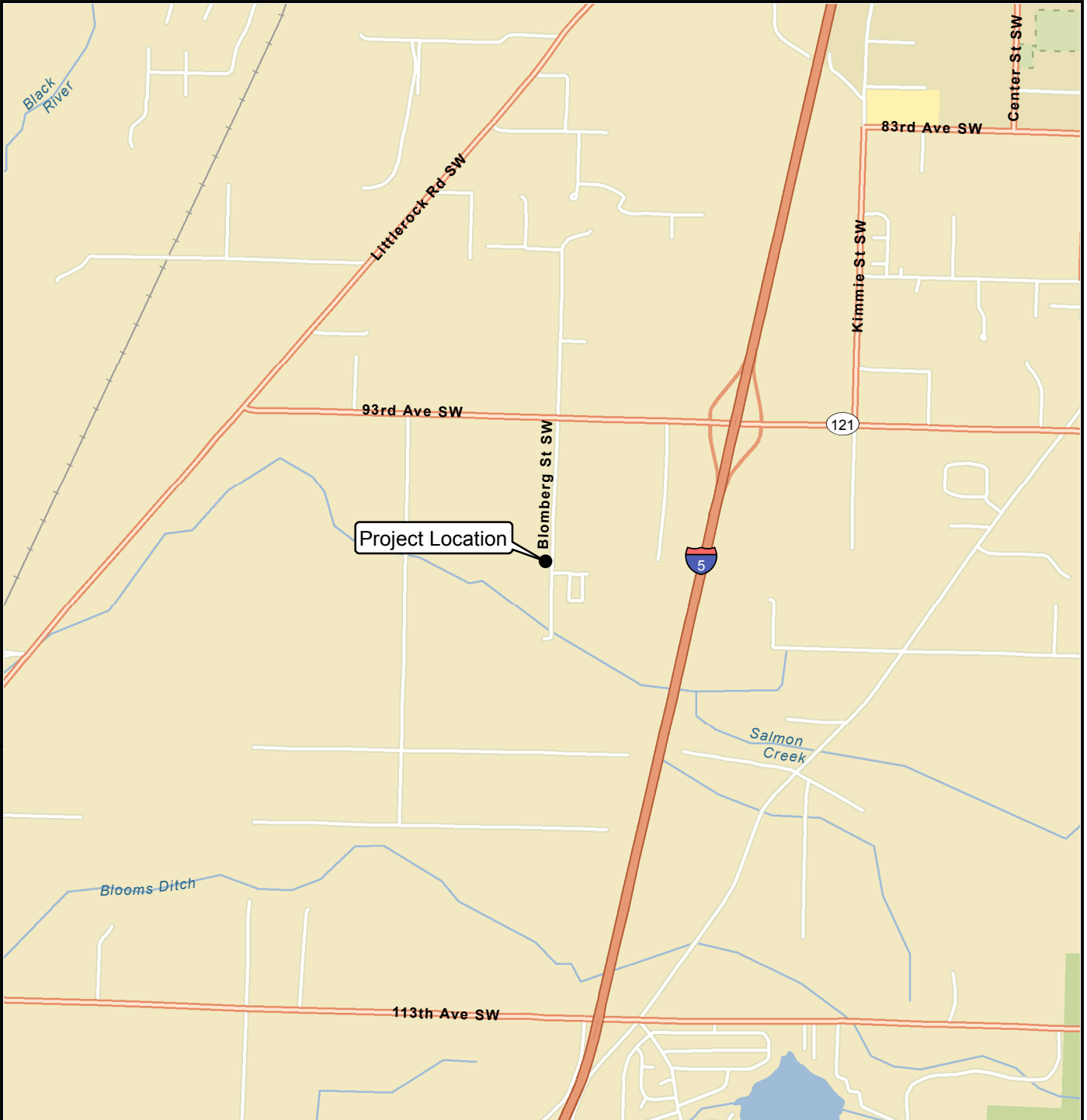
- LAI. 2014. Memorandum: September 2014 Semiannual Groundwater Monitoring Webster Nursery Site, Site ID 3380, Tumwater, Washington. From Eric Weber, Landau Associates, Inc., to Steve Teel, Washington State Department of Ecology. December 5.
- LAI. 2017. Remedial Action Work Plan, Webster Nursery, 9805 Blomberg Street SW, Tumwater, Washington. Landau Associates, Inc. October 31.
- Teel, S. 2015. "Re: Webster Nursery Change to Annual Monitoring." Steve Teel, Cleanup Project Manager/Hydrogeologist, Washington State Department of Ecology. February 6.

Attachments: Figure 1: Vicinity Map  
Figure 2: Monitoring Well Network and September 2017 Groundwater Elevation Contours  
Figure 3: Heptachlor Epoxide Time Series Concentrations for SW-10 and SW-11

Table 1: Groundwater Analytical Results  
Table 2: Groundwater Level Measurements

Attachment 1: September 2017 Laboratory Data Package

G:\Projects\774\006\020\026\FIS\F01\_VicinityMap.mxd 5/16/2016 NAD 1983 StatePlane Washington North FIPS 4601 Feet



Data Source: Esri 2012

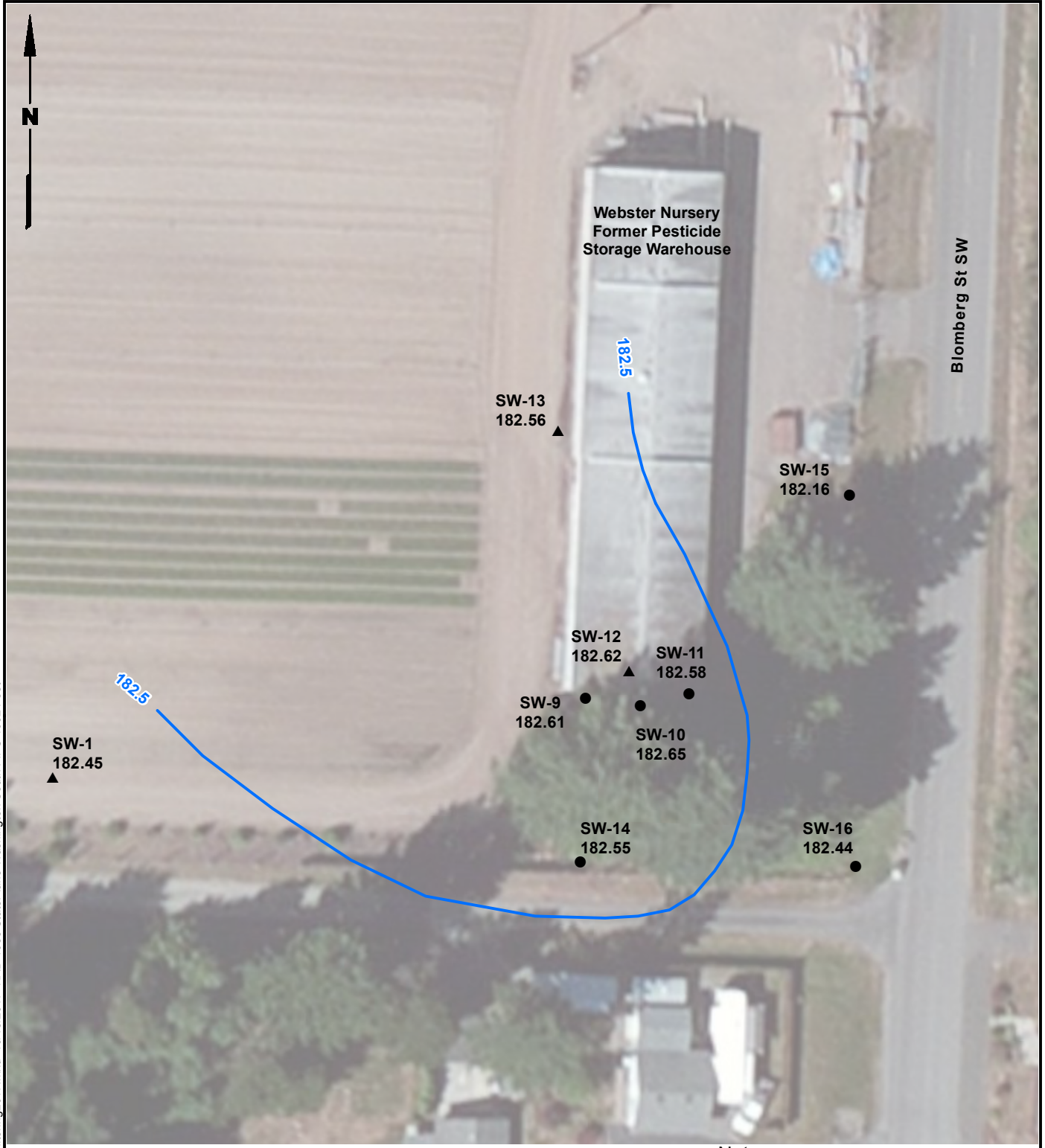


Webster Nursery Site  
Tumwater, Washington

Vicinity Map

Figure  
**1**

G:\Projects\774\006\031\031\F02GWMonitoring2017.mxd 10/18/2017 NAD 1983 StatePlane Washington South FIPS 4602 Feet

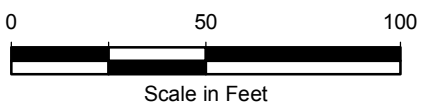


**Legend**

- Pesticide Monitoring Well
- ▲ Other Monitoring Well
- Tax Parcels
- Groundwater Contour

**Notes**

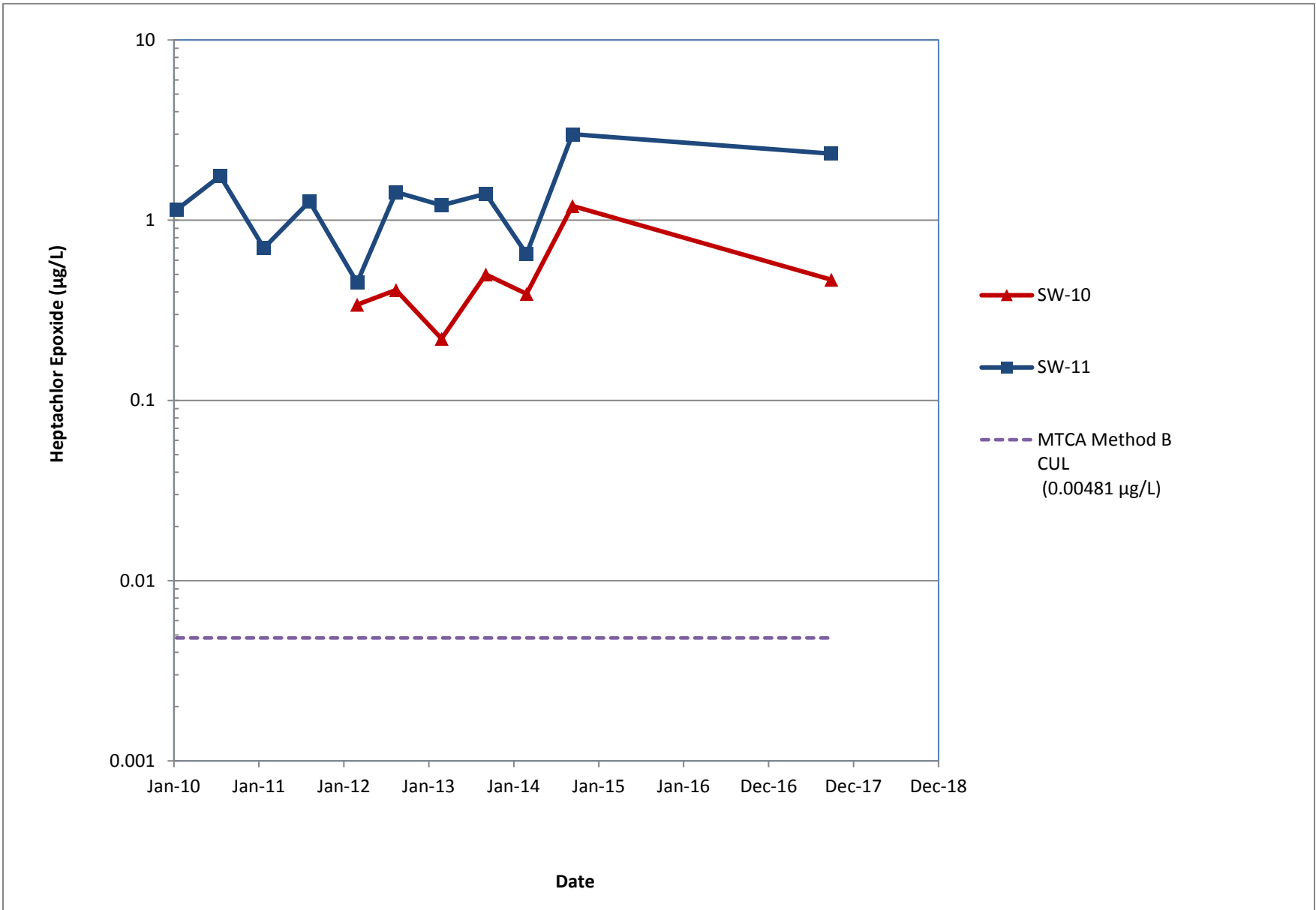
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Data Sources: Thurston County GIS; Esri World Imagery.



<p>Webster Nursery Site Tumwater, Washington</p>	<p><b>Monitoring Well Network and September 2017 Groundwater Elevation Contours</b></p>	<p>Figure <b>2</b></p>
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Webster Nursery Site  
Tumwater, Washington

**Heptachlor Epoxide Time Series  
Concentrations for SW-10 and SW-11**

Figure  
**3**

**Table 1**  
**Groundwater Analytical Results**  
**Webster Nursery**  
**Tumwater, Washington**

Analyte	MTCA Method B Cleanup Levels	Sample Location, Sample ID, Laboratory SDG, Sample Date, and Sample Type						
		SW-9	SW-9	SW-10	SW-11	SW-14	SW-15	SW-16
		SW-9-20170926 1710390 9/26/2017 N	SW-99-20170926 1710390 9/26/2017 FD	SW-10-20170926 1710390 9/26/2017 N	SW-11-20170926 1710390 9/26/2017 N	SW-14-20170926 1710390 9/26/2017 N	SW-15-20170926 1710390 9/26/2017 N	SW-16-20170926 1710390 9/26/2017 N
<b>Pesticides (ug/L; SW-846 8081B)</b>								
alpha-BHC	--	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U
beta-BHC	--	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U
gamma-BHC	--	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U
delta-BHC	--	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U
Heptachlor	0.0194	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U
Aldrin	--	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U
Heptachlor Epoxide	0.00481	0.000313 U	0.000313 U	<b>0.467</b>	<b>2.34</b>	0.000313 U	0.000313 U	0.000313 U
cis-Chlordane (alpha)	--	0.000313 U	0.000313 U	<b>0.0280</b>	<b>0.0670</b>	0.000313 U	0.000313 U	0.000313 U
trans-Chlordane (beta) (a)	--	0.000313 U	0.000313 U	<b>0.0838</b>	<b>0.207</b>	0.000313 U	0.000313 U	0.000313 U
Endosulfan I	--	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U	0.000313 U
4,4'-DDE	--	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U
Dieldrin	--	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U
Endrin	--	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U
Endosulfan II	--	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U
4,4'-DDD	--	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U
Endrin Aldehyde	--	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U
4,4'-DDT	--	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U
Endosulfan Sulfate	--	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U
Endrin Ketone	--	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U	0.000625 U
Methoxychlor	--	0.00313 U	0.00313 U	0.00313 U	0.00313 U	0.00313 U	0.00313 U	0.00313 U
Toxaphene	--	0.0625 U	0.0625 U	0.0625 U	0.0625 U	0.0625 U	0.0625 U	0.0625 U
Chlordane	0.25	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U

**Notes:**

- (a) Formerly reported as gamma.
- = Cleanup level is not applicable
- Bold text** indicates detected analyte.
- Green Box = detected concentration is greater than the preliminary action level.
- U = The compound was not detected at the reported concentration.

**Abbreviations:**

- FD = field duplicate
- µg/L = micrograms per liter
- MTCA = Model Toxics Control Act
- N = primary sample
- SDG = sample delivery group

**Table 2**  
**Groundwater Level Measurements**  
**Webster Nursery**  
**Tumwater, Washington**

<b>Well Identification</b>	<b>Top of PVC Elevation (a)</b>	<b>Depth to Water (b) (c)</b>	<b>Groundwater Elevation (a) (c)</b>
SW-1	193.38	10.93	182.45
SW-9	192.12	9.51	182.61
SW-10	193.37	10.72	182.65
SW-11	192.19	9.61	182.58
SW-12	192.9	10.28	182.62
SW-13	193.15	10.59	182.56
SW-14	193.08	10.53	182.55
SW-15	194.79	12.63	182.16
SW-16	194.79	12.35	182.44

**Notes:**

- (a) Measured in feet mean sea level.
- (b) Measured in feet.
- (c) Measured on September 26, 2017



# **September 2017 Laboratory Data Package**



16 October 2017

Sara Fees  
Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma, WA 98402

RE: Webster Nursery

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

<u>Associated Work Order(s)</u>	<u>Associated SDG ID(s)</u>
17I0390	N/A

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I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*







# Cooler Receipt Form

ARI Client: Landau Associates Project Name: 774006 Webster Nursery  
 COC No(s): \_\_\_\_\_ NA Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
 Assigned ARI Job No: 17I0390 Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO   
 Were custody papers included with the cooler? ..... YES  NO   
 Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO   
 Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 3.3  
 Time: 12:33  
 If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: \_\_\_\_\_  
 Cooler Accepted by: SF for BF Date: 9/27/17 Time: 10:35

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO   
 What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_  
 Was sufficient ice used (if appropriate)? ..... NA YES  NO   
 Were all bottles sealed in individual plastic bags? ..... YES  NO   
 Did all bottles arrive in good condition (unbroken)? ..... YES  NO   
 Were all bottle labels complete and legible? ..... YES  NO   
 Did the number of containers listed on COC match with the number of containers received? ..... YES  NO   
 Did all bottle labels and tags agree with custody papers? ..... YES  NO   
 Were all bottles used correct for the requested analyses? ..... YES  NO   
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...  NA YES  NO   
 Were all VOC vials free of air bubbles? .....  NA YES  NO   
 Was sufficient amount of sample sent in each bottle? ..... YES  NO   
 Date VOC Trip Blank was made at ARI.....  NA  
 Was Sample Split by ARI :  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_  
 Samples Logged by: SF Date: 9/27/17 Time: 12:53

**\*\* Notify Project Manager of discrepancies or concerns \*\***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: \_\_\_\_\_ Date: \_\_\_\_\_

<p>Small Air Bubbles = 2mm</p>	<p>Peabubbles 2-4 mm</p>	<p>LARGE Air Bubbles &gt; 4 mm</p>	Small → "sm" (< 2 mm) Peabubbles → "pb" (2 to < 4 mm) Large → "lg" (4 to < 6 mm) Headspace → "hs" (> 6 mm)
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Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SW-9-20170926	17I0390-01	Water	26-Sep-2017 09:40	27-Sep-2017 10:35
SW-99-20170926	17I0390-02	Water	26-Sep-2017 09:45	27-Sep-2017 10:35
SW-15-20170926	17I0390-03	Water	26-Sep-2017 11:30	27-Sep-2017 10:35
SW-16-20170926	17I0390-04	Water	26-Sep-2017 12:45	27-Sep-2017 10:35
SW-10-20170926	17I0390-05	Water	26-Sep-2017 14:55	27-Sep-2017 10:35
SW-11-20170926	17I0390-06	Water	26-Sep-2017 15:30	27-Sep-2017 10:35
SW-14-20170926	17I0390-07	Water	26-Sep-2017 16:15	27-Sep-2017 10:35



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

## Case Narrative

### Pesticides - EPA Method SW8081A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The LCS percent recoveries were within control limits.

The Matrix Spike/Matrix Spike duplicate recoveries and RPD were within limits.



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**SW-9-20170926**  
**17I0390-01 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B  
Instrument: ECD6

Sampled: 09/26/2017 09:40  
Analyzed: 11-Oct-2017 19:09

Sample Preparation: Preparation Method: EPA 3510C SepF  
Preparation Batch: BFI0723 Sample Size: 1000 mL  
Prepared: 02-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel  
Cleanup Batch: CFJ0067 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur  
Cleanup Batch: CFJ0066 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.000313	ND	ug/L	U
beta-BHC	319-85-7	1	0.000313	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.000313	ND	ug/L	U
delta-BHC	319-86-8	1	0.000313	ND	ug/L	U
Heptachlor	76-44-8	1	0.000313	ND	ug/L	U
Aldrin	309-00-2	1	0.000313	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.000313	ND	ug/L	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.000313	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.000313	ND	ug/L	U
Endosulfan I	959-98-8	1	0.000313	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.000625	ND	ug/L	U
Dieldrin	60-57-1	1	0.000625	ND	ug/L	U
Endrin	72-20-8	1	0.000625	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.000625	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.000625	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.000625	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.000625	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.000625	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.000625	ND	ug/L	U
Methoxychlor	72-43-5	1	0.00313	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.100	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	93.7	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	114	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	80.0	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	69.3	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**SW-99-20170926**  
**17I0390-02 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B  
Instrument: ECD6

Sampled: 09/26/2017 09:45  
Analyzed: 11-Oct-2017 19:27

Sample Preparation: Preparation Method: EPA 3510C SepF  
Preparation Batch: BFI0723 Sample Size: 1000 mL  
Prepared: 02-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel  
Cleanup Batch: CFJ0067 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur  
Cleanup Batch: CFJ0066 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.000313	ND	ug/L	U
beta-BHC	319-85-7	1	0.000313	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.000313	ND	ug/L	U
delta-BHC	319-86-8	1	0.000313	ND	ug/L	U
Heptachlor	76-44-8	1	0.000313	ND	ug/L	U
Aldrin	309-00-2	1	0.000313	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.000313	ND	ug/L	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.000313	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.000313	ND	ug/L	U
Endosulfan I	959-98-8	1	0.000313	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.000625	ND	ug/L	U
Dieldrin	60-57-1	1	0.000625	ND	ug/L	U
Endrin	72-20-8	1	0.000625	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.000625	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.000625	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.000625	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.000625	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.000625	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.000625	ND	ug/L	U
Methoxychlor	72-43-5	1	0.00313	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.100	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	94.1	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	112	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	74.7	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	62.5	%	





Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**SW-15-20170926**  
**17I0390-03 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B  
Instrument: ECD6

Sampled: 09/26/2017 11:30  
Analyzed: 11-Oct-2017 19:45

Sample Preparation: Preparation Method: EPA 3510C SepF  
Preparation Batch: BFI0723 Sample Size: 1000 mL  
Prepared: 02-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel  
Cleanup Batch: CFJ0067 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur  
Cleanup Batch: CFJ0066 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.000313	ND	ug/L	U
beta-BHC	319-85-7	1	0.000313	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.000313	ND	ug/L	U
delta-BHC	319-86-8	1	0.000313	ND	ug/L	U
Heptachlor	76-44-8	1	0.000313	ND	ug/L	U
Aldrin	309-00-2	1	0.000313	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.000313	ND	ug/L	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.000313	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.000313	ND	ug/L	U
Endosulfan I	959-98-8	1	0.000313	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.000625	ND	ug/L	U
Dieldrin	60-57-1	1	0.000625	ND	ug/L	U
Endrin	72-20-8	1	0.000625	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.000625	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.000625	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.000625	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.000625	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.000625	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.000625	ND	ug/L	U
Methoxychlor	72-43-5	1	0.00313	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.100	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	83.2	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	118	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	111	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	75.9	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**SW-16-20170926**  
**17I0390-04 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B  
Instrument: ECD6

Sampled: 09/26/2017 12:45  
Analyzed: 11-Oct-2017 20:03

Sample Preparation: Preparation Method: EPA 3510C SepF  
Preparation Batch: BFI0723 Sample Size: 1000 mL  
Prepared: 02-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel  
Cleanup Batch: CFJ0067 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur  
Cleanup Batch: CFJ0066 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.000313	ND	ug/L	U
beta-BHC	319-85-7	1	0.000313	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.000313	ND	ug/L	U
delta-BHC	319-86-8	1	0.000313	ND	ug/L	U
Heptachlor	76-44-8	1	0.000313	ND	ug/L	U
Aldrin	309-00-2	1	0.000313	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.000313	ND	ug/L	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.000313	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.000313	ND	ug/L	U
Endosulfan I	959-98-8	1	0.000313	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.000625	ND	ug/L	U
Dieldrin	60-57-1	1	0.000625	ND	ug/L	U
Endrin	72-20-8	1	0.000625	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.000625	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.000625	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.000625	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.000625	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.000625	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.000625	ND	ug/L	U
Methoxychlor	72-43-5	1	0.00313	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.100	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	94.8	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	123	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	95.2	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	66.8	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**SW-10-20170926**  
**17I0390-05 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B  
Instrument: ECD6

Sampled: 09/26/2017 14:55  
Analyzed: 11-Oct-2017 20:21

Sample Preparation: Preparation Method: EPA 3510C SepF  
Preparation Batch: BFI0723 Sample Size: 1000 mL  
Prepared: 02-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel  
Cleanup Batch: CFJ0067 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur  
Cleanup Batch: CFJ0066 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.000313	ND	ug/L	U
beta-BHC	319-85-7	1	0.000313	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.000313	ND	ug/L	U
delta-BHC	319-86-8	1	0.000313	ND	ug/L	U
Heptachlor	76-44-8	1	0.000313	ND	ug/L	U
Aldrin	309-00-2	1	0.000313	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.000313	0.489	ug/L	E
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.000313	0.0809	ug/L	E
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.000313	0.0280	ug/L	
Endosulfan I	959-98-8	1	0.000313	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.000625	ND	ug/L	U
Dieldrin	60-57-1	1	0.000625	ND	ug/L	U
Endrin	72-20-8	1	0.000625	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.000625	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.000625	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.000625	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.000625	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.000625	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.000625	ND	ug/L	U
Methoxychlor	72-43-5	1	0.00313	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.100	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	96.0	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	116	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	72.4	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	71.0	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**SW-10-20170926**  
**1710390-05RE1 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B  
Instrument: ECD6

Sampled: 09/26/2017 14:55  
Analyzed: 12-Oct-2017 17:26

Sample Preparation: Preparation Method: EPA 3510C SepF  
Preparation Batch: BF10723 Sample Size: 1000 mL  
Prepared: 02-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel  
Cleanup Batch: CFJ0067 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur  
Cleanup Batch: CFJ0066 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	20	0.00625	ND	ug/L	U
beta-BHC	319-85-7	20	0.00625	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	20	0.00625	ND	ug/L	U
delta-BHC	319-86-8	20	0.00625	ND	ug/L	U
Heptachlor	76-44-8	20	0.00625	ND	ug/L	U
Aldrin	309-00-2	20	0.00625	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	20	0.00625	<b>0.467</b>	ug/L	D
trans-Chlordane (beta-Chlordane)	5103-74-2	20	0.00625	<b>0.0838</b>	ug/L	D
cis-Chlordane (alpha-chlordane)	5103-71-9	20	0.00625	<b>0.0288</b>	ug/L	D
Endosulfan I	959-98-8	20	0.00625	ND	ug/L	U
4,4'-DDE	72-55-9	20	0.0125	ND	ug/L	U
Dieldrin	60-57-1	20	0.0125	ND	ug/L	U
Endrin	72-20-8	20	0.0125	ND	ug/L	U
Endosulfan II	33213-65-9	20	0.0125	ND	ug/L	U
4,4'-DDD	72-54-8	20	0.0125	ND	ug/L	U
Endrin Aldehyde	7421-93-4	20	0.0125	ND	ug/L	U
4,4'-DDT	50-29-3	20	0.0125	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	20	0.0125	ND	ug/L	U
Endrin Ketone	53494-70-5	20	0.0125	ND	ug/L	U
Methoxychlor	72-43-5	20	0.0625	ND	ug/L	U
Toxaphene	8001-35-2	20	1.25	ND	ug/L	U
Chlordane (NOS)	57-74-9	20	2.00	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			<i>30-160 %</i>	<i>103</i>	<i>%</i>	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			<i>30-160 %</i>	<i>136</i>	<i>%</i>	
<i>Surrogate: Tetrachlorometaxylene</i>			<i>30-160 %</i>	<i>74.5</i>	<i>%</i>	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			<i>30-160 %</i>	<i>76.3</i>	<i>%</i>	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**SW-11-20170926**  
**17I0390-06 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B  
Instrument: ECD6

Sampled: 09/26/2017 15:30  
Analyzed: 11-Oct-2017 20:39

Sample Preparation: Preparation Method: EPA 3510C SepF  
Preparation Batch: BF10723 Sample Size: 1000 mL  
Prepared: 02-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel  
Cleanup Batch: CFJ0067 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur  
Cleanup Batch: CFJ0066 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.000313	ND	ug/L	U
beta-BHC	319-85-7	1	0.000313	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.000313	ND	ug/L	U
delta-BHC	319-86-8	1	0.000313	ND	ug/L	U
Heptachlor	76-44-8	1	0.000313	ND	ug/L	U
Aldrin	309-00-2	1	0.000313	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.000313	<b>2.56</b>	ug/L	E
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.000313	<b>0.313</b>	ug/L	E
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.000313	<b>0.0875</b>	ug/L	P1, E
Endosulfan I	959-98-8	1	0.000313	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.000625	ND	ug/L	U
Dieldrin	60-57-1	1	0.000625	ND	ug/L	U
Endrin	72-20-8	1	0.000625	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.000625	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.000625	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.000625	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.000625	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.000625	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.000625	ND	ug/L	U
Methoxychlor	72-43-5	1	0.00313	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.100	ND	ug/L	U
Surrogate: Decachlorobiphenyl			30-160 %	98.1	%	
Surrogate: Decachlorobiphenyl [2C]			30-160 %	127	%	
Surrogate: Tetrachlorometaxylene			30-160 %	75.8	%	
Surrogate: Tetrachlorometaxylene [2C]			30-160 %	75.7	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**SW-11-20170926**  
**1710390-06RE1 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B  
Instrument: ECD6

Sampled: 09/26/2017 15:30  
Analyzed: 12-Oct-2017 17:44

Sample Preparation: Preparation Method: EPA 3510C SepF  
Preparation Batch: BF10723 Sample Size: 1000 mL  
Prepared: 02-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel  
Cleanup Batch: CFJ0067 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur  
Cleanup Batch: CFJ0066 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	100	0.0313	ND	ug/L	U
beta-BHC	319-85-7	100	0.0313	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	100	0.0313	ND	ug/L	U
delta-BHC	319-86-8	100	0.0313	ND	ug/L	U
Heptachlor	76-44-8	100	0.0313	ND	ug/L	U
Aldrin	309-00-2	100	0.0313	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	100	0.0313	<b>2.34</b>	ug/L	P1, D
trans-Chlordane (beta-Chlordane)	5103-74-2	100	0.0313	<b>0.207</b>	ug/L	D
cis-Chlordane (alpha-chlordane)	5103-71-9	100	0.0313	<b>0.0670</b>	ug/L	P1, D
Endosulfan I	959-98-8	100	0.0313	ND	ug/L	U
4,4'-DDE	72-55-9	100	0.0625	ND	ug/L	U
Dieldrin	60-57-1	100	0.0625	ND	ug/L	U
Endrin	72-20-8	100	0.0625	ND	ug/L	U
Endosulfan II	33213-65-9	100	0.0625	ND	ug/L	U
4,4'-DDD	72-54-8	100	0.0625	ND	ug/L	U
Endrin Aldehyde	7421-93-4	100	0.0625	ND	ug/L	U
4,4'-DDT	50-29-3	100	0.0625	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	100	0.0625	ND	ug/L	U
Endrin Ketone	53494-70-5	100	0.0625	ND	ug/L	U
Methoxychlor	72-43-5	100	0.313	ND	ug/L	U
Toxaphene	8001-35-2	100	6.25	ND	ug/L	U
Chlordane (NOS)	57-74-9	100	10.0	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %		D1	D1
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %		D1	D1
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %		D1	D1
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %		D1	D1



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**SW-14-20170926**  
**17I0390-07 (Water)**

**Chlorinated Pesticides**

Method: EPA 8081B  
Instrument: ECD6

Sampled: 09/26/2017 16:15  
Analyzed: 11-Oct-2017 20:56

Sample Preparation: Preparation Method: EPA 3510C SepF  
Preparation Batch: BF10723 Sample Size: 1000 mL  
Prepared: 02-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel  
Cleanup Batch: CFJ0067 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur  
Cleanup Batch: CFJ0066 Initial Volume: 0.5 mL  
Cleaned: 11-Oct-2017 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.000313	ND	ug/L	U
beta-BHC	319-85-7	1	0.000313	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.000313	ND	ug/L	U
delta-BHC	319-86-8	1	0.000313	ND	ug/L	U
Heptachlor	76-44-8	1	0.000313	ND	ug/L	U
Aldrin	309-00-2	1	0.000313	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.000313	ND	ug/L	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.000313	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.000313	ND	ug/L	U
Endosulfan I	959-98-8	1	0.000313	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.000625	ND	ug/L	U
Dieldrin	60-57-1	1	0.000625	ND	ug/L	U
Endrin	72-20-8	1	0.000625	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.000625	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.000625	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.000625	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.000625	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.000625	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.000625	ND	ug/L	U
Methoxychlor	72-43-5	1	0.00313	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.100	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	91.0	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	110	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	69.3	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	72.5	%	



Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

Chlorinated Pesticides - Quality Control

Batch BFI0723 - EPA 3510C SepF

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits	RPD	RPD Limit	Notes
<b>Blank (BFI0723-BLK1)</b>										
Prepared: 02-Oct-2017 Analyzed: 11-Oct-2017 17:58										
alpha-BHC	ND	0.000313	ug/L							U
beta-BHC	ND	0.000313	ug/L							U
gamma-BHC (Lindane)	ND	0.000313	ug/L							U
delta-BHC	ND	0.000313	ug/L							U
Heptachlor	ND	0.000313	ug/L							U
Aldrin	ND	0.000313	ug/L							U
Heptachlor Epoxide	ND	0.000313	ug/L							U
trans-Chlordane (beta-Chlordane)	ND	0.000313	ug/L							U
cis-Chlordane (alpha-chlordane)	ND	0.000313	ug/L							U
Endosulfan I	ND	0.000313	ug/L							U
4,4'-DDE	ND	0.000625	ug/L							U
Dieldrin	ND	0.000625	ug/L							U
Endrin	ND	0.000625	ug/L							U
Endosulfan II	ND	0.000625	ug/L							U
4,4'-DDD	ND	0.000625	ug/L							U
Endrin Aldehyde	ND	0.000625	ug/L							U
4,4'-DDT	ND	0.000625	ug/L							U
Endosulfan Sulfate	ND	0.000625	ug/L							U
Endrin Ketone	ND	0.000625	ug/L							U
Methoxychlor	ND	0.00313	ug/L							U
Toxaphene	ND	0.0625	ug/L							U
Chlordane (NOS)	ND	0.100	ug/L							U
Surrogate: Decachlorobiphenyl		0.0210	ug/L	0.0200		105	30-160			
Surrogate: Decachlorobiphenyl [2C]		0.0275	ug/L	0.0200		138	30-160			
Surrogate: Tetrachlorometaxylene		0.0151	ug/L	0.0200		75.3	30-160			
Surrogate: Tetrachlorometaxylene [2C]		0.0159	ug/L	0.0200		79.6	30-160			

LCS (BFI0723-BS1)

Prepared: 02-Oct-2017 Analyzed: 11-Oct-2017 18:16

alpha-BHC	0.00927	0.000313	ug/L	0.0100		92.7	30-160			
beta-BHC	0.00956	0.000313	ug/L	0.0100		95.6	30-160			
gamma-BHC (Lindane)	0.0102	0.000313	ug/L	0.0100		102	30-160			
delta-BHC	0.0102	0.000313	ug/L	0.0100		102	30-160			
Heptachlor	0.00982	0.000313	ug/L	0.0100		98.2	30-160			
Aldrin	0.00981	0.000313	ug/L	0.0100		98.1	30-160			
Heptachlor Epoxide	0.0110	0.000313	ug/L	0.0100		110	30-160			





Landau Associates, Inc. - Tacoma  
2107 South C Street  
Tacoma WA, 98402

Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

Chlorinated Pesticides - Quality Control

Batch BFI0723 - EPA 3510C SepF

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>LCS (BFI0723-BS1)</b>										
					Prepared: 02-Oct-2017 Analyzed: 11-Oct-2017 18:16					
trans-Chlordane (beta-Chlordane)	0.0107	0.000313	ug/L	0.0100		107	30-160			
cis-Chlordane (alpha-chlordane)	0.0100	0.000313	ug/L	0.0100		100	30-160			
Endosulfan I	0.0103	0.000313	ug/L	0.0100		103	30-160			
4,4'-DDE	0.0216	0.000625	ug/L	0.0200		108	30-160			
Dieldrin	0.0213	0.000625	ug/L	0.0200		107	30-160			
Endrin	0.0286	0.000625	ug/L	0.0200		143	30-160			
Endosulfan II	0.0277	0.000625	ug/L	0.0200		139	30-160			
4,4'-DDD	0.0295	0.000625	ug/L	0.0200		147	30-160			
Endrin Aldehyde	0.0200	0.000625	ug/L	0.0200		100	30-160			
4,4'-DDT	0.0282	0.000625	ug/L	0.0200		141	30-160			
Endosulfan Sulfate	0.0259	0.000625	ug/L	0.0200		129	30-160			
Endrin Ketone	0.0240	0.000625	ug/L	0.0200		120	30-160			
Methoxychlor	0.143	0.00313	ug/L	0.100		143	30-160			
Surrogate: Decachlorobiphenyl		0.0193	ug/L	0.0200		96.7	30-160			
Surrogate: Decachlorobiphenyl [2C]		0.0267	ug/L	0.0200		133	30-160			
Surrogate: Tetrachlorometaxylene		0.0151	ug/L	0.0200		75.6	30-160			
Surrogate: Tetrachlorometaxylene [2C]		0.0155	ug/L	0.0200		77.7	30-160			

<b>Matrix Spike (BFI0723-MS1)</b>										
					Source: 17I0390-03 Prepared: 02-Oct-2017 Analyzed: 11-Oct-2017 18:34					
alpha-BHC	0.00875	0.000313	ug/L	0.0100	ND	87.5	30-160			
beta-BHC	0.0159	0.000313	ug/L	0.0100	ND	159	30-160			P1
gamma-BHC (Lindane)	0.00946	0.000313	ug/L	0.0100	ND	94.6	30-160			
delta-BHC	0.00972	0.000313	ug/L	0.0100	ND	97.2	30-160			
Heptachlor	0.00968	0.000313	ug/L	0.0100	ND	96.8	30-160			
Aldrin	0.00918	0.000313	ug/L	0.0100	ND	91.8	30-160			
Heptachlor Epoxide	0.0106	0.000313	ug/L	0.0100	ND	106	30-160			
trans-Chlordane (beta-Chlordane)	0.0105	0.000313	ug/L	0.0100	ND	105	30-160			
cis-Chlordane (alpha-chlordane)	0.00946	0.000313	ug/L	0.0100	ND	94.6	30-160			
Endosulfan I	0.00975	0.000313	ug/L	0.0100	ND	97.5	30-160			
4,4'-DDE	0.0200	0.000625	ug/L	0.0200	ND	100.0	30-160			
Dieldrin	0.0199	0.000625	ug/L	0.0200	ND	99.5	30-160			
Endrin	0.0284	0.000625	ug/L	0.0200	ND	142	30-160			
Endosulfan II	0.0277	0.000625	ug/L	0.0200	ND	139	30-160			
4,4'-DDD	0.0294	0.000625	ug/L	0.0200	ND	147	30-160			
Endrin Aldehyde	0.0168	0.000625	ug/L	0.0200	ND	84.0	30-160			



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2107 South C Street  
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Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

### Chlorinated Pesticides - Quality Control

#### Batch BF10723 - EPA 3510C SepF

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Matrix Spike (BF10723-MS1)</b>										
		<b>Source: 1710390-03</b>			Prepared: 02-Oct-2017		Analyzed: 11-Oct-2017 18:34			
4,4'-DDT	0.0279	0.000625	ug/L	0.0200	ND	140	30-160			
Endosulfan Sulfate	0.0258	0.000625	ug/L	0.0200	ND	129	30-160			
Endrin Ketone	0.0244	0.000625	ug/L	0.0200	ND	122	30-160			
Methoxychlor	0.145	0.00313	ug/L	0.100	ND	145	30-160			
Surrogate: Decachlorobiphenyl		0.0125	ug/L	0.0200		62.6	30-160			PI
Surrogate: Decachlorobiphenyl [2C]		0.0190	ug/L	0.0200		95.2	30-160			PI
Surrogate: Tetrachlorometaxylene		0.0227	ug/L	0.0200		113	30-160			PI
Surrogate: Tetrachlorometaxylene [2C]		0.0151	ug/L	0.0200		75.4	30-160			PI

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

<b>Matrix Spike Dup (BF10723-MSD1)</b>										
		<b>Source: 1710390-03</b>			Prepared: 02-Oct-2017		Analyzed: 11-Oct-2017 18:51			
alpha-BHC	0.00814	0.000313	ug/L	0.0100	ND	81.4	30-160	7.22	30	
beta-BHC	0.0128	0.000313	ug/L	0.0100	ND	128	30-160	21.60	30	PI
gamma-BHC (Lindane)	0.00878	0.000313	ug/L	0.0100	ND	87.8	30-160	7.46	30	
delta-BHC	0.00858	0.000313	ug/L	0.0100	ND	85.8	30-160	12.46	30	
Heptachlor	0.00833	0.000313	ug/L	0.0100	ND	83.3	30-160	14.99	30	
Aldrin	0.00794	0.000313	ug/L	0.0100	ND	79.4	30-160	14.49	30	
Heptachlor Epoxide	0.00952	0.000313	ug/L	0.0100	ND	95.2	30-160	1.67	30	
trans-Chlordane (beta-Chlordane)	0.00931	0.000313	ug/L	0.0100	ND	93.1	30-160	12.01	30	
cis-Chlordane (alpha-chlordane)	0.00828	0.000313	ug/L	0.0100	ND	82.8	30-160	13.30	30	
Endosulfan I	0.00879	0.000313	ug/L	0.0100	ND	87.9	30-160	10.36	30	
4,4'-DDE	0.0174	0.000625	ug/L	0.0200	ND	87.0	30-160	13.90	30	
Dieldrin	0.0177	0.000625	ug/L	0.0200	ND	88.5	30-160	11.70	30	
Endrin	0.0242	0.000625	ug/L	0.0200	ND	121	30-160	15.97	30	
Endosulfan II	0.0233	0.000625	ug/L	0.0200	ND	117	30-160	17.25	30	
4,4'-DDD	0.0245	0.000625	ug/L	0.0200	ND	123	30-160	18.18	30	
Endrin Aldehyde	0.0136	0.000625	ug/L	0.0200	ND	68.0	30-160	21.05	30	
4,4'-DDT	0.0236	0.000625	ug/L	0.0200	ND	118	30-160	16.70	30	
Endosulfan Sulfate	0.0214	0.000625	ug/L	0.0200	ND	107	30-160	18.64	30	
Endrin Ketone	0.0206	0.000625	ug/L	0.0200	ND	103	30-160	16.89	30	
Methoxychlor	0.121	0.00313	ug/L	0.100	ND	121	30-160	18.05	30	
Surrogate: Decachlorobiphenyl		0.0115	ug/L	0.0200		57.5	30-160			
Surrogate: Decachlorobiphenyl [2C]		0.0163	ug/L	0.0200		81.7	30-160			
Surrogate: Tetrachlorometaxylene		0.0180	ug/L	0.0200		90.2	30-160			



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Project: Webster Nursery  
Project Number: Webster Nursery  
Project Manager: Sara Fees

Reported:  
16-Oct-2017 07:21

**Chlorinated Pesticides - Quality Control**

**Batch BFI0723 - EPA 3510C SepF**

Instrument: ECD6 Analyst: YZ

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Matrix Spike Dup (BFI0723-MSD1)</b>		<b>Source: 17I0390-03</b>		Prepared: 02-Oct-2017		Analyzed: 11-Oct-2017 18:51				
<i>Surrogate: Tetrachlorometaxylene [2C]</i>	0.0135		ug/L	0.0200		67.7	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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### Certified Analyses included in this Report

Analyte	Certifications
<b>EPA 8081B in Water</b>	
alpha-BHC	WADOE, DoD-ELAP, NELAP, CALAP
alpha-BHC [2C]	WADOE, DoD-ELAP, NELAP, CALAP
beta-BHC	WADOE, DoD-ELAP, NELAP, CALAP
beta-BHC [2C]	WADOE, DoD-ELAP, NELAP, CALAP
gamma-BHC (Lindane)	WADOE, DoD-ELAP, NELAP, CALAP
gamma-BHC (Lindane) [2C]	WADOE, DoD-ELAP, NELAP, CALAP
delta-BHC	WADOE, DoD-ELAP, NELAP, CALAP
delta-BHC [2C]	WADOE, DoD-ELAP, NELAP, CALAP
Heptachlor	WADOE, DoD-ELAP, NELAP, CALAP
Heptachlor [2C]	WADOE, DoD-ELAP, NELAP, CALAP
Aldrin	WADOE, DoD-ELAP, NELAP, CALAP
Aldrin [2C]	WADOE, DoD-ELAP, NELAP, CALAP
Heptachlor Epoxide	WADOE, DoD-ELAP, NELAP, CALAP
Heptachlor Epoxide [2C]	WADOE, DoD-ELAP, NELAP, CALAP
trans-Chlordane (beta-Chlordane)	WADOE, DoD-ELAP, NELAP, CALAP
trans-Chlordane (beta-Chlordane) [2C]	WADOE, DoD-ELAP, NELAP, CALAP
cis-Chlordane (alpha-chlordane)	WADOE, DoD-ELAP, NELAP, CALAP
cis-Chlordane (alpha-chlordane) [2C]	WADOE, DoD-ELAP, NELAP, CALAP
Endosulfan I	WADOE, DoD-ELAP, NELAP, CALAP
Endosulfan I [2C]	WADOE, DoD-ELAP, NELAP, CALAP
4,4'-DDE	WADOE, DoD-ELAP, NELAP, CALAP
4,4'-DDE [2C]	WADOE, DoD-ELAP, NELAP, CALAP
Dieldrin	WADOE, DoD-ELAP, NELAP, CALAP
Dieldrin [2C]	WADOE, DoD-ELAP, NELAP, CALAP
Endrin	WADOE, DoD-ELAP, NELAP, CALAP
Endrin [2C]	WADOE, DoD-ELAP, NELAP, CALAP
Endosulfan II	WADOE, DoD-ELAP, NELAP, CALAP
Endosulfan II [2C]	WADOE, DoD-ELAP, NELAP, CALAP
4,4'-DDD	WADOE, DoD-ELAP, NELAP, CALAP
4,4'-DDD [2C]	WADOE, DoD-ELAP, NELAP, CALAP
Endrin Aldehyde	WADOE, DoD-ELAP, NELAP, CALAP
Endrin Aldehyde [2C]	WADOE, DoD-ELAP, NELAP, CALAP
4,4'-DDT	WADOE, DoD-ELAP, NELAP, CALAP
4,4'-DDT [2C]	WADOE, DoD-ELAP, NELAP, CALAP
Endosulfan Sulfate	WADOE, DoD-ELAP, NELAP, CALAP



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Endosulfan Sulfate [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Endrin Ketone	WADOE,DoD-ELAP,NELAP,CALAP
Endrin Ketone [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Methoxychlor	WADOE,DoD-ELAP,NELAP,CALAP
Methoxychlor [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Hexachlorobutadiene	WADOE,DoD-ELAP,NELAP,CALAP
Hexachlorobutadiene [2C]	WADOE,DoD-ELAP,NELAP,CALAP
Hexachlorobenzene	WADOE,DoD-ELAP,NELAP,CALAP
Hexachlorobenzene [2C]	WADOE,DoD-ELAP,NELAP,CALAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	09/01/2017
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018



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### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- P1 The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D1 Surrogate was not detected due to sample extract dilution
- D The reported value is from a dilution
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.