

Technical Memorandum

TO: Matthew Morris, PE, Washington State Department of Ecology
CC: Amy Sikora, Washington State Department of Natural Resources
FROM: Sierra Mott and Eric Weber, LHG, CWRE
DATE: July 3, 2019
RE: **Fourth Quarter Groundwater Monitoring Results
Webster Nursery Site, Site ID 3380
Tumwater, Washington
Project No. 0774006.040.045**

Introduction

This technical memorandum summarizes the results of quarterly groundwater monitoring completed by Landau Associates, Inc. (LAI) at the Washington State Department of Natural Resources (DNR) Webster Nursery, a former pesticide-storage warehouse in Tumwater, Washington (site; Figure 1). The site is associated with past releases of organochlorine pesticides to soil and groundwater. Constituents of concern include the organochlorine pesticides heptachlor epoxide (HE; breakdown product of heptachlor) and technical chlordane.

Remedial action excavation and disposal of HE-contaminated soil were completed in August 2018. The May 2019 groundwater monitoring event is the fourth of four quarterly events required for remedial action per the Cleanup Action Plan. However, additional groundwater monitoring is warranted. A plan for additional groundwater monitoring will be provided in a forthcoming memorandum (Compliance Monitoring Plan). A summary of the remedial action is provided in a draft Cleanup Action Completion Report (CACR; LAI 2018a).

Groundwater Monitoring Summary

Fourth quarter (4Q) groundwater monitoring was completed on May 20, 2019. Groundwater monitoring wells SW-9R, SW-10R, SW-11R, SW-14, SW-15, and SW-16 were sampled in accordance with the framework established by Washington State Department of Ecology (Ecology) Agreed Order No. DE 00TCP-SR295, the Remedial Action Work Plan (RAWP; LAI 2017), and the CACR (LAI 2018a). The scope of groundwater monitoring is described below:

- Groundwater samples were collected from three new wells (SW-9R, SW-10R, and SW-11R) and from three existing wells (SW-14, SW-15, and SW-16). Analytical Resources, Inc. of Tukwila, Washington analyzed primary groundwater samples for organochlorine pesticides using U.S. Environmental Protection Agency Method 8081A low-level.
- Depth-to-groundwater measurements were collected at three additional wells (SW-1, SW-12, and SW-13) to support analysis of groundwater level contours and flow direction.

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 with a YSI 554 multi-parameter probe, and measuring turbidity with a handheld meter. One duplicate sample (SW-99 at SW-11R) was collected for quality control purposes.

As noted above, 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 provided in the next section. The groundwater monitoring network is shown on Figure 2.

Groundwater Monitoring Results

Groundwater monitoring results are summarized below:

- At three (SW-9R, SW-14, and SW-16) of the six wells, no organochlorine pesticides were detected at concentrations greater than the laboratory reporting limits. No analytes other than HE were detected in any well during 3Q groundwater monitoring.
- HE was detected in SW-11R at a concentration of 0.0045 micrograms per liter ($\mu\text{g/L}$). This concentration is below the cleanup level (CUL).
- HE was detected in SW-10R at a concentration of 0.0058 $\mu\text{g/L}$. This concentration narrowly exceeds the CUL.
- HE was detected in SW-15 at a concentration of 0.0011 $\mu\text{g/L}$. This concentration is below the CUL.

May 2019 organochlorine pesticide data are provided in Table 1, and the laboratory data package is provided in Attachment 1. Time series data of recent HE concentrations in groundwater at SW-10R and SW-11R (dating back to January 2010) are presented on Figure 3.

Groundwater elevations in May 2019 ranged from 183.73 to 184.61 feet mean sea level. Regionally, groundwater flow is likely to the south, toward Salmon Creek. Locally, groundwater flow elevation is more variable, and is likely influenced by factors including runoff, infiltration, and buried utilities. Depth-to-water and groundwater elevation data are provided in Table 2. Groundwater elevation contours are shown on Figure 2.

Environmental Information Management Submittal

An Environmental Information Management submittal is required. The submittal will be completed in summer 2019, after this technical memorandum has been submitted to Ecology.

LANDAU ASSOCIATES, INC.



Sierra Mott
Senior Project Scientist



Eric Weber, LHG, CWRE
Principal

SMM/EFW/kjg

[Y:\774\006\R\QUARTERLY GW MONITORING REPORTS\4Q_MAY 19\WEBSTER NURSERY 4Q GW MONITORING TECHNICAL MEMORANDUM.DOCX]

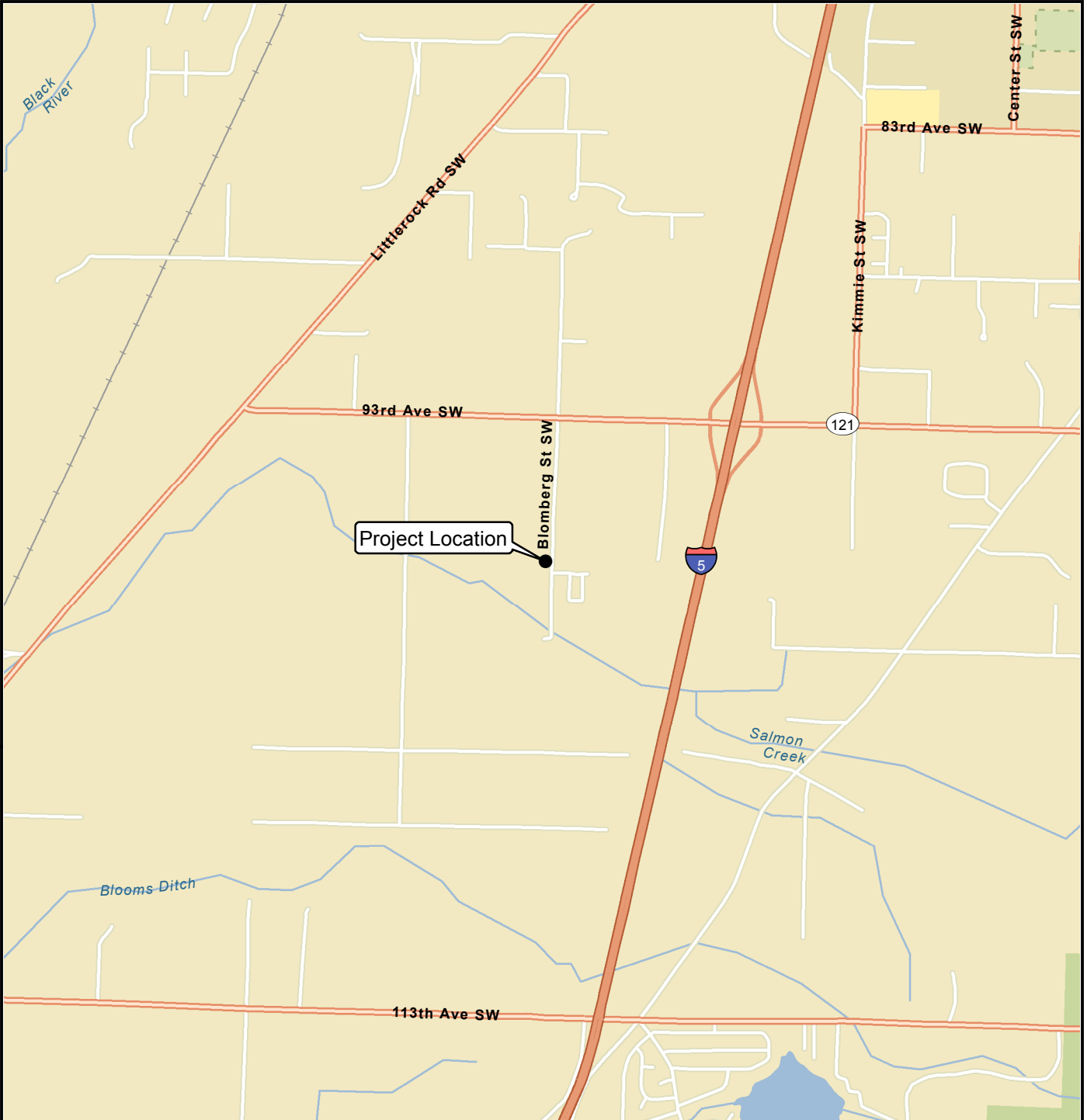
Attachments: Figure 1. Vicinity Map
Figure 2. Monitoring Well Network and May 2019 Groundwater Elevation Contours
Figure 3. Heptachlor Epoxide Time Series Concentrations for SW-10(R) and SW-11(R)
Table 1. Groundwater Analytical Results
Table 2. Groundwater Level Measurements
Attachment 1. May 2019 Laboratory Data Package

References

LAI. 2018a. Draft Cleanup Action Completion Report, Washington State Department of Natural Resources Webster Nursery, Tumwater, Washington. Landau Associates, Inc. October 12.

LAI. 2017. Remedial Action Work Plan, Webster Nursery, 9805 Blomberg Street SW, Tumwater, Washington. Landau Associates, Inc. October 31.

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

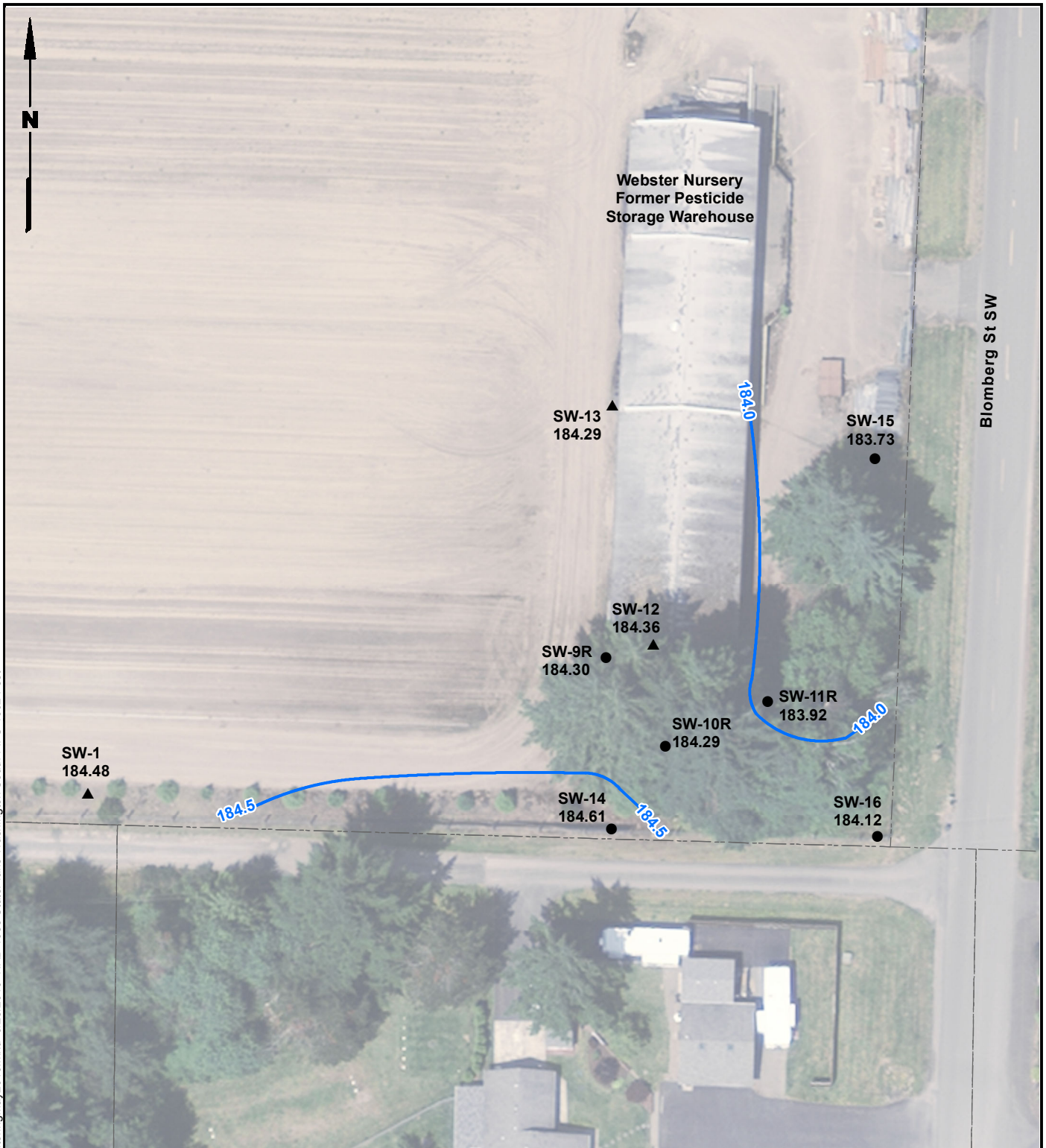


Webster Nursery Site
Tumwater, Washington

Vicinity Map

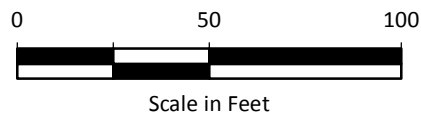
Figure
1

G:\Projects\7741006\040\045\F02GWMonitoringMay2019.mxd 6/25/2019 NAD 1983 StatePlane Washington South FIPS 4602 Feet



Legend

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



Notes

1. SW-9R, SW-10R, and SW-11R are new (replacement) wells.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Sources: Thurston County GIS; WA DNR Survey, 2018.



Webster Nursery Site
Tumwater, Washington

**Monitoring Well Network and
May 2019 Groundwater
Elevation Contours**

Figure
2

Webster Nursery - Select Well Data

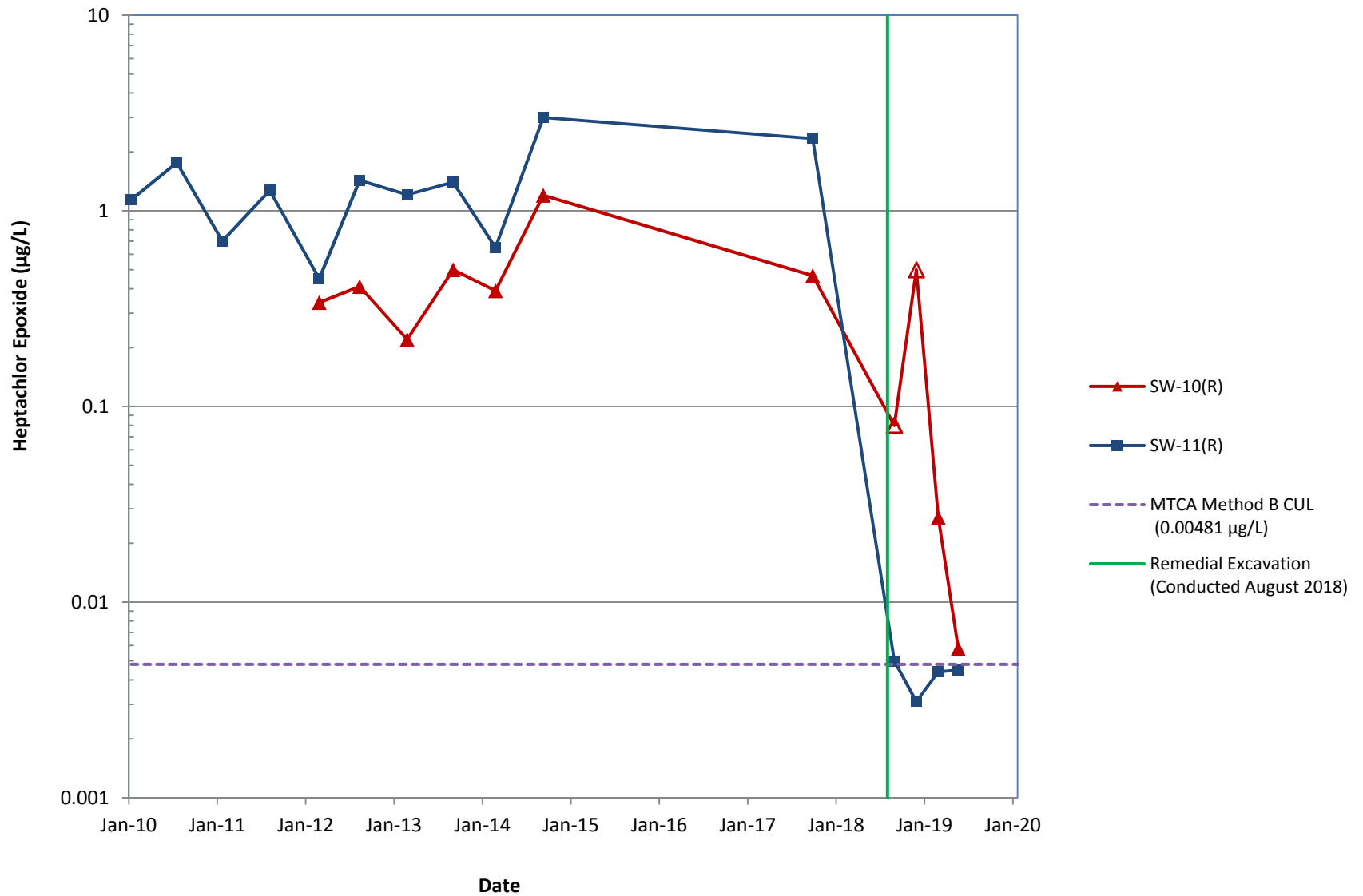


Table 1
Groundwater Analytical Results
Webster Nursery
Tumwater, Washington

Analyte	MTCA Method B Cleanup Levels	Sample Location, Sample ID, Laboratory SDG, Sample Date, and Sample Type							
		SW-9R	SW-10R	SW-11R	SW-11R	SW-14	SW-15	SW-16	
		SW-9R-20190520 19E0284 5/20/2019	SW-10R-20190520 19E0284 5/20/2019	SW-11R-20190520 19E0284 5/20/2019	SW-99-20190520 19E0284 5/20/2019	SW-14-20190520 19E0284 5/20/2019	SW-15-20190520 19E0284 5/20/2019	SW-16-20190520 19E0284 5/20/2019	
Cancerous	N	N	N	FD	N	N	N		
Pesticides (µg/L; SW-846 8081B)									
4,4'-DDD	--	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
4,4'-DDE	--	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
4,4'-DDT	--	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
Aldrin	--	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	
alpha-BHC	--	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	
beta-BHC	--	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	
Chlordane	0.25	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	
cis-Chlordane	--	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	
delta-BHC	--	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	
Dieldrin	--	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
Endosulfan I	--	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	
Endosulfan II	--	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
Endosulfan Sulfate	--	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
Endrin	--	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
Endrin Aldehyde	--	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
Endrin Ketone	--	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	
gamma-BHC	--	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	
Heptachlor	0.0194	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	
Heptachlor Epoxide	0.00481	0.0006 U	0.0058 J	0.0045	0.0043	0.0006 U	0.0011	0.0006 U	
Methoxychlor	--	0.0063 U	0.0063 U	0.0063 U	0.0063 U	0.0063 U	0.0063 U	0.0063 U	
Toxaphene	--	0.0625 U	0.0625 U	0.0625 U	0.0625 U	0.0625 U	0.0625 U	0.0625 U	
trans-Chlordane	--	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	0.0006 U	

Notes:

-- = cleanup level not applicable

Bold text = Indicates detected analyte.

Green Box = Detected concentration is greater than at least one of the cleanup levels

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

Abbreviations and Acronyms:

FD = field duplicate

ID = identification

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

Well ID	Top of Casing Elevation (ft)	Depth to Water (ft bgs)	Groundwater Elevation (ft)
SW-1	193.22	8.74	184.48
SW-9R	192.62	8.32	184.30
SW-10R	193.41	9.12	184.29
SW-11R	192.50	8.58	183.92
SW-12	192.68	8.32	184.36
SW-13	192.95	8.66	184.29
SW-14	192.87	8.26	184.61
SW-15	194.58	10.85	183.73
SW-16	194.57	10.45	184.12

Abbreviations:

bgs = below ground surface

ft = feet

May 2019 Laboratory Data Package



05 June 2019

Sierra Mott
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>
19E0284	N/A

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.



Chain of Custody Record & Laboratory Analysis Request



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

ARI Assigned Number: 19E0284	Turn-around Requested: Standard	Page: 1	of 1
ARI Client Company: Landau Associates	Phone: 253-926-2493	Date: 5/20/2019	Ice Present? Y
Client Contact: Eric Weber, Sierra Mott		No. of Coolers: 2	Cooler Temps: 4.1, 5.4

Client Project Name: Webster Nursery: quarterly groundwater sampling	Analysis Requested	Notes/Comments
Client Project #: 774006.040.045	Pesticides EPA 8051B LL Organochlorine	
Samplers: Katie Gauglitz		

Sample ID	Date	Time	Matrix	No. Containers													
SW-15-20190520	5/20/19	1014	Aq	2	X												
SW-16-20190520		1125			X												
SW-14-20190520		1230			X												
SW-9R-20190520		1328			X												
SW-10R-20190520		1445			X												
SW-11R-20190520		1533			X												
SW-99-20190520		1540			X												

Comments/Special Instructions	Relinquished by: (Signature) Katie M. Gauglitz	Received by: (Signature) A. Volgardsen	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Katie Gauglitz	Printed Name: A. Volgardsen	Printed Name:	Printed Name:
	Company: Landau Associates	Company: ARI	Company:	Company:
	Date & Time: 5/20/2019 17:20	Date & Time: 5/20/19 1720	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



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

Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SW-15-20190520	19E0284-01	Water	20-May-2019 10:14	20-May-2019 17:20
SW-16-20190520	19E0284-02	Water	20-May-2019 11:25	20-May-2019 17:20
SW-14-20190520	19E0284-03	Water	20-May-2019 12:30	20-May-2019 17:20
SW-9R-20190520	19E0284-04	Water	20-May-2019 13:28	20-May-2019 17:20
SW-10R-20190520	19E0284-05	Water	20-May-2019 14:45	20-May-2019 17:20
SW-11R-20190520	19E0284-06	Water	20-May-2019 15:33	20-May-2019 17:20
SW-99-20190520	19E0284-07	Water	20-May-2019 15:40	20-May-2019 17:20



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

Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

Work Order Case Narrative

Pesticides - EPA Method SW8081B

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.



WORK ORDER

19E0284

Client: Landau Associates, Inc. - Tacoma
Project: Webster Nursery

Project Manager: Kelly Bottem
Project Number: Webster Nursery

Report To:

Landau Associates, Inc. - Tacoma
Sara Fees
2107 South C Street
Tacoma, WA 98402
Phone: (253) 926-2493
Fax: (253) 926-2531

Invoice To:

Landau Associates, Inc. - Tacoma
Sara Fees
2107 South C Street
Tacoma, WA 98402
Phone : (253) 926-2493
Fax: (253) 926-2531

Date Due: 05-Jun-2019 18:00 (10 day TAT)

Received By: Amanda Volgardsen

Date Received: 20-May-2019 17:20

Logged In By: Jacob Walter

Date Logged In: 20-May-2019 17:45

Samples Received at: **4.1°C**

Intact, properly signed and dated custody seals attached to outside of cooler(s).....No	Custody papers included with the cooler.....	Yes
Custody papers properly filled out (in. signed, analyses requested, etc).....Yes	Was a temperature blank included in the cooler.....	No
Was sufficient ice used (if appropriate).....Yes	All bottles sealed in individual plastic bags.....	No
All bottles arrived in good condition (unbroken).....Yes	All bottle labels complete and legible.....	Yes
Number of containers listed on COC match number received.....Yes	Bottle labels and tags agree with COC.....	Yes
Correct bottles used for the requested analyses.....Yes	All VOC vials free of air bubbles.....	No
Analyses/bottles require preservation (attach preservation sheet excluding VOC).No	Sufficient amount of sample sent in each bottle.....	Yes
Sample split at ARI.....No		

Analysis	Due	TAT	Expires	Comments
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WORK ORDER

19E0284

Client: Landau Associates, Inc. - Tacoma	Project Manager: Kelly Bottem
Project: Webster Nursery	Project Number: Webster Nursery

Analysis	Due	TAT	Expires	Comments
19E0284-01 SW-15-20190520 [Water] Sampled 20-May-2019 10:14 (GMT-08:00) Pacific Time (US & Canada)				
<i>A = Glass NM, Amber, 1000 mL B = Glass NM, Amber, 1000 mL</i>				
8081B Pest (Low Level H2O)	05-Jun-2019 15:00	10	27-May-2019 10:14	Must meet MTCA method B. Must not over dilute. LC
19E0284-02 SW-16-20190520 [Water] Sampled 20-May-2019 11:25 (GMT-08:00) Pacific Time (US & Canada)				
<i>A = Glass NM, Amber, 1000 mL B = Glass NM, Amber, 1000 mL</i>				
8081B Pest (Low Level H2O)	05-Jun-2019 15:00	10	27-May-2019 11:25	Must meet MTCA method B. Must not over dilute. LC
19E0284-03 SW-14-20190520 [Water] Sampled 20-May-2019 12:30 (GMT-08:00) Pacific Time (US & Canada)				
<i>A = Glass NM, Amber, 1000 mL B = Glass NM, Amber, 1000 mL</i>				
8081B Pest (Low Level H2O)	05-Jun-2019 15:00	10	27-May-2019 12:30	Must meet MTCA method B. Must not over dilute. LC
19E0284-04 SW-9R-20190520 [Water] Sampled 20-May-2019 13:28 (GMT-08:00) Pacific Time (US & Canada)				
<i>A = Glass NM, Amber, 1000 mL B = Glass NM, Amber, 1000 mL</i>				
8081B Pest (Low Level H2O)	05-Jun-2019 15:00	10	27-May-2019 13:28	Must meet MTCA method B. Must not over dilute. LC
19E0284-05 SW-10R-20190520 [Water] Sampled 20-May-2019 14:45 (GMT-08:00) Pacific Time (US & Canada)				
<i>A = Glass NM, Amber, 1000 mL B = Glass NM, Amber, 1000 mL</i>				
8081B Pest (Low Level H2O)	05-Jun-2019 15:00	10	27-May-2019 14:45	Must meet MTCA method B. Must not over dilute. LC
19E0284-06 SW-11R-20190520 [Water] Sampled 20-May-2019 15:33 (GMT-08:00) Pacific Time (US & Canada)				
<i>A = Glass NM, Amber, 1000 mL B = Glass NM, Amber, 1000 mL</i>				
8081B Pest (Low Level H2O)	05-Jun-2019 15:00	10	27-May-2019 15:33	Must meet MTCA method B. Must not over dilute. LC
19E0284-07 SW-99-20190520 [Water] Sampled 20-May-2019 15:40 (GMT-08:00) Pacific Time (US & Canada)				
<i>A = Glass NM, Amber, 1000 mL B = Glass NM, Amber, 1000 mL</i>				
8081B Pest (Low Level H2O)	05-Jun-2019 15:00	10	27-May-2019 15:40	Must meet MTCA method B. Must not over dilute. LC

Reviewed By _____

Date _____



Cooler Receipt Form

ARI Client: Landau
 COC No(s): _____ (NA)
 Assigned ARI Job No: 19E0284

Project Name: webster nursery
 Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
 Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the 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)

Time 1720 4.1 5.4
 If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO 5006

Cooler Accepted by: AV Date: 5/20/19 Time: 1720

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
 How were bottles sealed in plastic bags? Individually Grouped Not
 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
 Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JBW Date: 05/20/19 Time: 1745 Labels checked by: JBW

**** 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: _____



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

Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

SW-15-20190520
19E0284-01 (Water)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 05/20/2019 10:14
Instrument: ECD6 Analyst: YZ		Analyzed: 06/03/2019 13:47
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHE0537 Prepared: 22-May-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19E0284-01 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHE0212 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-01 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHE0211 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-01 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	0.0011	ug/L	
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				30-160 %	69.3	%
<i>Surrogate: Decachlorobiphenyl [2C]</i>				30-160 %	66.3	%
<i>Surrogate: Tetrachlorometaxylene</i>				30-160 %	66.1	%
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				30-160 %	61.6	%



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

Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

SW-16-20190520
19E0284-02 (Water)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 05/20/2019 11:25
Instrument: ECD6 Analyst: YZ		Analyzed: 06/03/2019 14:05
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHE0537 Prepared: 22-May-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19E0284-02 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHE0212 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-02 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHE0211 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-02 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	ND	ug/L	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				30-160 %	78.7 %	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				30-160 %	78.8 %	
<i>Surrogate: Tetrachlorometaxylene</i>				30-160 %	72.5 %	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				30-160 %	65.5 %	



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Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

SW-14-20190520
19E0284-03 (Water)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 05/20/2019 12:30
Instrument: ECD6 Analyst: YZ		Analyzed: 06/03/2019 14:23
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHE0537 Prepared: 22-May-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19E0284-03 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHE0212 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-03 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHE0211 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-03 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	ND	ug/L	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	87.0	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	83.6	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	75.6	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	75.3	%	



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Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

SW-9R-20190520
19E0284-04 (Water)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 05/20/2019 13:28
Instrument: ECD6 Analyst: YZ		Analyzed: 06/03/2019 15:00
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHE0537 Prepared: 22-May-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19E0284-04 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHE0212 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-04 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHE0211 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-04 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	ND	ug/L	U
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	87.5	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	83.3	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	66.8	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	65.6	%	



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Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

SW-10R-20190520
19E0284-05 (Water)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 05/20/2019 14:45
Instrument: ECD6 Analyst: YZ		Analyzed: 06/03/2019 15:18
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHE0537 Prepared: 22-May-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19E0284-05 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHE0212 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-05 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHE0211 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-05 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	0.0058	ug/L	P1
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>			30-160 %	86.0	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>			30-160 %	88.4	%	
<i>Surrogate: Tetrachlorometaxylene</i>			30-160 %	70.0	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>			30-160 %	60.6	%	



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Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

SW-11R-20190520
19E0284-06 (Water)

Chlorinated Pesticides

Method: EPA 8081B		Sampled: 05/20/2019 15:33
Instrument: ECD6 Analyst: YZ		Analyzed: 06/03/2019 15:36
Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BHE0537 Prepared: 22-May-2019	Sample Size: 1000 mL Final Volume: 0.5 mL Extract ID: 19E0284-06 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CHE0212 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-06 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CHE0211 Cleaned: 23-May-2019	Initial Volume: 0.5 mL Final Volume: 0.5 mL Extract ID: 19E0284-06 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	0.0045	ug/L	
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				30-160 %	94.5 %	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				30-160 %	90.9 %	
<i>Surrogate: Tetrachlorometaxylene</i>				30-160 %	75.3 %	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				30-160 %	76.6 %	



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Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

SW-99-20190520
19E0284-07 (Water)

Chlorinated Pesticides

Method: EPA 8081B Sampled: 05/20/2019 15:40
Instrument: ECD6 Analyst: YZ Analyzed: 06/03/2019 15:54

Sample Preparation: Preparation Method: EPA 3510C SepF Extract ID: 19E0284-07 A 01
Preparation Batch: BHE0537 Sample Size: 1000 mL
Prepared: 22-May-2019 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel Extract ID: 19E0284-07 A 01
Cleanup Batch: CHE0212 Initial Volume: 0.5 mL
Cleaned: 23-May-2019 Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Sulfur Extract ID: 19E0284-07 A 01
Cleanup Batch: CHE0211 Initial Volume: 0.5 mL
Cleaned: 23-May-2019 Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
alpha-BHC	319-84-6	1	0.0006	ND	ug/L	U
beta-BHC	319-85-7	1	0.0006	ND	ug/L	U
gamma-BHC (Lindane)	58-89-9	1	0.0006	ND	ug/L	U
delta-BHC	319-86-8	1	0.0006	ND	ug/L	U
Heptachlor	76-44-8	1	0.0006	ND	ug/L	U
Aldrin	309-00-2	1	0.0006	ND	ug/L	U
Heptachlor Epoxide	1024-57-3	1	0.0006	0.0043	ug/L	
trans-Chlordane (beta-Chlordane)	5103-74-2	1	0.0006	ND	ug/L	U
cis-Chlordane (alpha-chlordane)	5103-71-9	1	0.0006	ND	ug/L	U
Endosulfan I	959-98-8	1	0.0006	ND	ug/L	U
4,4'-DDE	72-55-9	1	0.0013	ND	ug/L	U
Dieldrin	60-57-1	1	0.0013	ND	ug/L	U
Endrin	72-20-8	1	0.0013	ND	ug/L	U
Endosulfan II	33213-65-9	1	0.0013	ND	ug/L	U
4,4'-DDD	72-54-8	1	0.0013	ND	ug/L	U
Endrin Aldehyde	7421-93-4	1	0.0013	ND	ug/L	U
4,4'-DDT	50-29-3	1	0.0013	ND	ug/L	U
Endosulfan Sulfate	1031-07-8	1	0.0013	ND	ug/L	U
Endrin Ketone	53494-70-5	1	0.0013	ND	ug/L	U
Methoxychlor	72-43-5	1	0.0063	ND	ug/L	U
Toxaphene	8001-35-2	1	0.0625	ND	ug/L	U
Chlordane (NOS)	57-74-9	1	0.0050	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				30-160 %	87.1 %	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				30-160 %	87.4 %	
<i>Surrogate: Tetrachlorometaxylene</i>				30-160 %	67.3 %	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				30-160 %	61.8 %	



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Tacoma WA, 98402

Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

Chlorinated Pesticides - Quality Control

Batch BHE0537 - 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
Blank (BHE0537-BLK1)										
Prepared: 22-May-2019 Analyzed: 03-Jun-2019 12:52										
alpha-BHC	ND	0.0006	ug/L							U
beta-BHC	ND	0.0006	ug/L							U
gamma-BHC (Lindane)	ND	0.0006	ug/L							U
delta-BHC	ND	0.0006	ug/L							U
Heptachlor	ND	0.0006	ug/L							U
Aldrin	ND	0.0006	ug/L							U
Heptachlor Epoxide	ND	0.0006	ug/L							U
trans-Chlordane (beta-Chlordane)	ND	0.0006	ug/L							U
cis-Chlordane (alpha-chlordane)	ND	0.0006	ug/L							U
Endosulfan I	ND	0.0006	ug/L							U
4,4'-DDE	ND	0.0013	ug/L							U
Dieldrin	ND	0.0013	ug/L							U
Endrin	ND	0.0013	ug/L							U
Endosulfan II	ND	0.0013	ug/L							U
4,4'-DDD	ND	0.0013	ug/L							U
Endrin Aldehyde	ND	0.0013	ug/L							U
4,4'-DDT	ND	0.0013	ug/L							U
Endosulfan Sulfate	ND	0.0013	ug/L							U
Endrin Ketone	ND	0.0013	ug/L							U
Methoxychlor	ND	0.0063	ug/L							U
Toxaphene	ND	0.0625	ug/L							U
Chlordane (NOS)	ND	0.0050	ug/L							U
Surrogate: Decachlorobiphenyl	0.0132		ug/L	0.0200		66.2	30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0129		ug/L	0.0200		64.5	30-160			
Surrogate: Tetrachlorometaxylene	0.0146		ug/L	0.0200		73.1	30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0138		ug/L	0.0200		68.8	30-160			

LCS (BHE0537-BS1)

Prepared: 22-May-2019 Analyzed: 03-Jun-2019 13:11

alpha-BHC	0.0076	0.0006	ug/L	0.0100		76.3	30-160			
beta-BHC	0.0074	0.0006	ug/L	0.0100		74.4	30-160			
gamma-BHC (Lindane)	0.0078	0.0006	ug/L	0.0100		78.2	30-160			
delta-BHC	0.0078	0.0006	ug/L	0.0100		78.0	30-160			
Heptachlor	0.0076	0.0006	ug/L	0.0100		75.8	30-160			
Aldrin	0.0067	0.0006	ug/L	0.0100		67.4	30-160			
Heptachlor Epoxide	0.0079	0.0006	ug/L	0.0100		79.3	30-160			



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

Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
05-Jun-2019 14:55

Chlorinated Pesticides - Quality Control

Batch BHE0537 - 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
LCS (BHE0537-BS1)										
					Prepared: 22-May-2019	Analyzed: 03-Jun-2019 13:11				
trans-Chlordane (beta-Chlordane)	0.0081	0.0006	ug/L	0.0100		81.0	30-160			
cis-Chlordane (alpha-chlordane)	0.0080	0.0006	ug/L	0.0100		79.8	30-160			
Endosulfan I	0.0080	0.0006	ug/L	0.0100		80.0	30-160			
4,4'-DDE	0.0180	0.0013	ug/L	0.0200		90.0	30-160			
Dieldrin	0.0168	0.0013	ug/L	0.0200		84.2	30-160			
Endrin	0.0159	0.0013	ug/L	0.0200		79.7	30-160			
Endosulfan II	0.0149	0.0013	ug/L	0.0200		74.5	30-160			
4,4'-DDD	0.0160	0.0013	ug/L	0.0200		79.9	30-160			
Endrin Aldehyde	0.0108	0.0013	ug/L	0.0200		54.1	30-160			
4,4'-DDT	0.0165	0.0013	ug/L	0.0200		82.7	30-160			
Endosulfan Sulfate	0.0158	0.0013	ug/L	0.0200		79.2	30-160			
Endrin Ketone	0.0166	0.0013	ug/L	0.0200		83.1	30-160			
Methoxychlor	0.0807	0.0063	ug/L	0.100		80.7	30-160			
Surrogate: Decachlorobiphenyl	0.0182		ug/L	0.0200	91.1		30-160			
Surrogate: Decachlorobiphenyl [2C]	0.0185		ug/L	0.0200	92.7		30-160			
Surrogate: Tetrachlorometaxylene	0.0157		ug/L	0.0200	78.3		30-160			
Surrogate: Tetrachlorometaxylene [2C]	0.0149		ug/L	0.0200	74.6		30-160			
LCS Dup (BHE0537-BSD1)										
					Prepared: 22-May-2019	Analyzed: 03-Jun-2019 13:29				
alpha-BHC	0.0077	0.0006	ug/L	0.0100		76.6	30-160	0.30	30	
beta-BHC	0.0077	0.0006	ug/L	0.0100		76.8	30-160	7.76	30	
gamma-BHC (Lindane)	0.0080	0.0006	ug/L	0.0100		79.8	30-160	2.08	30	
delta-BHC	0.0080	0.0006	ug/L	0.0100		79.6	30-160	2.07	30	
Heptachlor	0.0078	0.0006	ug/L	0.0100		78.3	30-160	3.16	30	
Aldrin	0.0070	0.0006	ug/L	0.0100		69.7	30-160	5.09	30	
Heptachlor Epoxide	0.0080	0.0006	ug/L	0.0100		80.1	30-160	4.71	30	
trans-Chlordane (beta-Chlordane)	0.0083	0.0006	ug/L	0.0100		82.7	30-160	3.91	30	
cis-Chlordane (alpha-chlordane)	0.0084	0.0006	ug/L	0.0100		83.6	30-160	4.72	30	
Endosulfan I	0.0081	0.0006	ug/L	0.0100		80.6	30-160	0.70	30	
4,4'-DDE	0.0185	0.0013	ug/L	0.0200		92.7	30-160	2.90	30	
Dieldrin	0.0170	0.0013	ug/L	0.0200		84.8	30-160	3.57	30	
Endrin	0.0167	0.0013	ug/L	0.0200		83.3	30-160	4.39	30	
Endosulfan II	0.0150	0.0013	ug/L	0.0200		74.8	30-160	0.46	30	
4,4'-DDD	0.0159	0.0013	ug/L	0.0200		79.3	30-160	0.68	30	
Endrin Aldehyde	0.0102	0.0013	ug/L	0.0200		51.2	30-160	2.91	30	



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Tacoma WA, 98402

Project: Webster Nursery
Project Number: Webster Nursery
Project Manager: Sierra Mott

Reported:
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Chlorinated Pesticides - Quality Control

Batch BHE0537 - 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
LCS Dup (BHE0537-BSD1)				Prepared: 22-May-2019 Analyzed: 03-Jun-2019 13:29						
4,4'-DDT	0.0165	0.0013	ug/L	0.0200		82.3	30-160	0.59	30	
Endosulfan Sulfate	0.0161	0.0013	ug/L	0.0200		80.3	30-160	1.34	30	
Endrin Ketone	0.0165	0.0013	ug/L	0.0200		82.4	30-160	0.87	30	
Methoxychlor	0.0855	0.0063	ug/L	0.100		85.5	30-160	5.72	30	
<i>Surrogate: Decachlorobiphenyl</i>	0.0190		ug/L	0.0200		95.2	30-160			
<i>Surrogate: Decachlorobiphenyl [2C]</i>	0.0188		ug/L	0.0200		93.9	30-160			
<i>Surrogate: Tetrachlorometaxylene</i>	0.0165		ug/L	0.0200		82.7	30-160			
<i>Surrogate: Tetrachlorometaxylene [2C]</i>	0.0157		ug/L	0.0200		78.5	30-160			



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Certified Analyses included in this Report

Analyte	Certifications
EPA 8081B in Water	
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
2,4'-DDE	DoD-ELAP
2,4'-DDE [2C]	DoD-ELAP
2,4'-DDD	DoD-ELAP
2,4'-DDD [2C]	DoD-ELAP
2,4'-DDT	DoD-ELAP
2,4'-DDT [2C]	DoD-ELAP
Oxychlorane	DoD-ELAP
Oxychlorane [2C]	DoD-ELAP
cis-Nonachlor	DoD-ELAP
cis-Nonachlor [2C]	DoD-ELAP
trans-Nonachlor	DoD-ELAP
trans-Nonachlor [2C]	DoD-ELAP
Mirex	DoD-ELAP
Mirex [2C]	DoD-ELAP
Toxaphene	DoD-ELAP
Toxaphene [2C]	DoD-ELAP
Chlordane, technical	DoD-ELAP
Chlordane, technical [2C]	DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
CALAP	California Department of Public Health CAELAP	2748	06/30/2019
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2020
WADOE	WA Dept of Ecology	C558	06/30/2019
WA-DW	Ecology - Drinking Water	C558	06/30/2019



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Notes and Definitions

- * Flagged value is not within established control limits.
- P1 The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- 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.